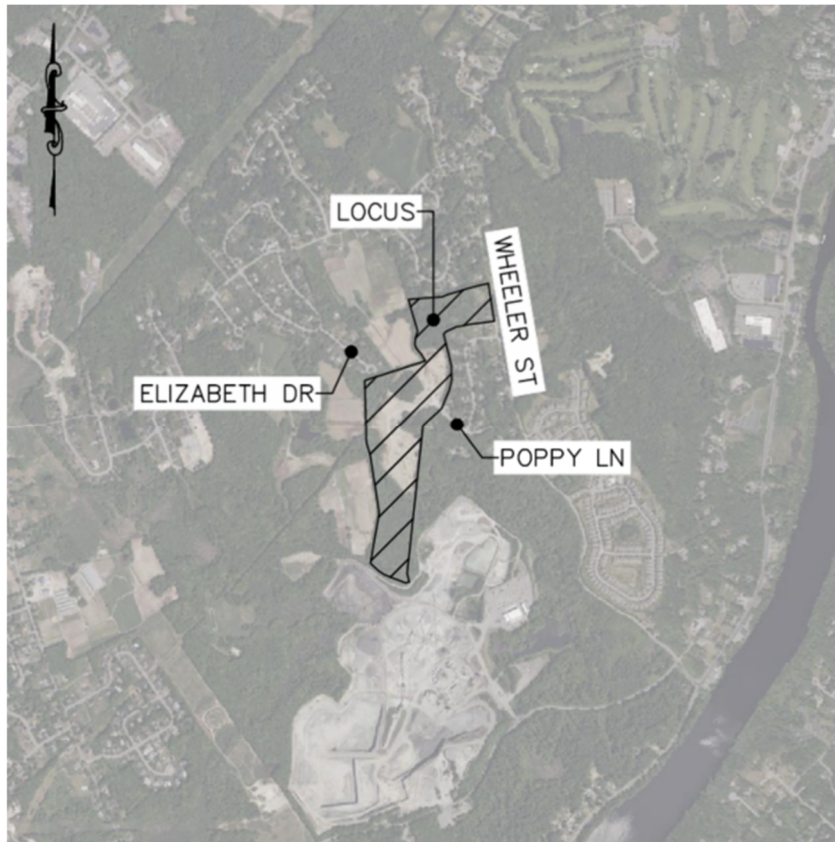


DRAINAGE REPORT

**Murphy's Farm
Dracut, MA 01826
Map 22 / Lot 53 &
Map 39 / Block 53 / Lots 1-23**



344 North Main Street | Andover • MA 01810
(978) 416-0920 | www.civildci.com



APPLICANT:

**The Homes at Murphy's Farm, LLC
18 Cassimere Street
Andover, MA 01810**

SUBMITTED TO:

**Town of Dracut
11 Spring Park Ave.
Dracut, MA 01826**

ISSUED:

April 22, 2024

REVISED:

December 30, 2024

CDCI FILE #: 23-10524

DRAINAGE REPORT

Drainage Narrative

TAB 1

Figures

TAB 2

Figure 1 – Orthophoto
Figure 2 – USGS Map
Figure 3 – FEMA Flood Map
Figure 4 – NRCS Soils Map
Figure 5 – NHESP Map

Existing Conditions

TAB 3

2-Yr Storm Event
10-Yr Storm Event Summary
25-Yr Storm Event Summary
50-Yr Storm Event Summary
100-Yr Storm Event Summary

Proposed Conditions

TAB 4

2-Yr Storm Event
10-Yr Storm Event Summary
25-Yr Storm Event Summary
50-Yr Storm Event Summary
100-Yr Storm Event Summary

Supplemental Information

TAB 5

Checklist for Stormwater Report
Stormwater Calculations
Groundwater Mounding Calculations
Operations and Maintenance Program
Test Pit Soil Logs
Existing Watershed Plan
Proposed Watershed Plan

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

TAB 1

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

PROJECT DESCRIPTION

The applicant proposes to develop Murphy's Farm (Map 22, Lot 53 & Map 39, Block 53, Lots 1-24) in Dracut, MA into a 40B development consisting of 63 Multi-Family Dwellings containing a total of 268 units, as well as two accessory buildings. The project consists of constructing $\pm 4,400$ -FT of new roadway along with associated infrastructure including driveways, landscaping, snow storage, parks, drainage facilities, and utilities. The project plans illustrate the proposal in detail including zoning, easements, construction details, roadway profile and provisions for utilities. Drainage will be collected and routed through a series of best management practices sized to address the MADEP Stormwater Management Standards as well as the local stormwater regulations.

SITE DESCRIPTION

The total area of the project site is approximately 33.30-AC and is located within the Residential-1 (R-1) zoning district. The site is located on the easterly side of Dracut, between Poppy Lane and Elizabeth Drive. A portion of the property has frontage on Wheeler Street in Methuen, MA. On-site resource areas include bordering vegetated wetlands (BVW), and vernal pools, both with associated setbacks. Elevations vary, ranging from approximately 114-FT along the frontage of Wheeler Street to a high of approximately 178-FT near Elizabeth Drive, at the boundary shared with 489 Wheeler Road. The resource areas were delineated by Norse Environmental Services in August 2015, and an ORAD was issued on January 26, 2016.

According to the Natural Resource Conservation Service Soil Survey for Essex County, Massachusetts, the on-site soils beyond the limit of the wetlands consist of the following soil types:

- Wareham Loamy Fine Sand Hydraulic Soil Group (HSG) A/D
- Swansea Muck, HSG B/D
- Freetown Muck, HSG B/D
- Hinkley Loamy San, HSG A
- Merrimac Fine Sandy Loam, HSG A
- Windsor Loamy Sand, HSG A
- Deerfield Loamy Fine Sand, HSG A
- Canton Fine Sandy Loam, HSG B
- Pits, gravel, Unranked
- Pits, quarry, Unranked
- Udorthents, Unranked

For the purposes of drainage calculations, portions of the Swansea Muck, Freetown Muck, Pits, and Udorthents map units were considered to be an HSG-A soil due to surrounding mapped soils, wetland delineation, and test pit results. Test pits were conducted by this office in December of 2023, April of 2024, and December of 2024 to determine soil texture and estimated seasonal high groundwater elevations. Test pit logs are provided under Tab 5 of this report. Finally, according to the Flood Insurance Rate Map for Essex County, Massachusetts Maps 25017C0163E and 25017C0161E, no part of this site is located within the 100-year base flood elevation.

SURFACE DRAINAGE

Pre-Development Condition

The project site has been disturbed and currently consists largely of bare sandy soil, however for drainage design purposes the existing cover types are assumed to be 'Woods' to mimic historic pre-development conditions. The pre-development condition consists of eight (8) watershed areas contributing to seven (7) design points. Design Point #1 (DP-1) receives runoff from EWA-1 and consists of overland flow through the northern wetland complex and into a culvert running across Wheeler Street. Design Point #3 (DP-3)

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

receives runoff from EWA-3 and consists of overland flow directed off-site, towards #48 Rinzee Road. Design Point #4 (DP-4) receives runoff from EWA-4 and consists of overland flow directed towards Poppy Lane. Design Point #5 (DP-5) receives runoff from EWA-5A and EWA-5B and consists of overland flow directed towards the Wetland Series 'A'. Runoff from EWA-5A first ponds in Wetland Series 'J' prior to flowing through a culvert that discharges to Wetland Series 'A'. This culvert was installed after the issuance of an Order of Conditions associated with DEP#145-1050 and is not considered for the sake of pre-development drainage calculations. Design Point #6 (DP-6) receives runoff from EWA-6 and consists of overland flow directed towards Wetland Series 'B' and 'C'. Design Point #7 (DP-7) receives runoff from EWA-7 and consists of overland flow directed towards #4 Poppy Lane. Design Point #8 (DP-8) receives runoff from EWA-8 and consists of overland flow directed towards series 'D' and 'E' wetland complex. Contributing areas to the Design Points are detailed in the following Table 1.

TABLE 1: EXISTING WATERSHED DESIGN POINT DETAILS

DESIGN POINT	AREA NAME	AREA (Acres)	Tc (min.)	CN
DP-1	EWA-1	5.11	13.7	37
DP-3	EWA-3	2.74	10.2	30
DP-4	EWA-4	2.77	28.1	30
DP-5	EWA-5A	1.14	14.9	30
	EWA-5B	10.52	19.5	33
DP-6	EWA-6	2.34	16.2	30
DP-7	EWA-7	3.96	14.3	30
DP-8	EWA-8	6.76	24.8	30

Post-Development Condition

The proposed project includes the construction of 63 Multi-Family Dwellings containing a total of 268 units, as well as three accessory buildings. Other components include construction of a new $\pm 4,400$ -FT roadway along with landscaping, snow storage, parks, drainage, utilities, and associated appurtenances. Drainage will be collected and routed through a series of best management practices sized to address the MADEP Stormwater Management Standards. Impervious area will include bituminous concrete pavement and rooftop areas, and totals 11.57-AC.

The post-development condition consists of sixteen (16) watershed areas discharging to seven (7) design points. DP-1 receives overland flow from PWA-1. DP-3 receives overland flow from PWA-3. DP-4 receives overland flow from PWA-4A while PWA-4B discharges to subsurface system 2 prior to discharging to DP-4. DP-5 receives overland flow from PWA-5A as well as discharge from two subsurface systems (PWA-5G, PWA-5F, PWA-5H) and one infiltration basin (PWA-5B and PWA-5C). Runoff from PWA-5D and PWA-5E are first routed through wetland series 'J', which acts as a pond before discharging to wetland series 'A' through an existing culvert. The existing culvert will be upgraded to an 18" RCP in accordance with MassDOT design guidelines. DP-6 receives overland flow from PWA-6. DP-7 receives overland flow from PWA-7. DP-8 receives overland flow from PWA-8A as well as discharge from one subsurface system (PWA-8B).

The design points are summarized in Table 2 below.

TABLE 2: PROPOSED WATERSHED DESIGN POINT DETAILS

DESIGN POINT	AREA NAME	AREA (Acres)	Tc (min.)	CN
DP-1	PWA-1	4.46	13.7	37
DP-3	PWA-3	0.28	6.6	34
DP-4	PWA-4A	0.32	6.0	37

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

	PWA-4B	3.77	22.8	64
DP-5	PWA-5A	0.59	6.0	34
	PWA-5B	3.16	8.7	72
	PWA-5C	4.85	6.0	72
	PWA-5D	2.26	13.1	36
	PWA-5E	1.78	9.6	37
	PWA-5F	2.67	6.0	84
	PWA-5G	0.48	6.0	67
	PWA-5H	1.82	9.4	34
DP-6	PWA-6	1.17	9.6	33
DP-7	PWA-7	0.98	11.2	35
DP-8	PWA-8A	1.29	8.5	33
	PWA-8B	5.46	6.0	75

Peak Discharge Comparison

As illustrated in the following tables, the impact of the proposed improvements has been mitigated through the use of best management practices including porous pavement, infiltration basins, detention basins, and infiltration trenches for up to and including the 100-year, 24-hour storm event.

Design Point #1

	2-YR	10-YR	25-YR	100-YR
	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development	0.0	0.1	0.5	2.2
Post-Development	0.0	0.1	0.4	1.9

Design Point #3

	2-YR	10-YR	25-YR	100-YR
	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development	0.0	0.0	0.0	0.2
Post-Development	0.0	0.0	0.0	0.1

Design Point #4

	2-YR	10-YR	25-YR	100-YR
	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development	0.0	0.0	0.0	0.2
Post-Development	0.0	0.0	0.0	0.2

Design Point #5

	2-YR	10-YR	25-YR	100-YR
	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development	0.0	0.0	0.3	2.0
Post-Development	0.0	0.0	0.3	0.7

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

Design Point #6

	2-YR	10-YR	25-YR	100-YR
	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development	0.0	0.0	0.0	0.2
Post-Development	0.0	0.0	0.0	0.2

Design Point #7

	2-YR	10-YR	25-YR	100-YR
	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development	0.0	0.0	0.0	0.3
Post-Development	0.0	0.0	0.0	0.3

Design Point #8

	2-YR	10-YR	25-YR	100-YR
	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development	0.0	0.0	0.1	0.4
Post-Development	0.0	0.0	0.1	0.4

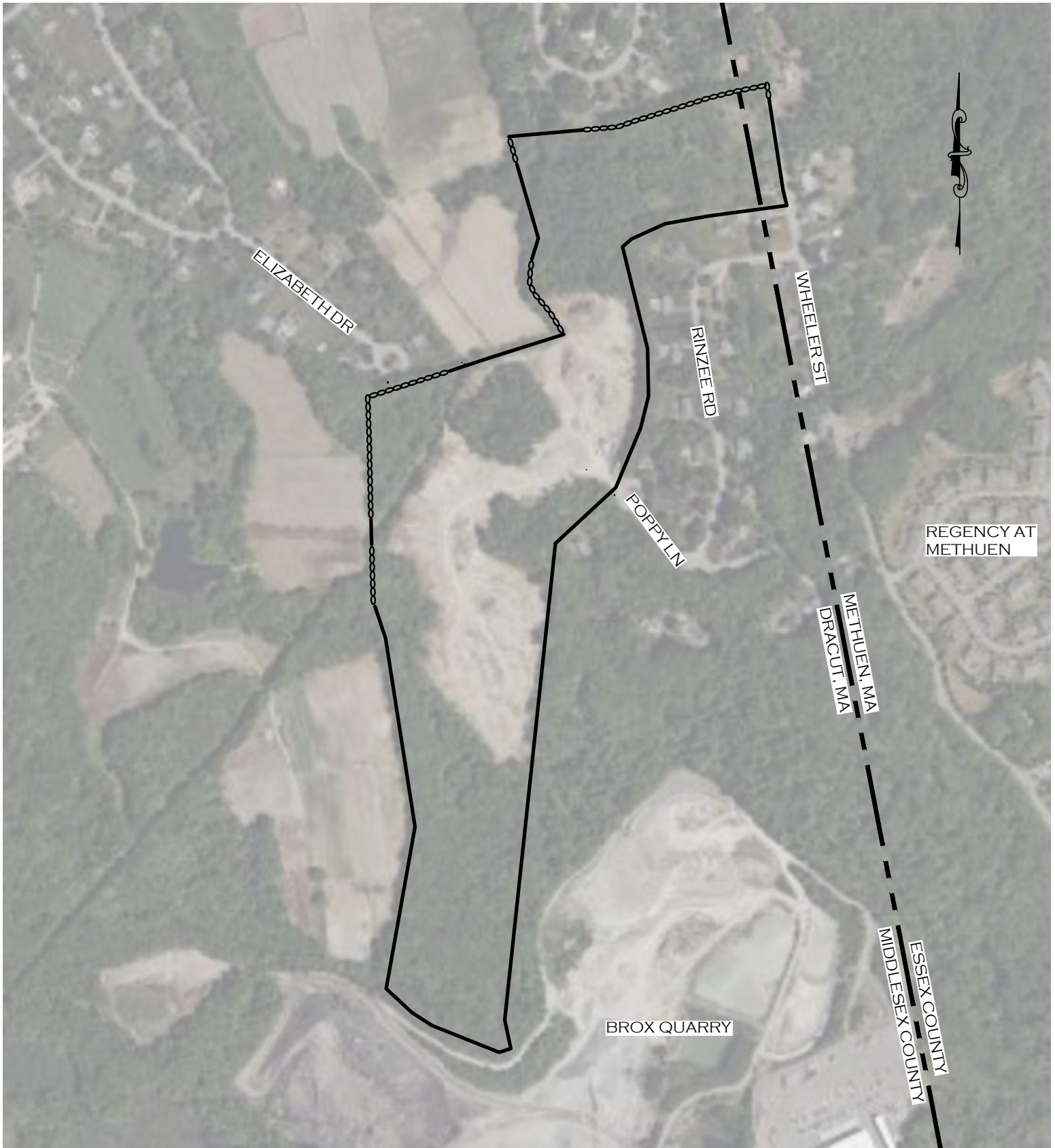
METHODOLOGY

Drainage calculations were performed using the computer program HydroCAD by HydroCAD Software Solutions, LLC based upon Technical Release 20 (TR-20), developed by the NRCS. Drainage calculations were prepared for the 2-YR, 10-YR, 25-YR, and 100-YR Type III 24-hour storm events. Rainfall data corresponds with NOAA Atlas 14. Curve numbers were generated using the information provided in TR-55 and the SCS Soils Survey.

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

TAB 2



344 North Main Street | Andover • MA 01810
(978) 416-0920 | www.civildci.com

PROJECT:
**THE HOMES AT MURPHY'S
FARM LLC**

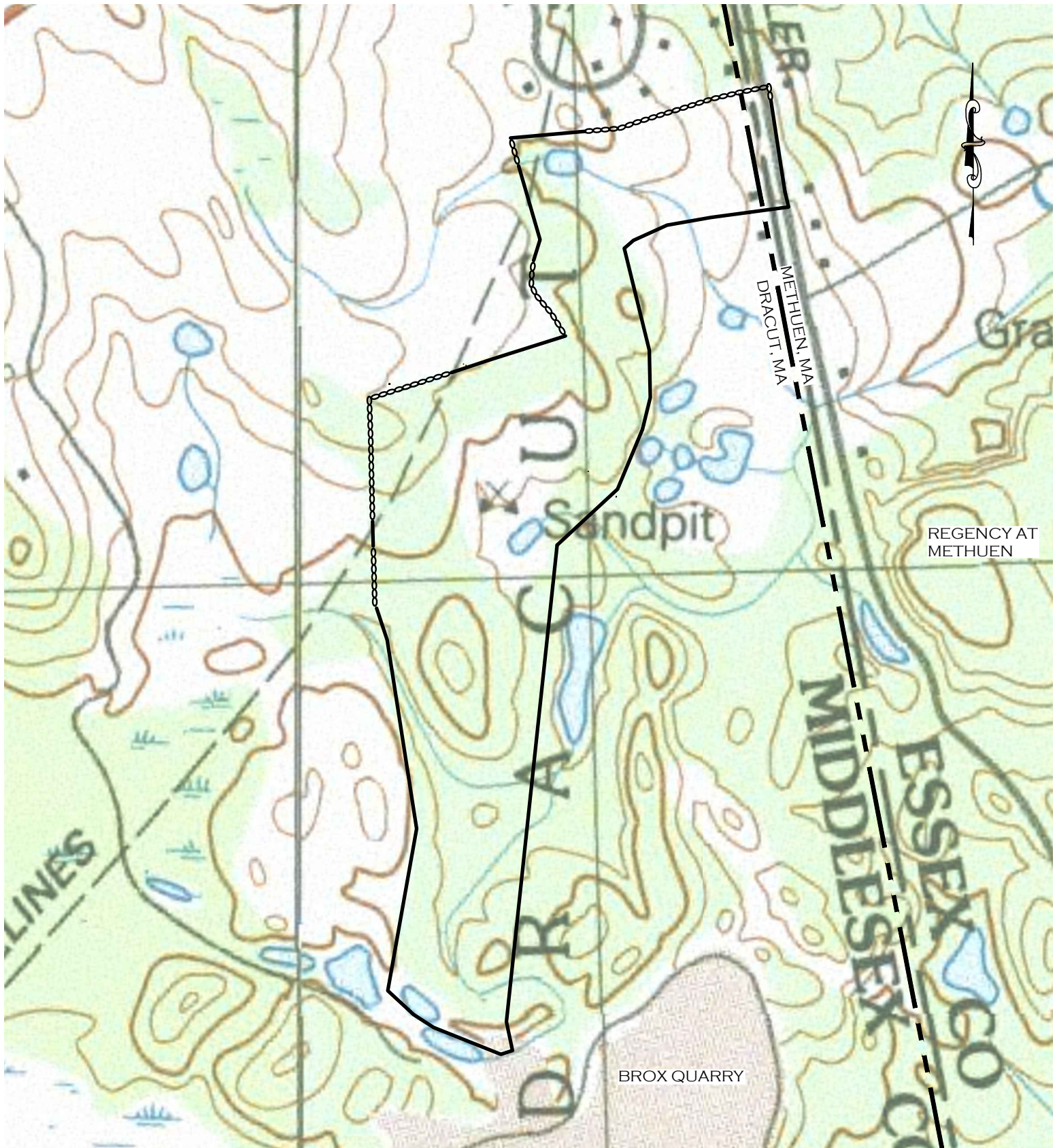
18 CASSIMERE STREET
ANDOVER, MA 01810

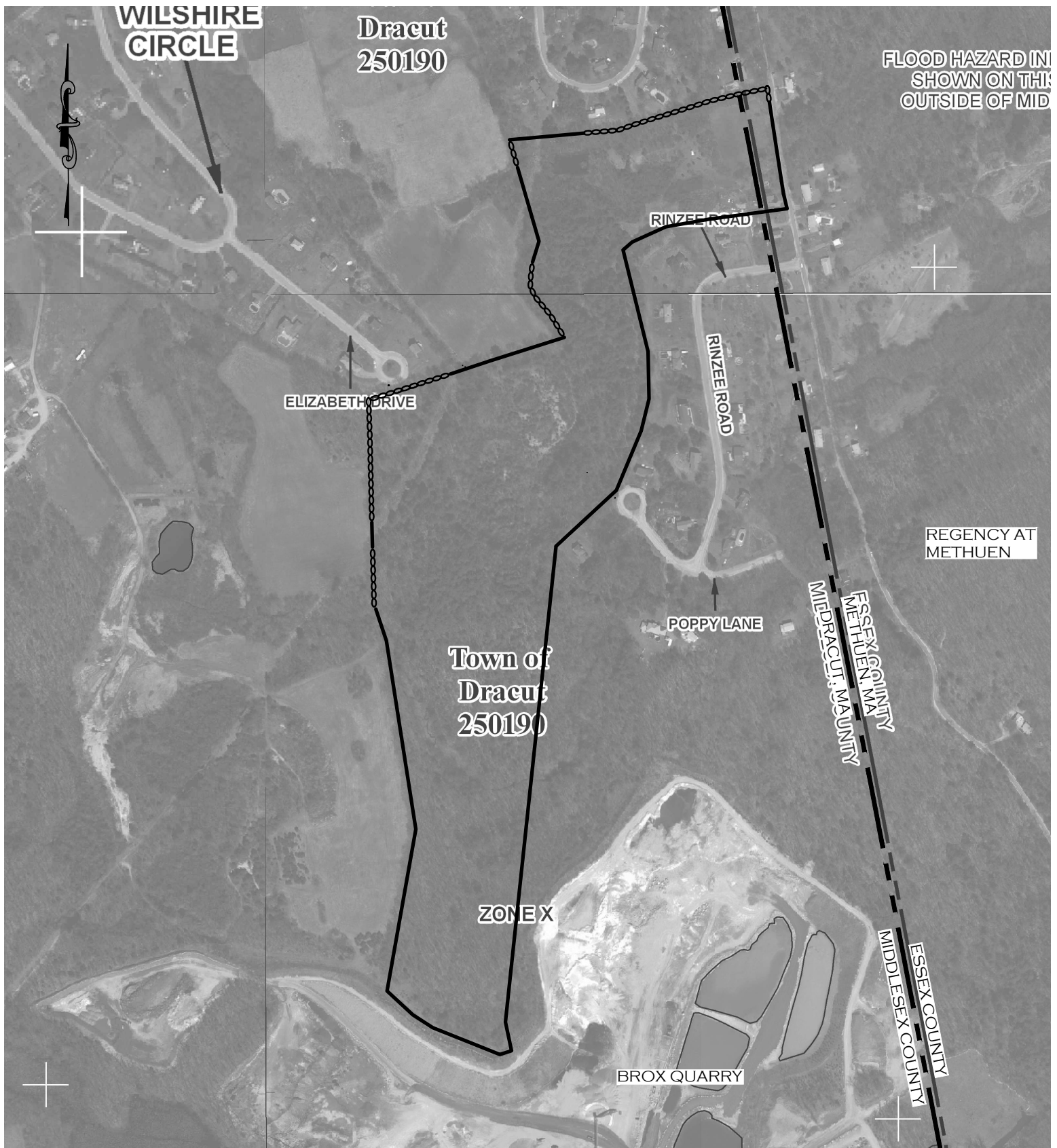
PREPARED FOR:
MURPHY'S FARM

DRACUT, MA 01826

FIGURE 1:
ORTHO

PREPARED BY: TJS
SCALE: 1"=500'
CDCI FILE #: 23-10524
DATE: MARCH 29, 2024





344 North Main Street | Andover • MA 01810
(978) 416-0920 | www.civildci.com

PROJECT:
THE HOMES AT MURPHY'S FARM LLC

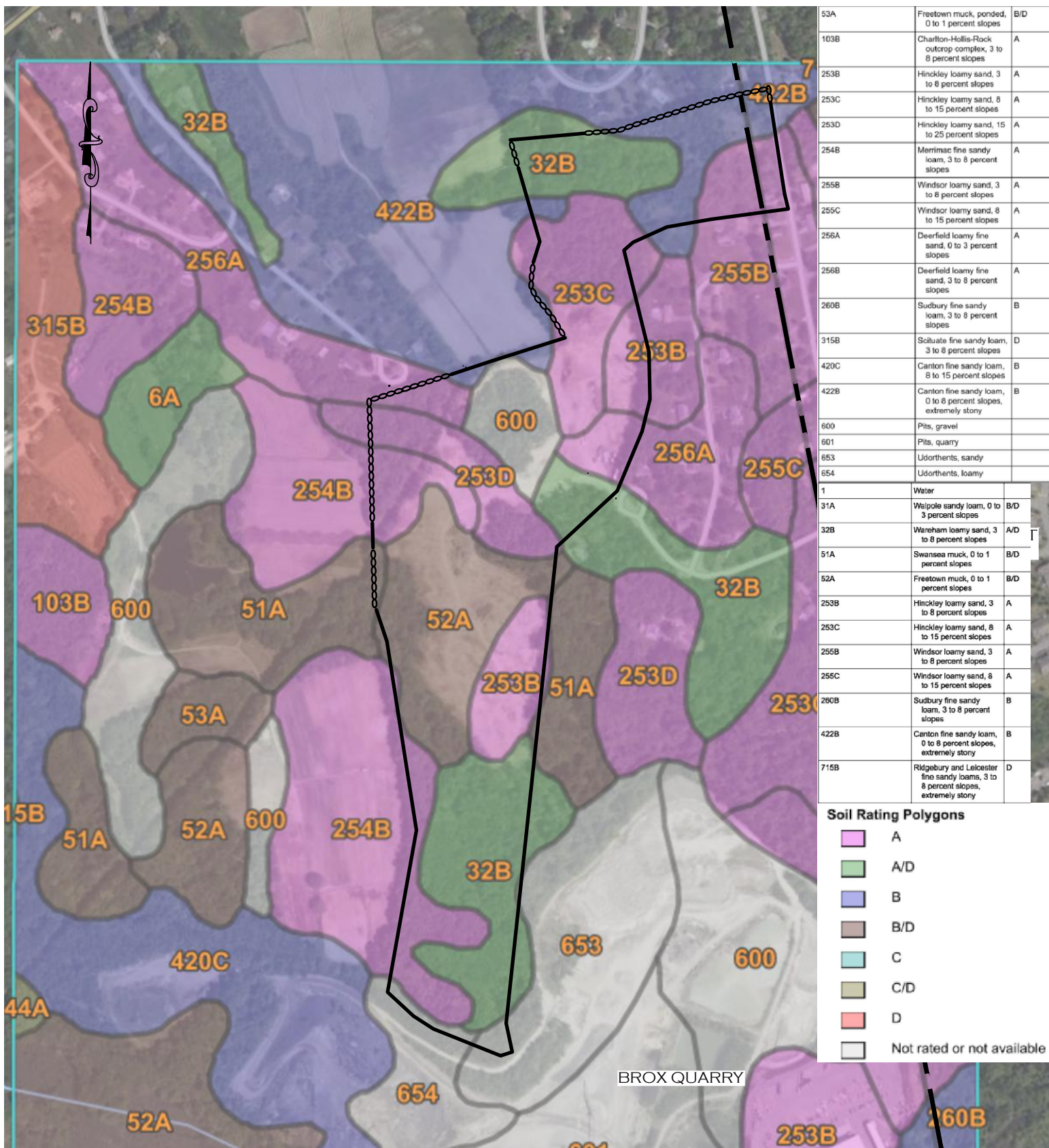
**18 CASSIMERE STREET
ANDOVER, MA 01810**

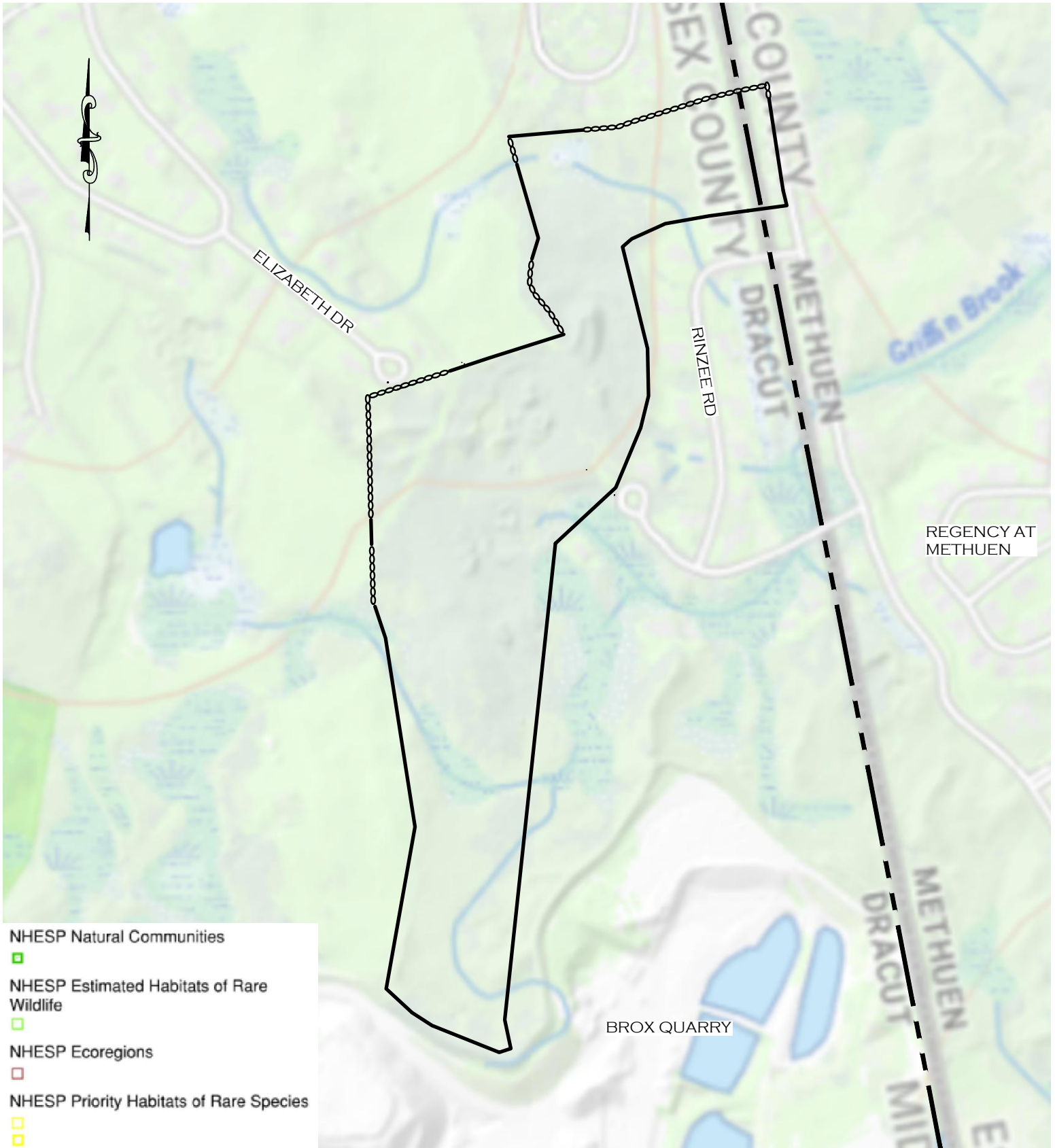
PREPARED FOR:
MURPHY'S FARM

DRACUT, MA 01826

FIGURE 3:
FEMA

PREPARED BY: TJS
SCALE: 1"=500'
CDCI FILE #: 23-10524
DATE: MARCH 29, 2024





NHESP Natural Communities



NHESP Estimated Habitats of Rare Wildlife



NHESP Ecoregions



NHESP Priority Habitats of Rare Species



344 North Main Street | Andover • MA 01810
(978) 416-0920 | www.civildci.com

PROJECT:
THE HOMES AT MURPHY'S FARM LLC

**18 CASSIMERE STREET
ANDOVER, MA 01810**

PREPARED FOR:
MURPHY'S FARM

DRACUT, MA 01826

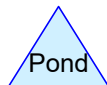
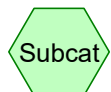
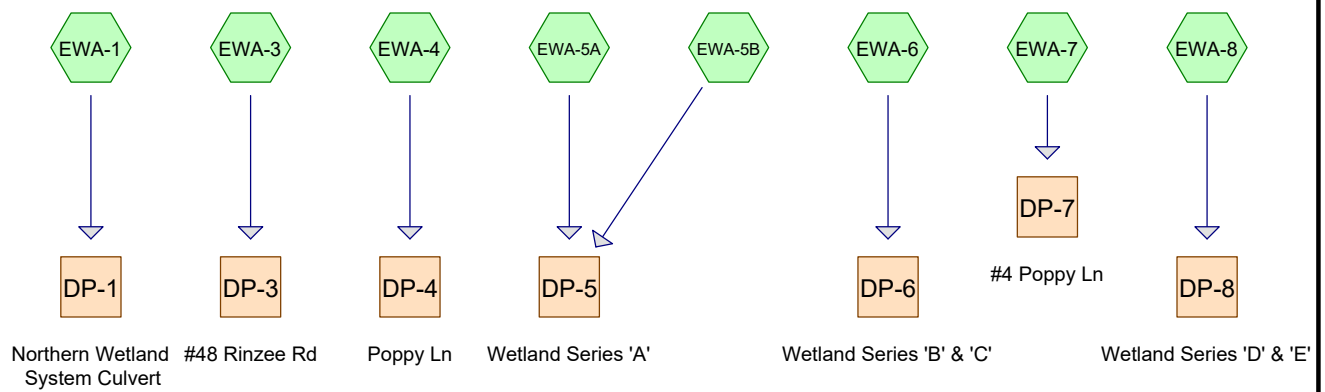
FIGURE 5:
NHESP

PREPARED BY: TJS
SCALE: 1"=500'
CDCI FILE #: 23-10524
DATE: MARCH 29, 2024

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

TAB 3



Routing Diagram for 23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc, Printed 12/24/2024
HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 2

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	3.12	2
2	10-Yr	Type III 24-hr		Default	24.00	1	4.90	2
3	25-Yr	Type III 24-hr		Default	24.00	1	6.02	2
4	100-Yr	Type III 24-hr		Default	24.00	1	7.73	2

23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 3

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.50	39	>75% Grass cover, Good, HSG A (EWA-1, EWA-5B)
0.50	61	>75% Grass cover, Good, HSG B (EWA-1, EWA-5B)
32.07	30	Woods, Good, HSG A (EWA-1, EWA-3, EWA-4, EWA-5A, EWA-5B, EWA-6, EWA-7, EWA-8)
1.27	55	Woods, Good, HSG B (EWA-1, EWA-5B)
35.34	32	TOTAL AREA

Summary for Subcatchment EWA-1:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-1 : Northern Wetland System Culvert

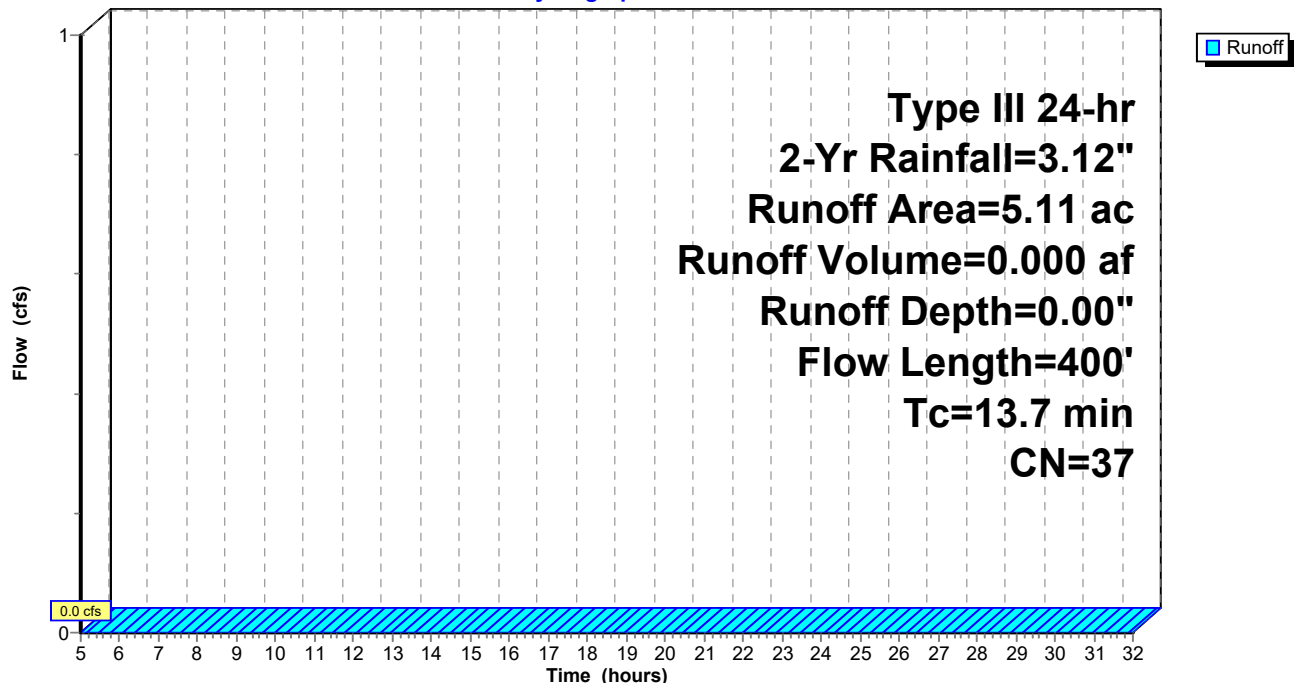
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.34	61	>75% Grass cover, Good, HSG B
0.52	39	>75% Grass cover, Good, HSG A
3.49	30	Woods, Good, HSG A
0.76	55	Woods, Good, HSG B
5.11	37	Weighted Average
5.11		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	350	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.7	400	Total			

Subcatchment EWA-1:

Hydrograph



Summary for Subcatchment EWA-3:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-3 : #48 Rinzee Rd

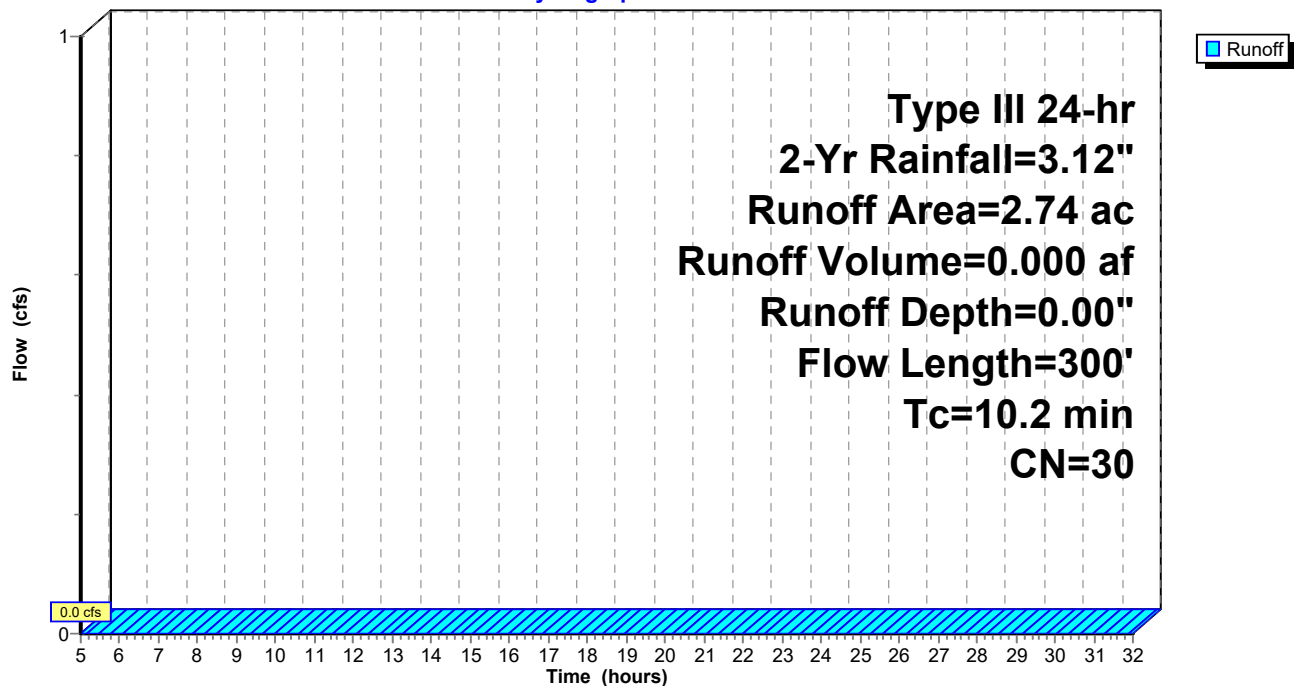
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
2.74	30	Woods, Good, HSG A
2.74		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.9	250	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.2	300	Total			

Subcatchment EWA-3:

Hydrograph



Summary for Subcatchment EWA-4:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-4 : Poppy Ln

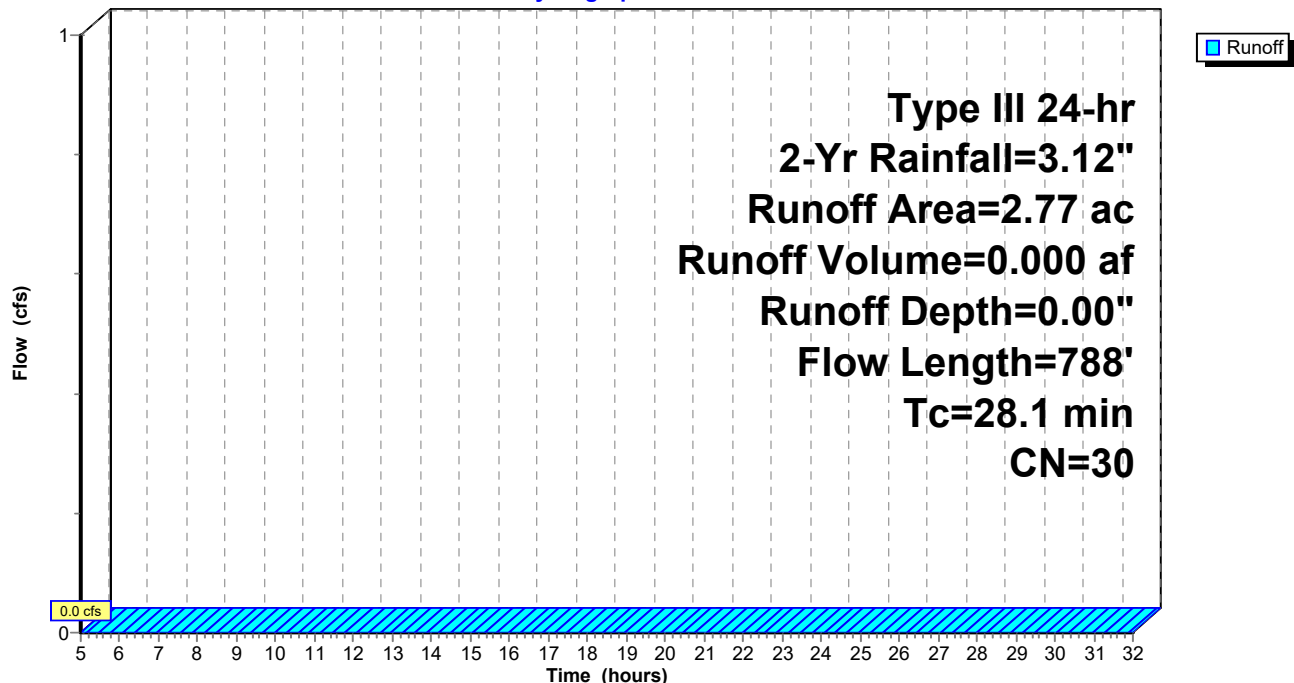
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
2.77	30	Woods, Good, HSG A
2.77		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	250	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.8	276	0.0072	0.42		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	212	0.0190	0.69		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.1	788	Total			

Subcatchment EWA-4:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 7

Summary for Subcatchment EWA-5A:

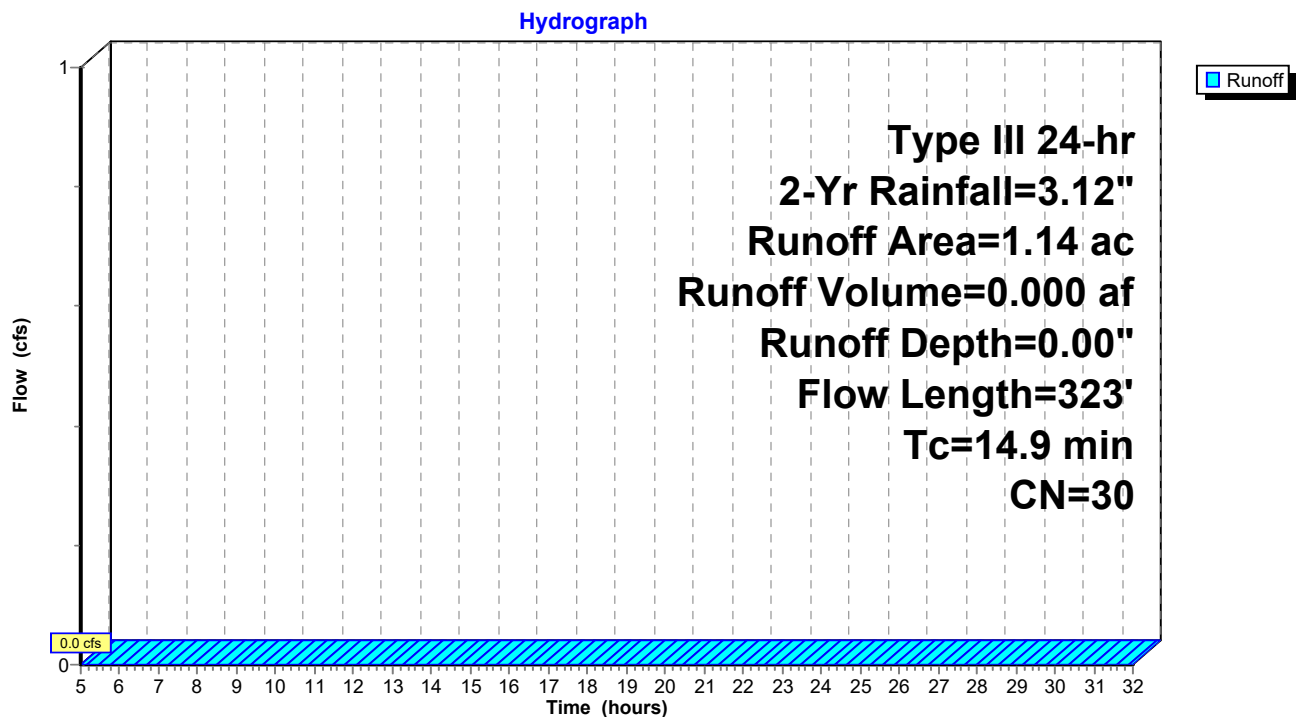
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-5 : Wetland Series 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
1.14	30	Woods, Good, HSG A
1.14		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0330	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.4	146	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	127	0.0620	1.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	323	Total			

Subcatchment EWA-5A:

Summary for Subcatchment EWA-5B:

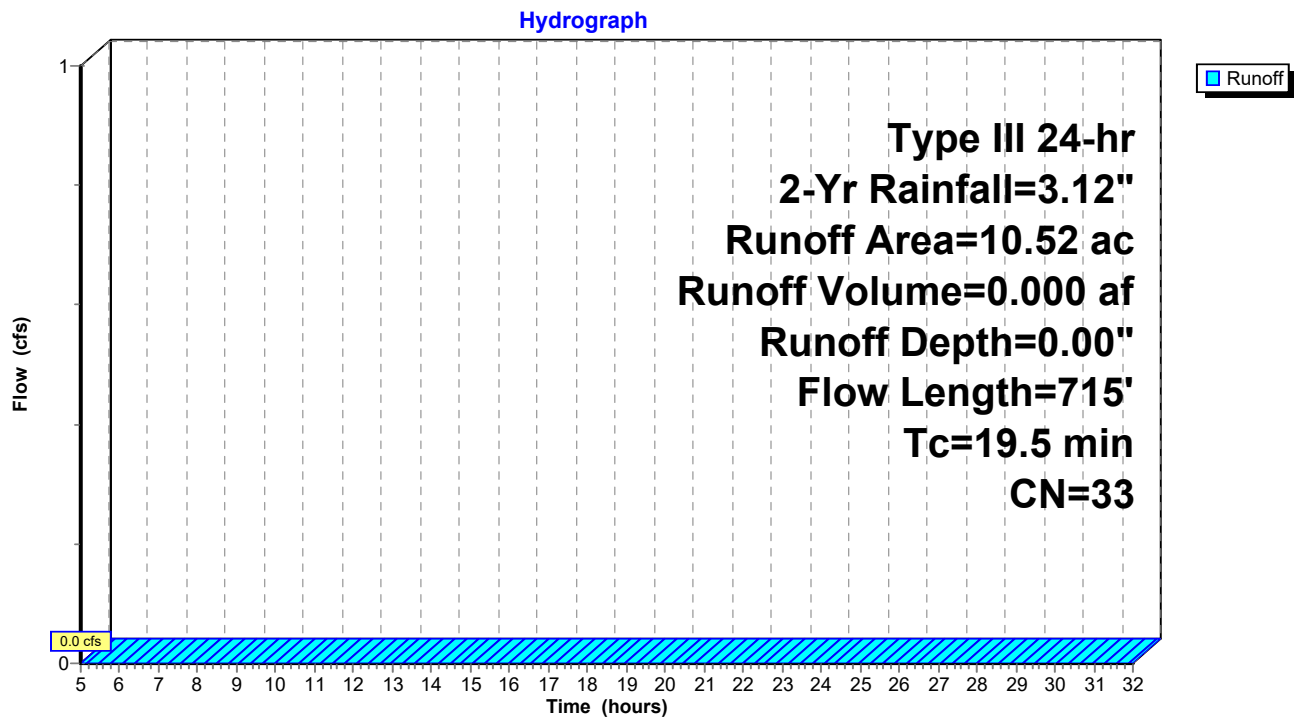
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-5 : Wetland Series 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
8.87	30	Woods, Good, HSG A
0.51	55	Woods, Good, HSG B
0.98	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
10.52	33	Weighted Average
10.52		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.2	251	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	76	0.0520	1.14		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	168	0.0120	0.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	170	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
19.5	715	Total			

Subcatchment EWA-5B:

23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 10

Summary for Subcatchment EWA-6:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

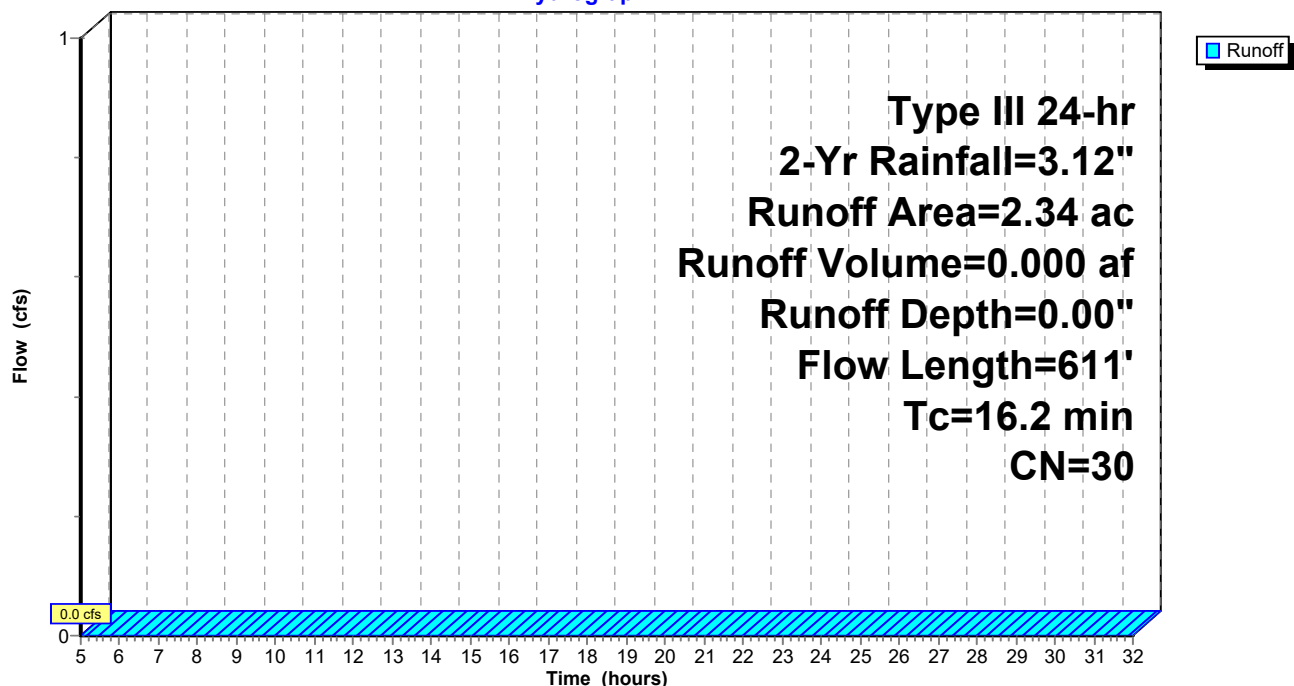
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
2.34	30	Woods, Good, HSG A
2.34		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.8	282	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.8	204	0.0590	1.21		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	75	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.2	611	Total			

Subcatchment EWA-6:

Hydrograph



Summary for Subcatchment EWA-7:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-7 : #4 Poppy Ln

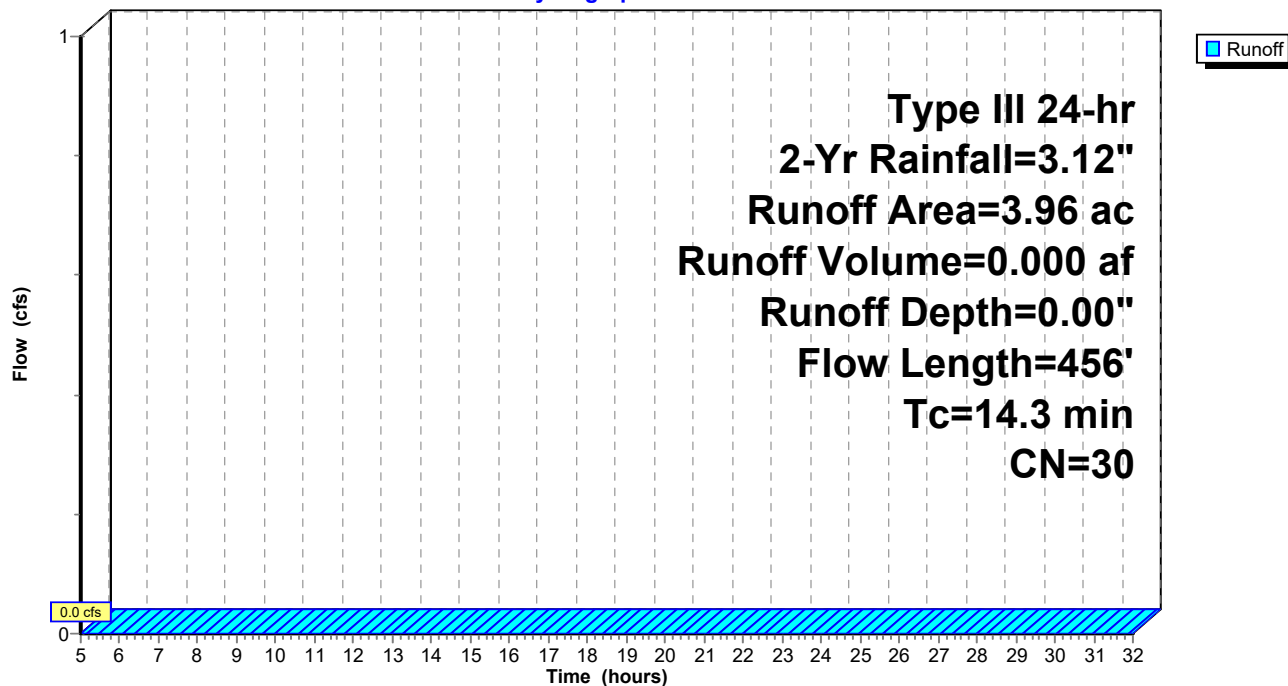
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
3.96	30	Woods, Good, HSG A
3.96		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.6	406	0.0420	1.02		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
14.3	456	Total			

Subcatchment EWA-7:

Hydrograph



Summary for Subcatchment EWA-8:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

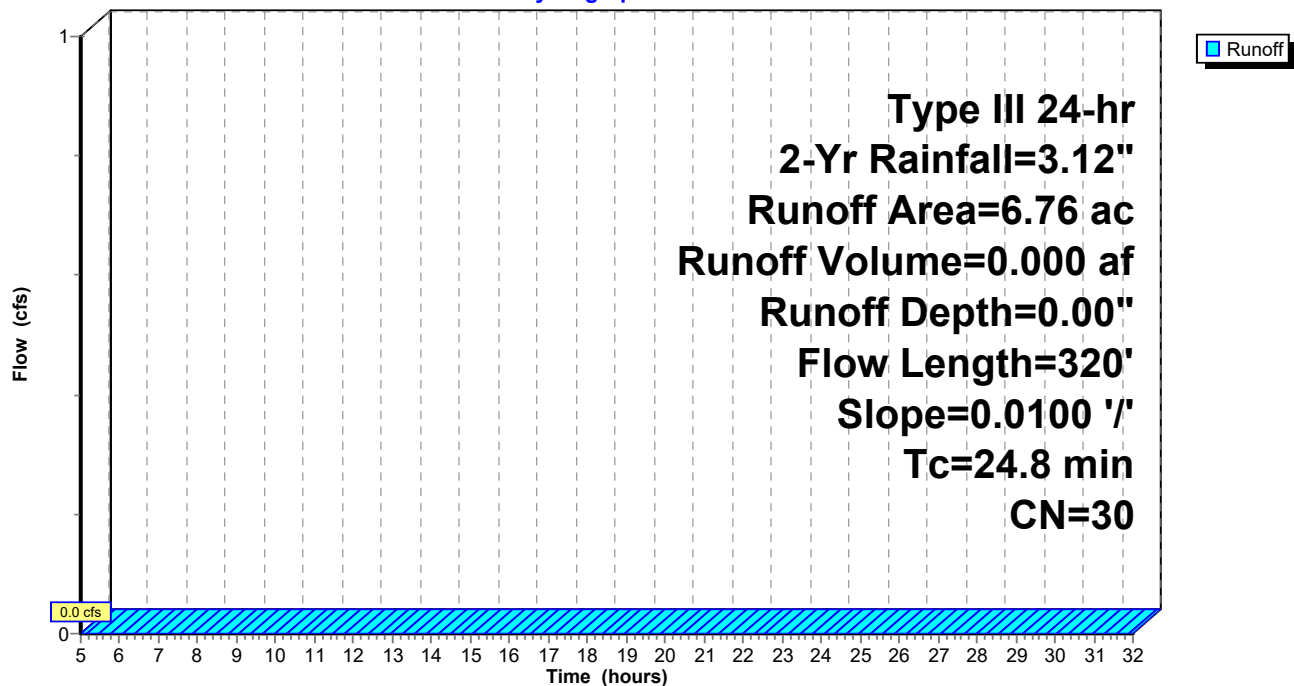
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
6.76	30	Woods, Good, HSG A
6.76		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
9.0	270	0.0100	0.50		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
24.8	320	Total			

Subcatchment EWA-8:

Hydrograph

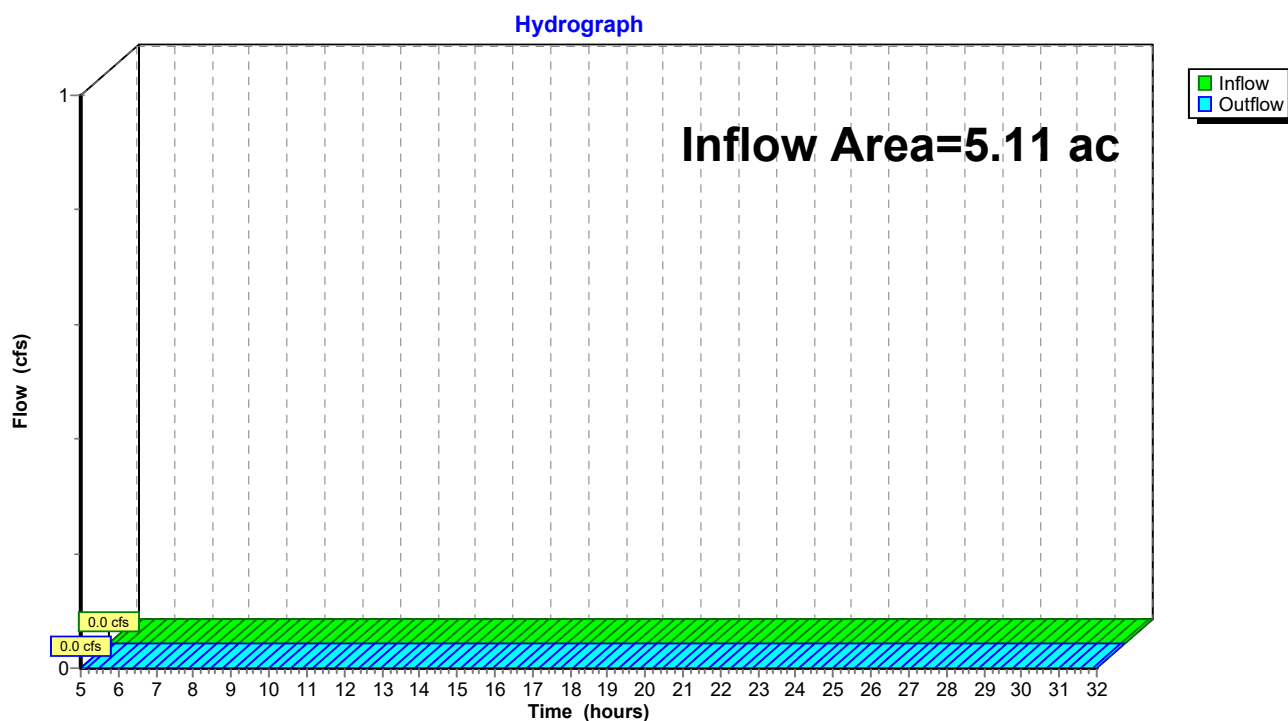


Summary for Reach DP-1: Northern Wetland System Culvert

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

Inflow Area = 5.11 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

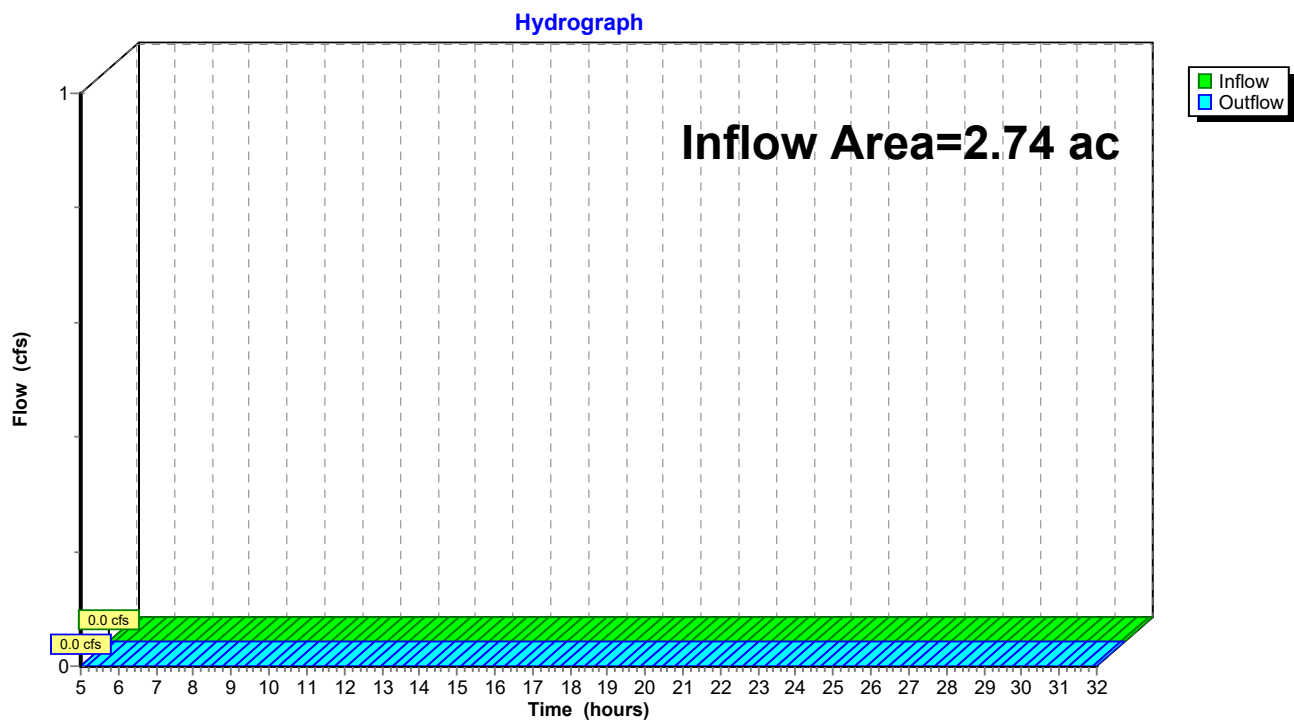
Reach DP-1: Northern Wetland System Culvert

Summary for Reach DP-3: #48 Rinzee Rd

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

Inflow Area = 2.74 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Summary for Reach DP-4: Poppy Ln

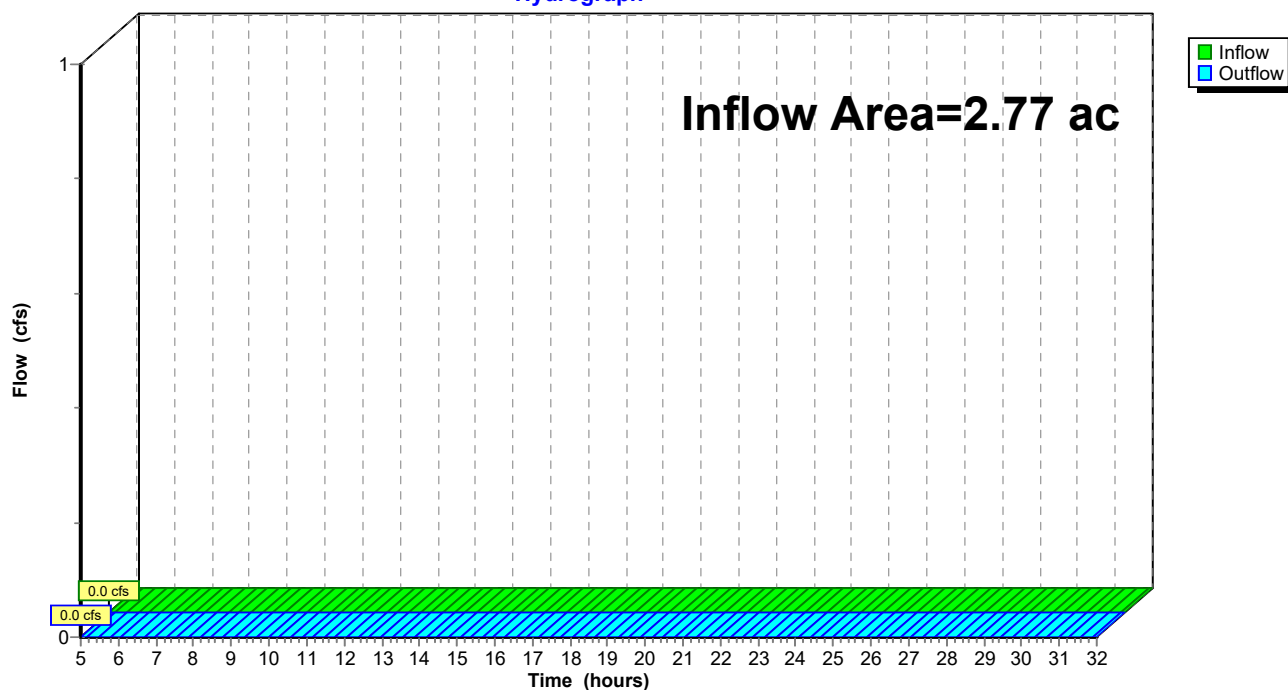
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.77 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph

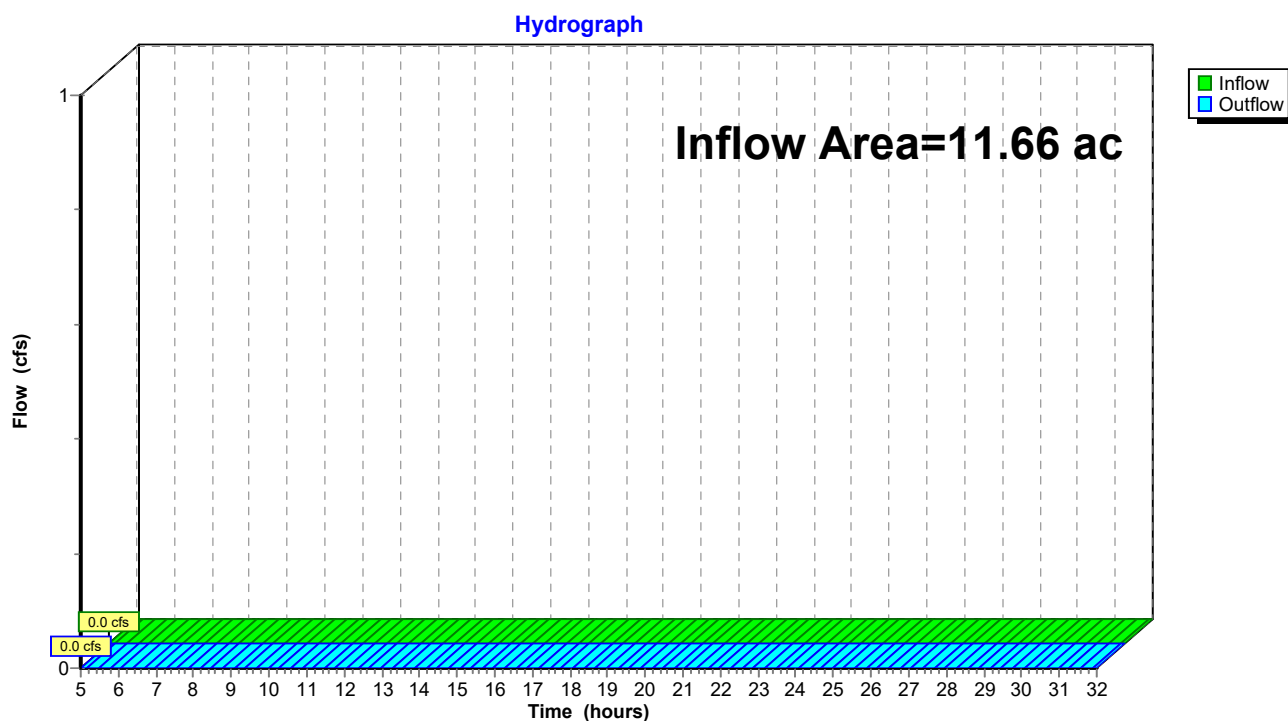


Summary for Reach DP-5: Wetland Series 'A'

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

Inflow Area = 11.66 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

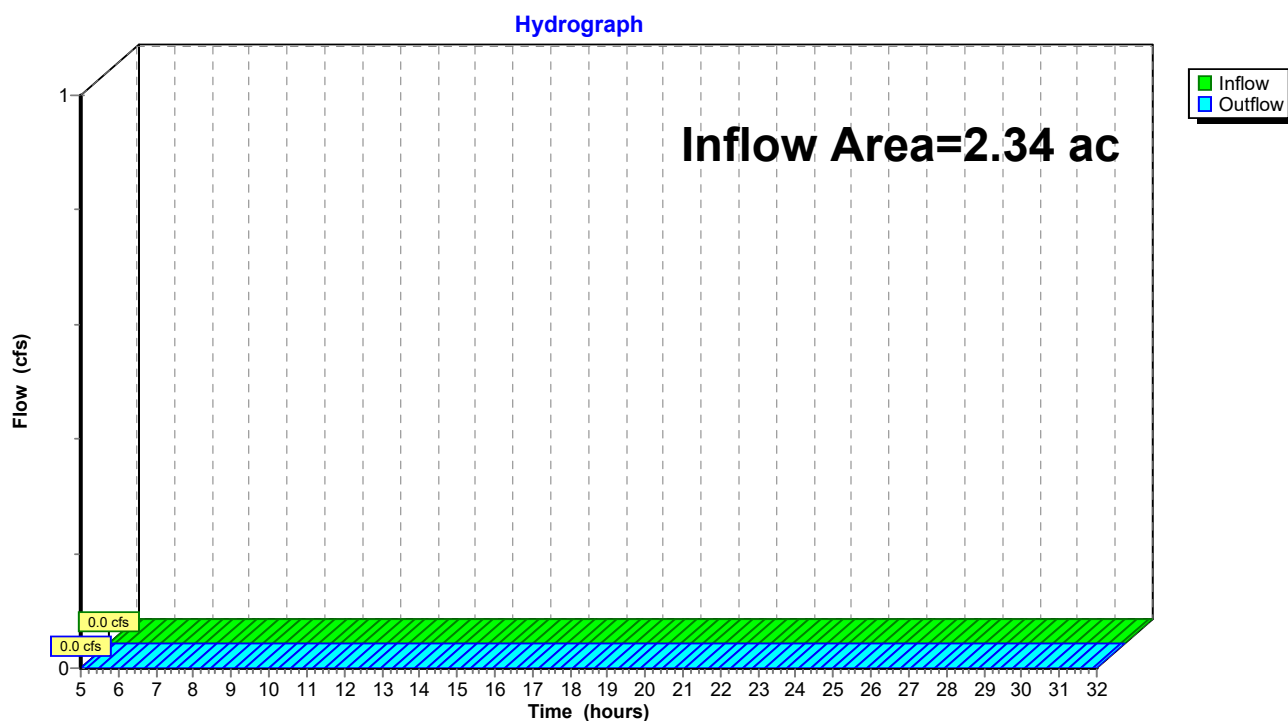
Reach DP-5: Wetland Series 'A'

Summary for Reach DP-6: Wetland Series 'B' & 'C'

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

Inflow Area = 2.34 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Summary for Reach DP-7: #4 Poppy Ln

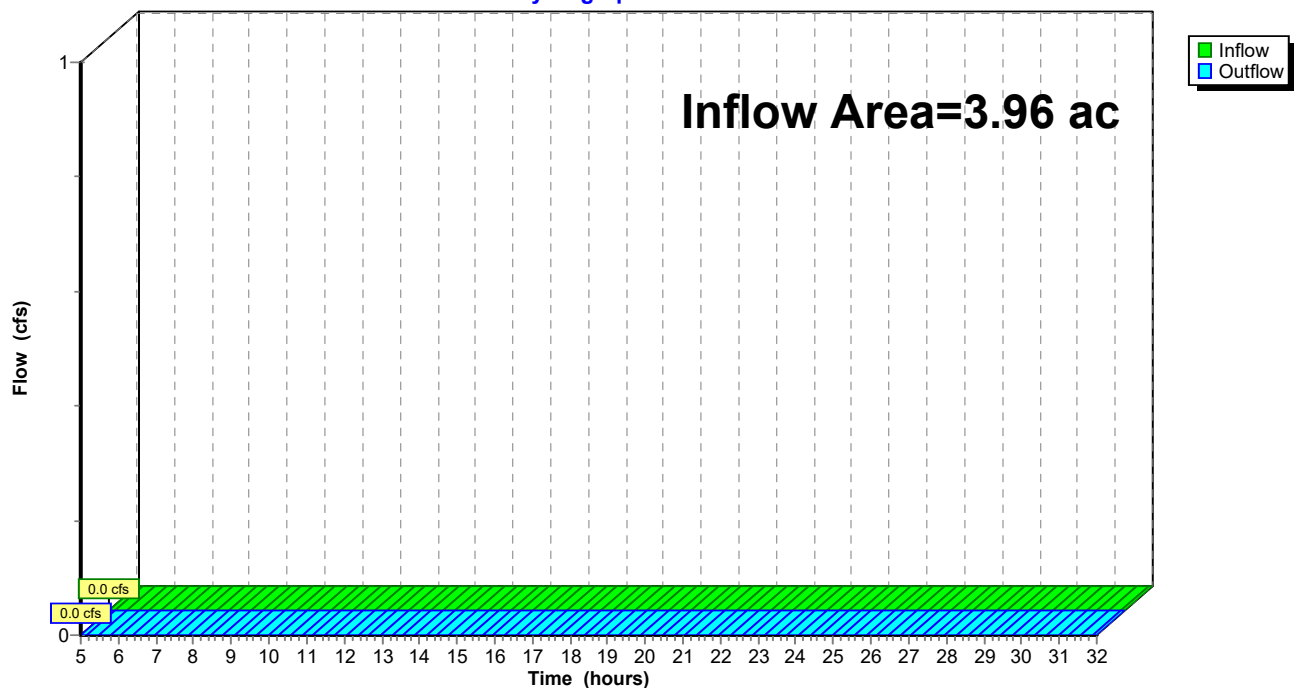
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.96 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph

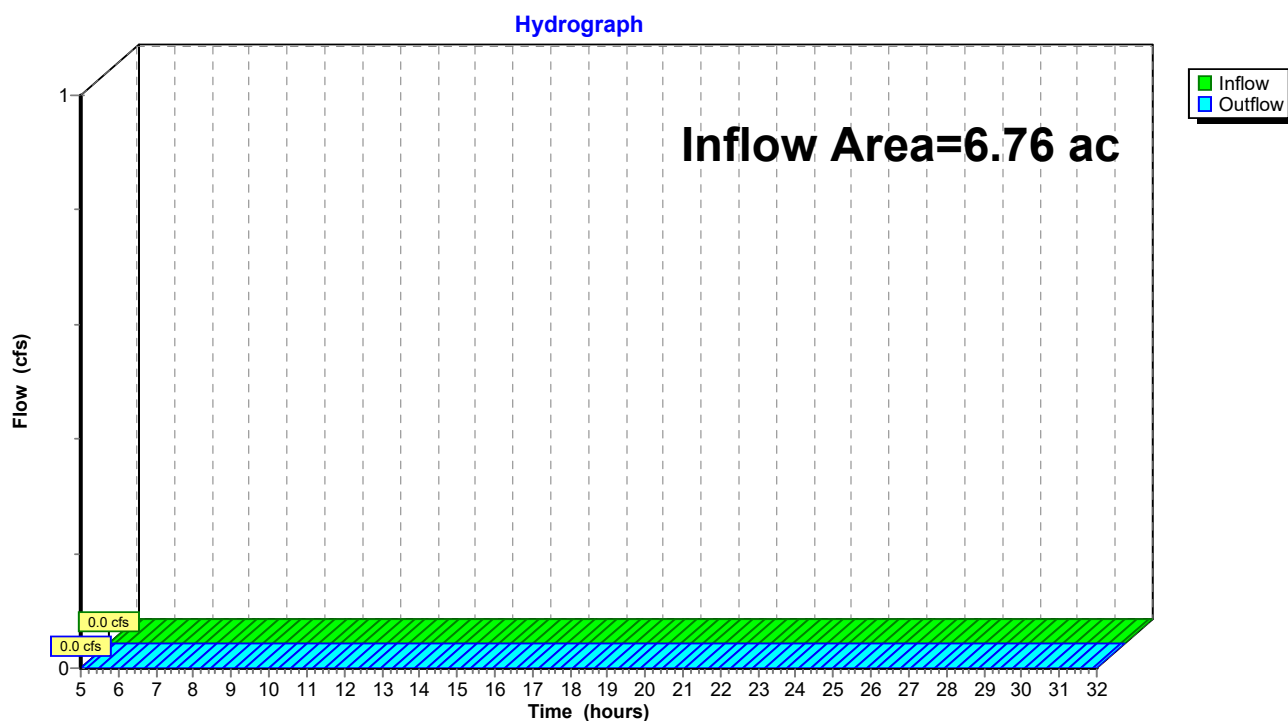


Summary for Reach DP-8: Wetland Series 'D' & 'E'

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

Inflow Area = 6.76 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

Summary for Subcatchment EWA-1:

Runoff = 0.1 cfs @ 14.82 hrs, Volume= 0.051 af, Depth= 0.12"

Routed to Reach DP-1 : Northern Wetland System Culvert

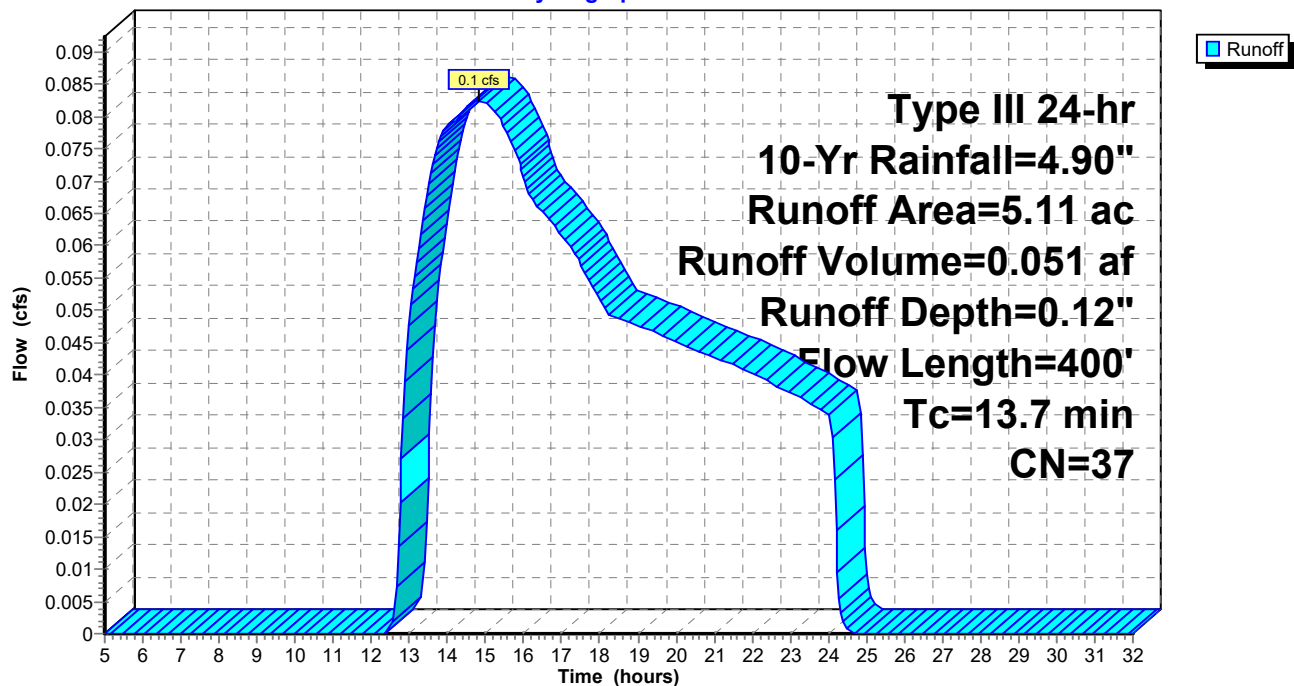
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.34	61	>75% Grass cover, Good, HSG B
0.52	39	>75% Grass cover, Good, HSG A
3.49	30	Woods, Good, HSG A
0.76	55	Woods, Good, HSG B
5.11	37	Weighted Average
5.11		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	350	0.0350	0.94		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.7	400	Total			

Subcatchment EWA-1:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 21

Summary for Subcatchment EWA-3:

Runoff = 0.0 cfs @ 24.00 hrs, Volume= 0.001 af, Depth= 0.00"
 Routed to Reach DP-3 : #48 Rinzee Rd

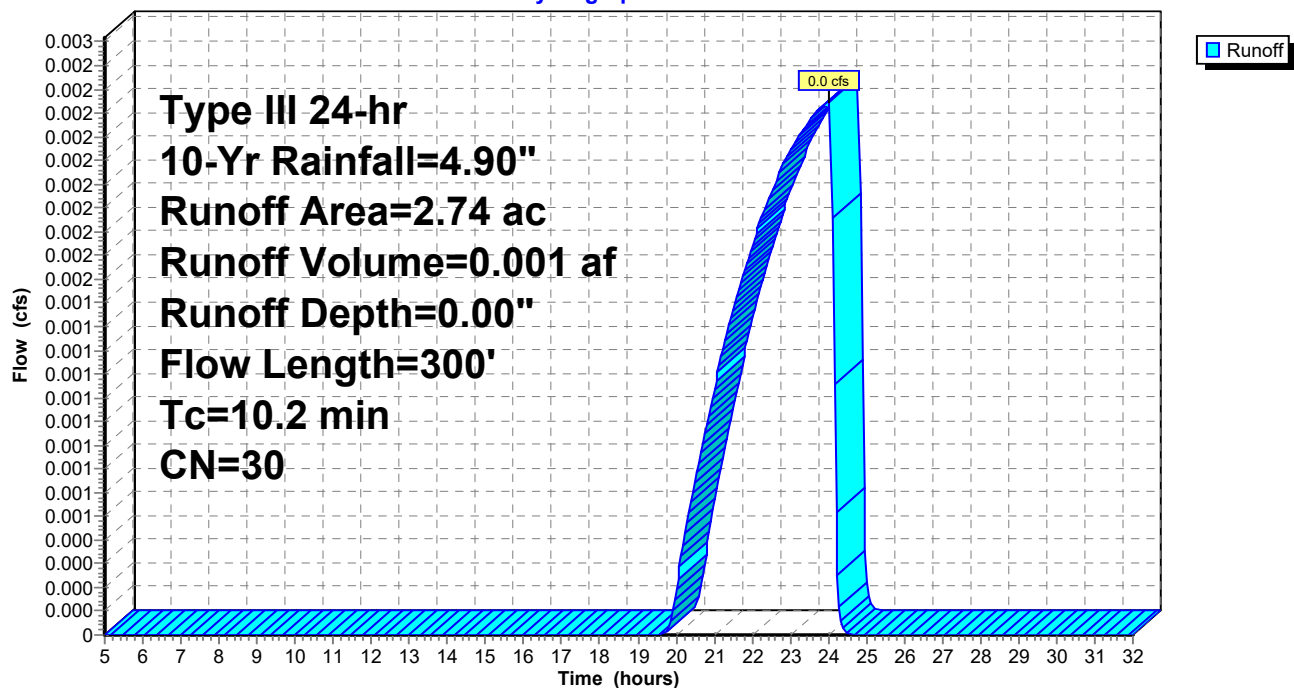
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
2.74	30	Woods, Good, HSG A
2.74		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.9	250	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.2	300	Total			

Subcatchment EWA-3:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 22

Summary for Subcatchment EWA-4:

Runoff = 0.0 cfs @ 24.04 hrs, Volume= 0.001 af, Depth= 0.00"
 Routed to Reach DP-4 : Poppy Ln

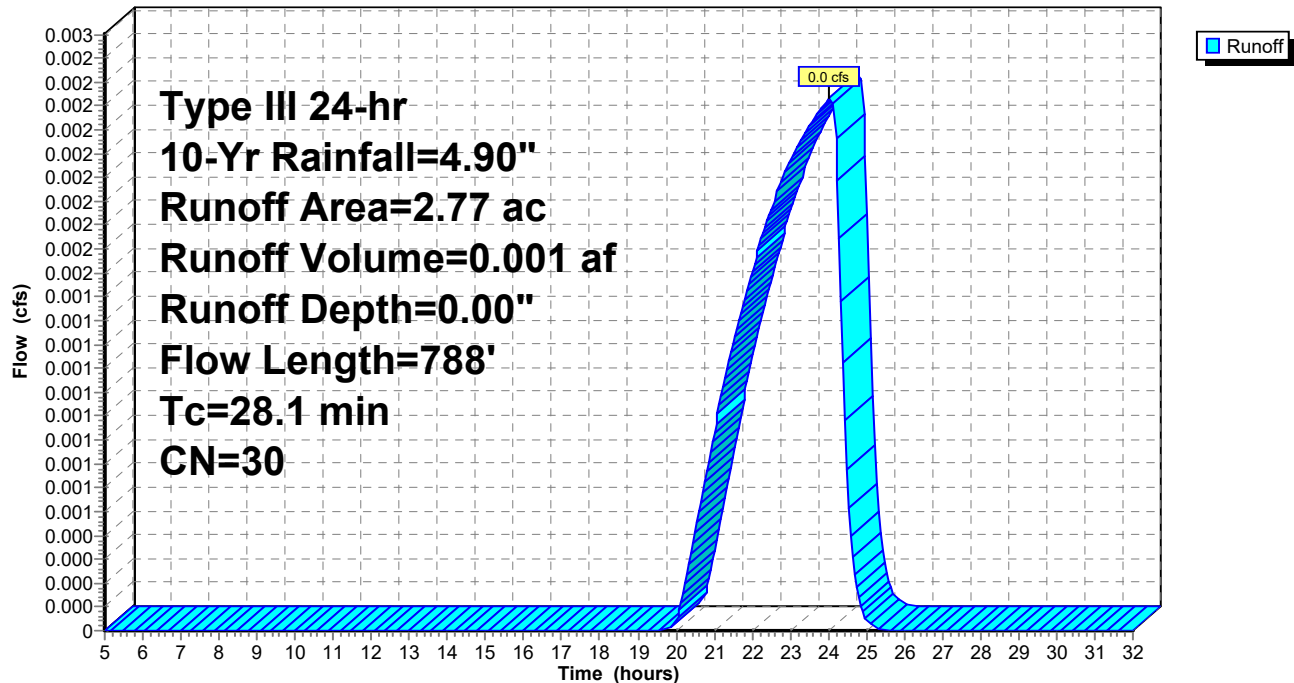
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
2.77	30	Woods, Good, HSG A
2.77		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	250	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.8	276	0.0072	0.42		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	212	0.0190	0.69		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.1	788	Total			

Subcatchment EWA-4:

Hydrograph



Summary for Subcatchment EWA-5A:

Runoff = 0.0 cfs @ 23.99 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-5 : Wetland Series 'A'

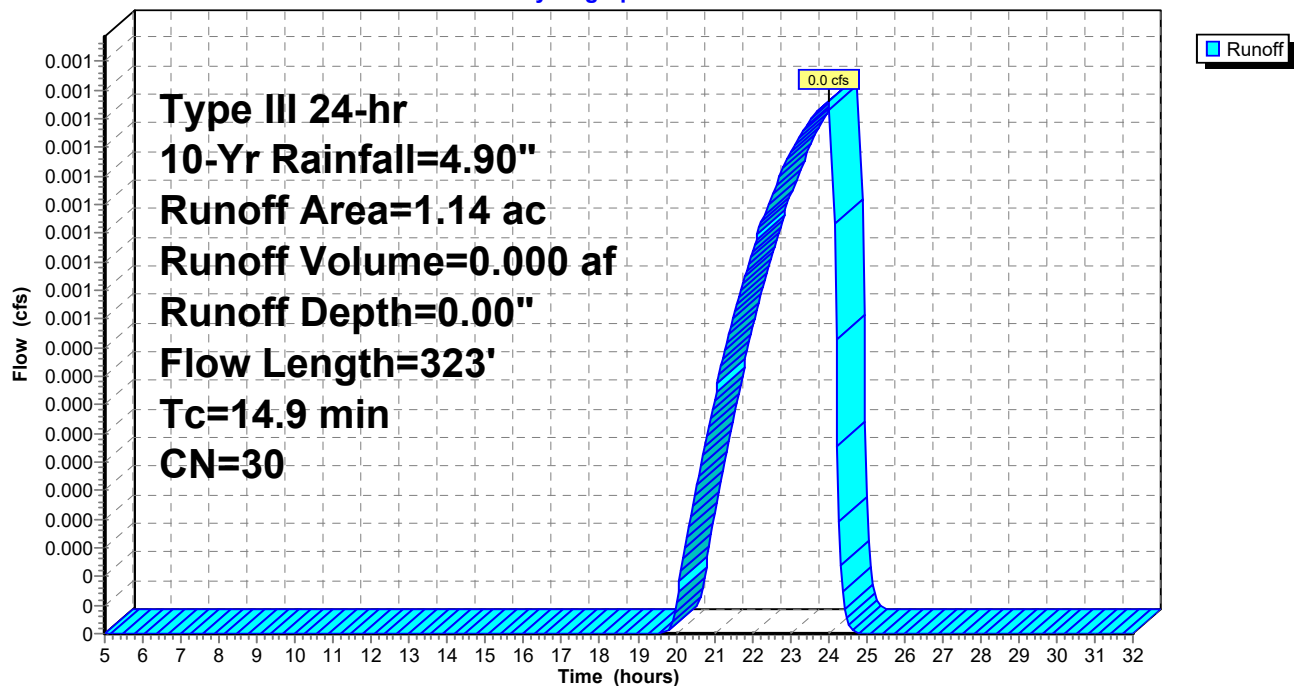
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
1.14	30	Woods, Good, HSG A
1.14		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0330	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.4	146	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	127	0.0620	1.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	323	Total			

Subcatchment EWA-5A:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 24

Summary for Subcatchment EWA-5B:

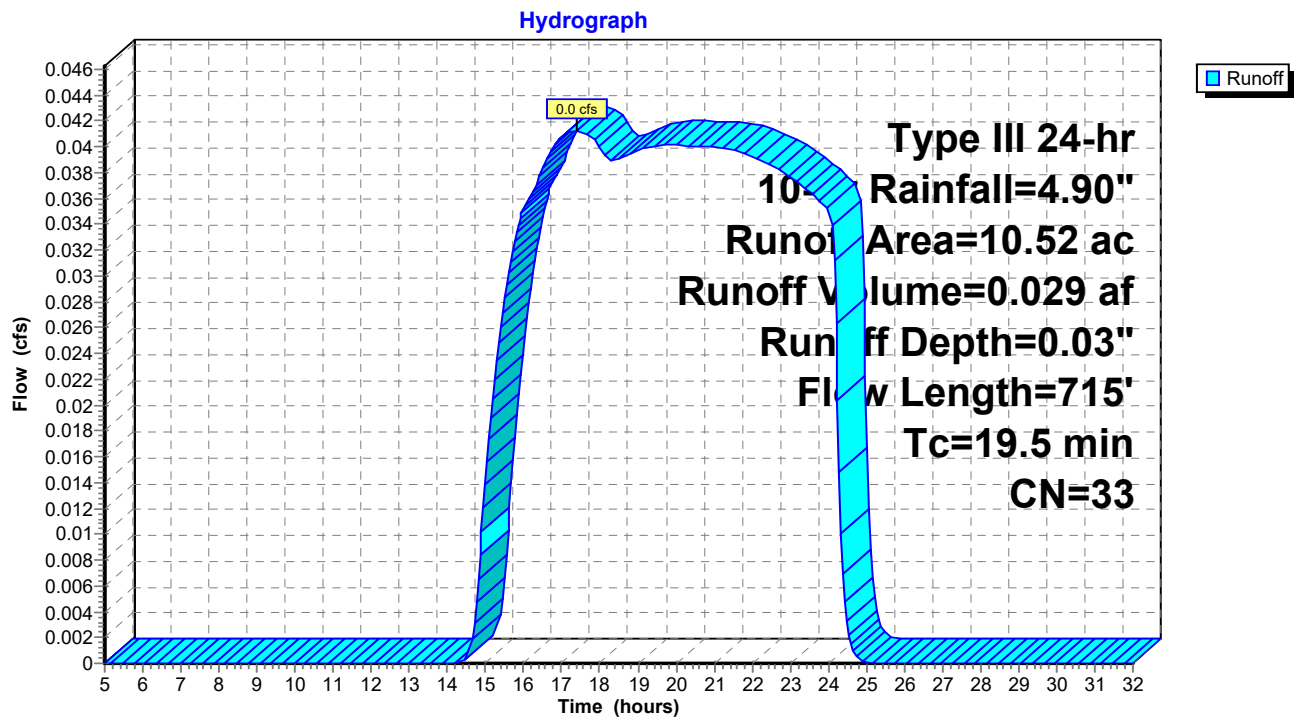
Runoff = 0.0 cfs @ 17.38 hrs, Volume= 0.029 af, Depth= 0.03"
 Routed to Reach DP-5 : Wetland Series 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
8.87	30	Woods, Good, HSG A
0.51	55	Woods, Good, HSG B
0.98	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
10.52	33	Weighted Average
10.52		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.2	251	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	76	0.0520	1.14		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	168	0.0120	0.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	170	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
19.5	715	Total			

Subcatchment EWA-5B:



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 26

Summary for Subcatchment EWA-6:

Runoff = 0.0 cfs @ 23.99 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

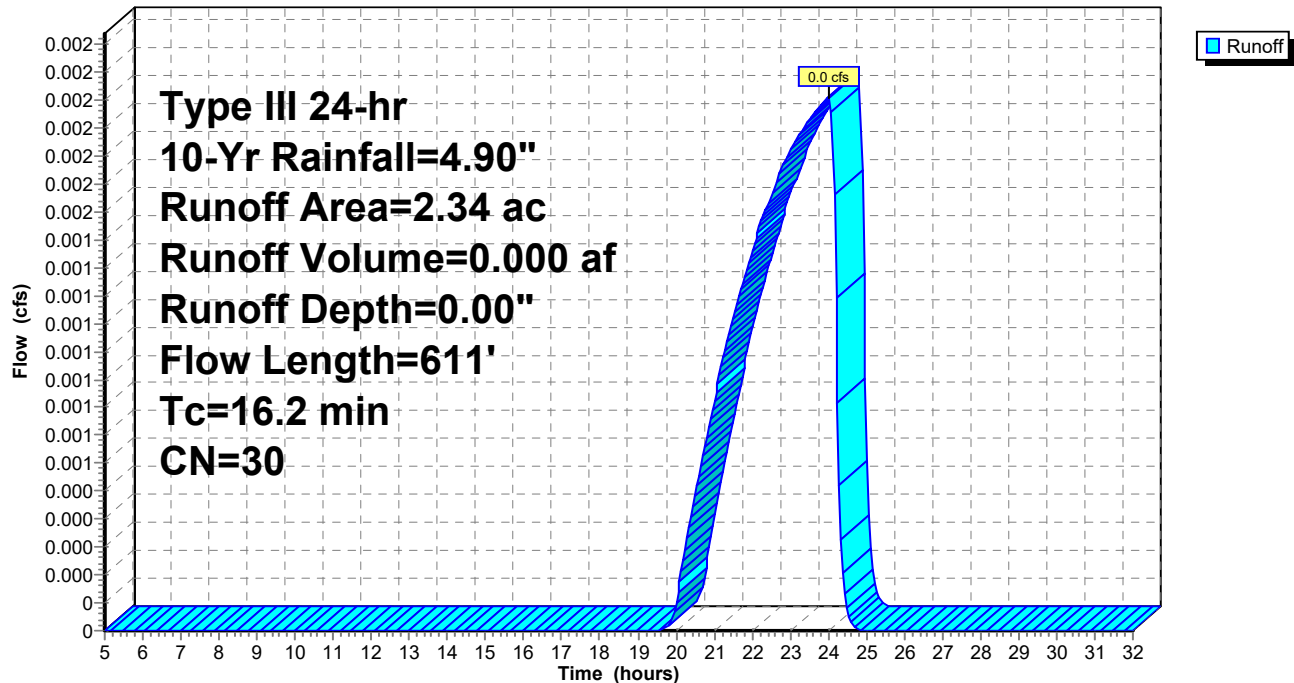
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
2.34	30	Woods, Good, HSG A
2.34		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.8	282	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.8	204	0.0590	1.21		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	75	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.2	611	Total			

Subcatchment EWA-6:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 27

Summary for Subcatchment EWA-7:

Runoff = 0.0 cfs @ 23.99 hrs, Volume= 0.001 af, Depth= 0.00"
 Routed to Reach DP-7 : #4 Poppy Ln

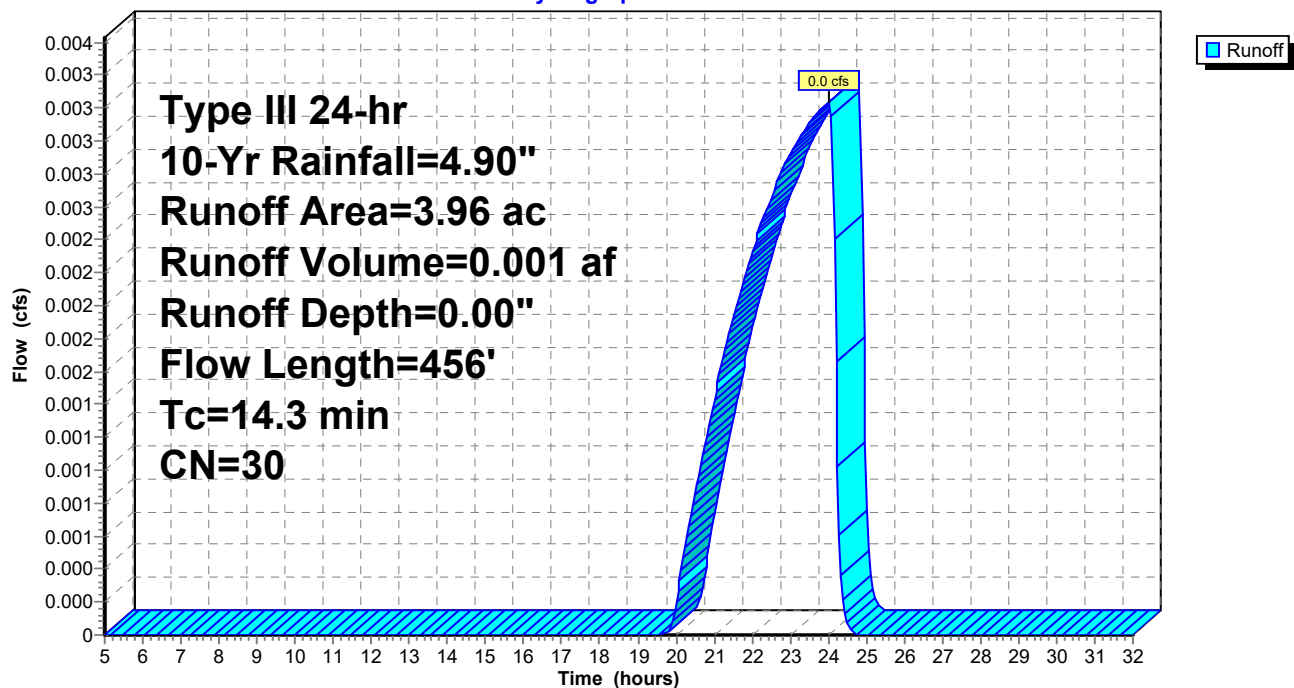
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
3.96	30	Woods, Good, HSG A
3.96		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.6	406	0.0420	1.02		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
14.3	456	Total			

Subcatchment EWA-7:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 28

Summary for Subcatchment EWA-8:

Runoff = 0.0 cfs @ 24.03 hrs, Volume= 0.001 af, Depth= 0.00"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

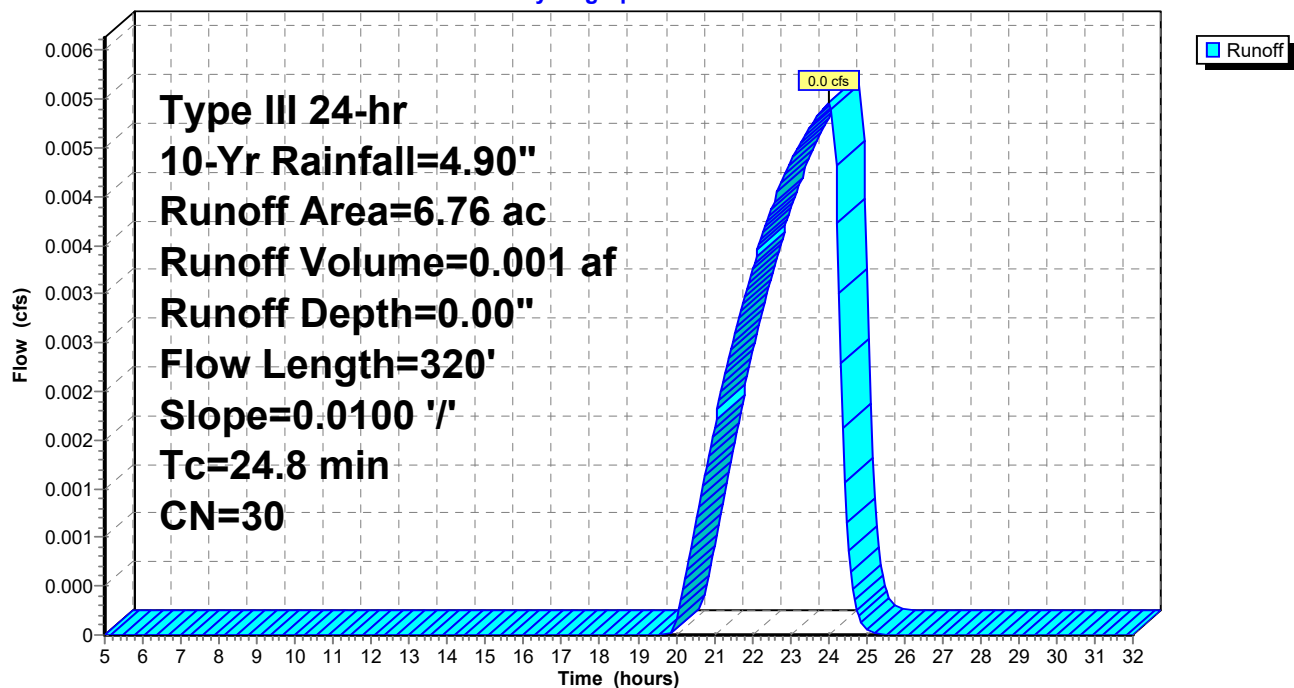
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
6.76	30	Woods, Good, HSG A
6.76		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
9.0	270	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
24.8	320	Total			

Subcatchment EWA-8:

Hydrograph

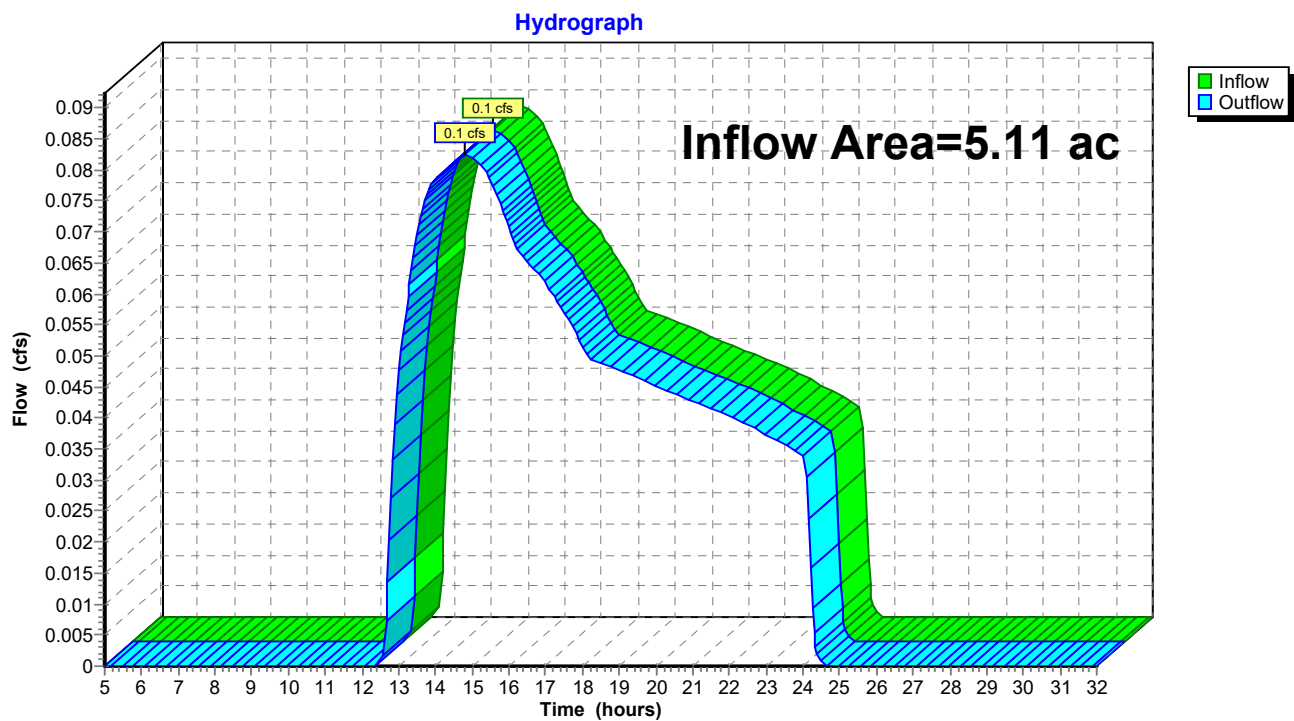


Summary for Reach DP-1: Northern Wetland System Culvert

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

Inflow Area = 5.11 ac, 0.00% Impervious, Inflow Depth = 0.12" for 10-Yr event
Inflow = 0.1 cfs @ 14.82 hrs, Volume= 0.051 af
Outflow = 0.1 cfs @ 14.82 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-1: Northern Wetland System Culvert

Summary for Reach DP-3: #48 Rinzee Rd

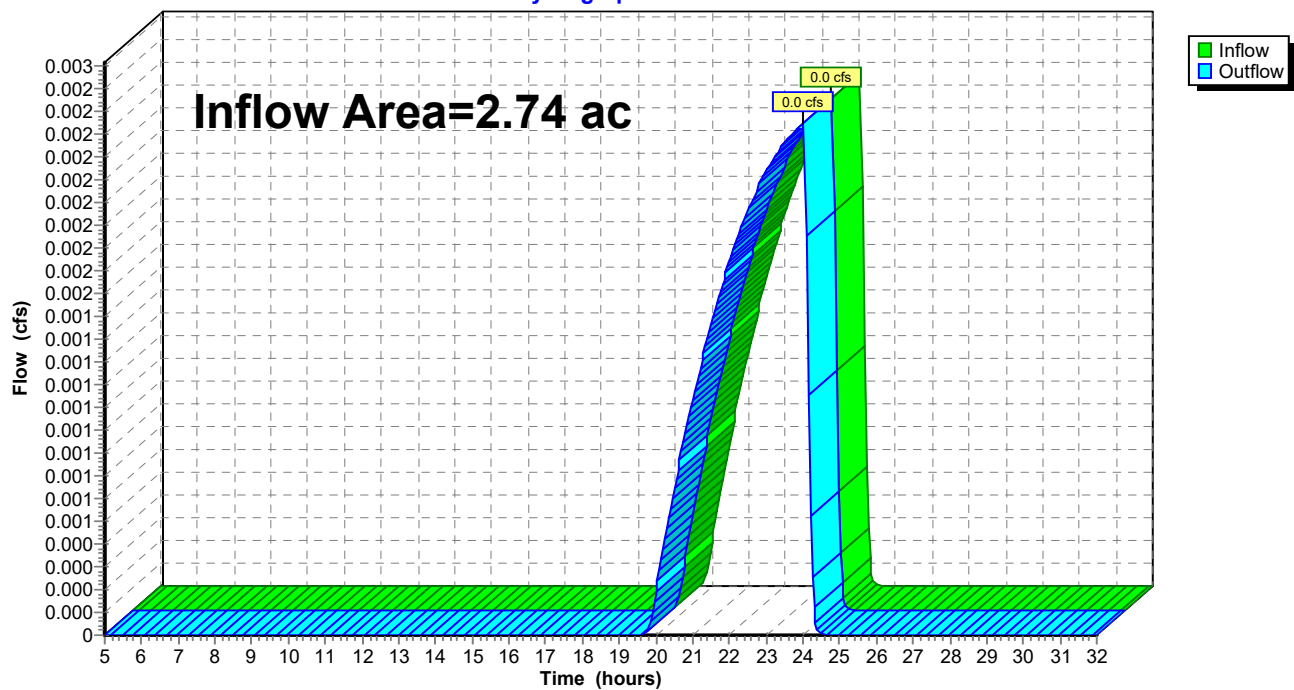
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.74 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Yr event
Inflow = 0.0 cfs @ 24.00 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 24.00 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Hydrograph



Summary for Reach DP-4: Poppy Ln

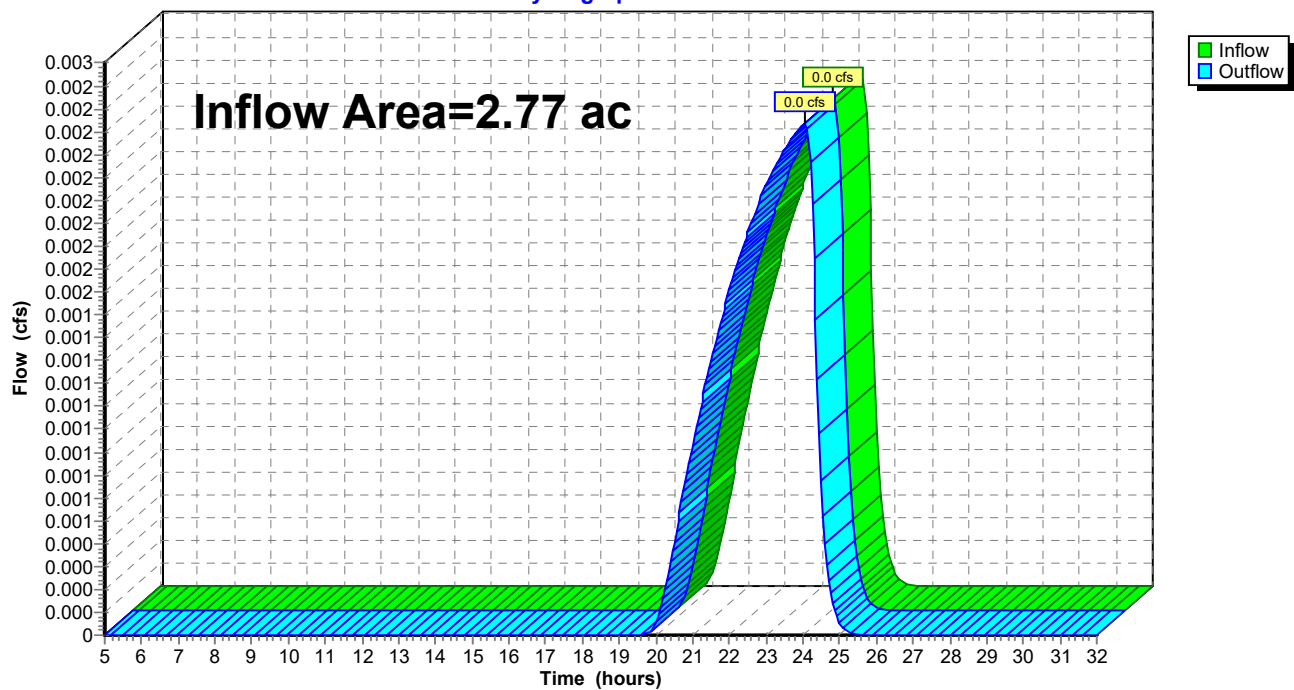
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.77 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Yr event
Inflow = 0.0 cfs @ 24.04 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 24.04 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph

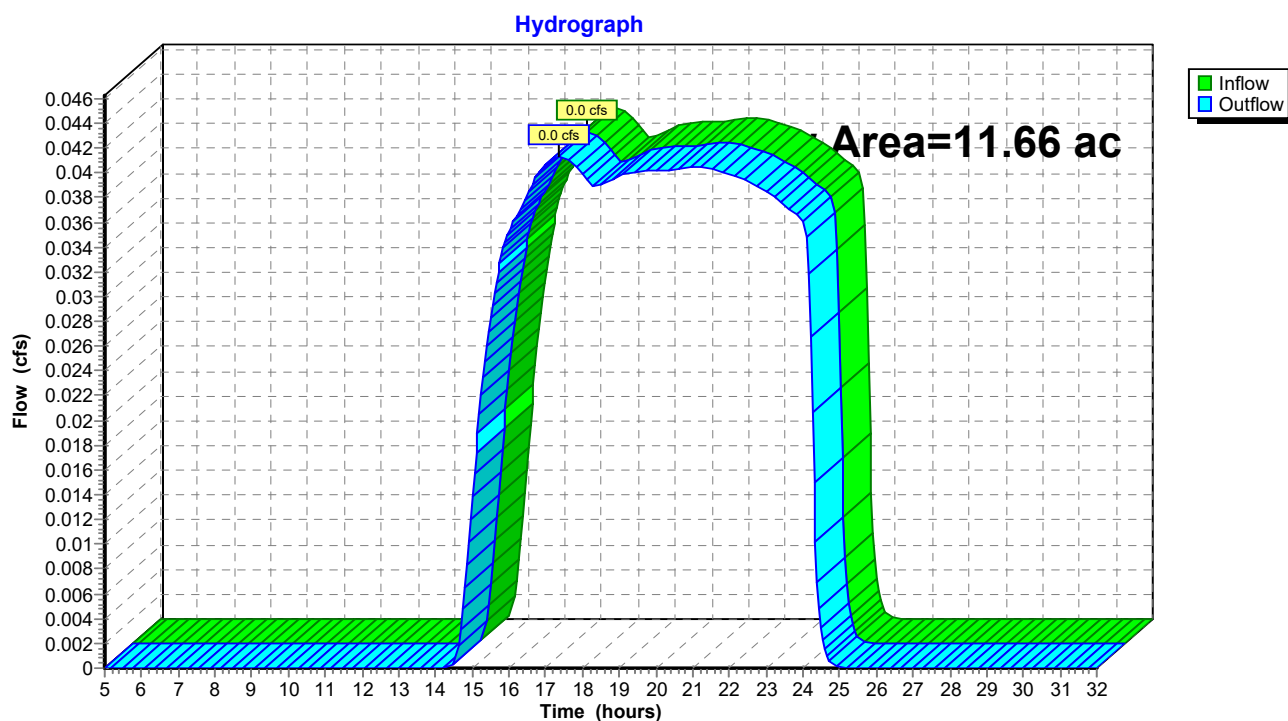


Summary for Reach DP-5: Wetland Series 'A'

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

Inflow Area = 11.66 ac, 0.00% Impervious, Inflow Depth = 0.03" for 10-Yr event
Inflow = 0.0 cfs @ 17.38 hrs, Volume= 0.029 af
Outflow = 0.0 cfs @ 17.38 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

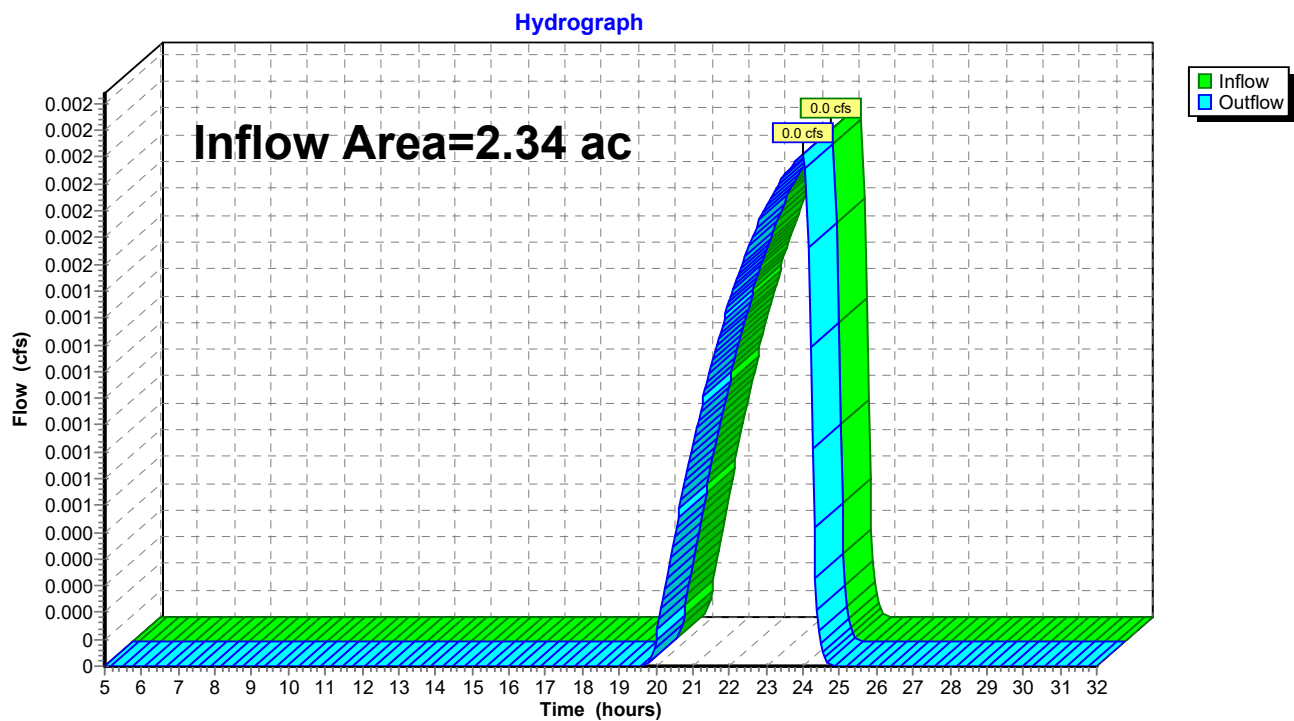
Reach DP-5: Wetland Series 'A'

Summary for Reach DP-6: Wetland Series 'B' & 'C'

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

Inflow Area = 2.34 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Yr event
Inflow = 0.0 cfs @ 23.99 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 23.99 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Summary for Reach DP-7: #4 Poppy Ln

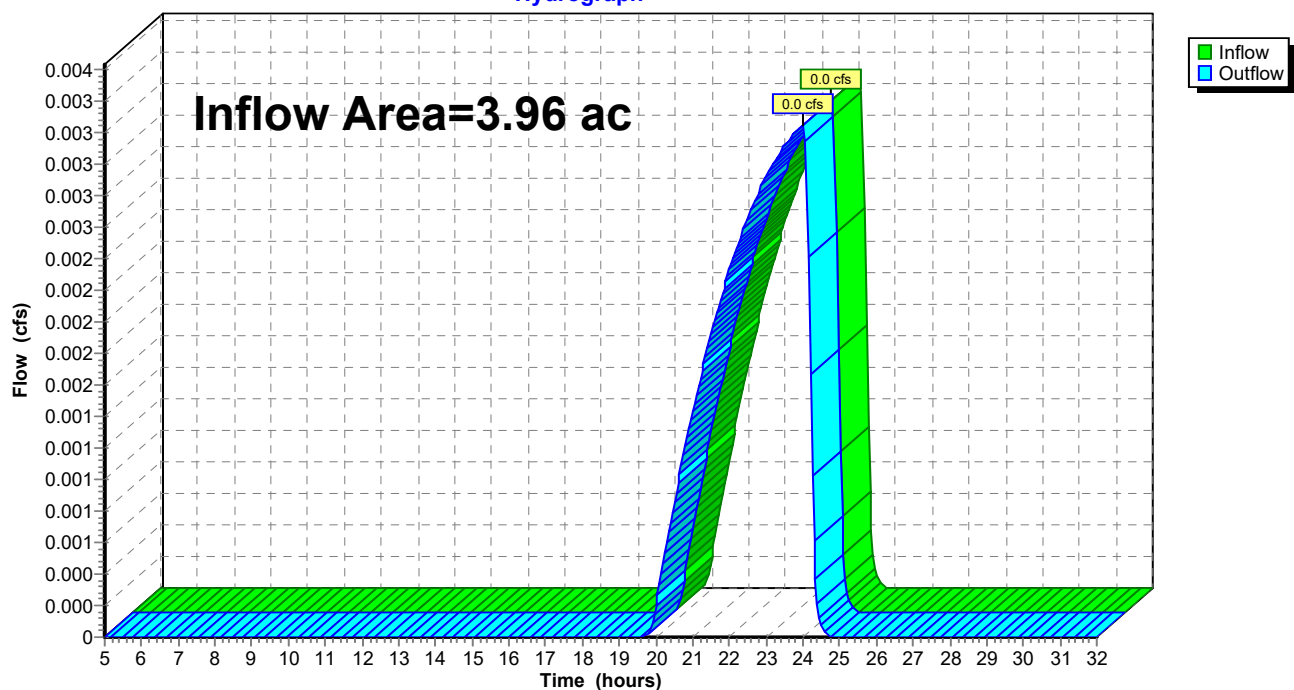
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.96 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Yr event
Inflow = 0.0 cfs @ 23.99 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 23.99 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph



Summary for Reach DP-8: Wetland Series 'D' & 'E'

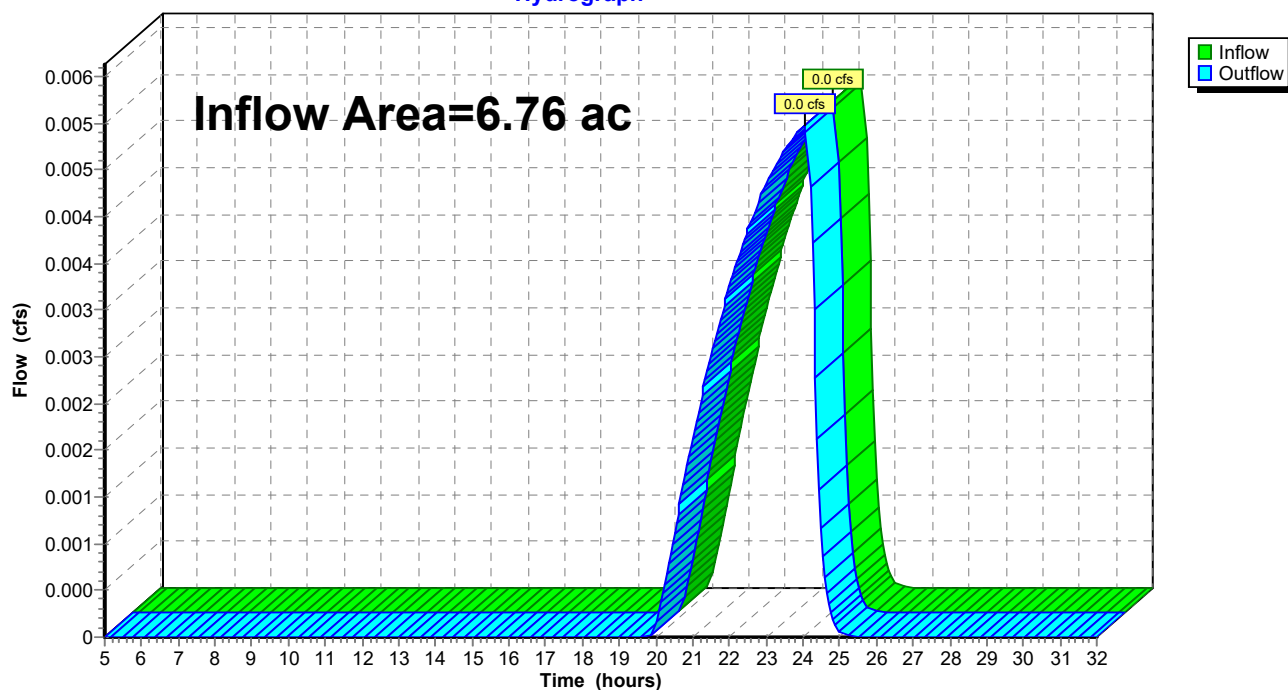
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.76 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Yr event
Inflow = 0.0 cfs @ 24.03 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 24.03 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 36

Summary for Subcatchment EWA-1:

Runoff = 0.5 cfs @ 12.51 hrs, Volume= 0.148 af, Depth= 0.35"

Routed to Reach DP-1 : Northern Wetland System Culvert

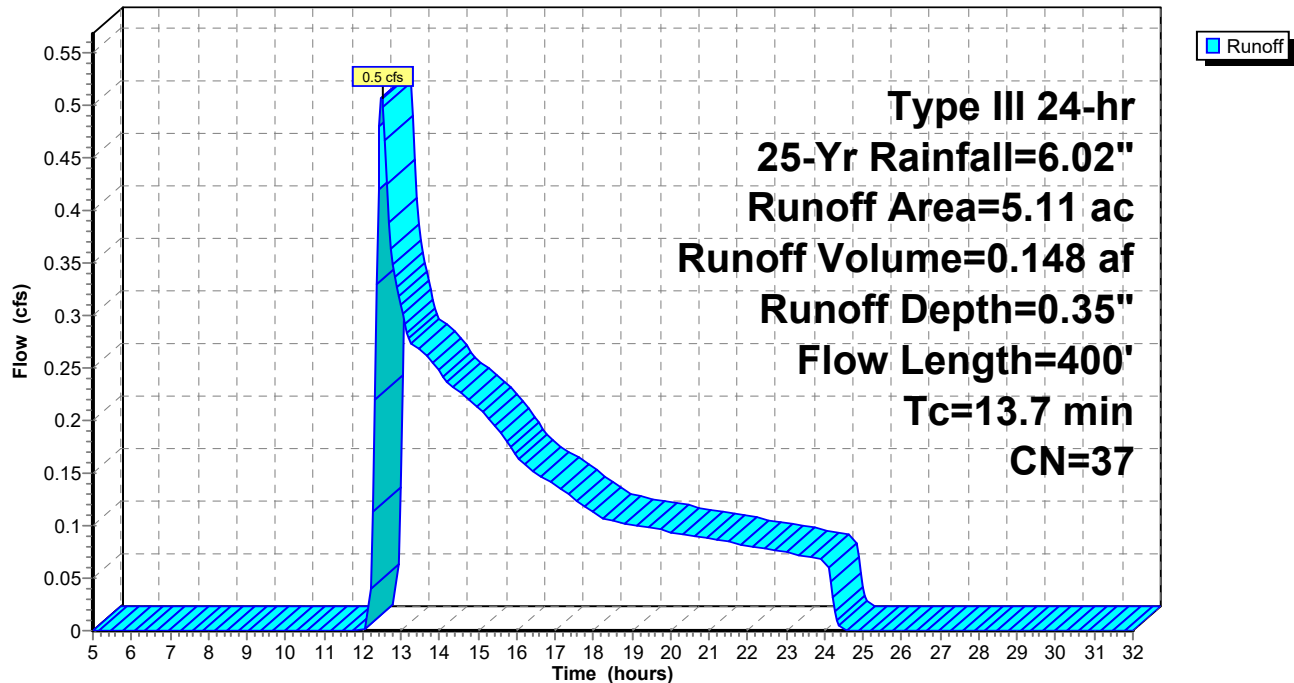
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.34	61	>75% Grass cover, Good, HSG B
0.52	39	>75% Grass cover, Good, HSG A
3.49	30	Woods, Good, HSG A
0.76	55	Woods, Good, HSG B
5.11	37	Weighted Average
5.11		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	350	0.0350	0.94		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.7	400	Total			

Subcatchment EWA-1:

Hydrograph



Summary for Subcatchment EWA-3:

Runoff = 0.0 cfs @ 15.53 hrs, Volume= 0.017 af, Depth= 0.07"
 Routed to Reach DP-3 : #48 Rinzee Rd

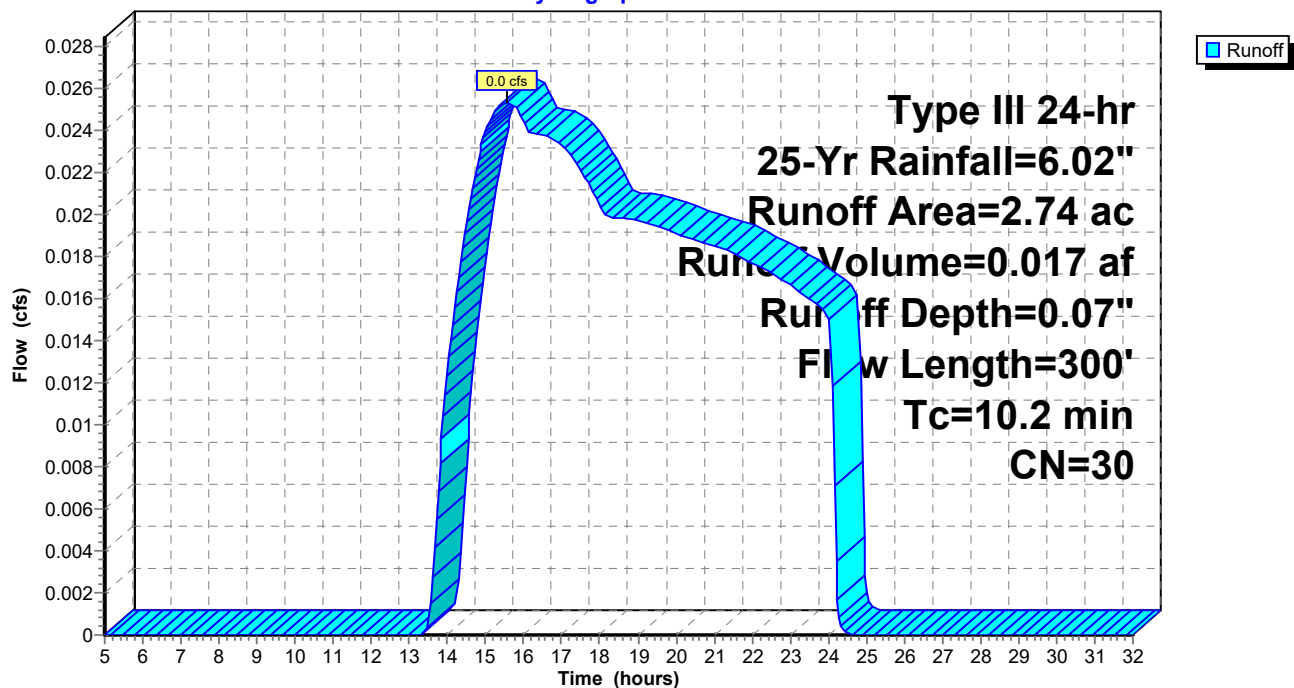
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
2.74	30	Woods, Good, HSG A
2.74		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.9	250	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.2	300	Total			

Subcatchment EWA-3:

Hydrograph



Summary for Subcatchment EWA-4:

Runoff = 0.0 cfs @ 15.82 hrs, Volume= 0.017 af, Depth= 0.07"
 Routed to Reach DP-4 : Poppy Ln

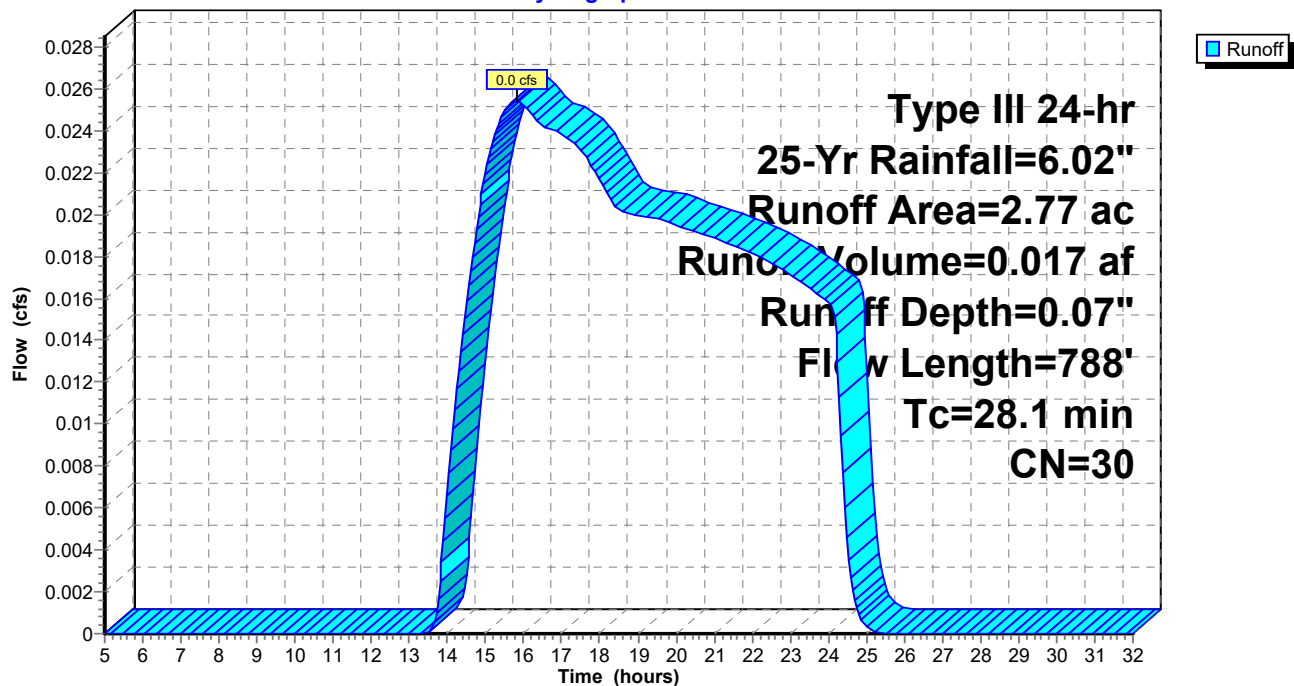
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
2.77	30	Woods, Good, HSG A
2.77		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	250	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.8	276	0.0072	0.42		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	212	0.0190	0.69		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.1	788	Total			

Subcatchment EWA-4:

Hydrograph



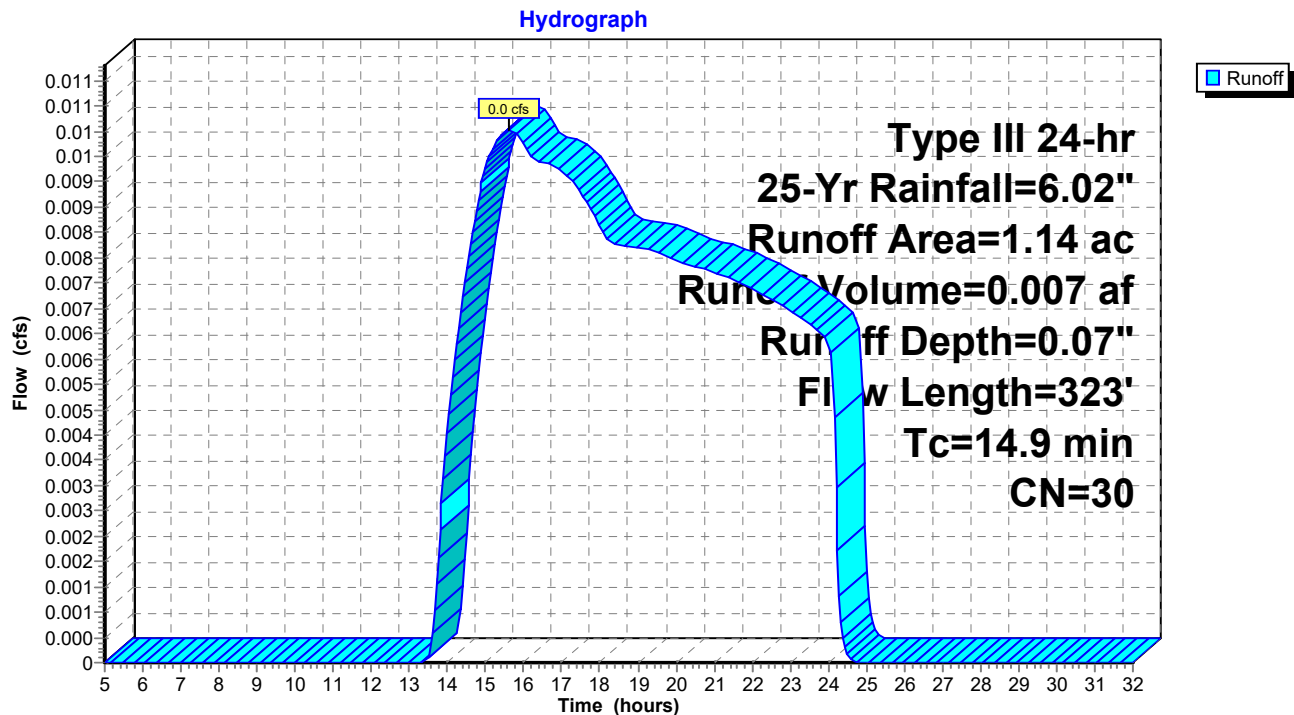
Summary for Subcatchment EWA-5A:

Runoff = 0.0 cfs @ 15.61 hrs, Volume= 0.007 af, Depth= 0.07"
 Routed to Reach DP-5 : Wetland Series 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
1.14	30	Woods, Good, HSG A
1.14		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0330	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.4	146	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	127	0.0620	1.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	323	Total			

Subcatchment EWA-5A:

Summary for Subcatchment EWA-5B:

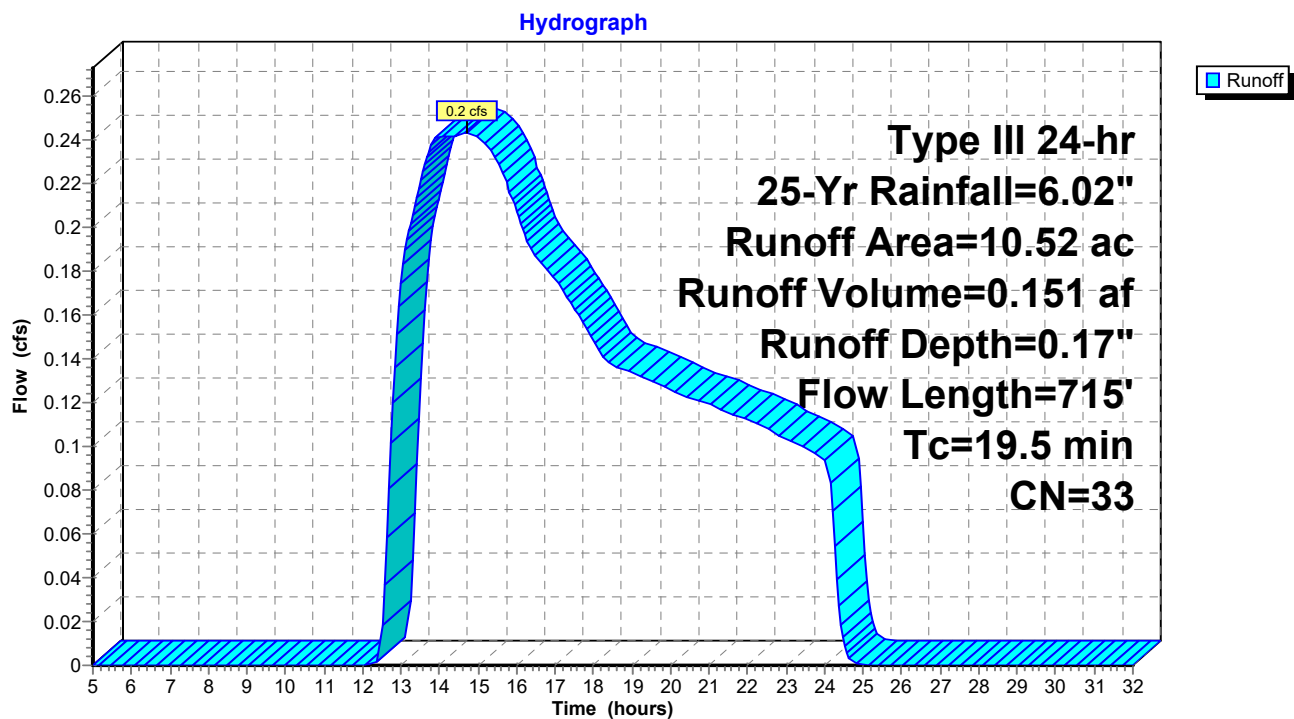
Runoff = 0.2 cfs @ 14.72 hrs, Volume= 0.151 af, Depth= 0.17"
 Routed to Reach DP-5 : Wetland Series 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
8.87	30	Woods, Good, HSG A
0.51	55	Woods, Good, HSG B
0.98	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
10.52	33	Weighted Average
10.52		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.2	251	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	76	0.0520	1.14		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	168	0.0120	0.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	170	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
19.5	715	Total			

Subcatchment EWA-5B:



Summary for Subcatchment EWA-6:

Runoff = 0.0 cfs @ 15.63 hrs, Volume= 0.014 af, Depth= 0.07"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

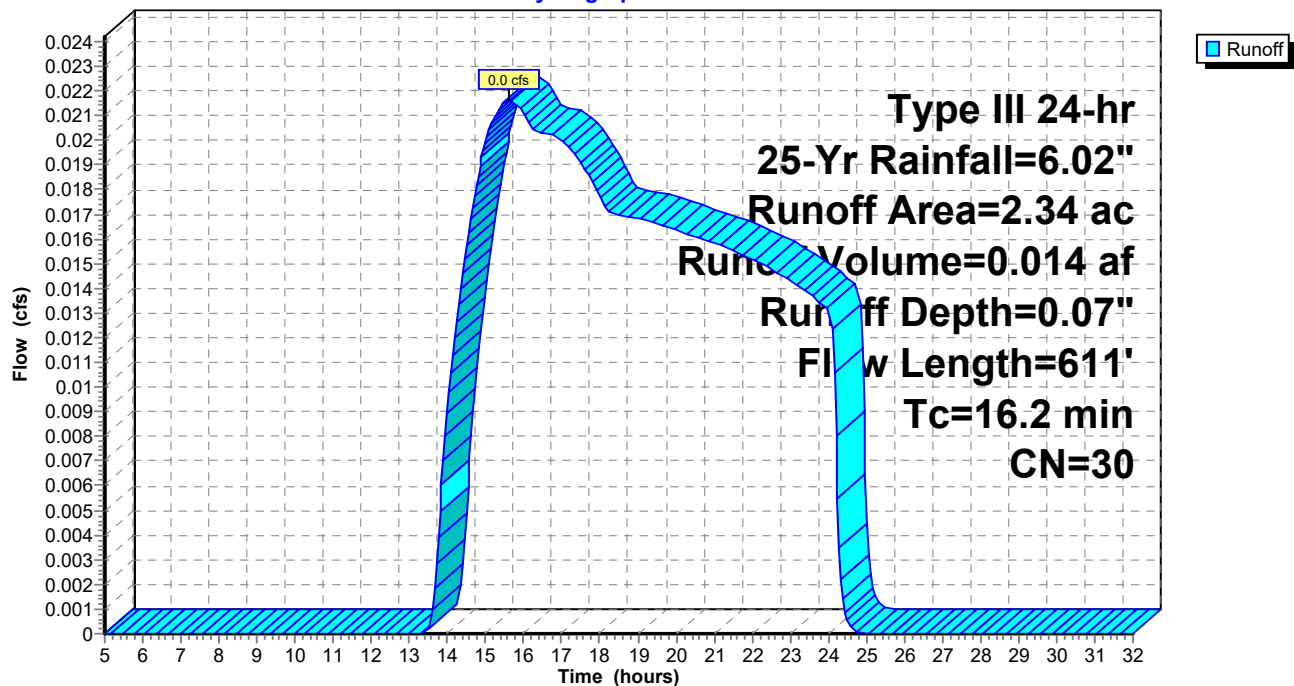
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
2.34	30	Woods, Good, HSG A
2.34		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.8	282	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.8	204	0.0590	1.21		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	75	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.2	611	Total			

Subcatchment EWA-6:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 43

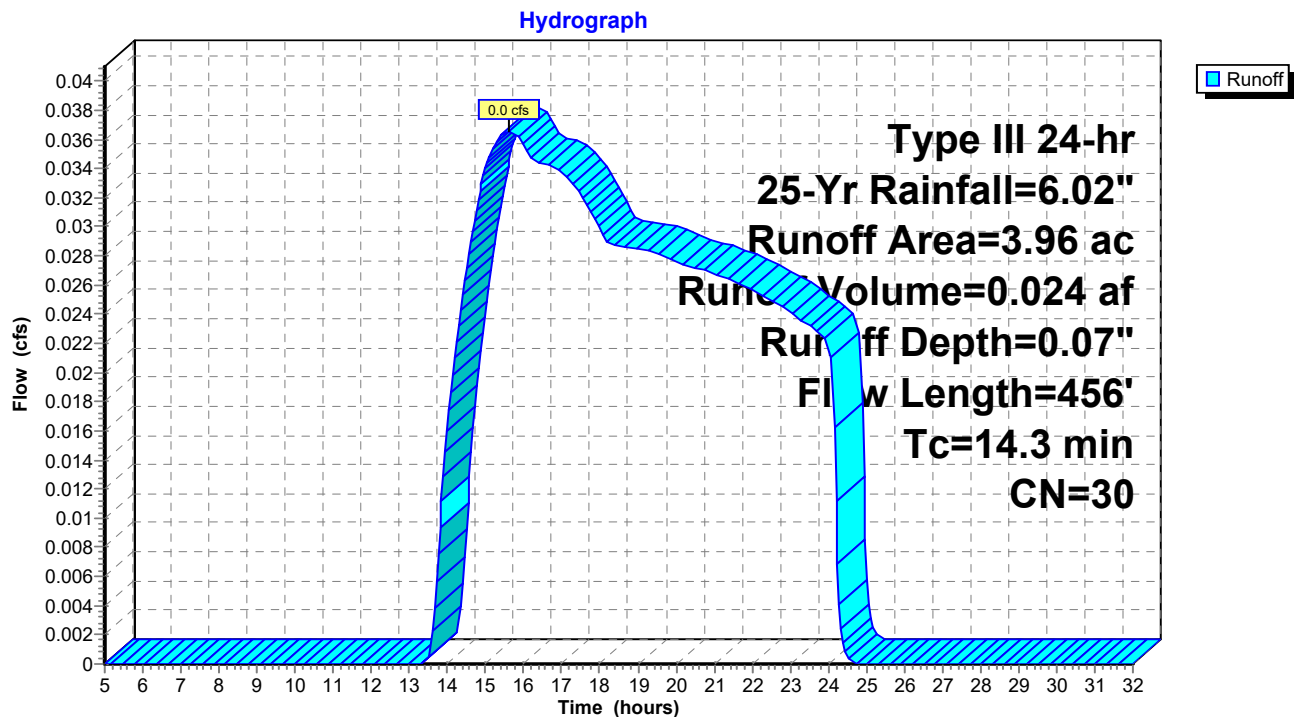
Summary for Subcatchment EWA-7:

Runoff = 0.0 cfs @ 15.60 hrs, Volume= 0.024 af, Depth= 0.07"
 Routed to Reach DP-7 : #4 Poppy Ln

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
3.96	30	Woods, Good, HSG A
3.96		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
6.6	406	0.0420	1.02		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.3	456	Total			

Subcatchment EWA-7:

23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 44

Summary for Subcatchment EWA-8:

Runoff = 0.1 cfs @ 15.77 hrs, Volume= 0.042 af, Depth= 0.07"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

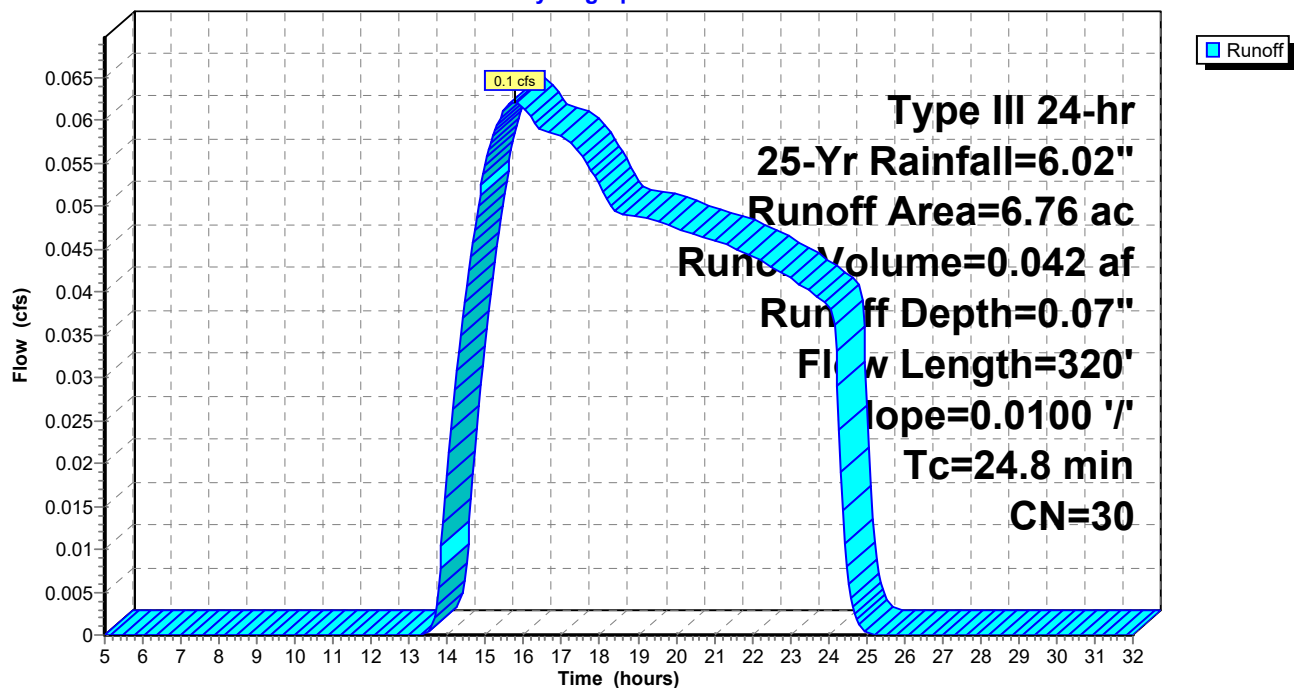
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
6.76	30	Woods, Good, HSG A
6.76		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
9.0	270	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
24.8	320	Total			

Subcatchment EWA-8:

Hydrograph



Summary for Reach DP-1: Northern Wetland System Culvert

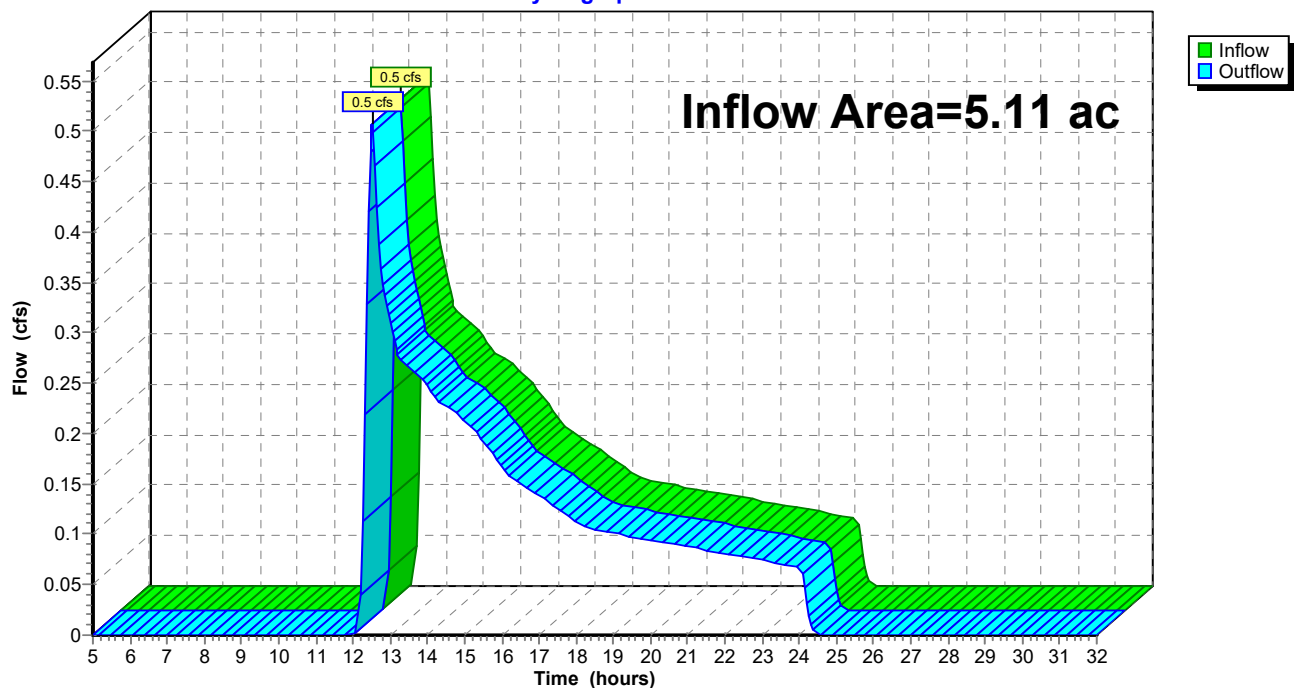
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.11 ac, 0.00% Impervious, Inflow Depth = 0.35" for 25-Yr event
Inflow = 0.5 cfs @ 12.51 hrs, Volume= 0.148 af
Outflow = 0.5 cfs @ 12.51 hrs, Volume= 0.148 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-1: Northern Wetland System Culvert

Hydrograph

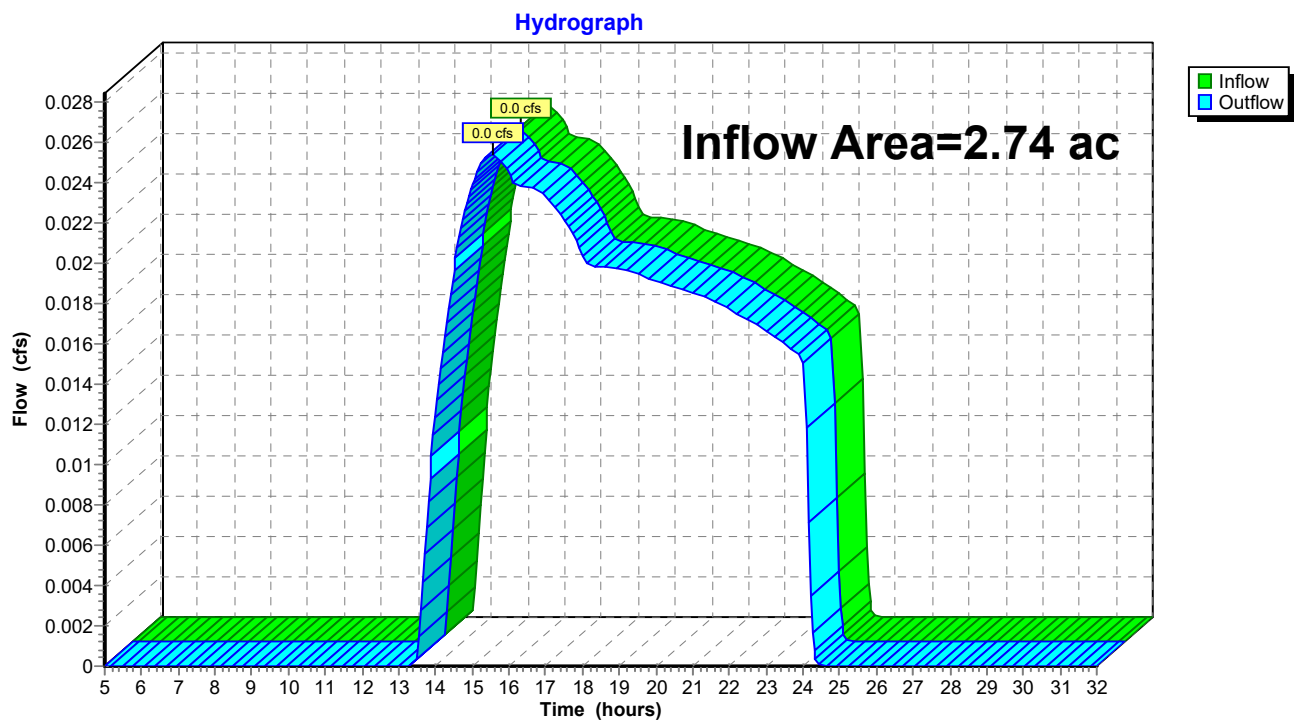


Summary for Reach DP-3: #48 Rinzee Rd

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

Inflow Area = 2.74 ac, 0.00% Impervious, Inflow Depth = 0.07" for 25-Yr event
Inflow = 0.0 cfs @ 15.53 hrs, Volume= 0.017 af
Outflow = 0.0 cfs @ 15.53 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Summary for Reach DP-4: Poppy Ln

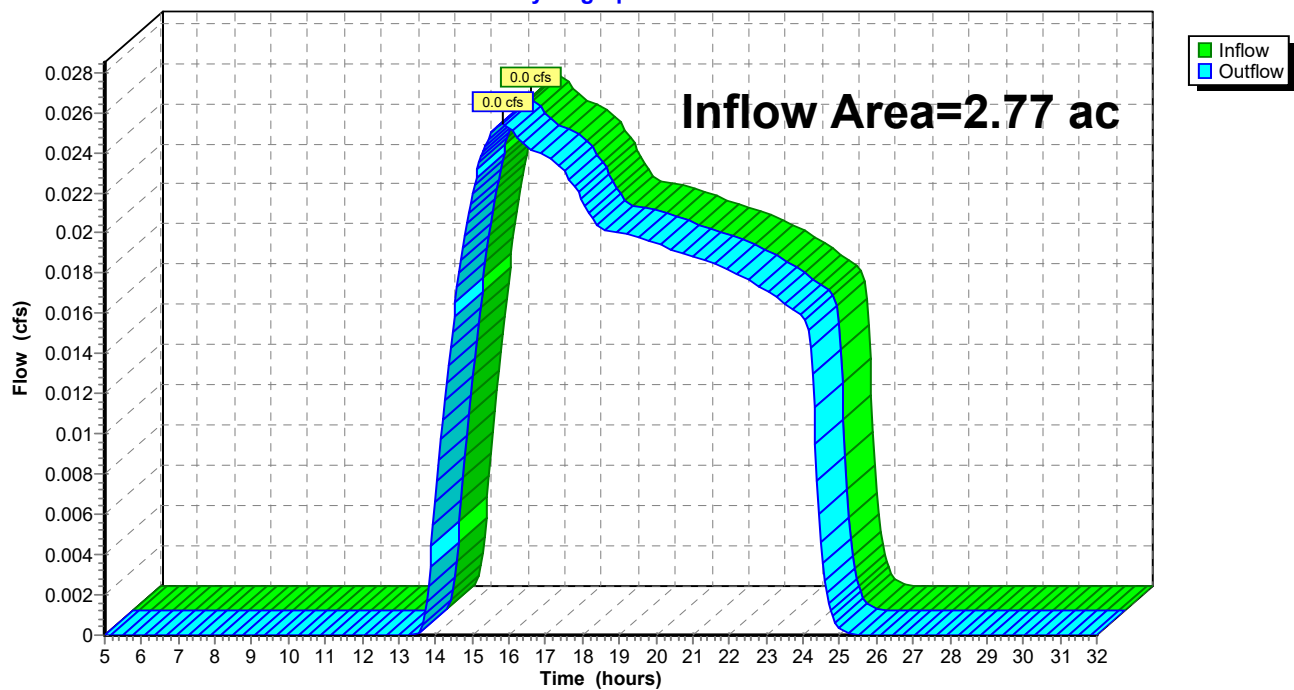
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.77 ac, 0.00% Impervious, Inflow Depth = 0.07" for 25-Yr event
Inflow = 0.0 cfs @ 15.82 hrs, Volume= 0.017 af
Outflow = 0.0 cfs @ 15.82 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph

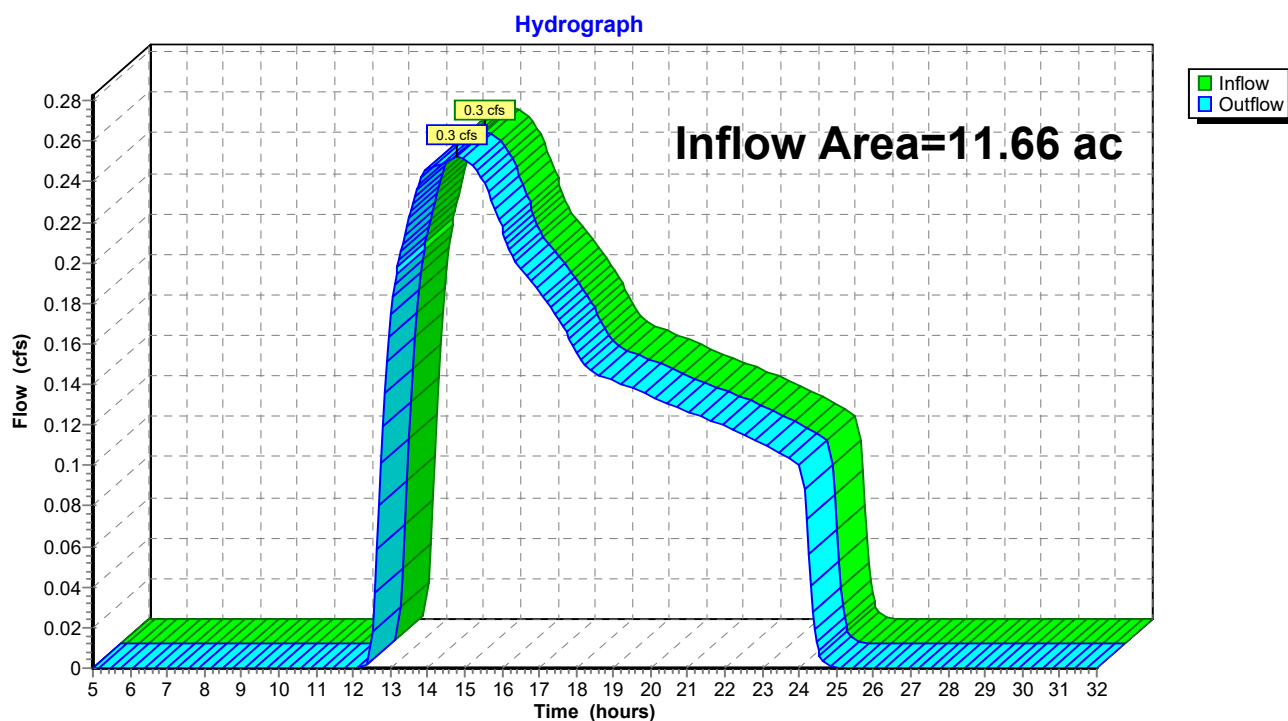


Summary for Reach DP-5: Wetland Series 'A'

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

Inflow Area = 11.66 ac, 0.00% Impervious, Inflow Depth = 0.16" for 25-Yr event
Inflow = 0.3 cfs @ 14.81 hrs, Volume= 0.158 af
Outflow = 0.3 cfs @ 14.81 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

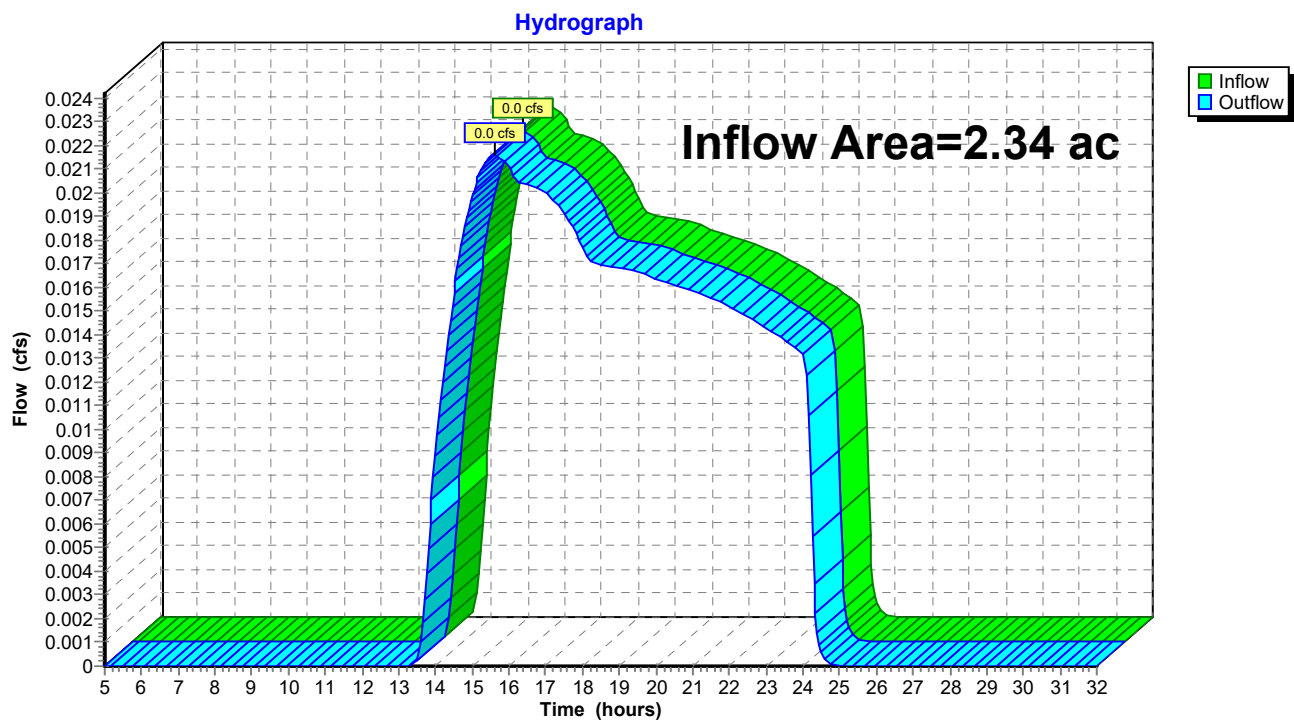
Reach DP-5: Wetland Series 'A'

Summary for Reach DP-6: Wetland Series 'B' & 'C'

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

Inflow Area = 2.34 ac, 0.00% Impervious, Inflow Depth = 0.07" for 25-Yr event
Inflow = 0.0 cfs @ 15.63 hrs, Volume= 0.014 af
Outflow = 0.0 cfs @ 15.63 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Summary for Reach DP-7: #4 Poppy Ln

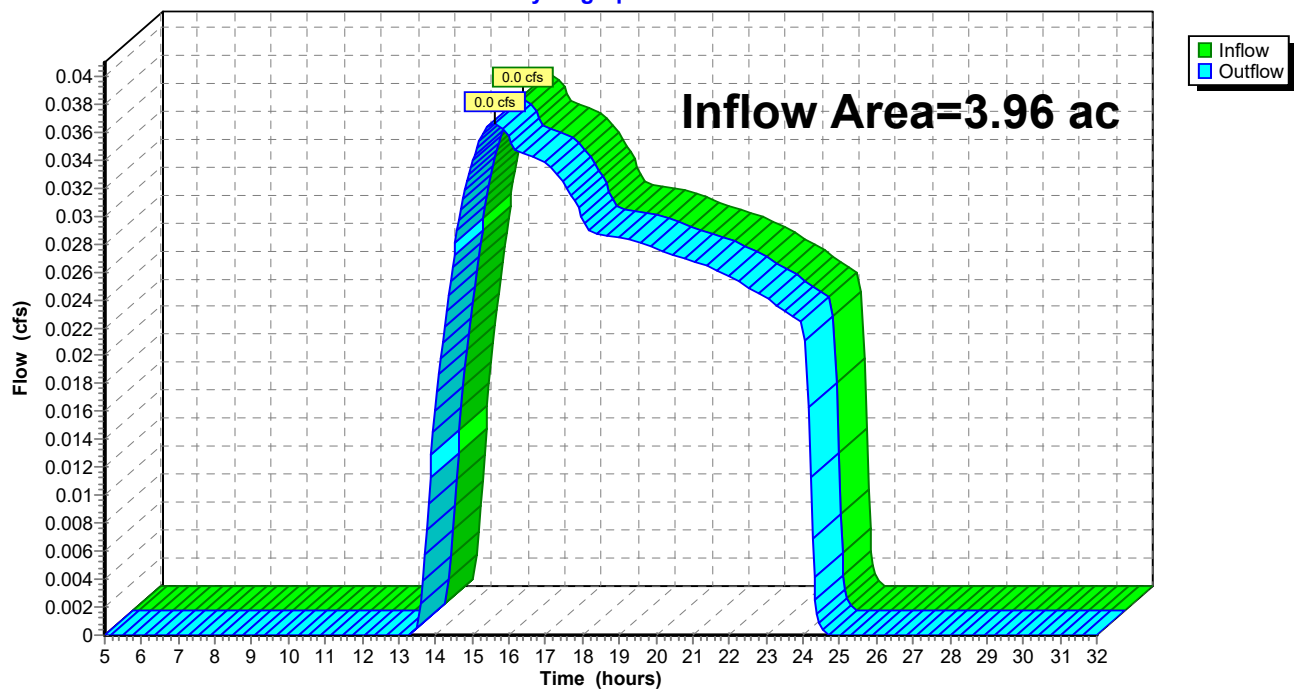
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.96 ac, 0.00% Impervious, Inflow Depth = 0.07" for 25-Yr event
Inflow = 0.0 cfs @ 15.60 hrs, Volume= 0.024 af
Outflow = 0.0 cfs @ 15.60 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph

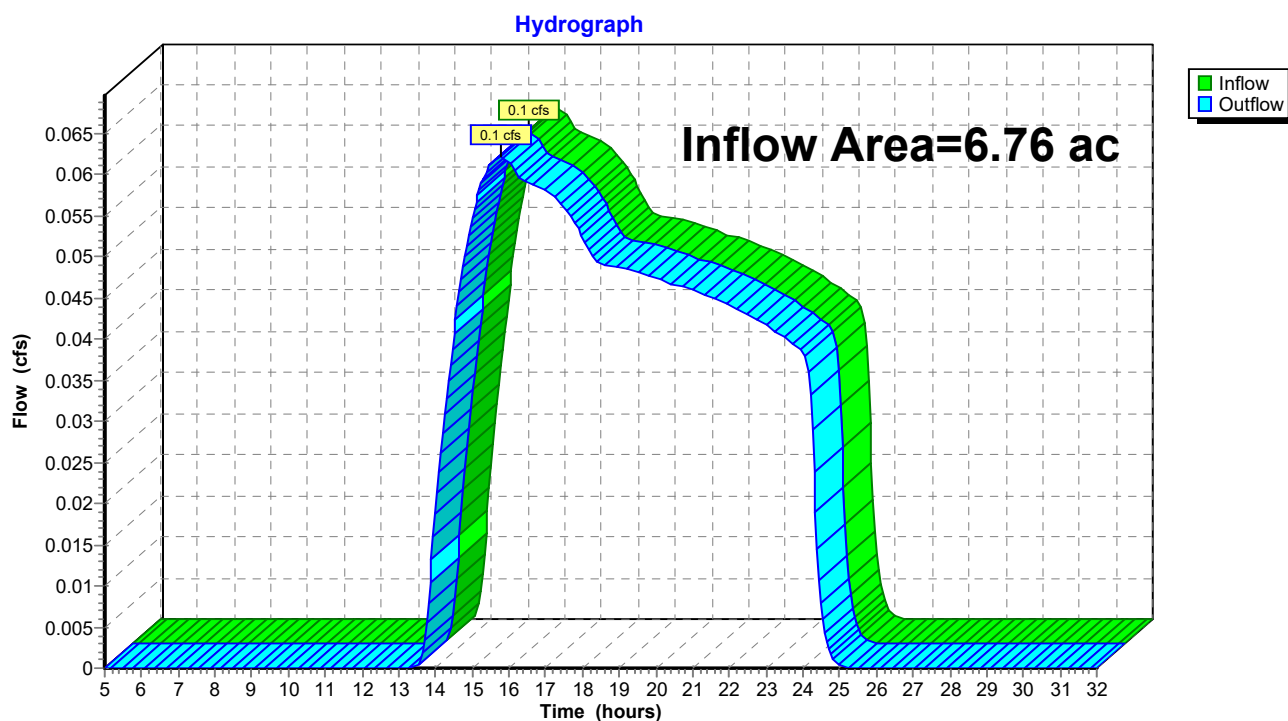


Summary for Reach DP-8: Wetland Series 'D' & 'E'

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

Inflow Area = 6.76 ac, 0.00% Impervious, Inflow Depth = 0.07" for 25-Yr event
Inflow = 0.1 cfs @ 15.77 hrs, Volume= 0.042 af
Outflow = 0.1 cfs @ 15.77 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

Summary for Subcatchment EWA-1:

Runoff = 2.2 cfs @ 12.35 hrs, Volume= 0.373 af, Depth= 0.88"

Routed to Reach DP-1 : Northern Wetland System Culvert

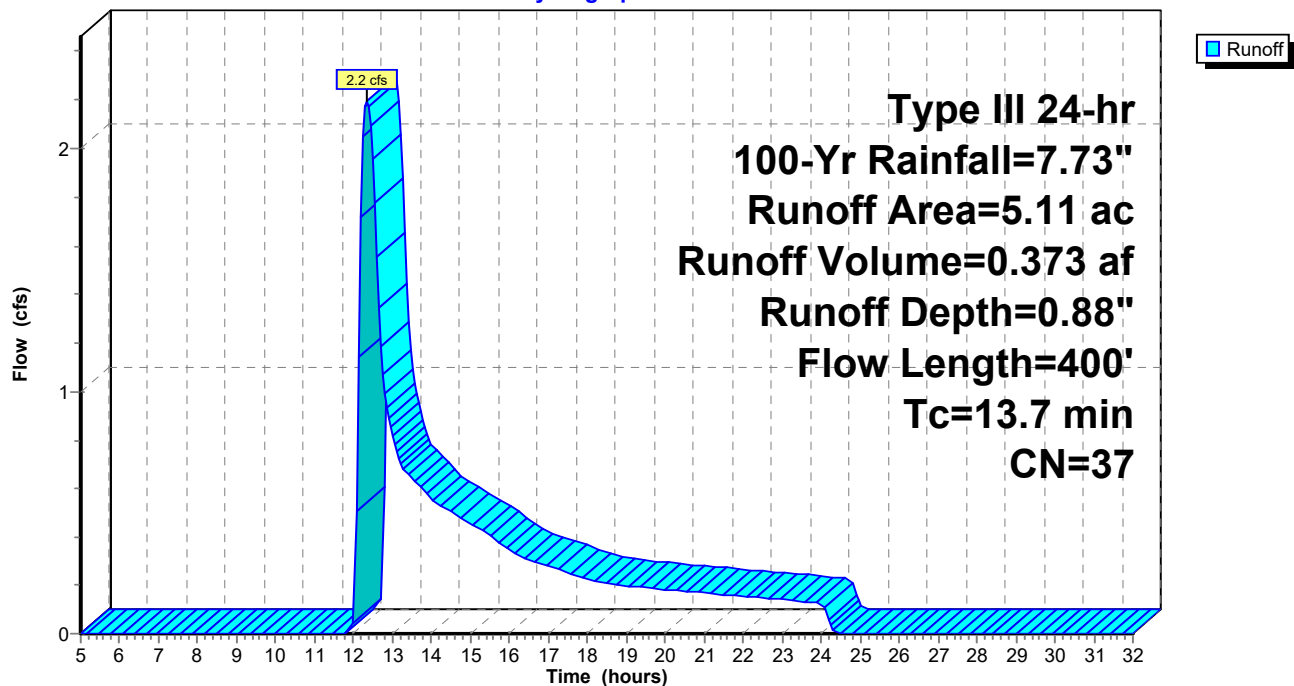
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.34	61	>75% Grass cover, Good, HSG B
0.52	39	>75% Grass cover, Good, HSG A
3.49	30	Woods, Good, HSG A
0.76	55	Woods, Good, HSG B
5.11	37	Weighted Average
5.11		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	350	0.0350	0.94		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.7	400	Total			

Subcatchment EWA-1:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 53

Summary for Subcatchment EWA-3:

Runoff = 0.2 cfs @ 12.51 hrs, Volume= 0.081 af, Depth= 0.36"
 Routed to Reach DP-3 : #48 Rinzee Rd

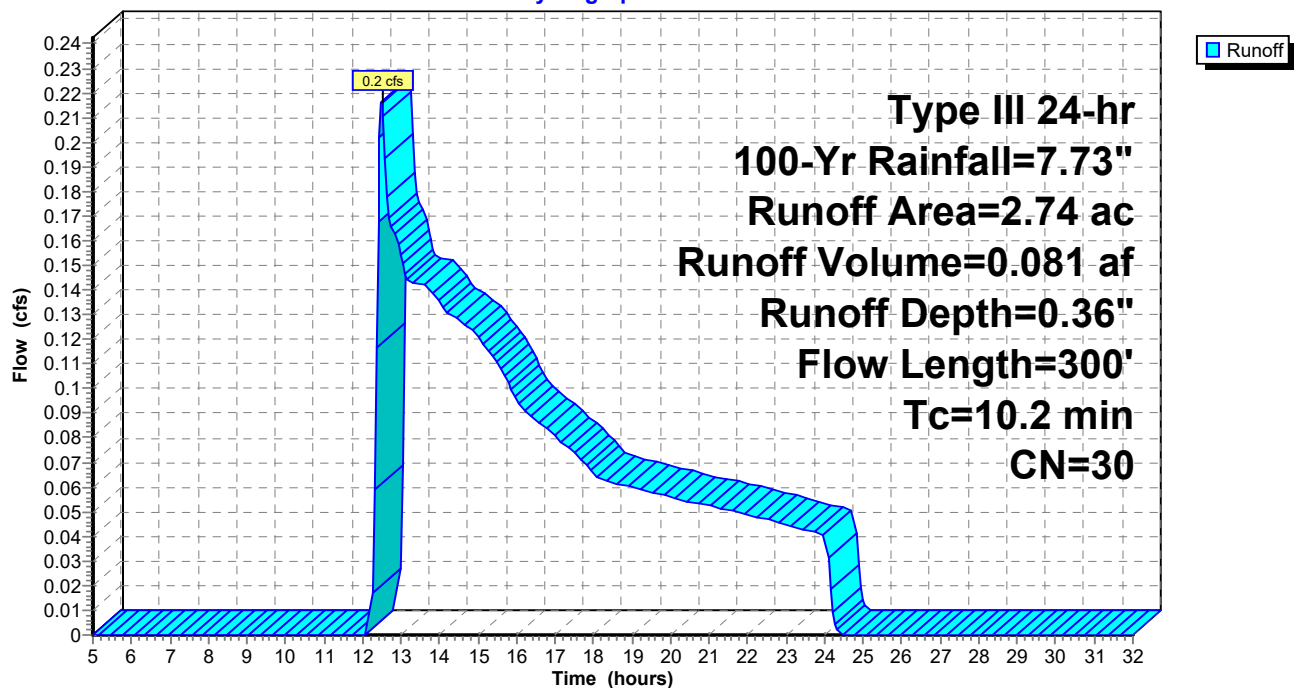
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
2.74	30	Woods, Good, HSG A
2.74		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.9	250	0.0450	1.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.2	300	Total			

Subcatchment EWA-3:

Hydrograph



23-10524 - Pre - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 54

Summary for Subcatchment EWA-4:

Runoff = 0.2 cfs @ 12.87 hrs, Volume= 0.082 af, Depth= 0.36"
 Routed to Reach DP-4 : Poppy Ln

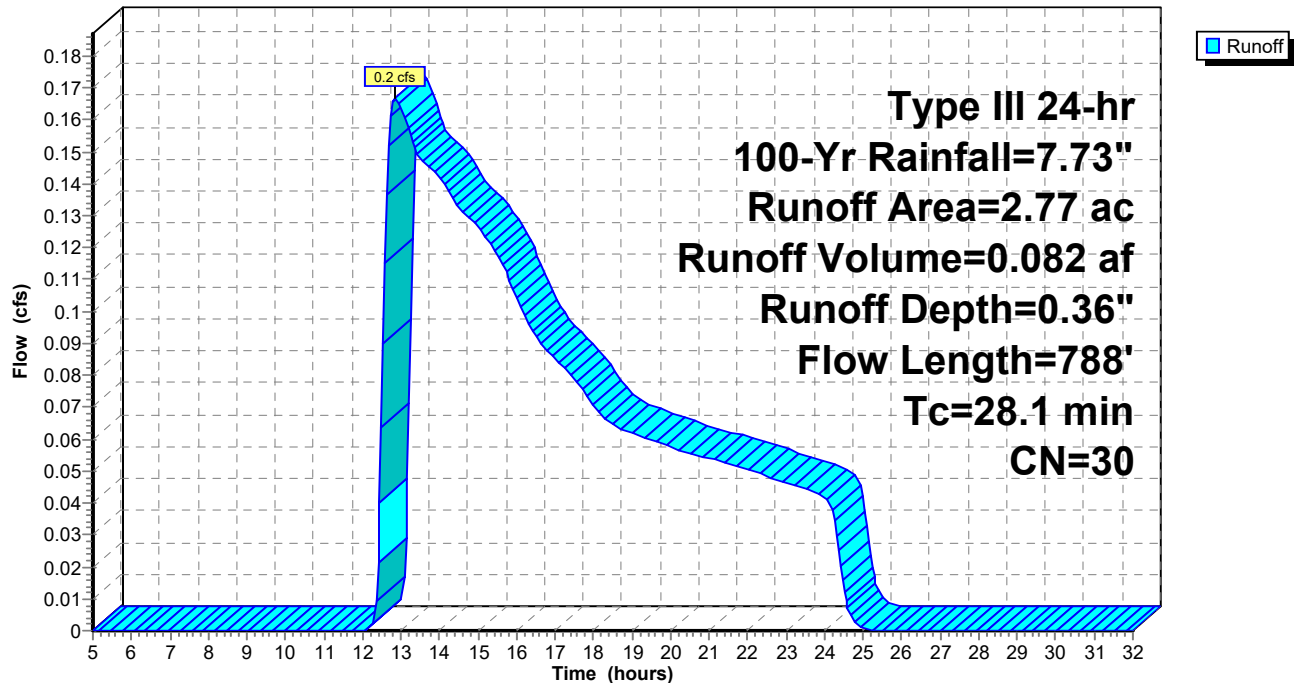
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
2.77	30	Woods, Good, HSG A
2.77		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	250	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.8	276	0.0072	0.42		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	212	0.0190	0.69		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.1	788				Total

Subcatchment EWA-4:

Hydrograph



Summary for Subcatchment EWA-5A:

Runoff = 0.1 cfs @ 12.59 hrs, Volume= 0.034 af, Depth= 0.36"
 Routed to Reach DP-5 : Wetland Series 'A'

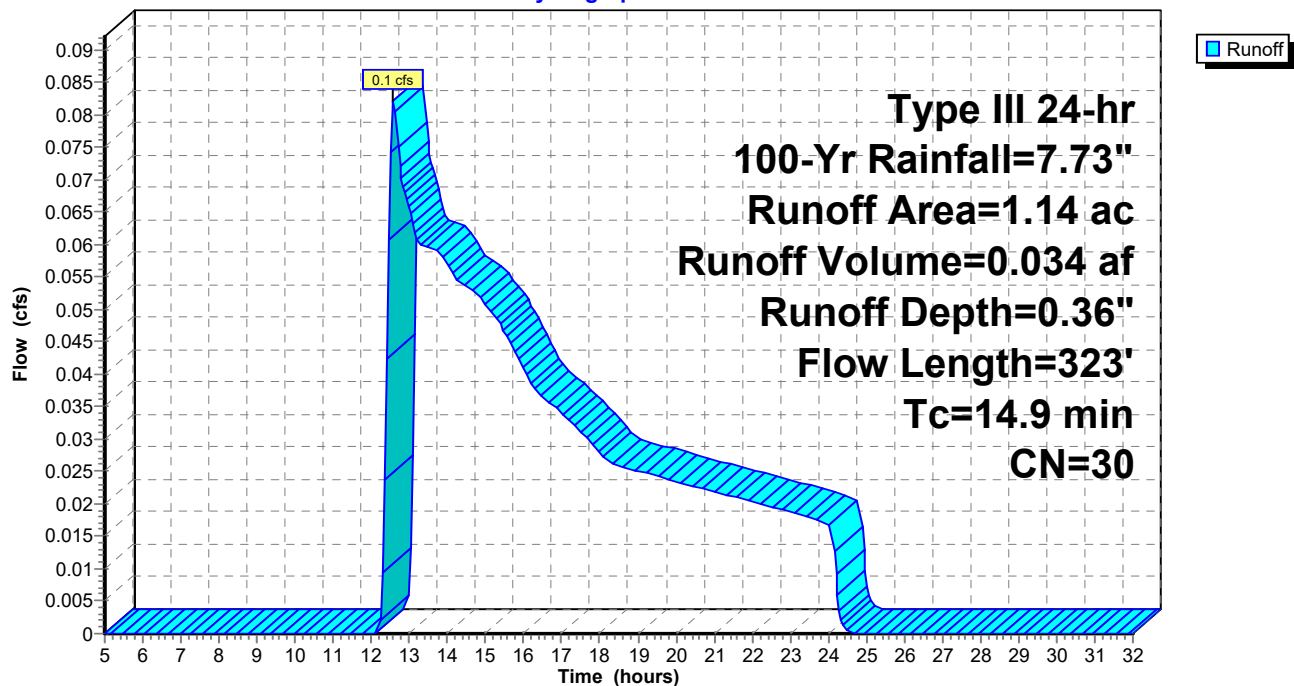
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
1.14	30	Woods, Good, HSG A
1.14		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	50	0.0330	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
3.4	146	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	127	0.0620	1.24		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	323	Total			

Subcatchment EWA-5A:

Hydrograph



Summary for Subcatchment EWA-5B:

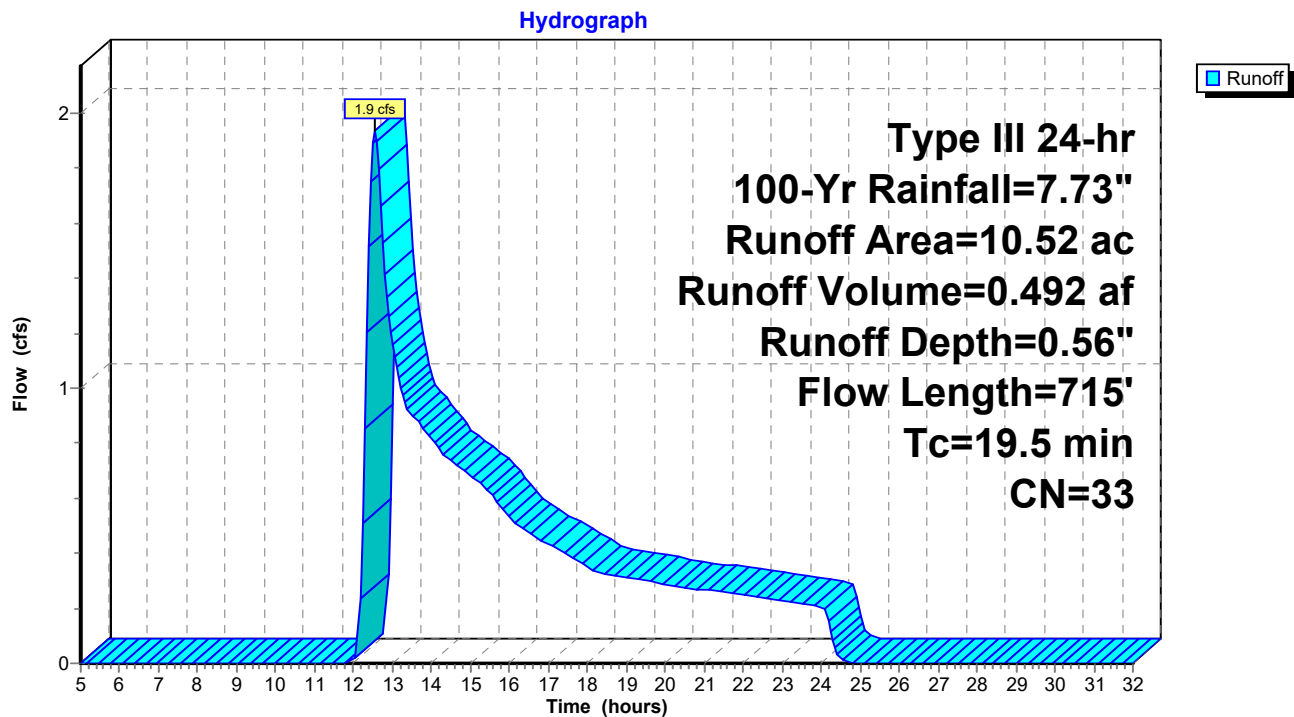
Runoff = 1.9 cfs @ 12.55 hrs, Volume= 0.492 af, Depth= 0.56"
 Routed to Reach DP-5 : Wetland Series 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
8.87	30	Woods, Good, HSG A
0.51	55	Woods, Good, HSG B
0.98	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
10.52	33	Weighted Average
10.52		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.2	251	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	76	0.0520	1.14		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
5.1	168	0.0120	0.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.8	170	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
19.5	715	Total			

Subcatchment EWA-5B:



Summary for Subcatchment EWA-6:

Runoff = 0.2 cfs @ 12.61 hrs, Volume= 0.069 af, Depth= 0.36"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

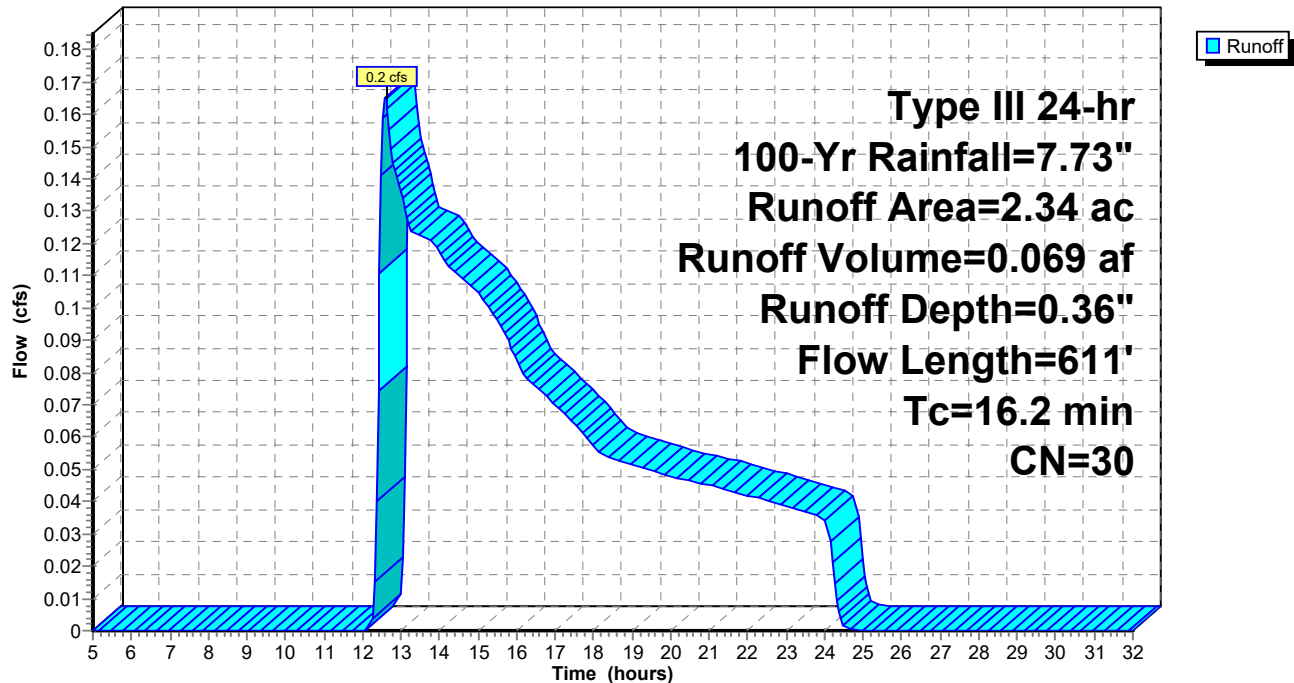
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
2.34	30	Woods, Good, HSG A
2.34		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.8	282	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.8	204	0.0590	1.21		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	75	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
16.2	611	Total			

Subcatchment EWA-6:

Hydrograph



Summary for Subcatchment EWA-7:

Runoff = 0.3 cfs @ 12.57 hrs, Volume= 0.117 af, Depth= 0.36"
 Routed to Reach DP-7 : #4 Poppy Ln

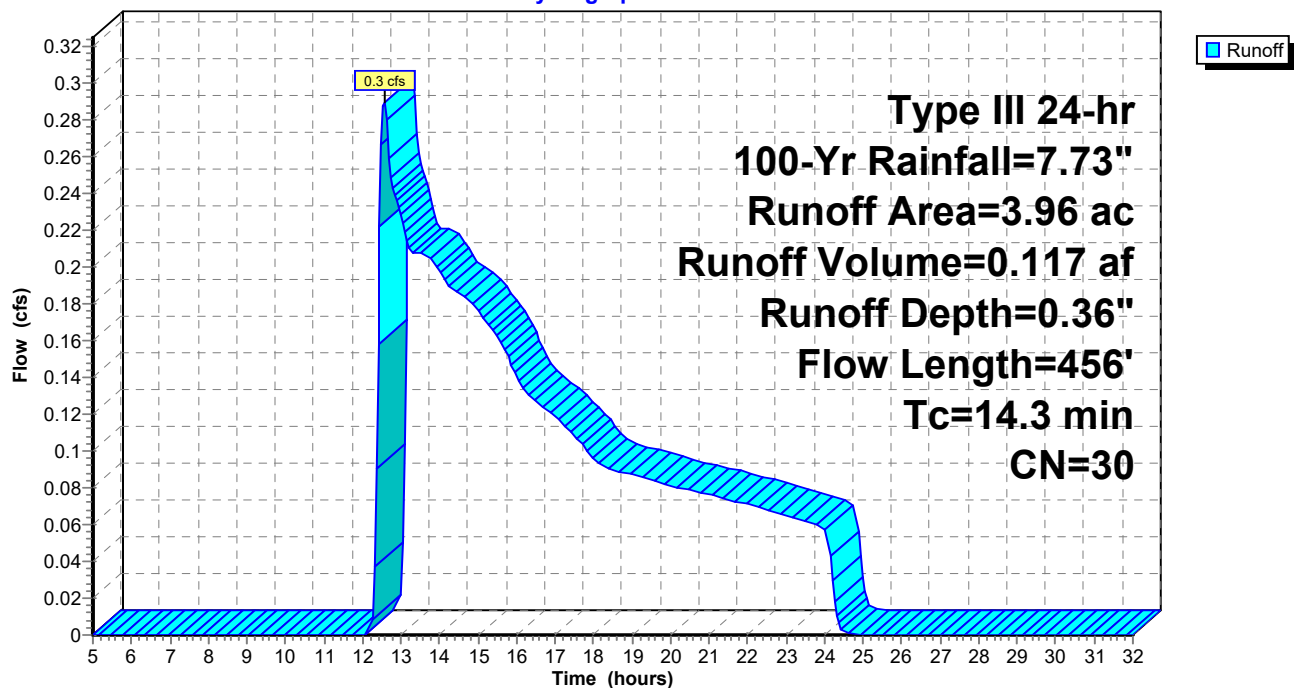
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
3.96	30	Woods, Good, HSG A
3.96		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
6.6	406	0.0420	1.02		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.3	456	Total			

Subcatchment EWA-7:

Hydrograph



Summary for Subcatchment EWA-8:

Runoff = 0.4 cfs @ 12.78 hrs, Volume= 0.200 af, Depth= 0.36"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

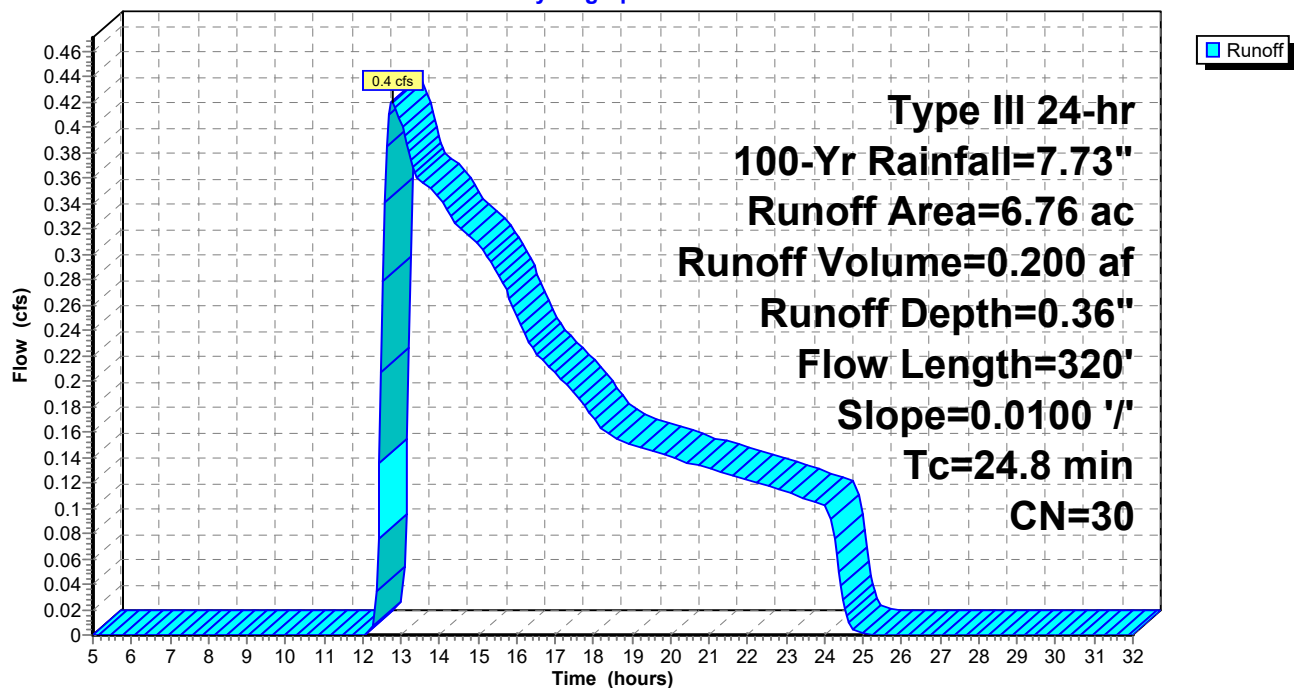
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
6.76	30	Woods, Good, HSG A
6.76		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
9.0	270	0.0100	0.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
24.8	320	Total			

Subcatchment EWA-8:

Hydrograph



Summary for Reach DP-1: Northern Wetland System Culvert

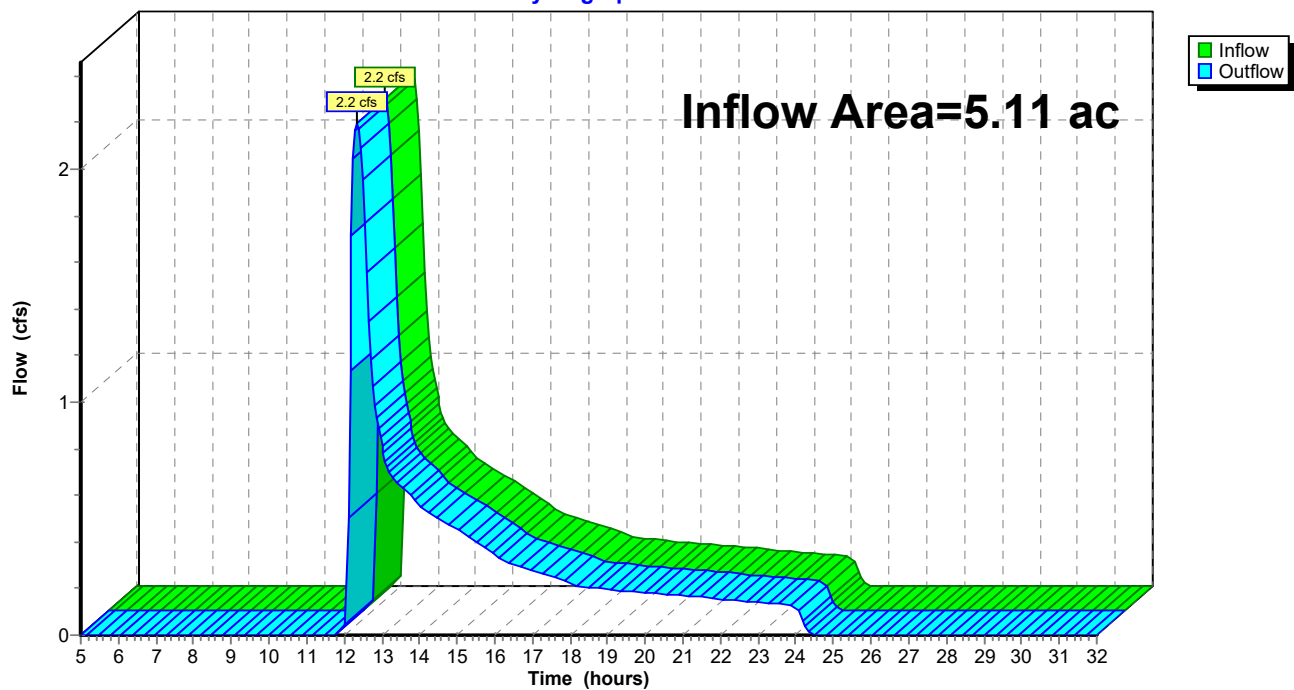
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.11 ac, 0.00% Impervious, Inflow Depth = 0.88" for 100-Yr event
Inflow = 2.2 cfs @ 12.35 hrs, Volume= 0.373 af
Outflow = 2.2 cfs @ 12.35 hrs, Volume= 0.373 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-1: Northern Wetland System Culvert

Hydrograph



Summary for Reach DP-3: #48 Rinzee Rd

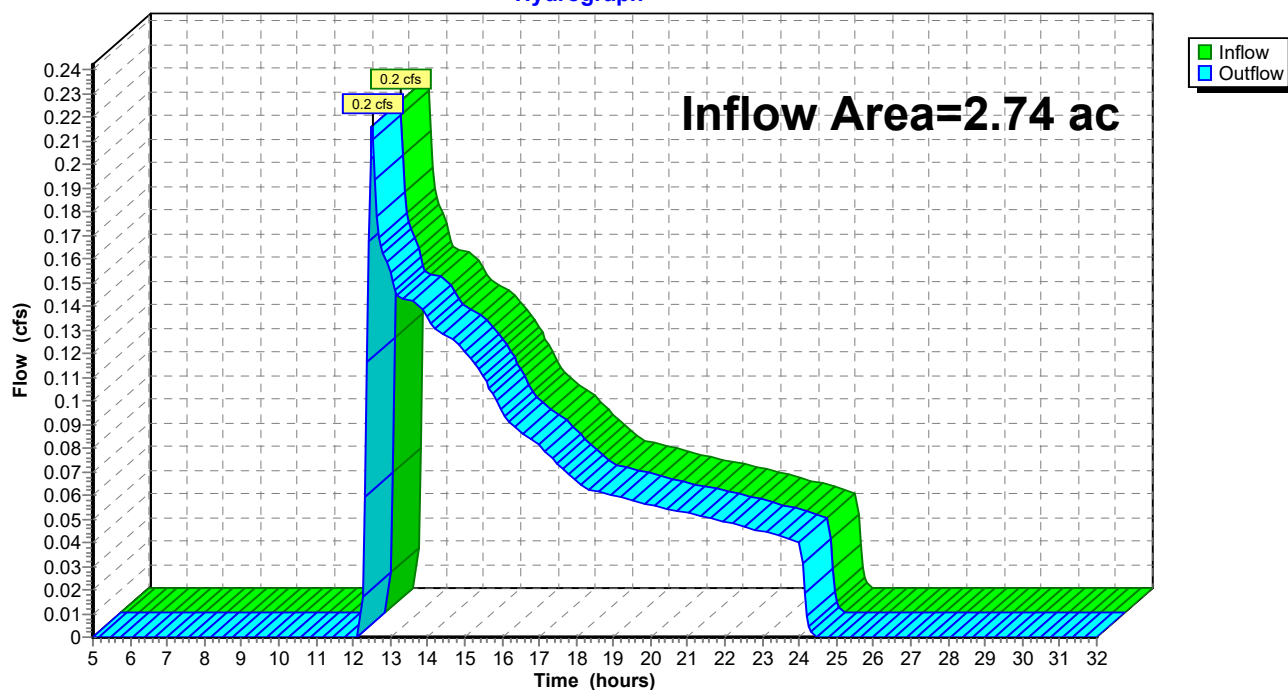
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.74 ac, 0.00% Impervious, Inflow Depth = 0.36" for 100-Yr event
Inflow = 0.2 cfs @ 12.51 hrs, Volume= 0.081 af
Outflow = 0.2 cfs @ 12.51 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Hydrograph



Summary for Reach DP-4: Poppy Ln

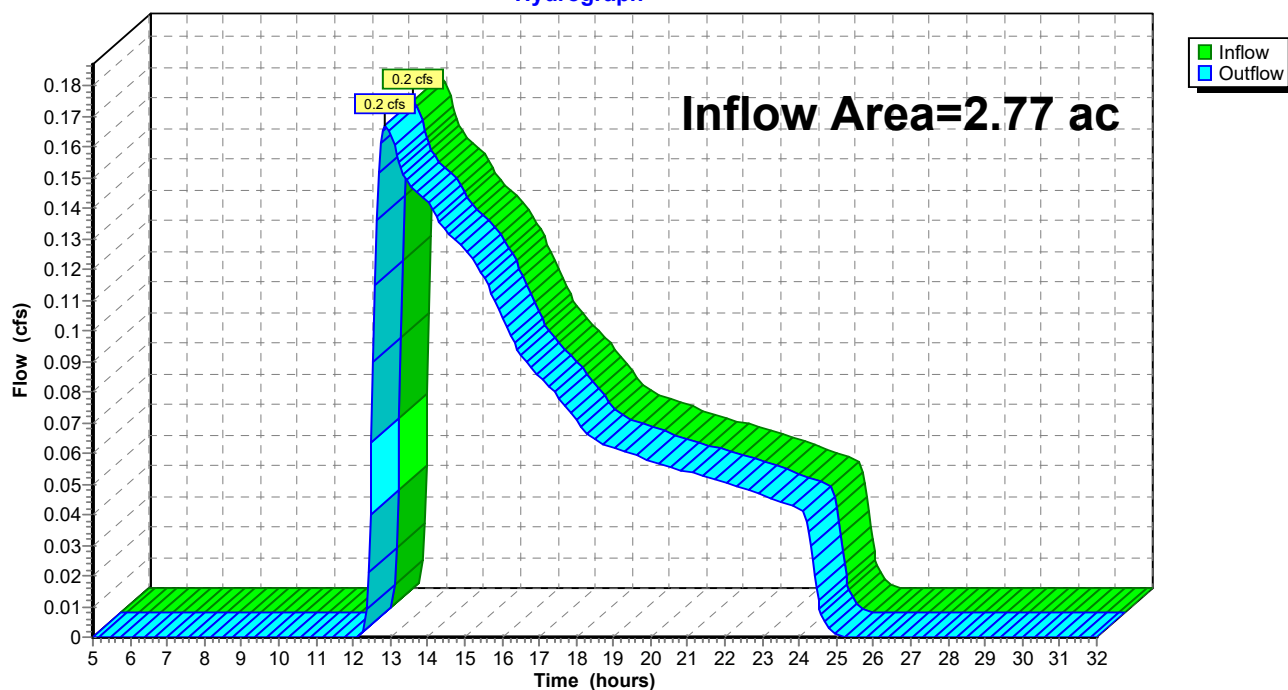
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.77 ac, 0.00% Impervious, Inflow Depth = 0.36" for 100-Yr event
Inflow = 0.2 cfs @ 12.87 hrs, Volume= 0.082 af
Outflow = 0.2 cfs @ 12.87 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph

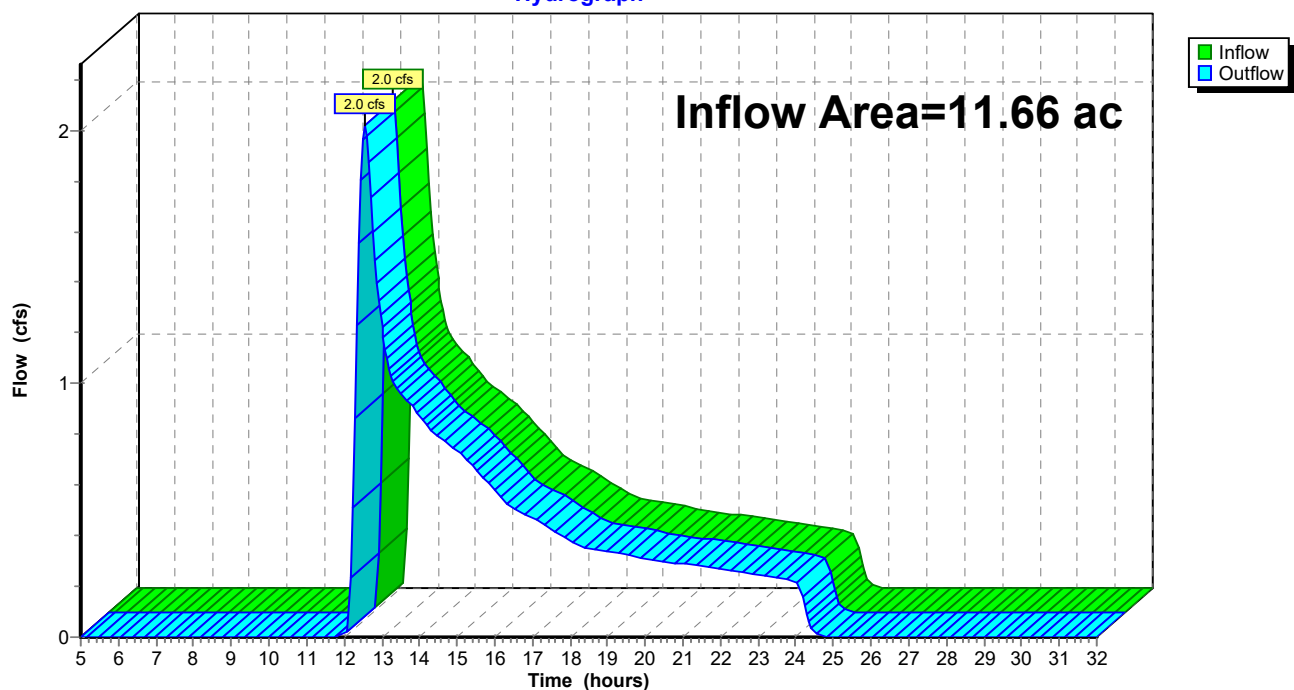


Summary for Reach DP-5: Wetland Series 'A'

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

Inflow Area = 11.66 ac, 0.00% Impervious, Inflow Depth = 0.54" for 100-Yr event
Inflow = 2.0 cfs @ 12.55 hrs, Volume= 0.526 af
Outflow = 2.0 cfs @ 12.55 hrs, Volume= 0.526 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-5: Wetland Series 'A'**Hydrograph**

Summary for Reach DP-6: Wetland Series 'B' & 'C'

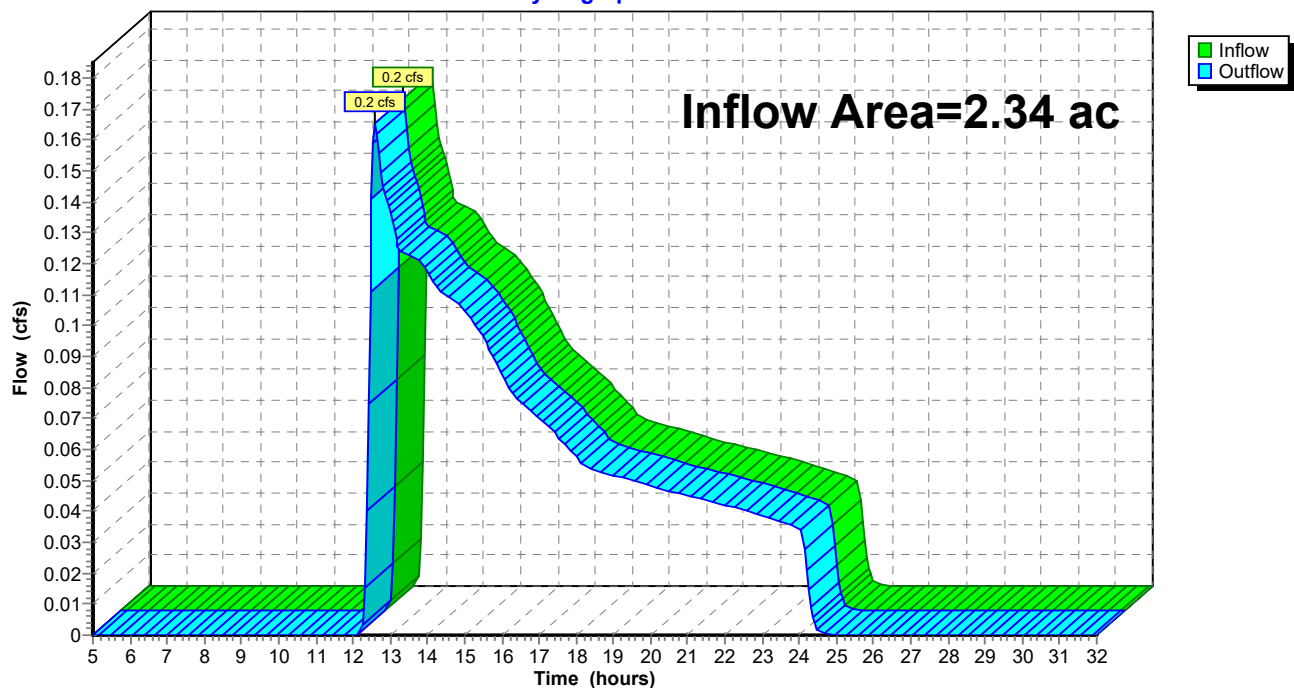
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.34 ac, 0.00% Impervious, Inflow Depth = 0.36" for 100-Yr event
Inflow = 0.2 cfs @ 12.61 hrs, Volume= 0.069 af
Outflow = 0.2 cfs @ 12.61 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Hydrograph



Summary for Reach DP-7: #4 Poppy Ln

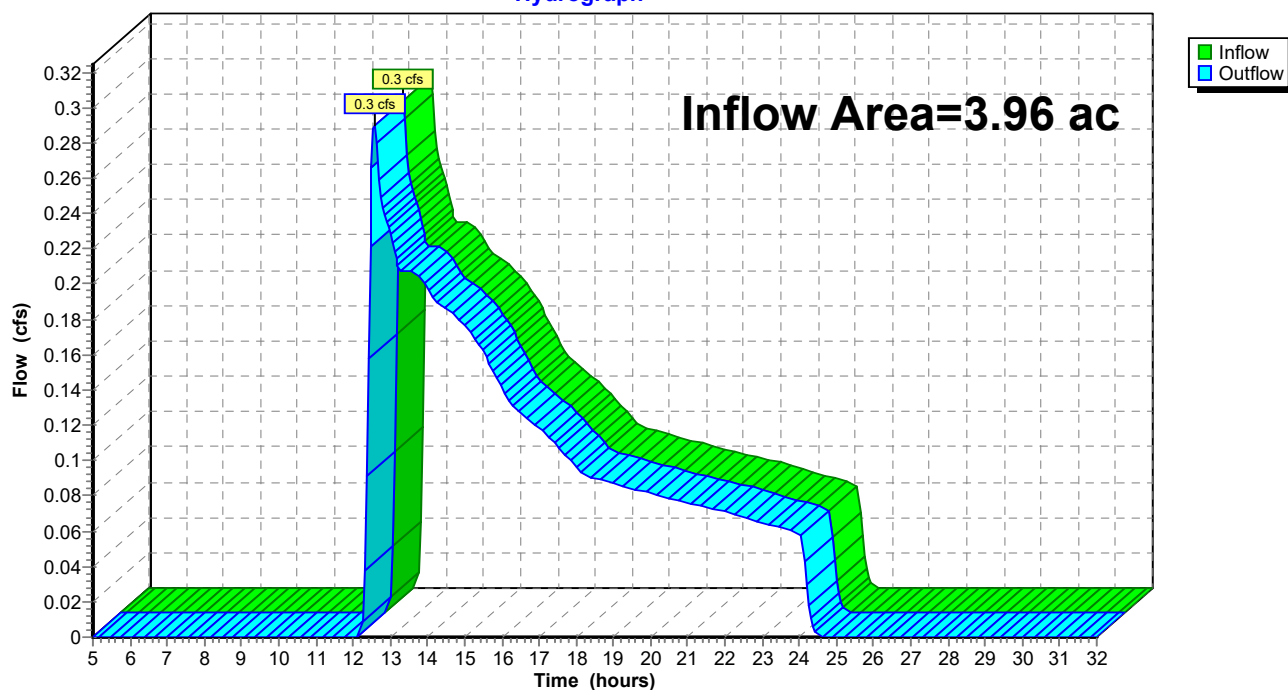
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.96 ac, 0.00% Impervious, Inflow Depth = 0.36" for 100-Yr event
Inflow = 0.3 cfs @ 12.57 hrs, Volume= 0.117 af
Outflow = 0.3 cfs @ 12.57 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph



Summary for Reach DP-8: Wetland Series 'D' & 'E'

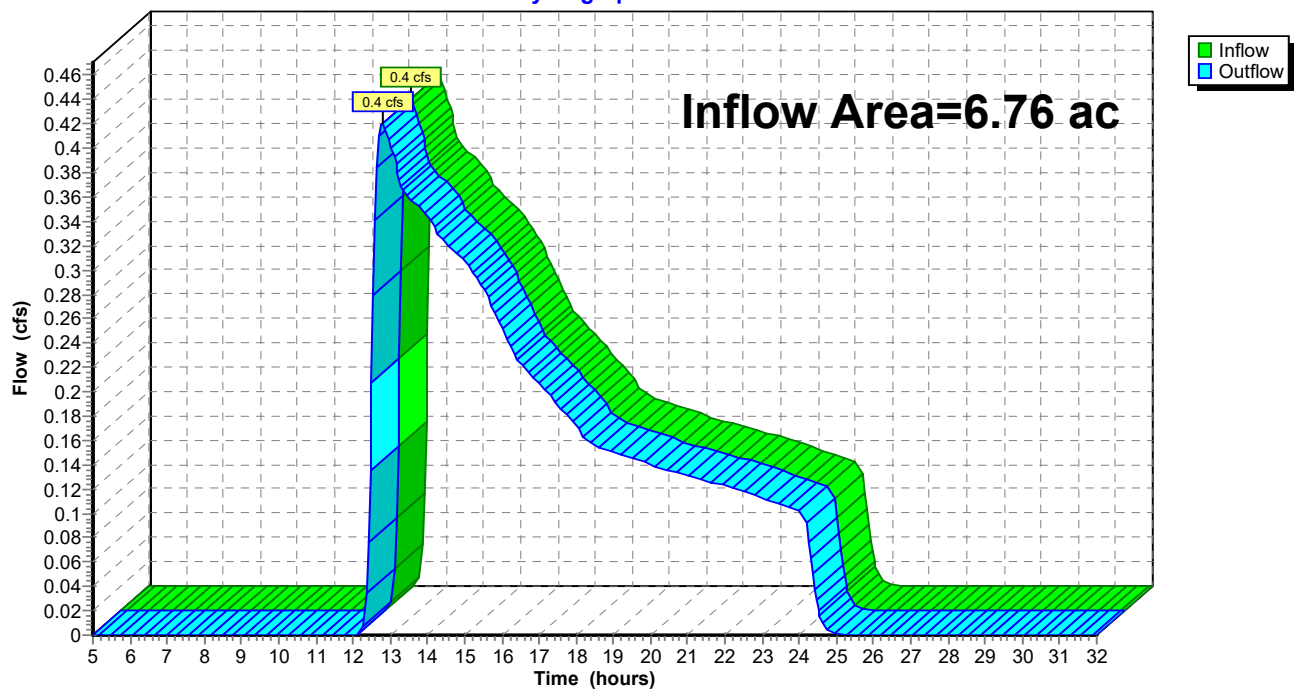
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.76 ac, 0.00% Impervious, Inflow Depth = 0.36" for 100-Yr event
Inflow = 0.4 cfs @ 12.78 hrs, Volume= 0.200 af
Outflow = 0.4 cfs @ 12.78 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

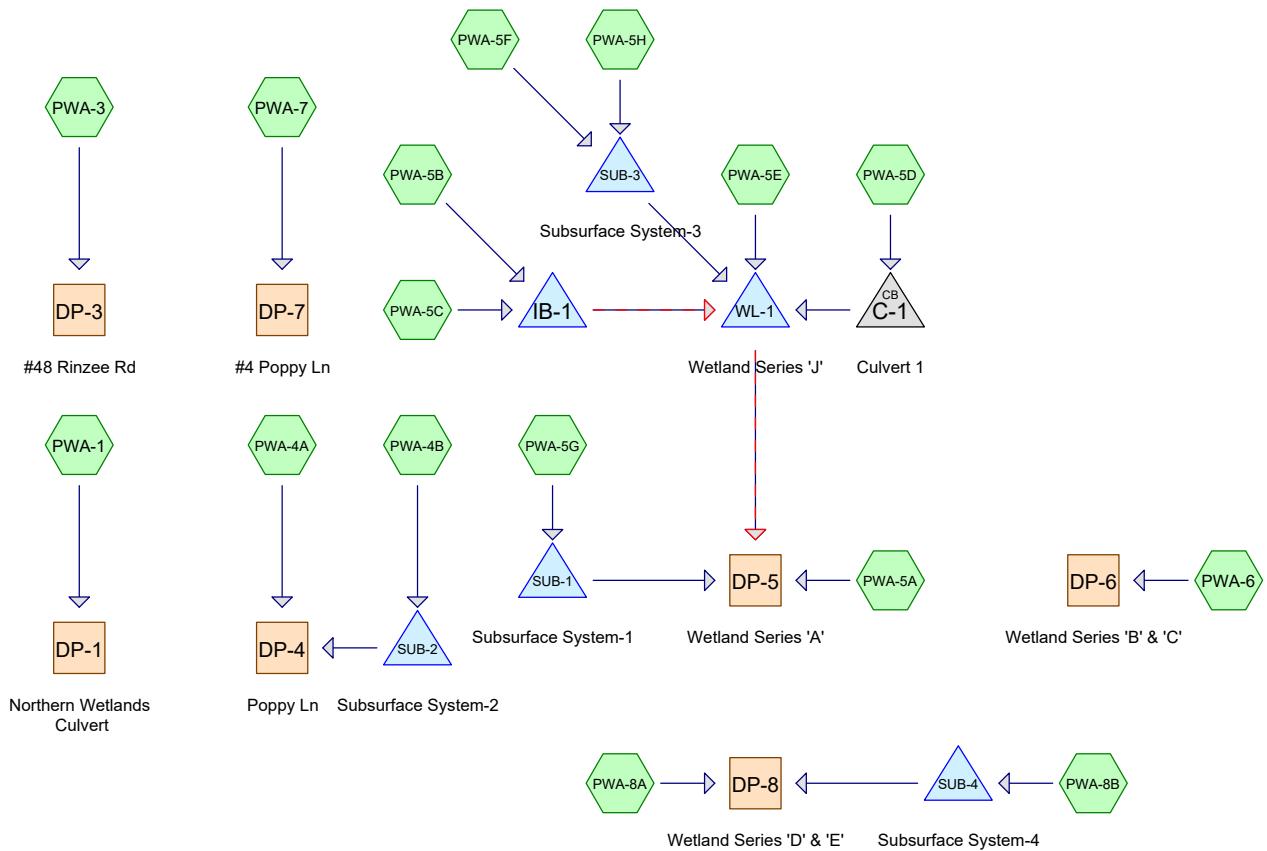
Hydrograph



DRAINAGE REPORT

Murphy's Farm
Dracut, MA

TAB 4



Routing Diagram for 23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc. Printed 12/24/2024
HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 2

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	3.12	2
2	10-Yr	Type III 24-hr		Default	24.00	1	4.90	2
3	25-Yr	Type III 24-hr		Default	24.00	1	6.02	2
4	100-Yr	Type III 24-hr		Default	24.00	1	7.73	2

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 3

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.32	39	>75% Grass cover, Good, HSG A (PWA-1, PWA-3, PWA-4A, PWA-4B, PWA-5A, PWA-5B, PWA-5C, PWA-5D, PWA-5E, PWA-5F, PWA-5G, PWA-5H, PWA-6, PWA-7, PWA-8A, PWA-8B)
0.81	61	>75% Grass cover, Good, HSG B (PWA-1, PWA-4B, PWA-5C, PWA-5D, PWA-5E)
7.11	98	Paved parking, HSG A (PWA-4B, PWA-5B, PWA-5C, PWA-5F, PWA-5G, PWA-8B)
0.03	98	Paved parking, HSG B (PWA-4B, PWA-5C)
4.32	98	Roofs, HSG A (PWA-4B, PWA-5B, PWA-5C, PWA-5F, PWA-8B)
0.11	98	Roofs, HSG B (PWA-4B, PWA-5C)
8.80	30	Woods, Good, HSG A (PWA-1, PWA-3, PWA-4A, PWA-4B, PWA-5A, PWA-5C, PWA-5D, PWA-5E, PWA-5H, PWA-6, PWA-7, PWA-8A)
0.84	55	Woods, Good, HSG B (PWA-1, PWA-4B, PWA-5C, PWA-5E)
35.34	57	TOTAL AREA

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 4

Time span=5.00-32.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPWA-1:	Runoff Area=4.46 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=397' Tc=13.7 min CN=37 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-3:	Runoff Area=0.28 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=80' Slope=0.1000 '/' Tc=6.6 min CN=34 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-4A:	Runoff Area=0.32 ac 0.00% Impervious Runoff Depth=0.00" Tc=6.0 min CN=37 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-4B:	Runoff Area=3.77 ac 42.44% Impervious Runoff Depth=0.52" Flow Length=1,000' Tc=22.8 min CN=64 Runoff=1.1 cfs 0.164 af
SubcatchmentPWA-5A:	Runoff Area=0.59 ac 0.00% Impervious Runoff Depth=0.00" Tc=6.0 min CN=34 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-5B:	Runoff Area=3.16 ac 56.65% Impervious Runoff Depth=0.88" Flow Length=705' Tc=8.7 min CN=72 Runoff=2.7 cfs 0.232 af
SubcatchmentPWA-5C:	Runoff Area=4.85 ac 53.40% Impervious Runoff Depth=0.88" Tc=6.0 min CN=72 Runoff=4.5 cfs 0.356 af
SubcatchmentPWA-5D:	Runoff Area=2.26 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=395' Tc=13.1 min CN=36 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-5E:	Runoff Area=1.78 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=230' Tc=9.6 min CN=37 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-5F:	Runoff Area=2.67 ac 75.66% Impervious Runoff Depth=1.62" Tc=6.0 min CN=84 Runoff=5.0 cfs 0.359 af
SubcatchmentPWA-5G:	Runoff Area=0.48 ac 47.92% Impervious Runoff Depth=0.65" Tc=6.0 min CN=67 Runoff=0.3 cfs 0.026 af
SubcatchmentPWA-5H:	Runoff Area=1.82 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=330' Tc=9.4 min CN=34 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-6:	Runoff Area=1.17 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=175' Tc=9.6 min CN=33 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-7:	Runoff Area=0.98 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=267' Tc=11.2 min CN=35 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-8A:	Runoff Area=1.29 ac 0.00% Impervious Runoff Depth=0.00" Flow Length=100' Tc=8.5 min CN=33 Runoff=0.0 cfs 0.000 af
SubcatchmentPWA-8B:	Runoff Area=5.46 ac 61.17% Impervious Runoff Depth=1.04" Tc=6.0 min CN=75 Runoff=6.2 cfs 0.473 af

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 5

Reach DP-1: Northern Wetlands CulvertInflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af**Reach DP-3: #48 Rinzee Rd**Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af**Reach DP-4: Poppy Ln**Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af**Reach DP-5: Wetland Series 'A'**Inflow=0.0 cfs 0.011 af
Outflow=0.0 cfs 0.011 af**Reach DP-6: Wetland Series 'B' & 'C'**Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af**Reach DP-7: #4 Poppy Ln**Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af**Reach DP-8: Wetland Series 'D' & 'E'**Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af**Pond C-1: Culvert 1**Peak Elev=166.00' Inflow=0.0 cfs 0.000 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=0.0 cfs 0.000 af**Pond IB-1:**Peak Elev=138.46' Storage=5,016 cf Inflow=7.1 cfs 0.588 af
Discarded=2.2 cfs 0.588 af Primary=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af Outflow=2.2 cfs 0.588 af**Pond SUB-1: Subsurface System-1**Peak Elev=131.69' Storage=0.019 af Inflow=0.3 cfs 0.026 af
Outflow=0.0 cfs 0.011 af**Pond SUB-2: Subsurface System-2**Peak Elev=137.04' Storage=227 cf Inflow=1.1 cfs 0.164 af
Discarded=1.0 cfs 0.164 af Primary=0.0 cfs 0.000 af Outflow=1.0 cfs 0.164 af**Pond SUB-3: Subsurface System-3**Peak Elev=140.09' Storage=4,692 cf Inflow=5.0 cfs 0.359 af
Discarded=0.8 cfs 0.359 af Primary=0.0 cfs 0.000 af Outflow=0.8 cfs 0.359 af**Pond SUB-4: Subsurface System-4**Peak Elev=134.71' Storage=5,104 cf Inflow=6.2 cfs 0.473 af
Discarded=1.4 cfs 0.473 af Primary=0.0 cfs 0.000 af Outflow=1.4 cfs 0.473 af**Pond WL-1: Wetland Series 'J'**Peak Elev=136.00' Storage=0 cf Inflow=0.0 cfs 0.000 af
Primary=0.0 cfs 0.000 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.000 af**Total Runoff Area = 35.34 ac Runoff Volume = 1.610 af Average Runoff Depth = 0.55"**
67.26% Pervious = 23.77 ac 32.74% Impervious = 11.57 ac

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 6

Summary for Subcatchment PWA-1:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-1 : Northern Wetlands Culvert

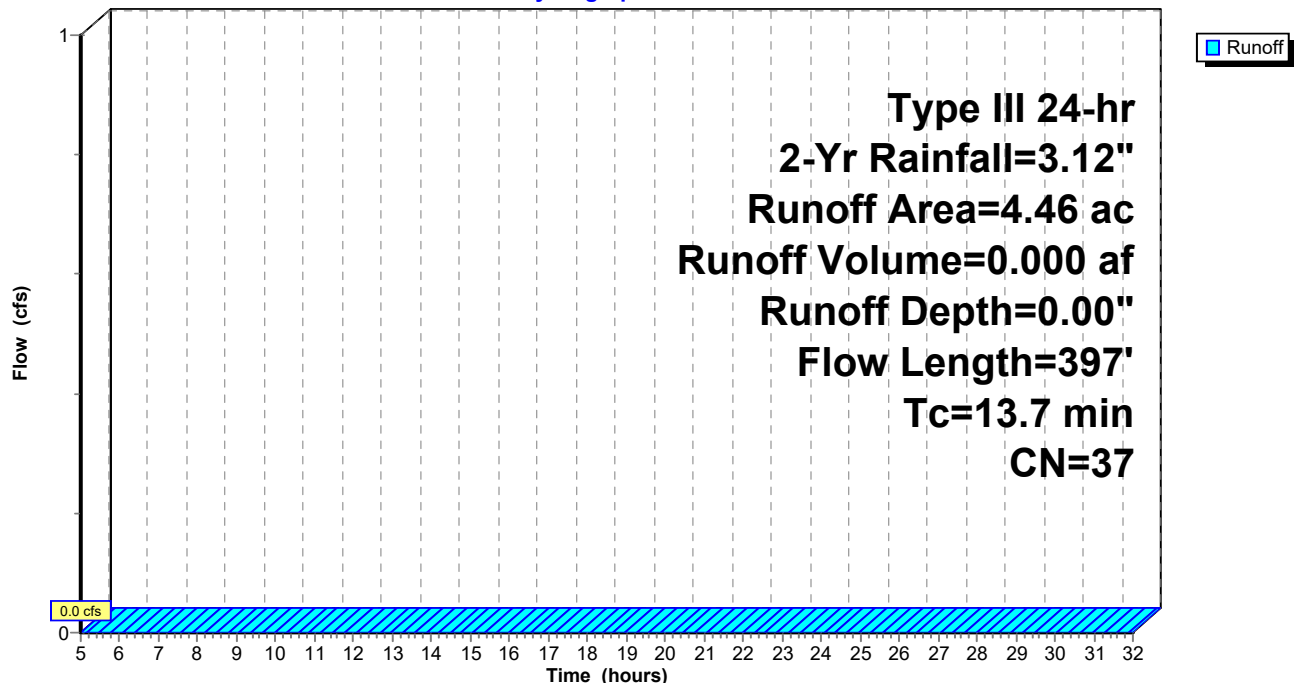
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.29	61	>75% Grass cover, Good, HSG B
0.55	39	>75% Grass cover, Good, HSG A
2.97	30	Woods, Good, HSG A
0.65	55	Woods, Good, HSG B
4.46	37	Weighted Average
4.46		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	347	0.0350	0.94		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.7	397	Total			

Subcatchment PWA-1:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 7

Summary for Subcatchment PWA-3:

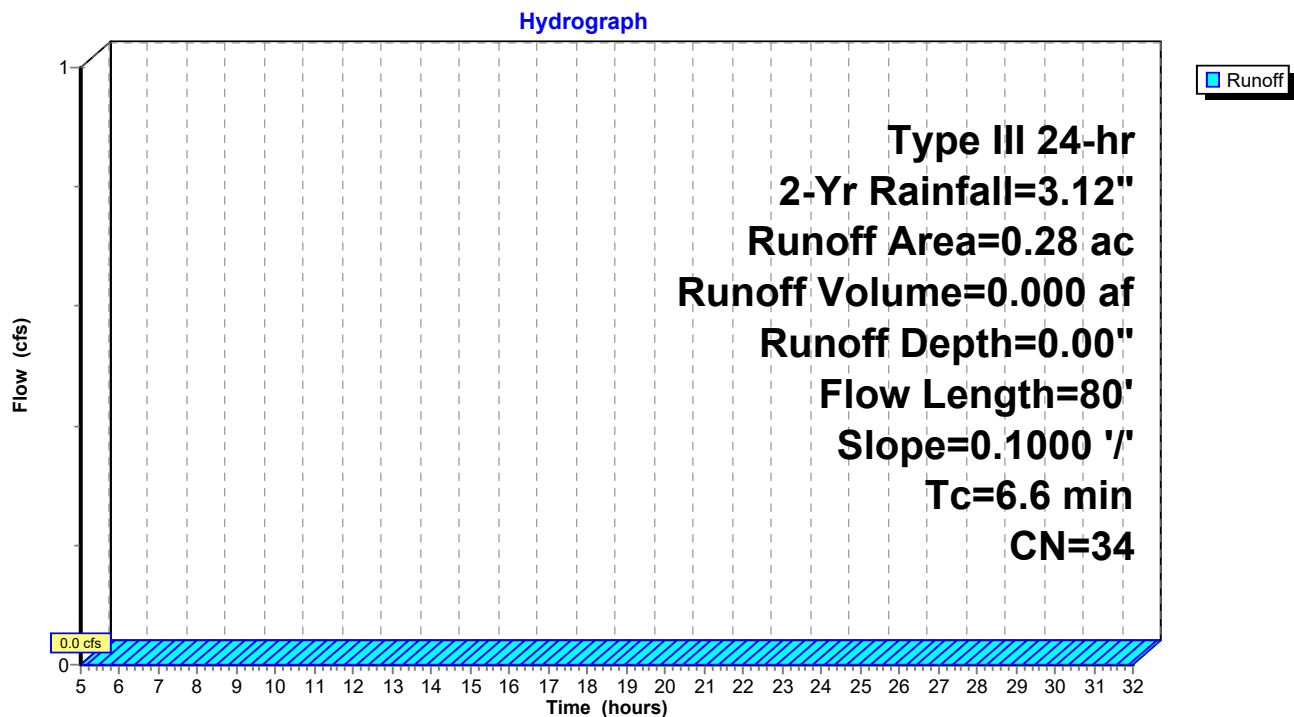
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-3 : #48 Rinzee Rd

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.11	39	>75% Grass cover, Good, HSG A
0.17	30	Woods, Good, HSG A
0.28	34	Weighted Average
0.28		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	30	0.1000	1.58		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
6.6	80	Total			

Subcatchment PWA-3:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 8

Summary for Subcatchment PWA-4A:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-4 : Poppy Ln

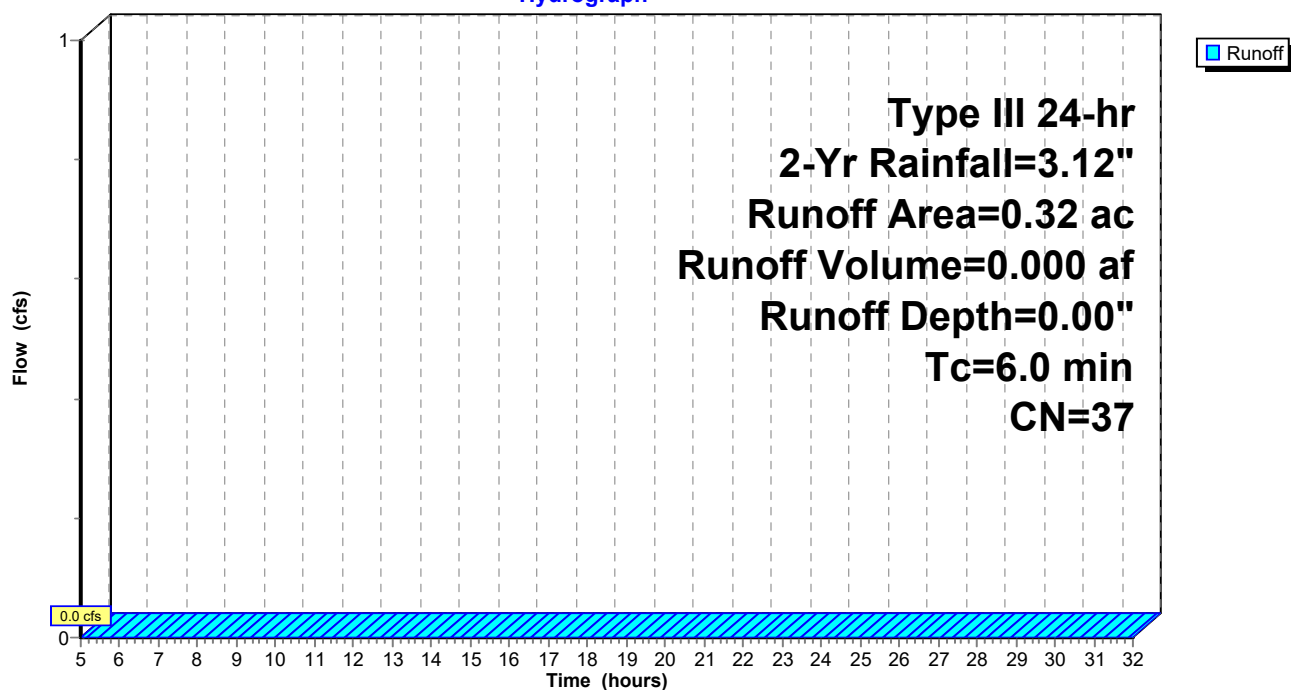
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.07	30	Woods, Good, HSG A
0.32	37	Weighted Average
0.32		100.00% Pervious Area

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

Subcatchment PWA-4A:

Hydrograph



23-10524 - Post - R2

Type III 24-hr 2-Yr Rainfall=3.12"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 9

Summary for Subcatchment PWA-4B:

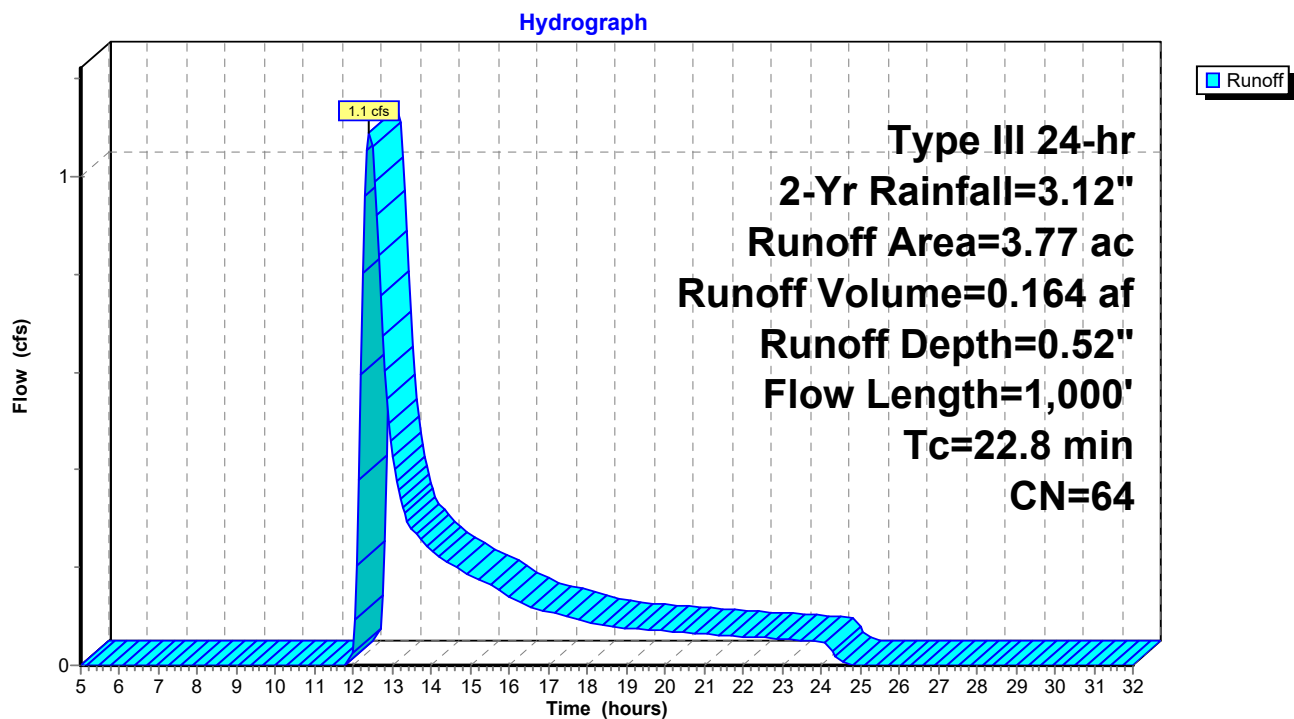
Runoff = 1.1 cfs @ 12.41 hrs, Volume= 0.164 af, Depth= 0.52"
 Routed to Pond SUB-2 : Subsurface System-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.20	30	Woods, Good, HSG A
0.05	55	Woods, Good, HSG B
1.85	39	>75% Grass cover, Good, HSG A
0.07	61	>75% Grass cover, Good, HSG B
0.62	98	Roofs, HSG A
0.04	98	Roofs, HSG B
0.93	98	Paved parking, HSG A
0.01	98	Paved parking, HSG B
3.77	64	Weighted Average
2.17		57.56% Pervious Area
1.60		42.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
17.3	950	0.0170	0.91		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.8	1,000	Total			

Subcatchment PWA-4B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 11

Summary for Subcatchment PWA-5A:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-5 : Wetland Series 'A'

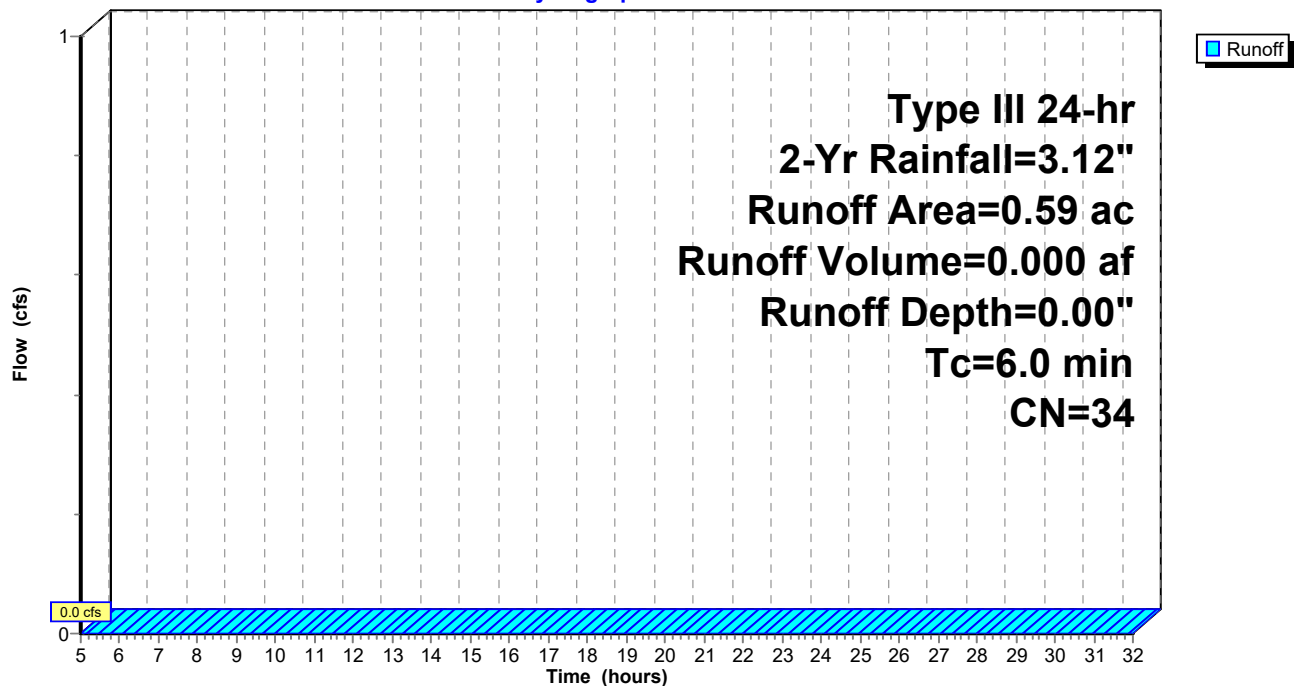
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.33	30	Woods, Good, HSG A
0.26	39	>75% Grass cover, Good, HSG A
0.59	34	Weighted Average
0.59		100.00% Pervious Area

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

Subcatchment PWA-5A:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 12

Summary for Subcatchment PWA-5B:

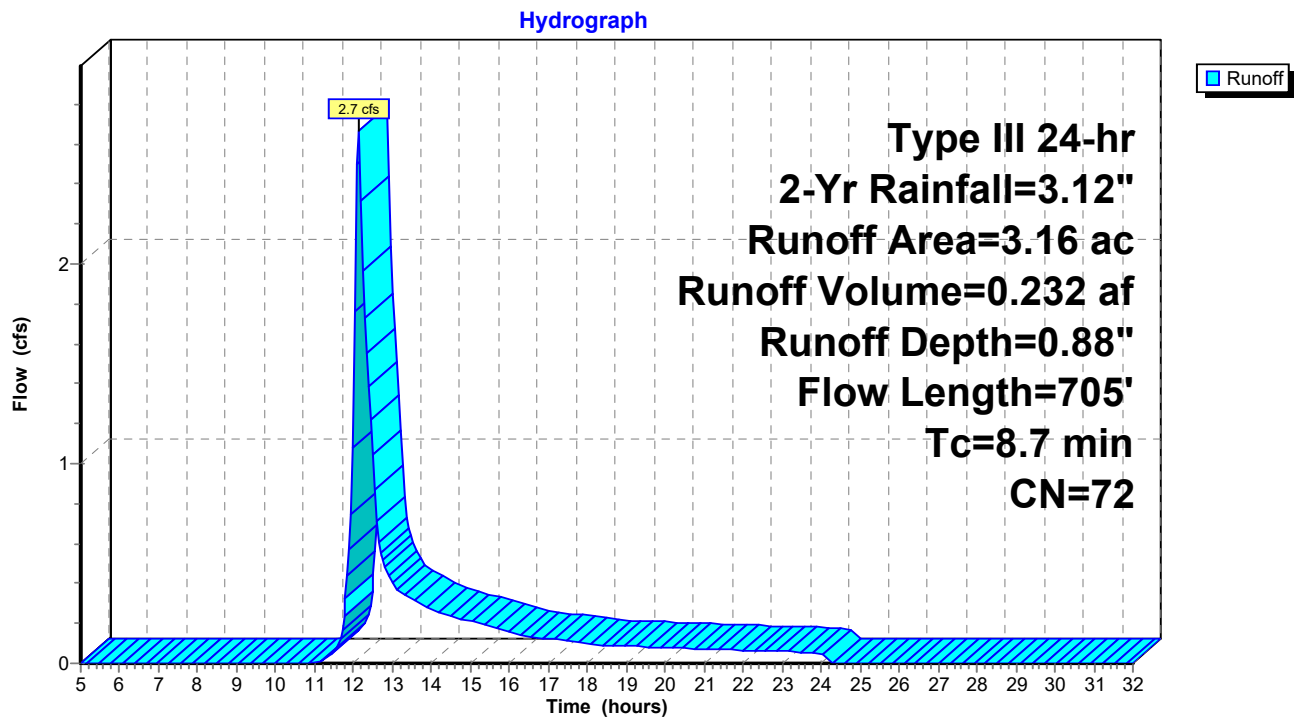
Runoff = 2.7 cfs @ 12.14 hrs, Volume= 0.232 af, Depth= 0.88"
 Routed to Pond IB-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
1.37	39	>75% Grass cover, Good, HSG A
0.52	98	Roofs, HSG A
1.27	98	Paved parking, HSG A
3.16	72	Weighted Average
1.37		43.35% Pervious Area
1.79		56.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0360	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	60	0.0400	3.00		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
1.1	265	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
3.0	330	0.0150	1.84		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.7	705	Total			

Subcatchment PWA-5B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 14

Summary for Subcatchment PWA-5C:

Runoff = 4.5 cfs @ 12.10 hrs, Volume= 0.356 af, Depth= 0.88"
 Routed to Pond IB-1 :

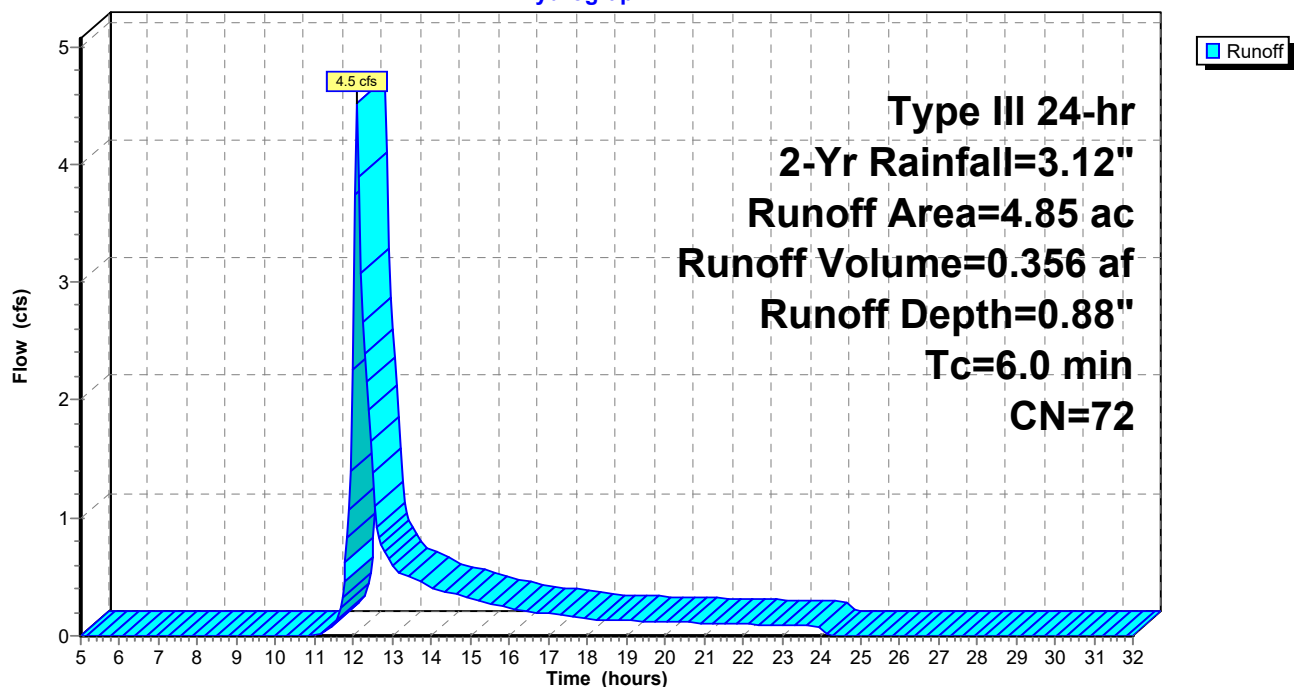
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
1.94	39	>75% Grass cover, Good, HSG A
0.25	61	>75% Grass cover, Good, HSG B
0.01	30	Woods, Good, HSG A
0.06	55	Woods, Good, HSG B
0.94	98	Roofs, HSG A
0.07	98	Roofs, HSG B
1.56	98	Paved parking, HSG A
0.02	98	Paved parking, HSG B
4.85	72	Weighted Average
2.26		46.60% Pervious Area
2.59		53.40% Impervious Area

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

Subcatchment PWA-5C:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 15

Summary for Subcatchment PWA-5D:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Pond C-1 : Culvert 1

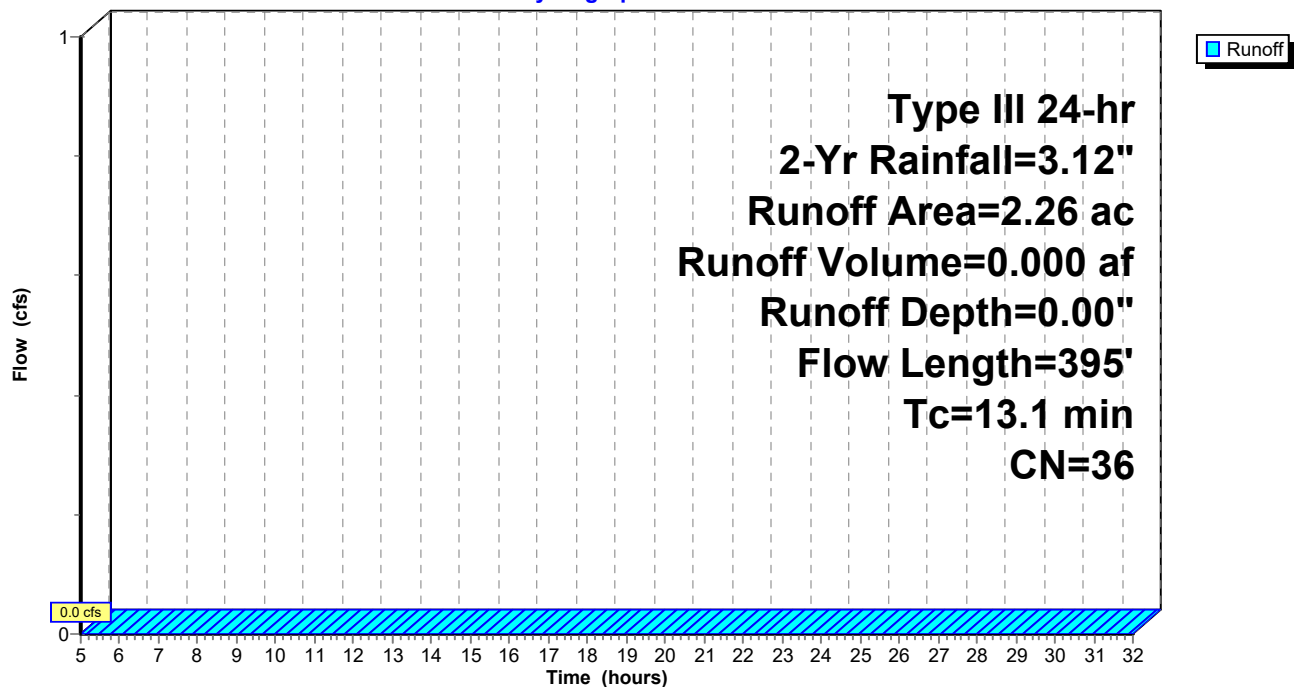
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.89	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
1.21	30	Woods, Good, HSG A
2.26	36	Weighted Average
2.26		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.1	245	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.1	395	Total			

Subcatchment PWA-5D:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 16

Summary for Subcatchment PWA-5E:

[45] Hint: Runoff=Zero

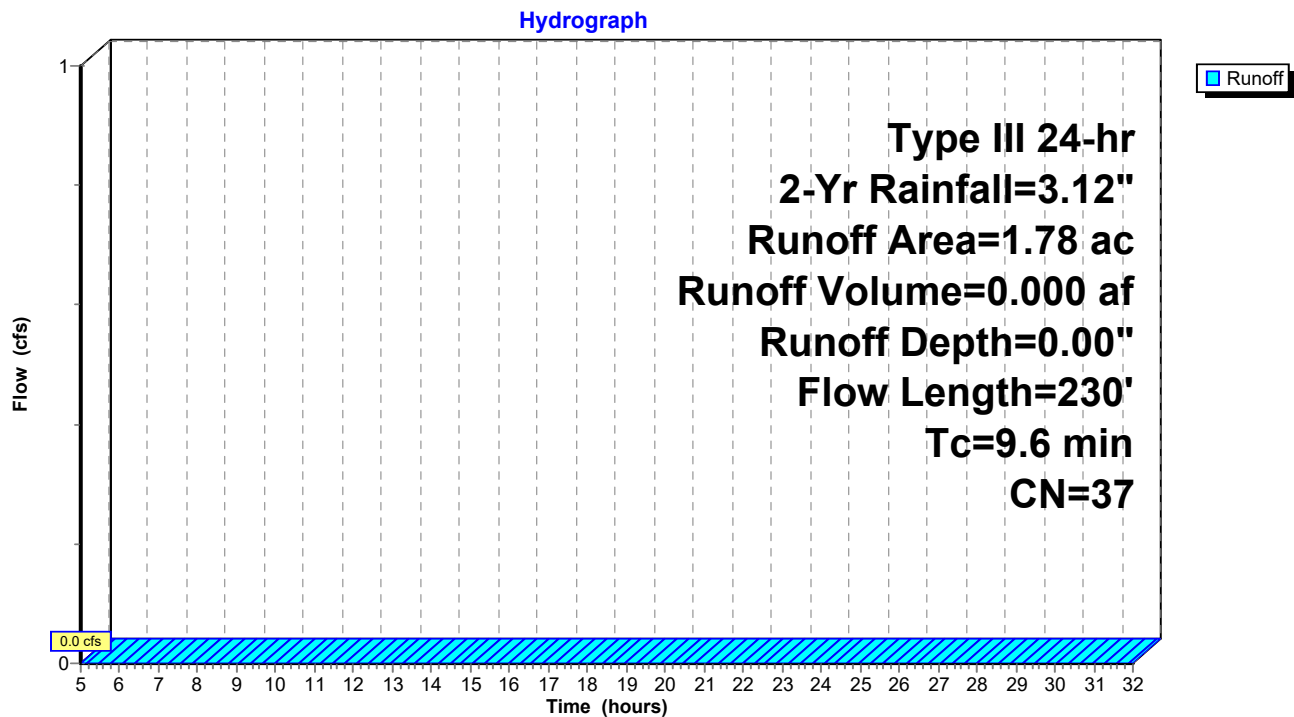
Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Pond WL-1 : Wetland Series 'J'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.97	39	>75% Grass cover, Good, HSG A
0.04	61	>75% Grass cover, Good, HSG B
0.69	30	Woods, Good, HSG A
0.08	55	Woods, Good, HSG B
1.78	37	Weighted Average
1.78		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	30	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	110	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	40	0.3700	4.26		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.6	230	Total			

Subcatchment PWA-5E:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 18

Summary for Subcatchment PWA-5F:

Runoff = 5.0 cfs @ 12.09 hrs, Volume= 0.359 af, Depth= 1.62"
Routed to Pond SUB-3 : Subsurface System-3

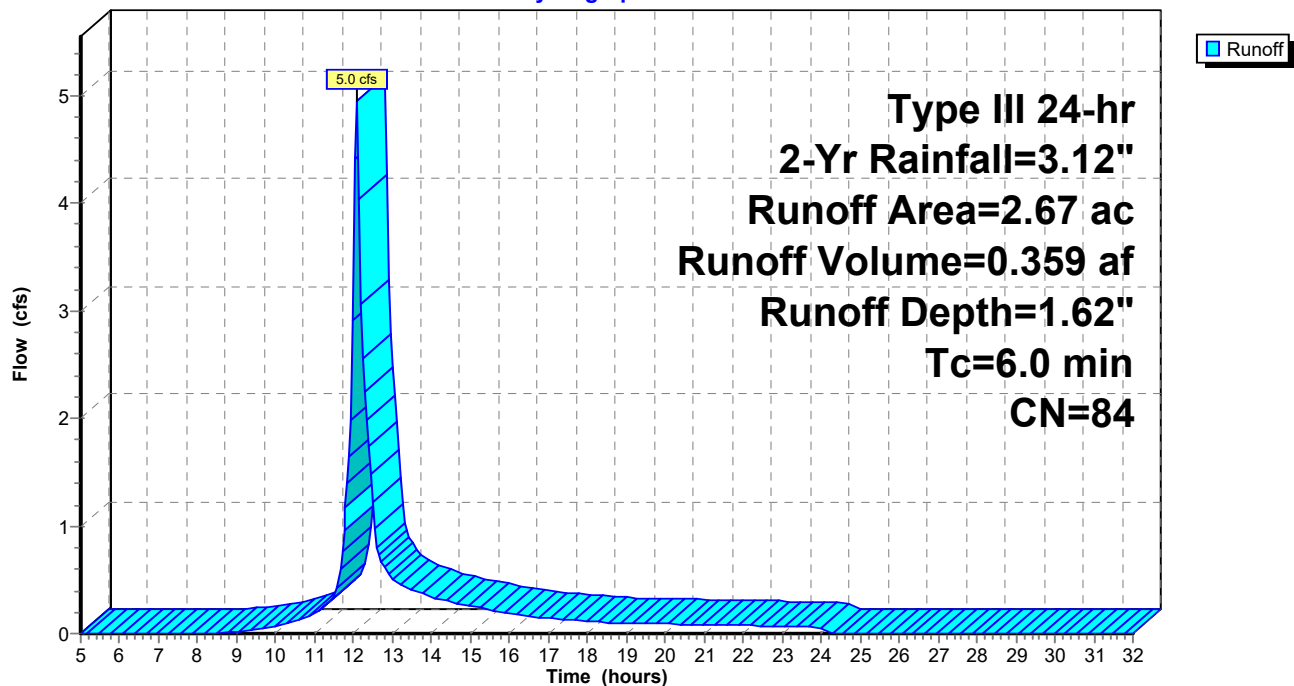
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.65	39	>75% Grass cover, Good, HSG A
0.85	98	Roofs, HSG A
1.17	98	Paved parking, HSG A
2.67	84	Weighted Average
0.65		24.34% Pervious Area
2.02		75.66% Impervious Area

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

Subcatchment PWA-5F:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 19

Summary for Subcatchment PWA-5G:

Runoff = 0.3 cfs @ 12.11 hrs, Volume= 0.026 af, Depth= 0.65"
Routed to Pond SUB-1 : Subsurface System-1

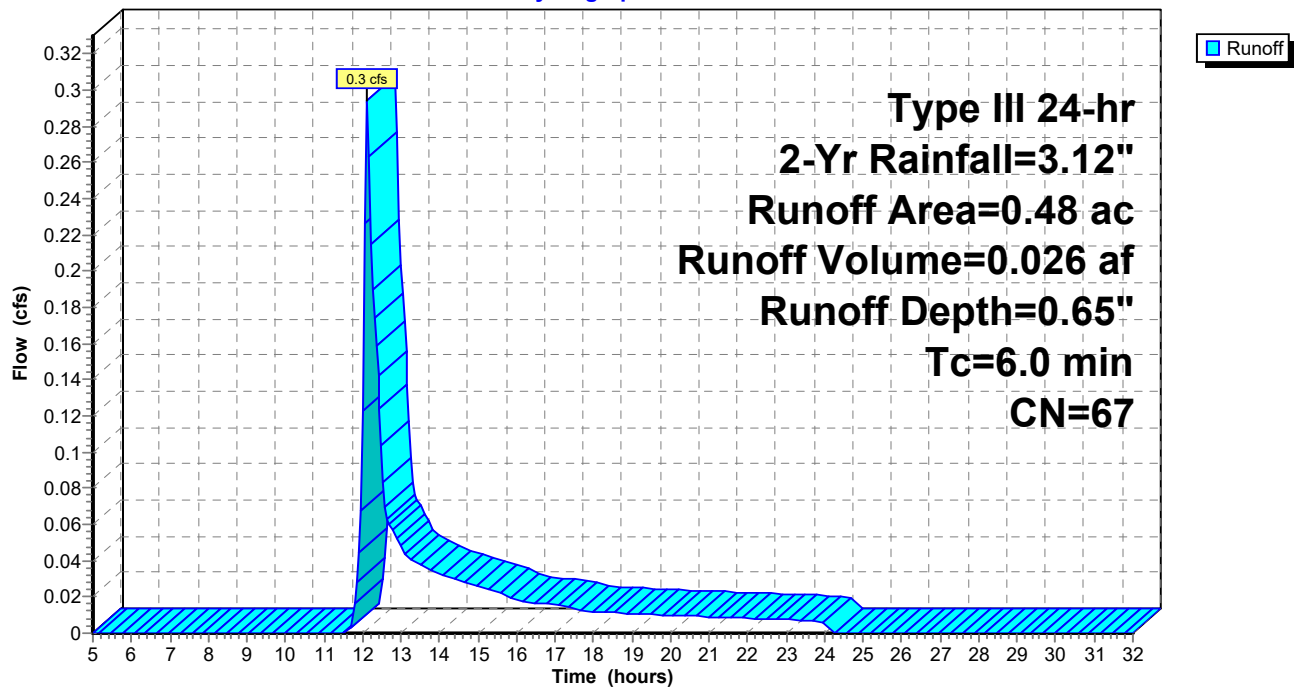
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.23	98	Paved parking, HSG A
0.48	67	Weighted Average
0.25		52.08% Pervious Area
0.23		47.92% Impervious Area

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

Subcatchment PWA-5G:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 20

Summary for Subcatchment PWA-5H:

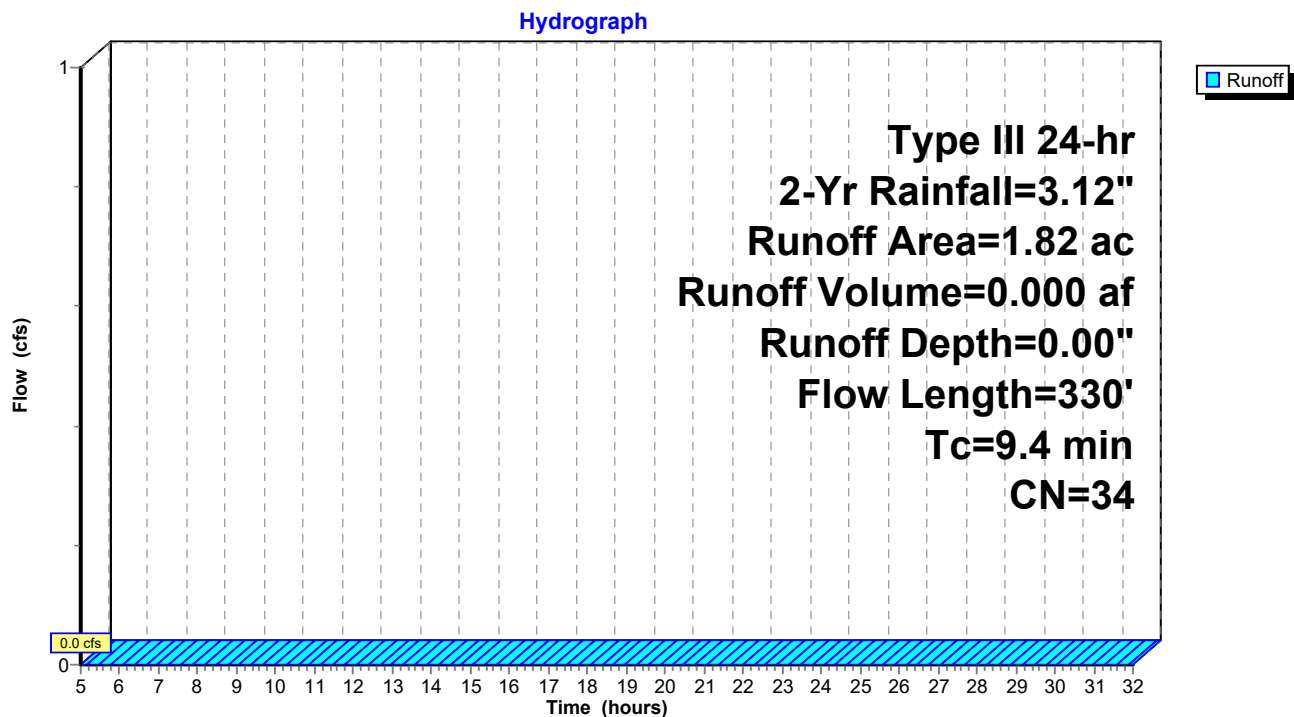
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Pond SUB-3 : Subsurface System-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
1.01	30	Woods, Good, HSG A
0.81	39	>75% Grass cover, Good, HSG A
1.82	34	Weighted Average
1.82		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.1600	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.2	280	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.4	330	Total			

Subcatchment PWA-5H:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 21

Summary for Subcatchment PWA-6:

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

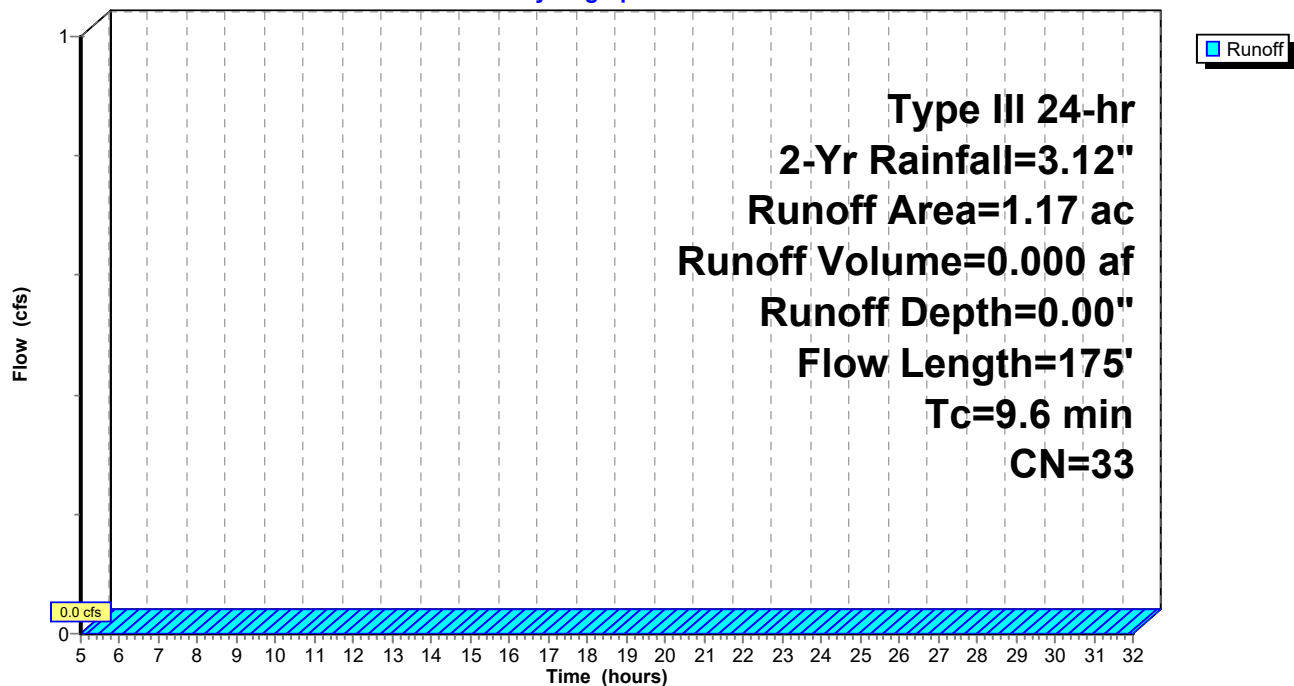
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.44	39	>75% Grass cover, Good, HSG A
0.73	30	Woods, Good, HSG A
1.17	33	Weighted Average
1.17		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.9	125	0.0500	1.12		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
9.6	175	Total			

Subcatchment PWA-6:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 22

Summary for Subcatchment PWA-7:

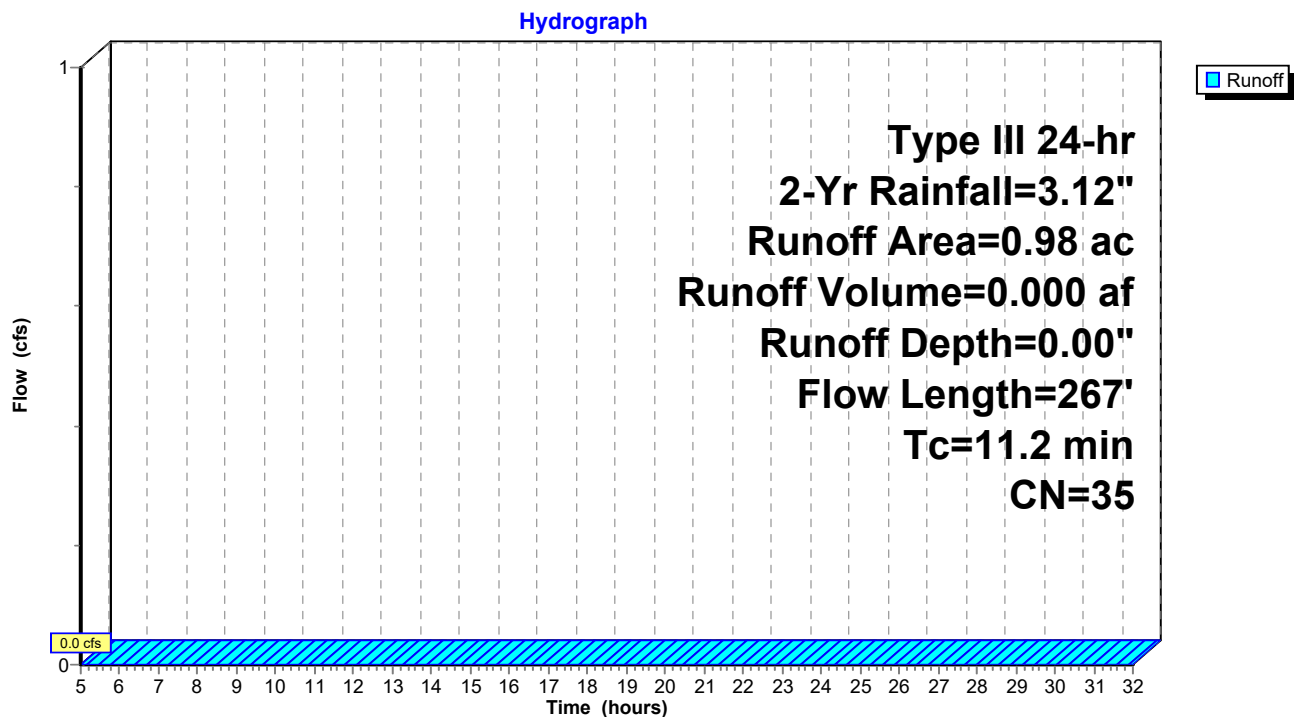
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-7 : #4 Poppy Ln

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.49	30	Woods, Good, HSG A
0.49	39	>75% Grass cover, Good, HSG A
0.98	35	Weighted Average
0.98		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
1.0	217	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.2	267	Total			

Subcatchment PWA-7:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 23

Summary for Subcatchment PWA-8A:

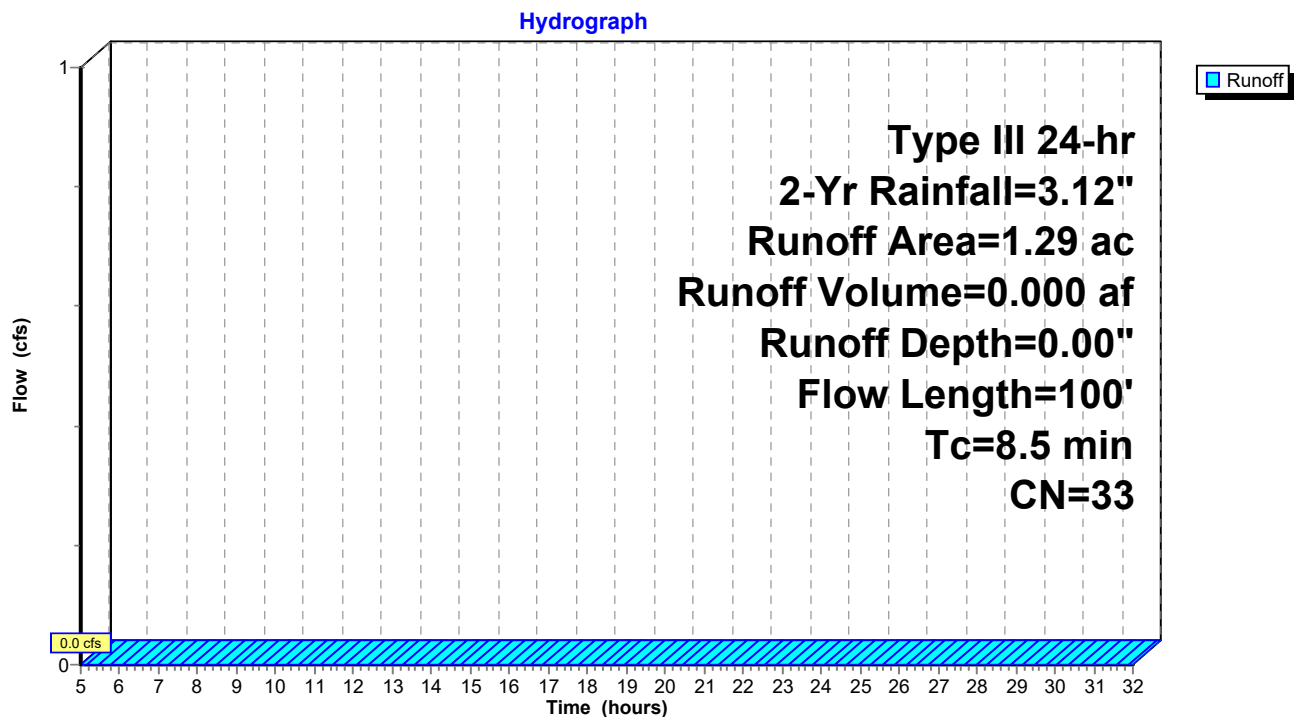
[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
0.92	30	Woods, Good, HSG A
0.37	39	>75% Grass cover, Good, HSG A
1.29	33	Weighted Average
1.29		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.40"
0.5	50	0.1200	1.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	100	Total			

Subcatchment PWA-8A:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 24

Summary for Subcatchment PWA-8B:

Runoff = 6.2 cfs @ 12.10 hrs, Volume= 0.473 af, Depth= 1.04"
Routed to Pond SUB-4 : Subsurface System-4

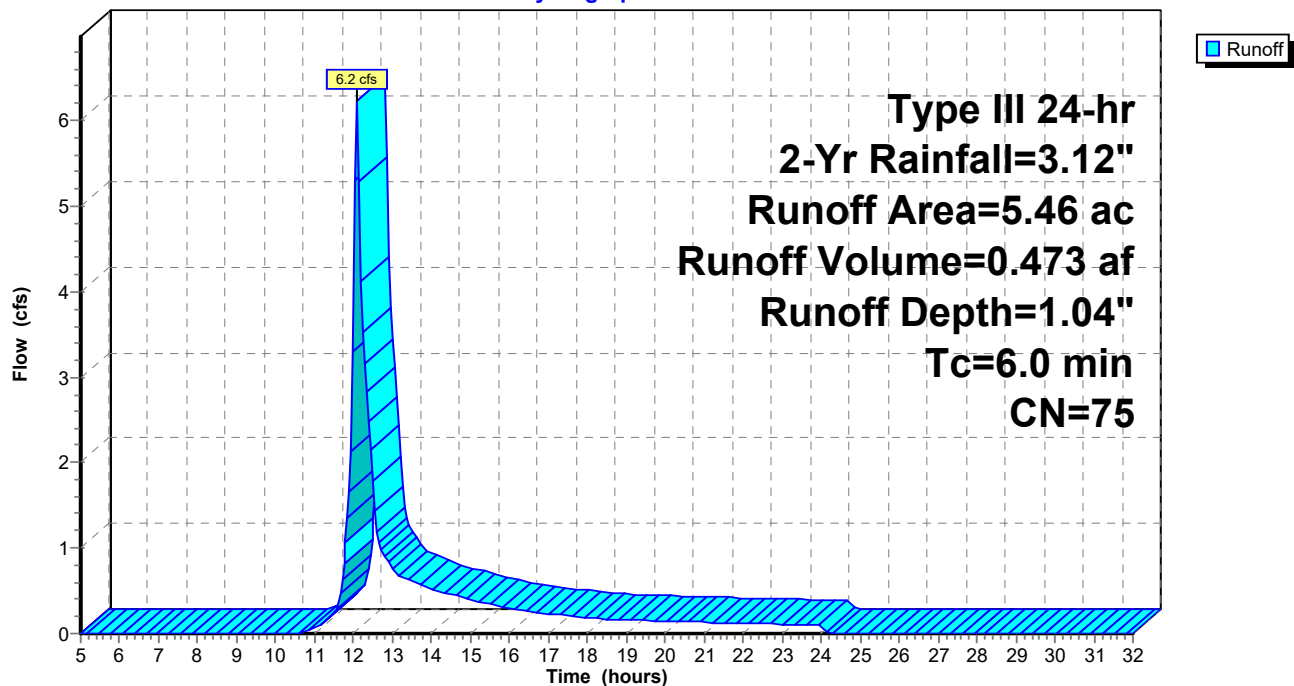
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr Rainfall=3.12"

Area (ac)	CN	Description
2.12	39	>75% Grass cover, Good, HSG A
1.39	98	Roofs, HSG A
1.95	98	Paved parking, HSG A
5.46	75	Weighted Average
2.12		38.83% Pervious Area
3.34		61.17% Impervious Area

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

Subcatchment PWA-8B:

Hydrograph

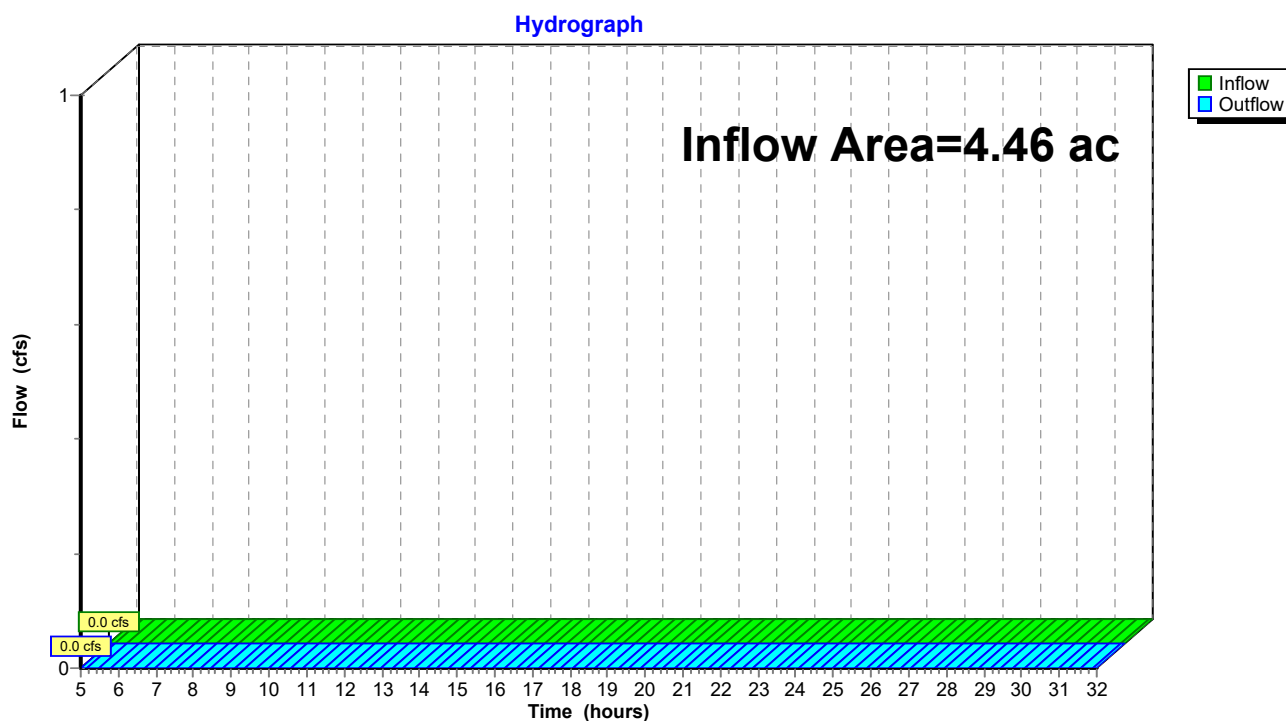


Summary for Reach DP-1: Northern Wetlands Culvert

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

Inflow Area = 4.46 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

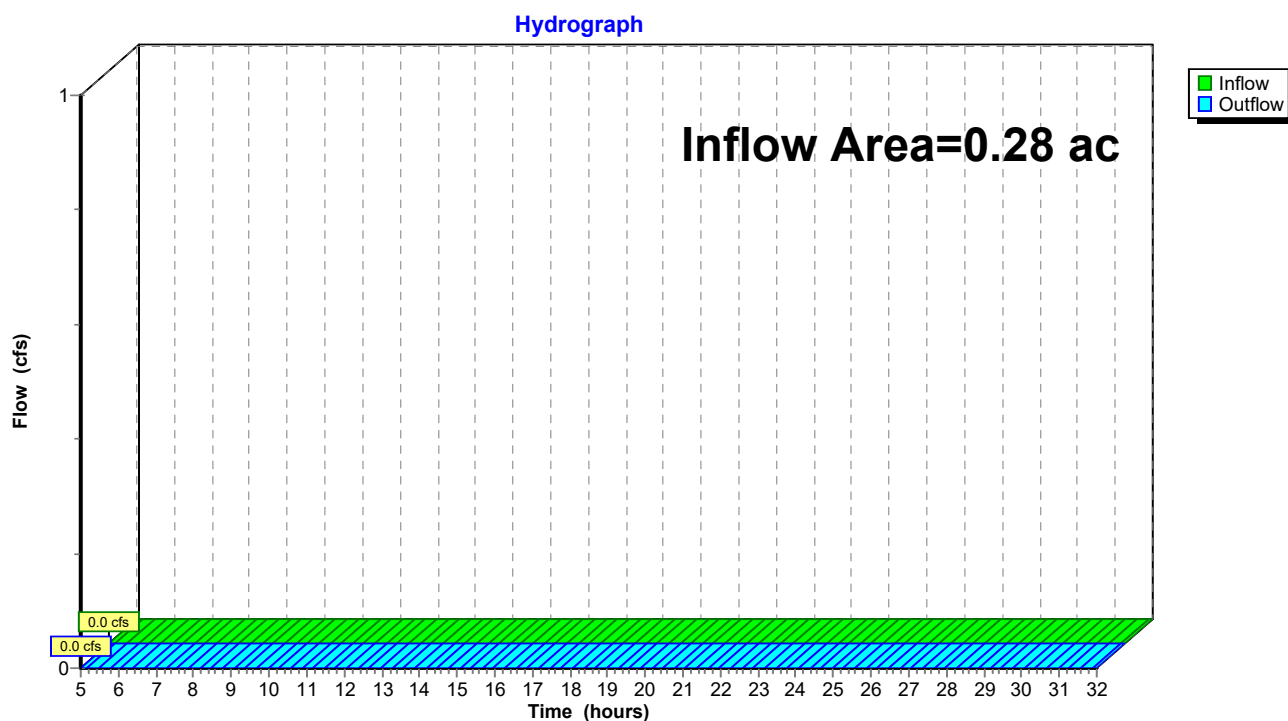
Reach DP-1: Northern Wetlands Culvert

Summary for Reach DP-3: #48 Rinzee Rd

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

Inflow Area = 0.28 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Summary for Reach DP-4: Poppy Ln

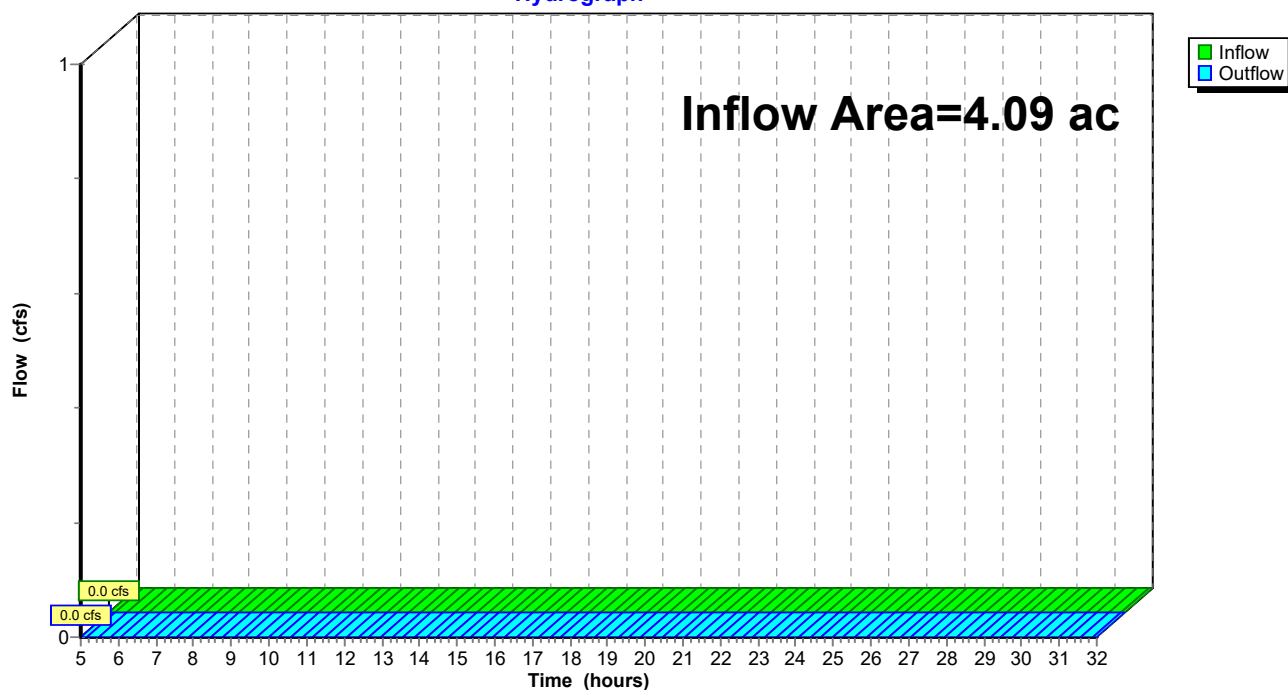
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.09 ac, 39.12% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph

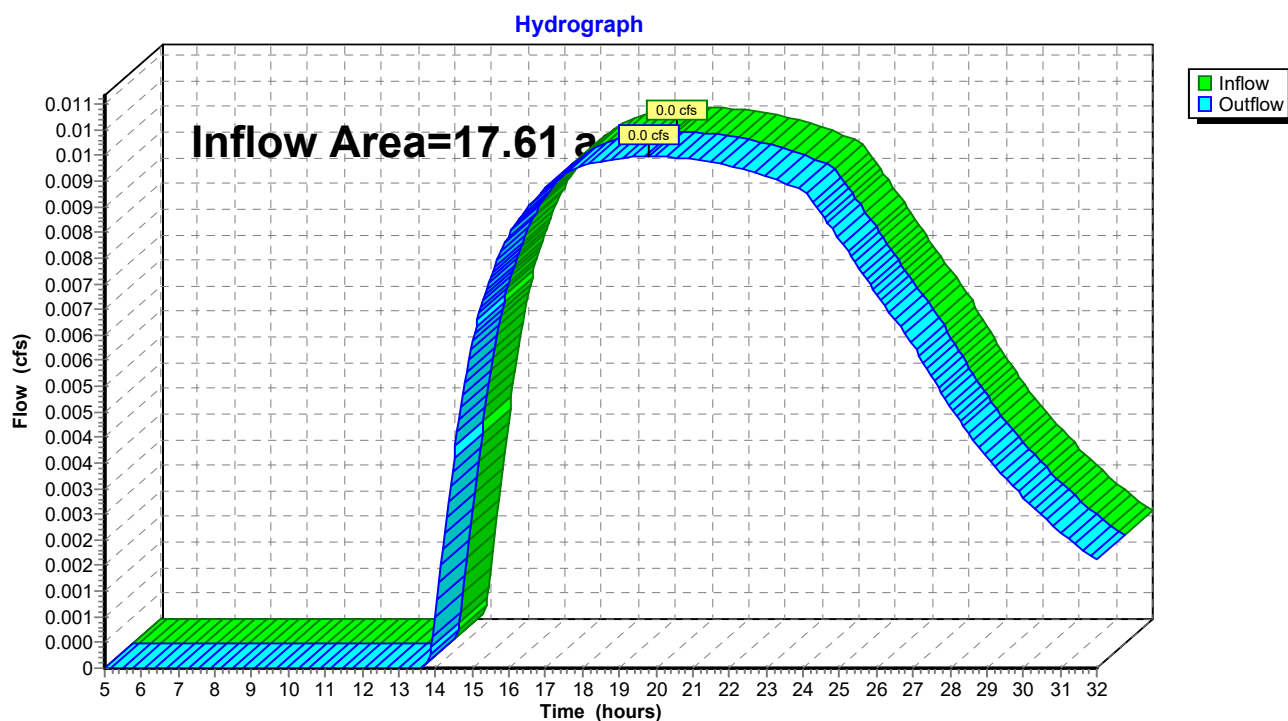


Summary for Reach DP-5: Wetland Series 'A'

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

Inflow Area = 17.61 ac, 37.65% Impervious, Inflow Depth > 0.01" for 2-Yr event
Inflow = 0.0 cfs @ 19.82 hrs, Volume= 0.011 af
Outflow = 0.0 cfs @ 19.82 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

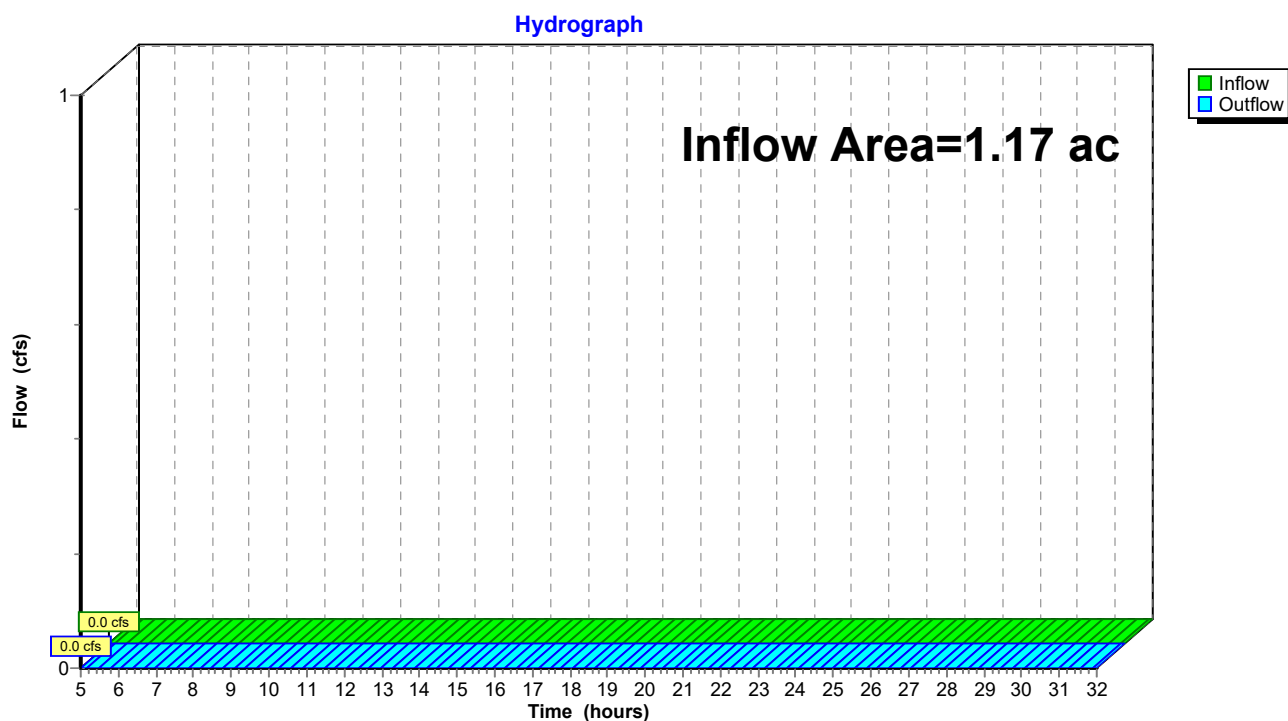
Reach DP-5: Wetland Series 'A'

Summary for Reach DP-6: Wetland Series 'B' & 'C'

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

Inflow Area = 1.17 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Summary for Reach DP-7: #4 Poppy Ln

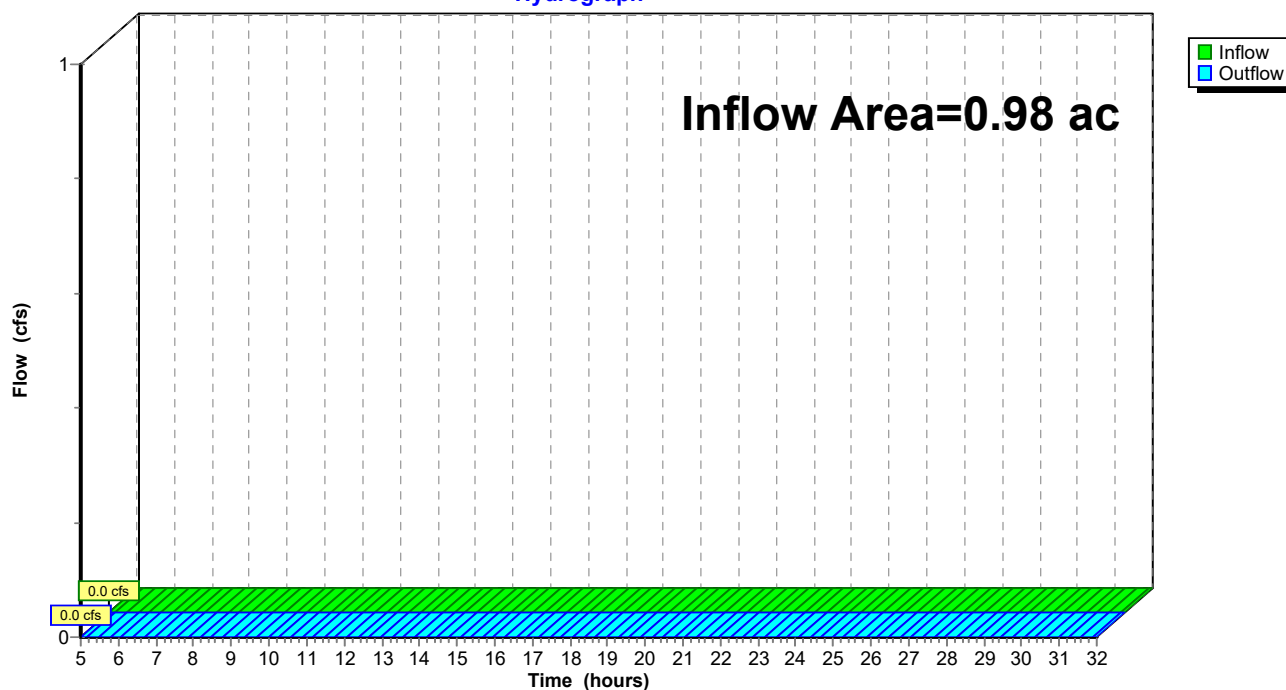
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.98 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph

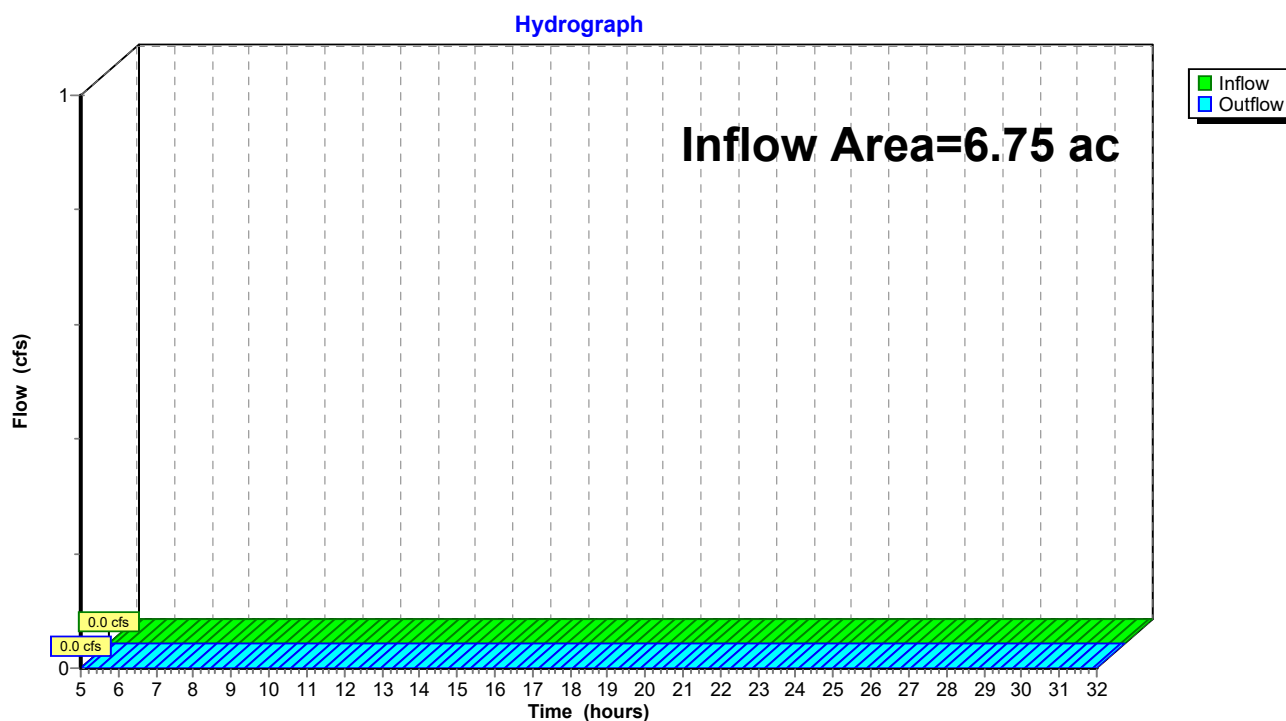


Summary for Reach DP-8: Wetland Series 'D' & 'E'

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

Inflow Area = 6.75 ac, 49.48% Impervious, Inflow Depth = 0.00" for 2-Yr event
Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

Summary for Pond C-1: Culvert 1

[57] Hint: Peaked at 166.00' (Flood elevation advised)

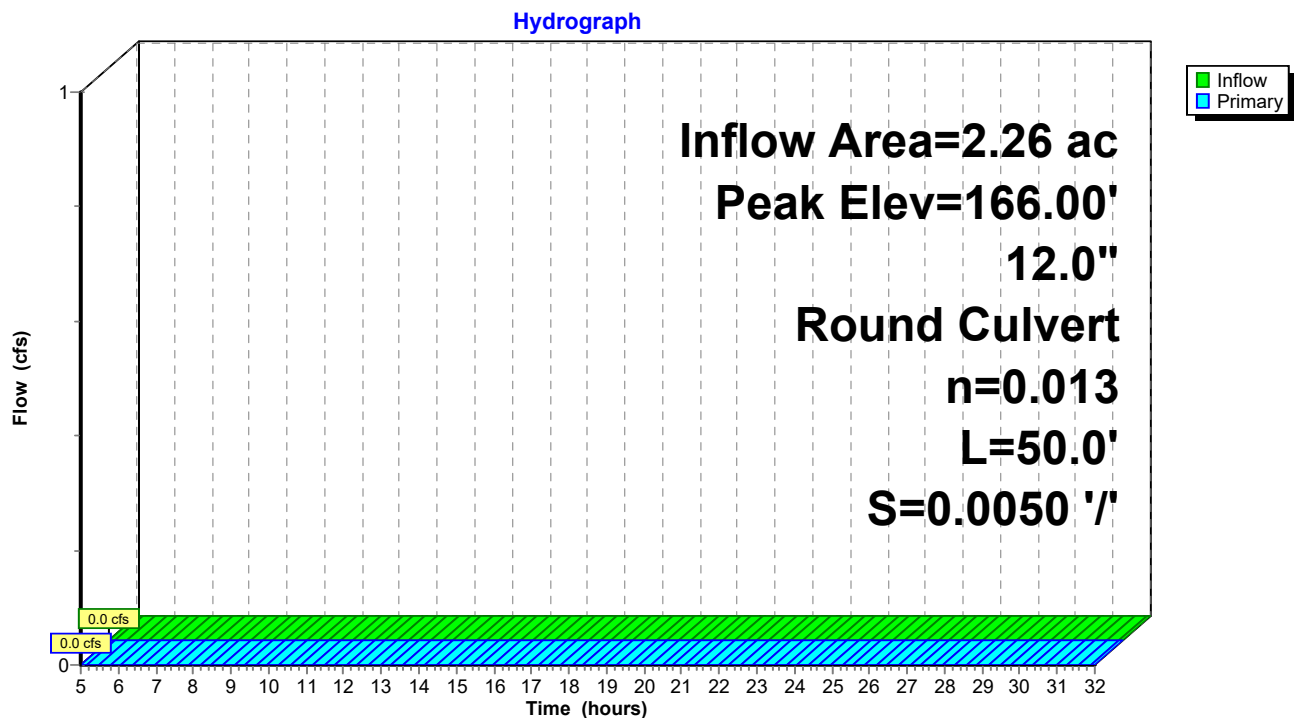
Inflow Area = 2.26 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Yr event
 Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 166.00' @ 5.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	166.00'	12.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 166.00' / 165.75' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=166.00' (Free Discharge)

↑1=Culvert (Controls 0.0 cfs)

Pond C-1: Culvert 1

Summary for Pond IB-1:

Inflow Area = 8.01 ac, 54.68% Impervious, Inflow Depth = 0.88" for 2-Yr event
 Inflow = 7.1 cfs @ 12.11 hrs, Volume= 0.588 af
 Outflow = 2.2 cfs @ 12.52 hrs, Volume= 0.588 af, Atten= 69%, Lag= 24.6 min
 Discarded = 2.2 cfs @ 12.52 hrs, Volume= 0.588 af
 Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond WL-1 : Wetland Series 'J'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 138.46' @ 12.52 hrs Surf.Area= 11,581 sf Storage= 5,016 cf

Plug-Flow detention time= 14.6 min calculated for 0.587 af (100% of inflow)
 Center-of-Mass det. time= 14.7 min (886.2 - 871.5)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	89,403 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	10,182	0	0
139.00	13,217	11,700	11,700
140.00	17,372	15,295	26,994
141.00	20,111	18,742	45,736
142.00	21,820	20,966	66,701
143.00	23,583	22,702	89,403

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	138.00'	12.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.65' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	139.40'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	141.90'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 2	142.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	142.00'	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

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 2-Yr Rainfall=3.12"

Printed 12/24/2024

Page 34

Discarded OutFlow Max=2.2 cfs @ 12.52 hrs HW=138.46' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 2.2 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=138.00' (Free Discharge)

↑ **2=Culvert** (Controls 0.0 cfs)

↑ **3=Orifice/Grate** (Controls 0.0 cfs)

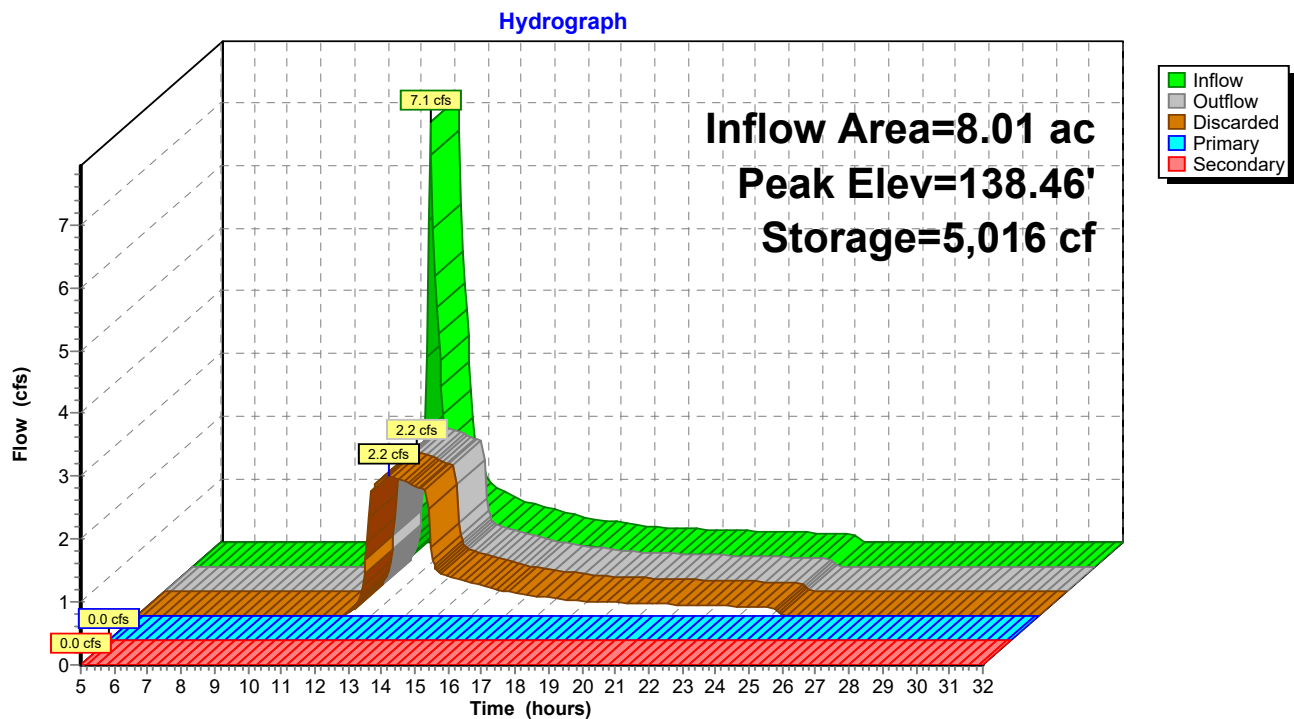
↑ **4=Orifice/Grate** (Controls 0.0 cfs)

↑ **5=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=138.00' (Free Discharge)

↑ **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond IB-1:



Summary for Pond SUB-1: Subsurface System-1

Inflow Area = 0.48 ac, 47.92% Impervious, Inflow Depth = 0.65" for 2-Yr event
 Inflow = 0.3 cfs @ 12.11 hrs, Volume= 0.026 af
 Outflow = 0.0 cfs @ 19.82 hrs, Volume= 0.011 af, Atten= 97%, Lag= 462.4 min
 Primary = 0.0 cfs @ 19.82 hrs, Volume= 0.011 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 131.69' @ 19.82 hrs Surf.Area= 0.03 ac Storage= 0.019 af

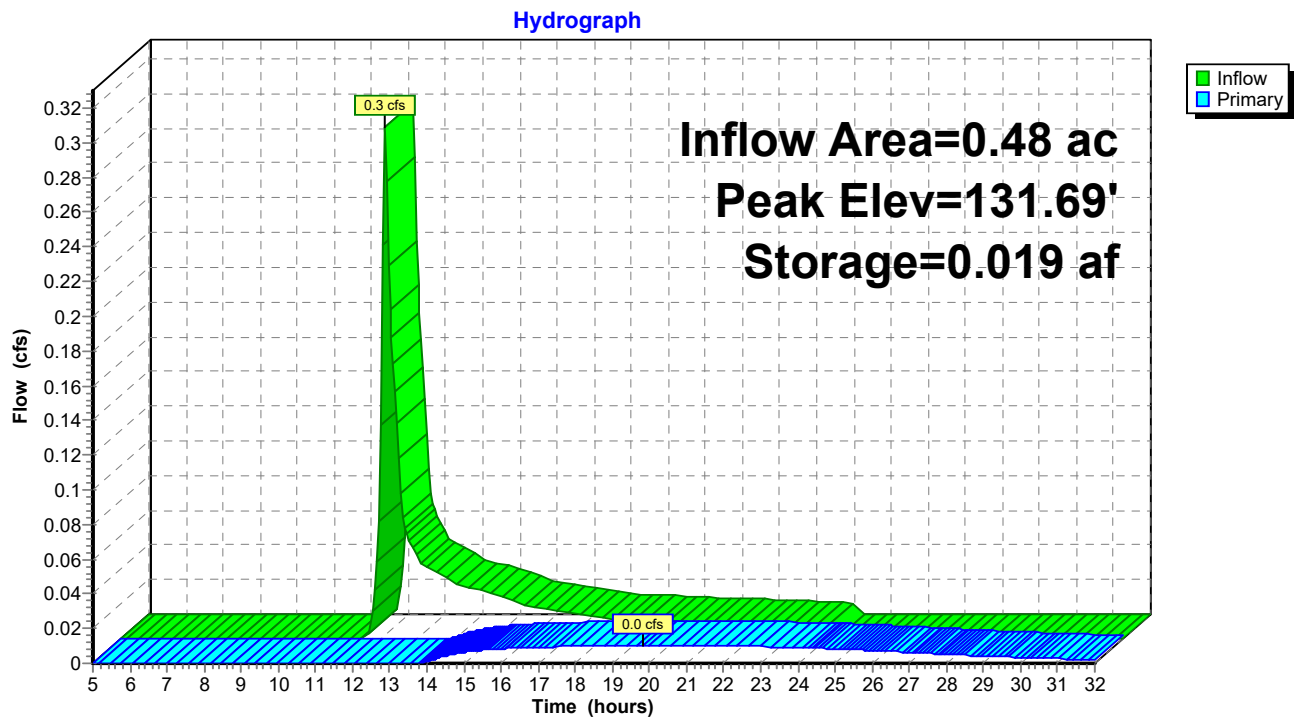
Plug-Flow detention time= 575.3 min calculated for 0.011 af (42% of inflow)
 Center-of-Mass det. time= 424.1 min (1,313.4 - 889.3)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	0.110 af	8.00'W x 15.00'L x 4.00'H Prisma toid x 10

Device	Routing	Invert	Outlet Devices
#1	Primary	131.00'	12.0" Round Culvert L= 48.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 130.76' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	131.50'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	134.80'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.0 cfs @ 19.82 hrs HW=131.69' (Free Discharge)

1=Culvert (Passes 0.0 cfs of 1.2 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.0 cfs @ 1.83 fps)
 3=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

Pond SUB-1: Subsurface System-1

23-10524 - Post - R2

Type III 24-hr 2-Yr Rainfall=3.12"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 37

Summary for Pond SUB-2: Subsurface System-2

Inflow Area = 3.77 ac, 42.44% Impervious, Inflow Depth = 0.52" for 2-Yr event
 Inflow = 1.1 cfs @ 12.41 hrs, Volume= 0.164 af
 Outflow = 1.0 cfs @ 12.45 hrs, Volume= 0.164 af, Atten= 5%, Lag= 2.1 min
 Discarded = 1.0 cfs @ 12.45 hrs, Volume= 0.164 af
 Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-4 : Poppy Ln

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.04' @ 12.51 hrs Surf.Area= 5,400 sf Storage= 227 cf

Plug-Flow detention time= 3.5 min calculated for 0.164 af (100% of inflow)
 Center-of-Mass det. time= 3.5 min (921.6 - 918.1)

Volume	Invert	Avail.Storage	Storage Description
#1	137.00'	21,600 cf	8.00'W x 15.00'L x 4.00'H 10x17 Concrete Chambers 12" Walk 45

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	137.00'	15.0" Round Culvert L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.00' / 136.72' S= 0.0051 ' / Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	138.10'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.0 cfs @ 12.45 hrs HW=137.04' (Free Discharge)

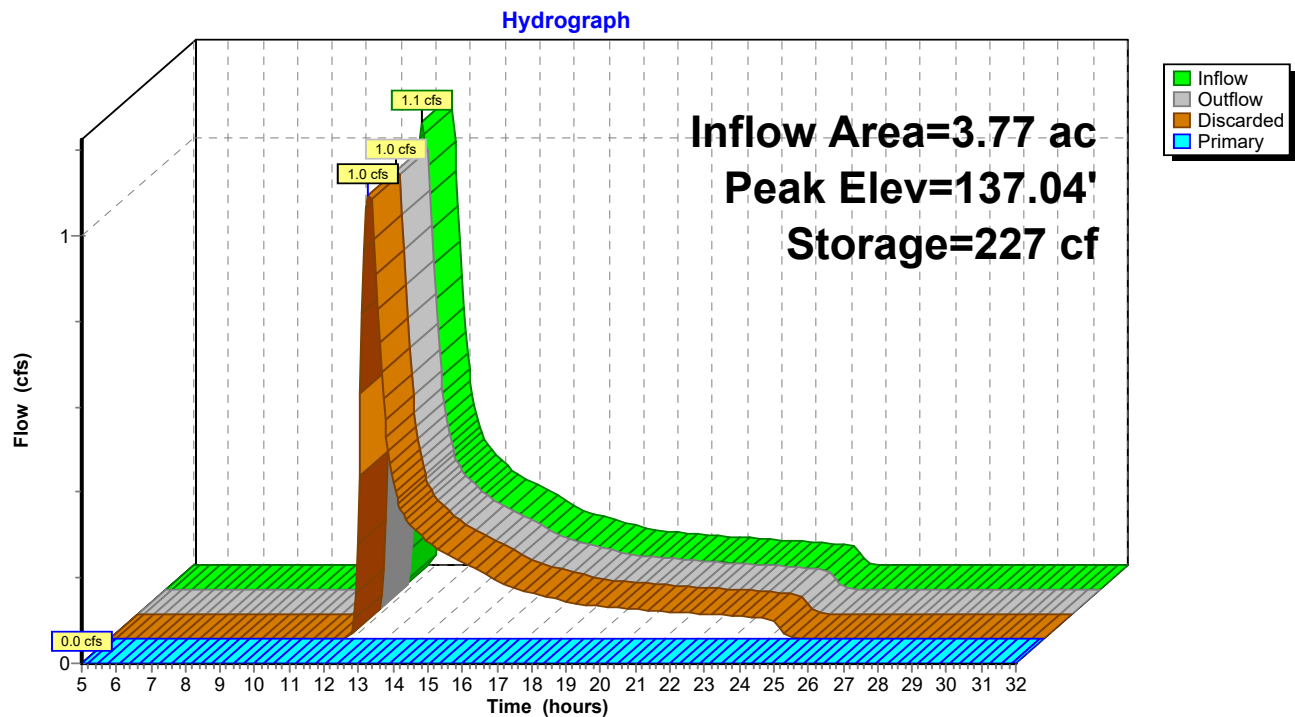
↑ **1=Exfiltration** (Exfiltration Controls 1.0 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=137.00' (Free Discharge)

↑ **2=Culvert** (Controls 0.0 cfs)

↑ **3=Orifice/Grate** (Controls 0.0 cfs)

↑ **4=Sharp-Crested Rectangular Weir**(Controls 0.0 cfs)

Pond SUB-2: Subsurface System-2

Summary for Pond SUB-3: Subsurface System-3

Inflow Area = 4.49 ac, 44.99% Impervious, Inflow Depth = 0.96" for 2-Yr event
 Inflow = 5.0 cfs @ 12.09 hrs, Volume= 0.359 af
 Outflow = 0.8 cfs @ 11.85 hrs, Volume= 0.359 af, Atten= 83%, Lag= 0.0 min
 Discarded = 0.8 cfs @ 11.85 hrs, Volume= 0.359 af
 Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 140.09' @ 12.60 hrs Surf.Area= 4,320 sf Storage= 4,692 cf

Plug-Flow detention time= 40.3 min calculated for 0.359 af (100% of inflow)
 Center-of-Mass det. time= 40.2 min (871.0 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1	139.00'	30,240 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 36

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	139.00'	15.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.00' / 138.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	140.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	145.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.8 cfs @ 11.85 hrs HW=139.09' (Free Discharge)

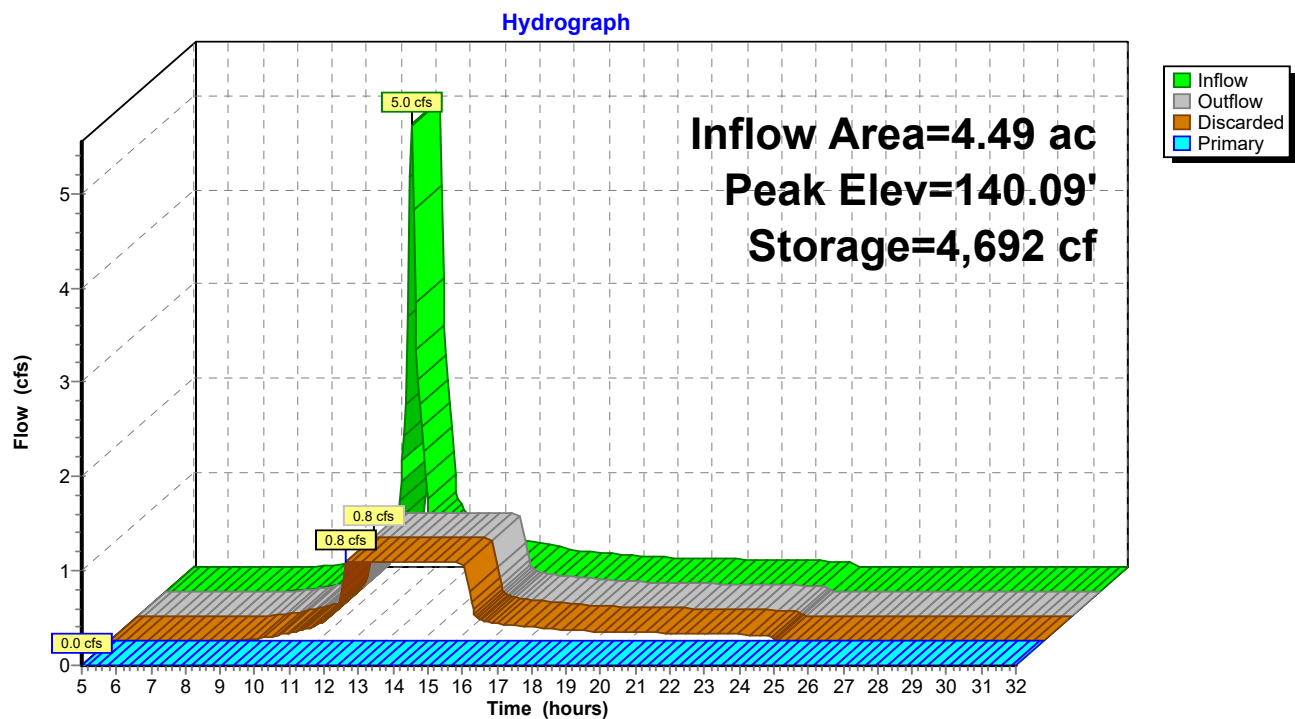
↑ **1=Exfiltration** (Exfiltration Controls 0.8 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=139.00' (Free Discharge)

↑ **2=Culvert** (Controls 0.0 cfs)

↑ **3=Orifice/Grate** (Controls 0.0 cfs)

↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-3: Subsurface System-3

Summary for Pond SUB-4: Subsurface System-4

Inflow Area = 5.46 ac, 61.17% Impervious, Inflow Depth = 1.04" for 2-Yr event
 Inflow = 6.2 cfs @ 12.10 hrs, Volume= 0.473 af
 Outflow = 1.4 cfs @ 11.95 hrs, Volume= 0.473 af, Atten= 78%, Lag= 0.0 min
 Discarded = 1.4 cfs @ 11.95 hrs, Volume= 0.473 af
 Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 134.71' @ 12.56 hrs Surf.Area= 7,200 sf Storage= 5,104 cf

Plug-Flow detention time= 25.3 min calculated for 0.472 af (100% of inflow)
 Center-of-Mass det. time= 25.3 min (885.7 - 860.4)

Volume	Invert	Avail.Storage	Storage Description
#1	134.00'	50,400 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 60

Device	Routing	Invert	Outlet Devices
#1	Discarded	134.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	134.00'	12.0" Round Culvert L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.00' / 133.88' S= 0.0052 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	135.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.4 cfs @ 11.95 hrs HW=134.07' (Free Discharge)

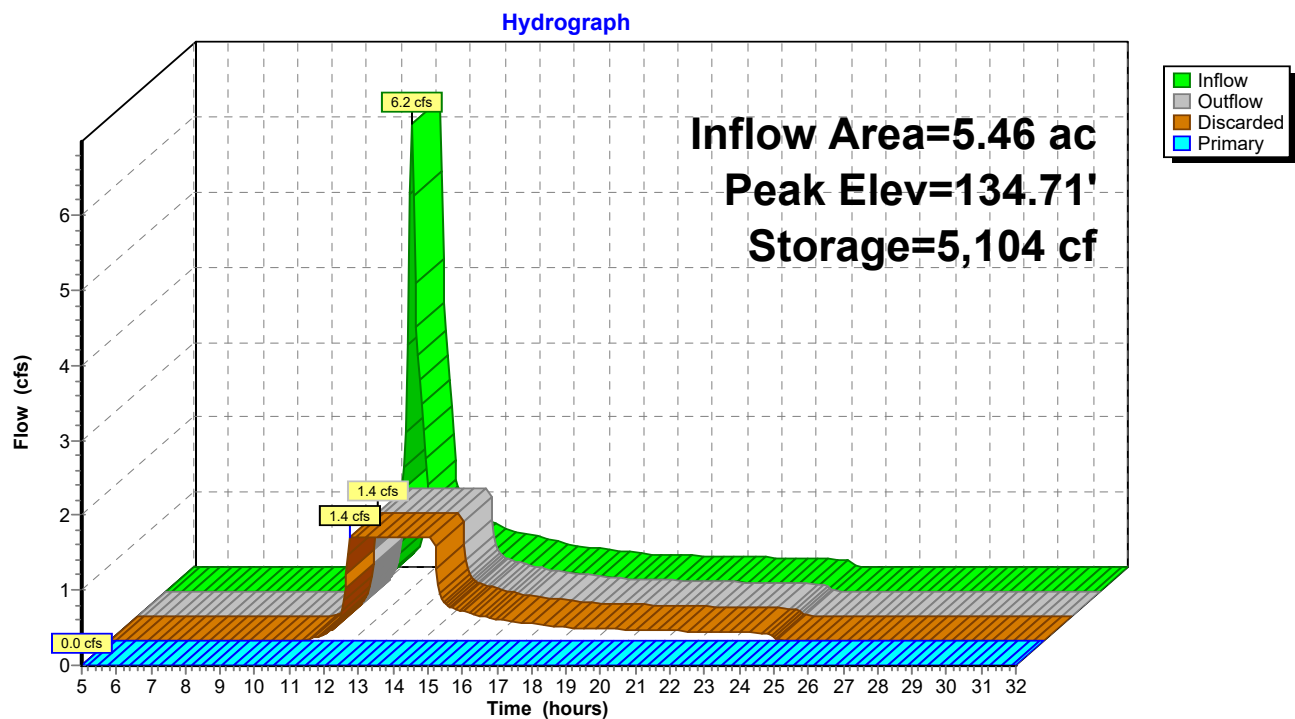
↑ **1=Exfiltration** (Exfiltration Controls 1.4 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=134.00' (Free Discharge)

↑ **2=Culvert** (Controls 0.0 cfs)

↑ **3=Orifice/Grate** (Controls 0.0 cfs)

↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-4: Subsurface System-4

23-10524 - Post - R2

Type III 24-hr 2-Yr Rainfall=3.12"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 43

Summary for Pond WL-1: Wetland Series 'J'

Inflow Area = 16.54 ac, 38.69% Impervious, Inflow Depth = 0.00" for 2-Yr event
 Inflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-5 : Wetland Series 'A'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 136.00' @ 5.00 hrs Surf.Area= 219 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	136.00'	127,590 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.00	219	0	0
138.00	6,965	7,184	7,184
140.00	25,165	32,130	39,314
141.00	41,218	33,192	72,506
142.00	68,950	55,084	127,590

Device	Routing	Invert	Outlet Devices
#1	Primary	137.05'	18.0" Round Culvert L= 145.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 137.05' / 136.05' S= 0.0069 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf
#2	Secondary	141.05'	155.0' long x 35.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

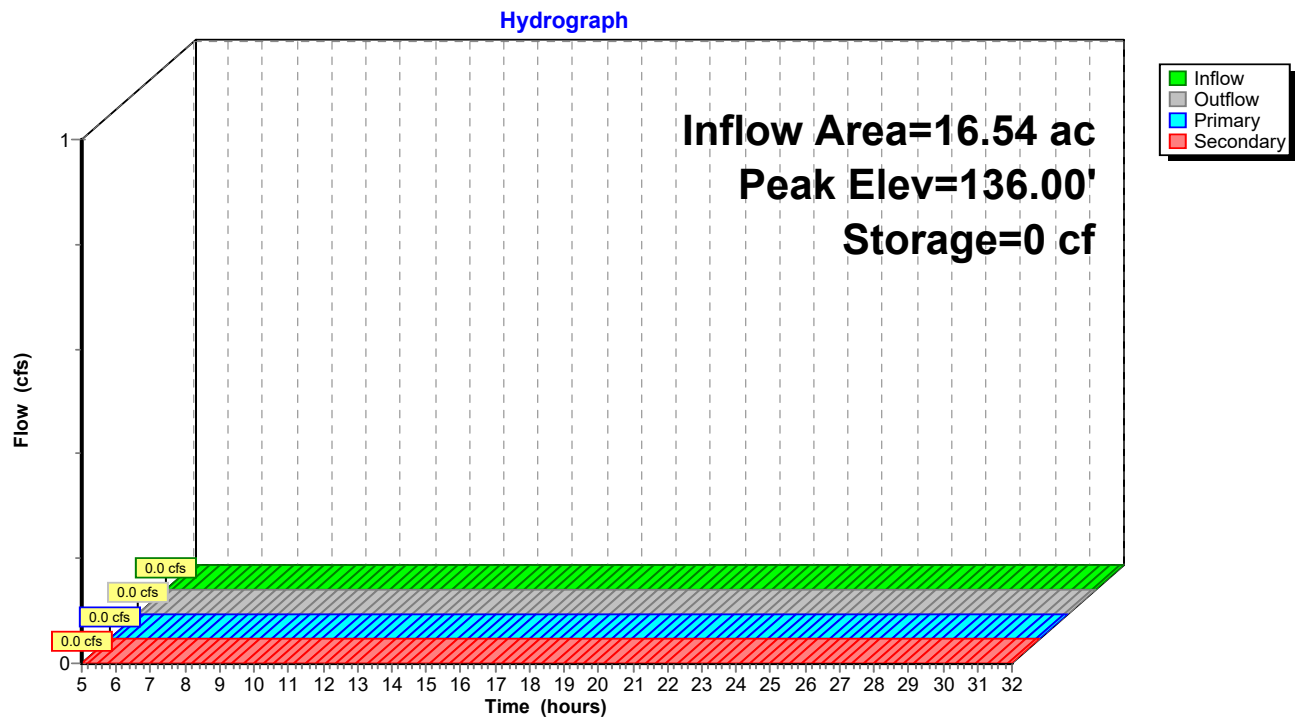
Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=136.00' (Free Discharge)

↑1=Culvert (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=136.00' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond WL-1: Wetland Series 'J'



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 45

Time span=5.00-32.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPWA-1:	Runoff Area=4.46 ac 0.00% Impervious Runoff Depth=0.12" Flow Length=397' Tc=13.7 min CN=37 Runoff=0.1 cfs 0.045 af
SubcatchmentPWA-3:	Runoff Area=0.28 ac 0.00% Impervious Runoff Depth=0.05" Flow Length=80' Slope=0.1000 '/' Tc=6.6 min CN=34 Runoff=0.0 cfs 0.001 af
SubcatchmentPWA-4A:	Runoff Area=0.32 ac 0.00% Impervious Runoff Depth=0.12" Tc=6.0 min CN=37 Runoff=0.0 cfs 0.003 af
SubcatchmentPWA-4B:	Runoff Area=3.77 ac 42.44% Impervious Runoff Depth=1.52" Flow Length=1,000' Tc=22.8 min CN=64 Runoff=4.0 cfs 0.476 af
SubcatchmentPWA-5A:	Runoff Area=0.59 ac 0.00% Impervious Runoff Depth=0.05" Tc=6.0 min CN=34 Runoff=0.0 cfs 0.002 af
SubcatchmentPWA-5B:	Runoff Area=3.16 ac 56.65% Impervious Runoff Depth=2.12" Flow Length=705' Tc=8.7 min CN=72 Runoff=6.9 cfs 0.559 af
SubcatchmentPWA-5C:	Runoff Area=4.85 ac 53.40% Impervious Runoff Depth=2.12" Tc=6.0 min CN=72 Runoff=11.7 cfs 0.857 af
SubcatchmentPWA-5D:	Runoff Area=2.26 ac 0.00% Impervious Runoff Depth=0.09" Flow Length=395' Tc=13.1 min CN=36 Runoff=0.0 cfs 0.018 af
SubcatchmentPWA-5E:	Runoff Area=1.78 ac 0.00% Impervious Runoff Depth=0.12" Flow Length=230' Tc=9.6 min CN=37 Runoff=0.0 cfs 0.018 af
SubcatchmentPWA-5F:	Runoff Area=2.67 ac 75.66% Impervious Runoff Depth=3.18" Tc=6.0 min CN=84 Runoff=9.7 cfs 0.707 af
SubcatchmentPWA-5G:	Runoff Area=0.48 ac 47.92% Impervious Runoff Depth=1.73" Tc=6.0 min CN=67 Runoff=0.9 cfs 0.069 af
SubcatchmentPWA-5H:	Runoff Area=1.82 ac 0.00% Impervious Runoff Depth=0.05" Flow Length=330' Tc=9.4 min CN=34 Runoff=0.0 cfs 0.008 af
SubcatchmentPWA-6:	Runoff Area=1.17 ac 0.00% Impervious Runoff Depth=0.03" Flow Length=175' Tc=9.6 min CN=33 Runoff=0.0 cfs 0.003 af
SubcatchmentPWA-7:	Runoff Area=0.98 ac 0.00% Impervious Runoff Depth=0.07" Flow Length=267' Tc=11.2 min CN=35 Runoff=0.0 cfs 0.006 af
SubcatchmentPWA-8A:	Runoff Area=1.29 ac 0.00% Impervious Runoff Depth=0.03" Flow Length=100' Tc=8.5 min CN=33 Runoff=0.0 cfs 0.004 af
SubcatchmentPWA-8B:	Runoff Area=5.46 ac 61.17% Impervious Runoff Depth=2.37" Tc=6.0 min CN=75 Runoff=14.8 cfs 1.078 af

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 46

Reach DP-1: Northern Wetlands CulvertInflow=0.1 cfs 0.045 af
Outflow=0.1 cfs 0.045 af**Reach DP-3: #48 Rinzee Rd**Inflow=0.0 cfs 0.001 af
Outflow=0.0 cfs 0.001 af**Reach DP-4: Poppy Ln**Inflow=0.0 cfs 0.003 af
Outflow=0.0 cfs 0.003 af**Reach DP-5: Wetland Series 'A'**Inflow=0.0 cfs 0.046 af
Outflow=0.0 cfs 0.046 af**Reach DP-6: Wetland Series 'B' & 'C'**Inflow=0.0 cfs 0.003 af
Outflow=0.0 cfs 0.003 af**Reach DP-7: #4 Poppy Ln**Inflow=0.0 cfs 0.006 af
Outflow=0.0 cfs 0.006 af**Reach DP-8: Wetland Series 'D' & 'E'**Inflow=0.0 cfs 0.015 af
Outflow=0.0 cfs 0.015 af**Pond C-1: Culvert 1**Peak Elev=166.10' Inflow=0.0 cfs 0.018 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=0.0 cfs 0.018 af**Pond IB-1:**Peak Elev=139.58' Storage=20,110 cf Inflow=18.4 cfs 1.416 af
Discarded=3.0 cfs 1.415 af Primary=0.0 cfs 0.001 af Secondary=0.0 cfs 0.000 af Outflow=3.0 cfs 1.416 af**Pond SUB-1: Subsurface System-1**Peak Elev=132.71' Storage=0.047 af Inflow=0.9 cfs 0.069 af
Outflow=0.0 cfs 0.041 af**Pond SUB-2: Subsurface System-2**Peak Elev=138.02' Storage=5,501 cf Inflow=4.0 cfs 0.476 af
Discarded=1.0 cfs 0.476 af Primary=0.0 cfs 0.000 af Outflow=1.0 cfs 0.476 af**Pond SUB-3: Subsurface System-3**Peak Elev=141.81' Storage=12,119 cf Inflow=9.7 cfs 0.715 af
Discarded=0.8 cfs 0.700 af Primary=0.1 cfs 0.015 af Outflow=0.9 cfs 0.715 af**Pond SUB-4: Subsurface System-4**Peak Elev=136.52' Storage=18,111 cf Inflow=14.8 cfs 1.078 af
Discarded=1.4 cfs 1.066 af Primary=0.0 cfs 0.011 af Outflow=1.4 cfs 1.078 af**Pond WL-1: Wetland Series 'J'**Peak Elev=137.09' Storage=2,226 cf Inflow=0.1 cfs 0.052 af
Primary=0.0 cfs 0.002 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.002 af**Total Runoff Area = 35.34 ac Runoff Volume = 3.854 af Average Runoff Depth = 1.31"**
67.26% Pervious = 23.77 ac 32.74% Impervious = 11.57 ac

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 47

Summary for Subcatchment PWA-1:

Runoff = 0.1 cfs @ 14.82 hrs, Volume= 0.045 af, Depth= 0.12"
 Routed to Reach DP-1 : Northern Wetlands Culvert

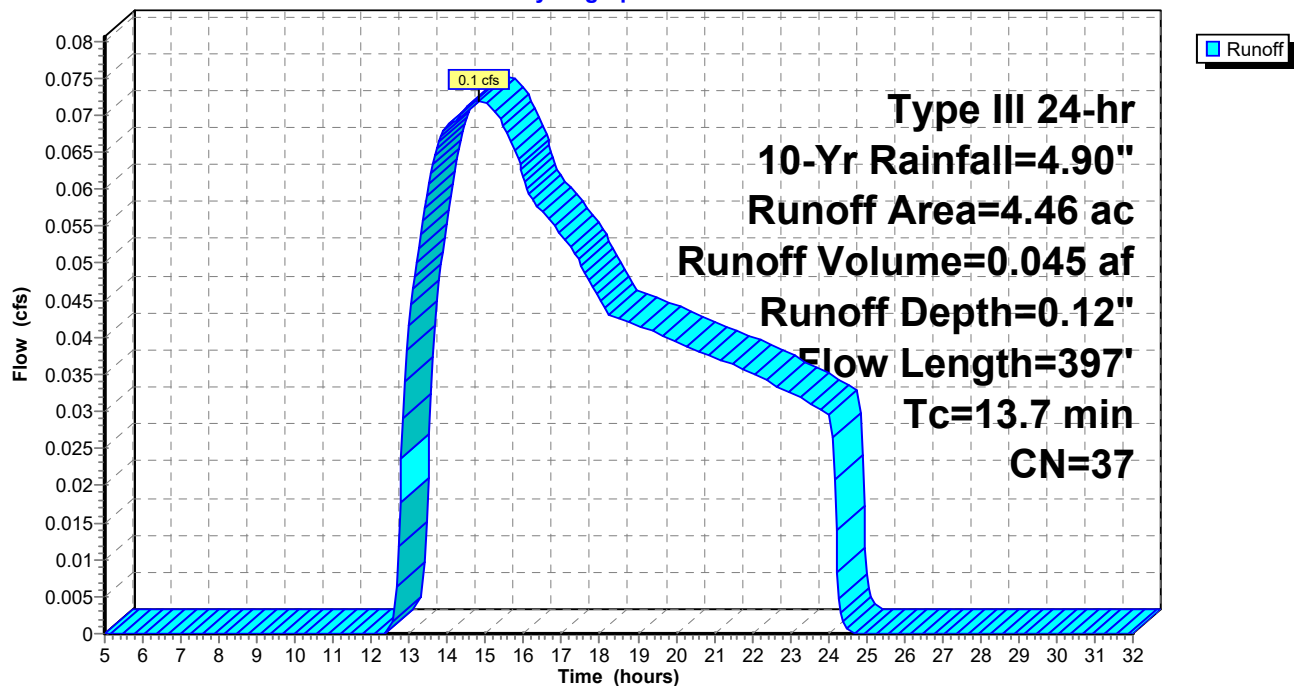
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.29	61	>75% Grass cover, Good, HSG B
0.55	39	>75% Grass cover, Good, HSG A
2.97	30	Woods, Good, HSG A
0.65	55	Woods, Good, HSG B
4.46	37	Weighted Average
4.46		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	347	0.0350	0.94		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.7	397	Total			

Subcatchment PWA-1:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 48

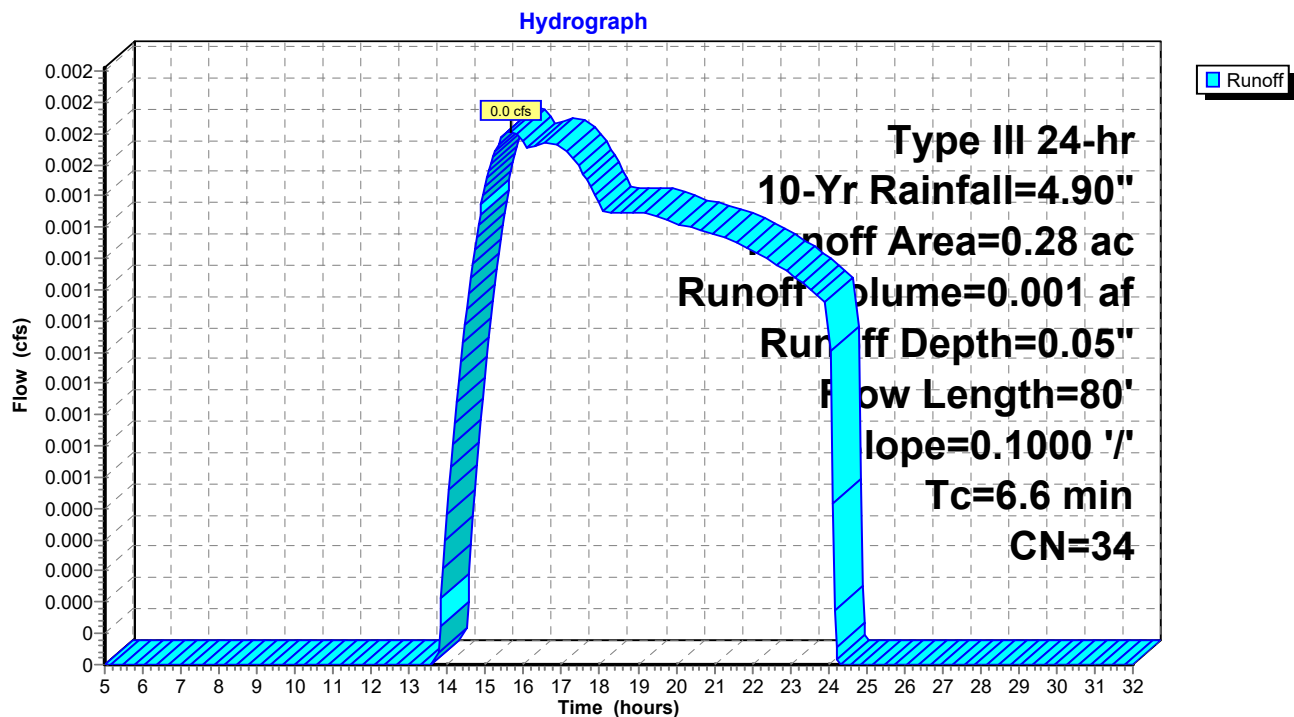
Summary for Subcatchment PWA-3:

Runoff = 0.0 cfs @ 15.66 hrs, Volume= 0.001 af, Depth= 0.05"
 Routed to Reach DP-3 : #48 Rinzee Rd

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.11	39	>75% Grass cover, Good, HSG A
0.17	30	Woods, Good, HSG A
0.28	34	Weighted Average
0.28		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	30	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.6	80	Total			

Subcatchment PWA-3:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 49

Summary for Subcatchment PWA-4A:

Runoff = 0.0 cfs @ 14.71 hrs, Volume= 0.003 af, Depth= 0.12"
Routed to Reach DP-4 : Poppy Ln

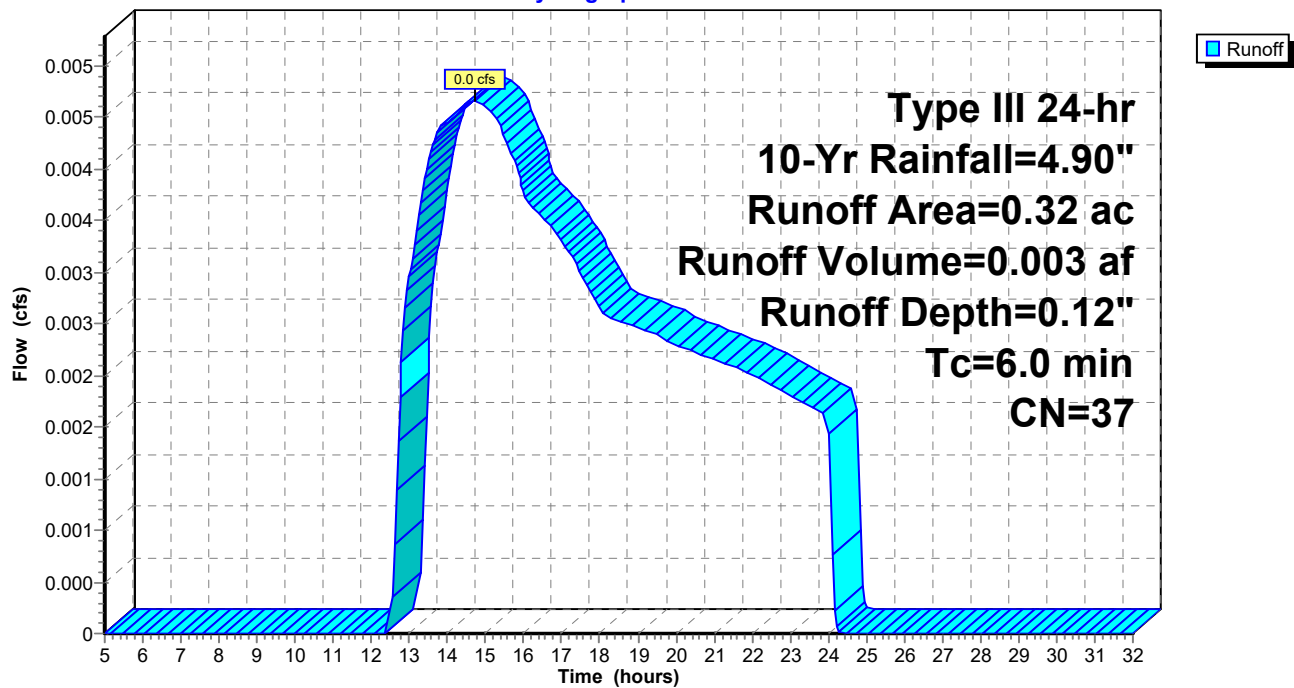
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.07	30	Woods, Good, HSG A
0.32	37	Weighted Average
0.32		100.00% Pervious Area

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

Subcatchment PWA-4A:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 50

Summary for Subcatchment PWA-4B:

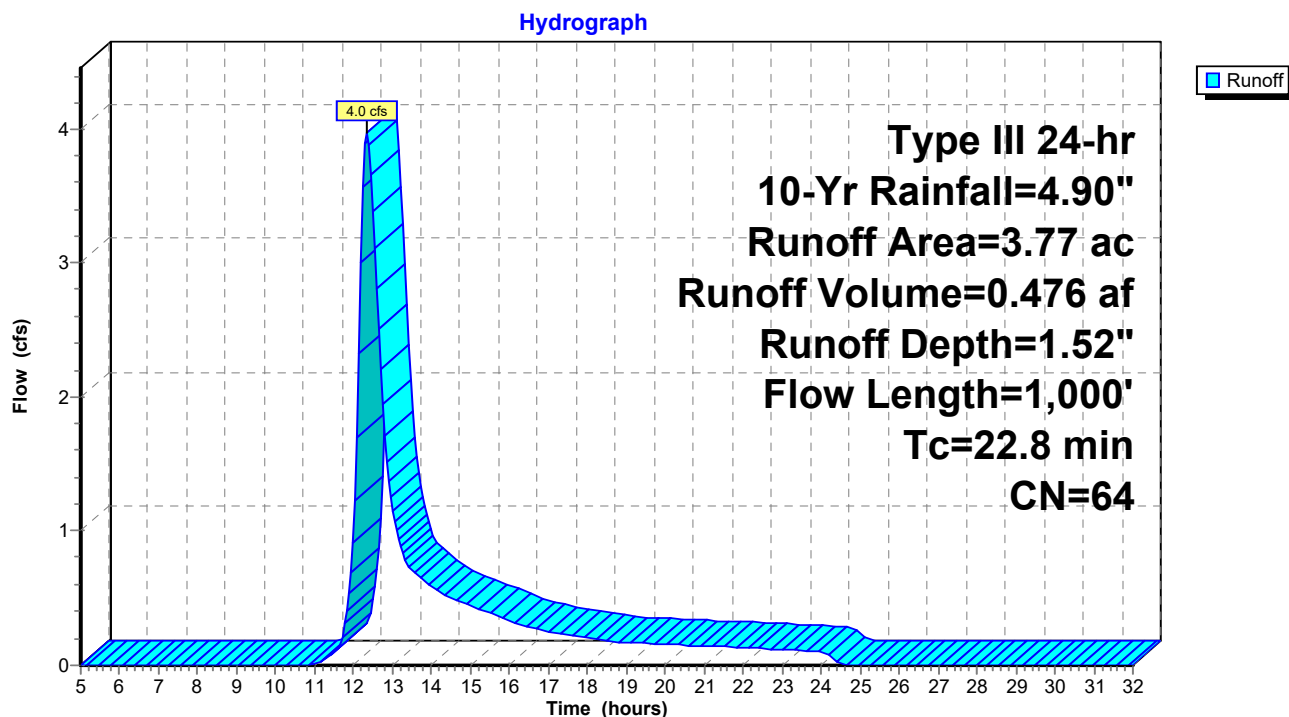
Runoff = 4.0 cfs @ 12.35 hrs, Volume= 0.476 af, Depth= 1.52"
 Routed to Pond SUB-2 : Subsurface System-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.20	30	Woods, Good, HSG A
0.05	55	Woods, Good, HSG B
1.85	39	>75% Grass cover, Good, HSG A
0.07	61	>75% Grass cover, Good, HSG B
0.62	98	Roofs, HSG A
0.04	98	Roofs, HSG B
0.93	98	Paved parking, HSG A
0.01	98	Paved parking, HSG B
3.77	64	Weighted Average
2.17		57.56% Pervious Area
1.60		42.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
17.3	950	0.0170	0.91		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.8	1,000	Total			

Subcatchment PWA-4B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 52

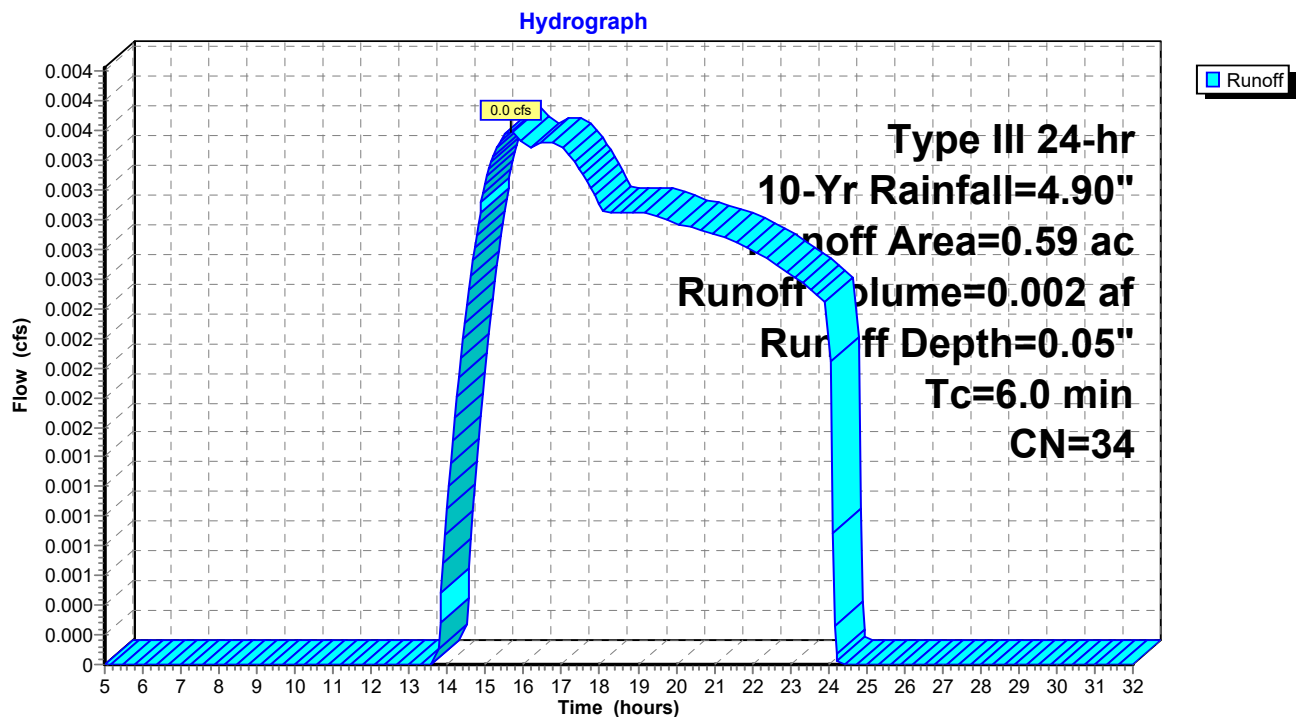
Summary for Subcatchment PWA-5A:

Runoff = 0.0 cfs @ 15.65 hrs, Volume= 0.002 af, Depth= 0.05"
Routed to Reach DP-5 : Wetland Series 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.33	30	Woods, Good, HSG A
0.26	39	>75% Grass cover, Good, HSG A
0.59	34	Weighted Average
0.59		100.00% Pervious Area

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

Subcatchment PWA-5A:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 53

Summary for Subcatchment PWA-5B:

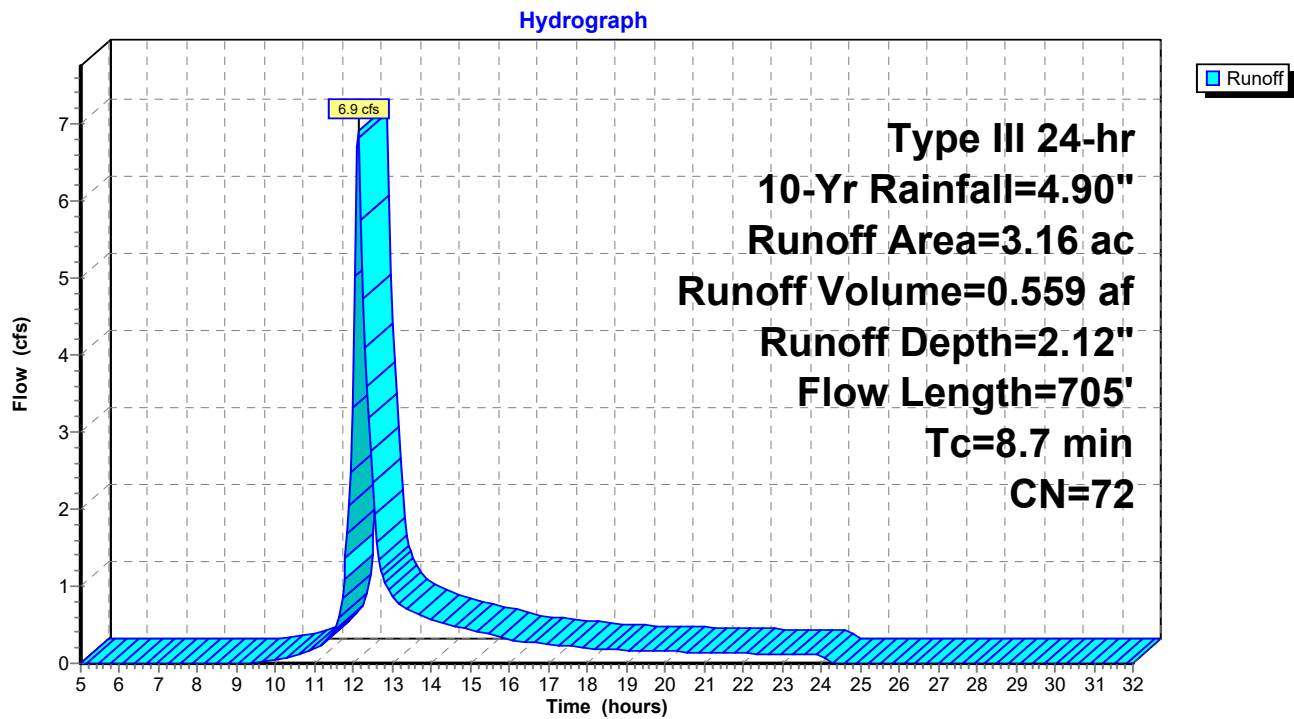
Runoff = 6.9 cfs @ 12.13 hrs, Volume= 0.559 af, Depth= 2.12"
 Routed to Pond IB-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
1.37	39	>75% Grass cover, Good, HSG A
0.52	98	Roofs, HSG A
1.27	98	Paved parking, HSG A
3.16	72	Weighted Average
1.37		43.35% Pervious Area
1.79		56.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0360	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	60	0.0400	3.00		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
1.1	265	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
3.0	330	0.0150	1.84		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.7	705	Total			

Subcatchment PWA-5B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 55

Summary for Subcatchment PWA-5C:

Runoff = 11.7 cfs @ 12.10 hrs, Volume= 0.857 af, Depth= 2.12"
 Routed to Pond IB-1 :

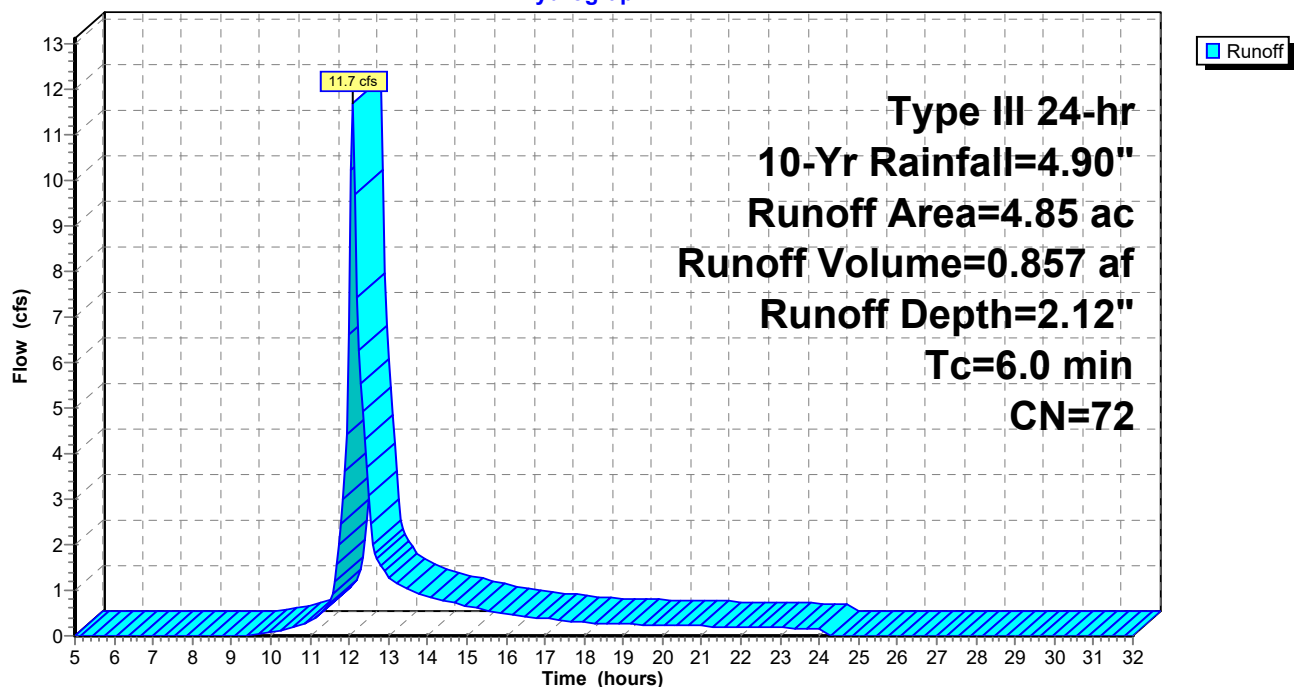
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
1.94	39	>75% Grass cover, Good, HSG A
0.25	61	>75% Grass cover, Good, HSG B
0.01	30	Woods, Good, HSG A
0.06	55	Woods, Good, HSG B
0.94	98	Roofs, HSG A
0.07	98	Roofs, HSG B
1.56	98	Paved parking, HSG A
0.02	98	Paved parking, HSG B
4.85	72	Weighted Average
2.26		46.60% Pervious Area
2.59		53.40% Impervious Area

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

Subcatchment PWA-5C:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 56

Summary for Subcatchment PWA-5D:

Runoff = 0.0 cfs @ 15.08 hrs, Volume= 0.018 af, Depth= 0.09"
 Routed to Pond C-1 : Culvert 1

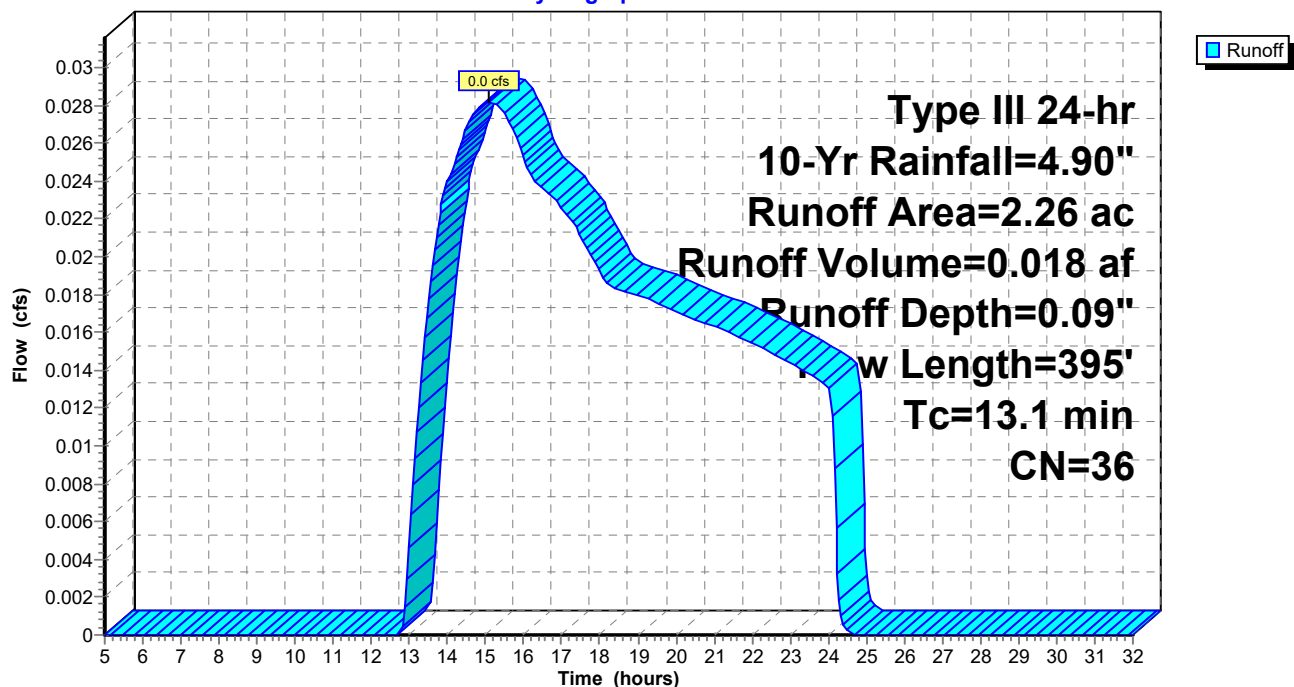
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.89	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
1.21	30	Woods, Good, HSG A
2.26	36	Weighted Average
2.26		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.1	245	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.1	395	Total			

Subcatchment PWA-5D:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 57

Summary for Subcatchment PWA-5E:

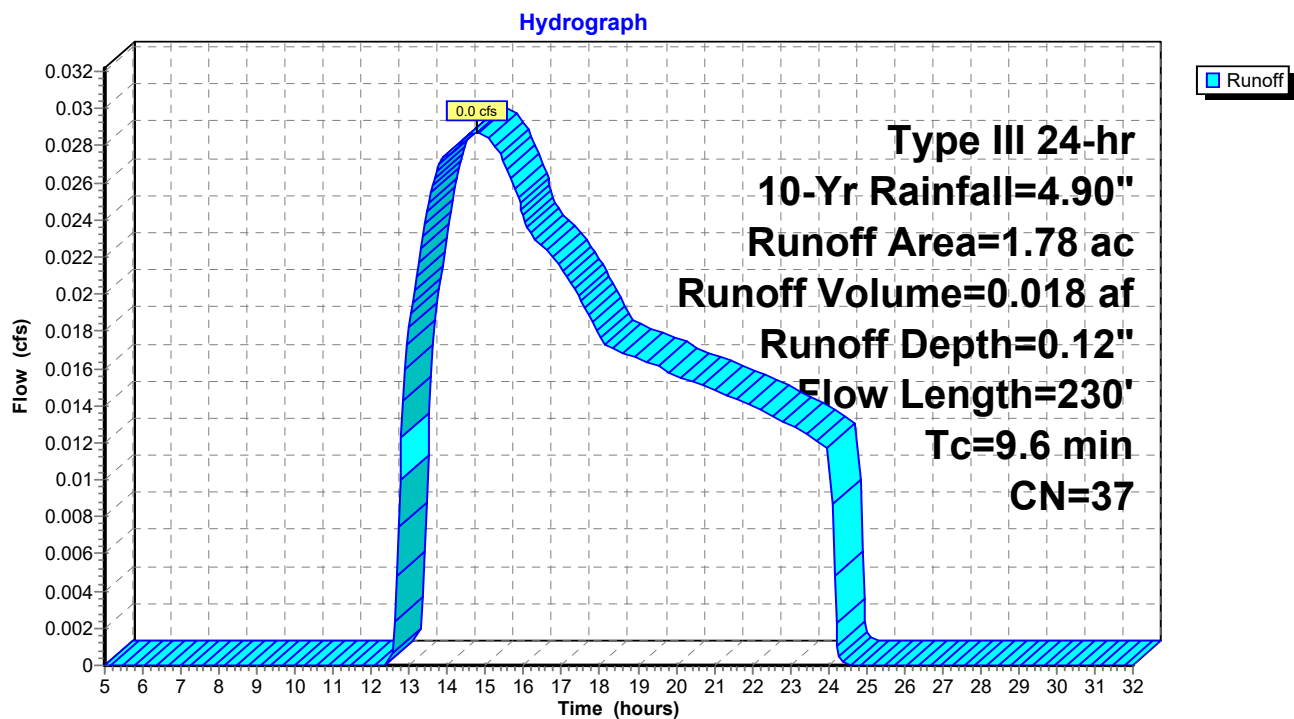
Runoff = 0.0 cfs @ 14.76 hrs, Volume= 0.018 af, Depth= 0.12"
 Routed to Pond WL-1 : Wetland Series 'J'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.97	39	>75% Grass cover, Good, HSG A
0.04	61	>75% Grass cover, Good, HSG B
0.69	30	Woods, Good, HSG A
0.08	55	Woods, Good, HSG B
1.78	37	Weighted Average
1.78		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	30	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	110	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	40	0.3700	4.26		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.6	230	Total			

Subcatchment PWA-5E:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 59

Summary for Subcatchment PWA-5F:

Runoff = 9.7 cfs @ 12.09 hrs, Volume= 0.707 af, Depth= 3.18"
Routed to Pond SUB-3 : Subsurface System-3

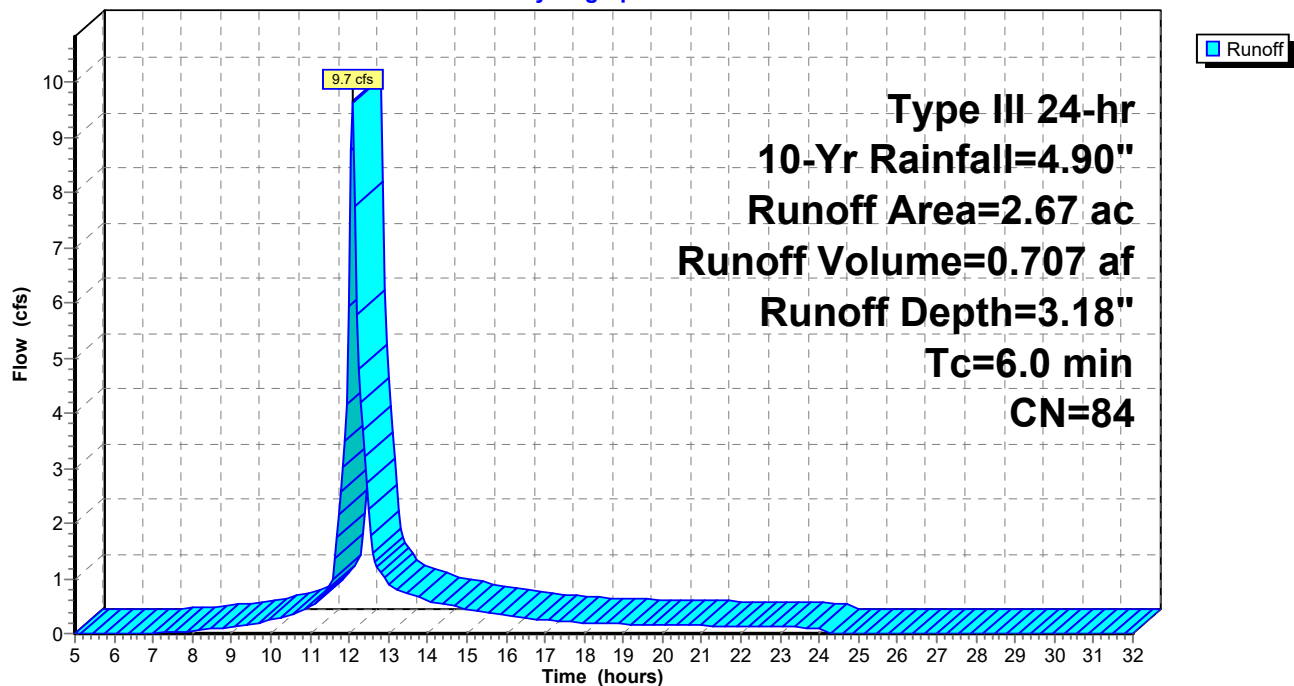
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.65	39	>75% Grass cover, Good, HSG A
0.85	98	Roofs, HSG A
1.17	98	Paved parking, HSG A
2.67	84	Weighted Average
0.65		24.34% Pervious Area
2.02		75.66% Impervious Area

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

Subcatchment PWA-5F:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 60

Summary for Subcatchment PWA-5G:

Runoff = 0.9 cfs @ 12.10 hrs, Volume= 0.069 af, Depth= 1.73"
 Routed to Pond SUB-1 : Subsurface System-1

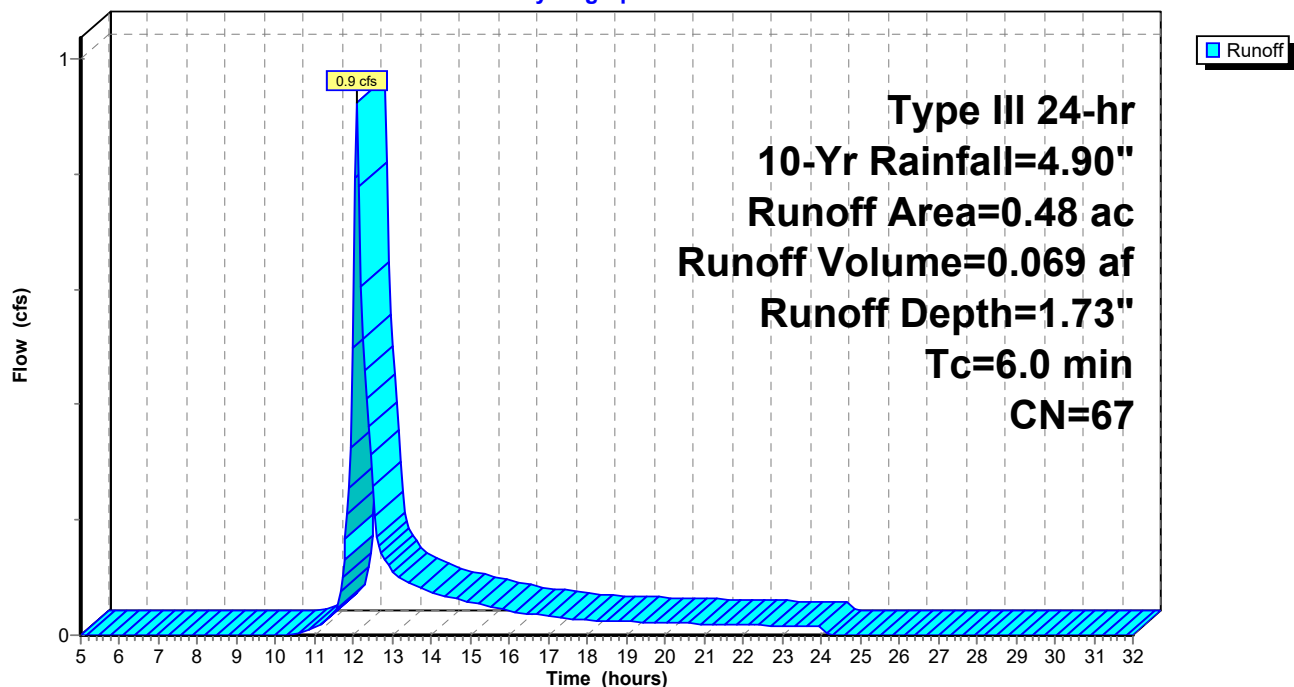
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.23	98	Paved parking, HSG A
0.48	67	Weighted Average
0.25		52.08% Pervious Area
0.23		47.92% Impervious Area

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

Subcatchment PWA-5G:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 61

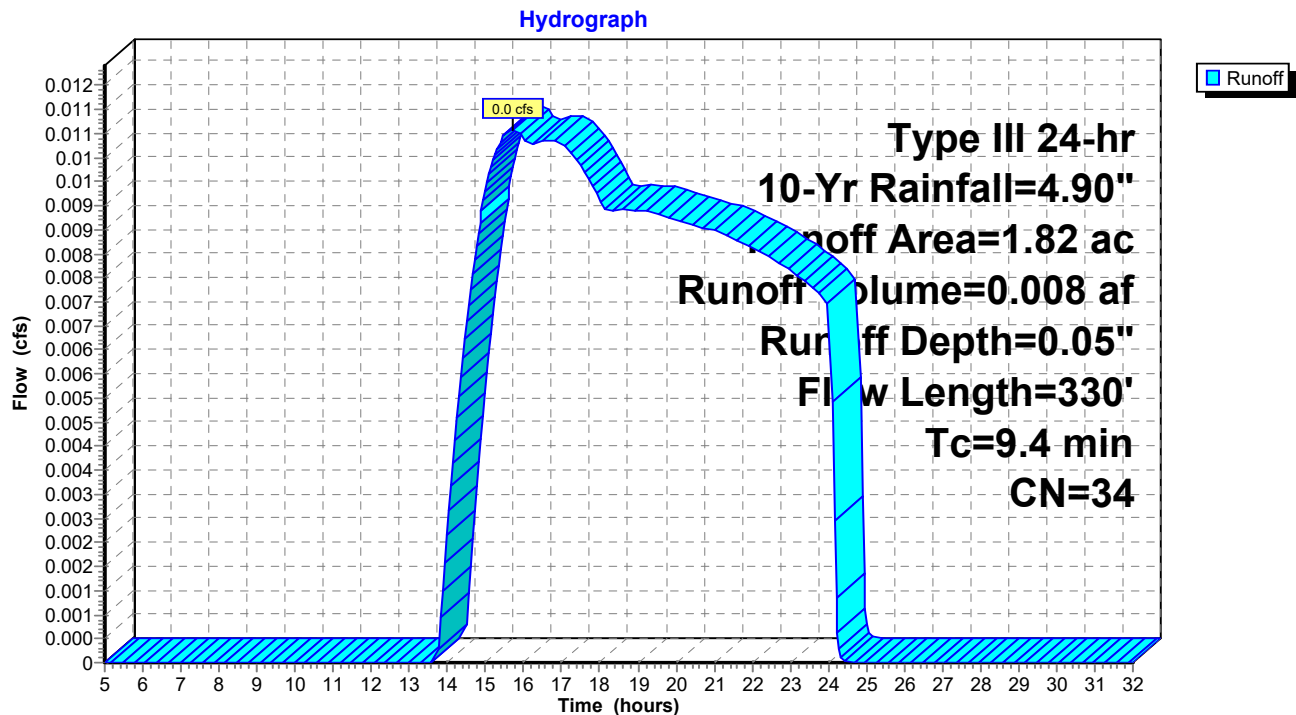
Summary for Subcatchment PWA-5H:

Runoff = 0.0 cfs @ 15.71 hrs, Volume= 0.008 af, Depth= 0.05"
 Routed to Pond SUB-3 : Subsurface System-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
1.01	30	Woods, Good, HSG A
0.81	39	>75% Grass cover, Good, HSG A
1.82	34	Weighted Average
1.82		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.1600	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.2	280	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.4	330	Total			

Subcatchment PWA-5H:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 62

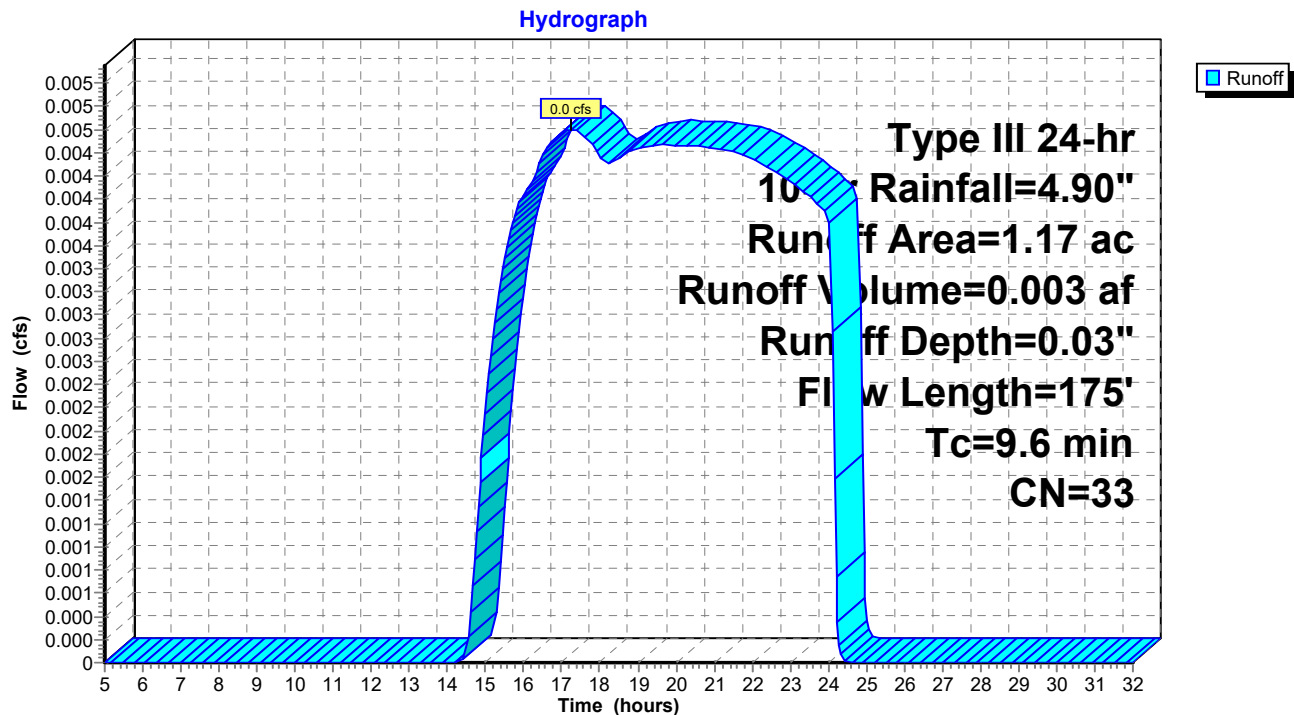
Summary for Subcatchment PWA-6:

Runoff = 0.0 cfs @ 17.23 hrs, Volume= 0.003 af, Depth= 0.03"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.44	39	>75% Grass cover, Good, HSG A
0.73	30	Woods, Good, HSG A
1.17	33	Weighted Average
1.17		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
1.9	125	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.6	175	Total			

Subcatchment PWA-6:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 63

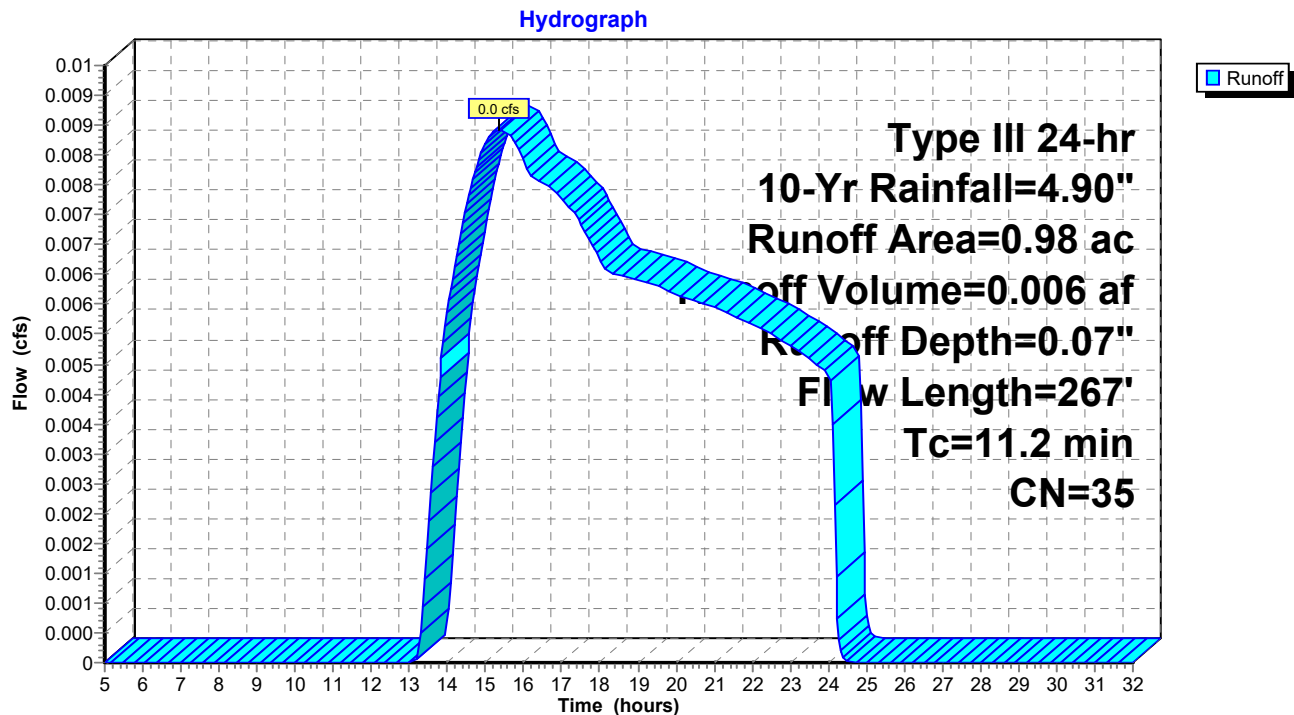
Summary for Subcatchment PWA-7:

Runoff = 0.0 cfs @ 15.37 hrs, Volume= 0.006 af, Depth= 0.07"
 Routed to Reach DP-7 : #4 Poppy Ln

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.49	30	Woods, Good, HSG A
0.49	39	>75% Grass cover, Good, HSG A
0.98	35	Weighted Average
0.98		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
1.0	217	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.2	267	Total			

Subcatchment PWA-7:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 64

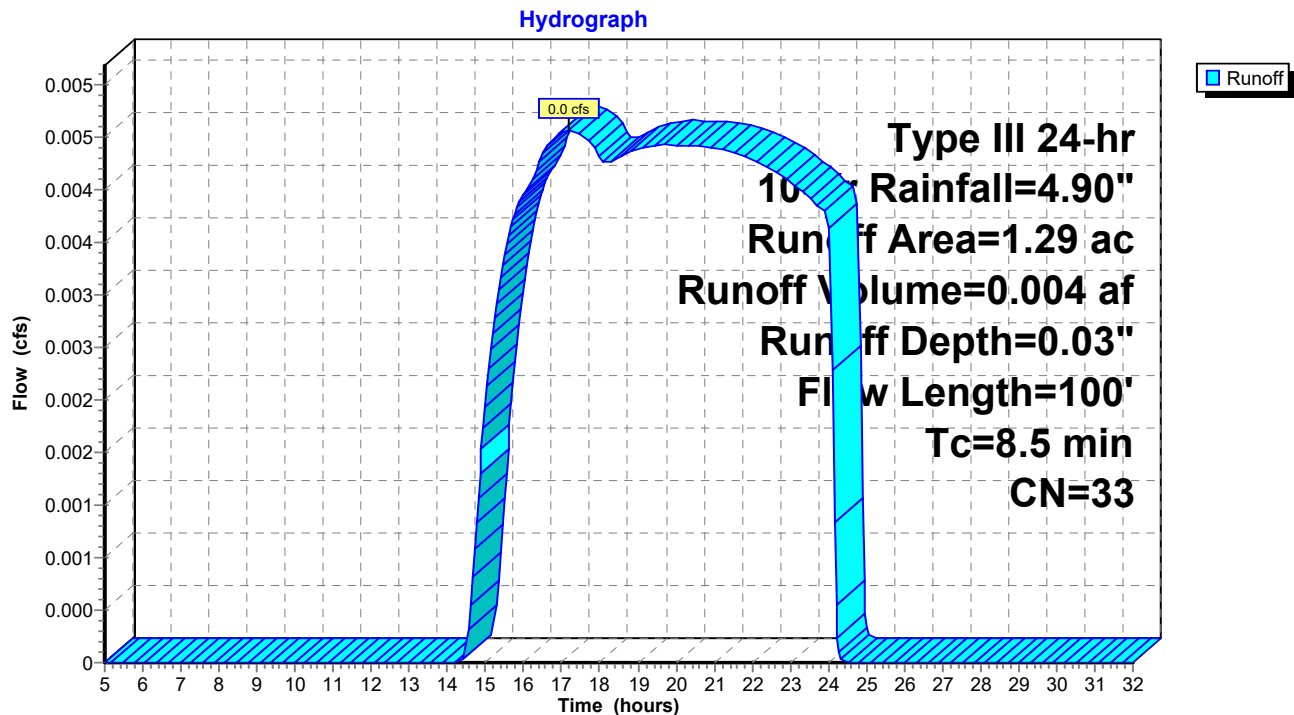
Summary for Subcatchment PWA-8A:

Runoff = 0.0 cfs @ 17.21 hrs, Volume= 0.004 af, Depth= 0.03"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
0.92	30	Woods, Good, HSG A
0.37	39	>75% Grass cover, Good, HSG A
1.29	33	Weighted Average
1.29		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.40"
0.5	50	0.1200	1.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	100	Total			

Subcatchment PWA-8A:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 65

Summary for Subcatchment PWA-8B:

Runoff = 14.8 cfs @ 12.09 hrs, Volume= 1.078 af, Depth= 2.37"
Routed to Pond SUB-4 : Subsurface System-4

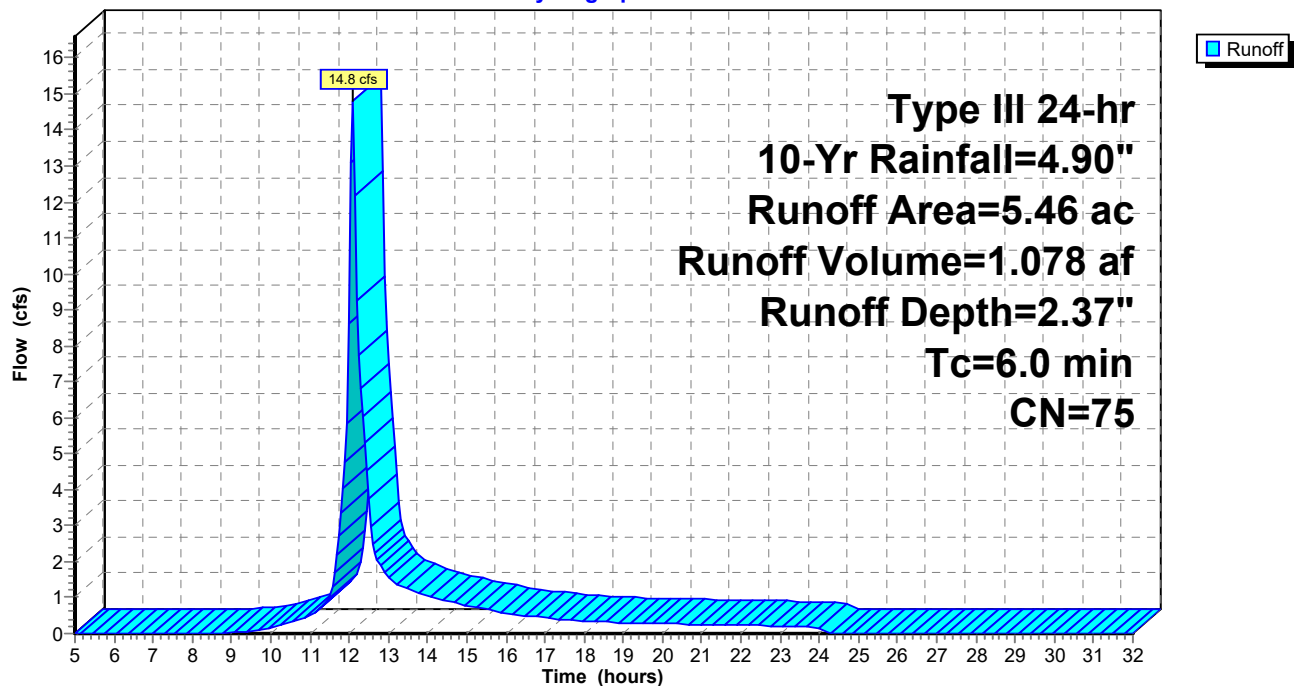
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=4.90"

Area (ac)	CN	Description
2.12	39	>75% Grass cover, Good, HSG A
1.39	98	Roofs, HSG A
1.95	98	Paved parking, HSG A
5.46	75	Weighted Average
2.12		38.83% Pervious Area
3.34		61.17% Impervious Area

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

Subcatchment PWA-8B:

Hydrograph

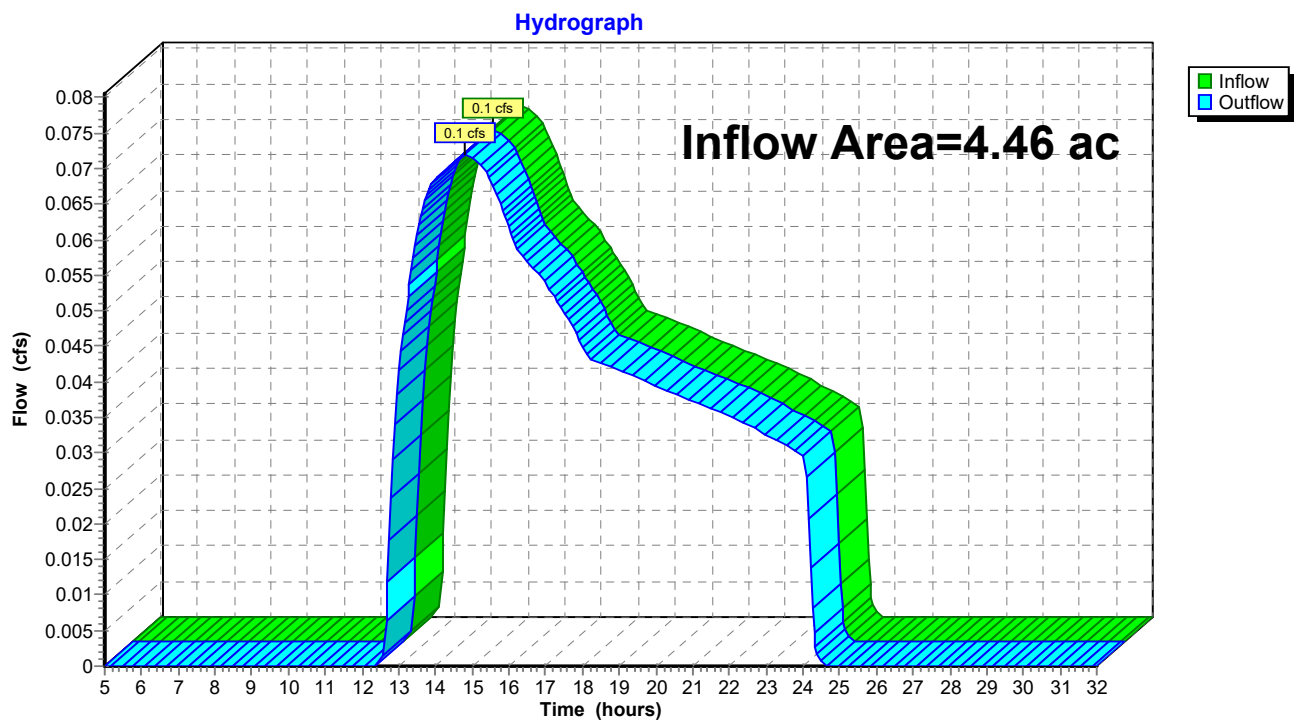


Summary for Reach DP-1: Northern Wetlands Culvert

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

Inflow Area = 4.46 ac, 0.00% Impervious, Inflow Depth = 0.12" for 10-Yr event
Inflow = 0.1 cfs @ 14.82 hrs, Volume= 0.045 af
Outflow = 0.1 cfs @ 14.82 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

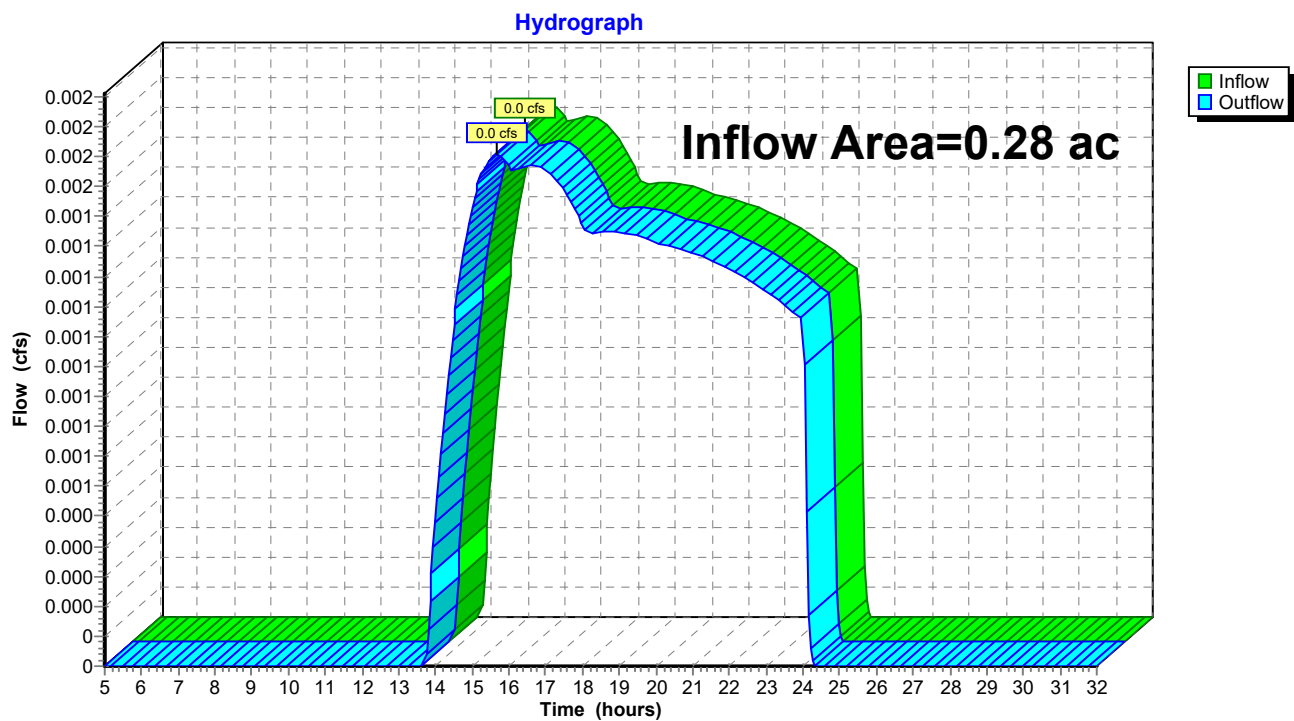
Reach DP-1: Northern Wetlands Culvert

Summary for Reach DP-3: #48 Rinzee Rd

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

Inflow Area = 0.28 ac, 0.00% Impervious, Inflow Depth = 0.05" for 10-Yr event
Inflow = 0.0 cfs @ 15.66 hrs, Volume= 0.001 af
Outflow = 0.0 cfs @ 15.66 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Summary for Reach DP-4: Poppy Ln

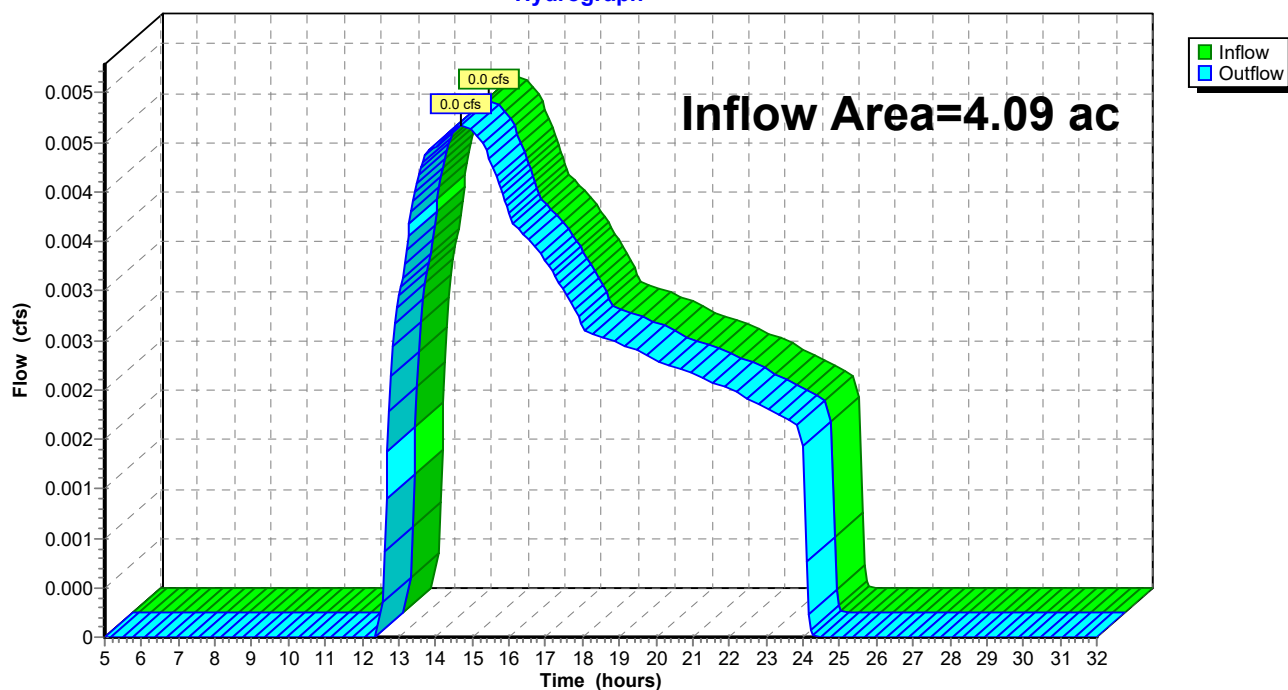
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.09 ac, 39.12% Impervious, Inflow Depth = 0.01" for 10-Yr event
Inflow = 0.0 cfs @ 14.71 hrs, Volume= 0.003 af
Outflow = 0.0 cfs @ 14.71 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph

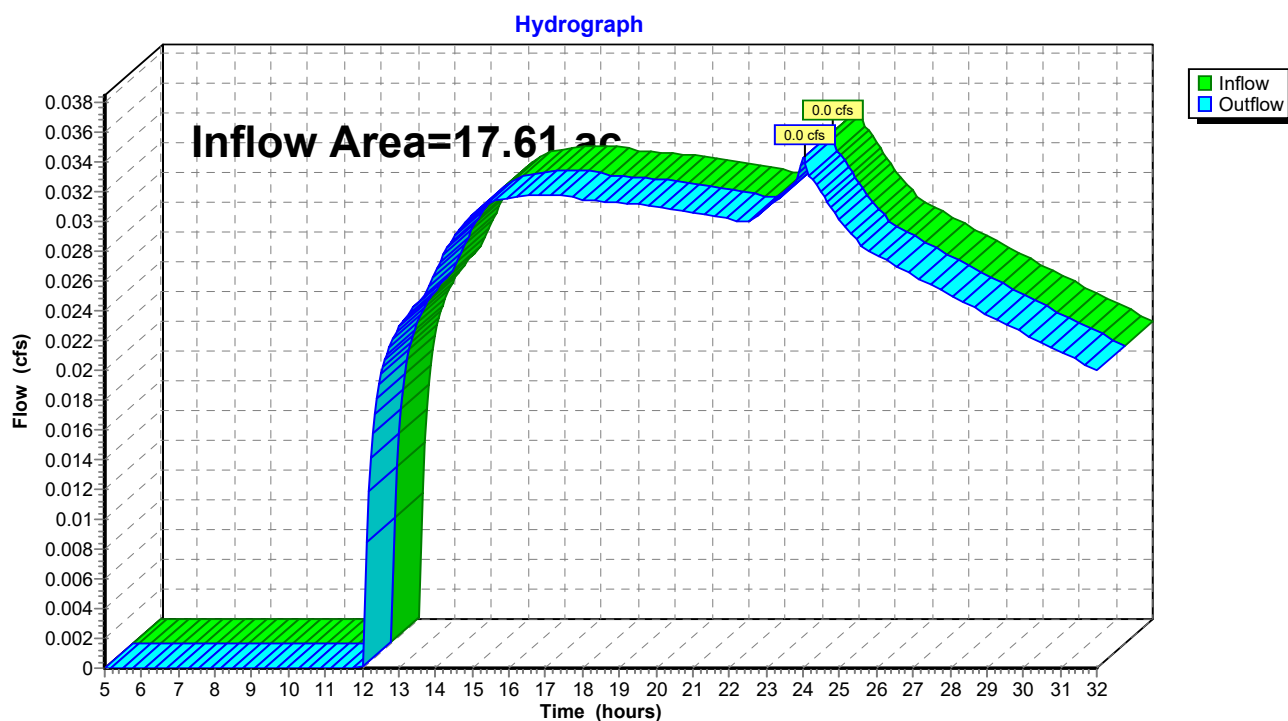


Summary for Reach DP-5: Wetland Series 'A'

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

Inflow Area = 17.61 ac, 37.65% Impervious, Inflow Depth > 0.03" for 10-Yr event
Inflow = 0.0 cfs @ 24.03 hrs, Volume= 0.046 af
Outflow = 0.0 cfs @ 24.03 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

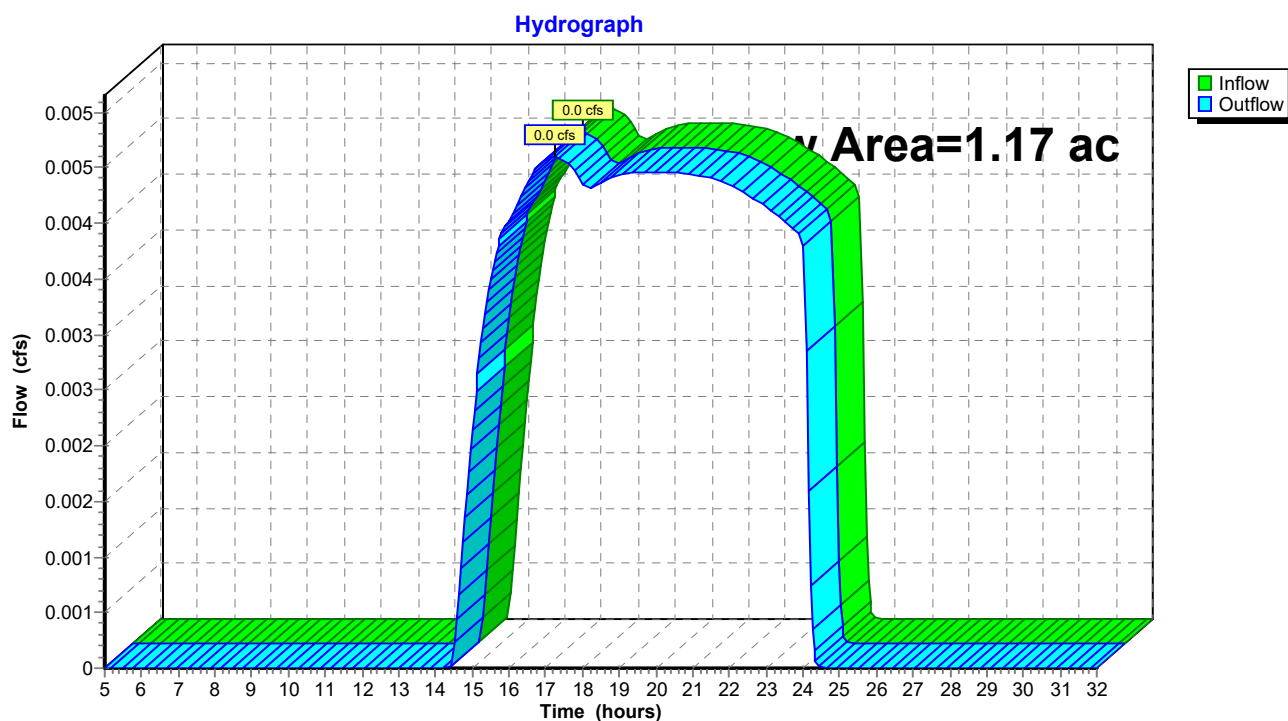
Reach DP-5: Wetland Series 'A'

Summary for Reach DP-6: Wetland Series 'B' & 'C'

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

Inflow Area = 1.17 ac, 0.00% Impervious, Inflow Depth = 0.03" for 10-Yr event
Inflow = 0.0 cfs @ 17.23 hrs, Volume= 0.003 af
Outflow = 0.0 cfs @ 17.23 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Summary for Reach DP-7: #4 Poppy Ln

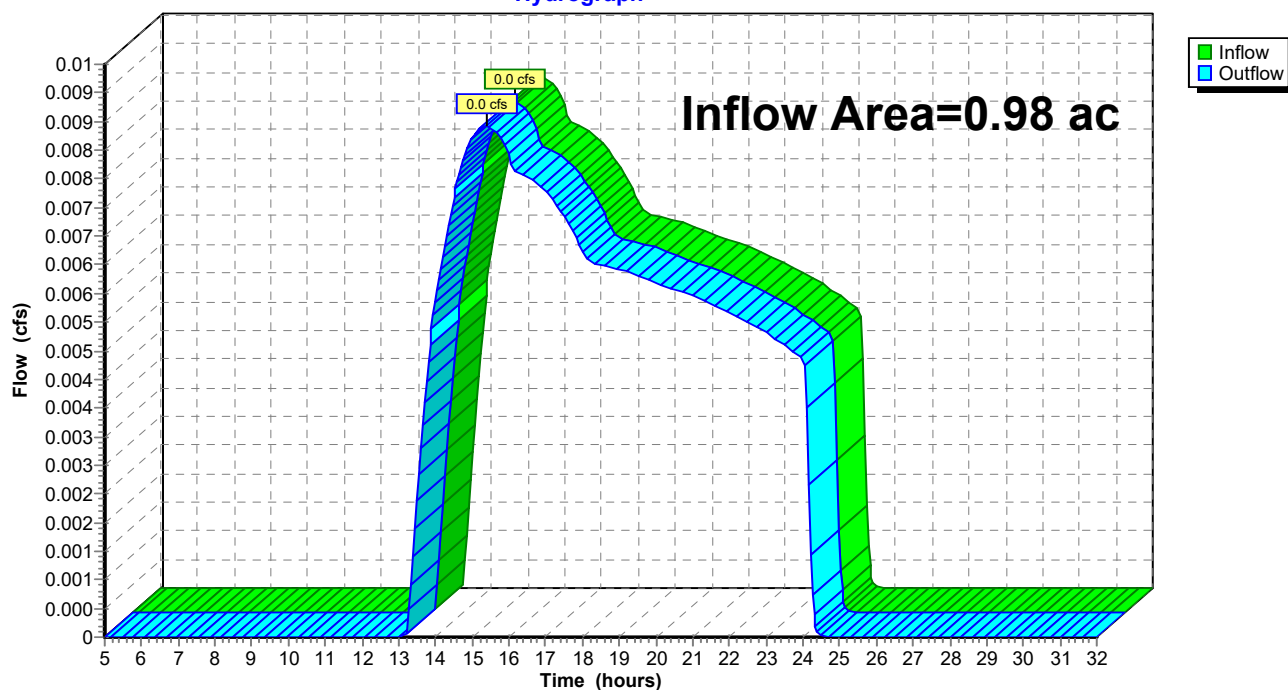
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.98 ac, 0.00% Impervious, Inflow Depth = 0.07" for 10-Yr event
Inflow = 0.0 cfs @ 15.37 hrs, Volume= 0.006 af
Outflow = 0.0 cfs @ 15.37 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph



Summary for Reach DP-8: Wetland Series 'D' & 'E'

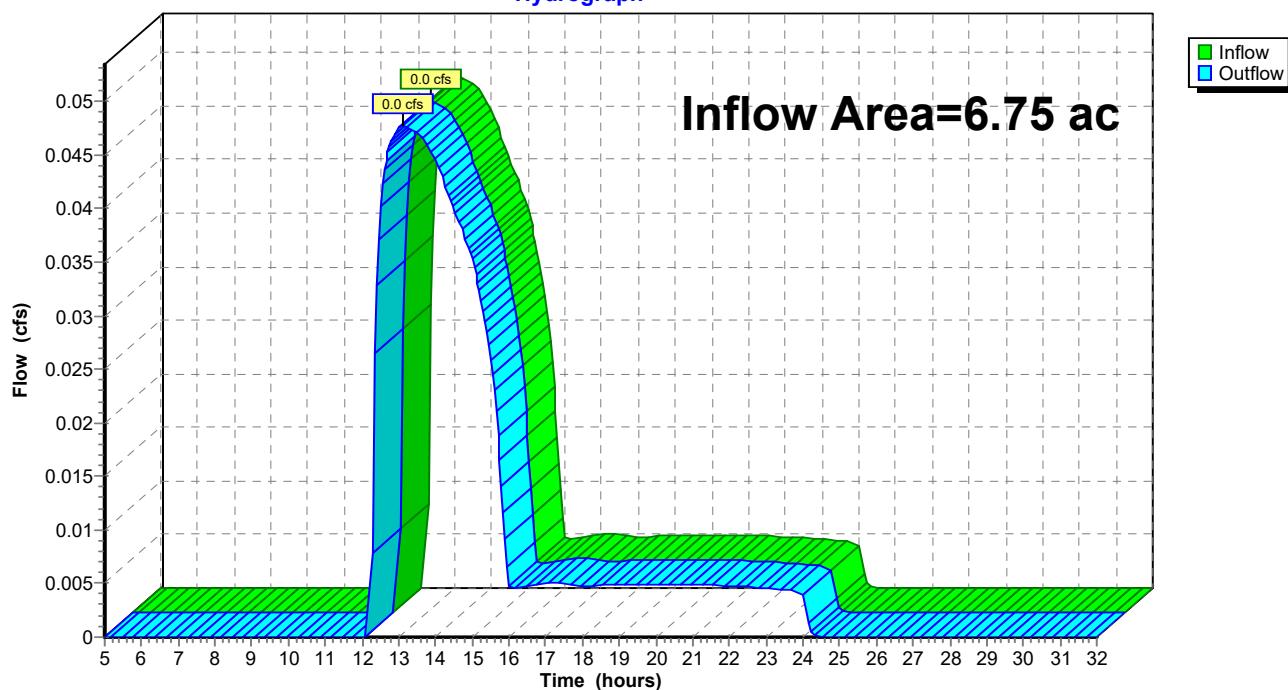
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.75 ac, 49.48% Impervious, Inflow Depth = 0.03" for 10-Yr event
Inflow = 0.0 cfs @ 13.12 hrs, Volume= 0.015 af
Outflow = 0.0 cfs @ 13.12 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

Hydrograph



Summary for Pond C-1: Culvert 1

[57] Hint: Peaked at 166.10' (Flood elevation advised)

Inflow Area = 2.26 ac, 0.00% Impervious, Inflow Depth = 0.09" for 10-Yr event
 Inflow = 0.0 cfs @ 15.08 hrs, Volume= 0.018 af
 Outflow = 0.0 cfs @ 15.08 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.0 cfs @ 15.08 hrs, Volume= 0.018 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Peak Elev= 166.10' @ 15.08 hrs

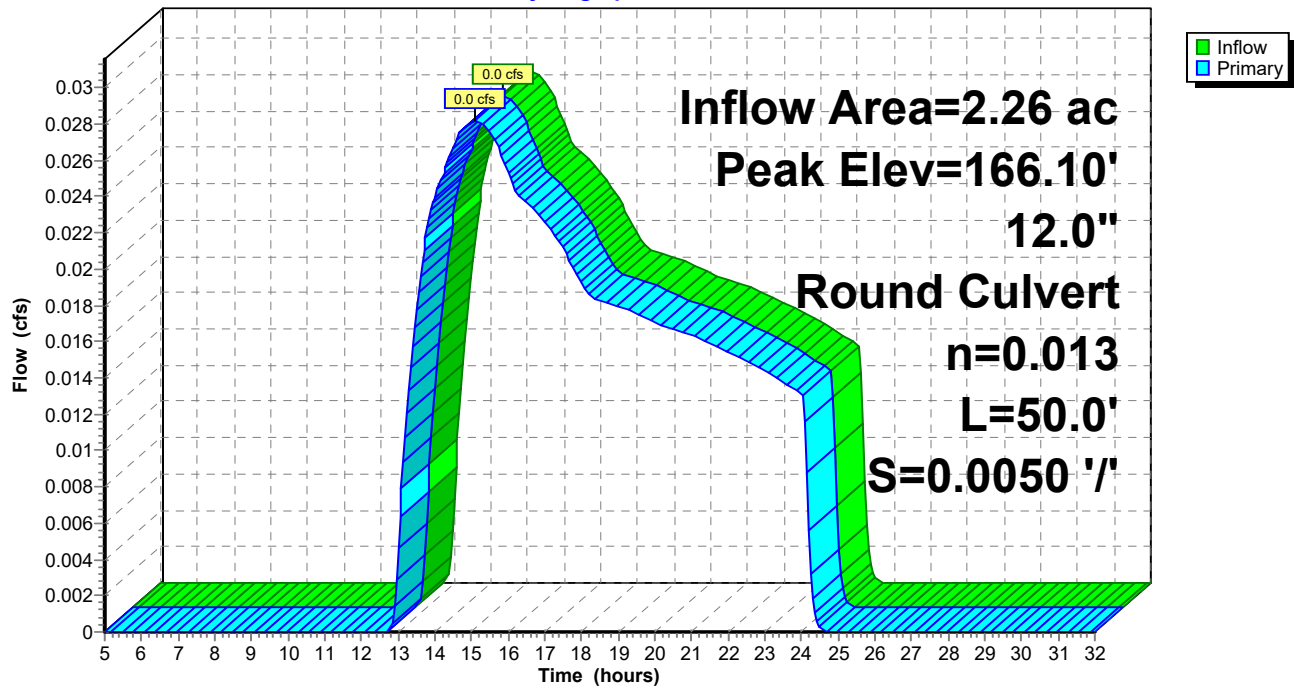
Device	Routing	Invert	Outlet Devices
#1	Primary	166.00'	12.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 166.00' / 165.75' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 15.08 hrs HW=166.10' (Free Discharge)

1=Culvert (Barrel Controls 0.0 cfs @ 1.06 fps)

Pond C-1: Culvert 1

Hydrograph



23-10524 - Post - R2

Type III 24-hr 10-Yr Rainfall=4.90"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 74

Summary for Pond IB-1:

Inflow Area = 8.01 ac, 54.68% Impervious, Inflow Depth = 2.12" for 10-Yr event
 Inflow = 18.4 cfs @ 12.11 hrs, Volume= 1.416 af
 Outflow = 3.0 cfs @ 12.69 hrs, Volume= 1.416 af, Atten= 84%, Lag= 34.8 min
 Discarded = 3.0 cfs @ 12.69 hrs, Volume= 1.415 af
 Primary = 0.0 cfs @ 12.69 hrs, Volume= 0.001 af
 Routed to Pond WL-1 : Wetland Series 'J'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 139.58' @ 12.69 hrs Surf.Area= 15,639 sf Storage= 20,110 cf

Plug-Flow detention time= 58.5 min calculated for 1.413 af (100% of inflow)
 Center-of-Mass det. time= 58.3 min (902.8 - 844.6)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	89,403 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	10,182	0	0
139.00	13,217	11,700	11,700
140.00	17,372	15,295	26,994
141.00	20,111	18,742	45,736
142.00	21,820	20,966	66,701
143.00	23,583	22,702	89,403

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	138.00'	12.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.65' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	139.40'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	141.90'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 2	142.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	142.00'	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

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 10-Yr Rainfall=4.90"

Printed 12/24/2024

Page 75

Discarded OutFlow Max=3.0 cfs @ 12.69 hrs HW=139.58' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 3.0 cfs)

Primary OutFlow Max=0.0 cfs @ 12.69 hrs HW=139.58' (Free Discharge)

↑ **2=Culvert** (Passes 0.0 cfs of 3.0 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.0 cfs @ 1.81 fps)

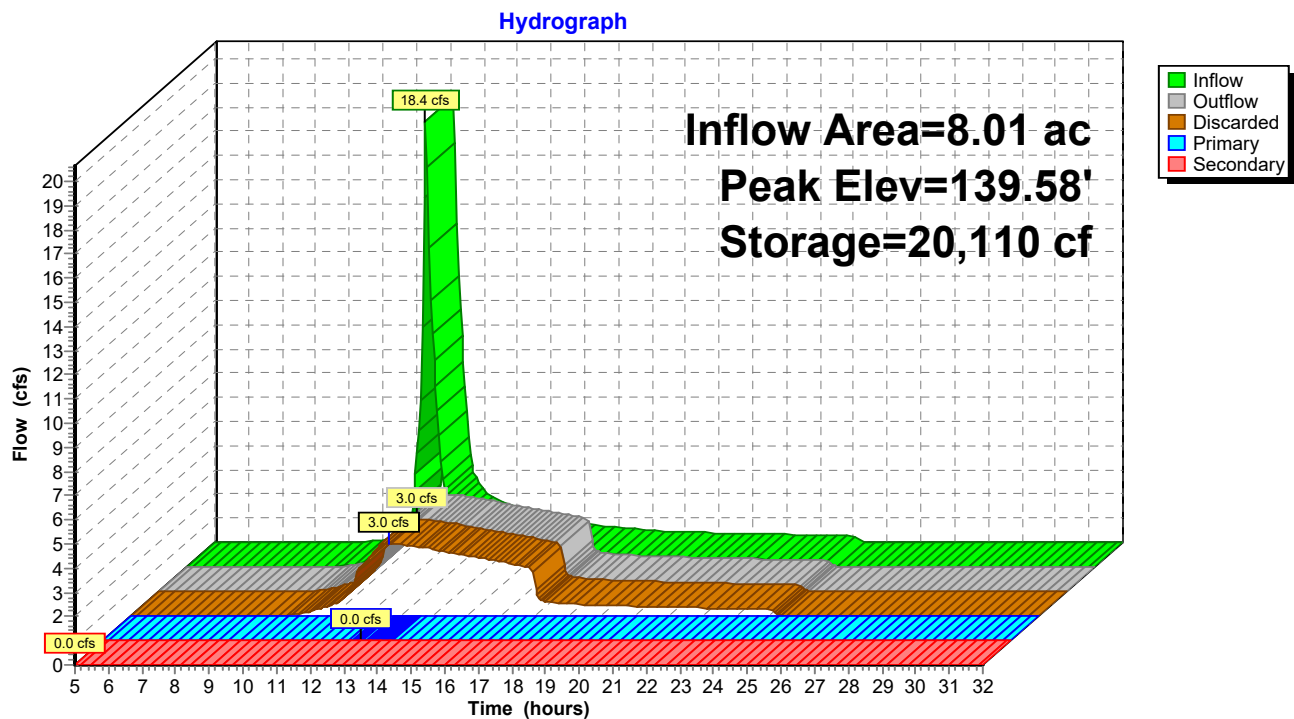
↑ **4=Orifice/Grate** (Controls 0.0 cfs)

↑ **5=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=138.00' (Free Discharge)

↑ **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond IB-1:



Summary for Pond SUB-1: Subsurface System-1

Inflow Area = 0.48 ac, 47.92% Impervious, Inflow Depth = 1.73" for 10-Yr event
 Inflow = 0.9 cfs @ 12.10 hrs, Volume= 0.069 af
 Outflow = 0.0 cfs @ 17.67 hrs, Volume= 0.041 af, Atten= 97%, Lag= 334.1 min
 Primary = 0.0 cfs @ 17.67 hrs, Volume= 0.041 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 132.71' @ 17.67 hrs Surf.Area= 0.03 ac Storage= 0.047 af

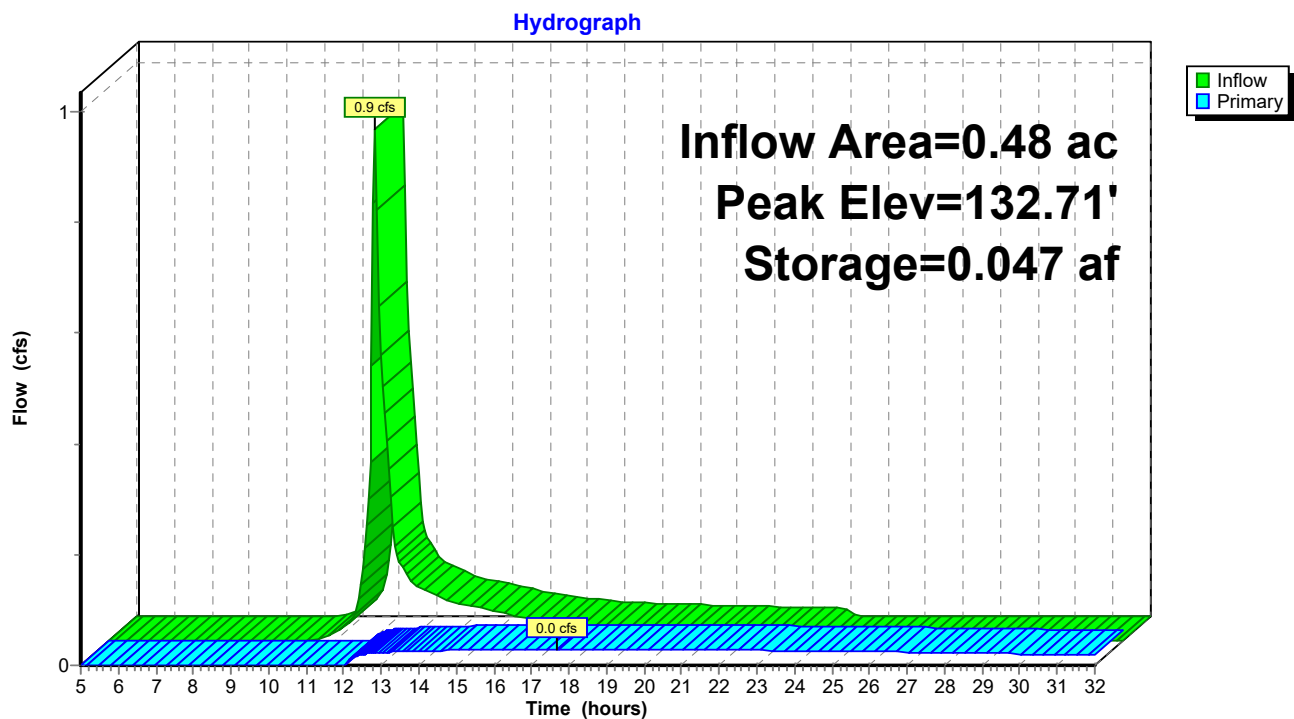
Plug-Flow detention time= 562.6 min calculated for 0.041 af (59% of inflow)
 Center-of-Mass det. time= 444.3 min (1,301.0 - 856.7)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	0.110 af	8.00'W x 15.00'L x 4.00'H Prisma toid x 10

Device	Routing	Invert	Outlet Devices
#1	Primary	131.00'	12.0" Round Culvert L= 48.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 130.76' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	131.50'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	134.80'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.0 cfs @ 17.67 hrs HW=132.71' (Free Discharge)

1=Culvert (Passes 0.0 cfs of 3.5 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.0 cfs @ 5.20 fps)
 3=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

Pond SUB-1: Subsurface System-1

23-10524 - Post - R2

Type III 24-hr 10-Yr Rainfall=4.90"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 78

Summary for Pond SUB-2: Subsurface System-2

Inflow Area = 3.77 ac, 42.44% Impervious, Inflow Depth = 1.52" for 10-Yr event
 Inflow = 4.0 cfs @ 12.35 hrs, Volume= 0.476 af
 Outflow = 1.0 cfs @ 12.10 hrs, Volume= 0.476 af, Atten= 74%, Lag= 0.0 min
 Discarded = 1.0 cfs @ 12.10 hrs, Volume= 0.476 af
 Primary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-4 : Poppy Ln

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 138.02' @ 13.08 hrs Surf.Area= 5,400 sf Storage= 5,501 cf

Plug-Flow detention time= 39.6 min calculated for 0.475 af (100% of inflow)
 Center-of-Mass det. time= 39.6 min (920.1 - 880.5)

Volume	Invert	Avail.Storage	Storage Description
#1	137.00'	21,600 cf	8.00'W x 15.00'L x 4.00'H 10x17 Concrete Chambers 12" Walk 45

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	137.00'	15.0" Round Culvert L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.00' / 136.72' S= 0.0051 ' / Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	138.10'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.0 cfs @ 12.10 hrs HW=137.05' (Free Discharge)

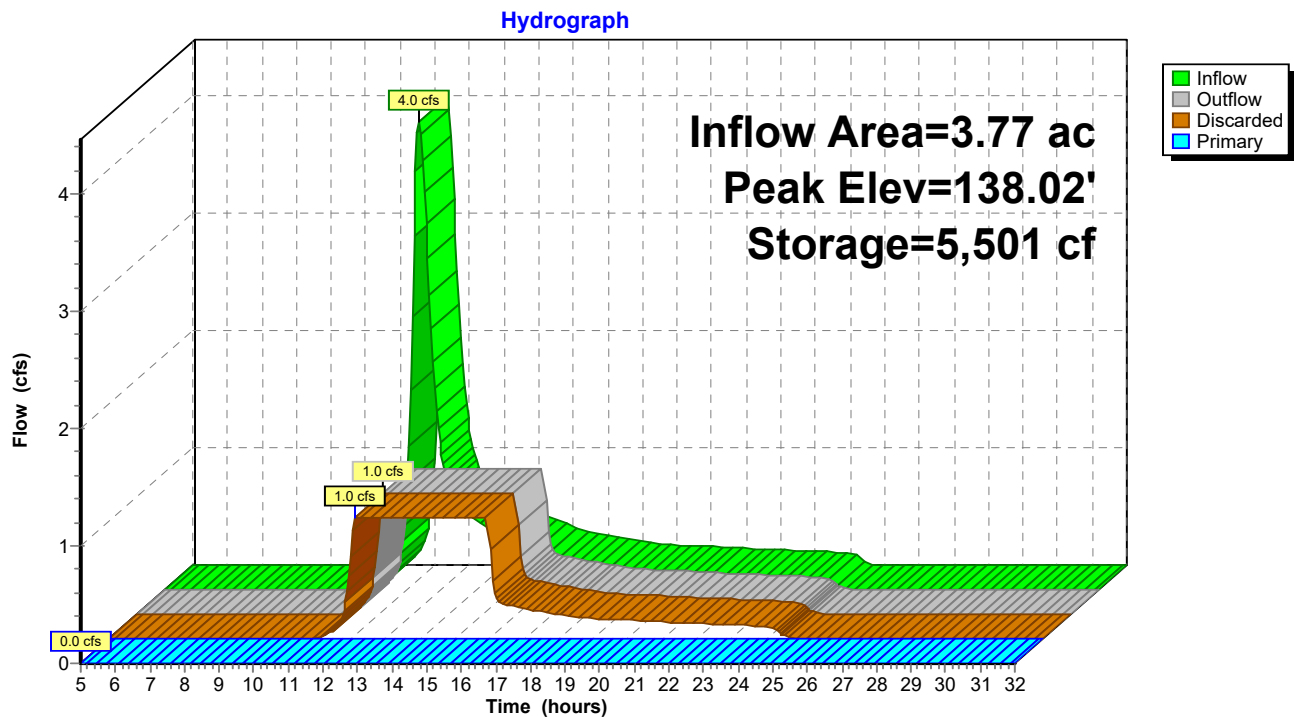
↑ **1=Exfiltration** (Exfiltration Controls 1.0 cfs)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=137.00' (Free Discharge)

↑ **2=Culvert** (Controls 0.0 cfs)

↑ **3=Orifice/Grate** (Controls 0.0 cfs)

↑ **4=Sharp-Crested Rectangular Weir**(Controls 0.0 cfs)

Pond SUB-2: Subsurface System-2

23-10524 - Post - R2

Type III 24-hr 10-Yr Rainfall=4.90"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 80

Summary for Pond SUB-3: Subsurface System-3

Inflow Area = 4.49 ac, 44.99% Impervious, Inflow Depth = 1.91" for 10-Yr event
 Inflow = 9.7 cfs @ 12.09 hrs, Volume= 0.715 af
 Outflow = 0.9 cfs @ 13.05 hrs, Volume= 0.715 af, Atten= 91%, Lag= 57.5 min
 Discarded = 0.8 cfs @ 11.60 hrs, Volume= 0.700 af
 Primary = 0.1 cfs @ 13.05 hrs, Volume= 0.015 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 141.81' @ 13.05 hrs Surf.Area= 4,320 sf Storage= 12,119 cf

Plug-Flow detention time= 118.7 min calculated for 0.714 af (100% of inflow)
 Center-of-Mass det. time= 118.5 min (933.3 - 814.8)

Volume	Invert	Avail.Storage	Storage Description
#1	139.00'	30,240 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 36

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	139.00'	15.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.00' / 138.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	140.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	145.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.8 cfs @ 11.60 hrs HW=139.08' (Free Discharge)

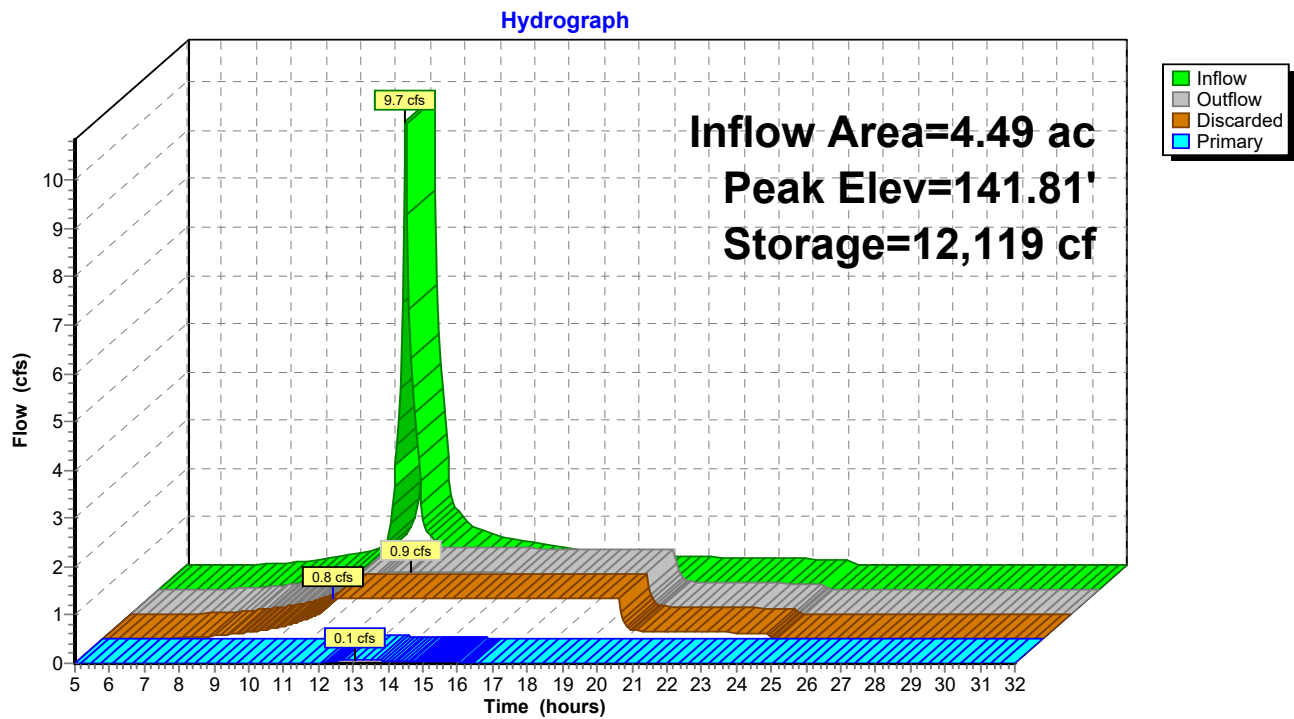
↑ **1=Exfiltration** (Exfiltration Controls 0.8 cfs)

Primary OutFlow Max=0.1 cfs @ 13.05 hrs HW=141.81' (Free Discharge)

↑ **2=Culvert** (Passes 0.1 cfs of 8.7 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.1 cfs @ 4.67 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-3: Subsurface System-3

23-10524 - Post - R2

Type III 24-hr 10-Yr Rainfall=4.90"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 82

Summary for Pond SUB-4: Subsurface System-4

Inflow Area = 5.46 ac, 61.17% Impervious, Inflow Depth = 2.37" for 10-Yr event
 Inflow = 14.8 cfs @ 12.09 hrs, Volume= 1.078 af
 Outflow = 1.4 cfs @ 13.12 hrs, Volume= 1.078 af, Atten= 90%, Lag= 61.7 min
 Discarded = 1.4 cfs @ 11.70 hrs, Volume= 1.066 af
 Primary = 0.0 cfs @ 13.12 hrs, Volume= 0.011 af
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 136.52' @ 13.12 hrs Surf.Area= 7,200 sf Storage= 18,111 cf

Plug-Flow detention time= 115.1 min calculated for 1.078 af (100% of inflow)
 Center-of-Mass det. time= 115.0 min (950.8 - 835.9)

Volume	Invert	Avail.Storage	Storage Description
#1	134.00'	50,400 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 60

Device	Routing	Invert	Outlet Devices
#1	Discarded	134.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	134.00'	12.0" Round Culvert L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.00' / 133.88' S= 0.0052 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	135.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.4 cfs @ 11.70 hrs HW=134.08' (Free Discharge)

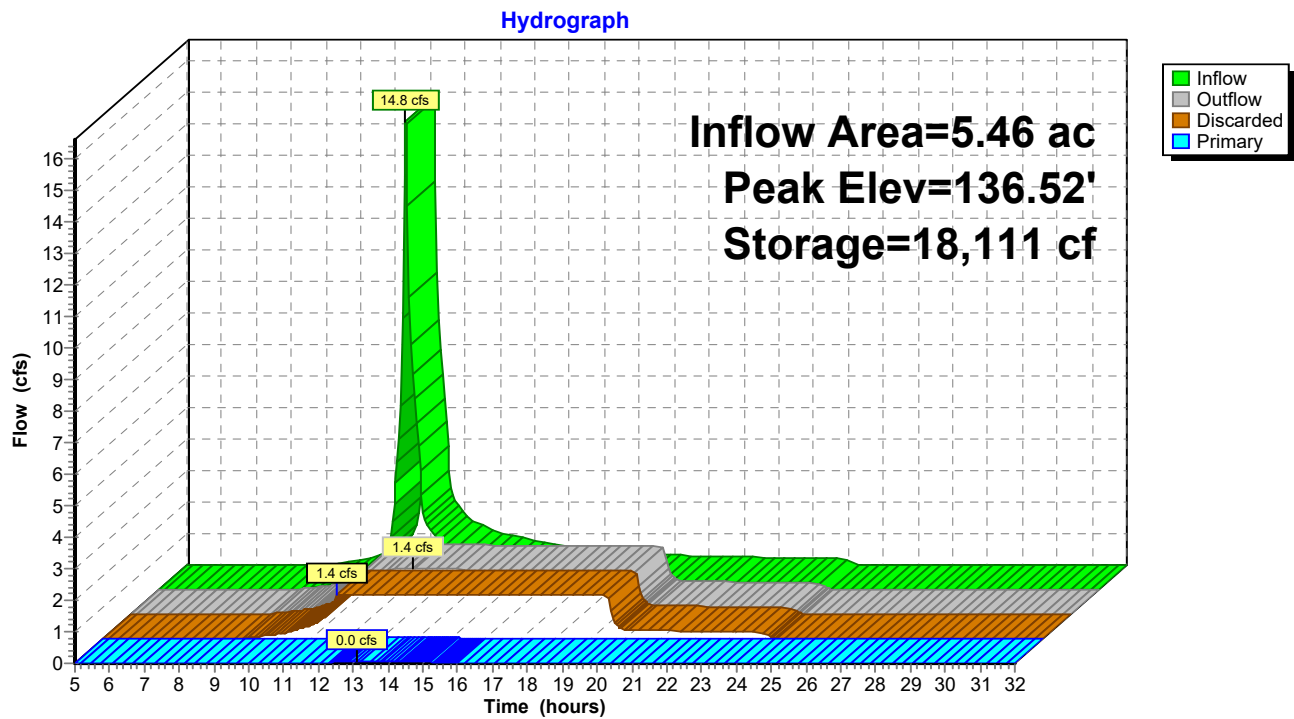
↑ **1=Exfiltration** (Exfiltration Controls 1.4 cfs)

Primary OutFlow Max=0.0 cfs @ 13.12 hrs HW=136.52' (Free Discharge)

↑ **2=Culvert** (Passes 0.0 cfs of 5.4 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.0 cfs @ 3.89 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-4: Subsurface System-4

23-10524 - Post - R2

Type III 24-hr 10-Yr Rainfall=4.90"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 84

Summary for Pond WL-1: Wetland Series 'J'

Inflow Area = 16.54 ac, 38.69% Impervious, Inflow Depth = 0.04" for 10-Yr event
 Inflow = 0.1 cfs @ 13.97 hrs, Volume= 0.052 af
 Outflow = 0.0 cfs @ 24.22 hrs, Volume= 0.002 af, Atten= 94%, Lag= 614.8 min
 Primary = 0.0 cfs @ 24.22 hrs, Volume= 0.002 af
 Routed to Reach DP-5 : Wetland Series 'A'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.09' @ 24.22 hrs Surf.Area= 3,881 sf Storage= 2,226 cf

Plug-Flow detention time= 855.4 min calculated for 0.002 af (4% of inflow)
 Center-of-Mass det. time= 608.0 min (1,606.3 - 998.3)

Volume	Invert	Avail.Storage	Storage Description
#1	136.00'	127,590 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.00	219	0	0
138.00	6,965	7,184	7,184
140.00	25,165	32,130	39,314
141.00	41,218	33,192	72,506
142.00	68,950	55,084	127,590

Device	Routing	Invert	Outlet Devices
#1	Primary	137.05'	18.0" Round Culvert L= 145.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 137.05' / 136.05' S= 0.0069 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf
#2	Secondary	141.05'	155.0' long x 35.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

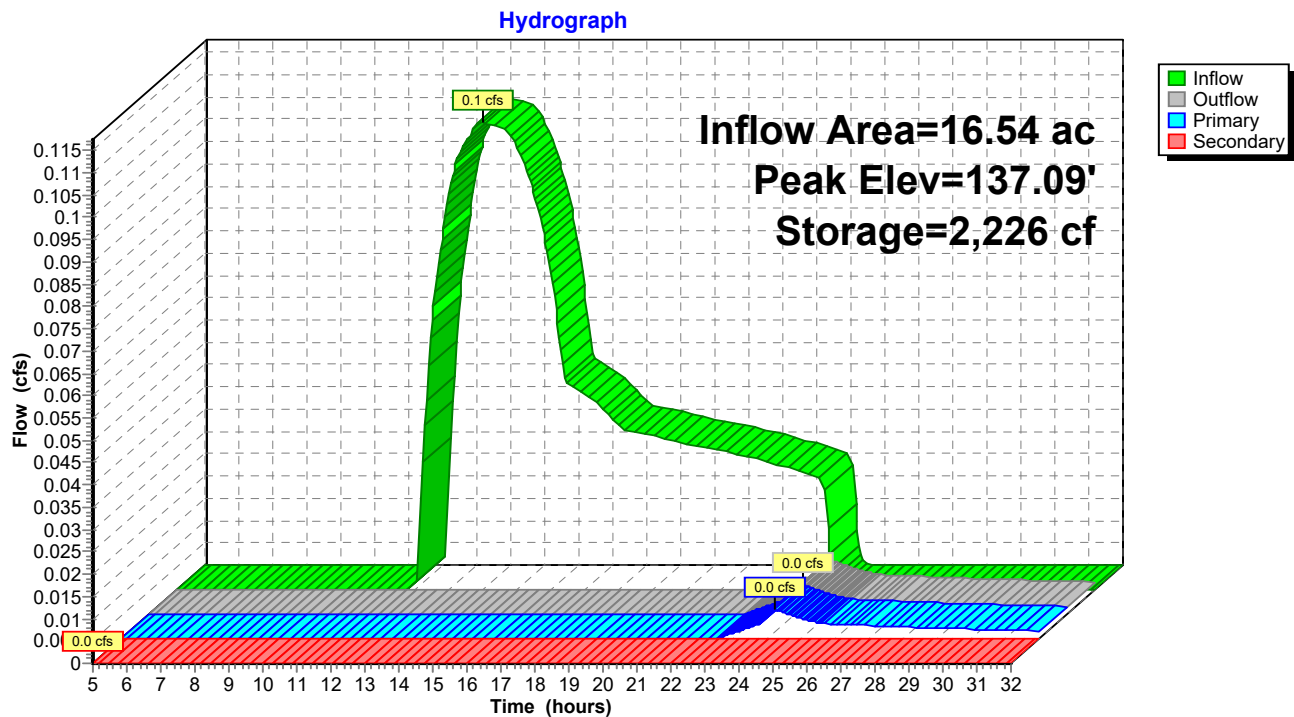
Primary OutFlow Max=0.0 cfs @ 24.22 hrs HW=137.09' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 0.0 cfs @ 0.70 fps)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=136.00' (Free Discharge)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond WL-1: Wetland Series 'J'



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 86

Time span=5.00-32.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPWA-1:	Runoff Area=4.46 ac 0.00% Impervious Runoff Depth=0.35" Flow Length=397' Tc=13.7 min CN=37 Runoff=0.4 cfs 0.129 af
SubcatchmentPWA-3:	Runoff Area=0.28 ac 0.00% Impervious Runoff Depth=0.21" Flow Length=80' Slope=0.1000 '/' Tc=6.6 min CN=34 Runoff=0.0 cfs 0.005 af
SubcatchmentPWA-4A:	Runoff Area=0.32 ac 0.00% Impervious Runoff Depth=0.35" Tc=6.0 min CN=37 Runoff=0.0 cfs 0.009 af
SubcatchmentPWA-4B:	Runoff Area=3.77 ac 42.44% Impervious Runoff Depth=2.28" Flow Length=1,000' Tc=22.8 min CN=64 Runoff=6.2 cfs 0.716 af
SubcatchmentPWA-5A:	Runoff Area=0.59 ac 0.00% Impervious Runoff Depth=0.21" Tc=6.0 min CN=34 Runoff=0.0 cfs 0.010 af
SubcatchmentPWA-5B:	Runoff Area=3.16 ac 56.65% Impervious Runoff Depth=3.01" Flow Length=705' Tc=8.7 min CN=72 Runoff=9.9 cfs 0.793 af
SubcatchmentPWA-5C:	Runoff Area=4.85 ac 53.40% Impervious Runoff Depth=3.01" Tc=6.0 min CN=72 Runoff=16.8 cfs 1.216 af
SubcatchmentPWA-5D:	Runoff Area=2.26 ac 0.00% Impervious Runoff Depth=0.30" Flow Length=395' Tc=13.1 min CN=36 Runoff=0.2 cfs 0.057 af
SubcatchmentPWA-5E:	Runoff Area=1.78 ac 0.00% Impervious Runoff Depth=0.35" Flow Length=230' Tc=9.6 min CN=37 Runoff=0.2 cfs 0.052 af
SubcatchmentPWA-5F:	Runoff Area=2.67 ac 75.66% Impervious Runoff Depth=4.22" Tc=6.0 min CN=84 Runoff=12.7 cfs 0.938 af
SubcatchmentPWA-5G:	Runoff Area=0.48 ac 47.92% Impervious Runoff Depth=2.55" Tc=6.0 min CN=67 Runoff=1.4 cfs 0.102 af
SubcatchmentPWA-5H:	Runoff Area=1.82 ac 0.00% Impervious Runoff Depth=0.21" Flow Length=330' Tc=9.4 min CN=34 Runoff=0.1 cfs 0.032 af
SubcatchmentPWA-6:	Runoff Area=1.17 ac 0.00% Impervious Runoff Depth=0.17" Flow Length=175' Tc=9.6 min CN=33 Runoff=0.0 cfs 0.017 af
SubcatchmentPWA-7:	Runoff Area=0.98 ac 0.00% Impervious Runoff Depth=0.25" Flow Length=267' Tc=11.2 min CN=35 Runoff=0.0 cfs 0.021 af
SubcatchmentPWA-8A:	Runoff Area=1.29 ac 0.00% Impervious Runoff Depth=0.17" Flow Length=100' Tc=8.5 min CN=33 Runoff=0.0 cfs 0.019 af
SubcatchmentPWA-8B:	Runoff Area=5.46 ac 61.17% Impervious Runoff Depth=3.30" Tc=6.0 min CN=75 Runoff=20.7 cfs 1.501 af

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 87

Reach DP-1: Northern Wetlands CulvertInflow=0.4 cfs 0.129 af
Outflow=0.4 cfs 0.129 af**Reach DP-3: #48 Rinzee Rd**Inflow=0.0 cfs 0.005 af
Outflow=0.0 cfs 0.005 af**Reach DP-4: Poppy Ln**Inflow=0.0 cfs 0.016 af
Outflow=0.0 cfs 0.016 af**Reach DP-5: Wetland Series 'A'**Inflow=0.3 cfs 0.174 af
Outflow=0.3 cfs 0.174 af**Reach DP-6: Wetland Series 'B' & 'C'**Inflow=0.0 cfs 0.017 af
Outflow=0.0 cfs 0.017 af**Reach DP-7: #4 Poppy Ln**Inflow=0.0 cfs 0.021 af
Outflow=0.0 cfs 0.021 af**Reach DP-8: Wetland Series 'D' & 'E'**Inflow=0.1 cfs 0.061 af
Outflow=0.1 cfs 0.061 af**Pond C-1: Culvert 1**Peak Elev=166.23' Inflow=0.2 cfs 0.057 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=0.2 cfs 0.057 af**Pond IB-1:**Peak Elev=140.28' Storage=31,928 cf Inflow=26.4 cfs 2.009 af
Discarded=3.5 cfs 2.004 af Primary=0.0 cfs 0.005 af Secondary=0.0 cfs 0.000 af Outflow=3.5 cfs 2.009 af**Pond SUB-1: Subsurface System-1**Peak Elev=133.60' Storage=0.072 af Inflow=1.4 cfs 0.102 af
Outflow=0.0 cfs 0.056 af**Pond SUB-2: Subsurface System-2**Peak Elev=139.01' Storage=10,854 cf Inflow=6.2 cfs 0.716 af
Discarded=1.0 cfs 0.709 af Primary=0.0 cfs 0.007 af Outflow=1.1 cfs 0.716 af**Pond SUB-3: Subsurface System-3**Peak Elev=143.12' Storage=17,801 cf Inflow=12.7 cfs 0.970 af
Discarded=0.8 cfs 0.927 af Primary=0.1 cfs 0.043 af Outflow=0.9 cfs 0.970 af**Pond SUB-4: Subsurface System-4**Peak Elev=137.99' Storage=28,699 cf Inflow=20.7 cfs 1.501 af
Discarded=1.4 cfs 1.459 af Primary=0.1 cfs 0.042 af Outflow=1.5 cfs 1.501 af**Pond WL-1: Wetland Series 'J'**Peak Elev=137.26' Storage=2,957 cf Inflow=0.4 cfs 0.157 af
Primary=0.2 cfs 0.107 af Secondary=0.0 cfs 0.000 af Outflow=0.2 cfs 0.107 af**Total Runoff Area = 35.34 ac Runoff Volume = 5.616 af Average Runoff Depth = 1.91"**
67.26% Pervious = 23.77 ac 32.74% Impervious = 11.57 ac

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 88

Summary for Subcatchment PWA-1:

Runoff = 0.4 cfs @ 12.51 hrs, Volume= 0.129 af, Depth= 0.35"
 Routed to Reach DP-1 : Northern Wetlands Culvert

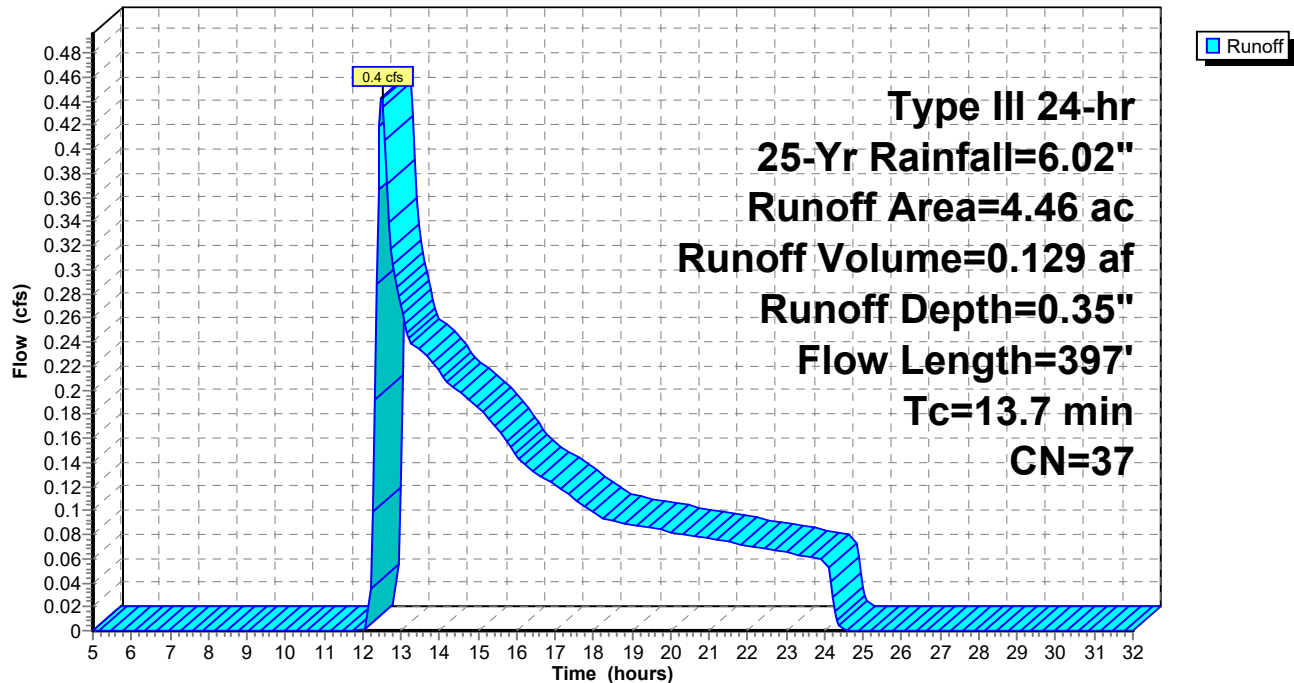
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.29	61	>75% Grass cover, Good, HSG B
0.55	39	>75% Grass cover, Good, HSG A
2.97	30	Woods, Good, HSG A
0.65	55	Woods, Good, HSG B
4.46	37	Weighted Average
4.46		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	347	0.0350	0.94		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.7	397	Total			

Subcatchment PWA-1:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 89

Summary for Subcatchment PWA-3:

Runoff = 0.0 cfs @ 13.64 hrs, Volume= 0.005 af, Depth= 0.21"
 Routed to Reach DP-3 : #48 Rinzee Rd

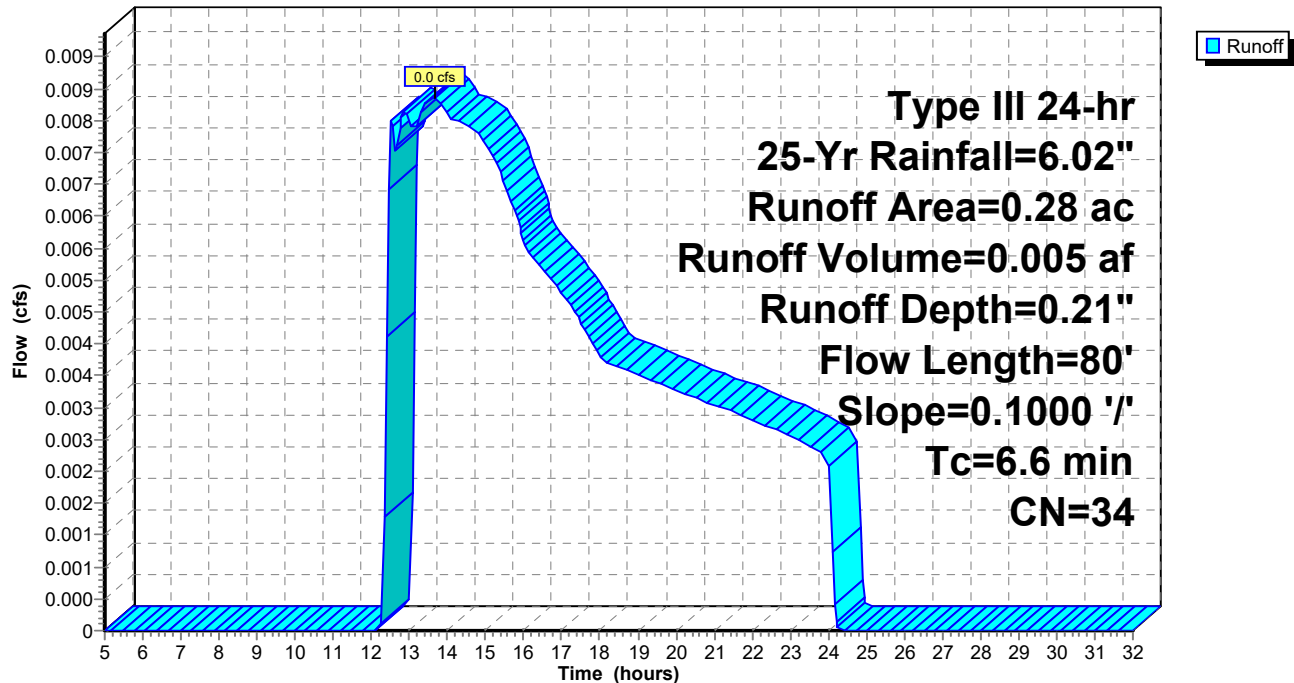
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.11	39	>75% Grass cover, Good, HSG A
0.17	30	Woods, Good, HSG A
0.28	34	Weighted Average
0.28		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	30	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.6	80	Total			

Subcatchment PWA-3:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 90

Summary for Subcatchment PWA-4A:

Runoff = 0.0 cfs @ 12.40 hrs, Volume= 0.009 af, Depth= 0.35"
Routed to Reach DP-4 : Poppy Ln

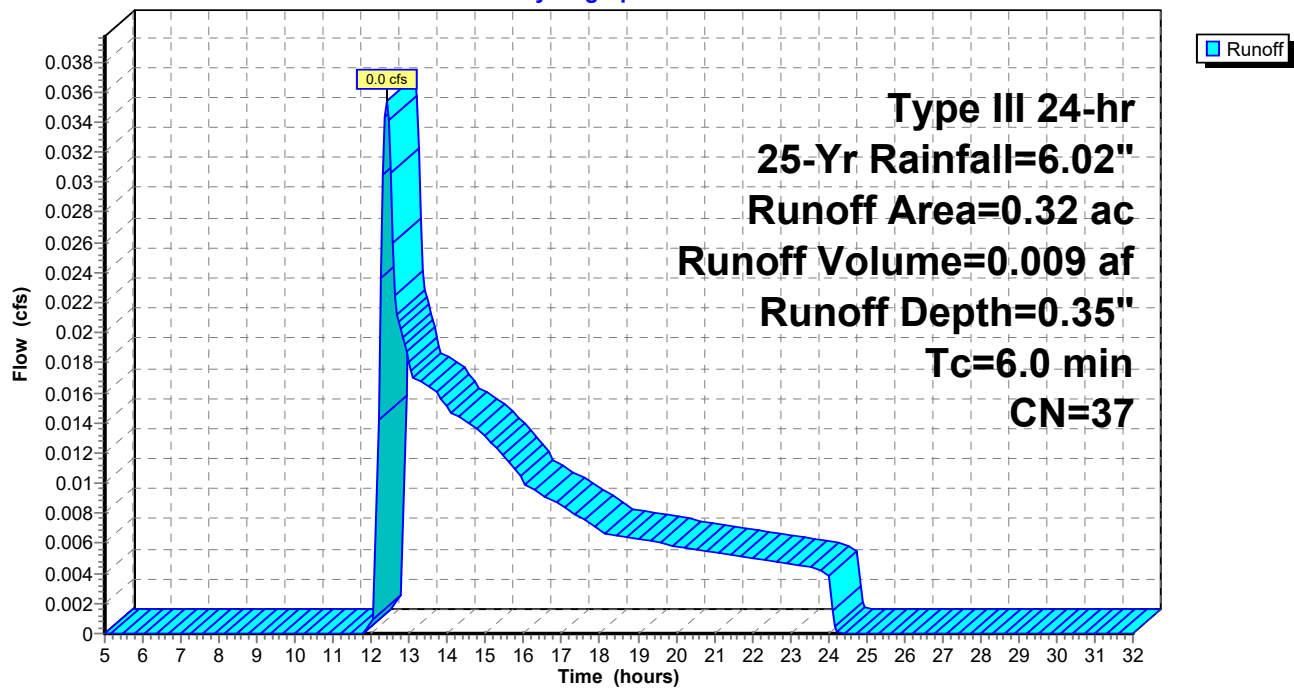
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.07	30	Woods, Good, HSG A
0.32	37	Weighted Average
0.32		100.00% Pervious Area

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

Subcatchment PWA-4A:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 91

Summary for Subcatchment PWA-4B:

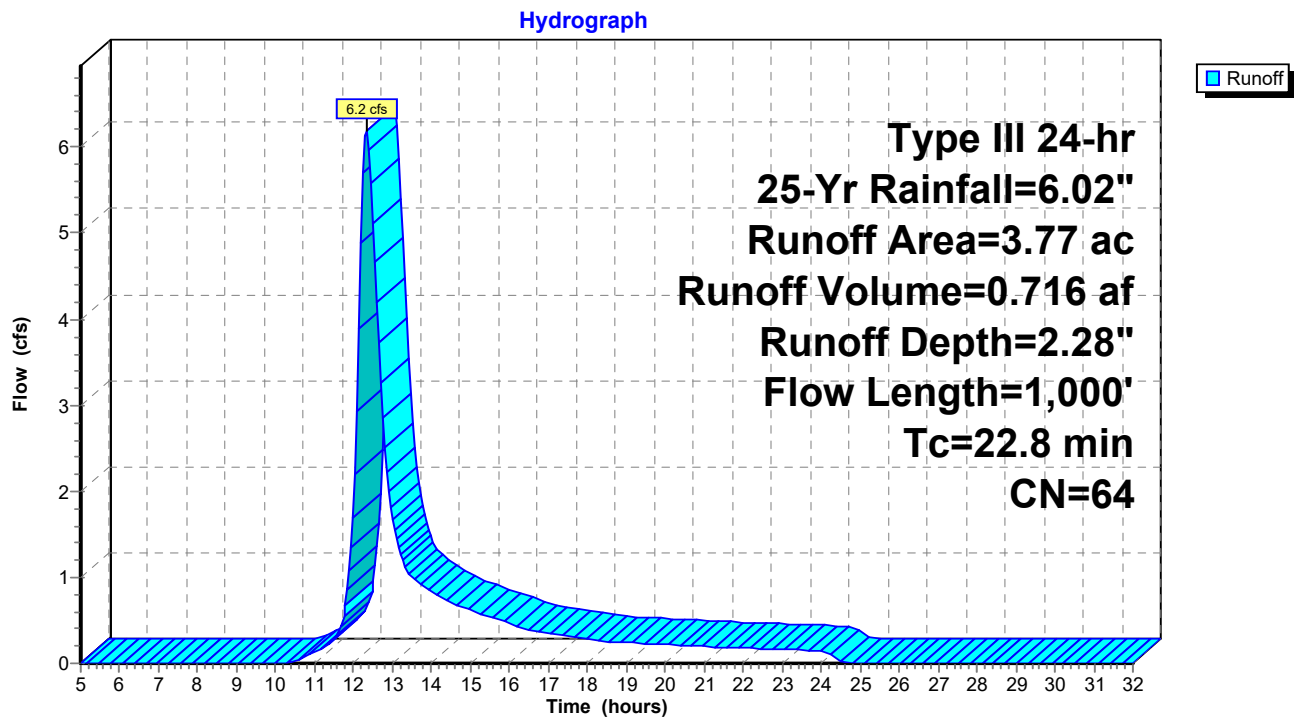
Runoff = 6.2 cfs @ 12.34 hrs, Volume= 0.716 af, Depth= 2.28"
 Routed to Pond SUB-2 : Subsurface System-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.20	30	Woods, Good, HSG A
0.05	55	Woods, Good, HSG B
1.85	39	>75% Grass cover, Good, HSG A
0.07	61	>75% Grass cover, Good, HSG B
0.62	98	Roofs, HSG A
0.04	98	Roofs, HSG B
0.93	98	Paved parking, HSG A
0.01	98	Paved parking, HSG B
3.77	64	Weighted Average
2.17		57.56% Pervious Area
1.60		42.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
17.3	950	0.0170	0.91		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.8	1,000	Total			

Subcatchment PWA-4B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 93

Summary for Subcatchment PWA-5A:

Runoff = 0.0 cfs @ 13.63 hrs, Volume= 0.010 af, Depth= 0.21"
Routed to Reach DP-5 : Wetland Series 'A'

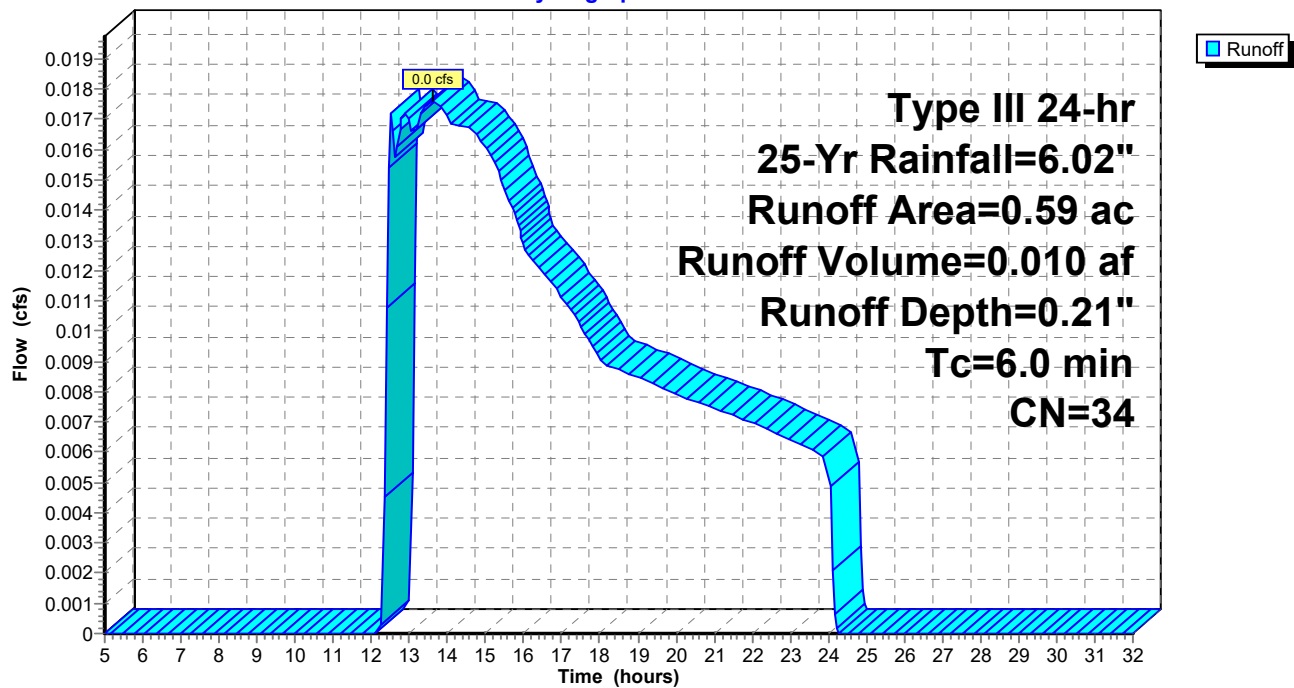
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.33	30	Woods, Good, HSG A
0.26	39	>75% Grass cover, Good, HSG A
0.59	34	Weighted Average
0.59		100.00% Pervious Area

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

Subcatchment PWA-5A:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 94

Summary for Subcatchment PWA-5B:

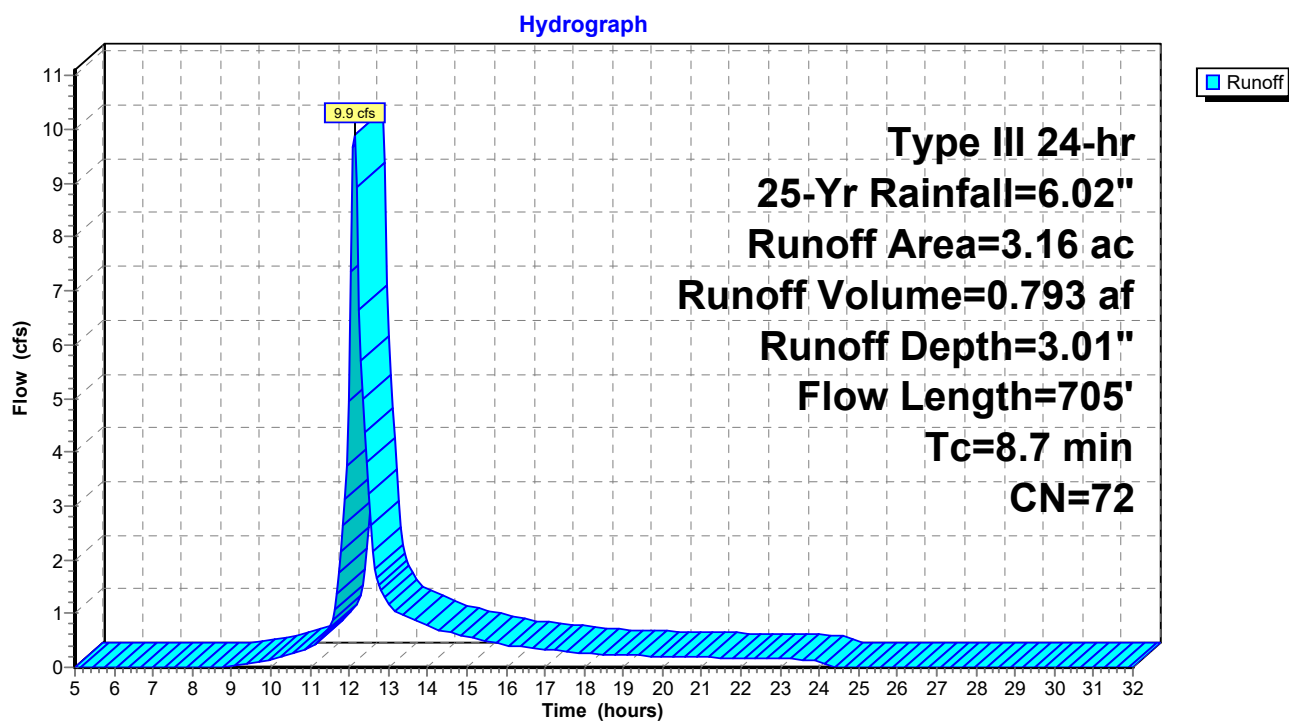
Runoff = 9.9 cfs @ 12.13 hrs, Volume= 0.793 af, Depth= 3.01"
 Routed to Pond IB-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
1.37	39	>75% Grass cover, Good, HSG A
0.52	98	Roofs, HSG A
1.27	98	Paved parking, HSG A
3.16	72	Weighted Average
1.37		43.35% Pervious Area
1.79		56.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0360	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	60	0.0400	3.00		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
1.1	265	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
3.0	330	0.0150	1.84		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.7	705	Total			

Subcatchment PWA-5B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 96

Summary for Subcatchment PWA-5C:

Runoff = 16.8 cfs @ 12.09 hrs, Volume= 1.216 af, Depth= 3.01"
Routed to Pond IB-1 :

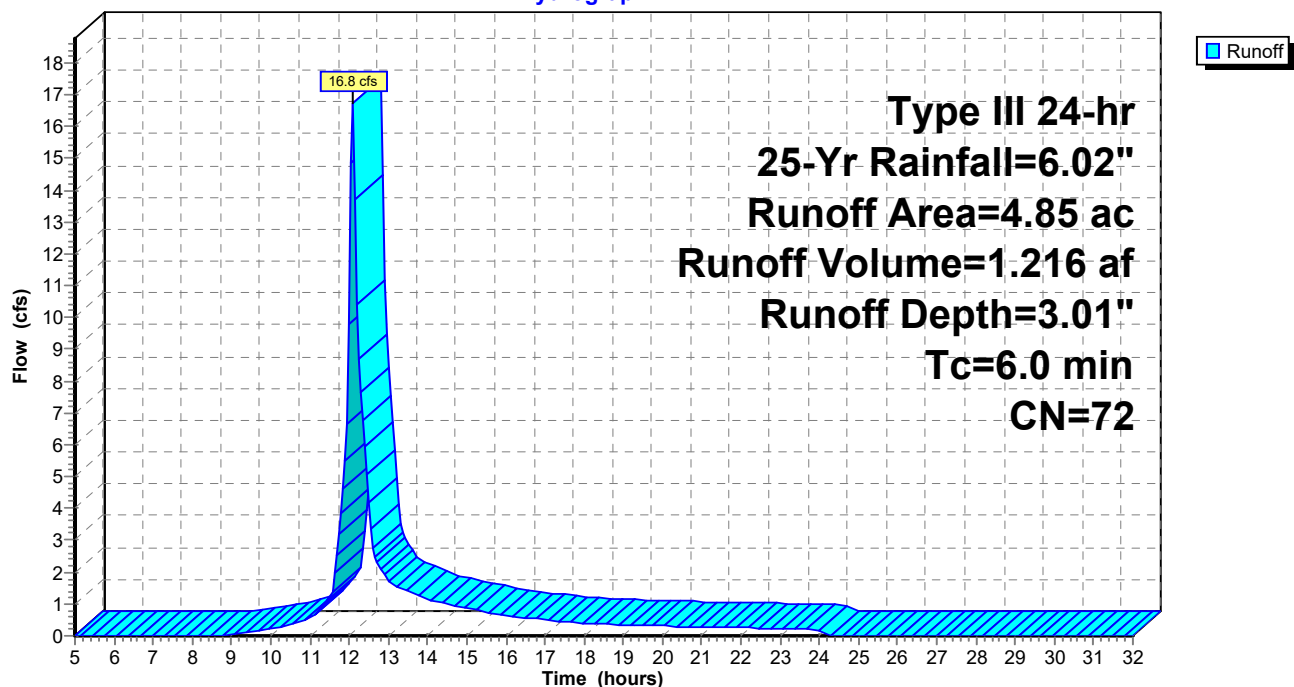
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
1.94	39	>75% Grass cover, Good, HSG A
0.25	61	>75% Grass cover, Good, HSG B
0.01	30	Woods, Good, HSG A
0.06	55	Woods, Good, HSG B
0.94	98	Roofs, HSG A
0.07	98	Roofs, HSG B
1.56	98	Paved parking, HSG A
0.02	98	Paved parking, HSG B
4.85	72	Weighted Average
2.26		46.60% Pervious Area
2.59		53.40% Impervious Area

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

Subcatchment PWA-5C:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 97

Summary for Subcatchment PWA-5D:

Runoff = 0.2 cfs @ 12.54 hrs, Volume= 0.057 af, Depth= 0.30"
 Routed to Pond C-1 : Culvert 1

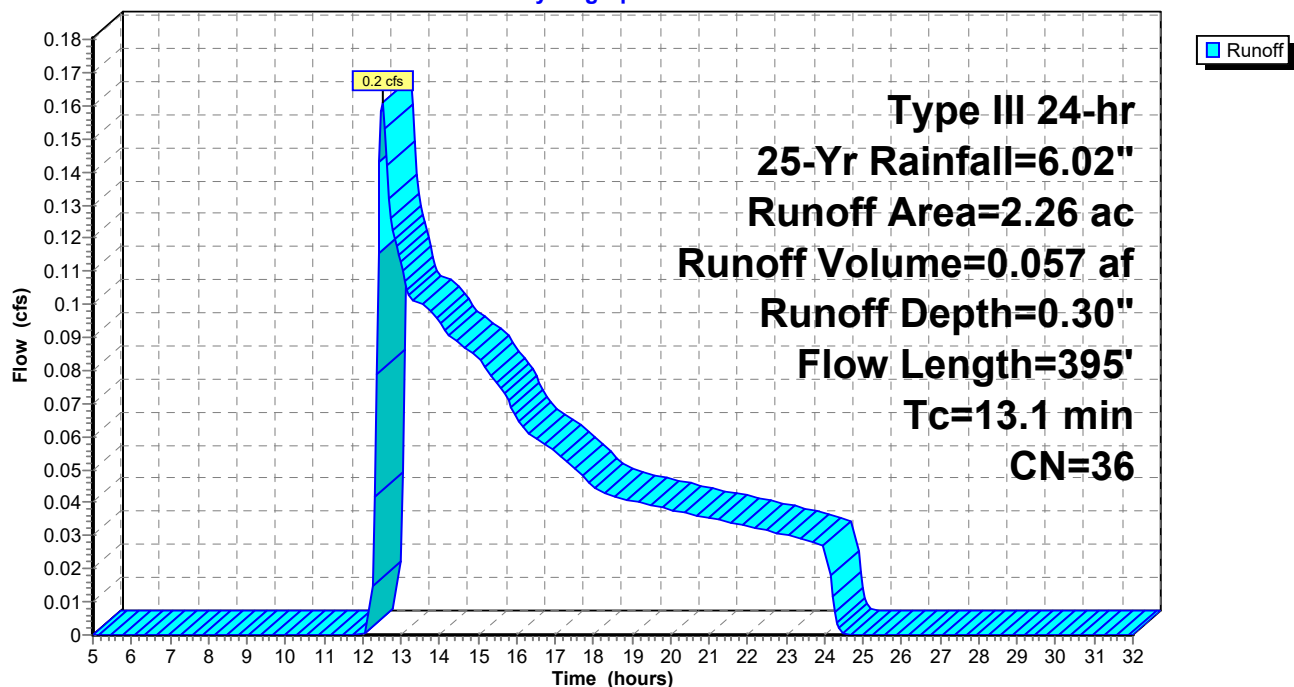
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.89	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
1.21	30	Woods, Good, HSG A
2.26	36	Weighted Average
2.26		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.1	245	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.1	395	Total			

Subcatchment PWA-5D:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 98

Summary for Subcatchment PWA-5E:

Runoff = 0.2 cfs @ 12.45 hrs, Volume= 0.052 af, Depth= 0.35"
 Routed to Pond WL-1 : Wetland Series 'J'

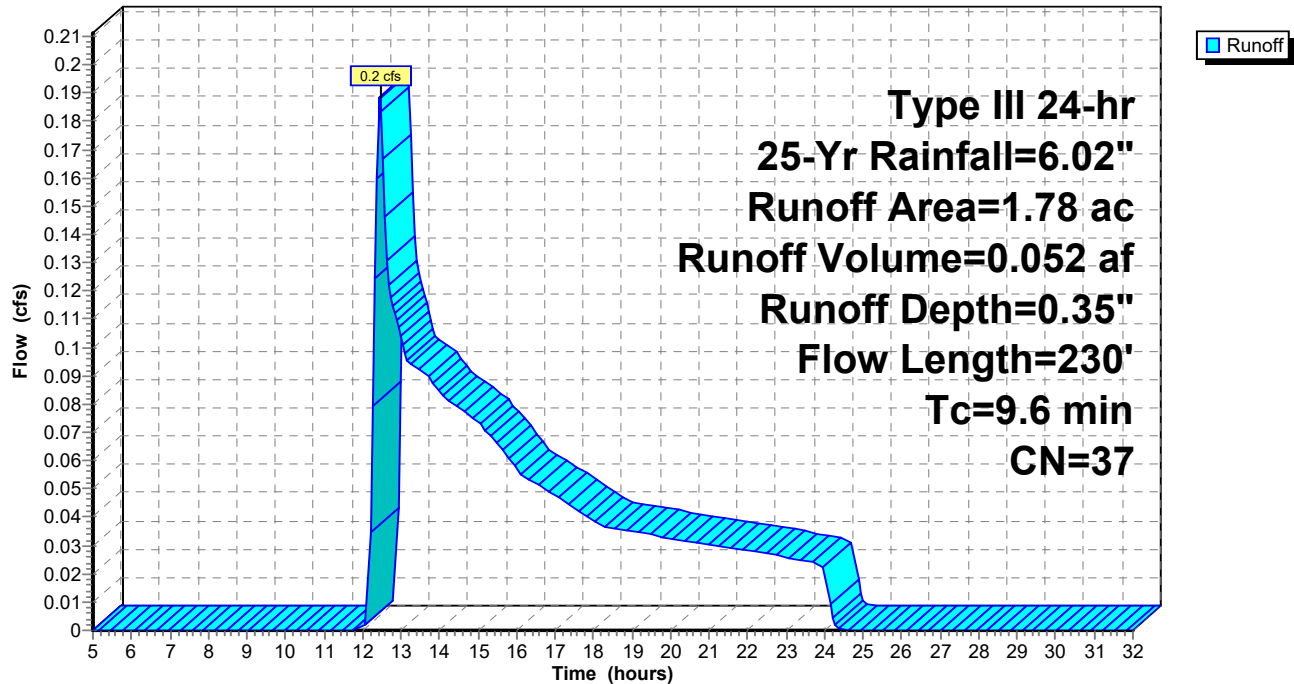
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.97	39	>75% Grass cover, Good, HSG A
0.04	61	>75% Grass cover, Good, HSG B
0.69	30	Woods, Good, HSG A
0.08	55	Woods, Good, HSG B
1.78	37	Weighted Average
1.78		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	30	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	110	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	40	0.3700	4.26		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.6	230	Total			

Subcatchment PWA-5E:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 100

Summary for Subcatchment PWA-5F:

Runoff = 12.7 cfs @ 12.09 hrs, Volume= 0.938 af, Depth= 4.22"
Routed to Pond SUB-3 : Subsurface System-3

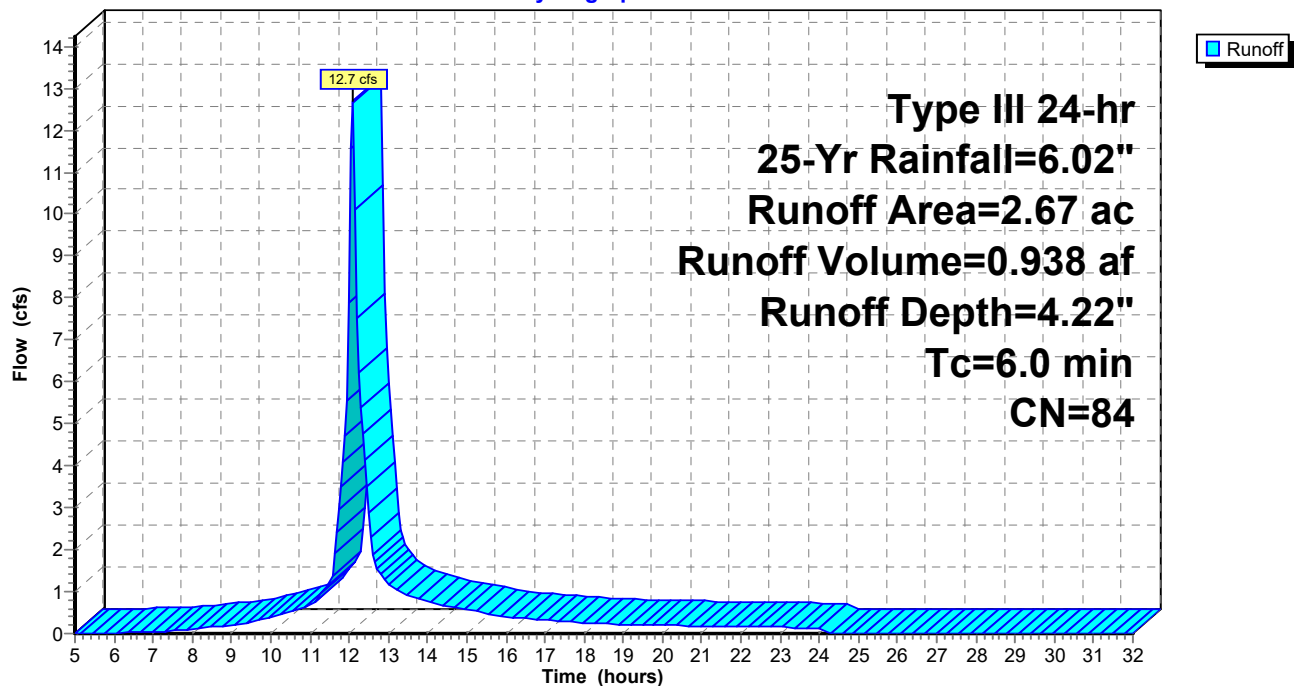
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.65	39	>75% Grass cover, Good, HSG A
0.85	98	Roofs, HSG A
1.17	98	Paved parking, HSG A
2.67	84	Weighted Average
0.65		24.34% Pervious Area
2.02		75.66% Impervious Area

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

Subcatchment PWA-5F:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 101

Summary for Subcatchment PWA-5G:

Runoff = 1.4 cfs @ 12.10 hrs, Volume= 0.102 af, Depth= 2.55"
Routed to Pond SUB-1 : Subsurface System-1

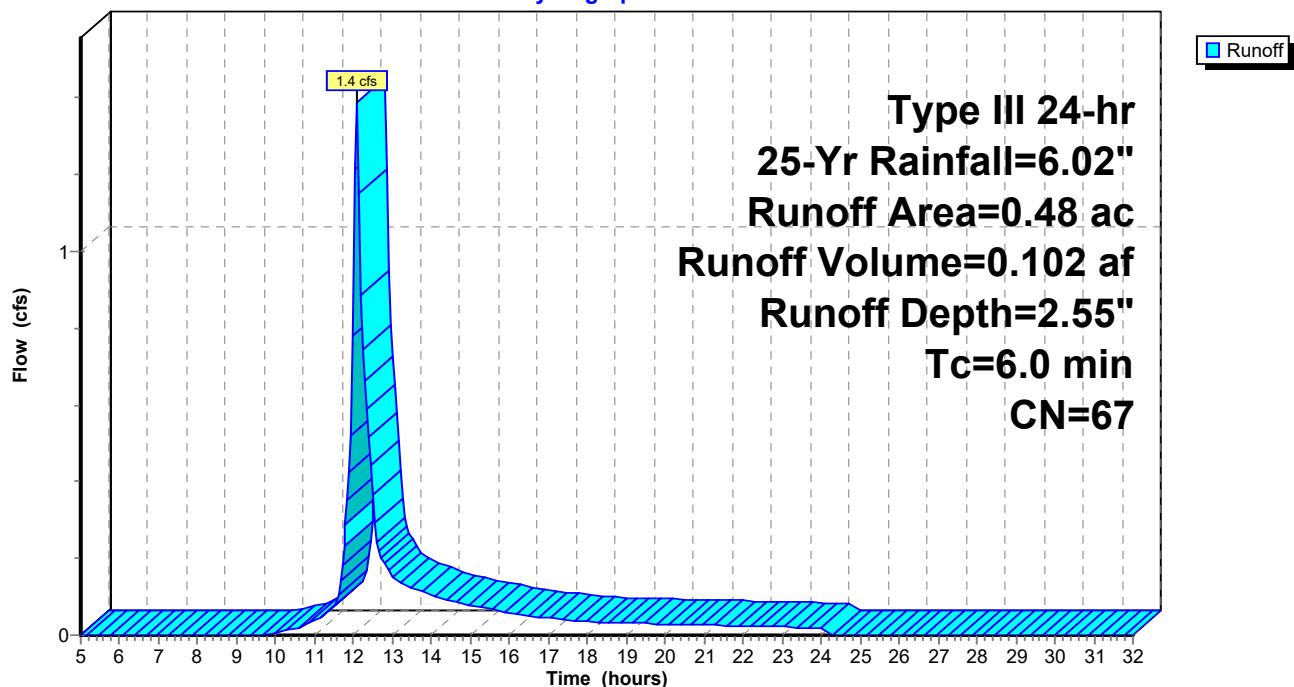
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.23	98	Paved parking, HSG A
0.48	67	Weighted Average
0.25		52.08% Pervious Area
0.23		47.92% Impervious Area

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

Subcatchment PWA-5G:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 102

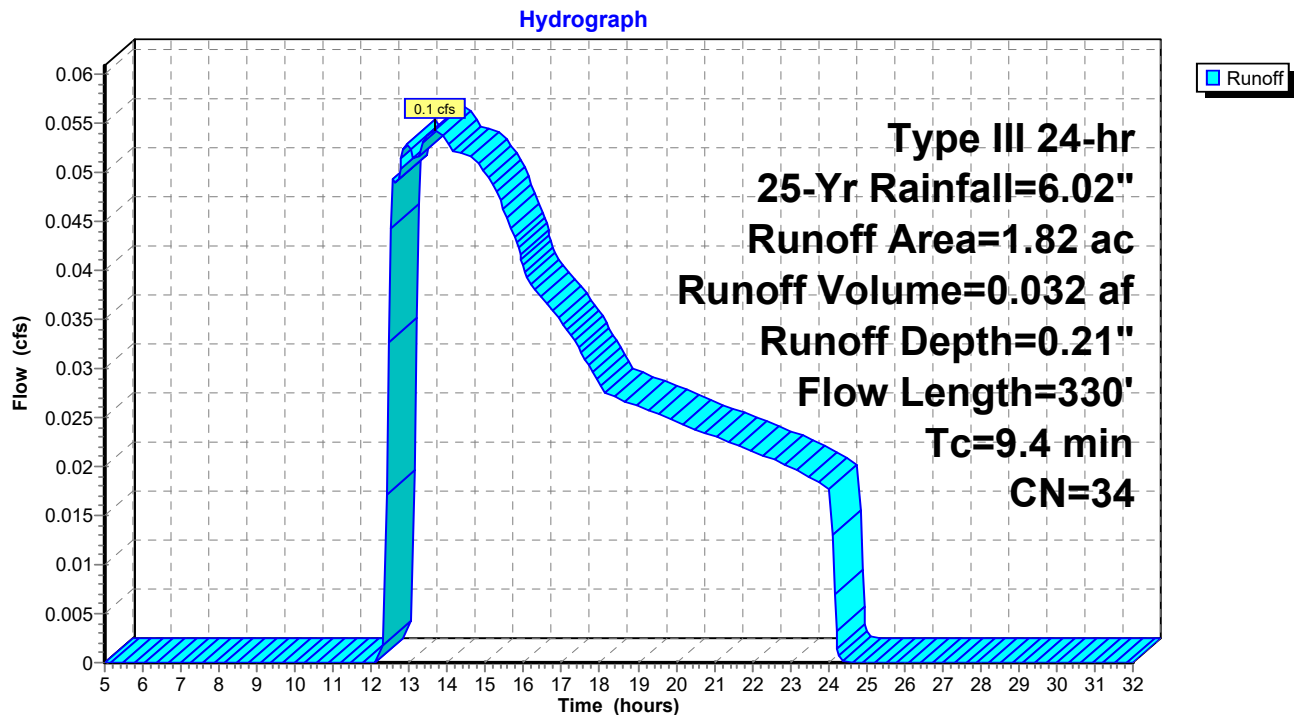
Summary for Subcatchment PWA-5H:

Runoff = 0.1 cfs @ 13.68 hrs, Volume= 0.032 af, Depth= 0.21"
Routed to Pond SUB-3 : Subsurface System-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
1.01	30	Woods, Good, HSG A
0.81	39	>75% Grass cover, Good, HSG A
1.82	34	Weighted Average
1.82		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.1600	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.2	280	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.4	330	Total			

Subcatchment PWA-5H:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 103

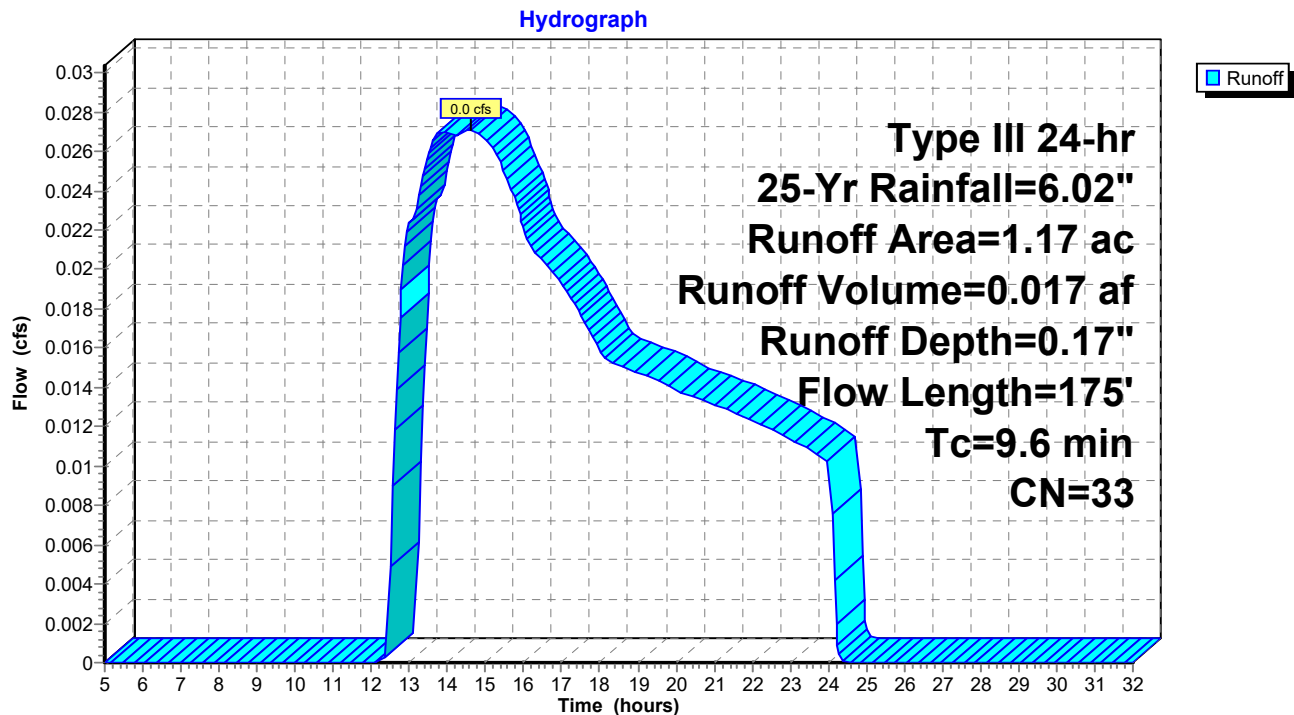
Summary for Subcatchment PWA-6:

Runoff = 0.0 cfs @ 14.59 hrs, Volume= 0.017 af, Depth= 0.17"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.44	39	>75% Grass cover, Good, HSG A
0.73	30	Woods, Good, HSG A
1.17	33	Weighted Average
1.17		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
1.9	125	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.6	175	Total			

Subcatchment PWA-6:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 104

Summary for Subcatchment PWA-7:

Runoff = 0.0 cfs @ 12.55 hrs, Volume= 0.021 af, Depth= 0.25"
 Routed to Reach DP-7 : #4 Poppy Ln

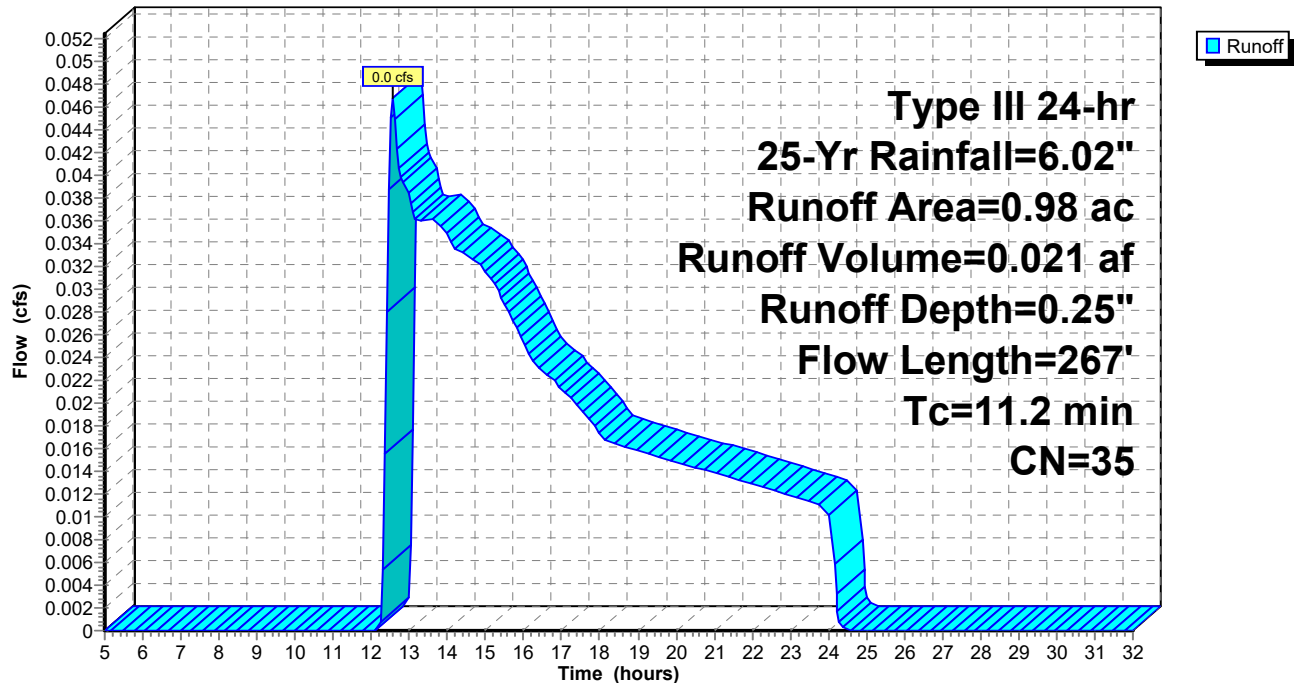
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.49	30	Woods, Good, HSG A
0.49	39	>75% Grass cover, Good, HSG A
0.98	35	Weighted Average
0.98		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
1.0	217	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.2	267	Total			

Subcatchment PWA-7:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 105

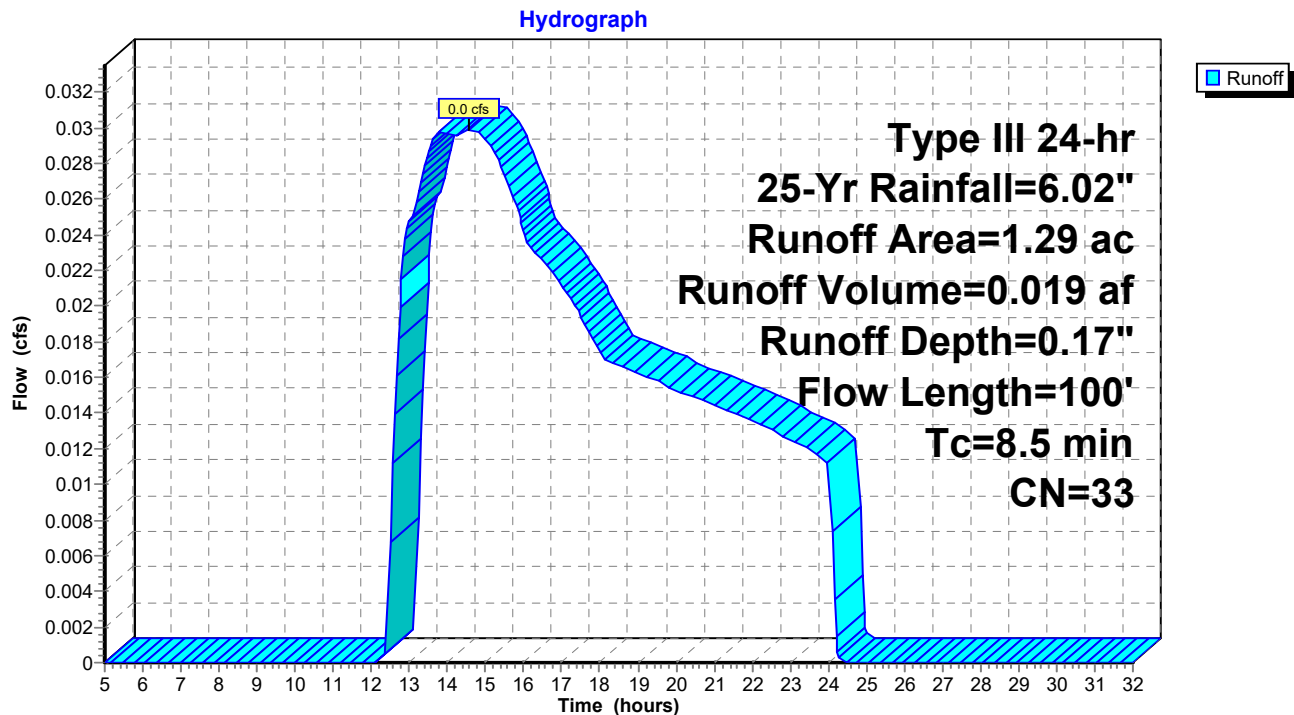
Summary for Subcatchment PWA-8A:

Runoff = 0.0 cfs @ 14.56 hrs, Volume= 0.019 af, Depth= 0.17"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
0.92	30	Woods, Good, HSG A
0.37	39	>75% Grass cover, Good, HSG A
1.29	33	Weighted Average
1.29		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.40"
0.5	50	0.1200	1.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	100	Total			

Subcatchment PWA-8A:

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 106

Summary for Subcatchment PWA-8B:

Runoff = 20.7 cfs @ 12.09 hrs, Volume= 1.501 af, Depth= 3.30"
Routed to Pond SUB-4 : Subsurface System-4

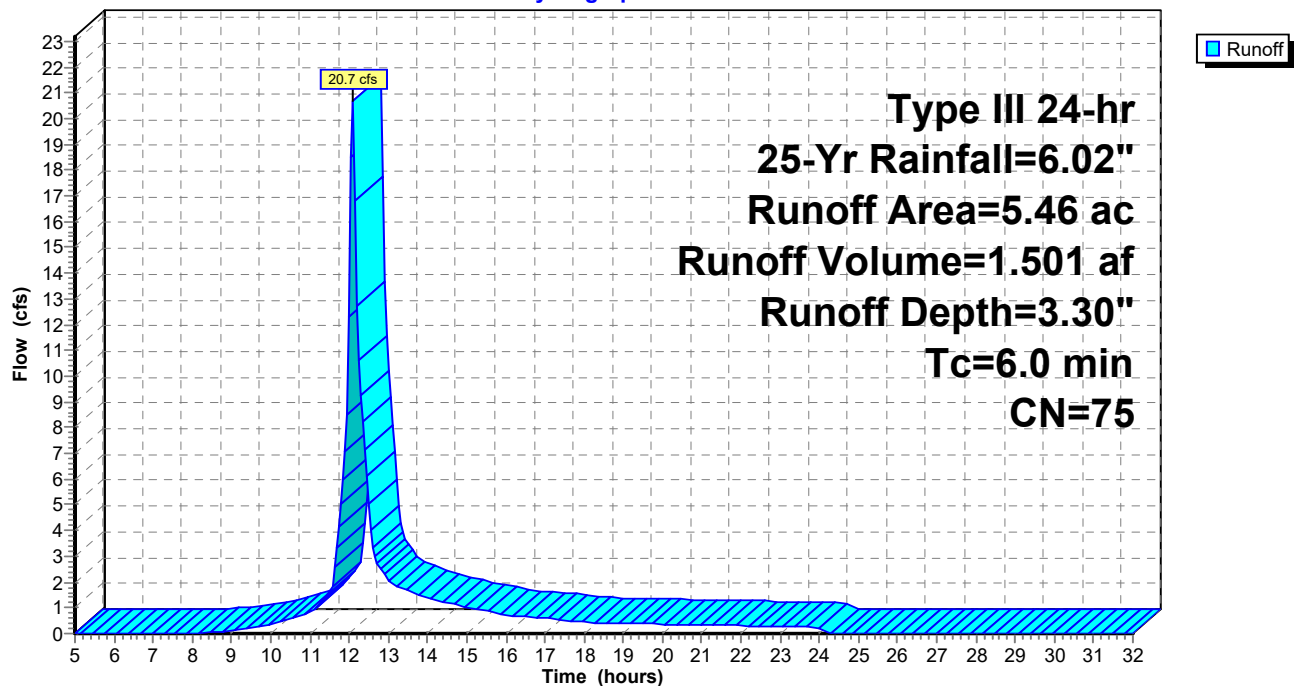
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Yr Rainfall=6.02"

Area (ac)	CN	Description
2.12	39	>75% Grass cover, Good, HSG A
1.39	98	Roofs, HSG A
1.95	98	Paved parking, HSG A
5.46	75	Weighted Average
2.12		38.83% Pervious Area
3.34		61.17% Impervious Area

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

Subcatchment PWA-8B:

Hydrograph



Summary for Reach DP-1: Northern Wetlands Culvert

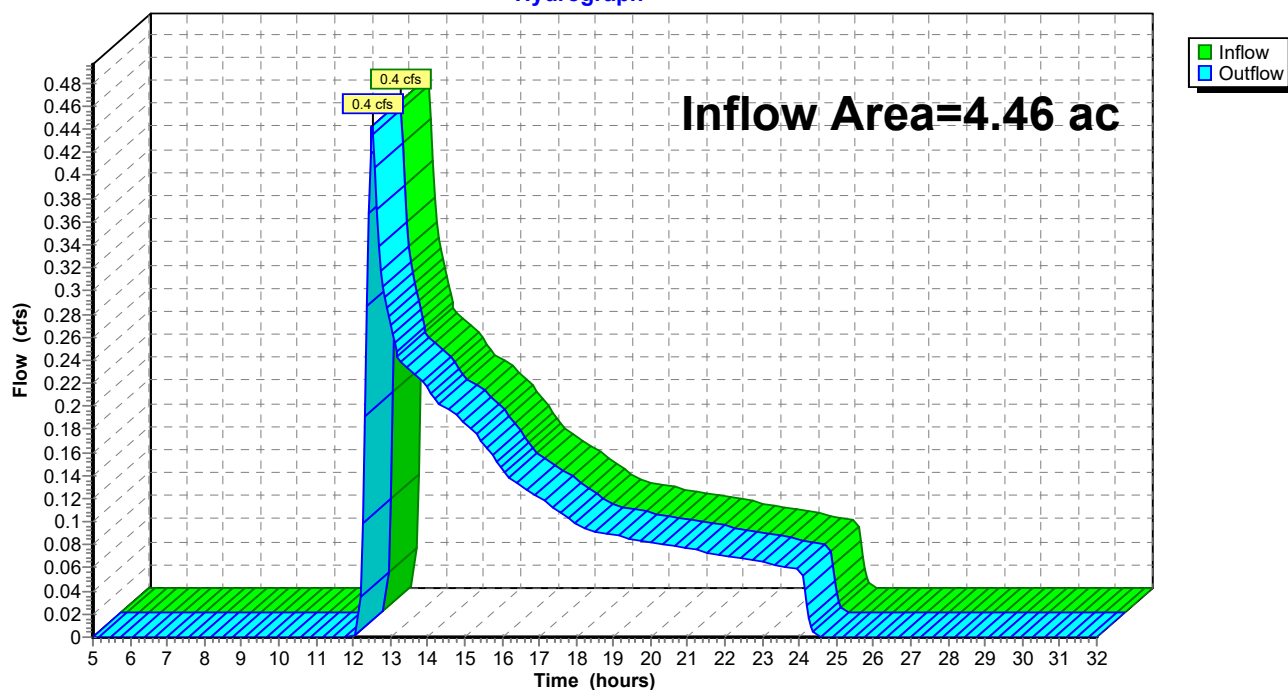
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.46 ac, 0.00% Impervious, Inflow Depth = 0.35" for 25-Yr event
Inflow = 0.4 cfs @ 12.51 hrs, Volume= 0.129 af
Outflow = 0.4 cfs @ 12.51 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-1: Northern Wetlands Culvert

Hydrograph



Summary for Reach DP-3: #48 Rinzee Rd

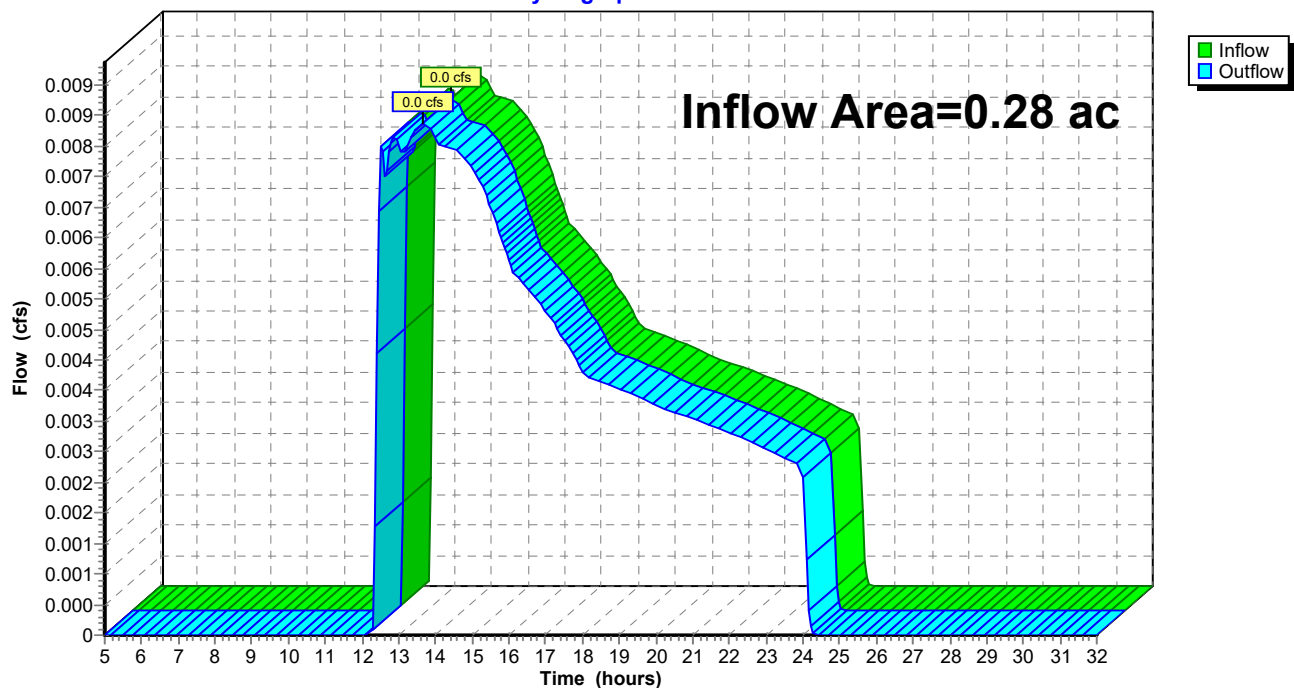
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.28 ac, 0.00% Impervious, Inflow Depth = 0.21" for 25-Yr event
Inflow = 0.0 cfs @ 13.64 hrs, Volume= 0.005 af
Outflow = 0.0 cfs @ 13.64 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Hydrograph



Summary for Reach DP-4: Poppy Ln

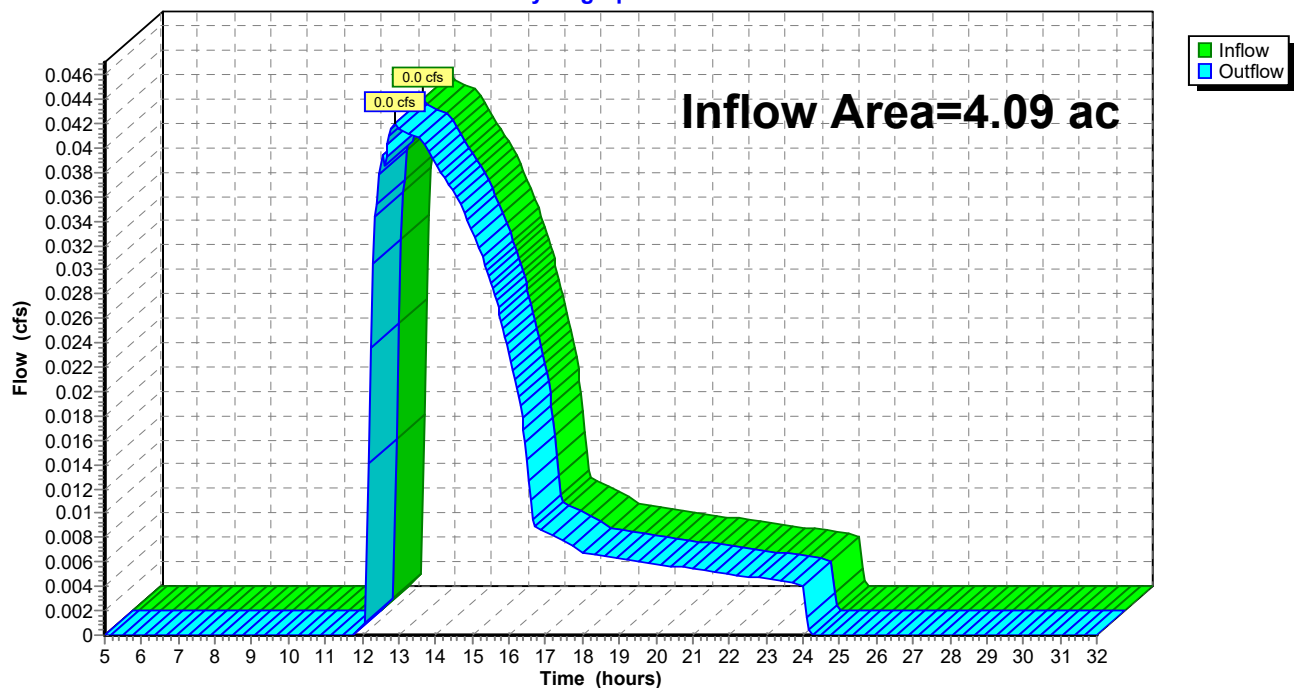
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.09 ac, 39.12% Impervious, Inflow Depth = 0.05" for 25-Yr event
Inflow = 0.0 cfs @ 12.89 hrs, Volume= 0.016 af
Outflow = 0.0 cfs @ 12.89 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph

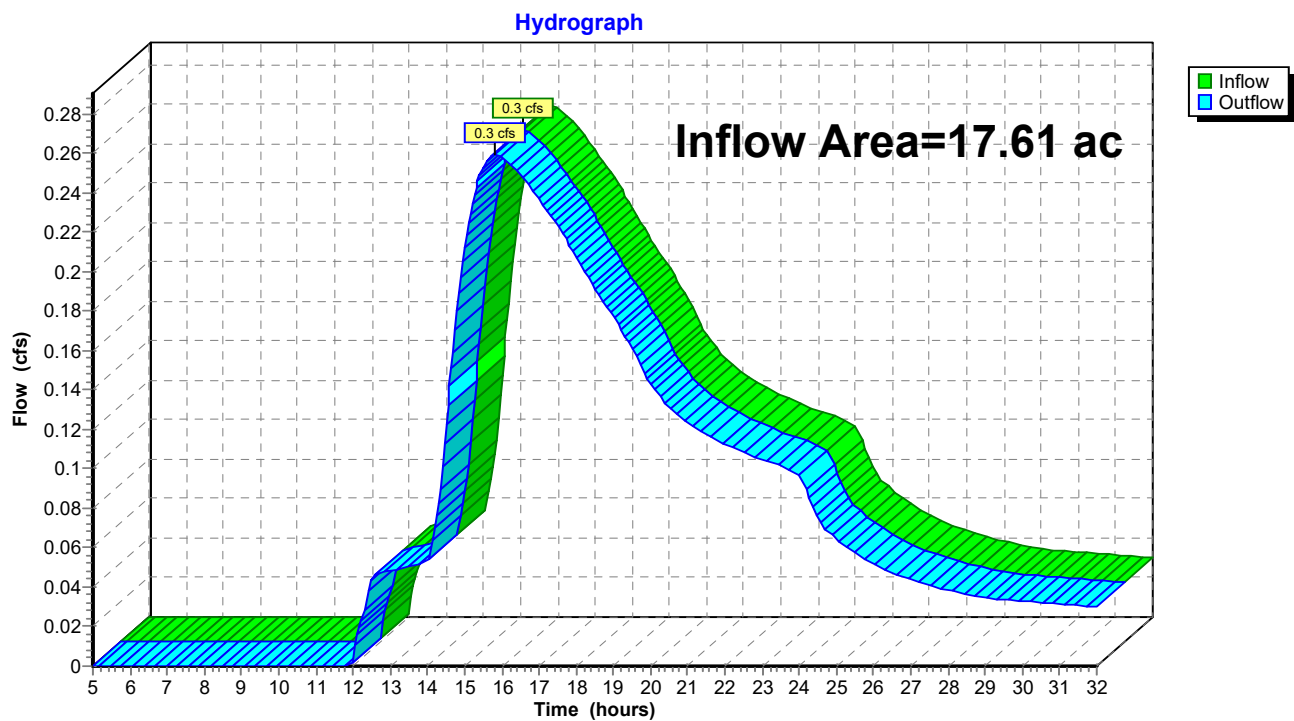


Summary for Reach DP-5: Wetland Series 'A'

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

Inflow Area = 17.61 ac, 37.65% Impervious, Inflow Depth > 0.12" for 25-Yr event
Inflow = 0.3 cfs @ 15.82 hrs, Volume= 0.174 af
Outflow = 0.3 cfs @ 15.82 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

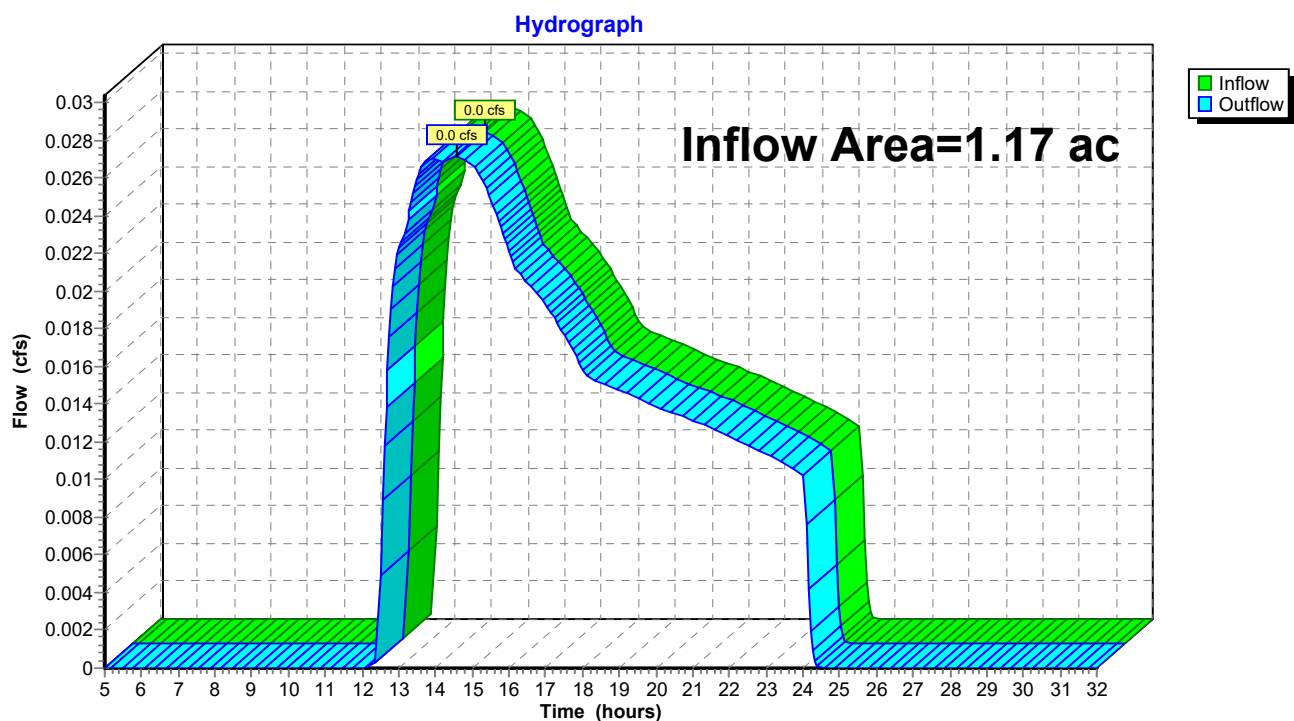
Reach DP-5: Wetland Series 'A'

Summary for Reach DP-6: Wetland Series 'B' & 'C'

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

Inflow Area = 1.17 ac, 0.00% Impervious, Inflow Depth = 0.17" for 25-Yr event
Inflow = 0.0 cfs @ 14.59 hrs, Volume= 0.017 af
Outflow = 0.0 cfs @ 14.59 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Summary for Reach DP-7: #4 Poppy Ln

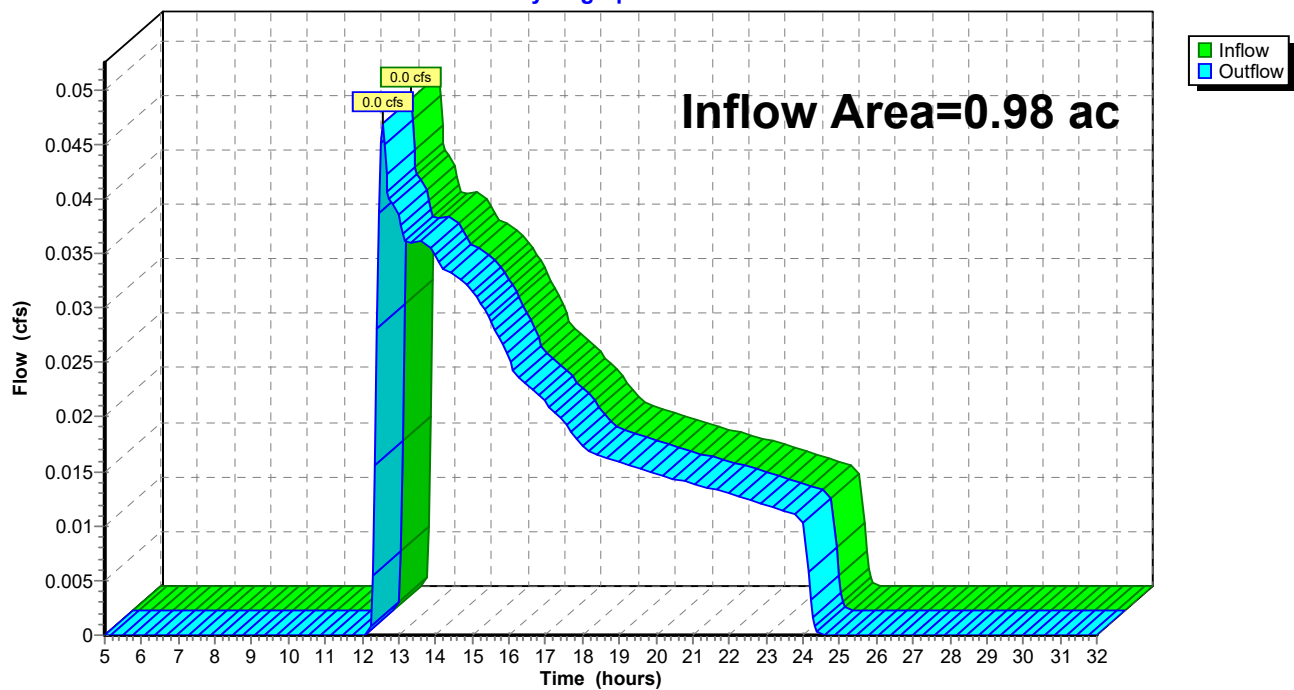
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.98 ac, 0.00% Impervious, Inflow Depth = 0.25" for 25-Yr event
Inflow = 0.0 cfs @ 12.55 hrs, Volume= 0.021 af
Outflow = 0.0 cfs @ 12.55 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph

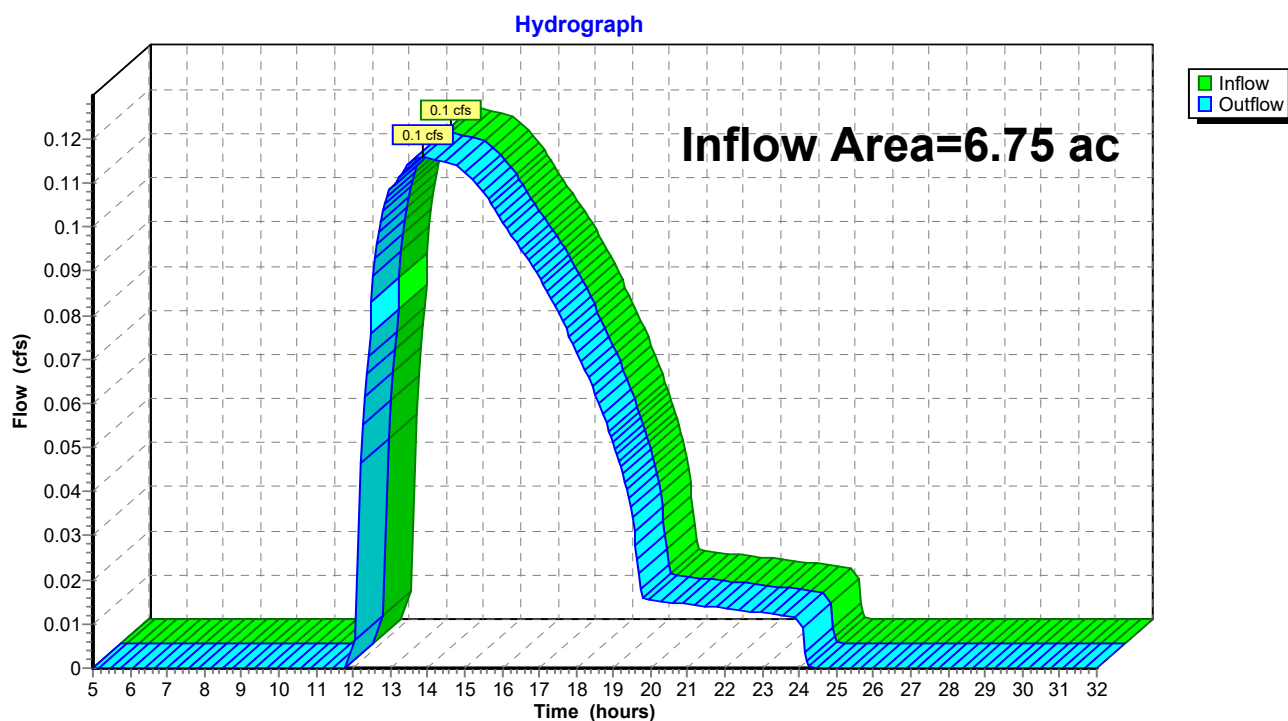


Summary for Reach DP-8: Wetland Series 'D' & 'E'

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

Inflow Area = 6.75 ac, 49.48% Impervious, Inflow Depth = 0.11" for 25-Yr event
Inflow = 0.1 cfs @ 13.85 hrs, Volume= 0.061 af
Outflow = 0.1 cfs @ 13.85 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

Summary for Pond C-1: Culvert 1

[57] Hint: Peaked at 166.23' (Flood elevation advised)

Inflow Area = 2.26 ac, 0.00% Impervious, Inflow Depth = 0.30" for 25-Yr event
 Inflow = 0.2 cfs @ 12.54 hrs, Volume= 0.057 af
 Outflow = 0.2 cfs @ 12.54 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.2 cfs @ 12.54 hrs, Volume= 0.057 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Peak Elev= 166.23' @ 12.54 hrs

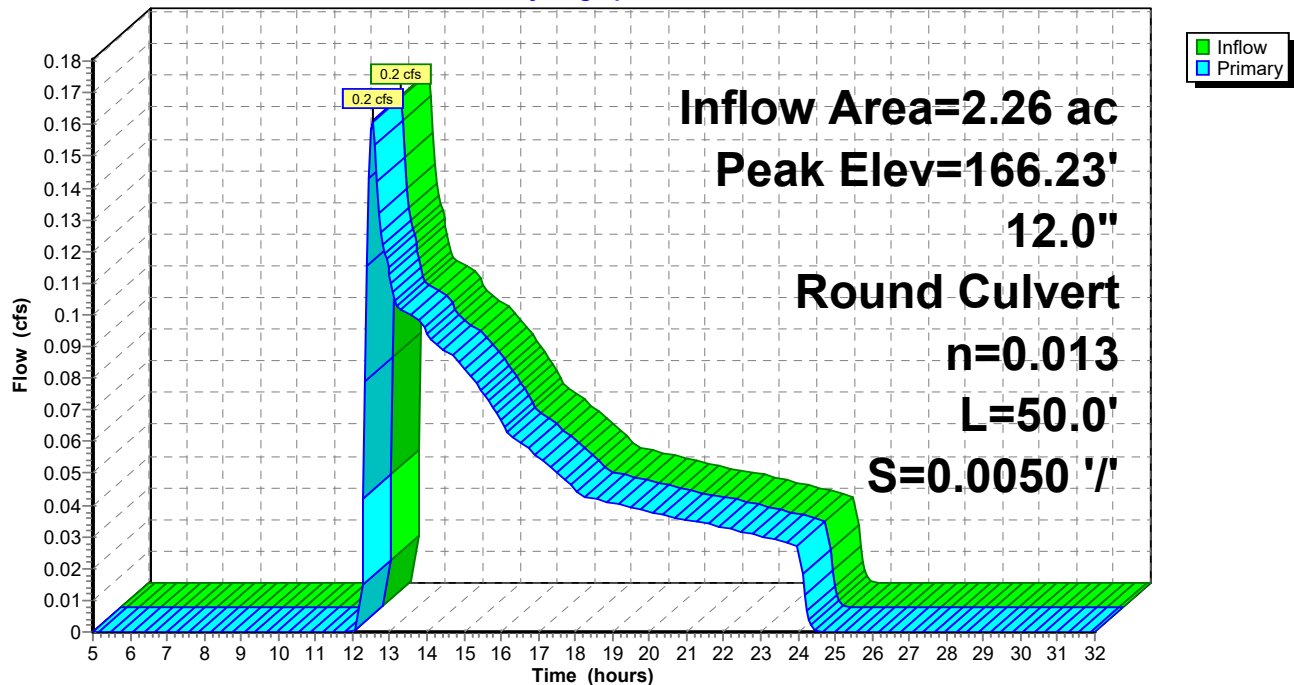
Device	Routing	Invert	Outlet Devices
#1	Primary	166.00'	12.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 166.00' / 165.75' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.2 cfs @ 12.54 hrs HW=166.23' (Free Discharge)

1=Culvert (Barrel Controls 0.2 cfs @ 1.76 fps)

Pond C-1: Culvert 1

Hydrograph



23-10524 - Post - R2

Type III 24-hr 25-Yr Rainfall=6.02"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 115

Summary for Pond IB-1:

Inflow Area = 8.01 ac, 54.68% Impervious, Inflow Depth = 3.01" for 25-Yr event
 Inflow = 26.4 cfs @ 12.10 hrs, Volume= 2.009 af
 Outflow = 3.5 cfs @ 12.83 hrs, Volume= 2.009 af, Atten= 87%, Lag= 43.8 min
 Discarded = 3.5 cfs @ 12.83 hrs, Volume= 2.004 af
 Primary = 0.0 cfs @ 12.83 hrs, Volume= 0.005 af
 Routed to Pond WL-1 : Wetland Series 'J'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 140.28' @ 12.83 hrs Surf.Area= 18,133 sf Storage= 31,928 cf

Plug-Flow detention time= 85.6 min calculated for 2.005 af (100% of inflow)
 Center-of-Mass det. time= 85.4 min (919.8 - 834.4)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	89,403 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	10,182	0	0
139.00	13,217	11,700	11,700
140.00	17,372	15,295	26,994
141.00	20,111	18,742	45,736
142.00	21,820	20,966	66,701
143.00	23,583	22,702	89,403

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	138.00'	12.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.65' S= 0.0050 ' S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	139.40'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	141.90'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 2	142.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	142.00'	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

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 25-Yr Rainfall=6.02"

Printed 12/24/2024

Page 116

Discarded OutFlow Max=3.5 cfs @ 12.83 hrs HW=140.28' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 3.5 cfs)

Primary OutFlow Max=0.0 cfs @ 12.83 hrs HW=140.28' (Free Discharge)

↑ **2=Culvert** (Passes 0.0 cfs of 4.0 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.0 cfs @ 4.40 fps)

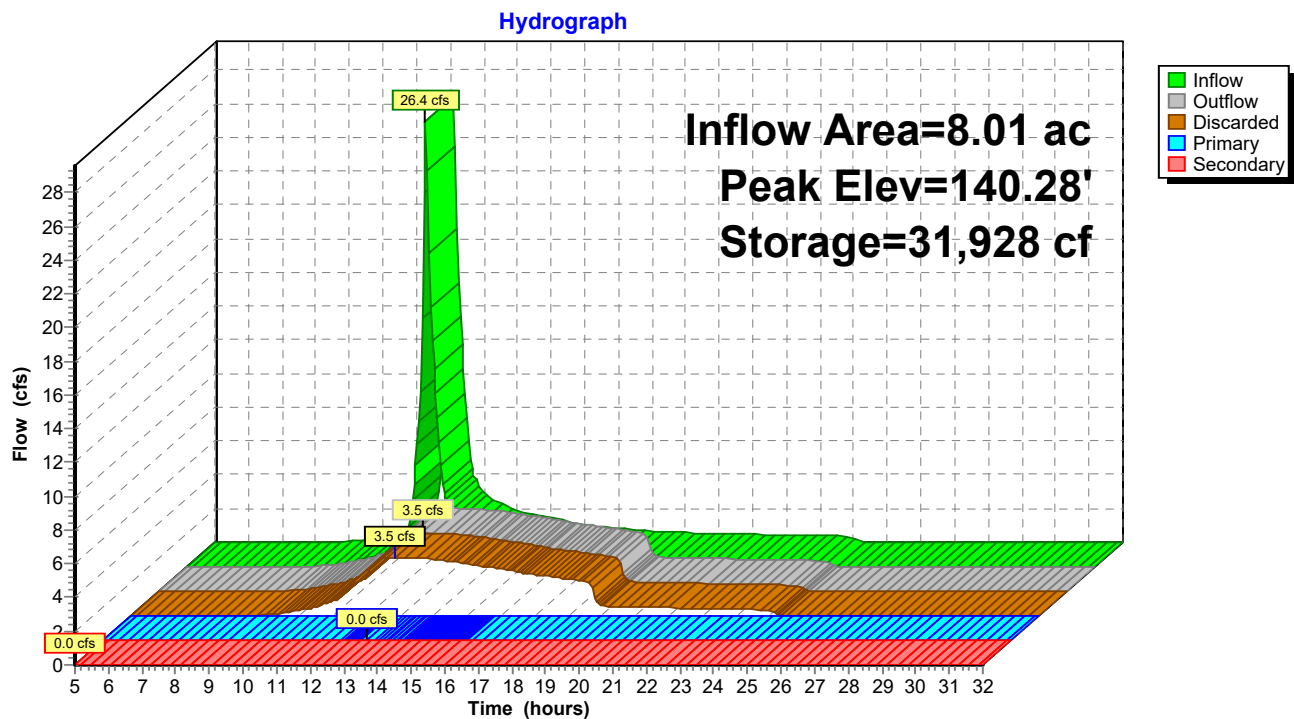
↑ **4=Orifice/Grate** (Controls 0.0 cfs)

↑ **5=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=138.00' (Free Discharge)

↑ **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond IB-1:



Summary for Pond SUB-1: Subsurface System-1

Inflow Area = 0.48 ac, 47.92% Impervious, Inflow Depth = 2.55" for 25-Yr event
 Inflow = 1.4 cfs @ 12.10 hrs, Volume= 0.102 af
 Outflow = 0.0 cfs @ 17.76 hrs, Volume= 0.056 af, Atten= 97%, Lag= 339.6 min
 Primary = 0.0 cfs @ 17.76 hrs, Volume= 0.056 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 133.60' @ 17.76 hrs Surf.Area= 0.03 ac Storage= 0.072 af

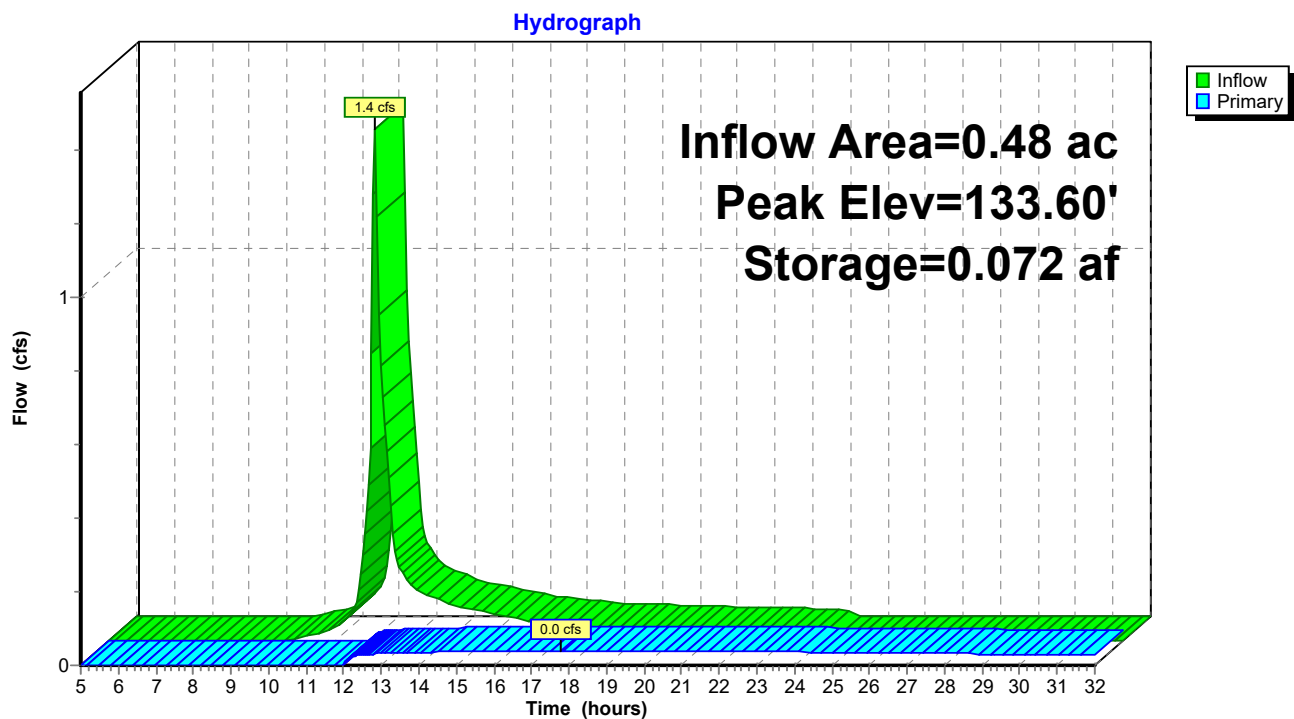
Plug-Flow detention time= 579.2 min calculated for 0.056 af (55% of inflow)
 Center-of-Mass det. time= 461.5 min (1,306.6 - 845.2)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	0.110 af	8.00'W x 15.00'L x 4.00'H Prisma toidx 10

Device	Routing	Invert	Outlet Devices
#1	Primary	131.00'	12.0" Round Culvert L= 48.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 130.76' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	131.50'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	134.80'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.0 cfs @ 17.76 hrs HW=133.60' (Free Discharge)

1=Culvert (Passes 0.0 cfs of 4.9 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 0.0 cfs @ 6.90 fps)
 3=Sharp-Crested Rectangular Weir (Controls 0.0 cfs)

Pond SUB-1: Subsurface System-1

23-10524 - Post - R2

Type III 24-hr 25-Yr Rainfall=6.02"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 119

Summary for Pond SUB-2: Subsurface System-2

Inflow Area = 3.77 ac, 42.44% Impervious, Inflow Depth = 2.28" for 25-Yr event
 Inflow = 6.2 cfs @ 12.34 hrs, Volume= 0.716 af
 Outflow = 1.1 cfs @ 13.41 hrs, Volume= 0.716 af, Atten= 83%, Lag= 64.3 min
 Discarded = 1.0 cfs @ 11.95 hrs, Volume= 0.709 af
 Primary = 0.0 cfs @ 13.41 hrs, Volume= 0.007 af
 Routed to Reach DP-4 : Poppy Ln

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 139.01' @ 13.41 hrs Surf.Area= 5,400 sf Storage= 10,854 cf

Plug-Flow detention time= 90.9 min calculated for 0.714 af (100% of inflow)
 Center-of-Mass det. time= 90.8 min (958.8 - 868.0)

Volume	Invert	Avail.Storage	Storage Description
#1	137.00'	21,600 cf	8.00'W x 15.00'L x 4.00'H 10x17 Concrete Chambers 12" Walk 45

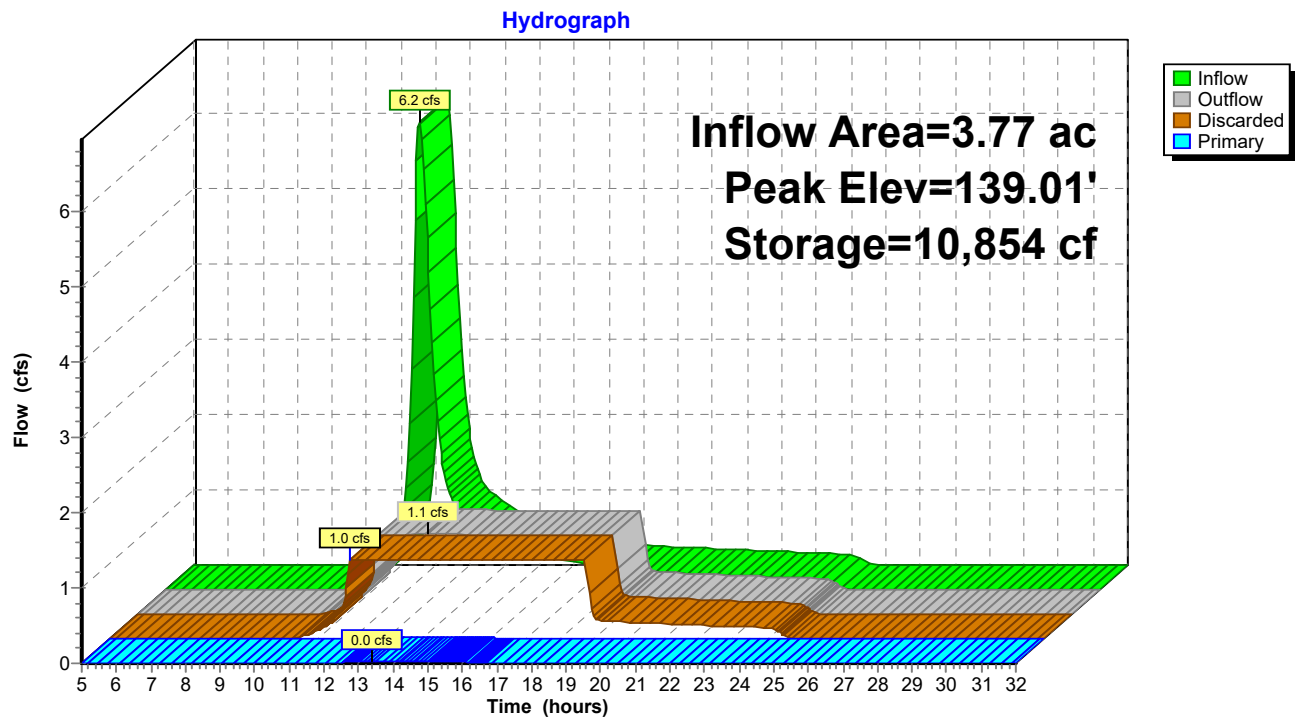
Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	137.00'	15.0" Round Culvert L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.00' / 136.72' S= 0.0051 ' / Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	138.10'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.0 cfs @ 11.95 hrs HW=137.04' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 1.0 cfs)

Primary OutFlow Max=0.0 cfs @ 13.41 hrs HW=139.01' (Free Discharge)

↑ **2=Culvert** (Passes 0.0 cfs of 6.0 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.0 cfs @ 4.49 fps)
 ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-2: Subsurface System-2

23-10524 - Post - R2

Type III 24-hr 25-Yr Rainfall=6.02"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 121

Summary for Pond SUB-3: Subsurface System-3

Inflow Area = 4.49 ac, 44.99% Impervious, Inflow Depth = 2.59" for 25-Yr event
 Inflow = 12.7 cfs @ 12.09 hrs, Volume= 0.970 af
 Outflow = 0.9 cfs @ 13.70 hrs, Volume= 0.970 af, Atten= 93%, Lag= 96.3 min
 Discarded = 0.8 cfs @ 11.30 hrs, Volume= 0.927 af
 Primary = 0.1 cfs @ 13.70 hrs, Volume= 0.043 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 143.12' @ 13.70 hrs Surf.Area= 4,320 sf Storage= 17,801 cf

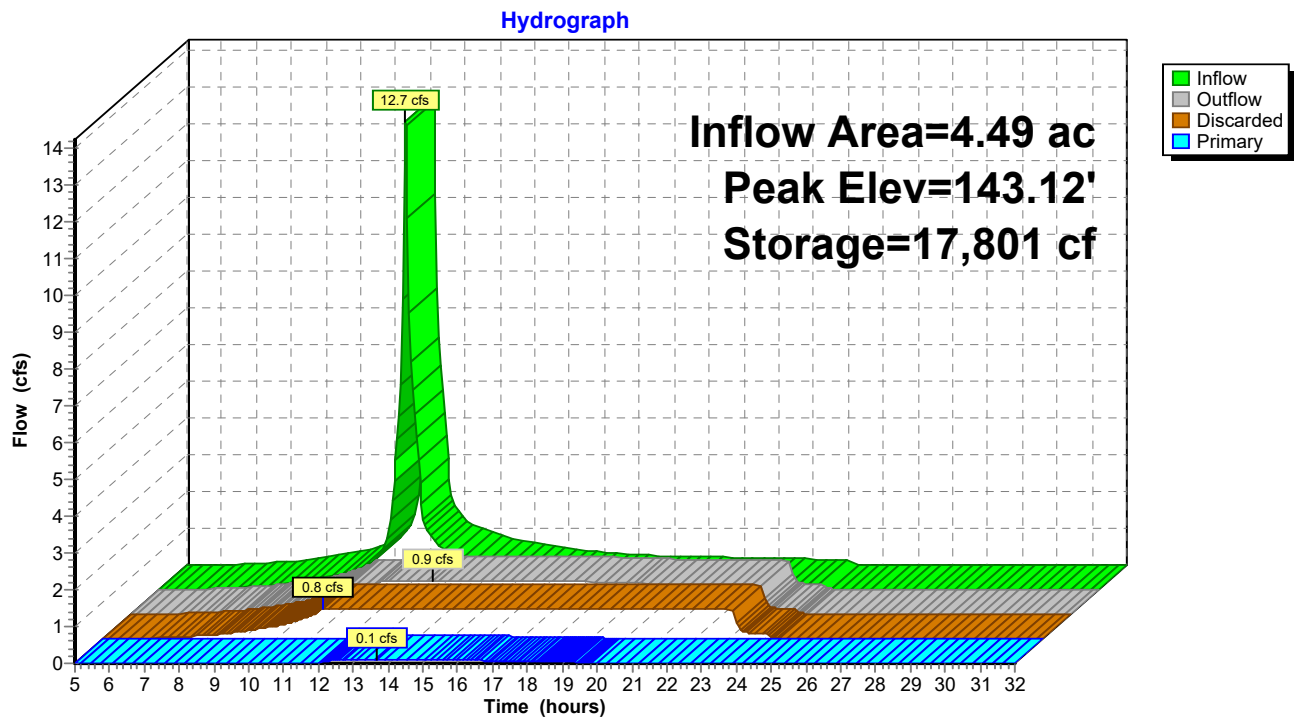
Plug-Flow detention time= 179.8 min calculated for 0.968 af (100% of inflow)
 Center-of-Mass det. time= 179.4 min (990.1 - 810.7)

Volume	Invert	Avail.Storage	Storage Description
#1	139.00'	30,240 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 36

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	139.00'	15.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.00' / 138.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	140.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	145.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.8 cfs @ 11.30 hrs HW=139.07' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.8 cfs)

Primary OutFlow Max=0.1 cfs @ 13.70 hrs HW=143.12' (Free Discharge)
 ↑ **2=Culvert** (Passes 0.1 cfs of 11.0 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.1 cfs @ 7.24 fps)
 ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-3: Subsurface System-3

23-10524 - Post - R2

Type III 24-hr 25-Yr Rainfall=6.02"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 123

Summary for Pond SUB-4: Subsurface System-4

Inflow Area = 5.46 ac, 61.17% Impervious, Inflow Depth = 3.30" for 25-Yr event
 Inflow = 20.7 cfs @ 12.09 hrs, Volume= 1.501 af
 Outflow = 1.5 cfs @ 13.84 hrs, Volume= 1.501 af, Atten= 93%, Lag= 104.5 min
 Discarded = 1.4 cfs @ 11.55 hrs, Volume= 1.459 af
 Primary = 0.1 cfs @ 13.84 hrs, Volume= 0.042 af
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.99' @ 13.84 hrs Surf.Area= 7,200 sf Storage= 28,699 cf

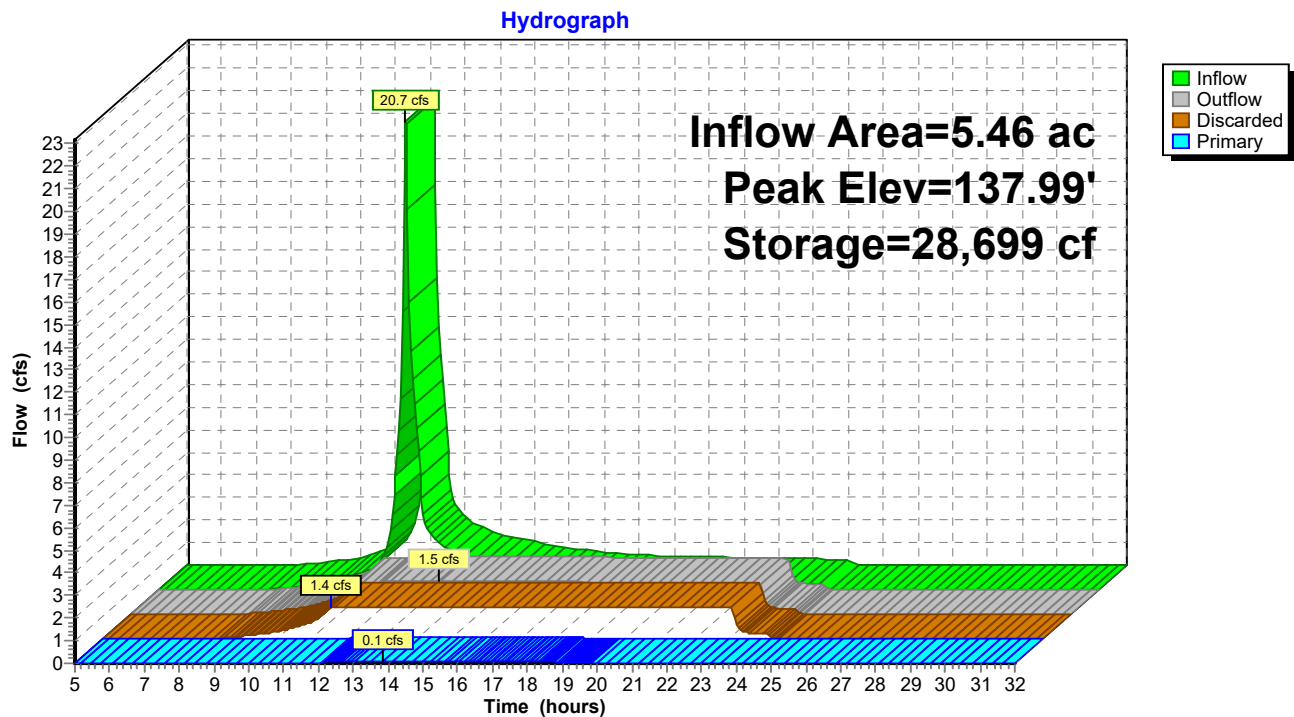
Plug-Flow detention time= 188.6 min calculated for 1.498 af (100% of inflow)
 Center-of-Mass det. time= 188.3 min (1,014.6 - 826.3)

Volume	Invert	Avail.Storage	Storage Description
#1	134.00'	50,400 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 60

Device	Routing	Invert	Outlet Devices
#1	Discarded	134.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	134.00'	12.0" Round Culvert L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.00' / 133.88' S= 0.0052 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	135.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.4 cfs @ 11.55 hrs HW=134.08' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 1.4 cfs)

Primary OutFlow Max=0.1 cfs @ 13.84 hrs HW=137.99' (Free Discharge)
 ↑ **2=Culvert** (Passes 0.1 cfs of 7.1 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.1 cfs @ 7.02 fps)
 ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-4: Subsurface System-4

23-10524 - Post - R2

Type III 24-hr 25-Yr Rainfall=6.02"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 125

Summary for Pond WL-1: Wetland Series 'J'

Inflow Area = 16.54 ac, 38.69% Impervious, Inflow Depth = 0.11" for 25-Yr event
 Inflow = 0.4 cfs @ 12.50 hrs, Volume= 0.157 af
 Outflow = 0.2 cfs @ 15.86 hrs, Volume= 0.107 af, Atten= 53%, Lag= 201.6 min
 Primary = 0.2 cfs @ 15.86 hrs, Volume= 0.107 af
 Routed to Reach DP-5 : Wetland Series 'A'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.26' @ 15.86 hrs Surf.Area= 4,472 sf Storage= 2,957 cf

Plug-Flow detention time= 267.7 min calculated for 0.107 af (68% of inflow)
 Center-of-Mass det. time= 162.2 min (1,128.2 - 966.1)

Volume	Invert	Avail.Storage	Storage Description
#1	136.00'	127,590 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.00	219	0	0
138.00	6,965	7,184	7,184
140.00	25,165	32,130	39,314
141.00	41,218	33,192	72,506
142.00	68,950	55,084	127,590

Device	Routing	Invert	Outlet Devices
#1	Primary	137.05'	18.0" Round Culvert L= 145.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 137.05' / 136.05' S= 0.0069 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf
#2	Secondary	141.05'	155.0' long x 35.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

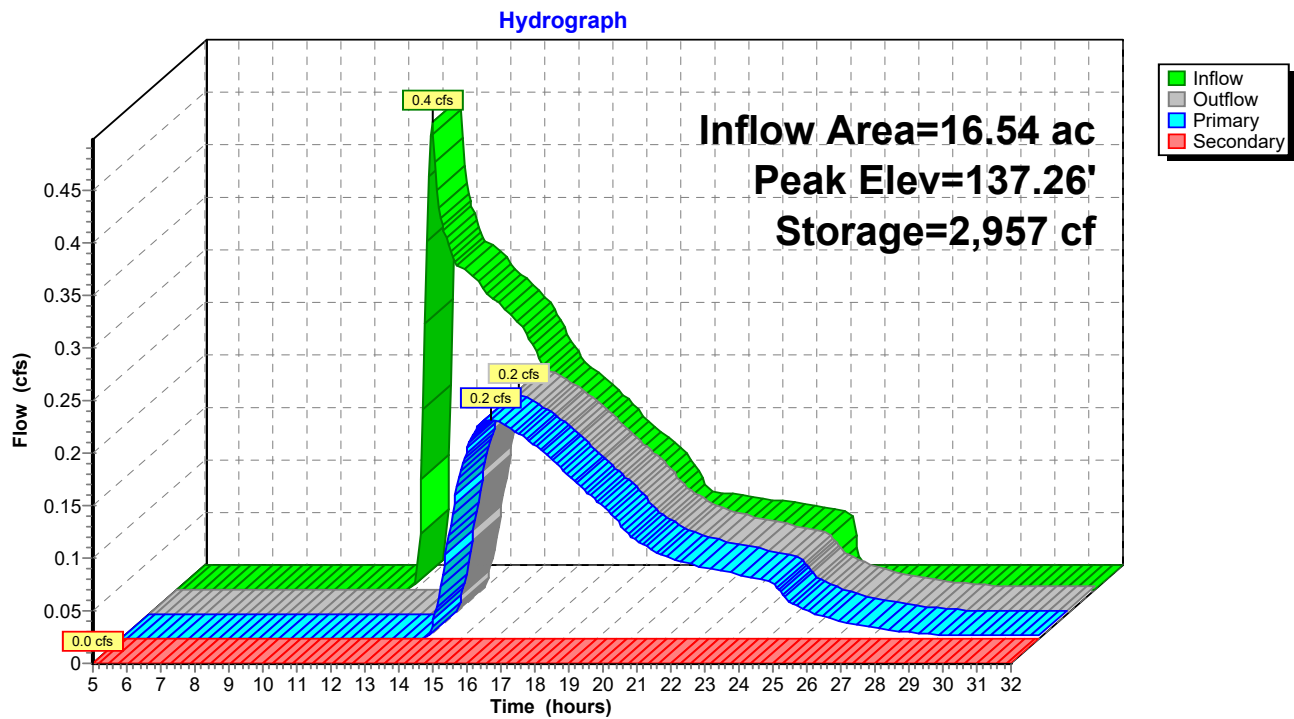
Primary OutFlow Max=0.2 cfs @ 15.86 hrs HW=137.26' (Free Discharge)

↑**1=Culvert** (Inlet Controls 0.2 cfs @ 1.38 fps)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=136.00' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond WL-1: Wetland Series 'J'



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 127

Time span=5.00-32.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPWA-1:	Runoff Area=4.46 ac 0.00% Impervious Runoff Depth=0.88" Flow Length=397' Tc=13.7 min CN=37 Runoff=1.9 cfs 0.326 af
SubcatchmentPWA-3:	Runoff Area=0.28 ac 0.00% Impervious Runoff Depth=0.64" Flow Length=80' Slope=0.1000 '/' Tc=6.6 min CN=34 Runoff=0.1 cfs 0.015 af
SubcatchmentPWA-4A:	Runoff Area=0.32 ac 0.00% Impervious Runoff Depth=0.88" Tc=6.0 min CN=37 Runoff=0.2 cfs 0.023 af
SubcatchmentPWA-4B:	Runoff Area=3.77 ac 42.44% Impervious Runoff Depth=3.57" Flow Length=1,000' Tc=22.8 min CN=64 Runoff=9.9 cfs 1.121 af
SubcatchmentPWA-5A:	Runoff Area=0.59 ac 0.00% Impervious Runoff Depth=0.64" Tc=6.0 min CN=34 Runoff=0.2 cfs 0.031 af
SubcatchmentPWA-5B:	Runoff Area=3.16 ac 56.65% Impervious Runoff Depth=4.46" Flow Length=705' Tc=8.7 min CN=72 Runoff=14.8 cfs 1.174 af
SubcatchmentPWA-5C:	Runoff Area=4.85 ac 53.40% Impervious Runoff Depth=4.46" Tc=6.0 min CN=72 Runoff=24.8 cfs 1.802 af
SubcatchmentPWA-5D:	Runoff Area=2.26 ac 0.00% Impervious Runoff Depth=0.79" Flow Length=395' Tc=13.1 min CN=36 Runoff=0.8 cfs 0.150 af
SubcatchmentPWA-5E:	Runoff Area=1.78 ac 0.00% Impervious Runoff Depth=0.88" Flow Length=230' Tc=9.6 min CN=37 Runoff=0.8 cfs 0.130 af
SubcatchmentPWA-5F:	Runoff Area=2.67 ac 75.66% Impervious Runoff Depth>5.84" Tc=6.0 min CN=84 Runoff=17.3 cfs 1.298 af
SubcatchmentPWA-5G:	Runoff Area=0.48 ac 47.92% Impervious Runoff Depth=3.90" Tc=6.0 min CN=67 Runoff=2.1 cfs 0.156 af
SubcatchmentPWA-5H:	Runoff Area=1.82 ac 0.00% Impervious Runoff Depth=0.64" Flow Length=330' Tc=9.4 min CN=34 Runoff=0.5 cfs 0.097 af
SubcatchmentPWA-6:	Runoff Area=1.17 ac 0.00% Impervious Runoff Depth=0.56" Flow Length=175' Tc=9.6 min CN=33 Runoff=0.2 cfs 0.055 af
SubcatchmentPWA-7:	Runoff Area=0.98 ac 0.00% Impervious Runoff Depth=0.71" Flow Length=267' Tc=11.2 min CN=35 Runoff=0.3 cfs 0.058 af
SubcatchmentPWA-8A:	Runoff Area=1.29 ac 0.00% Impervious Runoff Depth=0.56" Flow Length=100' Tc=8.5 min CN=33 Runoff=0.3 cfs 0.060 af
SubcatchmentPWA-8B:	Runoff Area=5.46 ac 61.17% Impervious Runoff Depth=4.80" Tc=6.0 min CN=75 Runoff=30.0 cfs 2.183 af

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 128

Reach DP-1: Northern Wetlands CulvertInflow=1.9 cfs 0.326 af
Outflow=1.9 cfs 0.326 af**Reach DP-3: #48 Rinzee Rd**Inflow=0.1 cfs 0.015 af
Outflow=0.1 cfs 0.015 af**Reach DP-4: Poppy Ln**Inflow=0.2 cfs 0.050 af
Outflow=0.2 cfs 0.050 af**Reach DP-5: Wetland Series 'A'**Inflow=0.7 cfs 0.467 af
Outflow=0.7 cfs 0.467 af**Reach DP-6: Wetland Series 'B' & 'C'**Inflow=0.2 cfs 0.055 af
Outflow=0.2 cfs 0.055 af**Reach DP-7: #4 Poppy Ln**Inflow=0.3 cfs 0.058 af
Outflow=0.3 cfs 0.058 af**Reach DP-8: Wetland Series 'D' & 'E'**Inflow=0.4 cfs 0.170 af
Outflow=0.4 cfs 0.170 af**Pond C-1: Culvert 1**Peak Elev=166.55' Inflow=0.8 cfs 0.150 af
12.0" Round Culvert n=0.013 L=50.0' S=0.0050 '/' Outflow=0.8 cfs 0.150 af**Pond IB-1:**Peak Elev=141.36' Storage=53,120 cf Inflow=39.2 cfs 2.976 af
Discarded=4.0 cfs 2.961 af Primary=0.0 cfs 0.015 af Secondary=0.0 cfs 0.000 af Outflow=4.0 cfs 2.976 af**Pond SUB-1: Subsurface System-1**Peak Elev=134.83' Storage=0.105 af Inflow=2.1 cfs 0.156 af
Outflow=0.1 cfs 0.084 af**Pond SUB-2: Subsurface System-2**Peak Elev=140.95' Storage=21,328 cf Inflow=9.9 cfs 1.121 af
Discarded=1.0 cfs 1.094 af Primary=0.0 cfs 0.026 af Outflow=1.1 cfs 1.121 af**Pond SUB-3: Subsurface System-3**Peak Elev=145.69' Storage=28,916 cf Inflow=17.4 cfs 1.395 af
Discarded=0.8 cfs 1.287 af Primary=0.1 cfs 0.108 af Outflow=1.0 cfs 1.395 af**Pond SUB-4: Subsurface System-4**Peak Elev=140.64' Storage=47,839 cf Inflow=30.0 cfs 2.183 af
Discarded=1.4 cfs 2.074 af Primary=0.1 cfs 0.110 af Outflow=1.5 cfs 2.183 af**Pond WL-1: Wetland Series 'J'**Peak Elev=137.42' Storage=3,716 cf Inflow=1.7 cfs 0.402 af
Primary=0.6 cfs 0.352 af Secondary=0.0 cfs 0.000 af Outflow=0.6 cfs 0.352 af**Total Runoff Area = 35.34 ac Runoff Volume = 8.679 af Average Runoff Depth = 2.95"**
67.26% Pervious = 23.77 ac 32.74% Impervious = 11.57 ac

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 129

Summary for Subcatchment PWA-1:

Runoff = 1.9 cfs @ 12.35 hrs, Volume= 0.326 af, Depth= 0.88"
 Routed to Reach DP-1 : Northern Wetlands Culvert

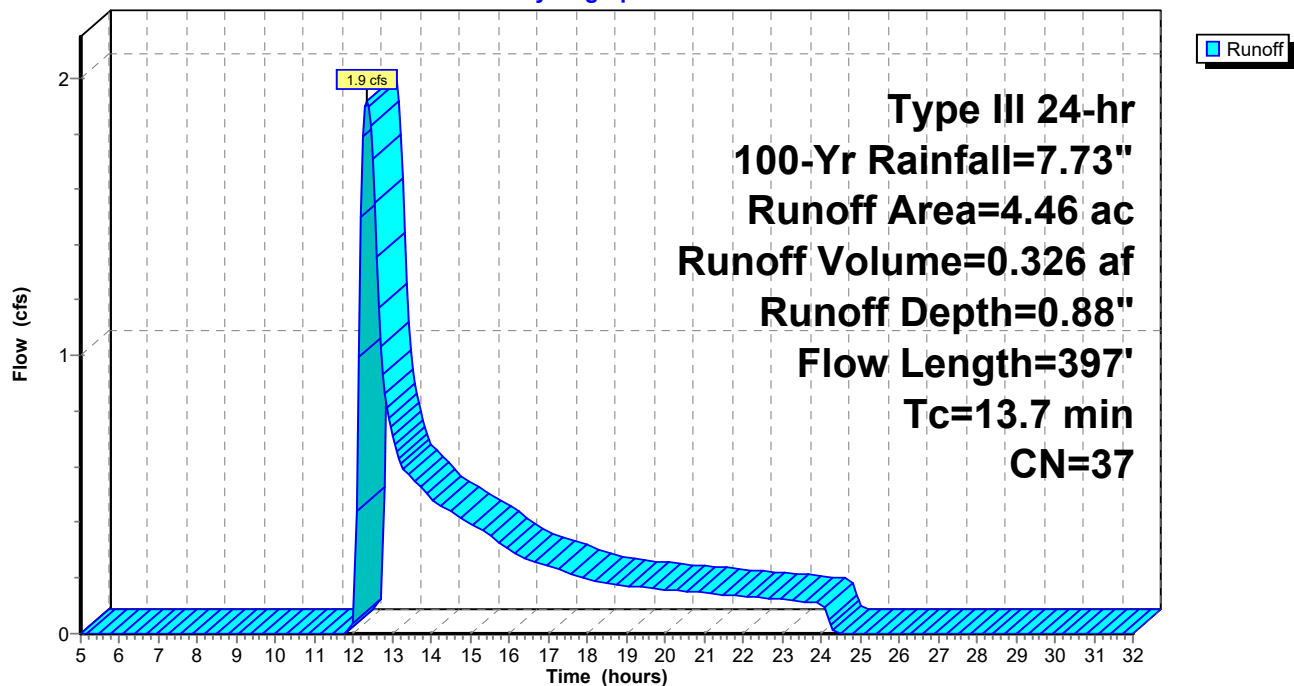
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.29	61	>75% Grass cover, Good, HSG B
0.55	39	>75% Grass cover, Good, HSG A
2.97	30	Woods, Good, HSG A
0.65	55	Woods, Good, HSG B
4.46	37	Weighted Average
4.46		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0650	0.11		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.40"
6.2	347	0.0350	0.94		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.7	397	Total			

Subcatchment PWA-1:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 130

Summary for Subcatchment PWA-3:

Runoff = 0.1 cfs @ 12.33 hrs, Volume= 0.015 af, Depth= 0.64"
 Routed to Reach DP-3 : #48 Rinzee Rd

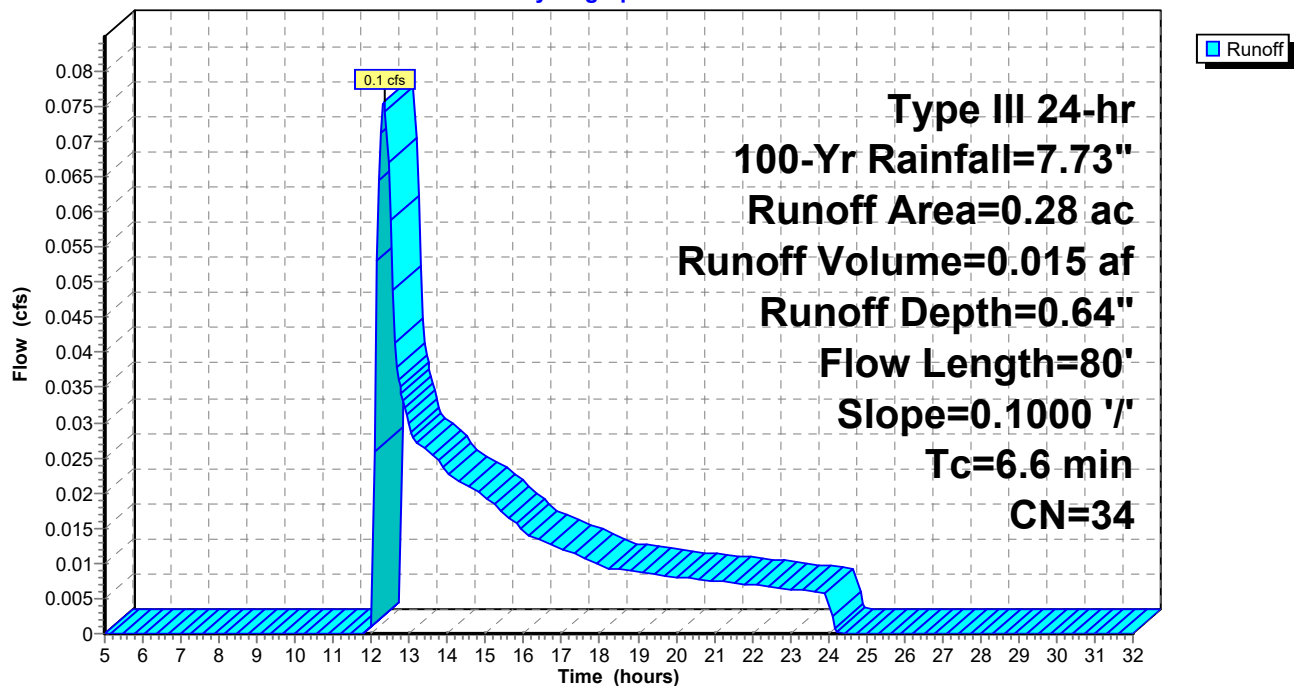
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.11	39	>75% Grass cover, Good, HSG A
0.17	30	Woods, Good, HSG A
0.28	34	Weighted Average
0.28		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	30	0.1000	1.58		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
6.6	80	Total			

Subcatchment PWA-3:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 131

Summary for Subcatchment PWA-4A:

Runoff = 0.2 cfs @ 12.16 hrs, Volume= 0.023 af, Depth= 0.88"
Routed to Reach DP-4 : Poppy Ln

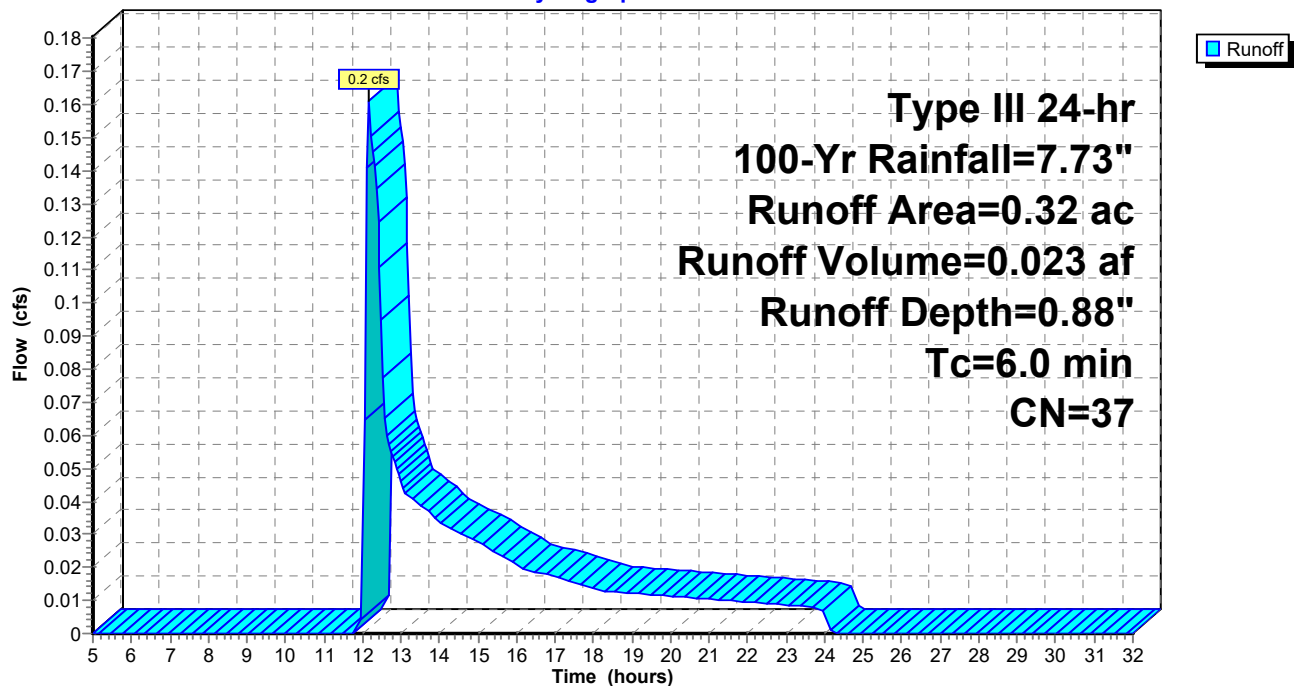
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.07	30	Woods, Good, HSG A
0.32	37	Weighted Average
0.32		100.00% Pervious Area

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

Subcatchment PWA-4A:

Hydrograph



23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 132

Summary for Subcatchment PWA-4B:

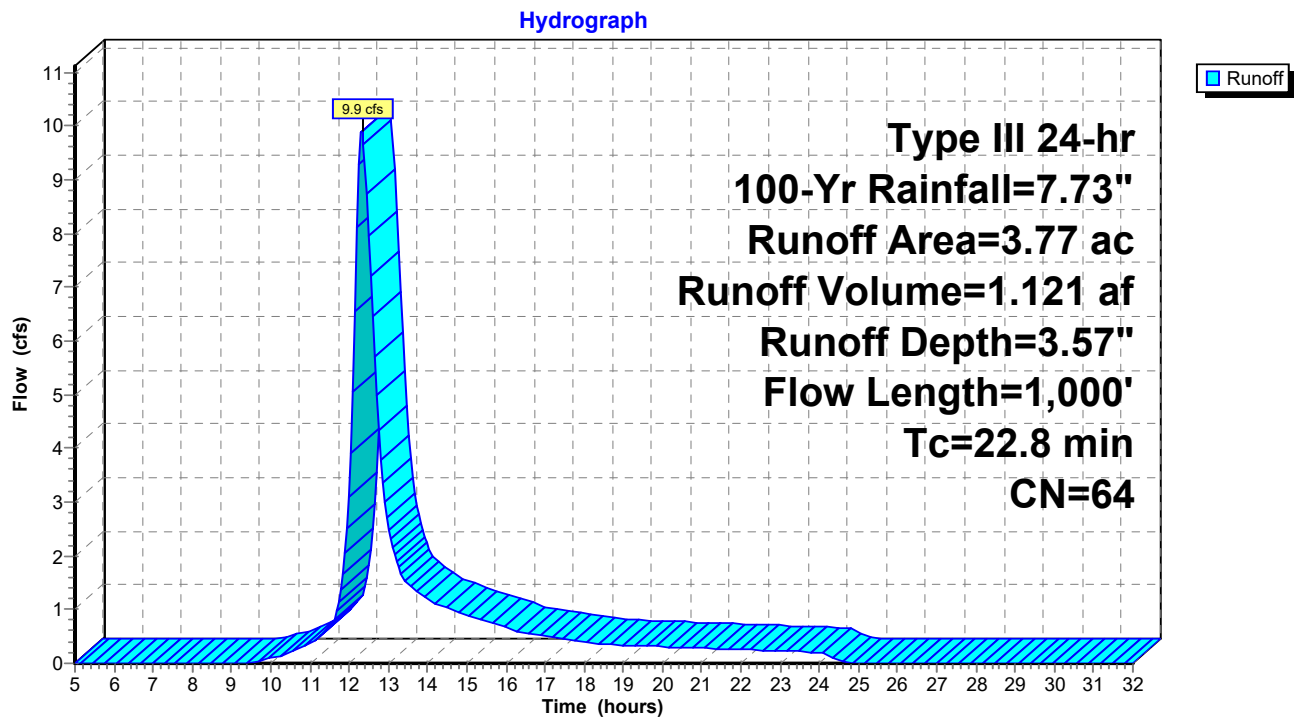
Runoff = 9.9 cfs @ 12.33 hrs, Volume= 1.121 af, Depth= 3.57"
 Routed to Pond SUB-2 : Subsurface System-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.20	30	Woods, Good, HSG A
0.05	55	Woods, Good, HSG B
1.85	39	>75% Grass cover, Good, HSG A
0.07	61	>75% Grass cover, Good, HSG B
0.62	98	Roofs, HSG A
0.04	98	Roofs, HSG B
0.93	98	Paved parking, HSG A
0.01	98	Paved parking, HSG B
3.77	64	Weighted Average
2.17		57.56% Pervious Area
1.60		42.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
17.3	950	0.0170	0.91		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.8	1,000	Total			

Subcatchment PWA-4B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 134

Summary for Subcatchment PWA-5A:

Runoff = 0.2 cfs @ 12.32 hrs, Volume= 0.031 af, Depth= 0.64"
Routed to Reach DP-5 : Wetland Series 'A'

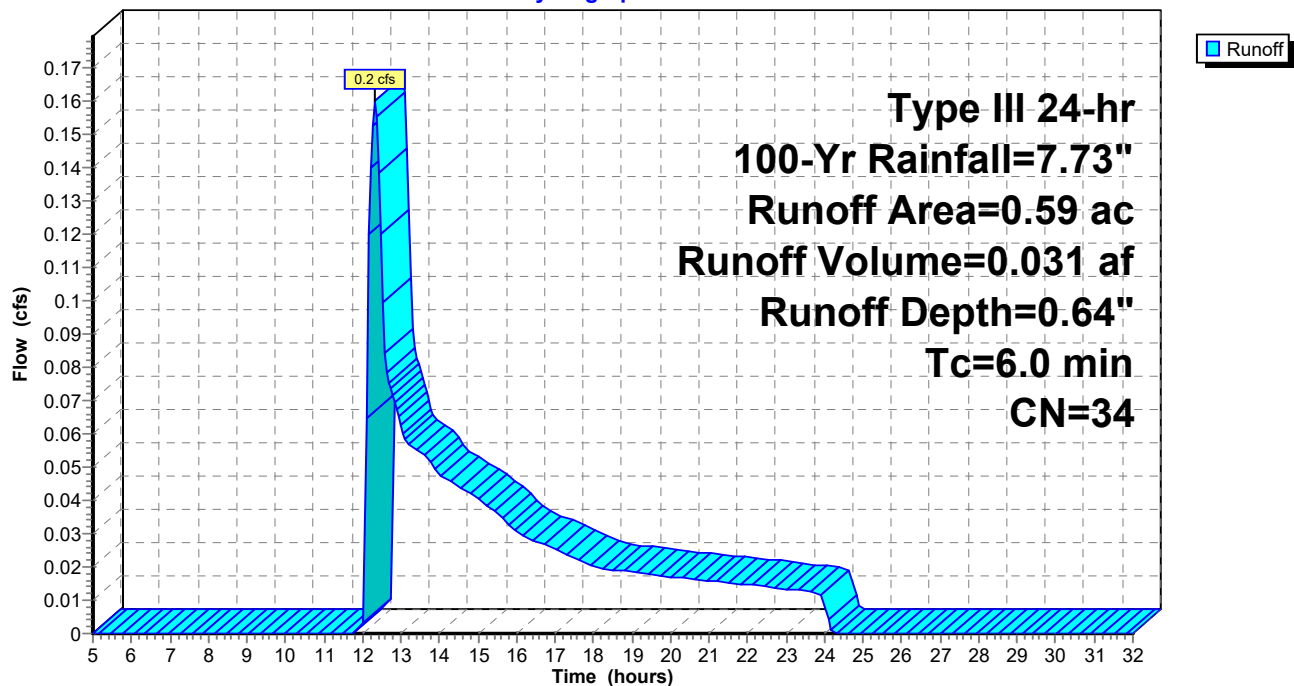
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.33	30	Woods, Good, HSG A
0.26	39	>75% Grass cover, Good, HSG A
0.59	34	Weighted Average
0.59		100.00% Pervious Area

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

Subcatchment PWA-5A:

Hydrograph



23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 135

Summary for Subcatchment PWA-5B:

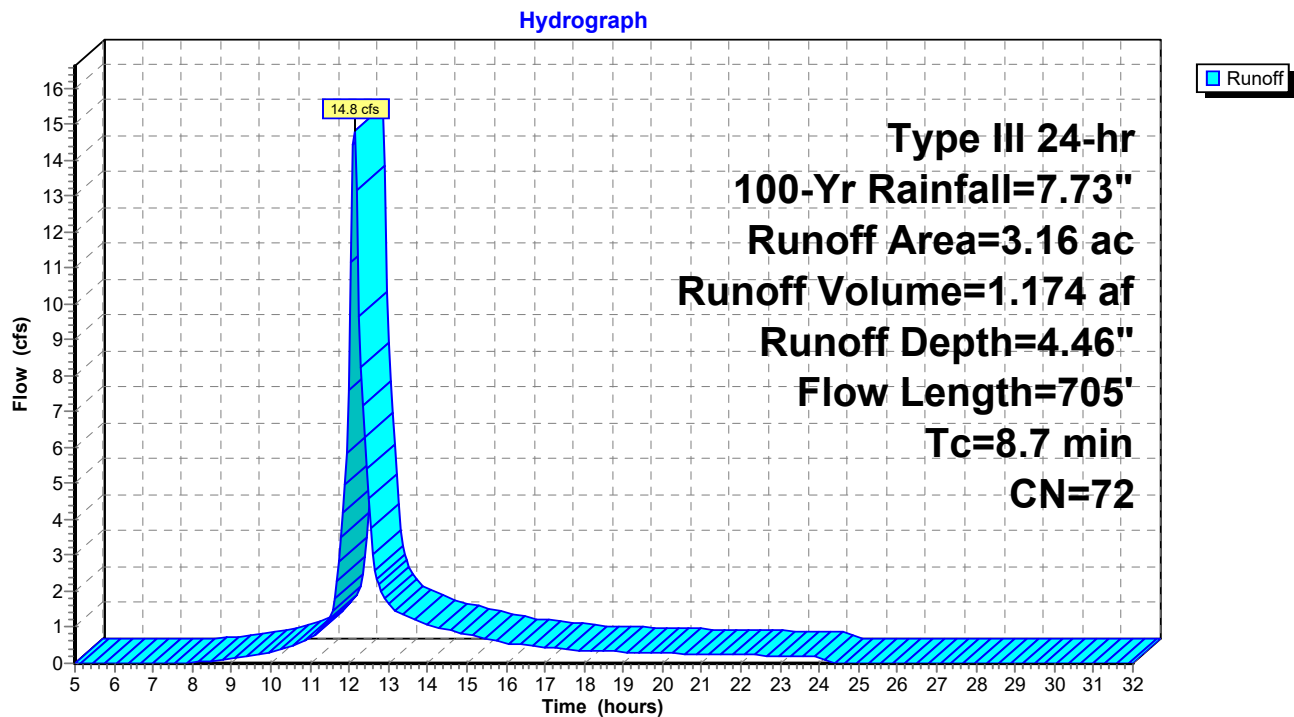
Runoff = 14.8 cfs @ 12.12 hrs, Volume= 1.174 af, Depth= 4.46"
 Routed to Pond IB-1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
1.37	39	>75% Grass cover, Good, HSG A
0.52	98	Roofs, HSG A
1.27	98	Paved parking, HSG A
3.16	72	Weighted Average
1.37		43.35% Pervious Area
1.79		56.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0360	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	60	0.0400	3.00		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
1.1	265	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
3.0	330	0.0150	1.84		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
8.7	705	Total			

Subcatchment PWA-5B:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 137

Summary for Subcatchment PWA-5C:

Runoff = 24.8 cfs @ 12.09 hrs, Volume= 1.802 af, Depth= 4.46"
 Routed to Pond IB-1 :

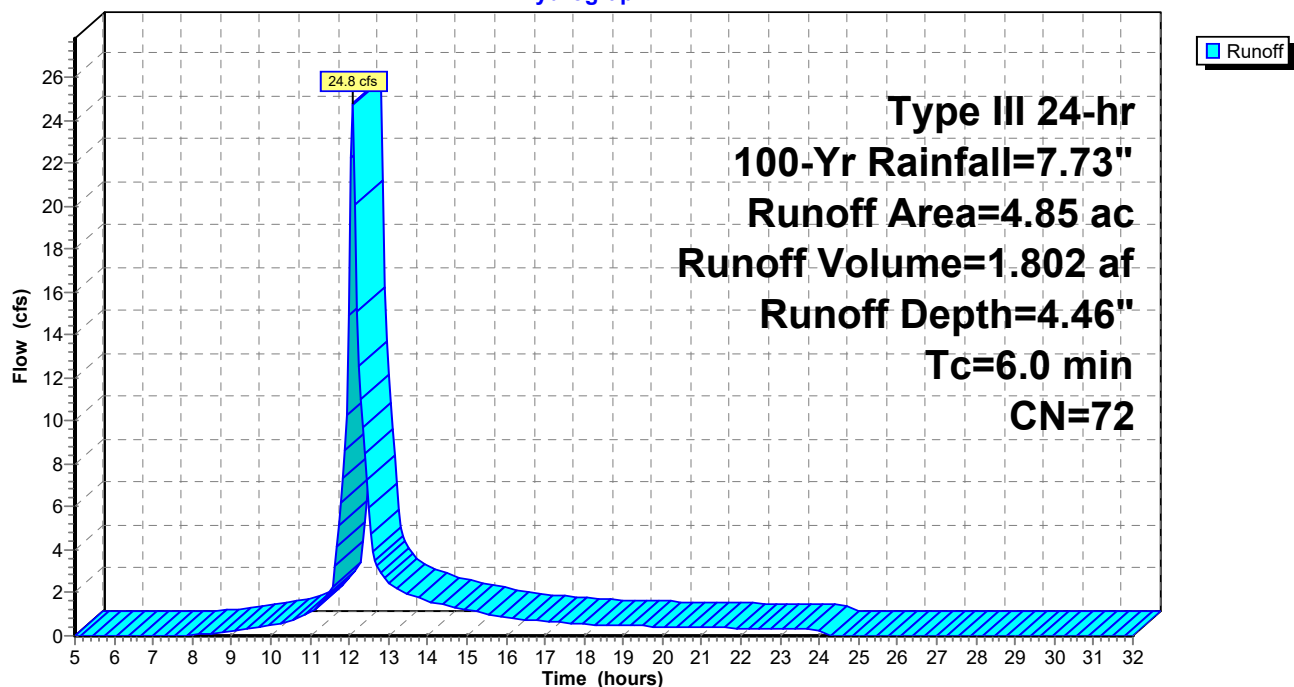
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
1.94	39	>75% Grass cover, Good, HSG A
0.25	61	>75% Grass cover, Good, HSG B
0.01	30	Woods, Good, HSG A
0.06	55	Woods, Good, HSG B
0.94	98	Roofs, HSG A
0.07	98	Roofs, HSG B
1.56	98	Paved parking, HSG A
0.02	98	Paved parking, HSG B
4.85	72	Weighted Average
2.26		46.60% Pervious Area
2.59		53.40% Impervious Area

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

Subcatchment PWA-5C:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 138

Summary for Subcatchment PWA-5D:

Runoff = 0.8 cfs @ 12.38 hrs, Volume= 0.150 af, Depth= 0.79"
Routed to Pond C-1 : Culvert 1

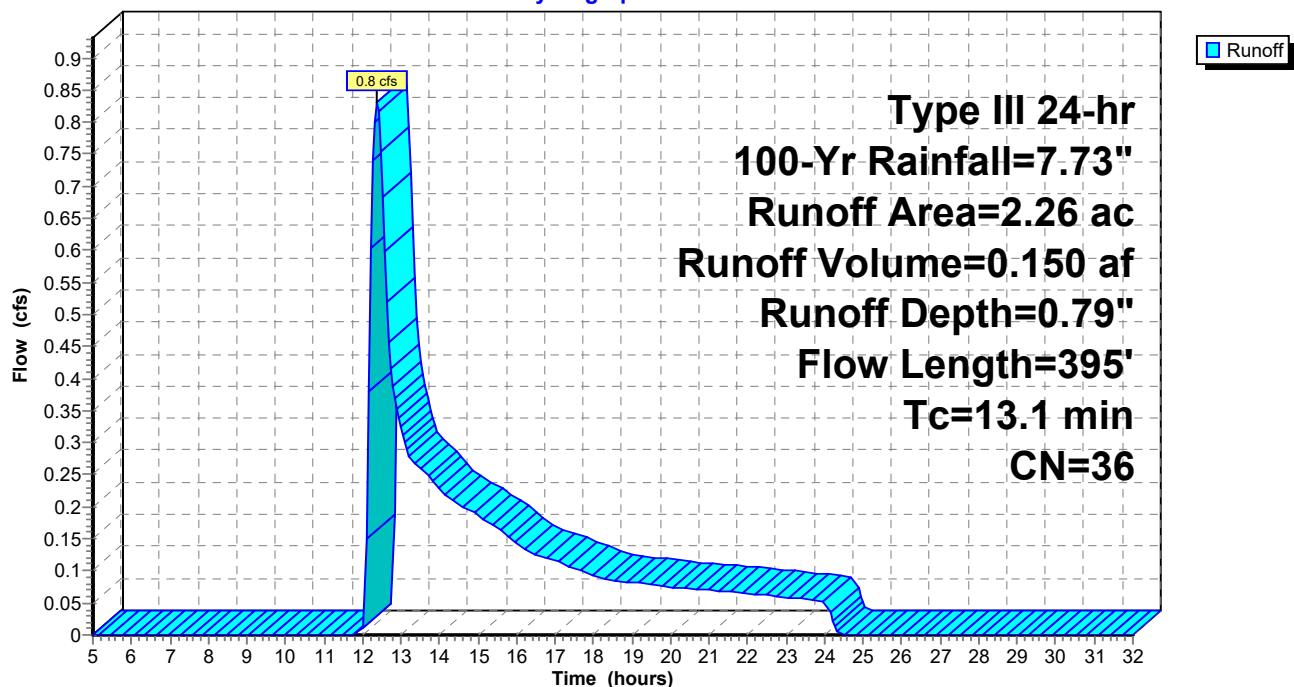
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.89	39	>75% Grass cover, Good, HSG A
0.16	61	>75% Grass cover, Good, HSG B
1.21	30	Woods, Good, HSG A
2.26	36	Weighted Average
2.26		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
5.1	245	0.0260	0.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.1	395	Total			

Subcatchment PWA-5D:

Hydrograph



23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 139

Summary for Subcatchment PWA-5E:

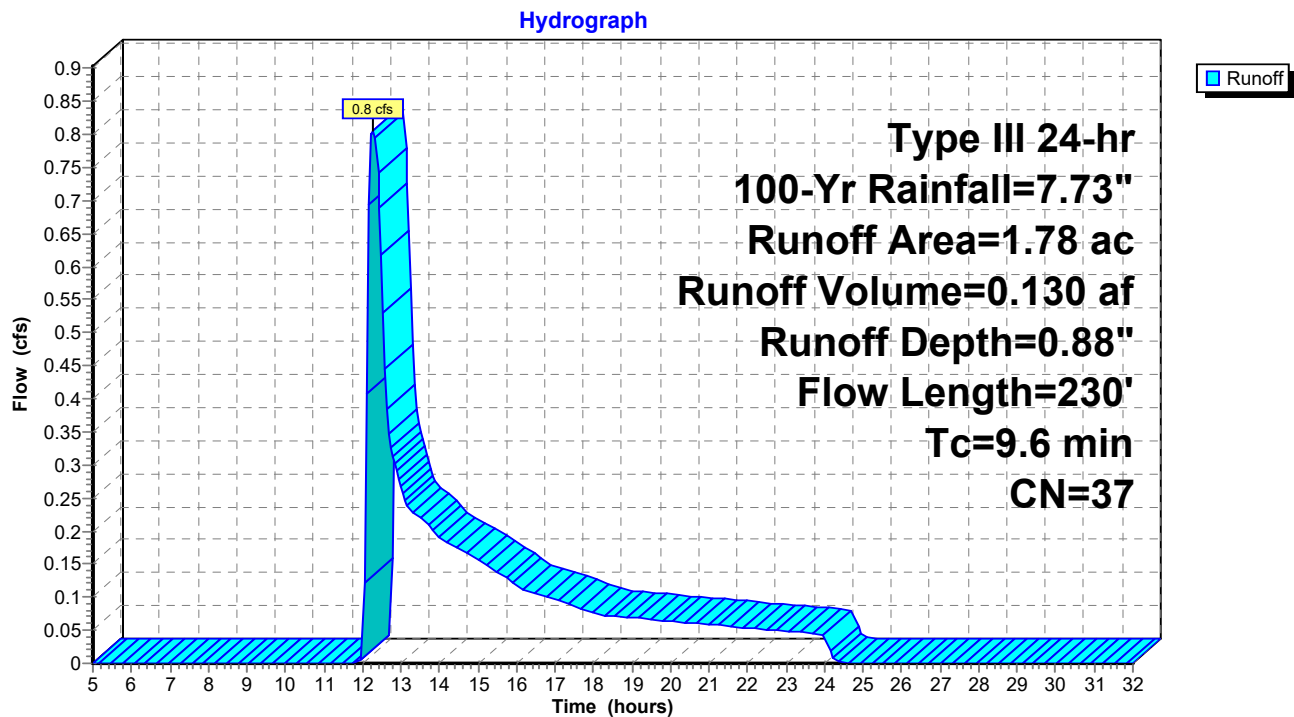
Runoff = 0.8 cfs @ 12.25 hrs, Volume= 0.130 af, Depth= 0.88"
 Routed to Pond WL-1 : Wetland Series 'J'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.97	39	>75% Grass cover, Good, HSG A
0.04	61	>75% Grass cover, Good, HSG B
0.69	30	Woods, Good, HSG A
0.08	55	Woods, Good, HSG B
1.78	37	Weighted Average
1.78		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.40"
0.3	30	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.9	110	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	40	0.3700	4.26		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.6	230	Total			

Subcatchment PWA-5E:



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 141

Summary for Subcatchment PWA-5F:

Runoff = 17.3 cfs @ 12.09 hrs, Volume= 1.298 af, Depth> 5.84"
Routed to Pond SUB-3 : Subsurface System-3

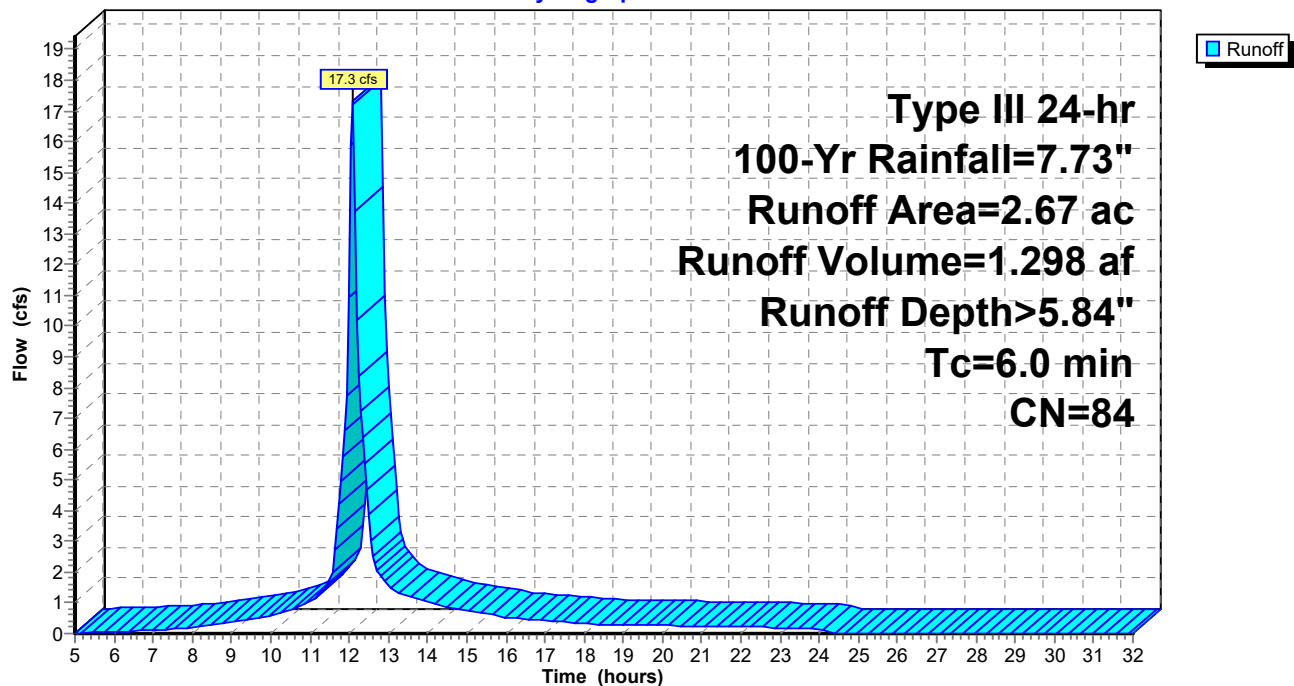
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.65	39	>75% Grass cover, Good, HSG A
0.85	98	Roofs, HSG A
1.17	98	Paved parking, HSG A
2.67	84	Weighted Average
0.65		24.34% Pervious Area
2.02		75.66% Impervious Area

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

Subcatchment PWA-5F:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 142

Summary for Subcatchment PWA-5G:

Runoff = 2.1 cfs @ 12.09 hrs, Volume= 0.156 af, Depth= 3.90"
Routed to Pond SUB-1 : Subsurface System-1

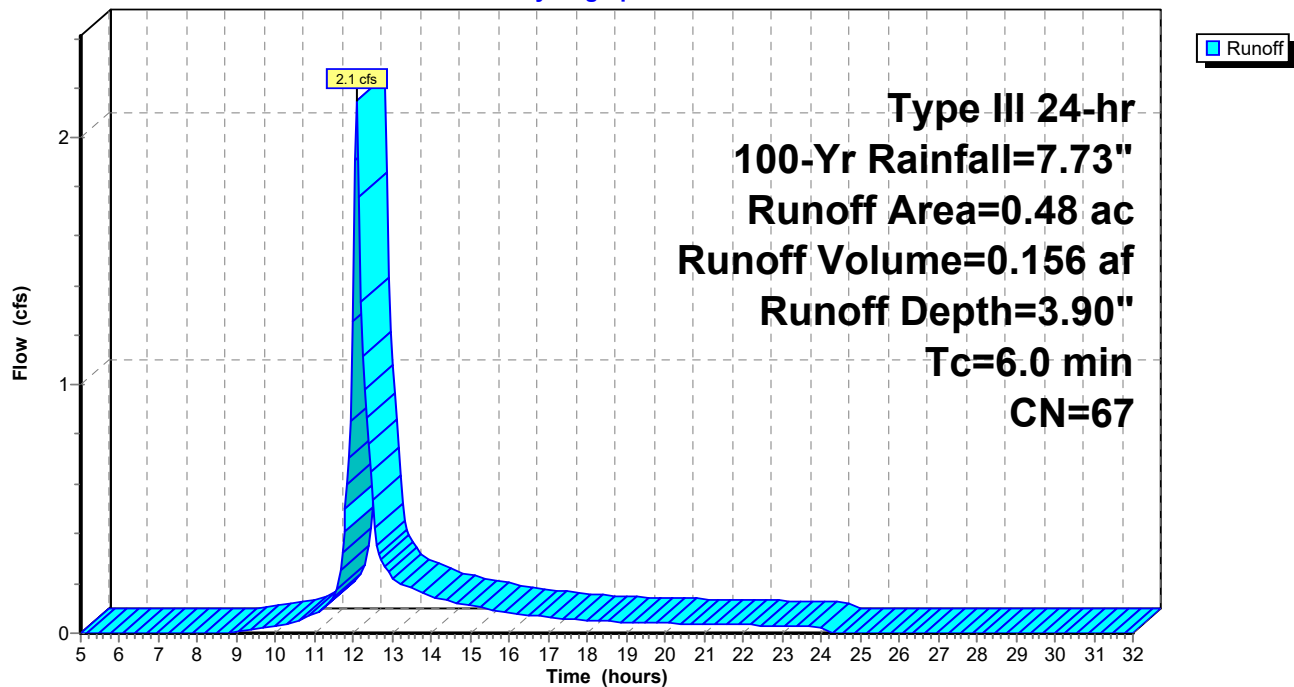
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.25	39	>75% Grass cover, Good, HSG A
0.23	98	Paved parking, HSG A
0.48	67	Weighted Average
0.25		52.08% Pervious Area
0.23		47.92% Impervious Area

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

Subcatchment PWA-5G:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 143

Summary for Subcatchment PWA-5H:

Runoff = 0.5 cfs @ 12.38 hrs, Volume= 0.097 af, Depth= 0.64"
 Routed to Pond SUB-3 : Subsurface System-3

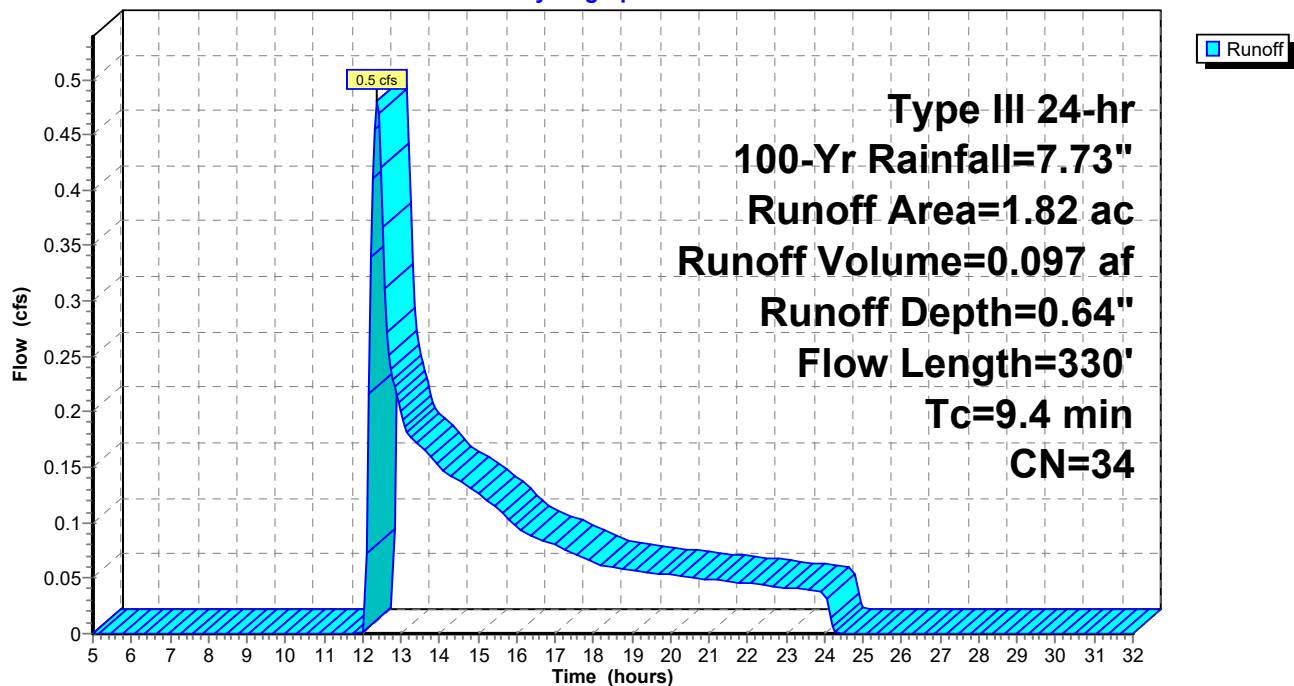
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
1.01	30	Woods, Good, HSG A
0.81	39	>75% Grass cover, Good, HSG A
1.82	34	Weighted Average
1.82		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.1600	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
4.2	280	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.4	330	Total			

Subcatchment PWA-5H:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 144

Summary for Subcatchment PWA-6:

Runoff = 0.2 cfs @ 12.41 hrs, Volume= 0.055 af, Depth= 0.56"
 Routed to Reach DP-6 : Wetland Series 'B' & 'C'

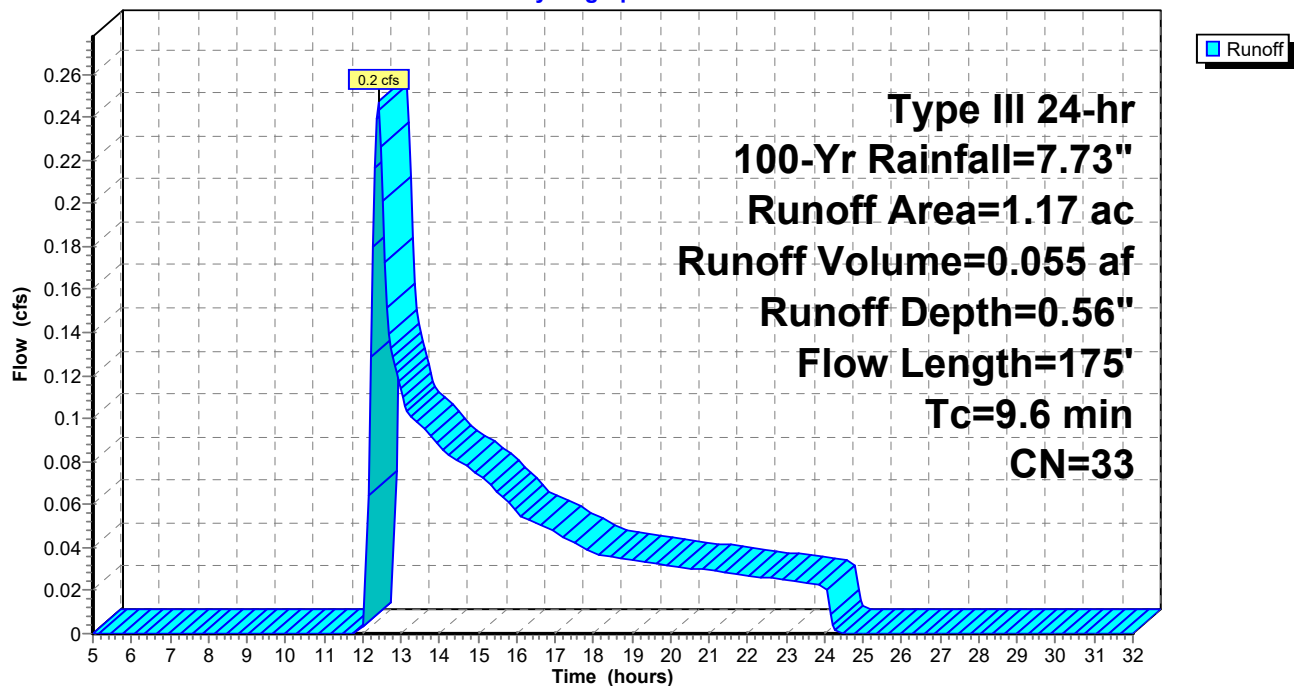
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.44	39	>75% Grass cover, Good, HSG A
0.73	30	Woods, Good, HSG A
1.17	33	Weighted Average
1.17		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
1.9	125	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
9.6	175	Total			

Subcatchment PWA-6:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 145

Summary for Subcatchment PWA-7:

Runoff = 0.3 cfs @ 12.38 hrs, Volume= 0.058 af, Depth= 0.71"
 Routed to Reach DP-7 : #4 Poppy Ln

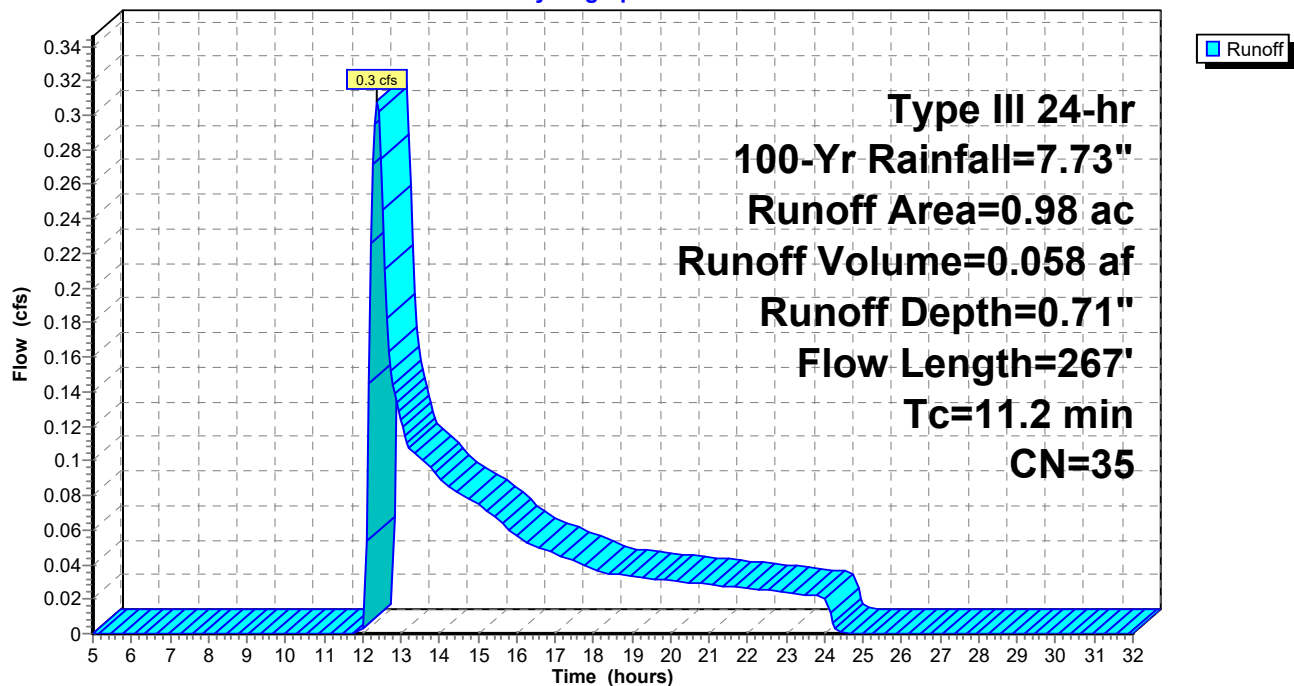
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.49	30	Woods, Good, HSG A
0.49	39	>75% Grass cover, Good, HSG A
0.98	35	Weighted Average
0.98		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.40"
1.0	217	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.2	267	Total			

Subcatchment PWA-7:

Hydrograph



23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 146

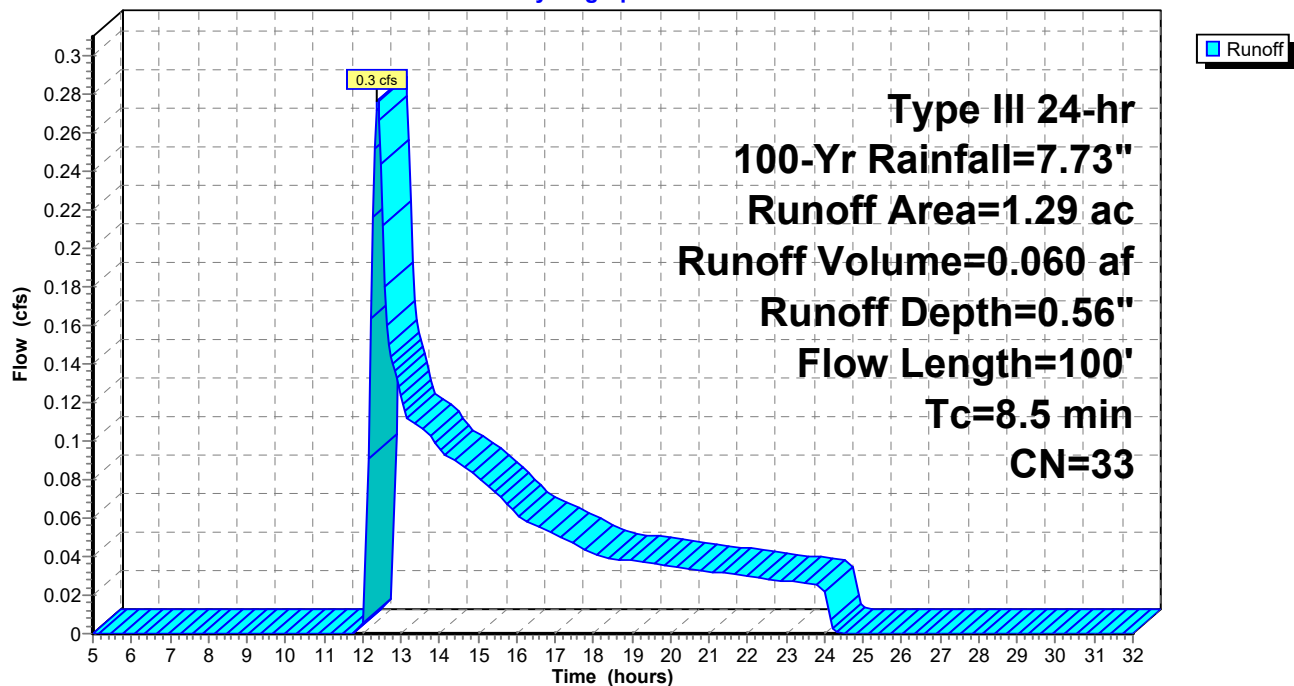
Summary for Subcatchment PWA-8A:

Runoff = 0.3 cfs @ 12.39 hrs, Volume= 0.060 af, Depth= 0.56"
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
0.92	30	Woods, Good, HSG A
0.37	39	>75% Grass cover, Good, HSG A
1.29	33	Weighted Average
1.29		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0200	0.10		Sheet Flow, Grass: Dense n= 0.240 P2= 3.40"
0.5	50	0.1200	1.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.5	100	Total			

Subcatchment PWA-8A:**Hydrograph**

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 147

Summary for Subcatchment PWA-8B:

Runoff = 30.0 cfs @ 12.09 hrs, Volume= 2.183 af, Depth= 4.80"
Routed to Pond SUB-4 : Subsurface System-4

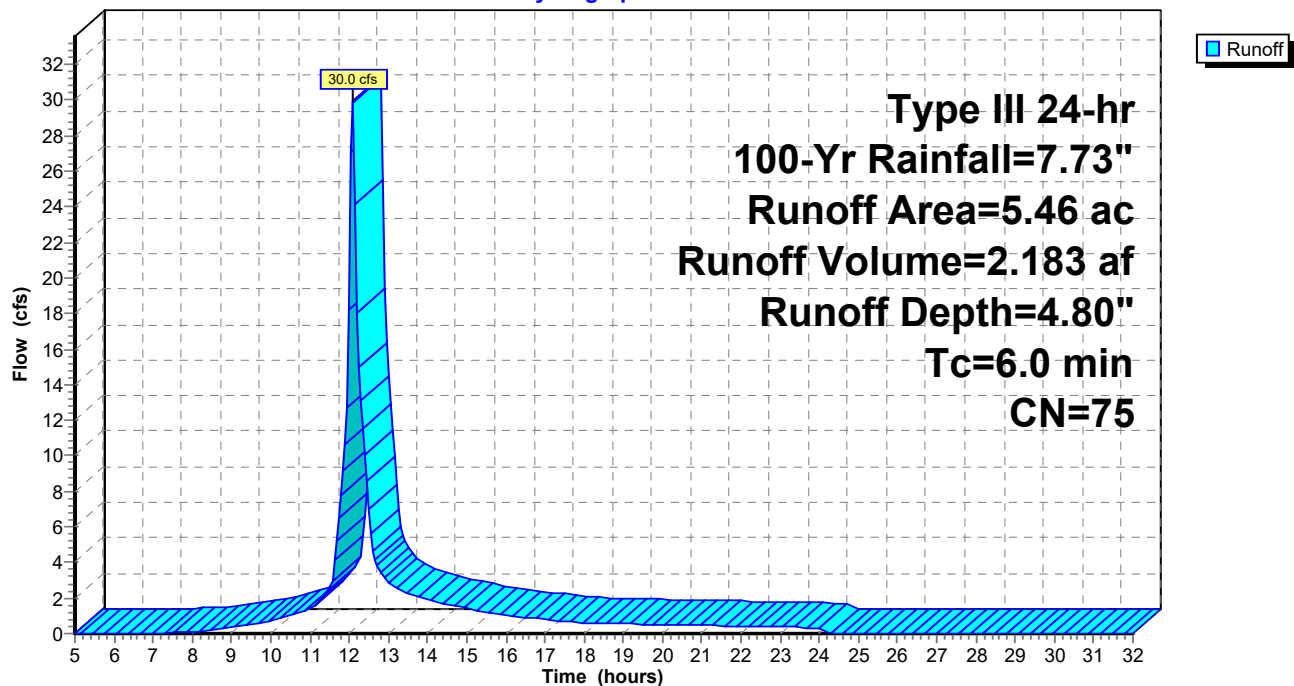
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr Rainfall=7.73"

Area (ac)	CN	Description
2.12	39	>75% Grass cover, Good, HSG A
1.39	98	Roofs, HSG A
1.95	98	Paved parking, HSG A
5.46	75	Weighted Average
2.12		38.83% Pervious Area
3.34		61.17% Impervious Area

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

Subcatchment PWA-8B:

Hydrograph



Summary for Reach DP-1: Northern Wetlands Culvert

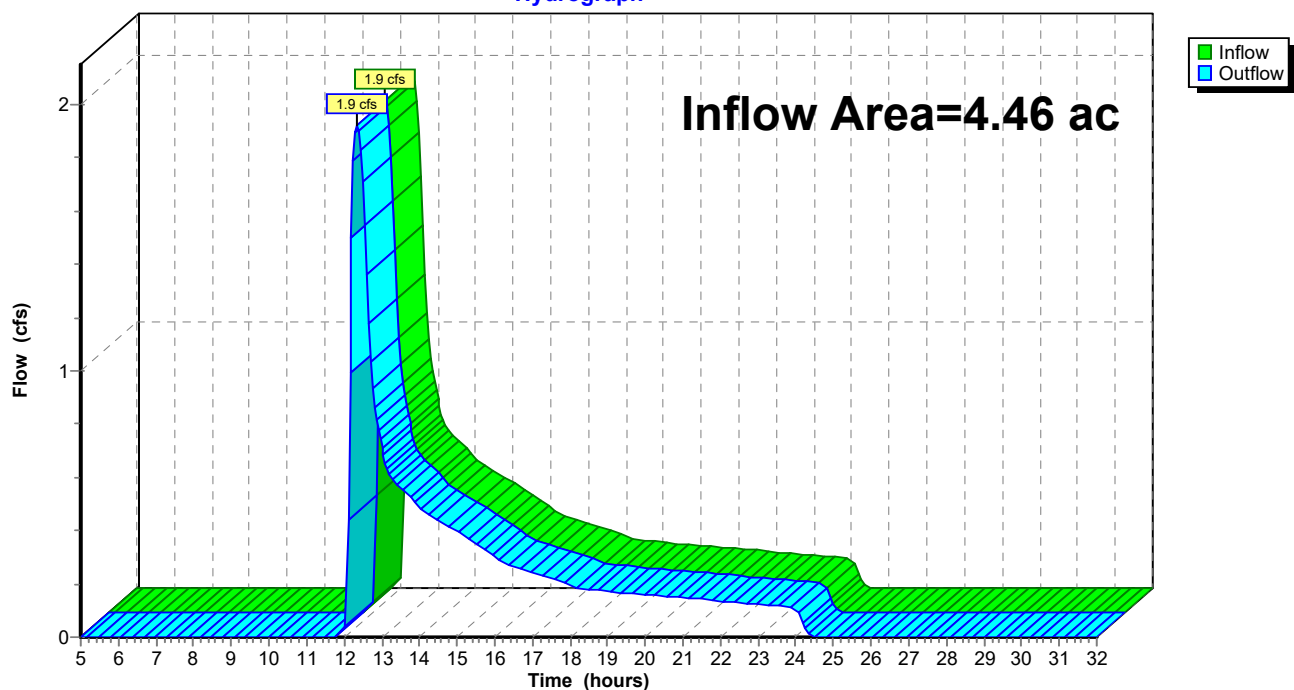
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.46 ac, 0.00% Impervious, Inflow Depth = 0.88" for 100-Yr event
Inflow = 1.9 cfs @ 12.35 hrs, Volume= 0.326 af
Outflow = 1.9 cfs @ 12.35 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-1: Northern Wetlands Culvert

Hydrograph



Summary for Reach DP-3: #48 Rinzee Rd

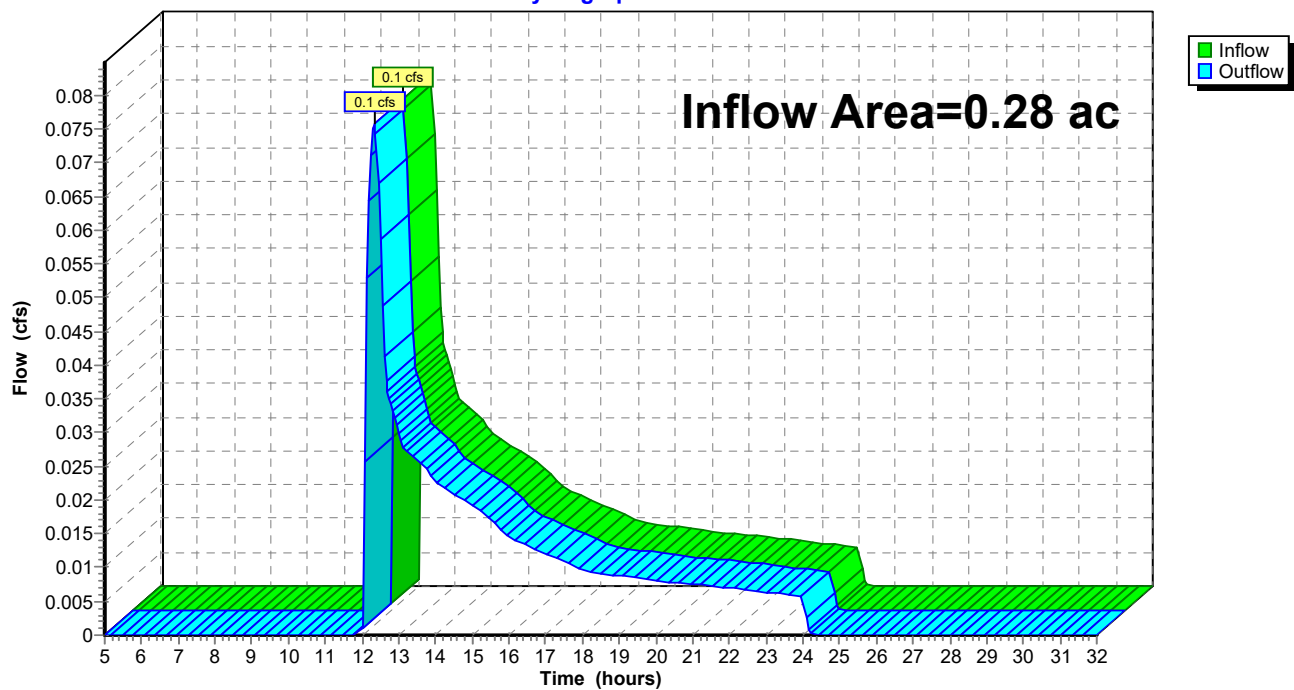
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.28 ac, 0.00% Impervious, Inflow Depth = 0.64" for 100-Yr event
Inflow = 0.1 cfs @ 12.33 hrs, Volume= 0.015 af
Outflow = 0.1 cfs @ 12.33 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-3: #48 Rinzee Rd

Hydrograph



Summary for Reach DP-4: Poppy Ln

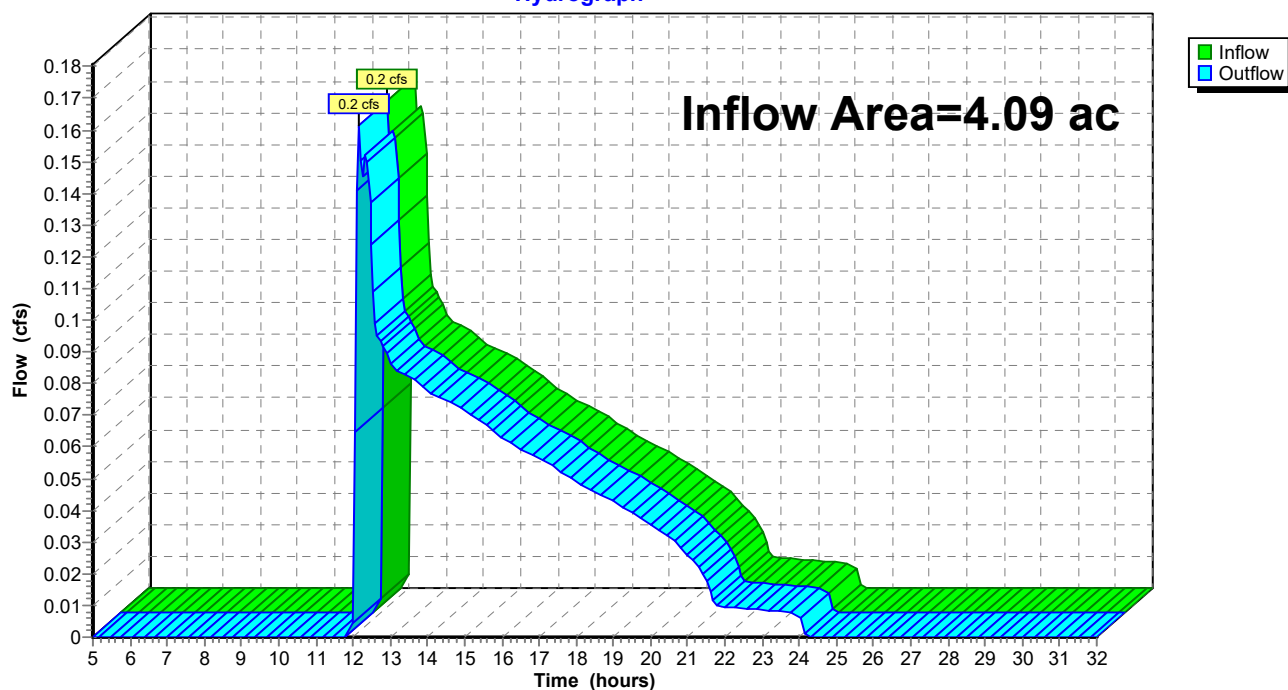
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.09 ac, 39.12% Impervious, Inflow Depth = 0.15" for 100-Yr event
Inflow = 0.2 cfs @ 12.16 hrs, Volume= 0.050 af
Outflow = 0.2 cfs @ 12.16 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-4: Poppy Ln

Hydrograph



Summary for Reach DP-5: Wetland Series 'A'

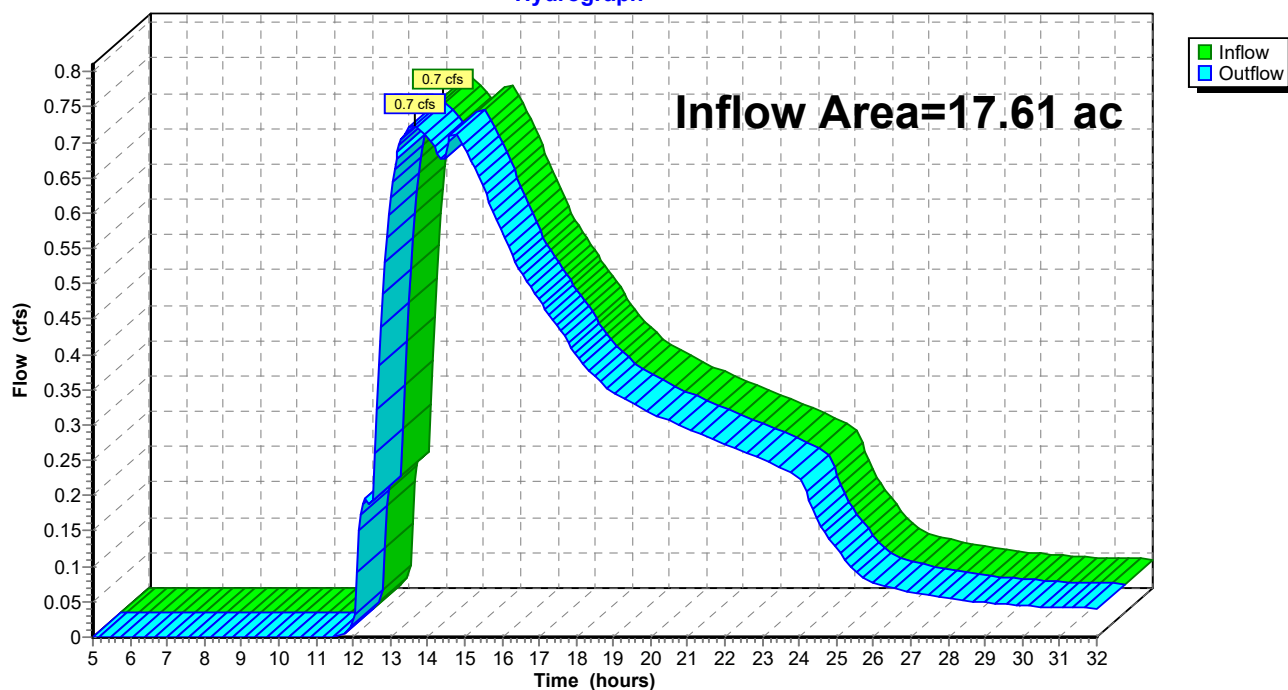
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17.61 ac, 37.65% Impervious, Inflow Depth > 0.32" for 100-Yr event
Inflow = 0.7 cfs @ 13.64 hrs, Volume= 0.467 af
Outflow = 0.7 cfs @ 13.64 hrs, Volume= 0.467 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-5: Wetland Series 'A'

Hydrograph



Summary for Reach DP-6: Wetland Series 'B' & 'C'

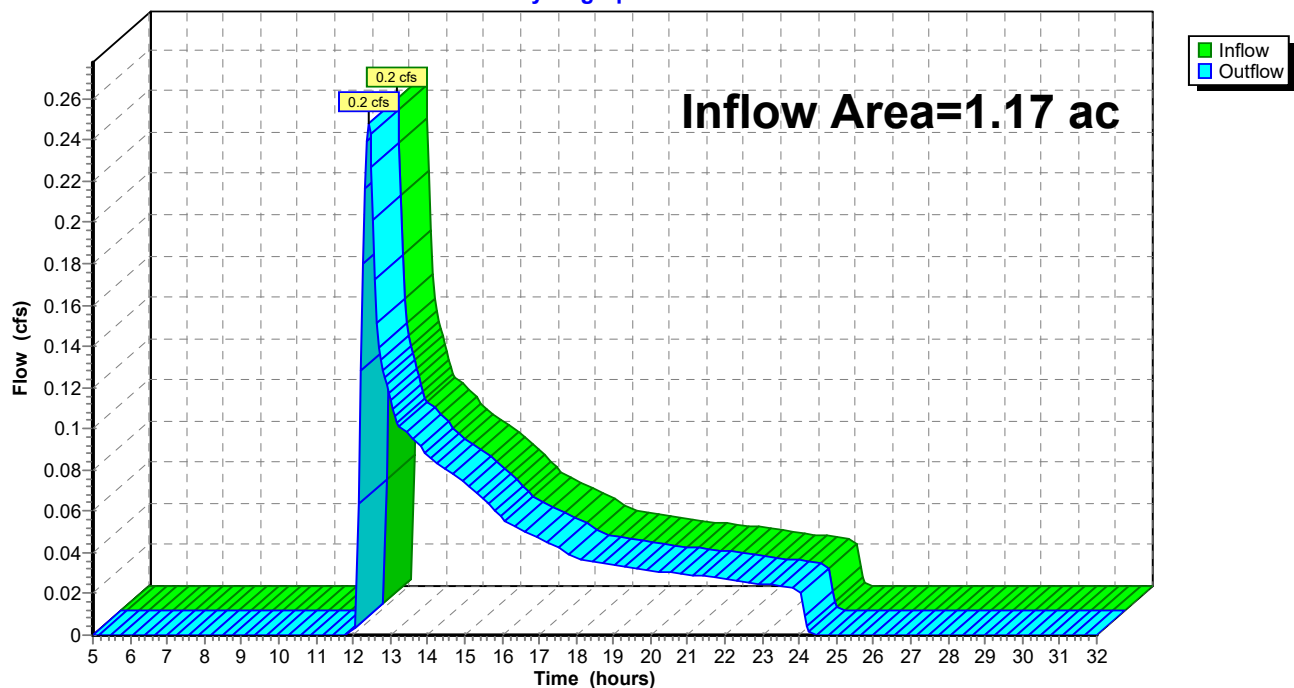
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.17 ac, 0.00% Impervious, Inflow Depth = 0.56" for 100-Yr event
Inflow = 0.2 cfs @ 12.41 hrs, Volume= 0.055 af
Outflow = 0.2 cfs @ 12.41 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-6: Wetland Series 'B' & 'C'

Hydrograph



Summary for Reach DP-7: #4 Poppy Ln

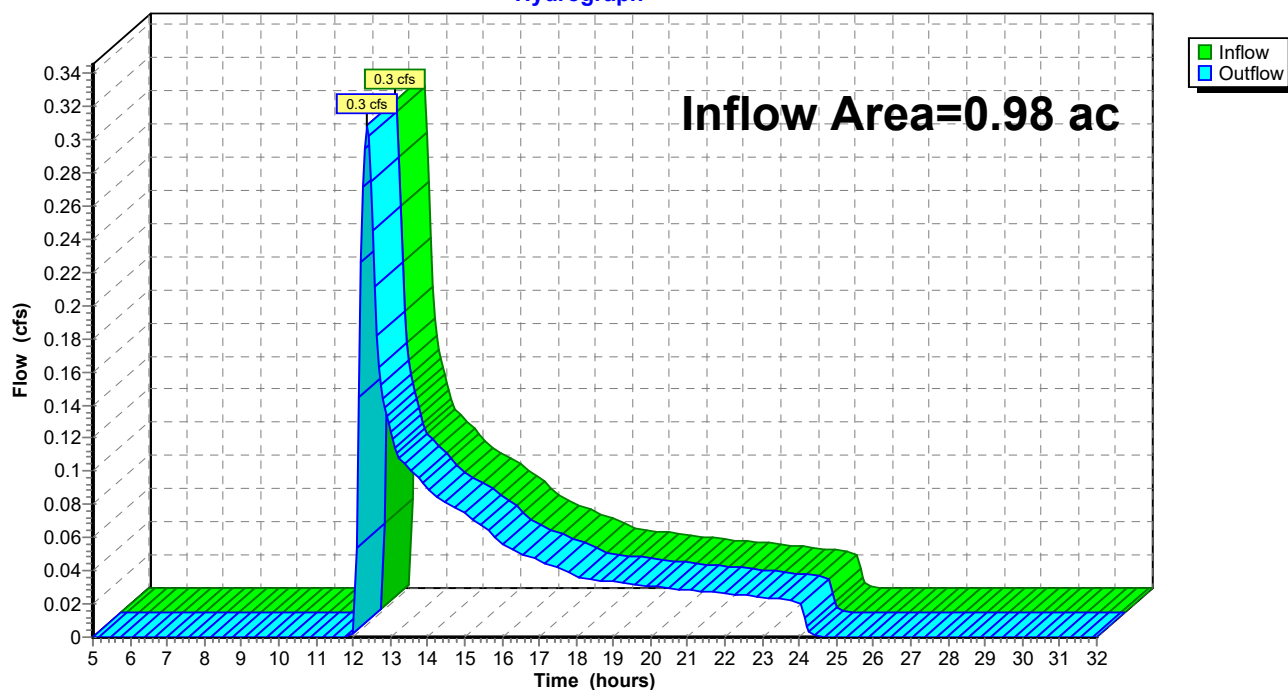
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.98 ac, 0.00% Impervious, Inflow Depth = 0.71" for 100-Yr event
Inflow = 0.3 cfs @ 12.38 hrs, Volume= 0.058 af
Outflow = 0.3 cfs @ 12.38 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-7: #4 Poppy Ln

Hydrograph



Summary for Reach DP-8: Wetland Series 'D' & 'E'

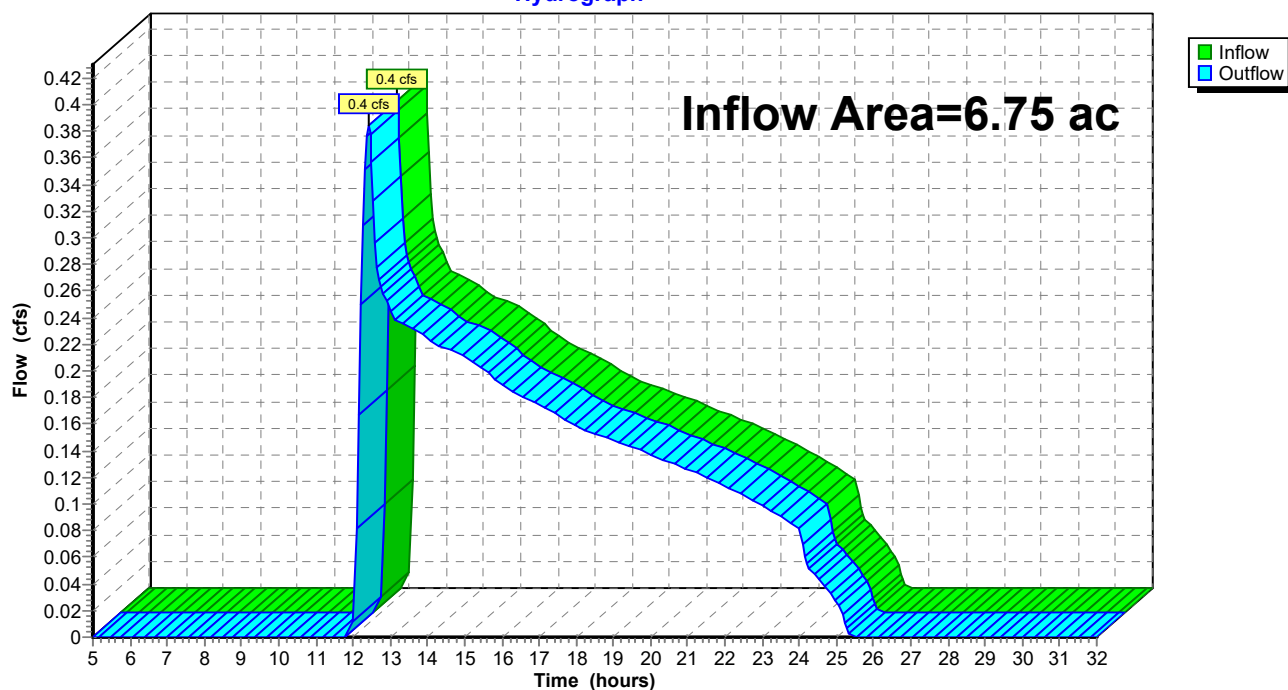
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.75 ac, 49.48% Impervious, Inflow Depth = 0.30" for 100-Yr event
Inflow = 0.4 cfs @ 12.40 hrs, Volume= 0.170 af
Outflow = 0.4 cfs @ 12.40 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetland Series 'D' & 'E'

Hydrograph



Summary for Pond C-1: Culvert 1

[57] Hint: Peaked at 166.55' (Flood elevation advised)

Inflow Area = 2.26 ac, 0.00% Impervious, Inflow Depth = 0.79" for 100-Yr event
 Inflow = 0.8 cfs @ 12.38 hrs, Volume= 0.150 af
 Outflow = 0.8 cfs @ 12.38 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.8 cfs @ 12.38 hrs, Volume= 0.150 af
 Routed to Pond WL-1 : Wetland Series 'J'

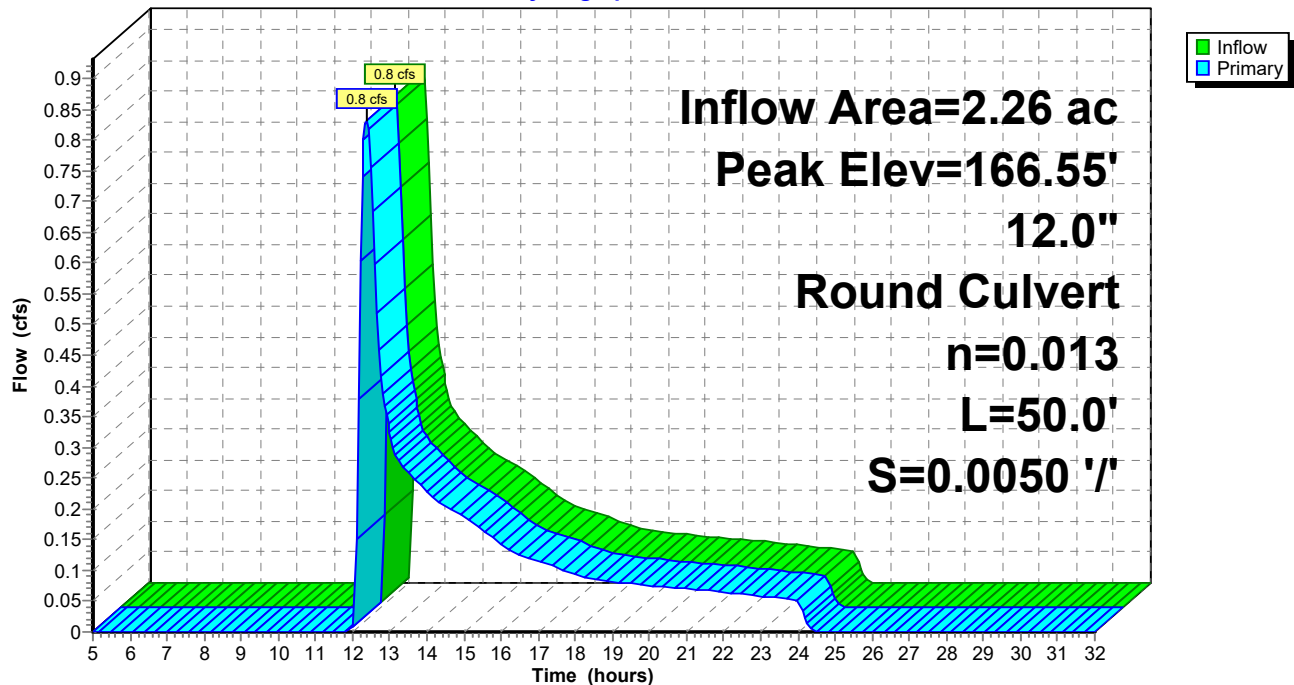
Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 166.55' @ 12.38 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	166.00'	12.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 166.00' / 165.75' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.8 cfs @ 12.38 hrs HW=166.55' (Free Discharge)
 ↳ **1=Culvert** (Barrel Controls 0.8 cfs @ 2.72 fps)

Pond C-1: Culvert 1

Hydrograph



23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 156

Summary for Pond IB-1:

Inflow Area = 8.01 ac, 54.68% Impervious, Inflow Depth = 4.46" for 100-Yr event
 Inflow = 39.2 cfs @ 12.10 hrs, Volume= 2.976 af
 Outflow = 4.0 cfs @ 13.04 hrs, Volume= 2.976 af, Atten= 90%, Lag= 56.4 min
 Discarded = 4.0 cfs @ 13.04 hrs, Volume= 2.961 af
 Primary = 0.0 cfs @ 13.04 hrs, Volume= 0.015 af
 Routed to Pond WL-1 : Wetland Series 'J'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 141.36' @ 13.04 hrs Surf.Area= 20,729 sf Storage= 53,120 cf

Plug-Flow detention time= 130.3 min calculated for 2.976 af (100% of inflow)
 Center-of-Mass det. time= 130.2 min (953.2 - 823.0)

Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	89,403 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	10,182	0	0
139.00	13,217	11,700	11,700
140.00	17,372	15,295	26,994
141.00	20,111	18,742	45,736
142.00	21,820	20,966	66,701
143.00	23,583	22,702	89,403

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	138.00'	12.0" Round Culvert L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 138.00' / 137.65' S= 0.0050 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	139.40'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	141.90'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Device 2	142.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	142.00'	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

23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Type III 24-hr 100-Yr Rainfall=7.73"

Printed 12/24/2024

Page 157

Discarded OutFlow Max=4.0 cfs @ 13.04 hrs HW=141.36' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 4.0 cfs)

Primary OutFlow Max=0.0 cfs @ 13.04 hrs HW=141.36' (Free Discharge)

↑ **2=Culvert** (Passes 0.0 cfs of 5.1 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.0 cfs @ 6.67 fps)

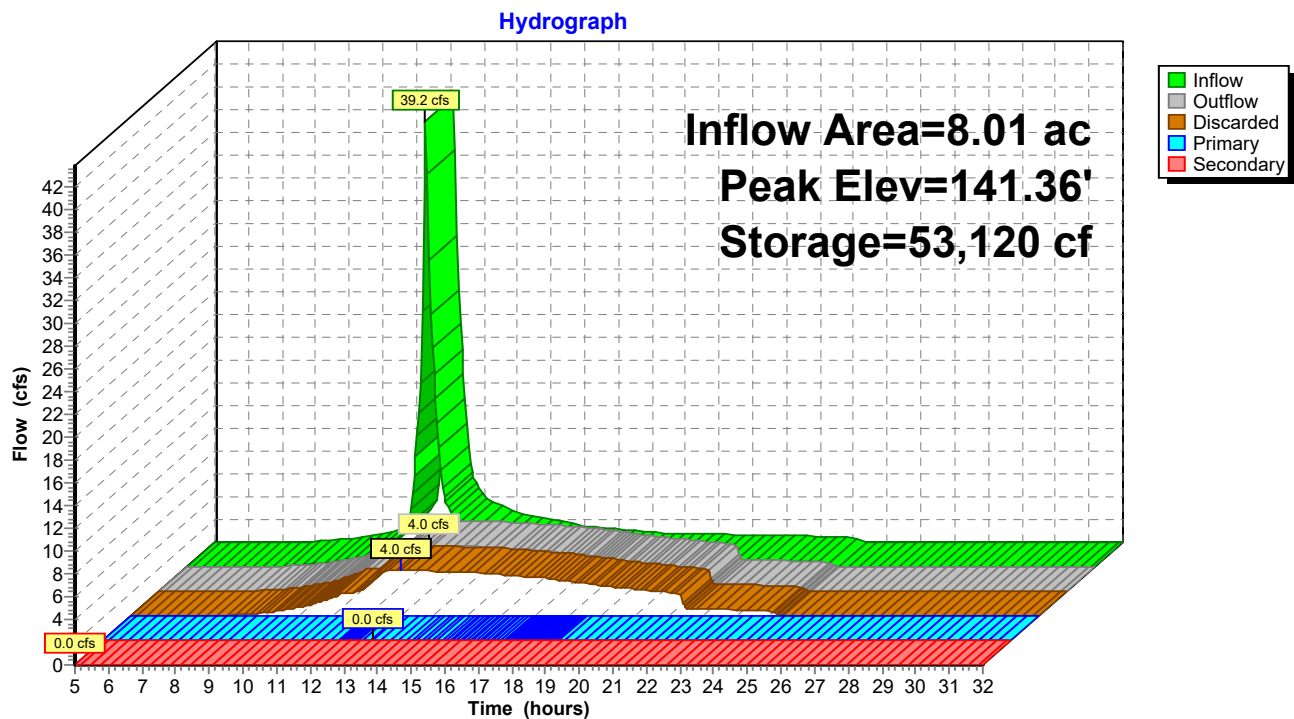
↑ **4=Orifice/Grate** (Controls 0.0 cfs)

↑ **5=Orifice/Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=138.00' (Free Discharge)

↑ **6=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond IB-1:



Summary for Pond SUB-1: Subsurface System-1

Inflow Area = 0.48 ac, 47.92% Impervious, Inflow Depth = 3.90" for 100-Yr event
 Inflow = 2.1 cfs @ 12.09 hrs, Volume= 0.156 af
 Outflow = 0.1 cfs @ 14.86 hrs, Volume= 0.084 af, Atten= 95%, Lag= 165.8 min
 Primary = 0.1 cfs @ 14.86 hrs, Volume= 0.084 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 134.83' @ 14.86 hrs Surf.Area= 0.03 ac Storage= 0.105 af

Plug-Flow detention time= 543.7 min calculated for 0.084 af (54% of inflow)
 Center-of-Mass det. time= 429.5 min (1,262.2 - 832.7)

Volume	Invert	Avail.Storage	Storage Description
#1	131.00'	0.110 af	8.00'W x 15.00'L x 4.00'H Prisma toidx 10

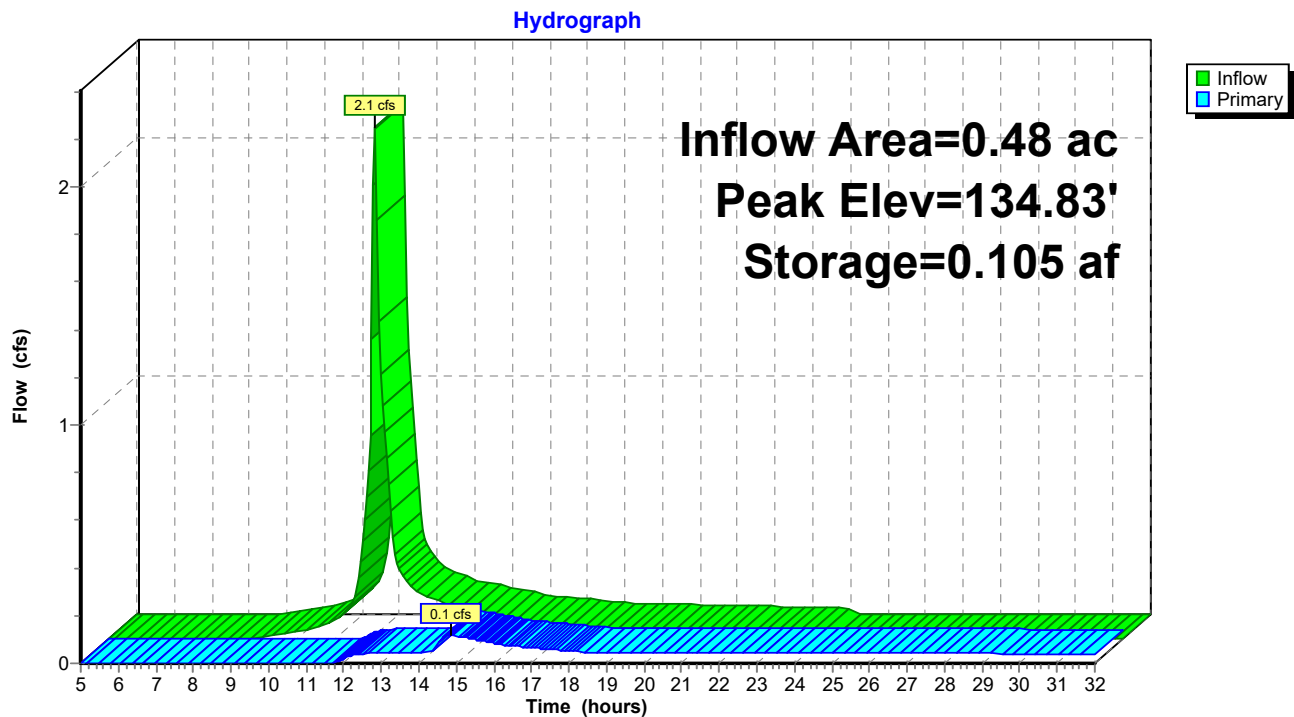
Device	Routing	Invert	Outlet Devices
#1	Primary	131.00'	12.0" Round Culvert L= 48.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 131.00' / 130.76' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	131.50'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	134.80'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.1 cfs @ 14.86 hrs HW=134.83' (Free Discharge)

1=Culvert (Passes 0.1 cfs of 6.4 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.0 cfs @ 8.73 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 0.1 cfs @ 0.53 fps)

Pond SUB-1: Subsurface System-1

23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 160

Summary for Pond SUB-2: Subsurface System-2

Inflow Area = 3.77 ac, 42.44% Impervious, Inflow Depth = 3.57" for 100-Yr event
 Inflow = 9.9 cfs @ 12.33 hrs, Volume= 1.121 af
 Outflow = 1.1 cfs @ 14.31 hrs, Volume= 1.121 af, Atten= 89%, Lag= 119.2 min
 Discarded = 1.0 cfs @ 11.80 hrs, Volume= 1.094 af
 Primary = 0.0 cfs @ 14.31 hrs, Volume= 0.026 af
 Routed to Reach DP-4 : Poppy Ln

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 140.95' @ 14.31 hrs Surf.Area= 5,400 sf Storage= 21,328 cf

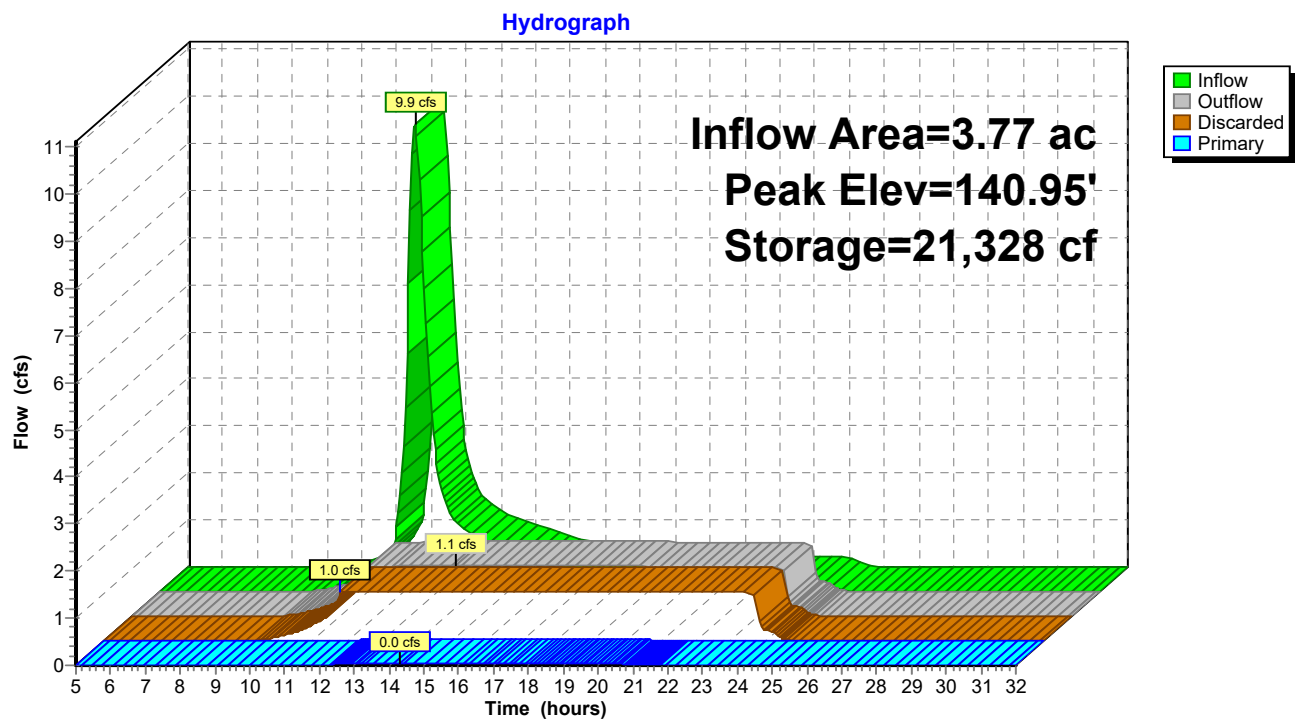
Plug-Flow detention time= 195.3 min calculated for 1.119 af (100% of inflow)
 Center-of-Mass det. time= 195.0 min (1,049.7 - 854.7)

Volume	Invert	Avail.Storage	Storage Description
#1	137.00'	21,600 cf	8.00'W x 15.00'L x 4.00'H 10x17 Concrete Chambers 12" Walk 45

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	137.00'	15.0" Round Culvert L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 137.00' / 136.72' S= 0.0051 ' / Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	138.10'	1.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.0 cfs @ 11.80 hrs HW=137.05' (Free Discharge)
 1=Exfiltration (Exfiltration Controls 1.0 cfs)

Primary OutFlow Max=0.0 cfs @ 14.31 hrs HW=140.95' (Free Discharge)
 2=Culvert (Passes 0.0 cfs of 10.2 cfs potential flow)
 3=Orifice/Grate (Orifice Controls 0.0 cfs @ 8.07 fps)
 4=Sharp-Crested Rectangular Weir(Controls 0.0 cfs)

Pond SUB-2: Subsurface System-2

23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 162

Summary for Pond SUB-3: Subsurface System-3

Inflow Area = 4.49 ac, 44.99% Impervious, Inflow Depth > 3.73" for 100-Yr event
 Inflow = 17.4 cfs @ 12.09 hrs, Volume= 1.395 af
 Outflow = 1.0 cfs @ 14.71 hrs, Volume= 1.395 af, Atten= 94%, Lag= 157.0 min
 Discarded = 0.8 cfs @ 10.75 hrs, Volume= 1.287 af
 Primary = 0.1 cfs @ 14.71 hrs, Volume= 0.108 af
 Routed to Pond WL-1 : Wetland Series 'J'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 145.69' @ 14.71 hrs Surf.Area= 4,320 sf Storage= 28,916 cf

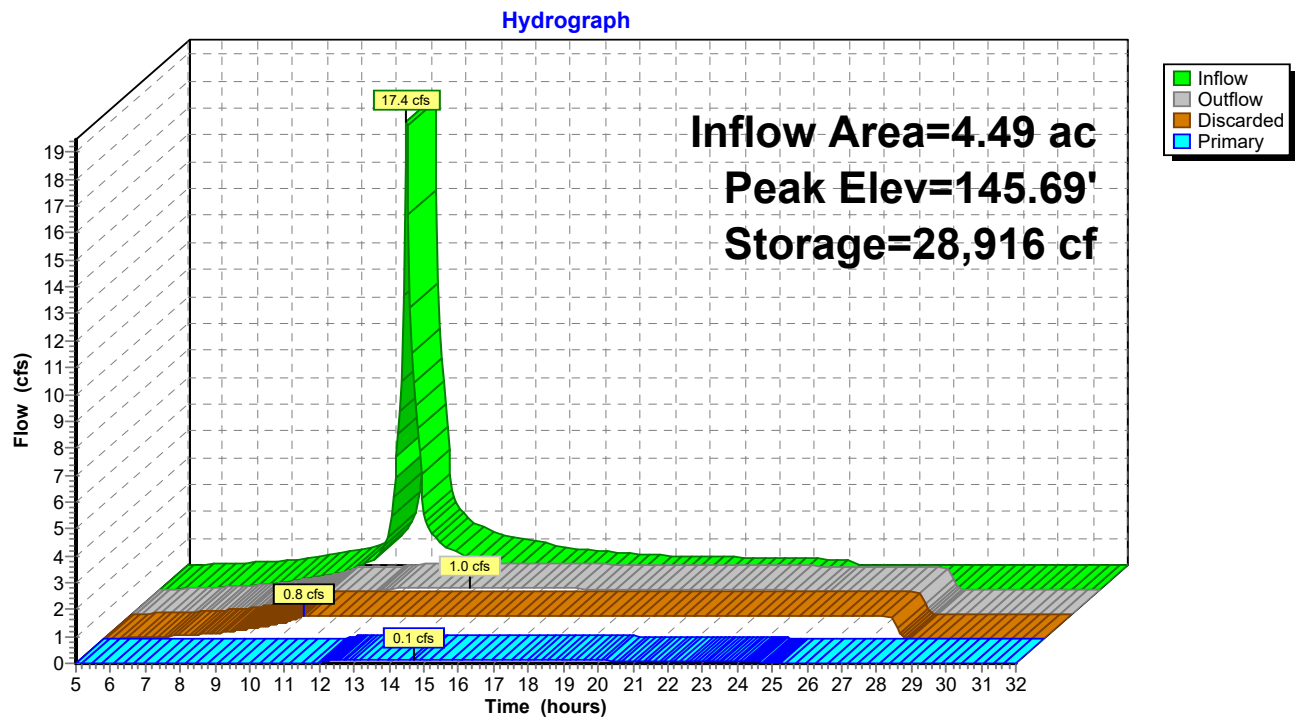
Plug-Flow detention time= 292.2 min calculated for 1.392 af (100% of inflow)
 Center-of-Mass det. time= 292.1 min (1,097.5 - 805.5)

Volume	Invert	Avail.Storage	Storage Description
#1	139.00'	30,240 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 36

Device	Routing	Invert	Outlet Devices
#1	Discarded	139.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	139.00'	15.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 139.00' / 138.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Device 2	140.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	145.90'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.8 cfs @ 10.75 hrs HW=139.07' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.8 cfs)

Primary OutFlow Max=0.1 cfs @ 14.71 hrs HW=145.69' (Free Discharge)
 ↑ **2=Culvert** (Passes 0.1 cfs of 14.6 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.1 cfs @ 10.58 fps)
 ↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-3: Subsurface System-3

23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 164

Summary for Pond SUB-4: Subsurface System-4

Inflow Area = 5.46 ac, 61.17% Impervious, Inflow Depth = 4.80" for 100-Yr event
 Inflow = 30.0 cfs @ 12.09 hrs, Volume= 2.183 af
 Outflow = 1.5 cfs @ 14.81 hrs, Volume= 2.183 af, Atten= 95%, Lag= 162.9 min
 Discarded = 1.4 cfs @ 11.10 hrs, Volume= 2.074 af
 Primary = 0.1 cfs @ 14.81 hrs, Volume= 0.110 af
 Routed to Reach DP-8 : Wetland Series 'D' & 'E'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 140.64' @ 14.81 hrs Surf.Area= 7,200 sf Storage= 47,839 cf

Plug-Flow detention time= 313.7 min calculated for 2.183 af (100% of inflow)
 Center-of-Mass det. time= 313.6 min (1,129.1 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	134.00'	50,400 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 60

Device	Routing	Invert	Outlet Devices
#1	Discarded	134.00'	8.270 in/hr Exfiltration over Surface area
#2	Primary	134.00'	12.0" Round Culvert L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 134.00' / 133.88' S= 0.0052 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	135.80'	1.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 2	140.99'	5.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=1.4 cfs @ 11.10 hrs HW=134.07' (Free Discharge)

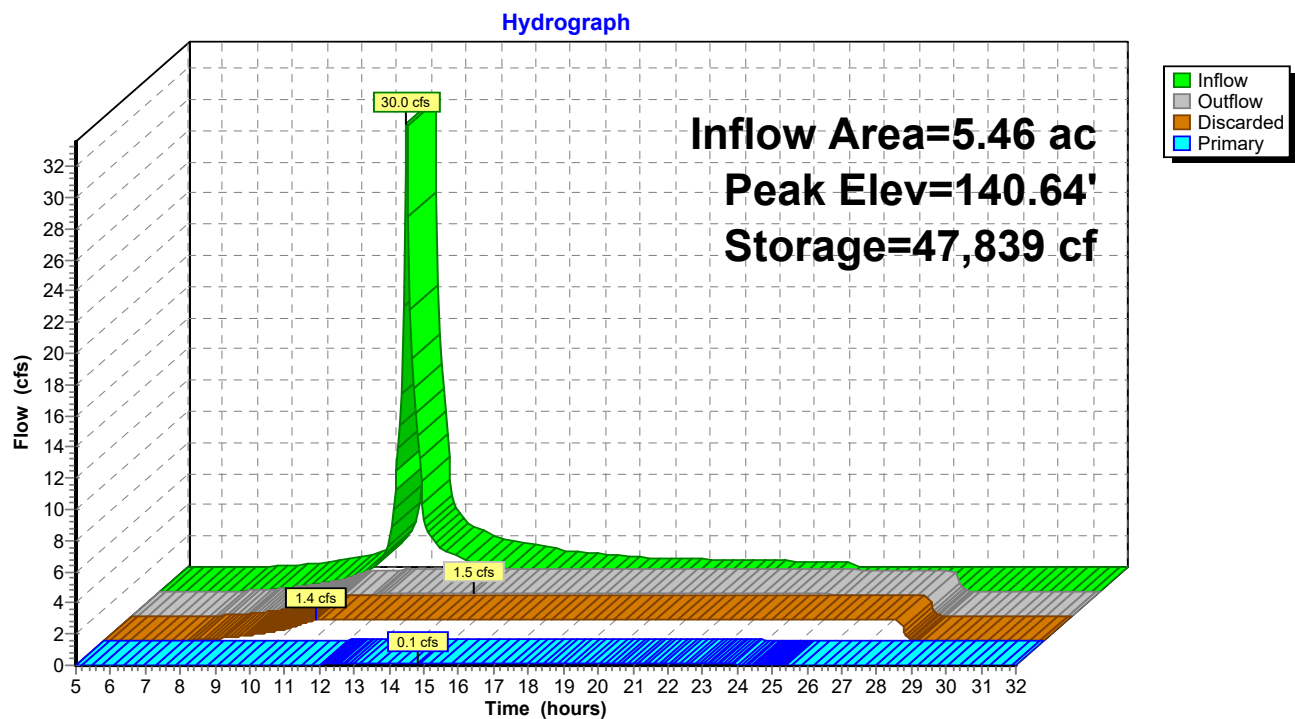
↑ **1=Exfiltration** (Exfiltration Controls 1.4 cfs)

Primary OutFlow Max=0.1 cfs @ 14.81 hrs HW=140.64' (Free Discharge)

↑ **2=Culvert** (Passes 0.1 cfs of 9.4 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 0.1 cfs @ 10.53 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond SUB-4: Subsurface System-4

23-10524 - Post - R2

Type III 24-hr 100-Yr Rainfall=7.73"

Prepared by Civil Design Consultants, Inc

Printed 12/24/2024

HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Page 166

Summary for Pond WL-1: Wetland Series 'J'

Inflow Area = 16.54 ac, 38.69% Impervious, Inflow Depth = 0.29" for 100-Yr event
 Inflow = 1.7 cfs @ 12.34 hrs, Volume= 0.402 af
 Outflow = 0.6 cfs @ 13.68 hrs, Volume= 0.352 af, Atten= 64%, Lag= 80.1 min
 Primary = 0.6 cfs @ 13.68 hrs, Volume= 0.352 af
 Routed to Reach DP-5 : Wetland Series 'A'
 Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Reach DP-5 : Wetland Series 'A'

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.42' @ 13.68 hrs Surf.Area= 5,012 sf Storage= 3,716 cf

Plug-Flow detention time= 139.9 min calculated for 0.352 af (88% of inflow)
 Center-of-Mass det. time= 84.5 min (1,052.5 - 968.0)

Volume	Invert	Avail.Storage	Storage Description
#1	136.00'	127,590 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
136.00	219	0	0
138.00	6,965	7,184	7,184
140.00	25,165	32,130	39,314
141.00	41,218	33,192	72,506
142.00	68,950	55,084	127,590

Device	Routing	Invert	Outlet Devices
#1	Primary	137.05'	18.0" Round Culvert L= 145.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 137.05' / 136.05' S= 0.0069 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf
#2	Secondary	141.05'	155.0' long x 35.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

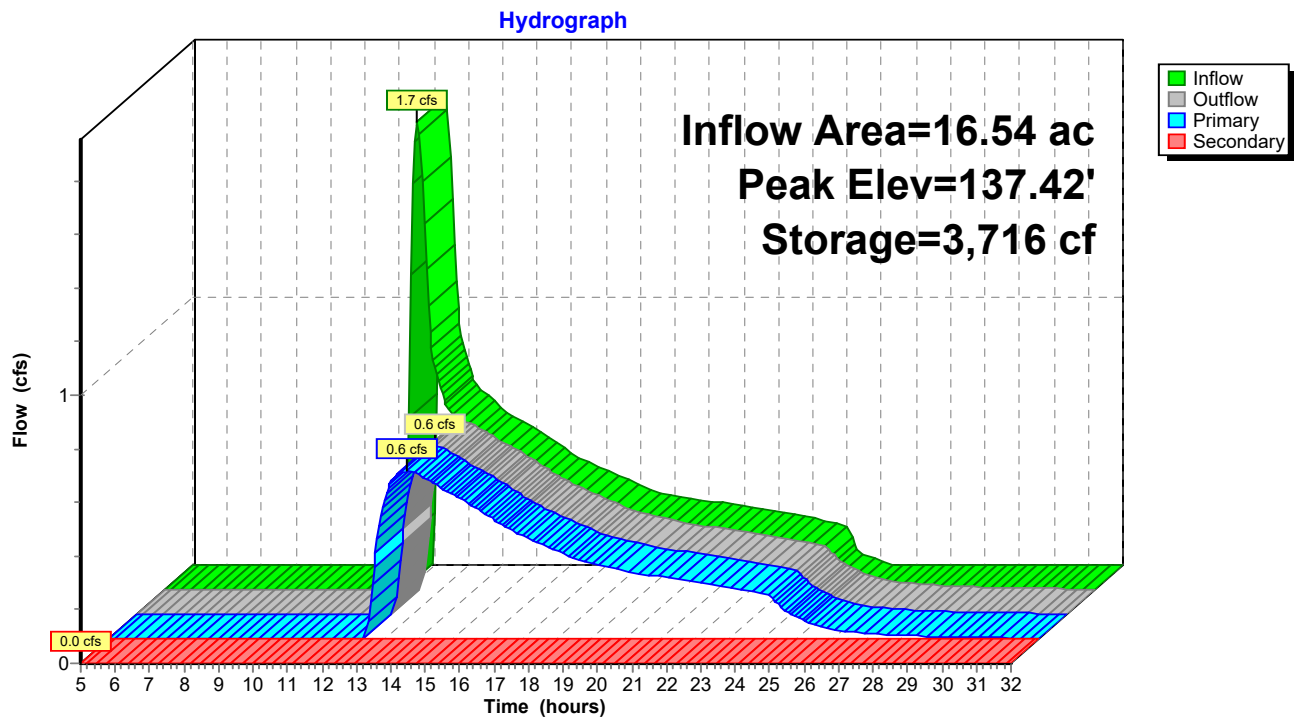
Primary OutFlow Max=0.6 cfs @ 13.68 hrs HW=137.42' (Free Discharge)

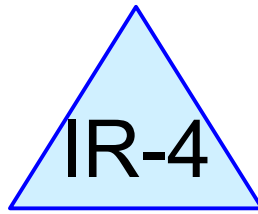
↑ **1=Culvert** (Inlet Controls 0.6 cfs @ 1.83 fps)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=136.00' (Free Discharge)

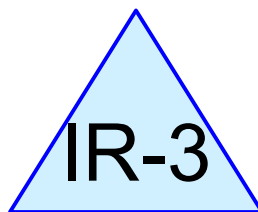
↑ **2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond WL-1: Wetland Series 'J'

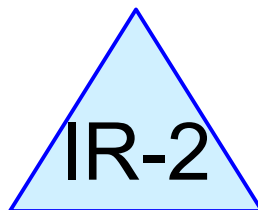




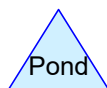
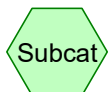
Isolator row for Sub-4



Isolator row for Sub-3



Isolator row for Sub-2



Routing Diagram for 23-10524 - Post - R2

Prepared by Civil Design Consultants, Inc, Printed 12/30/2024
HydroCAD® 10.20-5c s/n 06435 © 2023 HydroCAD Software Solutions LLC

Summary for Pond IR-2: Isolator row for Sub-2

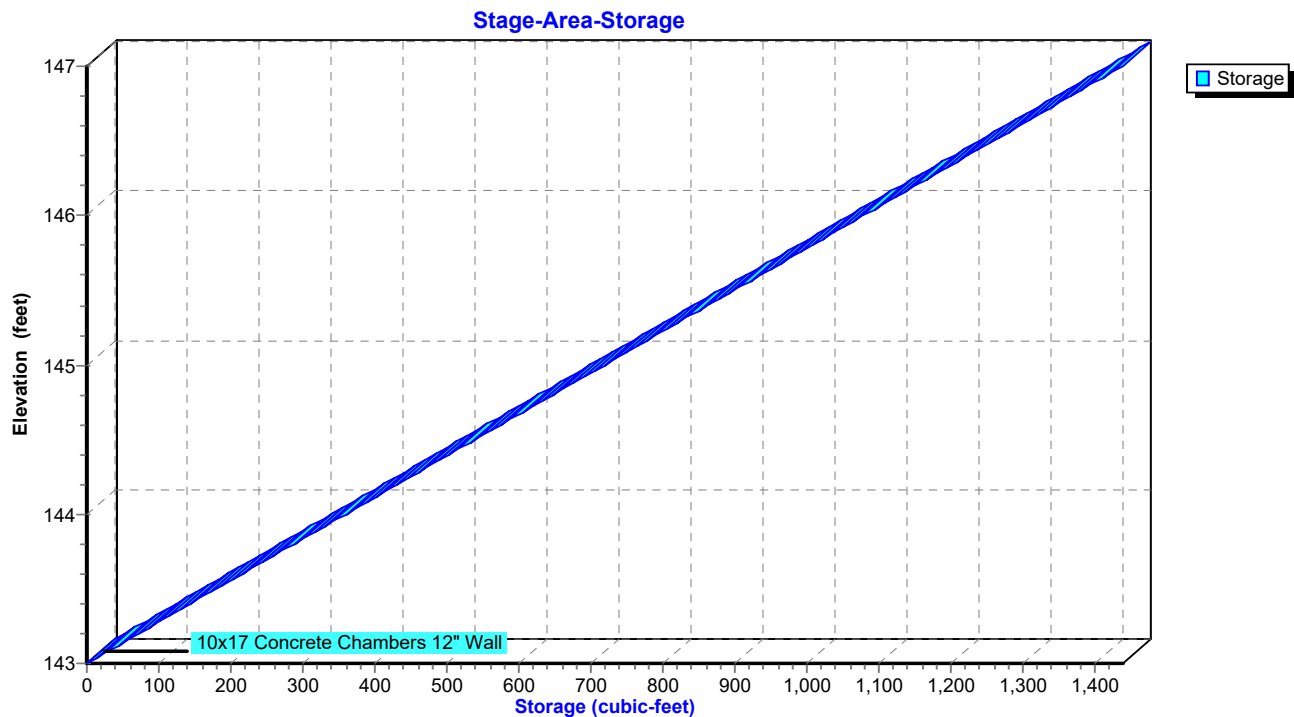
[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	1,440 cf	8.00'W x 15.00'L x 4.00'H 10x17 Concrete Chambers 12" Walk 3

Device	Routing	Invert	Outlet Devices
#1	Primary	145.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=0.00' (Free Discharge)

←1=Sharp-Crested Rectangular Weir(Controls 0.0 cfs)

Pond IR-2: Isolator row for Sub-2

Summary for Pond IR-3: Isolator row for Sub-3

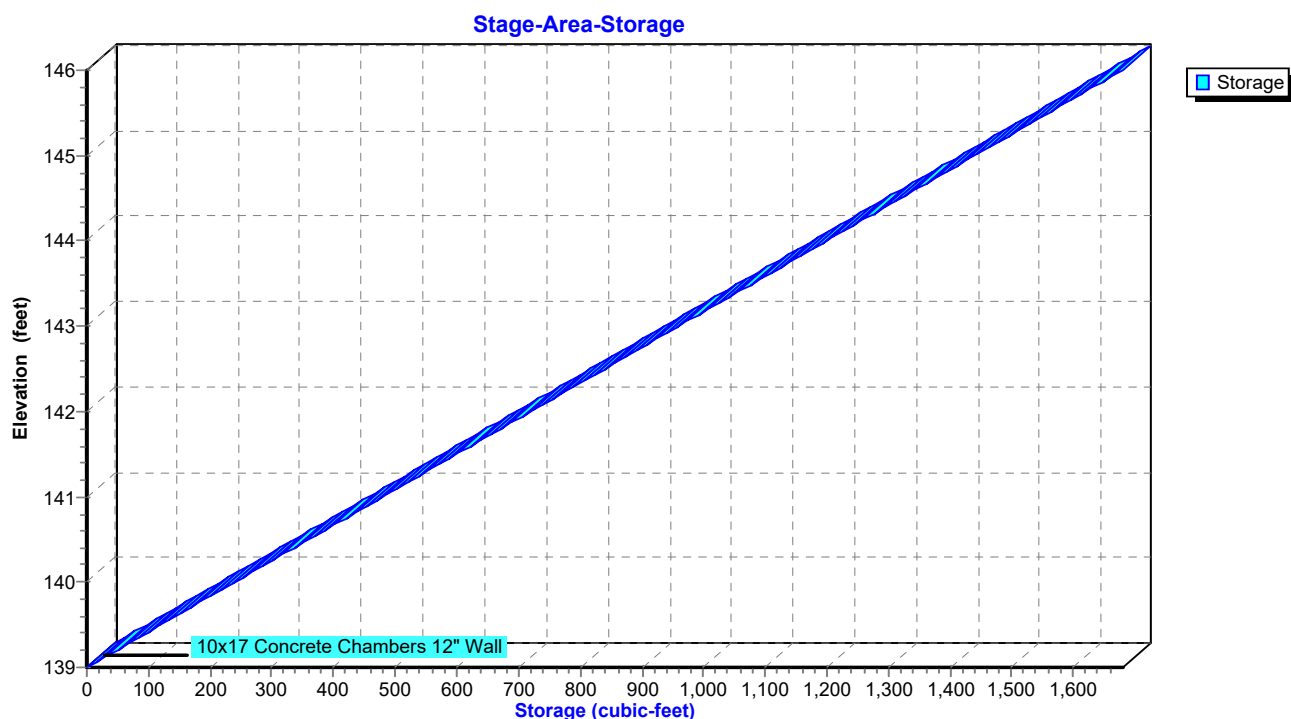
[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	139.00'	1,680 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 2

Device	Routing	Invert	Outlet Devices
#1	Primary	142.20'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=0.00' (Free Discharge)

↑1=Sharp-Crested Rectangular Weir(Controls 0.0 cfs)

Pond IR-3: Isolator row for Sub-3

Summary for Pond IR-4: Isolator row for Sub-4

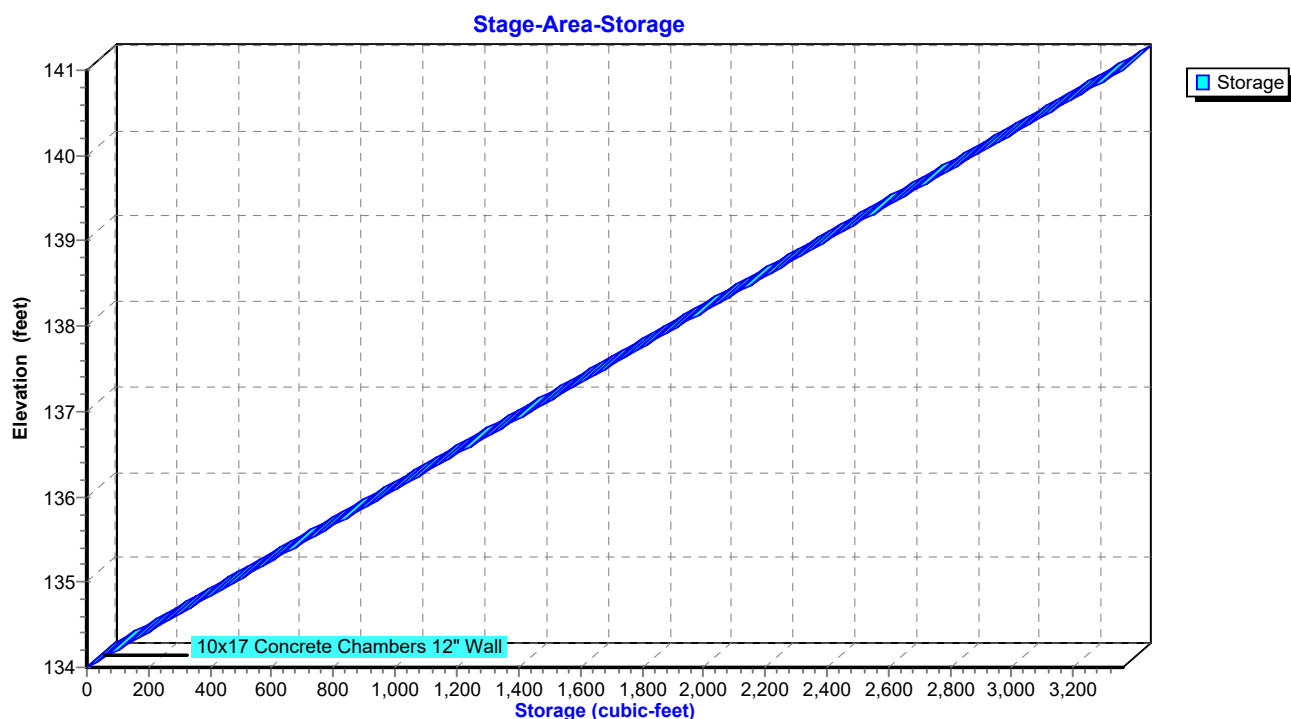
[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1	134.00'	3,360 cf	8.00'W x 15.00'L x 7.00'H 10x17 Concrete Chambers 12" Walk 4

Device	Routing	Invert	Outlet Devices
#1	Primary	137.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.0 cfs @ 5.00 hrs HW=0.00' (Free Discharge)

1=Sharp-Crested Rectangular Weir(Controls 0.0 cfs)

Pond IR-4: Isolator row for Sub-4

DRAINAGE REPORT

Murphy's Farm
Dracut, MA

TAB 5



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

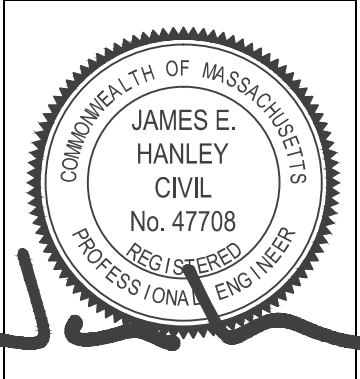

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

		December 30, 2024
<hr/>		
Signature and Date		

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☒ New development
- ☐ Redevelopment
- ☐ Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
 - ☐ Credit 1
 - ☐ Credit 2
 - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - ☒ Static
 - ☐ Simple Dynamic
 - ☐ Dynamic Field¹
- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- ☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☐ is within the Zone II or Interim Wellhead Protection Area
 - ☐ is near or to other critical areas
 - ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☐ Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - ☐ Limited Project
 - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
 - ☐ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☐ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☐ Description and delineation of public safety features;
 - ☒ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☐ An Illicit Discharge Compliance Statement is attached;
- ☒ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

Project: Murphy's Farm
Location: Dracut, MA
Client: The Homes at Murphy's Farm LLC

Project Number: 23-10524
Prepared By: Thomas Schomburg, EIT
Date: December 30, 2024

STORMWATER MANAGEMENT STANDARDS CALCULATIONS

Standard 1: Velocity & Rip-Rap Apron Sizing and Gradation Calculations

Outlet:	Q ₁₀ : (CFS)	Velocity (FPS)	Req'd	D _o : (FT)	L _A : (FT)	W ₁ : (FT)	W ₂ : (FT)	T _w : (FT)	d ₅₀ : (FT)
PFES-4	0.00	0.0	No	1	7.0	3.0	10.0	0.5	0.00
PFES-5	0.00	0.0	No	1	7.0	3.0	10.0	0.5	0.00
PFES-6	0.00	0.0	No	1	7.0	3.0	10.0	0.5	0.00
PFES-7	0.10	0.1	No	1	7.2	3.0	10.2	0.5	0.00
PFES-8	0.00	0.0	No	1	7.0	3.0	10.0	0.5	0.00
PFES-9	0.00	0.0	No	1	7.0	3.0	10.0	0.5	0.00

Conclusion: No point-source discharges require outlet protection during the 10 year storm event, however a riprap apron is still provided for each outfall. The Stormwater Management System conforms to Standard 1.

Standard 2: Peak Discharge Summary (CFS)

	2-Year (3.12-IN)	10-Year (4.90-IN)	25-Year (6.02-IN)	100-Year (7.73-IN)
Design Point 1				
Pre-Development Conditions:	0.0	0.1	0.5	2.2
Post Development Conditions:	0.0	0.1	0.4	1.9
Design Point 3				
Pre-Development Conditions:	0.0	0.0	0.0	0.2
Post Development Conditions:	0.0	0.0	0.0	0.1
Design Point 4				
Pre-Development Conditions:	0.0	0.0	0.0	0.2
Post Development Conditions:	0.0	0.0	0.0	0.2
Design Point 5				
Pre-Development Conditions:	0.0	0.0	0.3	2.0
Post Development Conditions:	0.0	0.0	0.3	0.7
Design Point 6				
Pre-Development Conditions:	0.0	0.0	0.0	0.2

Post Development Conditions:	0.0	0.0	0.0	0.2
	2-Year	10-Year	25-Year	100-Year
Design Point 7	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development Conditions:	0.0	0.0	0.0	0.3
Post Development Conditions:	0.0	0.0	0.0	0.3
	2-Year	10-Year	25-Year	100-Year
Design Point 8	(3.12-IN)	(4.90-IN)	(6.02-IN)	(7.73-IN)
Pre-Development Conditions:	0.0	0.0	0.1	0.4
Post Development Conditions:	0.0	0.0	0.1	0.4

Conclusion: The Stormwater Management System conforms to Standard 2.

Standard 3: Recharge Calculations (Static Method)

Infiltration Basin 1

Hydrologic Soils Group:	A	B	C	D	
Total Proposed Impervious Area:	4.29	0.09	0.00	0.00	4.38
Target Factor:	0.60	0.35	0.25	0.10	
Required Recharge Volume:	9,344	114	0	0	9,458 CF

Volume Below Lowest Outlet: 17,319 CF
Elevation of Lowest Invert: 139.40

Determine Drawdown Time

Saturated Hydraulic Conductivity (Rawls Rate): 8.27 IN/HR
Bottom Area of Infiltration Basin: 10,182 SF
Drawdown Time: 2.5 HRS

Subsurface System 2

Hydrologic Soils Group:	A	B	C	D	
Total Proposed Impervious Area:	1.55	0.05	0.00	0.00	1.60
Target Factor:	0.60	0.35	0.25	0.10	
Required Recharge Volume:	3,376	64	0	0	3,439 CF

Volume Below Lowest Outlet: 5,940 CF
Elevation of Lowest Invert: 138.10

Determine Drawdown Time

Saturated Hydraulic Conductivity (Rawls Rate): 8.27 IN/HR
Bottom Area of Infiltration Basin: 5,400 SF
Drawdown Time: 1.6 HRS

Subsurface System 3

Hydrologic Soils Group:	A	B	C	D	
Total Proposed Impervious Area:	2.02	0.00	0.00	0.00	2.02
Target Factor:	0.60	0.35	0.25	0.10	
Required Recharge Volume:	4,400	0	0	0	4,400 CF

Volume Below Lowest Outlet: 7,776 CF

Elevation of Lowest Invert: 140.80

Determine Drawdown Time

Saturated Hydraulic Conductivity (Rawls Rate): 8.27 IN/HR

Bottom Area of Infiltration Basin: 4,320 SF

Drawdown Time: 2.6 HRS

Subsurface System 4

Hydrologic Soils Group:	A	B	C	D	
Total Proposed Impervious Area:	3.34	0.00	0.00	0.00	3.34
Target Factor:	0.60	0.35	0.25	0.10	
Required Recharge Volume:	7,275	0	0	0	7,275 CF

Volume Below Lowest Outlet: 12,960 CF

Elevation of Lowest Invert: 135.80

Determine Drawdown Time

Saturated Hydraulic Conductivity (Rawls Rate): 8.27 IN/HR

Bottom Area of Infiltration Basin: 7,200 SF

Drawdown Time: 2.6 HRS

Capture Area Adjustment

Increase in Site Impervious: 11.57 Ac.

Impervious Draining to Basins: 11.34 Ac.

Adjusted Recharge Volume: 13,159 CF

Recharge Volume Provided: 43,995 CF

Percentage of Impervious Draining to Basins 98%

Conclusion: The volume provided below the lowest invert in the infiltration basin exceed the minimum recharge volume required. In addition, the basin drains within 72-HRS to comply with DEP regulations. The Stormwater Management System conforms to Standard 3.

Standard 4: Water Quality Volume Calculations

Infiltration Basin 1

Water Quality Depth: 1.0 IN

Total Proposed Impervious Area: 4.38 Acres

Required Water Quality Volume: 15,899 CF

Provided Water Quality Volume: 17,319 CF

Subsurface System 1

See Stormtech Cutsheet for WQV & TSS

Subsurface System 2

Water Quality Depth: 1.0 IN

Total Proposed Impervious Area: 1.60 Acres

Required Water Quality Volume: 5,808 CF

Provided Water Quality Volume: 5,940 CF

Subsurface System 3

Water Quality Depth:	1.0 IN
Total Proposed Impervious Area:	2.02 Acres
Required Water Quality Volume:	7,333 CF
Provided Water Quality Volume:	7,776 CF

Subsurface System 4

Water Quality Depth:	1.0 IN
Total Proposed Impervious Area:	3.34 Acres
Required Water Quality Volume:	12,124 CF
Provided Water Quality Volume:	12,960 CF

TSS Removal Rate Calculations

44% Pretreatment for Infiltration Basin 1:

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basin	25%	1	0.25	0.75
Sediment Forebay	25%	0.75	0.19	0.56
TSS Removed at Discharge from Pond:				44%

Treatment Provided at Discharge From Infiltration Basin 1

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basin	25%	1	0.25	0.75
Sediment Forebay & Infiltration Basin:	80%	0.75	0.60	0.15
TSS Removed at Discharge from Pond:				85.0%

Treatment Provided at Discharge From Subsurface-1

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basins	25%	1	0.25	0.75
Contech CDS	80%	0.75	0.60	0.15
TSS Removed at Discharge from Pond:				85.0%

44% Pretreatment for Subsurface-2:

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basin	25%	1	0.25	0.75
Isolator Row (Forebay)	25%	0.75	0.19	0.56
TSS Removed at Discharge from Pond:				44%

Treatment Provided at Discharge From Subsurface-2

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basins	25%	1	0.25	0.75
Subsurface Structure	80%	0.75	0.60	0.15
TSS Removed at Discharge from Pond:				85.0%

44% Pretreatment for Subsurface-3:

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basin	25%	1	0.25	0.75
Isolator Row (Forebay)	25%	0.75	0.19	0.56
TSS Removed at Discharge from Pond:				44%

Treatment Provided at Discharge From Subsurface-3

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basins	25%	1	0.25	0.75
Subsurface Structure	80%	0.75	0.60	0.15
TSS Removed at Discharge from Pond:				85.0%

44% Pretreatment for Subsurface-4:

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basin	25%	1	0.25	0.75
Isolator Row (Forebay)	25%	0.75	0.19	0.56
TSS Removed at Discharge from Pond:				44%

Treatment Provided at Discharge From Subsurface-4

	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Deep Sump Catch Basins	25%	1	0.25	0.75
Subsurface Structure	80%	0.75	0.60	0.15
TSS Removed at Discharge from Pond:				85.0%

Conclusion: The volume provided below the lowest invert in the infiltration basin and subsurface systems exceeds the Water Quality Volume and TSS Removal Rate is greater than 80%. BMPs with infiltration rates of greater than 2.41 in/hr have the required 44% TSS removal rate prior to infiltration. The Stormwater Management System conforms to Standard 4.

Standard 5: Land Uses With Higher Potential Pollutant Loads

Conclusion: The proposed use is not considered a Land Use with Higher Potential Pollutant Loads. This Standard is NOT Applicable.

Standard 6: Critical Areas

Conclusion: The project is not located within an Area of Critical Environmental Concern. Proposed BMPs and discharges are located outside of the 100-Ft buffer afforded to vernal pools. The Stormwater Management System conforms to Standard 4.

Standard 7: Redevelopment

Conclusion: The development does not meet the criteria for redevelopment.

Standard 8: Construction Period Controls

Conclusion: The project is covered by a NPDES Construction General Permit. No SWPPP has been prepared at this time but will be prepared prior to the start of construction. A Construction Period Pollution Prevention Plan has been prepared and provided. The Stormwater Management System Conforms to Standard 8.

Standard 9: Operations and Maintenance Plan

Conclusion: An Operations and Maintenance Plan has been prepared and provided with this summary. The Stormwater Management System Conforms to Standard 9.

Standard 10: Illicit Discharges to Drainage System

Conclusion: All off-site discharges are comprised entirely of stormwater. The Stormwater Management System Conforms to Standard 10.

Project: Murphy's Farm
Location: Dracut, MA
Client: The Homes at Murphy's Farm LLC

Project Number: 23-10524
Prepared By: Thomas Schomburg, EIT
Date: December 30, 2024

FOREBAY SIZING CALCULATIONS

Infiltration Basin 1 - Forebay PWA-5C

Watershed Characteristics

Impervious Area (Ai): 3.80 Acres

Required (0.1-IN x Ai): 1379 CF

Sediment Forebay Volume: 1487 CF

OK

Stage / Storage Tables

Sediment Forebay:	Elevation	Surface Area (SF)	Incremental Storage (CF)	Total Storage (CF)
	137.0	141	0	0
	140.0	850	1486.5	1486.5

Infiltration Basin 1 - Forebay PWA-5B

Watershed Characteristics

Impervious Area (Ai): 1.79 Acres

Required (0.1-IN x Ai): 650 CF

Sediment Forebay Volume: 727 CF

OK

Stage / Storage Tables

Sediment Forebay:	Elevation	Surface Area (SF)	Incremental Storage (CF)	Total Storage (CF)
	137.0	149	0	0
	139.0	578	727	727

Subsurface System 2 - Isolator Row

Watershed Characteristics

Impervious Area (Ai): 1.60 Acres

Required (0.1-IN x Ai): 581 CF

Sediment Forebay Volume: 720 CF

OK

Stage / Storage Tables

Isolator Row	Elevation	Surface Area (SF)	Incremental Storage (CF)	Total Storage (CF)
	143.0	360	0	0
	145.0	360	720	720

Subsurface System 3 - Isolator Row

Watershed Characteristics

Impervious Area (Ai): 2.02 Acres

Required (0.1-IN x Ai): 733 CF

Sediment Forebay Volume: 768 CF

OK

Stage / Storage Tables

Isolator Row	Elevation	Surface Area (SF)	Incremental Storage (CF)	Total Storage (CF)
	139.0	240	0	0
	142.2	240	768	768

Subsurface System 4 - Isolator Row

Watershed Characteristics

Impervious Area (Ai): 3.34 Acres

Required (0.1-IN x Ai): 1212 CF

Isolator Row Volume: 1440 CF

OK

Stage / Storage Tables

Isolator Row	Elevation	Surface Area (SF)	Incremental Storage (CF)	Total Storage (CF)
	134.0	480	0	0
	137.0	480	1440	1440

[illegible]

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

THE HOMES AT MURPHY'S FARM ANDOVER, MA

Area **0.24 ac**
Weighted C **0.9**
 t_c **6 min**
CDS Model **1515-3**

Unit Site Designation **CDS**
Rainfall Station # **67**

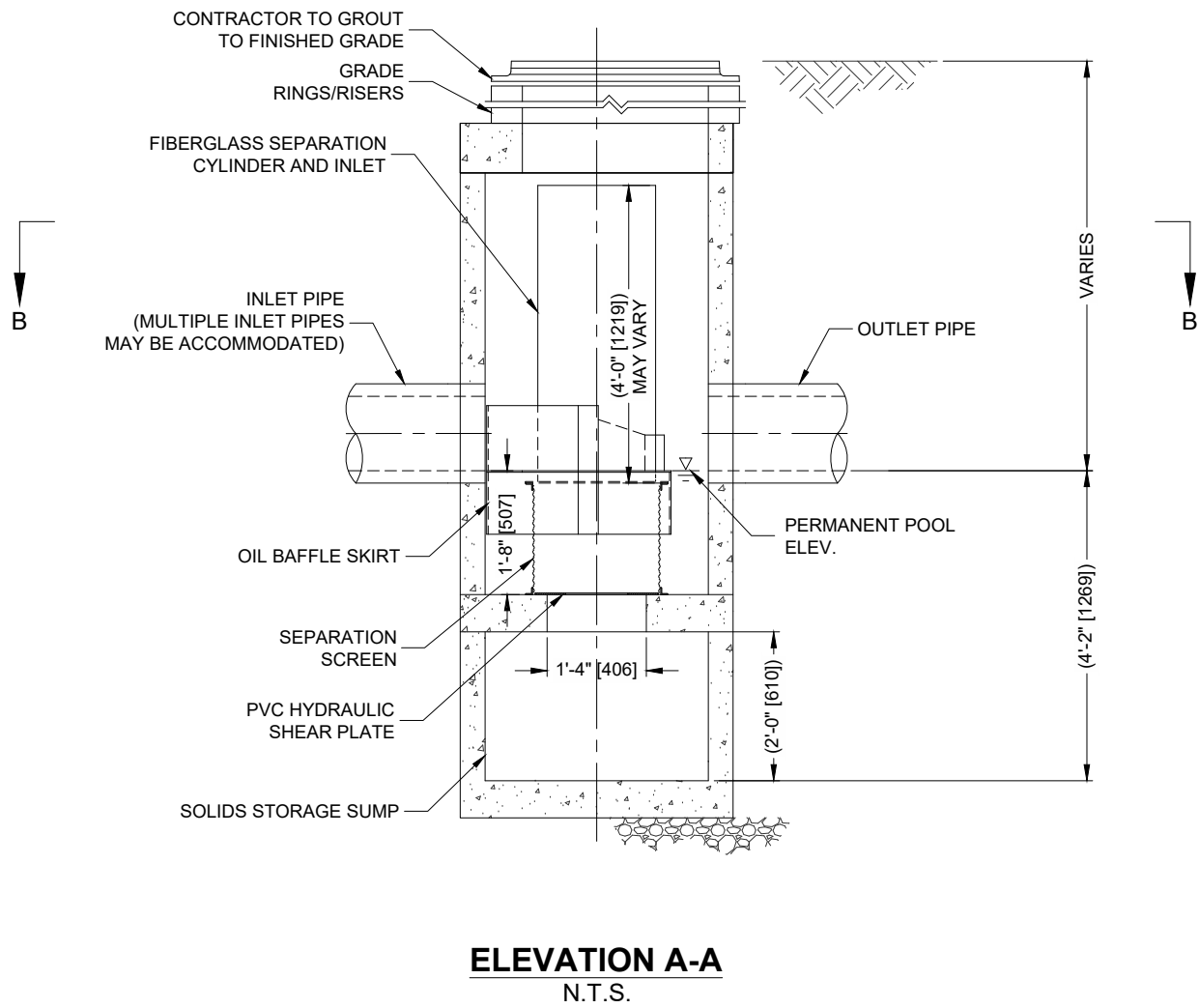
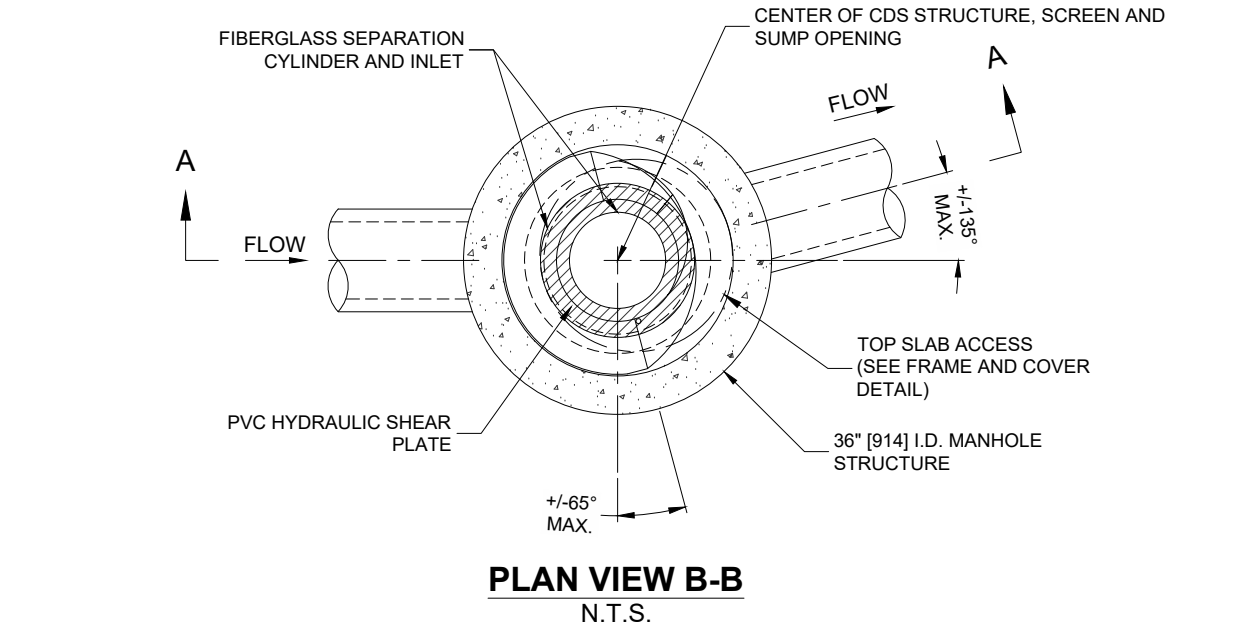
CDS Treatment Capacity **1.0 cfs**

<u>Rainfall Intensity¹</u> <u>(in/hr)</u>	<u>Percent Rainfall Volume¹</u>	<u>Cumulative Rainfall Volume</u>	<u>Total Flowrate (cfs)</u>	<u>Treated Flowrate (cfs)</u>	<u>Incremental Removal (%)</u>
0.08	41.0%	41.0%	0.02	0.02	39.4
0.16	23.9%	64.9%	0.03	0.03	22.6
0.24	11.5%	76.5%	0.05	0.05	10.8
0.32	7.4%	83.9%	0.07	0.07	6.9
0.40	4.4%	88.3%	0.09	0.09	4.1
0.48	2.9%	91.2%	0.10	0.10	2.6
0.56	1.8%	93.0%	0.12	0.12	1.6
0.64	1.2%	94.2%	0.14	0.14	1.0
0.72	1.6%	95.8%	0.16	0.16	1.4
0.80	0.8%	96.6%	0.17	0.17	0.7
1.00	0.6%	97.1%	0.22	0.22	0.5
1.40	1.4%	98.6%	0.31	0.31	1.1
1.80	0.9%	99.5%	0.39	0.39	0.6
2.20	0.5%	100.0%	0.48	0.48	0.3
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					93.6
Removal Efficiency Adjustment ² =					0.0%
Predicted % Annual Rainfall Treated =					100.0%
Predicted Net Annual Load Removal Efficiency =					93.6%

1 - Based on 7 years of data from NCDC station #3276, Groveland, Essex County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

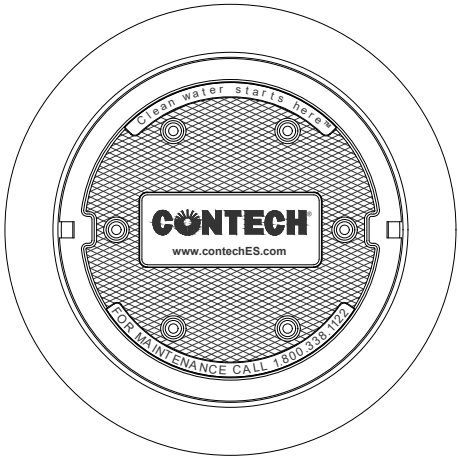
I:\AD.CONTECH\CPI.COM\ROOT\STORMWATER\URIS\DICTIONS\US\A\MAI_SDE DESIGN TOOLS\1_STANDARD DETAILS\CDS1515-3-C-DTL.DWG 8/6/2018 4:16 PM



THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,780,848; 6,641,720; 6,511,096; 6,581,789; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 1.0 CFS, OR PER LOCAL REGULATIONS.
THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC
DATA REQUIREMENTS

STRUCTURE ID				
WATER QUALITY FLOW RATE (CFS OR L/s)				*
PEAK FLOW RATE (CFS OR L/s)				*
RETURN PERIOD OF PEAK FLOW (YRS)				*
SCREEN APERTURE (2400 OR 4700)				*
PIPE DATA:		I.E.	MATERIAL	DIAMETER
INLET PIPE 1		*	*	*
INLET PIPE 2		*	*	*
OUTLET PIPE		*	*	*
RIM ELEVATION				*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT	
		*	*	
NOTES/SPECIAL REQUIREMENTS:				
* PER ENGINEER OF RECORD				

GENERAL NOTES

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
- CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
- STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
- IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
- CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS1515-3-C
ONLINE CDS
STANDARD DETAIL

Murphy's Farm

Proposed Peak Discharge Rates (Closed Drainage Design)

PCB-1

Cover Type	Area (ac)	C Value	C*A
Impervious	0.18	0.90	0.16
Lawn/Grass	0.18	0.20	0.04
Total	0.36	N/A	0.20

Composite C= 0.55

Q (cfs)
1.19

PCB-2

Cover Type	Area (ac)	C Value	C*A
Impervious	0.06	0.90	0.05
Lawn/Grass	0.03	0.20	0.01
Total	0.09	N/A	0.06

Composite C= 0.67

Q (cfs)
0.36

Cover Type	Area (ac)	C Value	C*A

Q (cfs)

PDMH-1

Cover Type	Area (ac)	C Value	C*A
Impervious	0.24	0.90	0.22
Lawn/Grass	0.21	0.20	0.04
Total	0.45	N/A	0.26

Composite C= 0.57

Q (cfs)
1.55

PCB-3

Cover Type	Area (ac)	C Value	C*A
Impervious	0.02	0.90	0.02
Lawn/Grass	0.02	0.20	0.00
Total	0.04	N/A	0.02

Composite C= 0.55

Q (cfs)
0.13

PCB-4

Cover Type	Area (ac)	C Value	C*A
Impervious	0.04	0.90	0.04
Lawn/Grass	0.01	0.20	0.00
Total	0.05	N/A	0.04

Composite C= 0.76

Q (cfs)
0.23

PDMH-2

Cover Type	Area (ac)	C Value	C*A
Impervious	0.06	0.90	0.05
Lawn/Grass	0.03	0.20	0.01
Total	0.09	N/A	0.06

Composite C= 0.67

Q (cfs)
0.36

PCB-5

Cover Type	Area (ac)	C Value	C*A
Impervious	0.44	0.90	0.40
Lawn/Grass	0.29	0.20	0.06
Total	0.73	N/A	0.45

Composite C= 0.62

Q (cfs)
2.72

PDMH-3A

Cover Type	Area (ac)	C Value	C*A
Impervious	2.35	0.90	2.12
Lawn/Grass	1.72	0.20	0.34
Total	4.07	N/A	2.46

Composite C= 0.60

Q (cfs)
14.75

PCB-6

Cover Type	Area (ac)	C Value	C*A
Impervious	0.78	0.90	0.70

Composite C= 0.50

Lawn/Grass	1.04	0.20	0.21
Total	1.82	N/A	0.91

Q (cfs)
5.46

PCB-7

Cover Type	Area (ac)	C Value	C*A
Impervious	0.23	0.90	0.21
Lawn/Grass	0.04	0.20	0.01
Total	0.27	N/A	0.22

Composite C= 0.80

Q (cfs)
1.29

PDMH-3B

Cover Type	Area (ac)	C Value	C*A
Impervious	1.91	0.90	1.72
Lawn/Grass	1.43	0.20	0.29
Total	3.34	N/A	2.01

Composite C= 0.60

Q (cfs)
12.03

PCB-8

Cover Type	Area (ac)	C Value	C*A
Impervious	0.41	0.90	0.37
Lawn/Grass	0.06	0.20	0.01
Total	0.47	N/A	0.38

Composite C= 0.81

Q (cfs)
2.29

PCB-9

Cover Type	Area (ac)	C Value	C*A
Impervious	0.49	0.90	0.44
Lawn/Grass	0.29	0.20	0.06
Total	0.78	N/A	0.50

Composite C= 0.64

Q (cfs)
2.99

PDMH-4

Cover Type	Area (ac)	C Value	C*A
Impervious	0.90	0.90	0.81
Lawn/Grass	0.35	0.20	0.07
Total	1.25	N/A	0.88

Composite C= 0.70

Q (cfs)
5.28

PCB-10

Cover Type	Area (ac)	C Value	C*A
Impervious	0.50	0.90	0.45
Lawn/Grass	0.66	0.20	0.13
Total	1.16	N/A	0.58

Composite C= 0.50

Q (cfs)
3.49

PCB-11

Cover Type	Area (ac)	C Value	C*A
Impervious	0.36	0.90	0.32
Lawn/Grass	0.07	0.20	0.01
Total	0.43	N/A	0.34

Composite C= 0.79

Q (cfs)
2.03

PDMH-5

Cover Type	Area (ac)	C Value	C*A
Impervious	0.86	0.90	0.77
Lawn/Grass	0.73	0.20	0.15
Total	1.59	N/A	0.92

Composite C= 0.58

Q (cfs)
5.52

PCB-12

Cover Type	Area (ac)	C Value	C*A
Impervious	0.24	0.90	0.22
Lawn/Grass	0.29	0.20	0.06
Total	0.53	N/A	0.27

Composite C= 0.52

Q (cfs)
1.64

PCB-13

Cover Type	Area (ac)	C Value	C*A
Impervious	0.34	0.90	0.31
Lawn/Grass	0.10	0.20	0.02
Total	0.44	N/A	0.33

Composite C= 0.74

Q (cfs)
1.96

PDMH-6

Cover Type	Area (ac)	C Value	C*A
Impervious	0.58	0.90	0.52
Lawn/Grass	0.39	0.20	0.08
Total	0.97	N/A	0.60

PDMH-15

Cover Type	Area (ac)	C Value	C*A
Impervious	1.44	0.90	1.30
Lawn/Grass	1.12	0.20	0.22
Total	2.56	N/A	1.52

PCB-30

Cover Type	Area (ac)	C Value	C*A
Impervious	0.00	0.90	0.00
Lawn/Grass	1.82	0.20	0.36
Total	1.82	N/A	0.36

PDMH-23

Cover Type	Area (ac)	C Value	C*A
Impervious	0.00	0.90	0.00
Lawn/Grass	1.82	0.20	0.36
Total	1.82	N/A	0.36

PCB-14

Cover Type	Area (ac)	C Value	C*A
Impervious	1.06	0.90	0.95
Lawn/Grass	0.14	0.20	0.03
Total	1.20	N/A	0.98

PCB-15

Cover Type	Area (ac)	C Value	C*A
Impervious	0.39	0.90	0.35
Lawn/Grass	0.04	0.20	0.01
Total	0.43	N/A	0.36

PDMH-7

Cover Type	Area (ac)	C Value	C*A
Impervious	1.45	0.90	1.31
Lawn/Grass	2.00	0.20	0.40
Total	3.45	N/A	1.71

PCB-16

Cover Type	Area (ac)	C Value	C*A
Impervious	0.06	0.90	0.05
Lawn/Grass	0.04	0.20	0.01
Total	0.10	N/A	0.06

PCB-17

Cover Type	Area (ac)	C Value	C*A
Impervious	0.38	0.90	0.34
Lawn/Grass	0.40	0.20	0.08
Total	0.78	N/A	0.42

PDMH-8

Cover Type	Area (ac)	C Value	C*A
Impervious	1.89	0.90	1.70
Lawn/Grass	2.44	0.20	0.49
Total	4.33	N/A	2.19

POS-3

Cover Type	Area (ac)	C Value	C*A
Impervious	#VALUE!	0.90	#VALUE!
Lawn/Grass	#VALUE!	0.20	#VALUE!
Total	#VALUE!	N/A	#VALUE!

PCB-18

Composite C= 0.62

Q (cfs)
3.60

Composite C= 0.59

Q (cfs)
9.12

Composite C= 0.20

Q (cfs)
2.18

Composite C= 0.20

Q (cfs)
2.18

Composite C= 0.82

Q (cfs)
5.89

Composite C= 0.83

Q (cfs)
2.15

Composite C= 0.49

Q (cfs)
10.23

Composite C= 0.62

Q (cfs)
0.37

Composite C= 0.54

Q (cfs)
2.53

Composite C= 0.51

Q (cfs)
13.13

Composite C= #VALUE!

Q (cfs)
#VALUE!

Cover Type	Area (ac)	C Value	C*A
Impervious	0.23	0.90	0.21
Lawn/Grass	0.10	0.20	0.02
Total	0.33	N/A	0.23

Composite C= 0.69

Q (cfs)
1.36

PCB-19

Cover Type	Area (ac)	C Value	C*A
Impervious	0.09	0.90	0.08
Lawn/Grass	0.00	0.20	0.00
Total	0.09	N/A	0.08

Composite C= 0.90

Q (cfs)
0.49

PDMH-9

Cover Type	Area (ac)	C Value	C*A
Impervious	0.32	0.90	0.29
Lawn/Grass	0.10	0.20	0.02
Total	0.42	N/A	0.31

Composite C= 0.73

Q (cfs)
1.85

PCB-20

Cover Type	Area (ac)	C Value	C*A
Impervious	0.96	0.90	0.86
Lawn/Grass	0.34	0.20	0.07
Total	1.30	N/A	0.93

Composite C= 0.72

Q (cfs)
5.59

PCB-21

Cover Type	Area (ac)	C Value	C*A
Impervious	0.99	0.90	0.89
Lawn/Grass	0.12	0.20	0.02
Total	1.11	N/A	0.92

Composite C= 0.82

Q (cfs)
5.49

PDMH-10

Cover Type	Area (ac)	C Value	C*A
Impervious	2.27	0.90	2.04
Lawn/Grass	0.56	0.20	0.11
Total	2.83	N/A	2.16

Composite C= 0.76

Q (cfs)
12.93

PDMH-11

Cover Type	Area (ac)	C Value	C*A
Impervious	2.27	0.90	2.04
Lawn/Grass	0.56	0.20	0.11
Total	2.83	N/A	2.16

Composite C= 0.76

Q (cfs)
12.93

PCB-22

Cover Type	Area (ac)	C Value	C*A
Impervious	0.32	0.90	0.29
Lawn/Grass	0.04	0.20	0.01
Total	0.36	N/A	0.30

Composite C= 0.82

Q (cfs)
1.78

PCB-23

Cover Type	Area (ac)	C Value	C*A
Impervious	0.53	0.90	0.48
Lawn/Grass	0.07	0.20	0.01
Total	0.60	N/A	0.49

Composite C= 0.82

Q (cfs)
2.95

PDMH-12

Cover Type	Area (ac)	C Value	C*A
Impervious	3.12	0.90	2.81
Lawn/Grass	0.67	0.20	0.13
Total	3.79	N/A	2.94

Composite C= 0.78

Q (cfs)
17.65

PCB-24

Cover Type	Area (ac)	C Value	C*A
Impervious	0.31	0.90	0.28
Lawn/Grass	0.03	0.20	0.01
Total	0.34	N/A	0.29

Composite C= 0.84

Q (cfs)
1.71

PCB-25

Cover Type	Area (ac)	C Value	C*A
Impervious	0.07	0.90	0.06
Lawn/Grass	0.01	0.20	0.00
Total	0.08	N/A	0.07

Composite C= 0.81

Q (cfs)
0.39

PDMH-13

Cover Type	Area (ac)	C Value	C*A
Impervious	3.50	0.90	3.15
Lawn/Grass	0.71	0.20	0.14
Total	4.21	N/A	3.29

Composite C= 0.78

Q (cfs)
19.75

PCB-29

Cover Type	Area (ac)	C Value	C*A
Impervious	0.00	0.90	0.00
Lawn/Grass	0.80	0.20	0.16
Total	0.80	N/A	0.16

Composite C= 0.20

Q (cfs)
0.96

PDMH-18

Cover Type	Area (ac)	C Value	C*A
Impervious	1.44	0.90	1.30
Lawn/Grass	1.92	0.20	0.38
Total	3.36	N/A	1.68

Composite C= 0.50

Q (cfs)
10.08

Closed Drainage System Calculations

Location Murphy's Farm, Dracut, MA
 Client The Homes at Murphy's Farm LLC
 Subject Closed Drainage System Calculations

Proj. No. 23-10524
 Date 12/20/2024 Design Storm 10 Year Storm
 Comp. TWS "Min. Pipe Size
 Check
 Location in Massachusetts 1 (1-Boston, 2-Barnstable, 3-Worcester, 4-Springfield, 5-Pittsfield)
 Manning's roughness coefficient 0.013

Rainfall Data is For **Boston**

LOCATION		RAINFALL CONCENTRATION PERIOD IN MINUTES		COMBINED RUNOFF COEFF.	TRIBUTARY AREA IN ACRES		C x A		RAINFALL INTENSITY (i)	PEAK FLOW	PIPE								PROFILE			
FROM DRAINAGE NO.	TO DRAINAGE NO.	PIPE	TOTAL	C	INC	TOTAL	INC	TOTAL	IN/HR	CFS	SIZE	n VALUE	SLOPE	LENGTH	FULL CAPACITY	FULL VELOCITY	PEAK FLOW CONDITIONS	VELOCITY	INVERT ELEVATION	UPPER END	LOWER END	RIM ELEVATION & DEPTH OF COVER
																	FT/S	d/D				
PCB-1	PDMH-1		5.00	0.55	0.360	0.360	0.20	0.20	5.40	1.07	12	0.013	0.005	19	2.52	3.2	3.1	0.45				
PCB-2	PDMH-1		5.00	0.67	0.090	0.090	0.06	0.06	5.40	0.33	12	0.013	0.005	11	2.52	3.2	2.1	0.23				
PDMH-1	SUBSURFACE-1	0.09	5.10			0.450	0.00	0.26	5.40	1.39	12	0.013	0.005	10	2.52	3.2	3.3	0.53				
PCB-3	PDMH-2		5.00	0.55	0.040	0.040	0.02	0.02	5.40	0.12	12	0.013	0.005	8	2.52	3.2	1.5	0.13				
PCB-4	PDMH-2		5.00	0.76	0.050	0.050	0.04	0.04	5.40	0.21	12	0.013	0.005	14	2.52	3.2	1.9	0.19				
PDMH-2	PFES-1	0.12	5.09			0.090	0.00	0.06	5.40	0.32	12	0.013	0.005	91	2.52	3.2	2.1	0.23				
PCB-12	PDMH-6		5.00	0.52	0.530	0.530	0.28	0.28	5.40	1.49	12	0.013	0.005	13	2.52	3.2	3.3	0.55				
PCB-13	PDMH-6		5.00	0.74	0.440	0.440	0.33	0.33	5.40	1.76	12	0.013	0.005	13	2.52	3.2	3.5	0.61				
PDMH-6	PDMH-15	0.07	5.07			0.970	0.00	0.60	5.40	3.25	15	0.013	0.005	144	4.57	3.7	4.0	0.62				
PCB-10	PDMH-5		5.00	0.50	1.160	1.160	0.58	0.58	5.40	3.13	12	0.013	0.010	14	3.56	4.5	5.1	0.72				
PCB-11	PDMH-5		5.00	0.79	0.430	0.430	0.34	0.34	5.40	1.83	12	0.013	0.005	11	2.52	3.2	3.5	0.63				
PDMH-5	PDMH-15	0.05	5.66			1.590	0.00	1.52	5.40	8.21	18	0.013	0.010	100	10.50	5.9	6.6	0.66				
PCB-8	PDMH-4		5.00	0.81	0.470	0.470	0.38	0.38	5.40	2.06	12	0.013	0.005	12	2.52	3.2	3.6	0.68				
PCB-9	PDMH-4		5.00	0.64	0.780	0.780	0.50	0.50	5.40	2.70	12	0.013	0.010	11	3.56	4.5	5.0	0.65				
PDMH-4	PDMH-3B	0.04	5.91			1.250	0.00	2.40	5.40	12.96	24	0.013	0.005	170	15.99	5.1	5.7	0.68				
PCB-6	PDMH-3B		5.00	0.50	1.820	1.820	0.91	0.91	5.40	4.91	15	0.013	0.010	15	6.46	5.3	5.8	0.65				
PCB-7	PDMH-3B		5.00	0.80	0.270	0.270	0.22	0.22	5.40	1.17	12	0.013	0.005	11	2.52	3.2	3.1	0.47				
PDMH-3B	PDMH-3A	0.06	6.41			3.340	0.00	3.53	5.20	18.34	24	0.013	0.015	24	27.70	8.8	9.4	0.59				
PCB-5	PDMH-3A		5.00	0.62	0.730	0.730	0.45	0.45	5.40	2.44	12	0.013	0.005	26	2.52	3.2	3.7	0.79				
PDMH-3A	PFES-3	0.12	6.46			4.070	0.00	3.98	5.20	20.69	24	0.013	0.010	152	22.61	7.2	8.2	0.75				
PCB-26	1B-1		5.00	0.58	2.700	2.700	1.57	1.57	5.40	8.46	18	0.013	0.029	34	17.88	10.1	9.8	0.48				
PCB-30	PDMH-23		5.00	0.20	1.820	1.820	0.36	0.36	5.40	1.97	12	0.013	0.005	77	2.52	3.2	3.5	0.66				
PCB-14	PDHM-7		5.00	0.82	1.200	1.200	0.98	0.98	5.40	5.31	15	0.013	0.010	27	6.46	5.3	5.9	0.69				

PCB-15	PDMH-7		5.00	0.83	0.430	0.430	0.36	0.36	5.40	1.93	15	0.013	0.010	27	6.46	5.3	4.6	0.37				
PDMH-7	PDMH-8	0.08	5.08			3.450	0.00	1.70	5.40	9.21	18	0.013	0.009	123	9.96	5.6	6.4	0.75				
PCB-16	PDMH-8		5.00	0.62	0.100	0.100	0.06	0.06	5.40	0.33	12	0.013	0.007	35	2.94	3.7	2.4	0.21				
PCB-17	PDMH-8		5.00	0.54	0.780	0.780	0.42	0.42	5.40	2.27	12	0.013	0.007	38	2.89	3.7	4.1	0.66				
PDMH-8	Subsurface	0.25	5.40			4.330	0.00	2.19	5.40	11.82	18	0.013	0.018	15	13.97	7.9	8.9	0.70				
PCB-18	PDMH-9		5.00	0.69	0.330	0.330	0.23	0.23	5.40	1.23	12	0.013	0.005	22	2.52	3.2	3.2	0.49				
PCB-19	PDMH-9		5.00	0.90	0.090	0.090	0.08	0.08	5.40	0.44	12	0.013	0.005	29	2.52	3.2	2.3	0.27				
PDMH-9	PDMH-10	0.21	5.12			0.420	0.00	0.31	5.40	1.67	12	0.013	0.005	192	2.52	3.2	3.4	0.59				
PCB-20	PDMH-10		5.00	0.72	1.300	1.300	0.94	0.94	5.40	5.05	15	0.013	0.010	14	6.46	5.3	5.8	0.66				
PCB-21	PDMH-10		5.00	0.82	1.110	1.110	0.91	0.91	5.40	4.92	15	0.013	0.010	13	6.46	5.3	5.8	0.65				
PDMH-10	PDMH-11	0.04	6.05			2.830	0.00	2.15	5.20	11.21	24	0.013	0.005	143	15.99	5.1	5.5	0.61				
PDMH-11	PDMH-12	0.04	6.49			2.830	0.00	2.15	5.20	11.21	24	0.013	0.005	142	15.99	5.1	5.5	0.61				
PCB-22	PDMH-12		5.00	0.82	0.360	0.360	0.30	0.30	5.40	1.59	12	0.013	0.005	27	2.52	3.2	3.4	0.57				
PCB-23	PDMH-12		5.00	0.82	0.600	0.600	0.49	0.49	5.40	2.66	12	0.013	0.010	39	3.56	4.5	5.0	0.64				
PDMH-12	PDMH-13	0.13	6.92			3.790	0.00	2.94	5.20	15.30	24	0.013	0.006	121	16.92	5.4	6.1	0.74				
PCB-24	PDMH-13		5.00	0.84	0.340	0.340	0.29	0.29	5.40	1.54	12	0.013	0.007	11	2.87	3.7	3.7	0.52				
PCB-25	PDMH-13		5.00	0.81	0.080	0.080	0.06	0.06	4.75	0.31	12	0.013	0.006	12	2.83	3.6	2.3	0.21				
PDMH-13	PDMH-21	0.05	7.25			4.210	0.00	3.29	4.75	15.64	24	0.013	0.010	18	23.06	7.3	7.9	0.60				
PCB-29	PDMH-18		5.00	0.20	0.800	0.800	0.16	0.16	4.75	0.76	12	0.013	0.005	13	2.52	3.2	2.8	0.37				
PDMH-15	PDMH-18	0.08	5.08	0.59	2.560	3.360	1.51	1.67	4.75	7.93	18	0.013	0.008	93	9.09	5.1	5.8	0.72				

Project: Murphy's Farm
Client: The Homes at Murphy's Farm LLC
Project Number: 24-10524

Prepared By: TWS
Checked By: WJH
Date: 12/30/24

344 North Main Street | Andover • MA 01810
(978) 416-0920 | www.civildci.com

GRATE INLET CAPACITY CALCULATION SHEET

Design Criteria

Orifice Flow

$$Q = 0.0108A \cdot d^{0.5}$$

Weir Flow

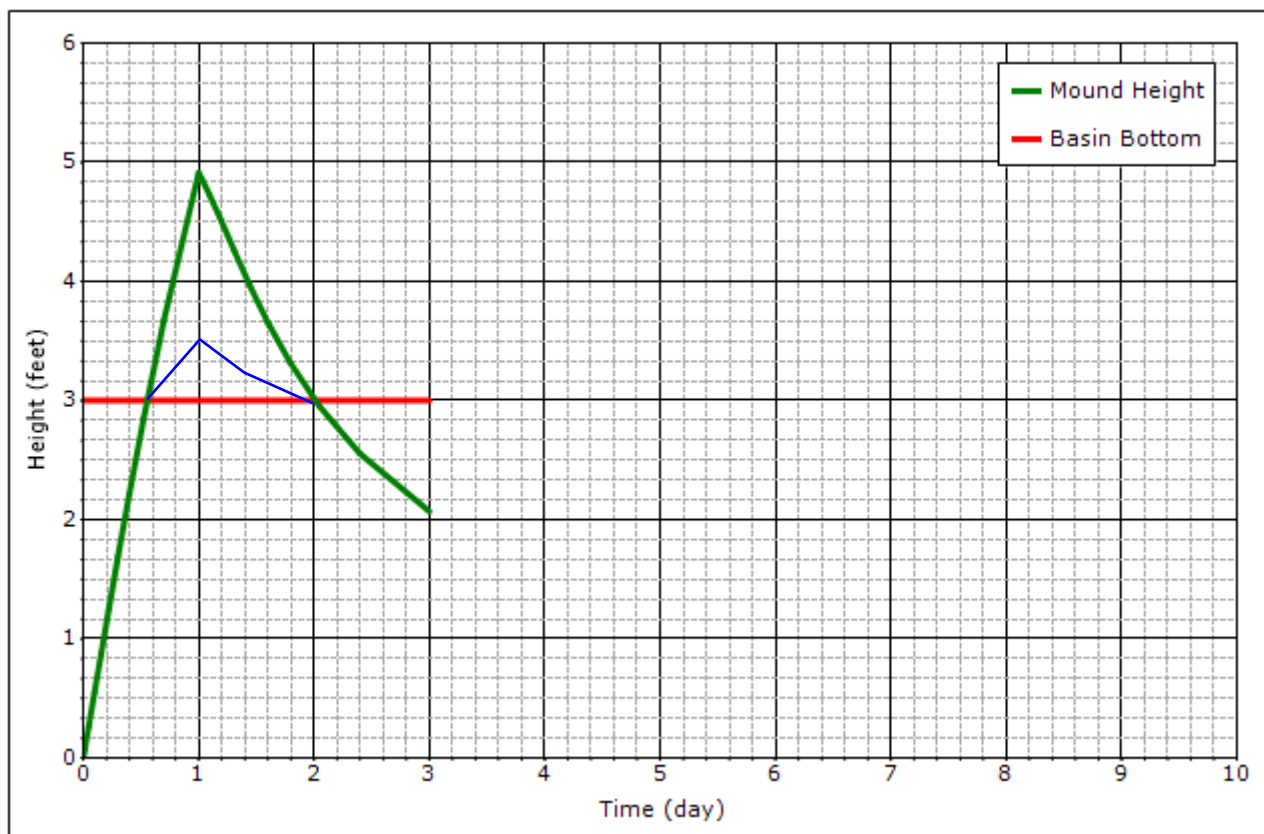
$$Q = 3.33L(H)^{1.5}$$

Where,

- A = the open area in the grate (square inches)
- d = the depth of water over the grate (inches)
- L = the perimeter of the grate (feet)
- H = the gutter depth of water (feet)
- Q = the grate capacity (CFS)

Structure	Low Point	A	d	L	H	Q
PCB-1-5	no			8	0.22	2.7
PCB-6 (Dbl.)	no			12	0.22	4.1
PCB-7-9	no			8	0.22	2.7
PCB-10 (Dbl.)	no			12	0.22	4.1
PCB-11-13	no			8	0.22	2.7
PCB-14-15	yes	212	6			5.6
PCB-16-19	no			8	0.22	2.7
PCB-20-21	yes	212	6			5.6
PCB-22-23	no			8	0.22	2.7
PCB-24-25	yes	212	6			5.6
PCB-26	yes	212	6			5.6
PCB-29	yes	212	6			5.6

Groundwater Mounding Analysis (Hantush Method using Glover's Solution)



Company: Civil Design
 Project: Consultants, Inc
 Murphy's Farm 1B-1
 Analyst: Thomas Schomburg
 Date: 12/30/2024

Recharge Basin Dimensions

Length (w): 90 ft
 Width (l): 110 ft
 Bottom Area: 9,900 ft²
 SHGW Separation: 3 ft

Recharge Rate Calculations

Duration (t): 1 d
 Volume (V): 17,319 ft³
 Rate (R): 1.7 ft/d
 Total Simulation Time: 3 d

Aquifer Characteristics

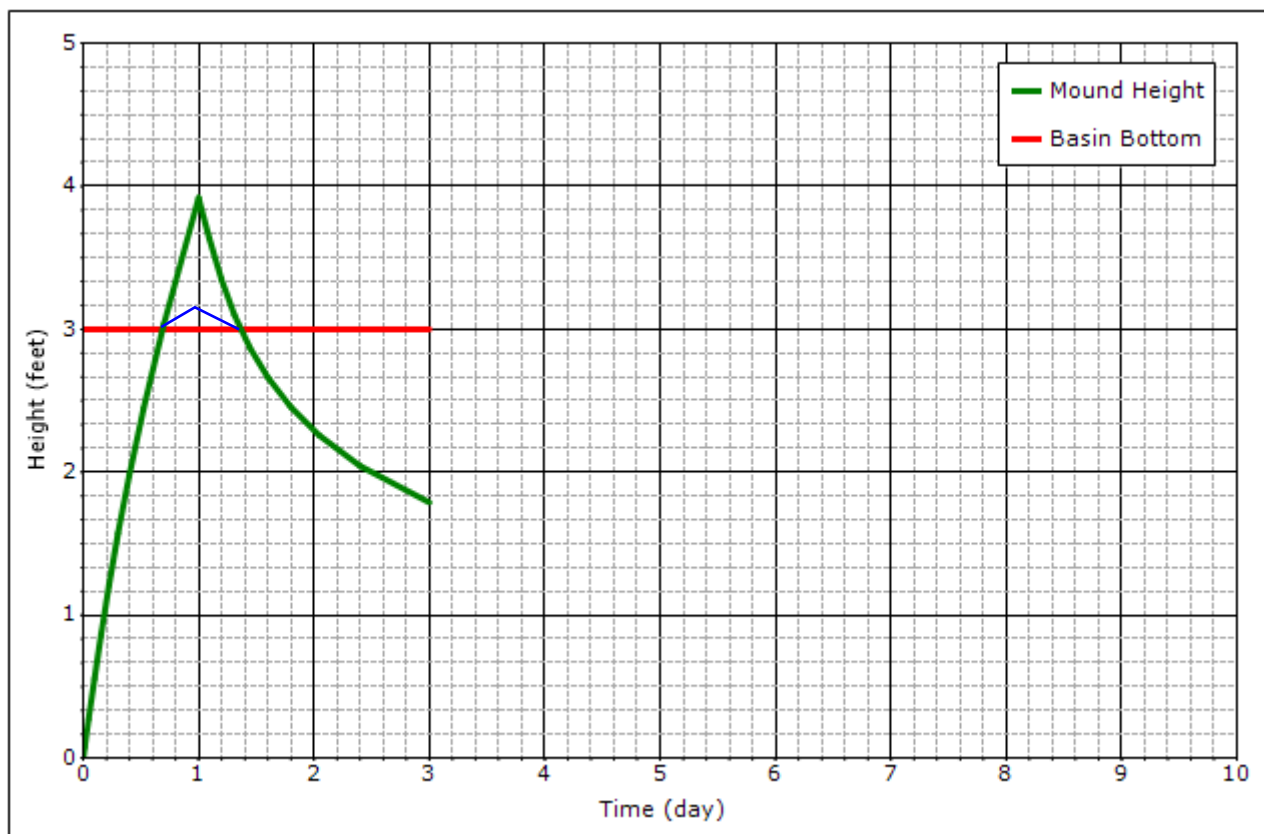
Hydraulic Conductivity (Kh): 41.35 ft/d
 Drainable Porosity(Sy): 0.3
 Saturated Thickness (h): 5 ft

Plot Geometry

X-Coordinate: 0 ft
 Y-Coordinate: 0 ft
 Left Side Plot Distance (DI): 0 ft
 Right Side Plot Distance (Dr): 0 ft
 Plot Angle From Y-Axis (Φ): 0
 Constant Head Boundary: No

<u>Time (d)</u>	<u>Height (ft)</u>
0.00	0.0000
0.01	0.0748
0.05	0.2595
0.10	0.5491
0.15	0.8775
0.22	1.2542
0.30	1.6932
0.40	2.2135
0.52	2.8502
0.70	3.6767
1.00	4.9135
1.03	4.8630
1.09	4.7326
1.19	4.5138
1.31	4.2558
1.44	3.9662
1.60	3.6517
1.80	3.3157
2.05	2.9548
2.40	2.5555
3.00	2.0708

Groundwater Mounding Analysis (Hantush Method using Glover's Solution)



Company: Civil Design
 Project: Consultants, Inc
 Murphy's Farm
 Subsurface System-3
 Analyst: Thomas Schomburg
 Date: 12/30/2024

Recharge Basin Dimensions

Length (w): 200 ft
 Width (l): 20 ft
 Bottom Area: 4,000 ft²
 SHGW Separation: 3 ft

Recharge Rate Calculations

Duration (t): 1 d
 Volume (V): 7,776 ft³
 Rate (R): 1.8 ft/d
 Total Simulation Time: 3 d

Aquifer Characteristics

Hydraulic Conductivity (Kh): 41.35 ft/d
 Drainable Porosity(Sy): 0.3
 Saturated Thickness (h): 1 ft

Plot Geometry

X-Coordinate: 0 ft
 Y-Coordinate: 0 ft
 Left Side Plot Distance (DI): 0 ft
 Right Side Plot Distance (Dr): 0 ft
 Plot Angle From Y-Axis (Φ): 0
 Constant Head Boundary: No

<u>Time (d)</u>	<u>Height (ft)</u>
0.00	0.0000
0.01	0.0792
0.05	0.2723
0.10	0.5558
0.15	0.8682
0.22	1.2071
0.30	1.5729
0.40	1.9773
0.52	2.4473
0.70	3.0387
1.00	3.9198
1.03	3.8328
1.09	3.6371
1.19	3.3571
1.31	3.0995
1.44	2.8709
1.60	2.6603
1.80	2.4587
2.05	2.2574
2.40	2.0439
3.00	1.7883

LONG TERM OPERATIONS AND MAINTENANCE PROGRAM

December 30, 2024

This Long-Term Operations and Maintenance Program Plan has been prepared in accordance with the Stormwater Management Policy issued by the Department of Environmental Protection (DEP) for the proposed multi-family residential development located at Murphy's Farm in Dracut, MA. Upon a period beginning twelve months after the completion of the roadway, all structural BMP's shall be inspected twice annually, once in April and once in November. The inspection shall be performed as indicated below:

Street Sweeping

Street sweeping can be an effective method to reduce pollutant loading in runoff generated from pavement. Street sweeping shall be performed quarterly, using a high efficiency vacuum sweeper or regenerative air sweeper, with sweeping scheduled primarily in the spring and fall.

Snow Storage / Removal

Snow plowed from the proposed roadway will be placed or disposed of in accordance with the policy developed by DEP. Under no circumstances shall snow plowed or removed from the road be stockpiled within wetland resource areas. If conditions arise where snow storage areas are at capacity the Operator is required to remove and dispose of snow off site in conformance with all local, state and federal regulations.

Catch Basins

Catch basins shall be inspected and/or cleaned at least four times per year and at the end of the foliage and snow removal seasons. Sediment shall be removed four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Sediment shall be removed and disposed of with a truck-mounted vacuum unit or other appropriate apparatus. The sediment will be disposed of at an approved offsite location in accordance with all applicable local, state, and federal regulations.

Drainage Outfalls

The outlets of the storm water management system will be inspected biannually. Any evidence of erosion or other damage will be reported to the appropriate town representative and repaired as soon as possible. Any sediment should be removed from the outlet structures.

Sediment Forebay

Sediments and associated pollutants are removed only when sediment forebays are actually cleaned out, so regular maintenance is essential. Frequently removing accumulated sediments will make it less likely that sediments will be re-suspended. At a minimum, inspect sediment forebays monthly and clean them out at least four times per year. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. When mowing grasses, keep the grass height no greater than 6 inches. Set mower blades no lower than 3 to 4 inches. Check for signs of riling and gullyng and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay while the seeds germinate and develop roots.

Infiltration/Detention Basin

Infiltration basins are prone to clogging and failure, so it is imperative to develop and implement aggressive maintenance plans and schedules. Installing the required pretreatment BMPs will significantly reduce maintenance requirements for the basin. Inspections and preventive maintenance must be performed at least twice a year.

Once the basin is in use, inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary, take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration

capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots).

Thereafter, inspect the infiltration basin at least twice per year. Important items to check during the inspection include:

- Signs of differential settlement,
- Cracking,
- Erosion,
- Leakage in the embankments,
- Tree growth on the embankments,
- Condition of riprap,
- Operation of the drawdown device,
- Sediment accumulation and
- The health of the turf.

At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces and revegetate immediately. Remove sediment from the basin as necessary but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer to not compact the underlying soil. Deeply till the remaining soil and revegetate as soon as possible. Inspect and clean pretreatment devices associated with basins at least twice a year, and ideally every other month.

Stormceptor (CDS)

Inspection and Maintenance is fundamental to the long-term performance of a Stormceptor oil/grit separator system. Stormceptors should be inspected post construction, prior to the discharge of any stormwater. Additional inspections should occur every 6 months for the first year to determine the sediment accumulation rate. After the first year, inspections should occur based on first-year observations or local requirements, whichever is stricter. Cleanings should be performed with a standard vacuum truck.

Subsurface Infiltration Systems

The subsurface infiltration systems shall be inspected twice annually, once in April and once in November. Any and all debris and/or sediments shall be removed from the units and be disposed of at an approved offsite location in accordance with all applicable local, state, and federal regulations.

Mosquito Control Plan

Mosquito pupae and larvae need at least four days of ponded water to emerge as adults. Ensure that Infiltration Basin maintenance is performed as required so that the period of infiltration is less than 72 hours per DEP requirements.

Owner:

The Homes At Murphy's Farm, LLC
(c/o Kevin O'Brien)
18 Cassimere Street
Andover, MA 01810

Applicant / Responsible Party (During Construction):

The Homes At Murphy's Farm, LLC
(c/o Kevin O'Brien)
18 Cassimere Street
Andover, MA 01810

Responsible Party (After Construction):

A Homeowners Association shall be created and shall be responsible for the maintenance of the stormwater basins, catch basins, and stormceptors.

Construction Period Pollution Prevention Plan:

A Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to construction to address the project's NPDES obligations with the EPA. The SWPPP will address the requirements of the Construction Period Pollution Prevention Plan.

System Map:

See Comprehensive Permit Site Plan for Murphy's Farm for the location of all stormwater management facilities.

Estimated Operations and Maintenance Budget

It is anticipated that the stormwater management system will require an annual budget of \$10,000 to maintain.

CDS[®] Inspection and Maintenance Guide



Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

©2017 Contech Engineered Solutions LLC, a QUIKRETE Company

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treatment products. For information, visit www.ContechES.com or call 800.338.1122

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS AN EXPRESSED WARRANTY OR AN IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. SEE THE CONTECH STANDARD CONDITION OF SALES (VIEWABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

[illegible]

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

TEST PIT LOGS

Address: Murhpy's Farm, Dracut, MA

Date: 12/7/2023

S.E.: William Hall

Witness: Tina Rivard

Note: Areas where test pits were performed have been stripped of top and subsoil.

CDCI-1

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-120	C	10YR5/4	Coarse Sand

Many cobbles and stones

Not mottling observed

No water observed

CDCI-3

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-156	C	10YR5/4	Coarse Sand

Many cobbles and stones

Not mottling observed

No water observed

CDCI-5

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-126	C	10YR5/4	Coarse Sand

Many cobbles and stones

Not mottling observed

No water observed

CDCI-7

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-72	Sandy Fill	-----	-----

Not mottling observed

No water observed

Ledge encountered at 72"

CDCI-9

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-102	C1	10YR5/4	Coarse Sand
102-144	C2	10YR6/3	Loamy Sand

Many cobbles and stones in C1 layer

Not mottling observed

No water observed

CDCI-2

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-132	C	10YR5/4	Coarse Sand

Many cobbles and stones

Not mottling observed

No water observed

CDCI-4

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-120	C	10YR5/4	Coarse Sand

Many cobbles and stones

Not mottling observed

No water observed

CDCI-6

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-24	Fill	-----	-----
24-80	C	10YR5/4	Coarse Sand

Many cobbles and stones

Not mottling observed

No water observed

Ledge encountered at 80"

CDCI-8

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-80	C1	10YR5/4	Coarse Sand
80-144	C2	10YR6/3	Loamy Sand

Many cobbles and stones in C1 layer

Not mottling observed

No water observed

CDCI-10

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-84	C1	10YR5/4	Coarse Sand
84-136	C2	10YR6/3	F. Loamy Sand

Many cobbles and stones in C1 layer

Mottling @ 72"

Weeping @ 84"

Address: Murhpy's Farm, Dracut, MA

Date: 12/7/2023

S.E.: William Hall

Witness: Tina Rivard

Note: Areas where test pits were performed have been stripped of top and subsoil.

CDCI-11

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-90	C1	10YR5/4	Coarse Sand
90-166	C2	10YR6/3	F. Loamy Sand

Many cobbles and stones in C1 layer

Mottling @ 128"

Weeping @ 160"

CDCI-12

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-80	C1	10YR5/4	Coarse Sand
80-144	C2	10YR6/3	F. Loamy Sand

Many cobbles and stones in C1 layer

Mottling @ 112"

Weeping @ 144"

Address: Murphy's Farm, Dracut, MA
Date: 4/3/2024
S.E.: Thomas Schomburg
Witness: N/a

Note: Test pits CDCI-14 - CDCI-23 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-13

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-16	A	10YR3/2	Sandy Loam
16-36	B	10YR5/6	Sandy Loam
36-80	C	10YR5/3	Sandy Loam

Mottling @ 32"
Water @ 40"

CDCI-15

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	A	10YR3/2	Sandy Loam
12-32	B	10YR5/6	Sandy Loam
32-96	C	10YR5/3	Sandy Loam

Mottling @ 30"
Water @ 30"

CDCI-17

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-16	B	10YR5/6	Fine Sand
16-80	C	10YR5/3	Fine Sand
80-108	C2	10YR5/3	Gravelly Sand

Many cobbles and stones in C Layer
C2 Layer primarily gravel
Mottling @ 24"
Water @ 80"

CDCI-19

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	B	10YR5/6	Sand
12-120	C	10YR5/3	Gravelly Sand

Many cobbles and stones in C Layer
Mottling @ 60"
Water @ 90"

CDCI-14

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-16	A	10YR3/2	Sandy Loam
16-32	B	10YR5/6	Sandy Loam
32-108	C	10YR5/3	Sandy Loam

Mottling @ 30"
Water @ 30"

CDCI-16

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-48	FILL	-----	-----
48-80	C	10YR5/3	Loamy Sand

Mottling @ 56"
Water @ 72"
Ledge @ 80"

CDCI-18

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-24	B	10YR5/6	Sand
24-104	C	10YR5/3	Gravelly Sand

Many cobbles and stones in C Layer
Mottling @ 80"
No water observed

CDCI-20

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	B	10YR5/6	Sand
12-102	C	10YR5/6	Gravelly Sand
102-138	2C	10YR5/3	F. Loamy Sand

Many cobbles and stones in C Layer
Mottling @ 102"
No water observed

Address: Murphy's Farm, Dracut, MA

Date: 4/3/2024

S.E.: Thomas Schomburg

Witness: N/a

Note: Test pits CDCI-14 - CDCI-23 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-21

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-24	B	10YR5/6	Sand
24-48	C	10YR5/6	Gravelly Sand
48-80	2C	10YR5/3	F. Loamy Sand

Many cobbles and stones in C Layer

No mottling observed

No water observed

Ledge encountered at 80"

CDCI-22

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-16	B	10YR5/6	Sand
16-60	C	10YR5/6	Gravelly Sand
60-80	2C	10YR5/3	F. Loamy Sand

Many cobbles and stones in C Layer

No mottling observed

No water observed

Ledge encountered at 80"

CDCI-23

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-16	B	10YR5/6	Sand
16-54	C	10YR5/6	Gravelly Sand

Many cobbles and stones in C Layer

No mottling observed

No water observed

Ledge encountered at 54"

CDCI-24

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/2	Sand
8-16	B	10YR5/6	Sand
16-60	C	10YR5/6	Gravelly Sand
60-72	2C	10YR5/3	F. Loamy Sand

Many cobbles and stones in C Layer

Mottling @ 32"

Water @ 72"

Ledge encountered at 72"

Address: Murphy's Farm, Dracut, MA
Date: 12/4/2024
S.E.: Thomas Schomburg & Steven Cummings
Witness: N/A

Note: Test pits CDCI-25 - CDCI-608 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-25

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-30	B	10YR6/6	Loamy Sand
30-120	C	10YR6/4	Gravelly Sand

CDCI-26

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-24	B	10YR6/6	Loamy Sand
24-72	C	10YR6/4	Gravelly Sand
72-120		10YR6/2	Sand

SHWT @ 72"

SHWT @ 72"

CDCI-27

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-66		10YR6/6	Gravelly Sand
66-120		10YR6/1	Sand

CDCI-470

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-10	A	10YR3/3	Sandy Loam
10-26	B	10YR5/6	Loamy Sand
26-78	C	10YR7/3	Fine Sand

SWHT @ 66"

SHWT NOT OBSERVED

CDCI-471

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	A	10YR3/3	Loamy Sand
12-24	B	10YR5/6	Loamy Sand
24-80	C	10YR7/3	Fine Sand

CDCI-472

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	A	10YR5/6	Loamy Sand
12-24	B	10YR5/3	Loamy Sand
24-72	C	10YR7/3	Fine Sand

SHWT NOT OBSERVED

SHWT NOT OBSERVED

CDCI-473

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/3	Sandy Loam
8-18	B	10YR5/6	Loamy Sand
18-72	C	10YR7/3	Fine Sand

CDCI-474

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/3	Sandy Loam
8-20	B	10YR5/6	Loamy Sand
20-72	C	10YR6/4	Medium Sand

SHWT NOT OBSERVED

SHWT NOT OBSERVED

Address: Murphy's Farm, Dracut, MA
Date: 12/4/2024
S.E.: Thomas Schomburg & Steven Cummings
Witness: N/A

Note: Test pits CDCI-25 - CDCI-608 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-475

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/2	Loamy Sand
8-18	B	10YR3/6	Loamy Sand
18-72	C	10YR6/4	Medium Sand

SHWT NOT OBSERVED

CDCI-477

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-6	A	10YR3/3	Sandy Loam
6-28	B	10YR5/4	Loamy Sand
28-72	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-479

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-10	A	10YR3/2	Loamy Sand
10-22	B	10YR5/4	Loamy Sand
22-80	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-481

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/2	Loamy Sand
8-16	B	10YR5/4	Loamy Sand
16-80	C	10YR7/3	Medium Sand

SHWT @ 48"

CDCI-476

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-16	A	10YR3/2	Loamy Sand
16-28	B	10YR3/4	Loamy Sand
28-72	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-478

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-6	A	10YR3/3	Sandy Loam
6-26	B	10YR5/4	Loamy Sand
26-72	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-480

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-6	A	10YR3/3	Sandy Loam
6-18	B	10YR5/6	Loamy Sand
18-72	C	10YR7/3	Sand

SHWT NOT OBSERVED

CDCI-480

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-6	A	10YR3/3	Sandy Loam
6-18	B	10YR5/6	Loamy Sand
18-72	C	10YR7/3	Sand

SHWT NOT OBSERVED

Address: Murphy's Farm, Dracut, MA

Date: 12/4/2024

S.E.: Thomas Schomburg & Steven Cummings

Witness: N/A

Note: Test pits CDCI-25 - CDCI-608 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-482

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/3	Sandy Loam
8-28	B	10YR5/6	Loamy Sand
28-78	C	10YR7/3	Medium Sand

SHWT @ 48"

CDCI-484

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-10	A	10YR3/3	Sandy Loam
10-24	B	10YR6/6	Loamy Sand
24-78	C	10YR8/3	Medium Sand

SHWT @ 36"

CDCI-486

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-6		10YR3/3	Sandy Loam
6-24		10YR5/8	Loamy Sand
24-72		10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-488

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/2	Loamy Sand
8-20	B	10YR5/8	Loamy Sand
20-72	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-483

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-16	A	10YR5/2	Loamy Sand
16-24	B	10YR5/4	Loamy Sand
24-74	C	10YR7/3	Fine Sand

SHWT @ 36"

CDCI-485

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-10	A	10YR5/2	Loamy Sand
10-32	B	10YR5/4	Loamy Sand
32-84	C	10YR7/3	Fine Sand

SHWT @ 36"

CDCI-487

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/2	Loamy Sand
8-24	B	10YR5/8	Loamy Sand
24-72	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-489

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-6		10YR3/3	Sandy Loam
6-22		10YR5/8	Loamy Sand
22-72		10YR7/4	Medium Sand

SHWT NOT OBSERVED

Address: Murphy's Farm, Dracut, MA
Date: 12/4/2024
S.E.: Thomas Schomburg & Steven Cummings
Witness: N/A

Note: Test pits CDCI-25 - CDCI-608 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-490

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-6	A	10YR3/2	Loamy Sand
6-16	B	10YR5/8	Loamy Sand
16-48	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-492

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	A	10YR3/2	Loamy Sand
12-24	B	10YR5/8	Loamy Sand
24-72	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-494

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-30	B	10YR5/6	Loamy Sand
30-84		10YR6/4	Gravelly Sand
84-120		10YR6/1	Sand

SHWT @ 84"

CDCI-496

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	B	10YR5/6	Loamy Sand
12-72	C	10YR6/4	Medium Sand
72-120	C2	10YR6/1	Fine Sand

SHWT @ 84"

CDCI-491

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8		10YR3/3	Sandy Loam
8-28		10YR5/8	Loamy Sand
28-74		10YR7/4	Medium Sand

SHWT @ 60"

CDCI-493

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-8	A	10YR3/3	Sandy Loam
8-24	B	10YR5/8	Loamy Sand
24-78	C	10YR7/4	Medium Sand

SHWT NOT OBSERVED

CDCI-495

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-72	C	10YR6/6	Medium Sand
72-132	C2	10YR7/4	Fine Sand

SHWT @ 84"

CDCI-497

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-60	Fill	-	-
60-120	C	10YR7/3	Loamy Sand

SHWT NOT OBSERVED

Address: Murphy's Farm, Dracut, MA

Date: 12/4/2024

S.E.: Thomas Schomburg & Steven Cummings

Witness: N/A

Note: Test pits CDCI-25 - CDCI-608 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-498

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-60	Fill	-	-
60-120	C	10YR7/3	Fine Sand

CDCI-499

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-60	Fill	-	-
60-138	C	10YR7/3	Fine Sand

SHWT NOT OBSERVED

SHWT NOT OBSERVED

CDCI-600

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-90	Fill	-	-
90-126	C	10YR7/3	Sand

CDCI-601

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-96	Fill	-	-
96-120	C	10YR7/3	Sand

SHWT NOT OBSERVED

SHWT @ 96"

CDCI-602

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-66	Fill	-	-
66-84	B	10YR5/4	Sand
84-120	C	10YR7/3	Sand

CDCI-603

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-24	Fill	-	-
24-120	C	10YR5/3	Gravelly Sand

SHWT @ 86"

SHWT @ 60"

CDCI-604

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-24	Fill	-	-
24-108	C	10YR7/3	Sand

CDCI-605

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-72	Fill	-	-
72-108	C	10YR7/3	Sand

SHWT @ 48"

SHWT @ 60"

Address: Murphy's Farm, Dracut, MA
Date: 12/4/2024
S.E.: Thomas Schomburg & Steven Cummings
Witness: N/A

Note: Test pits CDCI-25 - CDCI-608 performed in areas that have been stripped of top and subsoil. Soil has begun to weather.

CDCI-606

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-12	A	10YR3/2	Sandy Loam
12-32	B	7.5YR4/6	Loamy Sand
32-120	C	10YR6/3	Medium Sand

CDCI-607

<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-48	Fill	-	-
48-72	C	10YR5/3	Sand

SHWT @ 48"

SHWT NOT OBSERVED

CDCI-608

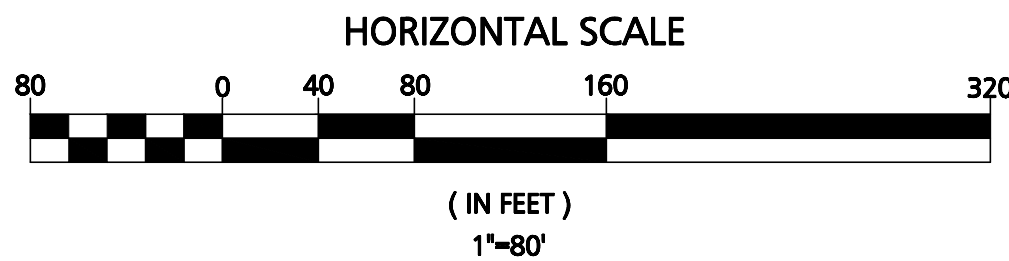
<u>Depth</u>	<u>Horizon</u>	<u>Color</u>	<u>Texture</u>
0-48	Fill	-	-
48-120		10YR7/4	Medium Sand

SHWT @ 84"

LEGEND	
PROPERTY LINE	
ABUTTERS PROPERTY LINE	
EXISTING EDGE OF PAVEMENT	
LIMIT OF BORDERING VEGETATED WETLAND (B/VW)	
WETLAND FLAG	ΔNF 80
WETLAND
50 FT BUFFER ZONE TO B/VW	
100 FT BUFFER ZONE TO B/VW	
EXISTING CONTOUR	
EXISTING WATERSHED BOUNDARY	
EXISTING TC	
HYDROLOGIC SOILS GROUP A	
HYDROLOGIC SOILS GROUP B	
HYDROLOGIC SOILS GROUP C	
HYDROLOGIC SOILS GROUP D	

SOILS SUMMARY:	
SYMBOL	DESCRIPTION
32B	WAREHAM LFS, 0-5% SLOPES
51A	SWANSEA MUCK, 0-1% SLOPES
52A	FREETOWN MUCK, 0-1% SLOPES
253B	HINKLEY LS, 3-8% SLOPES
253C	HINKLEY LS, 8-15% SLOPES
253D	HINKLEY LS, 15-25% SLOPES
54B	MERRIMAC FSL, 3-8% SLOPES
255B	WINDSOR LS, 3-8% SLOPES
255C	WINDSOR LS, 8-15% SLOPES
256A	DERFIELD LFS, 0-3% SLOPES
420C	CANTON FSL, 8-15% SLOPES
422B	CANTON FSL, 0-8% SLOPES
600	PITS, GRAVEL
601	PITS, QUARRY
653	UDORTHERTS, SANDY
654	UDORTHERTS, LOAMY

HSG	A/D
A/D	B/D
B/D	A
A	A
A	A
A	A
A	A
B	N/A
N/A	N/A
N/A	N/A
N/A	N/A



DATE	DESCRIPTION
REVISIONS	
APPLICANT:	THE HOMES AT MURPHY'S FARM LLC 18 CASSIMERE STREET ANDOVER, MA 01810
PROJECT:	MURPHY'S FARM DRACUT, MA 01826
DATE ISSUED:	-
PROJECT #:	23-10524
PREPARED BY:	TWS

PROFESSIONAL ENGINEER FOR CIVIL DESIGN
CONSULTANTS, INC.



DRAWING TITLE:
EXISTING WATERSHED
PLAN

DRAWING #:

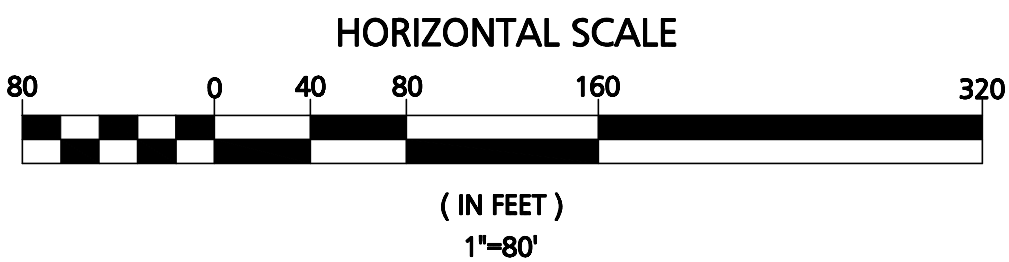
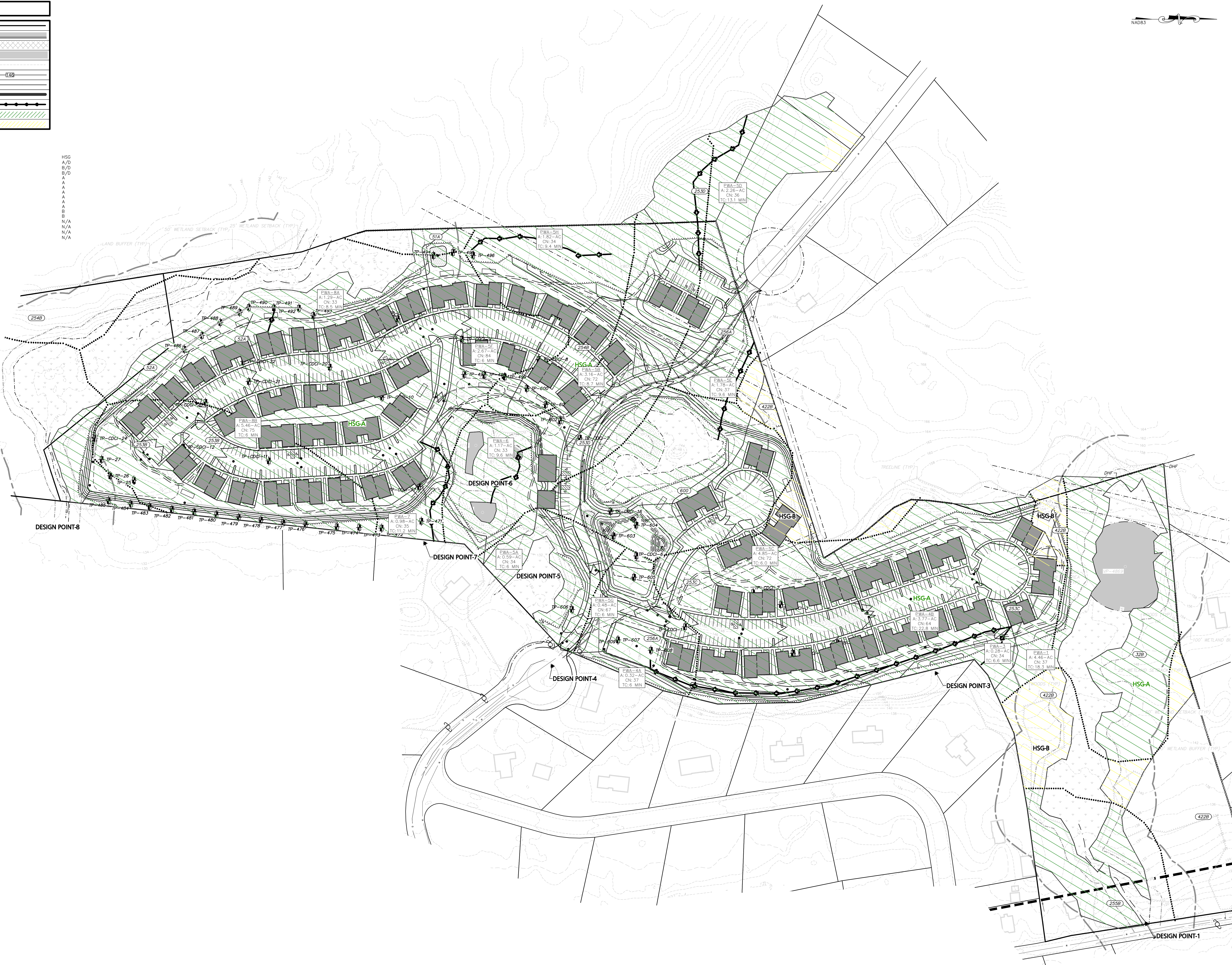
EWA

LEGEND	
PROPERTY LINE	
PROPOSED BUILDING	
PROPOSED POROUS PAVEMENT	
PROPOSED BIT. CONC.	
EXISTING CONTOUR	
PROPOSED CONTOUR	1125
PROPOSED RETAINING WALL	
PROPOSED WATERSHED BOUNDARY	
PROPOSED TC	
HYDROLOGIC SOILS GROUP A	
HYDROLOGIC SOILS GROUP B	

SOILS SUMMARY:

SYMBOL	DESCRIPTION	HSG
32B	WAREHAM LFS, 0-5% SLOPES	A/D
51A	SWANSEA MUCK, 0-1% SLOPES	B/D
52A	FREETOWN MUCK, 0-1% SLOPES	A
253B	HINKLEY LS, 3-8% SLOPES	A
253C	HINKLEY LS, 8-15% SLOPES	A
253D	HINKLEY LS, 15-25% SLOPES	A
254B	MERRIMAC FSL, 3-8% SLOPES	A
255B	WINDSOR LS, 3-8% SLOPES	A
255C	WINDSOR LS, 8-15% SLOPES	A
256A	DEERFIELD LFS, 0-3% SLOPES	B
420C	CANTON FSL, 8-15% SLOPES	N/A
422B	CANTON FSL, 0-8% SLOPES	N/A
600	PITS, GRAVEL	N/A
601	PITS, QUARRY	N/A
653	UDORTHERTS, SANDY	N/A
654	UDORTHERTS, LOAMY	N/A

NAD83



12/30/24	REV. PER PEER REVIEW COMMENTS
10/04/24	REV. PER PEER REVIEW COMMENTS
DATE	DESCRIPTION
REVISIONS	

APPLICANT:
THE HOMES AT MURPHY'S FARM LLC
18 CASSIMERE STREET
ANDOVER, MA 01810

PROJECT:
MURPHY'S FARM
DRACUT, MA 01826

DATE ISSUED:	APRIL 22, 2024
PROJECT #:	23-10524
PREPARED BY:	TWS

PROFESSIONAL ENGINEER FOR CIVIL DESIGN
CONSULTANTS, INC.



DRAWING TITLE:
GRADING, SEWER & UTILITIES PLAN

DRAWING #:
C-4B