



August 12, 2019

Pembroke Planning Board
Town Hall
100 Center Street
Pembroke, Massachusetts 02359

**RE: *Response to comments received as part of Site Plan Review*
 Centrica Business Solutions – Herring Brook Solar Project
 Pembroke, MA
 *ADE Project #3086.00***

Dear Board Members:

This response letter, along with our revised Site Development Plans dated August 12, 2019, and supporting documentation for the Herring Brook Solar Project address the comments received from Merrill Engineers and Land Surveyors (Merrill) dated July 16, 2019. Merrill comments are *italicized* and our responses follow in **bold**.

ZONING BYLAWS

Summary of Requested Waivers

The following waivers have been requested from the Zoning By-laws:

Section V. 12. Solar Photovoltaic Installations

D.1.f. Form of Financial Security

The Applicant is not requesting relief from the requirement to provide financial security. The Applicant is respectfully requesting that the financial security be required as part of the building permit submittal process and the amount determined at that time. The Applicant is amenable to funding additional peer review of the decommissioning bond amount if required.

Section V. 7. Site Plan Approval

All information required by this section of the Zoning Bylaws has been satisfactorily provided in the submittal material.

No response required

Section V. 12. Solar Photovoltaic Installations

D.9. An Operation and Maintenance Plan for the proposed solar facility is included in the submittal.

No response required

P.O. Box 1051
Sandwich, MA 02563
(508) 888-9282 · FAX 888-5859
email: ade@atlanticcompanies.com
www.atlanticcompanies.com

D.11.b. Screening 2b.

When a large scale ground mounted solar installation is directly about in existing residential uses screening shall be provided. “For a project site of greater than 5 acres: Minimum of one-hundred (100) feet of vegetation buffer with fifty (50) feet being undisturbed closest to the residential property and the other fifty (50) feet being allowed to be selectively cleared.” This requirement has been met with the exception of the northerly end of the property. The proposed setback is 78 feet from the property line. The owner of the abutting property at this location is the Town of Pembroke; however it is zoned residential. The Planning Board should review this condition.

The plan has been revised to adhere to the above referenced setback.

RULES AND REGULATIONS GOVERNING SITE PLAN APPROVAL

Summary of Requested Waivers

The following waivers have been requested from the Planning Board Rules & Regulations Governing the Issuance of Site Plan Approval.

Section IV – Site Plan Content

4.7 Landscape Plan

4.10 Building Elevations

4.21 Photometric Plan

4.22 Traffic Impact Study

We recommend that all waivers that are granted by the Planning Board be specified on the cover sheet of the approved Site Plans.

The cover sheet has been revised to include the requested waivers.

Section IV. Site Plan Content

4.4 And existing easement is shown on the plans adjacent to Hobomock Street opposite Monroe Street. The purpose and owner of this easement should be shown on the plans.

The information has been added to the plans.

4.5 The Town Clerk signature block is not presented on the plan set as required. We recommend that it be shown on the Cover Sheet and that it follow the format specified under this item of the Regulations.

The information has been added to the plans.

4.6 The location of the benchmark(s) should be presented on the plans.

The information has been added to the plans.

4.7 A Landscaping Plan prepared by a Registered Landscape Architect has not been provided as required. The Planning Board should determine whether a Landscaping Plan for this project is necessary. The applicant has requested a waiver of this requirement.

The Applicant respectfully requests a waiver from this requirement.

4.16 The design plans have been stamped and signed by a registered Professional Engineer but not a registered Professional Land Surveyor as required. In addition, a Professional Land Surveyor's certification as to the accuracy of the location of the buildings, etc. has not been presented on the plans and should be added.

The certifications have been added to the plans.

4.20 The Development Impact Statement specifies that a project sign is proposed at the entrance; however, none is shown on the plans. The sign should be shown on the plans and additional information regarding, location, height, size, color, etc. should be submitted to the Planning Board for review.

The proposed site information sign, containing project and emergency contact information, is proposed at the entrance gate to the proposed array. The location is approximately 400 feet from Hobomock Street. The proposed signage will conform to Locate, State and Federal requirements. The Applicant requests that this information be provided as part of the building permit process.

4.21 No information on lighting including a photometric plan has not been submitted as required. The applicant has requested a waiver of this requirement.

Due to the fact there is no lighting being proposed, the Applicant requests a waiver from this requirement.

4.22 A Traffic Impact Study has not been submitted. The applicant has requested a waiver of this requirement.

Due to the fact traffic will be limited to maintenance activities, coupled with the innocuous nature of the proposed solar facility, the Applicant requests a waiver from this requirement.

Section V. Requirements

5.1 A Landscaping Plan prepared by a Registered Landscape Architect has not been provided. The Planning Board should determine whether a Landscaping Plan for this project is required. The applicant has requested a waiver of this requirement.

Due to the setbacks provided, the secluded location which is screened all around by areas of existing vegetation to remain in-tact, the Applicant respectfully requests a waiver from this requirement.

5.2 No information on lighting including a photometric plan has not been submitted as required. The applicant has requested a waiver of this requirement.

Due to the fact there is no lighting being proposed, the Applicant requests a waiver from this requirement.

5.3 The Stormwater Report indicates that the overall stormwater management system will attenuate the post development stormwater flows to a level not exceeding the existing conditions. We offer the following comments regarding the stormwater design and analysis:

- No soil testing has been performed at the location of the proposed forebay and rain garden. We recommend soil testing be performed to demonstrate that adequate soils are present for infiltration and to determine the Estimated Seasonal High Groundwater Elevation (ESHGW) as required by the DEP Stormwater Management Regulations.*

The Applicant respectfully requests that this information be provided at the start of construction, prior to any earth moving activities. The basin location is generally inaccessible until the preliminary stages of tree clearing have commenced as required to construct the access road. Notes have been added to the Rain Garden Detail requiring test pits to be performed prior to the start of construction of the array by a licensed soil evaluator to determine estimated seasonal high groundwater (ESHGW) and confirm soil classification. Test pit results will be provided to the Engineer and the Town to confirm the results verify the basin will function as designed. The Applicant is amenable to making this a condition of approval if the Board requires.

- Design calculations should be provided for the proposed 3 - 12 inch diameter ADS culverts located beneath the access drive just north of the proposed rain garden. We also recommend that the minimum depth of cover be confirmed.*

The plans have been revised and the pipe size has been increased to 15-inches. As a conservative approach, the flow considered as part of the calculations is 29.47 cfs (entire 1S area). Three (3) 15-inch pipes at 3% can handle 38.71 cfs. HydroCAD calculations demonstrating the proposed culverts are sized to handle the 100-year storm are attached. The plans have also been revised to show +/- 2 feet of cover at this location and specifies 15" ADS HP-Storm pipe which has a minimum manufacturer's recommended cover of 1-foot.

- *A number of the sub-catchment areas presented in the HydroCAD computer calculations show a time of concentration (Tc) of 0 minutes. Since this is obviously not the case, we recommend that the engineer revise the calculations or provide additional information.*

The Time of Concentration has been changed to the minimum 6 minutes. The revised HydroCAD calculations are attached demonstrating the CN will not change or will be reduced, thereby meeting or decreasing peak rate of run-off.

- *A typical rain garden cross-section is presented on sheet 6 of the plans. We recommend that this cross-section be revised to show the proposed rain garden cross-section with outlet and berm elevations and depth of materials. In addition, the depth to the estimated seasonal high ground water and the elevations of the various storm events should be presented on the plans.*

With exception to the depth to ESHGW, (which will be provided once test pits are performed - see response above), the requested information has been added to the plans.

- *A planting plan for the rain garden should be included showing plantings as recommended by Mass DEP.*

A Rain Garden Planting List with layout specifications has been added to the detail sheet.

- *We recommend that a detail/cross section of the forebay outlet as well as weir/overflow for the rain garden be presented on the plan and should include the proposed size and depth of stone. The weir/overflow should also include a concrete weir at the control elevation.*

The information has been added to the plans.

It is general practice to design sites to comply with Massachusetts DEP Stormwater Management Regulations. The following section describes the 10 Standards for compliance with Stormwater Management Regulations and the status of the submittal relative to each standard.

Standard 1 – Untreated Stormwater

As previously stated, we recommend soil testing be performed at the location of the proposed forebay and rain garden. Additional Information required.

Please see response above pertaining to the requirement for test pits.

Standard 2 – Post Development Peak Discharge Rates
See Standard 1 above. Additional Information required.

Please see response above pertaining to the requirement for test pits.

Standard 3 – Recharge to Groundwater
This Standard has been satisfactorily met.

No response required.

Standard 4 – 80% Total Suspended Solids (TSS) Removal
This Standard has been satisfactorily met.

No response required.

Standard 5 – Higher Potential Pollutant Loads
The project is not considered a source of higher pollutant loads, this standard is not applicable.

No response required.

Standard 6 – Protection of Critical Areas
Based on information presented on MassGIS and the Town of Pembroke GIS web page, the project site is not in a Critical Area.

No response required.

Standard 7 – Redevelopment Projects
This project is not considered a redevelopment project and consequently this standard is not applicable.

No response required.

Standard 8 – Erosion/Sediment Control
This Standard has been satisfactorily met.

No response required.

Standard 9 – Operation and Maintenance Plan
A construction period Operation and Maintenance Plan been provided as required. This Standard has been satisfactorily met.

No response required.

Standard 10 – Illicit Discharges

In order to meet this standard, an “Illicit Discharge Compliance Statement” meeting the requirements specified in the Mass DEP Stormwater Management Regulations is required. Additional information required.

No response required.

5.6.1. *The Regulations state that “All access drives and parking areas shall be graded, paved and drained in accordance with the standards enumerated above.” The project proposes a section of the proposed drive to be gravel and to utilize the existing gravel access drives in the lower portion of the site where the solar array is to be located. The plans specify a 12 foot width for the gravel portion of the access drive. The width of the access drive should be clarified and approved by the Pembroke Fire Department. This access drive terminates in a hammerhead cul-de-sac. The configuration of this cul-de-sac should be also reviewed by the Fire Department in as much as the ability to turn around may be limited. The surface treatment for the access drive is proposed as gravel and may be acceptable since this site will only be accessed for maintenance. The Planning Board should review this item.*

The proposed access drive has been preliminarily reviewed by the Pembroke Fire Department and conforms to their requirements. Documentation of review/approval will be provided once it is received. The Applicant is amenable to making this a condition of approval if the Board requires.

5.6.3. *The Regulations state that “All utility connections shall be underground” The project proposes an overhead electric line from the connection at a utility pole on Hobomock Street to a proposed meter pole. From that point underground conduit is proposed. The Planning Board should determine if this is acceptable.*

The requirement to provide overhead electric at the point of inter-connection is a utility requirement and consistent with the infrastructure associated with nearby projects. The Applicant respectfully requests that the Board deem the configuration depicted on the Site Plans as being acceptable.

Section VI. Development Impact Statement

A Development Impact Statement has been submitted as required.

No response required.

ADDITIONAL COMMENTS

1. *The plans should be reviewed by the Pembroke Fire Department relative to access and fire protection.*

The proposed access drive has been preliminarily reviewed by the Pembroke Fire Department and conforms to their requirements. Documentation of review/approval will be provided once it is received. The Applicant is amenable to making this a condition of approval if the Board requires.

2. *Due to the location of wetland resource areas both on and adjacent to the project, review and approval by the Pembroke Conservation Commission is required.*

The project is currently being reviewed by the Pembroke Conservation Commission under a Notice of Intent filing. An approved Order of Conditions will be provided to the Planning Board once it is received. The Applicant is amenable to making this a condition of approval if the Board requires.


3. *An existing rip-rap apron just to the west of the entrance driveway into the Hobomock Arena conveys stormwater runoff from Hobomock Street to an existing drainage easement. This riprap apron is proposed to be reconstructed as shown on the site plan. We recommend that additional grading and details be provided for this apron and that an easement be granted to the Town of Pembroke for maintenance of this apron. Capacity calculations should also be provided.*

Additional grading details have been provided indicating bottom width, depth and side slope information. Capacity calculations have also been provided demonstrating the apron is sized appropriately (refer to attached HydroCAD calculations). The Applicant is amenable to creating an easement as recommended above. The Applicant respectfully requests that the creation/granting of the easement be required prior to the issuance of the Certificate of Occupancy and included as a condition of approval.

If you have any questions, please do not hesitate to call me at (508) 888-9282.

Sincerely,

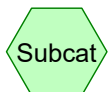
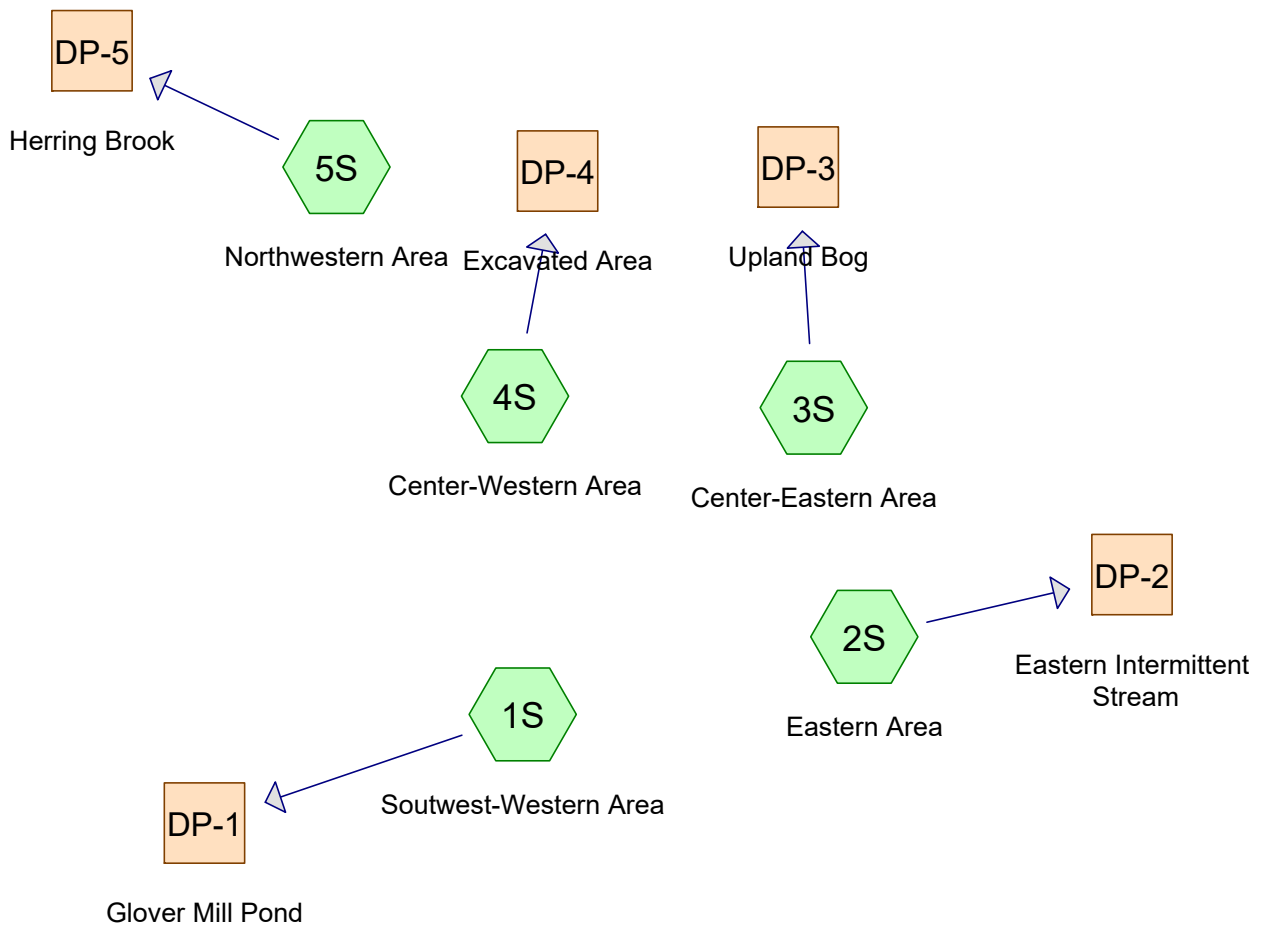
ATLANTIC DESIGN ENGINEERS, INC.



Richard J. Tabaczynski, P.E.
Vice President

cc: P. Palmieri, Merrill Engineers and Land Surveyors

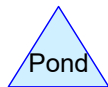
**REVISED PRE-DEVELOPMENT HYDROCAD CALCULATIONS
WITH CORRECTED TIME OF CONCENTRATION**



Subcat



Reach



Pond



Link

Routing Diagram for 3086.00 - Hydrocad Calculations - PRE - TC Change

Prepared by Atlantic Design Engineers, Inc., Printed 8/12/2019

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3086.00 - Hydrocad Calculations - PRE - TC Change*Type III 24-hr 2-yr Rainfall=3.41"*

Prepared by Atlantic Design Engineers, Inc.

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Page 2

Summary for Subcatchment 1S: Southwest-Western Area

Runoff = 6.45 cfs @ 12.41 hrs, Volume= 36,593 cf, Depth= 0.95"

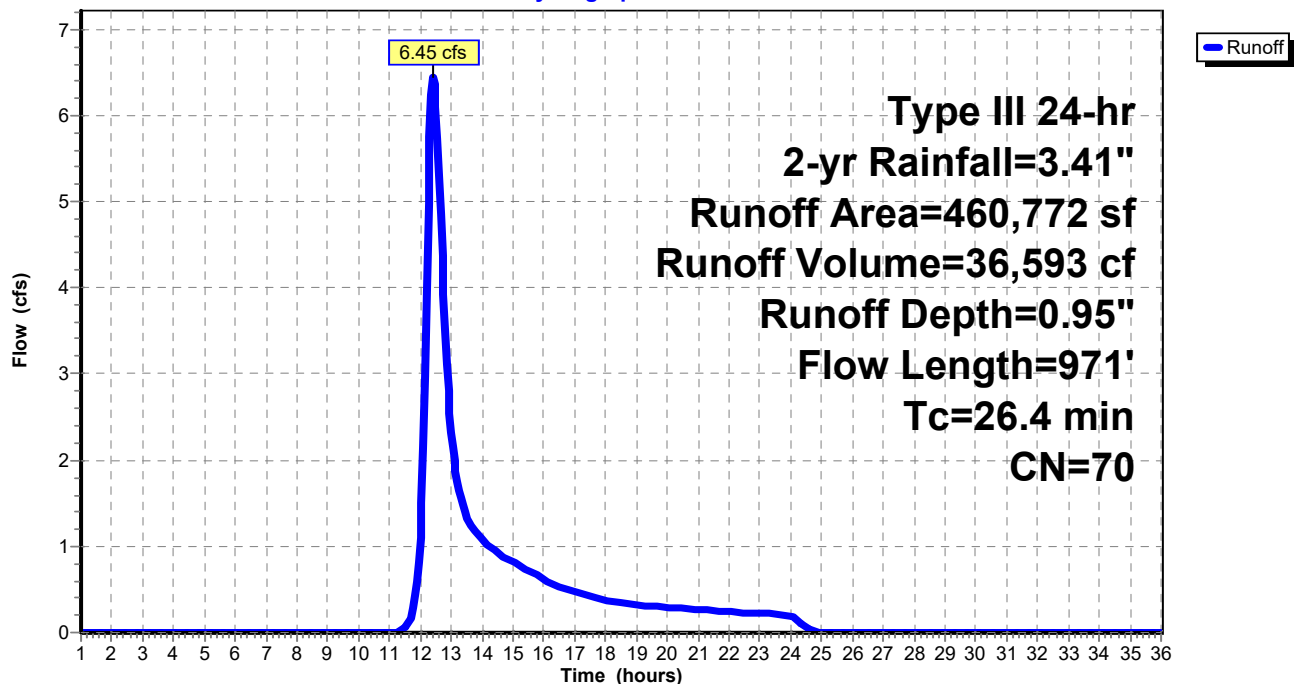
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
7,444	85	Gravel roads, HSG B
14,768	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
96,435	30	Woods, Good, HSG A
3,370	55	Woods, Good, HSG B
25,348	73	Woods/grass comb., Poor, HSG B
183,303	67	Brush, Poor, HSG B
460,772	70	Weighted Average
315,900		68.56% Pervious Area
144,872		31.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.2	400	0.0225	3.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	371	0.0455	3.43		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.4	971	Total			

Subcatchment 1S: Southwest-Western Area

Hydrograph



3086.00 - Hydrocad Calculations - PRE - TC Change

Type III 24-hr 2-yr Rainfall=3.41"

Prepared by Atlantic Design Engineers, Inc.

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Page 4

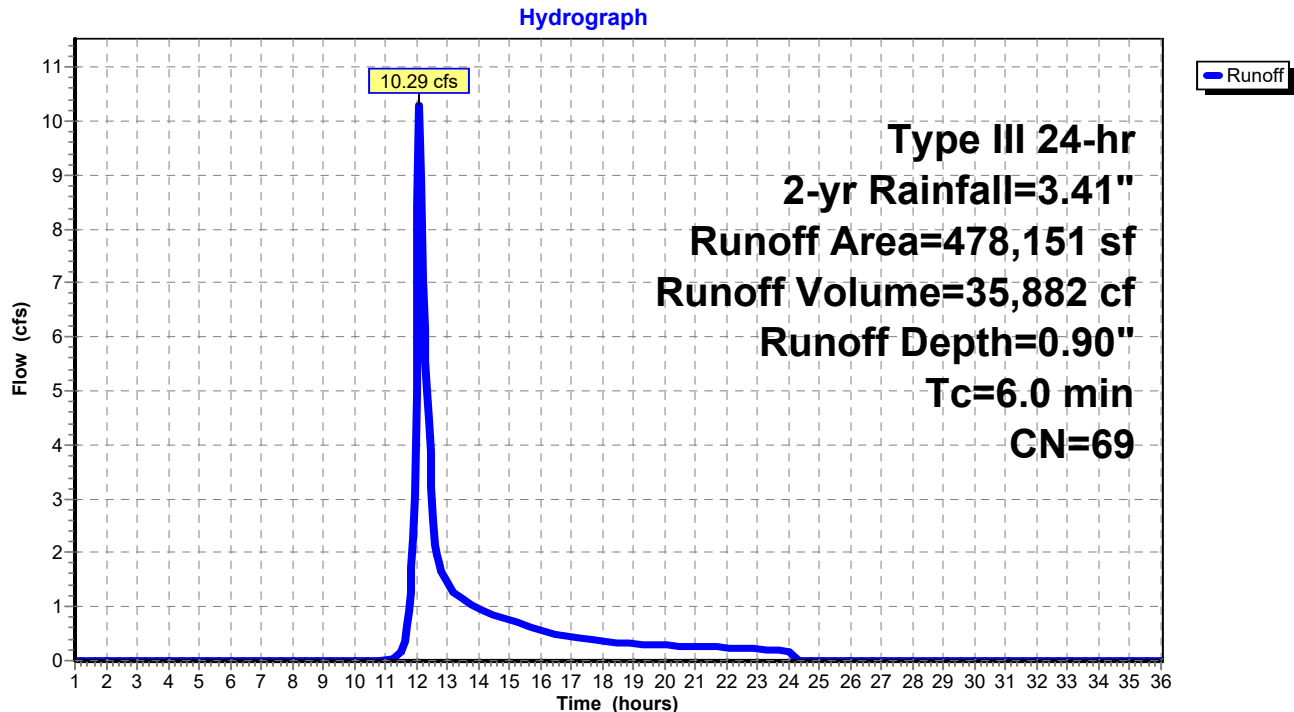
Summary for Subcatchment 2S: Eastern Area

Runoff = 10.29 cfs @ 12.10 hrs, Volume= 35,882 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
21,716	82	Dirt roads, HSG B
28,164	85	Gravel roads, HSG B
14,392	98	Roofs, HSG B
871	30	Woods, Good, HSG A
30,185	55	Woods, Good, HSG B
382,823	67	Brush, Poor, HSG B
478,151	69	Weighted Average
463,759		96.99% Pervious Area
14,392		3.01% Impervious Area

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

Subcatchment 2S: Eastern Area

3086.00 - Hydrocad Calculations - PRE - TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 5

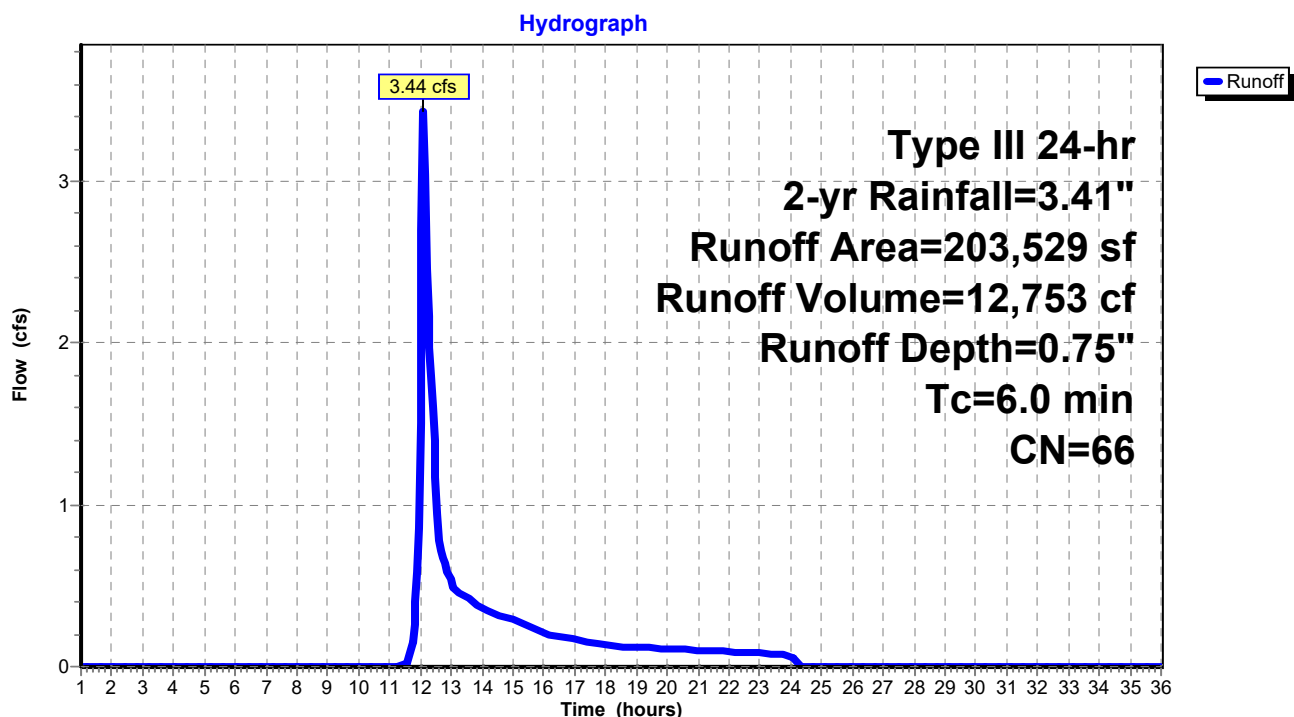
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

	Area (sf)	CN	Description
*	178,530	65	Upland Bog Area
	1,742	72	Dirt roads, HSG A
	10,138	82	Dirt roads, HSG B
	604	30	Woods, Good, HSG A
	12,515	67	Brush, Poor, HSG B
	203,529	66	Weighted Average
	203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area

3086.00 - Hydrocad Calculations - PRE - TC Change

Type III 24-hr 2-yr Rainfall=3.41"

Prepared by Atlantic Design Engineers, Inc.

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Page 6

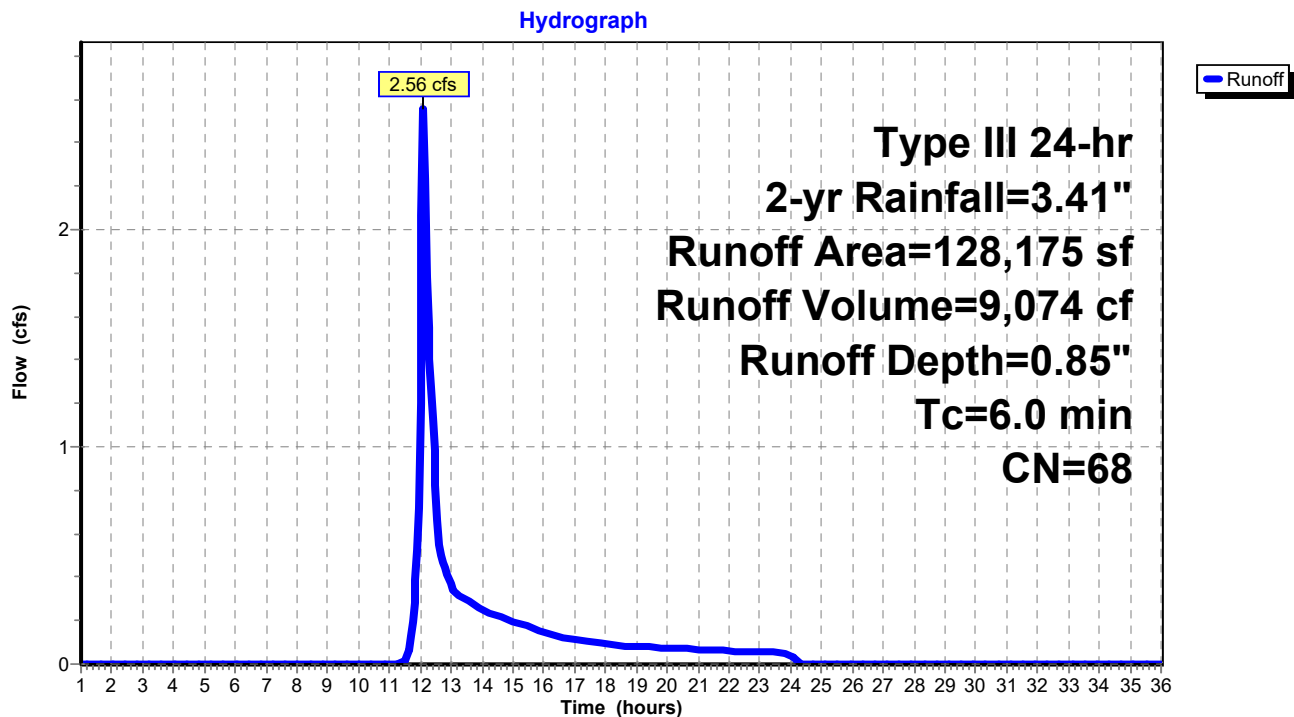
Summary for Subcatchment 4S: Center-Western Area

Runoff = 2.56 cfs @ 12.11 hrs, Volume= 9,074 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
10,682	82	Dirt roads, HSG B
953	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
116,075	67	Brush, Poor, HSG B
128,175	68	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area

3086.00 - Hydrocad Calculations - PRE - TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 7

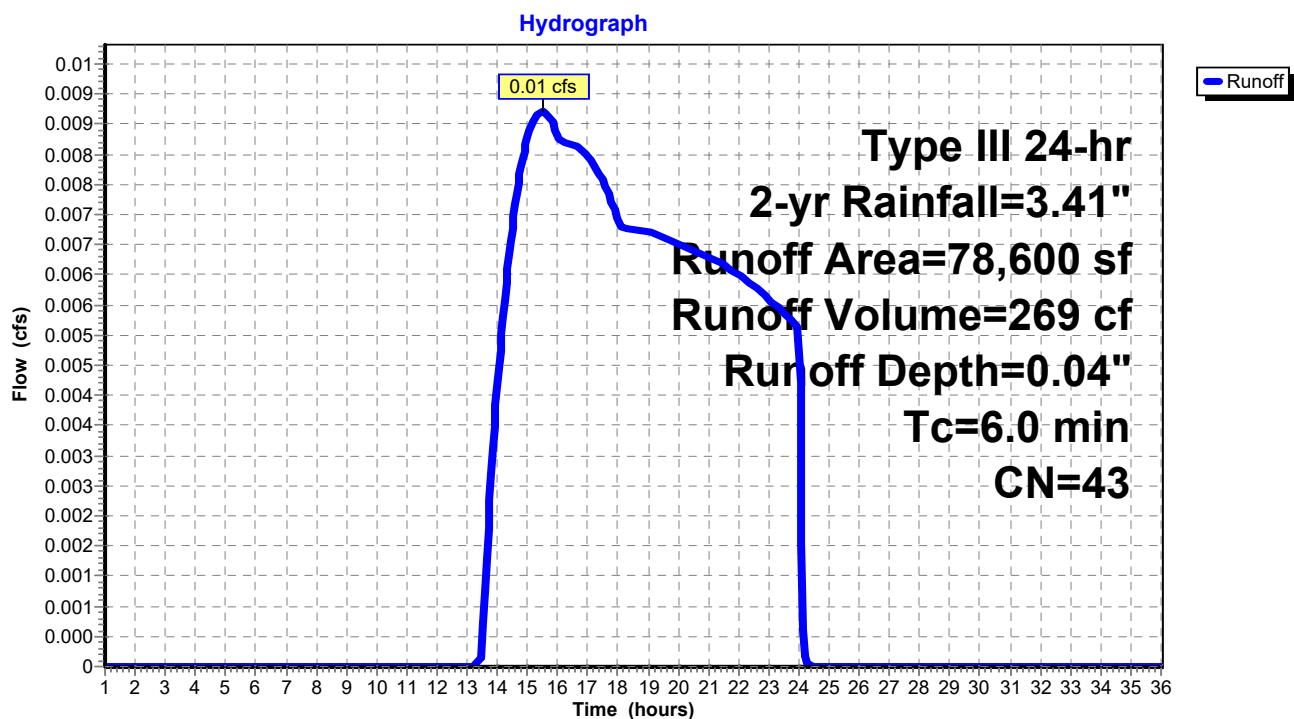
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.01 cfs @ 15.49 hrs, Volume= 269 cf, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
51,381	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
26,398	67	Brush, Poor, HSG B
78,600	43	Weighted Average
78,600		100.00% Pervious Area

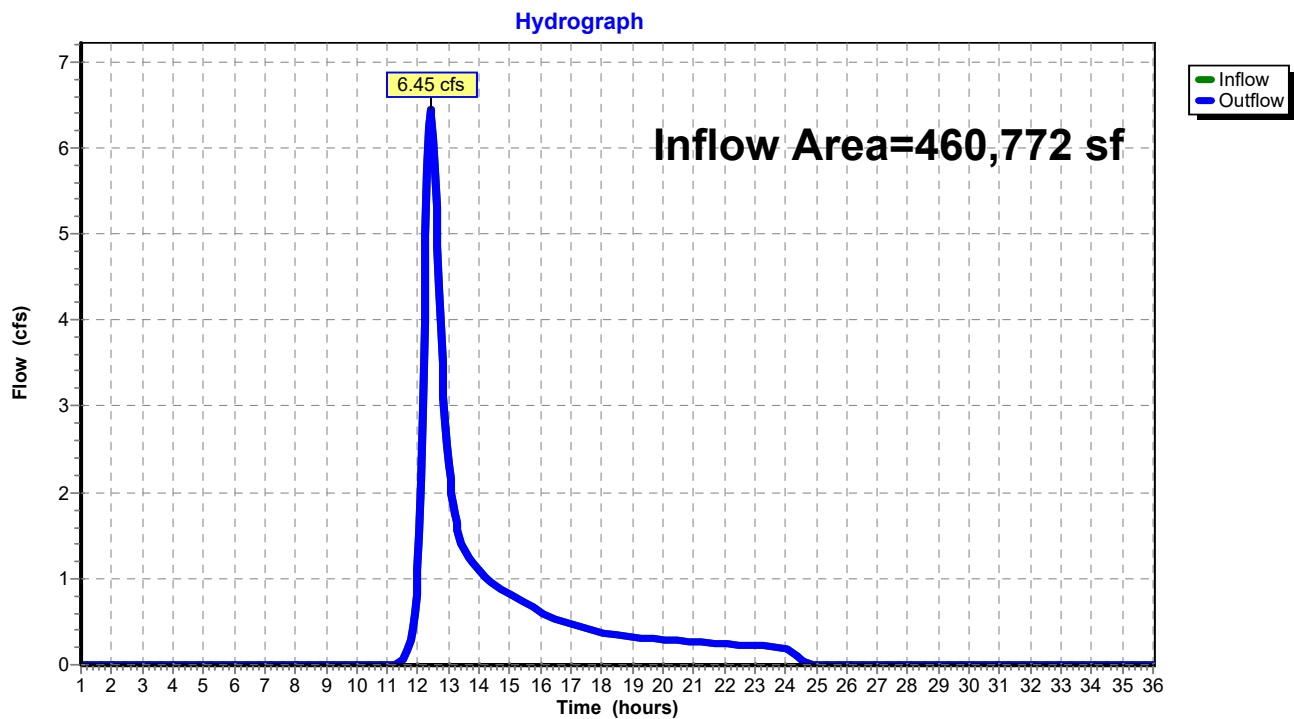
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 5S: Northwestern Area

Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 31.44% Impervious, Inflow Depth = 0.95" for 2-yr event
Inflow = 6.45 cfs @ 12.41 hrs, Volume= 36,593 cf
Outflow = 6.45 cfs @ 12.41 hrs, Volume= 36,593 cf, Atten= 0%, Lag= 0.0 min

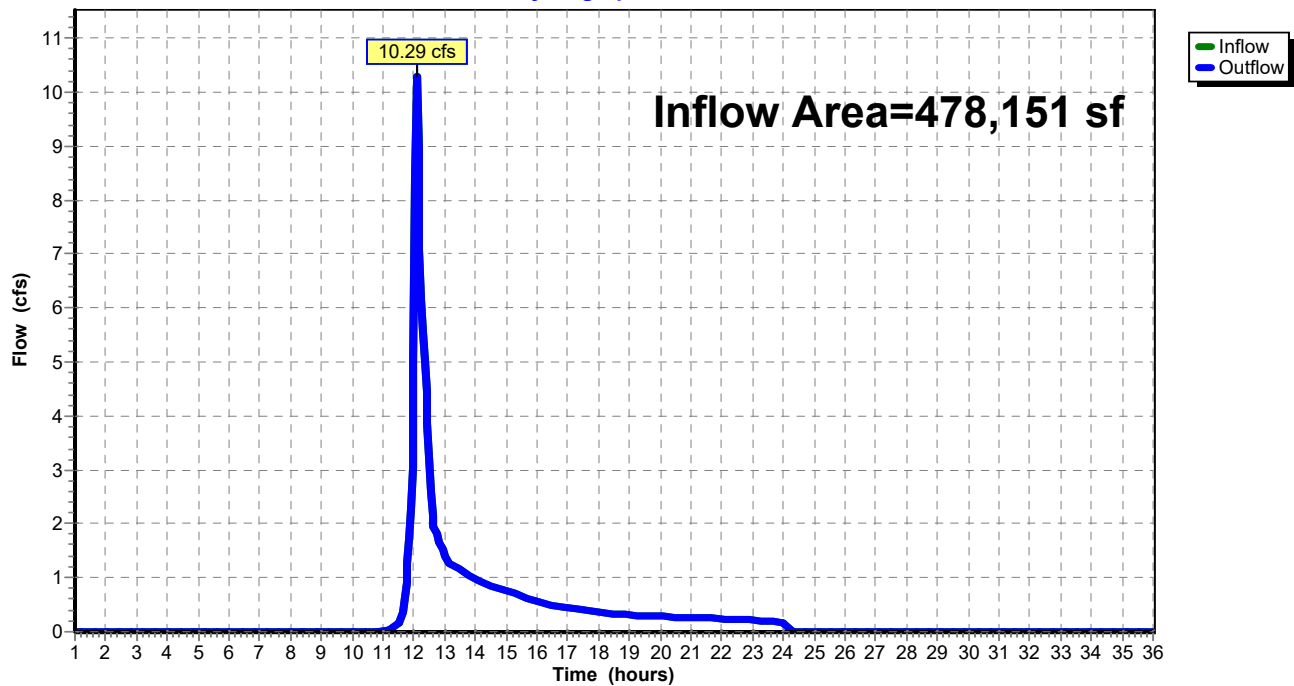
Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond

Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,151 sf, 3.01% Impervious, Inflow Depth = 0.90" for 2-yr event
Inflow = 10.29 cfs @ 12.10 hrs, Volume= 35,882 cf
Outflow = 10.29 cfs @ 12.10 hrs, Volume= 35,882 cf, Atten= 0%, Lag= 0.0 min

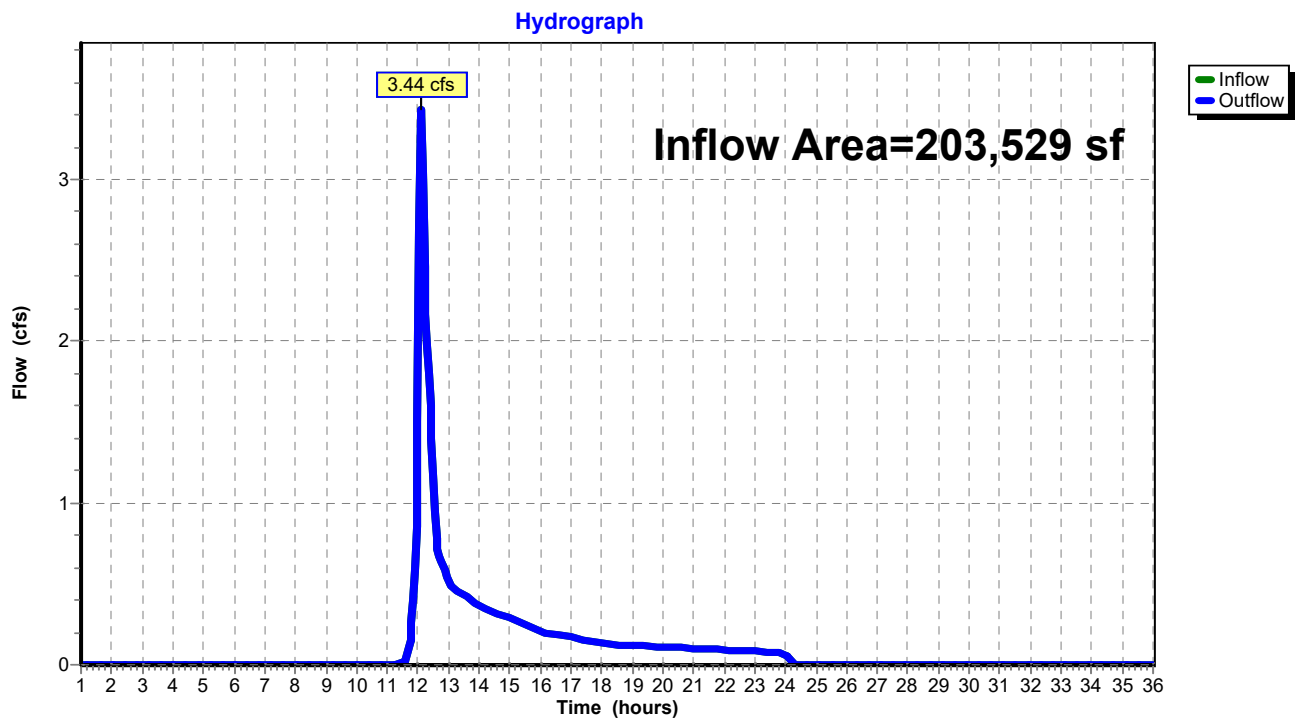
Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream**Hydrograph**

Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 0.75" for 2-yr event
Inflow = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf
Outflow = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf, Atten= 0%, Lag= 0.0 min

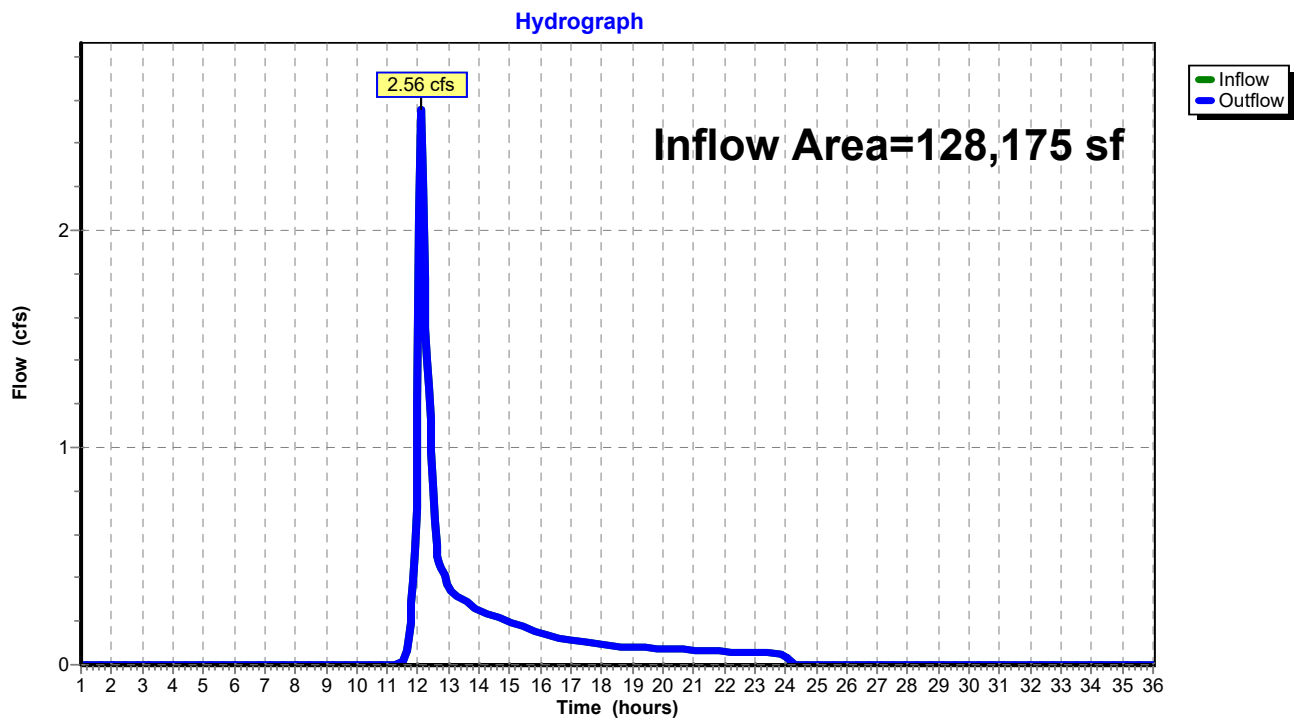
Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 0.85" for 2-yr event
Inflow = 2.56 cfs @ 12.11 hrs, Volume= 9,074 cf
Outflow = 2.56 cfs @ 12.11 hrs, Volume= 9,074 cf, Atten= 0%, Lag= 0.0 min

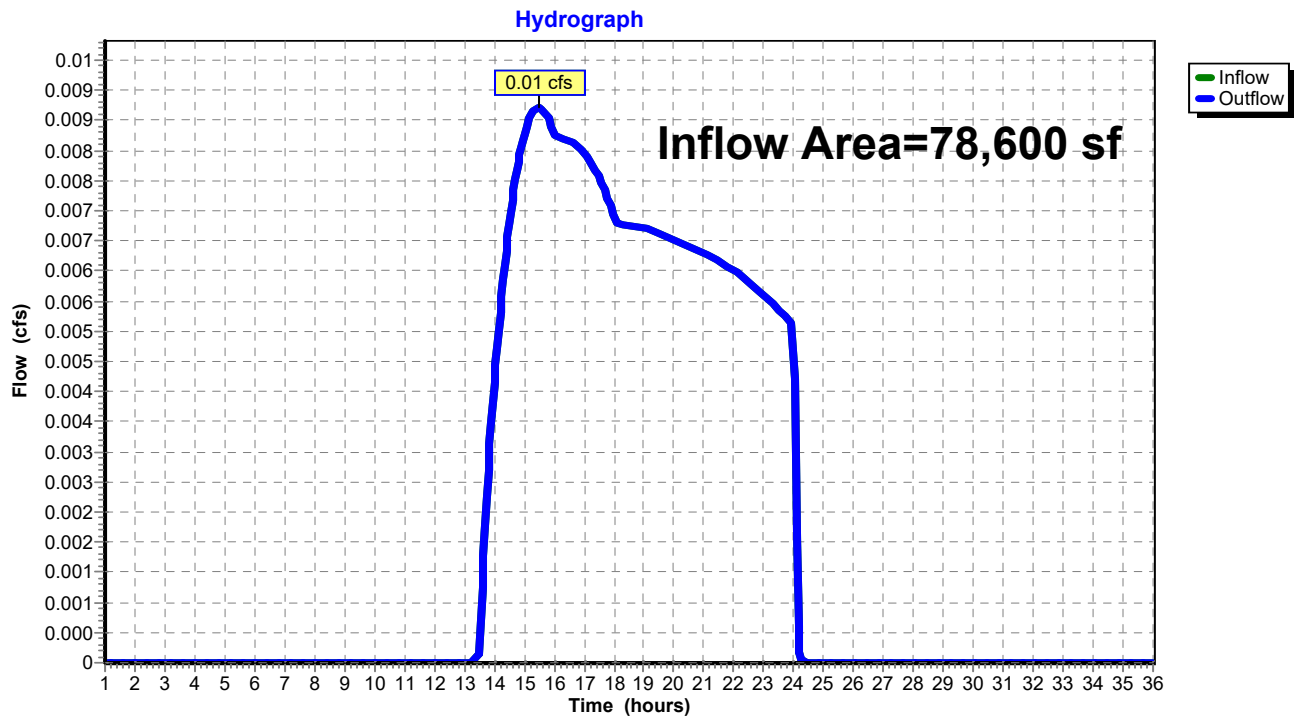
Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

Summary for Reach DP-5: Herring Brook

Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 0.04" for 2-yr event
Inflow = 0.01 cfs @ 15.49 hrs, Volume= 269 cf
Outflow = 0.01 cfs @ 15.49 hrs, Volume= 269 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook

Summary for Subcatchment 1S: Southwest-Western Area

Runoff = 15.05 cfs @ 12.39 hrs, Volume= 79,616 cf, Depth= 2.07"

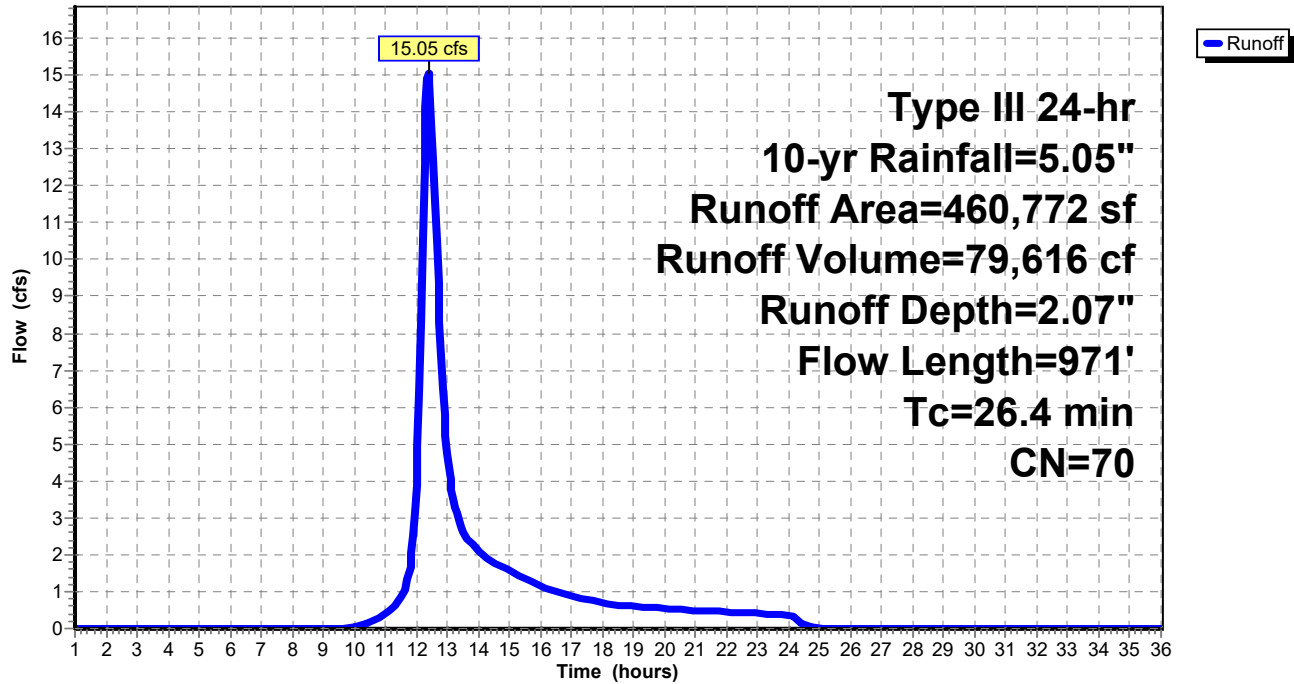
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
7,444	85	Gravel roads, HSG B
14,768	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
96,435	30	Woods, Good, HSG A
3,370	55	Woods, Good, HSG B
25,348	73	Woods/grass comb., Poor, HSG B
183,303	67	Brush, Poor, HSG B
460,772	70	Weighted Average
315,900		68.56% Pervious Area
144,872		31.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.2	400	0.0225	3.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	371	0.0455	3.43		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.4	971	Total			

Subcatchment 1S: Southwest-Western Area

Hydrograph



Summary for Subcatchment 2S: Eastern Area

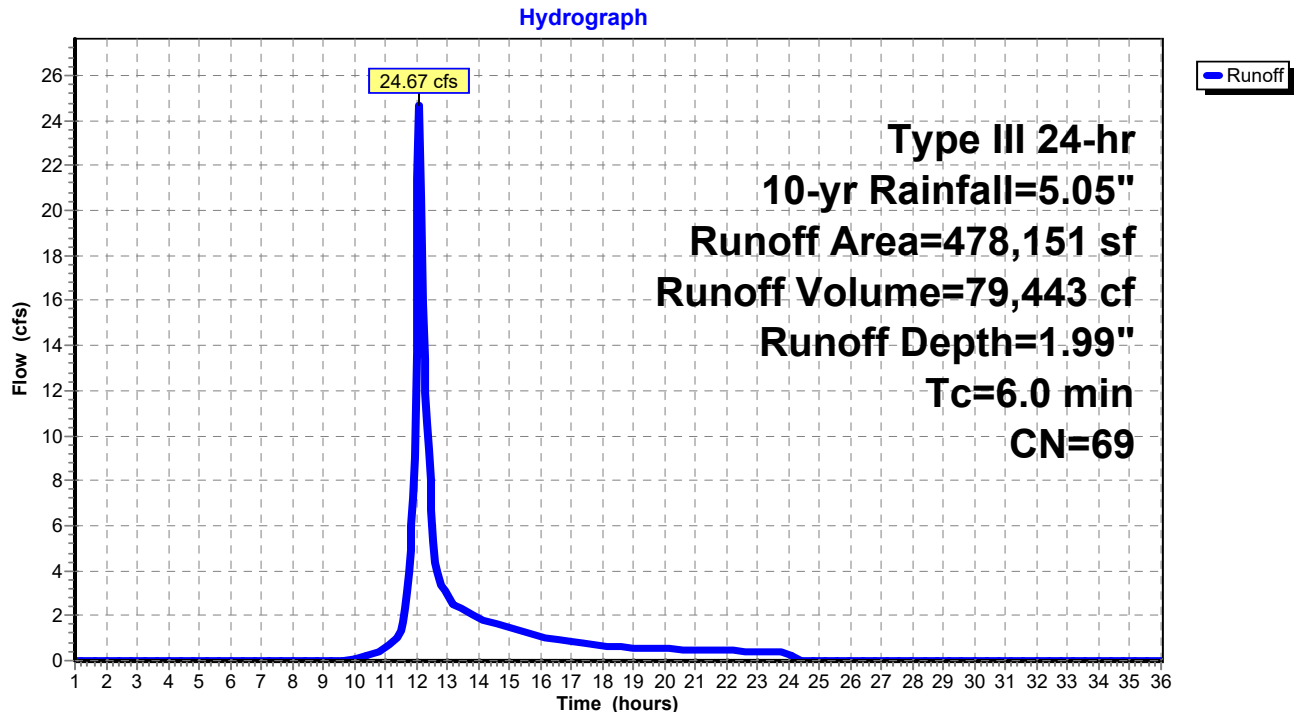
Runoff = 24.67 cfs @ 12.10 hrs, Volume= 79,443 cf, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
21,716	82	Dirt roads, HSG B
28,164	85	Gravel roads, HSG B
14,392	98	Roofs, HSG B
871	30	Woods, Good, HSG A
30,185	55	Woods, Good, HSG B
382,823	67	Brush, Poor, HSG B
478,151	69	Weighted Average
463,759		96.99% Pervious Area
14,392		3.01% Impervious Area

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

Subcatchment 2S: Eastern Area



Summary for Subcatchment 3S: Center-Eastern Area

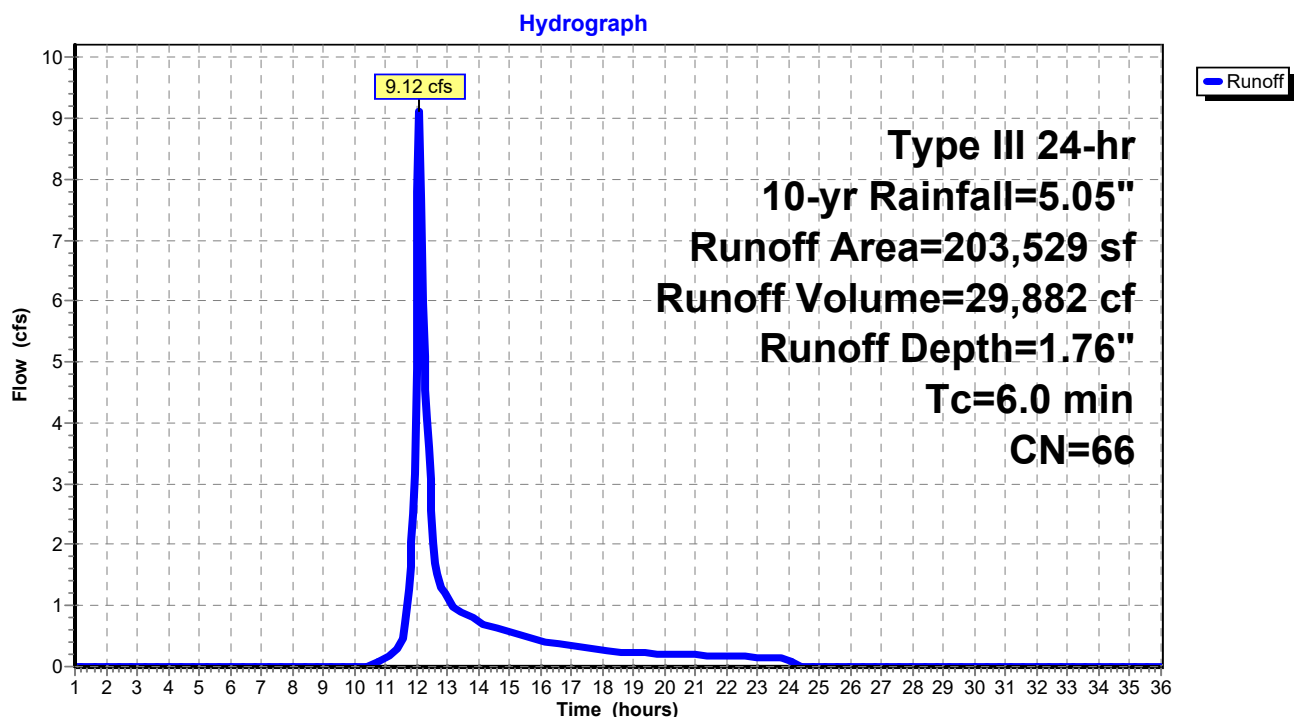
Runoff = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

	Area (sf)	CN	Description
*	178,530	65	Upland Bog Area
	1,742	72	Dirt roads, HSG A
	10,138	82	Dirt roads, HSG B
	604	30	Woods, Good, HSG A
	12,515	67	Brush, Poor, HSG B
	203,529	66	Weighted Average
	203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area



Summary for Subcatchment 4S: Center-Western Area

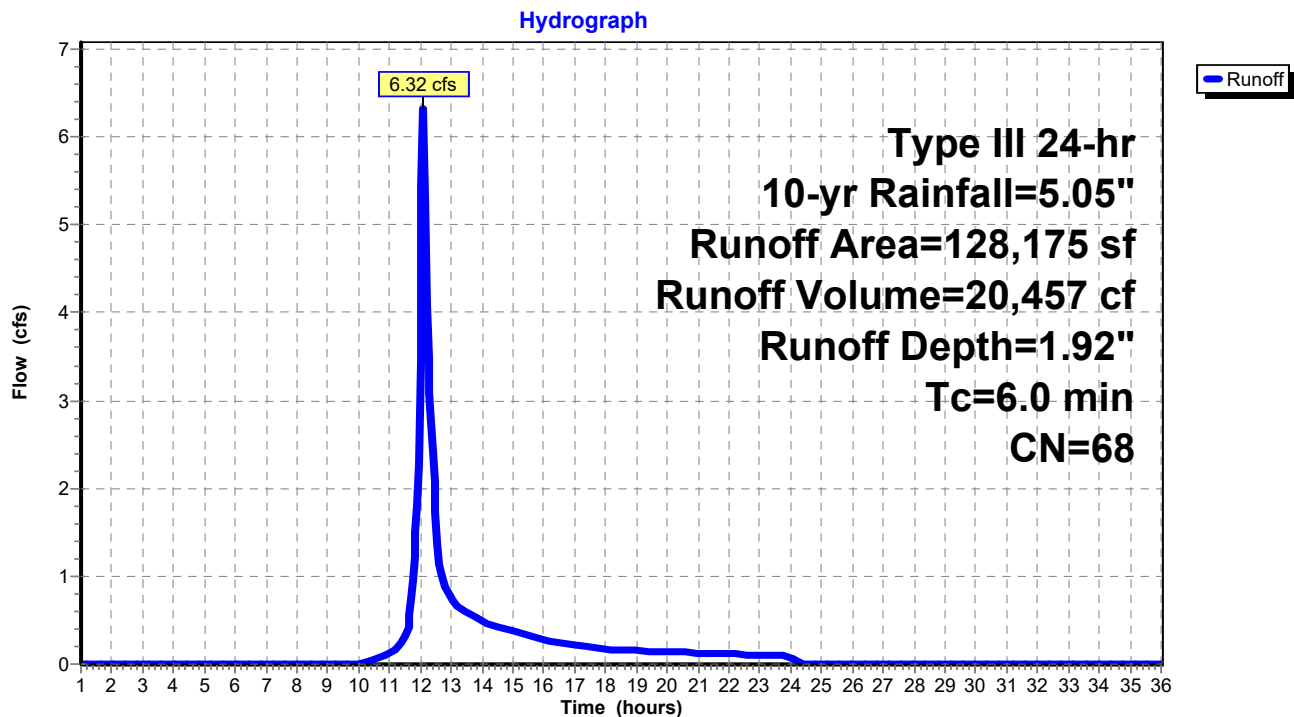
Runoff = 6.32 cfs @ 12.10 hrs, Volume= 20,457 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
10,682	82	Dirt roads, HSG B
953	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
116,075	67	Brush, Poor, HSG B
128,175	68	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area



Summary for Subcatchment 5S: Northwestern Area

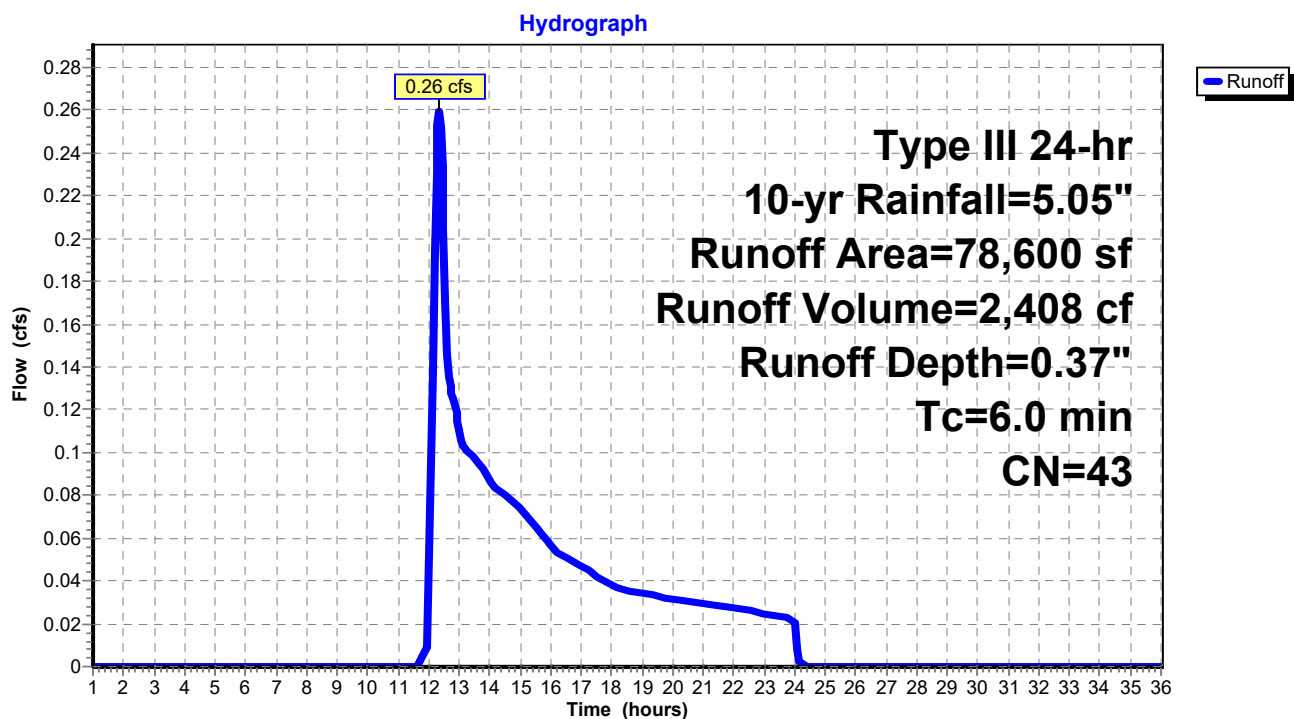
Runoff = 0.26 cfs @ 12.35 hrs, Volume= 2,408 cf, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
51,381	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
26,398	67	Brush, Poor, HSG B
78,600	43	Weighted Average
78,600		100.00% Pervious Area

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

Subcatchment 5S: Northwestern Area

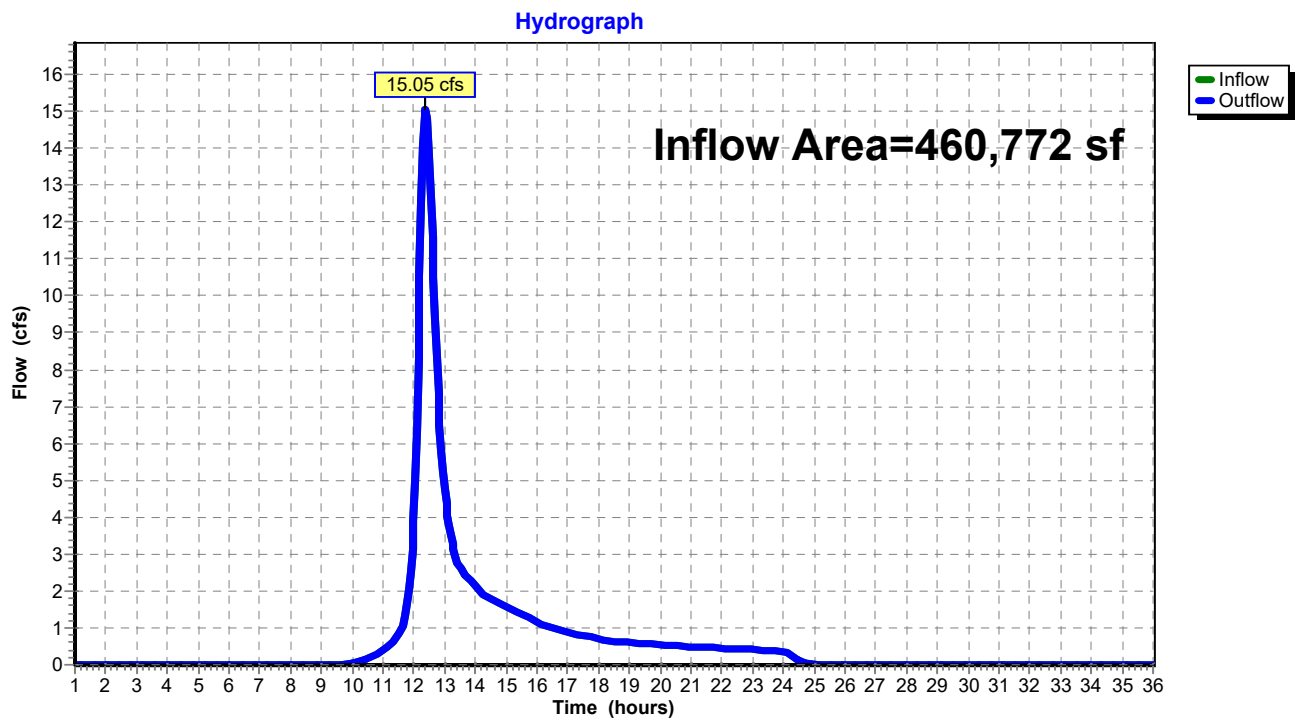


Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 31.44% Impervious, Inflow Depth = 2.07" for 10-yr event
Inflow = 15.05 cfs @ 12.39 hrs, Volume= 79,616 cf
Outflow = 15.05 cfs @ 12.39 hrs, Volume= 79,616 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond

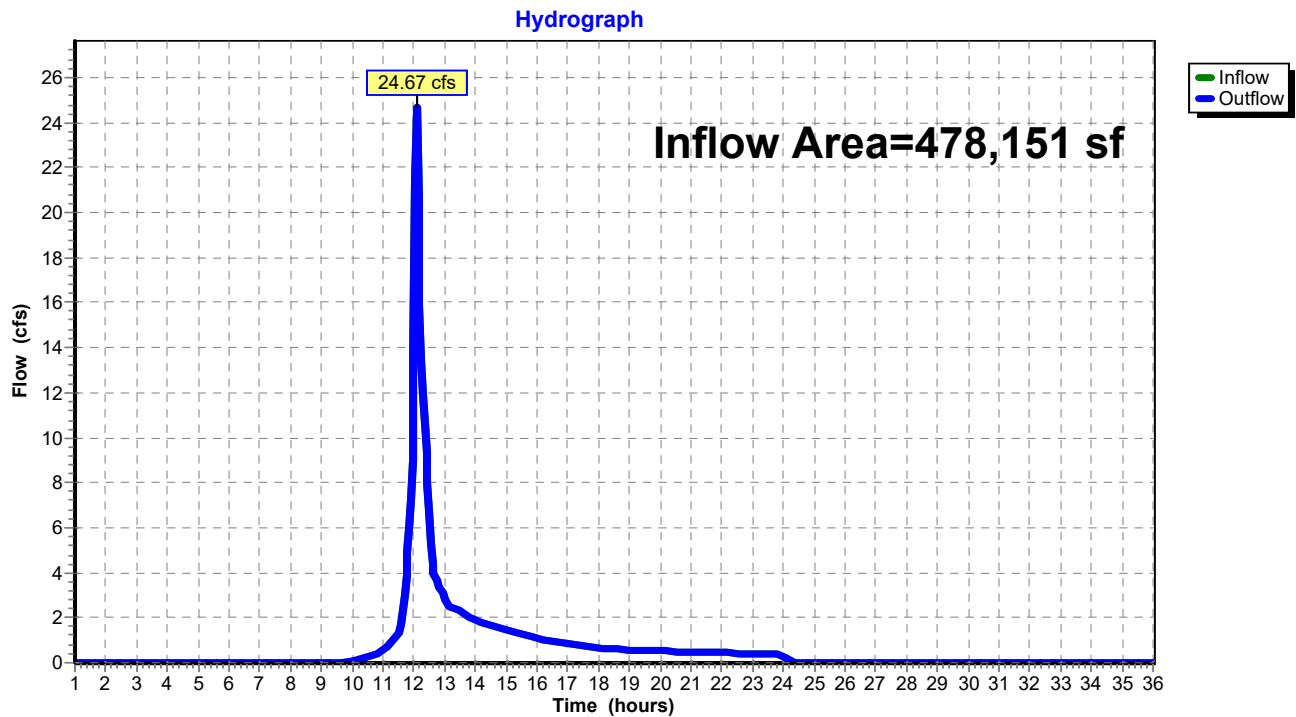


Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,151 sf, 3.01% Impervious, Inflow Depth = 1.99" for 10-yr event
Inflow = 24.67 cfs @ 12.10 hrs, Volume= 79,443 cf
Outflow = 24.67 cfs @ 12.10 hrs, Volume= 79,443 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream

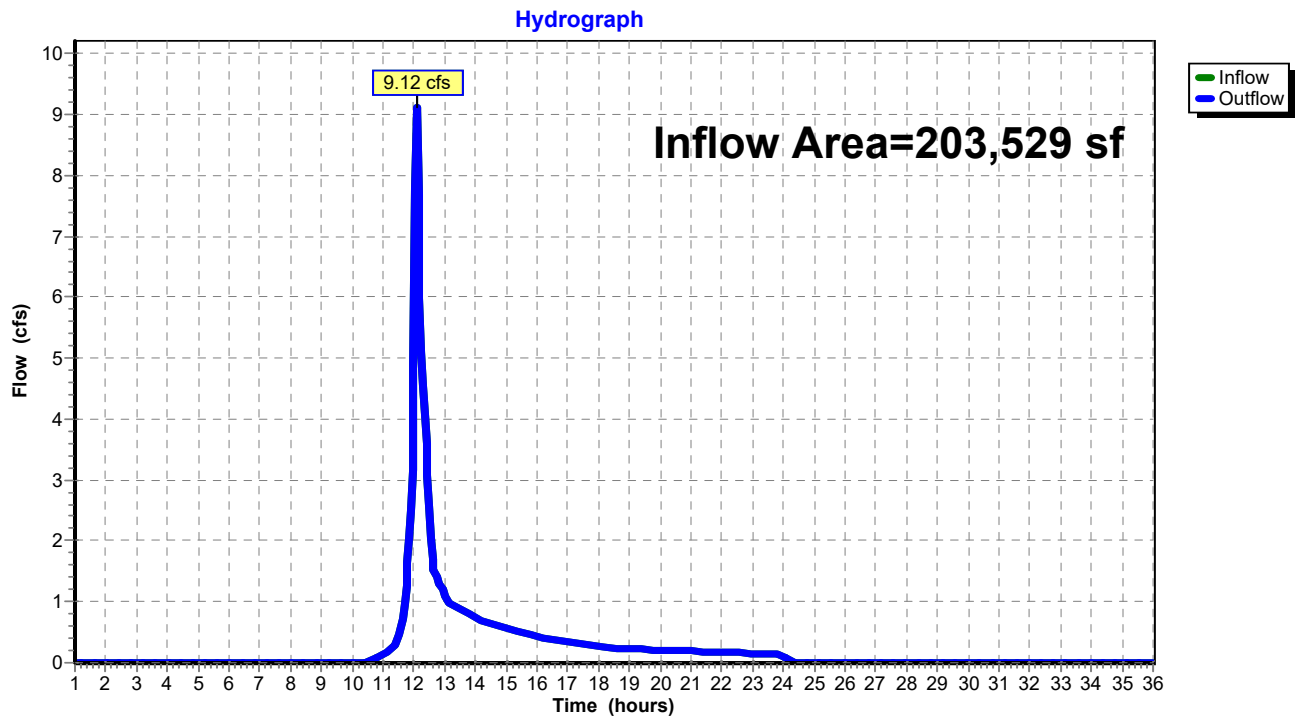


Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 1.76" for 10-yr event
Inflow = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf
Outflow = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

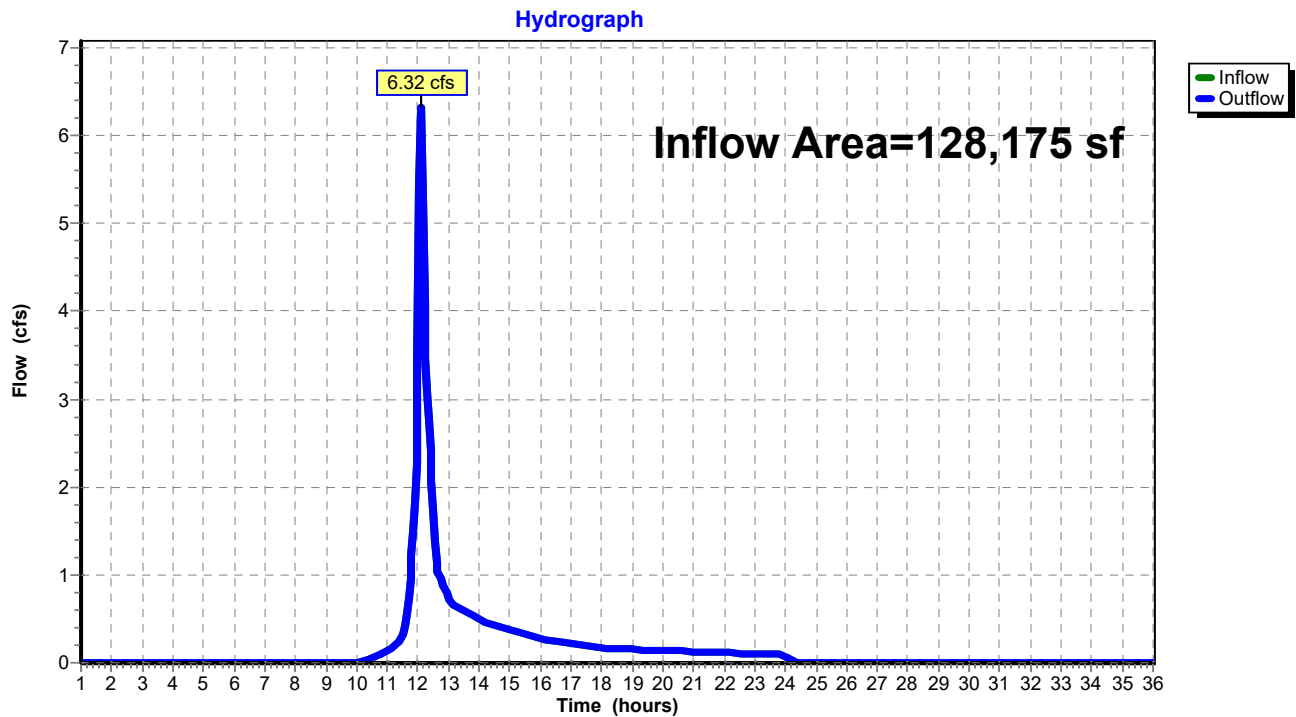


Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 1.92" for 10-yr event
Inflow = 6.32 cfs @ 12.10 hrs, Volume= 20,457 cf
Outflow = 6.32 cfs @ 12.10 hrs, Volume= 20,457 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

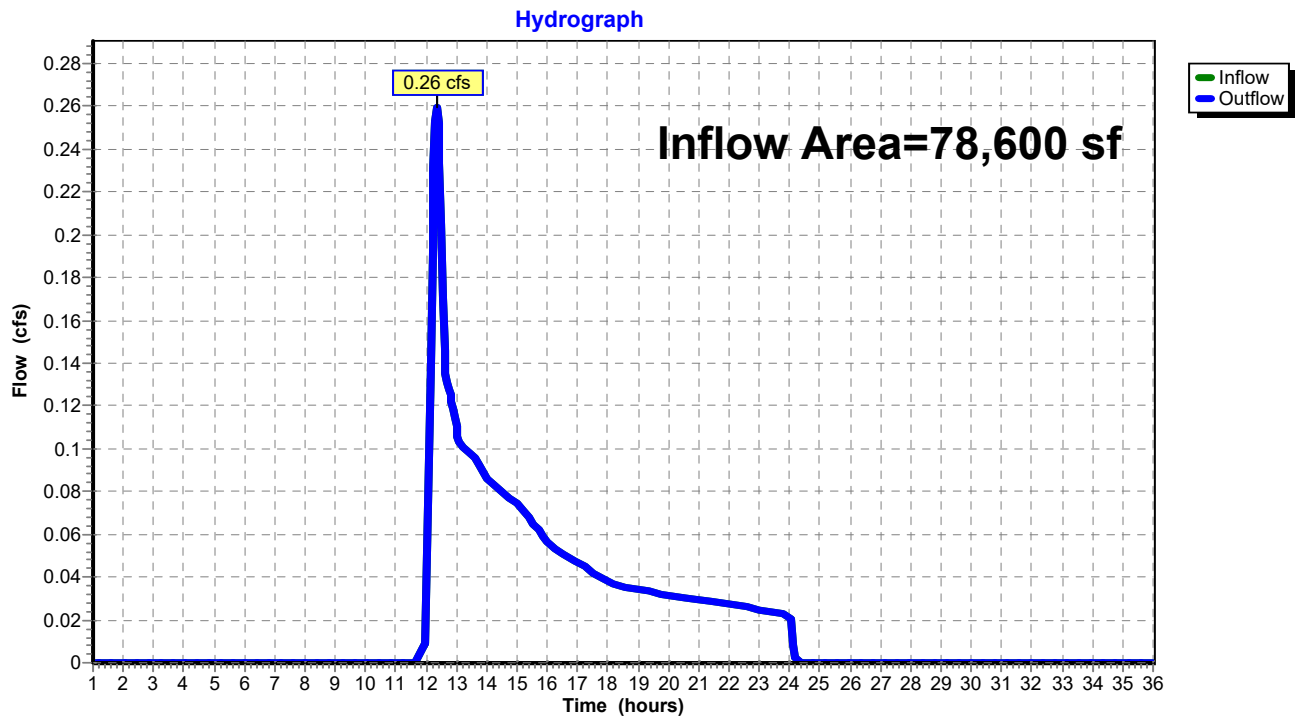


Summary for Reach DP-5: Herring Brook

Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 0.37" for 10-yr event
Inflow = 0.26 cfs @ 12.35 hrs, Volume= 2,408 cf
Outflow = 0.26 cfs @ 12.35 hrs, Volume= 2,408 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



Summary for Subcatchment 1S: Southwest-Western Area

Runoff = 21.11 cfs @ 12.38 hrs, Volume= 110,155 cf, Depth= 2.87"

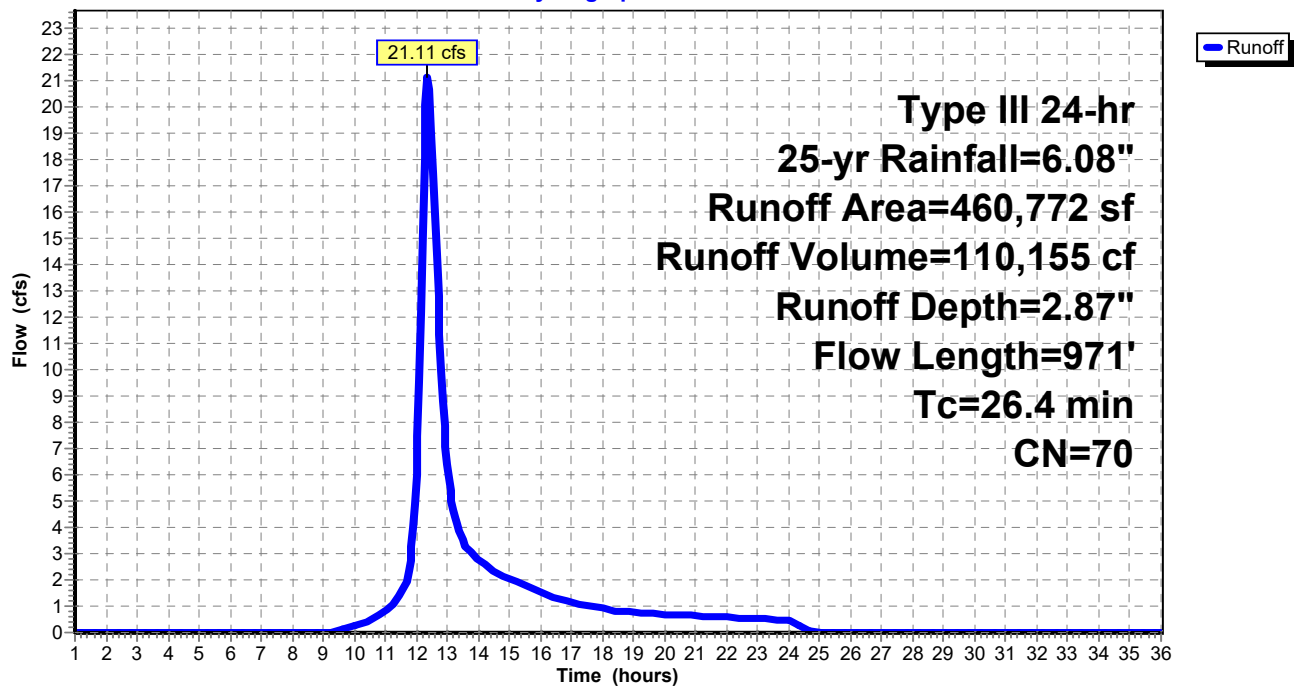
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
7,444	85	Gravel roads, HSG B
14,768	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
96,435	30	Woods, Good, HSG A
3,370	55	Woods, Good, HSG B
25,348	73	Woods/grass comb., Poor, HSG B
183,303	67	Brush, Poor, HSG B
460,772	70	Weighted Average
315,900		68.56% Pervious Area
144,872		31.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.2	400	0.0225	3.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	371	0.0455	3.43		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.4	971	Total			

Subcatchment 1S: Southwest-Western Area

Hydrograph



Summary for Subcatchment 2S: Eastern Area

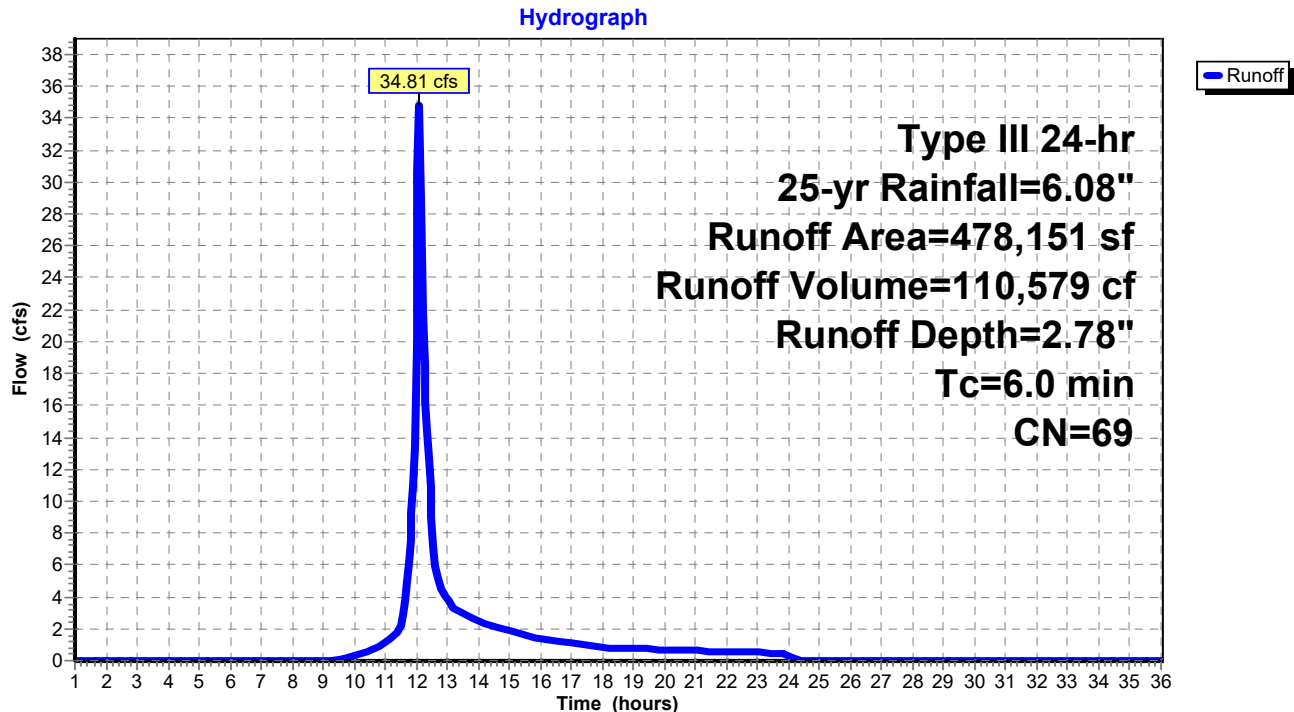
Runoff = 34.81 cfs @ 12.10 hrs, Volume= 110,579 cf, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
21,716	82	Dirt roads, HSG B
28,164	85	Gravel roads, HSG B
14,392	98	Roofs, HSG B
871	30	Woods, Good, HSG A
30,185	55	Woods, Good, HSG B
382,823	67	Brush, Poor, HSG B
478,151	69	Weighted Average
463,759		96.99% Pervious Area
14,392		3.01% Impervious Area

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

Subcatchment 2S: Eastern Area



Summary for Subcatchment 3S: Center-Eastern Area

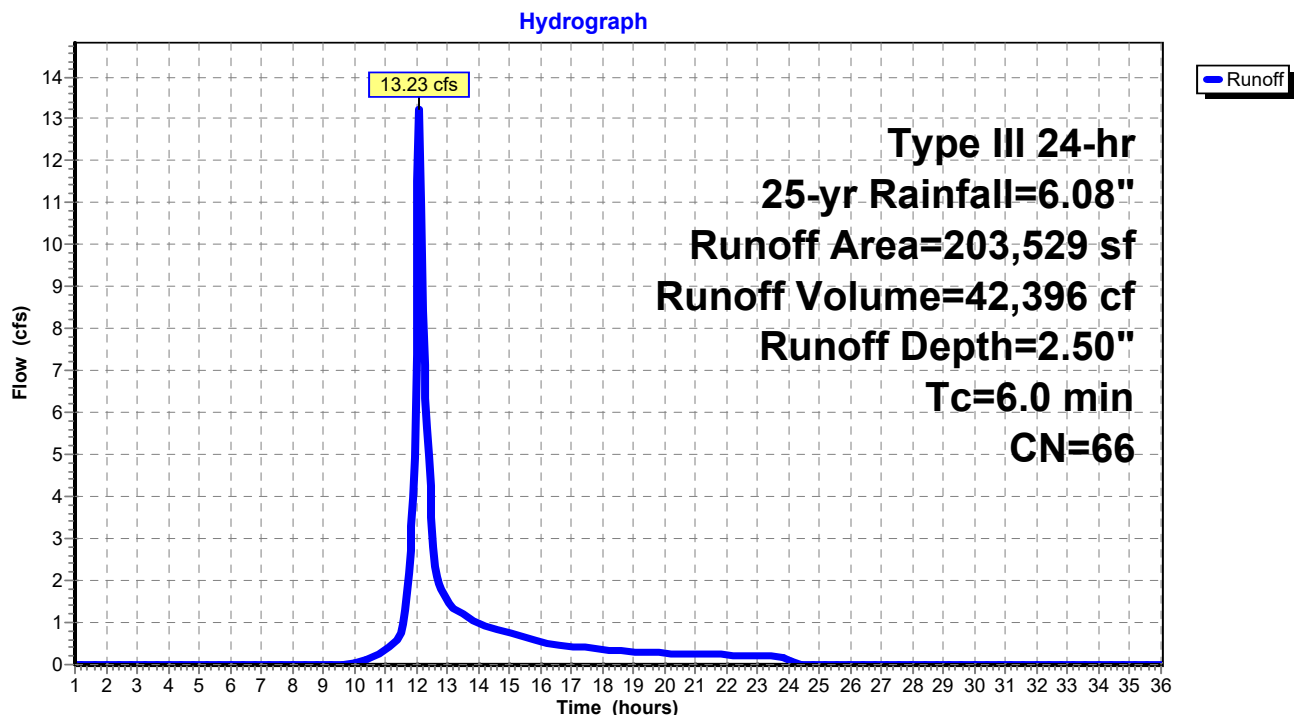
Runoff = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

	Area (sf)	CN	Description
*	178,530	65	Upland Bog Area
	1,742	72	Dirt roads, HSG A
	10,138	82	Dirt roads, HSG B
	604	30	Woods, Good, HSG A
	12,515	67	Brush, Poor, HSG B
	203,529	66	Weighted Average
	203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area



Summary for Subcatchment 4S: Center-Western Area

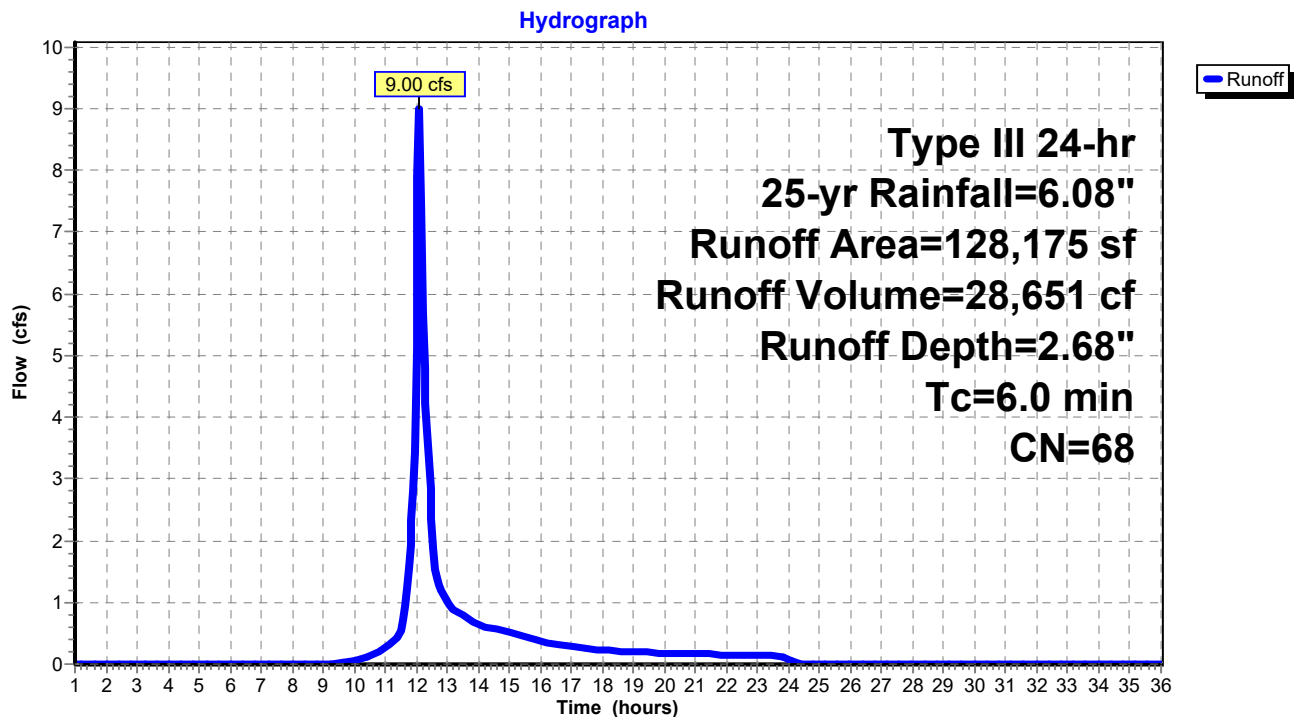
Runoff = 9.00 cfs @ 12.10 hrs, Volume= 28,651 cf, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
10,682	82	Dirt roads, HSG B
953	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
116,075	67	Brush, Poor, HSG B
128,175	68	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area



Summary for Subcatchment 5S: Northwestern Area

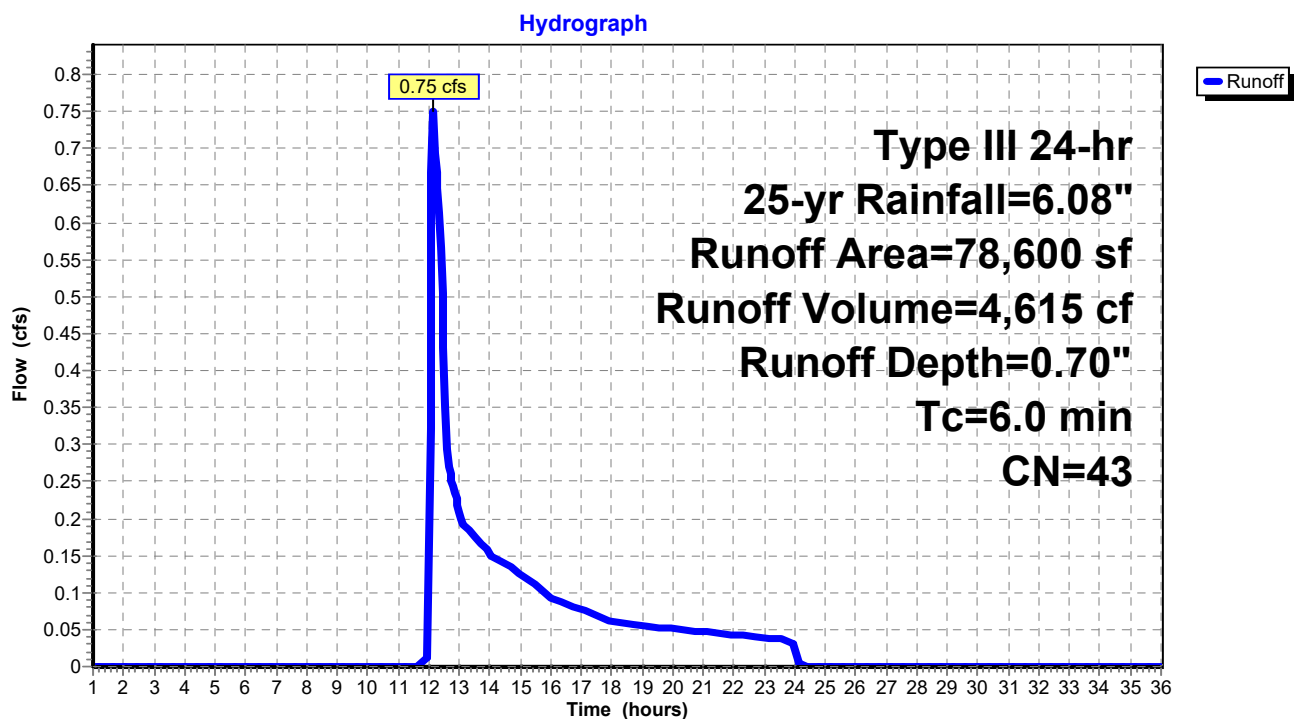
Runoff = 0.75 cfs @ 12.15 hrs, Volume= 4,615 cf, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
51,381	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
26,398	67	Brush, Poor, HSG B
78,600	43	Weighted Average
78,600		100.00% Pervious Area

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

Subcatchment 5S: Northwestern Area

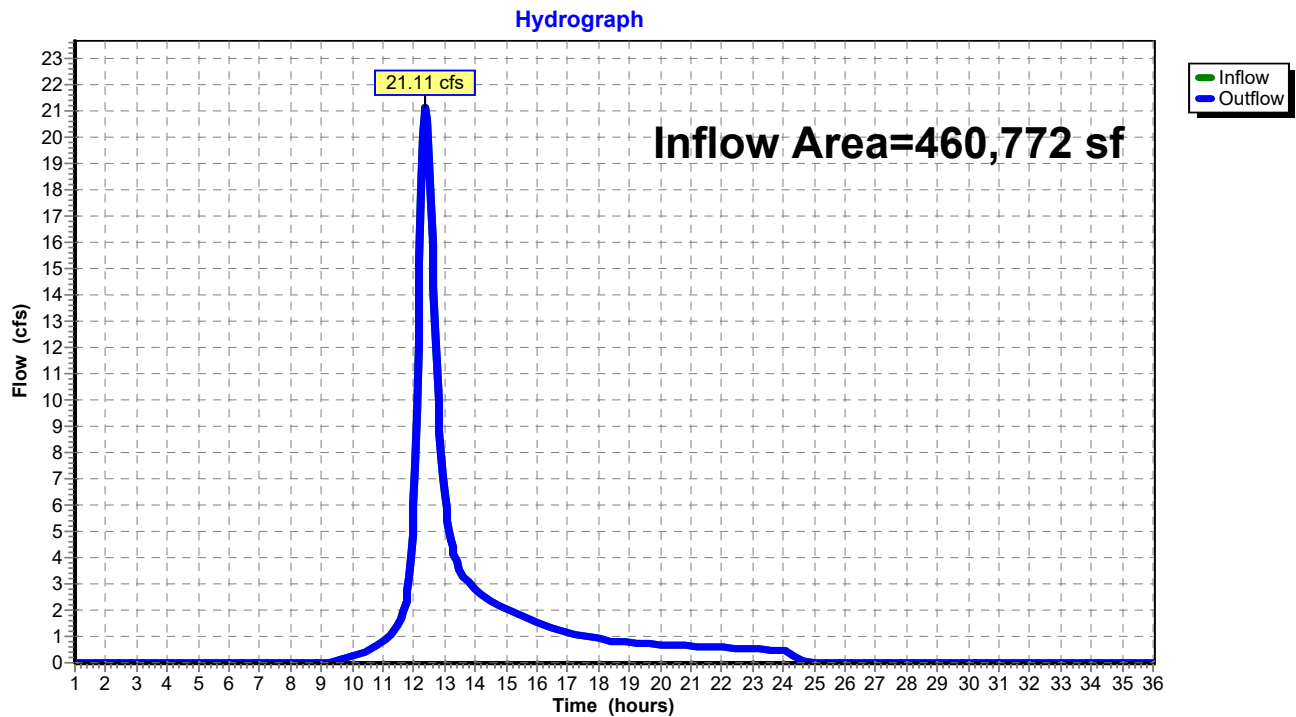


Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 31.44% Impervious, Inflow Depth = 2.87" for 25-yr event
Inflow = 21.11 cfs @ 12.38 hrs, Volume= 110,155 cf
Outflow = 21.11 cfs @ 12.38 hrs, Volume= 110,155 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond

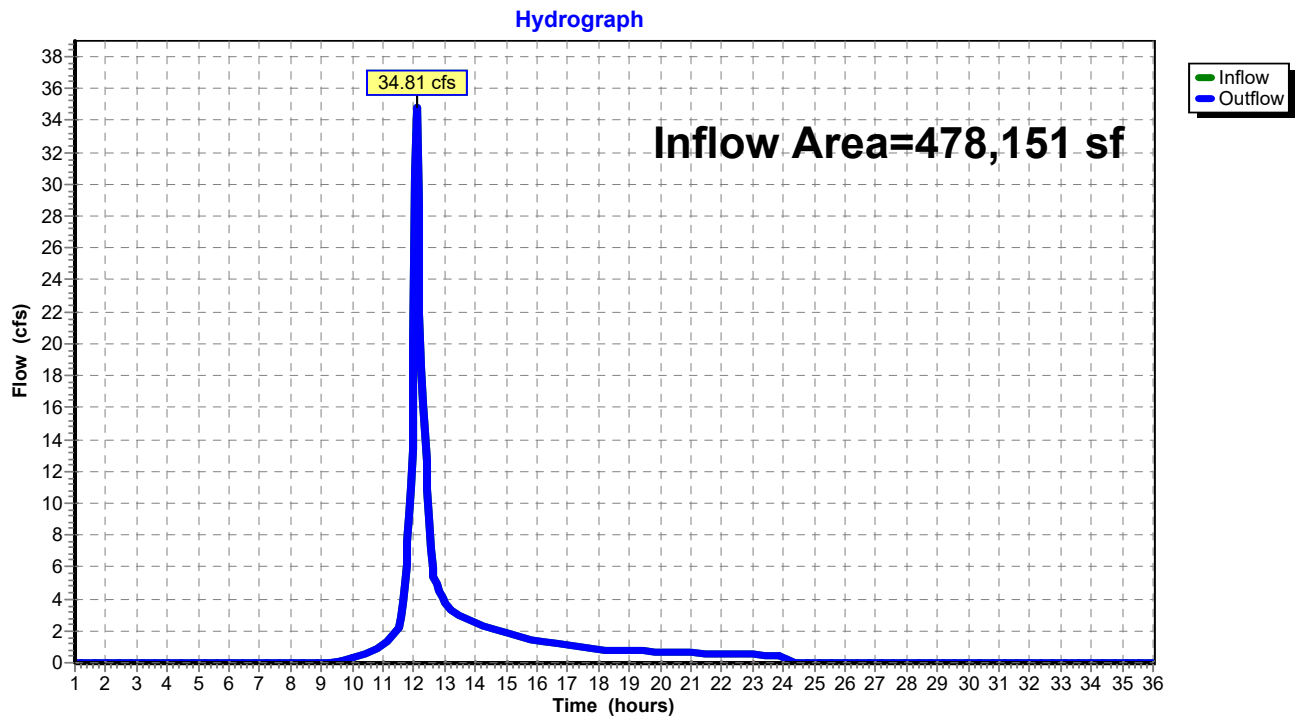


Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,151 sf, 3.01% Impervious, Inflow Depth = 2.78" for 25-yr event
Inflow = 34.81 cfs @ 12.10 hrs, Volume= 110,579 cf
Outflow = 34.81 cfs @ 12.10 hrs, Volume= 110,579 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream

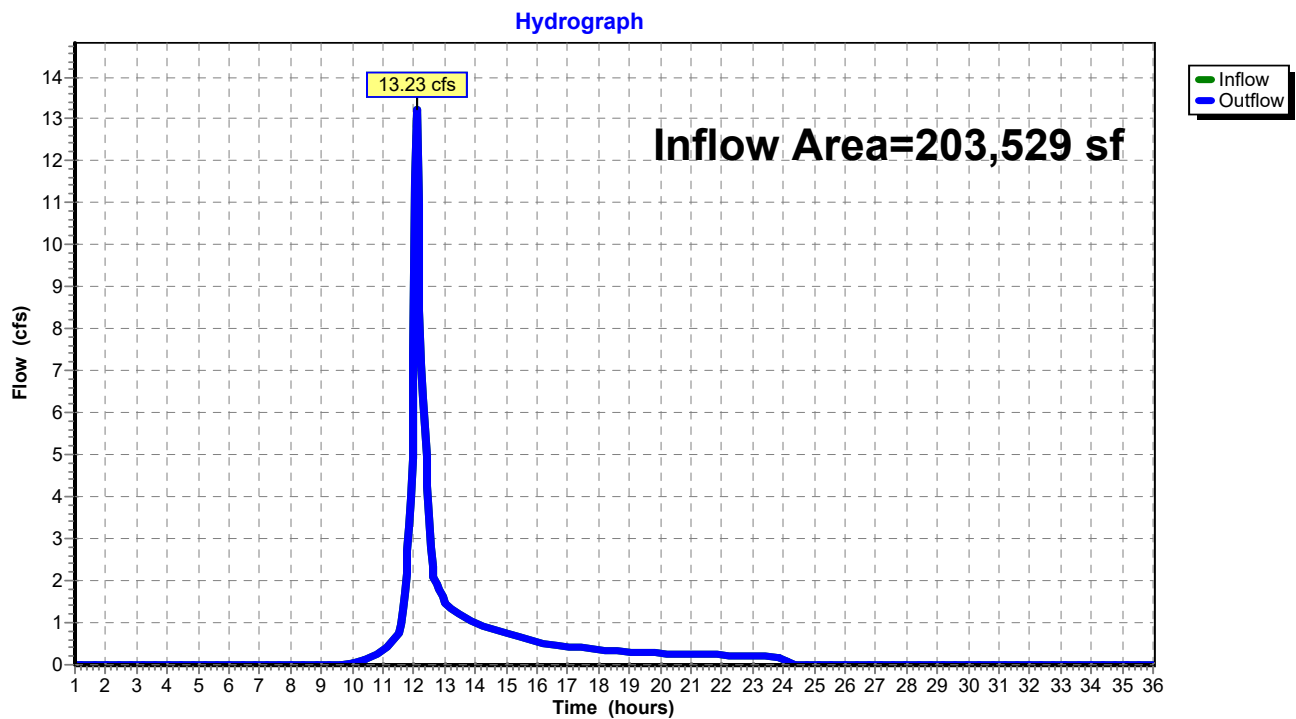


Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 2.50" for 25-yr event
Inflow = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf
Outflow = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

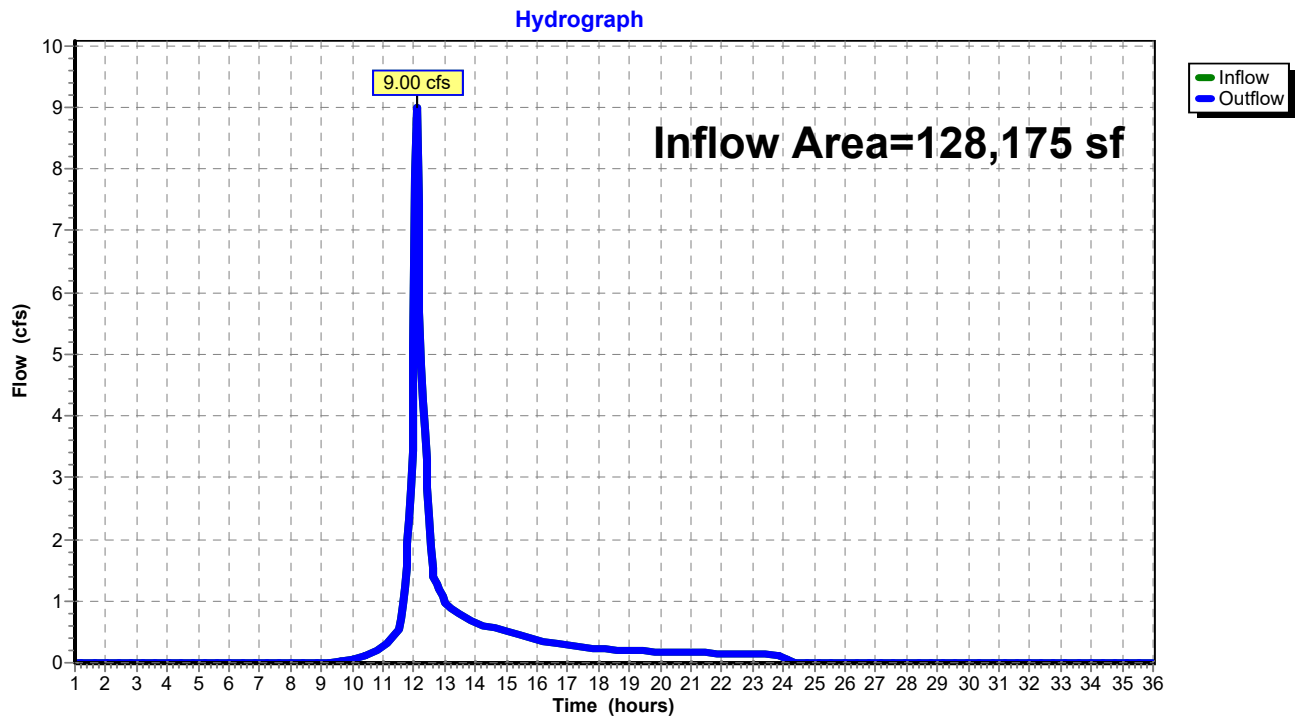


Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 2.68" for 25-yr event
Inflow = 9.00 cfs @ 12.10 hrs, Volume= 28,651 cf
Outflow = 9.00 cfs @ 12.10 hrs, Volume= 28,651 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

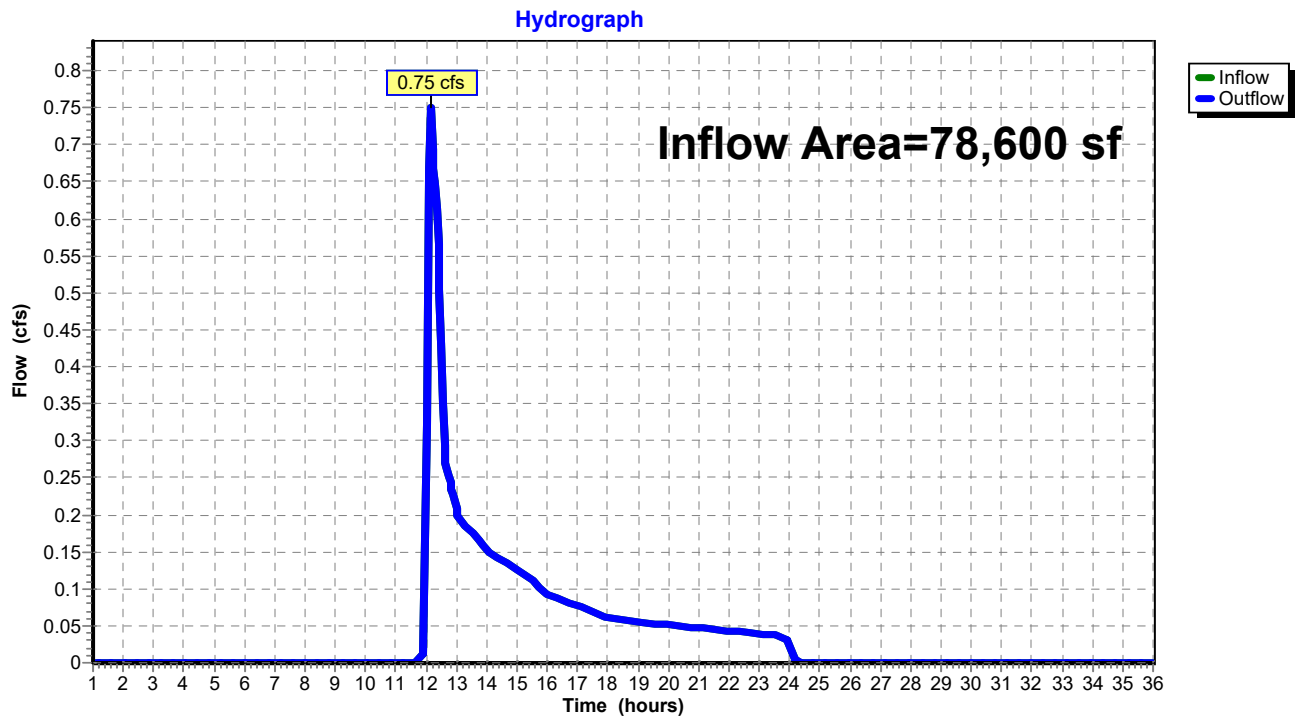


Summary for Reach DP-5: Herring Brook

Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 0.70" for 25-yr event
Inflow = 0.75 cfs @ 12.15 hrs, Volume= 4,615 cf
Outflow = 0.75 cfs @ 12.15 hrs, Volume= 4,615 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



Summary for Subcatchment 1S: Southwest-Western Area

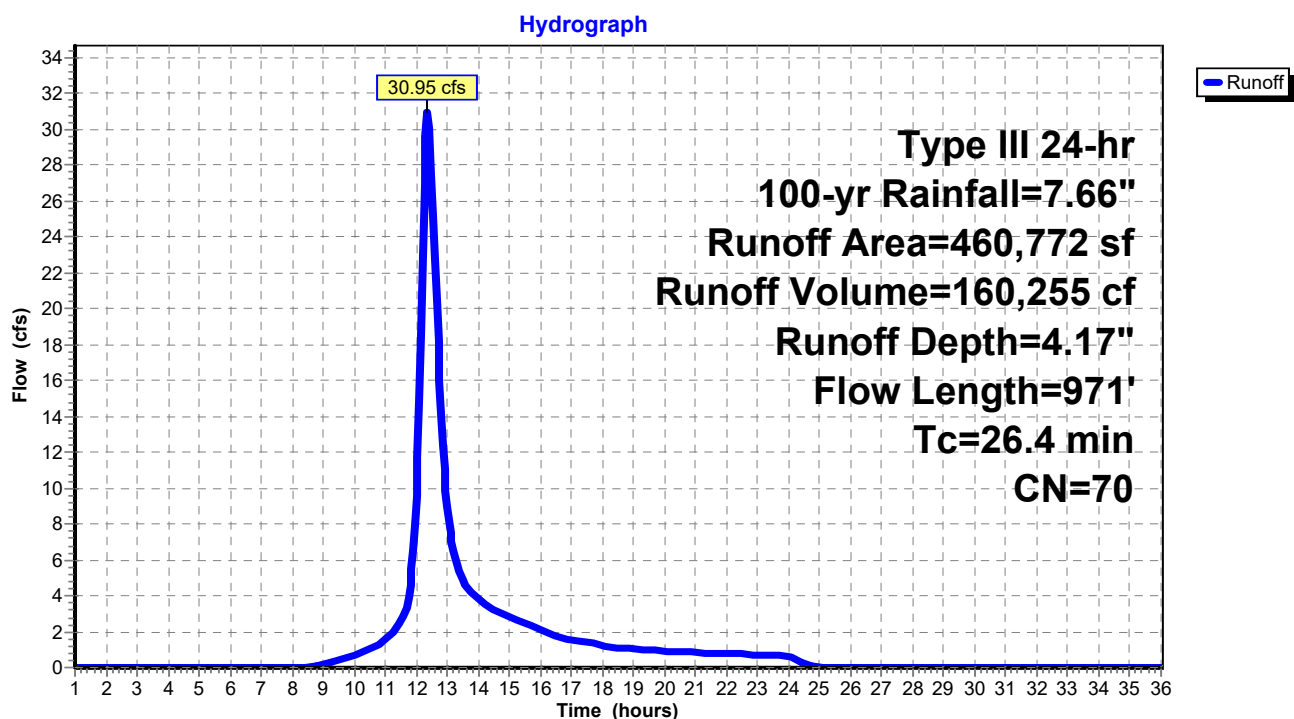
Runoff = 30.95 cfs @ 12.37 hrs, Volume= 160,255 cf, Depth= 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
7,444	85	Gravel roads, HSG B
14,768	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
96,435	30	Woods, Good, HSG A
3,370	55	Woods, Good, HSG B
25,348	73	Woods/grass comb., Poor, HSG B
183,303	67	Brush, Poor, HSG B
460,772	70	Weighted Average
315,900		68.56% Pervious Area
144,872		31.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.2	400	0.0225	3.04		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	371	0.0455	3.43		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.4	971	Total			

Subcatchment 1S: Southwest-Western Area



Summary for Subcatchment 2S: Eastern Area

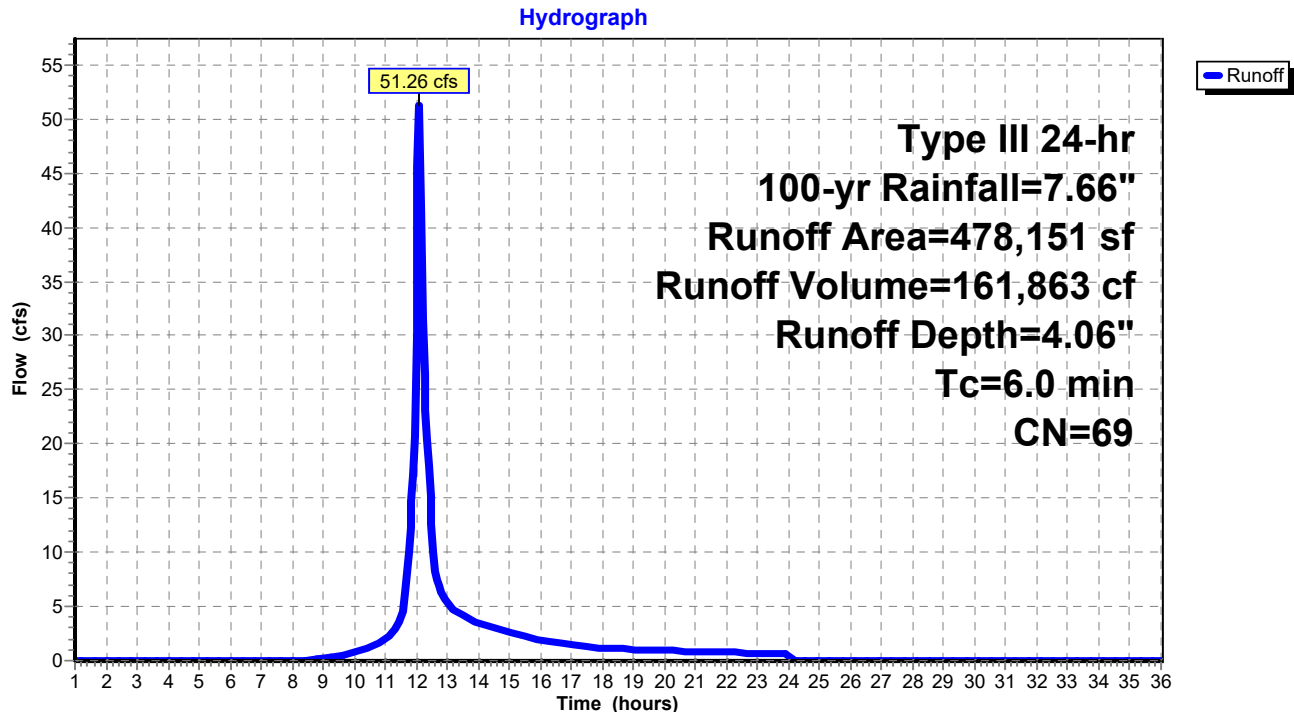
Runoff = 51.26 cfs @ 12.09 hrs, Volume= 161,863 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
21,716	82	Dirt roads, HSG B
28,164	85	Gravel roads, HSG B
14,392	98	Roofs, HSG B
871	30	Woods, Good, HSG A
30,185	55	Woods, Good, HSG B
382,823	67	Brush, Poor, HSG B
478,151	69	Weighted Average
463,759		96.99% Pervious Area
14,392		3.01% Impervious Area

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

Subcatchment 2S: Eastern Area



Summary for Subcatchment 3S: Center-Eastern Area

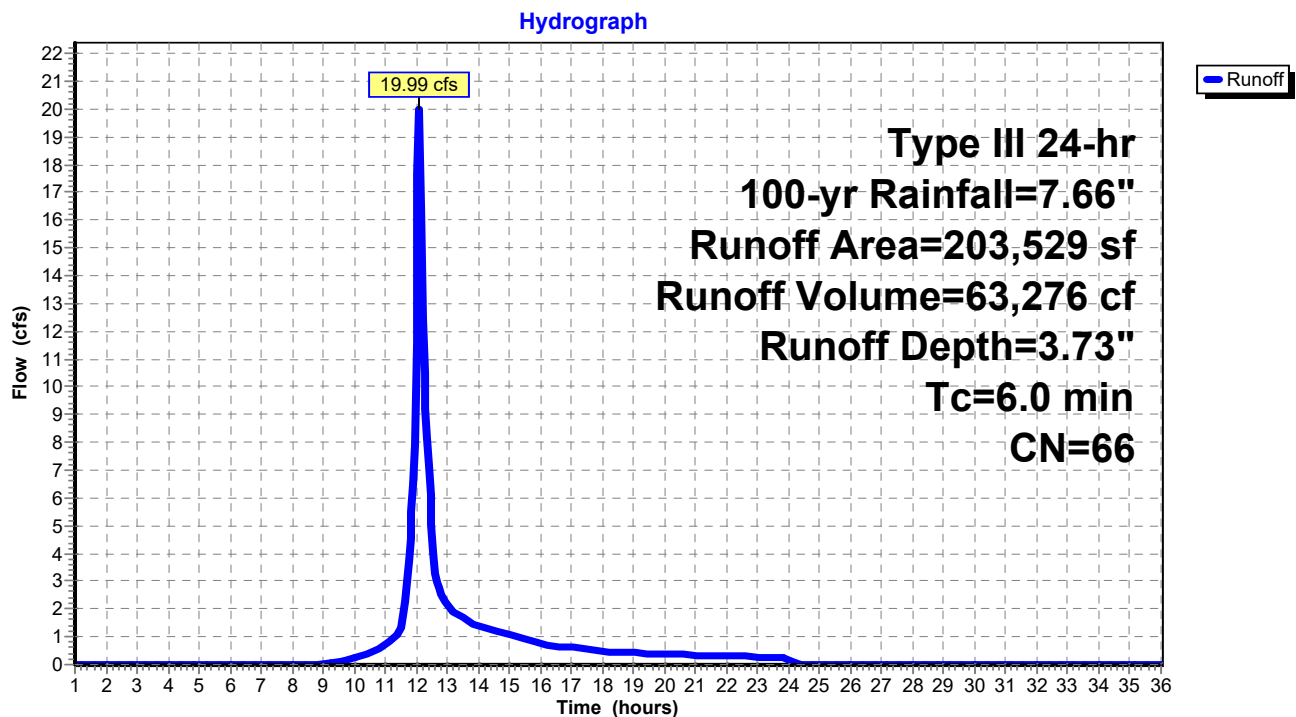
Runoff = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
* 178,530	65	Upland Bog Area
1,742	72	Dirt roads, HSG A
10,138	82	Dirt roads, HSG B
604	30	Woods, Good, HSG A
12,515	67	Brush, Poor, HSG B
203,529	66	Weighted Average
203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area



Summary for Subcatchment 4S: Center-Western Area

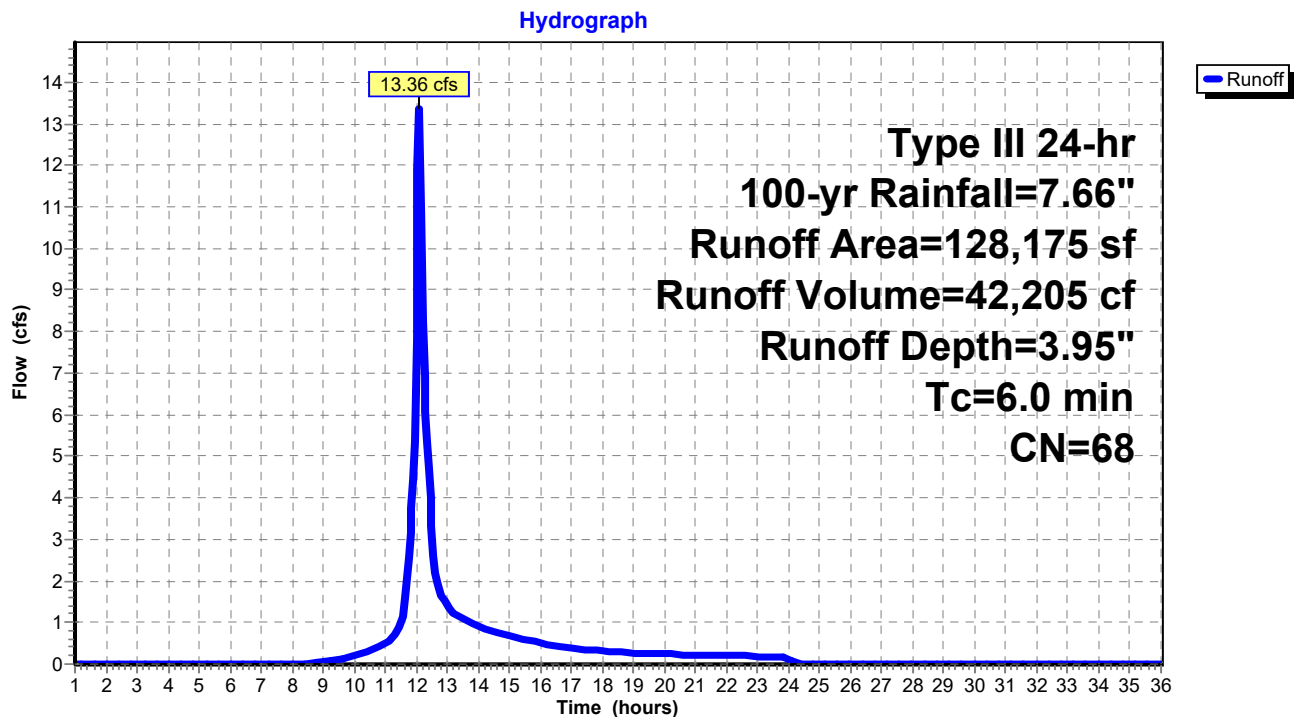
Runoff = 13.36 cfs @ 12.09 hrs, Volume= 42,205 cf, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
10,682	82	Dirt roads, HSG B
953	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
116,075	67	Brush, Poor, HSG B
128,175	68	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area



Summary for Subcatchment 5S: Northwestern Area

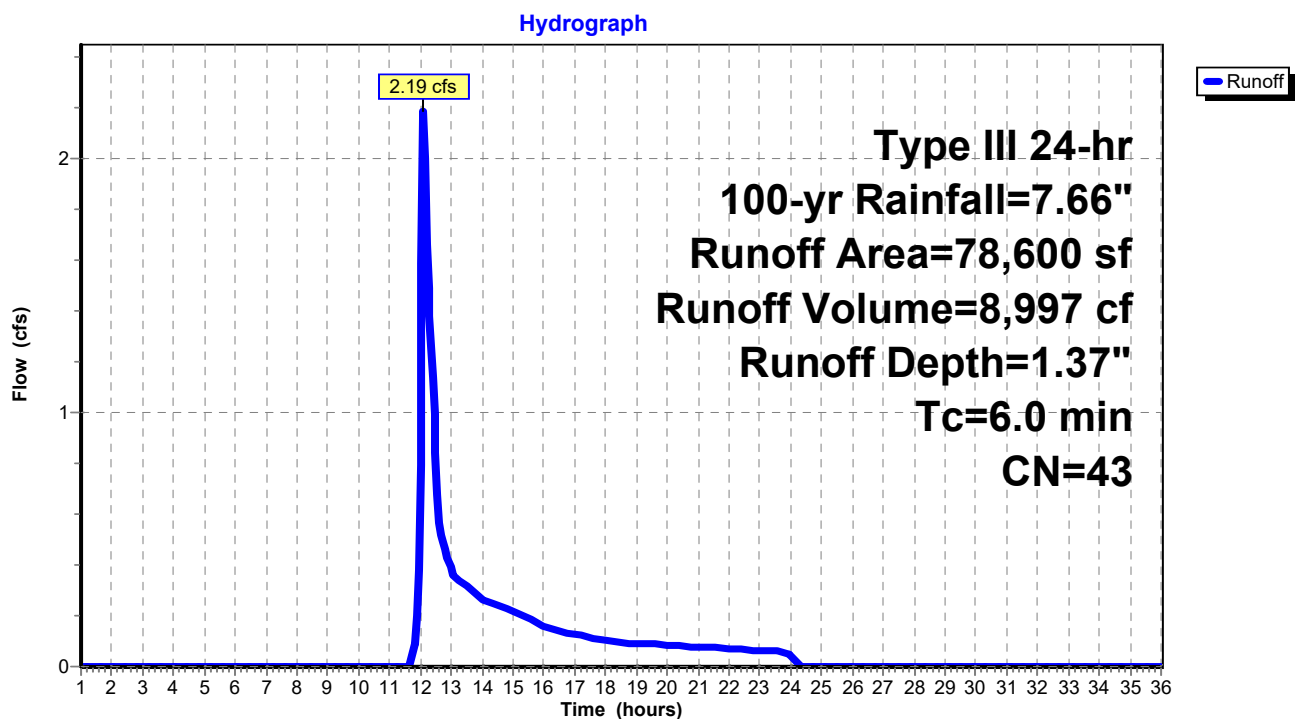
Runoff = 2.19 cfs @ 12.11 hrs, Volume= 8,997 cf, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
51,381	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
26,398	67	Brush, Poor, HSG B
78,600	43	Weighted Average
78,600		100.00% Pervious Area

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

Subcatchment 5S: Northwestern Area

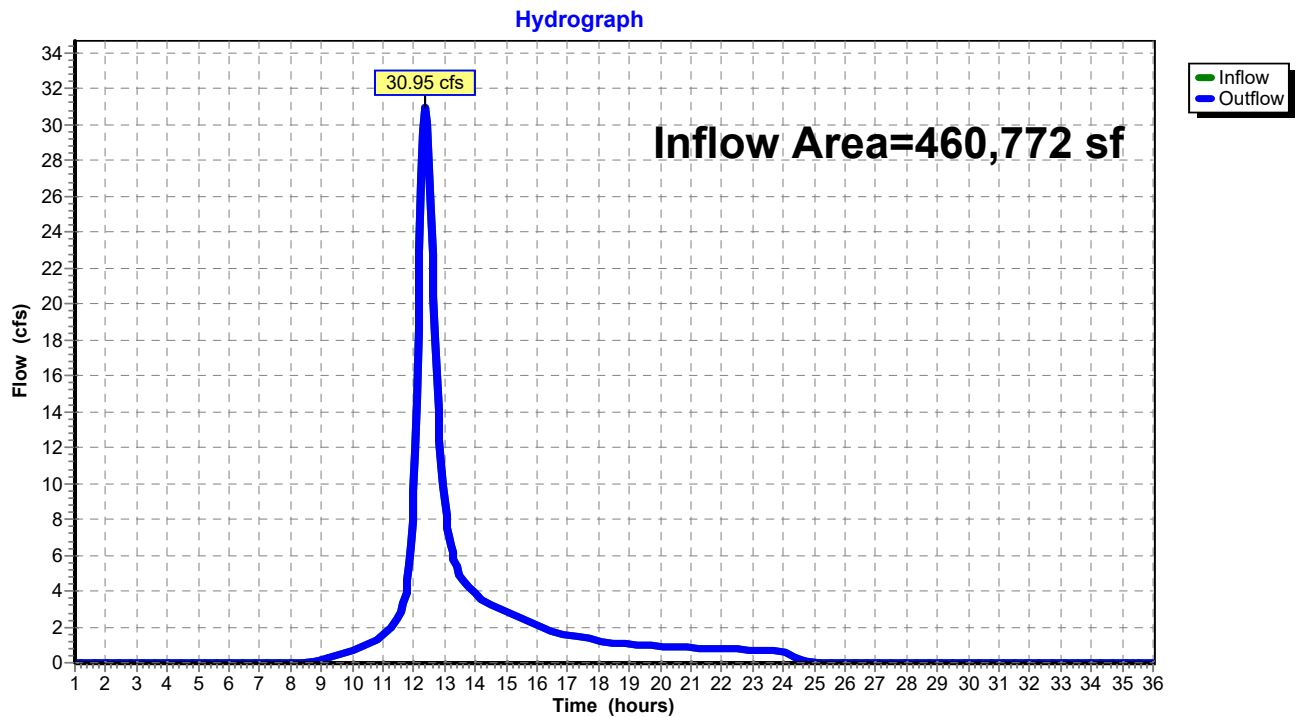


Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 31.44% Impervious, Inflow Depth = 4.17" for 100-yr event
Inflow = 30.95 cfs @ 12.37 hrs, Volume= 160,255 cf
Outflow = 30.95 cfs @ 12.37 hrs, Volume= 160,255 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond

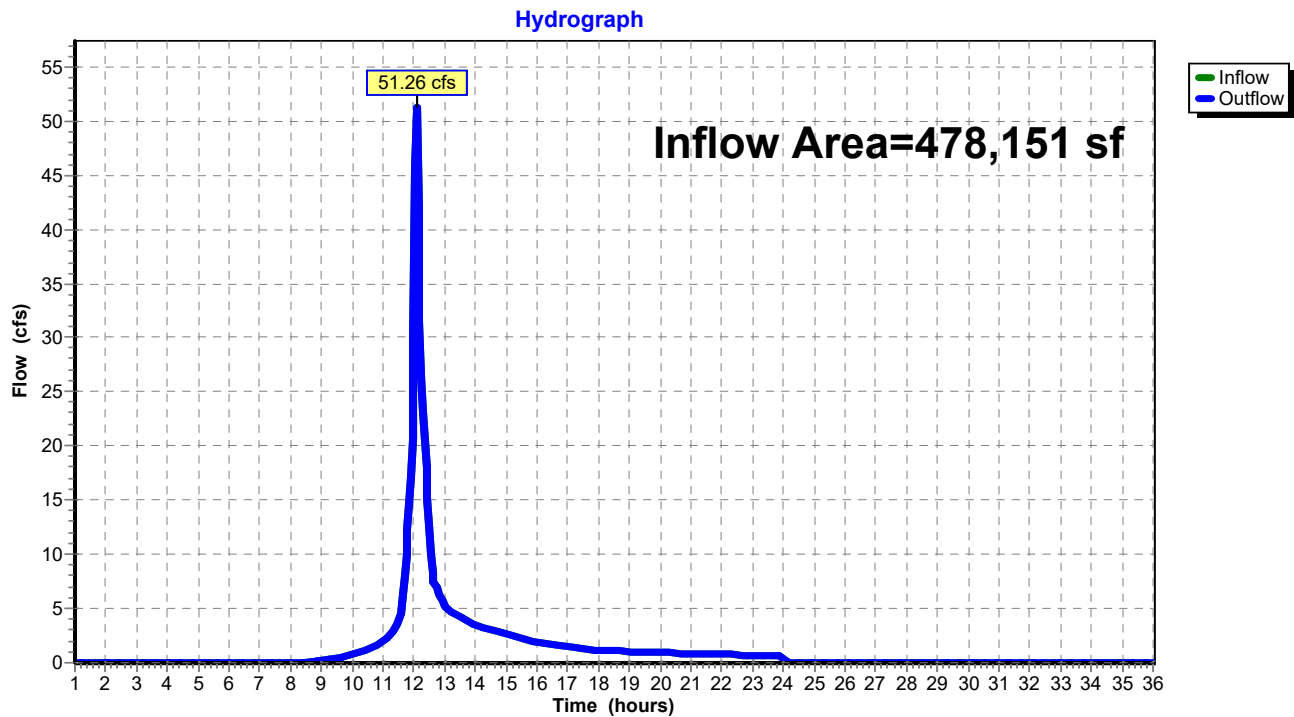


Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,151 sf, 3.01% Impervious, Inflow Depth = 4.06" for 100-yr event
Inflow = 51.26 cfs @ 12.09 hrs, Volume= 161,863 cf
Outflow = 51.26 cfs @ 12.09 hrs, Volume= 161,863 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream

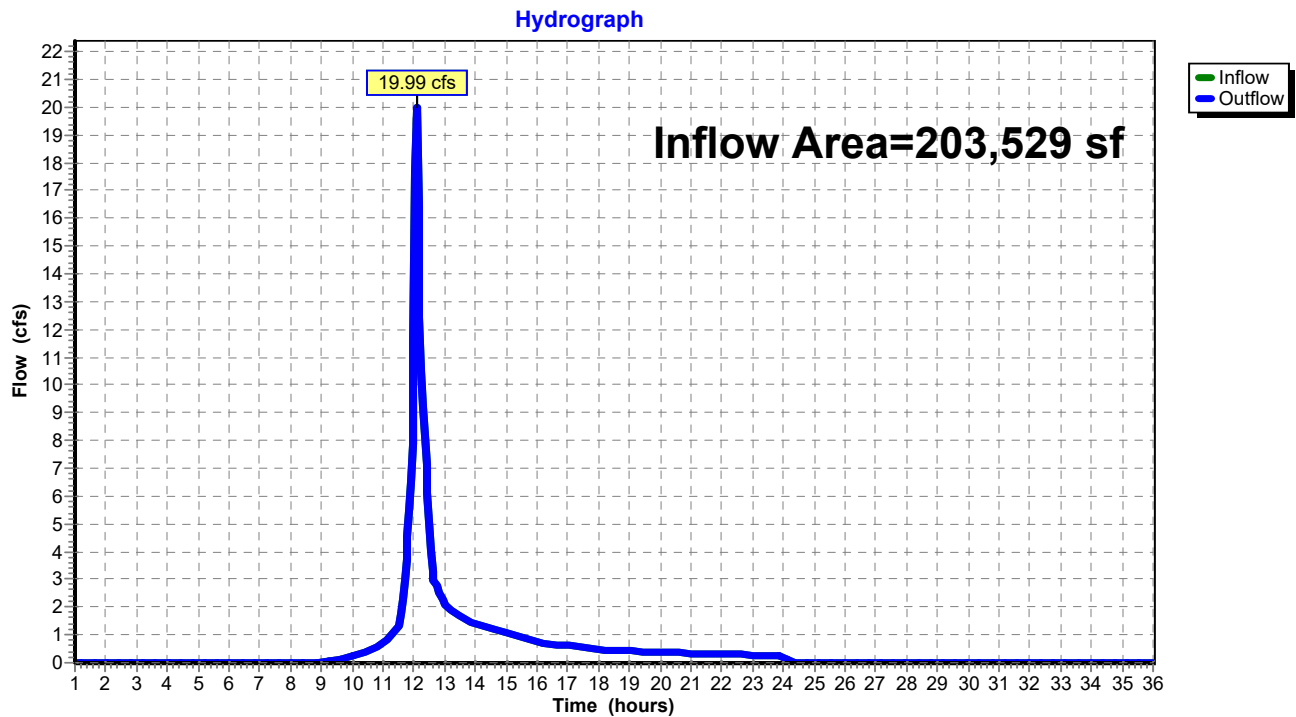


Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 3.73" for 100-yr event
Inflow = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf
Outflow = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

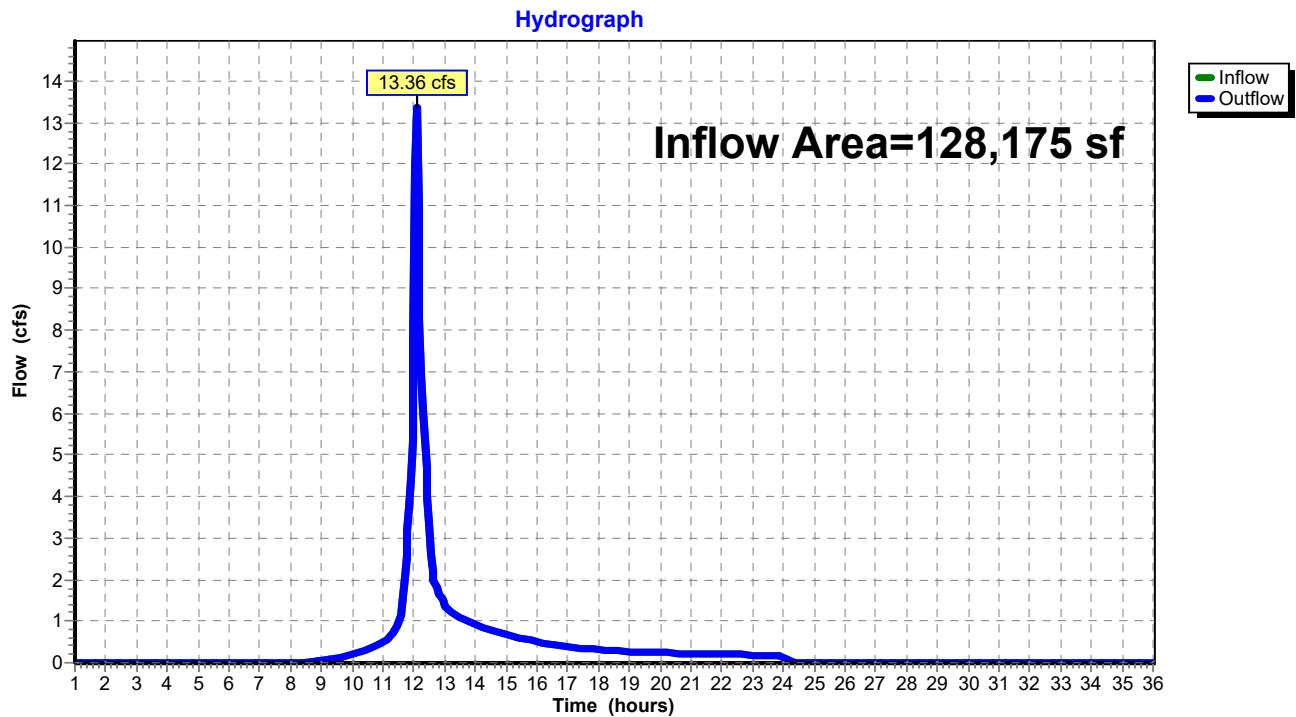


Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 3.95" for 100-yr event
Inflow = 13.36 cfs @ 12.09 hrs, Volume= 42,205 cf
Outflow = 13.36 cfs @ 12.09 hrs, Volume= 42,205 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

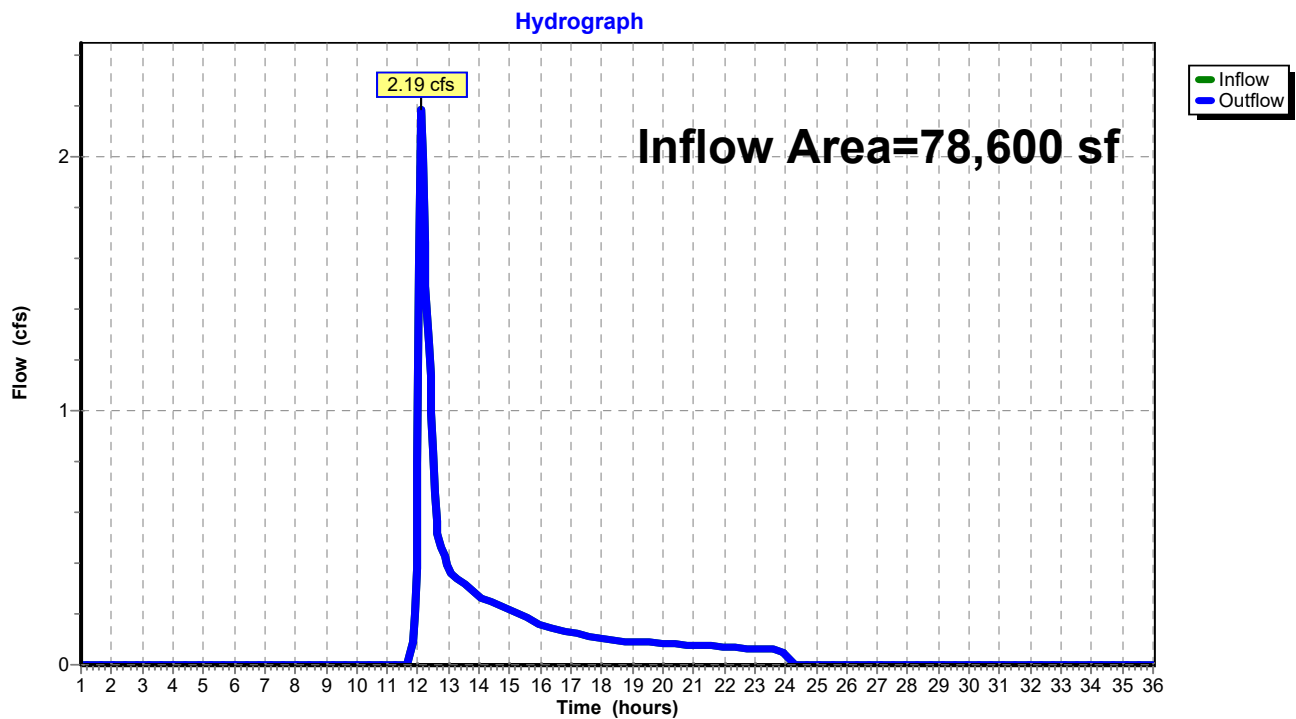


Summary for Reach DP-5: Herring Brook

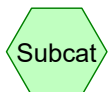
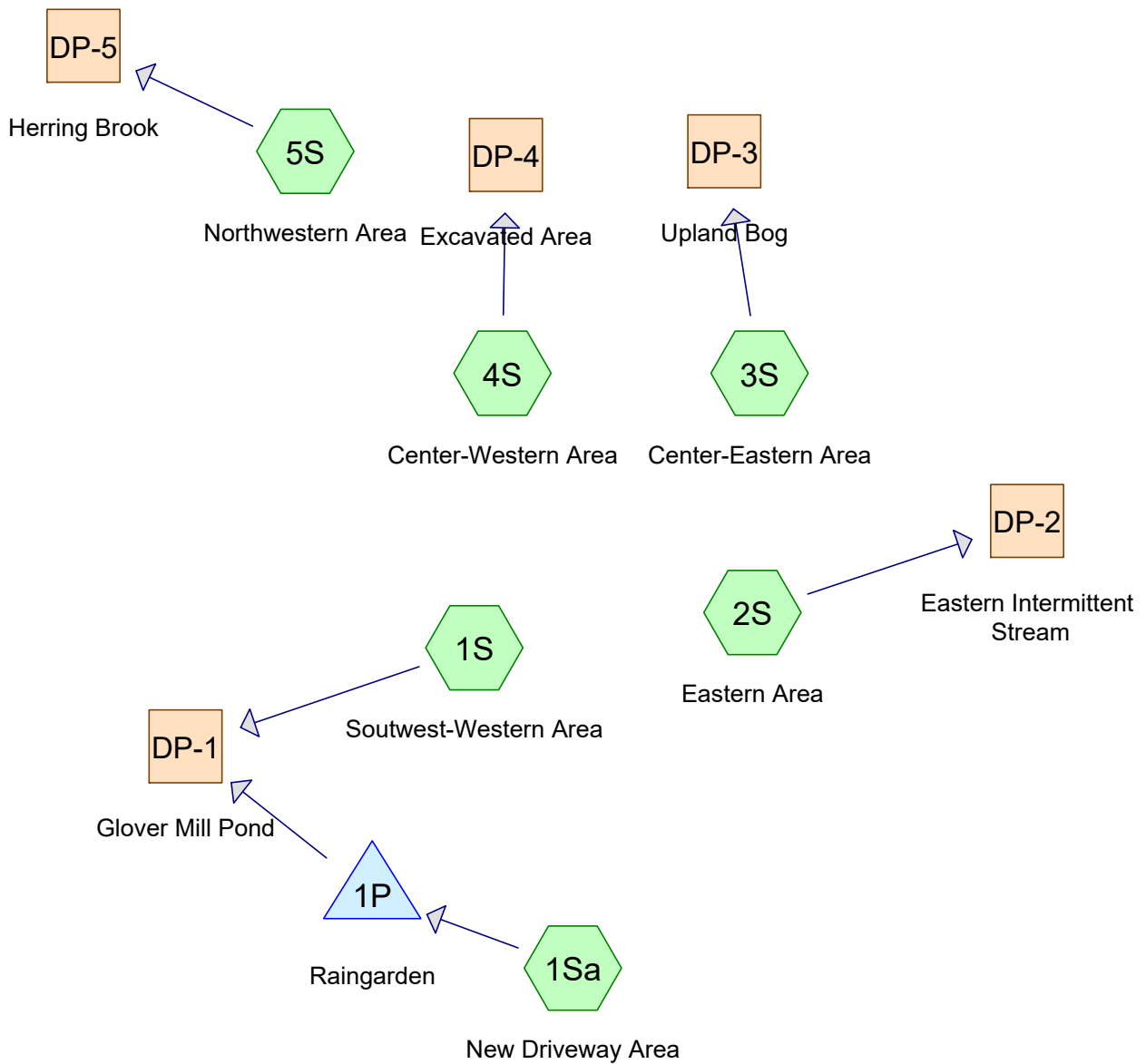
Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 1.37" for 100-yr event
Inflow = 2.19 cfs @ 12.11 hrs, Volume= 8,997 cf
Outflow = 2.19 cfs @ 12.11 hrs, Volume= 8,997 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



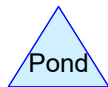
**REVISED POST-DEVELOPMENT HYDROCAD CALCULATIONS
WITH CORRECTED TIME OF CONCENTRATION**



Subcat



Reach



Pond



Link

Routing Diagram for 3086.00 - Hydrocad Calculations - POST-TC Change

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3086.00 - Hydrocad Calculations - POST-TC Change*Type III 24-hr 2-yr Rainfall=3.41"*

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Page 2

Summary for Subcatchment 1S: Southwest-Western Area

Runoff = 5.87 cfs @ 12.42 hrs, Volume= 33,927 cf, Depth= 0.90"

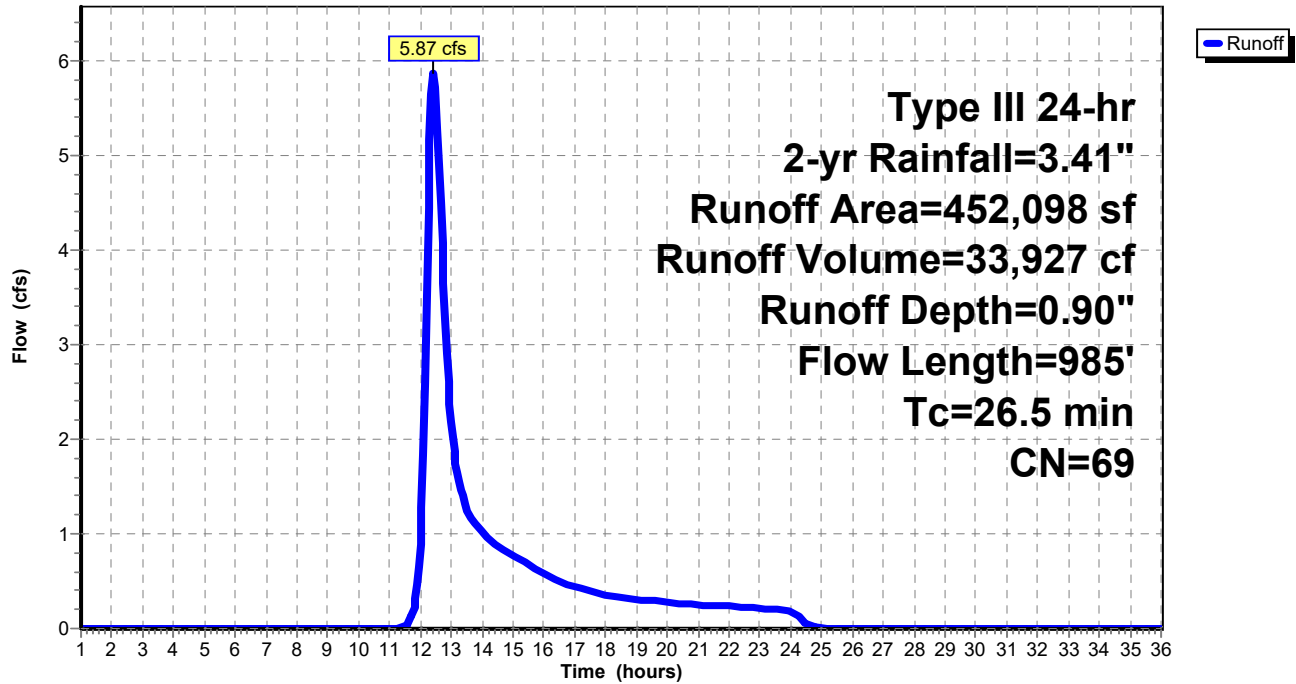
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
3,887	76	Gravel roads, HSG A
9,914	85	Gravel roads, HSG B
4,046	39	>75% Grass cover, Good, HSG A
139,352	61	>75% Grass cover, Good, HSG B
14,765	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
76,367	30	Woods, Good, HSG A
175	55	Woods, Good, HSG B
73,488	67	Brush, Poor, HSG B
452,098	69	Weighted Average
307,229		67.96% Pervious Area
144,869		32.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.5	985	Total			

Subcatchment 1S: Southwest-Western Area

Hydrograph



3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 4

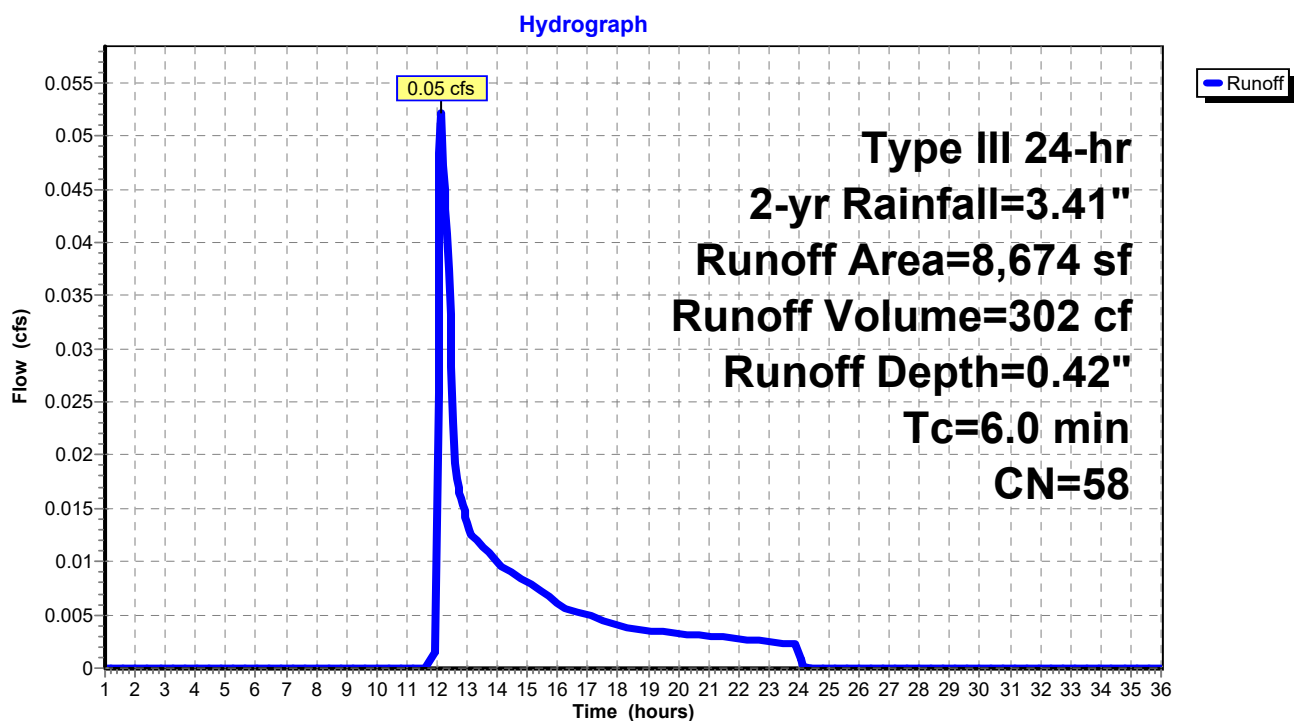
Summary for Subcatchment 1Sa: New Driveway Area

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 302 cf, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
239	76	Gravel roads, HSG A
* 1,954	98	New Driveway Area, HSG A
2,628	30	Woods, Good, HSG A
1,067	98	Water Surface, HSG A
2,786	39	>75% Grass cover, Good, HSG A
8,674	58	Weighted Average
5,653		65.17% Pervious Area
3,021		34.83% Impervious Area

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

Subcatchment 1Sa: New Driveway Area

3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 5

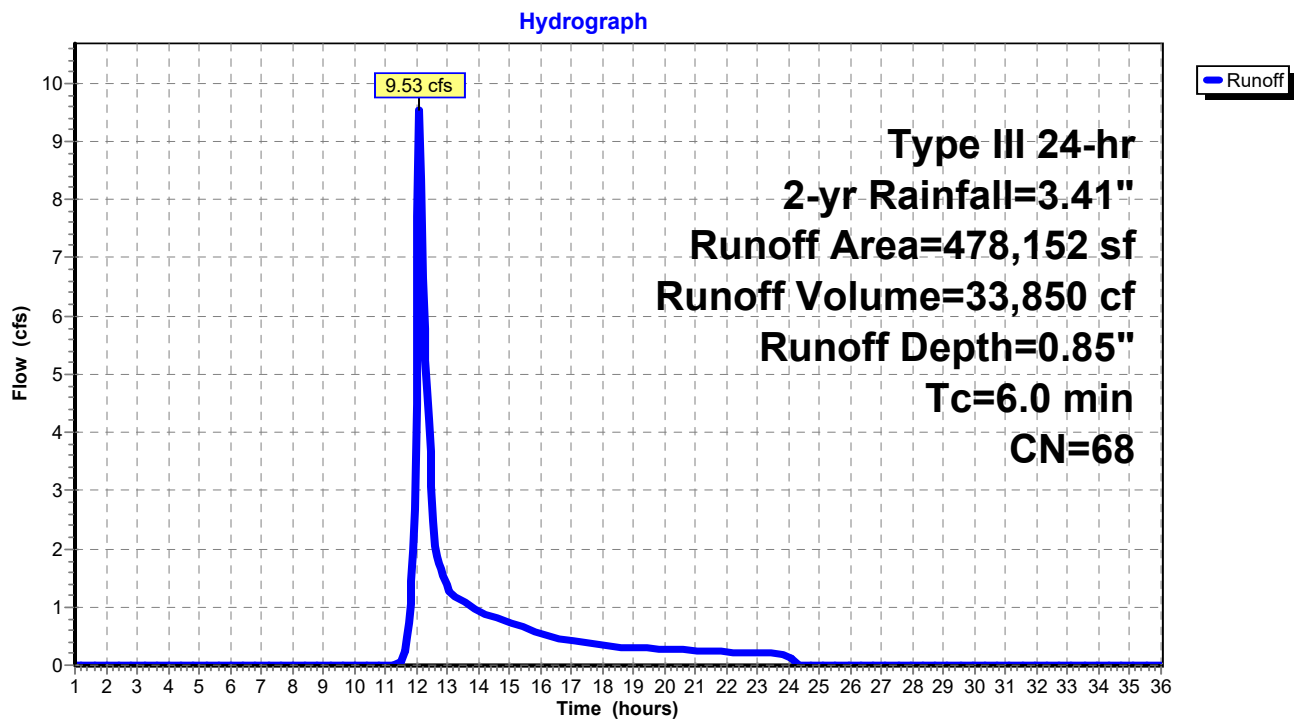
Summary for Subcatchment 2S: Eastern Area

Runoff = 9.53 cfs @ 12.11 hrs, Volume= 33,850 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
9,662	82	Dirt roads, HSG B
* 960	98	Equipment Pads
50,553	85	Gravel roads, HSG B
166,878	61	>75% Grass cover, Good, HSG B
14,392	98	Roofs, HSG B
23,117	55	Woods, Good, HSG B
212,590	67	Brush, Poor, HSG B
478,152	68	Weighted Average
462,800		96.79% Pervious Area
15,352		3.21% Impervious Area

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

Subcatchment 2S: Eastern Area

3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 6

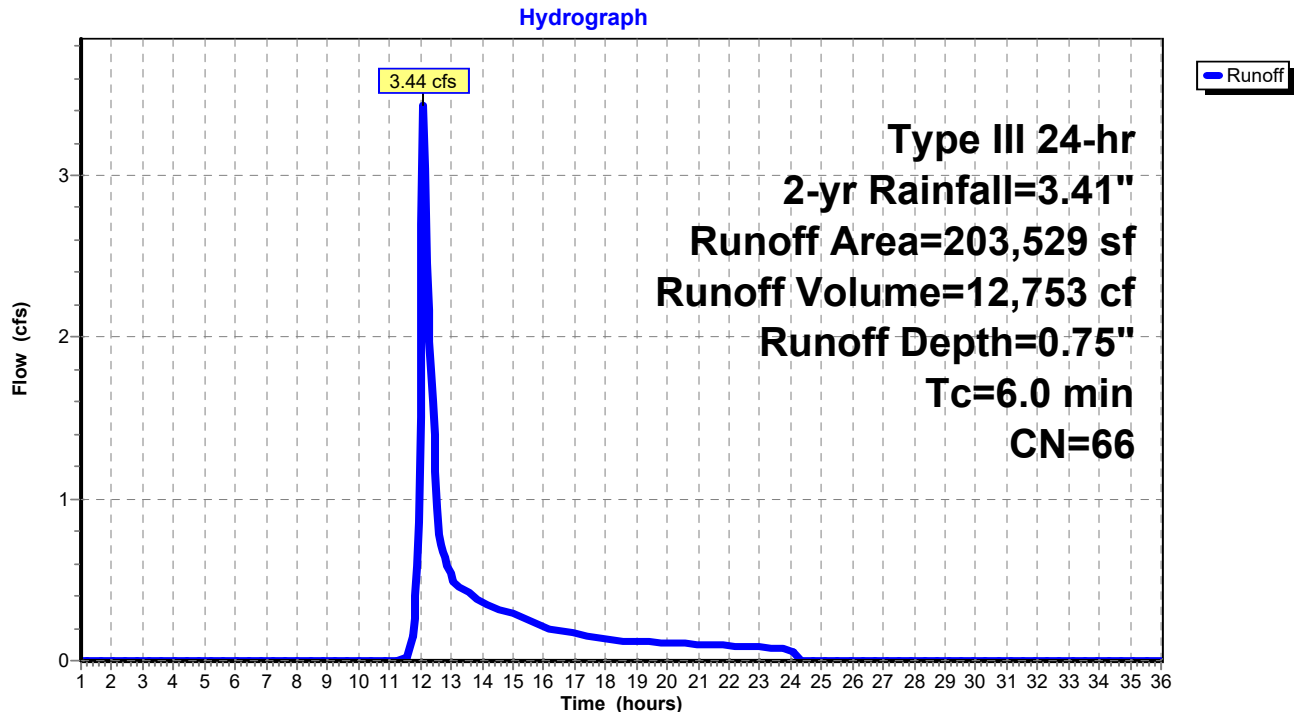
Summary for Subcatchment 3S: Center-Eastern Area

Runoff = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

	Area (sf)	CN	Description
*	172,845	65	Upland Bog Area
	1,176	72	Dirt roads, HSG A
	7,998	82	Dirt roads, HSG B
	2,102	85	Gravel roads, HSG B
	1,434	61	>75% Grass cover, Good, HSG B
	604	30	Woods, Good, HSG A
	17,370	67	Brush, Poor, HSG B
	203,529	66	Weighted Average
	203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area

3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 7

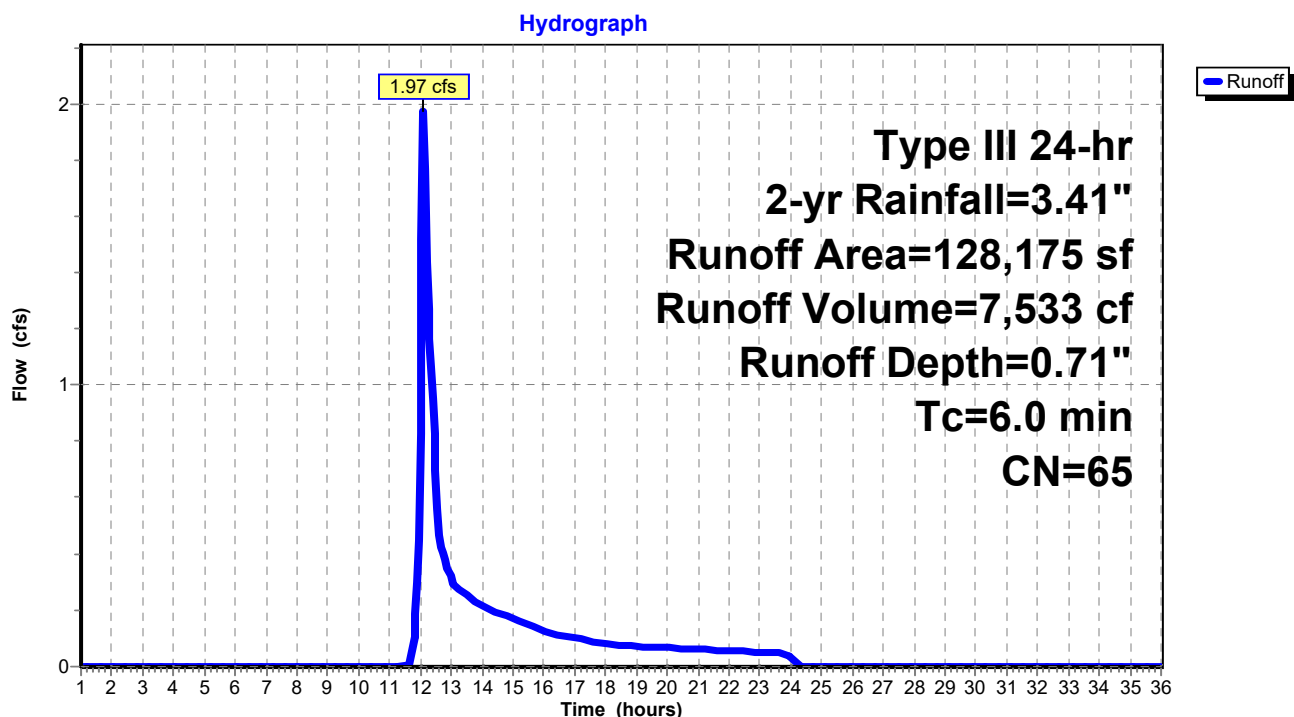
Summary for Subcatchment 4S: Center-Western Area

Runoff = 1.97 cfs @ 12.11 hrs, Volume= 7,533 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
227	39	>75% Grass cover, Good, HSG A
28,879	61	>75% Grass cover, Good, HSG B
954	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
97,650	67	Brush, Poor, HSG B
128,175	65	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area

3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 8

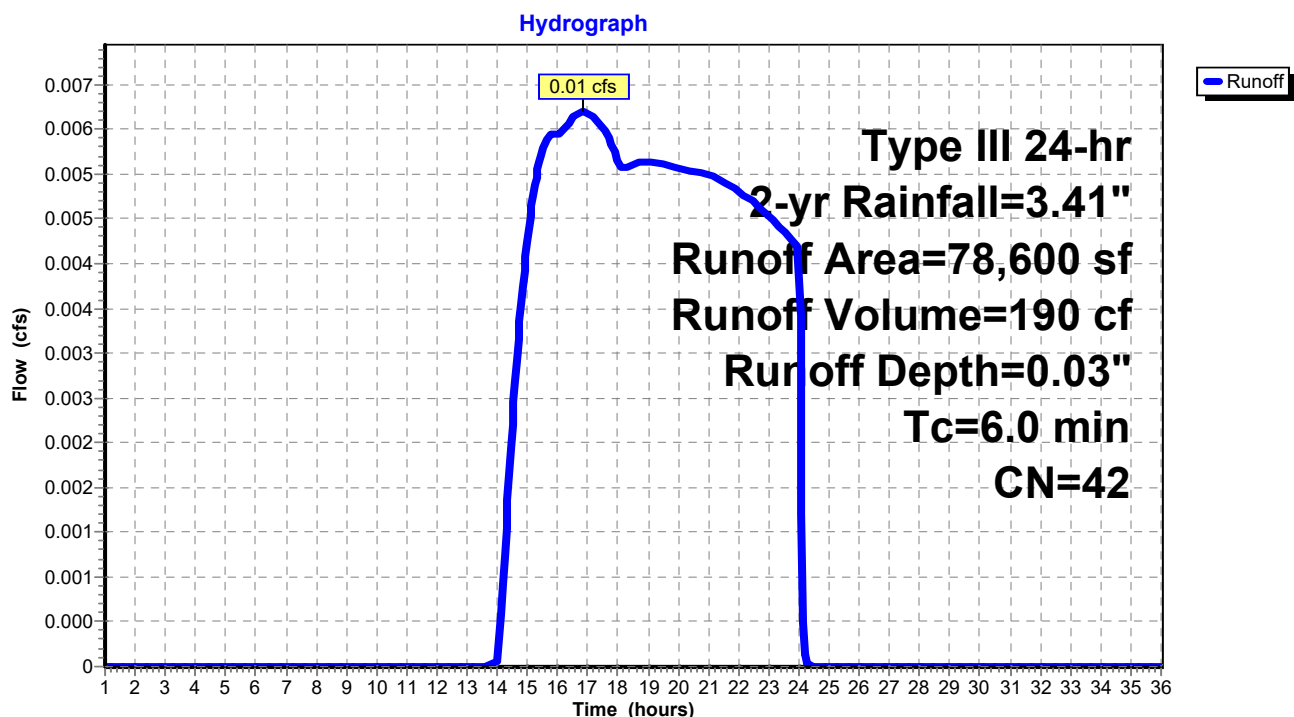
Summary for Subcatchment 5S: Northwestern Area

Runoff = 0.01 cfs @ 16.86 hrs, Volume= 190 cf, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.41"

Area (sf)	CN	Description
778	39	>75% Grass cover, Good, HSG A
10,099	61	>75% Grass cover, Good, HSG B
50,691	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
16,211	67	Brush, Poor, HSG B
78,600	42	Weighted Average
78,600		100.00% Pervious Area

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

Subcatchment 5S: Northwestern Area

3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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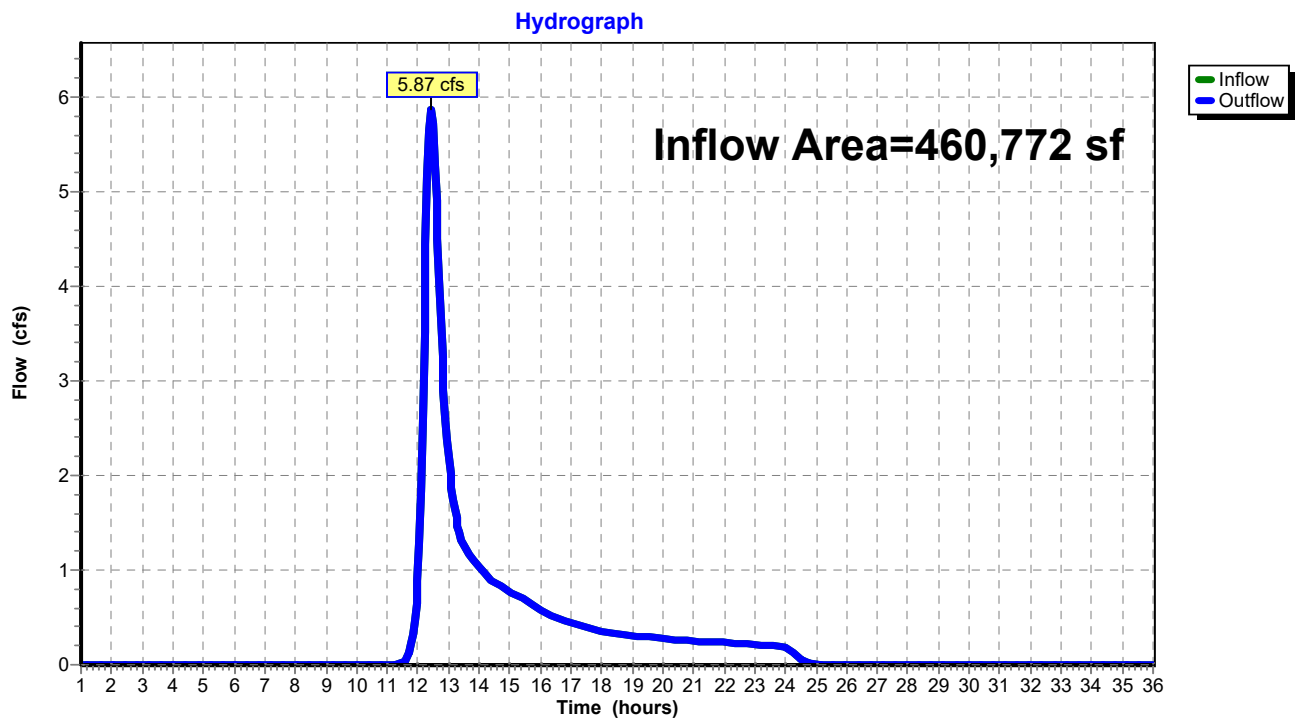
Page 9

Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 32.10% Impervious, Inflow Depth = 0.88" for 2-yr event
Inflow = 5.87 cfs @ 12.42 hrs, Volume= 33,927 cf
Outflow = 5.87 cfs @ 12.42 hrs, Volume= 33,927 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond



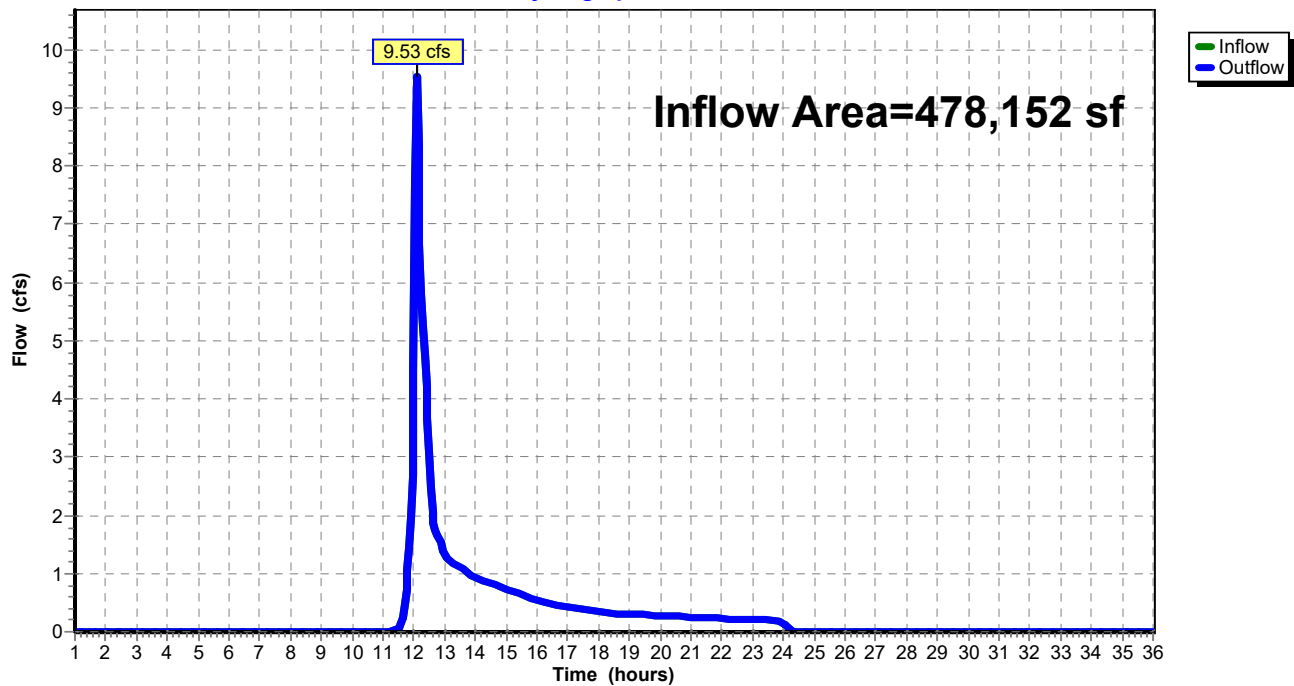
Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,152 sf, 3.21% Impervious, Inflow Depth = 0.85" for 2-yr event
Inflow = 9.53 cfs @ 12.11 hrs, Volume= 33,850 cf
Outflow = 9.53 cfs @ 12.11 hrs, Volume= 33,850 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream

Hydrograph



3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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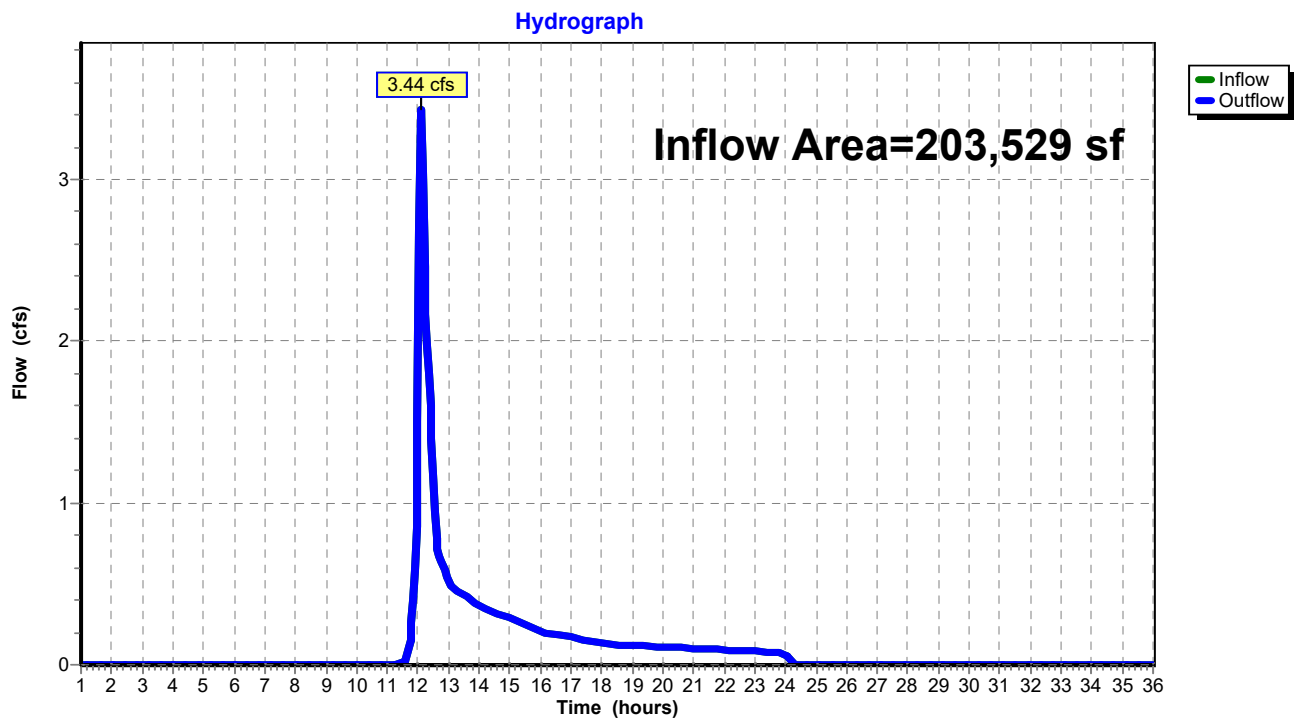
Page 11

Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 0.75" for 2-yr event
Inflow = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf
Outflow = 3.44 cfs @ 12.11 hrs, Volume= 12,753 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

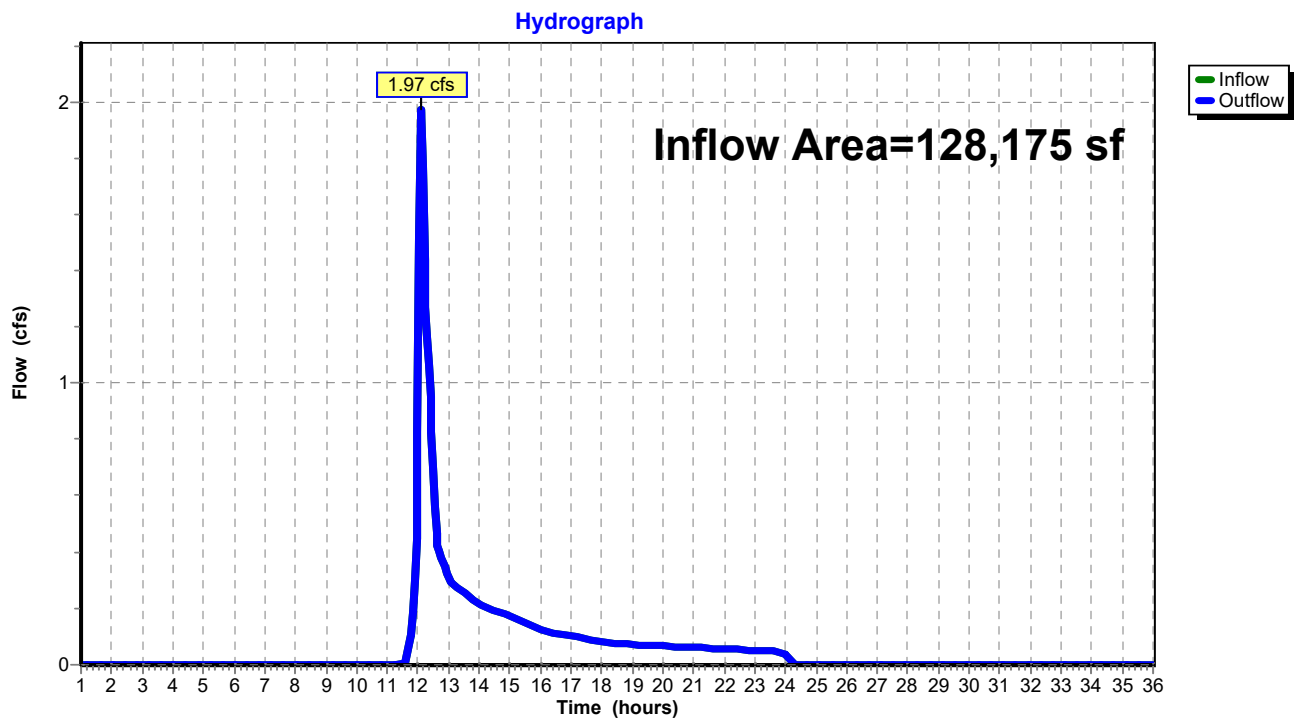
Reach DP-3: Upland Bog



Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 0.71" for 2-yr event
Inflow = 1.97 cfs @ 12.11 hrs, Volume= 7,533 cf
Outflow = 1.97 cfs @ 12.11 hrs, Volume= 7,533 cf, Atten= 0%, Lag= 0.0 min

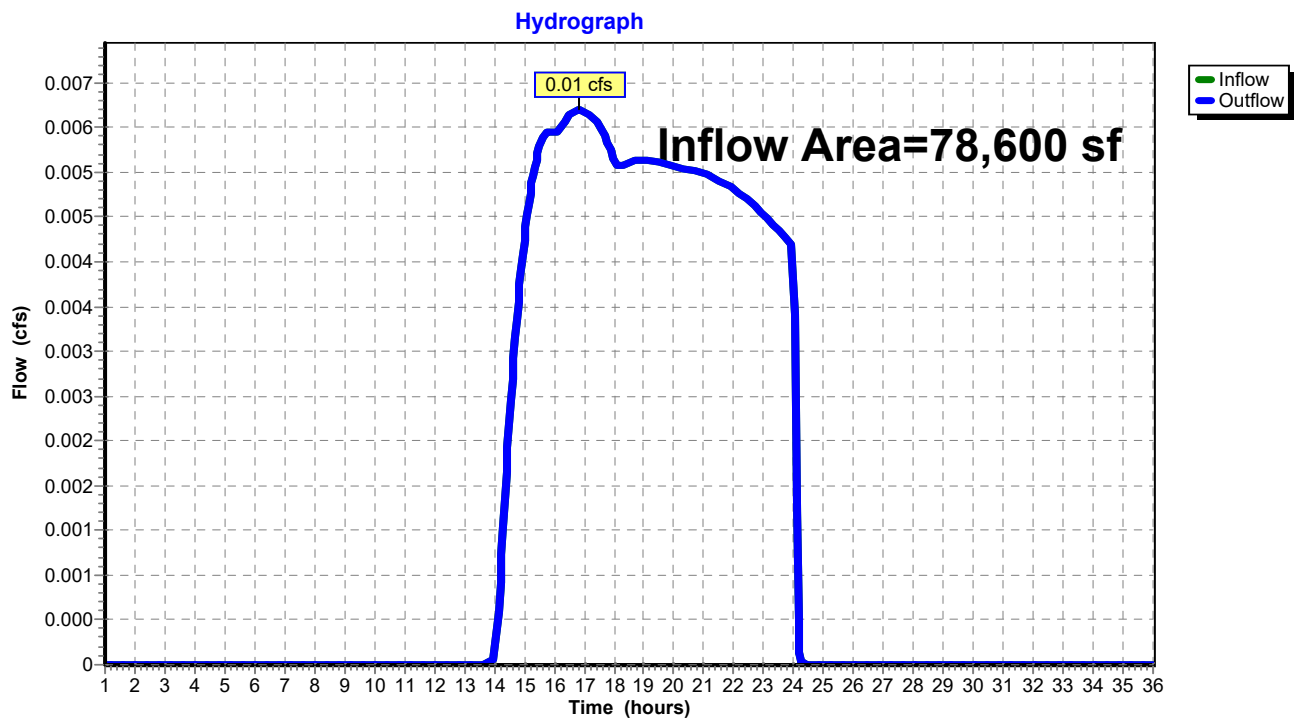
Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

Summary for Reach DP-5: Herring Brook

Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 0.03" for 2-yr event
Inflow = 0.01 cfs @ 16.86 hrs, Volume= 190 cf
Outflow = 0.01 cfs @ 16.86 hrs, Volume= 190 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook

3086.00 - Hydrocad Calculations - POST-TC Change

Type III 24-hr 2-yr Rainfall=3.41"

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Page 14

Summary for Pond 1P: Raingarden

Inflow Area = 8,674 sf, 34.83% Impervious, Inflow Depth = 0.42" for 2-yr event
 Inflow = 0.05 cfs @ 12.15 hrs, Volume= 302 cf
 Outflow = 0.03 cfs @ 12.46 hrs, Volume= 302 cf, Atten= 38%, Lag= 18.7 min
 Discarded = 0.03 cfs @ 12.46 hrs, Volume= 302 cf
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 65.04' @ 12.46 hrs Surf.Area= 571 sf Storage= 24 cf

Plug-Flow detention time= 8.2 min calculated for 302 cf (100% of inflow)
 Center-of-Mass det. time= 8.1 min (931.1 - 923.1)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	3,082 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.00	552	158.0	0	0	552
66.00	1,067	181.0	795	795	1,195
67.00	1,660	206.0	1,353	2,148	1,989
67.50	2,084	219.0	934	3,082	2,441

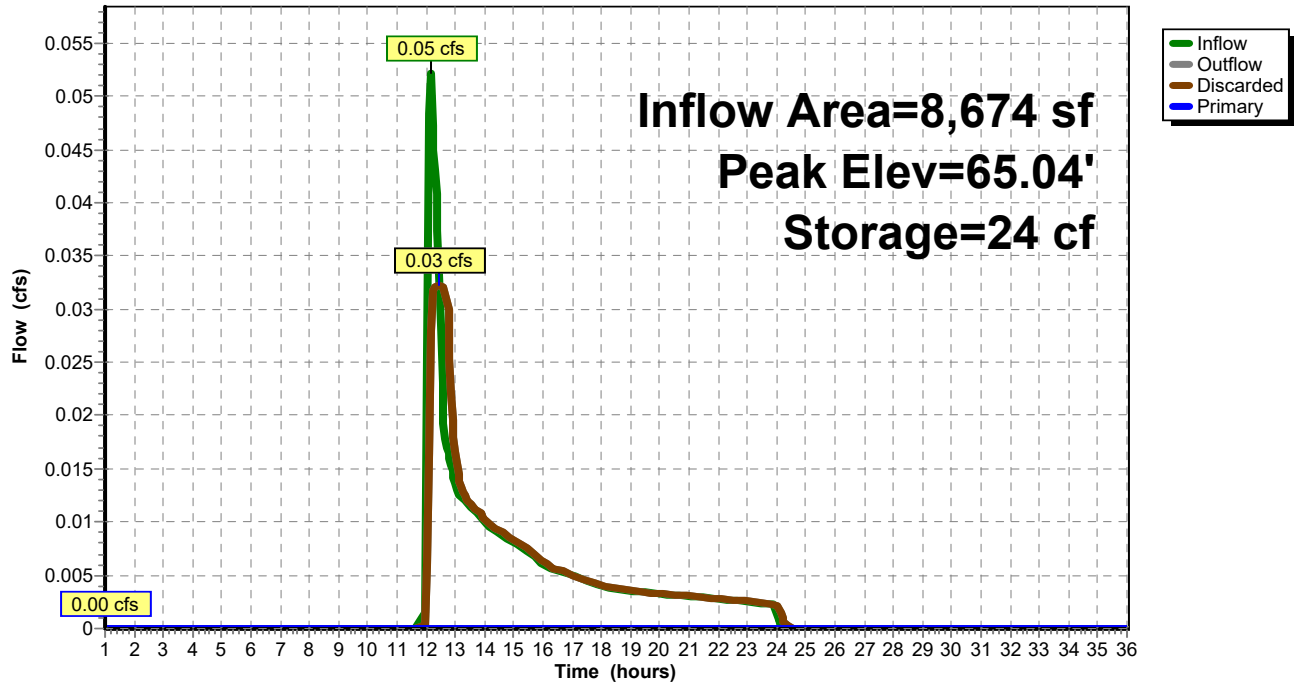
Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	65.50'	4.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.50' / 65.30' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#3	Primary	66.80'	10.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.03 cfs @ 12.46 hrs HW=65.04' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=65.00' (Free Discharge)
 ↳ **2=Culvert** (Controls 0.00 cfs)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Raingarden

Hydrograph



Summary for Subcatchment 1S: Southwest-Western Area

Runoff = 14.10 cfs @ 12.39 hrs, Volume= 75,115 cf, Depth= 1.99"

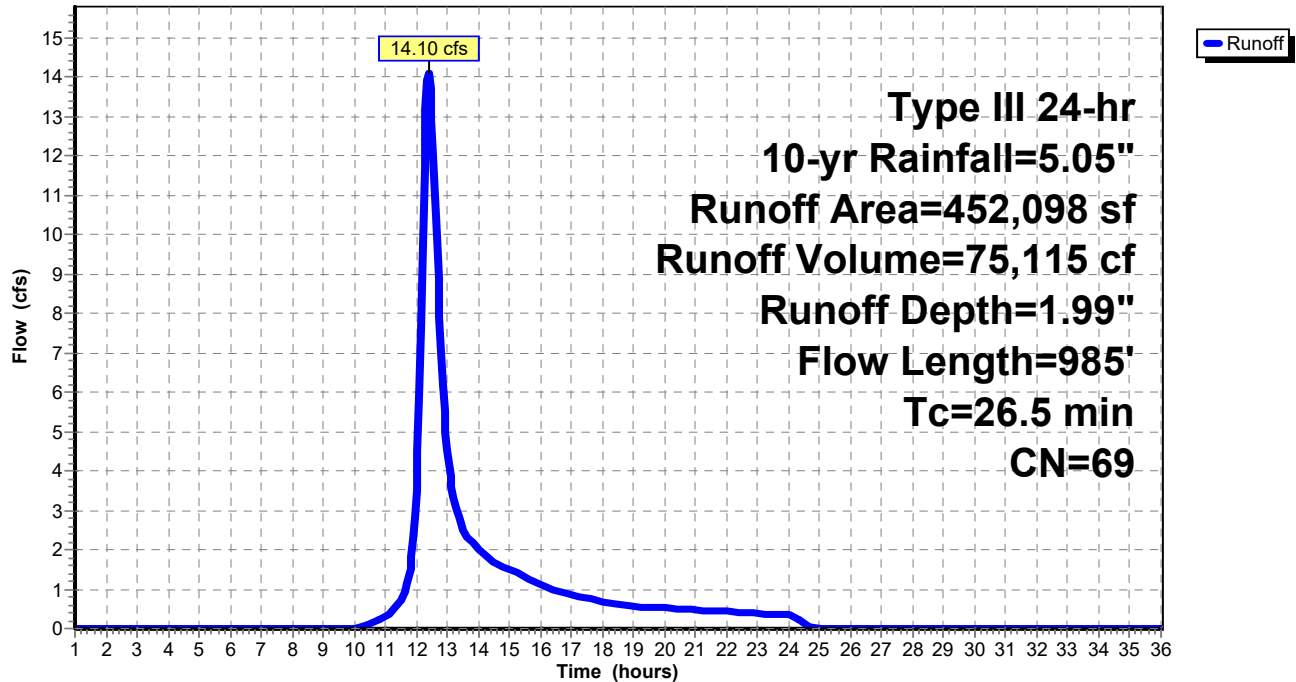
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
3,887	76	Gravel roads, HSG A
9,914	85	Gravel roads, HSG B
4,046	39	>75% Grass cover, Good, HSG A
139,352	61	>75% Grass cover, Good, HSG B
14,765	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
76,367	30	Woods, Good, HSG A
175	55	Woods, Good, HSG B
73,488	67	Brush, Poor, HSG B
452,098	69	Weighted Average
307,229		67.96% Pervious Area
144,869		32.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.5	985	Total			

Subcatchment 1S: Southwest-Western Area

Hydrograph



Summary for Subcatchment 1Sa: New Driveway Area

Runoff = 0.24 cfs @ 12.11 hrs, Volume= 865 cf, Depth= 1.20"

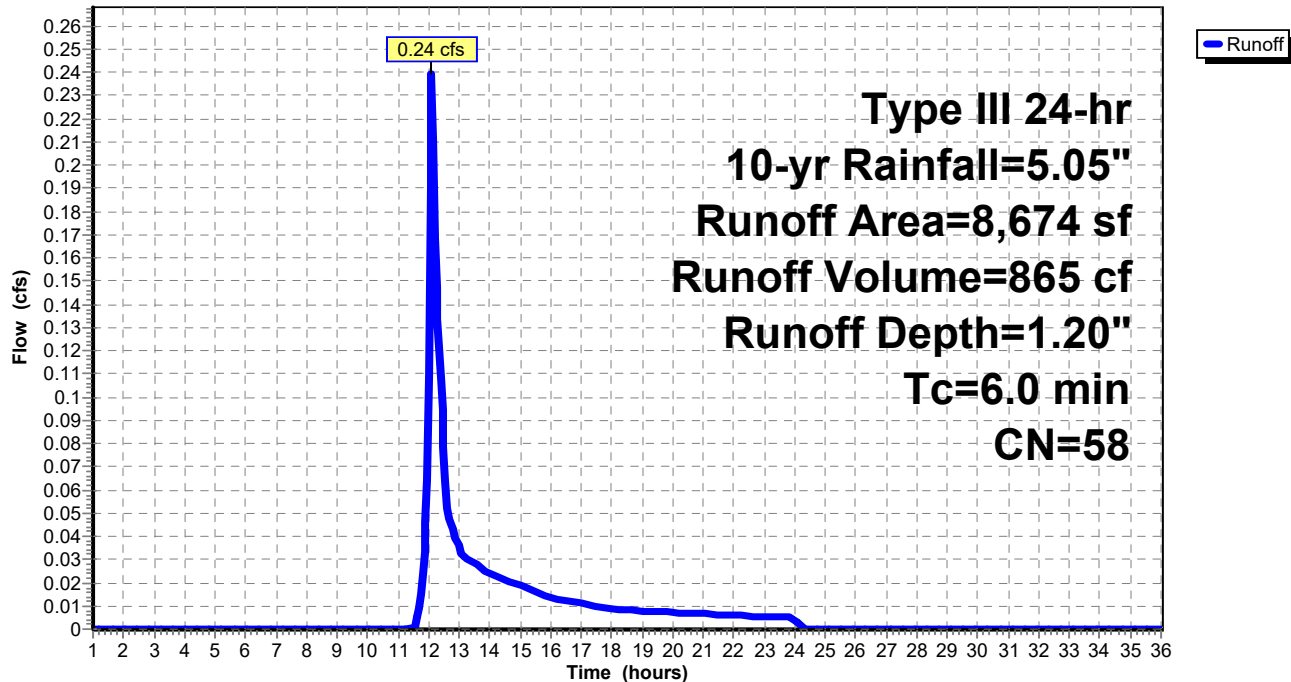
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
239	76	Gravel roads, HSG A
* 1,954	98	New Driveway Area, HSG A
2,628	30	Woods, Good, HSG A
1,067	98	Water Surface, HSG A
2,786	39	>75% Grass cover, Good, HSG A
8,674	58	Weighted Average
5,653		65.17% Pervious Area
3,021		34.83% Impervious Area

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

Subcatchment 1Sa: New Driveway Area

Hydrograph



Summary for Subcatchment 2S: Eastern Area

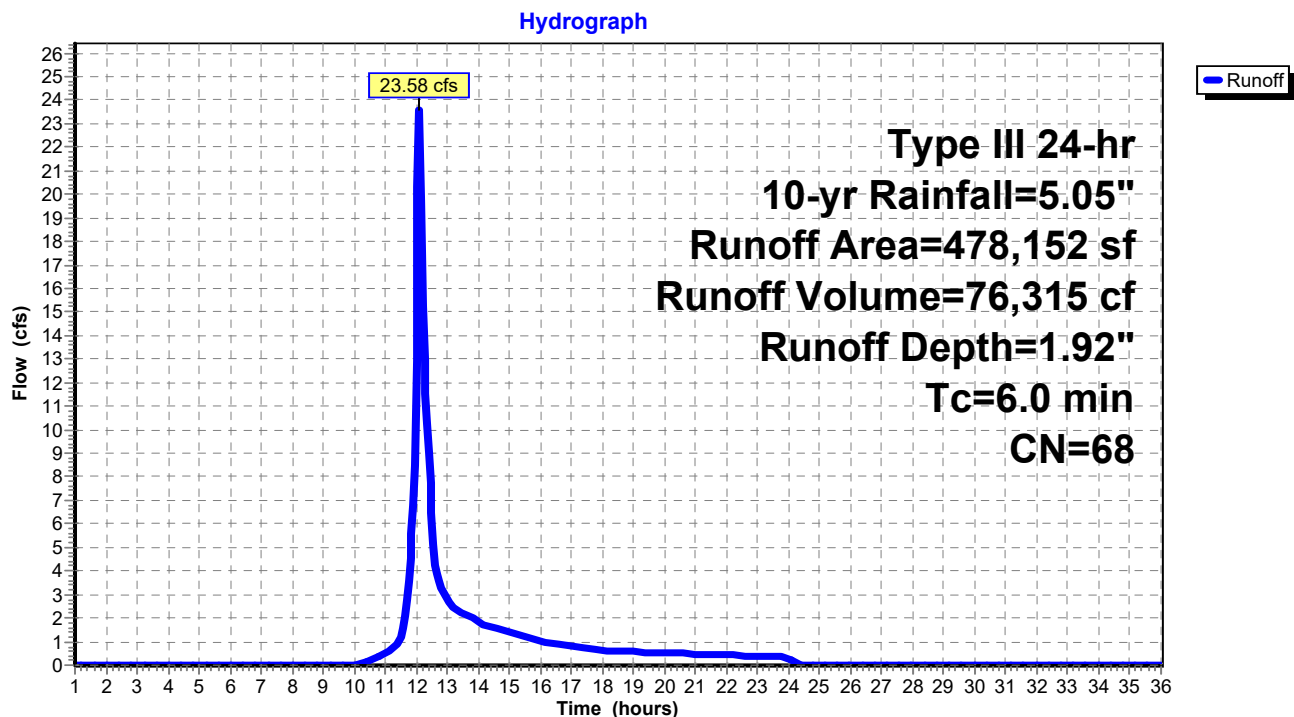
Runoff = 23.58 cfs @ 12.10 hrs, Volume= 76,315 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
9,662	82	Dirt roads, HSG B
* 960	98	Equipment Pads
50,553	85	Gravel roads, HSG B
166,878	61	>75% Grass cover, Good, HSG B
14,392	98	Roofs, HSG B
23,117	55	Woods, Good, HSG B
212,590	67	Brush, Poor, HSG B
478,152	68	Weighted Average
462,800		96.79% Pervious Area
15,352		3.21% Impervious Area

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

Subcatchment 2S: Eastern Area



Summary for Subcatchment 3S: Center-Eastern Area

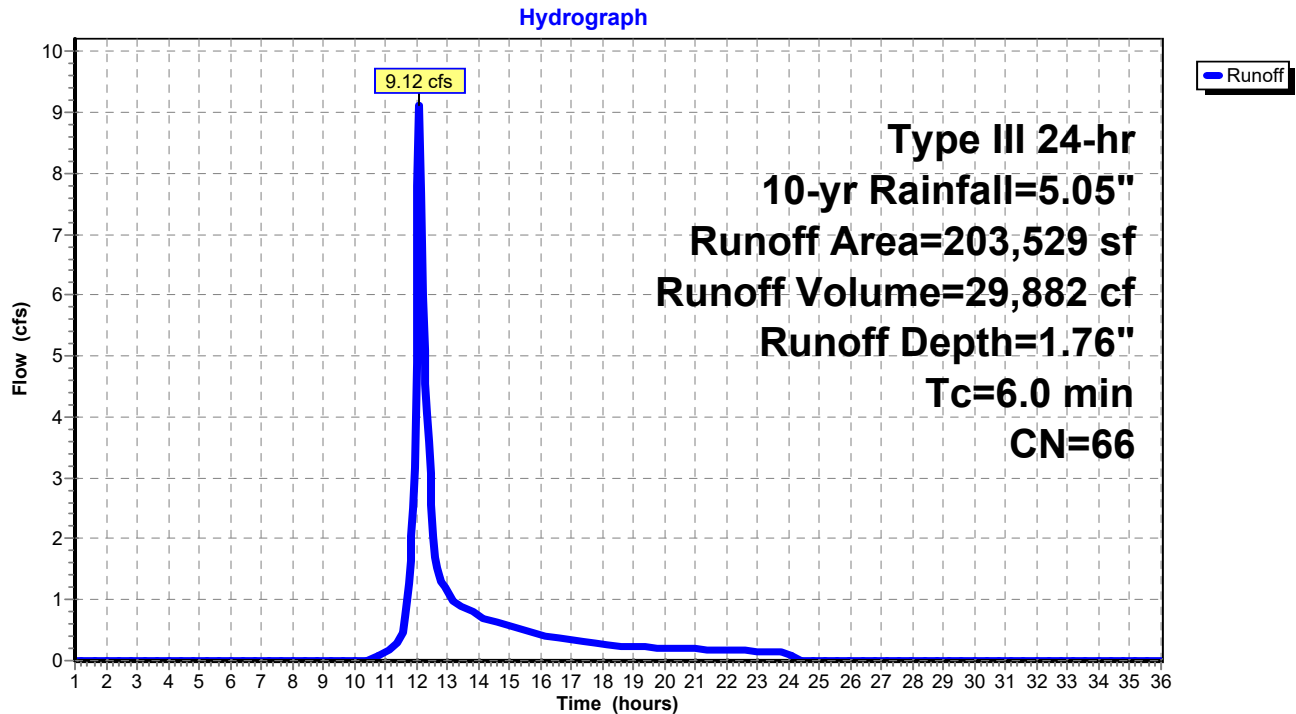
Runoff = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

	Area (sf)	CN	Description
*	172,845	65	Upland Bog Area
	1,176	72	Dirt roads, HSG A
	7,998	82	Dirt roads, HSG B
	2,102	85	Gravel roads, HSG B
	1,434	61	>75% Grass cover, Good, HSG B
	604	30	Woods, Good, HSG A
	17,370	67	Brush, Poor, HSG B
	203,529	66	Weighted Average
	203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area



Summary for Subcatchment 4S: Center-Western Area

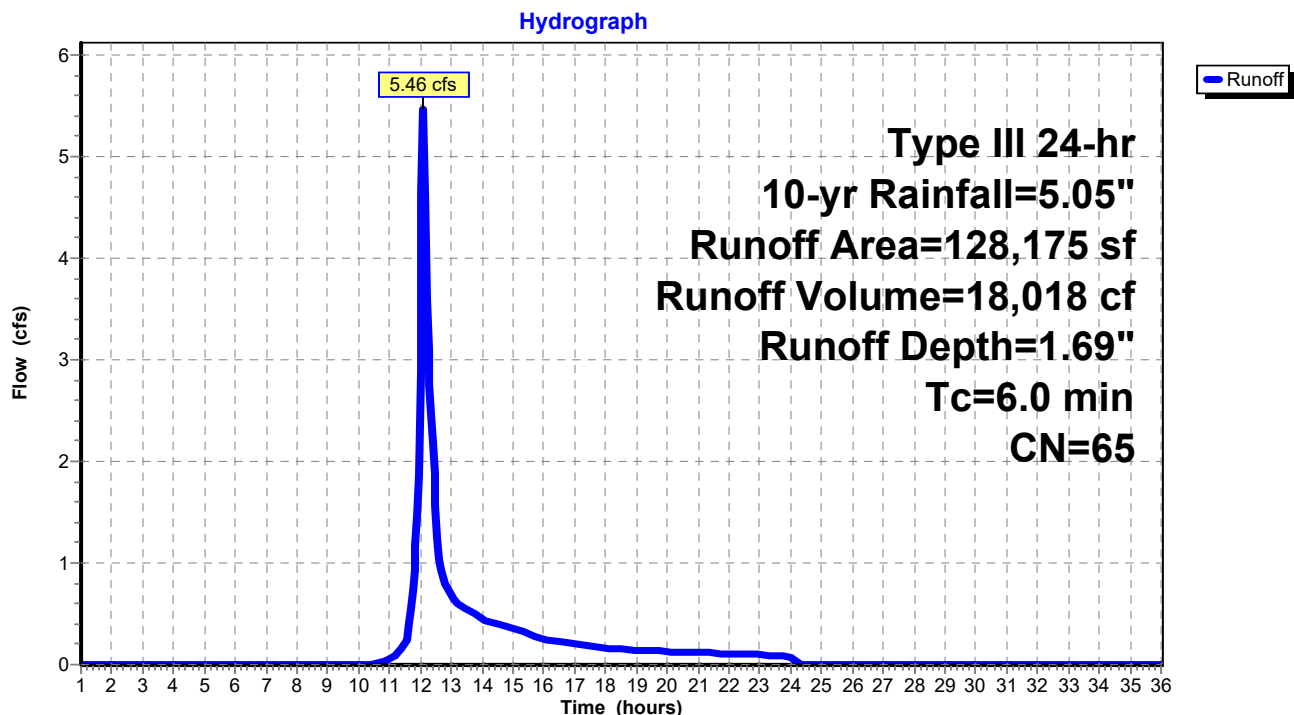
Runoff = 5.46 cfs @ 12.10 hrs, Volume= 18,018 cf, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
227	39	>75% Grass cover, Good, HSG A
28,879	61	>75% Grass cover, Good, HSG B
954	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
97,650	67	Brush, Poor, HSG B
128,175	65	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area



Summary for Subcatchment 5S: Northwestern Area

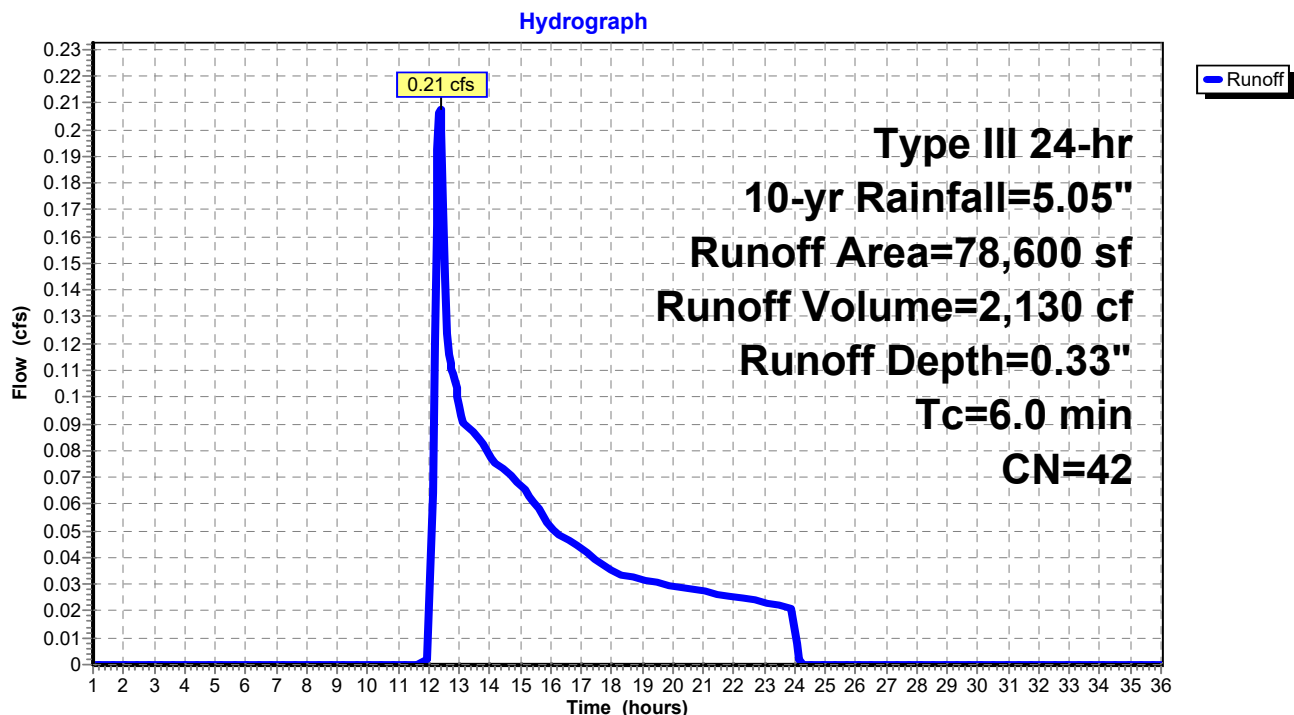
Runoff = 0.21 cfs @ 12.37 hrs, Volume= 2,130 cf, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Rainfall=5.05"

Area (sf)	CN	Description
778	39	>75% Grass cover, Good, HSG A
10,099	61	>75% Grass cover, Good, HSG B
50,691	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
16,211	67	Brush, Poor, HSG B
78,600	42	Weighted Average
78,600		100.00% Pervious Area

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

Subcatchment 5S: Northwestern Area

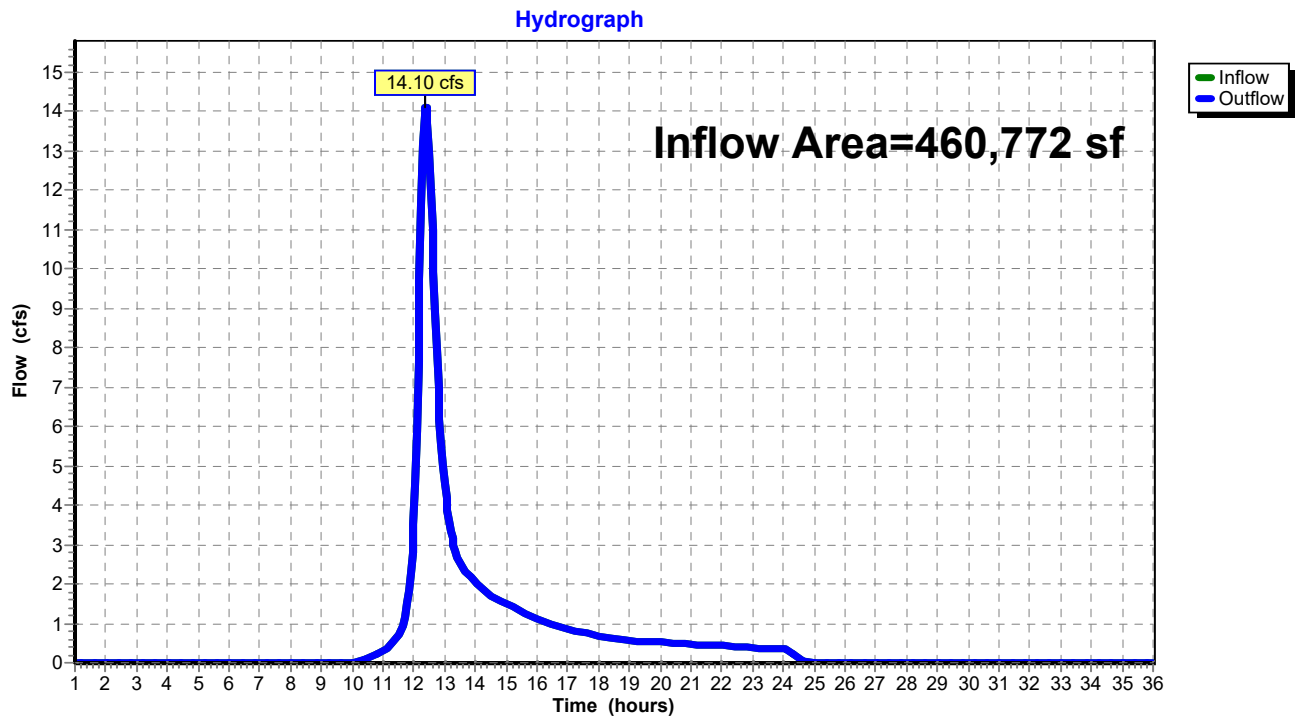


Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 32.10% Impervious, Inflow Depth = 1.96" for 10-yr event
Inflow = 14.10 cfs @ 12.39 hrs, Volume= 75,115 cf
Outflow = 14.10 cfs @ 12.39 hrs, Volume= 75,115 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond

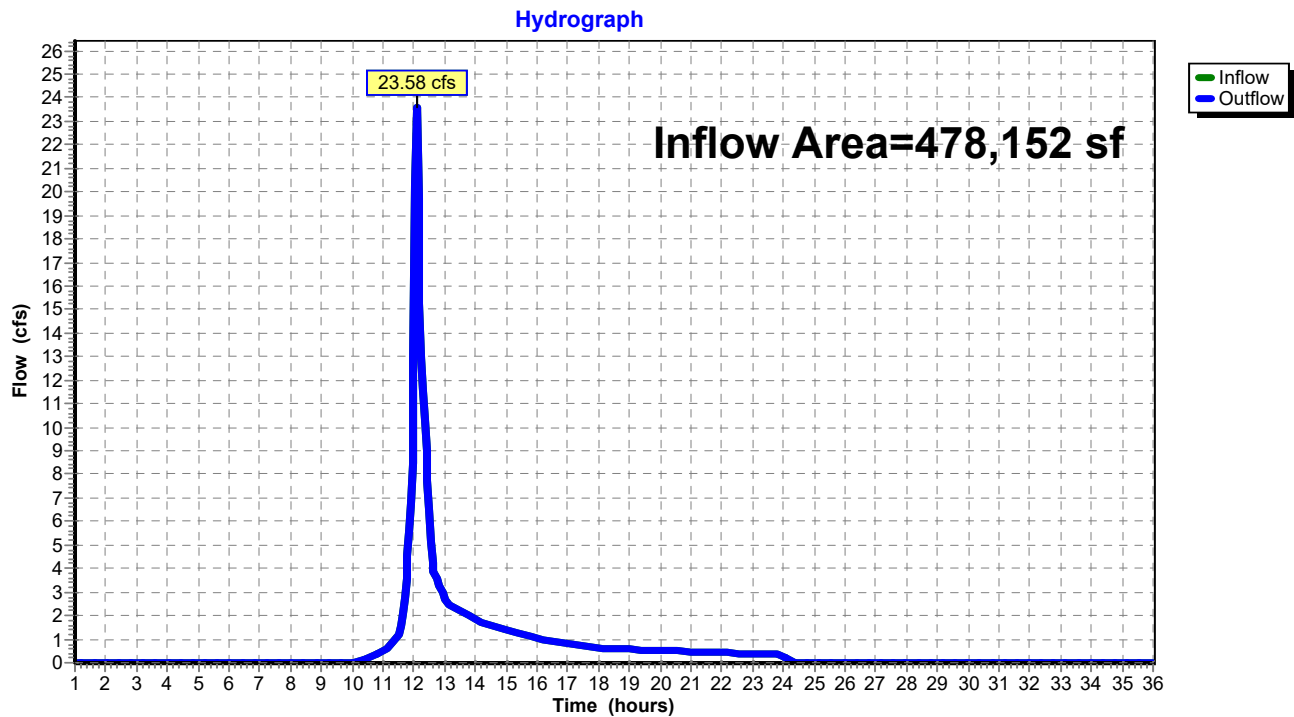


Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,152 sf, 3.21% Impervious, Inflow Depth = 1.92" for 10-yr event
Inflow = 23.58 cfs @ 12.10 hrs, Volume= 76,315 cf
Outflow = 23.58 cfs @ 12.10 hrs, Volume= 76,315 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream

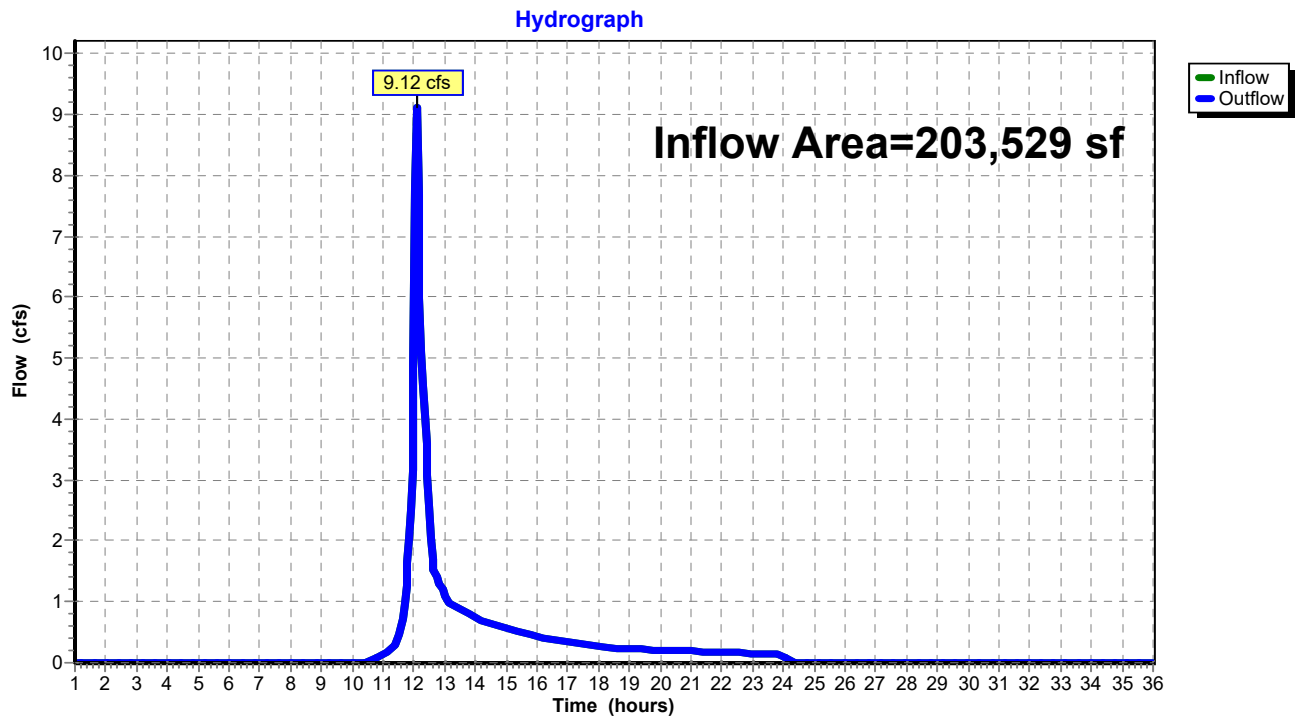


Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 1.76" for 10-yr event
Inflow = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf
Outflow = 9.12 cfs @ 12.10 hrs, Volume= 29,882 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

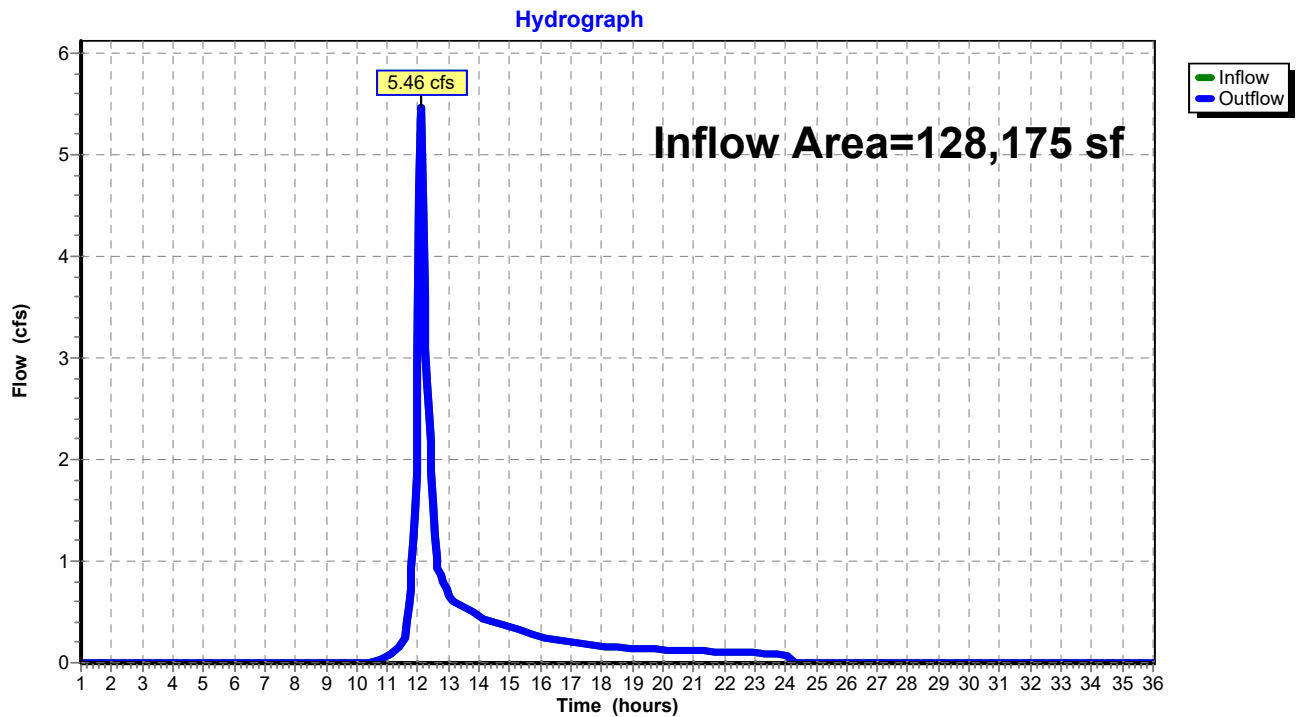


Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 1.69" for 10-yr event
Inflow = 5.46 cfs @ 12.10 hrs, Volume= 18,018 cf
Outflow = 5.46 cfs @ 12.10 hrs, Volume= 18,018 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

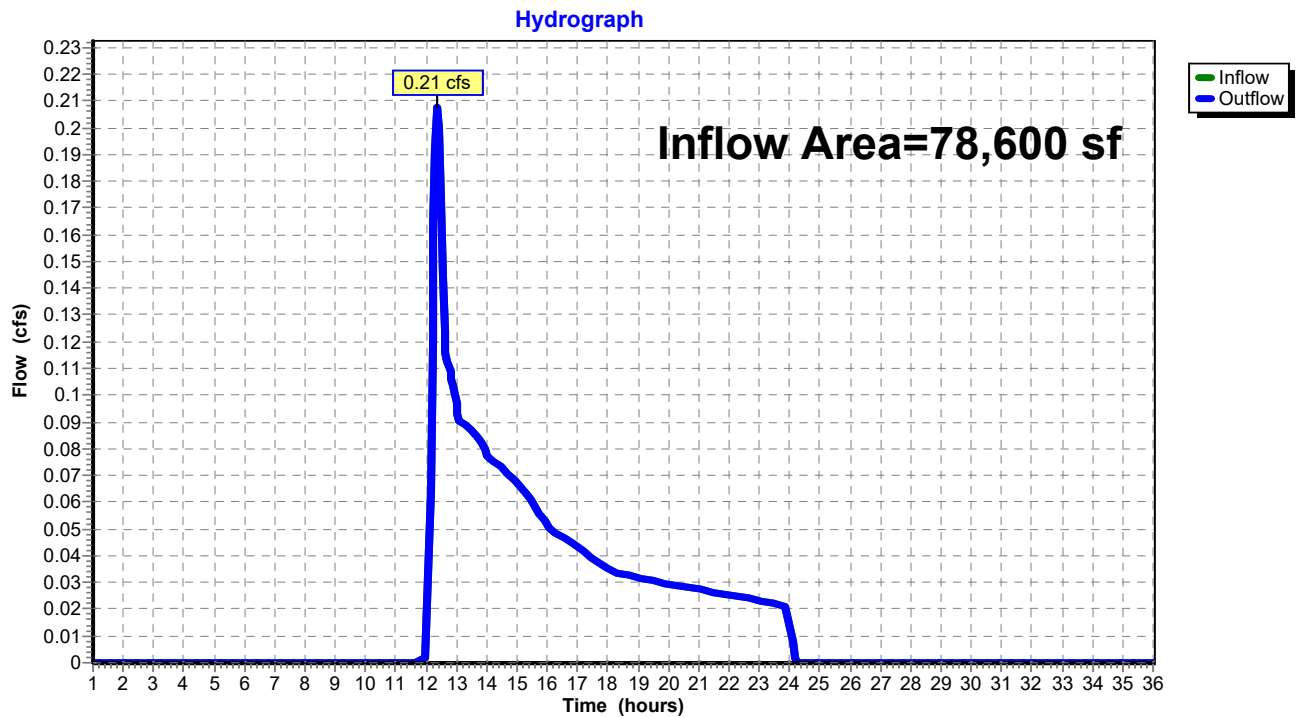


Summary for Reach DP-5: Herring Brook

Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 0.33" for 10-yr event
Inflow = 0.21 cfs @ 12.37 hrs, Volume= 2,130 cf
Outflow = 0.21 cfs @ 12.37 hrs, Volume= 2,130 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



Summary for Pond 1P: Raingarden

Inflow Area = 8,674 sf, 34.83% Impervious, Inflow Depth = 1.20" for 10-yr event
 Inflow = 0.24 cfs @ 12.11 hrs, Volume= 865 cf
 Outflow = 0.04 cfs @ 12.75 hrs, Volume= 865 cf, Atten= 82%, Lag= 38.6 min
 Discarded = 0.04 cfs @ 12.75 hrs, Volume= 865 cf
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 65.37' @ 12.75 hrs Surf.Area= 724 sf Storage= 236 cf

Plug-Flow detention time= 47.4 min calculated for 864 cf (100% of inflow)
 Center-of-Mass det. time= 47.3 min (928.4 - 881.1)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	3,082 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.00	552	158.0	0	0	552
66.00	1,067	181.0	795	795	1,195
67.00	1,660	206.0	1,353	2,148	1,989
67.50	2,084	219.0	934	3,082	2,441

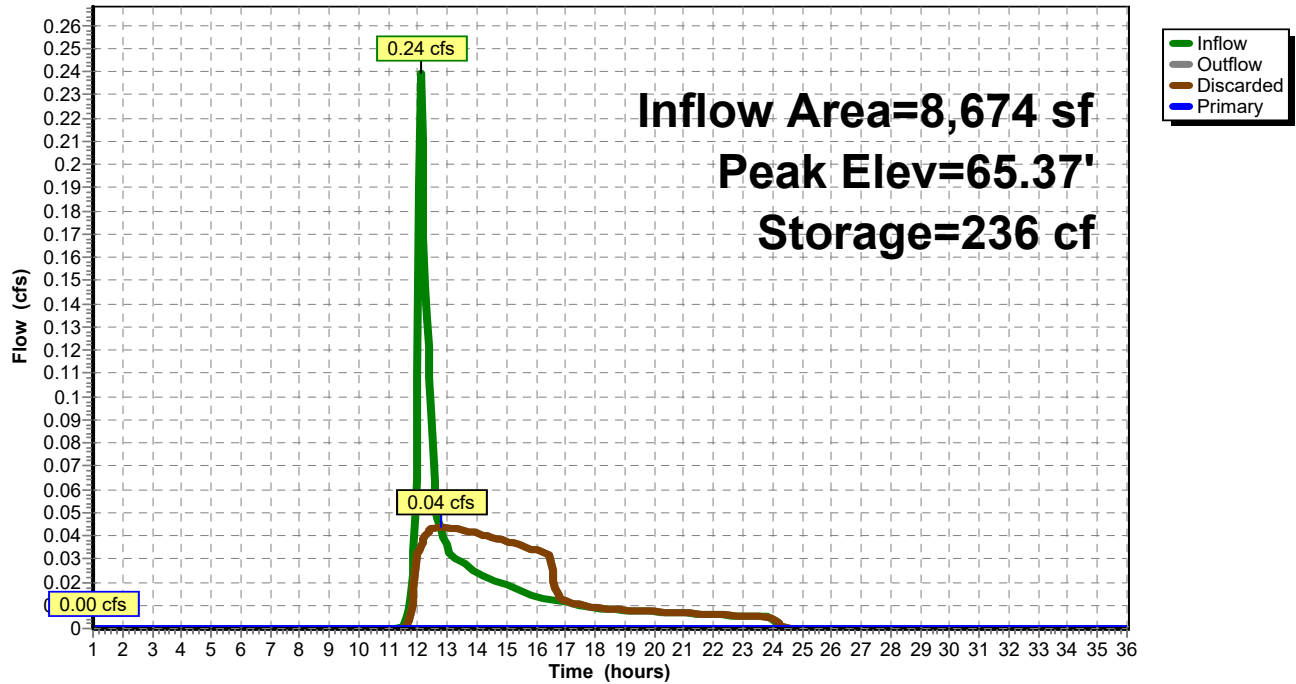
Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	65.50'	4.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.50' / 65.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#3	Primary	66.80'	10.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.04 cfs @ 12.75 hrs HW=65.37' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=65.00' (Free Discharge)
 ↳ **2=Culvert** (Controls 0.00 cfs)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Raingarden

Hydrograph



Summary for Subcatchment 1S: Southwest-Western Area

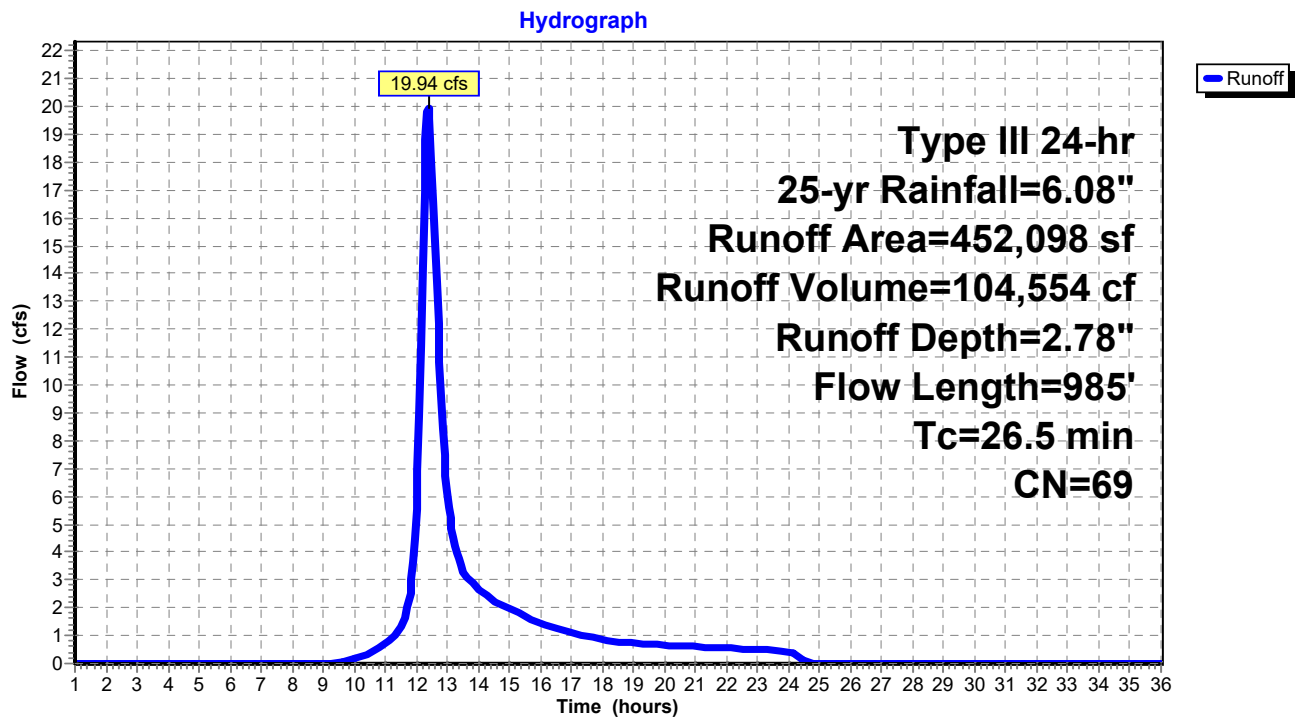
Runoff = 19.94 cfs @ 12.38 hrs, Volume= 104,554 cf, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
3,887	76	Gravel roads, HSG A
9,914	85	Gravel roads, HSG B
4,046	39	>75% Grass cover, Good, HSG A
139,352	61	>75% Grass cover, Good, HSG B
14,765	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
76,367	30	Woods, Good, HSG A
175	55	Woods, Good, HSG B
73,488	67	Brush, Poor, HSG B
452,098	69	Weighted Average
307,229		67.96% Pervious Area
144,869		32.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.5	985	Total			

Subcatchment 1S: Southwest-Western Area



Summary for Subcatchment 1Sa: New Driveway Area

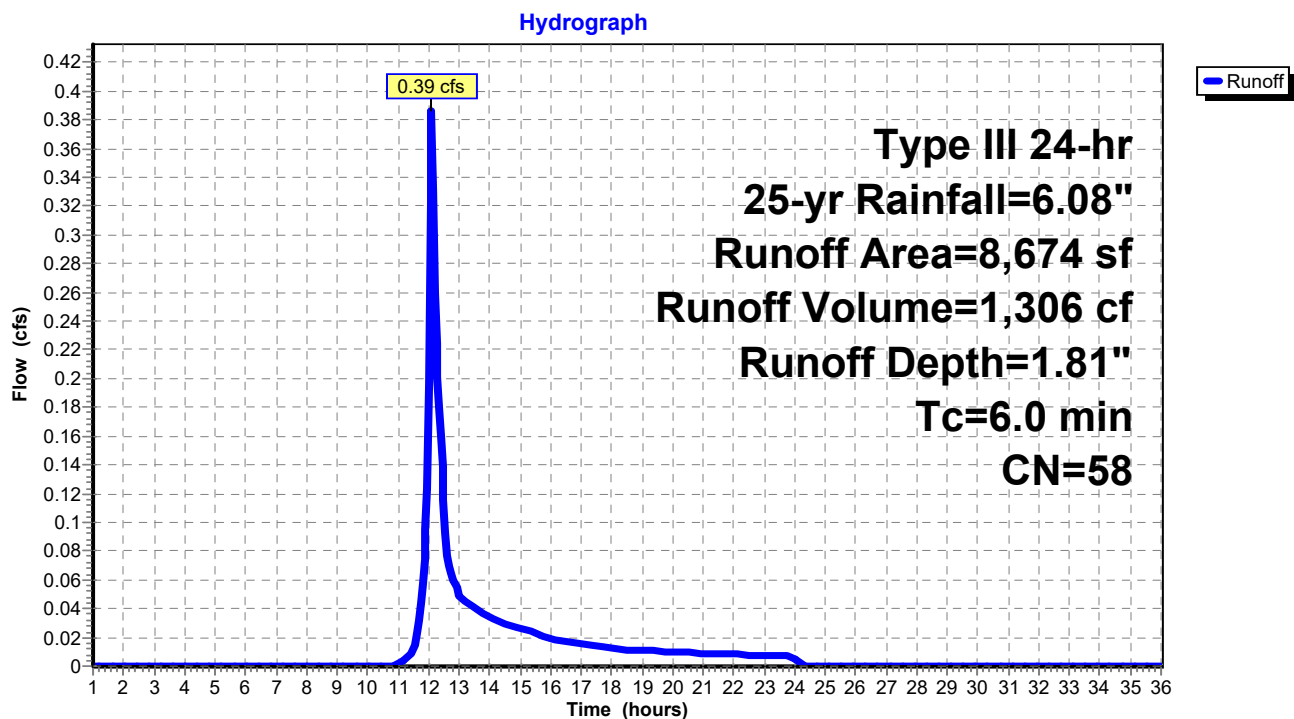
Runoff = 0.39 cfs @ 12.10 hrs, Volume= 1,306 cf, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
239	76	Gravel roads, HSG A
* 1,954	98	New Driveway Area, HSG A
2,628	30	Woods, Good, HSG A
1,067	98	Water Surface, HSG A
2,786	39	>75% Grass cover, Good, HSG A
8,674	58	Weighted Average
5,653		65.17% Pervious Area
3,021		34.83% Impervious Area

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

Subcatchment 1Sa: New Driveway Area



Summary for Subcatchment 2S: Eastern Area

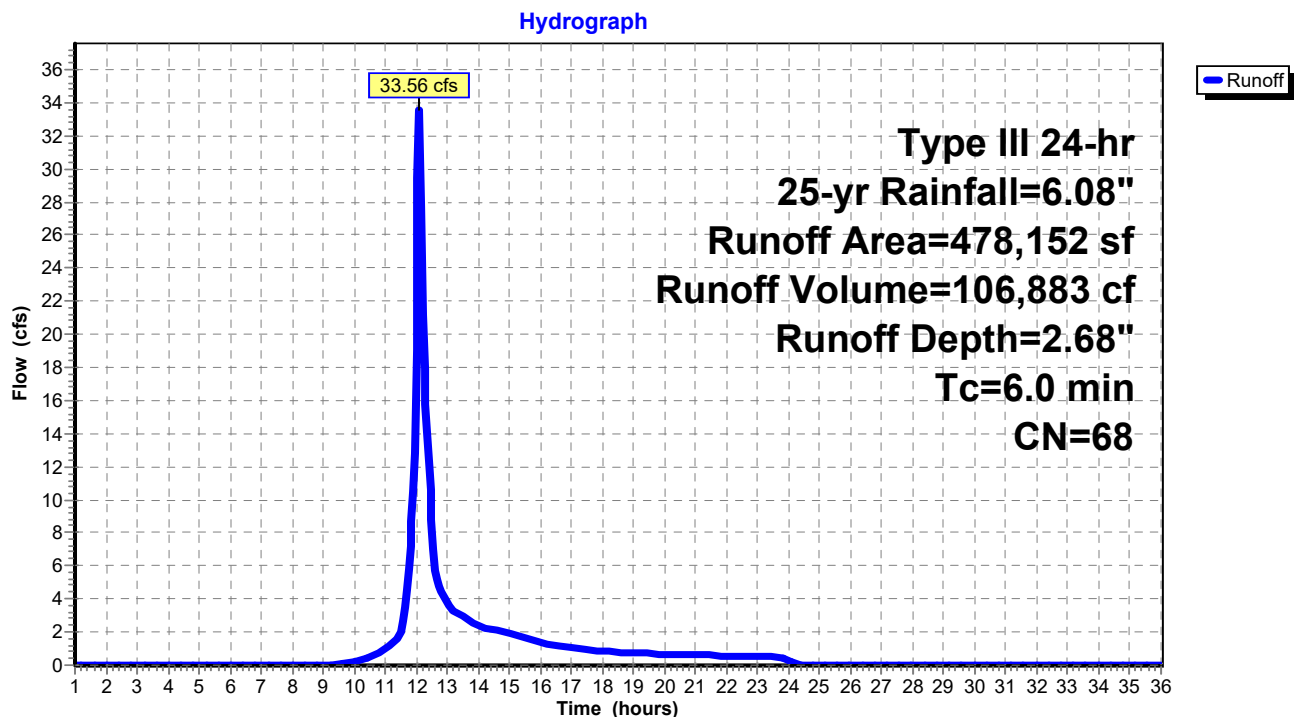
Runoff = 33.56 cfs @ 12.10 hrs, Volume= 106,883 cf, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
9,662	82	Dirt roads, HSG B
* 960	98	Equipment Pads
50,553	85	Gravel roads, HSG B
166,878	61	>75% Grass cover, Good, HSG B
14,392	98	Roofs, HSG B
23,117	55	Woods, Good, HSG B
212,590	67	Brush, Poor, HSG B
478,152	68	Weighted Average
462,800		96.79% Pervious Area
15,352		3.21% Impervious Area

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

Subcatchment 2S: Eastern Area



Summary for Subcatchment 3S: Center-Eastern Area

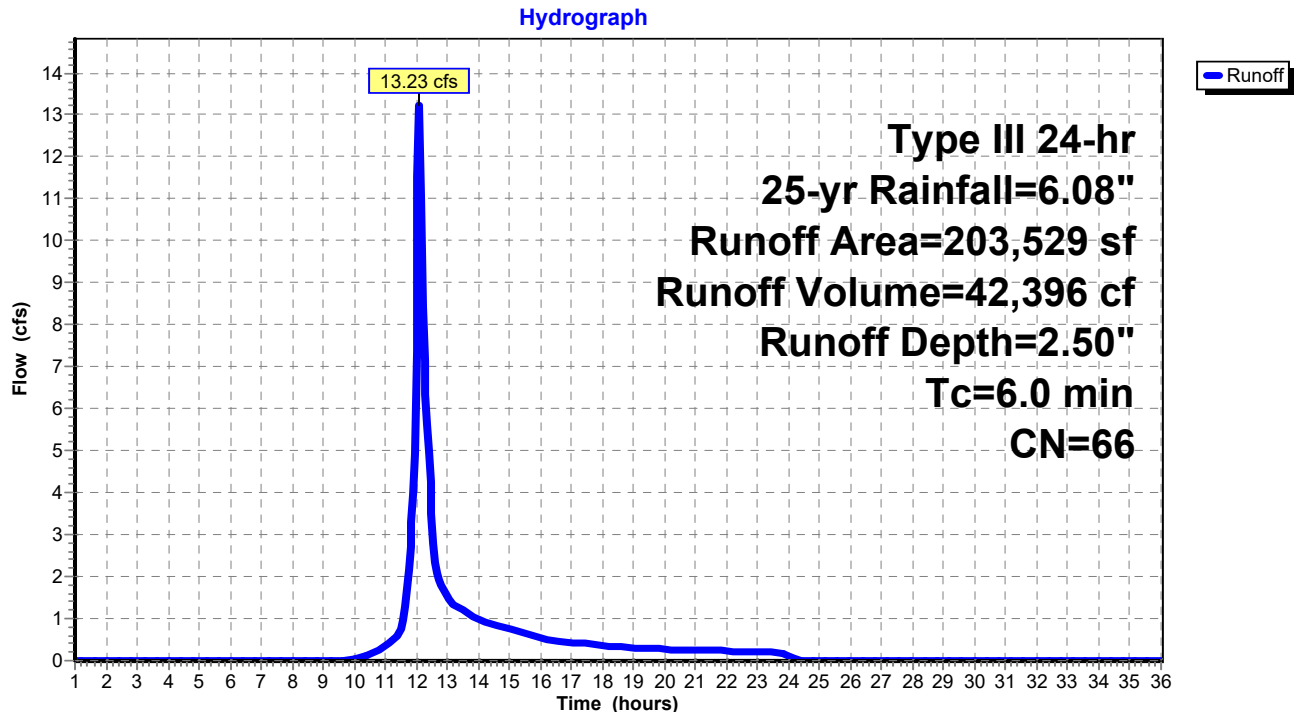
Runoff = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf, Depth= 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

	Area (sf)	CN	Description
*	172,845	65	Upland Bog Area
	1,176	72	Dirt roads, HSG A
	7,998	82	Dirt roads, HSG B
	2,102	85	Gravel roads, HSG B
	1,434	61	>75% Grass cover, Good, HSG B
	604	30	Woods, Good, HSG A
	17,370	67	Brush, Poor, HSG B
	203,529	66	Weighted Average
	203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area



Summary for Subcatchment 4S: Center-Western Area

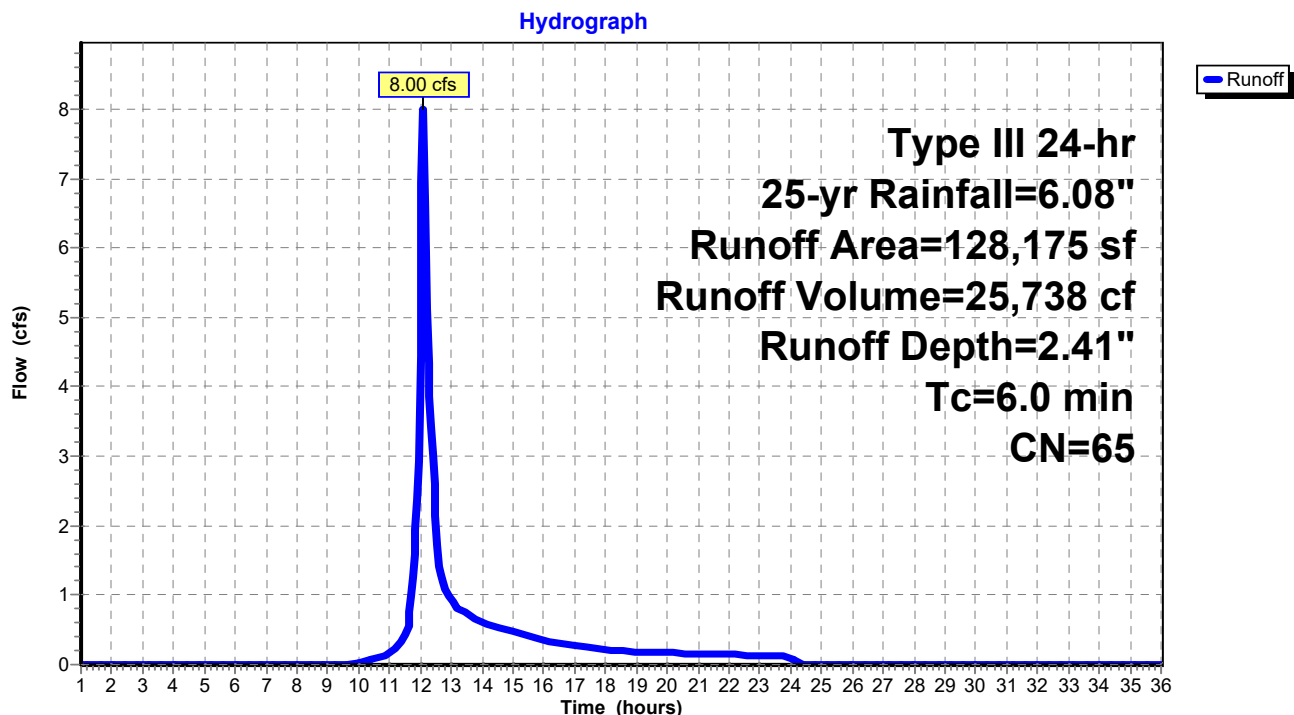
Runoff = 8.00 cfs @ 12.10 hrs, Volume= 25,738 cf, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
227	39	>75% Grass cover, Good, HSG A
28,879	61	>75% Grass cover, Good, HSG B
954	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
97,650	67	Brush, Poor, HSG B
128,175	65	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area



Summary for Subcatchment 5S: Northwestern Area

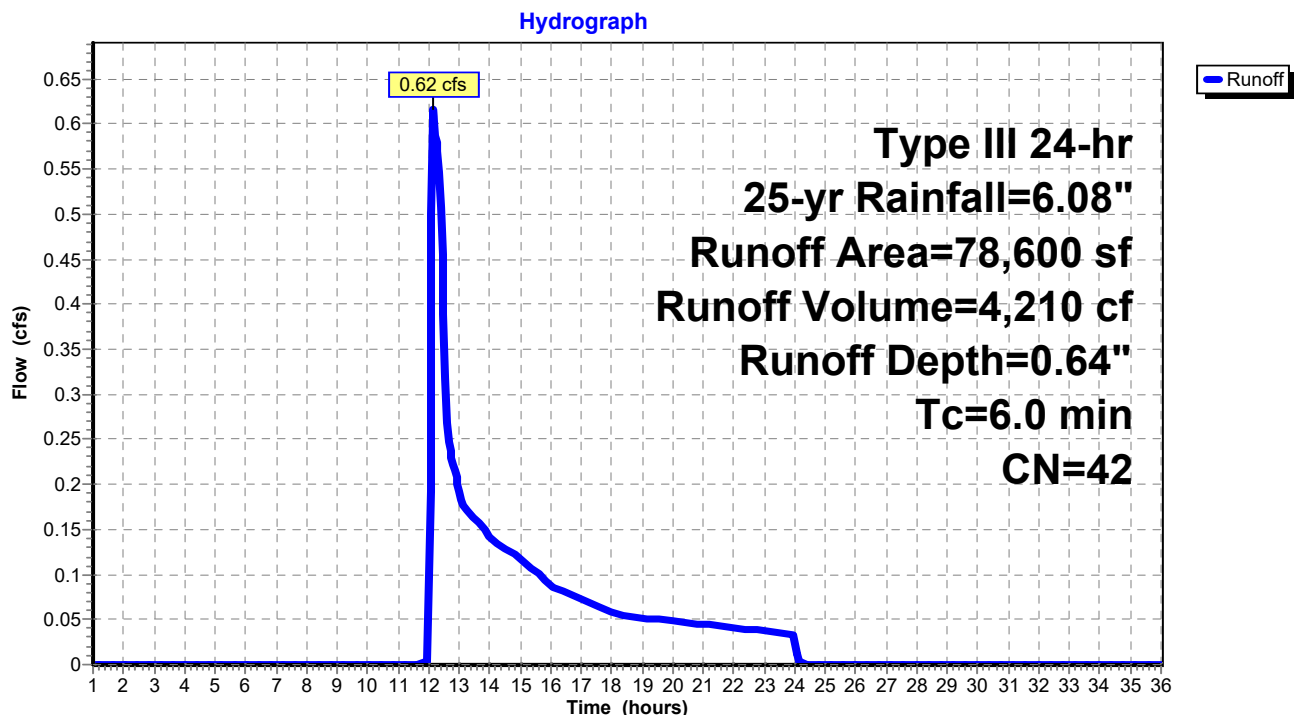
Runoff = 0.62 cfs @ 12.17 hrs, Volume= 4,210 cf, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Rainfall=6.08"

Area (sf)	CN	Description
778	39	>75% Grass cover, Good, HSG A
10,099	61	>75% Grass cover, Good, HSG B
50,691	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
16,211	67	Brush, Poor, HSG B
78,600	42	Weighted Average
78,600		100.00% Pervious Area

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

Subcatchment 5S: Northwestern Area

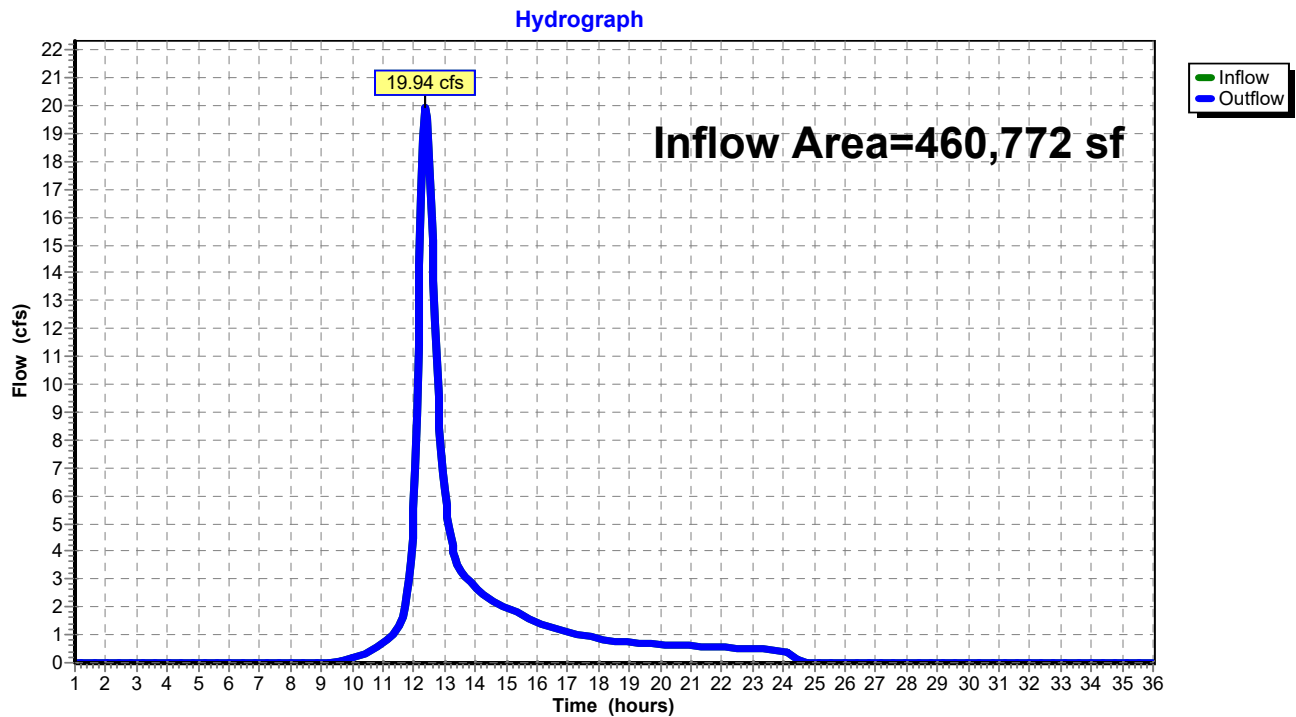


Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 32.10% Impervious, Inflow Depth = 2.72" for 25-yr event
Inflow = 19.94 cfs @ 12.38 hrs, Volume= 104,612 cf
Outflow = 19.94 cfs @ 12.38 hrs, Volume= 104,612 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond



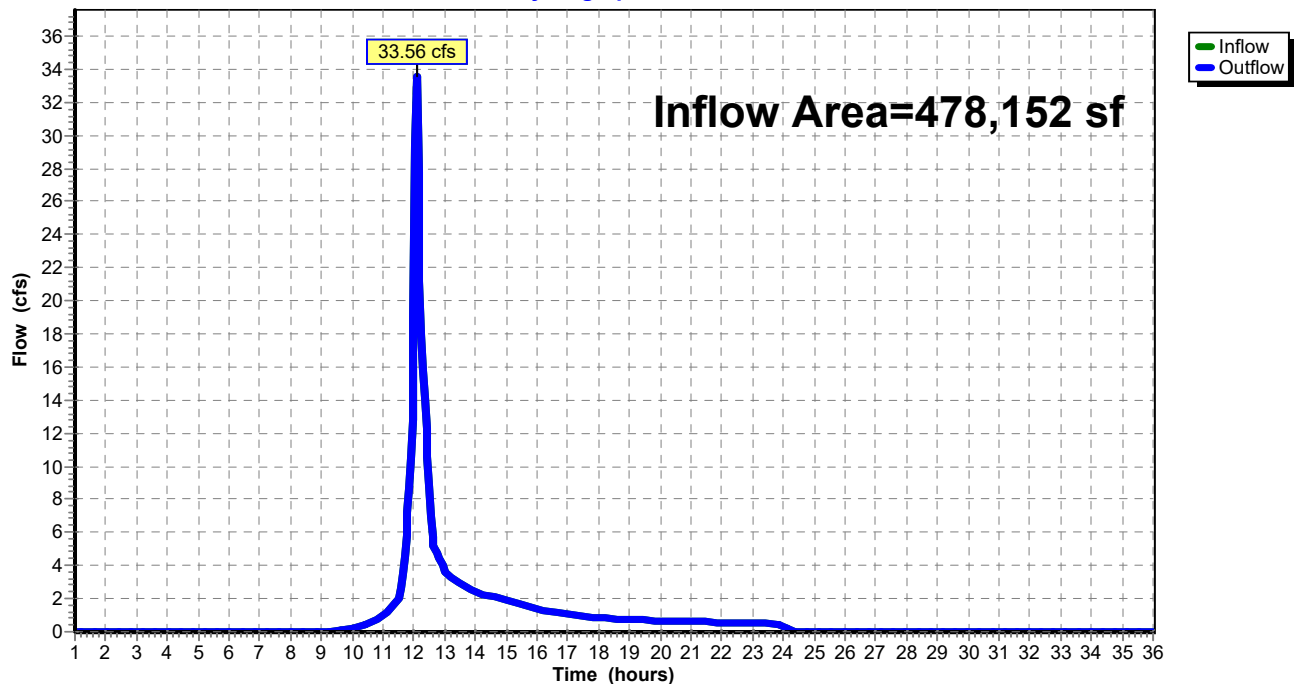
Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,152 sf, 3.21% Impervious, Inflow Depth = 2.68" for 25-yr event
Inflow = 33.56 cfs @ 12.10 hrs, Volume= 106,883 cf
Outflow = 33.56 cfs @ 12.10 hrs, Volume= 106,883 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream

Hydrograph

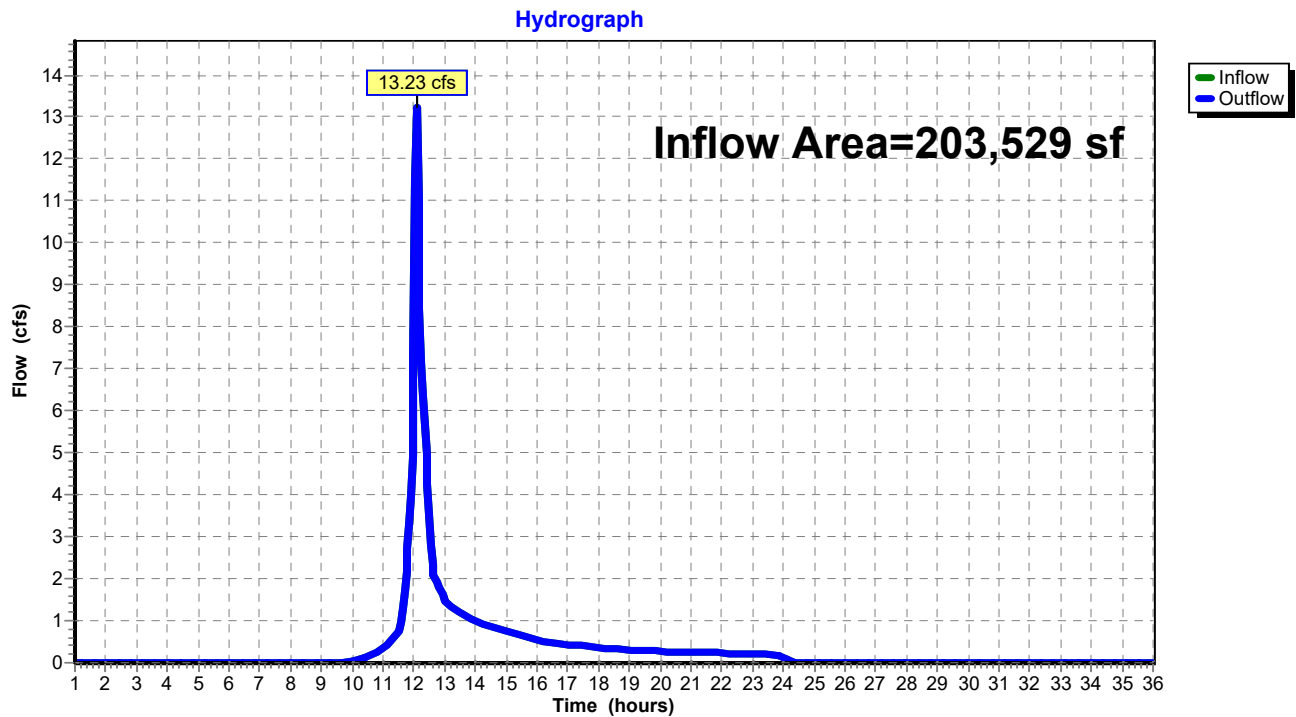


Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 2.50" for 25-yr event
Inflow = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf
Outflow = 13.23 cfs @ 12.10 hrs, Volume= 42,396 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

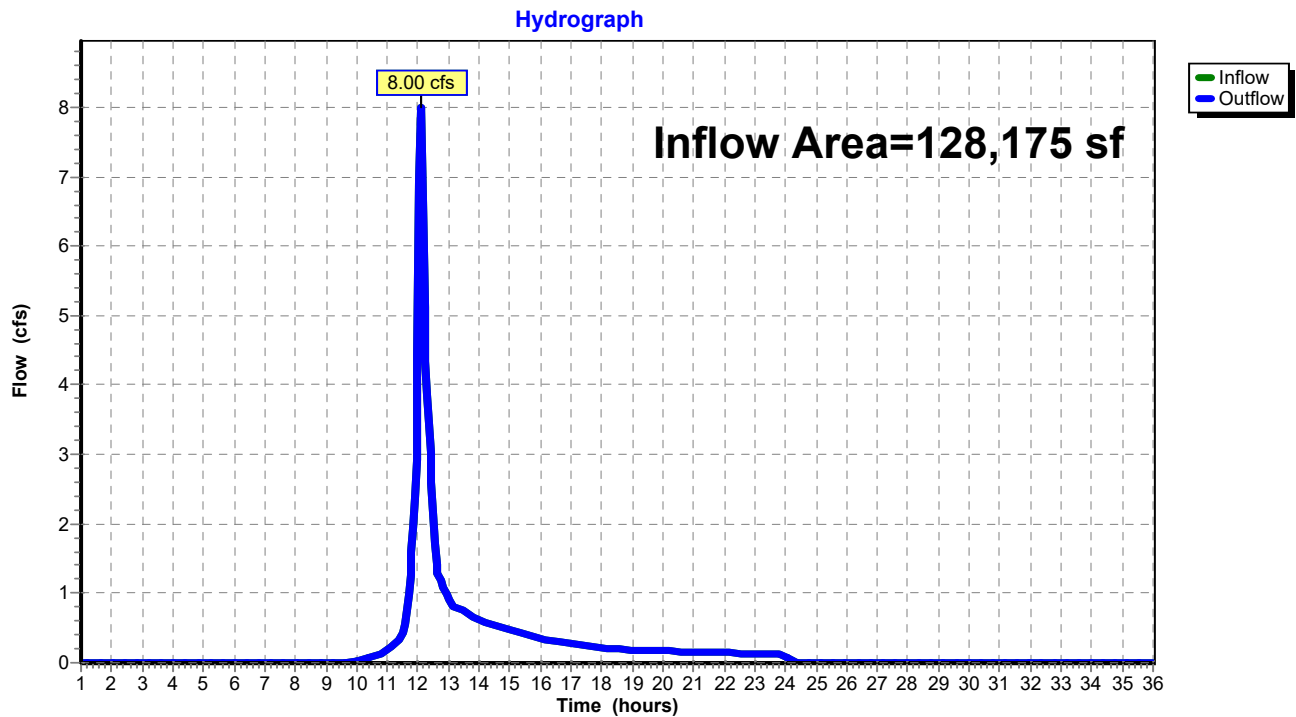


Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 2.41" for 25-yr event
Inflow = 8.00 cfs @ 12.10 hrs, Volume= 25,738 cf
Outflow = 8.00 cfs @ 12.10 hrs, Volume= 25,738 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

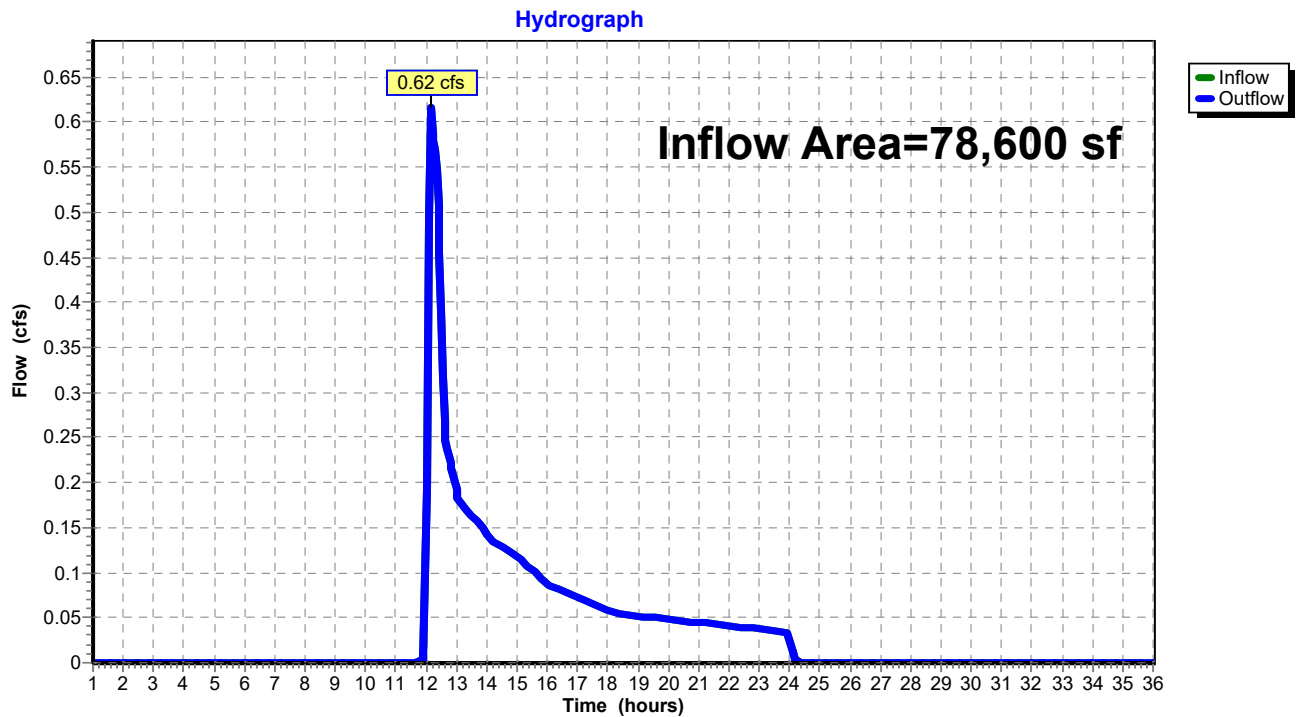


Summary for Reach DP-5: Herring Brook

Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 0.64" for 25-yr event
Inflow = 0.62 cfs @ 12.17 hrs, Volume= 4,210 cf
Outflow = 0.62 cfs @ 12.17 hrs, Volume= 4,210 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



Summary for Pond 1P: Raingarden

Inflow Area = 8,674 sf, 34.83% Impervious, Inflow Depth = 1.81" for 25-yr event
 Inflow = 0.39 cfs @ 12.10 hrs, Volume= 1,306 cf
 Outflow = 0.07 cfs @ 12.65 hrs, Volume= 1,306 cf, Atten= 82%, Lag= 32.8 min
 Discarded = 0.05 cfs @ 12.65 hrs, Volume= 1,248 cf
 Primary = 0.02 cfs @ 12.65 hrs, Volume= 58 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 65.60' @ 12.65 hrs Surf.Area= 841 sf Storage= 415 cf

Plug-Flow detention time= 72.8 min calculated for 1,304 cf (100% of inflow)
 Center-of-Mass det. time= 72.7 min (940.1 - 867.4)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	3,082 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.00	552	158.0	0	0	552
66.00	1,067	181.0	795	795	1,195
67.00	1,660	206.0	1,353	2,148	1,989
67.50	2,084	219.0	934	3,082	2,441

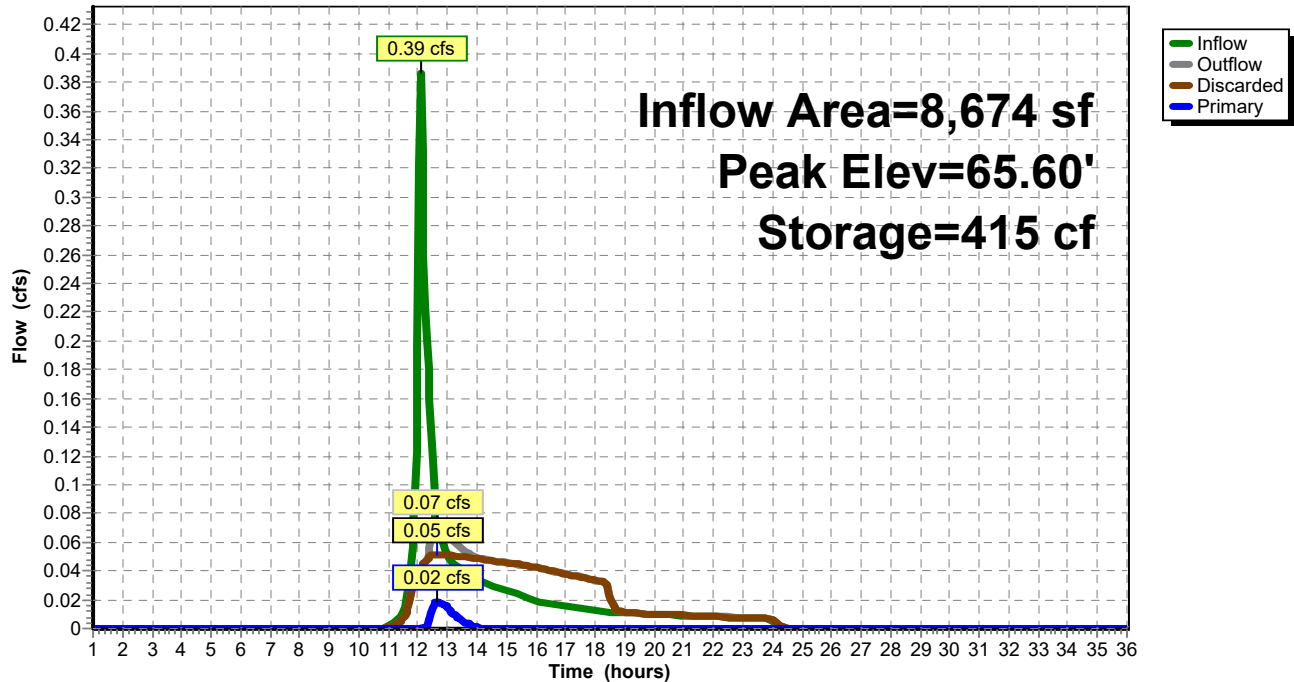
Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	65.50'	4.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.50' / 65.30' S= 0.0100 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#3	Primary	66.80'	10.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.05 cfs @ 12.65 hrs HW=65.60' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.02 cfs @ 12.65 hrs HW=65.60' (Free Discharge)
 ↑ **2=Culvert** (Inlet Controls 0.02 cfs @ 0.85 fps)
 ↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Raingarden

Hydrograph



Summary for Subcatchment 1S: Southwest-Western Area

Runoff = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf, Depth= 4.06"

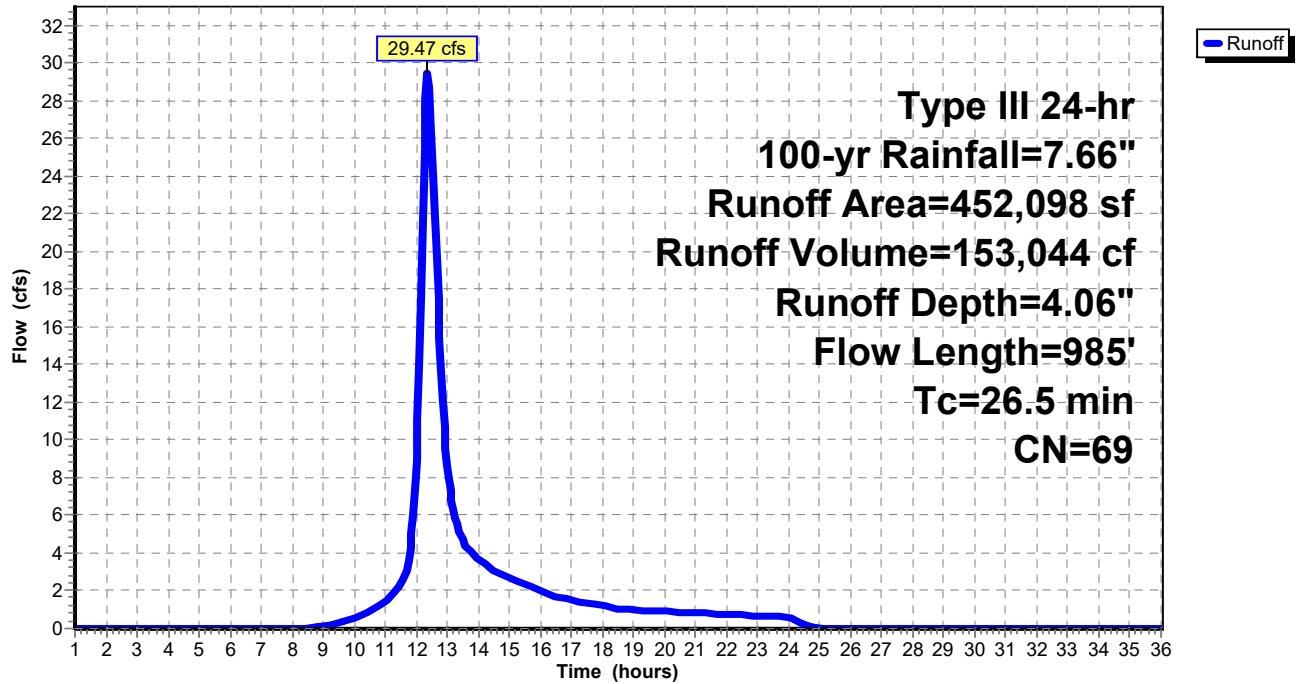
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
3,887	76	Gravel roads, HSG A
9,914	85	Gravel roads, HSG B
4,046	39	>75% Grass cover, Good, HSG A
139,352	61	>75% Grass cover, Good, HSG B
14,765	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
76,367	30	Woods, Good, HSG A
175	55	Woods, Good, HSG B
73,488	67	Brush, Poor, HSG B
452,098	69	Weighted Average
307,229		67.96% Pervious Area
144,869		32.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.5	985	Total			

Subcatchment 1S: Southwest-Western Area

Hydrograph



Summary for Subcatchment 1Sa: New Driveway Area

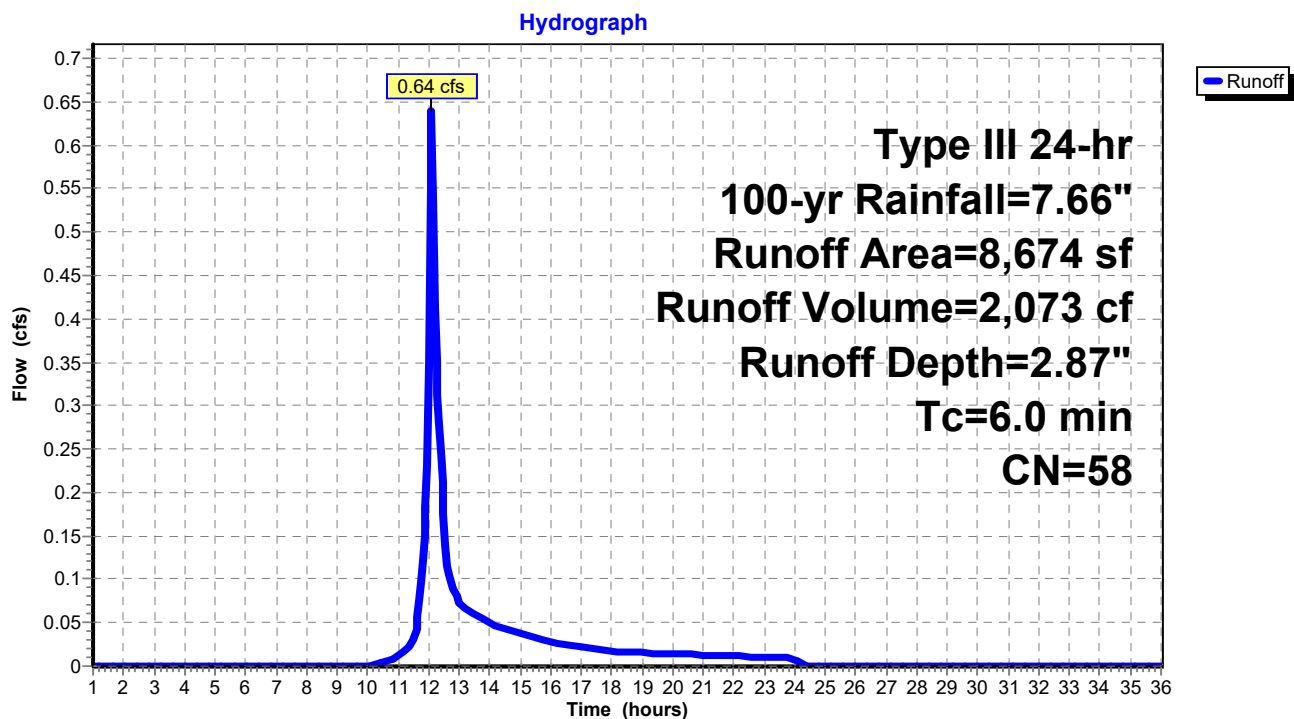
Runoff = 0.64 cfs @ 12.10 hrs, Volume= 2,073 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
239	76	Gravel roads, HSG A
* 1,954	98	New Driveway Area, HSG A
2,628	30	Woods, Good, HSG A
1,067	98	Water Surface, HSG A
2,786	39	>75% Grass cover, Good, HSG A
8,674	58	Weighted Average
5,653		65.17% Pervious Area
3,021		34.83% Impervious Area

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

Subcatchment 1Sa: New Driveway Area



Summary for Subcatchment 2S: Eastern Area

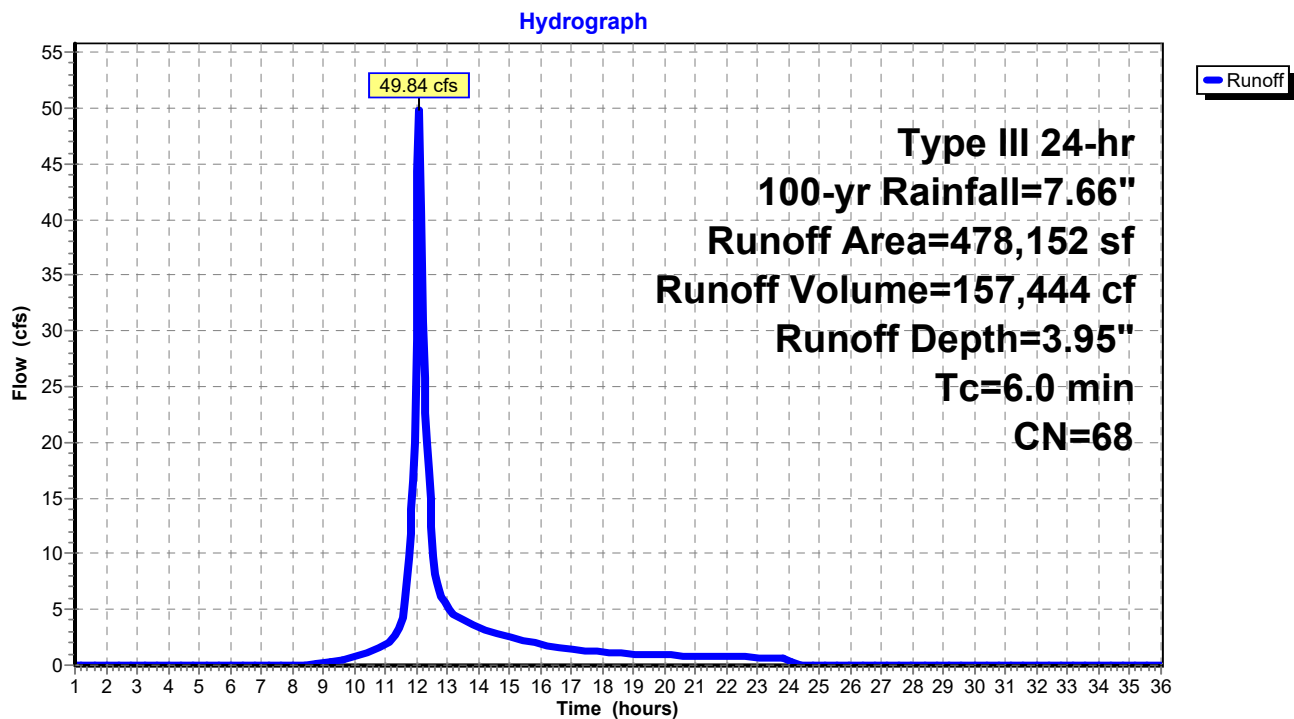
Runoff = 49.84 cfs @ 12.09 hrs, Volume= 157,444 cf, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
9,662	82	Dirt roads, HSG B
* 960	98	Equipment Pads
50,553	85	Gravel roads, HSG B
166,878	61	>75% Grass cover, Good, HSG B
14,392	98	Roofs, HSG B
23,117	55	Woods, Good, HSG B
212,590	67	Brush, Poor, HSG B
478,152	68	Weighted Average
462,800		96.79% Pervious Area
15,352		3.21% Impervious Area

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

Subcatchment 2S: Eastern Area



Summary for Subcatchment 3S: Center-Eastern Area

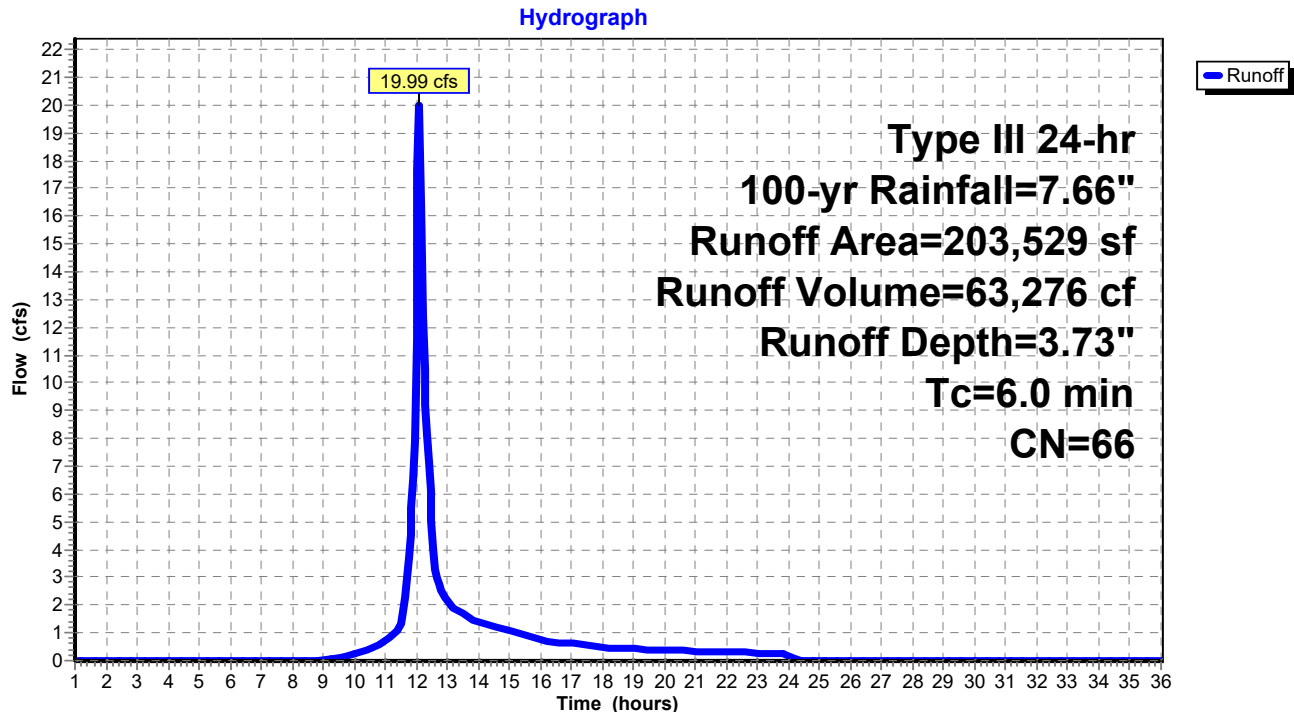
Runoff = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

	Area (sf)	CN	Description
*	172,845	65	Upland Bog Area
	1,176	72	Dirt roads, HSG A
	7,998	82	Dirt roads, HSG B
	2,102	85	Gravel roads, HSG B
	1,434	61	>75% Grass cover, Good, HSG B
	604	30	Woods, Good, HSG A
	17,370	67	Brush, Poor, HSG B
	203,529	66	Weighted Average
	203,529		100.00% Pervious Area

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

Subcatchment 3S: Center-Eastern Area



Summary for Subcatchment 4S: Center-Western Area

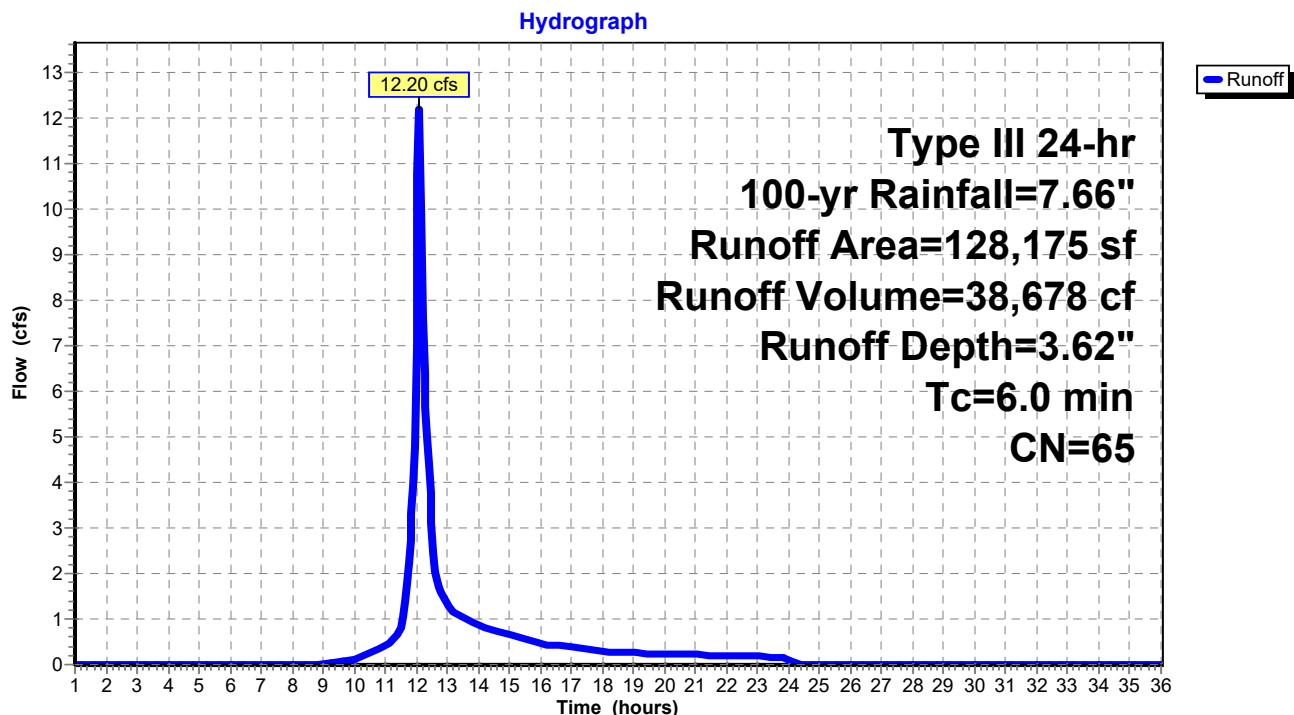
Runoff = 12.20 cfs @ 12.09 hrs, Volume= 38,678 cf, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
227	39	>75% Grass cover, Good, HSG A
28,879	61	>75% Grass cover, Good, HSG B
954	30	Woods, Good, HSG A
465	55	Woods, Good, HSG B
97,650	67	Brush, Poor, HSG B
128,175	65	Weighted Average
128,175		100.00% Pervious Area

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

Subcatchment 4S: Center-Western Area



Summary for Subcatchment 5S: Northwestern Area

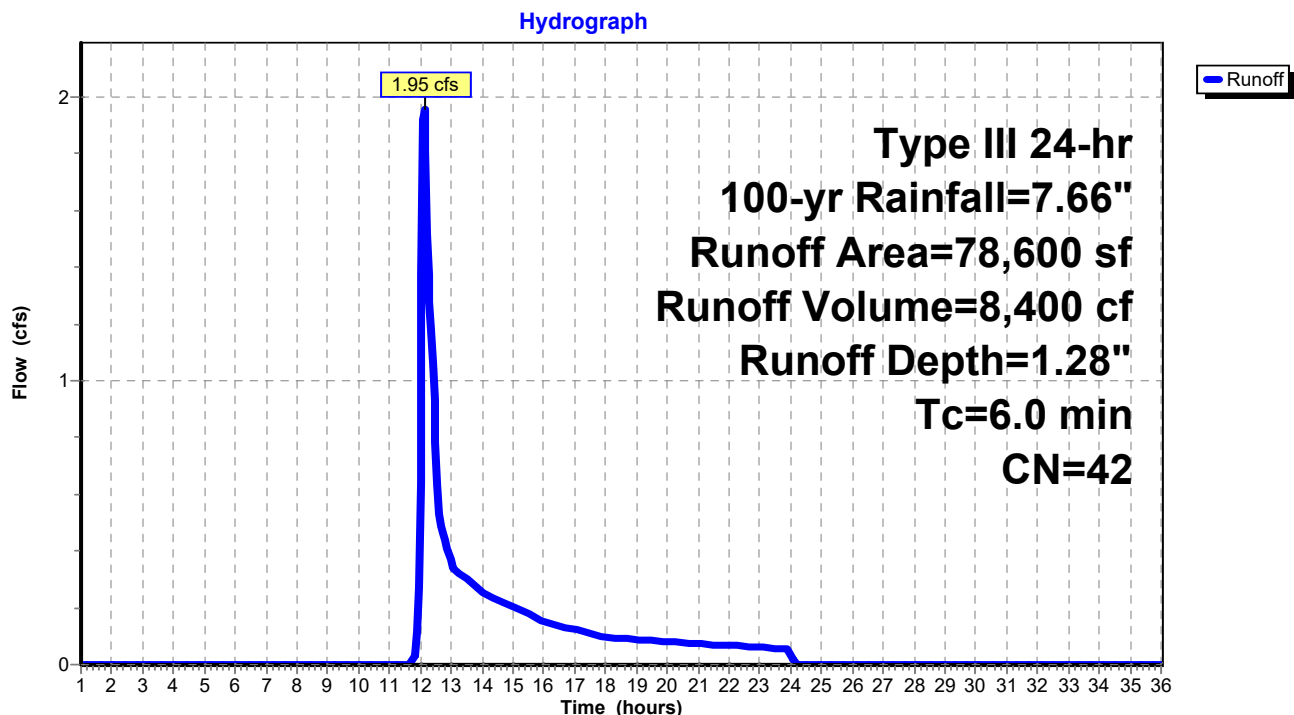
Runoff = 1.95 cfs @ 12.12 hrs, Volume= 8,400 cf, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
778	39	>75% Grass cover, Good, HSG A
10,099	61	>75% Grass cover, Good, HSG B
50,691	30	Woods, Good, HSG A
821	55	Woods, Good, HSG B
16,211	67	Brush, Poor, HSG B
78,600	42	Weighted Average
78,600		100.00% Pervious Area

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

Subcatchment 5S: Northwestern Area

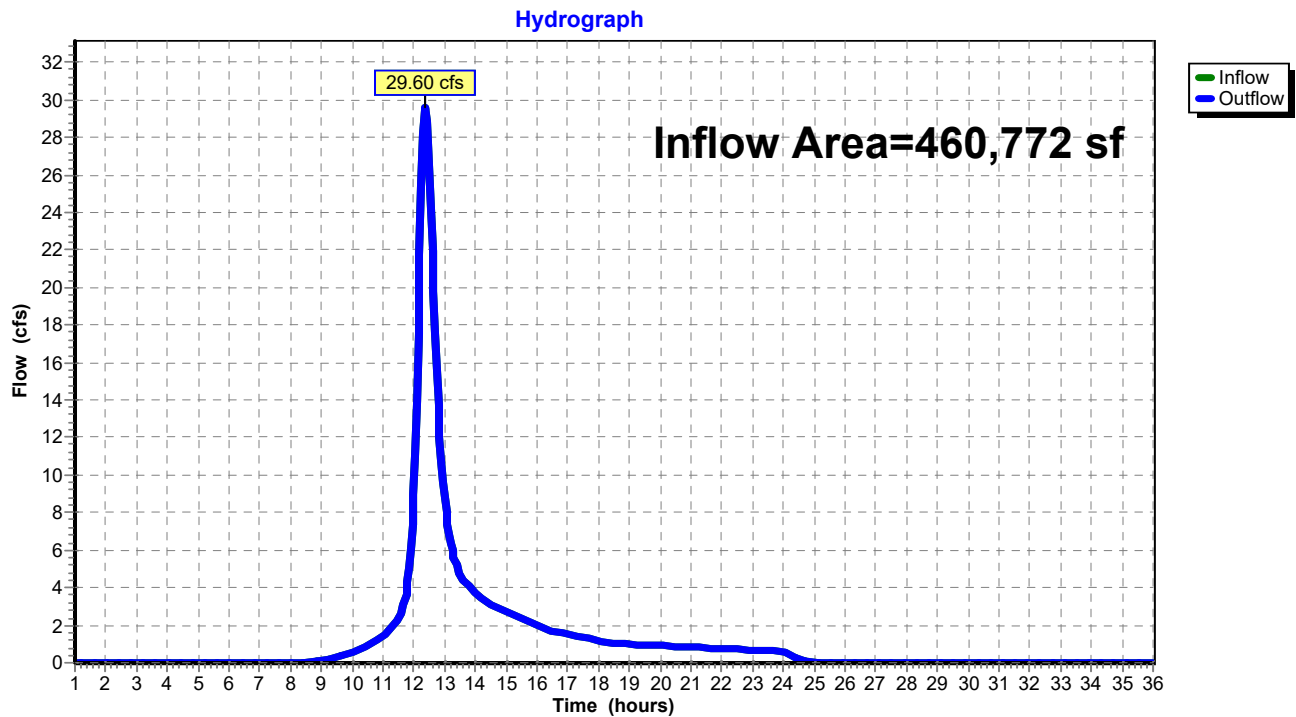


Summary for Reach DP-1: Glover Mill Pond

Inflow Area = 460,772 sf, 32.10% Impervious, Inflow Depth = 4.00" for 100-yr event
Inflow = 29.60 cfs @ 12.37 hrs, Volume= 153,522 cf
Outflow = 29.60 cfs @ 12.37 hrs, Volume= 153,522 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-1: Glover Mill Pond

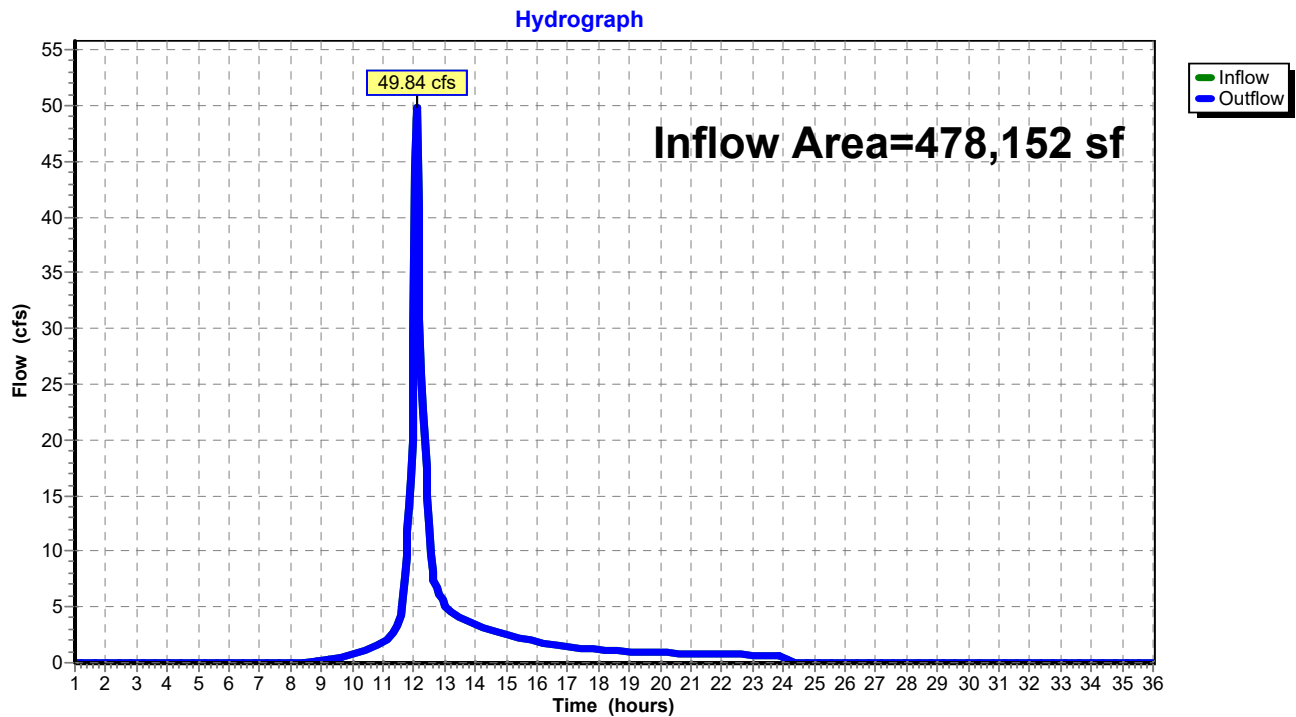


Summary for Reach DP-2: Eastern Intermittent Stream

Inflow Area = 478,152 sf, 3.21% Impervious, Inflow Depth = 3.95" for 100-yr event
Inflow = 49.84 cfs @ 12.09 hrs, Volume= 157,444 cf
Outflow = 49.84 cfs @ 12.09 hrs, Volume= 157,444 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-2: Eastern Intermittent Stream

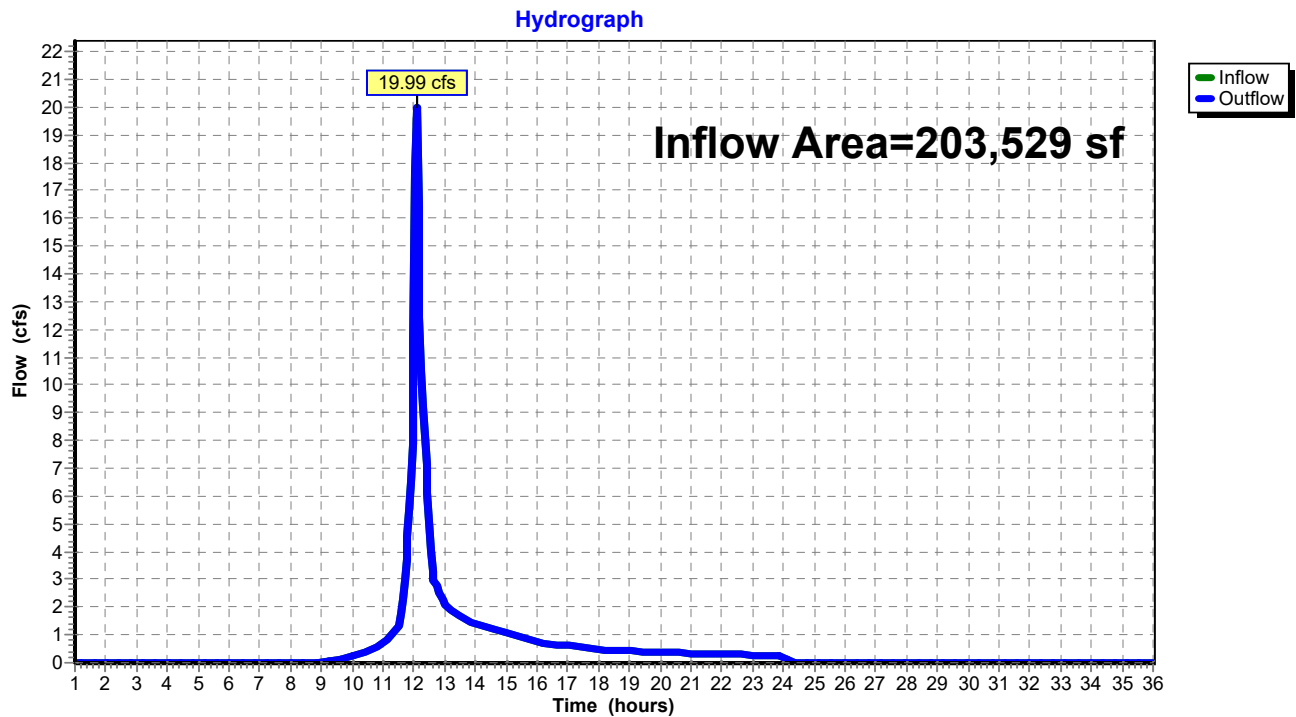


Summary for Reach DP-3: Upland Bog

Inflow Area = 203,529 sf, 0.00% Impervious, Inflow Depth = 3.73" for 100-yr event
Inflow = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf
Outflow = 19.99 cfs @ 12.09 hrs, Volume= 63,276 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-3: Upland Bog

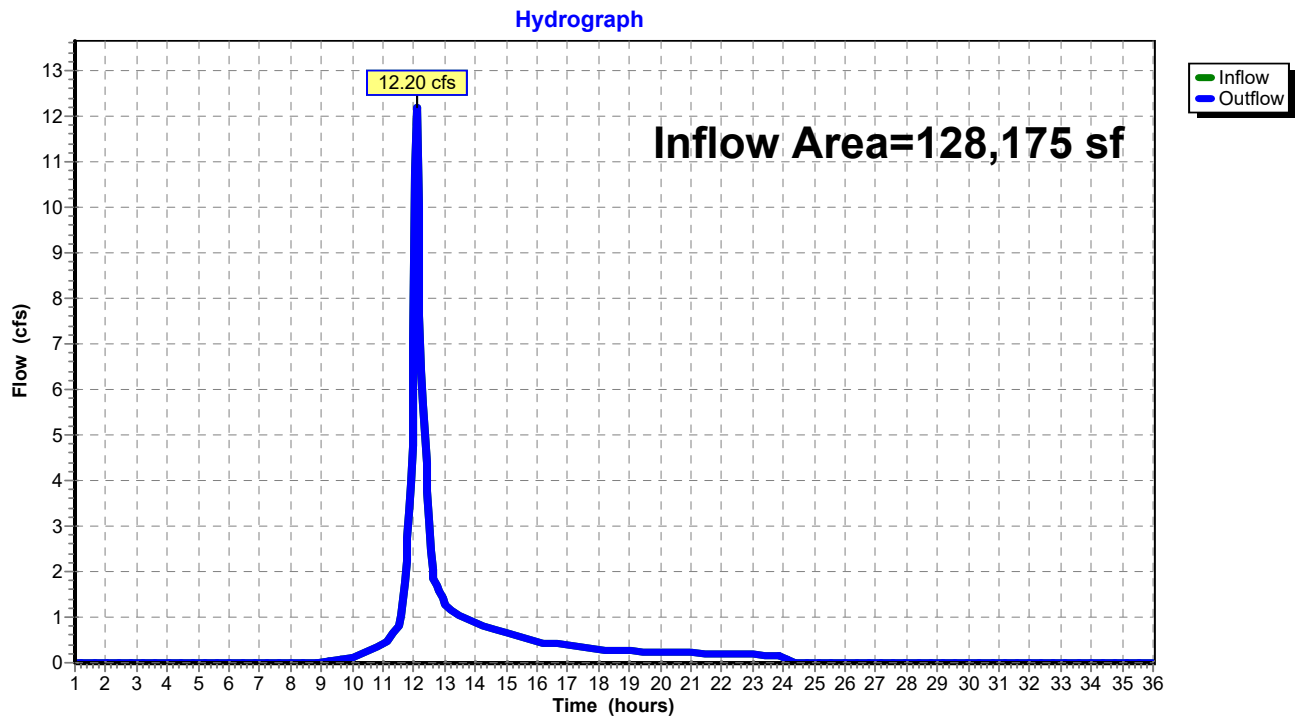


Summary for Reach DP-4: Excavated Area

Inflow Area = 128,175 sf, 0.00% Impervious, Inflow Depth = 3.62" for 100-yr event
Inflow = 12.20 cfs @ 12.09 hrs, Volume= 38,678 cf
Outflow = 12.20 cfs @ 12.09 hrs, Volume= 38,678 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-4: Excavated Area

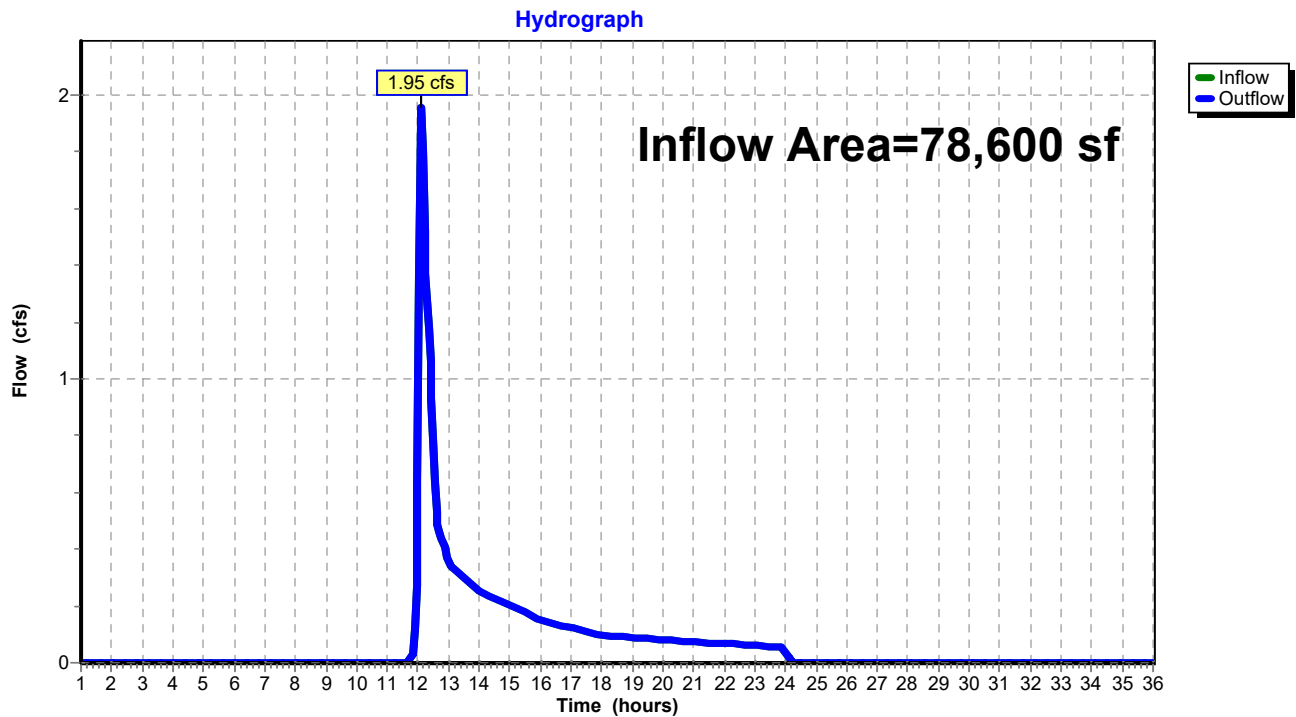


Summary for Reach DP-5: Herring Brook

Inflow Area = 78,600 sf, 0.00% Impervious, Inflow Depth = 1.28" for 100-yr event
Inflow = 1.95 cfs @ 12.12 hrs, Volume= 8,400 cf
Outflow = 1.95 cfs @ 12.12 hrs, Volume= 8,400 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Reach DP-5: Herring Brook



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Page 56

Summary for Pond 1P: Raingarden

Inflow Area = 8,674 sf, 34.83% Impervious, Inflow Depth = 2.87" for 100-yr event
 Inflow = 0.64 cfs @ 12.10 hrs, Volume= 2,073 cf
 Outflow = 0.19 cfs @ 12.48 hrs, Volume= 2,073 cf, Atten= 70%, Lag= 22.7 min
 Discarded = 0.06 cfs @ 12.48 hrs, Volume= 1,595 cf
 Primary = 0.13 cfs @ 12.48 hrs, Volume= 478 cf

Routing by Stor-Ind method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 65.82' @ 12.48 hrs Surf.Area= 965 sf Storage= 618 cf

Plug-Flow detention time= 68.3 min calculated for 2,073 cf (100% of inflow)
 Center-of-Mass det. time= 68.2 min (921.2 - 853.1)

Volume	Invert	Avail.Storage	Storage Description
#1	65.00'	3,082 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.00	552	158.0	0	0	552
66.00	1,067	181.0	795	795	1,195
67.00	1,660	206.0	1,353	2,148	1,989
67.50	2,084	219.0	934	3,082	2,441

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	65.50'	4.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 65.50' / 65.30' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#3	Primary	66.80'	10.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.06 cfs @ 12.48 hrs HW=65.82' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.06 cfs)

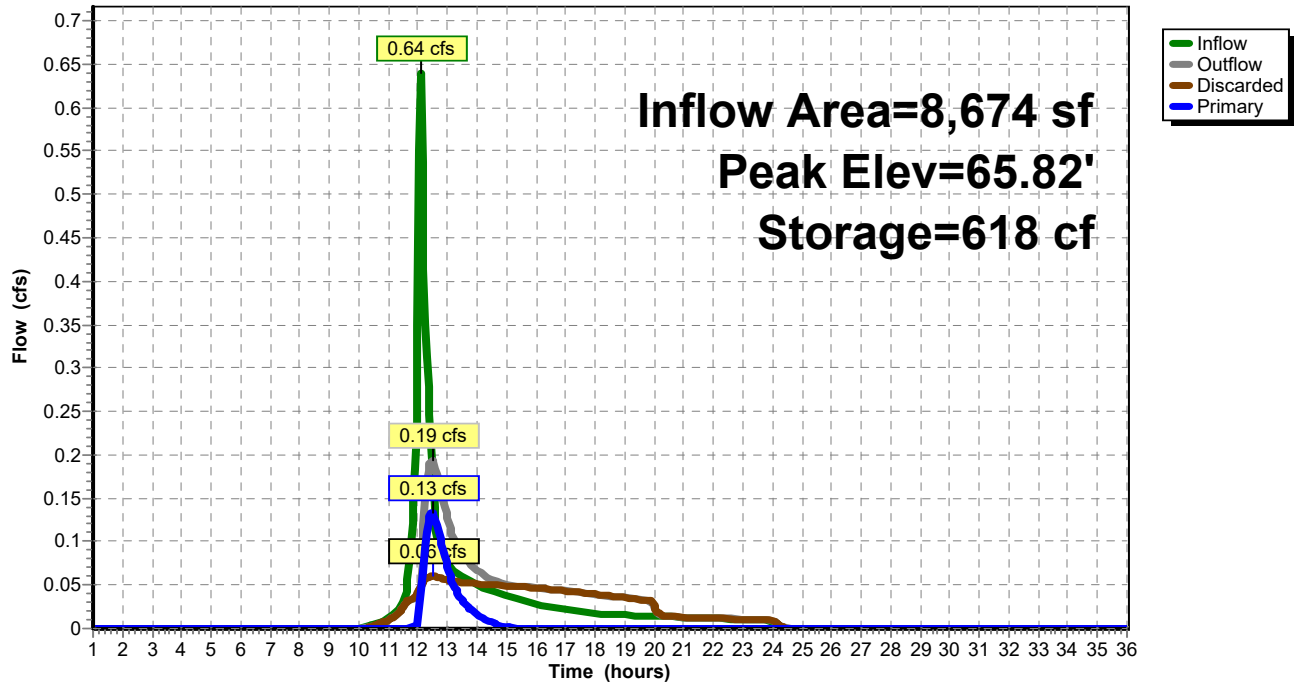
Primary OutFlow Max=0.13 cfs @ 12.48 hrs HW=65.82' (Free Discharge)

↑ **2=Culvert** (Inlet Controls 0.13 cfs @ 1.53 fps)

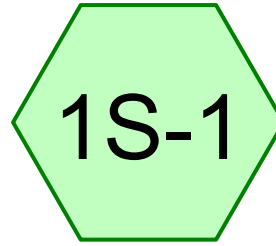
↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Raingarden

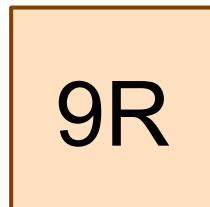
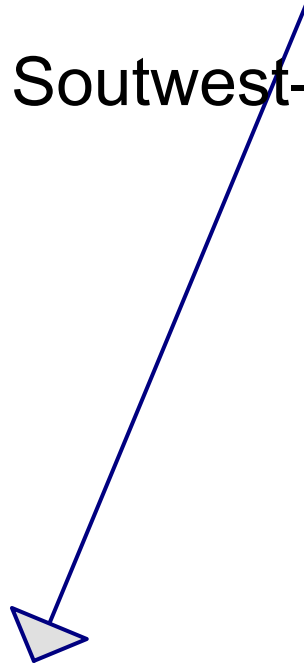
Hydrograph



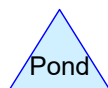
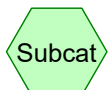
PIPE SIZING CALCULATIONS



Southwest-Western Area



3-15" PIPE



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Page 2

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	9R	0.50	-0.52	30.0	0.0340	0.012	15.0	0.0	0.0

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Type III 24-hr 100-yr Rainfall=7.66"

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Page 3

Time span=1.00-36.00 hrs, dt=0.05 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S-1: Southwest-Western Runoff Area=452,098 sf 32.04% Impervious Runoff Depth=4.06"
Flow Length=985' Tc=26.5 min CN=69 Runoff=29.47 cfs 153,044 cf

Reach 9R: 3-15" PIPE Avg. Flow Depth=0.82' Max Vel=11.56 fps Inflow=29.47 cfs 153,044 cf
15.0" Round Pipe x 3.00 n=0.012 L=30.0' S=0.0340 '/ Capacity=38.71 cfs Outflow=29.46 cfs 153,044 cf

Total Runoff Area = 452,098 sf Runoff Volume = 153,044 cf Average Runoff Depth = 4.06"
67.96% Pervious = 307,229 sf 32.04% Impervious = 144,869 sf

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Type III 24-hr 100-yr Rainfall=7.66"

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Page 4

Summary for Subcatchment 1S-1: Southwest-Western Area

Runoff = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
3,887	76	Gravel roads, HSG A
9,914	85	Gravel roads, HSG B
4,046	39	>75% Grass cover, Good, HSG A
139,352	61	>75% Grass cover, Good, HSG B
14,765	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
76,367	30	Woods, Good, HSG A
175	55	Woods, Good, HSG B
73,488	67	Brush, Poor, HSG B
452,098	69	Weighted Average
307,229		67.96% Pervious Area
144,869		32.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.5	985	Total			

Summary for Reach 9R: 3-15" PIPE

Inflow Area = 452,098 sf, 32.04% Impervious, Inflow Depth = 4.06" for 100-yr event

Inflow = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf

Outflow = 29.46 cfs @ 12.37 hrs, Volume= 153,044 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Max. Velocity= 11.56 fps, Min. Travel Time= 0.0 min

Avg. Velocity= 4.83 fps, Avg. Travel Time= 0.1 min

Peak Storage= 76 cf @ 12.37 hrs

Average Depth at Peak Storage= 0.82'

Bank-Full Depth= 1.25' Flow Area= 3.7 sf, Capacity= 38.71 cfs

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Type III 24-hr 100-yr Rainfall=7.66"

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Page 5

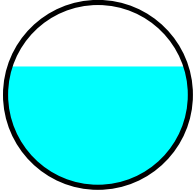
A factor of 3.00 has been applied to the storage and discharge capacity

15.0" Round Pipe

n= 0.012 Corrugated PP, smooth interior

Length= 30.0' Slope= 0.0340 '/'

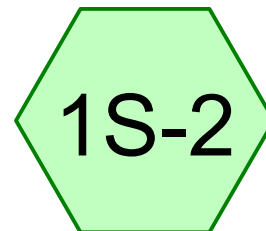
Inlet Invert= 0.50', Outlet Invert= -0.52'



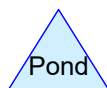
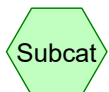
SWALE SIZING CALCULATIONS



SWALE



Southwest-Western Area



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Type III 24-hr 100-yr Rainfall=7.66"

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Page 2

Time span=1.00-36.00 hrs, dt=0.05 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S-2: Southwest-Western Runoff Area=452,098 sf 32.04% Impervious Runoff Depth=4.06"
Flow Length=985' Tc=26.5 min CN=69 Runoff=29.47 cfs 153,044 cf

Reach 10R: SWALE Avg. Flow Depth=0.98' Max Vel=3.78 fps Inflow=29.47 cfs 153,044 cf
n=0.069 L=40.0' S=0.0500 ' Capacity=122.71 cfs Outflow=29.41 cfs 153,044 cf

Total Runoff Area = 452,098 sf Runoff Volume = 153,044 cf Average Runoff Depth = 4.06"
67.96% Pervious = 307,229 sf 32.04% Impervious = 144,869 sf

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Type III 24-hr 100-yr Rainfall=7.66"

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Page 3

Summary for Subcatchment 1S-2: Southwest-Western Area

Runoff = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.66"

Area (sf)	CN	Description
3,887	76	Gravel roads, HSG A
9,914	85	Gravel roads, HSG B
4,046	39	>75% Grass cover, Good, HSG A
139,352	61	>75% Grass cover, Good, HSG B
14,765	98	Paved parking, HSG A
103,603	98	Paved parking, HSG B
26,501	98	Roofs, HSG B
76,367	30	Woods, Good, HSG A
175	55	Woods, Good, HSG B
73,488	67	Brush, Poor, HSG B
452,098	69	Weighted Average
307,229		67.96% Pervious Area
144,869		32.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	50	0.0050	0.04		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	150	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.1	380	0.0230	3.08		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	405	0.0420	3.30		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
26.5	985	Total			

Summary for Reach 10R: SWALE

Inflow Area = 452,098 sf, 32.04% Impervious, Inflow Depth = 4.06" for 100-yr event

Inflow = 29.47 cfs @ 12.37 hrs, Volume= 153,044 cf

Outflow = 29.41 cfs @ 12.38 hrs, Volume= 153,044 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-36.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.78 fps, Min. Travel Time= 0.2 min

Avg. Velocity= 1.39 fps, Avg. Travel Time= 0.5 min

Peak Storage= 312 cf @ 12.37 hrs

Average Depth at Peak Storage= 0.98'

Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 122.71 cfs

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Type III 24-hr 100-yr Rainfall=7.66"

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Page 4

5.00' x 2.00' deep channel, n= 0.069 Riprap, 6-inch

Side Slope Z-value= 3.0 '/' Top Width= 17.00'

Length= 40.0' Slope= 0.0500 '/'

Inlet Invert= 50.00', Outlet Invert= 48.00'

