Principe Company

DRAINAGE ANALYSIS
March 13, 2024

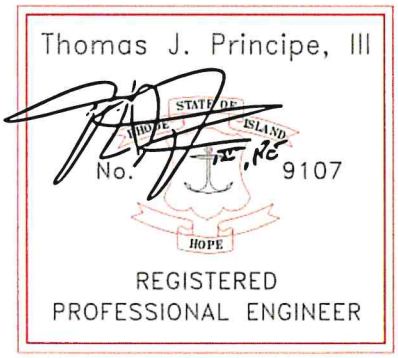
507-509 HIGH STREET
AP 48-3, Lot 150
South Kingstown, RI

Prepared For:

Glenn & Gretel McCrory
200 Lavan Street
Warwick, RI 02888

Prepared By:

Principe Engineering, Inc.
27 Sakonnet Ridge Drive
Tiverton, Rhode Island



Stormwater Calculations
507-509 High Street
South Kingstown, RI
March 13, 2024

Storm Water Management

The storm water management system selected is best suited to the site and provides the least disturbance of the site while complying with the stormwater regulations. The storm water management system consists of the collection of overland runoff to a proposed bioretention system. The drainage system is designed to offset increased storm flows and provide water quality in accordance with the regulations of both state and local authorities. This drainage system is intended to mitigate increased runoff generated from new construction so the downstream wetlands, water bodies, and neighboring properties will not be impacted. The drainage system will completely control post development peak flows and provide for pollutant removal at the maximum possible rates.

The Pre-Development watershed area includes the entirety of the site and does not have any off-site contributions. A test pit was dug for the property by the previous project engineer, which was provided to the RIDEM Freshwater Wetlands Section engineer and biologist and the subsequent drainage design was approved under RIDEM #19-0346. This permit expires on February 22, 2025, unless extensions are requested and approved. To the greatest extent possible, no changes to the approved drainage design is proposed. This report represents a review and updated certification by Principe Company in support of the project to the Town of South Kingstown. This includes the proposed cut/fill calculations for the work within the 100-year floodplain, also submitted to and approved by RIDEM under RIDEM#19-0346.

Principe Company

Under post development conditions the watershed was analyzed to address in two sub-areas: the area controlled by the proposed bioretention basin and the uncontrolled portions of the site.

The following table compares the flows between pre-development conditions and post development conditions, after flows are routed through the stormwater treatment areas:

WATERSHED	1-YEAR STORM	10-YEAR STORM	25-YEAR STORM	100-YEAR STORM
PRE-SITE	0.55 CFS	1.33 CFS	1.80 CFS	2.75 CFS
POST-SITE	0.15 CFS	0.87 CFS	1.41 CFS	2.21 CFS

Per RIDEM regulations, the required water quality volume and recharge volume is provided by the project:

Rev= 2,554 x 0.35/12 = 74.49 cf < 261.36 cf **OK**

WQv= 2,554/12 = 212.83 cf < 261.36 cf **OK**

The drainage collection system proposed takes advantage of the natural slopes and contours of the site and accommodates the hydrologic soil group present on the site. It provides for both peak storm flow mitigation, recharge and water quality control. By reducing post-development storm water flows, the primary goal of the proposed drainage system is achieved. Any potential impacts from the proposed development on the abutting properties have been mitigated, and again, this stormwater has been approved with a state permit.

Principe Company

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
235 Promenade Street
Providence, Rhode Island 02908

February 22, 2021

Glenn McCrory
80 Fawn's Run
North Kingstown, RI 02852

Insignificant Alteration – Permit

Re: Application No. 19-0346 in reference to the location below:

Approximately 75 feet east of High Street (at 507-509 High Street), Utility Pole 1815-48, approximately 250 feet south of its intersection with Kingstown Road, Assessor's Plat 48-3, Lot 150, South Kingstown, RI.

Dear Mr. McCrory:

Kindly be advised that the Department of Environmental Management's ("DEM") Freshwater Wetlands Program ("Program") has completed its review of your **Request for Preliminary Determination** application. This review included a site inspection of the above referenced property ("subject property") and an evaluation of the proposed five (5) condominium units with attached decks, expanded gravel parking areas, dumpster enclosure, vegetated bioretention basin and mitigation plantings with associated site alterations as illustrated and detailed on site plans submitted with your application. These revised site plans were received by the DEM on December 30, 2020 and the revised Operation & Maintenance Plan was received by the DEM on February 11, 2021.

Our observations of the subject property, review of the site plans and evaluation of the proposed project reveals that alterations of freshwater wetlands are proposed. However, pursuant to 250-RICR-150-15-1.9 of the Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act, 250-RICR-150-15-1, this project may be permitted as an **insignificant alteration** to freshwater wetlands under the following terms and conditions:

Terms and Conditions for Wetlands Application No. 19-0346:

1. This letter is the DEM's permit for this project under the R.I. Fresh Water Wetlands Act, R.I. Gen. Laws § 2-1-18 et seq.

2. This permit is specifically limited to the project, site alterations and limits of disturbance as detailed on the revised site plans submitted with your application and received by the DEM on December 30, 2020. A copy of the site plans stamped approved by the DEM is enclosed. Changes or revisions to the project that would alter freshwater wetlands are not authorized without a permit from the DEM.

3. Where the terms and conditions of the permit conflict with the approved site plans, these terms and conditions shall be deemed to supersede the site plans.

4. You must notify this Program in writing of the anticipated start date, and of your contractor's contact information, by submitting the Notice of Start of Construction Form prior to commencement of any permitted site alterations or construction activity. You must also notify this Program in writing upon completion of the project. The Start of Construction Form can be found on the webpage: dem.ri.gov/stormwaterconstruction

5. A copy of the stamped approved site plans and a copy of this permit must be kept at the site at all times during site preparation, construction, and final stabilization. Copies of this permit and the stamped approved plans must be made available for review by any DEM or town representative upon request.

6. Within ten (10) days of the receipt of this permit, you must record this permit in the land evidence records of the Town of South Kingstown and supply this Program with written documentation obtained from the Town showing this permit was recorded.

7. The effective date of this permit is the date this letter was issued. This permit expires four (4) years from the date of this letter unless renewed pursuant to the Rules.

8. Any material utilized in this project must be clean and free of matter that could pollute any freshwater wetland.

9. Prior to commencement of site alterations, you shall erect or post a sign resistant to the weather and at least twelve (12) inches wide and eighteen (18) inches long, which boldly identifies the initials "DEM" and the application number of this permit. This sign must be maintained at the site in a conspicuous location until such time that the project is complete.

10. Temporary erosion and sediment controls detailed or described on the approved site plans shall be properly installed at the site prior to or commensurate with site alterations. Such controls shall be properly maintained, replaced, supplemented, or modified as necessary throughout the life of this project to minimize soil erosion and to prevent sediment from being deposited in any wetlands not subject to disturbance under this permit.

11. Upon permanent stabilization of all disturbed soils, temporary erosion and/or sediment controls must be removed.

12. You are responsible for the proper installation, operation, maintenance and stability of any mitigative features, stormwater treatment facilities, and systems of treatment and control that are installed or used in compliance with this permit to prevent harm to adjacent wetlands until documentation is provided that this responsibility has been assigned to another entity. The long-term operation and maintenance plan shall be strictly followed. The long-term O & M Plan shall be that entitled "Operation & Maintenance Plan for the Stormwater Management System; Project: Existing Multi-Family Dwelling and Proposed 5-Unit Condominium Parking and Stormwater Improvements, Assessor's Plat 48-3, Lot 150, 507-509 High Street, South Kingstown, RI; Applicant / Owner's Name: Glenn & Gretel McCrory, 570 Glen Hill Drive, Saunderstown, RI 02874," dated 12/20/2020, dated received 02/11/2021, prepared by Gary C. Lamond, P.E., LLC.

13. A 2.5' wide by 1.5' deep washed crushed stone diaphragm shall be added between the proposed parking area and the bioretention practice to serve as pretreatment for runoff entering the proposed bioretention basin.

14. The owner shall perform stream maintenance activities in the form of removal of fallen trees that have been observed partially clogging the stream adjacent to the site. In no case shall such wok exceed the exempted activities allowed without a permit by the Freshwater Wetlands Rules – see Rule 250-RICR-150-15.1.6(C)(1)(j).

15. You are obligated to install, utilize and follow all best management practices detailed or described on the approved site plans in the construction of the project to minimize or prevent adverse impacts to any adjacent freshwater wetlands and the functions and values provided by such wetlands.

16. Since the proposed Bioretention basin may provide some limited volumetric compensation for flood storage, it must be completed prior to any filling or construction alterations within flood plain or areas subject to flooding on the subject property.

17. All plantings of shrubs, trees or other forms of vegetation as shown or detailed on the approved plans, or detailed in this permit, must be installed as soon as possible after completion of final grading; weather and season permitting.

18. Buffer zone plantings of trees and/or shrubs proposed between the project and any adjacent freshwater wetland areas, except for necessary replacement, must be allowed to develop naturally without being subjected to mowing or manicuring.

19. Any plantings which fail to survive one full growing season shall be replaced. Replacement plantings shall be similarly guaranteed for one full growing season.

20. Artificial lighting must be directed away from all vegetated wetland areas. Where this is not possible, the use of deflectors to concentrate lighting away from vegetated wetlands must be employed.

21. You must provide written certification from a registered land surveyor or registered professional engineer that the stormwater drainage system including any and all basins, piping systems, catch basins, culverts, swales and any other stormwater management control features have been constructed/installed in accordance with the site plans approved by this permit. This written certification must be submitted to this Program within twenty (20) days of its request or upon completion of the project.

Pursuant to the provisions in 250-RICR-150-15-1.7(A)(9) and 250-RICR-150-15-1.11(D), as applicable, any properly recorded and valid permit is automatically transferred to the new owner upon sale of the property.

You are required to comply with the terms and conditions of this permit and to carry out this project in compliance with the Rules at all times. Failure to do so may result in an enforcement action by this Department.

In permitting the proposed alterations, the DEM assumes no responsibility for damages resulting from faulty design or construction.

Kindly be advised that this permit is not equivalent to a verification of the type or extent of freshwater wetlands on site. Should you wish to have the types and extent of freshwater wetlands verified, you may submit the appropriate application in accordance with 250-RICR-150-15-1.8(C).

This permit does not remove your obligation to obtain any local, state, or federal approvals or permits required by ordinance or law and does not relieve you from any duties owed to adjacent landowners with specific reference to any changes in drainage.

Please contact Rene Legault of this office (telephone: 401-222-4700, ext. 77732) should you have any questions regarding this letter.

Sincerely,

Nancy L. Freeman

Nancy L. Freeman, Principal Environmental Scientist
Office of Water Resources
Freshwater Wetlands Program

NLF/RJL/rjl

Enclosure: Approved site plans

ec: Jon R. Schock, South Kingstown Town Director of Public Works
Jamie Gorman, South Kingstown Town Building Official
Nicholas A. Pisani, PE, Supervisor, DEM Stormwater Program
Gary C. Lamond, Gary C. Lamond, PE, LLC.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment Systems Program

Site Evaluation Form
Part A – Soil Profile Description Application Number _____

Property Owner: Glenn McCrory
Property Location: High St South Kingston
Date of Test Hole: 4/15/20
Soil Evaluator: DAVID DOW License Number: 4037
Weather: cloudy Shaded: Yes ☐ No ☒ Time: 10 AM

TH 1 Horizon	Depth	Horizon Boundaries: Dist	Horizon Boundaries: Topo	Soil Colors: Matrix	Soil Colors: Re-Dox Features	Re-Dox: Ab. S. Contr.	Texture	Structure	Consistence	Soil Category
HTM	32–0									

TH 2 Horizon	Depth	Horizon Boundaries: Dist	Horizon Boundaries: Topo	Soil Colors: Matrix	Soil Colors: Re-Dox Features	Re-Dox: Ab. S. Contr.	Texture	Structure	Consistence	Soil Category
HTM	32–0									
TH 3										
HTM	32–0									

TH 1-3 Soil Class HTM Total Depth 32" Impervious/Limiting Layer Depth _____(og) GW Seepage Depth 24" SHWT 0 (og)

TH _____ Soil Class _____ Total Depth _____ Impervious/Limiting Layer Depth _____(og) GW Seepage Depth _____ SHWT _____(og)

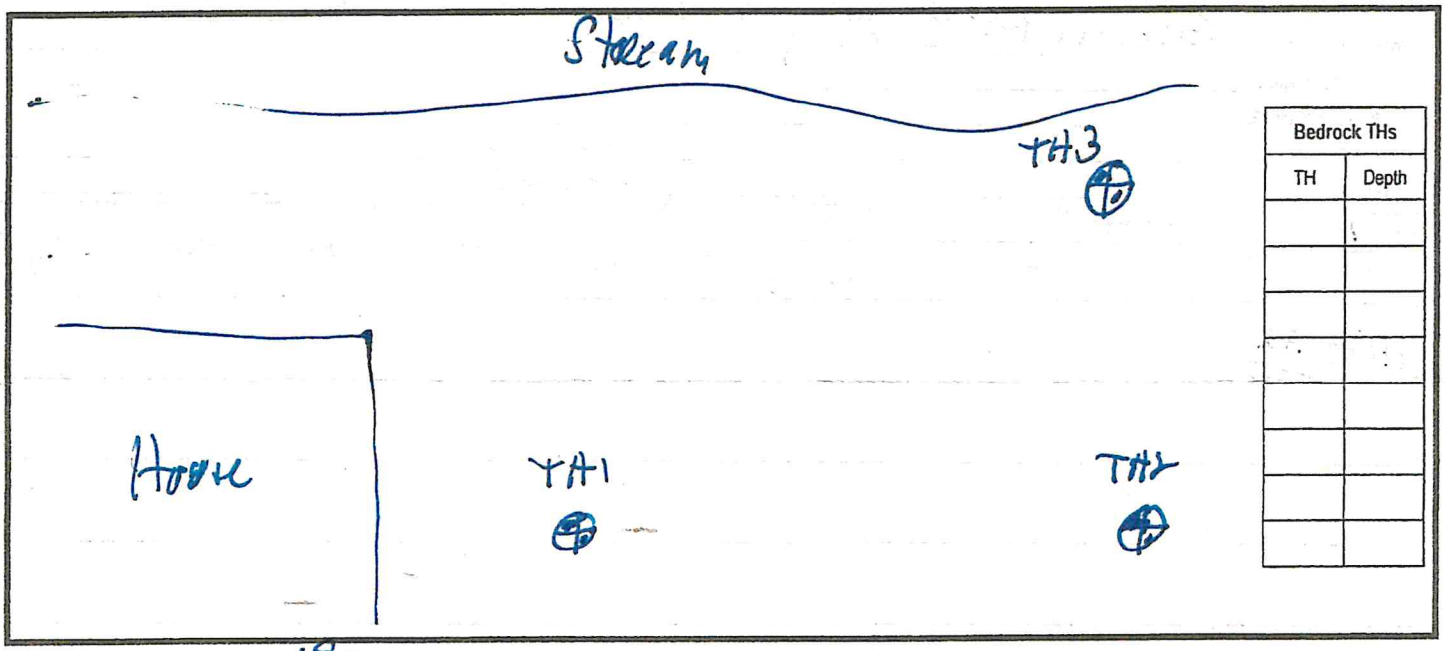
Comments: Native soil Below 32". HTM Unconsolidated

Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*
   *OFFSETS MUST BE SHOWN

Approximate location of test holes
Approximate location of bedrock test holes
x% Estimated gradient and direction of slope
N Approximate direction of due north



Bedrock THs	
TH	Depth

1. Relief and Slope: 190

2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch.	NO ☐	YES ☒
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above.	NO ☒	YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch.	NO ☒	YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch.	NO ☒	YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 6.42?	NO ☒	YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch.	NO ☐	YES ☒

8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☐ MODERATE ☒ SEVERE ☐
9. Landscape position: TOE Slope
10. Vegetation: Grass
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: _____

Certification

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: _____ 4037 (Signature / License #) Part B prepared by: _____ 4037 (Signature / License #)

DO NOT WRITE IN THIS SPACE

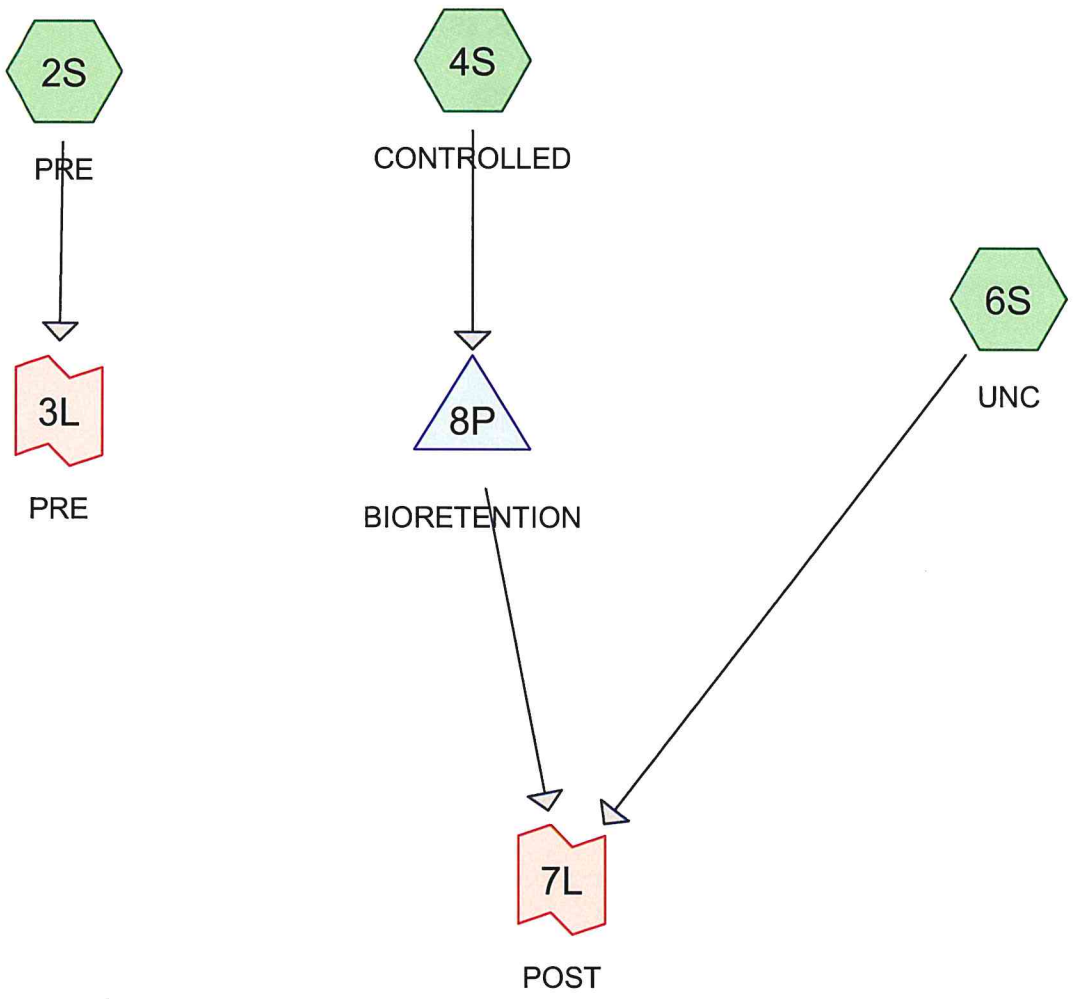
Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐

Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐

Wet Season Determination required ☐ **Additional Field Review Required** ☐

Explanation: _____

Signature Authorized Agent _____ Date _____



Subcat Reach Pond Link

Routing Diagram for 507 HIGH ST - KAB
Prepared by Principe Engineering, Inc, Printed 3/14/2024
HydroCAD® 10.20-4b s/n 08247 © 2023 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.131	61	>75% Grass cover, Good, HSG B (2S, 4S, 6S)
0.388	85	Gravel roads, HSG B (2S, 4S, 6S)
0.125	98	Roofs, HSG B (2S, 4S, 6S)
0.062	55	Woods, Good, HSG B (2S, 6S)
0.706	**80**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.706	HSG B	2S, 4S, 6S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.706		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.131	0.000	0.000	0.000	0.131	>75% Grass cover, Good	2S, 4S, 6S
0.000	0.388	0.000	0.000	0.000	0.388	Gravel roads	2S, 4S, 6S
0.000	0.125	0.000	0.000	0.000	0.125	Roofs	2S, 4S, 6S
0.000	0.062	0.000	0.000	0.000	0.062	Woods, Good	2S, 6S
0.000	**0.706**	**0.000**	**0.000**	**0.000**	**0.706**	**TOTAL AREA**	

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: PRE Runoff Area=15,222 sf 9.57% Impervious Runoff Depth=0.23"
Flow Length=185' Tc=1.7 min CN=80/98 Runoff=0.08 cfs 0.007 af

Subcatchment 4S: CONTROLLED Runoff Area=6,503 sf 39.27% Impervious Runoff Depth=0.46"
Tc=6.0 min CN=78/98 Runoff=0.07 cfs 0.006 af

Subcatchment 6S: UNC Runoff Area=9,033 sf 16.12% Impervious Runoff Depth=0.17"
Flow Length=80' Tc=9.1 min CN=69/98 Runoff=0.03 cfs 0.003 af

Pond 8P: BIORETENTION Peak Elev=21.70' Storage=75 cf Inflow=0.07 cfs 0.006 af
Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

Link 3L: PRE Inflow=0.08 cfs 0.007 af
Primary=0.08 cfs 0.007 af

Link 7L: POST Inflow=0.03 cfs 0.003 af
Primary=0.03 cfs 0.003 af

Total Runoff Area = 0.706 ac Runoff Volume = 0.015 af Average Runoff Depth = 0.26"
82.23% Pervious = 0.581 ac 17.77% Impervious = 0.125 ac

Summary for Subcatchment 2S: PRE

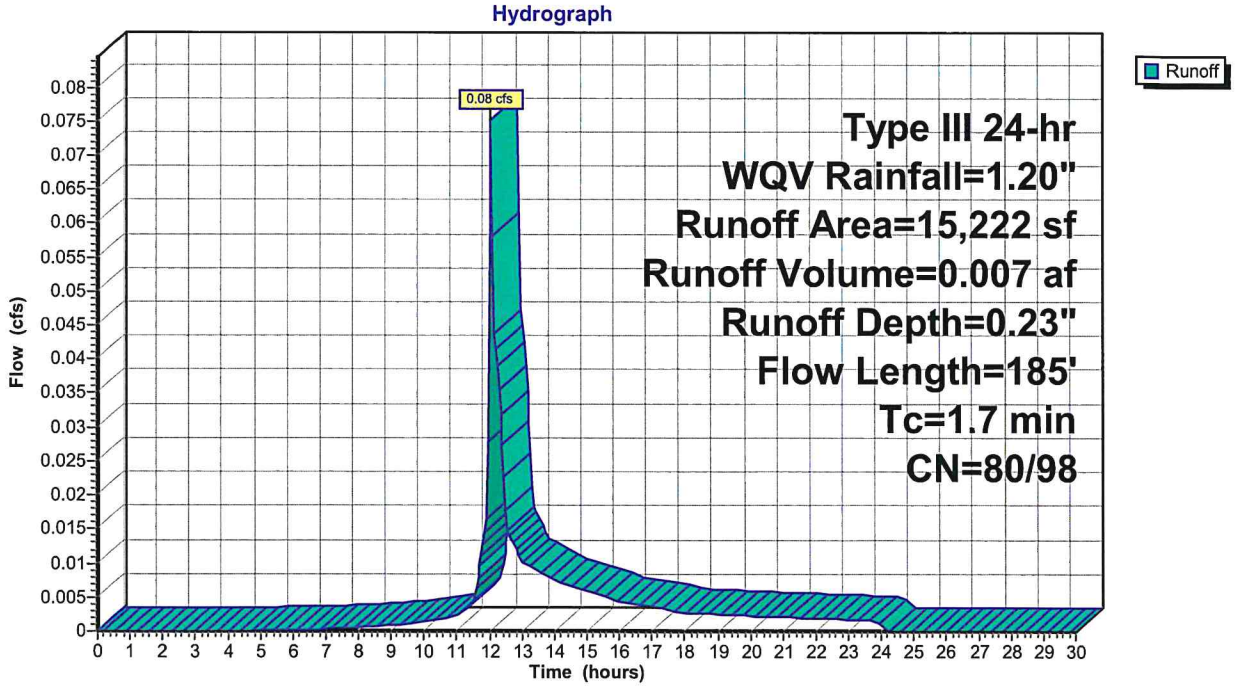
Runoff = 0.08 cfs @ 12.05 hrs, Volume= 0.007 af, Depth= 0.23"
Routed to Link 3L : PRE

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-30.00 hrs, dt= 0.05 h
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
1,698	55	Woods, Good, HSG B
11,365	85	Gravel roads, HSG B
1,456	98	Roofs, HSG B
703	61	>75% Grass cover, Good, HSG B
15,222	82	Weighted Average
13,766	80	90.43% Pervious Area
1,456	98	9.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	64	0.0310	1.53		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.33"
1.0	121	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	185	Total			

Subcatchment 2S: PRE



Summary for Subcatchment 4S: CONTROLLED

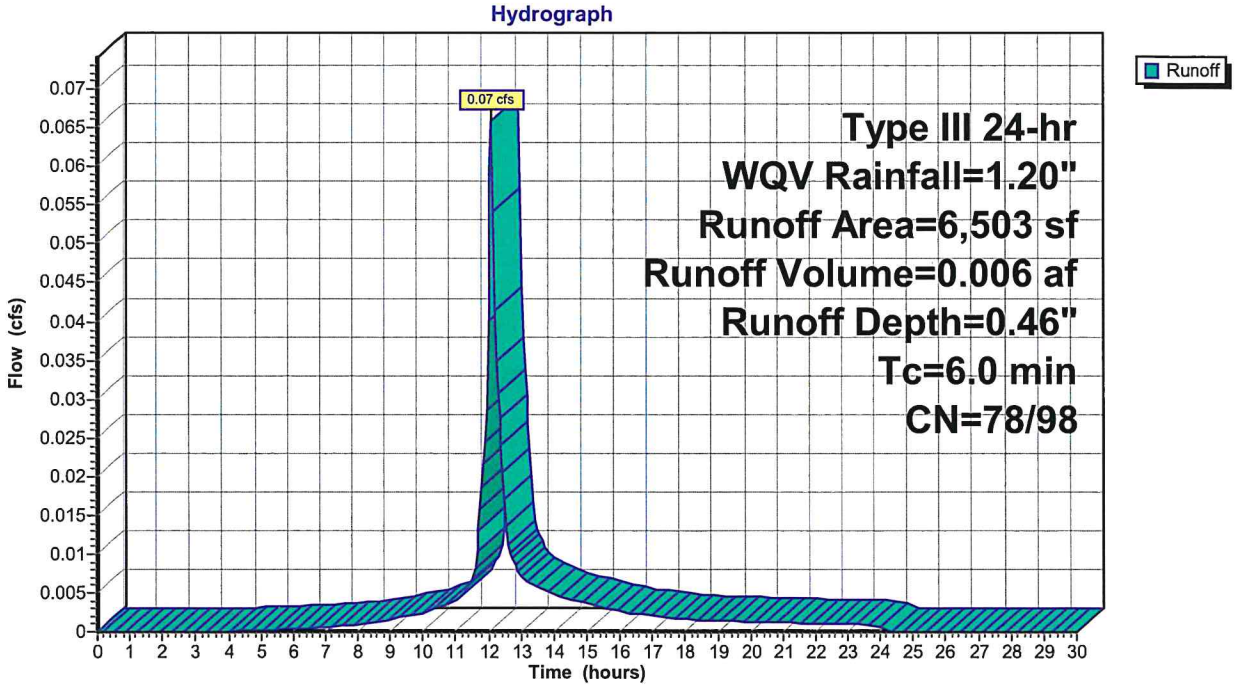
Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 0.46"
Routed to Pond 8P : BIORETENTION

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-30.00 hrs, dt= 0.05 h
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
2,554	98	Roofs, HSG B
2,818	85	Gravel roads, HSG B
1,131	61	>75% Grass cover, Good, HSG B
6,503	86	Weighted Average
3,949	78	60.73% Pervious Area
2,554	98	39.27% Impervious Area

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

Subcatchment 4S: CONTROLLED



Summary for Subcatchment 6S: UNC

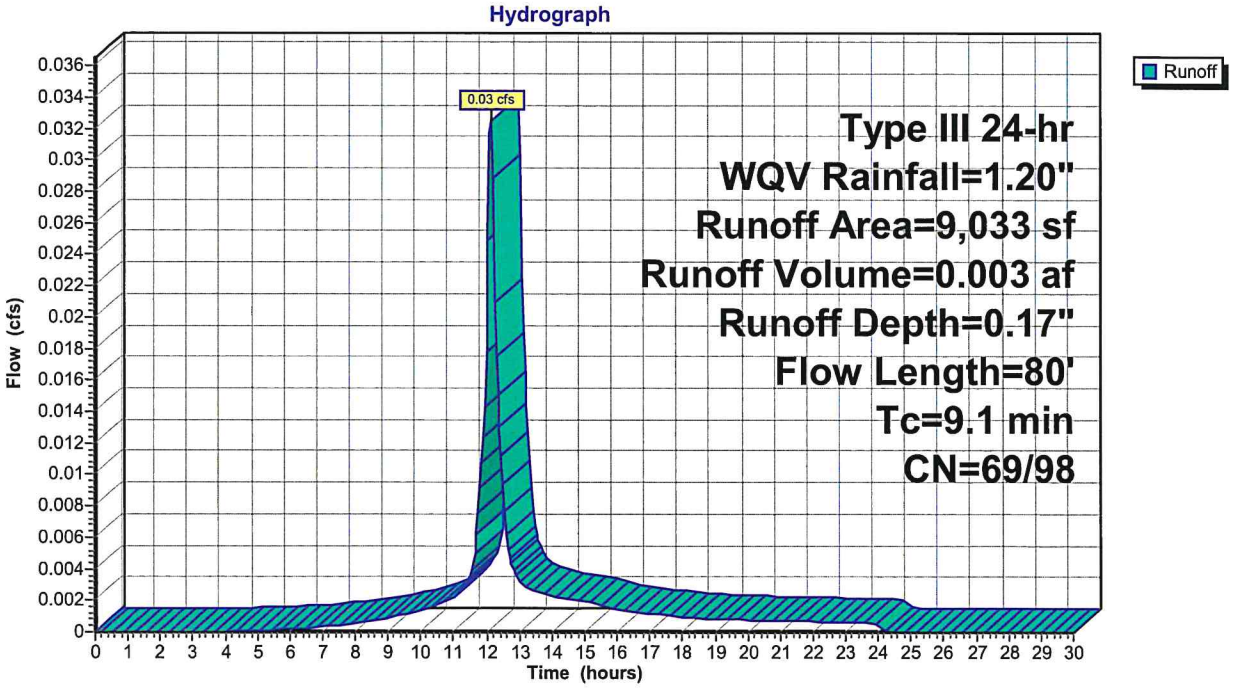
Runoff = 0.03 cfs @ 12.12 hrs, Volume= 0.003 af, Depth= 0.17"
Routed to Link 7L : POST

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-30.00 hrs, dt= 0.05 h
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
3,874	61	>75% Grass cover, Good, HSG B
1,456	98	Roofs, HSG B
2,710	85	Gravel roads, HSG B
993	55	Woods, Good, HSG B
9,033	74	Weighted Average
7,577	69	83.88% Pervious Area
1,456	98	16.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	45	0.0050	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.33"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.1	80	Total			

Subcatchment 6S: UNC



Summary for Pond 8P: BIORETENTION

Inflow Area = 0.149 ac, 39.27% Impervious, Inflow Depth = 0.46" for WQV event
Inflow = 0.07 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 12.70 hrs, Volume= 0.006 af, Atten= 85%, Lag= 36.1 min
Discarded = 0.01 cfs @ 12.70 hrs, Volume= 0.006 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 7L : POST

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 21.70' @ 12.70 hrs Surf.Area= 412 sf Storage= 75 cf

Plug-Flow detention time= 58.1 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 58.1 min (864.4 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	21.50'	678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

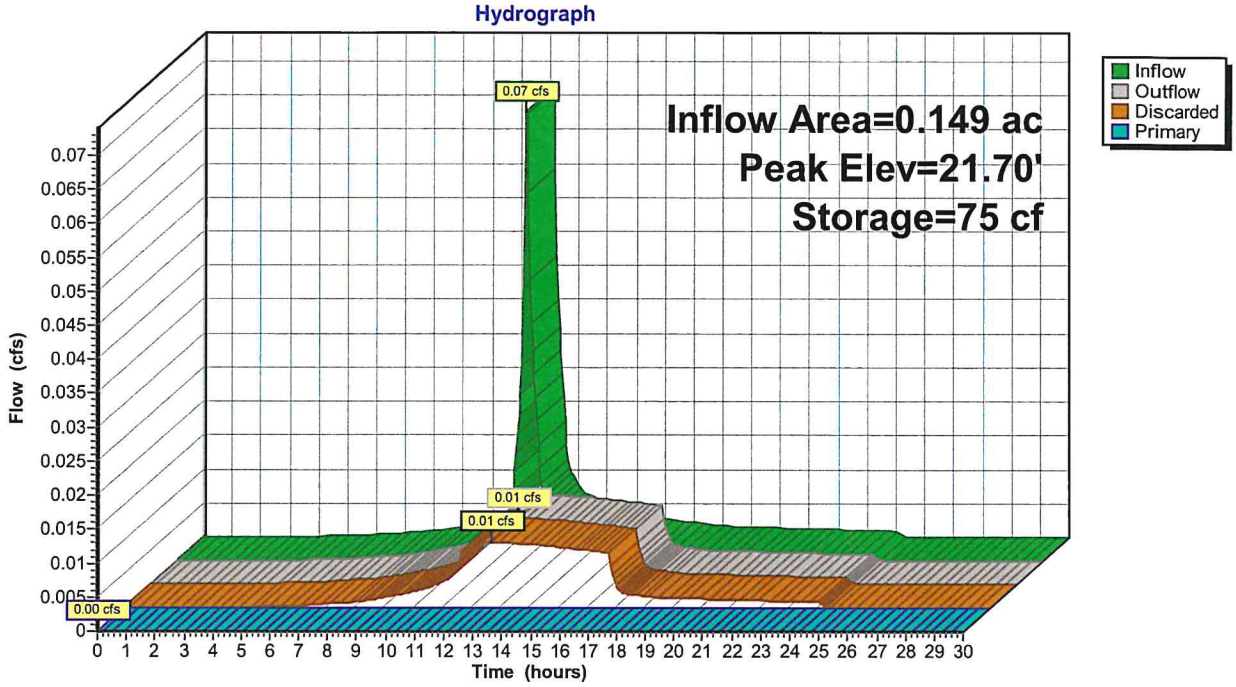
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.50	339	0	0
22.00	523	216	216
22.50	720	311	526
22.70	793	151	678

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	22.50'	**6.0' long x 1.5' 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 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Discarded OutFlow Max=0.01 cfs @ 12.70 hrs HW=21.70' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=21.50' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: BIORETENTION

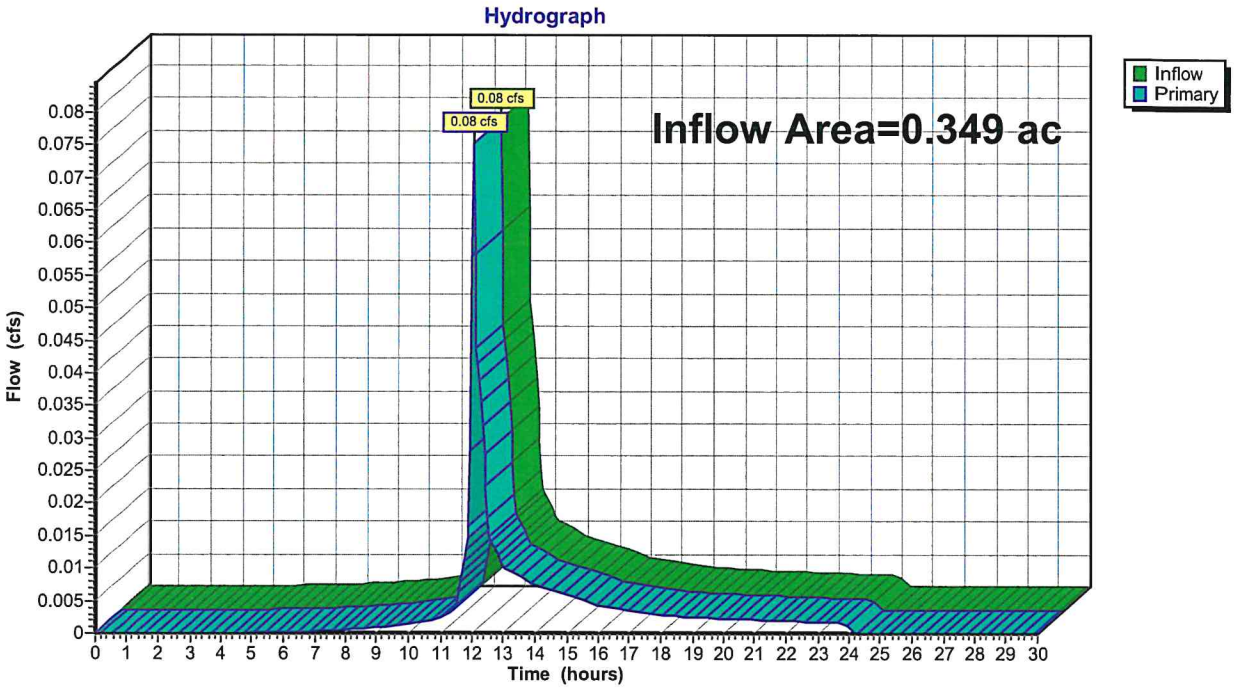


Summary for Link 3L: PRE

Inflow Area = 0.349 ac, 9.57% Impervious, Inflow Depth = 0.23" for WQV event
Inflow = 0.08 cfs @ 12.05 hrs, Volume= 0.007 af
Primary = 0.08 cfs @ 12.05 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

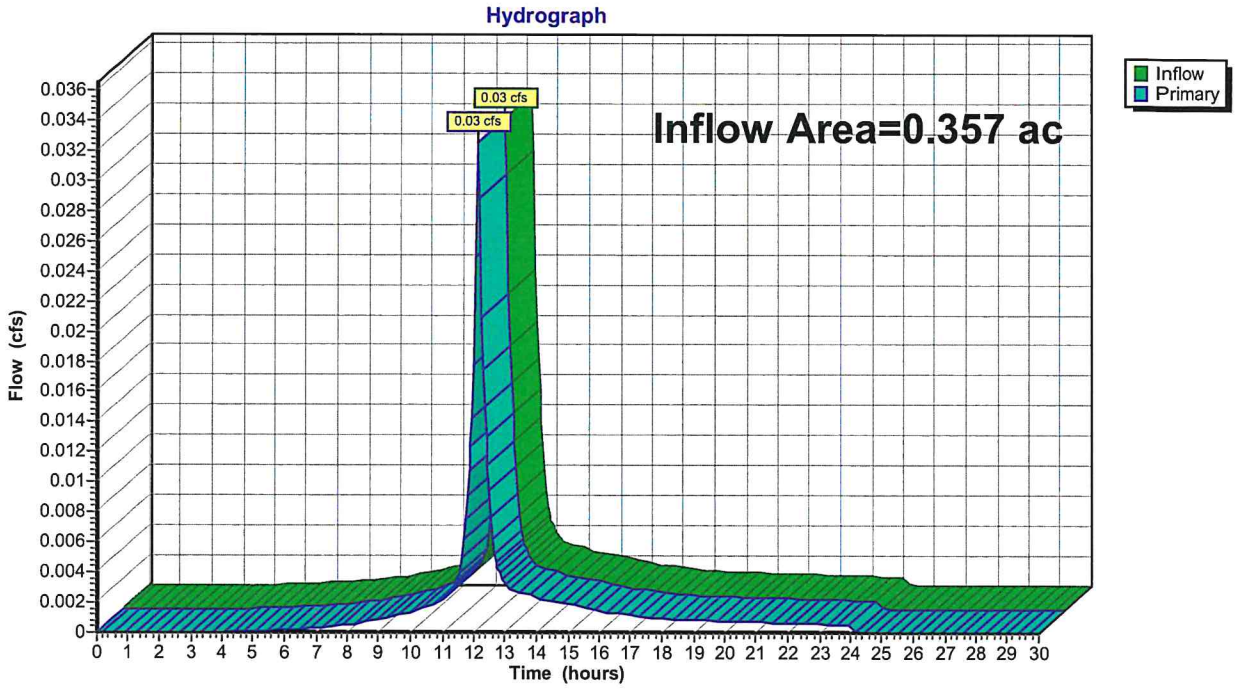


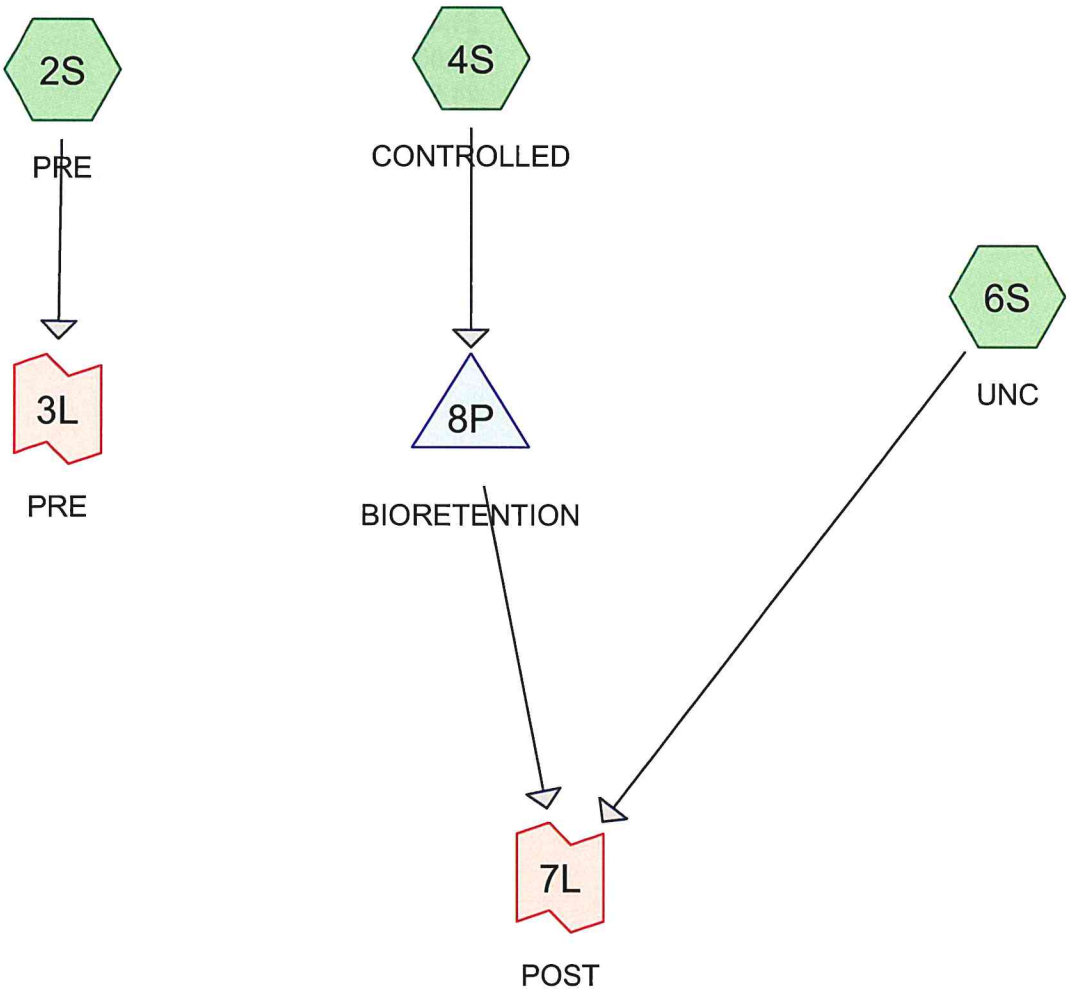
Summary for Link 7L: POST

Inflow Area = 0.357 ac, 25.81% Impervious, Inflow Depth = 0.10" for WQV event
Inflow = 0.03 cfs @ 12.12 hrs, Volume= 0.003 af
Primary = 0.03 cfs @ 12.12 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST





Subcat Reach Pond Link

Routing Diagram for 507 HIGH ST - KAB
Prepared by Principe Engineering, Inc, Printed 3/14/2024

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type III 24-hr		Default	24.00	1	2.80	2
2	10-yr	Type III 24-hr		Default	24.00	1	4.90	2
3	25-yr	Type III 24-hr		Default	24.00	1	6.10	2
4	100-yr	Type III 24-hr		Default	24.00	1	8.50	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.131	61	>75% Grass cover, Good, HSG B (2S, 4S, 6S)
0.388	85	Gravel roads, HSG B (2S, 4S, 6S)
0.125	98	Roofs, HSG B (2S, 4S, 6S)
0.062	55	Woods, Good, HSG B (2S, 6S)
0.706	**80**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.706	HSG B	2S, 4S, 6S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.706		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.131	0.000	0.000	0.000	0.131	>75% Grass cover, Good	2S, 4S, 6S
0.000	0.388	0.000	0.000	0.000	0.388	Gravel roads	2S, 4S, 6S
0.000	0.125	0.000	0.000	0.000	0.125	Roofs	2S, 4S, 6S
0.000	0.062	0.000	0.000	0.000	0.062	Woods, Good	2S, 6S
0.000	**0.706**	**0.000**	**0.000**	**0.000**	**0.706**	**TOTAL AREA**	

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 2S: PRE Runoff Area=15,222 sf 9.57% Impervious Runoff Depth=1.22"
Flow Length=185' Tc=1.7 min CN=82 Runoff=0.55 cfs 0.036 af

Subcatchment 4S: CONTROLLED Runoff Area=6,503 sf 39.27% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=86 Runoff=0.26 cfs 0.019 af

Subcatchment 6S: UNC Runoff Area=9,033 sf 16.12% Impervious Runoff Depth=0.78"
Flow Length=80' Tc=9.1 min CN=74 Runoff=0.15 cfs 0.014 af

Pond 8P: BIORETENTION Peak Elev=22.32' Storage=404 cf Inflow=0.26 cfs 0.019 af
Discarded=0.02 cfs 0.019 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.019 af

Link 3L: PRE Inflow=0.55 cfs 0.036 af
Primary=0.55 cfs 0.036 af

Link 7L: POST Inflow=0.15 cfs 0.014 af
Primary=0.15 cfs 0.014 af

Total Runoff Area = 0.706 ac Runoff Volume = 0.068 af Average Runoff Depth = 1.15"
82.23% Pervious = 0.581 ac 17.77% Impervious = 0.125 ac

Summary for Subcatchment 2S: PRE

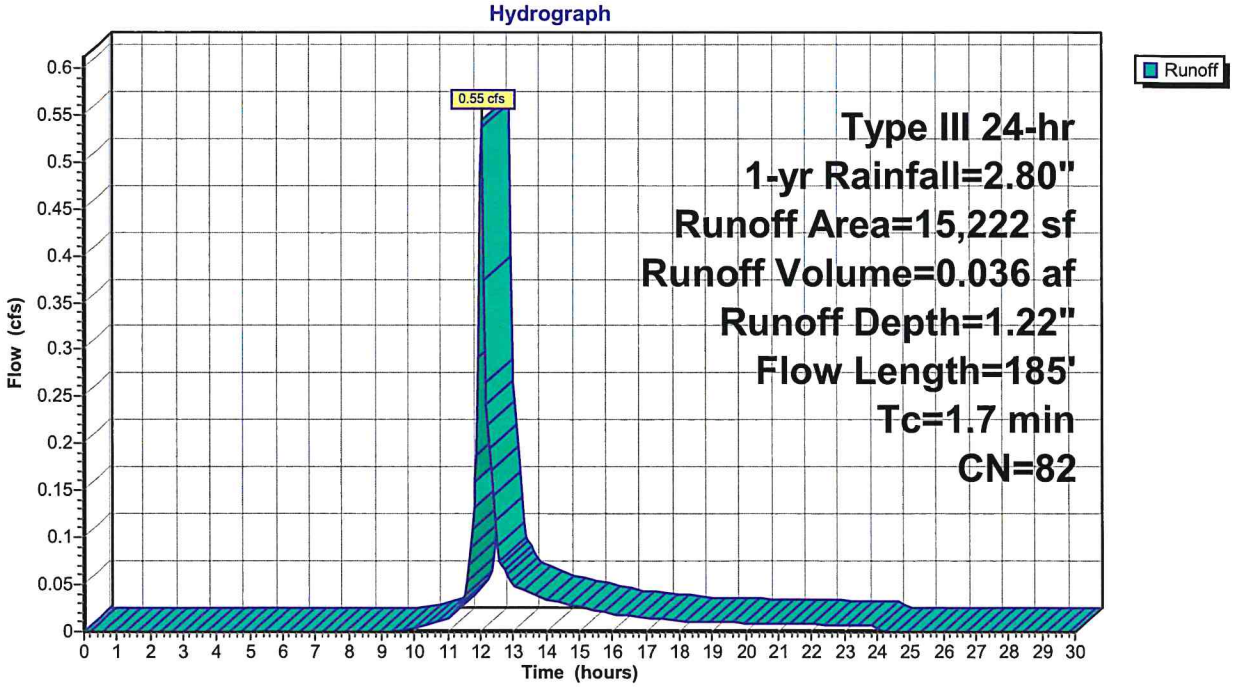
Runoff = 0.55 cfs @ 12.04 hrs, Volume= 0.036 af, Depth= 1.22"
Routed to Link 3L : PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.80"

Area (sf)	CN	Description
1,698	55	Woods, Good, HSG B
11,365	85	Gravel roads, HSG B
1,456	98	Roofs, HSG B
703	61	>75% Grass cover, Good, HSG B
15,222	82	Weighted Average
13,766	80	90.43% Pervious Area
1,456	98	9.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	64	0.0310	1.53		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.33"
1.0	121	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	185	Total			

Subcatchment 2S: PRE



Summary for Subcatchment 4S: CONTROLLED

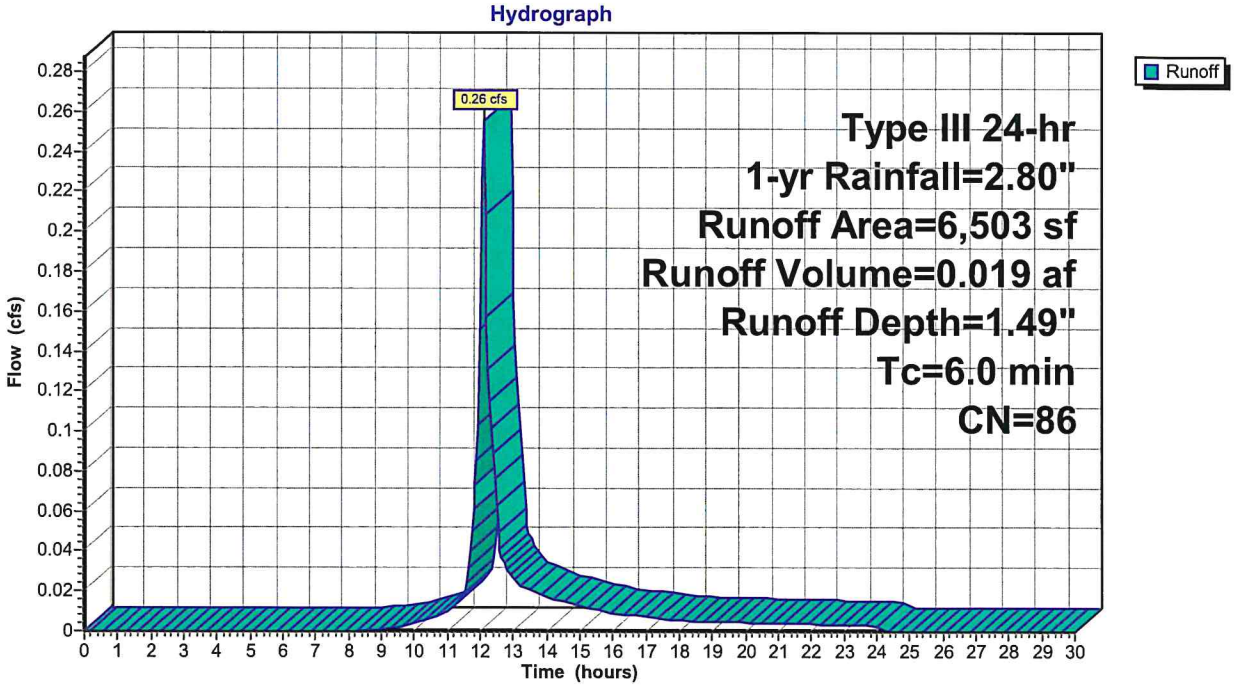
Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 1.49"
Routed to Pond 8P : BIORETENTION

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.80"

Area (sf)	CN	Description
2,554	98	Roofs, HSG B
2,818	85	Gravel roads, HSG B
1,131	61	>75% Grass cover, Good, HSG B
6,503	86	Weighted Average
3,949	78	60.73% Pervious Area
2,554	98	39.27% Impervious Area

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

Subcatchment 4S: CONTROLLED



Summary for Subcatchment 6S: UNC

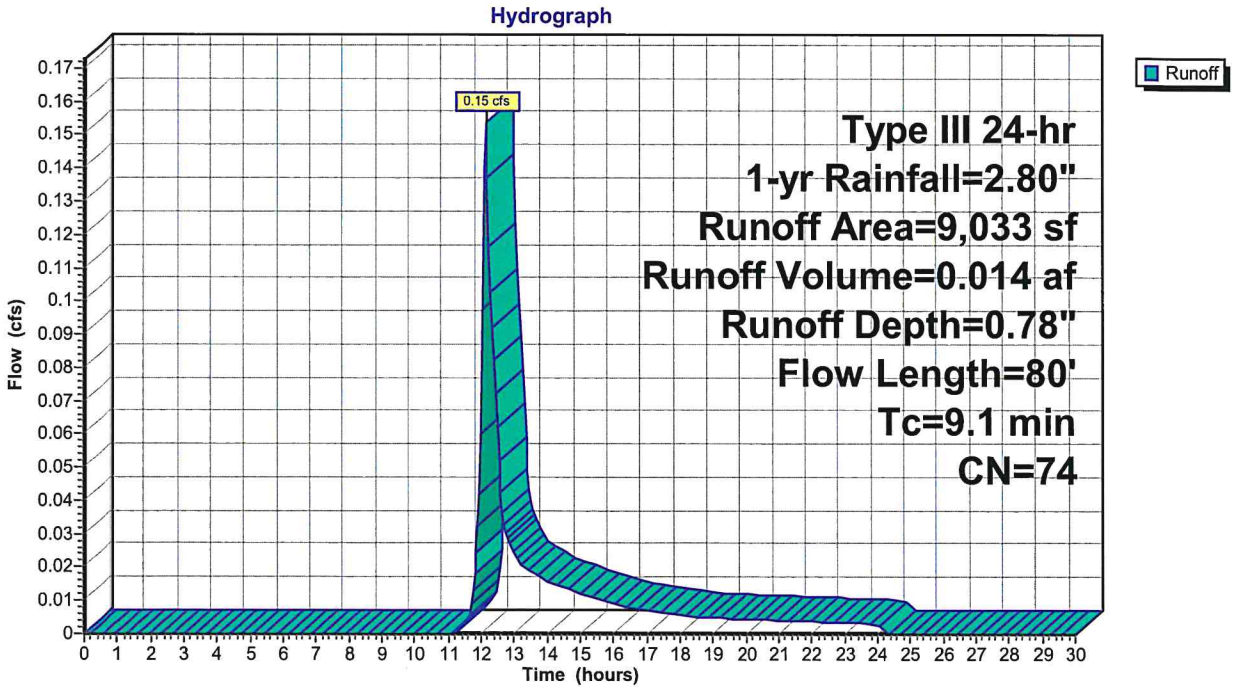
Runoff = 0.15 cfs @ 12.15 hrs, Volume= 0.014 af, Depth= 0.78"
Routed to Link 7L : POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.80"

Area (sf)	CN	Description
3,874	61	>75% Grass cover, Good, HSG B
1,456	98	Roofs, HSG B
2,710	85	Gravel roads, HSG B
993	55	Woods, Good, HSG B
9,033	74	Weighted Average
7,577	69	83.88% Pervious Area
1,456	98	16.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	45	0.0050	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.33"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.1	80	Total			

Subcatchment 6S: UNC



Summary for Pond 8P: BIORETENTION

Inflow Area = 0.149 ac, 39.27% Impervious, Inflow Depth = 1.49" for 1-yr event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af
Outflow = 0.02 cfs @ 14.38 hrs, Volume= 0.019 af, Atten= 94%, Lag= 137.4 min
Discarded = 0.02 cfs @ 14.38 hrs, Volume= 0.019 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 7L : POST

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 22.32' @ 14.38 hrs Surf.Area= 649 sf Storage= 404 cf

Plug-Flow detention time= 297.8 min calculated for 0.019 af (100% of inflow)
Center-of-Mass det. time= 297.7 min (1,126.2 - 828.5)

Volume	Invert	Avail.Storage	Storage Description
#1	21.50'	678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

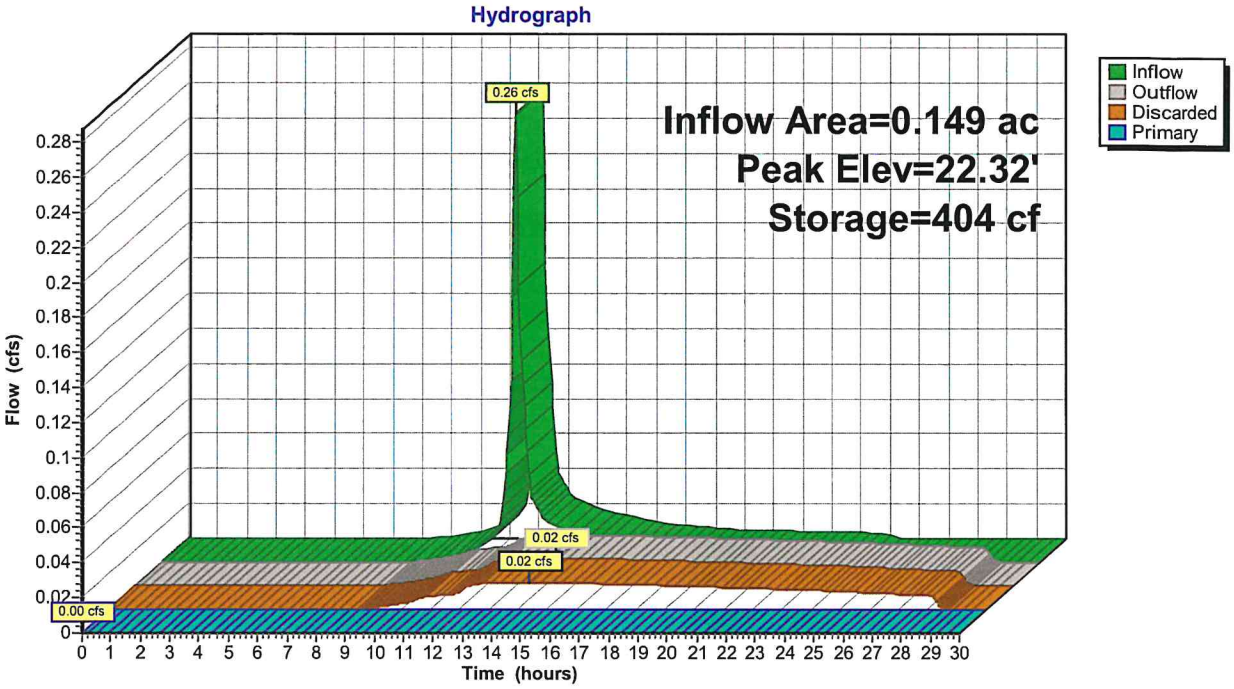
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.50	339	0	0
22.00	523	216	216
22.50	720	311	526
22.70	793	151	678

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	22.50'	**6.0' long x 1.5' 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 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Discarded OutFlow Max=0.02 cfs @ 14.38 hrs HW=22.32' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=21.50' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: BIORETENTION

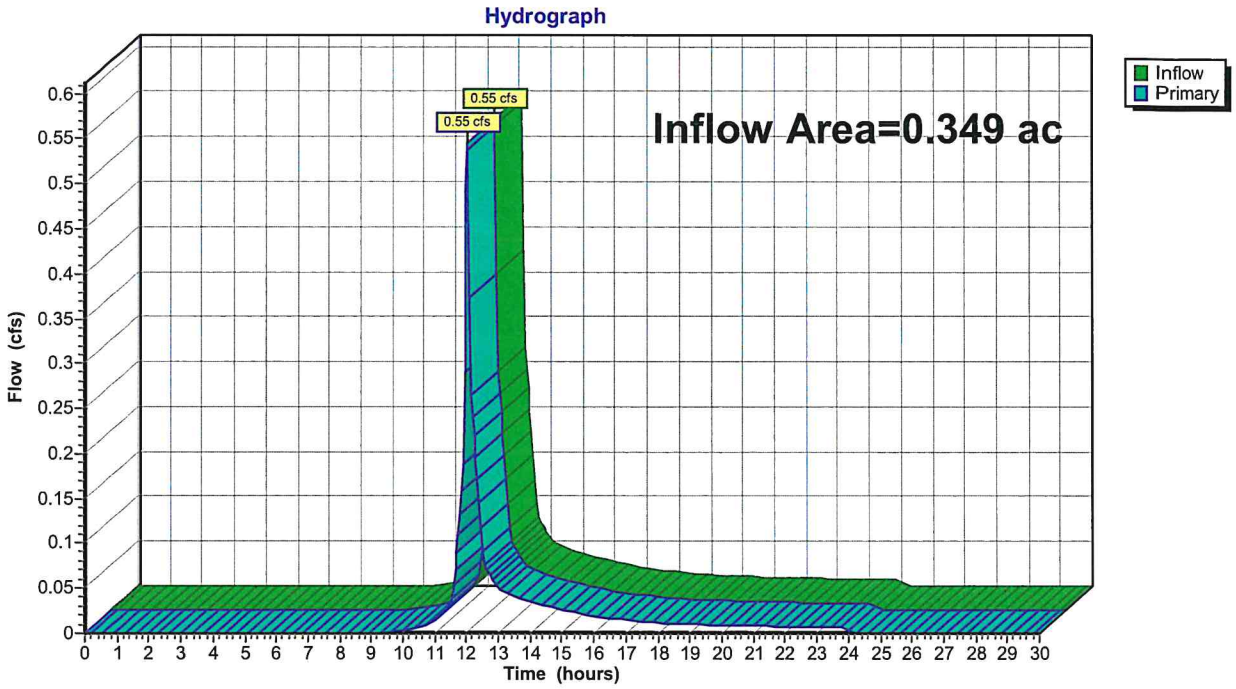


Summary for Link 3L: PRE

Inflow Area = 0.349 ac, 9.57% Impervious, Inflow Depth = 1.22" for 1-yr event
Inflow = 0.55 cfs @ 12.04 hrs, Volume= 0.036 af
Primary = 0.55 cfs @ 12.04 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

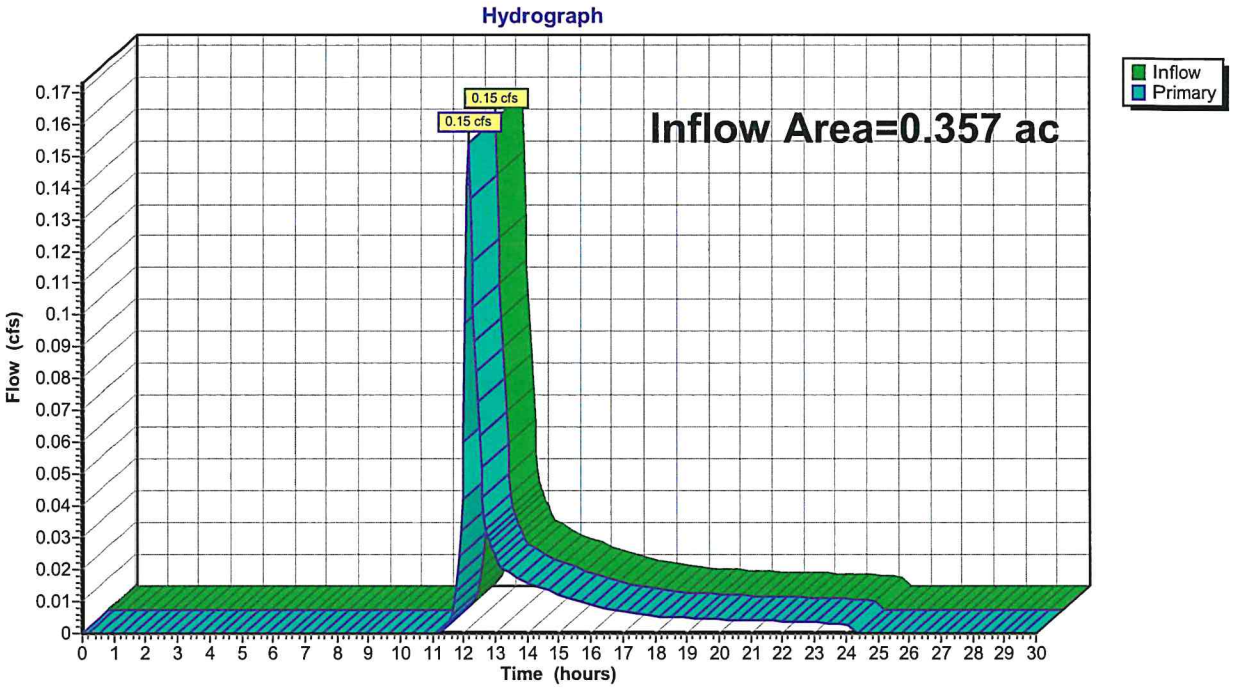


Summary for Link 7L: POST

Inflow Area = 0.357 ac, 25.81% Impervious, Inflow Depth = 0.46" for 1-yr event
Inflow = 0.15 cfs @ 12.15 hrs, Volume= 0.014 af
Primary = 0.15 cfs @ 12.15 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 2S: PRE Runoff Area=15,222 sf 9.57% Impervious Runoff Depth=2.99"
Flow Length=185' Tc=1.7 min CN=82 Runoff=1.33 cfs 0.087 af

Subcatchment 4S: CONTROLLED Runoff Area=6,503 sf 39.27% Impervious Runoff Depth=3.37"
Tc=6.0 min CN=86 Runoff=0.57 cfs 0.042 af

Subcatchment 6S: UNC Runoff Area=9,033 sf 16.12% Impervious Runoff Depth=2.28"
Flow Length=80' Tc=9.1 min CN=74 Runoff=0.49 cfs 0.039 af

Pond 8P: BIORETENTION Peak Elev=22.58' Storage=588 cf Inflow=0.57 cfs 0.042 af
Discarded=0.02 cfs 0.025 af Primary=0.38 cfs 0.015 af Outflow=0.40 cfs 0.040 af

Link 3L: PRE Inflow=1.33 cfs 0.087 af
Primary=1.33 cfs 0.087 af

Link 7L: POST Inflow=0.87 cfs 0.054 af
Primary=0.87 cfs 0.054 af

Total Runoff Area = 0.706 ac Runoff Volume = 0.169 af Average Runoff Depth = 2.86"
82.23% Pervious = 0.581 ac 17.77% Impervious = 0.125 ac

Summary for Subcatchment 2S: PRE

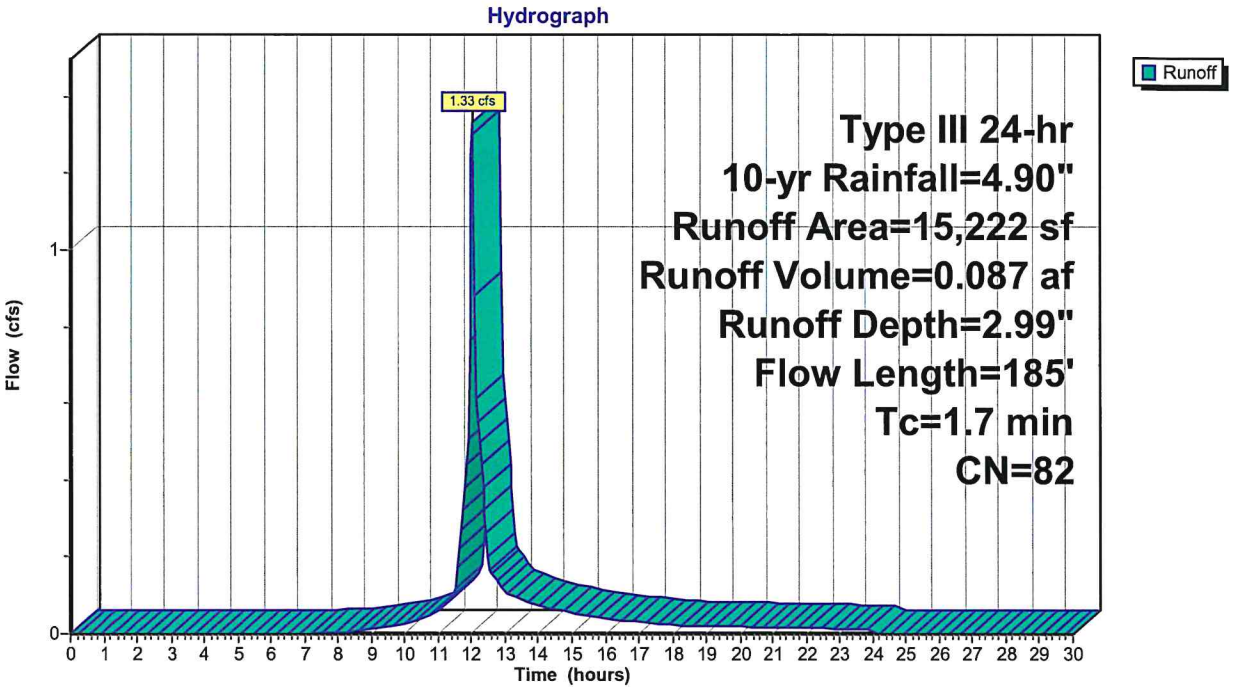
Runoff = 1.33 cfs @ 12.03 hrs, Volume= 0.087 af, Depth= 2.99"
Routed to Link 3L : PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.90"

Area (sf)	CN	Description
1,698	55	Woods, Good, HSG B
11,365	85	Gravel roads, HSG B
1,456	98	Roofs, HSG B
703	61	>75% Grass cover, Good, HSG B
15,222	82	Weighted Average
13,766	80	90.43% Pervious Area
1,456	98	9.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	64	0.0310	1.53		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.33"
1.0	121	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	185	Total			

Subcatchment 2S: PRE



Summary for Subcatchment 4S: CONTROLLED

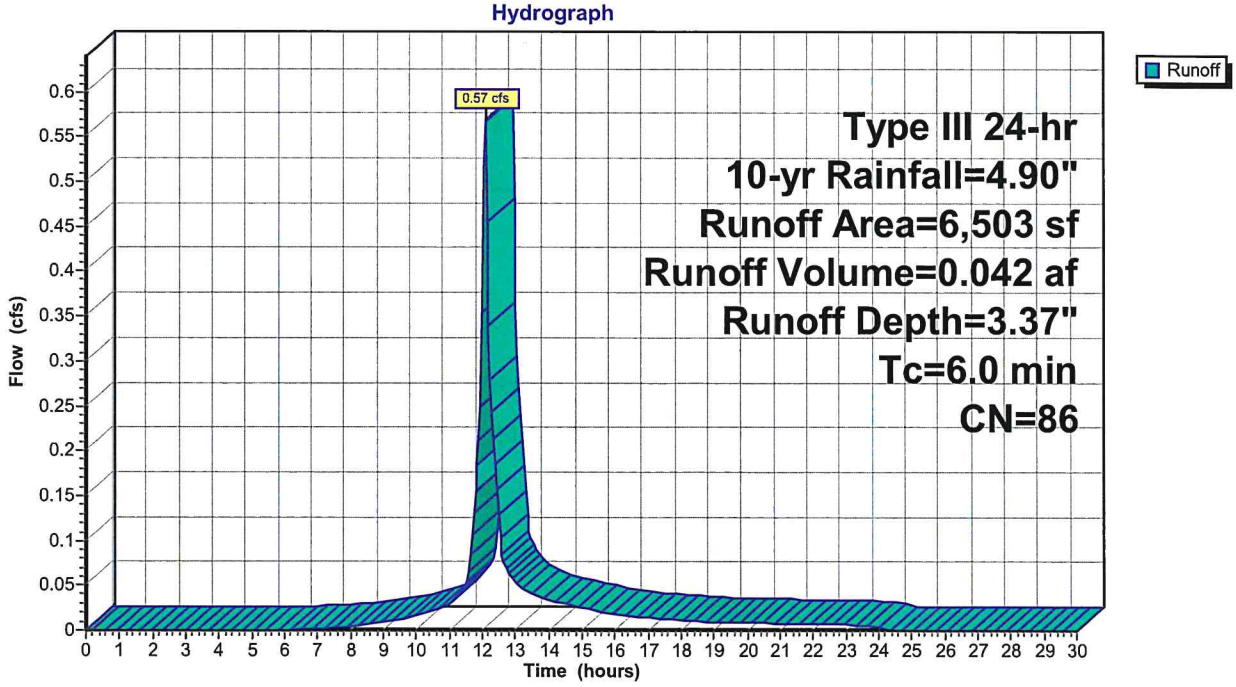
Runoff = 0.57 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 3.37"
Routed to Pond 8P : BIORETENTION

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.90"

Area (sf)	CN	Description
2,554	98	Roofs, HSG B
2,818	85	Gravel roads, HSG B
1,131	61	>75% Grass cover, Good, HSG B
6,503	86	Weighted Average
3,949	78	60.73% Pervious Area
2,554	98	39.27% Impervious Area

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

Subcatchment 4S: CONTROLLED



Summary for Subcatchment 6S: UNC

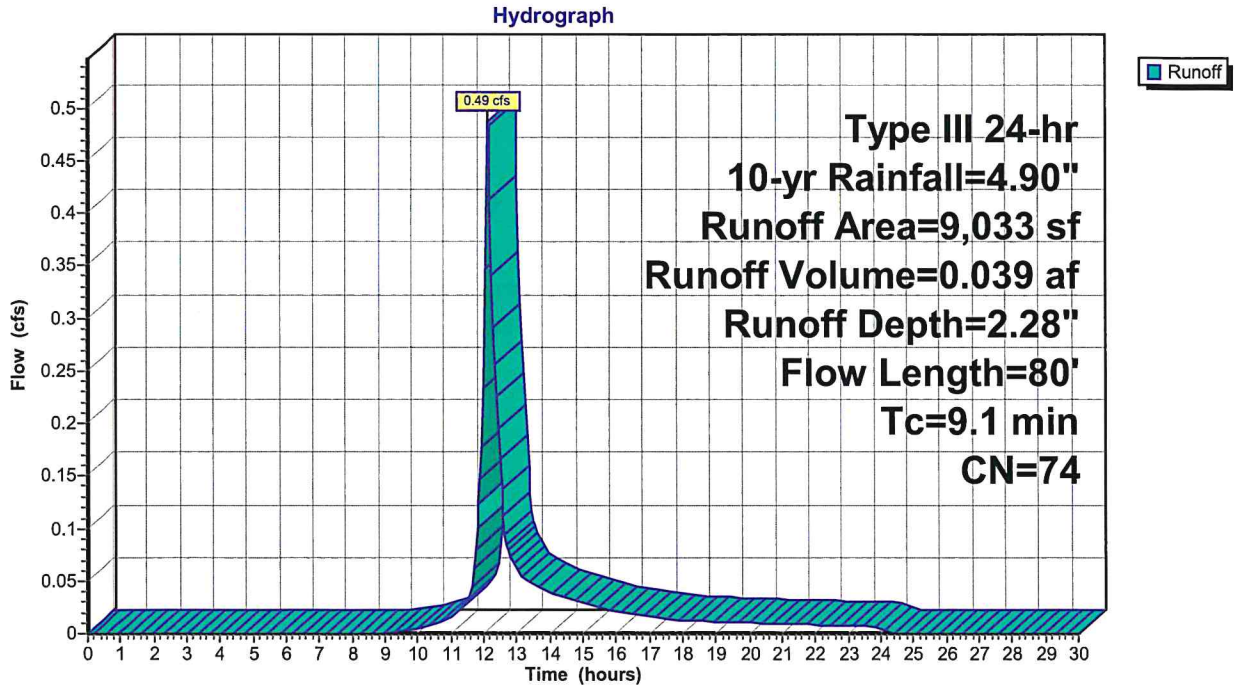
Runoff = 0.49 cfs @ 12.14 hrs, Volume= 0.039 af, Depth= 2.28"
Routed to Link 7L : POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.90"

Area (sf)	CN	Description
3,874	61	>75% Grass cover, Good, HSG B
1,456	98	Roofs, HSG B
2,710	85	Gravel roads, HSG B
993	55	Woods, Good, HSG B
9,033	74	Weighted Average
7,577	69	83.88% Pervious Area
1,456	98	16.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	45	0.0050	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.33"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.1	80	Total			

Subcatchment 6S: UNC



Summary for Pond 8P: BIORETENTION

Inflow Area = 0.149 ac, 39.27% Impervious, Inflow Depth = 3.37" for 10-yr event
Inflow = 0.57 cfs @ 12.09 hrs, Volume= 0.042 af
Outflow = 0.40 cfs @ 12.18 hrs, Volume= 0.040 af, Atten= 30%, Lag= 5.7 min
Discarded = 0.02 cfs @ 12.18 hrs, Volume= 0.025 af
Primary = 0.38 cfs @ 12.18 hrs, Volume= 0.015 af
Routed to Link 7L : POST

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 22.58' @ 12.18 hrs Surf.Area= 751 sf Storage= 588 cf

Plug-Flow detention time= 226.3 min calculated for 0.040 af (95% of inflow)
Center-of-Mass det. time= 200.8 min (1,006.0 - 805.2)

Volume	Invert	Avail.Storage	Storage Description
#1	21.50'	678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

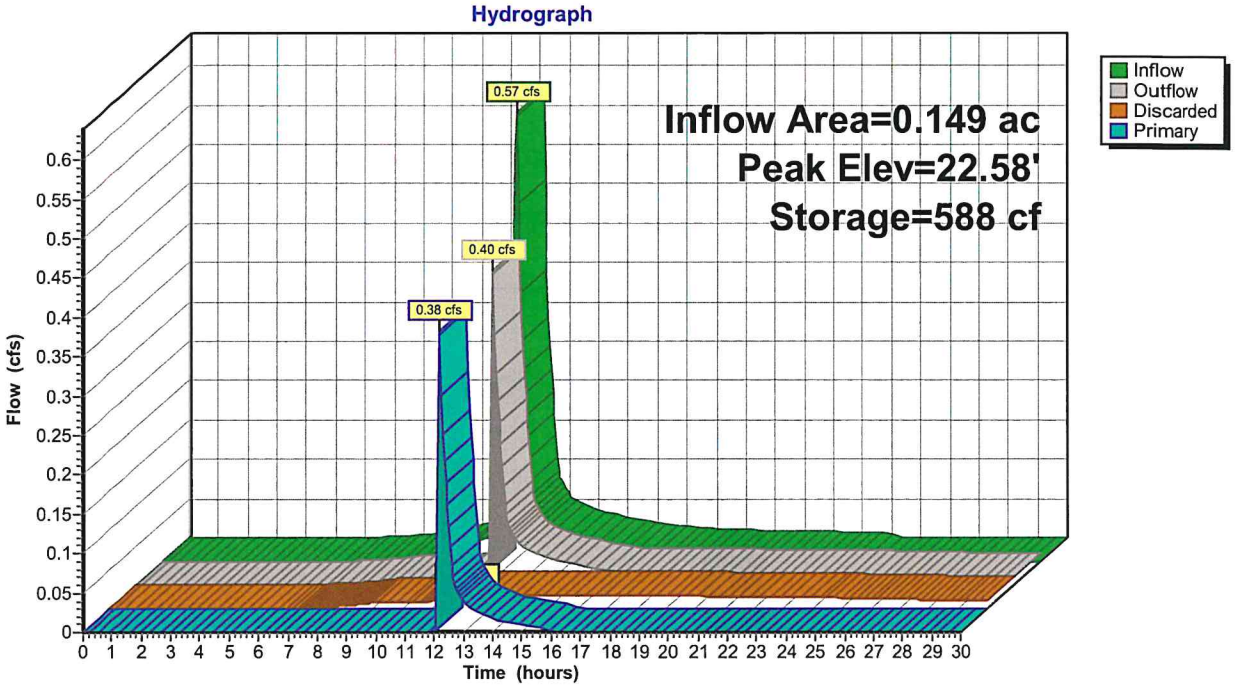
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.50	339	0	0
22.00	523	216	216
22.50	720	311	526
22.70	793	151	678

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	22.50'	**6.0' long x 1.5' 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 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Discarded OutFlow Max=0.02 cfs @ 12.18 hrs HW=22.58' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.37 cfs @ 12.18 hrs HW=22.58' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.37 cfs @ 0.75 fps)

Pond 8P: BIORETENTION

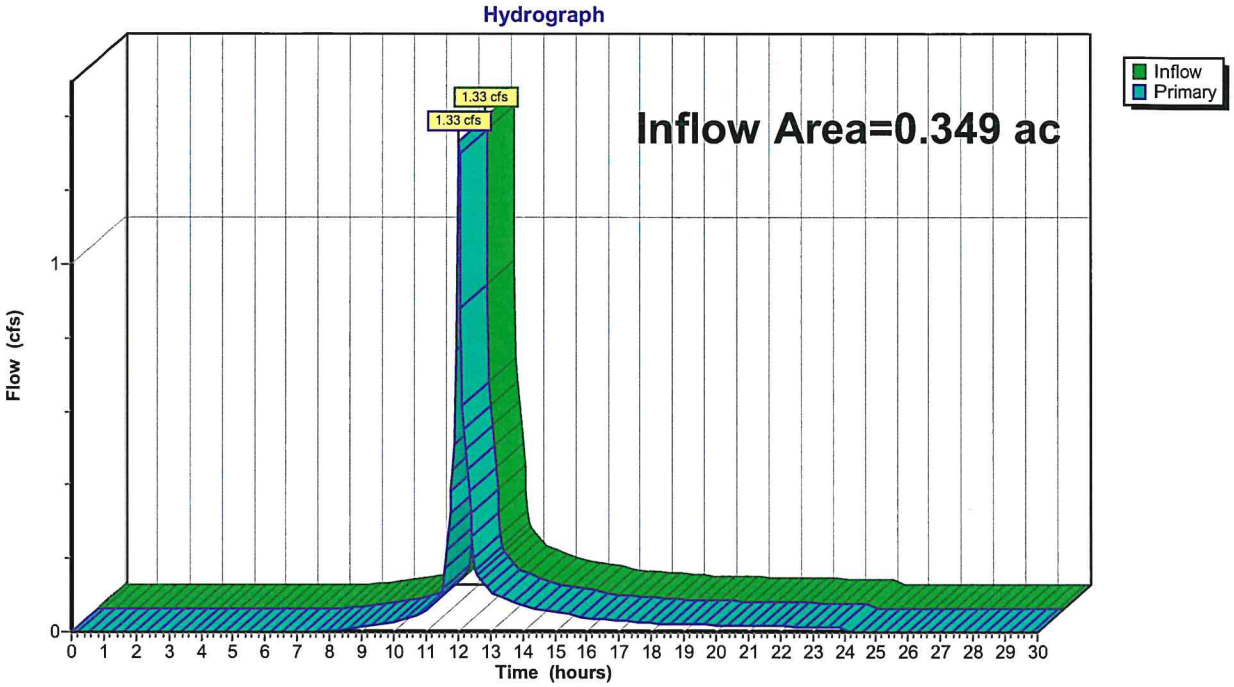


Summary for Link 3L: PRE

Inflow Area = 0.349 ac, 9.57% Impervious, Inflow Depth = 2.99" for 10-yr event
Inflow = 1.33 cfs @ 12.03 hrs, Volume= 0.087 af
Primary = 1.33 cfs @ 12.03 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

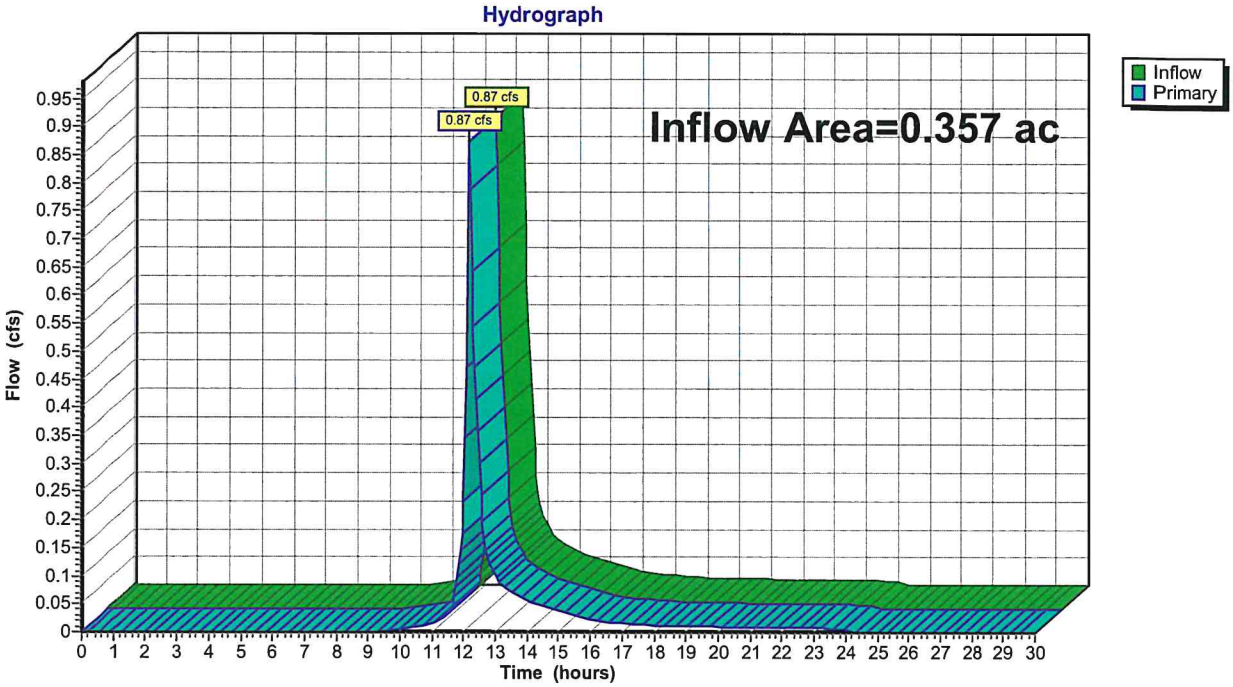


Summary for Link 7L: POST

Inflow Area = 0.357 ac, 25.81% Impervious, Inflow Depth = 1.82" for 10-yr event
Inflow = 0.87 cfs @ 12.17 hrs, Volume= 0.054 af
Primary = 0.87 cfs @ 12.17 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 2S: PRE Runoff Area=15,222 sf 9.57% Impervious Runoff Depth=4.08"
Flow Length=185' Tc=1.7 min CN=82 Runoff=1.80 cfs 0.119 af

Subcatchment 4S: CONTROLLED Runoff Area=6,503 sf 39.27% Impervious Runoff Depth=4.50"
Tc=6.0 min CN=86 Runoff=0.75 cfs 0.056 af

Subcatchment 6S: UNC Runoff Area=9,033 sf 16.12% Impervious Runoff Depth=3.27"
Flow Length=80' Tc=9.1 min CN=74 Runoff=0.70 cfs 0.056 af

Pond 8P: BIORETENTION Peak Elev=22.63' Storage=620 cf Inflow=0.75 cfs 0.056 af
Discarded=0.02 cfs 0.027 af Primary=0.71 cfs 0.026 af Outflow=0.73 cfs 0.053 af

Link 3L: PRE Inflow=1.80 cfs 0.119 af
Primary=1.80 cfs 0.119 af

Link 7L: POST Inflow=1.41 cfs 0.083 af
Primary=1.41 cfs 0.083 af

Total Runoff Area = 0.706 ac Runoff Volume = 0.231 af Average Runoff Depth = 3.93"
82.23% Pervious = 0.581 ac 17.77% Impervious = 0.125 ac

Summary for Subcatchment 2S: PRE

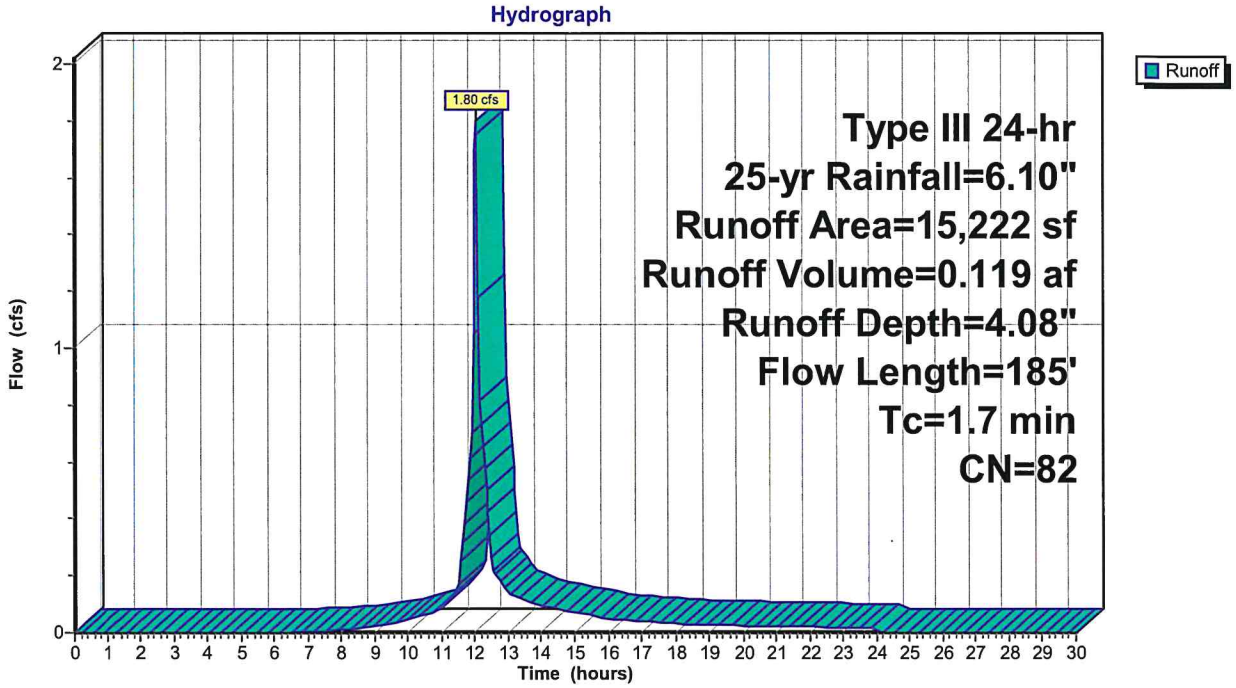
Runoff = 1.80 cfs @ 12.03 hrs, Volume= 0.119 af, Depth= 4.08"
Routed to Link 3L : PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.10"

Area (sf)	CN	Description
1,698	55	Woods, Good, HSG B
11,365	85	Gravel roads, HSG B
1,456	98	Roofs, HSG B
703	61	>75% Grass cover, Good, HSG B
15,222	82	Weighted Average
13,766	80	90.43% Pervious Area
1,456	98	9.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	64	0.0310	1.53		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.33"
1.0	121	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	185	Total			

Subcatchment 2S: PRE



Summary for Subcatchment 4S: CONTROLLED

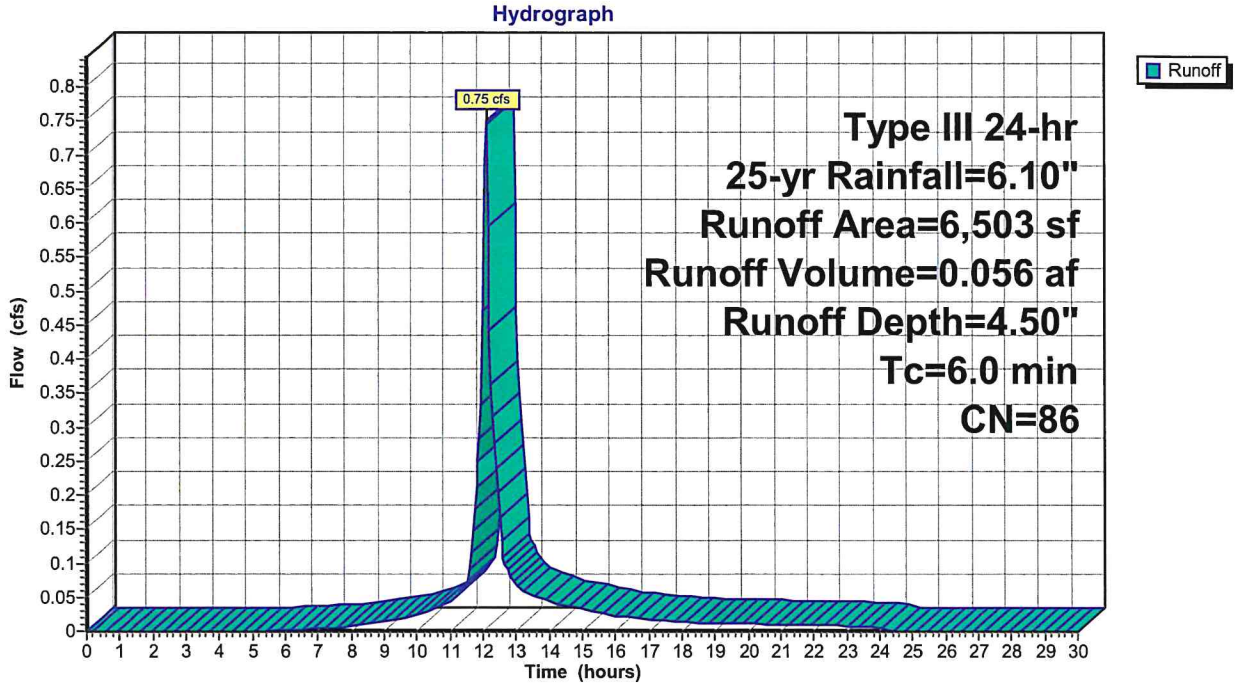
Runoff = 0.75 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 4.50"
Routed to Pond 8P : BIORETENTION

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.10"

Area (sf)	CN	Description
2,554	98	Roofs, HSG B
2,818	85	Gravel roads, HSG B
1,131	61	>75% Grass cover, Good, HSG B
6,503	86	Weighted Average
3,949	78	60.73% Pervious Area
2,554	98	39.27% Impervious Area

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

Subcatchment 4S: CONTROLLED



Summary for Subcatchment 6S: UNC

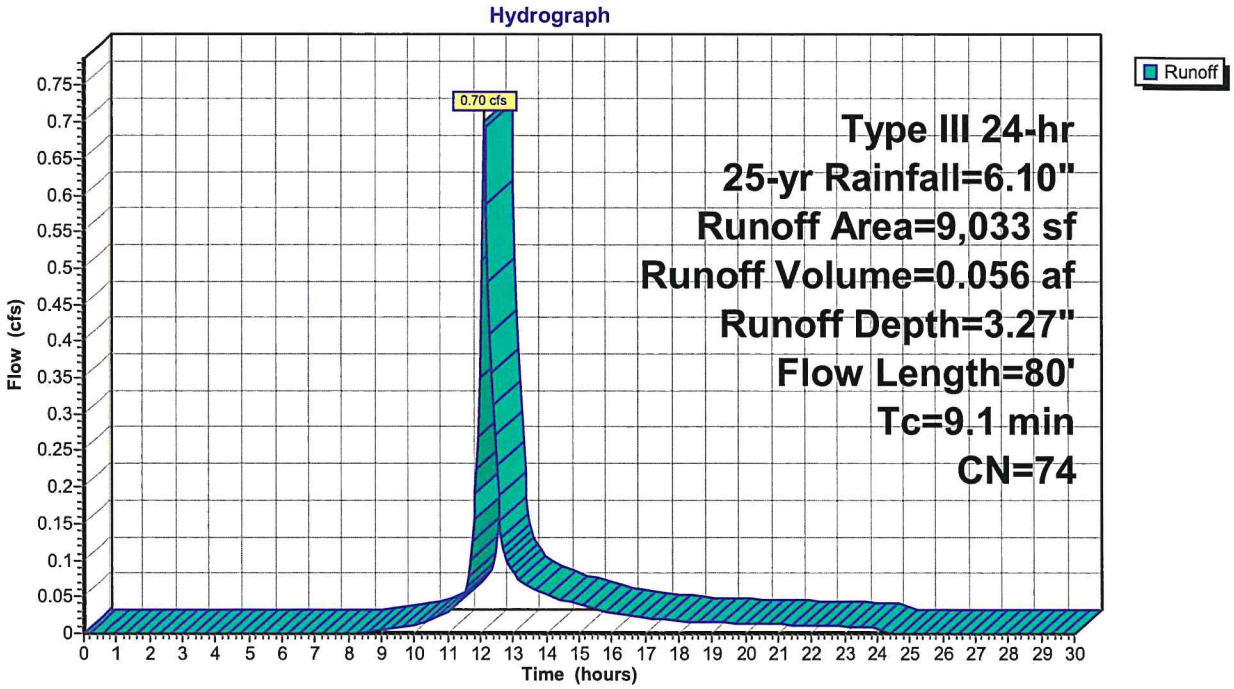
Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.056 af, Depth= 3.27"
Routed to Link 7L : POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=6.10"

Area (sf)	CN	Description
3,874	61	>75% Grass cover, Good, HSG B
1,456	98	Roofs, HSG B
2,710	85	Gravel roads, HSG B
993	55	Woods, Good, HSG B
9,033	74	Weighted Average
7,577	69	83.88% Pervious Area
1,456	98	16.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	45	0.0050	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.33"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.1	80	Total			

Subcatchment 6S: UNC



Summary for Pond 8P: BIORETENTION

Inflow Area = 0.149 ac, 39.27% Impervious, Inflow Depth = 4.50" for 25-yr event
Inflow = 0.75 cfs @ 12.09 hrs, Volume= 0.056 af
Outflow = 0.73 cfs @ 12.12 hrs, Volume= 0.053 af, Atten= 3%, Lag= 1.8 min
Discarded = 0.02 cfs @ 12.12 hrs, Volume= 0.027 af
Primary = 0.71 cfs @ 12.12 hrs, Volume= 0.026 af
Routed to Link 7L : POST

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 22.63' @ 12.12 hrs Surf.Area= 766 sf Storage= 620 cf

Plug-Flow detention time= 180.3 min calculated for 0.053 af (95% of inflow)
Center-of-Mass det. time= 153.1 min (950.2 - 797.1)

Volume	Invert	Avail.Storage	Storage Description
#1	21.50'	678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

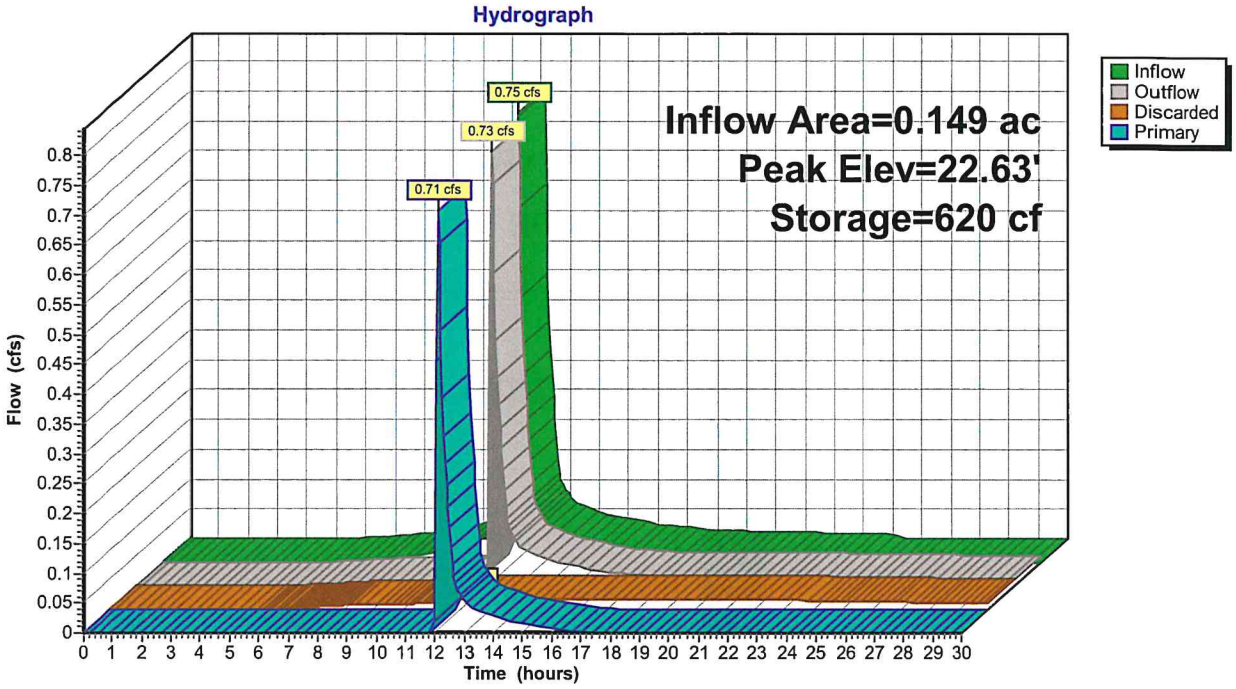
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.50	339	0	0
22.00	523	216	216
22.50	720	311	526
22.70	793	151	678

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	22.50'	**6.0' long x 1.5' 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 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Discarded OutFlow Max=0.02 cfs @ 12.12 hrs HW=22.62' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.68 cfs @ 12.12 hrs HW=22.62' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.68 cfs @ 0.92 fps)

Pond 8P: BIORETENTION

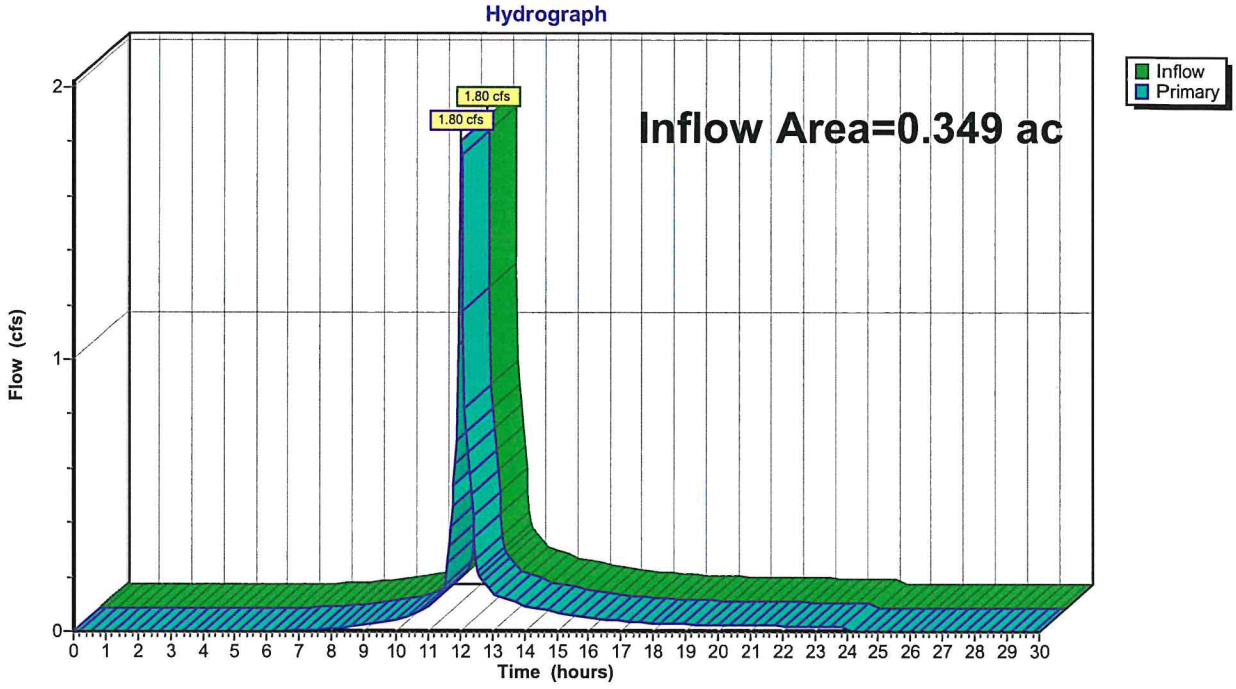


Summary for Link 3L: PRE

Inflow Area = 0.349 ac, 9.57% Impervious, Inflow Depth = 4.08" for 25-yr event
Inflow = 1.80 cfs @ 12.03 hrs, Volume= 0.119 af
Primary = 1.80 cfs @ 12.03 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

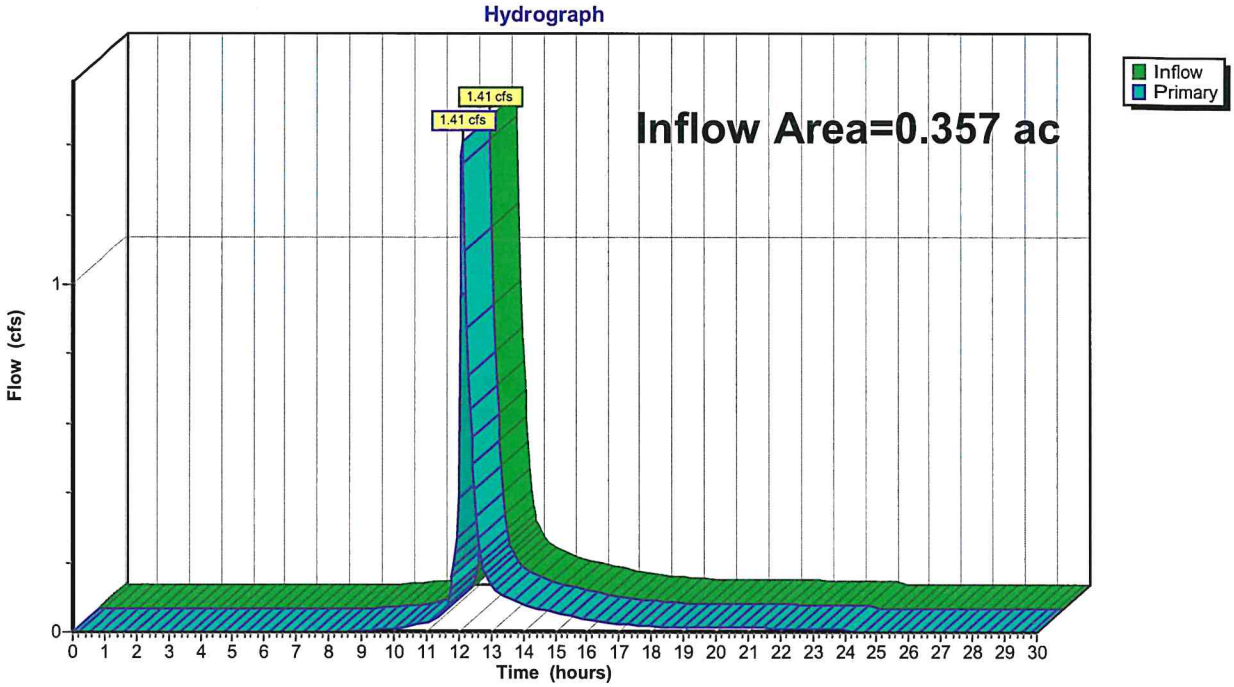


Summary for Link 7L: POST

Inflow Area = 0.357 ac, 25.81% Impervious, Inflow Depth = 2.78" for 25-yr event
Inflow = 1.41 cfs @ 12.12 hrs, Volume= 0.083 af
Primary = 1.41 cfs @ 12.12 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 2S: PRE Runoff Area=15,222 sf 9.57% Impervious Runoff Depth=6.34"
Flow Length=185' Tc=1.7 min CN=82 Runoff=2.75 cfs 0.184 af

Subcatchment 4S: CONTROLLED Runoff Area=6,503 sf 39.27% Impervious Runoff Depth=6.82"
Tc=6.0 min CN=86 Runoff=1.11 cfs 0.085 af

Subcatchment 6S: UNC Runoff Area=9,033 sf 16.12% Impervious Runoff Depth=5.38"
Flow Length=80' Tc=9.1 min CN=74 Runoff=1.15 cfs 0.093 af

Pond 8P: BIORETENTION Peak Elev=22.67' Storage=651 cf Inflow=1.11 cfs 0.085 af
Discarded=0.02 cfs 0.029 af Primary=1.06 cfs 0.051 af Outflow=1.08 cfs 0.081 af

Link 3L: PRE Inflow=2.75 cfs 0.184 af
Primary=2.75 cfs 0.184 af

Link 7L: POST Inflow=2.21 cfs 0.144 af
Primary=2.21 cfs 0.144 af

Total Runoff Area = 0.706 ac Runoff Volume = 0.362 af Average Runoff Depth = 6.16"
82.23% Pervious = 0.581 ac 17.77% Impervious = 0.125 ac

Summary for Subcatchment 2S: PRE

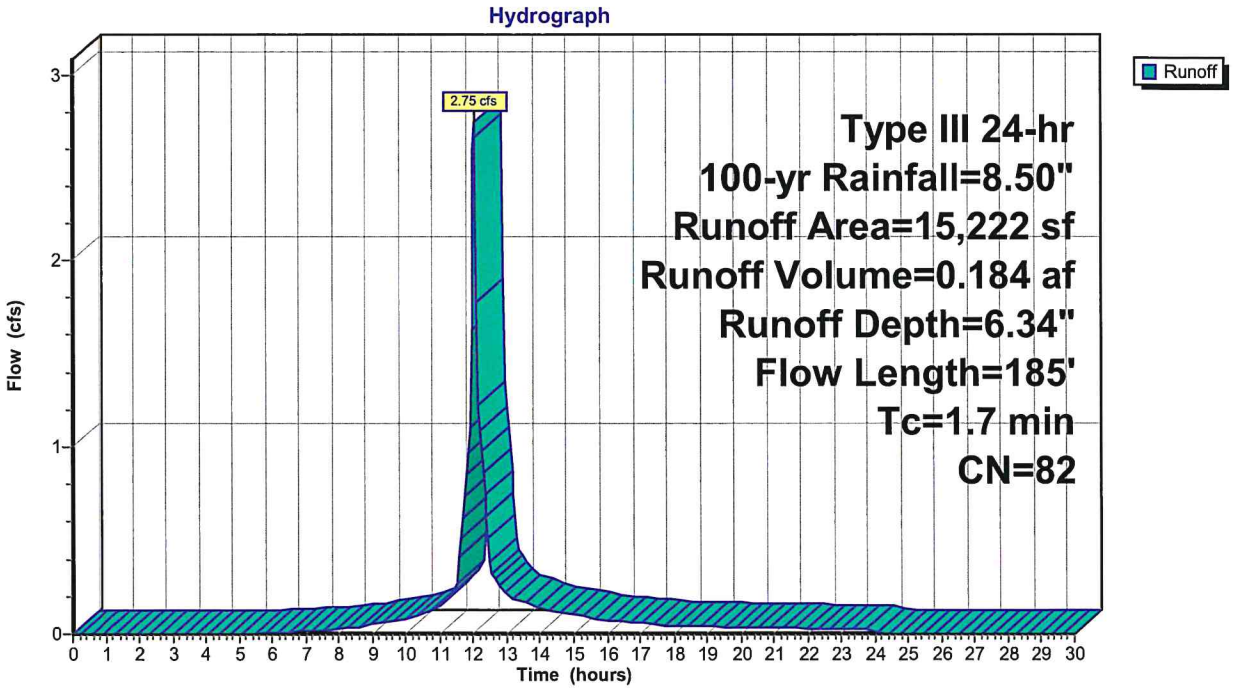
Runoff = 2.75 cfs @ 12.03 hrs, Volume= 0.184 af, Depth= 6.34"
Routed to Link 3L : PRE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.50"

Area (sf)	CN	Description
1,698	55	Woods, Good, HSG B
11,365	85	Gravel roads, HSG B
1,456	98	Roofs, HSG B
703	61	>75% Grass cover, Good, HSG B
15,222	82	Weighted Average
13,766	80	90.43% Pervious Area
1,456	98	9.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	64	0.0310	1.53		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.33"
1.0	121	0.0165	2.07		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	185	Total			

Subcatchment 2S: PRE



Summary for Subcatchment 4S: CONTROLLED

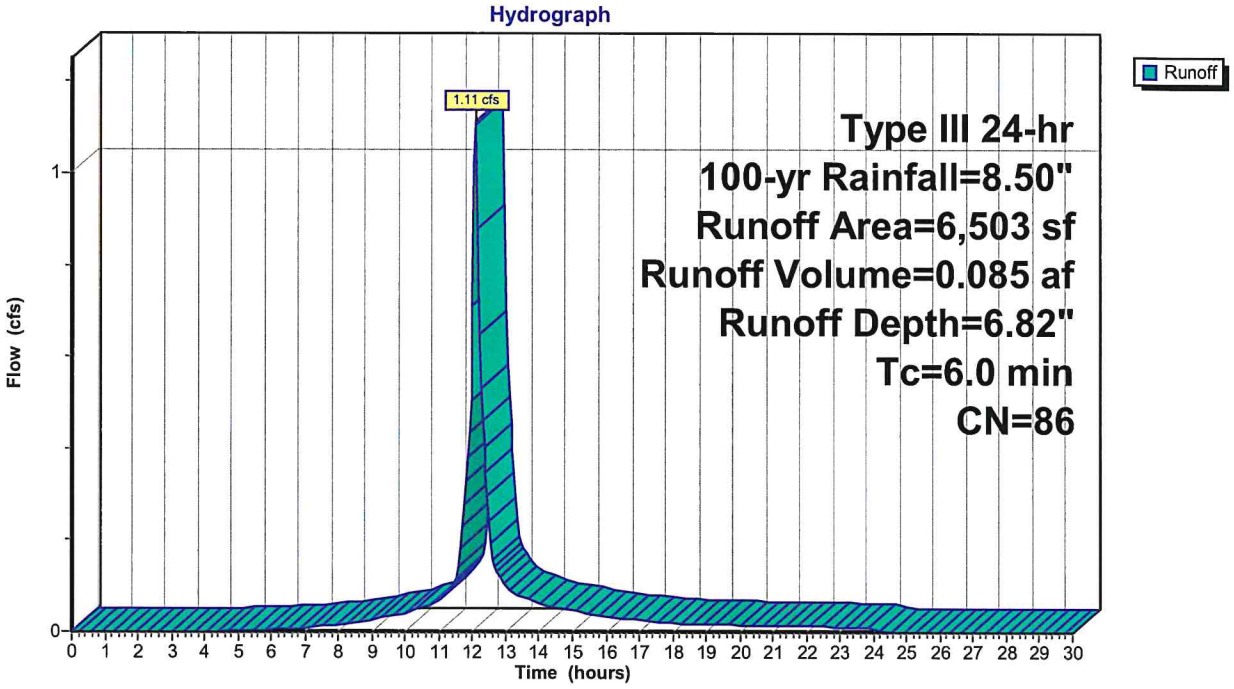
Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 6.82"
Routed to Pond 8P : BIORETENTION

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.50"

Area (sf)	CN	Description
2,554	98	Roofs, HSG B
2,818	85	Gravel roads, HSG B
1,131	61	>75% Grass cover, Good, HSG B
6,503	86	Weighted Average
3,949	78	60.73% Pervious Area
2,554	98	39.27% Impervious Area

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

Subcatchment 4S: CONTROLLED



Summary for Subcatchment 6S: UNC

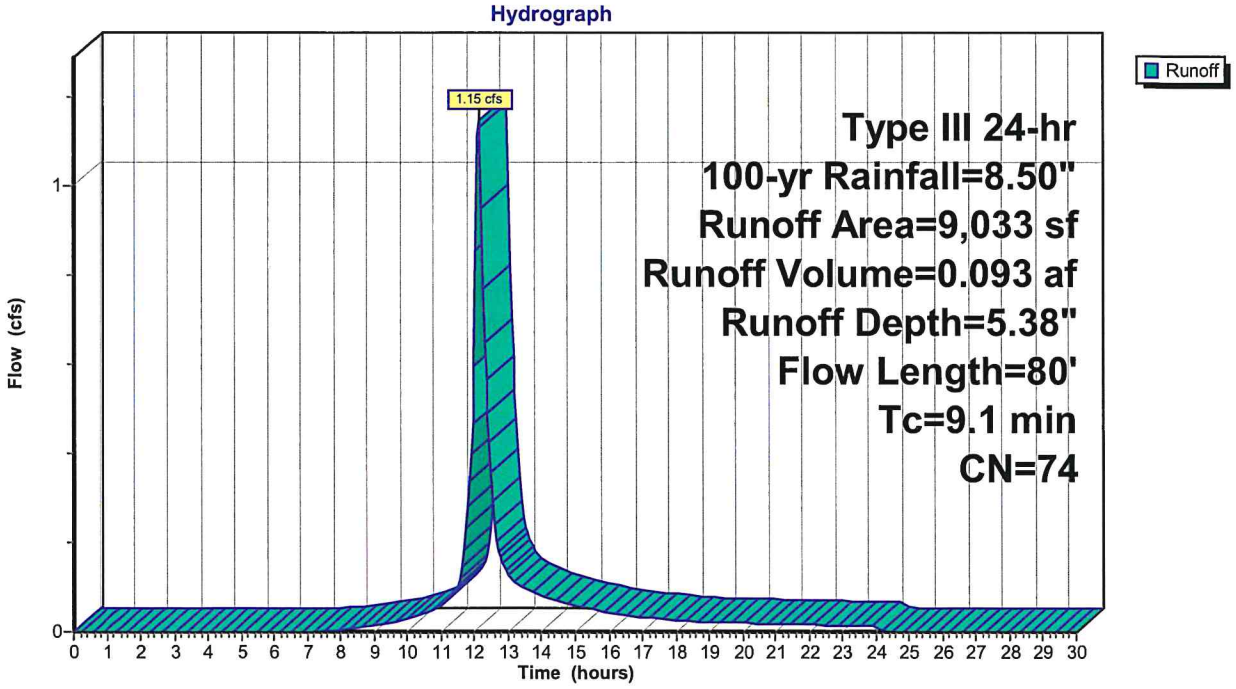
Runoff = 1.15 cfs @ 12.13 hrs, Volume= 0.093 af, Depth= 5.38"
Routed to Link 7L : POST

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.50"

Area (sf)	CN	Description
3,874	61	>75% Grass cover, Good, HSG B
1,456	98	Roofs, HSG B
2,710	85	Gravel roads, HSG B
993	55	Woods, Good, HSG B
9,033	74	Weighted Average
7,577	69	83.88% Pervious Area
1,456	98	16.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	45	0.0050	0.08		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.33"
0.3	35	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
9.1	80	Total			

Subcatchment 6S: UNC



Summary for Pond 8P: BIORETENTION

Inflow Area = 0.149 ac, 39.27% Impervious, Inflow Depth = 6.82" for 100-yr event
Inflow = 1.11 cfs @ 12.09 hrs, Volume= 0.085 af
Outflow = 1.08 cfs @ 12.11 hrs, Volume= 0.081 af, Atten= 3%, Lag= 1.3 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.029 af
Primary = 1.06 cfs @ 12.11 hrs, Volume= 0.051 af
Routed to Link 7L : POST

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 22.67' @ 12.11 hrs Surf.Area= 780 sf Storage= 651 cf

Plug-Flow detention time= 131.5 min calculated for 0.081 af (95% of inflow)
Center-of-Mass det. time= 104.2 min (890.0 - 785.8)

Volume	Invert	Avail.Storage	Storage Description
#1	21.50'	678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

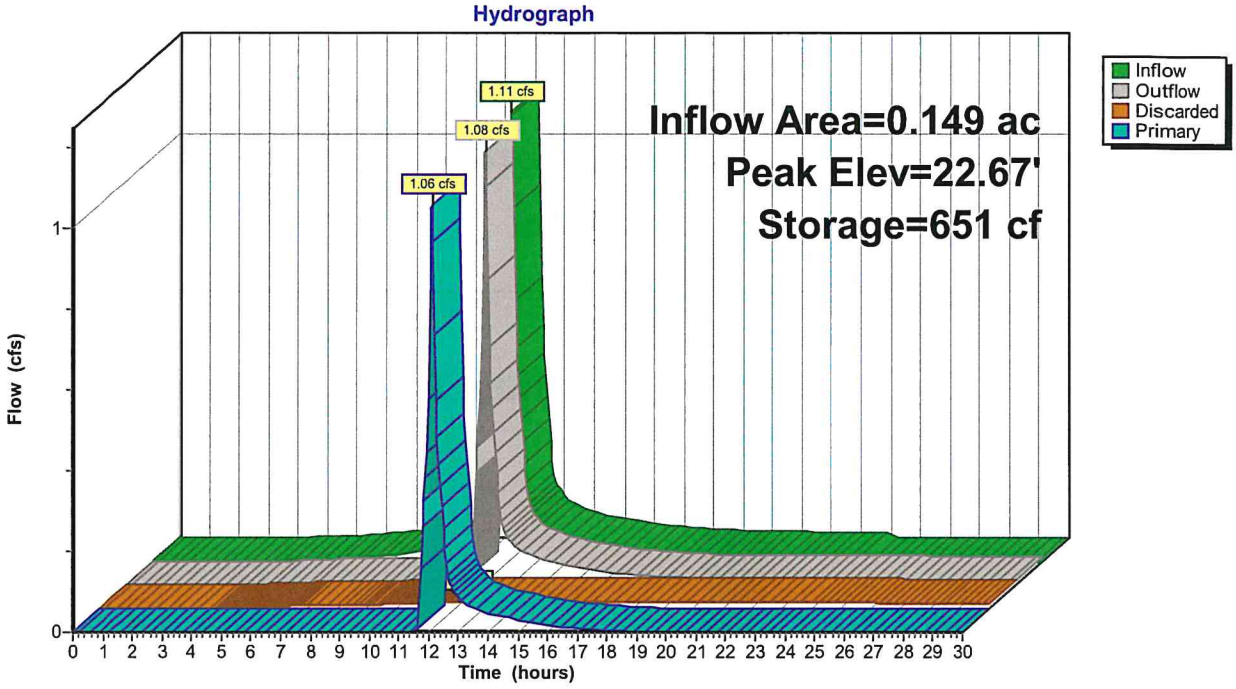
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.50	339	0	0
22.00	523	216	216
22.50	720	311	526
22.70	793	151	678

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	22.50'	**6.0' long x 1.5' 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 Coef. (English) 2.62 2.64 2.64 2.68 2.75 2.86 2.92 3.07 3.07 3.03 3.28 3.32

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=22.66' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.04 cfs @ 12.11 hrs HW=22.66' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.04 cfs @ 1.06 fps)

Pond 8P: BIORETENTION

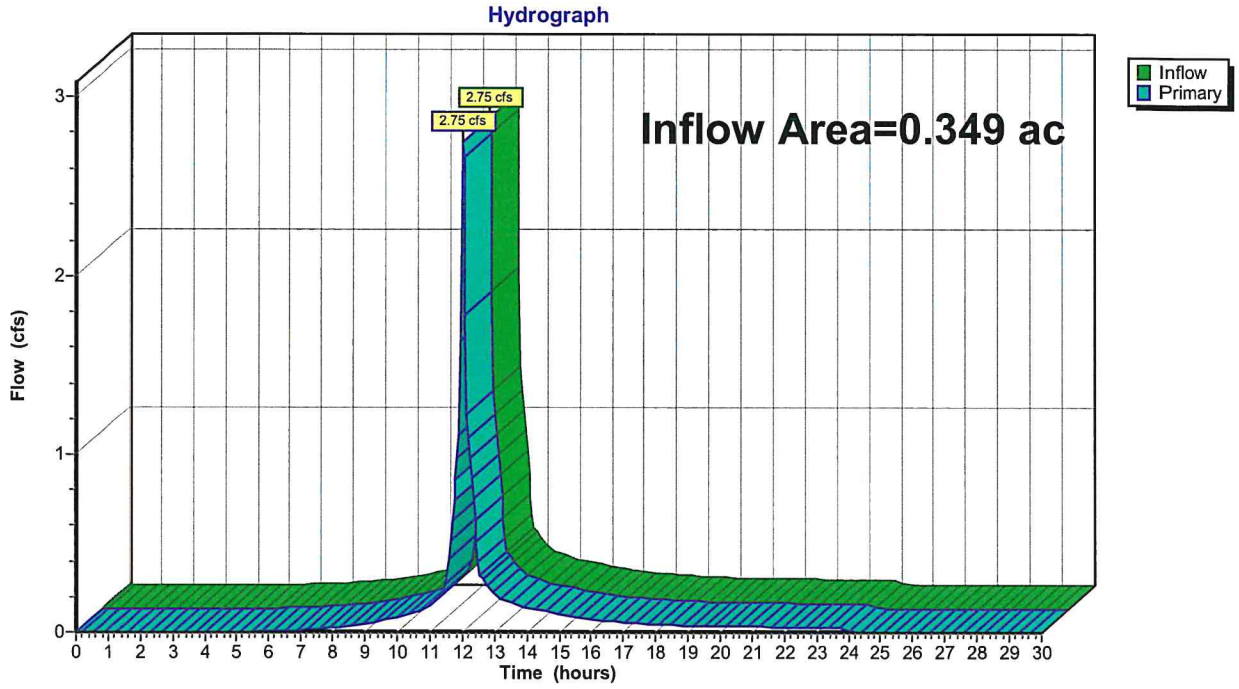


Summary for Link 3L: PRE

Inflow Area = 0.349 ac, 9.57% Impervious, Inflow Depth = 6.34" for 100-yr event
Inflow = 2.75 cfs @ 12.03 hrs, Volume= 0.184 af
Primary = 2.75 cfs @ 12.03 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE



Summary for Link 7L: POST

Inflow Area = 0.357 ac, 25.81% Impervious, Inflow Depth = 4.85" for 100-yr event
Inflow = 2.21 cfs @ 12.12 hrs, Volume= 0.144 af
Primary = 2.21 cfs @ 12.12 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST