

"THE BIRCHES"

A 40B RESIDENTIAL PROJECT
OFF LONG RIDGE ROAD, CARLISLE, MASSACHUSETTS

FINAL
**STORMWATER
MANAGEMENT REPORT**

VOLUME 2 OF 2

STORMWATER MANAGEMENT DESIGN

July 1, 2014

PREPARED FOR:

LIFETIME GREEN HOMES, LLC
142 LITTLETON ROAD, WESTFORD, MA 01886

PREPARED BY:

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STORMWATER MANAGEMENT REPORT – VOLUME 2 OF 2

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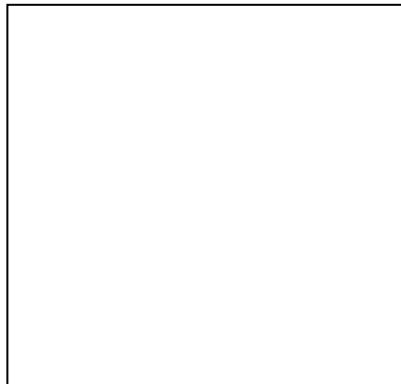
THE FOLLOWING REPORT HAS BEEN PREPARED UNDER THE SUPERVISION OF A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF MASSACHUSETTS.

"THE BIRCHES"

*OFF LONG RIDGE ROAD
CARLISLE, MASSACHUSETTS*

Volume 2

STORMWATER MANAGEMENT DESIGN



MEISNER BREM CORPORATION

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STORMWATER MANAGEMENT REPORT – VOLUME 2 OF 2
A 40B RESIDENTIAL PROJECT OFF LONG RIDGE ROAD, CARLISLE, MA

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STORMWATER CHECKLIST

HYDROCAD WORKSHEETS - 2, 10, 25 & 100 YEAR STORM EVENTS

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STORMWATER CHECKLIST

SEE FOLLOWING PAGES FOR MASS DEP STORMWATER CHECKLIST



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
 - Credit 1
 - Credit 2
 - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): _____

Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

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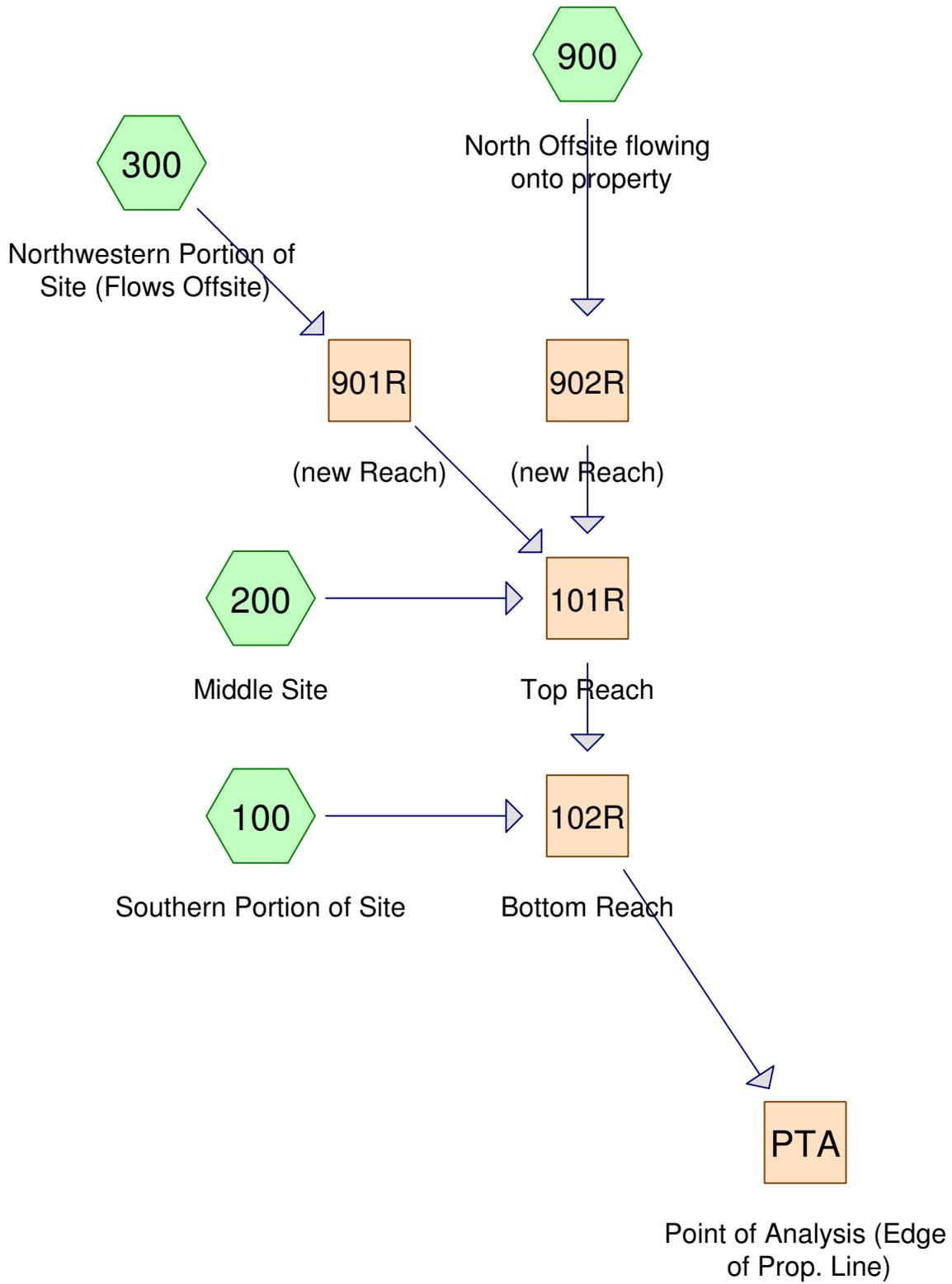
THE BIRCHES

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HydroCAD Printouts

Pre Development

Storm Frequency: 2, 10, 25, 100 Year



2066 Predevelopment_4c

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Page 2

2/25/2015

Area Listing (all nodes)

<u>Area (sq-ft)</u>	<u>CN</u>	<u>Description (subcats)</u>
143,231	70	Woods, Good, HSG C (100,200,300,900)
52,040	74	>75% Grass cover, Good, HSG C (100,300)
4,161	89	Gravel roads, HSG C (200)
74,919	91	Fallow, bare soil, HSG C (100,200,300)
20,909	98	Paved parking & roofs (100,200)
<hr/>		
295,260		

2066 Predevelopment_4c

Type III 24-hr 2-Year Rainfall=3.00"

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Page 3

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

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

Subcatchment 100: Southern Portion of Site

Runoff Area=134,123 sf Runoff Depth>1.07"

Flow Length=560' Tc=13.3 min CN=77 Runoff=2.94 cfs 11,931 cf

Subcatchment 200: Middle Site

Runoff Area=78,511 sf Runoff Depth>1.44"

Flow Length=570' Tc=12.3 min CN=83 Runoff=2.48 cfs 9,439 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offsi

Runoff Area=68,550 sf Runoff Depth>1.07"

Flow Length=450' Tc=14.2 min CN=77 Runoff=1.46 cfs 6,096 cf

Subcatchment 900: North Offsite flowing onto property

Runoff Area=14,076 sf Runoff Depth>0.71"

Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.19 cfs 835 cf

Reach 101R: Top Reach

Avg. Depth=0.13' Max Vel=2.03 fps Inflow=4.09 cfs 16,370 cf

n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=4.00 cfs 16,341 cf

Reach 102R: Bottom Reach

Avg. Depth=0.17' Max Vel=3.88 fps Inflow=6.92 cfs 28,272 cf

n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=6.91 cfs 28,259 cf

Reach 901R: (new Reach)

Inflow=1.46 cfs 6,096 cf

Outflow=1.46 cfs 6,096 cf

Reach 902R: (new Reach)

Inflow=0.19 cfs 835 cf

Outflow=0.19 cfs 835 cf

Reach PTA: Point of Analysis (Edge of Prop. Line)

Inflow=6.91 cfs 28,259 cf

Outflow=6.91 cfs 28,259 cf

Total Runoff Area = 295,260 sf Runoff Volume = 28,301 cf Average Runoff Depth = 1.15"

92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf

2066 Predevelopment_4c

Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 100: Southern Portion of Site

Runoff = 2.94 cfs @ 12.19 hrs, Volume= 11,931 cf, Depth> 1.07"

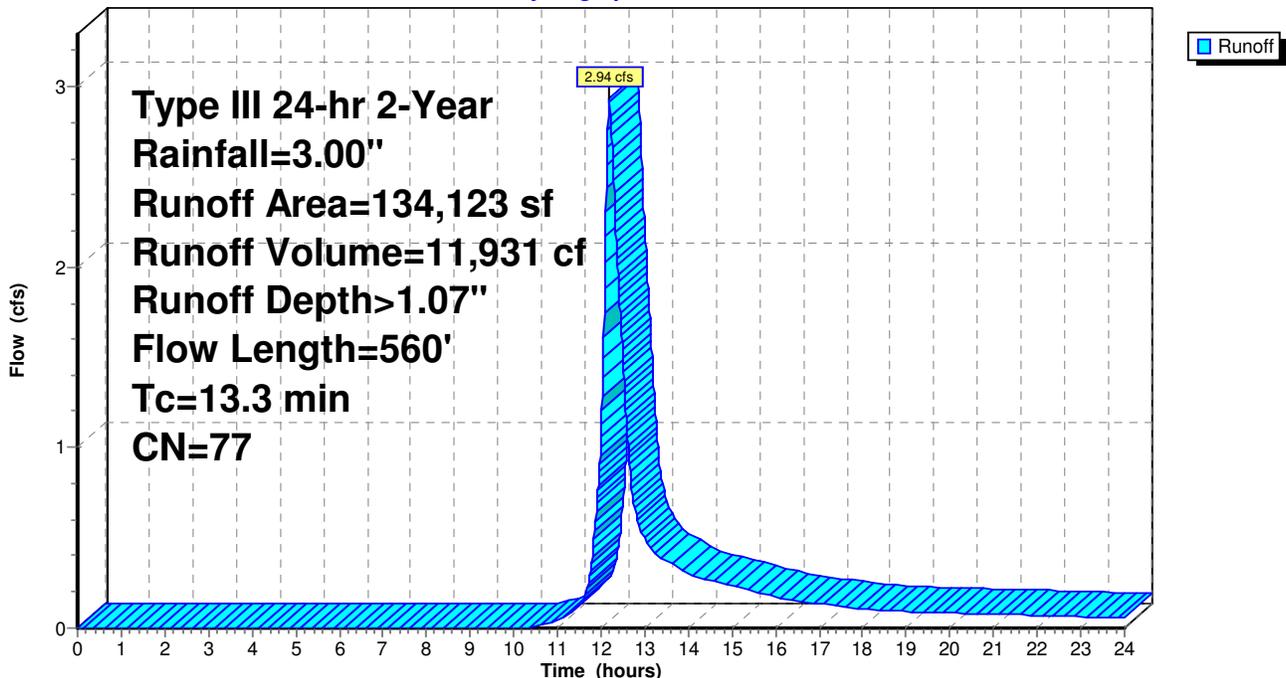
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 200: Middle Site

Runoff = 2.48 cfs @ 12.17 hrs, Volume= 9,439 cf, Depth> 1.44"

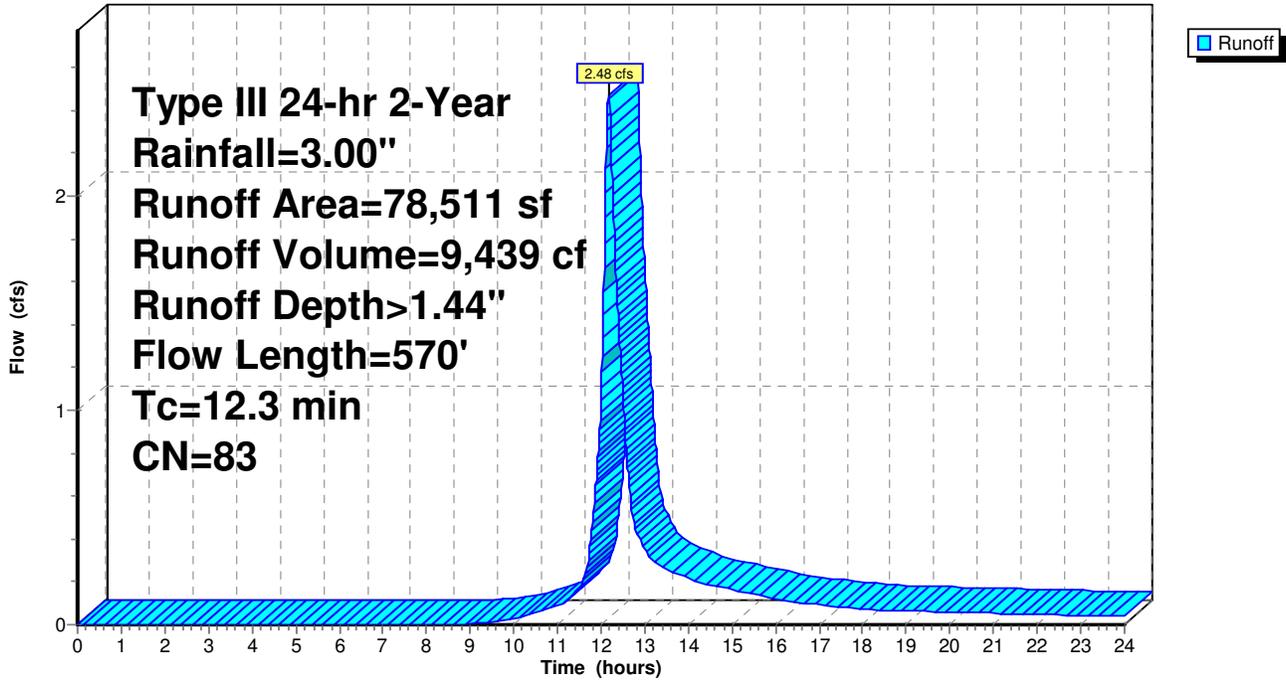
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Runoff = 1.46 cfs @ 12.20 hrs, Volume= 6,096 cf, Depth> 1.07"

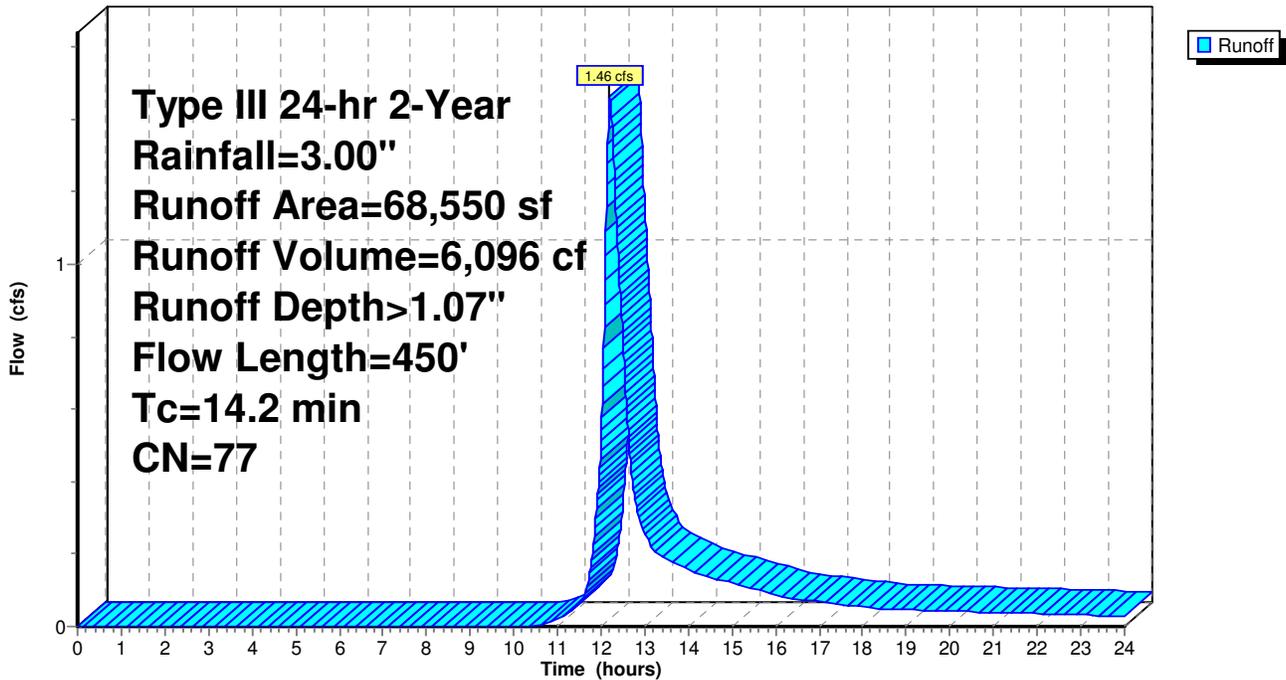
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.19 cfs @ 12.20 hrs, Volume= 835 cf, Depth> 0.71"

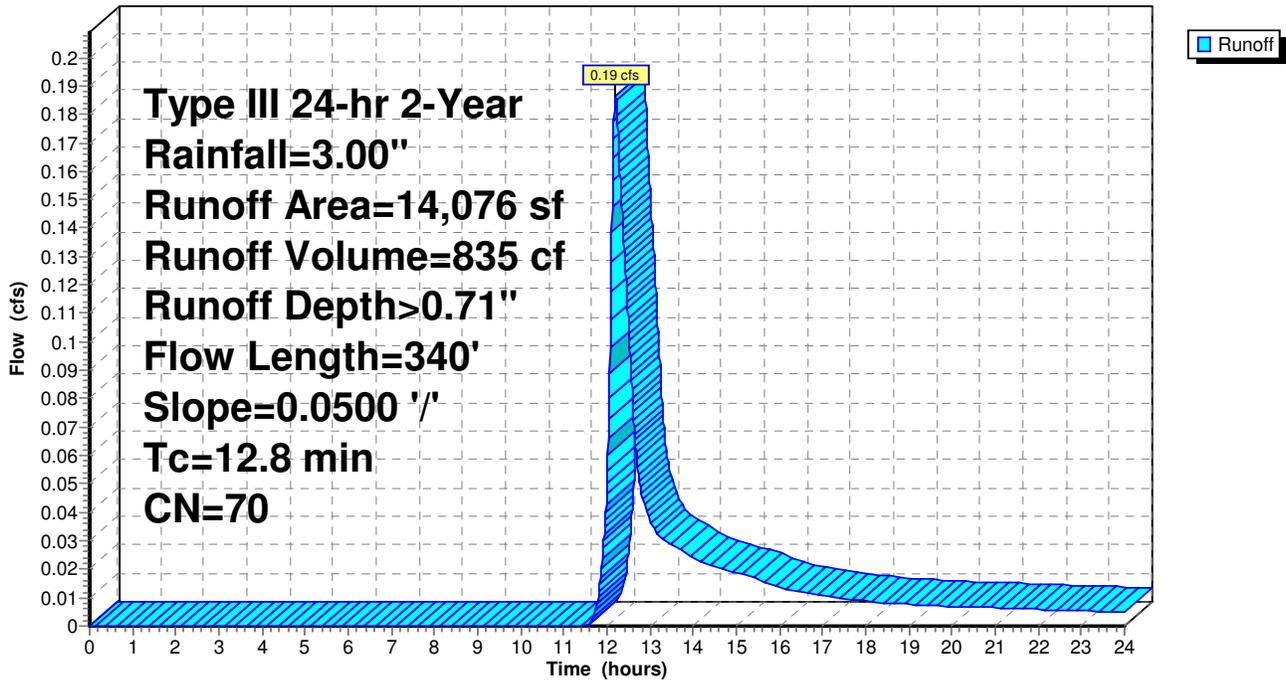
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 1.22" for 2-Year event
 Inflow = 4.09 cfs @ 12.18 hrs, Volume= 16,370 cf
 Outflow = 4.00 cfs @ 12.21 hrs, Volume= 16,341 cf, Atten= 2%, Lag= 1.7 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.03 fps, Min. Travel Time= 2.6 min
 Avg. Velocity = 0.85 fps, Avg. Travel Time= 6.2 min

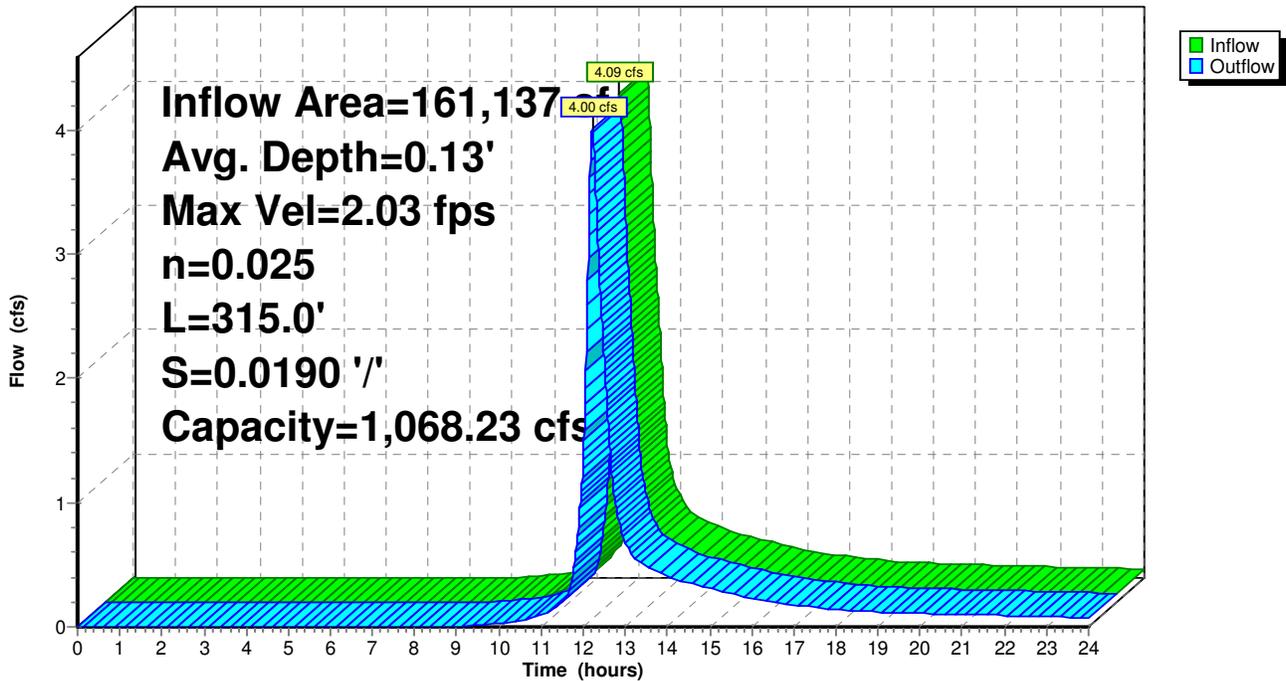
Peak Storage= 620 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.13'
 Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
 Side Slope Z-value= 4.0 '/' Top Width= 39.00'
 Length= 315.0' Slope= 0.0190 '/'
 Inlet Invert= 94.00', Outlet Invert= 88.00'



Reach 101R: Top Reach

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 102R: Bottom Reach

[61] Hint: Submerged 3% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 1.15" for 2-Year event
Inflow = 6.92 cfs @ 12.21 hrs, Volume= 28,272 cf
Outflow = 6.91 cfs @ 12.21 hrs, Volume= 28,259 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.88 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 1.4 min

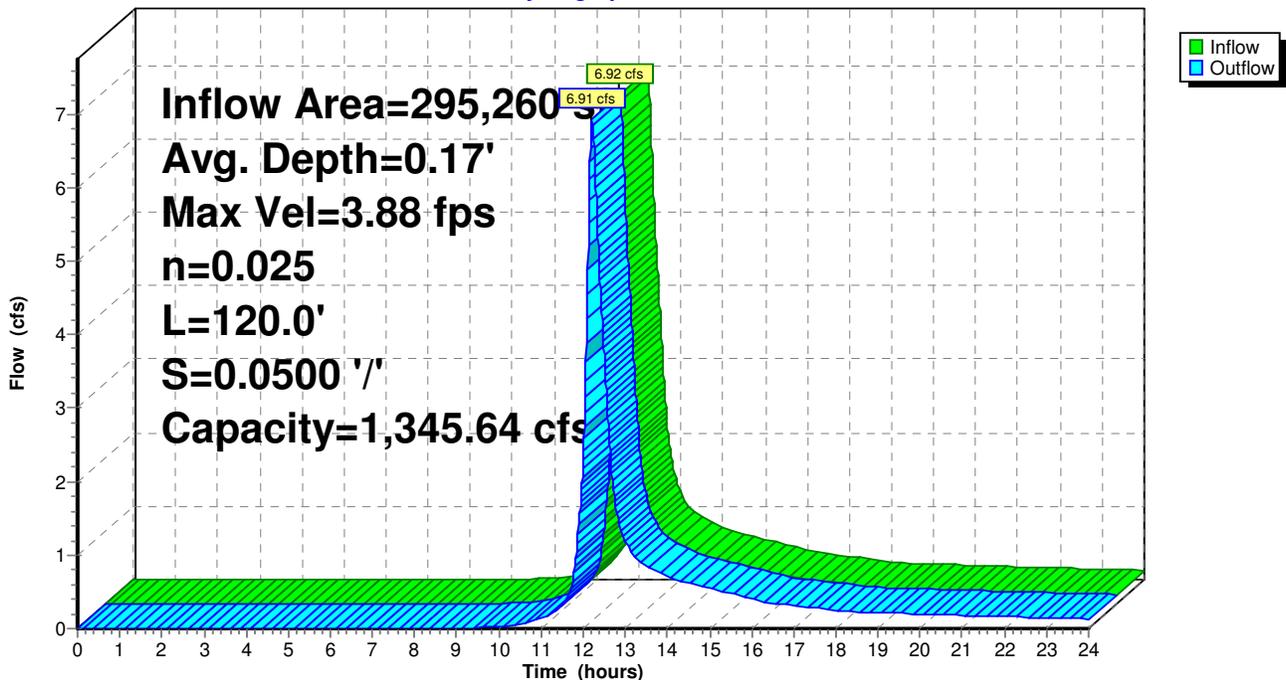
Peak Storage= 214 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 34.00'
Length= 120.0' Slope= 0.0500 '/'
Inlet Invert= 88.00', Outlet Invert= 82.00'



Reach 102R: Bottom Reach

Hydrograph



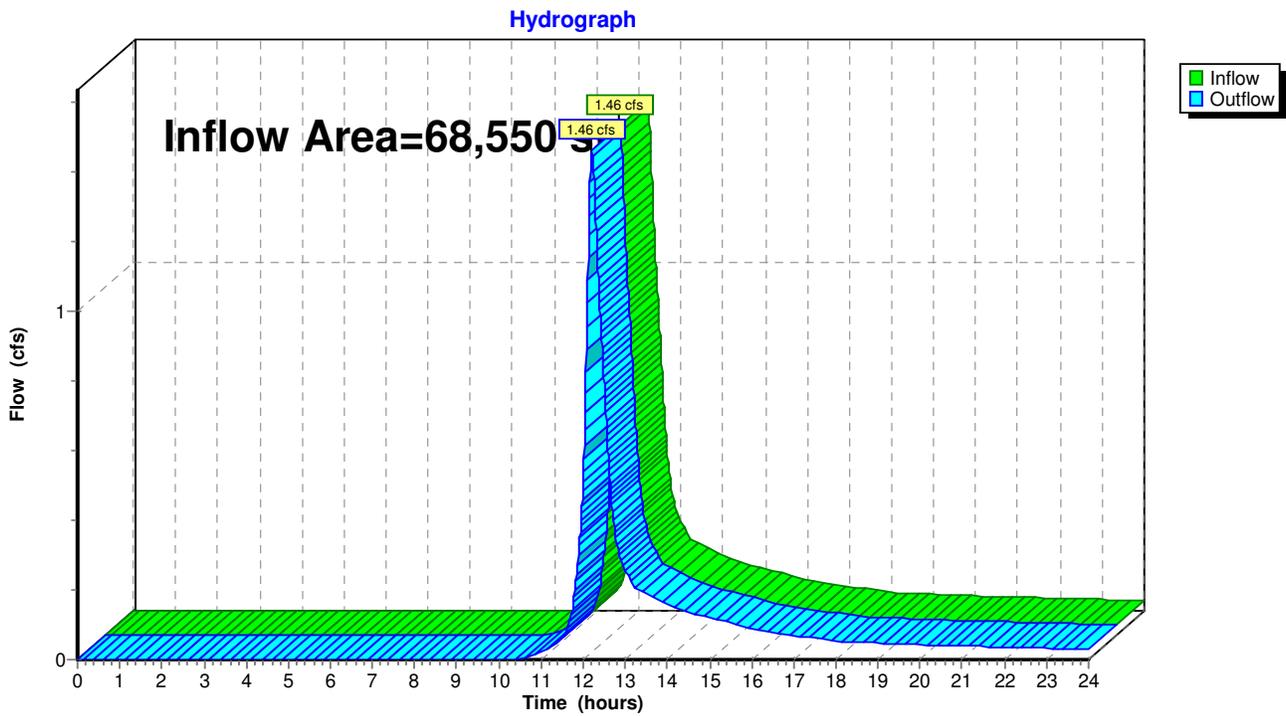
Reach 901R: (new Reach)

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

Inflow Area = 68,550 sf, Inflow Depth > 1.07" for 2-Year event
Inflow = 1.46 cfs @ 12.20 hrs, Volume= 6,096 cf
Outflow = 1.46 cfs @ 12.20 hrs, Volume= 6,096 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)



Reach 902R: (new Reach)

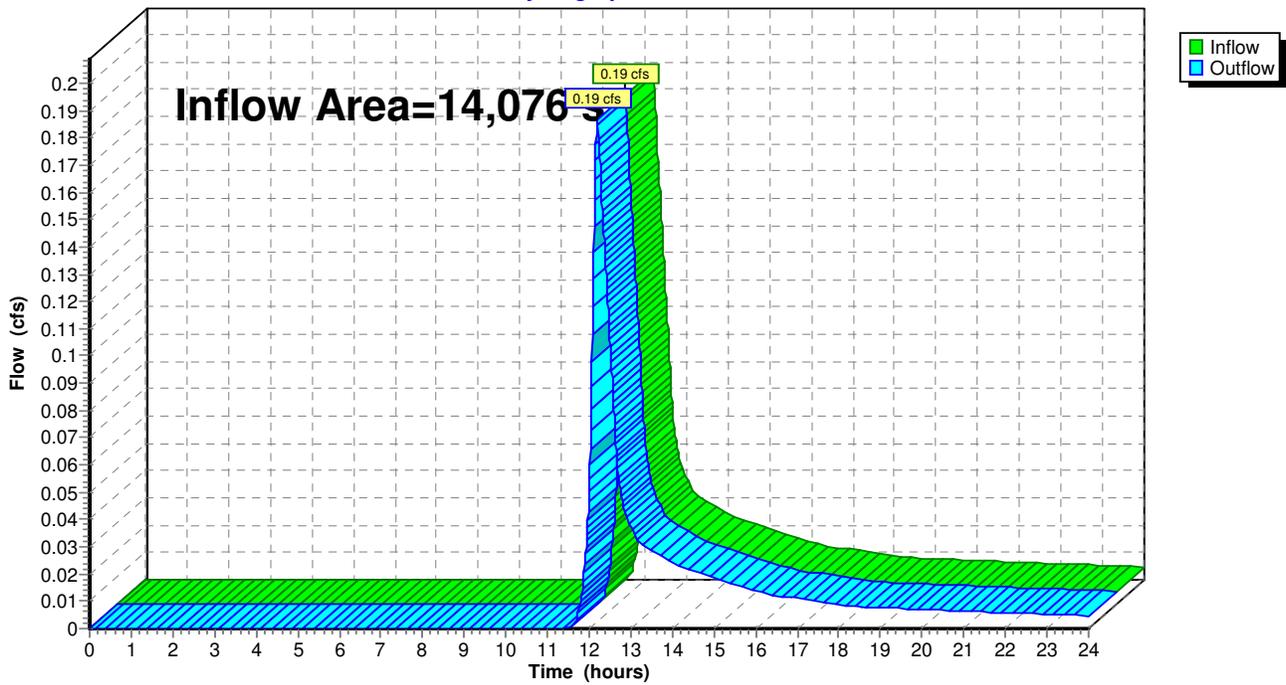
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 0.71" for 2-Year event
Inflow = 0.19 cfs @ 12.20 hrs, Volume= 835 cf
Outflow = 0.19 cfs @ 12.20 hrs, Volume= 835 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)

Hydrograph



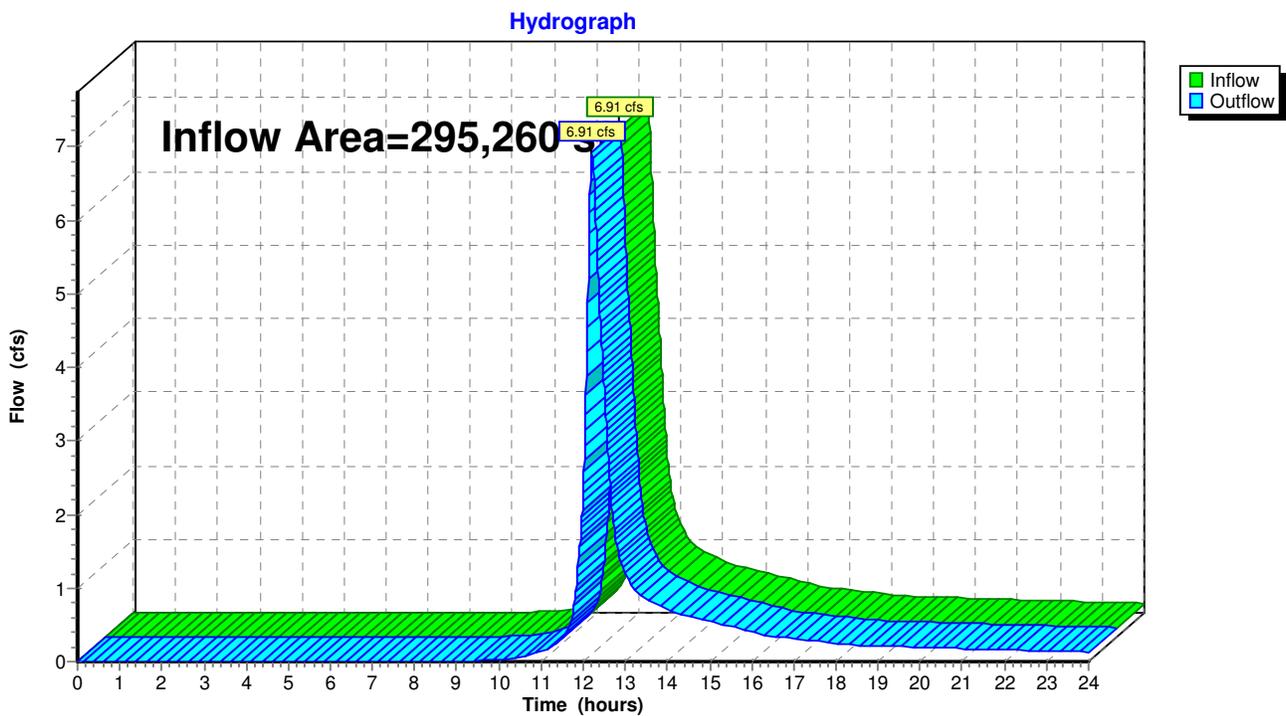
Reach PTA: Point of Analysis (Edge of Prop. Line)

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

Inflow Area = 295,260 sf, Inflow Depth > 1.15" for 2-Year event
Inflow = 6.91 cfs @ 12.21 hrs, Volume= 28,259 cf
Outflow = 6.91 cfs @ 12.21 hrs, Volume= 28,259 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach PTA: Point of Analysis (Edge of Prop. Line)



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Type III 24-hr 10-Year Rainfall=4.50"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

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

Subcatchment 100: Southern Portion of Site

Runoff Area=134,123 sf Runoff Depth>2.20"

Flow Length=560' Tc=13.3 min CN=77 Runoff=6.30 cfs 24,637 cf

Subcatchment 200: Middle Site

Runoff Area=78,511 sf Runoff Depth>2.72"

Flow Length=570' Tc=12.3 min CN=83 Runoff=4.69 cfs 17,790 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offsi

Runoff Area=68,550 sf Runoff Depth>2.20"

Flow Length=450' Tc=14.2 min CN=77 Runoff=3.14 cfs 12,589 cf

Subcatchment 900: North Offsite flowing onto property

Runoff Area=14,076 sf Runoff Depth>1.67"

Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.49 cfs 1,957 cf

Reach 101R: Top Reach

Avg. Depth=0.19' Max Vel=2.67 fps Inflow=8.27 cfs 32,337 cf

n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=8.16 cfs 32,287 cf

Reach 102R: Bottom Reach

Avg. Depth=0.26' Max Vel=5.06 fps Inflow=14.43 cfs 56,924 cf

n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=14.42 cfs 56,903 cf

Reach 901R: (new Reach)

Inflow=3.14 cfs 12,589 cf

Outflow=3.14 cfs 12,589 cf

Reach 902R: (new Reach)

Inflow=0.49 cfs 1,957 cf

Outflow=0.49 cfs 1,957 cf

Reach PTA: Point of Analysis (Edge of Prop. Line)

Inflow=14.42 cfs 56,903 cf

Outflow=14.42 cfs 56,903 cf

Total Runoff Area = 295,260 sf Runoff Volume = 56,974 cf Average Runoff Depth = 2.32"**92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf**

2066 Predevelopment_4c

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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 100: Southern Portion of Site

Runoff = 6.30 cfs @ 12.19 hrs, Volume= 24,637 cf, Depth> 2.20"

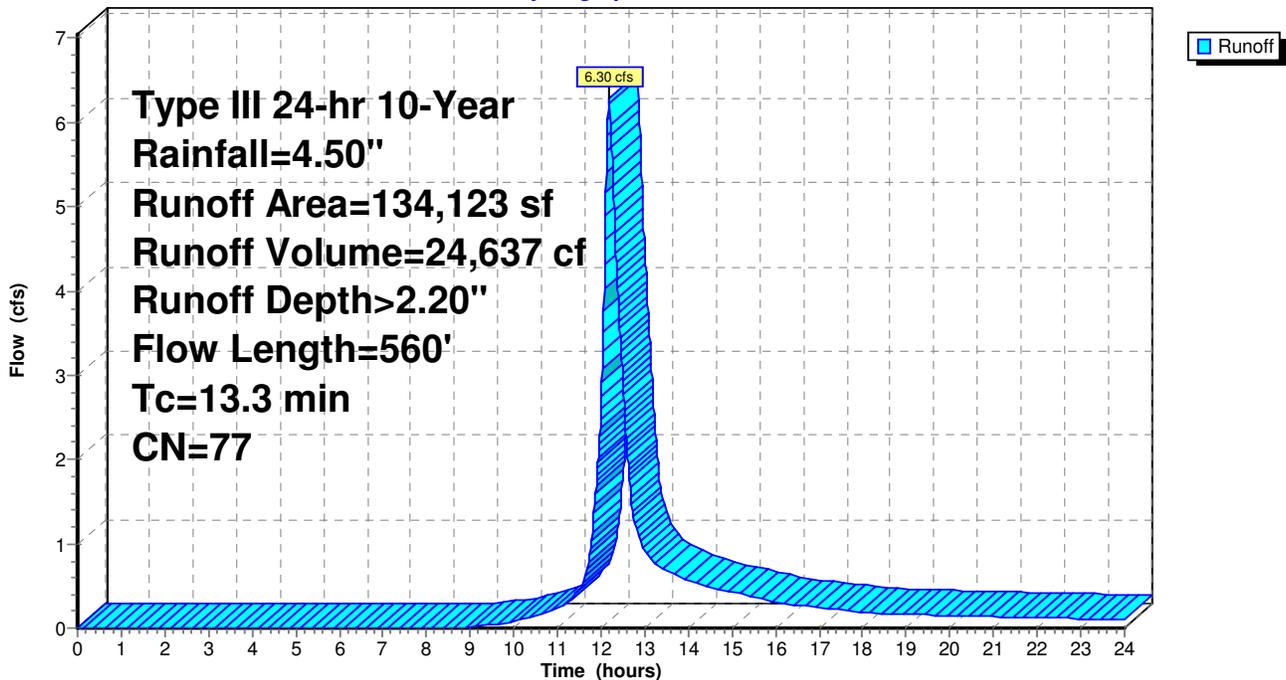
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 200: Middle Site

Runoff = 4.69 cfs @ 12.17 hrs, Volume= 17,790 cf, Depth> 2.72"

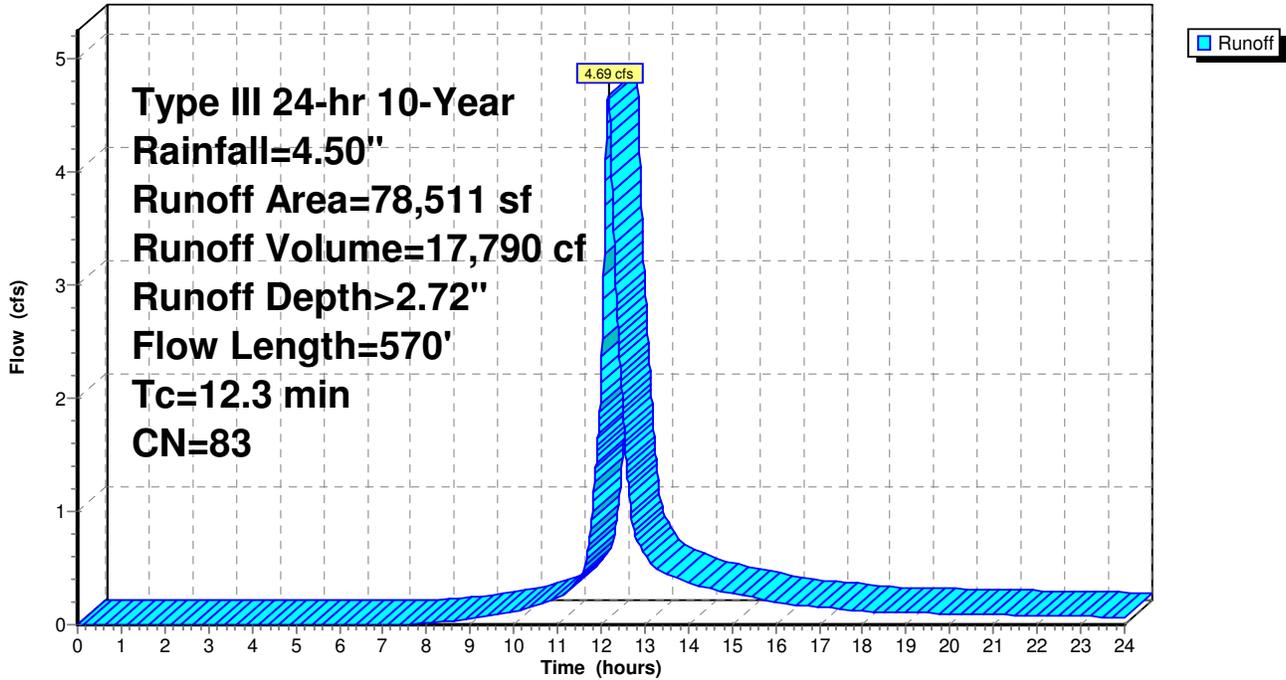
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Runoff = 3.14 cfs @ 12.20 hrs, Volume= 12,589 cf, Depth> 2.20"

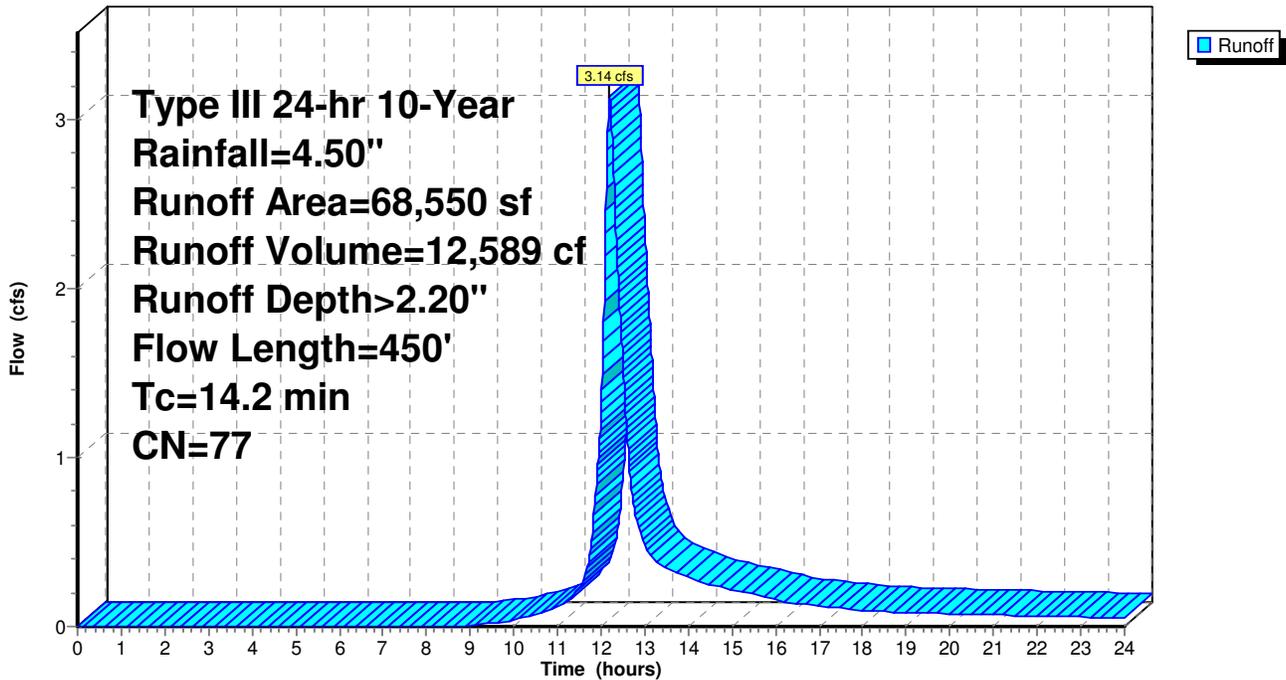
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.49 cfs @ 12.19 hrs, Volume= 1,957 cf, Depth> 1.67"

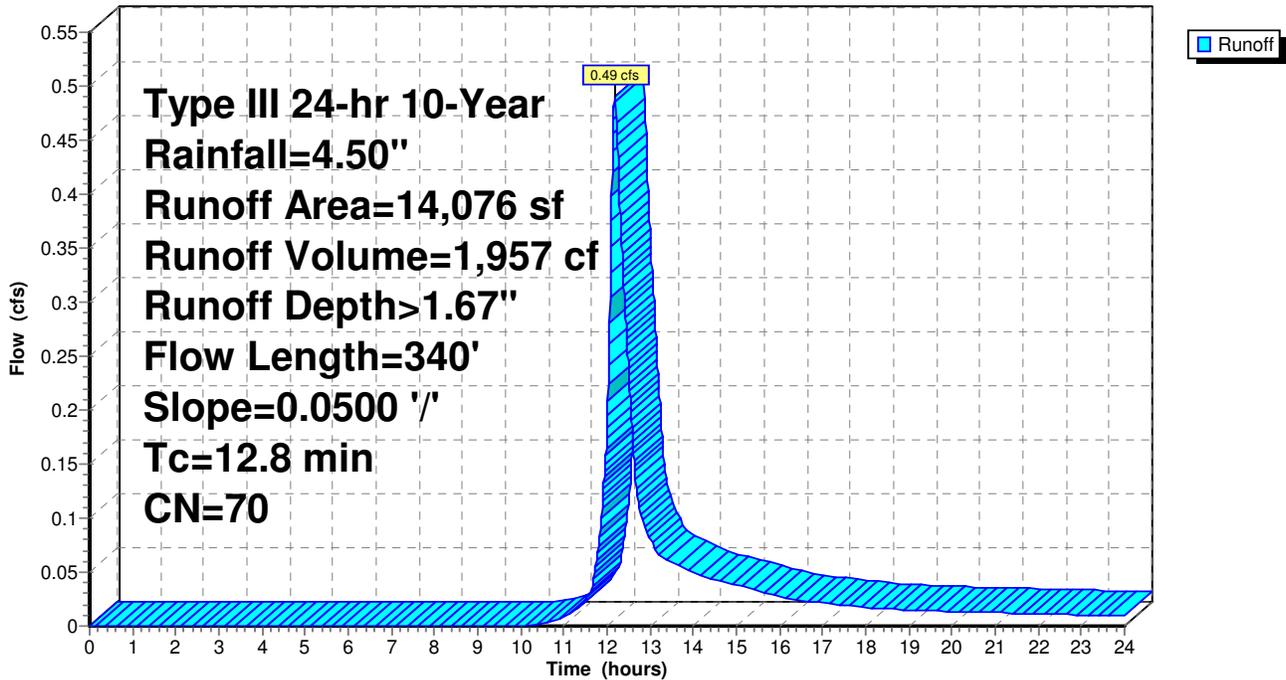
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 2.41" for 10-Year event
Inflow = 8.27 cfs @ 12.18 hrs, Volume= 32,337 cf
Outflow = 8.16 cfs @ 12.20 hrs, Volume= 32,287 cf, Atten= 1%, Lag= 1.3 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.67 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 5.7 min

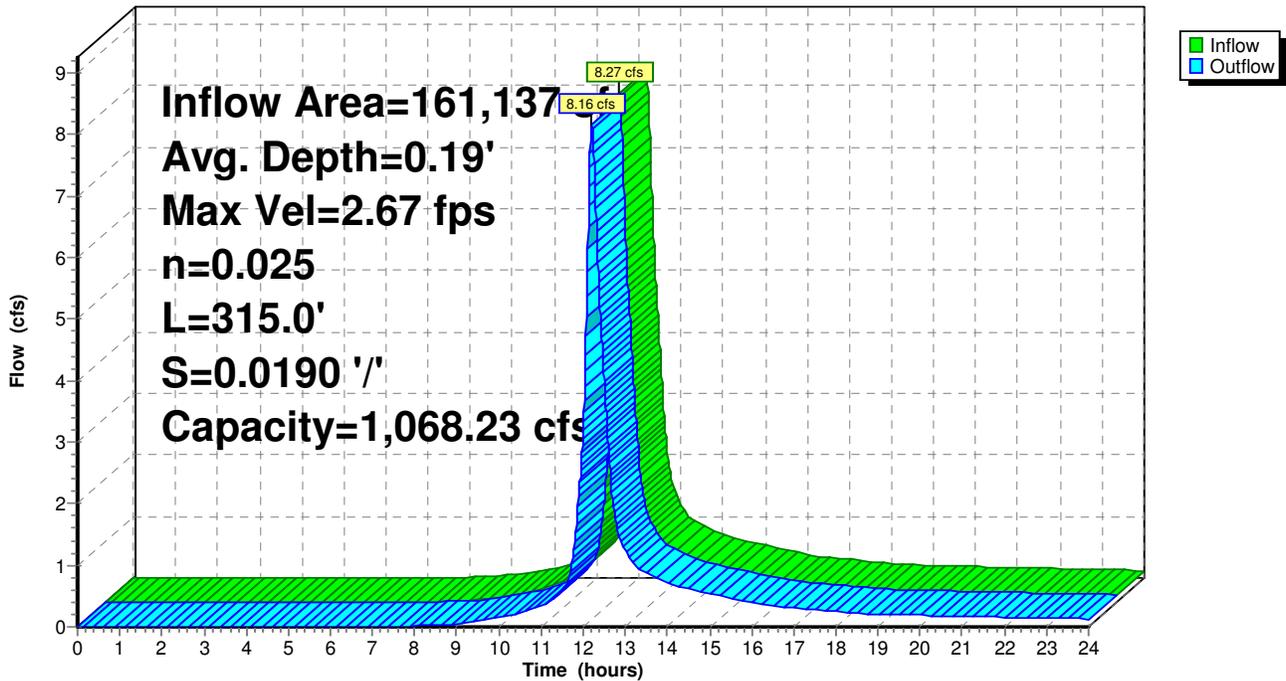
Peak Storage= 964 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 39.00'
Length= 315.0' Slope= 0.0190 '/'
Inlet Invert= 94.00', Outlet Invert= 88.00'



Reach 101R: Top Reach

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Reach 102R: Bottom Reach

[61] Hint: Submerged 4% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 2.31" for 10-Year event
Inflow = 14.43 cfs @ 12.19 hrs, Volume= 56,924 cf
Outflow = 14.42 cfs @ 12.20 hrs, Volume= 56,903 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.06 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.63 fps, Avg. Travel Time= 1.2 min

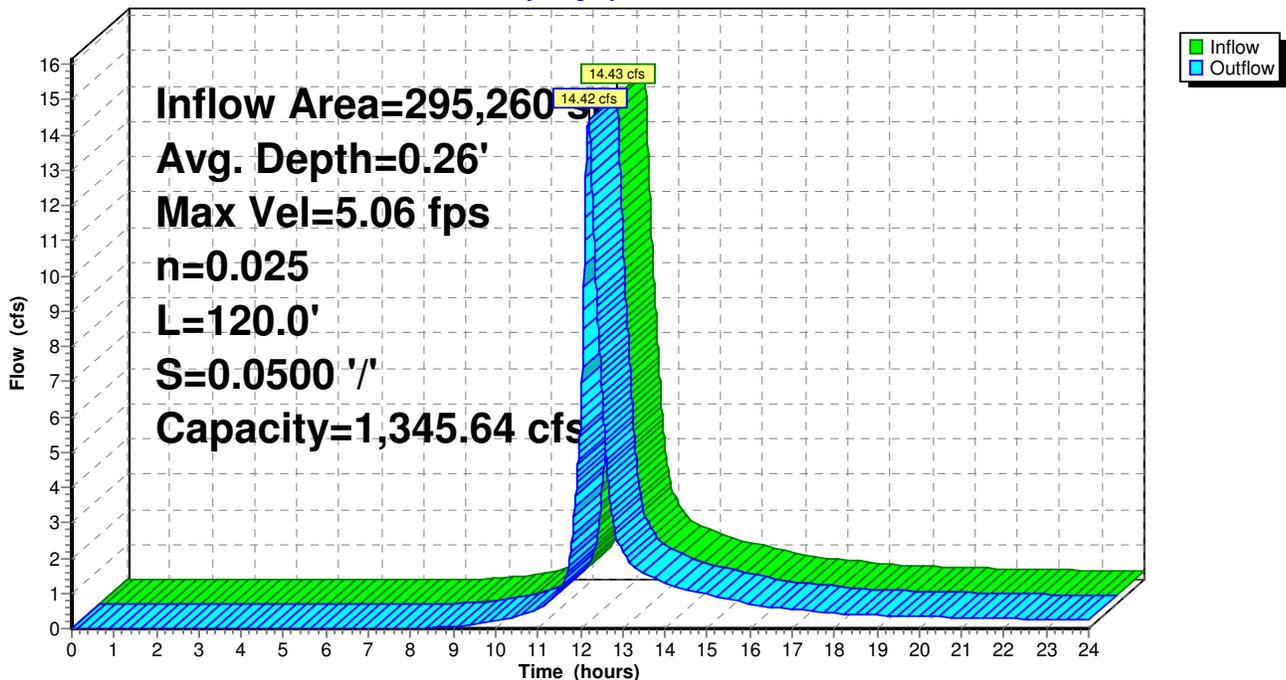
Peak Storage= 342 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 34.00'
Length= 120.0' Slope= 0.0500 '/'
Inlet Invert= 88.00', Outlet Invert= 82.00'



Reach 102R: Bottom Reach

Hydrograph



Reach 901R: (new Reach)

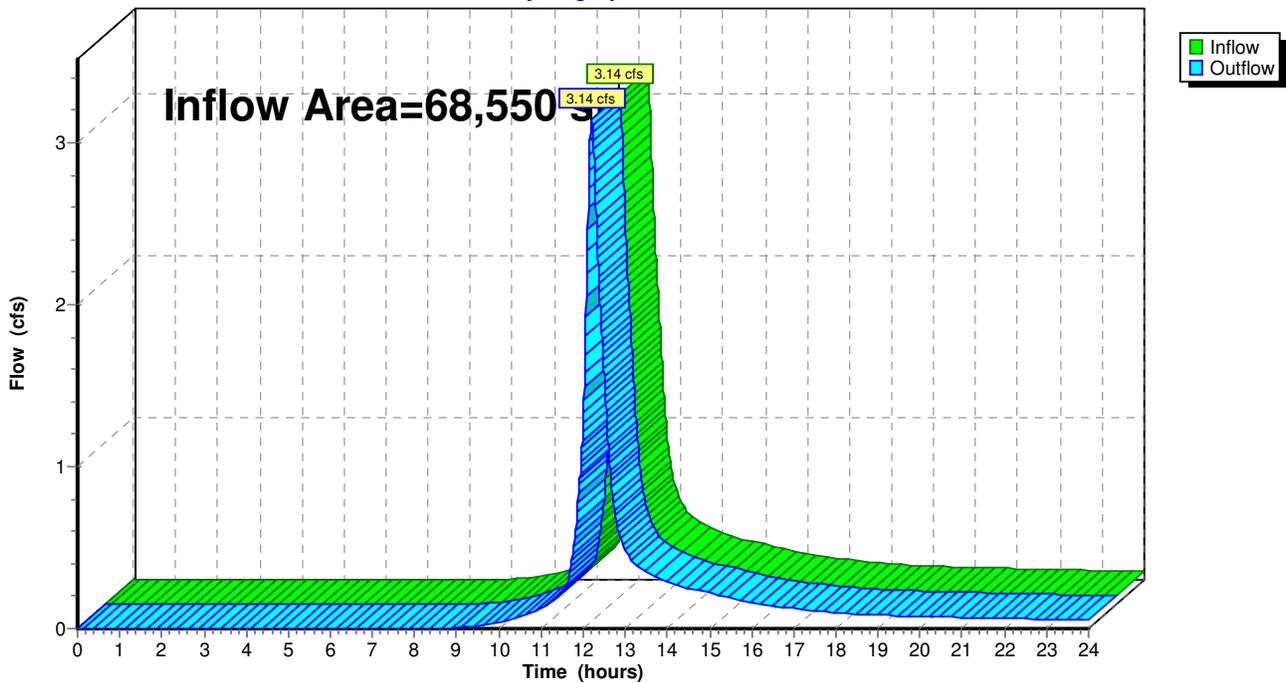
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 68,550 sf, Inflow Depth > 2.20" for 10-Year event
Inflow = 3.14 cfs @ 12.20 hrs, Volume= 12,589 cf
Outflow = 3.14 cfs @ 12.20 hrs, Volume= 12,589 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)

Hydrograph



Reach 902R: (new Reach)

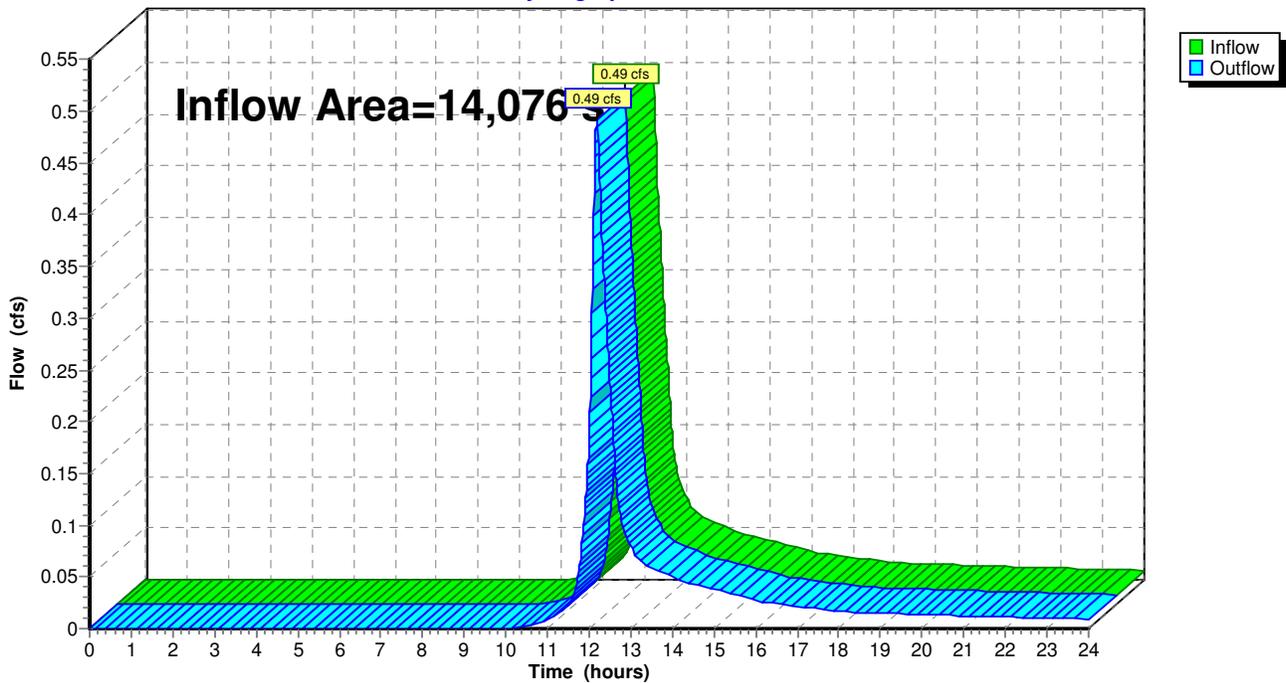
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 1.67" for 10-Year event
Inflow = 0.49 cfs @ 12.19 hrs, Volume= 1,957 cf
Outflow = 0.49 cfs @ 12.19 hrs, Volume= 1,957 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)

Hydrograph



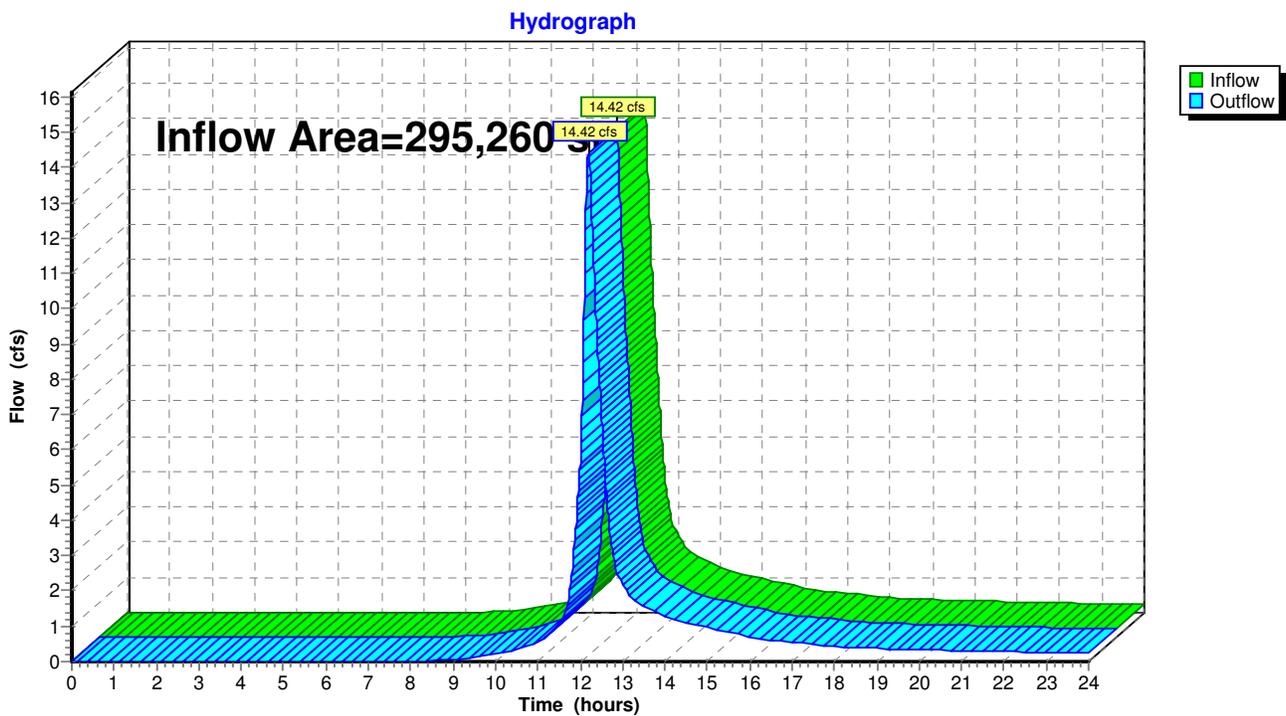
Reach PTA: Point of Analysis (Edge of Prop. Line)

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

Inflow Area = 295,260 sf, Inflow Depth > 2.31" for 10-Year event
Inflow = 14.42 cfs @ 12.20 hrs, Volume= 56,903 cf
Outflow = 14.42 cfs @ 12.20 hrs, Volume= 56,903 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach PTA: Point of Analysis (Edge of Prop. Line)



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Type III 24-hr 25-Year Rainfall=5.30"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

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

Subcatchment 100: Southern Portion of Site

Runoff Area=134,123 sf Runoff Depth>2.87"

Flow Length=560' Tc=13.3 min CN=77 Runoff=8.22 cfs 32,056 cf

Subcatchment 200: Middle Site

Runoff Area=78,511 sf Runoff Depth>3.44"

Flow Length=570' Tc=12.3 min CN=83 Runoff=5.90 cfs 22,500 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offsi

Runoff Area=68,550 sf Runoff Depth>2.87"

Flow Length=450' Tc=14.2 min CN=77 Runoff=4.10 cfs 16,381 cf

Subcatchment 900: North Offsite flowing onto property

Runoff Area=14,076 sf Runoff Depth>2.25"

Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.68 cfs 2,645 cf

Reach 101R: Top Reach

Avg. Depth=0.23' Max Vel=2.93 fps Inflow=10.62 cfs 41,526 cf

n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=10.50 cfs 41,465 cf

Reach 102R: Bottom Reach

Avg. Depth=0.30' Max Vel=5.55 fps Inflow=18.70 cfs 73,521 cf

n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=18.69 cfs 73,495 cf

Reach 901R: (new Reach)

Inflow=4.10 cfs 16,381 cf

Outflow=4.10 cfs 16,381 cf

Reach 902R: (new Reach)

Inflow=0.68 cfs 2,645 cf

Outflow=0.68 cfs 2,645 cf

Reach PTA: Point of Analysis (Edge of Prop. Line)

Inflow=18.69 cfs 73,495 cf

Outflow=18.69 cfs 73,495 cf

Total Runoff Area = 295,260 sf Runoff Volume = 73,582 cf Average Runoff Depth = 2.99"**92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf**

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 100: Southern Portion of Site

Runoff = 8.22 cfs @ 12.19 hrs, Volume= 32,056 cf, Depth> 2.87"

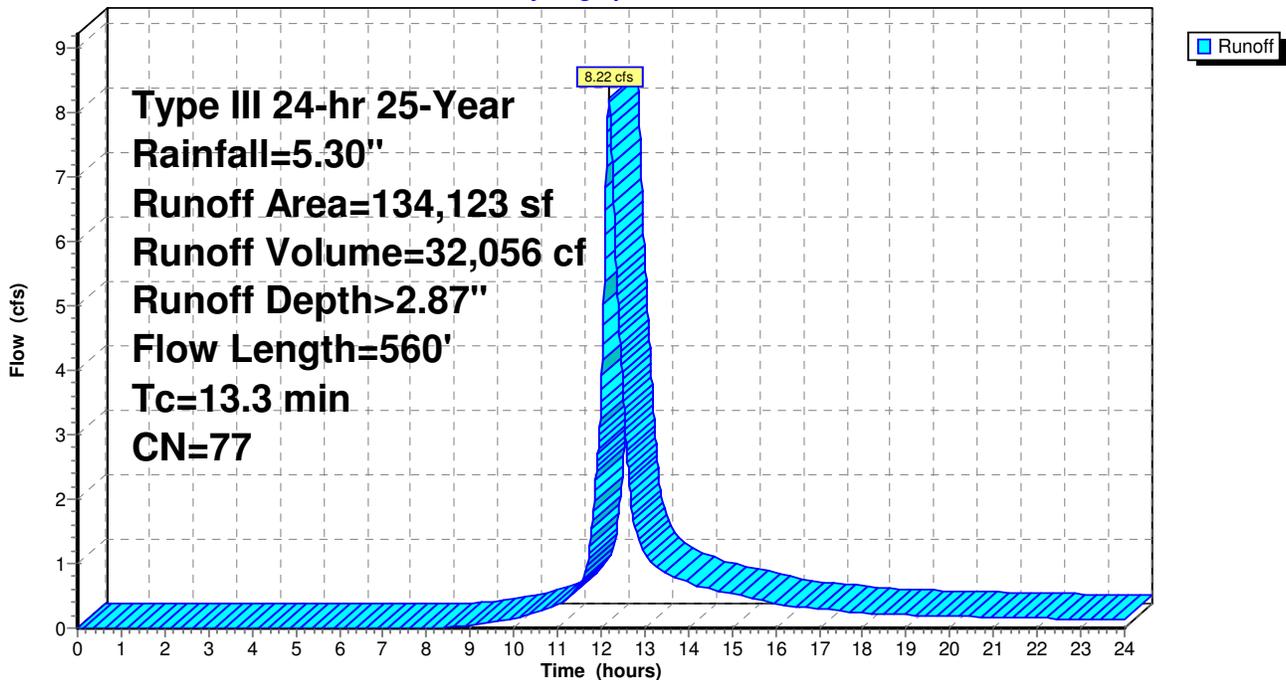
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 200: Middle Site

Runoff = 5.90 cfs @ 12.17 hrs, Volume= 22,500 cf, Depth> 3.44"

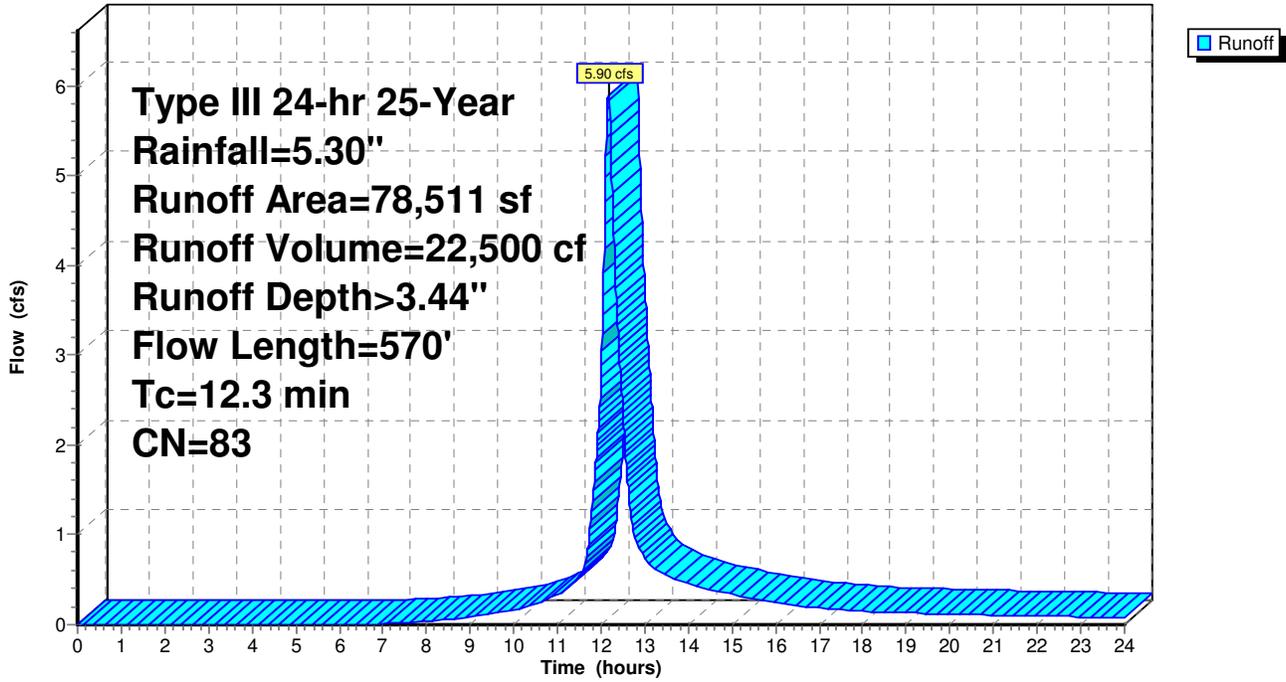
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Runoff = 4.10 cfs @ 12.20 hrs, Volume= 16,381 cf, Depth> 2.87"

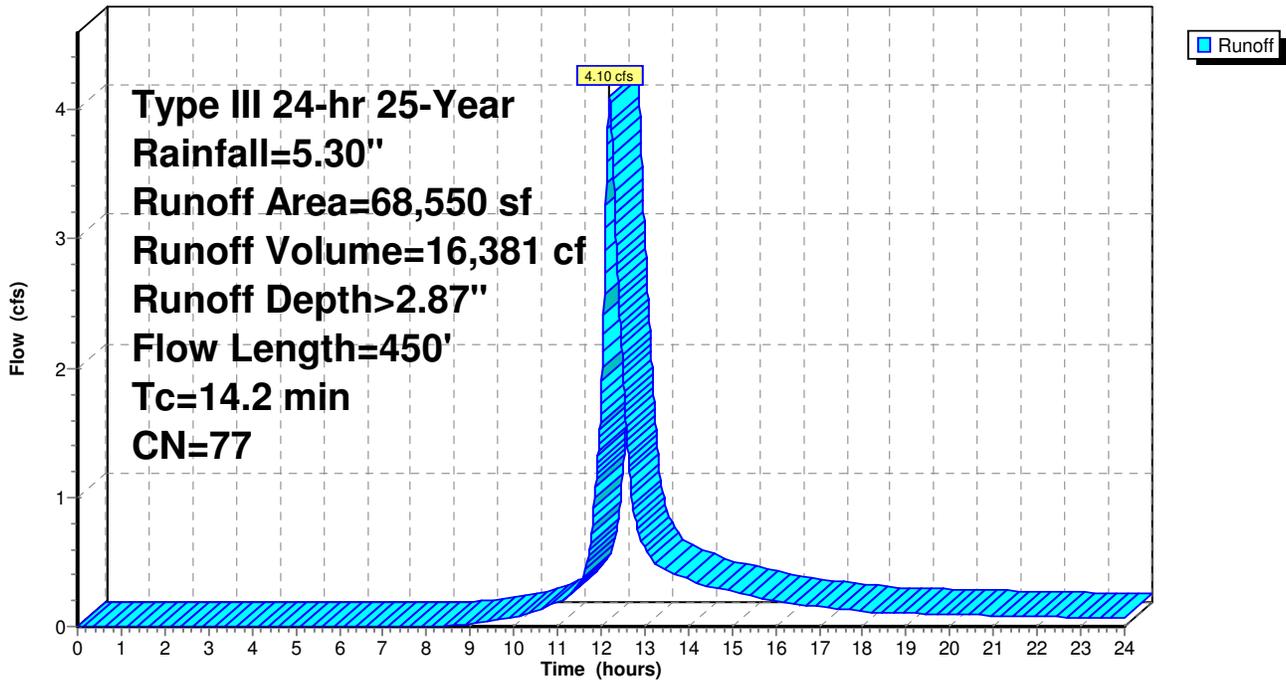
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.68 cfs @ 12.18 hrs, Volume= 2,645 cf, Depth> 2.25"

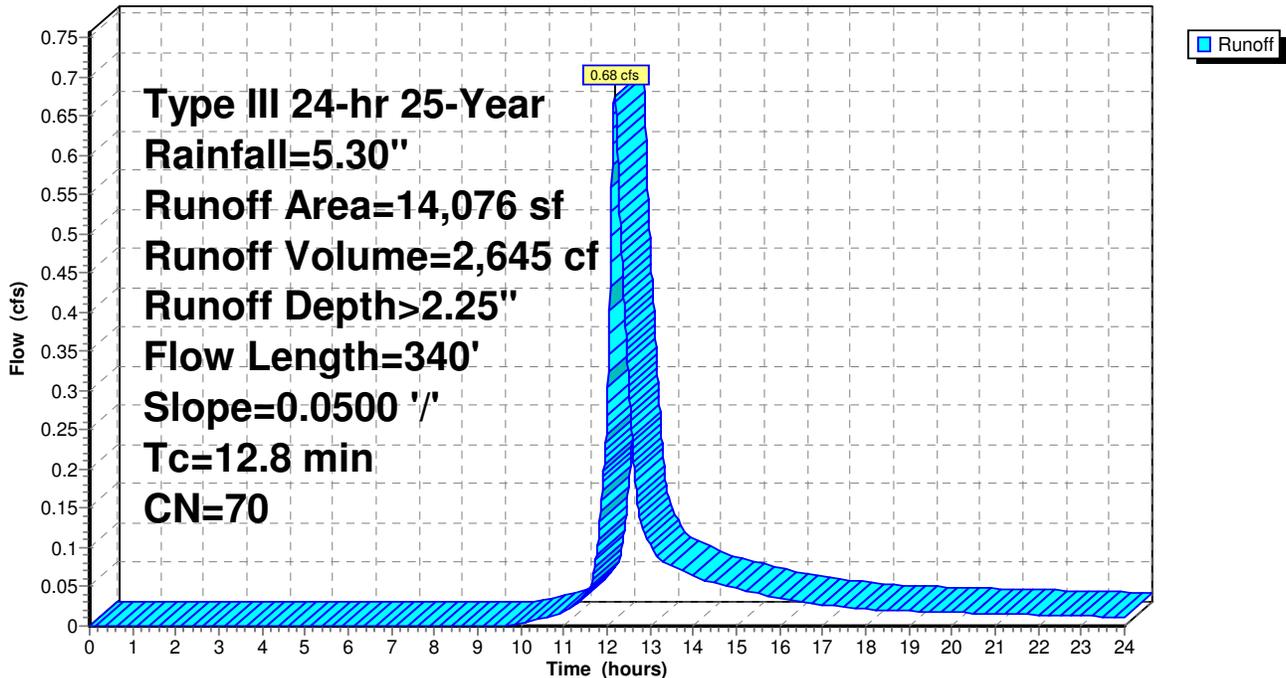
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 25-Year Rainfall=5.30"

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Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 3.09" for 25-Year event
Inflow = 10.62 cfs @ 12.18 hrs, Volume= 41,526 cf
Outflow = 10.50 cfs @ 12.20 hrs, Volume= 41,465 cf, Atten= 1%, Lag= 1.2 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 5.5 min

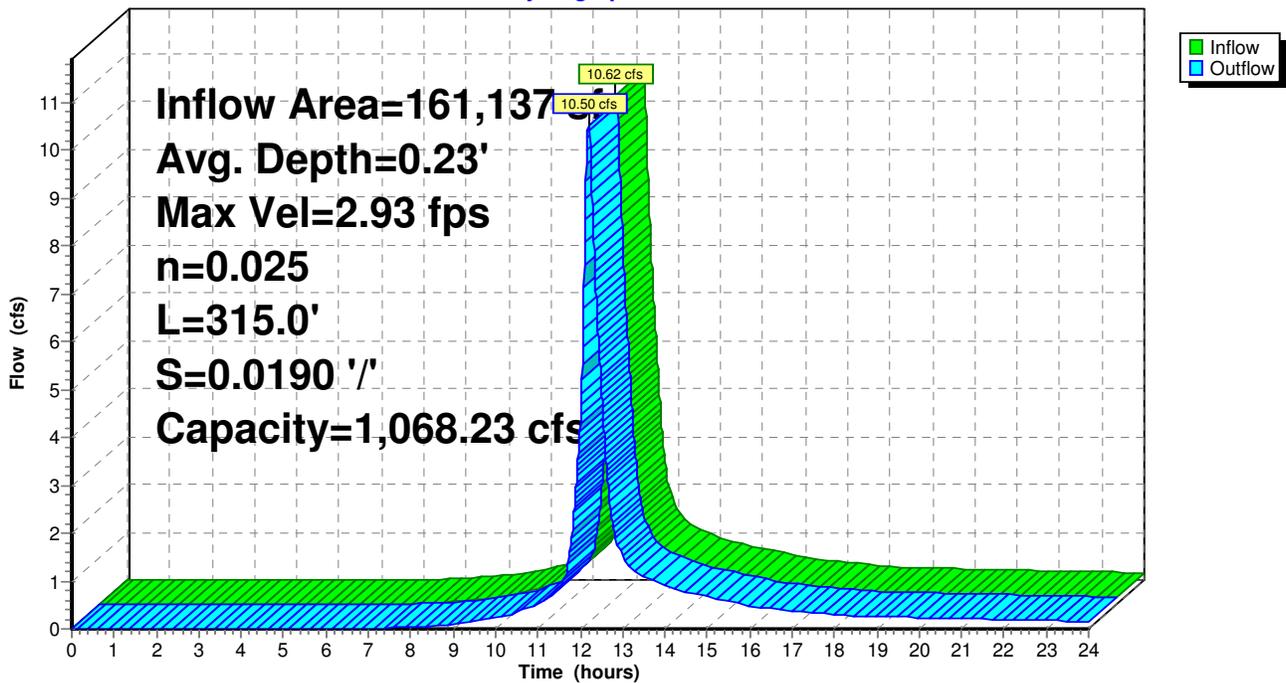
Peak Storage= 1,129 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 39.00'
Length= 315.0' Slope= 0.0190 '/'
Inlet Invert= 94.00', Outlet Invert= 88.00'



Reach 101R: Top Reach

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 25-Year Rainfall=5.30"

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Reach 102R: Bottom Reach

[61] Hint: Submerged 5% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 2.99" for 25-Year event
 Inflow = 18.70 cfs @ 12.19 hrs, Volume= 73,521 cf
 Outflow = 18.69 cfs @ 12.20 hrs, Volume= 73,495 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.55 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 1.72 fps, Avg. Travel Time= 1.2 min

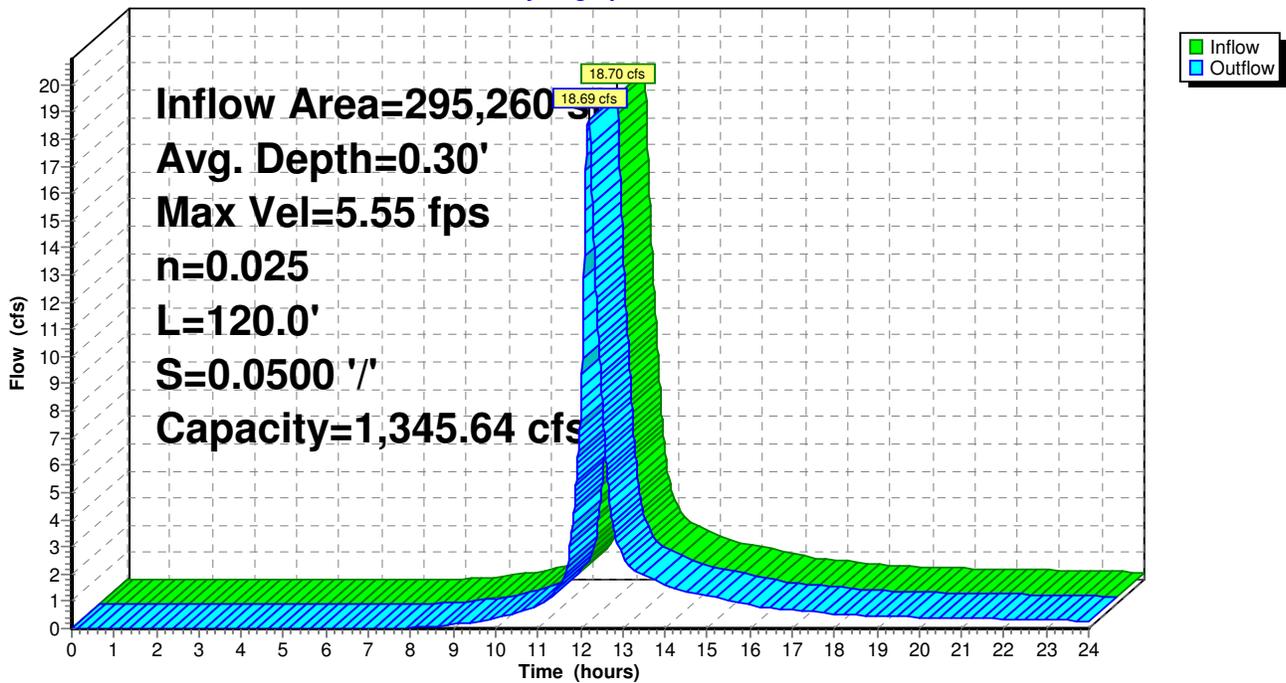
Peak Storage= 404 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.30'
 Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
 Side Slope Z-value= 4.0 '/' Top Width= 34.00'
 Length= 120.0' Slope= 0.0500 '/'
 Inlet Invert= 88.00', Outlet Invert= 82.00'



Reach 102R: Bottom Reach

Hydrograph



Reach 901R: (new Reach)

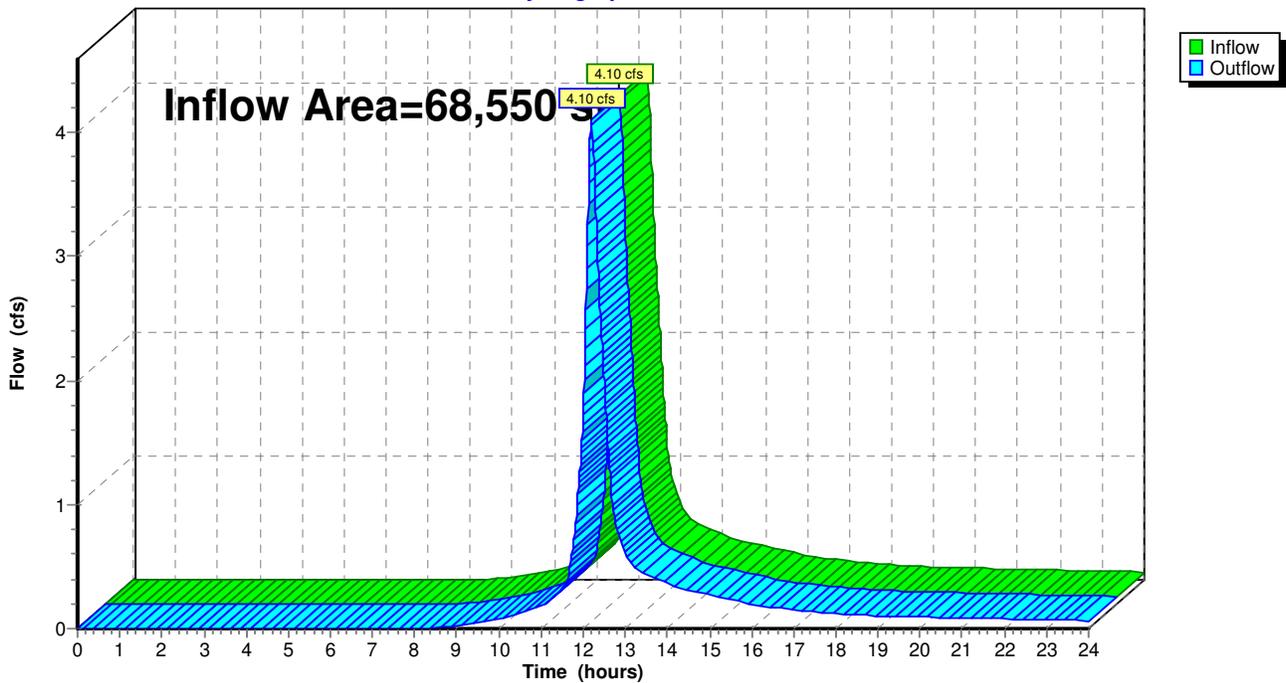
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 68,550 sf, Inflow Depth > 2.87" for 25-Year event
Inflow = 4.10 cfs @ 12.20 hrs, Volume= 16,381 cf
Outflow = 4.10 cfs @ 12.20 hrs, Volume= 16,381 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)

Hydrograph



Reach 902R: (new Reach)

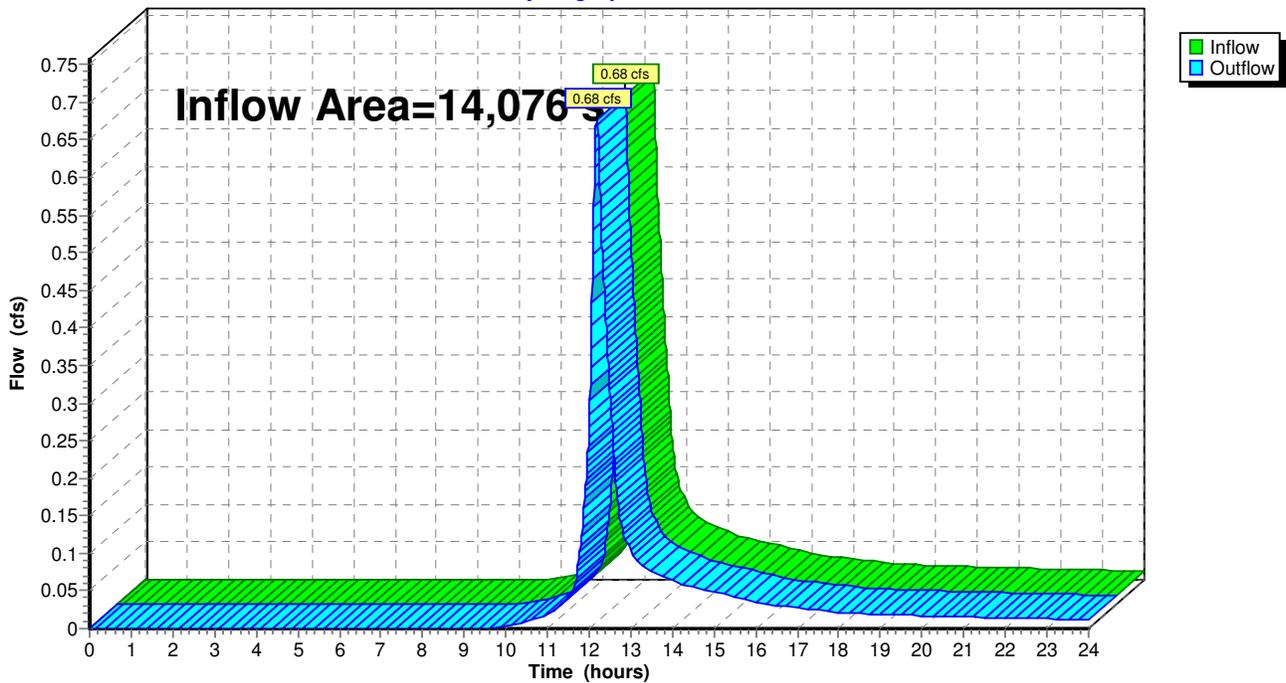
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 2.25" for 25-Year event
Inflow = 0.68 cfs @ 12.18 hrs, Volume= 2,645 cf
Outflow = 0.68 cfs @ 12.18 hrs, Volume= 2,645 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)

Hydrograph



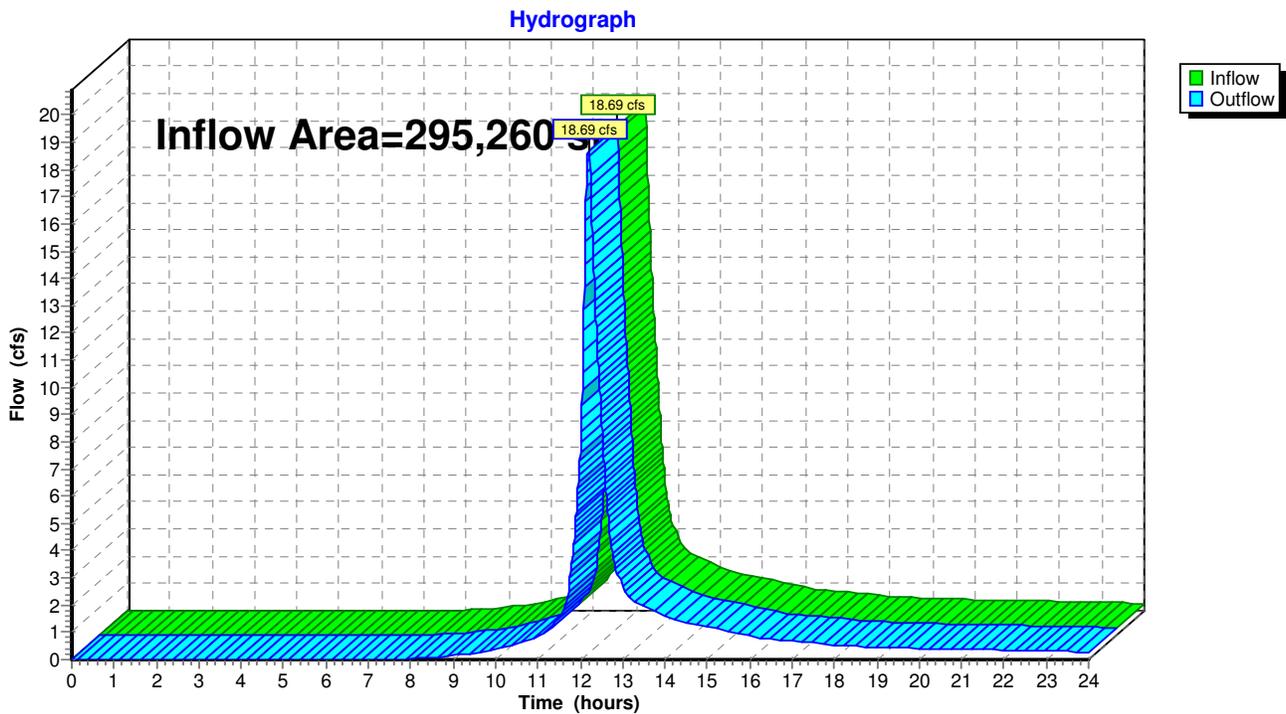
Reach PTA: Point of Analysis (Edge of Prop. Line)

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

Inflow Area = 295,260 sf, Inflow Depth > 2.99" for 25-Year event
Inflow = 18.69 cfs @ 12.20 hrs, Volume= 73,495 cf
Outflow = 18.69 cfs @ 12.20 hrs, Volume= 73,495 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach PTA: Point of Analysis (Edge of Prop. Line)



2066 Predevelopment_4c

Type III 24-hr 100-Year Rainfall=6.50"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 100: Southern Portion of Site Runoff Area=134,123 sf Runoff Depth>3.91"
 Flow Length=560' Tc=13.3 min CN=77 Runoff=11.19 cfs 43,694 cf

Subcatchment 200: Middle Site Runoff Area=78,511 sf Runoff Depth>4.55"
 Flow Length=570' Tc=12.3 min CN=83 Runoff=7.74 cfs 29,755 cf

Subcatchment 300: Northwestern Portion of Site (Flows Offsi Runoff Area=68,550 sf Runoff Depth>3.91"
 Flow Length=450' Tc=14.2 min CN=77 Runoff=5.59 cfs 22,328 cf

Subcatchment 900: North Offsite flowing onto property Runoff Area=14,076 sf Runoff Depth>3.20"
 Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.97 cfs 3,752 cf

Reach 101R: Top Reach Avg. Depth=0.27' Max Vel=3.26 fps Inflow=14.23 cfs 55,834 cf
 n=0.025 L=315.0' S=0.0190 '/' Capacity=1,068.23 cfs Outflow=14.09 cfs 55,757 cf

Reach 102R: Bottom Reach Avg. Depth=0.36' Max Vel=6.17 fps Inflow=25.27 cfs 99,450 cf
 n=0.025 L=120.0' S=0.0500 '/' Capacity=1,345.64 cfs Outflow=25.25 cfs 99,417 cf

Reach 901R: (new Reach) Inflow=5.59 cfs 22,328 cf
 Outflow=5.59 cfs 22,328 cf

Reach 902R: (new Reach) Inflow=0.97 cfs 3,752 cf
 Outflow=0.97 cfs 3,752 cf

Reach PTA: Point of Analysis (Edge of Prop. Line) Inflow=25.25 cfs 99,417 cf
 Outflow=25.25 cfs 99,417 cf

Total Runoff Area = 295,260 sf Runoff Volume = 99,528 cf Average Runoff Depth = 4.05"
92.92% Pervious Area = 274,351 sf 7.08% Impervious Area = 20,909 sf

2066 Predevelopment_4c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 100: Southern Portion of Site

Runoff = 11.19 cfs @ 12.18 hrs, Volume= 43,694 cf, Depth> 3.91"

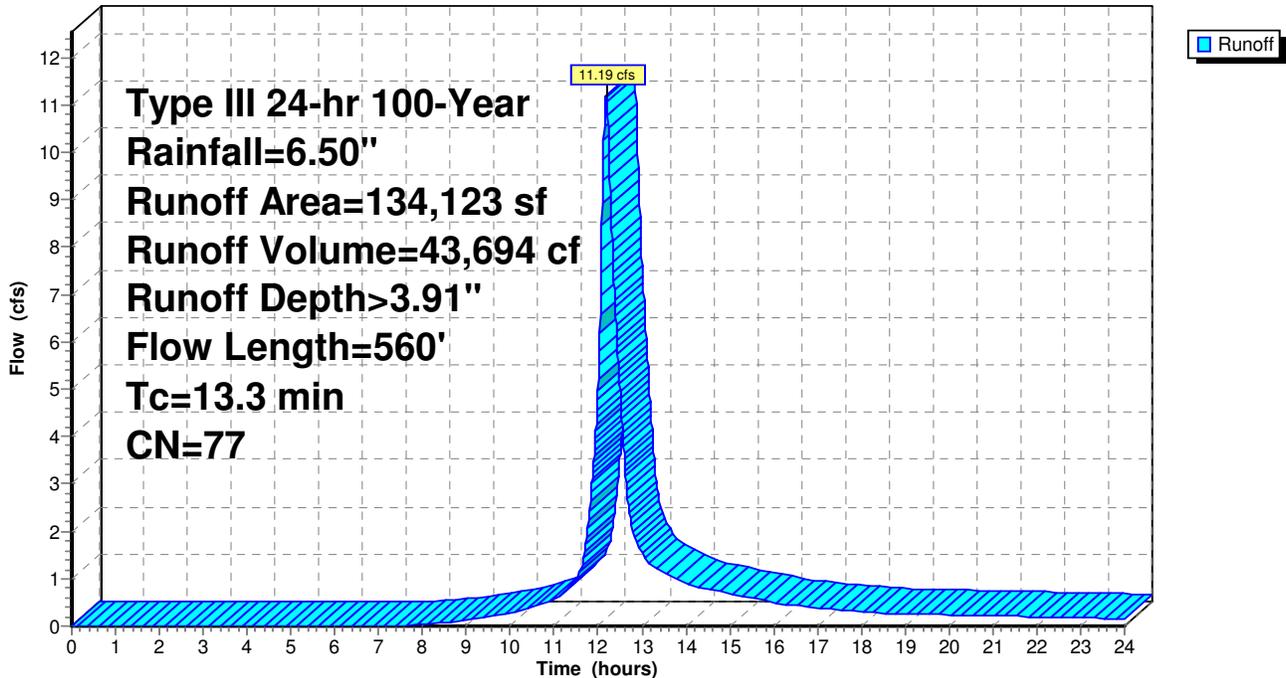
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
16,512	98	Paved parking & roofs
81,239	70	Woods, Good, HSG C
17,903	74	>75% Grass cover, Good, HSG C
18,469	91	Fallow, bare soil, HSG C
134,123	77	Weighted Average
117,611		Pervious Area
16,512		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.6	340	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	170	0.2100	2.29		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.3	560	Total			

Subcatchment 100: Southern Portion of Site

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 200: Middle Site

Runoff = 7.74 cfs @ 12.17 hrs, Volume= 29,755 cf, Depth> 4.55"

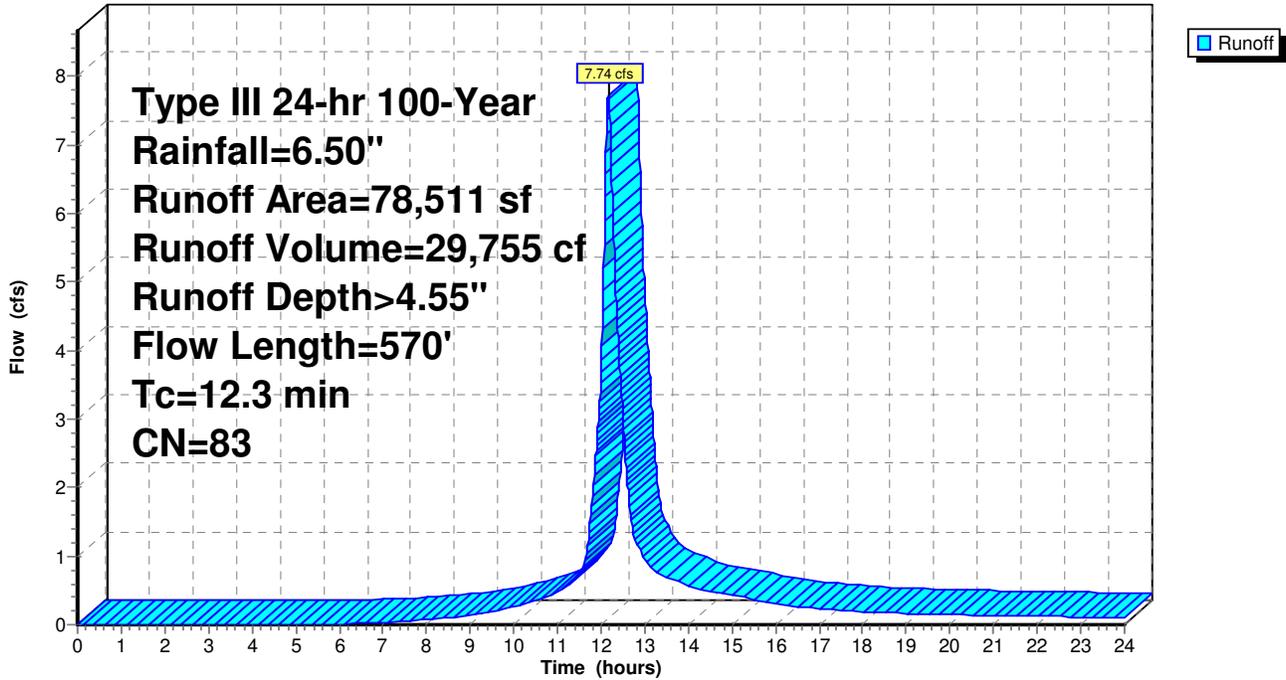
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,397	98	Paved parking & roofs
31,363	70	Woods, Good, HSG C
38,590	91	Fallow, bare soil, HSG C
4,161	89	Gravel roads, HSG C
78,511	83	Weighted Average
74,114		Pervious Area
4,397		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.3	260	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.9	120	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	140	0.0900	1.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.3	570	Total			

Subcatchment 200: Middle Site

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Runoff = 5.59 cfs @ 12.19 hrs, Volume= 22,328 cf, Depth> 3.91"

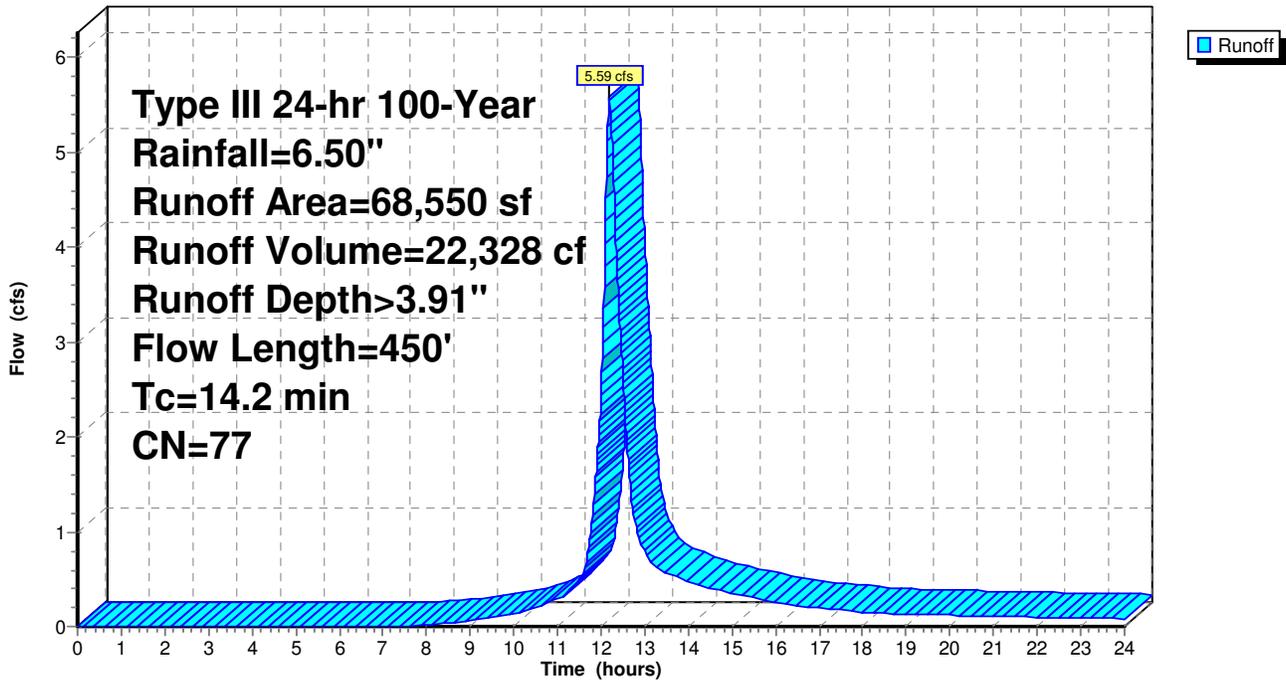
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
16,553	70	Woods, Good, HSG C
34,137	74	>75% Grass cover, Good, HSG C
17,860	91	Fallow, bare soil, HSG C
68,550	77	Weighted Average
68,550		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	200	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.4	200	0.1100	2.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
14.2	450	Total			

Subcatchment 300: Northwestern Portion of Site (Flows Offsite)

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.97 cfs @ 12.18 hrs, Volume= 3,752 cf, Depth> 3.20"

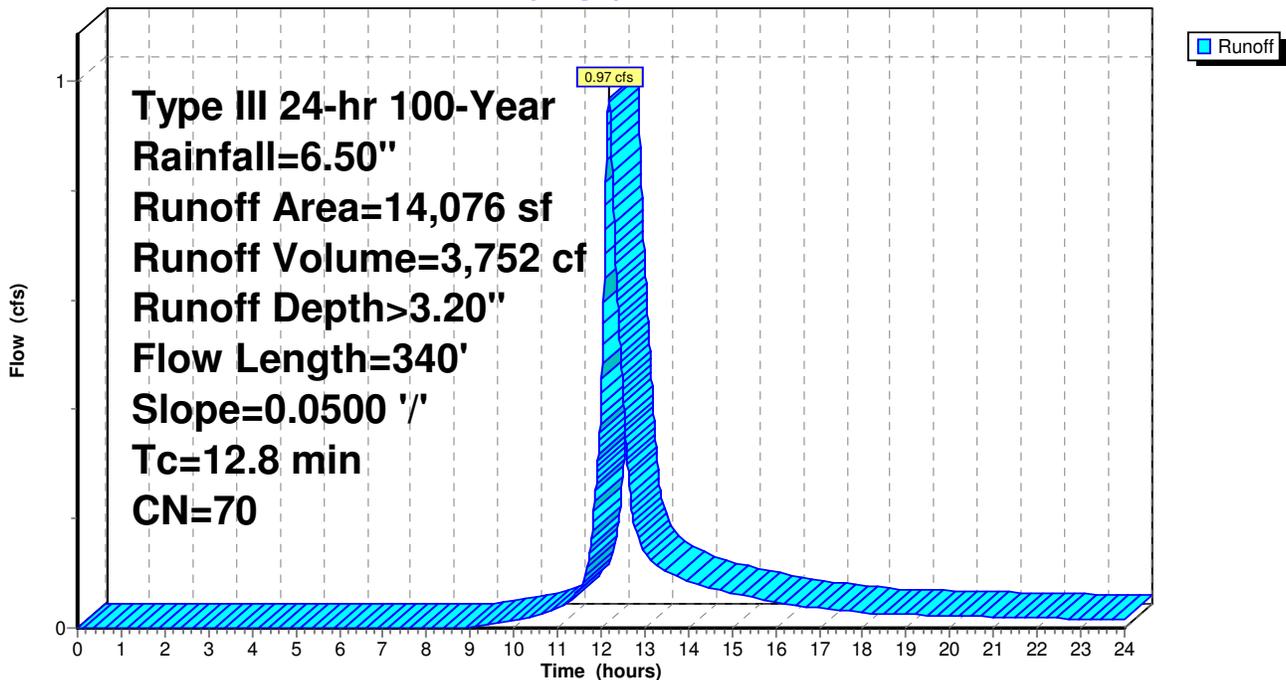
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



2066 Predevelopment_4c

Type III 24-hr 100-Year Rainfall=6.50"

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Reach 101R: Top Reach

Inflow Area = 161,137 sf, Inflow Depth > 4.16" for 100-Year event
 Inflow = 14.23 cfs @ 12.18 hrs, Volume= 55,834 cf
 Outflow = 14.09 cfs @ 12.19 hrs, Volume= 55,757 cf, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.26 fps, Min. Travel Time= 1.6 min
 Avg. Velocity = 1.00 fps, Avg. Travel Time= 5.2 min

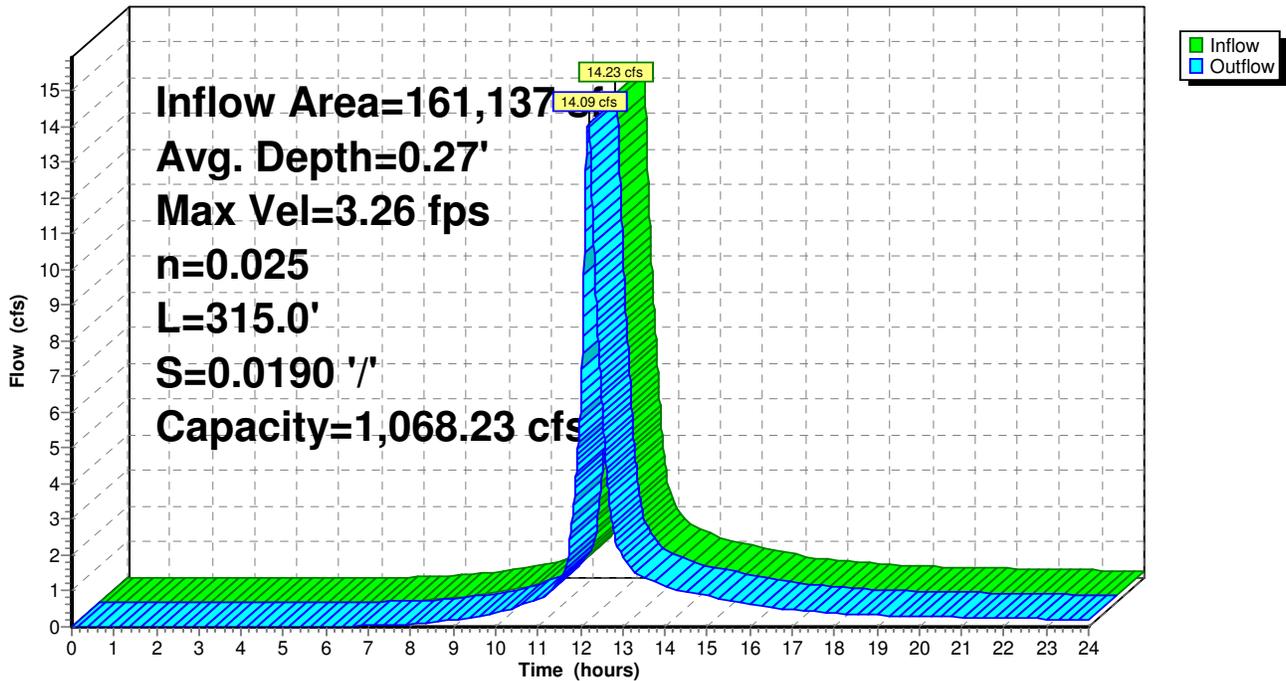
Peak Storage= 1,360 cf @ 12.19 hrs, Average Depth at Peak Storage= 0.27'
 Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,068.23 cfs

15.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
 Side Slope Z-value= 4.0 '/' Top Width= 39.00'
 Length= 315.0' Slope= 0.0190 '/'
 Inlet Invert= 94.00', Outlet Invert= 88.00'



Reach 101R: Top Reach

Hydrograph



Reach 102R: Bottom Reach

[61] Hint: Submerged 6% of Reach 101R bottom

Inflow Area = 295,260 sf, Inflow Depth > 4.04" for 100-Year event
 Inflow = 25.27 cfs @ 12.19 hrs, Volume= 99,450 cf
 Outflow = 25.25 cfs @ 12.19 hrs, Volume= 99,417 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.17 fps, Min. Travel Time= 0.3 min
 Avg. Velocity = 1.86 fps, Avg. Travel Time= 1.1 min

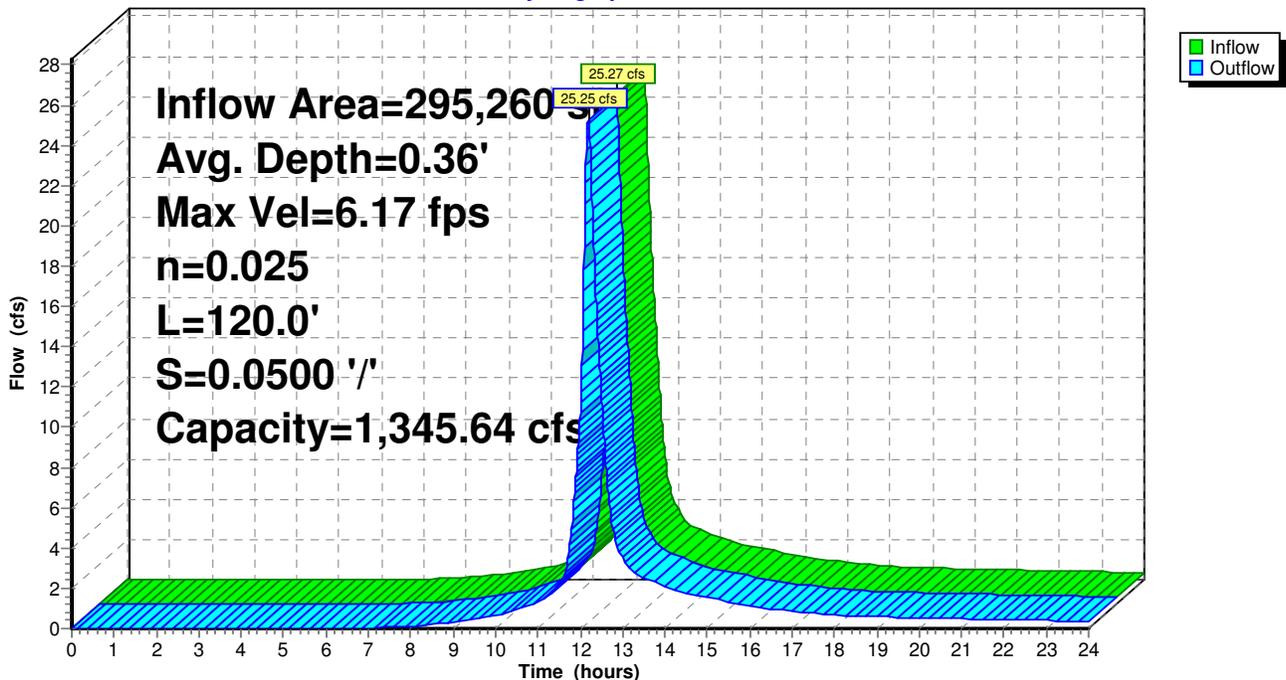
Peak Storage= 491 cf @ 12.19 hrs, Average Depth at Peak Storage= 0.36'
 Bank-Full Depth= 3.00', Capacity at Bank-Full= 1,345.64 cfs

10.00' x 3.00' deep channel, n= 0.025 Earth, clean & winding
 Side Slope Z-value= 4.0 '/' Top Width= 34.00'
 Length= 120.0' Slope= 0.0500 '/'
 Inlet Invert= 88.00', Outlet Invert= 82.00'



Reach 102R: Bottom Reach

Hydrograph



Reach 901R: (new Reach)

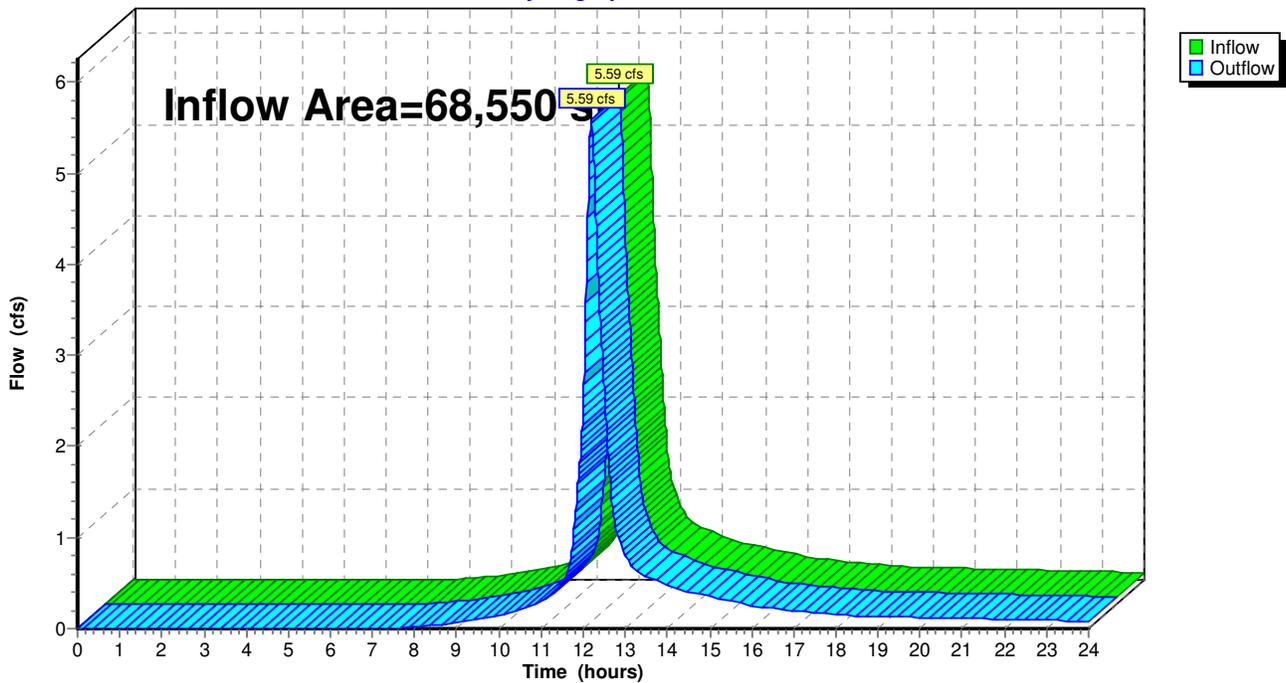
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 68,550 sf, Inflow Depth > 3.91" for 100-Year event
Inflow = 5.59 cfs @ 12.19 hrs, Volume= 22,328 cf
Outflow = 5.59 cfs @ 12.19 hrs, Volume= 22,328 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 901R: (new Reach)

Hydrograph



Reach 902R: (new Reach)

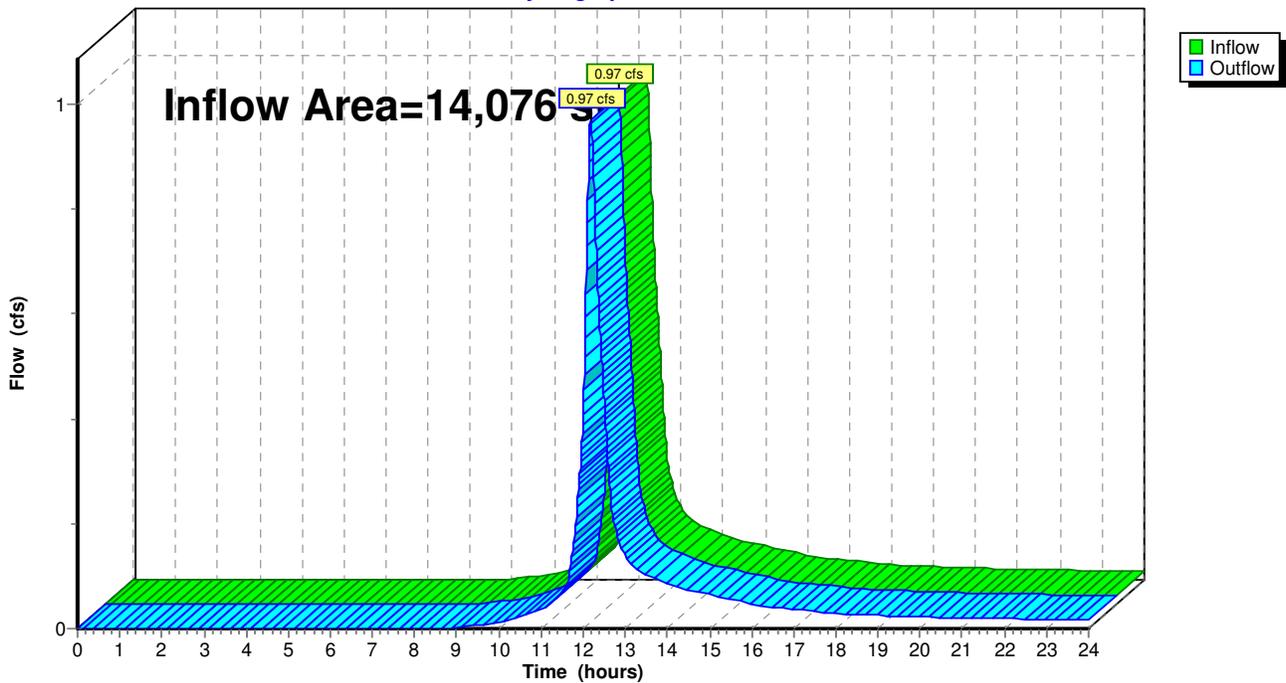
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14,076 sf, Inflow Depth > 3.20" for 100-Year event
Inflow = 0.97 cfs @ 12.18 hrs, Volume= 3,752 cf
Outflow = 0.97 cfs @ 12.18 hrs, Volume= 3,752 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 902R: (new Reach)

Hydrograph



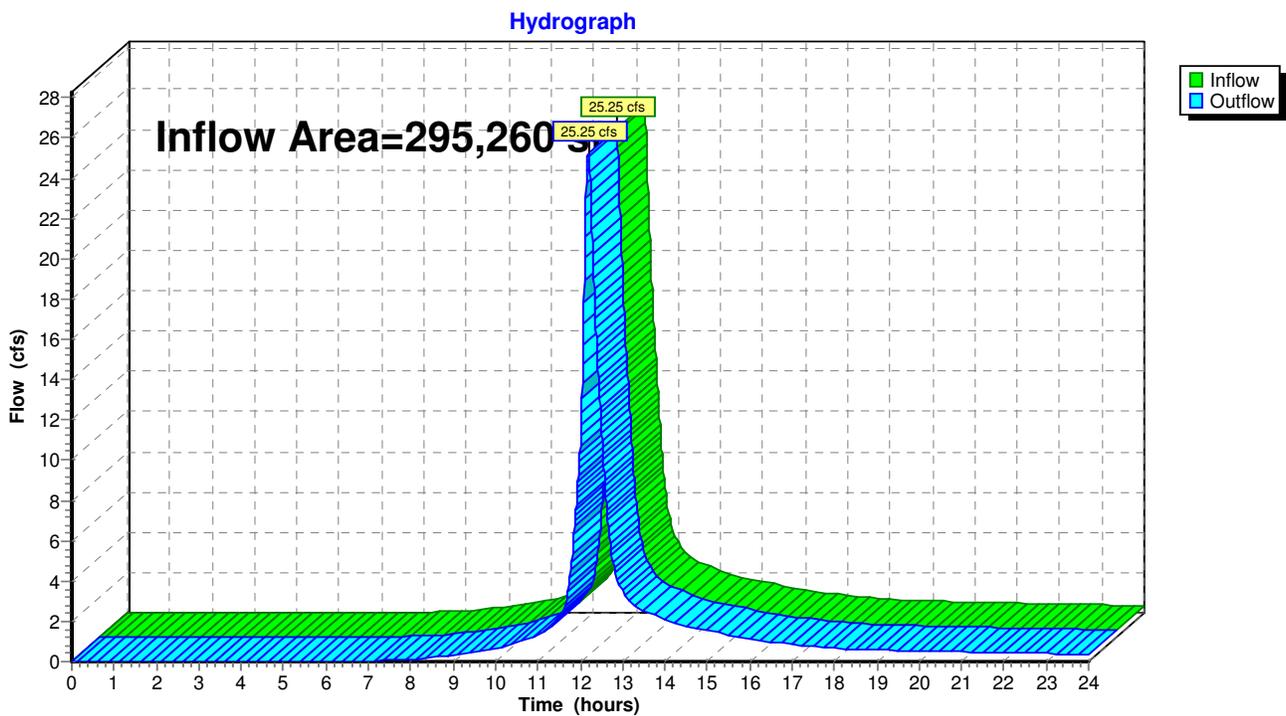
Reach PTA: Point of Analysis (Edge of Prop. Line)

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

Inflow Area = 295,260 sf, Inflow Depth > 4.04" for 100-Year event
Inflow = 25.25 cfs @ 12.19 hrs, Volume= 99,417 cf
Outflow = 25.25 cfs @ 12.19 hrs, Volume= 99,417 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach PTA: Point of Analysis (Edge of Prop. Line)



MEISNER BREM CORPORATION

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THE BIRCHES

*STORMWATER MANAGEMENT REPORT – VOLUME 2 OF 2
A 40B RESIDENTIAL PROJECT OFF LONG RIDGE ROAD, CARLISLE, MA*

HydroCAD Printouts

Post Development

Storm Frequency: 2, 10, 25, 100 Year

Postdevelopment10c

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Area Listing (all nodes)

<u>Area (sq-ft)</u>	<u>CN</u>	<u>Description (subcats)</u>
21,776	70	Woods, Good, HSG C (62S,136S,140S,900)
192,414	74	>75% Grass cover, Good, HSG C (54S,56S,60S,62S,65S,68S,110S,112S,114S,116S,118S,
81,070	98	Paved parking & roofs (54S,54S,56S,56S,60S,60S,62S,62S,65S,65S,68S,68S,110S,110S,1
<hr/>		
295,260		

Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

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

Subcatchment 54S: CB at Cul-de-Sac - Outside Runoff Area=20,970 sf Runoff Depth>1.38"
Flow Length=200' Tc=5.0 min CN=82 Runoff=0.80 cfs 2,407 cf

Subcatchment 56S: CB at Cul-de-Sac - Inside Runoff Area=8,660 sf Runoff Depth>1.59"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min CN=85 Runoff=0.38 cfs 1,145 cf

Subcatchment 60S: Runoff Area=4,640 sf Runoff Depth>1.90"
Flow Length=80' Tc=2.0 min CN=89 Runoff=0.27 cfs 734 cf

Subcatchment 62S: Large Area including 2 Septics Runoff Area=39,429 sf Runoff Depth>1.13"
Flow Length=260' Tc=11.2 min CN=78 Runoff=0.98 cfs 3,699 cf

Subcatchment 65S: Throat of Cul-de-sac u.g. Runoff Area=11,590 sf Runoff Depth>1.44"
Flow Length=180' Tc=9.4 min CN=83 Runoff=0.40 cfs 1,394 cf

Subcatchment 68S: From hill near 19,20 to Lawn CB Runoff Area=15,091 sf Runoff Depth>1.13"
Flow Length=190' Tc=6.2 min CN=78 Runoff=0.44 cfs 1,418 cf

Subcatchment 110S: To CB 20 Runoff Area=7,780 sf Runoff Depth>1.82"
Flow Length=100' Slope=0.0200 '/' Tc=0.6 min CN=88 Runoff=0.46 cfs 1,179 cf

Subcatchment 112S: To CB 22 Runoff Area=5,198 sf Runoff Depth>2.16"
Flow Length=60' Tc=0.3 min CN=92 Runoff=0.36 cfs 936 cf

Subcatchment 114S: Behind Units 1&2 Runoff Area=12,960 sf Runoff Depth>1.19"
Flow Length=130' Tc=11.4 min CN=79 Runoff=0.34 cfs 1,280 cf

Subcatchment 116S: Runoff Area=3,050 sf Runoff Depth>1.98"
Flow Length=70' Tc=0.3 min CN=90 Runoff=0.20 cfs 504 cf

Subcatchment 118S: Runoff Area=3,610 sf Runoff Depth>1.82"
Flow Length=50' Tc=0.2 min CN=88 Runoff=0.21 cfs 547 cf

Subcatchment 120S: Runoff Area=6,190 sf Runoff Depth>1.74"
Flow Length=90' Tc=0.5 min CN=87 Runoff=0.35 cfs 897 cf

Subcatchment 122S: Runoff Area=6,066 sf Runoff Depth>1.07"
Flow Length=100' Tc=3.6 min CN=77 Runoff=0.18 cfs 541 cf

Subcatchment 124S: Runoff Area=7,500 sf Runoff Depth>1.74"
Flow Length=80' Tc=0.5 min CN=87 Runoff=0.43 cfs 1,087 cf

Subcatchment 126S: Runoff Area=5,370 sf Runoff Depth>1.74"
Flow Length=60' Tc=0.3 min CN=87 Runoff=0.30 cfs 778 cf

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- Subcatchment 128S:** Runoff Area=7,200 sf Runoff Depth>1.59"
Flow Length=115' Slope=0.0200 '/' Tc=3.2 min CN=85 Runoff=0.34 cfs 952 cf
- Subcatchment 130S:** Runoff Area=6,950 sf Runoff Depth>1.45"
Flow Length=60' Tc=0.3 min CN=83 Runoff=0.33 cfs 838 cf
- Subcatchment 132S: Behind Unit 3** Runoff Area=26,270 sf Runoff Depth>1.01"
Flow Length=130' Tc=0.9 min CN=76 Runoff=0.82 cfs 2,222 cf
- Subcatchment 134S: To Swale behind 7,6,5** Runoff Area=13,850 sf Runoff Depth>1.19"
Flow Length=70' Slope=0.0200 '/' Tc=3.1 min CN=79 Runoff=0.48 cfs 1,371 cf
- Subcatchment 136S: To Swale behind 4 to HW 30** Runoff Area=21,060 sf Runoff Depth>1.01"
Flow Length=95' Slope=0.0100 '/' Tc=4.9 min CN=76 Runoff=0.57 cfs 1,779 cf
- Subcatchment 138S: Rear of Units 10,11,12,13** Runoff Area=15,030 sf Runoff Depth>1.38"
Flow Length=430' Tc=12.3 min CN=82 Runoff=0.45 cfs 1,722 cf
- Subcatchment 140S: Behind Units 14, 15, 16** Runoff Area=21,630 sf Runoff Depth>1.07"
Flow Length=150' Slope=0.0100 '/' Tc=13.2 min CN=77 Runoff=0.47 cfs 1,924 cf
- Subcatchment 214S:** Runoff Area=6,950 sf Runoff Depth>1.82"
Flow Length=110' Tc=2.8 min CN=88 Runoff=0.38 cfs 1,053 cf
- Subcatchment 216S:** Runoff Area=4,140 sf Runoff Depth>1.59"
Tc=1.0 min CN=85 Runoff=0.21 cfs 548 cf
- Subcatchment 900: North Offsite flowing onto property** Runoff Area=14,076 sf Runoff Depth>0.71"
Flow Length=340' Slope=0.0500 '/' Tc=12.8 min CN=70 Runoff=0.19 cfs 835 cf
- Reach 1R: Existing wetland channel to WF** Avg. Depth=0.13' Max Vel=3.01 fps Inflow=2.40 cfs 12,605 cf
n=0.022 L=300.0' S=0.0333 '/' Capacity=82.44 cfs Outflow=2.38 cfs 12,572 cf
- Reach 2R: Swale from Drive at #10 to Drive a** Avg. Depth=0.10' Max Vel=2.94 fps Inflow=0.38 cfs 1,053 cf
n=0.022 L=65.0' S=0.0554 '/' Capacity=72.03 cfs Outflow=0.38 cfs 1,052 cf
- Reach 55R: DMH 52 to DMH 50** Avg. Depth=0.37' Max Vel=6.45 fps Inflow=1.71 cfs 4,926 cf
D=12.0" n=0.013 L=32.0' S=0.0269 '/' Capacity=5.84 cfs Outflow=1.70 cfs 4,926 cf
- Reach 62R: DMH 64 to Bio-Retention A (HW** Avg. Depth=0.34' Max Vel=4.62 fps Inflow=1.09 cfs 4,433 cf
D=12.0" n=0.013 L=12.0' S=0.0150 '/' Capacity=4.36 cfs Outflow=1.09 cfs 4,433 cf
- Reach 64R: Swale from Drive at #12 to RG 10A** Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.022 L=10.0' S=0.0350 '/' Capacity=57.26 cfs Outflow=0.00 cfs 0 cf
- Reach 67R: Culvert under Unit 12 Drive** Avg. Depth=0.26' Max Vel=3.06 fps Inflow=0.38 cfs 946 cf
D=8.0" n=0.013 L=35.0' S=0.0100 '/' Capacity=1.21 cfs Outflow=0.38 cfs 946 cf
- Reach 68R: Underdrain to CB 66** Avg. Depth=0.26' Max Vel=7.58 fps Inflow=0.96 cfs 4,304 cf
D=8.0" n=0.013 L=15.0' S=0.0600 '/' Capacity=2.96 cfs Outflow=0.96 cfs 4,303 cf

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Reach 69R: Drain to DMH 52	Avg. Depth=0.26'	Max Vel=4.34 fps	Inflow=0.54 cfs	1,375 cf
	D=8.0" n=0.013 L=38.0' S=0.0200 '/'	Capacity=1.71 cfs	Outflow=0.54 cfs	1,375 cf
Reach 114R: DMH 16 to DMH 14	Avg. Depth=0.30'	Max Vel=4.08 fps	Inflow=0.82 cfs	2,115 cf
	D=12.0" n=0.013 L=60.0' S=0.0133 '/'	Capacity=4.11 cfs	Outflow=0.81 cfs	2,114 cf
Reach 118R: Swale from Drive at #4 to RG 11	Avg. Depth=0.18'	Max Vel=3.27 fps	Inflow=0.93 cfs	2,543 cf
	n=0.022 L=10.0' S=0.0350 '/'	Capacity=57.26 cfs	Outflow=0.93 cfs	2,542 cf
Reach 127R: Swale from Drive at #3 to RG 11	Avg. Depth=0.22'	Max Vel=2.38 fps	Inflow=0.88 cfs	2,206 cf
	n=0.022 L=10.0' S=0.0150 '/'	Capacity=37.49 cfs	Outflow=0.88 cfs	2,205 cf
Reach 128R: Culvert under Unit 3 Drive	Avg. Depth=0.26'	Max Vel=6.92 fps	Inflow=0.88 cfs	2,206 cf
	D=8.0" n=0.013 L=40.0' S=0.0500 '/'	Capacity=2.70 cfs	Outflow=0.88 cfs	2,206 cf
Reach 129R: Swale from Drive at #20 to RG 124	Avg. Depth=0.00'	Max Vel=0.00 fps	Inflow=0.00 cfs	0 cf
	n=0.022 L=10.0' S=0.0450 '/'	Capacity=64.93 cfs	Outflow=0.00 cfs	0 cf
Reach 130R: Swale to RG 122	Avg. Depth=0.16'	Max Vel=3.05 fps	Inflow=0.74 cfs	1,708 cf
	n=0.022 L=30.0' S=0.0350 '/'	Capacity=57.26 cfs	Outflow=0.73 cfs	1,708 cf
Reach 131R: Culvert under Unit 20 Drive	Avg. Depth=0.23'	Max Vel=2.92 fps	Inflow=0.32 cfs	719 cf
	D=8.0" n=0.013 L=48.0' S=0.0100 '/'	Capacity=1.21 cfs	Outflow=0.32 cfs	719 cf
Reach 137R: Swale Back of 7,6,5	Avg. Depth=0.11'	Max Vel=1.26 fps	Inflow=0.48 cfs	1,371 cf
	n=0.030 L=140.0' S=0.0143 '/'	Capacity=26.48 cfs	Outflow=0.46 cfs	1,367 cf
Reach 138R: Swale Back of 4	Avg. Depth=0.23'	Max Vel=1.58 fps	Inflow=1.02 cfs	3,146 cf
	n=0.030 L=140.0' S=0.0100 '/'	Capacity=17.63 cfs	Outflow=0.99 cfs	3,139 cf
Reach 149R: DMH 14 to DMH 12	Avg. Depth=0.53'	Max Vel=6.13 fps	Inflow=3.39 cfs	10,976 cf
	D=18.0" n=0.013 L=95.0' S=0.0149 '/'	Capacity=12.84 cfs	Outflow=3.38 cfs	10,973 cf
Reach 150R: DMH 12 to HW 10 - Outlet	Avg. Depth=0.52'	Max Vel=6.15 fps	Inflow=3.38 cfs	10,973 cf
	D=18.0" n=0.013 L=55.0' S=0.0151 '/'	Capacity=12.90 cfs	Outflow=3.37 cfs	10,971 cf
Reach 153R: CB 116 to DMH 14	Avg. Depth=0.28'	Max Vel=7.87 fps	Inflow=1.11 cfs	3,004 cf
	D=8.0" n=0.013 L=28.0' S=0.0600 '/'	Capacity=2.96 cfs	Outflow=1.11 cfs	3,004 cf
Reach 154R: Swale from Drive at #6 to RG 126	Avg. Depth=0.00'	Max Vel=0.00 fps	Inflow=0.00 cfs	0 cf
	n=0.022 L=33.0' S=0.0091 '/'	Capacity=29.18 cfs	Outflow=0.00 cfs	0 cf
Reach 155R: Swale from Drive at #5 to RG 120	Avg. Depth=0.00'	Max Vel=0.00 fps	Inflow=0.00 cfs	0 cf
	n=0.022 L=50.0' S=0.0200 '/'	Capacity=43.29 cfs	Outflow=0.00 cfs	0 cf
Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland			Inflow=3.37 cfs	10,971 cf
			Outflow=3.37 cfs	10,971 cf
Reach 220R: CB 56 to DMH 52	Avg. Depth=0.22'	Max Vel=2.94 fps	Inflow=0.38 cfs	1,145 cf
	D=12.0" n=0.013 L=14.0' S=0.0100 '/'	Capacity=3.56 cfs	Outflow=0.38 cfs	1,145 cf

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Reach 222R: CB 54 to DMH 52	Avg. Depth=0.32' Max Vel=3.66 fps Inflow=0.80 cfs 2,407 cf D=12.0" n=0.013 L=22.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=0.80 cfs 2,407 cf
Reach 403R: CB 65 to DMH 50	Avg. Depth=0.30' Max Vel=4.94 fps Inflow=0.96 cfs 4,303 cf D=12.0" n=0.013 L=30.0' S=0.0200 '/' Capacity=5.04 cfs Outflow=0.96 cfs 4,303 cf
Reach 902R: Existing wetland channel to W	Avg. Depth=0.13' Max Vel=3.36 fps Inflow=2.75 cfs 16,073 cf n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=2.75 cfs 16,061 cf
Pond 2P: Recharge System	Peak Elev=103.81' Storage=3,926 cf Inflow=2.78 cfs 12,041 cf Discarded=0.01 cfs 405 cf Primary=1.67 cfs 8,124 cf Secondary=0.00 cfs 0 cf Outflow=1.67 cfs 8,529 cf
Pond 3P: Culvert under Drive Unit 10	Peak Elev=114.64' Inflow=0.38 cfs 1,053 cf 8.0" x 35.0' Culvert Outflow=0.38 cfs 1,053 cf
Pond 4P: Culvert under Drive Unit 11	Peak Elev=110.69' Inflow=0.38 cfs 1,052 cf 8.0" x 35.0' Culvert Outflow=0.38 cfs 1,052 cf
Pond 8P: Main Cell - Bio Retention	Peak Elev=111.20' Storage=761 cf Inflow=1.09 cfs 4,433 cf Primary=0.96 cfs 4,304 cf Secondary=0.00 cfs 0 cf Outflow=0.96 cfs 4,304 cf
Pond 9P: CB 65	Peak Elev=107.96' Inflow=0.82 cfs 2,812 cf 12.0" x 126.0' Culvert Outflow=0.82 cfs 2,812 cf
Pond 43R: CB 60 to DMH 64	Peak Elev=111.30' Inflow=0.27 cfs 734 cf 12.0" x 12.0' Culvert Outflow=0.27 cfs 734 cf
Pond 61R: CB 62 to DMH 64	Peak Elev=111.69' Inflow=0.98 cfs 3,699 cf 12.0" x 24.0' Culvert Outflow=0.98 cfs 3,699 cf
Pond 66P: RG 9A at Units 11/12 - CB 214	Peak Elev=107.64' Storage=119 cf Inflow=0.38 cfs 1,052 cf Primary=0.38 cfs 946 cf Secondary=0.00 cfs 0 cf Outflow=0.38 cfs 946 cf
Pond 67P: CB 66 (emergency vertical release)	Peak Elev=106.28' Inflow=0.96 cfs 4,303 cf Primary=0.96 cfs 4,303 cf Secondary=0.00 cfs 0 cf Outflow=0.96 cfs 4,303 cf
Pond 70P: RG 10A - CB 216 at Units 13	Peak Elev=104.73' Storage=140 cf Inflow=0.54 cfs 1,494 cf Primary=0.54 cfs 1,375 cf Secondary=0.00 cfs 0 cf Outflow=0.54 cfs 1,375 cf
Pond 111P: CB 20	Peak Elev=104.11' Inflow=0.46 cfs 1,179 cf 12.0" x 16.0' Culvert Outflow=0.46 cfs 1,179 cf
Pond 112P: CB 22	Peak Elev=104.11' Inflow=0.36 cfs 936 cf 12.0" x 22.0' Culvert Outflow=0.36 cfs 936 cf
Pond 119P: RG - 1A - CB 118 to DMH 14	Peak Elev=110.10' Storage=52 cf Inflow=1.06 cfs 2,752 cf Primary=1.06 cfs 2,718 cf Secondary=0.00 cfs 0 cf Outflow=1.06 cfs 2,718 cf
Pond 119R: Culvert under Unit 4 Drive	Peak Elev=111.75' Inflow=0.93 cfs 2,543 cf 8.0" x 40.0' Culvert Outflow=0.93 cfs 2,543 cf

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Pond 121P: RG 6A - CB 120 Under Drive Unit 4 Peak Elev=112.23' Storage=53 cf Inflow=0.93 cfs 2,585 cf
Primary=0.93 cfs 2,543 cf Secondary=0.00 cfs 0 cf Outflow=0.93 cfs 2,543 cf

Pond 128P: RG 2A - CB 122 RG Unit 3 Peak Elev=113.10' Storage=53 cf Inflow=0.88 cfs 2,248 cf
Primary=0.88 cfs 2,206 cf Secondary=0.00 cfs 0 cf Outflow=0.88 cfs 2,206 cf

Pond 132P: RG 3B - CB 124 Rain Garden - Unit Peak Elev=114.95' Storage=98 cf Inflow=0.43 cfs 1,087 cf
Outflow=0.43 cfs 989 cf

Pond 133P: Large RG 4C at Unit 20 Peak Elev=116.90' Storage=134 cf Inflow=0.33 cfs 838 cf
Primary=0.32 cfs 719 cf Secondary=0.00 cfs 0 cf Outflow=0.32 cfs 719 cf

Pond 144R: HW 30 to DMH 14 Peak Elev=113.51' Inflow=0.99 cfs 3,139 cf
12.0" x 114.0' Culvert Outflow=0.99 cfs 3,139 cf

Pond 155P: RG 5A - CB 116 between Septic an Peak Elev=109.12' Storage=54 cf Inflow=1.11 cfs 3,047 cf
Primary=1.11 cfs 3,004 cf Secondary=0.00 cfs 0 cf Outflow=1.11 cfs 3,004 cf

Pond 156R: Culvert under Unit 5 Drive Peak Elev=114.83' Inflow=0.59 cfs 1,688 cf
8.0" x 35.0' Culvert Outflow=0.59 cfs 1,688 cf

Pond 157P: RG 7A - CB 126 Under Drive Unit 5 Peak Elev=115.43' Storage=50 cf Inflow=0.59 cfs 1,731 cf
Primary=0.59 cfs 1,688 cf Secondary=0.00 cfs 0 cf Outflow=0.59 cfs 1,688 cf

Pond 158P: Culvert under Drive Unit 6 Peak Elev=116.35' Inflow=0.34 cfs 952 cf
8.0" x 35.0' Culvert Outflow=0.34 cfs 952 cf

Pond 218R: DMH 50 to Irrigation Cistern Peak Elev=102.50' Inflow=2.78 cfs 12,041 cf
15.0" x 5.0' Culvert Outflow=2.78 cfs 12,041 cf

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
Discarded=0.00 cfs 0 cf Primary=0.00 cfs 0 cf

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
12.0" x 5.0' Culvert Primary=0.00 cfs 0 cf

Link A: POA A Inflow=4.68 cfs 27,032 cf
Primary=4.68 cfs 27,032 cf

Total Runoff Area = 295,260 sf Runoff Volume = 31,790 cf Average Runoff Depth = 1.29"
72.54% Pervious Area = 214,190 sf 27.46% Impervious Area = 81,070 sf

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Subcatchment 54S: CB at Cul-de-Sac - Outside

Runoff = 0.80 cfs @ 12.08 hrs, Volume= 2,407 cf, Depth> 1.38"

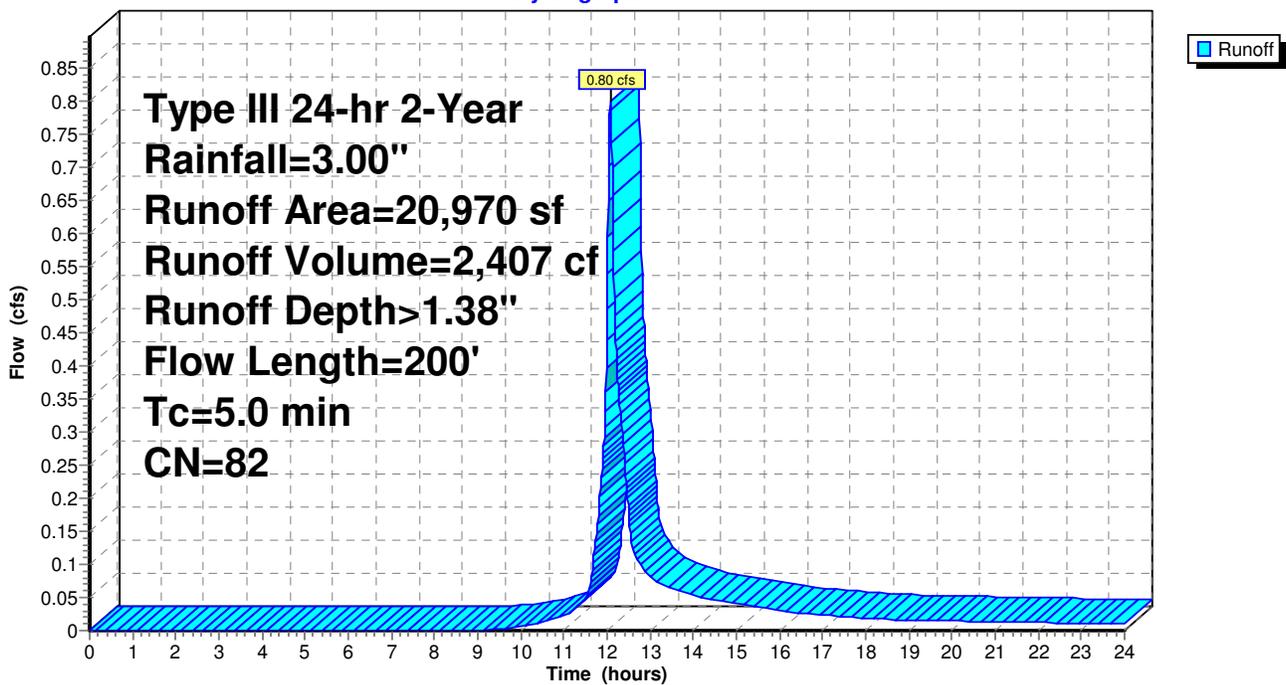
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,100	98	Paved parking & roofs
2,724	98	Paved parking & roofs
14,146	74	>75% Grass cover, Good, HSG C
20,970	82	Weighted Average
14,146		Pervious Area
6,824		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.1	20	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	150	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.0	200	Total			

Subcatchment 54S: CB at Cul-de-Sac - Outside

Hydrograph



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Subcatchment 56S: CB at Cul-de-Sac - Inside

Runoff = 0.38 cfs @ 12.08 hrs, Volume= 1,145 cf, Depth> 1.59"

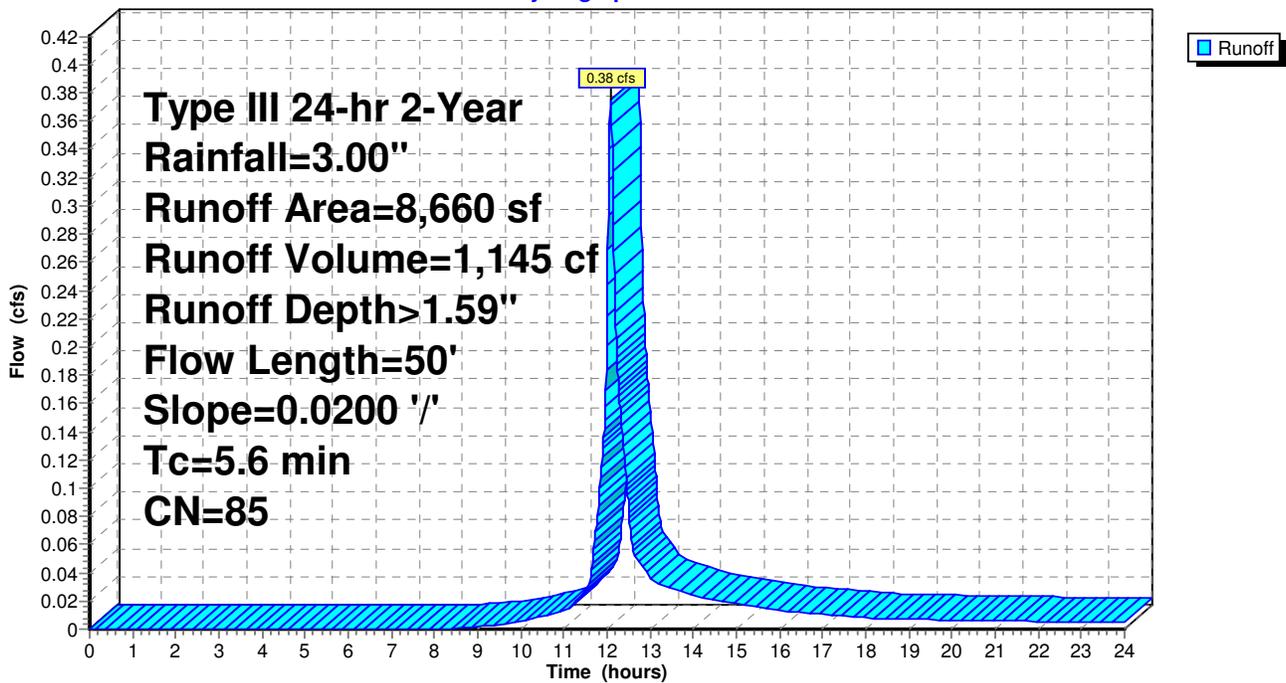
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
0	98	Paved parking & roofs
3,847	98	Paved parking & roofs
4,813	74	>75% Grass cover, Good, HSG C
8,660	85	Weighted Average
4,813		Pervious Area
3,847		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"

Subcatchment 56S: CB at Cul-de-Sac - Inside

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 60S:

Runoff = 0.27 cfs @ 12.03 hrs, Volume= 734 cf, Depth> 1.90"

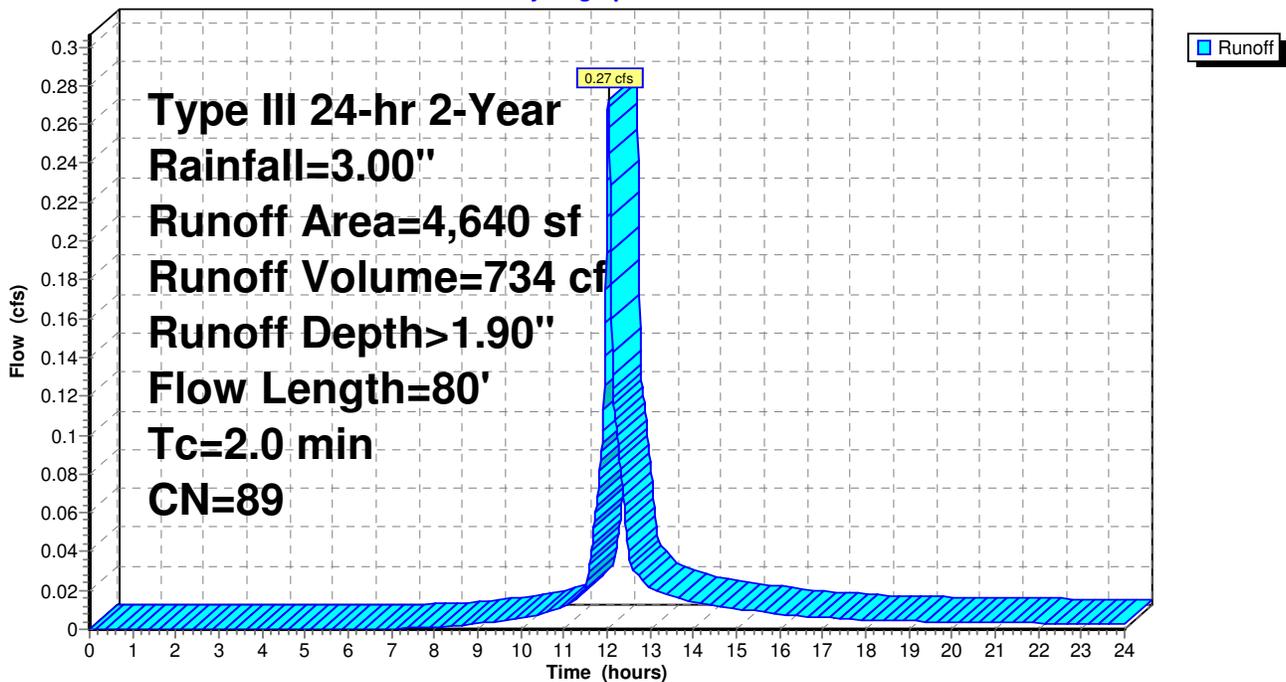
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
960	98	Paved parking & roofs
1,850	98	Paved parking & roofs
1,830	74	>75% Grass cover, Good, HSG C
4,640	89	Weighted Average
1,830		Pervious Area
2,810		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	10	0.0250	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	80	Total			

Subcatchment 60S:

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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 62S: Large Area including 2 Septics

Runoff = 0.98 cfs @ 12.16 hrs, Volume= 3,699 cf, Depth> 1.13"

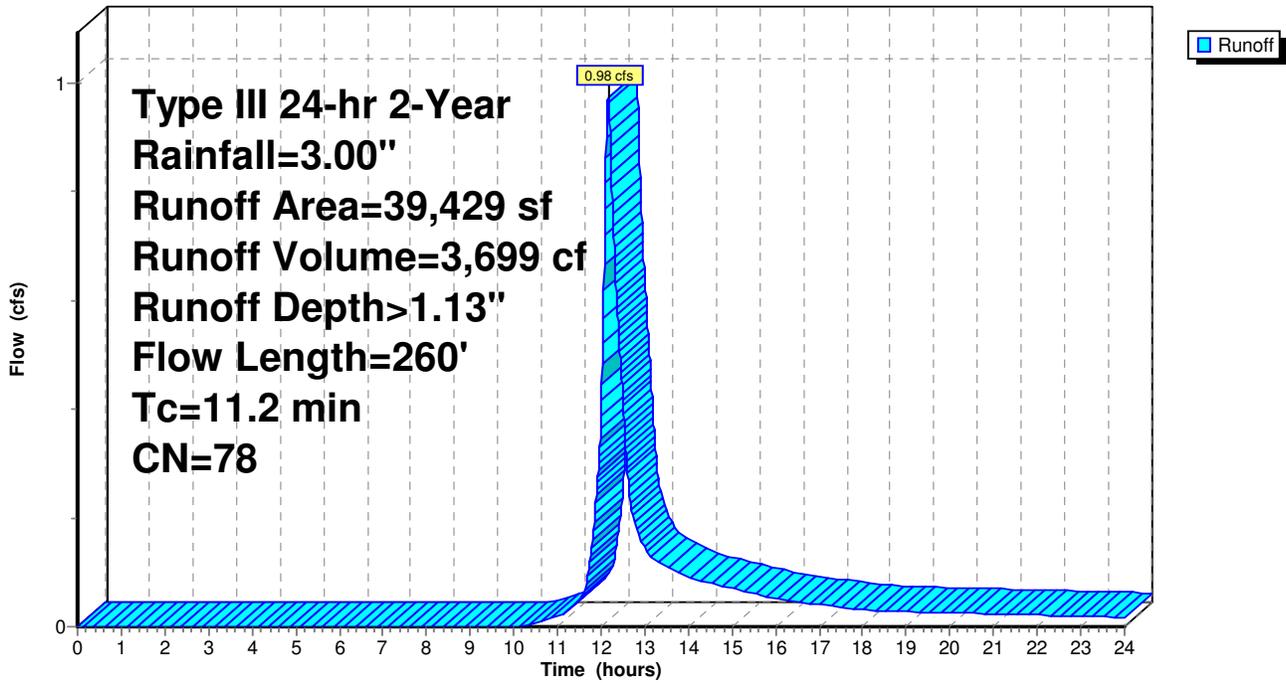
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
3,880	98	Paved parking & roofs
2,734	98	Paved parking & roofs
30,815	74	>75% Grass cover, Good, HSG C
2,000	70	Woods, Good, HSG C
39,429	78	Weighted Average
32,815		Pervious Area
6,614		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	25	0.0500	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	25	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.2	260	Total			

Subcatchment 62S: Large Area including 2 Septics

Hydrograph



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Subcatchment 65S: Throat of Cul-de-sac u.g.

Runoff = 0.40 cfs @ 12.13 hrs, Volume= 1,394 cf, Depth> 1.44"

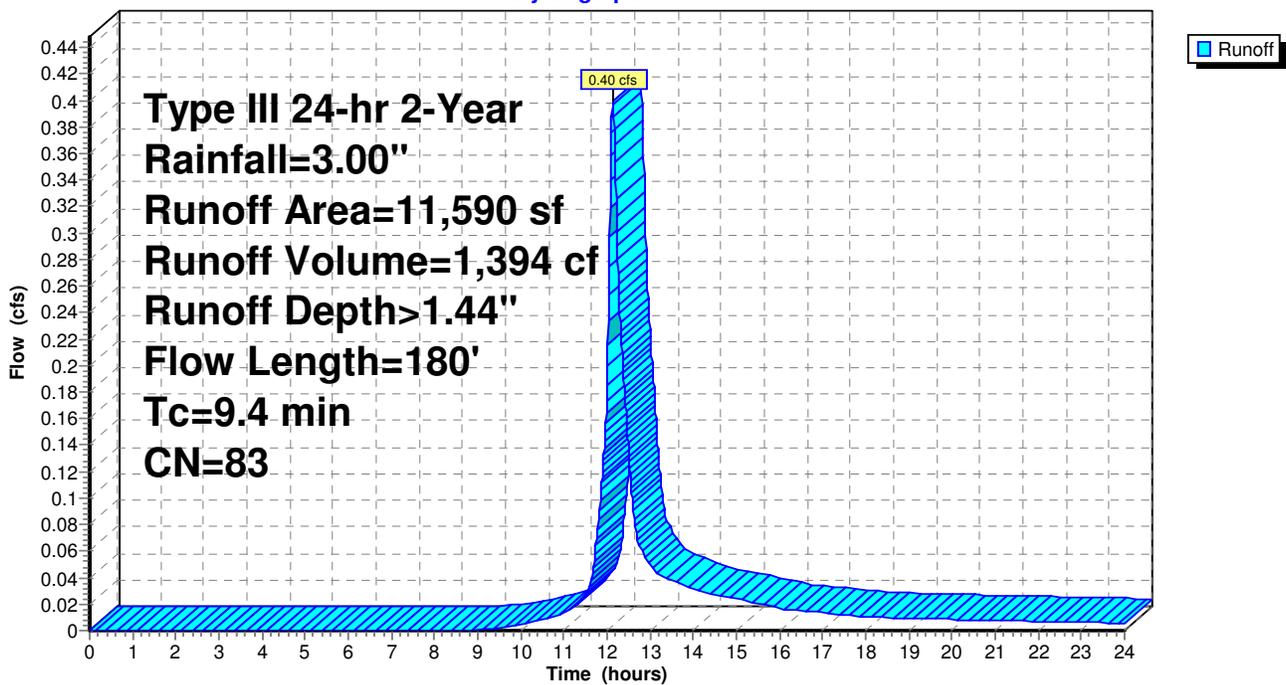
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
2,200	98	Paved parking & roofs
2,160	98	Paved parking & roofs
7,230	74	>75% Grass cover, Good, HSG C
11,590	83	Weighted Average
7,230		Pervious Area
4,360		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	30	0.1500	2.42		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
9.0	90	0.0200	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.2	60	0.0400	4.06		Shallow Concentrated Flow, Unit 17 Drive and Private Drive Paved Kv= 20.3 fps
9.4	180	Total			

Subcatchment 65S: Throat of Cul-de-sac u.g.

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 68S: From hill near 19,20 to Lawn CB

Runoff = 0.44 cfs @ 12.10 hrs, Volume= 1,418 cf, Depth> 1.13"

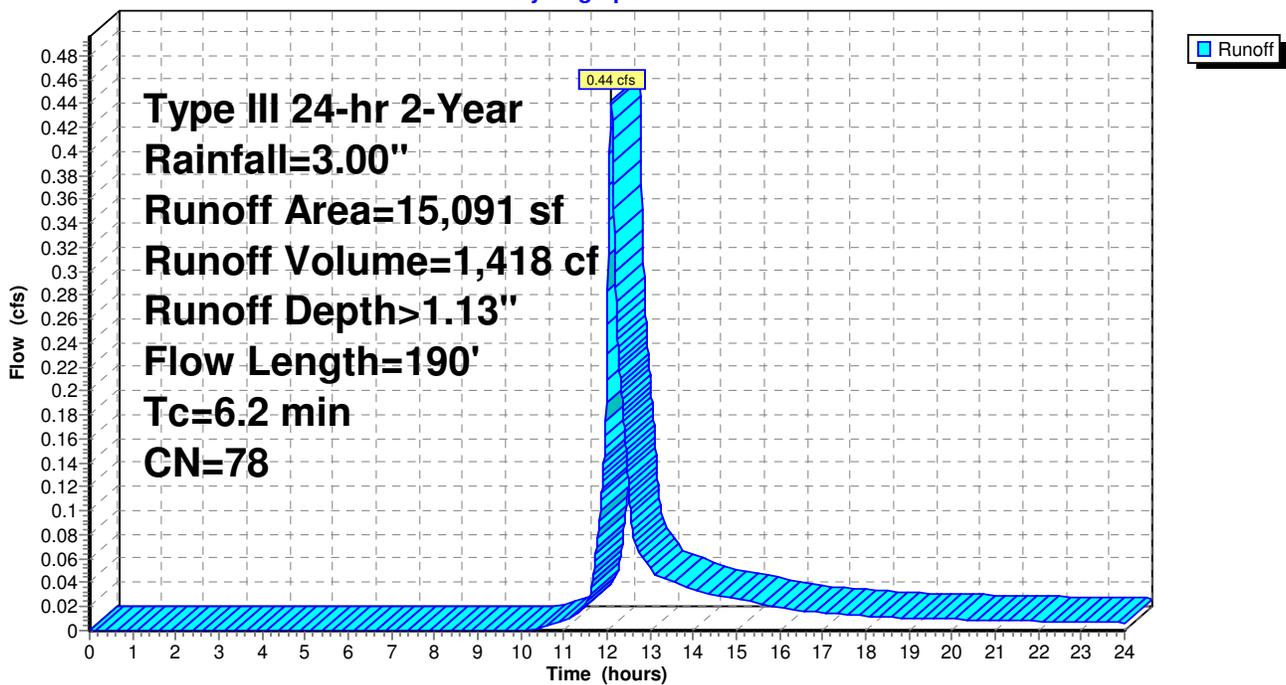
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
2,730	98	Paved parking & roofs
0	98	Paved parking & roofs
12,361	74	>75% Grass cover, Good, HSG C
15,091	78	Weighted Average
12,361		Pervious Area
2,730		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.1500	2.23		Sheet Flow, Roof Unit 20 Smooth surfaces n= 0.011 P2= 3.20"
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.4	140	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	190	Total			

Subcatchment 68S: From hill near 19,20 to Lawn CB

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 110S: To CB 20

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.46 cfs @ 12.01 hrs, Volume= 1,179 cf, Depth> 1.82"

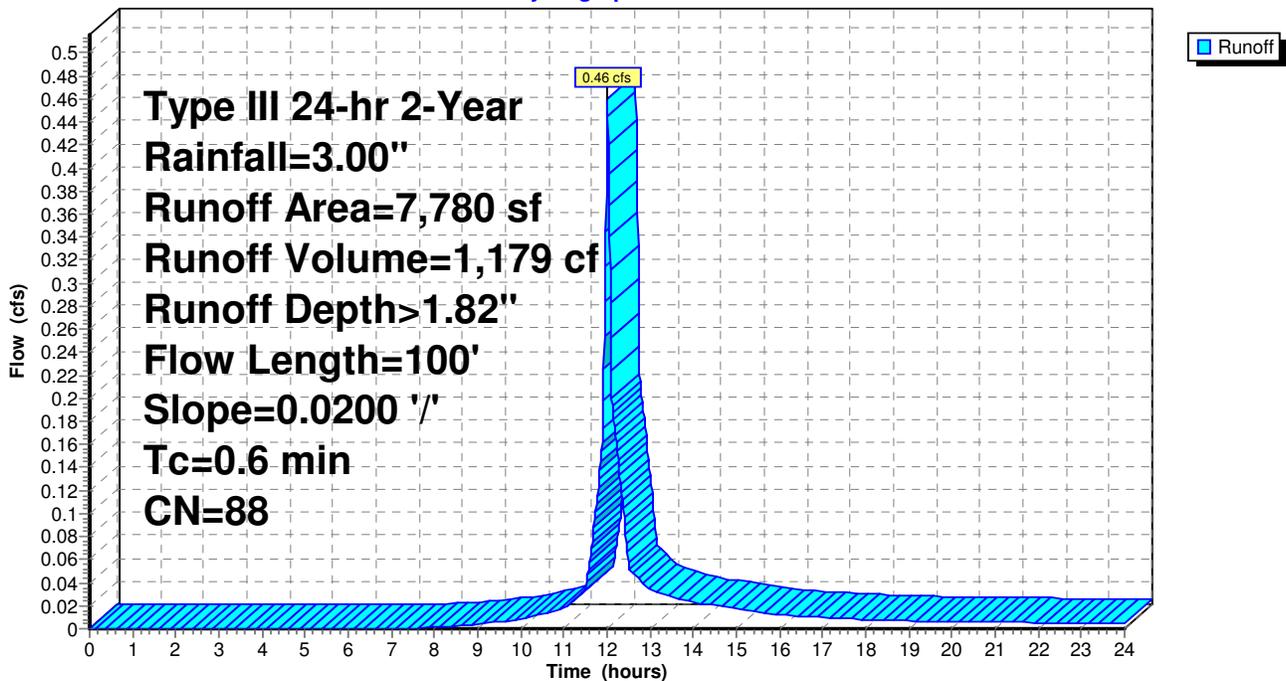
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
2,880	98	Paved parking & roofs
3,240	74	>75% Grass cover, Good, HSG C
7,780	88	Weighted Average
3,240		Pervious Area
4,540		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	100	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps

Subcatchment 110S: To CB 20

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 112S: To CB 22

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.36 cfs @ 12.01 hrs, Volume= 936 cf, Depth > 2.16"

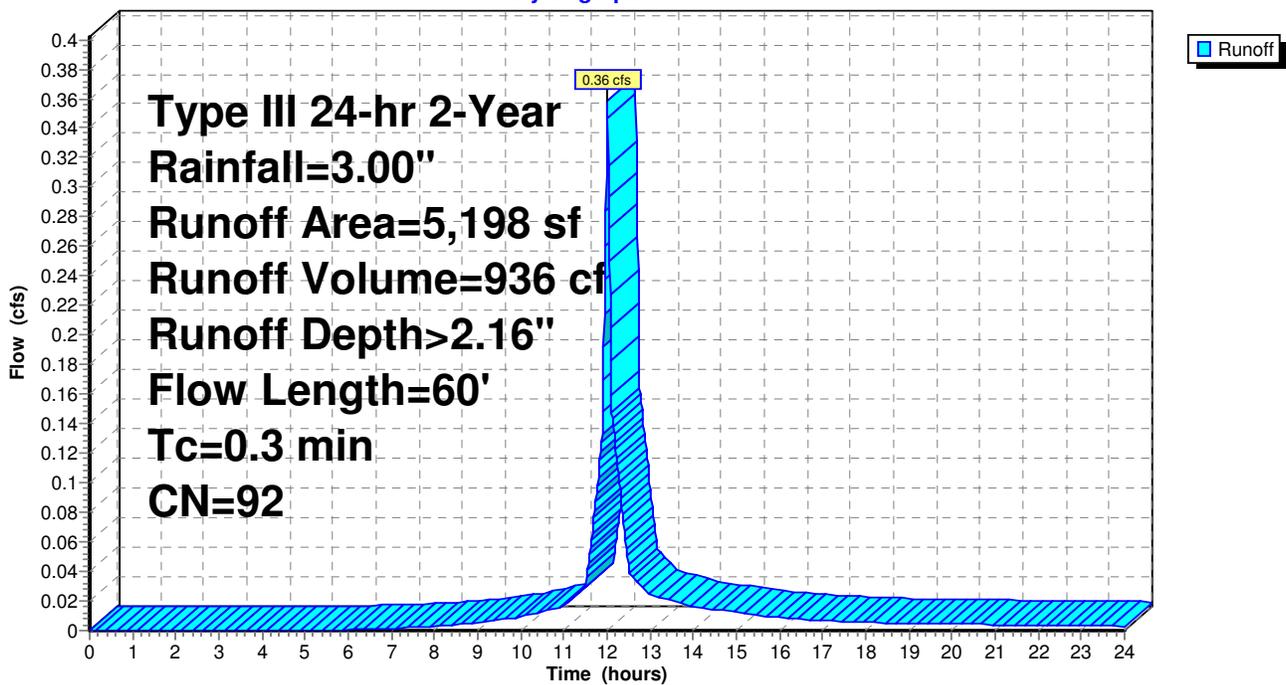
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
2,400	98	Paved parking & roofs
1,525	98	Paved parking & roofs
1,273	74	>75% Grass cover, Good, HSG C
5,198	92	Weighted Average
1,273		Pervious Area
3,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v=20.3$ fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved $K_v=16.1$ fps
0.3	60	Total			

Subcatchment 112S: To CB 22

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 114S: Behind Units 1&2

Runoff = 0.34 cfs @ 12.17 hrs, Volume= 1,280 cf, Depth> 1.19"

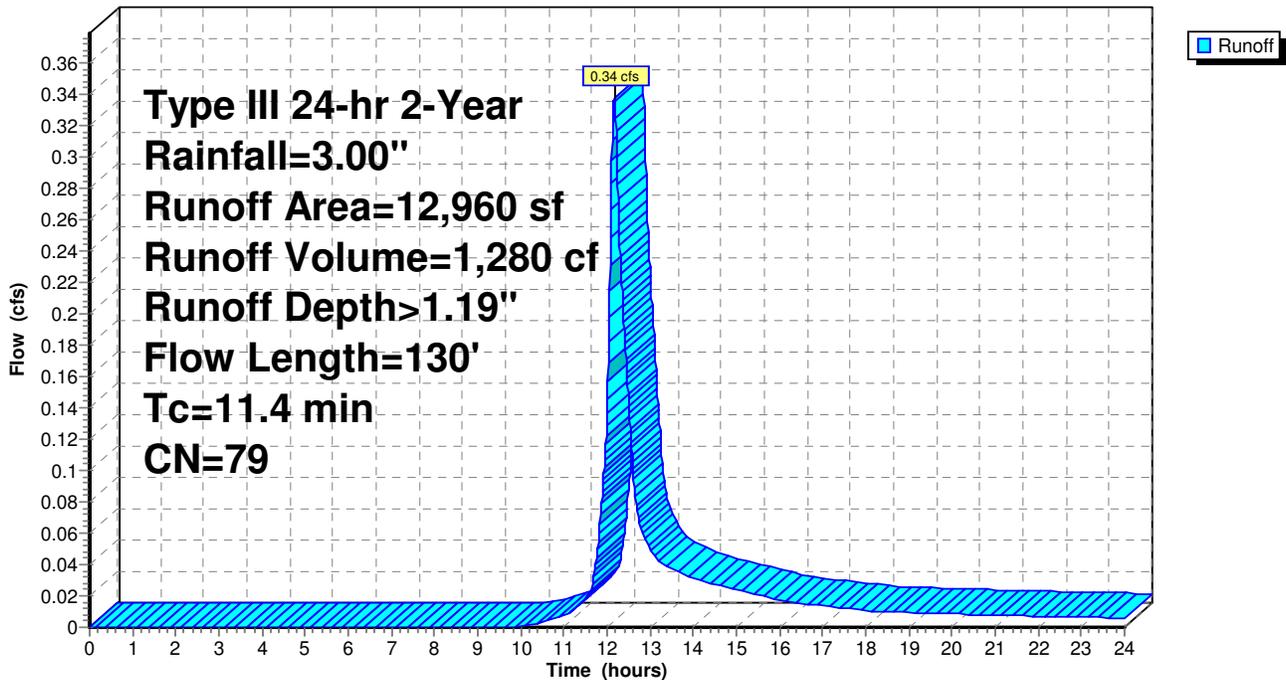
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,300	98	Paved parking & roofs
10,000	74	>75% Grass cover, Good, HSG C
12,960	79	Weighted Average
10,000		Pervious Area
2,960		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.6	80	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.4	130	Total			

Subcatchment 114S: Behind Units 1&2

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 116S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.20 cfs @ 12.01 hrs, Volume= 504 cf, Depth> 1.98"

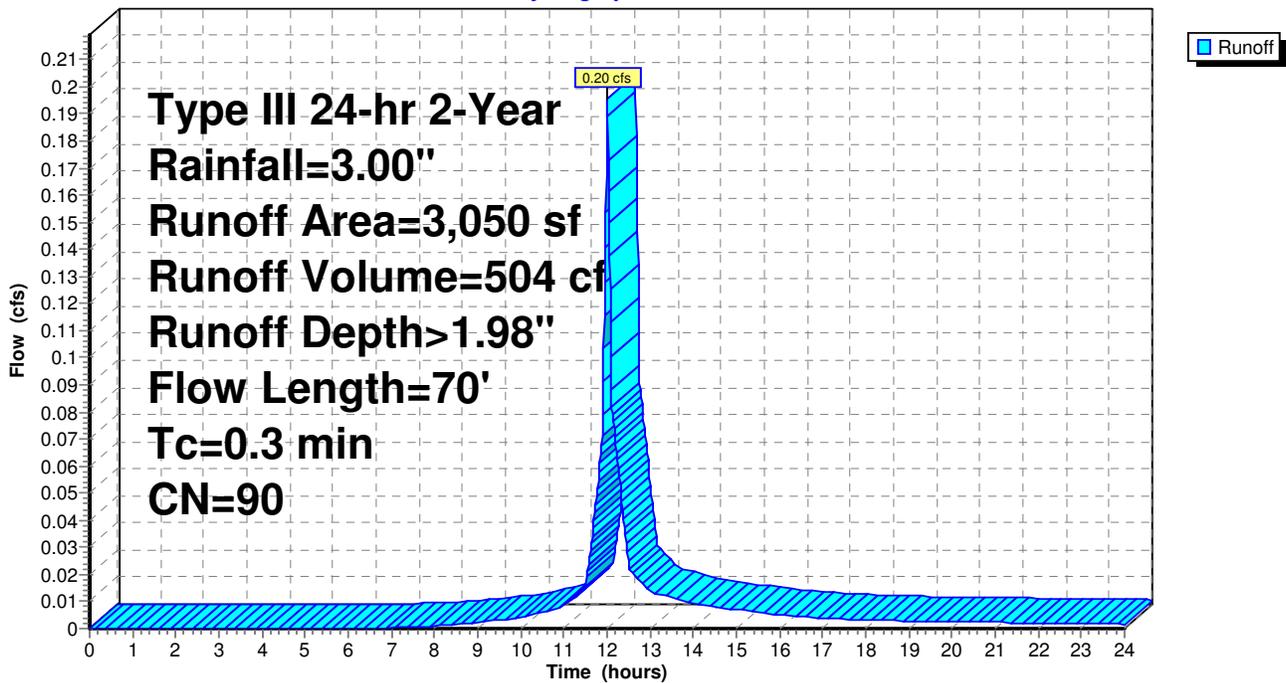
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,300	98	Paved parking & roofs
1,050	74	>75% Grass cover, Good, HSG C
3,050	90	Weighted Average
1,050		Pervious Area
2,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	40	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	70	Total			

Subcatchment 116S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 118S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.21 cfs @ 12.00 hrs, Volume= 547 cf, Depth> 1.82"

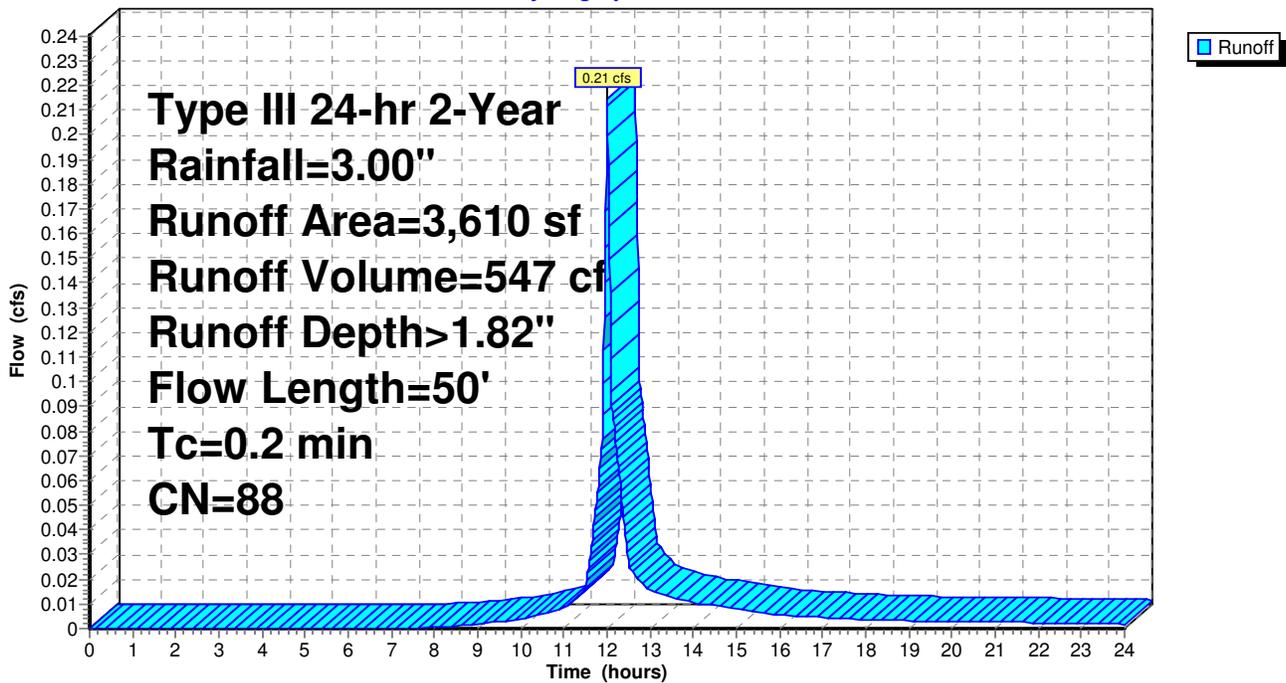
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,040	98	Paved parking & roofs
1,140	98	Paved parking & roofs
1,430	74	>75% Grass cover, Good, HSG C
3,610	88	Weighted Average
1,430		Pervious Area
2,180		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	50	Total			

Subcatchment 118S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 120S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.35 cfs @ 12.01 hrs, Volume= 897 cf, Depth> 1.74"

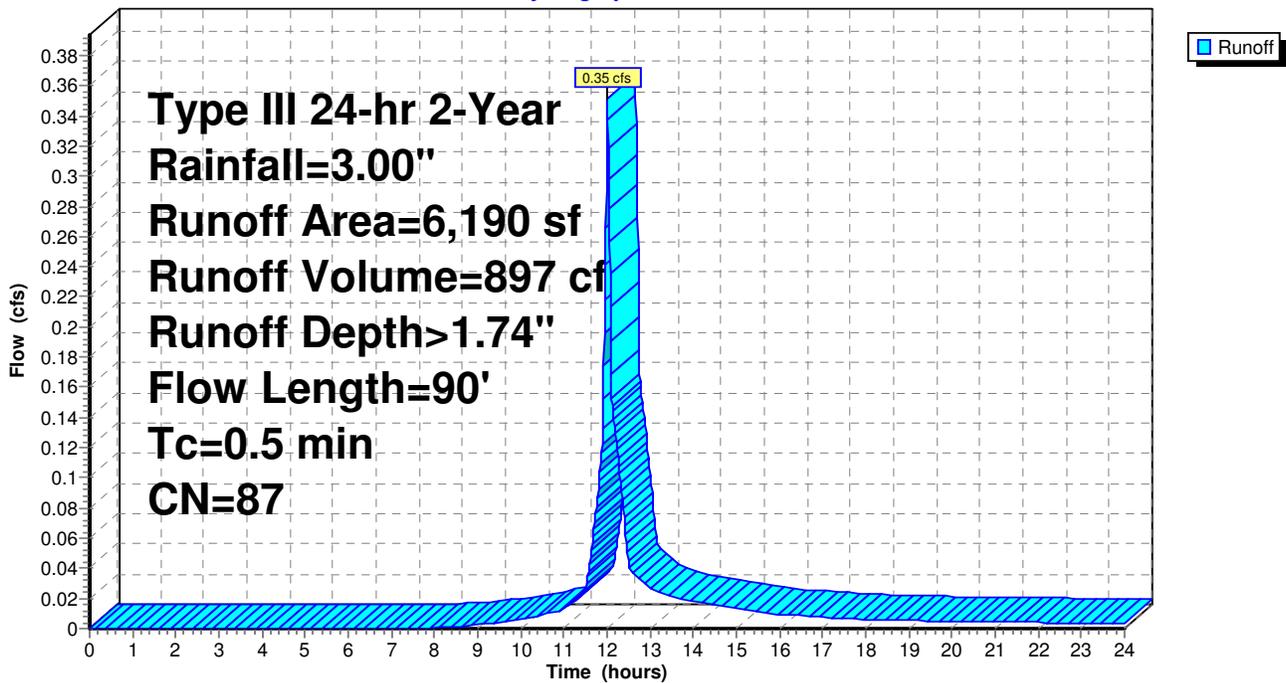
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,450	98	Paved parking & roofs
1,800	98	Paved parking & roofs
2,940	74	>75% Grass cover, Good, HSG C
6,190	87	Weighted Average
2,940		Pervious Area
3,250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	60	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	90	Total			

Subcatchment 120S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 122S:

Runoff = 0.18 cfs @ 12.06 hrs, Volume= 541 cf, Depth> 1.07"

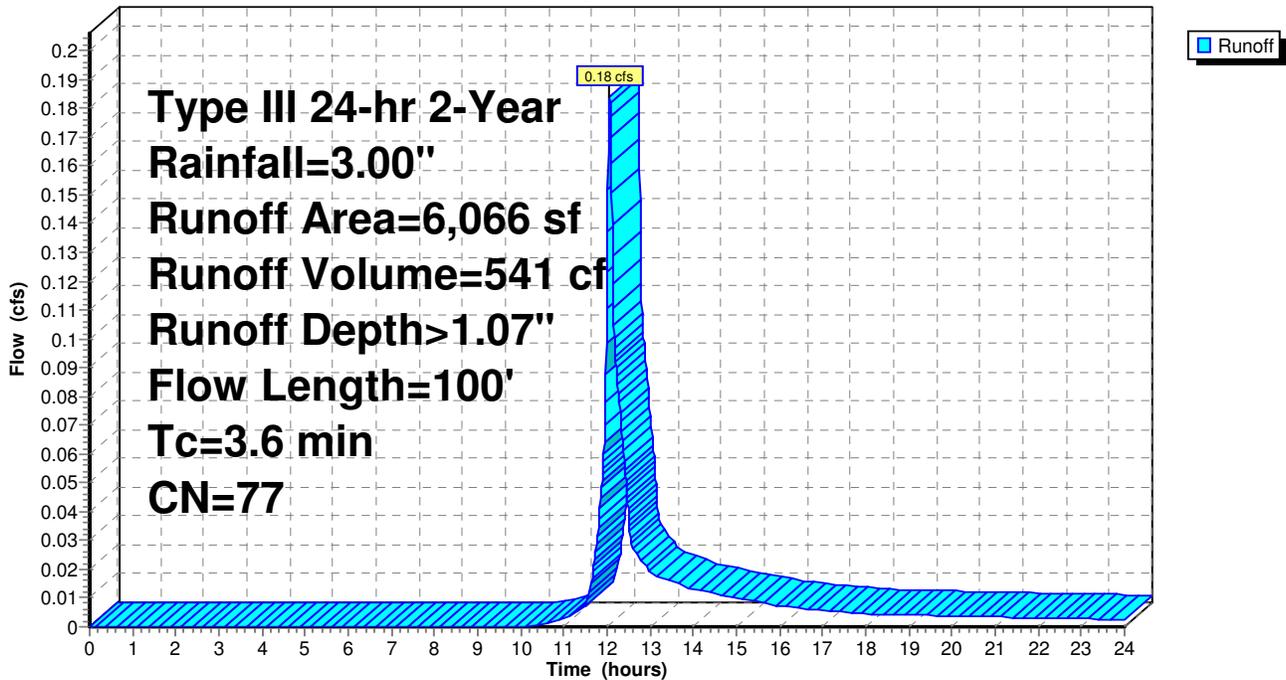
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
720	98	Paved parking & roofs
5,346	74	>75% Grass cover, Good, HSG C
6,066	77	Weighted Average
5,346		Pervious Area
720		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	20	0.0300	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.3	80	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.6	100	Total			

Subcatchment 122S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 124S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.43 cfs @ 12.01 hrs, Volume= 1,087 cf, Depth> 1.74"

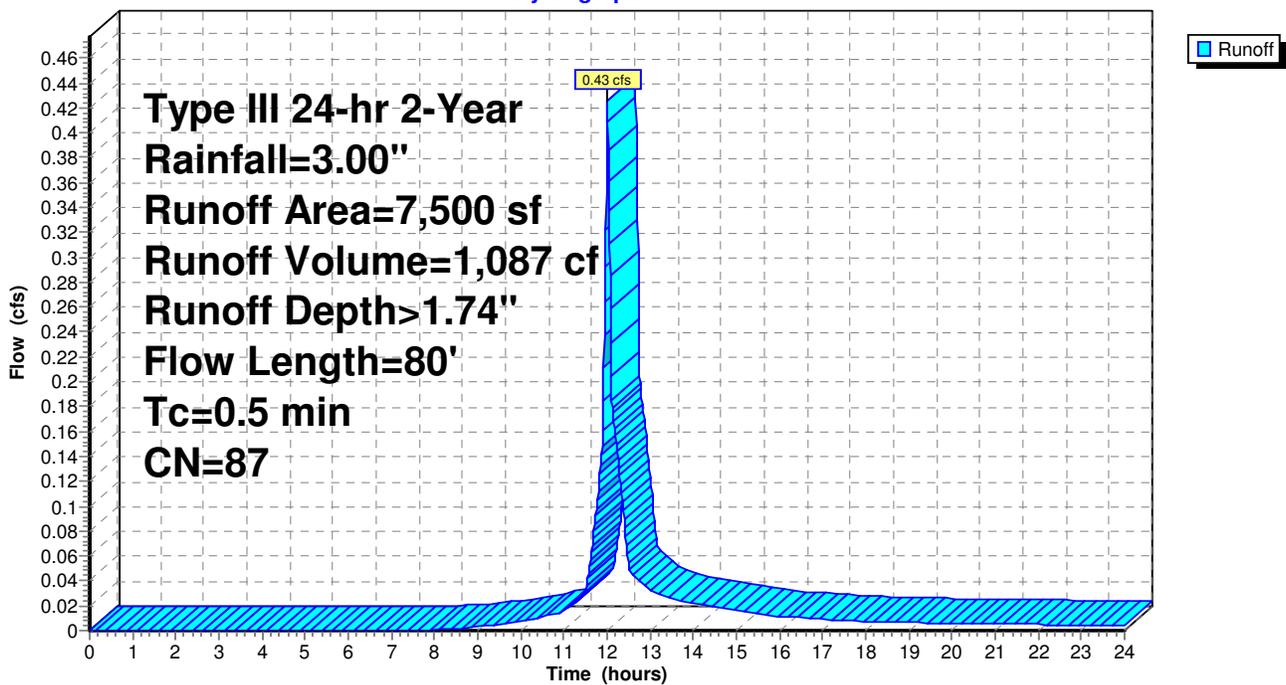
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,410	98	Paved parking & roofs
2,600	98	Paved parking & roofs
3,490	74	>75% Grass cover, Good, HSG C
7,500	87	Weighted Average
3,490		Pervious Area
4,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	80	Total			

Subcatchment 124S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 126S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.30 cfs @ 12.01 hrs, Volume= 778 cf, Depth> 1.74"

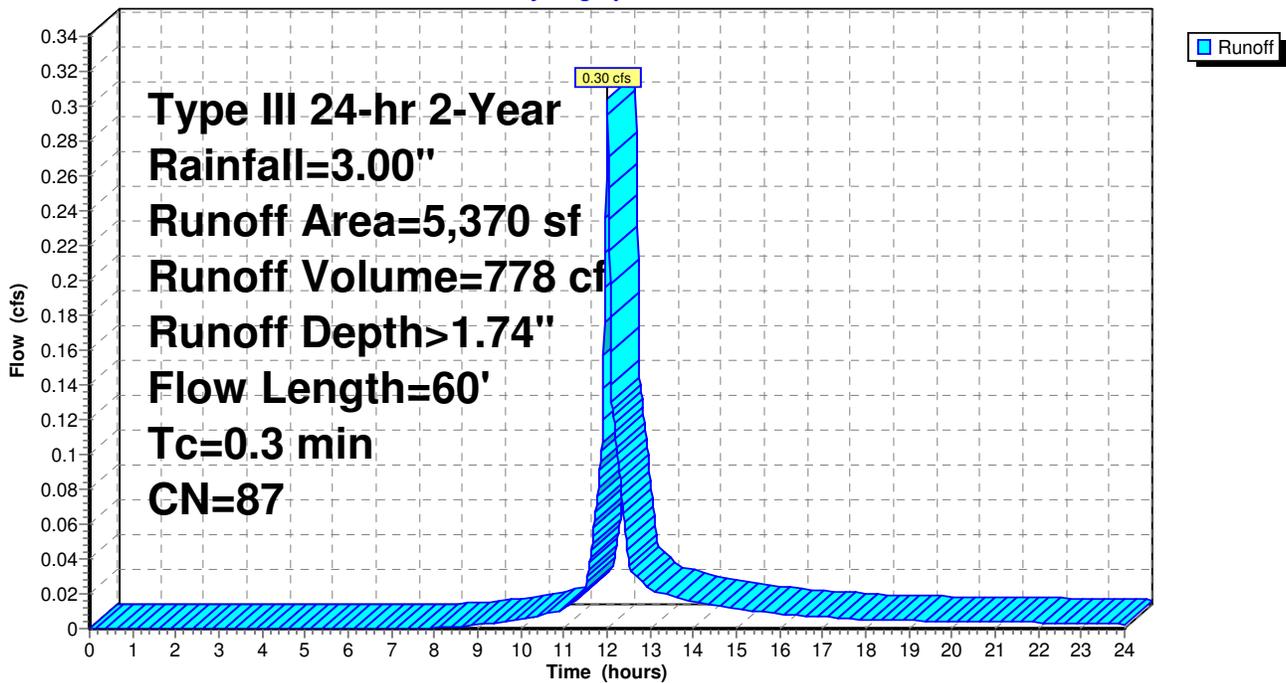
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,350	98	Paved parking & roofs
2,360	74	>75% Grass cover, Good, HSG C
5,370	87	Weighted Average
2,360		Pervious Area
3,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	60	Total			

Subcatchment 126S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 128S:

Runoff = 0.34 cfs @ 12.05 hrs, Volume= 952 cf, Depth> 1.59"

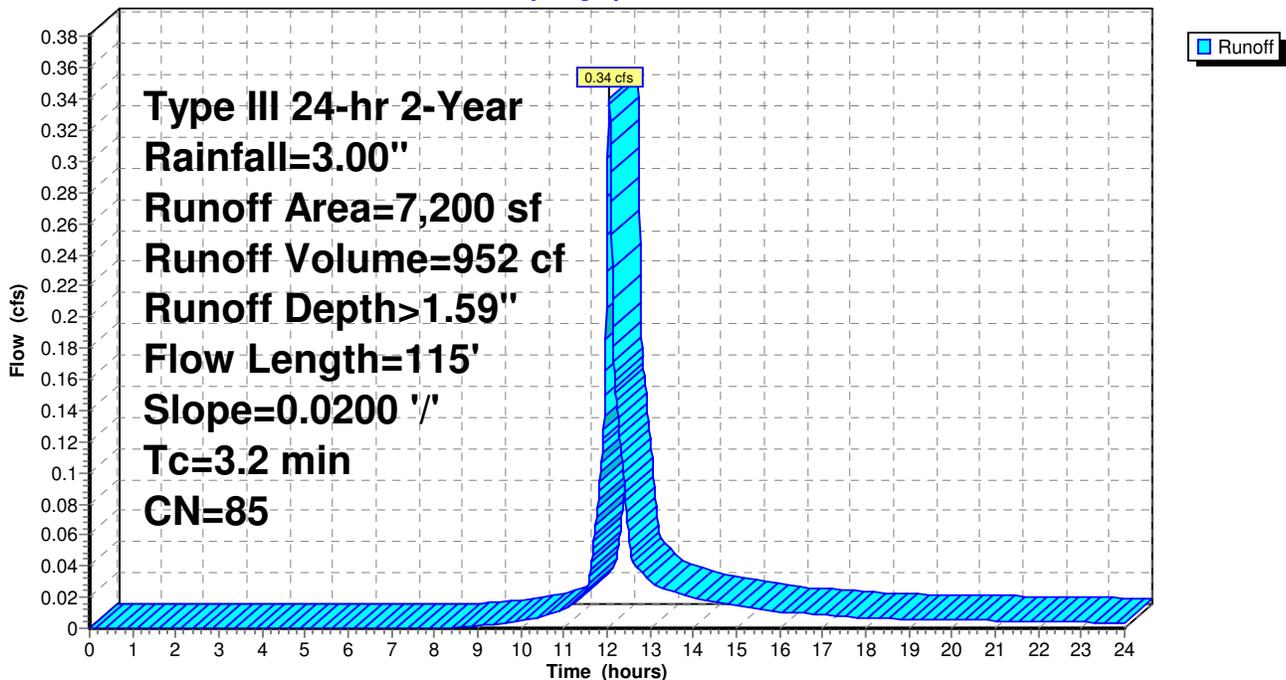
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
1,550	98	Paved parking & roofs
1,600	98	Paved parking & roofs
4,050	74	>75% Grass cover, Good, HSG C
7,200	85	Weighted Average
4,050		Pervious Area
3,150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	25	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.2	115	Total			

Subcatchment 128S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 130S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.33 cfs @ 12.01 hrs, Volume= 838 cf, Depth> 1.45"

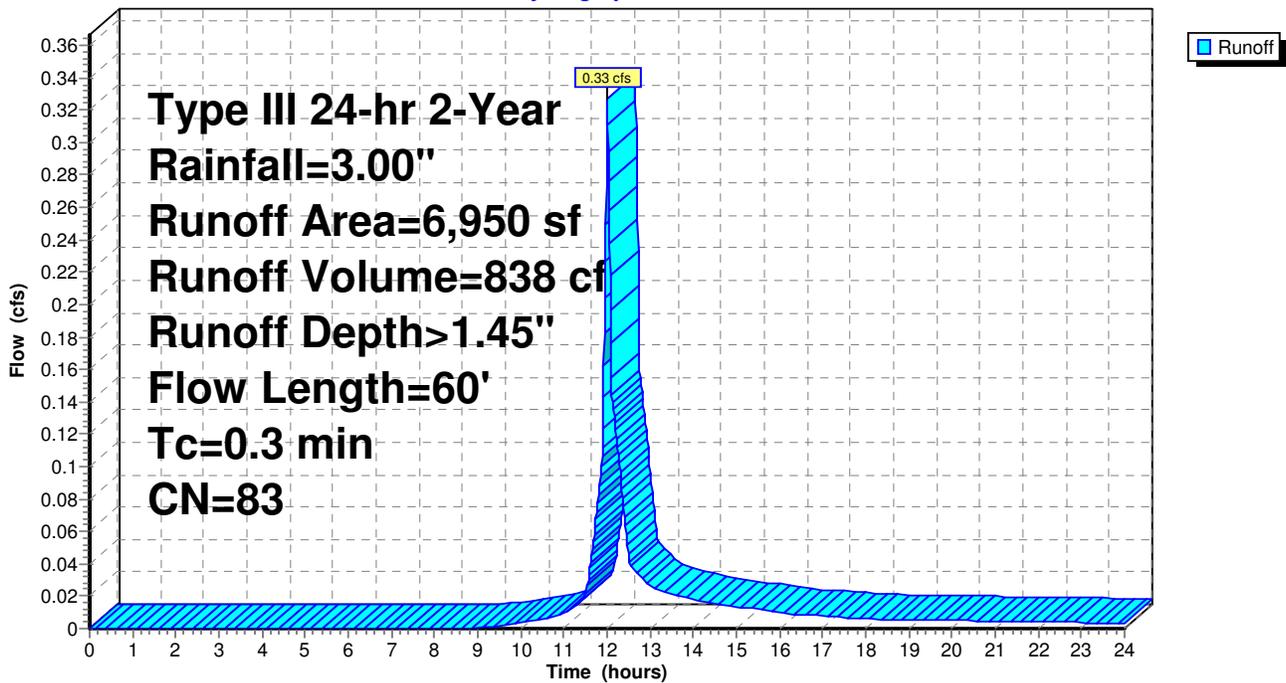
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
800	98	Paved parking & roofs
1,940	98	Paved parking & roofs
4,210	74	>75% Grass cover, Good, HSG C
6,950	83	Weighted Average
4,210		Pervious Area
2,740		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	60	Total			

Subcatchment 130S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 132S: Behind Unit 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.82 cfs @ 12.02 hrs, Volume= 2,222 cf, Depth> 1.01"

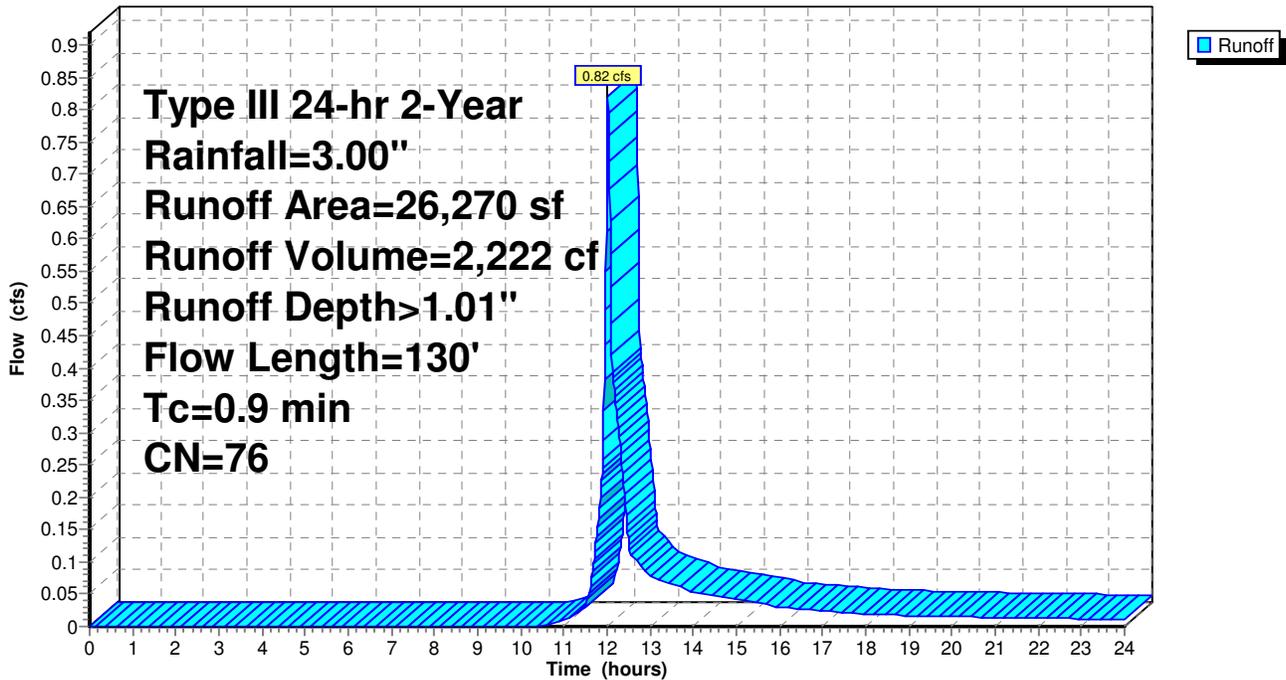
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
2,100	98	Paved parking & roofs
24,170	74	>75% Grass cover, Good, HSG C
26,270	76	Weighted Average
24,170		Pervious Area
2,100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.0150	1.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	130	Total			

Subcatchment 132S: Behind Unit 3

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 134S: To Swale behind 7,6,5

Runoff = 0.48 cfs @ 12.05 hrs, Volume= 1,371 cf, Depth> 1.19"

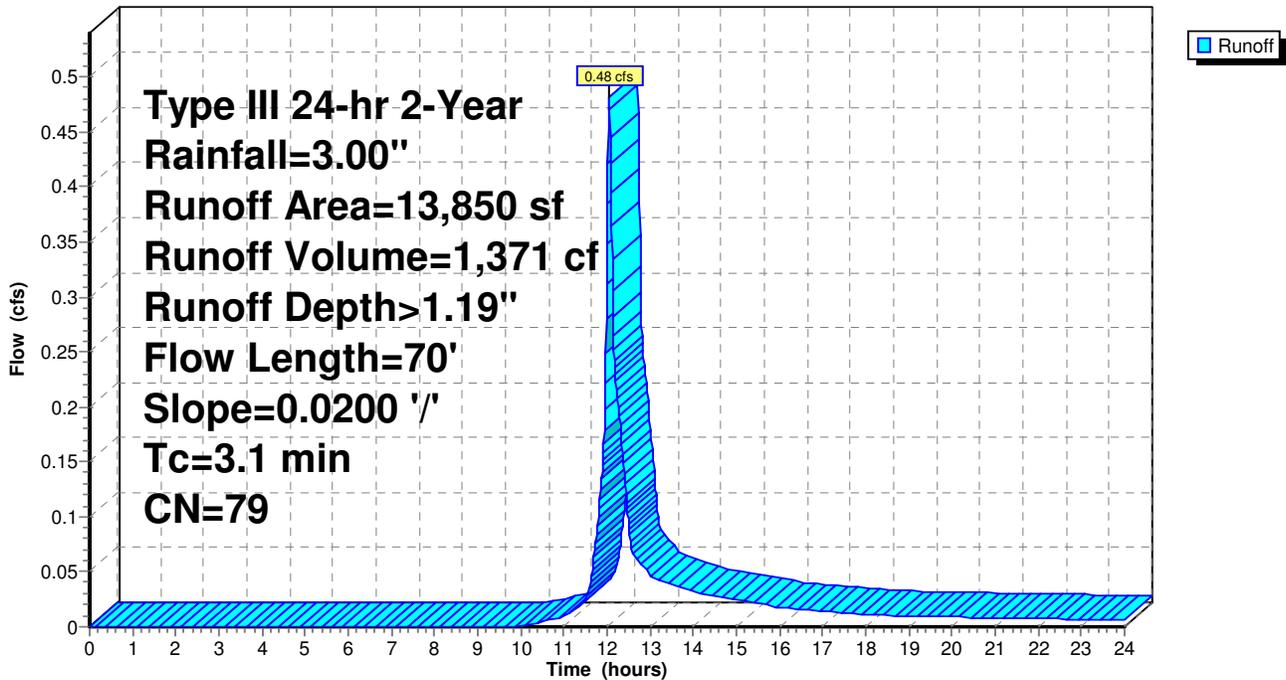
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs
10,850	74	>75% Grass cover, Good, HSG C
13,850	79	Weighted Average
10,850		Pervious Area
3,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: To Swale behind 7,6,5

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 136S: To Swale behind 4 to HW 30

Runoff = 0.57 cfs @ 12.08 hrs, Volume= 1,779 cf, Depth> 1.01"

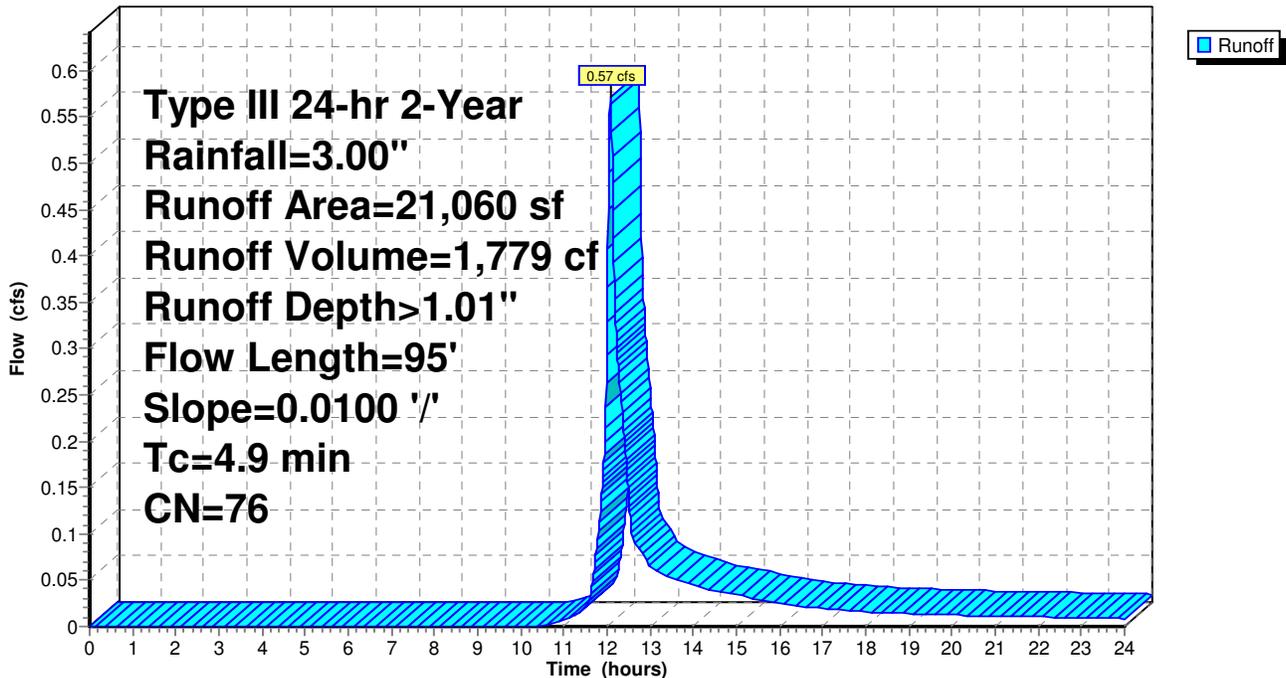
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
2,060	98	Paved parking & roofs
1,700	70	Woods, Good, HSG C
17,300	74	>75% Grass cover, Good, HSG C
21,060	76	Weighted Average
19,000		Pervious Area
2,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	1.83	0.59	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022 Earth, clean & straight
4.9	95	Total			

Subcatchment 136S: To Swale behind 4 to HW 30

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 138S: Rear of Units 10,11,12,13

Runoff = 0.45 cfs @ 12.18 hrs, Volume= 1,722 cf, Depth> 1.38"

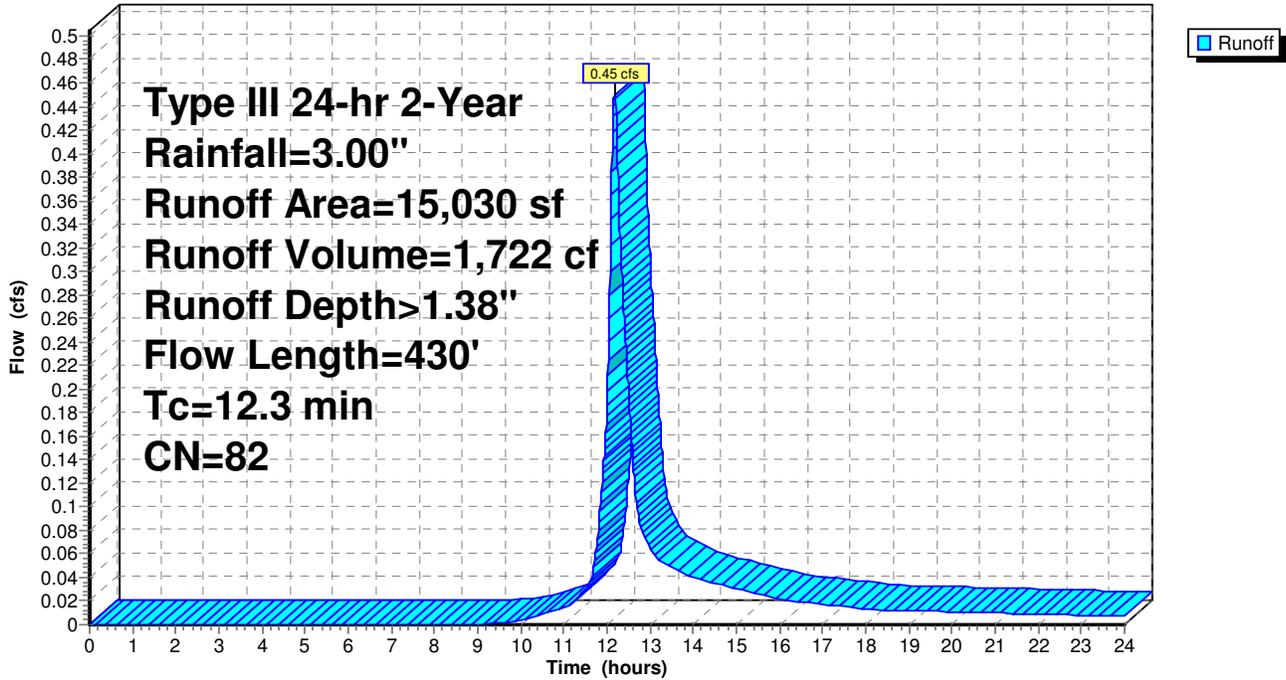
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
4,800	98	Paved parking & roofs
0	98	Paved parking & roofs
10,230	74	>75% Grass cover, Good, HSG C
15,030	82	Weighted Average
10,230		Pervious Area
4,800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	80	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	150	0.0500	4.63	2.02	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.25' Z= 3.0 '/' Top.W=2.50' n= 0.022 Earth, clean & straight
0.6	150	0.0300	3.89	2.68	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=0.25' Z= 3.0 '/' Top.W=3.50' n= 0.022 Earth, clean & straight
12.3	430	Total			

Subcatchment 138S: Rear of Units 10,11,12,13

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 140S: Behind Units 14, 15, 16

Runoff = 0.47 cfs @ 12.19 hrs, Volume= 1,924 cf, Depth> 1.07"

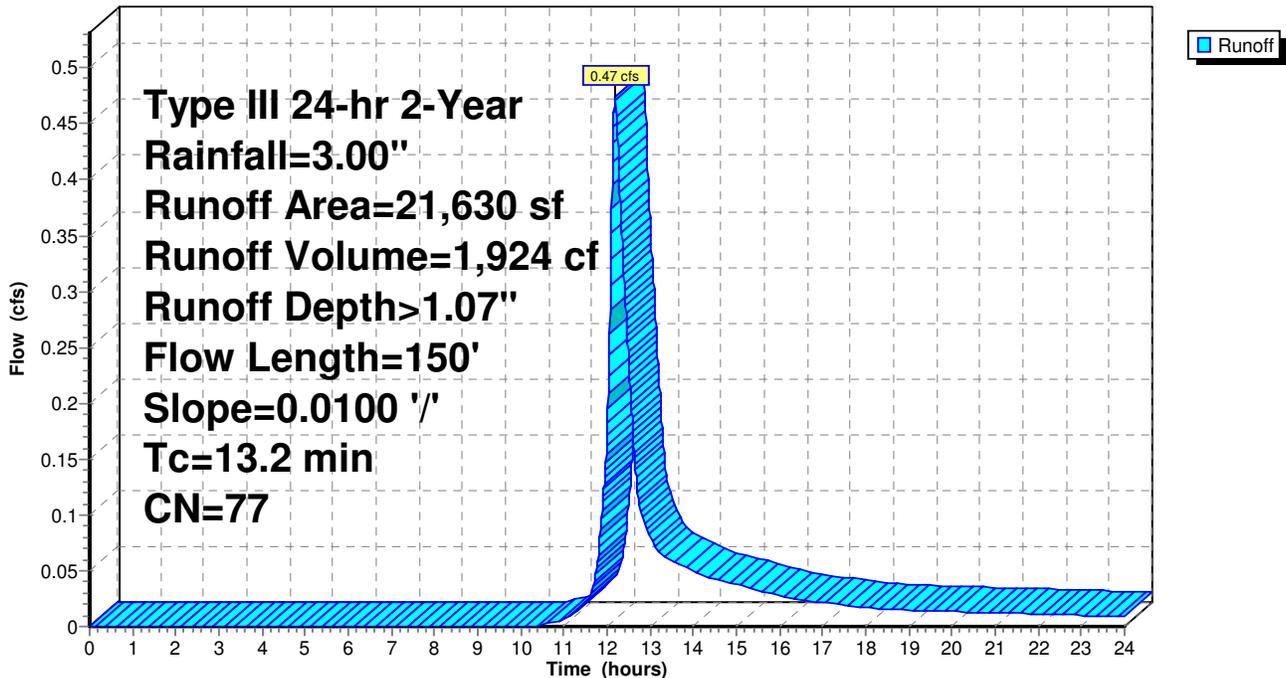
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
3,600	98	Paved parking & roofs
0	98	Paved parking & roofs
14,030	74	>75% Grass cover, Good, HSG C
4,000	70	Woods, Good, HSG C
21,630	77	Weighted Average
18,030		Pervious Area
3,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
2.4	100	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.2	150	Total			

Subcatchment 140S: Behind Units 14, 15, 16

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 214S:

Runoff = 0.38 cfs @ 12.04 hrs, Volume= 1,053 cf, Depth> 1.82"

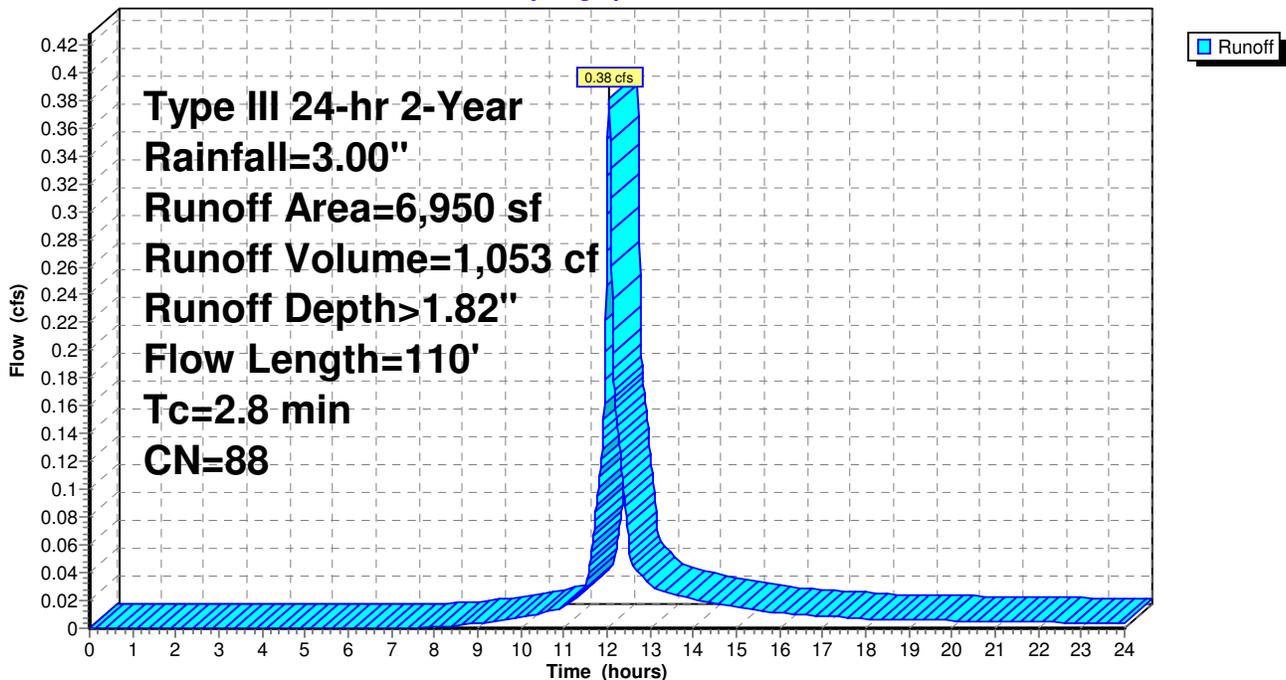
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
2,000	98	Paved parking & roofs
1,940	98	Paved parking & roofs
3,010	74	>75% Grass cover, Good, HSG C
6,950	88	Weighted Average
3,010		Pervious Area
3,940		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	10	0.0100	0.08		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	20	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0200	2.59	0.83	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022
2.8	110	Total			

Subcatchment 214S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 216S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.21 cfs @ 12.02 hrs, Volume= 548 cf, Depth > 1.59"

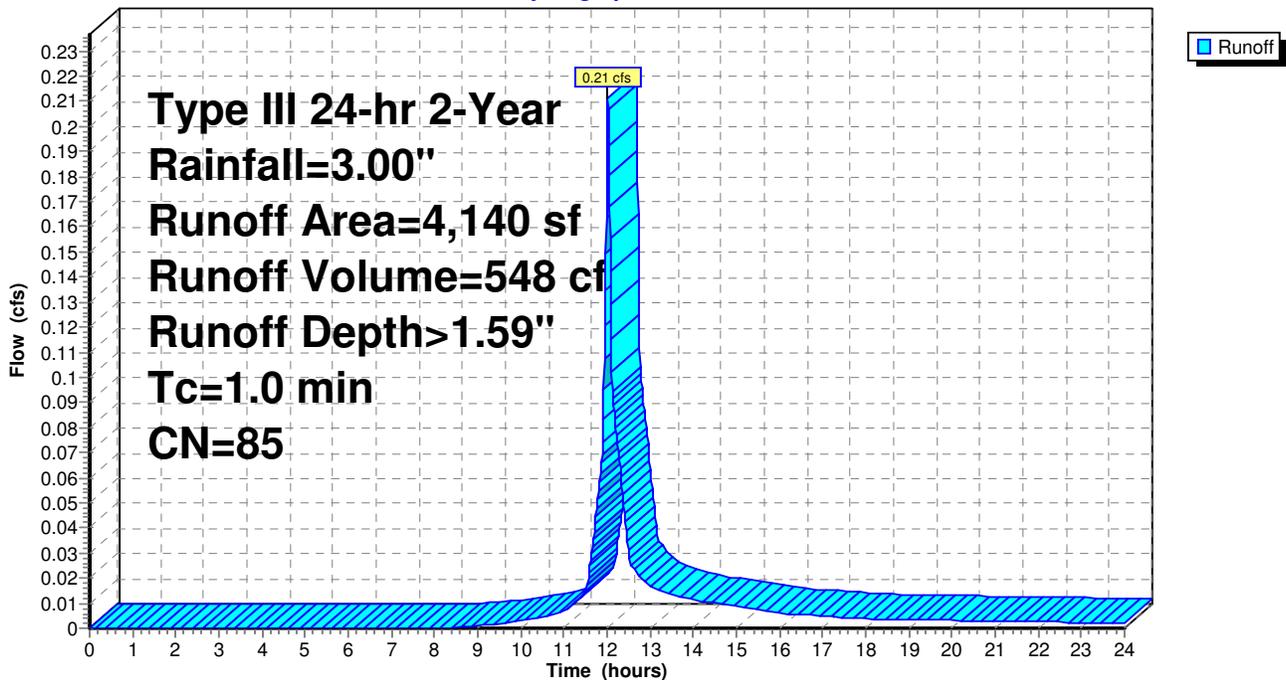
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,200	98	Paved parking & roofs
2,240	74	>75% Grass cover, Good, HSG C
4,140	85	Weighted Average
2,240		Pervious Area
1,900		Impervious Area

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

Subcatchment 216S:

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.19 cfs @ 12.20 hrs, Volume= 835 cf, Depth> 0.71"

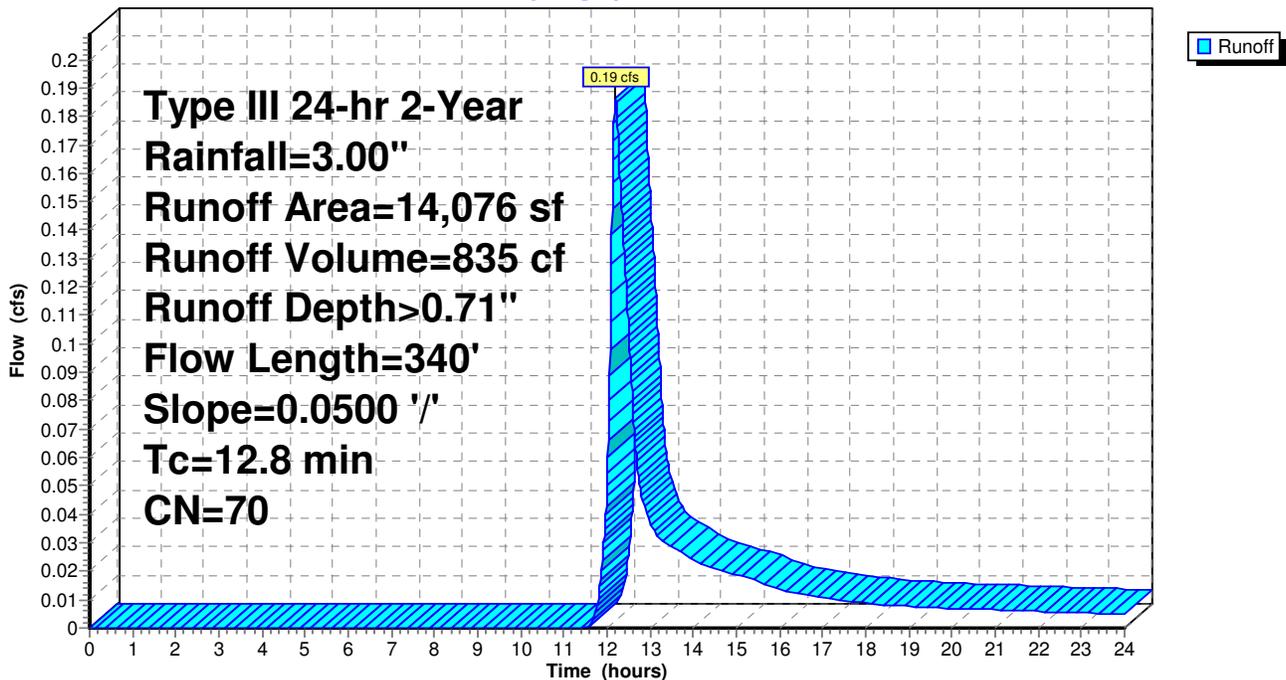
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Reach 1R: Existing wetland channel to WF 16

Inflow Area = 162,206 sf, Inflow Depth > 0.93" for 2-Year event
Inflow = 2.40 cfs @ 12.37 hrs, Volume= 12,605 cf
Outflow = 2.38 cfs @ 12.42 hrs, Volume= 12,572 cf, Atten= 1%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.01 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 4.6 min

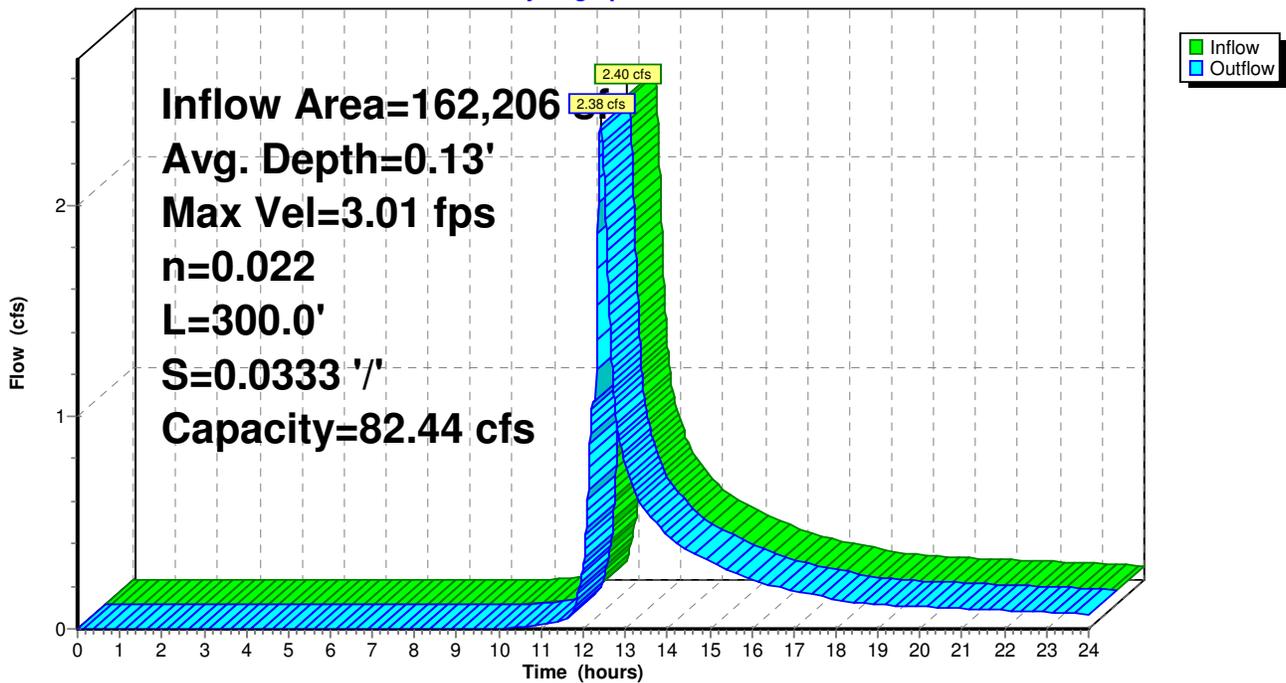
Peak Storage= 237 cf @ 12.39 hrs, Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'



Reach 1R: Existing wetland channel to WF 16

Hydrograph



Reach 2R: Swale from Drive at #10 to Drive at #11

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[79] Warning: Submerged Pond 3P Primary device # 1 OUTLET by 0.10'

Inflow Area =	6,950 sf,	Inflow Depth >	1.82"	for 2-Year event
Inflow =	0.38 cfs @	12.04 hrs,	Volume=	1,053 cf
Outflow =	0.38 cfs @	12.05 hrs,	Volume=	1,052 cf, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.94 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 0.97 fps, Avg. Travel Time= 1.1 min

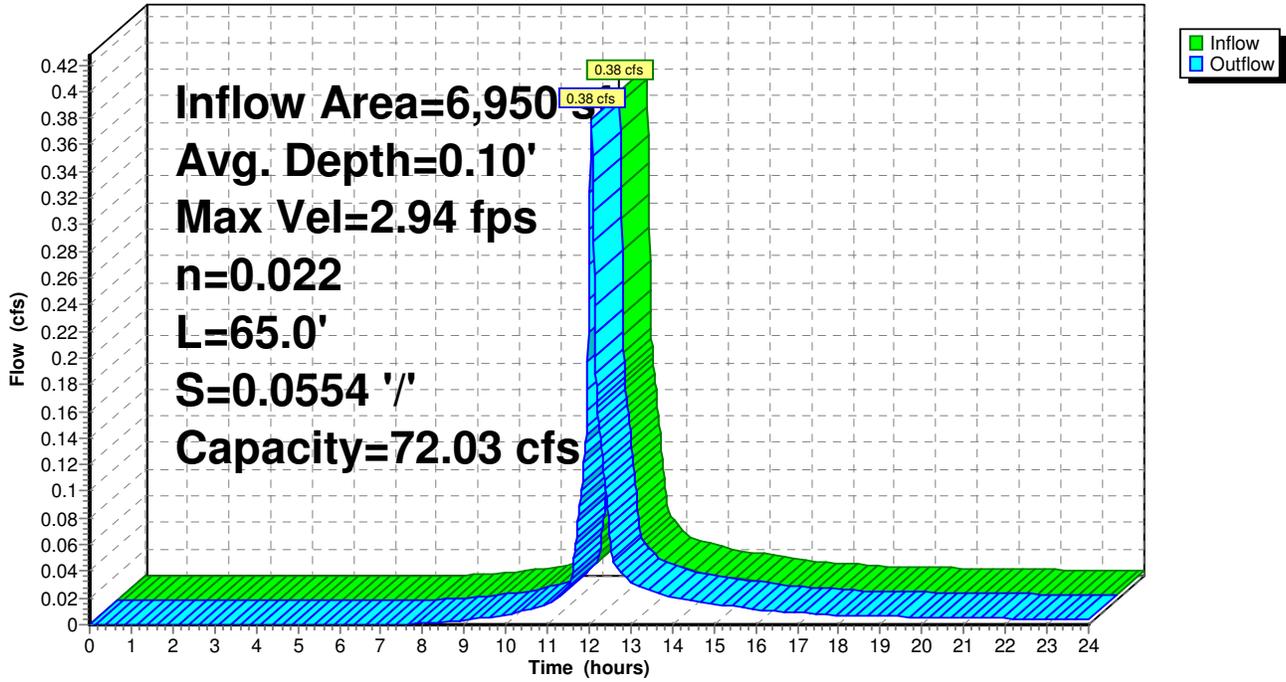
Peak Storage= 8 cf @ 12.05 hrs, Average Depth at Peak Storage= 0.10'
 Bank-Full Depth= 1.25', Capacity at Bank-Full= 72.03 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 3.0 '/' Top Width= 8.50'
 Length= 65.0' Slope= 0.0554 '/'
 Inlet Invert= 113.92', Outlet Invert= 110.32'



Reach 2R: Swale from Drive at #10 to Drive at #11

Hydrograph



Reach 55R: DMH 52 to DMH 50

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

[62] Warning: Submerged 13% of Reach 220R inlet

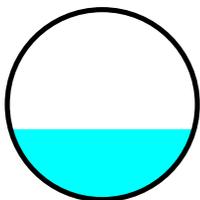
[62] Warning: Submerged 5% of Reach 222R inlet

Inflow Area =	40,720 sf,	Inflow Depth > 1.45"	for 2-Year event
Inflow =	1.71 cfs @ 12.08 hrs,	Volume=	4,926 cf
Outflow =	1.70 cfs @ 12.08 hrs,	Volume=	4,926 cf, Atten= 0%, Lag= 0.1 min

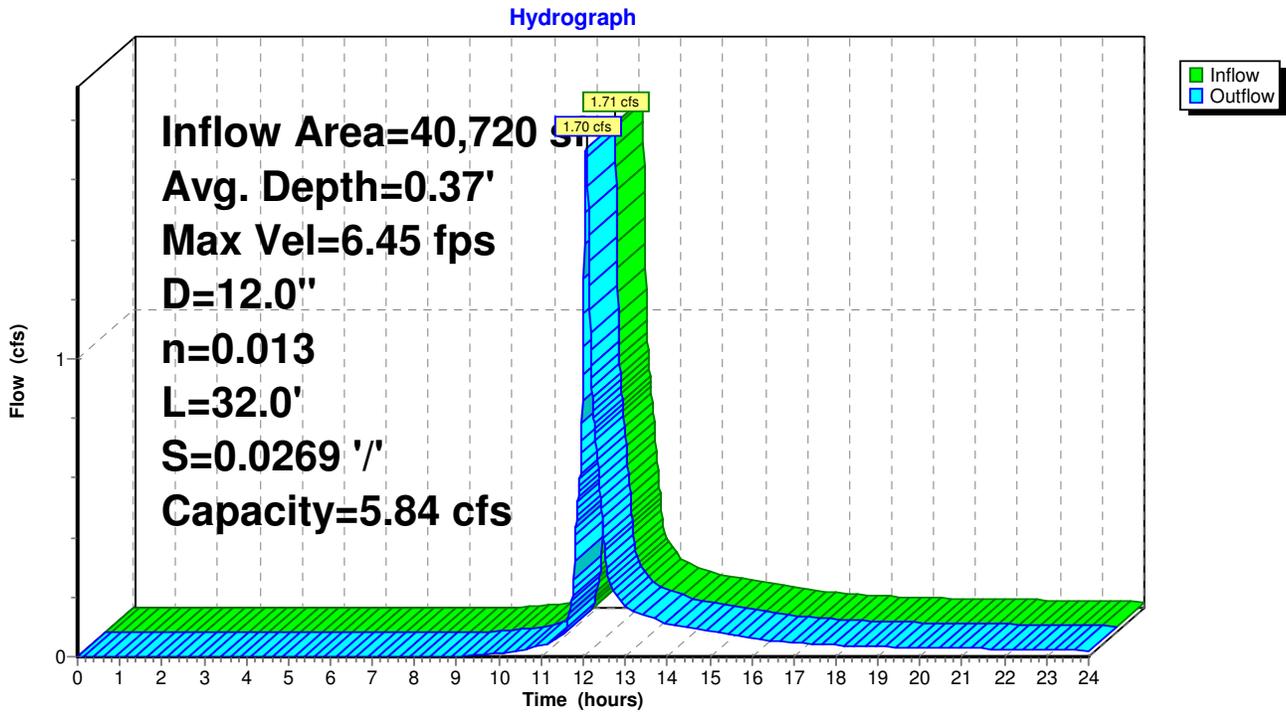
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.45 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 2.25 fps, Avg. Travel Time= 0.2 min

Peak Storage= 8 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.37'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.84 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
 Length= 32.0' Slope= 0.0269 1/1'
 Inlet Invert= 102.48', Outlet Invert= 101.62'



Reach 55R: DMH 52 to DMH 50



Reach 62R: DMH 64 to Bio-Retention A (HW 46)

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[52] Hint: Inlet conditions not evaluated

[79] Warning: Submerged Pond 43R Primary device # 1 INLET by 0.12'

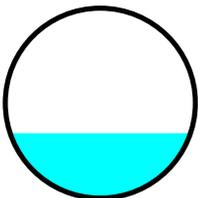
[79] Warning: Submerged Pond 61R Primary device # 1 OUTLET by 0.24'

Inflow Area =	44,069 sf,	Inflow Depth >	1.21"	for	2-Year event
Inflow =	1.09 cfs @	12.16 hrs,	Volume=	4,433 cf	
Outflow =	1.09 cfs @	12.16 hrs,	Volume=	4,433 cf,	Atten= 0%, Lag= 0.1 min

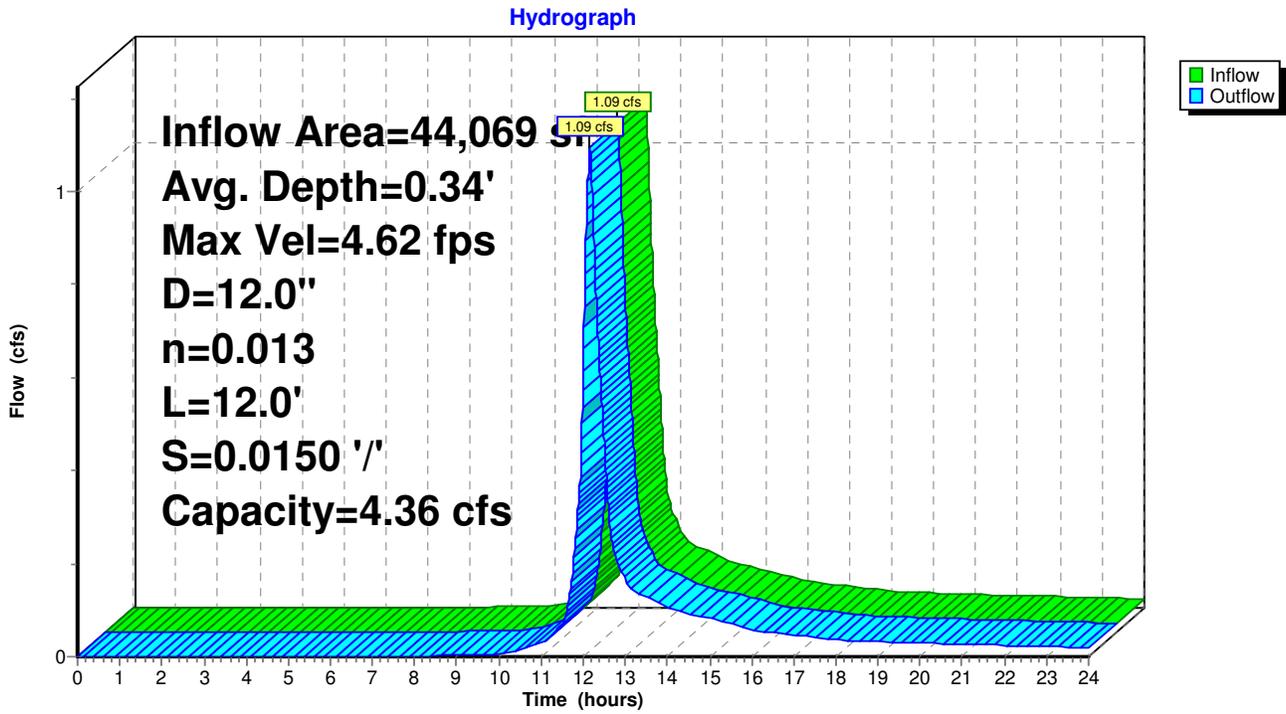
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.62 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.16 hrs, Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.36 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 12.0' Slope= 0.0150 '/'
Inlet Invert= 110.80', Outlet Invert= 110.62'



Reach 62R: DMH 64 to Bio-Retention A (HW 46)



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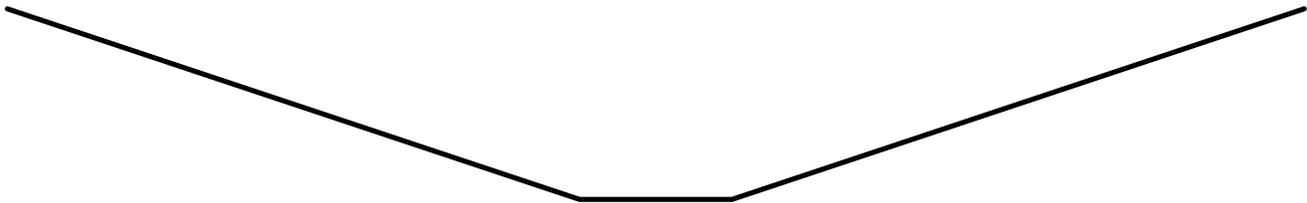
Reach 64R: Swale from Drive at #12 to RG 10A

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

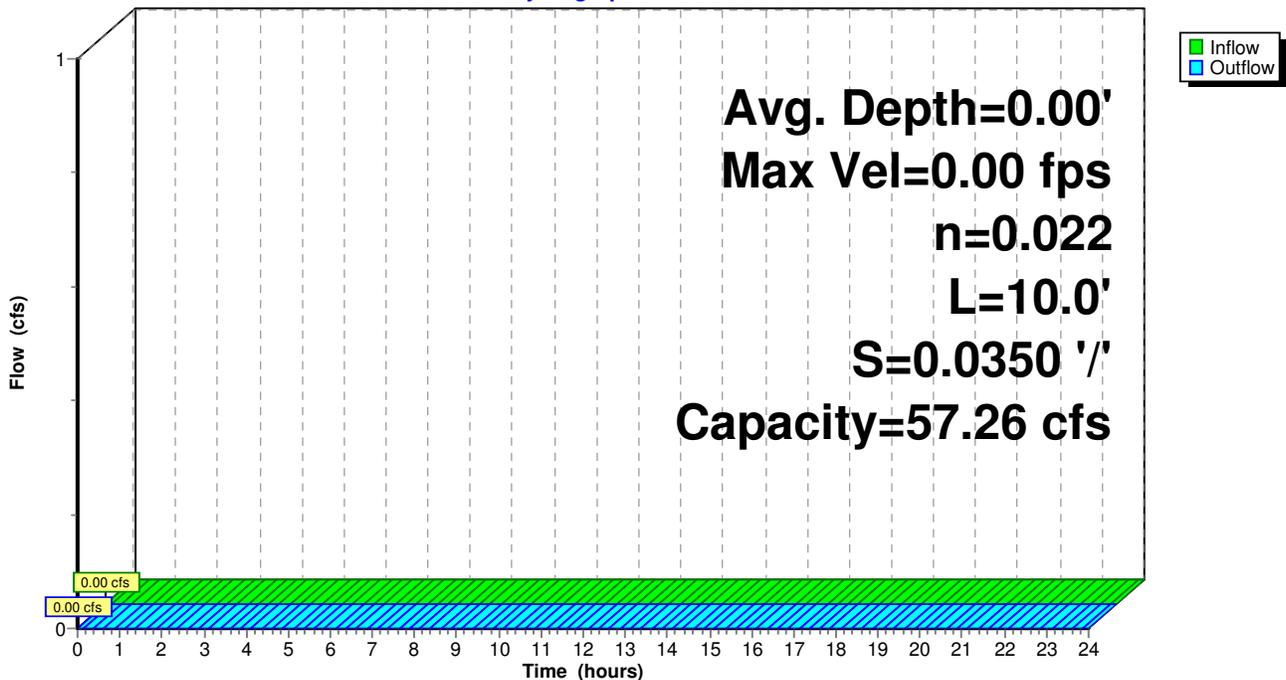
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 106.23', Outlet Invert= 105.88'



Reach 64R: Swale from Drive at #12 to RG 10A

Hydrograph



Reach 67R: Culvert under Unit 12 Drive

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

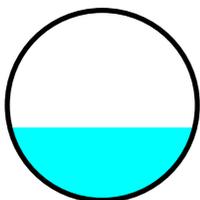
[52] Hint: Inlet conditions not evaluated

Inflow Area =	6,950 sf,	Inflow Depth > 1.63"	for 2-Year event
Inflow =	0.38 cfs @ 12.06 hrs,	Volume=	946 cf
Outflow =	0.38 cfs @ 12.07 hrs,	Volume=	946 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.06 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 1.12 fps, Avg. Travel Time= 0.5 min

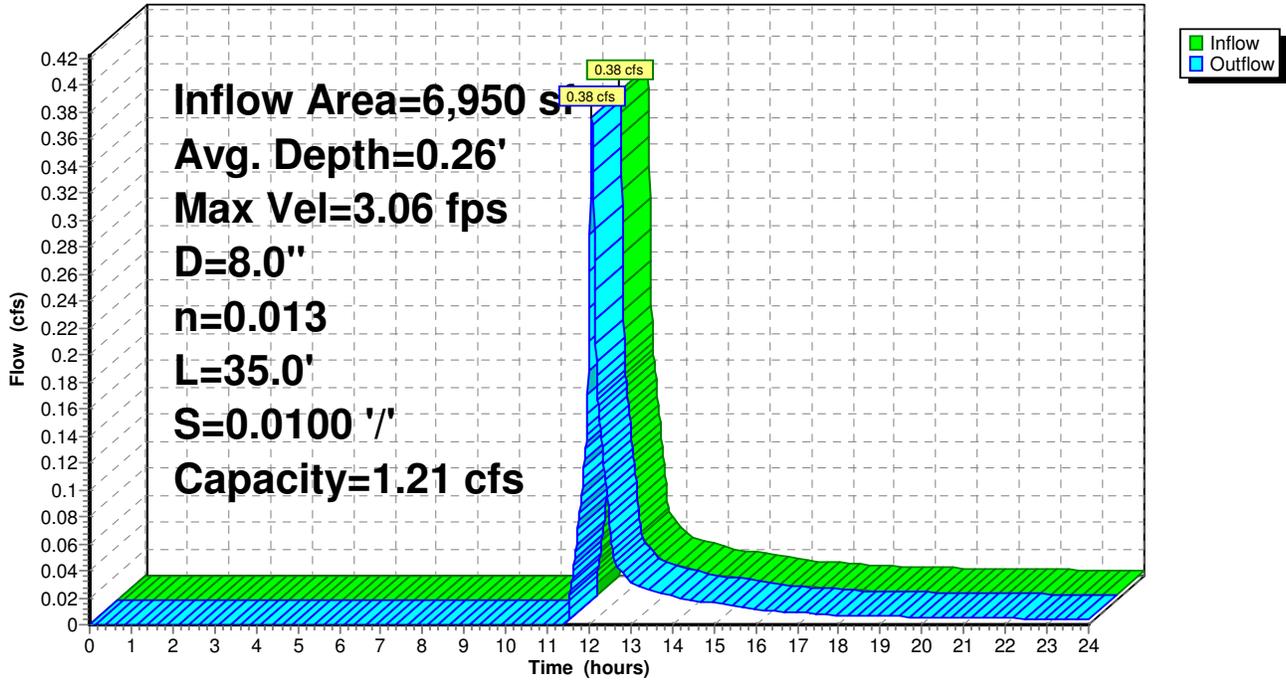
Peak Storage= 4 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.26'
 Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 35.0' Slope= 0.0100 '/'
 Inlet Invert= 106.58', Outlet Invert= 106.23'



Reach 67R: Culvert under Unit 12 Drive

Hydrograph



Reach 68R: Underdrain to CB 66

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

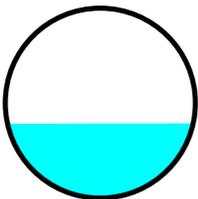
[79] Warning: Submerged Pond 8P Primary device # 7 INLET by 0.51'

Inflow Area = 44,069 sf, Inflow Depth > 1.17" for 2-Year event
Inflow = 0.96 cfs @ 12.23 hrs, Volume= 4,304 cf
Outflow = 0.96 cfs @ 12.23 hrs, Volume= 4,303 cf, Atten= 0%, Lag= 0.1 min

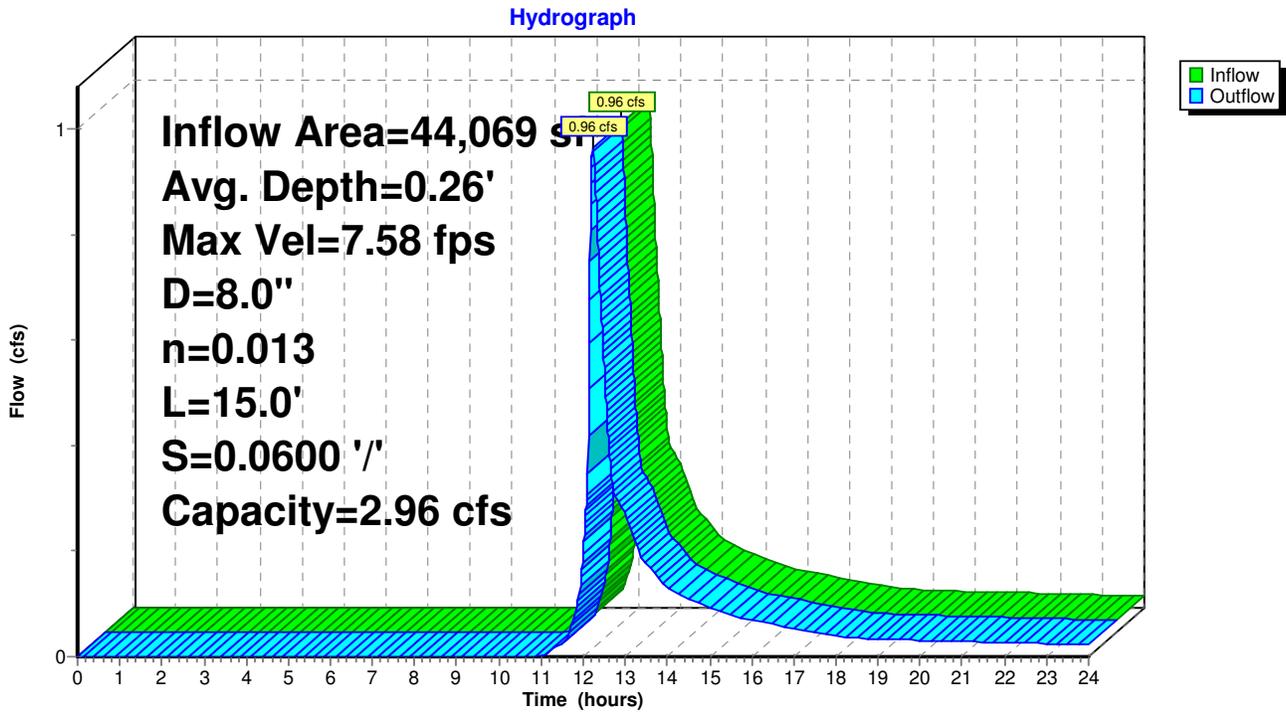
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.58 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.40 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.23 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 15.0' Slope= 0.0600 '/'
Inlet Invert= 107.25', Outlet Invert= 106.35'



Reach 68R: Underdrain to CB 66



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Reach 69R: Drain to DMH 52

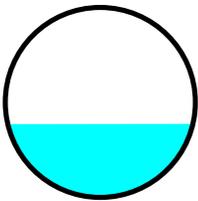
[52] Hint: Inlet conditions not evaluated

Inflow Area = 11,090 sf, Inflow Depth > 1.49" for 2-Year event
Inflow = 0.54 cfs @ 12.06 hrs, Volume= 1,375 cf
Outflow = 0.54 cfs @ 12.07 hrs, Volume= 1,375 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.34 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.61 fps, Avg. Travel Time= 0.4 min

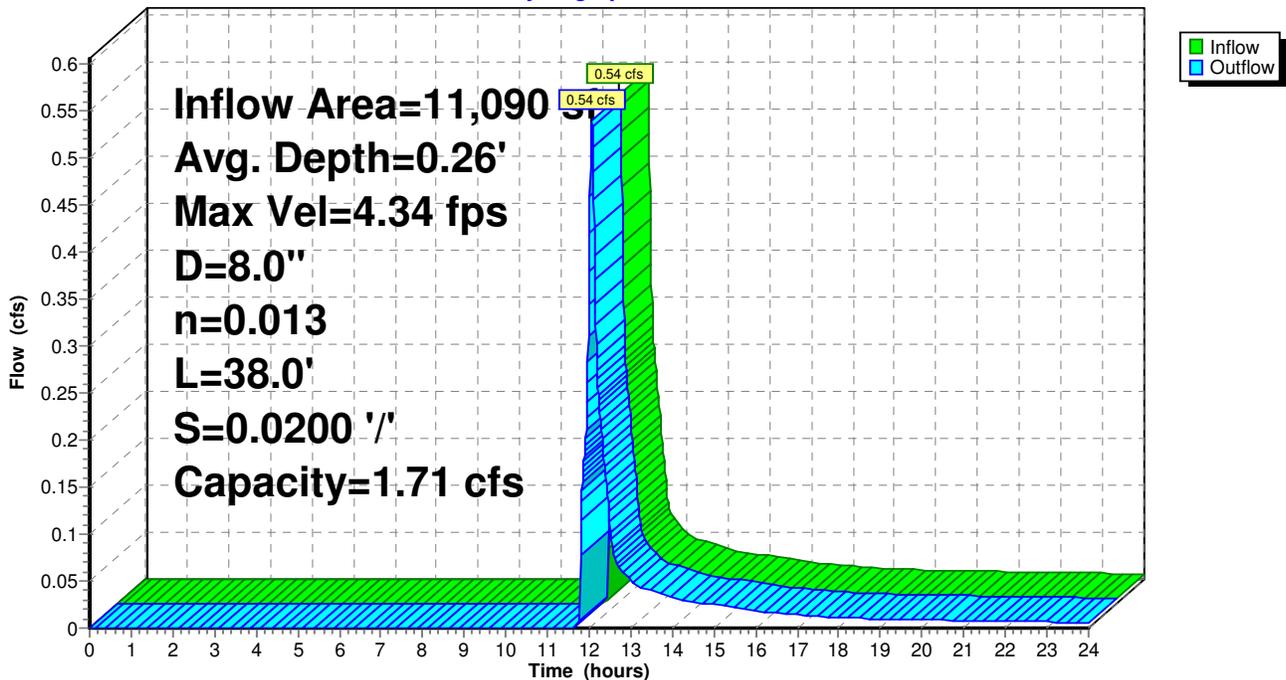
Peak Storage= 5 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.71 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 38.0' Slope= 0.0200 '/'
Inlet Invert= 103.69', Outlet Invert= 102.93'



Reach 69R: Drain to DMH 52

Hydrograph



Reach 114R: DMH 16 to DMH 14

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

[79] Warning: Submerged Pond 111P Primary device # 1 INLET by 0.04'

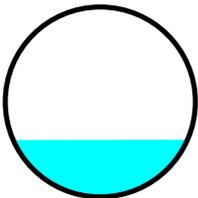
[79] Warning: Submerged Pond 112P Primary device # 1 OUTLET by 0.20'

Inflow Area =	12,978 sf,	Inflow Depth >	1.96"	for	2-Year event
Inflow =	0.82 cfs @	12.01 hrs,	Volume=	2,115 cf	
Outflow =	0.81 cfs @	12.02 hrs,	Volume=	2,114 cf,	Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 4.08 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 1.27 fps, Avg. Travel Time= 0.8 min

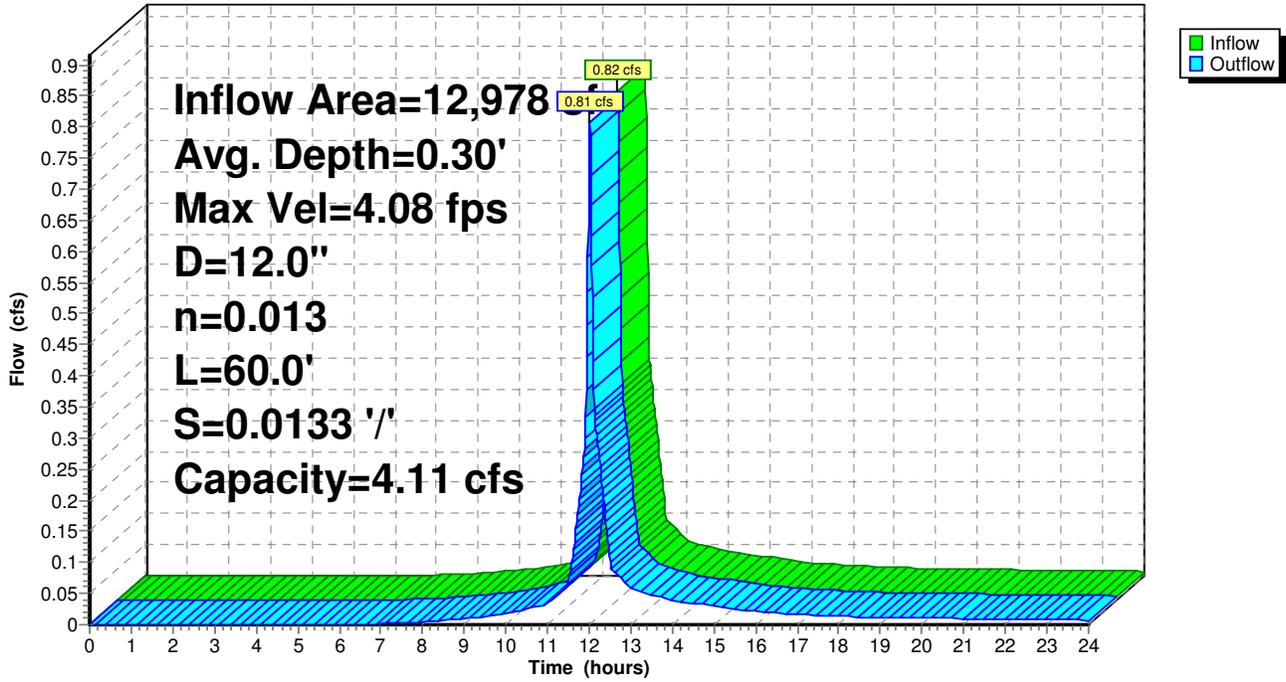
Peak Storage= 12 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.30'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.11 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 60.0' Slope= 0.0133 '/'
 Inlet Invert= 103.48', Outlet Invert= 102.68'



Reach 114R: DMH 16 to DMH 14

Hydrograph



Reach 118R: Swale from Drive at #4 to RG 116

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

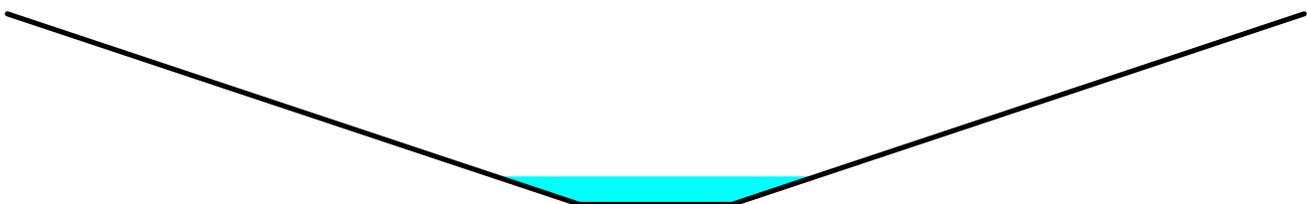
[79] Warning: Submerged Pond 119R Primary device # 1 OUTLET by 0.68'

Inflow Area =	18,760 sf,	Inflow Depth > 1.63"	for 2-Year event
Inflow =	0.93 cfs @ 12.02 hrs,	Volume=	2,543 cf
Outflow =	0.93 cfs @ 12.02 hrs,	Volume=	2,542 cf, Atten= 0%, Lag= 0.1 min

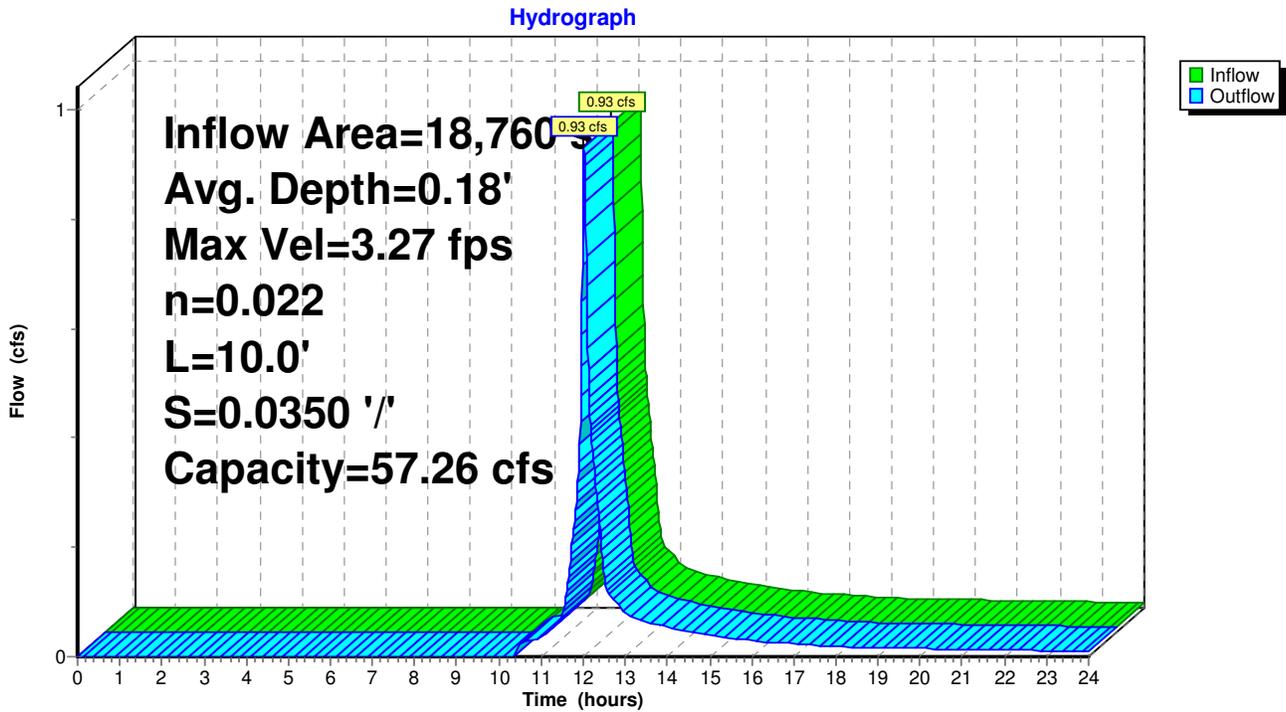
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.27 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 110.42', Outlet Invert= 110.07'



Reach 118R: Swale from Drive at #4 to RG 116



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Reach 127R: Swale from Drive at #3 to RG 118

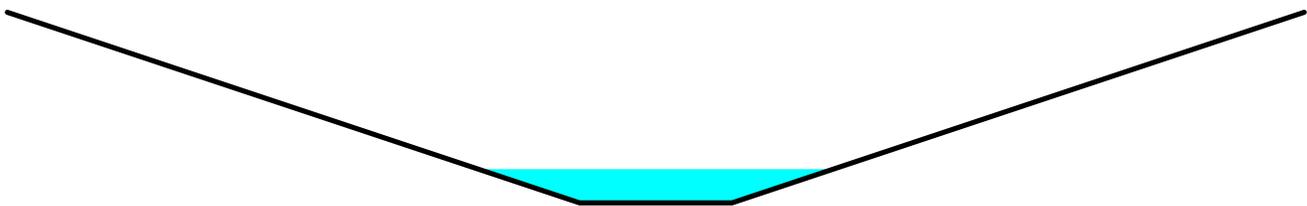
[61] Hint: Submerged 11% of Reach 128R bottom

Inflow Area = 13,016 sf, Inflow Depth > 2.03" for 2-Year event
Inflow = 0.88 cfs @ 12.03 hrs, Volume= 2,206 cf
Outflow = 0.88 cfs @ 12.03 hrs, Volume= 2,205 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.38 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 0.2 min

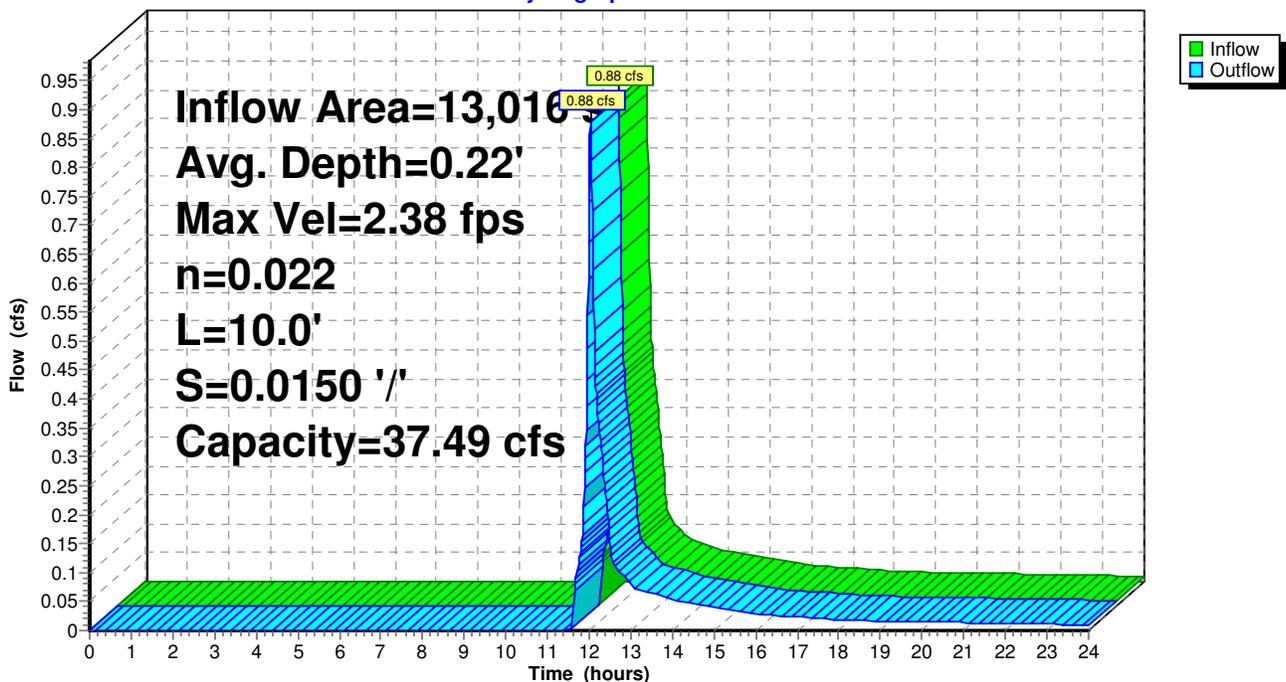
Peak Storage= 4 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 37.49 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0150 '/'
Inlet Invert= 110.00', Outlet Invert= 109.85'



Reach 127R: Swale from Drive at #3 to RG 118

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Reach 128R: Culvert under Unit 3 Drive

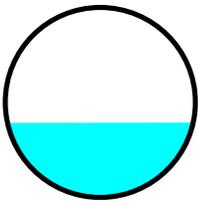
[52] Hint: Inlet conditions not evaluated

Inflow Area = 13,016 sf, Inflow Depth > 2.03" for 2-Year event
Inflow = 0.88 cfs @ 12.03 hrs, Volume= 2,206 cf
Outflow = 0.88 cfs @ 12.03 hrs, Volume= 2,206 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.58 fps, Avg. Travel Time= 0.3 min

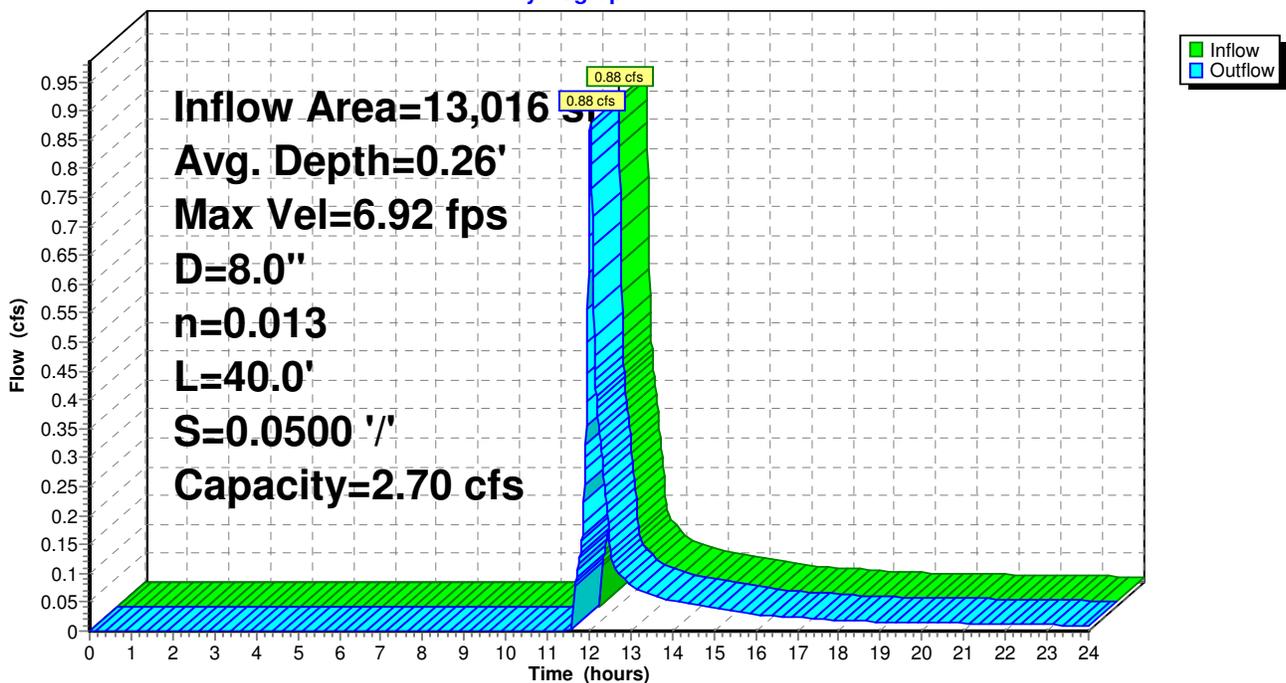
Peak Storage= 5 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.70 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 40.0' Slope= 0.0500 '/'
Inlet Invert= 112.00', Outlet Invert= 110.00'



Reach 128R: Culvert under Unit 3 Drive

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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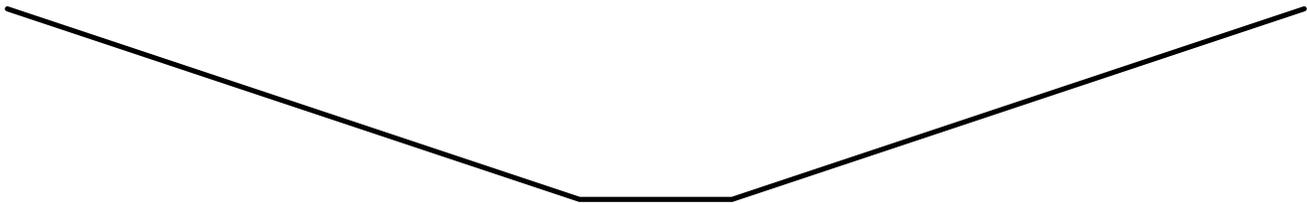
Reach 129R: Swale from Drive at #20 to RG 124

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

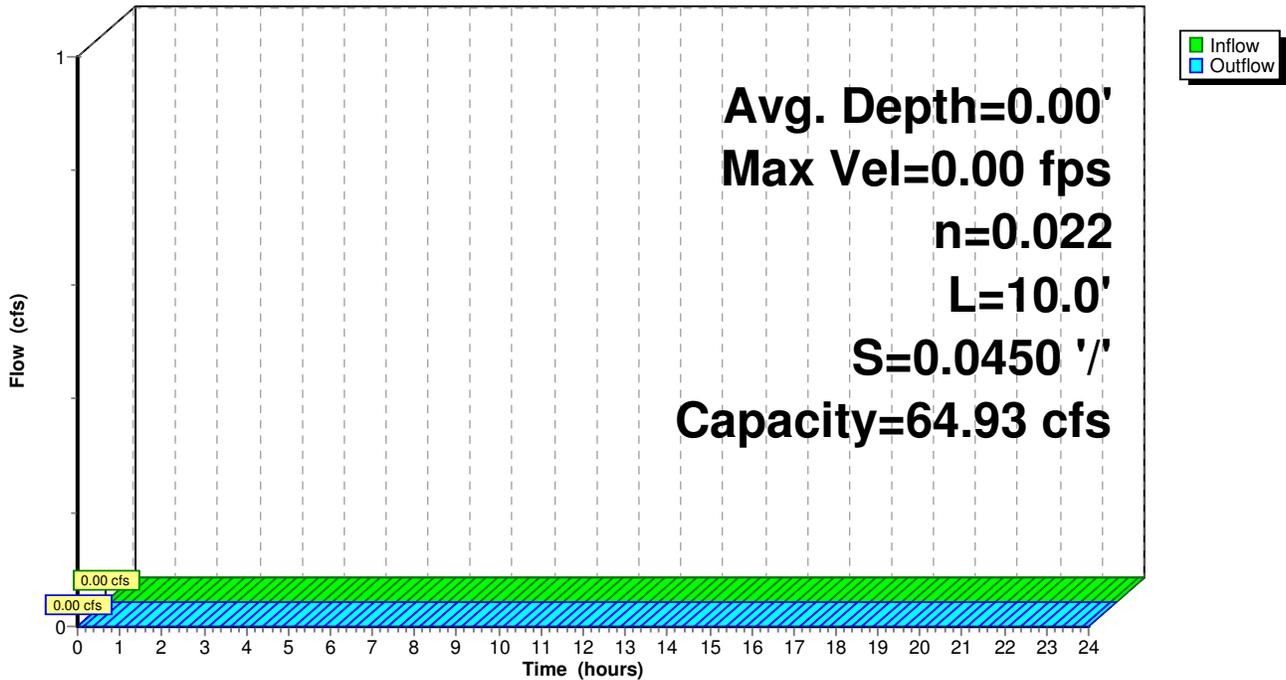
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 64.93 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0450 '/'
Inlet Invert= 115.37', Outlet Invert= 114.92'



Reach 129R: Swale from Drive at #20 to RG 124

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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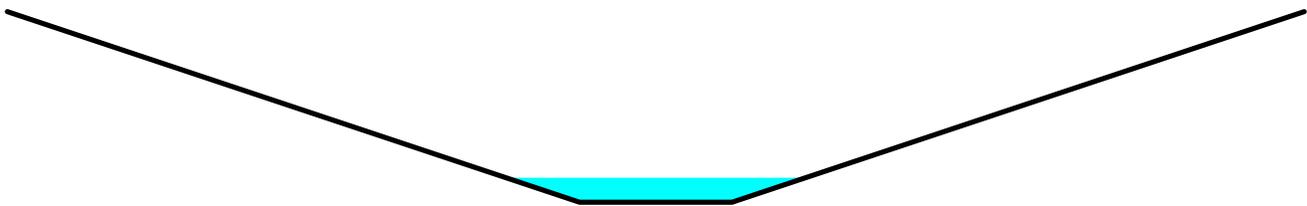
Reach 130R: Swale to RG 122

Inflow Area = 6,950 sf, Inflow Depth > 2.95" for 2-Year event
Inflow = 0.74 cfs @ 12.02 hrs, Volume= 1,708 cf
Outflow = 0.73 cfs @ 12.02 hrs, Volume= 1,708 cf, Atten= 2%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.05 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 0.5 min

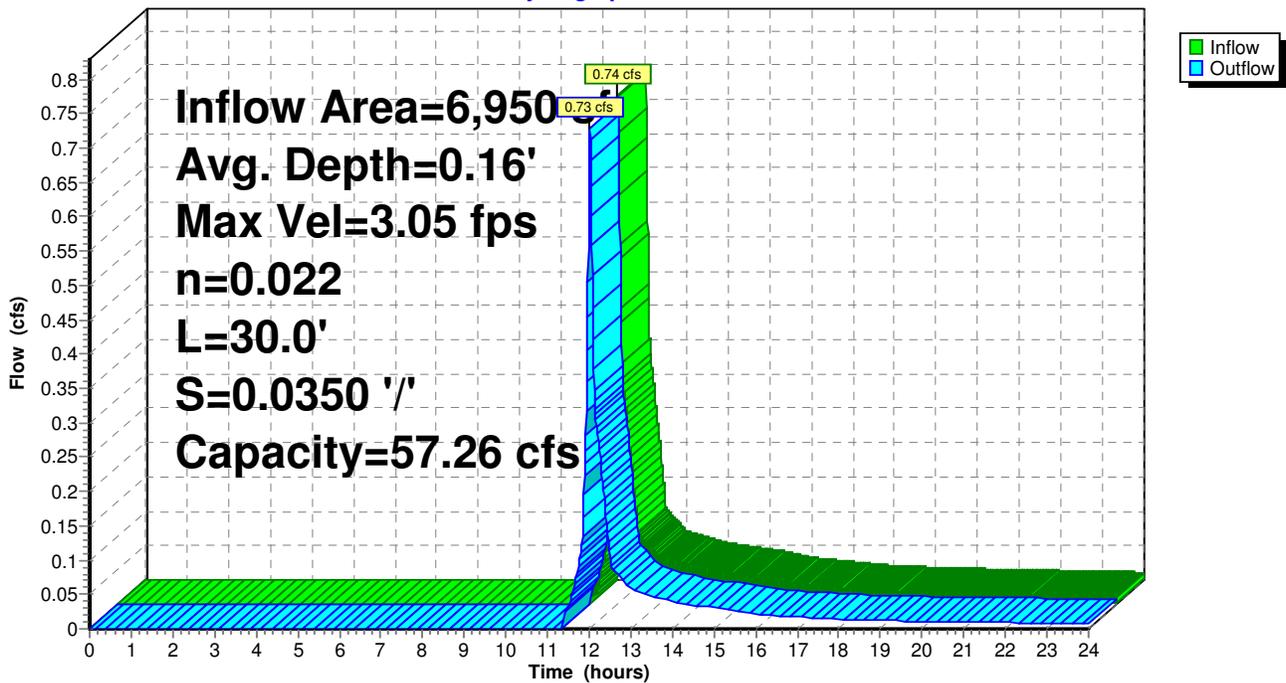
Peak Storage= 7 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 30.0' Slope= 0.0350 '/'
Inlet Invert= 114.25', Outlet Invert= 113.20'



Reach 130R: Swale to RG 122

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Reach 131R: Culvert under Unit 20 Drive

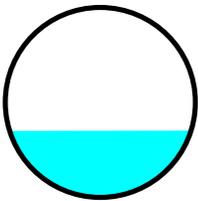
[52] Hint: Inlet conditions not evaluated

Inflow Area = 6,950 sf, Inflow Depth > 1.24" for 2-Year event
Inflow = 0.32 cfs @ 12.02 hrs, Volume= 719 cf
Outflow = 0.32 cfs @ 12.02 hrs, Volume= 719 cf, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.92 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 0.8 min

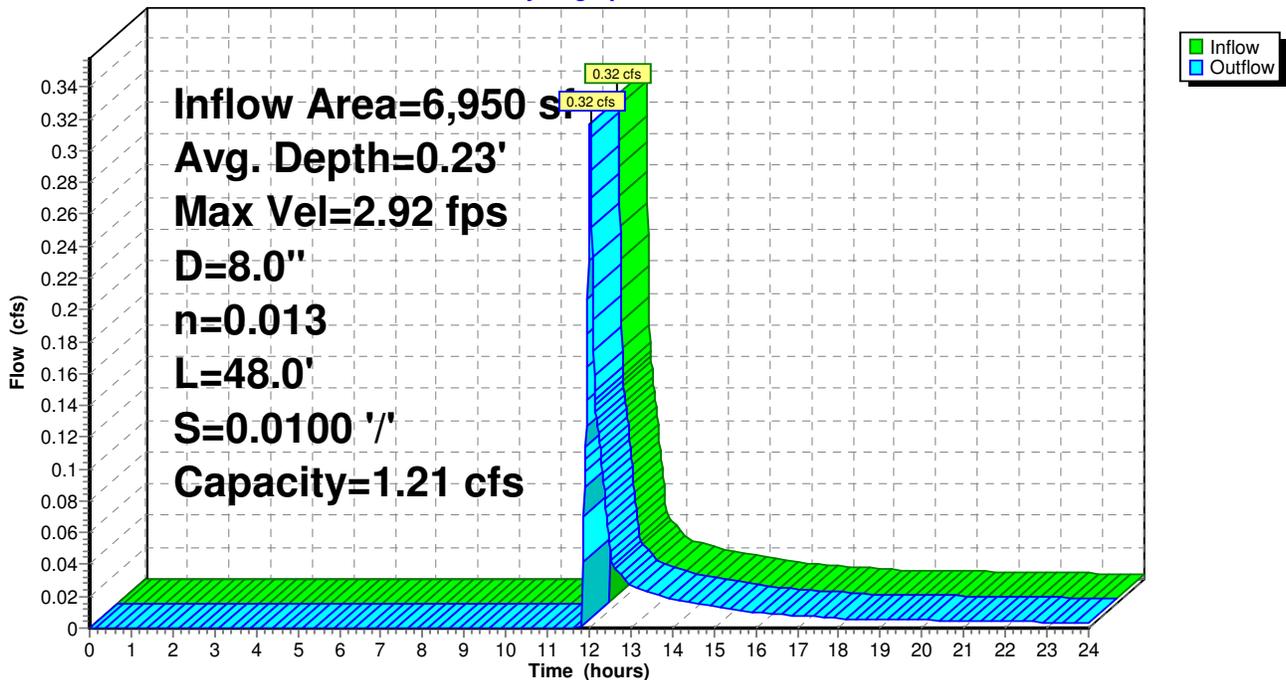
Peak Storage= 5 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 48.0' Slope= 0.0100 '/'
Inlet Invert= 115.85', Outlet Invert= 115.37'



Reach 131R: Culvert under Unit 20 Drive

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 137R: Swale Back of 7,6,5

Inflow Area = 13,850 sf, Inflow Depth > 1.19" for 2-Year event
Inflow = 0.48 cfs @ 12.05 hrs, Volume= 1,371 cf
Outflow = 0.46 cfs @ 12.10 hrs, Volume= 1,367 cf, Atten= 4%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.26 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.38 fps, Avg. Travel Time= 6.1 min

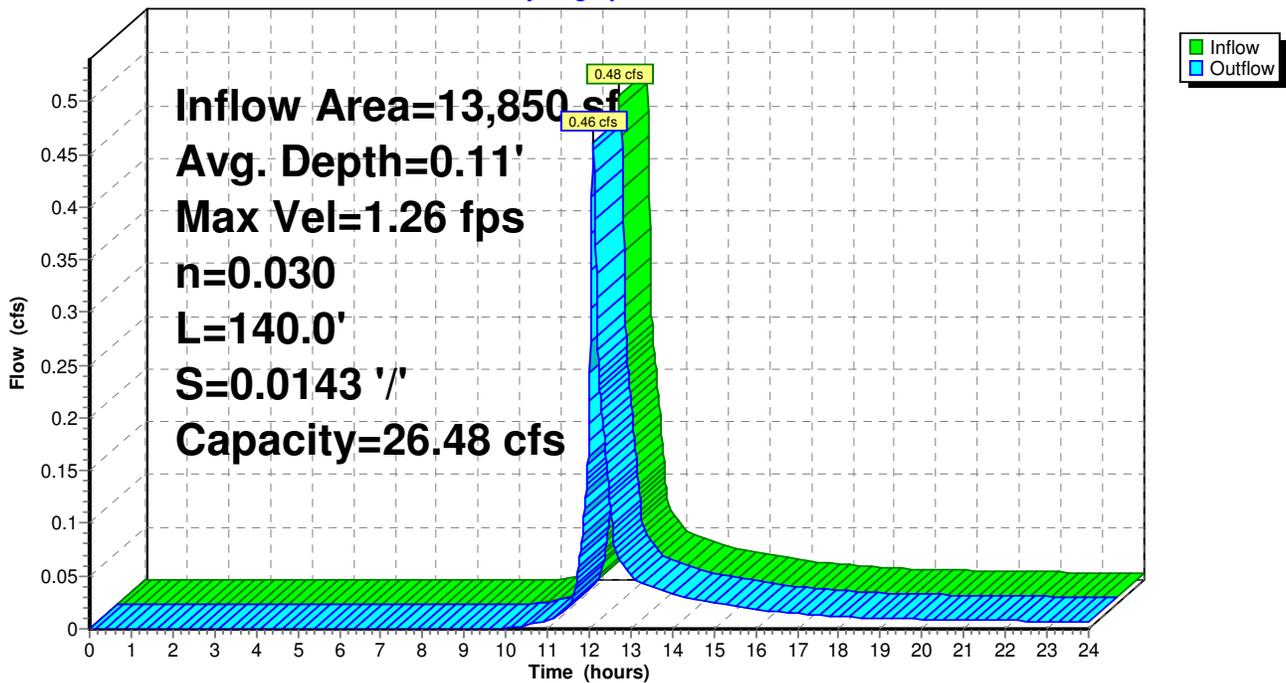
Peak Storage= 51 cf @ 12.07 hrs, Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.48 cfs

3.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 140.0' Slope= 0.0143 '/'
Inlet Invert= 118.00', Outlet Invert= 116.00'



Reach 137R: Swale Back of 7,6,5

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Reach 138R: Swale Back of 4

[61] Hint: Submerged 12% of Reach 137R bottom

Inflow Area = 34,910 sf, Inflow Depth > 1.08" for 2-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 3,146 cf
Outflow = 0.99 cfs @ 12.13 hrs, Volume= 3,139 cf, Atten= 3%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.58 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 4.5 min

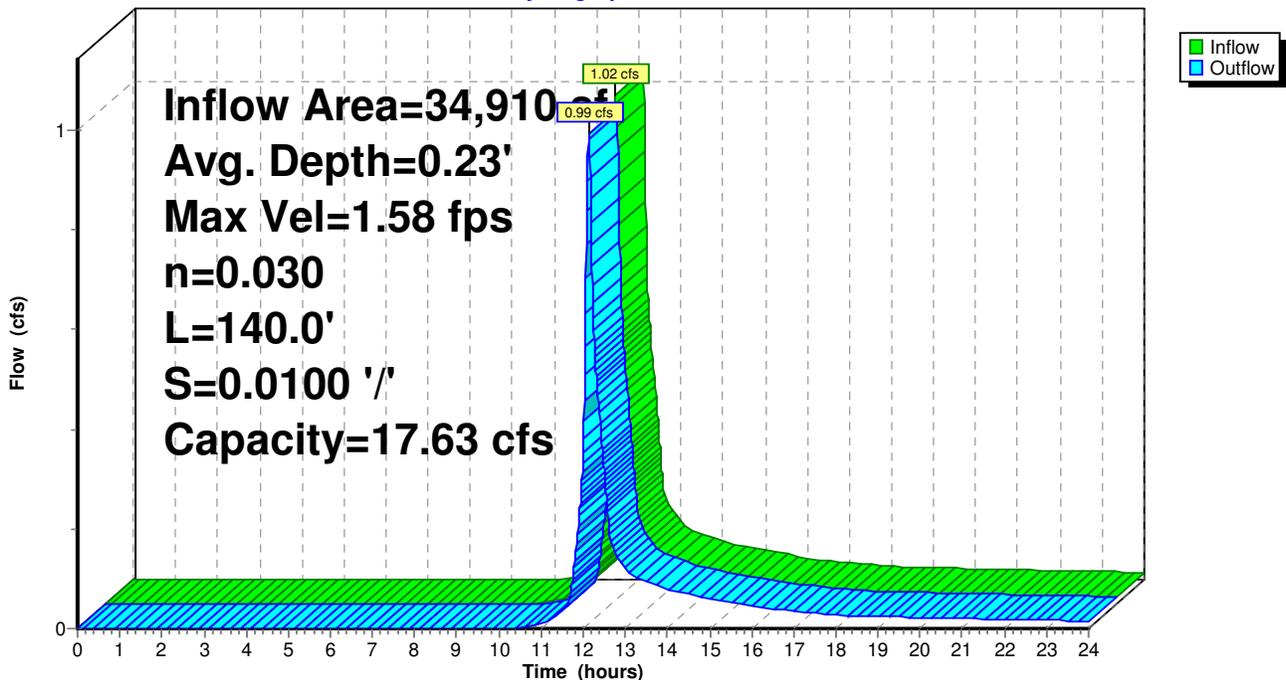
Peak Storage= 88 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 17.63 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 116.00', Outlet Invert= 114.60'



Reach 138R: Swale Back of 4

Hydrograph



Reach 149R: DMH 14 to DMH 12

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

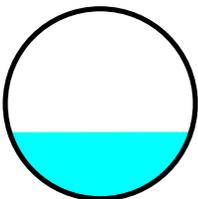
[61] Hint: Submerged 53% of Reach 114R bottom

Inflow Area =	86,324 sf,	Inflow Depth > 1.53"	for 2-Year event
Inflow =	3.39 cfs @ 12.03 hrs,	Volume=	10,976 cf
Outflow =	3.38 cfs @ 12.04 hrs,	Volume=	10,973 cf, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.13 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.98 fps, Avg. Travel Time= 0.8 min

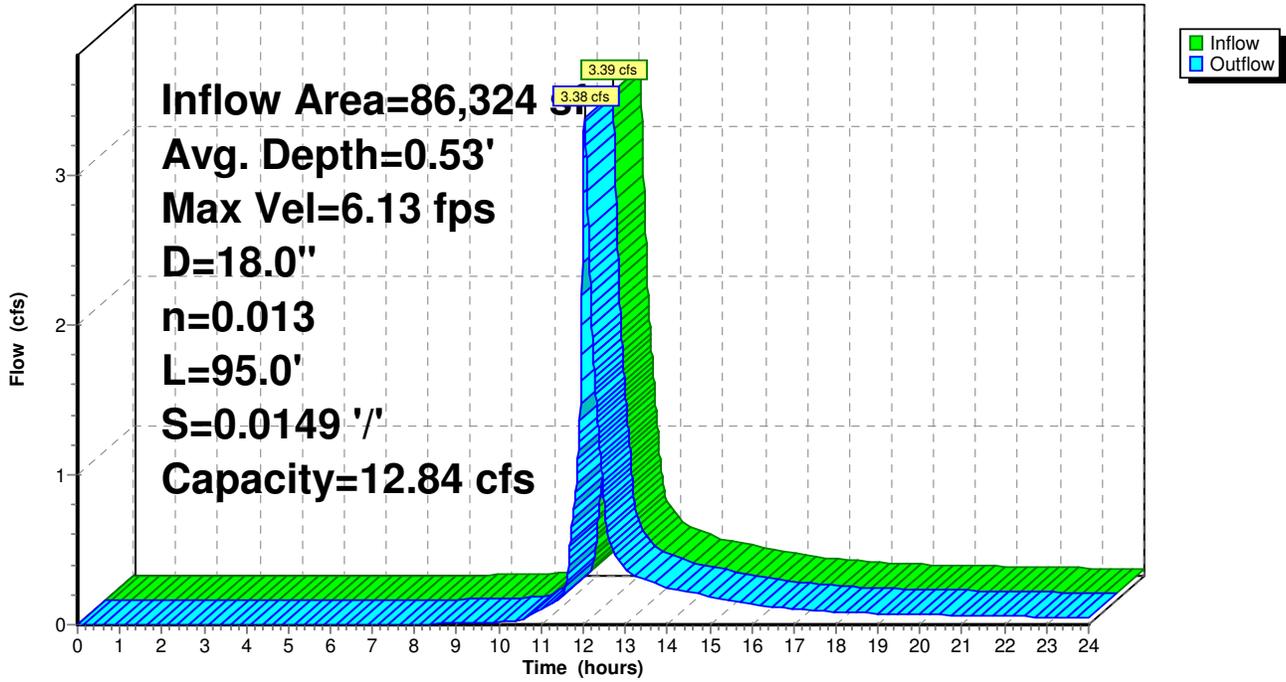
Peak Storage= 53 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.84 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0149 '/'
Inlet Invert= 102.58', Outlet Invert= 101.16'



Reach 149R: DMH 14 to DMH 12

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 150R: DMH 12 to HW 10 - Outlet

[52] Hint: Inlet conditions not evaluated

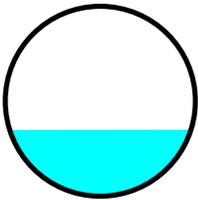
[61] Hint: Submerged 30% of Reach 149R bottom

Inflow Area = 86,324 sf, Inflow Depth > 1.53" for 2-Year event
Inflow = 3.38 cfs @ 12.04 hrs, Volume= 10,973 cf
Outflow = 3.37 cfs @ 12.04 hrs, Volume= 10,971 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.15 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.98 fps, Avg. Travel Time= 0.5 min

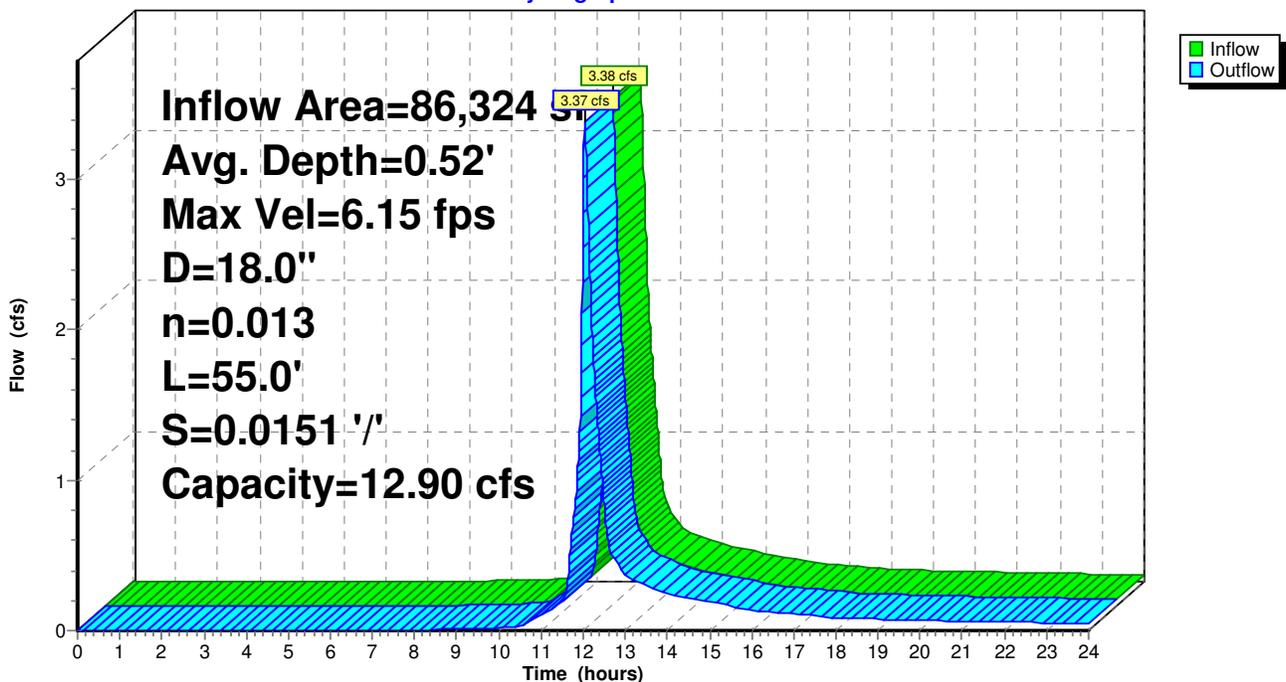
Peak Storage= 30 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.90 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 55.0' Slope= 0.0151 '/'
Inlet Invert= 101.06', Outlet Invert= 100.23'



Reach 150R: DMH 12 to HW 10 - Outlet

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 153R: CB 116 to DMH 14

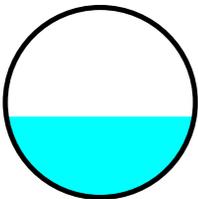
[52] Hint: Inlet conditions not evaluated

Inflow Area = 21,810 sf, Inflow Depth > 1.65" for 2-Year event
Inflow = 1.11 cfs @ 12.02 hrs, Volume= 3,004 cf
Outflow = 1.11 cfs @ 12.02 hrs, Volume= 3,004 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.87 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.94 fps, Avg. Travel Time= 0.2 min

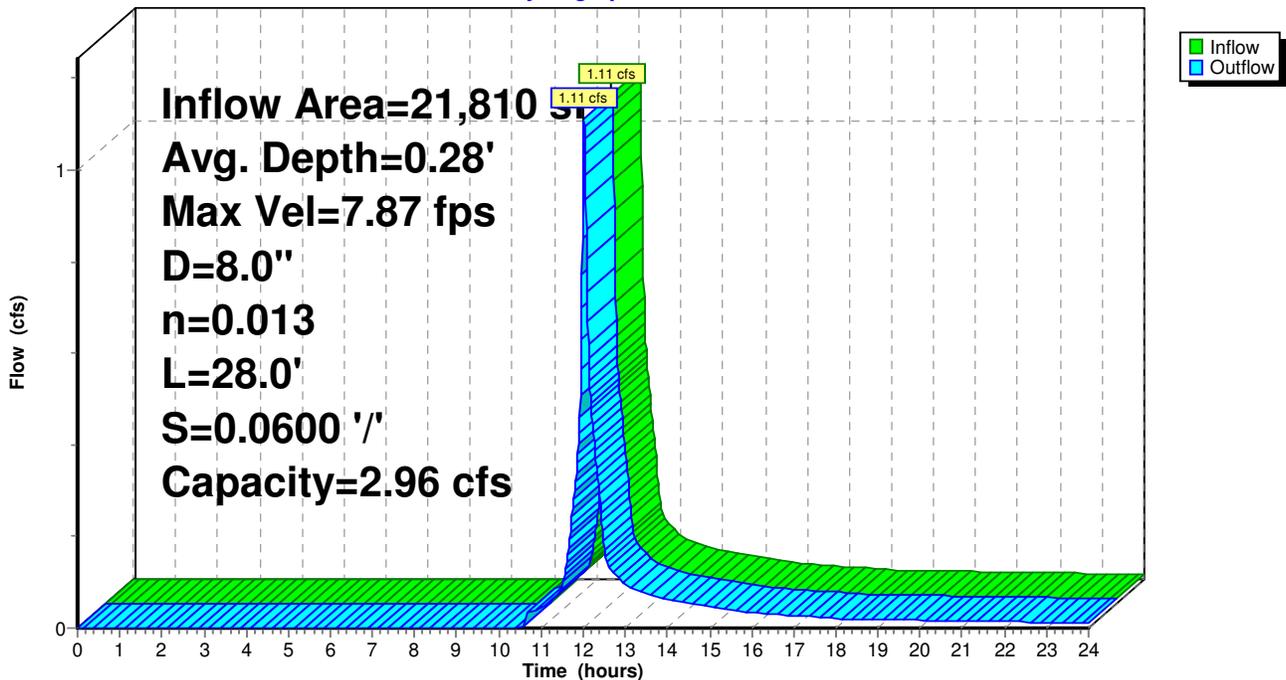
Peak Storage= 4 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 28.0' Slope= 0.0600 '/'
Inlet Invert= 107.12', Outlet Invert= 105.44'



Reach 153R: CB 116 to DMH 14

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 154R: Swale from Drive at #6 to RG 126

[43] Hint: Has no inflow (Outflow=Zero)

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'

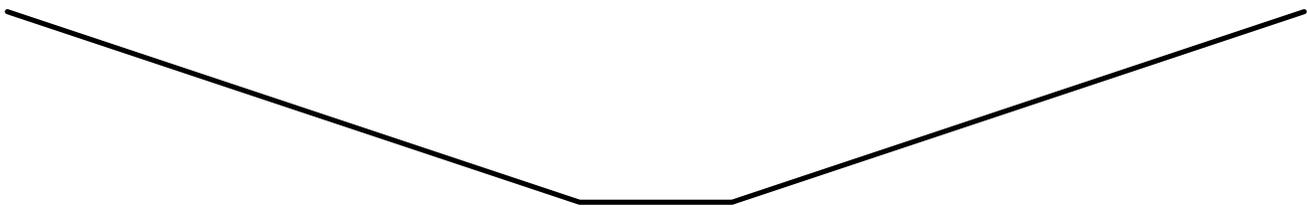
Bank-Full Depth= 1.25', Capacity at Bank-Full= 29.18 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 3.0 '/' Top Width= 8.50'

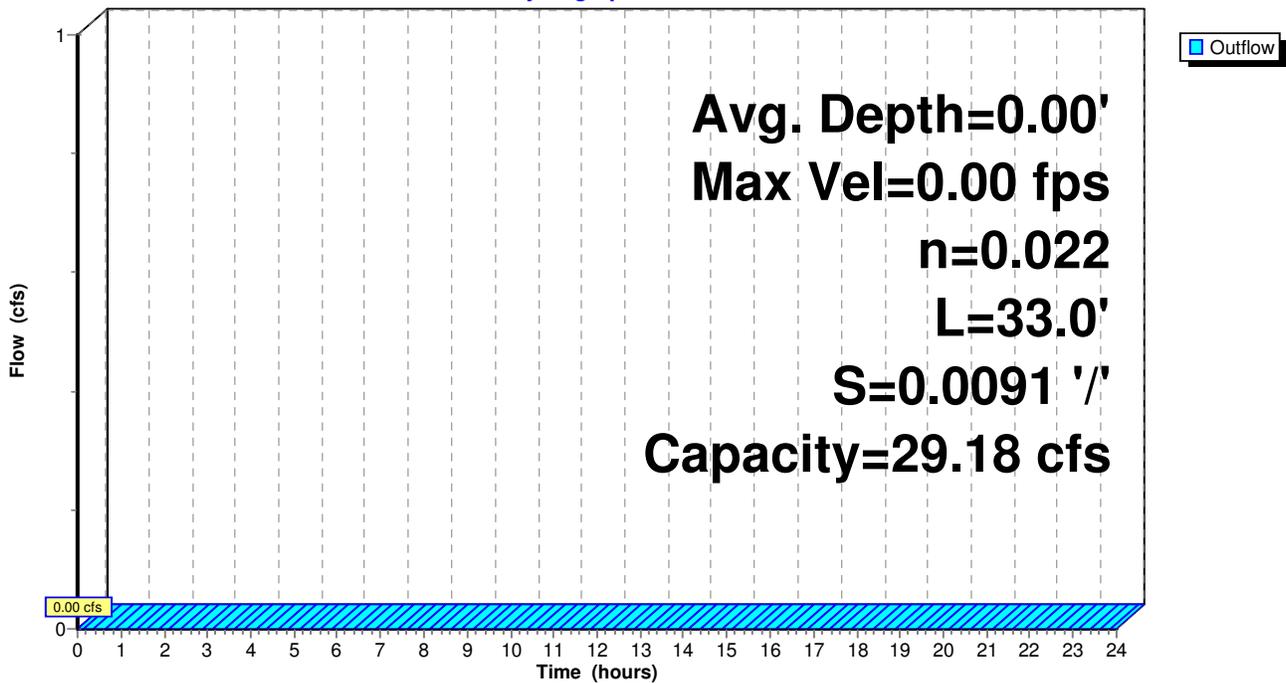
Length= 33.0' Slope= 0.0091 '/'

Inlet Invert= 115.65', Outlet Invert= 115.35'



Reach 154R: Swale from Drive at #6 to RG 126

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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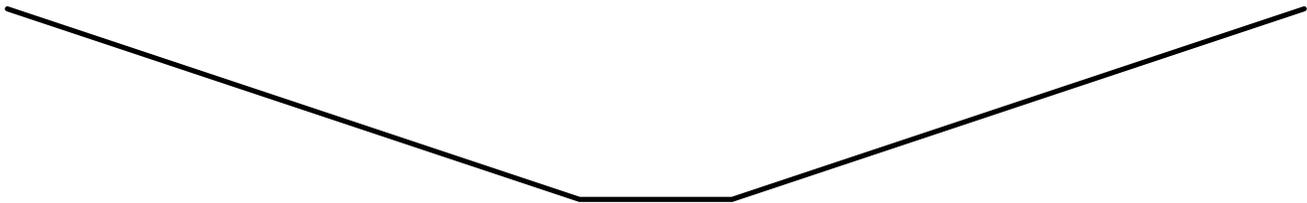
Reach 155R: Swale from Drive at #5 to RG 120

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

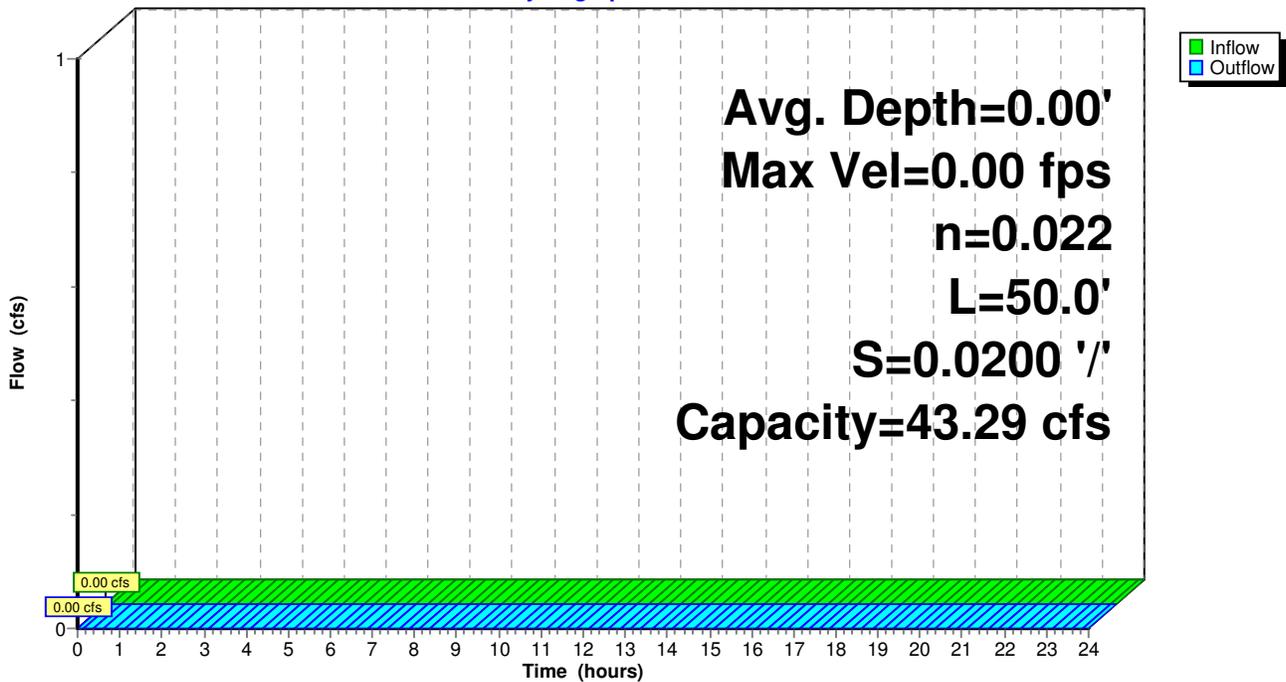
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 43.29 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 50.0' Slope= 0.0200 '/'
Inlet Invert= 114.00', Outlet Invert= 113.00'



Reach 155R: Swale from Drive at #5 to RG 120

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

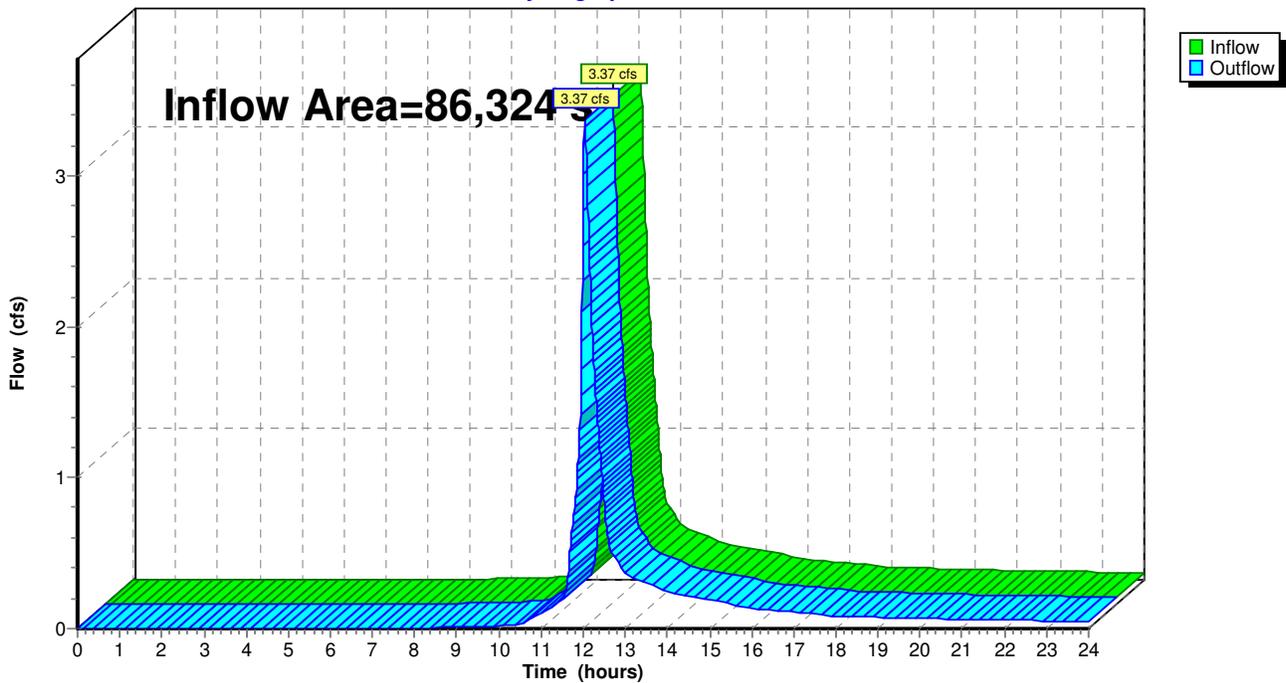
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 86,324 sf, Inflow Depth > 1.53" for 2-Year event
Inflow = 3.37 cfs @ 12.04 hrs, Volume= 10,971 cf
Outflow = 3.37 cfs @ 12.04 hrs, Volume= 10,971 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 220R: CB 56 to DMH 52

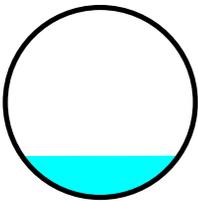
[52] Hint: Inlet conditions not evaluated

Inflow Area = 8,660 sf, Inflow Depth > 1.59" for 2-Year event
Inflow = 0.38 cfs @ 12.08 hrs, Volume= 1,145 cf
Outflow = 0.38 cfs @ 12.09 hrs, Volume= 1,145 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.94 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 0.2 min

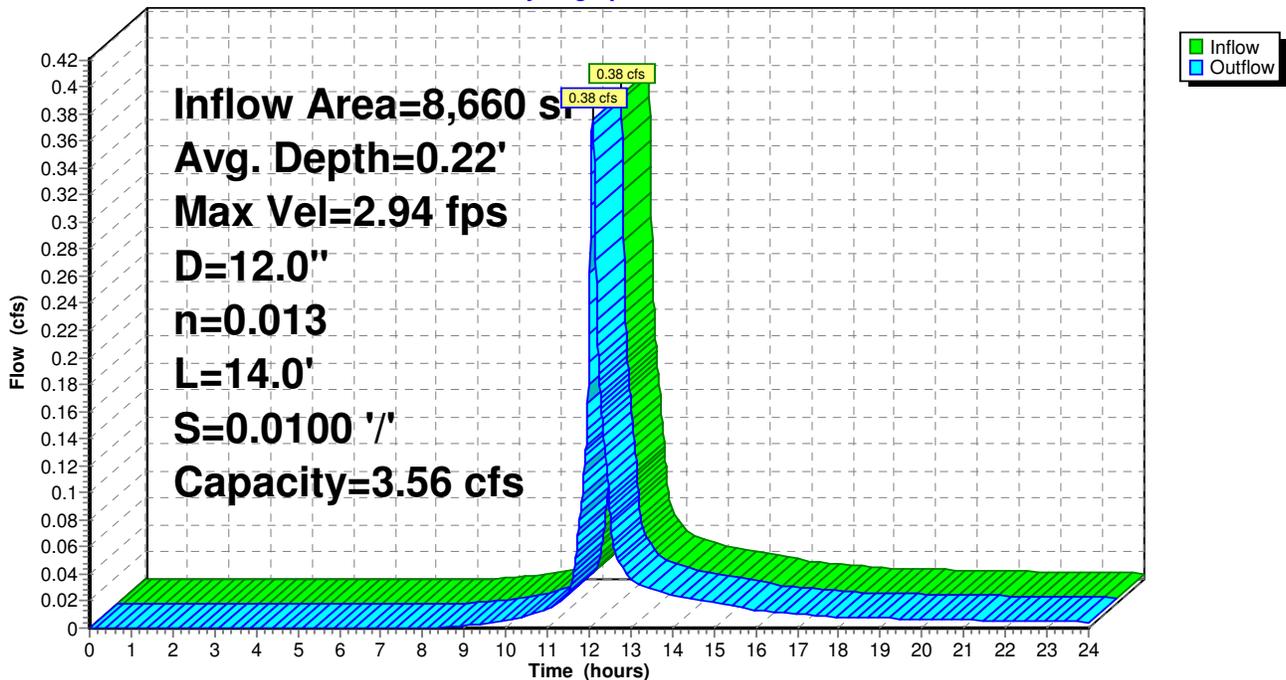
Peak Storage= 2 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 102.72', Outlet Invert= 102.58'



Reach 220R: CB 56 to DMH 52

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Reach 222R: CB 54 to DMH 52

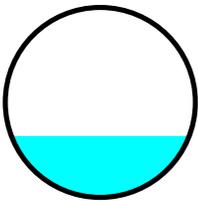
[52] Hint: Inlet conditions not evaluated

Inflow Area = 20,970 sf, Inflow Depth > 1.38" for 2-Year event
Inflow = 0.80 cfs @ 12.08 hrs, Volume= 2,407 cf
Outflow = 0.80 cfs @ 12.08 hrs, Volume= 2,407 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.66 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 0.3 min

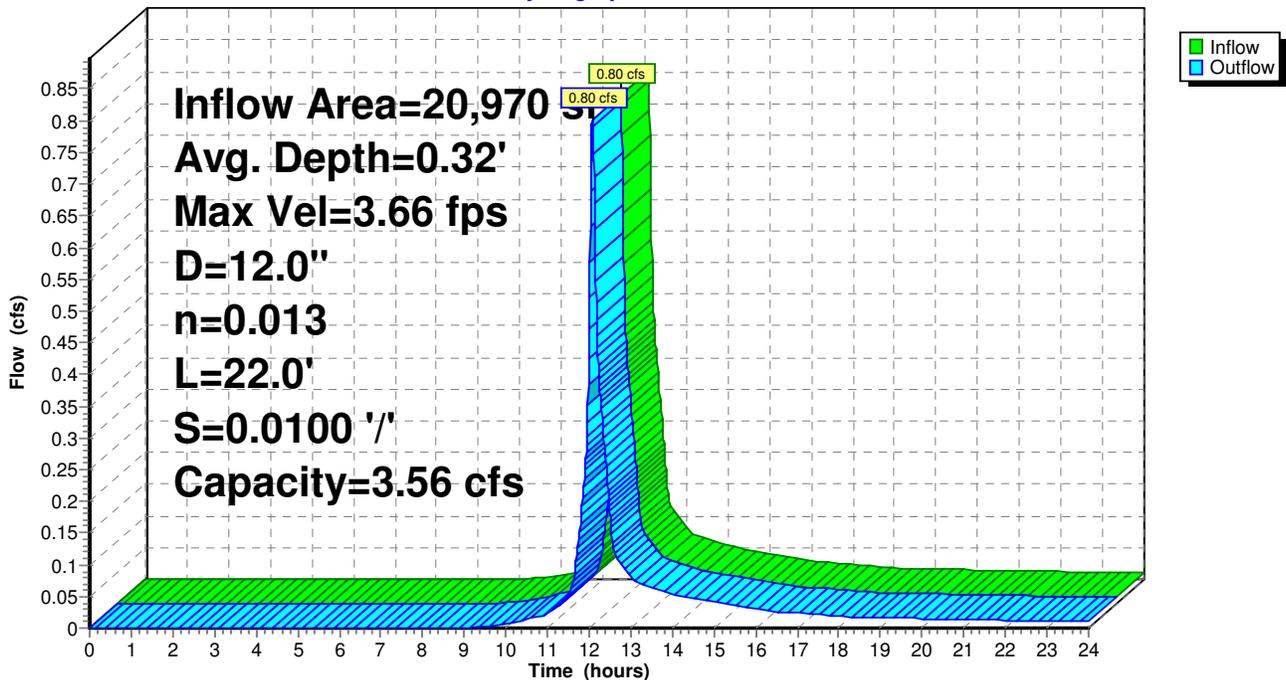
Peak Storage= 5 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 22.0' Slope= 0.0100 '/'
Inlet Invert= 102.80', Outlet Invert= 102.58'



Reach 222R: CB 54 to DMH 52

Hydrograph



Reach 403R: CB 65 to DMH 50

FROM HYDROCAD WEBSITE:

[79] Warning:
{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

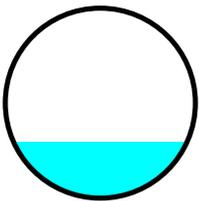
[79] Warning: Submerged Pond 67P Primary device # 1 OUTLET by 0.16'

Inflow Area =	44,069 sf,	Inflow Depth >	1.17"	for	2-Year event
Inflow =	0.96 cfs @	12.23 hrs,	Volume=	4,303 cf	
Outflow =	0.96 cfs @	12.23 hrs,	Volume=	4,303 cf,	Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.94 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.19 fps, Avg. Travel Time= 0.2 min

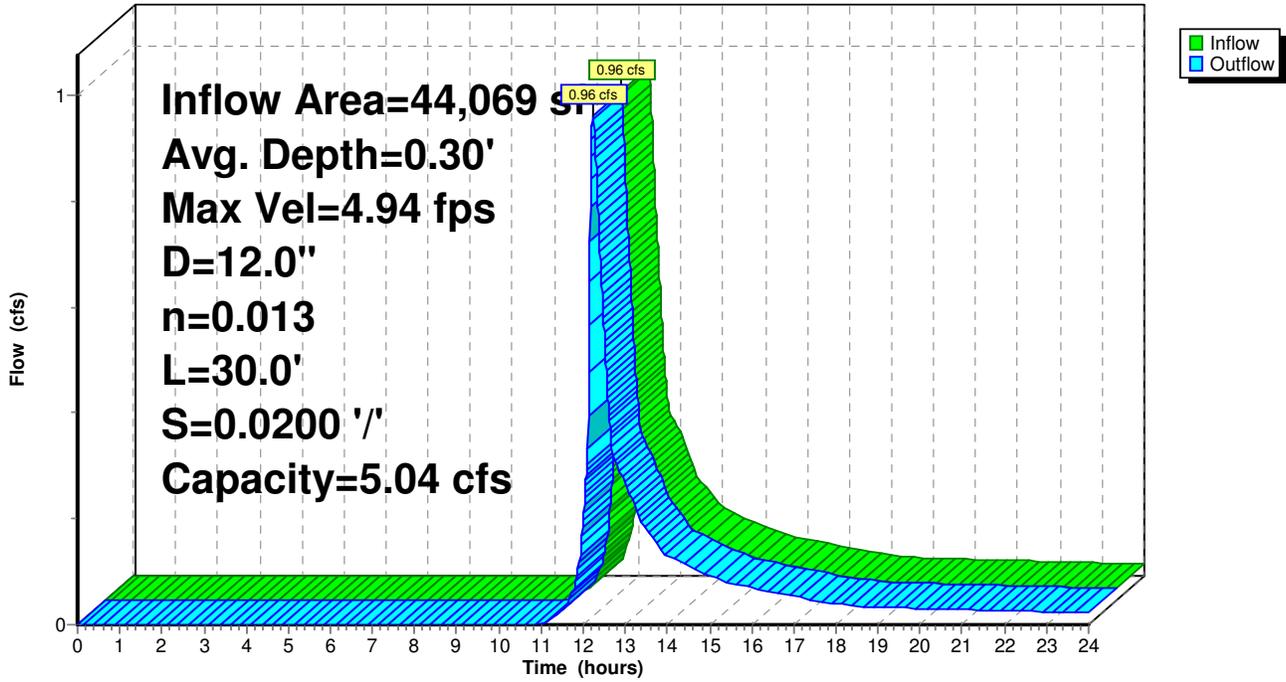
Peak Storage= 6 cf @ 12.23 hrs, Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.04 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 30.0' Slope= 0.0200 '/'
Inlet Invert= 102.22', Outlet Invert= 101.62'



Reach 403R: CB 65 to DMH 50

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Reach 902R: Existing wetland channel to WF 13

[61] Hint: Submerged 1% of Reach 1R bottom

Inflow Area =	201,436 sf,	Inflow Depth > 0.96"	for 2-Year event
Inflow =	2.75 cfs @ 12.41 hrs,	Volume=	16,073 cf
Outflow =	2.75 cfs @ 12.43 hrs,	Volume=	16,061 cf, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.36 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.26 fps, Avg. Travel Time= 1.3 min

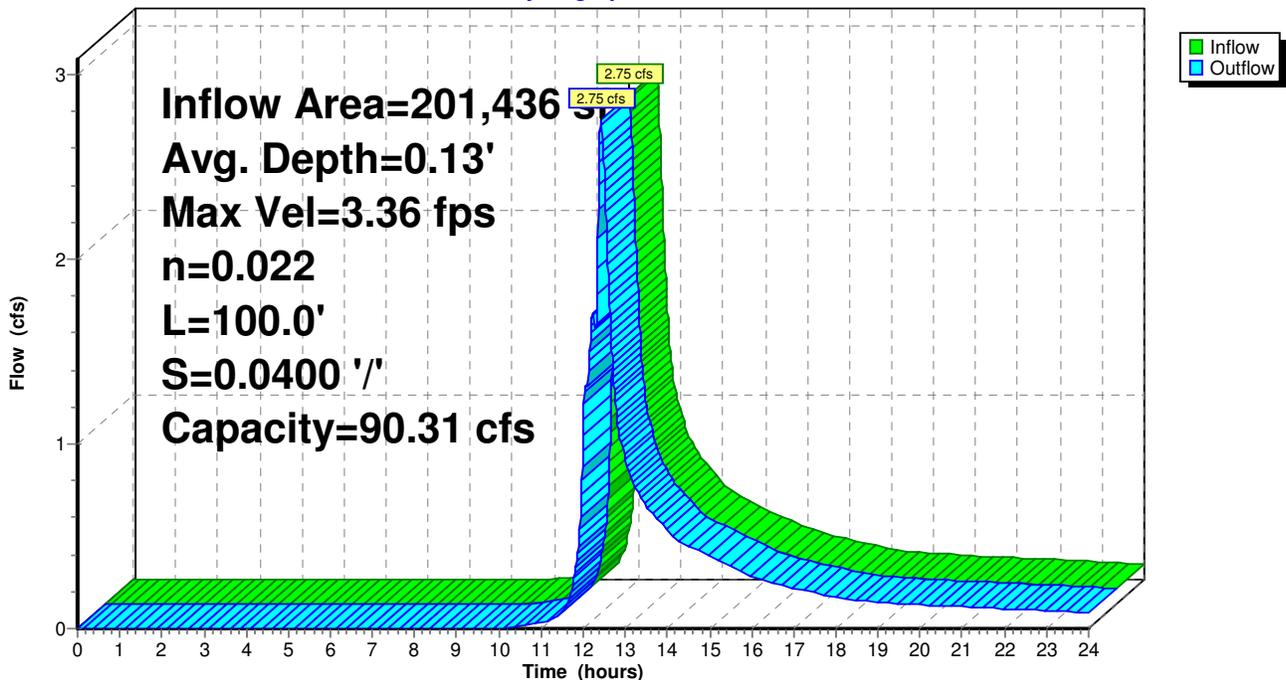
Peak Storage= 82 cf @ 12.42 hrs, Average Depth at Peak Storage= 0.13'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 2.0 '/' Top Width= 10.00'
 Length= 100.0' Slope= 0.0400 '/'
 Inlet Invert= 86.00', Outlet Invert= 82.00'



Reach 902R: Existing wetland channel to WF 13

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Pond 2P: Recharge System

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT:: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[81] Warning: Exceeded Pond 218R by 1.69' @ 18.09 hrs

Inflow Area =	111,470 sf,	Inflow Depth >	1.30"	for	2-Year event
Inflow =	2.78 cfs @	12.09 hrs,	Volume=	12,041 cf	
Outflow =	1.67 cfs @	12.39 hrs,	Volume=	8,529 cf,	Atten= 40%, Lag= 17.7 min
Discarded =	0.01 cfs @	10.33 hrs,	Volume=	405 cf	
Primary =	1.67 cfs @	12.39 hrs,	Volume=	8,124 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 103.81' @ 12.39 hrs Surf.Area= 2,016 sf Storage= 3,926 cf

Plug-Flow detention time= 159.7 min calculated for 8,529 cf (71% of inflow)
Center-of-Mass det. time= 61.6 min (914.3 - 852.7)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	3,138 cf	42.00'W x 48.00'L x 5.00'H 100 10,080 cf Overall - 2,235 cf Embedded = 7,845 cf x 40.0% Voids
#2	101.00'	2,235 cf	47.8"W x 30.0"H x 6.25'L Cultec R-330 x 48 Inside #1
		5,373 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area
#2	Primary	103.22'	18.0" x 75.0' long Culvert Ke= 0.500 Outlet Invert= 102.09' S= 0.0151 '/' Cc= 0.900 n= 0.013
#3	Secondary	106.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600

Discarded OutFlow Max=0.01 cfs @ 10.33 hrs HW=100.65' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.66 cfs @ 12.39 hrs HW=103.81' (Free Discharge)

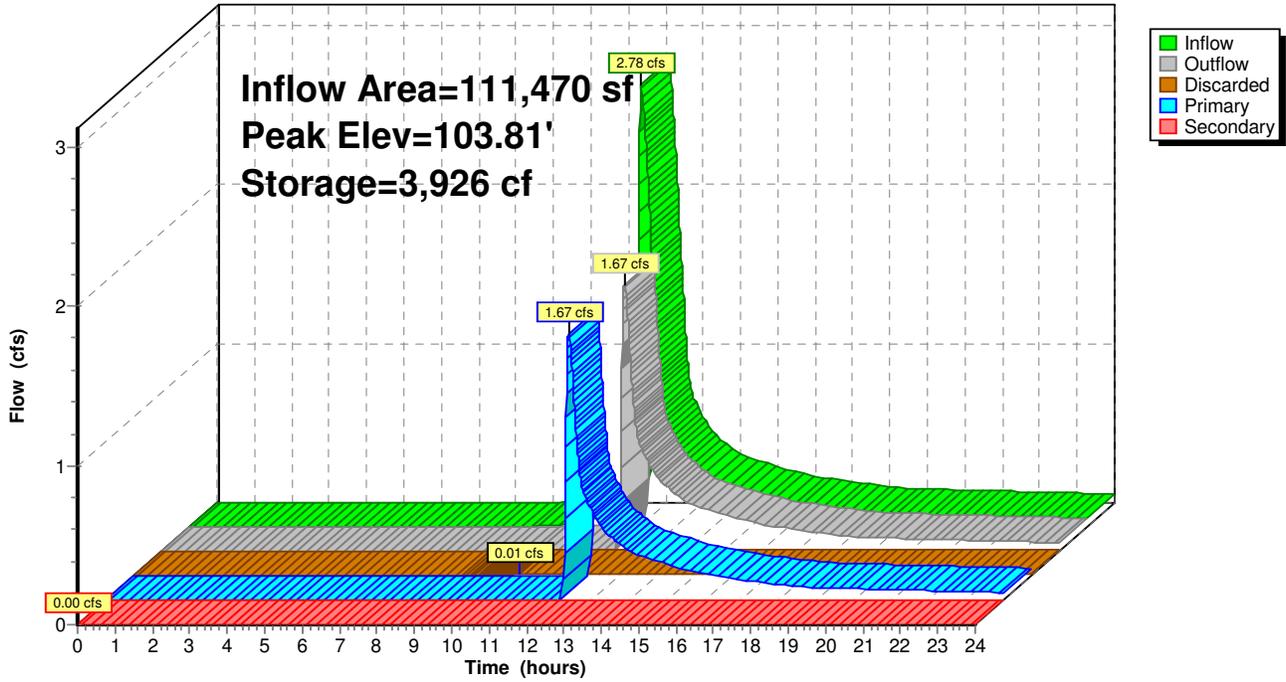
↑**2=Culvert** (Inlet Controls 1.66 cfs @ 2.60 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.60' (Free Discharge)

↑**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Recharge System

Hydrograph



Postdevelopment10c

Type III 24-hr 2-Year Rainfall=3.00"

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Pond 3P: Culvert under Drive Unit 10

[57] Hint: Peaked at 114.64' (Flood elevation advised)

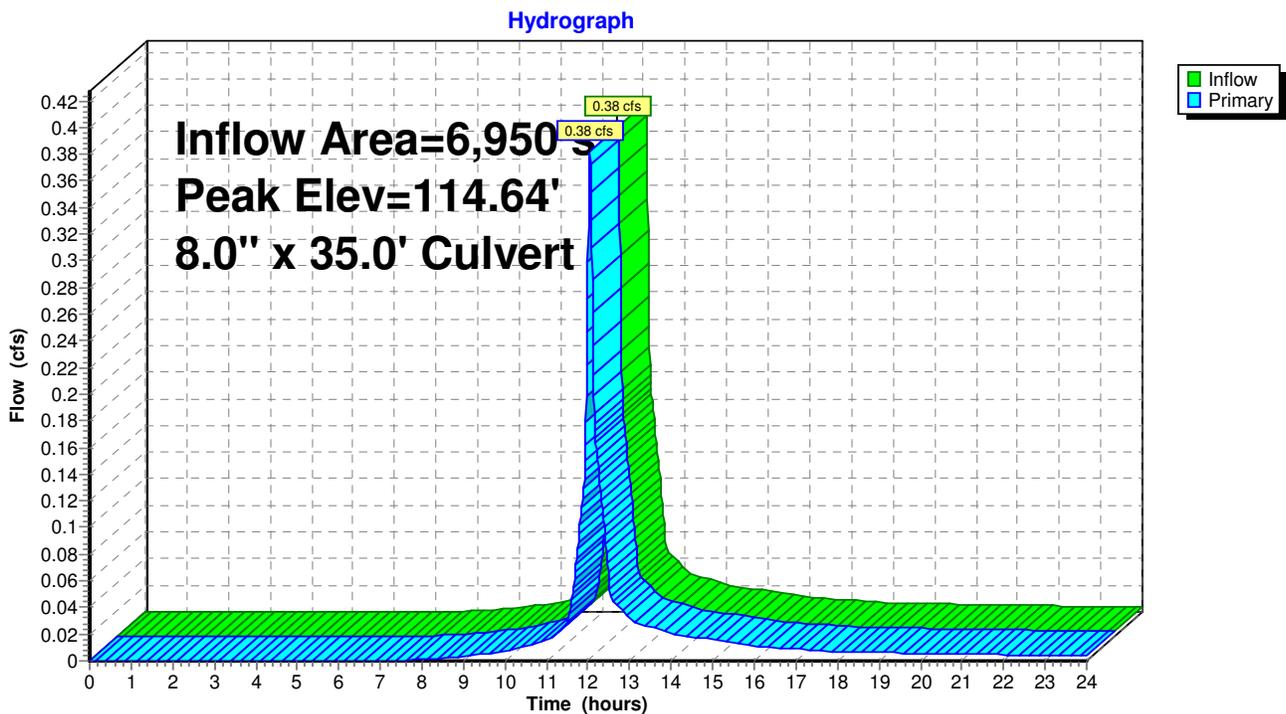
Inflow Area = 6,950 sf, Inflow Depth > 1.82" for 2-Year event
Inflow = 0.38 cfs @ 12.04 hrs, Volume= 1,053 cf
Outflow = 0.38 cfs @ 12.04 hrs, Volume= 1,053 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.04 hrs, Volume= 1,053 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.64' @ 12.04 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	114.27'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 113.92' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.38 cfs @ 12.04 hrs HW=114.64' (Free Discharge)
↑1=Culvert (Barrel Controls 0.38 cfs @ 2.76 fps)

Pond 3P: Culvert under Drive Unit 10



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 4P: Culvert under Drive Unit 11

[57] Hint: Peaked at 110.69' (Flood elevation advised)

[61] Hint: Submerged 10% of Reach 2R bottom

Inflow Area = 6,950 sf, Inflow Depth > 1.82" for 2-Year event
Inflow = 0.38 cfs @ 12.05 hrs, Volume= 1,052 cf
Outflow = 0.38 cfs @ 12.05 hrs, Volume= 1,052 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.05 hrs, Volume= 1,052 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 110.69' @ 12.05 hrs

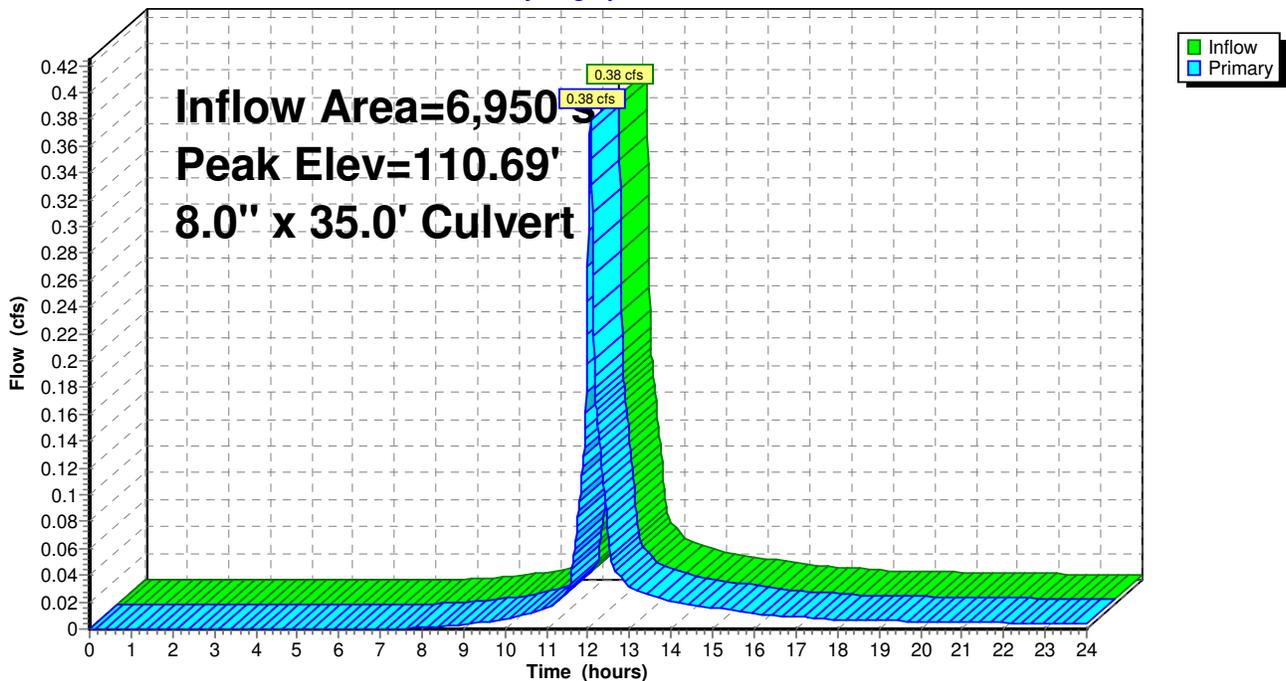
Device #	Routing	Invert	Outlet Devices
1	Primary	110.32'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 109.97' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.38 cfs @ 12.05 hrs HW=110.69' (Free Discharge)

↑1=Culvert (Barrel Controls 0.38 cfs @ 2.76 fps)

Pond 4P: Culvert under Drive Unit 11

Hydrograph



Pond 8P: Main Cell - Bio Retention

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[63] Warning: Exceeded Reach 62R inflow depth by 0.09' @ 12.30 hrs

Inflow Area = 44,069 sf, Inflow Depth > 1.21" for 2-Year event
 Inflow = 1.09 cfs @ 12.16 hrs, Volume= 4,433 cf
 Outflow = 0.96 cfs @ 12.23 hrs, Volume= 4,304 cf, Atten= 12%, Lag= 4.2 min
 Primary = 0.96 cfs @ 12.23 hrs, Volume= 4,304 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 111.20' @ 12.23 hrs Surf.Area= 820 sf Storage= 761 cf

Plug-Flow detention time= 41.4 min calculated for 4,304 cf (97% of inflow)
 Center-of-Mass det. time= 25.2 min (873.6 - 848.4)

Volume	Invert	Avail.Storage	Storage Description
#1	109.74'	2,193 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.74	0	0	0
109.75	350	2	2
110.00	375	91	92
111.00	667	521	613
112.00	1,440	1,054	1,667
112.33	1,750	526	2,193

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Type III 24-hr 2-Year Rainfall=3.00"

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Device	Routing	Invert	Outlet Devices
#1	Device 7	110.00'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#2	Device 7	110.17'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#3	Device 7	110.33'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#4	Device 7	110.50'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#5	Device 7	110.67'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#6	Device 7	111.00'	8.0" Horiz. Orifice/Grate Limited to weir flow C= 0.900
#7	Primary	107.00'	12.0" x 126.0' long Culvert CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 105.61' S= 0.0110 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#8	Secondary	112.33'	8.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.96 cfs @ 12.23 hrs HW=111.20' (Free Discharge)

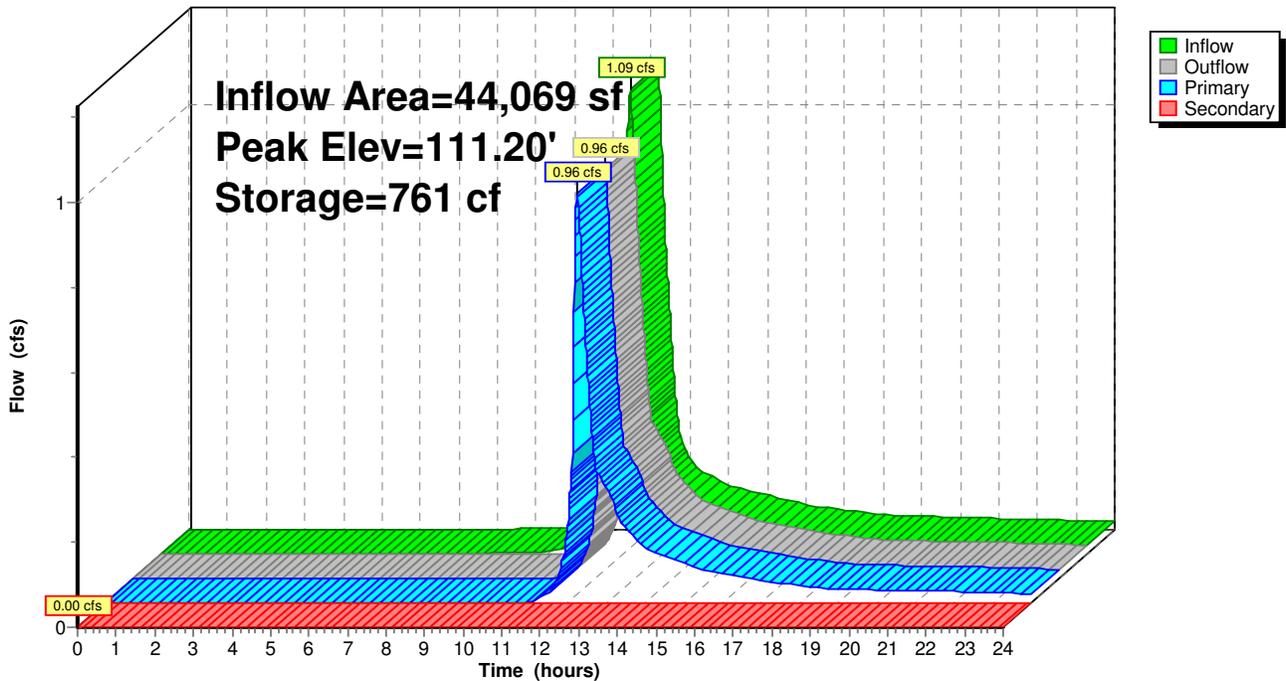
- ↑ **7=Culvert** (Passes 0.96 cfs of 6.42 cfs potential flow)
 - ↑ **1=Orifice/Grate** (Orifice Controls 0.09 cfs @ 5.22 fps)
 - ↑ **2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 4.83 fps)
 - ↑ **3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 4.43 fps)
 - ↑ **4=Orifice/Grate** (Orifice Controls 0.06 cfs @ 3.96 fps)
 - ↑ **5=Orifice/Grate** (Orifice Controls 0.06 cfs @ 3.43 fps)
 - ↑ **6=Orifice/Grate** (Weir Controls 0.60 cfs @ 1.45 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.74' (Free Discharge)

- ↑ **8=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: Main Cell - Bio Retention

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 9P: CB 65

Inflow Area = 26,681 sf, Inflow Depth > 1.26" for 2-Year event
Inflow = 0.82 cfs @ 12.11 hrs, Volume= 2,812 cf
Outflow = 0.82 cfs @ 12.11 hrs, Volume= 2,812 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.82 cfs @ 12.11 hrs, Volume= 2,812 cf

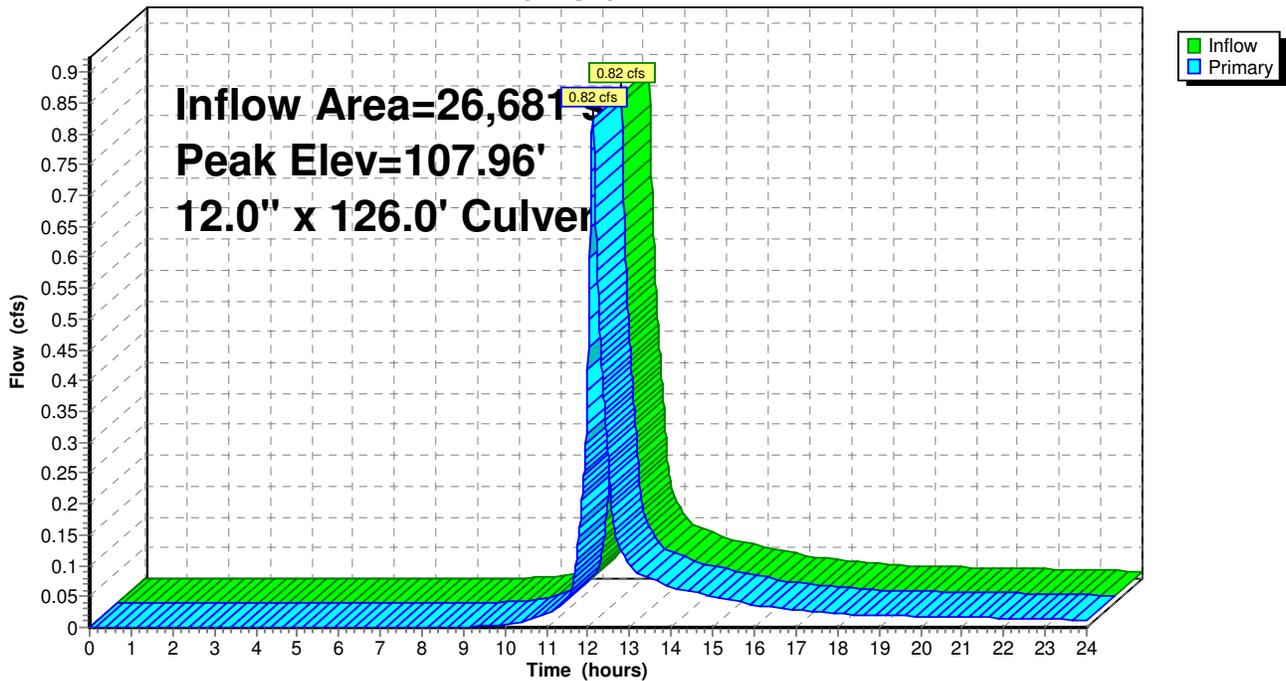
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 107.96' @ 12.11 hrs
Flood Elev= 112.00'

Device #	Routing	Invert	Outlet Devices
#1	Primary	107.50'	12.0" x 126.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 105.61' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.82 cfs @ 12.11 hrs HW=107.96' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.82 cfs @ 2.32 fps)

Pond 9P: CB 65

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 43R: CB 60 to DMH 64

[57] Hint: Peaked at 111.30' (Flood elevation advised)

Inflow Area = 4,640 sf, Inflow Depth > 1.90" for 2-Year event
 Inflow = 0.27 cfs @ 12.03 hrs, Volume= 734 cf
 Outflow = 0.27 cfs @ 12.03 hrs, Volume= 734 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.27 cfs @ 12.03 hrs, Volume= 734 cf

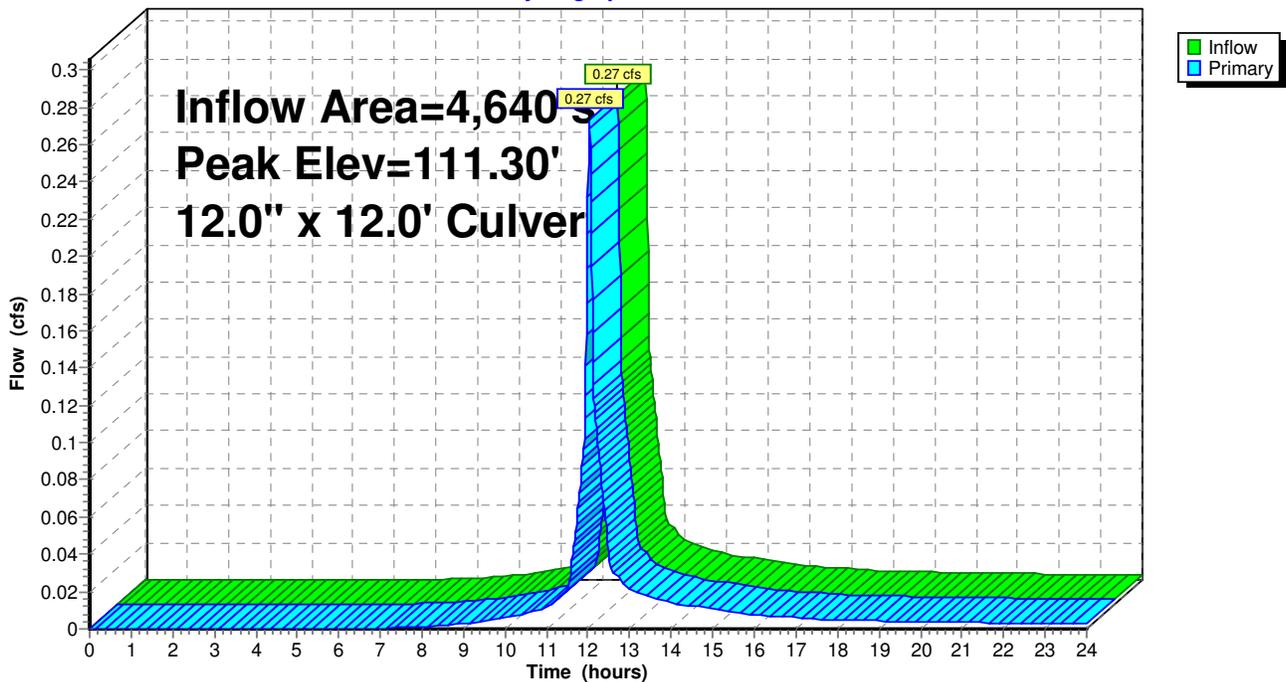
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 111.30' @ 12.03 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	111.02'	12.0" x 12.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.27 cfs @ 12.03 hrs HW=111.30' (Free Discharge)
 ↑1=Culvert (Barrel Controls 0.27 cfs @ 2.25 fps)

Pond 43R: CB 60 to DMH 64

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 61R: CB 62 to DMH 64

[57] Hint: Peaked at 111.69' (Flood elevation advised)

Inflow Area = 39,429 sf, Inflow Depth > 1.13" for 2-Year event
Inflow = 0.98 cfs @ 12.16 hrs, Volume= 3,699 cf
Outflow = 0.98 cfs @ 12.16 hrs, Volume= 3,699 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.98 cfs @ 12.16 hrs, Volume= 3,699 cf

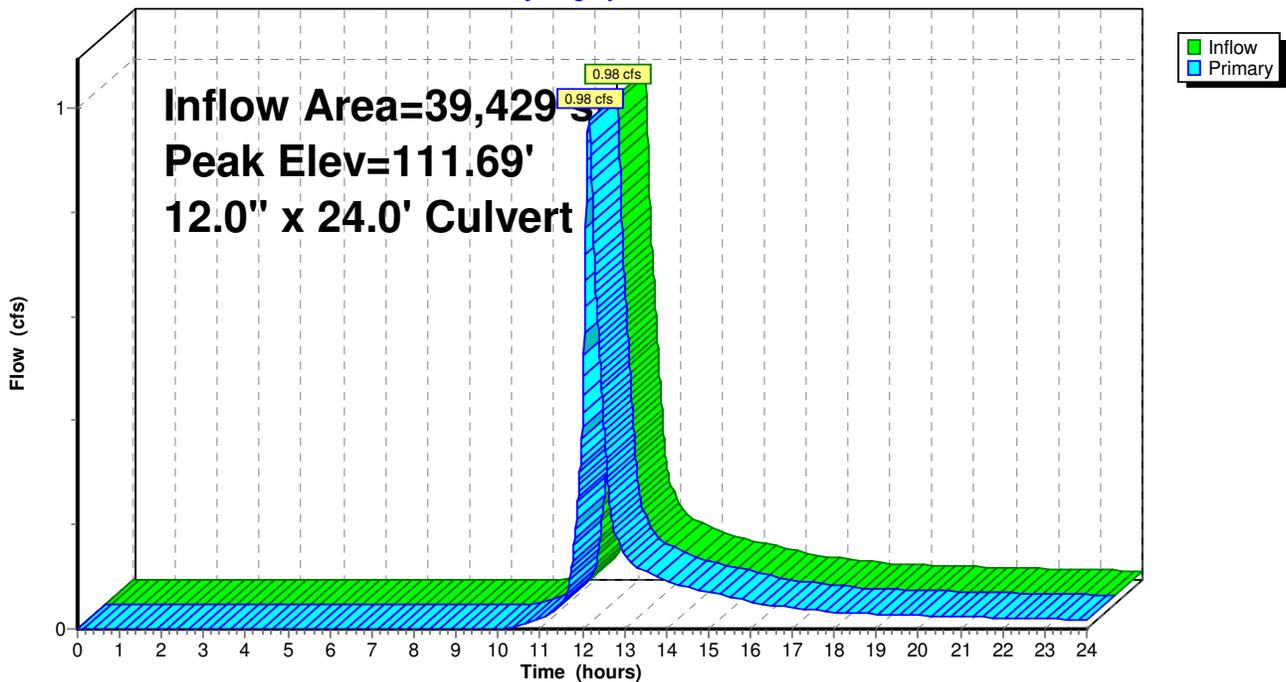
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 111.69' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	111.14'	12.0" x 24.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.98 cfs @ 12.16 hrs HW=111.69' (Free Discharge)
↑1=Culvert (Barrel Controls 0.98 cfs @ 3.19 fps)

Pond 61R: CB 62 to DMH 64

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 66P: RG 9A at Units 11/12 - CB 214

Inflow Area = 6,950 sf, Inflow Depth > 1.82" for 2-Year event
 Inflow = 0.38 cfs @ 12.05 hrs, Volume= 1,052 cf
 Outflow = 0.38 cfs @ 12.06 hrs, Volume= 946 cf, Atten= 1%, Lag= 0.4 min
 Primary = 0.38 cfs @ 12.06 hrs, Volume= 946 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 107.64' @ 12.06 hrs Surf.Area= 229 sf Storage= 119 cf

Plug-Flow detention time= 70.3 min calculated for 946 cf (90% of inflow)
 Center-of-Mass det. time= 21.9 min (837.3 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	107.08'	359 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
107.08	0	0	0
107.09	200	1	1
108.58	280	358	359

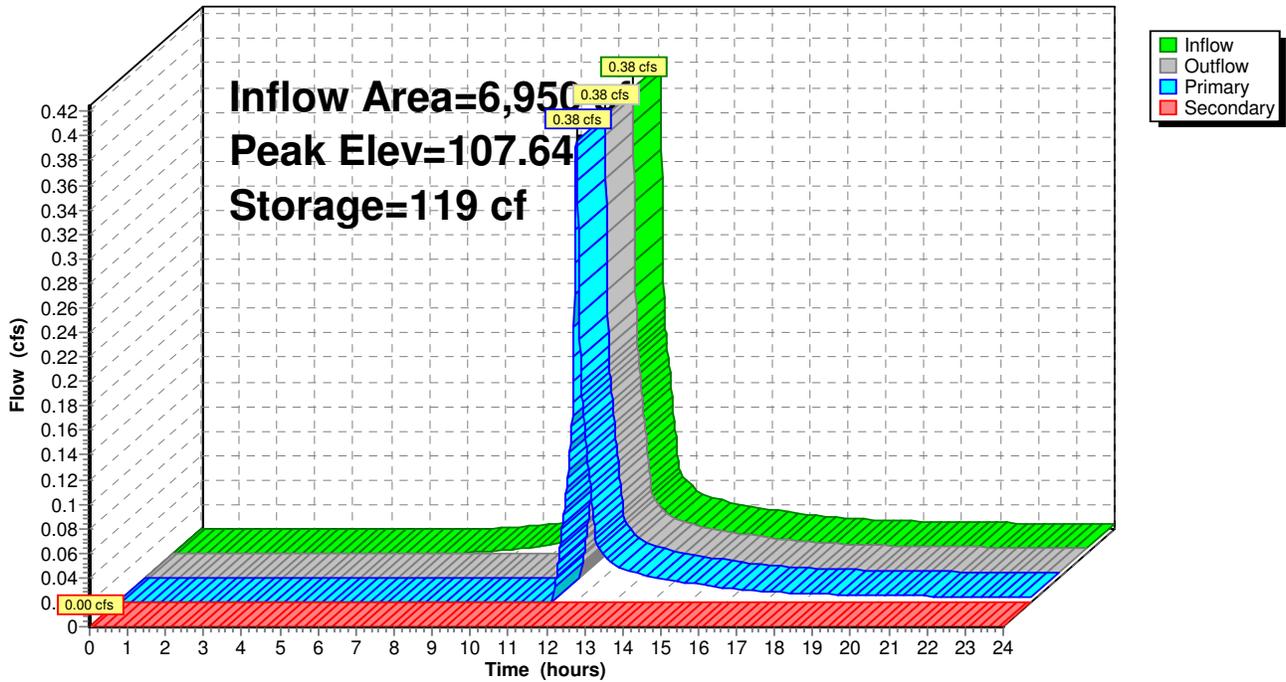
Device	Routing	Invert	Outlet Devices
#1	Primary	107.58'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	108.08'	2.0' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.37 cfs @ 12.06 hrs HW=107.64' (Free Discharge)
 ↑1=**Orifice/Grate** (Weir Controls 0.37 cfs @ 0.79 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=107.08' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 66P: RG 9A at Units 11/12 - CB 214

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 67P: CB 66 (emergency vertical release)

Inflow Area = 44,069 sf, Inflow Depth > 1.17" for 2-Year event
 Inflow = 0.96 cfs @ 12.23 hrs, Volume= 4,303 cf
 Outflow = 0.96 cfs @ 12.23 hrs, Volume= 4,303 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.96 cfs @ 12.23 hrs, Volume= 4,303 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

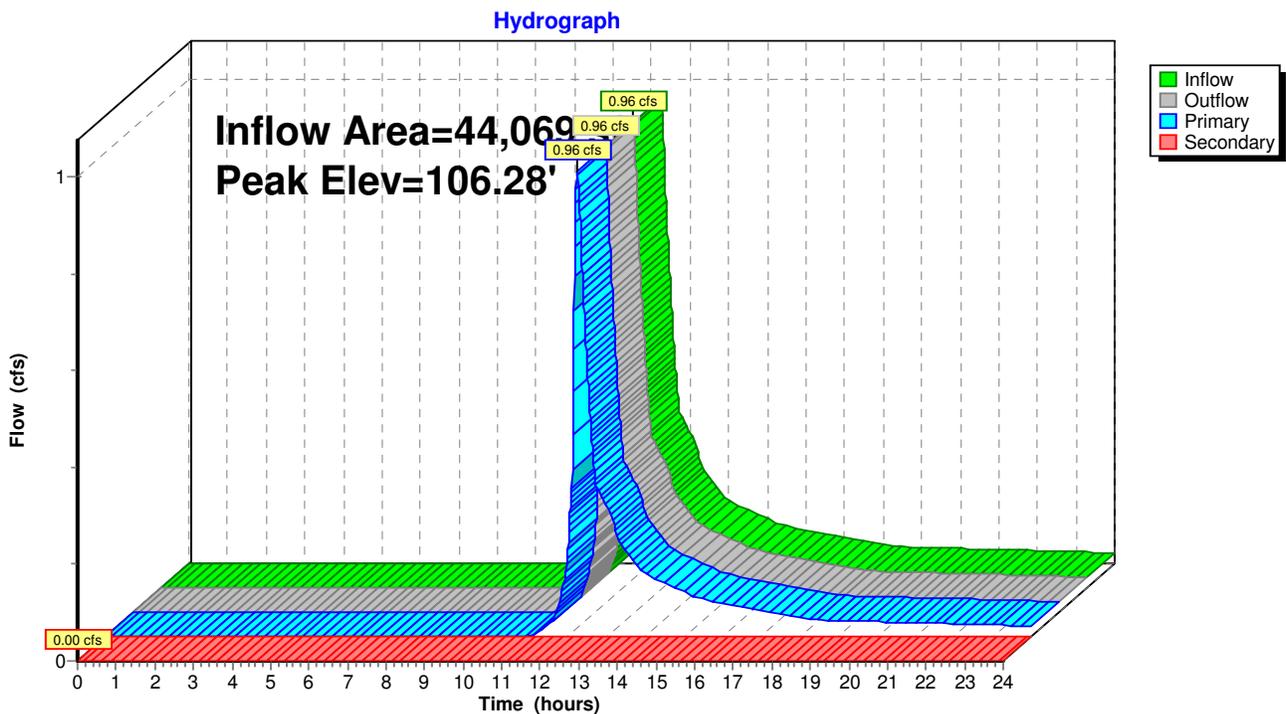
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 106.28' @ 12.23 hrs
 Flood Elev= 112.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	2.00' W x 2.00' H x 52.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 102.36' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Secondary	112.00'	2.00' W x 2.00' H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.95 cfs @ 12.23 hrs HW=106.28' (Free Discharge)
 ↳1=Culvert (Inlet Controls 0.95 cfs @ 1.70 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' (Free Discharge)
 ↳2=Orifice/Grate (Controls 0.00 cfs)

Pond 67P: CB 66 (emergency vertical release)



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 70P: RG 10A - CB 216 at Units 13

Inflow Area = 11,090 sf, Inflow Depth > 1.62" for 2-Year event
 Inflow = 0.54 cfs @ 12.05 hrs, Volume= 1,494 cf
 Outflow = 0.54 cfs @ 12.06 hrs, Volume= 1,375 cf, Atten= 1%, Lag= 0.4 min
 Primary = 0.54 cfs @ 12.06 hrs, Volume= 1,375 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 104.73' @ 12.06 hrs Surf.Area= 292 sf Storage= 140 cf

Plug-Flow detention time= 54.3 min calculated for 1,374 cf (92% of inflow)
 Center-of-Mass det. time= 14.3 min (847.1 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1	104.15'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.15	0	0	0
104.16	200	1	1
104.65	280	118	119
105.15	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	104.65'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	105.15'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

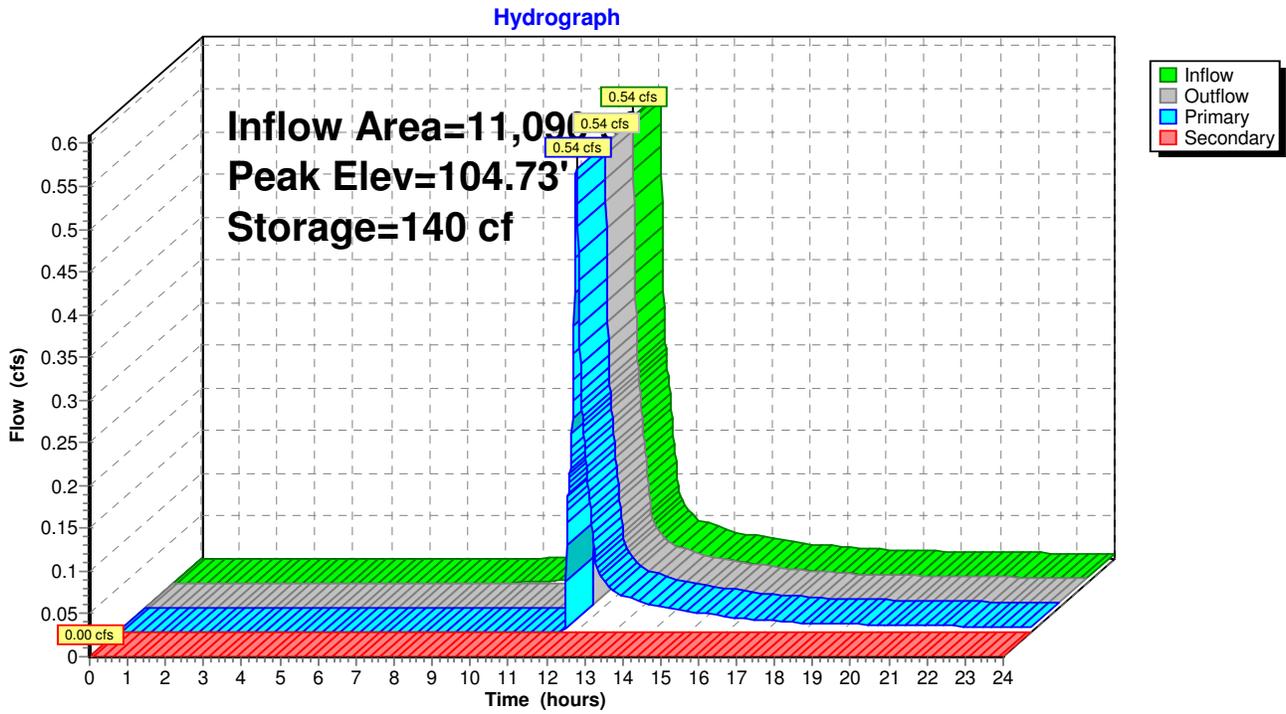
Primary OutFlow Max=0.54 cfs @ 12.06 hrs HW=104.73' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 0.54 cfs @ 0.90 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=104.15' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 70P: RG 10A - CB 216 at Units 13



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 111P: CB 20

Inflow Area = 7,780 sf, Inflow Depth > 1.82" for 2-Year event
Inflow = 0.46 cfs @ 12.01 hrs, Volume= 1,179 cf
Outflow = 0.46 cfs @ 12.01 hrs, Volume= 1,179 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.46 cfs @ 12.01 hrs, Volume= 1,179 cf

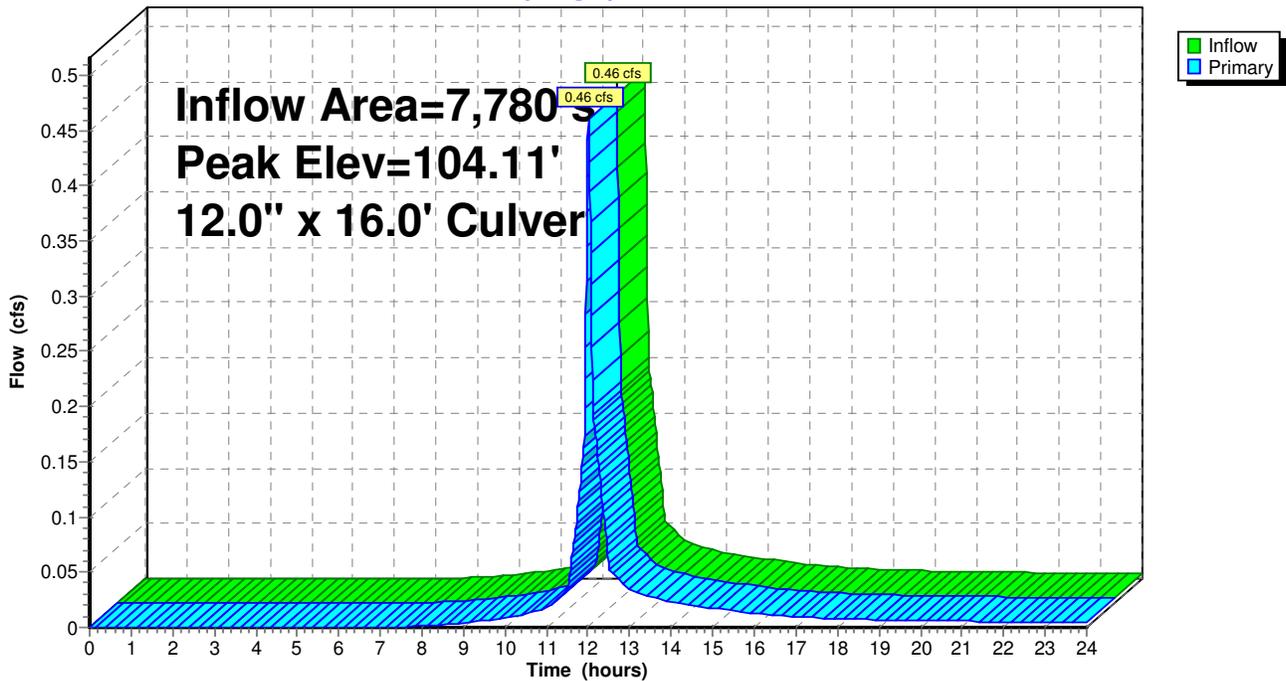
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.11' @ 12.01 hrs
Flood Elev= 107.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.74'	12.0" x 16.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.46 cfs @ 12.01 hrs HW=104.11' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.46 cfs @ 2.59 fps)

Pond 111P: CB 20

Hydrograph



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Pond 112P: CB 22

Inflow Area = 5,198 sf, Inflow Depth > 2.16" for 2-Year event
Inflow = 0.36 cfs @ 12.01 hrs, Volume= 936 cf
Outflow = 0.36 cfs @ 12.01 hrs, Volume= 936 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.01 hrs, Volume= 936 cf

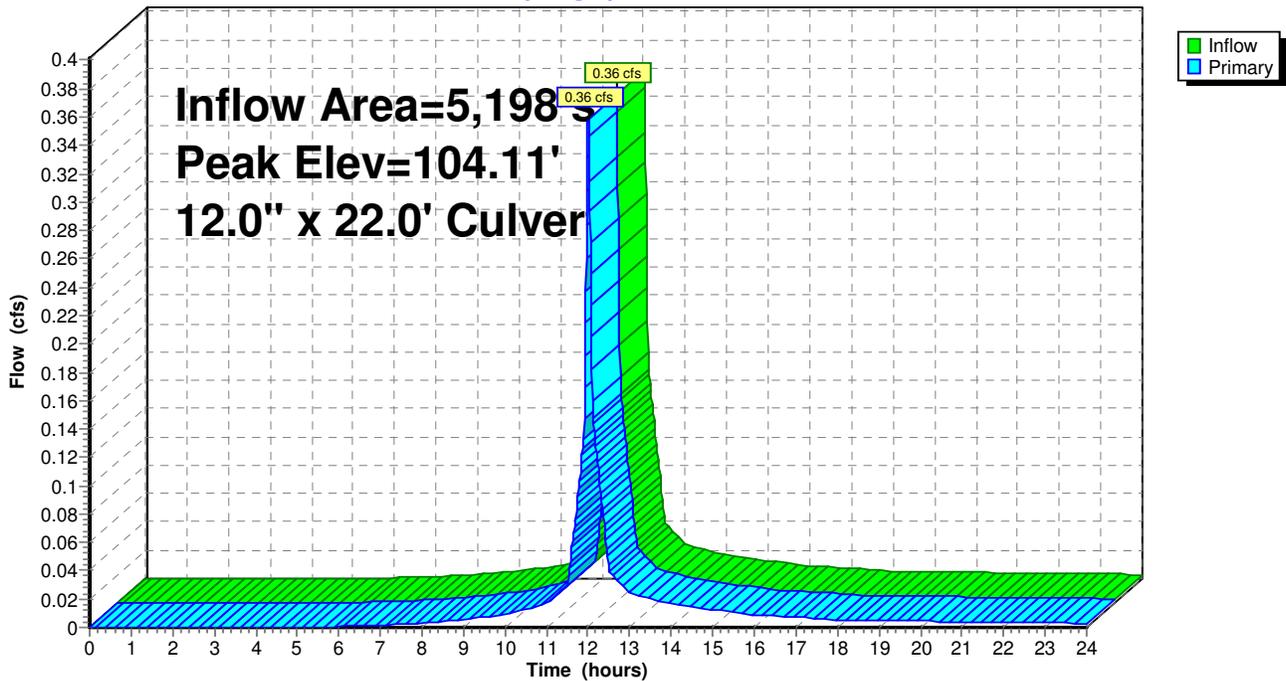
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.11' @ 12.01 hrs
Flood Elev= 107.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.80'	12.0" x 22.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.36 cfs @ 12.01 hrs HW=104.11' (Free Discharge)
↑1=Culvert (Barrel Controls 0.36 cfs @ 2.53 fps)

Pond 112P: CB 22

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 119P: RG - 1A - CB 118 to DMH 14

[62] Warning: Submerged 8% of Reach 127R inlet

Inflow Area = 16,626 sf, Inflow Depth > 1.99" for 2-Year event
 Inflow = 1.06 cfs @ 12.03 hrs, Volume= 2,752 cf
 Outflow = 1.06 cfs @ 12.03 hrs, Volume= 2,718 cf, Atten= 0%, Lag= 0.1 min
 Primary = 1.06 cfs @ 12.03 hrs, Volume= 2,718 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 110.10' @ 12.03 hrs Surf.Area= 99 sf Storage= 52 cf

Plug-Flow detention time= 11.2 min calculated for 2,717 cf (99% of inflow)
 Center-of-Mass det. time= 4.1 min (847.3 - 843.2)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	0	0	0
109.51	75	0	0
110.00	96	42	42
111.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	110.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Primary	109.86'	8.0" x 65.0' long Culvert Ke= 0.200 Outlet Invert= 105.96' S= 0.0600 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#3	Secondary	111.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.06 cfs @ 12.03 hrs HW=110.10' (Free Discharge)

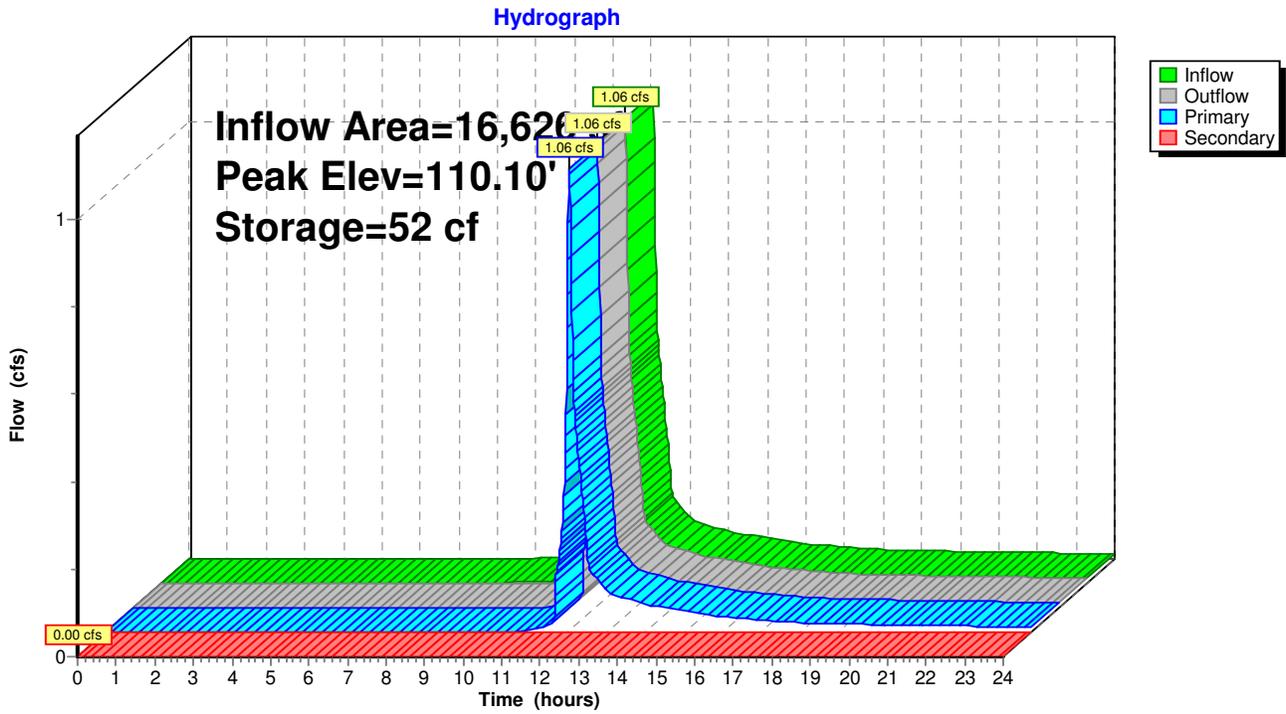
↑1=**Orifice/Grate** (Weir Controls 0.83 cfs @ 1.03 fps)

└2=**Culvert** (Inlet Controls 0.24 cfs @ 2.08 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)

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

Pond 119P: RG - 1A - CB 118 to DMH 14



Pond 119R: Culvert under Unit 4 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:
 {node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 111.75' (Flood elevation advised)

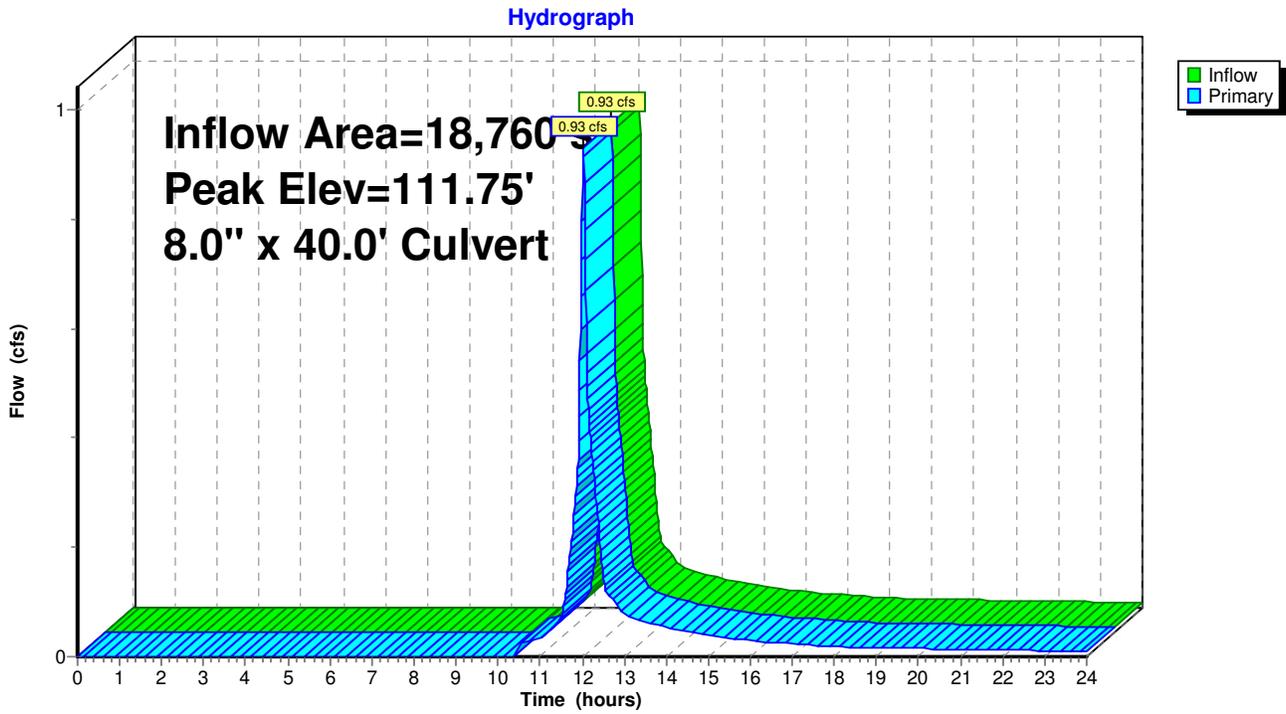
Inflow Area = 18,760 sf, Inflow Depth > 1.63" for 2-Year event
 Inflow = 0.93 cfs @ 12.02 hrs, Volume= 2,543 cf
 Outflow = 0.93 cfs @ 12.02 hrs, Volume= 2,543 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.93 cfs @ 12.02 hrs, Volume= 2,543 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 111.75' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	111.12'	8.0" x 40.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 109.92' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.93 cfs @ 12.02 hrs HW=111.75' (Free Discharge)
 ←**1=Culvert** (Inlet Controls 0.93 cfs @ 2.71 fps)

Pond 119R: Culvert under Unit 4 Drive



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Pond 121P: RG 6A - CB 120 Under Drive Unit 4

Inflow Area = 18,760 sf, Inflow Depth > 1.65" for 2-Year event
 Inflow = 0.93 cfs @ 12.01 hrs, Volume= 2,585 cf
 Outflow = 0.93 cfs @ 12.02 hrs, Volume= 2,543 cf, Atten= 0%, Lag= 0.2 min
 Primary = 0.93 cfs @ 12.02 hrs, Volume= 2,543 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 112.23' @ 12.02 hrs Surf.Area= 99 sf Storage= 53 cf

Plug-Flow detention time= 13.9 min calculated for 2,543 cf (98% of inflow)
 Center-of-Mass det. time= 4.2 min (828.4 - 824.2)

Volume	Invert	Avail.Storage	Storage Description
#1	111.62'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.62	0	0	0
111.63	75	0	0
112.12	96	42	42
113.12	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	112.12'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.12'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

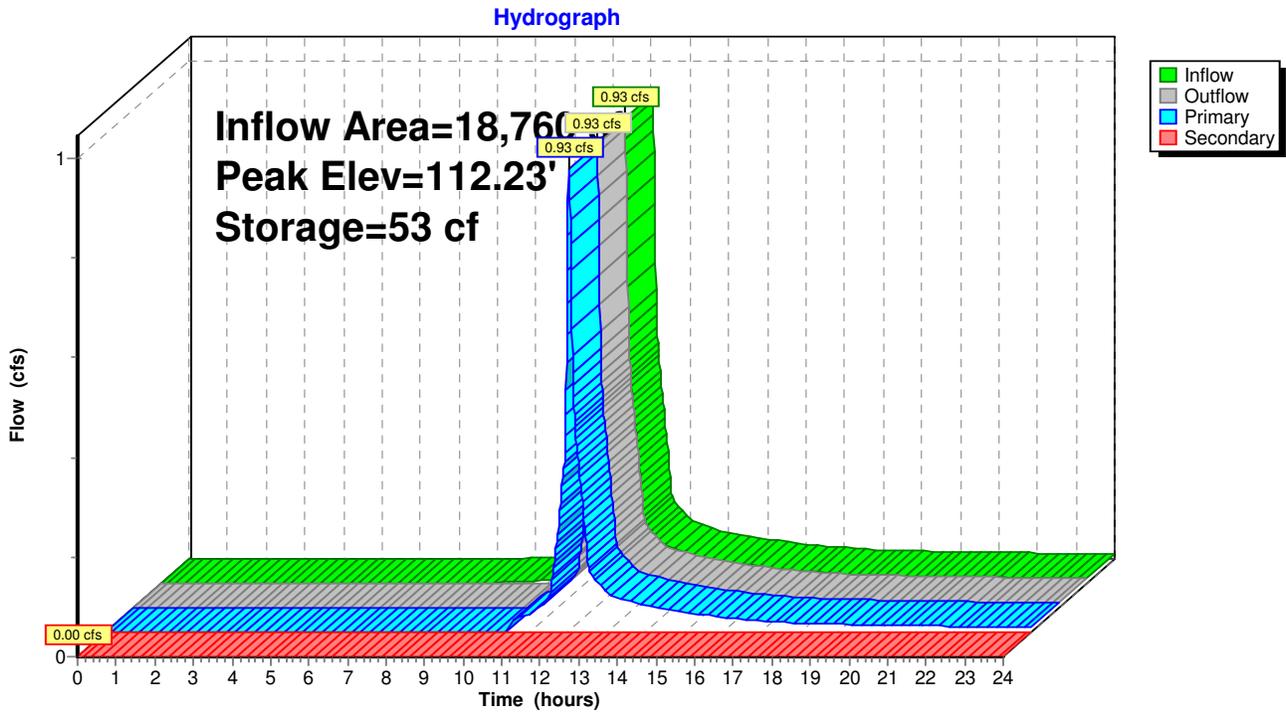
Primary OutFlow Max=0.93 cfs @ 12.02 hrs HW=112.23' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 0.93 cfs @ 1.07 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=111.62' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 121P: RG 6A - CB 120 Under Drive Unit 4



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 128P: RG 2A - CB 122 RG Unit 3

Inflow Area = 13,016 sf, Inflow Depth > 2.07" for 2-Year event
 Inflow = 0.88 cfs @ 12.02 hrs, Volume= 2,248 cf
 Outflow = 0.88 cfs @ 12.03 hrs, Volume= 2,206 cf, Atten= 0%, Lag= 0.2 min
 Primary = 0.88 cfs @ 12.03 hrs, Volume= 2,206 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 113.10' @ 12.03 hrs Surf.Area= 102 sf Storage= 53 cf

Plug-Flow detention time= 14.2 min calculated for 2,206 cf (98% of inflow)
 Center-of-Mass det. time= 3.4 min (850.4 - 847.0)

Volume	Invert	Avail.Storage	Storage Description
#1	112.50'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.50	0	0	0
112.51	75	0	0
113.00	96	42	42
113.50	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.50'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

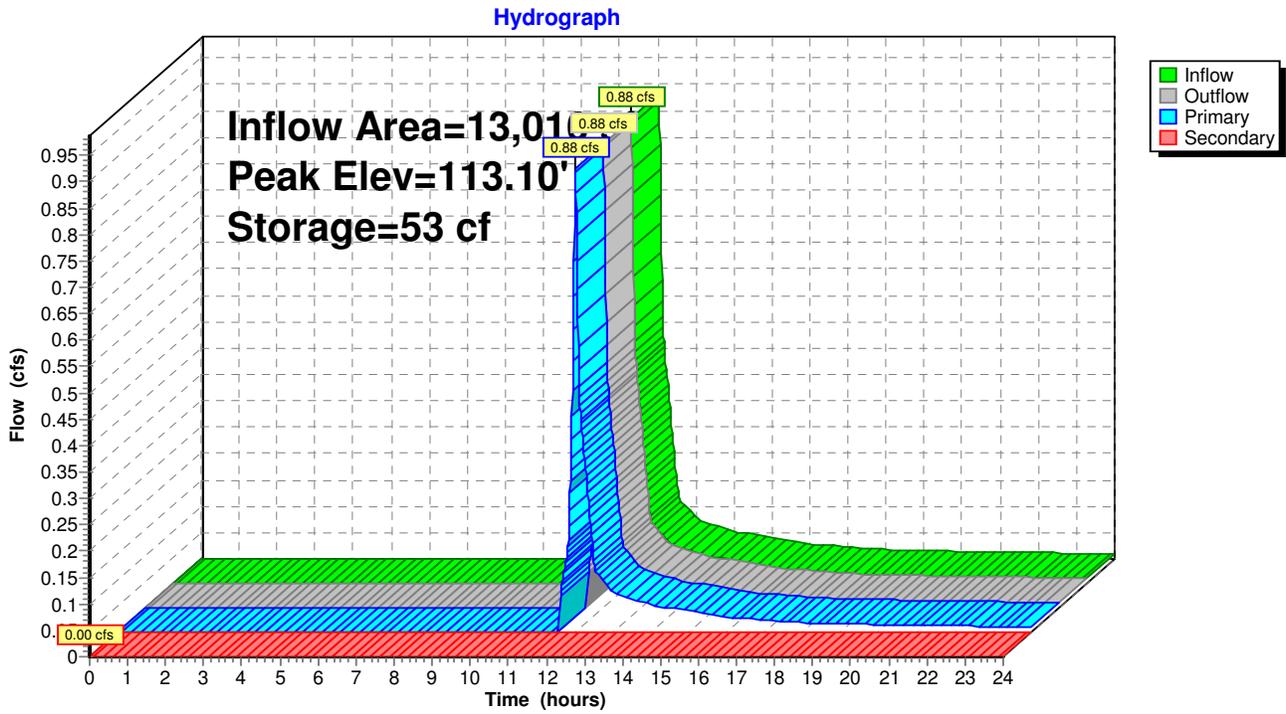
Primary OutFlow Max=0.88 cfs @ 12.03 hrs HW=113.10' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 0.88 cfs @ 1.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 128P: RG 2A - CB 122 RG Unit 3



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20

This rain garden is a level spreader and is intended to overtop with secondary flow to 130R. Flow continues via secondary (red). Routing adjusted to Max = 3. Warning message acceptable.

- [93] Warning: Storage range exceeded by 0.20'
- [85] Warning: Oscillations may require Finer Routing>1
- [61] Hint: Submerged 7% of Reach 129R bottom

Inflow Area = 7,500 sf, Inflow Depth > 1.74" for 2-Year event
 Inflow = 0.43 cfs @ 12.01 hrs, Volume= 1,087 cf
 Outflow = 0.43 cfs @ 12.00 hrs, Volume= 989 cf, Atten= 0%, Lag= 0.0 min
 Secondary = 0.43 cfs @ 12.00 hrs, Volume= 989 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 114.95' @ 12.00 hrs Surf.Area= 126 sf Storage= 98 cf

Plug-Flow detention time= 63.3 min calculated for 989 cf (91% of inflow)
 Center-of-Mass det. time= 18.7 min (835.2 - 816.5)

Volume	Invert	Avail.Storage	Storage Description
#1	113.75'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

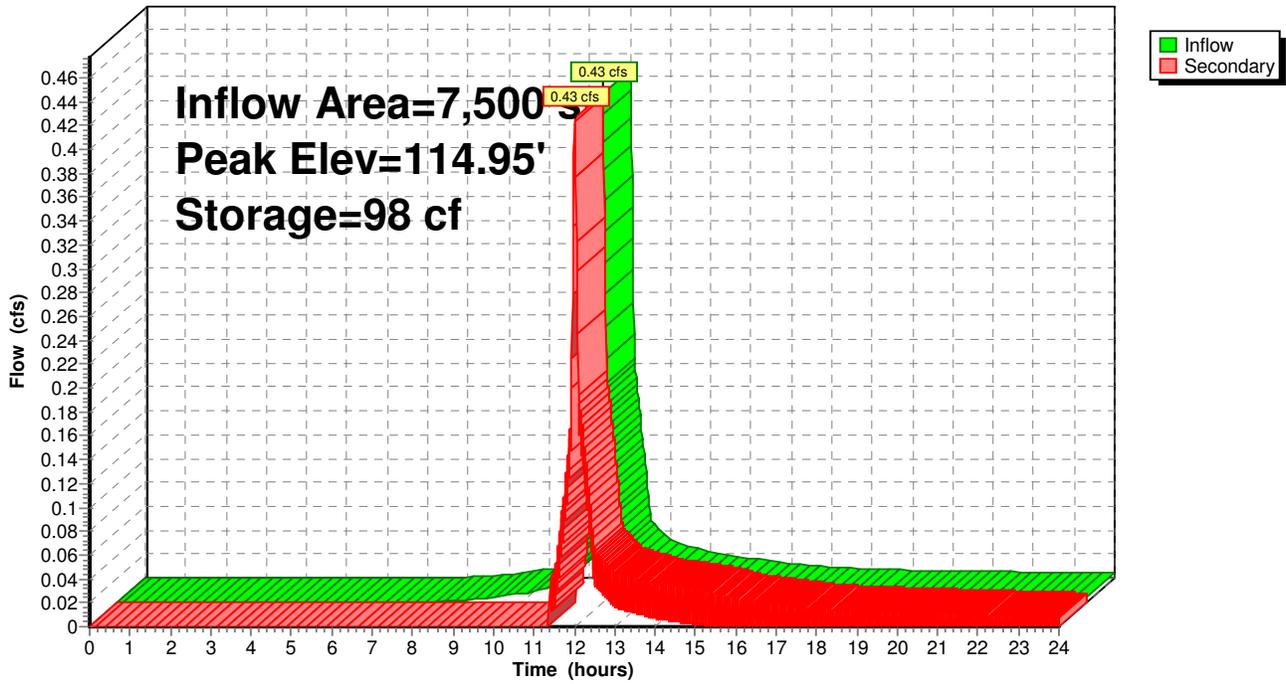
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
113.75	0	0	0
113.76	75	0	0
114.25	96	42	42
114.75	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Secondary	114.75'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Secondary OutFlow Max=0.43 cfs @ 12.00 hrs HW=114.95' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 1.06 fps)

Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 133P: Large RG 4C at Unit 20

Inflow Area = 6,950 sf, Inflow Depth > 1.45" for 2-Year event
 Inflow = 0.33 cfs @ 12.01 hrs, Volume= 838 cf
 Outflow = 0.32 cfs @ 12.02 hrs, Volume= 719 cf, Atten= 2%, Lag= 0.5 min
 Primary = 0.32 cfs @ 12.02 hrs, Volume= 719 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 116.90' @ 12.02 hrs Surf.Area= 288 sf Storage= 134 cf

Plug-Flow detention time= 89.2 min calculated for 719 cf (86% of inflow)
 Center-of-Mass det. time= 26.3 min (857.0 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1	116.35'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.35	0	0	0
116.36	200	1	1
116.85	280	118	119
117.35	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	116.85'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	117.35'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

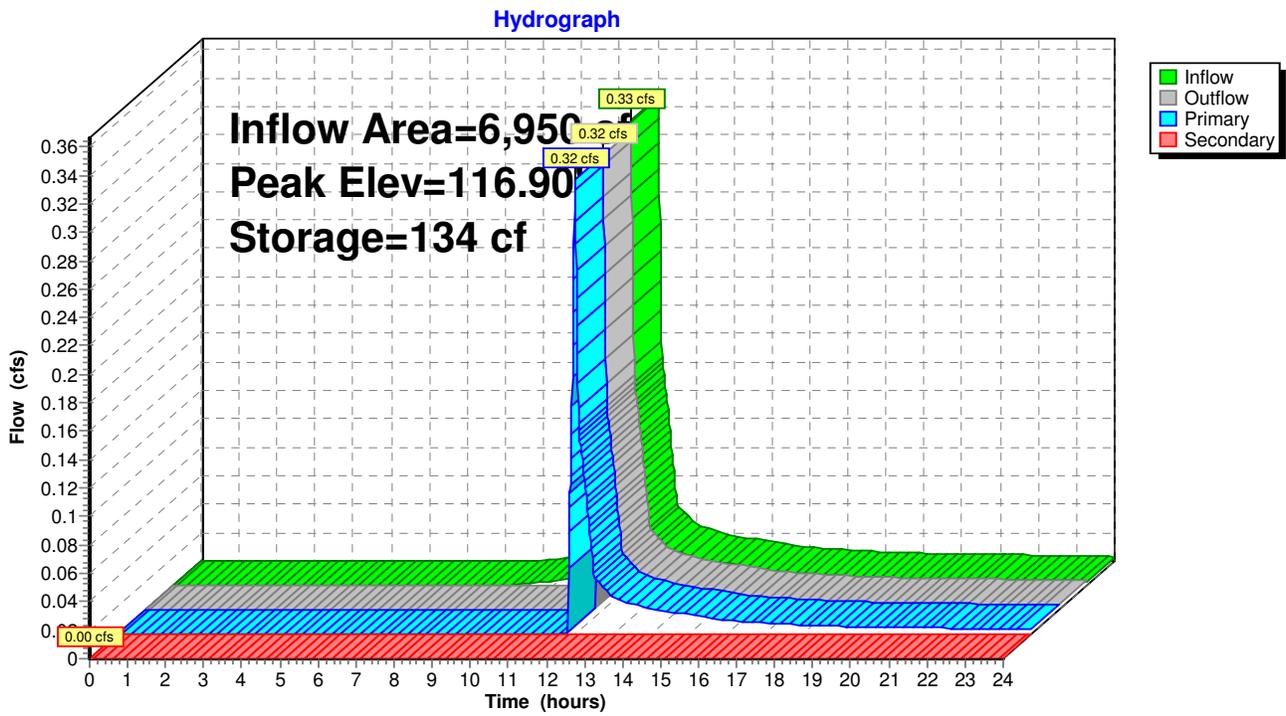
Primary OutFlow Max=0.32 cfs @ 12.02 hrs HW=116.90' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 0.32 cfs @ 0.75 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=116.35' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 133P: Large RG 4C at Unit 20



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 144R: HW 30 to DMH 14

[57] Hint: Peaked at 113.51' (Flood elevation advised)

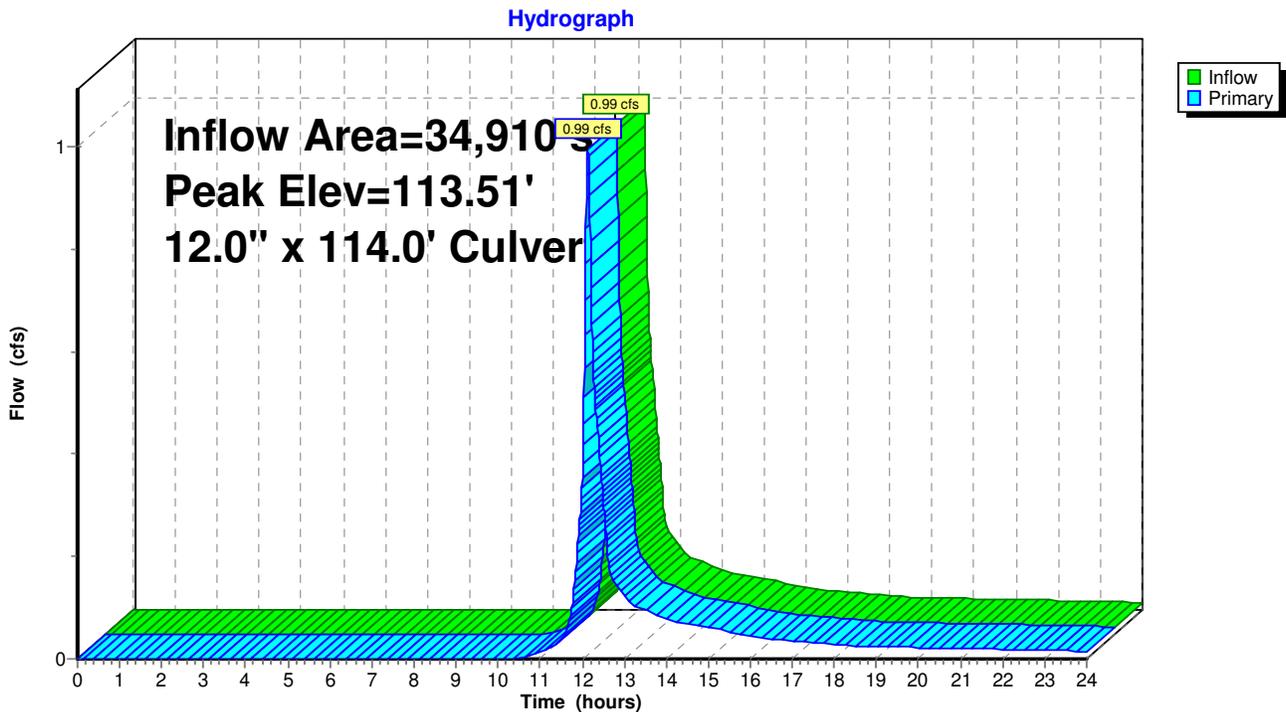
Inflow Area = 34,910 sf, Inflow Depth > 1.08" for 2-Year event
Inflow = 0.99 cfs @ 12.13 hrs, Volume= 3,139 cf
Outflow = 0.99 cfs @ 12.13 hrs, Volume= 3,139 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.99 cfs @ 12.13 hrs, Volume= 3,139 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 113.51' @ 12.13 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	113.00'	12.0" x 114.0' long Culvert Ke= 0.500 Outlet Invert= 103.88' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.99 cfs @ 12.13 hrs HW=113.51' (Free Discharge)
↑1=Culvert (Inlet Controls 0.99 cfs @ 2.44 fps)

Pond 144R: HW 30 to DMH 14



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 155P: RG 5A - CB 116 between Septic and Unit 4

Inflow Area = 21,810 sf, Inflow Depth > 1.68" for 2-Year event
 Inflow = 1.11 cfs @ 12.02 hrs, Volume= 3,047 cf
 Outflow = 1.11 cfs @ 12.02 hrs, Volume= 3,004 cf, Atten= 0%, Lag= 0.2 min
 Primary = 1.11 cfs @ 12.02 hrs, Volume= 3,004 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 109.12' @ 12.02 hrs Surf.Area= 100 sf Storage= 54 cf

Plug-Flow detention time= 11.9 min calculated for 3,003 cf (99% of inflow)
 Center-of-Mass det. time= 3.7 min (828.2 - 824.5)

Volume	Invert	Avail.Storage	Storage Description
#1	108.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.50	0	0	0
108.51	75	0	0
109.00	96	42	42
110.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	109.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	110.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

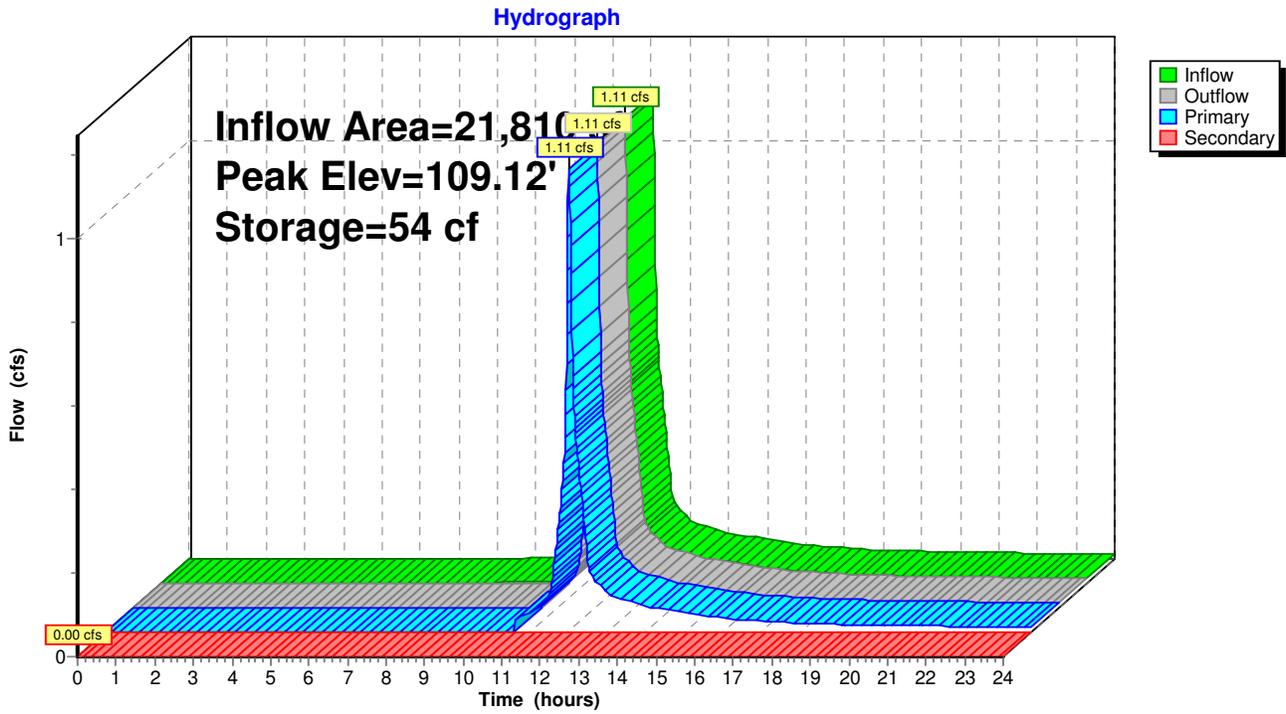
Primary OutFlow Max=1.11 cfs @ 12.02 hrs HW=109.12' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 1.11 cfs @ 1.14 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 155P: RG 5A - CB 116 between Septic and Unit 4



Pond 156R: Culvert under Unit 5 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 114.83' (Flood elevation advised)

Inflow Area =	12,570 sf,	Inflow Depth >	1.61"	for 2-Year event
Inflow =	0.59 cfs @	12.03 hrs,	Volume=	1,688 cf
Outflow =	0.59 cfs @	12.03 hrs,	Volume=	1,688 cf, Atten= 0%, Lag= 0.0 min
Primary =	0.59 cfs @	12.03 hrs,	Volume=	1,688 cf

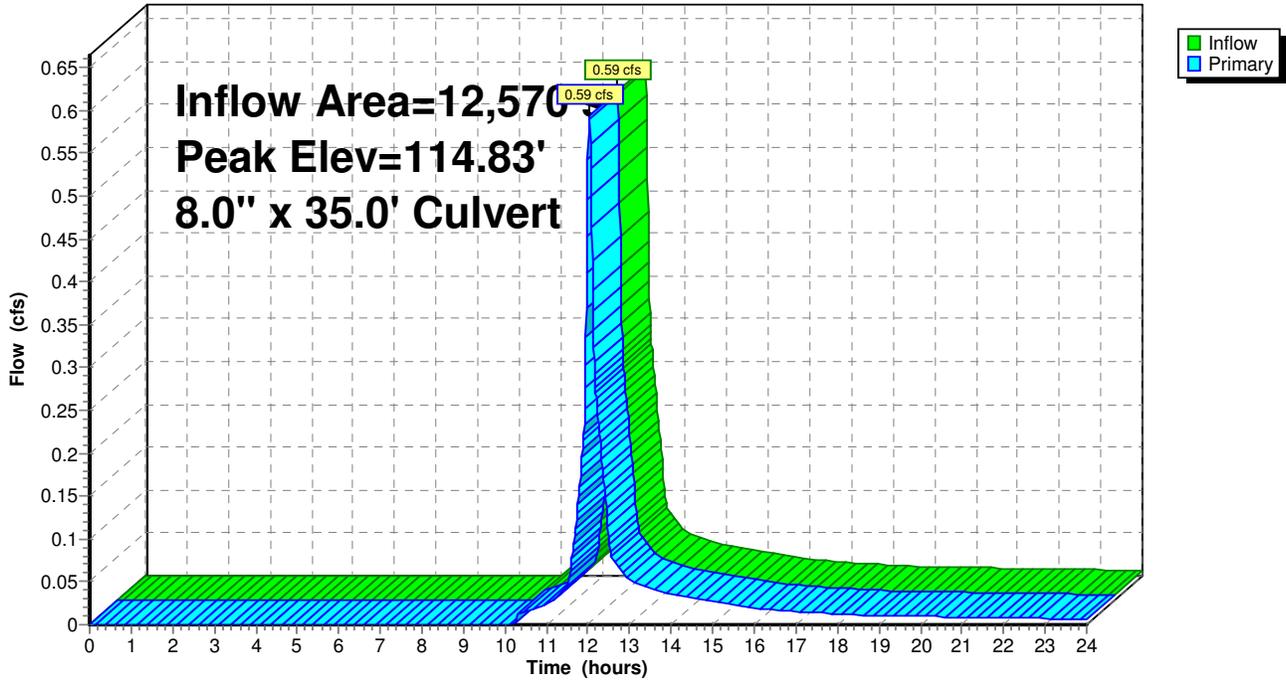
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.83' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	114.35'	8.0" x 35.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 114.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.59 cfs @ 12.03 hrs HW=114.83' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.59 cfs @ 3.05 fps)

Pond 156R: Culvert under Unit 5 Drive

Hydrograph



Pond 157P: RG 7A - CB 126 Under Drive Unit 5

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[61] Hint: Submerged 27% of Reach 154R bottom

Inflow Area = 12,570 sf, Inflow Depth > 1.65" for 2-Year event
 Inflow = 0.59 cfs @ 12.03 hrs, Volume= 1,731 cf
 Outflow = 0.59 cfs @ 12.03 hrs, Volume= 1,688 cf, Atten= 0%, Lag= 0.2 min
 Primary = 0.59 cfs @ 12.03 hrs, Volume= 1,688 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 115.43' @ 12.03 hrs Surf.Area= 101 sf Storage= 50 cf

Plug-Flow detention time= 20.8 min calculated for 1,687 cf (98% of inflow)
 Center-of-Mass det. time= 6.6 min (828.2 - 821.7)

Volume	Invert	Avail.Storage	Storage Description	
#1	114.85'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
114.85	0	0	0	
114.86	75	0	0	
115.35	96	42	42	
115.85	126	56	98	

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Type III 24-hr 2-Year Rainfall=3.00"

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Device	Routing	Invert	Outlet Devices
#1	Primary	115.35'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	115.85'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.59 cfs @ 12.03 hrs HW=115.43' (Free Discharge)

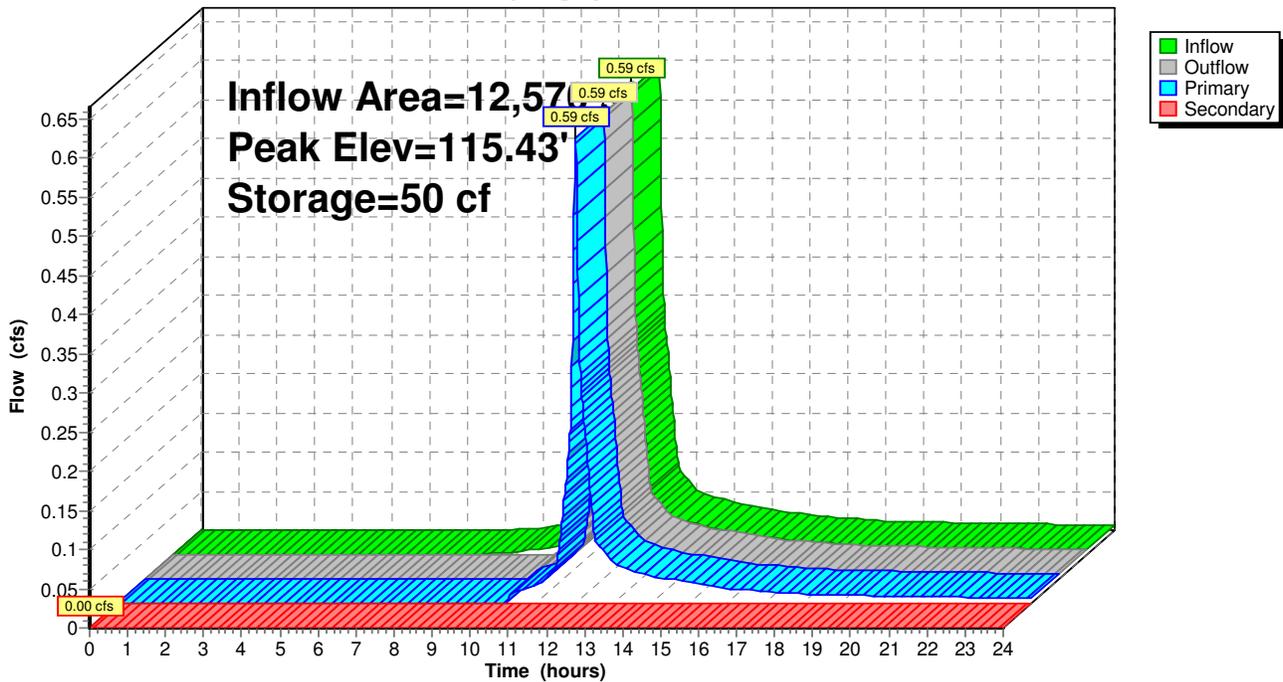
←1=Orifice/Grate (Weir Controls 0.59 cfs @ 0.93 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=114.85' (Free Discharge)

←2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 157P: RG 7A - CB 126 Under Drive Unit 5

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 158P: Culvert under Drive Unit 6

[57] Hint: Peaked at 116.35' (Flood elevation advised)

Inflow Area = 7,200 sf, Inflow Depth > 1.59" for 2-Year event
 Inflow = 0.34 cfs @ 12.05 hrs, Volume= 952 cf
 Outflow = 0.34 cfs @ 12.05 hrs, Volume= 952 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.34 cfs @ 12.05 hrs, Volume= 952 cf

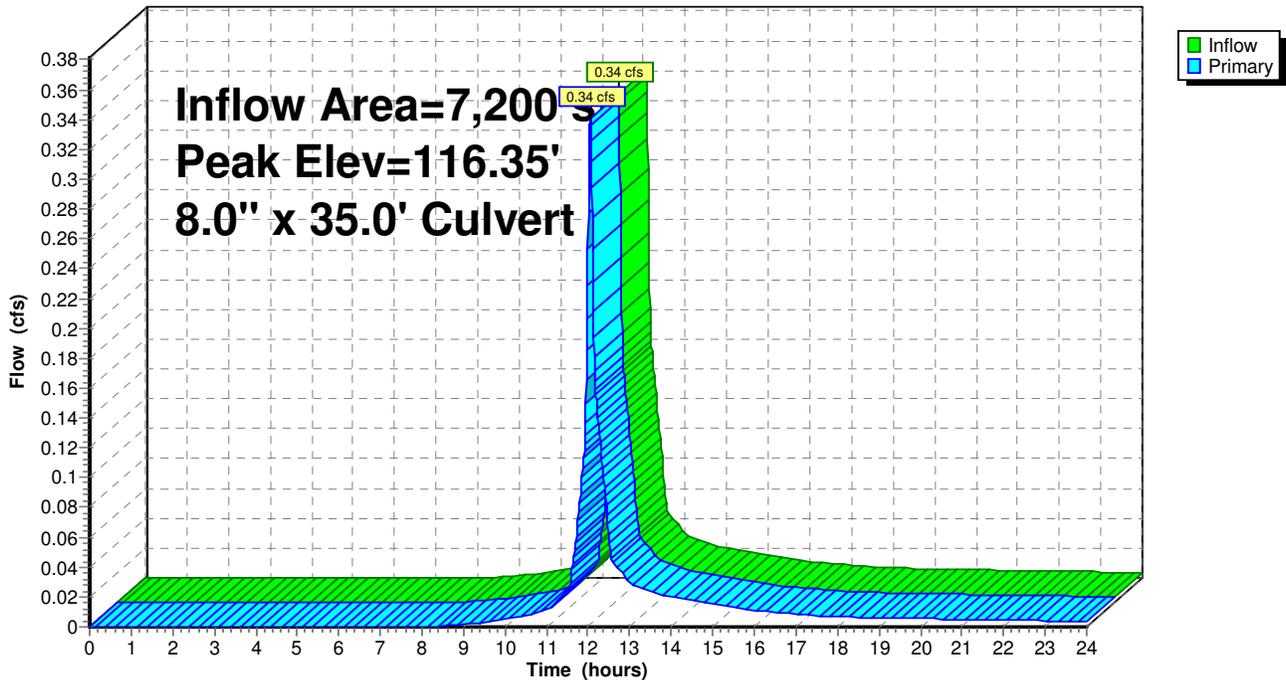
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 116.35' @ 12.05 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	116.00'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 115.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.34 cfs @ 12.05 hrs HW=116.35' (Free Discharge)
 1=Culvert (Barrel Controls 0.34 cfs @ 2.70 fps)

Pond 158P: Culvert under Drive Unit 6

Hydrograph



Pond 218R: DMH 50 to Irrigation Cistern

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[57] Hint: Peaked at 102.50' (Flood elevation advised)

[62] Warning: Submerged 2% of Reach 55R inlet

[63] Warning: Exceeded Reach 403R inflow depth by 0.11' @ 12.09 hrs

Inflow Area = 111,470 sf, Inflow Depth > 1.30" for 2-Year event
 Inflow = 2.78 cfs @ 12.09 hrs, Volume= 12,041 cf
 Outflow = 2.78 cfs @ 12.09 hrs, Volume= 12,041 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.78 cfs @ 12.09 hrs, Volume= 12,041 cf

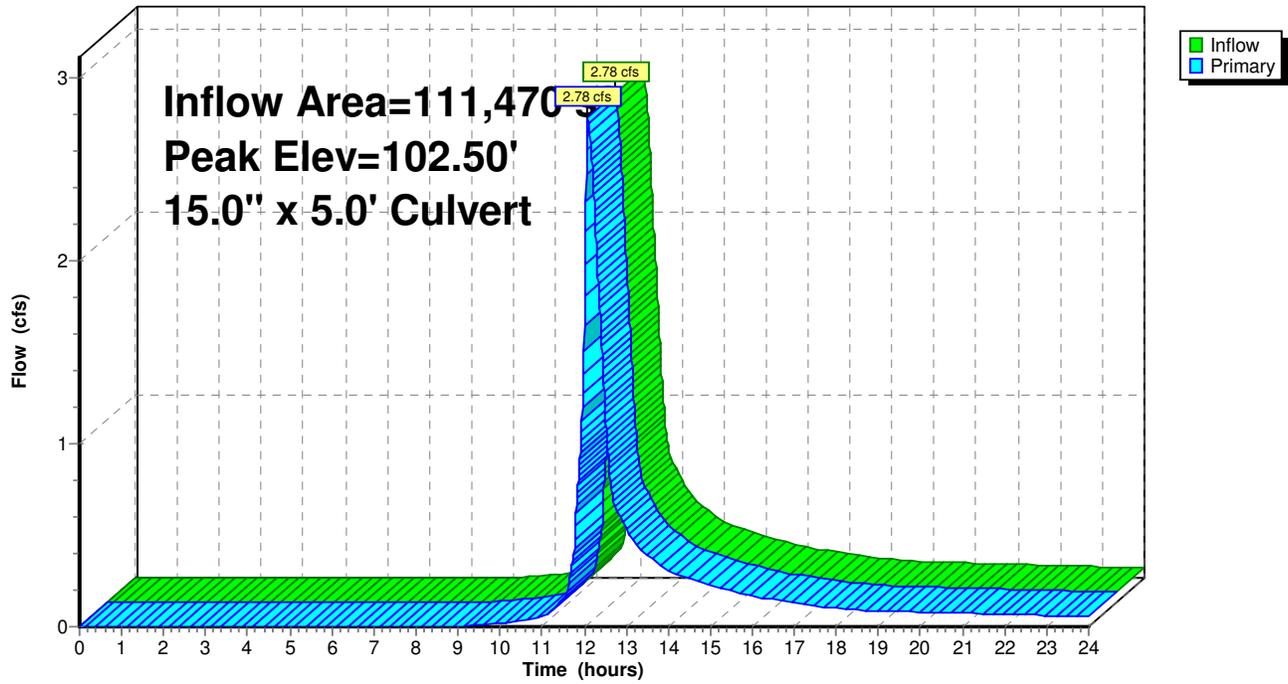
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 102.50' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	101.52'	15.0" x 5.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 101.42' S= 0.0200 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=2.78 cfs @ 12.09 hrs HW=102.50' (Free Discharge)
 ←**1=Culvert** (Barrel Controls 2.78 cfs @ 3.72 fps)

Pond 218R: DMH 50 to Irrigation Cistern

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)
 Center-of-Mass det. time= (not calculated)

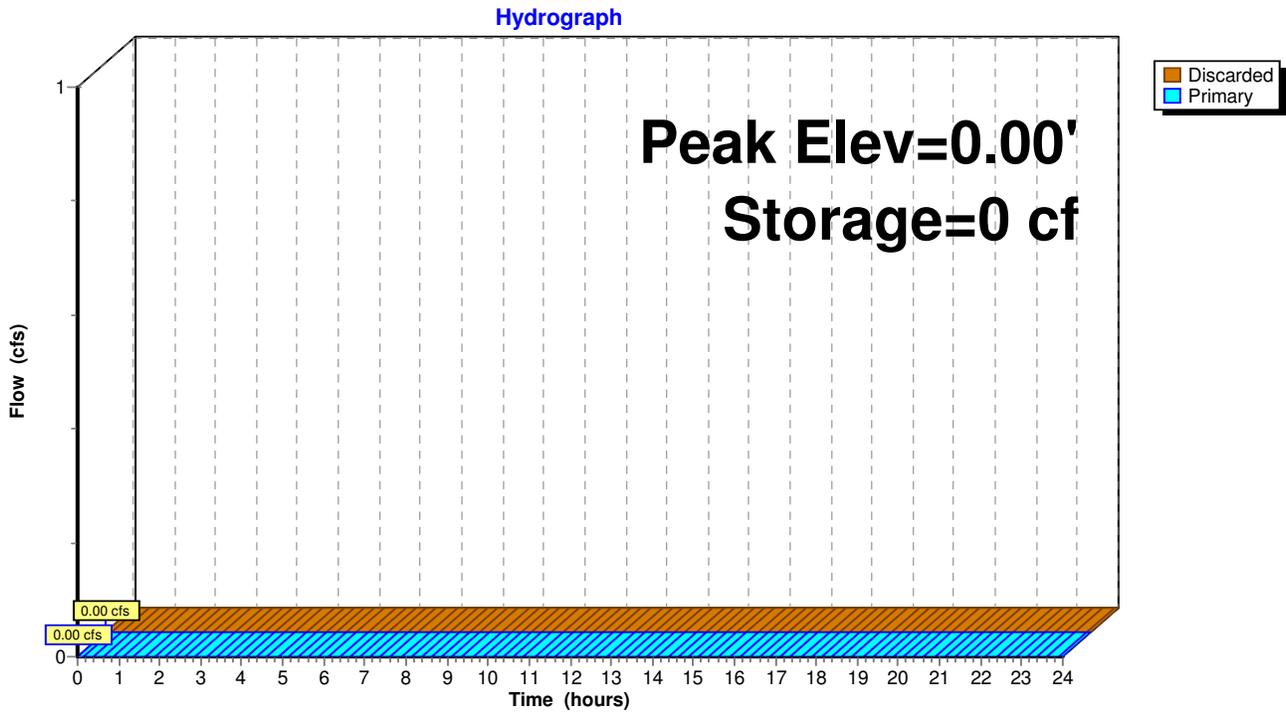
Volume	Invert	Avail.Storage	Storage Description
#1	110.49'	304 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
110.49	0	0	0
111.00	205	52	52
111.50	248	113	166
112.00	305	138	304

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.001 in/hr Exfiltration over Surface area
#2	Primary	111.50'	8.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

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

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING



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Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)

Center-of-Mass det. time= (not calculated)

Volume	Invert	Avail.Storage	Storage Description
#1	101.42'	4,292 cf	11.50'W x 40.00'L x 9.33'H Prismaoid

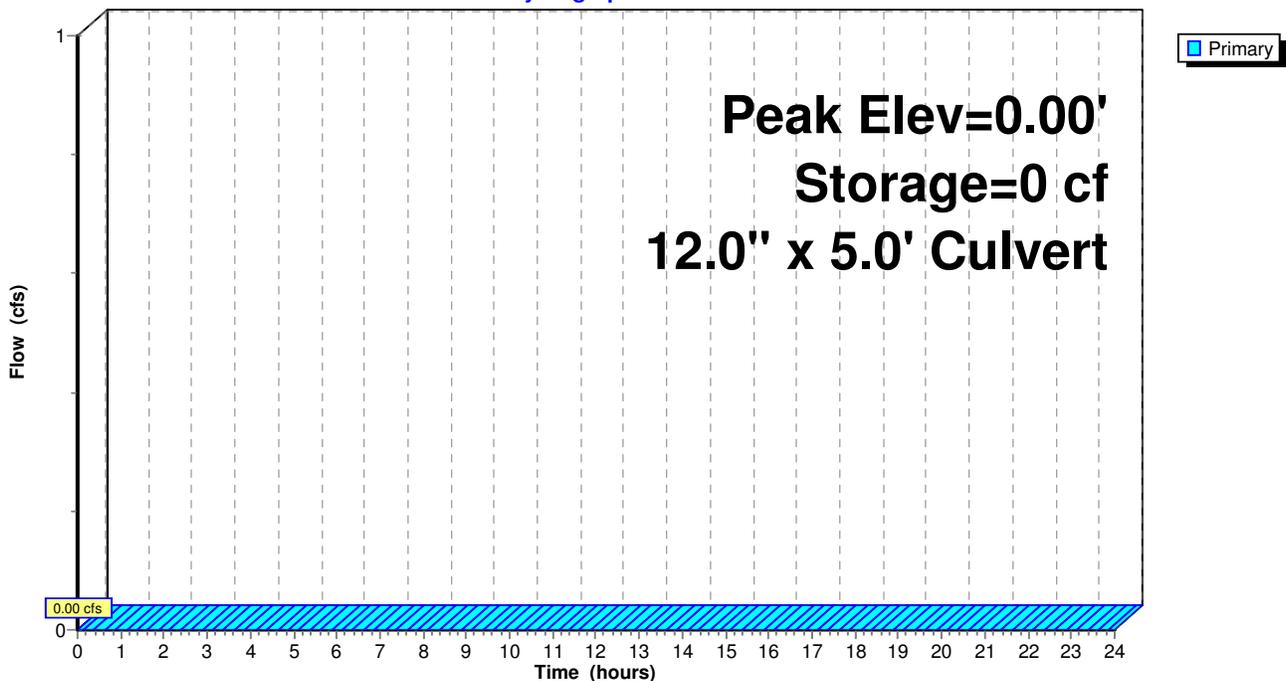
Device	Routing	Invert	Outlet Devices
#1	Primary	101.32'	12.0" x 5.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.22' S= 0.0200 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)

←1=Culvert (Controls 0.00 cfs)

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.00"

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Link A: POA A

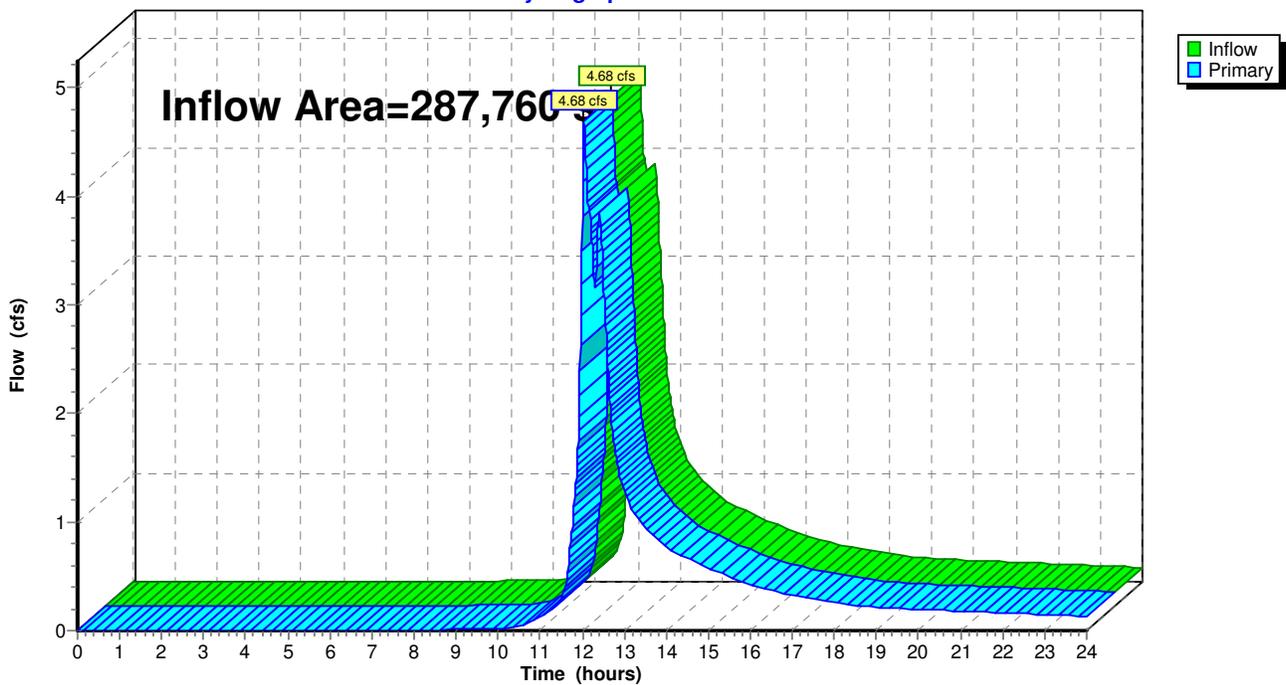
Inflow Area = 287,760 sf, Inflow Depth > 1.13" for 2-Year event
Inflow = 4.68 cfs @ 12.04 hrs, Volume= 27,032 cf
Primary = 4.68 cfs @ 12.04 hrs, Volume= 27,032 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A

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Type III 24-hr 10-Year Rainfall=4.50"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

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

Subcatchment 54S: CB at Cul-de-Sac - Outside Runoff Area=20,970 sf Runoff Depth>2.63"
Flow Length=200' Tc=5.0 min CN=82 Runoff=1.54 cfs 4,602 cf

Subcatchment 56S: CB at Cul-de-Sac - Inside Runoff Area=8,660 sf Runoff Depth>2.91"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min CN=85 Runoff=0.68 cfs 2,097 cf

Subcatchment 60S: Runoff Area=4,640 sf Runoff Depth>3.29"
Flow Length=80' Tc=2.0 min CN=89 Runoff=0.46 cfs 1,274 cf

Subcatchment 62S: Large Area including 2 Septics Runoff Area=39,429 sf Runoff Depth>2.29"
Flow Length=260' Tc=11.2 min CN=78 Runoff=2.04 cfs 7,516 cf

Subcatchment 65S: Throat of Cul-de-sac u.g. Runoff Area=11,590 sf Runoff Depth>2.72"
Flow Length=180' Tc=9.4 min CN=83 Runoff=0.76 cfs 2,628 cf

Subcatchment 68S: From hill near 19,20 to Lawn CB Runoff Area=15,091 sf Runoff Depth>2.29"
Flow Length=190' Tc=6.2 min CN=78 Runoff=0.92 cfs 2,880 cf

Subcatchment 110S: To CB 20 Runoff Area=7,780 sf Runoff Depth>3.20"
Flow Length=100' Slope=0.0200 '/' Tc=0.6 min CN=88 Runoff=0.80 cfs 2,072 cf

Subcatchment 112S: To CB 22 Runoff Area=5,198 sf Runoff Depth>3.60"
Flow Length=60' Tc=0.3 min CN=92 Runoff=0.58 cfs 1,560 cf

Subcatchment 114S: Behind Units 1&2 Runoff Area=12,960 sf Runoff Depth>2.37"
Flow Length=130' Tc=11.4 min CN=79 Runoff=0.69 cfs 2,561 cf

Subcatchment 116S: Runoff Area=3,050 sf Runoff Depth>3.40"
Flow Length=70' Tc=0.3 min CN=90 Runoff=0.33 cfs 863 cf

Subcatchment 118S: Runoff Area=3,610 sf Runoff Depth>3.20"
Flow Length=50' Tc=0.2 min CN=88 Runoff=0.37 cfs 962 cf

Subcatchment 120S: Runoff Area=6,190 sf Runoff Depth>3.10"
Flow Length=90' Tc=0.5 min CN=87 Runoff=0.62 cfs 1,598 cf

Subcatchment 122S: Runoff Area=6,066 sf Runoff Depth>2.21"
Flow Length=100' Tc=3.6 min CN=77 Runoff=0.39 cfs 1,117 cf

Subcatchment 124S: Runoff Area=7,500 sf Runoff Depth>3.10"
Flow Length=80' Tc=0.5 min CN=87 Runoff=0.75 cfs 1,937 cf

Subcatchment 126S: Runoff Area=5,370 sf Runoff Depth>3.10"
Flow Length=60' Tc=0.3 min CN=87 Runoff=0.54 cfs 1,387 cf

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Subcatchment 128S:	Runoff Area=7,200 sf	Runoff Depth>2.91"
Flow Length=115'	Slope=0.0200 '/'	Tc=3.2 min CN=85
	Runoff=0.62 cfs	1,745 cf
Subcatchment 130S:	Runoff Area=6,950 sf	Runoff Depth>2.73"
Flow Length=60'	Tc=0.3 min	CN=83
	Runoff=0.62 cfs	1,579 cf
Subcatchment 132S: Behind Unit 3	Runoff Area=26,270 sf	Runoff Depth>2.13"
Flow Length=130'	Tc=0.9 min	CN=76
	Runoff=1.79 cfs	4,662 cf
Subcatchment 134S: To Swale behind 7,6,5	Runoff Area=13,850 sf	Runoff Depth>2.38"
Flow Length=70'	Slope=0.0200 '/'	Tc=3.1 min CN=79
	Runoff=0.98 cfs	2,741 cf
Subcatchment 136S: To Swale behind 4 to HW 30	Runoff Area=21,060 sf	Runoff Depth>2.13"
Flow Length=95'	Slope=0.0100 '/'	Tc=4.9 min CN=76
	Runoff=1.25 cfs	3,734 cf
Subcatchment 138S: Rear of Units 10,11,12,13	Runoff Area=15,030 sf	Runoff Depth>2.63"
Flow Length=430'	Tc=12.3 min	CN=82
	Runoff=0.87 cfs	3,294 cf
Subcatchment 140S: Behind Units 14, 15, 16	Runoff Area=21,630 sf	Runoff Depth>2.20"
Flow Length=150'	Slope=0.0100 '/'	Tc=13.2 min CN=77
	Runoff=1.02 cfs	3,973 cf
Subcatchment 214S:	Runoff Area=6,950 sf	Runoff Depth>3.19"
Flow Length=110'	Tc=2.8 min	CN=88
	Runoff=0.66 cfs	1,850 cf
Subcatchment 216S:	Runoff Area=4,140 sf	Runoff Depth>2.91"
	Tc=1.0 min	CN=85
	Runoff=0.38 cfs	1,004 cf
Subcatchment 900: North Offsite flowing onto property	Runoff Area=14,076 sf	Runoff Depth>1.67"
Flow Length=340'	Slope=0.0500 '/'	Tc=12.8 min CN=70
	Runoff=0.49 cfs	1,957 cf
Reach 1R: Existing wetland channel to WF	Avg. Depth=0.26'	Max Vel=4.76 fps
	Inflow=8.25 cfs	28,687 cf
n=0.022	L=300.0'	S=0.0333 '/'
	Capacity=82.44 cfs	Outflow=8.21 cfs
		28,641 cf
Reach 2R: Swale from Drive at #10 to Drive a	Avg. Depth=0.13'	Max Vel=3.47 fps
	Inflow=0.66 cfs	1,850 cf
n=0.022	L=65.0'	S=0.0554 '/'
	Capacity=72.03 cfs	Outflow=0.66 cfs
		1,850 cf
Reach 55R: DMH 52 to DMH 50	Avg. Depth=0.52'	Max Vel=7.58 fps
	Inflow=3.15 cfs	9,326 cf
D=12.0"	n=0.013	L=32.0'
	S=0.0269 '/'	Capacity=5.84 cfs
		Outflow=3.15 cfs
		9,326 cf
Reach 62R: DMH 64 to Bio-Retention A (HW	Avg. Depth=0.51'	Max Vel=5.59 fps
	Inflow=2.24 cfs	8,790 cf
D=12.0"	n=0.013	L=12.0'
	S=0.0150 '/'	Capacity=4.36 cfs
		Outflow=2.24 cfs
		8,789 cf
Reach 64R: Swale from Drive at #12 to RG 10A	Avg. Depth=0.00'	Max Vel=0.00 fps
	Inflow=0.00 cfs	0 cf
n=0.022	L=10.0'	S=0.0350 '/'
	Capacity=57.26 cfs	Outflow=0.00 cfs
		0 cf
Reach 67R: Culvert under Unit 12 Drive	Avg. Depth=0.35'	Max Vel=3.53 fps
	Inflow=0.65 cfs	1,744 cf
D=8.0"	n=0.013	L=35.0'
	S=0.0100 '/'	Capacity=1.21 cfs
		Outflow=0.65 cfs
		1,744 cf
Reach 68R: Underdrain to CB 66	Avg. Depth=0.41'	Max Vel=9.15 fps
	Inflow=2.05 cfs	8,623 cf
D=8.0"	n=0.013	L=15.0'
	S=0.0600 '/'	Capacity=2.96 cfs
		Outflow=2.05 cfs
		8,622 cf

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Reach 69R: Drain to DMH 52	Avg. Depth=0.36'	Max Vel=5.03 fps	Inflow=0.96 cfs	2,627 cf
	D=8.0" n=0.013 L=38.0' S=0.0200 '/'	Capacity=1.71 cfs	Outflow=0.96 cfs	2,627 cf
Reach 114R: DMH 16 to DMH 14	Avg. Depth=0.40'	Max Vel=4.71 fps	Inflow=1.38 cfs	3,632 cf
	D=12.0" n=0.013 L=60.0' S=0.0133 '/'	Capacity=4.11 cfs	Outflow=1.36 cfs	3,632 cf
Reach 118R: Swale from Drive at #4 to RG 11	Avg. Depth=0.25'	Max Vel=3.85 fps	Inflow=1.66 cfs	4,644 cf
	n=0.022 L=10.0' S=0.0350 '/'	Capacity=57.26 cfs	Outflow=1.65 cfs	4,644 cf
Reach 127R: Swale from Drive at #3 to RG 11	Avg. Depth=0.31'	Max Vel=2.83 fps	Inflow=1.65 cfs	4,371 cf
	n=0.022 L=10.0' S=0.0150 '/'	Capacity=37.49 cfs	Outflow=1.65 cfs	4,371 cf
Reach 128R: Culvert under Unit 3 Drive	Avg. Depth=0.38'	Max Vel=8.13 fps	Inflow=1.66 cfs	4,371 cf
	D=8.0" n=0.013 L=40.0' S=0.0500 '/'	Capacity=2.70 cfs	Outflow=1.65 cfs	4,371 cf
Reach 129R: Swale from Drive at #20 to RG 124	Avg. Depth=0.00'	Max Vel=0.00 fps	Inflow=0.00 cfs	0 cf
	n=0.022 L=10.0' S=0.0450 '/'	Capacity=64.93 cfs	Outflow=0.00 cfs	0 cf
Reach 130R: Swale to RG 122	Avg. Depth=0.22'	Max Vel=3.62 fps	Inflow=1.35 cfs	3,298 cf
	n=0.022 L=30.0' S=0.0350 '/'	Capacity=57.26 cfs	Outflow=1.33 cfs	3,297 cf
Reach 131R: Culvert under Unit 20 Drive	Avg. Depth=0.33'	Max Vel=3.46 fps	Inflow=0.61 cfs	1,459 cf
	D=8.0" n=0.013 L=48.0' S=0.0100 '/'	Capacity=1.21 cfs	Outflow=0.60 cfs	1,459 cf
Reach 137R: Swale Back of 7,6,5	Avg. Depth=0.17'	Max Vel=1.63 fps	Inflow=0.98 cfs	2,741 cf
	n=0.030 L=140.0' S=0.0143 '/'	Capacity=26.48 cfs	Outflow=0.95 cfs	2,736 cf
Reach 138R: Swale Back of 4	Avg. Depth=0.35'	Max Vel=1.99 fps	Inflow=2.19 cfs	6,470 cf
	n=0.030 L=140.0' S=0.0100 '/'	Capacity=17.63 cfs	Outflow=2.15 cfs	6,460 cf
Reach 149R: DMH 14 to DMH 12	Avg. Depth=0.75'	Max Vel=7.26 fps	Inflow=6.38 cfs	20,852 cf
	D=18.0" n=0.013 L=95.0' S=0.0149 '/'	Capacity=12.84 cfs	Outflow=6.38 cfs	20,848 cf
Reach 150R: DMH 12 to HW 10 - Outlet	Avg. Depth=0.74'	Max Vel=7.28 fps	Inflow=6.38 cfs	20,848 cf
	D=18.0" n=0.013 L=55.0' S=0.0151 '/'	Capacity=12.90 cfs	Outflow=6.36 cfs	20,845 cf
Reach 153R: CB 116 to DMH 14	Avg. Depth=0.40'	Max Vel=9.07 fps	Inflow=1.96 cfs	5,464 cf
	D=8.0" n=0.013 L=28.0' S=0.0600 '/'	Capacity=2.96 cfs	Outflow=1.96 cfs	5,464 cf
Reach 154R: Swale from Drive at #6 to RG 126	Avg. Depth=0.00'	Max Vel=0.00 fps	Inflow=0.00 cfs	0 cf
	n=0.022 L=33.0' S=0.0091 '/'	Capacity=29.18 cfs	Outflow=0.00 cfs	0 cf
Reach 155R: Swale from Drive at #5 to RG 120	Avg. Depth=0.00'	Max Vel=0.00 fps	Inflow=0.00 cfs	0 cf
	n=0.022 L=50.0' S=0.0200 '/'	Capacity=43.29 cfs	Outflow=0.00 cfs	0 cf
Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland			Inflow=6.36 cfs	20,845 cf
			Outflow=6.36 cfs	20,845 cf
Reach 220R: CB 56 to DMH 52	Avg. Depth=0.30'	Max Vel=3.50 fps	Inflow=0.68 cfs	2,097 cf
	D=12.0" n=0.013 L=14.0' S=0.0100 '/'	Capacity=3.56 cfs	Outflow=0.68 cfs	2,097 cf

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Reach 222R: CB 54 to DMH 52 Avg. Depth=0.46' Max Vel=4.37 fps Inflow=1.54 cfs 4,602 cf
 D=12.0" n=0.013 L=22.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=1.54 cfs 4,602 cf

Reach 403R: CB 65 to DMH 50 Avg. Depth=0.44' Max Vel=6.08 fps Inflow=2.05 cfs 8,622 cf
 D=12.0" n=0.013 L=30.0' S=0.0200 '/' Capacity=5.04 cfs Outflow=2.05 cfs 8,622 cf

Reach 902R: Existing wetland channel to W Avg. Depth=0.27' Max Vel=5.35 fps Inflow=9.64 cfs 35,864 cf
 n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=9.63 cfs 35,847 cf

Pond 2P: Recharge System Peak Elev=104.47' Storage=4,465 cf Inflow=6.35 cfs 23,455 cf
 Discarded=0.01 cfs 451 cf Primary=6.02 cfs 19,463 cf Secondary=0.00 cfs 0 cf Outflow=6.02 cfs 19,913 cf

Pond 3P: Culvert under Drive Unit 10 Peak Elev=114.79' Inflow=0.66 cfs 1,850 cf
 8.0" x 35.0' Culvert Outflow=0.66 cfs 1,850 cf

Pond 4P: Culvert under Drive Unit 11 Peak Elev=110.84' Inflow=0.66 cfs 1,850 cf
 8.0" x 35.0' Culvert Outflow=0.66 cfs 1,850 cf

Pond 8P: Main Cell - Bio Retention Peak Elev=111.43' Storage=967 cf Inflow=2.24 cfs 8,789 cf
 Primary=2.05 cfs 8,623 cf Secondary=0.00 cfs 0 cf Outflow=2.05 cfs 8,623 cf

Pond 9P: CB 65 Peak Elev=108.19' Inflow=1.64 cfs 5,508 cf
 12.0" x 126.0' Culvert Outflow=1.64 cfs 5,508 cf

Pond 43R: CB 60 to DMH 64 Peak Elev=111.40' Inflow=0.46 cfs 1,274 cf
 12.0" x 12.0' Culvert Outflow=0.46 cfs 1,274 cf

Pond 61R: CB 62 to DMH 64 Peak Elev=112.02' Inflow=2.04 cfs 7,516 cf
 12.0" x 24.0' Culvert Outflow=2.04 cfs 7,516 cf

Pond 66P: RG 9A at Units 11/12 - CB 214 Peak Elev=107.67' Storage=125 cf Inflow=0.66 cfs 1,850 cf
 Primary=0.65 cfs 1,744 cf Secondary=0.00 cfs 0 cf Outflow=0.65 cfs 1,744 cf

Pond 67P: CB 66 (emergency vertical release) Peak Elev=106.47' Inflow=2.05 cfs 8,622 cf
 Primary=2.05 cfs 8,622 cf Secondary=0.00 cfs 0 cf Outflow=2.05 cfs 8,622 cf

Pond 70P: RG 10A - CB 216 at Units 13 Peak Elev=104.76' Storage=150 cf Inflow=0.96 cfs 2,747 cf
 Primary=0.96 cfs 2,627 cf Secondary=0.00 cfs 0 cf Outflow=0.96 cfs 2,627 cf

Pond 111P: CB 20 Peak Elev=104.24' Inflow=0.80 cfs 2,072 cf
 12.0" x 16.0' Culvert Outflow=0.80 cfs 2,072 cf

Pond 112P: CB 22 Peak Elev=104.21' Inflow=0.58 cfs 1,560 cf
 12.0" x 22.0' Culvert Outflow=0.58 cfs 1,560 cf

Pond 119P: RG - 1A - CB 118 to DMH 14 Peak Elev=110.16' Storage=58 cf Inflow=1.98 cfs 5,332 cf
 Primary=1.98 cfs 5,297 cf Secondary=0.00 cfs 0 cf Outflow=1.98 cfs 5,297 cf

Pond 119R: Culvert under Unit 4 Drive Peak Elev=112.43' Inflow=1.66 cfs 4,644 cf
 8.0" x 40.0' Culvert Outflow=1.66 cfs 4,644 cf

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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 121P: RG 6A - CB 120 Under Drive Unit 4 Peak Elev=112.28' Storage=58 cf Inflow=1.66 cfs 4,687 cf
 Primary=1.66 cfs 4,644 cf Secondary=0.00 cfs 0 cf Outflow=1.66 cfs 4,644 cf

Pond 128P: RG 2A - CB 122 RG Unit 3 Peak Elev=113.16' Storage=58 cf Inflow=1.66 cfs 4,414 cf
 Primary=1.66 cfs 4,371 cf Secondary=0.00 cfs 0 cf Outflow=1.66 cfs 4,371 cf

Pond 132P: RG 3B - CB 124 Rain Garden - Unit Peak Elev=115.04' Storage=98 cf Inflow=0.75 cfs 1,937 cf
 Outflow=0.76 cfs 1,839 cf

Pond 133P: Large RG 4C at Unit 20 Peak Elev=116.93' Storage=142 cf Inflow=0.62 cfs 1,579 cf
 Primary=0.61 cfs 1,459 cf Secondary=0.00 cfs 0 cf Outflow=0.61 cfs 1,459 cf

Pond 144R: HW 30 to DMH 14 Peak Elev=113.83' Inflow=2.15 cfs 6,460 cf
 12.0" x 114.0' Culvert Outflow=2.15 cfs 6,460 cf

Pond 155P: RG 5A - CB 116 between Septic an Peak Elev=109.18' Storage=60 cf Inflow=1.97 cfs 5,507 cf
 Primary=1.96 cfs 5,464 cf Secondary=0.00 cfs 0 cf Outflow=1.96 cfs 5,464 cf

Pond 156R: Culvert under Unit 5 Drive Peak Elev=115.09' Inflow=1.06 cfs 3,089 cf
 8.0" x 35.0' Culvert Outflow=1.06 cfs 3,089 cf

Pond 157P: RG 7A - CB 126 Under Drive Unit 5 Peak Elev=115.47' Storage=54 cf Inflow=1.06 cfs 3,131 cf
 Primary=1.06 cfs 3,089 cf Secondary=0.00 cfs 0 cf Outflow=1.06 cfs 3,089 cf

Pond 158P: Culvert under Drive Unit 6 Peak Elev=116.50' Inflow=0.62 cfs 1,745 cf
 8.0" x 35.0' Culvert Outflow=0.62 cfs 1,745 cf

Pond 218R: DMH 50 to Irrigation Cistern Peak Elev=103.34' Inflow=6.35 cfs 23,455 cf
 15.0" x 5.0' Culvert Outflow=6.35 cfs 23,455 cf

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
 Discarded=0.00 cfs 0 cf Primary=0.00 cfs 0 cf

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
 12.0" x 5.0' Culvert Primary=0.00 cfs 0 cf

Link A: POA A Inflow=13.89 cfs 56,693 cf
 Primary=13.89 cfs 56,693 cf

Total Runoff Area = 295,260 sf Runoff Volume = 61,591 cf Average Runoff Depth = 2.50"
72.54% Pervious Area = 214,190 sf 27.46% Impervious Area = 81,070 sf

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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 54S: CB at Cul-de-Sac - Outside

Runoff = 1.54 cfs @ 12.07 hrs, Volume= 4,602 cf, Depth> 2.63"

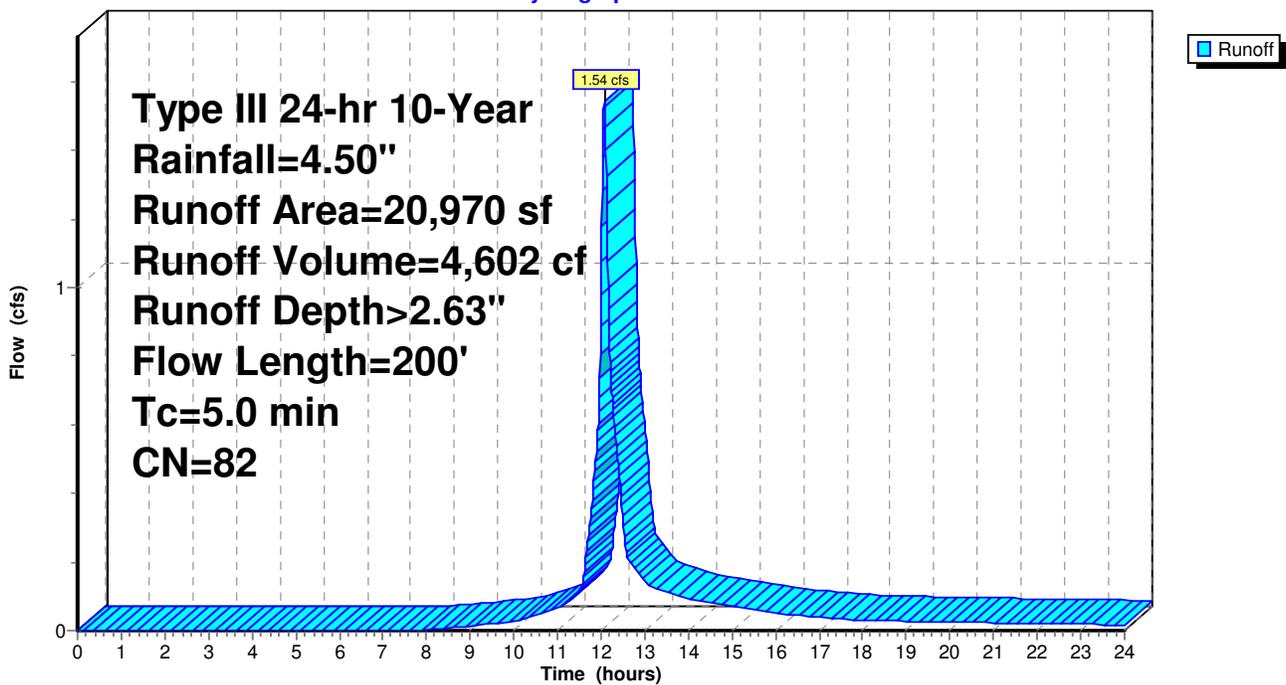
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,100	98	Paved parking & roofs
2,724	98	Paved parking & roofs
14,146	74	>75% Grass cover, Good, HSG C
20,970	82	Weighted Average
14,146		Pervious Area
6,824		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.1	20	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	150	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.0	200	Total			

Subcatchment 54S: CB at Cul-de-Sac - Outside

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 56S: CB at Cul-de-Sac - Inside

Runoff = 0.68 cfs @ 12.08 hrs, Volume= 2,097 cf, Depth> 2.91"

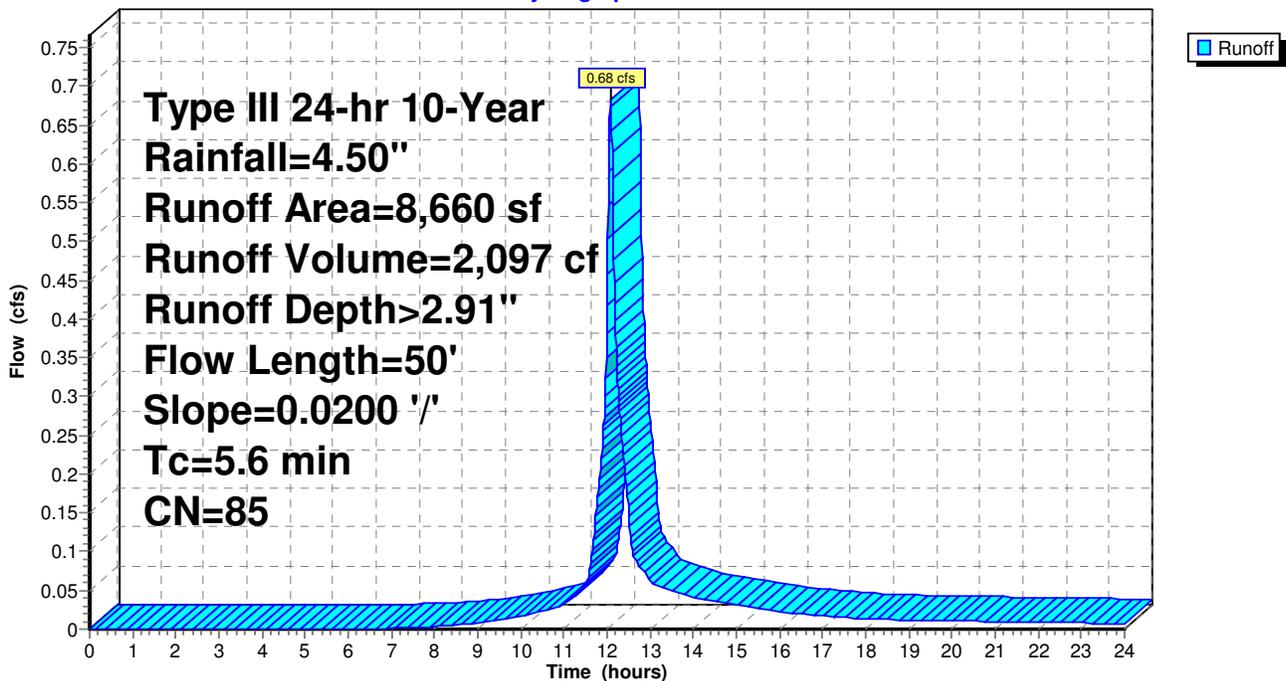
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
0	98	Paved parking & roofs
3,847	98	Paved parking & roofs
4,813	74	>75% Grass cover, Good, HSG C
8,660	85	Weighted Average
4,813		Pervious Area
3,847		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"

Subcatchment 56S: CB at Cul-de-Sac - Inside

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 60S:

Runoff = 0.46 cfs @ 12.03 hrs, Volume= 1,274 cf, Depth> 3.29"

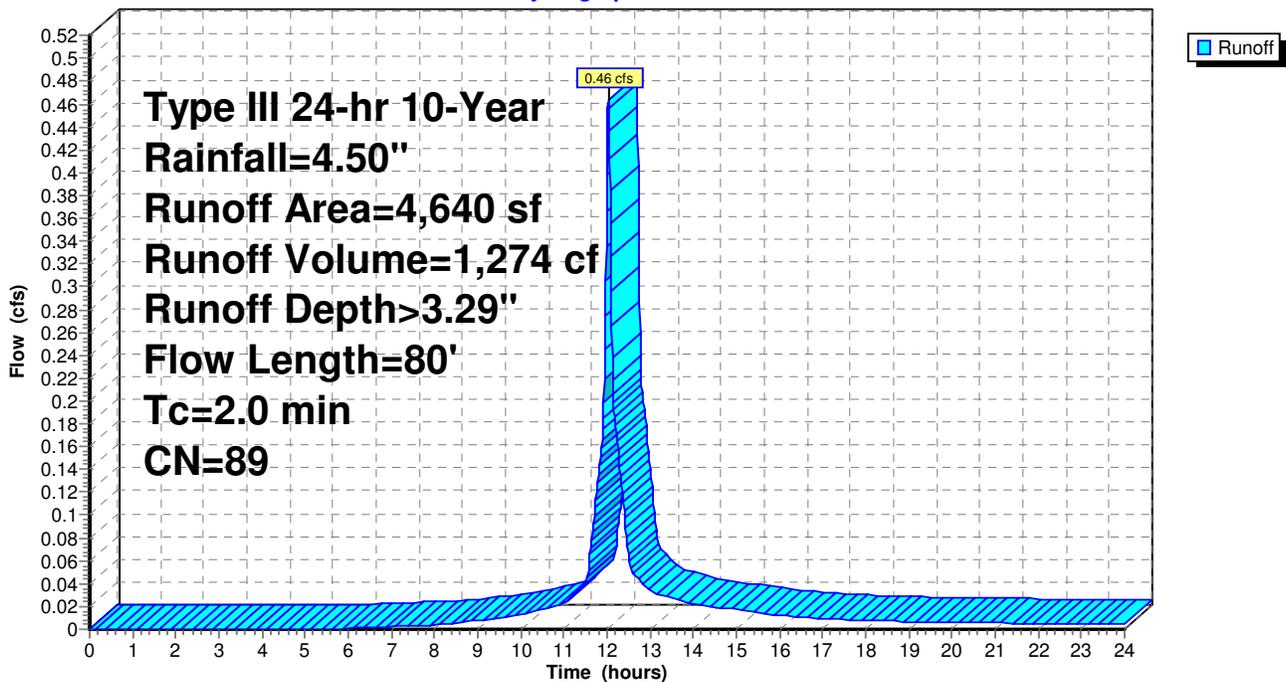
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
960	98	Paved parking & roofs
1,850	98	Paved parking & roofs
1,830	74	>75% Grass cover, Good, HSG C
4,640	89	Weighted Average
1,830		Pervious Area
2,810		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	10	0.0250	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	80	Total			

Subcatchment 60S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 62S: Large Area including 2 Septics

Runoff = 2.04 cfs @ 12.16 hrs, Volume= 7,516 cf, Depth> 2.29"

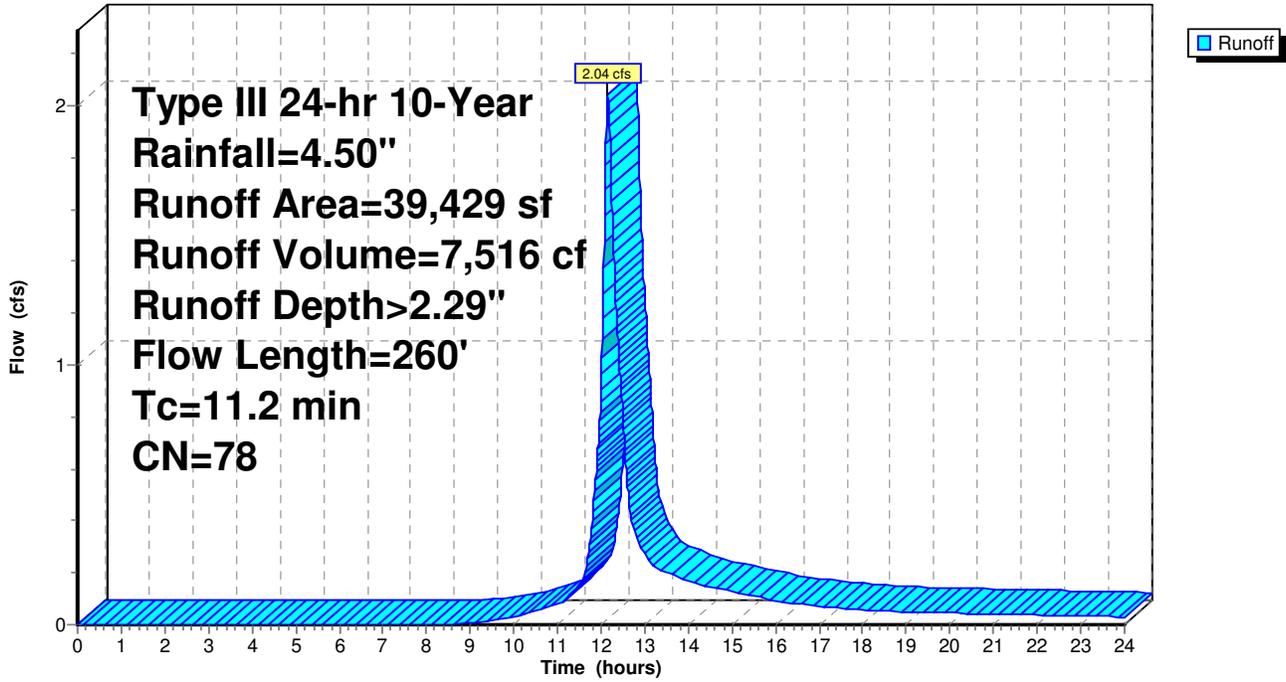
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,880	98	Paved parking & roofs
2,734	98	Paved parking & roofs
30,815	74	>75% Grass cover, Good, HSG C
2,000	70	Woods, Good, HSG C
39,429	78	Weighted Average
32,815		Pervious Area
6,614		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	25	0.0500	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	25	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.2	260	Total			

Subcatchment 62S: Large Area including 2 Septics

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 65S: Throat of Cul-de-sac u.g.

Runoff = 0.76 cfs @ 12.13 hrs, Volume= 2,628 cf, Depth> 2.72"

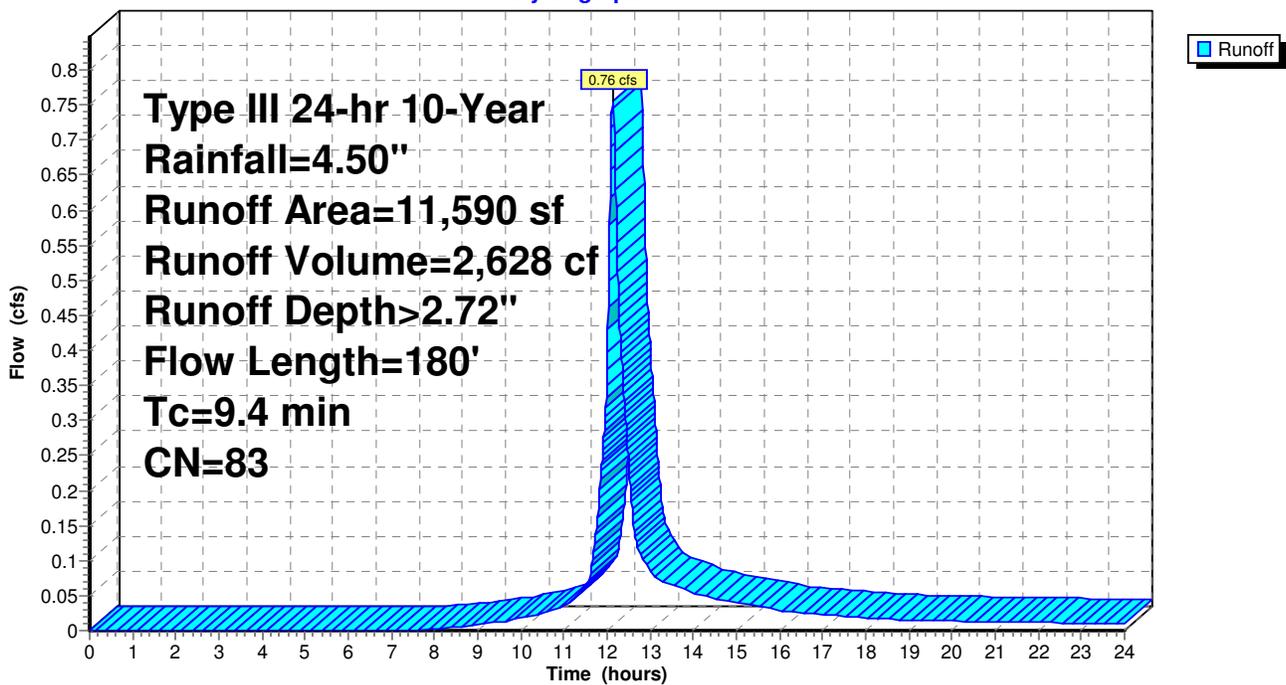
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,200	98	Paved parking & roofs
2,160	98	Paved parking & roofs
7,230	74	>75% Grass cover, Good, HSG C
11,590	83	Weighted Average
7,230		Pervious Area
4,360		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	30	0.1500	2.42		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
9.0	90	0.0200	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.2	60	0.0400	4.06		Shallow Concentrated Flow, Unit 17 Drive and Private Drive Paved Kv= 20.3 fps
9.4	180	Total			

Subcatchment 65S: Throat of Cul-de-sac u.g.

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 68S: From hill near 19,20 to Lawn CB

Runoff = 0.92 cfs @ 12.09 hrs, Volume= 2,880 cf, Depth> 2.29"

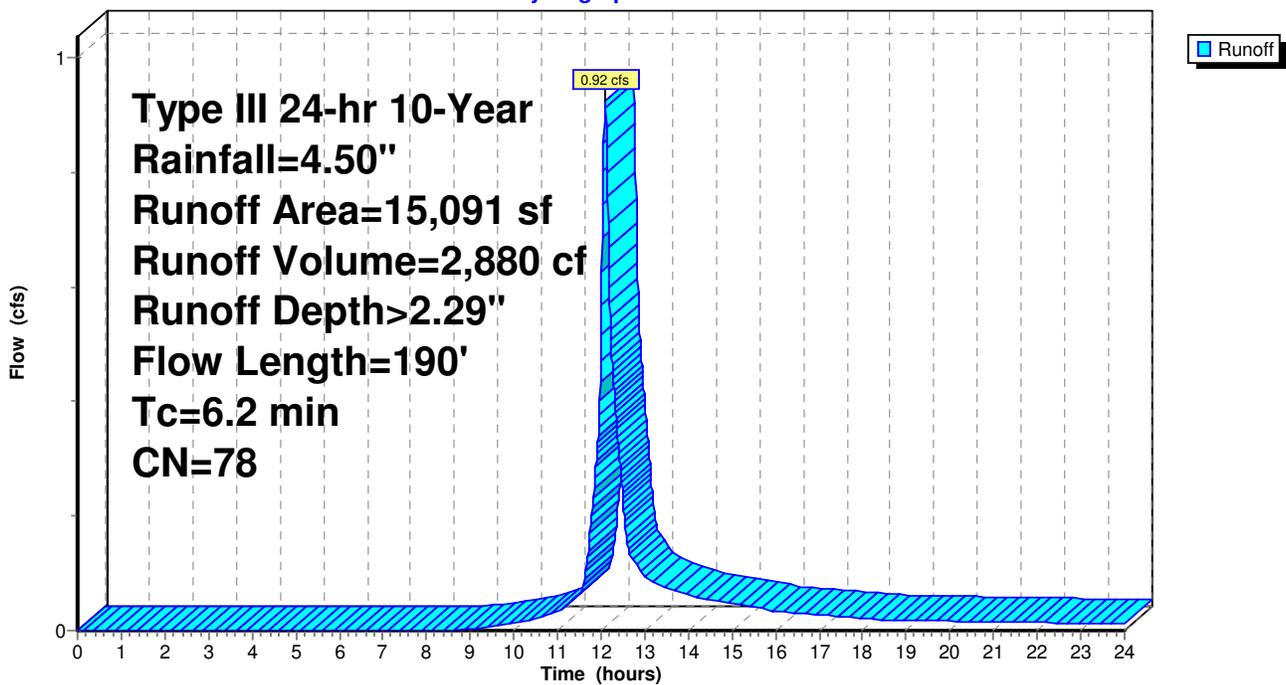
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,730	98	Paved parking & roofs
0	98	Paved parking & roofs
12,361	74	>75% Grass cover, Good, HSG C
15,091	78	Weighted Average
12,361		Pervious Area
2,730		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.1500	2.23		Sheet Flow, Roof Unit 20 Smooth surfaces n= 0.011 P2= 3.20"
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.4	140	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	190	Total			

Subcatchment 68S: From hill near 19,20 to Lawn CB

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 110S: To CB 20

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.80 cfs @ 12.01 hrs, Volume= 2,072 cf, Depth> 3.20"

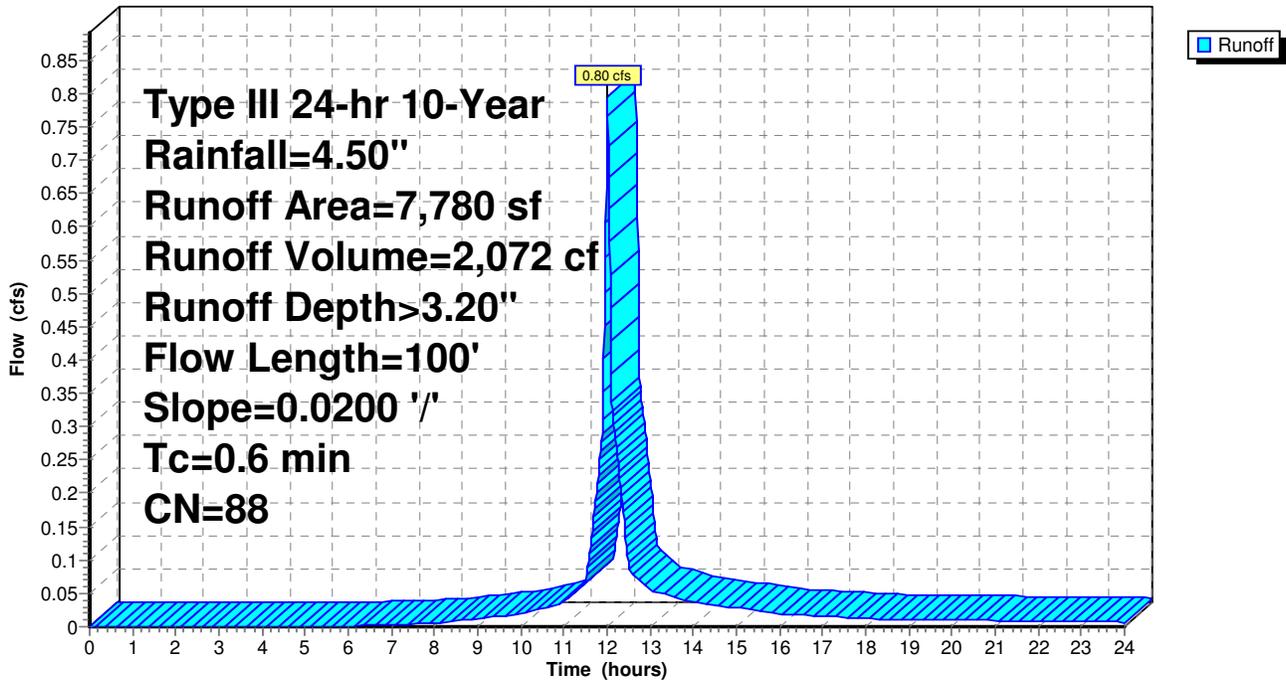
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
2,880	98	Paved parking & roofs
3,240	74	>75% Grass cover, Good, HSG C
7,780	88	Weighted Average
3,240		Pervious Area
4,540		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	100	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps

Subcatchment 110S: To CB 20

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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 112S: To CB 22

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.58 cfs @ 12.00 hrs, Volume= 1,560 cf, Depth> 3.60"

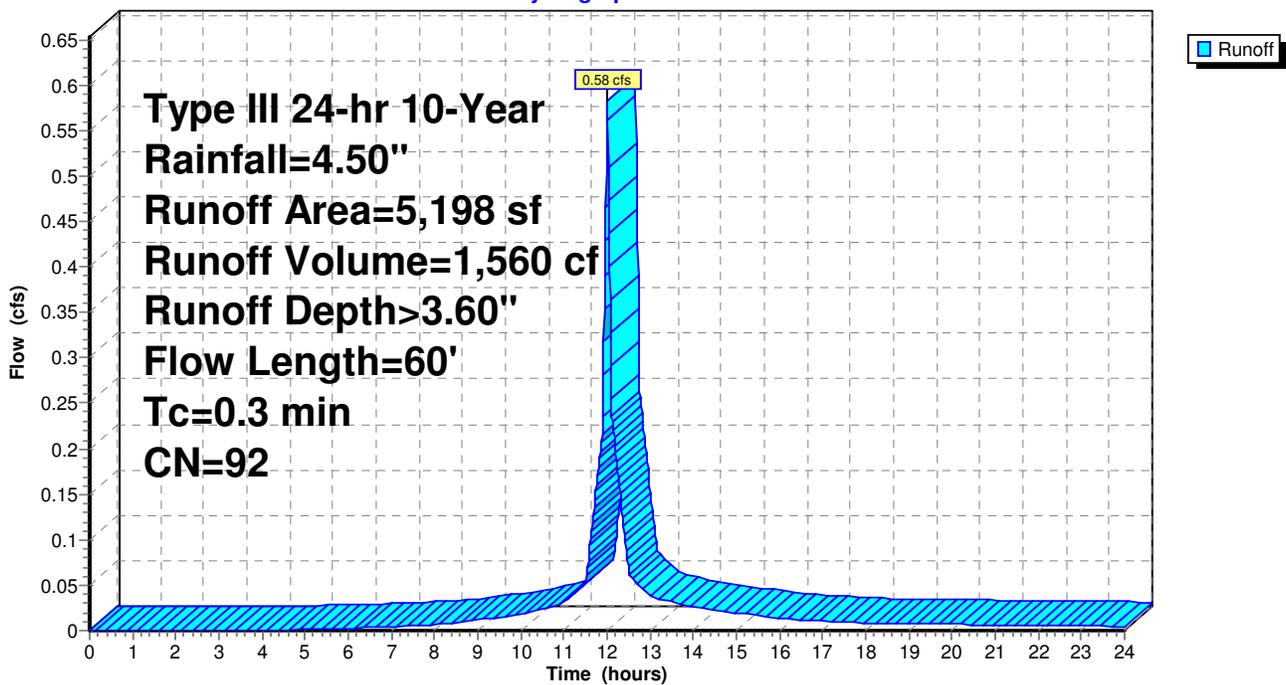
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,400	98	Paved parking & roofs
1,525	98	Paved parking & roofs
1,273	74	>75% Grass cover, Good, HSG C
5,198	92	Weighted Average
1,273		Pervious Area
3,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	60	Total			

Subcatchment 112S: To CB 22

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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 114S: Behind Units 1&2

Runoff = 0.69 cfs @ 12.16 hrs, Volume= 2,561 cf, Depth> 2.37"

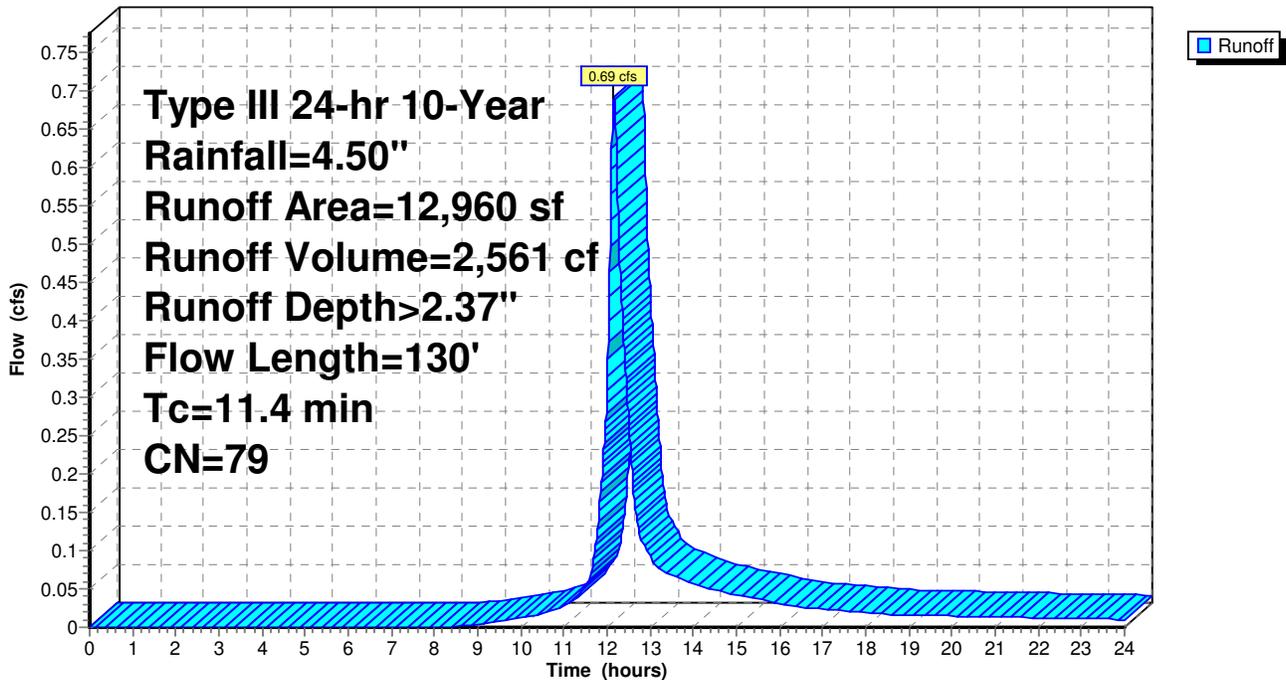
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,300	98	Paved parking & roofs
10,000	74	>75% Grass cover, Good, HSG C
12,960	79	Weighted Average
10,000		Pervious Area
2,960		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.6	80	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.4	130	Total			

Subcatchment 114S: Behind Units 1&2

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 116S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.33 cfs @ 12.00 hrs, Volume= 863 cf, Depth> 3.40"

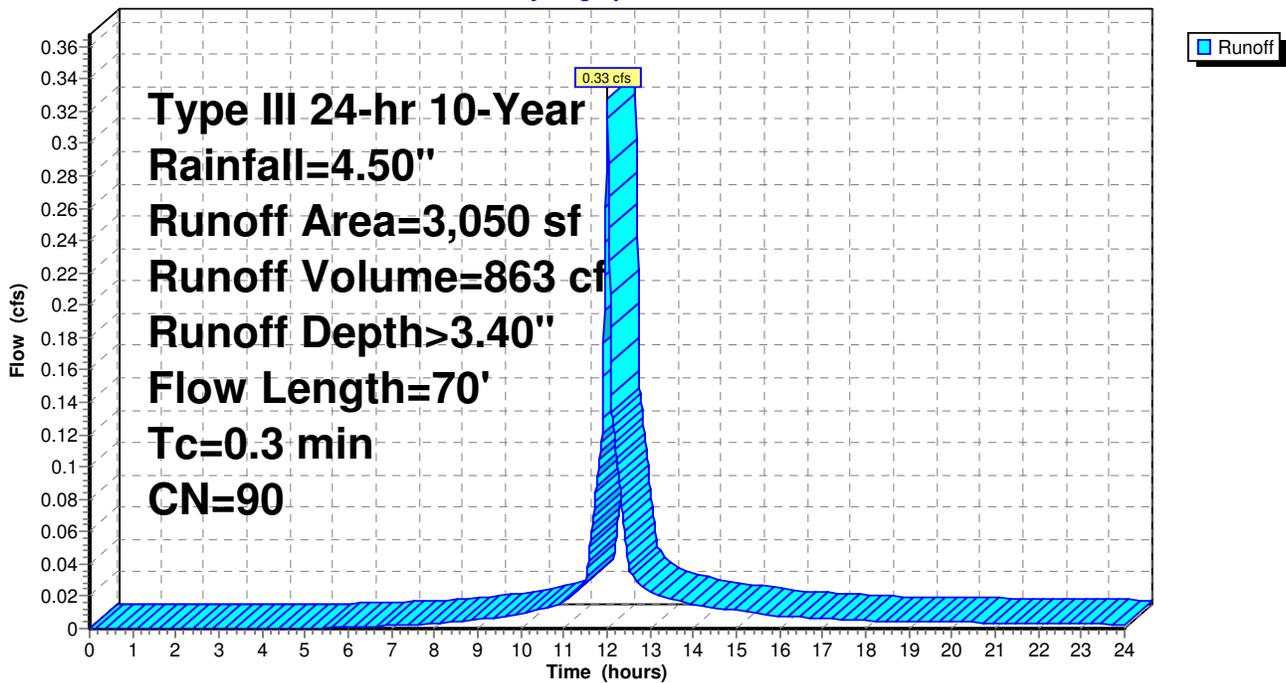
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,300	98	Paved parking & roofs
1,050	74	>75% Grass cover, Good, HSG C
3,050	90	Weighted Average
1,050		Pervious Area
2,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	40	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	70	Total			

Subcatchment 116S:

Hydrograph



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Subcatchment 118S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.37 cfs @ 12.00 hrs, Volume= 962 cf, Depth> 3.20"

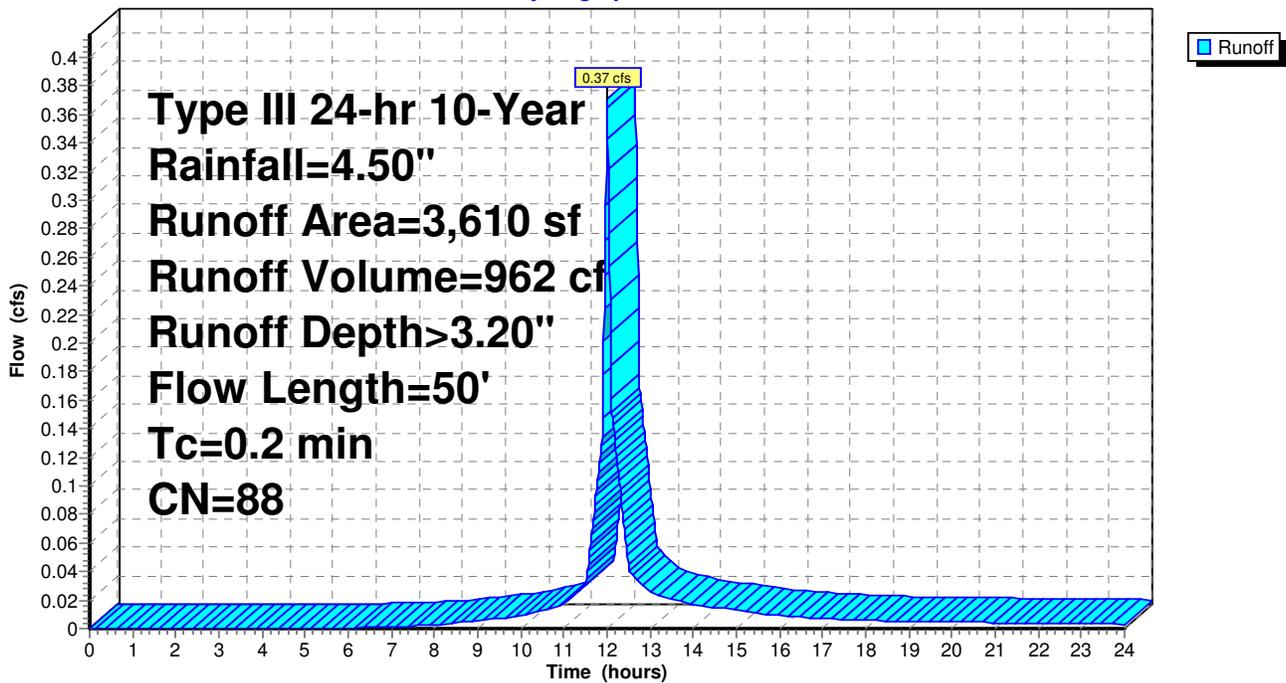
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,040	98	Paved parking & roofs
1,140	98	Paved parking & roofs
1,430	74	>75% Grass cover, Good, HSG C
3,610	88	Weighted Average
1,430		Pervious Area
2,180		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	50	Total			

Subcatchment 118S:

Hydrograph



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Subcatchment 120S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.62 cfs @ 12.01 hrs, Volume= 1,598 cf, Depth> 3.10"

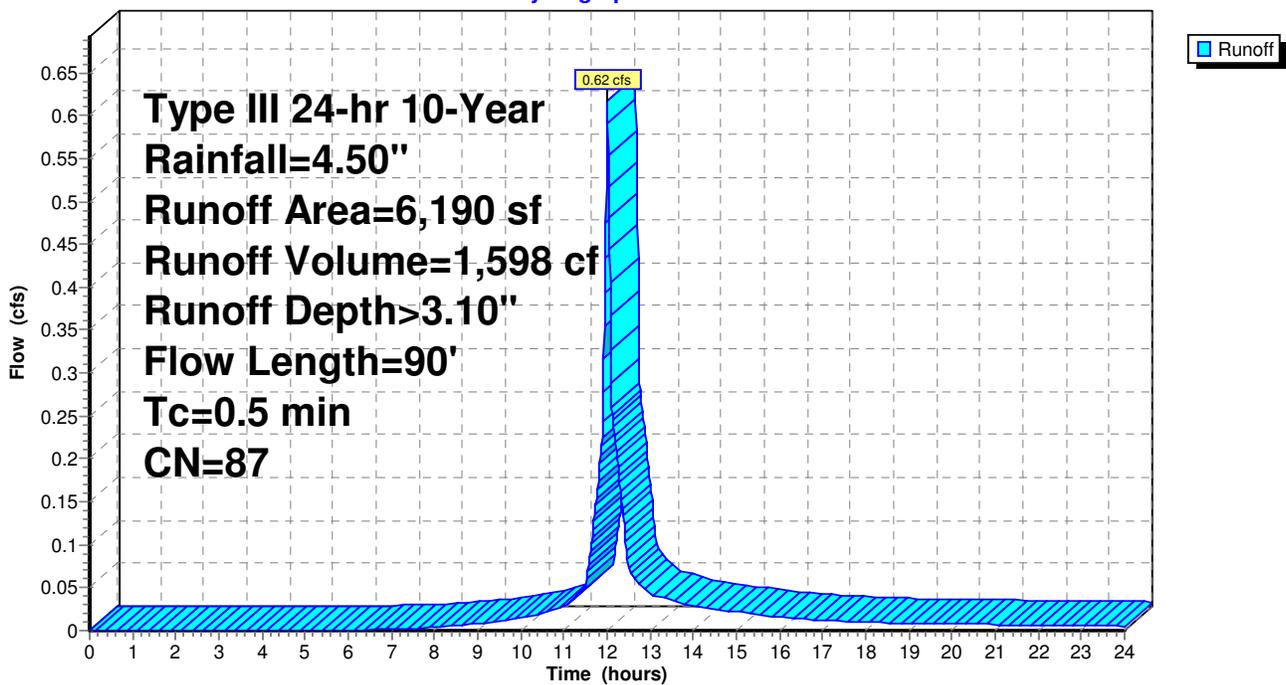
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,450	98	Paved parking & roofs
1,800	98	Paved parking & roofs
2,940	74	>75% Grass cover, Good, HSG C
6,190	87	Weighted Average
2,940		Pervious Area
3,250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v = 20.3$ fps
0.4	60	0.0300	2.79		Shallow Concentrated Flow, Unpaved $K_v = 16.1$ fps
0.5	90	Total			

Subcatchment 120S:

Hydrograph



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Subcatchment 122S:

Runoff = 0.39 cfs @ 12.06 hrs, Volume= 1,117 cf, Depth> 2.21"

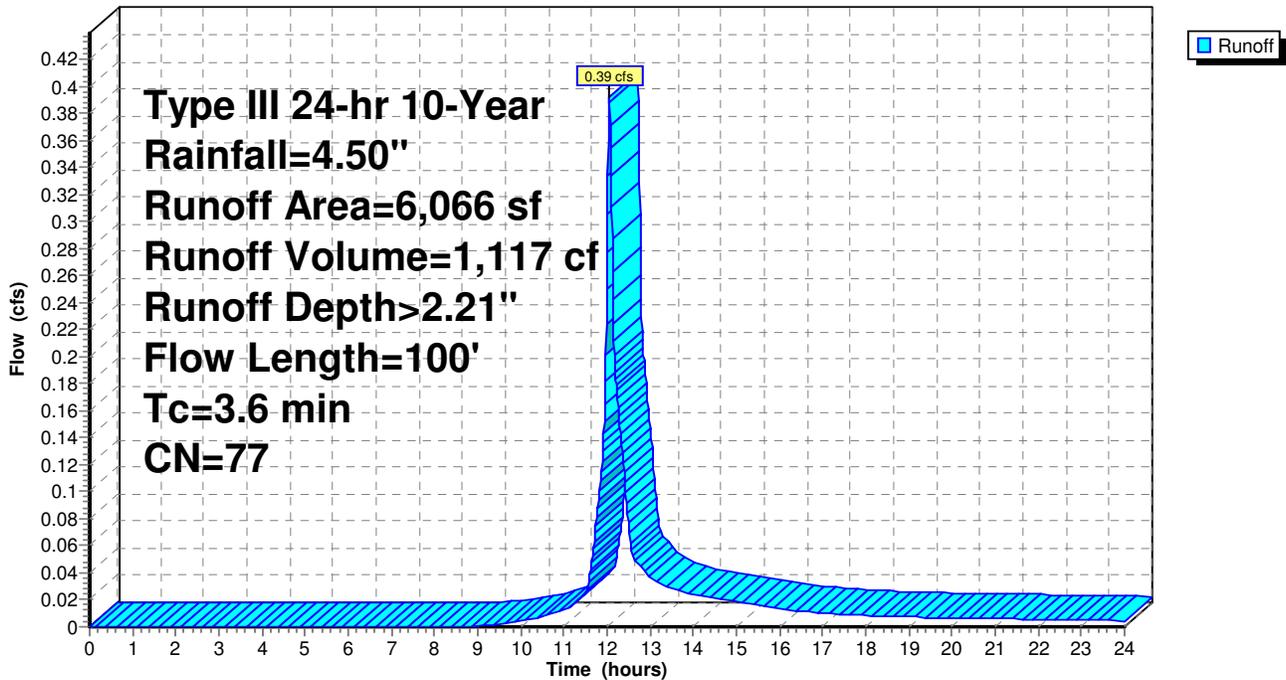
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
720	98	Paved parking & roofs
5,346	74	>75% Grass cover, Good, HSG C
6,066	77	Weighted Average
5,346		Pervious Area
720		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	20	0.0300	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.3	80	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.6	100	Total			

Subcatchment 122S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 124S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.75 cfs @ 12.01 hrs, Volume= 1,937 cf, Depth> 3.10"

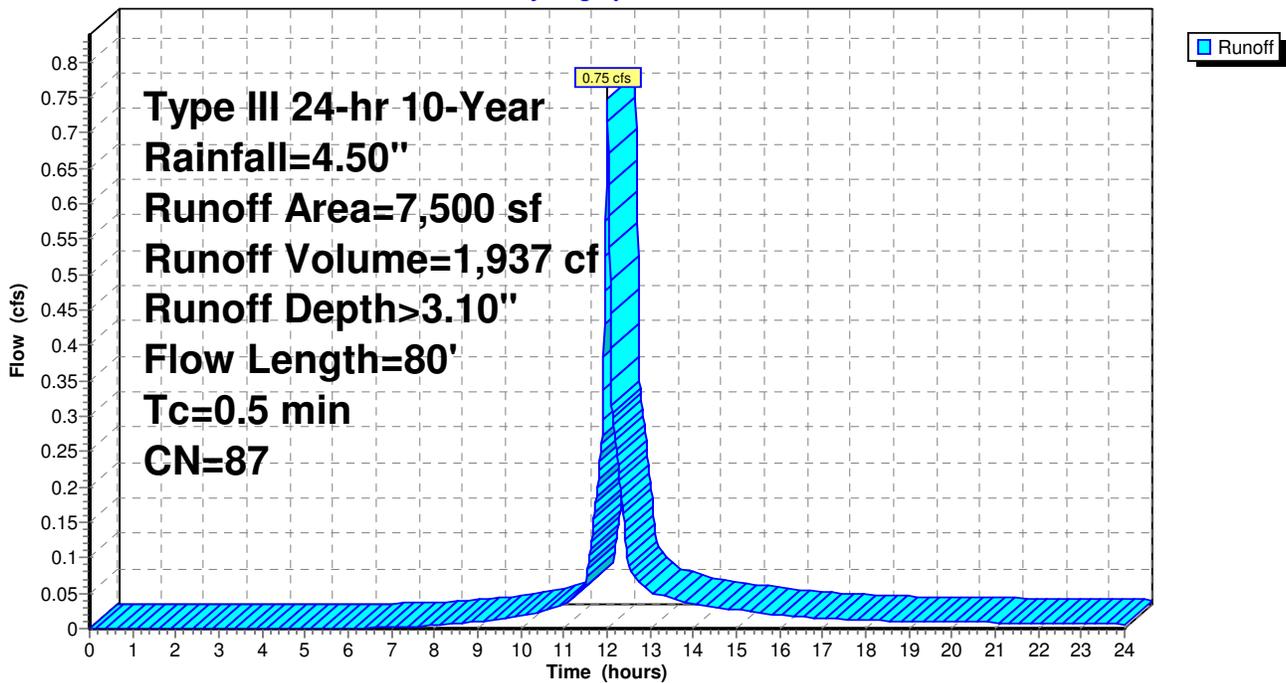
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,410	98	Paved parking & roofs
2,600	98	Paved parking & roofs
3,490	74	>75% Grass cover, Good, HSG C
7,500	87	Weighted Average
3,490		Pervious Area
4,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v = 20.3$ fps
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved $K_v = 16.1$ fps
0.5	80	Total			

Subcatchment 124S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 126S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.54 cfs @ 12.01 hrs, Volume= 1,387 cf, Depth> 3.10"

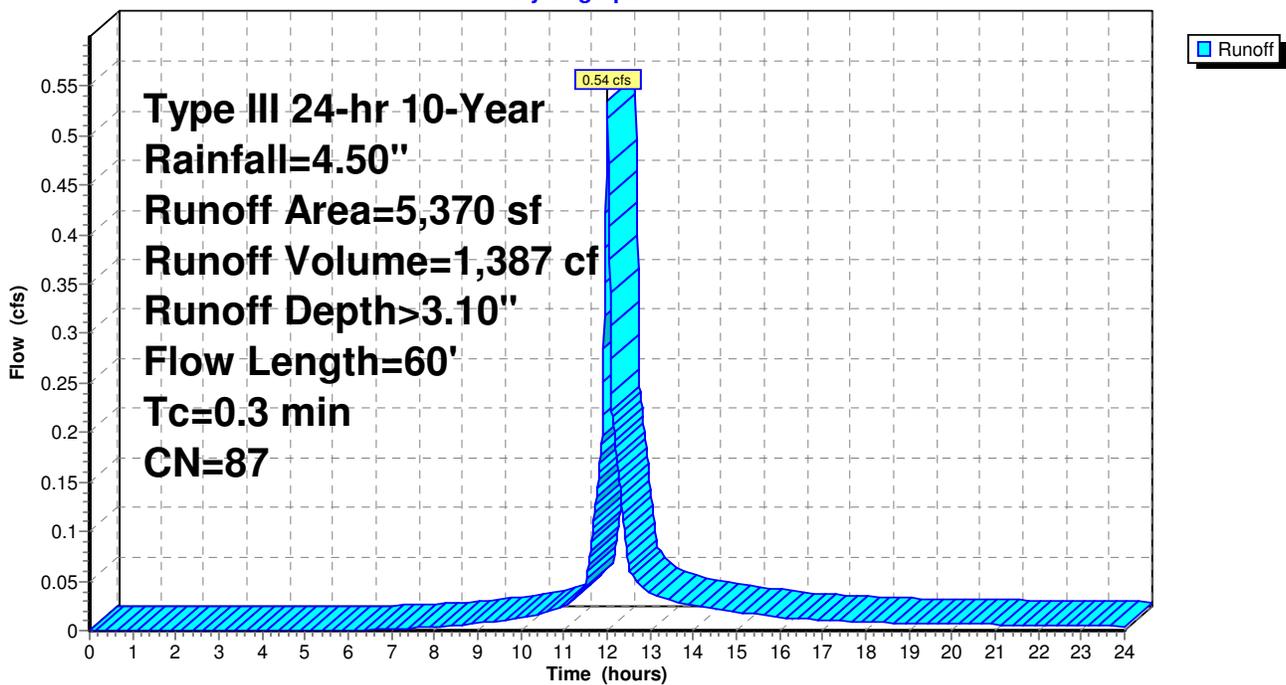
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,350	98	Paved parking & roofs
2,360	74	>75% Grass cover, Good, HSG C
5,370	87	Weighted Average
2,360		Pervious Area
3,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v=20.3$ fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved $K_v=16.1$ fps
0.3	60	Total			

Subcatchment 126S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 128S:

Runoff = 0.62 cfs @ 12.05 hrs, Volume= 1,745 cf, Depth> 2.91"

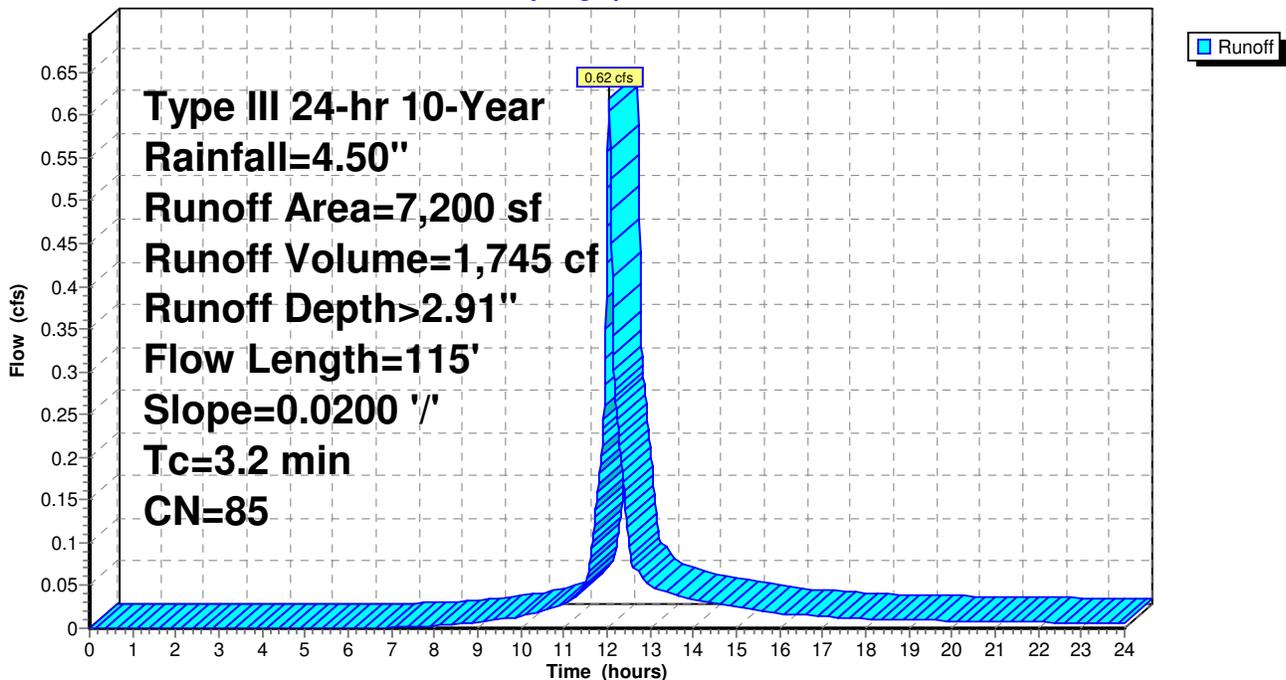
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,550	98	Paved parking & roofs
1,600	98	Paved parking & roofs
4,050	74	>75% Grass cover, Good, HSG C
7,200	85	Weighted Average
4,050		Pervious Area
3,150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	25	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.2	115	Total			

Subcatchment 128S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 130S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.62 cfs @ 12.01 hrs, Volume= 1,579 cf, Depth> 2.73"

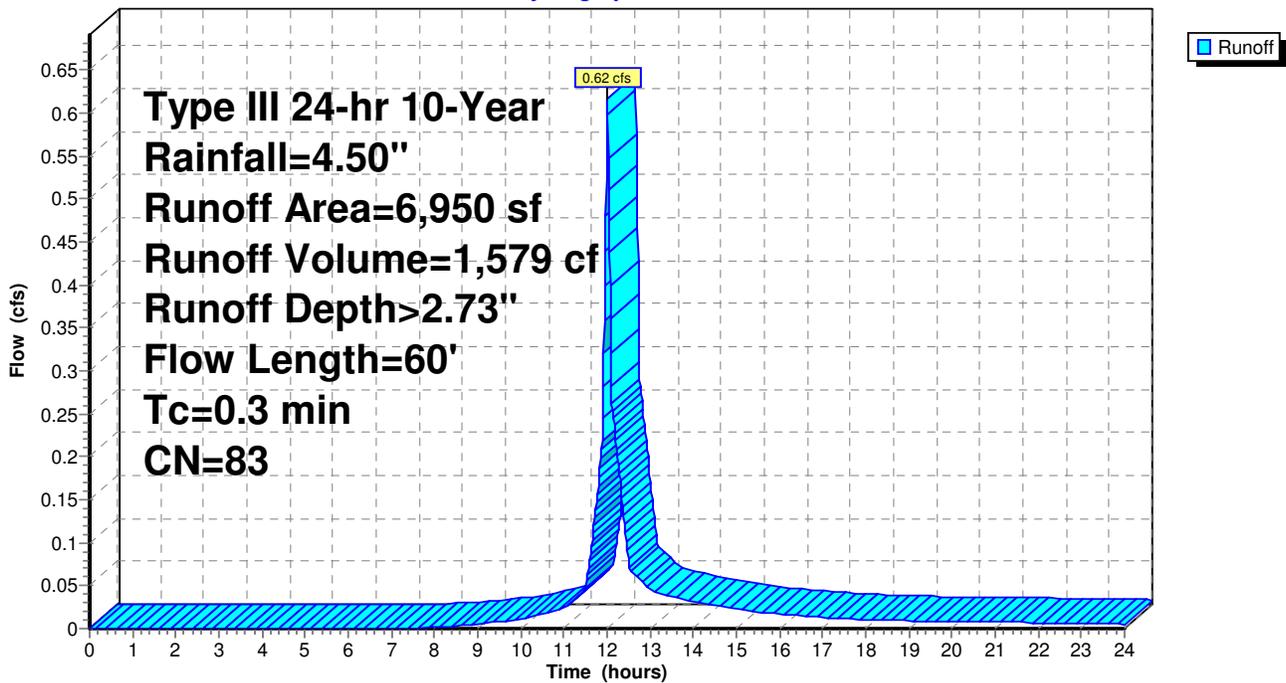
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
800	98	Paved parking & roofs
1,940	98	Paved parking & roofs
4,210	74	>75% Grass cover, Good, HSG C
6,950	83	Weighted Average
4,210		Pervious Area
2,740		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v = 20.3$ fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved $K_v = 16.1$ fps
0.3	60	Total			

Subcatchment 130S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 132S: Behind Unit 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.79 cfs @ 12.02 hrs, Volume= 4,662 cf, Depth> 2.13"

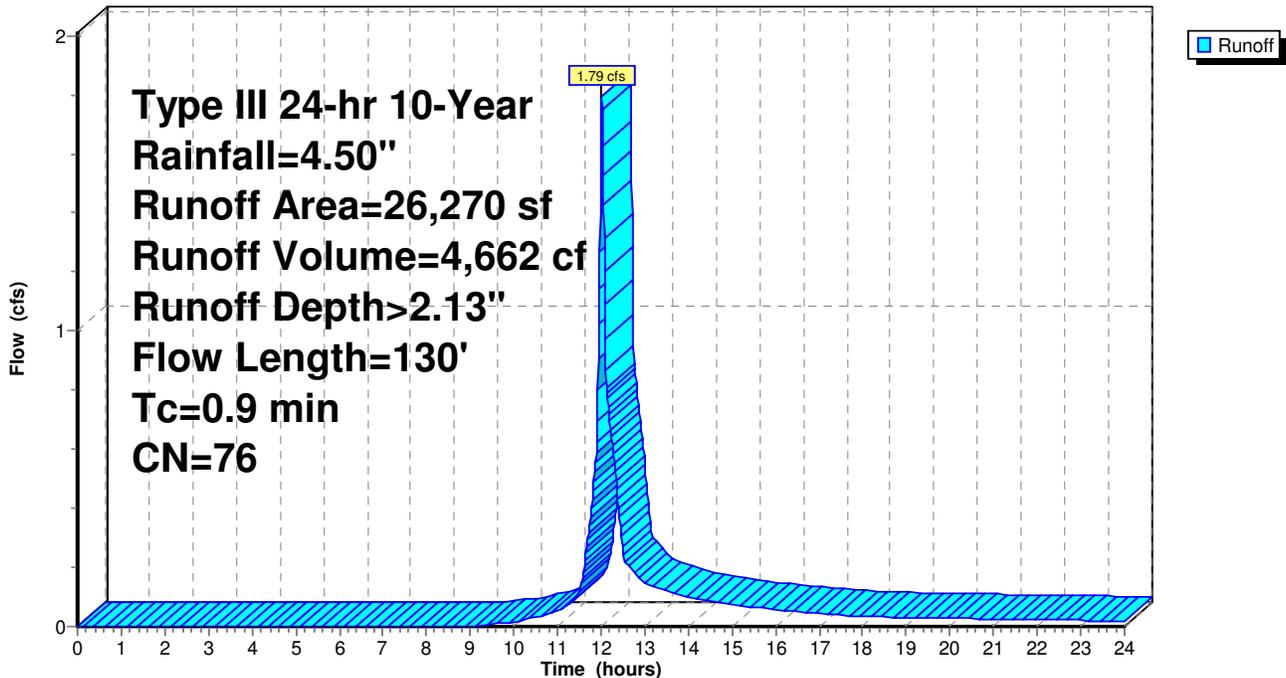
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,100	98	Paved parking & roofs
24,170	74	>75% Grass cover, Good, HSG C
26,270	76	Weighted Average
24,170		Pervious Area
2,100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.0150	1.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	130	Total			

Subcatchment 132S: Behind Unit 3

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 134S: To Swale behind 7,6,5

Runoff = 0.98 cfs @ 12.05 hrs, Volume= 2,741 cf, Depth> 2.38"

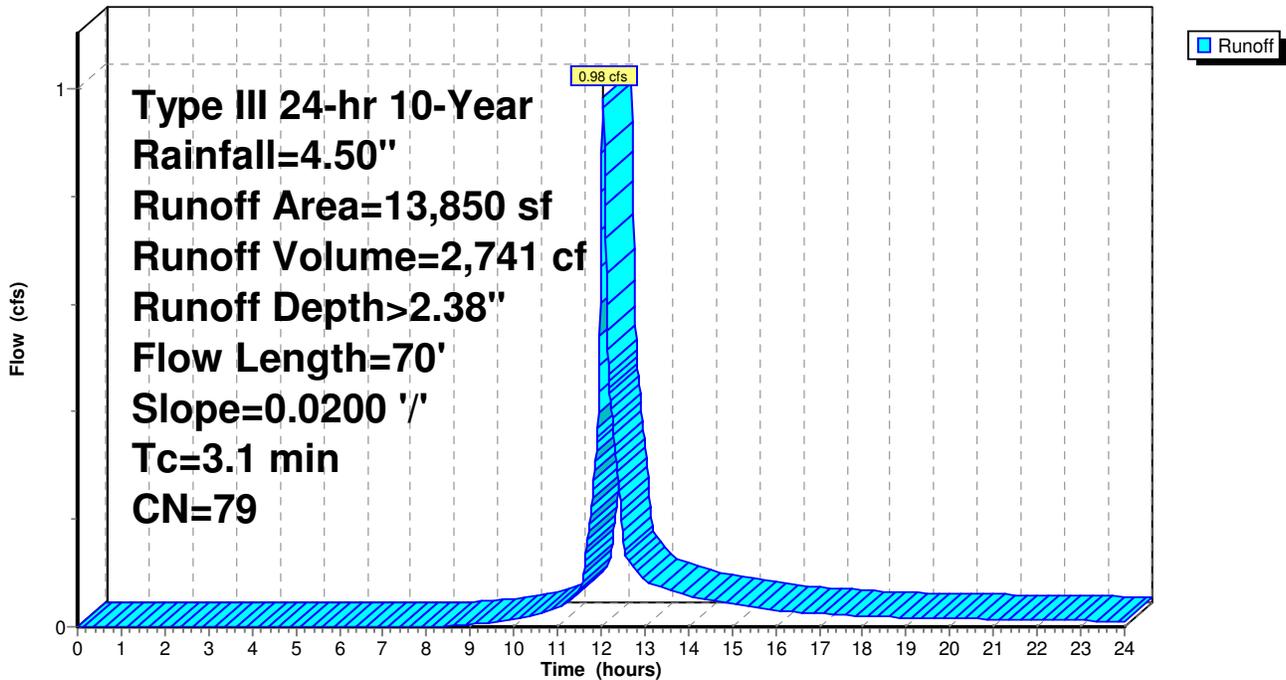
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs
10,850	74	>75% Grass cover, Good, HSG C
13,850	79	Weighted Average
10,850		Pervious Area
3,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: To Swale behind 7,6,5

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 136S: To Swale behind 4 to HW 30

Runoff = 1.25 cfs @ 12.08 hrs, Volume= 3,734 cf, Depth> 2.13"

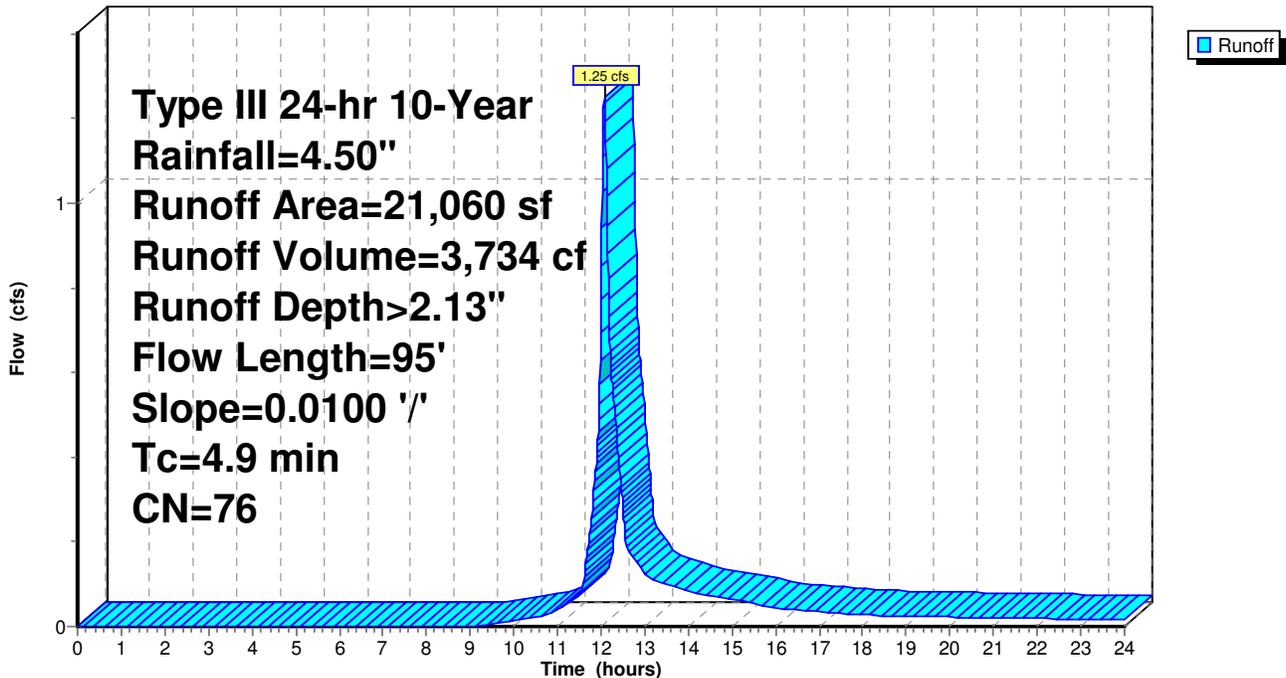
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,060	98	Paved parking & roofs
1,700	70	Woods, Good, HSG C
17,300	74	>75% Grass cover, Good, HSG C
21,060	76	Weighted Average
19,000		Pervious Area
2,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	1.83	0.59	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022 Earth, clean & straight
4.9	95	Total			

Subcatchment 136S: To Swale behind 4 to HW 30

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 138S: Rear of Units 10,11,12,13

Runoff = 0.87 cfs @ 12.17 hrs, Volume= 3,294 cf, Depth> 2.63"

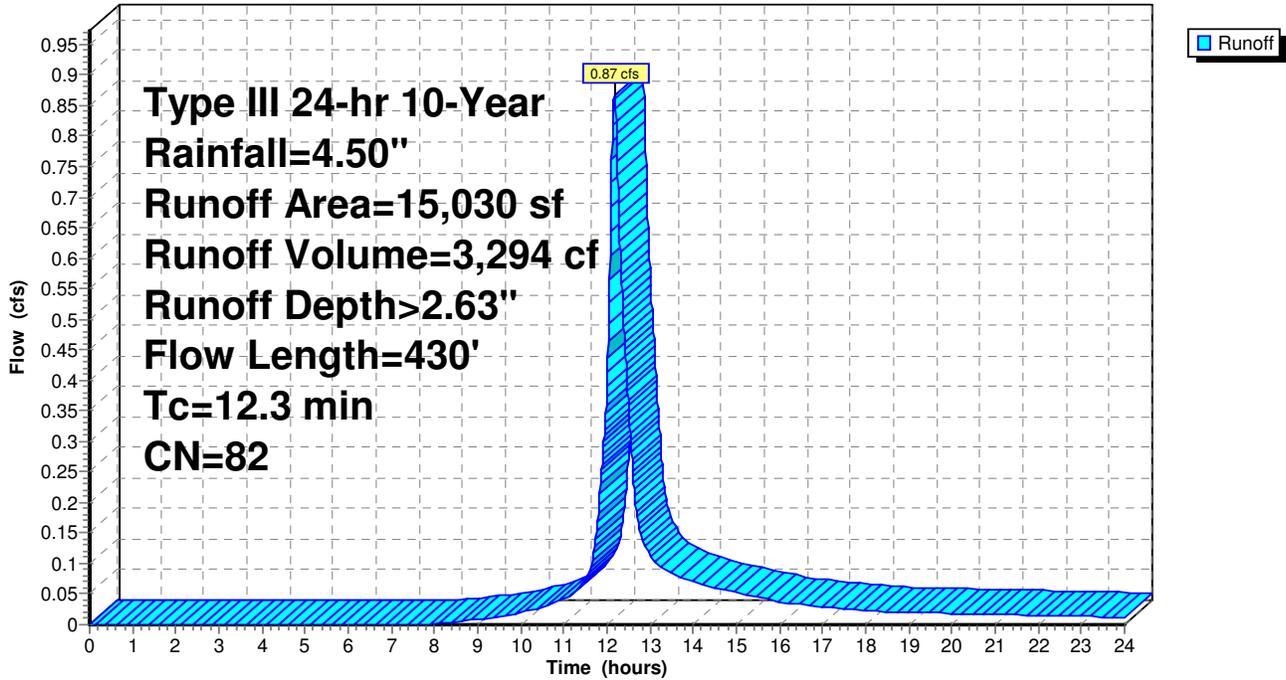
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
4,800	98	Paved parking & roofs
0	98	Paved parking & roofs
10,230	74	>75% Grass cover, Good, HSG C
15,030	82	Weighted Average
10,230		Pervious Area
4,800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	80	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	150	0.0500	4.63	2.02	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.25' Z= 3.0 '/' Top.W=2.50' n= 0.022 Earth, clean & straight
0.6	150	0.0300	3.89	2.68	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=0.25' Z= 3.0 '/' Top.W=3.50' n= 0.022 Earth, clean & straight
12.3	430	Total			

Subcatchment 138S: Rear of Units 10,11,12,13

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 140S: Behind Units 14, 15, 16

Runoff = 1.02 cfs @ 12.19 hrs, Volume= 3,973 cf, Depth> 2.20"

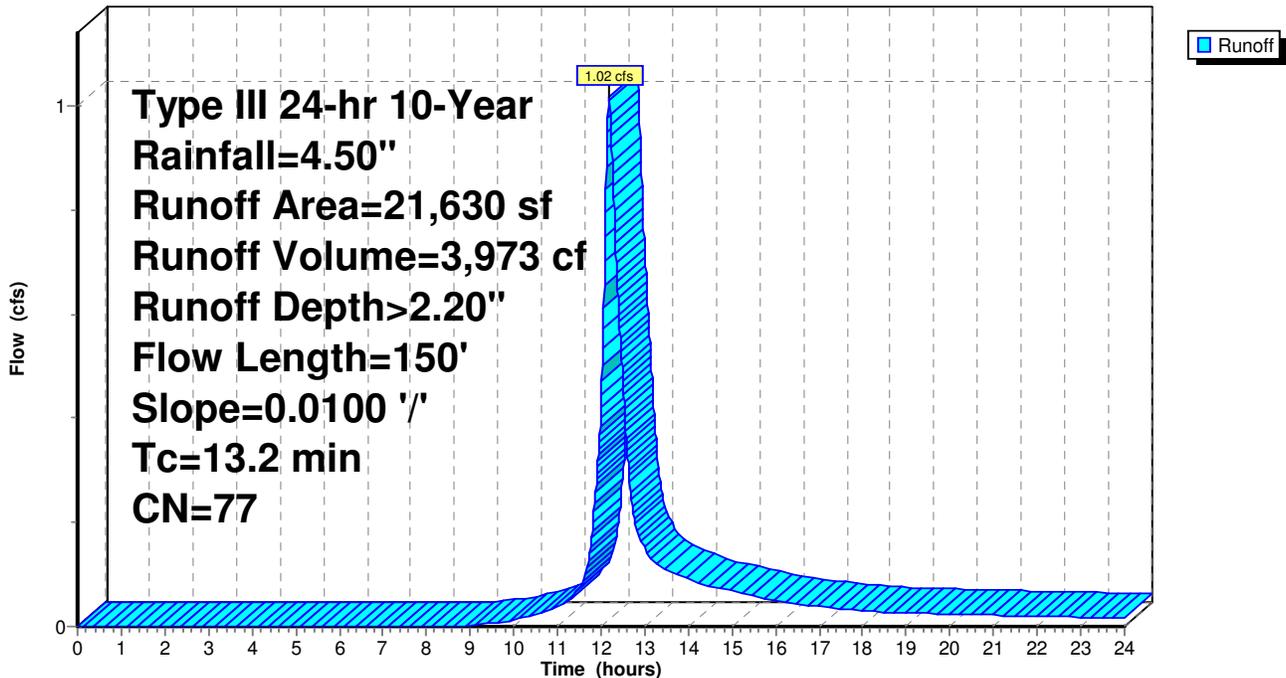
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,600	98	Paved parking & roofs
0	98	Paved parking & roofs
14,030	74	>75% Grass cover, Good, HSG C
4,000	70	Woods, Good, HSG C
21,630	77	Weighted Average
18,030		Pervious Area
3,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
2.4	100	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.2	150	Total			

Subcatchment 140S: Behind Units 14, 15, 16

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 214S:

Runoff = 0.66 cfs @ 12.04 hrs, Volume= 1,850 cf, Depth> 3.19"

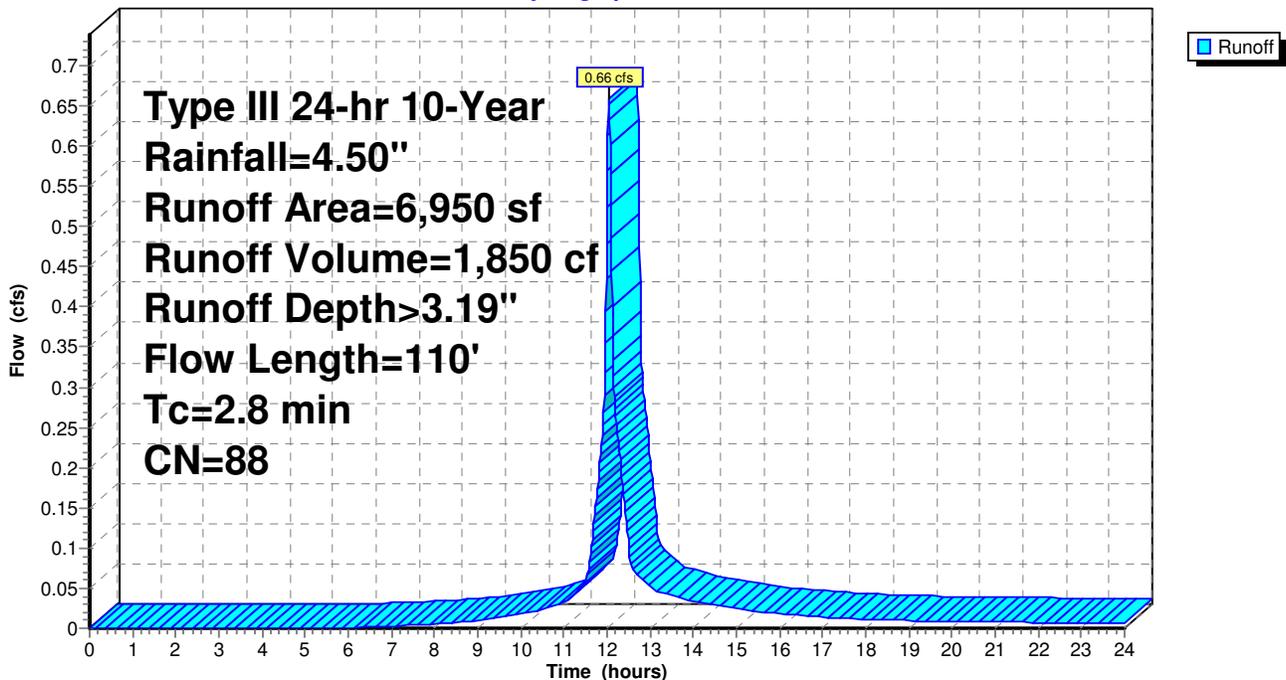
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,000	98	Paved parking & roofs
1,940	98	Paved parking & roofs
3,010	74	>75% Grass cover, Good, HSG C
6,950	88	Weighted Average
3,010		Pervious Area
3,940		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	10	0.0100	0.08		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	20	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0200	2.59	0.83	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022
2.8	110	Total			

Subcatchment 214S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 216S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.38 cfs @ 12.02 hrs, Volume= 1,004 cf, Depth> 2.91"

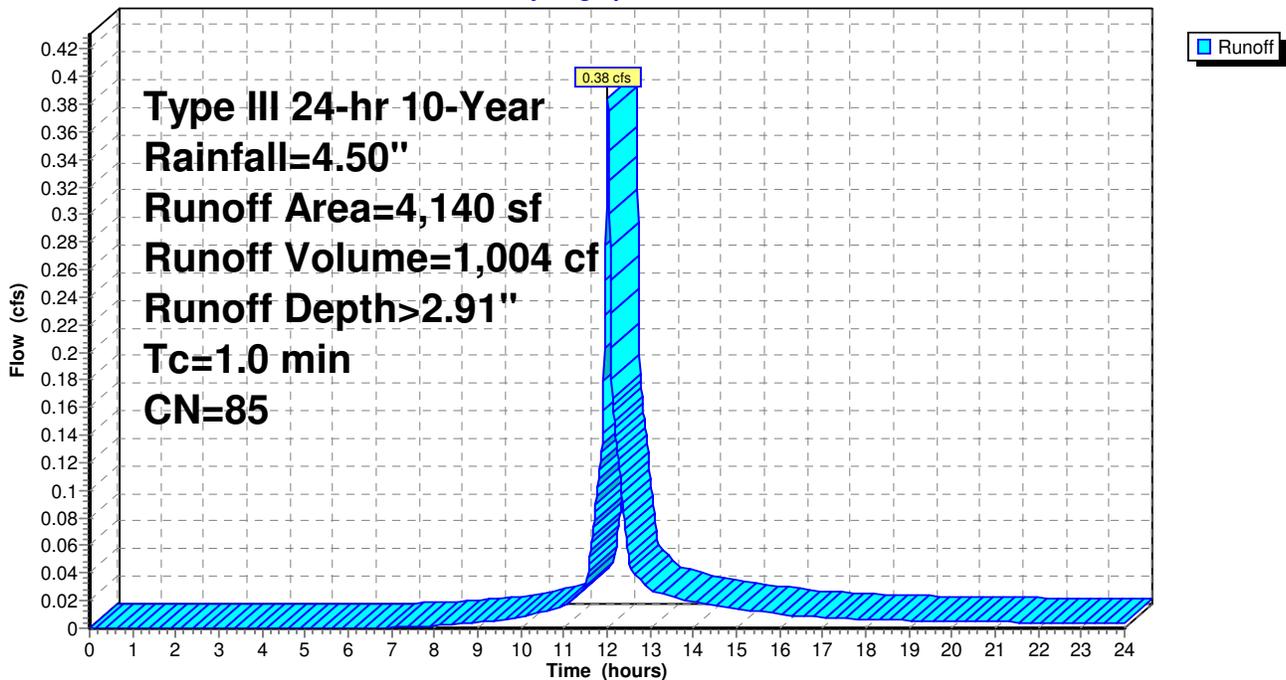
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,200	98	Paved parking & roofs
2,240	74	>75% Grass cover, Good, HSG C
4,140	85	Weighted Average
2,240		Pervious Area
1,900		Impervious Area

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

Subcatchment 216S:

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.49 cfs @ 12.19 hrs, Volume= 1,957 cf, Depth> 1.67"

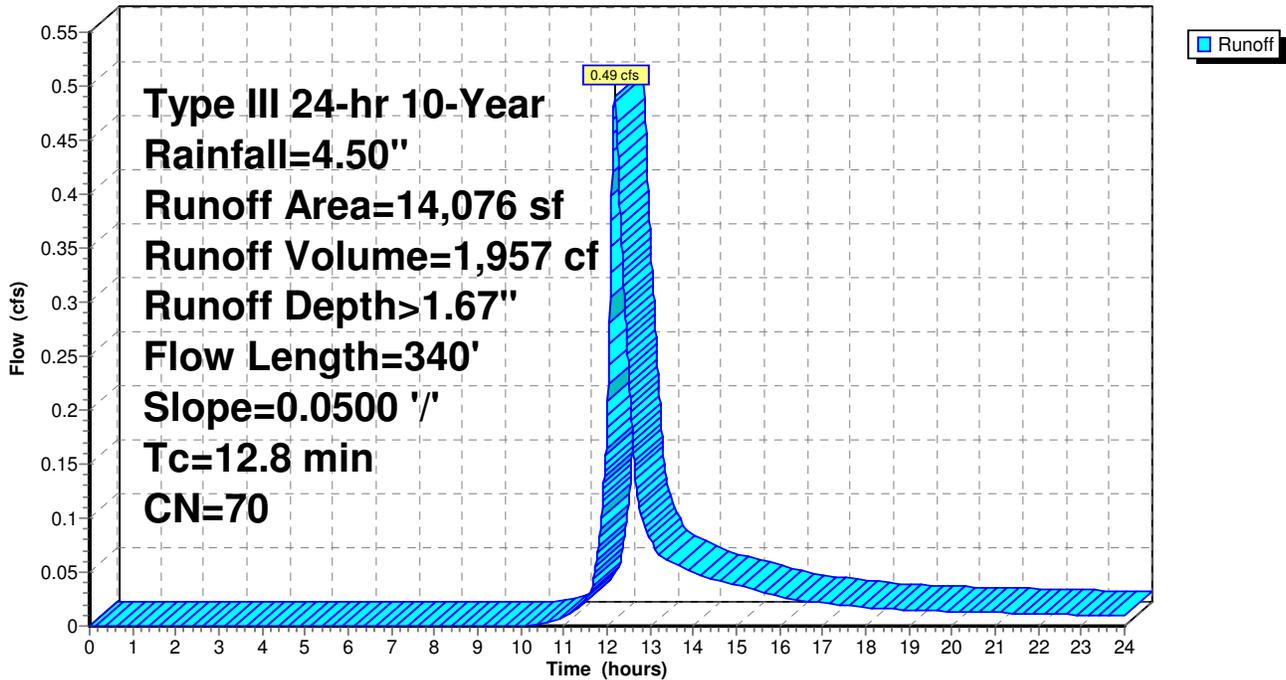
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Reach 1R: Existing wetland channel to WF 16

Inflow Area = 162,206 sf, Inflow Depth > 2.12" for 10-Year event
Inflow = 8.25 cfs @ 12.14 hrs, Volume= 28,687 cf
Outflow = 8.21 cfs @ 12.17 hrs, Volume= 28,641 cf, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.76 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 3.8 min

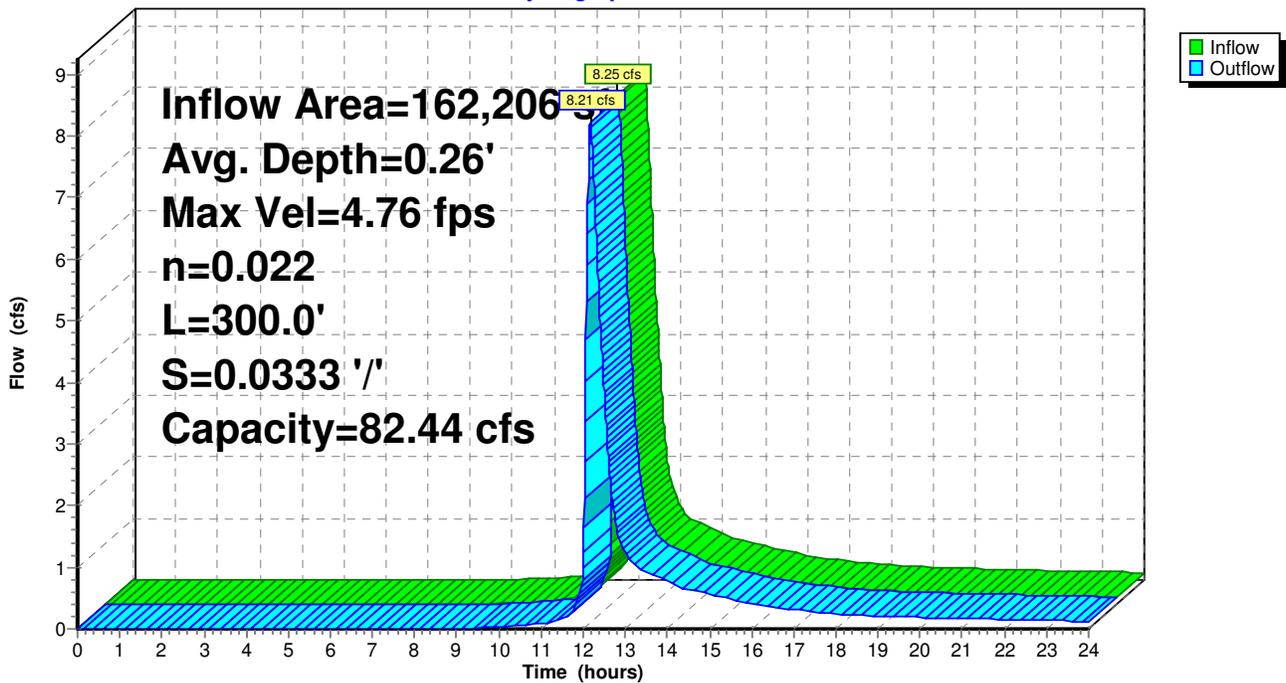
Peak Storage= 517 cf @ 12.16 hrs, Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'



Reach 1R: Existing wetland channel to WF 16

Hydrograph



Reach 2R: Swale from Drive at #10 to Drive at #11

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

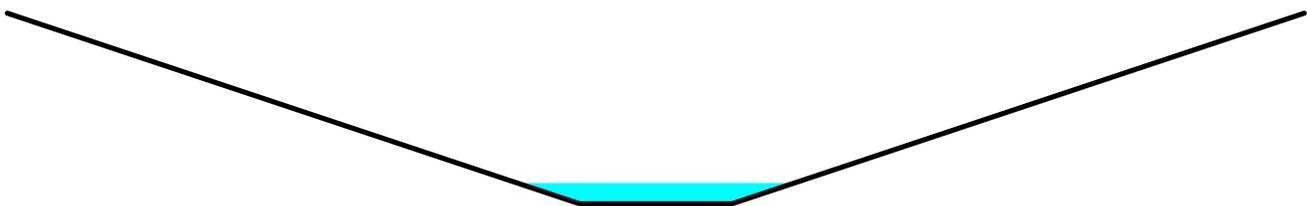
[79] Warning: Submerged Pond 3P Primary device # 1 OUTLET by 0.13'

Inflow Area =	6,950 sf,	Inflow Depth >	3.19"	for	10-Year event
Inflow =	0.66 cfs @	12.04 hrs,	Volume=	1,850 cf	
Outflow =	0.66 cfs @	12.05 hrs,	Volume=	1,850 cf,	Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.47 fps, Min. Travel Time= 0.3 min
 Avg. Velocity = 1.06 fps, Avg. Travel Time= 1.0 min

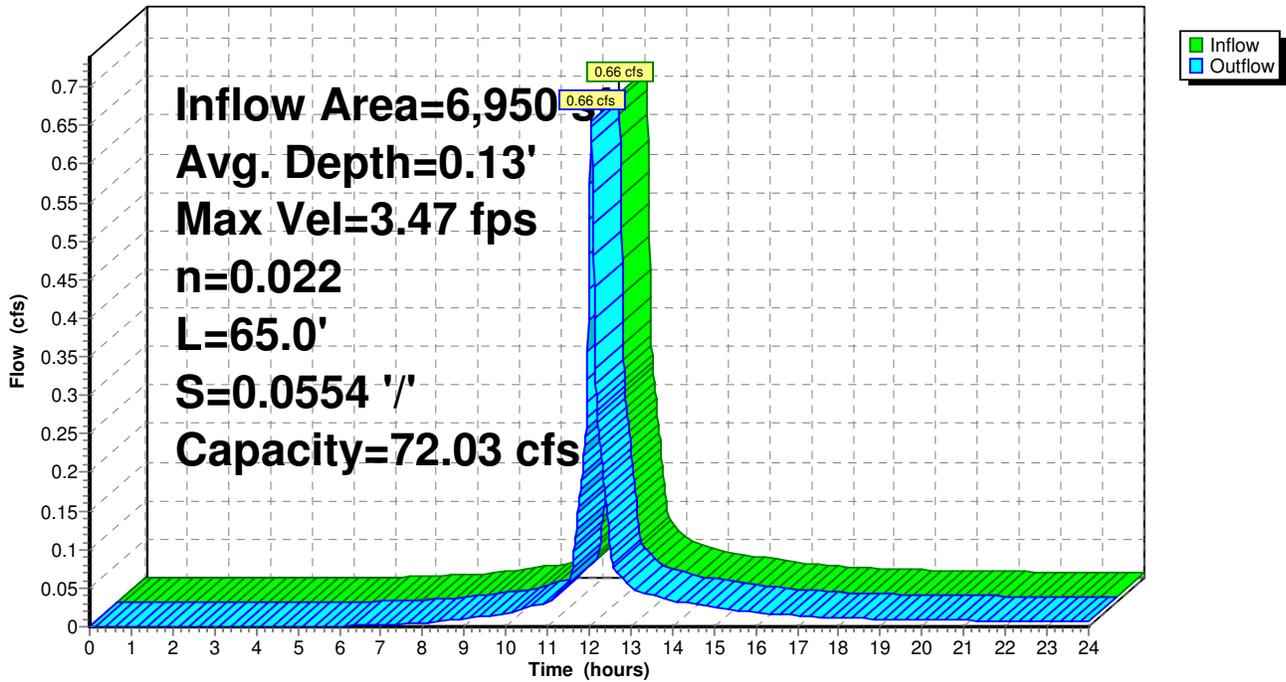
Peak Storage= 12 cf @ 12.05 hrs, Average Depth at Peak Storage= 0.13'
 Bank-Full Depth= 1.25', Capacity at Bank-Full= 72.03 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 3.0 '/' Top Width= 8.50'
 Length= 65.0' Slope= 0.0554 '/'
 Inlet Invert= 113.92', Outlet Invert= 110.32'



Reach 2R: Swale from Drive at #10 to Drive at #11

Hydrograph



Reach 55R: DMH 52 to DMH 50

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

[61] Hint: Submerged 10% of Reach 69R bottom

[62] Warning: Submerged 28% of Reach 220R inlet

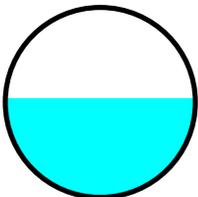
[62] Warning: Submerged 20% of Reach 222R inlet

Inflow Area =	40,720 sf,	Inflow Depth > 2.75"	for 10-Year event
Inflow =	3.15 cfs @ 12.07 hrs,	Volume=	9,326 cf
Outflow =	3.15 cfs @ 12.07 hrs,	Volume=	9,326 cf, Atten= 0%, Lag= 0.1 min

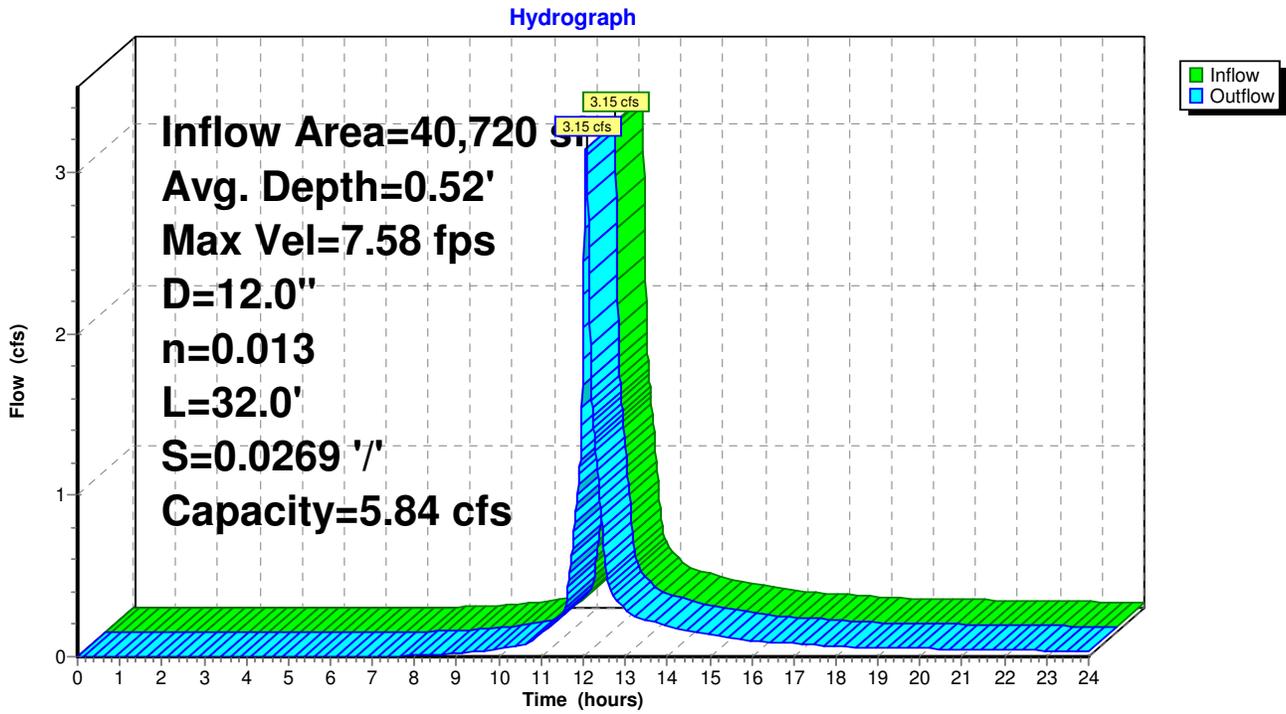
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.58 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.58 fps, Avg. Travel Time= 0.2 min

Peak Storage= 13 cf @ 12.07 hrs, Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.84 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 32.0' Slope= 0.0269 '/'
Inlet Invert= 102.48', Outlet Invert= 101.62'



Reach 55R: DMH 52 to DMH 50



Reach 62R: DMH 64 to Bio-Retention A (HW 46)

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[52] Hint: Inlet conditions not evaluated

[81] Warning: Exceeded Pond 43R by 0.05' @ 12.17 hrs

[79] Warning: Submerged Pond 61R Primary device # 1 INLET by 0.17'

Inflow Area =	44,069 sf,	Inflow Depth >	2.39"	for	10-Year event
Inflow =	2.24 cfs @	12.16 hrs,	Volume=	8,790 cf	
Outflow =	2.24 cfs @	12.16 hrs,	Volume=	8,789 cf,	Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 5.59 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 1.96 fps, Avg. Travel Time= 0.1 min

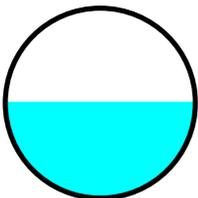
Peak Storage= 5 cf @ 12.16 hrs, Average Depth at Peak Storage= 0.51'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.36 cfs

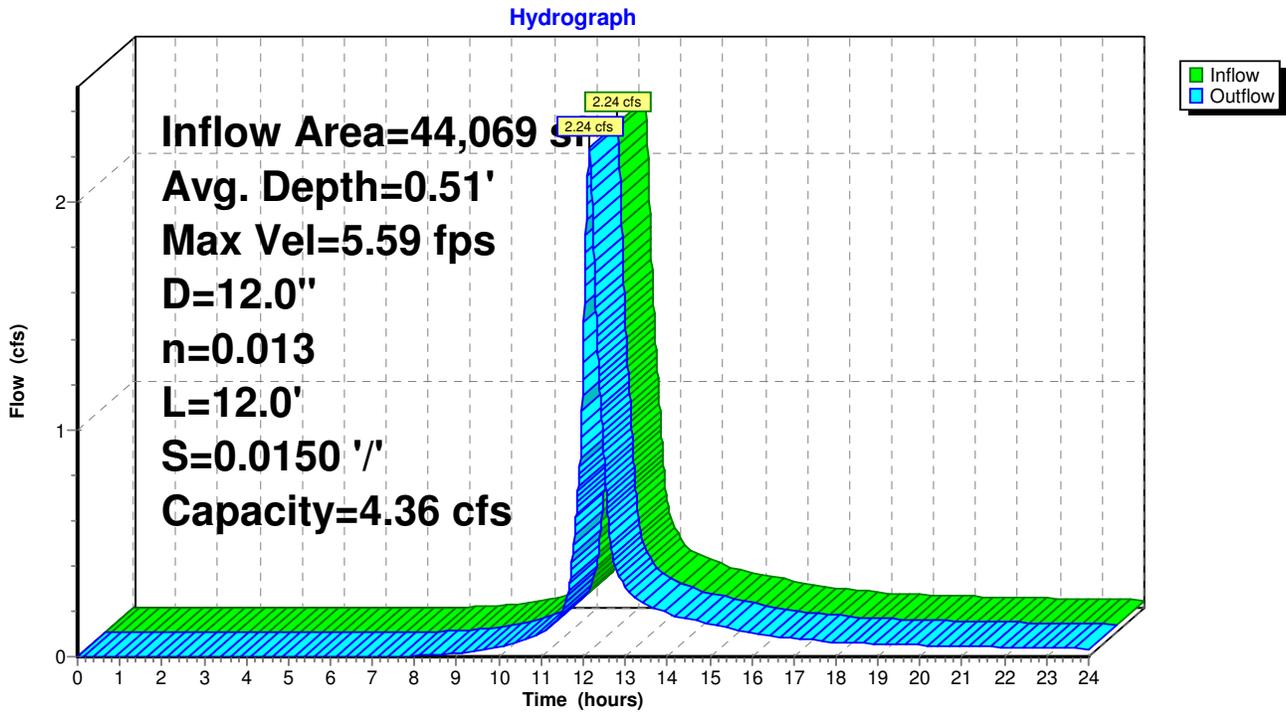
12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior

Length= 12.0' Slope= 0.0150 '/'

Inlet Invert= 110.80', Outlet Invert= 110.62'



Reach 62R: DMH 64 to Bio-Retention A (HW 46)



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Type III 24-hr 10-Year Rainfall=4.50"

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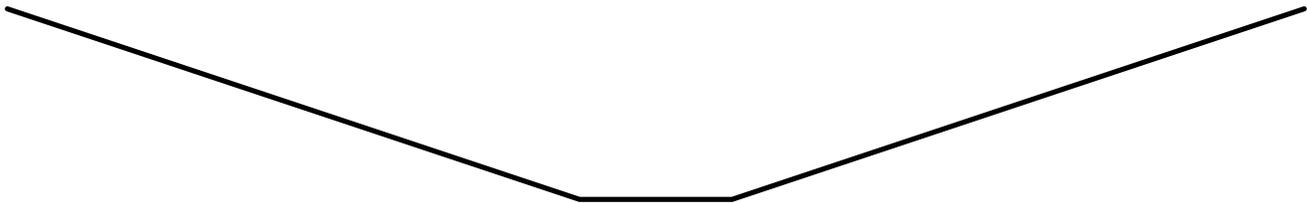
Reach 64R: Swale from Drive at #12 to RG 10A

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

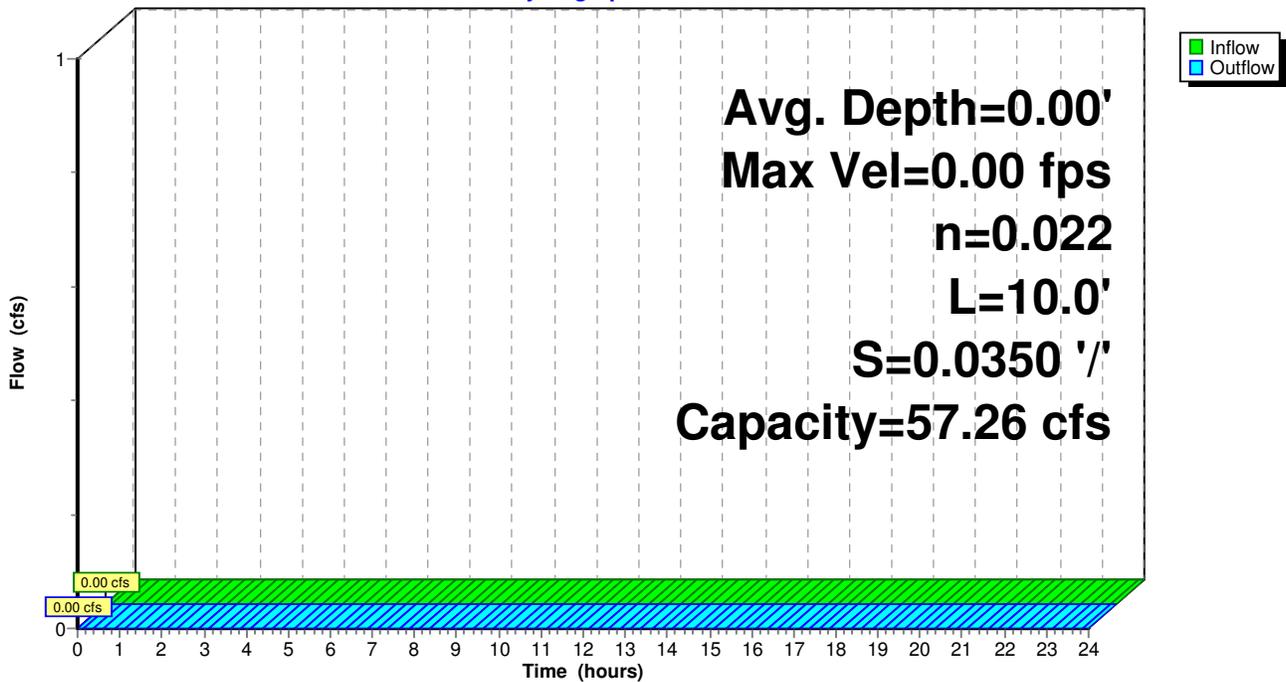
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 106.23', Outlet Invert= 105.88'



Reach 64R: Swale from Drive at #12 to RG 10A

Hydrograph



Reach 67R: Culvert under Unit 12 Drive

FROM HYDROCAD WEBSITE:

[63] Warning:
{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

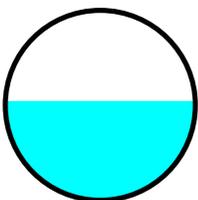
[52] Hint: Inlet conditions not evaluated

Inflow Area =	6,950 sf,	Inflow Depth > 3.01"	for 10-Year event
Inflow =	0.65 cfs @ 12.06 hrs,	Volume=	1,744 cf
Outflow =	0.65 cfs @ 12.06 hrs,	Volume=	1,744 cf, Atten= 0%, Lag= 0.3 min

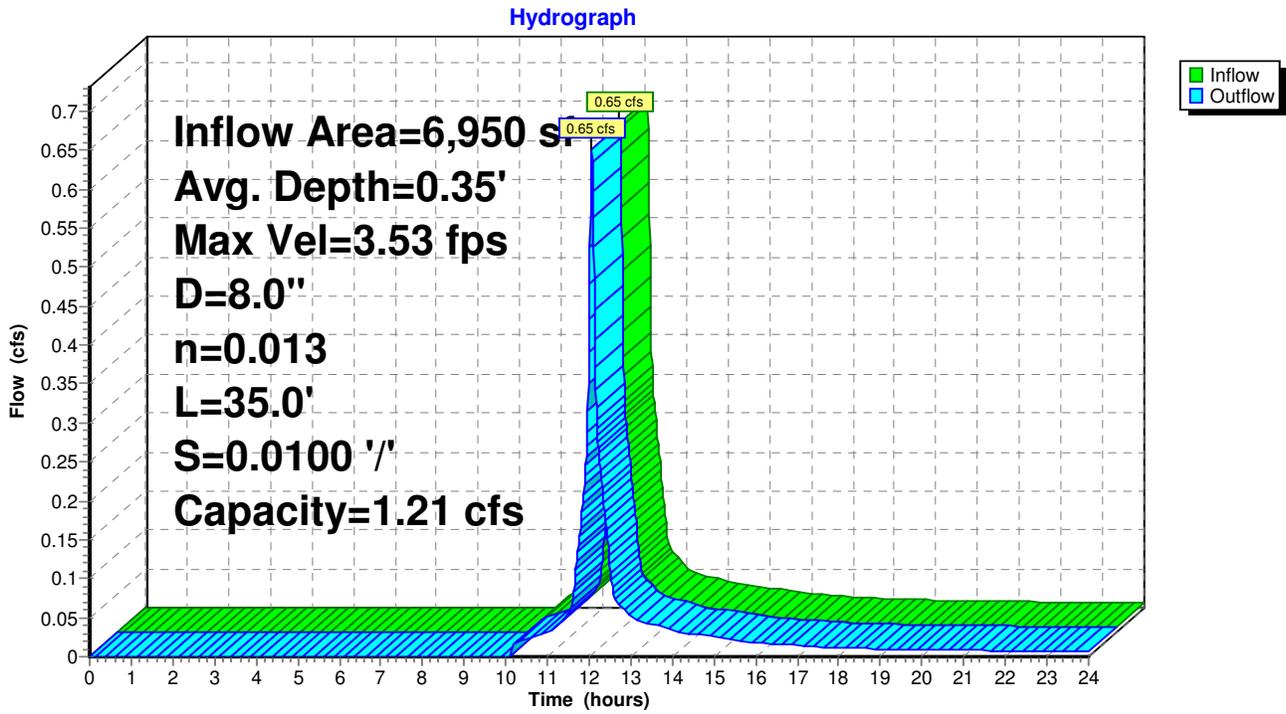
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.53 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 0.4 min

Peak Storage= 6 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 35.0' Slope= 0.0100 '/'
Inlet Invert= 106.58', Outlet Invert= 106.23'



Reach 67R: Culvert under Unit 12 Drive



Reach 68R: Underdrain to CB 66

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

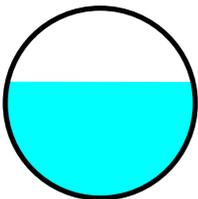
[79] Warning: Submerged Pond 8P Primary device # 7 INLET by 0.66'

Inflow Area =	44,069 sf,	Inflow Depth >	2.35"	for	10-Year event
Inflow =	2.05 cfs @	12.21 hrs,	Volume=	8,623 cf	
Outflow =	2.05 cfs @	12.21 hrs,	Volume=	8,622 cf,	Atten= 0%, Lag= 0.0 min

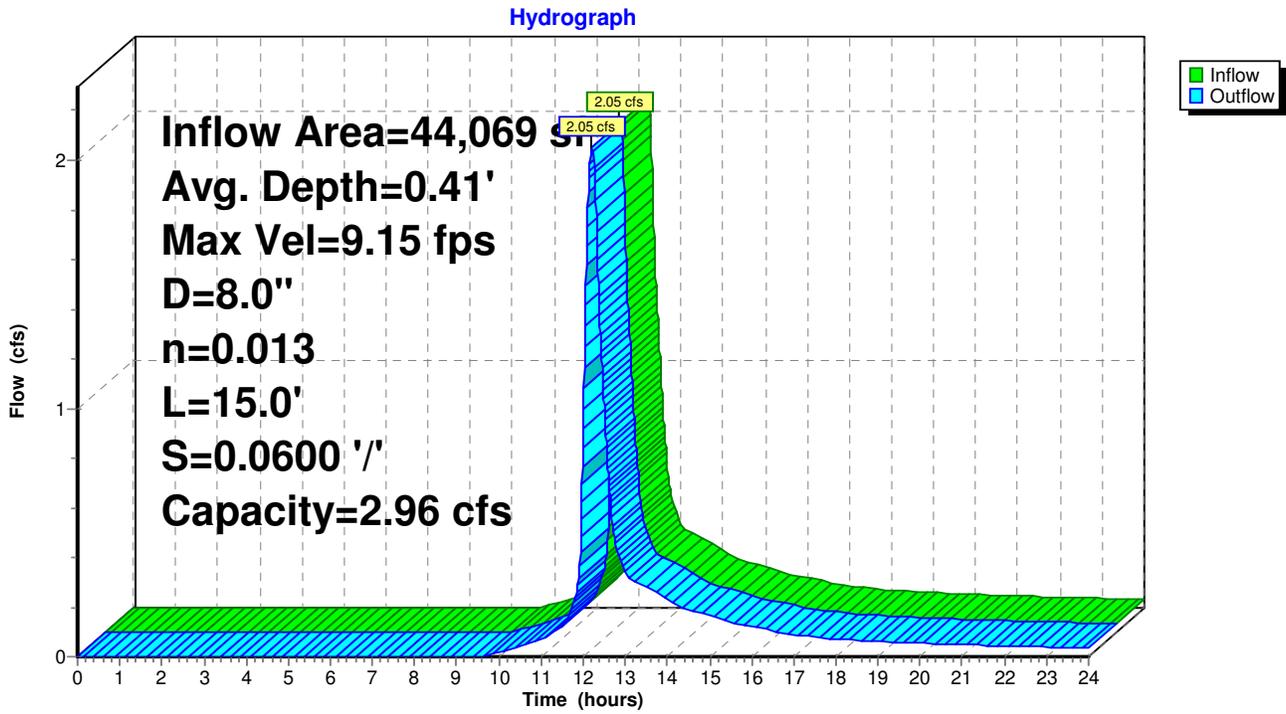
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.15 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 3.95 fps, Avg. Travel Time= 0.1 min

Peak Storage= 3 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.41'
 Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 15.0' Slope= 0.0600 '/'
 Inlet Invert= 107.25', Outlet Invert= 106.35'



Reach 68R: Underdrain to CB 66



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Reach 69R: Drain to DMH 52

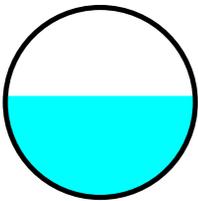
[52] Hint: Inlet conditions not evaluated

Inflow Area =	11,090 sf,	Inflow Depth > 2.84"	for 10-Year event
Inflow =	0.96 cfs @ 12.05 hrs,	Volume=	2,627 cf
Outflow =	0.96 cfs @ 12.06 hrs,	Volume=	2,627 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.03 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.91 fps, Avg. Travel Time= 0.3 min

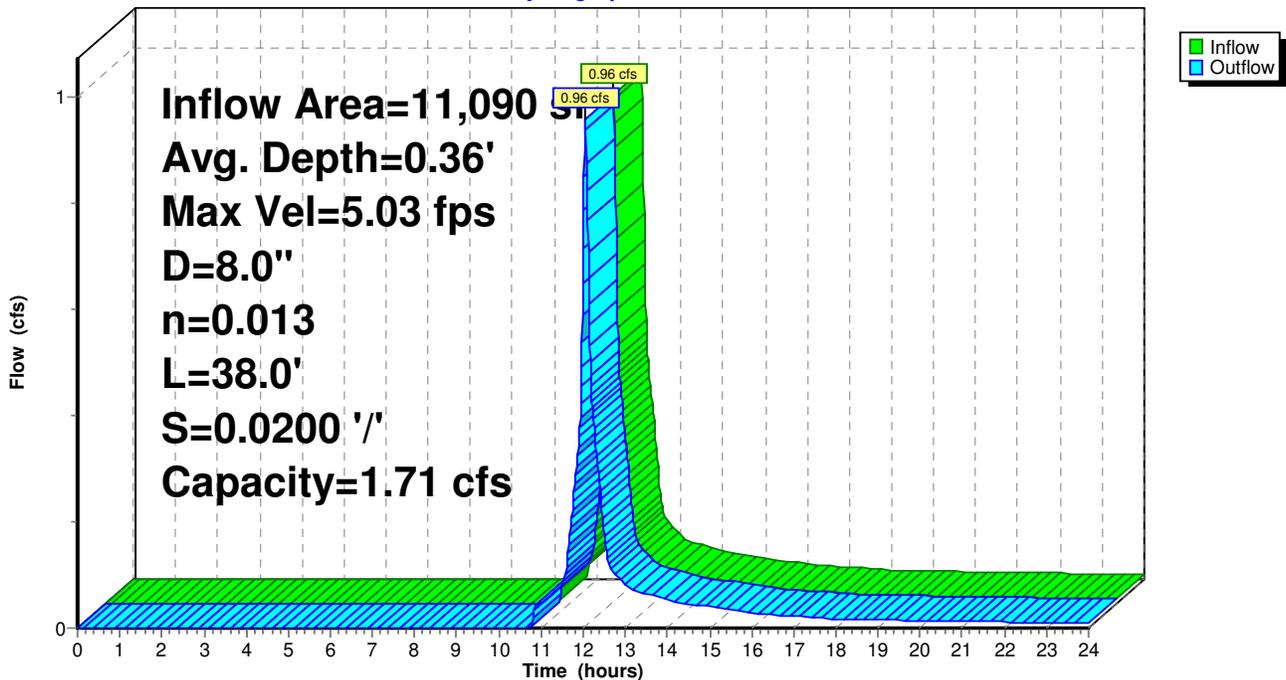
Peak Storage= 7 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.36'
 Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.71 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 38.0' Slope= 0.0200 '/'
 Inlet Invert= 103.69', Outlet Invert= 102.93'



Reach 69R: Drain to DMH 52

Hydrograph



Reach 114R: DMH 16 to DMH 14

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

[79] Warning: Submerged Pond 111P Primary device # 1 INLET by 0.14'

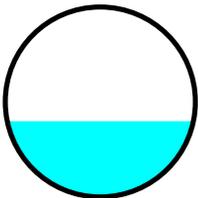
[79] Warning: Submerged Pond 112P Primary device # 1 INLET by 0.08'

Inflow Area =	12,978 sf,	Inflow Depth >	3.36"	for	10-Year event
Inflow =	1.38 cfs @	12.01 hrs,	Volume=	3,632 cf	
Outflow =	1.36 cfs @	12.01 hrs,	Volume=	3,632 cf,	Atten= 1%, Lag= 0.4 min

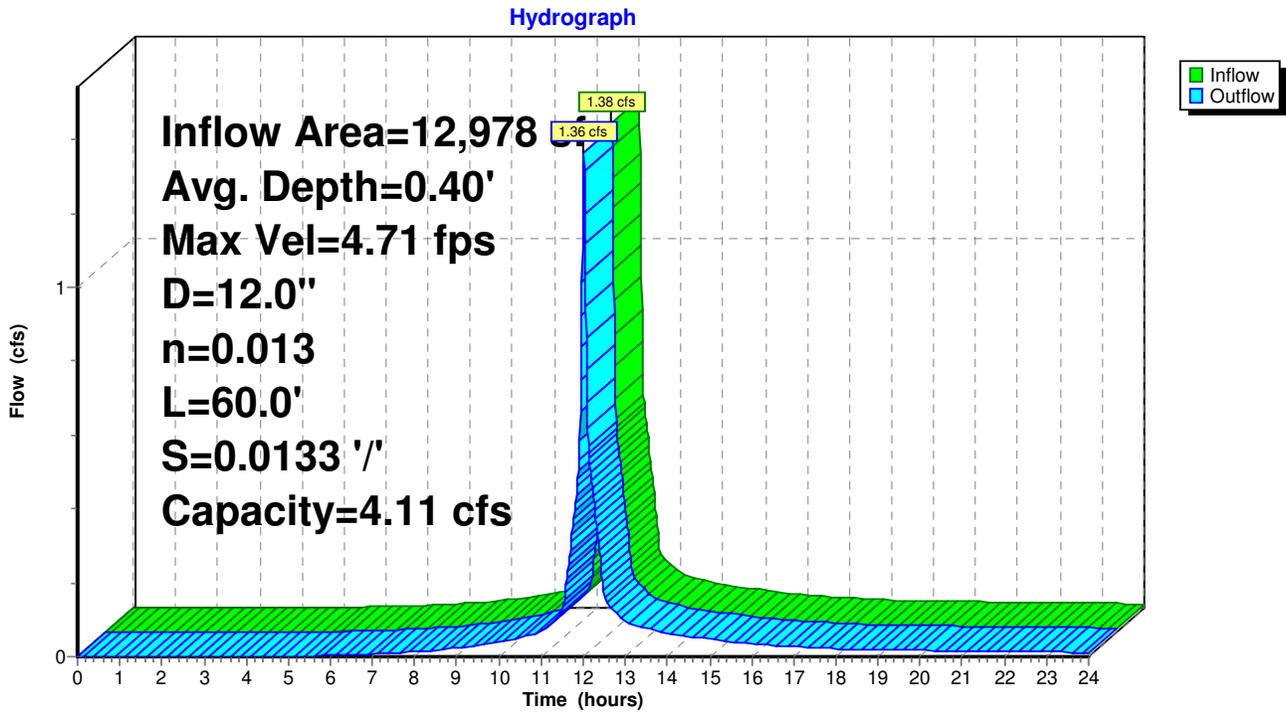
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.71 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 0.7 min

Peak Storage= 17 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.11 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 60.0' Slope= 0.0133 '/'
Inlet Invert= 103.48', Outlet Invert= 102.68'



Reach 114R: DMH 16 to DMH 14



Reach 118R: Swale from Drive at #4 to RG 116

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

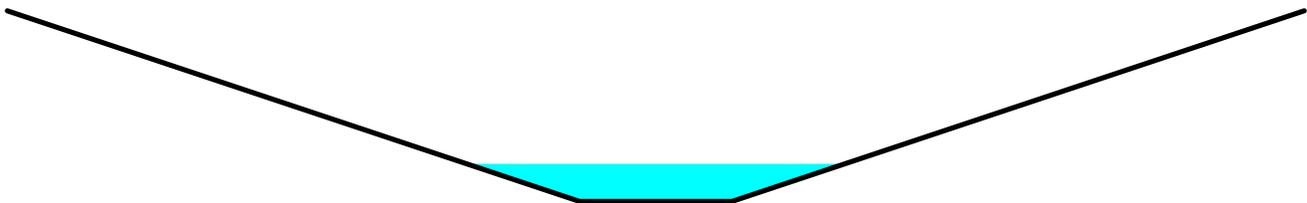
[79] Warning: Submerged Pond 119R Primary device # 1 OUTLET by 0.75'

Inflow Area =	18,760 sf,	Inflow Depth > 2.97"	for 10-Year event
Inflow =	1.66 cfs @ 12.02 hrs,	Volume=	4,644 cf
Outflow =	1.65 cfs @ 12.02 hrs,	Volume=	4,644 cf, Atten= 0%, Lag= 0.1 min

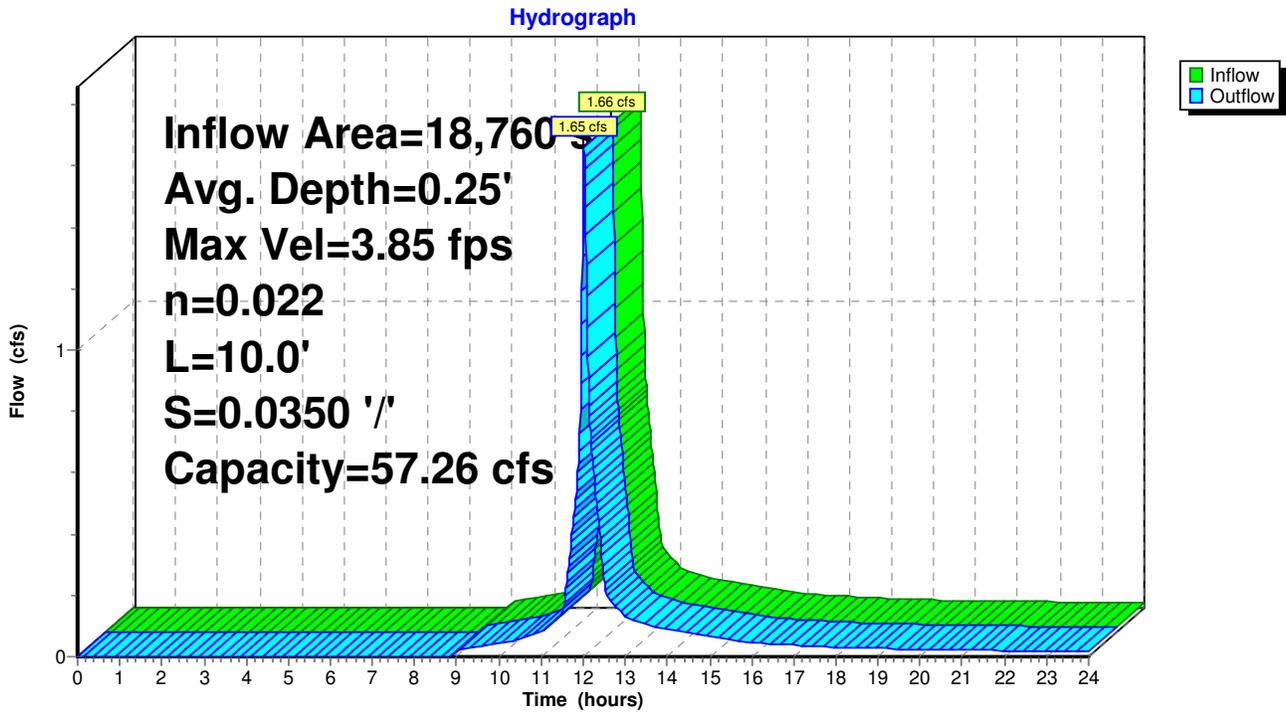
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.85 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 0.1 min

Peak Storage= 4 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 110.42', Outlet Invert= 110.07'



Reach 118R: Swale from Drive at #4 to RG 116



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Reach 127R: Swale from Drive at #3 to RG 118

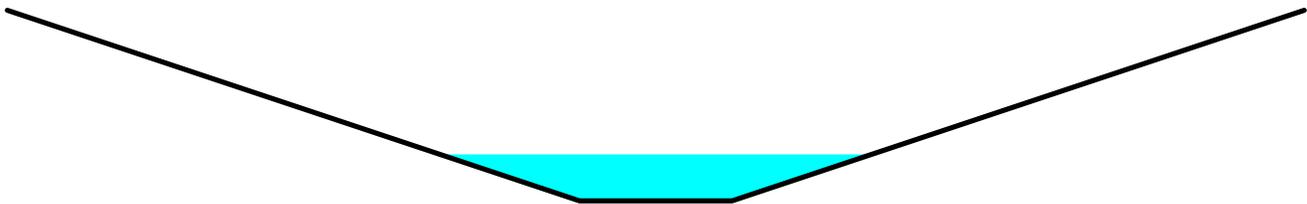
[61] Hint: Submerged 15% of Reach 128R bottom

Inflow Area = 13,016 sf, Inflow Depth > 4.03" for 10-Year event
Inflow = 1.65 cfs @ 12.03 hrs, Volume= 4,371 cf
Outflow = 1.65 cfs @ 12.03 hrs, Volume= 4,371 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.83 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 0.2 min

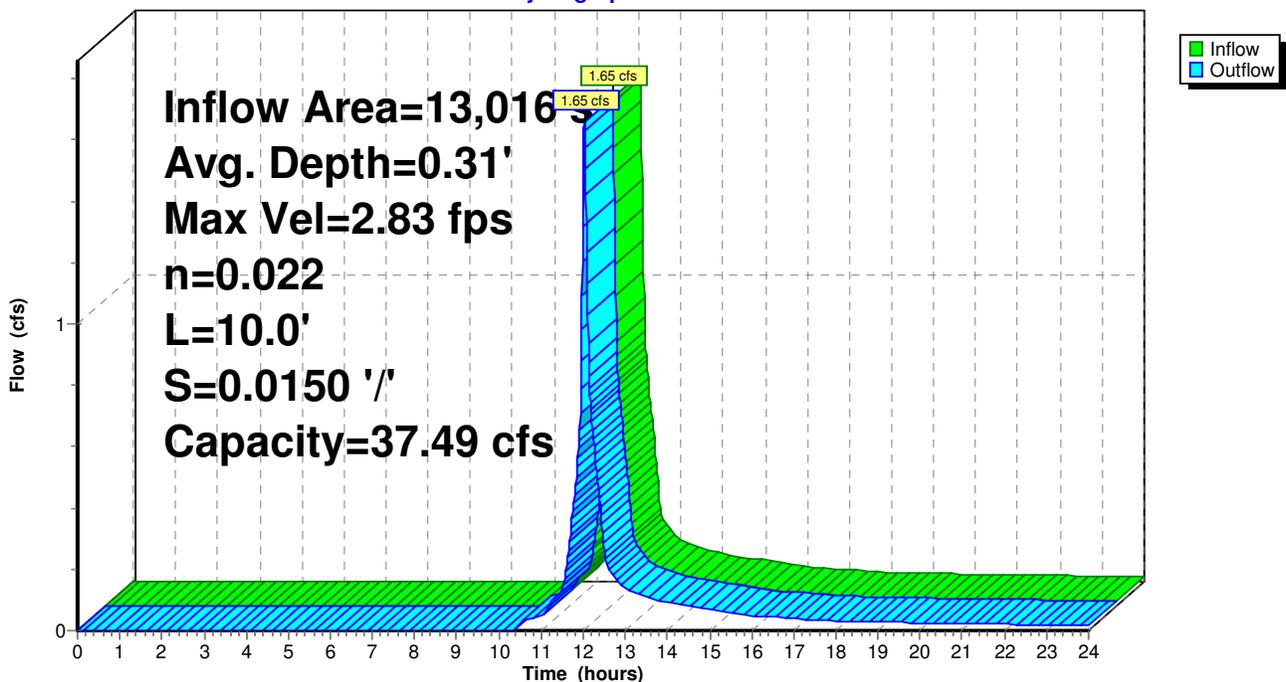
Peak Storage= 6 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 37.49 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0150 '/'
Inlet Invert= 110.00', Outlet Invert= 109.85'



Reach 127R: Swale from Drive at #3 to RG 118

Hydrograph



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Reach 128R: Culvert under Unit 3 Drive

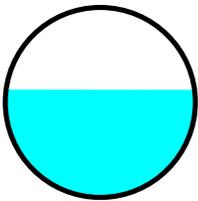
[52] Hint: Inlet conditions not evaluated

Inflow Area = 13,016 sf, Inflow Depth > 4.03" for 10-Year event
Inflow = 1.66 cfs @ 12.02 hrs, Volume= 4,371 cf
Outflow = 1.65 cfs @ 12.03 hrs, Volume= 4,371 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.13 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.05 fps, Avg. Travel Time= 0.2 min

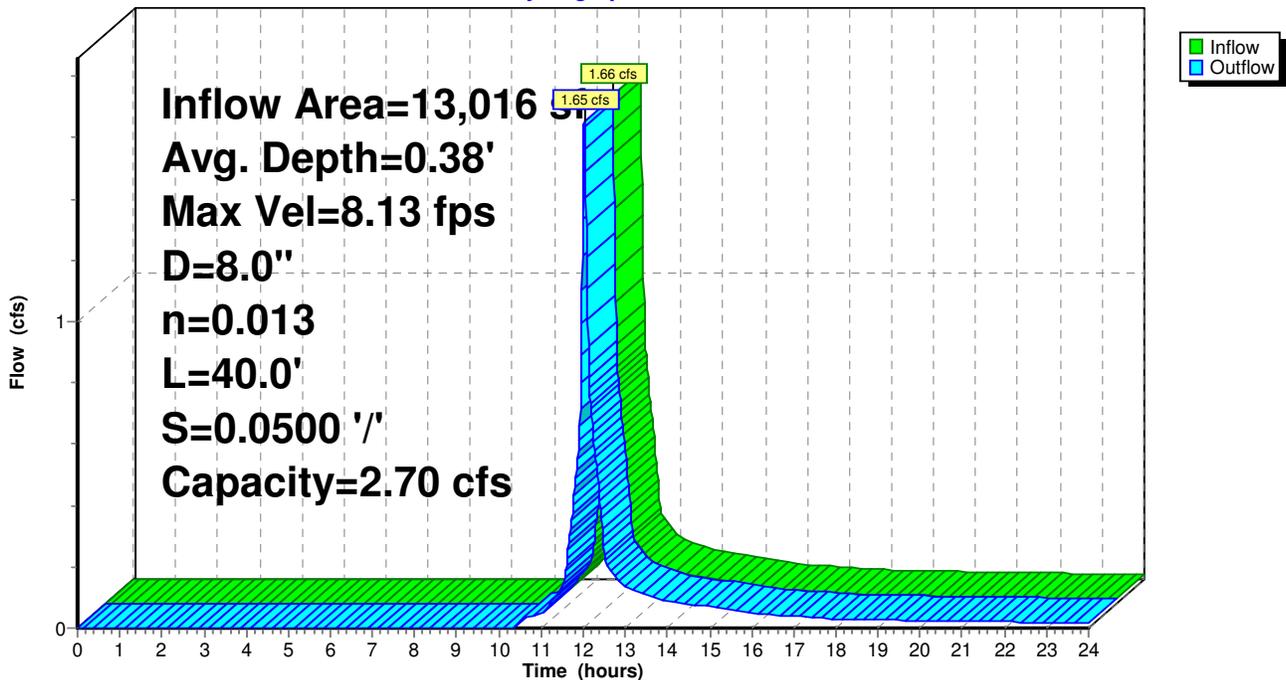
Peak Storage= 8 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.70 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 40.0' Slope= 0.0500 '/'
Inlet Invert= 112.00', Outlet Invert= 110.00'



Reach 128R: Culvert under Unit 3 Drive

Hydrograph



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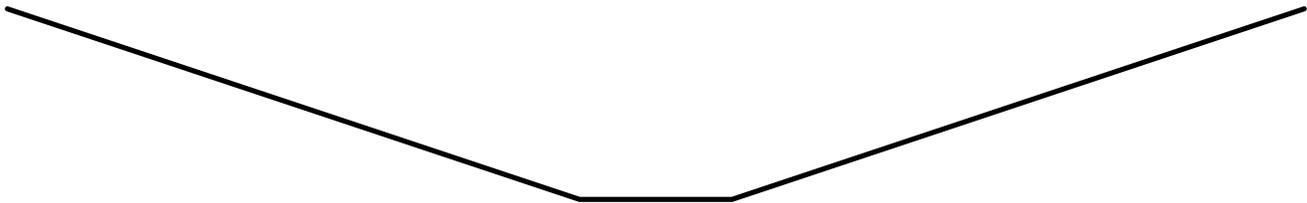
Reach 129R: Swale from Drive at #20 to RG 124

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

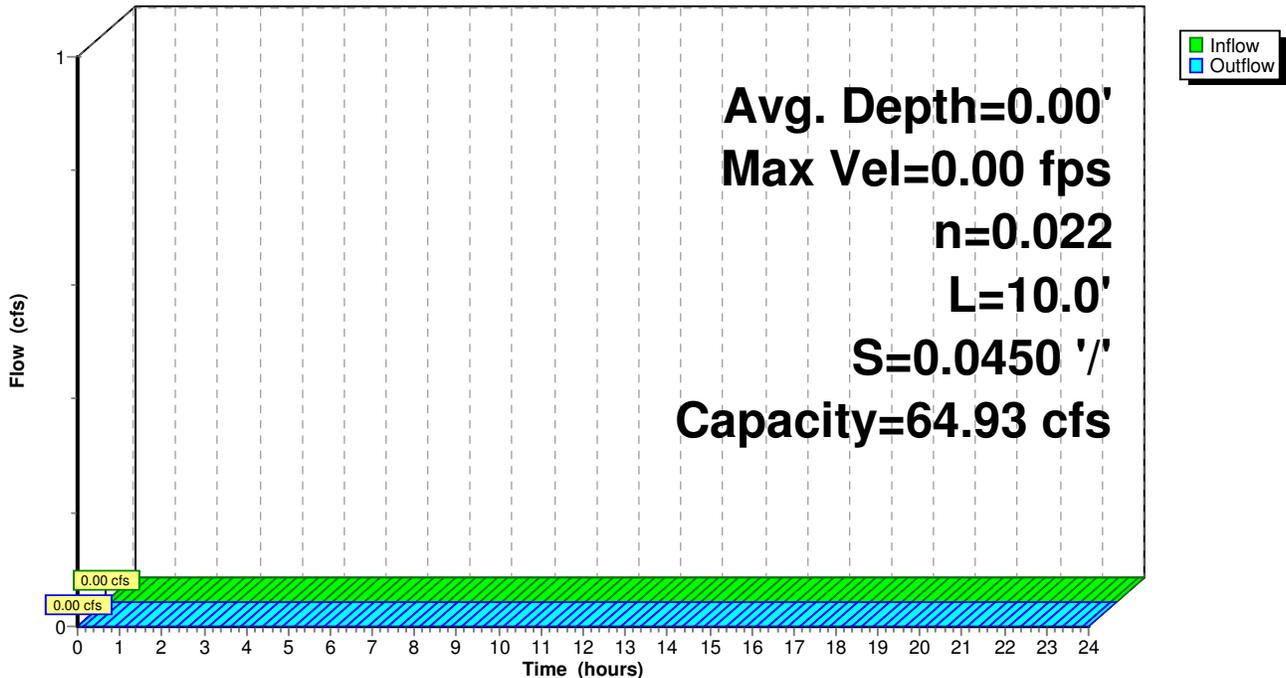
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 64.93 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0450 '/'
Inlet Invert= 115.37', Outlet Invert= 114.92'



Reach 129R: Swale from Drive at #20 to RG 124

Hydrograph



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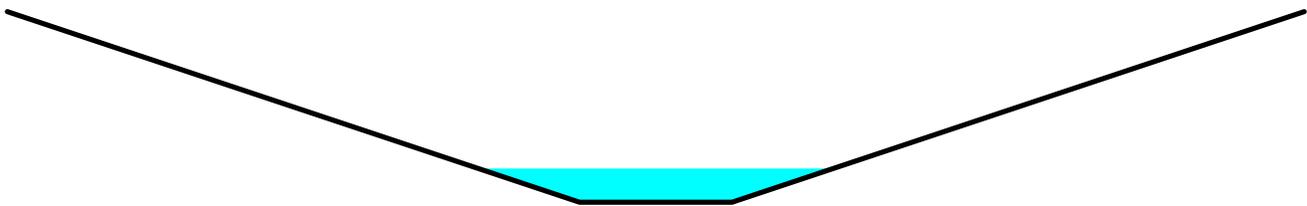
Reach 130R: Swale to RG 122

Inflow Area = 6,950 sf, Inflow Depth > 5.69" for 10-Year event
Inflow = 1.35 cfs @ 12.01 hrs, Volume= 3,298 cf
Outflow = 1.33 cfs @ 12.02 hrs, Volume= 3,297 cf, Atten= 2%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.62 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 0.4 min

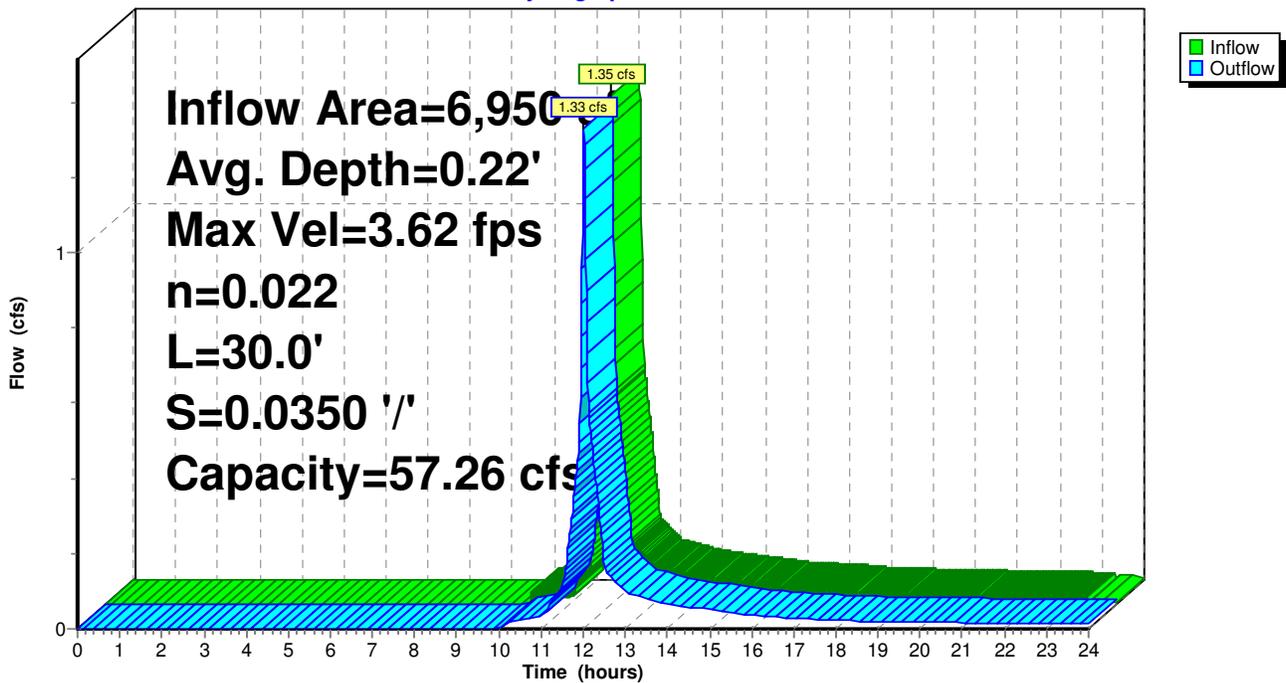
Peak Storage= 11 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 30.0' Slope= 0.0350 '/'
Inlet Invert= 114.25', Outlet Invert= 113.20'



Reach 130R: Swale to RG 122

Hydrograph



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Reach 131R: Culvert under Unit 20 Drive

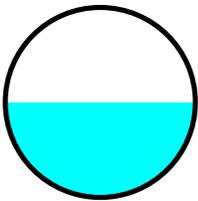
[52] Hint: Inlet conditions not evaluated

Inflow Area = 6,950 sf, Inflow Depth > 2.52" for 10-Year event
Inflow = 0.61 cfs @ 12.01 hrs, Volume= 1,459 cf
Outflow = 0.60 cfs @ 12.02 hrs, Volume= 1,459 cf, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.46 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 0.6 min

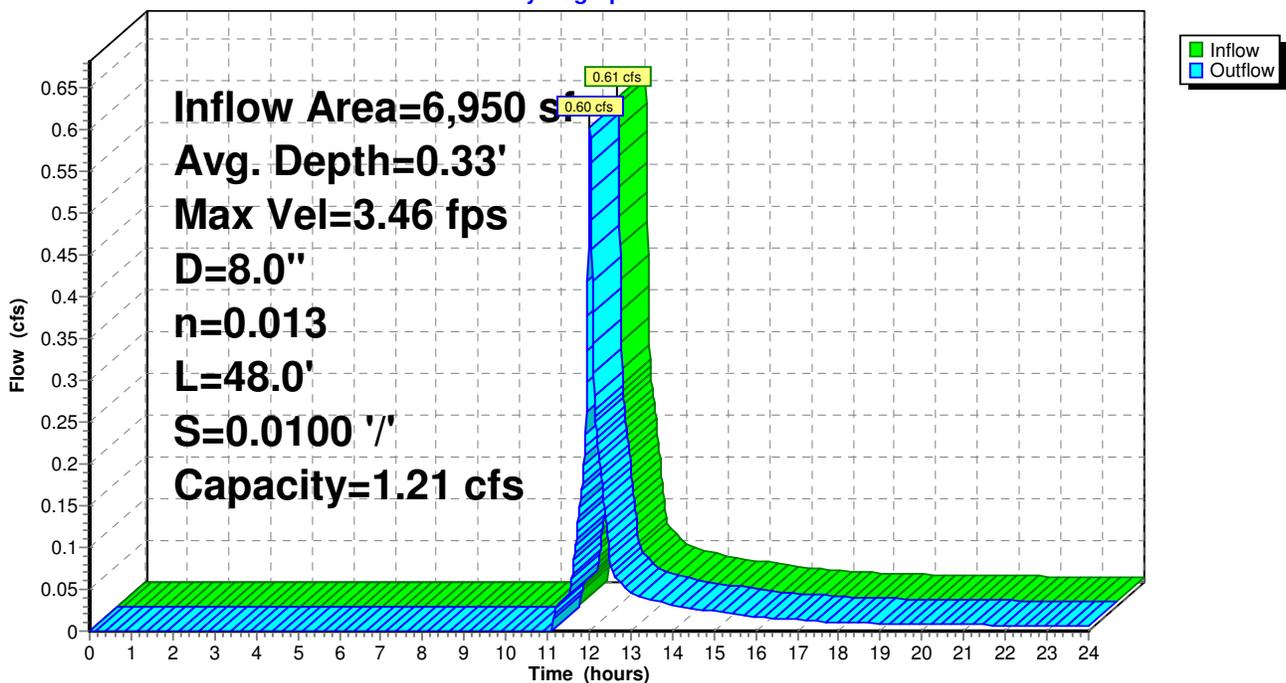
Peak Storage= 8 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 48.0' Slope= 0.0100 '/'
Inlet Invert= 115.85', Outlet Invert= 115.37'



Reach 131R: Culvert under Unit 20 Drive

Hydrograph



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Reach 137R: Swale Back of 7,6,5

Inflow Area = 13,850 sf, Inflow Depth > 2.38" for 10-Year event
Inflow = 0.98 cfs @ 12.05 hrs, Volume= 2,741 cf
Outflow = 0.95 cfs @ 12.09 hrs, Volume= 2,736 cf, Atten= 3%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.63 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.46 fps, Avg. Travel Time= 5.0 min

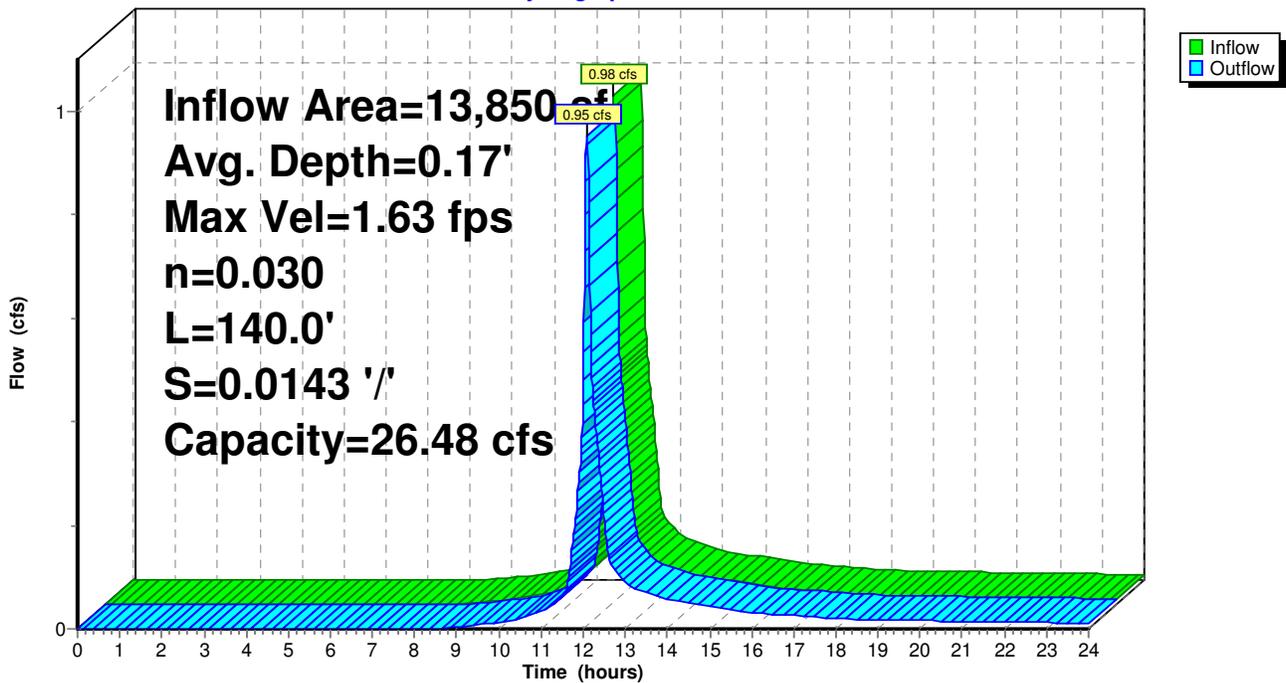
Peak Storage= 82 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.48 cfs

3.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 140.0' Slope= 0.0143 '/'
Inlet Invert= 118.00', Outlet Invert= 116.00'



Reach 137R: Swale Back of 7,6,5

Hydrograph



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Reach 138R: Swale Back of 4

[61] Hint: Submerged 18% of Reach 137R bottom

Inflow Area = 34,910 sf, Inflow Depth > 2.22" for 10-Year event
Inflow = 2.19 cfs @ 12.08 hrs, Volume= 6,470 cf
Outflow = 2.15 cfs @ 12.12 hrs, Volume= 6,460 cf, Atten= 2%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.99 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 3.7 min

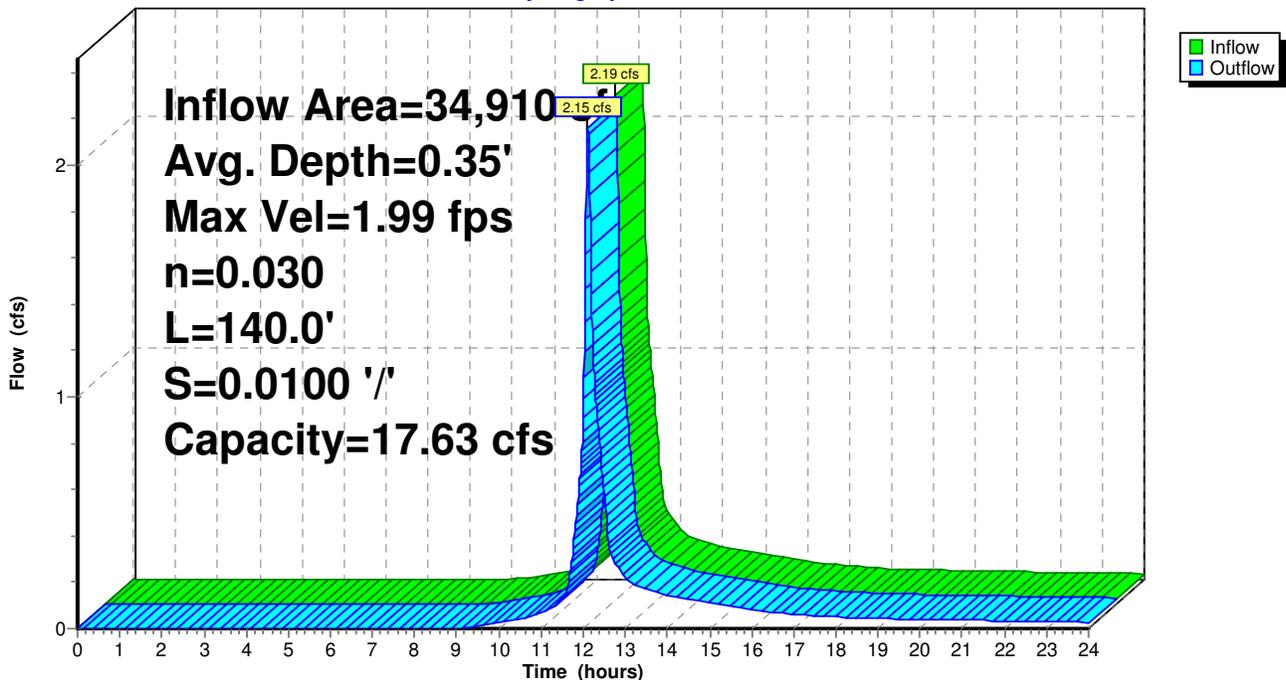
Peak Storage= 151 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 17.63 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 116.00', Outlet Invert= 114.60'



Reach 138R: Swale Back of 4

Hydrograph



Reach 149R: DMH 14 to DMH 12

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

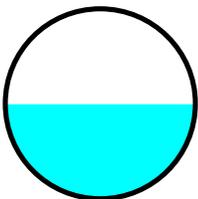
[61] Hint: Submerged 81% of Reach 114R bottom

Inflow Area =	86,324 sf,	Inflow Depth > 2.90"	for 10-Year event
Inflow =	6.38 cfs @ 12.03 hrs,	Volume=	20,852 cf
Outflow =	6.38 cfs @ 12.03 hrs,	Volume=	20,848 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 7.26 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 2.31 fps, Avg. Travel Time= 0.7 min

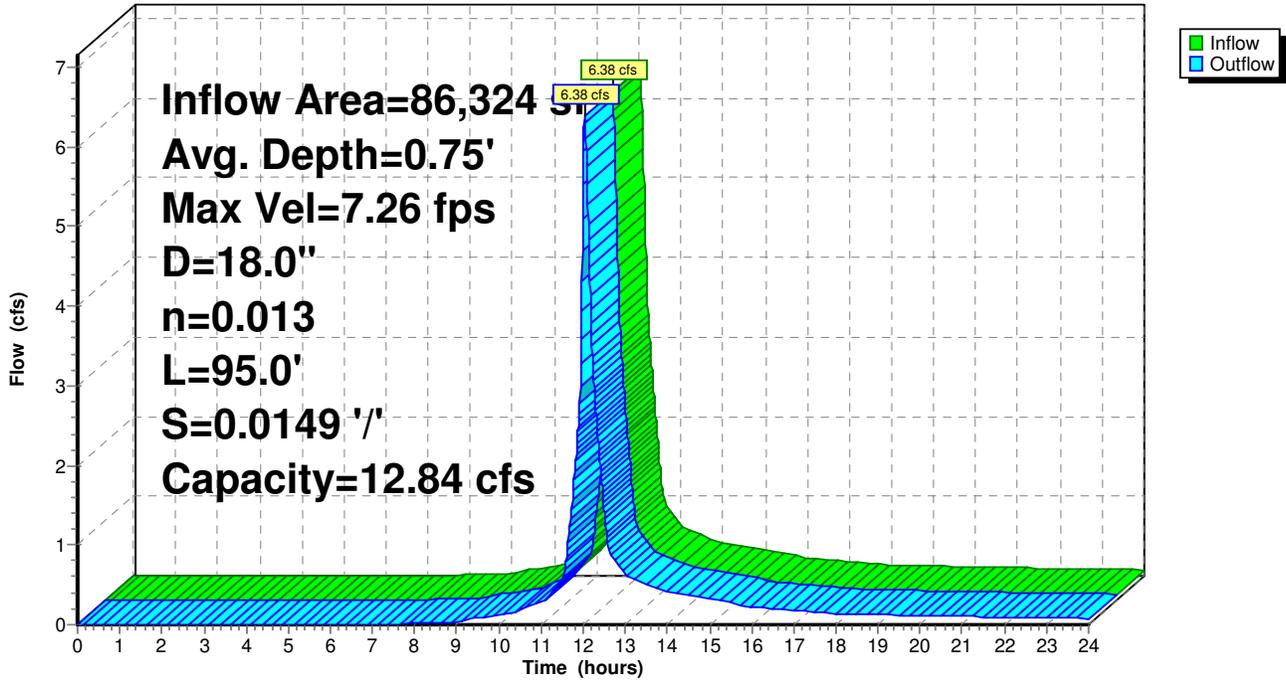
Peak Storage= 84 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.75'
 Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.84 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 95.0' Slope= 0.0149 '/'
 Inlet Invert= 102.58', Outlet Invert= 101.16'



Reach 149R: DMH 14 to DMH 12

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Reach 150R: DMH 12 to HW 10 - Outlet

[52] Hint: Inlet conditions not evaluated

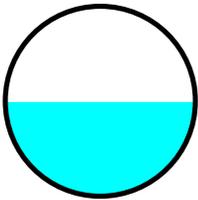
[61] Hint: Submerged 45% of Reach 149R bottom

Inflow Area = 86,324 sf, Inflow Depth > 2.90" for 10-Year event
Inflow = 6.38 cfs @ 12.03 hrs, Volume= 20,848 cf
Outflow = 6.36 cfs @ 12.04 hrs, Volume= 20,845 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.28 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.31 fps, Avg. Travel Time= 0.4 min

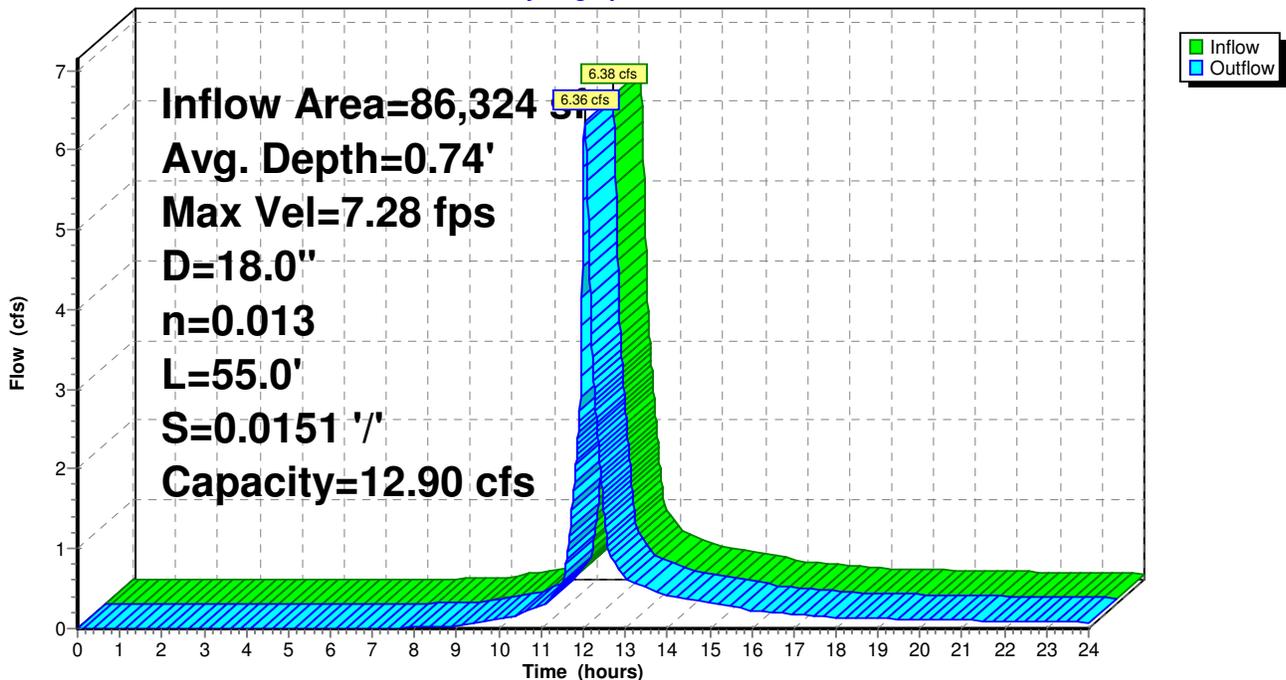
Peak Storage= 48 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.74'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.90 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 55.0' Slope= 0.0151 '/'
Inlet Invert= 101.06', Outlet Invert= 100.23'



Reach 150R: DMH 12 to HW 10 - Outlet

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Reach 153R: CB 116 to DMH 14

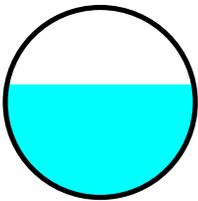
[52] Hint: Inlet conditions not evaluated

Inflow Area = 21,810 sf, Inflow Depth > 3.01" for 10-Year event
 Inflow = 1.96 cfs @ 12.02 hrs, Volume= 5,464 cf
 Outflow = 1.96 cfs @ 12.02 hrs, Volume= 5,464 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.07 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 3.40 fps, Avg. Travel Time= 0.1 min

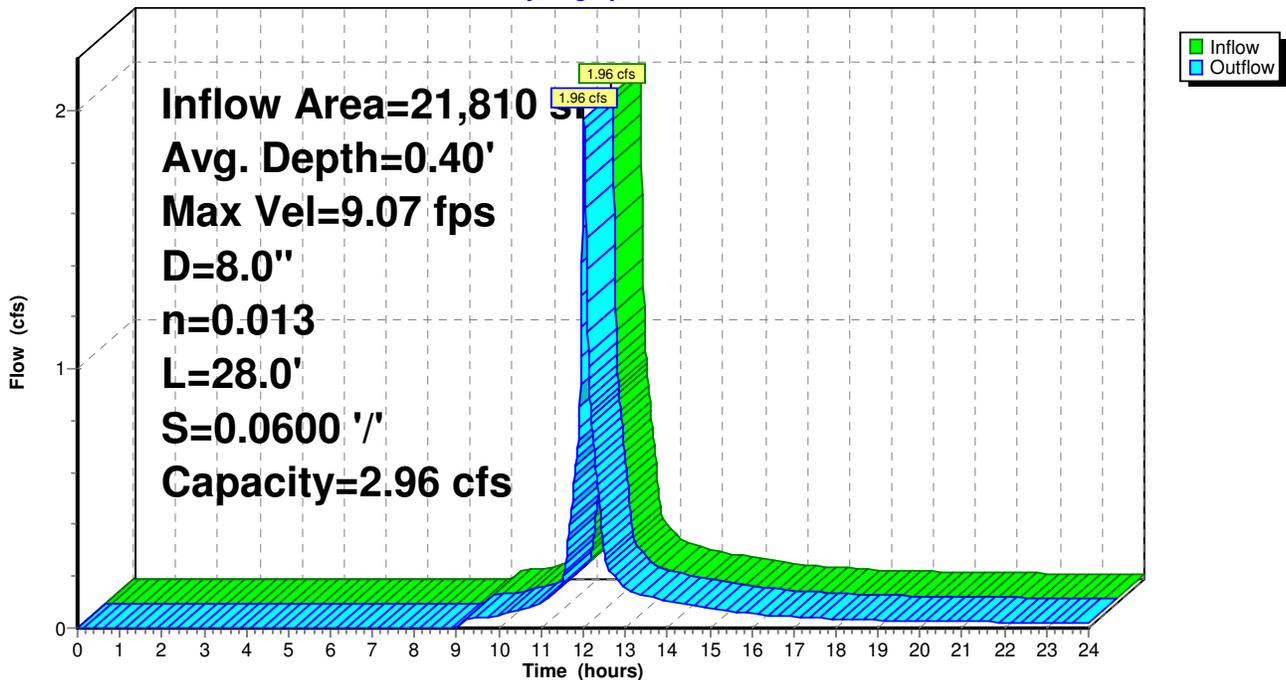
Peak Storage= 6 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.40'
 Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 28.0' Slope= 0.0600 '/'
 Inlet Invert= 107.12', Outlet Invert= 105.44'



Reach 153R: CB 116 to DMH 14

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Reach 154R: Swale from Drive at #6 to RG 126

[43] Hint: Has no inflow (Outflow=Zero)

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'

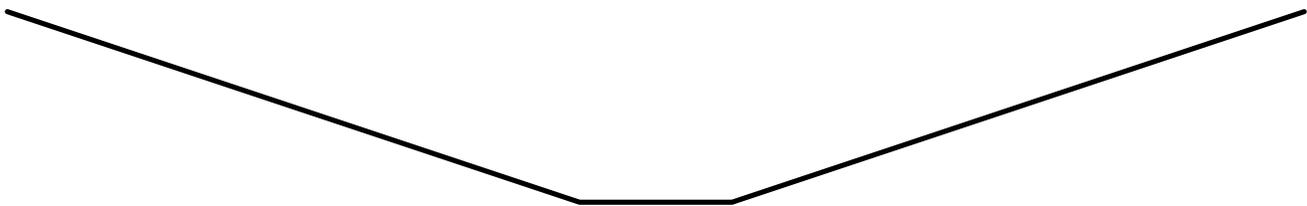
Bank-Full Depth= 1.25', Capacity at Bank-Full= 29.18 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 3.0 '/' Top Width= 8.50'

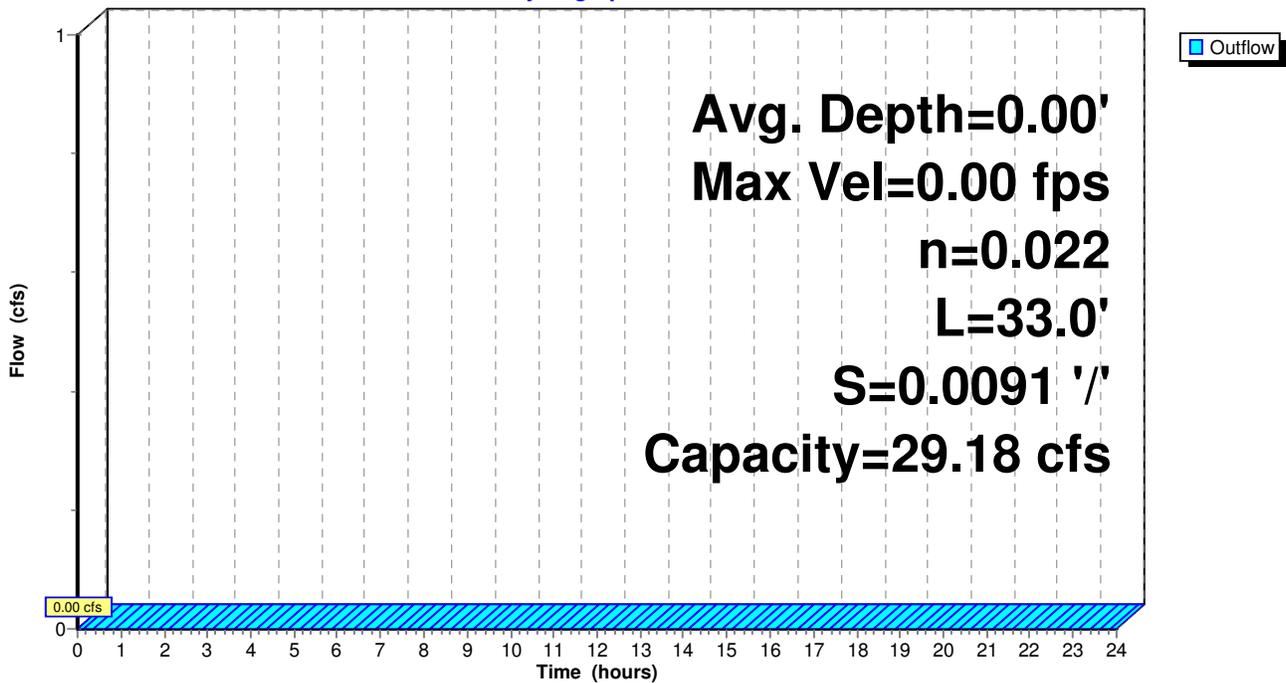
Length= 33.0' Slope= 0.0091 '/'

Inlet Invert= 115.65', Outlet Invert= 115.35'



Reach 154R: Swale from Drive at #6 to RG 126

Hydrograph



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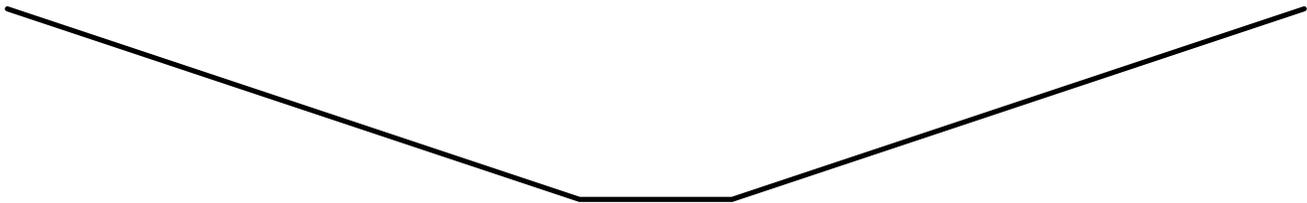
Reach 155R: Swale from Drive at #5 to RG 120

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

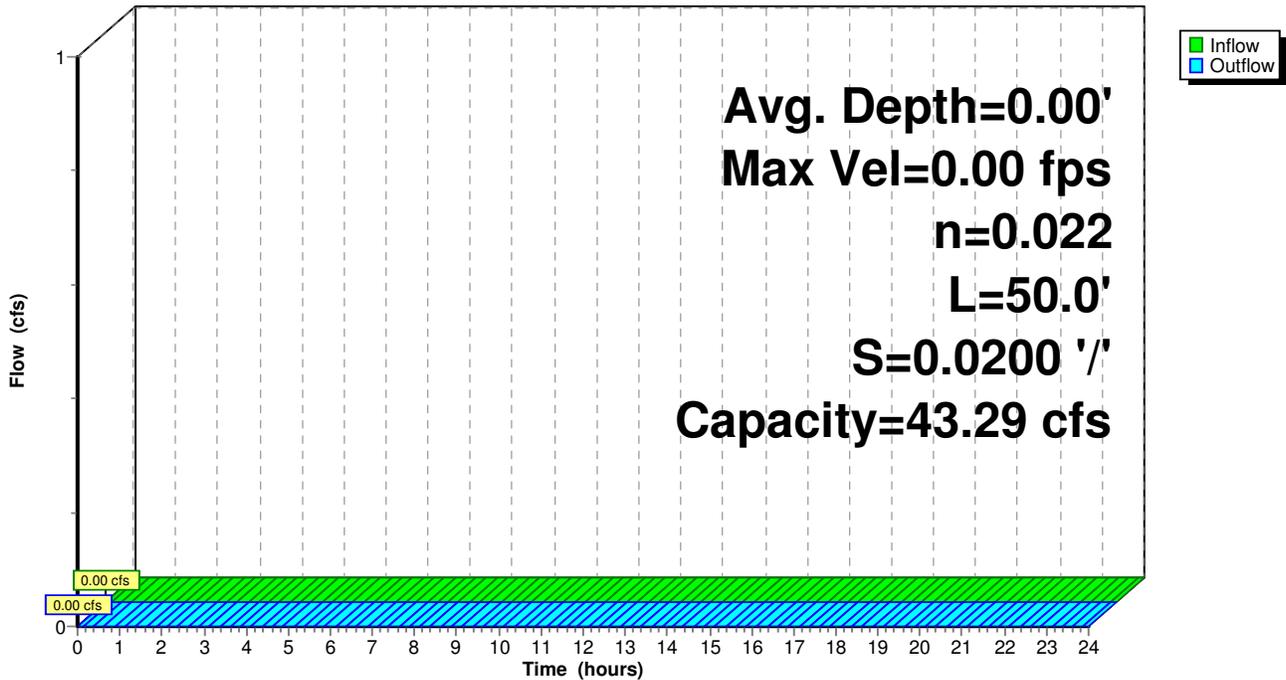
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 43.29 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 50.0' Slope= 0.0200 '/'
Inlet Invert= 114.00', Outlet Invert= 113.00'



Reach 155R: Swale from Drive at #5 to RG 120

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Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

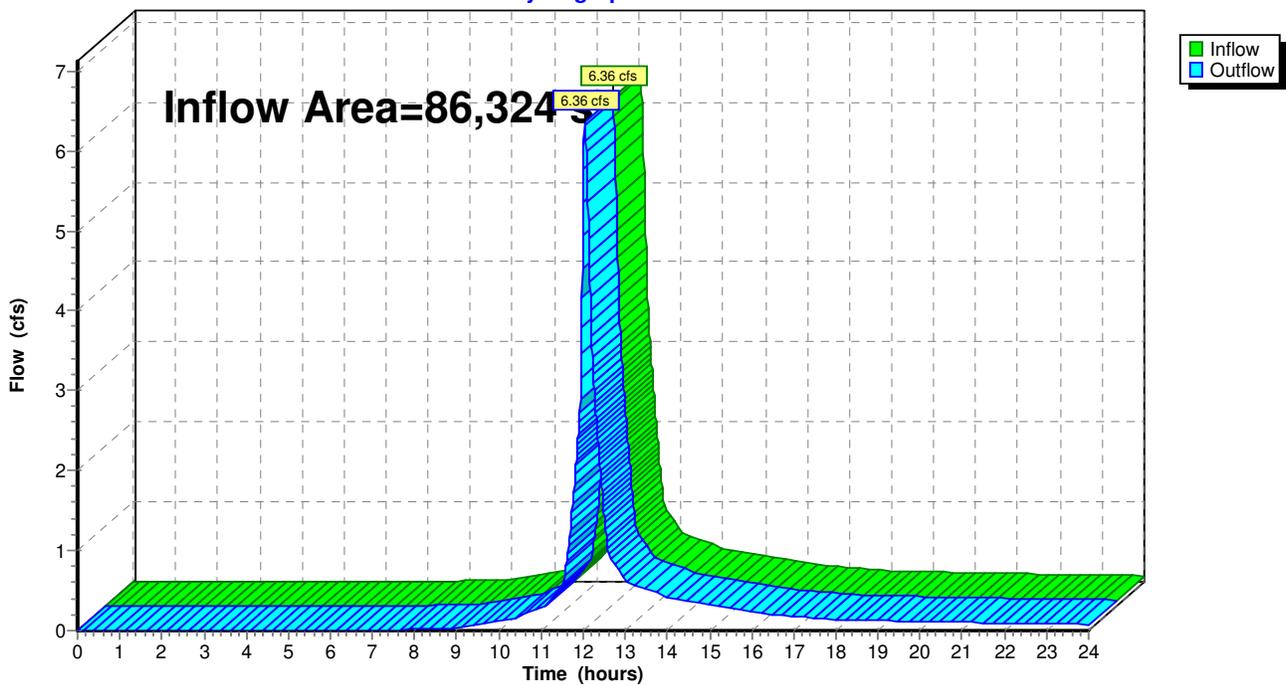
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 86,324 sf, Inflow Depth > 2.90" for 10-Year event
Inflow = 6.36 cfs @ 12.04 hrs, Volume= 20,845 cf
Outflow = 6.36 cfs @ 12.04 hrs, Volume= 20,845 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

Hydrograph



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Reach 220R: CB 56 to DMH 52

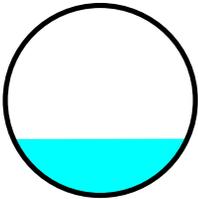
[52] Hint: Inlet conditions not evaluated

Inflow Area = 8,660 sf, Inflow Depth > 2.91" for 10-Year event
Inflow = 0.68 cfs @ 12.08 hrs, Volume= 2,097 cf
Outflow = 0.68 cfs @ 12.08 hrs, Volume= 2,097 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.50 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 0.2 min

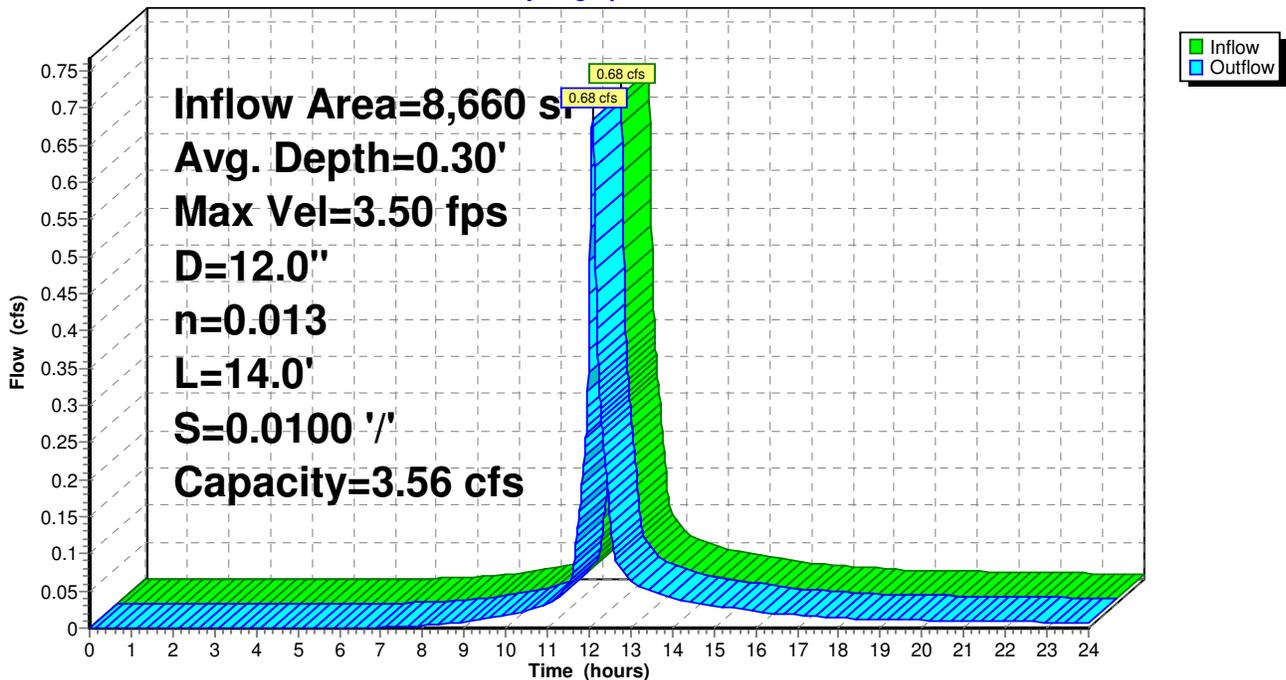
Peak Storage= 3 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 102.72', Outlet Invert= 102.58'



Reach 220R: CB 56 to DMH 52

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Reach 222R: CB 54 to DMH 52

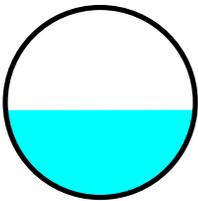
[52] Hint: Inlet conditions not evaluated

Inflow Area =	20,970 sf,	Inflow Depth > 2.63"	for 10-Year event
Inflow =	1.54 cfs @ 12.07 hrs,	Volume=	4,602 cf
Outflow =	1.54 cfs @ 12.08 hrs,	Volume=	4,602 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 4.37 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.55 fps, Avg. Travel Time= 0.2 min

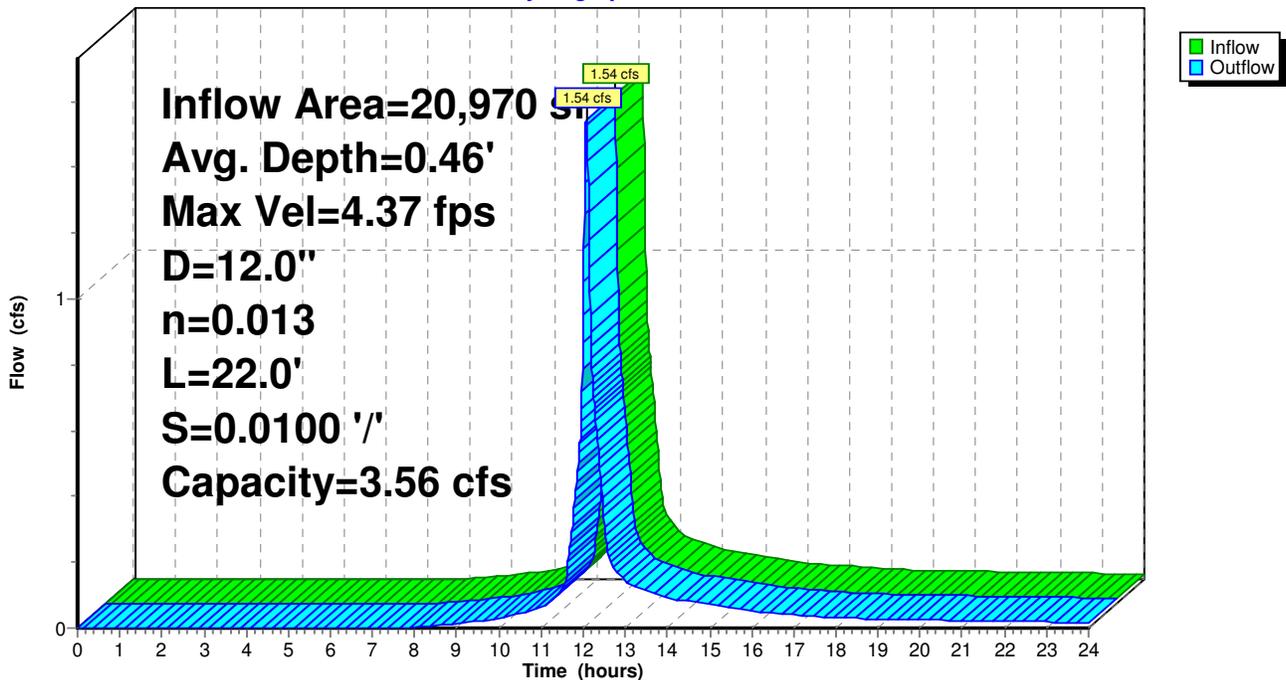
Peak Storage= 8 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.46'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
 Length= 22.0' Slope= 0.0100 '/'
 Inlet Invert= 102.80', Outlet Invert= 102.58'



Reach 222R: CB 54 to DMH 52

Hydrograph



Reach 403R: CB 65 to DMH 50

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

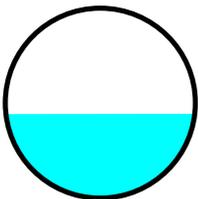
[79] Warning: Submerged Pond 67P Primary device # 1 OUTLET by 0.30'

Inflow Area =	44,069 sf,	Inflow Depth >	2.35"	for	10-Year event
Inflow =	2.05 cfs @	12.21 hrs,	Volume=	8,622 cf	
Outflow =	2.05 cfs @	12.21 hrs,	Volume=	8,622 cf,	Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.08 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 2.55 fps, Avg. Travel Time= 0.2 min

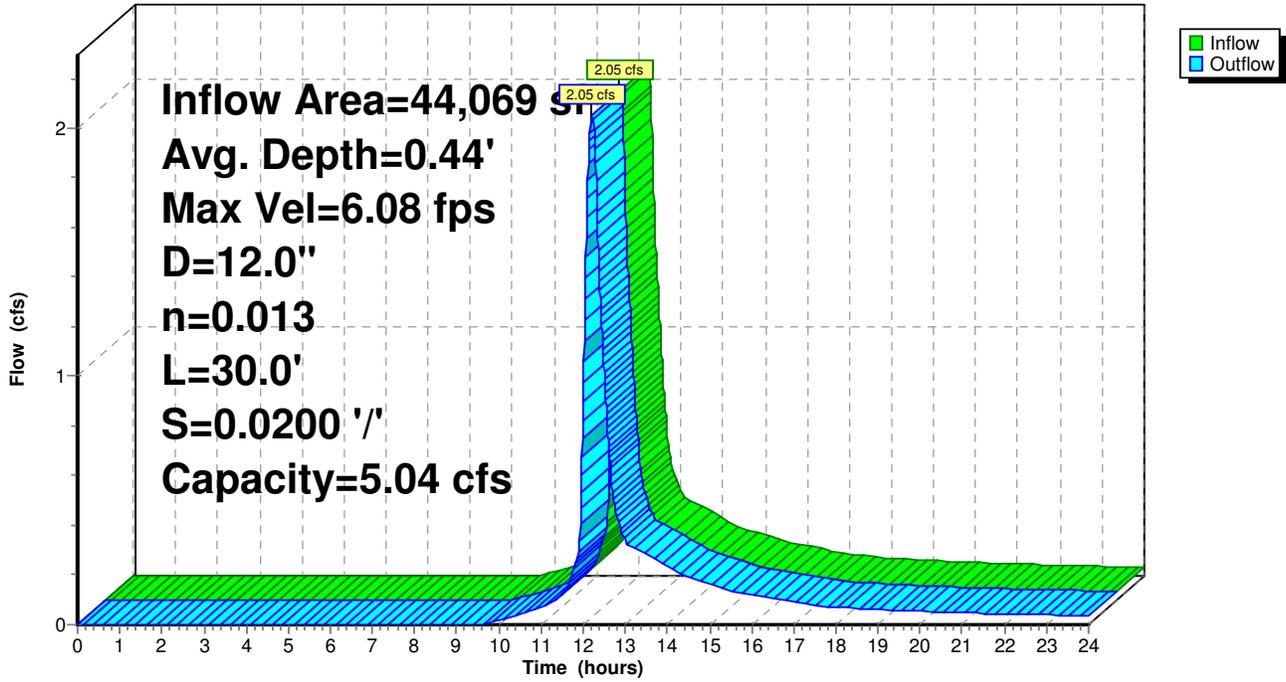
Peak Storage= 10 cf @ 12.21 hrs, Average Depth at Peak Storage= 0.44'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.04 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 30.0' Slope= 0.0200 '/'
 Inlet Invert= 102.22', Outlet Invert= 101.62'



Reach 403R: CB 65 to DMH 50

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Reach 902R: Existing wetland channel to WF 13

[61] Hint: Submerged 3% of Reach 1R bottom

Inflow Area = 201,436 sf, Inflow Depth > 2.14" for 10-Year event
Inflow = 9.64 cfs @ 12.17 hrs, Volume= 35,864 cf
Outflow = 9.63 cfs @ 12.18 hrs, Volume= 35,847 cf, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.35 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 1.1 min

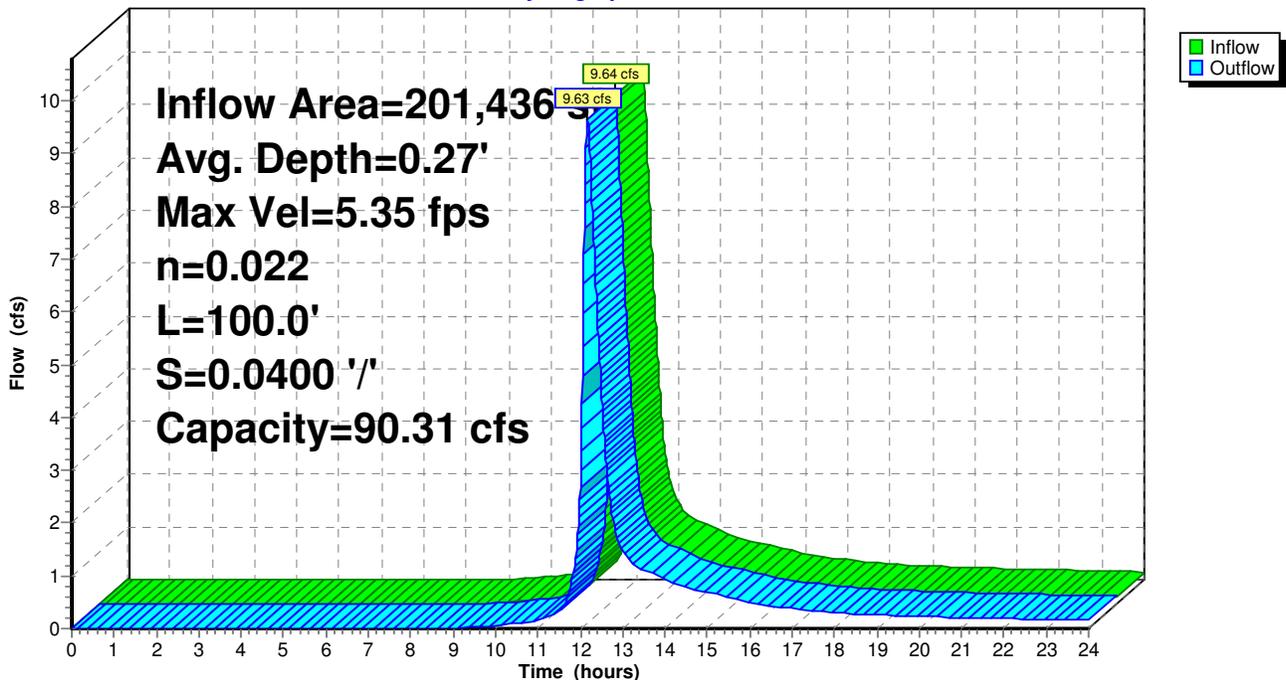
Peak Storage= 180 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0400 '/'
Inlet Invert= 86.00', Outlet Invert= 82.00'



Reach 902R: Existing wetland channel to WF 13

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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 2P: Recharge System

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT:: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[81] Warning: Exceeded Pond 218R by 1.69' @ 23.99 hrs

Inflow Area =	111,470 sf,	Inflow Depth >	2.52"	for	10-Year event
Inflow =	6.35 cfs @	12.10 hrs,	Volume=	23,455 cf	
Outflow =	6.02 cfs @	12.13 hrs,	Volume=	19,913 cf,	Atten= 5%, Lag= 2.2 min
Discarded =	0.01 cfs @	8.78 hrs,	Volume=	451 cf	
Primary =	6.02 cfs @	12.13 hrs,	Volume=	19,463 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 104.47' @ 12.13 hrs Surf.Area= 2,016 sf Storage= 4,465 cf

Plug-Flow detention time= 94.7 min calculated for 19,905 cf (85% of inflow)
Center-of-Mass det. time= 30.6 min (861.9 - 831.2)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	3,138 cf	42.00'W x 48.00'L x 5.00'H 100 10,080 cf Overall - 2,235 cf Embedded = 7,845 cf x 40.0% Voids
#2	101.00'	2,235 cf	47.8"W x 30.0"H x 6.25'L Cultec R-330 x 48 Inside #1
		5,373 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area
#2	Primary	103.22'	18.0" x 75.0' long Culvert Ke= 0.500 Outlet Invert= 102.09' S= 0.0151 '/' Cc= 0.900 n= 0.013
#3	Secondary	106.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600

Discarded OutFlow Max=0.01 cfs @ 8.78 hrs HW=100.65' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=6.01 cfs @ 12.13 hrs HW=104.47' (Free Discharge)

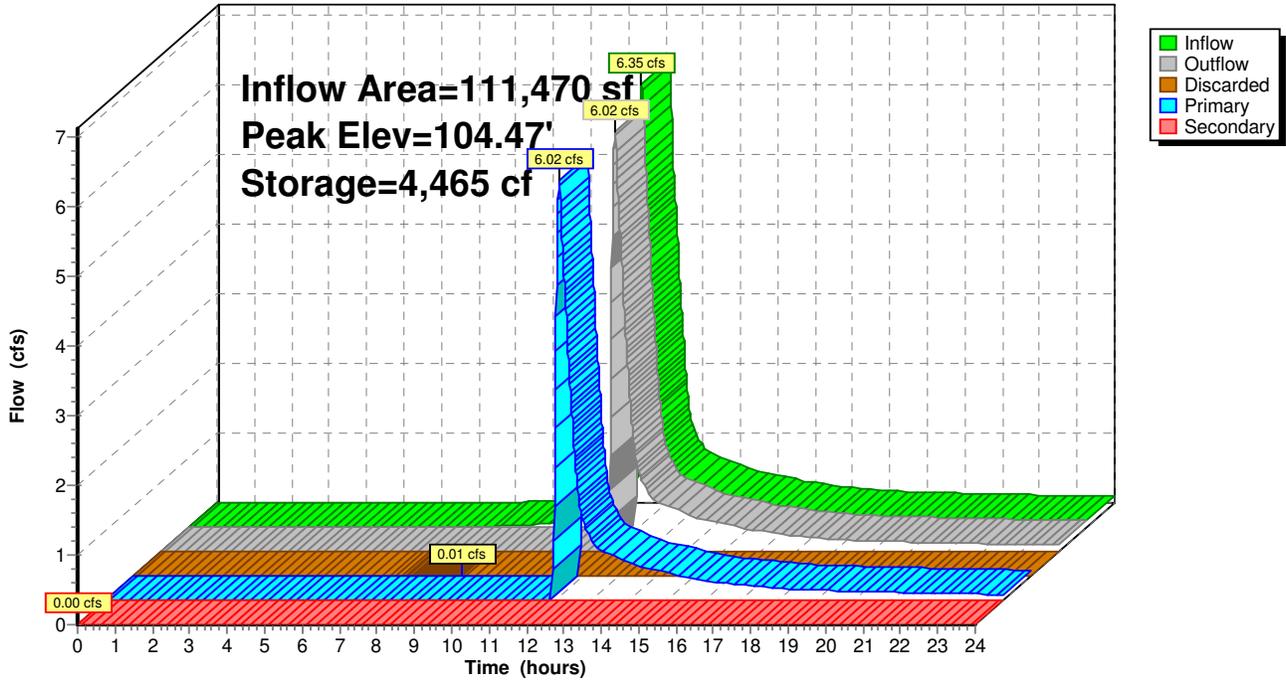
↑**2=Culvert** (Inlet Controls 6.01 cfs @ 3.81 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.60' (Free Discharge)

↑**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Recharge System

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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 3P: Culvert under Drive Unit 10

[57] Hint: Peaked at 114.79' (Flood elevation advised)

Inflow Area = 6,950 sf, Inflow Depth > 3.19" for 10-Year event
Inflow = 0.66 cfs @ 12.04 hrs, Volume= 1,850 cf
Outflow = 0.66 cfs @ 12.04 hrs, Volume= 1,850 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.66 cfs @ 12.04 hrs, Volume= 1,850 cf

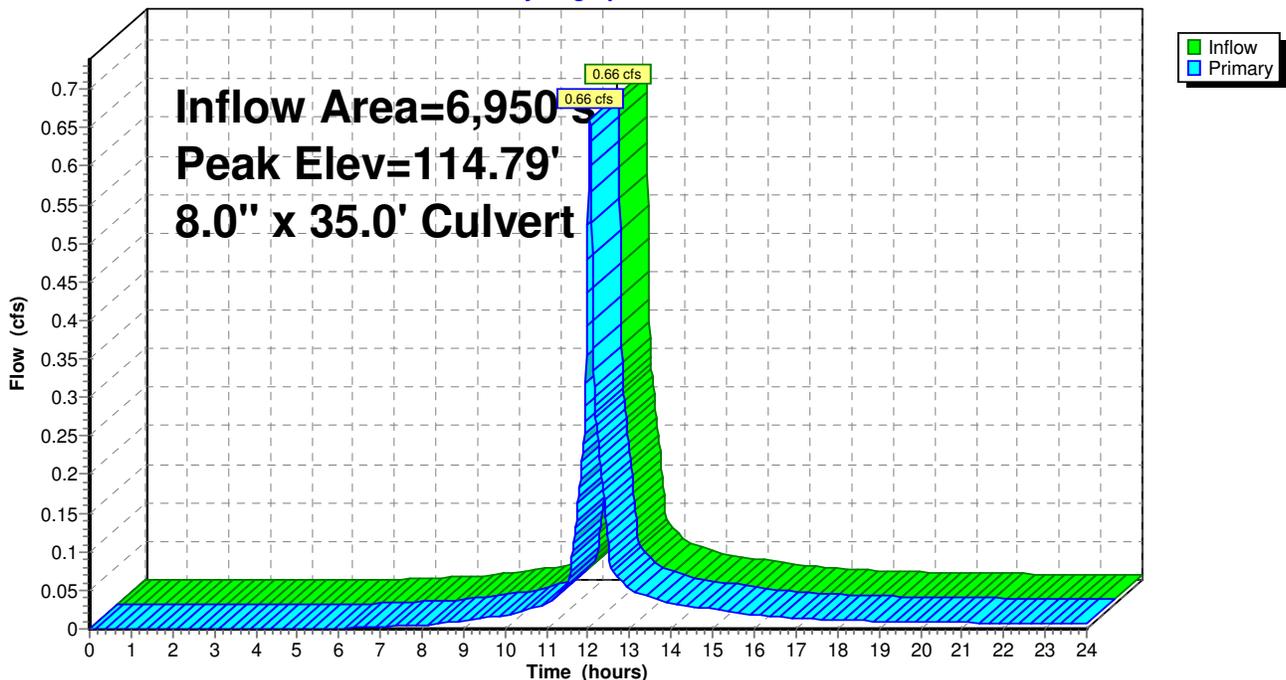
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.79' @ 12.04 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	114.27'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 113.92' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.66 cfs @ 12.04 hrs HW=114.79' (Free Discharge)
↑1=Culvert (Barrel Controls 0.66 cfs @ 3.12 fps)

Pond 3P: Culvert under Drive Unit 10

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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 4P: Culvert under Drive Unit 11

[57] Hint: Peaked at 110.84' (Flood elevation advised)

[61] Hint: Submerged 14% of Reach 2R bottom

Inflow Area = 6,950 sf, Inflow Depth > 3.19" for 10-Year event
Inflow = 0.66 cfs @ 12.05 hrs, Volume= 1,850 cf
Outflow = 0.66 cfs @ 12.05 hrs, Volume= 1,850 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.66 cfs @ 12.05 hrs, Volume= 1,850 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

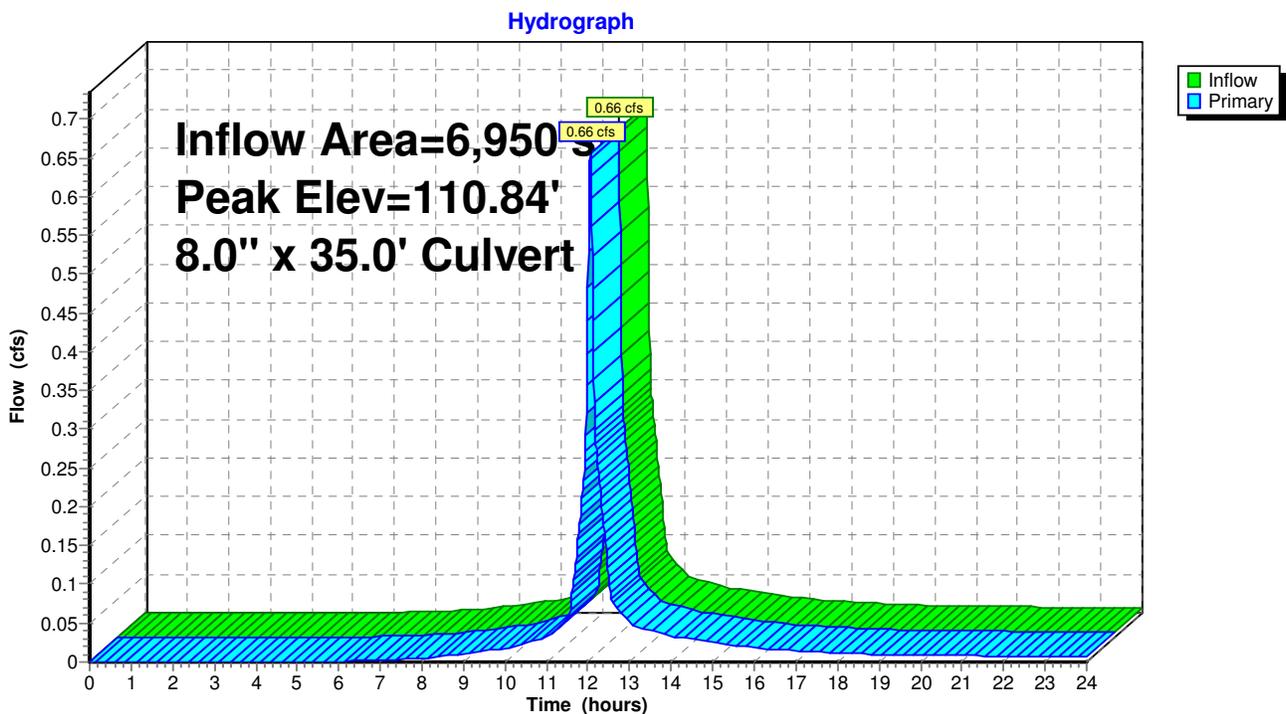
Peak Elev= 110.84' @ 12.05 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	110.32'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 109.97' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.66 cfs @ 12.05 hrs HW=110.84' (Free Discharge)

↑1=Culvert (Barrel Controls 0.66 cfs @ 3.12 fps)

Pond 4P: Culvert under Drive Unit 11



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 8P: Main Cell - Bio Retention

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[63] Warning: Exceeded Reach 62R inflow depth by 0.16' @ 12.25 hrs

Inflow Area =	44,069 sf,	Inflow Depth >	2.39"	for	10-Year event
Inflow =	2.24 cfs @	12.16 hrs,	Volume=	8,789 cf	
Outflow =	2.05 cfs @	12.21 hrs,	Volume=	8,623 cf,	Atten= 8%, Lag= 3.2 min
Primary =	2.05 cfs @	12.21 hrs,	Volume=	8,623 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 111.43' @ 12.21 hrs Surf.Area= 996 sf Storage= 967 cf

Plug-Flow detention time= 29.3 min calculated for 8,619 cf (98% of inflow)
Center-of-Mass det. time= 18.3 min (847.8 - 829.5)

Volume	Invert	Avail.Storage	Storage Description
#1	109.74'	2,193 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.74	0	0	0
109.75	350	2	2
110.00	375	91	92
111.00	667	521	613
112.00	1,440	1,054	1,667
112.33	1,750	526	2,193

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Type III 24-hr 10-Year Rainfall=4.50"

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Device	Routing	Invert	Outlet Devices
#1	Device 7	110.00'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#2	Device 7	110.17'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#3	Device 7	110.33'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#4	Device 7	110.50'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#5	Device 7	110.67'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#6	Device 7	111.00'	8.0" Horiz. Orifice/Grate Limited to weir flow C= 0.900
#7	Primary	107.00'	12.0" x 126.0' long Culvert CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 105.61' S= 0.0110 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#8	Secondary	112.33'	8.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=2.05 cfs @ 12.21 hrs HW=111.43' (Free Discharge)

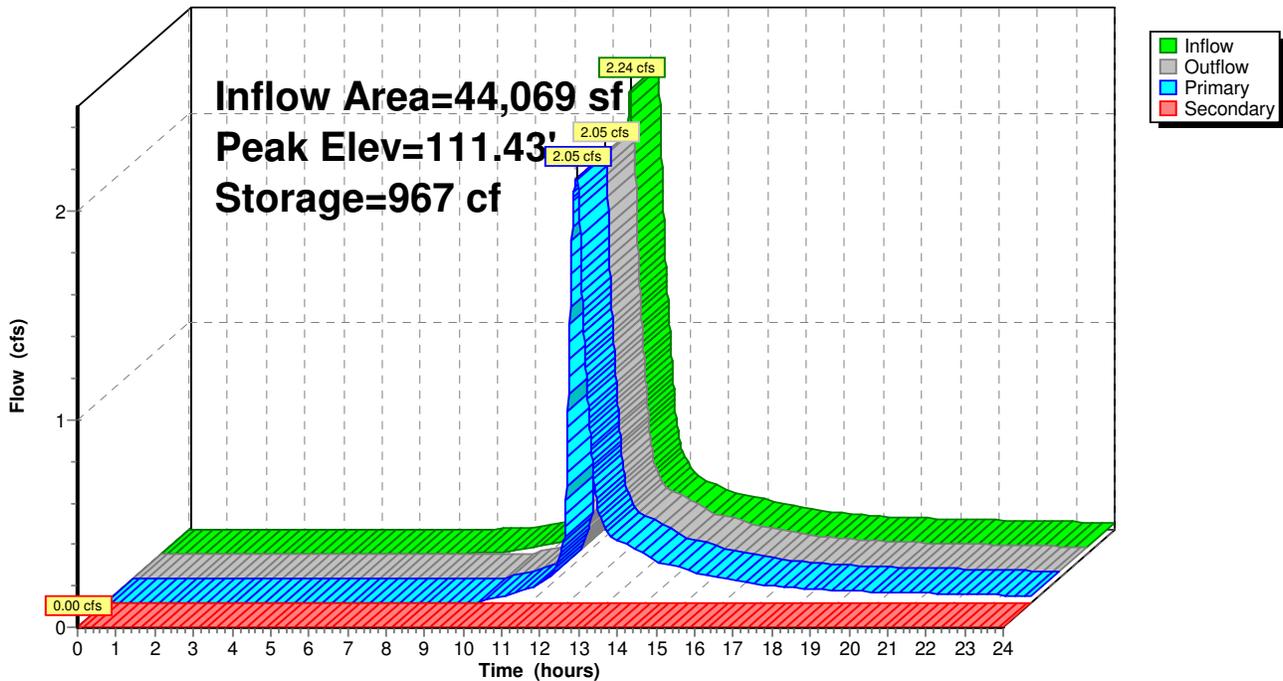
- 7=Culvert (Passes 2.05 cfs of 6.61 cfs potential flow)
 - 1=Orifice/Grate (Orifice Controls 0.09 cfs @ 5.71 fps)
 - 2=Orifice/Grate (Orifice Controls 0.09 cfs @ 5.35 fps)
 - 3=Orifice/Grate (Orifice Controls 0.08 cfs @ 4.99 fps)
 - 4=Orifice/Grate (Orifice Controls 0.07 cfs @ 4.58 fps)
 - 5=Orifice/Grate (Orifice Controls 0.07 cfs @ 4.13 fps)
 - 6=Orifice/Grate (Orifice Controls 1.64 cfs @ 4.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.74' (Free Discharge)

- 8=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 8P: Main Cell - Bio Retention

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 9P: CB 65

Inflow Area = 26,681 sf, Inflow Depth > 2.48" for 10-Year event
Inflow = 1.64 cfs @ 12.11 hrs, Volume= 5,508 cf
Outflow = 1.64 cfs @ 12.11 hrs, Volume= 5,508 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.64 cfs @ 12.11 hrs, Volume= 5,508 cf

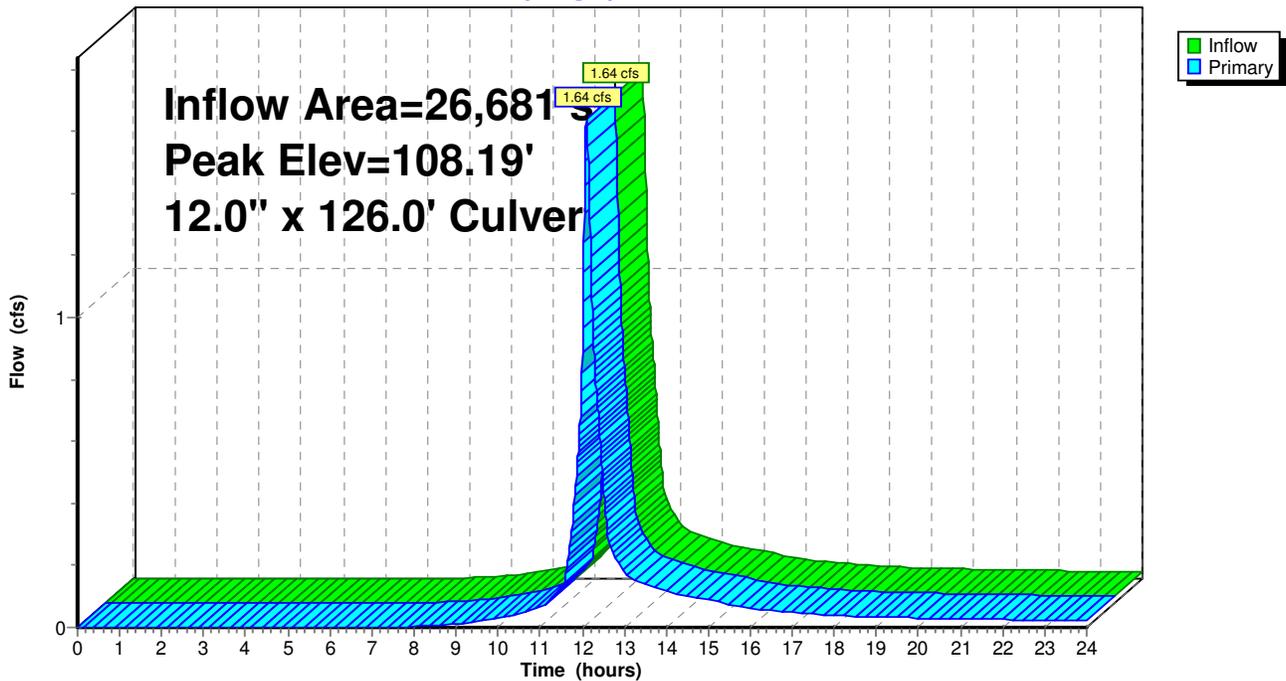
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 108.19' @ 12.11 hrs
Flood Elev= 112.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.50'	12.0" x 126.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 105.61' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.64 cfs @ 12.11 hrs HW=108.19' (Free Discharge)
↑1=Culvert (Inlet Controls 1.64 cfs @ 2.83 fps)

Pond 9P: CB 65

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 43R: CB 60 to DMH 64

[57] Hint: Peaked at 111.40' (Flood elevation advised)

Inflow Area = 4,640 sf, Inflow Depth > 3.29" for 10-Year event
Inflow = 0.46 cfs @ 12.03 hrs, Volume= 1,274 cf
Outflow = 0.46 cfs @ 12.03 hrs, Volume= 1,274 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.46 cfs @ 12.03 hrs, Volume= 1,274 cf

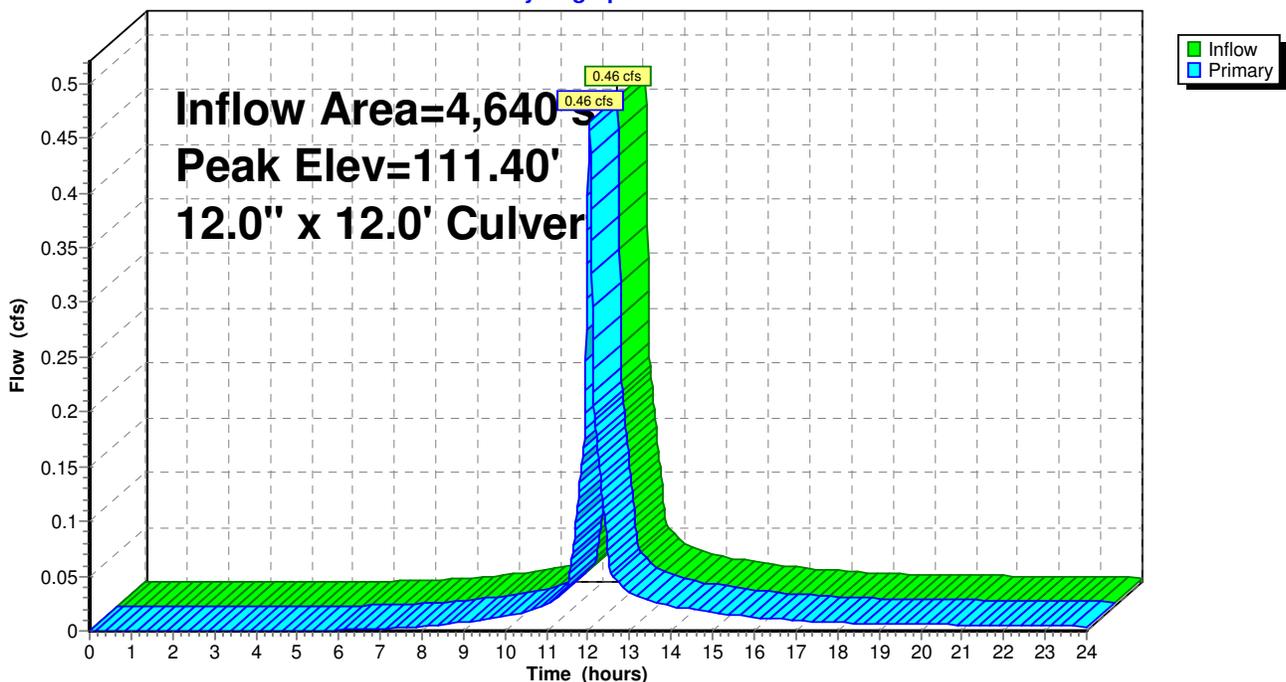
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 111.40' @ 12.03 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	111.02'	12.0" x 12.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.46 cfs @ 12.03 hrs HW=111.40' (Free Discharge)
↑1=Culvert (Barrel Controls 0.46 cfs @ 2.53 fps)

Pond 43R: CB 60 to DMH 64

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 61R: CB 62 to DMH 64

[57] Hint: Peaked at 112.02' (Flood elevation advised)

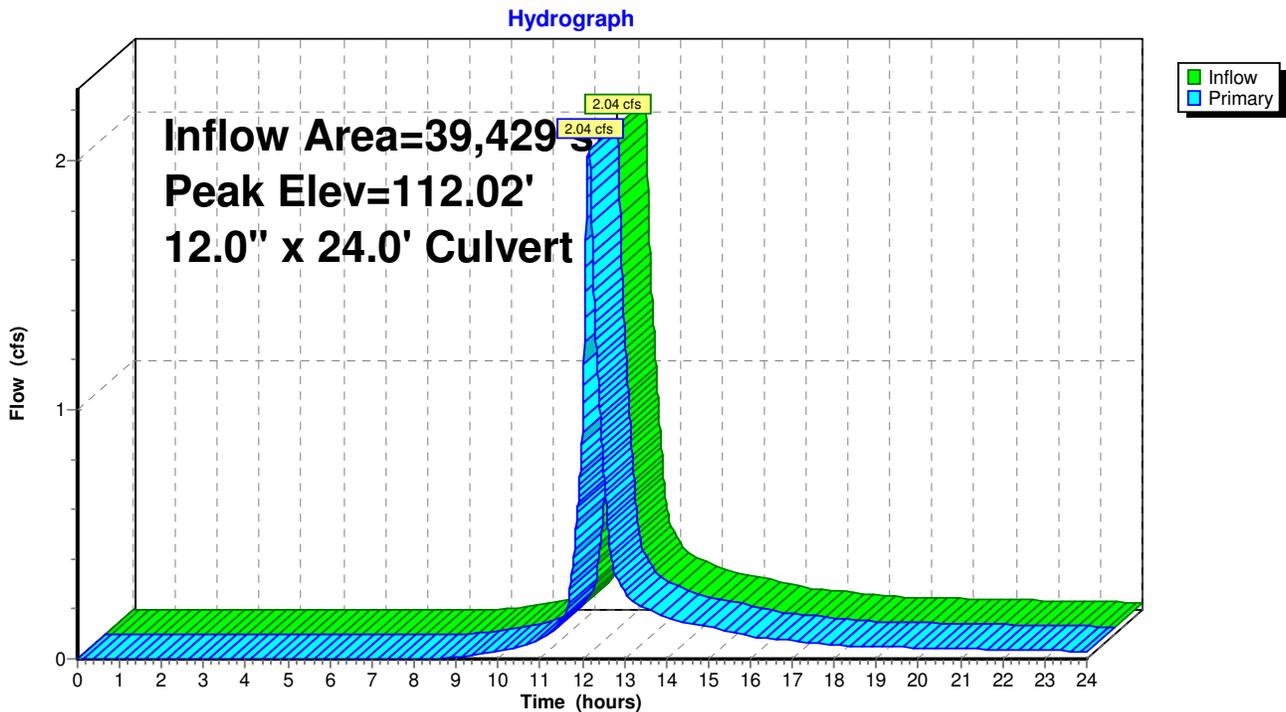
Inflow Area = 39,429 sf, Inflow Depth > 2.29" for 10-Year event
Inflow = 2.04 cfs @ 12.16 hrs, Volume= 7,516 cf
Outflow = 2.04 cfs @ 12.16 hrs, Volume= 7,516 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.16 hrs, Volume= 7,516 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 112.02' @ 12.16 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	111.14'	12.0" x 24.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.04 cfs @ 12.16 hrs HW=112.02' (Free Discharge)
↑1=Culvert (Barrel Controls 2.04 cfs @ 3.73 fps)

Pond 61R: CB 62 to DMH 64



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 66P: RG 9A at Units 11/12 - CB 214

Inflow Area = 6,950 sf, Inflow Depth > 3.19" for 10-Year event
 Inflow = 0.66 cfs @ 12.05 hrs, Volume= 1,850 cf
 Outflow = 0.65 cfs @ 12.06 hrs, Volume= 1,744 cf, Atten= 0%, Lag= 0.4 min
 Primary = 0.65 cfs @ 12.06 hrs, Volume= 1,744 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 107.67' @ 12.06 hrs Surf.Area= 231 sf Storage= 125 cf

Plug-Flow detention time= 47.8 min calculated for 1,743 cf (94% of inflow)
 Center-of-Mass det. time= 16.8 min (816.1 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1	107.08'	359 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
107.08	0	0	0
107.09	200	1	1
108.58	280	358	359

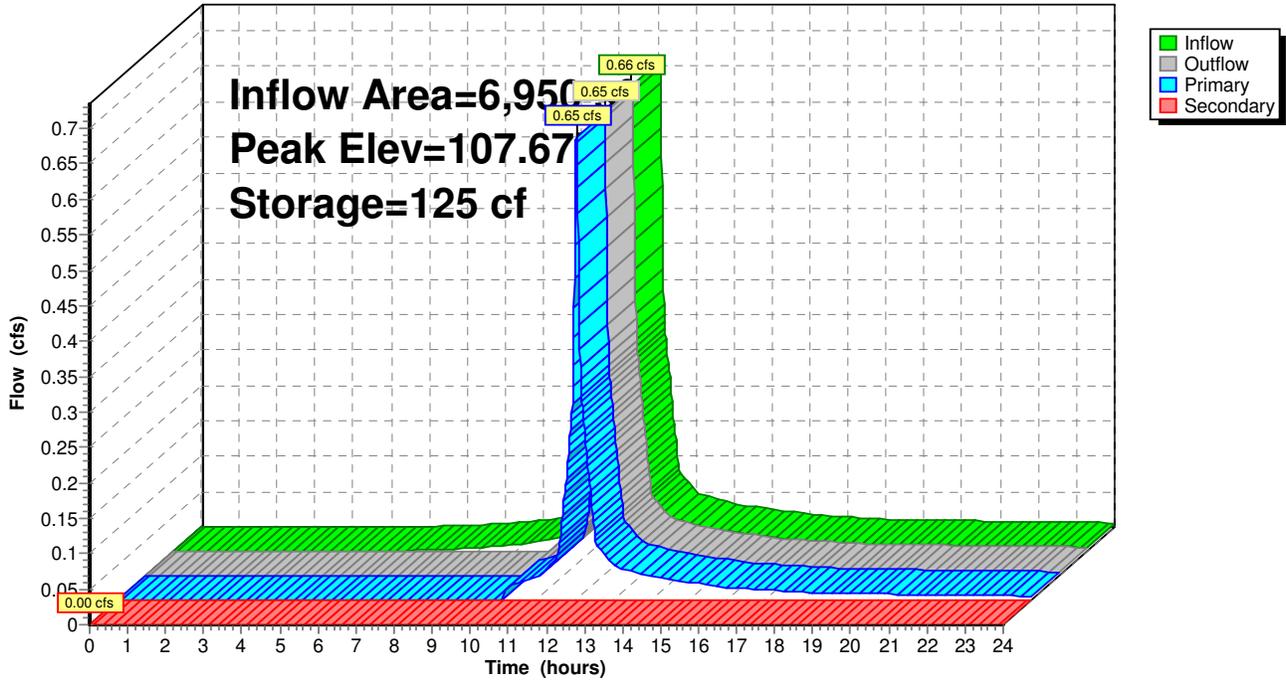
Device	Routing	Invert	Outlet Devices
#1	Primary	107.58'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	108.08'	2.0' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.65 cfs @ 12.06 hrs HW=107.67' (Free Discharge)
 ↑1=**Orifice/Grate** (Weir Controls 0.65 cfs @ 0.95 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=107.08' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 66P: RG 9A at Units 11/12 - CB 214

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 67P: CB 66 (emergency vertical release)

[61] Hint: Submerged 13% of Reach 68R bottom

Inflow Area = 44,069 sf, Inflow Depth > 2.35" for 10-Year event
Inflow = 2.05 cfs @ 12.21 hrs, Volume= 8,622 cf
Outflow = 2.05 cfs @ 12.21 hrs, Volume= 8,622 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.05 cfs @ 12.21 hrs, Volume= 8,622 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 106.47' @ 12.21 hrs

Flood Elev= 112.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	2.00' W x 2.00' H x 52.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 102.36' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Secondary	112.00'	2.00' W x 2.00' H Vert. Orifice/Grate C= 0.600

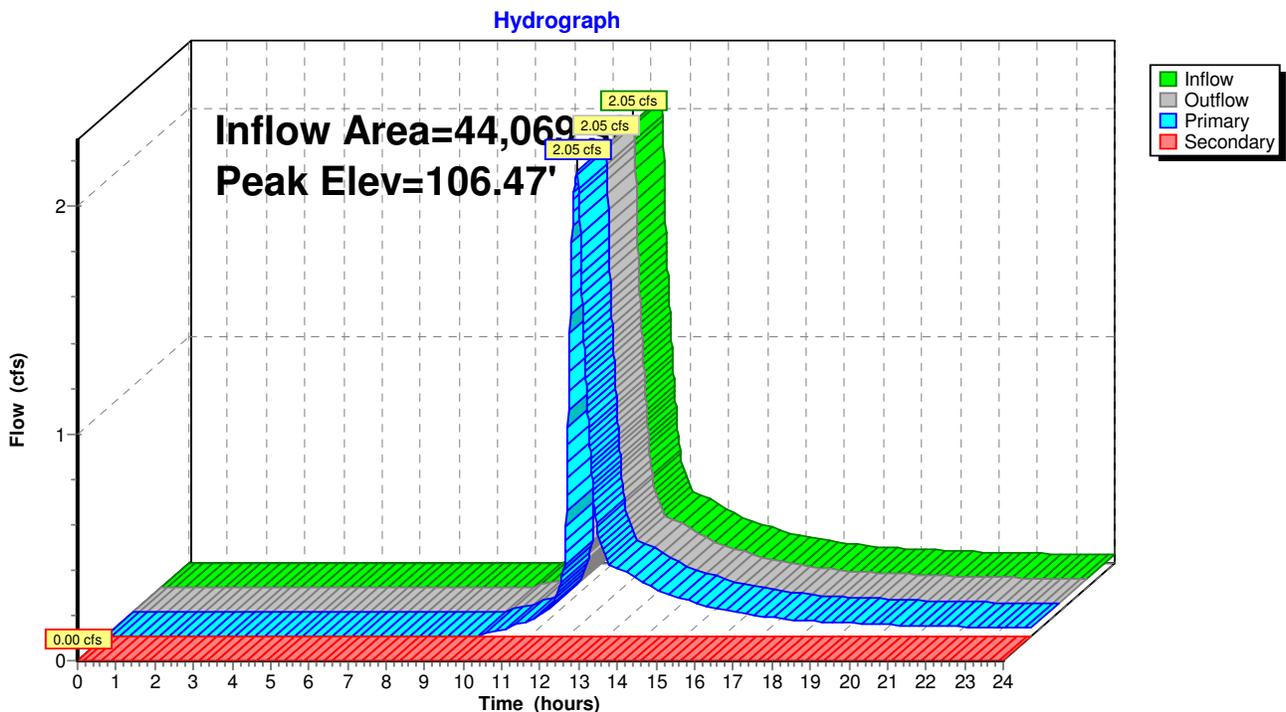
Primary OutFlow Max=2.05 cfs @ 12.21 hrs HW=106.47' (Free Discharge)

↳ **1=Culvert** (Inlet Controls 2.05 cfs @ 2.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' (Free Discharge)

↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Pond 67P: CB 66 (emergency vertical release)



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 70P: RG 10A - CB 216 at Units 13

Inflow Area = 11,090 sf, Inflow Depth > 2.97" for 10-Year event
 Inflow = 0.96 cfs @ 12.05 hrs, Volume= 2,747 cf
 Outflow = 0.96 cfs @ 12.05 hrs, Volume= 2,627 cf, Atten= 0%, Lag= 0.4 min
 Primary = 0.96 cfs @ 12.05 hrs, Volume= 2,627 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 104.76' @ 12.05 hrs Surf.Area= 298 sf Storage= 150 cf

Plug-Flow detention time= 34.6 min calculated for 2,627 cf (96% of inflow)
 Center-of-Mass det. time= 10.4 min (823.5 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	104.15'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.15	0	0	0
104.16	200	1	1
104.65	280	118	119
105.15	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	104.65'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	105.15'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

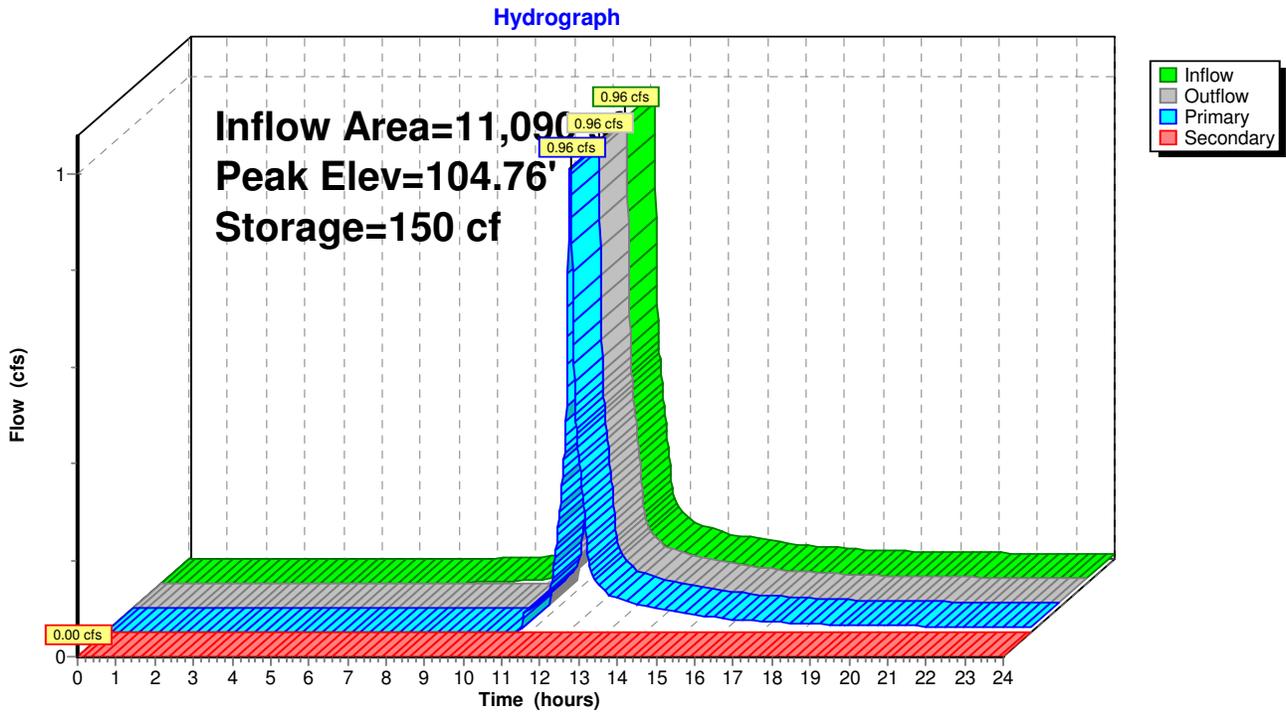
Primary OutFlow Max=0.96 cfs @ 12.05 hrs HW=104.76' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 0.96 cfs @ 1.09 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=104.15' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 70P: RG 10A - CB 216 at Units 13



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 111P: CB 20

Inflow Area = 7,780 sf, Inflow Depth > 3.20" for 10-Year event
Inflow = 0.80 cfs @ 12.01 hrs, Volume= 2,072 cf
Outflow = 0.80 cfs @ 12.01 hrs, Volume= 2,072 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.01 hrs, Volume= 2,072 cf

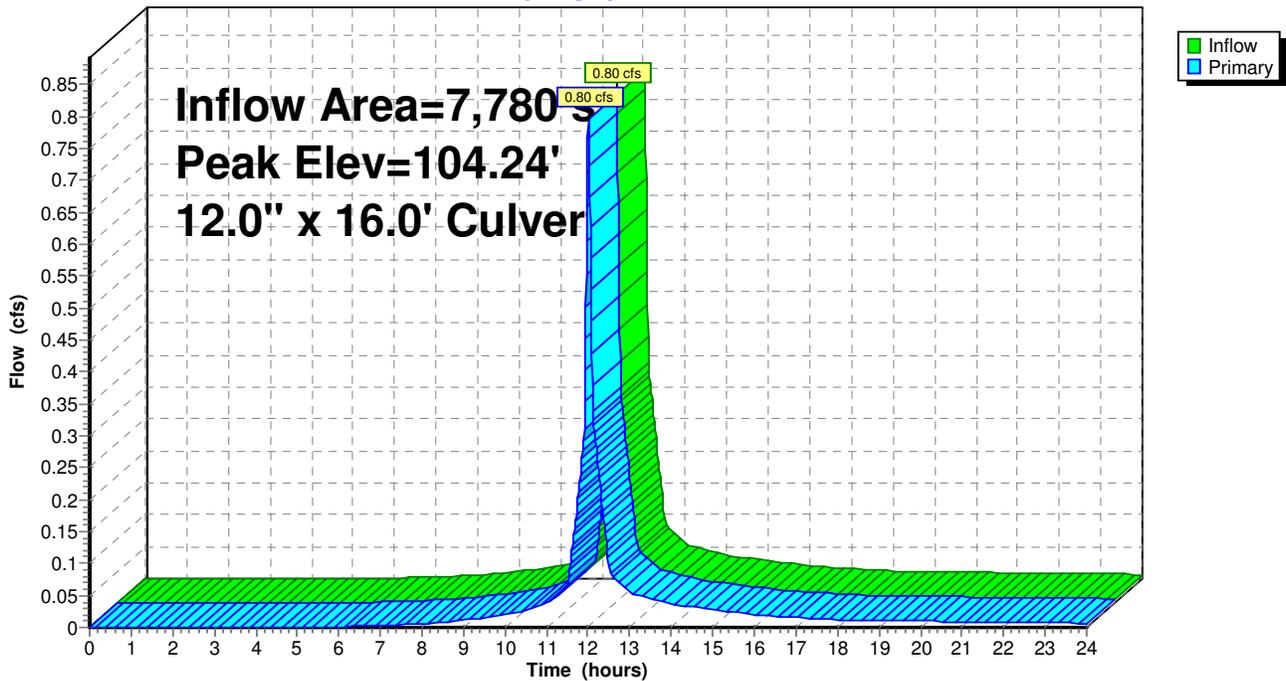
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.24' @ 12.01 hrs
Flood Elev= 107.82'

Device #	Routing	Invert	Outlet Devices
#1	Primary	103.74'	12.0" x 16.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.80 cfs @ 12.01 hrs HW=104.24' (Free Discharge)
1=Culvert (Barrel Controls 0.80 cfs @ 2.92 fps)

Pond 111P: CB 20

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 112P: CB 22

Inflow Area = 5,198 sf, Inflow Depth > 3.60" for 10-Year event
Inflow = 0.58 cfs @ 12.00 hrs, Volume= 1,560 cf
Outflow = 0.58 cfs @ 12.00 hrs, Volume= 1,560 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 12.00 hrs, Volume= 1,560 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 104.21' @ 12.00 hrs

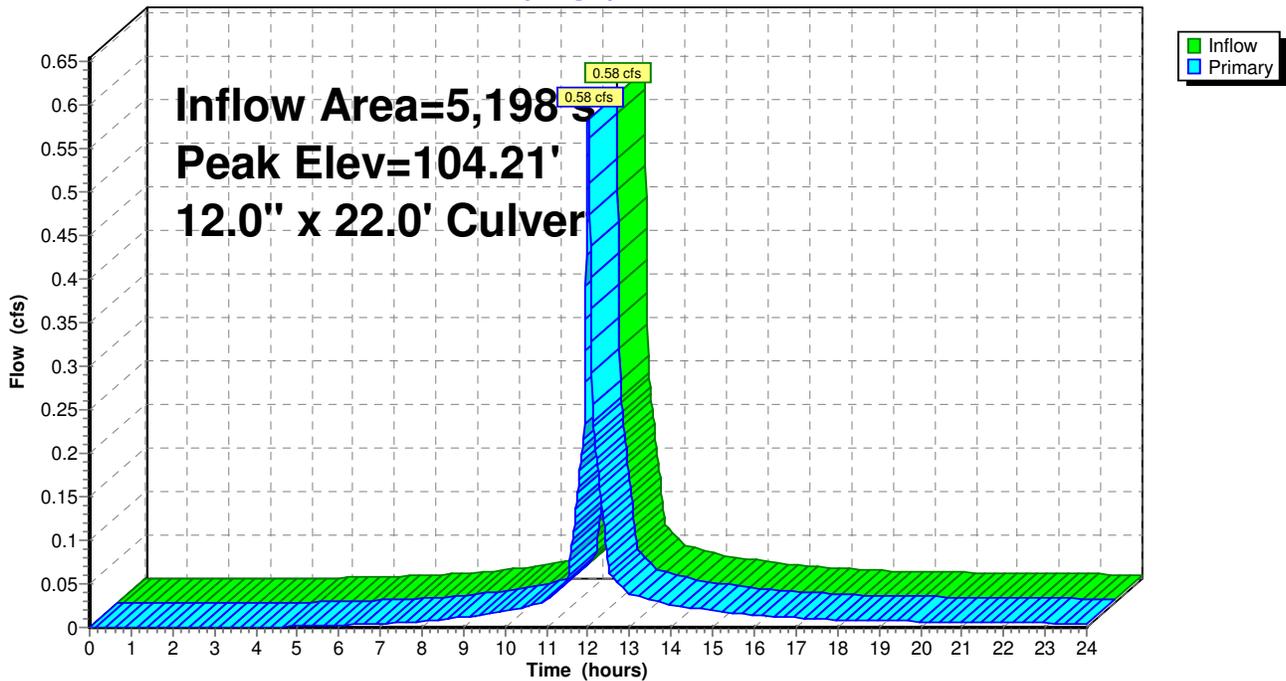
Flood Elev= 107.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.80'	12.0" x 22.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.58 cfs @ 12.00 hrs HW=104.21' (Free Discharge)
↑1=Culvert (Barrel Controls 0.58 cfs @ 2.82 fps)

Pond 112P: CB 22

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 119P: RG - 1A - CB 118 to DMH 14

[62] Warning: Submerged 13% of Reach 127R inlet

Inflow Area = 16,626 sf, Inflow Depth > 3.85" for 10-Year event
 Inflow = 1.98 cfs @ 12.02 hrs, Volume= 5,332 cf
 Outflow = 1.98 cfs @ 12.03 hrs, Volume= 5,297 cf, Atten= 0%, Lag= 0.1 min
 Primary = 1.98 cfs @ 12.03 hrs, Volume= 5,297 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 110.16' @ 12.03 hrs Surf.Area= 101 sf Storage= 58 cf

Plug-Flow detention time= 6.7 min calculated for 5,297 cf (99% of inflow)
 Center-of-Mass det. time= 2.8 min (824.4 - 821.6)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	0	0	0
109.51	75	0	0
110.00	96	42	42
111.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	110.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Primary	109.86'	8.0" x 65.0' long Culvert Ke= 0.200 Outlet Invert= 105.96' S= 0.0600 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#3	Secondary	111.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.97 cfs @ 12.03 hrs HW=110.16' (Free Discharge)

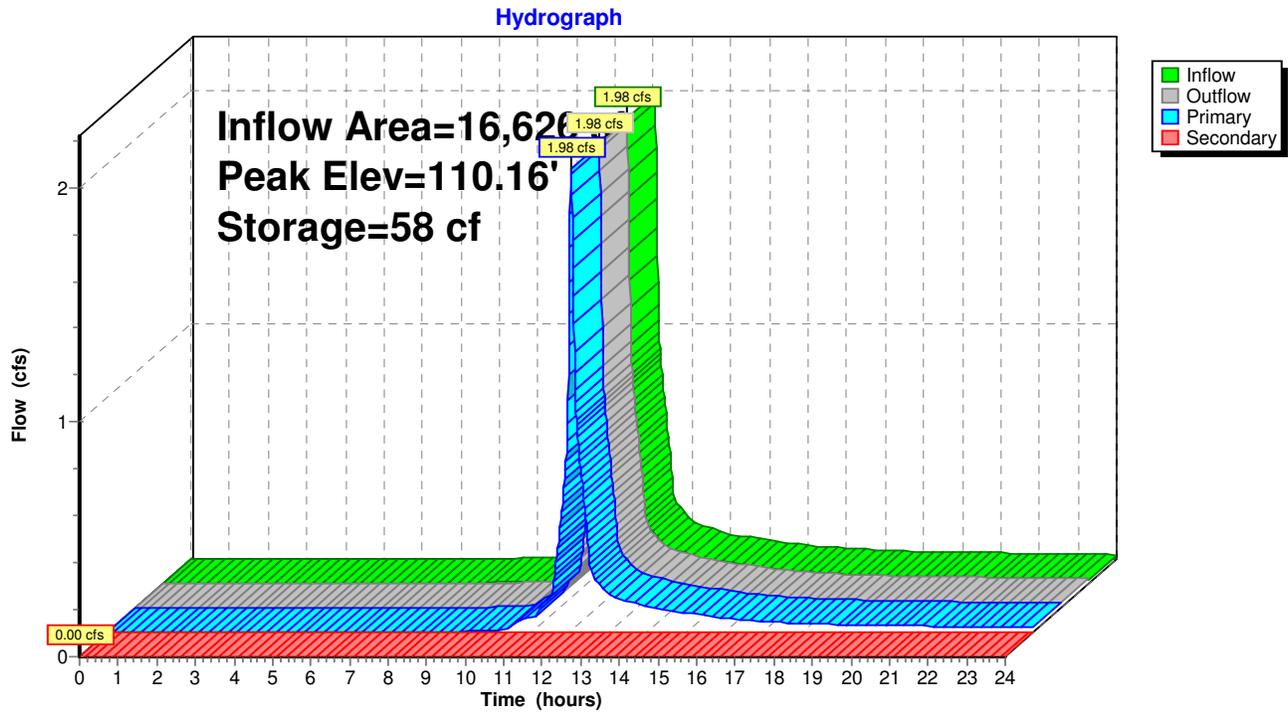
↑1=**Orifice/Grate** (Weir Controls 1.62 cfs @ 1.29 fps)

└2=**Culvert** (Inlet Controls 0.35 cfs @ 2.32 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)

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

Pond 119P: RG - 1A - CB 118 to DMH 14



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 119R: Culvert under Unit 4 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 112.43' (Flood elevation advised)

[81] Warning: Exceeded Pond 121P by 0.14' @ 12.02 hrs

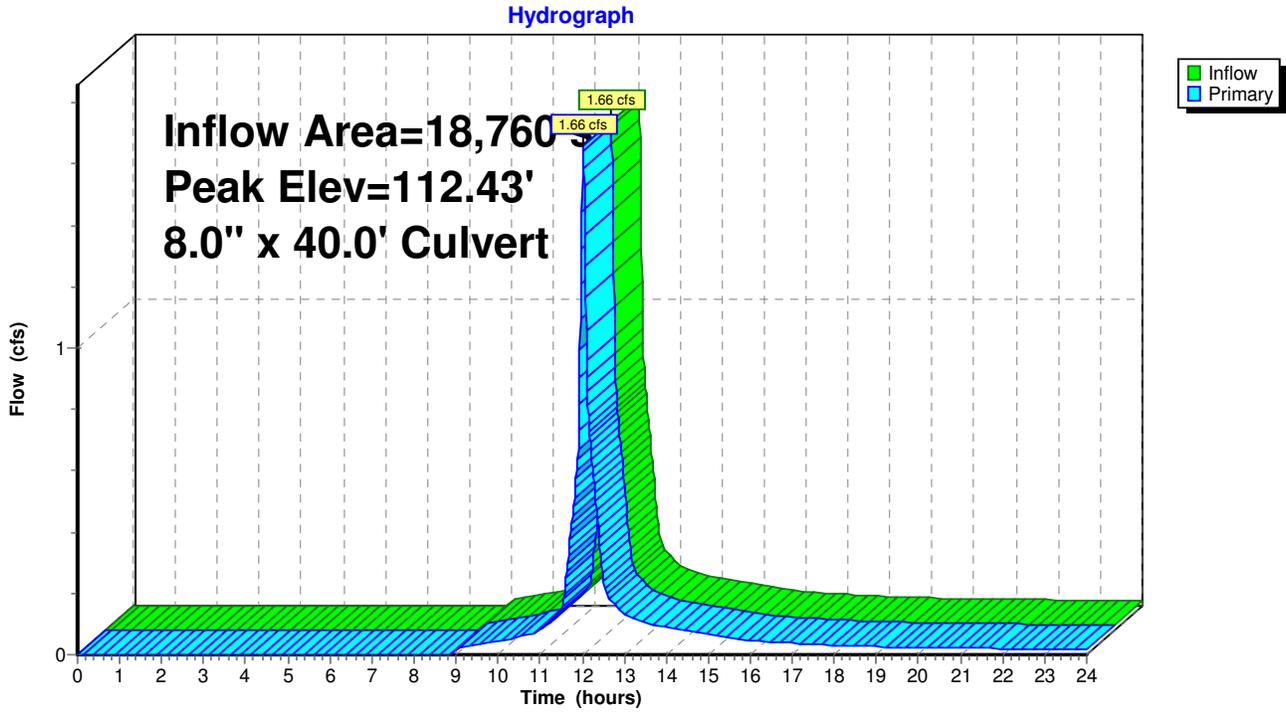
Inflow Area =	18,760 sf,	Inflow Depth >	2.97"	for	10-Year event
Inflow =	1.66 cfs @	12.02 hrs,	Volume=	4,644 cf	
Outflow =	1.66 cfs @	12.02 hrs,	Volume=	4,644 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.66 cfs @	12.02 hrs,	Volume=	4,644 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 112.43' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	111.12'	8.0" x 40.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 109.92' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.65 cfs @ 12.02 hrs HW=112.42' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.65 cfs @ 4.74 fps)

Pond 119R: Culvert under Unit 4 Drive



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 121P: RG 6A - CB 120 Under Drive Unit 4

Inflow Area = 18,760 sf, Inflow Depth > 3.00" for 10-Year event
 Inflow = 1.66 cfs @ 12.01 hrs, Volume= 4,687 cf
 Outflow = 1.66 cfs @ 12.02 hrs, Volume= 4,644 cf, Atten= 0%, Lag= 0.2 min
 Primary = 1.66 cfs @ 12.02 hrs, Volume= 4,644 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 112.28' @ 12.02 hrs Surf.Area= 101 sf Storage= 58 cf

Plug-Flow detention time= 8.7 min calculated for 4,642 cf (99% of inflow)
 Center-of-Mass det. time= 3.1 min (809.5 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	111.62'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.62	0	0	0
111.63	75	0	0
112.12	96	42	42
113.12	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	112.12'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.12'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

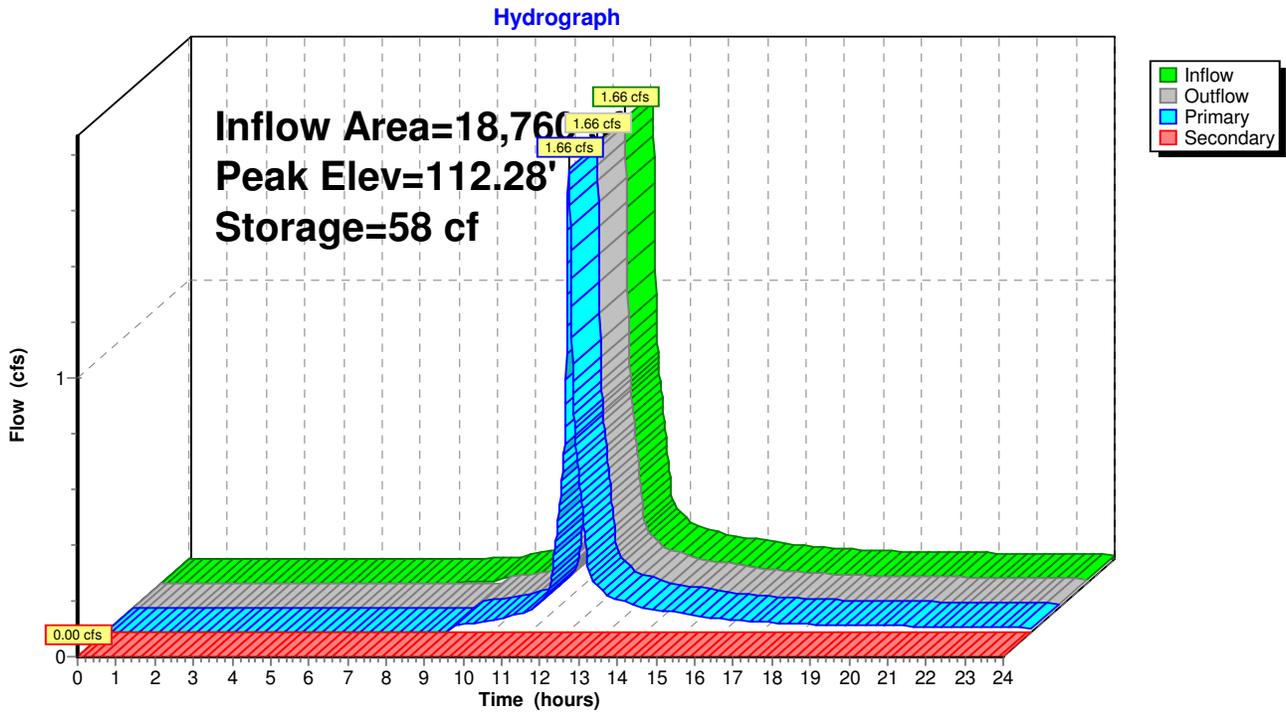
Primary OutFlow Max=1.65 cfs @ 12.02 hrs HW=112.28' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 1.65 cfs @ 1.30 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=111.62' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 121P: RG 6A - CB 120 Under Drive Unit 4



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 128P: RG 2A - CB 122 RG Unit 3

Inflow Area = 13,016 sf, Inflow Depth > 4.07" for 10-Year event
 Inflow = 1.66 cfs @ 12.02 hrs, Volume= 4,414 cf
 Outflow = 1.66 cfs @ 12.02 hrs, Volume= 4,371 cf, Atten= 0%, Lag= 0.1 min
 Primary = 1.66 cfs @ 12.02 hrs, Volume= 4,371 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 113.16' @ 12.02 hrs Surf.Area= 106 sf Storage= 58 cf

Plug-Flow detention time= 8.2 min calculated for 4,371 cf (99% of inflow)
 Center-of-Mass det. time= 2.4 min (826.8 - 824.4)

Volume	Invert	Avail.Storage	Storage Description
#1	112.50'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.50	0	0	0
112.51	75	0	0
113.00	96	42	42
113.50	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.50'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

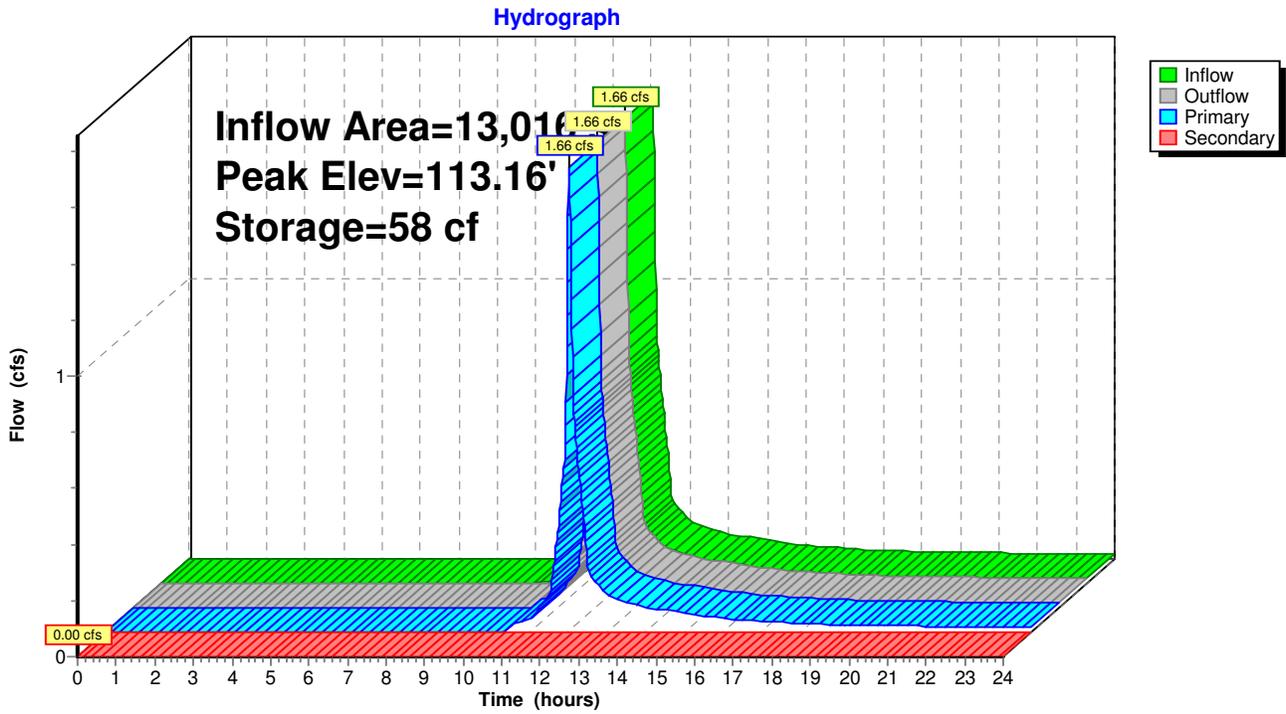
Primary OutFlow Max=1.65 cfs @ 12.02 hrs HW=113.16' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 1.65 cfs @ 1.30 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 128P: RG 2A - CB 122 RG Unit 3



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20

This rain garden is a level spreader and is intended to overtop with secondary flow to 130R. Flow continues via secondary (red). Routing adjusted to Max = 3. Warning message acceptable.

- [93] Warning: Storage range exceeded by 0.29'
- [88] Warning: Qout>Qin may require Finer Routing>1
- [85] Warning: Oscillations may require Finer Routing>1
- [61] Hint: Submerged 27% of Reach 129R bottom

Inflow Area = 7,500 sf, Inflow Depth > 3.10" for 10-Year event
 Inflow = 0.75 cfs @ 12.01 hrs, Volume= 1,937 cf
 Outflow = 0.76 cfs @ 12.01 hrs, Volume= 1,839 cf, Atten= 0%, Lag= 0.0 min
 Secondary = 0.76 cfs @ 12.01 hrs, Volume= 1,839 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 115.04' @ 12.01 hrs Surf.Area= 126 sf Storage= 98 cf

Plug-Flow detention time= 41.9 min calculated for 1,838 cf (95% of inflow)
 Center-of-Mass det. time= 14.0 min (814.1 - 800.1)

Volume	Invert	Avail.Storage	Storage Description
#1	113.75'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

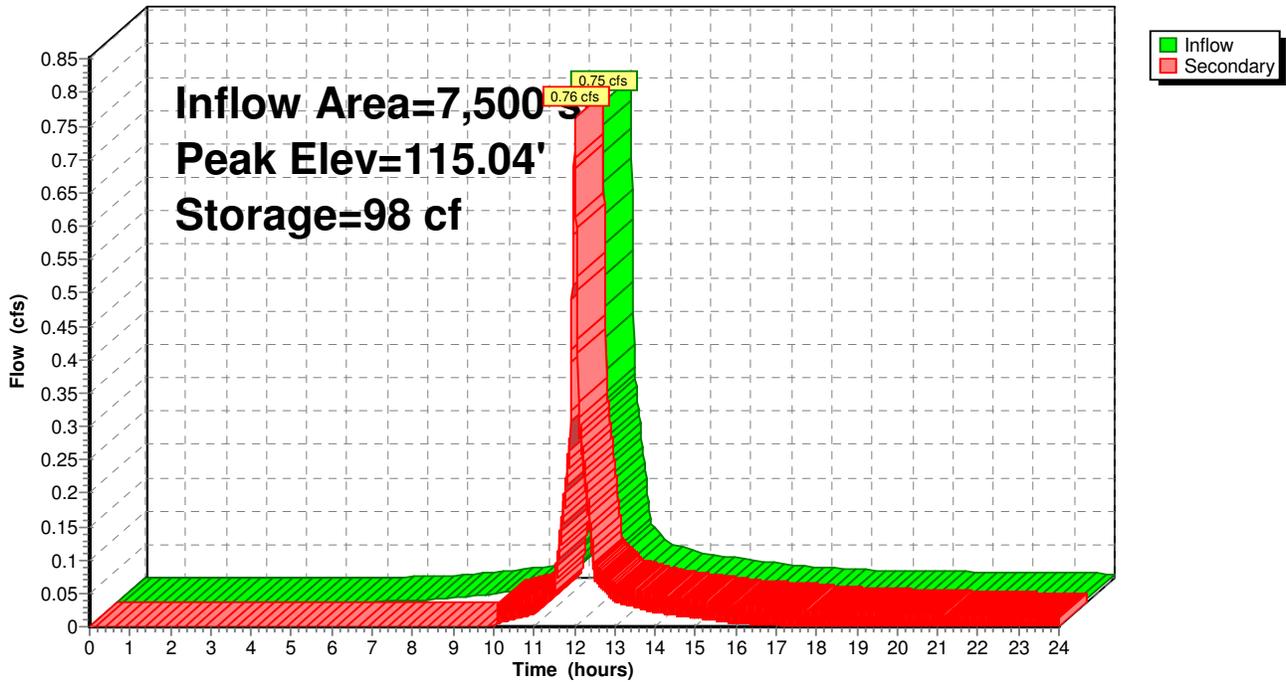
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
113.75	0	0	0
113.76	75	0	0
114.25	96	42	42
114.75	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Secondary	114.75'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Secondary OutFlow Max=0.76 cfs @ 12.01 hrs HW=115.04' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.76 cfs @ 1.31 fps)

Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20

Hydrograph



Postdevelopment10c

Type III 24-hr 10-Year Rainfall=4.50"

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Pond 133P: Large RG 4C at Unit 20

Inflow Area = 6,950 sf, Inflow Depth > 2.73" for 10-Year event
 Inflow = 0.62 cfs @ 12.01 hrs, Volume= 1,579 cf
 Outflow = 0.61 cfs @ 12.01 hrs, Volume= 1,459 cf, Atten= 2%, Lag= 0.4 min
 Primary = 0.61 cfs @ 12.01 hrs, Volume= 1,459 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 116.93' @ 12.01 hrs Surf.Area= 293 sf Storage= 142 cf

Plug-Flow detention time= 56.7 min calculated for 1,459 cf (92% of inflow)
 Center-of-Mass det. time= 17.9 min (830.4 - 812.5)

Volume	Invert	Avail.Storage	Storage Description
#1	116.35'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.35	0	0	0
116.36	200	1	1
116.85	280	118	119
117.35	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	116.85'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	117.35'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

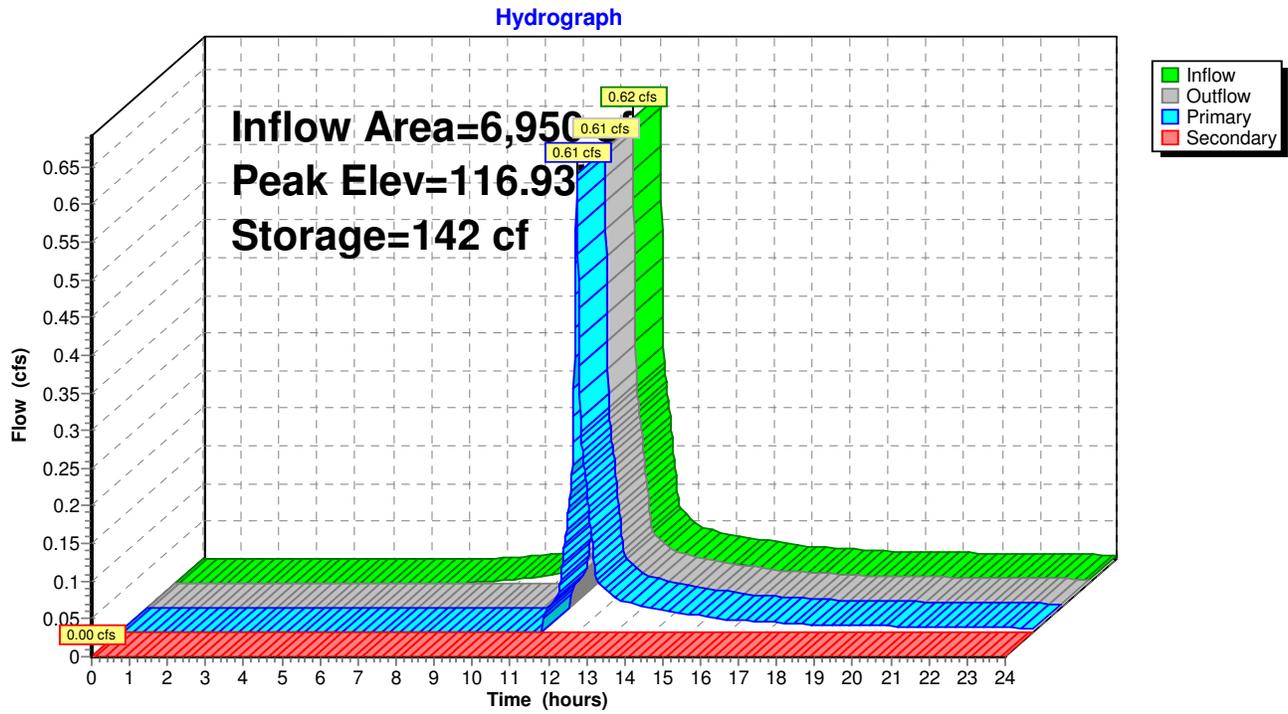
Primary OutFlow Max=0.60 cfs @ 12.01 hrs HW=116.93' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 0.60 cfs @ 0.93 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=116.35' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 133P: Large RG 4C at Unit 20



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 144R: HW 30 to DMH 14

[57] Hint: Peaked at 113.83' (Flood elevation advised)

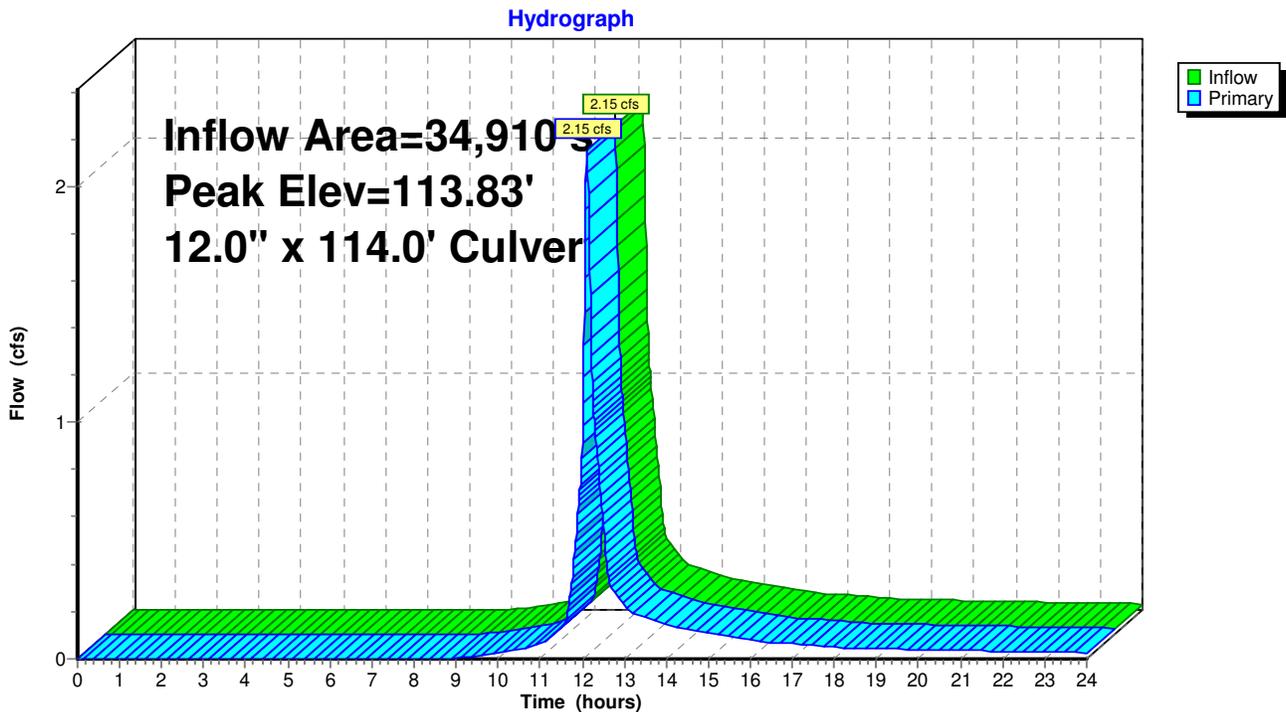
Inflow Area = 34,910 sf, Inflow Depth > 2.22" for 10-Year event
Inflow = 2.15 cfs @ 12.12 hrs, Volume= 6,460 cf
Outflow = 2.15 cfs @ 12.12 hrs, Volume= 6,460 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.15 cfs @ 12.12 hrs, Volume= 6,460 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 113.83' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	12.0" x 114.0' long Culvert Ke= 0.500 Outlet Invert= 103.88' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.15 cfs @ 12.12 hrs HW=113.83' (Free Discharge)
↑1=Culvert (Inlet Controls 2.15 cfs @ 3.10 fps)

Pond 144R: HW 30 to DMH 14



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 155P: RG 5A - CB 116 between Septic and Unit 4

Inflow Area = 21,810 sf, Inflow Depth > 3.03" for 10-Year event
 Inflow = 1.97 cfs @ 12.01 hrs, Volume= 5,507 cf
 Outflow = 1.96 cfs @ 12.02 hrs, Volume= 5,464 cf, Atten= 1%, Lag= 0.2 min
 Primary = 1.96 cfs @ 12.02 hrs, Volume= 5,464 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 109.18' @ 12.02 hrs Surf.Area= 101 sf Storage= 60 cf

Plug-Flow detention time= 7.5 min calculated for 5,464 cf (99% of inflow)
 Center-of-Mass det. time= 2.7 min (809.1 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	108.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.50	0	0	0
108.51	75	0	0
109.00	96	42	42
110.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	109.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	110.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

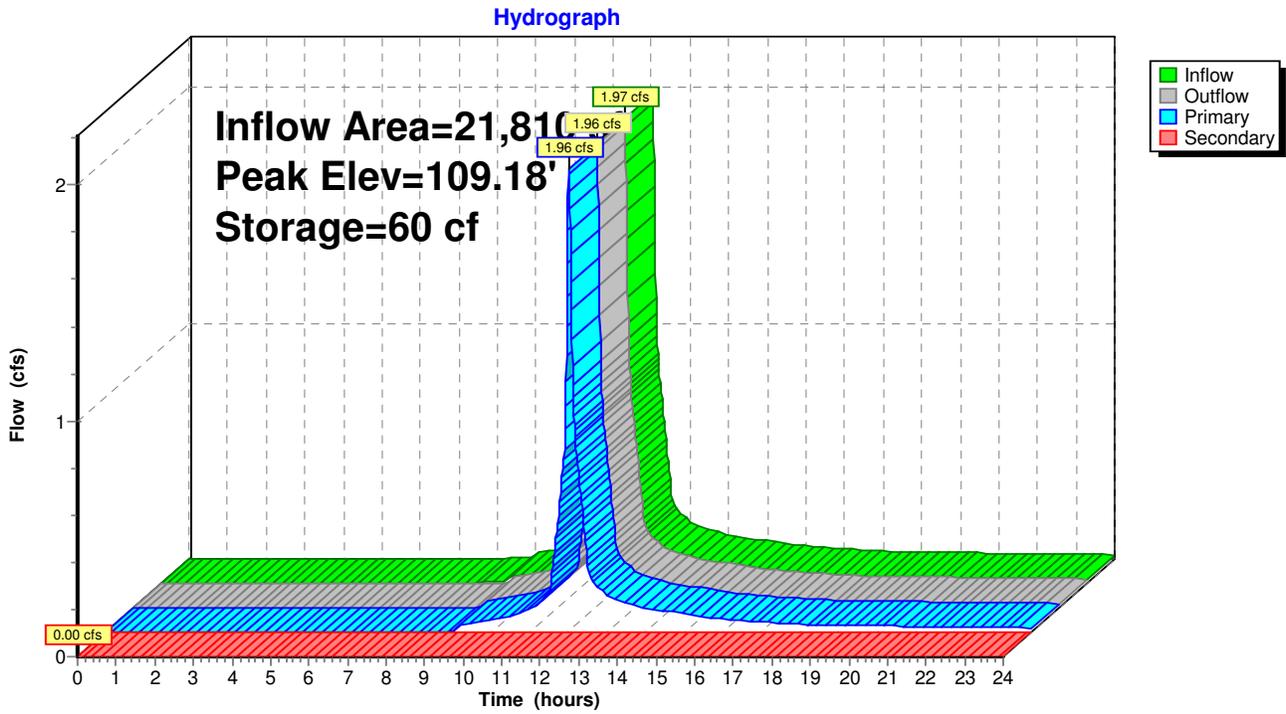
Primary OutFlow Max=1.96 cfs @ 12.02 hrs HW=109.18' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 1.96 cfs @ 1.38 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 155P: RG 5A - CB 116 between Septic and Unit 4



Pond 156R: Culvert under Unit 5 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 115.09' (Flood elevation advised)

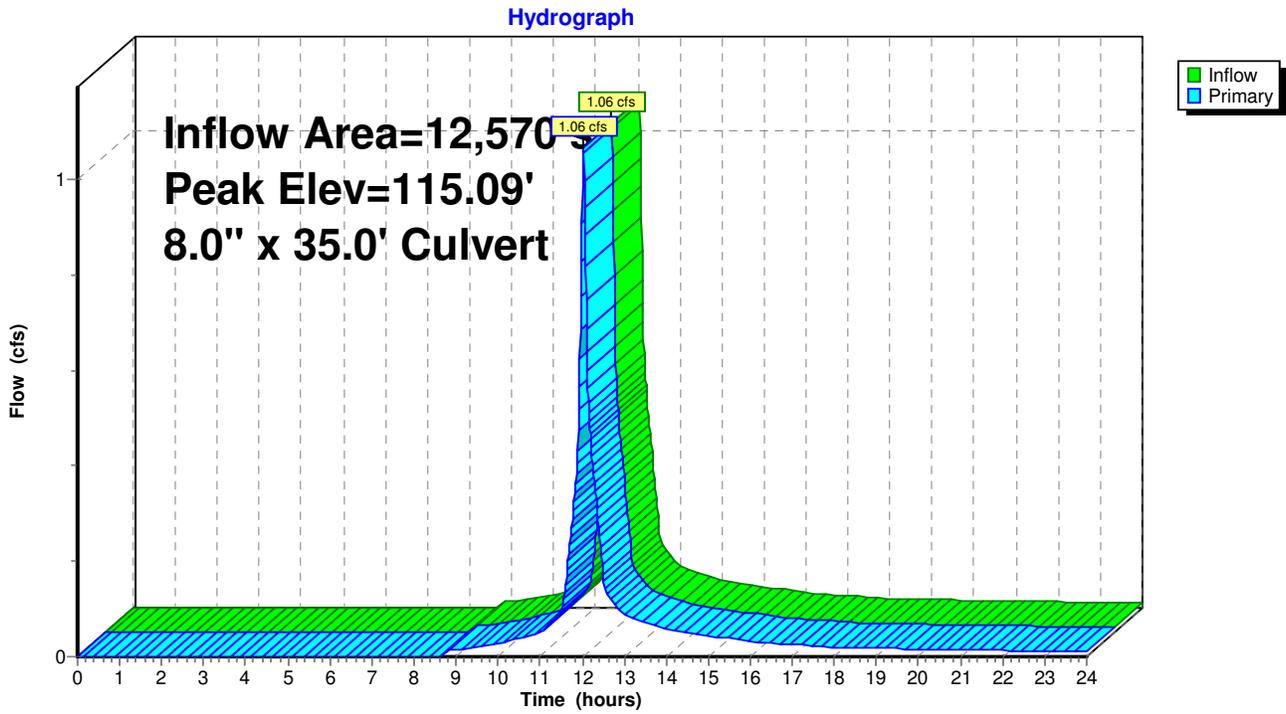
Inflow Area =	12,570 sf,	Inflow Depth >	2.95"	for	10-Year event
Inflow =	1.06 cfs @	12.03 hrs,	Volume=	3,089 cf	
Outflow =	1.06 cfs @	12.03 hrs,	Volume=	3,089 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.06 cfs @	12.03 hrs,	Volume=	3,089 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 115.09' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	114.35'	8.0" x 35.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 114.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.06 cfs @ 12.03 hrs HW=115.09' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.06 cfs @ 3.42 fps)

Pond 156R: Culvert under Unit 5 Drive



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 157P: RG 7A - CB 126 Under Drive Unit 5

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[61] Hint: Submerged 39% of Reach 154R bottom

Inflow Area =	12,570 sf,	Inflow Depth > 2.99"	for 10-Year event
Inflow =	1.06 cfs @ 12.03 hrs,	Volume=	3,131 cf
Outflow =	1.06 cfs @ 12.03 hrs,	Volume=	3,089 cf, Atten= 0%, Lag= 0.1 min
Primary =	1.06 cfs @ 12.03 hrs,	Volume=	3,089 cf
Secondary =	0.00 cfs @ 0.00 hrs,	Volume=	0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 115.47' @ 12.03 hrs Surf.Area= 103 sf Storage= 54 cf

Plug-Flow detention time= 13.1 min calculated for 3,089 cf (99% of inflow)
Center-of-Mass det. time= 4.8 min (809.6 - 804.8)

Volume #1	Invert 114.85'	Avail.Storage 98 cf	Storage Description Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
114.85	0	0	0	
114.86	75	0	0	
115.35	96	42	42	
115.85	126	56	98	

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Type III 24-hr 10-Year Rainfall=4.50"

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Device	Routing	Invert	Outlet Devices
#1	Primary	115.35'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	115.85'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

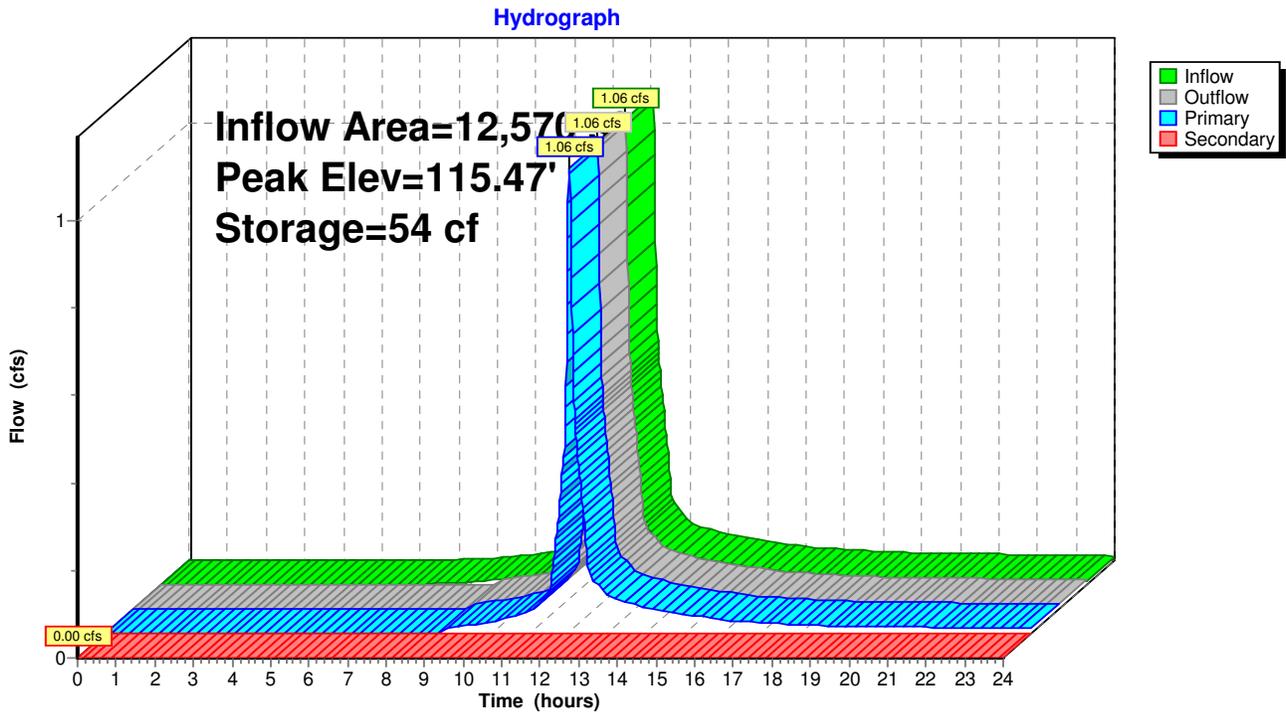
Primary OutFlow Max=1.06 cfs @ 12.03 hrs HW=115.47' (Free Discharge)

←1=Orifice/Grate (Weir Controls 1.06 cfs @ 1.12 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=114.85' (Free Discharge)

←2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 157P: RG 7A - CB 126 Under Drive Unit 5



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 158P: Culvert under Drive Unit 6

[57] Hint: Peaked at 116.50' (Flood elevation advised)

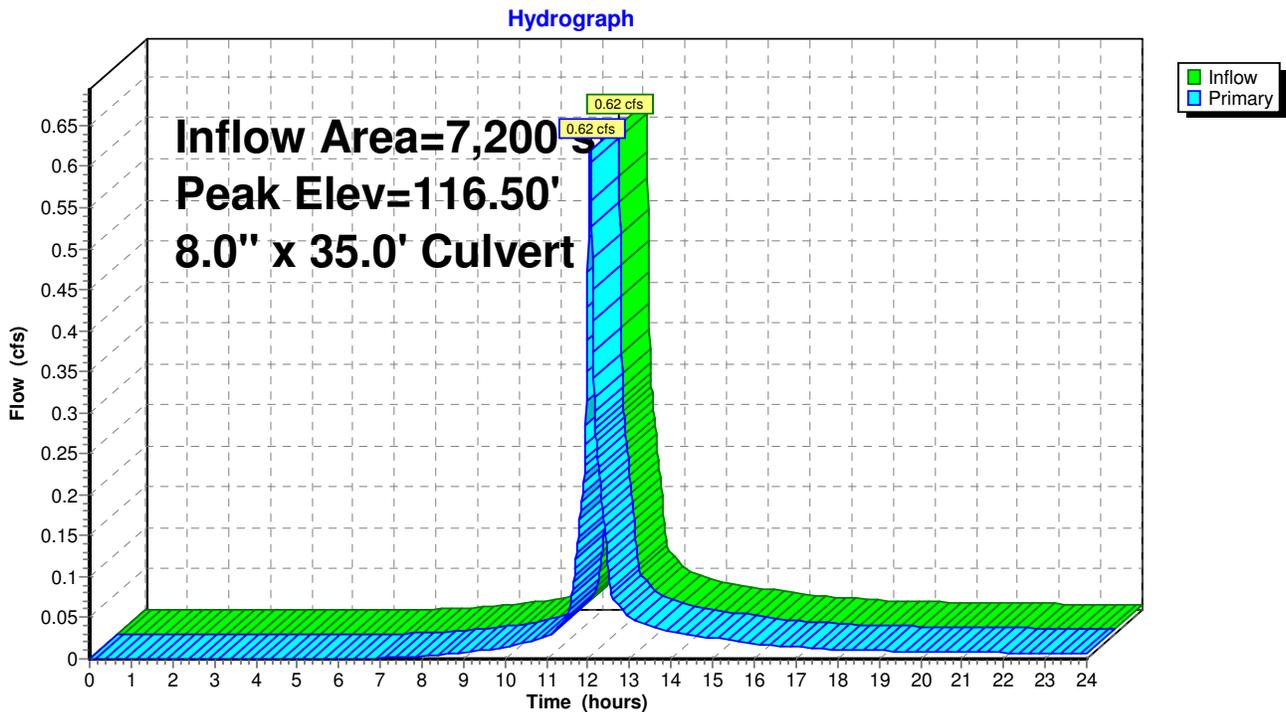
Inflow Area = 7,200 sf, Inflow Depth > 2.91" for 10-Year event
Inflow = 0.62 cfs @ 12.05 hrs, Volume= 1,745 cf
Outflow = 0.62 cfs @ 12.05 hrs, Volume= 1,745 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 12.05 hrs, Volume= 1,745 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 116.50' @ 12.05 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	116.00'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 115.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.62 cfs @ 12.05 hrs HW=116.50' (Free Discharge)
↑1=Culvert (Barrel Controls 0.62 cfs @ 3.08 fps)

Pond 158P: Culvert under Drive Unit 6



Pond 218R: DMH 50 to Irrigation Cistern

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[57] Hint: Peaked at 103.34' (Flood elevation advised)

[63] Warning: Exceeded Reach 55R inflow depth by 0.36' @ 12.11 hrs

[63] Warning: Exceeded Reach 403R inflow depth by 0.73' @ 12.09 hrs

Inflow Area =	111,470 sf,	Inflow Depth > 2.52"	for 10-Year event
Inflow =	6.35 cfs @ 12.10 hrs,	Volume=	23,455 cf
Outflow =	6.35 cfs @ 12.10 hrs,	Volume=	23,455 cf, Atten= 0%, Lag= 0.0 min
Primary =	6.35 cfs @ 12.10 hrs,	Volume=	23,455 cf

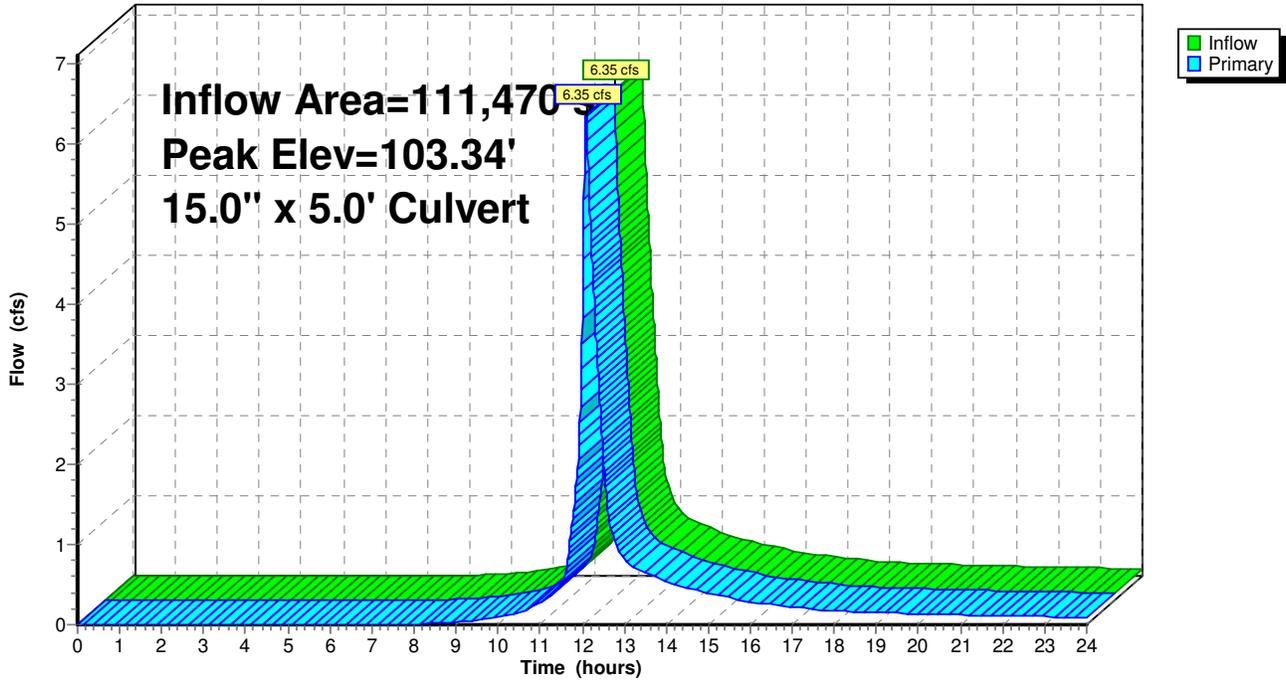
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.34' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	101.52'	15.0" x 5.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 101.42' S= 0.0200 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=6.35 cfs @ 12.10 hrs HW=103.34' (Free Discharge)
↑**1=Culvert** (Barrel Controls 6.35 cfs @ 5.17 fps)

Pond 218R: DMH 50 to Irrigation Cistern

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)
 Center-of-Mass det. time= (not calculated)

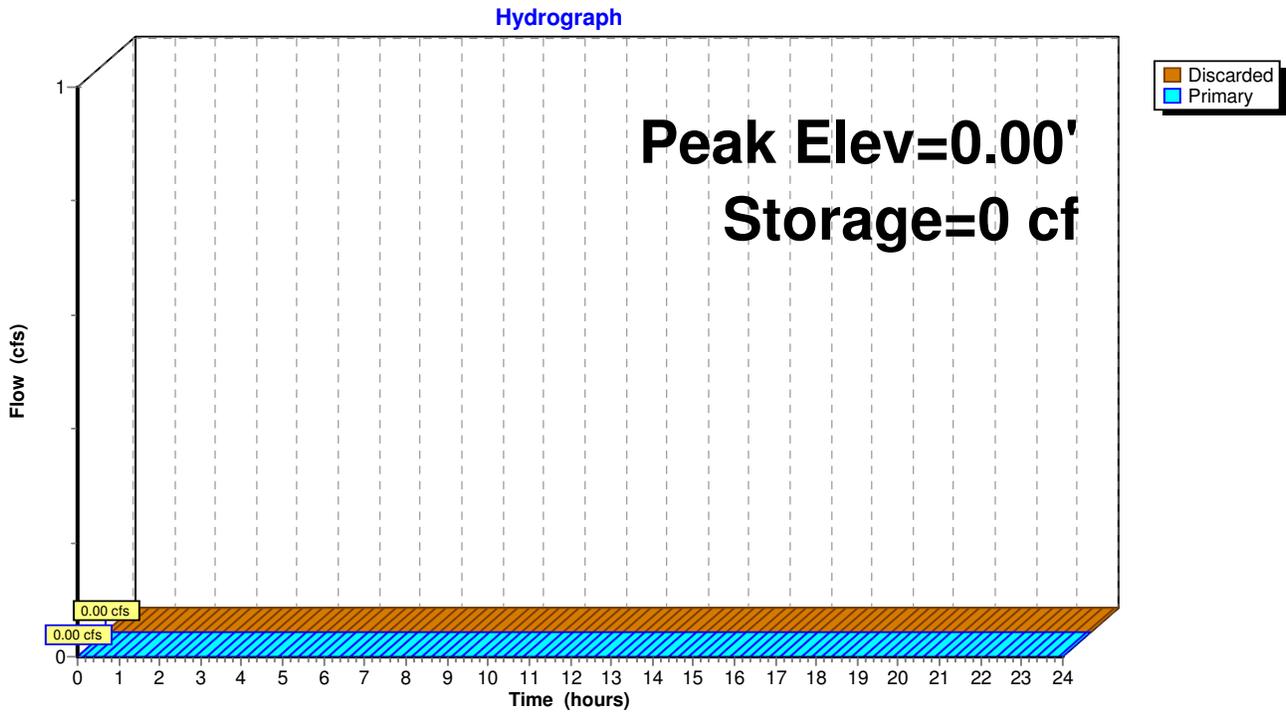
Volume	Invert	Avail.Storage	Storage Description
#1	110.49'	304 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
110.49	0	0	0
111.00	205	52	52
111.50	248	113	166
112.00	305	138	304

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.001 in/hr Exfiltration over Surface area
#2	Primary	111.50'	8.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

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

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING



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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)

Center-of-Mass det. time= (not calculated)

Volume	Invert	Avail.Storage	Storage Description
#1	101.42'	4,292 cf	11.50'W x 40.00'L x 9.33'H Prisma

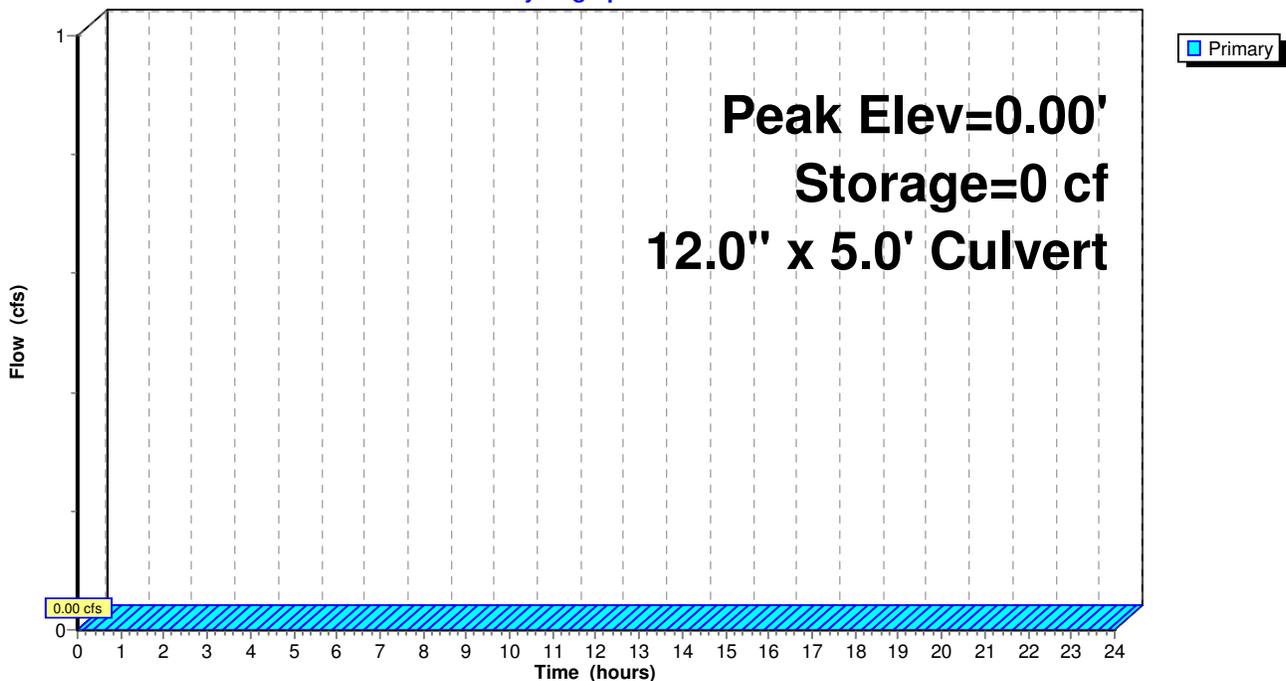
Device	Routing	Invert	Outlet Devices
#1	Primary	101.32'	12.0" x 5.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.22' S= 0.0200 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)

←1=Culvert (Controls 0.00 cfs)

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Link A: POA A

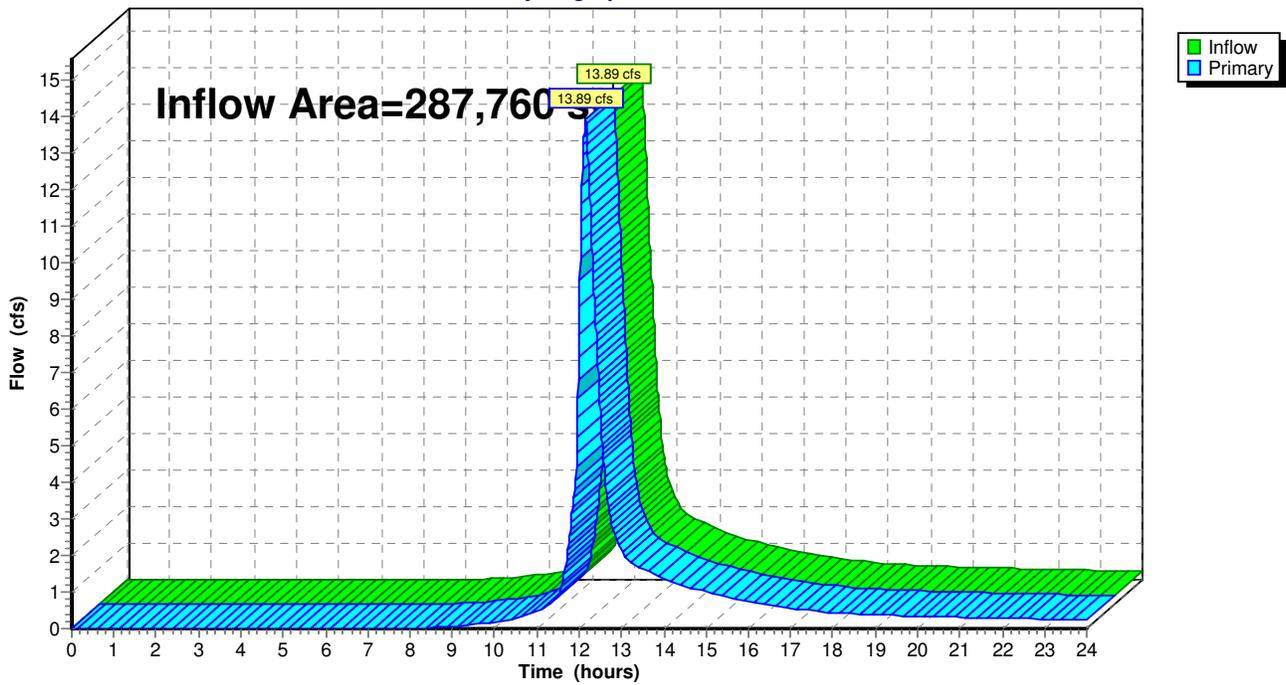
Inflow Area = 287,760 sf, Inflow Depth > 2.36" for 10-Year event
Inflow = 13.89 cfs @ 12.15 hrs, Volume= 56,693 cf
Primary = 13.89 cfs @ 12.15 hrs, Volume= 56,693 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

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

Subcatchment 54S: CB at Cul-de-Sac - Outside Runoff Area=20,970 sf Runoff Depth>3.35"
Flow Length=200' Tc=5.0 min CN=82 Runoff=1.95 cfs 5,847 cf

Subcatchment 56S: CB at Cul-de-Sac - Inside Runoff Area=8,660 sf Runoff Depth>3.64"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min CN=85 Runoff=0.85 cfs 2,629 cf

Subcatchment 60S: Runoff Area=4,640 sf Runoff Depth>4.06"
Flow Length=80' Tc=2.0 min CN=89 Runoff=0.57 cfs 1,569 cf

Subcatchment 62S: Large Area including 2 Septics Runoff Area=39,429 sf Runoff Depth>2.96"
Flow Length=260' Tc=11.2 min CN=78 Runoff=2.65 cfs 9,731 cf

Subcatchment 65S: Throat of Cul-de-sac u.g. Runoff Area=11,590 sf Runoff Depth>3.44"
Flow Length=180' Tc=9.4 min CN=83 Runoff=0.95 cfs 3,323 cf

Subcatchment 68S: From hill near 19,20 to Lawn CB Runoff Area=15,091 sf Runoff Depth>2.96"
Flow Length=190' Tc=6.2 min CN=78 Runoff=1.20 cfs 3,728 cf

Subcatchment 110S: To CB 20 Runoff Area=7,780 sf Runoff Depth>3.95"
Flow Length=100' Slope=0.0200 '/' Tc=0.6 min CN=88 Runoff=0.98 cfs 2,564 cf

Subcatchment 112S: To CB 22 Runoff Area=5,198 sf Runoff Depth>4.38"
Flow Length=60' Tc=0.3 min CN=92 Runoff=0.70 cfs 1,898 cf

Subcatchment 114S: Behind Units 1&2 Runoff Area=12,960 sf Runoff Depth>3.05"
Flow Length=130' Tc=11.4 min CN=79 Runoff=0.89 cfs 3,299 cf

Subcatchment 116S: Runoff Area=3,050 sf Runoff Depth>4.17"
Flow Length=70' Tc=0.3 min CN=90 Runoff=0.40 cfs 1,059 cf

Subcatchment 118S: Runoff Area=3,610 sf Runoff Depth>3.95"
Flow Length=50' Tc=0.2 min CN=88 Runoff=0.45 cfs 1,190 cf

Subcatchment 120S: Runoff Area=6,190 sf Runoff Depth>3.85"
Flow Length=90' Tc=0.5 min CN=87 Runoff=0.76 cfs 1,986 cf

Subcatchment 122S: Runoff Area=6,066 sf Runoff Depth>2.87"
Flow Length=100' Tc=3.6 min CN=77 Runoff=0.51 cfs 1,453 cf

Subcatchment 124S: Runoff Area=7,500 sf Runoff Depth>3.85"
Flow Length=80' Tc=0.5 min CN=87 Runoff=0.92 cfs 2,407 cf

Subcatchment 126S: Runoff Area=5,370 sf Runoff Depth>3.85"
Flow Length=60' Tc=0.3 min CN=87 Runoff=0.66 cfs 1,723 cf

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 128S:	Runoff Area=7,200 sf	Runoff Depth>3.64"
Flow Length=115'	Slope=0.0200 '/'	Tc=3.2 min CN=85 Runoff=0.77 cfs 2,187 cf
Subcatchment 130S:	Runoff Area=6,950 sf	Runoff Depth>3.45"
Flow Length=60'	Tc=0.3 min CN=83	Runoff=0.78 cfs 1,996 cf
Subcatchment 132S: Behind Unit 3	Runoff Area=26,270 sf	Runoff Depth>2.78"
Flow Length=130'	Tc=0.9 min CN=76	Runoff=2.36 cfs 6,095 cf
Subcatchment 134S: To Swale behind 7,6,5	Runoff Area=13,850 sf	Runoff Depth>3.06"
Flow Length=70'	Slope=0.0200 '/'	Tc=3.1 min CN=79 Runoff=1.27 cfs 3,532 cf
Subcatchment 136S: To Swale behind 4 to HW 30	Runoff Area=21,060 sf	Runoff Depth>2.78"
Flow Length=95'	Slope=0.0100 '/'	Tc=4.9 min CN=76 Runoff=1.64 cfs 4,882 cf
Subcatchment 138S: Rear of Units 10,11,12,13	Runoff Area=15,030 sf	Runoff Depth>3.34"
Flow Length=430'	Tc=12.3 min CN=82	Runoff=1.10 cfs 4,185 cf
Subcatchment 140S: Behind Units 14, 15, 16	Runoff Area=21,630 sf	Runoff Depth>2.87"
Flow Length=150'	Slope=0.0100 '/'	Tc=13.2 min CN=77 Runoff=1.33 cfs 5,170 cf
Subcatchment 214S:	Runoff Area=6,950 sf	Runoff Depth>3.95"
Flow Length=110'	Tc=2.8 min CN=88	Runoff=0.81 cfs 2,289 cf
Subcatchment 216S:	Runoff Area=4,140 sf	Runoff Depth>3.65"
	Tc=1.0 min CN=85	Runoff=0.48 cfs 1,258 cf
Subcatchment 900: North Offsite flowing onto property	Runoff Area=14,076 sf	Runoff Depth>2.25"
Flow Length=340'	Slope=0.0500 '/'	Tc=12.8 min CN=70 Runoff=0.68 cfs 2,645 cf
Reach 1R: Existing wetland channel to WF	Avg. Depth=0.30'	Max Vel=5.17 fps Inflow=10.36 cfs 37,944 cf
	n=0.022 L=300.0'	S=0.0333 '/' Capacity=82.44 cfs Outflow=10.33 cfs 37,893 cf
Reach 2R: Swale from Drive at #10 to Drive a	Avg. Depth=0.15'	Max Vel=3.69 fps Inflow=0.81 cfs 2,289 cf
	n=0.022 L=65.0'	S=0.0554 '/' Capacity=72.03 cfs Outflow=0.80 cfs 2,289 cf
Reach 55R: DMH 52 to DMH 50	Avg. Depth=0.60'	Max Vel=7.98 fps Inflow=3.95 cfs 11,795 cf
	D=12.0" n=0.013 L=32.0'	S=0.0269 '/' Capacity=5.84 cfs Outflow=3.94 cfs 11,794 cf
Reach 62R: DMH 64 to Bio-Retention A (HW	Avg. Depth=0.59'	Max Vel=5.94 fps Inflow=2.89 cfs 11,300 cf
	D=12.0" n=0.013 L=12.0'	S=0.0150 '/' Capacity=4.36 cfs Outflow=2.89 cfs 11,300 cf
Reach 64R: Swale from Drive at #12 to RG 10A	Avg. Depth=0.00'	Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
	n=0.022 L=10.0'	S=0.0350 '/' Capacity=57.26 cfs Outflow=0.00 cfs 0 cf
Reach 67R: Culvert under Unit 12 Drive	Avg. Depth=0.40'	Max Vel=3.70 fps Inflow=0.80 cfs 2,183 cf
	D=8.0" n=0.013 L=35.0'	S=0.0100 '/' Capacity=1.21 cfs Outflow=0.80 cfs 2,182 cf
Reach 68R: Underdrain to CB 66	Avg. Depth=0.46'	Max Vel=9.48 fps Inflow=2.45 cfs 11,125 cf
	D=8.0" n=0.013 L=15.0'	S=0.0600 '/' Capacity=2.96 cfs Outflow=2.45 cfs 11,125 cf

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Reach 69R: Drain to DMH 52 Avg. Depth=0.41' Max Vel=5.28 fps Inflow=1.19 cfs 3,320 cf
D=8.0" n=0.013 L=38.0' S=0.0200 '/' Capacity=1.71 cfs Outflow=1.18 cfs 3,320 cf

Reach 114R: DMH 16 to DMH 14 Avg. Depth=0.44' Max Vel=4.96 fps Inflow=1.67 cfs 4,462 cf
D=12.0" n=0.013 L=60.0' S=0.0133 '/' Capacity=4.11 cfs Outflow=1.65 cfs 4,461 cf

Reach 118R: Swale from Drive at #4 to RG 11 Avg. Depth=0.28' Max Vel=4.08 fps Inflow=2.05 cfs 5,810 cf
n=0.022 L=10.0' S=0.0350 '/' Capacity=57.26 cfs Outflow=2.05 cfs 5,810 cf

Reach 127R: Swale from Drive at #3 to RG 11 Avg. Depth=0.34' Max Vel=3.01 fps Inflow=2.08 cfs 5,594 cf
n=0.022 L=10.0' S=0.0150 '/' Capacity=37.49 cfs Outflow=2.08 cfs 5,593 cf

Reach 128R: Culvert under Unit 3 Drive Avg. Depth=0.44' Max Vel=8.54 fps Inflow=2.09 cfs 5,594 cf
D=8.0" n=0.013 L=40.0' S=0.0500 '/' Capacity=2.70 cfs Outflow=2.08 cfs 5,594 cf

Reach 129R: Swale from Drive at #20 to RG 124 Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.022 L=10.0' S=0.0450 '/' Capacity=64.93 cfs Outflow=0.00 cfs 0 cf

Reach 130R: Swale to RG 122 Avg. Depth=0.25' Max Vel=3.85 fps Inflow=1.67 cfs 4,185 cf
n=0.022 L=30.0' S=0.0350 '/' Capacity=57.26 cfs Outflow=1.65 cfs 4,184 cf

Reach 131R: Culvert under Unit 20 Drive Avg. Depth=0.38' Max Vel=3.66 fps Inflow=0.77 cfs 1,877 cf
D=8.0" n=0.013 L=48.0' S=0.0100 '/' Capacity=1.21 cfs Outflow=0.76 cfs 1,877 cf

Reach 137R: Swale Back of 7,6,5 Avg. Depth=0.19' Max Vel=1.78 fps Inflow=1.27 cfs 3,532 cf
n=0.030 L=140.0' S=0.0143 '/' Capacity=26.48 cfs Outflow=1.23 cfs 3,525 cf

Reach 138R: Swale Back of 4 Avg. Depth=0.41' Max Vel=2.15 fps Inflow=2.87 cfs 8,408 cf
n=0.030 L=140.0' S=0.0100 '/' Capacity=17.63 cfs Outflow=2.82 cfs 8,397 cf

Reach 149R: DMH 14 to DMH 12 Avg. Depth=0.86' Max Vel=7.67 fps Inflow=8.05 cfs 26,431 cf
D=18.0" n=0.013 L=95.0' S=0.0149 '/' Capacity=12.84 cfs Outflow=8.04 cfs 26,426 cf

Reach 150R: DMH 12 to HW 10 - Outlet Avg. Depth=0.86' Max Vel=7.70 fps Inflow=8.04 cfs 26,426 cf
D=18.0" n=0.013 L=55.0' S=0.0151 '/' Capacity=12.90 cfs Outflow=8.03 cfs 26,423 cf

Reach 153R: CB 116 to DMH 14 Avg. Depth=0.46' Max Vel=9.46 fps Inflow=2.42 cfs 6,826 cf
D=8.0" n=0.013 L=28.0' S=0.0600 '/' Capacity=2.96 cfs Outflow=2.42 cfs 6,826 cf

Reach 154R: Swale from Drive at #6 to RG 126 Avg. Depth=0.00' Max Vel=0.00 fps
n=0.022 L=33.0' S=0.0091 '/' Capacity=29.18 cfs Outflow=0.00 cfs 0 cf

Reach 155R: Swale from Drive at #5 to RG 120 Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.022 L=50.0' S=0.0200 '/' Capacity=43.29 cfs Outflow=0.00 cfs 0 cf

Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland Inflow=8.03 cfs 26,423 cf
Outflow=8.03 cfs 26,423 cf

Reach 220R: CB 56 to DMH 52 Avg. Depth=0.33' Max Vel=3.72 fps Inflow=0.85 cfs 2,629 cf
D=12.0" n=0.013 L=14.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=0.85 cfs 2,629 cf

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Reach 222R: CB 54 to DMH 52 Avg. Depth=0.53' Max Vel=4.64 fps Inflow=1.95 cfs 5,847 cf
D=12.0" n=0.013 L=22.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=1.95 cfs 5,846 cf

Reach 403R: CB 65 to DMH 50 Avg. Depth=0.49' Max Vel=6.37 fps Inflow=2.45 cfs 11,125 cf
D=12.0" n=0.013 L=30.0' S=0.0200 '/' Capacity=5.04 cfs Outflow=2.45 cfs 11,124 cf

Reach 902R: Existing wetland channel to Avg. Depth=0.32' Max Vel=5.81 fps Inflow=12.16 cfs 47,287 cf
n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=12.15 cfs 47,269 cf

Pond 2P: Recharge System Peak Elev=104.73' Storage=4,672 cf Inflow=7.95 cfs 29,970 cf
Discarded=0.01 cfs 471 cf Primary=7.43 cfs 25,945 cf Secondary=0.00 cfs 0 cf Outflow=7.44 cfs 26,415 cf

Pond 3P: Culvert under Drive Unit 10 Peak Elev=114.87' Inflow=0.81 cfs 2,289 cf
8.0" x 35.0' Culvert Outflow=0.81 cfs 2,289 cf

Pond 4P: Culvert under Drive Unit 11 Peak Elev=110.91' Inflow=0.80 cfs 2,289 cf
8.0" x 35.0' Culvert Outflow=0.80 cfs 2,289 cf

Pond 8P: Main Cell - Bio Retention Peak Elev=111.63' Storage=1,190 cf Inflow=2.89 cfs 11,300 cf
Primary=2.45 cfs 11,125 cf Secondary=0.00 cfs 0 cf Outflow=2.45 cfs 11,125 cf

Pond 9P: CB 65 Peak Elev=108.31' Inflow=2.10 cfs 7,052 cf
12.0" x 126.0' Culvert Outflow=2.10 cfs 7,052 cf

Pond 43R: CB 60 to DMH 64 Peak Elev=111.44' Inflow=0.57 cfs 1,569 cf
12.0" x 12.0' Culvert Outflow=0.57 cfs 1,569 cf

Pond 61R: CB 62 to DMH 64 Peak Elev=112.20' Inflow=2.65 cfs 9,731 cf
12.0" x 24.0' Culvert Outflow=2.65 cfs 9,731 cf

Pond 66P: RG 9A at Units 11/12 - CB 214 Peak Elev=107.68' Storage=128 cf Inflow=0.80 cfs 2,289 cf
Primary=0.80 cfs 2,183 cf Secondary=0.00 cfs 0 cf Outflow=0.80 cfs 2,183 cf

Pond 67P: CB 66 (emergency vertical release) Peak Elev=106.53' Inflow=2.45 cfs 11,125 cf
Primary=2.45 cfs 11,125 cf Secondary=0.00 cfs 0 cf Outflow=2.45 cfs 11,125 cf

Pond 70P: RG 10A - CB 216 at Units 13 Peak Elev=104.78' Storage=155 cf Inflow=1.19 cfs 3,440 cf
Primary=1.19 cfs 3,320 cf Secondary=0.00 cfs 0 cf Outflow=1.19 cfs 3,320 cf

Pond 111P: CB 20 Peak Elev=104.31' Inflow=0.98 cfs 2,564 cf
12.0" x 16.0' Culvert Outflow=0.98 cfs 2,564 cf

Pond 112P: CB 22 Peak Elev=104.26' Inflow=0.70 cfs 1,898 cf
12.0" x 22.0' Culvert Outflow=0.70 cfs 1,898 cf

Pond 119P: RG - 1A - CB 118 to DMH 14 Peak Elev=110.18' Storage=60 cf Inflow=2.49 cfs 6,783 cf
Primary=2.48 cfs 6,747 cf Secondary=0.00 cfs 0 cf Outflow=2.48 cfs 6,747 cf

Pond 119R: Culvert under Unit 4 Drive Peak Elev=112.94' Inflow=2.05 cfs 5,810 cf
8.0" x 40.0' Culvert Outflow=2.05 cfs 5,810 cf

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Pond 121P: RG 6A - CB 120 Under Drive Unit 4 Peak Elev=112.30' Storage=60 cf Inflow=2.06 cfs 5,853 cf
 Primary=2.05 cfs 5,810 cf Secondary=0.00 cfs 0 cf Outflow=2.05 cfs 5,810 cf

Pond 128P: RG 2A - CB 122 RG Unit 3 Peak Elev=113.19' Storage=61 cf Inflow=2.09 cfs 5,637 cf
 Primary=2.09 cfs 5,594 cf Secondary=0.00 cfs 0 cf Outflow=2.09 cfs 5,594 cf

Pond 132P: RG 3B - CB 124 Rain Garden - Unit Peak Elev=115.08' Storage=98 cf Inflow=0.92 cfs 2,407 cf
 Outflow=0.93 cfs 2,308 cf

Pond 133P: Large RG 4C at Unit 20 Peak Elev=116.94' Storage=146 cf Inflow=0.78 cfs 1,996 cf
 Primary=0.77 cfs 1,877 cf Secondary=0.00 cfs 0 cf Outflow=0.77 cfs 1,877 cf

Pond 144R: HW 30 to DMH 14 Peak Elev=114.06' Inflow=2.82 cfs 8,397 cf
 12.0" x 114.0' Culvert Outflow=2.82 cfs 8,397 cf

Pond 155P: RG 5A - CB 116 between Septic an Peak Elev=109.20' Storage=63 cf Inflow=2.44 cfs 6,869 cf
 Primary=2.42 cfs 6,826 cf Secondary=0.00 cfs 0 cf Outflow=2.42 cfs 6,826 cf

Pond 156R: Culvert under Unit 5 Drive Peak Elev=115.42' Inflow=1.32 cfs 3,867 cf
 8.0" x 35.0' Culvert Outflow=1.32 cfs 3,867 cf

Pond 157P: RG 7A - CB 126 Under Drive Unit 5 Peak Elev=115.49' Storage=56 cf Inflow=1.32 cfs 3,910 cf
 Primary=1.32 cfs 3,867 cf Secondary=0.00 cfs 0 cf Outflow=1.32 cfs 3,867 cf

Pond 158P: Culvert under Drive Unit 6 Peak Elev=116.58' Inflow=0.77 cfs 2,187 cf
 8.0" x 35.0' Culvert Outflow=0.77 cfs 2,187 cf

Pond 218R: DMH 50 to Irrigation Cistern Peak Elev=103.95' Inflow=7.95 cfs 29,970 cf
 15.0" x 5.0' Culvert Outflow=7.95 cfs 29,970 cf

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
 Discarded=0.00 cfs 0 cf Primary=0.00 cfs 0 cf

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
 12.0" x 5.0' Culvert Primary=0.00 cfs 0 cf

Link A: POA A Inflow=17.68 cfs 73,692 cf
 Primary=17.68 cfs 73,692 cf

Total Runoff Area = 295,260 sf Runoff Volume = 78,645 cf Average Runoff Depth = 3.20"
72.54% Pervious Area = 214,190 sf 27.46% Impervious Area = 81,070 sf

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 54S: CB at Cul-de-Sac - Outside

Runoff = 1.95 cfs @ 12.07 hrs, Volume= 5,847 cf, Depth> 3.35"

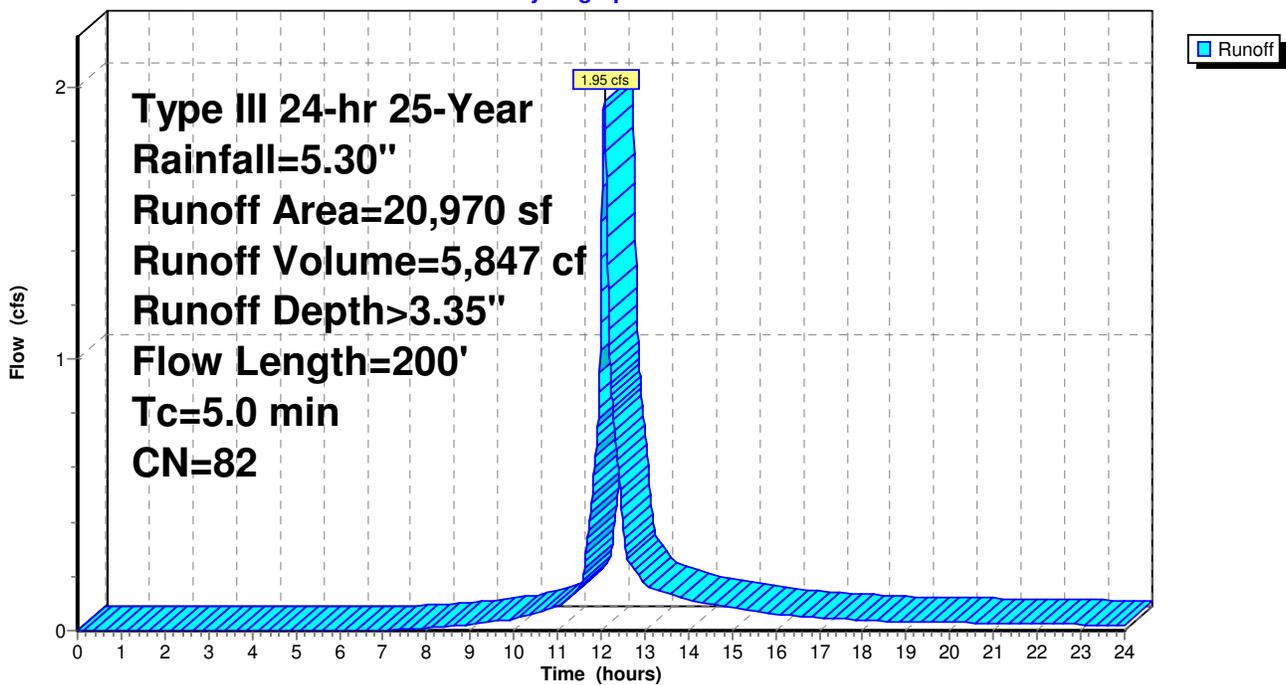
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,100	98	Paved parking & roofs
2,724	98	Paved parking & roofs
14,146	74	>75% Grass cover, Good, HSG C
20,970	82	Weighted Average
14,146		Pervious Area
6,824		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.1	20	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	150	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.0	200	Total			

Subcatchment 54S: CB at Cul-de-Sac - Outside

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 56S: CB at Cul-de-Sac - Inside

Runoff = 0.85 cfs @ 12.08 hrs, Volume= 2,629 cf, Depth> 3.64"

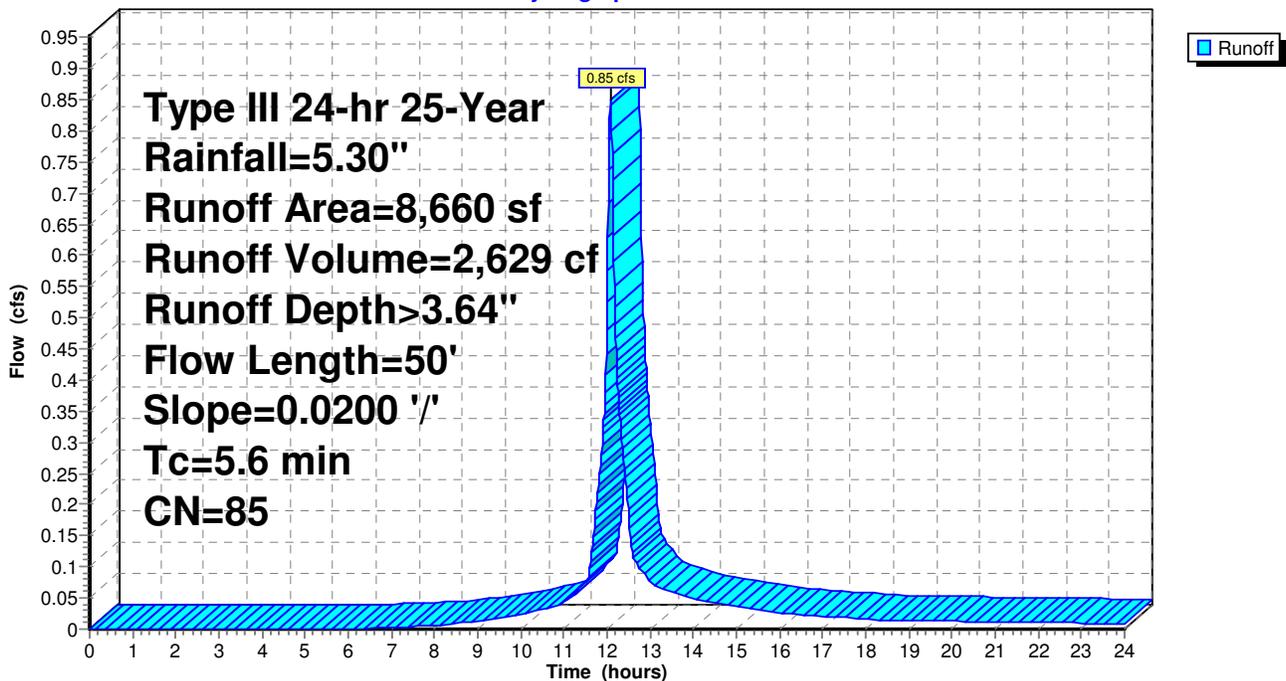
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
0	98	Paved parking & roofs
3,847	98	Paved parking & roofs
4,813	74	>75% Grass cover, Good, HSG C
8,660	85	Weighted Average
4,813		Pervious Area
3,847		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"

Subcatchment 56S: CB at Cul-de-Sac - Inside

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 60S:

Runoff = 0.57 cfs @ 12.03 hrs, Volume= 1,569 cf, Depth> 4.06"

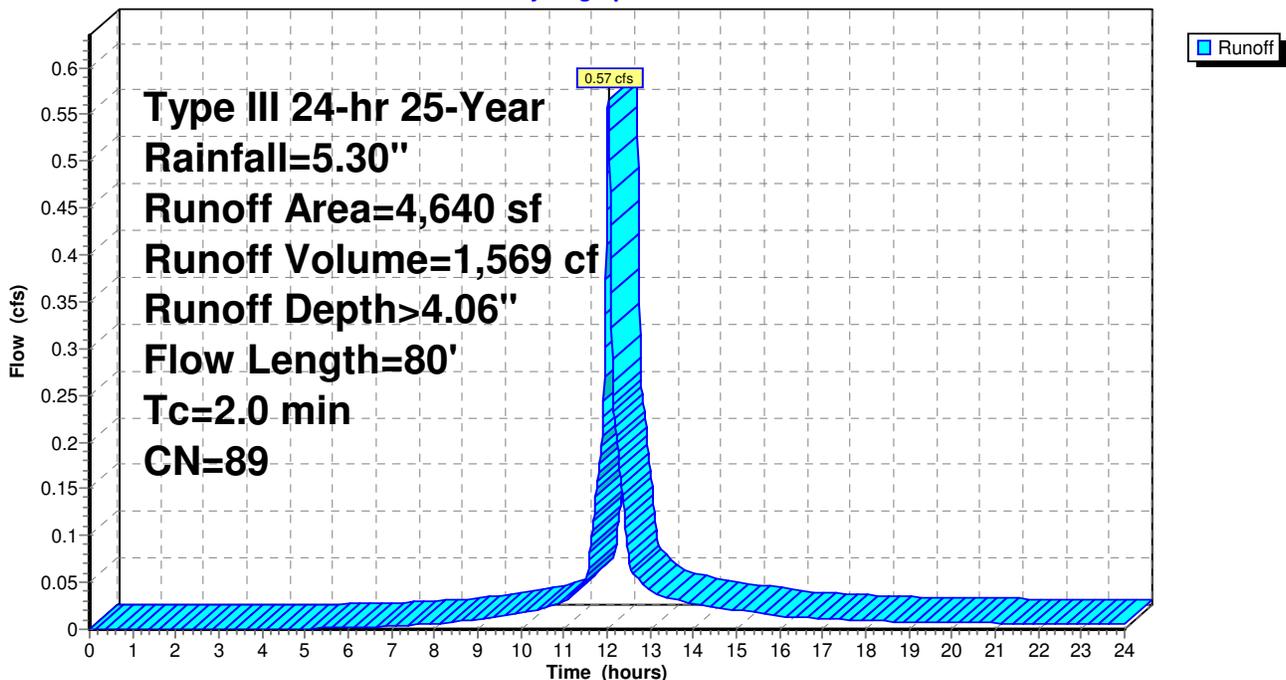
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
960	98	Paved parking & roofs
1,850	98	Paved parking & roofs
1,830	74	>75% Grass cover, Good, HSG C
4,640	89	Weighted Average
1,830		Pervious Area
2,810		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	10	0.0250	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	80	Total			

Subcatchment 60S:

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 62S: Large Area including 2 Septics

Runoff = 2.65 cfs @ 12.16 hrs, Volume= 9,731 cf, Depth> 2.96"

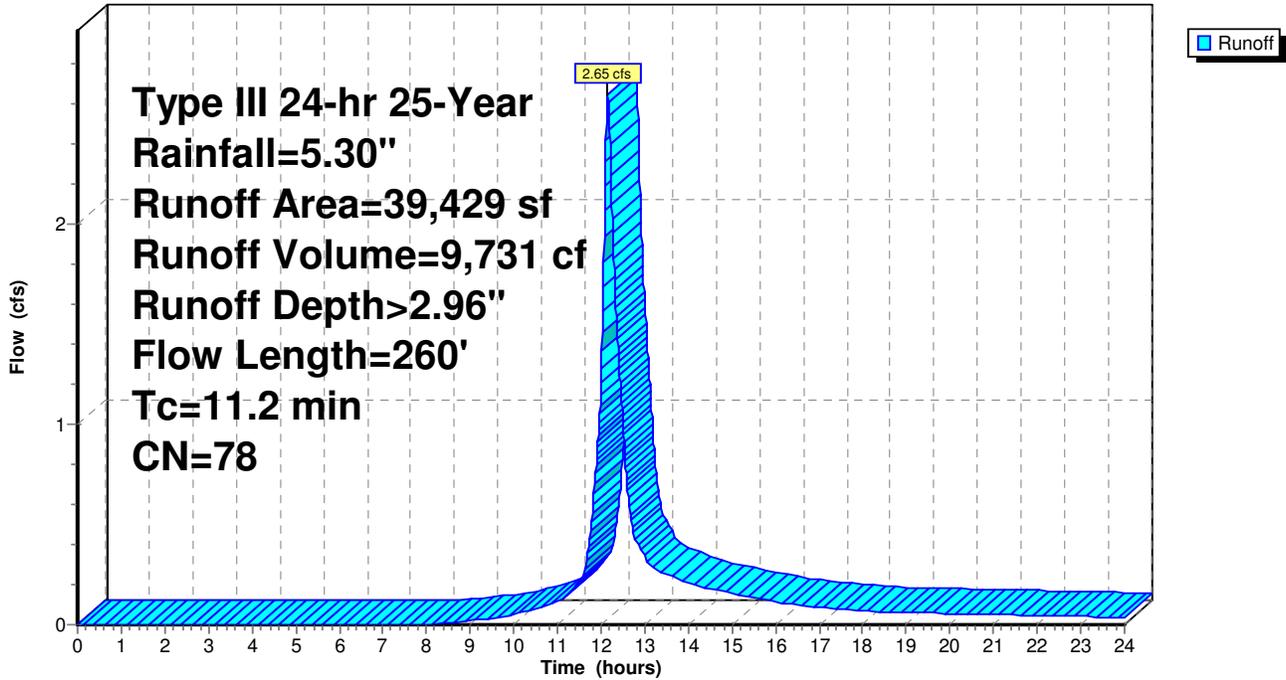
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
3,880	98	Paved parking & roofs
2,734	98	Paved parking & roofs
30,815	74	>75% Grass cover, Good, HSG C
2,000	70	Woods, Good, HSG C
39,429	78	Weighted Average
32,815		Pervious Area
6,614		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	25	0.0500	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	25	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.2	260	Total			

Subcatchment 62S: Large Area including 2 Septics

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 65S: Throat of Cul-de-sac u.g.

Runoff = 0.95 cfs @ 12.13 hrs, Volume= 3,323 cf, Depth> 3.44"

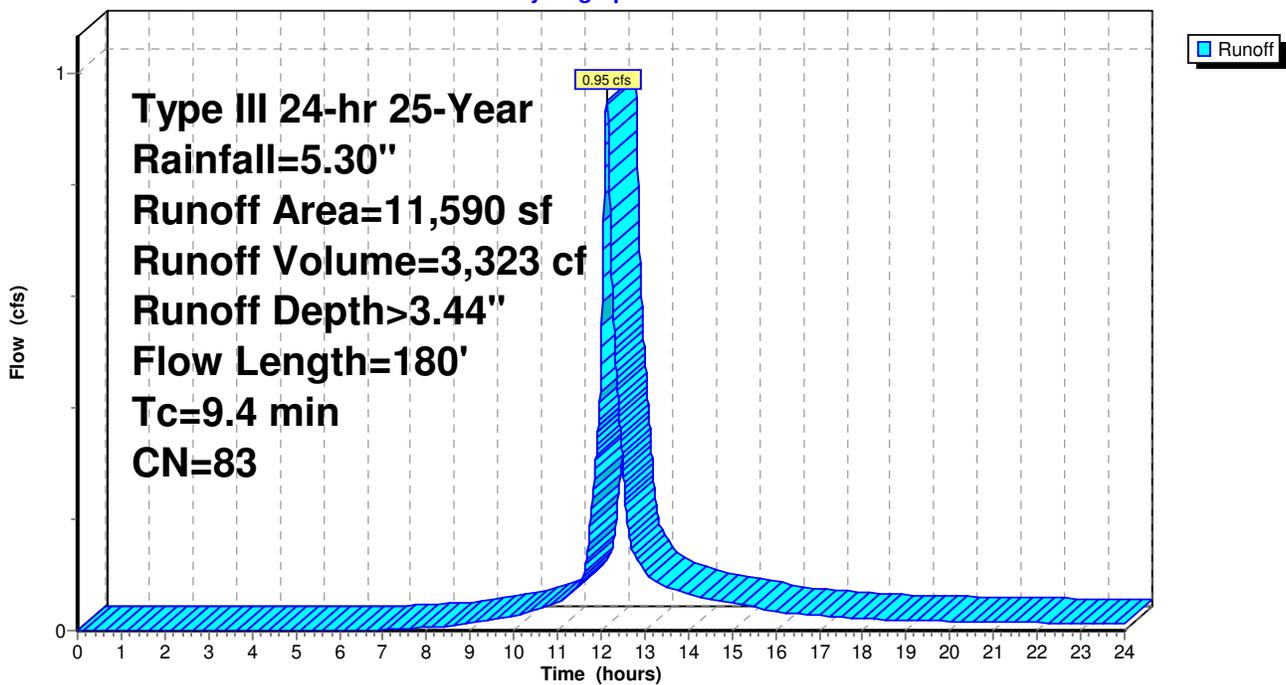
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
2,200	98	Paved parking & roofs
2,160	98	Paved parking & roofs
7,230	74	>75% Grass cover, Good, HSG C
11,590	83	Weighted Average
7,230		Pervious Area
4,360		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	30	0.1500	2.42		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
9.0	90	0.0200	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.2	60	0.0400	4.06		Shallow Concentrated Flow, Unit 17 Drive and Private Drive Paved Kv= 20.3 fps
9.4	180	Total			

Subcatchment 65S: Throat of Cul-de-sac u.g.

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 68S: From hill near 19,20 to Lawn CB

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 3,728 cf, Depth> 2.96"

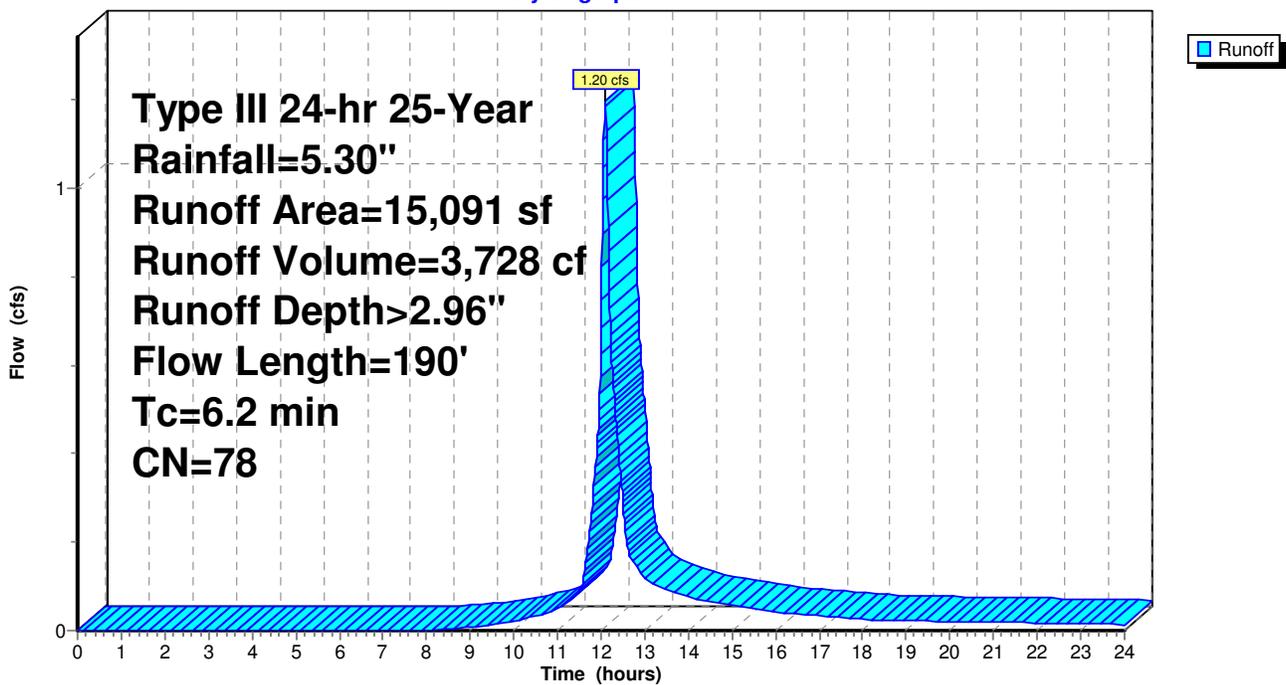
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
2,730	98	Paved parking & roofs
0	98	Paved parking & roofs
12,361	74	>75% Grass cover, Good, HSG C
15,091	78	Weighted Average
12,361		Pervious Area
2,730		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.1500	2.23		Sheet Flow, Roof Unit 20 Smooth surfaces n= 0.011 P2= 3.20"
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.4	140	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	190	Total			

Subcatchment 68S: From hill near 19,20 to Lawn CB

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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 110S: To CB 20

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.98 cfs @ 12.01 hrs, Volume= 2,564 cf, Depth> 3.95"

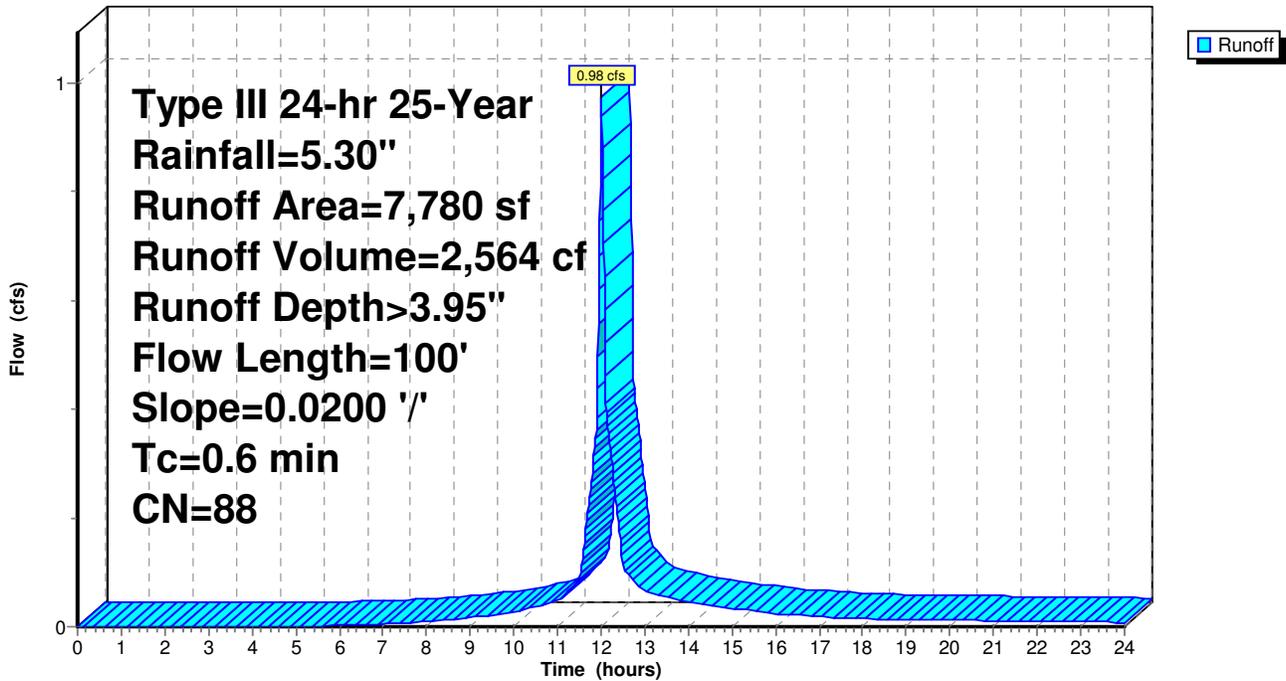
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
2,880	98	Paved parking & roofs
3,240	74	>75% Grass cover, Good, HSG C
7,780	88	Weighted Average
3,240		Pervious Area
4,540		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	100	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps

Subcatchment 110S: To CB 20

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 112S: To CB 22

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.70 cfs @ 12.00 hrs, Volume= 1,898 cf, Depth> 4.38"

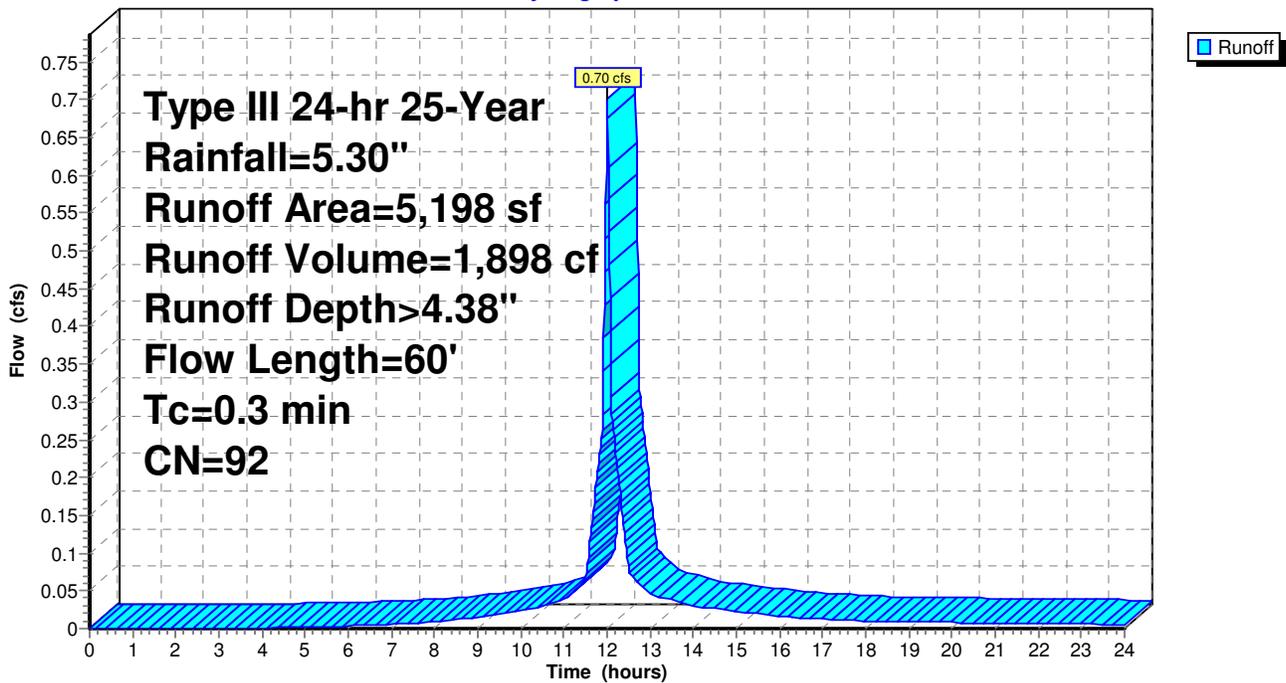
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
2,400	98	Paved parking & roofs
1,525	98	Paved parking & roofs
1,273	74	>75% Grass cover, Good, HSG C
5,198	92	Weighted Average
1,273		Pervious Area
3,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	60	Total			

Subcatchment 112S: To CB 22

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 114S: Behind Units 1&2

Runoff = 0.89 cfs @ 12.16 hrs, Volume= 3,299 cf, Depth> 3.05"

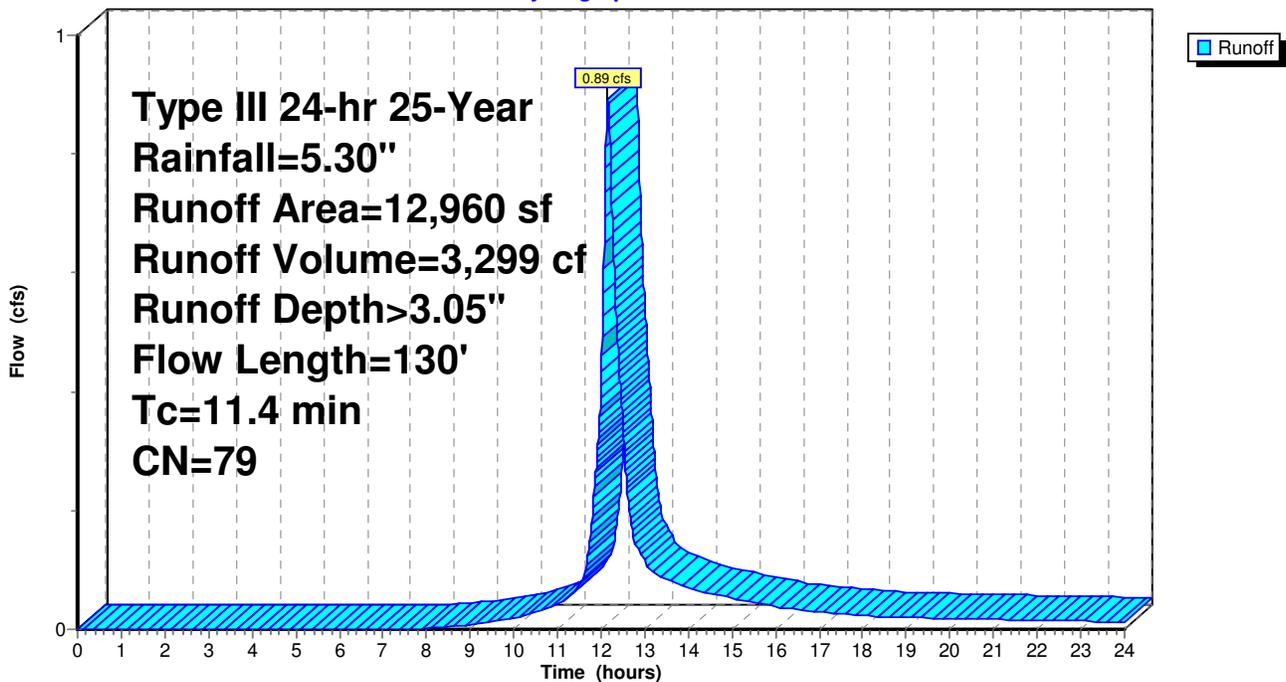
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,300	98	Paved parking & roofs
10,000	74	>75% Grass cover, Good, HSG C
12,960	79	Weighted Average
10,000		Pervious Area
2,960		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.6	80	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.4	130	Total			

Subcatchment 114S: Behind Units 1&2

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 116S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.40 cfs @ 12.00 hrs, Volume= 1,059 cf, Depth> 4.17"

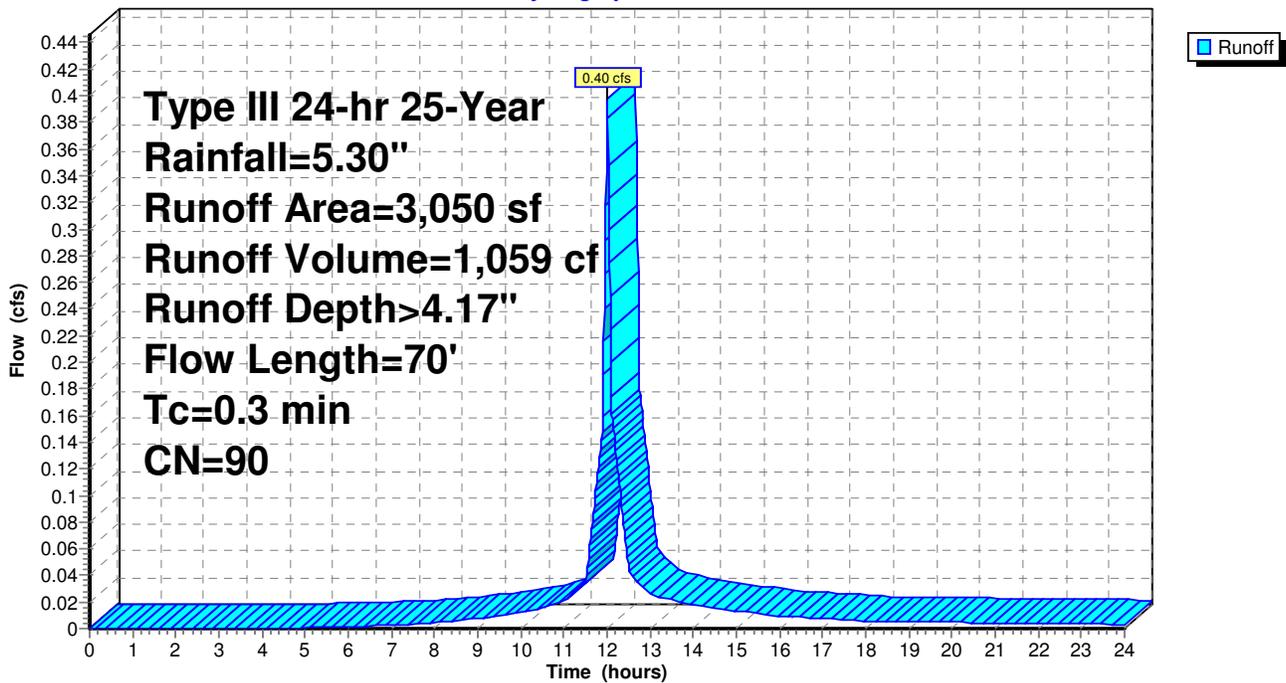
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,300	98	Paved parking & roofs
1,050	74	>75% Grass cover, Good, HSG C
3,050	90	Weighted Average
1,050		Pervious Area
2,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	40	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	70	Total			

Subcatchment 116S:

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 118S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.45 cfs @ 12.00 hrs, Volume= 1,190 cf, Depth> 3.95"

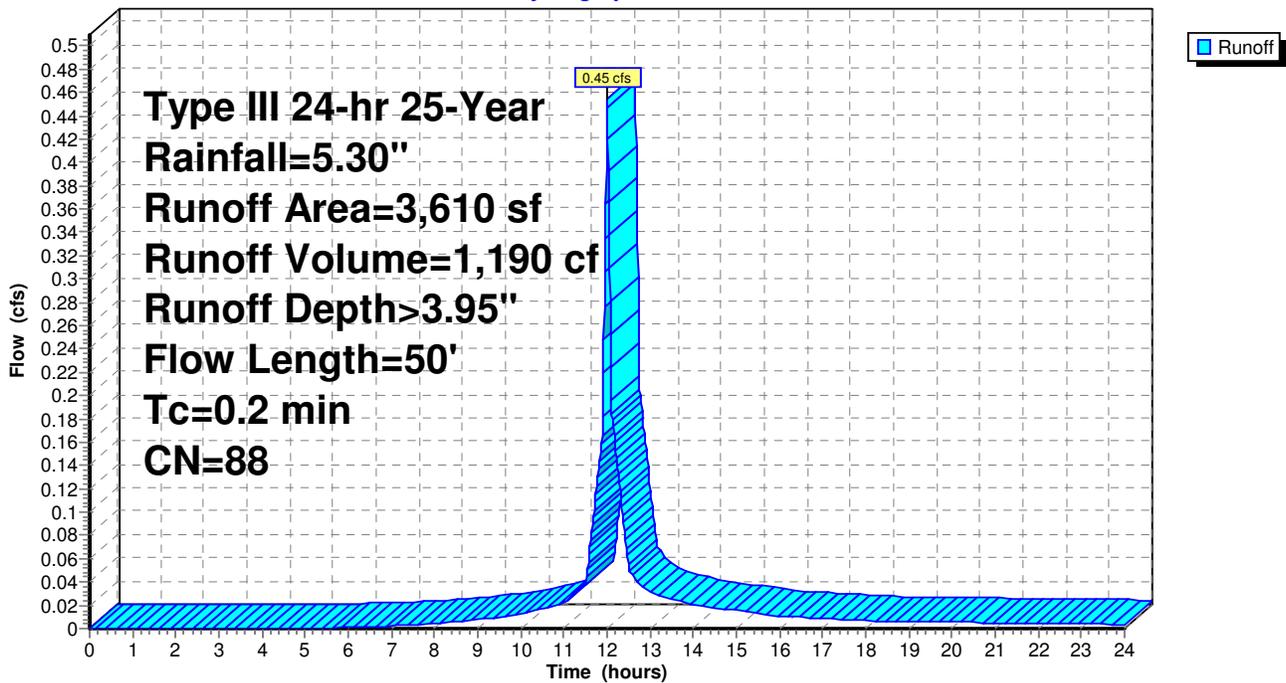
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,040	98	Paved parking & roofs
1,140	98	Paved parking & roofs
1,430	74	>75% Grass cover, Good, HSG C
3,610	88	Weighted Average
1,430		Pervious Area
2,180		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	50	Total			

Subcatchment 118S:

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 120S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.76 cfs @ 12.01 hrs, Volume= 1,986 cf, Depth> 3.85"

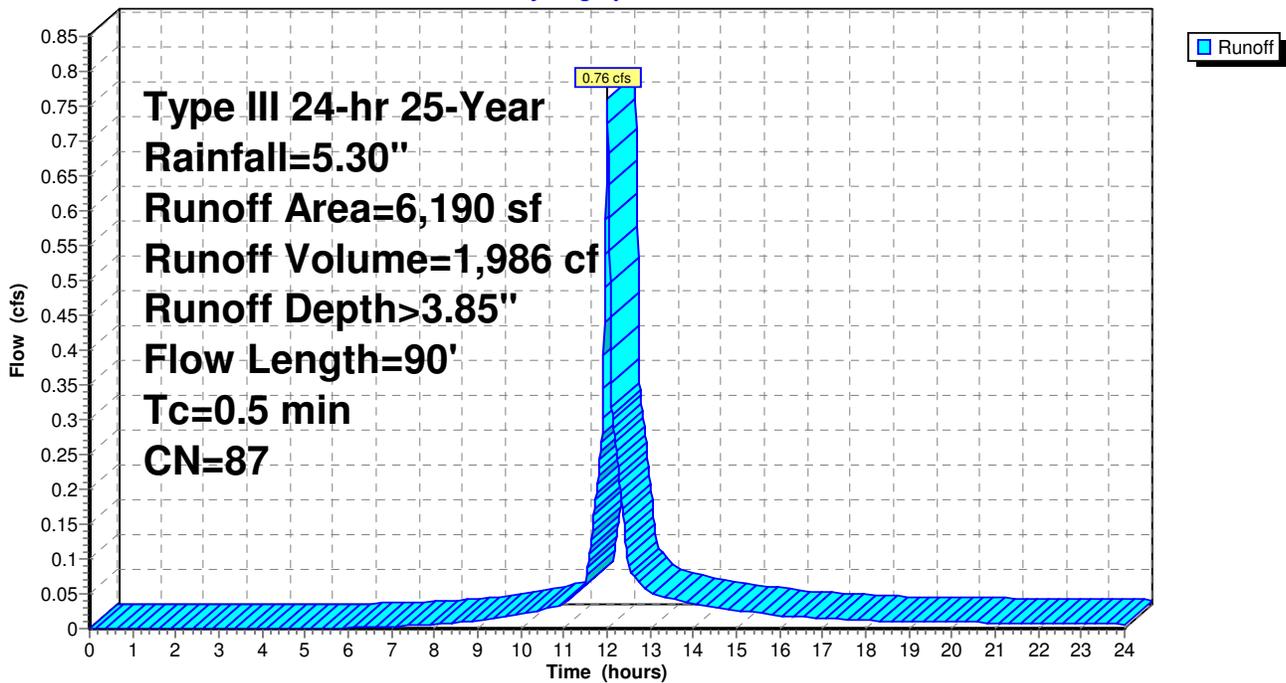
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,450	98	Paved parking & roofs
1,800	98	Paved parking & roofs
2,940	74	>75% Grass cover, Good, HSG C
6,190	87	Weighted Average
2,940		Pervious Area
3,250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v=20.3$ fps
0.4	60	0.0300	2.79		Shallow Concentrated Flow, Unpaved $K_v=16.1$ fps
0.5	90	Total			

Subcatchment 120S:

Hydrograph



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Subcatchment 122S:

Runoff = 0.51 cfs @ 12.06 hrs, Volume= 1,453 cf, Depth> 2.87"

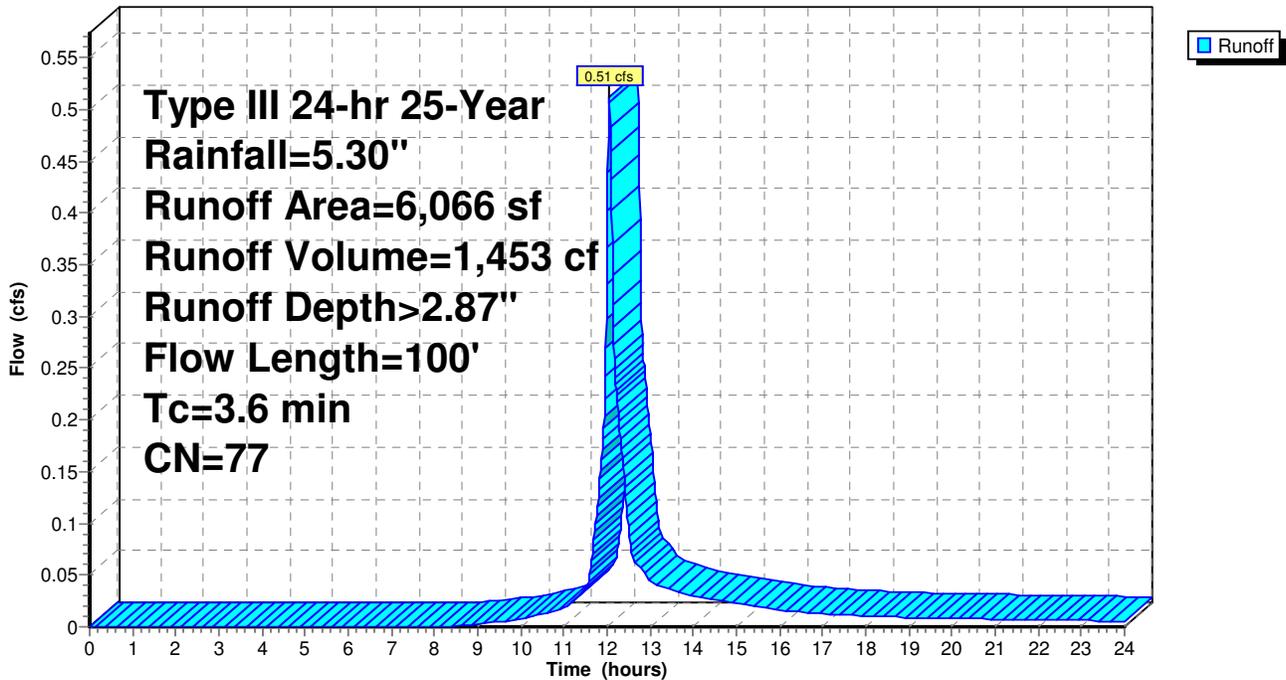
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
720	98	Paved parking & roofs
5,346	74	>75% Grass cover, Good, HSG C
6,066	77	Weighted Average
5,346		Pervious Area
720		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	20	0.0300	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.3	80	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.6	100	Total			

Subcatchment 122S:

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 124S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.92 cfs @ 12.01 hrs, Volume= 2,407 cf, Depth> 3.85"

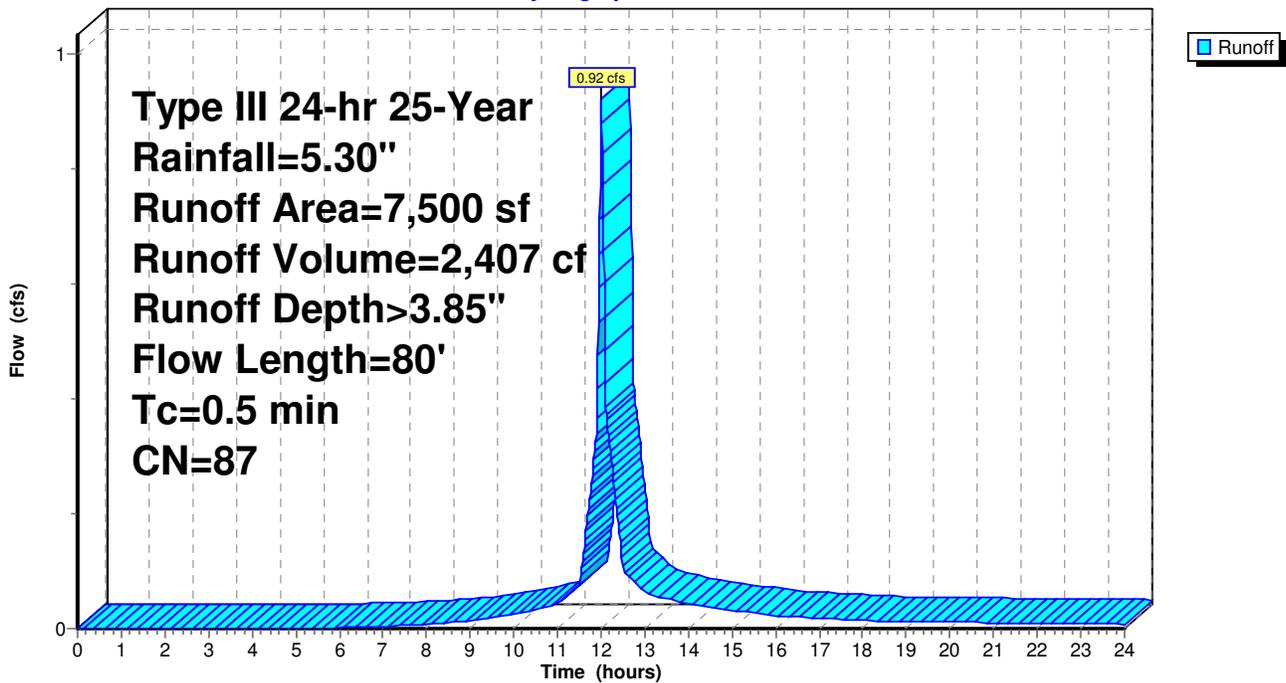
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,410	98	Paved parking & roofs
2,600	98	Paved parking & roofs
3,490	74	>75% Grass cover, Good, HSG C
7,500	87	Weighted Average
3,490		Pervious Area
4,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	80	Total			

Subcatchment 124S:

Hydrograph



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Subcatchment 126S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.66 cfs @ 12.01 hrs, Volume= 1,723 cf, Depth> 3.85"

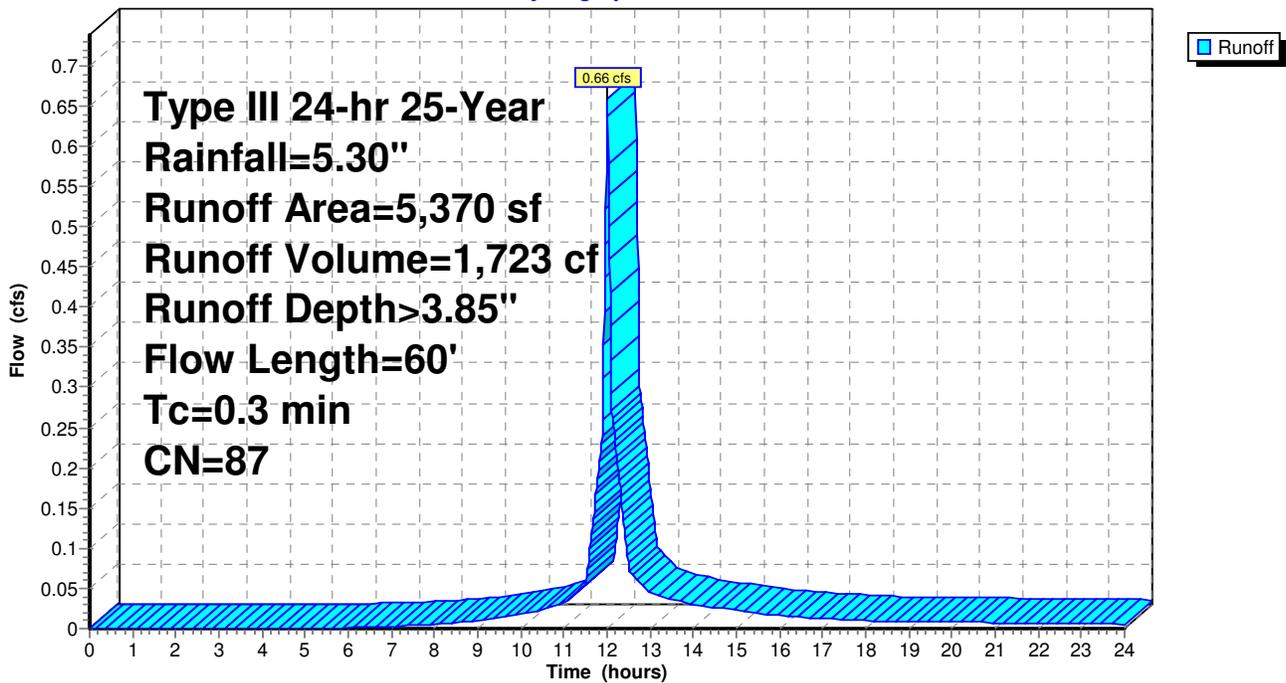
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,350	98	Paved parking & roofs
2,360	74	>75% Grass cover, Good, HSG C
5,370	87	Weighted Average
2,360		Pervious Area
3,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	60	Total			

Subcatchment 126S:

Hydrograph



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Subcatchment 128S:

Runoff = 0.77 cfs @ 12.05 hrs, Volume= 2,187 cf, Depth> 3.64"

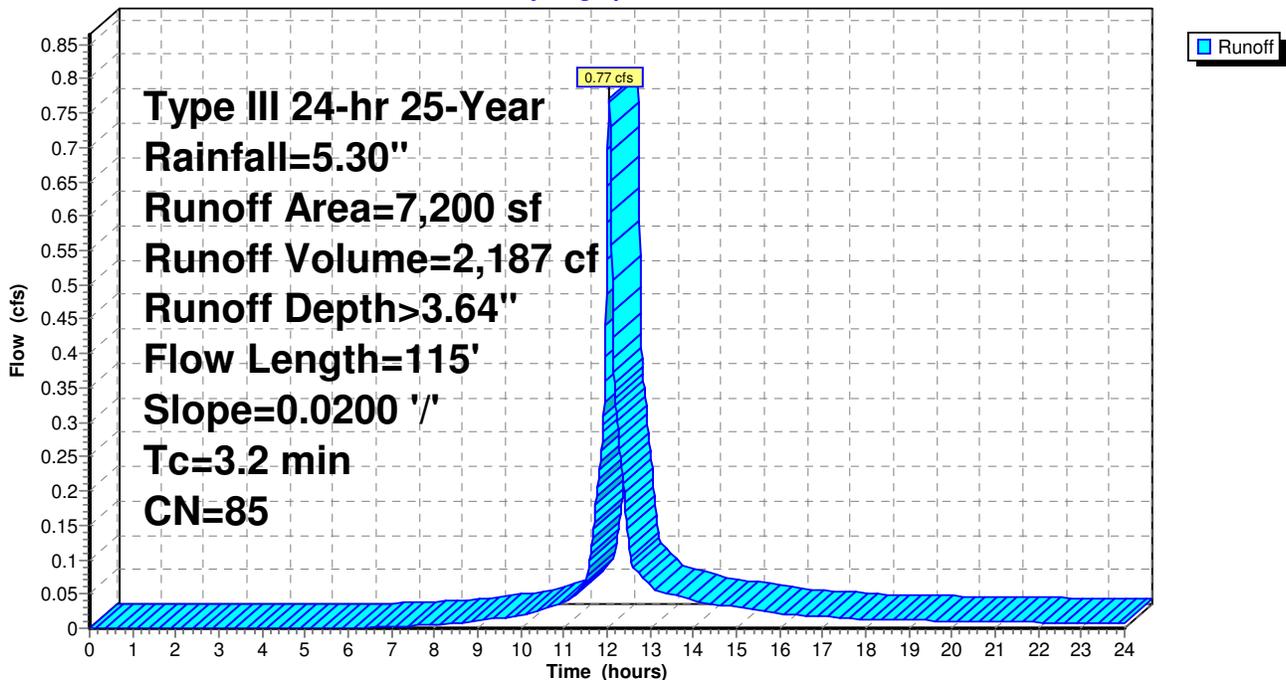
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
1,550	98	Paved parking & roofs
1,600	98	Paved parking & roofs
4,050	74	>75% Grass cover, Good, HSG C
7,200	85	Weighted Average
4,050		Pervious Area
3,150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	25	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.2	115	Total			

Subcatchment 128S:

Hydrograph



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Subcatchment 130S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.78 cfs @ 12.01 hrs, Volume= 1,996 cf, Depth> 3.45"

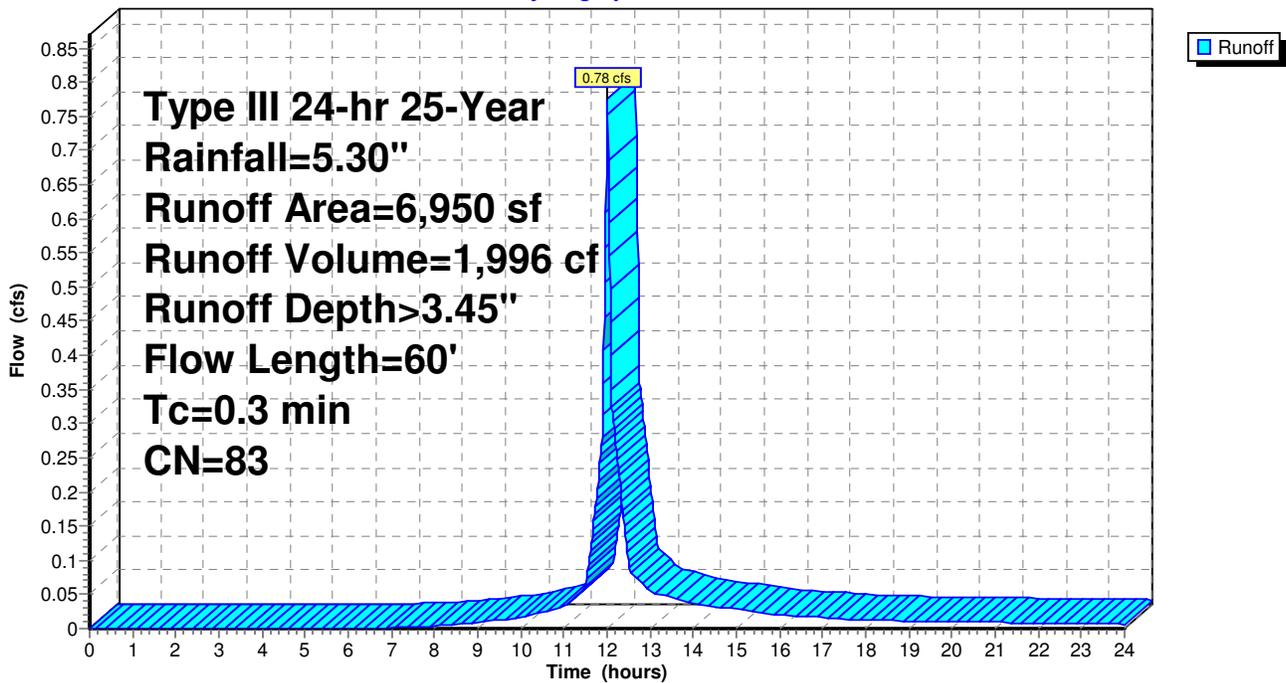
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
800	98	Paved parking & roofs
1,940	98	Paved parking & roofs
4,210	74	>75% Grass cover, Good, HSG C
6,950	83	Weighted Average
4,210		Pervious Area
2,740		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	60	Total			

Subcatchment 130S:

Hydrograph



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Subcatchment 132S: Behind Unit 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.36 cfs @ 12.02 hrs, Volume= 6,095 cf, Depth> 2.78"

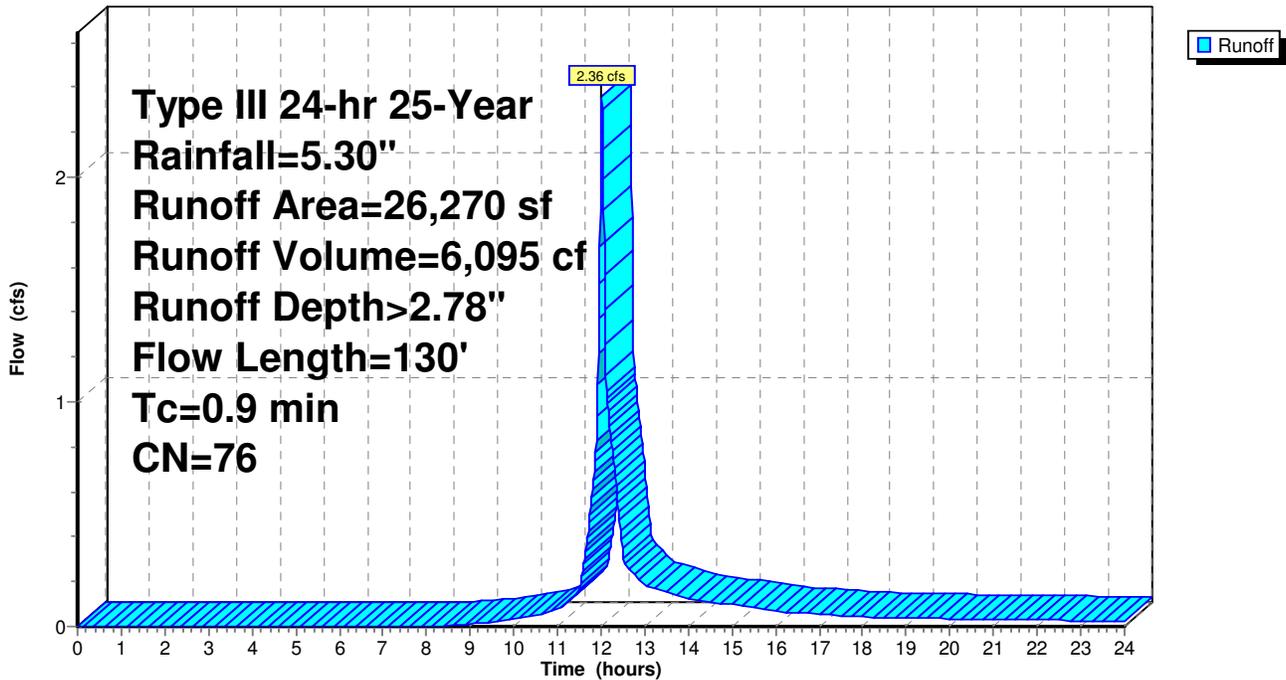
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
2,100	98	Paved parking & roofs
24,170	74	>75% Grass cover, Good, HSG C
26,270	76	Weighted Average
24,170		Pervious Area
2,100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.0150	1.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	130	Total			

Subcatchment 132S: Behind Unit 3

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 134S: To Swale behind 7,6,5

Runoff = 1.27 cfs @ 12.05 hrs, Volume= 3,532 cf, Depth> 3.06"

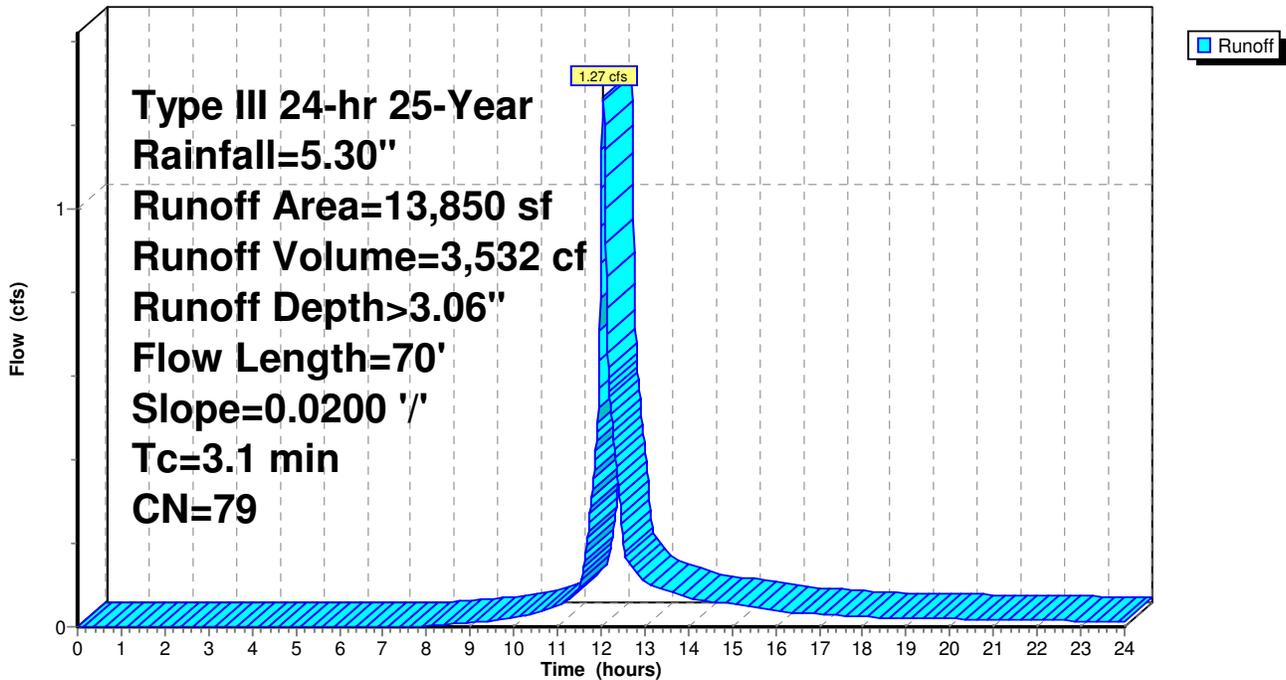
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs
10,850	74	>75% Grass cover, Good, HSG C
13,850	79	Weighted Average
10,850		Pervious Area
3,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: To Swale behind 7,6,5

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 136S: To Swale behind 4 to HW 30

Runoff = 1.64 cfs @ 12.07 hrs, Volume= 4,882 cf, Depth> 2.78"

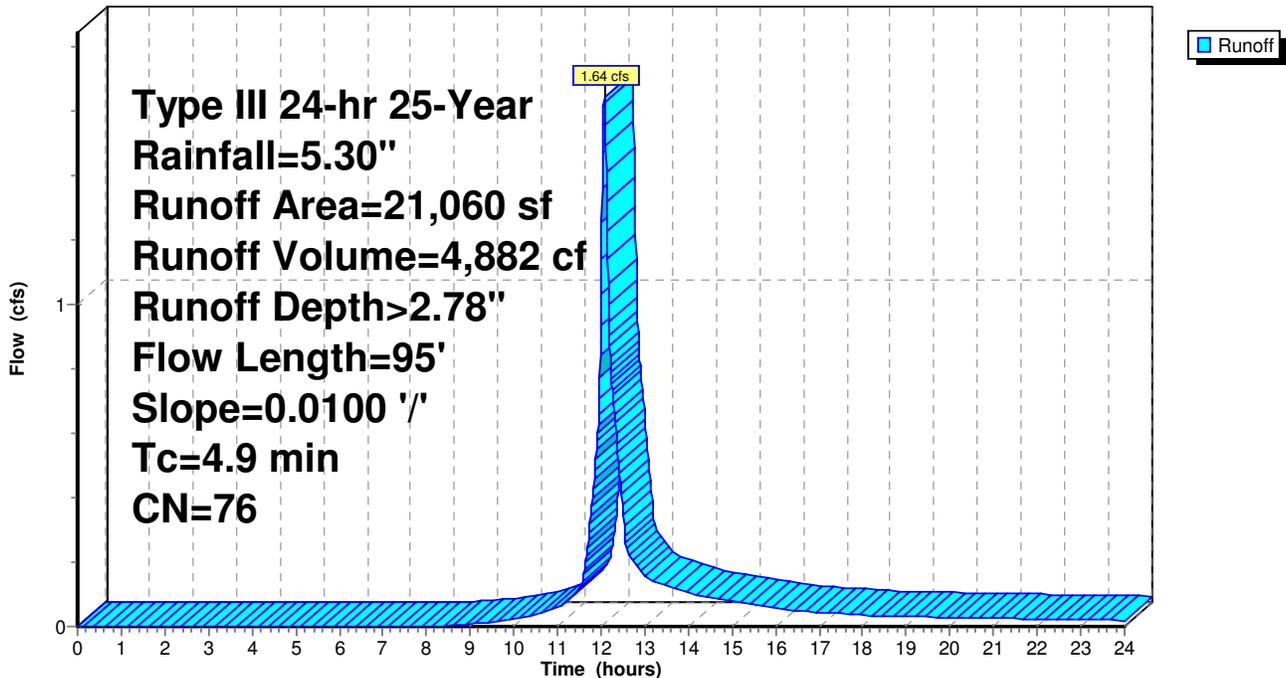
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
2,060	98	Paved parking & roofs
1,700	70	Woods, Good, HSG C
17,300	74	>75% Grass cover, Good, HSG C
21,060	76	Weighted Average
19,000		Pervious Area
2,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	1.83	0.59	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022 Earth, clean & straight
4.9	95	Total			

Subcatchment 136S: To Swale behind 4 to HW 30

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 138S: Rear of Units 10,11,12,13

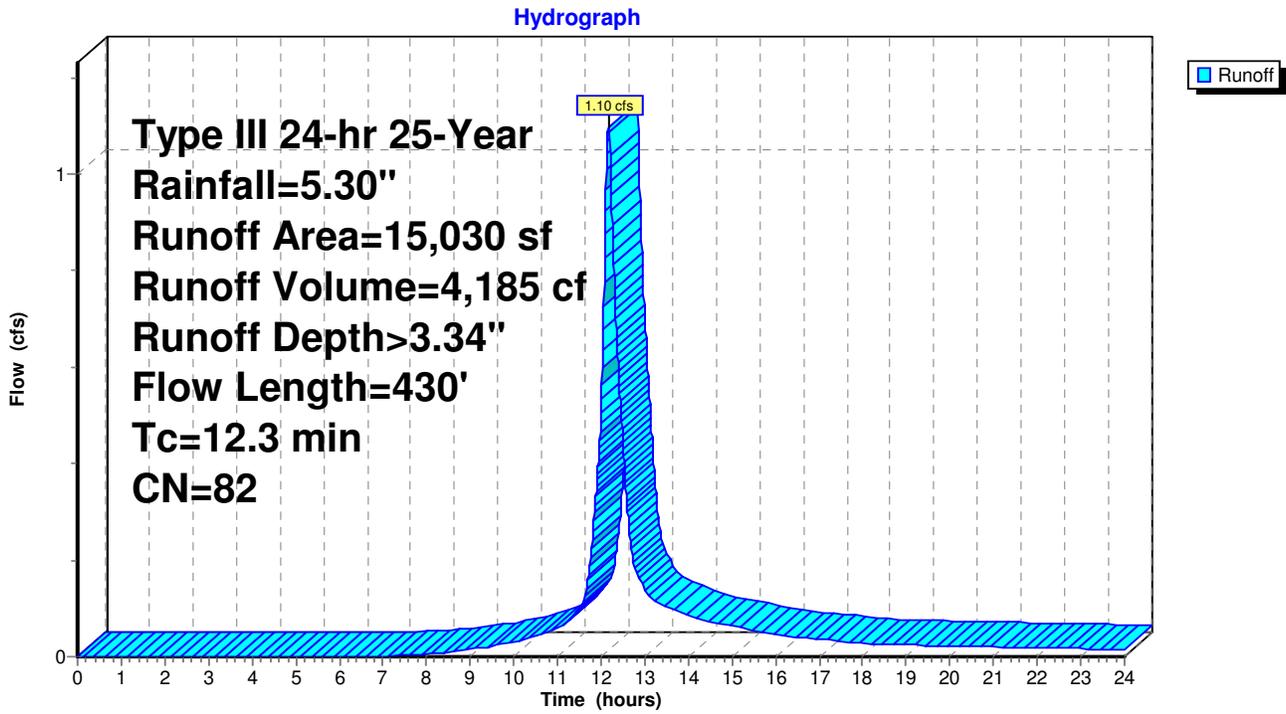
Runoff = 1.10 cfs @ 12.17 hrs, Volume= 4,185 cf, Depth> 3.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
4,800	98	Paved parking & roofs
0	98	Paved parking & roofs
10,230	74	>75% Grass cover, Good, HSG C
15,030	82	Weighted Average
10,230		Pervious Area
4,800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	80	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	150	0.0500	4.63	2.02	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.25' Z= 3.0 '/' Top.W=2.50' n= 0.022 Earth, clean & straight
0.6	150	0.0300	3.89	2.68	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=0.25' Z= 3.0 '/' Top.W=3.50' n= 0.022 Earth, clean & straight
12.3	430	Total			

Subcatchment 138S: Rear of Units 10,11,12,13



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 140S: Behind Units 14, 15, 16

Runoff = 1.33 cfs @ 12.18 hrs, Volume= 5,170 cf, Depth> 2.87"

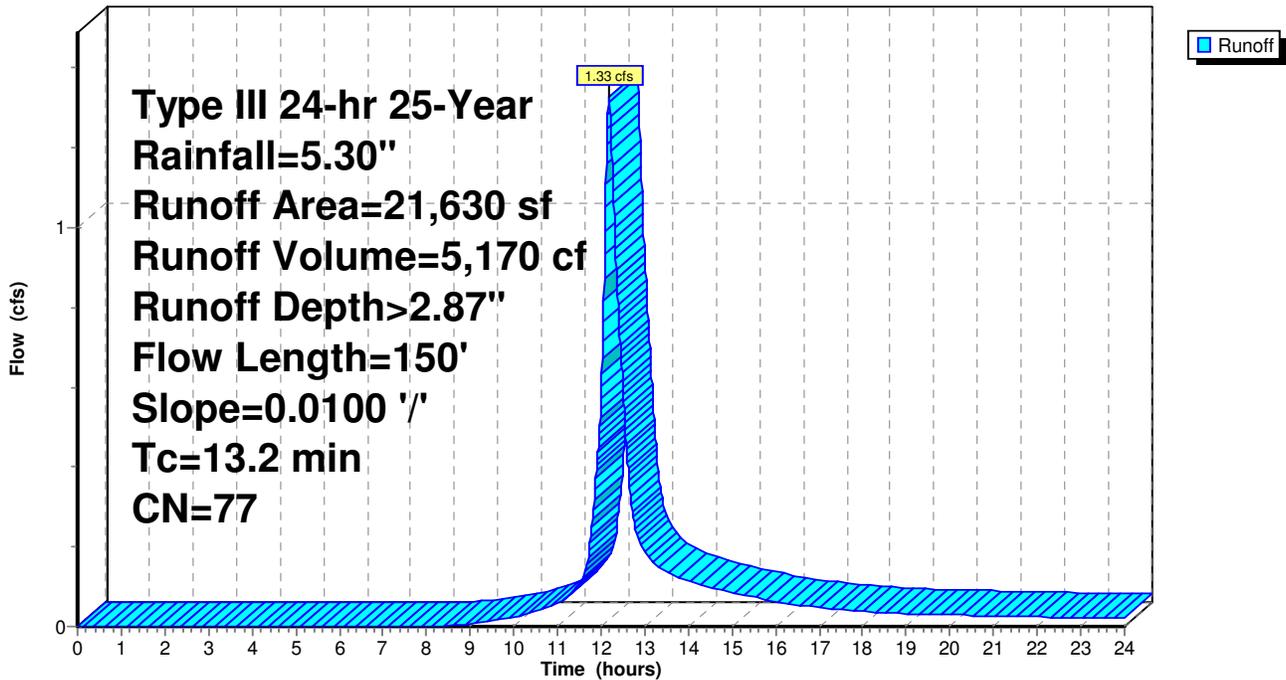
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
3,600	98	Paved parking & roofs
0	98	Paved parking & roofs
14,030	74	>75% Grass cover, Good, HSG C
4,000	70	Woods, Good, HSG C
21,630	77	Weighted Average
18,030		Pervious Area
3,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
2.4	100	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.2	150	Total			

Subcatchment 140S: Behind Units 14, 15, 16

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 214S:

Runoff = 0.81 cfs @ 12.04 hrs, Volume= 2,289 cf, Depth> 3.95"

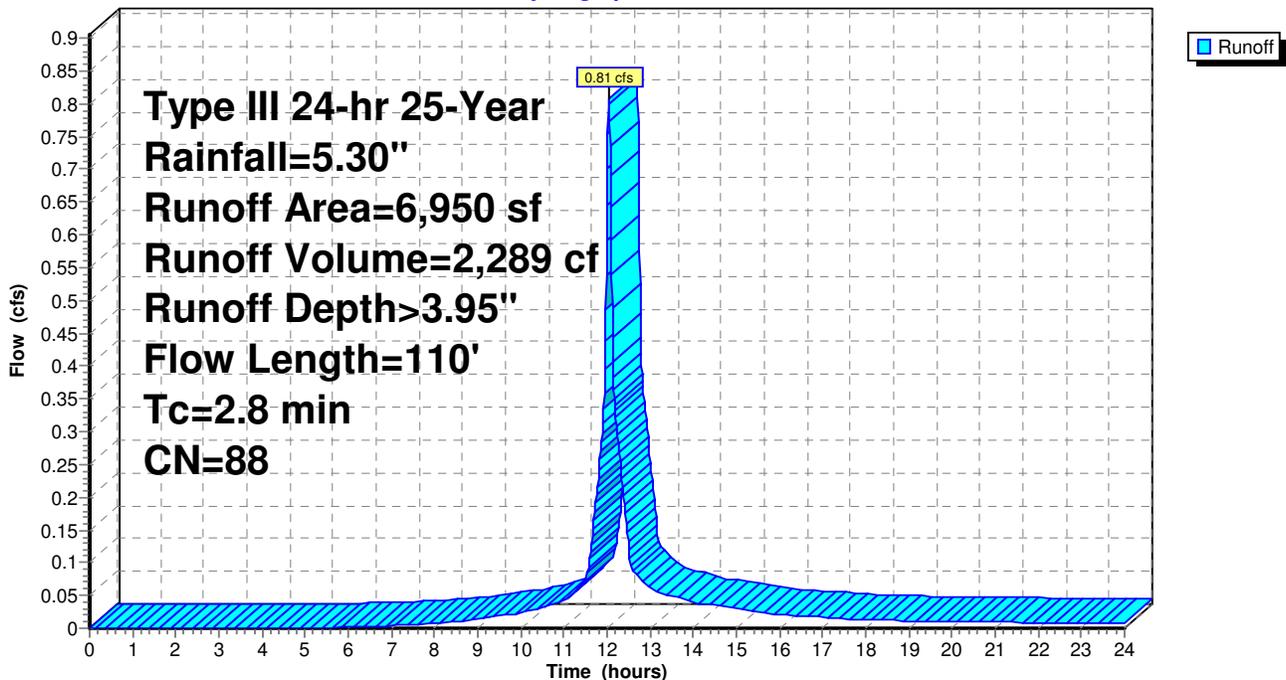
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
2,000	98	Paved parking & roofs
1,940	98	Paved parking & roofs
3,010	74	>75% Grass cover, Good, HSG C
6,950	88	Weighted Average
3,010		Pervious Area
3,940		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	10	0.0100	0.08		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	20	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0200	2.59	0.83	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022
2.8	110	Total			

Subcatchment 214S:

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 216S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.48 cfs @ 12.02 hrs, Volume= 1,258 cf, Depth> 3.65"

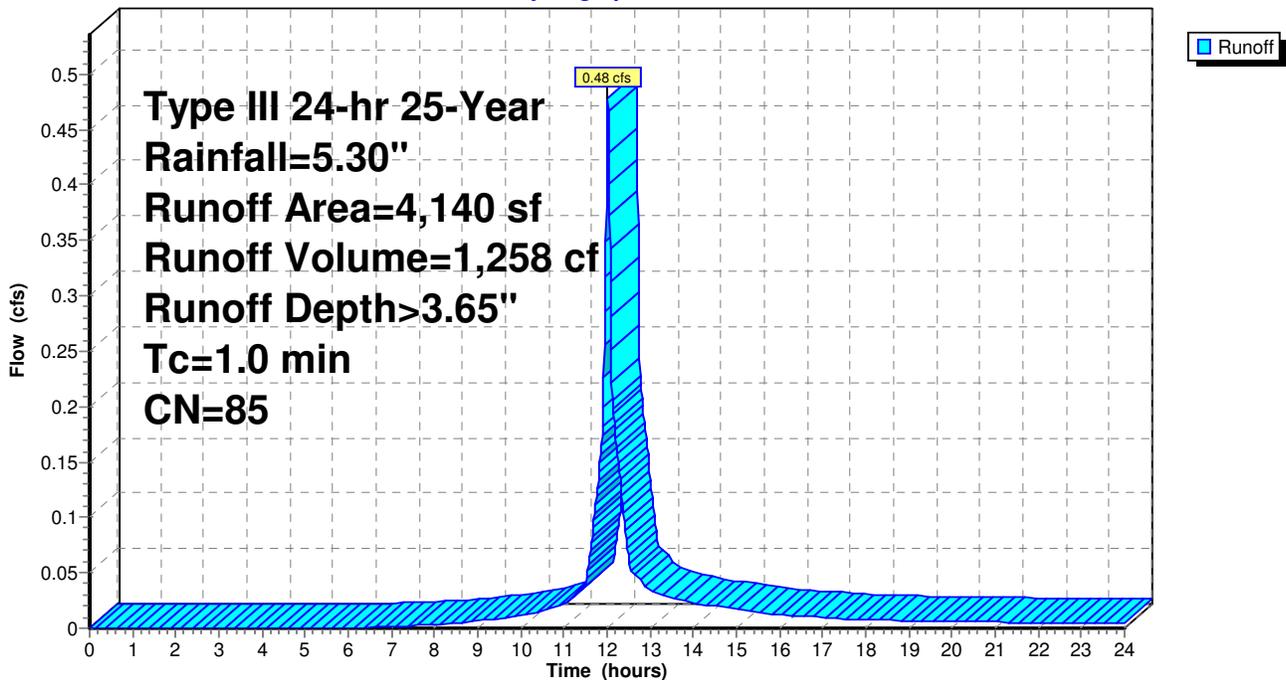
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,200	98	Paved parking & roofs
2,240	74	>75% Grass cover, Good, HSG C
4,140	85	Weighted Average
2,240		Pervious Area
1,900		Impervious Area

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

Subcatchment 216S:

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.68 cfs @ 12.18 hrs, Volume= 2,645 cf, Depth> 2.25"

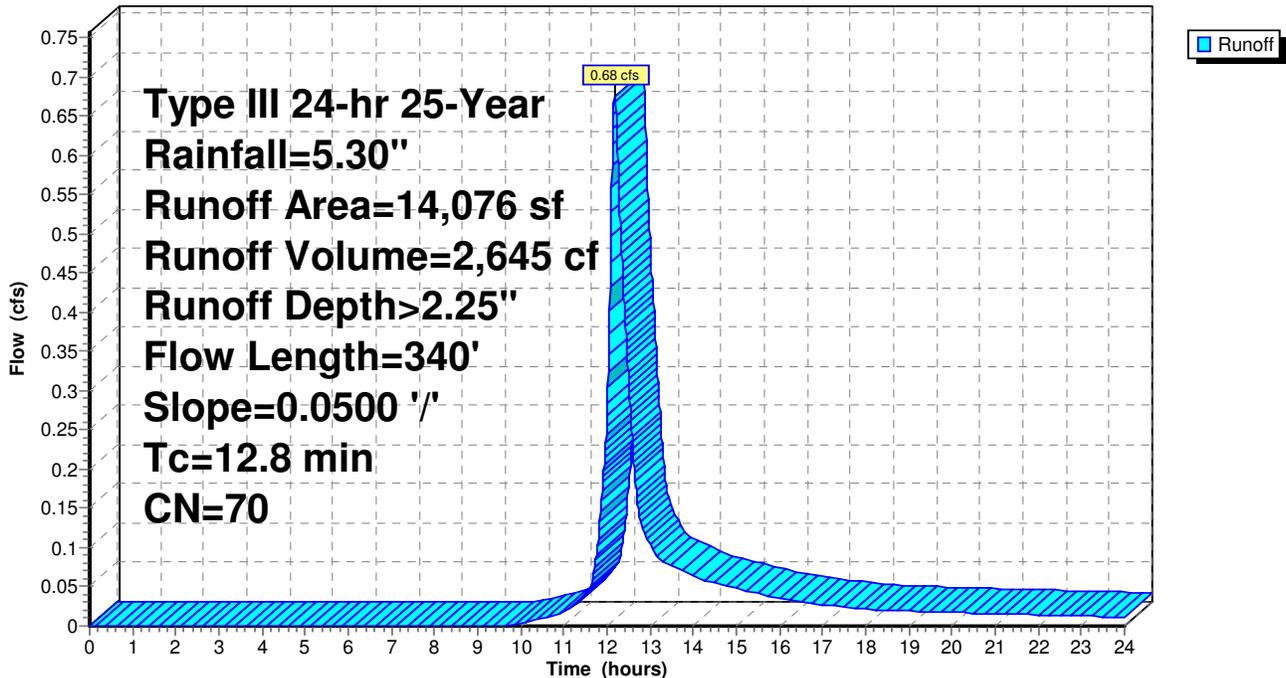
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Reach 1R: Existing wetland channel to WF 16

Inflow Area = 162,206 sf, Inflow Depth > 2.81" for 25-Year event
Inflow = 10.36 cfs @ 12.15 hrs, Volume= 37,944 cf
Outflow = 10.33 cfs @ 12.17 hrs, Volume= 37,893 cf, Atten= 0%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.17 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 3.6 min

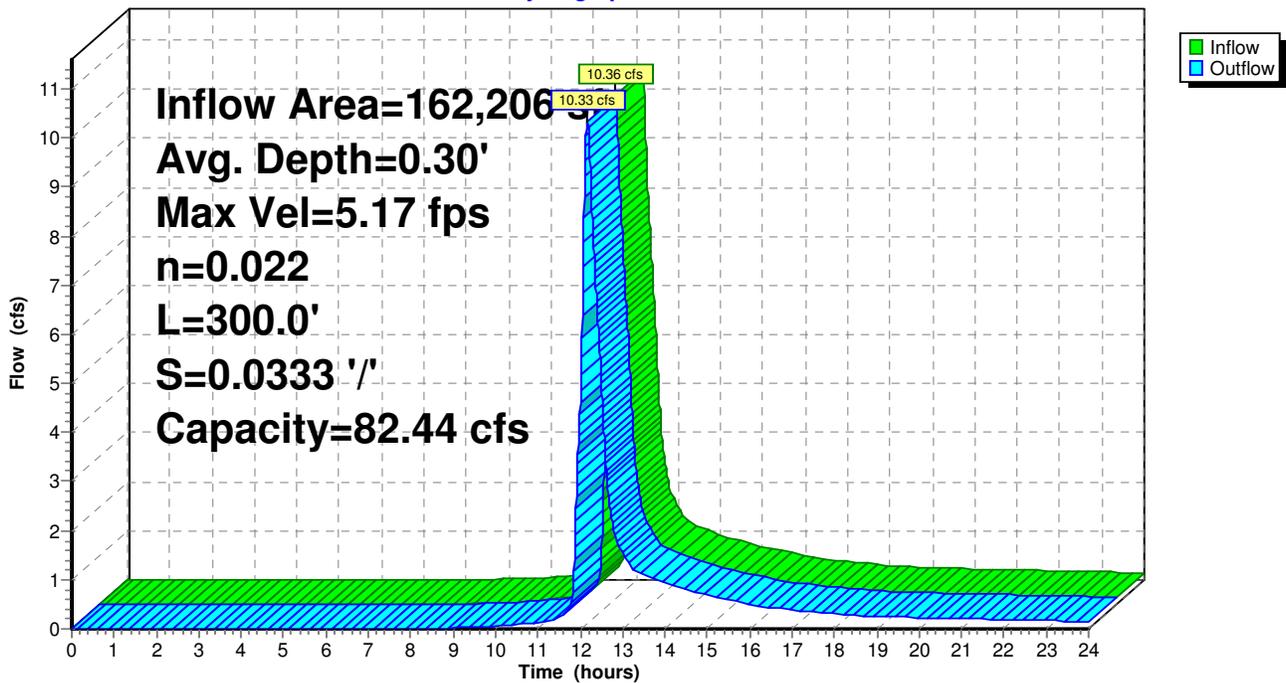
Peak Storage= 599 cf @ 12.16 hrs, Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'



Reach 1R: Existing wetland channel to WF 16

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Reach 2R: Swale from Drive at #10 to Drive at #11

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

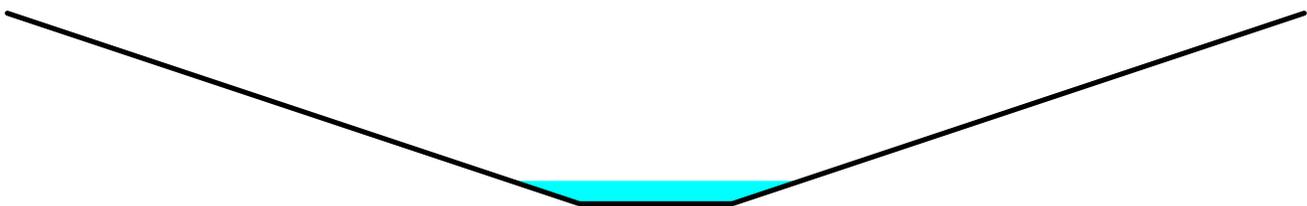
[79] Warning: Submerged Pond 3P Primary device # 1 OUTLET by 0.15'

Inflow Area =	6,950 sf,	Inflow Depth >	3.95"	for	25-Year event
Inflow =	0.81 cfs @	12.04 hrs,	Volume=	2,289 cf	
Outflow =	0.80 cfs @	12.05 hrs,	Volume=	2,289 cf,	Atten= 1%, Lag= 0.5 min

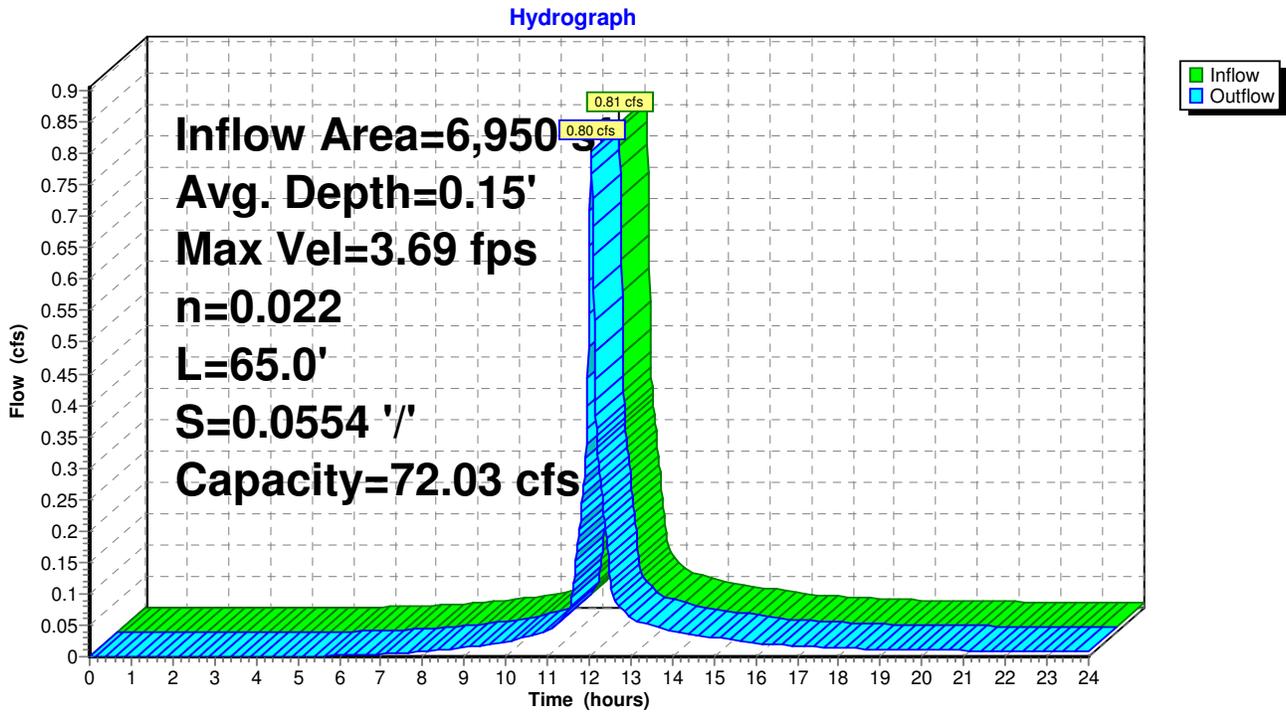
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.69 fps, Min. Travel Time= 0.3 min
 Avg. Velocity = 1.10 fps, Avg. Travel Time= 1.0 min

Peak Storage= 14 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.15'
 Bank-Full Depth= 1.25', Capacity at Bank-Full= 72.03 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 3.0 '/' Top Width= 8.50'
 Length= 65.0' Slope= 0.0554 '/'
 Inlet Invert= 113.92', Outlet Invert= 110.32'



Reach 2R: Swale from Drive at #10 to Drive at #11



Reach 55R: DMH 52 to DMH 50

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

[61] Hint: Submerged 20% of Reach 69R bottom

[63] Warning: Exceeded Reach 220R inflow depth by 0.03' @ 12.07 hrs

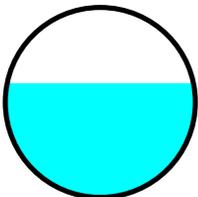
[62] Warning: Submerged 28% of Reach 222R inlet

Inflow Area =	40,720 sf,	Inflow Depth > 3.48"	for 25-Year event
Inflow =	3.95 cfs @ 12.07 hrs,	Volume=	11,795 cf
Outflow =	3.94 cfs @ 12.07 hrs,	Volume=	11,794 cf, Atten= 0%, Lag= 0.1 min

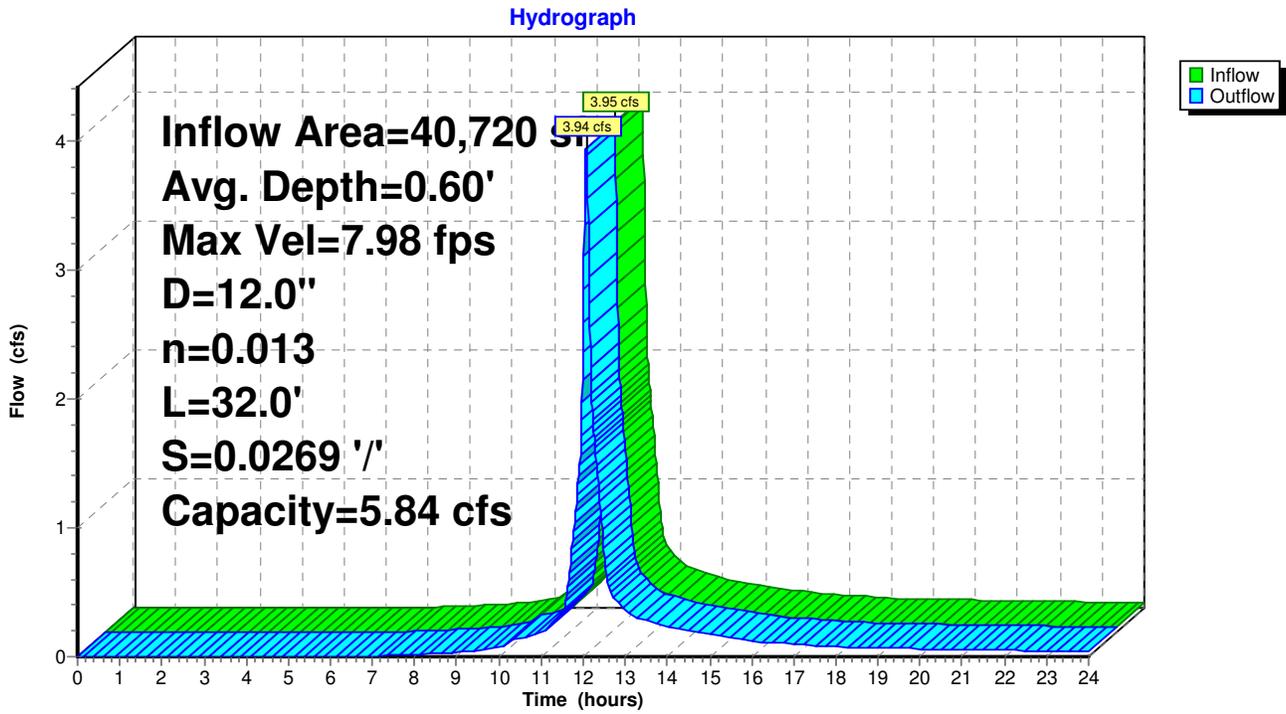
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.98 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.72 fps, Avg. Travel Time= 0.2 min

Peak Storage= 16 cf @ 12.07 hrs, Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.84 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 32.0' Slope= 0.0269 1/1'
Inlet Invert= 102.48', Outlet Invert= 101.62'



Reach 55R: DMH 52 to DMH 50



Reach 62R: DMH 64 to Bio-Retention A (HW 46)

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[52] Hint: Inlet conditions not evaluated

[81] Warning: Exceeded Pond 43R by 0.11' @ 12.16 hrs

[79] Warning: Submerged Pond 61R Primary device # 1 INLET by 0.25'

Inflow Area =	44,069 sf,	Inflow Depth >	3.08"	for	25-Year event
Inflow =	2.89 cfs @	12.15 hrs,	Volume=	11,300 cf	
Outflow =	2.89 cfs @	12.15 hrs,	Volume=	11,300 cf,	Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 5.94 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 2.08 fps, Avg. Travel Time= 0.1 min

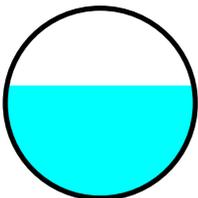
Peak Storage= 6 cf @ 12.15 hrs, Average Depth at Peak Storage= 0.59'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.36 cfs

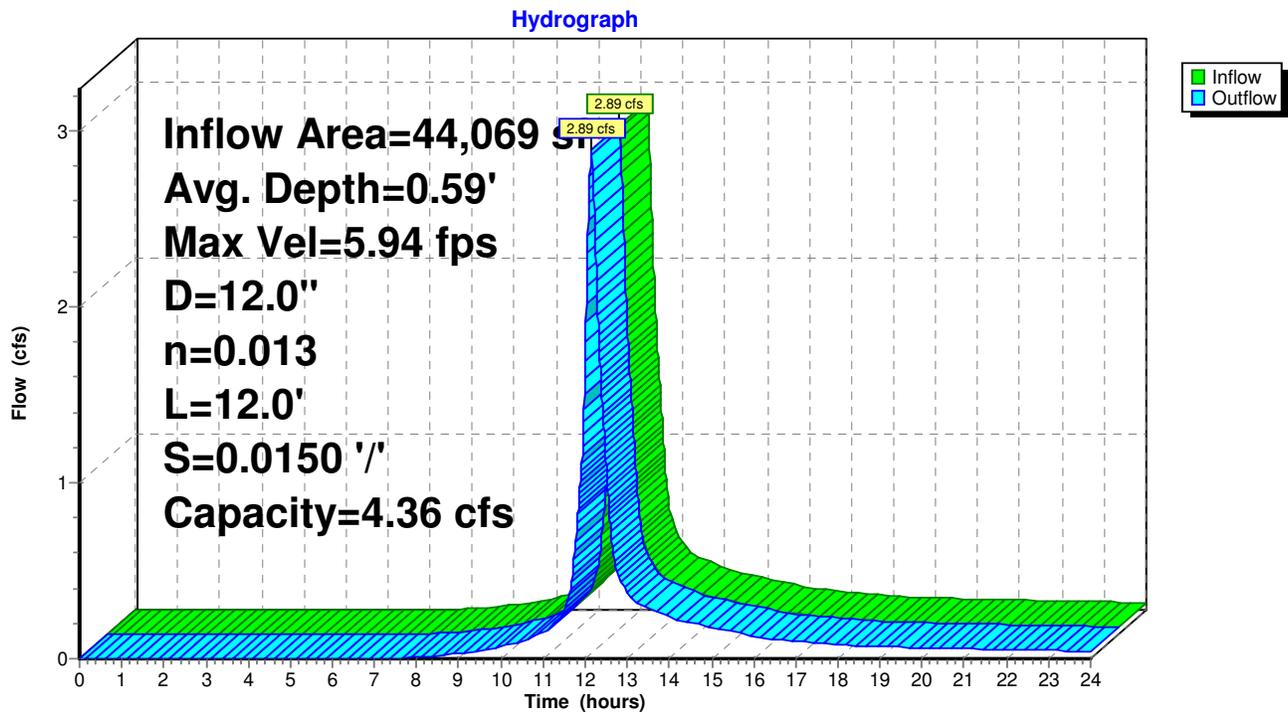
12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior

Length= 12.0' Slope= 0.0150 '/'

Inlet Invert= 110.80', Outlet Invert= 110.62'



Reach 62R: DMH 64 to Bio-Retention A (HW 46)



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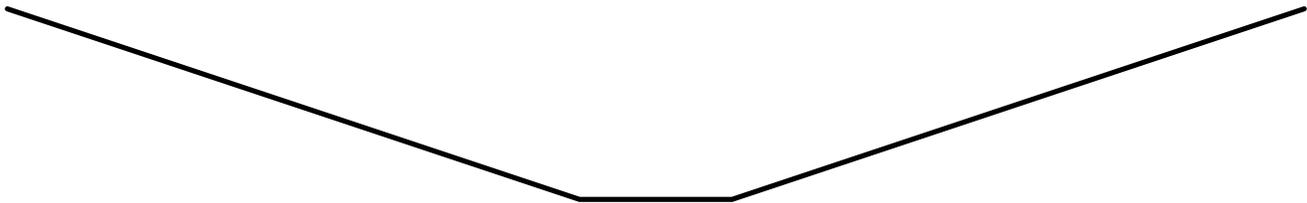
Reach 64R: Swale from Drive at #12 to RG 10A

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

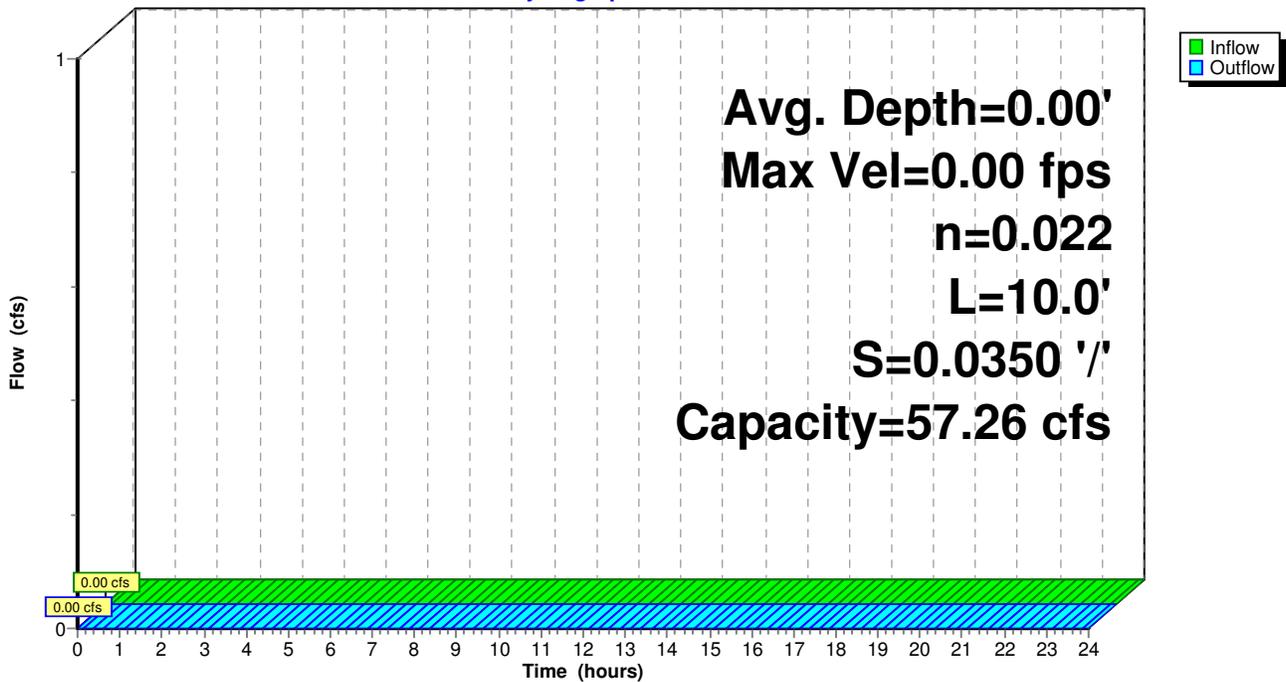
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 106.23', Outlet Invert= 105.88'



Reach 64R: Swale from Drive at #12 to RG 10A

Hydrograph



Reach 67R: Culvert under Unit 12 Drive

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

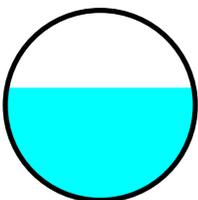
[52] Hint: Inlet conditions not evaluated

Inflow Area =	6,950 sf,	Inflow Depth > 3.77"	for 25-Year event
Inflow =	0.80 cfs @ 12.06 hrs,	Volume=	2,183 cf
Outflow =	0.80 cfs @ 12.06 hrs,	Volume=	2,182 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 0.4 min

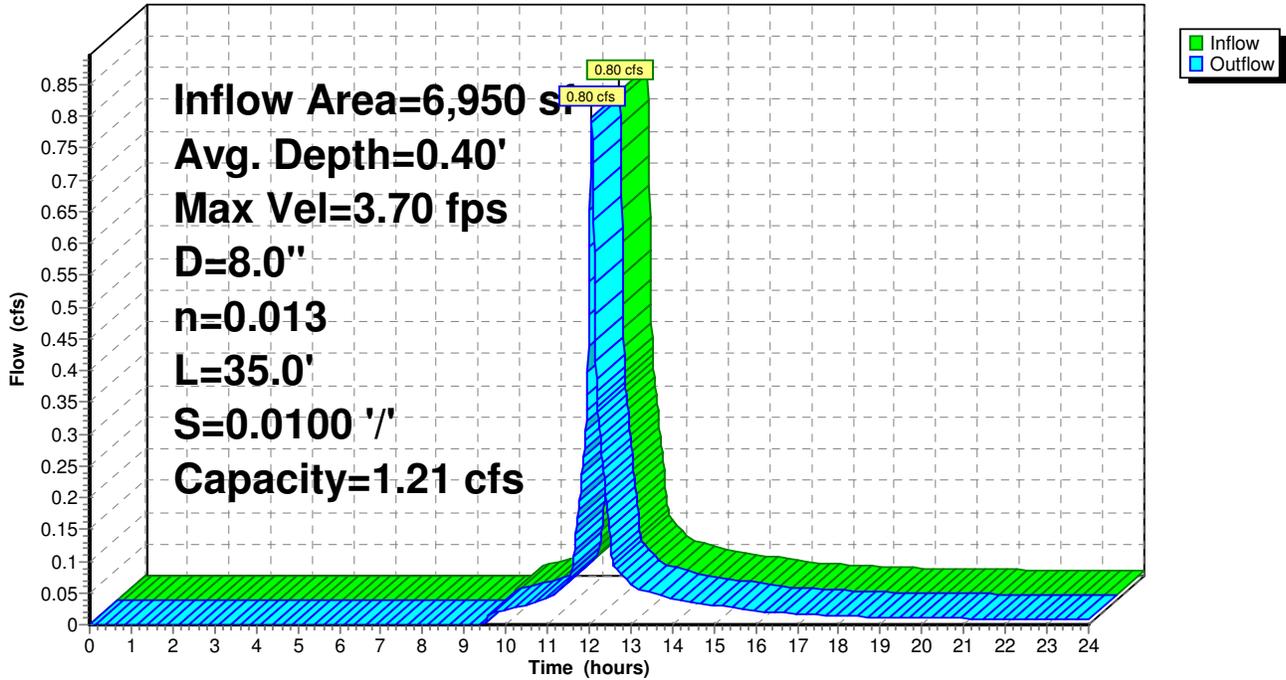
Peak Storage= 8 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 35.0' Slope= 0.0100 '/'
Inlet Invert= 106.58', Outlet Invert= 106.23'



Reach 67R: Culvert under Unit 12 Drive

Hydrograph



Reach 68R: Underdrain to CB 66

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

[79] Warning: Submerged Pond 8P Primary device # 7 INLET by 0.71'

Inflow Area =	44,069 sf,	Inflow Depth >	3.03"	for	25-Year event
Inflow =	2.45 cfs @	12.23 hrs,	Volume=	11,125 cf	
Outflow =	2.45 cfs @	12.23 hrs,	Volume=	11,125 cf,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 9.48 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 4.18 fps, Avg. Travel Time= 0.1 min

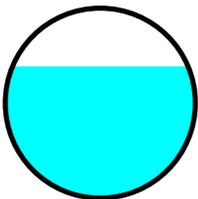
Peak Storage= 4 cf @ 12.23 hrs, Average Depth at Peak Storage= 0.46'

Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

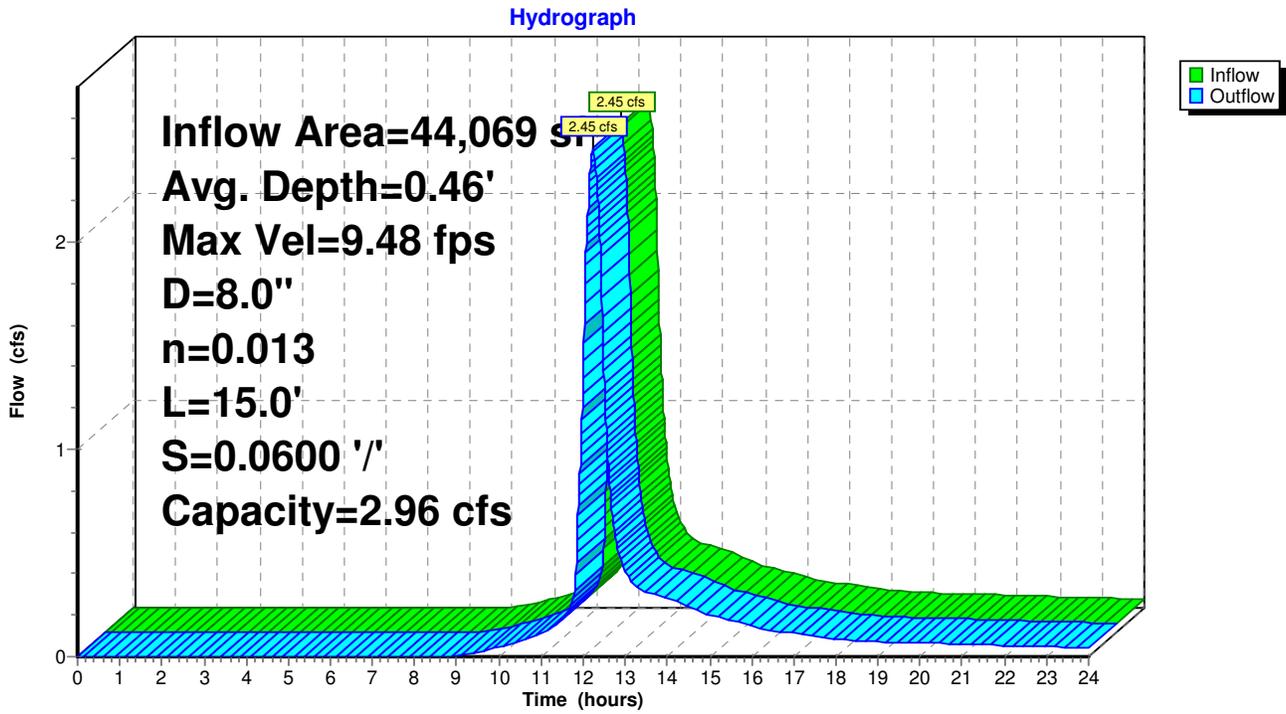
8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior

Length= 15.0' Slope= 0.0600 '/'

Inlet Invert= 107.25', Outlet Invert= 106.35'



Reach 68R: Underdrain to CB 66



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Reach 69R: Drain to DMH 52

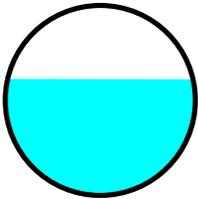
[52] Hint: Inlet conditions not evaluated

Inflow Area = 11,090 sf, Inflow Depth > 3.59" for 25-Year event
Inflow = 1.19 cfs @ 12.05 hrs, Volume= 3,320 cf
Outflow = 1.18 cfs @ 12.06 hrs, Volume= 3,320 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.28 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 0.3 min

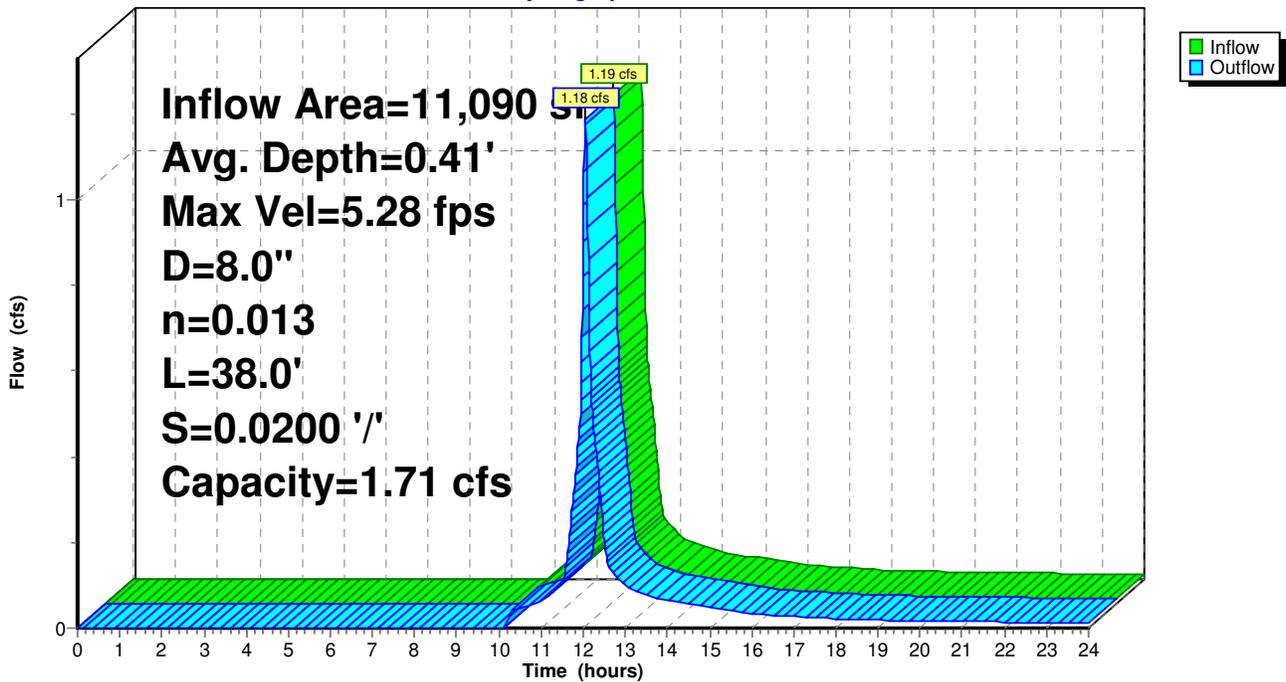
Peak Storage= 9 cf @ 12.05 hrs, Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.71 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 38.0' Slope= 0.0200 '/'
Inlet Invert= 103.69', Outlet Invert= 102.93'



Reach 69R: Drain to DMH 52

Hydrograph



Reach 114R: DMH 16 to DMH 14

FROM HYDROCAD WEBSITE:

[79] Warning:
{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

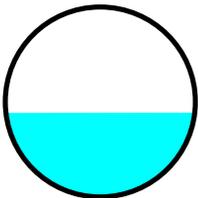
[52] Hint: Inlet conditions not evaluated
[79] Warning: Submerged Pond 111P Primary device # 1 INLET by 0.18'
[79] Warning: Submerged Pond 112P Primary device # 1 INLET by 0.12'

Inflow Area = 12,978 sf, Inflow Depth > 4.13" for 25-Year event
Inflow = 1.67 cfs @ 12.01 hrs, Volume= 4,462 cf
Outflow = 1.65 cfs @ 12.01 hrs, Volume= 4,461 cf, Atten= 1%, Lag= 0.3 min

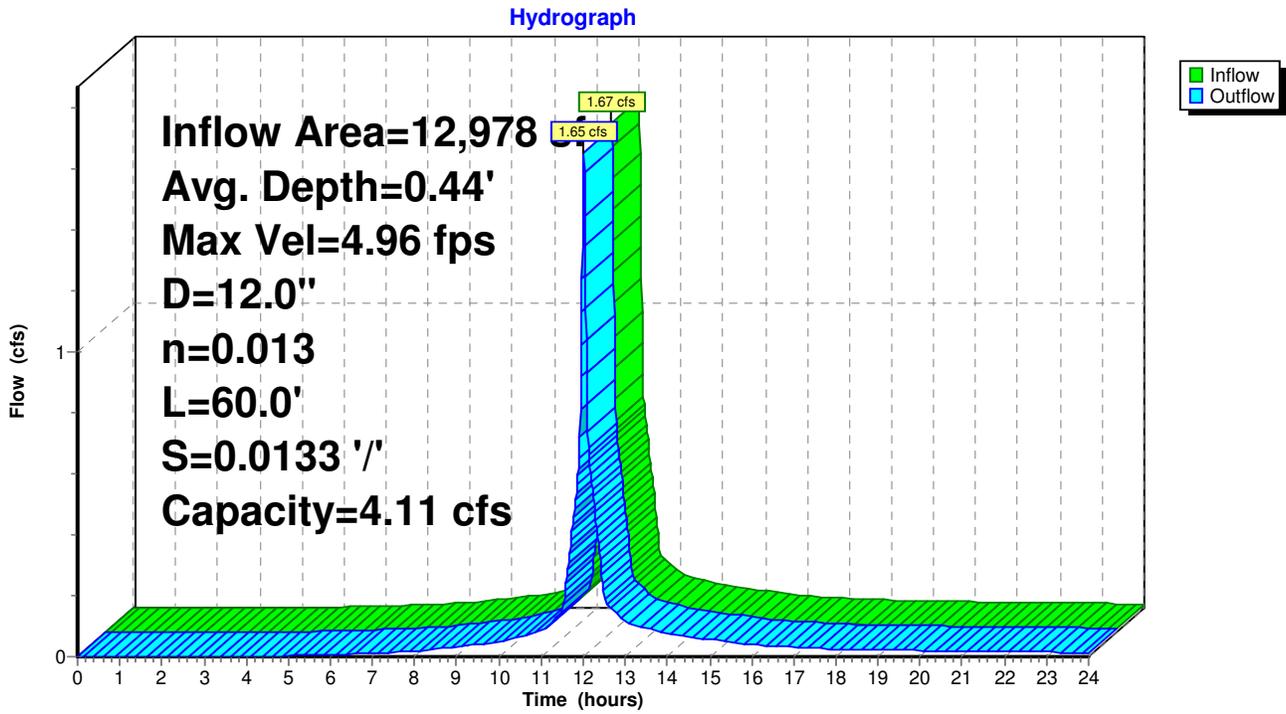
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.96 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.54 fps, Avg. Travel Time= 0.6 min

Peak Storage= 20 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.11 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 60.0' Slope= 0.0133 '/'
Inlet Invert= 103.48', Outlet Invert= 102.68'



Reach 114R: DMH 16 to DMH 14



Reach 118R: Swale from Drive at #4 to RG 116

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

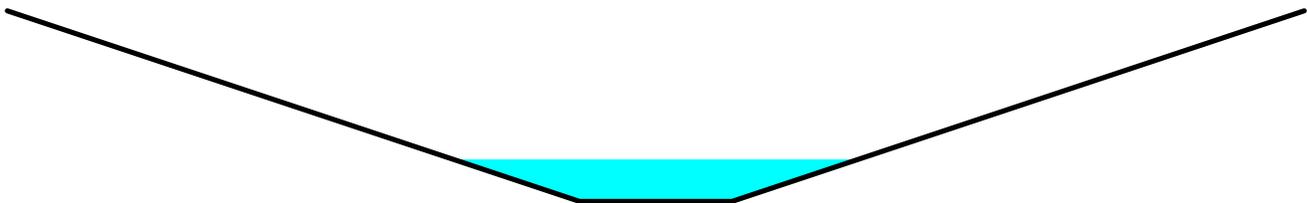
[79] Warning: Submerged Pond 119R Primary device # 1 OUTLET by 0.78'

Inflow Area =	18,760 sf,	Inflow Depth >	3.72"	for	25-Year event
Inflow =	2.05 cfs @	12.02 hrs,	Volume=	5,810 cf	
Outflow =	2.05 cfs @	12.02 hrs,	Volume=	5,810 cf,	Atten= 0%, Lag= 0.1 min

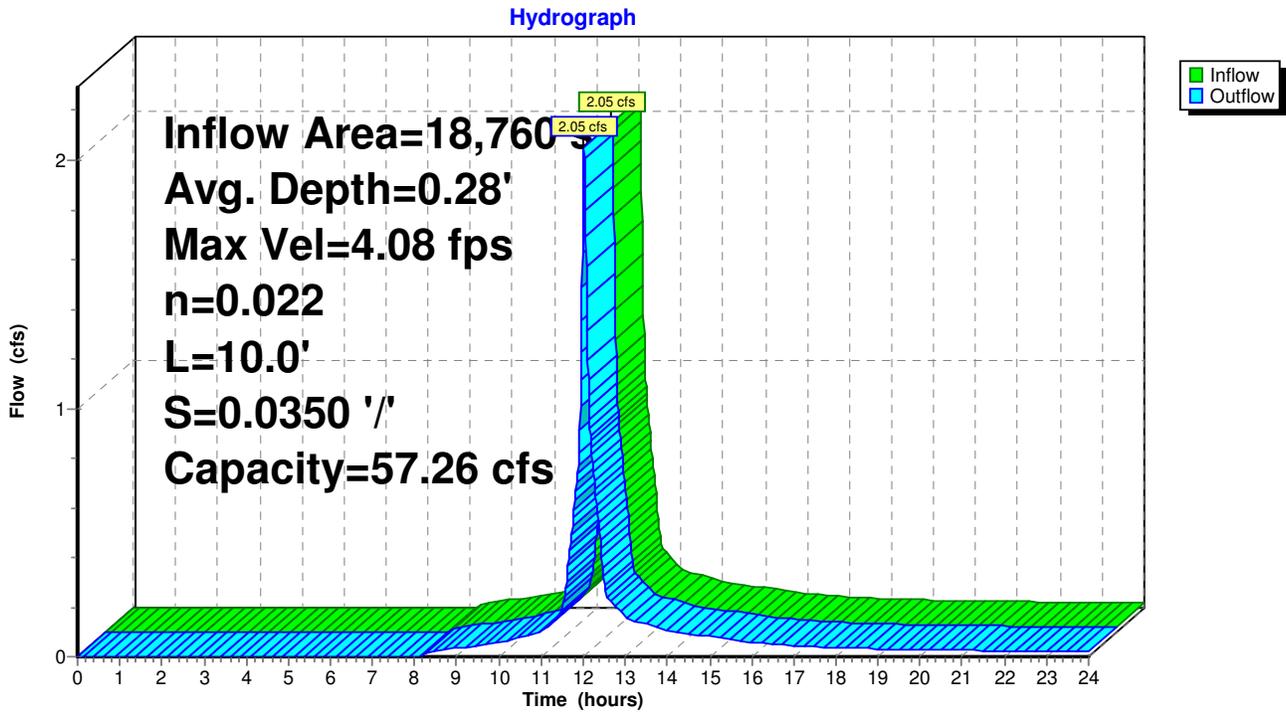
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.08 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 110.42', Outlet Invert= 110.07'



Reach 118R: Swale from Drive at #4 to RG 116



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Reach 127R: Swale from Drive at #3 to RG 118

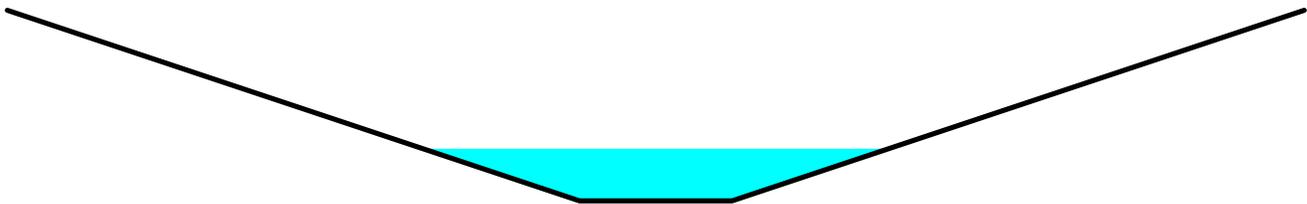
[61] Hint: Submerged 17% of Reach 128R bottom

Inflow Area = 13,016 sf, Inflow Depth > 5.16" for 25-Year event
Inflow = 2.08 cfs @ 12.03 hrs, Volume= 5,594 cf
Outflow = 2.08 cfs @ 12.03 hrs, Volume= 5,593 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.01 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 0.2 min

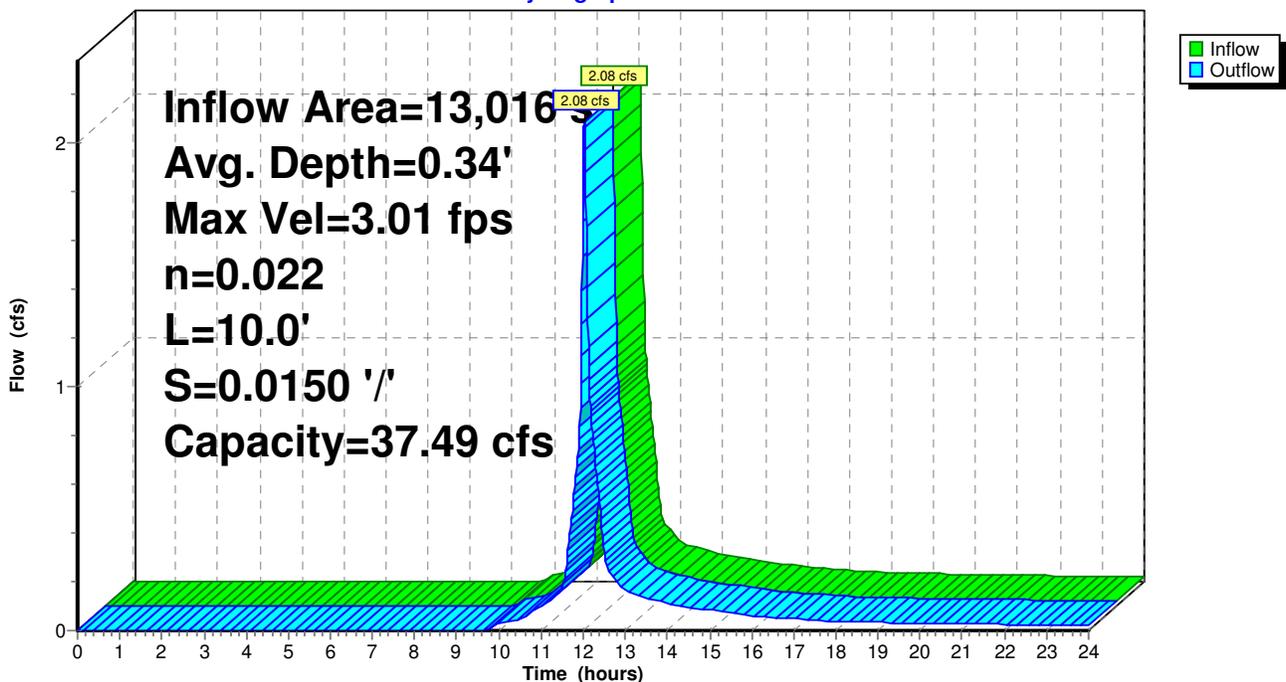
Peak Storage= 7 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 37.49 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0150 '/'
Inlet Invert= 110.00', Outlet Invert= 109.85'



Reach 127R: Swale from Drive at #3 to RG 118

Hydrograph



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Reach 128R: Culvert under Unit 3 Drive

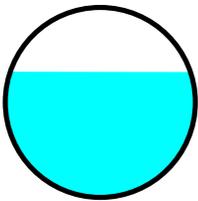
[52] Hint: Inlet conditions not evaluated

Inflow Area = 13,016 sf, Inflow Depth > 5.16" for 25-Year event
Inflow = 2.09 cfs @ 12.02 hrs, Volume= 5,594 cf
Outflow = 2.08 cfs @ 12.03 hrs, Volume= 5,594 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.54 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.24 fps, Avg. Travel Time= 0.2 min

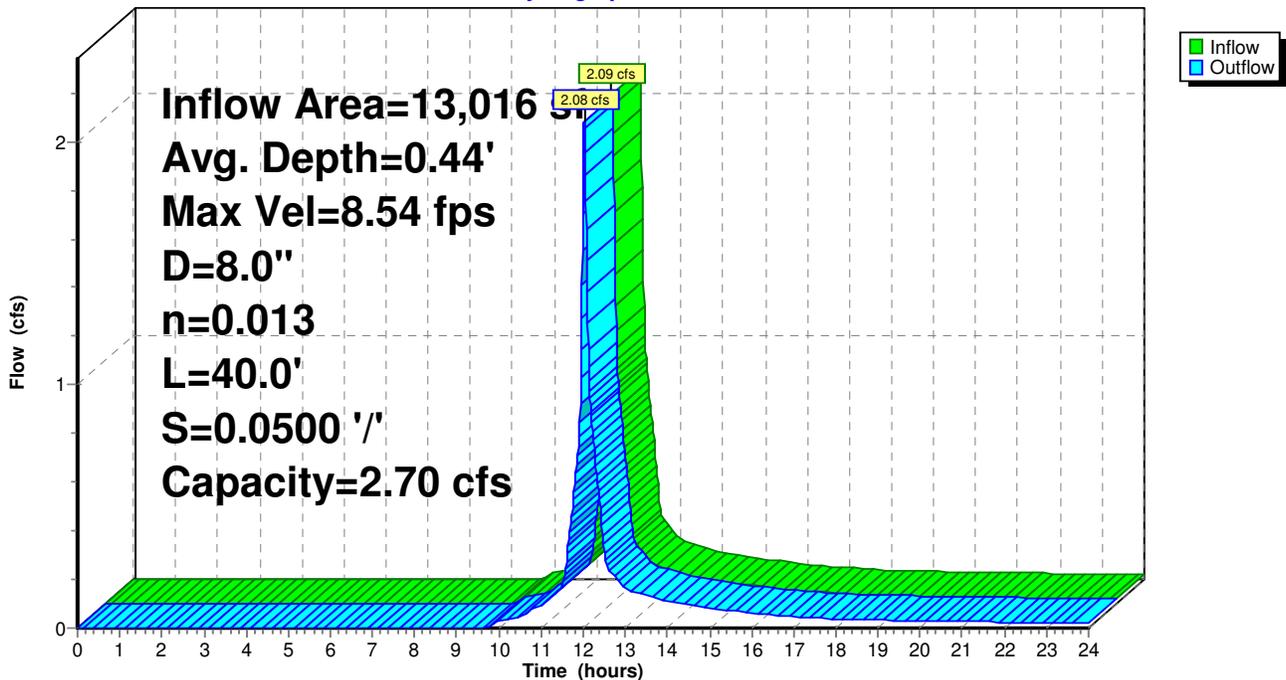
Peak Storage= 10 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.70 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 40.0' Slope= 0.0500 '/'
Inlet Invert= 112.00', Outlet Invert= 110.00'



Reach 128R: Culvert under Unit 3 Drive

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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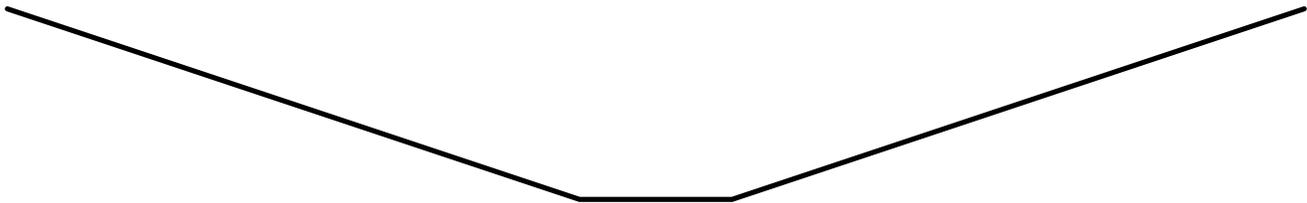
Reach 129R: Swale from Drive at #20 to RG 124

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

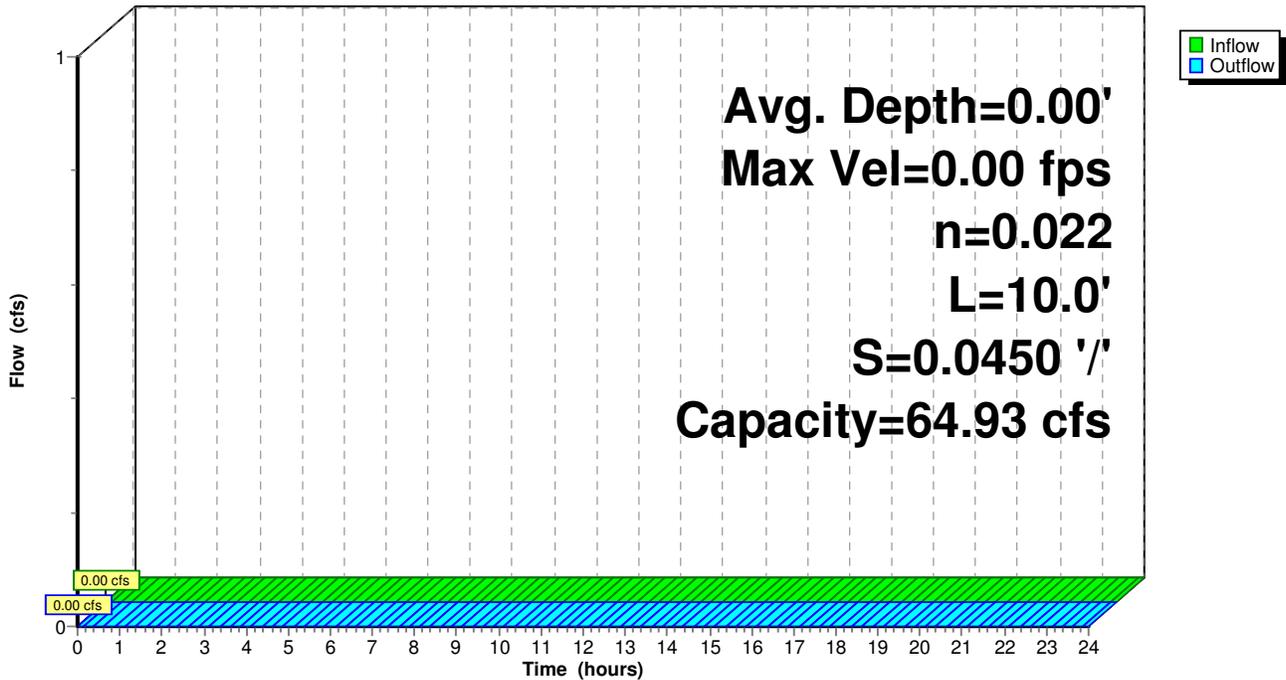
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 64.93 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0450 '/'
Inlet Invert= 115.37', Outlet Invert= 114.92'



Reach 129R: Swale from Drive at #20 to RG 124

Hydrograph



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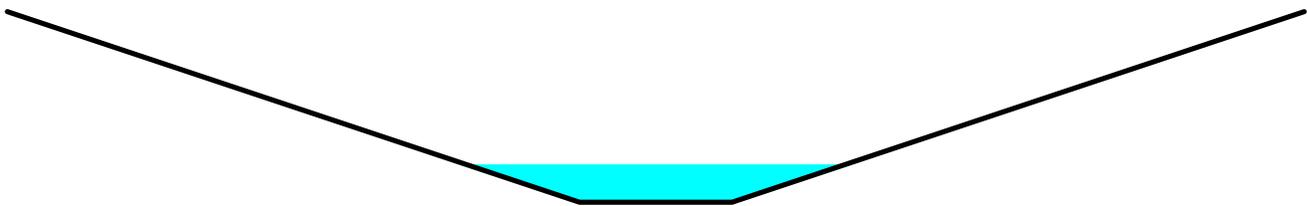
Reach 130R: Swale to RG 122

Inflow Area = 6,950 sf, Inflow Depth > 7.23" for 25-Year event
Inflow = 1.67 cfs @ 12.01 hrs, Volume= 4,185 cf
Outflow = 1.65 cfs @ 12.02 hrs, Volume= 4,184 cf, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 0.4 min

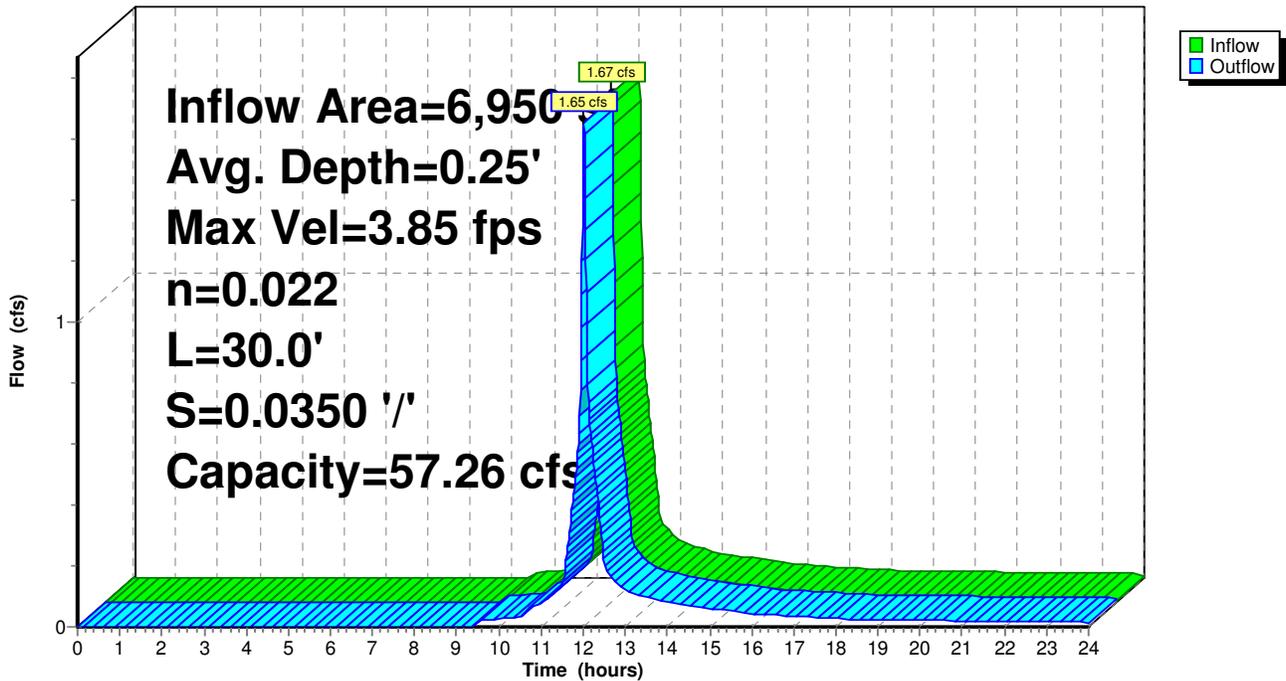
Peak Storage= 13 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 30.0' Slope= 0.0350 '/'
Inlet Invert= 114.25', Outlet Invert= 113.20'



Reach 130R: Swale to RG 122

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Reach 131R: Culvert under Unit 20 Drive

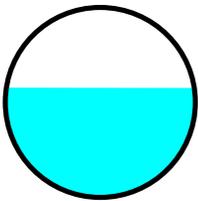
[52] Hint: Inlet conditions not evaluated

Inflow Area = 6,950 sf, Inflow Depth > 3.24" for 25-Year event
Inflow = 0.77 cfs @ 12.01 hrs, Volume= 1,877 cf
Outflow = 0.76 cfs @ 12.02 hrs, Volume= 1,877 cf, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.66 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 0.6 min

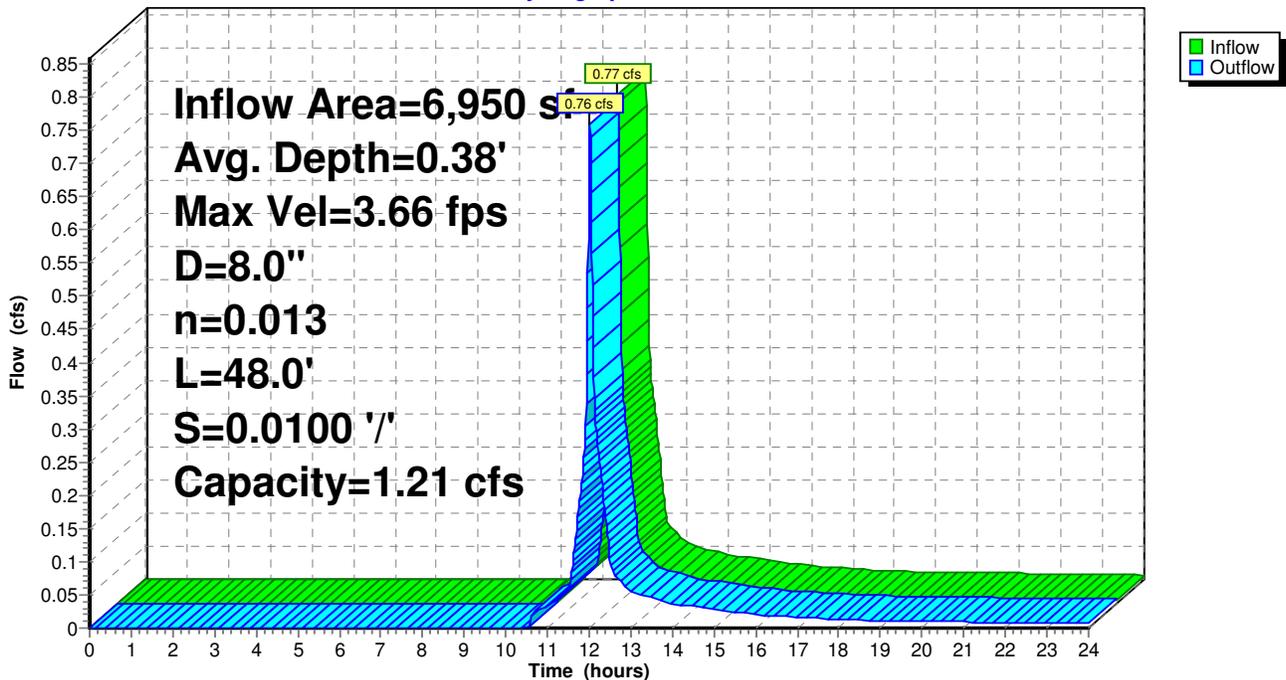
Peak Storage= 10 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 48.0' Slope= 0.0100 '/'
Inlet Invert= 115.85', Outlet Invert= 115.37'



Reach 131R: Culvert under Unit 20 Drive

Hydrograph



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Reach 137R: Swale Back of 7,6,5

Inflow Area = 13,850 sf, Inflow Depth > 3.06" for 25-Year event
Inflow = 1.27 cfs @ 12.05 hrs, Volume= 3,532 cf
Outflow = 1.23 cfs @ 12.08 hrs, Volume= 3,525 cf, Atten= 3%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.78 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.50 fps, Avg. Travel Time= 4.7 min

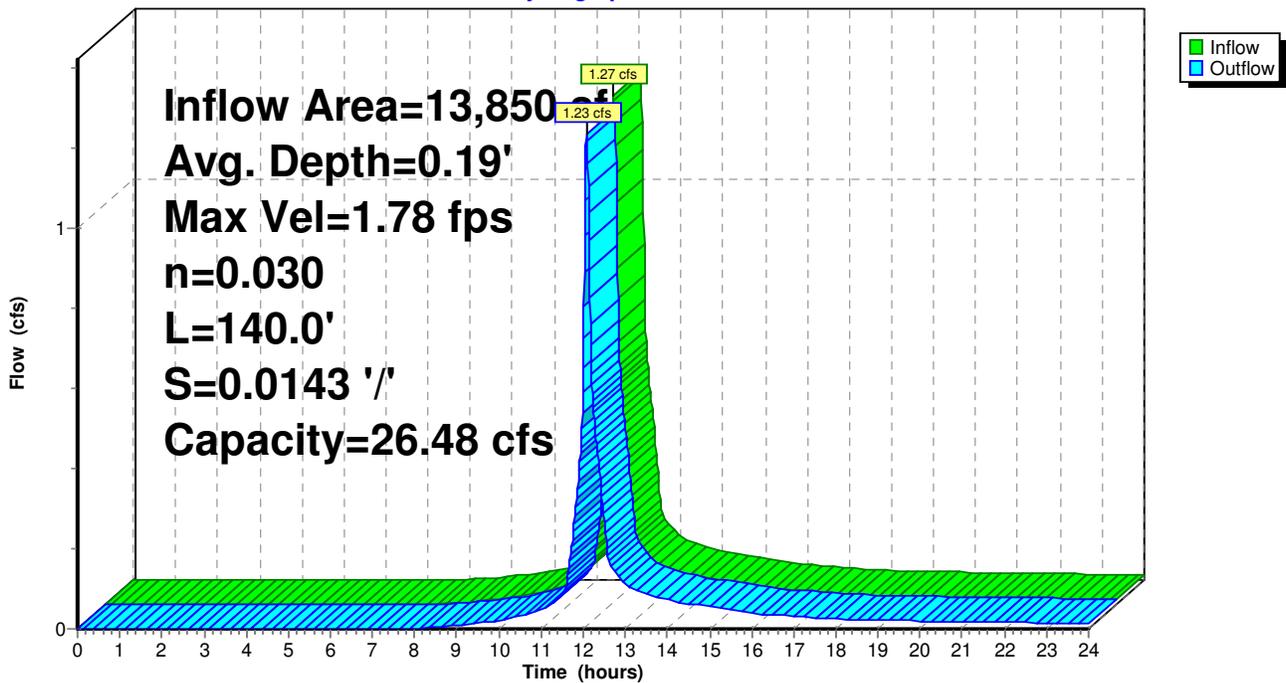
Peak Storage= 97 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.48 cfs

3.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 140.0' Slope= 0.0143 '/'
Inlet Invert= 118.00', Outlet Invert= 116.00'



Reach 137R: Swale Back of 7,6,5

Hydrograph



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Reach 138R: Swale Back of 4

[61] Hint: Submerged 20% of Reach 137R bottom

Inflow Area = 34,910 sf, Inflow Depth > 2.89" for 25-Year event
Inflow = 2.87 cfs @ 12.08 hrs, Volume= 8,408 cf
Outflow = 2.82 cfs @ 12.11 hrs, Volume= 8,397 cf, Atten= 2%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.15 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 3.4 min

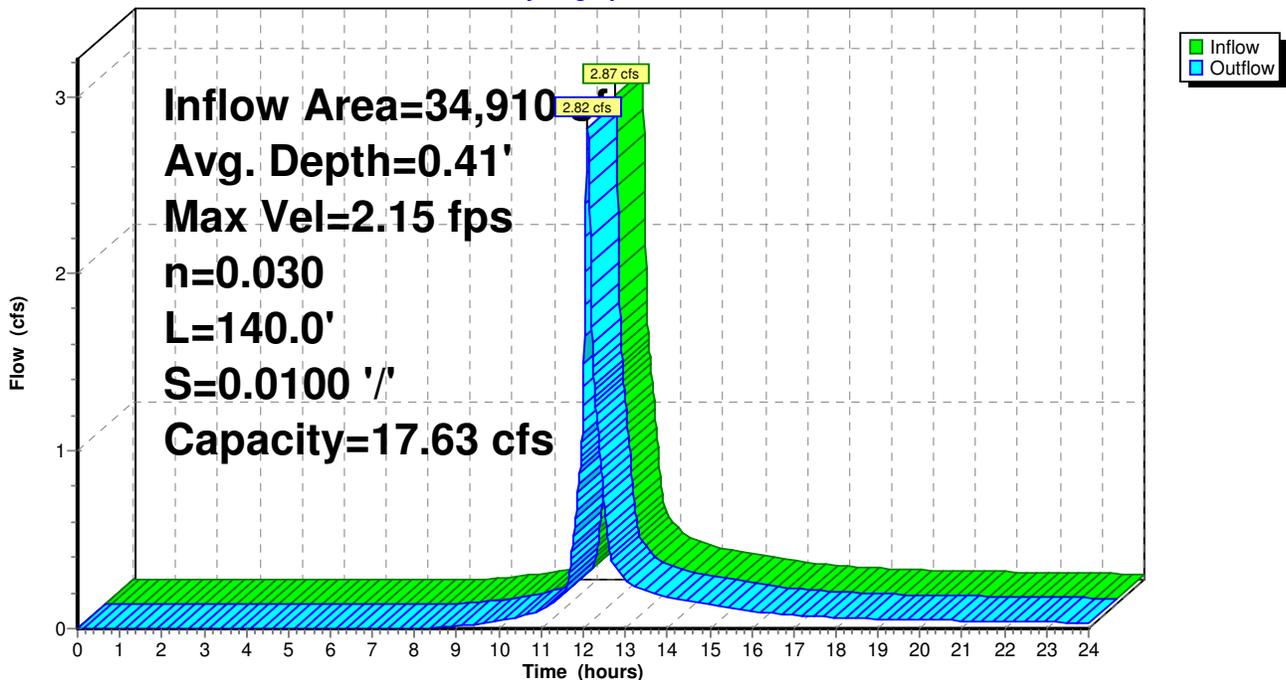
Peak Storage= 183 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 17.63 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 116.00', Outlet Invert= 114.60'



Reach 138R: Swale Back of 4

Hydrograph



Reach 149R: DMH 14 to DMH 12

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

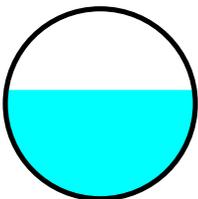
[61] Hint: Submerged 95% of Reach 114R bottom

Inflow Area =	86,324 sf,	Inflow Depth > 3.67"	for 25-Year event
Inflow =	8.05 cfs @ 12.03 hrs,	Volume=	26,431 cf
Outflow =	8.04 cfs @ 12.04 hrs,	Volume=	26,426 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.67 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 0.6 min

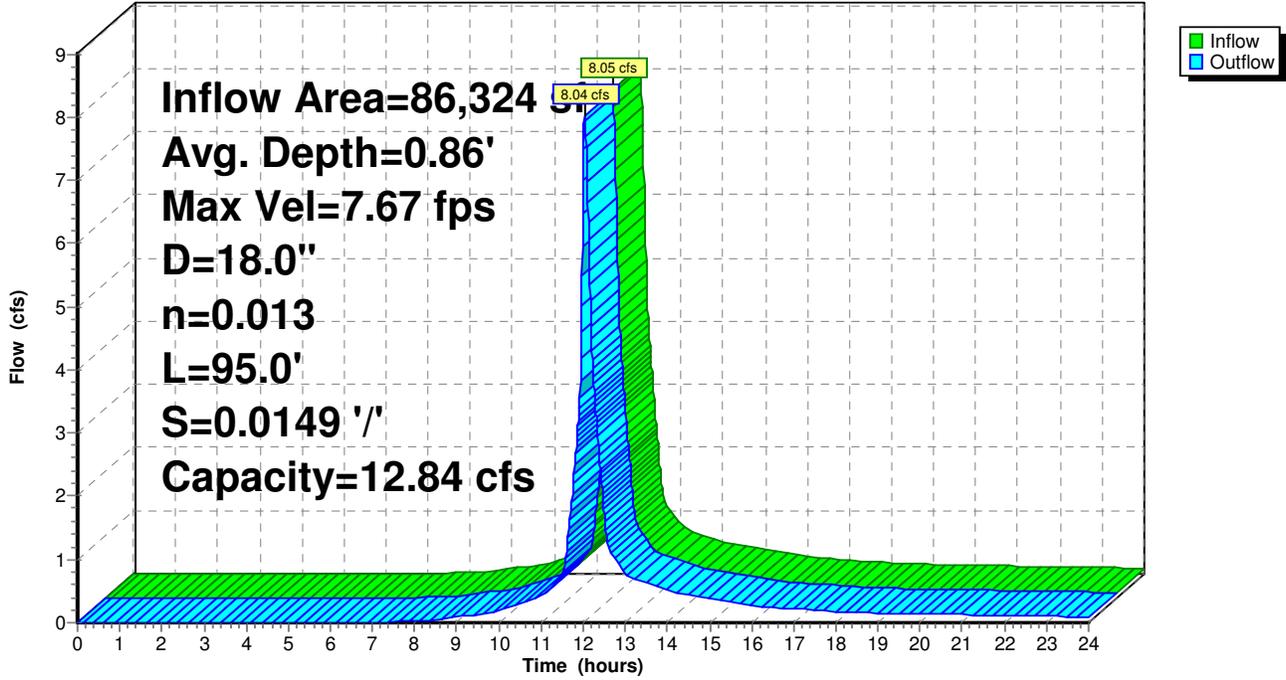
Peak Storage= 100 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.84 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 95.0' Slope= 0.0149 '/'
Inlet Invert= 102.58', Outlet Invert= 101.16'



Reach 149R: DMH 14 to DMH 12

Hydrograph



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Reach 150R: DMH 12 to HW 10 - Outlet

[52] Hint: Inlet conditions not evaluated

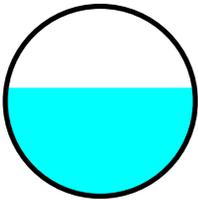
[61] Hint: Submerged 53% of Reach 149R bottom

Inflow Area = 86,324 sf, Inflow Depth > 3.67" for 25-Year event
Inflow = 8.04 cfs @ 12.04 hrs, Volume= 26,426 cf
Outflow = 8.03 cfs @ 12.04 hrs, Volume= 26,423 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.70 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.46 fps, Avg. Travel Time= 0.4 min

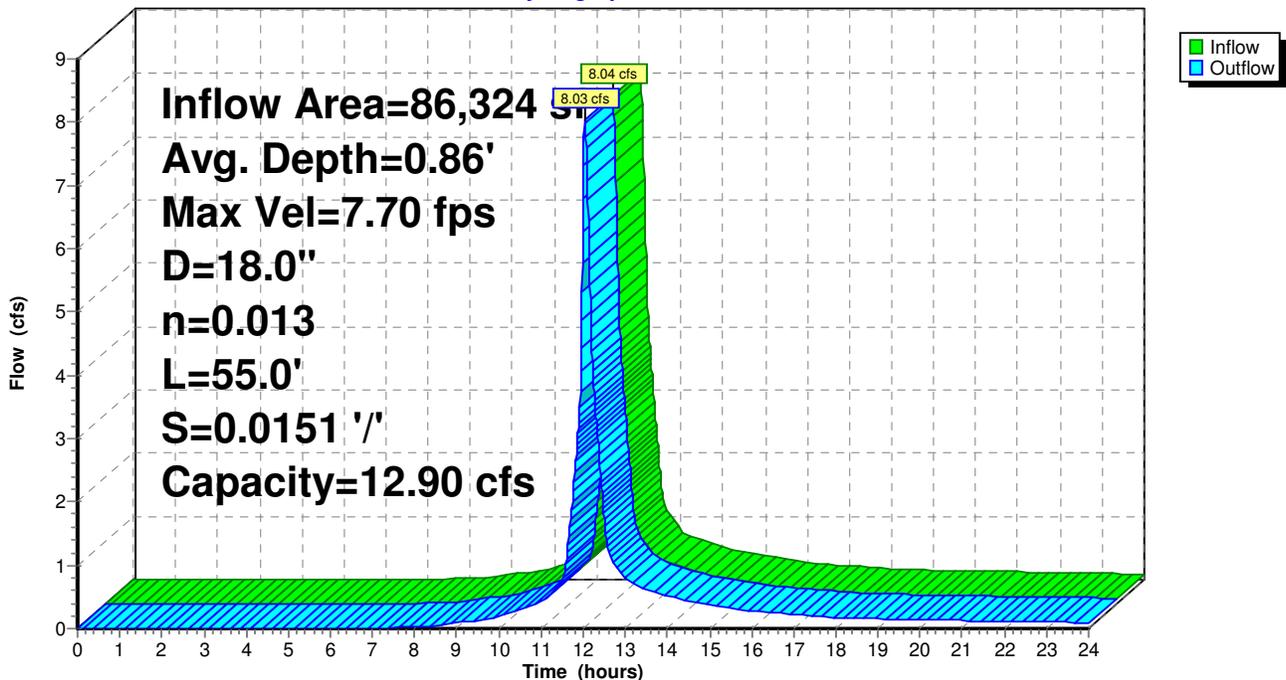
Peak Storage= 57 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.90 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 55.0' Slope= 0.0151 '/'
Inlet Invert= 101.06', Outlet Invert= 100.23'



Reach 150R: DMH 12 to HW 10 - Outlet

Hydrograph



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Reach 153R: CB 116 to DMH 14

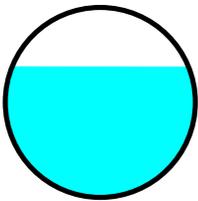
[52] Hint: Inlet conditions not evaluated

Inflow Area = 21,810 sf, Inflow Depth > 3.76" for 25-Year event
Inflow = 2.42 cfs @ 12.02 hrs, Volume= 6,826 cf
Outflow = 2.42 cfs @ 12.02 hrs, Volume= 6,826 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.46 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.58 fps, Avg. Travel Time= 0.1 min

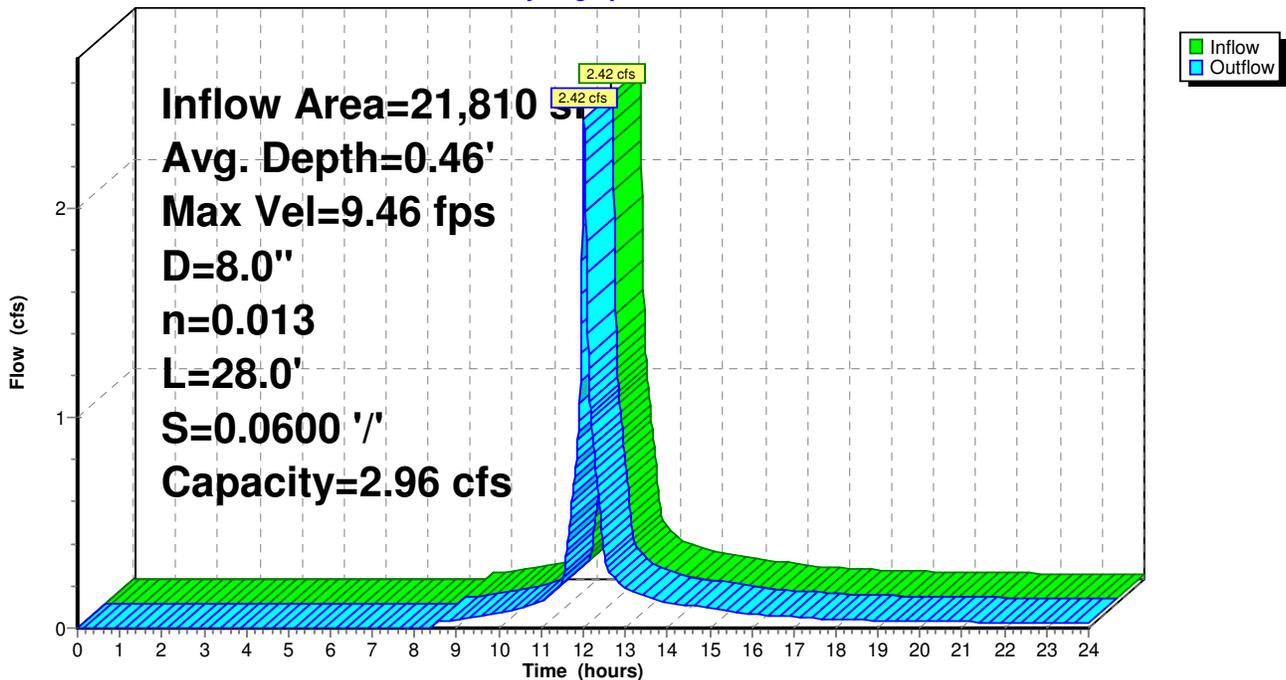
Peak Storage= 7 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 28.0' Slope= 0.0600 '/'
Inlet Invert= 107.12', Outlet Invert= 105.44'



Reach 153R: CB 116 to DMH 14

Hydrograph



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Reach 154R: Swale from Drive at #6 to RG 126

[43] Hint: Has no inflow (Outflow=Zero)

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'

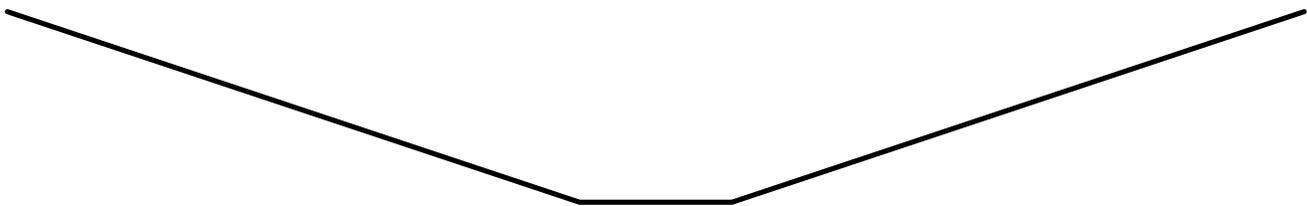
Bank-Full Depth= 1.25', Capacity at Bank-Full= 29.18 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 3.0 '/' Top Width= 8.50'

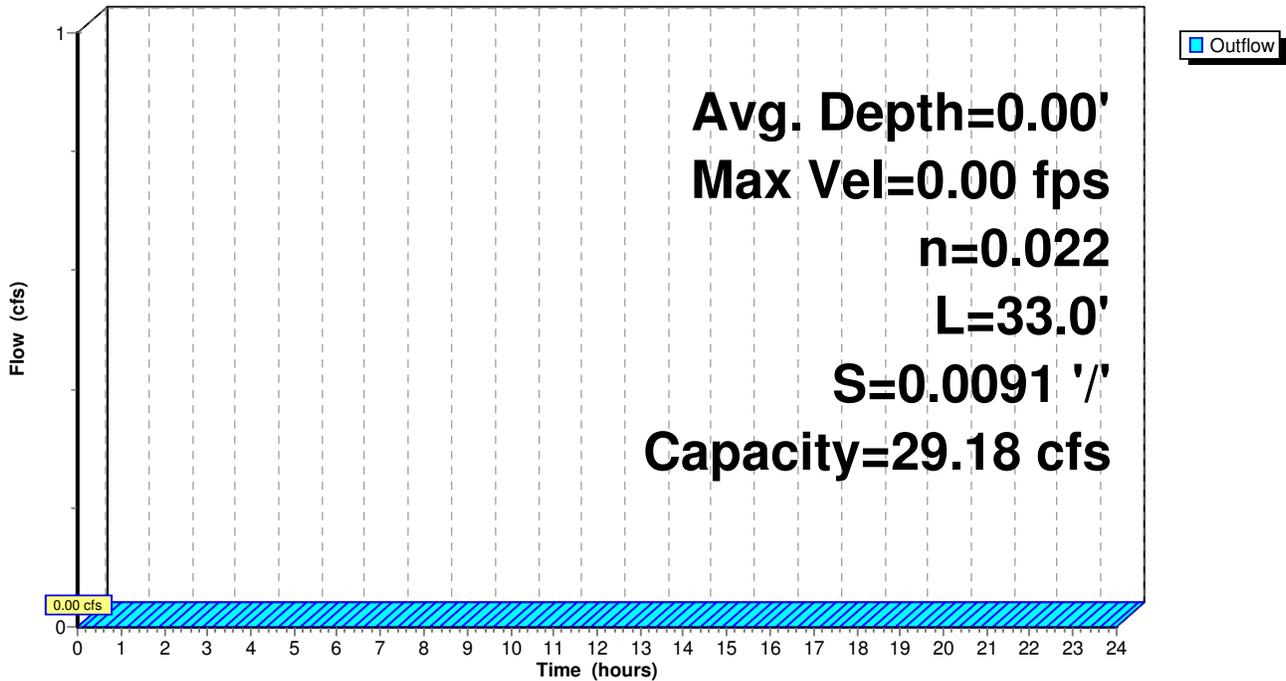
Length= 33.0' Slope= 0.0091 '/'

Inlet Invert= 115.65', Outlet Invert= 115.35'



Reach 154R: Swale from Drive at #6 to RG 126

Hydrograph



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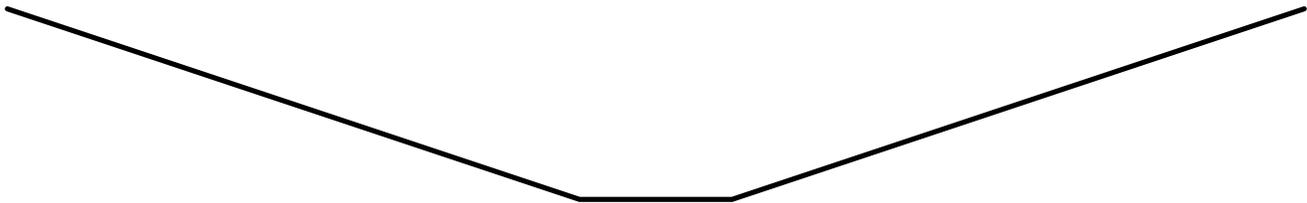
Reach 155R: Swale from Drive at #5 to RG 120

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

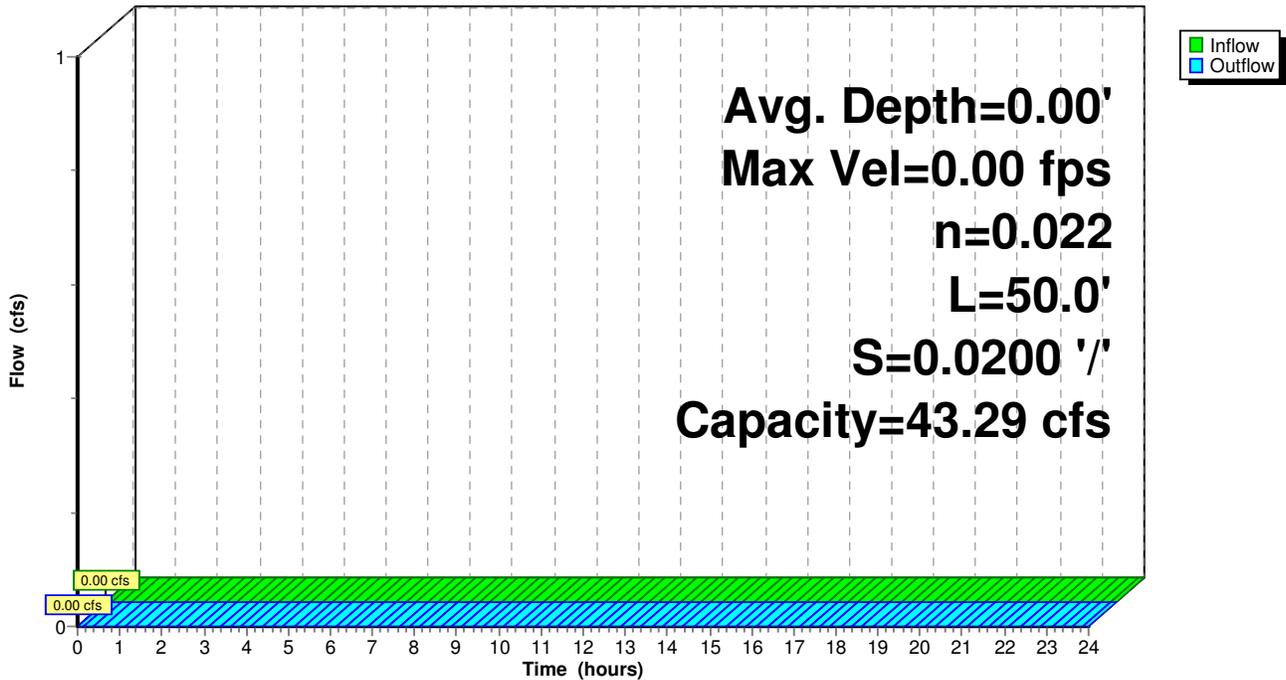
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 43.29 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 50.0' Slope= 0.0200 '/'
Inlet Invert= 114.00', Outlet Invert= 113.00'



Reach 155R: Swale from Drive at #5 to RG 120

Hydrograph



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Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

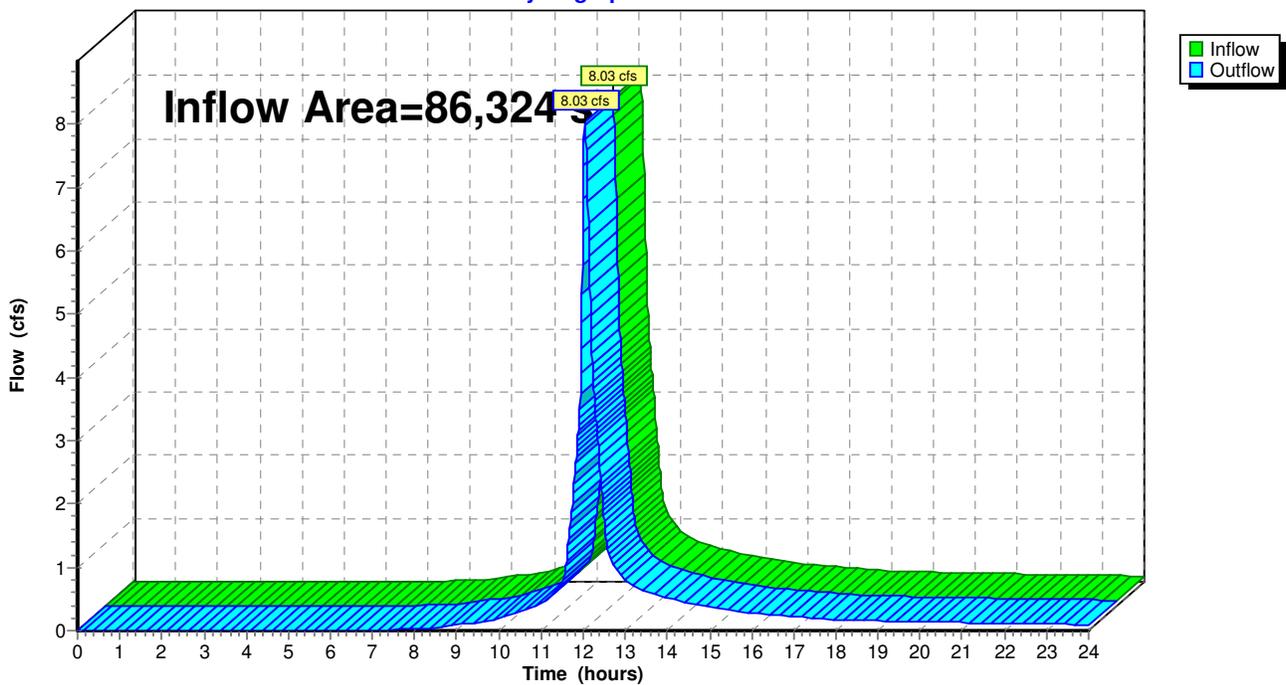
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 86,324 sf, Inflow Depth > 3.67" for 25-Year event
Inflow = 8.03 cfs @ 12.04 hrs, Volume= 26,423 cf
Outflow = 8.03 cfs @ 12.04 hrs, Volume= 26,423 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

Hydrograph



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Reach 220R: CB 56 to DMH 52

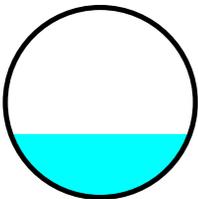
[52] Hint: Inlet conditions not evaluated

Inflow Area =	8,660 sf,	Inflow Depth > 3.64"	for 25-Year event
Inflow =	0.85 cfs @ 12.08 hrs,	Volume=	2,629 cf
Outflow =	0.85 cfs @ 12.08 hrs,	Volume=	2,629 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.72 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.26 fps, Avg. Travel Time= 0.2 min

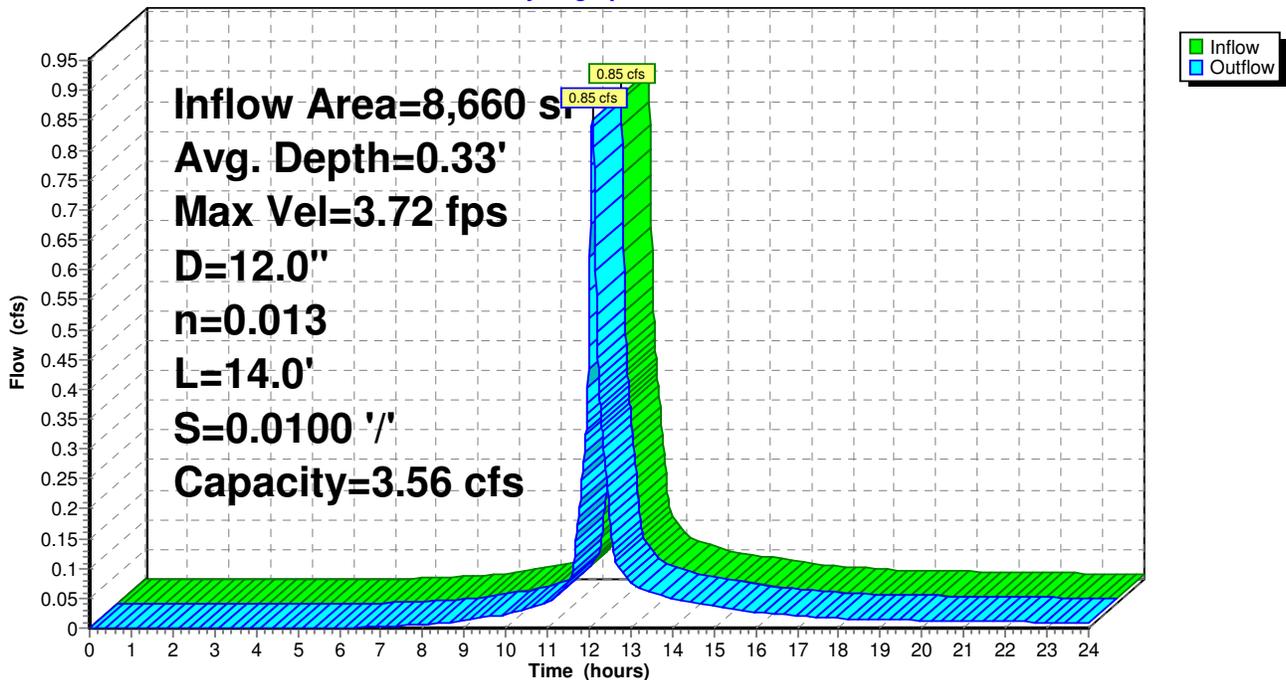
Peak Storage= 3 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.33'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
 Length= 14.0' Slope= 0.0100 '/'
 Inlet Invert= 102.72', Outlet Invert= 102.58'



Reach 220R: CB 56 to DMH 52

Hydrograph



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Reach 222R: CB 54 to DMH 52

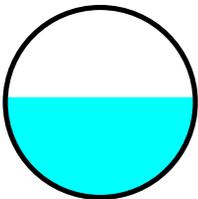
[52] Hint: Inlet conditions not evaluated

Inflow Area = 20,970 sf, Inflow Depth > 3.35" for 25-Year event
Inflow = 1.95 cfs @ 12.07 hrs, Volume= 5,847 cf
Outflow = 1.95 cfs @ 12.08 hrs, Volume= 5,846 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.64 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.63 fps, Avg. Travel Time= 0.2 min

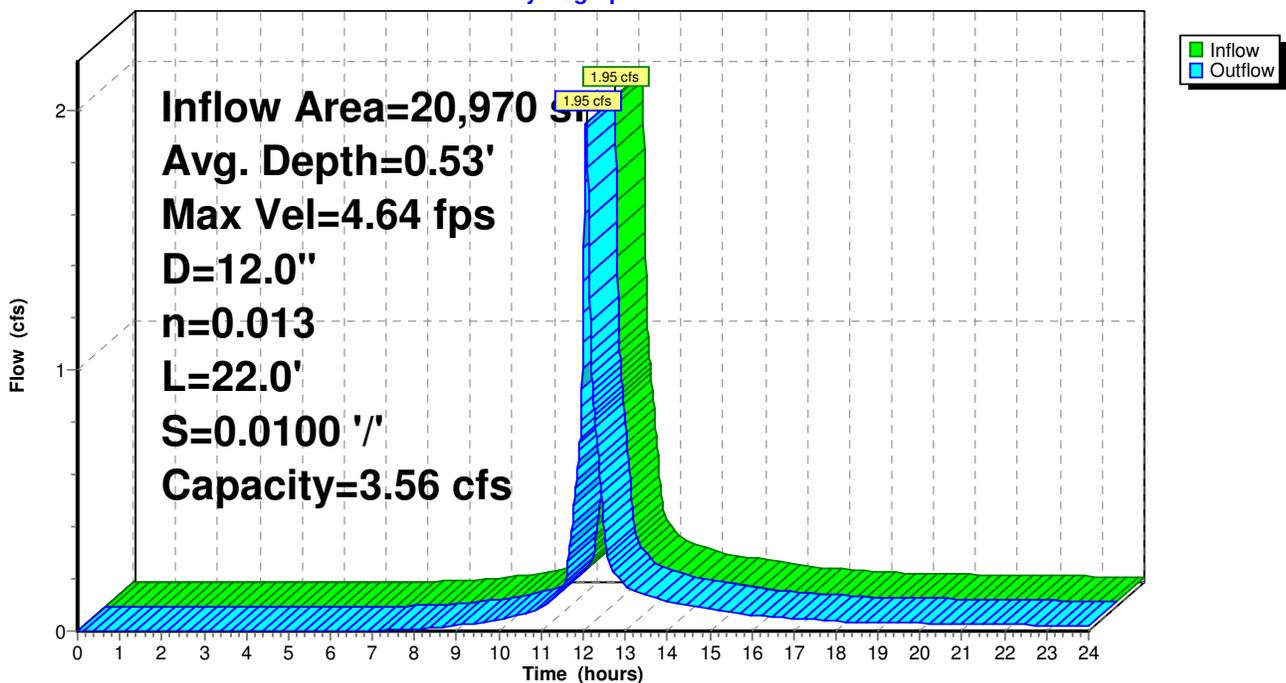
Peak Storage= 9 cf @ 12.07 hrs, Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 22.0' Slope= 0.0100 '/'
Inlet Invert= 102.80', Outlet Invert= 102.58'



Reach 222R: CB 54 to DMH 52

Hydrograph



Reach 403R: CB 65 to DMH 50

FROM HYDROCAD WEBSITE:

[79] Warning:
{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

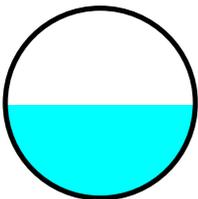
[79] Warning: Submerged Pond 67P Primary device # 1 OUTLET by 0.35'

Inflow Area =	44,069 sf,	Inflow Depth >	3.03"	for	25-Year event
Inflow =	2.45 cfs @	12.23 hrs,	Volume=	11,125 cf	
Outflow =	2.45 cfs @	12.23 hrs,	Volume=	11,124 cf,	Atten= 0%, Lag= 0.1 min

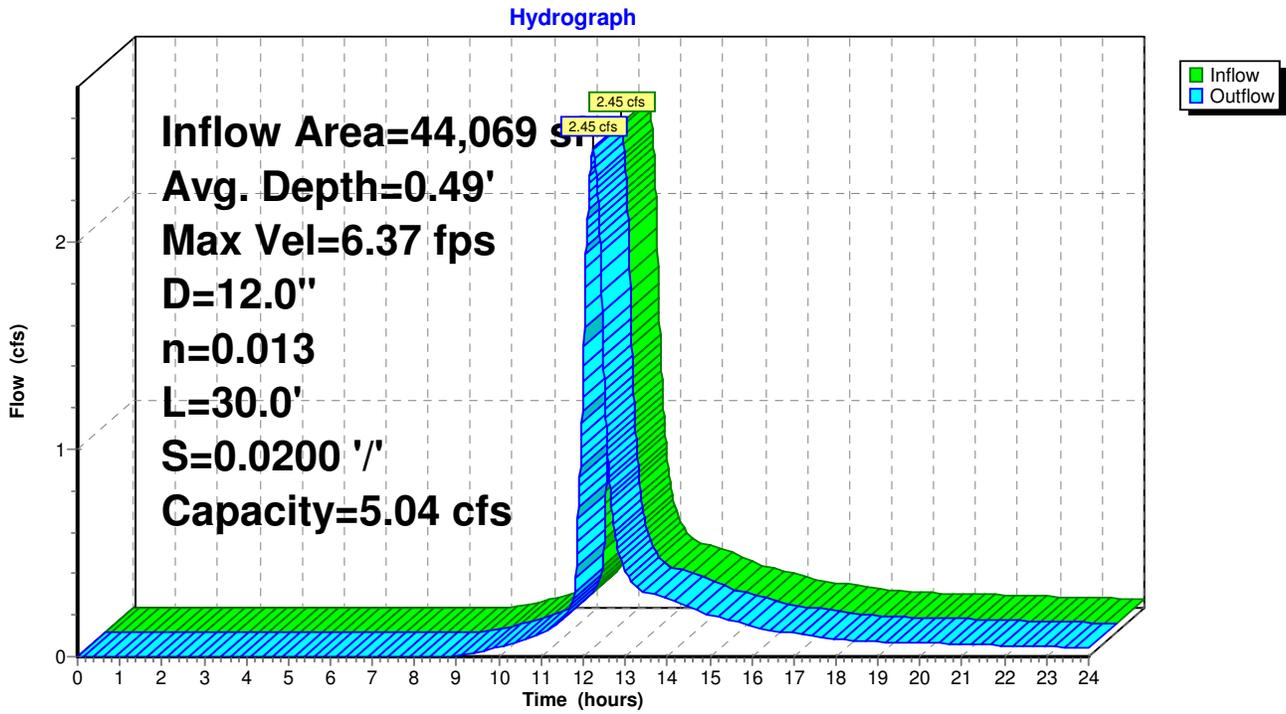
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.37 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.71 fps, Avg. Travel Time= 0.2 min

Peak Storage= 12 cf @ 12.23 hrs, Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.04 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 30.0' Slope= 0.0200 '/'
Inlet Invert= 102.22', Outlet Invert= 101.62'



Reach 403R: CB 65 to DMH 50



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Reach 902R: Existing wetland channel to WF 13

[61] Hint: Submerged 3% of Reach 1R bottom

Inflow Area = 201,436 sf, Inflow Depth > 2.82" for 25-Year event
Inflow = 12.16 cfs @ 12.17 hrs, Volume= 47,287 cf
Outflow = 12.15 cfs @ 12.18 hrs, Volume= 47,269 cf, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.64 fps, Avg. Travel Time= 1.0 min

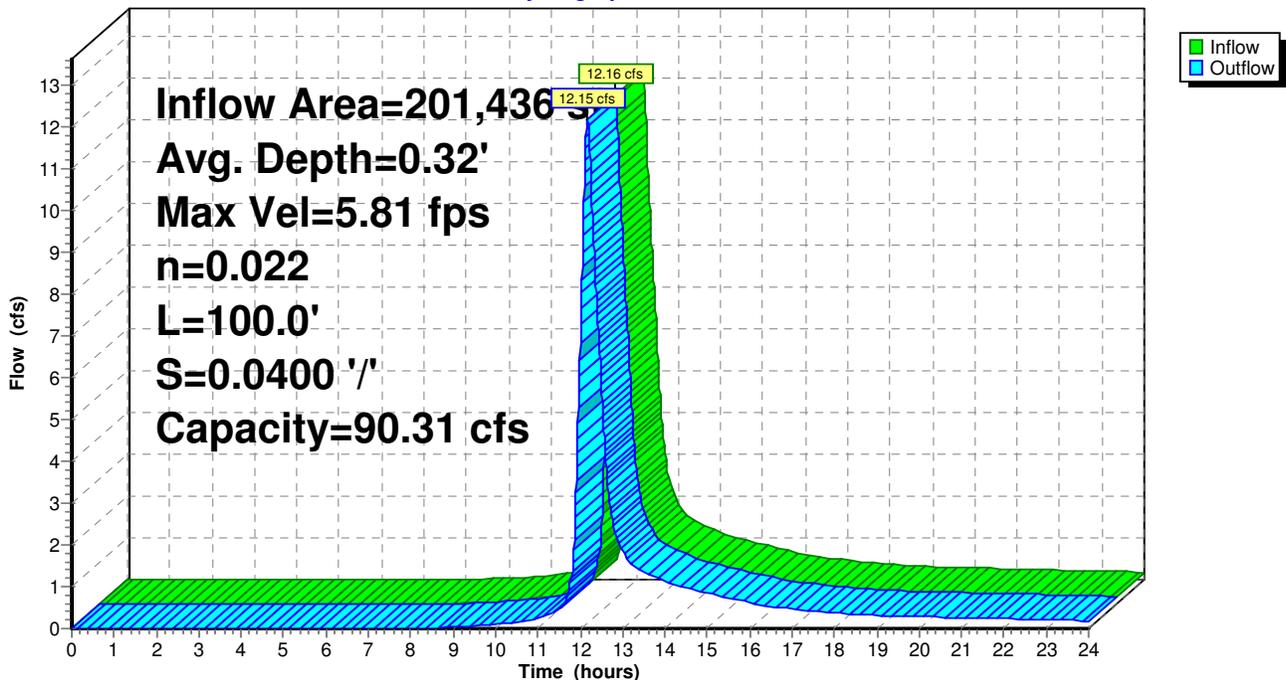
Peak Storage= 209 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0400 '/'
Inlet Invert= 86.00', Outlet Invert= 82.00'



Reach 902R: Existing wetland channel to WF 13

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 2P: Recharge System

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT:: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[81] Warning: Exceeded Pond 218R by 1.69' @ 23.99 hrs

Inflow Area =	111,470 sf,	Inflow Depth >	3.23"	for	25-Year event
Inflow =	7.95 cfs @	12.09 hrs,	Volume=	29,970 cf	
Outflow =	7.44 cfs @	12.13 hrs,	Volume=	26,415 cf,	Atten= 6%, Lag= 2.4 min
Discarded =	0.01 cfs @	8.12 hrs,	Volume=	471 cf	
Primary =	7.43 cfs @	12.13 hrs,	Volume=	25,945 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 104.73' @ 12.13 hrs Surf.Area= 2,016 sf Storage= 4,672 cf

Plug-Flow detention time= 80.4 min calculated for 26,415 cf (88% of inflow)
Center-of-Mass det. time= 26.1 min (850.1 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	3,138 cf	42.00'W x 48.00'L x 5.00'H 100 10,080 cf Overall - 2,235 cf Embedded = 7,845 cf x 40.0% Voids
#2	101.00'	2,235 cf	47.8"W x 30.0"H x 6.25'L Cultec R-330 x 48 Inside #1
		5,373 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area
#2	Primary	103.22'	18.0" x 75.0' long Culvert Ke= 0.500 Outlet Invert= 102.09' S= 0.0151 '/' Cc= 0.900 n= 0.013
#3	Secondary	106.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600

Discarded OutFlow Max=0.01 cfs @ 8.12 hrs HW=100.65' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=7.41 cfs @ 12.13 hrs HW=104.73' (Free Discharge)

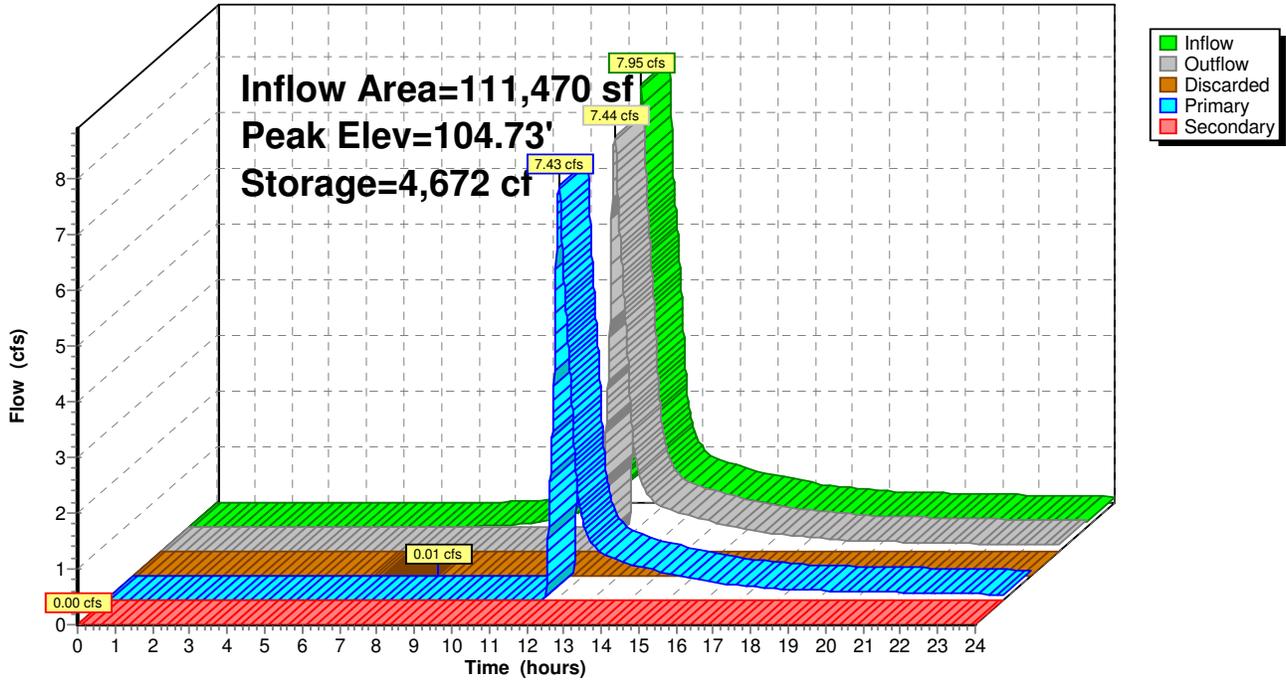
↑**2=Culvert** (Inlet Controls 7.41 cfs @ 4.20 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.60' (Free Discharge)

↑**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Recharge System

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 3P: Culvert under Drive Unit 10

[57] Hint: Peaked at 114.87' (Flood elevation advised)

Inflow Area = 6,950 sf, Inflow Depth > 3.95" for 25-Year event
Inflow = 0.81 cfs @ 12.04 hrs, Volume= 2,289 cf
Outflow = 0.81 cfs @ 12.04 hrs, Volume= 2,289 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.81 cfs @ 12.04 hrs, Volume= 2,289 cf

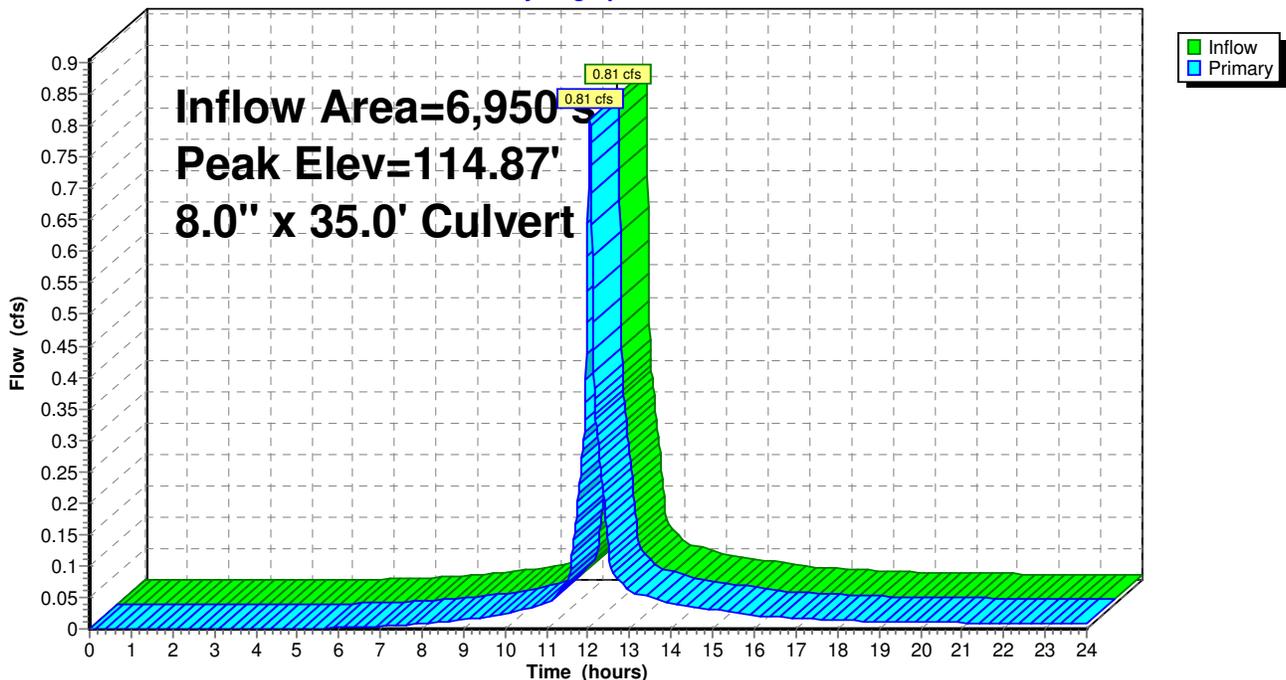
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.87' @ 12.04 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	114.27'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 113.92' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.81 cfs @ 12.04 hrs HW=114.86' (Free Discharge)
↑1=Culvert (Barrel Controls 0.81 cfs @ 3.25 fps)

Pond 3P: Culvert under Drive Unit 10

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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 4P: Culvert under Drive Unit 11

[57] Hint: Peaked at 110.91' (Flood elevation advised)

[61] Hint: Submerged 16% of Reach 2R bottom

Inflow Area = 6,950 sf, Inflow Depth > 3.95" for 25-Year event
Inflow = 0.80 cfs @ 12.05 hrs, Volume= 2,289 cf
Outflow = 0.80 cfs @ 12.05 hrs, Volume= 2,289 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.05 hrs, Volume= 2,289 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 110.91' @ 12.05 hrs

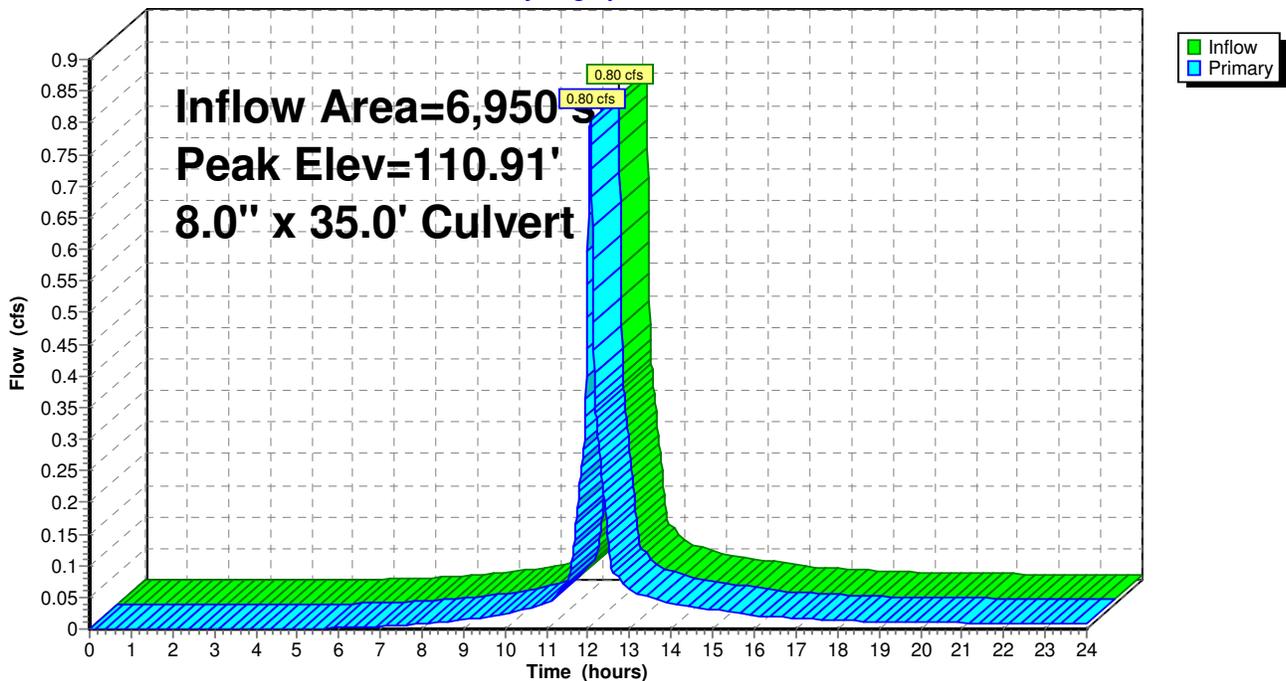
Device #	Routing	Invert	Outlet Devices
#1	Primary	110.32'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 109.97' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.80 cfs @ 12.05 hrs HW=110.91' (Free Discharge)

↑1=Culvert (Barrel Controls 0.80 cfs @ 3.25 fps)

Pond 4P: Culvert under Drive Unit 11

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 8P: Main Cell - Bio Retention

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[63] Warning: Exceeded Reach 62R inflow depth by 0.32' @ 12.27 hrs

Inflow Area =	44,069 sf,	Inflow Depth >	3.08"	for	25-Year event
Inflow =	2.89 cfs @	12.15 hrs,	Volume=	11,300 cf	
Outflow =	2.45 cfs @	12.23 hrs,	Volume=	11,125 cf,	Atten= 15%, Lag= 4.6 min
Primary =	2.45 cfs @	12.23 hrs,	Volume=	11,125 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 111.63' @ 12.23 hrs Surf.Area= 1,156 sf Storage= 1,190 cf

Plug-Flow detention time= 26.4 min calculated for 11,121 cf (98% of inflow)
Center-of-Mass det. time= 17.3 min (839.9 - 822.5)

Volume #1	Invert 109.74'	Avail.Storage 2,193 cf	Storage Description Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
109.74	0	0	0	
109.75	350	2	2	
110.00	375	91	92	
111.00	667	521	613	
112.00	1,440	1,054	1,667	
112.33	1,750	526	2,193	

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Type III 24-hr 25-Year Rainfall=5.30"

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Device	Routing	Invert	Outlet Devices
#1	Device 7	110.00'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#2	Device 7	110.17'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#3	Device 7	110.33'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#4	Device 7	110.50'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#5	Device 7	110.67'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#6	Device 7	111.00'	8.0" Horiz. Orifice/Grate Limited to weir flow C= 0.900
#7	Primary	107.00'	12.0" x 126.0' long Culvert CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 105.61' S= 0.0110 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#8	Secondary	112.33'	8.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=2.45 cfs @ 12.23 hrs HW=111.63' (Free Discharge)

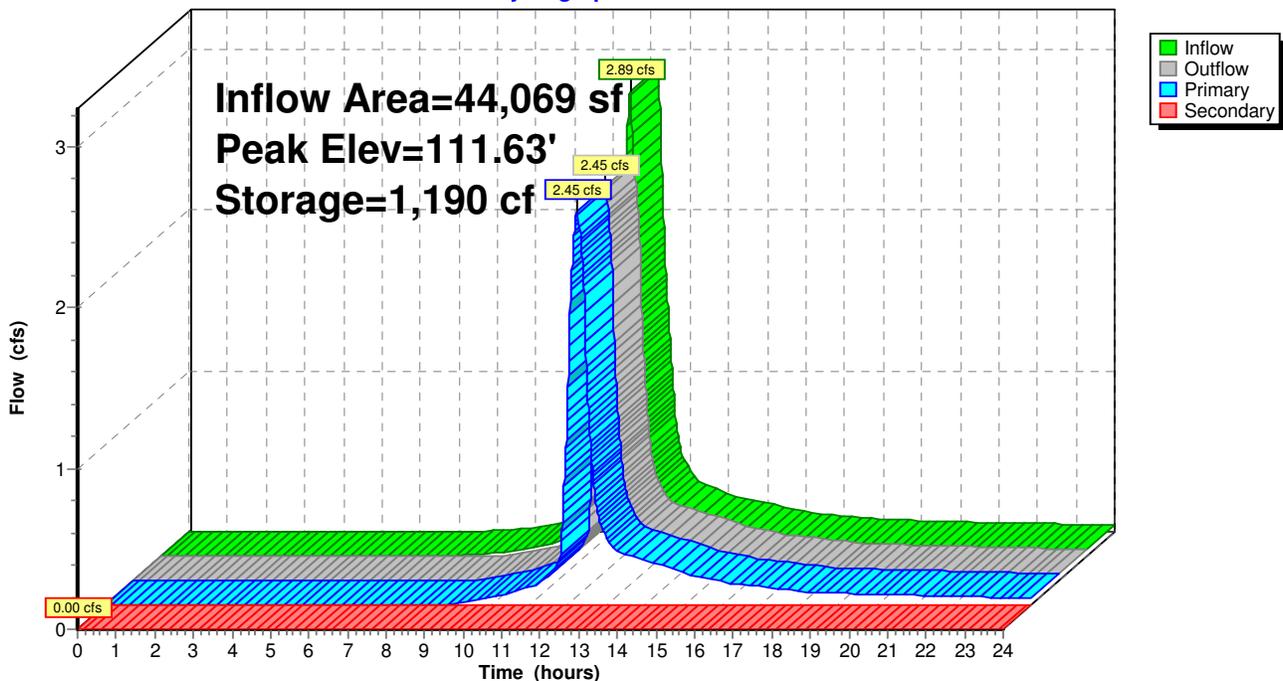
- 7=Culvert (Passes 2.45 cfs of 6.78 cfs potential flow)
 - 1=Orifice/Grate (Orifice Controls 0.10 cfs @ 6.11 fps)
 - 2=Orifice/Grate (Orifice Controls 0.09 cfs @ 5.78 fps)
 - 3=Orifice/Grate (Orifice Controls 0.09 cfs @ 5.45 fps)
 - 4=Orifice/Grate (Orifice Controls 0.08 cfs @ 5.08 fps)
 - 5=Orifice/Grate (Orifice Controls 0.08 cfs @ 4.67 fps)
 - 6=Orifice/Grate (Orifice Controls 2.00 cfs @ 5.74 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.74' (Free Discharge)

- 8=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 8P: Main Cell - Bio Retention

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 9P: CB 65

Inflow Area = 26,681 sf, Inflow Depth > 3.17" for 25-Year event
Inflow = 2.10 cfs @ 12.11 hrs, Volume= 7,052 cf
Outflow = 2.10 cfs @ 12.11 hrs, Volume= 7,052 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.10 cfs @ 12.11 hrs, Volume= 7,052 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 108.31' @ 12.11 hrs

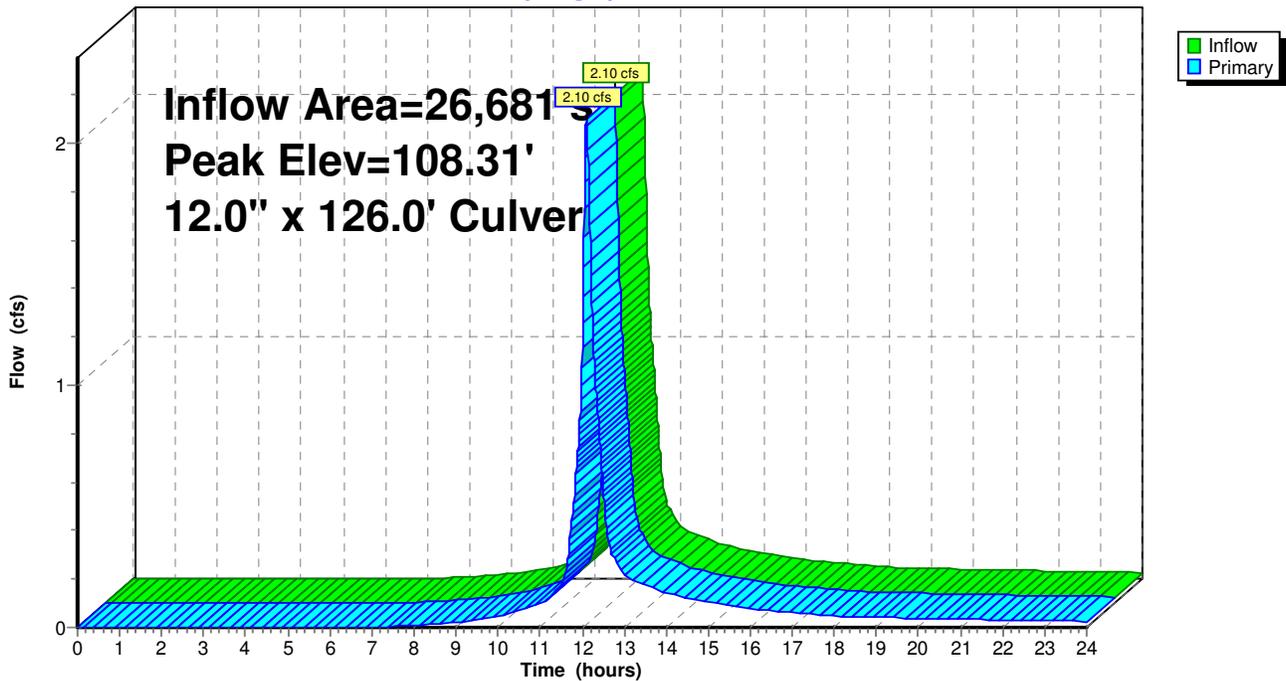
Flood Elev= 112.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.50'	12.0" x 126.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 105.61' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.10 cfs @ 12.11 hrs HW=108.31' (Free Discharge)
↑1=Culvert (Inlet Controls 2.10 cfs @ 3.07 fps)

Pond 9P: CB 65

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 43R: CB 60 to DMH 64

[57] Hint: Peaked at 111.44' (Flood elevation advised)

Inflow Area = 4,640 sf, Inflow Depth > 4.06" for 25-Year event
 Inflow = 0.57 cfs @ 12.03 hrs, Volume= 1,569 cf
 Outflow = 0.57 cfs @ 12.03 hrs, Volume= 1,569 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.57 cfs @ 12.03 hrs, Volume= 1,569 cf

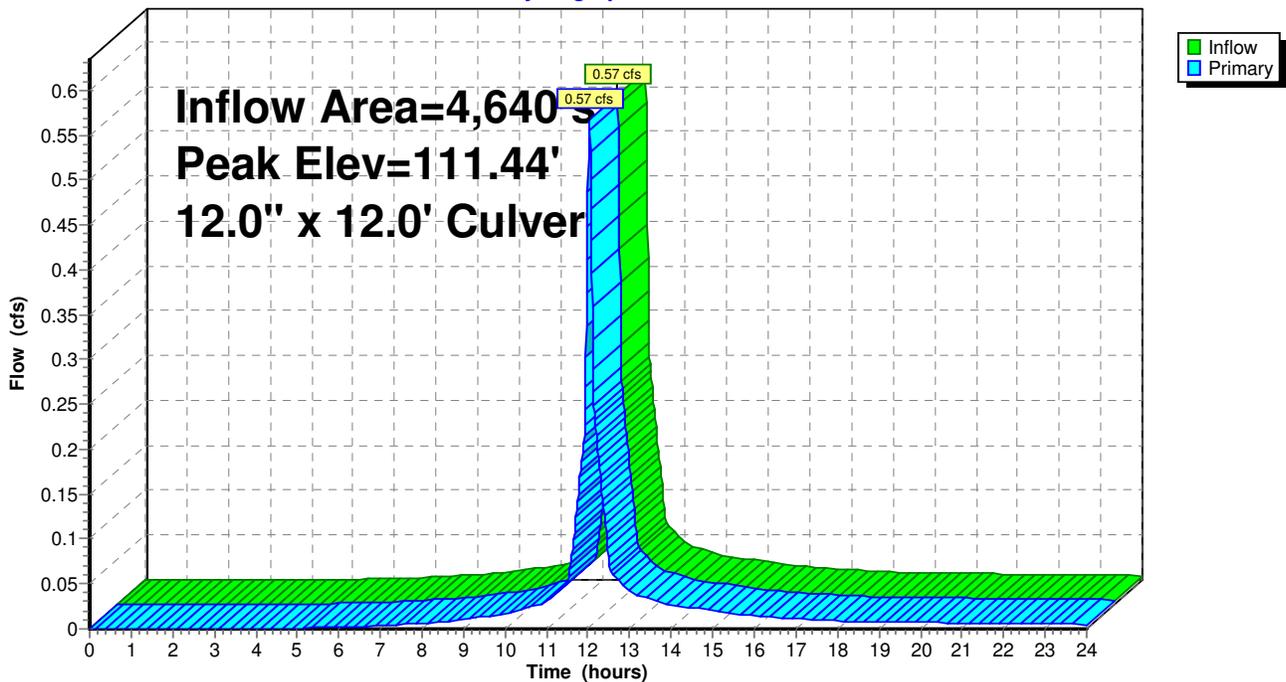
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 111.44' @ 12.03 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	111.02'	12.0" x 12.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.57 cfs @ 12.03 hrs HW=111.44' (Free Discharge)
 ↑1=Culvert (Barrel Controls 0.57 cfs @ 2.64 fps)

Pond 43R: CB 60 to DMH 64

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 61R: CB 62 to DMH 64

[57] Hint: Peaked at 112.20' (Flood elevation advised)

Inflow Area = 39,429 sf, Inflow Depth > 2.96" for 25-Year event
 Inflow = 2.65 cfs @ 12.16 hrs, Volume= 9,731 cf
 Outflow = 2.65 cfs @ 12.16 hrs, Volume= 9,731 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.65 cfs @ 12.16 hrs, Volume= 9,731 cf

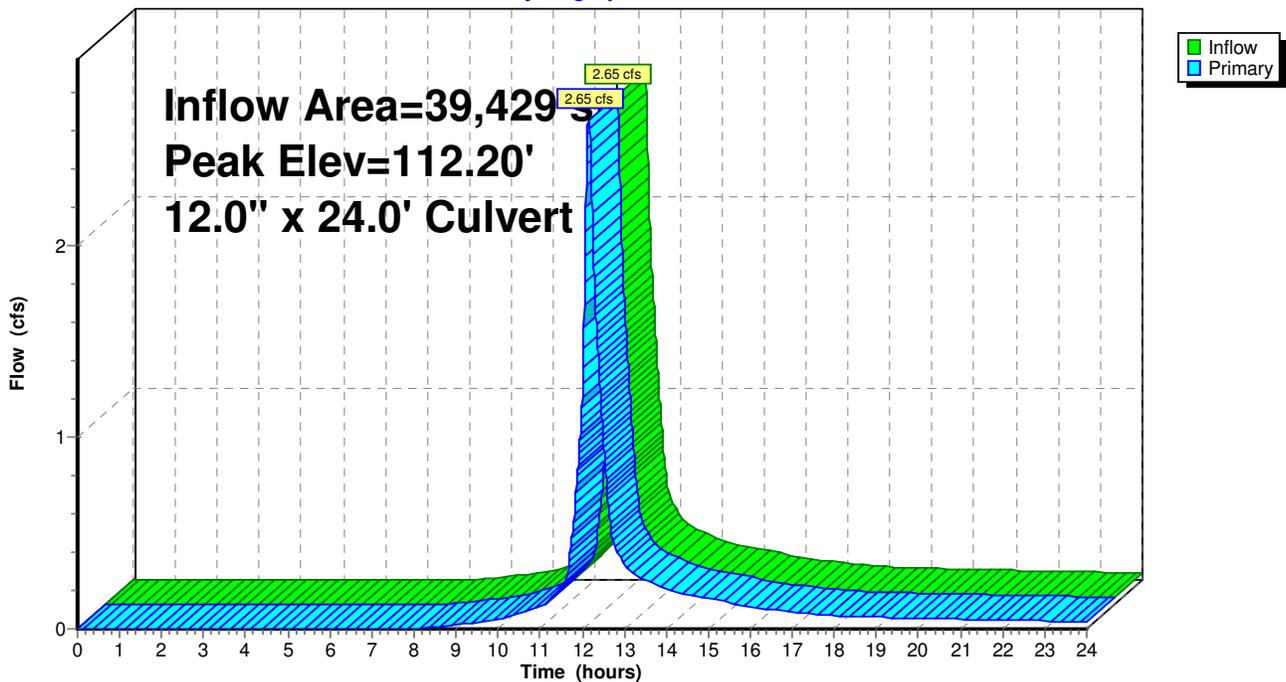
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 112.20' @ 12.16 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	111.14'	12.0" x 24.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.65 cfs @ 12.16 hrs HW=112.20' (Free Discharge)
 ↑1=Culvert (Barrel Controls 2.65 cfs @ 3.95 fps)

Pond 61R: CB 62 to DMH 64

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 66P: RG 9A at Units 11/12 - CB 214

Inflow Area = 6,950 sf, Inflow Depth > 3.95" for 25-Year event
 Inflow = 0.80 cfs @ 12.05 hrs, Volume= 2,289 cf
 Outflow = 0.80 cfs @ 12.06 hrs, Volume= 2,183 cf, Atten= 0%, Lag= 0.3 min
 Primary = 0.80 cfs @ 12.06 hrs, Volume= 2,183 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 107.68' @ 12.06 hrs Surf.Area= 232 sf Storage= 128 cf

Plug-Flow detention time= 41.2 min calculated for 2,182 cf (95% of inflow)
 Center-of-Mass det. time= 15.2 min (808.5 - 793.3)

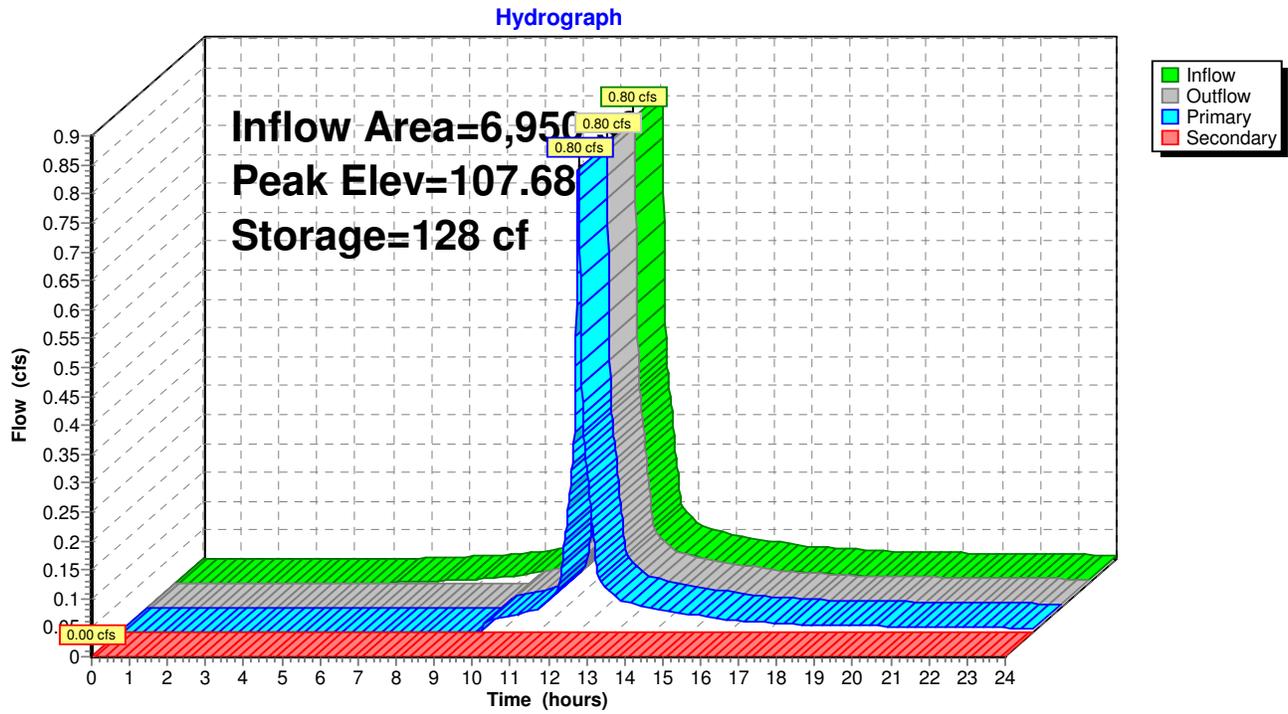
Volume	Invert	Avail.Storage	Storage Description
#1	107.08'	359 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
107.08	0	0	0
107.09	200	1	1
108.58	280	358	359

Device	Routing	Invert	Outlet Devices
#1	Primary	107.58'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	108.08'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.80 cfs @ 12.06 hrs HW=107.68' (Free Discharge)
 ↑1=**Orifice/Grate** (Weir Controls 0.80 cfs @ 1.02 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=107.08' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 66P: RG 9A at Units 11/12 - CB 214



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 67P: CB 66 (emergency vertical release)

[61] Hint: Submerged 19% of Reach 68R bottom

Inflow Area = 44,069 sf, Inflow Depth > 3.03" for 25-Year event
 Inflow = 2.45 cfs @ 12.23 hrs, Volume= 11,125 cf
 Outflow = 2.45 cfs @ 12.23 hrs, Volume= 11,125 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.45 cfs @ 12.23 hrs, Volume= 11,125 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

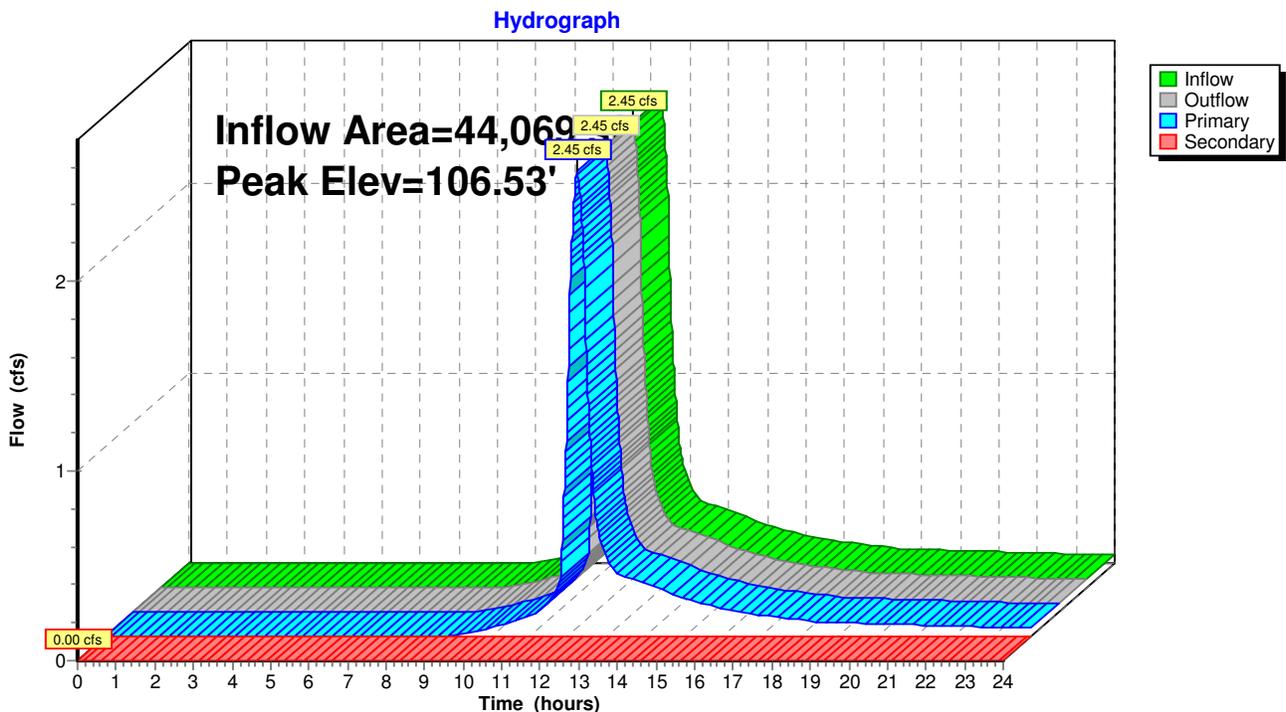
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 106.53' @ 12.23 hrs
 Flood Elev= 112.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	2.00' W x 2.00' H x 52.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 102.36' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Secondary	112.00'	2.00' W x 2.00' H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=2.44 cfs @ 12.23 hrs HW=106.53' (Free Discharge)
 ↳1=Culvert (Inlet Controls 2.44 cfs @ 2.33 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' (Free Discharge)
 ↳2=Orifice/Grate (Controls 0.00 cfs)

Pond 67P: CB 66 (emergency vertical release)



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Pond 70P: RG 10A - CB 216 at Units 13

Inflow Area = 11,090 sf, Inflow Depth > 3.72" for 25-Year event
 Inflow = 1.19 cfs @ 12.05 hrs, Volume= 3,440 cf
 Outflow = 1.19 cfs @ 12.05 hrs, Volume= 3,320 cf, Atten= 0%, Lag= 0.3 min
 Primary = 1.19 cfs @ 12.05 hrs, Volume= 3,320 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 104.78' @ 12.05 hrs Surf.Area= 300 sf Storage= 155 cf

Plug-Flow detention time= 29.4 min calculated for 3,320 cf (97% of inflow)
 Center-of-Mass det. time= 9.5 min (815.3 - 805.9)

Volume	Invert	Avail.Storage	Storage Description
#1	104.15'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.15	0	0	0
104.16	200	1	1
104.65	280	118	119
105.15	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	104.65'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	105.15'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

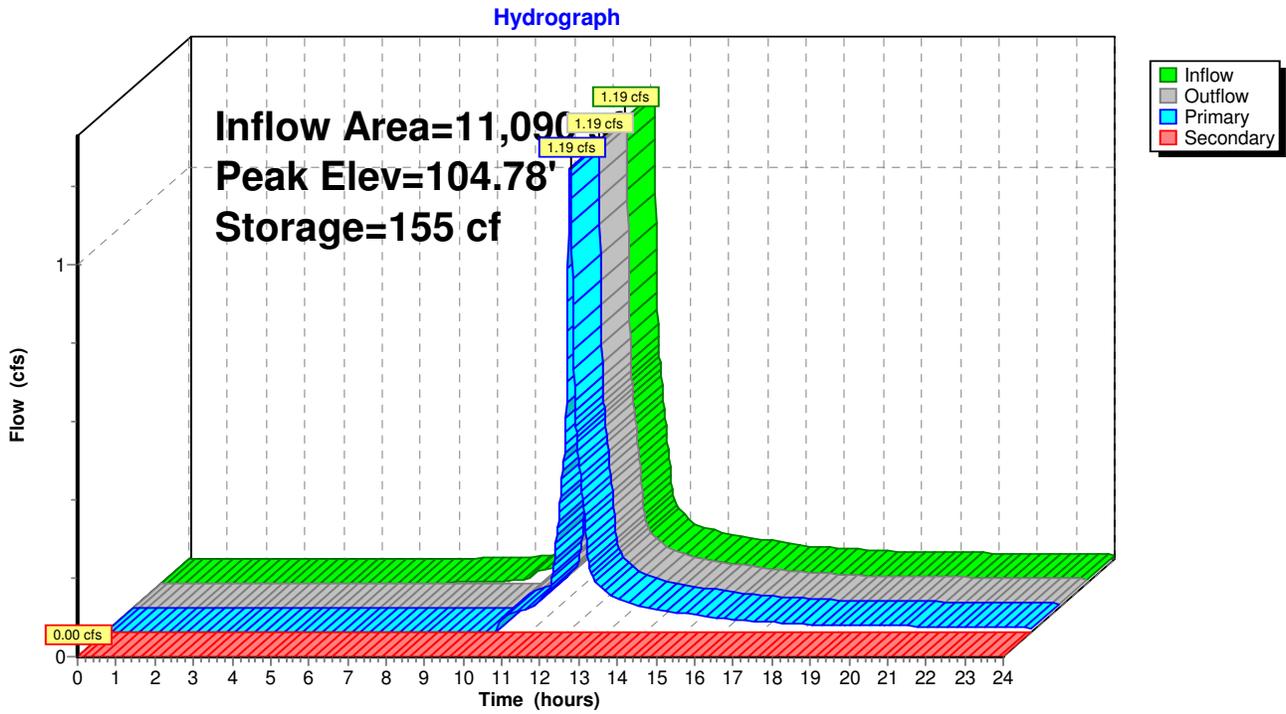
Primary OutFlow Max=1.18 cfs @ 12.05 hrs HW=104.78' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 1.18 cfs @ 1.16 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=104.15' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 70P: RG 10A - CB 216 at Units 13



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 111P: CB 20

Inflow Area = 7,780 sf, Inflow Depth > 3.95" for 25-Year event
Inflow = 0.98 cfs @ 12.01 hrs, Volume= 2,564 cf
Outflow = 0.98 cfs @ 12.01 hrs, Volume= 2,564 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.98 cfs @ 12.01 hrs, Volume= 2,564 cf

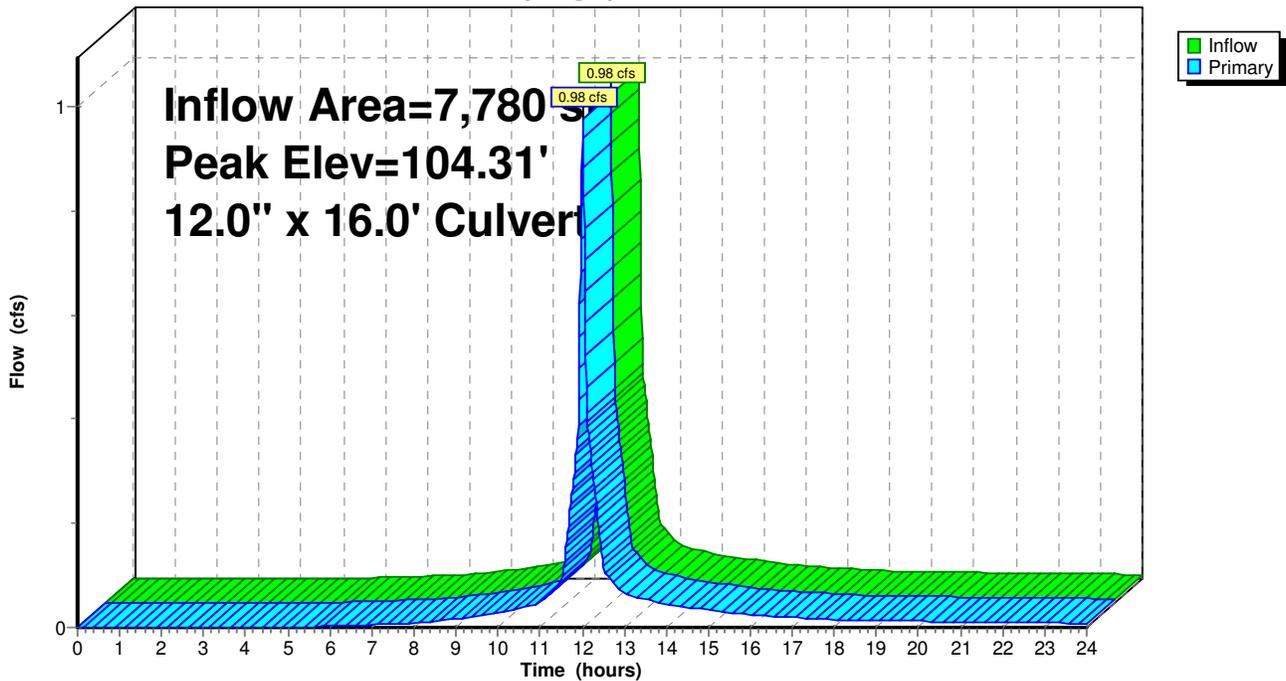
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.31' @ 12.01 hrs
Flood Elev= 107.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.74'	12.0" x 16.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.97 cfs @ 12.01 hrs HW=104.31' (Free Discharge)
↑1=Culvert (Barrel Controls 0.97 cfs @ 3.06 fps)

Pond 111P: CB 20

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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 112P: CB 22

Inflow Area = 5,198 sf, Inflow Depth > 4.38" for 25-Year event
Inflow = 0.70 cfs @ 12.00 hrs, Volume= 1,898 cf
Outflow = 0.70 cfs @ 12.00 hrs, Volume= 1,898 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.70 cfs @ 12.00 hrs, Volume= 1,898 cf

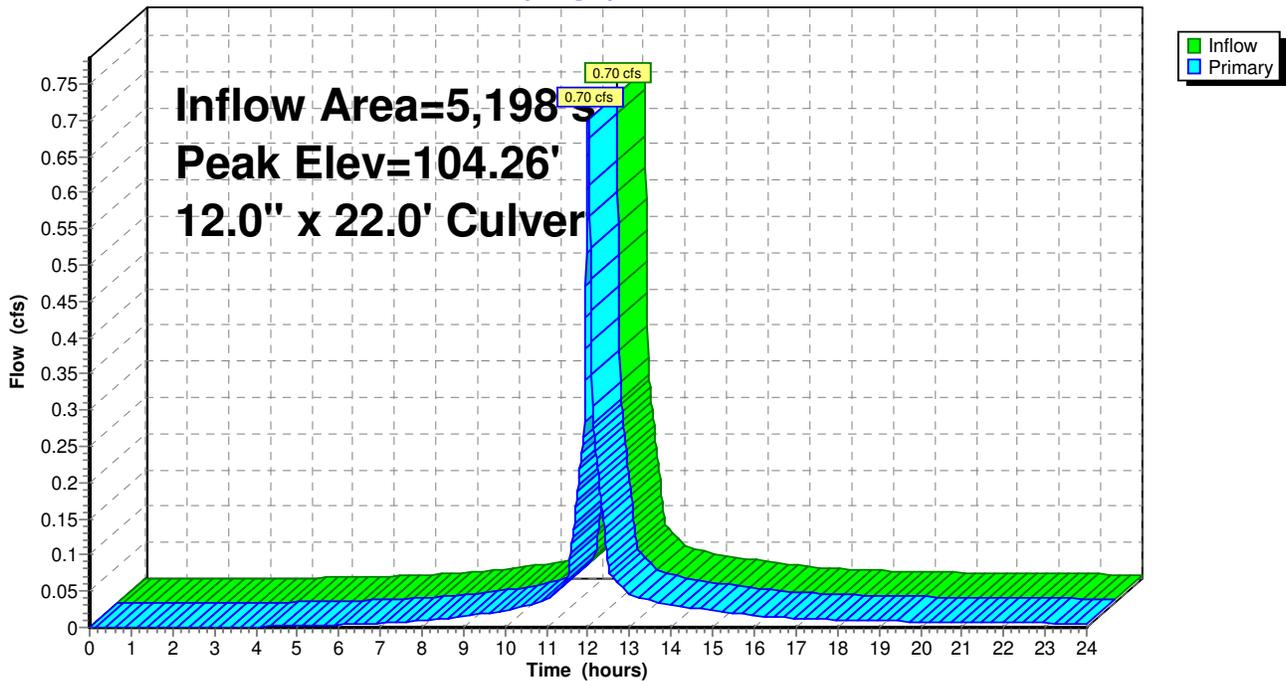
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.26' @ 12.00 hrs
Flood Elev= 107.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.80'	12.0" x 22.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.70 cfs @ 12.00 hrs HW=104.26' (Free Discharge)
↑1=Culvert (Barrel Controls 0.70 cfs @ 2.93 fps)

Pond 112P: CB 22

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 119P: RG - 1A - CB 118 to DMH 14

[62] Warning: Submerged 15% of Reach 127R inlet

Inflow Area = 16,626 sf, Inflow Depth > 4.90" for 25-Year event
 Inflow = 2.49 cfs @ 12.02 hrs, Volume= 6,783 cf
 Outflow = 2.48 cfs @ 12.03 hrs, Volume= 6,747 cf, Atten= 0%, Lag= 0.1 min
 Primary = 2.48 cfs @ 12.03 hrs, Volume= 6,747 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 110.18' @ 12.03 hrs Surf.Area= 102 sf Storage= 60 cf

Plug-Flow detention time= 5.6 min calculated for 6,745 cf (99% of inflow)
 Center-of-Mass det. time= 2.4 min (816.5 - 814.1)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	0	0	0
109.51	75	0	0
110.00	96	42	42
111.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	110.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Primary	109.86'	8.0" x 65.0' long Culvert Ke= 0.200 Outlet Invert= 105.96' S= 0.0600 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#3	Secondary	111.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.47 cfs @ 12.03 hrs HW=110.18' (Free Discharge)

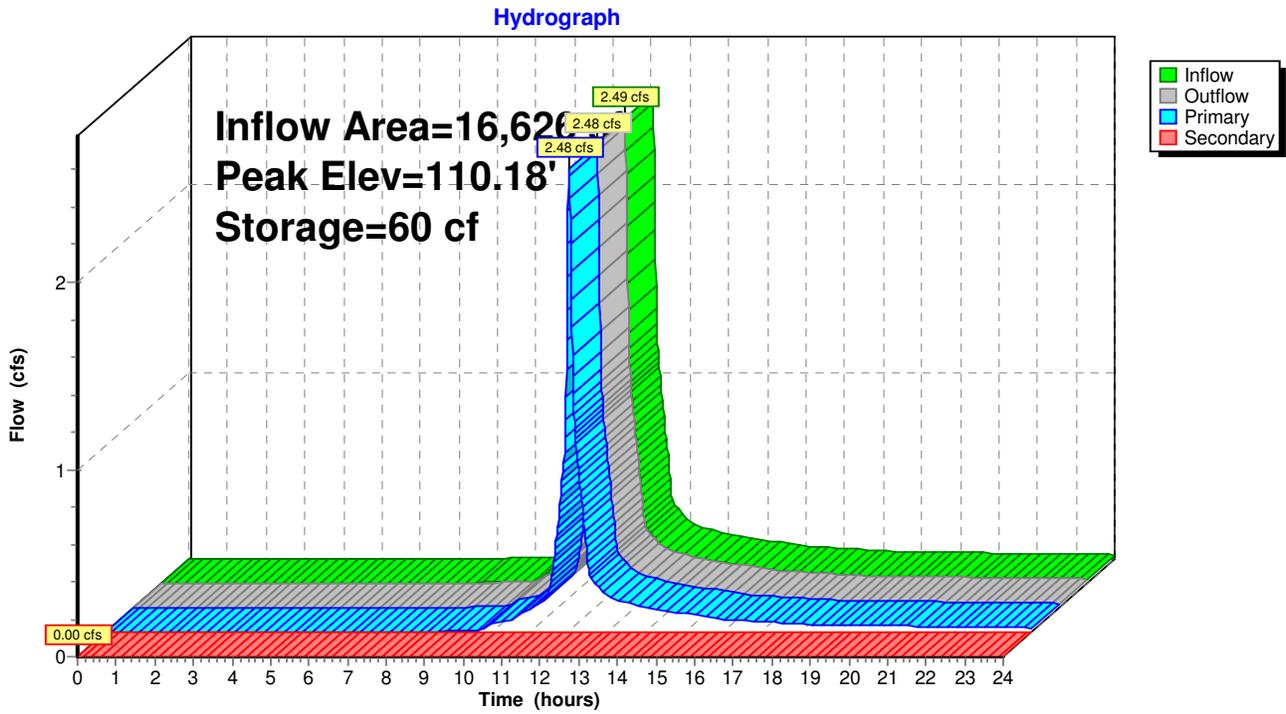
↑1=**Orifice/Grate** (Weir Controls 2.06 cfs @ 1.40 fps)

└2=**Culvert** (Inlet Controls 0.41 cfs @ 2.42 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)

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

Pond 119P: RG - 1A - CB 118 to DMH 14



Pond 119R: Culvert under Unit 4 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:
{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 112.94' (Flood elevation advised)
[81] Warning: Exceeded Pond 121P by 0.63' @ 12.02 hrs

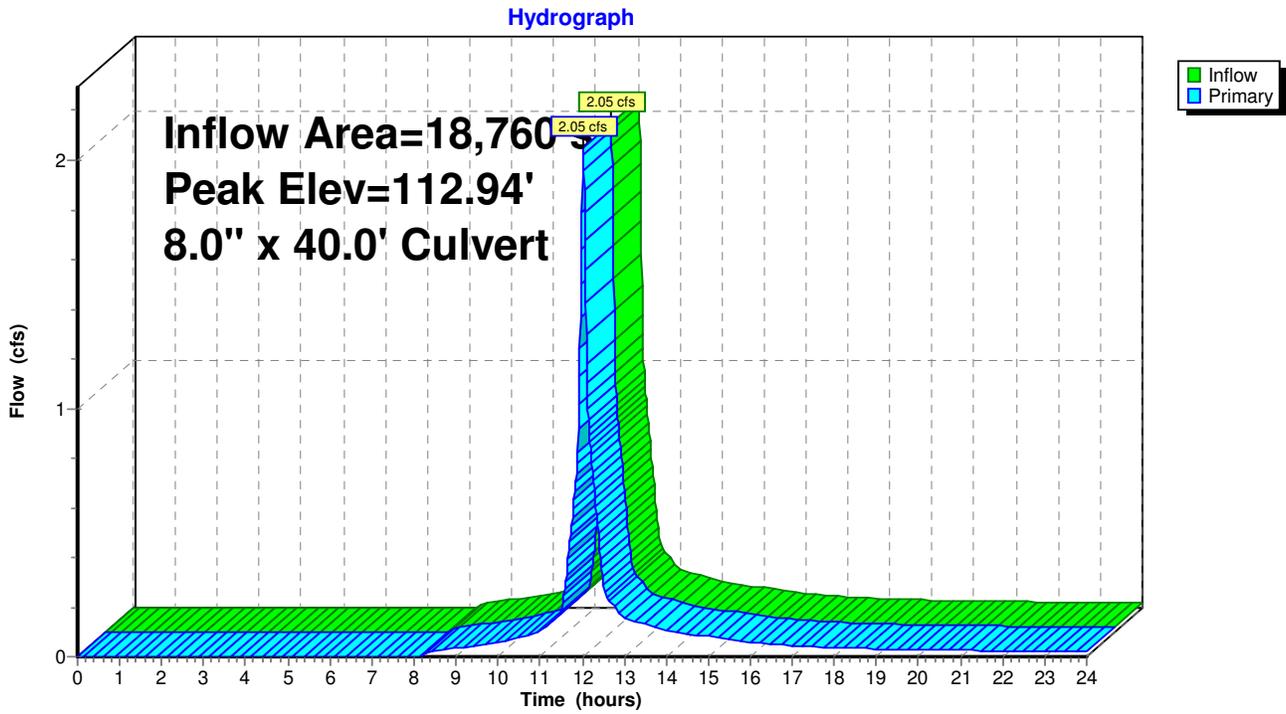
Inflow Area = 18,760 sf, Inflow Depth > 3.72" for 25-Year event
Inflow = 2.05 cfs @ 12.02 hrs, Volume= 5,810 cf
Outflow = 2.05 cfs @ 12.02 hrs, Volume= 5,810 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.05 cfs @ 12.02 hrs, Volume= 5,810 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 112.94' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	111.12'	8.0" x 40.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 109.92' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.04 cfs @ 12.02 hrs HW=112.93' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.04 cfs @ 5.86 fps)

Pond 119R: Culvert under Unit 4 Drive



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 121P: RG 6A - CB 120 Under Drive Unit 4

Inflow Area = 18,760 sf, Inflow Depth > 3.74" for 25-Year event
 Inflow = 2.06 cfs @ 12.01 hrs, Volume= 5,853 cf
 Outflow = 2.05 cfs @ 12.02 hrs, Volume= 5,810 cf, Atten= 0%, Lag= 0.1 min
 Primary = 2.05 cfs @ 12.02 hrs, Volume= 5,810 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 112.30' @ 12.02 hrs Surf.Area= 101 sf Storage= 60 cf

Plug-Flow detention time= 7.3 min calculated for 5,808 cf (99% of inflow)
 Center-of-Mass det. time= 2.8 min (802.6 - 799.8)

Volume	Invert	Avail.Storage	Storage Description
#1	111.62'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.62	0	0	0
111.63	75	0	0
112.12	96	42	42
113.12	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	112.12'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.12'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

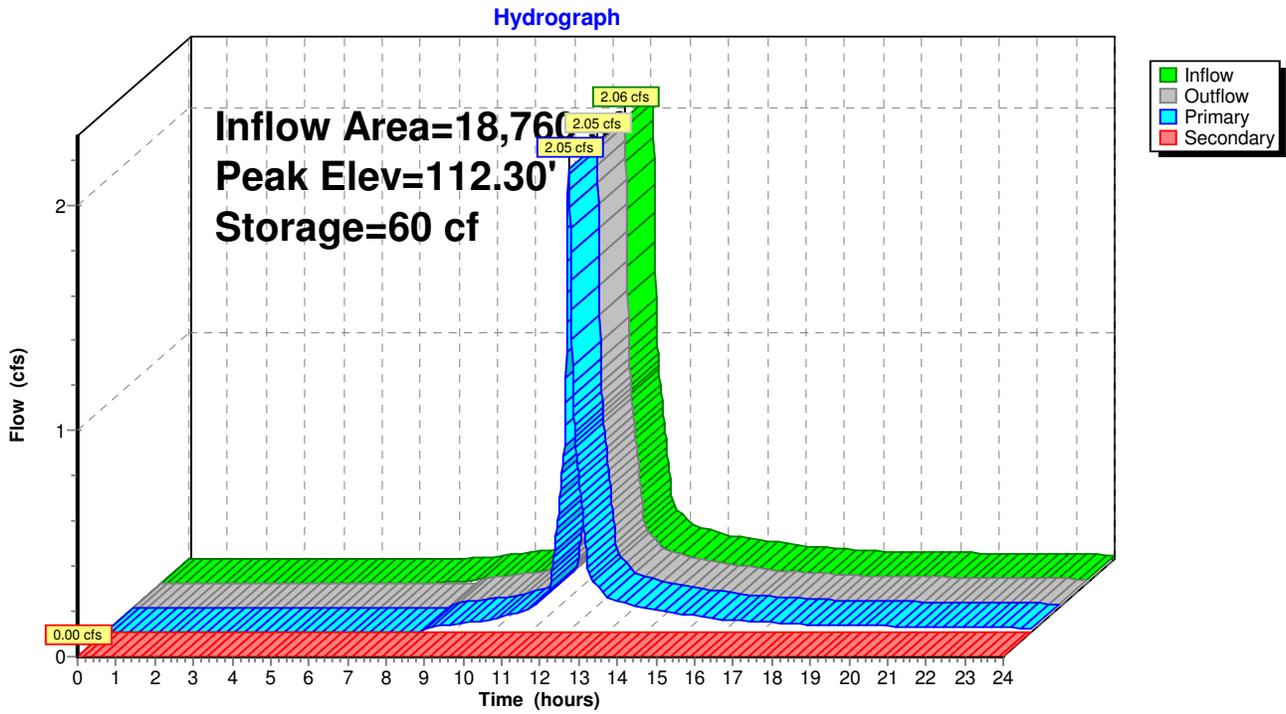
Primary OutFlow Max=2.04 cfs @ 12.02 hrs HW=112.30' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 2.04 cfs @ 1.40 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=111.62' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 121P: RG 6A - CB 120 Under Drive Unit 4



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 128P: RG 2A - CB 122 RG Unit 3

Inflow Area = 13,016 sf, Inflow Depth > 5.20" for 25-Year event
 Inflow = 2.09 cfs @ 12.02 hrs, Volume= 5,637 cf
 Outflow = 2.09 cfs @ 12.02 hrs, Volume= 5,594 cf, Atten= 0%, Lag= 0.1 min
 Primary = 2.09 cfs @ 12.02 hrs, Volume= 5,594 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 113.19' @ 12.02 hrs Surf.Area= 107 sf Storage= 61 cf

Plug-Flow detention time= 6.7 min calculated for 5,594 cf (99% of inflow)
 Center-of-Mass det. time= 2.1 min (818.8 - 816.7)

Volume	Invert	Avail.Storage	Storage Description
#1	112.50'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.50	0	0	0
112.51	75	0	0
113.00	96	42	42
113.50	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.50'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.08 cfs @ 12.02 hrs HW=113.18' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 2.08 cfs @ 1.41 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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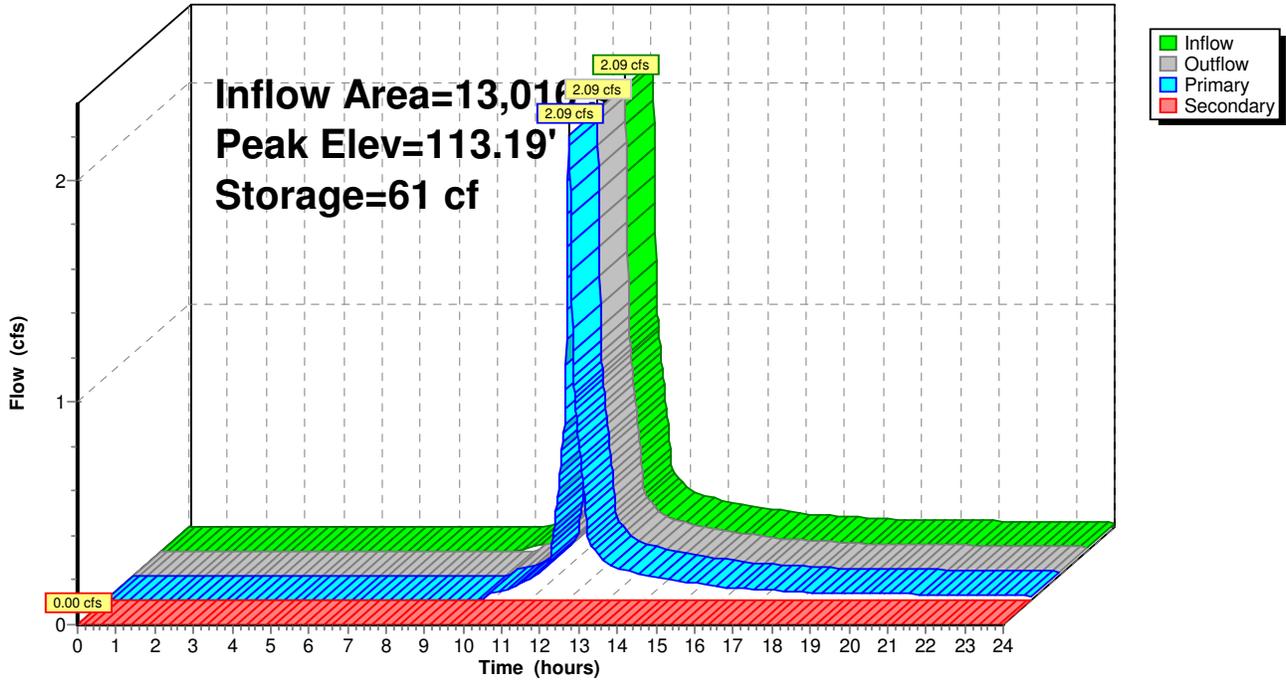
Type III 24-hr 25-Year Rainfall=5.30"

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Pond 128P: RG 2A - CB 122 RG Unit 3

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20

This rain garden is a level spreader and is intended to overtop with secondary flow to 130R. Flow continues via secondary (red). Routing adjusted to Max = 3. Warning message acceptable.

- [93] Warning: Storage range exceeded by 0.33'
- [88] Warning: Qout>Qin may require Finer Routing>1
- [85] Warning: Oscillations may require Finer Routing>1
- [61] Hint: Submerged 35% of Reach 129R bottom

Inflow Area = 7,500 sf, Inflow Depth > 3.85" for 25-Year event
 Inflow = 0.92 cfs @ 12.01 hrs, Volume= 2,407 cf
 Outflow = 0.93 cfs @ 12.01 hrs, Volume= 2,308 cf, Atten= 0%, Lag= 0.0 min
 Secondary = 0.93 cfs @ 12.01 hrs, Volume= 2,308 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 115.08' @ 12.01 hrs Surf.Area= 126 sf Storage= 98 cf

Plug-Flow detention time= 35.9 min calculated for 2,307 cf (96% of inflow)
 Center-of-Mass det. time= 12.6 min (806.6 - 794.0)

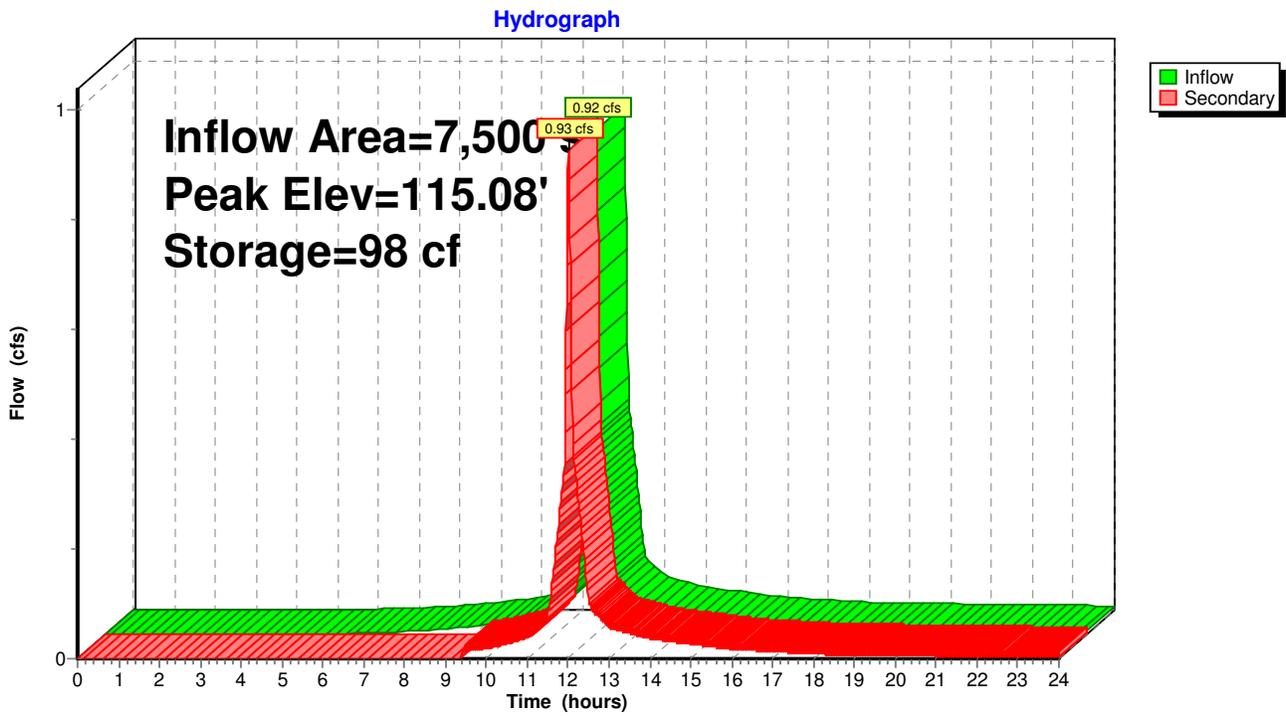
Volume	Invert	Avail.Storage	Storage Description
#1	113.75'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
113.75	0	0	0
113.76	75	0	0
114.25	96	42	42
114.75	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Secondary	114.75'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Secondary OutFlow Max=0.92 cfs @ 12.01 hrs HW=115.08' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.92 cfs @ 1.41 fps)

Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 133P: Large RG 4C at Unit 20

Inflow Area = 6,950 sf, Inflow Depth > 3.45" for 25-Year event
 Inflow = 0.78 cfs @ 12.01 hrs, Volume= 1,996 cf
 Outflow = 0.77 cfs @ 12.01 hrs, Volume= 1,877 cf, Atten= 1%, Lag= 0.4 min
 Primary = 0.77 cfs @ 12.01 hrs, Volume= 1,877 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 116.94' @ 12.01 hrs Surf.Area= 295 sf Storage= 146 cf

Plug-Flow detention time= 48.1 min calculated for 1,876 cf (94% of inflow)
 Center-of-Mass det. time= 16.0 min (821.8 - 805.8)

Volume	Invert	Avail.Storage	Storage Description
#1	116.35'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.35	0	0	0
116.36	200	1	1
116.85	280	118	119
117.35	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	116.85'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	117.35'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.76 cfs @ 12.01 hrs HW=116.94' (Free Discharge)

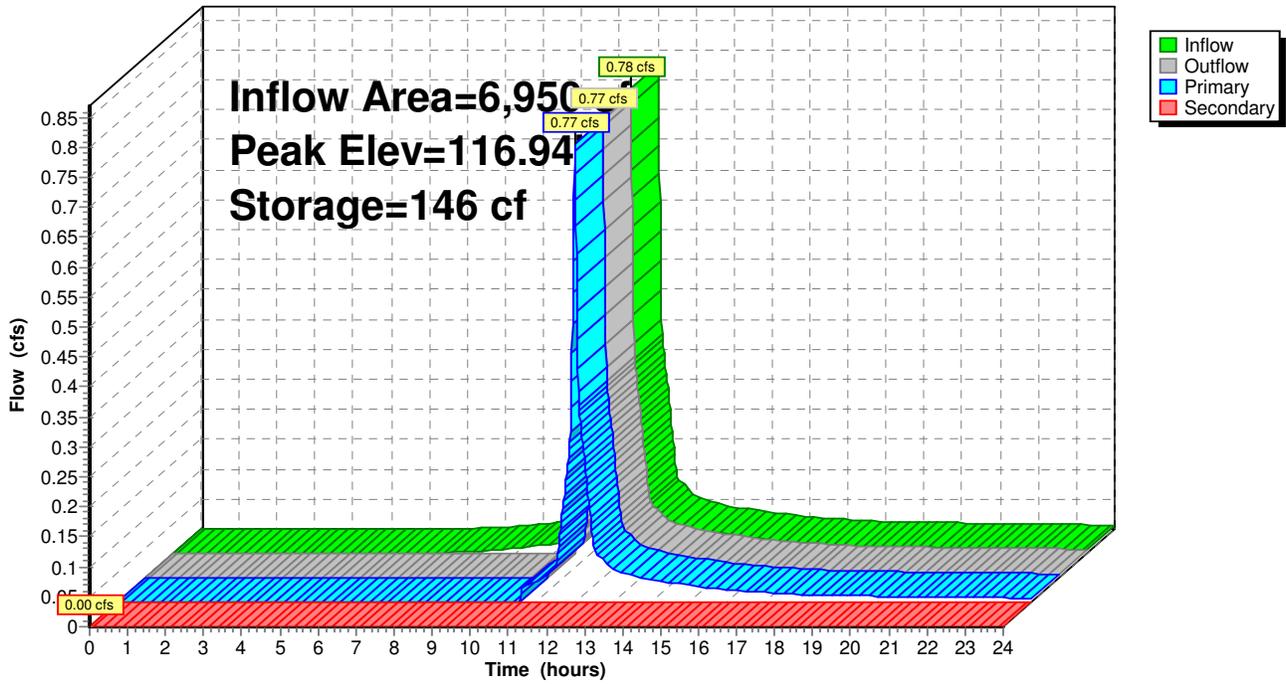
↑1=**Orifice/Grate** (Weir Controls 0.76 cfs @ 1.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=116.35' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 133P: Large RG 4C at Unit 20

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 144R: HW 30 to DMH 14

[57] Hint: Peaked at 114.06' (Flood elevation advised)

Inflow Area = 34,910 sf, Inflow Depth > 2.89" for 25-Year event
Inflow = 2.82 cfs @ 12.11 hrs, Volume= 8,397 cf
Outflow = 2.82 cfs @ 12.11 hrs, Volume= 8,397 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.82 cfs @ 12.11 hrs, Volume= 8,397 cf

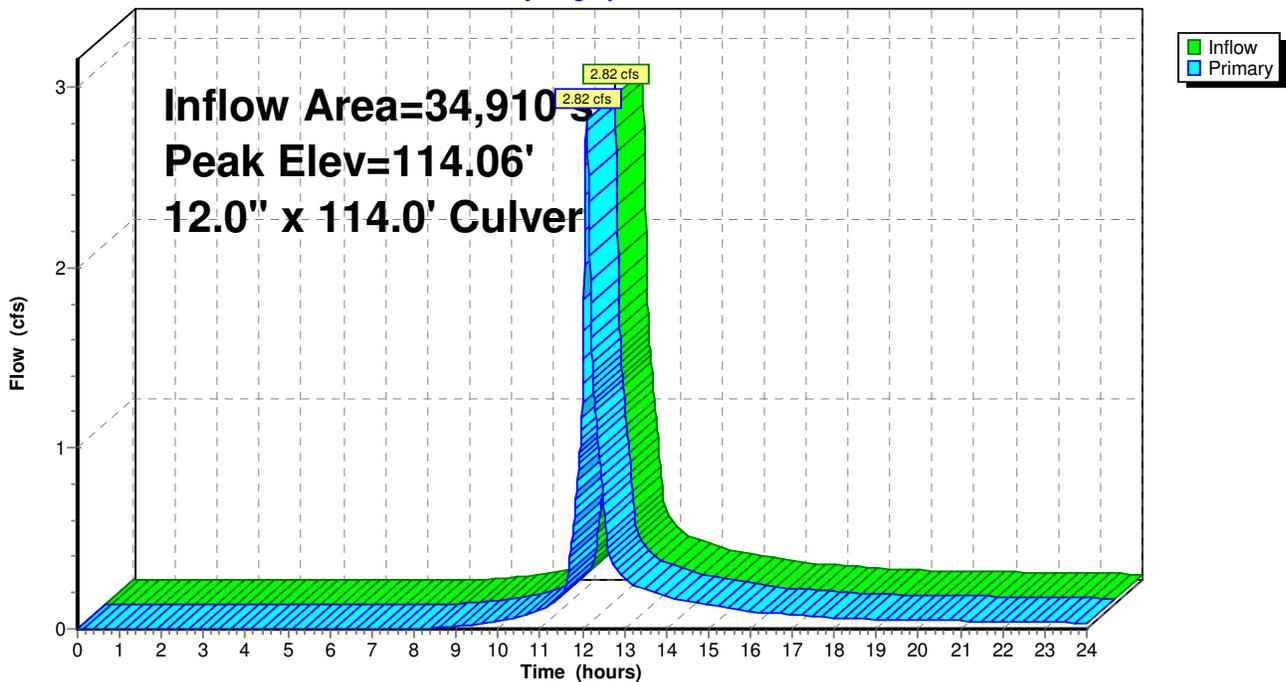
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.06' @ 12.11 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	113.00'	12.0" x 114.0' long Culvert Ke= 0.500 Outlet Invert= 103.88' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.82 cfs @ 12.11 hrs HW=114.05' (Free Discharge)
↑1=Culvert (Inlet Controls 2.82 cfs @ 3.58 fps)

Pond 144R: HW 30 to DMH 14

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 155P: RG 5A - CB 116 between Septic and Unit 4

Inflow Area = 21,810 sf, Inflow Depth > 3.78" for 25-Year event
 Inflow = 2.44 cfs @ 12.01 hrs, Volume= 6,869 cf
 Outflow = 2.42 cfs @ 12.02 hrs, Volume= 6,826 cf, Atten= 1%, Lag= 0.1 min
 Primary = 2.42 cfs @ 12.02 hrs, Volume= 6,826 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 109.20' @ 12.02 hrs Surf.Area= 102 sf Storage= 63 cf

Plug-Flow detention time= 6.3 min calculated for 6,826 cf (99% of inflow)
 Center-of-Mass det. time= 2.4 min (802.2 - 799.8)

Volume	Invert	Avail.Storage	Storage Description
#1	108.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.50	0	0	0
108.51	75	0	0
109.00	96	42	42
110.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	109.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	110.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.41 cfs @ 12.02 hrs HW=109.20' (Free Discharge)

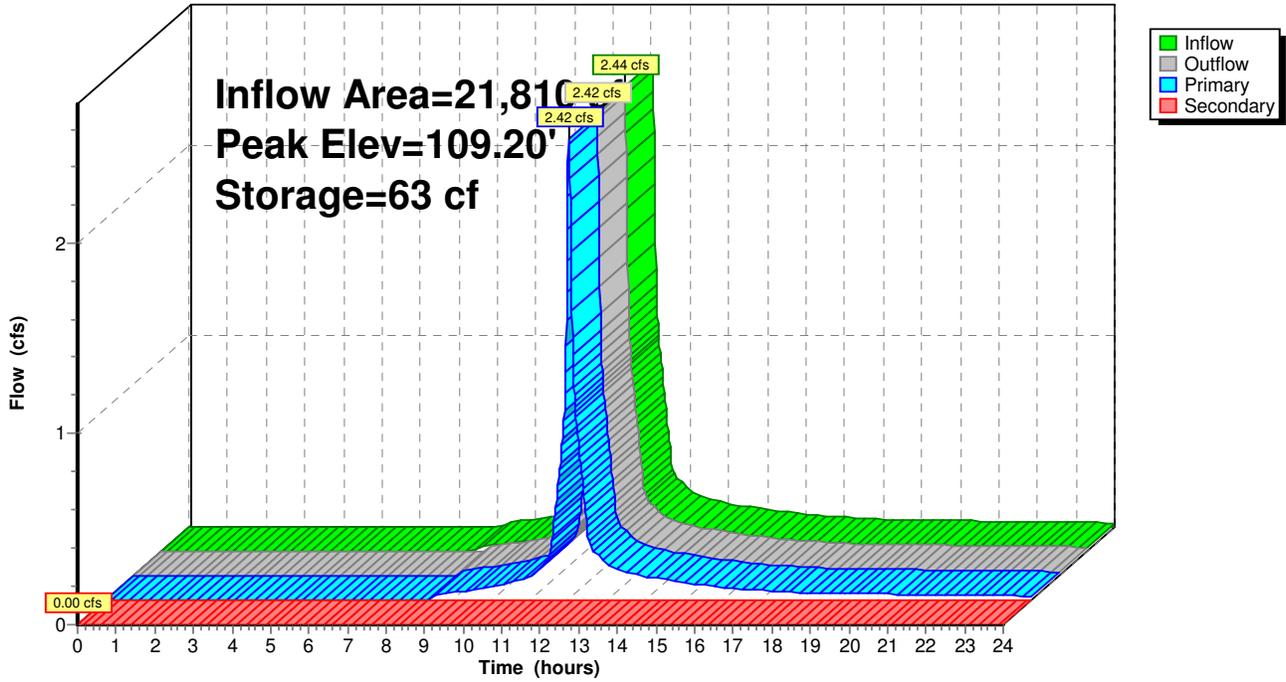
↑1=**Orifice/Grate** (Weir Controls 2.41 cfs @ 1.48 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 155P: RG 5A - CB 116 between Septic and Unit 4

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 156R: Culvert under Unit 5 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 115.42' (Flood elevation advised)

[79] Warning: Submerged Pond 157P Primary device # 1 by 0.07'

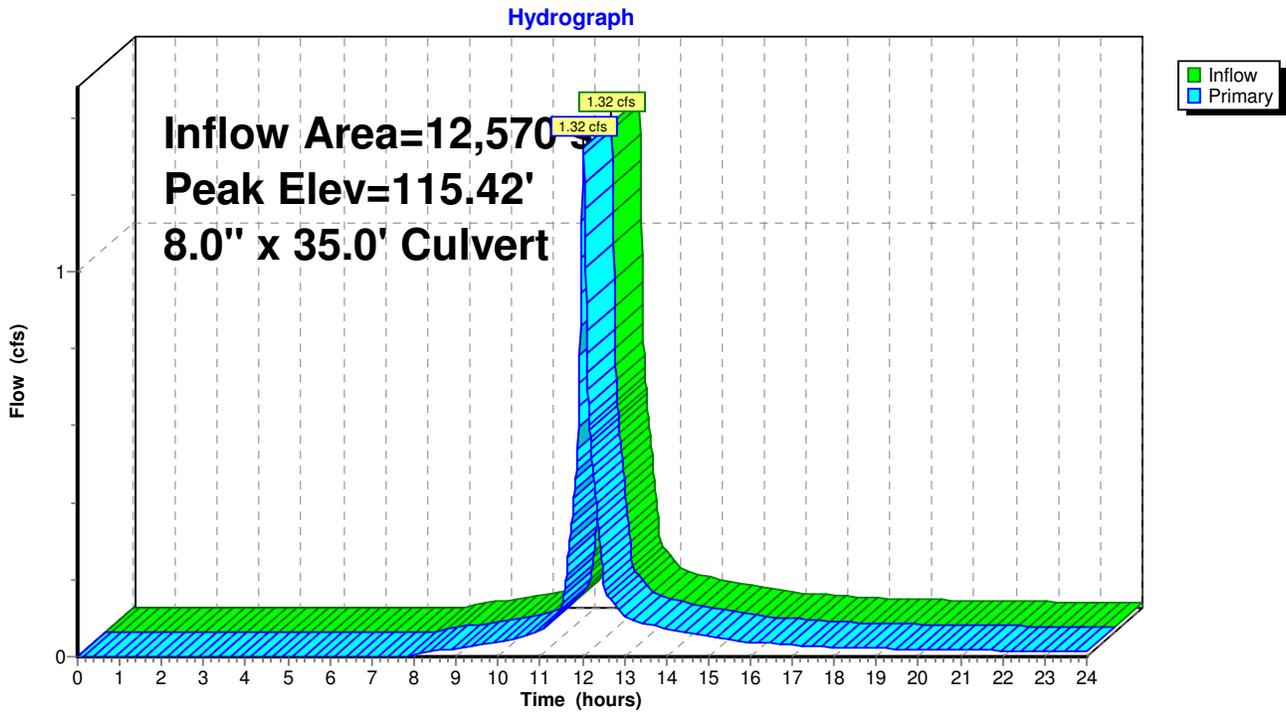
Inflow Area =	12,570 sf,	Inflow Depth >	3.69"	for	25-Year event
Inflow =	1.32 cfs @	12.03 hrs,	Volume=	3,867 cf	
Outflow =	1.32 cfs @	12.03 hrs,	Volume=	3,867 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.32 cfs @	12.03 hrs,	Volume=	3,867 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 115.42' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	114.35'	8.0" x 35.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 114.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.32 cfs @ 12.03 hrs HW=115.42' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.32 cfs @ 3.77 fps)

Pond 156R: Culvert under Unit 5 Drive



Pond 157P: RG 7A - CB 126 Under Drive Unit 5

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[61] Hint: Submerged 45% of Reach 154R bottom

Inflow Area = 12,570 sf, Inflow Depth > 3.73" for 25-Year event
 Inflow = 1.32 cfs @ 12.03 hrs, Volume= 3,910 cf
 Outflow = 1.32 cfs @ 12.03 hrs, Volume= 3,867 cf, Atten= 0%, Lag= 0.1 min
 Primary = 1.32 cfs @ 12.03 hrs, Volume= 3,867 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 115.49' @ 12.03 hrs Surf.Area= 104 sf Storage= 56 cf

Plug-Flow detention time= 11.0 min calculated for 3,866 cf (99% of inflow)
 Center-of-Mass det. time= 4.3 min (802.9 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	114.85'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
114.85	0	0	0
114.86	75	0	0
115.35	96	42	42
115.85	126	56	98

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Type III 24-hr 25-Year Rainfall=5.30"

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Device	Routing	Invert	Outlet Devices
#1	Primary	115.35'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	115.85'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

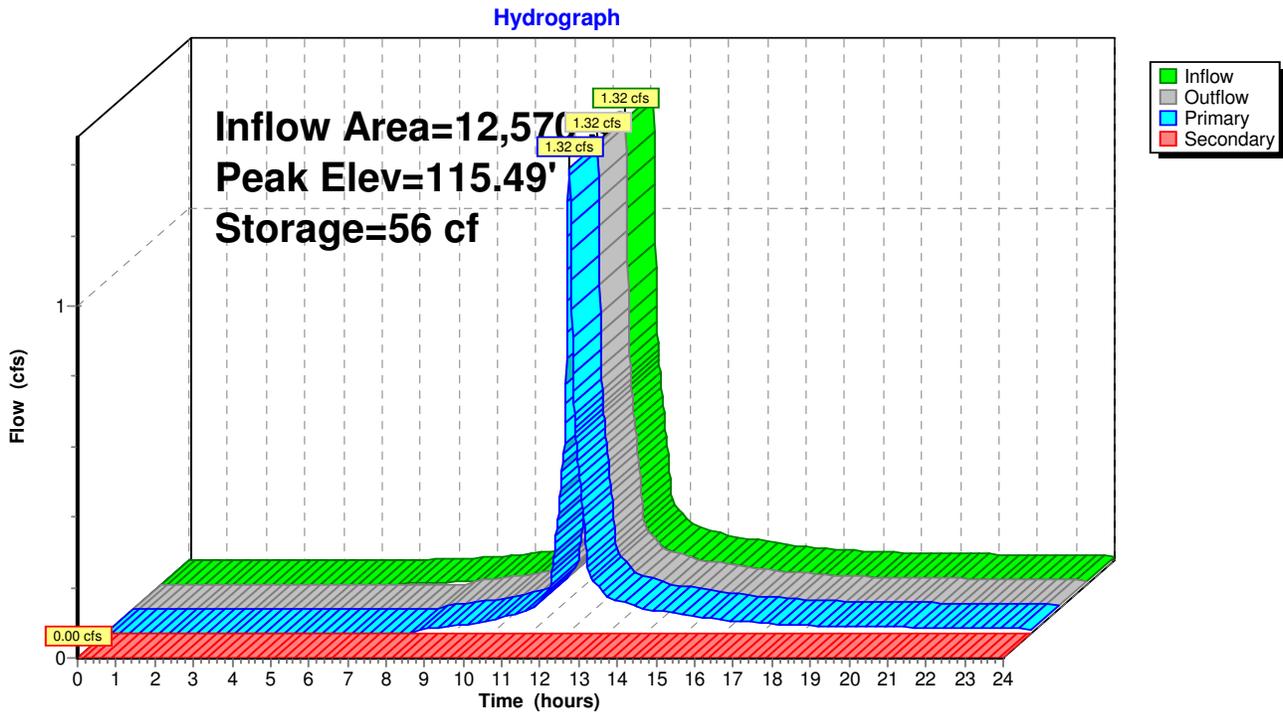
Primary OutFlow Max=1.32 cfs @ 12.03 hrs HW=115.49' (Free Discharge)

←1=Orifice/Grate (Weir Controls 1.32 cfs @ 1.21 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=114.85' (Free Discharge)

←2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 157P: RG 7A - CB 126 Under Drive Unit 5



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 158P: Culvert under Drive Unit 6

[57] Hint: Peaked at 116.58' (Flood elevation advised)

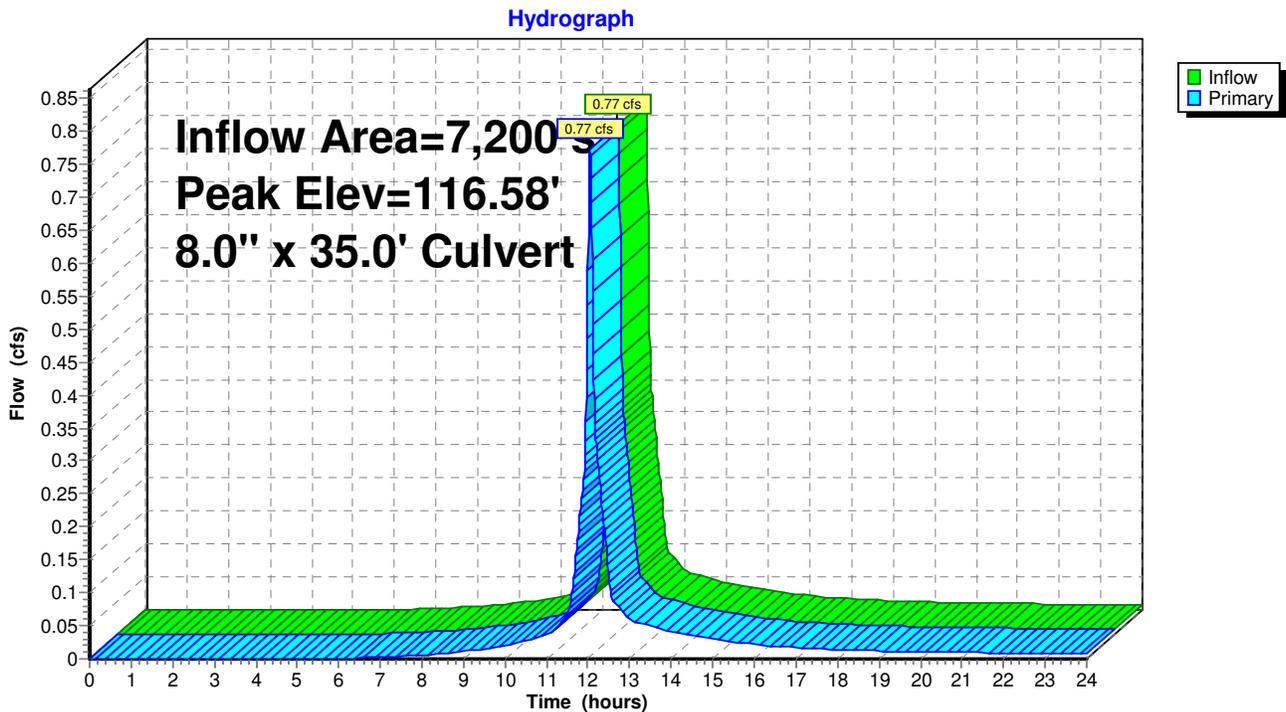
Inflow Area = 7,200 sf, Inflow Depth > 3.64" for 25-Year event
Inflow = 0.77 cfs @ 12.05 hrs, Volume= 2,187 cf
Outflow = 0.77 cfs @ 12.05 hrs, Volume= 2,187 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.05 hrs, Volume= 2,187 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 116.58' @ 12.05 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	116.00'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 115.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.77 cfs @ 12.05 hrs HW=116.58' (Free Discharge)
↑1=Culvert (Barrel Controls 0.77 cfs @ 3.22 fps)

Pond 158P: Culvert under Drive Unit 6



Pond 218R: DMH 50 to Irrigation Cistern

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[57] Hint: Peaked at 103.95' (Flood elevation advised)

[63] Warning: Exceeded Reach 55R inflow depth by 0.88' @ 12.09 hrs

[63] Warning: Exceeded Reach 403R inflow depth by 1.29' @ 12.09 hrs

Inflow Area =	111,470 sf,	Inflow Depth >	3.23"	for	25-Year event
Inflow =	7.95 cfs @	12.09 hrs,	Volume=	29,970 cf	
Outflow =	7.95 cfs @	12.09 hrs,	Volume=	29,970 cf,	Atten= 0%, Lag= 0.0 min
Primary =	7.95 cfs @	12.09 hrs,	Volume=	29,970 cf	

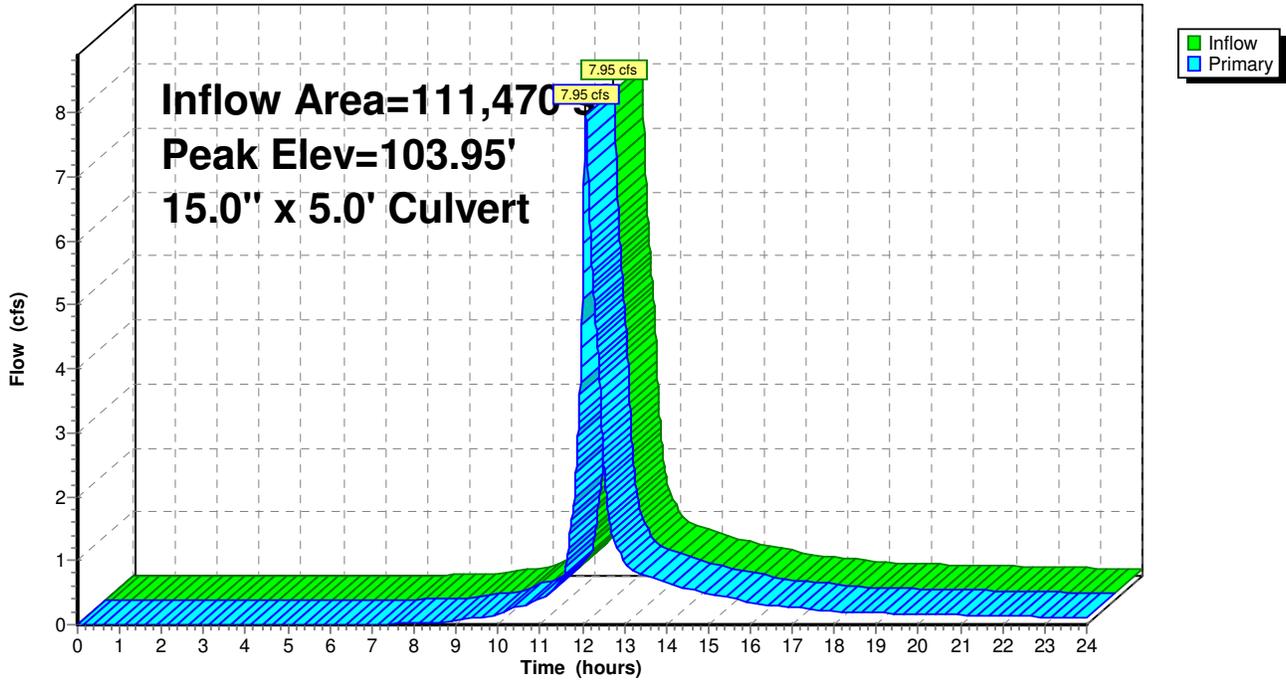
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 103.95' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	101.52'	15.0" x 5.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 101.42' S= 0.0200 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=7.94 cfs @ 12.09 hrs HW=103.95' (Free Discharge)
↑**1=Culvert** (Inlet Controls 7.94 cfs @ 6.47 fps)

Pond 218R: DMH 50 to Irrigation Cistern

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)
 Center-of-Mass det. time= (not calculated)

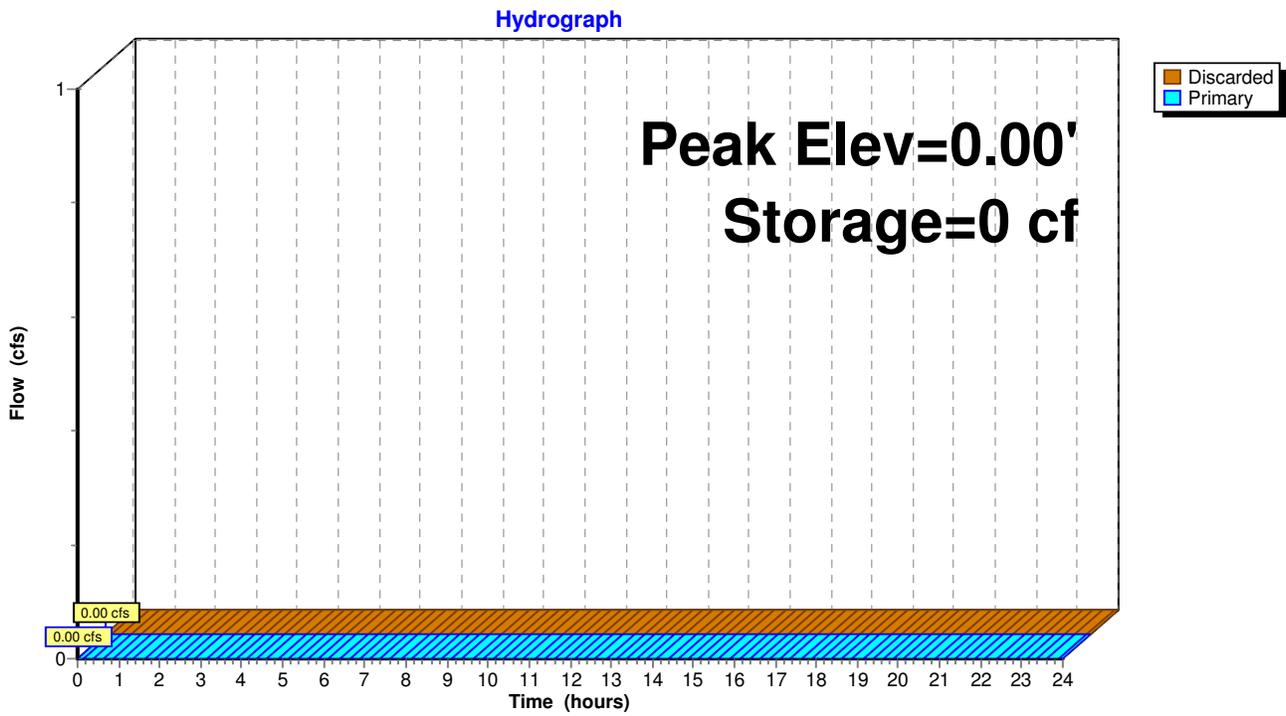
Volume	Invert	Avail.Storage	Storage Description
#1	110.49'	304 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
110.49	0	0	0
111.00	205	52	52
111.50	248	113	166
112.00	305	138	304

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.001 in/hr Exfiltration over Surface area
#2	Primary	111.50'	8.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

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

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING



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Type III 24-hr 25-Year Rainfall=5.30"

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Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)

Center-of-Mass det. time= (not calculated)

Volume	Invert	Avail.Storage	Storage Description
#1	101.42'	4,292 cf	11.50'W x 40.00'L x 9.33'H Prismatic

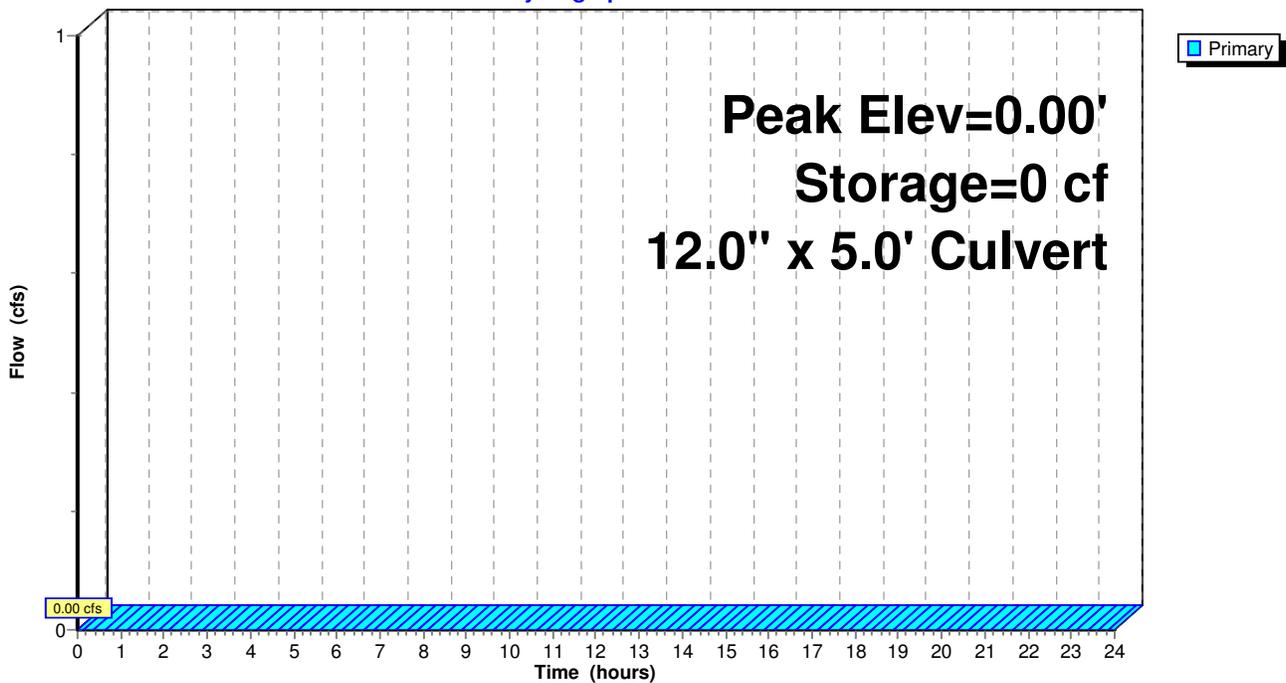
Device	Routing	Invert	Outlet Devices
#1	Primary	101.32'	12.0" x 5.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.22' S= 0.0200 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)

←1=Culvert (Controls 0.00 cfs)

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.30"

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Link A: POA A

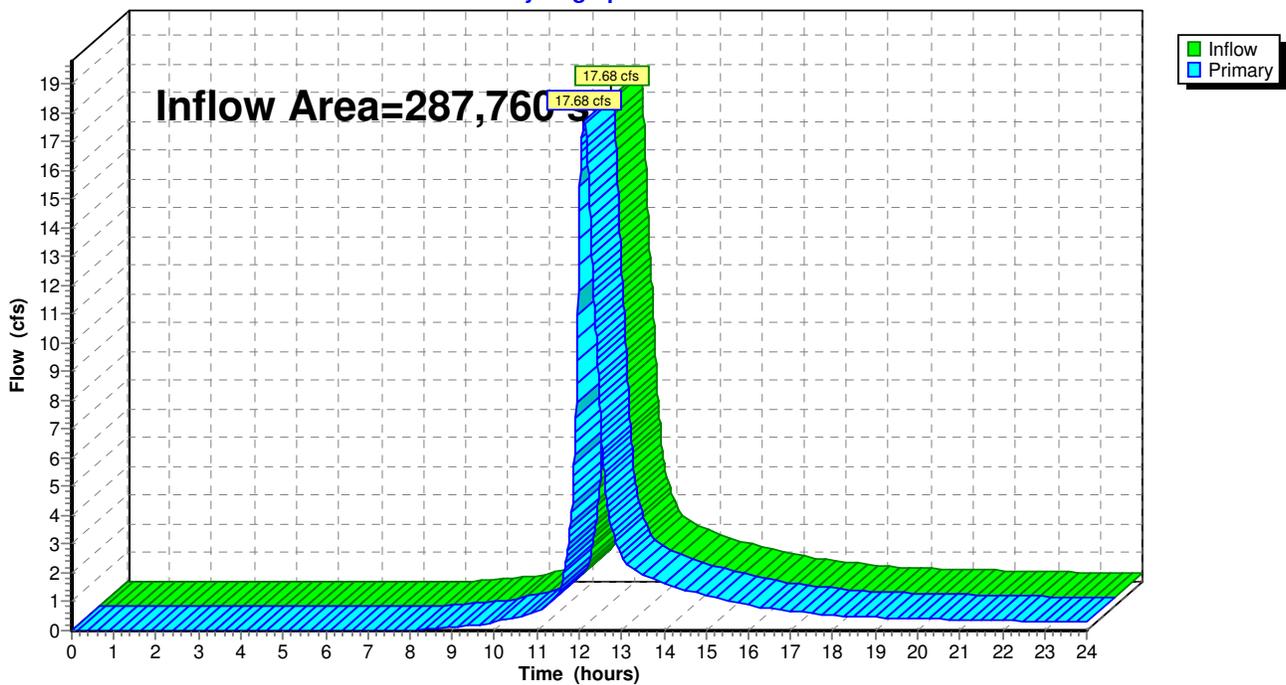
Inflow Area = 287,760 sf, Inflow Depth > 3.07" for 25-Year event
Inflow = 17.68 cfs @ 12.11 hrs, Volume= 73,692 cf
Primary = 17.68 cfs @ 12.11 hrs, Volume= 73,692 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A

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Type III 24-hr 100-Year Rainfall=6.50"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS

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

Subcatchment 54S: CB at Cul-de-Sac - Outside Runoff Area=20,970 sf Runoff Depth>4.45"
Flow Length=200' Tc=5.0 min CN=82 Runoff=2.57 cfs 7,769 cf

Subcatchment 56S: CB at Cul-de-Sac - Inside Runoff Area=8,660 sf Runoff Depth>4.77"
Flow Length=50' Slope=0.0200 '/' Tc=5.6 min CN=85 Runoff=1.10 cfs 3,444 cf

Subcatchment 60S: Runoff Area=4,640 sf Runoff Depth>5.22"
Flow Length=80' Tc=2.0 min CN=89 Runoff=0.72 cfs 2,018 cf

Subcatchment 62S: Large Area including 2 Septics Runoff Area=39,429 sf Runoff Depth>4.02"
Flow Length=260' Tc=11.2 min CN=78 Runoff=3.59 cfs 13,194 cf

Subcatchment 65S: Throat of Cul-de-sac u.g. Runoff Area=11,590 sf Runoff Depth>4.55"
Flow Length=180' Tc=9.4 min CN=83 Runoff=1.25 cfs 4,395 cf

Subcatchment 68S: From hill near 19,20 to Lawn CB Runoff Area=15,091 sf Runoff Depth>4.02"
Flow Length=190' Tc=6.2 min CN=78 Runoff=1.62 cfs 5,055 cf

Subcatchment 110S: To CB 20 Runoff Area=7,780 sf Runoff Depth>5.11"
Flow Length=100' Slope=0.0200 '/' Tc=0.6 min CN=88 Runoff=1.24 cfs 3,312 cf

Subcatchment 112S: To CB 22 Runoff Area=5,198 sf Runoff Depth>5.56"
Flow Length=60' Tc=0.3 min CN=92 Runoff=0.88 cfs 2,409 cf

Subcatchment 114S: Behind Units 1&2 Runoff Area=12,960 sf Runoff Depth>4.12"
Flow Length=130' Tc=11.4 min CN=79 Runoff=1.20 cfs 4,450 cf

Subcatchment 116S: Runoff Area=3,050 sf Runoff Depth>5.33"
Flow Length=70' Tc=0.3 min CN=90 Runoff=0.50 cfs 1,356 cf

Subcatchment 118S: Runoff Area=3,610 sf Runoff Depth>5.11"
Flow Length=50' Tc=0.2 min CN=88 Runoff=0.58 cfs 1,537 cf

Subcatchment 120S: Runoff Area=6,190 sf Runoff Depth>5.00"
Flow Length=90' Tc=0.5 min CN=87 Runoff=0.97 cfs 2,578 cf

Subcatchment 122S: Runoff Area=6,066 sf Runoff Depth>3.92"
Flow Length=100' Tc=3.6 min CN=77 Runoff=0.70 cfs 1,980 cf

Subcatchment 124S: Runoff Area=7,500 sf Runoff Depth>5.00"
Flow Length=80' Tc=0.5 min CN=87 Runoff=1.18 cfs 3,123 cf

Subcatchment 126S: Runoff Area=5,370 sf Runoff Depth>5.00"
Flow Length=60' Tc=0.3 min CN=87 Runoff=0.85 cfs 2,236 cf

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Subcatchment 128S:	Runoff Area=7,200 sf	Runoff Depth>4.77"
Flow Length=115'	Slope=0.0200 '/'	Tc=3.2 min CN=85 Runoff=1.00 cfs 2,864 cf
Subcatchment 130S:	Runoff Area=6,950 sf	Runoff Depth>4.56"
Flow Length=60'	Tc=0.3 min CN=83	Runoff=1.02 cfs 2,640 cf
Subcatchment 132S: Behind Unit 3	Runoff Area=26,270 sf	Runoff Depth>3.81"
Flow Length=130'	Tc=0.9 min CN=76	Runoff=3.23 cfs 8,351 cf
Subcatchment 134S: To Swale behind 7,6,5	Runoff Area=13,850 sf	Runoff Depth>4.13"
Flow Length=70'	Slope=0.0200 '/'	Tc=3.1 min CN=79 Runoff=1.70 cfs 4,763 cf
Subcatchment 136S: To Swale behind 4 to HW 30	Runoff Area=21,060 sf	Runoff Depth>3.81"
Flow Length=95'	Slope=0.0100 '/'	Tc=4.9 min CN=76 Runoff=2.25 cfs 6,690 cf
Subcatchment 138S: Rear of Units 10,11,12,13	Runoff Area=15,030 sf	Runoff Depth>4.44"
Flow Length=430'	Tc=12.3 min CN=82	Runoff=1.45 cfs 5,561 cf
Subcatchment 140S: Behind Units 14, 15, 16	Runoff Area=21,630 sf	Runoff Depth>3.91"
Flow Length=150'	Slope=0.0100 '/'	Tc=13.2 min CN=77 Runoff=1.81 cfs 7,047 cf
Subcatchment 214S:	Runoff Area=6,950 sf	Runoff Depth>5.11"
Flow Length=110'	Tc=2.8 min CN=88	Runoff=1.03 cfs 2,958 cf
Subcatchment 216S:	Runoff Area=4,140 sf	Runoff Depth>4.78"
	Tc=1.0 min CN=85	Runoff=0.62 cfs 1,648 cf
Subcatchment 900: North Offsite flowing onto property	Runoff Area=14,076 sf	Runoff Depth>3.20"
Flow Length=340'	Slope=0.0500 '/'	Tc=12.8 min CN=70 Runoff=0.97 cfs 3,752 cf
Reach 1R: Existing wetland channel to WF	Avg. Depth=0.35'	Max Vel=5.67 fps Inflow=13.39 cfs 52,347 cf
	n=0.022 L=300.0'	S=0.0333 '/' Capacity=82.44 cfs Outflow=13.35 cfs 52,286 cf
Reach 2R: Swale from Drive at #10 to Drive a	Avg. Depth=0.17'	Max Vel=3.96 fps Inflow=1.03 cfs 2,958 cf
	n=0.022 L=65.0'	S=0.0554 '/' Capacity=72.03 cfs Outflow=1.03 cfs 2,957 cf
Reach 55R: DMH 52 to DMH 50	Avg. Depth=0.73'	Max Vel=8.39 fps Inflow=5.14 cfs 15,589 cf
	D=12.0" n=0.013 L=32.0'	S=0.0269 '/' Capacity=5.84 cfs Outflow=5.13 cfs 15,588 cf
Reach 62R: DMH 64 to Bio-Retention A (HW	Avg. Depth=0.74'	Max Vel=6.28 fps Inflow=3.89 cfs 15,212 cf
	D=12.0" n=0.013 L=12.0'	S=0.0150 '/' Capacity=4.36 cfs Outflow=3.89 cfs 15,212 cf
Reach 64R: Swale from Drive at #12 to RG 10A	Avg. Depth=0.00'	Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
	n=0.022 L=10.0'	S=0.0350 '/' Capacity=57.26 cfs Outflow=0.00 cfs 0 cf
Reach 67R: Culvert under Unit 12 Drive	Avg. Depth=0.47'	Max Vel=3.88 fps Inflow=1.02 cfs 2,851 cf
	D=8.0" n=0.013 L=35.0'	S=0.0100 '/' Capacity=1.21 cfs Outflow=1.02 cfs 2,850 cf
Reach 68R: Underdrain to CB 66	Avg. Depth=0.56'	Max Vel=9.67 fps Inflow=3.00 cfs 15,018 cf
	D=8.0" n=0.013 L=15.0'	S=0.0600 '/' Capacity=2.96 cfs Outflow=3.00 cfs 15,018 cf

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Reach 69R: Drain to DMH 52 Avg. Depth=0.49' Max Vel=5.53 fps Inflow=1.52 cfs 4,378 cf
D=8.0" n=0.013 L=38.0' S=0.0200 '/' Capacity=1.71 cfs Outflow=1.52 cfs 4,377 cf

Reach 114R: DMH 16 to DMH 14 Avg. Depth=0.51' Max Vel=5.27 fps Inflow=2.12 cfs 5,721 cf
D=12.0" n=0.013 L=60.0' S=0.0133 '/' Capacity=4.11 cfs Outflow=2.09 cfs 5,720 cf

Reach 118R: Swale from Drive at #4 to RG 11 Avg. Depth=0.31' Max Vel=4.37 fps Inflow=2.64 cfs 7,592 cf
n=0.022 L=10.0' S=0.0350 '/' Capacity=57.26 cfs Outflow=2.64 cfs 7,592 cf

Reach 127R: Swale from Drive at #3 to RG 11 Avg. Depth=0.39' Max Vel=3.23 fps Inflow=2.73 cfs 7,481 cf
n=0.022 L=10.0' S=0.0150 '/' Capacity=37.49 cfs Outflow=2.73 cfs 7,480 cf

Reach 128R: Culvert under Unit 3 Drive Avg. Depth=0.55' Max Vel=8.82 fps Inflow=2.74 cfs 7,481 cf
D=8.0" n=0.013 L=40.0' S=0.0500 '/' Capacity=2.70 cfs Outflow=2.73 cfs 7,481 cf

Reach 129R: Swale from Drive at #20 to RG 124 Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.022 L=10.0' S=0.0450 '/' Capacity=64.93 cfs Outflow=0.00 cfs 0 cf

Reach 130R: Swale to RG 122 Avg. Depth=0.28' Max Vel=4.13 fps Inflow=2.16 cfs 5,545 cf
n=0.022 L=30.0' S=0.0350 '/' Capacity=57.26 cfs Outflow=2.14 cfs 5,544 cf

Reach 131R: Culvert under Unit 20 Drive Avg. Depth=0.46' Max Vel=3.87 fps Inflow=1.01 cfs 2,520 cf
D=8.0" n=0.013 L=48.0' S=0.0100 '/' Capacity=1.21 cfs Outflow=0.99 cfs 2,520 cf

Reach 137R: Swale Back of 7,6,5 Avg. Depth=0.23' Max Vel=1.96 fps Inflow=1.70 cfs 4,763 cf
n=0.030 L=140.0' S=0.0143 '/' Capacity=26.48 cfs Outflow=1.66 cfs 4,756 cf

Reach 138R: Swale Back of 4 Avg. Depth=0.48' Max Vel=2.35 fps Inflow=3.91 cfs 11,446 cf
n=0.030 L=140.0' S=0.0100 '/' Capacity=17.63 cfs Outflow=3.84 cfs 11,433 cf

Reach 149R: DMH 14 to DMH 12 Avg. Depth=1.04' Max Vel=8.12 fps Inflow=10.60 cfs 35,037 cf
D=18.0" n=0.013 L=95.0' S=0.0149 '/' Capacity=12.84 cfs Outflow=10.59 cfs 35,031 cf

Reach 150R: DMH 12 to HW 10 - Outlet Avg. Depth=1.03' Max Vel=8.15 fps Inflow=10.59 cfs 35,031 cf
D=18.0" n=0.013 L=55.0' S=0.0151 '/' Capacity=12.90 cfs Outflow=10.58 cfs 35,028 cf

Reach 153R: CB 116 to DMH 14 Avg. Depth=0.58' Max Vel=9.67 fps Inflow=3.11 cfs 8,904 cf
D=8.0" n=0.013 L=28.0' S=0.0600 '/' Capacity=2.96 cfs Outflow=3.11 cfs 8,904 cf

Reach 154R: Swale from Drive at #6 to RG 126 Avg. Depth=0.00' Max Vel=0.00 fps
n=0.022 L=33.0' S=0.0091 '/' Capacity=29.18 cfs Outflow=0.00 cfs 0 cf

Reach 155R: Swale from Drive at #5 to RG 120 Avg. Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.022 L=50.0' S=0.0200 '/' Capacity=43.29 cfs Outflow=0.00 cfs 0 cf

Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland Inflow=10.58 cfs 35,028 cf
Outflow=10.58 cfs 35,028 cf

Reach 220R: CB 56 to DMH 52 Avg. Depth=0.38' Max Vel=4.00 fps Inflow=1.10 cfs 3,444 cf
D=12.0" n=0.013 L=14.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=1.10 cfs 3,443 cf

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Reach 222R: CB 54 to DMH 52 Avg. Depth=0.63' Max Vel=4.94 fps Inflow=2.57 cfs 7,769 cf
 D=12.0" n=0.013 L=22.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=2.57 cfs 7,768 cf

Reach 403R: CB 65 to DMH 50 Avg. Depth=0.56' Max Vel=6.69 fps Inflow=3.00 cfs 15,018 cf
 D=12.0" n=0.013 L=30.0' S=0.0200 '/' Capacity=5.04 cfs Outflow=3.00 cfs 15,017 cf

Reach 902R: Existing wetland channel to Avg. Depth=0.37' Max Vel=6.38 fps Inflow=15.81 cfs 65,088 cf
 n=0.022 L=100.0' S=0.0400 '/' Capacity=90.31 cfs Outflow=15.80 cfs 65,066 cf

Pond 2P: Recharge System Peak Elev=105.17' Storage=5,030 cf Inflow=10.16 cfs 40,055 cf
 Discarded=0.01 cfs 496 cf Primary=9.34 cfs 35,988 cf Secondary=0.00 cfs 0 cf Outflow=9.34 cfs 36,484 cf

Pond 3P: Culvert under Drive Unit 10 Peak Elev=114.99' Inflow=1.03 cfs 2,958 cf
 8.0" x 35.0' Culvert Outflow=1.03 cfs 2,958 cf

Pond 4P: Culvert under Drive Unit 11 Peak Elev=111.04' Inflow=1.03 cfs 2,957 cf
 8.0" x 35.0' Culvert Outflow=1.03 cfs 2,957 cf

Pond 8P: Main Cell - Bio Retention Peak Elev=111.98' Storage=1,645 cf Inflow=3.89 cfs 15,212 cf
 Primary=3.00 cfs 15,018 cf Secondary=0.00 cfs 0 cf Outflow=3.00 cfs 15,018 cf

Pond 9P: CB 65 Peak Elev=108.55' Inflow=2.80 cfs 9,450 cf
 12.0" x 126.0' Culvert Outflow=2.80 cfs 9,450 cf

Pond 43R: CB 60 to DMH 64 Peak Elev=111.51' Inflow=0.72 cfs 2,018 cf
 12.0" x 12.0' Culvert Outflow=0.72 cfs 2,018 cf

Pond 61R: CB 62 to DMH 64 Peak Elev=112.63' Inflow=3.59 cfs 13,194 cf
 12.0" x 24.0' Culvert Outflow=3.59 cfs 13,194 cf

Pond 66P: RG 9A at Units 11/12 - CB 214 Peak Elev=107.70' Storage=132 cf Inflow=1.03 cfs 2,957 cf
 Primary=1.02 cfs 2,851 cf Secondary=0.00 cfs 0 cf Outflow=1.02 cfs 2,851 cf

Pond 67P: CB 66 (emergency vertical release) Peak Elev=106.60' Inflow=3.00 cfs 15,018 cf
 Primary=3.00 cfs 15,018 cf Secondary=0.00 cfs 0 cf Outflow=3.00 cfs 15,018 cf

Pond 70P: RG 10A - CB 216 at Units 13 Peak Elev=104.80' Storage=162 cf Inflow=1.53 cfs 4,498 cf
 Primary=1.52 cfs 4,378 cf Secondary=0.00 cfs 0 cf Outflow=1.52 cfs 4,378 cf

Pond 111P: CB 20 Peak Elev=104.40' Inflow=1.24 cfs 3,312 cf
 12.0" x 16.0' Culvert Outflow=1.24 cfs 3,312 cf

Pond 112P: CB 22 Peak Elev=104.32' Inflow=0.88 cfs 2,409 cf
 12.0" x 22.0' Culvert Outflow=0.88 cfs 2,409 cf

Pond 119P: RG - 1A - CB 118 to DMH 14 Peak Elev=110.22' Storage=64 cf Inflow=3.25 cfs 9,017 cf
 Primary=3.24 cfs 8,981 cf Secondary=0.00 cfs 0 cf Outflow=3.24 cfs 8,981 cf

Pond 119R: Culvert under Unit 4 Drive Peak Elev=113.92' Inflow=2.64 cfs 7,592 cf
 8.0" x 40.0' Culvert Outflow=2.64 cfs 7,592 cf

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Pond 121P: RG 6A - CB 120 Under Drive Unit 4 Peak Elev=112.34' Storage=64 cf Inflow=2.65 cfs 7,635 cf
Primary=2.64 cfs 7,592 cf Secondary=0.00 cfs 0 cf Outflow=2.64 cfs 7,592 cf

Pond 128P: RG 2A - CB 122 RG Unit 3 Peak Elev=113.22' Storage=65 cf Inflow=2.74 cfs 7,524 cf
Primary=2.74 cfs 7,481 cf Secondary=0.00 cfs 0 cf Outflow=2.74 cfs 7,481 cf

Pond 132P: RG 3B - CB 124 Rain Garden - Unit Peak Elev=115.13' Storage=98 cf Inflow=1.18 cfs 3,123 cf
Outflow=1.18 cfs 3,025 cf

Pond 133P: Large RG 4C at Unit 20 Peak Elev=116.96' Storage=152 cf Inflow=1.02 cfs 2,640 cf
Primary=1.01 cfs 2,520 cf Secondary=0.00 cfs 0 cf Outflow=1.01 cfs 2,520 cf

Pond 144R: HW 30 to DMH 14 Peak Elev=114.53' Inflow=3.84 cfs 11,433 cf
12.0" x 114.0' Culvert Outflow=3.84 cfs 11,433 cf

Pond 155P: RG 5A - CB 116 between Septic an Peak Elev=109.24' Storage=66 cf Inflow=3.13 cfs 8,947 cf
Primary=3.11 cfs 8,904 cf Secondary=0.00 cfs 0 cf Outflow=3.11 cfs 8,904 cf

Pond 156R: Culvert under Unit 5 Drive Peak Elev=115.91' Inflow=1.70 cfs 5,058 cf
8.0" x 35.0' Culvert Outflow=1.70 cfs 5,058 cf

Pond 157P: RG 7A - CB 126 Under Drive Unit 5 Peak Elev=115.51' Storage=59 cf Inflow=1.70 cfs 5,100 cf
Primary=1.70 cfs 5,058 cf Secondary=0.00 cfs 0 cf Outflow=1.70 cfs 5,058 cf

Pond 158P: Culvert under Drive Unit 6 Peak Elev=116.70' Inflow=1.00 cfs 2,864 cf
8.0" x 35.0' Culvert Outflow=1.00 cfs 2,864 cf

Pond 218R: DMH 50 to Irrigation Cistern Peak Elev=105.10' Inflow=10.16 cfs 40,055 cf
15.0" x 5.0' Culvert Outflow=10.16 cfs 40,055 cf

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
Discarded=0.00 cfs 0 cf Primary=0.00 cfs 0 cf

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING Peak Elev=0.00' Storage=0 cf
12.0" x 5.0' Culvert Primary=0.00 cfs 0 cf

Link A: POA A Inflow=23.25 cfs 100,094 cf
Primary=23.25 cfs 100,094 cf

Total Runoff Area = 295,260 sf Runoff Volume = 105,127 cf Average Runoff Depth = 4.27"
72.54% Pervious Area = 214,190 sf 27.46% Impervious Area = 81,070 sf

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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 54S: CB at Cul-de-Sac - Outside

Runoff = 2.57 cfs @ 12.07 hrs, Volume= 7,769 cf, Depth> 4.45"

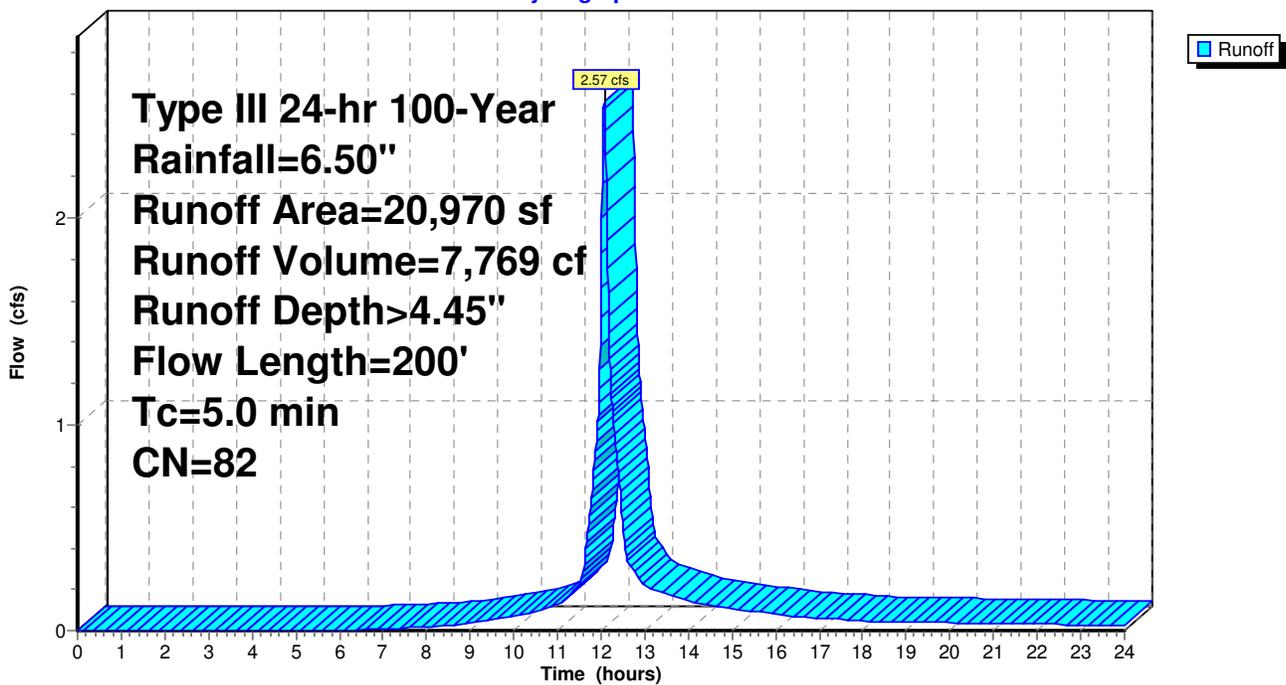
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,100	98	Paved parking & roofs
2,724	98	Paved parking & roofs
14,146	74	>75% Grass cover, Good, HSG C
20,970	82	Weighted Average
14,146		Pervious Area
6,824		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.1	20	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	150	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
5.0	200	Total			

Subcatchment 54S: CB at Cul-de-Sac - Outside

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 56S: CB at Cul-de-Sac - Inside

Runoff = 1.10 cfs @ 12.08 hrs, Volume= 3,444 cf, Depth> 4.77"

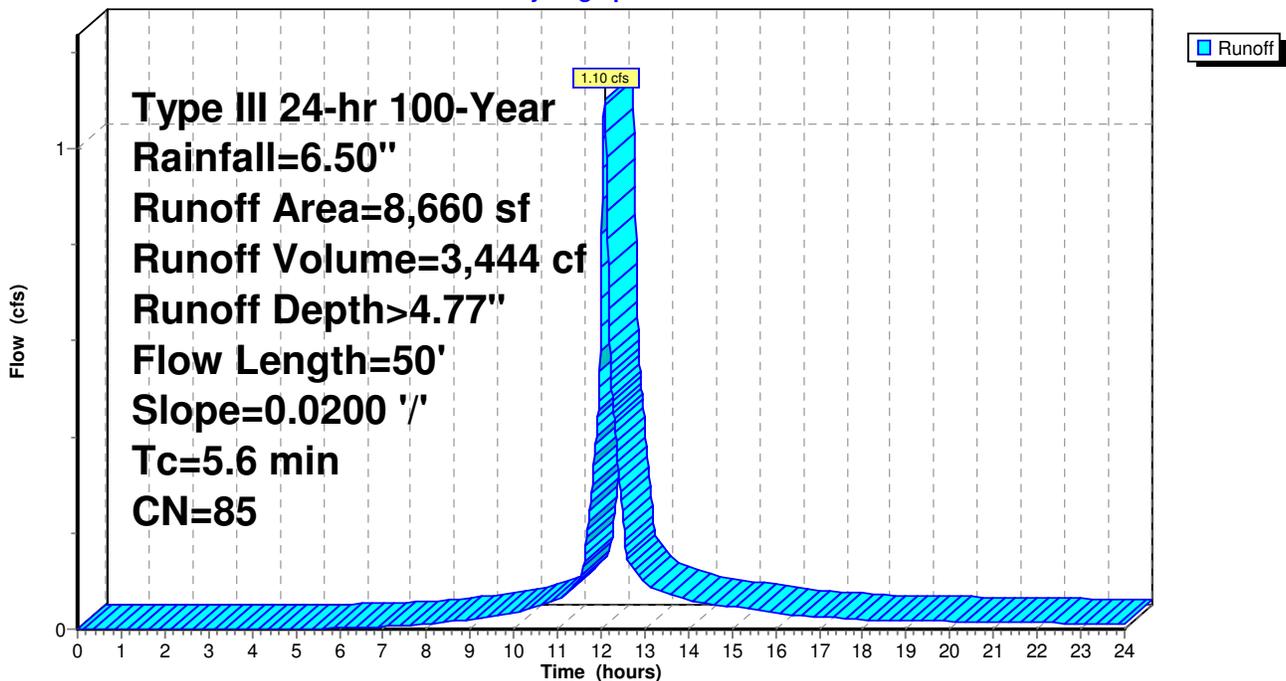
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
0	98	Paved parking & roofs
3,847	98	Paved parking & roofs
4,813	74	>75% Grass cover, Good, HSG C
8,660	85	Weighted Average
4,813		Pervious Area
3,847		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"

Subcatchment 56S: CB at Cul-de-Sac - Inside

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 60S:

Runoff = 0.72 cfs @ 12.03 hrs, Volume= 2,018 cf, Depth> 5.22"

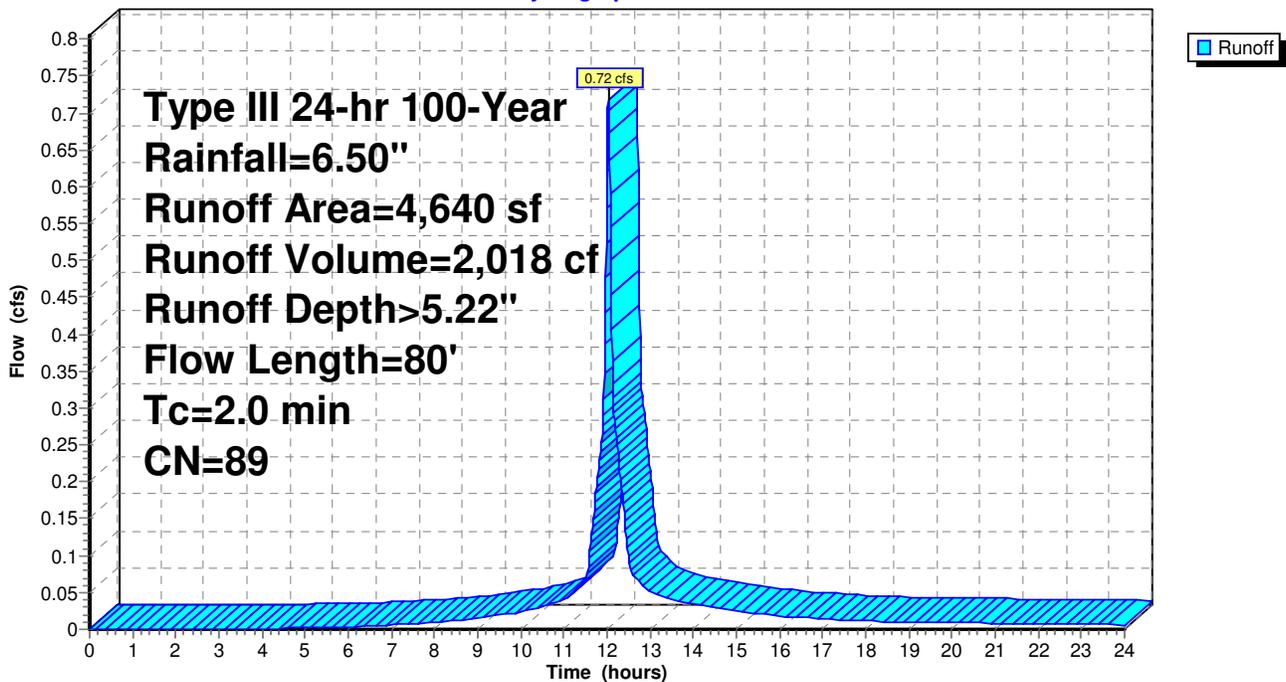
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
960	98	Paved parking & roofs
1,850	98	Paved parking & roofs
1,830	74	>75% Grass cover, Good, HSG C
4,640	89	Weighted Average
1,830		Pervious Area
2,810		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	10	0.0250	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
2.0	80	Total			

Subcatchment 60S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 62S: Large Area including 2 Septics

Runoff = 3.59 cfs @ 12.16 hrs, Volume= 13,194 cf, Depth> 4.02"

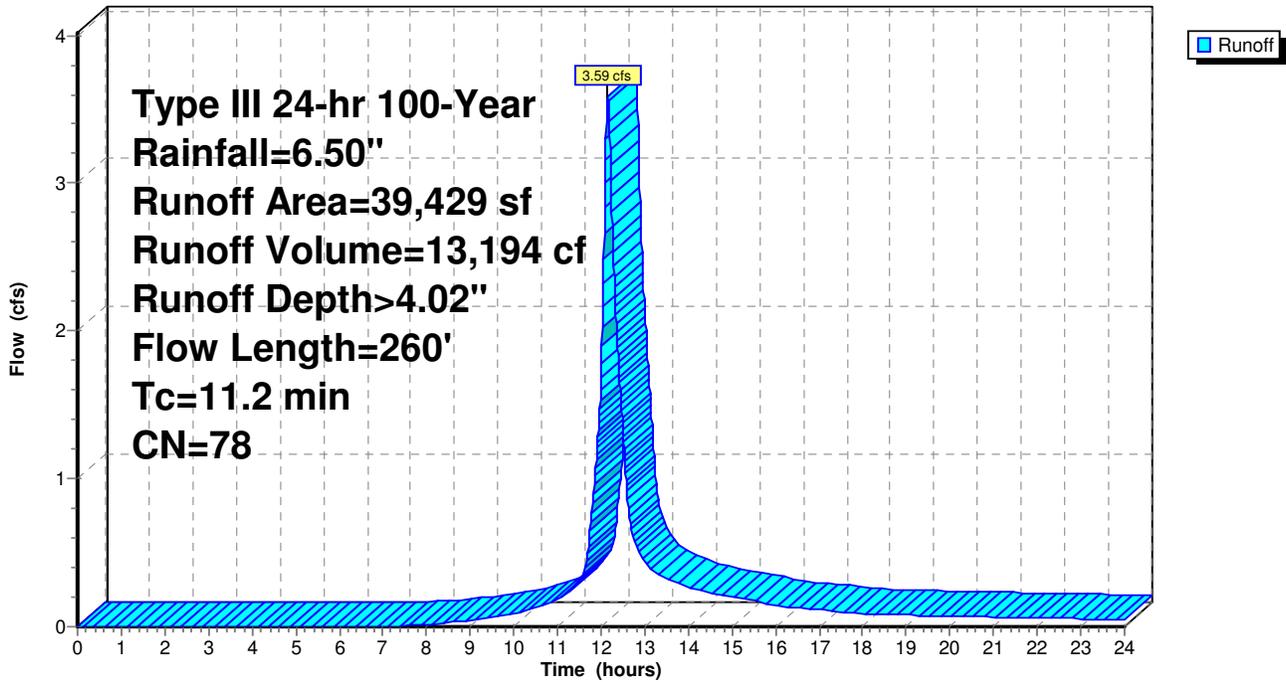
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,880	98	Paved parking & roofs
2,734	98	Paved parking & roofs
30,815	74	>75% Grass cover, Good, HSG C
2,000	70	Woods, Good, HSG C
39,429	78	Weighted Average
32,815		Pervious Area
6,614		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	25	0.0500	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	25	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.0	180	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.2	260	Total			

Subcatchment 62S: Large Area including 2 Septics

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 65S: Throat of Cul-de-sac u.g.

Runoff = 1.25 cfs @ 12.13 hrs, Volume= 4,395 cf, Depth> 4.55"

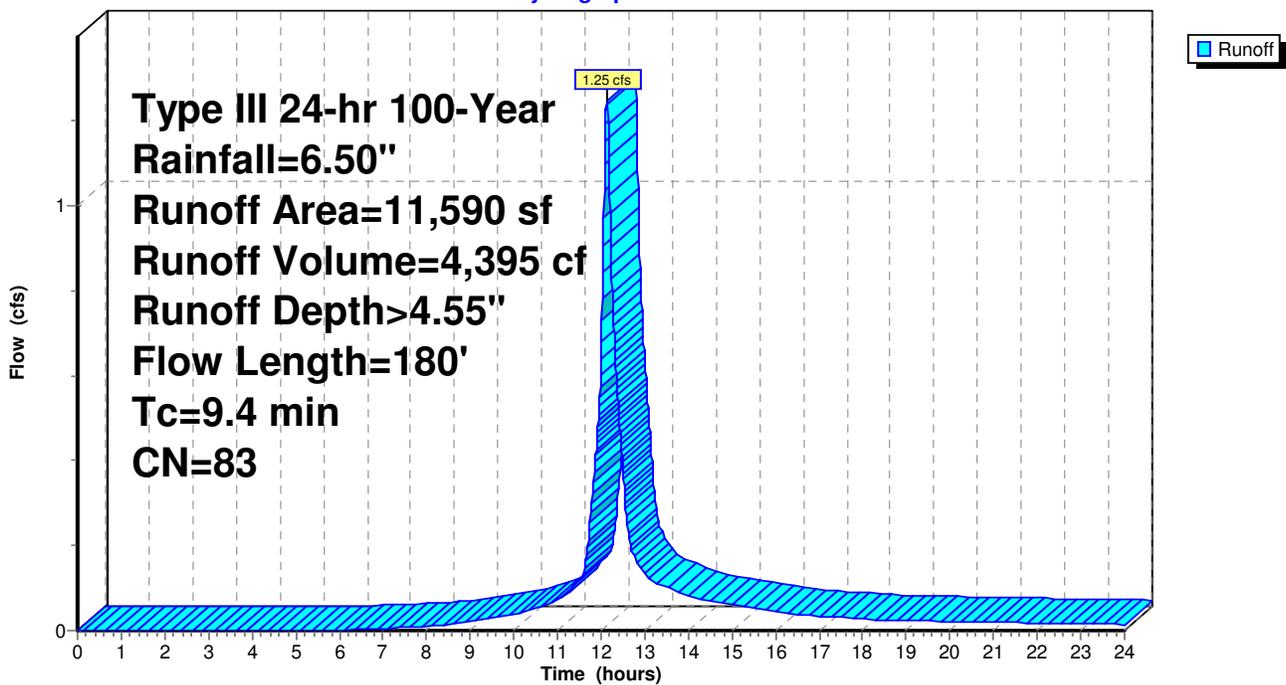
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,200	98	Paved parking & roofs
2,160	98	Paved parking & roofs
7,230	74	>75% Grass cover, Good, HSG C
11,590	83	Weighted Average
7,230		Pervious Area
4,360		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	30	0.1500	2.42		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
9.0	90	0.0200	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.2	60	0.0400	4.06		Shallow Concentrated Flow, Unit 17 Drive and Private Drive Paved Kv= 20.3 fps
9.4	180	Total			

Subcatchment 65S: Throat of Cul-de-sac u.g.

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 68S: From hill near 19,20 to Lawn CB

Runoff = 1.62 cfs @ 12.09 hrs, Volume= 5,055 cf, Depth> 4.02"

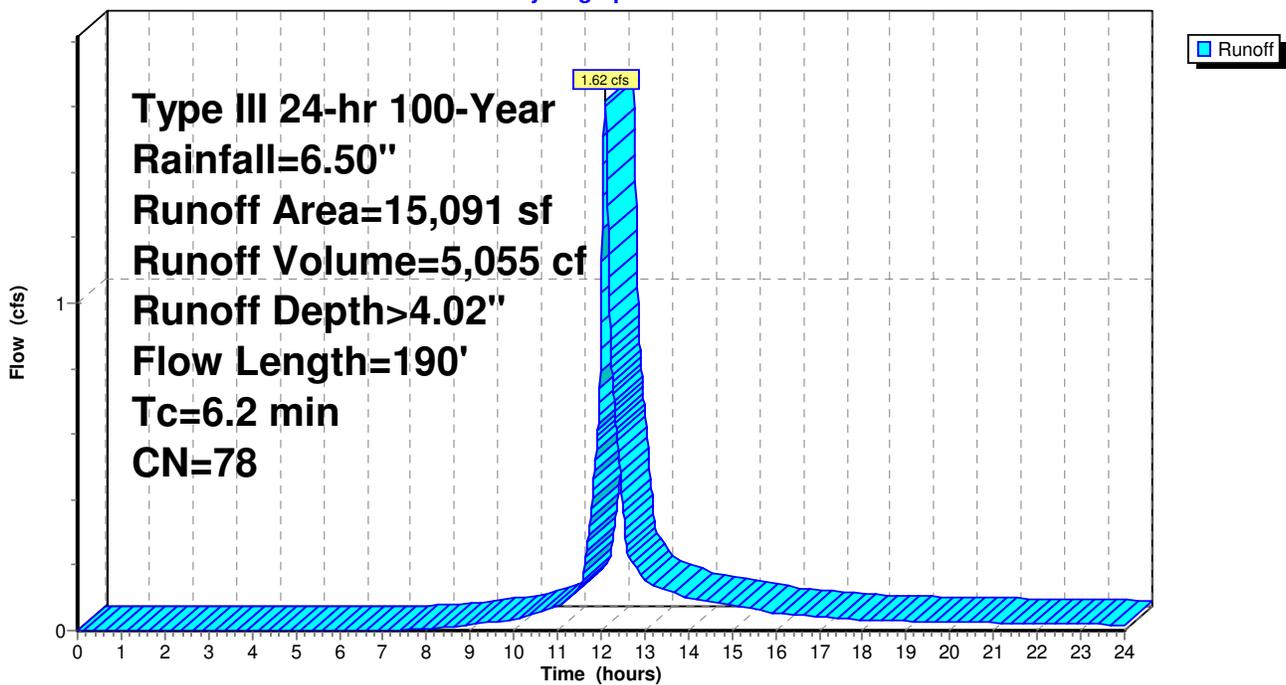
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,730	98	Paved parking & roofs
0	98	Paved parking & roofs
12,361	74	>75% Grass cover, Good, HSG C
15,091	78	Weighted Average
12,361		Pervious Area
2,730		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	20	0.1500	2.23		Sheet Flow, Roof Unit 20 Smooth surfaces n= 0.011 P2= 3.20"
3.7	30	0.0200	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.4	140	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
6.2	190	Total			

Subcatchment 68S: From hill near 19,20 to Lawn CB

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 110S: To CB 20

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.24 cfs @ 12.01 hrs, Volume= 3,312 cf, Depth> 5.11"

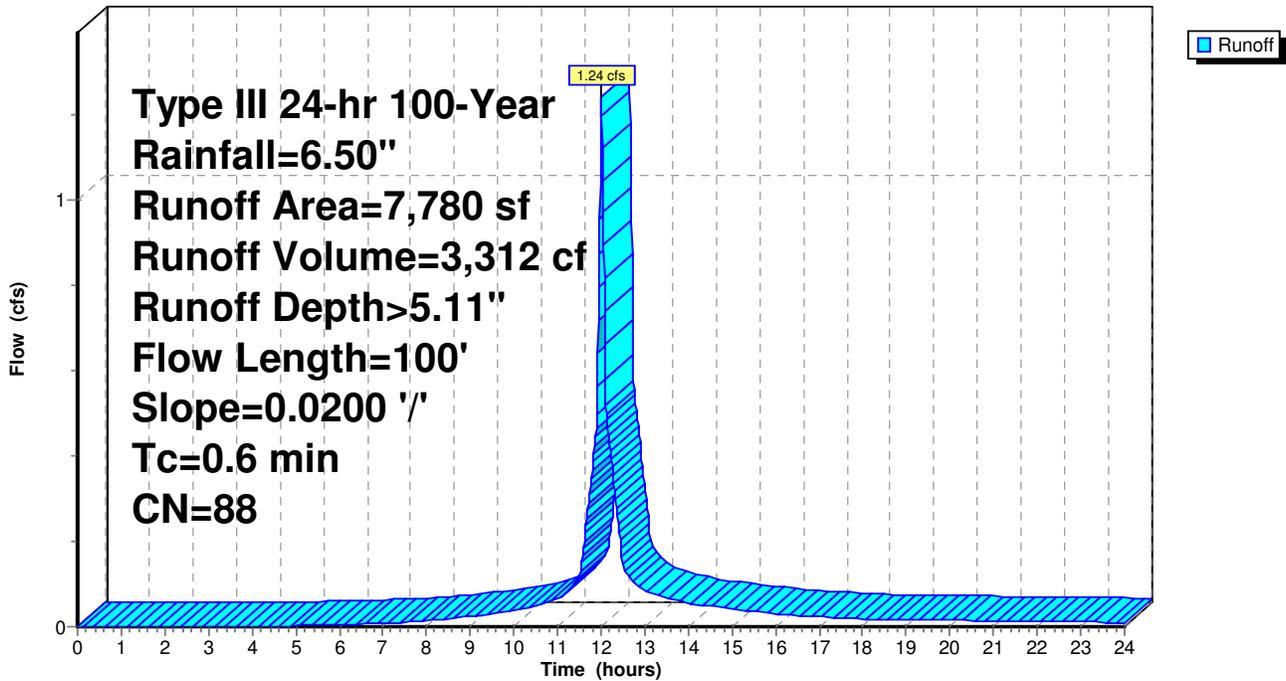
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
2,880	98	Paved parking & roofs
3,240	74	>75% Grass cover, Good, HSG C
7,780	88	Weighted Average
3,240		Pervious Area
4,540		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	100	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps

Subcatchment 110S: To CB 20

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 112S: To CB 22

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.88 cfs @ 12.00 hrs, Volume= 2,409 cf, Depth> 5.56"

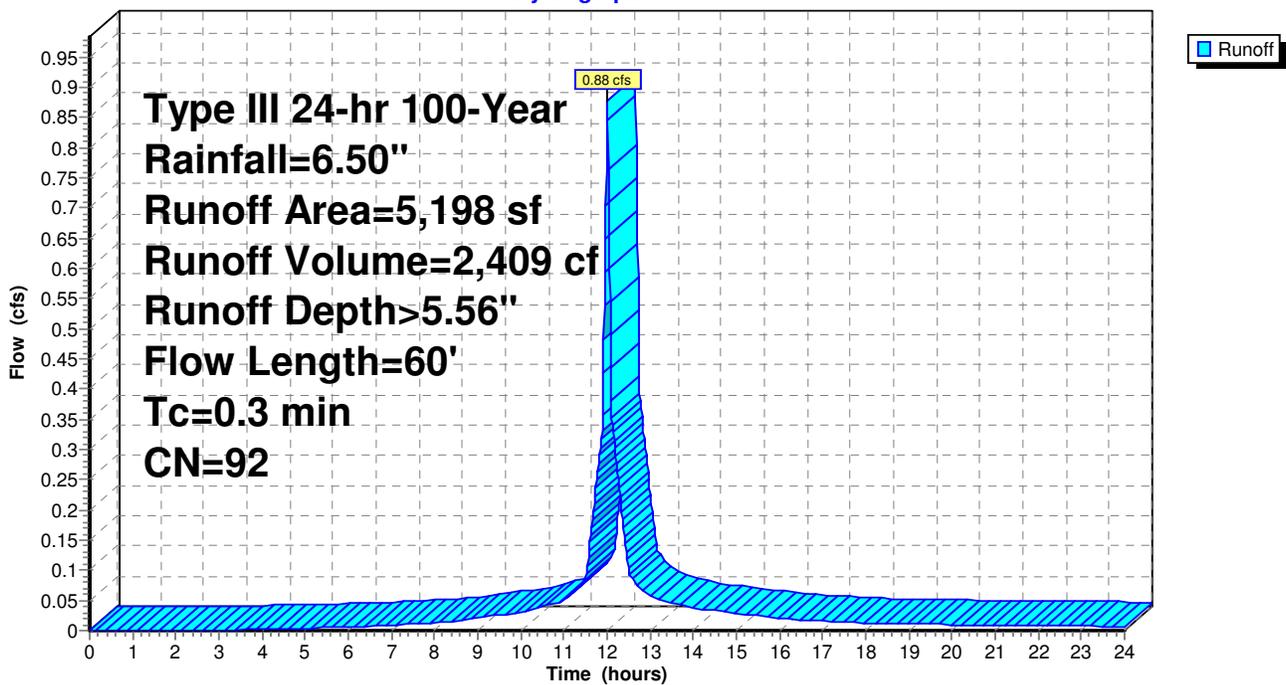
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,400	98	Paved parking & roofs
1,525	98	Paved parking & roofs
1,273	74	>75% Grass cover, Good, HSG C
5,198	92	Weighted Average
1,273		Pervious Area
3,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v=20.3$ fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved $K_v=16.1$ fps
0.3	60	Total			

Subcatchment 112S: To CB 22

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 114S: Behind Units 1&2

Runoff = 1.20 cfs @ 12.15 hrs, Volume= 4,450 cf, Depth> 4.12"

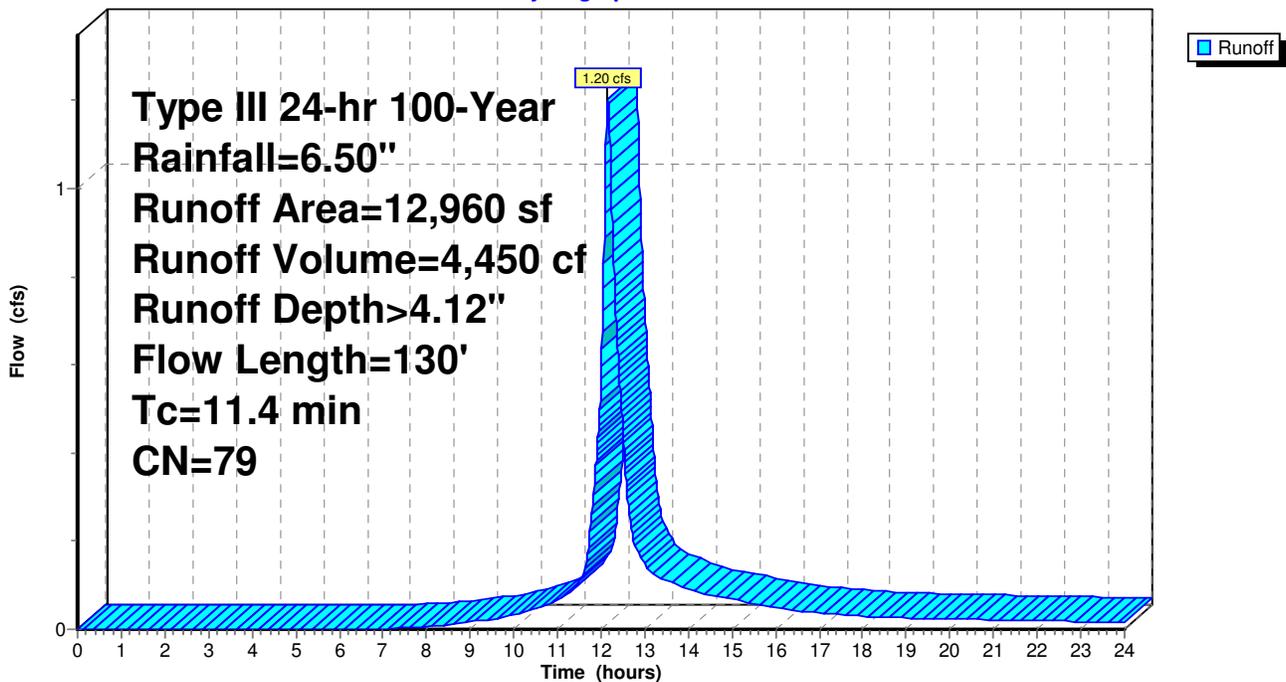
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,300	98	Paved parking & roofs
10,000	74	>75% Grass cover, Good, HSG C
12,960	79	Weighted Average
10,000		Pervious Area
2,960		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.6	80	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
11.4	130	Total			

Subcatchment 114S: Behind Units 1&2

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 116S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.50 cfs @ 12.00 hrs, Volume= 1,356 cf, Depth> 5.33"

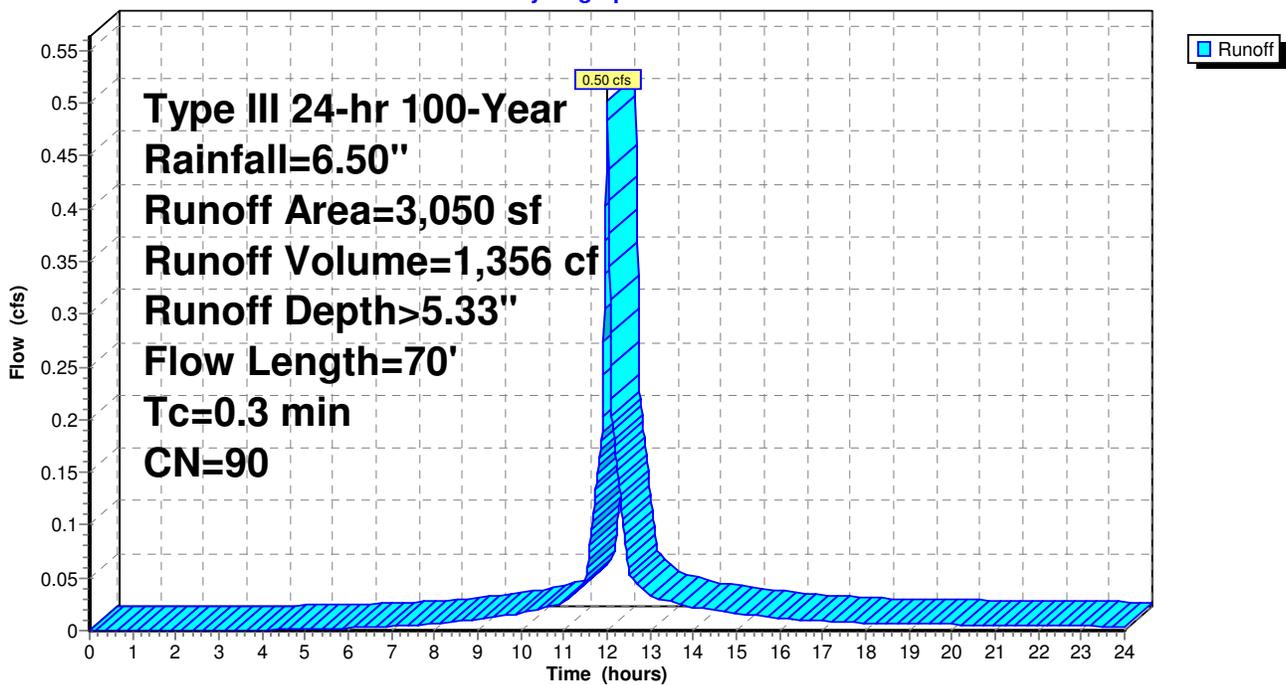
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,300	98	Paved parking & roofs
1,050	74	>75% Grass cover, Good, HSG C
3,050	90	Weighted Average
1,050		Pervious Area
2,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	40	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v = 20.3$ fps
0.2	30	0.0300	2.79		Shallow Concentrated Flow, Unpaved $K_v = 16.1$ fps
0.3	70	Total			

Subcatchment 116S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 118S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.58 cfs @ 12.00 hrs, Volume= 1,537 cf, Depth> 5.11"

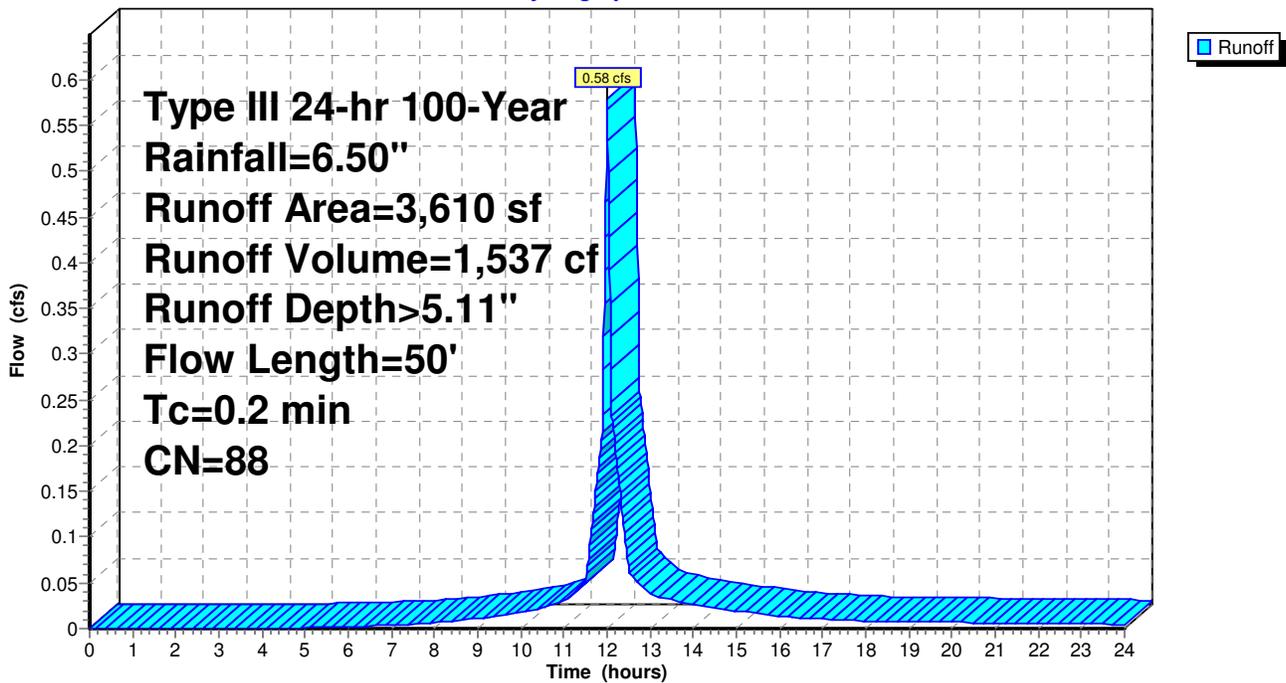
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,040	98	Paved parking & roofs
1,140	98	Paved parking & roofs
1,430	74	>75% Grass cover, Good, HSG C
3,610	88	Weighted Average
1,430		Pervious Area
2,180		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.2	50	Total			

Subcatchment 118S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 120S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.97 cfs @ 12.01 hrs, Volume= 2,578 cf, Depth> 5.00"

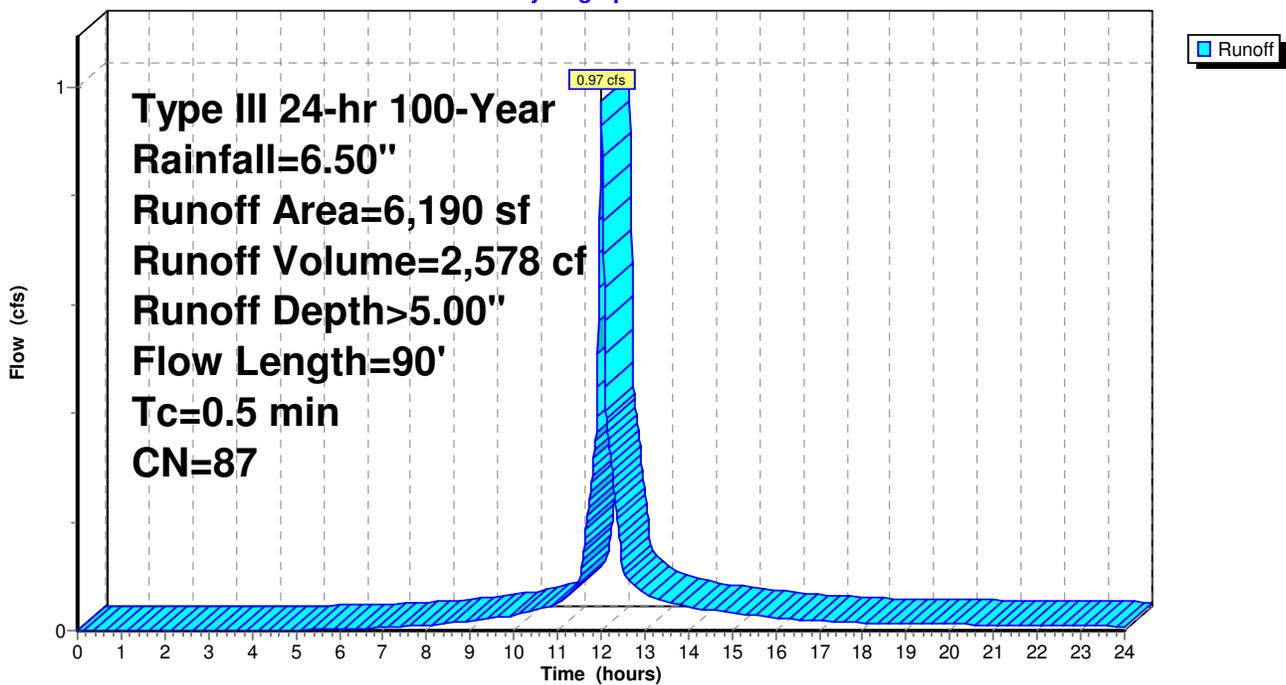
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,450	98	Paved parking & roofs
1,800	98	Paved parking & roofs
2,940	74	>75% Grass cover, Good, HSG C
6,190	87	Weighted Average
2,940		Pervious Area
3,250		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	60	0.0300	2.79		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	90	Total			

Subcatchment 120S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 122S:

Runoff = 0.70 cfs @ 12.05 hrs, Volume= 1,980 cf, Depth> 3.92"

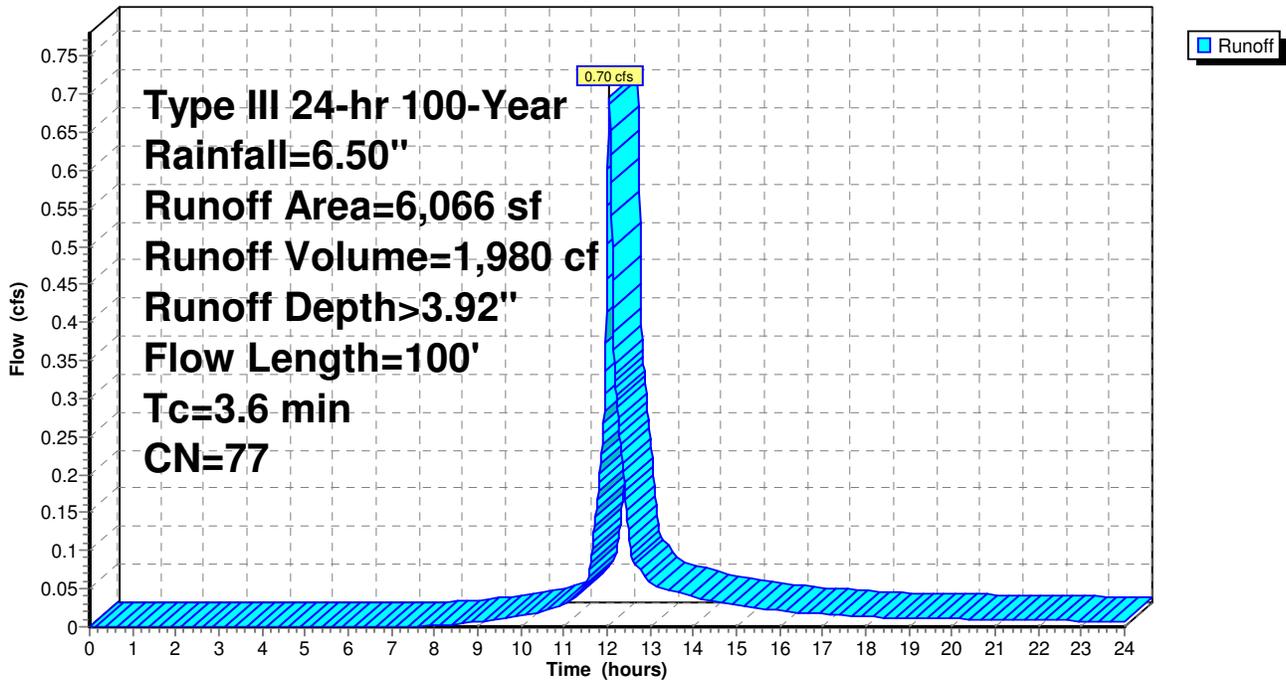
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
720	98	Paved parking & roofs
5,346	74	>75% Grass cover, Good, HSG C
6,066	77	Weighted Average
5,346		Pervious Area
720		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	20	0.0300	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
1.3	80	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.6	100	Total			

Subcatchment 122S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 124S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.18 cfs @ 12.01 hrs, Volume= 3,123 cf, Depth> 5.00"

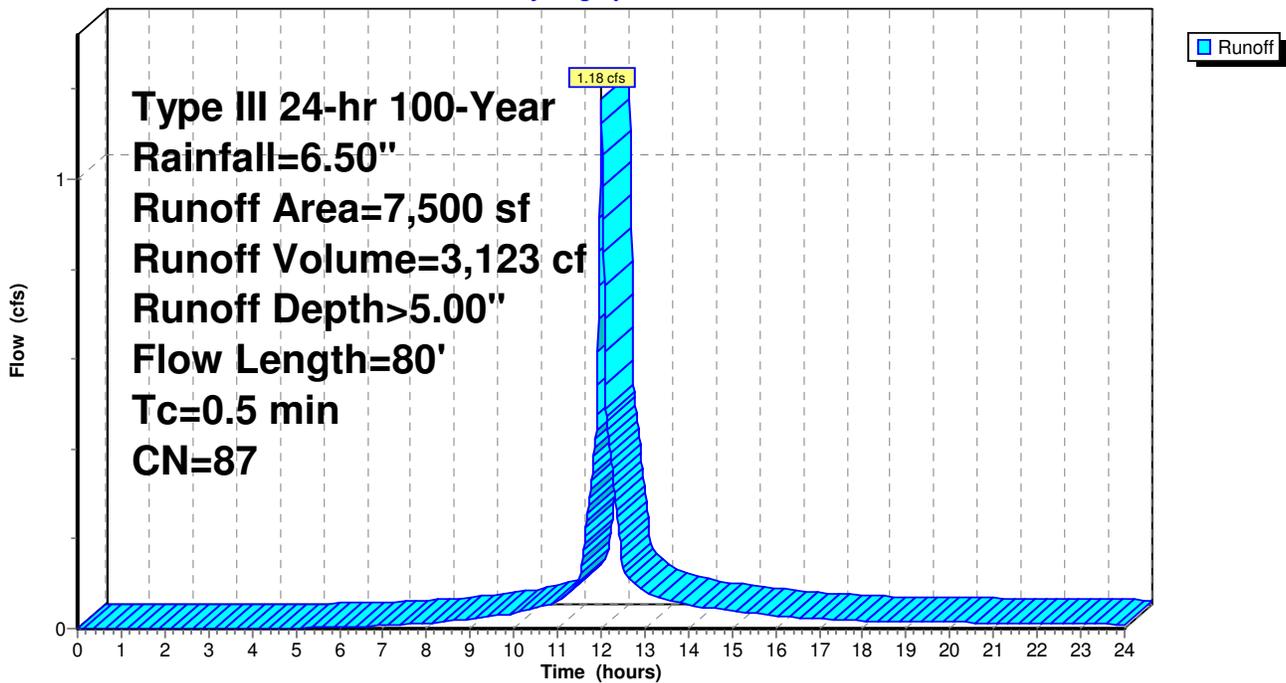
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,410	98	Paved parking & roofs
2,600	98	Paved parking & roofs
3,490	74	>75% Grass cover, Good, HSG C
7,500	87	Weighted Average
3,490		Pervious Area
4,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	80	Total			

Subcatchment 124S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 126S:

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.85 cfs @ 12.00 hrs, Volume= 2,236 cf, Depth> 5.00"

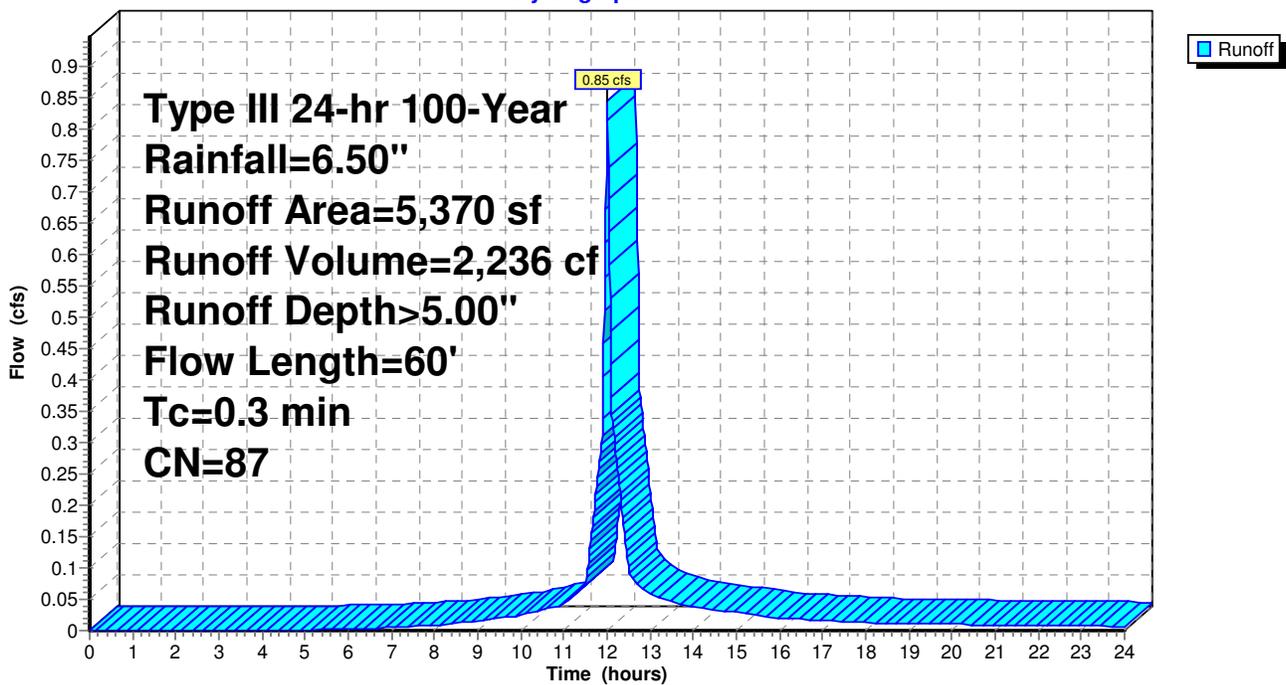
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, $dt=0.01$ hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,660	98	Paved parking & roofs
1,350	98	Paved parking & roofs
2,360	74	>75% Grass cover, Good, HSG C
5,370	87	Weighted Average
2,360		Pervious Area
3,010		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	30	0.1500	7.86		Shallow Concentrated Flow, Paved $K_v=20.3$ fps
0.2	30	0.0200	2.28		Shallow Concentrated Flow, Unpaved $K_v=16.1$ fps
0.3	60	Total			

Subcatchment 126S:

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 128S:

Runoff = 1.00 cfs @ 12.05 hrs, Volume= 2,864 cf, Depth> 4.77"

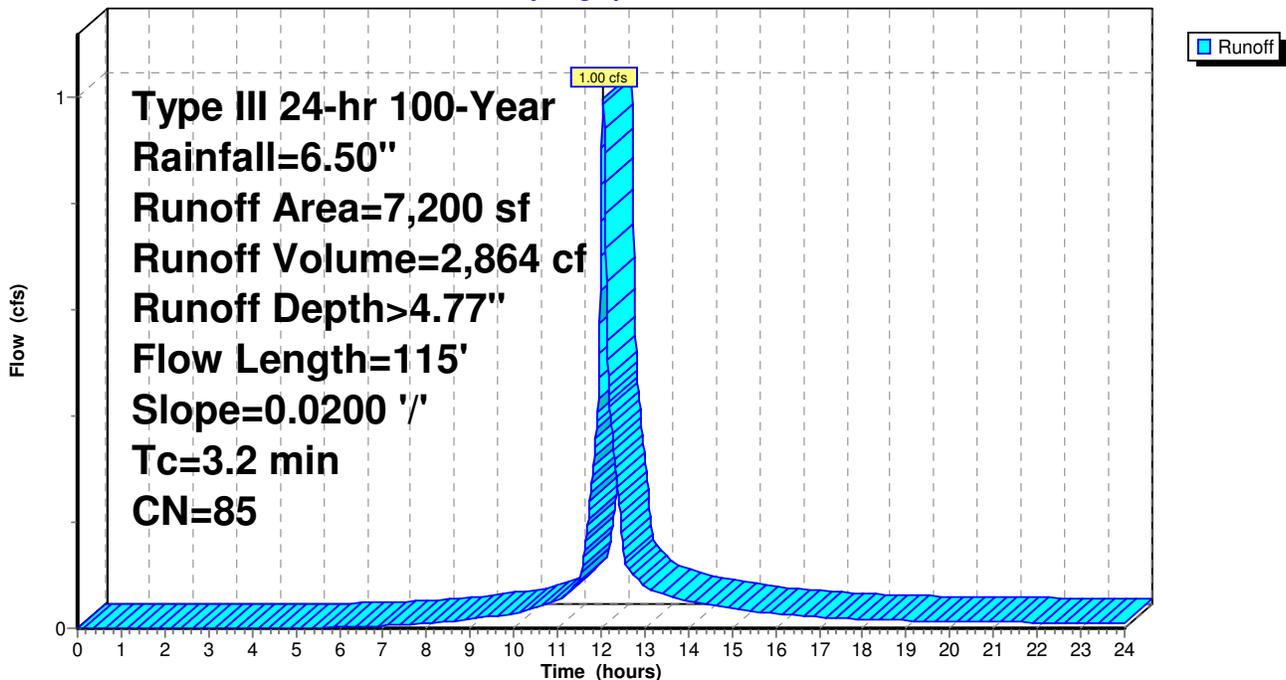
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,550	98	Paved parking & roofs
1,600	98	Paved parking & roofs
4,050	74	>75% Grass cover, Good, HSG C
7,200	85	Weighted Average
4,050		Pervious Area
3,150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	25	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	20	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.2	115	Total			

Subcatchment 128S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 130S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.02 cfs @ 12.01 hrs, Volume= 2,640 cf, Depth> 4.56"

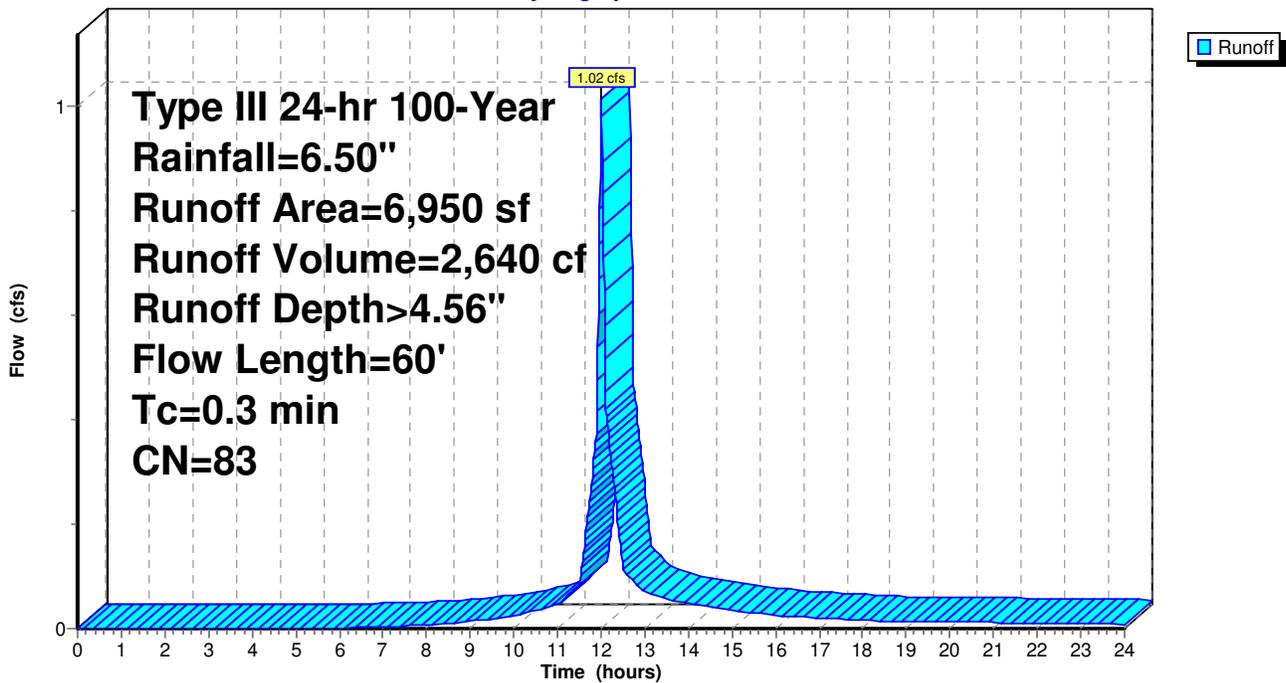
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
800	98	Paved parking & roofs
1,940	98	Paved parking & roofs
4,210	74	>75% Grass cover, Good, HSG C
6,950	83	Weighted Average
4,210		Pervious Area
2,740		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	20	0.1500	7.86		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	60	Total			

Subcatchment 130S:

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 132S: Behind Unit 3

[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.23 cfs @ 12.01 hrs, Volume= 8,351 cf, Depth> 3.81"

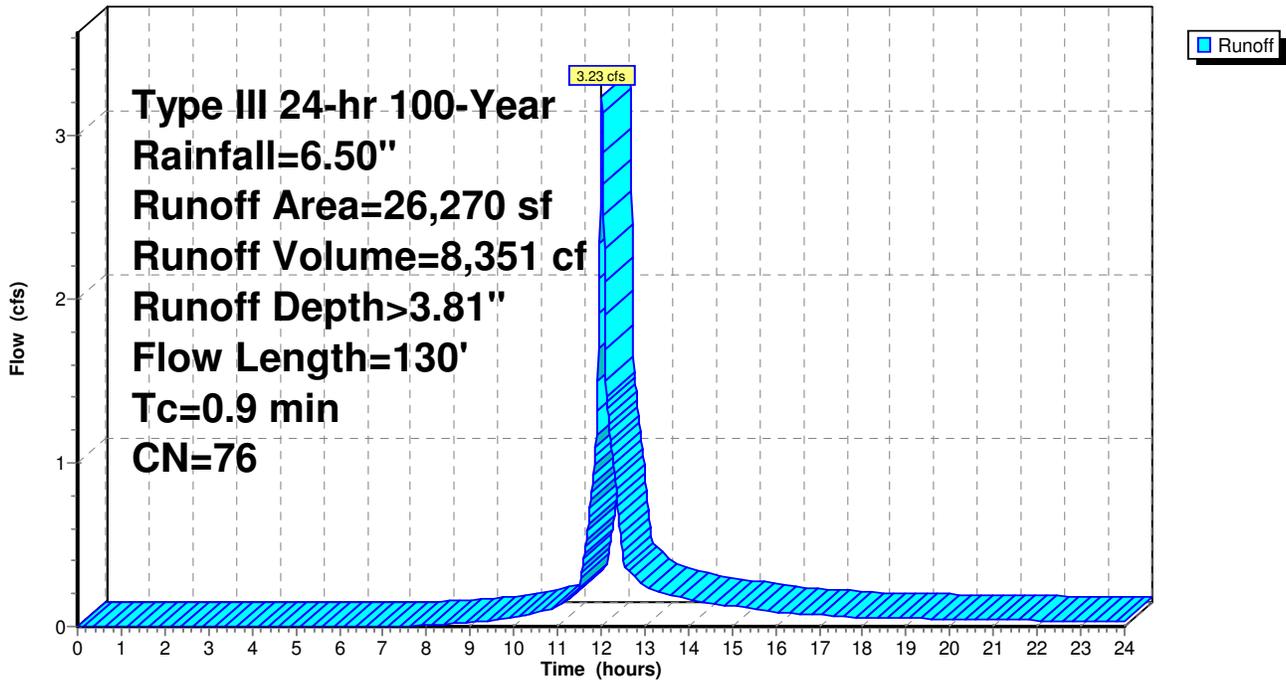
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,100	98	Paved parking & roofs
24,170	74	>75% Grass cover, Good, HSG C
26,270	76	Weighted Average
24,170		Pervious Area
2,100		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.0150	1.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	130	Total			

Subcatchment 132S: Behind Unit 3

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 134S: To Swale behind 7,6,5

Runoff = 1.70 cfs @ 12.05 hrs, Volume= 4,763 cf, Depth> 4.13"

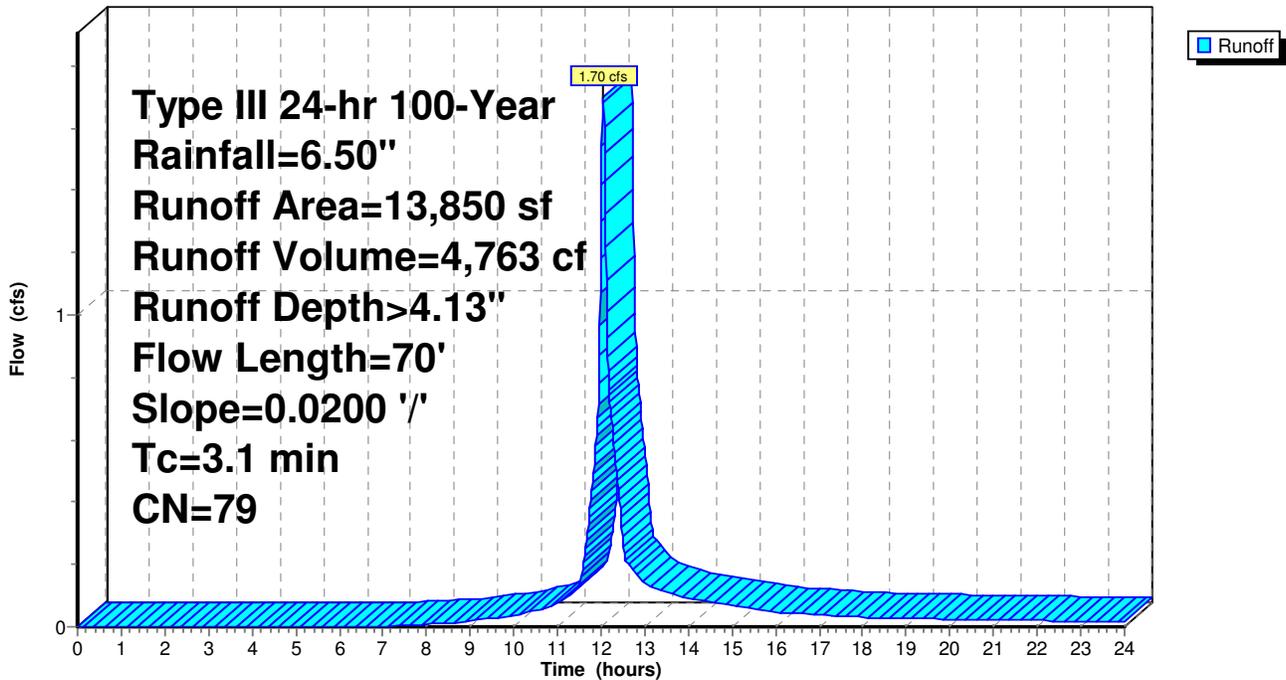
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,000	98	Paved parking & roofs
10,850	74	>75% Grass cover, Good, HSG C
13,850	79	Weighted Average
10,850		Pervious Area
3,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	20	0.0200	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.4	50	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
3.1	70	Total			

Subcatchment 134S: To Swale behind 7,6,5

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 136S: To Swale behind 4 to HW 30

Runoff = 2.25 cfs @ 12.07 hrs, Volume= 6,690 cf, Depth> 3.81"

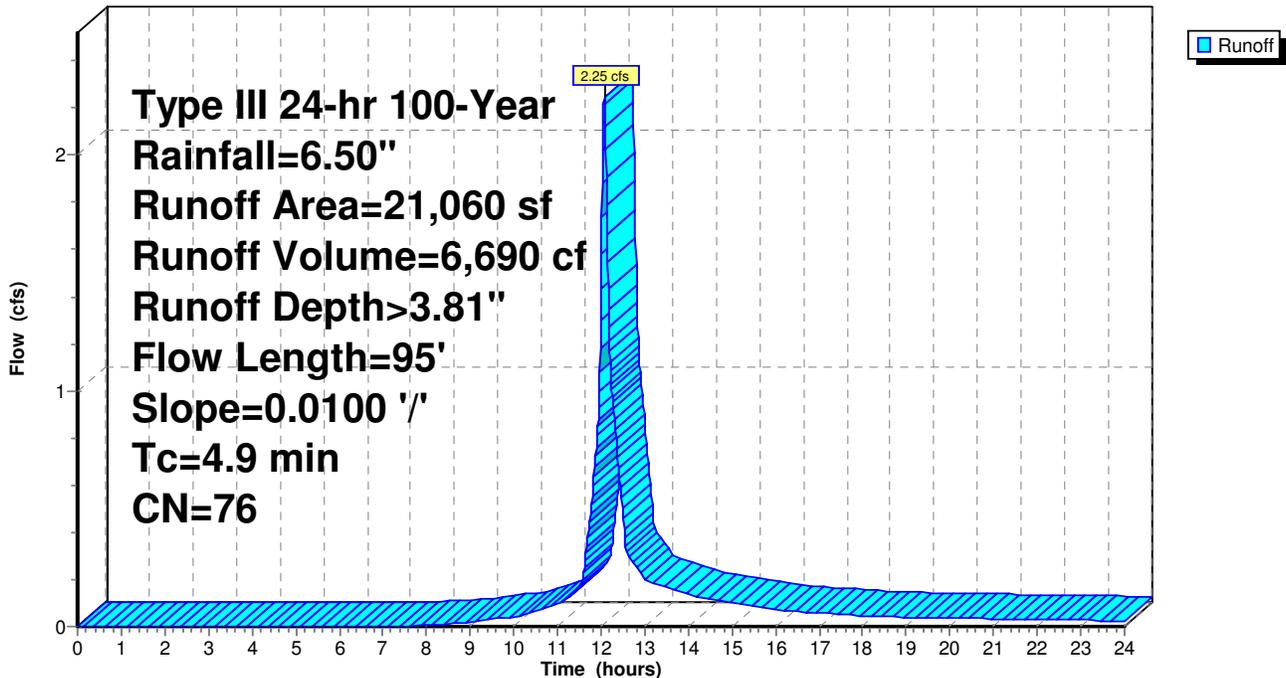
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,060	98	Paved parking & roofs
1,700	70	Woods, Good, HSG C
17,300	74	>75% Grass cover, Good, HSG C
21,060	76	Weighted Average
19,000		Pervious Area
2,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	25	0.0100	0.10		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.6	70	0.0100	1.83	0.59	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022 Earth, clean & straight
4.9	95	Total			

Subcatchment 136S: To Swale behind 4 to HW 30

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 138S: Rear of Units 10,11,12,13

Runoff = 1.45 cfs @ 12.17 hrs, Volume= 5,561 cf, Depth> 4.44"

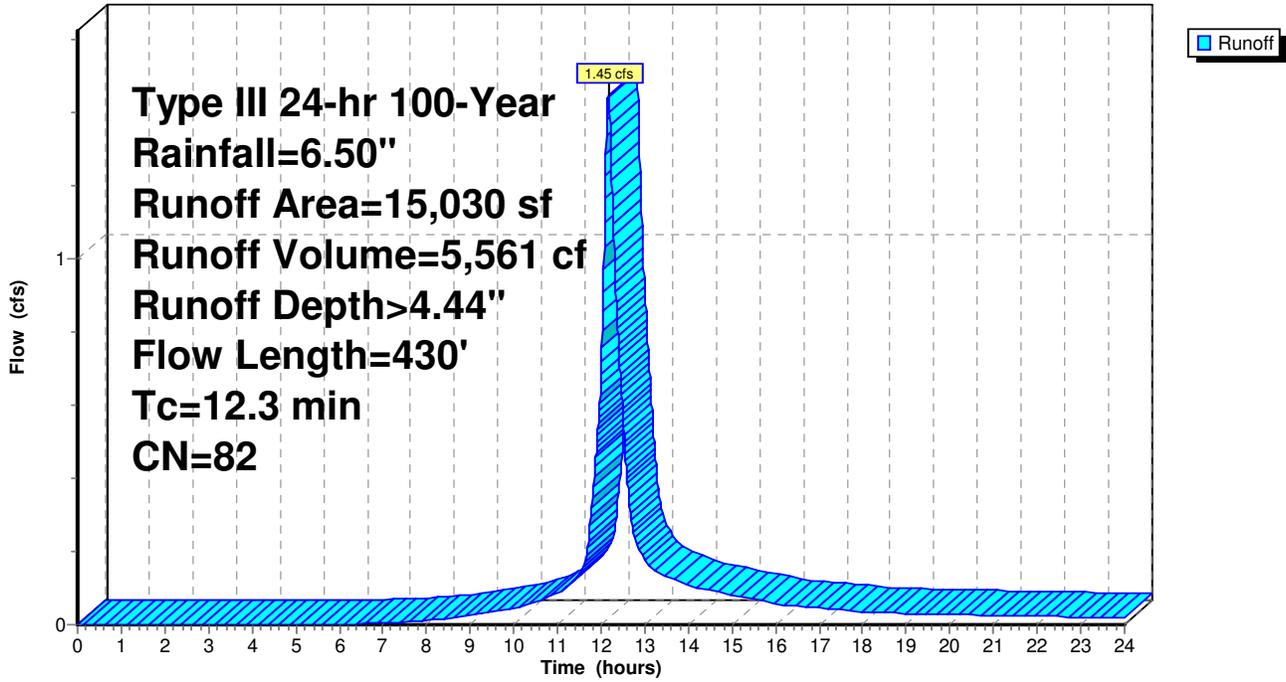
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
4,800	98	Paved parking & roofs
0	98	Paved parking & roofs
10,230	74	>75% Grass cover, Good, HSG C
15,030	82	Weighted Average
10,230		Pervious Area
4,800		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
0.4	80	0.2500	3.50		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.5	150	0.0500	4.63	2.02	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.25' Z= 3.0 '/' Top.W=2.50' n= 0.022 Earth, clean & straight
0.6	150	0.0300	3.89	2.68	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=0.25' Z= 3.0 '/' Top.W=3.50' n= 0.022 Earth, clean & straight
12.3	430	Total			

Subcatchment 138S: Rear of Units 10,11,12,13

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 140S: Behind Units 14, 15, 16

Runoff = 1.81 cfs @ 12.18 hrs, Volume= 7,047 cf, Depth> 3.91"

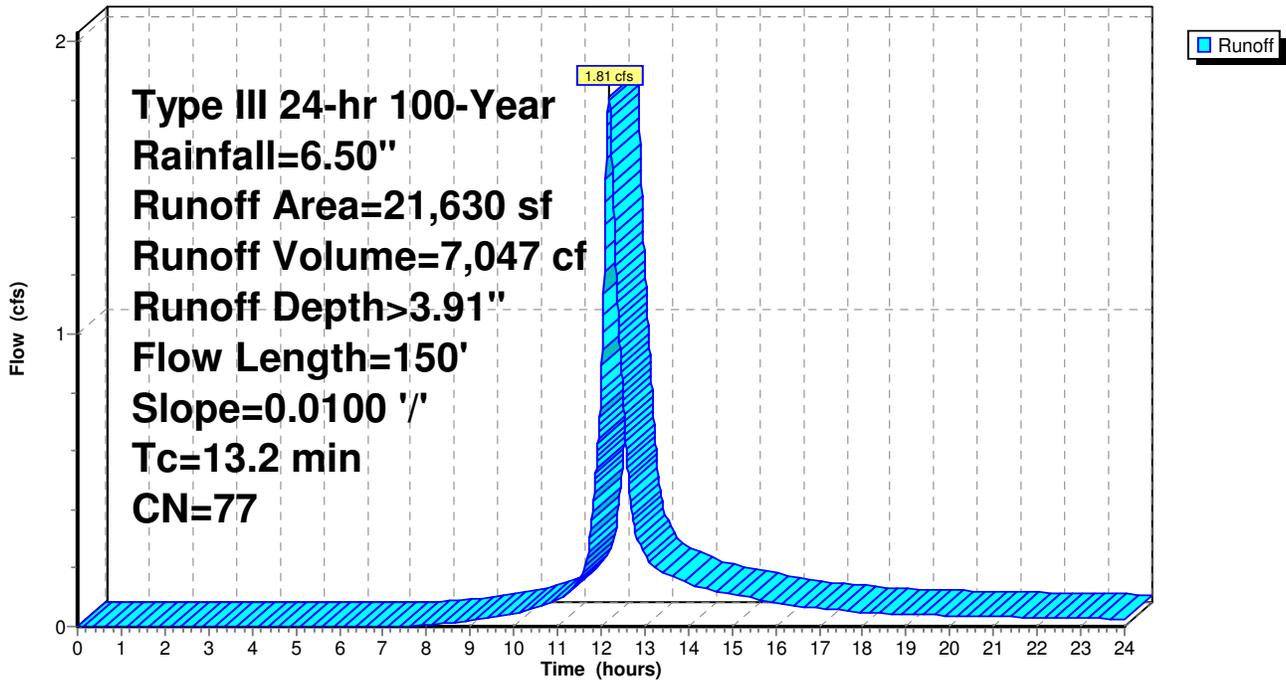
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,600	98	Paved parking & roofs
0	98	Paved parking & roofs
14,030	74	>75% Grass cover, Good, HSG C
4,000	70	Woods, Good, HSG C
21,630	77	Weighted Average
18,030		Pervious Area
3,600		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
2.4	100	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.2	150	Total			

Subcatchment 140S: Behind Units 14, 15, 16

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 214S:

Runoff = 1.03 cfs @ 12.04 hrs, Volume= 2,958 cf, Depth> 5.11"

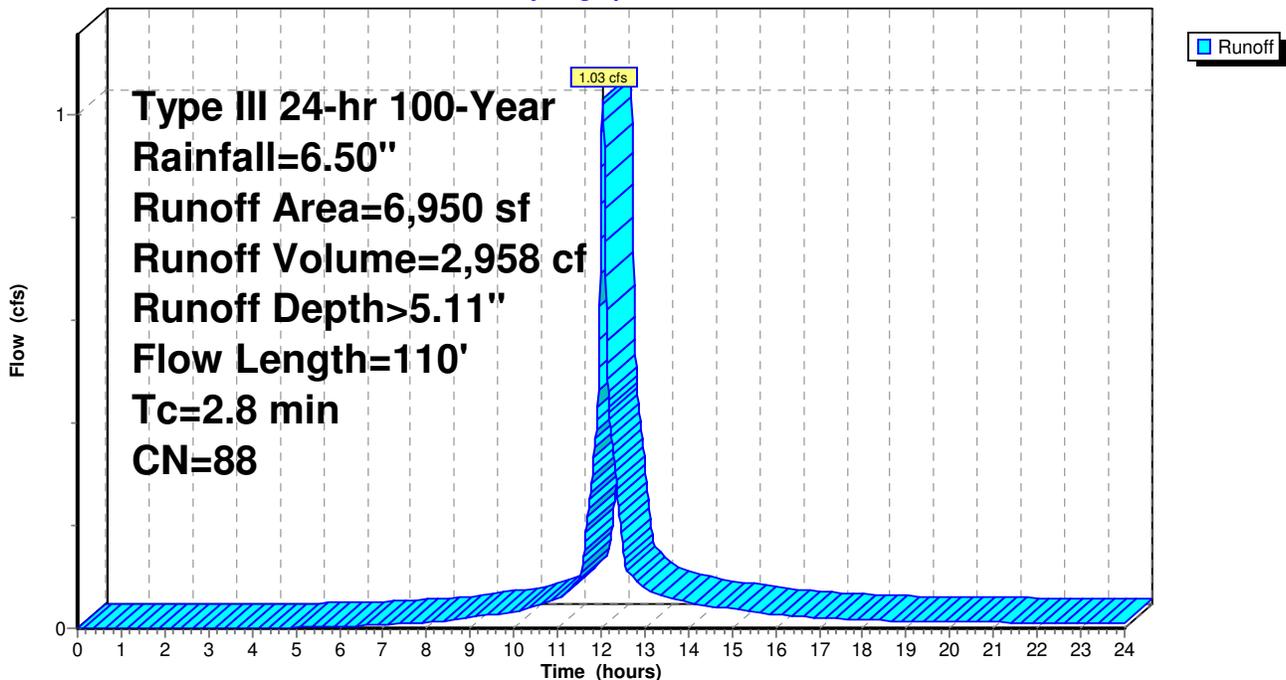
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,000	98	Paved parking & roofs
1,940	98	Paved parking & roofs
3,010	74	>75% Grass cover, Good, HSG C
6,950	88	Weighted Average
3,010		Pervious Area
3,940		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	10	0.0100	0.08		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	40	0.0200	2.28		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	20	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	40	0.0200	2.59	0.83	Trap/Vee/Rect Channel Flow, Bot.W=1.00' D=0.20' Z= 3.0 '/' Top.W=2.20' n= 0.022
2.8	110	Total			

Subcatchment 214S:

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 216S:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.62 cfs @ 12.02 hrs, Volume= 1,648 cf, Depth> 4.78"

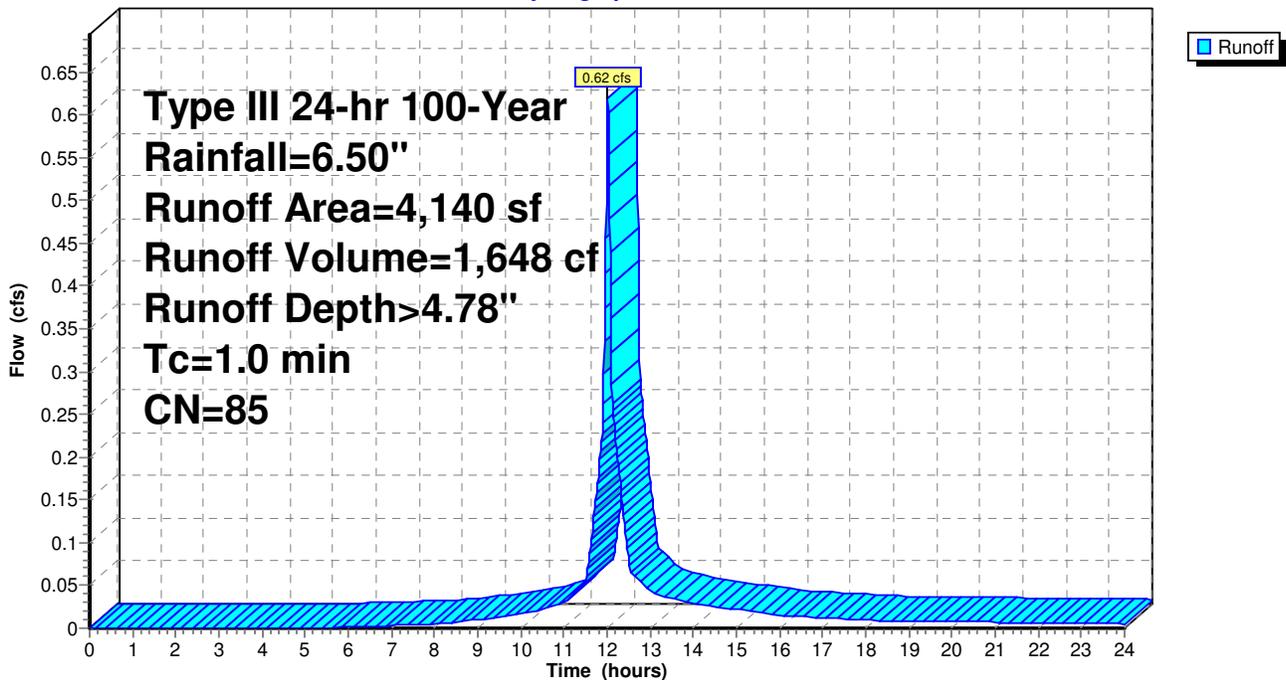
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
700	98	Paved parking & roofs
1,200	98	Paved parking & roofs
2,240	74	>75% Grass cover, Good, HSG C
4,140	85	Weighted Average
2,240		Pervious Area
1,900		Impervious Area

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

Subcatchment 216S:

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Subcatchment 900: North Offsite flowing onto property

Runoff = 0.97 cfs @ 12.18 hrs, Volume= 3,752 cf, Depth> 3.20"

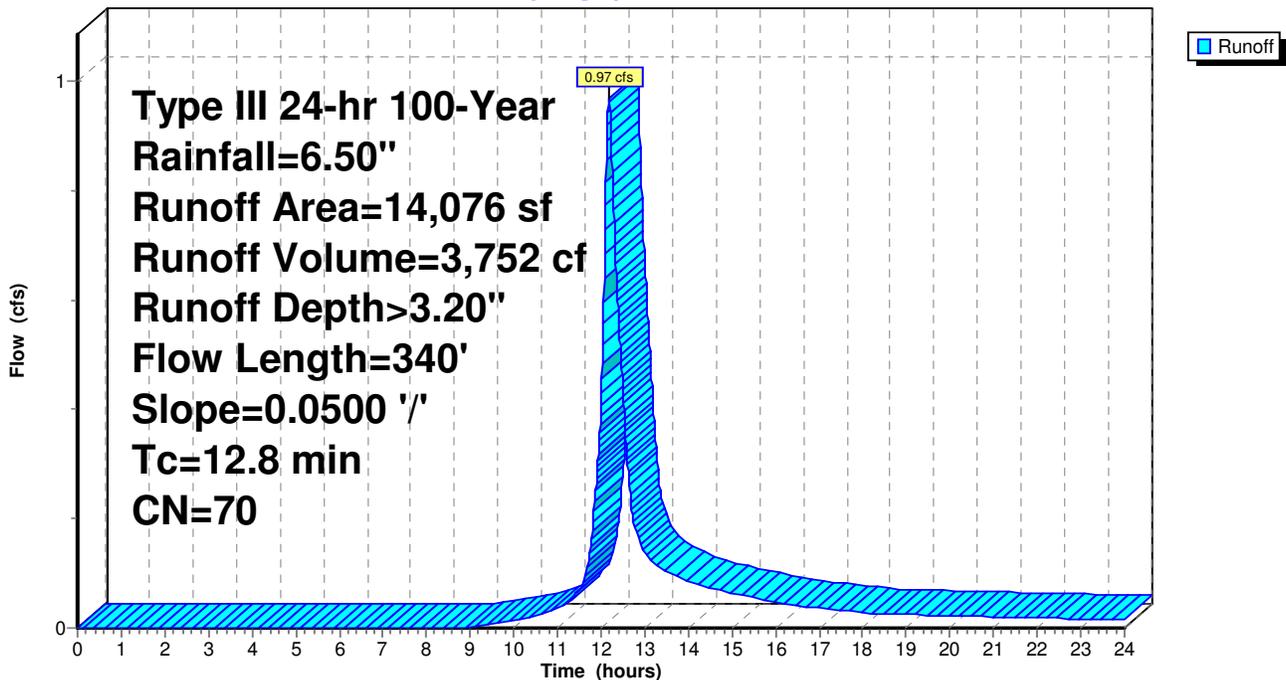
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
14,076	70	Woods, Good, HSG C
14,076		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.3	290	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.8	340	Total			

Subcatchment 900: North Offsite flowing onto property

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Reach 1R: Existing wetland channel to WF 16

Inflow Area = 162,206 sf, Inflow Depth > 3.87" for 100-Year event
Inflow = 13.39 cfs @ 12.15 hrs, Volume= 52,347 cf
Outflow = 13.35 cfs @ 12.17 hrs, Volume= 52,286 cf, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.67 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 3.3 min

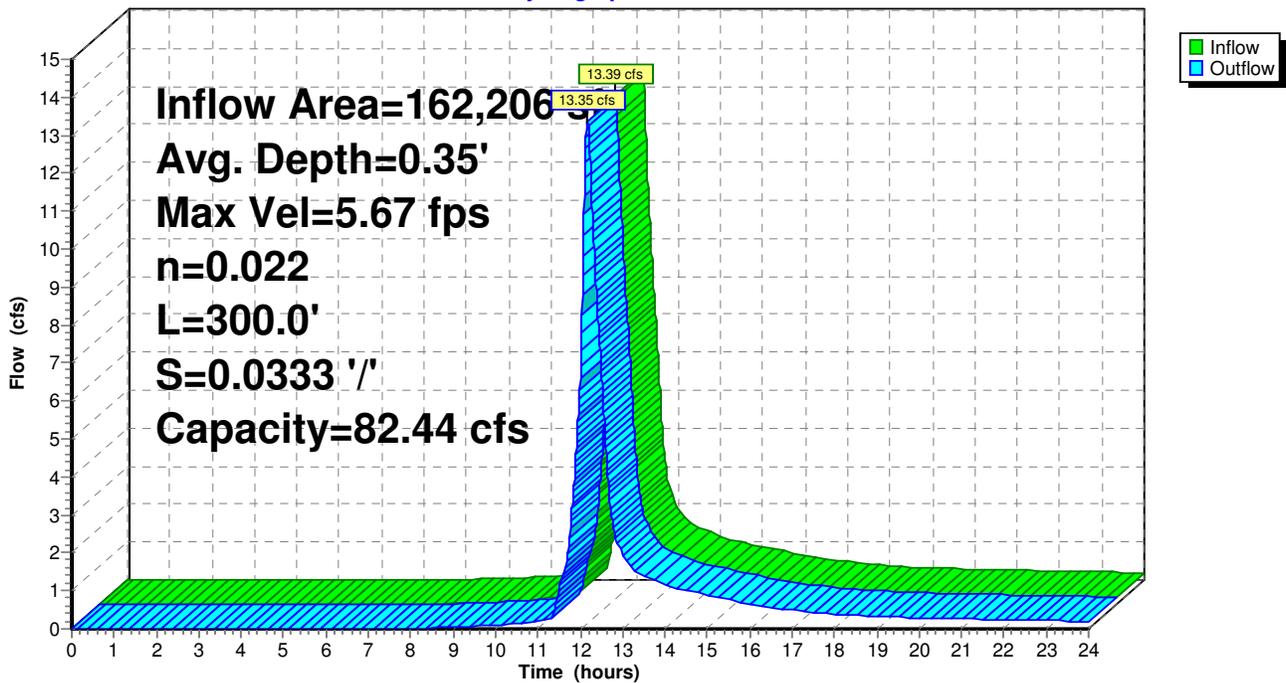
Peak Storage= 707 cf @ 12.16 hrs, Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 82.44 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 300.0' Slope= 0.0333 '/'
Inlet Invert= 96.00', Outlet Invert= 86.00'



Reach 1R: Existing wetland channel to WF 16

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 2R: Swale from Drive at #10 to Drive at #11

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

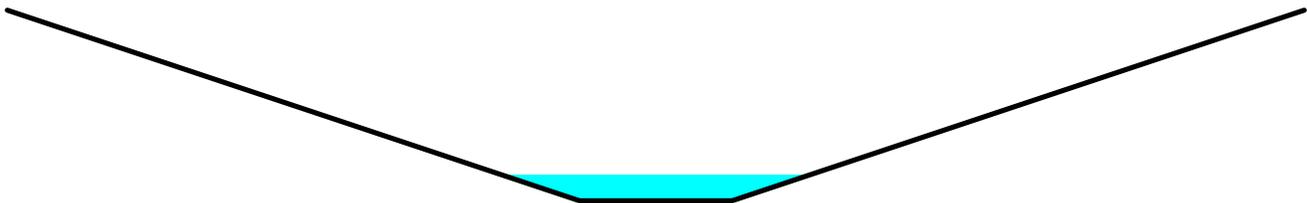
[79] Warning: Submerged Pond 3P Primary device # 1 OUTLET by 0.17'

Inflow Area =	6,950 sf,	Inflow Depth >	5.11"	for	100-Year event
Inflow =	1.03 cfs @	12.04 hrs,	Volume=	2,958 cf	
Outflow =	1.03 cfs @	12.05 hrs,	Volume=	2,957 cf,	Atten= 1%, Lag= 0.5 min

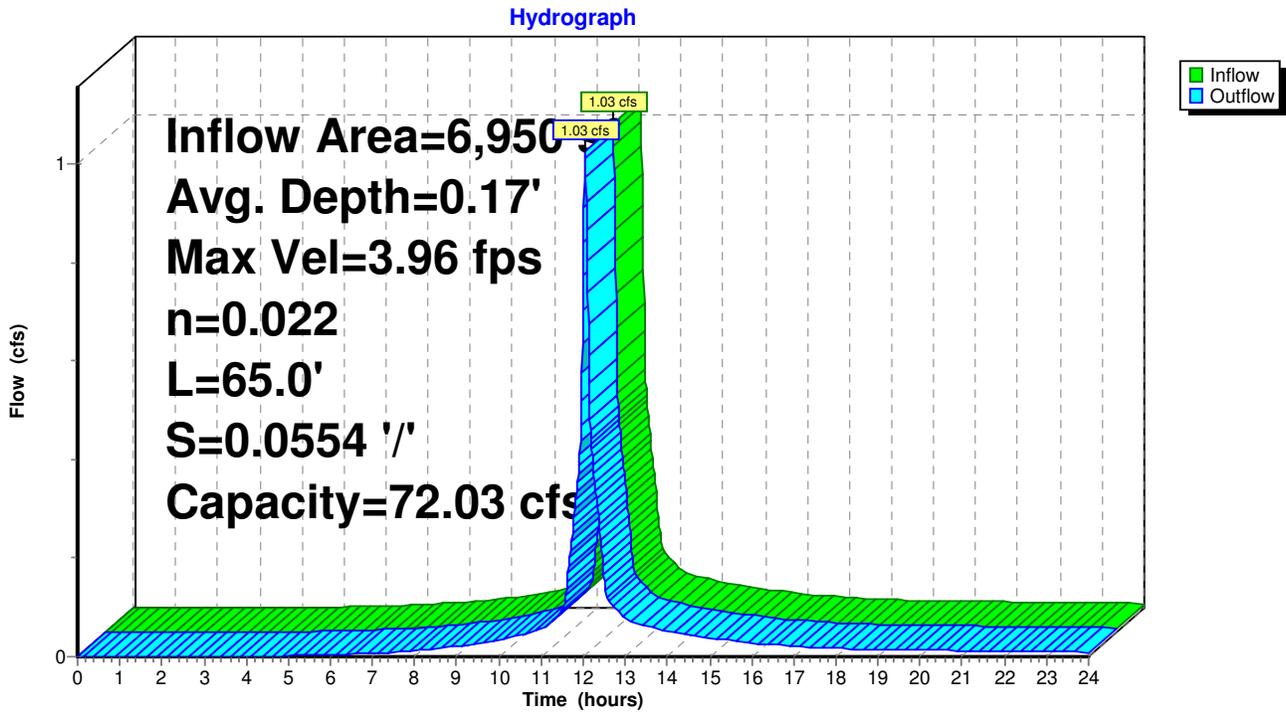
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.96 fps, Min. Travel Time= 0.3 min
 Avg. Velocity = 1.17 fps, Avg. Travel Time= 0.9 min

Peak Storage= 17 cf @ 12.04 hrs, Average Depth at Peak Storage= 0.17'
 Bank-Full Depth= 1.25', Capacity at Bank-Full= 72.03 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 3.0 '/' Top Width= 8.50'
 Length= 65.0' Slope= 0.0554 '/'
 Inlet Invert= 113.92', Outlet Invert= 110.32'



Reach 2R: Swale from Drive at #10 to Drive at #11



Reach 55R: DMH 52 to DMH 50

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

[61] Hint: Submerged 37% of Reach 69R bottom

[63] Warning: Exceeded Reach 220R inflow depth by 0.11' @ 12.07 hrs

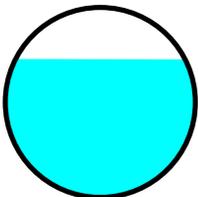
[62] Warning: Submerged 41% of Reach 222R inlet

Inflow Area =	40,720 sf,	Inflow Depth > 4.59"	for 100-Year event
Inflow =	5.14 cfs @ 12.07 hrs,	Volume=	15,589 cf
Outflow =	5.13 cfs @ 12.07 hrs,	Volume=	15,588 cf, Atten= 0%, Lag= 0.1 min

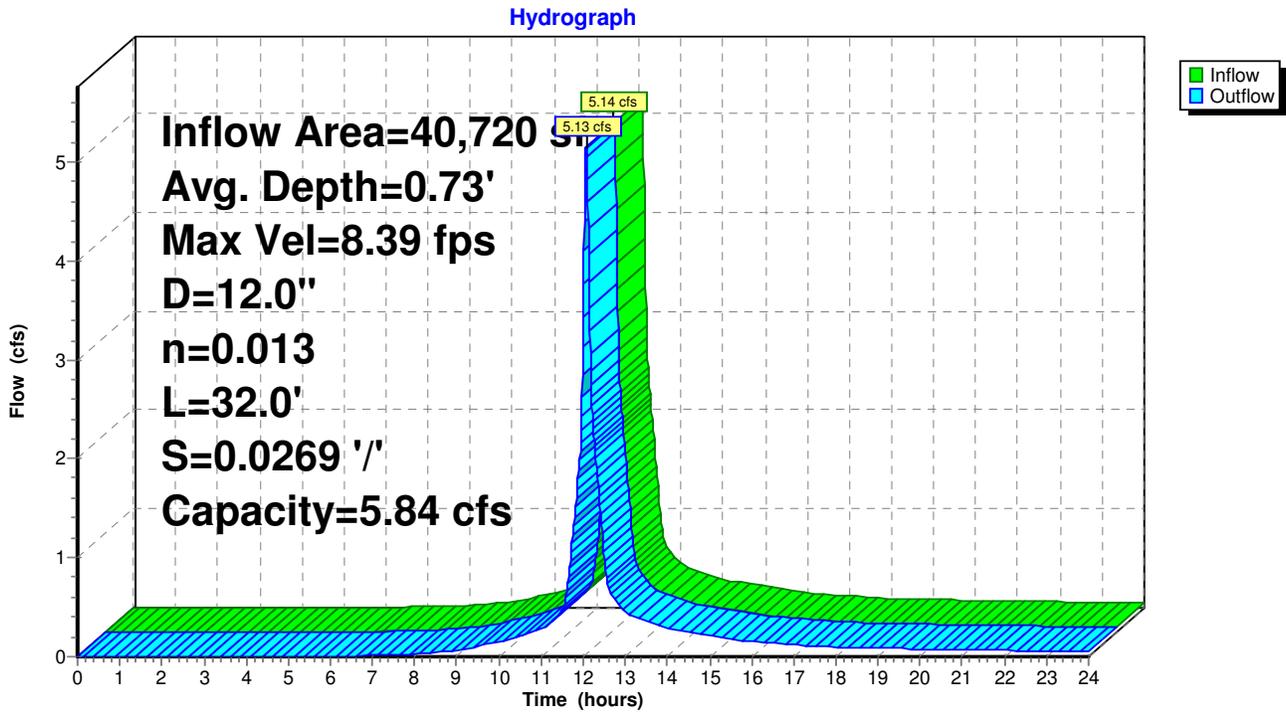
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.91 fps, Avg. Travel Time= 0.2 min

Peak Storage= 20 cf @ 12.07 hrs, Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.84 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 32.0' Slope= 0.0269 1/1'
Inlet Invert= 102.48', Outlet Invert= 101.62'



Reach 55R: DMH 52 to DMH 50



Reach 62R: DMH 64 to Bio-Retention A (HW 46)

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[52] Hint: Inlet conditions not evaluated

[81] Warning: Exceeded Pond 43R by 0.22' @ 12.16 hrs

[79] Warning: Submerged Pond 61R Primary device # 1 INLET by 0.40'

Inflow Area =	44,069 sf,	Inflow Depth >	4.14"	for	100-Year event
Inflow =	3.89 cfs @	12.15 hrs,	Volume=	15,212 cf	
Outflow =	3.89 cfs @	12.15 hrs,	Volume=	15,212 cf,	Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 6.28 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 2.24 fps, Avg. Travel Time= 0.1 min

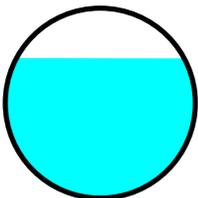
Peak Storage= 7 cf @ 12.15 hrs, Average Depth at Peak Storage= 0.74'

Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.36 cfs

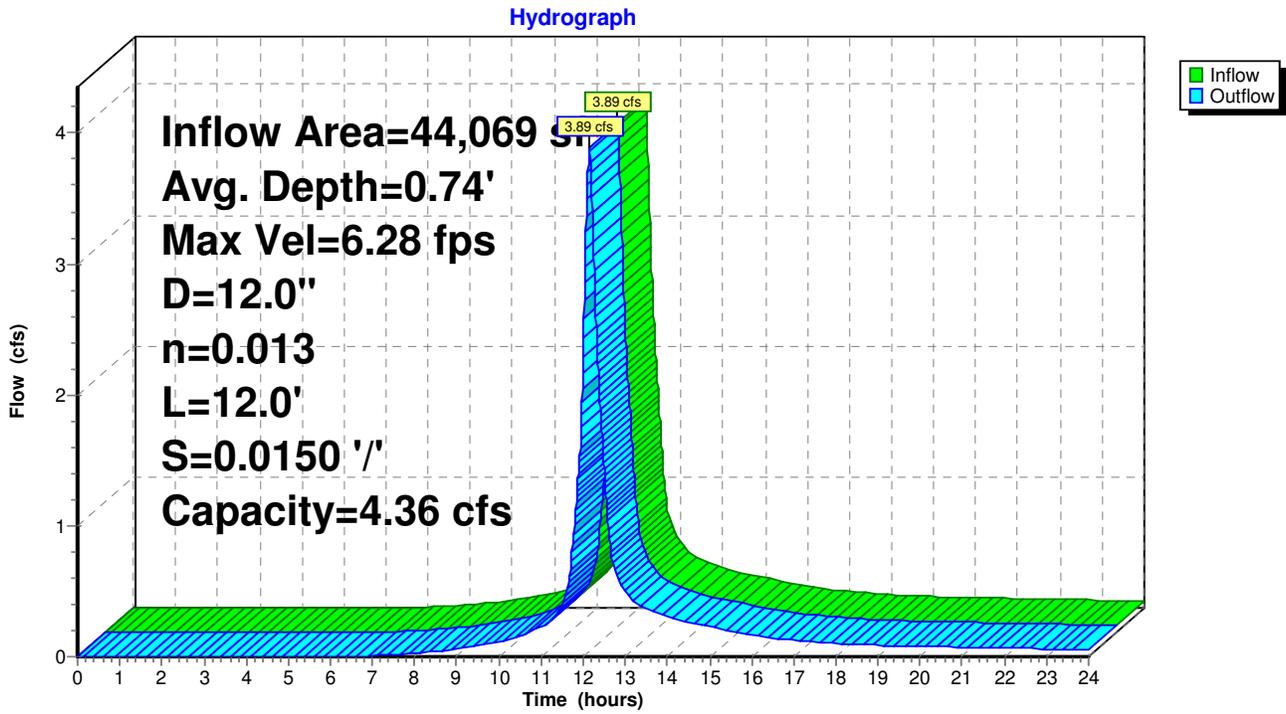
12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior

Length= 12.0' Slope= 0.0150 '/'

Inlet Invert= 110.80', Outlet Invert= 110.62'



Reach 62R: DMH 64 to Bio-Retention A (HW 46)



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Type III 24-hr 100-Year Rainfall=6.50"

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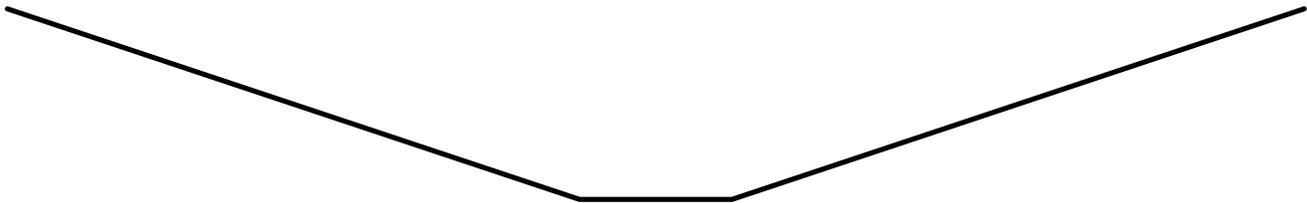
Reach 64R: Swale from Drive at #12 to RG 10A

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

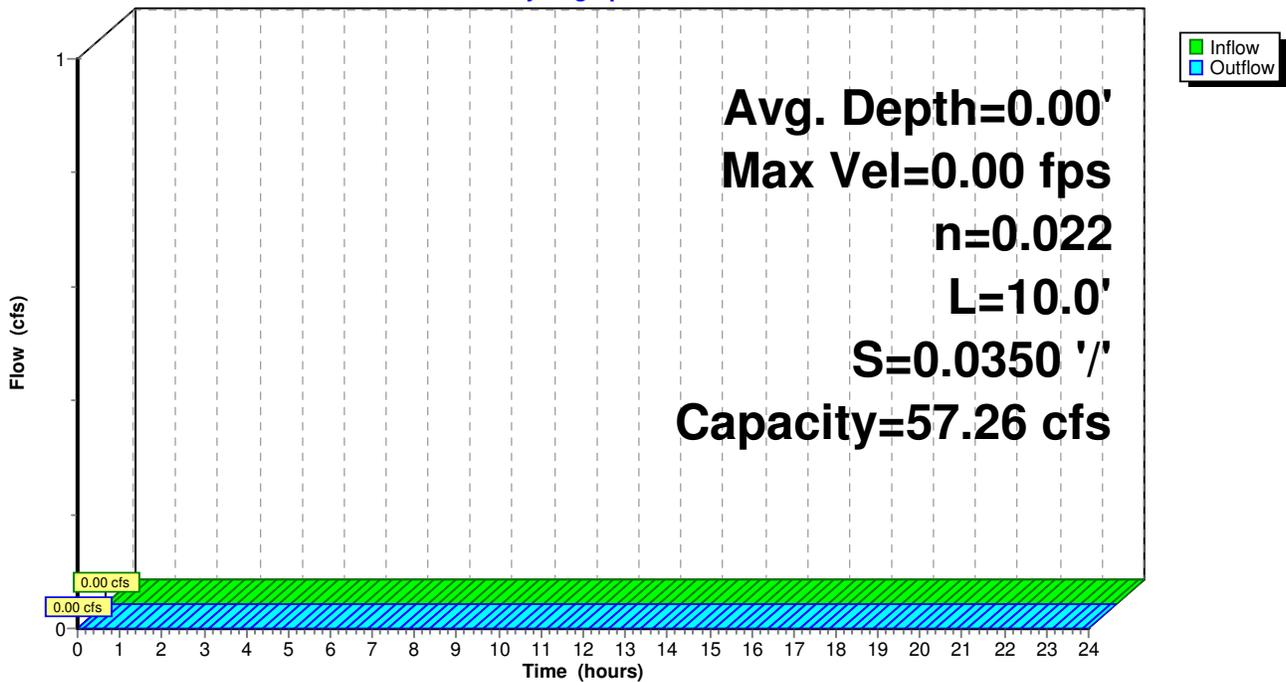
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 106.23', Outlet Invert= 105.88'



Reach 64R: Swale from Drive at #12 to RG 10A

Hydrograph



Reach 67R: Culvert under Unit 12 Drive

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

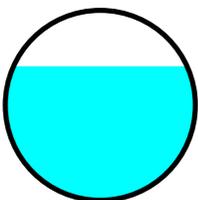
[52] Hint: Inlet conditions not evaluated

Inflow Area =	6,950 sf,	Inflow Depth > 4.92"	for 100-Year event
Inflow =	1.02 cfs @ 12.05 hrs,	Volume=	2,851 cf
Outflow =	1.02 cfs @ 12.06 hrs,	Volume=	2,850 cf, Atten= 0%, Lag= 0.3 min

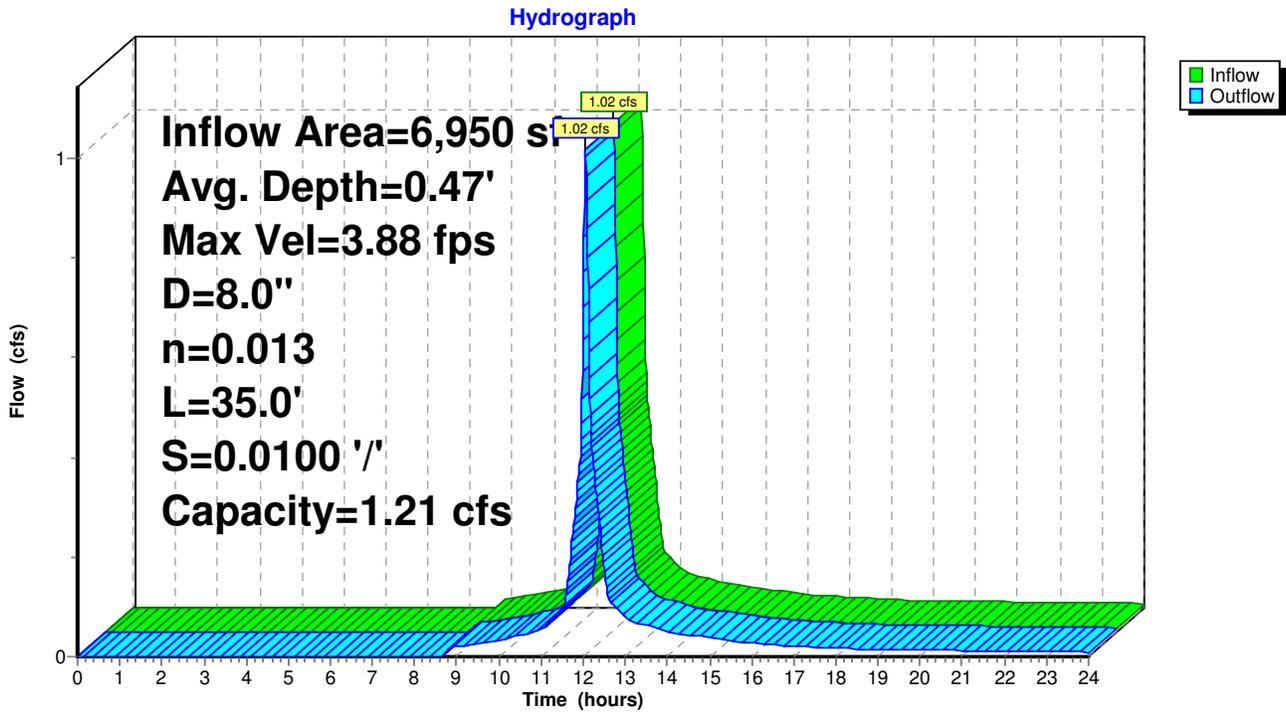
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.88 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 1.48 fps, Avg. Travel Time= 0.4 min

Peak Storage= 9 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.47'
 Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 35.0' Slope= 0.0100 '/'
 Inlet Invert= 106.58', Outlet Invert= 106.23'



Reach 67R: Culvert under Unit 12 Drive



Reach 68R: Underdrain to CB 66

FROM HYDROCAD WEBSITE:

[79] Warning:
{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

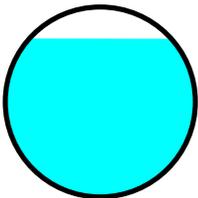
[52] Hint: Inlet conditions not evaluated
[55] Hint: Peak inflow is 101% of Manning's capacity
[79] Warning: Submerged Pond 8P Primary device # 7 INLET by 0.81'

Inflow Area = 44,069 sf, Inflow Depth > 4.09" for 100-Year event
Inflow = 3.00 cfs @ 12.26 hrs, Volume= 15,018 cf
Outflow = 3.00 cfs @ 12.26 hrs, Volume= 15,018 cf, Atten= 0%, Lag= 0.1 min

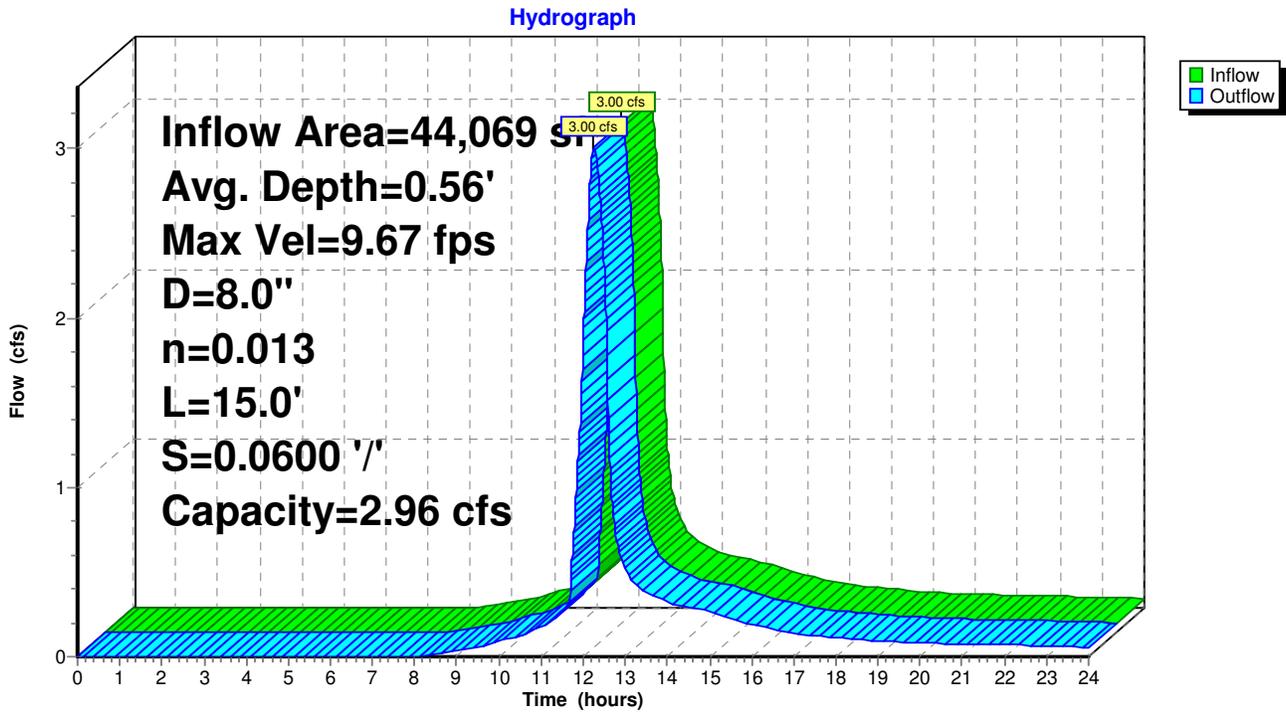
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.67 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.46 fps, Avg. Travel Time= 0.1 min

Peak Storage= 5 cf @ 12.26 hrs, Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 15.0' Slope= 0.0600 '/'
Inlet Invert= 107.25', Outlet Invert= 106.35'



Reach 68R: Underdrain to CB 66



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 69R: Drain to DMH 52

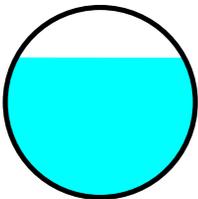
[52] Hint: Inlet conditions not evaluated

Inflow Area = 11,090 sf, Inflow Depth > 4.74" for 100-Year event
Inflow = 1.52 cfs @ 12.05 hrs, Volume= 4,378 cf
Outflow = 1.52 cfs @ 12.05 hrs, Volume= 4,377 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.53 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.17 fps, Avg. Travel Time= 0.3 min

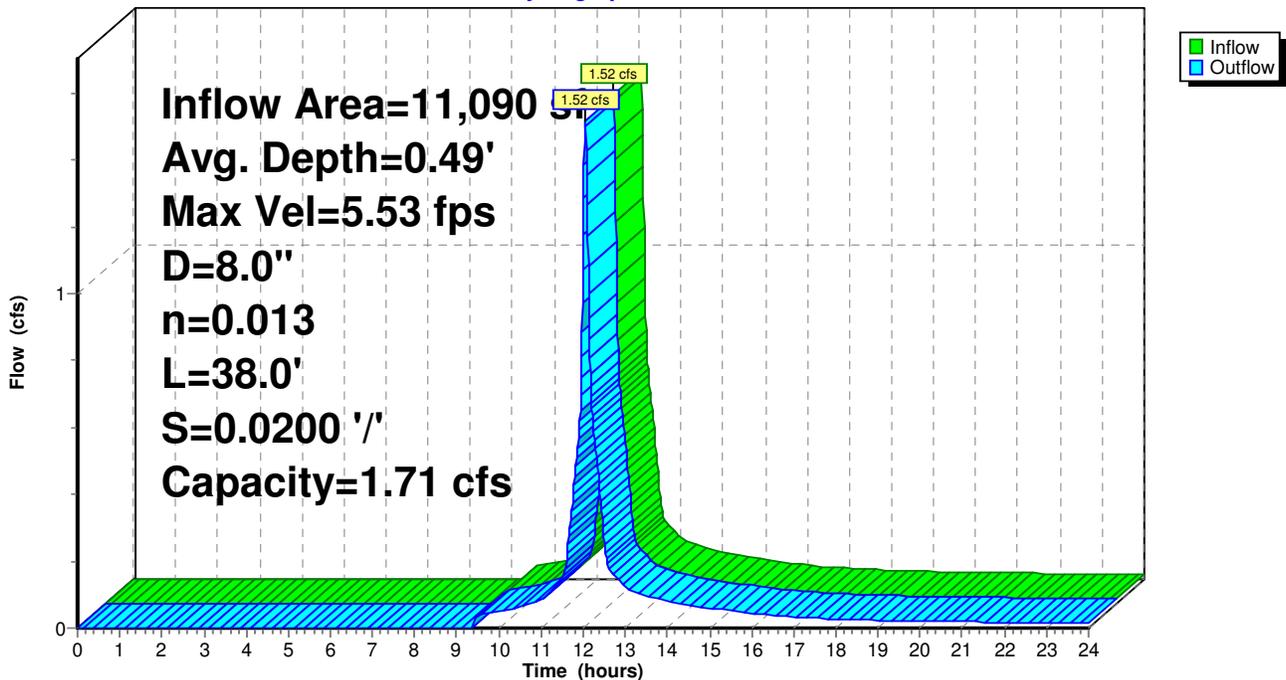
Peak Storage= 10 cf @ 12.05 hrs, Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.71 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 38.0' Slope= 0.0200 '/'
Inlet Invert= 103.69', Outlet Invert= 102.93'



Reach 69R: Drain to DMH 52

Hydrograph



Reach 114R: DMH 16 to DMH 14

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

[79] Warning: Submerged Pond 111P Primary device # 1 INLET by 0.25'

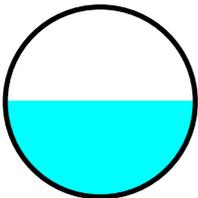
[79] Warning: Submerged Pond 112P Primary device # 1 INLET by 0.19'

Inflow Area =	12,978 sf,	Inflow Depth >	5.29"	for	100-Year event
Inflow =	2.12 cfs @	12.01 hrs,	Volume=	5,721 cf	
Outflow =	2.09 cfs @	12.01 hrs,	Volume=	5,720 cf,	Atten= 1%, Lag= 0.3 min

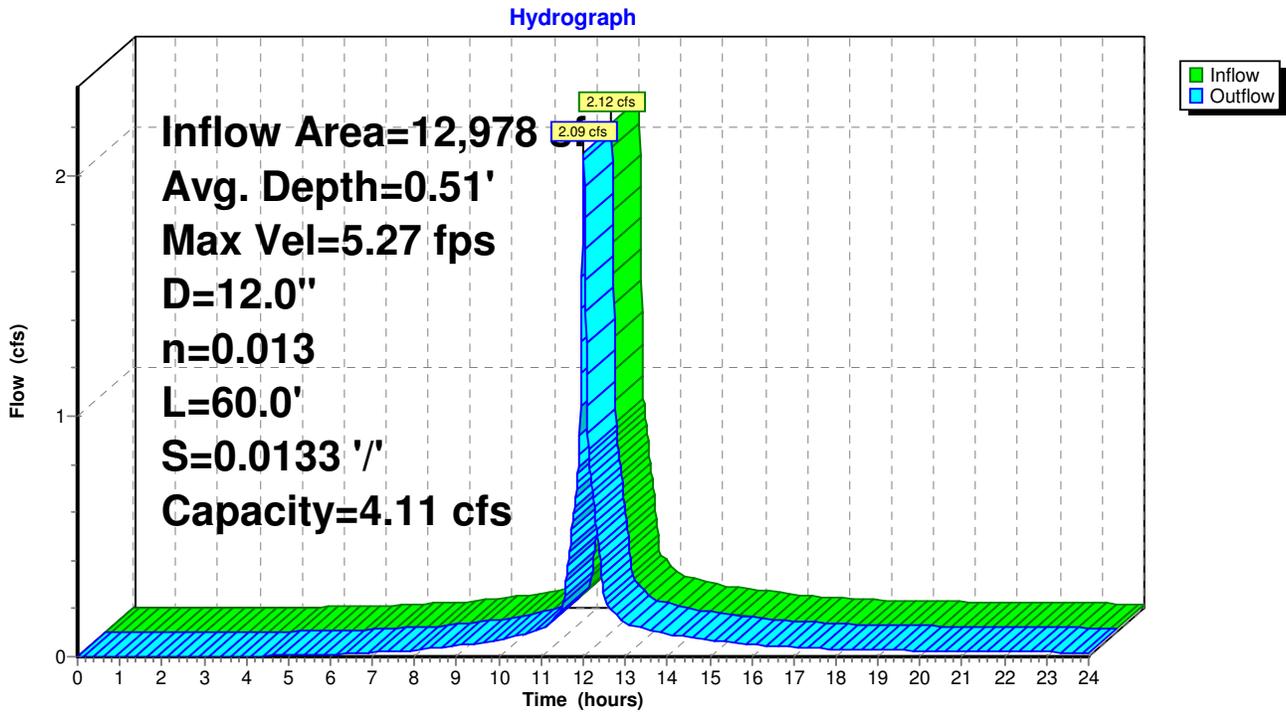
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.27 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 1.65 fps, Avg. Travel Time= 0.6 min

Peak Storage= 24 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.51'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 4.11 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 60.0' Slope= 0.0133 '/'
 Inlet Invert= 103.48', Outlet Invert= 102.68'



Reach 114R: DMH 16 to DMH 14



Reach 118R: Swale from Drive at #4 to RG 116

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

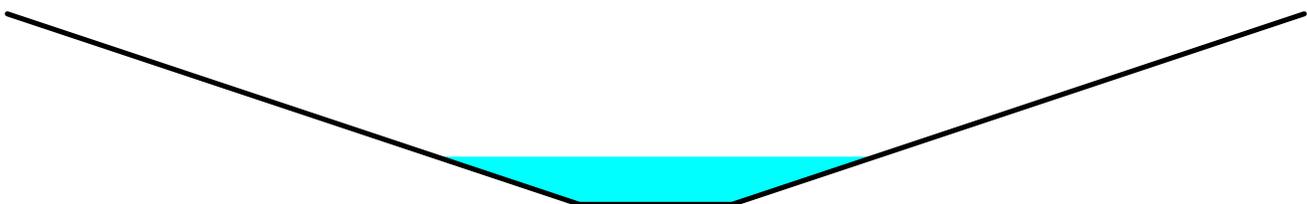
[79] Warning: Submerged Pond 119R Primary device # 1 OUTLET by 0.81'

Inflow Area =	18,760 sf,	Inflow Depth >	4.86"	for	100-Year event
Inflow =	2.64 cfs @	12.02 hrs,	Volume=	7,592 cf	
Outflow =	2.64 cfs @	12.02 hrs,	Volume=	7,592 cf,	Atten= 0%, Lag= 0.1 min

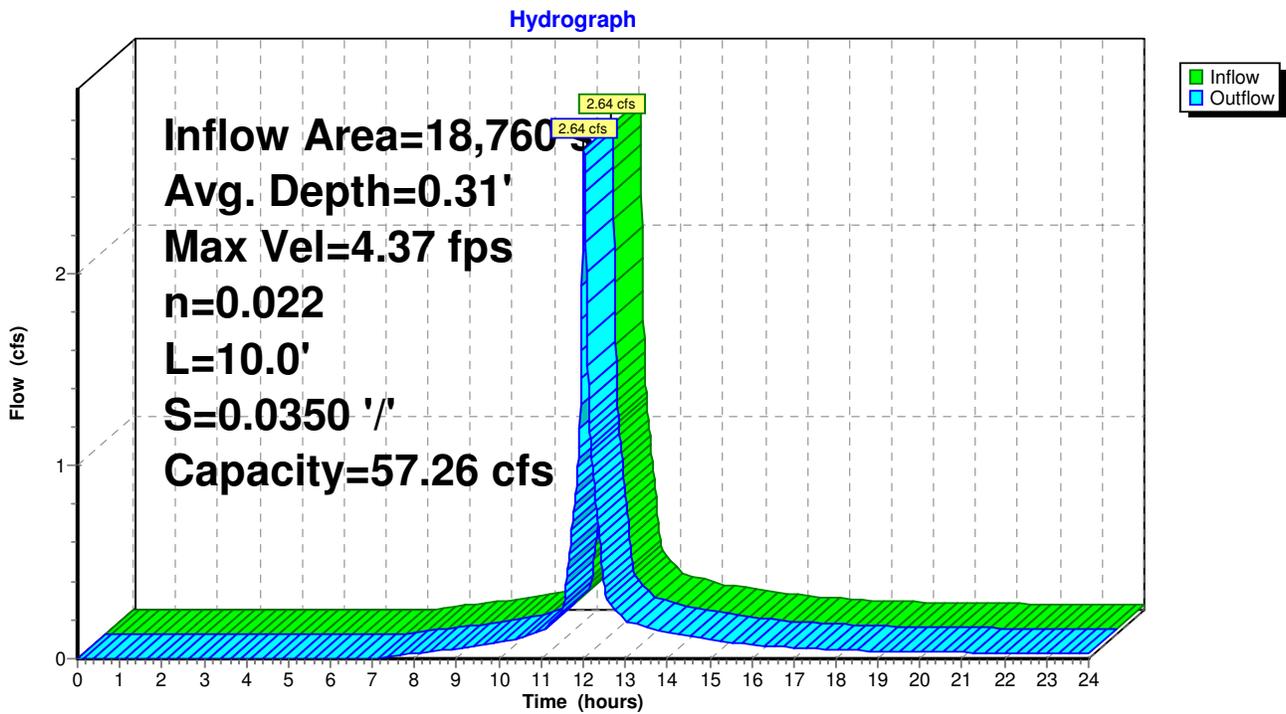
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.37 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 0.1 min

Peak Storage= 6 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0350 '/'
Inlet Invert= 110.42', Outlet Invert= 110.07'



Reach 118R: Swale from Drive at #4 to RG 116



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Reach 127R: Swale from Drive at #3 to RG 118

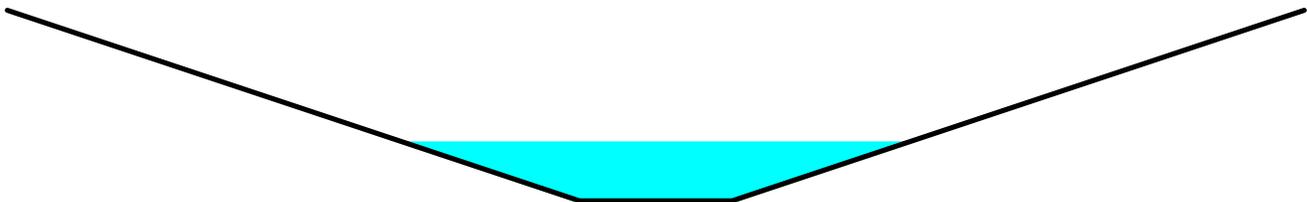
[61] Hint: Submerged 19% of Reach 128R bottom

Inflow Area =	13,016 sf,	Inflow Depth > 6.90"	for 100-Year event
Inflow =	2.73 cfs @ 12.03 hrs,	Volume=	7,481 cf
Outflow =	2.73 cfs @ 12.03 hrs,	Volume=	7,480 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.23 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.15 fps, Avg. Travel Time= 0.1 min

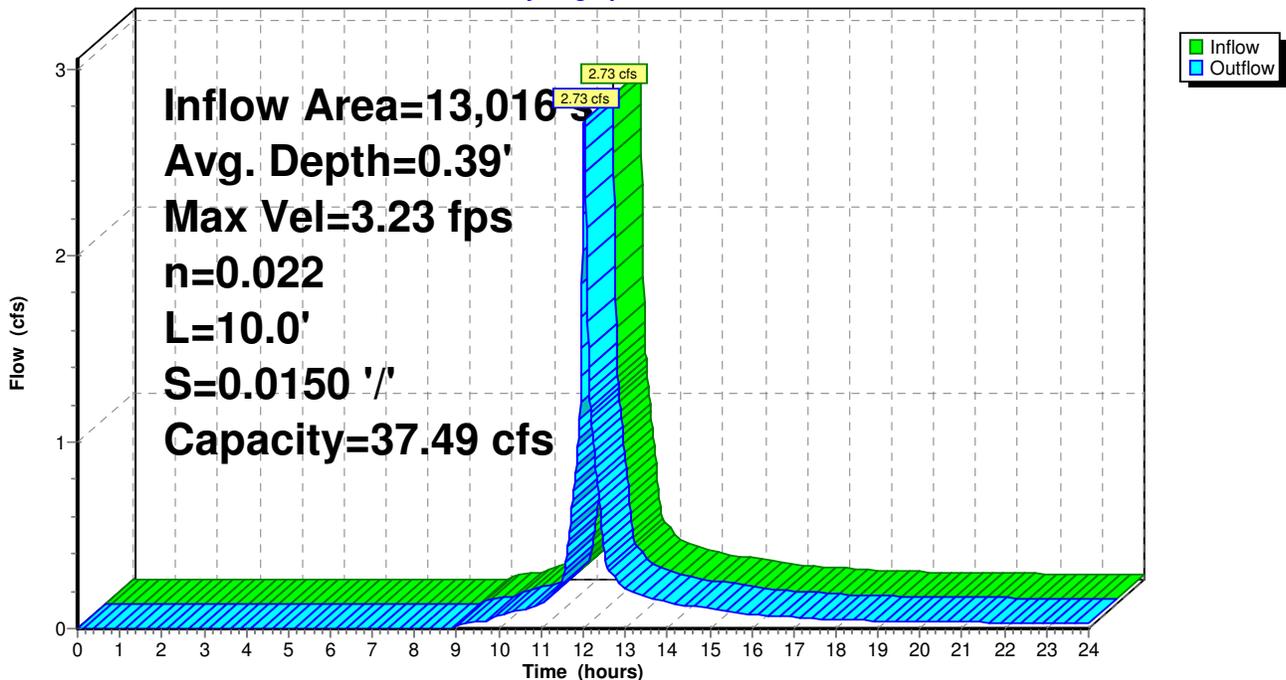
Peak Storage= 8 cf @ 12.03 hrs, Average Depth at Peak Storage= 0.39'
 Bank-Full Depth= 1.25', Capacity at Bank-Full= 37.49 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 3.0 '/' Top Width= 8.50'
 Length= 10.0' Slope= 0.0150 '/'
 Inlet Invert= 110.00', Outlet Invert= 109.85'



Reach 127R: Swale from Drive at #3 to RG 118

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 128R: Culvert under Unit 3 Drive

[52] Hint: Inlet conditions not evaluated

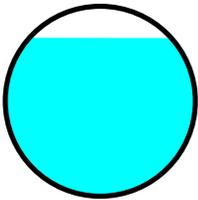
[55] Hint: Peak inflow is 101% of Manning's capacity

Inflow Area = 13,016 sf, Inflow Depth > 6.90" for 100-Year event
Inflow = 2.74 cfs @ 12.02 hrs, Volume= 7,481 cf
Outflow = 2.73 cfs @ 12.03 hrs, Volume= 7,481 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.82 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.48 fps, Avg. Travel Time= 0.2 min

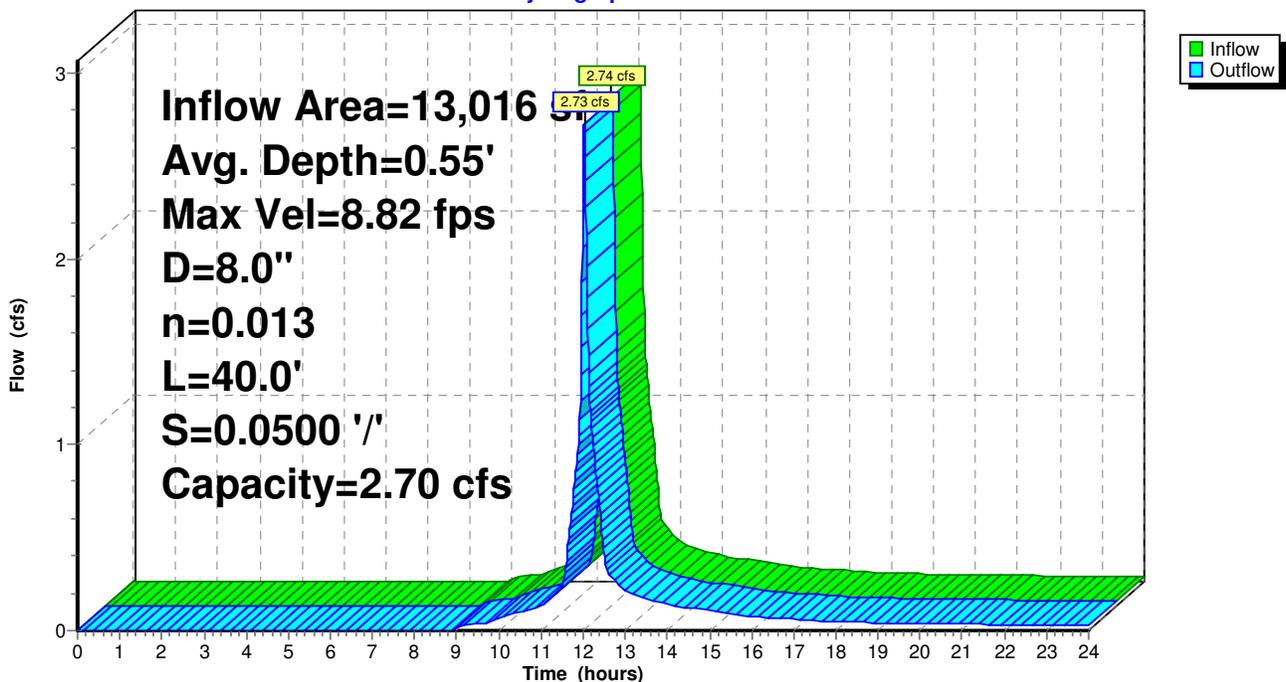
Peak Storage= 12 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.70 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 40.0' Slope= 0.0500 '/'
Inlet Invert= 112.00', Outlet Invert= 110.00'



Reach 128R: Culvert under Unit 3 Drive

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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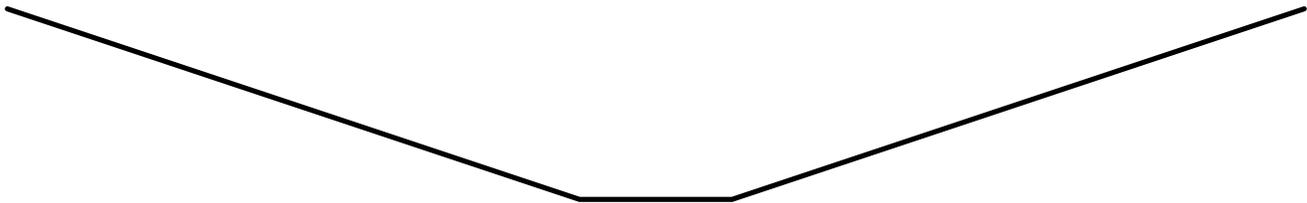
Reach 129R: Swale from Drive at #20 to RG 124

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

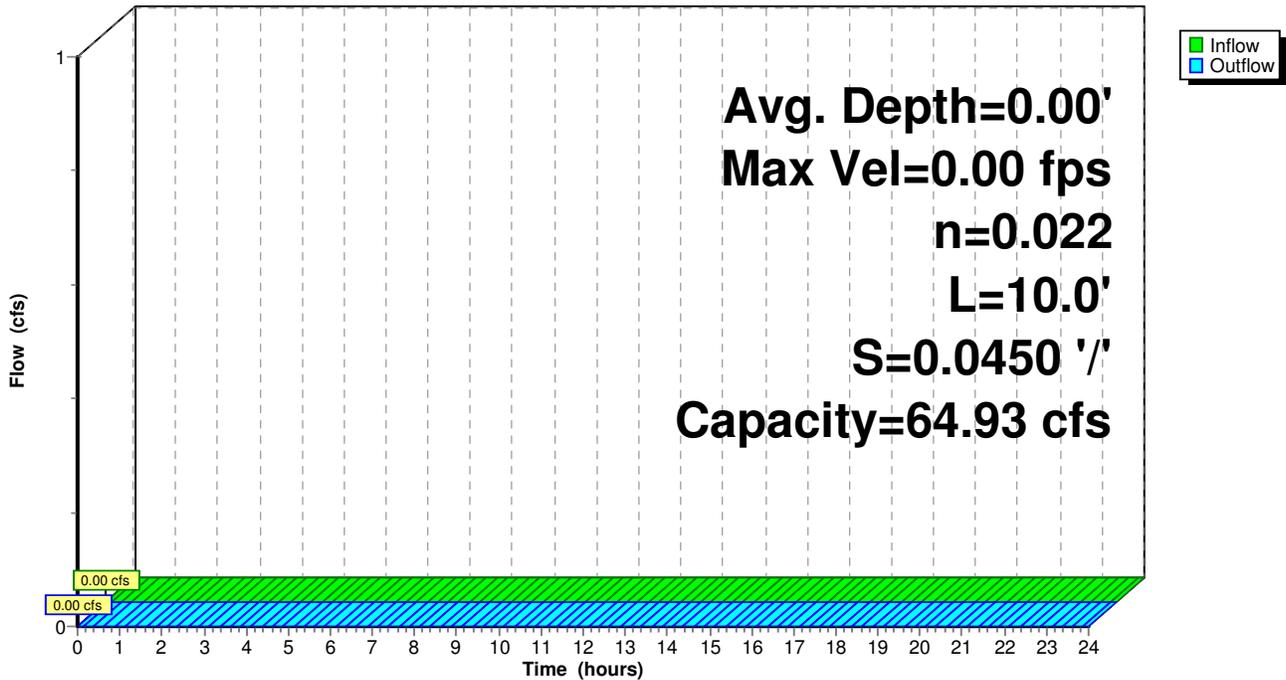
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 64.93 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 10.0' Slope= 0.0450 '/'
Inlet Invert= 115.37', Outlet Invert= 114.92'



Reach 129R: Swale from Drive at #20 to RG 124

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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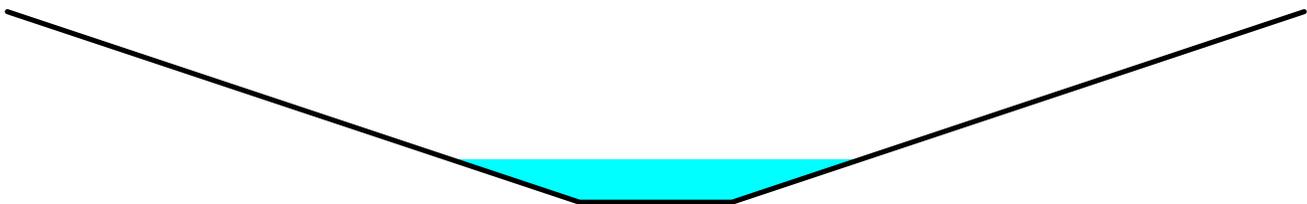
Reach 130R: Swale to RG 122

Inflow Area = 6,950 sf, Inflow Depth > 9.57" for 100-Year event
Inflow = 2.16 cfs @ 12.01 hrs, Volume= 5,545 cf
Outflow = 2.14 cfs @ 12.02 hrs, Volume= 5,544 cf, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.13 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 0.4 min

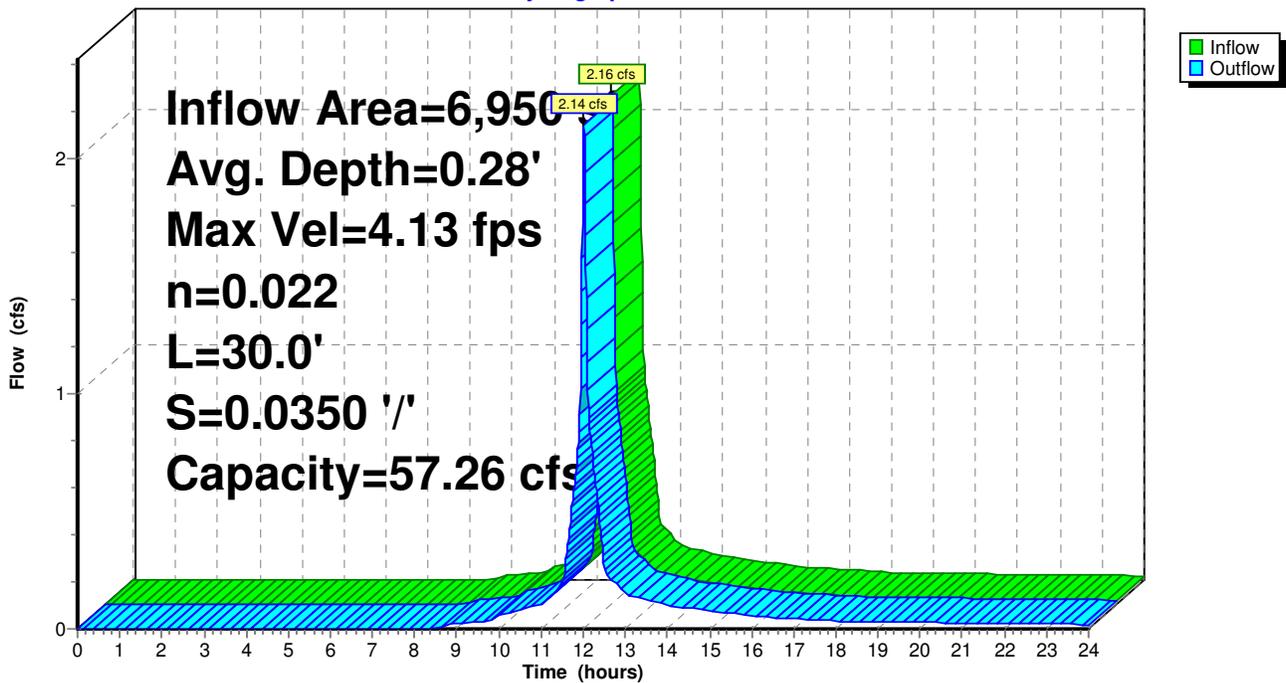
Peak Storage= 16 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 57.26 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 30.0' Slope= 0.0350 '/'
Inlet Invert= 114.25', Outlet Invert= 113.20'



Reach 130R: Swale to RG 122

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 131R: Culvert under Unit 20 Drive

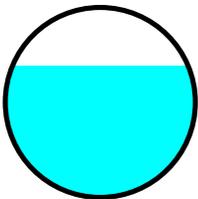
[52] Hint: Inlet conditions not evaluated

Inflow Area =	6,950 sf,	Inflow Depth > 4.35"	for 100-Year event
Inflow =	1.01 cfs @ 12.01 hrs,	Volume=	2,520 cf
Outflow =	0.99 cfs @ 12.02 hrs,	Volume=	2,520 cf, Atten= 1%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.87 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 1.45 fps, Avg. Travel Time= 0.6 min

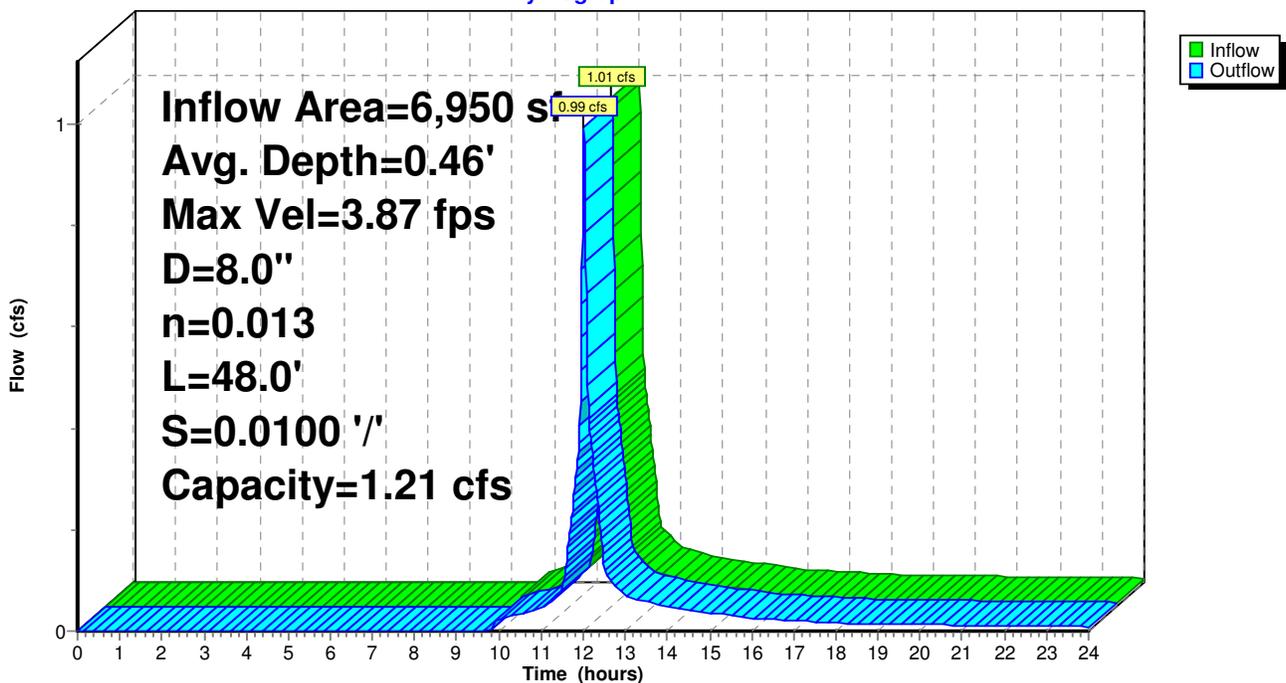
Peak Storage= 12 cf @ 12.01 hrs, Average Depth at Peak Storage= 0.46'
 Bank-Full Depth= 0.67', Capacity at Bank-Full= 1.21 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 48.0' Slope= 0.0100 '/'
 Inlet Invert= 115.85', Outlet Invert= 115.37'



Reach 131R: Culvert under Unit 20 Drive

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 137R: Swale Back of 7,6,5

Inflow Area = 13,850 sf, Inflow Depth > 4.13" for 100-Year event
Inflow = 1.70 cfs @ 12.05 hrs, Volume= 4,763 cf
Outflow = 1.66 cfs @ 12.08 hrs, Volume= 4,756 cf, Atten= 2%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.96 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 4.3 min

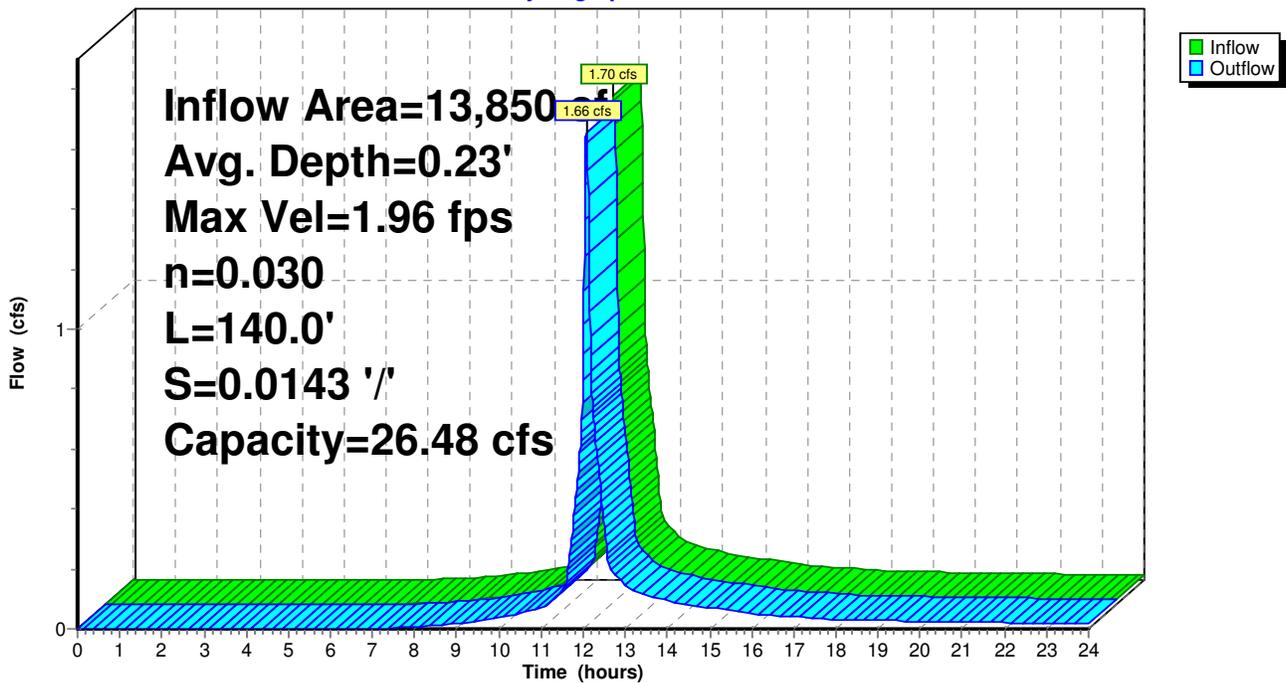
Peak Storage= 119 cf @ 12.06 hrs, Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.48 cfs

3.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 140.0' Slope= 0.0143 '/'
Inlet Invert= 118.00', Outlet Invert= 116.00'



Reach 137R: Swale Back of 7,6,5

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 138R: Swale Back of 4

[61] Hint: Submerged 24% of Reach 137R bottom

Inflow Area = 34,910 sf, Inflow Depth > 3.93" for 100-Year event
Inflow = 3.91 cfs @ 12.08 hrs, Volume= 11,446 cf
Outflow = 3.84 cfs @ 12.11 hrs, Volume= 11,433 cf, Atten= 2%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.35 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 3.2 min

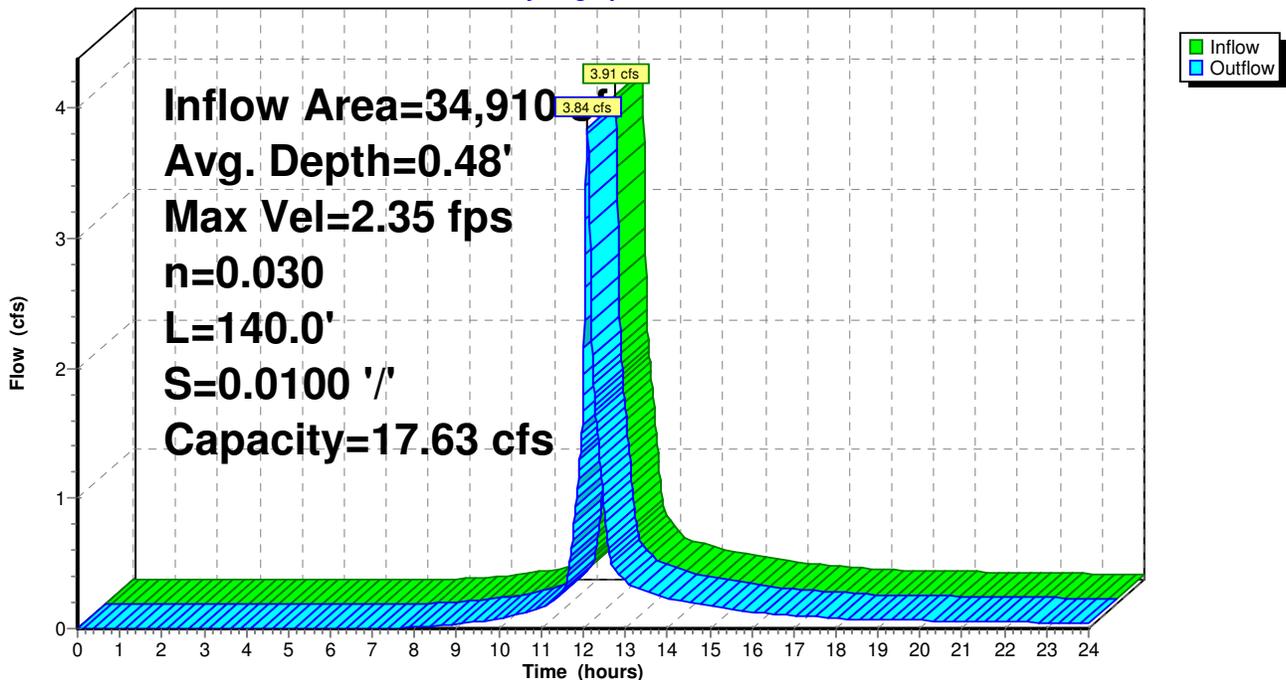
Peak Storage= 230 cf @ 12.09 hrs, Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 17.63 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 140.0' Slope= 0.0100 '/'
Inlet Invert= 116.00', Outlet Invert= 114.60'



Reach 138R: Swale Back of 4

Hydrograph



Reach 149R: DMH 14 to DMH 12

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

[52] Hint: Inlet conditions not evaluated

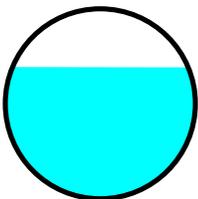
[62] Warning: Submerged 14% of Reach 114R inlet

Inflow Area =	86,324 sf,	Inflow Depth > 4.87"	for 100-Year event
Inflow =	10.60 cfs @ 12.03 hrs,	Volume=	35,037 cf
Outflow =	10.59 cfs @ 12.04 hrs,	Volume=	35,031 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 8.12 fps, Min. Travel Time= 0.2 min
 Avg. Velocity = 2.65 fps, Avg. Travel Time= 0.6 min

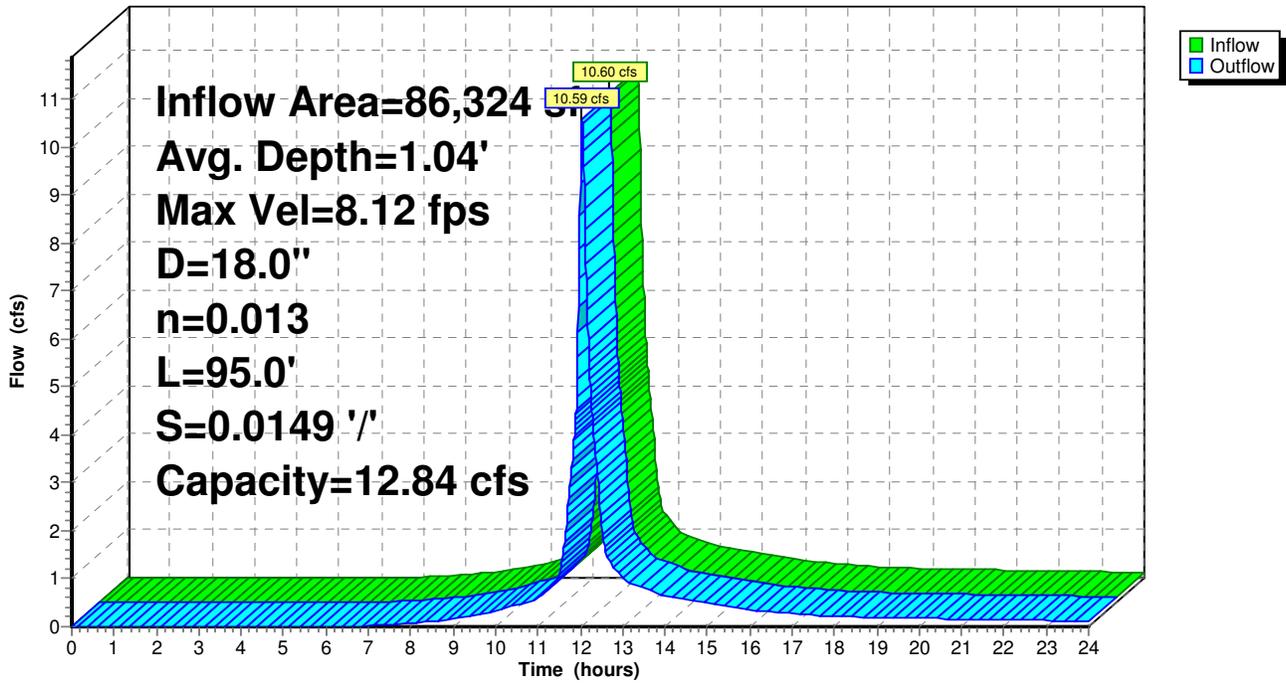
Peak Storage= 124 cf @ 12.03 hrs, Average Depth at Peak Storage= 1.04'
 Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.84 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
 Length= 95.0' Slope= 0.0149 '/'
 Inlet Invert= 102.58', Outlet Invert= 101.16'



Reach 149R: DMH 14 to DMH 12

Hydrograph



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Reach 150R: DMH 12 to HW 10 - Outlet

[52] Hint: Inlet conditions not evaluated

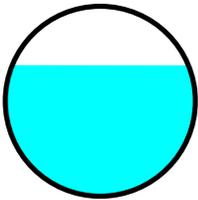
[61] Hint: Submerged 66% of Reach 149R bottom

Inflow Area = 86,324 sf, Inflow Depth > 4.87" for 100-Year event
Inflow = 10.59 cfs @ 12.04 hrs, Volume= 35,031 cf
Outflow = 10.58 cfs @ 12.04 hrs, Volume= 35,028 cf, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.15 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 0.3 min

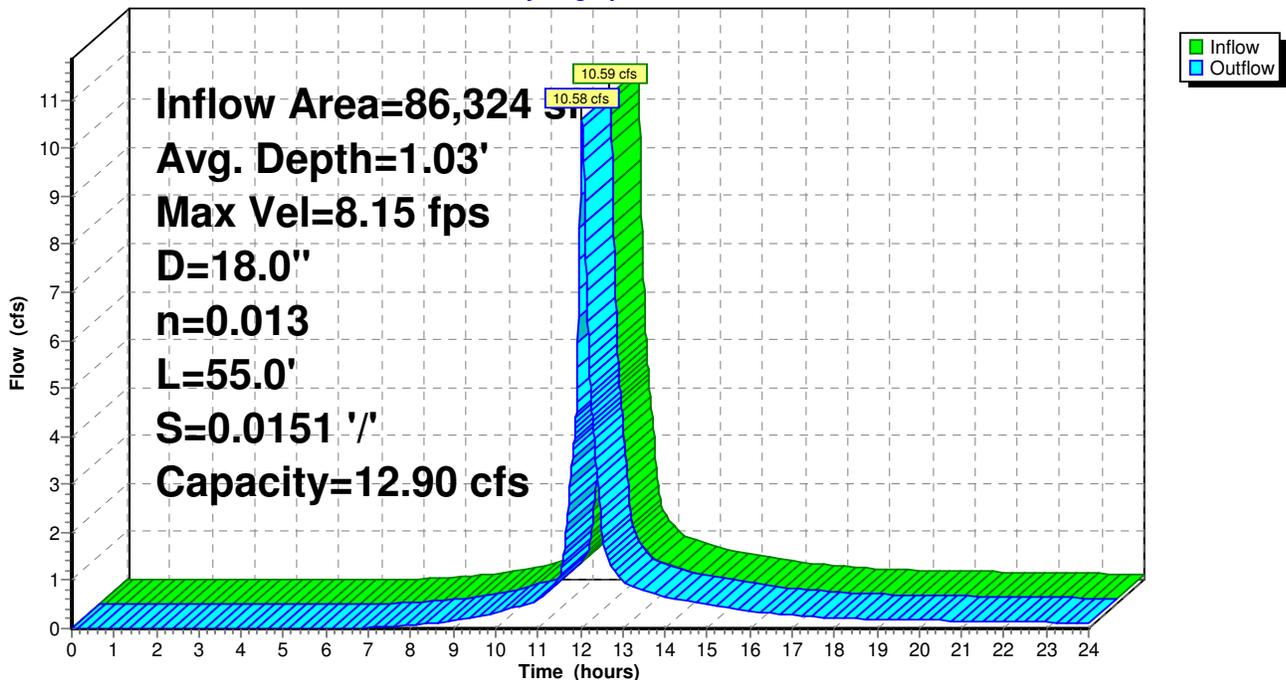
Peak Storage= 71 cf @ 12.04 hrs, Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 12.90 cfs

18.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 55.0' Slope= 0.0151 '/'
Inlet Invert= 101.06', Outlet Invert= 100.23'



Reach 150R: DMH 12 to HW 10 - Outlet

Hydrograph



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Reach 153R: CB 116 to DMH 14

[52] Hint: Inlet conditions not evaluated

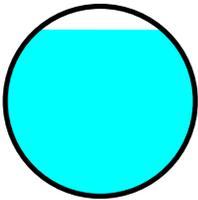
[55] Hint: Peak inflow is 105% of Manning's capacity

Inflow Area = 21,810 sf, Inflow Depth > 4.90" for 100-Year event
Inflow = 3.11 cfs @ 12.02 hrs, Volume= 8,904 cf
Outflow = 3.11 cfs @ 12.02 hrs, Volume= 8,904 cf, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.67 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.80 fps, Avg. Travel Time= 0.1 min

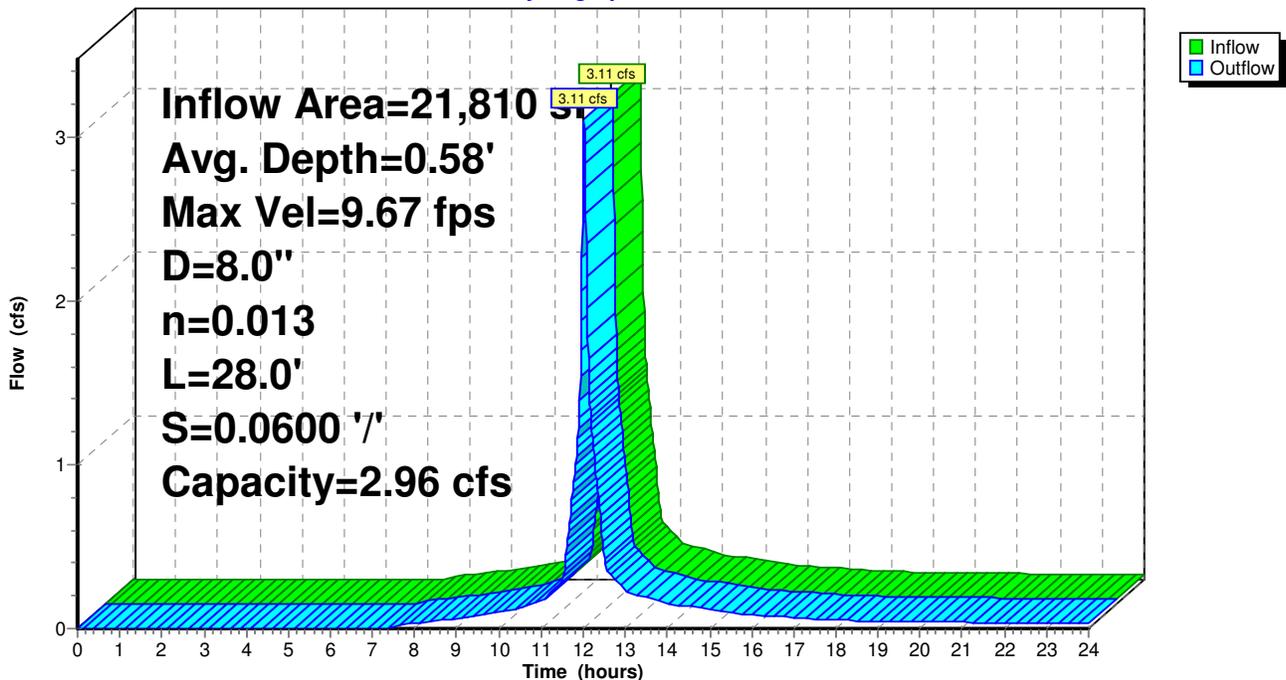
Peak Storage= 9 cf @ 12.02 hrs, Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 2.96 cfs

8.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 28.0' Slope= 0.0600 '/'
Inlet Invert= 107.12', Outlet Invert= 105.44'



Reach 153R: CB 116 to DMH 14

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Reach 154R: Swale from Drive at #6 to RG 126

[43] Hint: Has no inflow (Outflow=Zero)

Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min

Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'

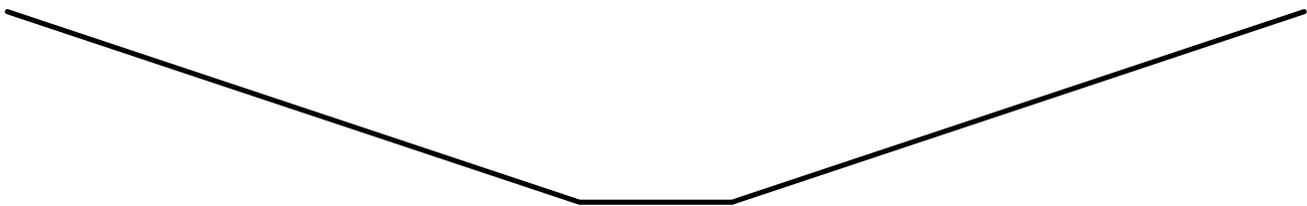
Bank-Full Depth= 1.25', Capacity at Bank-Full= 29.18 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 3.0 '/' Top Width= 8.50'

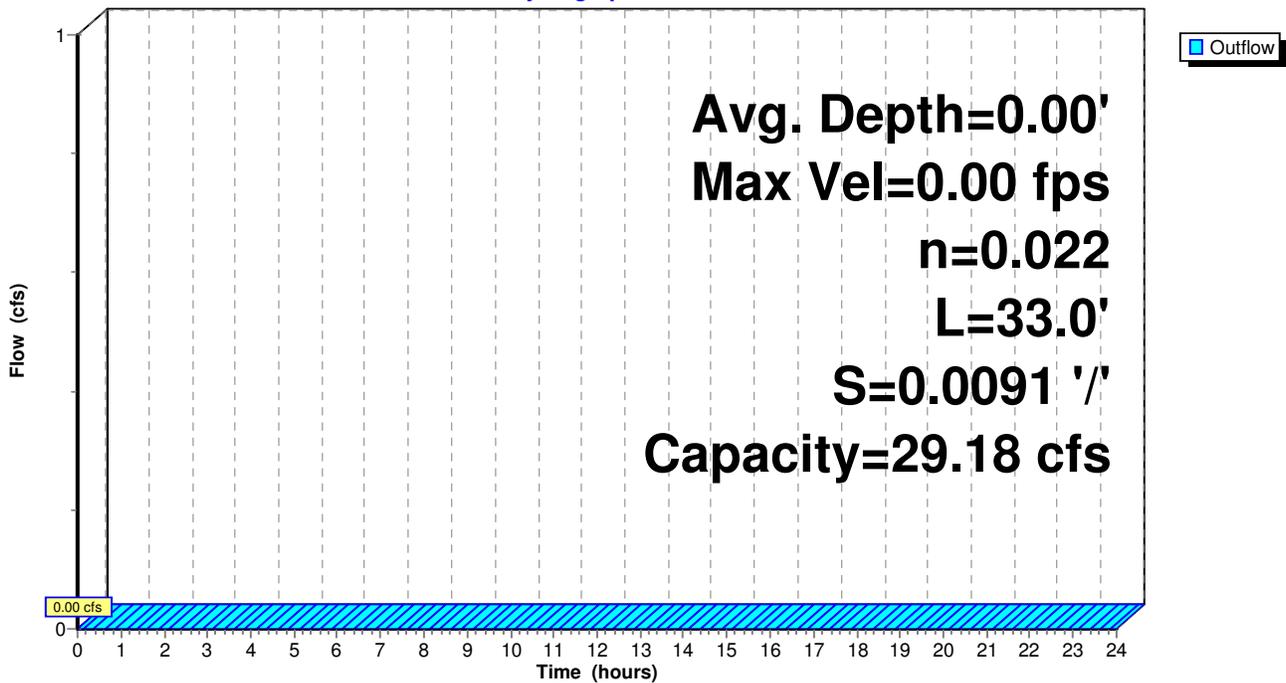
Length= 33.0' Slope= 0.0091 '/'

Inlet Invert= 115.65', Outlet Invert= 115.35'



Reach 154R: Swale from Drive at #6 to RG 126

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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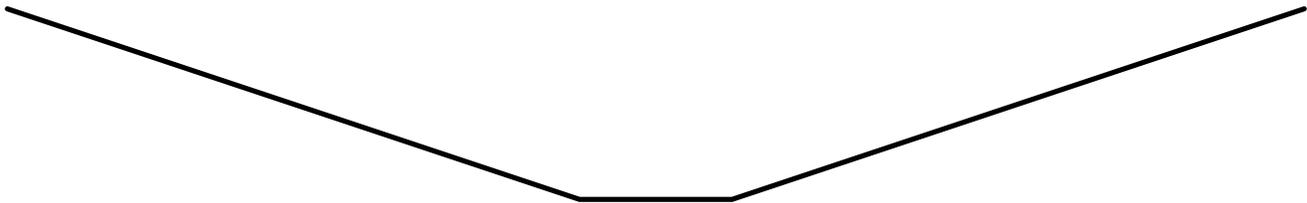
Reach 155R: Swale from Drive at #5 to RG 120

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

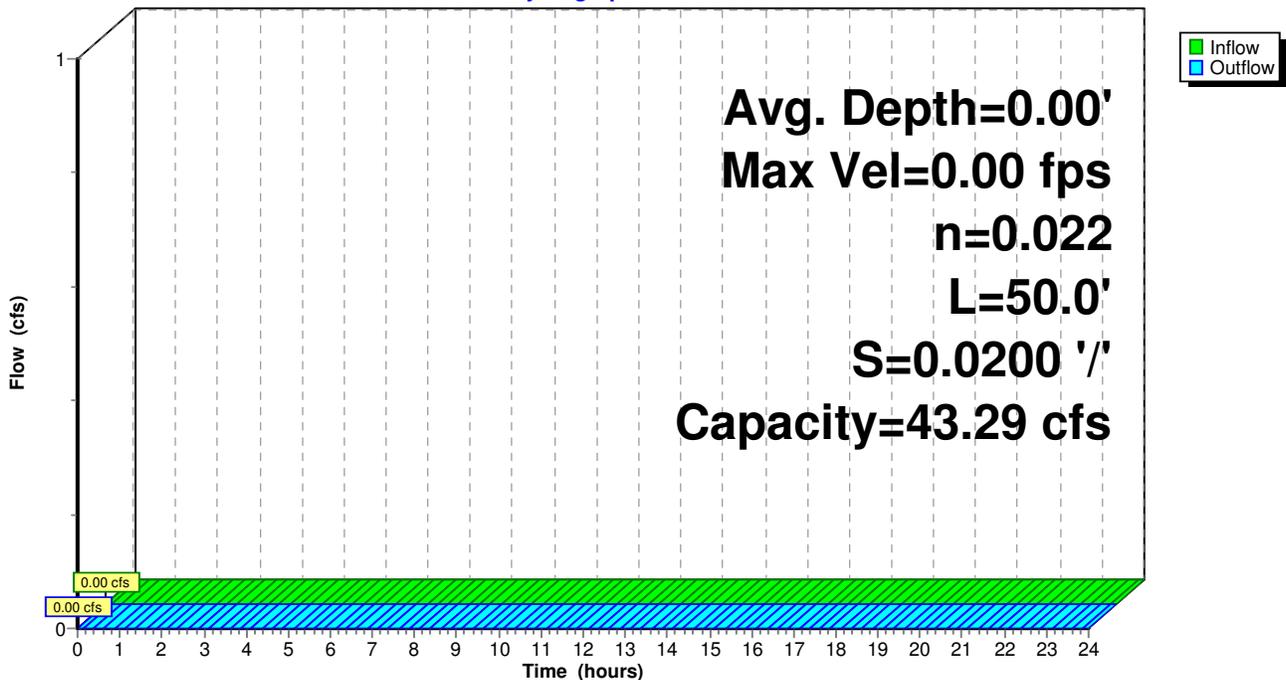
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.25', Capacity at Bank-Full= 43.29 cfs

1.00' x 1.25' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 8.50'
Length= 50.0' Slope= 0.0200 '/'
Inlet Invert= 114.00', Outlet Invert= 113.00'



Reach 155R: Swale from Drive at #5 to RG 120

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

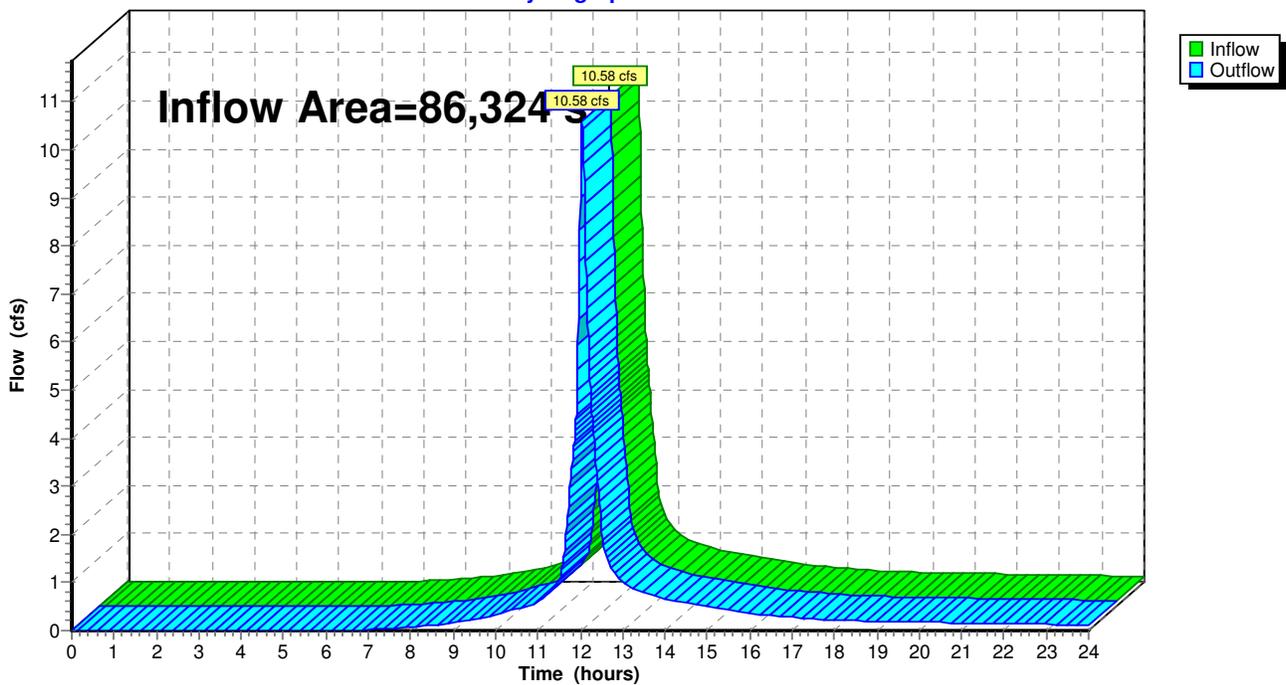
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 86,324 sf, Inflow Depth > 4.87" for 100-Year event
Inflow = 10.58 cfs @ 12.04 hrs, Volume= 35,028 cf
Outflow = 10.58 cfs @ 12.04 hrs, Volume= 35,028 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 159R: HW 10 Outlet to Rip Rap >100' from Wetland

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Reach 220R: CB 56 to DMH 52

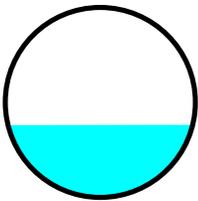
[52] Hint: Inlet conditions not evaluated

Inflow Area = 8,660 sf, Inflow Depth > 4.77" for 100-Year event
Inflow = 1.10 cfs @ 12.08 hrs, Volume= 3,444 cf
Outflow = 1.10 cfs @ 12.08 hrs, Volume= 3,443 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.00 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 0.2 min

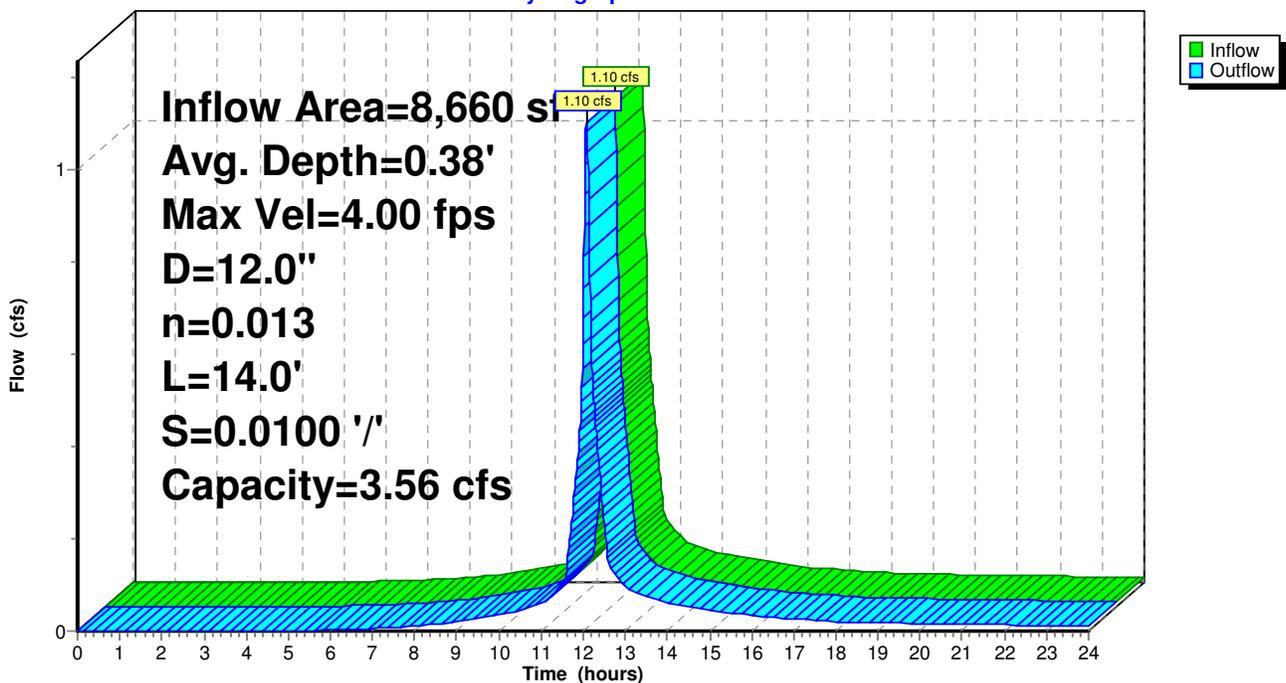
Peak Storage= 4 cf @ 12.08 hrs, Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
Length= 14.0' Slope= 0.0100 '/'
Inlet Invert= 102.72', Outlet Invert= 102.58'



Reach 220R: CB 56 to DMH 52

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Reach 222R: CB 54 to DMH 52

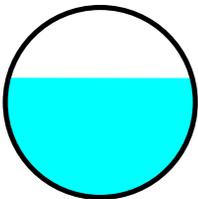
[52] Hint: Inlet conditions not evaluated

Inflow Area =	20,970 sf,	Inflow Depth > 4.45"	for 100-Year event
Inflow =	2.57 cfs @ 12.07 hrs,	Volume=	7,769 cf
Outflow =	2.57 cfs @ 12.07 hrs,	Volume=	7,768 cf, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 4.94 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 1.74 fps, Avg. Travel Time= 0.2 min

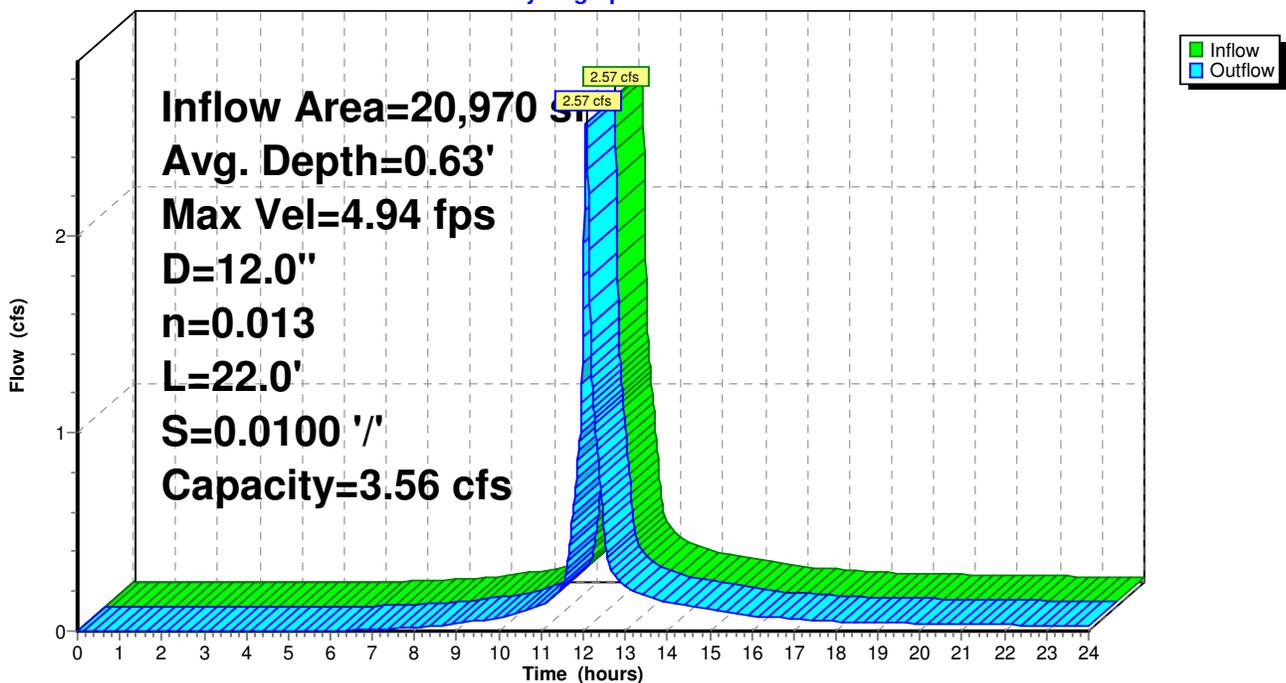
Peak Storage= 11 cf @ 12.07 hrs, Average Depth at Peak Storage= 0.63'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 3.56 cfs

12.0" Diameter Pipe, n= 0.013 Concrete pipe, bends & connections
 Length= 22.0' Slope= 0.0100 '/'
 Inlet Invert= 102.80', Outlet Invert= 102.58'



Reach 222R: CB 54 to DMH 52

Hydrograph



Reach 403R: CB 65 to DMH 50

FROM HYDROCAD WEBSITE:

[79] Warning:
{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[52] Hint: Inlet conditions not evaluated

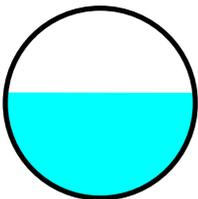
[79] Warning: Submerged Pond 67P Primary device # 1 OUTLET by 0.42'

Inflow Area =	44,069 sf,	Inflow Depth >	4.09"	for	100-Year event
Inflow =	3.00 cfs @	12.26 hrs,	Volume=	15,018 cf	
Outflow =	3.00 cfs @	12.26 hrs,	Volume=	15,017 cf,	Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.69 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.89 fps, Avg. Travel Time= 0.2 min

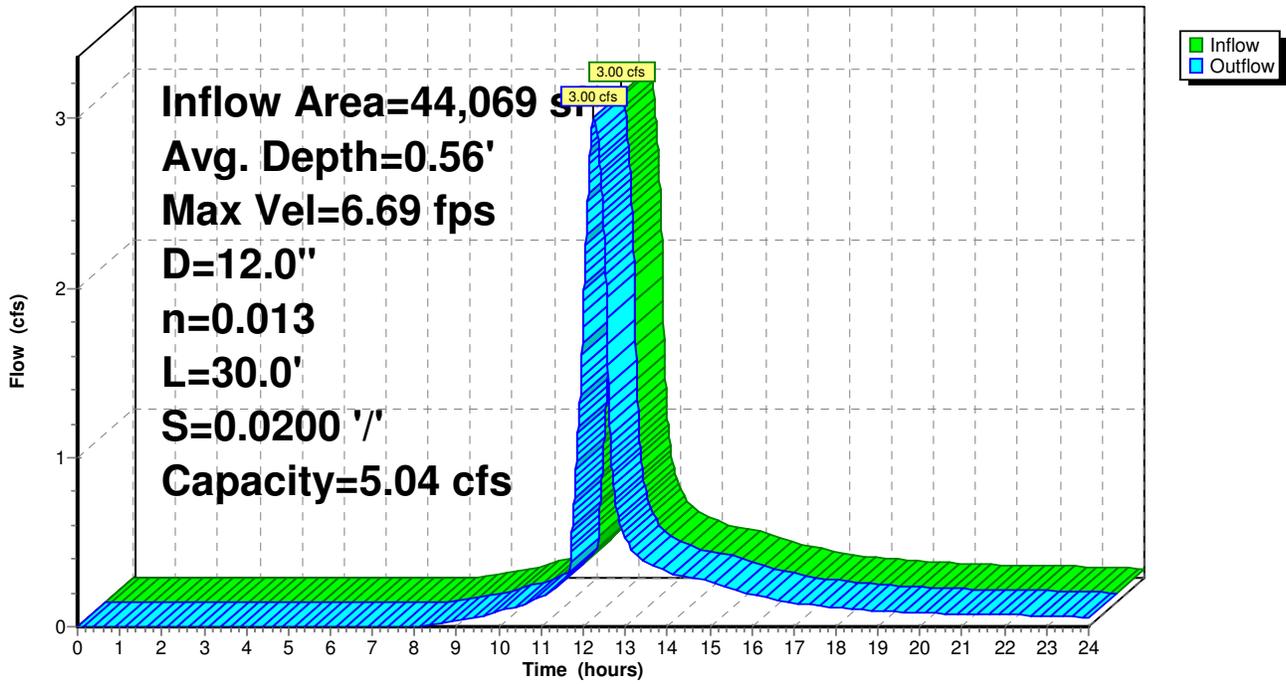
Peak Storage= 13 cf @ 12.26 hrs, Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 5.04 cfs

12.0" Diameter Pipe, n= 0.013 Corrugated PE, smooth interior
Length= 30.0' Slope= 0.0200 '/'
Inlet Invert= 102.22', Outlet Invert= 101.62'



Reach 403R: CB 65 to DMH 50

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Reach 902R: Existing wetland channel to WF 13

[61] Hint: Submerged 4% of Reach 1R bottom

Inflow Area =	201,436 sf,	Inflow Depth > 3.88"	for 100-Year event
Inflow =	15.81 cfs @ 12.17 hrs,	Volume=	65,088 cf
Outflow =	15.80 cfs @ 12.18 hrs,	Volume=	65,066 cf, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.38 fps, Min. Travel Time= 0.3 min
 Avg. Velocity = 1.79 fps, Avg. Travel Time= 0.9 min

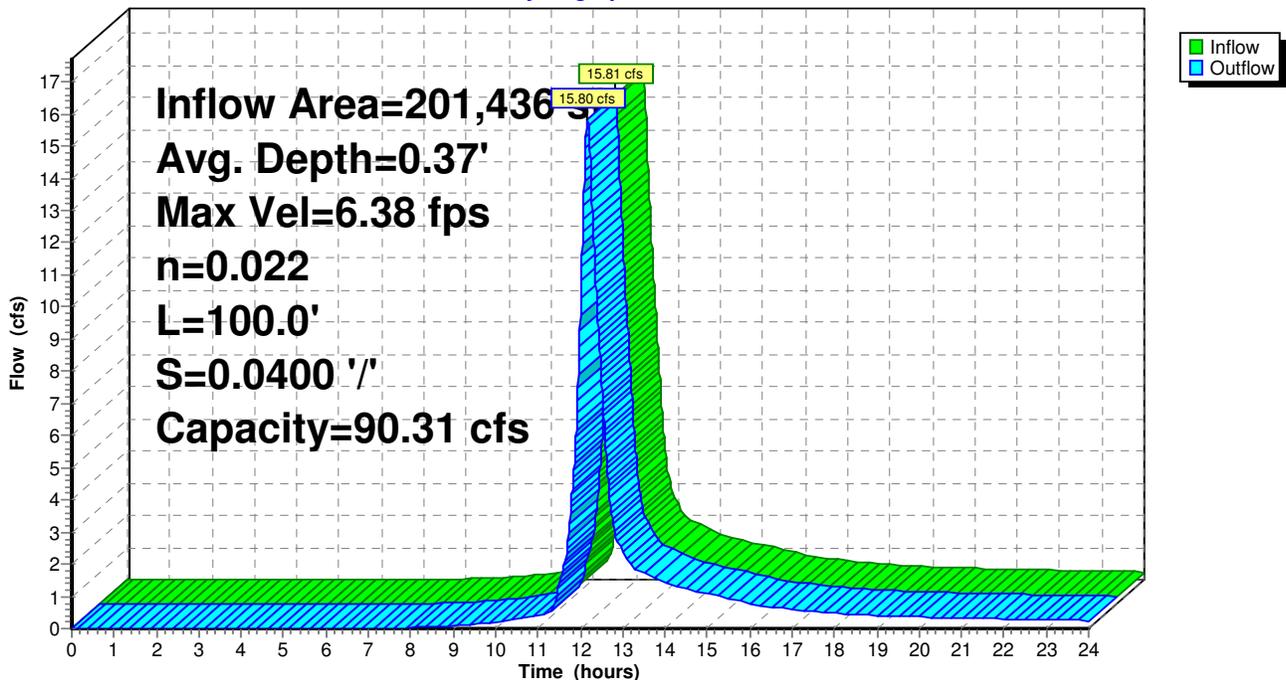
Peak Storage= 248 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.37'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 90.31 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 2.0 '/' Top Width= 10.00'
 Length= 100.0' Slope= 0.0400 '/'
 Inlet Invert= 86.00', Outlet Invert= 82.00'



Reach 902R: Existing wetland channel to WF 13

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 2P: Recharge System

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT:: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[81] Warning: Exceeded Pond 218R by 1.68' @ 23.99 hrs

Inflow Area = 111,470 sf, Inflow Depth > 4.31" for 100-Year event
Inflow = 10.16 cfs @ 12.09 hrs, Volume= 40,055 cf
Outflow = 9.34 cfs @ 12.13 hrs, Volume= 36,484 cf, Atten= 8%, Lag= 2.7 min
Discarded = 0.01 cfs @ 7.23 hrs, Volume= 496 cf
Primary = 9.34 cfs @ 12.13 hrs, Volume= 35,988 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 105.17' @ 12.13 hrs Surf.Area= 2,016 sf Storage= 5,030 cf

Plug-Flow detention time= 66.7 min calculated for 36,484 cf (91% of inflow)
Center-of-Mass det. time= 22.8 min (838.2 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	3,138 cf	42.00'W x 48.00'L x 5.00'H 100 10,080 cf Overall - 2,235 cf Embedded = 7,845 cf x 40.0% Voids
#2	101.00'	2,235 cf	47.8"W x 30.0"H x 6.25'L Cultec R-330 x 48 Inside #1
		5,373 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area
#2	Primary	103.22'	18.0" x 75.0' long Culvert Ke= 0.500 Outlet Invert= 102.09' S= 0.0151 '/' Cc= 0.900 n= 0.013
#3	Secondary	106.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600

Discarded OutFlow Max=0.01 cfs @ 7.23 hrs HW=100.65' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=9.33 cfs @ 12.13 hrs HW=105.17' (Free Discharge)

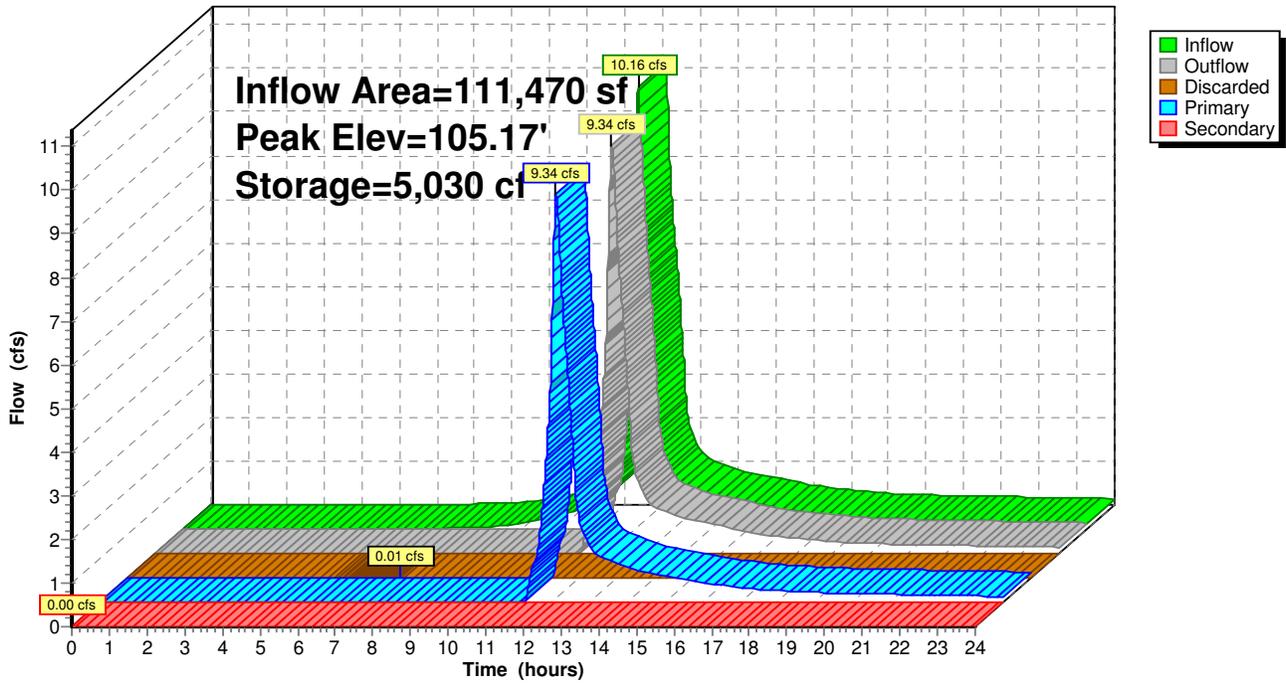
↑**2=Culvert** (Inlet Controls 9.33 cfs @ 5.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.60' (Free Discharge)

↑**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: Recharge System

Hydrograph



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Pond 3P: Culvert under Drive Unit 10

[57] Hint: Peaked at 114.99' (Flood elevation advised)

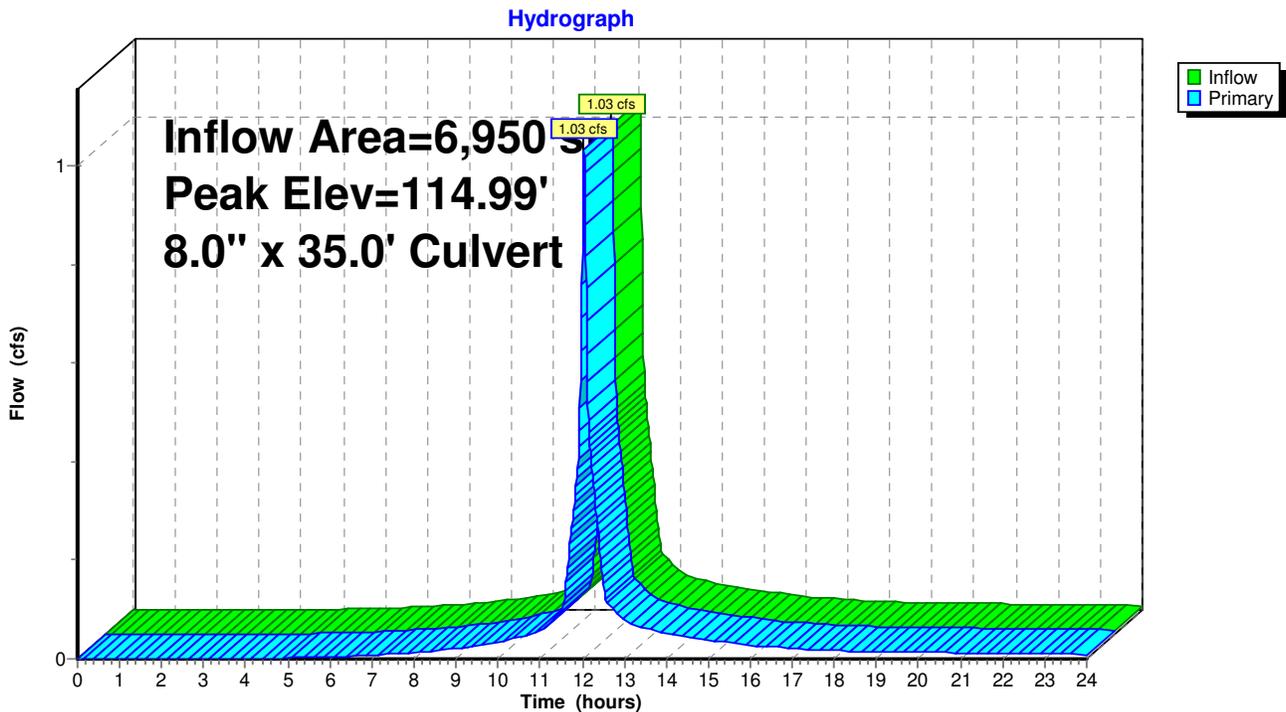
Inflow Area = 6,950 sf, Inflow Depth > 5.11" for 100-Year event
Inflow = 1.03 cfs @ 12.04 hrs, Volume= 2,958 cf
Outflow = 1.03 cfs @ 12.04 hrs, Volume= 2,958 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.03 cfs @ 12.04 hrs, Volume= 2,958 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.99' @ 12.04 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	114.27'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 113.92' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.03 cfs @ 12.04 hrs HW=114.99' (Free Discharge)
↑1=Culvert (Barrel Controls 1.03 cfs @ 3.40 fps)

Pond 3P: Culvert under Drive Unit 10



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 4P: Culvert under Drive Unit 11

[57] Hint: Peaked at 111.04' (Flood elevation advised)

[61] Hint: Submerged 20% of Reach 2R bottom

Inflow Area = 6,950 sf, Inflow Depth > 5.11" for 100-Year event
 Inflow = 1.03 cfs @ 12.05 hrs, Volume= 2,957 cf
 Outflow = 1.03 cfs @ 12.05 hrs, Volume= 2,957 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.03 cfs @ 12.05 hrs, Volume= 2,957 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 111.04' @ 12.05 hrs

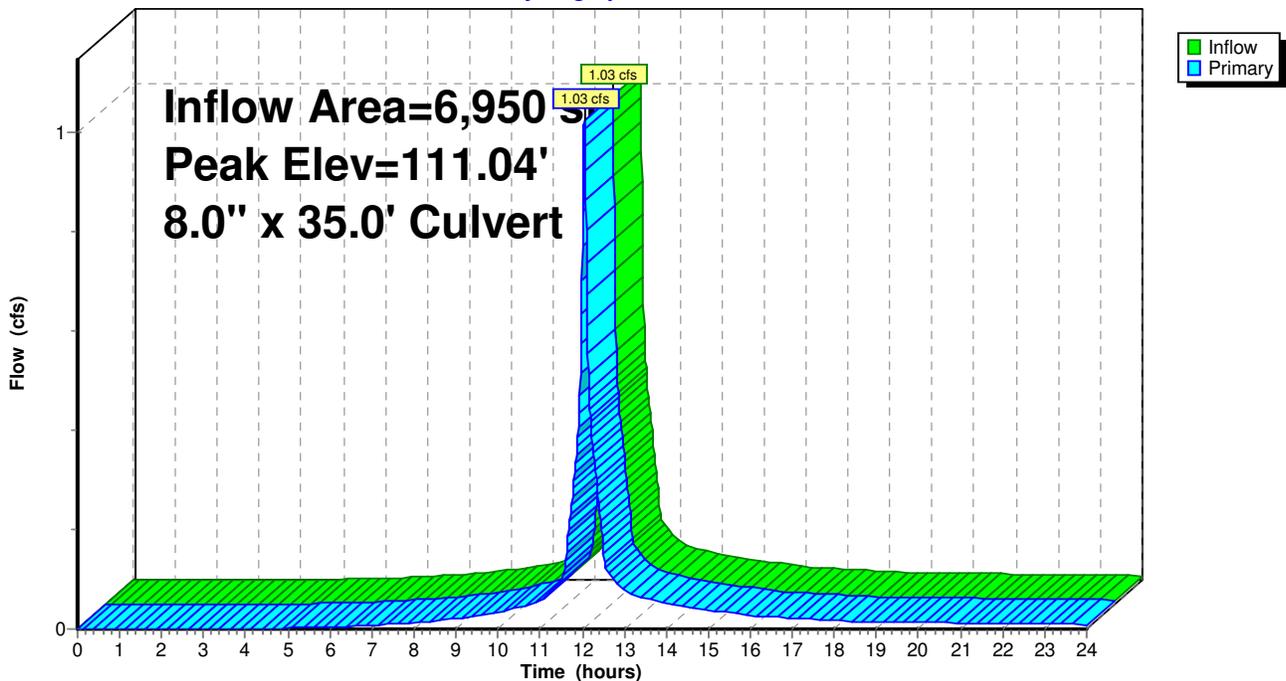
Device #1	Routing Primary	Invert 110.32'	Outlet Devices
			8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500
			Outlet Invert= 109.97' S= 0.0100 '/ Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.02 cfs @ 12.05 hrs HW=111.04' (Free Discharge)

↑1=Culvert (Barrel Controls 1.02 cfs @ 3.40 fps)

Pond 4P: Culvert under Drive Unit 11

Hydrograph



Pond 8P: Main Cell - Bio Retention

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

FROM HYDROCAD WEBSITE:

[63] Warning:

{node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[63] Warning: Exceeded Reach 62R inflow depth by 0.61' @ 12.30 hrs

Inflow Area = 44,069 sf, Inflow Depth > 4.14" for 100-Year event
 Inflow = 3.89 cfs @ 12.15 hrs, Volume= 15,212 cf
 Outflow = 3.00 cfs @ 12.26 hrs, Volume= 15,018 cf, Atten= 23%, Lag= 6.2 min
 Primary = 3.00 cfs @ 12.26 hrs, Volume= 15,018 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 111.98' @ 12.26 hrs Surf.Area= 1,428 sf Storage= 1,645 cf

Plug-Flow detention time= 23.8 min calculated for 15,012 cf (99% of inflow)
 Center-of-Mass det. time= 16.2 min (830.6 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	109.74'	2,193 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.74	0	0	0
109.75	350	2	2
110.00	375	91	92
111.00	667	521	613
112.00	1,440	1,054	1,667
112.33	1,750	526	2,193

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Device	Routing	Invert	Outlet Devices
#1	Device 7	110.00'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#2	Device 7	110.17'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#3	Device 7	110.33'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#4	Device 7	110.50'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#5	Device 7	110.67'	0.5" Vert. Orifice/Grate X 12.00 C= 0.600
#6	Device 7	111.00'	8.0" Horiz. Orifice/Grate Limited to weir flow C= 0.900
#7	Primary	107.00'	12.0" x 126.0' long Culvert CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 105.61' S= 0.0110 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#8	Secondary	112.33'	8.0' long (Profile 1) Broad-Crested Rectangular Weir Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.00 cfs @ 12.26 hrs HW=111.98' (Free Discharge)

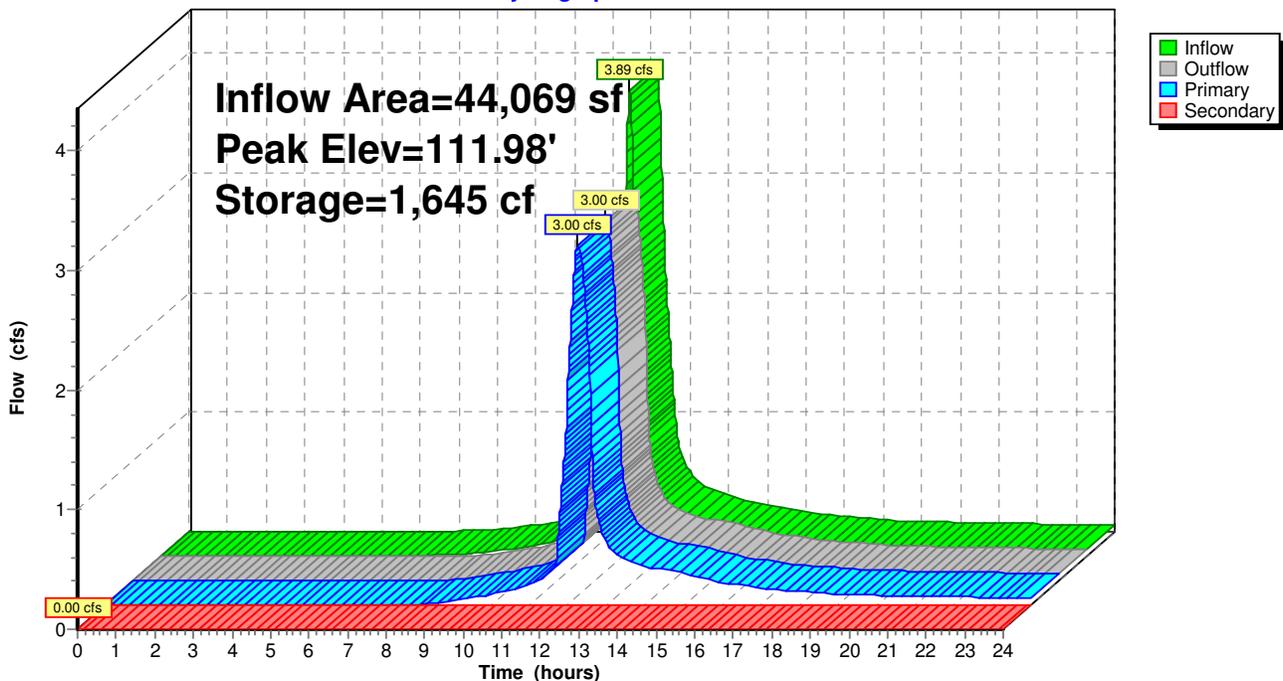
- 7=Culvert (Passes 3.00 cfs of 7.07 cfs potential flow)
 - 1=Orifice/Grate (Orifice Controls 0.11 cfs @ 6.75 fps)
 - 2=Orifice/Grate (Orifice Controls 0.11 cfs @ 6.45 fps)
 - 3=Orifice/Grate (Orifice Controls 0.10 cfs @ 6.15 fps)
 - 4=Orifice/Grate (Orifice Controls 0.10 cfs @ 5.82 fps)
 - 5=Orifice/Grate (Orifice Controls 0.09 cfs @ 5.48 fps)
 - 6=Orifice/Grate (Orifice Controls 2.50 cfs @ 7.17 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.74' (Free Discharge)

- 8=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 8P: Main Cell - Bio Retention

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 9P: CB 65

Inflow Area = 26,681 sf, Inflow Depth > 4.25" for 100-Year event
Inflow = 2.80 cfs @ 12.10 hrs, Volume= 9,450 cf
Outflow = 2.80 cfs @ 12.10 hrs, Volume= 9,450 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.80 cfs @ 12.10 hrs, Volume= 9,450 cf

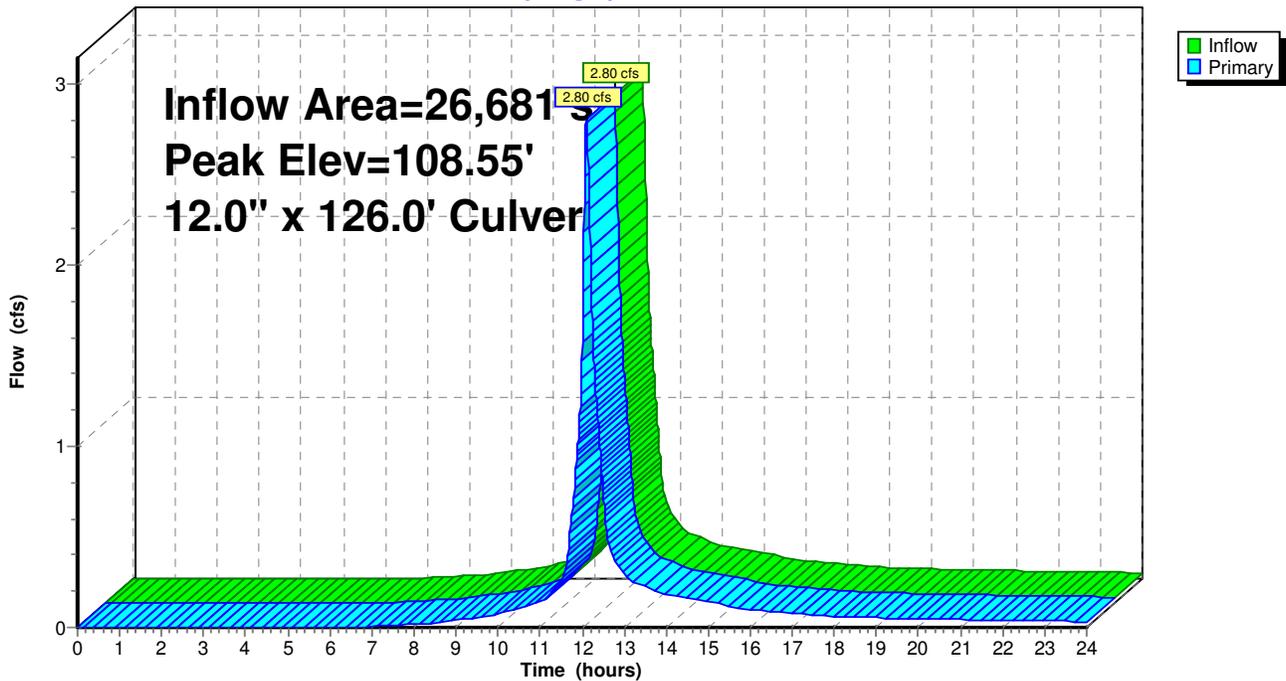
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 108.55' @ 12.10 hrs
Flood Elev= 112.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	107.50'	12.0" x 126.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 105.61' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.80 cfs @ 12.10 hrs HW=108.55' (Free Discharge)
↑1=Culvert (Inlet Controls 2.80 cfs @ 3.56 fps)

Pond 9P: CB 65

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 43R: CB 60 to DMH 64

[57] Hint: Peaked at 111.51' (Flood elevation advised)

Inflow Area = 4,640 sf, Inflow Depth > 5.22" for 100-Year event
Inflow = 0.72 cfs @ 12.03 hrs, Volume= 2,018 cf
Outflow = 0.72 cfs @ 12.03 hrs, Volume= 2,018 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.72 cfs @ 12.03 hrs, Volume= 2,018 cf

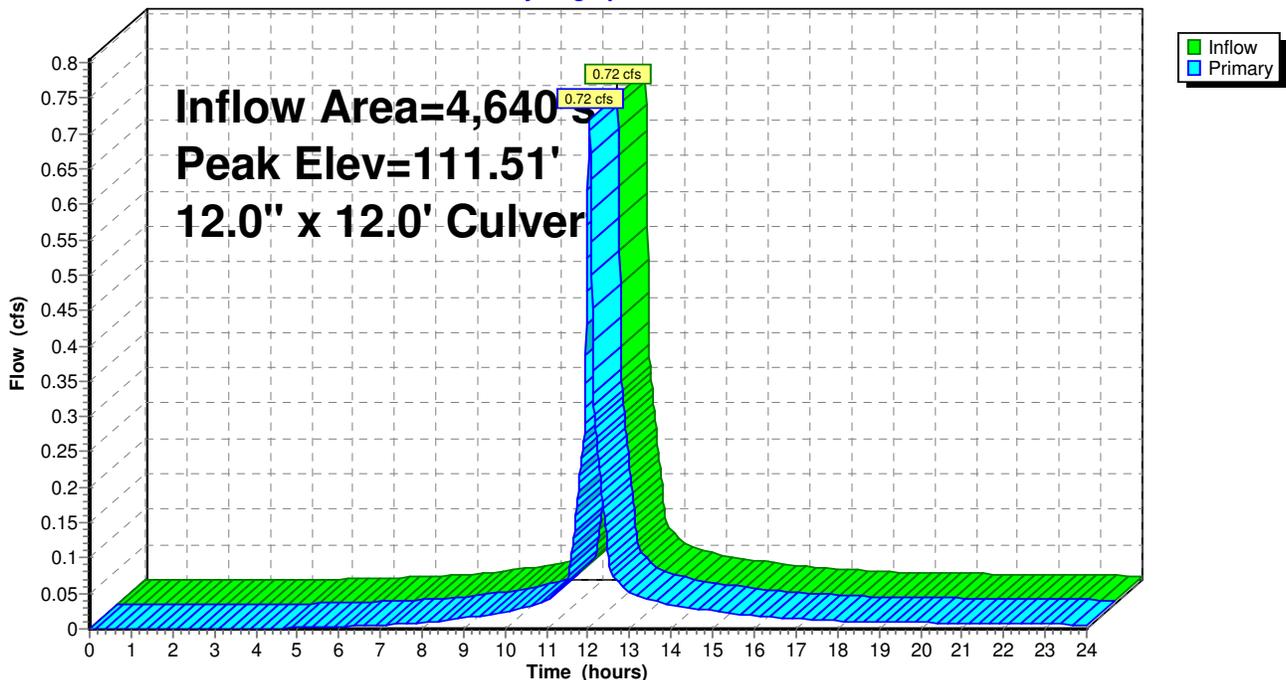
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 111.51' @ 12.03 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	111.02'	12.0" x 12.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.72 cfs @ 12.03 hrs HW=111.51' (Free Discharge)
↑1=Culvert (Barrel Controls 0.72 cfs @ 2.78 fps)

Pond 43R: CB 60 to DMH 64

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 61R: CB 62 to DMH 64

[57] Hint: Peaked at 112.63' (Flood elevation advised)

Inflow Area = 39,429 sf, Inflow Depth > 4.02" for 100-Year event
 Inflow = 3.59 cfs @ 12.16 hrs, Volume= 13,194 cf
 Outflow = 3.59 cfs @ 12.16 hrs, Volume= 13,194 cf, Atten= 0%, Lag= 0.0 min
 Primary = 3.59 cfs @ 12.16 hrs, Volume= 13,194 cf

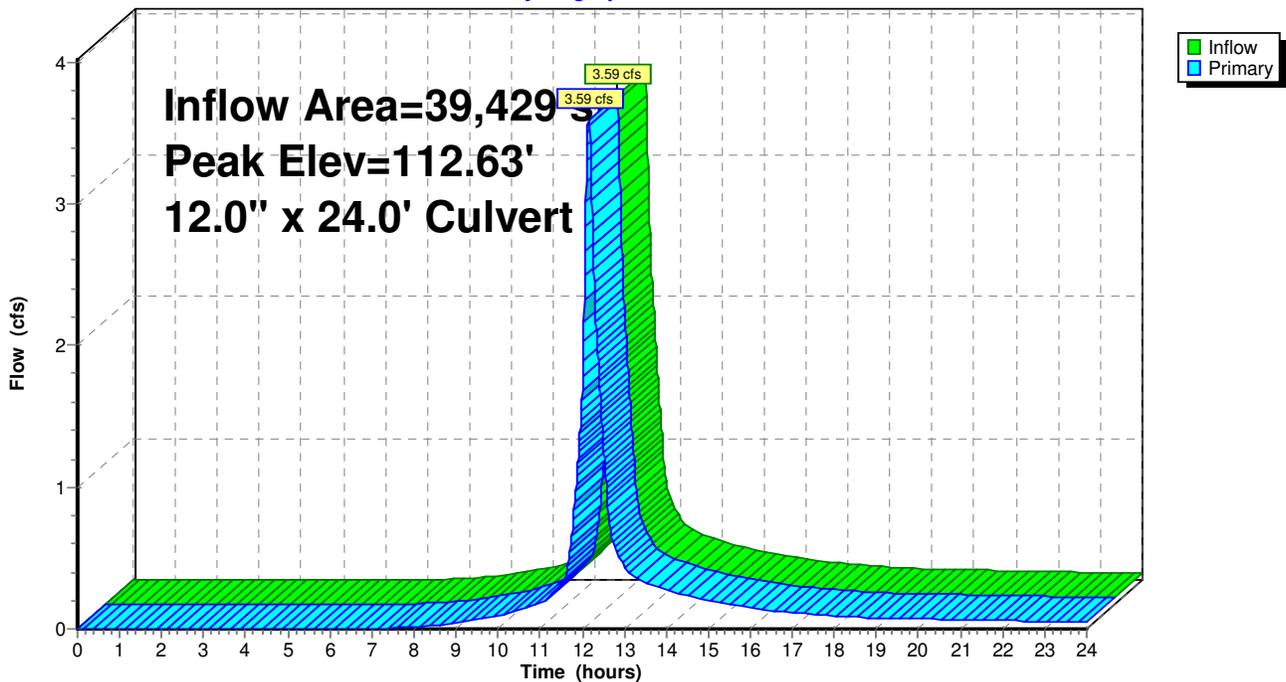
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 112.63' @ 12.16 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	111.14'	12.0" x 24.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 110.90' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.58 cfs @ 12.16 hrs HW=112.63' (Free Discharge)
 ↑1=Culvert (Barrel Controls 3.58 cfs @ 4.56 fps)

Pond 61R: CB 62 to DMH 64

Hydrograph



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Pond 66P: RG 9A at Units 11/12 - CB 214

Inflow Area = 6,950 sf, Inflow Depth > 5.11" for 100-Year event
 Inflow = 1.03 cfs @ 12.05 hrs, Volume= 2,957 cf
 Outflow = 1.02 cfs @ 12.05 hrs, Volume= 2,851 cf, Atten= 0%, Lag= 0.3 min
 Primary = 1.02 cfs @ 12.05 hrs, Volume= 2,851 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 107.70' @ 12.05 hrs Surf.Area= 232 sf Storage= 132 cf

Plug-Flow detention time= 34.3 min calculated for 2,849 cf (96% of inflow)
 Center-of-Mass det. time= 13.4 min (799.7 - 786.3)

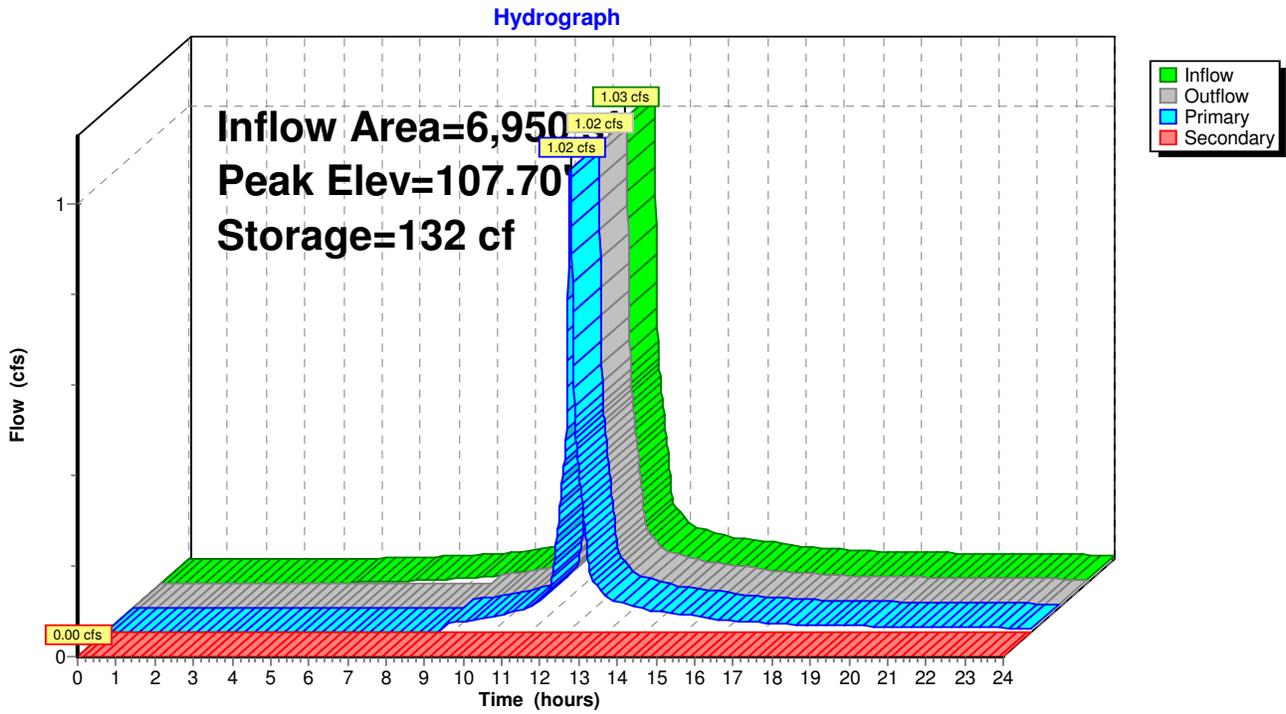
Volume	Invert	Avail.Storage	Storage Description
#1	107.08'	359 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
107.08	0	0	0
107.09	200	1	1
108.58	280	358	359

Device	Routing	Invert	Outlet Devices
#1	Primary	107.58'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	108.08'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.02 cfs @ 12.05 hrs HW=107.69' (Free Discharge)
 ↑1=**Orifice/Grate** (Weir Controls 1.02 cfs @ 1.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=107.08' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 66P: RG 9A at Units 11/12 - CB 214



Postdevelopment10c

Type III 24-hr 100-Year Rainfall=6.50"

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Pond 67P: CB 66 (emergency vertical release)

[61] Hint: Submerged 28% of Reach 68R bottom

Inflow Area = 44,069 sf, Inflow Depth > 4.09" for 100-Year event
Inflow = 3.00 cfs @ 12.26 hrs, Volume= 15,018 cf
Outflow = 3.00 cfs @ 12.26 hrs, Volume= 15,018 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.00 cfs @ 12.26 hrs, Volume= 15,018 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

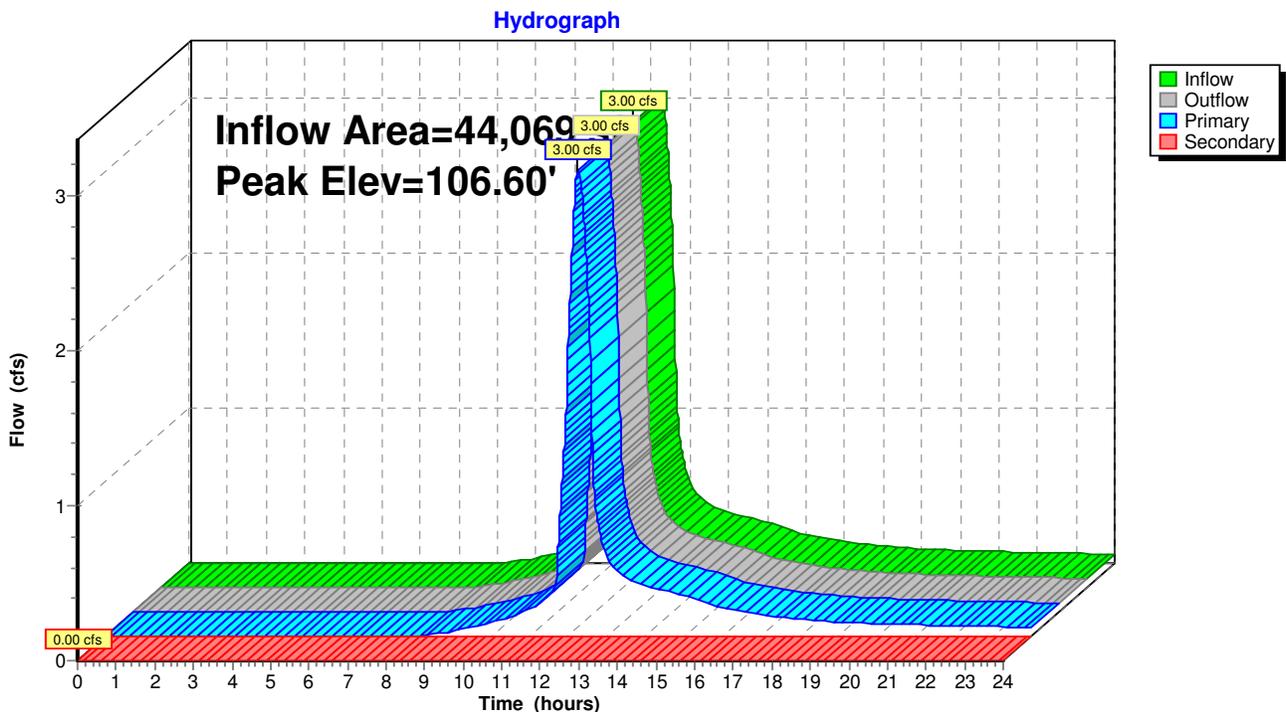
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 106.60' @ 12.26 hrs
Flood Elev= 112.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	2.00' W x 2.00' H x 52.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 102.36' S= 0.0700 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Secondary	112.00'	2.00' W x 2.00' H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=3.00 cfs @ 12.26 hrs HW=106.60' (Free Discharge)
↑1=Culvert (Inlet Controls 3.00 cfs @ 2.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' (Free Discharge)
↑2=Orifice/Grate (Controls 0.00 cfs)

Pond 67P: CB 66 (emergency vertical release)



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 70P: RG 10A - CB 216 at Units 13

Inflow Area = 11,090 sf, Inflow Depth > 4.87" for 100-Year event
 Inflow = 1.53 cfs @ 12.05 hrs, Volume= 4,498 cf
 Outflow = 1.52 cfs @ 12.05 hrs, Volume= 4,378 cf, Atten= 0%, Lag= 0.3 min
 Primary = 1.52 cfs @ 12.05 hrs, Volume= 4,378 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 104.80' @ 12.05 hrs Surf.Area= 304 sf Storage= 162 cf

Plug-Flow detention time= 24.1 min calculated for 4,376 cf (97% of inflow)
 Center-of-Mass det. time= 8.4 min (805.9 - 797.5)

Volume	Invert	Avail.Storage	Storage Description
#1	104.15'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.15	0	0	0
104.16	200	1	1
104.65	280	118	119
105.15	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	104.65'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	105.15'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

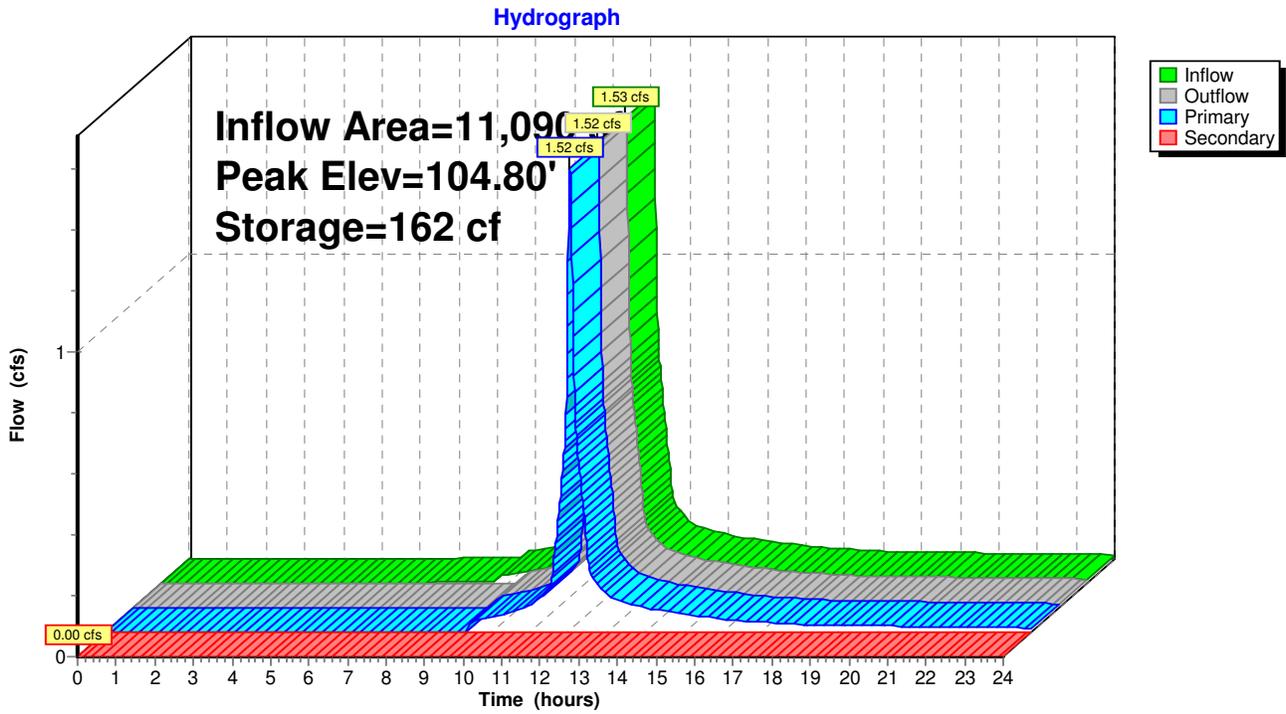
Primary OutFlow Max=1.52 cfs @ 12.05 hrs HW=104.80' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 1.52 cfs @ 1.27 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=104.15' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 70P: RG 10A - CB 216 at Units 13



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 111P: CB 20

Inflow Area = 7,780 sf, Inflow Depth > 5.11" for 100-Year event
Inflow = 1.24 cfs @ 12.01 hrs, Volume= 3,312 cf
Outflow = 1.24 cfs @ 12.01 hrs, Volume= 3,312 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 12.01 hrs, Volume= 3,312 cf

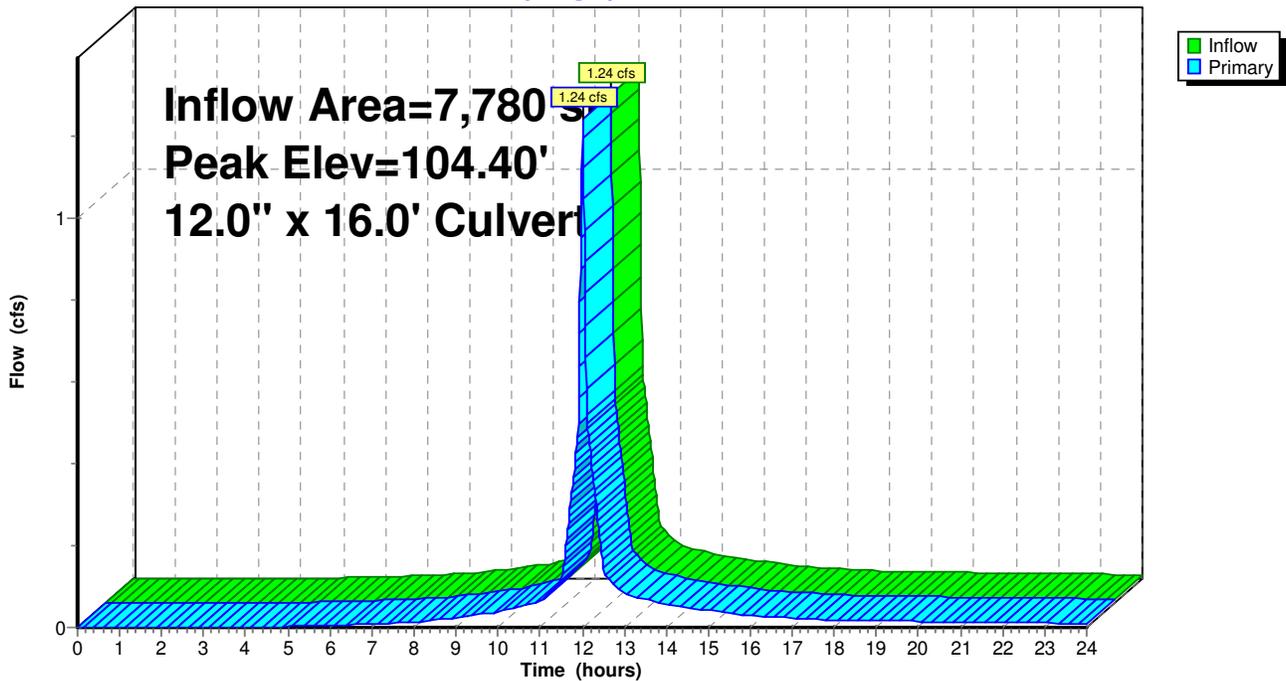
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.40' @ 12.01 hrs
Flood Elev= 107.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.74'	12.0" x 16.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.24 cfs @ 12.01 hrs HW=104.40' (Free Discharge)
↑1=Culvert (Barrel Controls 1.24 cfs @ 3.22 fps)

Pond 111P: CB 20

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 112P: CB 22

Inflow Area = 5,198 sf, Inflow Depth > 5.56" for 100-Year event
Inflow = 0.88 cfs @ 12.00 hrs, Volume= 2,409 cf
Outflow = 0.88 cfs @ 12.00 hrs, Volume= 2,409 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 12.00 hrs, Volume= 2,409 cf

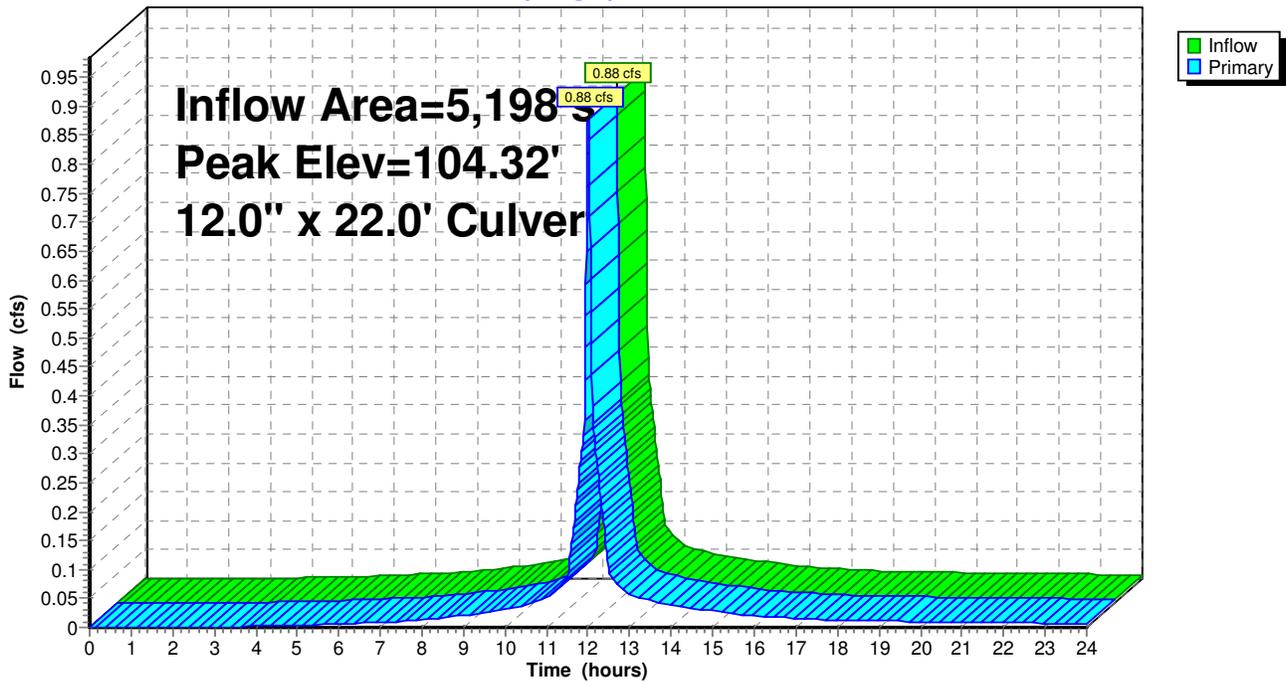
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 104.32' @ 12.00 hrs
Flood Elev= 107.82'

Device	Routing	Invert	Outlet Devices
#1	Primary	103.80'	12.0" x 22.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 103.58' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.87 cfs @ 12.00 hrs HW=104.32' (Free Discharge)
↑1=Culvert (Barrel Controls 0.87 cfs @ 3.08 fps)

Pond 112P: CB 22

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 119P: RG - 1A - CB 118 to DMH 14

[62] Warning: Submerged 18% of Reach 127R inlet

Inflow Area = 16,626 sf, Inflow Depth > 6.51" for 100-Year event
 Inflow = 3.25 cfs @ 12.02 hrs, Volume= 9,017 cf
 Outflow = 3.24 cfs @ 12.02 hrs, Volume= 8,981 cf, Atten= 0%, Lag= 0.1 min
 Primary = 3.24 cfs @ 12.02 hrs, Volume= 8,981 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 110.22' @ 12.02 hrs Surf.Area= 103 sf Storage= 64 cf

Plug-Flow detention time= 4.6 min calculated for 8,977 cf (100% of inflow)
 Center-of-Mass det. time= 2.1 min (807.3 - 805.2)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	0	0	0
109.51	75	0	0
110.00	96	42	42
111.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	110.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Primary	109.86'	8.0" x 65.0' long Culvert Ke= 0.200 Outlet Invert= 105.96' S= 0.0600 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#3	Secondary	111.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.23 cfs @ 12.02 hrs HW=110.22' (Free Discharge)

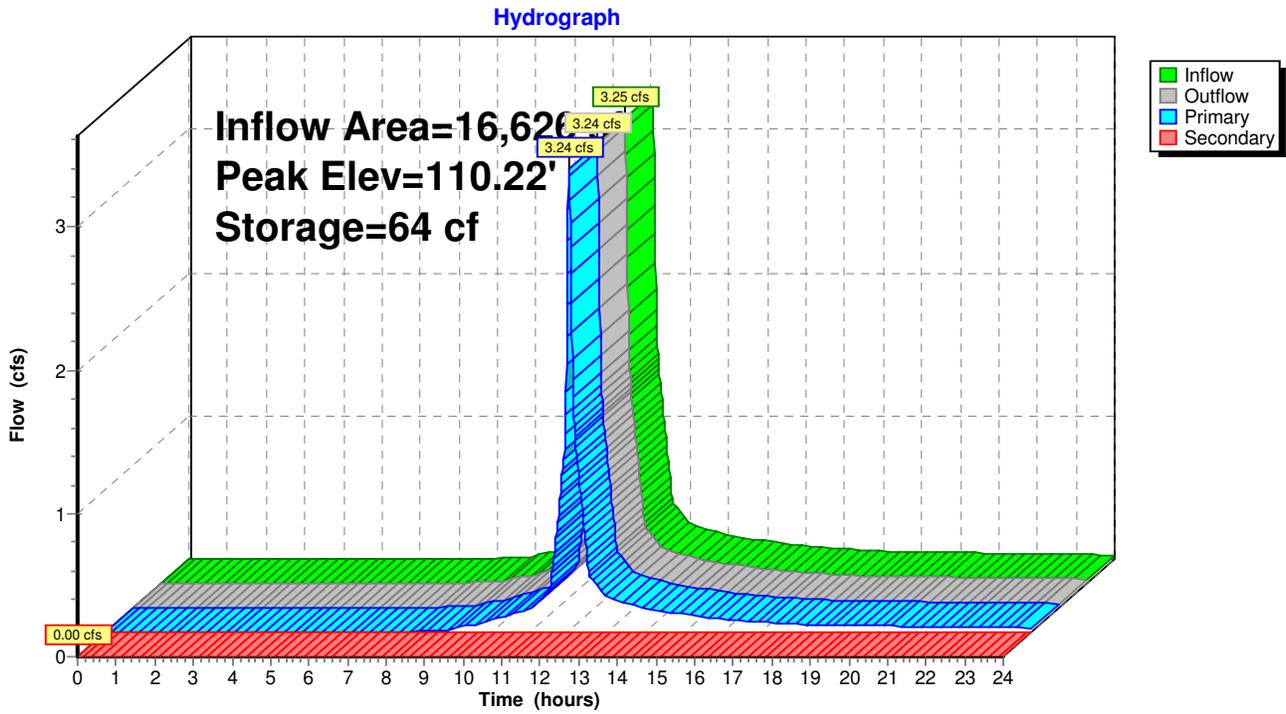
↑1=**Orifice/Grate** (Weir Controls 2.73 cfs @ 1.54 fps)

└2=**Culvert** (Inlet Controls 0.50 cfs @ 2.56 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)

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

Pond 119P: RG - 1A - CB 118 to DMH 14



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 119R: Culvert under Unit 4 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:

{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 113.92' (Flood elevation advised)

[81] Warning: Exceeded Pond 121P by 1.57' @ 12.02 hrs

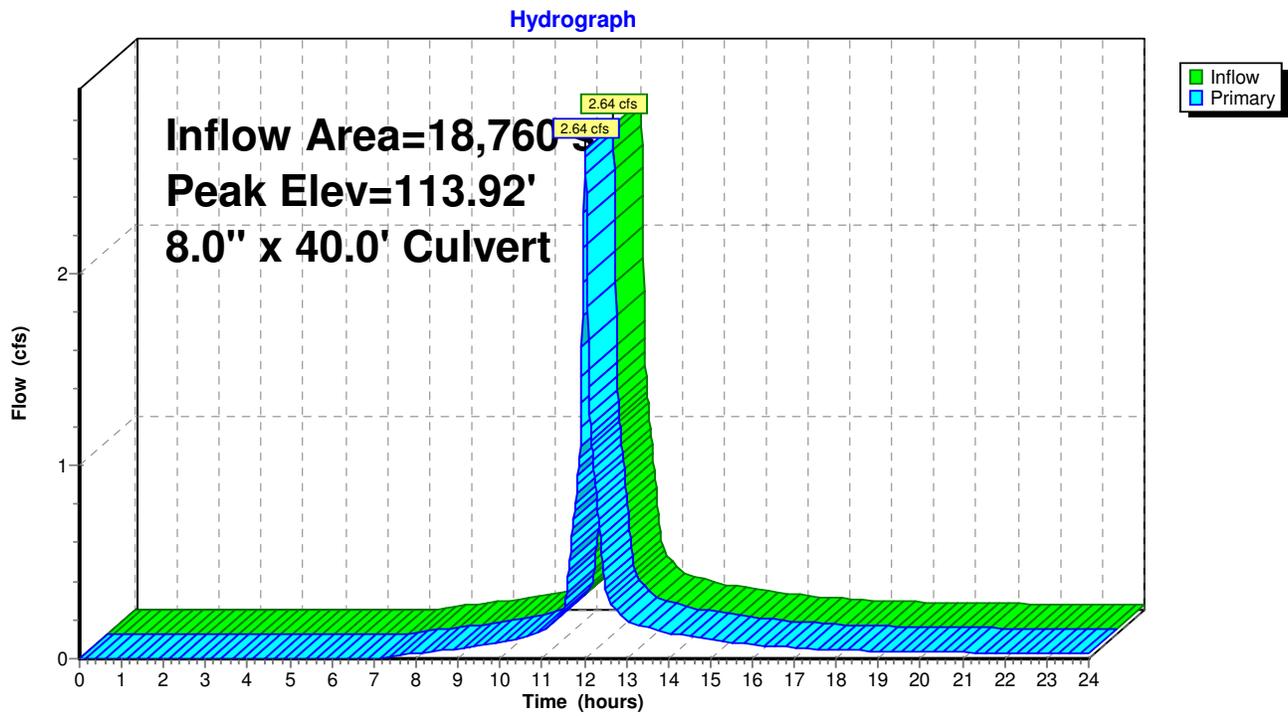
Inflow Area =	18,760 sf,	Inflow Depth >	4.86"	for	100-Year event
Inflow =	2.64 cfs @	12.02 hrs,	Volume=	7,592 cf	
Outflow =	2.64 cfs @	12.02 hrs,	Volume=	7,592 cf,	Atten= 0%, Lag= 0.0 min
Primary =	2.64 cfs @	12.02 hrs,	Volume=	7,592 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 113.92' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	111.12'	8.0" x 40.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 109.92' S= 0.0300 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.63 cfs @ 12.02 hrs HW=113.91' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.63 cfs @ 7.54 fps)

Pond 119R: Culvert under Unit 4 Drive



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 121P: RG 6A - CB 120 Under Drive Unit 4

Inflow Area = 18,760 sf, Inflow Depth > 4.88" for 100-Year event
 Inflow = 2.65 cfs @ 12.01 hrs, Volume= 7,635 cf
 Outflow = 2.64 cfs @ 12.02 hrs, Volume= 7,592 cf, Atten= 0%, Lag= 0.1 min
 Primary = 2.64 cfs @ 12.02 hrs, Volume= 7,592 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 112.34' @ 12.02 hrs Surf.Area= 103 sf Storage= 64 cf

Plug-Flow detention time= 6.0 min calculated for 7,592 cf (99% of inflow)
 Center-of-Mass det. time= 2.4 min (794.6 - 792.2)

Volume	Invert	Avail.Storage	Storage Description
#1	111.62'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.62	0	0	0
111.63	75	0	0
112.12	96	42	42
113.12	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	112.12'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.12'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

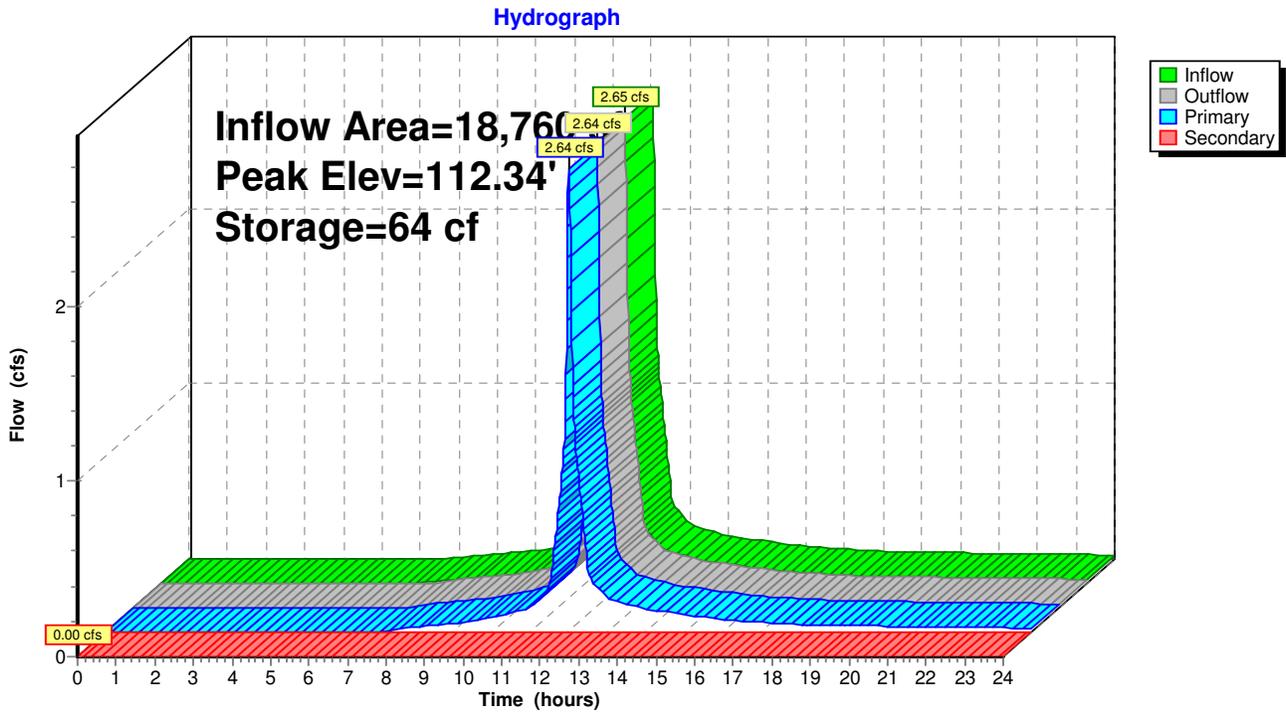
Primary OutFlow Max=2.63 cfs @ 12.02 hrs HW=112.34' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 2.63 cfs @ 1.52 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=111.62' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 121P: RG 6A - CB 120 Under Drive Unit 4



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 128P: RG 2A - CB 122 RG Unit 3

[61] Hint: Submerged 2% of Reach 130R bottom

Inflow Area = 13,016 sf, Inflow Depth > 6.94" for 100-Year event
 Inflow = 2.74 cfs @ 12.02 hrs, Volume= 7,524 cf
 Outflow = 2.74 cfs @ 12.02 hrs, Volume= 7,481 cf, Atten= 0%, Lag= 0.1 min
 Primary = 2.74 cfs @ 12.02 hrs, Volume= 7,481 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 113.22' @ 12.02 hrs Surf.Area= 109 sf Storage= 65 cf

Plug-Flow detention time= 5.4 min calculated for 7,478 cf (99% of inflow)
 Center-of-Mass det. time= 1.8 min (809.4 - 807.6)

Volume	Invert	Avail.Storage	Storage Description
#1	112.50'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.50	0	0	0
112.51	75	0	0
113.00	96	42	42
113.50	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Primary	113.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	113.50'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

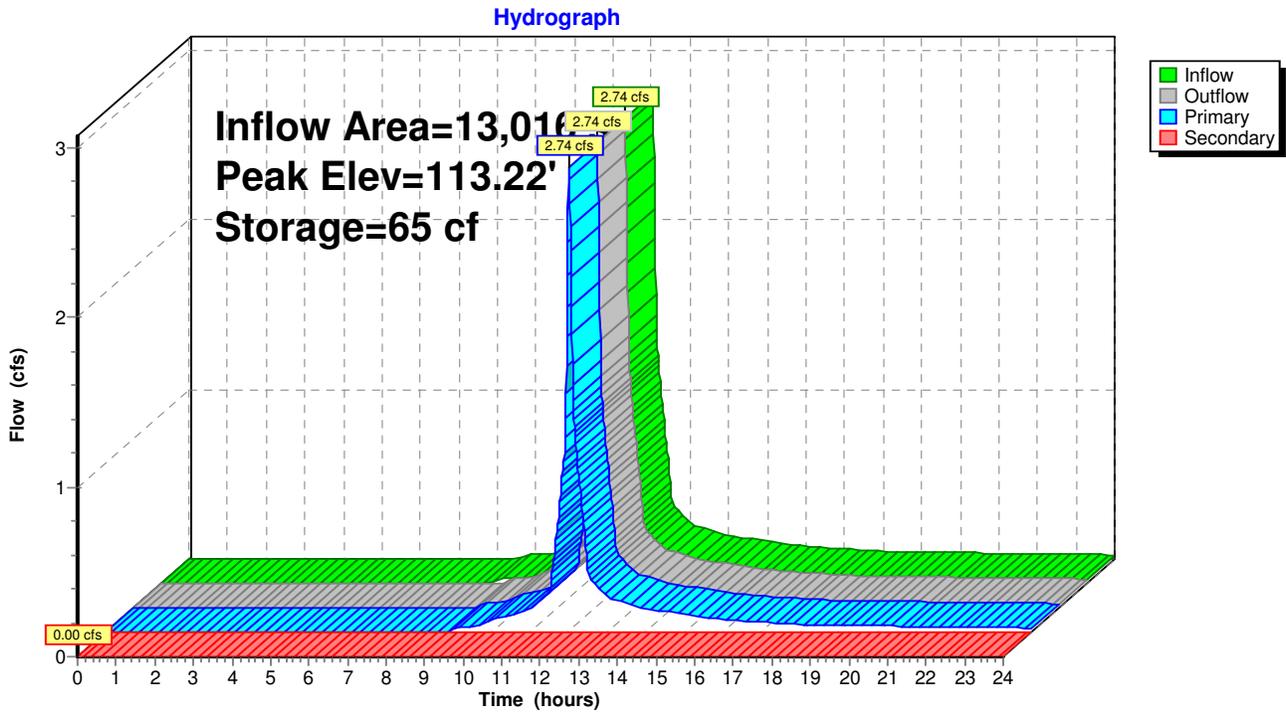
Primary OutFlow Max=2.73 cfs @ 12.02 hrs HW=113.22' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 2.73 cfs @ 1.54 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 128P: RG 2A - CB 122 RG Unit 3



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20

This rain garden is a level spreader and is intended to overtop with secondary flow to 130R. Flow continues via secondary (red). Routing adjusted to Max = 3. Warning message acceptable.

- [93] Warning: Storage range exceeded by 0.38'
- [88] Warning: Qout>Qin may require Finer Routing>1
- [85] Warning: Oscillations may require Finer Routing>1
- [61] Hint: Submerged 47% of Reach 129R bottom

Inflow Area = 7,500 sf, Inflow Depth > 5.00" for 100-Year event
 Inflow = 1.18 cfs @ 12.01 hrs, Volume= 3,123 cf
 Outflow = 1.18 cfs @ 12.01 hrs, Volume= 3,025 cf, Atten= 0%, Lag= 0.0 min
 Secondary = 1.18 cfs @ 12.01 hrs, Volume= 3,025 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 115.13' @ 12.01 hrs Surf.Area= 126 sf Storage= 98 cf

Plug-Flow detention time= 29.5 min calculated for 3,025 cf (97% of inflow)
 Center-of-Mass det. time= 11.0 min (797.8 - 786.8)

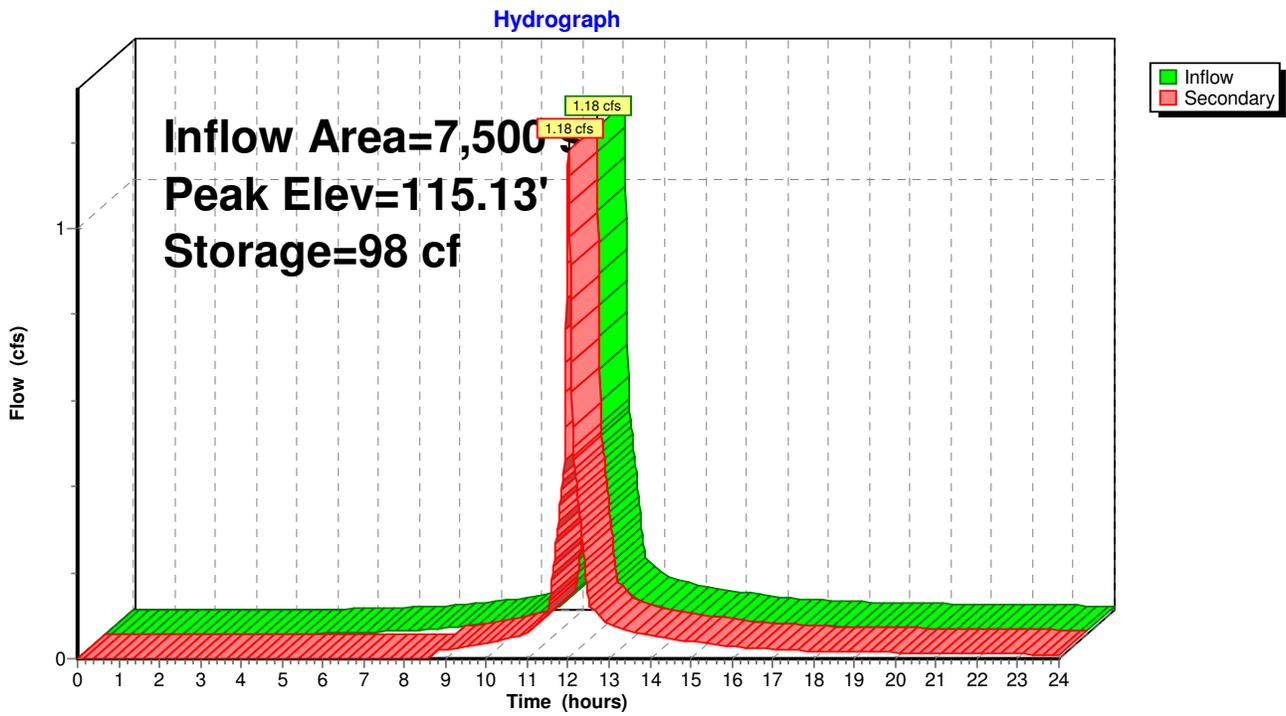
Volume	Invert	Avail.Storage	Storage Description
#1	113.75'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
113.75	0	0	0
113.76	75	0	0
114.25	96	42	42
114.75	126	56	98

Device	Routing	Invert	Outlet Devices
#1	Secondary	114.75'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Secondary OutFlow Max=1.18 cfs @ 12.01 hrs HW=115.13' (Free Discharge)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 1.18 cfs @ 1.54 fps)

Pond 132P: RG 3B - CB 124 Rain Garden - Unit 20



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 133P: Large RG 4C at Unit 20

Inflow Area = 6,950 sf, Inflow Depth > 4.56" for 100-Year event
 Inflow = 1.02 cfs @ 12.01 hrs, Volume= 2,640 cf
 Outflow = 1.01 cfs @ 12.01 hrs, Volume= 2,520 cf, Atten= 1%, Lag= 0.4 min
 Primary = 1.01 cfs @ 12.01 hrs, Volume= 2,520 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 116.96' @ 12.01 hrs Surf.Area= 298 sf Storage= 152 cf

Plug-Flow detention time= 39.5 min calculated for 2,520 cf (95% of inflow)
 Center-of-Mass det. time= 14.0 min (811.9 - 797.9)

Volume	Invert	Avail.Storage	Storage Description
#1	116.35'	279 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.35	0	0	0
116.36	200	1	1
116.85	280	118	119
117.35	360	160	279

Device	Routing	Invert	Outlet Devices
#1	Primary	116.85'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	117.35'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

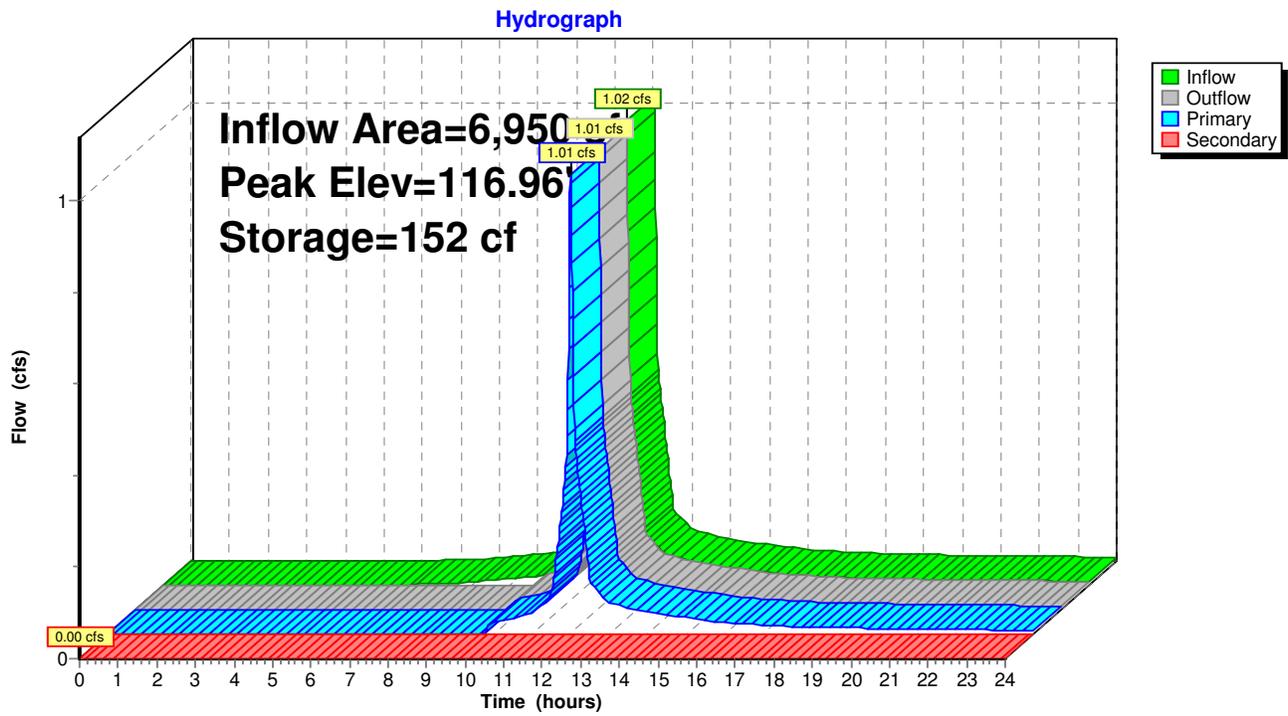
Primary OutFlow Max=1.00 cfs @ 12.01 hrs HW=116.96' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 1.00 cfs @ 1.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=116.35' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 133P: Large RG 4C at Unit 20



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 144R: HW 30 to DMH 14

[57] Hint: Peaked at 114.53' (Flood elevation advised)

Inflow Area = 34,910 sf, Inflow Depth > 3.93" for 100-Year event
Inflow = 3.84 cfs @ 12.11 hrs, Volume= 11,433 cf
Outflow = 3.84 cfs @ 12.11 hrs, Volume= 11,433 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.84 cfs @ 12.11 hrs, Volume= 11,433 cf

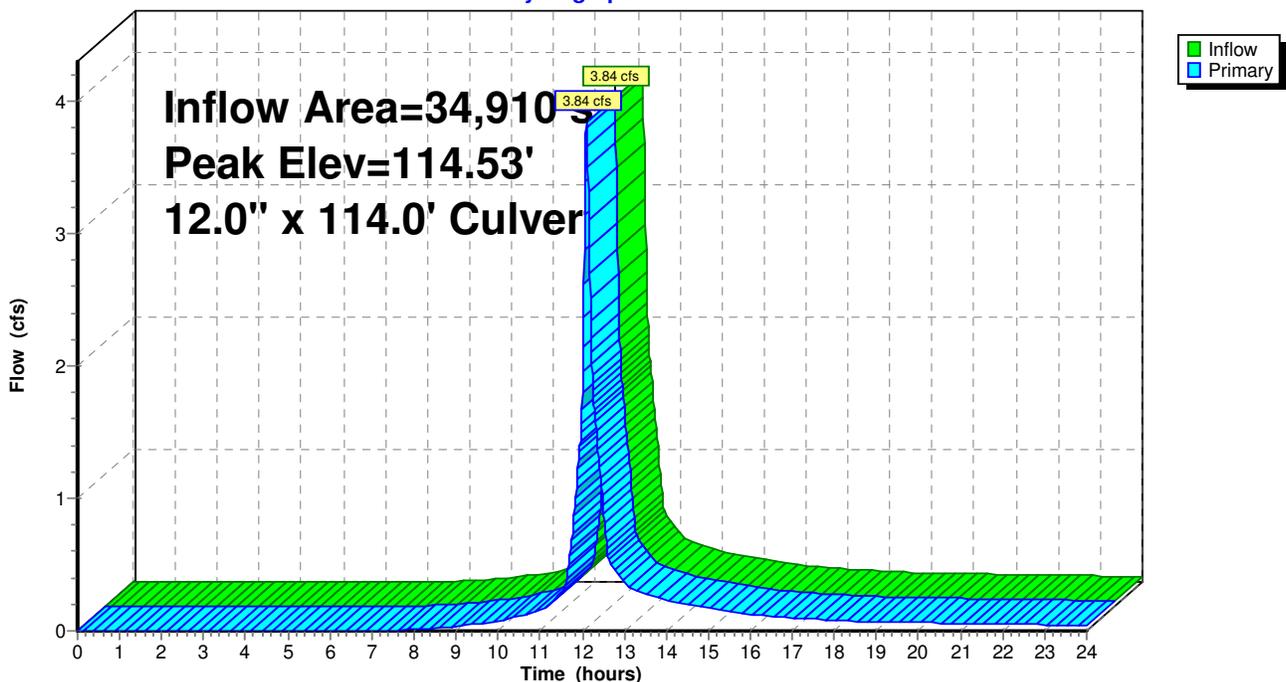
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 114.53' @ 12.11 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	113.00'	12.0" x 114.0' long Culvert Ke= 0.500 Outlet Invert= 103.88' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.84 cfs @ 12.11 hrs HW=114.53' (Free Discharge)
↑1=Culvert (Inlet Controls 3.84 cfs @ 4.88 fps)

Pond 144R: HW 30 to DMH 14

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 155P: RG 5A - CB 116 between Septic and Unit 4

Inflow Area = 21,810 sf, Inflow Depth > 4.92" for 100-Year event
 Inflow = 3.13 cfs @ 12.01 hrs, Volume= 8,947 cf
 Outflow = 3.11 cfs @ 12.02 hrs, Volume= 8,904 cf, Atten= 1%, Lag= 0.1 min
 Primary = 3.11 cfs @ 12.02 hrs, Volume= 8,904 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 109.24' @ 12.02 hrs Surf.Area= 103 sf Storage= 66 cf

Plug-Flow detention time= 5.1 min calculated for 8,901 cf (99% of inflow)
 Center-of-Mass det. time= 2.1 min (794.1 - 792.0)

Volume	Invert	Avail.Storage	Storage Description
#1	108.50'	153 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.50	0	0	0
108.51	75	0	0
109.00	96	42	42
110.00	126	111	153

Device	Routing	Invert	Outlet Devices
#1	Primary	109.00'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	110.00'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

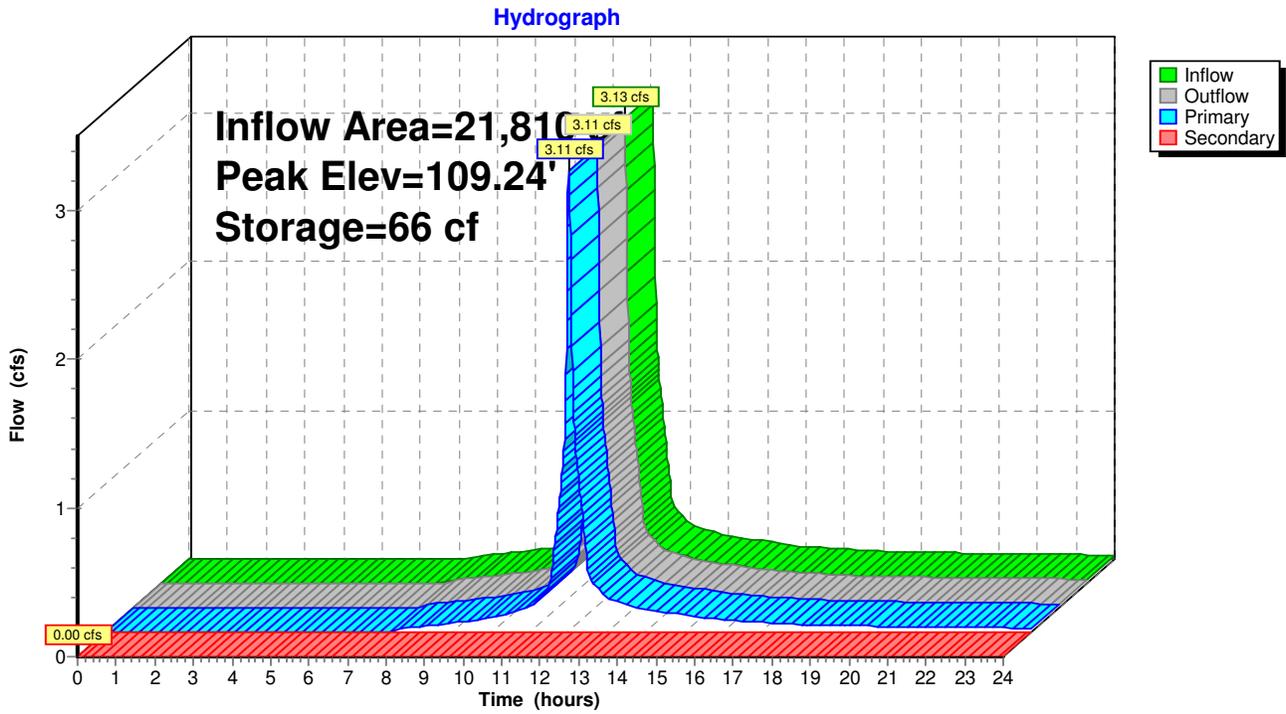
Primary OutFlow Max=3.10 cfs @ 12.02 hrs HW=109.24' (Free Discharge)

↑1=**Orifice/Grate** (Weir Controls 3.10 cfs @ 1.61 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=108.50' (Free Discharge)

↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 155P: RG 5A - CB 116 between Septic and Unit 4



Pond 156R: Culvert under Unit 5 Drive

FROM HYDROCAD WEBSITE:

[81] Warning:
{node} Exceeded Pond x by x.x' @ x.x hrs

At some point during the routing, the node's water surface elevation has exceeded the water surface elevation of an inflowing pond, indicating a possible tailwater dependency. The message shows the maximum amount of reverse head and the time at which it occurred.

IMPORTANT: The pond routing is not altered by this situation, even though the higher tailwater may in reality cause a reduced discharge

[57] Hint: Peaked at 115.91' (Flood elevation advised)
[81] Warning: Exceeded Pond 157P by 0.40' @ 12.03 hrs

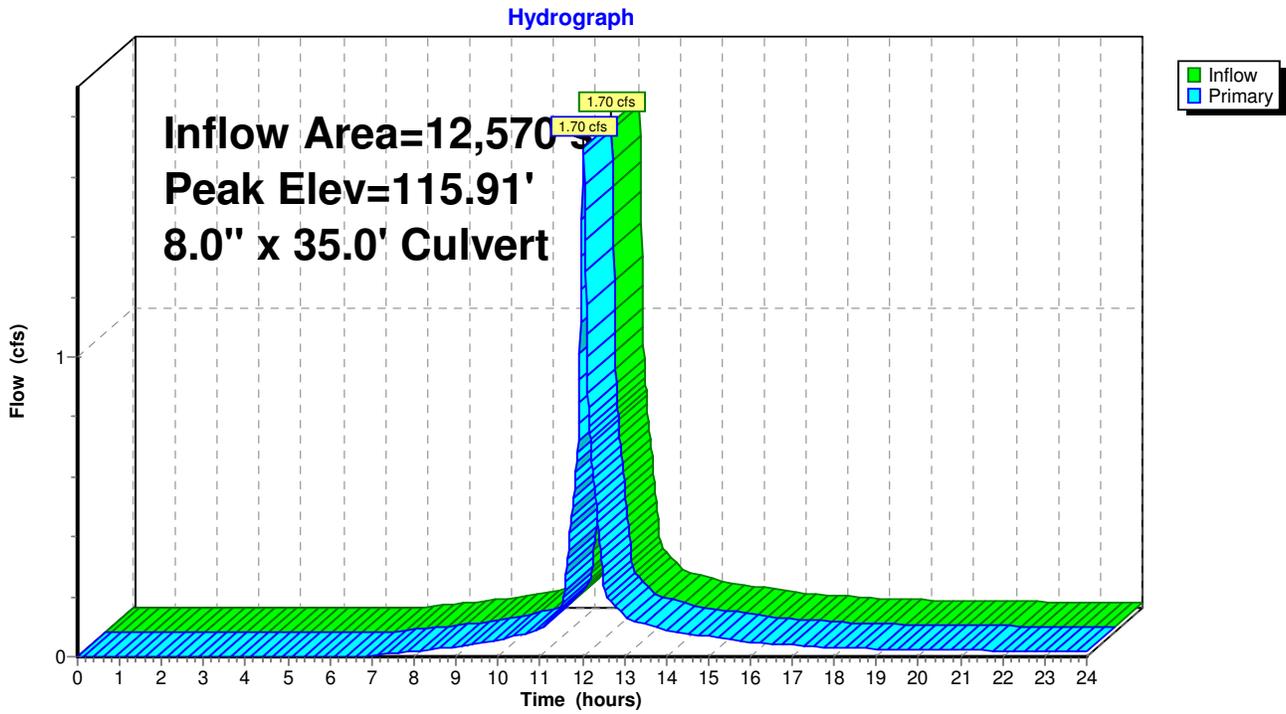
Inflow Area = 12,570 sf, Inflow Depth > 4.83" for 100-Year event
Inflow = 1.70 cfs @ 12.03 hrs, Volume= 5,058 cf
Outflow = 1.70 cfs @ 12.03 hrs, Volume= 5,058 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.70 cfs @ 12.03 hrs, Volume= 5,058 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 115.91' @ 12.03 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	114.35'	8.0" x 35.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 114.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.70 cfs @ 12.03 hrs HW=115.91' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.70 cfs @ 4.87 fps)

Pond 156R: Culvert under Unit 5 Drive



Pond 157P: RG 7A - CB 126 Under Drive Unit 5

FROM HYDROCAD WEBSITE:

[62] Hint: {node} Submerged xx% of Reach x inlet

The node's peak elevation has partially submerged the inlet of an inflowing reach.

This message occurs when the peak elevation (tailwater) rises above the inlet invert but remains below the calculated inlet depth at all times. The percentage indicates the fraction of the defined reach depth that is submerged at the inlet.

IMPORTANT: The reach routing calculations are not altered by this situation, even though it may reduce the actual reach discharge. The routing continues to be performed as if the reach were operating under normal Manning's flow with no tailwater influence.

FROM HYDROCAD WEBSITE:

[79] Warning:

{node} Submerged Pond x device # by x.x'

The node's peak water surface elevation has submerged the specified pond outlet device. This message occurs when the peak elevation (tailwater) rises above the invert of one of the pond's final outlet device(s).

IMPORTANT: The pond routing calculations are not altered by this situation, even though the tailwater may reduce the pond's actual discharge. The routing continues to be performed based on the existing stage-discharge relationship, as if the tailwater did not exist.

[61] Hint: Submerged 54% of Reach 154R bottom

Inflow Area = 12,570 sf, Inflow Depth > 4.87" for 100-Year event
 Inflow = 1.70 cfs @ 12.03 hrs, Volume= 5,100 cf
 Outflow = 1.70 cfs @ 12.03 hrs, Volume= 5,058 cf, Atten= 0%, Lag= 0.1 min
 Primary = 1.70 cfs @ 12.03 hrs, Volume= 5,058 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 115.51' @ 12.03 hrs Surf.Area= 106 sf Storage= 59 cf

Plug-Flow detention time= 9.0 min calculated for 5,055 cf (99% of inflow)
 Center-of-Mass det. time= 3.7 min (794.9 - 791.2)

Volume	Invert	Avail.Storage	Storage Description
#1	114.85'	98 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
114.85	0	0	0
114.86	75	0	0
115.35	96	42	42
115.85	126	56	98

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Device	Routing	Invert	Outlet Devices
#1	Primary	115.35'	2.00' x 2.00' Horiz. Orifice/Grate Limited to weir flow C= 0.600
#2	Secondary	115.85'	2.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65
			2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

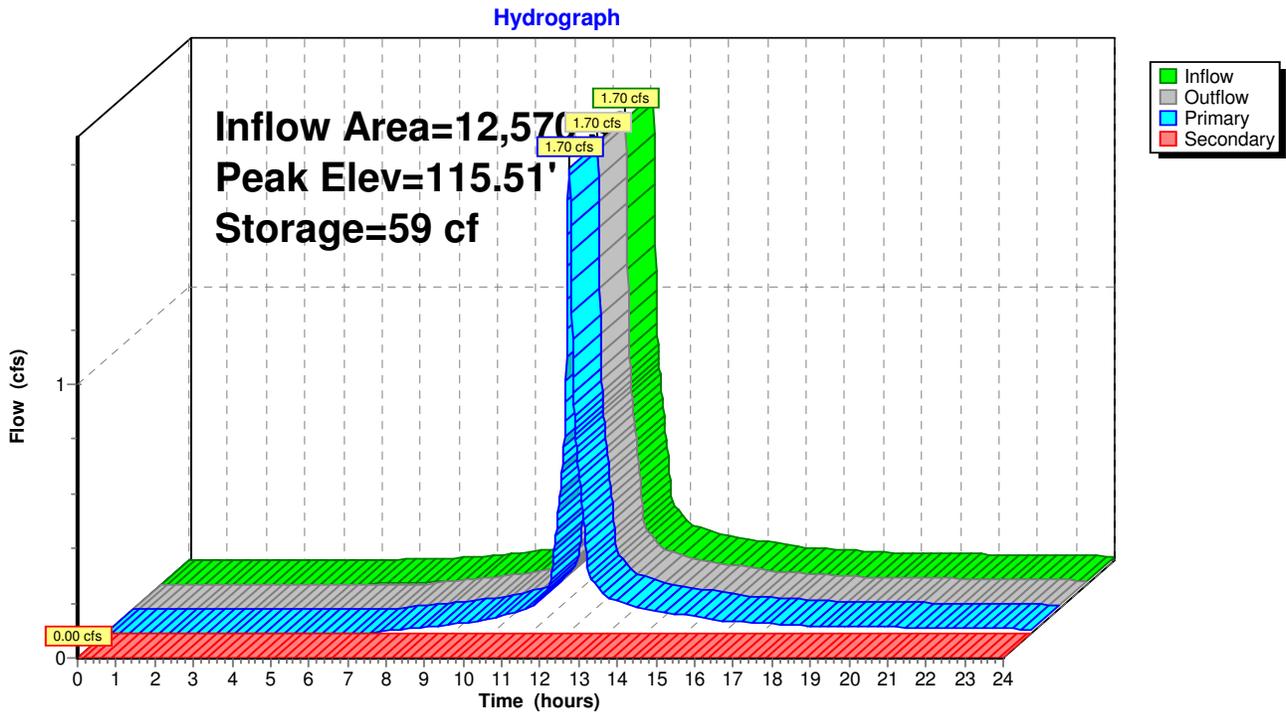
Primary OutFlow Max=1.70 cfs @ 12.03 hrs HW=115.51' (Free Discharge)

↳1=Orifice/Grate (Weir Controls 1.70 cfs @ 1.31 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=114.85' (Free Discharge)

↳2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 157P: RG 7A - CB 126 Under Drive Unit 5



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 158P: Culvert under Drive Unit 6

[57] Hint: Peaked at 116.70' (Flood elevation advised)

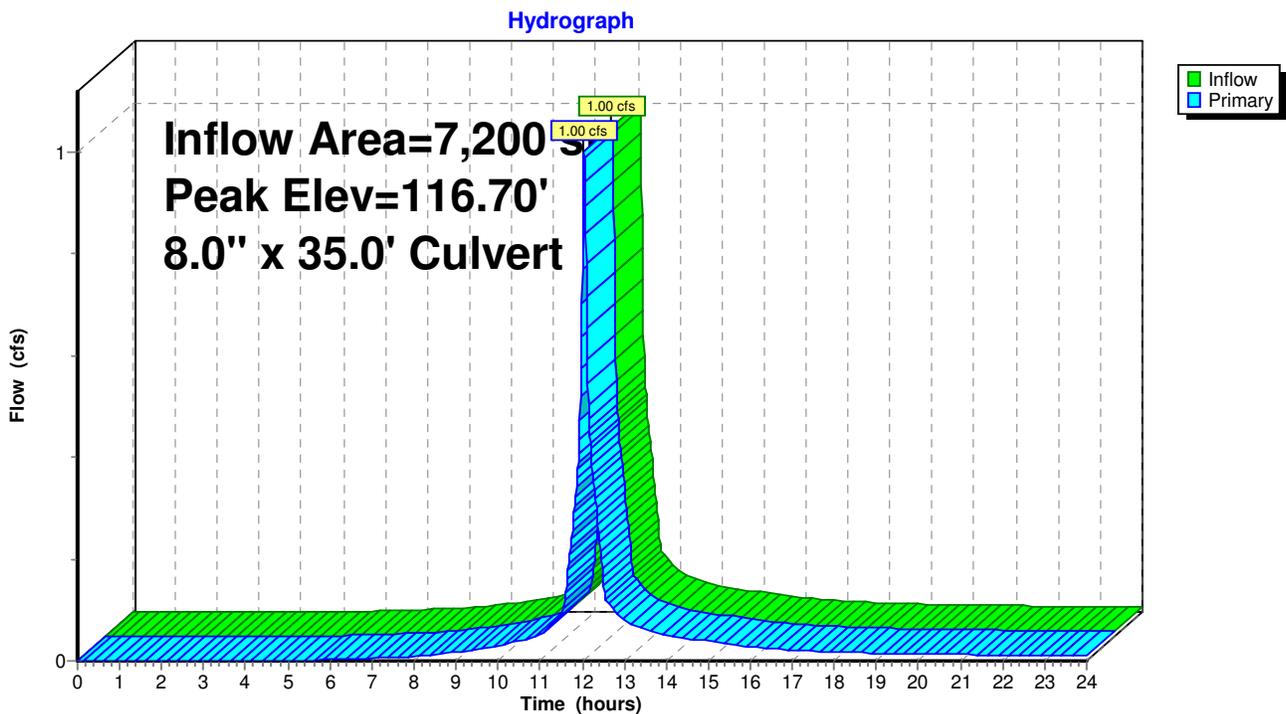
Inflow Area = 7,200 sf, Inflow Depth > 4.77" for 100-Year event
Inflow = 1.00 cfs @ 12.05 hrs, Volume= 2,864 cf
Outflow = 1.00 cfs @ 12.05 hrs, Volume= 2,864 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.00 cfs @ 12.05 hrs, Volume= 2,864 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 116.70' @ 12.05 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	116.00'	8.0" x 35.0' long Culvert RCP, sq.cut end projecting, Ke= 0.500 Outlet Invert= 115.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.00 cfs @ 12.05 hrs HW=116.70' (Free Discharge)
↑1=Culvert (Barrel Controls 1.00 cfs @ 3.38 fps)

Pond 158P: Culvert under Drive Unit 6



Pond 218R: DMH 50 to Irrigation Cistern

FROM HYDROCAD WEBSITE:

[63] Warning:
 {node} Exceeded Reach x INLET depth by x.x' @ x.x hrs

At some time during the routing, the node's water surface elevation has exceeded the flow depth at the reach inlet, indicating a tailwater dependency, or even the potential for reverse flow. The message shows the maximum amount of reverse head and the time at which it occurred

IMPORTANT: The reach routing calculations are not automatically changed to accommodate this situation, even though the higher tailwater may in reality cause a reduction in flow, or even a reverse flow

[57] Hint: Peaked at 105.10' (Flood elevation advised)
 [63] Warning: Exceeded Reach 55R inflow depth by 1.91' @ 12.09 hrs
 [63] Warning: Exceeded Reach 403R inflow depth by 2.39' @ 12.09 hrs

Inflow Area = 111,470 sf, Inflow Depth > 4.31" for 100-Year event
 Inflow = 10.16 cfs @ 12.09 hrs, Volume= 40,055 cf
 Outflow = 10.16 cfs @ 12.09 hrs, Volume= 40,055 cf, Atten= 0%, Lag= 0.0 min
 Primary = 10.16 cfs @ 12.09 hrs, Volume= 40,055 cf

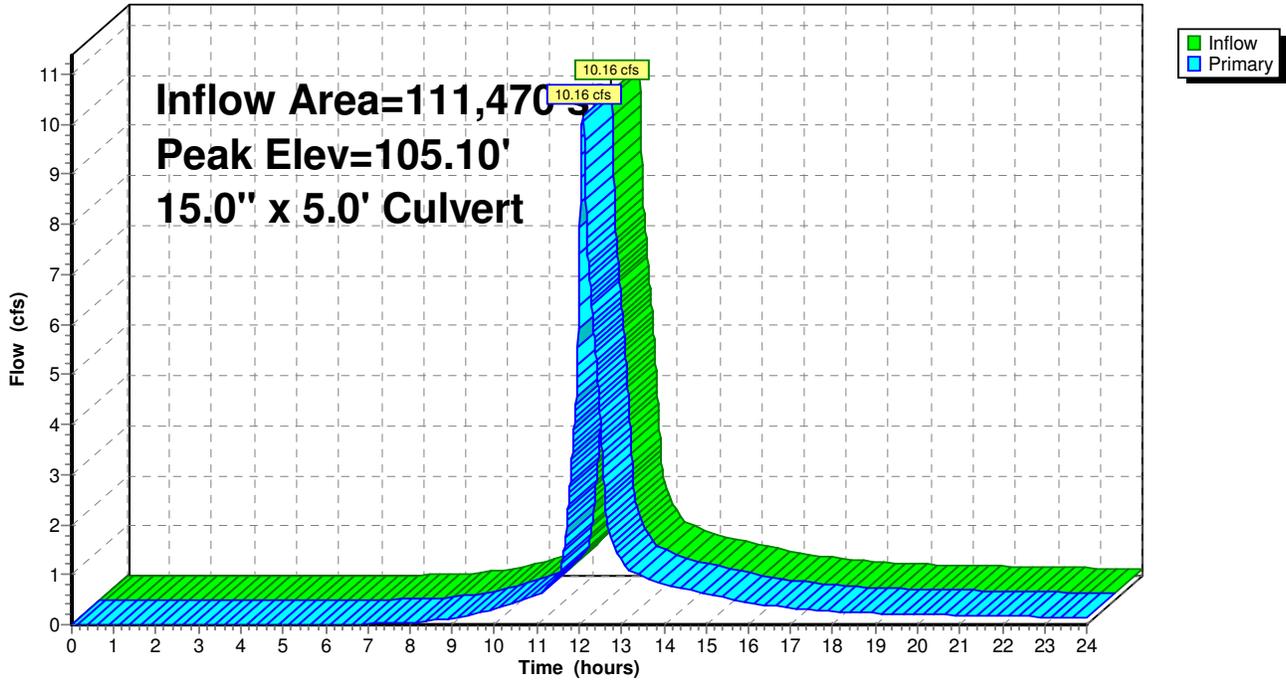
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 105.10' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	101.52'	15.0" x 5.0' long Culvert Square-edged headwall, Ke= 0.500 Outlet Invert= 101.42' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=10.14 cfs @ 12.09 hrs HW=105.09' (Free Discharge)
 ←**1=Culvert** (Inlet Controls 10.14 cfs @ 8.27 fps)

Pond 218R: DMH 50 to Irrigation Cistern

Hydrograph



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)
 Center-of-Mass det. time= (not calculated)

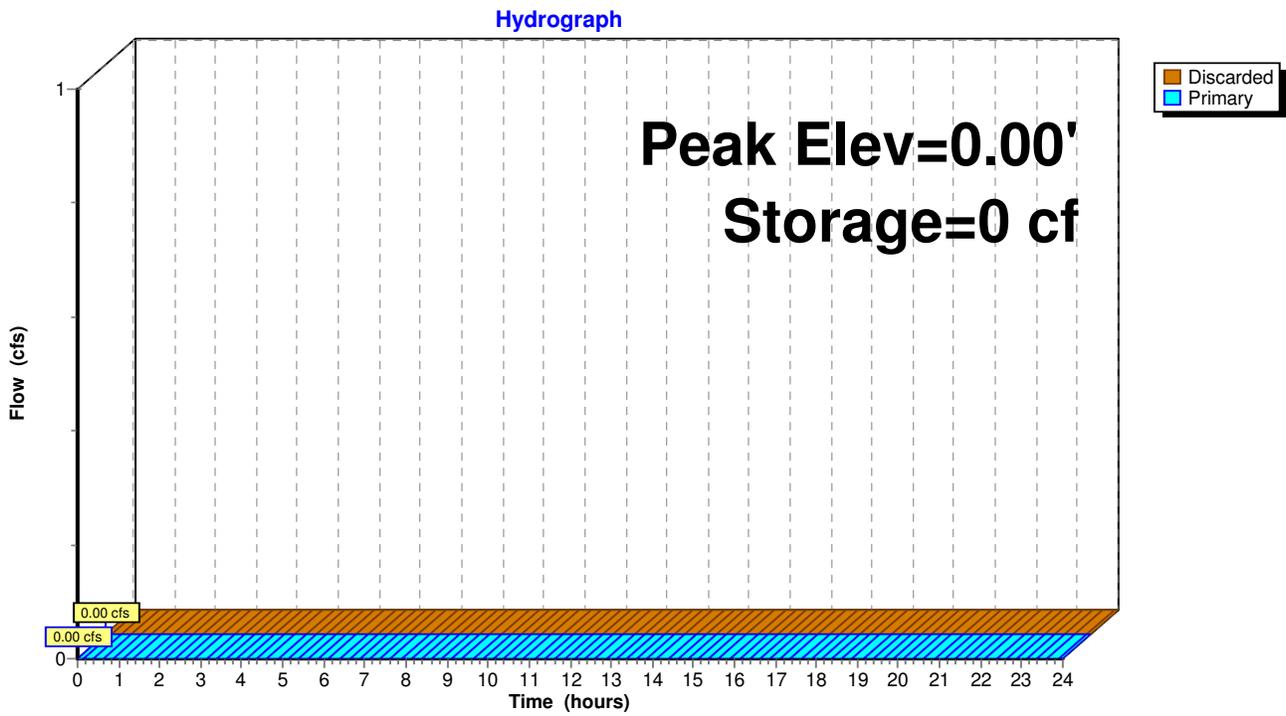
Volume	Invert	Avail.Storage	Storage Description
#1	110.49'	304 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
110.49	0	0	0
111.00	205	52	52
111.50	248	113	166
112.00	305	138	304

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	0.001 in/hr Exfiltration over Surface area
#2	Primary	111.50'	8.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

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

Pond 998: Forebay - Bio Retention - DO NOT USE IN ROUTING



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Type III 24-hr 100-Year Rainfall=6.50"

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Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

[43] Hint: Has no inflow (Outflow=Zero)

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)

Center-of-Mass det. time= (not calculated)

Volume	Invert	Avail.Storage	Storage Description
#1	101.42'	4,292 cf	11.50'W x 40.00'L x 9.33'H Prismaoid

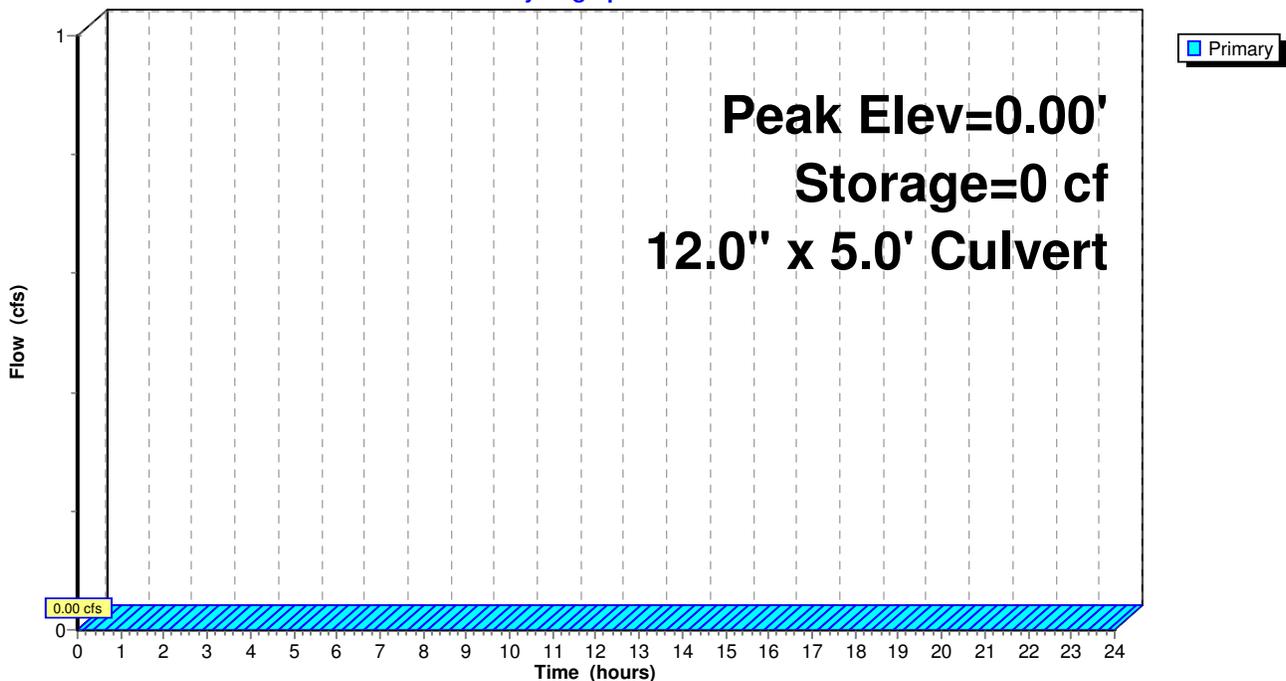
Device	Routing	Invert	Outlet Devices
#1	Primary	101.32'	12.0" x 5.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 101.22' S= 0.0200 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)

←1=Culvert (Controls 0.00 cfs)

Pond 999: Irrigation Cistern - DO NOT USE IN ROUTING

Hydrograph



Link A: POA A

Inflow Area = 287,760 sf, Inflow Depth > 4.17" for 100-Year event
Inflow = 23.25 cfs @ 12.09 hrs, Volume= 100,094 cf
Primary = 23.25 cfs @ 12.09 hrs, Volume= 100,094 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Fixed water surface Elevation= 82.00'

Link A: POA A

Hydrograph

