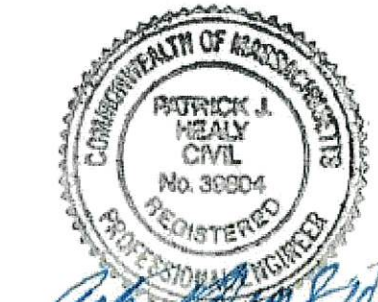
STORMWATER CALCULATIONS REPORT

for

"Grafton Woods"
Brandt Lane
Worcester, Massachusetts

Prepared for Owner:
Brandt Lane Development, LLC
38 Brentwood Lane, Holden, MA 01520

October 30, 2024



Alex S Wood

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LOCUS MAP FROM USGS MAP
BRANDT LANE DEVELOPMENT, LLC.
4 BRANDT LANE
WORCESTER, MA

0 1000 2000 FT
0 1/2 MILE
N

SOURCE: 1:25,000 USGS QUADRANGLES (MASSGIS)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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 8[2]
- 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.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.

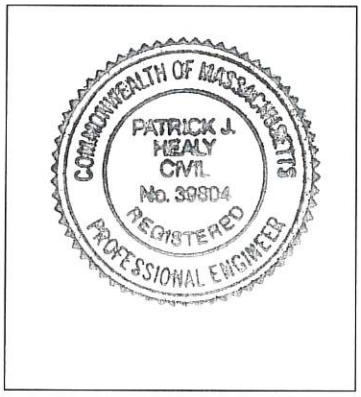
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



10/30/24
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): Proprietary Stormwater Treatment and Infiltration Systems

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 Field[1]

☐ 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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Stormwater Report for
"Grafton Woods" Multi-family Community
Brandt Lane, Worcester, Massachusetts

October 30, 2024

OBJECTIVE: To mitigate the increase in the peak rate of runoff resulting from additional impervious cover that results from converting an abused and disused site with various solid waste and fill conditions to much needed multi-family housing, which will entail construction of a developed site with five occupied buildings, a parking deck, parking facilities, and extensive recreational amenities.

METHODOLOGY: We began by measuring the pervious and impervious areas in the existing conditions, and the proposed conditions.

We prepared a previous stormwater report and calculations for the construction of the subdivision roadway, in which we documented compliance with the stormwater standards for that portion of the project. Since the time we prepared that report in October 2023, the Conservation Commission has enacted a policy relative to the rainfall events that should be used for determining mitigation measures. We have revisited the stormwater mitigation in that area as well. As we reported in our earlier stormwater document, the subdivision roadway itself will result in a net increase in impervious cover of approximately 17,045 sq. ft. will result when comparing the existing conditions to the proposed condition. This requires a minimum retention volume of 355 cubic feet. The volume requirement was met in the previously designed system and documented at that time.

The runoff from the proposed parking areas, sidewalks, patios, and other amenity spaces (all paved areas) will be directed through deep sump catch basins; thence through a proprietary water quality BMP for pretreatment, that is, removal of sediment, oil, and trash, and thence to stormwater BMPs for infiltration and detention. Runoff from roofs will be piped directly to the infiltration BMPs, since runoff from roofs is not contaminated by contact with pavements and pedestrian zones. Subsurface infiltration BMPs will be constructed where conditions allow, or subsurface detention structure will be constructed where soil or groundwater conditions are not suited to infiltration.

In a subsurface infiltration system of the type proposed, an excavation is made to remove any unsuitable fill or solid waste, filter fabric is installed, a bed of washed crushed stone is placed, and a series of precast concrete chambers is buried in the crushed stone bed to create additional volume to store the runoff as it infiltrates into the ground. Where subsurface detention is constructed, an impervious liner is installed first, rather than filter fabric, so stormwater is held until released at a slower rate by a controlled outlet. Infiltration structures will have outlet pipes near the top of the chambers, while detention structures will be designed to empty, and pipes will be located at the bottom of the systems.

As the site is graded, the land will be sloped toward a catch basin, pipe, and manhole system to collect the runoff from paved and improved surfaces, and to direct the flow away from abutting properties and toward the infiltration or detention structures to mitigate the peak rate of flow. Discharges from all of the proposed stormwater structures will be directed toward the intermittent stream that flows southerly

through a new large open bottom box culvert to an intermittent stream leaving the site where it enters a group of pipe culverts under Pine Hill Road, and toward O'Hara Brook. This is our primary Design Point.

We prepared a model of the site and contributing areas using HydroCAD software to show the resulting runoff existing and proposed conditions, flowing toward O'Hara Brook and toward a wetland on the land of an abutting residential neighbor. We also summed the flow to get a picture of the overall runoff from the site in a third structure that does not represent a physical location. The pre-development and post-development flows are then compared at these design points. Rainfall amounts used in the calculations for all storms use the most recent NOAA Atlas 14 rainfall data that is available for the immediate area, at the highest level, essentially the projected storm events for the year 2070.

The contributing areas are modeled in the accompanying summary report printout from the HydroCAD Stormwater Modeling software. All of the infiltration systems are designed as "online" BMPs, meaning the infiltration BMP will receive the first flush of rainfall and will continue to function to receive flow from the contributing area throughout the various storm events; only when the BMP fill, such as for a larger storm, will overland discharge be significant.

SUMMARY: Our calculations show that through the employment of several subsurface recharge and detention structures, we can retain and infiltrate a significant volume of runoff. Each subsurface BMP, whether detention or infiltration pond, has significant static volume capacity. Through the use of the subsurface systems, our calculations show that the peak rates of runoff will be mitigated for the 2-year, 10-year, 25-year and 100-year storm events, thereby eliminating any concern with off-site flooding.

Summaries are provided in the following tables:

Table 1.1
Runoff to Design Point 1, Pine Hill Road Culverts

	PEAK FLOW (in cfs)			
RAINFALL EVENT*	2 yr storm (3.90 in)	10 yr (6.09 in)	25 yr (7.84 in)	100 yr (10.80 in)
PREDEVELOPMENT				
DESIGN POINT (Reach 3R)	16.12 pre	30.41 pre	43.92 pre	67.00 pre
POSTDEVELOPMENT				
DESIGN POINT (Reach 13R)	10.37 post	23.20 post	37.91 post	66.69 post

Table 1.2
Runoff to Wetland on Neighboring Residential Lot

	PEAK FLOW (in cfs)			
RAINFALL EVENT*	2 yr storm (3.90 in)	10 yr (6.09 in)	25 yr (7.84 in)	100 yr (10.80 in)
PREDEVELOPMENT				
DESIGN POINT (Subcat 12)	1.85 pre 6	5.92 pre	9.72 pre	16.74 pre
POSTDEVELOPMENT				
DESIGN POINT (Subcat 92)	1.27 post	2.96 post	4.43 post	7.01 post

Table 1.3
Summary of Runoff from the Entire Site

RAINFALL EVENT*	PEAK FLOW (in cfs) 2 yr storm (3.90 in)	10 yr (6.09 in)	25 yr (7.84 in)	100 yr (10.80 in)
PREDEVELOPMENT				
DESIGN POINT (Reach 3R)	21.52 pre	43.87 pre	64.83 pre	101.41 pre
POSTDEVELOPMENT				
DESIGN POINT (Reach 13R)	11.86 post	25.12 post	40.96 post	73.54 post

*Rainfall from NOAA Atlas 14 for the immediate area accessed from the NOAA website.

Respectfully submitted,

THOMPSON-LISTON ASSOCIATES, INC.

Alex Wood
Civil Engineer

Patrick J. Healy, P.E.
Principal

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Stormwater Standards Compliance Statement
"Grafton Woods" Multi-family Community
Brandt Lane
Worcester, Massachusetts 01604

October 28, 2024

Brandt Lane Development LLC proposes to develop a multi-family rental community on five lots within the Brandt Lane Development Subdivision. After the subdivision road is constructed, the site will be cleared of existing access roads, impervious areas, and other improvements, and developed to construct five new buildings, each with basement level parking, one parking deck, recreational and open space amenities, landscaped areas, and recreated wetlands. The development will include stormwater improvements to mitigate the runoff from the increased impervious areas. The project will comply with the Massachusetts DEP Stormwater Standards, as described below. Each statement either describes compliance with those Standards that are applicable to the scope of work proposed, or describes why the Standard is not applicable.

STANDARD 1 – NO NEW UNTREATED DISCHARGES

Stormwater runoff from the site will include runoff from the proposed common driveways, buildings and associated parking, and landscaped/ amenity areas. This stormwater runoff will be collected in a piped drainage system, treated, and directed to multiple subsurface infiltration systems, in this case systems of pond chambers set in crushed stone envelopes. The discharges from these subsurface infiltration systems will be directed to stabilized discharge points to disperse the flow prior to reaching the resource areas. The stabilized discharges are sized using guidelines such that their velocities will be non-erosive. There will be no new untreated discharges. Standard 1 is met.

STANDARD 2 – PEAK RATE ATTENUATION

As described in the foregoing report and summarized in Table 1 and in the following HydroCAD hydrologic calculations, the peak rate of runoff will be mitigated for the 2, 10, 25, and 100-year storms, so there is no contribution to off-site flooding. Standard 2 is met. Based upon guidance received from the City of Worcester Conservation Planner, Eric Flint, the rainfall depths used in this evaluation are from NOAA Atlas 14, at the highest level of prediction for the frequency of rainfall events in 2070. Mitigating events at this much higher rainfall standard has caused us to redesign and increase the volume of detention structures throughout the project site.

Another factor adding to the challenges of peak rate attenuation is the redirection of runoff from a portion of the property on the easterly boundary away from residential abutters. During earlier public meetings, neighbors of the project have expressed concerns about redirection of runoff toward their properties by past owners of the property, and we have taken their concerns into account in the design of this project. Approximately 5.5 acres of the site that in the existing condition runs off toward a small wetland southeast of the property will be redirected to flow toward the central south of the property toward the intermittent stream. The reduction of runoff and avoiding the placement of a pipe discharge toward that wetland and the inadequate drainage system in Pine Hill Road (a private way) will directly benefit the neighbors.

Several subsurface stormwater management structures / ponds are proposed to manage the stormwater runoff from the developed site. These will be configured using precast concrete chambers such as Retain-It© chambers, each measuring 8' wide x 8' long and varying in height from two feet to five feet. A group of chambers is placed in a common excavation to form an underground vault where stormwater can be temporarily stored. The set of chambers, which are open at the bottom, will be enclosed in an envelope of crushed stone, which will permit exfiltration of stormwater through the bottom of the structure into underlying soil. These BMPs will provide recharge of water into the ground, store stormwater while such recharge occurs, and permit controlled discharge of excess runoff to mitigate storm events (detention). The proposed structures have been sized to mitigate up to the large predicted storm events. Where conditions are not favorable for infiltration, an impervious barrier will line the excavation to create a sealed chamber to provide detention, and will be designed to completely empty after each storm event through the discharge pipe.

STANDARD 3 – RECHARGE

Given: Soil Types present on the site are identified as Ridgebury fine sandy loam (hydrologic soil group C), Chatfield-Hollis-Rock outcrop complex (hydrologic soil group B), and Urban Land (hydrologic soil group C). Recharge volumes are calculated using impervious areas over their respective hydrologic soil groups.

Variable depths of rainfall must be used in determining the Required Recharge Volume (Rv), depending upon the hydrologic group of the soil:
0.25 inches is used for Hydrologic Group C soils, and 0.35 inches for Hydrologic Group B, (DEP Stormwater Handbook, Vol.3, Ch.1, Table 2.3.2).

Determine Required Recharge Volume

The Required Recharge Volume (R_v) is calculated according to the formula

$R_v = (F)$(Impervious Area),

where F is the Target Depth Factor,

from Table 2.3.2, Vol. 3, *Massachusetts Stormwater Handbook*.

For Hydrologic Soil Group C, F = 0.25 in.

Total Impervious Area = 157,743 ft^2

$R_v = (0.25\ in)(1\ ft/12\ in)(157{,}743\ ft^2) = 3{,}286\ ft^3$

For Hydrologic Soil Group B, F = 0.35 in.

Total Impervious Area = 211,172 ft^2

$R_v = (0.25\ in)(1\ ft/12\ in)(211{,}172) = 6{,}159\ ft^3$

For the overall site,

$R_{Vtotal} = 3{,}286\ ft^3 + 6{,}159\ ft^3 = 9{,}445\ ft^3$

Although conditions in some areas of the site areas have been found to be suitable for infiltration, other areas are not suitable. A large part of the site has been significantly filled with unsuitable materials that contain some highly permeable materials, asphalt, concrete, and other construction debris, street sweepings, and heavy metals in the soils. Large volumes of material would have to be removed, classified for export, and removed from the site to appropriate facilities at great expense. We have reviewed and discussed the varying conditions with Joe McLoughlin, LSP, of BETA. We have agreed that conditions in certain areas make in infeasible to construct infiltration BMPs in these areas.

Even so, we are able to meet the 65% minimum area of impervious cover being recharged as required by of Standard 3. We have maximized the infiltration volume in those areas where conditions allow.

Area to Infiltration
The percentage of impervious area directed towards infiltration basins is as follows:

% Impervious to Infiltration structures = impervious area to infiltration / total impervious area
= 240,493 ft^2 / 368,915 ft^2 = 65%

As 65% of the proposed impervious areas of the site reach an infiltration BMP, the site is able to meet the minimum 65% that is required by Standard 3.

Capture Area Adjustment:
Due to the 35% of the proposed impervious area being directed towards detention basins, an adjusted minimum required recharge volume is necessary. Per Volume 3 of the Massachusetts Stormwater handbook, the minimum required recharge volume is calculated as follows:

Ratio of total site area draining to recharge facilities = 368,915 ft^3 / 240,493 ft^3
= 1.53

We then adjusted the minimum required recharge volume = 9,445 ft^3 * 1.53
R_v = 14,490 ft^3

Confirm Recharge Volume
In order to confirm that the adjusted minimum required recharge volume was met, the static method was used as outlined in the DEP Stormwater Handbook Volume 3, Chapter 1.

The following is the summary of the static volumes for each of the proposed infiltration BMPs up to the lowest outlet pipe. This represents the volume infiltrated in each BMP. We have added these volumes to summarize the overall infiltration volume across the site.

Pond	1B	2	3C	4A	5A	5B	**Total**
Static Vol. (ft^3)	1,124	15,105	4,848	6,075	11,006	3,014	**41,172**

When comparing the total static volume of all infiltration BMPs across the site to the adjusted minimum required recharge volume, it can be seen that the required minimum volume is far exceeded.

Total static volume = 41,172 ft^3 > R_v = 14,490 ft^3 **OK**

Therefore, the minimum required recharge volume as outlined by the DEP Stormwater Standard 3 is met.

Drawdown Time
The drawdown time, the time it takes for each infiltration structure to empty, must be checked for the proposed infiltration BMPs to verify that the structures will empty in a maximum of 72 hours using the prescribed formula in the DEP Handbook:

Time = Rv/(K)(BA), where K is the soil permeability allowed in the recharge area from Rawls, and BA is the bottom area of the recharge structure. Values used in the drawdown calculations and their results are tabulated below. The allowed soil permeability for Sandy Loam is 1.02 in.hr, Loamy Sand 2.41 in/hr, and Sand 8.27 in/hr (DEP Stormwater Handbook, Vol.3, Ch.1, Table 2.3.3).

Pond	Static Vol. (ft^3)	Rawls Rate (in/hr)	Bottom Area (ft^2)	Drawdown Time (hours)
1B	1,124	2.41	4,452	1.3
2	15,105	1.02	6,804	26.1
3C	4,848	2.41	2,964	8.1
4A	6,075	1.02	4,212	17.0
5A	3,014	8.27	3,060	1.4
5B	11,006	8.27	900	17.7

All infiltration BMPs will empty in under 72 hours according to the formula provided.

Groundwater Mounding

The proposed infiltration structures shown will be greater than 48" above seasonal high groundwater indicators (ESHGW), in most cases, so a groundwater mounding analysis is not warranted. Some structures will be situated more than 24" above the ESHGW, but less than 48". In those areas, a mounding analysis will be provided.

Standard 3 is met.

STANDARD 4 – WATER QUALITY

Calculate Water Quality Treatment Volume

Standard 4 requires treatment of stormwater from impervious areas such as parking lots and driveways, sufficient to remove 80% of total suspended solids (TSS) from a calculated Water Quality Volume (WQV). The new paved areas will have a total impervious area of 327,920 ft^2. Since the site is not within a sensitive area, a ½-inch rainfall is used to calculate the V_{WQ}:

$$V_{WQ} = \frac{327{,}920\ ft^2\ (0.5\ in)\ (1\ ft)}{(12\ in)} = 13{,}663\ ft^3$$

All runoff from the paved impervious surfaces was used to calculate the WQV. All runoff from paved areas will be directed through deep sump catchbasins and proprietary treatment devices prior to discharge to either a detention pond or an infiltration pond.

As documented previously in Standard 3, the volume being held in infiltration BMPs before discharge is 41,172 ft^3, which far exceeds the total required water quality treatment volume of 13,663 ft^3. This proves the first flush of rainfall is infiltrated without discharge and therefore, the required WQV is effectively treated.

TSS Removal

The runoff from the paved impervious areas is proposed to be directed to two possible treatment trains which are defined as follows. Both treatment trains utilize deep sump catch basins and proprietary stormwater treatment devices to provide the required pretreatment. The treatment trains differ in that the majority of the impervious area is directed to subsurface infiltration structures before discharge, and a smaller portion is directed to subsurface detention BMPs. To ensure a total of 80% TSS removal is met over the whole site, more effective stormwater treatment devices (minimum 80% removal) are proposed to the detention BMPs.

Treatment Train 1 (Infiltration):

Removal by Deep Sump Catch Basins =	25%	(1.00 - 0.25) = 75% remaining TSS
Removal by Treatment Device =	72% (minimum)	(0.72 x 0.75) = 54% removed by BMP
Pretreatment provided		(0.25 + 0.54) = 0.79, 21% remaining

79% (minimum) pre-treatment removal of TSS (> 44%) prior to infiltration system.

Then we add the removal by Infiltration =	(0.80 x 0.21) = 0.17
Total TSS removal is then	(0.25 + 0.54 + 0.17) = 0.96

THEREFORE 96% removal of TSS for areas directed to the infiltration BMPs.

Treatment Train 2 (Detention):

Removal by Deep Sump Catch Basins =	25%	(1.00 - 0.25) = 75% remaining TSS
Removal by Treatment Device =	80% (minimum)	(0.80 x 0.75) = 60% removed by BMP
Pretreatment provided		(0.25 + 0.60) = 0.85, 15% remaining

No credit is gained by dry detention,	
Total TSS removal is then	= 0.85

All runoff from paved areas is directed to the treatment trains, so the required treatment is provided.

Standard 4 is met.

STANDARD 5 – LUHPPLs

Although the roadway that supports all five buildings will have over 1,500 VTD and be considered a LUHPPL, and where the 1" rainfall depth has been used to size the treatment BMP for the roadway, each of the individual parking lots on the site will have a much lower traffic count, with no specific activities or uses with higher potential pollutant loads and are note considered LUHPPL. Even so, pretreatment of parking lot runoff >44% has been incorporated into the system design for every infiltration basin accepting parking lot runoff.

STANDARD 6 – CRITICAL AREAS

Site is not in a Critical Area; therefore Standard 6 does not apply.

STANDARD 7 – REDEVELOPMENT

As a project that proposes to improve on existing conditions, the project can be considered to be redevelopment, but we are not seeking any relief from the Standards. The project will meet the Standards as new development, as described herein. Extensive existing solid waste, scrap metal, nonoperative vehicles, construction materials, are present on the site. Much has been removed from the site, and there is much more to do.

Stormwater quality and surface conditions will be drastically improved, by eliminating potential contact with stormwater pollutants. Runoff from all newly paved areas will be routed through water quality and flow control structures, as described in Standard 4.

The existing Brandt Lane stream crossing, consisting of four pipe culverts, will be replaced with a three-sided, open-bottom box culvert that meets or exceeds DEP stream crossing standards. The open-bottom box culvert is a DEP-preferred structure for such a stream crossing, thereby an improvement over existing conditions. This open crossing will allow the proponent to remove several segments of paved intermittent stream and to naturalize the paved stream area and create a functioning wetland system in its place.

STANDARD 8 – CONSTRUCTION PERIOD CONTROLS

An Erosion and Sedimentation Control Plan has been developed, and is shown on the plans. Details of the BMPs are shown. Temporary staging areas, settling basins and perimeter controls are included.

STANDARD 9 – OPERATION AND MAINTENANCE PLAN

An Operation and Maintenance Program covering the construction period and post-construction period maintenance and inspection requirements of the proposed stormwater structures has been written and is included herewith. An earlier stormwater O&M Program was developed for the construction of the Brandt Lane subdivision roadway.

The roadway and utility infrastructure is expected to be completed and is necessary to be in place up to the base course of the road before the Grafton Woods development begins in earnest. Of course, certain site cleanup activities will be and must be don during the road construction timeline. These activities include the building and outbuilding demolition, solid waste removal, additional testing, and classification of materials that will be excavation as part of the site improvement project, and preparation of construction staging areas.

STANDARD 10 – PROHIBITION OF ILLICIT DISCHARGES

During the construction of the site improvements, including the new stormwater system and new connections to the sanitary sewer system, provisions will be made to prevent illicit non-stormwater discharges to waters of the Commonwealth. The developer is cognizant of the effects upon the environment of improper disposal of wastewater, process waste, raw materials, toxic and hazardous substances, oil, and grease, and seek to prevent damage to the environment. Such substances, if present, shall be stored in covered containers or within parked vehicles on the site and will not be exposed to rainfall. Spill kits will be stored on site duration construction.

The operator of the completed facility will be the owner. Individuals with supervisory responsibilities will be trained in the proper maintenance and operation of water quality control structures.

Prepared by: _____

Nikita J. Shugrue
Civil Engineer

_____

Patrick J. Healy, P.E.
Principal
THOMPSON-LISTON ASSOCIATES, INC

ILLICIT DISCHARGE COMPLIANCE STATEMENT

Grafton Woods, 4 Brandt Lane, Worcester, Massachusetts

Provisions will be made to prevent illicit non-stormwater discharges to waters of the Commonwealth. The Owner is cognizant of the effects upon the environment of improper disposal of wastewater, process waste, raw materials, toxic and hazardous substances, oil and grease, and seeks to prevent damage to the environment. The Owner's personnel will regularly view the site will prevent illicit discharges.

One potential is cross connection of sanitary and stormwater pipes. Sanitary sewers will be installed and stubs will be clearly labeled to prevent the connection of stormwater discharges to sanitary sewers and vice versa. Each building will have connections from sanitary waste and garage floor drains that lead to oil water separators, to prevent the migration of oils and sands into the sanitary sewer system.

An area will be designated for concrete truck washout water to prevent it from reaching the stormwater system or the wetland resources. This is area will be clearly marked with a sign and concrete truck delivery drivers will be given instructions.

The greatest potential for illicit discharges appears to be along the driveways and parking areas where petroleum fueled vehicles drive and park. The owner will not refuel construction vehicles or other mechanical equipment in the 100-foot buffer zone.

The Pollution Prevention Plan includes measures for construction period waste disposal, equipment and vehicle maintenance practices, and spill prevention and control measures. Spill cleanup kits will be available during construction and post construction and employees will be trained in the location and use of cleanup kits.

By Owner:_____

Brandt Lane Development, LLC
Jack Maroney, Jr., Manager

GRAFTON WOODS: 4 Brandt Lane, Worcester, Massachusetts

DRAINAGE PIPE AND INVERT TABLE

	FROM			Rational Runoff				PIPE							TO	
	STRUCTURE	RIM/GRATE	INV OUT	A (ac)	C	i (in/hr)	Q (cfs)	L (ft)	SIZE (in)	SLOPE	TYPE	n	Vfull (ft/s)	Mannings Qcap (cfs)	STRUCTURE	INV IN
LOT 5	CB 501	458.00	454.20	0.24	0.76	5.4	0.98	15	12	0.01	HDPE	0.012	5.0	3.99	DMH 503	454.05
	CB 502	458.00	454.20	0.24	0.76	5.4	0.98	7	12	0.01	HDPE	0.012	5.0	3.99	DMH 503	454.13
	DMH 503	458.62	454.03	0.48	0.76	5.4	1.97	74	12	0.01	HDPE	0.012	5.0	3.99	WQU 505	453.29
	CB 504	457.10	453.30	0.12	0.77	5.4	0.50	15	12	0.01	HDPE	0.012	5.0	3.99	WQU 505	453.15
	WQU 505	457.90	453.15	0.60	0.76	5.4	2.47	5	12	0.01	HDPE	0.012	5.0	3.99	INFIL 5B	453.10
	CB 508	468.50	464.70	0.13	0.90	5.4	0.63	28	12	0.01	HDPE	0.012	5.0	3.99	DMH 509	464.42
	DMH 509	466.75	464.32	0.13	0.90	5.4	0.63	22	12	0.01	HDPE	0.012	5.0	3.99	DMH 510	464.10
	CB 507	464.50	460.70	0.23	0.49	5.4	0.61	17	12	0.01	HDPE	0.012	5.0	3.99	DMH 510	460.53
	CB 506	464.50	460.70	0.23	0.81	5.4	1.01	49	12	0.01	HDPE	0.012	5.0	3.99	DMH 510	460.21
	DMH 510	465.37	464.00	0.49	0.85	5.4	2.25	1	12	0.01	HDPE	0.012	5.0	3.99	WQU 511	463.99
	WQU 511	465.58	463.99	0.49	0.85	5.4	2.25	5	12	0.01	HDPE	0.012	5.0	3.99	INFIL 5A	463.94
LOT 4	CB 45	468.60	464.80	0.16	0.86	5.4	0.74	60	12	0.01	HDPE	0.012	5.0	3.99	DMH 46	464.20
	DMH 46	469.68	464.10	0.26	0.83	5.4	1.16	6	12	0.01	HDPE	0.012	5.0	3.99	WQU 47	464.04
	WQU 47	469.72	464.04	0.26	0.83	5.4	1.16	5	12	0.01	HDPE	0.012	5.0	3.99	INFIL 4A	463.99
	CB 43	468.60	464.80	0.16	0.86	5.4	0.74	99	12	0.01	HDPE	0.012	5.0	3.99	DMH 44	463.81
	CB 41	471.00	467.20	0.24	0.75	5.4	0.97	30	12	0.01	HDPE	0.012	5.0	3.99	DMH 42	466.90
	DMH 44	470.49	463.71	0.16	0.86	5.4	0.74	20	12	0.01	HDPE	0.012	5.0	3.99	DMH 42	463.51
	DMH 42	470.72	463.41	0.40	0.79	5.4	1.72	3	12	0.01	HDPE	0.012	5.0	3.99	WQU 40	463.38
	WQU 40	470.65	463.28	0.40	0.79	5.4	1.72	5	12	0.01	HDPE	0.012	5.0	3.99	INFIL 4A	463.23
	CB 91	469.20	465.40	0.10	0.78	5.4	0.42	106	12	0.01	HDPE	0.012	5.0	3.99	DMH 46	464.34
	CB 64	468.40	464.60	0.23	0.73	5.4	0.91	23	12	0.01	HDPE	0.012	5.0	3.99	DMH 67	464.37
	CB 68	468.40	464.60	0.19	0.79	5.4	0.81	23	12	0.01	HDPE	0.012	5.0	3.99	DMH 67	464.37
	DMH 67	468.85	464.27	0.42	0.76	5.4	1.72	4	12	0.01	HDPE	0.012	5.0	3.99	WQU 69	464.23
	WQU 69	468.95	464.23	0.42	0.76	5.4	1.72	6	12	0.01	HDPE	0.012	5.0	3.99	DETN 4B	464.17
LOT 3	CB 30	477.20	473.40	0.38	0.71	5.4	1.46	179	12	0.01	HDPE	0.012	5.0	3.99	DMH 31	471.61
	CB 32	480.55	476.75	0.28	0.55	5.4	0.83	21	12	0.01	HDPE	0.012	5.0	3.99	DMH 31	476.54
	DMH 31	481.40	471.51	0.66	0.64	5.4	2.29	227	12	0.01	HDPE	0.012	5.0	3.99	DMH 33	469.24
	CB 34	475.00	471.20	0.52	0.59	5.4	1.66	19	12	0.01	HDPE	0.012	5.0	3.99	DMH 33	471.01
	DMH 33	475.16	469.14	1.18	0.62	5.4	3.95	4	18	0.01	HDPE	0.012	6.5	11.50	WQU 35	469.10
	WQU 35	474.82	469.10	1.18	0.62	5.4	3.95	5	18	0.01	HDPE	0.012	6.5	11.50	DETN 3A	469.05
	CB 58	471.60	467.80	0.16	0.77	5.4	0.67	46	12	0.01	HDPE	0.012	5.0	3.99	DMH 55	467.34
	CB 56	471.70	467.90	0.16	0.77	5.4	0.67	18	12	0.01	HDPE	0.012	5.0	3.99	DMH 55	467.72
	DMH 55	472.00	467.24	0.32	0.77	5.4	1.33	48	12	0.01	HDPE	0.012	5.0	3.99	DMH 53	466.76
	CB 54	469.50	465.70	0.33	0.78	5.4	1.39	12	12	0.01	HDPE	0.012	5.0	3.99	DMH 53	465.58
	CB 50	471.20	467.40	0.14	0.79	5.4	0.60	79	12	0.01	HDPE	0.012	5.0	3.99	DMH 51	466.61

GRAFTON WOODS: 4 Brandt Lane, Worcester, Massachusetts

DRAINAGE PIPE AND INVERT TABLE

	FROM			Rational Runoff				PIPE							TO	
	STRUCTURE	RIM/GRATE	INV OUT	A (ac)	C	i (in/hr)	Q (cfs)	L (ft)	SIZE (in)	SLOPE	TYPE	n	Vfull (ft/s)	Mannings Qcap (cfs)	STRUCTURE	INV IN
	CB 52	469.50	465.70	0.18	0.83	5.4	0.81	9	12	0.01	HDPE	0.012	5.0	3.99	DMH 51	465.61
	DMH 51	469.88	465.51	0.32	0.81	5.4	1.40	23	12	0.01	HDPE	0.012	5.0	3.99	DMH 53	465.28
	DMH 53	469.62	465.18	0.97	0.79	5.4	4.12	4	12	0.01	HDPE	0.012	5.0	3.99	WQU 57	465.14
	WQU 57	469.83	465.14	0.97	0.79	5.4	4.12	14	12	0.01	HDPE	0.012	5.0	3.99	DETN 3B	465.00
LOT 2	CB 204	469.90	466.10	0.09	0.77	5.4	0.37	29	12	0.01	HDPE	0.012	5.0	3.99	DMH 205	465.81
	DMH 205	470.40	465.71	0.09	0.77	5.4	0.37	96	12	0.01	HDPE	0.012	5.0	3.99	WQU 203	464.75
	CB 202	468.50	464.70	0.56	0.75	5.4	2.27	22	12	0.01	HDPE	0.012	5.0	3.99	WQU 203	464.48
	WQU 203	469.00	464.38	0.65	0.75	5.4	2.64	5	12	0.01	HDPE	0.012	5.0	3.99	INFIL 2	464.33
LOT 1	CB 20	466.90	463.10	0.23	0.70	5.4	0.87	12	12	0.01	HDPE	0.012	5.0	3.99	DMH 22	462.98
	OWS 21	466.50	462.70	0.49	0.90	5.4	2.38	21	12	0.01	HDPE	0.012	5.0	3.99	DMH 22	462.49
	DMH 22	466.10	462.39	0.72	0.84	5.4	3.25	90	12	0.01	HDPE	0.012	5.0	3.99	DMH 23	461.49
	DMH 23	461.55	461.39	0.72	0.84	5.4	3.25	122	12	0.01	HDPE	0.012	5.0	3.99	DMH 25	460.17
	CB 24	460.20	456.40	0.22	0.81	5.4	0.96	48	12	0.01	HDPE	0.012	5.0	3.99	DMH 25	455.92
	CB 26	460.72	456.92	0.15	0.75	5.4	0.61	20	12	0.01	HDPE	0.012	5.0	3.99	DMH 25	456.72
	DMH 25	461.55	455.82	1.09	0.82	5.4	4.82	60	18	0.01	HDPE	0.012	6.5	11.50	DMH 27	455.22
	CB 28	460.34	456.54	0.13	0.81	5.4	0.57	45	12	0.01	HDPE	0.012	5.0	3.99	DMH 27	456.09
	DMH 27	461.66	455.12	1.22	0.82	5.4	5.39	132	18	0.01	HDPE	0.012	6.5	11.50	DMH 29	453.80
	CB 12	460.14	456.34	0.25	0.83	5.4	1.12	40	12	0.01	HDPE	0.012	5.0	3.99	DMH 29	455.94
	DMH 29	461.00	453.70	1.47	0.82	5.4	6.51	18	18	0.01	HDPE	0.012	6.5	11.50	DMH 13	453.52
	CB 14	459.87	456.07	0.11	0.87	5.4	0.52	36	12	0.01	HDPE	0.012	5.0	3.99	DMH 13	455.71
	DMH 13	460.90	453.42	1.58	0.82	5.4	7.03	42	18	0.01	HDPE	0.012	6.5	11.5	WQU 14	453.00
	WQU 14	462.30	453.00	1.58	0.82	5.4	7.03	33	18	0.01	HDPE	0.012	6.5	11.5	DETN 1A	452.67
	CB 16	460.34	456.54	0.29	0.81	5.4	1.27	28	12	0.01	HDPE	0.012	5.0	3.99	DMH 15	456.26
	CB 18	460.31	456.51	0.23	0.83	5.4	1.03	28	12	0.01	HDPE	0.012	5.0	3.99	DMH 15	456.23
	DMH 15	460.07	456.13	0.52	0.82	5.4	2.30	4	12	0.01	HDPE	0.012	5.0	3.99	WQU 17	456.09
	WQU 17	460.33	456.09	0.52	0.82	5.4	2.30	7	12	0.01	HDPE	0.012	5.0	3.99	DETN 1A	456.02
	CB 100	461.70	457.90	0.25	0.77	5.4	1.04	52	12	0.01	HDPE	0.012	5.0	3.99	WQU 102	457.38
	WQU 102	463.90	457.28	0.25	0.77	5.4	1.04	106	12	0.01	HDPE	0.012	5.0	3.99	DMH 103	456.22
	DMH 103	472.25	456.12	0.25	0.77	5.4	1.04	6	12	0.01	HDPE	0.012	5.0	3.99	INFIL 1B	456.06

NOTE: LOCATION, LENGTH, AND INVERTS SUBJECT TO REVISION AFTER EXISTING PIPES/STRUCTURES AND GROUND ARE UNCOVERED IN THE FIELD.

CONSTRUCTION PERIOD (SHORT TERM)
STORMWATER OPERATION & MAINTENANCE PROGRAM
October 28, 2024

"Grafton Woods" Multi-family Community
Brandt Lane
Worcester, Massachusetts

During Construction the contractor is responsible for the following inspection and maintenance. Inspections and resulting maintenance tasks shall be recorded in an Inspection Log that is kept on site and available for inspection by Town, State, and Federal officials.

Contractor Information:

Contractor/Operator: **Brandt Lane Development, LLC**

Address: **38 Brentwood Lane, Holden, MA 01520**

Contact Name and Phone Number: **Jack Maroney 508-826-6182**
Email: jack.maroneyjr@gmail.com

An emergency spill kit containing absorbent material should be kept in an area accessible to the equipment operators. An emergency spill kit can be purchased from an industrial supplier. If a spill of any harmful substance occurs on the surface, it shall be contained and cleaned up by the use of a dike or absorbent material. Employees should be instructed on the proper use and deployment of the spill kit.

1. Water tightness of catch basin sumps shall be tested and assured after installation.

2. Catch basins shall be protected from sedimentation through haybale filter dikes, filter fabric sacks, or other approved methods. At all times, sedimentation of the infiltration system shall be prohibited and prevented.

3. Catch basin grates shall be inspected monthly. Debris, sand, and accumulated trash shall be removed from inlets.

4. Catch basins shall be inspected bi-weekly and shall be cleaned out as necessary, when the siltsacks or sumps have accumulated one half (1/2) the original depth. If excessive oil, gasoline, or sediment is present, remove all liquid and solids from the sumps. If catch basins are regularly observed to have a sheen of petroleum product, install oil adsorbent materials that float on the surface. Dispose of waste properly. Catch basin sumps shall be cleaned out quarterly. Catch basin traps shall be inspected after each cleaning, and any damage shall be repaired.

5. Drain manholes, Water Quality Units and the in-ground detention/infiltration system shall be inspected monthly, and shall be cleaned out as necessary. Cleanout shall be recorded in the maintenance log. Dispose of waste properly. Engineer shall be notified of any evidence of sediment in the drain manholes.

6. The subsurface infiltration area must be kept free of sediment and shall not be used as a temporary settling area or for discharge of excavation dewatering.

7. The subsurface infiltration system shall be observed through the inspection port monthly for any sign of sediment laden water, backup, or contamination. Engineer shall be notified if any of these conditions are observed.

8. The owner's designee shall inspect the system, and the contractor shall clean all components as necessary (e.g. by removing the siltsacks, sediment, and sand) in order to turn over to the owner a clean and functioning system.

POST CONSTRUCTION (LONG TERM)
STORMWATER OPERATION & MAINTENANCE PROGRAM
October 28, 2024

Brandt Lane Development, LLC
"Grafton Woods" Multi-family Community
Brandt Lane
Worcester, Massachusetts

Responsible Party:

Brandt Lane Development, LLC

38 Brentwood Lane, Holden, MA 01520

Contact name and phone number: Jack Maroney 508-826-6182

Email: jack.maroneyjr@gmail.com

Upon completion of the project, the drainage system will be maintained by the responsible party as listed above. In addition to the good housekeeping practices described below, and once the construction site has been fully stabilized, the owner should establish a schedule and keep a log of inspection and maintenance activities for the Stormwater BMPs described below:

Good Housekeeping Practices:

Solid Waste Management:

There will be no solid waste dumpster on the site. Office waste will be stored in closed receptacles (toters) within the building and will be picked up on a weekly basis. There shall no exposure of stormwater to solid waste.

Winter Conditions

1. Calcium Chloride (CaCl) usage in winter months shall be limited to the amount necessary to prevent sand from freezing. Sand shall be used sparingly but in sufficient quantity to maintain the driving surface in a safe condition.

2. Sand and salt shall not be stored on site unless within covered containers.

Snow Plowing

1. In minor storms, snow will be plowed from the roadway onto neighboring landscaped areas; in larger storms, snow will be on landscaped areas adjacent to the roadway.

2. Snow shall be pushed back to maintain open lines of sight along Grafton Street from the roadway curb cuts at all times.

3. At no time may snow be pushed into the culvert headwall area, or into the wetland resource areas.

Landscape Maintenance:

Vegetated areas in the landscape will reduce erosion, encourage infiltration of rainwater, and keep stormwater clean. It is important to maintain the vegetated areas of the site.

1. Proper mowing is one of the most important ways to maintain a healthy lawn. Mow only when the grass is dry to get a clean cut and minimize the spread of disease. Mow grass to a height of 3". Mow frequently, cutting no more than 1/3 of the height of the grass at a time. Sharpen your mower blades after every 10 hours of mowing.

2. Grass clippings contain high amounts of nitrogen, a key ingredient in fertilizer. Make all attempts to use your grass clippings by leaving them on your lawn. If the grass clippings are not used, do not dispose of them near any wetlands and or water bodies and designate a place to compost them in an upland area.

3. If your lawn areas and plant material demand fertilizer, then use organic or slow-release fertilizers. Fertilize in the fall, but in coordination with weather patterns.

4. The best defense against pests within the grass is to use an Integrated Pest Management system which consists of beneficial insects (lady bugs, spiders, certain nemetodes and bacteria).

5. Minimize watering the lawn areas. If needed, water in the early morning, and water deeply and infrequently.

6. If needed, the trees and shrubs shall be pruned, but at a minimum of once a year.

Impervious Surface Maintenance:

Particles that collect on paved surfaces can contain materials that can inhibit water quality. Sweeping sand and debris from the roadway is a good housekeeping measure that will remove gross pollutants, and should be undertaken a minimum of twice per year.

1. The roadway shall be swept at least twice a year.

2. Accumulated leaves and grass clippings shall also be removed from the impervious surfaces regularly, at a minimum of twice a year.

3. In the winter months, CaCl application shall be limited to the amount necessary to prevent sand from freezing. Sand shall be used sparingly, but in sufficient quantity to maintain the roadway surface in a safe condition.

4. Cracking from expansion and contraction of large paved areas is to be expected. Cracks that develop should be sealed to prevent infiltration of water and subsequent frost damage to the pavement. This will prolong the life of the paved surfaces.

5. It should be anticipated that the pavement will be resurfaced on a 20- to 25-year basis. If surfaces are substantially intact, milling and topcoat would be the recommended course of action. If significant cracking, settling, or deterioration is evident, a full-depth pavement removal and resurfacing can be anticipated.

BMP Inspection and Maintenance

Catch Basins and Area Drains:

Environmental Safety: Catch basins with oil traps and deep sumps are the first line of defense to protect the environment by preventing pollutants from reaching water resources. Regular maintenance and cleaning of the catch basins is key to protecting water quality, and can reduce the more expensive maintenance of other devices in the treatment train. Each catch basin has the capacity to hold over 25 gallons of floatables, such as oil, spilled fuel, or gross pollutants. It is important to inspect and clean the catch basins regularly to maintain their ability to keep the pollutants out of the ecosystem.

1. If excessive oil, gasoline, or sediment is present, remove all liquid and solids from the sumps. Absorbent products are available to attach to the interior of catch basins to absorb floatable petroleum products from sumps. If floatables are noted on a regular basis, these measures should be added to the catch basin sumps. Dispose of waste properly.

2. Catch basin grates shall be inspected on a monthly basis. Debris, sand, vegetation, and accumulated trash shall be removed and disposed of properly.

3. Catch Basin sumps shall be inspected on a monthly basis for the first year, and quarterly thereafter, and will be cleaned upon the presence of observable petroleum products, such as oil, coolant, or fuel. Dispose of waste properly.

4. If a spill of any harmful substance occurs on the surface of the roadway, the catch basin shall be protected against contamination by the use of a dike or absorbent material. Adequate quantities of absorbent material shall be stored in an accessible location.

5. In any case, Catch Basin sumps shall be cleaned of sand and liquid at least twice per. Dispose of waste properly.

6. Catch basin traps shall be inspected after each cleaning, and any damages shall be repaired.

Hydrodynamic Separator (Stormceptor Unit):

Environmental Safety: The Stormceptor hydrodynamic separator unit removes floatable trash, petroleum products, and sediments form the stormwater stream to prevent them from reaching the infiltration and groundwater resources. It must be inspected and cleaned periodically to be sure it is operating properly.

1. Separator shall be inspected at a minimum of two times a year (i.e. spring and fall).

2. The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions to the inlet and/or separation screen. Consult the manufacturer's maintenance manuals for more specific methods of observation and measurement.

3. If during the inspection, it is noticed that any of the internal components are damaged or missing, contact CONTECH 1-800-338-2211.

4. The inspection should also identify evidence of vector infestation (mosquito larvae, for example) and accumulation of hydrocarbons, trash, and sediment in the system and the screen.

5. Pump out the systems and conduct the recommended maintenance when the inspections determine that level of sediment collection has reached 75% of capacity in the isolated sump and/or when an appreciable level of hydrocarbons and trash has accumulated.

6. A vactor truck is recommended for cleanout of the hydro unit. Disposal of the material from the unit should be in accordance with the local municipality's requirements.

7. Clean the treatment unit during dry weather conditions when no flow is entering the system. Remove debris, sand, and accumulated trash from unit's interior and remove the fines from the screen.

8. The screen of the unit shall be power washed and the internal components of the unit cleaned when the system is pumped out.

9. The hydro unit is a confined space, and only properly trained personnel possessing the proper training and the necessary safety equipment should enter the unit. Confined spaces can contain odorless, colorless poison gas.

In-Ground Infiltration/Retention Systems

The in-ground retention system keeps the peak rate of flow of runoff from this project from exceeding the peak rate of flow of runoff to abutting properties in the predevelopment condition. It must be inspected to make sure that debris is not entering the piping system or storage chamber which might clog the outlet pipe outlet and to confirm the integrity of the system joints. Another benefit of the system is recharging the groundwater, so keeping the bottom surface of the chamber clear and sediment free is important to maintaining the recharge function of the system. It is important to inspect the system on a regular basis.

1. The in ground detention systems shall be inspected twice per year at the inspection ports. Look for debris, either sediment or trash that may indicate the CDS units are not functioning correctly and that may clog the outlets.

2. The inspection should also include looking for any signs of deformation of the precast concrete chambers or a break in connection at chamber unit joints. If water, trash, sediment or other material has been visibly deposited in the system, report this to the owner or property manager so that maintenance can be scheduled.

3. If maintenance is required of inlet or outlet pipes, use a high-powered pressure nozzle with rear facing jets to wash away sediments and debris within the pipes and remove the sediment.

4. If, during the inspection, it is noticed that any components of the in-ground detention system are damaged or missing, contact the owner, property manager and the manufacturer.

5. Subsurface Infiltration structures will be provided with inspection ports. These ports shall be opened, and the structures inspected, at least once per year through the inlet and outlet manholes and inspection ports. The underground pipe and stone area shall be inspected via observations through the inspection and observation ports. If water, trash, sediment, or any other material is visible in either port, report this to the property manager so that maintenance can be scheduled.

6. The in-ground detention system is a confined space and only properly trained personnel possessing the proper training and the necessary safety equipment should enter the systems. Confined spaces can contain odorless, colorless poison gas.

Outlet Pipes (flared end pipes or headwalls)

There is an overflow pipe from the stormwater system where overflows from large storms will be discharged to the surface. A Rip Rap splash pad will be installed in this location.

1. At least twice per year, inspect the pipe end to verify that the pipe is not blocked or displaced or shifted due to settlement.

2. Inspect the rip rap splash pad and reposition rocks if they have become displaced from high flows.

3. Remove invasive plants or saplings that may grow in the rip rap.

Stormwater Operation and Maintenance Program
Estimated Annual Budget:

Inspection Tasks:

Month:	$ 350
Quarter:	$ 1,000
Semi-annual:	$ 1,000
Inspection Subtotal	$ 10,200

Maintenance Tasks:

Month:	$ 500
Semi-annual:	$ 3,000
Annual:	$ 8,000
Maintenance Subtotal:	$ 16,500

Estimated Total: $ 26,700

Construction Phase Site Inspection Report

General Information			
Project Name	Grafton Woods" Rental Community		
NPDES Tracking No.		**Location**	4 Brandt Lane, Worcester, MA
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			

Type of Inspection:
❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ❑Yes ❑No
If yes, provide:
Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):

Weather at time of this inspection?
❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds
❑ Other: Temperature:

Have any discharges occurred since the last inspection? ❑Yes ❑No
If yes, describe:

Are there any discharges at the time of inspection? ❑Yes ❑No
If yes, describe:

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Silt fence and/or straw bale perimeter barriers: Grafton Street Pine Hill Road Brook above Pine Hill Easterly toward homes Northerly side North Wetland boundary West limit of work	 ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No	 ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No ❑Yes ❑No	Describe location and actions needed:
2	Temporary settling basins	❑Yes ❑No	❑Yes ❑No	
3	Catch Basin protection	❑Yes ❑No	❑Yes ❑No	
4	Drainage swales	❑Yes ❑No	❑Yes ❑No	
5	Stormceptor units	❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
6	Site entrance mats	❑Yes ❑No	❑Yes ❑No	
7	Grassed slopes	❑Yes ❑No	❑Yes ❑No	
8	Culvert under the road	❑Yes ❑No	❑Yes ❑No	
9	Retaining Walls	❑Yes ❑No	❑Yes ❑No	
10	Wetland Restoration	❑Yes ❑No	❑Yes ❑No	
11	Stream bank restoration	❑Yes ❑No	❑Yes ❑No	
12	Pipe Outfalls/Rip Rap	❑Yes ❑No	❑Yes ❑No	
13		❑Yes ❑No	❑Yes ❑No	
14		❑Yes ❑No	❑Yes ❑No	
15		❑Yes ❑No	❑Yes ❑No	
16		❑Yes ❑No	❑Yes ❑No	
17		❑Yes ❑No	❑Yes ❑No	
18		❑Yes ❑No	❑Yes ❑No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature: _____ **Date:** _____

ANNUAL RECORD OF INSPECTIONS

OWNER: Brandt Lane Development, LLC

SITE ADDRESS: Grafton Woods, Brandt Lane, Worcester, MA

INSPECTOR: _____ **PHONE:** _____

DEVICES/ AREAS INSPECTED:

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
LANDSCAPING												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
IMPERVIOUS SURFACES												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CATCH BASINS												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
HYDRODYNAMIC SEPARATORS (CDS)												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
GROUNDWATER RECHARGE SYSTEMS												
OBSERVATIONS												

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OUTLET PIPES												
OBSERVATIONS												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CONSTRUCTED WETLANDS												
OBSERVATIONS												

ADDITIONAL NOTES: _____

_____

_____

_____

_____

SIGNATURE: _____ **DATE:** _____

Include additional copies as necessary to describe all inspection tasks and observations.

Submit the report annually by January 15 of each year to:

Worcester Conservation Commission
455 Main Street, Room 404
Worcester MA 01608

ANNUAL RECORD OF MAINTENANCE

OWNER: Brandt Lane Development, LLC

SITE ADDRESS: Grafton Woods, Brandt Lane, Worcester, MA

INSPECTOR: _____ **PHONE:** _____

DEVICES/ AREAS OPERATION AND MAINTENANCE:

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
LANDSCAPING MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
IMPERVIOUS SURFACES MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CATCH BASINS MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
HYDRODYNAMIC SEPARATORS MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
GROUND RECHARGE SYSTEMS MAINTENANCE PERFORMED												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DISCHARGE PIPES & RIP RAP PADS MAINTENANCE PERFORMED												

ADDITIONAL NOTES: _____

_____

SIGNATURE: _____ **DATE:** _____

Submit the report annually by January 15 of each year to:

Worcester Conservation Commission
455 Main Street, Room 404, Worcester MA 01608

Soil Map—Worcester County, Massachusetts, Northeastern Part
(Brandt Lane)

Map Scale: 1:4,260 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Northeastern Part
Survey Area Data: Version 17, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
71A	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	7.7	20.4%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	2.9	7.7%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	15.4	41.1%
602	Urban land	11.6	30.8%
Totals for Area of Interest		**37.6**	**100.0%**

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Brandt Lane Development LLC.
Owner Name

Brandt Lane
Street Address

38-26-3A
Map/Lot #

Worcester
City

Massachusetts
State

01604
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade

2. Soil Survey MA 613 (Source) | 102C (Soil Map Unit) | Chatfield (Soil Series)

   Ridges / Hills (Landform) | None (Soil Limitations)

   Coarse-Loamy melt out till derived from granite gneiss and schist
   Soil Parent material

3. Surficial Geological Report 2022/MassGIS (Year Published/Source) | Thin Till (Map Unit)

   Nonsort, nonstrat matrix of sand some silt little clay scattered pebbles, gravel, boulders large surface boulders common prime consists of upper till
   Description of Geologic Map Unit:

4. Flood Rate Insurance Map — Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No — If yes, MassGIS Wetland Data Layer: _____ (Wetland Type)

7. Current Water Resource Conditions (USGS): 08/15/24 (Month/Day/ Year) — Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed:
   (Zone II, IWPA, Zone A, EEA Data Portal, etc.)

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 1A (Hole #) | 08/15/24 (Date) | 9:30AM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Grass, Disturbed Soil Veg (Vegetation) | Fewl (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3% (Slope (%))

Description of Location: End of Abandoned Paved Road

2. Soil Parent Material: Coarse-Loamy melt out | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other ____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: N/A Depth to Weeping in Hole N/A Depth to Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-96	Fill		Fill		Cnc :Fill Dpl:		Fill		Fill		Fill
96-99	Ab	FSL	10YR 2/2		Cnc : Dpl:				Granular	Friable	
99-106	Bb	FSL	10YR 6/7		Cnc : Dpl:				Granular	Friable	
106-168	C	LS	2.5Y6/3	120"	Cnc :5YR5/6 Dpl: 2.5Y7/3	30			Massive	Friable	
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 1B (Hole #) | 08/15/24 (Date) | 9:00AM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Disturbed Soil/Veg (Vegetation) | Few (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3 (Slope (%))

Description of Location: Side of abandoned Dirt Road

2. Soil Parent Material: Coarse-Loamy Melt Out | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other N/A feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: N/A Depth to Weeping in Hole N/A Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-72	Fill		Fill		Cnc :Fill Dpl:		Fill		Fill		Fill
72-132	C	LS	2.5Y7/3	108"	Cnc :10YR 5/6 Dpl: 2.5Y6/3	30	25	20	Massive	Friable	
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used (Choose one):	Obs. Hole #1A	Obs. Hole #1B
☒ Depth to soil redoximorphic features	120 inches	108 inches
☐ Depth to observed standing water in observation hole	_____ inches	_____ inches
☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)	_____ inches	_____ inches

_____ Index Well Number _____ Reading Date

$S_h = S_c - [S_r \times (OW_c - OW_{max})/OW_r]$

Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

☒ Yes ☐ No

b. If yes, at what depth was it observed (exclude O, A, and E Horizons)? Upper boundary: 72 inches Lower boundary: 132 inches

c. If no, at what depth was impervious material observed? Upper boundary: _____ inches Lower boundary: _____ inches

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

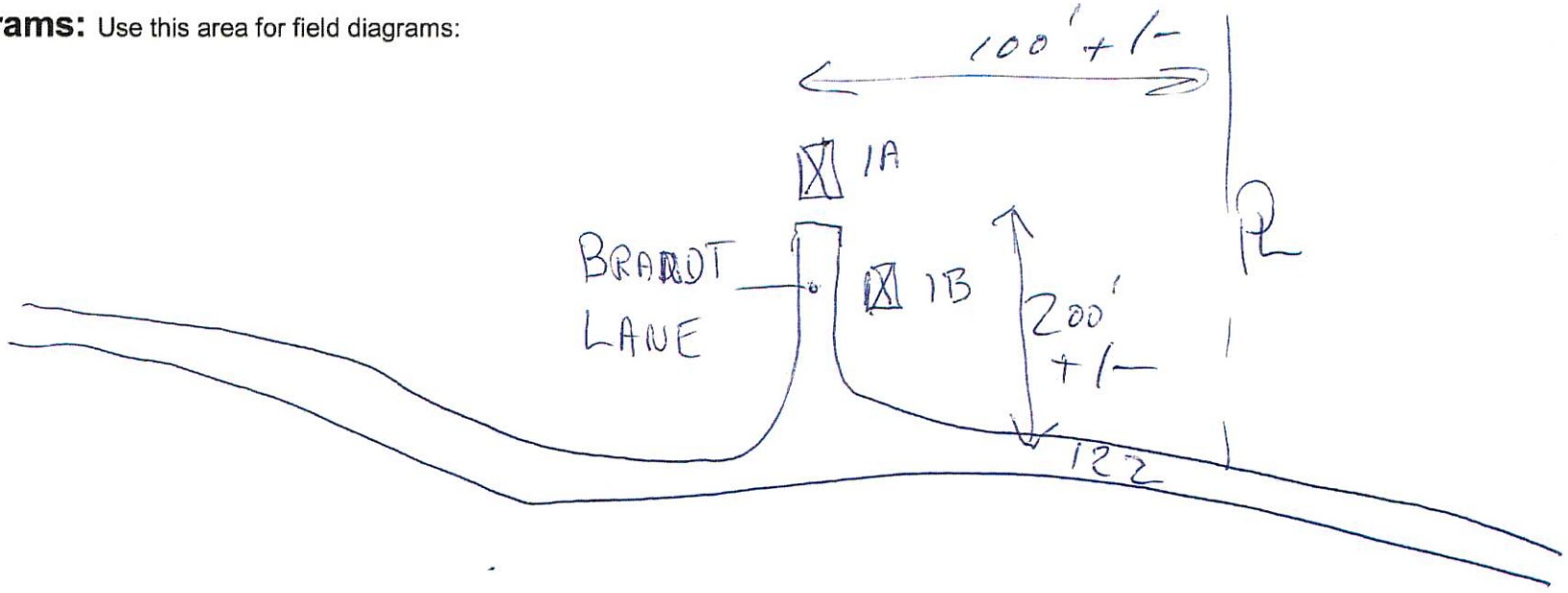
F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	9/30/24 Date
John M. Madeiros Typed or Printed Name of Soil Evaluator / License #	6/3025 Expiration Date of License
N/A Infiltration Only Name of Approving Authority Witness	City of Worcester Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:



Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Brandt Lane Development LLC.
Owner Name

Brandt Lane
Street Address

38-26-3A
Map/Lot #

Worcester
City

Massachusetts
State

01604
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade

2. Soil Survey MA 613 (Source) | 102C (Soil Map Unit) | Chatfield (Soil Series)

Ridges / Hills
Landform

None
Soil Limitations

Coarse-Loamy melt out till derived from granite gneiss and schist
Soil Parent material

3. Surficial Geological Report 2022/MassGIS (Year Published/Source) | Thin Till (Map Unit)

Nonsort, nonstrat matrix of sand some silt little clay scattered pebbles, gravel, boulders large surface boulders common prime consists of upper till
Description of Geologic Map Unit:

4. Flood Rate Insurance Map — Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No — If yes, MassGIS Wetland Data Layer: _____ (Wetland Type)

7. Current Water Resource Conditions (USGS): 08/15/24 (Month/Day/ Year) — Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed:
(Zone II, IWPA, Zone A, EEA Data Portal, etc.)

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 2 (Hole #) | 08/15/24 (Date) | 11 AM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Grass, Disturbed Soil Veg (Vegetation) | Fewl (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3% (Slope (%))

Description of Location: End of Abandoned Paved Road

2. Soil Parent Material: Coarse-Loamy melt out | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other ____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: N/A Depth to Weeping in Hole | N/A Depth to Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-36	Fill		Fill		Cnc :Fill Dpl:		Fill		Fill		Fill
36-40	Ab	FSL	10YR 2/2		Cnc : Dpl:				Granular	Friable	
40-46	Bb	FSL	10YR 6/7		Cnc : Dpl:				Granular	Friable	
46-144	C	SL	2.5Y6/3		Cnc : Dpl:				Massive	Friable	10% Boulders
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 5 (Hole #) | 08/15/24 (Date) | 11 AM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Disturbed Soil/Veg (Vegetation) | Few (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3 (Slope (%))

   Description of Location: Side of abandoned Dirt Road

2. Soil Parent Material: Coarse-Loamy Melt Out | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other N/A feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: N/A Depth to Weeping in Hole | 130" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-132	Fill		Fill		Cnc :Fill Dpl:		Fill		Fill		Fill
132-185	C	SAND	2.5Y7/3	130"	Cnc :10YR 5/6 Dpl: 2.5Y6/3	30	25		Massive	Friable	
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used (Choose one):	Obs. Hole #2	Obs. Hole #5
☐ Depth to soil redoximorphic features	N/A Inches	_____ inches
☒ Depth to observed standing water in observation hole	N/A inches	130 inches
☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)	_____ inches	_____ inches

_____ Index Well Number _____ Reading Date

$S_h = S_c - [S_r \times (OW_c - OW_{max})/OW_r]$

Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed (exclude O, A, and E Horizons)? Upper boundary: 132 inches Lower boundary: 185 inches

   c. If no, at what depth was impervious material observed? Upper boundary: _____ inches Lower boundary: _____ inches

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

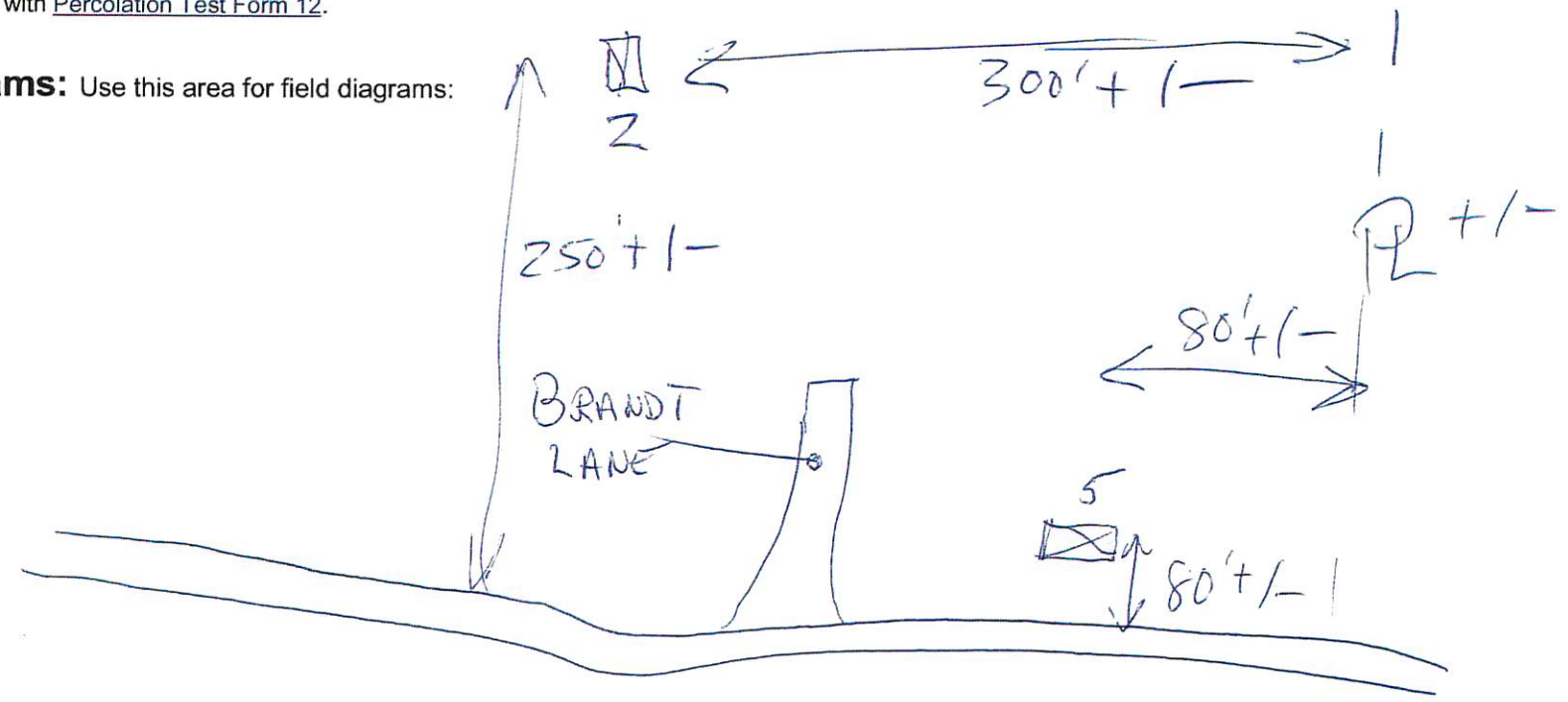
F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	9/30/24 Date
John M. Madeiros Typed or Printed Name of Soil Evaluator / License #	6/3025 Expiration Date of License
N/A Infiltration Only Name of Approving Authority Witness	City of Worcester Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:



Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Brandt Lane Development LLC.
Owner Name

Brandt Lane
Street Address

38-26-3A
Map/Lot #

Worcester
City

Massachusetts
State

01604
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade

2. Soil Survey MA 613 (Source) | 71A (Soil Map Unit) | Ridgebury (Soil Series)

   Ground Morraine, Hills, Drumlins (Landform) | None (Soil Limitations)

   Coarse-Loamy Lodgement Till
   Soil Parent material

3. Surficial Geological Report 2022/MassGIS (Year Published/Source) | Thin Till (Map Unit)

   Nonsort, nonstrat matrix of sand some silt little clay scattered pebbles, gravel, boulders large surface boulders common prime consists of upper till
   Description of Geologic Map Unit:

4. Flood Rate Insurance Map — Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No — If yes, MassGIS Wetland Data Layer: _____ (Wetland Type)

7. Current Water Resource Conditions (USGS): 08/15/24 (Month/Day/ Year) — Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed:
   (Zone II, IWPA, Zone A, EEA Data Portal, etc.)

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 3A (Hole #) | 08/15/24 (Date) | 1 PM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Grass, Disturbed Soil Veg (Vegetation) | Fewl (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3% (Slope (%))

Description of Location: End of Abandoned Paved Road

2. Soil Parent Material: Coarse-Loamy Lodgement Till | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other ____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: N/A Depth to Weeping In Hole | N/A Depth to Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-36	Fill		Fill		Cnc :Fill Dpl:		Fill		Fill		Fill
36-40	Ab	FSL	10YR 2/2		Cnc : Dpl:				Granular	Friable	
40-44	Bb	FSL	10YR 6/7		Cnc : Dpl:				Granular	Friable	
44-96	C1	SL	2.5Y6/3	132"	Cnc :10YR6/6 Dpl: 2.5Y6/2				Massive	Friable	
96-156	C2	Sand	2.5Y6/2		Cnc : Dpl:				Massive	Friable	
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 3B (Hole #) | 08/15/24 (Date) | 1 PM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Disturbed Soil/Veg (Vegetation) | Few (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3 (Slope (%))

   Description of Location: Side of abandoned Dirt Road

2. Soil Parent Material: Coarse-Loamy Lodgement Till | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other N/A feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 132" Depth to Weeping in Hole 144" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other	
				Depth	Color	Percent	Gravel	Cobbles & Stones				
0-3	Pave		Pave		Cnc :Pave Dpl:		Pave		Pave			Pave
3-36	Fill		Fill		Cnc :Fill Dpl:		Fill		Fill			Fill
36-40	Ab	FSL	10 YR 2/2		Cnc : Dpl:				Granular	Friable		
40-48	Bb	FSL	10YR 6/7		Cnc : Dpl:				Granular	Friable		
48-168	C	Sand	2.5Y 4/5	144"	Cnc :10YR 5/6 Dpl: 2.5Y 4/5				Massive	Loose		
					Cnc : Dpl:							

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used (Choose one):

	Obs. Hole #3A	Obs. Hole #3B
☐ Depth to soil redoximorphic features	132 inches	144 inches
☒ Depth to observed standing water in observation hole	N/A inches	N/A inches
☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)	_____ inches	_____ inches

_____ Index Well Number _____ Reading Date

$S_h = S_c - [S_r \times (OW_c - OW_{max})/OW_r]$

Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

☒ Yes ☐ No

b. If yes, at what depth was it observed (exclude O, A, and E Horizons)? Upper boundary: 48 inches Lower boundary: 168 inches

c. If no, at what depth was impervious material observed? Upper boundary: _____ inches Lower boundary: _____ inches

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator

9/30/24
Date

John M. Madeiros
Typed or Printed Name of Soil Evaluator / License #

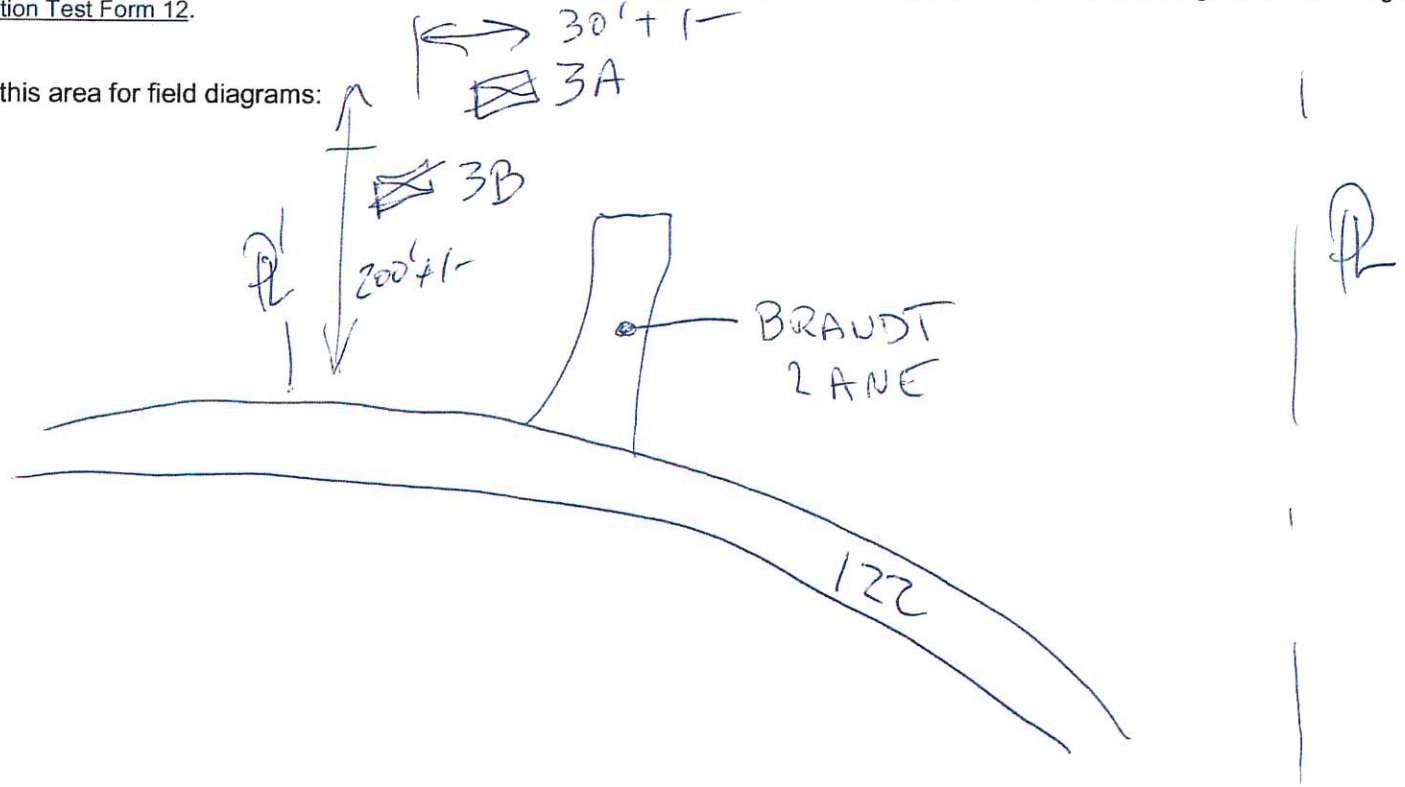
6/3025
Expiration Date of License

N/A Infiltration Only
Name of Approving Authority Witness

City of Worcester
Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:



Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Brandt Lane Development LLC.
Owner Name

Brandt Lane
Street Address

38-26-3A
Map/Lot #

Worcester
City

Massachusetts
State

01604
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade

2. Soil Survey MA 613 (Source) 102C (Soil Map Unit) Chatfield (Soil Series)
   Ridges / Hills (Landform) None (Soil Limitations)
   Coarse-Loamy melt out till derived from granite gneiss and schist
   Soil Parent material

3. Surficial Geological Report 2022/MassGIS (Year Published/Source) Thin Till (Map Unit)
   Nonsort, nonstrat matrix of sand some silt little clay scattered pebbles, gravel, boulders large surface boulders common prime consists of upper till
   Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No If yes, MassGIS Wetland Data Layer: _____ (Wetland Type)

7. Current Water Resource Conditions (USGS): 08/15/24 (Month/Day/ Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed:
   (Zone II, IWPA, Zone A, EEA Data Portal, etc.)

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 4A (Hole #) | 08/15/24 (Date) | 9:30AM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Grass, Disturbed Soil Veg (Vegetation) | Fewl (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3% (Slope (%))

Description of Location: End of Abandoned Paved Road

2. Soil Parent Material: Coarse-Loamy melt out | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other ____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: N/A Depth to Weeping in Hole | N/A Depth to Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)		Other
				Depth	Color	Percent	Gravel	Cobbles & Stones				
0-36	Fill		Fill		Cnc :Fill Dpl:		Fill		Fill			Fill
36-96	C	FSL	1 6/10Y		Cnc : Dpl:				SAB	Friable		GLEY
96-144	Cb	SAND	2.5Y7/4	108	Cnc : Dpl:	30	20	30	Loose	Single Grain		
					Cnc : Dpl:							
					Cnc : Dpl:							
					Cnc : Dpl:							

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 4B (Hole #) | 08/15/24 (Date) | 9:00AM (Time) | Sunny (Weather) | 42.24515 (Latitude) | -71.75545 (Longitude)

1. Land Use: Abandoned Lot (e.g., woodland, agricultural field, vacant lot, etc.) | Disturbed Soil/Veg (Vegetation) | Few (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-3 (Slope (%))

   Description of Location: Side of abandoned Dirt Road

2. Soil Parent Material: Coarse-Loamy Melt Out | Hill (Landform) | On Slope (Position on Landscape (SU, SH, BS, FS, TS, Plain))

3. Distances from: Open Water Body >100 feet | Drainage Way >50 feet | Wetlands >100 feet | Property Line >100 feet | Drinking Water Well >200 feet | Other N/A feet

4. Unsuitable Materials Present: ☒ Yes ☐ No If Yes: ☒ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: N/A Depth to Weeping in Hole N/A Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-3	Pave		Pave		Cnc : Dpl:						
3-6	Ab	FSL	10YR 2/2		Cnc : Dpl:				Granular	Friable	
6-84	C	SL	1/5/10Y	60	Cnc : Dpl:	30			SAB	Friable	
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used (Choose one):

	Obs. Hole #4A	Obs. Hole #4B
☒ Depth to soil redoximorphic features	108 inches	60 inches
☐ Depth to observed standing water in observation hole	_____ inches	_____ inches
☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)	_____ inches	_____ inches

_____ Index Well Number _____ Reading Date

$S_h = S_c - [S_r \times (OW_c - OW_{max})/OW_r]$

Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☒ Yes ☐ No

   b. If yes, at what depth was it observed (exclude O, A, and E Horizons)? Upper boundary: 6 inches Lower boundary: 84 inches

   c. If no, at what depth was impervious material observed? Upper boundary: _____ inches Lower boundary: _____ inches

Commonwealth of Massachusetts
City/Town of Worcester

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

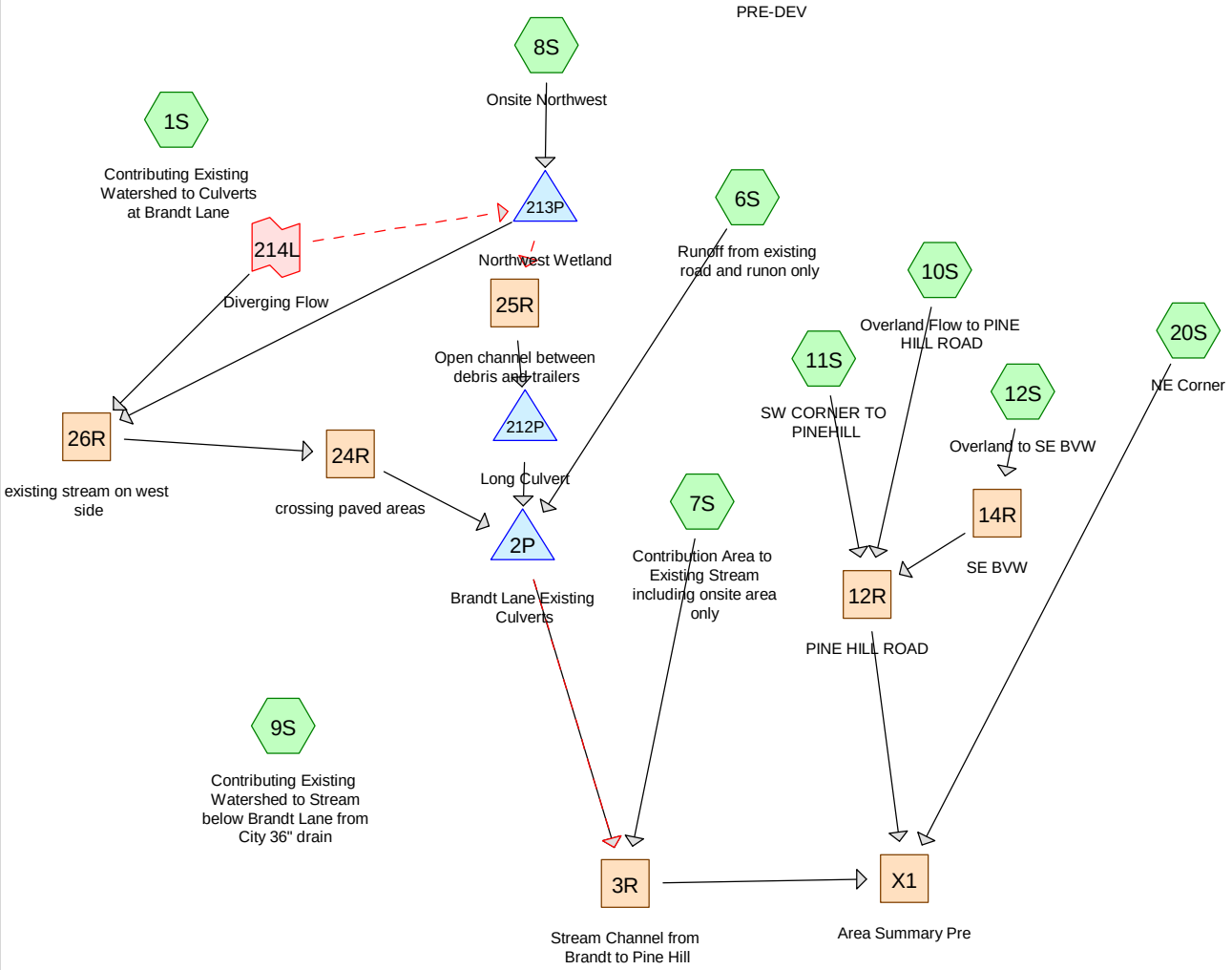
I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	9/30/24 Date
John M. Madeiros Typed or Printed Name of Soil Evaluator / License #	6/3025 Expiration Date of License
N/A Infiltration Only Name of Approving Authority Witness	City of Worcester Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:

SEE SKETCH



Routing Diagram for Grafton Woods Study - Current

Prepared by THOMPSON-LISTON Associates, Inc., Printed 10/30/2024

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
26.720	80	1/2 acre lots, 25% imp, HSG C (9S)
4.390	83	1/4 acre lots, 38% imp, HSG C (9S)
1.122	80	>75% Grass cover, Good, HSG D (8S)
3.175	65	Brush, Good, HSG C (6S, 7S, 10S)
0.513	87	Dirt roads, HSG C (7S, 10S)
2.290	92	Dirt roads, HSG C, stones, bit. conc. (6S)
0.076	98	Impervious BLDG and Trailers (8S)
1.316	98	Paved Area (8S)
0.680	98	Paved parking, HSG C (6S)
0.010	98	Roofs, HSG C (10S)
182.196	75	Urban 38% imp, HSG B (1S)
18.160	94	Urban commercial, 85% imp, HSG C (9S)
1.841	55	Woods, Good, HSG B (12S)
4.214	70	Woods, Good, HSG C (6S, 10S, 11S, 12S, 20S)
0.845	77	Woods, Good, HSG D (8S, 12S)
0.149	58	Woods/grass comb., Good, HSG B (8S)
247.696	**77**	**TOTAL AREA**

Summary for Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane

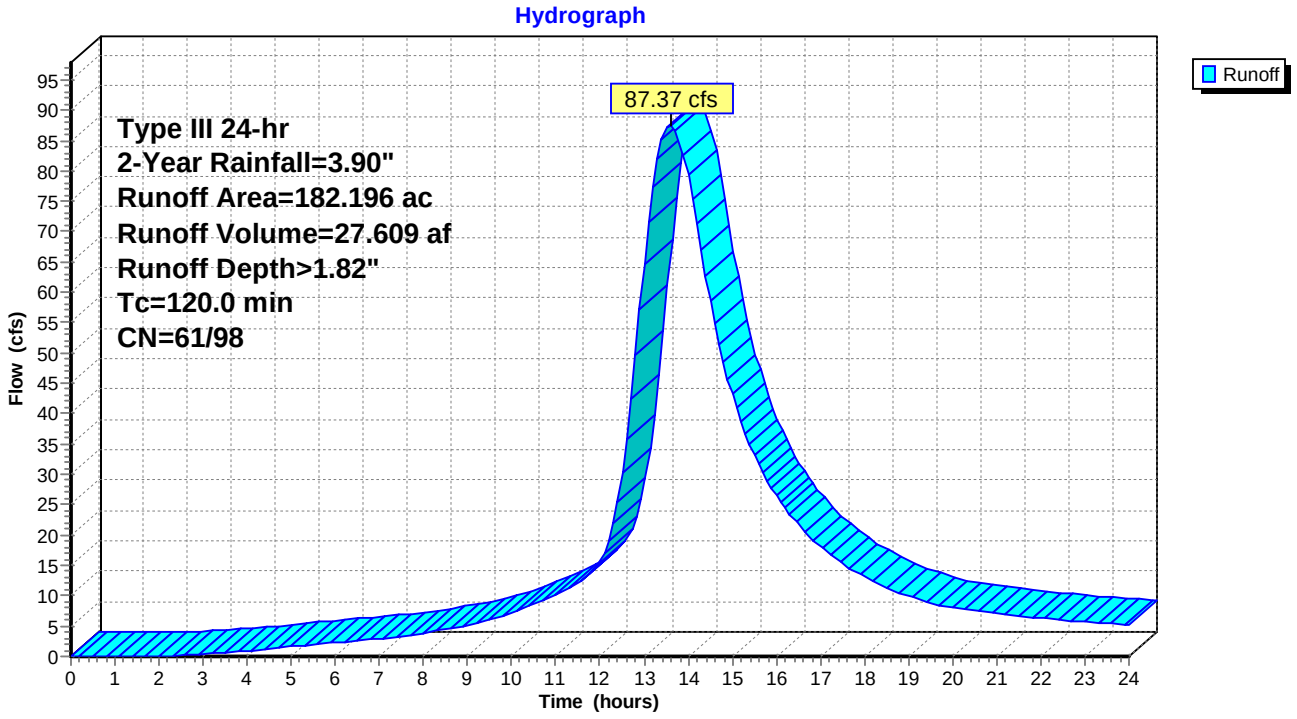
Runoff = 87.37 cfs @ 13.59 hrs, Volume= 27.609 af, Depth> 1.82"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane



Summary for Subcatchment 6S: Runoff from existing road and runon only

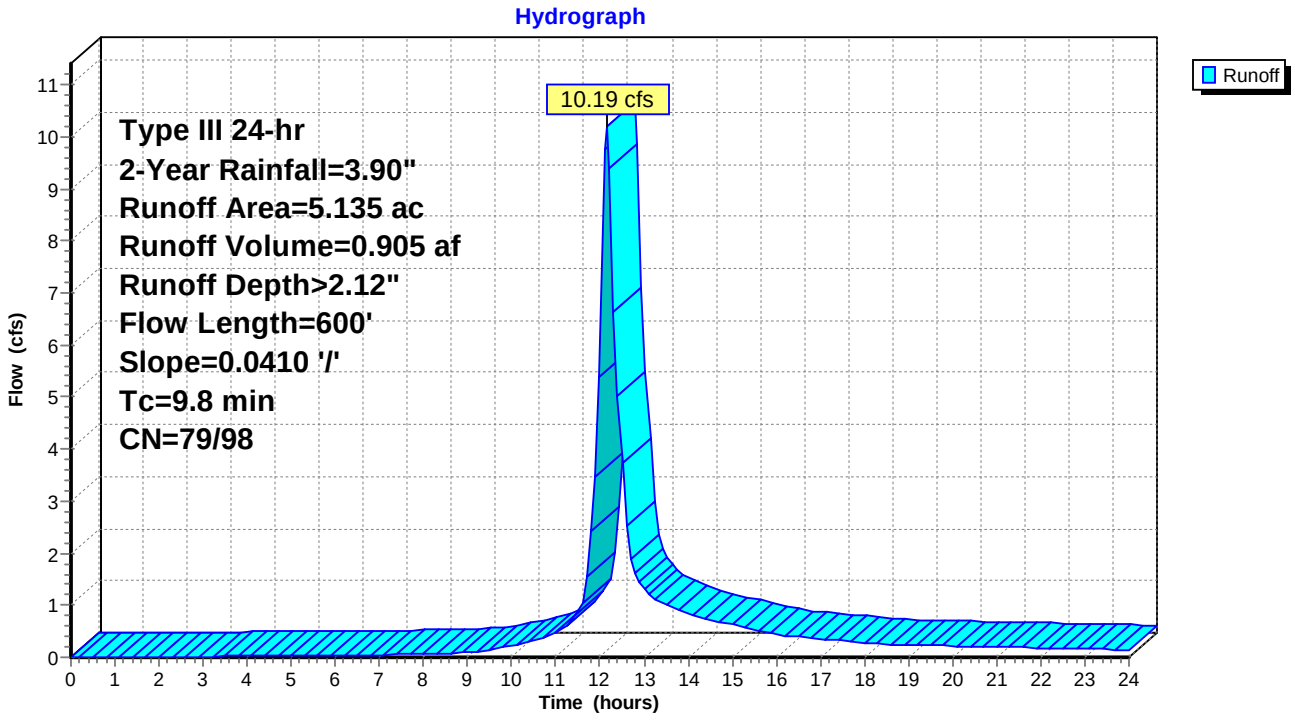
Runoff = 10.19 cfs @ 12.14 hrs, Volume= 0.905 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (ac)	CN	Description
	0.250	70	Woods, Good, HSG C
	1.915	65	Brush, Good, HSG C
	0.680	98	Paved parking, HSG C
*	2.290	92	Dirt roads, HSG C, stones, bit. conc.
	5.135	82	Weighted Average
	4.455	79	86.76% Pervious Area
	0.680	98	13.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	600	0.0410	1.02		**Lag/CN Method,**

Subcatchment 6S: Runoff from existing road and runon only



Summary for Subcatchment 7S: Contribution Area to Existing Stream including onsite area only

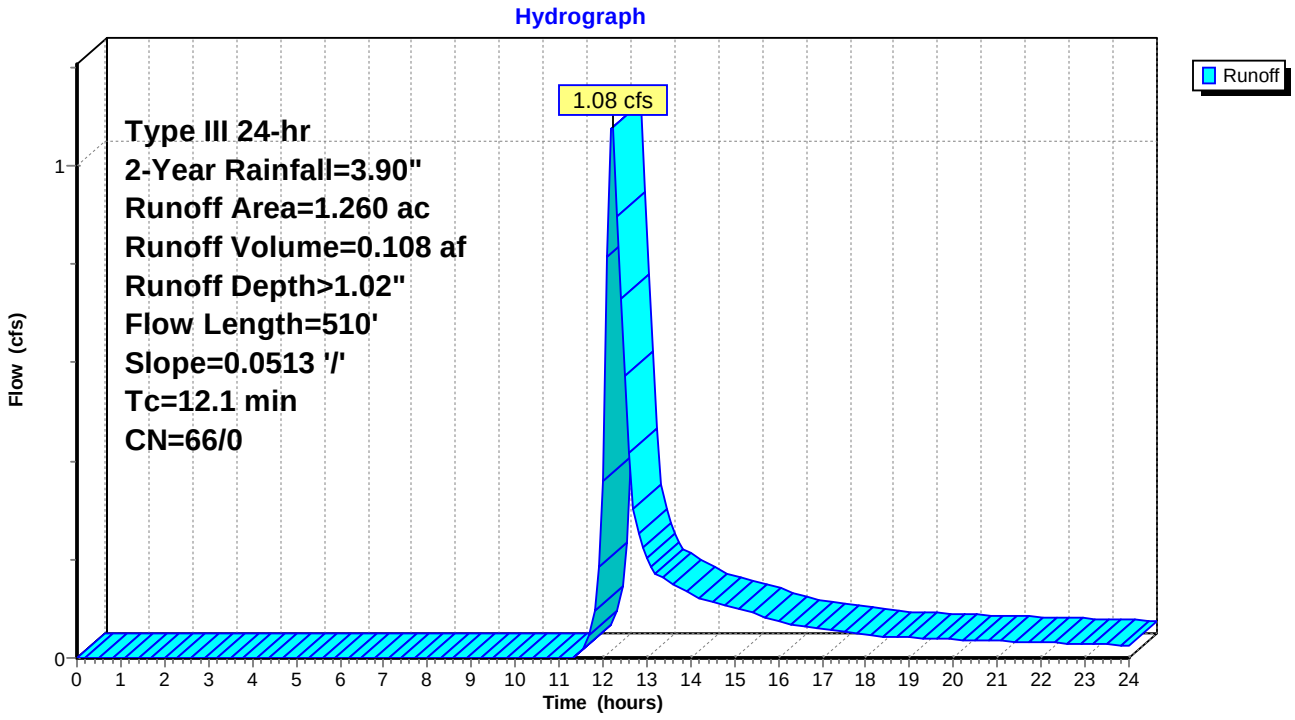
Runoff = 1.08 cfs @ 12.21 hrs, Volume= 0.108 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (ac)	CN	Description
1.210	65	Brush, Good, HSG C
0.050	87	Dirt roads, HSG C
1.260	66	Weighted Average
1.260	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	510	0.0513	0.70		**Lag/CN Method,**

Subcatchment 7S: Contribution Area to Existing Stream including onsite area only



Summary for Subcatchment 8S: Onsite Northwest

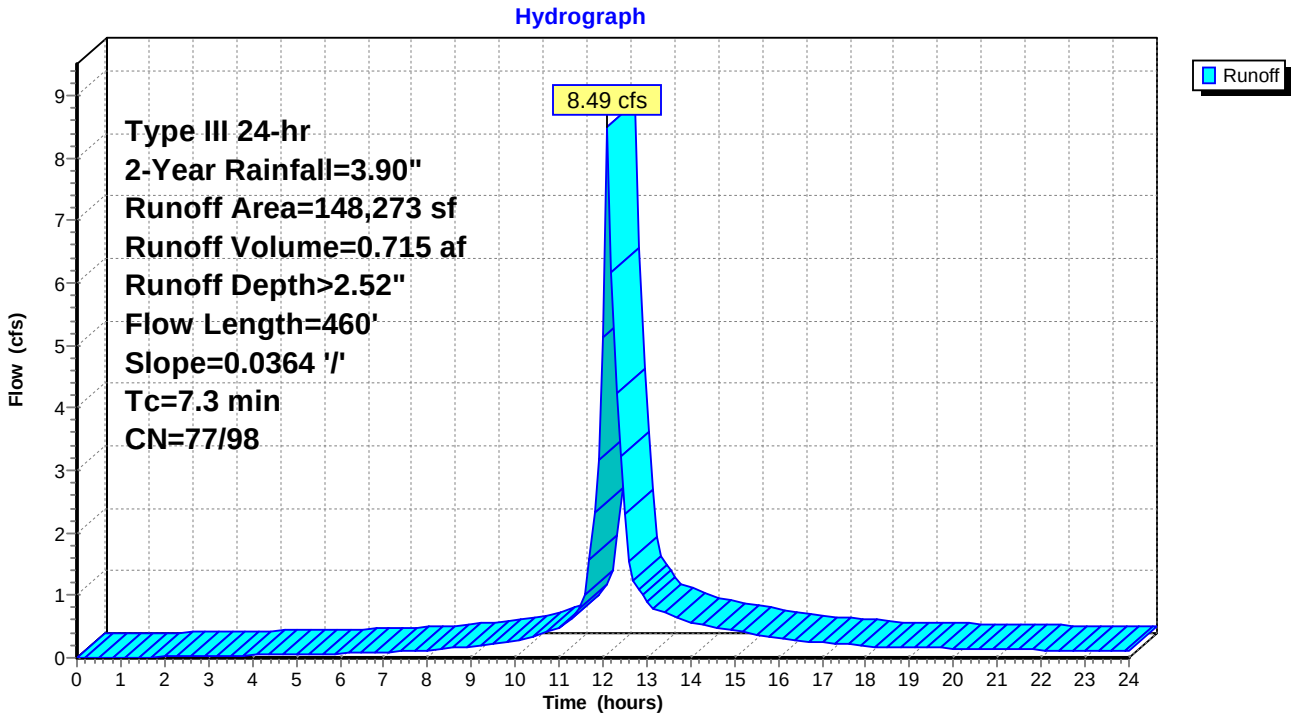
Runoff = 8.49 cfs @ 12.11 hrs, Volume= 0.715 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
	6,482	58	Woods/grass comb., Good, HSG B
	48,881	80	>75% Grass cover, Good, HSG D
	32,266	77	Woods, Good, HSG D
*	3,299	98	Impervious BLDG and Trailers
*	57,345	98	Paved Area
	148,273	86	Weighted Average
	87,629	77	59.10% Pervious Area
	60,644	98	40.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	460	0.0364	1.05		**Lag/CN Method,**

Subcatchment 8S: Onsite Northwest



ummary for Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dra

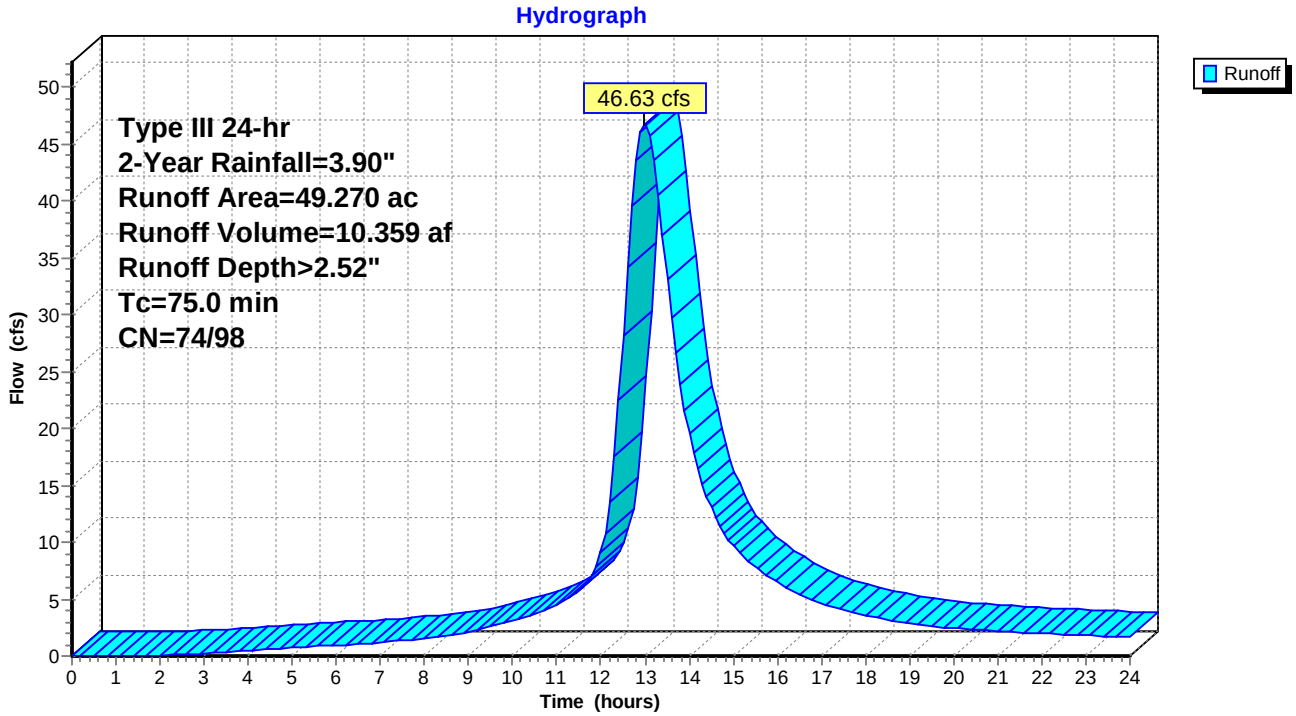
Runoff = 46.63 cfs @ 12.99 hrs, Volume= 10.359 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 10S: Overland Flow to PINE HILL ROAD

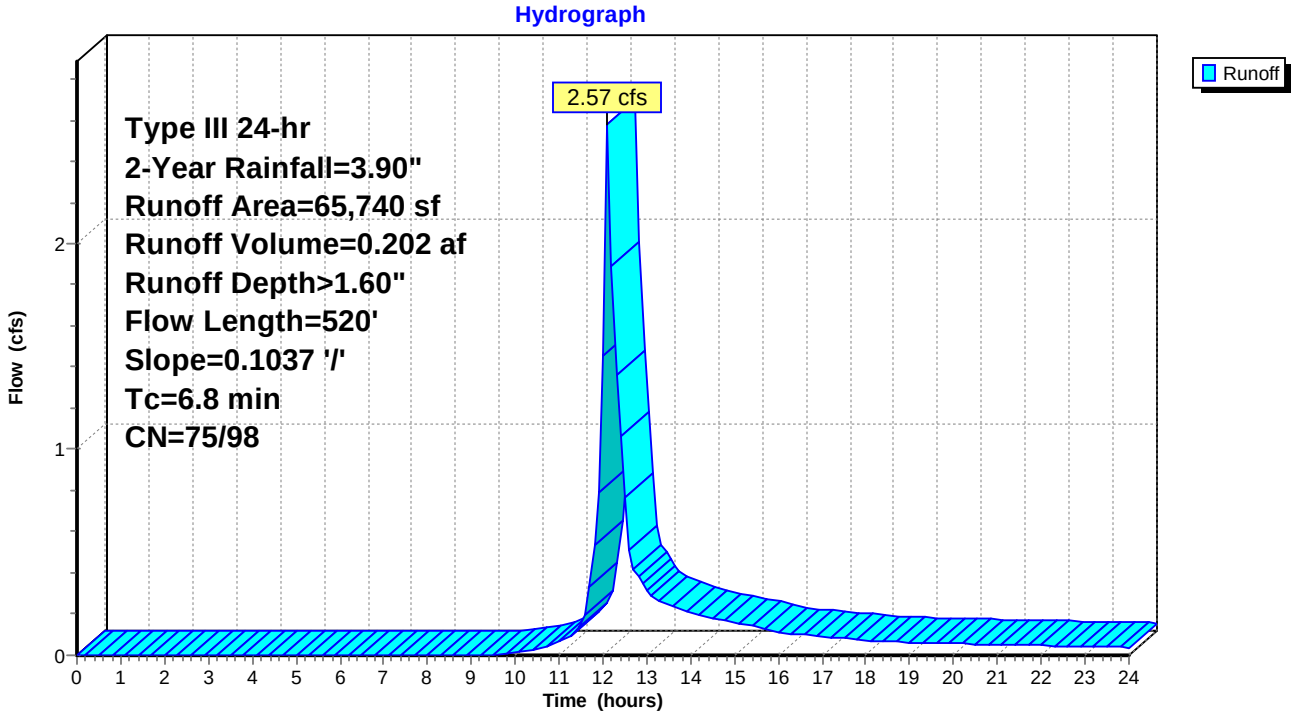
Runoff = 2.57 cfs @ 12.11 hrs, Volume= 0.202 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
20,156	87	Dirt roads, HSG C
2,183	65	Brush, Good, HSG C
418	98	Roofs, HSG C
42,983	70	Woods, Good, HSG C
65,740	75	Weighted Average
65,322	75	99.36% Pervious Area
418	98	0.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	520	0.1037	1.28		**Lag/CN Method,**

Subcatchment 10S: Overland Flow to PINE HILL ROAD



Summary for Subcatchment 11S: SW CORNER TO PINEHILL

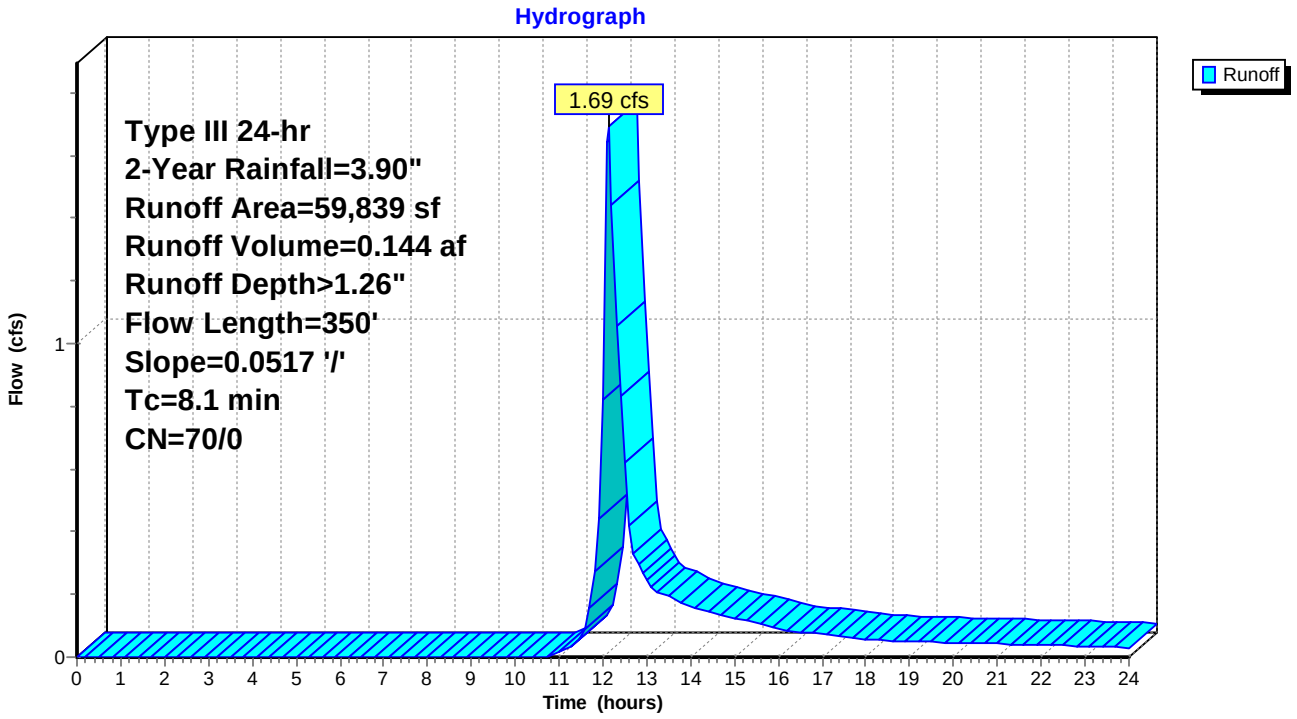
Runoff = 1.69 cfs @ 12.13 hrs, Volume= 0.144 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
59,839	70	Woods, Good, HSG C
59,839	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	350	0.0517	0.72		**Lag/CN Method,**

Subcatchment 11S: SW CORNER TO PINEHILL



Summary for Subcatchment 12S: Overland to SE BVW

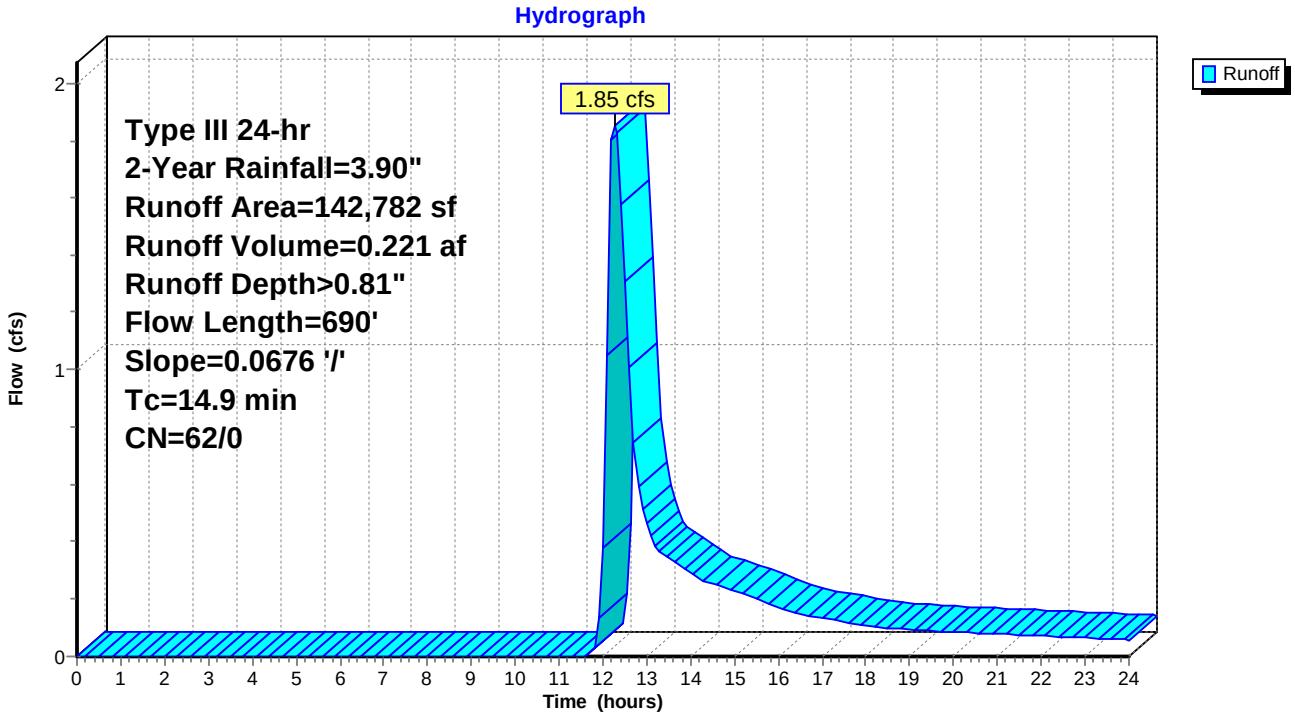
Runoff = 1.85 cfs @ 12.26 hrs, Volume= 0.221 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
58,053	70	Woods, Good, HSG C
4,548	77	Woods, Good, HSG D
80,181	55	Woods, Good, HSG B
142,782	62	Weighted Average
142,782	62	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	690	0.0676	0.77		**Lag/CN Method,**

Subcatchment 12S: Overland to SE BVW



Summary for Subcatchment 20S: NE Corner

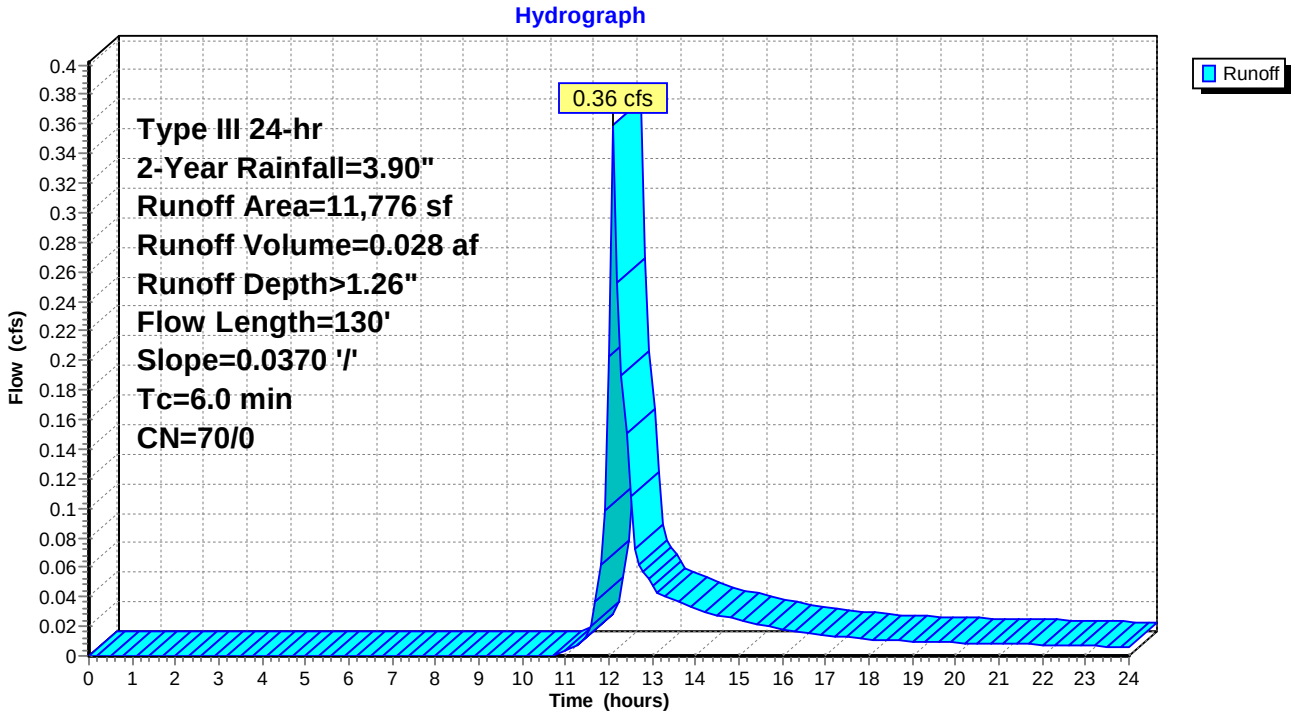
Runoff = 0.36 cfs @ 12.11 hrs, Volume= 0.028 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
11,776	70	Woods, Good, HSG C
11,776	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	130	0.0370	0.50		**Lag/CN Method,**
4.3	130	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20S: NE Corner



Summary for Reach 3R: Stream Channel from Brandt to Pine Hill

Inflow Area = 9.799 ac, 21.15% Impervious, Inflow Depth > 2.10" for 2-Year event
Inflow = 16.24 cfs @ 12.17 hrs, Volume= 1.715 af
Outflow = 16.12 cfs @ 12.20 hrs, Volume= 1.712 af, Atten= 1%, Lag= 2.2 min

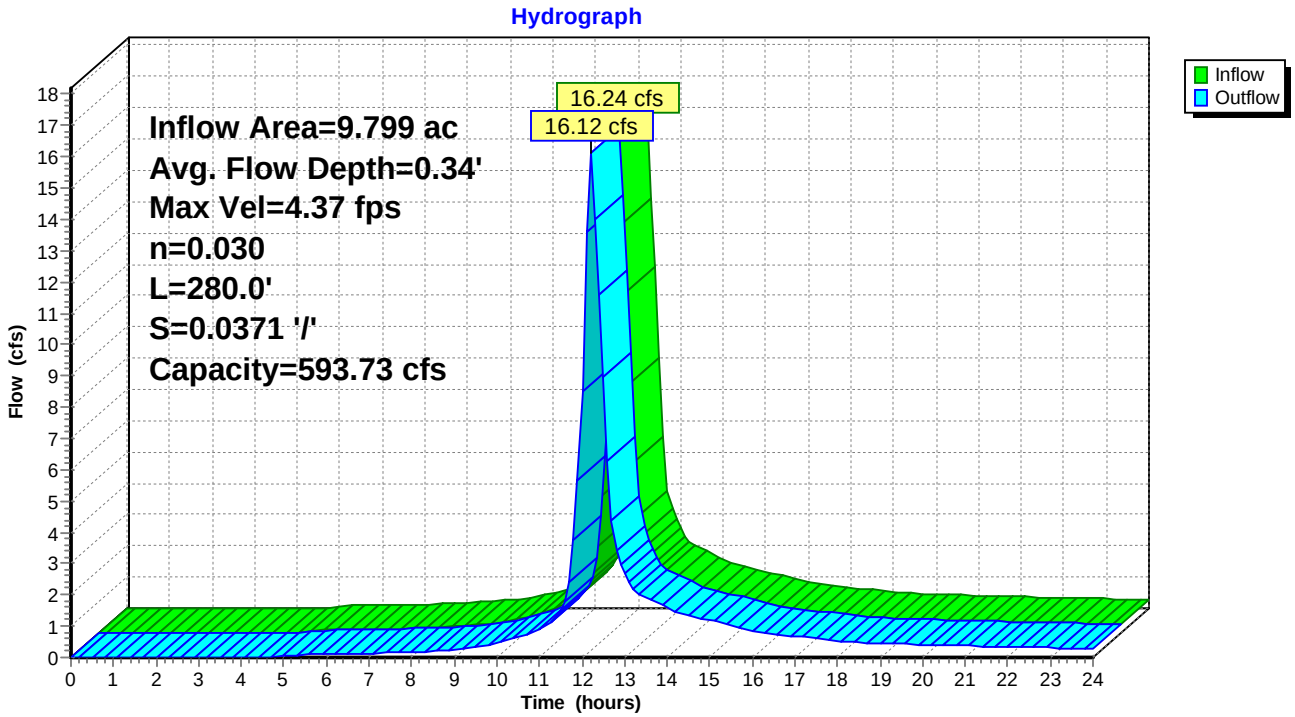
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 4.37 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 3.5 min

Peak Storage= 1,055 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 3R: Stream Channel from Brandt to Pine Hill

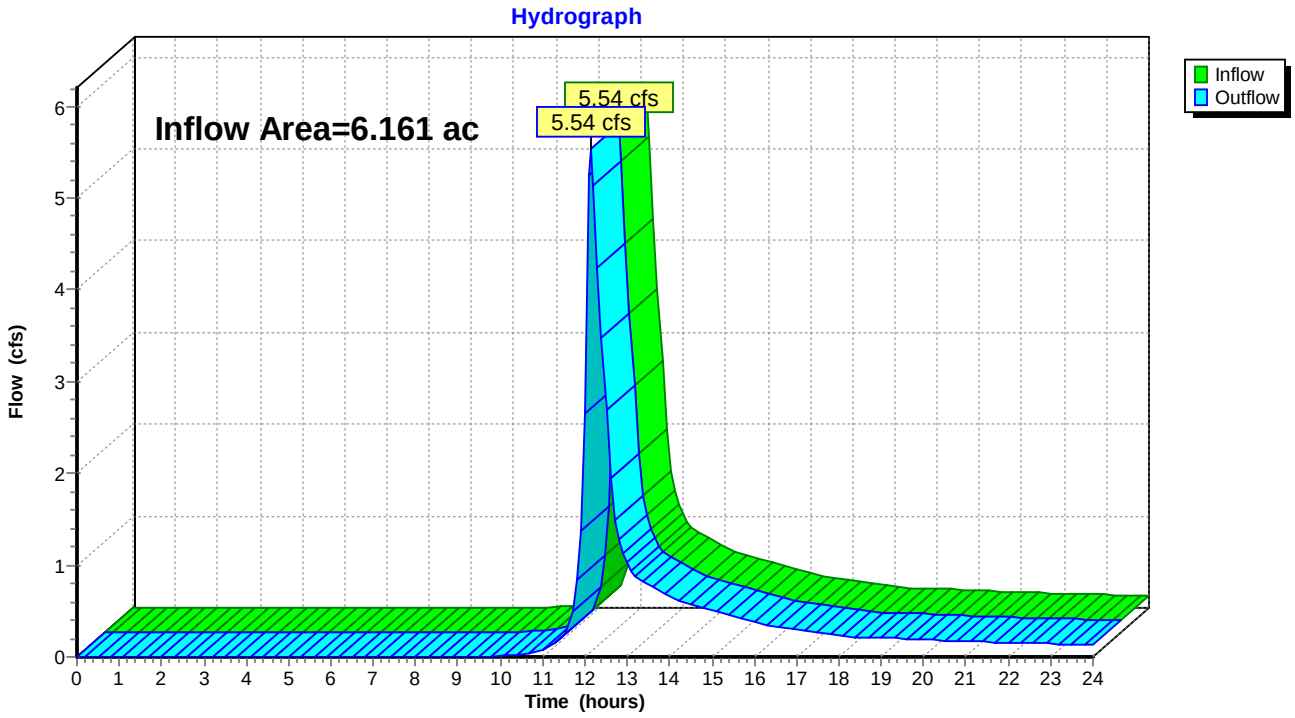


Summary for Reach 12R: PINE HILL ROAD

Inflow Area = 6.161 ac, 0.16% Impervious, Inflow Depth > 1.10" for 2-Year event
Inflow = 5.54 cfs @ 12.15 hrs, Volume= 0.567 af
Outflow = 5.54 cfs @ 12.15 hrs, Volume= 0.567 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 12R: PINE HILL ROAD

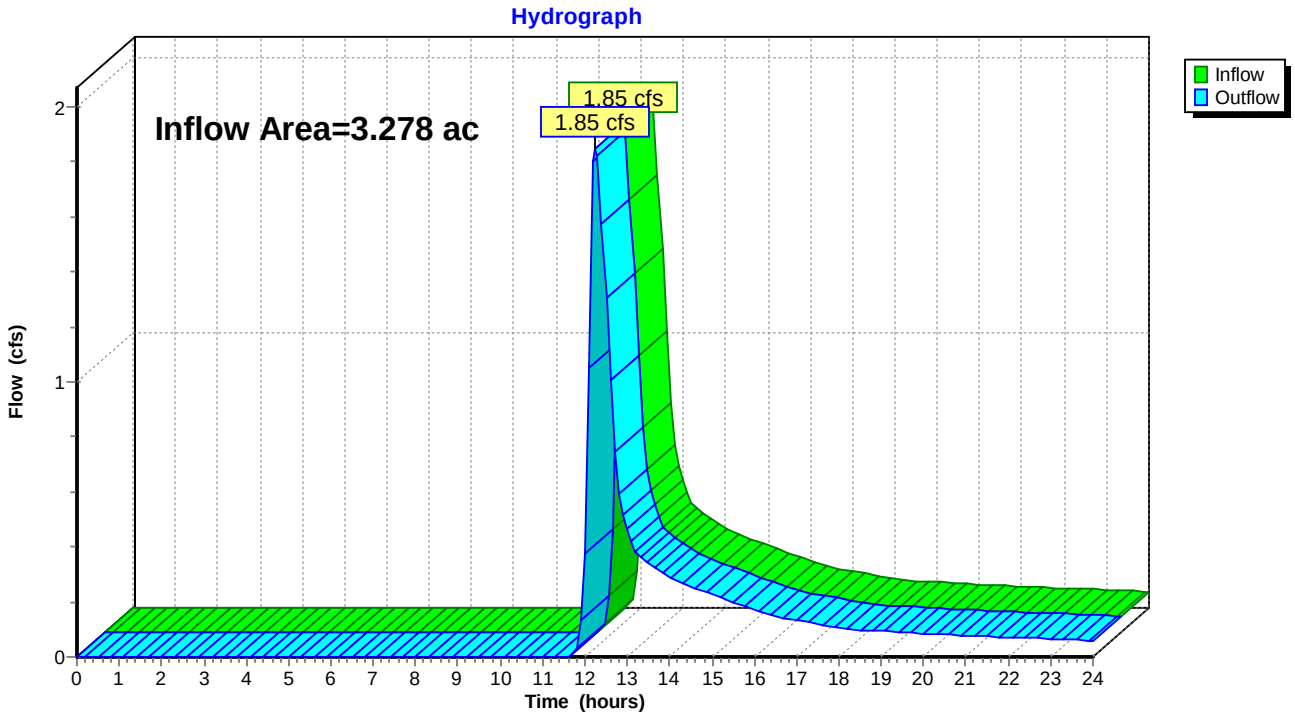


Summary for Reach 14R: SE BVW

Inflow Area = 3.278 ac, 0.00% Impervious, Inflow Depth > 0.81" for 2-Year event
Inflow = 1.85 cfs @ 12.26 hrs, Volume= 0.221 af
Outflow = 1.85 cfs @ 12.26 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 14R: SE BVW



Summary for Reach 24R: crossing paved areas

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 0.13" for 2-Year event
Inflow = 1.47 cfs @ 12.32 hrs, Volume= 0.036 af
Outflow = 1.25 cfs @ 12.41 hrs, Volume= 0.036 af, Atten= 15%, Lag= 5.1 min

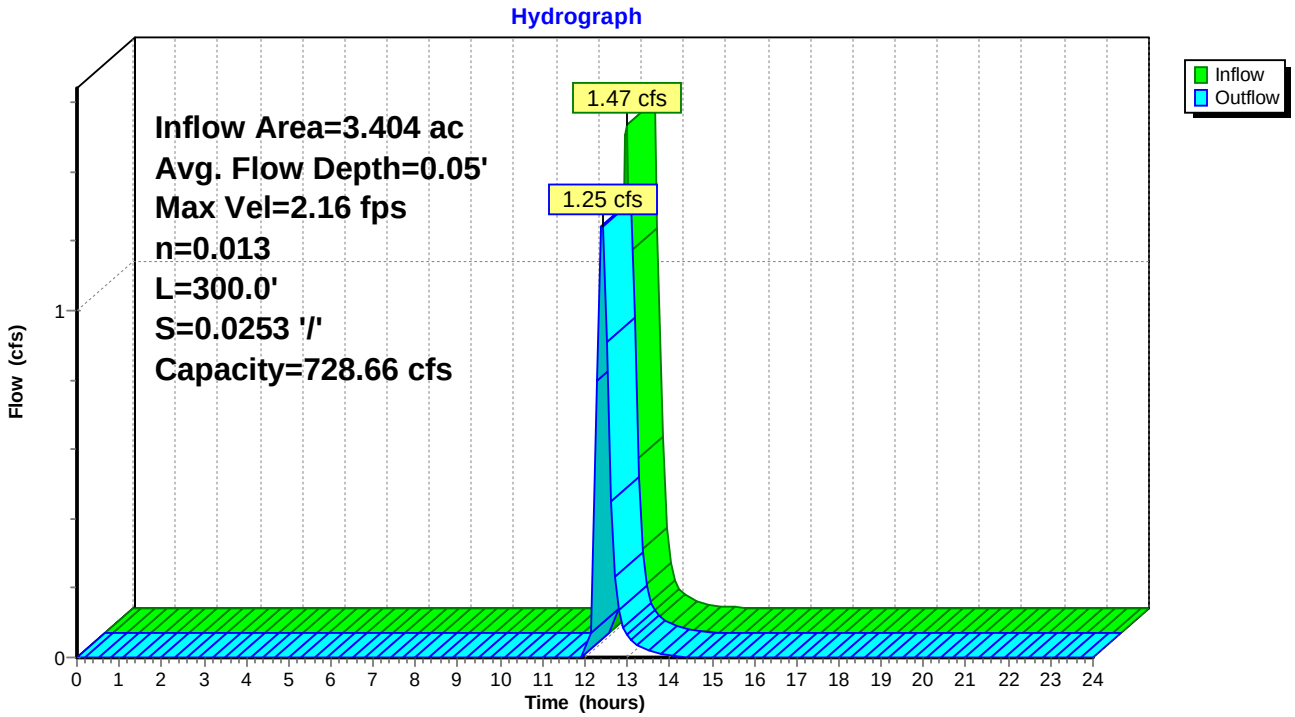
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.16 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 5.3 min

Peak Storage= 185 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 728.66 cfs

10.00' x 1.00' deep channel, n= 0.013 Asphalt, smooth
Side Slope Z-value= 50.0 '/' Top Width= 110.00'
Length= 300.0' Slope= 0.0253 '/'
Inlet Invert= 463.00', Outlet Invert= 455.40'

‡

Reach 24R: crossing paved areas



Summary for Reach 25R: Open channel between debris and trailers

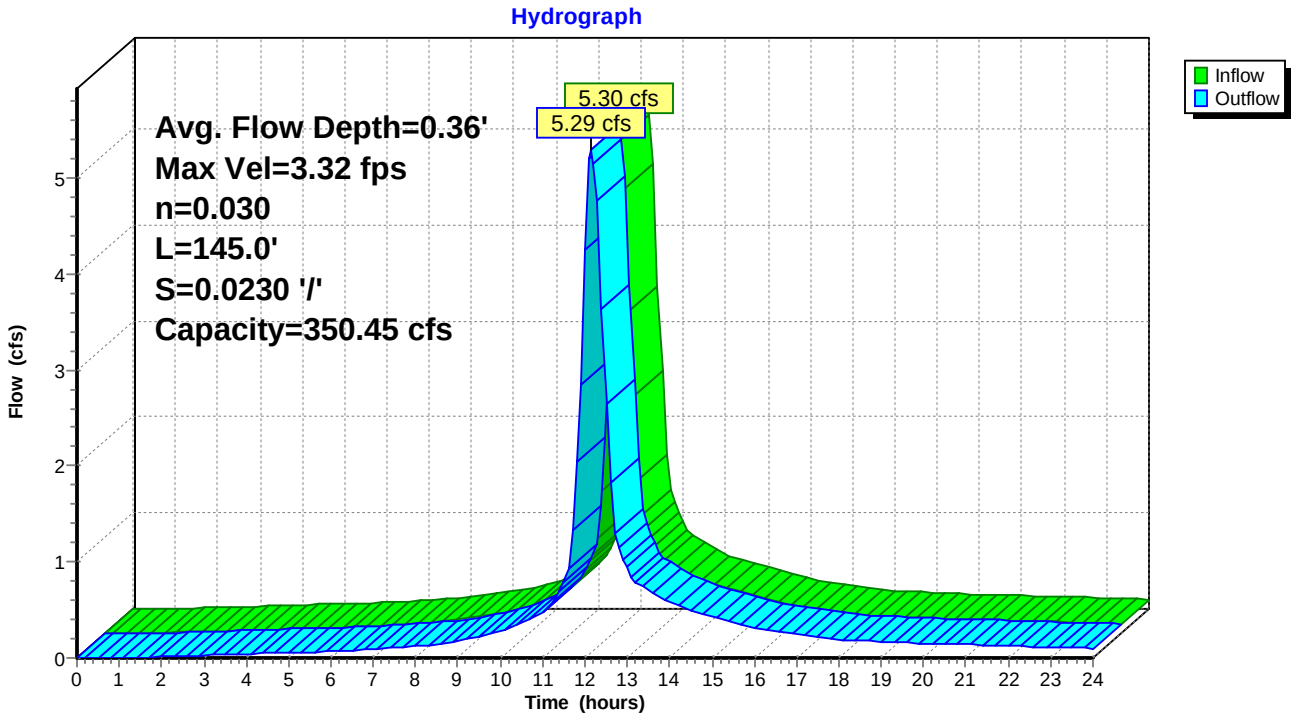
Inflow = 5.30 cfs @ 12.13 hrs, Volume= 0.680 af
Outflow = 5.29 cfs @ 12.14 hrs, Volume= 0.679 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.32 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 2.2 min

Peak Storage= 233 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 350.45 cfs

3.50' x 3.00' deep channel, n= 0.030 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.5 '/' Top Width= 18.50'
Length= 145.0' Slope= 0.0230 '/'
Inlet Invert= 464.54', Outlet Invert= 461.20'

Reach 25R: Open channel between debris and trailers



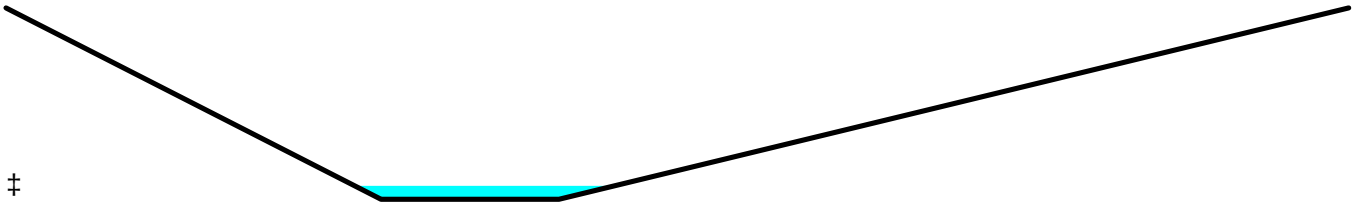
Summary for Reach 26R: existing stream on west side

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 0.13" for 2-Year event
Inflow = 3.45 cfs @ 12.11 hrs, Volume= 0.036 af
Outflow = 1.47 cfs @ 12.32 hrs, Volume= 0.036 af, Atten= 57%, Lag= 12.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.17 fps, Min. Travel Time= 7.8 min
Avg. Velocity = 0.41 fps, Avg. Travel Time= 21.9 min

Peak Storage= 801 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



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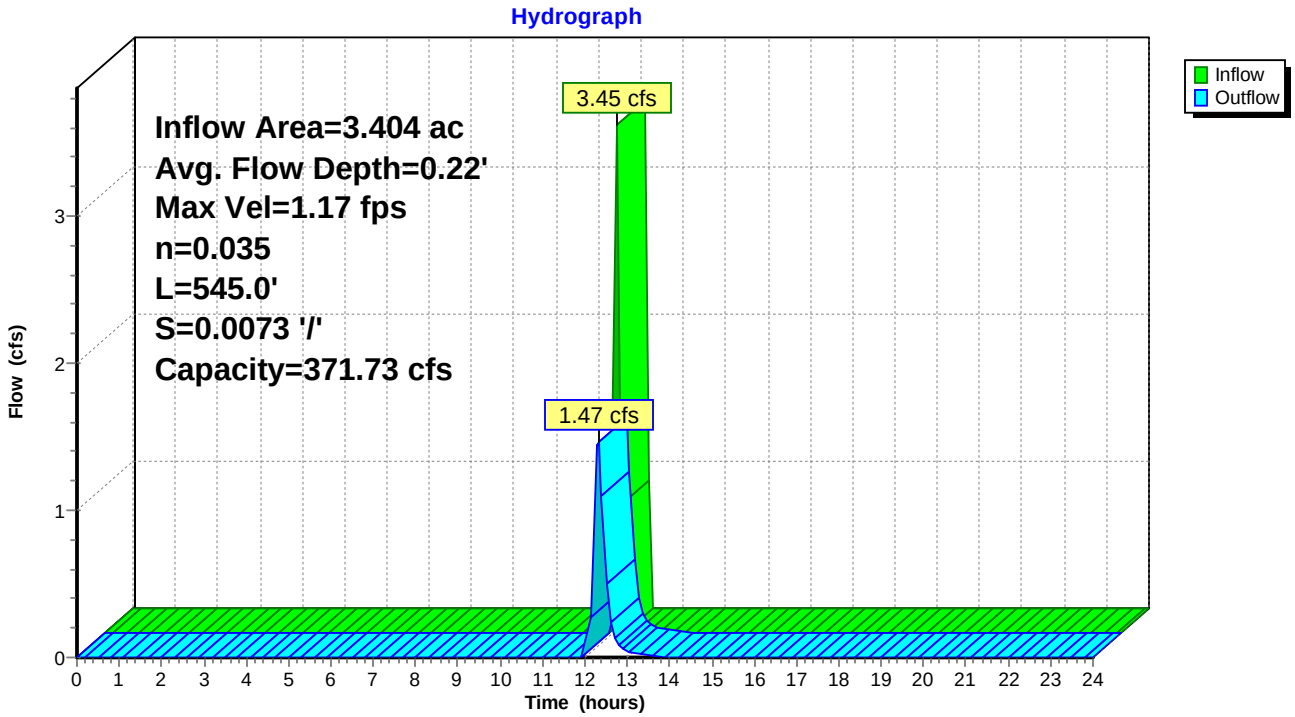
Reach 26R: existing stream on west side

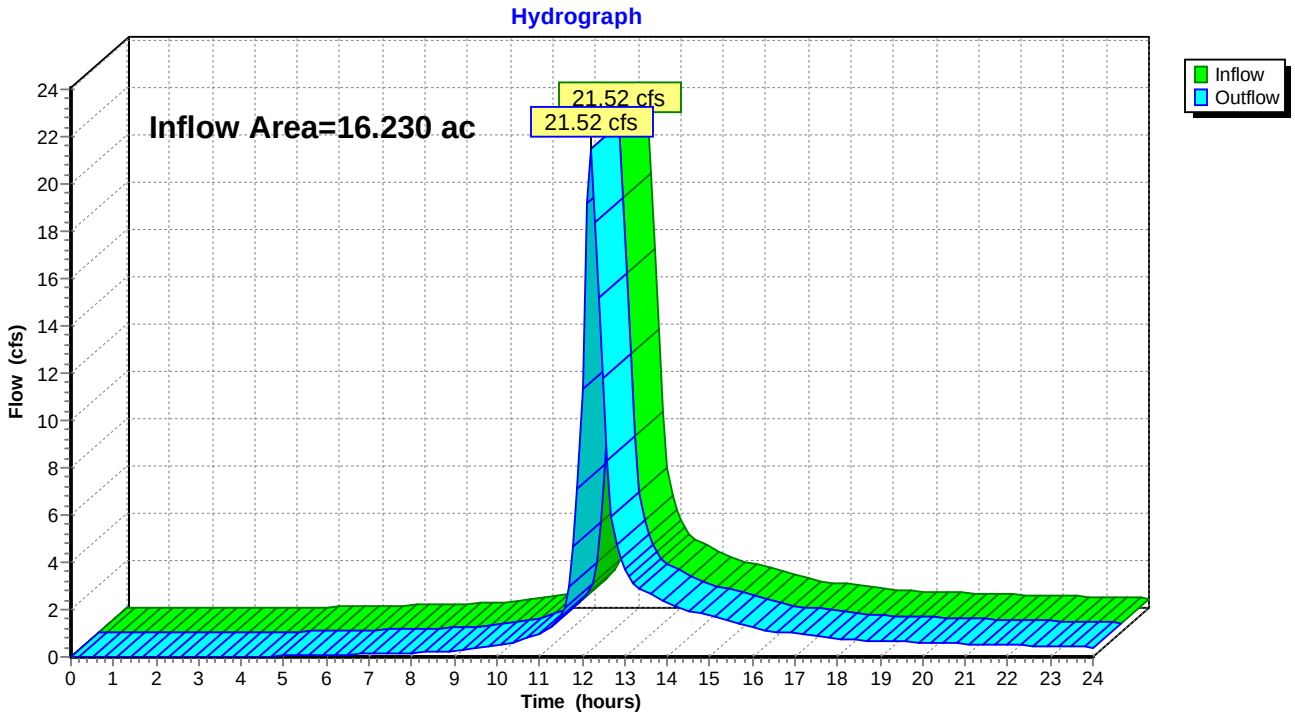


Summary for Reach X1: Area Summary Pre

Inflow Area = 16.230 ac, 12.83% Impervious, Inflow Depth > 1.71" for 2-Year event
Inflow = 21.52 cfs @ 12.19 hrs, Volume= 2.308 af
Outflow = 21.52 cfs @ 12.19 hrs, Volume= 2.308 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X1: Area Summary Pre



Summary for Pond 2P: Brandt Lane Existing Culverts

Inflow Area = 8.539 ac, 24.27% Impervious, Inflow Depth > 2.28" for 2-Year event
Inflow = 15.53 cfs @ 12.14 hrs, Volume= 1.620 af
Outflow = 15.21 cfs @ 12.16 hrs, Volume= 1.607 af, Atten= 2%, Lag= 1.0 min
Primary = 15.21 cfs @ 12.16 hrs, Volume= 1.607 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 460.03' @ 12.16 hrs Surf.Area= 788 sf Storage= 1,120 cf

Plug-Flow detention time= 10.4 min calculated for 1.607 af (99% of inflow)
Center-of-Mass det. time= 5.7 min (813.5 - 807.8)

Volume	Invert	Avail.Storage	Storage Description
#1	455.40'	31,204 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

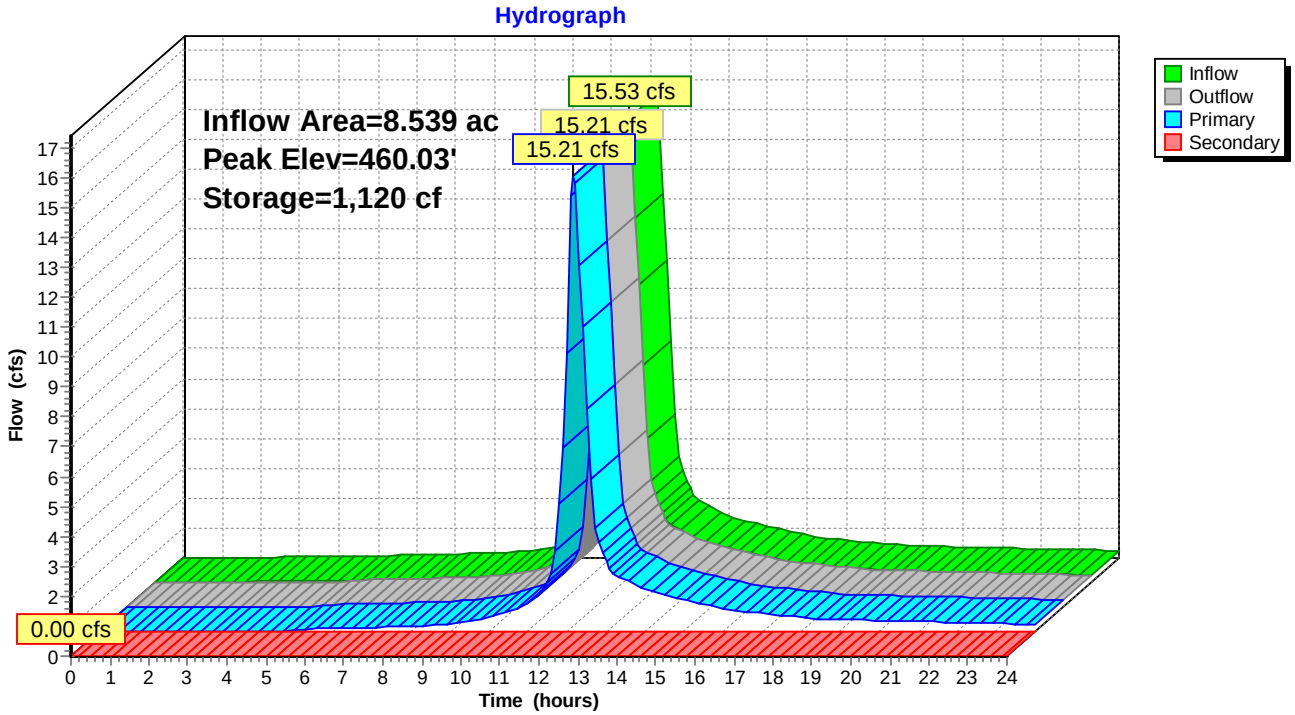
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
455.40	0	0	0
456.00	4	1	1
458.00	163	167	168
460.00	767	930	1,098
461.00	1,520	1,144	2,242
462.00	3,690	2,605	4,847
463.00	12,362	8,026	12,873
464.00	24,300	18,331	31,204

Device	Routing	Invert	Outlet Devices
#1	Primary	459.40'	**30.0" Round Culvert X 3.00** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.40' / 458.74' S= 0.0264 '/' Cc= 0.900 n= 0.015, Flow Area= 4.91 sf
#2	Primary	459.00'	**36.0" Round Culvert** L= 18.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.00' / 458.40' S= 0.0324 '/' Cc= 0.900 n= 0.015, Flow Area= 7.07 sf
#3	Secondary	462.00'	**46.0' long x 12.0' breadth Broad-Crested Rectangular Weir (road fill section)** 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

Primary OutFlow Max=14.83 cfs @ 12.16 hrs HW=460.02' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.57 cfs @ 2.68 fps)
└**2=Culvert** (Inlet Controls 7.25 cfs @ 3.43 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=455.40' (Free Discharge)
└**3=Broad-Crested Rectangular Weir (road fill section)** (Controls 0.00 cfs)

Pond 2P: Brandt Lane Existing Culverts



Summary for Pond 212P: Long Culvert

Inflow	=	5.29 cfs @	12.14 hrs,	Volume=	0.679 af
Outflow	=	5.30 cfs @	12.15 hrs,	Volume=	0.679 af, Atten= 0%, Lag= 0.1 min
Primary	=	5.30 cfs @	12.15 hrs,	Volume=	0.679 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 462.35' @ 12.15 hrs Surf.Area= 46 sf Storage= 21 cf

Plug-Flow detention time= 0.0 min calculated for 0.676 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (795.1 - 795.0)

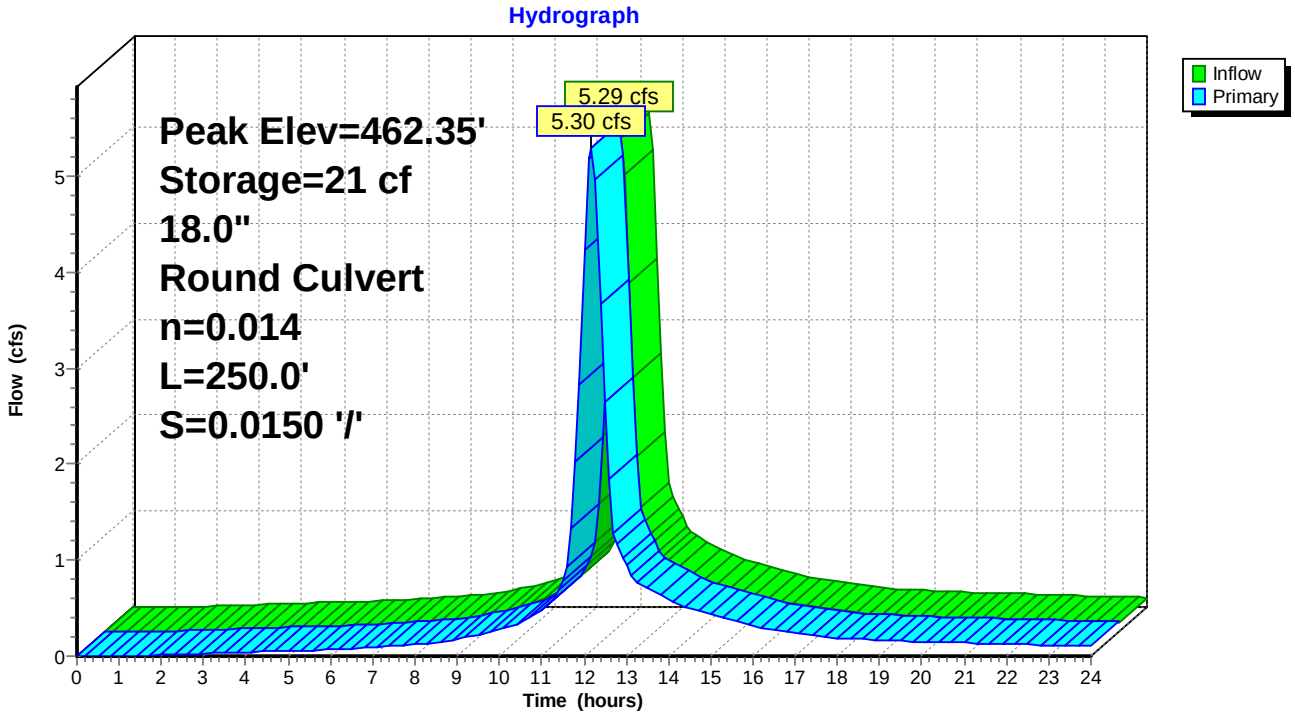
Volume	Invert	Avail.Storage	Storage Description
#1	461.00'	858 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
461.00	0	0.0	0	0	0
463.00	102	44.4	68	68	163
465.00	798	126.3	790	858	1,289

Device	Routing	Invert	Outlet Devices
#1	Primary	461.20'	**18.0" Round 18" Culvert to South** L= 250.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 461.20' / 457.44' S= 0.0150 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=5.17 cfs @ 12.15 hrs HW=462.33' (Free Discharge)
1=18" Culvert to South (Inlet Controls 5.17 cfs @ 3.62 fps)

Pond 212P: Long Culvert



Summary for Pond 213P: Northwest Wetland

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth > 2.52" for 2-Year event
Inflow = 8.49 cfs @ 12.11 hrs, Volume= 0.715 af
Outflow = 8.72 cfs @ 12.11 hrs, Volume= 0.715 af, Atten= 0%, Lag= 0.1 min
Primary = 3.45 cfs @ 12.11 hrs, Volume= 0.036 af
Secondary = 5.30 cfs @ 12.13 hrs, Volume= 0.680 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.23' @ 12.13 hrs Surf.Area= 561 sf Storage= 301 cf

Plug-Flow detention time= 0.6 min calculated for 0.715 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (790.0 - 789.4)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

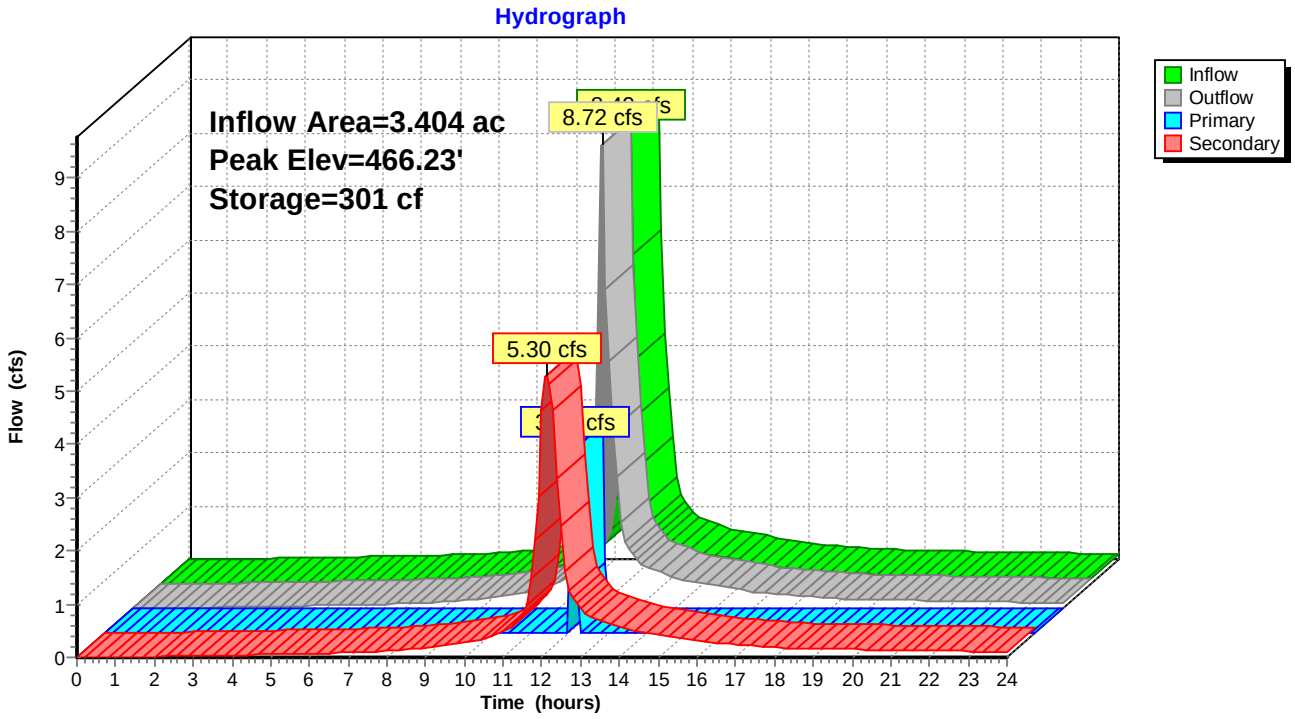
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing Stream- model as b/c we** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**18.0" Round 18" Culvert to South** L= 26.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 465.08' / 464.54' S= 0.0202 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf
#3	Secondary	467.08'	**20.0' long x 10.0' breadth Flow over topping to channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.10 cfs @ 12.11 hrs HW=466.22' (Free Discharge)
└─**1=Discharge to West to Existing Stream- model as b/c weir** (Weir Controls 2.10 cfs @ 0.39 fps)

Secondary OutFlow Max=5.21 cfs @ 12.13 hrs HW=466.22' (Free Discharge)
├─**2=18" Culvert to South** (Inlet Controls 5.21 cfs @ 3.63 fps)
└─**3=Flow over topping to channel - model as b/c weir** (Controls 0.00 cfs)

Pond 213P: Northwest Wetland

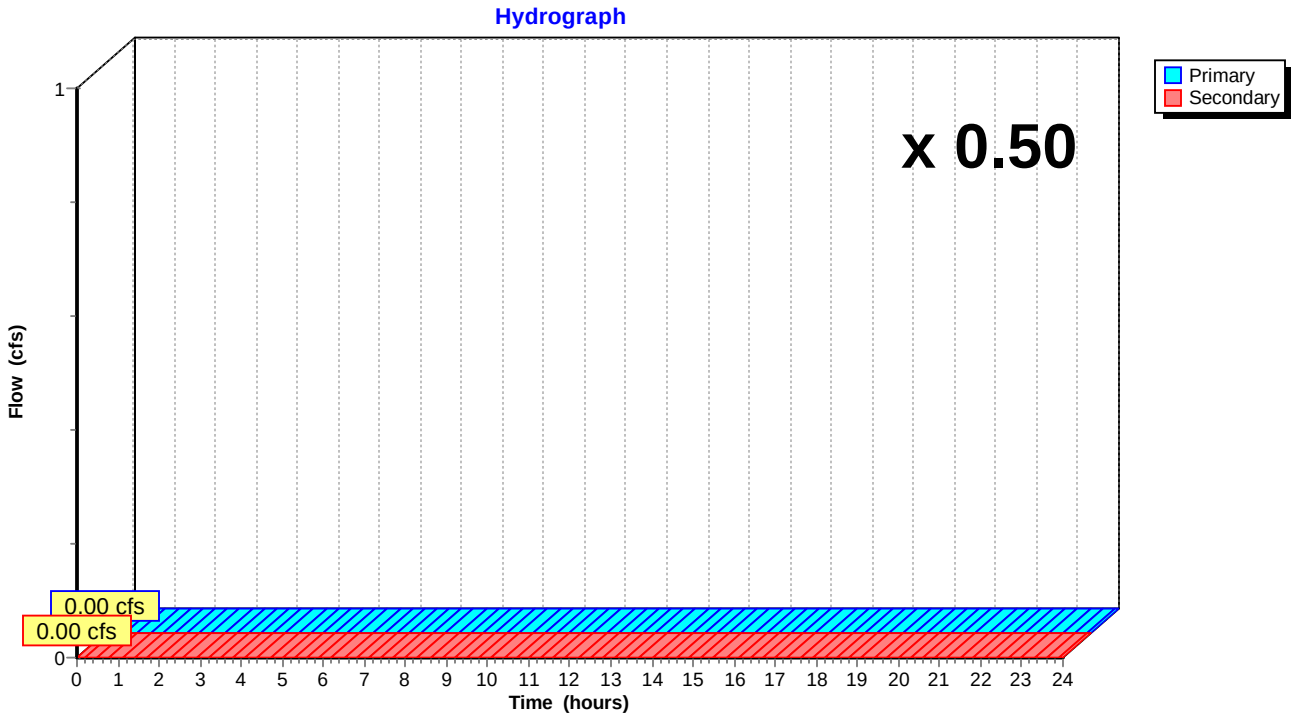


Summary for Link 214L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 214L: Diverging Flow



Summary for Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane

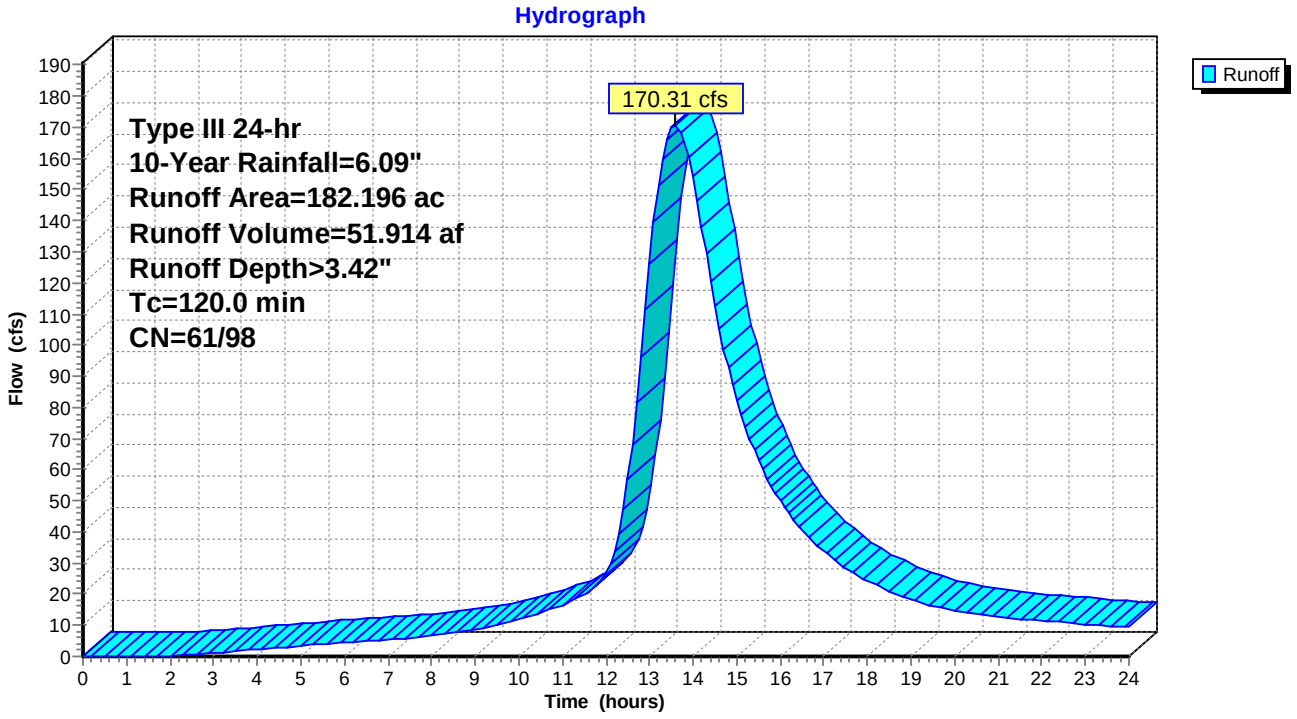
Runoff = 170.31 cfs @ 13.58 hrs, Volume= 51.914 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane



Summary for Subcatchment 6S: Runoff from existing road and runon only

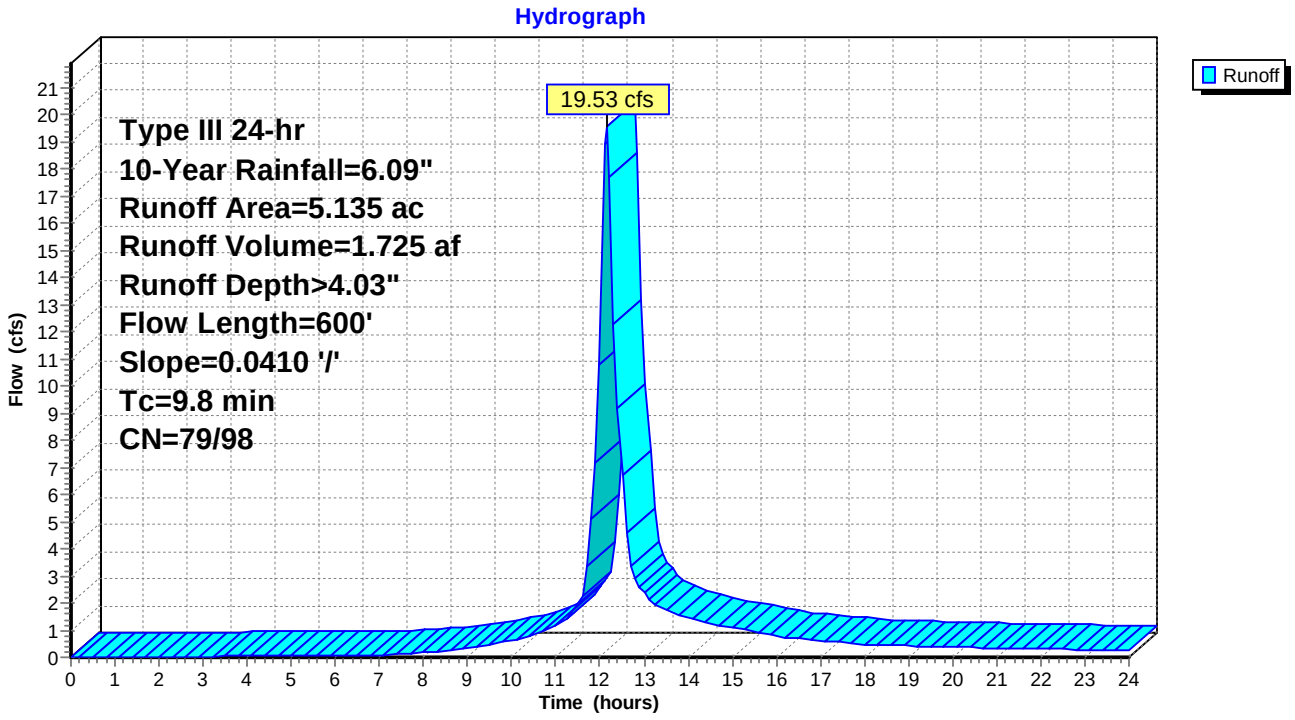
Runoff = 19.53 cfs @ 12.14 hrs, Volume= 1.725 af, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (ac)	CN	Description
	0.250	70	Woods, Good, HSG C
	1.915	65	Brush, Good, HSG C
	0.680	98	Paved parking, HSG C
*	2.290	92	Dirt roads, HSG C, stones, bit. conc.
	5.135	82	Weighted Average
	4.455	79	86.76% Pervious Area
	0.680	98	13.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	600	0.0410	1.02		**Lag/CN Method,**

Subcatchment 6S: Runoff from existing road and runon only



Summary for Subcatchment 7S: Contribution Area to Existing Stream including onsite area only

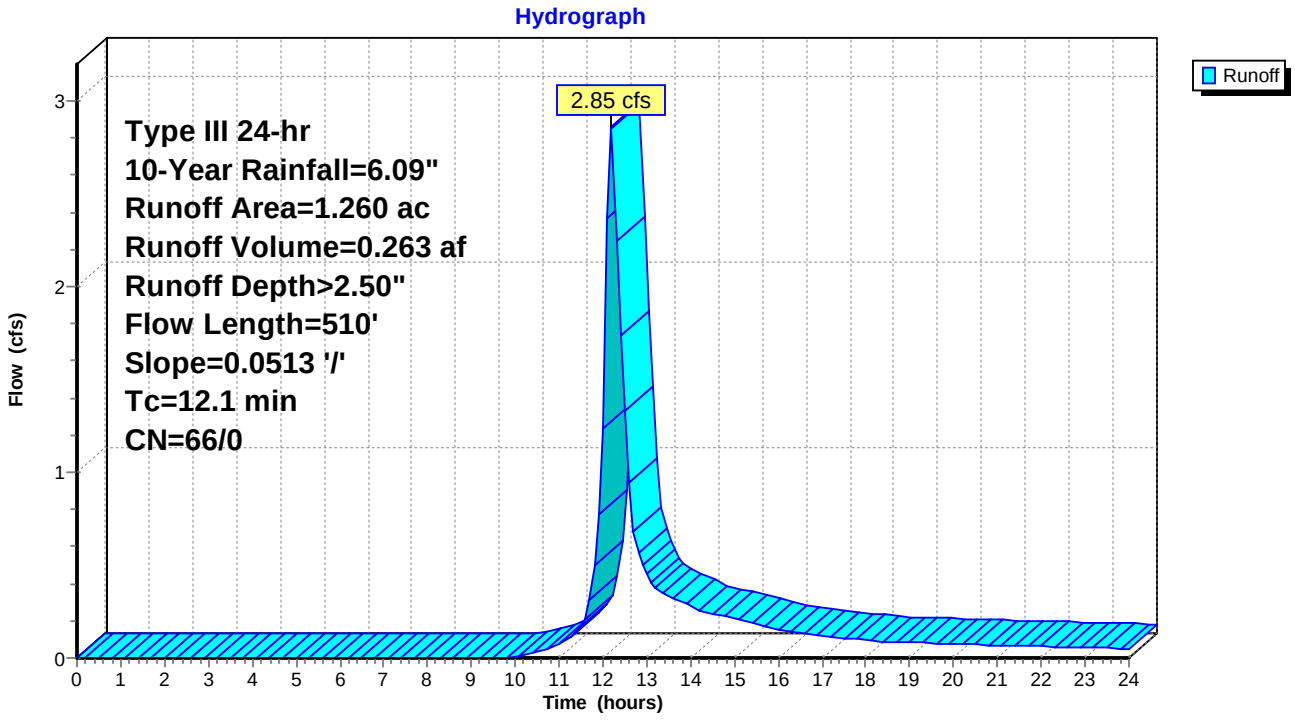
Runoff = 2.85 cfs @ 12.19 hrs, Volume= 0.263 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (ac)	CN	Description
1.210	65	Brush, Good, HSG C
0.050	87	Dirt roads, HSG C
1.260	66	Weighted Average
1.260	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	510	0.0513	0.70		**Lag/CN Method,**

Subcatchment 7S: Contribution Area to Existing Stream including onsite area only



Summary for Subcatchment 8S: Onsite Northwest

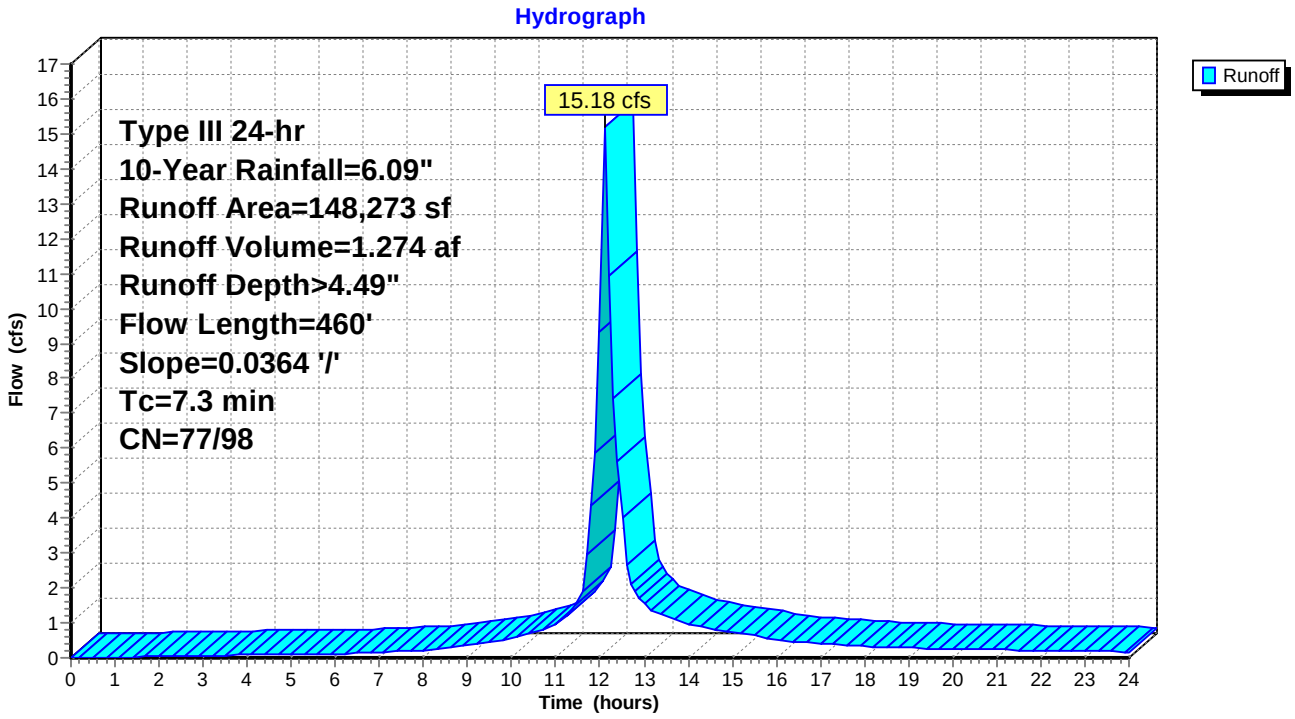
Runoff = 15.18 cfs @ 12.11 hrs, Volume= 1.274 af, Depth> 4.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
	6,482	58	Woods/grass comb., Good, HSG B
	48,881	80	>75% Grass cover, Good, HSG D
	32,266	77	Woods, Good, HSG D
*	3,299	98	Impervious BLDG and Trailers
*	57,345	98	Paved Area
	148,273	86	Weighted Average
	87,629	77	59.10% Pervious Area
	60,644	98	40.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	460	0.0364	1.05		**Lag/CN Method,**

Subcatchment 8S: Onsite Northwest



ummary for Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dra

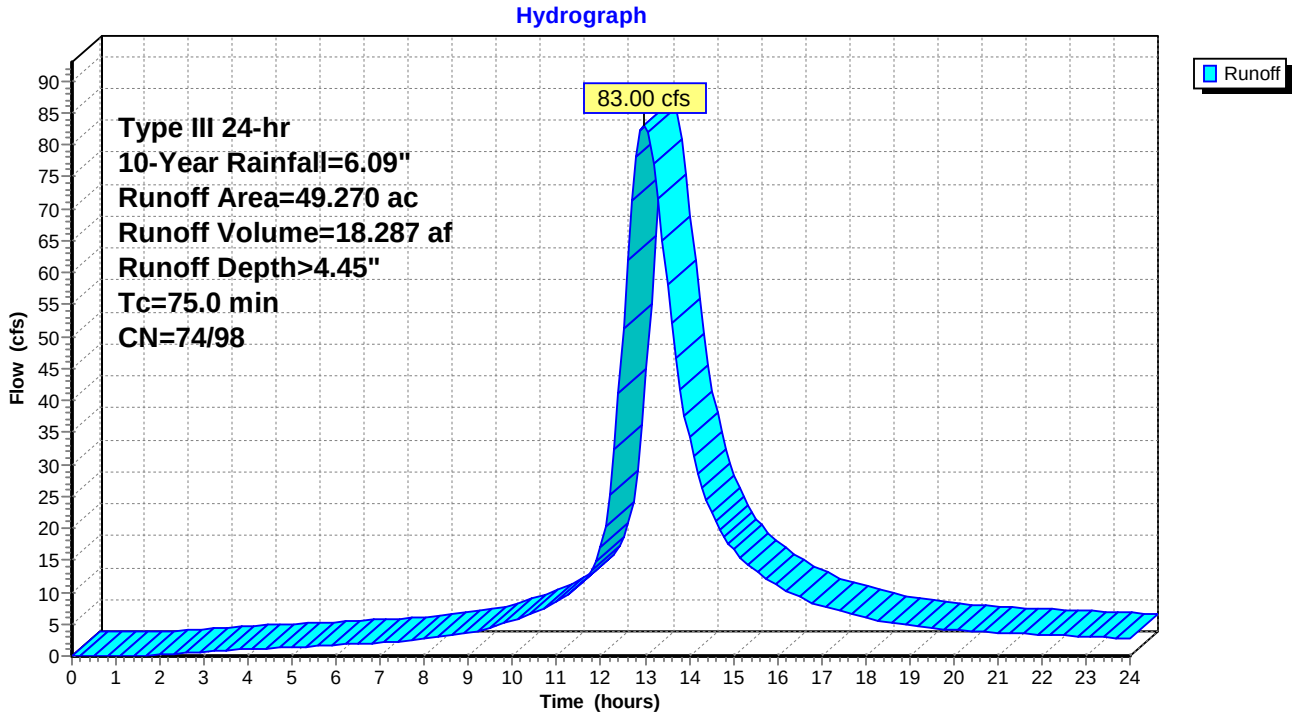
Runoff = 83.00 cfs @ 12.98 hrs, Volume= 18.287 af, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 10S: Overland Flow to PINE HILL ROAD

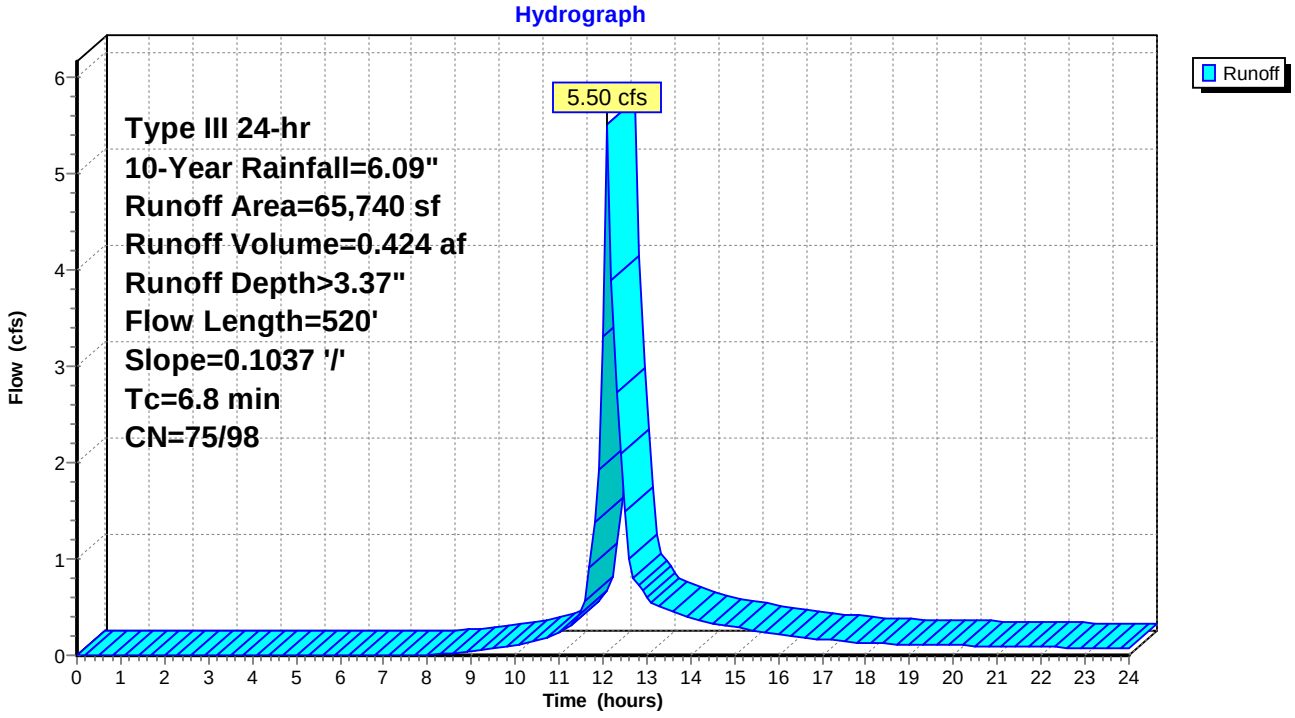
Runoff = 5.50 cfs @ 12.11 hrs, Volume= 0.424 af, Depth> 3.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
20,156	87	Dirt roads, HSG C
2,183	65	Brush, Good, HSG C
418	98	Roofs, HSG C
42,983	70	Woods, Good, HSG C
65,740	75	Weighted Average
65,322	75	99.36% Pervious Area
418	98	0.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	520	0.1037	1.28		**Lag/CN Method,**

Subcatchment 10S: Overland Flow to PINE HILL ROAD



Summary for Subcatchment 11S: SW CORNER TO PINEHILL

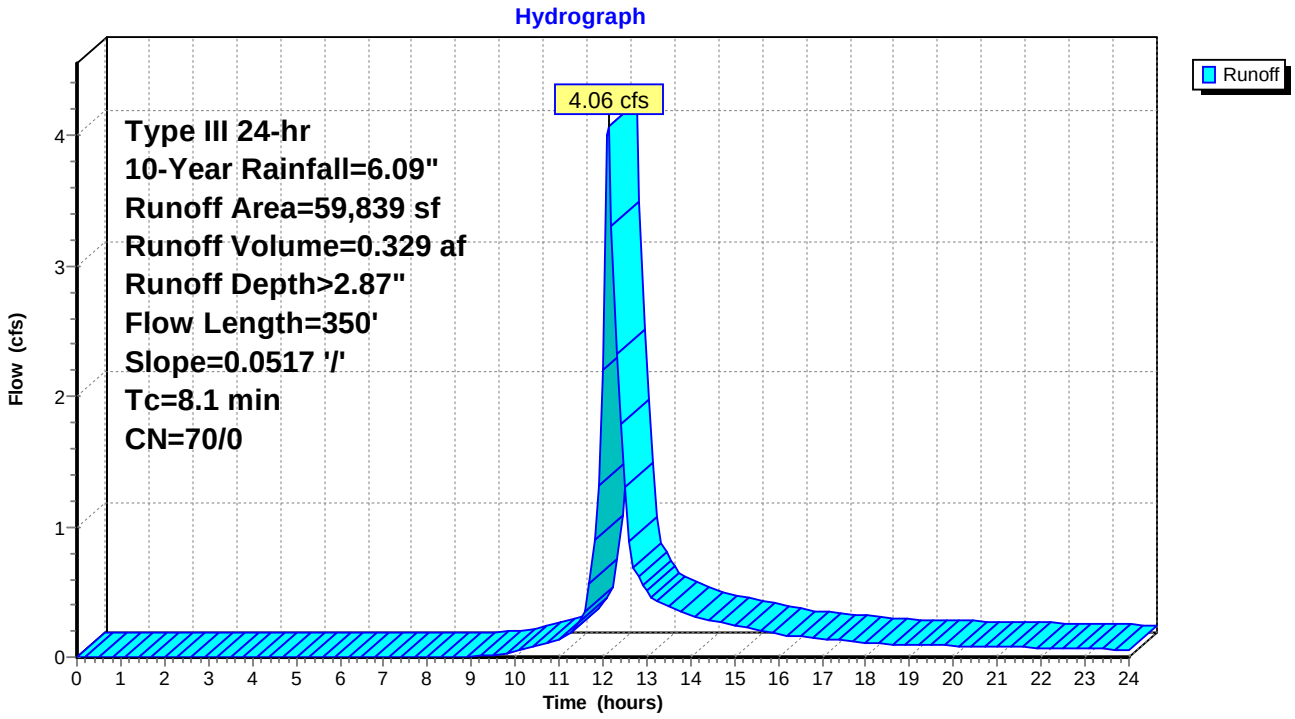
Runoff = 4.06 cfs @ 12.12 hrs, Volume= 0.329 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
59,839	70	Woods, Good, HSG C
59,839	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	350	0.0517	0.72		**Lag/CN Method,**

Subcatchment 11S: SW CORNER TO PINEHILL



Summary for Subcatchment 12S: Overland to SE BVW

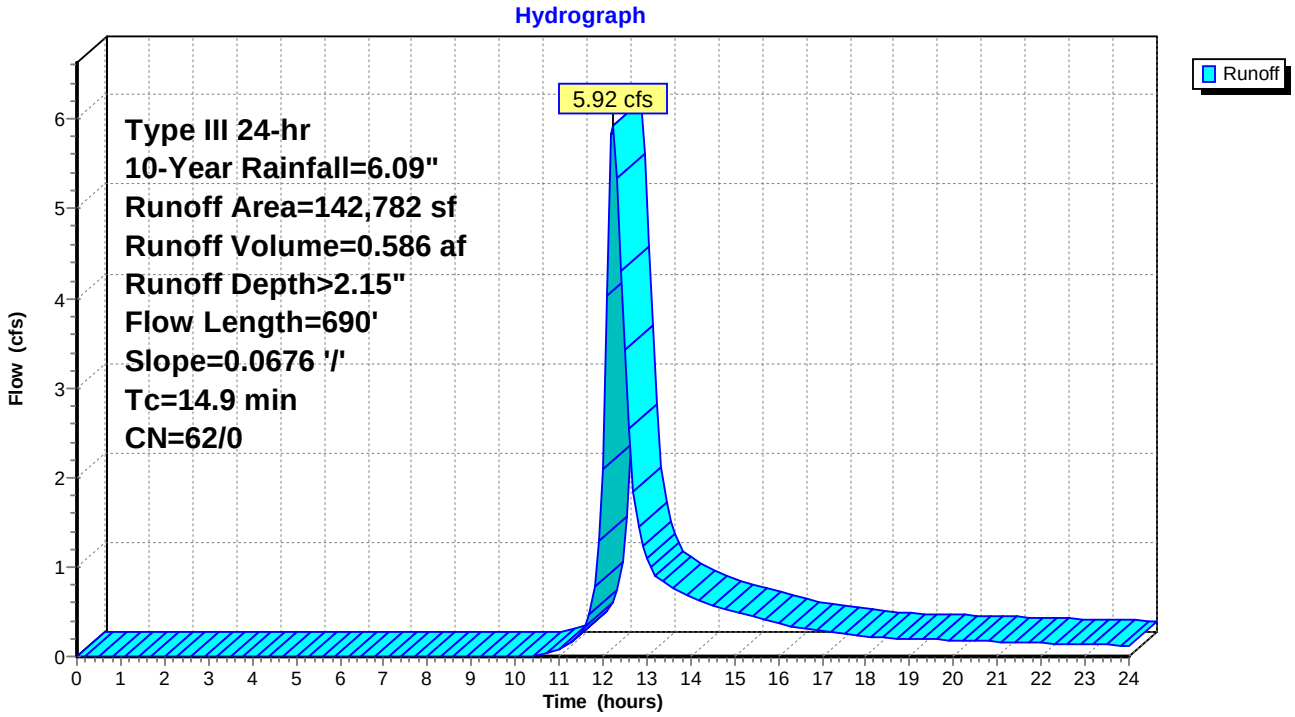
Runoff = 5.92 cfs @ 12.23 hrs, Volume= 0.586 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
58,053	70	Woods, Good, HSG C
4,548	77	Woods, Good, HSG D
80,181	55	Woods, Good, HSG B
142,782	62	Weighted Average
142,782	62	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	690	0.0676	0.77		**Lag/CN Method,**

Subcatchment 12S: Overland to SE BVW



Summary for Subcatchment 20S: NE Corner

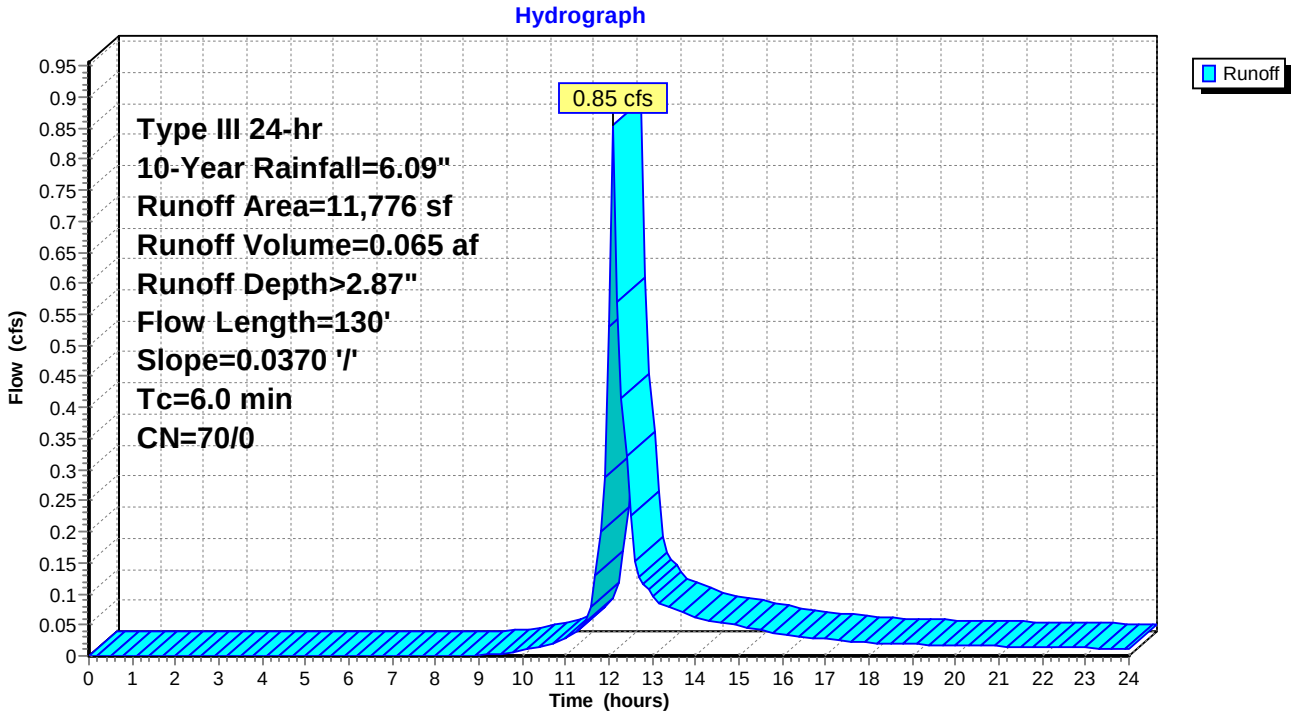
Runoff = 0.85 cfs @ 12.10 hrs, Volume= 0.065 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
11,776	70	Woods, Good, HSG C
11,776	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	130	0.0370	0.50		**Lag/CN Method,**
4.3	130	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20S: NE Corner



Summary for Reach 3R: Stream Channel from Brandt to Pine Hill

Inflow Area = 9.799 ac, 21.15% Impervious, Inflow Depth > 3.98" for 10-Year event
Inflow = 30.71 cfs @ 12.20 hrs, Volume= 3.248 af
Outflow = 30.41 cfs @ 12.22 hrs, Volume= 3.245 af, Atten= 1%, Lag= 1.3 min

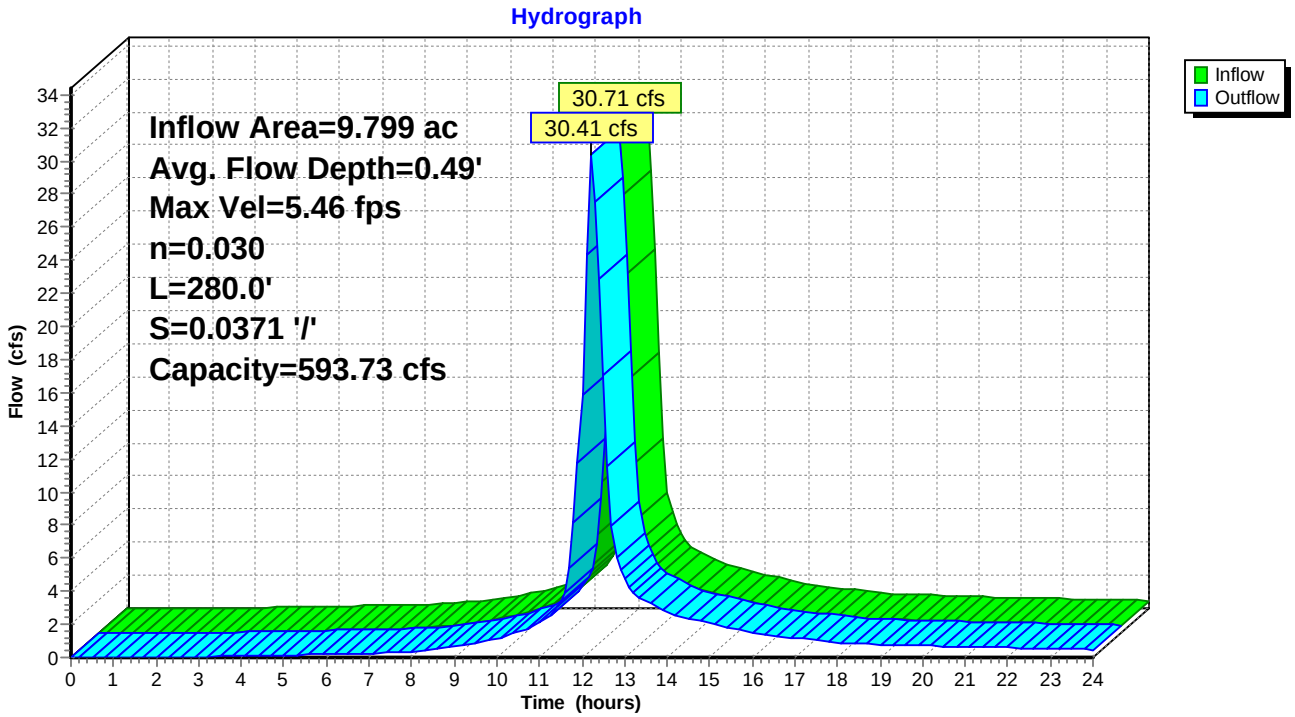
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 5.46 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 2.9 min

Peak Storage= 1,591 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 3R: Stream Channel from Brandt to Pine Hill

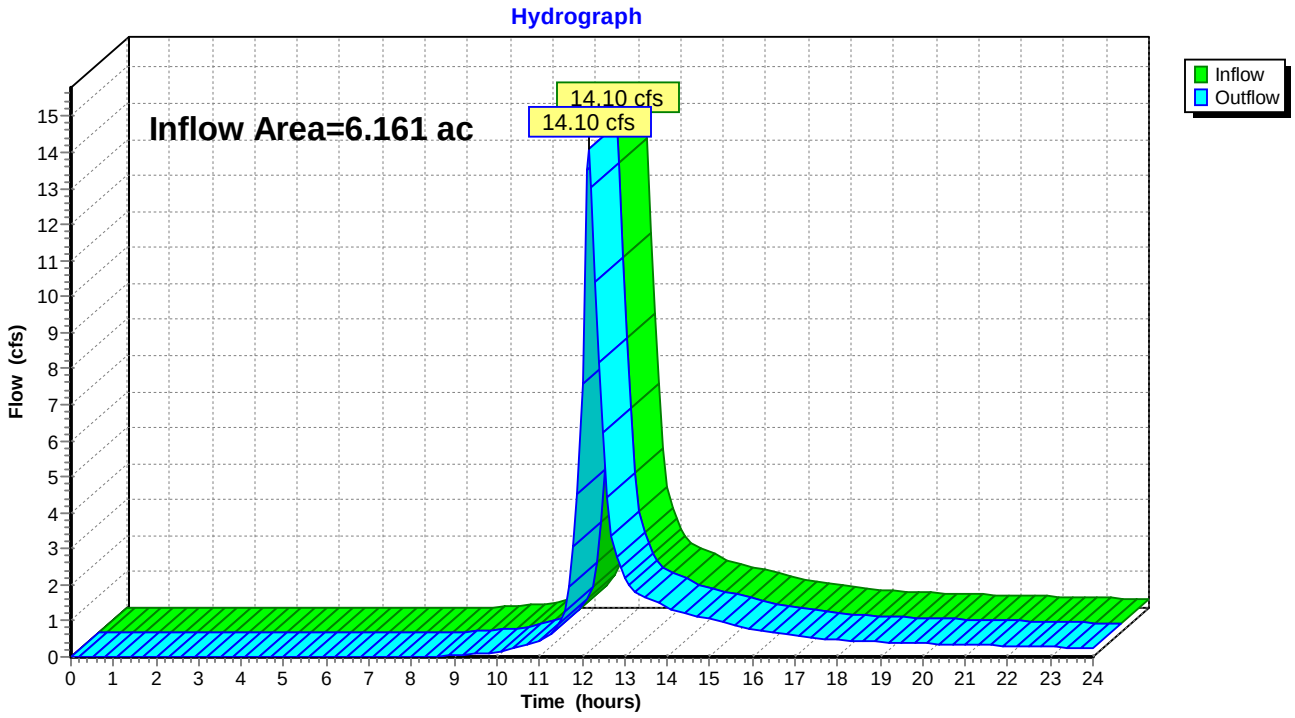


Summary for Reach 12R: PINE HILL ROAD

Inflow Area = 6.161 ac, 0.16% Impervious, Inflow Depth > 2.61" for 10-Year event
Inflow = 14.10 cfs @ 12.14 hrs, Volume= 1.339 af
Outflow = 14.10 cfs @ 12.14 hrs, Volume= 1.339 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 12R: PINE HILL ROAD

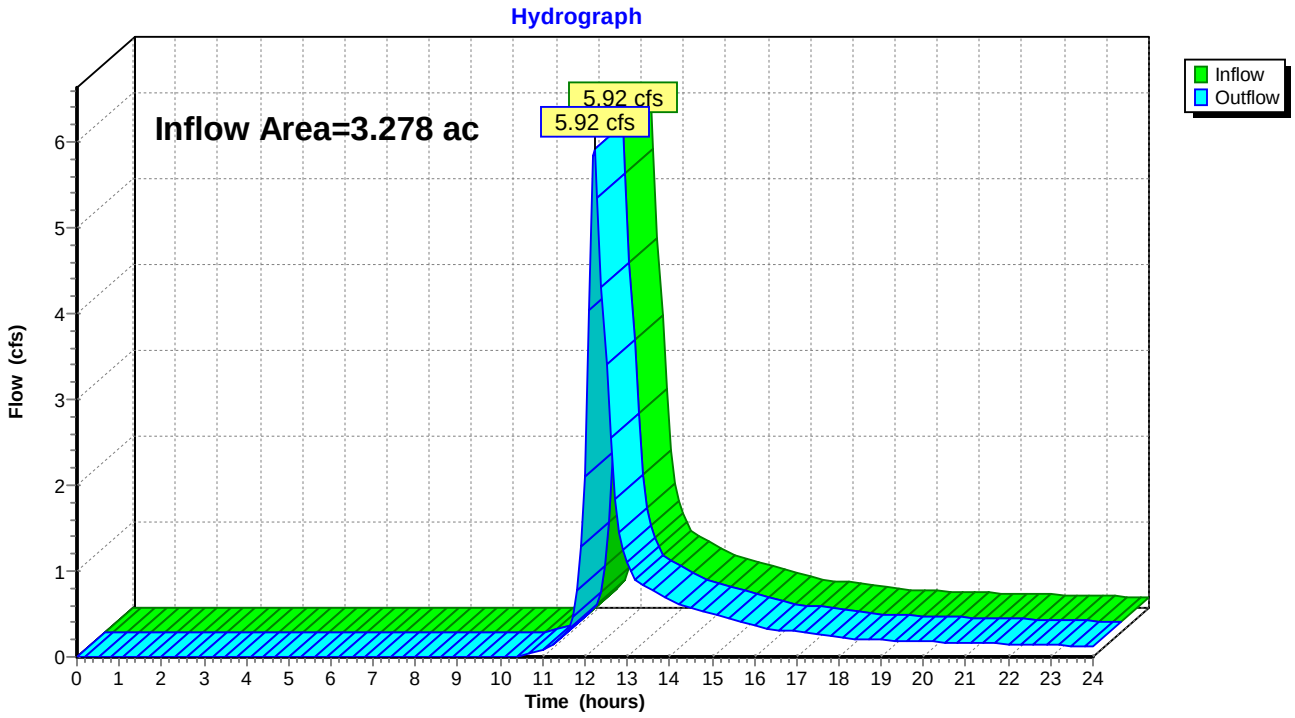


Summary for Reach 14R: SE BVW

Inflow Area = 3.278 ac, 0.00% Impervious, Inflow Depth > 2.15" for 10-Year event
Inflow = 5.92 cfs @ 12.23 hrs, Volume= 0.586 af
Outflow = 5.92 cfs @ 12.23 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 14R: SE BVW



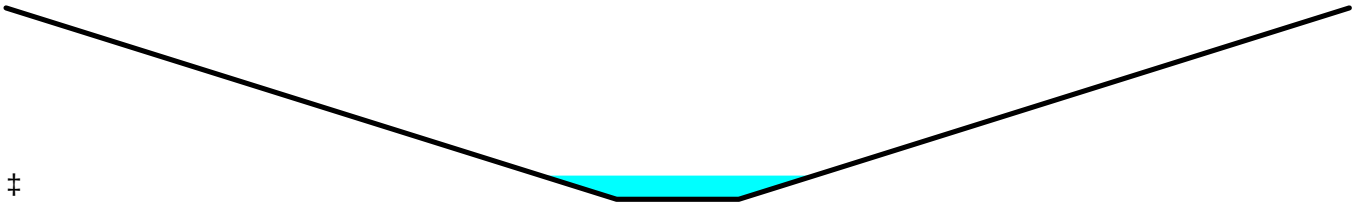
Summary for Reach 24R: crossing paved areas

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 0.66" for 10-Year event
Inflow = 7.07 cfs @ 12.27 hrs, Volume= 0.188 af
Outflow = 6.71 cfs @ 12.31 hrs, Volume= 0.188 af, Atten= 5%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.62 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 4.4 min

Peak Storage= 591 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 728.66 cfs

10.00' x 1.00' deep channel, n= 0.013 Asphalt, smooth
Side Slope Z-value= 50.0 '/' Top Width= 110.00'
Length= 300.0' Slope= 0.0253 '/'
Inlet Invert= 463.00', Outlet Invert= 455.40'



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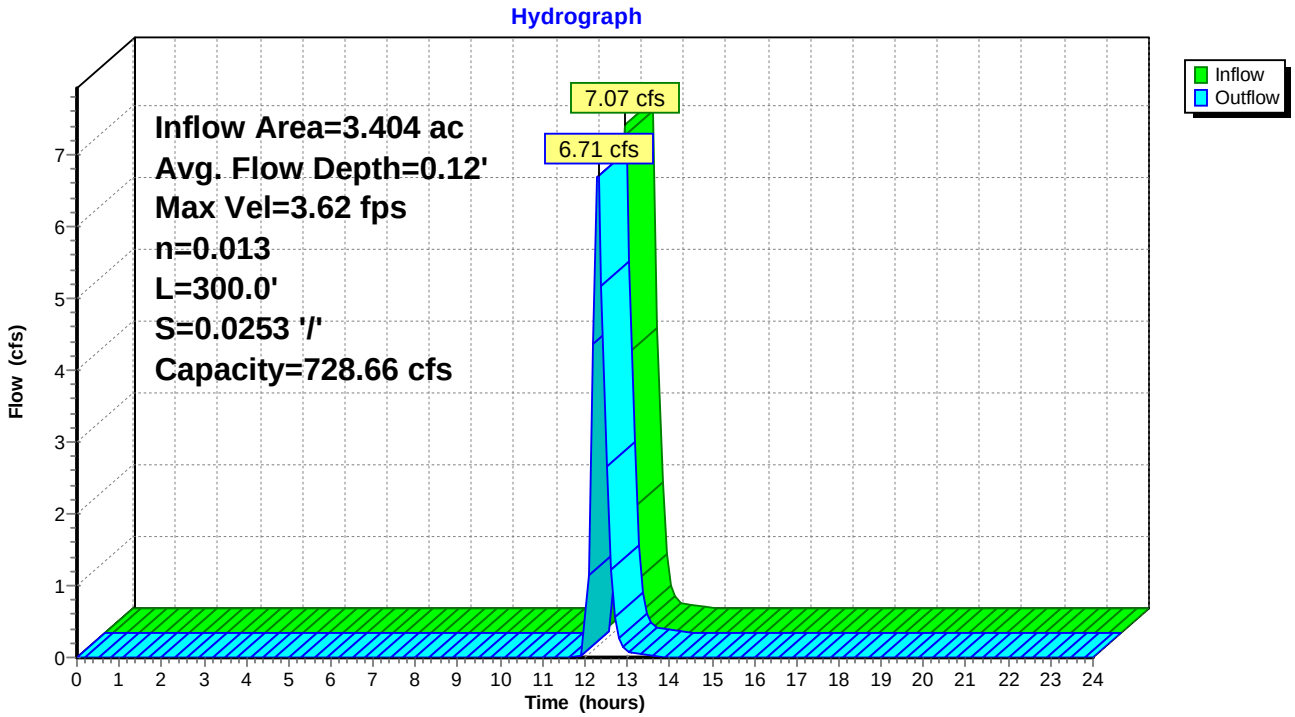
Reach 24R: crossing paved areas



Summary for Reach 25R: Open channel between debris and trailers

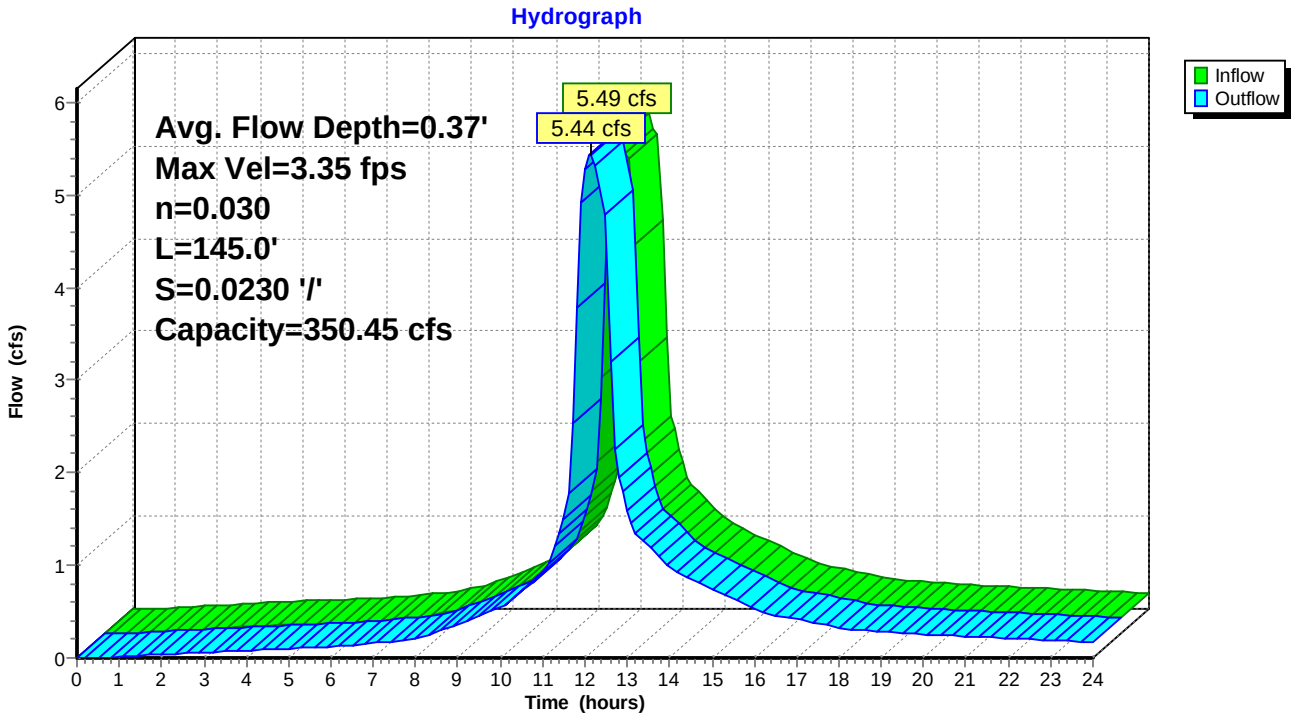
Inflow = 5.49 cfs @ 12.11 hrs, Volume= 1.086 af
Outflow = 5.44 cfs @ 12.14 hrs, Volume= 1.086 af, Atten= 1%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.35 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 1.9 min

Peak Storage= 236 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 350.45 cfs

3.50' x 3.00' deep channel, n= 0.030 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.5 '/' Top Width= 18.50'
Length= 145.0' Slope= 0.0230 '/'
Inlet Invert= 464.54', Outlet Invert= 461.20'

Reach 25R: Open channel between debris and trailers



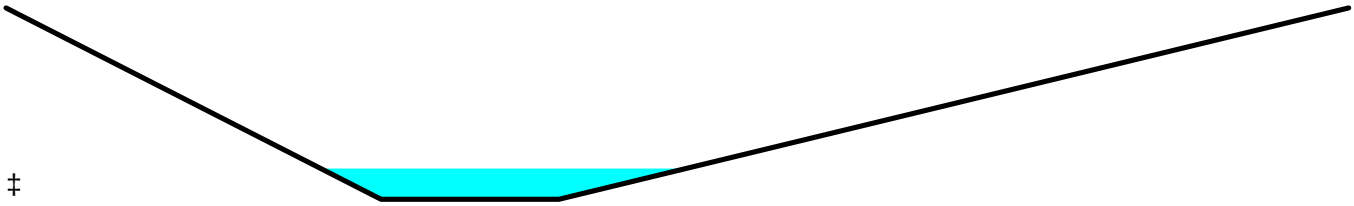
Summary for Reach 26R: existing stream on west side

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 0.66" for 10-Year event
Inflow = 9.51 cfs @ 12.11 hrs, Volume= 0.188 af
Outflow = 7.07 cfs @ 12.27 hrs, Volume= 0.188 af, Atten= 26%, Lag= 9.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.84 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 17.9 min

Peak Storage= 2,229 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



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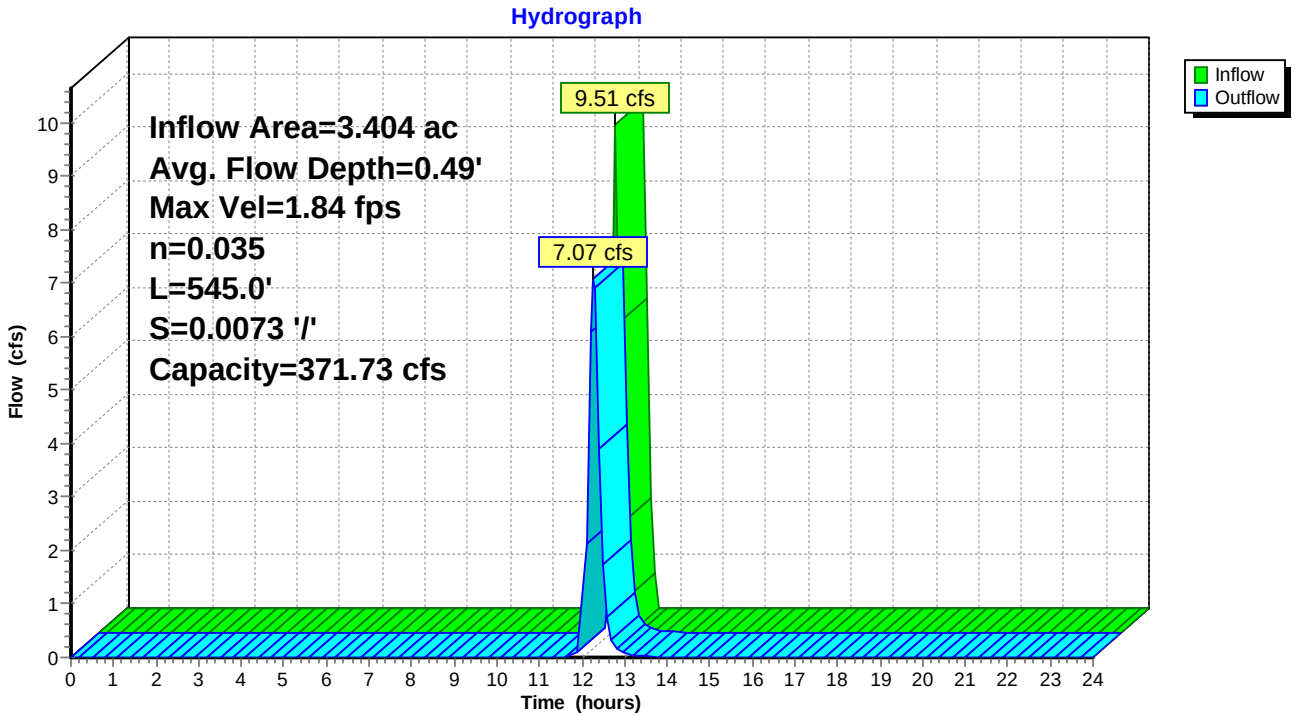
Reach 26R: existing stream on west side

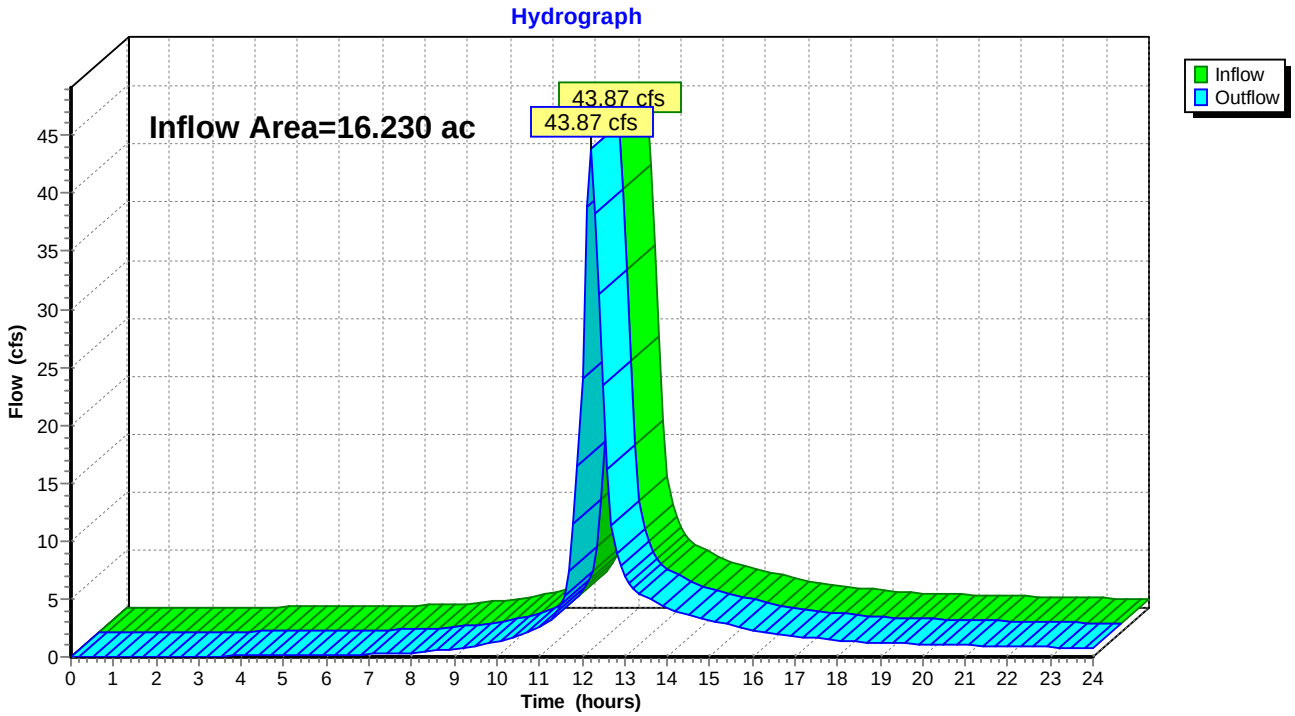


Summary for Reach X1: Area Summary Pre

Inflow Area = 16.230 ac, 12.83% Impervious, Inflow Depth > 3.44" for 10-Year event
Inflow = 43.87 cfs @ 12.20 hrs, Volume= 4.649 af
Outflow = 43.87 cfs @ 12.20 hrs, Volume= 4.649 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X1: Area Summary Pre



Summary for Pond 2P: Brandt Lane Existing Culverts

Inflow Area = 8.539 ac, 24.27% Impervious, Inflow Depth > 4.21" for 10-Year event
Inflow = 27.51 cfs @ 12.19 hrs, Volume= 2.999 af
Outflow = 27.86 cfs @ 12.20 hrs, Volume= 2.985 af, Atten= 0%, Lag= 0.5 min
Primary = 27.86 cfs @ 12.20 hrs, Volume= 2.985 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 460.32' @ 12.20 hrs Surf.Area= 1,009 sf Storage= 1,383 cf

Plug-Flow detention time= 6.3 min calculated for 2.985 af (100% of inflow)
Center-of-Mass det. time= 3.7 min (800.4 - 796.7)

Volume	Invert	Avail.Storage	Storage Description
#1	455.40'	31,204 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

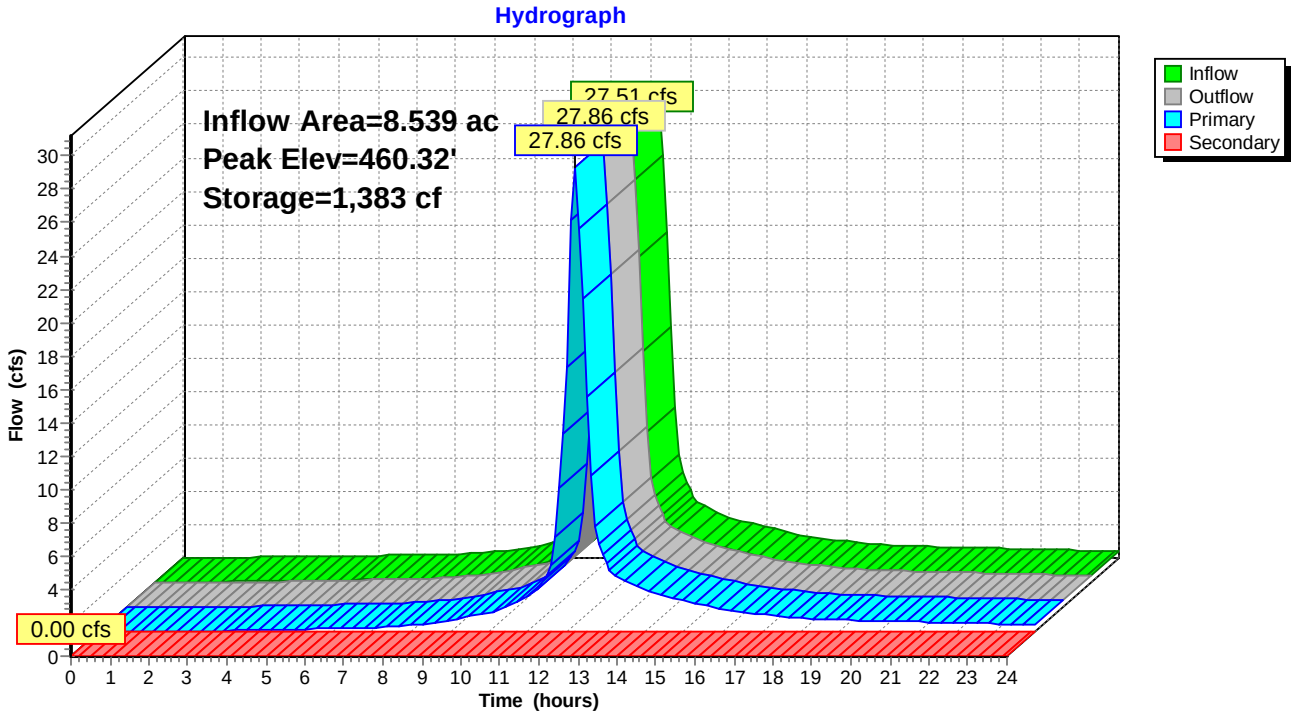
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
455.40	0	0	0
456.00	4	1	1
458.00	163	167	168
460.00	767	930	1,098
461.00	1,520	1,144	2,242
462.00	3,690	2,605	4,847
463.00	12,362	8,026	12,873
464.00	24,300	18,331	31,204

Device	Routing	Invert	Outlet Devices
#1	Primary	459.40'	**30.0" Round Culvert X 3.00** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.40' / 458.74' S= 0.0264 '/' Cc= 0.900 n= 0.015, Flow Area= 4.91 sf
#2	Primary	459.00'	**36.0" Round Culvert** L= 18.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.00' / 458.40' S= 0.0324 '/' Cc= 0.900 n= 0.015, Flow Area= 7.07 sf
#3	Secondary	462.00'	**46.0' long x 12.0' breadth Broad-Crested Rectangular Weir (road fill section)** 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

Primary OutFlow Max=27.71 cfs @ 12.20 hrs HW=460.32' (Free Discharge)
└**1=Culvert** (Inlet Controls 16.02 cfs @ 3.26 fps)
└**2=Culvert** (Inlet Controls 11.70 cfs @ 3.91 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=455.40' (Free Discharge)
└**3=Broad-Crested Rectangular Weir (road fill section)** (Controls 0.00 cfs)

Pond 2P: Brandt Lane Existing Culverts



Summary for Pond 212P: Long Culvert

Inflow	=	5.44 cfs @	12.14 hrs,	Volume=	1.086 af
Outflow	=	5.45 cfs @	12.15 hrs,	Volume=	1.086 af, Atten= 0%, Lag= 0.5 min
Primary	=	5.45 cfs @	12.15 hrs,	Volume=	1.086 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 462.37' @ 12.15 hrs Surf.Area= 48 sf Storage= 22 cf

Plug-Flow detention time= 0.0 min calculated for 1.081 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (792.7 - 792.7)

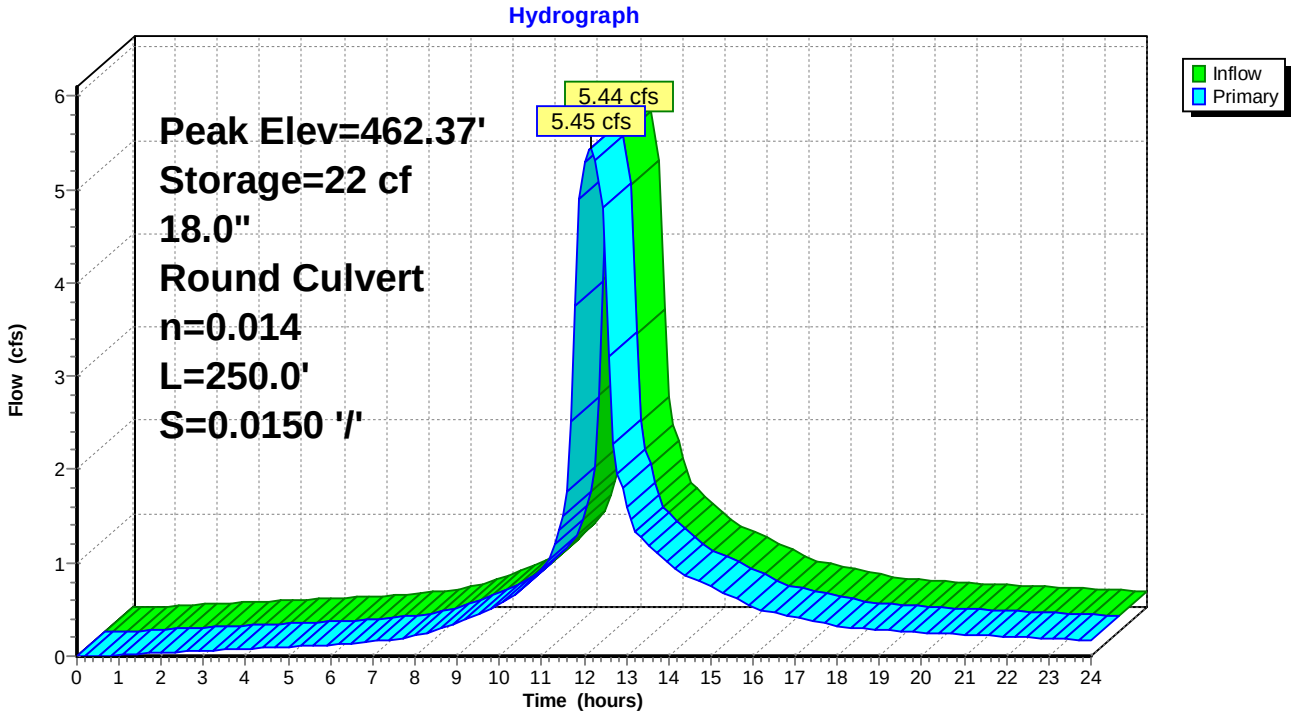
Volume	Invert	Avail.Storage	Storage Description
#1	461.00'	858 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
461.00	0	0.0	0	0	0
463.00	102	44.4	68	68	163
465.00	798	126.3	790	858	1,289

Device	Routing	Invert	Outlet Devices
#1	Primary	461.20'	**18.0" Round 18" Culvert to South** L= 250.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 461.20' / 457.44' S= 0.0150 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=5.42 cfs @ 12.15 hrs HW=462.37' (Free Discharge)
1=18" Culvert to South (Inlet Controls 5.42 cfs @ 3.68 fps)

Pond 212P: Long Culvert



Summary for Pond 213P: Northwest Wetland

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth > 4.49" for 10-Year event
Inflow = 15.18 cfs @ 12.11 hrs, Volume= 1.274 af
Outflow = 15.00 cfs @ 12.11 hrs, Volume= 1.274 af, Atten= 1%, Lag= 0.1 min
Primary = 9.51 cfs @ 12.11 hrs, Volume= 0.188 af
Secondary = 5.49 cfs @ 12.11 hrs, Volume= 1.086 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.26' @ 12.11 hrs Surf.Area= 569 sf Storage= 317 cf

Plug-Flow detention time= 0.6 min calculated for 1.269 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (781.7 - 781.2)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

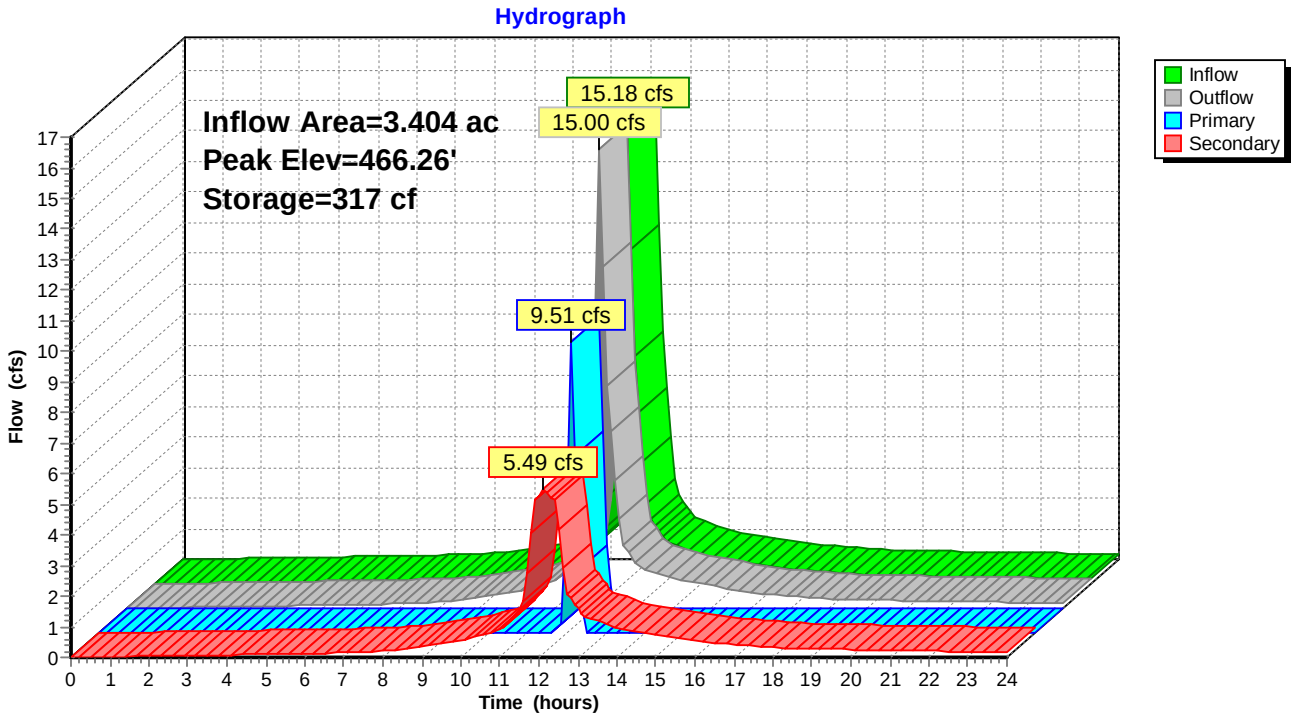
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing Stream- model as b/c we** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**18.0" Round 18" Culvert to South** L= 26.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 465.08' / 464.54' S= 0.0202 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf
#3	Secondary	467.08'	**20.0' long x 10.0' breadth Flow over topping to channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.79 cfs @ 12.11 hrs HW=466.25' (Free Discharge)
└**1=Discharge to West to Existing Stream- model as b/c weir** (Weir Controls 8.79 cfs @ 0.62 fps)

Secondary OutFlow Max=5.47 cfs @ 12.11 hrs HW=466.25' (Free Discharge)
├**2=18" Culvert to South** (Inlet Controls 5.47 cfs @ 3.69 fps)
└**3=Flow over topping to channel - model as b/c weir** (Controls 0.00 cfs)

Pond 213P: Northwest Wetland

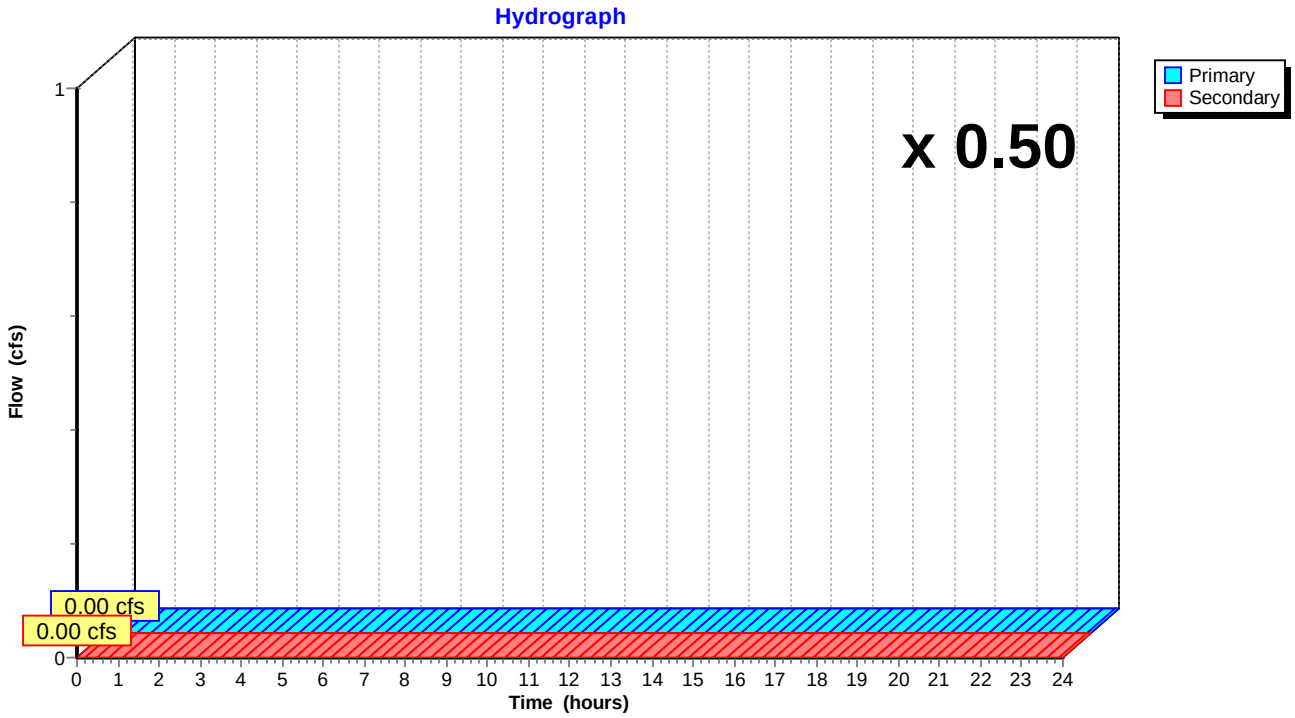


Summary for Link 214L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 214L: Diverging Flow



Summary for Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane

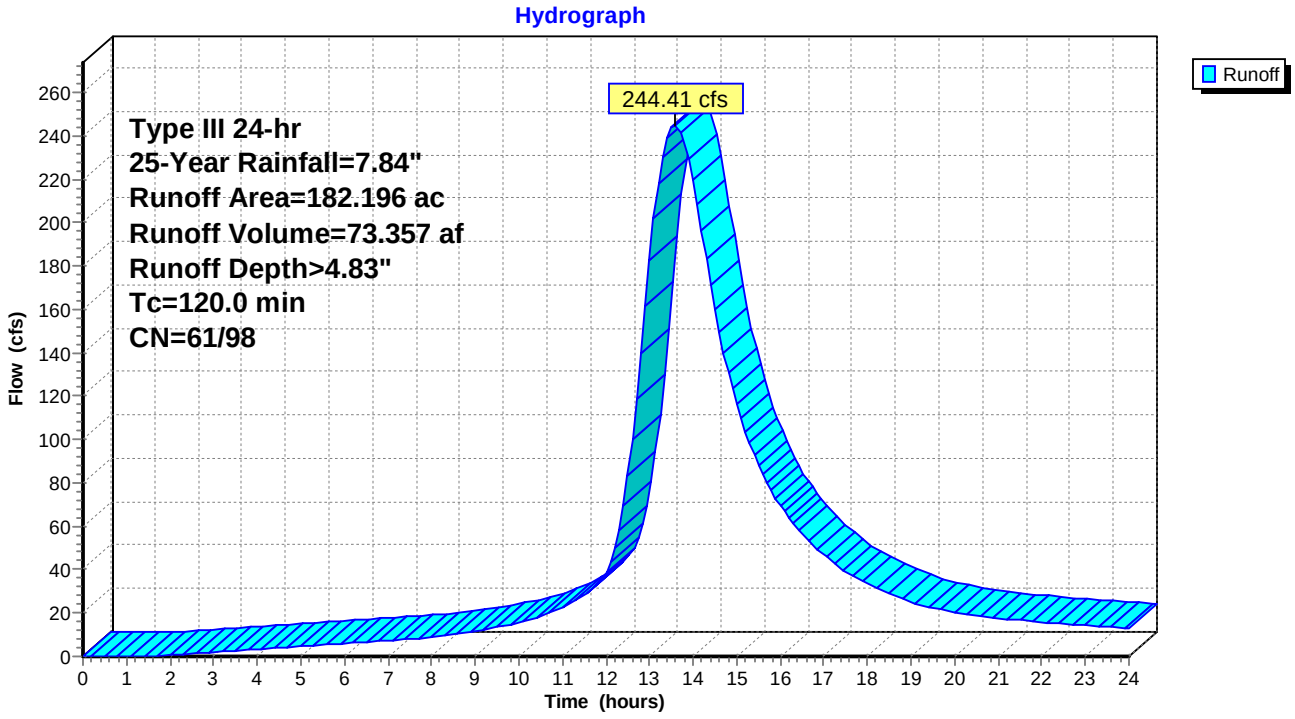
Runoff = 244.41 cfs @ 13.56 hrs, Volume= 73.357 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane



Summary for Subcatchment 6S: Runoff from existing road and runon only

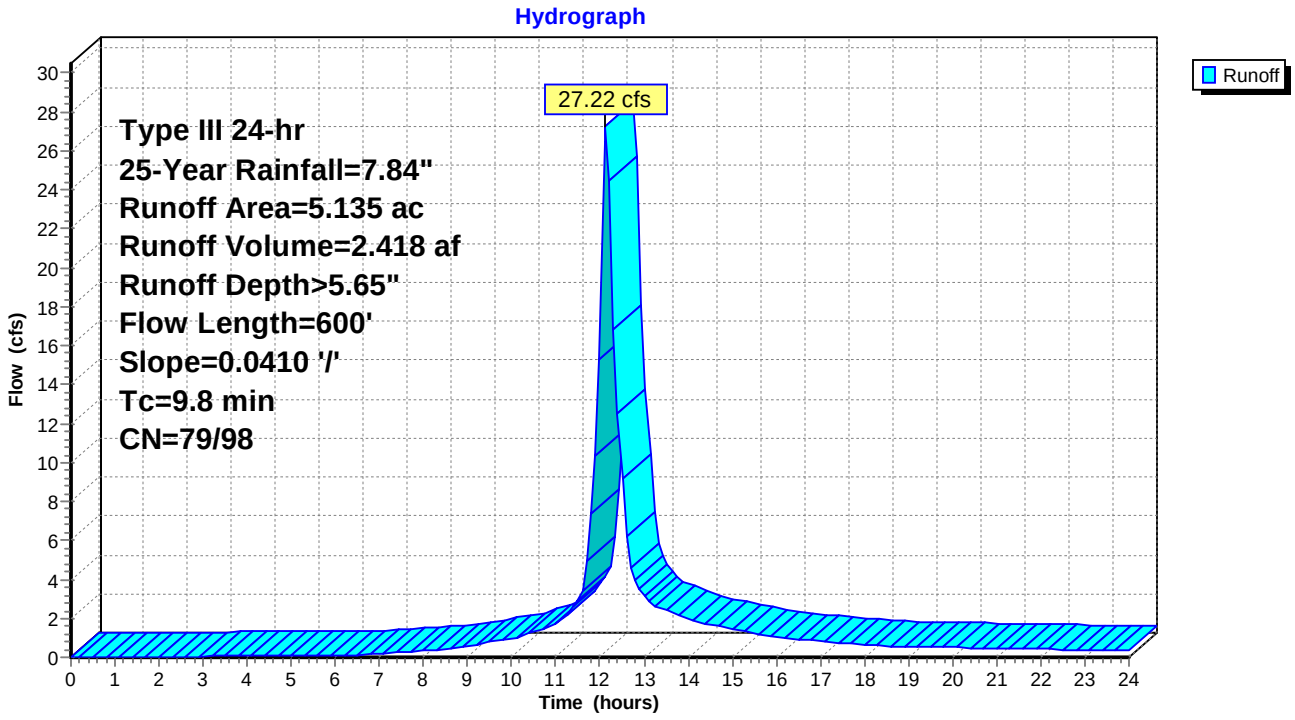
Runoff = 27.22 cfs @ 12.14 hrs, Volume= 2.418 af, Depth> 5.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (ac)	CN	Description
	0.250	70	Woods, Good, HSG C
	1.915	65	Brush, Good, HSG C
	0.680	98	Paved parking, HSG C
*	2.290	92	Dirt roads, HSG C, stones, bit. conc.
	5.135	82	Weighted Average
	4.455	79	86.76% Pervious Area
	0.680	98	13.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	600	0.0410	1.02		**Lag/CN Method,**

Subcatchment 6S: Runoff from existing road and runon only



Summary for Subcatchment 7S: Contribution Area to Existing Stream including onsite area only

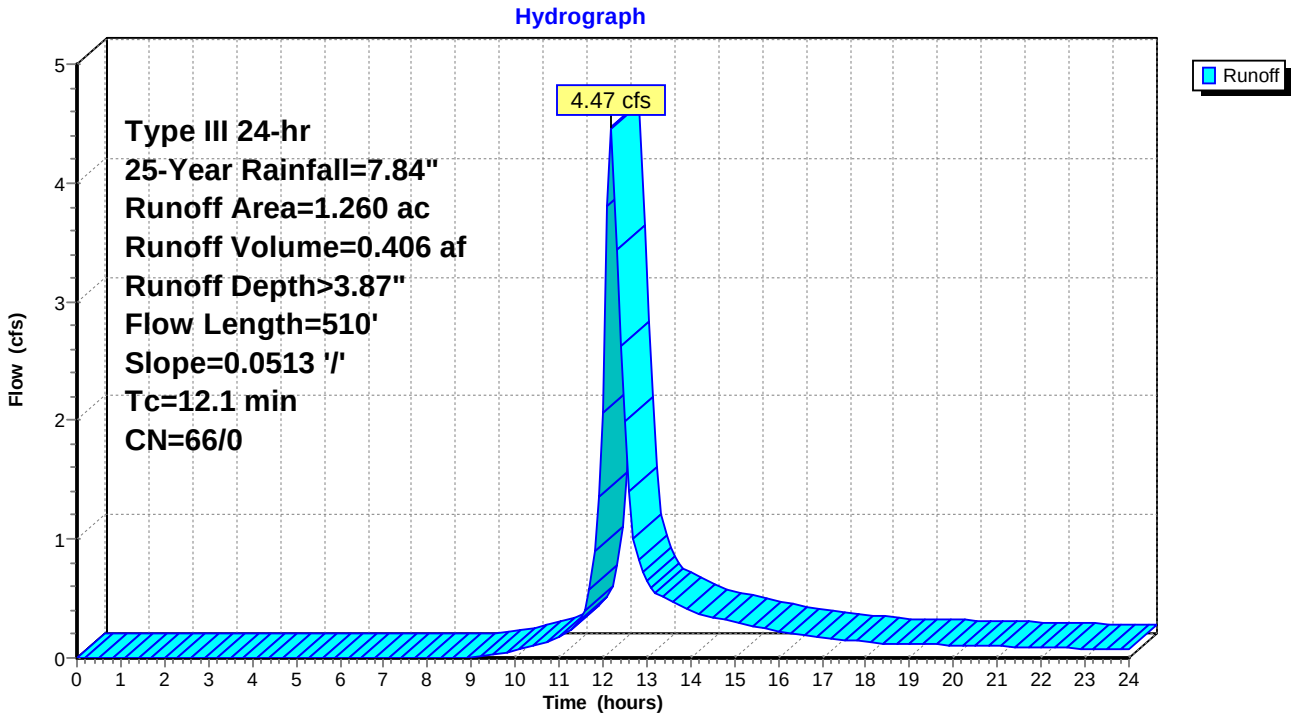
Runoff = 4.47 cfs @ 12.19 hrs, Volume= 0.406 af, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (ac)	CN	Description
1.210	65	Brush, Good, HSG C
0.050	87	Dirt roads, HSG C
1.260	66	Weighted Average
1.260	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	510	0.0513	0.70		**Lag/CN Method,**

Subcatchment 7S: Contribution Area to Existing Stream including onsite area only



Summary for Subcatchment 8S: Onsite Northwest

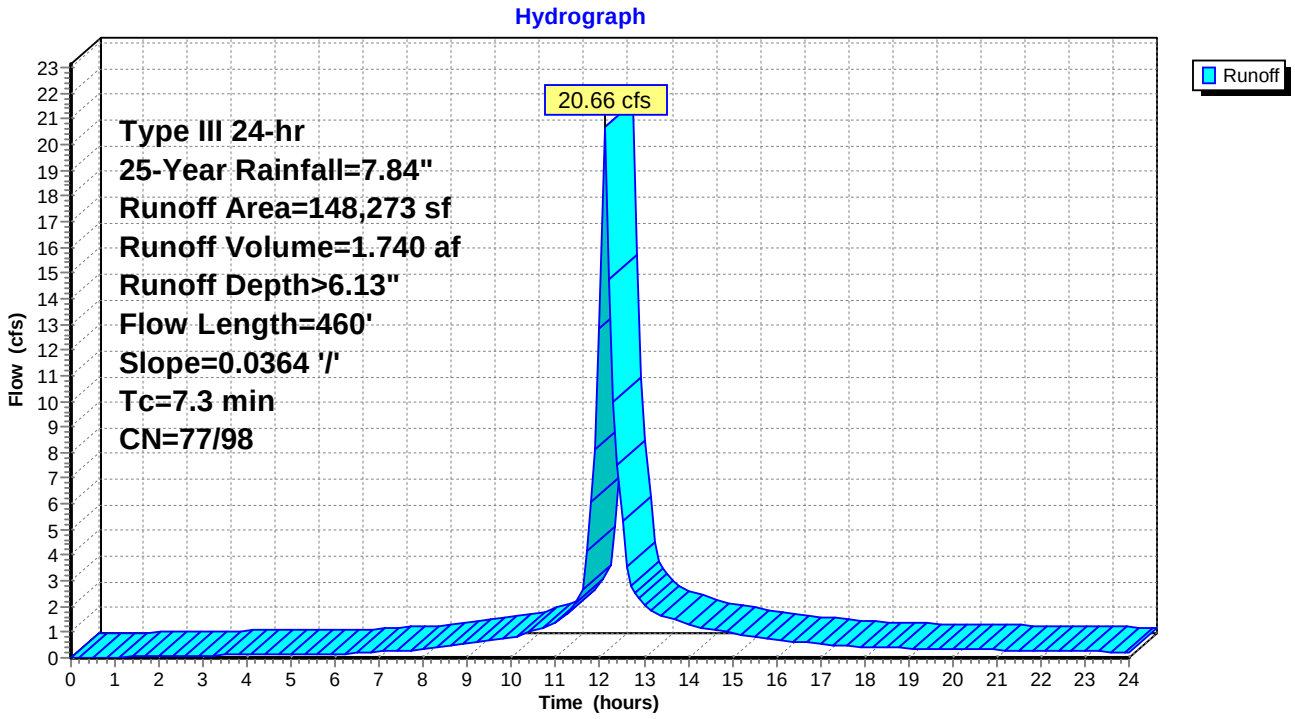
Runoff = 20.66 cfs @ 12.11 hrs, Volume= 1.740 af, Depth> 6.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
	6,482	58	Woods/grass comb., Good, HSG B
	48,881	80	>75% Grass cover, Good, HSG D
	32,266	77	Woods, Good, HSG D
*	3,299	98	Impervious BLDG and Trailers
*	57,345	98	Paved Area
	148,273	86	Weighted Average
	87,629	77	59.10% Pervious Area
	60,644	98	40.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	460	0.0364	1.05		**Lag/CN Method,**

Subcatchment 8S: Onsite Northwest



ummary for Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dra

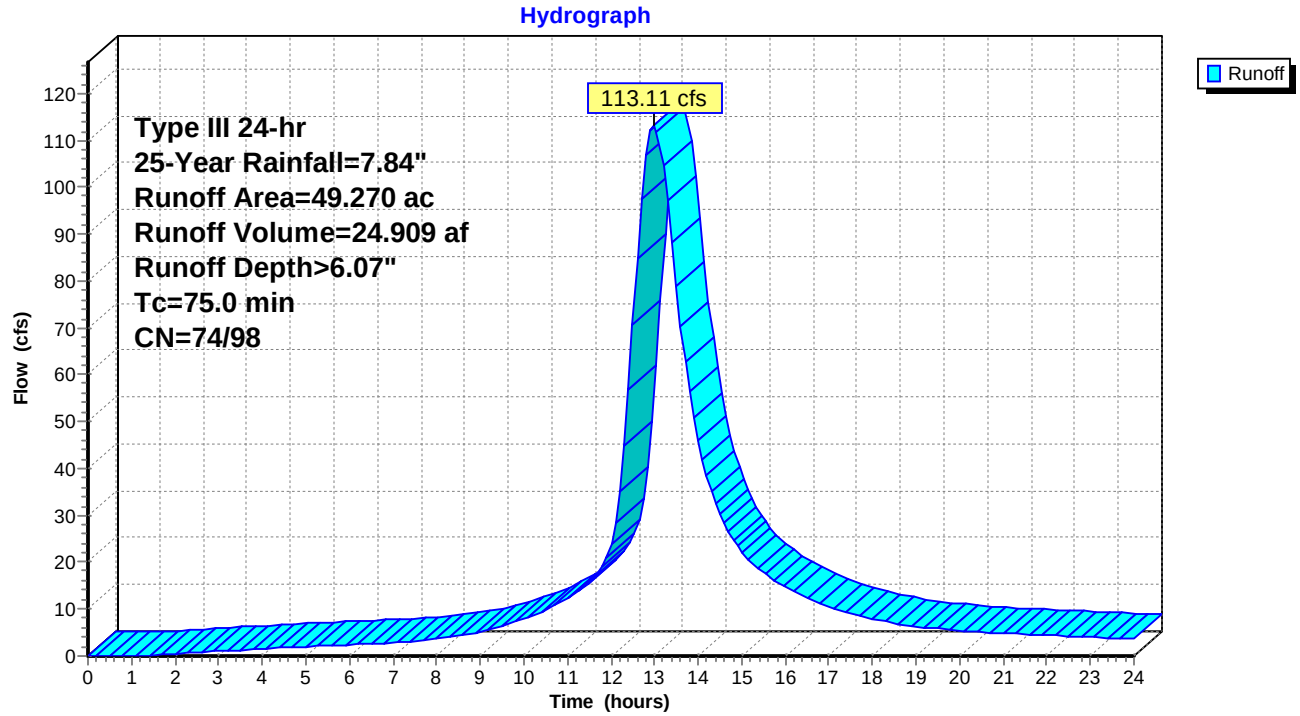
Runoff = 113.11 cfs @ 12.98 hrs, Volume= 24.909 af, Depth> 6.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 10S: Overland Flow to PINE HILL ROAD

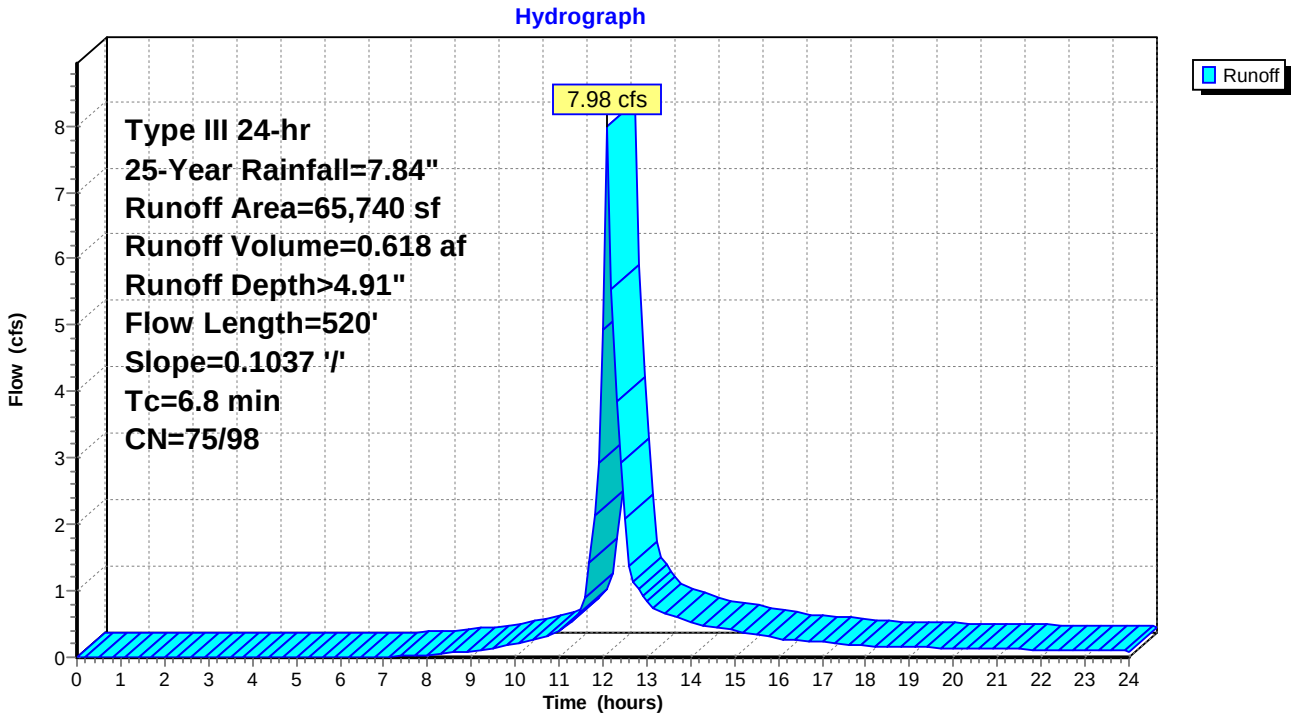
Runoff = 7.98 cfs @ 12.11 hrs, Volume= 0.618 af, Depth> 4.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
20,156	87	Dirt roads, HSG C
2,183	65	Brush, Good, HSG C
418	98	Roofs, HSG C
42,983	70	Woods, Good, HSG C
65,740	75	Weighted Average
65,322	75	99.36% Pervious Area
418	98	0.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	520	0.1037	1.28		**Lag/CN Method,**

Subcatchment 10S: Overland Flow to PINE HILL ROAD



Summary for Subcatchment 11S: SW CORNER TO PINEHILL

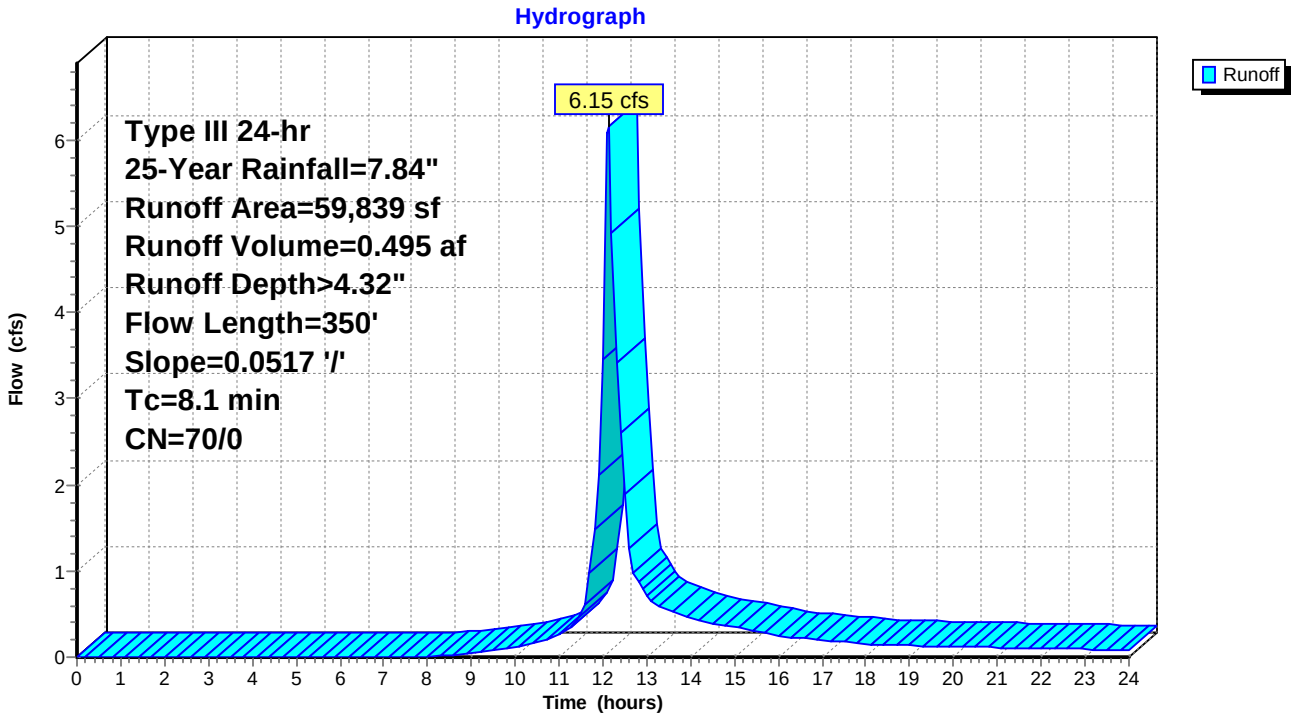
Runoff = 6.15 cfs @ 12.12 hrs, Volume= 0.495 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
59,839	70	Woods, Good, HSG C
59,839	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	350	0.0517	0.72		**Lag/CN Method,**

Subcatchment 11S: SW CORNER TO PINEHILL



Summary for Subcatchment 12S: Overland to SE BVW

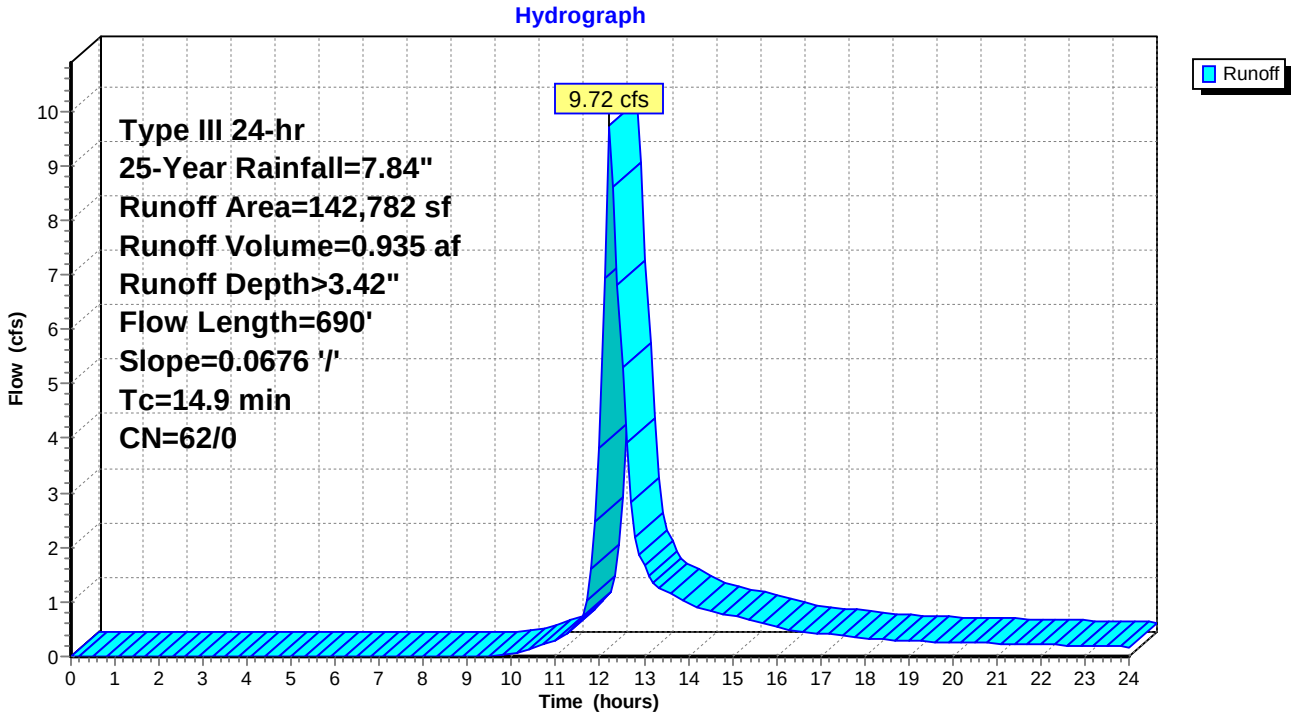
Runoff = 9.72 cfs @ 12.22 hrs, Volume= 0.935 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
58,053	70	Woods, Good, HSG C
4,548	77	Woods, Good, HSG D
80,181	55	Woods, Good, HSG B
142,782	62	Weighted Average
142,782	62	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	690	0.0676	0.77		**Lag/CN Method,**

Subcatchment 12S: Overland to SE BVW



Summary for Subcatchment 20S: NE Corner

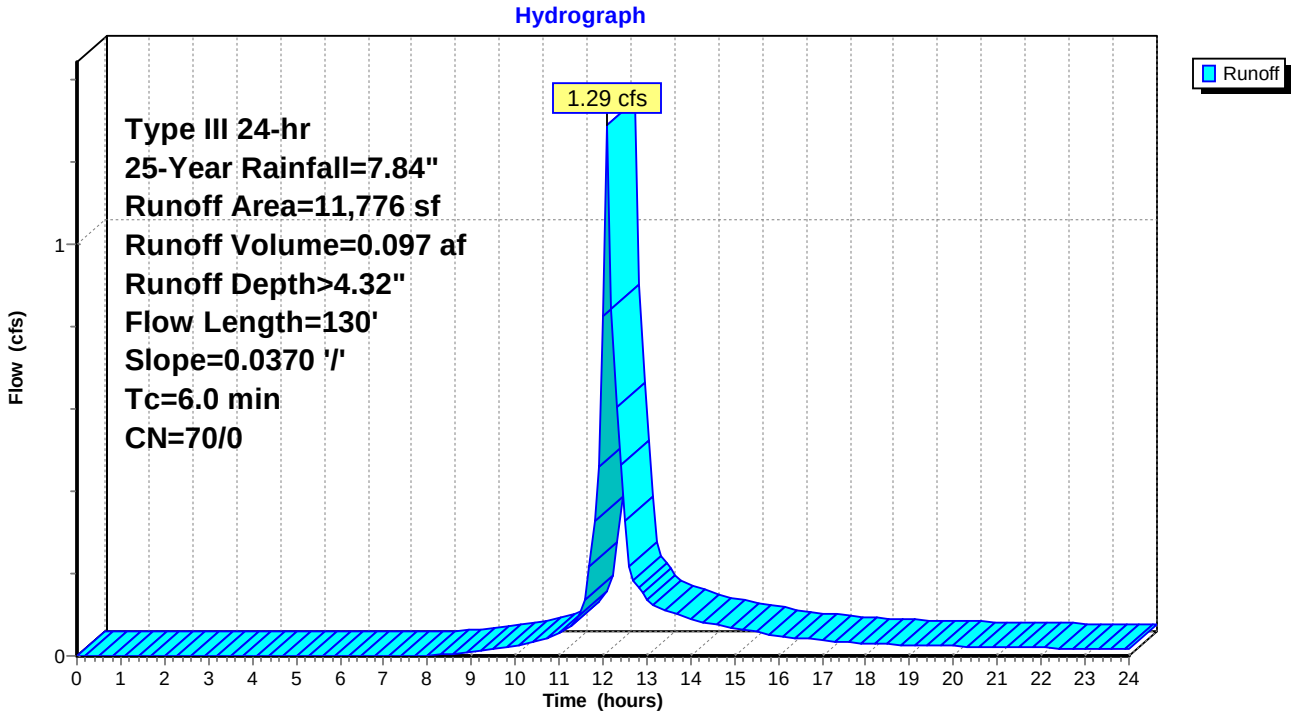
Runoff = 1.29 cfs @ 12.10 hrs, Volume= 0.097 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
11,776	70	Woods, Good, HSG C
11,776	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	130	0.0370	0.50		**Lag/CN Method,**
4.3	130	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20S: NE Corner



Summary for Reach 3R: Stream Channel from Brandt to Pine Hill

Inflow Area = 9.799 ac, 21.15% Impervious, Inflow Depth > 5.57" for 25-Year event
Inflow = 44.28 cfs @ 12.19 hrs, Volume= 4.549 af
Outflow = 43.92 cfs @ 12.21 hrs, Volume= 4.545 af, Atten= 1%, Lag= 1.2 min

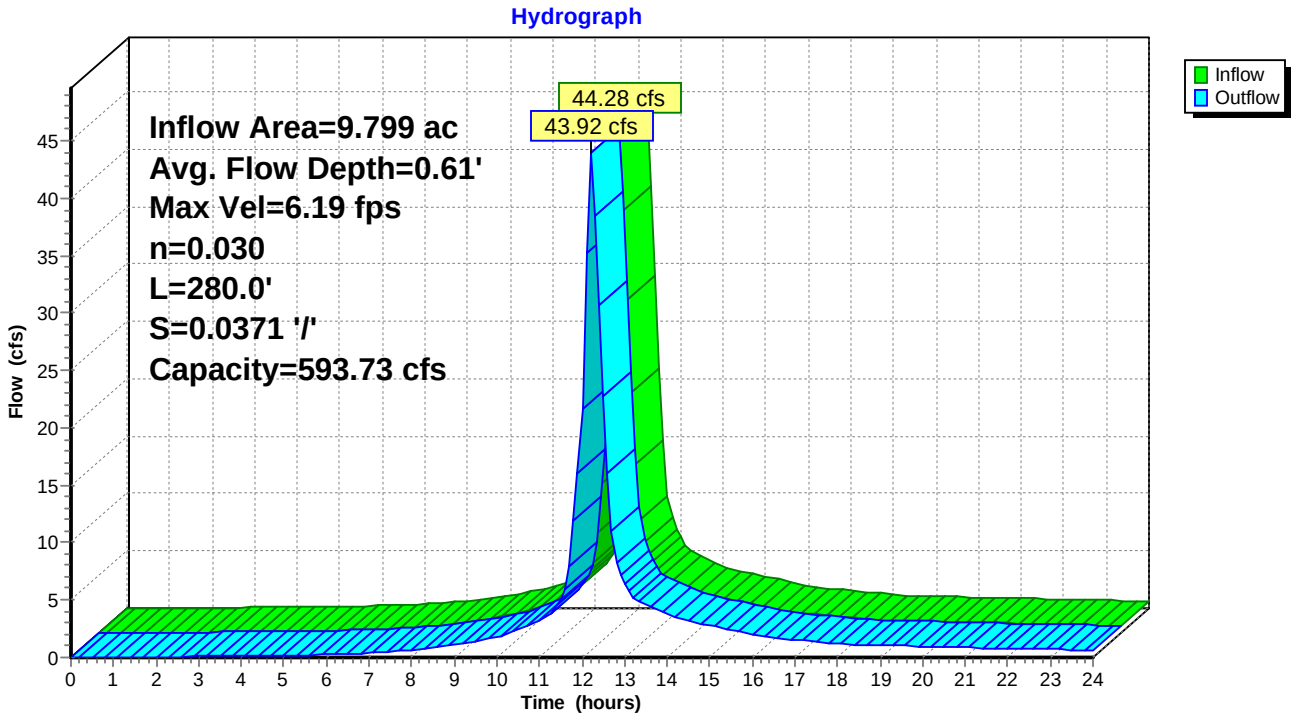
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 6.19 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 2.7 min

Peak Storage= 2,027 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 3R: Stream Channel from Brandt to Pine Hill

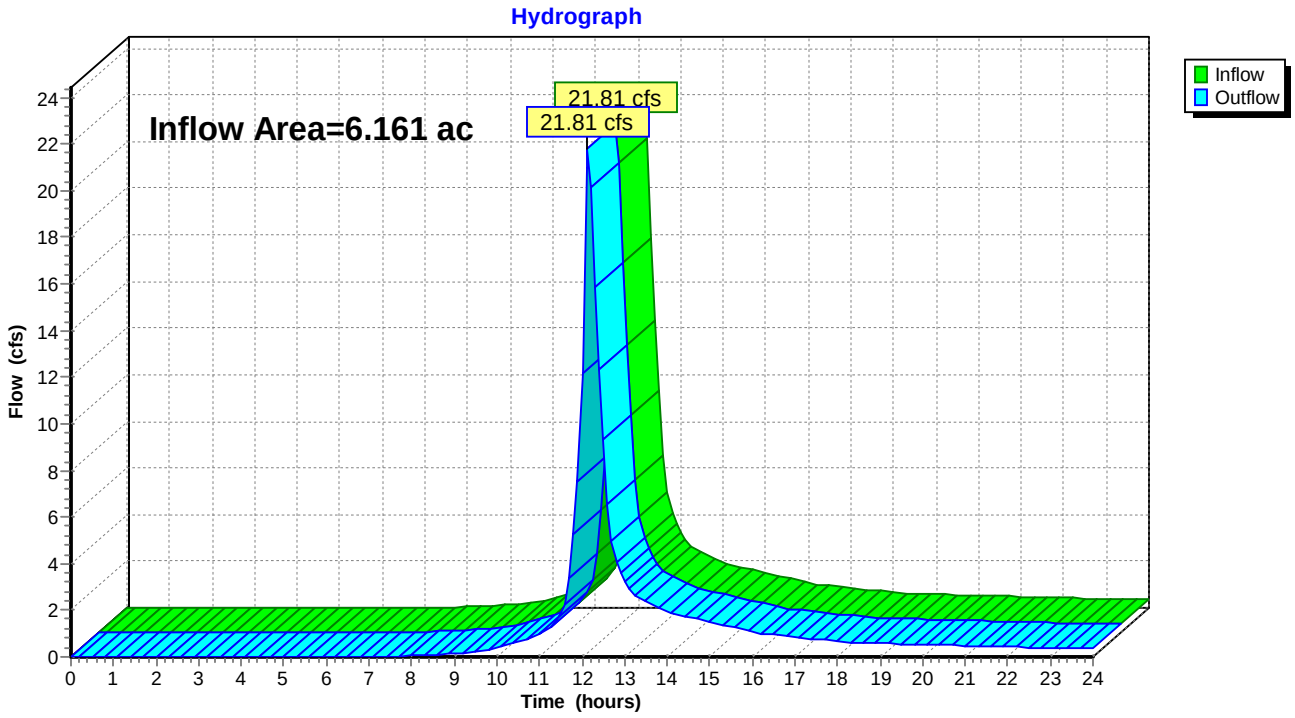


Summary for Reach 12R: PINE HILL ROAD

Inflow Area = 6.161 ac, 0.16% Impervious, Inflow Depth > 3.99" for 25-Year event
Inflow = 21.81 cfs @ 12.14 hrs, Volume= 2.048 af
Outflow = 21.81 cfs @ 12.14 hrs, Volume= 2.048 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 12R: PINE HILL ROAD

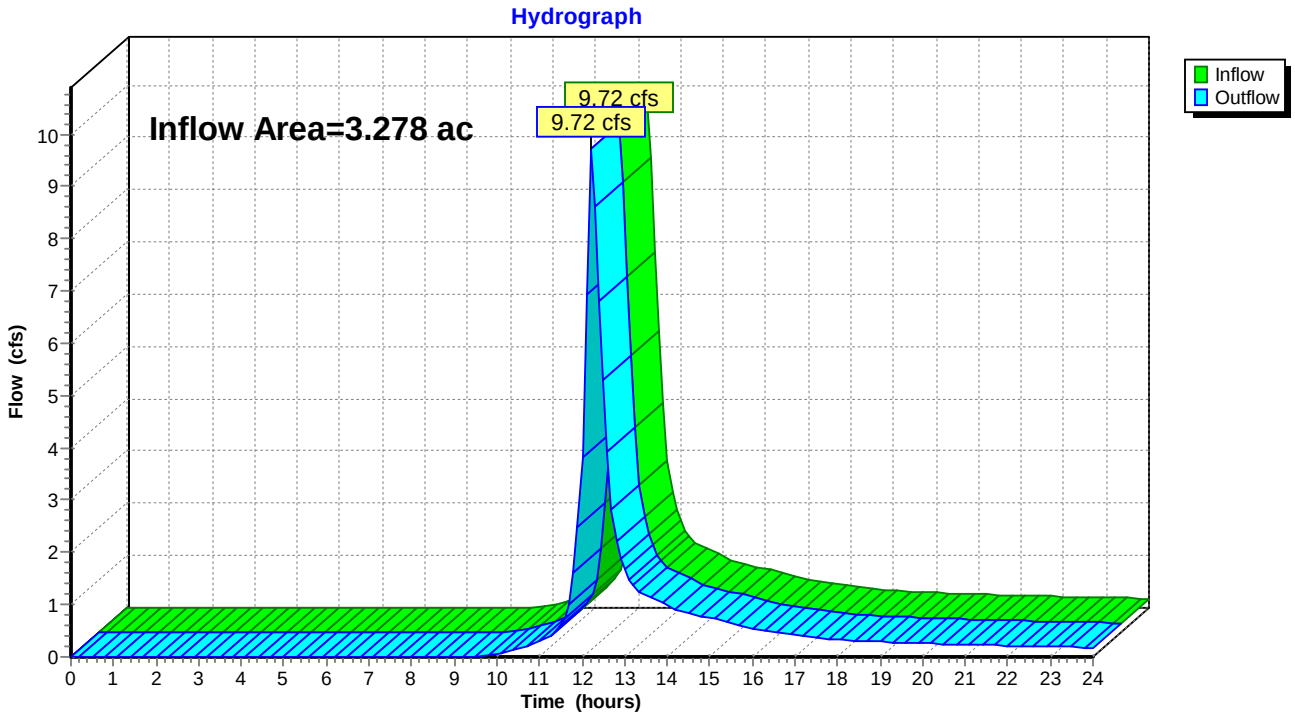


Summary for Reach 14R: SE BVW

Inflow Area = 3.278 ac, 0.00% Impervious, Inflow Depth > 3.42" for 25-Year event
Inflow = 9.72 cfs @ 12.22 hrs, Volume= 0.935 af
Outflow = 9.72 cfs @ 12.22 hrs, Volume= 0.935 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 14R: SE BVW



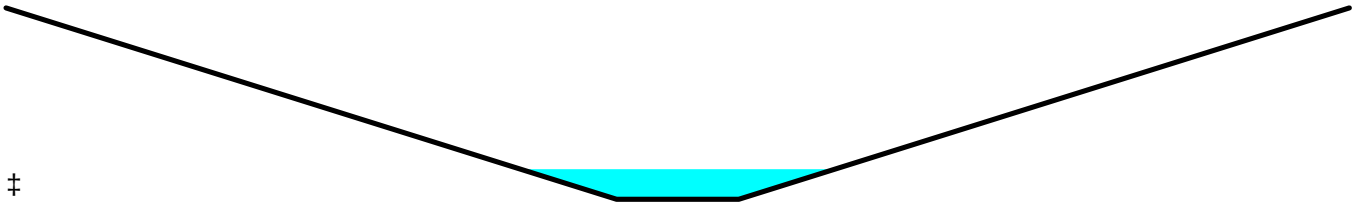
Summary for Reach 24R: crossing paved areas

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 1.24" for 25-Year event
Inflow = 11.55 cfs @ 12.25 hrs, Volume= 0.353 af
Outflow = 11.07 cfs @ 12.29 hrs, Volume= 0.353 af, Atten= 4%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 4.11 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 3.9 min

Peak Storage= 833 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 728.66 cfs

10.00' x 1.00' deep channel, n= 0.013 Asphalt, smooth
Side Slope Z-value= 50.0 '/' Top Width= 110.00'
Length= 300.0' Slope= 0.0253 '/'
Inlet Invert= 463.00', Outlet Invert= 455.40'



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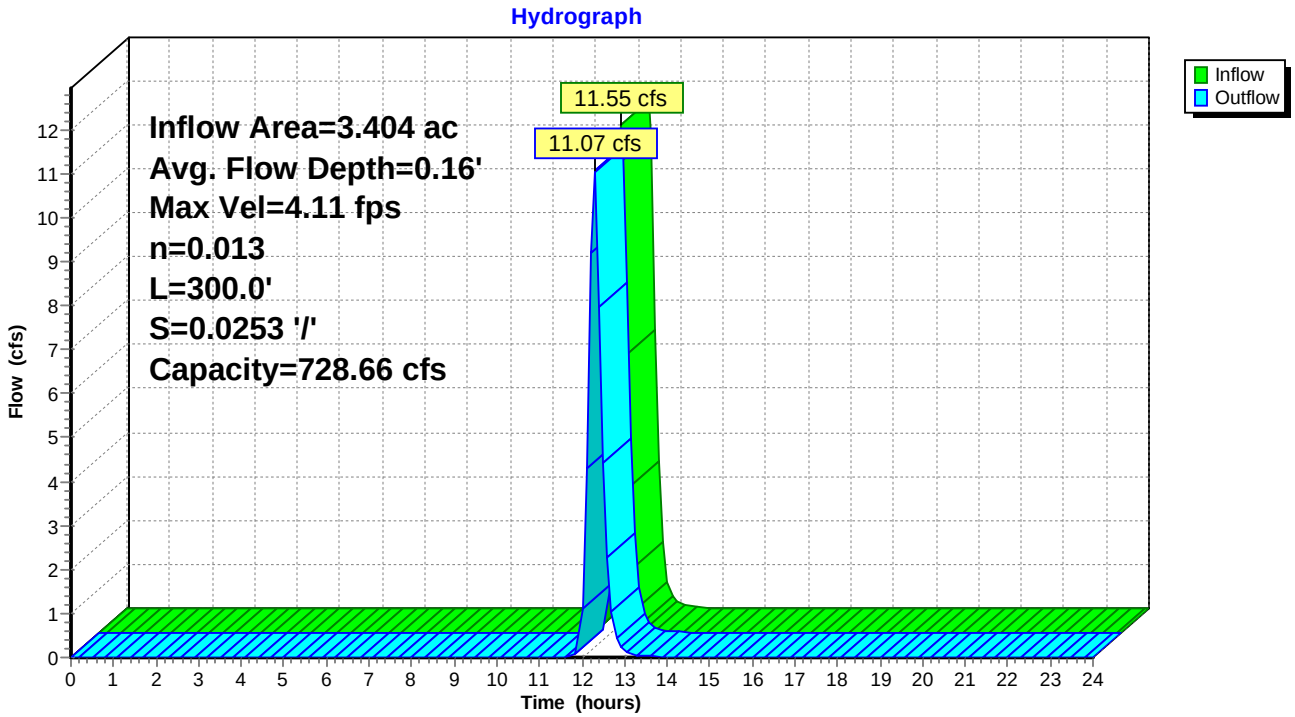
Reach 24R: crossing paved areas



Summary for Reach 25R: Open channel between debris and trailers

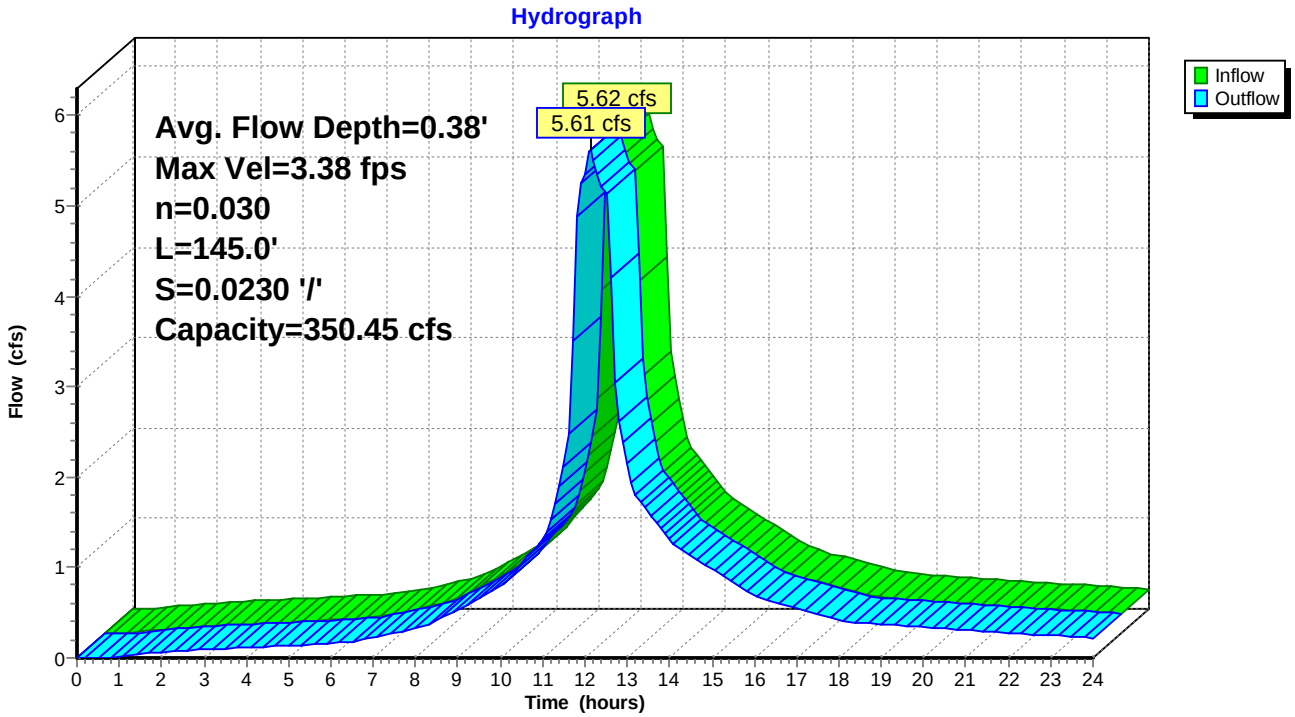
Inflow = 5.62 cfs @ 12.11 hrs, Volume= 1.387 af
Outflow = 5.61 cfs @ 12.12 hrs, Volume= 1.386 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.38 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.44 fps, Avg. Travel Time= 1.7 min

Peak Storage= 242 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 350.45 cfs

3.50' x 3.00' deep channel, n= 0.030 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.5 '/' Top Width= 18.50'
Length= 145.0' Slope= 0.0230 '/'
Inlet Invert= 464.54', Outlet Invert= 461.20'

Reach 25R: Open channel between debris and trailers



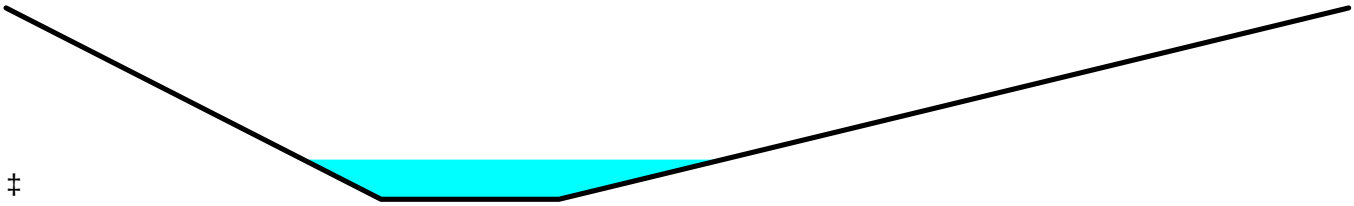
Summary for Reach 26R: existing stream on west side

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 1.24" for 25-Year event
Inflow = 15.20 cfs @ 12.11 hrs, Volume= 0.353 af
Outflow = 11.55 cfs @ 12.25 hrs, Volume= 0.353 af, Atten= 24%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.11 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 0.57 fps, Avg. Travel Time= 16.0 min

Peak Storage= 3,178 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.63'
Bank-Full Depth= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



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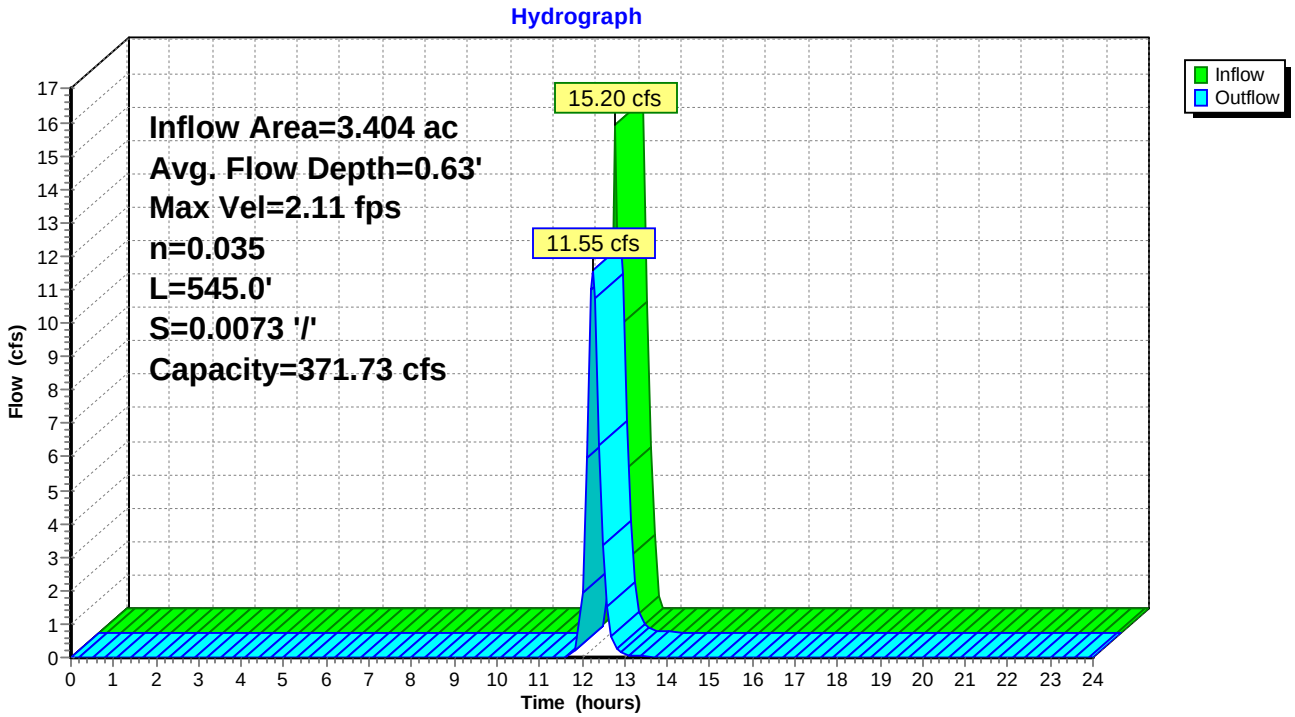
Reach 26R: existing stream on west side

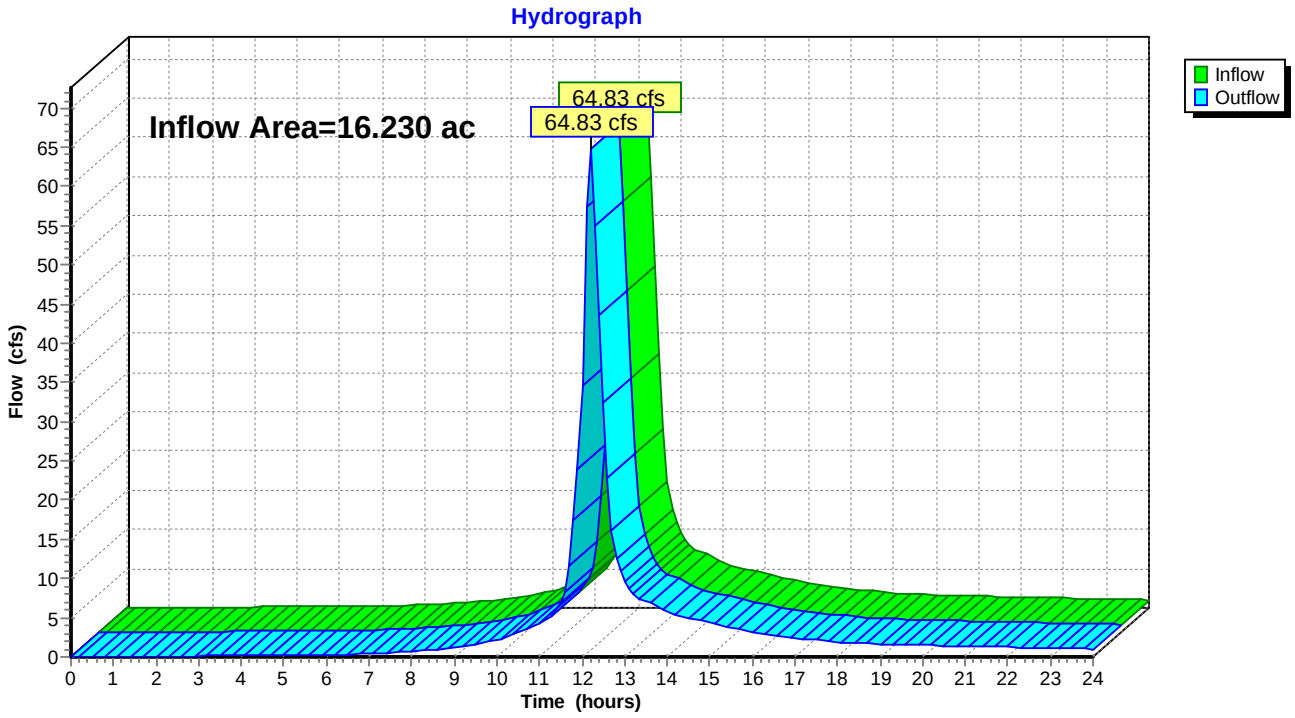


Summary for Reach X1: Area Summary Pre

Inflow Area = 16.230 ac, 12.83% Impervious, Inflow Depth > 4.95" for 25-Year event
Inflow = 64.83 cfs @ 12.19 hrs, Volume= 6.690 af
Outflow = 64.83 cfs @ 12.19 hrs, Volume= 6.690 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X1: Area Summary Pre



Summary for Pond 2P: Brandt Lane Existing Culverts

Inflow Area = 8.539 ac, 24.27% Impervious, Inflow Depth > 5.84" for 25-Year event
Inflow = 39.33 cfs @ 12.18 hrs, Volume= 4.157 af
Outflow = 39.81 cfs @ 12.19 hrs, Volume= 4.143 af, Atten= 0%, Lag= 0.6 min
Primary = 39.81 cfs @ 12.19 hrs, Volume= 4.143 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 460.56' @ 12.19 hrs Surf.Area= 1,185 sf Storage= 1,641 cf

Plug-Flow detention time= 4.9 min calculated for 4.143 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (793.2 - 790.3)

Volume	Invert	Avail.Storage	Storage Description
#1	455.40'	31,204 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

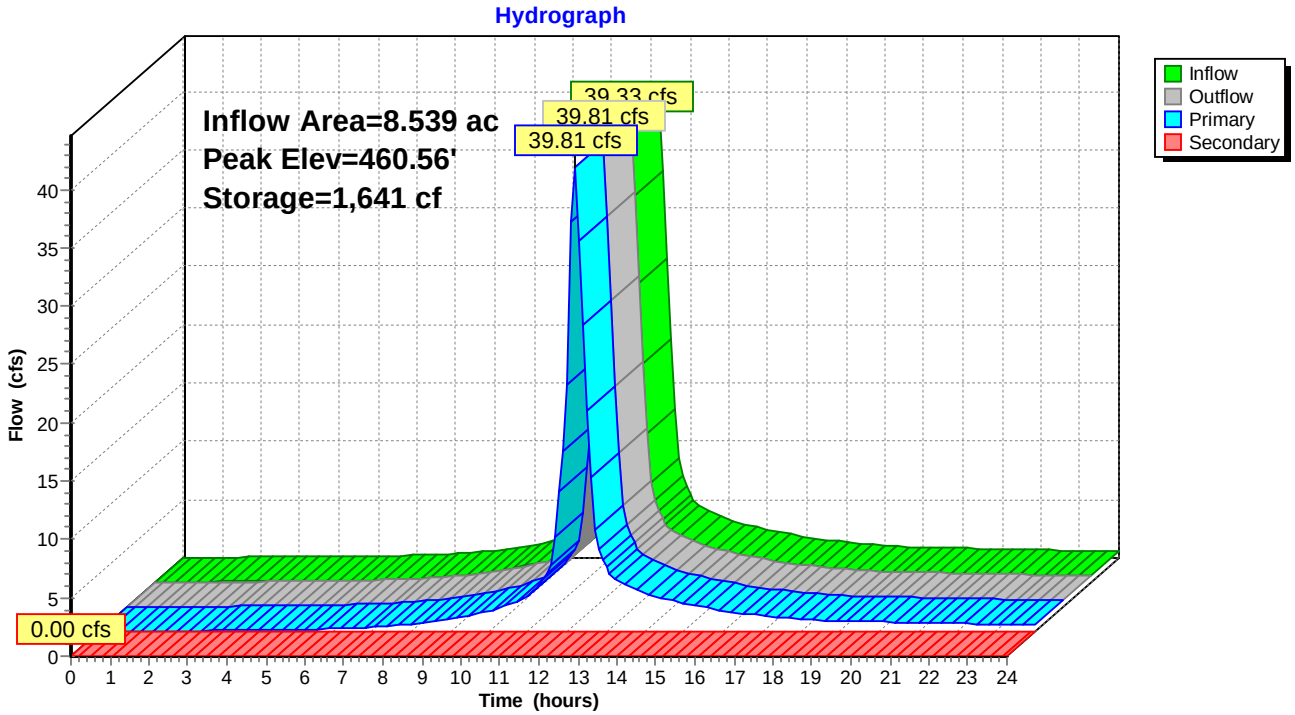
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
455.40	0	0	0
456.00	4	1	1
458.00	163	167	168
460.00	767	930	1,098
461.00	1,520	1,144	2,242
462.00	3,690	2,605	4,847
463.00	12,362	8,026	12,873
464.00	24,300	18,331	31,204

Device	Routing	Invert	Outlet Devices
#1	Primary	459.40'	**30.0" Round Culvert X 3.00** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.40' / 458.74' S= 0.0264 '/' Cc= 0.900 n= 0.015, Flow Area= 4.91 sf
#2	Primary	459.00'	**36.0" Round Culvert** L= 18.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.00' / 458.40' S= 0.0324 '/' Cc= 0.900 n= 0.015, Flow Area= 7.07 sf
#3	Secondary	462.00'	**46.0' long x 12.0' breadth Broad-Crested Rectangular Weir (road fill section)** 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

Primary OutFlow Max=39.39 cfs @ 12.19 hrs HW=460.55' (Free Discharge)
└**1=Culvert** (Inlet Controls 24.07 cfs @ 3.65 fps)
└**2=Culvert** (Barrel Controls 15.32 cfs @ 6.07 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=455.40' (Free Discharge)
└**3=Broad-Crested Rectangular Weir (road fill section)** (Controls 0.00 cfs)

Pond 2P: Brandt Lane Existing Culverts



Summary for Pond 212P: Long Culvert

Inflow	=	5.61 cfs @	12.12 hrs,	Volume=	1.386 af
Outflow	=	5.61 cfs @	12.12 hrs,	Volume=	1.386 af, Atten= 0%, Lag= 0.1 min
Primary	=	5.61 cfs @	12.12 hrs,	Volume=	1.386 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 462.39' @ 12.12 hrs Surf.Area= 50 sf Storage= 23 cf

Plug-Flow detention time= 0.0 min calculated for 1.380 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (790.9 - 790.9)

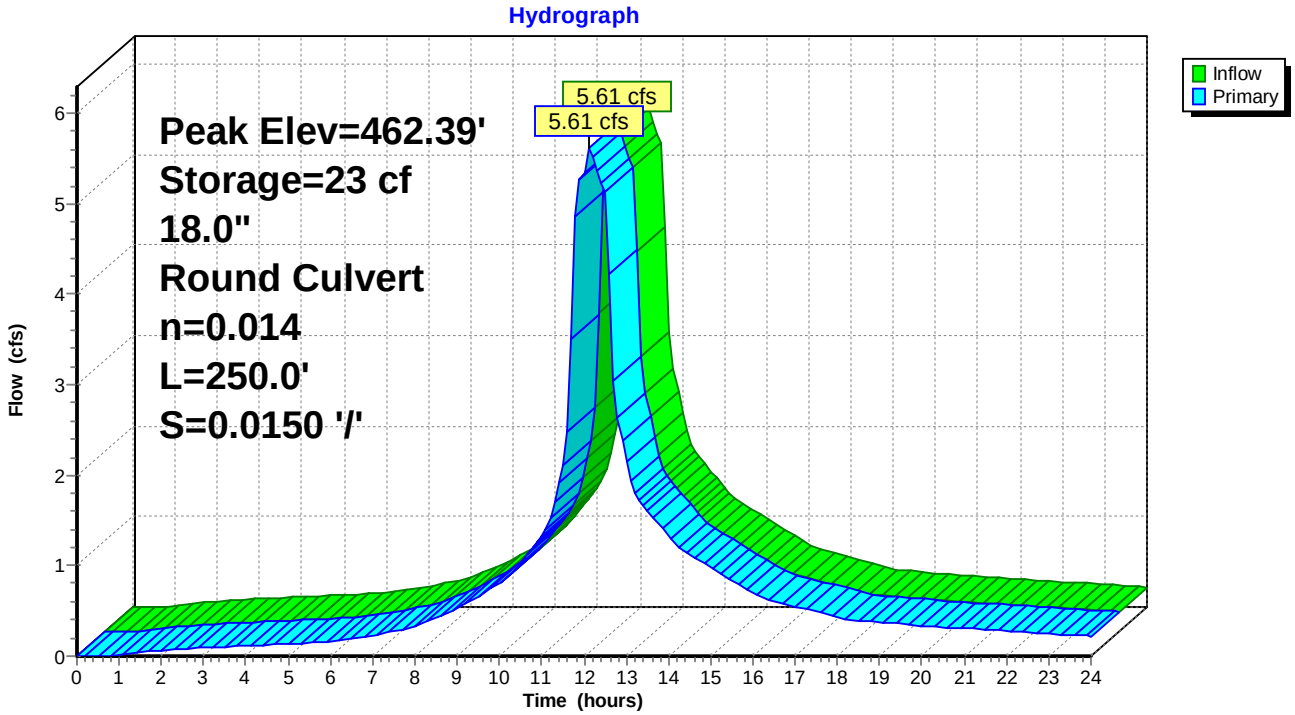
Volume	Invert	Avail.Storage	Storage Description
#1	461.00'	858 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
461.00	0	0.0	0	0	0
463.00	102	44.4	68	68	163
465.00	798	126.3	790	858	1,289

Device	Routing	Invert	Outlet Devices
#1	Primary	461.20'	**18.0" Round 18" Culvert to South** L= 250.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 461.20' / 457.44' S= 0.0150 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=5.58 cfs @ 12.12 hrs HW=462.39' (Free Discharge)
↑—1=18" Culvert to South (Inlet Controls 5.58 cfs @ 3.71 fps)

Pond 212P: Long Culvert



Summary for Pond 213P: Northwest Wetland

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth > 6.13" for 25-Year event
Inflow = 20.66 cfs @ 12.11 hrs, Volume= 1.740 af
Outflow = 20.83 cfs @ 12.11 hrs, Volume= 1.740 af, Atten= 0%, Lag= 0.0 min
Primary = 15.20 cfs @ 12.11 hrs, Volume= 0.353 af
Secondary = 5.62 cfs @ 12.11 hrs, Volume= 1.387 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.28' @ 12.11 hrs Surf.Area= 575 sf Storage= 328 cf

Plug-Flow detention time= 0.5 min calculated for 1.733 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (776.8 - 776.3)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

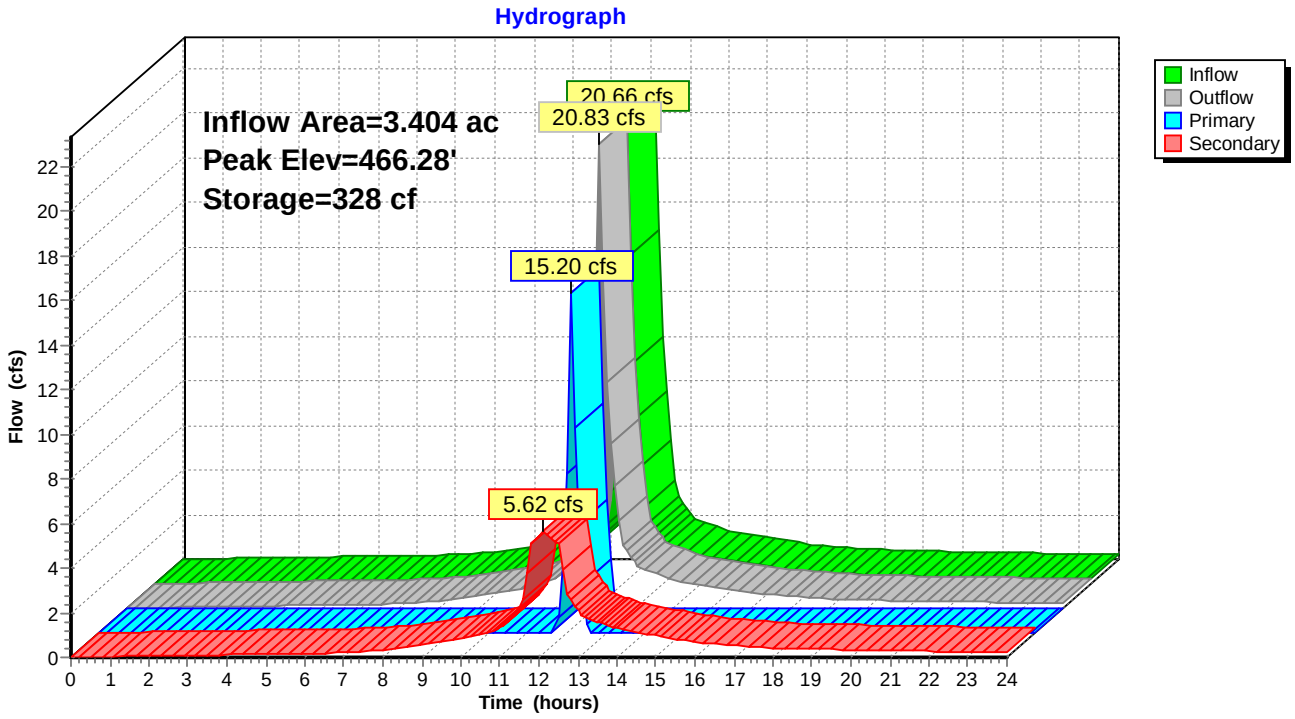
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing Stream- model as b/c we** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**18.0" Round 18" Culvert to South** L= 26.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 465.08' / 464.54' S= 0.0202 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf
#3	Secondary	467.08'	**20.0' long x 10.0' breadth Flow over topping to channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=14.13 cfs @ 12.11 hrs HW=466.27' (Free Discharge)
└─**1=Discharge to West to Existing Stream- model as b/c weir** (Weir Controls 14.13 cfs @ 0.73 fps)

Secondary OutFlow Max=5.61 cfs @ 12.11 hrs HW=466.27' (Free Discharge)
├─**2=18" Culvert to South** (Inlet Controls 5.61 cfs @ 3.72 fps)
└─**3=Flow over topping to channel - model as b/c weir** (Controls 0.00 cfs)

Pond 213P: Northwest Wetland

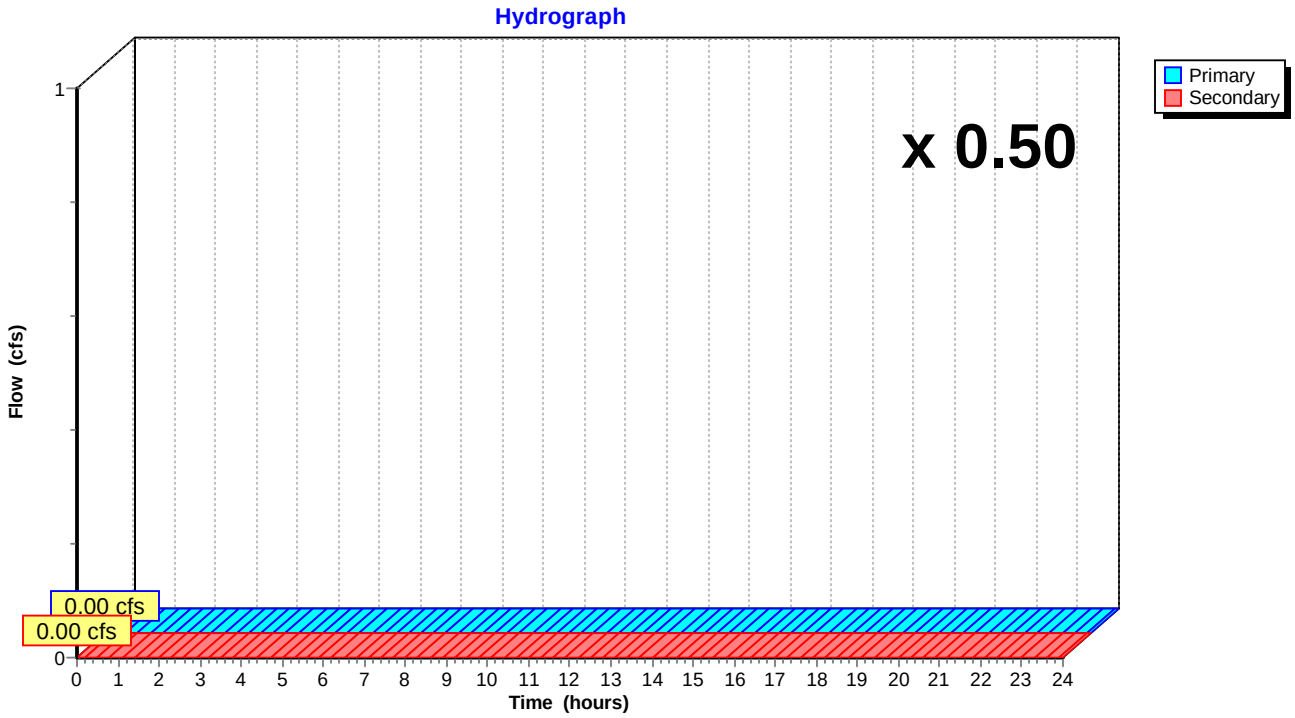


Summary for Link 214L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 214L: Diverging Flow



Summary for Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane

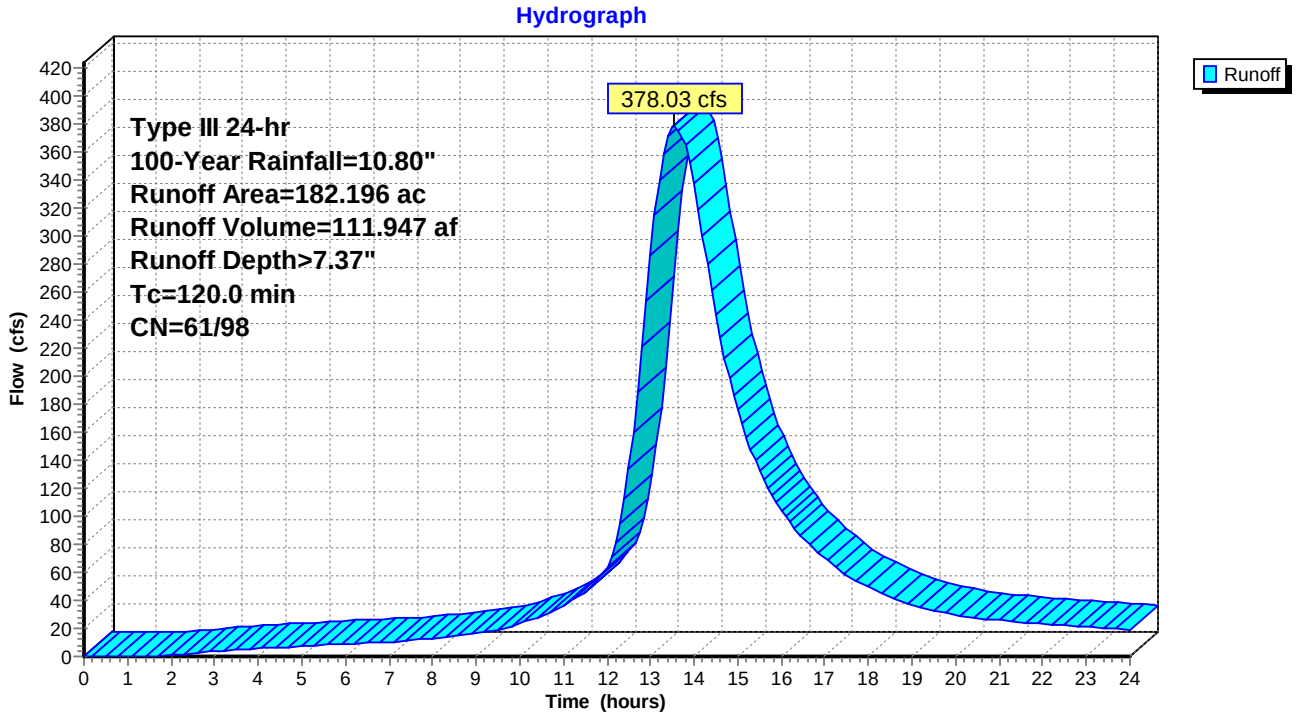
Runoff = 378.03 cfs @ 13.55 hrs, Volume= 111.947 af, Depth> 7.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 1S: Contributing Existing Watershed to Culverts at Brandt Lane



Summary for Subcatchment 6S: Runoff from existing road and runon only

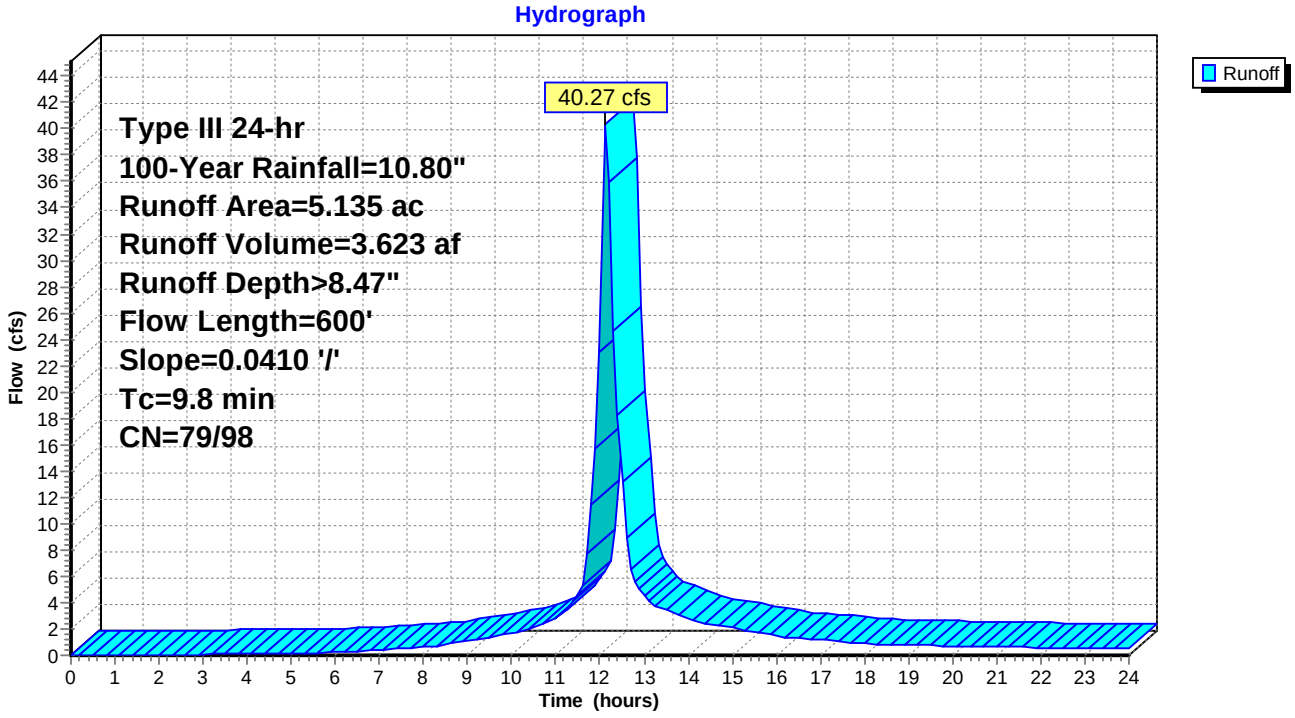
Runoff = 40.27 cfs @ 12.13 hrs, Volume= 3.623 af, Depth> 8.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (ac)	CN	Description
	0.250	70	Woods, Good, HSG C
	1.915	65	Brush, Good, HSG C
	0.680	98	Paved parking, HSG C
*	2.290	92	Dirt roads, HSG C, stones, bit. conc.
	5.135	82	Weighted Average
	4.455	79	86.76% Pervious Area
	0.680	98	13.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	600	0.0410	1.02		**Lag/CN Method,**

Subcatchment 6S: Runoff from existing road and runon only



Summary for Subcatchment 7S: Contribution Area to Existing Stream including onsite area only

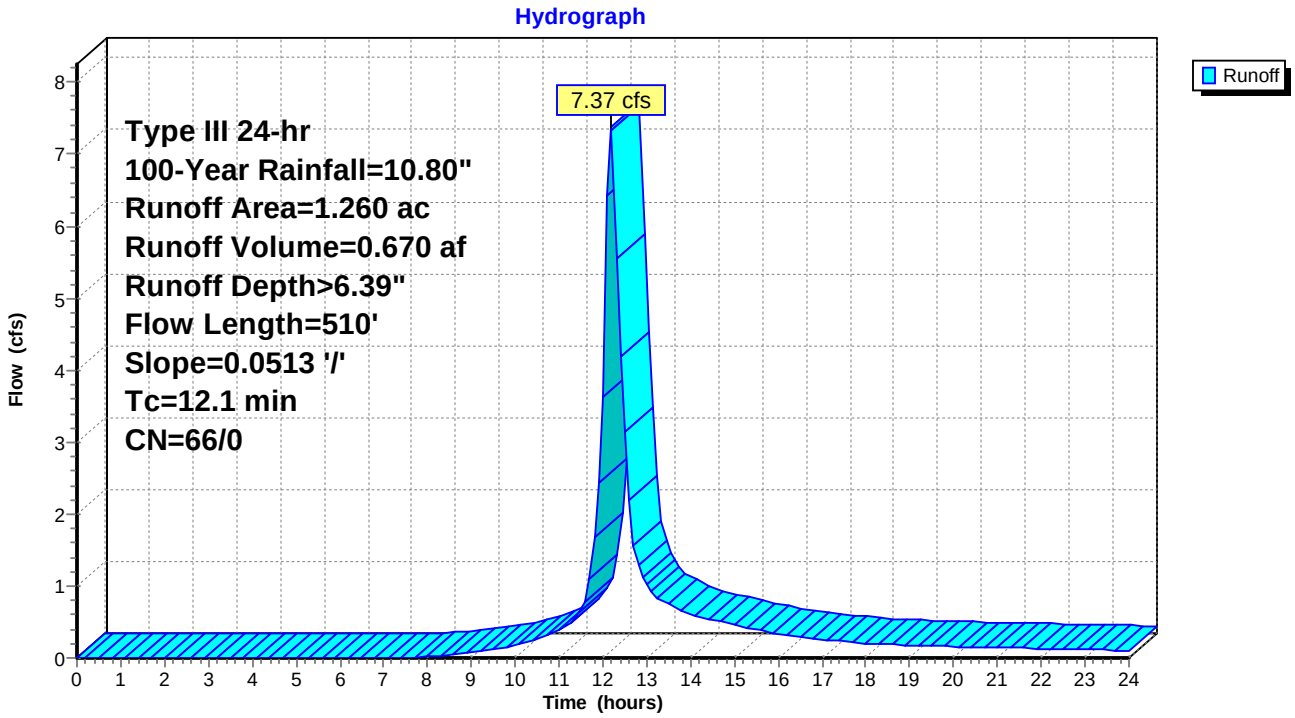
Runoff = 7.37 cfs @ 12.18 hrs, Volume= 0.670 af, Depth> 6.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (ac)	CN	Description
1.210	65	Brush, Good, HSG C
0.050	87	Dirt roads, HSG C
1.260	66	Weighted Average
1.260	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	510	0.0513	0.70		**Lag/CN Method,**

Subcatchment 7S: Contribution Area to Existing Stream including onsite area only



Summary for Subcatchment 8S: Onsite Northwest

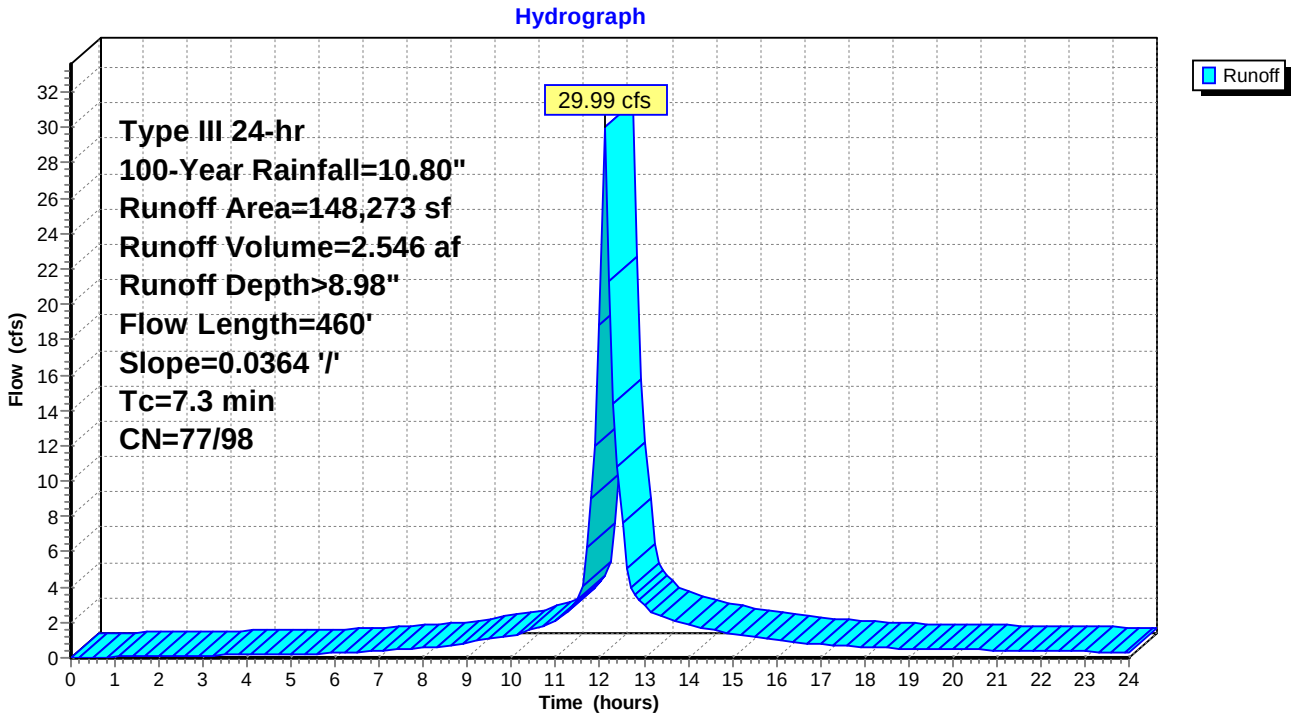
Runoff = 29.99 cfs @ 12.11 hrs, Volume= 2.546 af, Depth> 8.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
	6,482	58	Woods/grass comb., Good, HSG B
	48,881	80	>75% Grass cover, Good, HSG D
	32,266	77	Woods, Good, HSG D
*	3,299	98	Impervious BLDG and Trailers
*	57,345	98	Paved Area
	148,273	86	Weighted Average
	87,629	77	59.10% Pervious Area
	60,644	98	40.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	460	0.0364	1.05		**Lag/CN Method,**

Subcatchment 8S: Onsite Northwest



ummary for Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dra

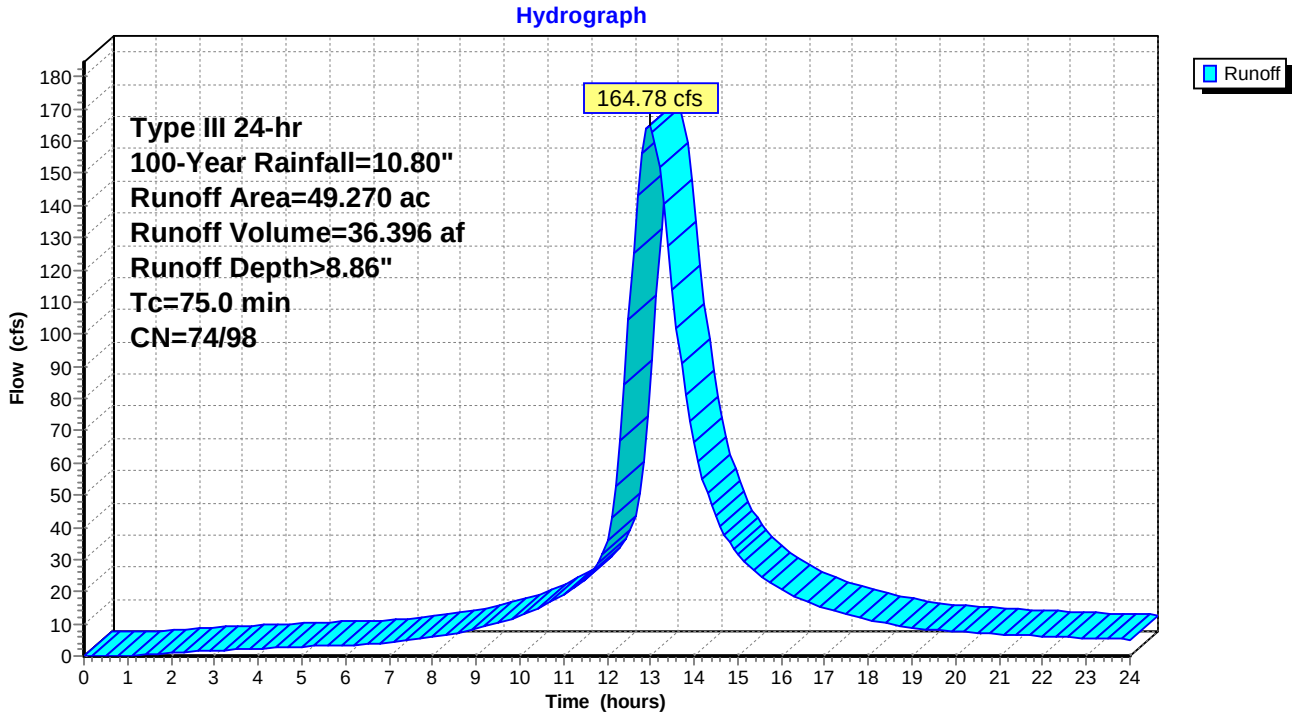
Runoff = 164.78 cfs @ 12.97 hrs, Volume= 36.396 af, Depth> 8.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 9S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 10S: Overland Flow to PINE HILL ROAD

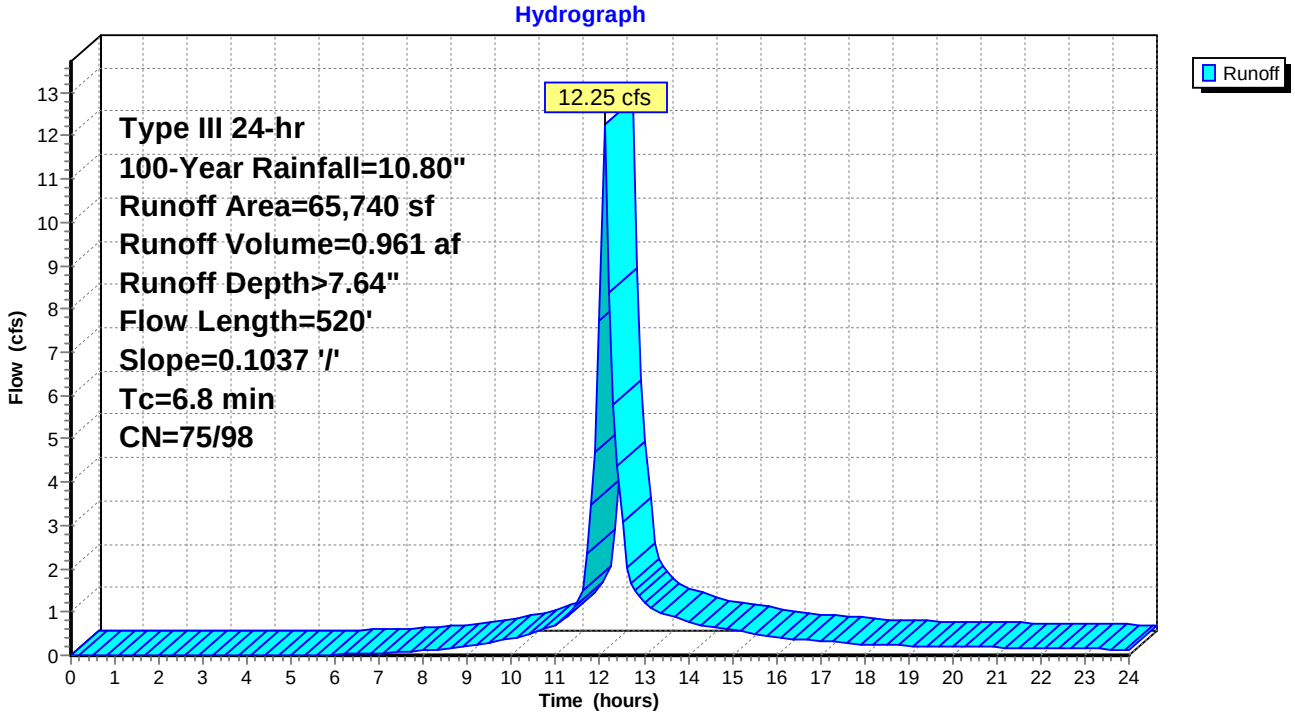
Runoff = 12.25 cfs @ 12.10 hrs, Volume= 0.961 af, Depth> 7.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
20,156	87	Dirt roads, HSG C
2,183	65	Brush, Good, HSG C
418	98	Roofs, HSG C
42,983	70	Woods, Good, HSG C
65,740	75	Weighted Average
65,322	75	99.36% Pervious Area
418	98	0.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	520	0.1037	1.28		**Lag/CN Method,**

Subcatchment 10S: Overland Flow to PINE HILL ROAD



Summary for Subcatchment 11S: SW CORNER TO PINEHILL

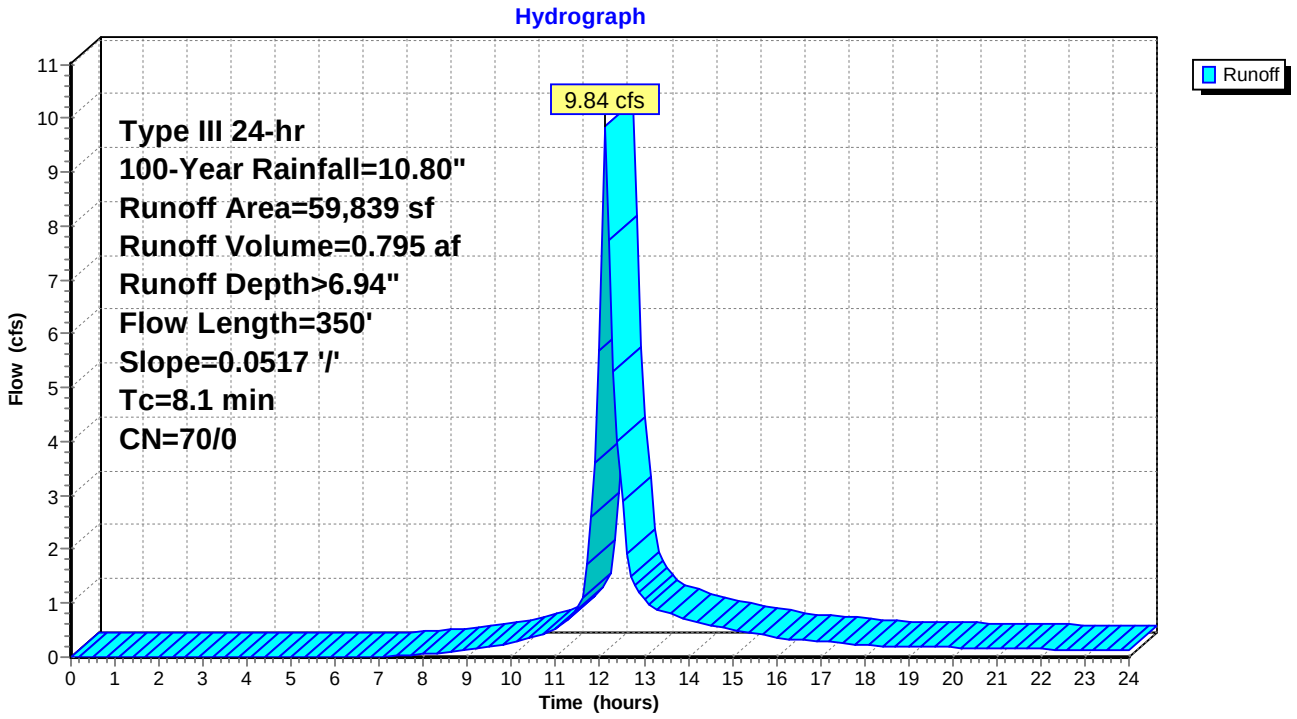
Runoff = 9.84 cfs @ 12.12 hrs, Volume= 0.795 af, Depth> 6.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
59,839	70	Woods, Good, HSG C
59,839	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	350	0.0517	0.72		**Lag/CN Method,**

Subcatchment 11S: SW CORNER TO PINEHILL



Summary for Subcatchment 12S: Overland to SE BVW

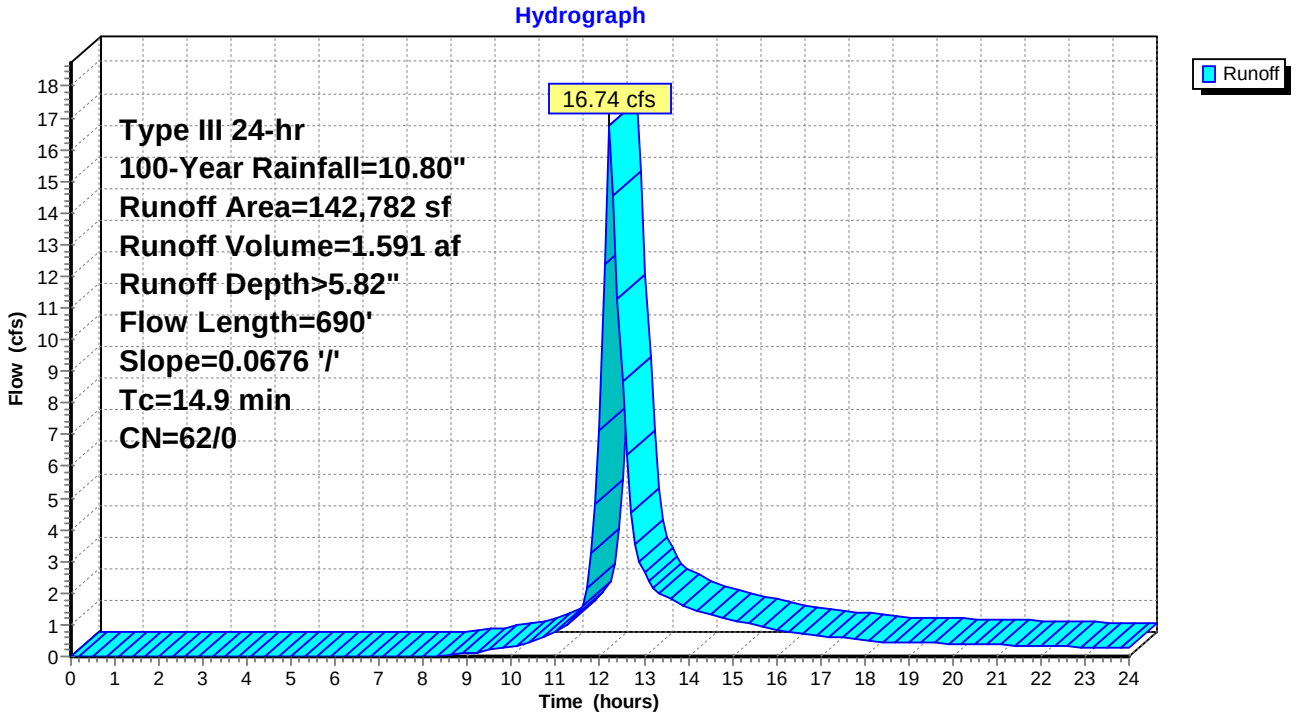
Runoff = 16.74 cfs @ 12.22 hrs, Volume= 1.591 af, Depth> 5.82"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
58,053	70	Woods, Good, HSG C
4,548	77	Woods, Good, HSG D
80,181	55	Woods, Good, HSG B
142,782	62	Weighted Average
142,782	62	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	690	0.0676	0.77		**Lag/CN Method,**

Subcatchment 12S: Overland to SE BVW



Summary for Subcatchment 20S: NE Corner

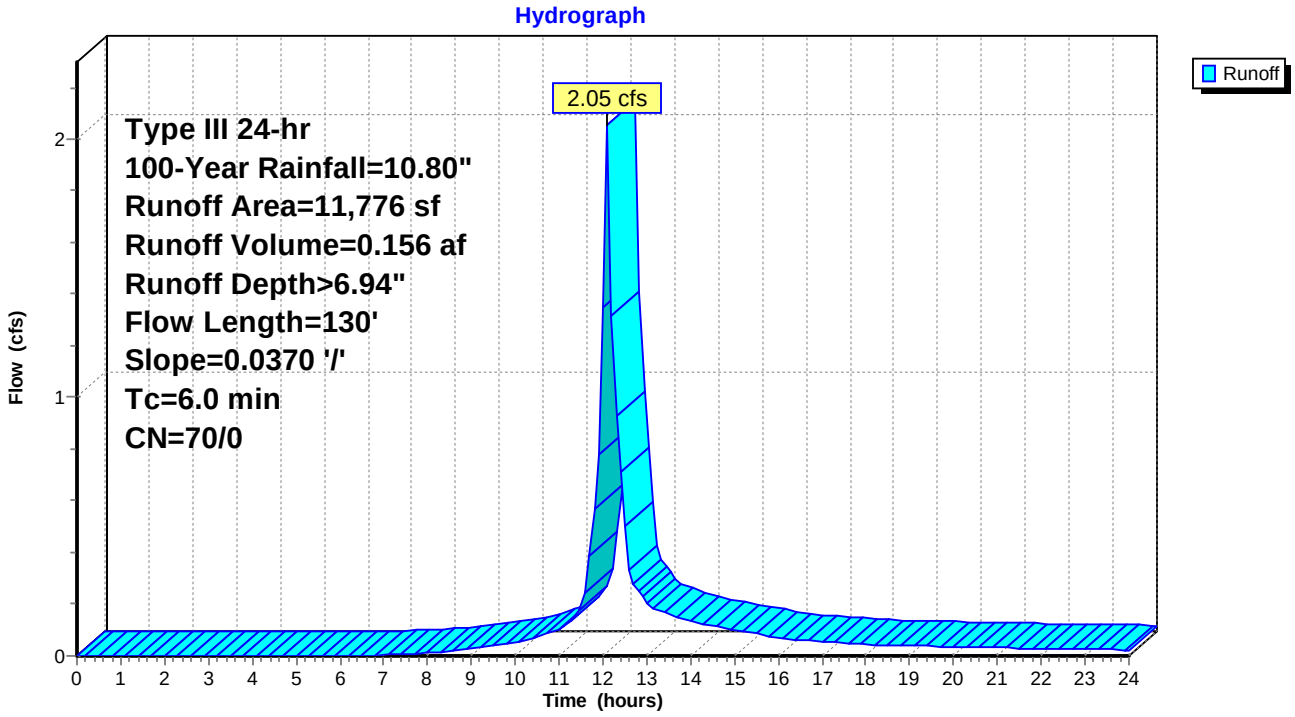
Runoff = 2.05 cfs @ 12.10 hrs, Volume= 0.156 af, Depth> 6.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
11,776	70	Woods, Good, HSG C
11,776	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	130	0.0370	0.50		**Lag/CN Method,**
4.3	130	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 20S: NE Corner



Summary for Reach 3R: Stream Channel from Brandt to Pine Hill

Inflow Area = 9.799 ac, 21.15% Impervious, Inflow Depth > 8.36" for 100-Year event
Inflow = 67.51 cfs @ 12.19 hrs, Volume= 6.823 af
Outflow = 67.00 cfs @ 12.20 hrs, Volume= 6.819 af, Atten= 1%, Lag= 1.1 min

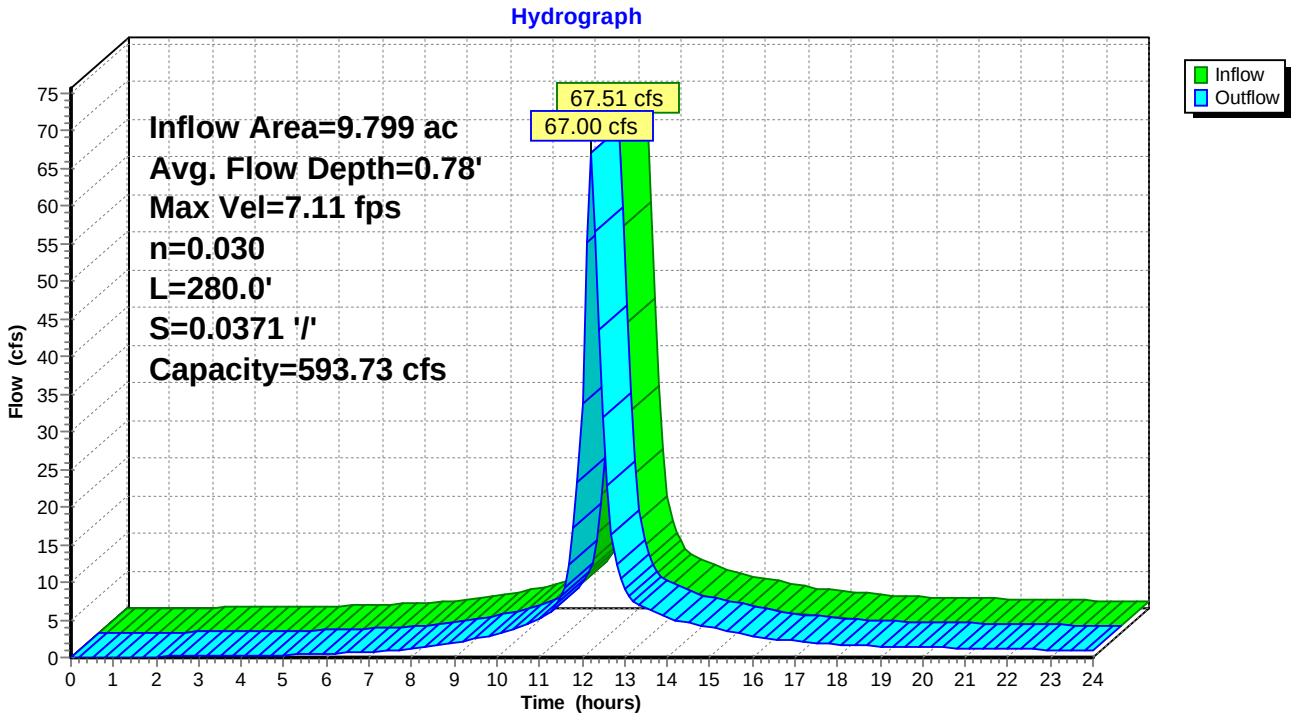
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 7.11 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.01 fps, Avg. Travel Time= 2.3 min

Peak Storage= 2,684 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.78'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 3R: Stream Channel from Brandt to Pine Hill

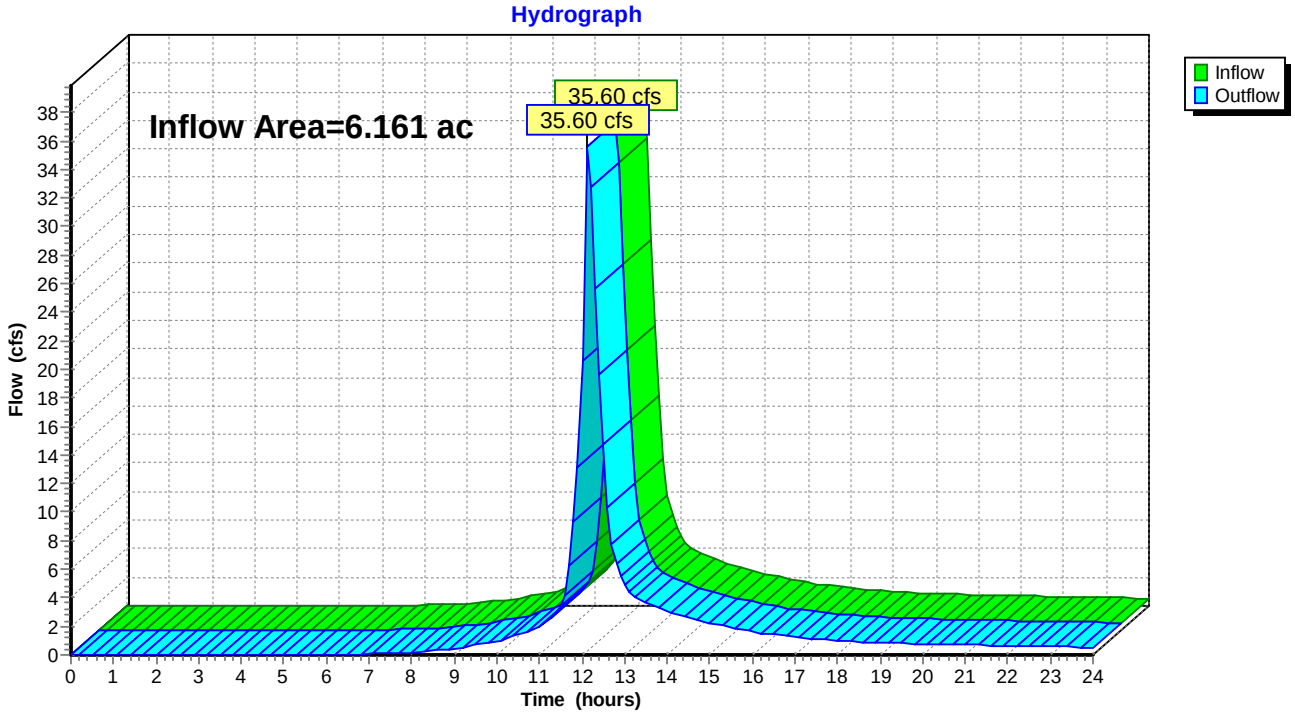


Summary for Reach 12R: PINE HILL ROAD

Inflow Area = 6.161 ac, 0.16% Impervious, Inflow Depth > 6.52" for 100-Year event
Inflow = 35.60 cfs @ 12.14 hrs, Volume= 3.346 af
Outflow = 35.60 cfs @ 12.14 hrs, Volume= 3.346 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 12R: PINE HILL ROAD

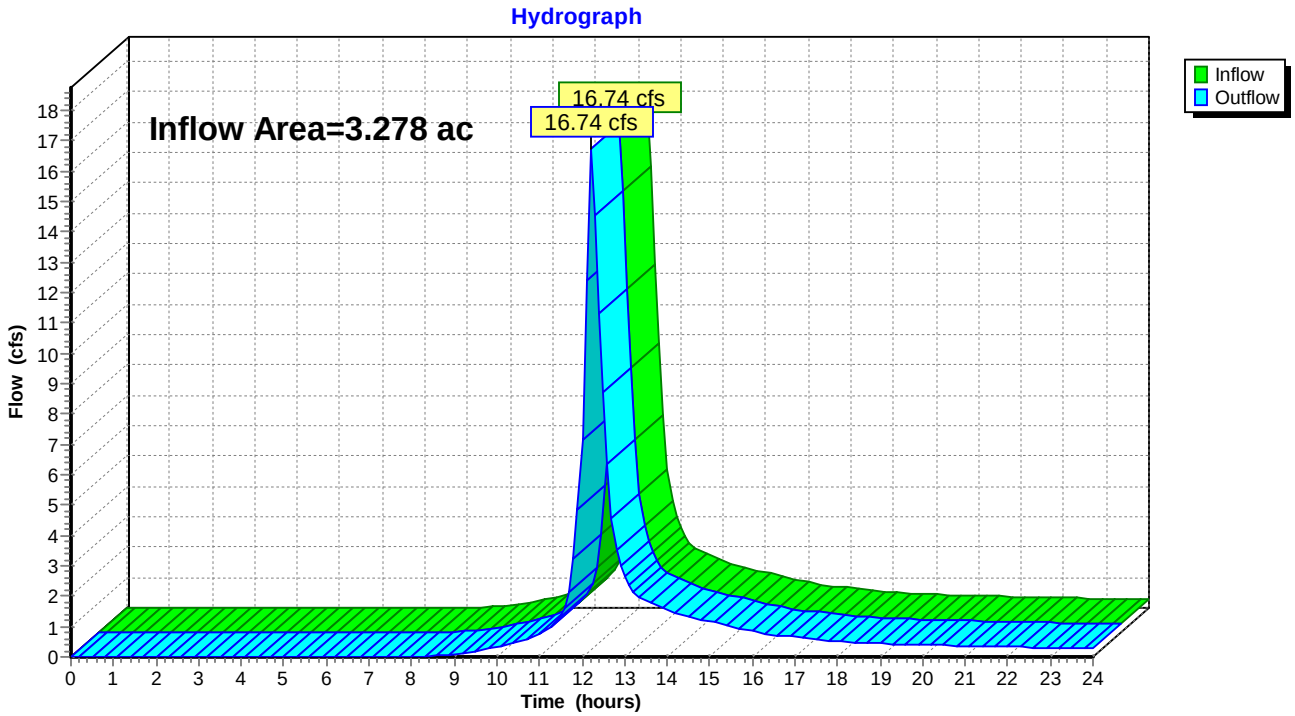


Summary for Reach 14R: SE BVW

Inflow Area = 3.278 ac, 0.00% Impervious, Inflow Depth > 5.82" for 100-Year event
Inflow = 16.74 cfs @ 12.22 hrs, Volume= 1.591 af
Outflow = 16.74 cfs @ 12.22 hrs, Volume= 1.591 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 14R: SE BVW



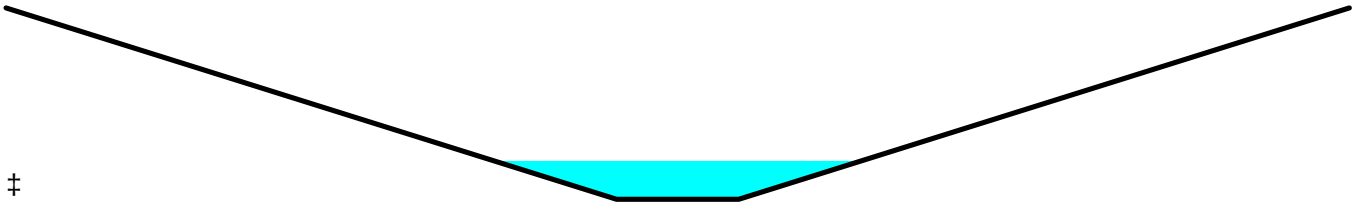
Summary for Reach 24R: crossing paved areas

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 2.36" for 100-Year event
Inflow = 19.40 cfs @ 12.23 hrs, Volume= 0.670 af
Outflow = 18.44 cfs @ 12.26 hrs, Volume= 0.670 af, Atten= 5%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 4.71 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.43 fps, Avg. Travel Time= 3.5 min

Peak Storage= 1,208 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 60.0 sf, Capacity= 728.66 cfs

10.00' x 1.00' deep channel, n= 0.013 Asphalt, smooth
Side Slope Z-value= 50.0 '/' Top Width= 110.00'
Length= 300.0' Slope= 0.0253 '/'
Inlet Invert= 463.00', Outlet Invert= 455.40'



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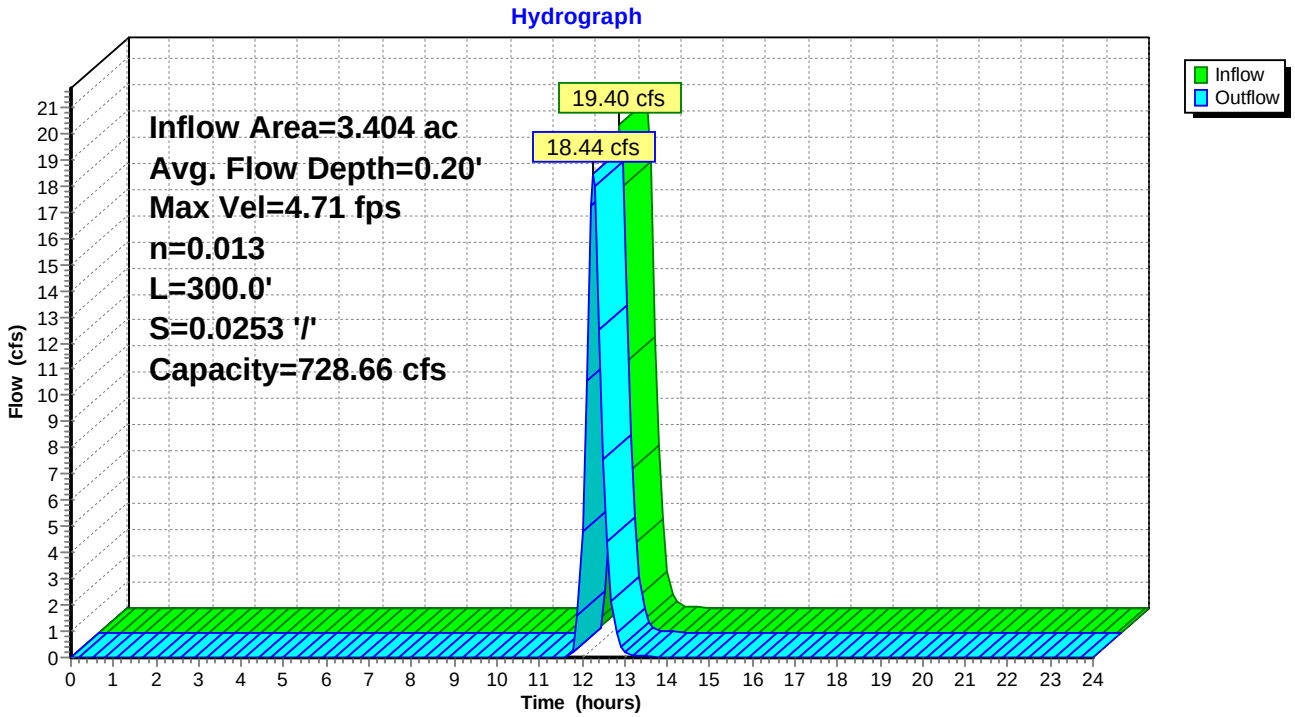
Reach 24R: crossing paved areas



Summary for Reach 25R: Open channel between debris and trailers

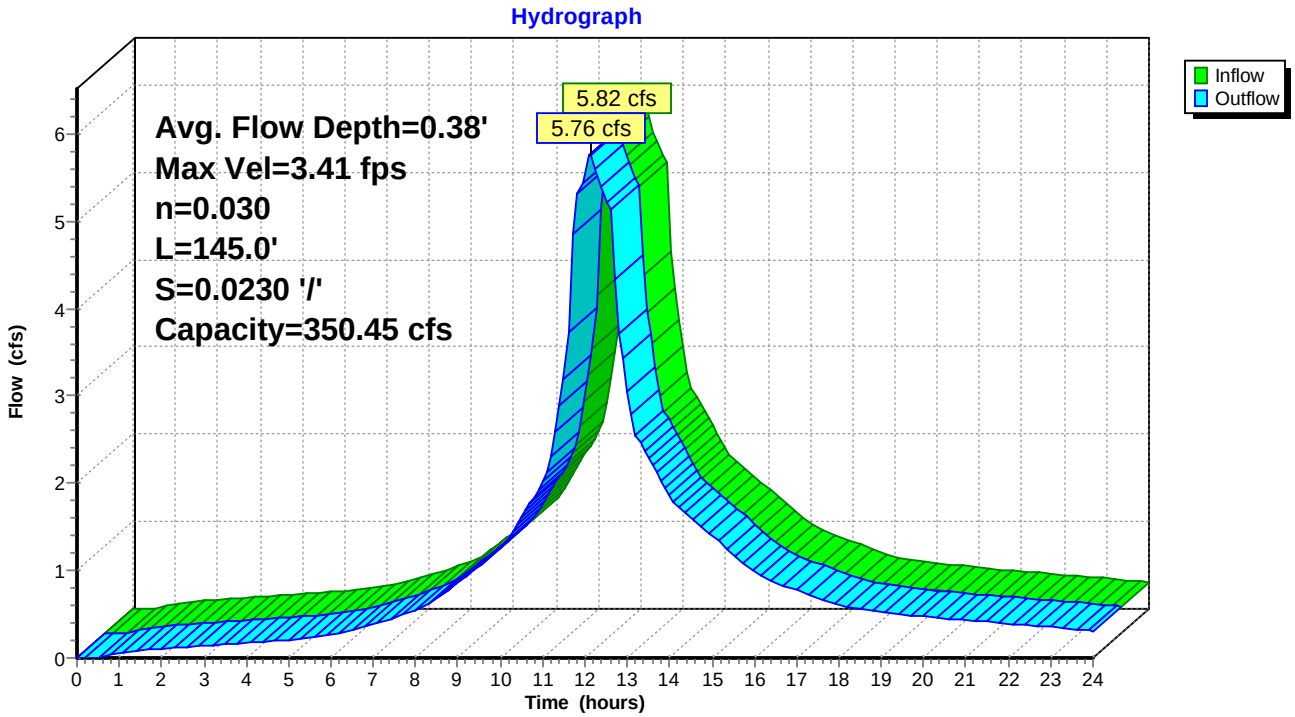
Inflow = 5.82 cfs @ 12.11 hrs, Volume= 1.876 af
Outflow = 5.76 cfs @ 12.13 hrs, Volume= 1.875 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.41 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 1.5 min

Peak Storage= 246 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 350.45 cfs

3.50' x 3.00' deep channel, n= 0.030 Earth, cobble bottom, clean sides
Side Slope Z-value= 2.5 '/' Top Width= 18.50'
Length= 145.0' Slope= 0.0230 '/'
Inlet Invert= 464.54', Outlet Invert= 461.20'

Reach 25R: Open channel between debris and trailers



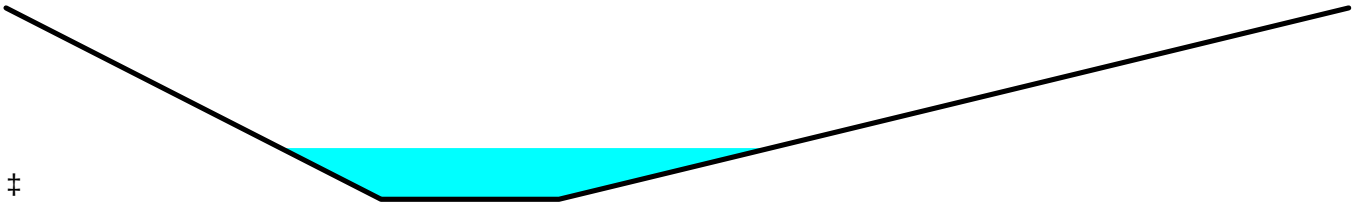
Summary for Reach 26R: existing stream on west side

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth = 2.36" for 100-Year event
Inflow = 23.83 cfs @ 12.11 hrs, Volume= 0.670 af
Outflow = 19.40 cfs @ 12.23 hrs, Volume= 0.670 af, Atten= 19%, Lag= 7.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.42 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.65 fps, Avg. Travel Time= 14.0 min

Peak Storage= 4,594 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.82'
Bank-Full Depth= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



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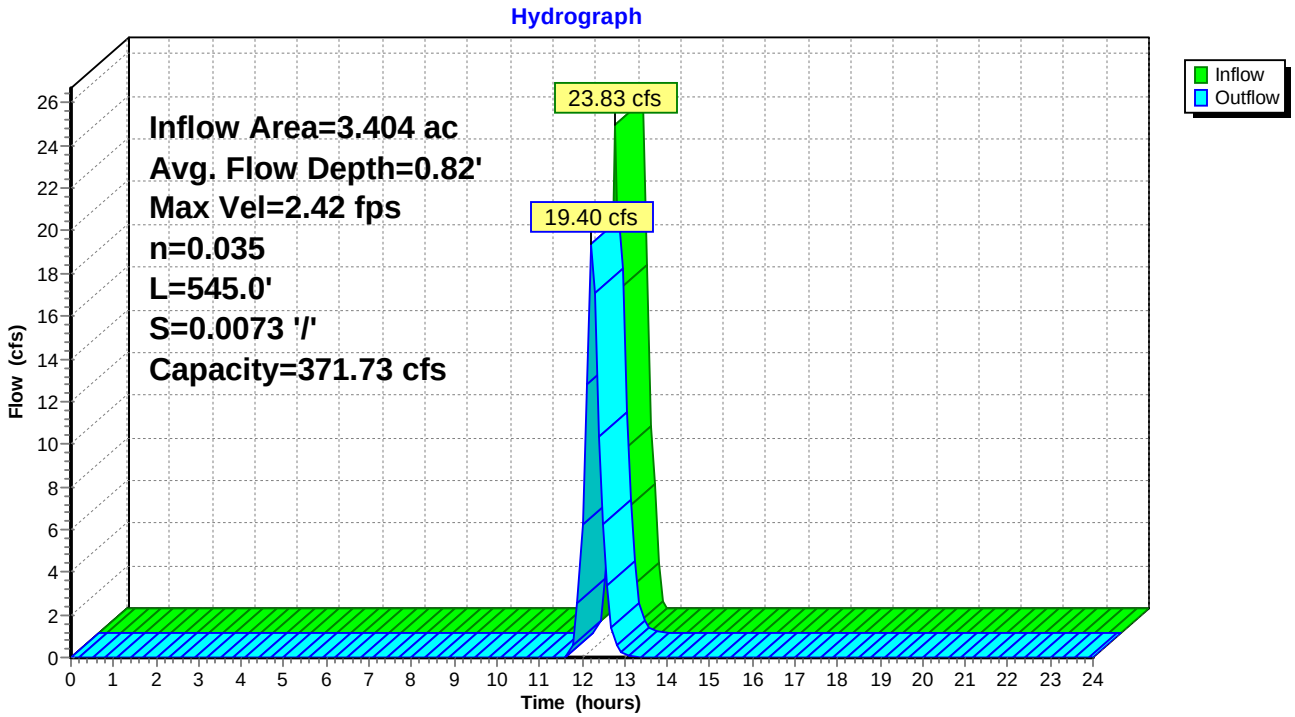
Reach 26R: existing stream on west side

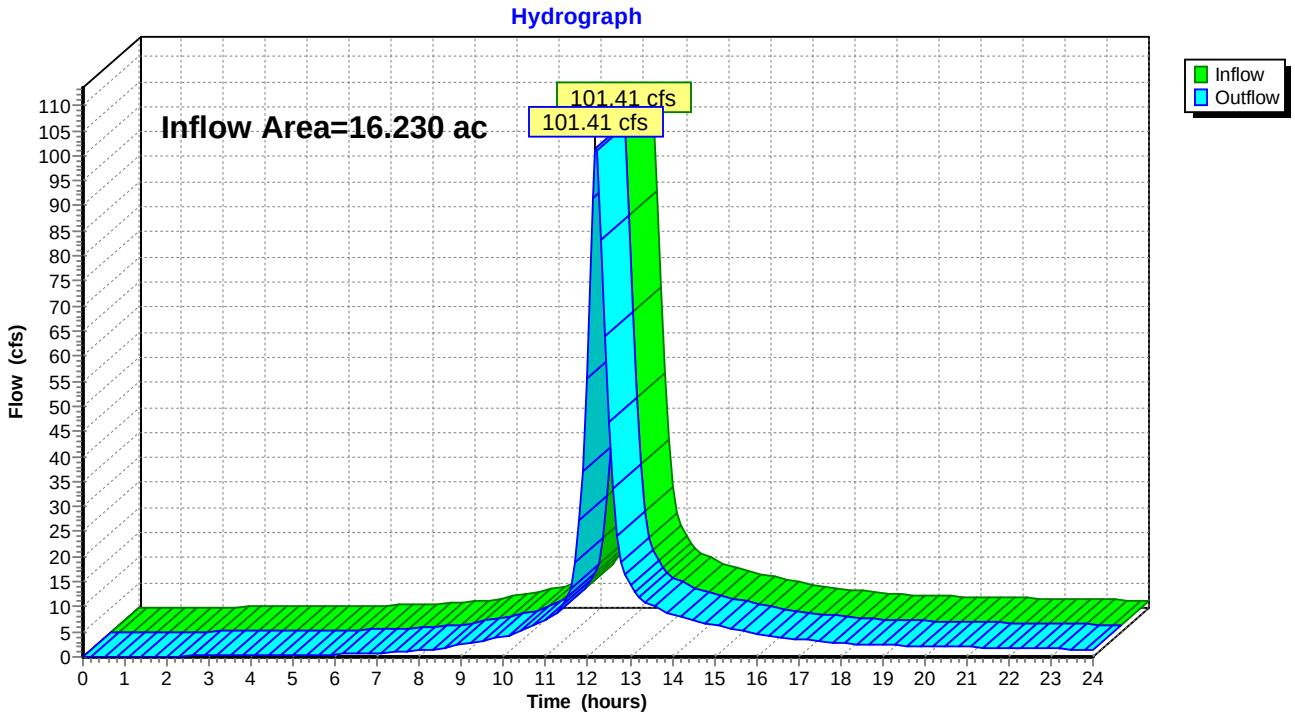


Summary for Reach X1: Area Summary Pre

Inflow Area = 16.230 ac, 12.83% Impervious, Inflow Depth > 7.63" for 100-Year event
Inflow = 101.41 cfs @ 12.18 hrs, Volume= 10.321 af
Outflow = 101.41 cfs @ 12.18 hrs, Volume= 10.321 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X1: Area Summary Pre



Summary for Pond 2P: Brandt Lane Existing Culverts

Inflow Area = 8.539 ac, 24.27% Impervious, Inflow Depth > 8.67" for 100-Year event
Inflow = 59.43 cfs @ 12.17 hrs, Volume= 6.168 af
Outflow = 60.14 cfs @ 12.19 hrs, Volume= 6.153 af, Atten= 0%, Lag= 0.7 min
Primary = 60.14 cfs @ 12.19 hrs, Volume= 6.153 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 460.91' @ 12.18 hrs Surf.Area= 1,451 sf Storage= 2,105 cf

Plug-Flow detention time= 3.6 min calculated for 6.127 af (99% of inflow)
Center-of-Mass det. time= 2.2 min (784.4 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	455.40'	31,204 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

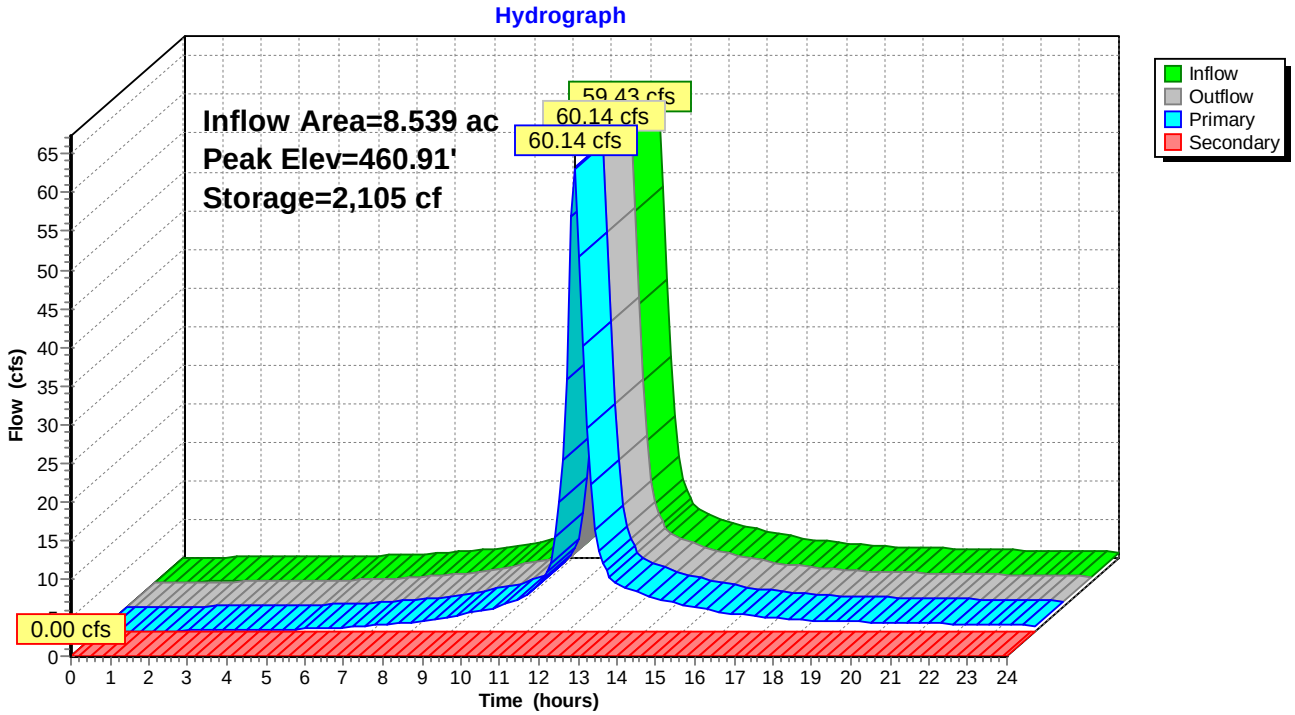
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
455.40	0	0	0
456.00	4	1	1
458.00	163	167	168
460.00	767	930	1,098
461.00	1,520	1,144	2,242
462.00	3,690	2,605	4,847
463.00	12,362	8,026	12,873
464.00	24,300	18,331	31,204

Device	Routing	Invert	Outlet Devices
#1	Primary	459.40'	**30.0" Round Culvert X 3.00** L= 25.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.40' / 458.74' S= 0.0264 '/' Cc= 0.900 n= 0.015, Flow Area= 4.91 sf
#2	Primary	459.00'	**36.0" Round Culvert** L= 18.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 459.00' / 458.40' S= 0.0324 '/' Cc= 0.900 n= 0.015, Flow Area= 7.07 sf
#3	Secondary	462.00'	**46.0' long x 12.0' breadth Broad-Crested Rectangular Weir (road fill section)** 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

Primary OutFlow Max=59.02 cfs @ 12.19 hrs HW=460.89' (Free Discharge)
└**1=Culvert** (Inlet Controls 38.00 cfs @ 4.15 fps)
└**2=Culvert** (Barrel Controls 21.01 cfs @ 6.40 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=455.40' (Free Discharge)
└**3=Broad-Crested Rectangular Weir (road fill section)** (Controls 0.00 cfs)

Pond 2P: Brandt Lane Existing Culverts



Summary for Pond 212P: Long Culvert

Inflow	=	5.76 cfs @	12.13 hrs,	Volume=	1.875 af
Outflow	=	5.76 cfs @	12.14 hrs,	Volume=	1.875 af, Atten= 0%, Lag= 0.2 min
Primary	=	5.76 cfs @	12.14 hrs,	Volume=	1.875 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 462.42' @ 12.14 hrs Surf.Area= 51 sf Storage= 24 cf

Plug-Flow detention time= 0.0 min calculated for 1.875 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (787.4 - 787.3)

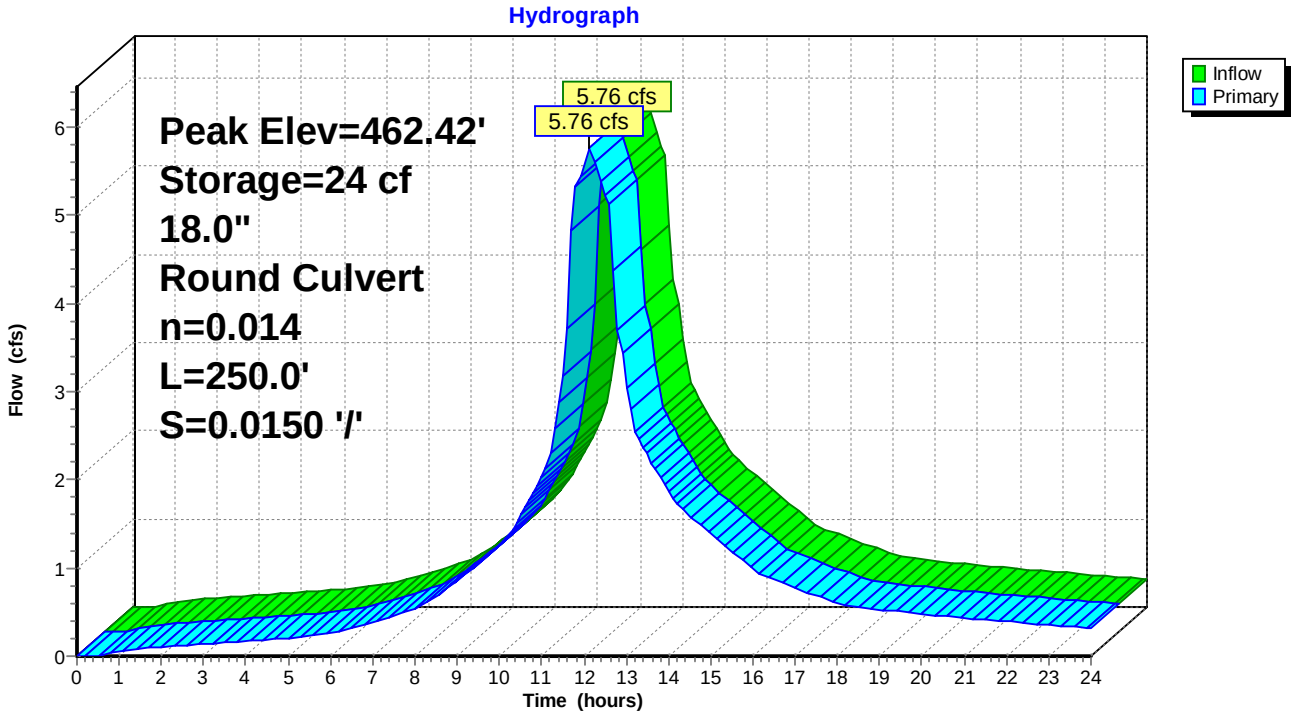
Volume	Invert	Avail.Storage	Storage Description
#1	461.00'	858 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
461.00	0	0.0	0	0	0
463.00	102	44.4	68	68	163
465.00	798	126.3	790	858	1,289

Device	Routing	Invert	Outlet Devices
#1	Primary	461.20'	**18.0" Round 18" Culvert to South** L= 250.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 461.20' / 457.44' S= 0.0150 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=5.74 cfs @ 12.14 hrs HW=462.41' (Free Discharge)
1=18" Culvert to South (Inlet Controls 5.74 cfs @ 3.75 fps)

Pond 212P: Long Culvert



Summary for Pond 213P: Northwest Wetland

Inflow Area = 3.404 ac, 40.90% Impervious, Inflow Depth > 8.98" for 100-Year event
Inflow = 29.99 cfs @ 12.11 hrs, Volume= 2.546 af
Outflow = 29.65 cfs @ 12.11 hrs, Volume= 2.546 af, Atten= 1%, Lag= 0.1 min
Primary = 23.83 cfs @ 12.11 hrs, Volume= 0.670 af
Secondary = 5.82 cfs @ 12.11 hrs, Volume= 1.876 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.30' @ 12.11 hrs Surf.Area= 584 sf Storage= 345 cf

Plug-Flow detention time= 0.5 min calculated for 2.546 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (770.5 - 770.1)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

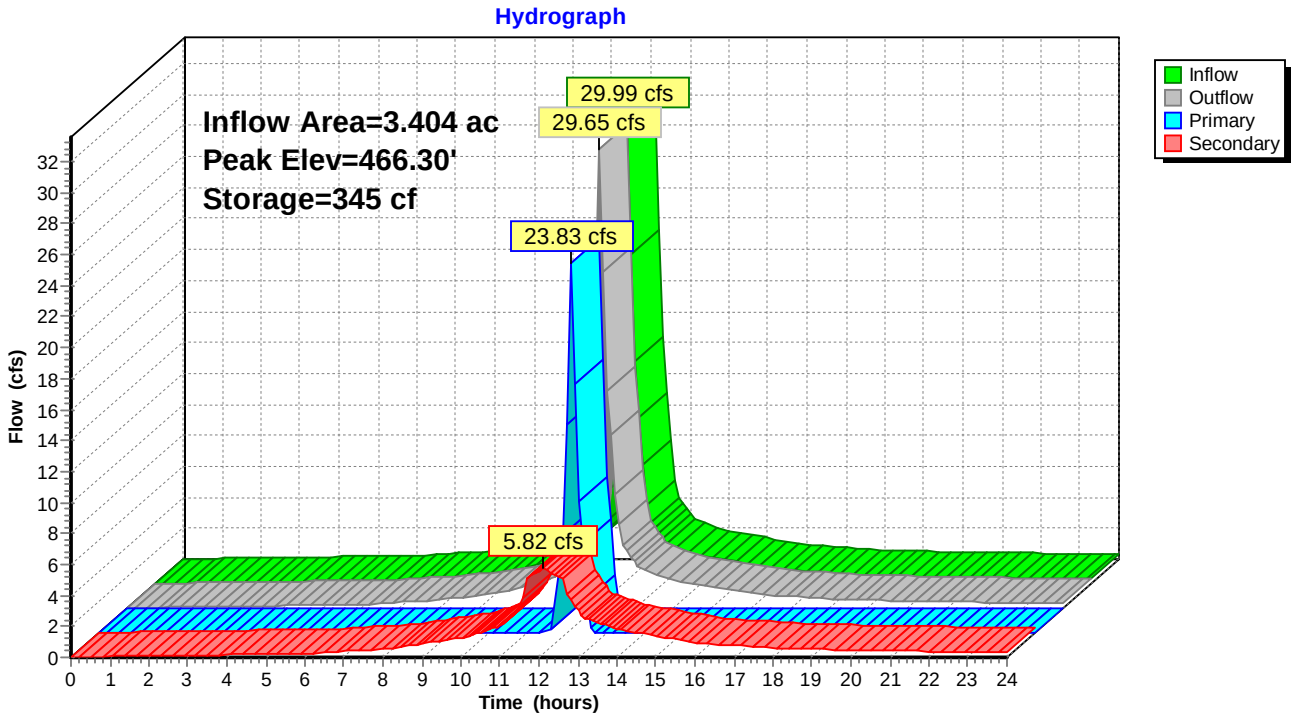
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing Stream- model as b/c we** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**18.0" Round 18" Culvert to South** L= 26.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 465.08' / 464.54' S= 0.0202 '/' Cc= 0.900 n= 0.014 Concrete pipe, finished, Flow Area= 1.77 sf
#3	Secondary	467.08'	**20.0' long x 10.0' breadth Flow over topping to channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=22.99 cfs @ 12.11 hrs HW=466.30' (Free Discharge)
└─**1=Discharge to West to Existing Stream- model as b/c weir** (Weir Controls 22.99 cfs @ 0.86 fps)

Secondary OutFlow Max=5.81 cfs @ 12.11 hrs HW=466.30' (Free Discharge)
├─**2=18" Culvert to South** (Inlet Controls 5.81 cfs @ 3.76 fps)
└─**3=Flow over topping to channel - model as b/c weir** (Controls 0.00 cfs)

Pond 213P: Northwest Wetland

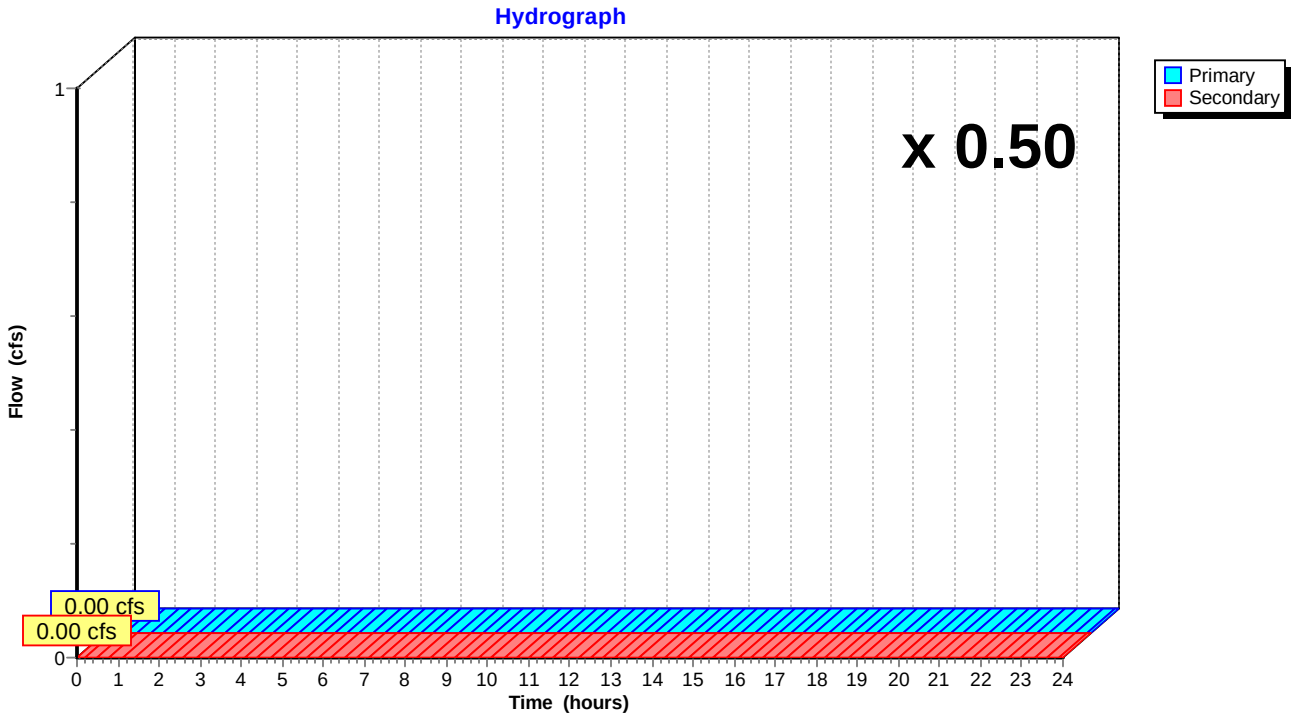


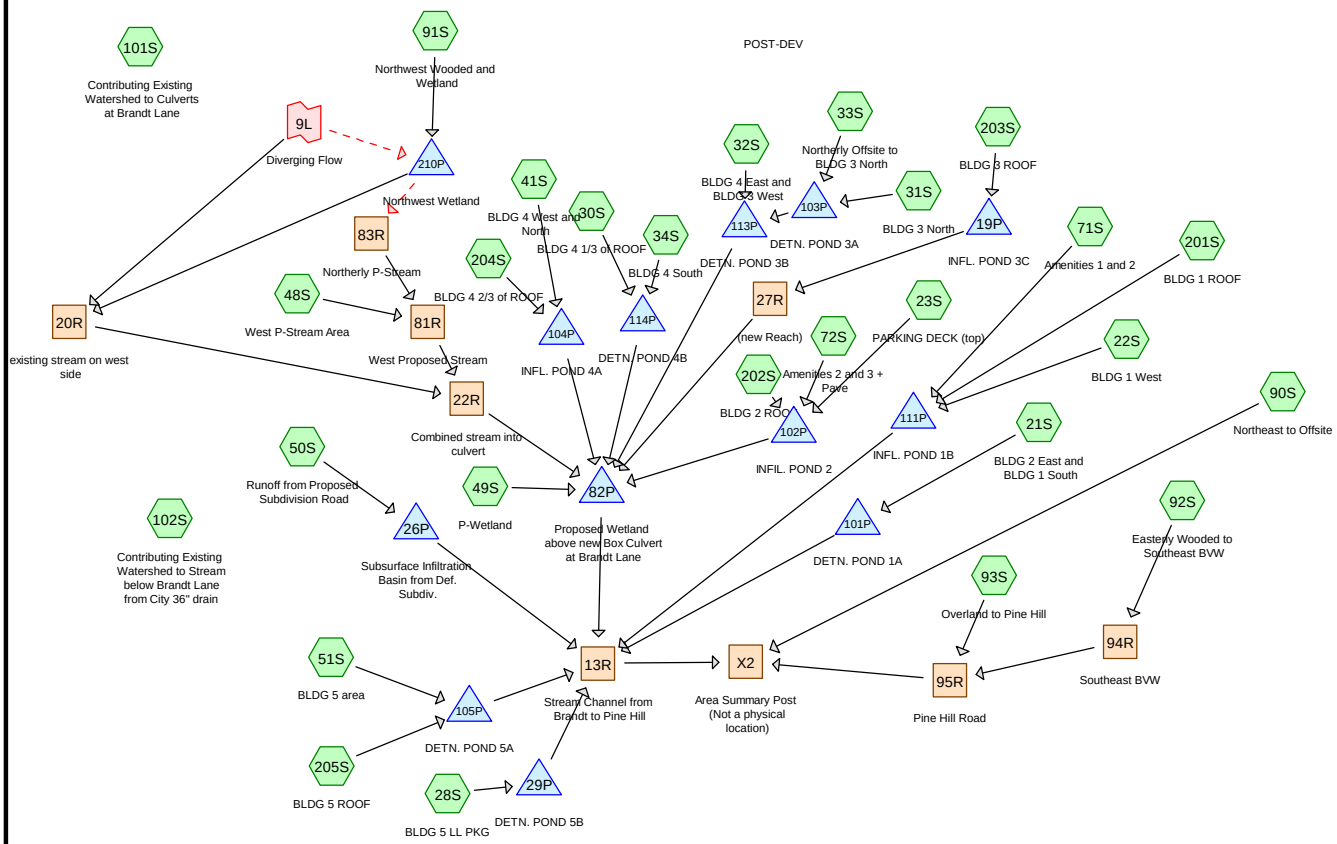
Summary for Link 214L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 214L: Diverging Flow





Routing Diagram for Grafton Woods Study - Current

Prepared by THOMPSON-LISTON Associates, Inc., Printed 10/30/2024

Time span=0.00-24.00 hrs, dt=0.10 hrs, 241 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 21S: BLDG 2 East and BLDG 1 Runoff Area=71,065 sf 79.38% Impervious Runoff Depth>3.22"
Tc=10.0 min CN=74/98 Runoff=4.54 cfs 0.438 af

Subcatchment 22S: BLDG 1 West Runoff Area=10,930 sf 74.42% Impervious Runoff Depth>3.11"
Tc=10.0 min CN=74/98 Runoff=0.68 cfs 0.065 af

Subcatchment 23S: PARKING DECK (top) Runoff Area=25,493 sf 94.05% Impervious Runoff Depth>3.53"
Tc=10.0 min CN=74/98 Runoff=1.78 cfs 0.172 af

Subcatchment 28S: BLDG 5 LL PKG Runoff Area=10,149 sf 91.42% Impervious Runoff Depth>3.48"
Tc=10.0 min CN=74/98 Runoff=0.70 cfs 0.068 af

Subcatchment 30S: BLDG 4 1/3 of ROOF Runoff Area=10,155 sf 100.00% Impervious Runoff Depth>3.66"
Tc=6.0 min CN=0/98 Runoff=0.83 cfs 0.071 af

Subcatchment 31S: BLDG 3 North Runoff Area=51,616 sf 68.73% Impervious Runoff Depth>2.97"
Flow Length=189' Slope=0.0237 '/' Tc=10.1 min CN=73/98 Runoff=3.04 cfs 0.293 af

Subcatchment 32S: BLDG 4 East and BLDG 3 Runoff Area=33,395 sf 67.17% Impervious Runoff Depth>3.15"
Tc=10.0 min CN=82/98 Runoff=2.13 cfs 0.201 af

Subcatchment 33S: Northerly Offsite to BLDG 3 Runoff Area=12,685 sf 0.00% Impervious Runoff Depth>1.26"
Flow Length=90' Slope=0.0322 '/' Tc=10.0 min CN=70/0 Runoff=0.33 cfs 0.031 af

Subcatchment 34S: BLDG 4 South Runoff Area=18,423 sf 70.83% Impervious Runoff Depth>3.04"
Tc=10.0 min CN=74/98 Runoff=1.11 cfs 0.107 af

Subcatchment 41S: BLDG 4 West and North Runoff Area=28,818 sf 81.57% Impervious Runoff Depth>3.27"
Tc=10.0 min CN=74/98 Runoff=1.87 cfs 0.180 af

Subcatchment 48S: West P-Stream Area Runoff Area=34,984 sf 0.00% Impervious Runoff Depth>1.02"
Flow Length=300' Slope=0.0500 '/' Tc=10.0 min CN=66/0 Runoff=0.70 cfs 0.069 af

Subcatchment 49S: P-Wetland Runoff Area=27,172 sf 0.00% Impervious Runoff Depth>0.97"
Flow Length=345' Slope=0.0600 '/' Tc=8.4 min CN=65/0 Runoff=0.54 cfs 0.050 af

Subcatchment 50S: Runoff from Proposed Runoff Area=60,868 sf 80.69% Impervious Runoff Depth>3.25"
Tc=12.0 min CN=74/98 Runoff=3.71 cfs 0.378 af

Subcatchment 51S: BLDG 5 area Runoff Area=32,450 sf 76.58% Impervious Runoff Depth>3.16"
Tc=10.0 min CN=74/98 Runoff=2.04 cfs 0.196 af

Subcatchment 71S: Amenities 1 and 2 Runoff Area=35,555 sf 51.73% Impervious Runoff Depth>2.63"
Flow Length=124' Slope=0.0106 '/' Tc=10.0 min CN=74/98 Runoff=1.88 cfs 0.179 af

Subcatchment 72S: Amenities 2 and 3 + Pave Runoff Area=28,428 sf 70.52% Impervious Runoff Depth>2.99"
Flow Length=380' Slope=0.0308 '/' Tc=10.0 min CN=72/98 Runoff=1.69 cfs 0.163 af

Subcatchment 90S: Northeast to Offsite Runoff Area=3,287 sf 0.00% Impervious Runoff Depth>1.26"
Flow Length=69' Slope=0.2520 '/' Tc=10.0 min CN=70/0 Runoff=0.08 cfs 0.008 af

Subcatchment 91S: Northwest Wooded and Runoff Area=48,103 sf 0.00% Impervious Runoff Depth>1.45"
Tc=20.0 min CN=73/0 Runoff=1.21 cfs 0.133 af

Subcatchment 92S: Easterly Wooded to Runoff Area=47,176 sf 0.00% Impervious Runoff Depth>1.32"
Flow Length=655' Slope=0.0674 '/' Tc=11.3 min CN=71/0 Runoff=1.27 cfs 0.119 af

Subcatchment 93S: Overland to Pine Hill Runoff Area=13,547 sf 0.00% Impervious Runoff Depth>1.39"
Tc=10.0 min CN=72/0 Runoff=0.39 cfs 0.036 af

Subcatchment 101S: Contributing Existing Runoff Area=182.196 ac 38.00% Impervious Runoff Depth>1.82"
Tc=120.0 min CN=61/98 Runoff=87.37 cfs 27.609 af

Subcatchment 102S: Contributing Existing Runoff Area=49.270 ac 48.27% Impervious Runoff Depth>2.52"
Tc=75.0 min CN=74/98 Runoff=46.63 cfs 10.359 af

Subcatchment 201S: BLDG 1 ROOF Runoff Area=28,260 sf 100.00% Impervious Runoff Depth>3.66"
Tc=6.0 min CN=0/98 Runoff=2.30 cfs 0.198 af

Subcatchment 202S: BLDG 2 ROOF Runoff Area=28,346 sf 100.00% Impervious Runoff Depth>3.66"
Tc=6.0 min CN=0/98 Runoff=2.30 cfs 0.199 af

Subcatchment 203S: BLDG 3 ROOF Runoff Area=38,210 sf 100.00% Impervious Runoff Depth>3.66"
Tc=6.0 min CN=0/98 Runoff=3.11 cfs 0.268 af

Subcatchment 204S: BLDG 4 2/3 of ROOF Runoff Area=20,310 sf 100.00% Impervious Runoff Depth>3.66"
Tc=6.0 min CN=0/98 Runoff=1.65 cfs 0.142 af

Subcatchment 205S: BLDG 5 ROOF Runoff Area=14,325 sf 100.00% Impervious Runoff Depth>3.66"
Tc=6.0 min CN=0/98 Runoff=1.16 cfs 0.100 af

Reach 13R: Stream Channel from Brandt to Avg. Flow Depth=0.26' Max Vel=3.70 fps Inflow=10.52 cfs 1.611 af
n=0.030 L=280.0' S=0.0371 '/' Capacity=593.73 cfs Outflow=10.37 cfs 1.609 af

Reach 20R: existing stream on west side Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=545.0' S=0.0073 '/' Capacity=371.73 cfs Outflow=0.00 cfs 0.000 af

Reach 22R: Combined stream into culvert Avg. Flow Depth=0.12' Max Vel=1.47 fps Inflow=1.53 cfs 0.200 af
n=0.040 L=282.0' S=0.0266 '/' Capacity=653.19 cfs Outflow=1.50 cfs 0.200 af

Reach 27R: (new Reach) Inflow=0.05 cfs 0.007 af
Outflow=0.05 cfs 0.007 af

Reach 81R: West Proposed Stream Avg. Flow Depth=0.22' Max Vel=1.48 fps Inflow=1.59 cfs 0.201 af
n=0.025 L=362.0' S=0.0061 '/' Capacity=205.07 cfs Outflow=1.53 cfs 0.200 af

Reach 83R: Northerly P-Stream Avg. Flow Depth=0.19' Max Vel=1.32 fps Inflow=1.22 cfs 0.133 af
n=0.025 L=300.0' S=0.0057 '/' Capacity=198.02 cfs Outflow=1.16 cfs 0.133 af

Reach 94R: Southeast BVW Inflow=1.27 cfs 0.119 af
Outflow=1.27 cfs 0.119 af

Reach 95R: Pine Hill Road Inflow=1.66 cfs 0.155 af
Outflow=1.66 cfs 0.155 af

Reach X2: Area Summary Post (Not a physical location) Inflow=11.60 cfs 1.773 af
Outflow=11.60 cfs 1.773 af

Pond 19P: INFL. POND 3C Peak Elev=474.16' Storage=5,130 cf Inflow=3.11 cfs 0.268 af
Discarded=0.17 cfs 0.228 af Primary=0.05 cfs 0.007 af Outflow=0.22 cfs 0.235 af

Pond 26P: Subsurface Infiltration Basin from Peak Elev=460.48' Storage=5,232 cf Inflow=3.71 cfs 0.378 af
Discarded=0.53 cfs 0.378 af Primary=0.00 cfs 0.000 af Outflow=0.53 cfs 0.378 af

Pond 29P: DETN. POND 5B Peak Elev=453.18' Storage=660 cf Inflow=0.70 cfs 0.068 af
Discarded=0.17 cfs 0.068 af Primary=0.00 cfs 0.000 af Outflow=0.17 cfs 0.068 af

Pond 82P: Proposed Wetland above new Box Peak Elev=456.31' Storage=132 cf Inflow=6.67 cfs 1.003 af
144.0" x 48.0" Box Culvert n=0.015 L=52.0' S=0.0135 '/' Outflow=6.68 cfs 1.003 af

Pond 101P: DETN. POND 1A Peak Elev=456.36' Storage=4,083 cf Inflow=4.54 cfs 0.438 af
12.0" Round Culvert n=0.012 L=140.0' S=0.0050 '/' Outflow=2.37 cfs 0.430 af

Pond 102P: INFIL. POND 2 Peak Elev=466.44' Storage=14,306 cf Inflow=5.70 cfs 0.534 af
Discarded=0.16 cfs 0.244 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.244 af

Pond 103P: DETN. POND 3A Peak Elev=468.24' Storage=1,356 cf Inflow=3.37 cfs 0.324 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=2.67 cfs 0.322 af

Pond 104P: INFL. POND 4A Peak Elev=464.31' Storage=7,173 cf Inflow=3.48 cfs 0.322 af
Discarded=0.10 cfs 0.151 af Primary=0.21 cfs 0.049 af Outflow=0.31 cfs 0.200 af

Pond 105P: DETN. POND 5A Peak Elev=460.59' Storage=3,456 cf Inflow=3.16 cfs 0.297 af
Discarded=0.59 cfs 0.296 af Primary=0.00 cfs 0.000 af Outflow=0.59 cfs 0.296 af

Pond 111P: INFL. POND 1B Peak Elev=463.03' Storage=5,474 cf Inflow=4.79 cfs 0.442 af
Discarded=0.25 cfs 0.258 af Primary=1.50 cfs 0.179 af Outflow=1.75 cfs 0.437 af

Pond 113P: DETN. POND 3B Peak Elev=466.48' Storage=1,629 cf Inflow=4.53 cfs 0.523 af
18.0" Round Culvert n=0.012 L=320.0' S=0.0109 '/' Outflow=4.10 cfs 0.520 af

Pond 114P: DETN. POND 4B Peak Elev=463.45' Storage=771 cf Inflow=1.92 cfs 0.178 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0114 '/' Outflow=1.47 cfs 0.177 af

Pond 210P: Northwest Wetland Peak Elev=465.28' Storage=7 cf Inflow=1.21 cfs 0.133 af
Primary=0.00 cfs 0.000 af Secondary=1.22 cfs 0.133 af Outflow=1.22 cfs 0.133 af

Link 9L: Diverging Flow x 0.50
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 248.311 ac Runoff Volume = 41.833 af Average Runoff Depth = 2.02"
58.43% Pervious = 145.093 ac 41.57% Impervious = 103.218 ac

Summary for Subcatchment 21S: BLDG 2 East and BLDG 1 South

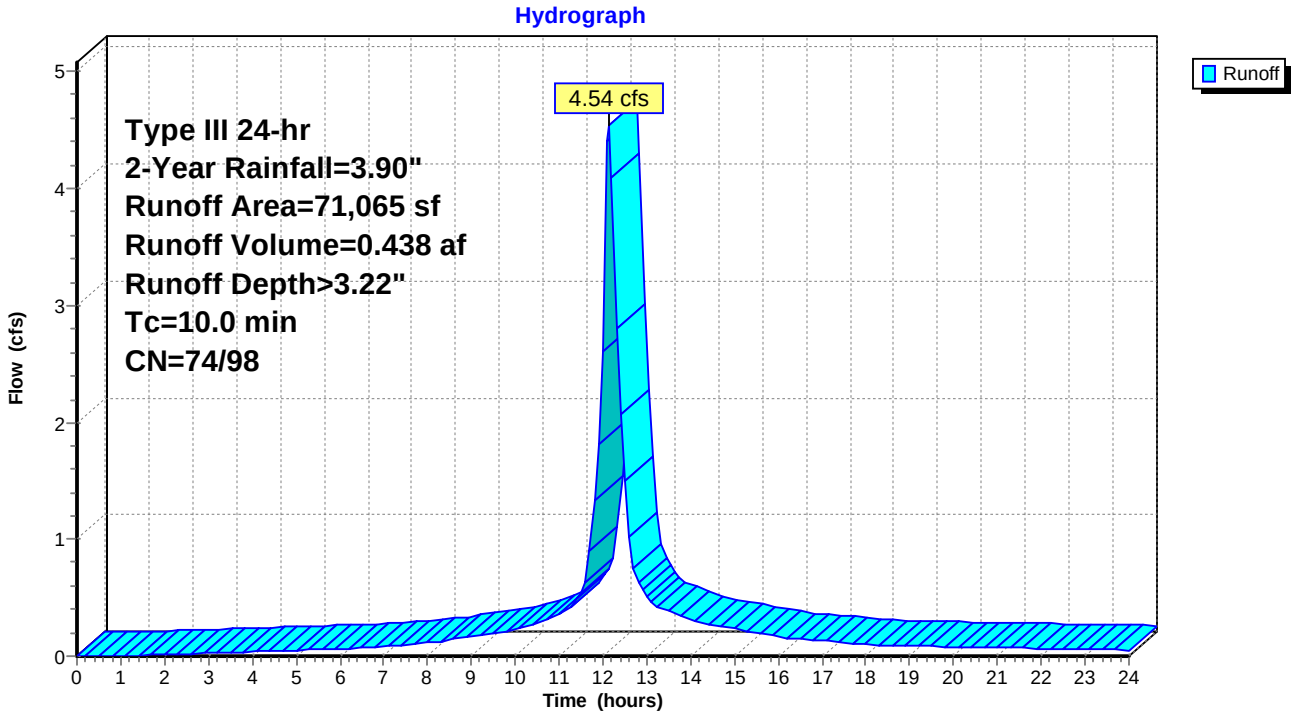
Runoff = 4.54 cfs @ 12.14 hrs, Volume= 0.438 af, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	2,198	74	Grass, good, HSG C to CB16
*	10,610	98	Pavement to CB16
*	1,481	74	Grass, good, HSG C to CB18
*	8,712	98	Pavement to CB18
*	257	74	Grass, good, HSG C to CB14
*	4,521	98	Pavement to CB14
*	1,595	74	Grass, good, HSG C to CB12
*	9,297	98	Pavement to CB12
*	1,034	74	Grass, good, HSG C to CB28
*	4,655	98	Pavement to CB28
*	2,021	74	Grass, good, HSG C to CB26
*	4,692	98	Pavement to CB26
*	2,054	74	Grass, good, HSG C to CB24
*	7,783	98	Pavement to CB24
*	4,016	74	Grass, good, HSG C to CB20
*	6,139	98	Pavement to CB20
	71,065	93	Weighted Average
	14,656	74	20.62% Pervious Area
	56,409	98	79.38% Impervious Area

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

Subcatchment 21S: BLDG 2 East and BLDG 1 South



Summary for Subcatchment 22S: BLDG 1 West

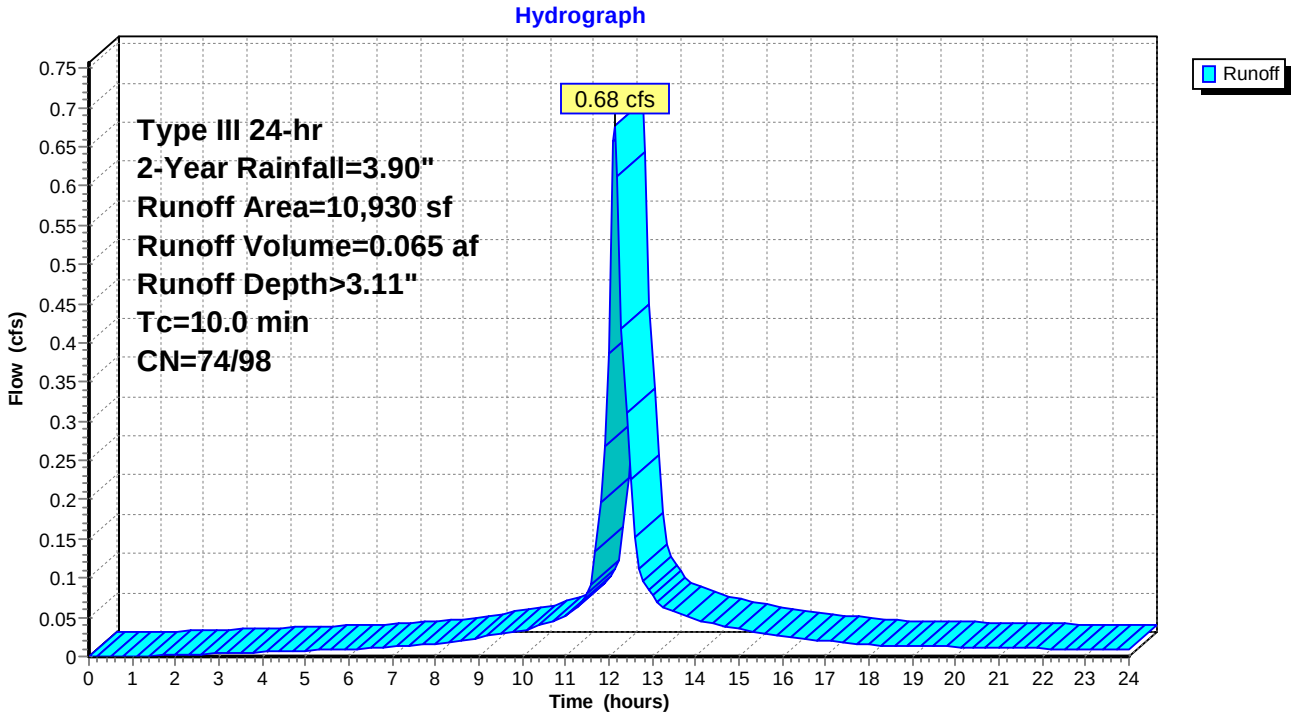
Runoff = 0.68 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
	2,796	74	>75% Grass cover, Good, HSG C
*	8,134	98	Pavement
	10,930	92	Weighted Average
	2,796	74	25.58% Pervious Area
	8,134	98	74.42% Impervious Area

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

Subcatchment 22S: BLDG 1 West



Summary for Subcatchment 23S: PARKING DECK (top)

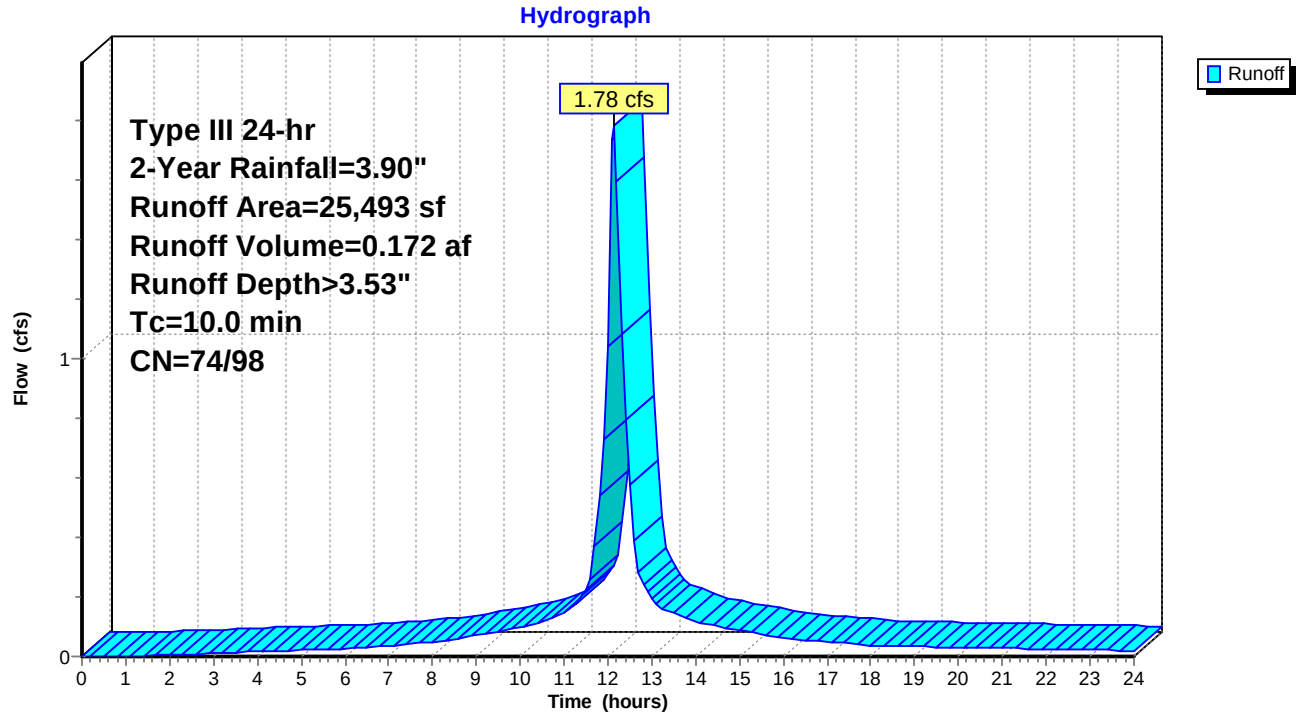
Runoff = 1.78 cfs @ 12.13 hrs, Volume= 0.172 af, Depth> 3.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
	1,518	74	>75% Grass cover, Good, HSG C
*	23,975	98	Pavement
	25,493	97	Weighted Average
	1,518	74	5.95% Pervious Area
	23,975	98	94.05% Impervious Area

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

Subcatchment 23S: PARKING DECK (top)



Summary for Subcatchment 28S: BLDG 5 LL PKG

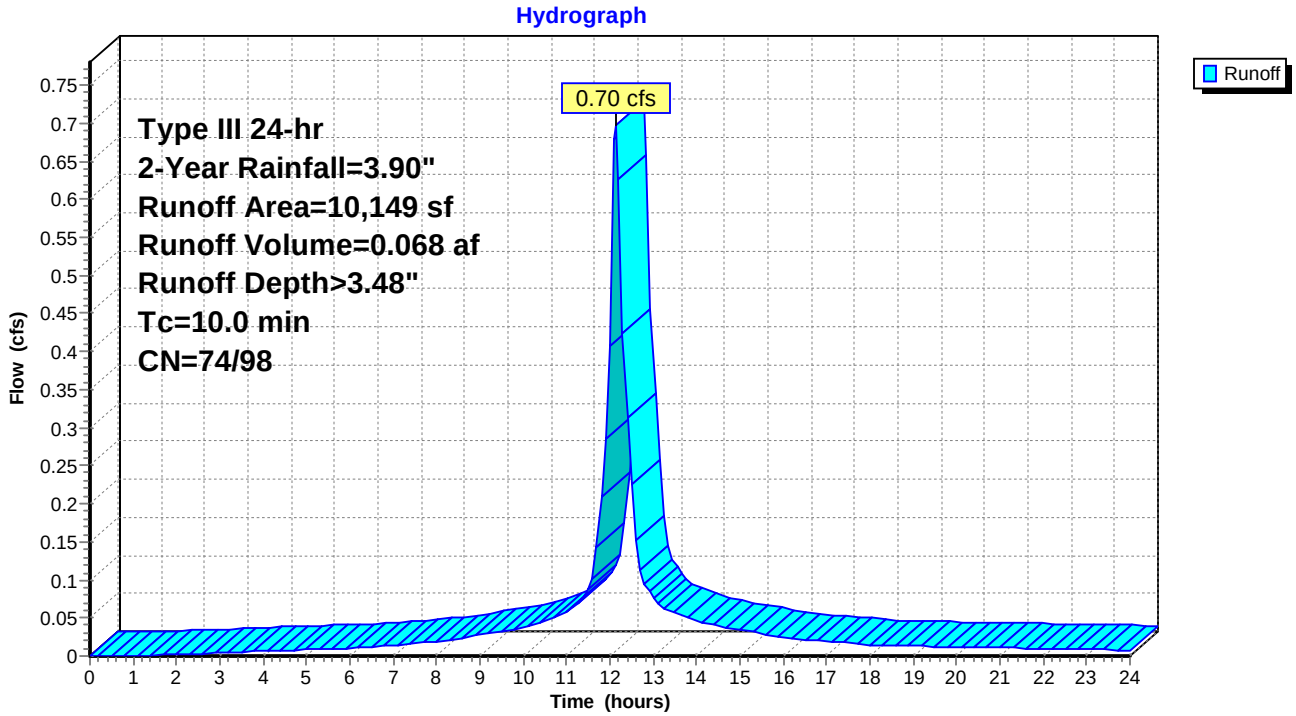
Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.068 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	9,278	98	Impervious Pavement
	580	74	>75% Grass cover, Good, HSG C
*	291	74	Landscaped Areas
	10,149	96	Weighted Average
	871	74	8.58% Pervious Area
	9,278	98	91.42% Impervious Area

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

Subcatchment 28S: BLDG 5 LL PKG



Summary for Subcatchment 30S: BLDG 4 1/3 of ROOF

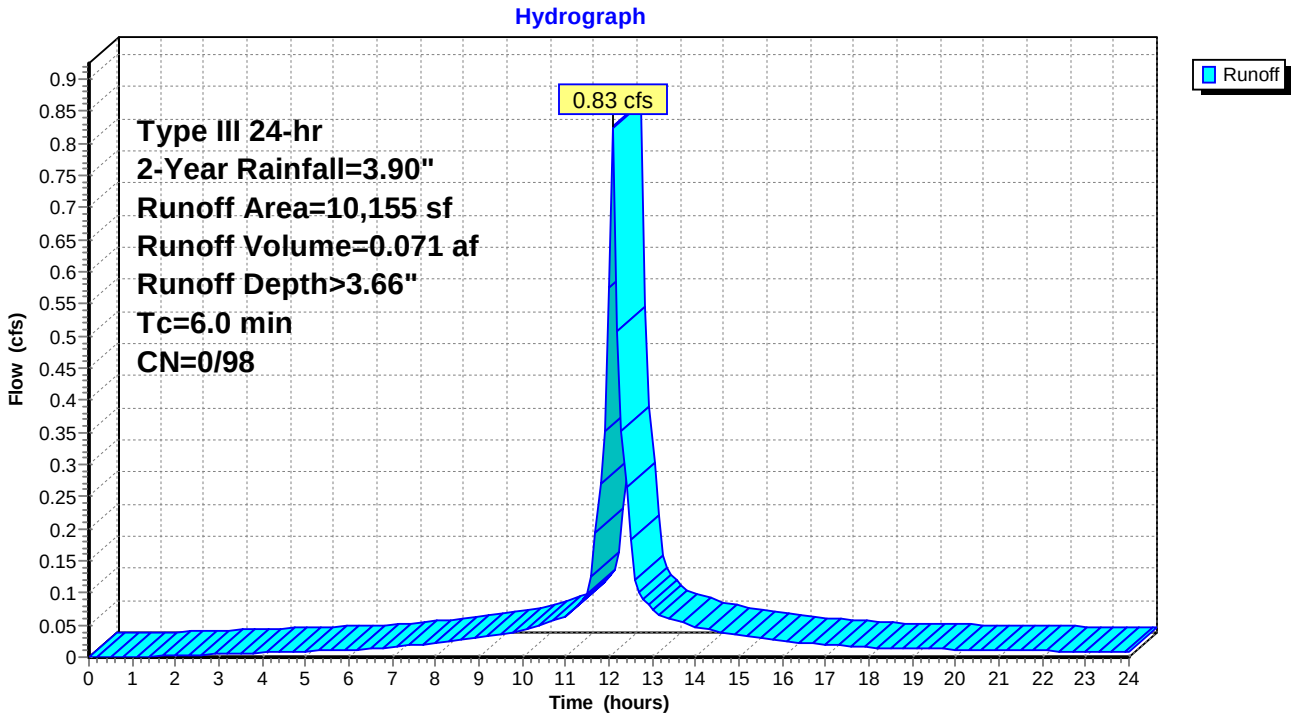
Runoff = 0.83 cfs @ 12.09 hrs, Volume= 0.071 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	10,155	98	BLDG 4 ROOF
	10,155	98	100.00% Impervious Area

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

Subcatchment 30S: BLDG 4 1/3 of ROOF



Summary for Subcatchment 31S: BLDG 3 North

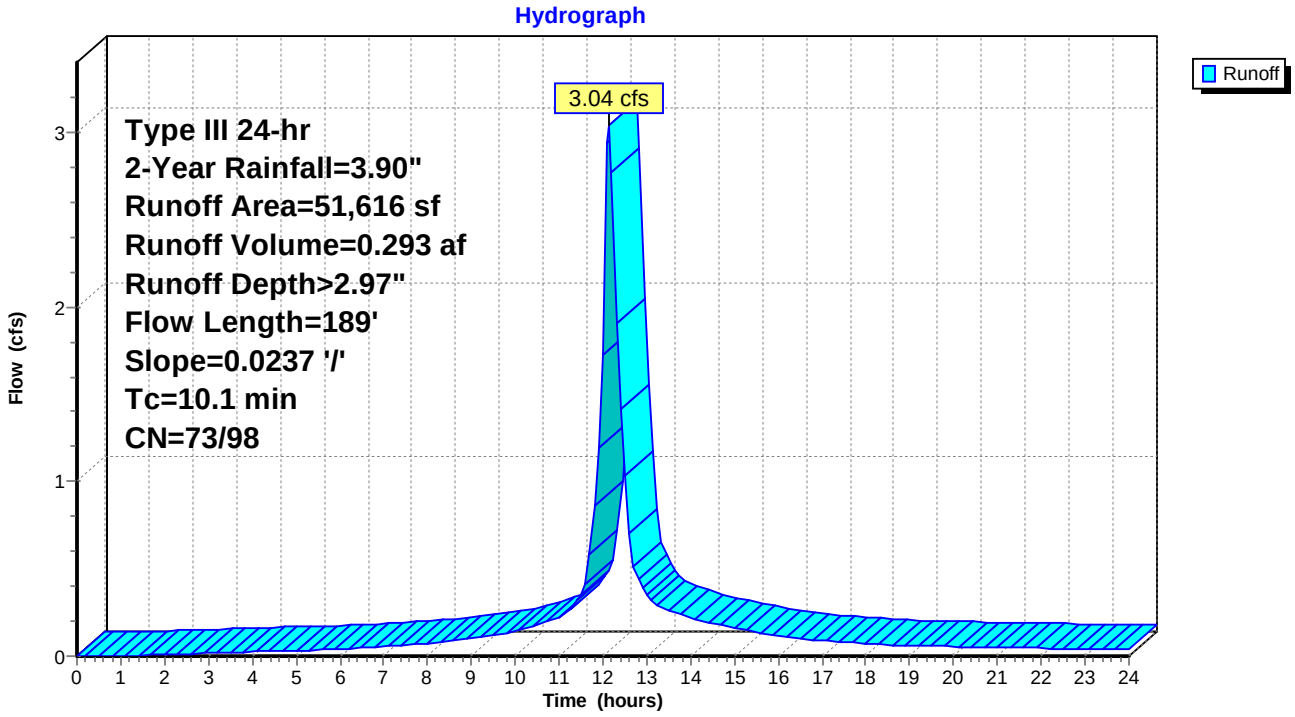
Runoff = 3.04 cfs @ 12.14 hrs, Volume= 0.293 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	536	70	Woods, good, C to CB30
	4,684	74	>75% Grass cover, Good, HSG C
*	10,379	98	Pavement to CB30
*	1,010	74	Grass, good, C to CB30
*	1,892	70	Woods, good, C to CB32
*	642	74	Grass, good, C to CB32
*	3,648	98	Pavement to CB32
*	2,882	74	Grass, good, C to CB34
*	8,638	98	Pavement to CB34
*	3,104	74	Grass, good, C to CB58
*	9,564	98	Pavement to CB58
*	4,637	90	Amenity space, 70% impervious
	51,616	90	Weighted Average
	16,141	73	31.27% Pervious Area
	35,475	98	68.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	189	0.0237	0.82		**Lag/CN Method,**
6.3					**Direct Entry, round up to 10**
10.1	189	Total			

Subcatchment 31S: BLDG 3 North



Summary for Subcatchment 32S: BLDG 4 East and BLDG 3 West

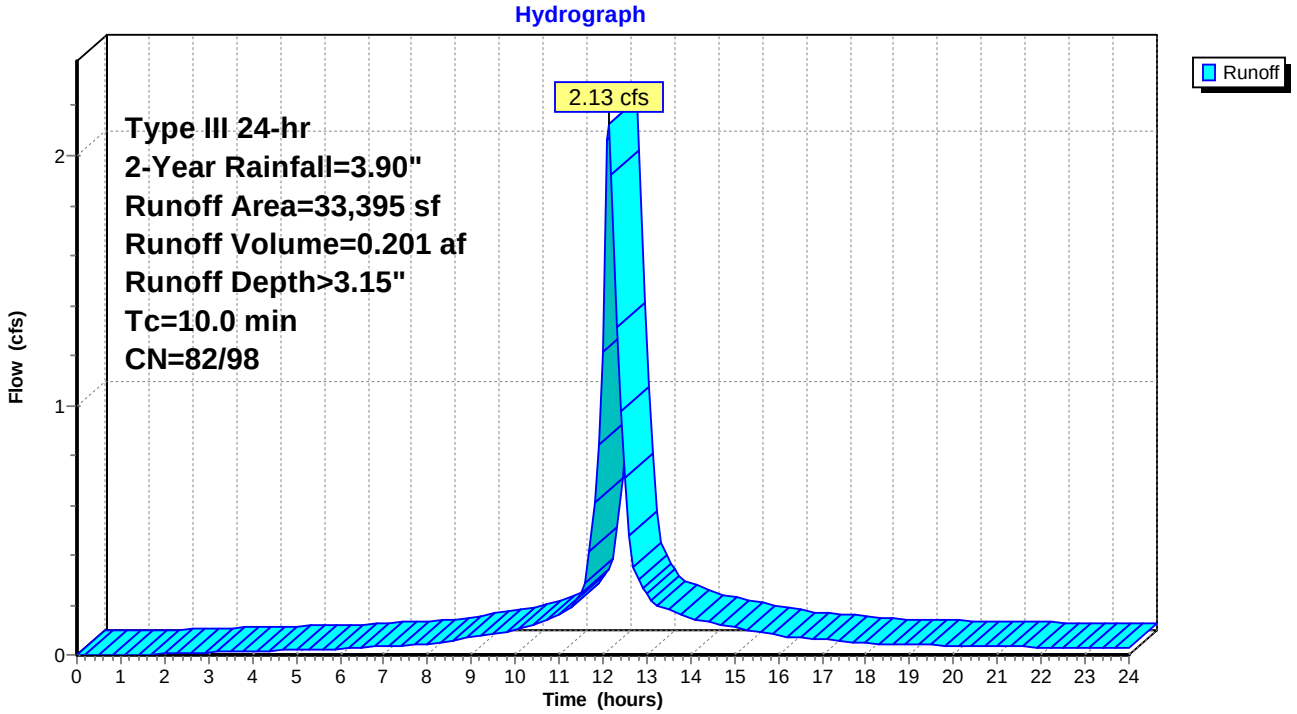
Runoff = 2.13 cfs @ 12.14 hrs, Volume= 0.201 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	1,323	74	Grass, good, C to CB50
*	4,601	98	Pavement to CB50
*	1,023	74	Grass, good, C to CB52
*	6,739	98	Pavement to CB52
*	3,383	74	Grass, good, C to CB54
*	11,092	98	Pavement to CB54
*	5,234	90	Amenity area and landscaping
	33,395	93	Weighted Average
	10,963	82	32.83% Pervious Area
	22,432	98	67.17% Impervious Area

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

Subcatchment 32S: BLDG 4 East and BLDG 3 West



Summary for Subcatchment 33S: Northerly Offsite to BLDG 3 North

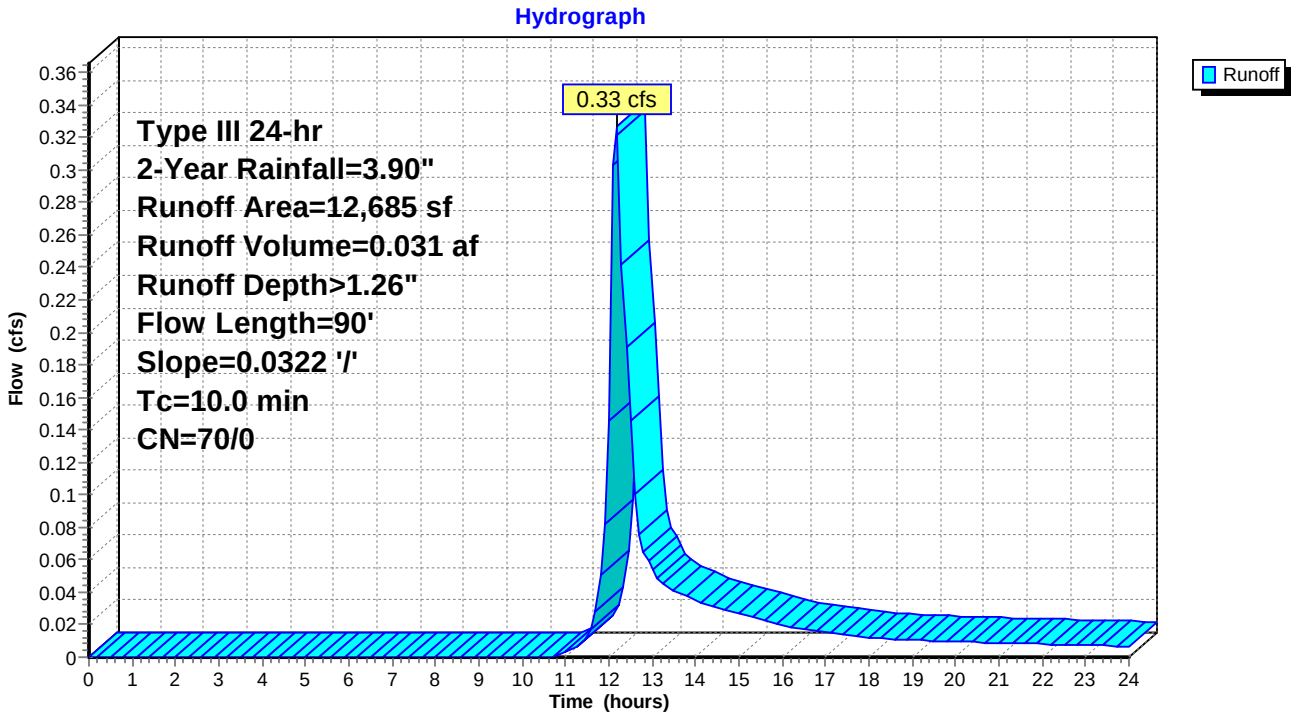
Runoff = 0.33 cfs @ 12.17 hrs, Volume= 0.031 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
12,685	70	Woods, Good, HSG C
12,685	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	90	0.0322	0.44		**Lag/CN Method,**
6.6					**Direct Entry, round up to 10**
10.0	90	Total			

Subcatchment 33S: Northerly Offsite to BLDG 3 North



Summary for Subcatchment 34S: BLDG 4 South

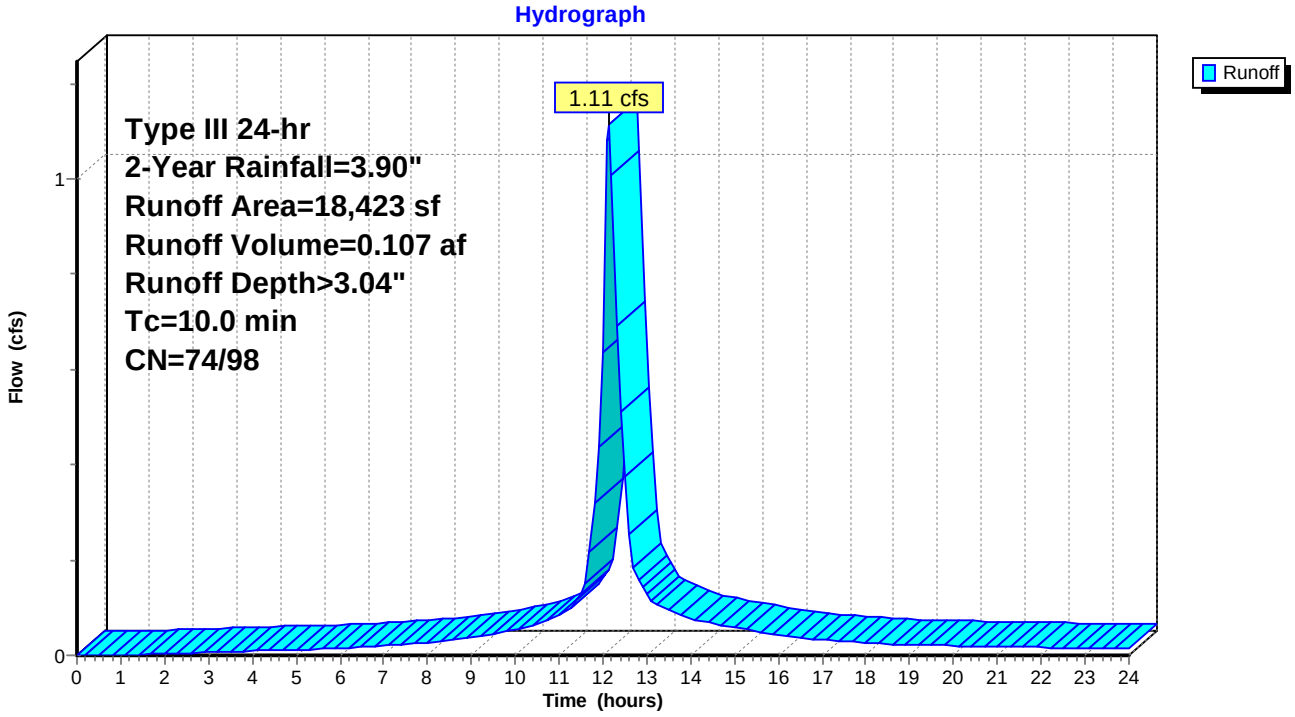
Runoff = 1.11 cfs @ 12.14 hrs, Volume= 0.107 af, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	516	74	Grass, good, C to CB64
*	2,953	74	Park - Grass, good, C to CB64
*	6,515	98	Pavement to CB64
*	210	74	Grass, good, C to CB68
*	1,695	74	Park - Grass, good, C to CB68
*	6,534	98	Pavement to CB68
	18,423	91	Weighted Average
	5,374	74	29.17% Pervious Area
	13,049	98	70.83% Impervious Area

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

Subcatchment 34S: BLDG 4 South



Summary for Subcatchment 41S: BLDG 4 West and North

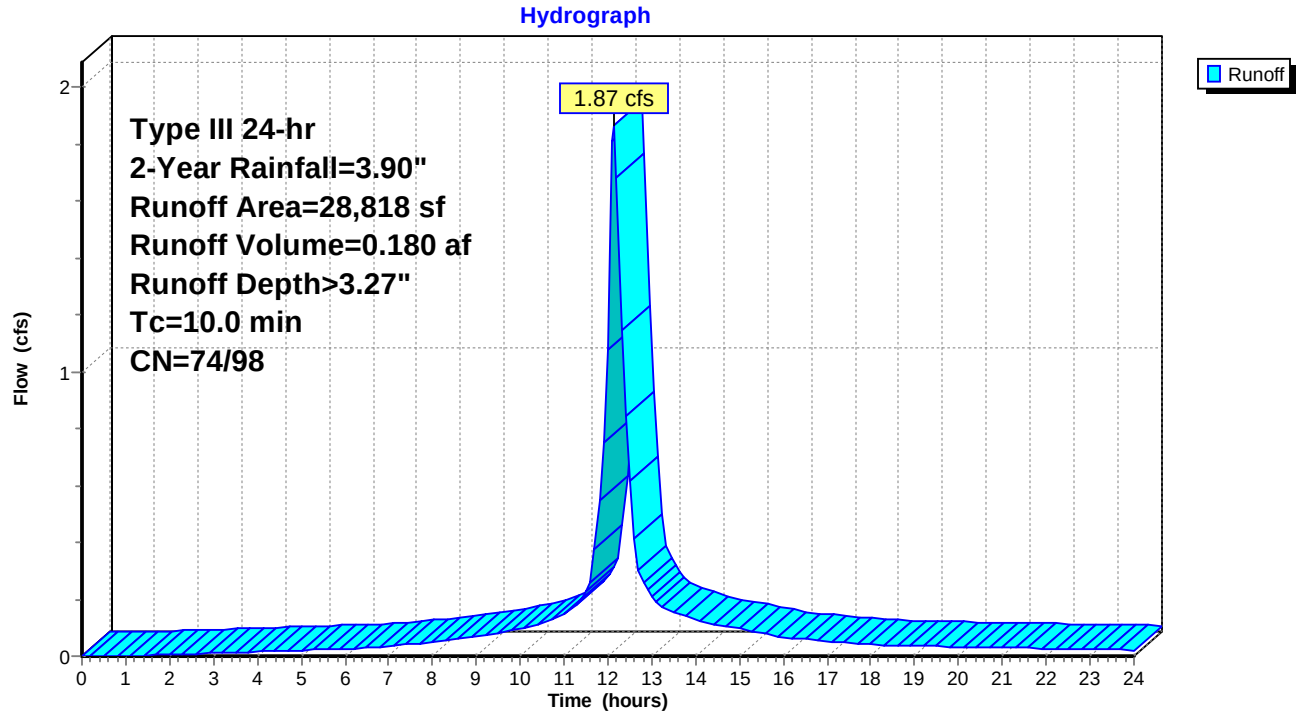
Runoff = 1.87 cfs @ 12.13 hrs, Volume= 0.180 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	2,990	74	Grass, good, C to CB41
*	7,270	98	Pavement to CB41
*	603	74	Grass to CB43
*	6,402	98	Pavement to CB43
*	603	74	Grass, good, C to CB45
*	6,402	98	Pavement to CB45
*	1,115	74	Grass to CB91
*	3,433	98	Grass to CB91
	28,818	94	Weighted Average
	5,311	74	18.43% Pervious Area
	23,507	98	81.57% Impervious Area

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

Subcatchment 41S: BLDG 4 West and North



Summary for Subcatchment 48S: West P-Stream Area

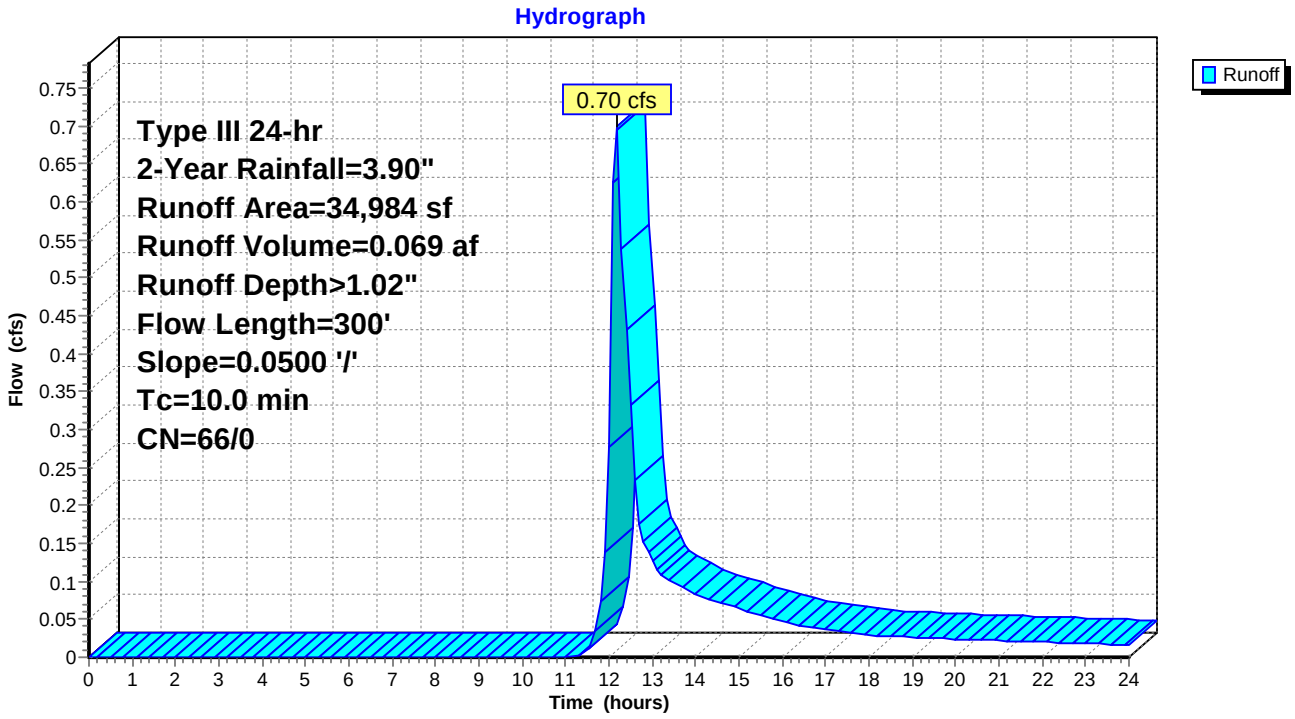
Runoff = 0.70 cfs @ 12.18 hrs, Volume= 0.069 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
5,350	74	>75% Grass cover, Good, HSG C
29,634	65	Brush, Good, HSG C
34,984	66	Weighted Average
34,984	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	300	0.0500	0.62		**Lag/CN Method,**
2.0					**Direct Entry, Round up to 10**
10.0	300	Total			

Subcatchment 48S: West P-Stream Area



Summary for Subcatchment 49S: P-Wetland

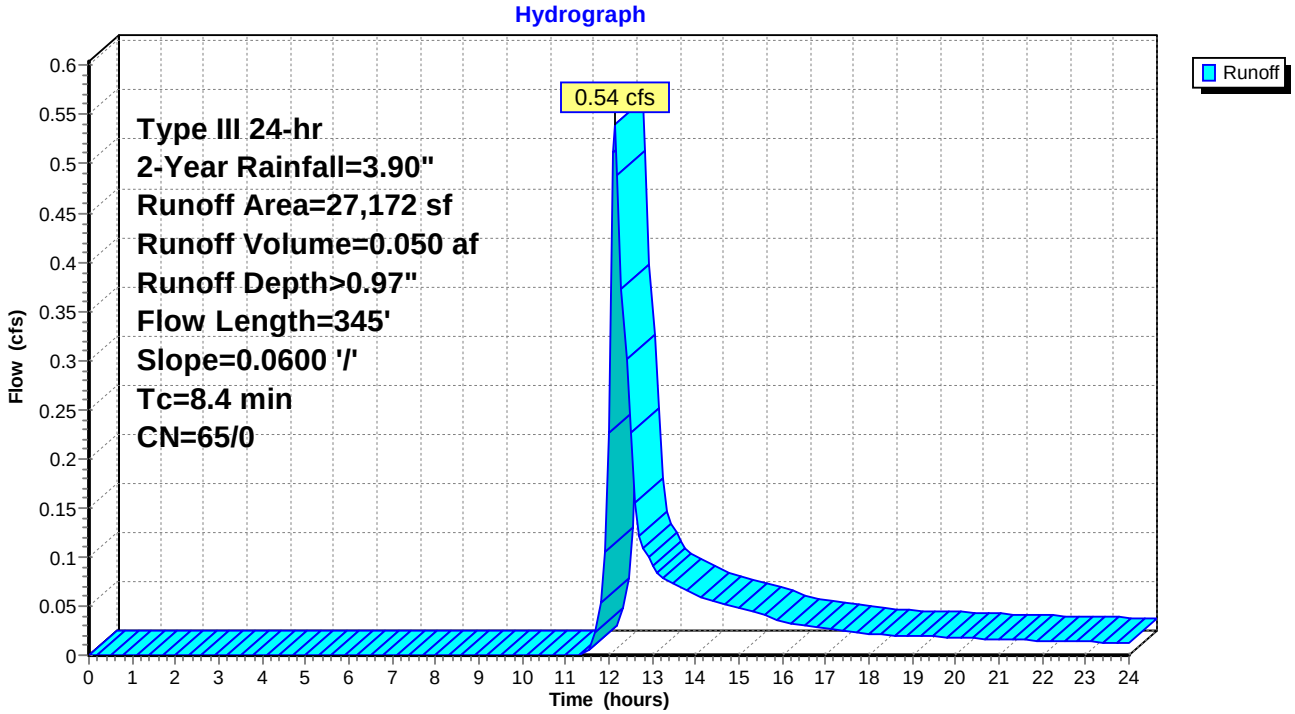
Runoff = 0.54 cfs @ 12.14 hrs, Volume= 0.050 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
27,172	65	Brush, Good, HSG C
27,172	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	345	0.0600	0.68		**Lag/CN Method,**
0.0					**Direct Entry, round up to 10**
8.4	345	Total			

Subcatchment 49S: P-Wetland



Summary for Subcatchment 50S: Runoff from Proposed Subdivision Road

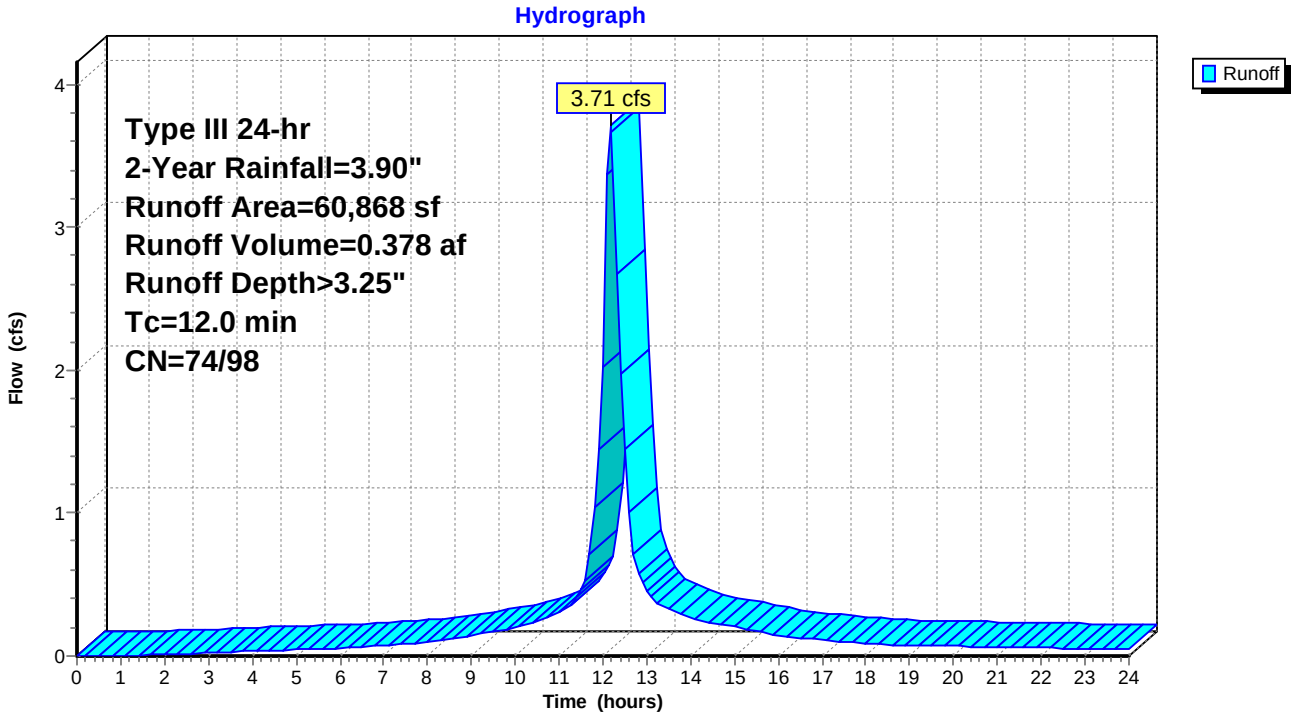
Runoff = 3.71 cfs @ 12.17 hrs, Volume= 0.378 af, Depth> 3.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	6,850	74	Landscaping
	4,904	74	>75% Grass cover, Good, HSG C
*	49,114	98	Pavement and Sidewalks
	60,868	93	Weighted Average
	11,754	74	19.31% Pervious Area
	49,114	98	80.69% Impervious Area

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

Subcatchment 50S: Runoff from Proposed Subdivision Road



Summary for Subcatchment 51S: BLDG 5 area

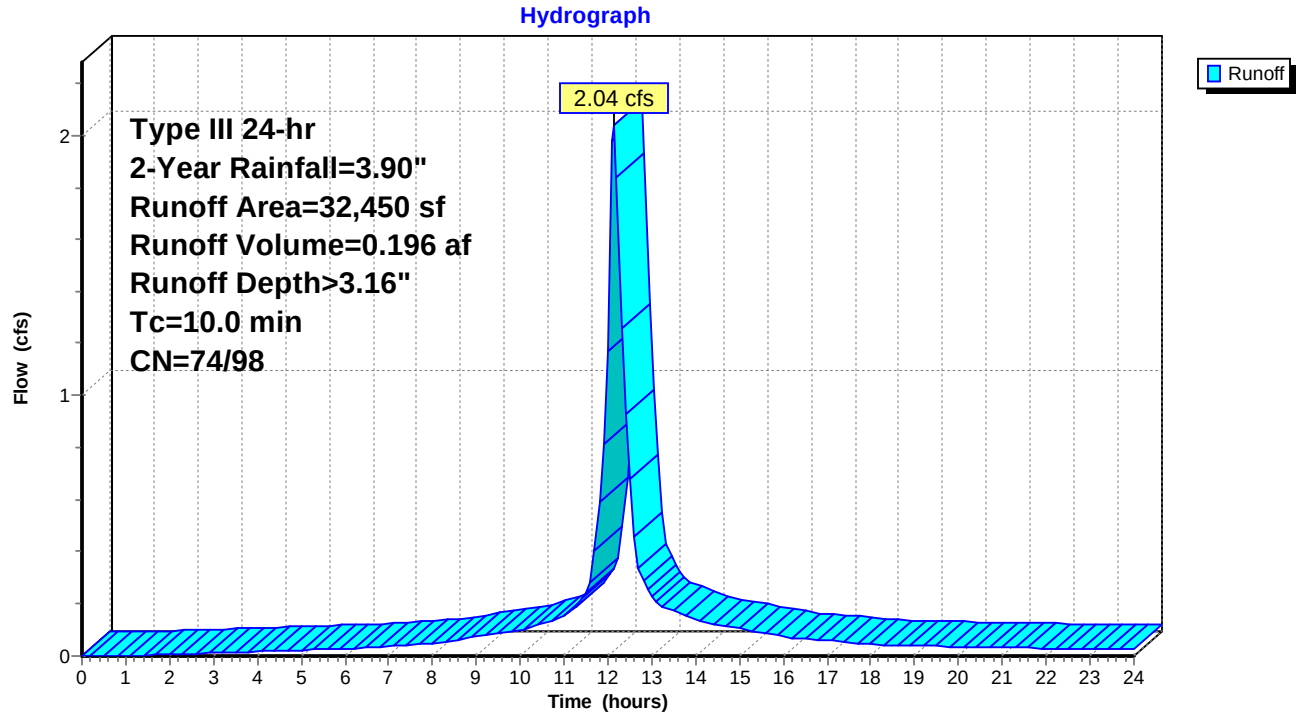
Runoff = 2.04 cfs @ 12.14 hrs, Volume= 0.196 af, Depth> 3.16"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	24,850	98	Impervious Pavement
	5,600	74	>75% Grass cover, Good, HSG C
*	2,000	74	Landscaped Areas
	32,450	92	Weighted Average
	7,600	74	23.42% Pervious Area
	24,850	98	76.58% Impervious Area

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

Subcatchment 51S: BLDG 5 area



Summary for Subcatchment 71S: Amenities 1 and 2

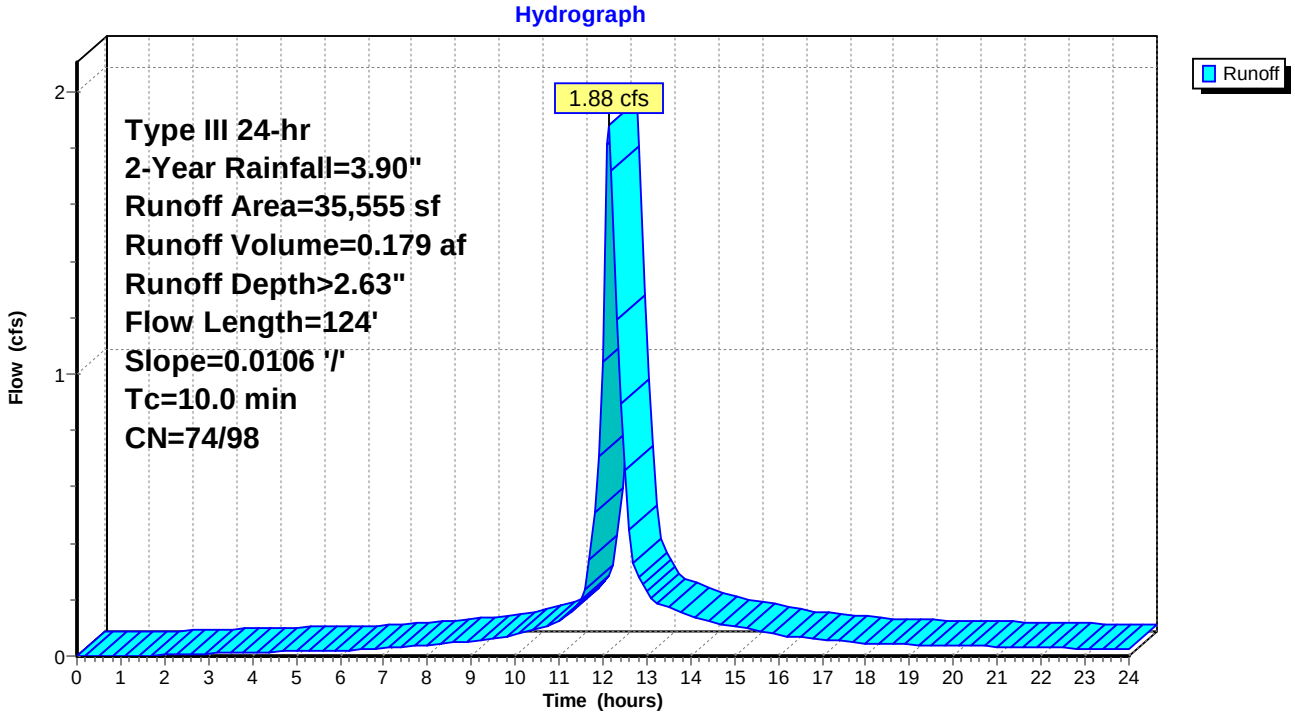
Runoff = 1.88 cfs @ 12.14 hrs, Volume= 0.179 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	11,076	98	Athletic courts, impervious
	14,025	74	>75% Grass cover, Good, HSG C
*	10,454	90	BLDG 1&2 amenity space, 70% imp
	35,555	86	Weighted Average
	17,161	74	48.27% Pervious Area
	18,394	98	51.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	124	0.0106	0.43		**Lag/CN Method,**
5.2					**Direct Entry, round up to 10**
10.0	124	Total			

Subcatchment 71S: Amenities 1 and 2



Summary for Subcatchment 72S: Amenities 2 and 3 + Pave

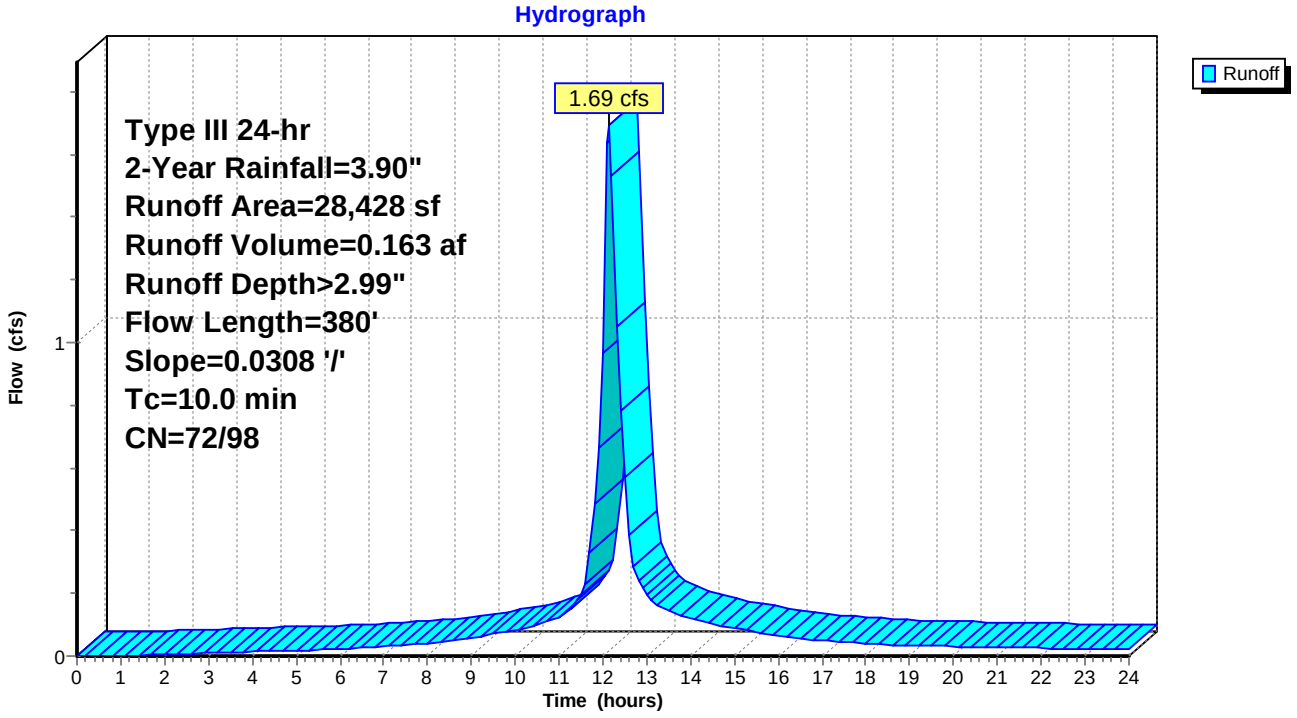
Runoff = 1.69 cfs @ 12.14 hrs, Volume= 0.163 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	24,342	90	BLDG 2&3 amenity space, 70% imp
*	3,008	98	Pavement
	1,078	74	>75% Grass cover, Good, HSG C
	28,428	90	Weighted Average
	8,381	72	29.48% Pervious Area
	20,047	98	70.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	380	0.0308	1.08		**Lag/CN Method,**
4.1					**Direct Entry, round up to 10**
10.0	380	Total			

Subcatchment 72S: Amenities 2 and 3 + Pave



Summary for Subcatchment 90S: Northeast to Offsite

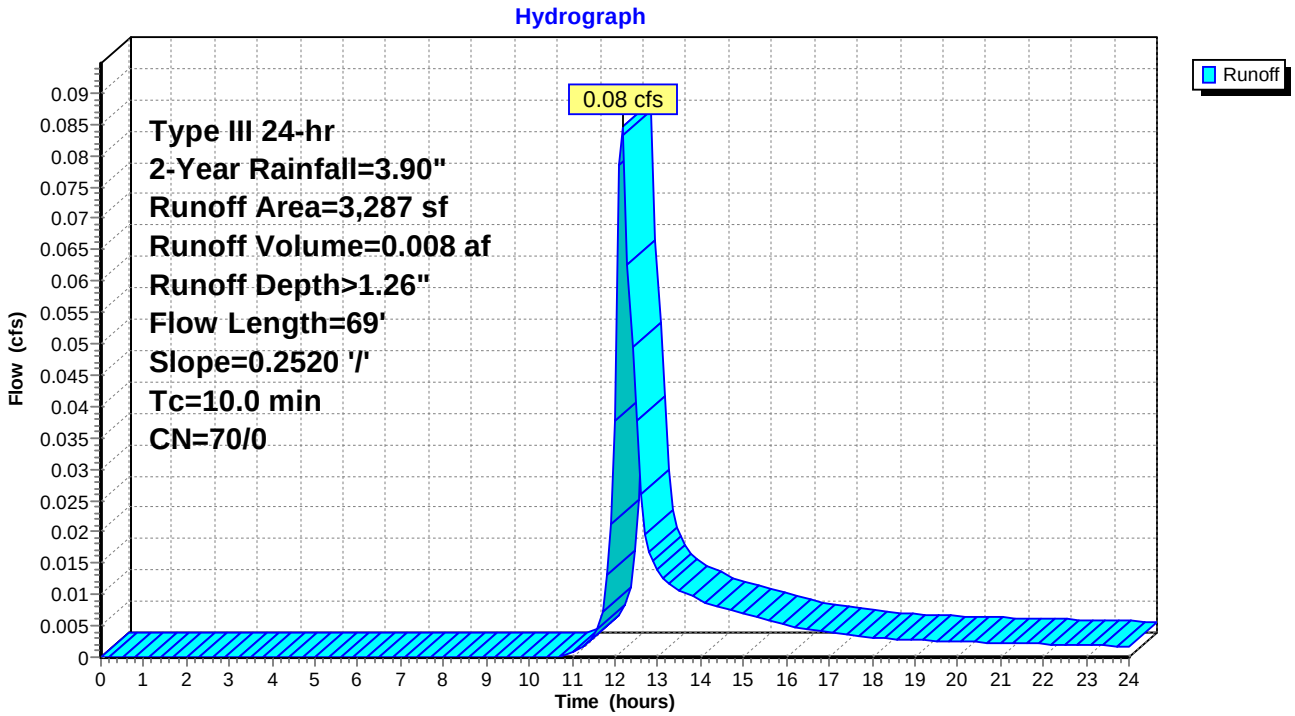
Runoff = 0.08 cfs @ 12.17 hrs, Volume= 0.008 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
3,287	70	Woods, Good, HSG C
3,287	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	69	0.2520	1.16		**Lag/CN Method,**
9.0					**Direct Entry, round up to 10**
10.0	69	Total			

Subcatchment 90S: Northeast to Offsite



Summary for Subcatchment 91S: Northwest Wooded and Wetland

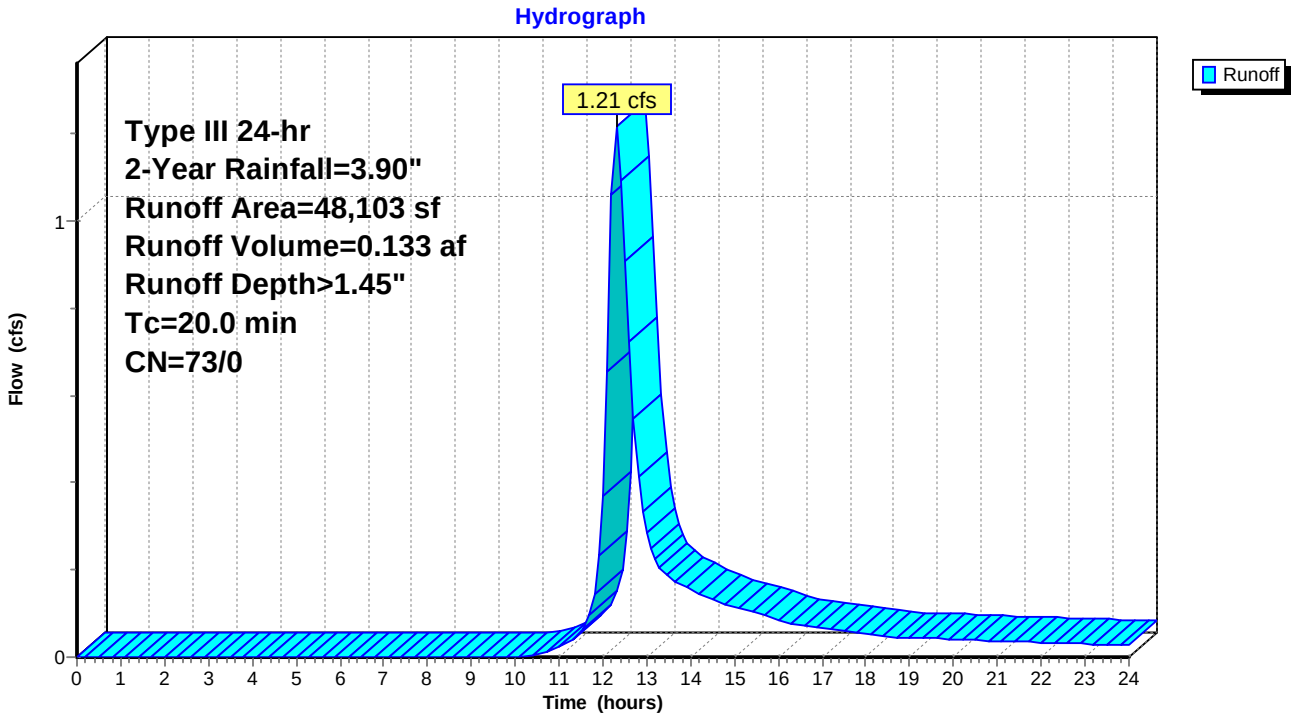
Runoff = 1.21 cfs @ 12.31 hrs, Volume= 0.133 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
48,103	73	Brush, Good, HSG D
48,103	73	100.00% Pervious Area

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

Subcatchment 91S: Northwest Wooded and Wetland



Summary for Subcatchment 92S: Easterly Wooded to Southeast BVW

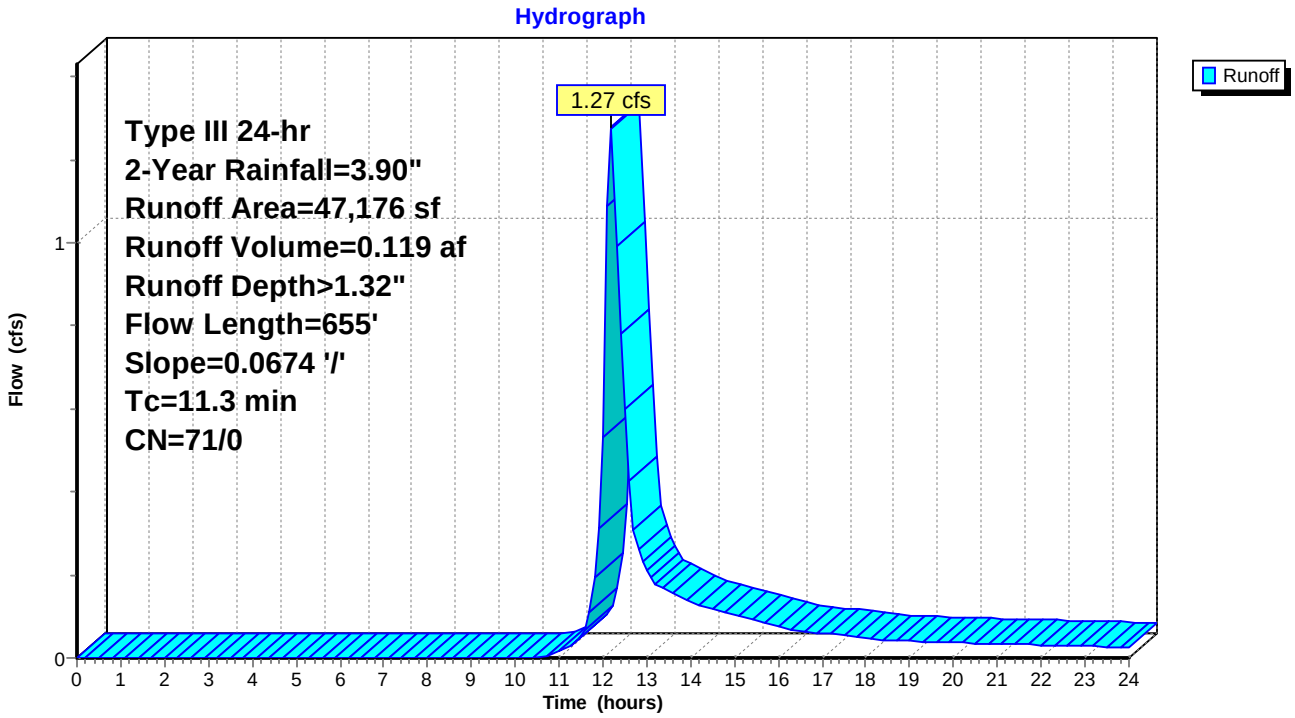
Runoff = 1.27 cfs @ 12.19 hrs, Volume= 0.119 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
38,558	70	Woods, Good, HSG C
8,618	74	>75% Grass cover, Good, HSG C
47,176	71	Weighted Average
47,176	71	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	655	0.0674	0.96		**Lag/CN Method,**

Subcatchment 92S: Easterly Wooded to Southeast BVW



Summary for Subcatchment 93S: Overland to Pine Hill

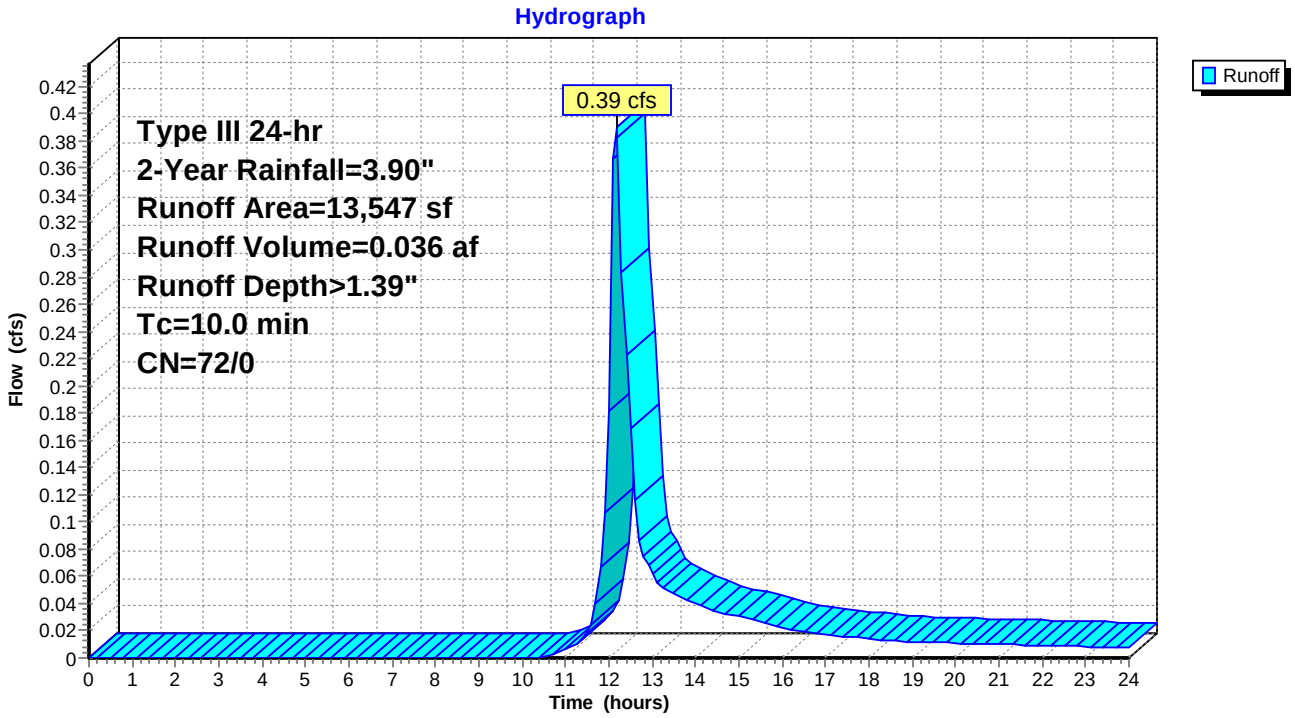
Runoff = 0.39 cfs @ 12.16 hrs, Volume= 0.036 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (sf)	CN	Description
5,534	74	>75% Grass cover, Good, HSG C
8,013	70	Woods, Good, HSG C
13,547	72	Weighted Average
13,547	72	100.00% Pervious Area

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

Subcatchment 93S: Overland to Pine Hill



Summary for Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane

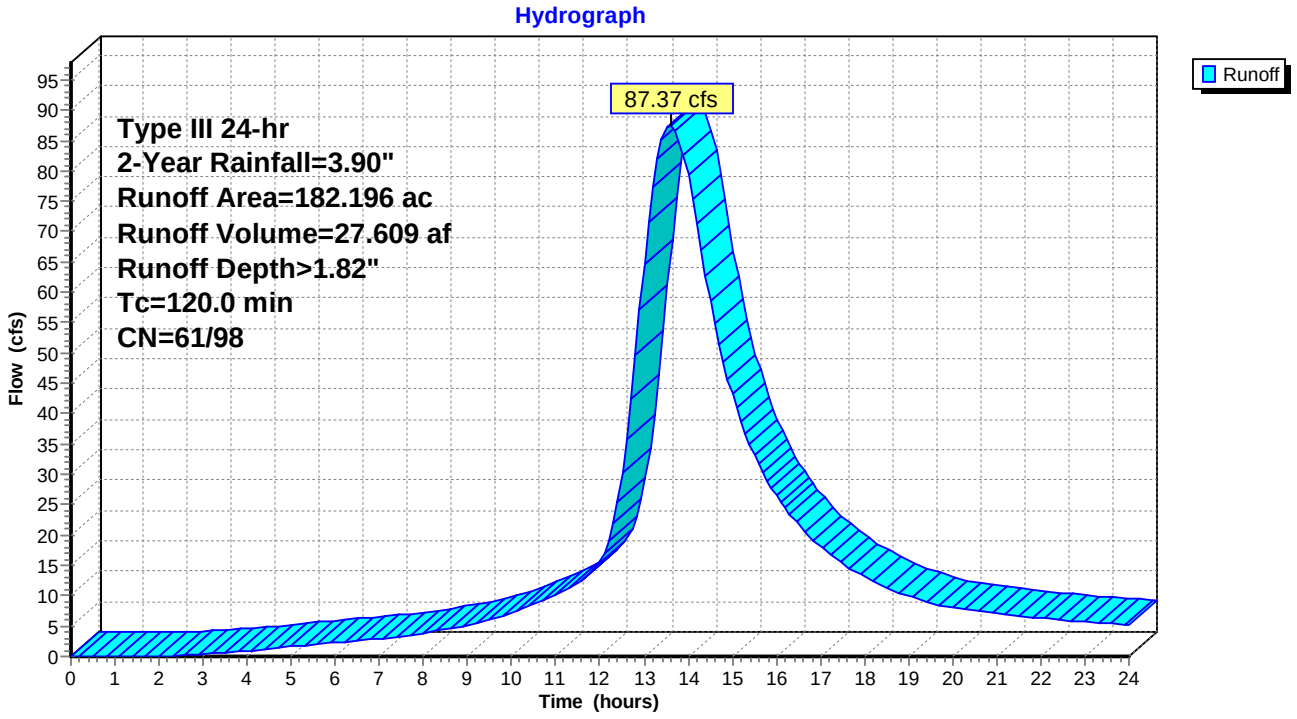
Runoff = 87.37 cfs @ 13.59 hrs, Volume= 27.609 af, Depth> 1.82"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane



mmary for Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dr

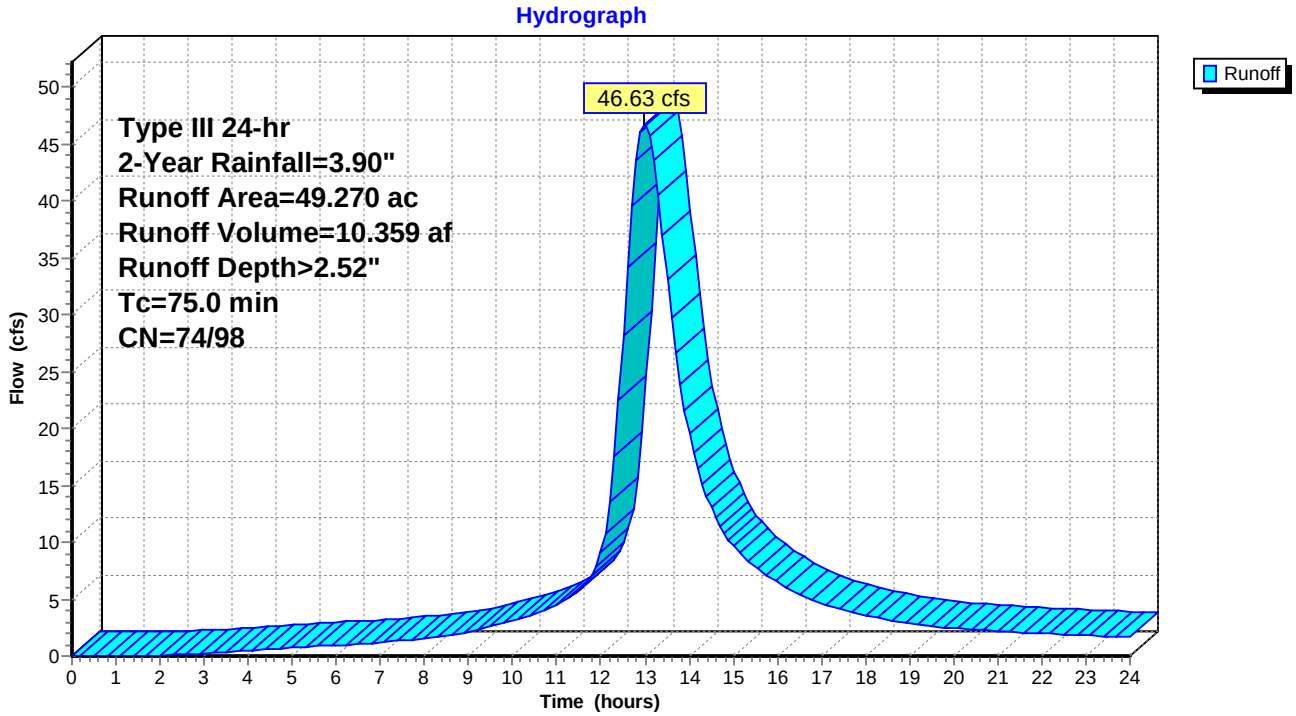
Runoff = 46.63 cfs @ 12.99 hrs, Volume= 10.359 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 201S: BLDG 1 ROOF

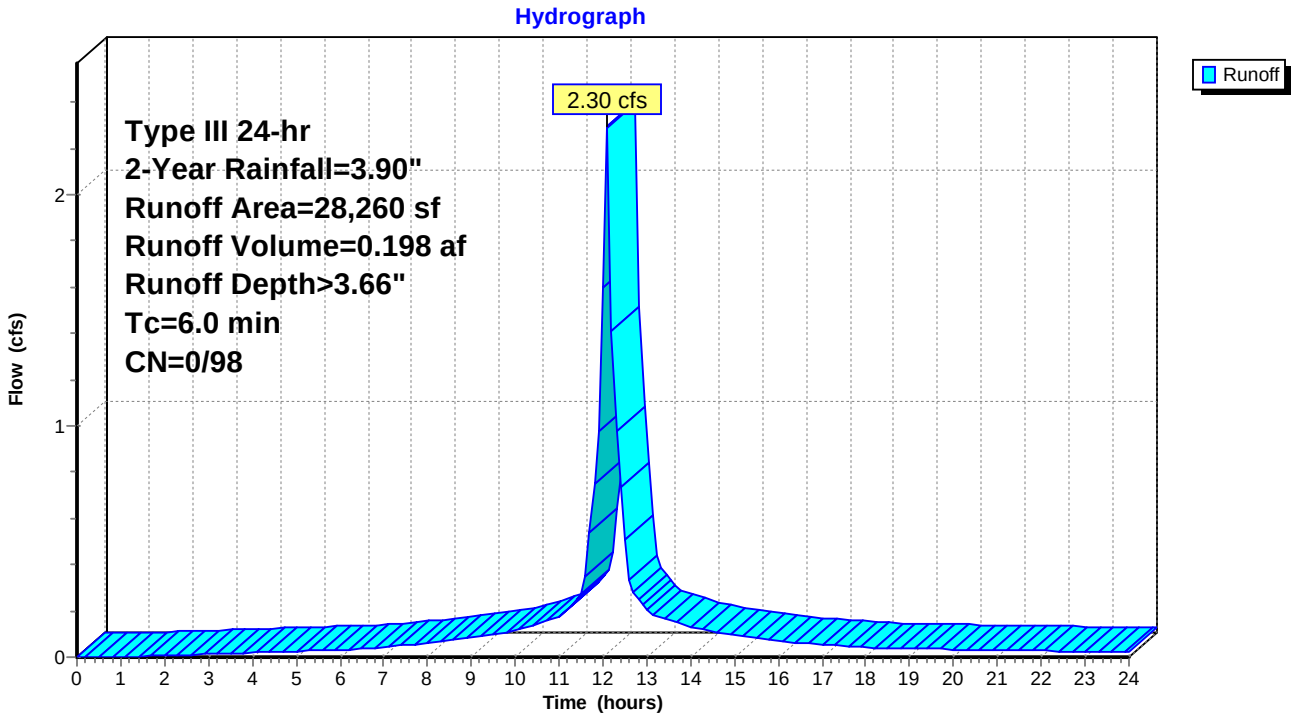
Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.198 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	28,260	98	BLDG 1 ROOF
	28,260	98	100.00% Impervious Area

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

Subcatchment 201S: BLDG 1 ROOF



Summary for Subcatchment 202S: BLDG 2 ROOF

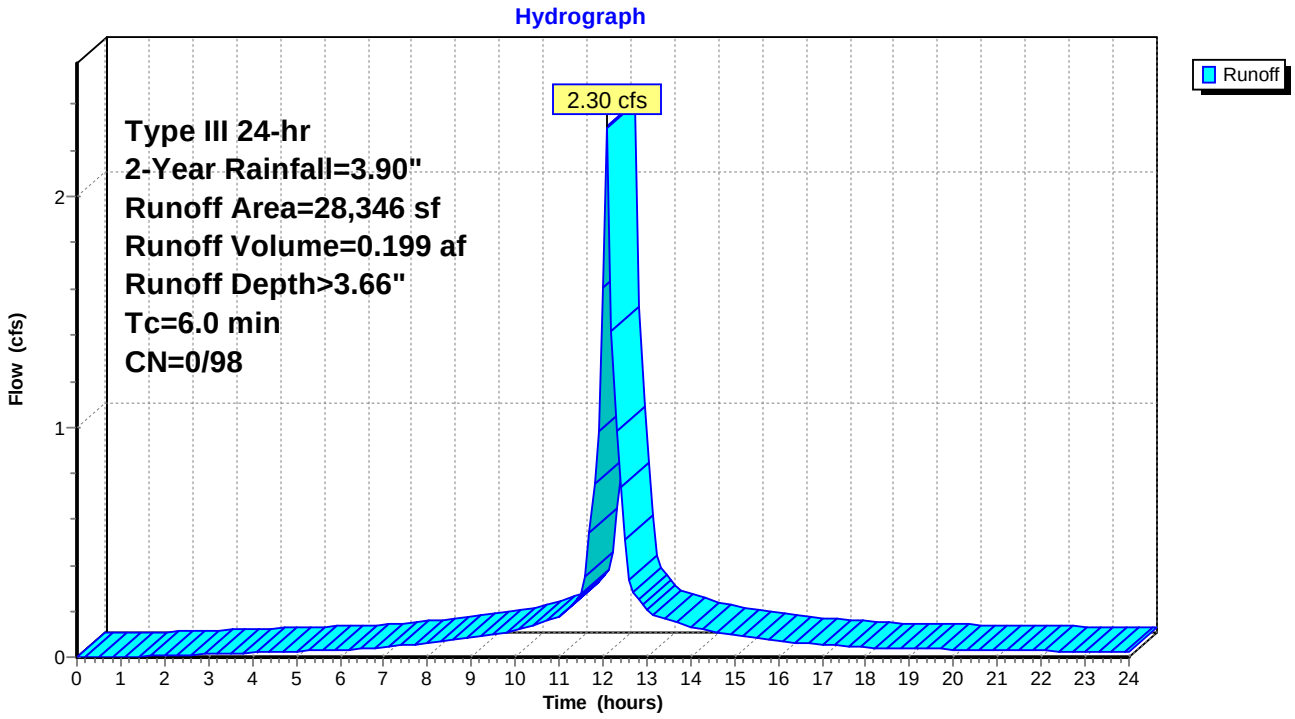
Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.199 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	28,346	98	BLDG 2 ROOF
	28,346	98	100.00% Impervious Area

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

Subcatchment 202S: BLDG 2 ROOF



Summary for Subcatchment 203S: BLDG 3 ROOF

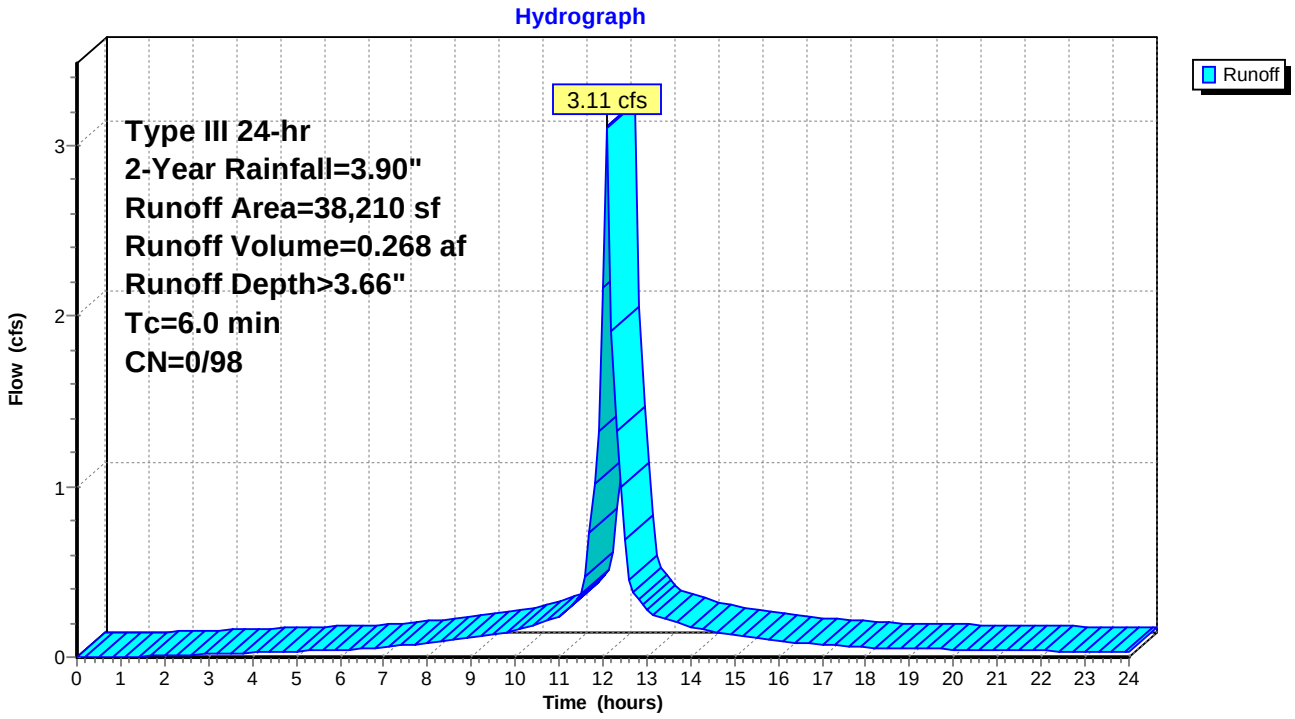
Runoff = 3.11 cfs @ 12.09 hrs, Volume= 0.268 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	38,210	98	BLDG ROOF 3
	38,210	98	100.00% Impervious Area

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

Subcatchment 203S: BLDG 3 ROOF



Summary for Subcatchment 204S: BLDG 4 2/3 of ROOF

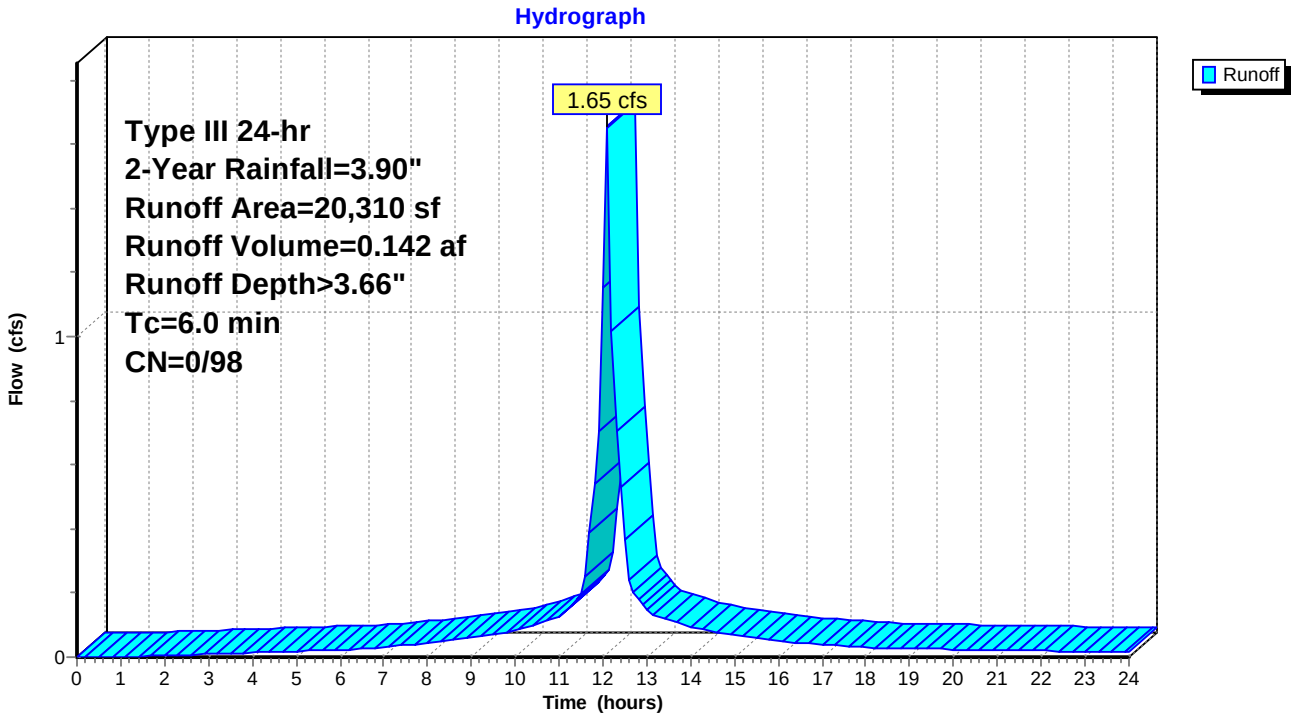
Runoff = 1.65 cfs @ 12.09 hrs, Volume= 0.142 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	20,310	98	BLDG 4 ROOF
	20,310	98	100.00% Impervious Area

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

Subcatchment 204S: BLDG 4 2/3 of ROOF



Summary for Subcatchment 205S: BLDG 5 ROOF

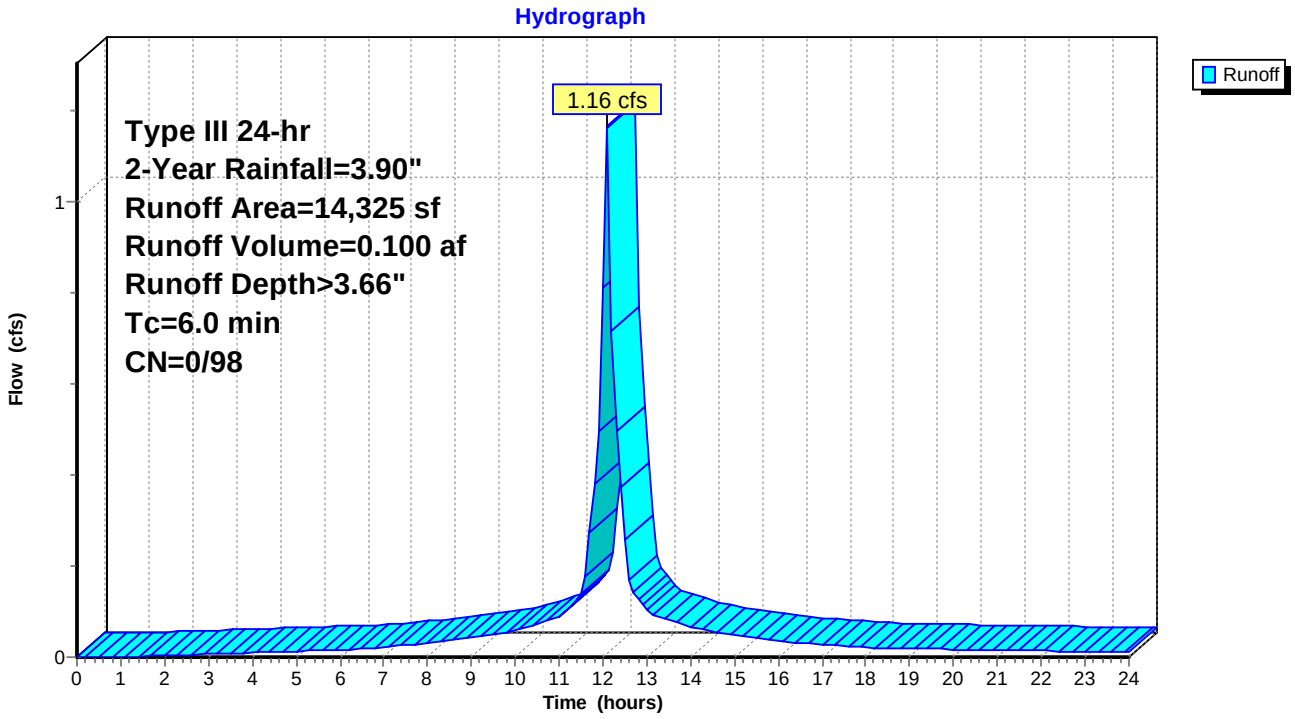
Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.100 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	14,325	98	BLDG 5 ROOF
	14,325	98	100.00% Impervious Area

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

Subcatchment 205S: BLDG 5 ROOF



Summary for Reach 13R: Stream Channel from Brandt to Pine Hill

Inflow Area = 15.375 ac, 66.33% Impervious, Inflow Depth > 1.26" for 2-Year event
Inflow = 10.52 cfs @ 12.33 hrs, Volume= 1.611 af
Outflow = 10.37 cfs @ 12.37 hrs, Volume= 1.609 af, Atten= 1%, Lag= 2.5 min

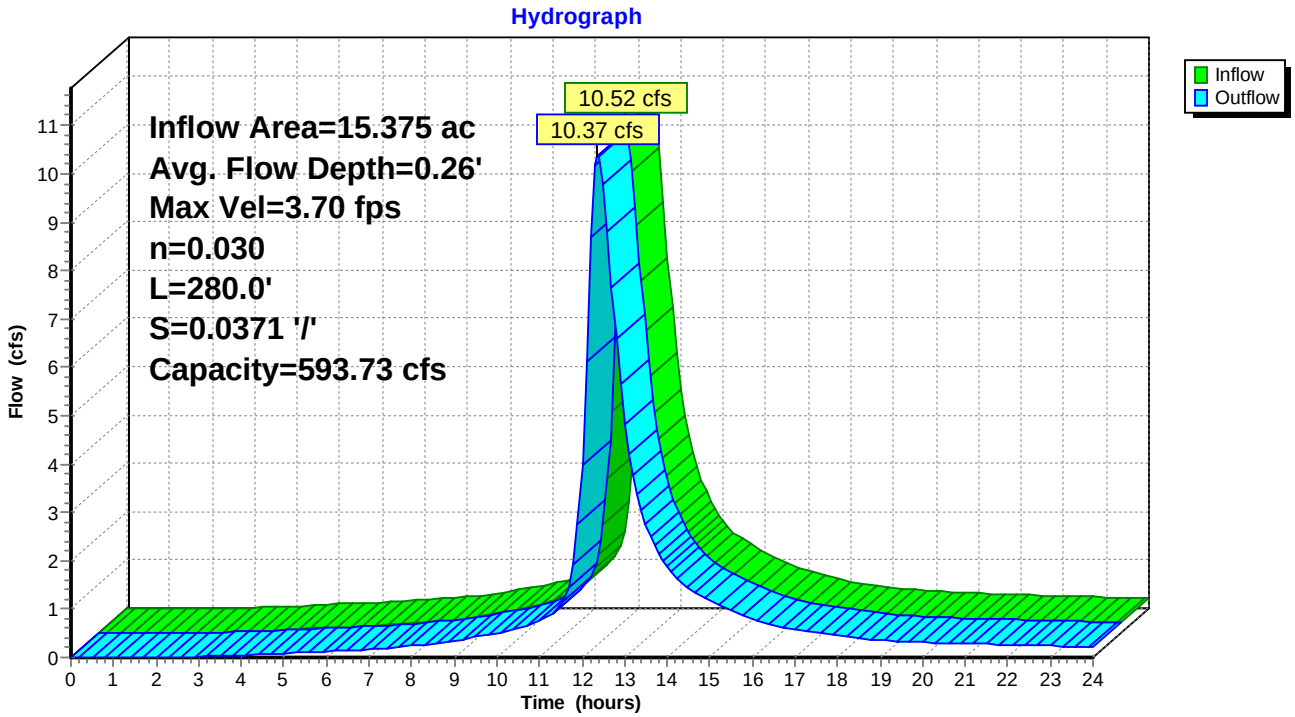
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 3.8 min

Peak Storage= 793 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 13R: Stream Channel from Brandt to Pine Hill



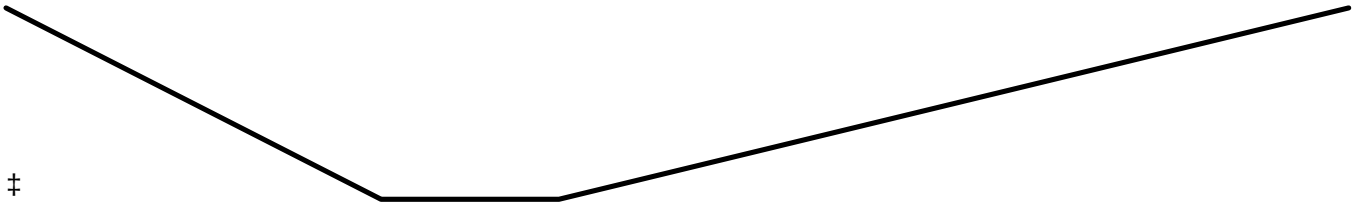
Summary for Reach 20R: existing stream on west side

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 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= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



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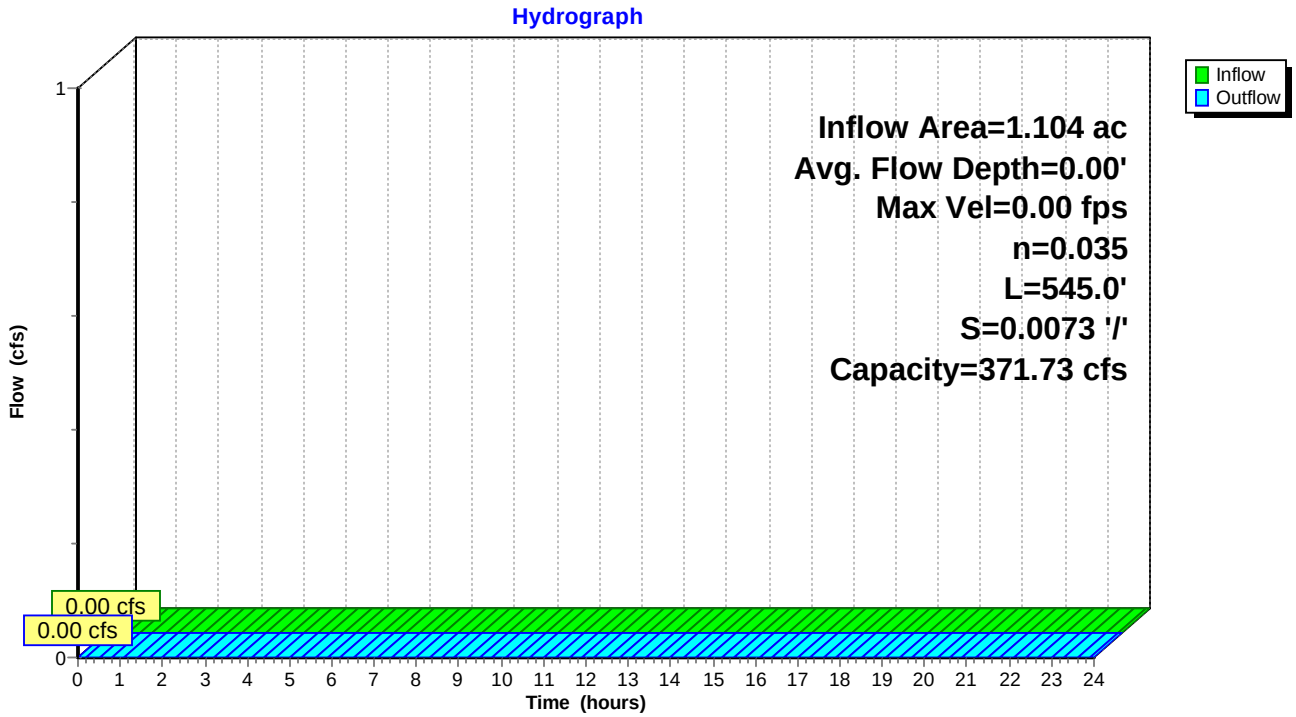
Reach 20R: existing stream on west side



Summary for Reach 22R: Combined stream into culvert

Inflow Area = 1.907 ac, 0.00% Impervious, Inflow Depth > 1.26" for 2-Year event
Inflow = 1.53 cfs @ 12.49 hrs, Volume= 0.200 af
Outflow = 1.50 cfs @ 12.58 hrs, Volume= 0.200 af, Atten= 2%, Lag= 5.3 min

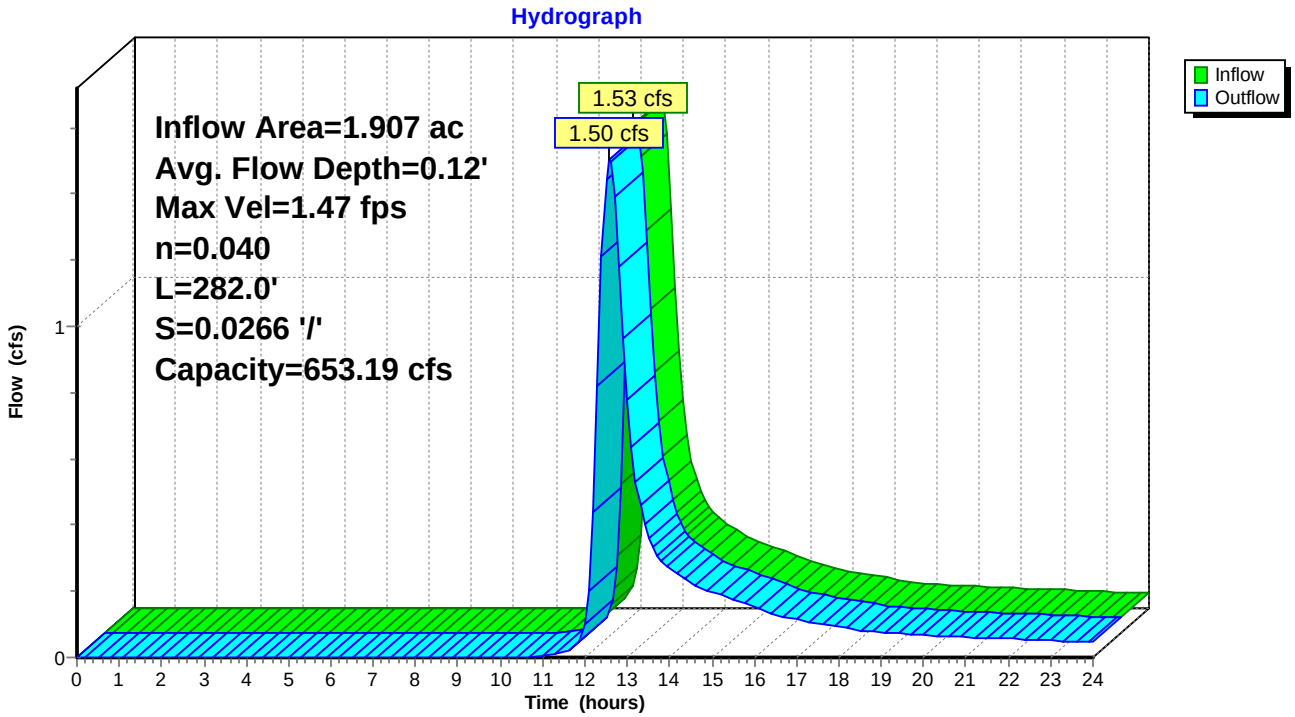
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.47 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 6.6 min

Peak Storage= 292 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 3.50' Flow Area= 64.8 sf, Capacity= 653.19 cfs

8.00' x 3.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 3.0 '/' Top Width= 29.00'
Length= 282.0' Slope= 0.0266 '/'
Inlet Invert= 463.50', Outlet Invert= 456.00'

‡

Reach 22R: Combined stream into culvert

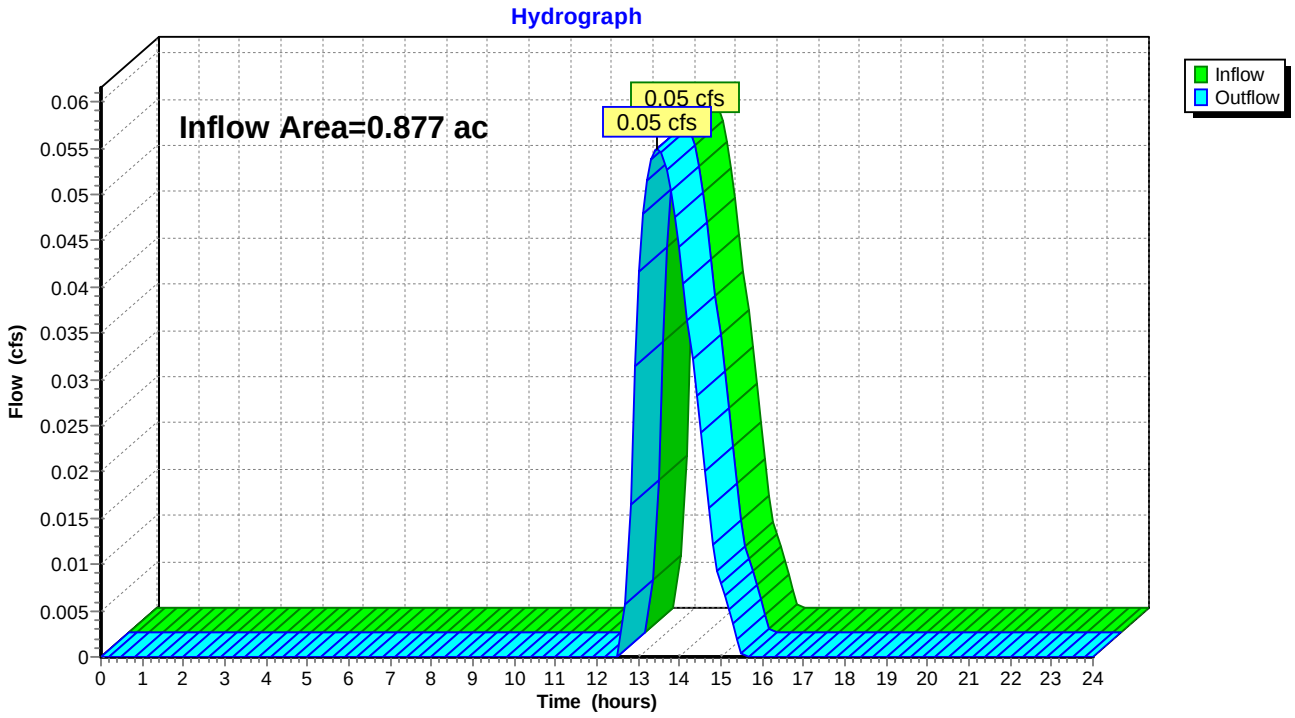


Summary for Reach 27R: (new Reach)

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth = 0.10" for 2-Year event
Inflow = 0.05 cfs @ 13.46 hrs, Volume= 0.007 af
Outflow = 0.05 cfs @ 13.46 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 27R: (new Reach)



Summary for Reach 81R: West Proposed Stream

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 3.01" for 2-Year event
Inflow = 1.59 cfs @ 12.39 hrs, Volume= 0.201 af
Outflow = 1.53 cfs @ 12.49 hrs, Volume= 0.200 af, Atten= 3%, Lag= 6.5 min

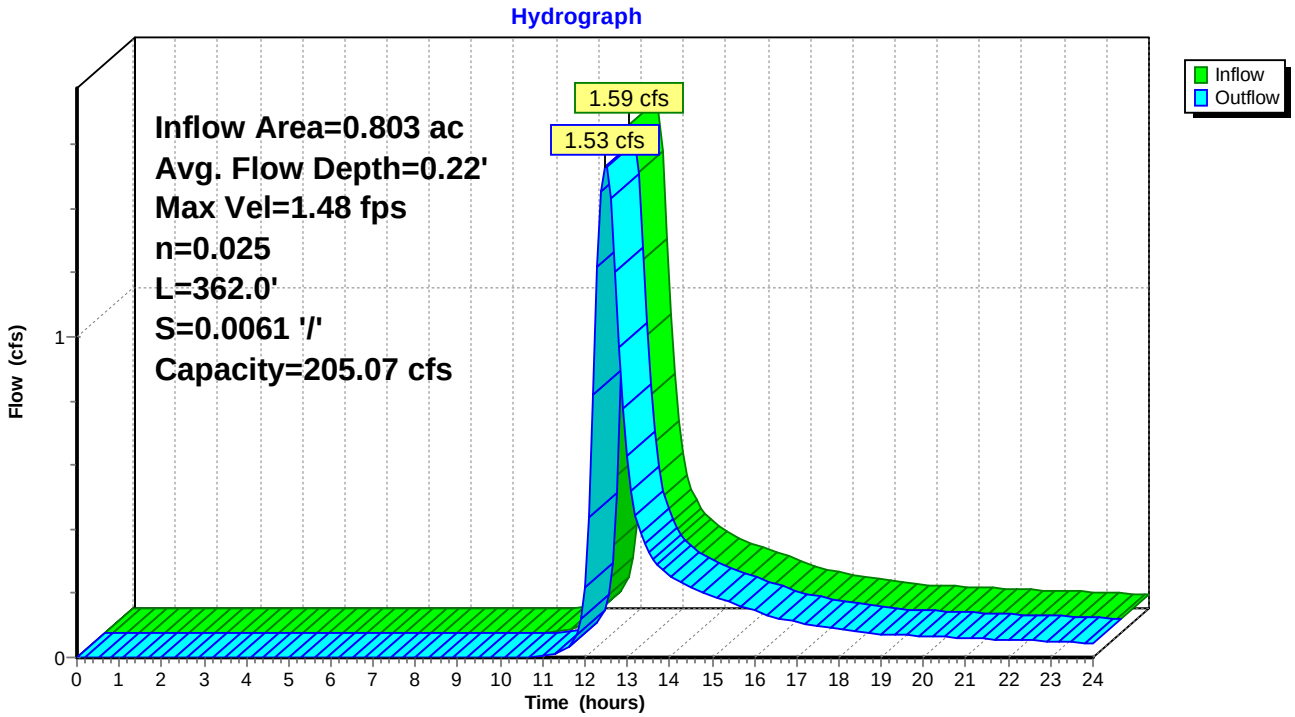
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.48 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 9.9 min

Peak Storage= 379 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 205.07 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 362.0' Slope= 0.0061 '/'
Inlet Invert= 466.70', Outlet Invert= 464.50'

‡

Reach 81R: West Proposed Stream



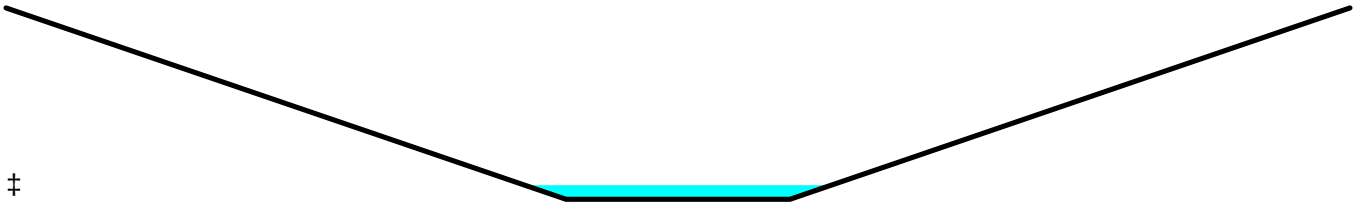
Summary for Reach 83R: Northerly P-Stream

Inflow = 1.22 cfs @ 12.31 hrs, Volume= 0.133 af
Outflow = 1.16 cfs @ 12.43 hrs, Volume= 0.133 af, Atten= 4%, Lag= 7.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 9.8 min

Peak Storage= 266 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 198.02 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 300.0' Slope= 0.0057 '/'
Inlet Invert= 468.40', Outlet Invert= 466.70'



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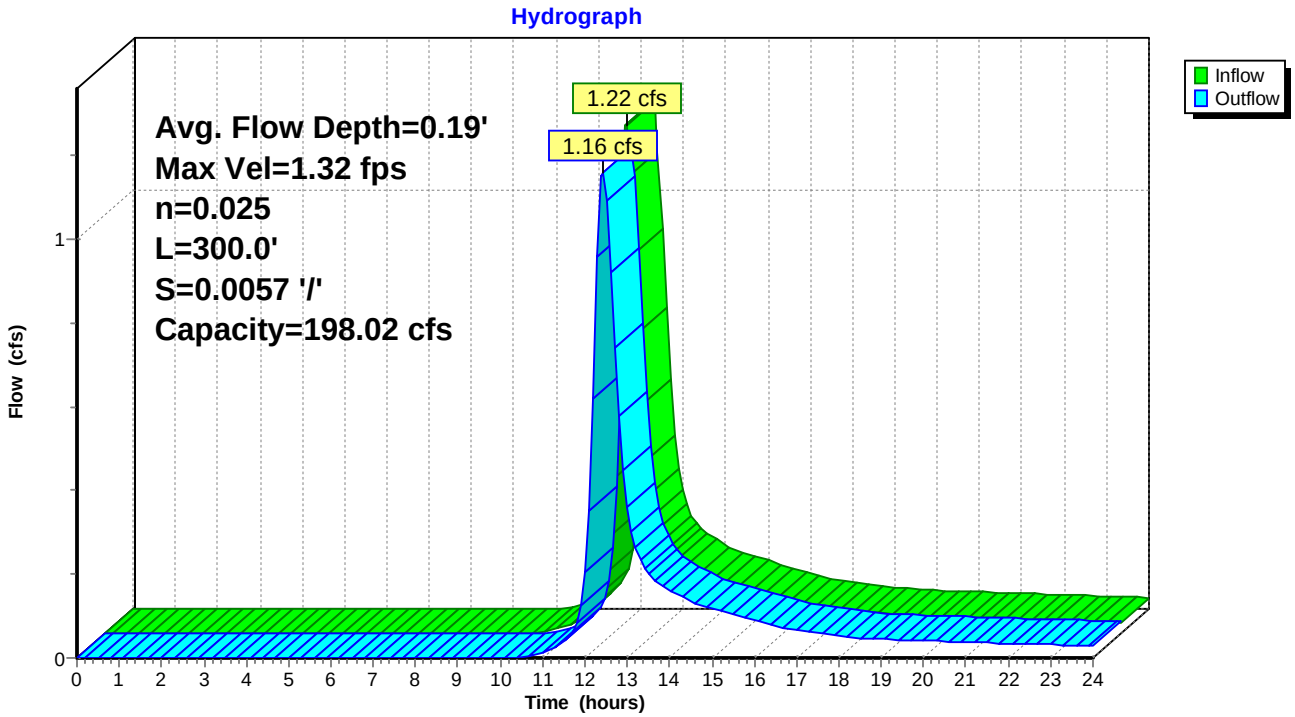
Reach 83R: Northerly P-Stream

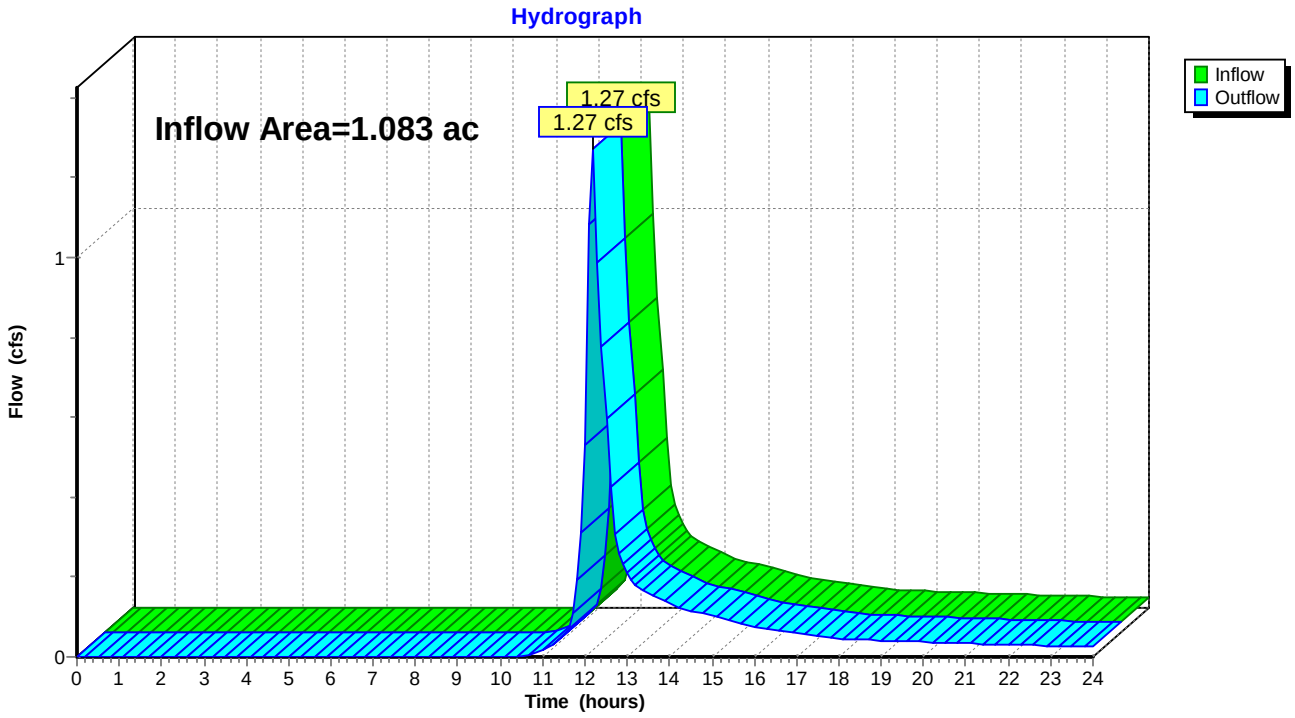


Summary for Reach 94R: Southeast BVW

Inflow Area = 1.083 ac, 0.00% Impervious, Inflow Depth > 1.32" for 2-Year event
Inflow = 1.27 cfs @ 12.19 hrs, Volume= 0.119 af
Outflow = 1.27 cfs @ 12.19 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 94R: Southeast BVW

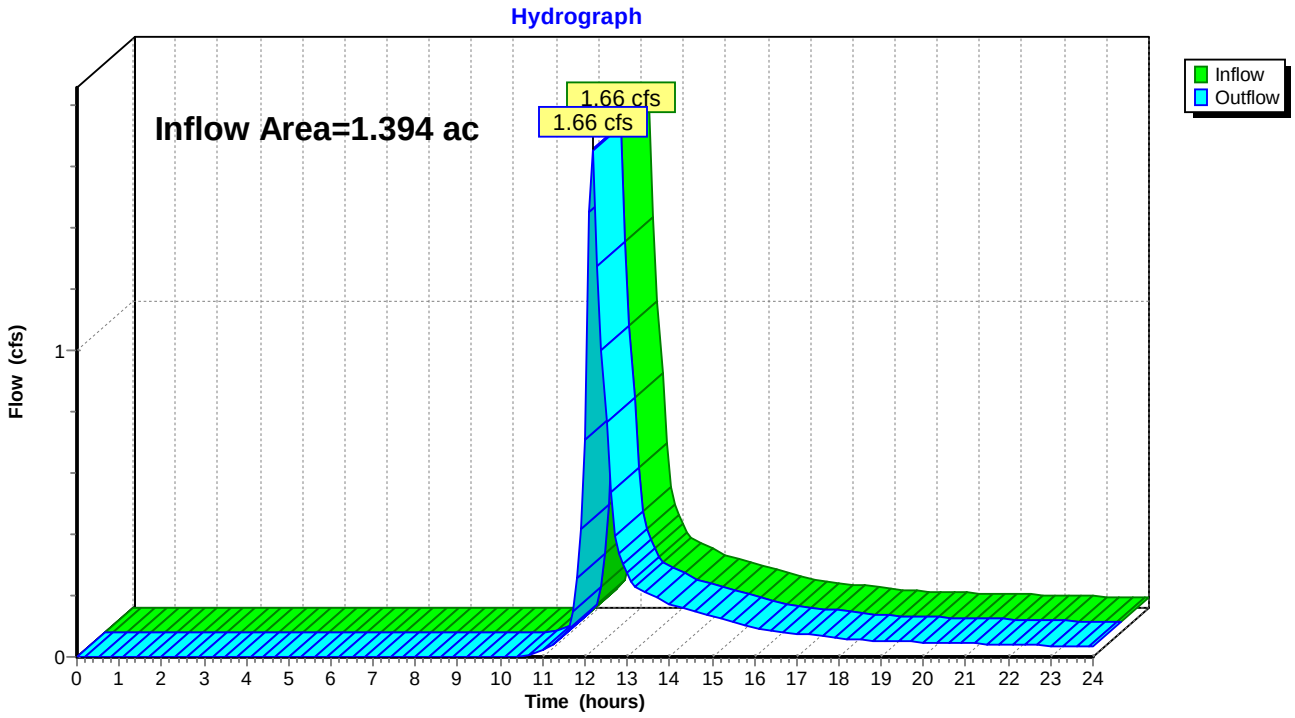


Summary for Reach 95R: Pine Hill Road

Inflow Area = 1.394 ac, 0.00% Impervious, Inflow Depth > 1.34" for 2-Year event
Inflow = 1.66 cfs @ 12.18 hrs, Volume= 0.155 af
Outflow = 1.66 cfs @ 12.18 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 95R: Pine Hill Road

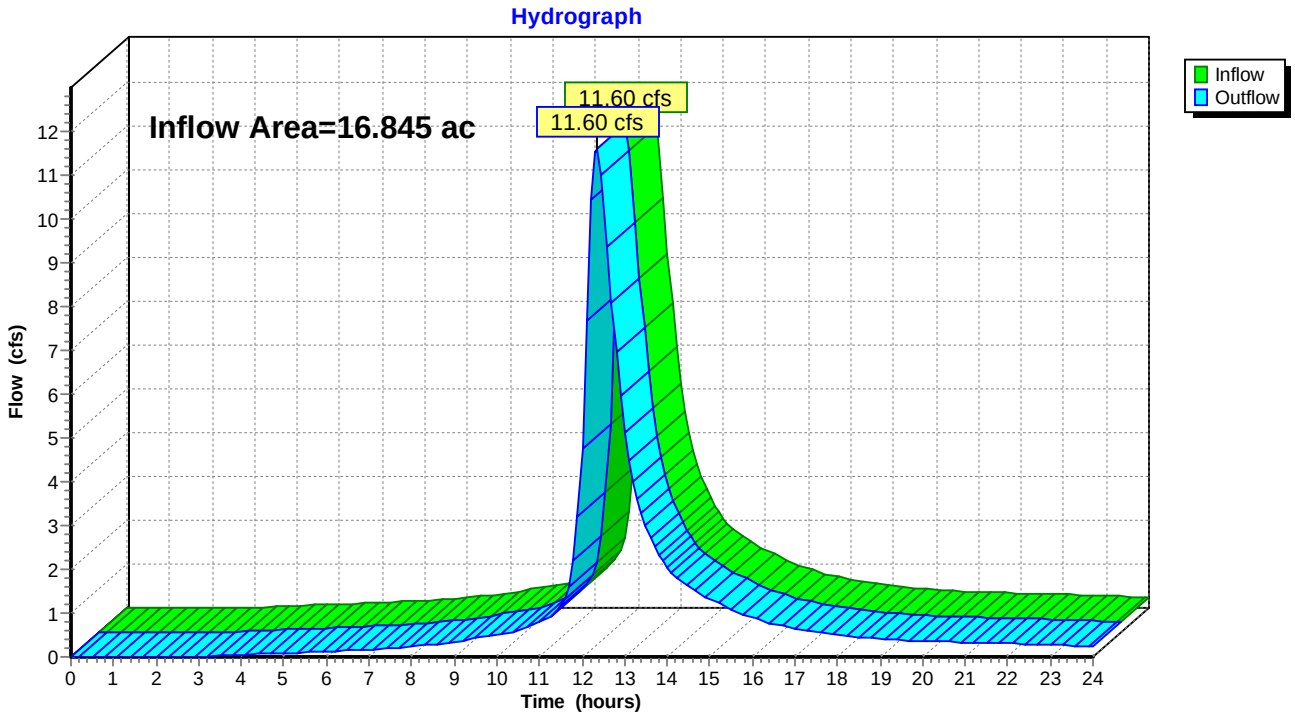


Summary for Reach X2: Area Summary Post (Not a physical location)

Inflow Area = 16.845 ac, 60.55% Impervious, Inflow Depth > 1.26" for 2-Year event
Inflow = 11.60 cfs @ 12.34 hrs, Volume= 1.773 af
Outflow = 11.60 cfs @ 12.34 hrs, Volume= 1.773 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X2: Area Summary Post (Not a physical location)



Summary for Pond 19P: INFL. POND 3C

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth > 3.66" for 2-Year event
Inflow = 3.11 cfs @ 12.09 hrs, Volume= 0.268 af
Outflow = 0.22 cfs @ 13.46 hrs, Volume= 0.235 af, Atten= 93%, Lag= 82.2 min
Discarded = 0.17 cfs @ 10.30 hrs, Volume= 0.228 af
Primary = 0.05 cfs @ 13.46 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 474.16' @ 13.46 hrs Surf.Area= 2,964 sf Storage= 5,130 cf

Plug-Flow detention time= 229.9 min calculated for 0.235 af (88% of inflow)
Center-of-Mass det. time= 174.5 min (926.7 - 752.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	471.80'	998 cf	**114.00'W x 26.00'L x 4.17'H Field A** 12,350 cf Overall - 9,856 cf Embedded = 2,494 cf x 40.0% Voids
#2A	472.30'	7,005 cf	**retain_it retain_it 3.0'** x 42 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 14 Rows adjusted for 160.5 cf perimeter wall
#3	475.30'	38 cf	**3.00'D x 2.70'H Vertical Cone/Cylinder - Risers** x 2 -Impervious
		8,041 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	471.80'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	474.05'	**15.0" Round Culvert** L= 209.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 474.05' / 466.50' S= 0.0361 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.17 cfs @ 10.30 hrs HW=471.86' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.05 cfs @ 13.46 hrs HW=474.16' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.05 cfs @ 1.10 fps)

Pond 19P: INFL. POND 3C - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
14 Rows adjusted for 160.5 cf perimeter wall

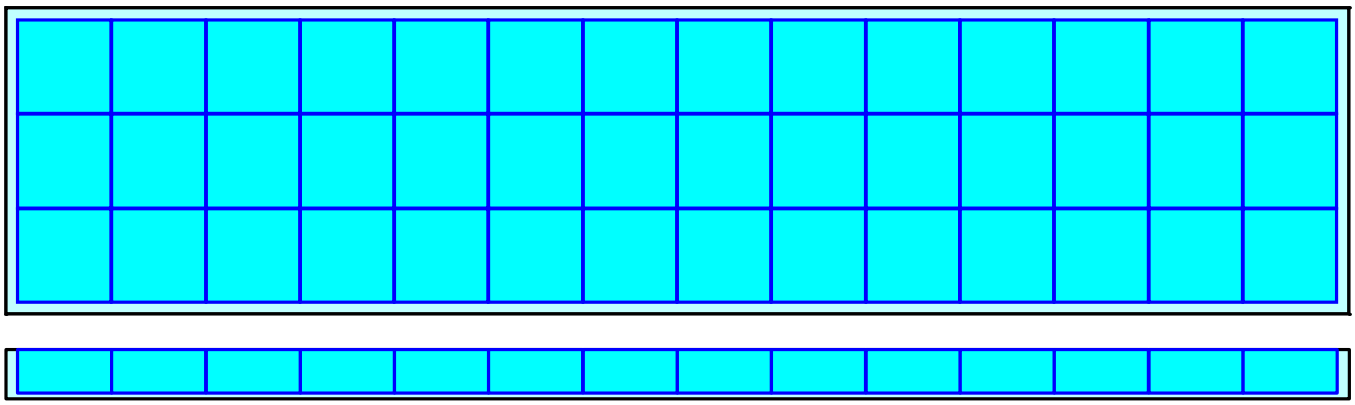
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
14 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 114.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 14 x 2 = 160.5 cf Perimeter Wall
42 Chambers x 170.6 cf - 160.5 cf Perimeter wall = 7,005.1 cf Chamber Storage
42 Chambers x 234.7 cf = 9,856.0 cf Displacement

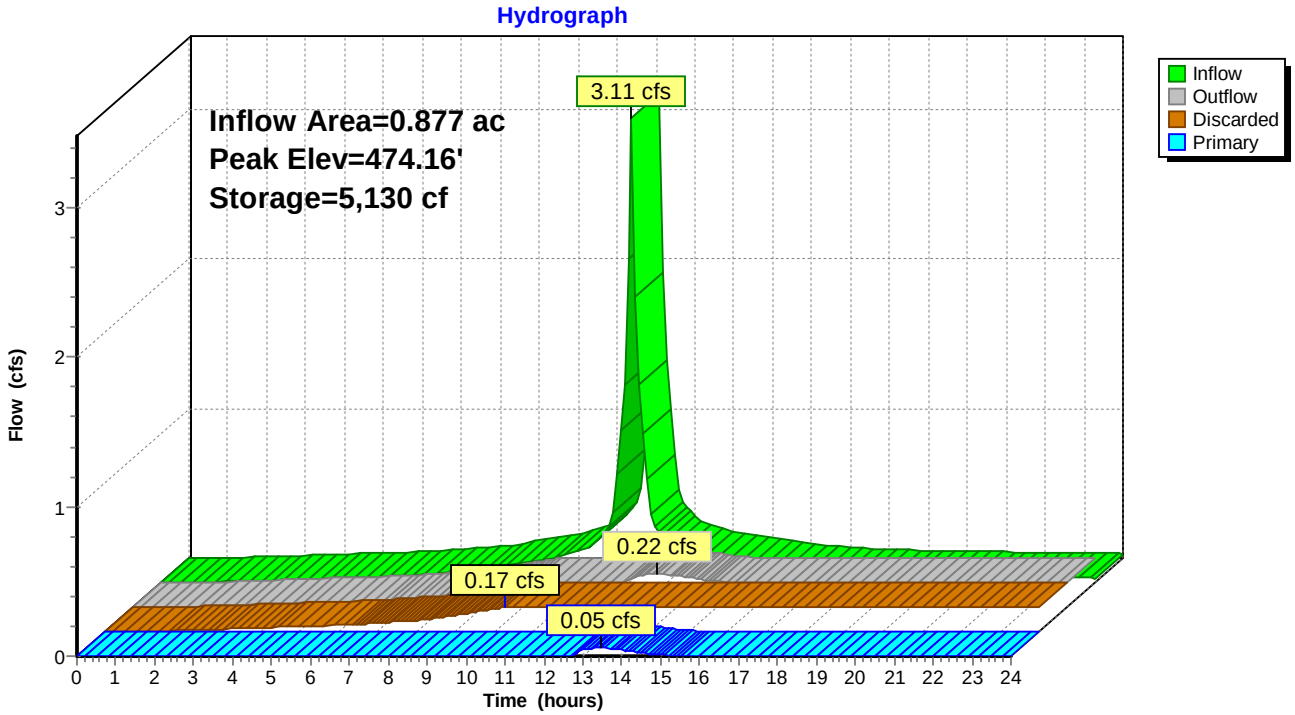
12,350.0 cf Field - 9,856.0 cf Chambers = 2,494.0 cf Stone x 40.0% Voids = 997.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,002.7 cf = 0.184 af
Overall Storage Efficiency = 64.8%
Overall System Size = 26.00' x 114.00' x 4.17'

42 Chambers
457.4 cy Field
92.4 cy Stone



Pond 19P: INFL. POND 3C



Summary for Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.

Inflow Area = 1.397 ac, 80.69% Impervious, Inflow Depth > 3.25" for 2-Year event
Inflow = 3.71 cfs @ 12.17 hrs, Volume= 0.378 af
Outflow = 0.53 cfs @ 11.70 hrs, Volume= 0.378 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.53 cfs @ 11.70 hrs, Volume= 0.378 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs / 3
Peak Elev= 460.48' @ 12.87 hrs Surf.Area= 2,788 sf Storage= 5,232 cf

Plug-Flow detention time= 65.5 min calculated for 0.378 af (100% of inflow)
Center-of-Mass det. time= 64.7 min (830.6 - 766.0)

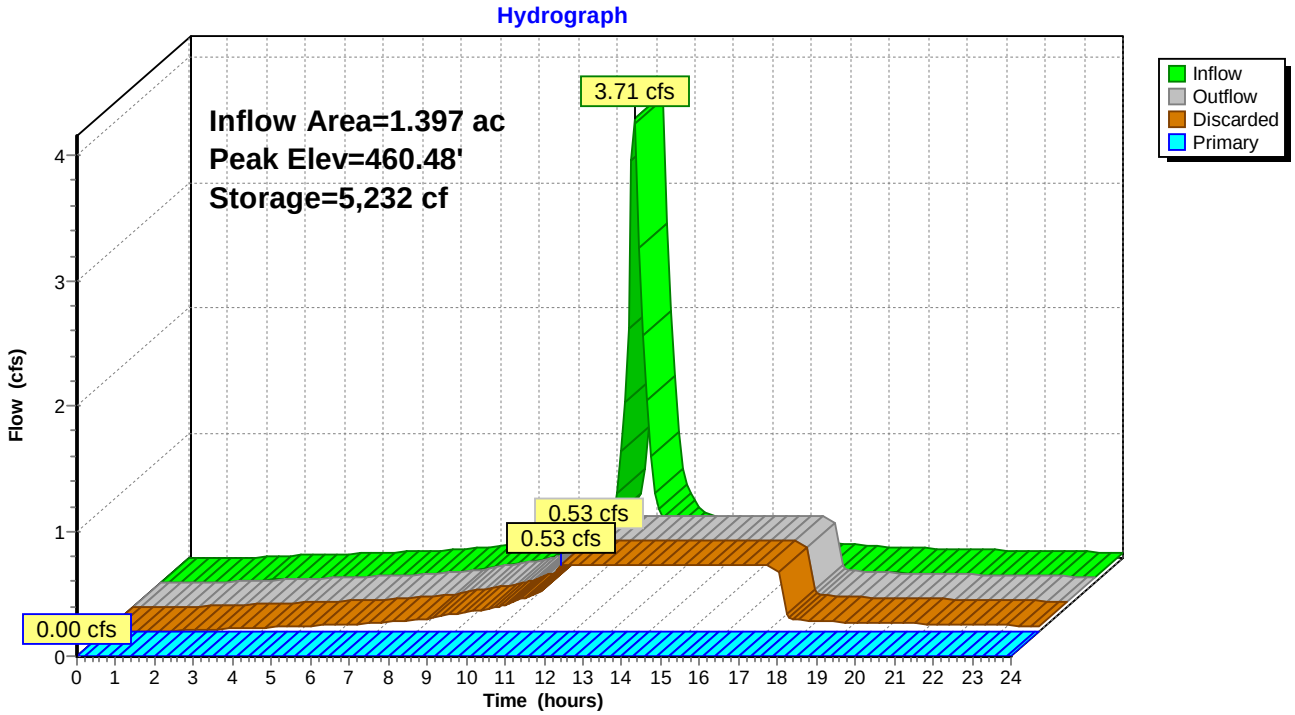
Volume	Invert	Avail.Storage	Storage Description
#1	458.00'	1,112 cf	**34.00'W x 82.00'L x 6.20'H Prismatoid of crushed stone** 17,286 cf Overall - 14,507 cf Embedded = 2,779 cf x 40.0% Voids
#2	458.50'	11,360 cf	**retain_it retain_it 5.0'** x 40 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 290.9 cf perimeter wall
#3	463.50'	170 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 3 -Impervious
#4	461.00'	119 cf	**18.0" Round Pipe Storage** L= 67.5' S= 0.0150 '/'
		12,761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	458.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	461.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.00' / 460.50' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#3	Device 2	462.75'	**4.0' long x 4.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.5' Crest Height
#4	Device 2	465.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.53 cfs @ 11.70 hrs HW=458.12' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.53 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=458.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
  ├**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.



Summary for Pond 29P: DETN. POND 5B

Inflow Area = 0.233 ac, 91.42% Impervious, Inflow Depth > 3.48" for 2-Year event
Inflow = 0.70 cfs @ 12.13 hrs, Volume= 0.068 af
Outflow = 0.17 cfs @ 11.80 hrs, Volume= 0.068 af, Atten= 75%, Lag= 0.0 min
Discarded = 0.17 cfs @ 11.80 hrs, Volume= 0.068 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 453.18' @ 12.58 hrs Surf.Area= 900 sf Storage= 660 cf

Plug-Flow detention time= 20.1 min calculated for 0.067 af (100% of inflow)
Center-of-Mass det. time= 19.8 min (778.9 - 759.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	452.00'	374 cf	**50.00'W x 18.00'L x 4.17'H Field A** 3,750 cf Overall - 2,816 cf Embedded = 934 cf x 40.0% Voids
#2A	452.50'	1,972 cf	**retain_it retain_it 3.0'** x 12 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 6 Rows adjusted for 75.5 cf perimeter wall
#3	455.50'	35 cf	**3.00'D x 2.50'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	457.00'	633 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		3,014 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
457.00	368	128.8	0	0	368
458.00	942	158.0	633	633	1,050

Device	Routing	Invert	Outlet Devices
#1	Discarded	452.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	458.00'	**2.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.17 cfs @ 11.80 hrs HW=452.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=452.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29P: DETN. POND 5B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
6 Rows adjusted for 75.5 cf perimeter wall

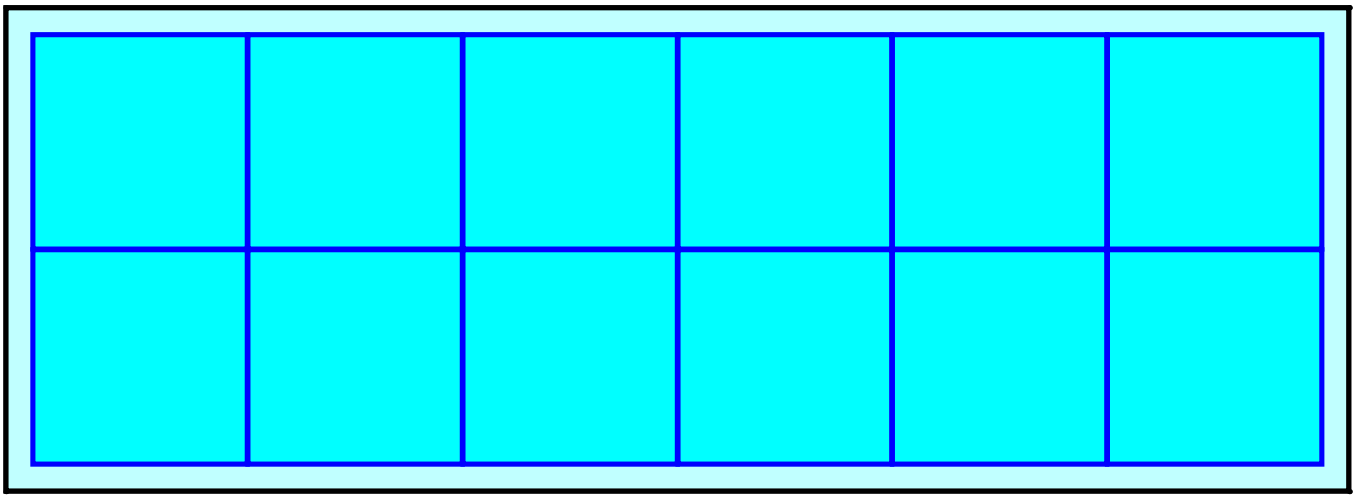
2 Chambers/Row x 8.00' Long = 16.00' Row Length +12.0" End Stone x 2 = 18.00' Base Length
6 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 50.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

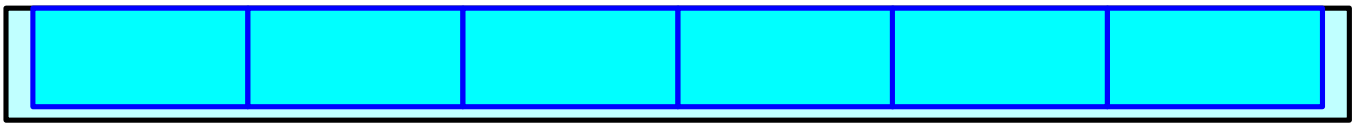
4.7 cf Sidewall x 2 x 2 + 4.7 cf Endwall x 6 x 2 = 75.5 cf Perimeter Wall
12 Chambers x 170.6 cf - 75.5 cf Perimeter wall = 1,971.8 cf Chamber Storage
12 Chambers x 234.7 cf = 2,816.0 cf Displacement

3,750.0 cf Field - 2,816.0 cf Chambers = 934.0 cf Stone x 40.0% Voids = 373.6 cf Stone Storage

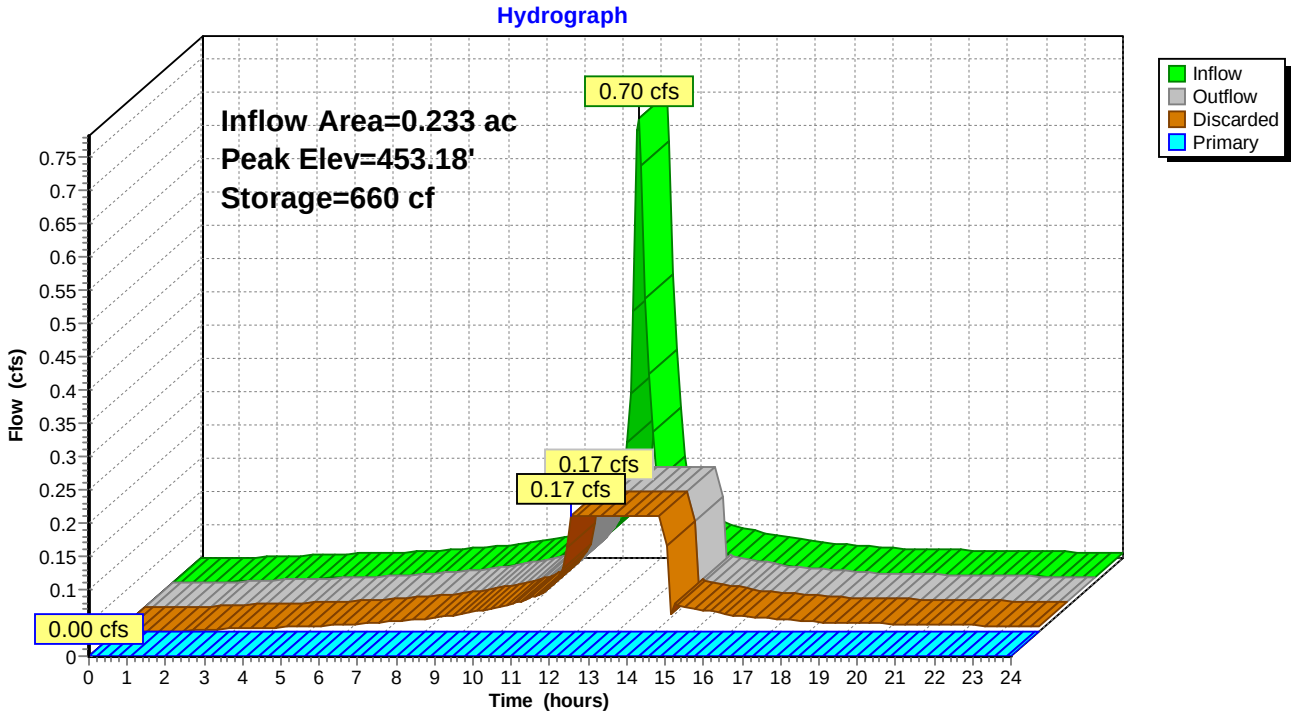
Chamber Storage + Stone Storage = 2,345.4 cf = 0.054 af
Overall Storage Efficiency = 62.5%
Overall System Size = 18.00' x 50.00' x 4.17'

12 Chambers
138.9 cy Field
34.6 cy Stone





Pond 29P: DETN. POND 5B



Summary for Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane

Inflow Area = 9.324 ac, 57.99% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 6.67 cfs @ 12.31 hrs, Volume= 1.003 af
Outflow = 6.68 cfs @ 12.32 hrs, Volume= 1.003 af, Atten= 0%, Lag= 0.2 min
Primary = 6.68 cfs @ 12.32 hrs, Volume= 1.003 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 456.31' @ 12.32 hrs Surf.Area= 515 sf Storage= 132 cf

Plug-Flow detention time= 0.4 min calculated for 0.998 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (817.7 - 817.3)

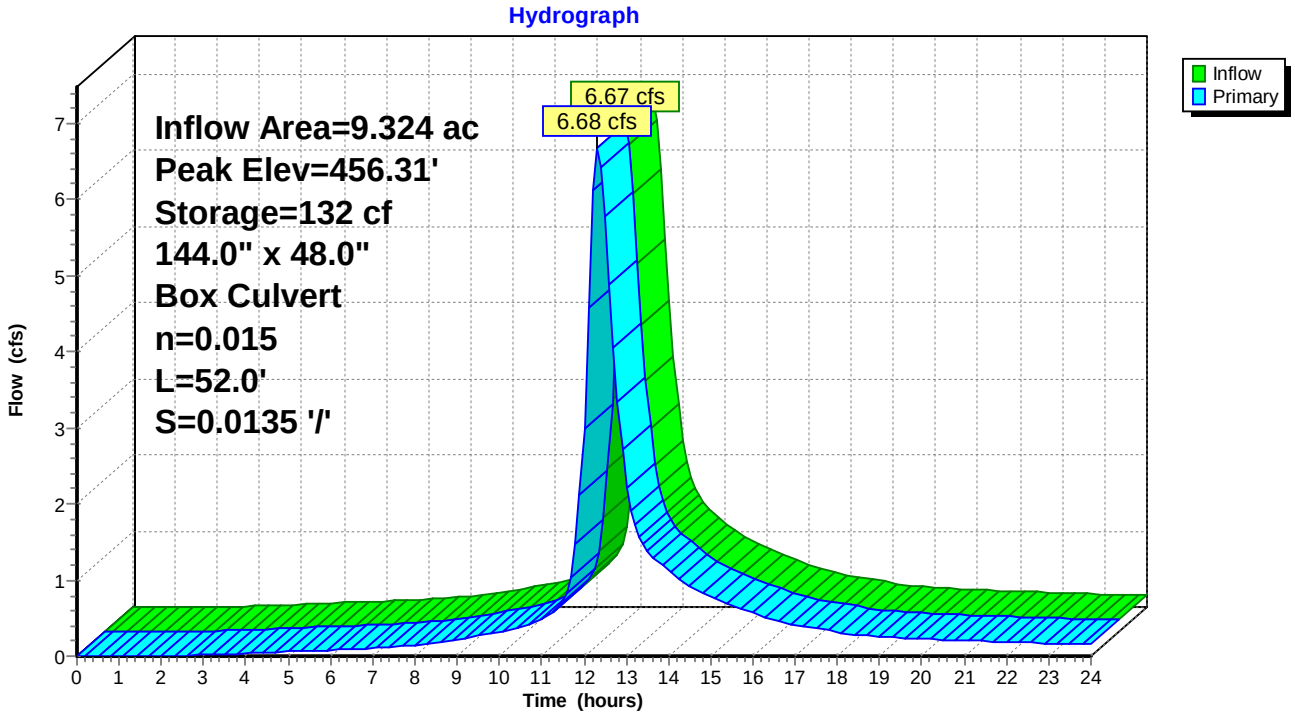
Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	90,081 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
456.00	340	69.0	0	0	340
458.00	2,107	180.0	2,196	2,196	2,553
460.00	5,971	358.0	7,750	9,946	10,193
462.00	11,082	505.0	16,792	26,737	20,325
464.00	16,612	607.0	27,508	54,245	29,419
466.00	19,256	663.0	35,835	90,081	35,220

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**144.0" W x 48.0" H Box Box Culvert** L= 52.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 456.00' / 455.30' S= 0.0135 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 48.00 sf

Primary OutFlow Max=6.60 cfs @ 12.32 hrs HW=456.31' (Free Discharge)
1=Box Culvert (Inlet Controls 6.60 cfs @ 1.78 fps)

Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane



Summary for Pond 101P: DETN. POND 1A

Inflow Area = 1.631 ac, 79.38% Impervious, Inflow Depth > 3.22" for 2-Year event
Inflow = 4.54 cfs @ 12.14 hrs, Volume= 0.438 af
Outflow = 2.37 cfs @ 12.36 hrs, Volume= 0.430 af, Atten= 48%, Lag= 13.7 min
Primary = 2.37 cfs @ 12.36 hrs, Volume= 0.430 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 456.36' @ 12.36 hrs Surf.Area= 6,294 sf Storage= 4,083 cf

Plug-Flow detention time= 43.5 min calculated for 0.428 af (98% of inflow)
Center-of-Mass det. time= 32.0 min (797.0 - 765.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	455.35'	1,229 cf	**24.00'W x 256.00'L x 4.17'H Field A** 25,600 cf Overall - 22,528 cf Embedded = 3,072 cf x 40.0% Voids
#2A	455.85'	16,048 cf	**retain_it retain_it 3.0'** x 96 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 330.5 cf perimeter wall
#3	458.80'	47 cf	**3.00'D x 2.20'H Riser** x 3
#4	454.65'	251 cf	**18.0" Round Pipe Storage** L= 142.0' S= 0.0116 '/'
		17,575 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	455.35'	**12.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 455.35' / 454.65' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.36 cfs @ 12.36 hrs HW=456.35' (Free Discharge)
1=Culvert (Barrel Controls 2.36 cfs @ 3.72 fps)

Pond 101P: DETN. POND 1A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
3 Rows adjusted for 330.5 cf perimeter wall

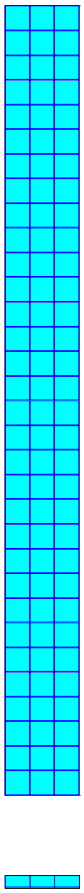
32 Chambers/Row x 8.00' Long = 256.00' Row Length
3 Rows x 96.0" Wide = 24.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 32 x 2 + 4.7 cf Endwall x 3 x 2 = 330.5 cf Perimeter Wall
96 Chambers x 170.6 cf - 330.5 cf Perimeter wall = 16,048.2 cf Chamber Storage
96 Chambers x 234.7 cf = 22,528.0 cf Displacement

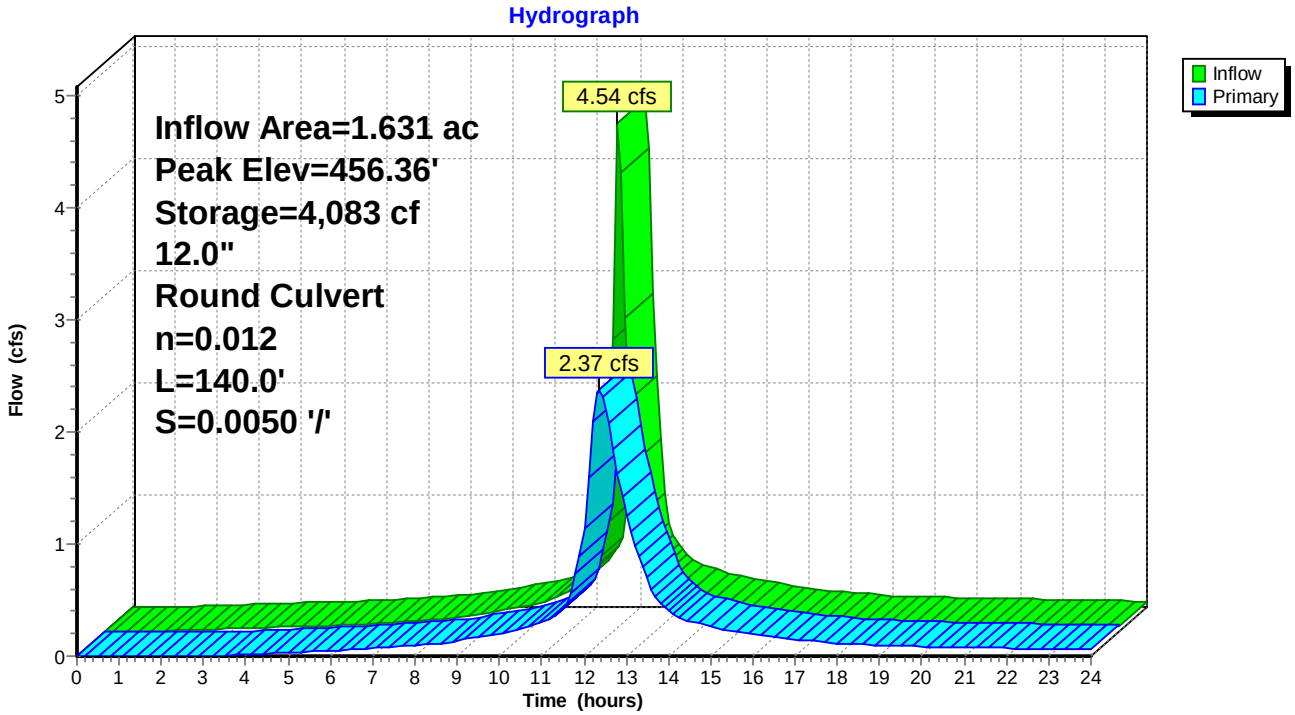
25,600.0 cf Field - 22,528.0 cf Chambers = 3,072.0 cf Stone x 40.0% Voids = 1,228.8 cf Stone Storage

Chamber Storage + Stone Storage = 17,277.0 cf = 0.397 af
Overall Storage Efficiency = 67.5%
Overall System Size = 256.00' x 24.00' x 4.17'

96 Chambers
948.1 cy Field
113.8 cy Stone



Pond 101P: DETN. POND 1A



Summary for Pond 102P: INFIL. POND 2

Inflow Area = 1.889 ac, 87.97% Impervious, Inflow Depth > 3.39" for 2-Year event
Inflow = 5.70 cfs @ 12.11 hrs, Volume= 0.534 af
Outflow = 0.16 cfs @ 8.30 hrs, Volume= 0.244 af, Atten= 97%, Lag= 0.0 min
Discarded = 0.16 cfs @ 8.30 hrs, Volume= 0.244 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.44' @ 16.81 hrs Surf.Area= 6,804 sf Storage= 14,306 cf

Plug-Flow detention time= 262.0 min calculated for 0.244 af (46% of inflow)
Center-of-Mass det. time= 126.1 min (885.5 - 759.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	463.80'	2,115 cf	**162.00'W x 42.00'L x 5.17'H Field A** 35,154 cf Overall - 29,867 cf Embedded = 5,287 cf x 40.0% Voids
#2A	464.30'	22,716 cf	**retain_it retain_it 4.0'** x 100 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 20 Rows adjusted for 377.5 cf perimeter wall
#3	468.30'	99 cf	**3.00'D x 3.50'H Riser** x 4 -Impervious
#4	461.50'	560 cf	**18.0" Round Pipe Storage** -Impervious L= 317.0' S= 0.0157 '/'
		25,491 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	463.80'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	466.57'	**18.0" Round 18" DRAIN** L= 317.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 466.57' / 461.50' S= 0.0160 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.16 cfs @ 8.30 hrs HW=463.80' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=461.50' (Free Discharge)
↑—**2=18" DRAIN** (Controls 0.00 cfs)

Pond 102P: INFIL. POND 2 - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)
Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf
Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf
20 Rows adjusted for 377.5 cf perimeter wall

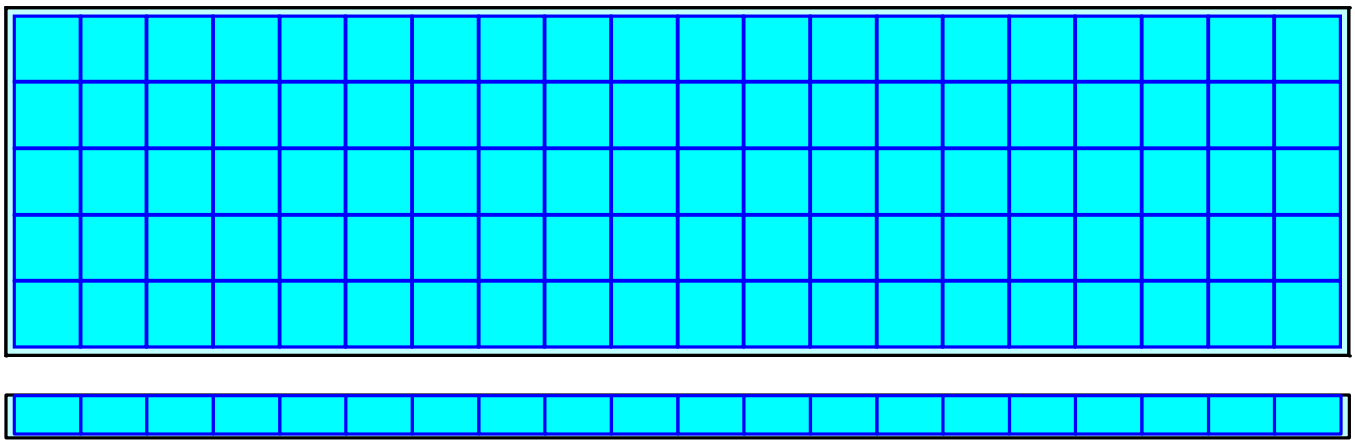
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 56.0" Chamber Height = 5.17' Field Height

7.5 cf Sidewall x 5 x 2 + 7.5 cf Endwall x 20 x 2 = 377.5 cf Perimeter Wall
100 Chambers x 230.9 cf - 377.5 cf Perimeter wall = 22,716.5 cf Chamber Storage
100 Chambers x 298.7 cf = 29,866.7 cf Displacement

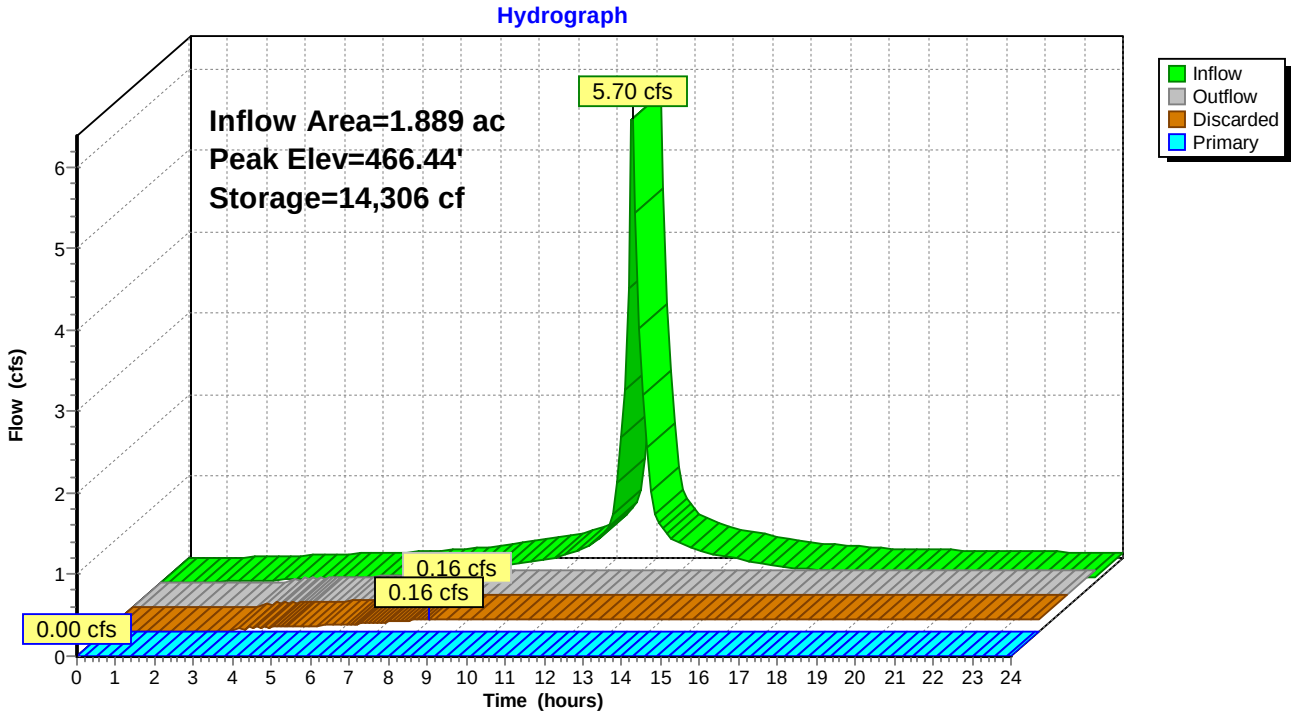
35,154.0 cf Field - 29,866.7 cf Chambers = 5,287.3 cf Stone x 40.0% Voids = 2,114.9 cf Stone Storage

Chamber Storage + Stone Storage = 24,831.4 cf = 0.570 af
Overall Storage Efficiency = 70.6%
Overall System Size = 42.00' x 162.00' x 5.17'

100 Chambers
1,302.0 cy Field
195.8 cy Stone



Pond 102P: INFIL. POND 2



Summary for Pond 103P: DETN. POND 3A

Inflow Area = 1.476 ac, 55.17% Impervious, Inflow Depth > 2.63" for 2-Year event
Inflow = 3.37 cfs @ 12.14 hrs, Volume= 0.324 af
Outflow = 2.67 cfs @ 12.25 hrs, Volume= 0.322 af, Atten= 21%, Lag= 6.7 min
Primary = 2.67 cfs @ 12.25 hrs, Volume= 0.322 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 468.24' @ 12.25 hrs Surf.Area= 2,724 sf Storage= 1,356 cf

Plug-Flow detention time= 16.6 min calculated for 0.320 af (99% of inflow)
Center-of-Mass det. time= 12.0 min (791.8 - 779.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	467.40'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	467.90'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	469.90'	28 cf	**3.00'D x 2.00'H Vetical Cone/Cylinder - Risers** x 2
#4	467.40'	39 cf	**12.0" Round Pipe Storage** L= 50.0'
		5,188 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	467.40'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 467.40' / 466.90' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.61 cfs @ 12.25 hrs HW=468.23' (Free Discharge)
1=Culvert (Barrel Controls 2.61 cfs @ 4.27 fps)

Pond 103P: DETN. POND 3A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

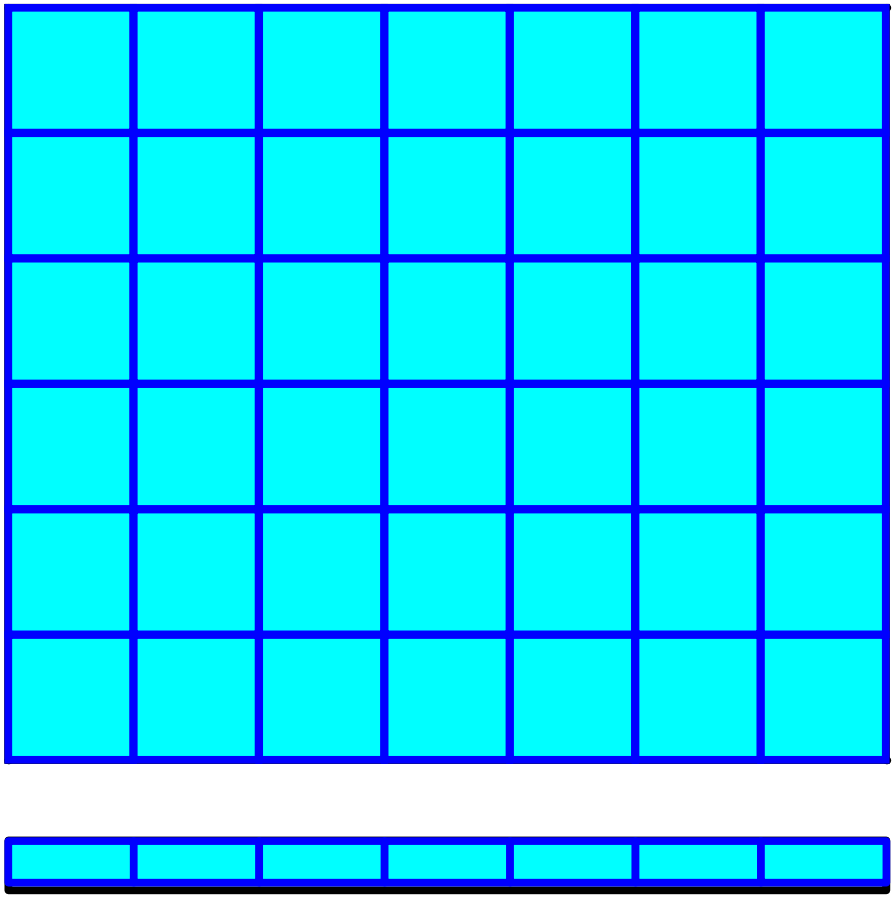
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

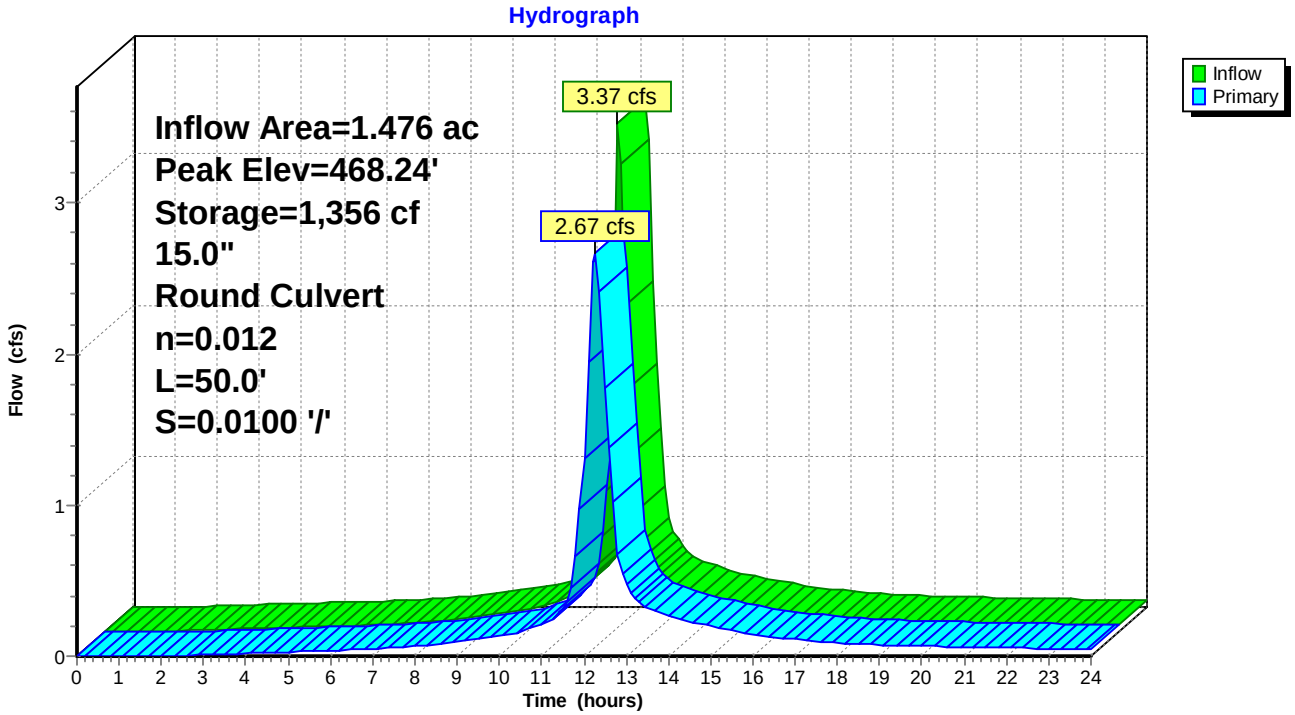
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 103P: DETN. POND 3A



Summary for Pond 104P: INFL. POND 4A

Inflow Area = 1.128 ac, 89.19% Impervious, Inflow Depth > 3.43" for 2-Year event
Inflow = 3.48 cfs @ 12.11 hrs, Volume= 0.322 af
Outflow = 0.31 cfs @ 13.16 hrs, Volume= 0.200 af, Atten= 91%, Lag= 63.2 min
Discarded = 0.10 cfs @ 8.60 hrs, Volume= 0.151 af
Primary = 0.21 cfs @ 13.16 hrs, Volume= 0.049 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 464.31' @ 13.16 hrs Surf.Area= 4,212 sf Storage= 7,173 cf

Plug-Flow detention time= 225.8 min calculated for 0.199 af (62% of inflow)
Center-of-Mass det. time= 120.8 min (879.5 - 758.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.00'	1,388 cf	**162.00'W x 26.00'L x 4.17'H Field A** 17,550 cf Overall - 14,080 cf Embedded = 3,470 cf x 40.0% Voids
#2A	462.50'	10,019 cf	**retain_it retain_it 3.0'** x 60 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 20 Rows adjusted for 217.2 cf perimeter wall
#3	465.50'	64 cf	**3.00'D x 3.00'H Riser** x 3 -Impervious
#4	464.00'	67 cf	**18.0" Round Pipe Storage** -Impervious L= 38.0' S= 0.0132 '/'
		11,538 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	462.00'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	464.00'	**18.0" Round Culvert** L= 38.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 464.00' / 464.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.10 cfs @ 8.60 hrs HW=462.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.21 cfs @ 13.16 hrs HW=464.31' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 0.21 cfs @ 1.18 fps)

Pond 104P: INFL. POND 4A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
20 Rows adjusted for 217.2 cf perimeter wall

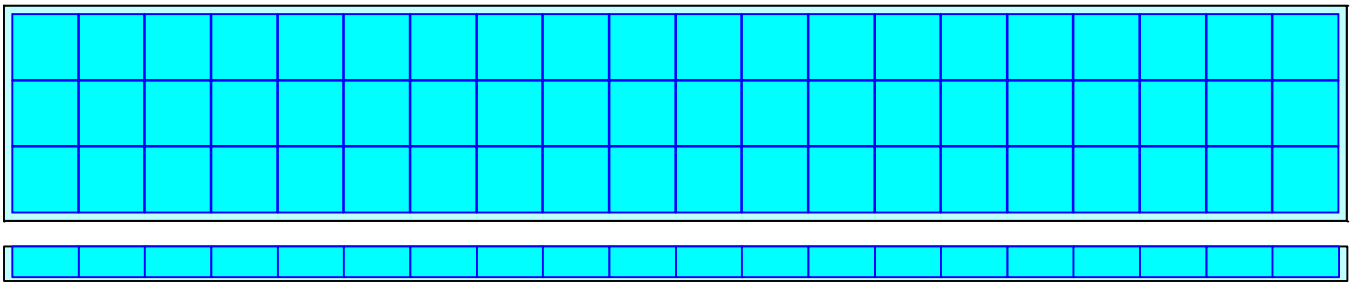
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 20 x 2 = 217.2 cf Perimeter Wall
60 Chambers x 170.6 cf - 217.2 cf Perimeter wall = 10,019.5 cf Chamber Storage
60 Chambers x 234.7 cf = 14,080.0 cf Displacement

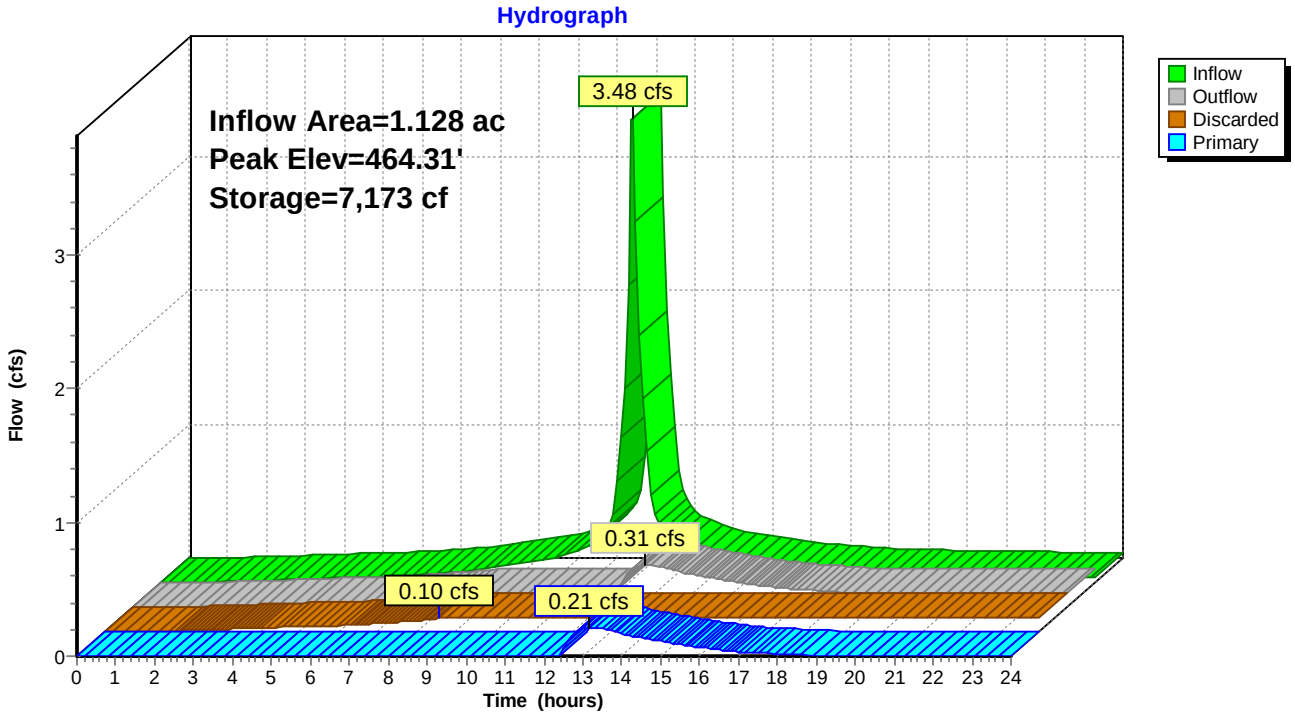
17,550.0 cf Field - 14,080.0 cf Chambers = 3,470.0 cf Stone x 40.0% Voids = 1,388.0 cf Stone Storage

Chamber Storage + Stone Storage = 11,407.5 cf = 0.262 af
Overall Storage Efficiency = 65.0%
Overall System Size = 26.00' x 162.00' x 4.17'

60 Chambers
650.0 cy Field
128.5 cy Stone



Pond 104P: INFL. POND 4A



Summary for Pond 105P: DETN. POND 5A

Inflow Area = 1.074 ac, 83.75% Impervious, Inflow Depth > 3.31" for 2-Year event
Inflow = 3.16 cfs @ 12.12 hrs, Volume= 0.297 af
Outflow = 0.59 cfs @ 11.80 hrs, Volume= 0.296 af, Atten= 81%, Lag= 0.0 min
Discarded = 0.59 cfs @ 11.80 hrs, Volume= 0.296 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 460.59' @ 12.64 hrs Surf.Area= 3,060 sf Storage= 3,456 cf

Plug-Flow detention time= 34.1 min calculated for 0.296 af (100% of inflow)
Center-of-Mass det. time= 33.8 min (795.4 - 761.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	459.00'	1,165 cf	**34.00'W x 90.00'L x 6.17'H Field A** 18,870 cf Overall - 15,957 cf Embedded = 2,913 cf x 40.0% Voids
#2A	459.50'	12,505 cf	**retain_it retain_it 5.0'** x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	464.50'	28 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	463.50'	79 cf	**12.0" Round Pipe Storage** L= 100.0' S= 0.0100 '/'
		13,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	459.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	463.50'	**12.0" Round Culvert** L= 150.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 463.50' / 461.60' S= 0.0126 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.59 cfs @ 11.80 hrs HW=459.15' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.59 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=459.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 105P: DETN. POND 5A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
4 Rows adjusted for 311.7 cf perimeter wall

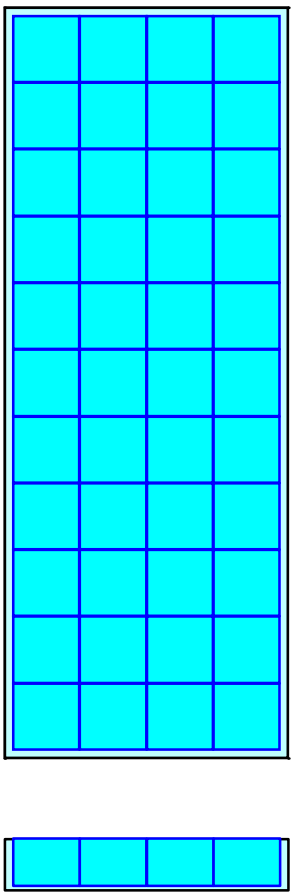
11 Chambers/Row x 8.00' Long = 88.00' Row Length +12.0" End Stone x 2 = 90.00' Base Length
4 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 34.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 11 x 2 + 10.4 cf Endwall x 4 x 2 = 311.7 cf Perimeter Wall
44 Chambers x 291.3 cf - 311.7 cf Perimeter wall = 12,504.6 cf Chamber Storage
44 Chambers x 362.7 cf = 15,957.3 cf Displacement

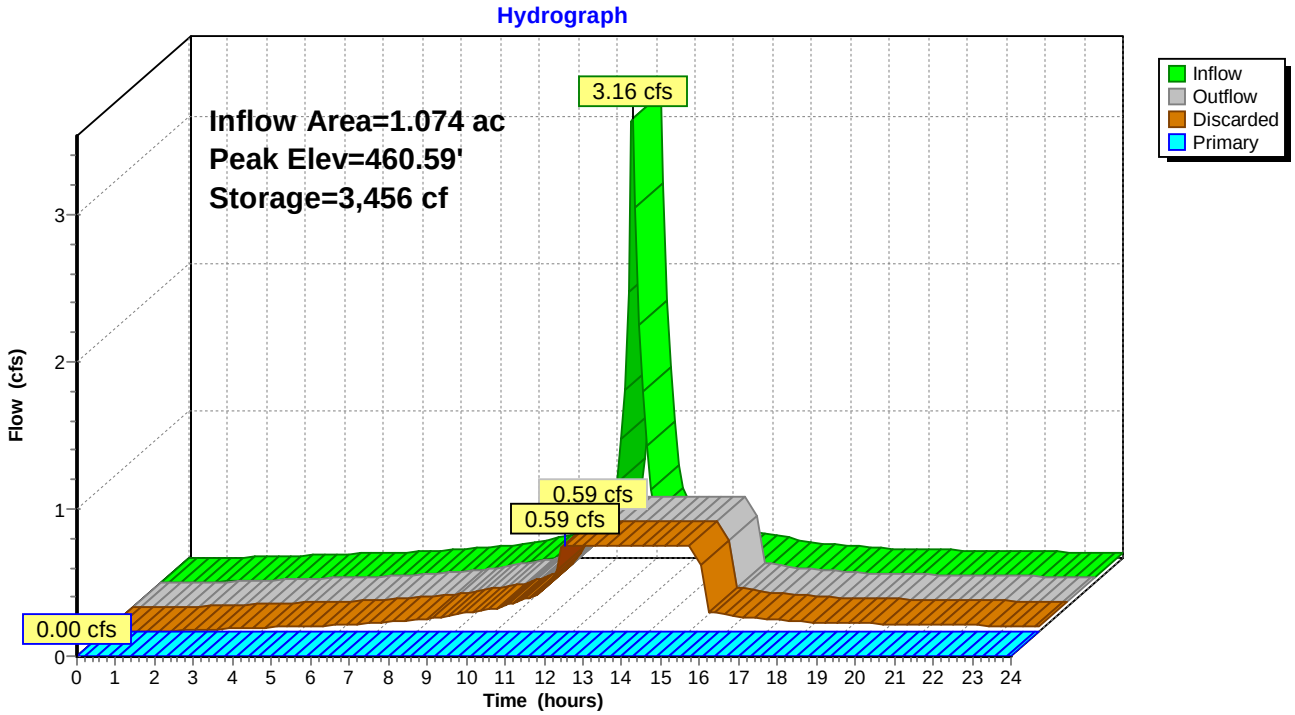
18,870.0 cf Field - 15,957.3 cf Chambers = 2,912.7 cf Stone x 40.0% Voids = 1,165.1 cf Stone Storage

Chamber Storage + Stone Storage = 13,669.7 cf = 0.314 af
Overall Storage Efficiency = 72.4%
Overall System Size = 90.00' x 34.00' x 6.17'

44 Chambers
698.9 cy Field
107.9 cy Stone



Pond 105P: DETN. POND 5A



Summary for Pond 111P: INFL. POND 1B

Inflow Area = 1.716 ac, 73.30% Impervious, Inflow Depth > 3.09" for 2-Year event
Inflow = 4.79 cfs @ 12.11 hrs, Volume= 0.442 af
Outflow = 1.75 cfs @ 12.44 hrs, Volume= 0.437 af, Atten= 64%, Lag= 19.5 min
Discarded = 0.25 cfs @ 10.30 hrs, Volume= 0.258 af
Primary = 1.50 cfs @ 12.44 hrs, Volume= 0.179 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 463.03' @ 12.44 hrs Surf.Area= 4,452 sf Storage= 5,474 cf

Plug-Flow detention time= 54.6 min calculated for 0.435 af (98% of inflow)
Center-of-Mass det. time= 47.1 min (813.9 - 766.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	461.40'	1,552 cf	**106.00'W x 42.00'L x 6.17'H Field A** 27,454 cf Overall - 23,573 cf Embedded = 3,881 cf x 40.0% Voids
#2A	461.90'	18,559 cf	**retain_it retain_it 5.0'** x 65 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 13 Rows adjusted for 374.0 cf perimeter wall
#3	466.50'	64 cf	**3.00'D x 4.50'H Riser** x 2 -Impervious
#4	454.65'	262 cf	**18.0" Round Pipe Storage** -Impervious L= 148.0' S= 0.0449 '/'
		20,437 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	461.90'	**8.0" Round Culvert** L= 148.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.90' / 454.65' S= 0.0490 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Discarded	461.40'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.25 cfs @ 10.30 hrs HW=461.40' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=1.49 cfs @ 12.44 hrs HW=463.02' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.49 cfs @ 4.28 fps)

Pond 111P: INFL. POND 1B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
13 Rows adjusted for 374.0 cf perimeter wall

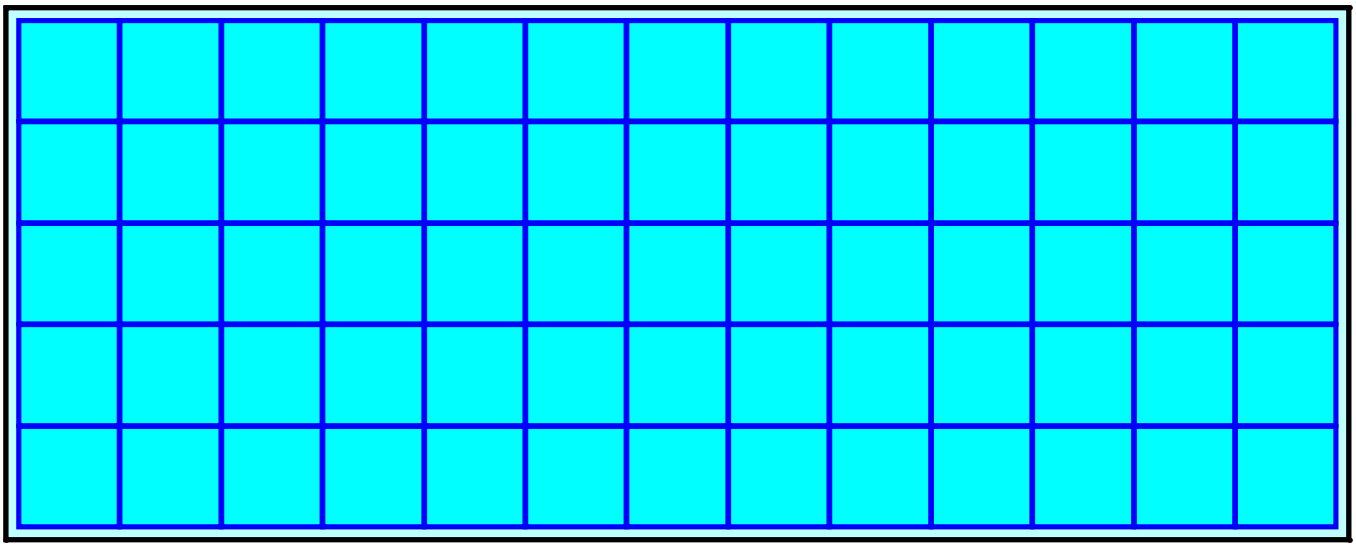
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
13 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 106.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 5 x 2 + 10.4 cf Endwall x 13 x 2 = 374.0 cf Perimeter Wall
65 Chambers x 291.3 cf - 374.0 cf Perimeter wall = 18,559.2 cf Chamber Storage
65 Chambers x 362.7 cf = 23,573.3 cf Displacement

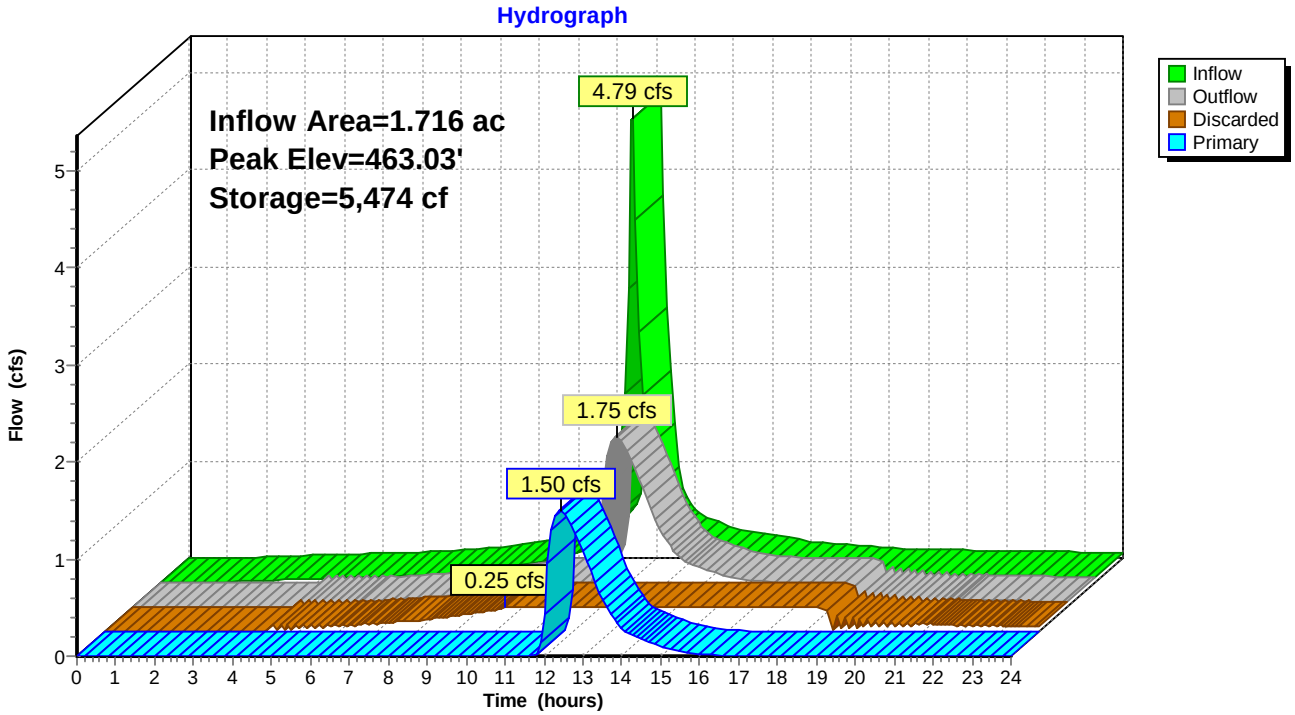
27,454.0 cf Field - 23,573.3 cf Chambers = 3,880.7 cf Stone x 40.0% Voids = 1,552.3 cf Stone Storage

Chamber Storage + Stone Storage = 20,111.4 cf = 0.462 af
Overall Storage Efficiency = 73.3%
Overall System Size = 42.00' x 106.00' x 6.17'

65 Chambers
1,016.8 cy Field
143.7 cy Stone



Pond 111P: INFL. POND 1B



Summary for Pond 113P: DETN. POND 3B

Inflow Area = 2.243 ac, 59.27% Impervious, Inflow Depth > 2.80" for 2-Year event
Inflow = 4.53 cfs @ 12.20 hrs, Volume= 0.523 af
Outflow = 4.10 cfs @ 12.30 hrs, Volume= 0.520 af, Atten= 10%, Lag= 5.9 min
Primary = 4.10 cfs @ 12.30 hrs, Volume= 0.520 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.48' @ 12.30 hrs Surf.Area= 2,688 sf Storage= 1,629 cf

Plug-Flow detention time= 12.3 min calculated for 0.518 af (99% of inflow)
Center-of-Mass det. time= 9.0 min (793.1 - 784.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	465.50'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	466.00'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	468.00'	14 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - risers**
		5,134 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	465.50'	**18.0" Round Culvert** L= 320.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.50' / 462.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.08 cfs @ 12.30 hrs HW=466.47' (Free Discharge)
1=Culvert (Inlet Controls 4.08 cfs @ 3.36 fps)

Pond 113P: DETN. POND 3B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

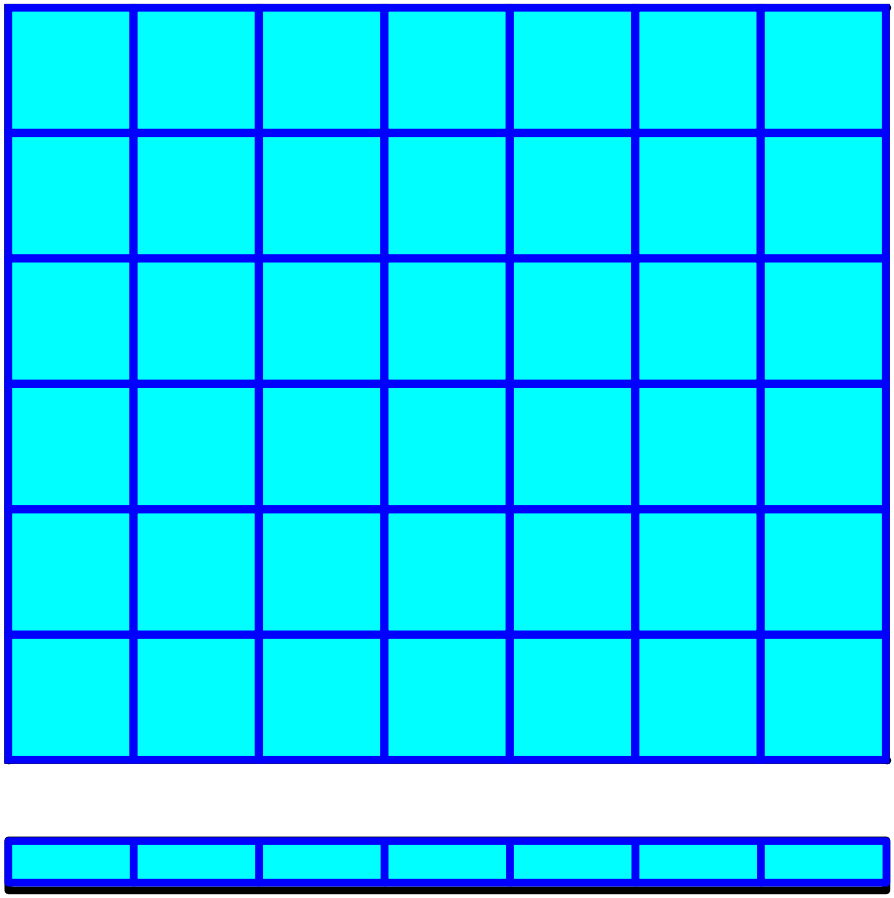
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

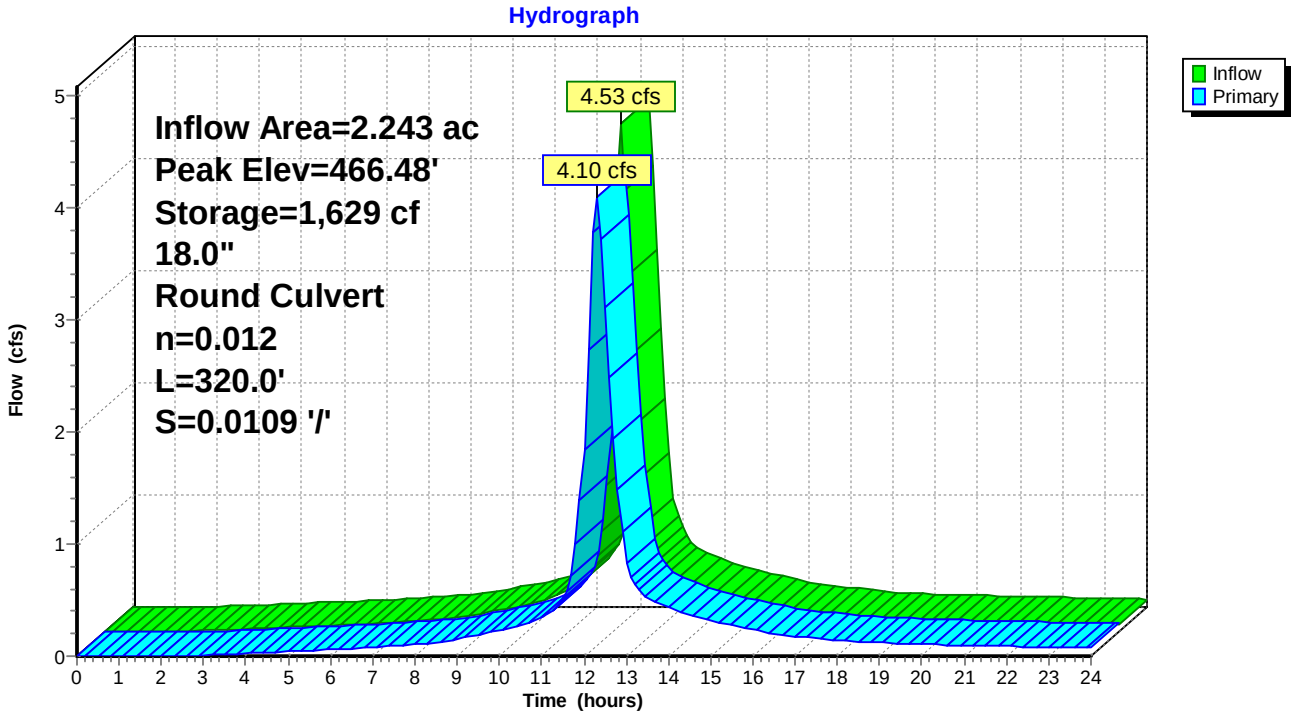
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 113P: DETN. POND 3B



Summary for Pond 114P: DETN. POND 4B

Inflow Area = 0.656 ac, 81.20% Impervious, Inflow Depth > 3.26" for 2-Year event
Inflow = 1.92 cfs @ 12.11 hrs, Volume= 0.178 af
Outflow = 1.47 cfs @ 12.22 hrs, Volume= 0.177 af, Atten= 23%, Lag= 6.5 min
Primary = 1.47 cfs @ 12.22 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 463.45' @ 12.22 hrs Surf.Area= 2,360 sf Storage= 771 cf

Plug-Flow detention time= 19.0 min calculated for 0.176 af (99% of inflow)
Center-of-Mass det. time= 13.8 min (776.5 - 762.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.80'	461 cf	**96.00'W x 24.00'L x 4.17'H Field A** 9,600 cf Overall - 8,448 cf Embedded = 1,152 cf x 40.0% Voids
#2A	463.30'	6,000 cf	**retain_it retain_it 3.0'** x 36 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 12 Rows adjusted for 141.6 cf perimeter wall
#3	465.80'	42 cf	**3.00'D x 3.00'H Riser** x 2
#4	462.80'	78 cf	**18.0" Round Pipe Storage** L= 44.0' S= 0.0114 '/'
		6,581 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	462.80'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 462.80' / 462.30' S= 0.0114 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.44 cfs @ 12.22 hrs HW=463.44' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.44 cfs @ 2.72 fps)

Pond 114P: DETN. POND 4B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
12 Rows adjusted for 141.6 cf perimeter wall

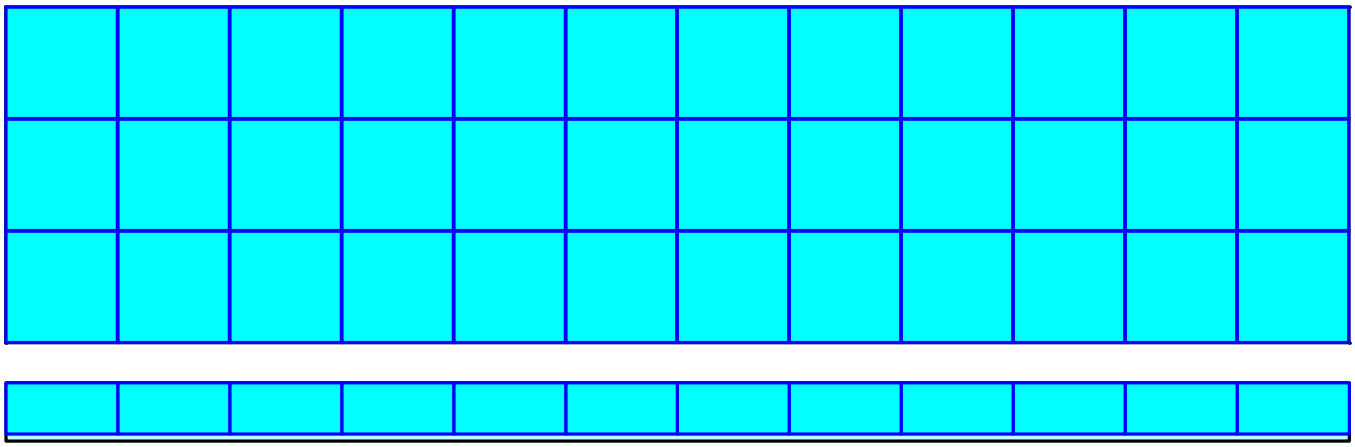
3 Chambers/Row x 8.00' Long = 24.00' Row Length
12 Rows x 96.0" Wide = 96.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 12 x 2 = 141.6 cf Perimeter Wall
36 Chambers x 170.6 cf - 141.6 cf Perimeter wall = 6,000.4 cf Chamber Storage
36 Chambers x 234.7 cf = 8,448.0 cf Displacement

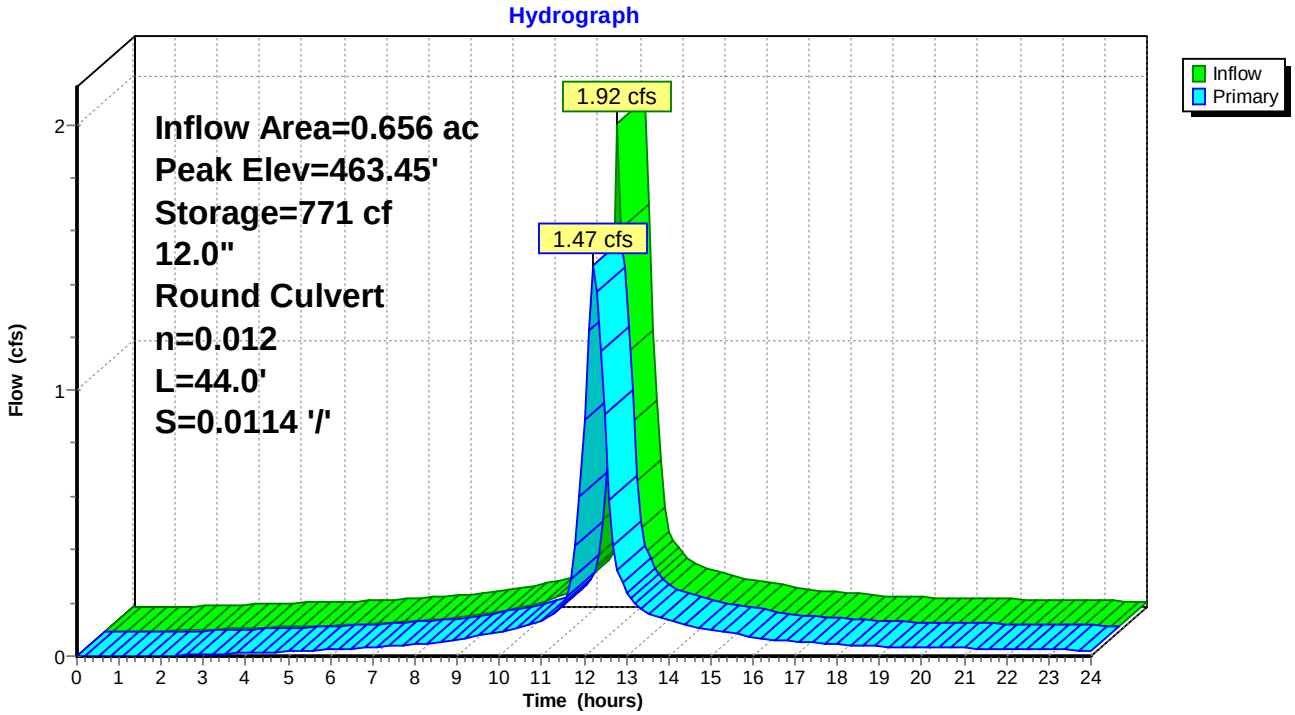
9,600.0 cf Field - 8,448.0 cf Chambers = 1,152.0 cf Stone x 40.0% Voids = 460.8 cf Stone Storage

Chamber Storage + Stone Storage = 6,461.2 cf = 0.148 af
Overall Storage Efficiency = 67.3%
Overall System Size = 24.00' x 96.00' x 4.17'

36 Chambers
355.6 cy Field
42.7 cy Stone



Pond 114P: DETN. POND 4B



Summary for Pond 210P: Northwest Wetland

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth > 1.45" for 2-Year event
Inflow = 1.21 cfs @ 12.31 hrs, Volume= 0.133 af
Outflow = 1.22 cfs @ 12.31 hrs, Volume= 0.133 af, Atten= 0%, Lag= 0.1 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 1.22 cfs @ 12.31 hrs, Volume= 0.133 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 465.28' @ 12.31 hrs Surf.Area= 56 sf Storage= 7 cf

Plug-Flow detention time= 0.2 min calculated for 0.133 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (863.8 - 863.7)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

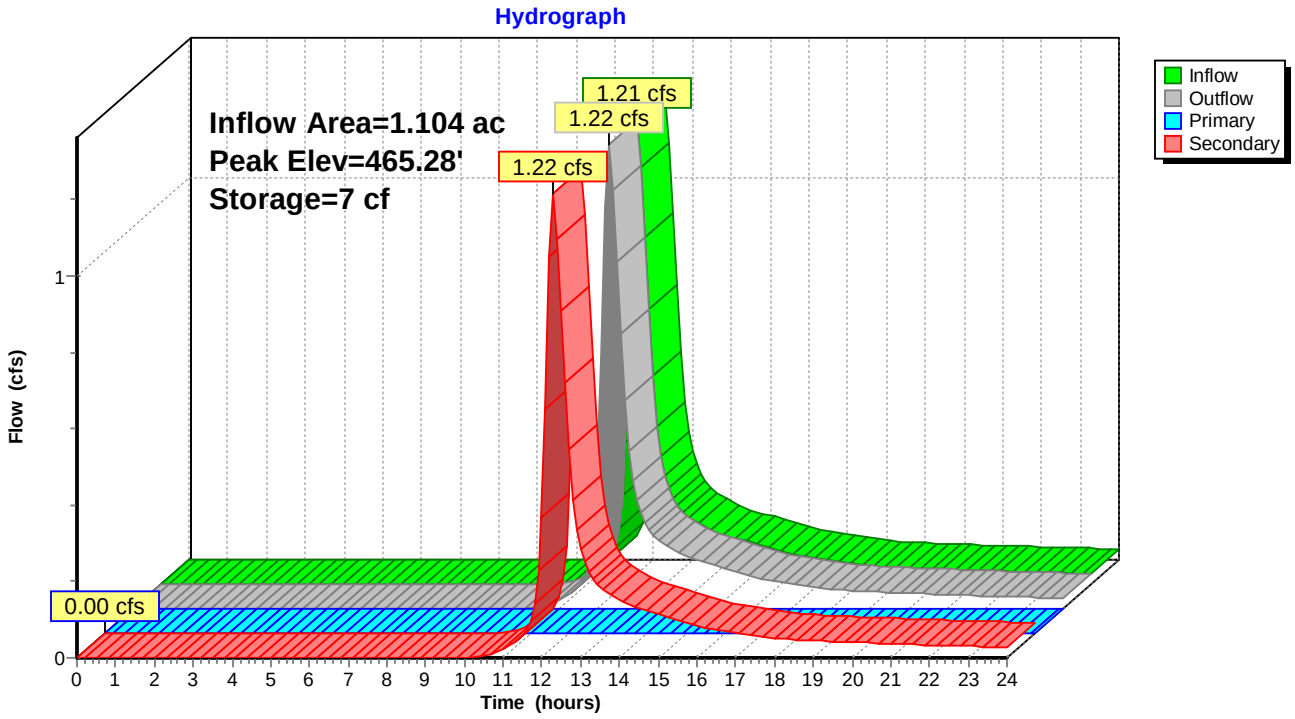
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing channel - model as b/c w** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**5.0' long x 1.0' breadth Flow to New Channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=465.00' (Free Discharge)
└**1=Discharge to West to Existing channel - model as b/c weir** (Controls 0.00 cfs)

Secondary OutFlow Max=1.20 cfs @ 12.31 hrs HW=465.28' (Free Discharge)
└**2=Flow to New Channel - model as b/c weir** (Weir Controls 1.20 cfs @ 1.20 fps)

Pond 210P: Northwest Wetland

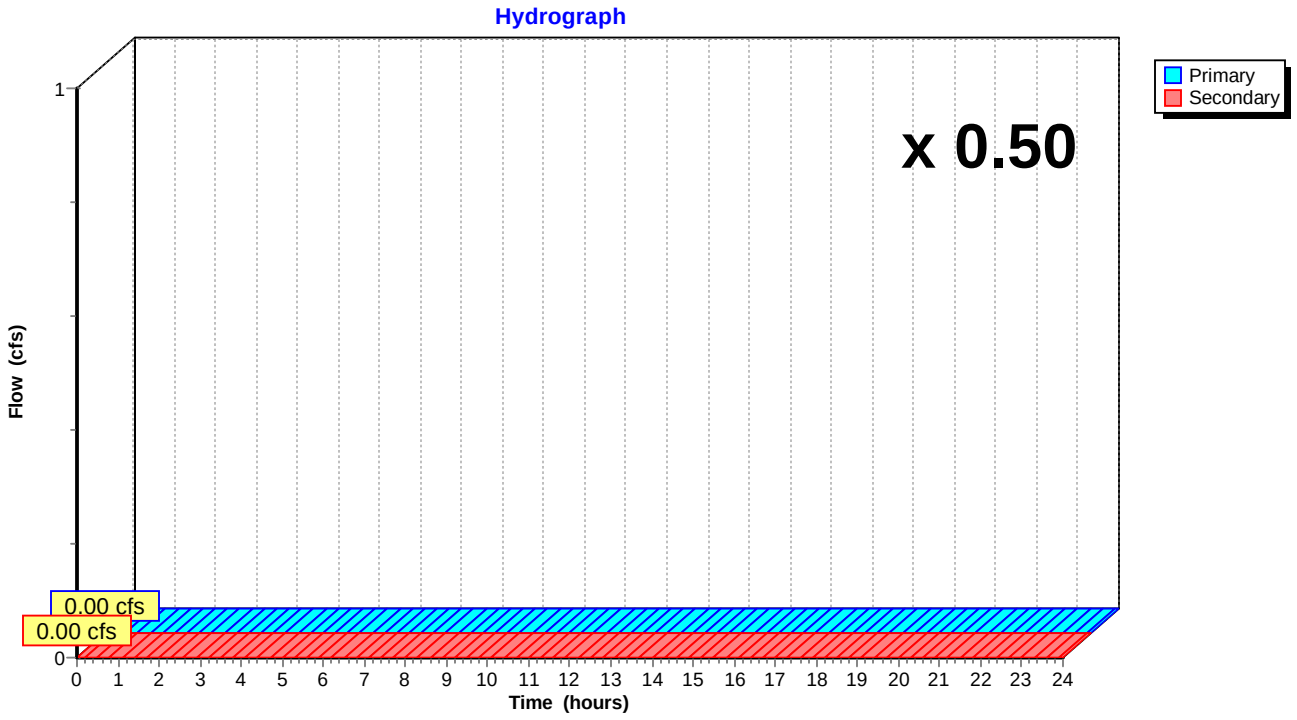


Summary for Link 9L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 9L: Diverging Flow



Time span=0.00-24.00 hrs, dt=0.10 hrs, 241 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 21S: BLDG 2 East and BLDG 1 Runoff Area=71,065 sf 79.38% Impervious Runoff Depth>5.31"
Tc=10.0 min CN=74/98 Runoff=7.43 cfs 0.722 af

Subcatchment 22S: BLDG 1 West Runoff Area=10,930 sf 74.42% Impervious Runoff Depth>5.18"
Tc=10.0 min CN=74/98 Runoff=1.12 cfs 0.108 af

Subcatchment 23S: PARKING DECK (top) Runoff Area=25,493 sf 94.05% Impervious Runoff Depth>5.69"
Tc=10.0 min CN=74/98 Runoff=2.82 cfs 0.278 af

Subcatchment 28S: BLDG 5 LL PKG Runoff Area=10,149 sf 91.42% Impervious Runoff Depth>5.62"
Tc=10.0 min CN=74/98 Runoff=1.11 cfs 0.109 af

Subcatchment 30S: BLDG 4 1/3 of ROOF Runoff Area=10,155 sf 100.00% Impervious Runoff Depth>5.85"
Tc=6.0 min CN=0/98 Runoff=1.30 cfs 0.114 af

Subcatchment 31S: BLDG 3 North Runoff Area=51,616 sf 68.73% Impervious Runoff Depth>5.01"
Flow Length=189' Slope=0.0237 '/' Tc=10.1 min CN=73/98 Runoff=5.11 cfs 0.494 af

Subcatchment 32S: BLDG 4 East and BLDG 3 Runoff Area=33,395 sf 67.17% Impervious Runoff Depth>5.26"
Tc=10.0 min CN=82/98 Runoff=3.51 cfs 0.336 af

Subcatchment 33S: Northerly Offsite to BLDG 3 Runoff Area=12,685 sf 0.00% Impervious Runoff Depth>2.87"
Flow Length=90' Slope=0.0322 '/' Tc=10.0 min CN=70/0 Runoff=0.80 cfs 0.070 af

Subcatchment 34S: BLDG 4 South Runoff Area=18,423 sf 70.83% Impervious Runoff Depth>5.09"
Tc=10.0 min CN=74/98 Runoff=1.86 cfs 0.179 af

Subcatchment 41S: BLDG 4 West and North Runoff Area=28,818 sf 81.57% Impervious Runoff Depth>5.37"
Tc=10.0 min CN=74/98 Runoff=3.04 cfs 0.296 af

Subcatchment 48S: West P-Stream Area Runoff Area=34,984 sf 0.00% Impervious Runoff Depth>2.50"
Flow Length=300' Slope=0.0500 '/' Tc=10.0 min CN=66/0 Runoff=1.85 cfs 0.168 af

Subcatchment 49S: P-Wetland Runoff Area=27,172 sf 0.00% Impervious Runoff Depth>2.41"
Flow Length=345' Slope=0.0600 '/' Tc=8.4 min CN=65/0 Runoff=1.50 cfs 0.125 af

Subcatchment 50S: Runoff from Proposed Runoff Area=60,868 sf 80.69% Impervious Runoff Depth>5.34"
Tc=12.0 min CN=74/98 Runoff=6.05 cfs 0.622 af

Subcatchment 51S: BLDG 5 area Runoff Area=32,450 sf 76.58% Impervious Runoff Depth>5.24"
Tc=10.0 min CN=74/98 Runoff=3.36 cfs 0.325 af

Subcatchment 71S: Amenities 1 and 2 Runoff Area=35,555 sf 51.73% Impervious Runoff Depth>4.60"
Flow Length=124' Slope=0.0106 '/' Tc=10.0 min CN=74/98 Runoff=3.31 cfs 0.313 af

Subcatchment 72S: Amenities 2 and 3 + Pave Runoff Area=28,428 sf 70.52% Impervious Runoff Depth>5.03"
Flow Length=380' Slope=0.0308 '/' Tc=10.0 min CN=72/98 Runoff=2.83 cfs 0.273 af

Subcatchment 90S: Northeast to Offsite Runoff Area=3,287 sf 0.00% Impervious Runoff Depth>2.87"
Flow Length=69' Slope=0.2520 '/' Tc=10.0 min CN=70/0 Runoff=0.21 cfs 0.018 af

Subcatchment 91S: Northwest Wooded and Runoff Area=48,103 sf 0.00% Impervious Runoff Depth>3.15"
Tc=20.0 min CN=73/0 Runoff=2.71 cfs 0.290 af

Subcatchment 92S: Easterly Wooded to Runoff Area=47,176 sf 0.00% Impervious Runoff Depth>2.97"
Flow Length=655' Slope=0.0674 '/' Tc=11.3 min CN=71/0 Runoff=2.96 cfs 0.268 af

Subcatchment 93S: Overland to Pine Hill Runoff Area=13,547 sf 0.00% Impervious Runoff Depth>3.06"
Tc=10.0 min CN=72/0 Runoff=0.91 cfs 0.079 af

Subcatchment 101S: Contributing Existing Runoff Area=182.196 ac 38.00% Impervious Runoff Depth>3.42"
Tc=120.0 min CN=61/98 Runoff=170.31 cfs 51.914 af

Subcatchment 102S: Contributing Existing Runoff Area=49.270 ac 48.27% Impervious Runoff Depth>4.45"
Tc=75.0 min CN=74/98 Runoff=83.00 cfs 18.287 af

Subcatchment 201S: BLDG 1 ROOF Runoff Area=28,260 sf 100.00% Impervious Runoff Depth>5.85"
Tc=6.0 min CN=0/98 Runoff=3.61 cfs 0.316 af

Subcatchment 202S: BLDG 2 ROOF Runoff Area=28,346 sf 100.00% Impervious Runoff Depth>5.85"
Tc=6.0 min CN=0/98 Runoff=3.62 cfs 0.317 af

Subcatchment 203S: BLDG 3 ROOF Runoff Area=38,210 sf 100.00% Impervious Runoff Depth>5.85"
Tc=6.0 min CN=0/98 Runoff=4.88 cfs 0.428 af

Subcatchment 204S: BLDG 4 2/3 of ROOF Runoff Area=20,310 sf 100.00% Impervious Runoff Depth>5.85"
Tc=6.0 min CN=0/98 Runoff=2.59 cfs 0.227 af

Subcatchment 205S: BLDG 5 ROOF Runoff Area=14,325 sf 100.00% Impervious Runoff Depth>5.85"
Tc=6.0 min CN=0/98 Runoff=1.83 cfs 0.160 af

Reach 13R: Stream Channel from Brandt to Avg. Flow Depth=0.42' Max Vel=4.94 fps Inflow=23.34 cfs 3.471 af
n=0.030 L=280.0' S=0.0371 '/' Capacity=593.73 cfs Outflow=23.20 cfs 3.468 af

Reach 20R: existing stream on west side Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=545.0' S=0.0073 '/' Capacity=371.73 cfs Outflow=0.00 cfs 0.000 af

Reach 22R: Combined stream into culvert Avg. Flow Depth=0.21' Max Vel=2.03 fps Inflow=3.67 cfs 0.455 af
n=0.040 L=282.0' S=0.0266 '/' Capacity=653.19 cfs Outflow=3.61 cfs 0.454 af

Reach 27R: (new Reach) Inflow=1.94 cfs 0.119 af
Outflow=1.94 cfs 0.119 af

Reach 81R: West Proposed Stream Avg. Flow Depth=0.35' Max Vel=1.95 fps Inflow=3.72 cfs 0.457 af
n=0.025 L=362.0' S=0.0061 '/' Capacity=205.07 cfs Outflow=3.67 cfs 0.455 af

Reach 83R: Northerly P-Stream Avg. Flow Depth=0.30' Max Vel=1.73 fps Inflow=2.72 cfs 0.290 af
n=0.025 L=300.0' S=0.0057 '/' Capacity=198.02 cfs Outflow=2.60 cfs 0.289 af

Reach 94R: Southeast BVW Inflow=2.96 cfs 0.268 af
Outflow=2.96 cfs 0.268 af

Reach 95R: Pine Hill Road Inflow=3.84 cfs 0.347 af
Outflow=3.84 cfs 0.347 af

Reach X2: Area Summary Post (Not a physical location) Inflow=25.55 cfs 3.834 af
Outflow=25.55 cfs 3.834 af

Pond 19P: INFL. POND 3C Peak Elev=474.73' Storage=6,545 cf Inflow=4.88 cfs 0.428 af
Discarded=0.17 cfs 0.252 af Primary=1.94 cfs 0.119 af Outflow=2.10 cfs 0.371 af

Pond 26P: Subsurface Infiltration Basin from Peak Elev=462.65' Storage=10,450 cf Inflow=6.05 cfs 0.622 af
Discarded=0.55 cfs 0.622 af Primary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.622 af

Pond 29P: DETN. POND 5B Peak Elev=454.21' Storage=1,393 cf Inflow=1.11 cfs 0.109 af
Discarded=0.17 cfs 0.109 af Primary=0.00 cfs 0.000 af Outflow=0.17 cfs 0.109 af

Pond 82P: Proposed Wetland above new Box Peak Elev=456.60' Storage=310 cf Inflow=17.98 cfs 2.360 af
144.0" x 48.0" Box Culvert n=0.015 L=52.0' S=0.0135 '/' Outflow=17.96 cfs 2.359 af

Pond 101P: DETN. POND 1A Peak Elev=456.93' Storage=7,218 cf Inflow=7.43 cfs 0.722 af
12.0" Round Culvert n=0.012 L=140.0' S=0.0050 '/' Outflow=3.11 cfs 0.712 af

Pond 102P: INFIL. POND 2 Peak Elev=467.18' Storage=18,743 cf Inflow=9.16 cfs 0.868 af
Discarded=0.16 cfs 0.270 af Primary=1.82 cfs 0.258 af Outflow=1.98 cfs 0.528 af

Pond 103P: DETN. POND 3A Peak Elev=468.66' Storage=2,329 cf Inflow=5.91 cfs 0.564 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=4.77 cfs 0.561 af

Pond 104P: INFL. POND 4A Peak Elev=464.95' Storage=9,430 cf Inflow=5.57 cfs 0.523 af
Discarded=0.10 cfs 0.167 af Primary=2.24 cfs 0.219 af Outflow=2.34 cfs 0.385 af

Pond 105P: DETN. POND 5A Peak Elev=461.98' Storage=7,060 cf Inflow=5.13 cfs 0.486 af
Discarded=0.59 cfs 0.485 af Primary=0.00 cfs 0.000 af Outflow=0.59 cfs 0.485 af

Pond 111P: INFL. POND 1B Peak Elev=464.14' Storage=9,713 cf Inflow=7.93 cfs 0.737 af
Discarded=0.25 cfs 0.332 af Primary=2.32 cfs 0.399 af Outflow=2.57 cfs 0.732 af

Pond 113P: DETN. POND 3B Peak Elev=466.92' Storage=2,646 cf Inflow=7.81 cfs 0.897 af
18.0" Round Culvert n=0.012 L=320.0' S=0.0109 '/' Outflow=7.02 cfs 0.893 af

Pond 114P: DETN. POND 4B Peak Elev=463.69' Storage=1,263 cf Inflow=3.12 cfs 0.293 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0114 '/' Outflow=2.36 cfs 0.291 af

Pond 210P: Northwest Wetland Peak Elev=465.42' Storage=18 cf Inflow=2.71 cfs 0.290 af
Primary=0.00 cfs 0.000 af Secondary=2.72 cfs 0.290 af Outflow=2.72 cfs 0.290 af

Link 9L: Diverging Flow x 0.50
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 248.311 ac Runoff Volume = 76.838 af Average Runoff Depth = 3.71"
58.43% Pervious = 145.093 ac 41.57% Impervious = 103.218 ac

Summary for Subcatchment 21S: BLDG 2 East and BLDG 1 South

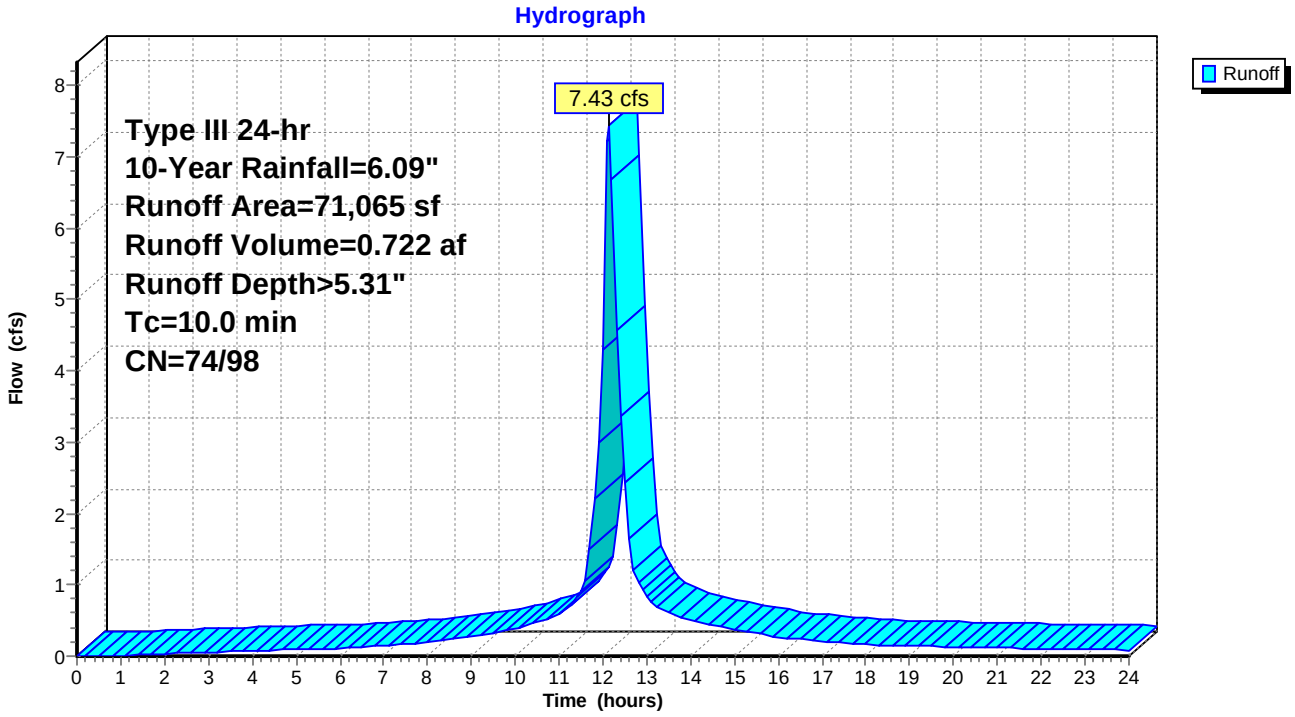
Runoff = 7.43 cfs @ 12.13 hrs, Volume= 0.722 af, Depth> 5.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	2,198	74	Grass, good, HSG C to CB16
*	10,610	98	Pavement to CB16
*	1,481	74	Grass, good, HSG C to CB18
*	8,712	98	Pavement to CB18
*	257	74	Grass, good, HSG C to CB14
*	4,521	98	Pavement to CB14
*	1,595	74	Grass, good, HSG C to CB12
*	9,297	98	Pavement to CB12
*	1,034	74	Grass, good, HSG C to CB28
*	4,655	98	Pavement to CB28
*	2,021	74	Grass, good, HSG C to CB26
*	4,692	98	Pavement to CB26
*	2,054	74	Grass, good, HSG C to CB24
*	7,783	98	Pavement to CB24
*	4,016	74	Grass, good, HSG C to CB20
*	6,139	98	Pavement to CB20
	71,065	93	Weighted Average
	14,656	74	20.62% Pervious Area
	56,409	98	79.38% Impervious Area

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

Subcatchment 21S: BLDG 2 East and BLDG 1 South



Summary for Subcatchment 22S: BLDG 1 West

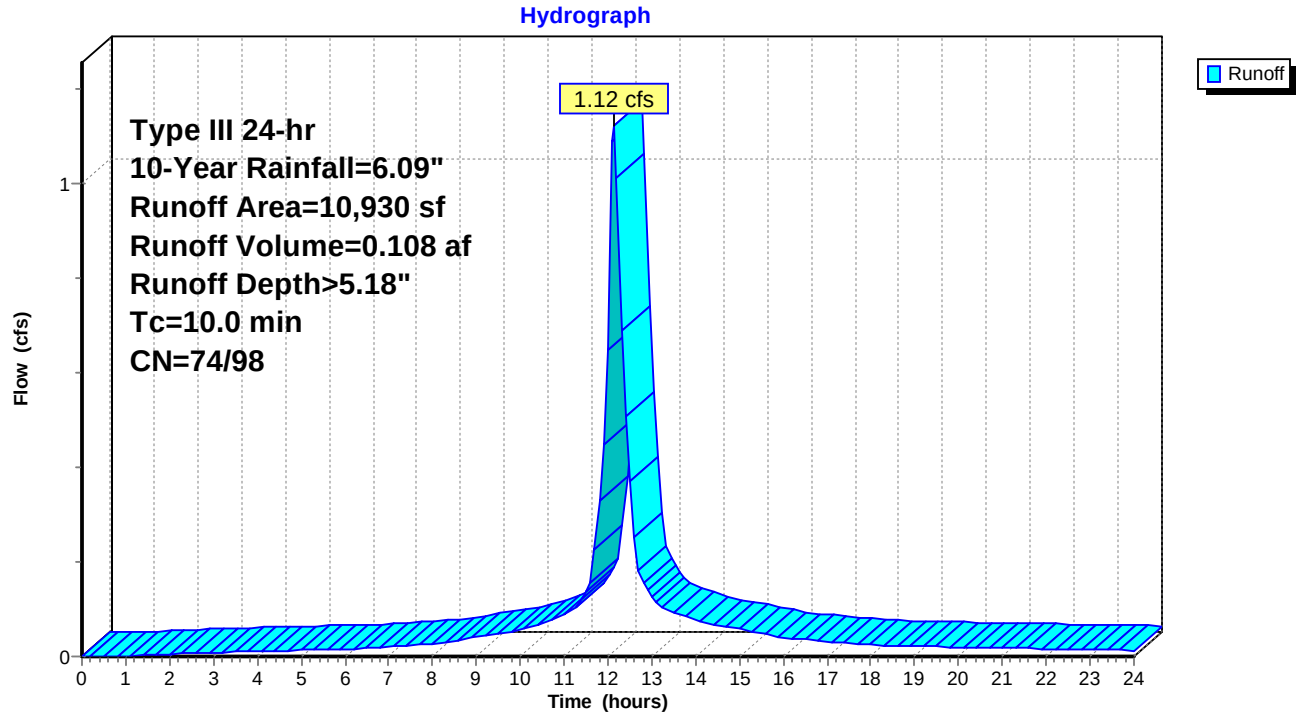
Runoff = 1.12 cfs @ 12.13 hrs, Volume= 0.108 af, Depth> 5.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
	2,796	74	>75% Grass cover, Good, HSG C
*	8,134	98	Pavement
	10,930	92	Weighted Average
	2,796	74	25.58% Pervious Area
	8,134	98	74.42% Impervious Area

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

Subcatchment 22S: BLDG 1 West



Summary for Subcatchment 23S: PARKING DECK (top)

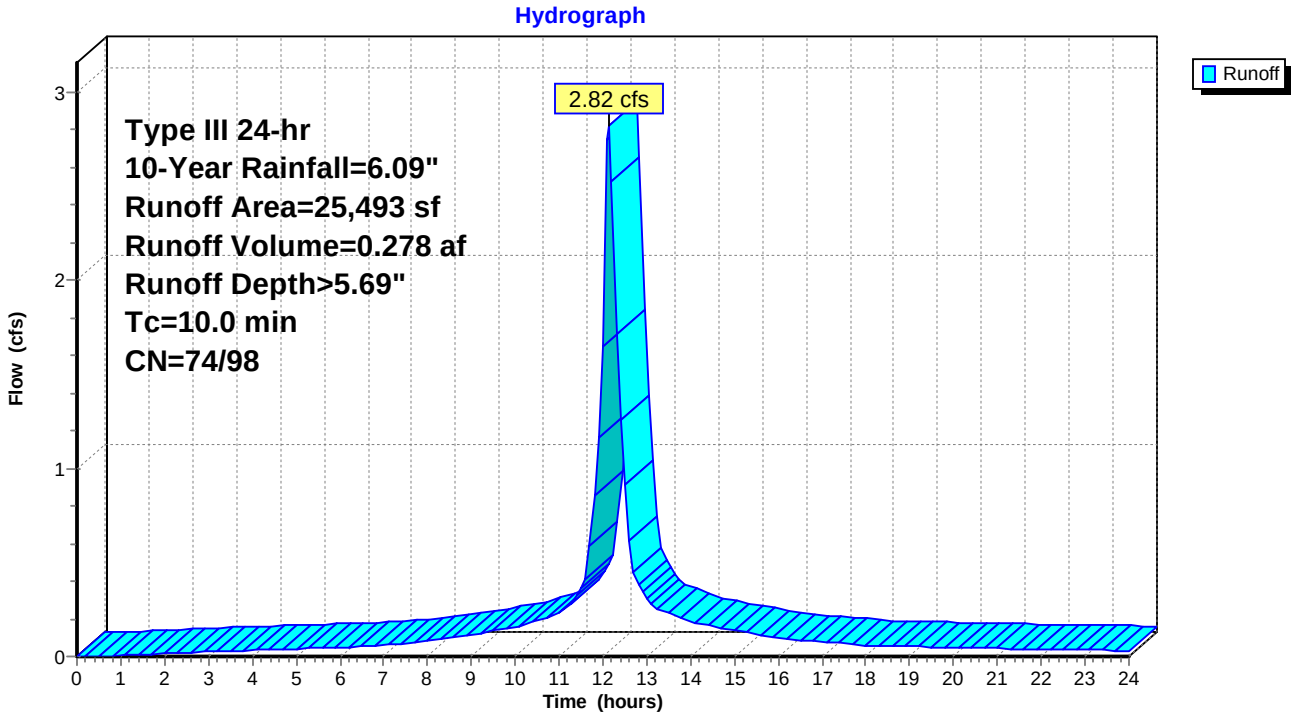
Runoff = 2.82 cfs @ 12.13 hrs, Volume= 0.278 af, Depth> 5.69"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
	1,518	74	>75% Grass cover, Good, HSG C
*	23,975	98	Pavement
	25,493	97	Weighted Average
	1,518	74	5.95% Pervious Area
	23,975	98	94.05% Impervious Area

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

Subcatchment 23S: PARKING DECK (top)



Summary for Subcatchment 28S: BLDG 5 LL PKG

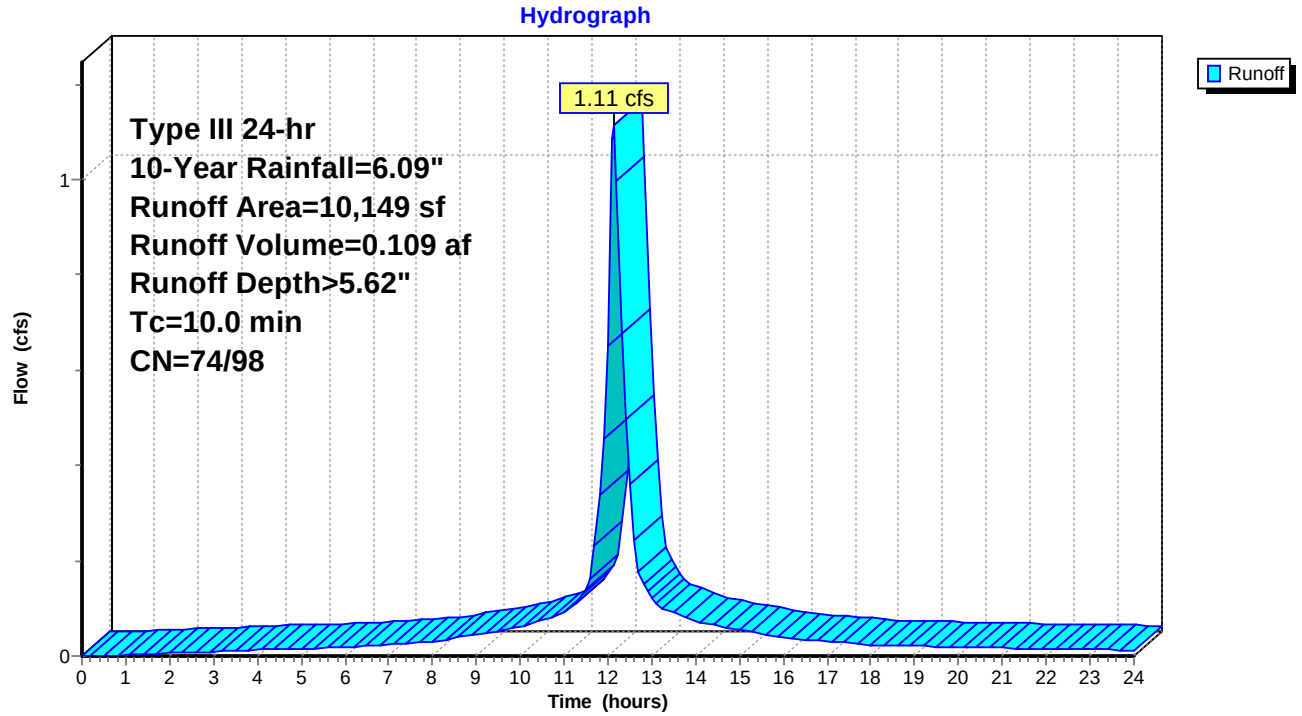
Runoff = 1.11 cfs @ 12.13 hrs, Volume= 0.109 af, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	9,278	98	Impervious Pavement
	580	74	>75% Grass cover, Good, HSG C
*	291	74	Landscaped Areas
	10,149	96	Weighted Average
	871	74	8.58% Pervious Area
	9,278	98	91.42% Impervious Area

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

Subcatchment 28S: BLDG 5 LL PKG



Summary for Subcatchment 30S: BLDG 4 1/3 of ROOF

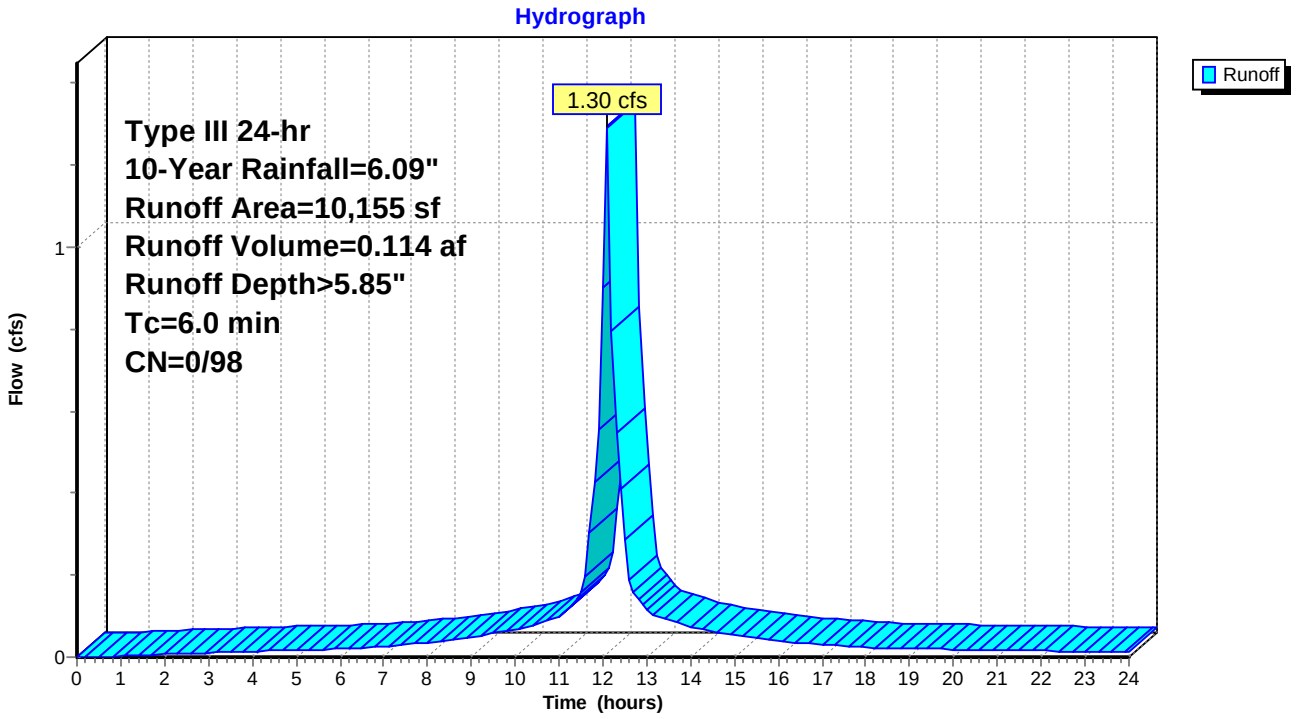
Runoff = 1.30 cfs @ 12.09 hrs, Volume= 0.114 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	10,155	98	BLDG 4 ROOF
	10,155	98	100.00% Impervious Area

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

Subcatchment 30S: BLDG 4 1/3 of ROOF



Summary for Subcatchment 31S: BLDG 3 North

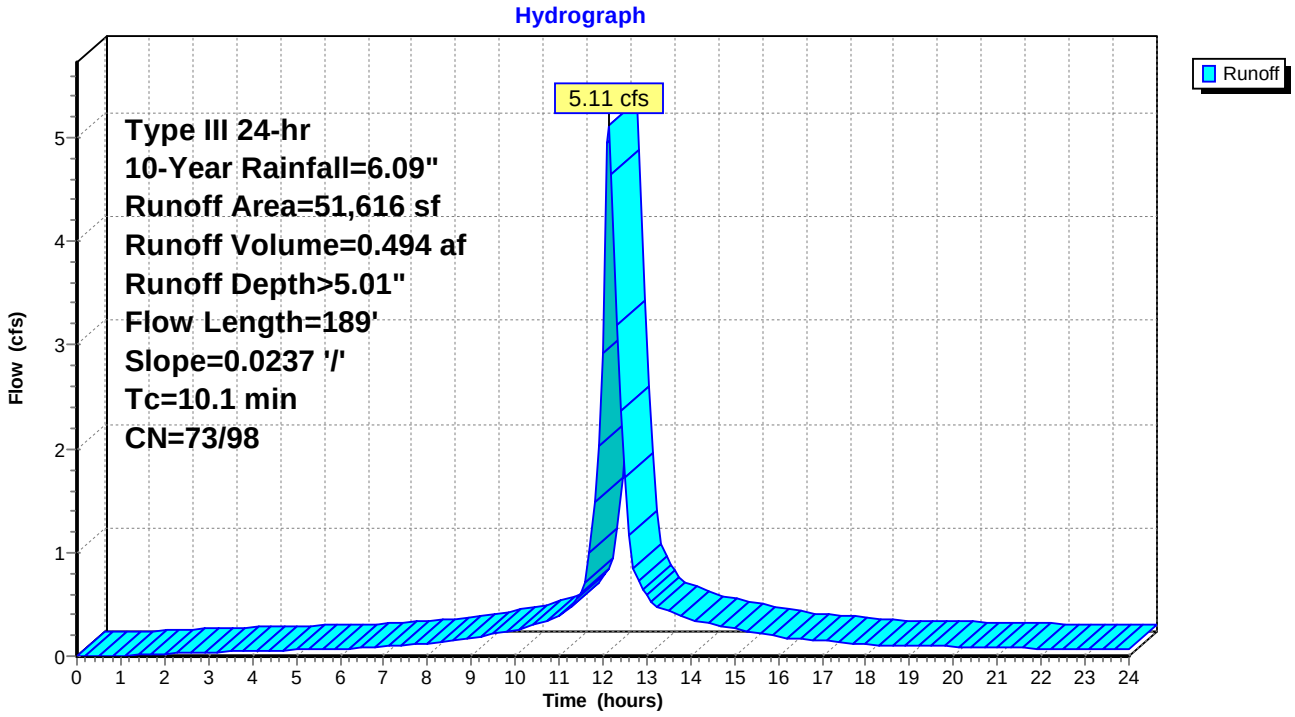
Runoff = 5.11 cfs @ 12.14 hrs, Volume= 0.494 af, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	536	70	Woods, good, C to CB30
	4,684	74	>75% Grass cover, Good, HSG C
*	10,379	98	Pavement to CB30
*	1,010	74	Grass, good, C to CB30
*	1,892	70	Woods, good, C to CB32
*	642	74	Grass, good, C to CB32
*	3,648	98	Pavement to CB32
*	2,882	74	Grass, good, C to CB34
*	8,638	98	Pavement to CB34
*	3,104	74	Grass, good, C to CB58
*	9,564	98	Pavement to CB58
*	4,637	90	Amenity space, 70% impervious
	51,616	90	Weighted Average
	16,141	73	31.27% Pervious Area
	35,475	98	68.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	189	0.0237	0.82		**Lag/CN Method,**
6.3					**Direct Entry, round up to 10**
10.1	189	Total			

Subcatchment 31S: BLDG 3 North



Summary for Subcatchment 32S: BLDG 4 East and BLDG 3 West

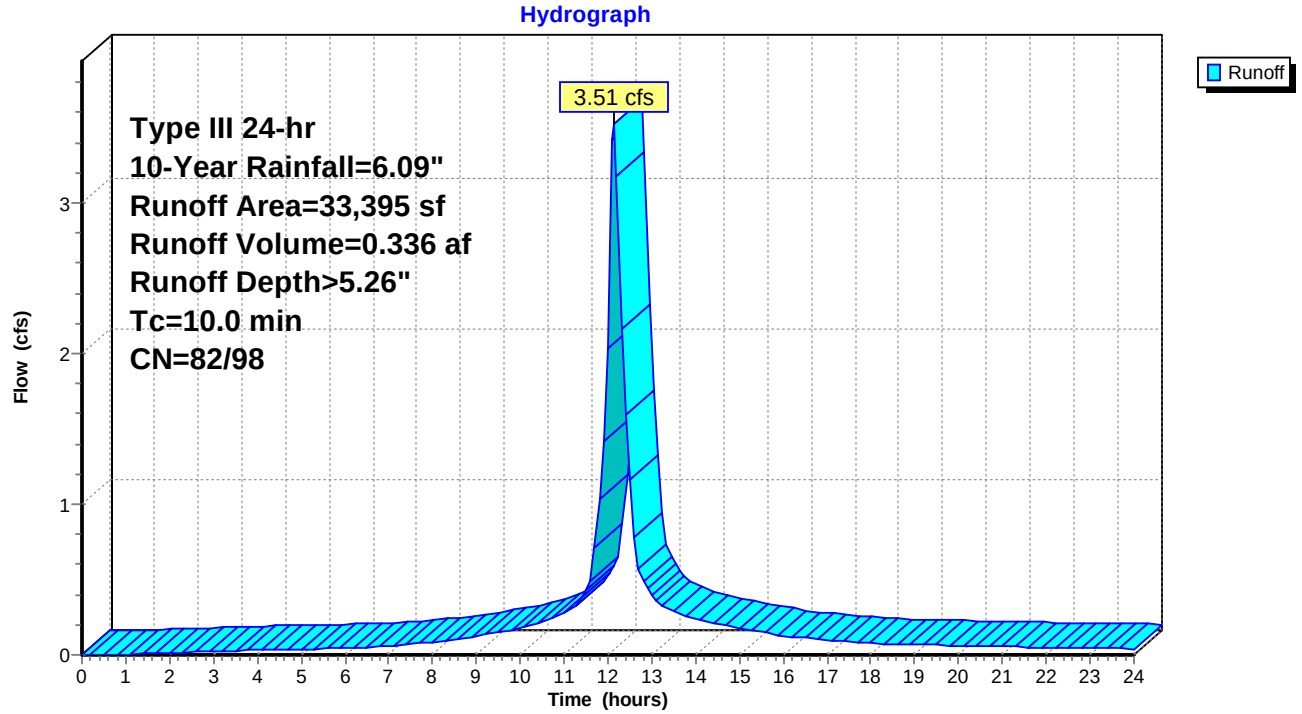
Runoff = 3.51 cfs @ 12.13 hrs, Volume= 0.336 af, Depth> 5.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	1,323	74	Grass, good, C to CB50
*	4,601	98	Pavement to CB50
*	1,023	74	Grass, good, C to CB52
*	6,739	98	Pavement to CB52
*	3,383	74	Grass, good, C to CB54
*	11,092	98	Pavement to CB54
*	5,234	90	Amenity area and landscaping
	33,395	93	Weighted Average
	10,963	82	32.83% Pervious Area
	22,432	98	67.17% Impervious Area

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

Subcatchment 32S: BLDG 4 East and BLDG 3 West



Summary for Subcatchment 33S: Northerly Offsite to BLDG 3 North

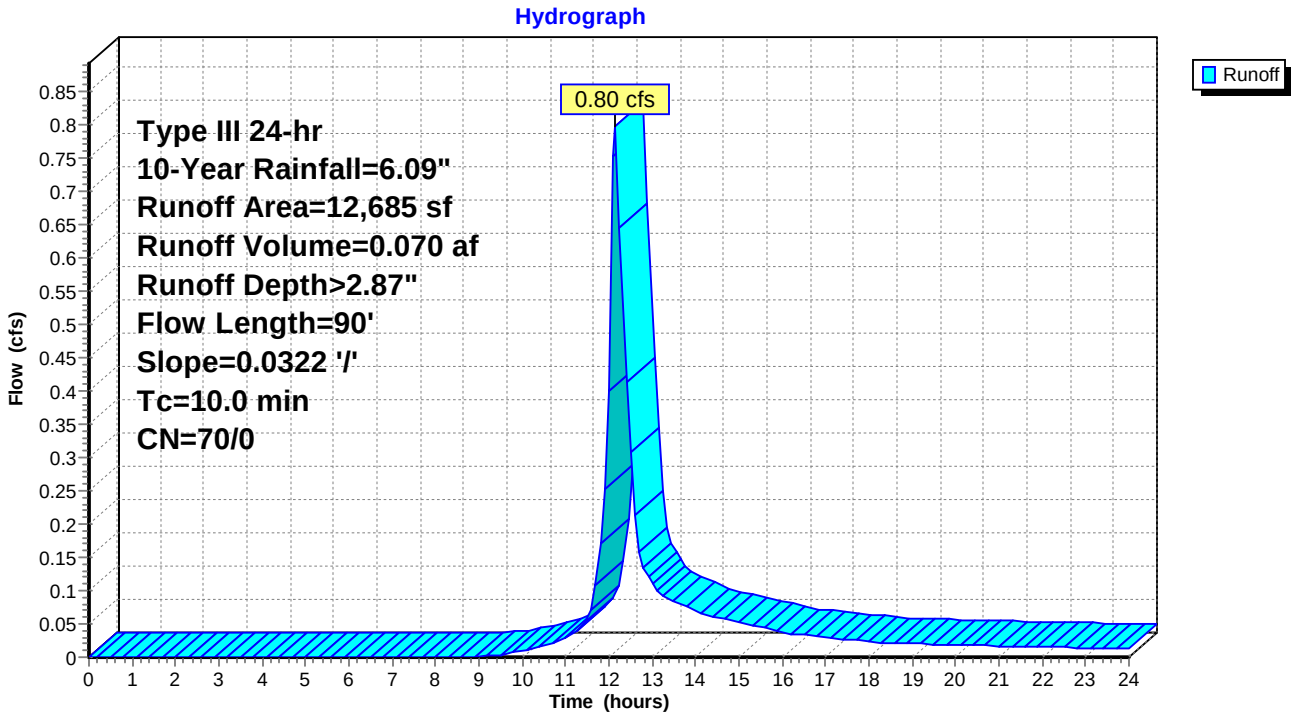
Runoff = 0.80 cfs @ 12.15 hrs, Volume= 0.070 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
12,685	70	Woods, Good, HSG C
12,685	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	90	0.0322	0.44		**Lag/CN Method,**
6.6					**Direct Entry, round up to 10**
10.0	90	Total			

Subcatchment 33S: Northerly Offsite to BLDG 3 North



Summary for Subcatchment 34S: BLDG 4 South

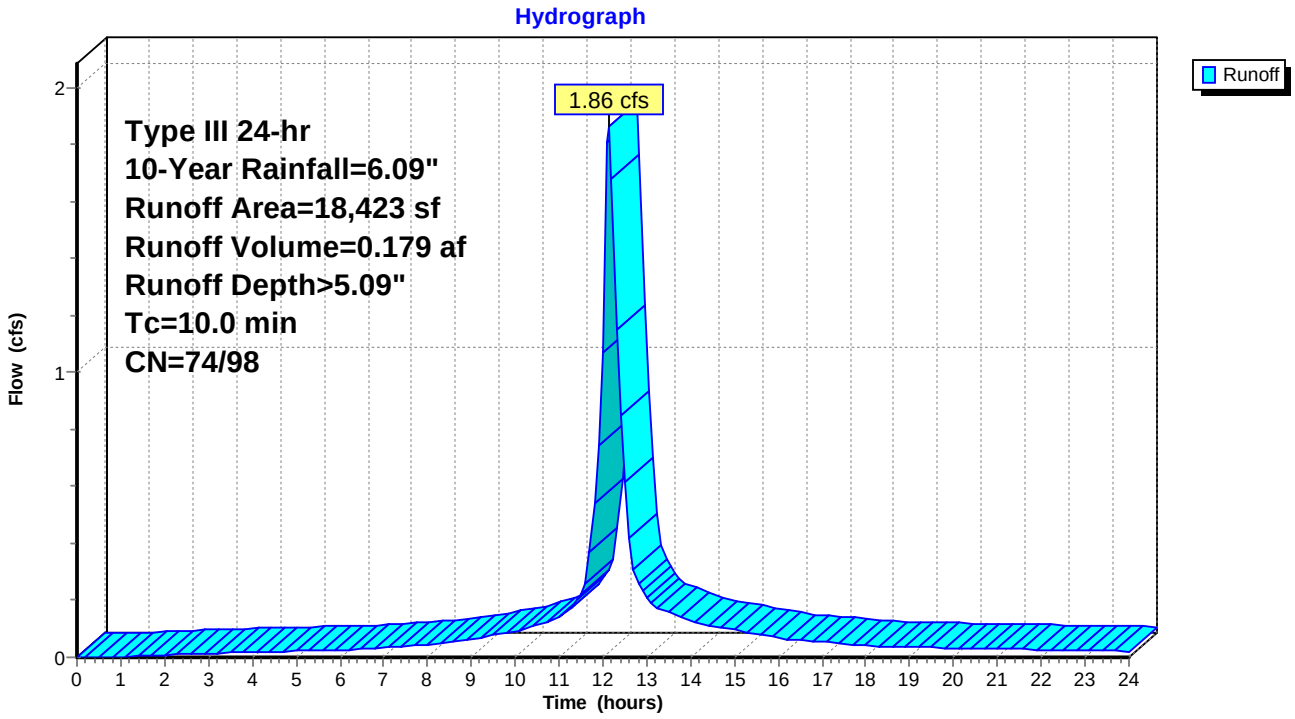
Runoff = 1.86 cfs @ 12.14 hrs, Volume= 0.179 af, Depth> 5.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	516	74	Grass, good, C to CB64
*	2,953	74	Park - Grass, good, C to CB64
*	6,515	98	Pavement to CB64
*	210	74	Grass, good, C to CB68
*	1,695	74	Park - Grass, good, C to CB68
*	6,534	98	Pavement to CB68
	18,423	91	Weighted Average
	5,374	74	29.17% Pervious Area
	13,049	98	70.83% Impervious Area

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

Subcatchment 34S: BLDG 4 South



Summary for Subcatchment 41S: BLDG 4 West and North

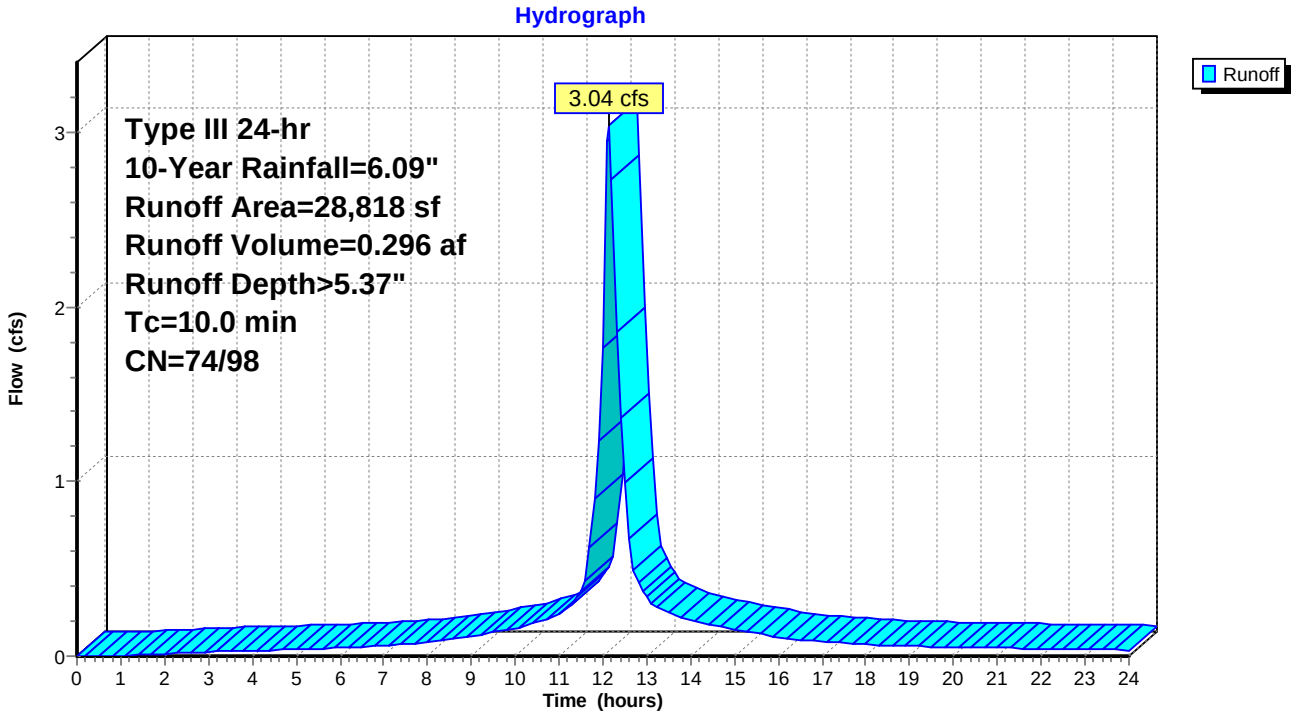
Runoff = 3.04 cfs @ 12.13 hrs, Volume= 0.296 af, Depth> 5.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	2,990	74	Grass, good, C to CB41
*	7,270	98	Pavement to CB41
*	603	74	Grass to CB43
*	6,402	98	Pavement to CB43
*	603	74	Grass, good, C to CB45
*	6,402	98	Pavement to CB45
*	1,115	74	Grass to CB91
*	3,433	98	Grass to CB91
	28,818	94	Weighted Average
	5,311	74	18.43% Pervious Area
	23,507	98	81.57% Impervious Area

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

Subcatchment 41S: BLDG 4 West and North



Summary for Subcatchment 48S: West P-Stream Area

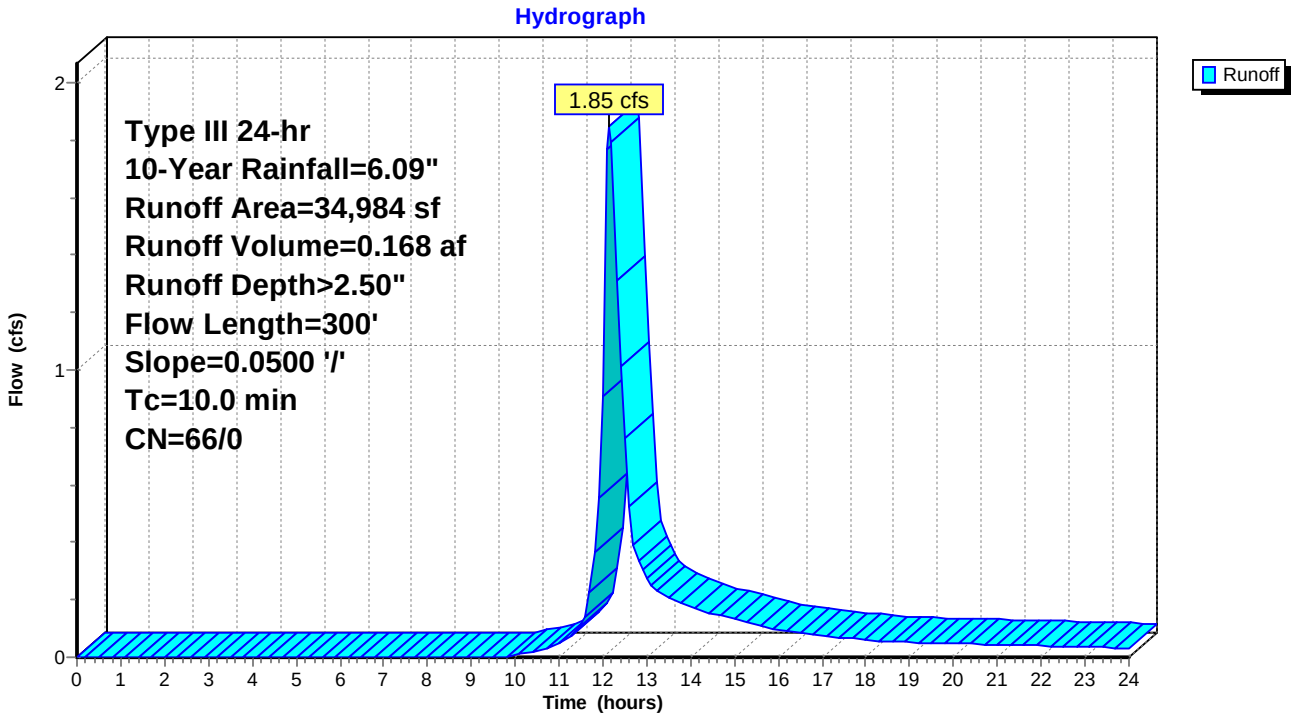
Runoff = 1.85 cfs @ 12.16 hrs, Volume= 0.168 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
5,350	74	>75% Grass cover, Good, HSG C
29,634	65	Brush, Good, HSG C
34,984	66	Weighted Average
34,984	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	300	0.0500	0.62		**Lag/CN Method,**
2.0					**Direct Entry, Round up to 10**
10.0	300	Total			

Subcatchment 48S: West P-Stream Area



Summary for Subcatchment 49S: P-Wetland

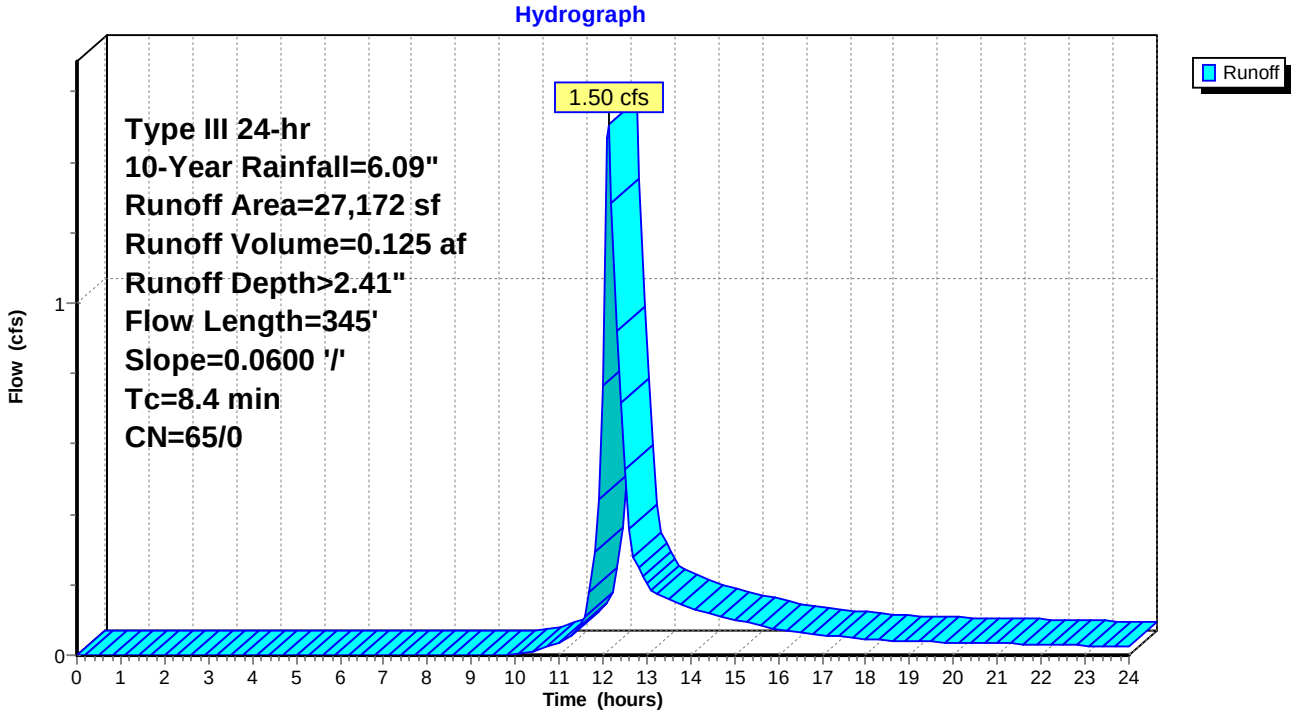
Runoff = 1.50 cfs @ 12.13 hrs, Volume= 0.125 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
27,172	65	Brush, Good, HSG C
27,172	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	345	0.0600	0.68		**Lag/CN Method,**
0.0					**Direct Entry, round up to 10**
8.4	345	Total			

Subcatchment 49S: P-Wetland



Summary for Subcatchment 50S: Runoff from Proposed Subdivision Road

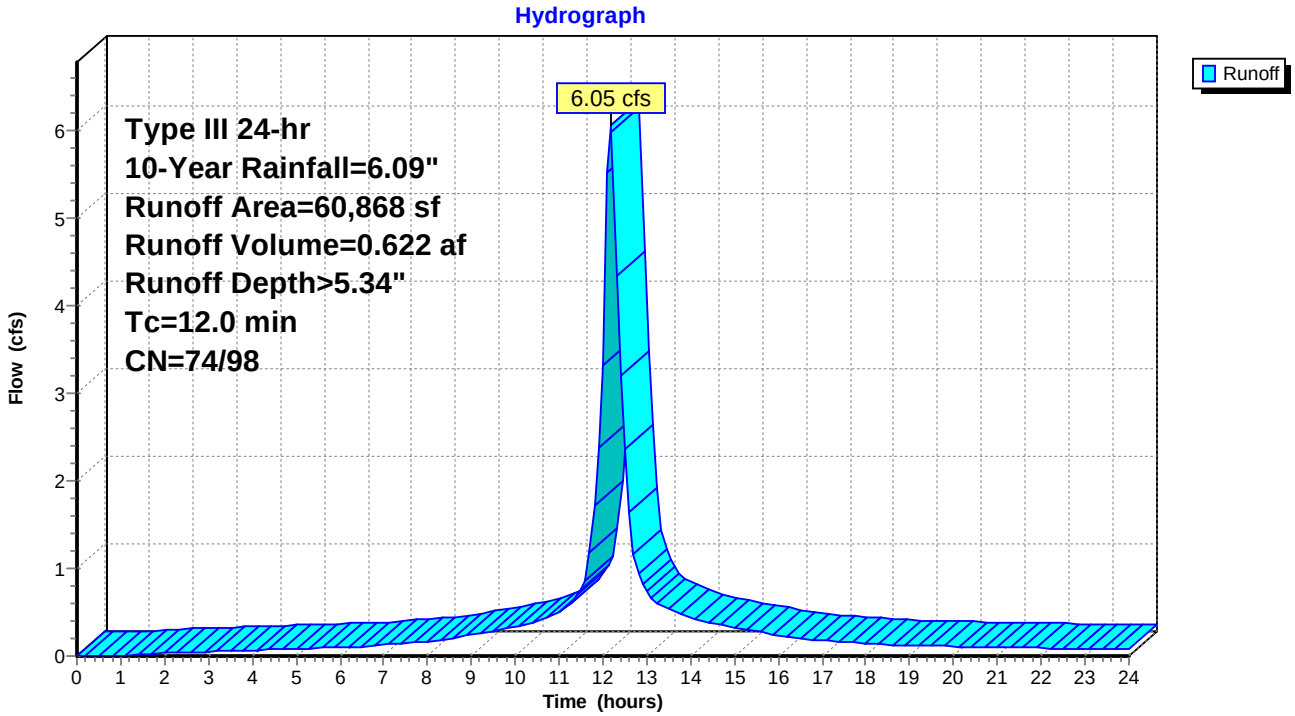
Runoff = 6.05 cfs @ 12.17 hrs, Volume= 0.622 af, Depth> 5.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	6,850	74	Landscaping
	4,904	74	>75% Grass cover, Good, HSG C
*	49,114	98	Pavement and Sidewalks
	60,868	93	Weighted Average
	11,754	74	19.31% Pervious Area
	49,114	98	80.69% Impervious Area

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

Subcatchment 50S: Runoff from Proposed Subdivision Road



Summary for Subcatchment 51S: BLDG 5 area

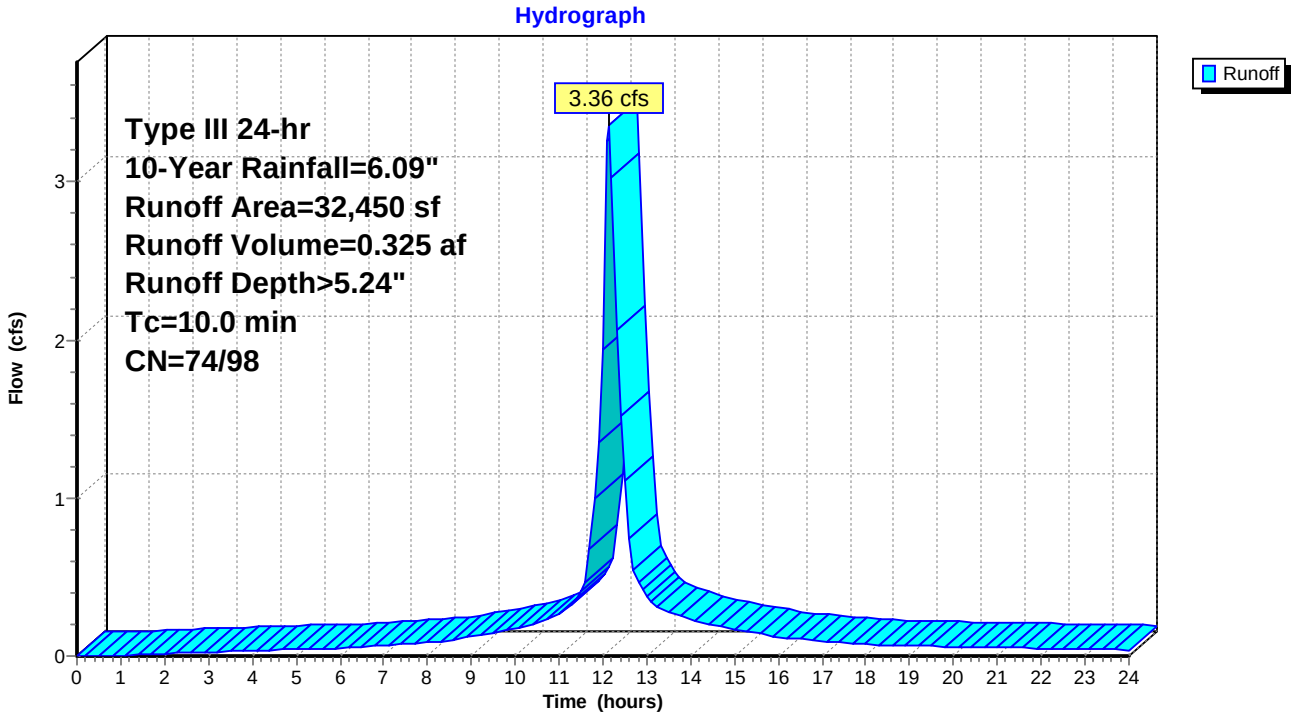
Runoff = 3.36 cfs @ 12.13 hrs, Volume= 0.325 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	24,850	98	Impervious Pavement
	5,600	74	>75% Grass cover, Good, HSG C
*	2,000	74	Landscaped Areas
	32,450	92	Weighted Average
	7,600	74	23.42% Pervious Area
	24,850	98	76.58% Impervious Area

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

Subcatchment 51S: BLDG 5 area



Summary for Subcatchment 71S: Amenities 1 and 2

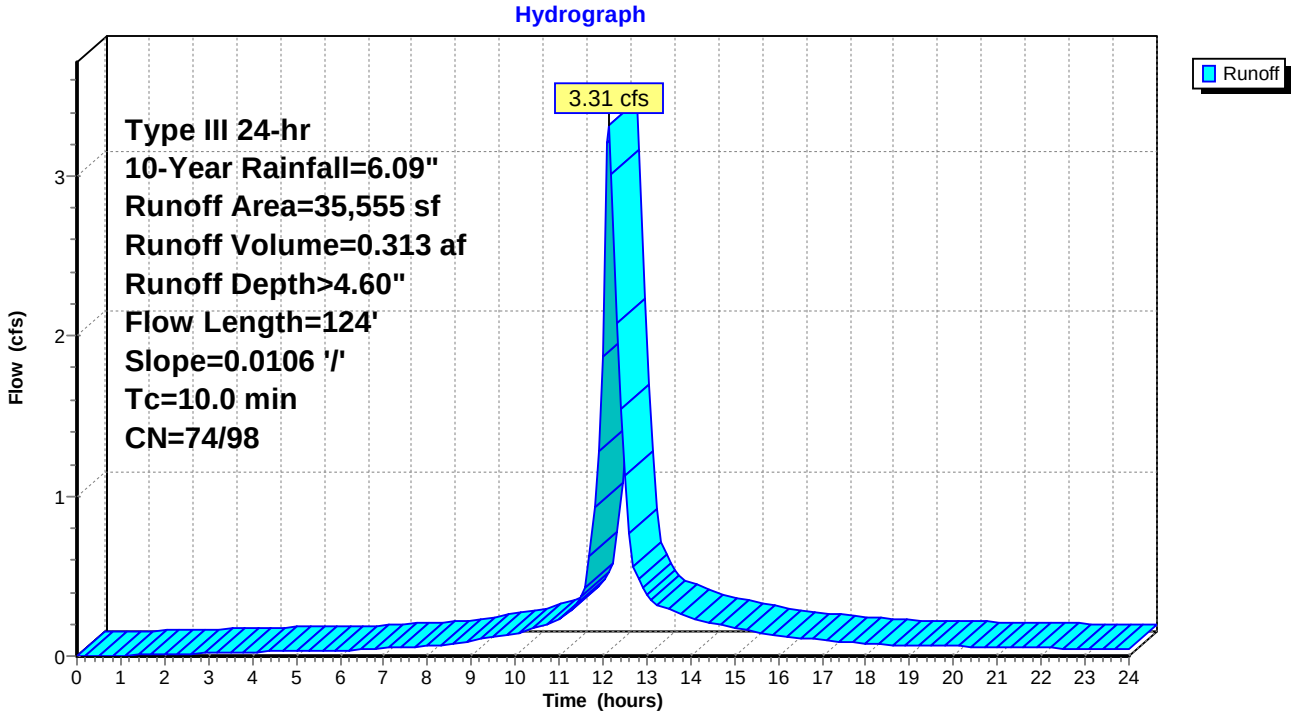
Runoff = 3.31 cfs @ 12.14 hrs, Volume= 0.313 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	11,076	98	Athletic courts, impervious
	14,025	74	>75% Grass cover, Good, HSG C
*	10,454	90	BLDG 1&2 amenity space, 70% imp
	35,555	86	Weighted Average
	17,161	74	48.27% Pervious Area
	18,394	98	51.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	124	0.0106	0.43		**Lag/CN Method,**
5.2					**Direct Entry, round up to 10**
10.0	124	Total			

Subcatchment 71S: Amenities 1 and 2



Summary for Subcatchment 72S: Amenities 2 and 3 + Pave

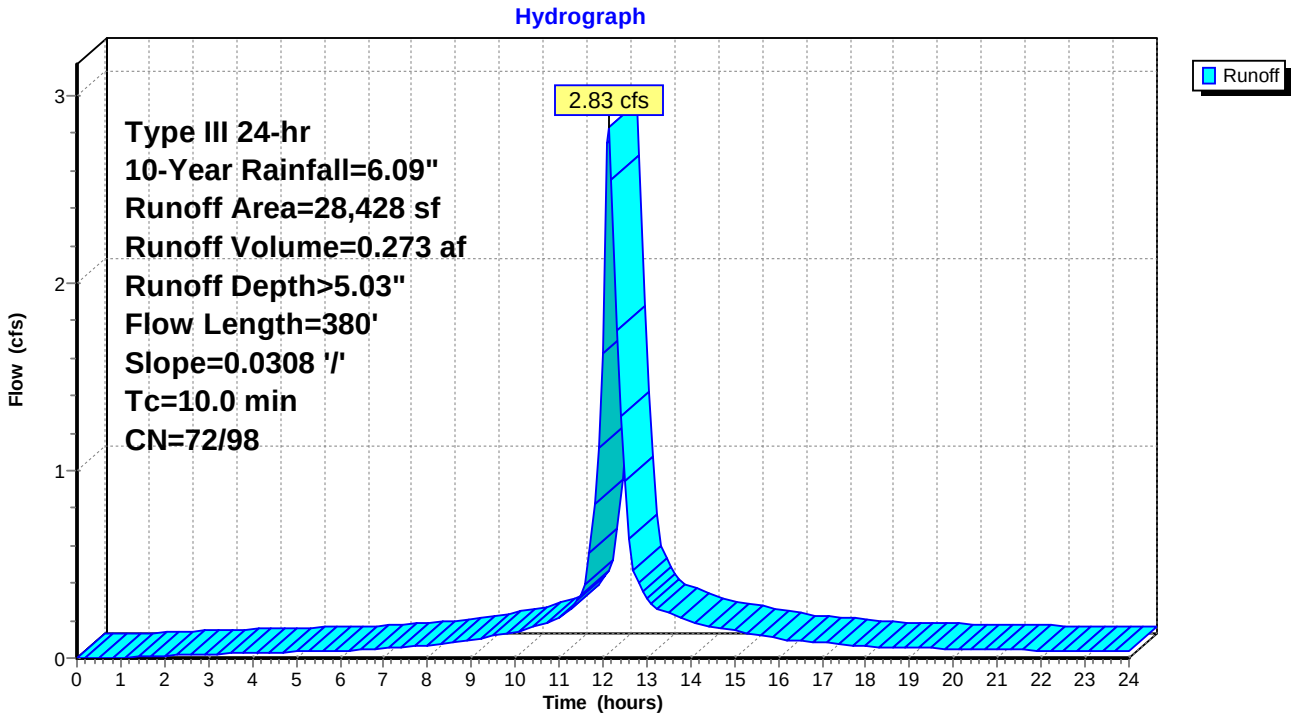
Runoff = 2.83 cfs @ 12.14 hrs, Volume= 0.273 af, Depth> 5.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	24,342	90	BLDG 2&3 amenity space, 70% imp
*	3,008	98	Pavement
	1,078	74	>75% Grass cover, Good, HSG C
	28,428	90	Weighted Average
	8,381	72	29.48% Pervious Area
	20,047	98	70.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	380	0.0308	1.08		**Lag/CN Method,**
4.1					**Direct Entry, round up to 10**
10.0	380	Total			

Subcatchment 72S: Amenities 2 and 3 + Pave



Summary for Subcatchment 90S: Northeast to Offsite

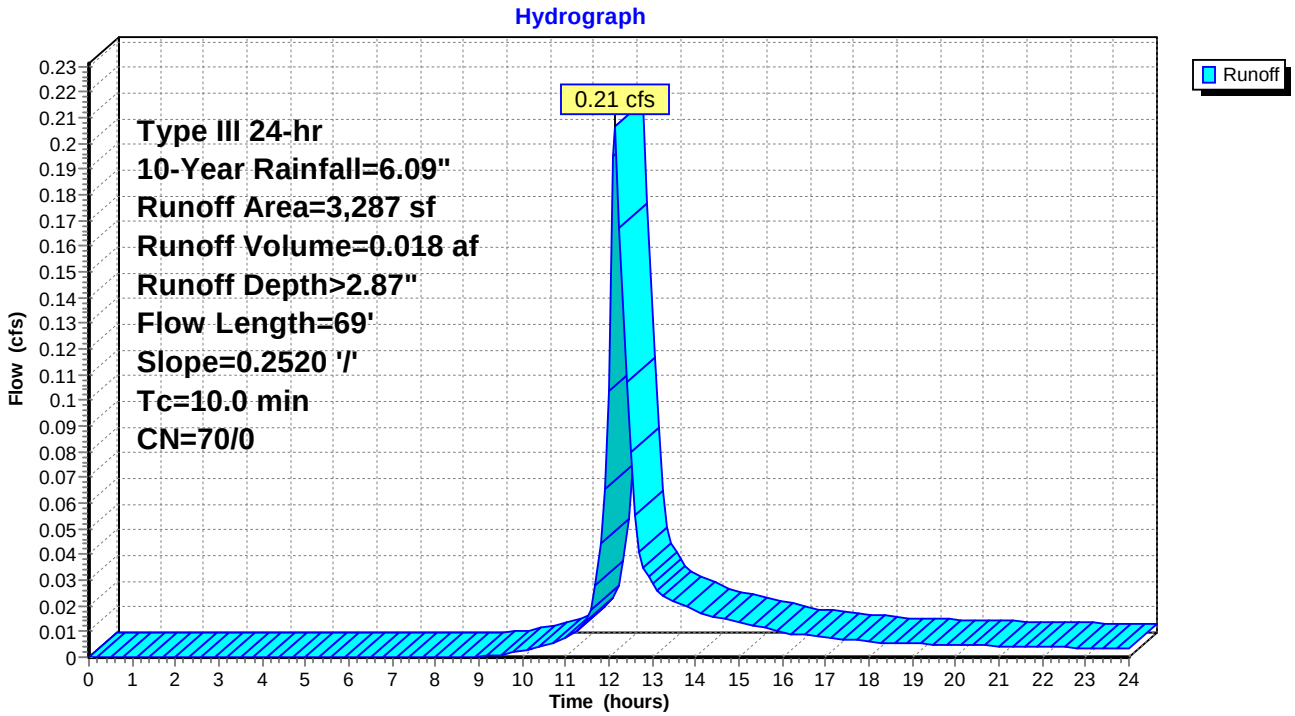
Runoff = 0.21 cfs @ 12.15 hrs, Volume= 0.018 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
3,287	70	Woods, Good, HSG C
3,287	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	69	0.2520	1.16		**Lag/CN Method,**
9.0					**Direct Entry, round up to 10**
10.0	69	Total			

Subcatchment 90S: Northeast to Offsite



Summary for Subcatchment 91S: Northwest Wooded and Wetland

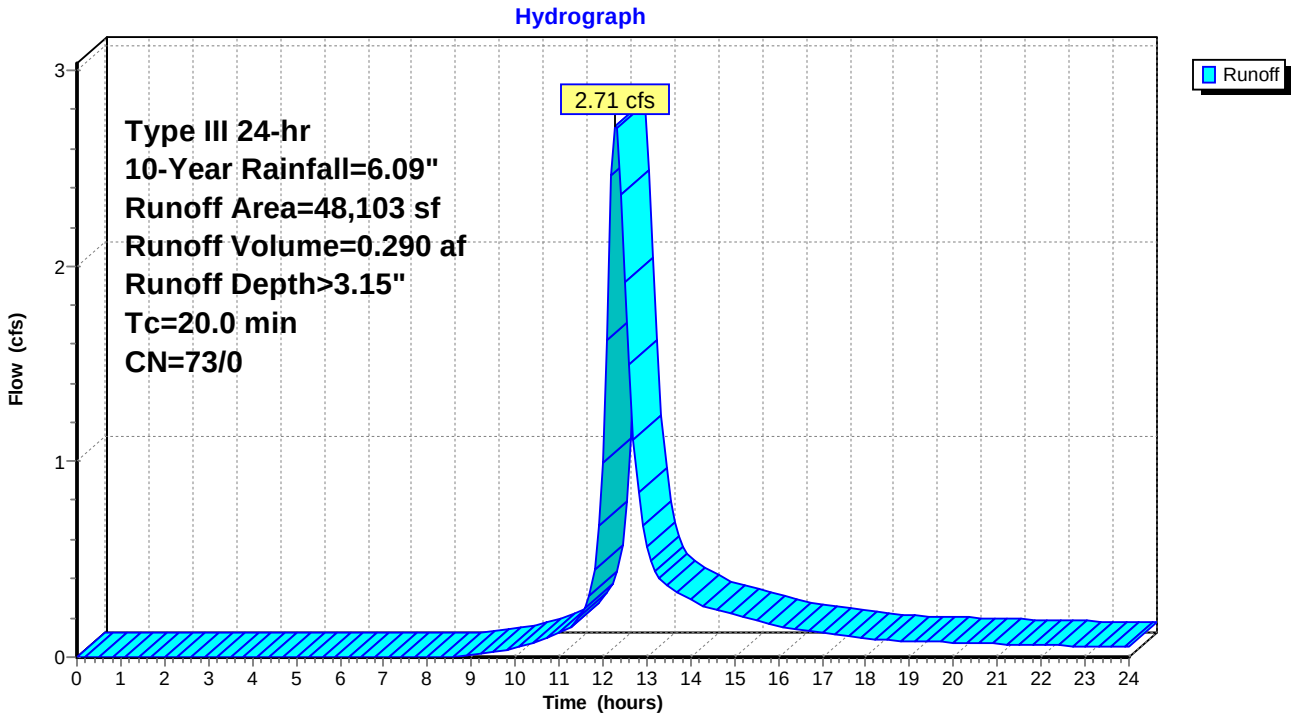
Runoff = 2.71 cfs @ 12.29 hrs, Volume= 0.290 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
48,103	73	Brush, Good, HSG D
48,103	73	100.00% Pervious Area

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

Subcatchment 91S: Northwest Wooded and Wetland



Summary for Subcatchment 92S: Easterly Wooded to Southeast BVW

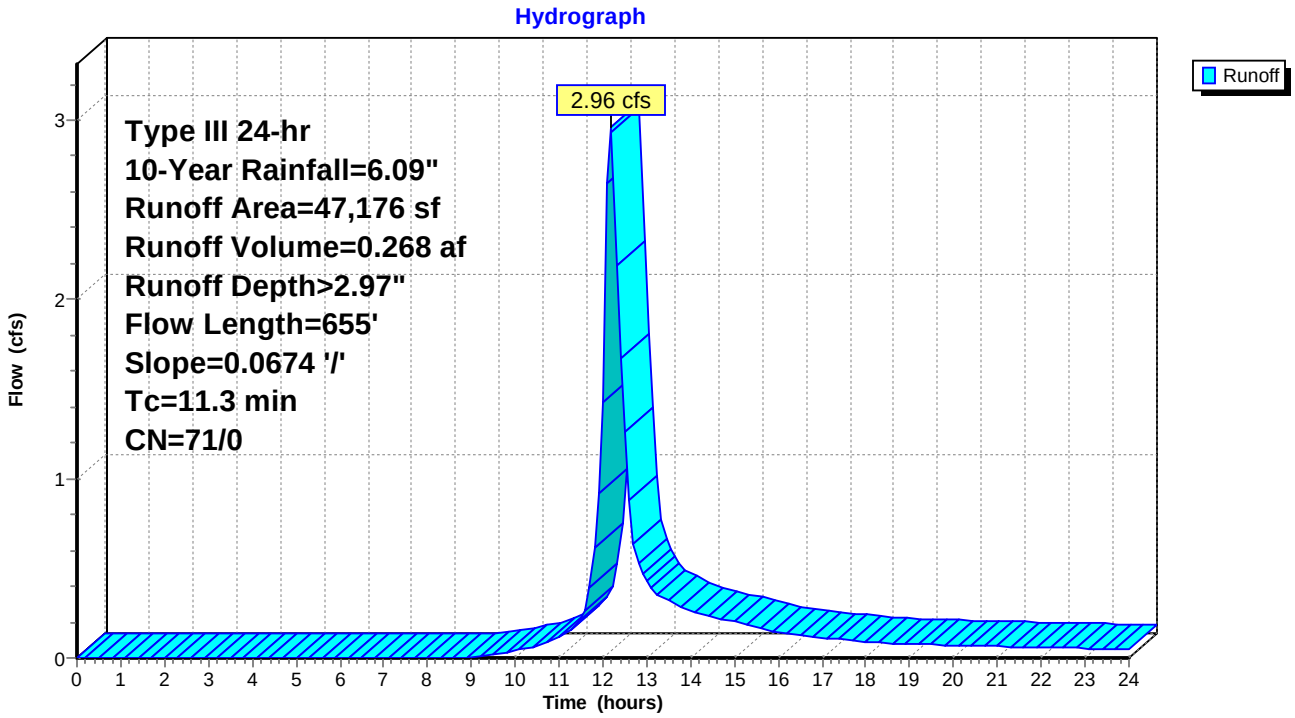
Runoff = 2.96 cfs @ 12.18 hrs, Volume= 0.268 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
38,558	70	Woods, Good, HSG C
8,618	74	>75% Grass cover, Good, HSG C
47,176	71	Weighted Average
47,176	71	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	655	0.0674	0.96		**Lag/CN Method,**

Subcatchment 92S: Easterly Wooded to Southeast BVW



Summary for Subcatchment 93S: Overland to Pine Hill

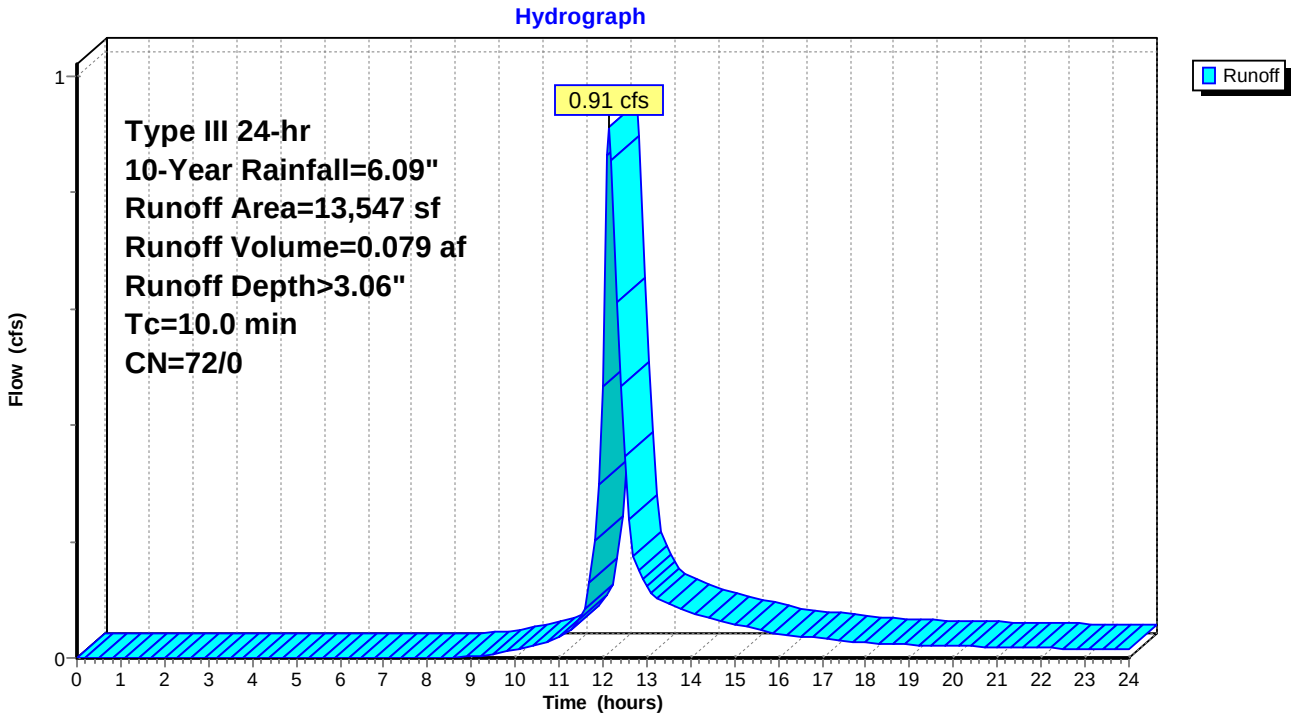
Runoff = 0.91 cfs @ 12.15 hrs, Volume= 0.079 af, Depth> 3.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (sf)	CN	Description
5,534	74	>75% Grass cover, Good, HSG C
8,013	70	Woods, Good, HSG C
13,547	72	Weighted Average
13,547	72	100.00% Pervious Area

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

Subcatchment 93S: Overland to Pine Hill



Summary for Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane

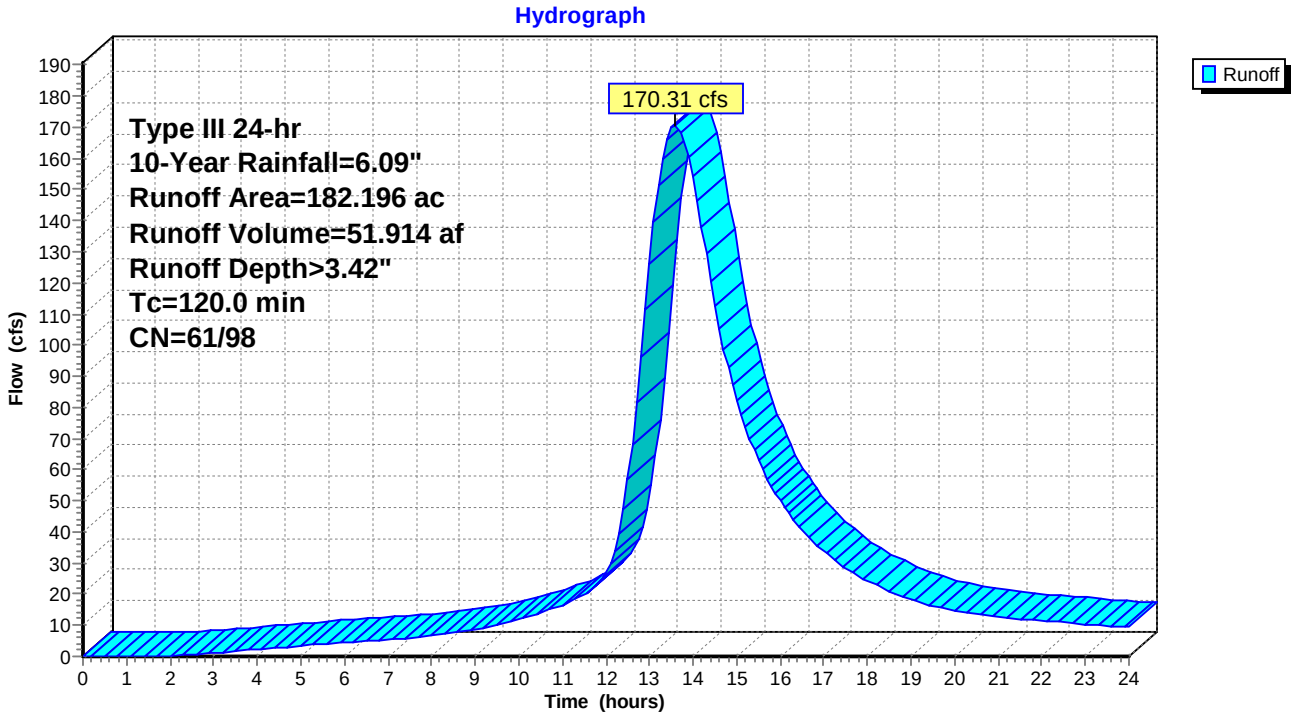
Runoff = 170.31 cfs @ 13.58 hrs, Volume= 51.914 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane



mmary for Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dr

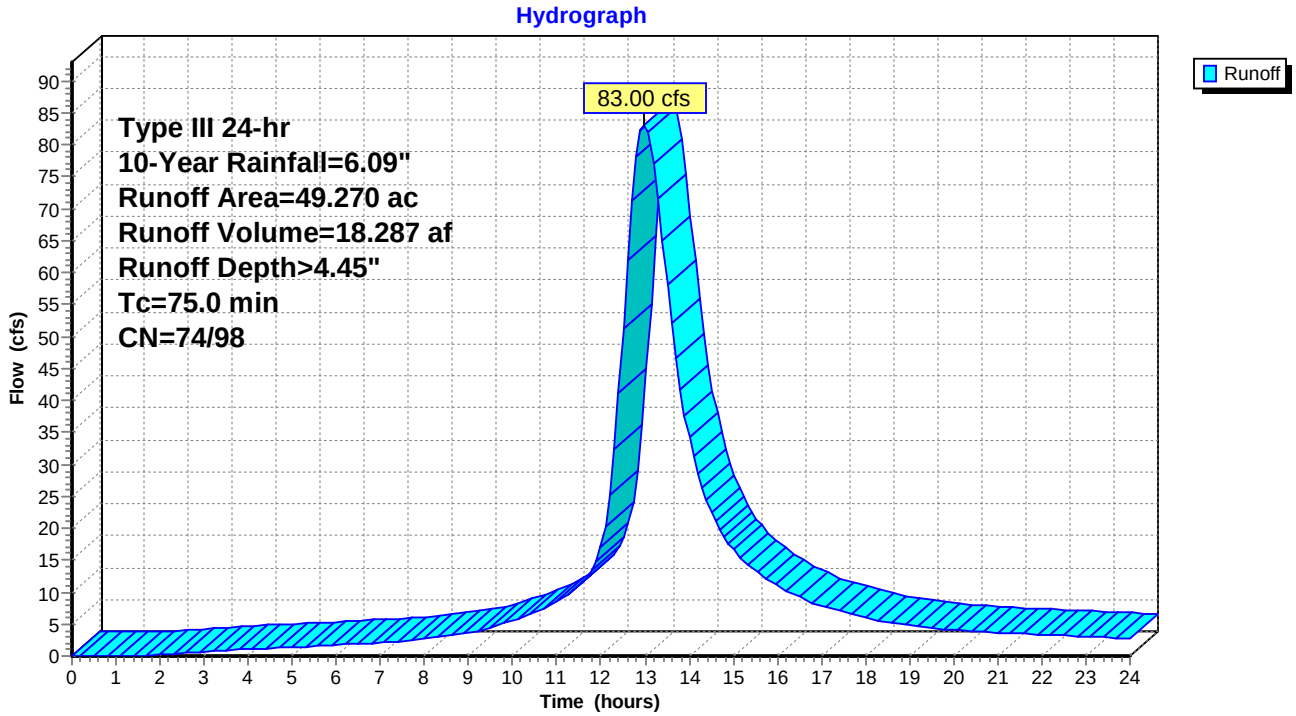
Runoff = 83.00 cfs @ 12.98 hrs, Volume= 18.287 af, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 201S: BLDG 1 ROOF

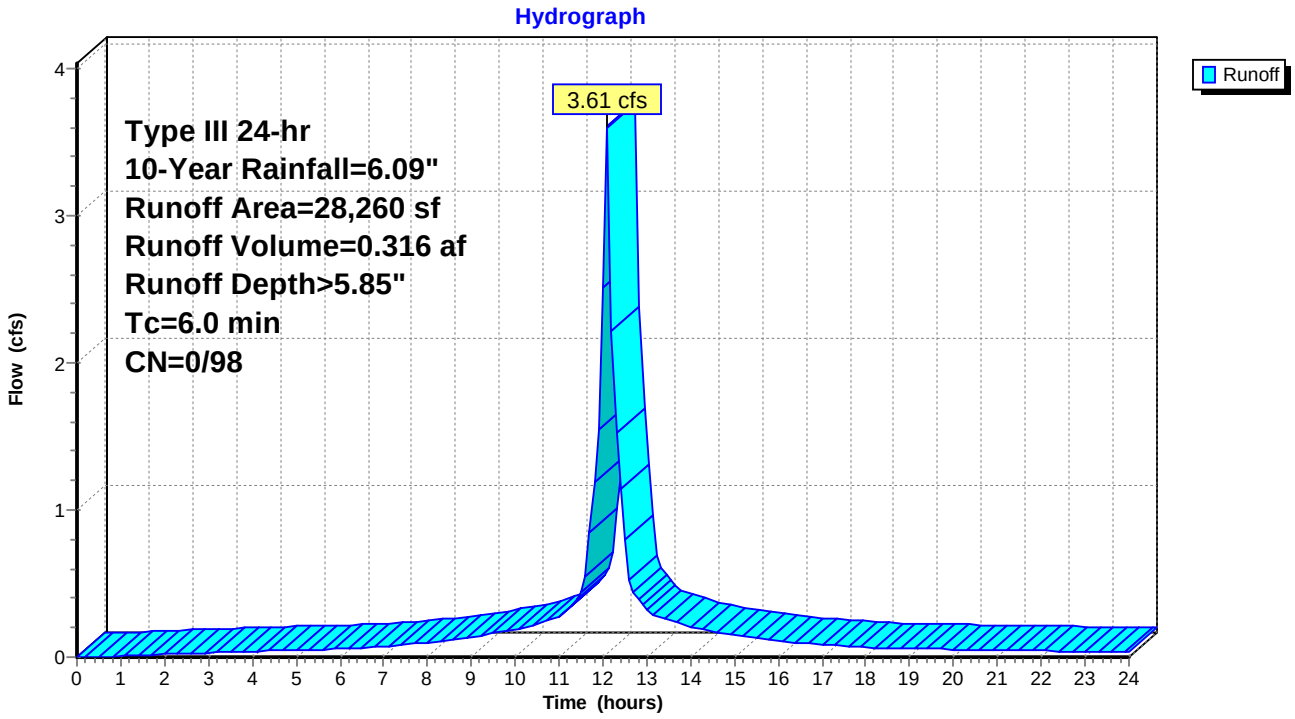
Runoff = 3.61 cfs @ 12.09 hrs, Volume= 0.316 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	28,260	98	BLDG 1 ROOF
	28,260	98	100.00% Impervious Area

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

Subcatchment 201S: BLDG 1 ROOF



Summary for Subcatchment 202S: BLDG 2 ROOF

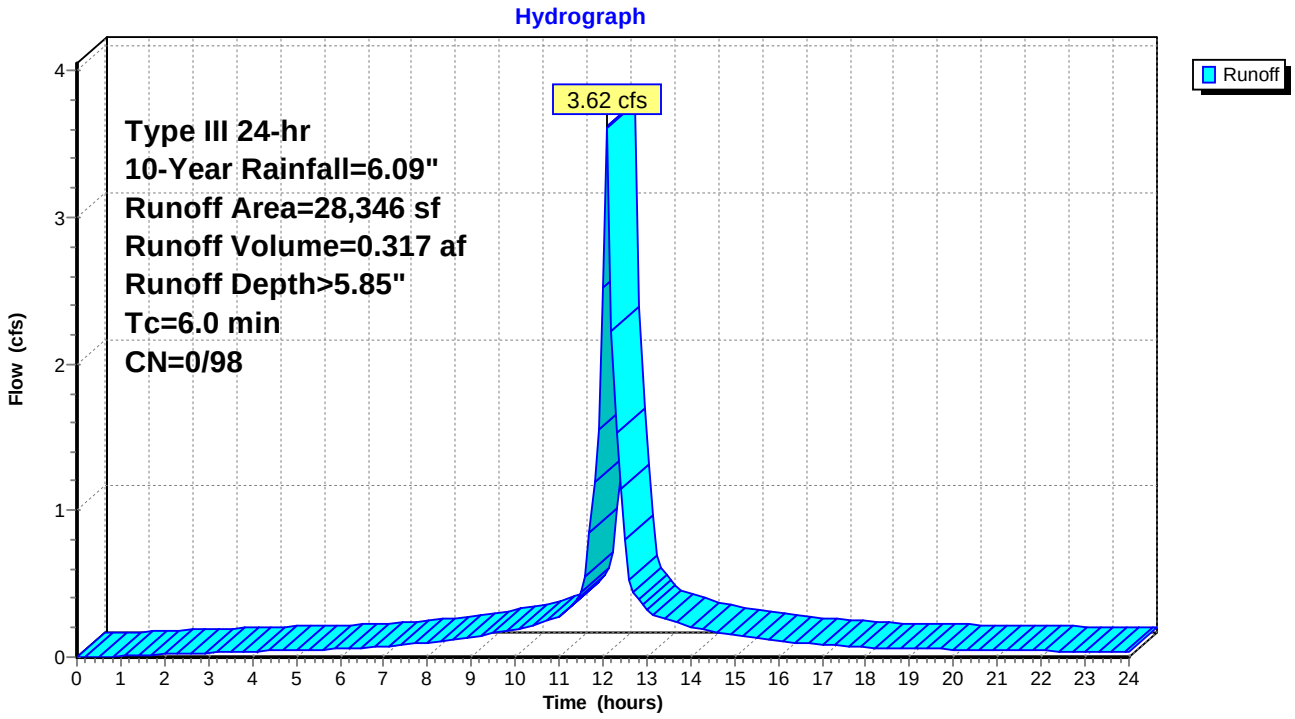
Runoff = 3.62 cfs @ 12.09 hrs, Volume= 0.317 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	28,346	98	BLDG 2 ROOF
	28,346	98	100.00% Impervious Area

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

Subcatchment 202S: BLDG 2 ROOF



Summary for Subcatchment 203S: BLDG 3 ROOF

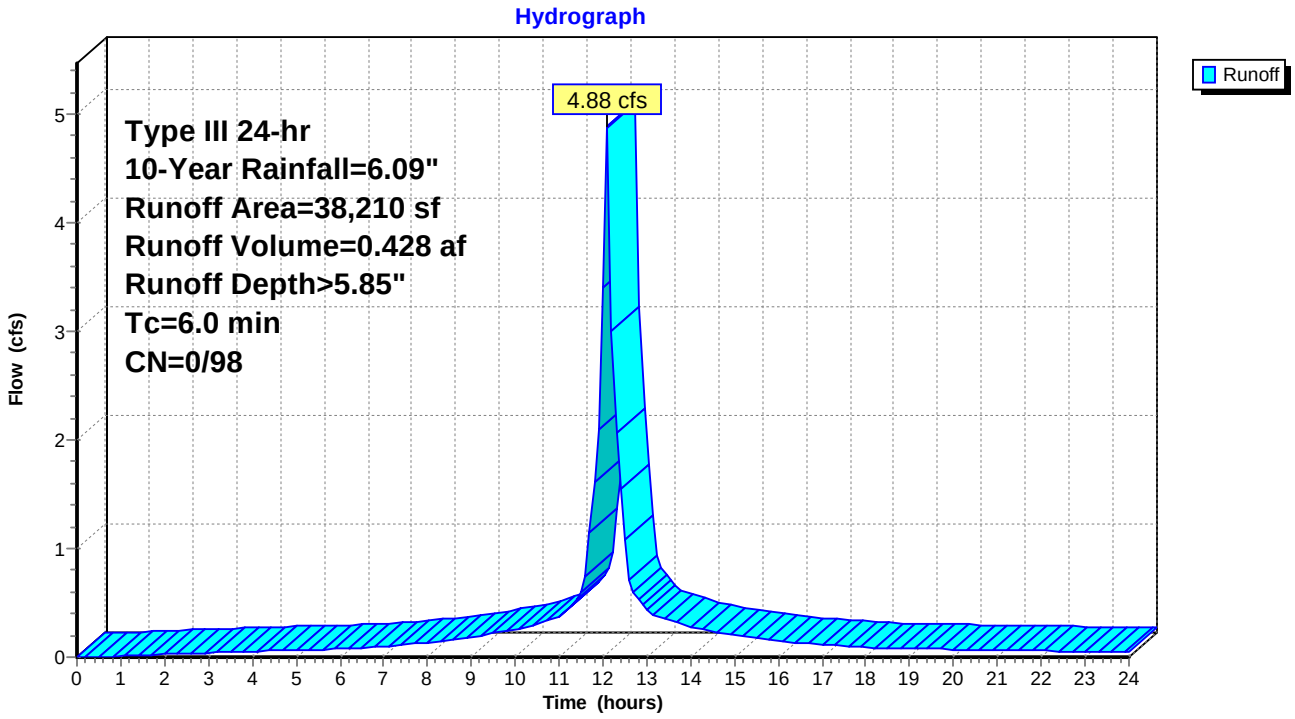
Runoff = 4.88 cfs @ 12.09 hrs, Volume= 0.428 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	38,210	98	BLDG ROOF 3
	38,210	98	100.00% Impervious Area

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

Subcatchment 203S: BLDG 3 ROOF



Summary for Subcatchment 204S: BLDG 4 2/3 of ROOF

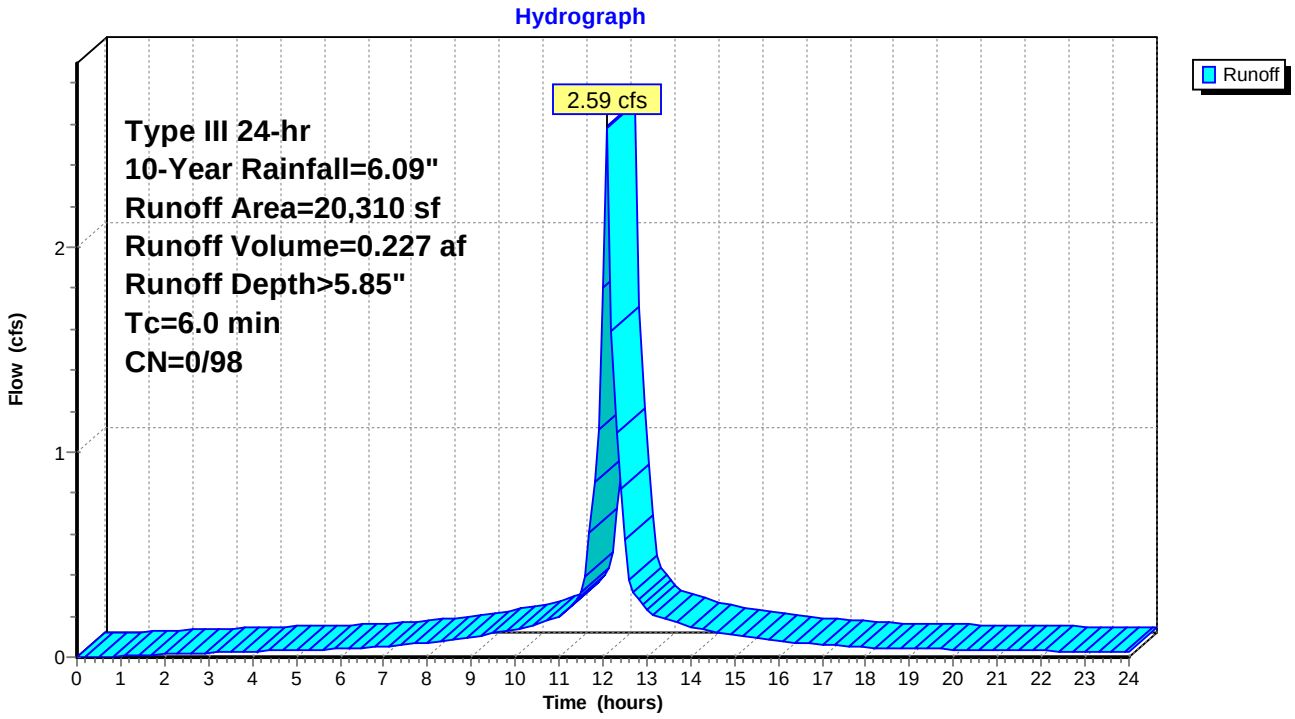
Runoff = 2.59 cfs @ 12.09 hrs, Volume= 0.227 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	20,310	98	BLDG 4 ROOF
	20,310	98	100.00% Impervious Area

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

Subcatchment 204S: BLDG 4 2/3 of ROOF



Summary for Subcatchment 205S: BLDG 5 ROOF

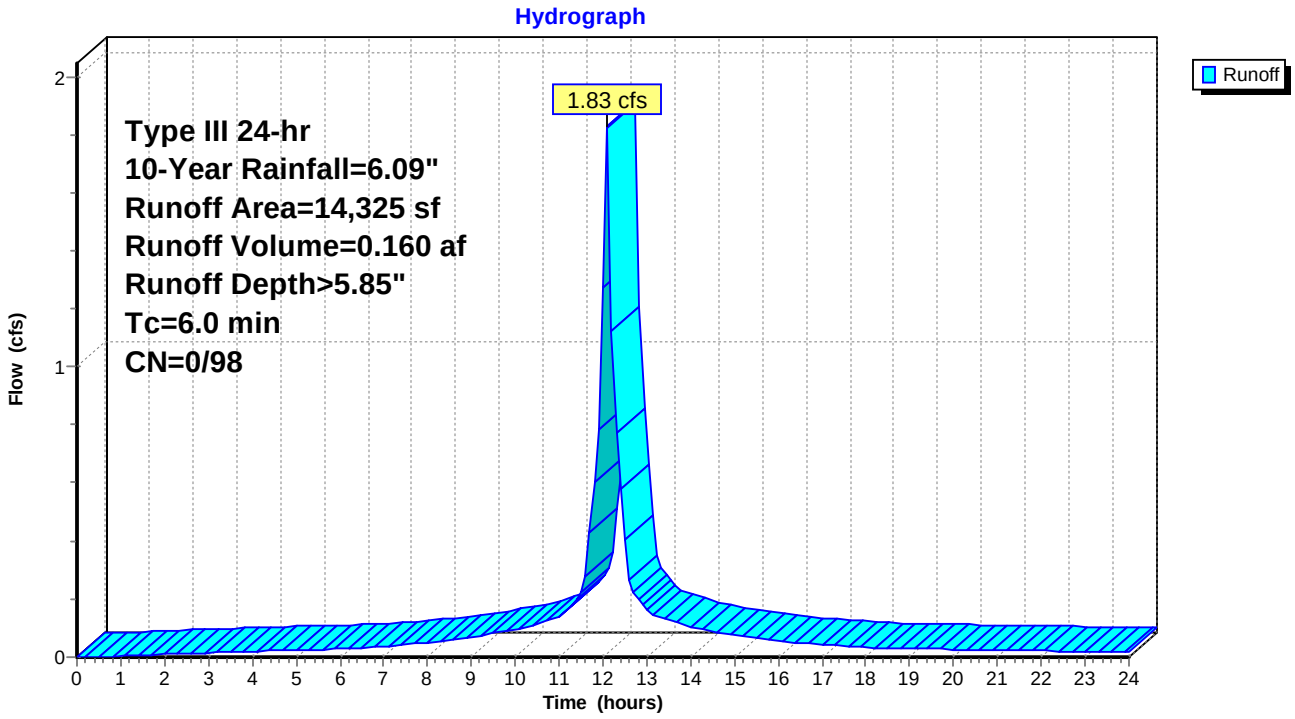
Runoff = 1.83 cfs @ 12.09 hrs, Volume= 0.160 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	14,325	98	BLDG 5 ROOF
	14,325	98	100.00% Impervious Area

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

Subcatchment 205S: BLDG 5 ROOF



Summary for Reach 13R: Stream Channel from Brandt to Pine Hill

Inflow Area = 15.375 ac, 66.33% Impervious, Inflow Depth > 2.71" for 10-Year event
Inflow = 23.34 cfs @ 12.37 hrs, Volume= 3.471 af
Outflow = 23.20 cfs @ 12.40 hrs, Volume= 3.468 af, Atten= 1%, Lag= 1.9 min

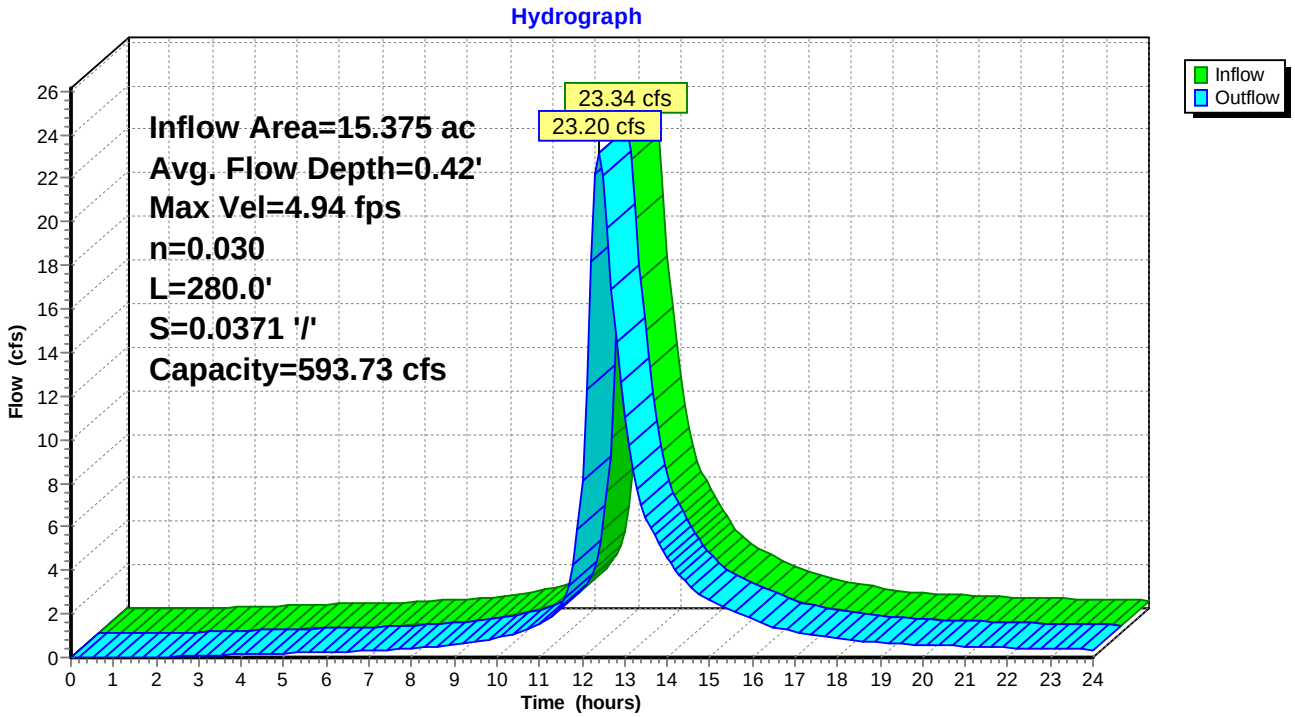
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 4.94 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.52 fps, Avg. Travel Time= 3.1 min

Peak Storage= 1,320 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 13R: Stream Channel from Brandt to Pine Hill



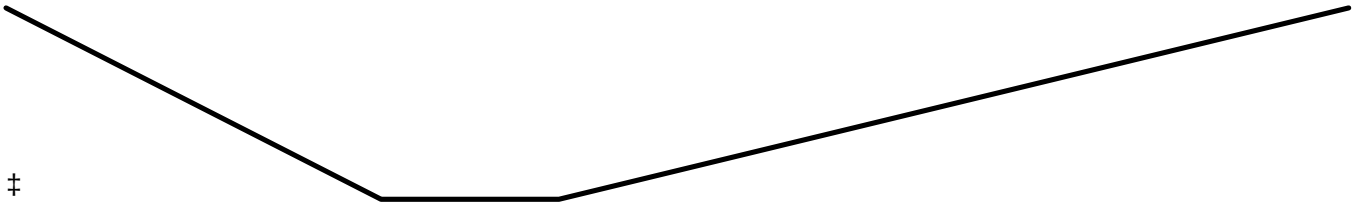
Summary for Reach 20R: existing stream on west side

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 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= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



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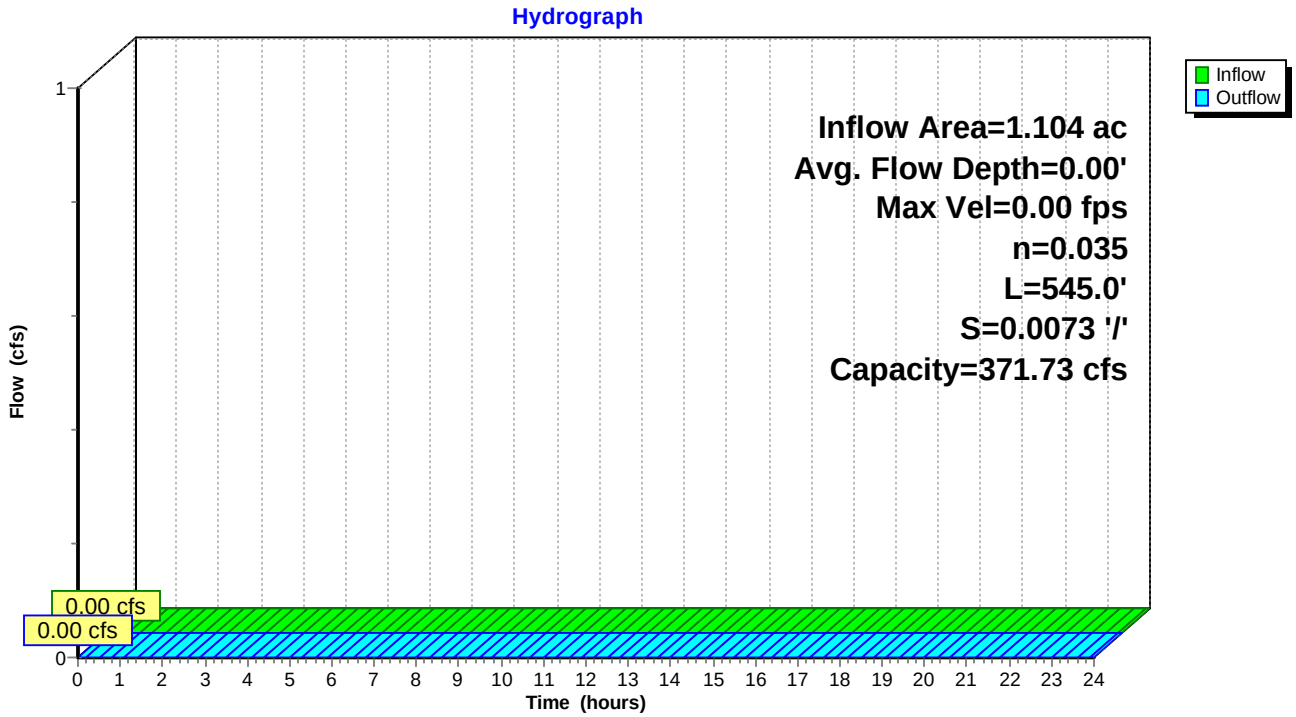
Reach 20R: existing stream on west side



Summary for Reach 22R: Combined stream into culvert

Inflow Area = 1.907 ac, 0.00% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 3.67 cfs @ 12.40 hrs, Volume= 0.455 af
Outflow = 3.61 cfs @ 12.46 hrs, Volume= 0.454 af, Atten= 2%, Lag= 4.0 min

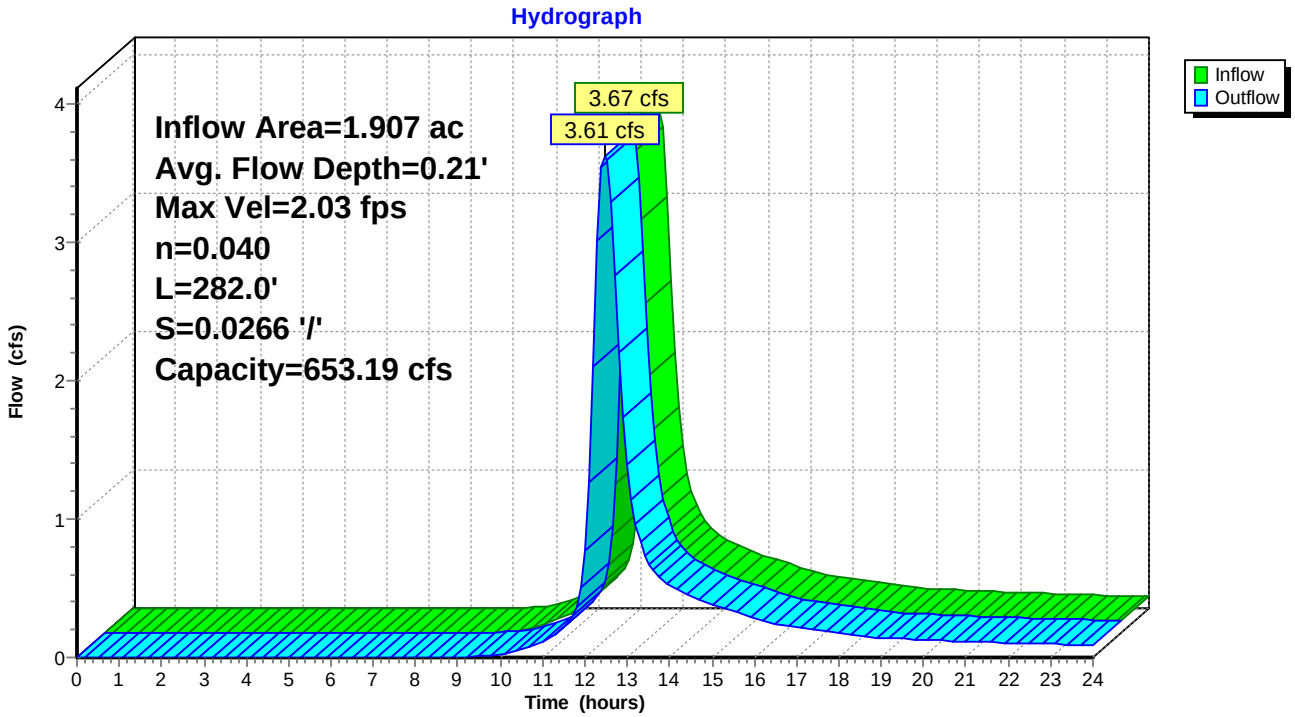
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.03 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 5.9 min

Peak Storage= 510 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 3.50' Flow Area= 64.8 sf, Capacity= 653.19 cfs

8.00' x 3.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 3.0 '/' Top Width= 29.00'
Length= 282.0' Slope= 0.0266 '/'
Inlet Invert= 463.50', Outlet Invert= 456.00'

‡

Reach 22R: Combined stream into culvert

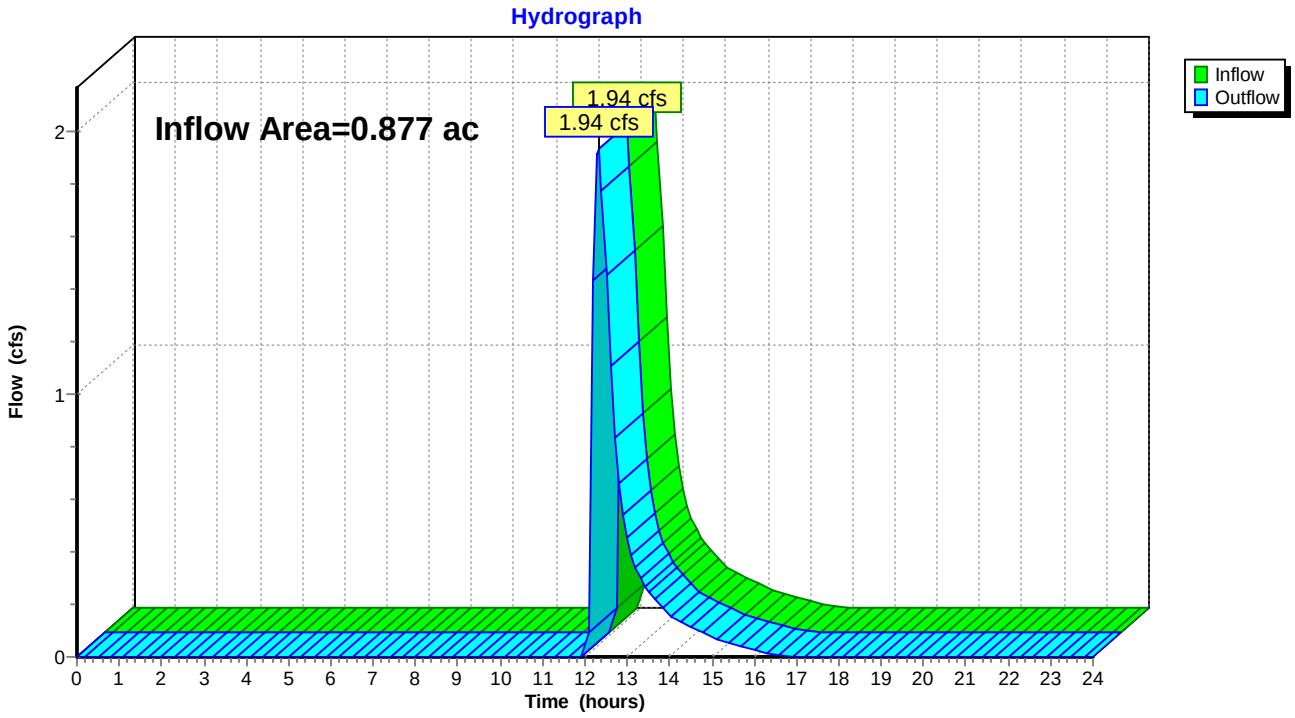


Summary for Reach 27R: (new Reach)

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth = 1.63" for 10-Year event
Inflow = 1.94 cfs @ 12.33 hrs, Volume= 0.119 af
Outflow = 1.94 cfs @ 12.33 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 27R: (new Reach)



Summary for Reach 81R: West Proposed Stream

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 6.82" for 10-Year event
Inflow = 3.72 cfs @ 12.31 hrs, Volume= 0.457 af
Outflow = 3.67 cfs @ 12.40 hrs, Volume= 0.455 af, Atten= 1%, Lag= 5.2 min

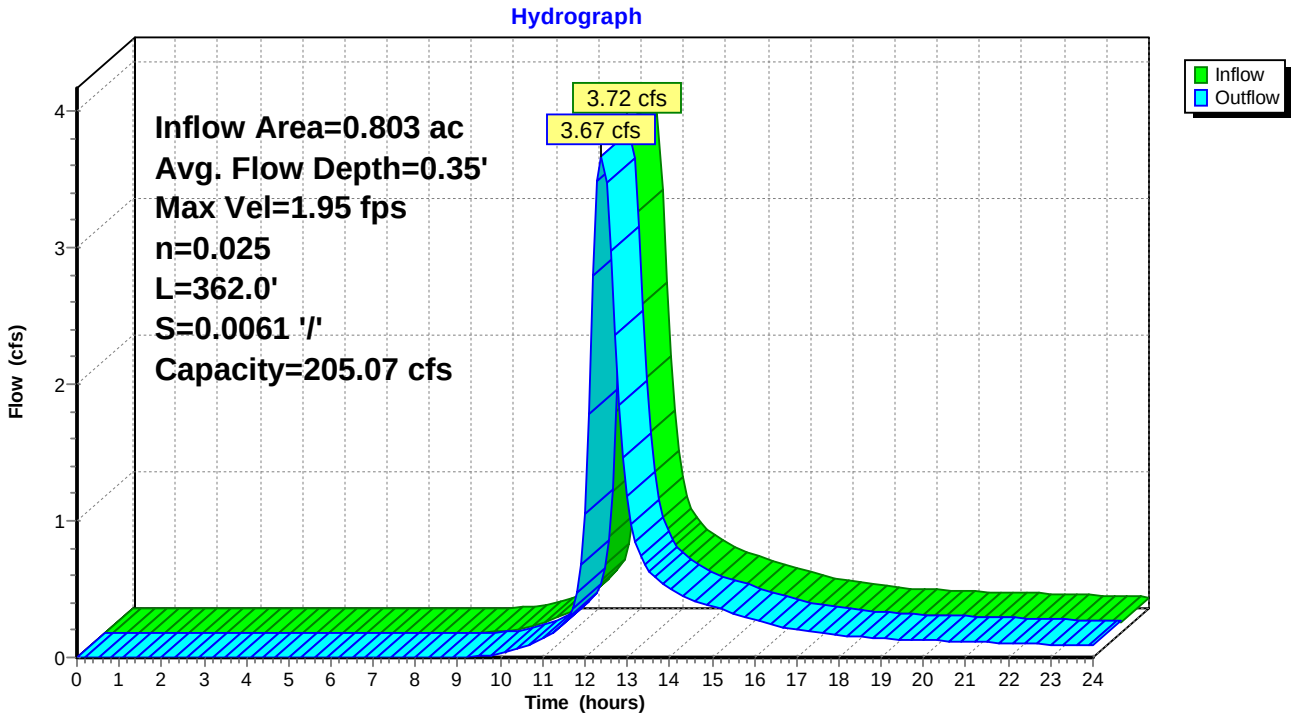
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.95 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 8.0 min

Peak Storage= 687 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 205.07 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 362.0' Slope= 0.0061 '/'
Inlet Invert= 466.70', Outlet Invert= 464.50'

‡

Reach 81R: West Proposed Stream



Summary for Reach 83R: Northerly P-Stream

Inflow = 2.72 cfs @ 12.29 hrs, Volume= 0.290 af
Outflow = 2.60 cfs @ 12.39 hrs, Volume= 0.289 af, Atten= 5%, Lag= 5.6 min

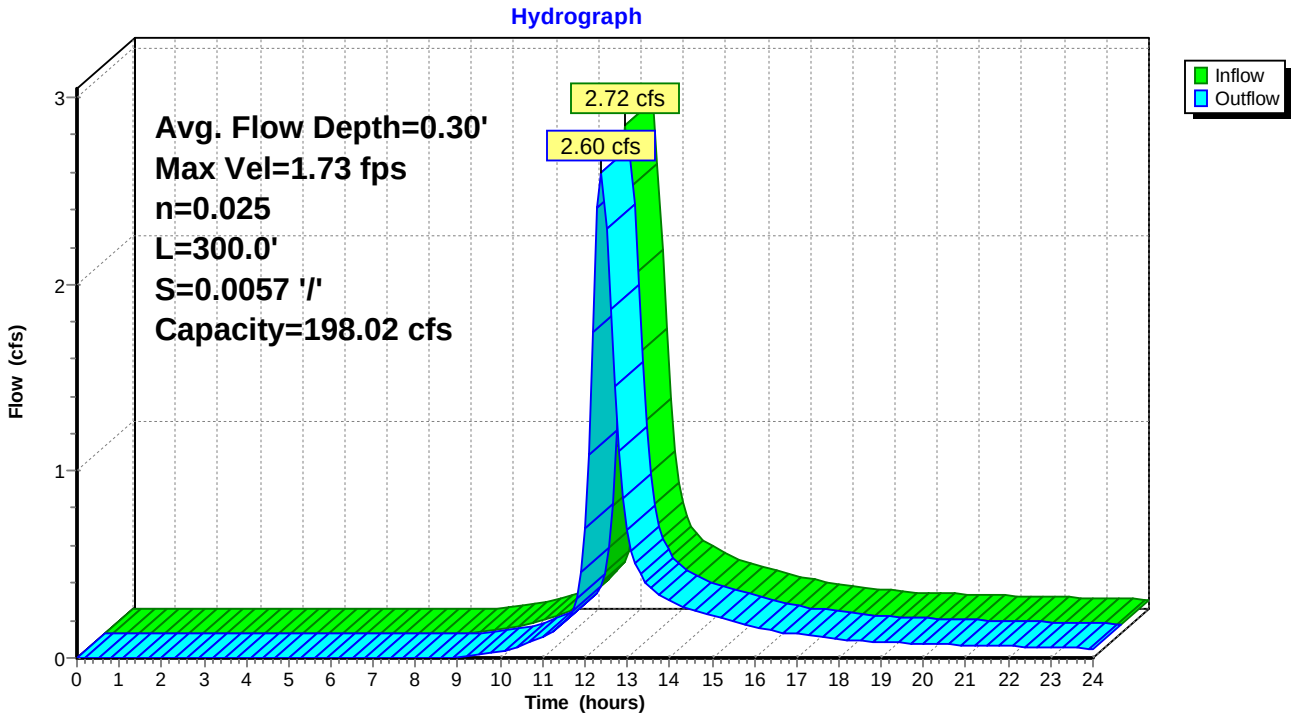
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.73 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 7.9 min

Peak Storage= 467 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 198.02 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 300.0' Slope= 0.0057 '/'
Inlet Invert= 468.40', Outlet Invert= 466.70'

‡

Reach 83R: Northerly P-Stream

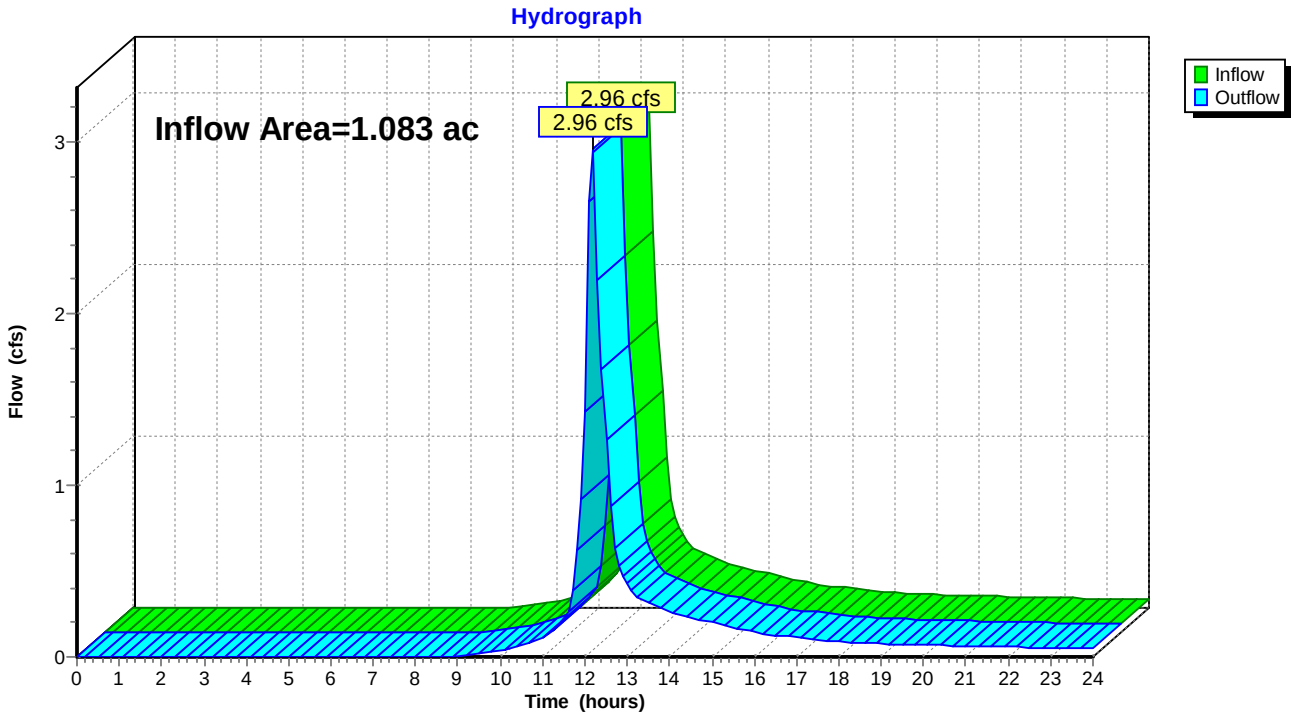


Summary for Reach 94R: Southeast BVW

Inflow Area = 1.083 ac, 0.00% Impervious, Inflow Depth > 2.97" for 10-Year event
Inflow = 2.96 cfs @ 12.18 hrs, Volume= 0.268 af
Outflow = 2.96 cfs @ 12.18 hrs, Volume= 0.268 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 94R: Southeast BVW

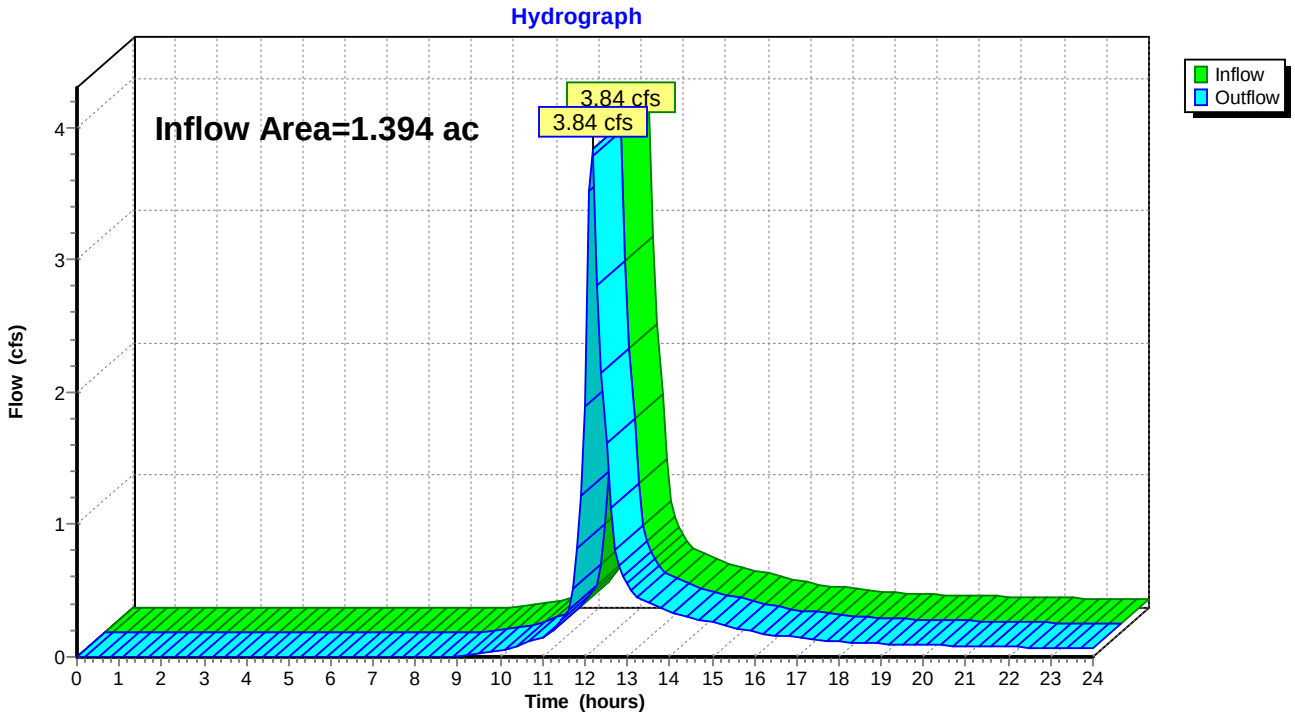


Summary for Reach 95R: Pine Hill Road

Inflow Area = 1.394 ac, 0.00% Impervious, Inflow Depth > 2.99" for 10-Year event
Inflow = 3.84 cfs @ 12.17 hrs, Volume= 0.347 af
Outflow = 3.84 cfs @ 12.17 hrs, Volume= 0.347 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 95R: Pine Hill Road

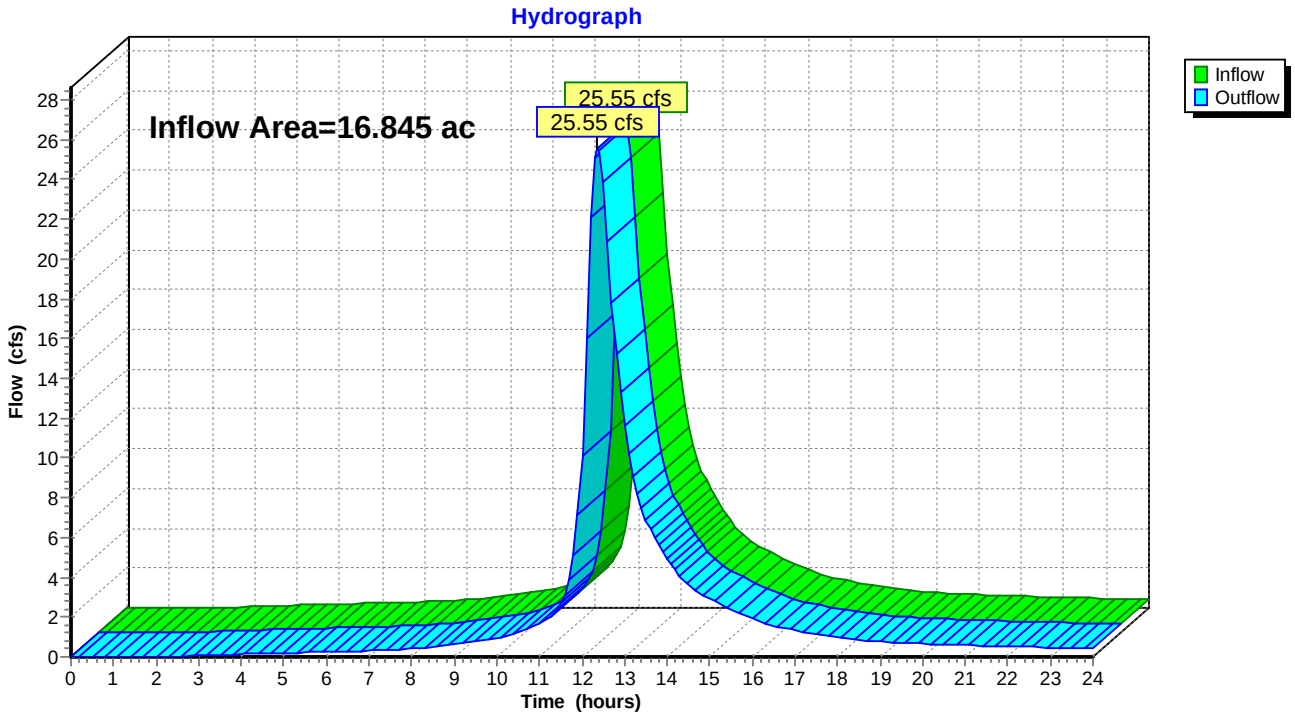


Summary for Reach X2: Area Summary Post (Not a physical location)

Inflow Area = 16.845 ac, 60.55% Impervious, Inflow Depth > 2.73" for 10-Year event
Inflow = 25.55 cfs @ 12.37 hrs, Volume= 3.834 af
Outflow = 25.55 cfs @ 12.37 hrs, Volume= 3.834 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X2: Area Summary Post (Not a physical location)



Summary for Pond 19P: INFL. POND 3C

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth > 5.85" for 10-Year event
Inflow = 4.88 cfs @ 12.09 hrs, Volume= 0.428 af
Outflow = 2.10 cfs @ 12.33 hrs, Volume= 0.371 af, Atten= 57%, Lag= 14.0 min
Discarded = 0.17 cfs @ 8.80 hrs, Volume= 0.252 af
Primary = 1.94 cfs @ 12.33 hrs, Volume= 0.119 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 474.73' @ 12.33 hrs Surf.Area= 2,964 sf Storage= 6,545 cf

Plug-Flow detention time= 161.4 min calculated for 0.371 af (87% of inflow)
Center-of-Mass det. time= 101.2 min (845.9 - 744.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	471.80'	998 cf	**114.00'W x 26.00'L x 4.17'H Field A** 12,350 cf Overall - 9,856 cf Embedded = 2,494 cf x 40.0% Voids
#2A	472.30'	7,005 cf	**retain_it retain_it 3.0'** x 42 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 14 Rows adjusted for 160.5 cf perimeter wall
#3	475.30'	38 cf	**3.00'D x 2.70'H Vertical Cone/Cylinder - Risers** x 2 -Impervious
		8,041 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	471.80'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	474.05'	**15.0" Round Culvert** L= 209.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 474.05' / 466.50' S= 0.0361 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.17 cfs @ 8.80 hrs HW=471.86' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=1.87 cfs @ 12.33 hrs HW=474.72' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 1.87 cfs @ 2.79 fps)

Pond 19P: INFL. POND 3C - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
14 Rows adjusted for 160.5 cf perimeter wall

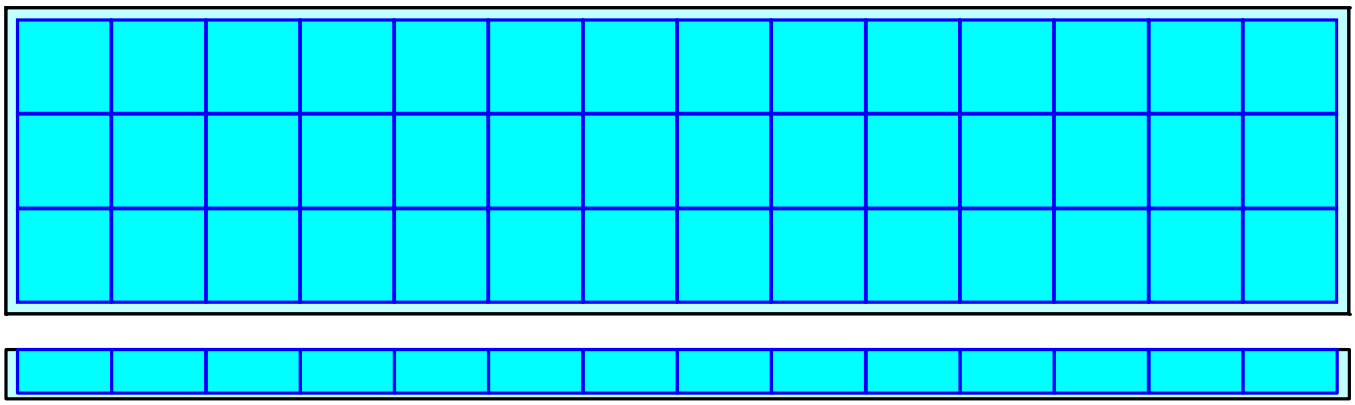
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
14 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 114.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 14 x 2 = 160.5 cf Perimeter Wall
42 Chambers x 170.6 cf - 160.5 cf Perimeter wall = 7,005.1 cf Chamber Storage
42 Chambers x 234.7 cf = 9,856.0 cf Displacement

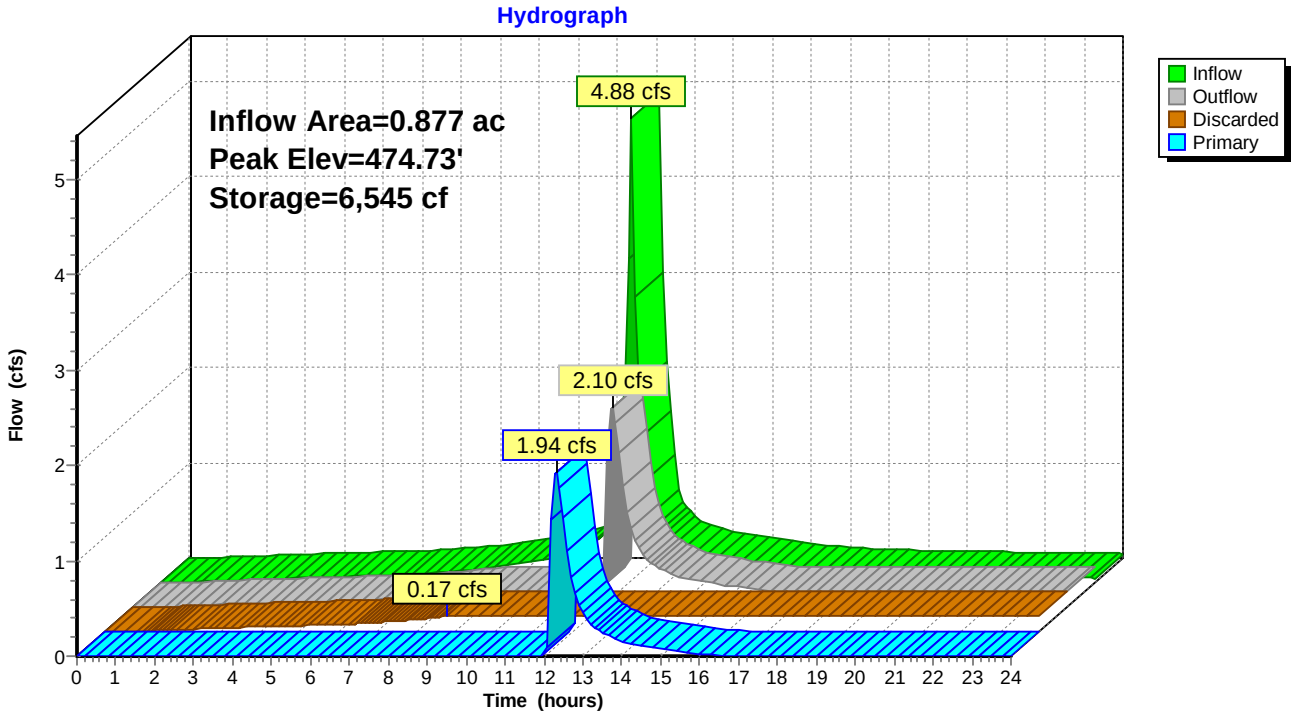
12,350.0 cf Field - 9,856.0 cf Chambers = 2,494.0 cf Stone x 40.0% Voids = 997.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,002.7 cf = 0.184 af
Overall Storage Efficiency = 64.8%
Overall System Size = 26.00' x 114.00' x 4.17'

42 Chambers
457.4 cy Field
92.4 cy Stone



Pond 19P: INFL. POND 3C



Summary for Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.

Inflow Area = 1.397 ac, 80.69% Impervious, Inflow Depth > 5.34" for 10-Year event
Inflow = 6.05 cfs @ 12.17 hrs, Volume= 0.622 af
Outflow = 0.55 cfs @ 13.42 hrs, Volume= 0.622 af, Atten= 91%, Lag= 75.1 min
Discarded = 0.55 cfs @ 13.42 hrs, Volume= 0.622 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs / 3
Peak Elev= 462.65' @ 13.42 hrs Surf.Area= 2,858 sf Storage= 10,450 cf

Plug-Flow detention time= 147.1 min calculated for 0.619 af (99% of inflow)
Center-of-Mass det. time= 145.9 min (905.3 - 759.4)

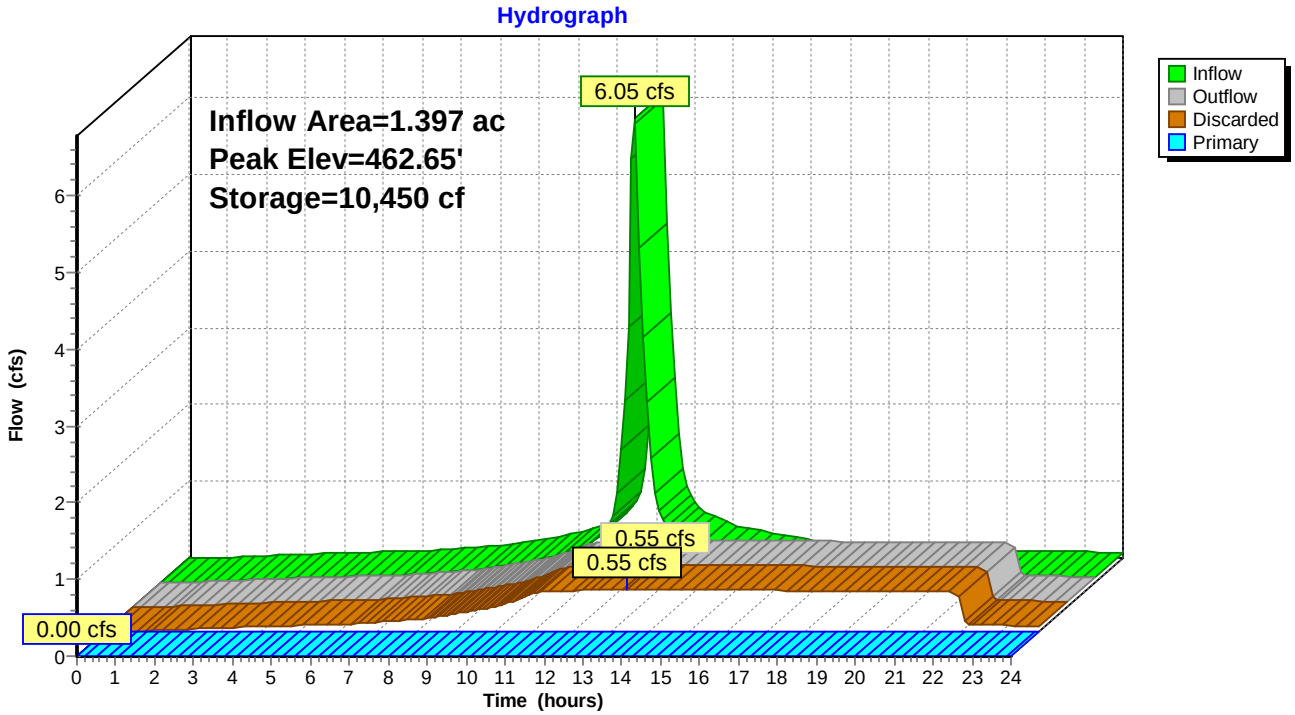
Volume	Invert	Avail.Storage	Storage Description
#1	458.00'	1,112 cf	**34.00'W x 82.00'L x 6.20'H Prismatoid of crushed stone** 17,286 cf Overall - 14,507 cf Embedded = 2,779 cf x 40.0% Voids
#2	458.50'	11,360 cf	**retain_it retain_it 5.0'** x 40 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 290.9 cf perimeter wall
#3	463.50'	170 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 3 -Impervious
#4	461.00'	119 cf	**18.0" Round Pipe Storage** L= 67.5' S= 0.0150 '/'
		12,761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	458.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	461.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.00' / 460.50' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#3	Device 2	462.75'	**4.0' long x 4.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.5' Crest Height
#4	Device 2	465.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.55 cfs @ 13.42 hrs HW=462.65' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.55 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=458.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)
  ├**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.



Summary for Pond 29P: DETN. POND 5B

Inflow Area = 0.233 ac, 91.42% Impervious, Inflow Depth > 5.62" for 10-Year event
Inflow = 1.11 cfs @ 12.13 hrs, Volume= 0.109 af
Outflow = 0.17 cfs @ 11.70 hrs, Volume= 0.109 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.17 cfs @ 11.70 hrs, Volume= 0.109 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 454.21' @ 12.73 hrs Surf.Area= 900 sf Storage= 1,393 cf

Plug-Flow detention time= 49.0 min calculated for 0.109 af (100% of inflow)
Center-of-Mass det. time= 48.7 min (800.8 - 752.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	452.00'	374 cf	**50.00'W x 18.00'L x 4.17'H Field A** 3,750 cf Overall - 2,816 cf Embedded = 934 cf x 40.0% Voids
#2A	452.50'	1,972 cf	**retain_it retain_it 3.0'** x 12 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 6 Rows adjusted for 75.5 cf perimeter wall
#3	455.50'	35 cf	**3.00'D x 2.50'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	457.00'	633 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		3,014 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
457.00	368	128.8	0	0	368
458.00	942	158.0	633	633	1,050

Device	Routing	Invert	Outlet Devices
#1	Discarded	452.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	458.00'	**2.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.17 cfs @ 11.70 hrs HW=452.09' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=452.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29P: DETN. POND 5B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
6 Rows adjusted for 75.5 cf perimeter wall

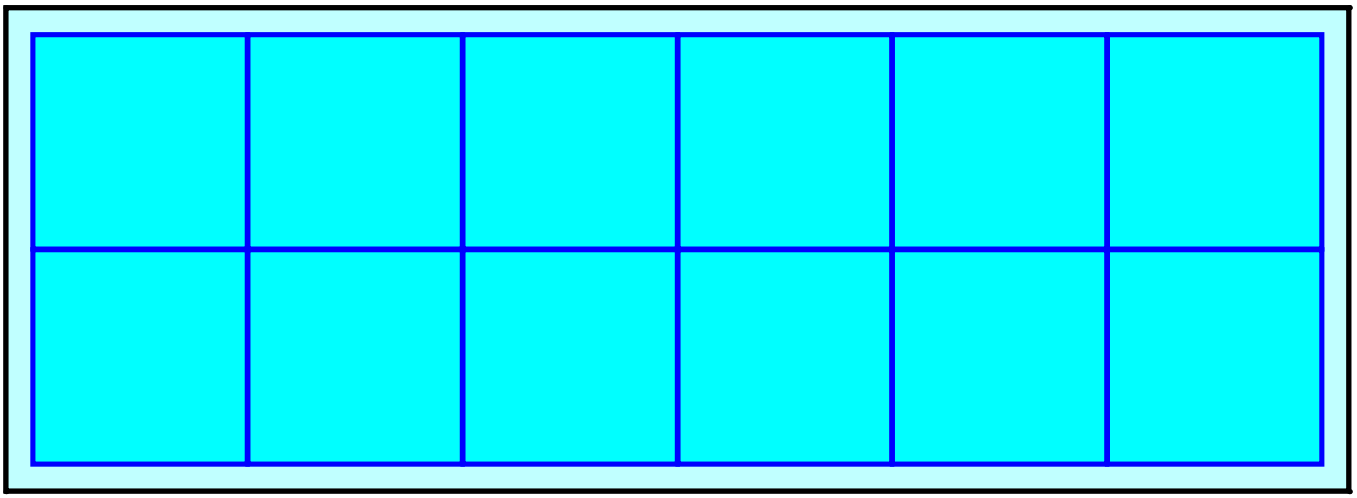
2 Chambers/Row x 8.00' Long = 16.00' Row Length +12.0" End Stone x 2 = 18.00' Base Length
6 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 50.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

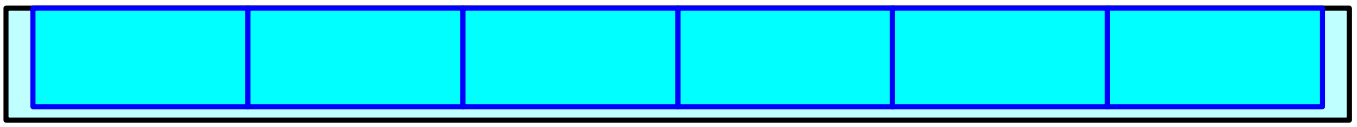
4.7 cf Sidewall x 2 x 2 + 4.7 cf Endwall x 6 x 2 = 75.5 cf Perimeter Wall
12 Chambers x 170.6 cf - 75.5 cf Perimeter wall = 1,971.8 cf Chamber Storage
12 Chambers x 234.7 cf = 2,816.0 cf Displacement

3,750.0 cf Field - 2,816.0 cf Chambers = 934.0 cf Stone x 40.0% Voids = 373.6 cf Stone Storage

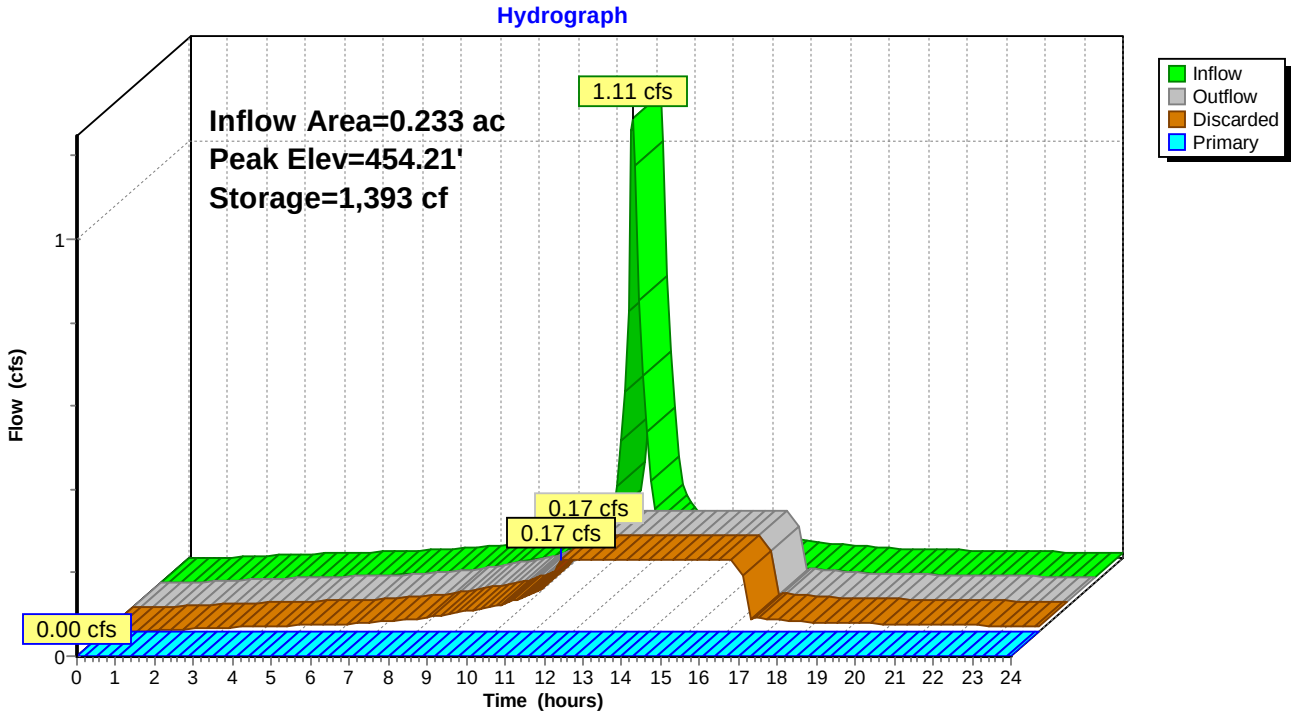
Chamber Storage + Stone Storage = 2,345.4 cf = 0.054 af
Overall Storage Efficiency = 62.5%
Overall System Size = 18.00' x 50.00' x 4.17'

12 Chambers
138.9 cy Field
34.6 cy Stone





Pond 29P: DETN. POND 5B



Summary for Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane

Inflow Area = 9.324 ac, 57.99% Impervious, Inflow Depth > 3.04" for 10-Year event
Inflow = 17.98 cfs @ 12.36 hrs, Volume= 2.360 af
Outflow = 17.96 cfs @ 12.36 hrs, Volume= 2.359 af, Atten= 0%, Lag= 0.1 min
Primary = 17.96 cfs @ 12.36 hrs, Volume= 2.359 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 456.60' @ 12.36 hrs Surf.Area= 713 sf Storage= 310 cf

Plug-Flow detention time= 0.4 min calculated for 2.350 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (810.5 - 810.1)

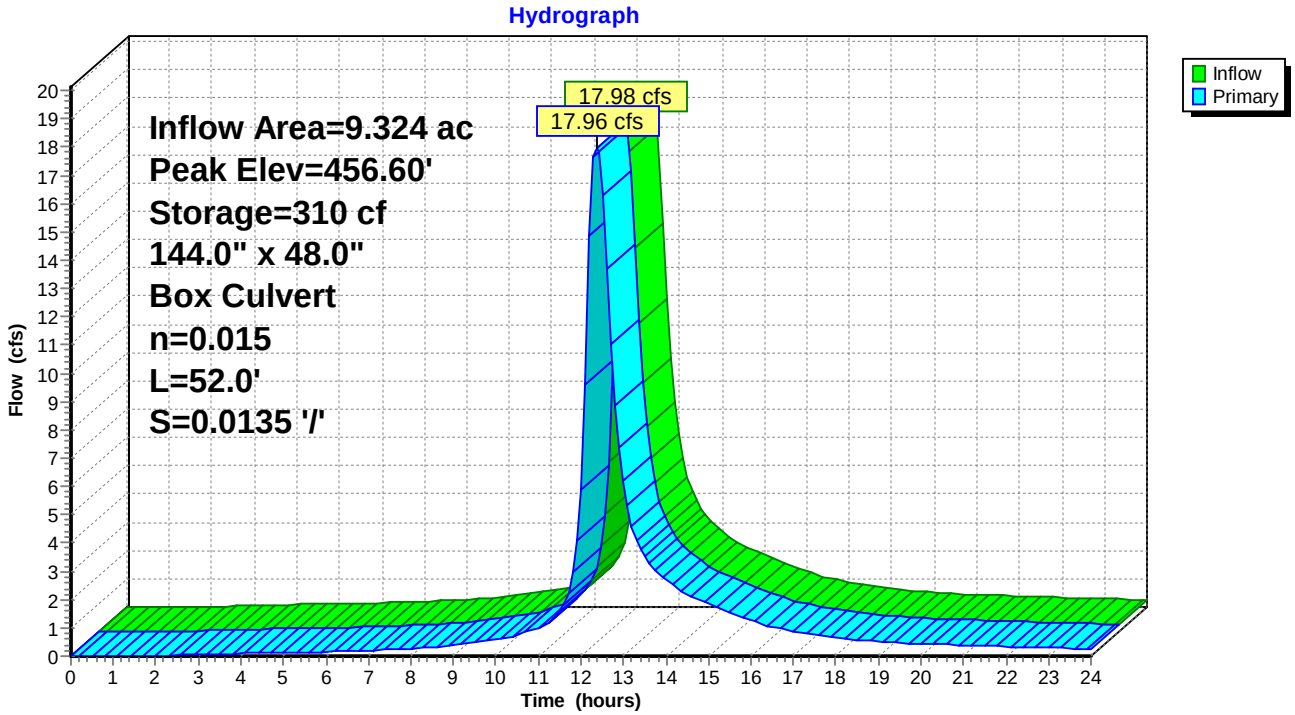
Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	90,081 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
456.00	340	69.0	0	0	340
458.00	2,107	180.0	2,196	2,196	2,553
460.00	5,971	358.0	7,750	9,946	10,193
462.00	11,082	505.0	16,792	26,737	20,325
464.00	16,612	607.0	27,508	54,245	29,419
466.00	19,256	663.0	35,835	90,081	35,220

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**144.0" W x 48.0" H Box Box Culvert** L= 52.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 456.00' / 455.30' S= 0.0135 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 48.00 sf

Primary OutFlow Max=17.75 cfs @ 12.36 hrs HW=456.60' (Free Discharge)
↑**1=Box Culvert** (Inlet Controls 17.75 cfs @ 2.48 fps)

Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane



Summary for Pond 101P: DETN. POND 1A

Inflow Area = 1.631 ac, 79.38% Impervious, Inflow Depth > 5.31" for 10-Year event
Inflow = 7.43 cfs @ 12.13 hrs, Volume= 0.722 af
Outflow = 3.11 cfs @ 12.43 hrs, Volume= 0.712 af, Atten= 58%, Lag= 17.8 min
Primary = 3.11 cfs @ 12.43 hrs, Volume= 0.712 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 456.93' @ 12.43 hrs Surf.Area= 6,235 sf Storage= 7,218 cf

Plug-Flow detention time= 39.6 min calculated for 0.709 af (98% of inflow)
Center-of-Mass det. time= 30.8 min (789.3 - 758.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	455.35'	1,229 cf	**24.00'W x 256.00'L x 4.17'H Field A** 25,600 cf Overall - 22,528 cf Embedded = 3,072 cf x 40.0% Voids
#2A	455.85'	16,048 cf	**retain_it retain_it 3.0'** x 96 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 330.5 cf perimeter wall
#3	458.80'	47 cf	**3.00'D x 2.20'H Riser** x 3
#4	454.65'	251 cf	**18.0" Round Pipe Storage** L= 142.0' S= 0.0116 '/'
		17,575 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	455.35'	**12.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 455.35' / 454.65' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.10 cfs @ 12.43 hrs HW=456.92' (Free Discharge)
1=Culvert (Barrel Controls 3.10 cfs @ 3.95 fps)

Pond 101P: DETN. POND 1A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
3 Rows adjusted for 330.5 cf perimeter wall

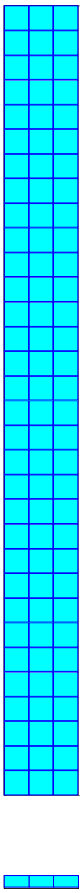
32 Chambers/Row x 8.00' Long = 256.00' Row Length
3 Rows x 96.0" Wide = 24.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 32 x 2 + 4.7 cf Endwall x 3 x 2 = 330.5 cf Perimeter Wall
96 Chambers x 170.6 cf - 330.5 cf Perimeter wall = 16,048.2 cf Chamber Storage
96 Chambers x 234.7 cf = 22,528.0 cf Displacement

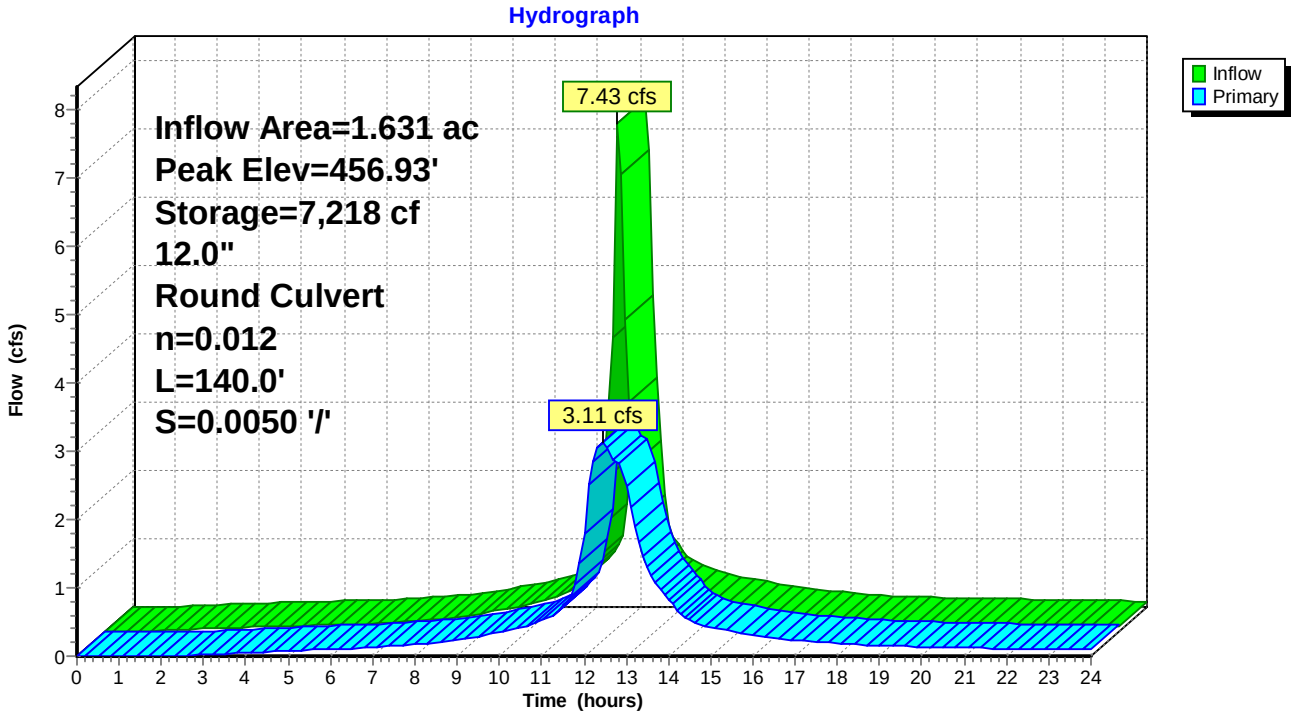
25,600.0 cf Field - 22,528.0 cf Chambers = 3,072.0 cf Stone x 40.0% Voids = 1,228.8 cf Stone Storage

Chamber Storage + Stone Storage = 17,277.0 cf = 0.397 af
Overall Storage Efficiency = 67.5%
Overall System Size = 256.00' x 24.00' x 4.17'

96 Chambers
948.1 cy Field
113.8 cy Stone



Pond 101P: DETN. POND 1A



Summary for Pond 102P: INFIL. POND 2

Inflow Area = 1.889 ac, 87.97% Impervious, Inflow Depth > 5.52" for 10-Year event
Inflow = 9.16 cfs @ 12.11 hrs, Volume= 0.868 af
Outflow = 1.98 cfs @ 12.60 hrs, Volume= 0.528 af, Atten= 78%, Lag= 28.8 min
Discarded = 0.16 cfs @ 6.50 hrs, Volume= 0.270 af
Primary = 1.82 cfs @ 12.60 hrs, Volume= 0.258 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 467.18' @ 12.59 hrs Surf.Area= 6,804 sf Storage= 18,743 cf

Plug-Flow detention time= 196.3 min calculated for 0.528 af (61% of inflow)
Center-of-Mass det. time= 86.0 min (838.6 - 752.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	463.80'	2,115 cf	**162.00'W x 42.00'L x 5.17'H Field A** 35,154 cf Overall - 29,867 cf Embedded = 5,287 cf x 40.0% Voids
#2A	464.30'	22,716 cf	**retain_it retain_it 4.0'** x 100 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 20 Rows adjusted for 377.5 cf perimeter wall
#3	468.30'	99 cf	**3.00'D x 3.50'H Riser** x 4 -Impervious
#4	461.50'	560 cf	**18.0" Round Pipe Storage** -Impervious L= 317.0' S= 0.0157 '/'
		25,491 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	463.80'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	466.57'	**18.0" Round 18" DRAIN** L= 317.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 466.57' / 461.50' S= 0.0160 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.16 cfs @ 6.50 hrs HW=463.80' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=1.81 cfs @ 12.60 hrs HW=467.18' (Free Discharge)
↑—**2=18" DRAIN** (Inlet Controls 1.81 cfs @ 2.67 fps)

Pond 102P: INFIL. POND 2 - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)
Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf
Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf
20 Rows adjusted for 377.5 cf perimeter wall

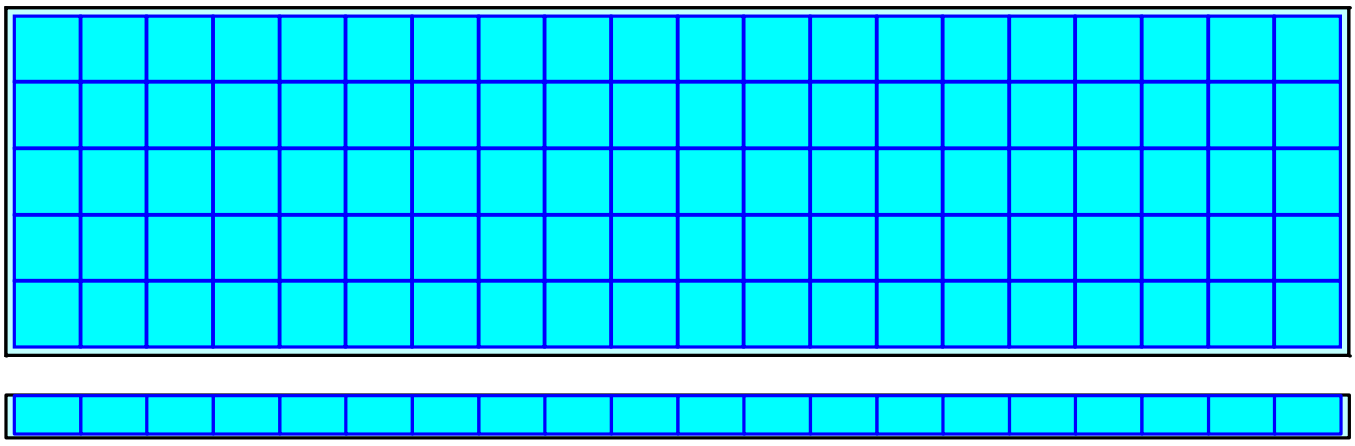
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 56.0" Chamber Height = 5.17' Field Height

7.5 cf Sidewall x 5 x 2 + 7.5 cf Endwall x 20 x 2 = 377.5 cf Perimeter Wall
100 Chambers x 230.9 cf - 377.5 cf Perimeter wall = 22,716.5 cf Chamber Storage
100 Chambers x 298.7 cf = 29,866.7 cf Displacement

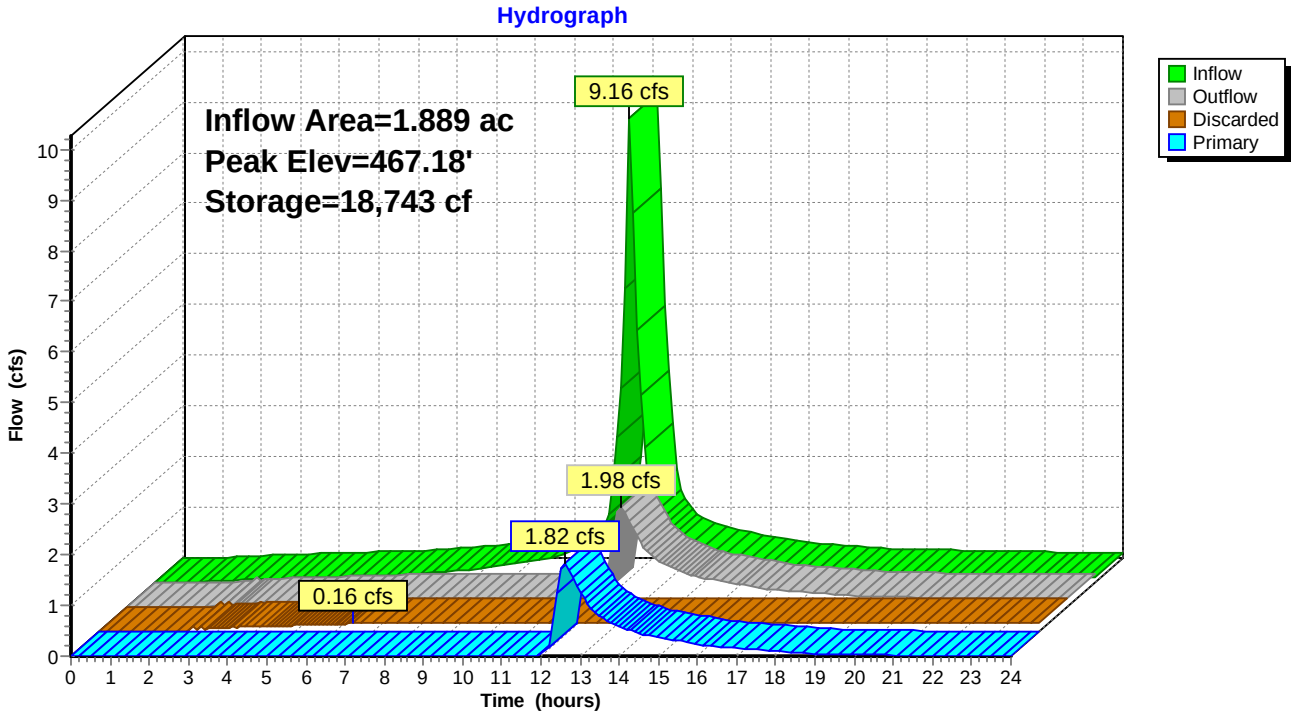
35,154.0 cf Field - 29,866.7 cf Chambers = 5,287.3 cf Stone x 40.0% Voids = 2,114.9 cf Stone Storage

Chamber Storage + Stone Storage = 24,831.4 cf = 0.570 af
Overall Storage Efficiency = 70.6%
Overall System Size = 42.00' x 162.00' x 5.17'

100 Chambers
1,302.0 cy Field
195.8 cy Stone



Pond 102P: INFIL. POND 2



Summary for Pond 103P: DETN. POND 3A

Inflow Area = 1.476 ac, 55.17% Impervious, Inflow Depth > 4.58" for 10-Year event
Inflow = 5.91 cfs @ 12.14 hrs, Volume= 0.564 af
Outflow = 4.77 cfs @ 12.25 hrs, Volume= 0.561 af, Atten= 19%, Lag= 6.5 min
Primary = 4.77 cfs @ 12.25 hrs, Volume= 0.561 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 468.66' @ 12.25 hrs Surf.Area= 2,688 sf Storage= 2,329 cf

Plug-Flow detention time= 13.6 min calculated for 0.561 af (99% of inflow)
Center-of-Mass det. time= 10.1 min (784.3 - 774.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	467.40'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	467.90'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	469.90'	28 cf	**3.00'D x 2.00'H Vetical Cone/Cylinder - Risers** x 2
#4	467.40'	39 cf	**12.0" Round Pipe Storage** L= 50.0'
		5,188 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	467.40'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 467.40' / 466.90' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.63 cfs @ 12.25 hrs HW=468.63' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.63 cfs @ 3.78 fps)

Pond 103P: DETN. POND 3A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

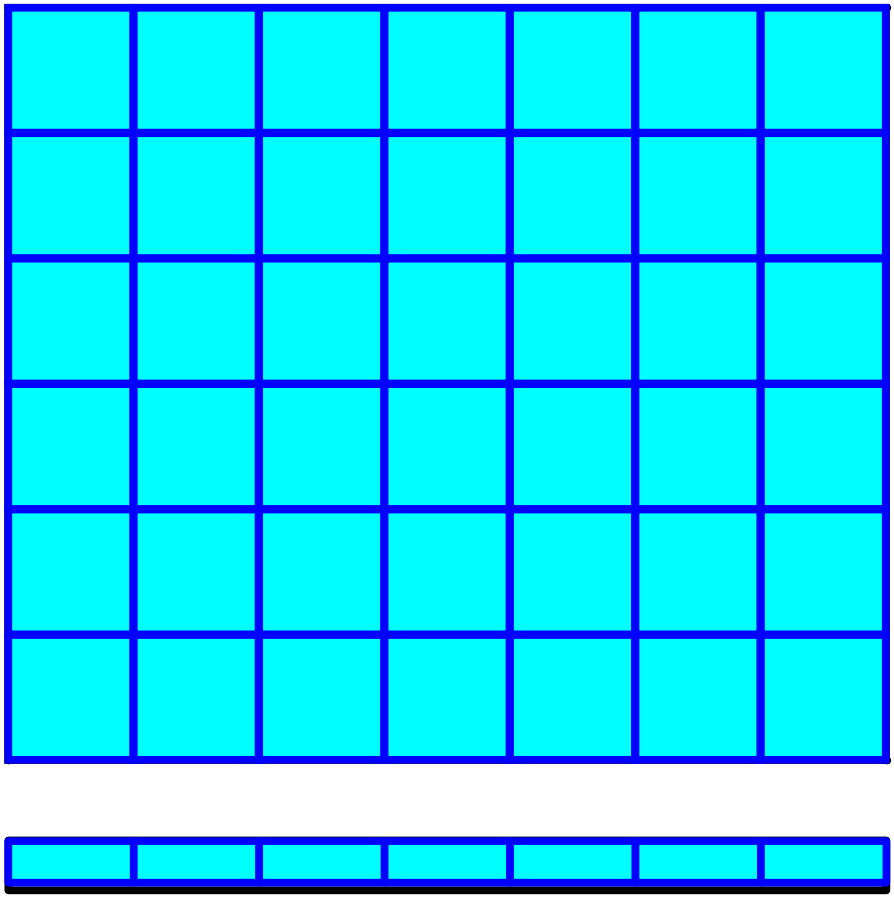
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

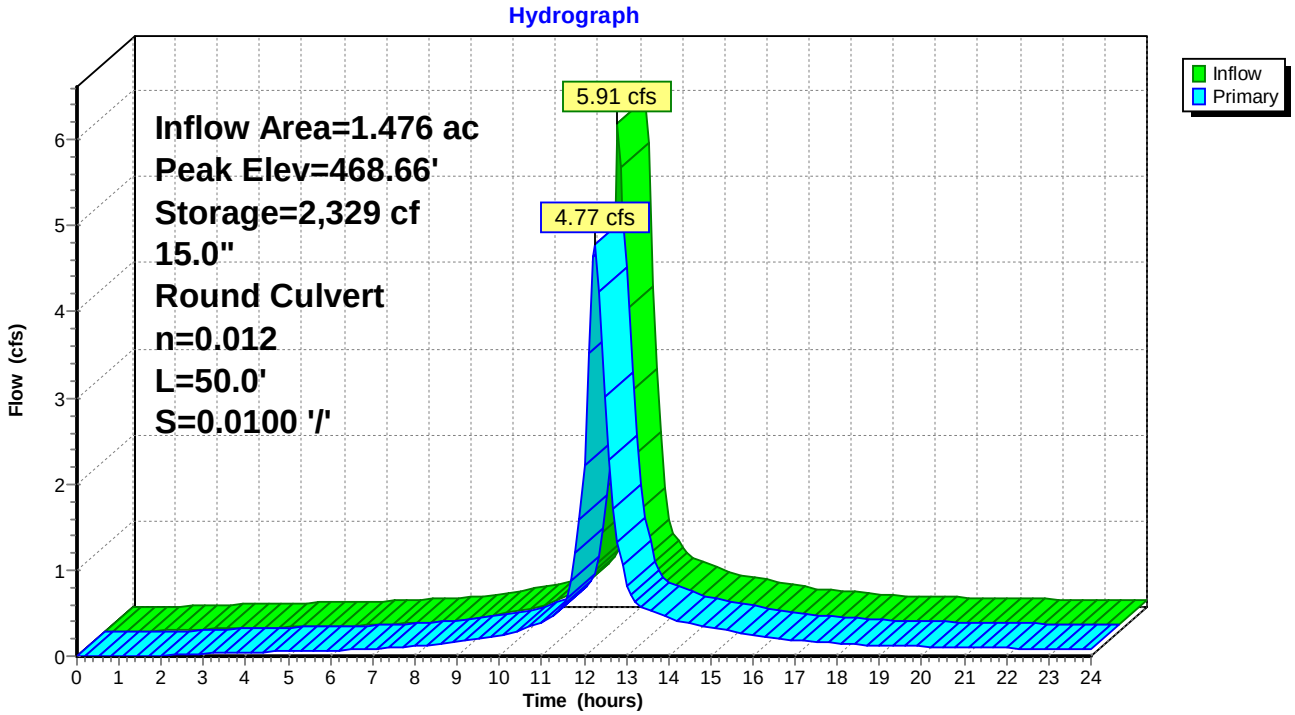
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 103P: DETN. POND 3A



Summary for Pond 104P: INFL. POND 4A

Inflow Area = 1.128 ac, 89.19% Impervious, Inflow Depth > 5.57" for 10-Year event
Inflow = 5.57 cfs @ 12.11 hrs, Volume= 0.523 af
Outflow = 2.34 cfs @ 12.40 hrs, Volume= 0.385 af, Atten= 58%, Lag= 17.0 min
Discarded = 0.10 cfs @ 6.80 hrs, Volume= 0.167 af
Primary = 2.24 cfs @ 12.40 hrs, Volume= 0.219 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 464.95' @ 12.40 hrs Surf.Area= 4,212 sf Storage= 9,430 cf

Plug-Flow detention time= 160.9 min calculated for 0.385 af (74% of inflow)
Center-of-Mass det. time= 71.0 min (822.8 - 751.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.00'	1,388 cf	**162.00'W x 26.00'L x 4.17'H Field A** 17,550 cf Overall - 14,080 cf Embedded = 3,470 cf x 40.0% Voids
#2A	462.50'	10,019 cf	**retain_it retain_it 3.0'** x 60 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 20 Rows adjusted for 217.2 cf perimeter wall
#3	465.50'	64 cf	**3.00'D x 3.00'H Riser** x 3 -Impervious
#4	464.00'	67 cf	**18.0" Round Pipe Storage** -Impervious L= 38.0' S= 0.0132 '/'
		11,538 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	462.00'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	464.00'	**18.0" Round Culvert** L= 38.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 464.00' / 464.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.10 cfs @ 6.80 hrs HW=462.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=2.23 cfs @ 12.40 hrs HW=464.95' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 2.23 cfs @ 2.69 fps)

Pond 104P: INFL. POND 4A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
20 Rows adjusted for 217.2 cf perimeter wall

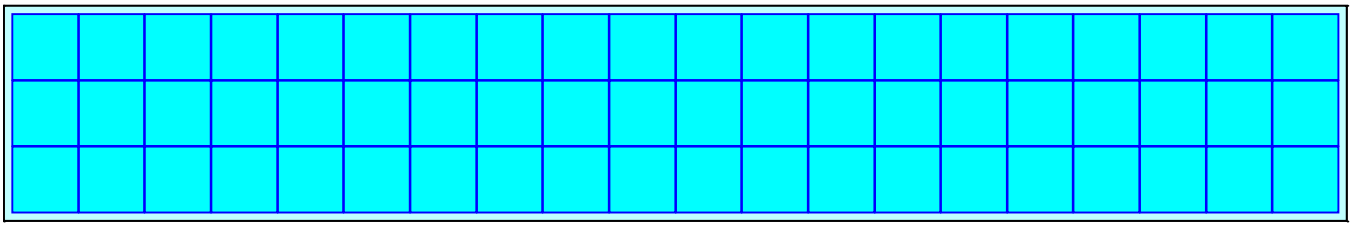
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

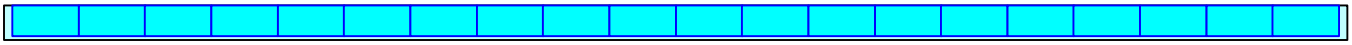
4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 20 x 2 = 217.2 cf Perimeter Wall
60 Chambers x 170.6 cf - 217.2 cf Perimeter wall = 10,019.5 cf Chamber Storage
60 Chambers x 234.7 cf = 14,080.0 cf Displacement

17,550.0 cf Field - 14,080.0 cf Chambers = 3,470.0 cf Stone x 40.0% Voids = 1,388.0 cf Stone Storage

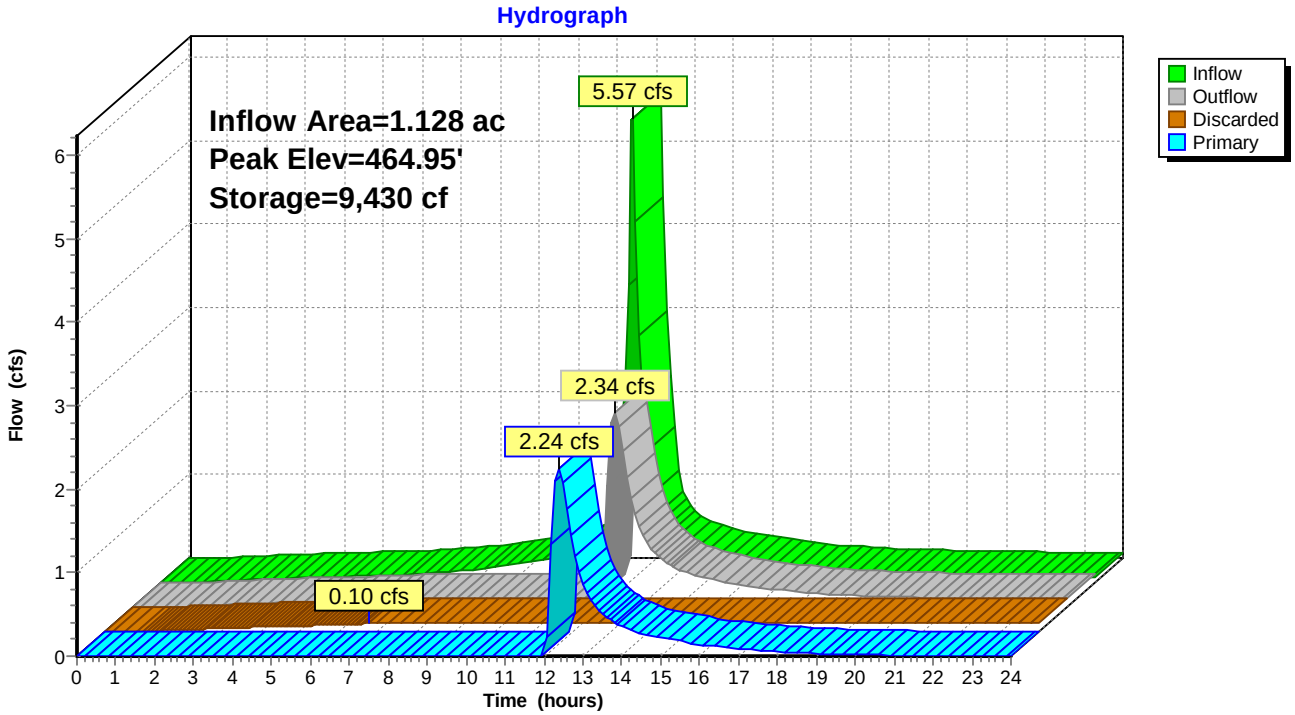
Chamber Storage + Stone Storage = 11,407.5 cf = 0.262 af
Overall Storage Efficiency = 65.0%
Overall System Size = 26.00' x 162.00' x 4.17'

60 Chambers
650.0 cy Field
128.5 cy Stone





Pond 104P: INFL. POND 4A



Summary for Pond 105P: DETN. POND 5A

Inflow Area = 1.074 ac, 83.75% Impervious, Inflow Depth > 5.43" for 10-Year event
Inflow = 5.13 cfs @ 12.12 hrs, Volume= 0.486 af
Outflow = 0.59 cfs @ 11.50 hrs, Volume= 0.485 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.59 cfs @ 11.50 hrs, Volume= 0.485 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 461.98' @ 12.93 hrs Surf.Area= 3,060 sf Storage= 7,060 cf

Plug-Flow detention time= 82.3 min calculated for 0.483 af (100% of inflow)
Center-of-Mass det. time= 81.7 min (836.7 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	459.00'	1,165 cf	**34.00'W x 90.00'L x 6.17'H Field A** 18,870 cf Overall - 15,957 cf Embedded = 2,913 cf x 40.0% Voids
#2A	459.50'	12,505 cf	**retain_it retain_it 5.0'** x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	464.50'	28 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	463.50'	79 cf	**12.0" Round Pipe Storage** L= 100.0' S= 0.0100 '/'
		13,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	459.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	463.50'	**12.0" Round Culvert** L= 150.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 463.50' / 461.60' S= 0.0126 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.59 cfs @ 11.50 hrs HW=459.08' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.59 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=459.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 105P: DETN. POND 5A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
4 Rows adjusted for 311.7 cf perimeter wall

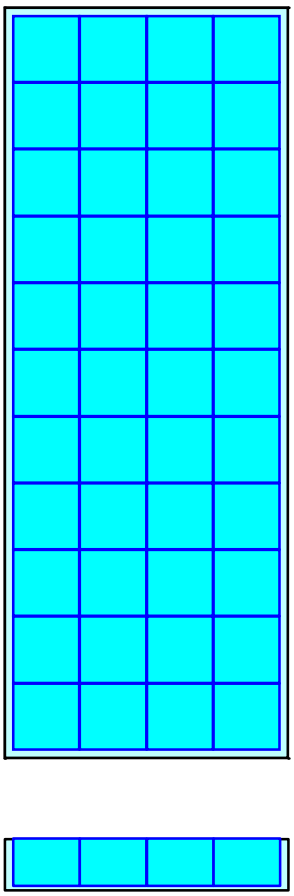
11 Chambers/Row x 8.00' Long = 88.00' Row Length +12.0" End Stone x 2 = 90.00' Base Length
4 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 34.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 11 x 2 + 10.4 cf Endwall x 4 x 2 = 311.7 cf Perimeter Wall
44 Chambers x 291.3 cf - 311.7 cf Perimeter wall = 12,504.6 cf Chamber Storage
44 Chambers x 362.7 cf = 15,957.3 cf Displacement

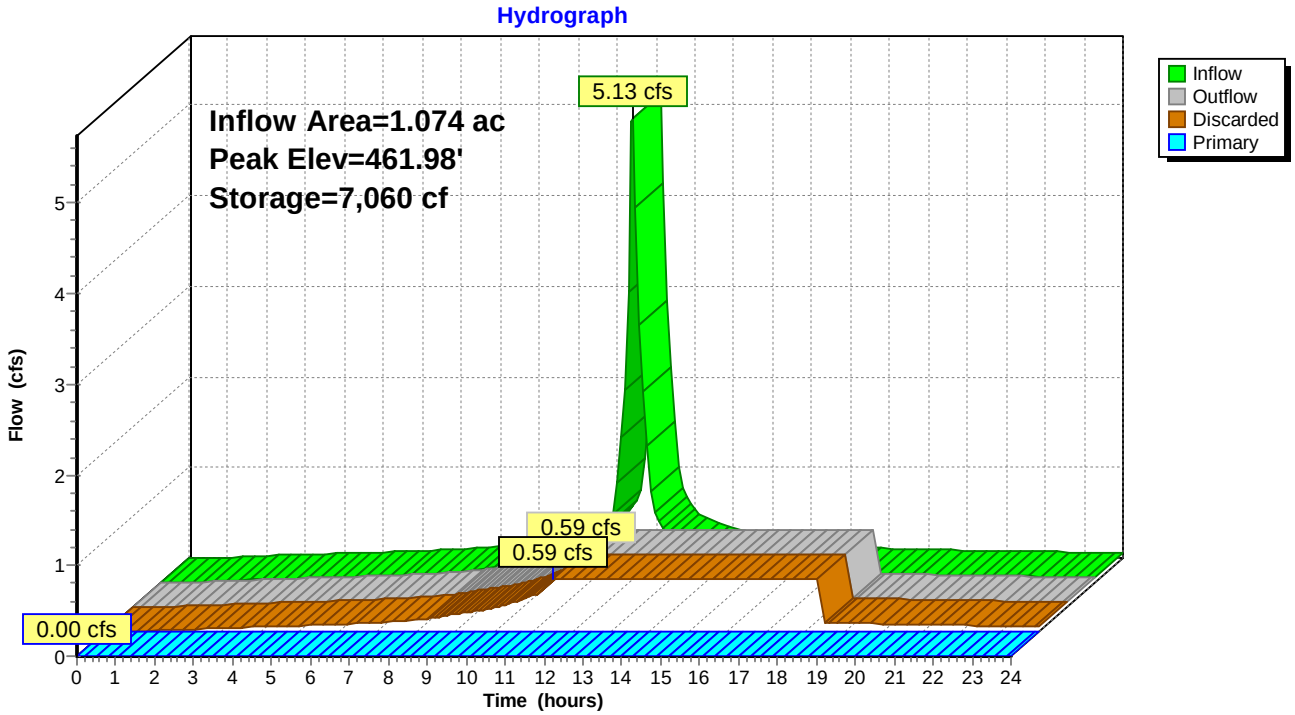
18,870.0 cf Field - 15,957.3 cf Chambers = 2,912.7 cf Stone x 40.0% Voids = 1,165.1 cf Stone Storage

Chamber Storage + Stone Storage = 13,669.7 cf = 0.314 af
Overall Storage Efficiency = 72.4%
Overall System Size = 90.00' x 34.00' x 6.17'

44 Chambers
698.9 cy Field
107.9 cy Stone



Pond 105P: DETN. POND 5A



Summary for Pond 111P: INFL. POND 1B

Inflow Area = 1.716 ac, 73.30% Impervious, Inflow Depth > 5.16" for 10-Year event
Inflow = 7.93 cfs @ 12.11 hrs, Volume= 0.737 af
Outflow = 2.57 cfs @ 12.47 hrs, Volume= 0.732 af, Atten= 68%, Lag= 21.6 min
Discarded = 0.25 cfs @ 8.80 hrs, Volume= 0.332 af
Primary = 2.32 cfs @ 12.47 hrs, Volume= 0.399 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 464.14' @ 12.47 hrs Surf.Area= 4,452 sf Storage= 9,713 cf

Plug-Flow detention time= 56.3 min calculated for 0.732 af (99% of inflow)
Center-of-Mass det. time= 51.7 min (812.2 - 760.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	461.40'	1,552 cf	**106.00'W x 42.00'L x 6.17'H Field A** 27,454 cf Overall - 23,573 cf Embedded = 3,881 cf x 40.0% Voids
#2A	461.90'	18,559 cf	**retain_it retain_it 5.0'** x 65 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 13 Rows adjusted for 374.0 cf perimeter wall
#3	466.50'	64 cf	**3.00'D x 4.50'H Riser** x 2 -Impervious
#4	454.65'	262 cf	**18.0" Round Pipe Storage** -Impervious L= 148.0' S= 0.0449 '/'
		20,437 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	461.90'	**8.0" Round Culvert** L= 148.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.90' / 454.65' S= 0.0490 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Discarded	461.40'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.25 cfs @ 8.80 hrs HW=461.40' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=2.31 cfs @ 12.47 hrs HW=464.13' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.31 cfs @ 6.63 fps)

Pond 111P: INFL. POND 1B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
13 Rows adjusted for 374.0 cf perimeter wall

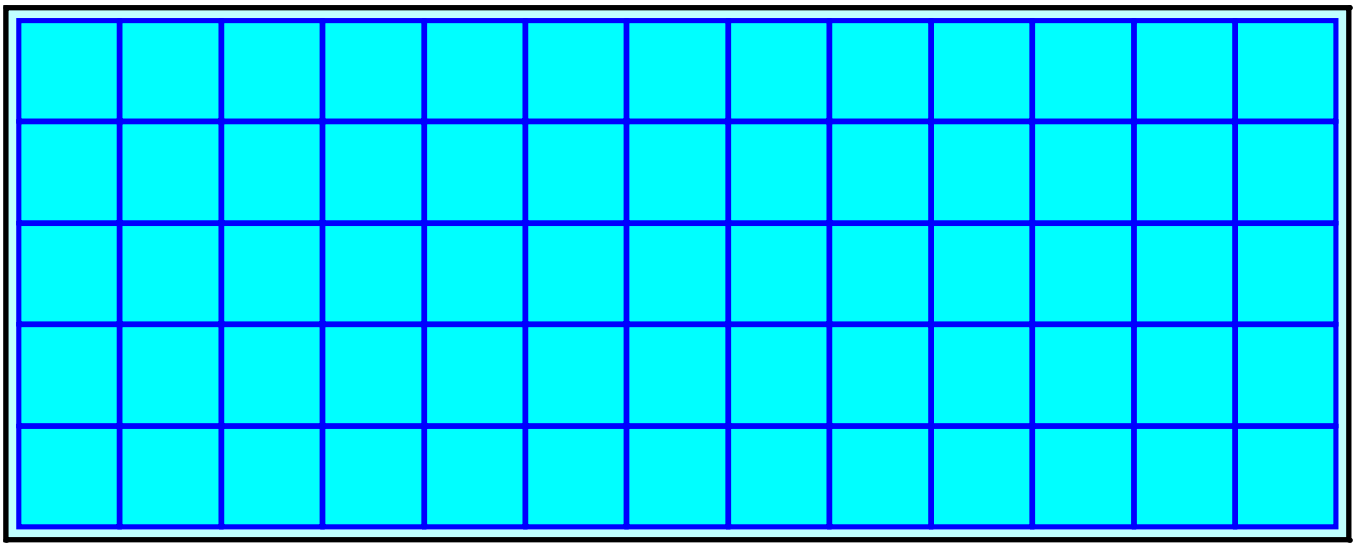
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
13 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 106.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 5 x 2 + 10.4 cf Endwall x 13 x 2 = 374.0 cf Perimeter Wall
65 Chambers x 291.3 cf - 374.0 cf Perimeter wall = 18,559.2 cf Chamber Storage
65 Chambers x 362.7 cf = 23,573.3 cf Displacement

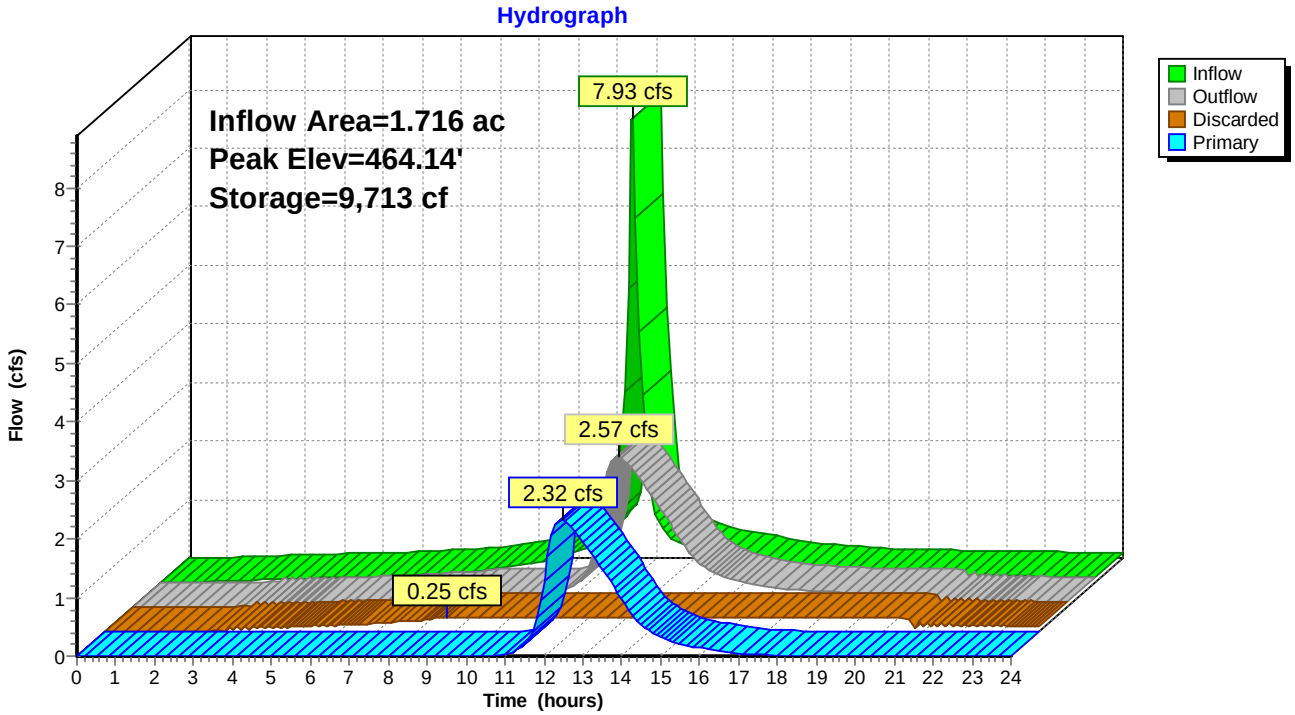
27,454.0 cf Field - 23,573.3 cf Chambers = 3,880.7 cf Stone x 40.0% Voids = 1,552.3 cf Stone Storage

Chamber Storage + Stone Storage = 20,111.4 cf = 0.462 af
Overall Storage Efficiency = 73.3%
Overall System Size = 42.00' x 106.00' x 6.17'

65 Chambers
1,016.8 cy Field
143.7 cy Stone



Pond 111P: INFL. POND 1B



Summary for Pond 113P: DETN. POND 3B

Inflow Area = 2.243 ac, 59.27% Impervious, Inflow Depth > 4.80" for 10-Year event
Inflow = 7.81 cfs @ 12.20 hrs, Volume= 0.897 af
Outflow = 7.02 cfs @ 12.29 hrs, Volume= 0.893 af, Atten= 10%, Lag= 5.8 min
Primary = 7.02 cfs @ 12.29 hrs, Volume= 0.893 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.92' @ 12.29 hrs Surf.Area= 2,688 sf Storage= 2,646 cf

Plug-Flow detention time= 10.2 min calculated for 0.893 af (100% of inflow)
Center-of-Mass det. time= 7.7 min (784.4 - 776.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	465.50'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	466.00'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	468.00'	14 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - risers**
		5,134 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	465.50'	**18.0" Round Culvert** L= 320.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.50' / 462.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.99 cfs @ 12.29 hrs HW=466.91' (Free Discharge)
1=Culvert (Inlet Controls 6.99 cfs @ 4.05 fps)

Pond 113P: DETN. POND 3B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

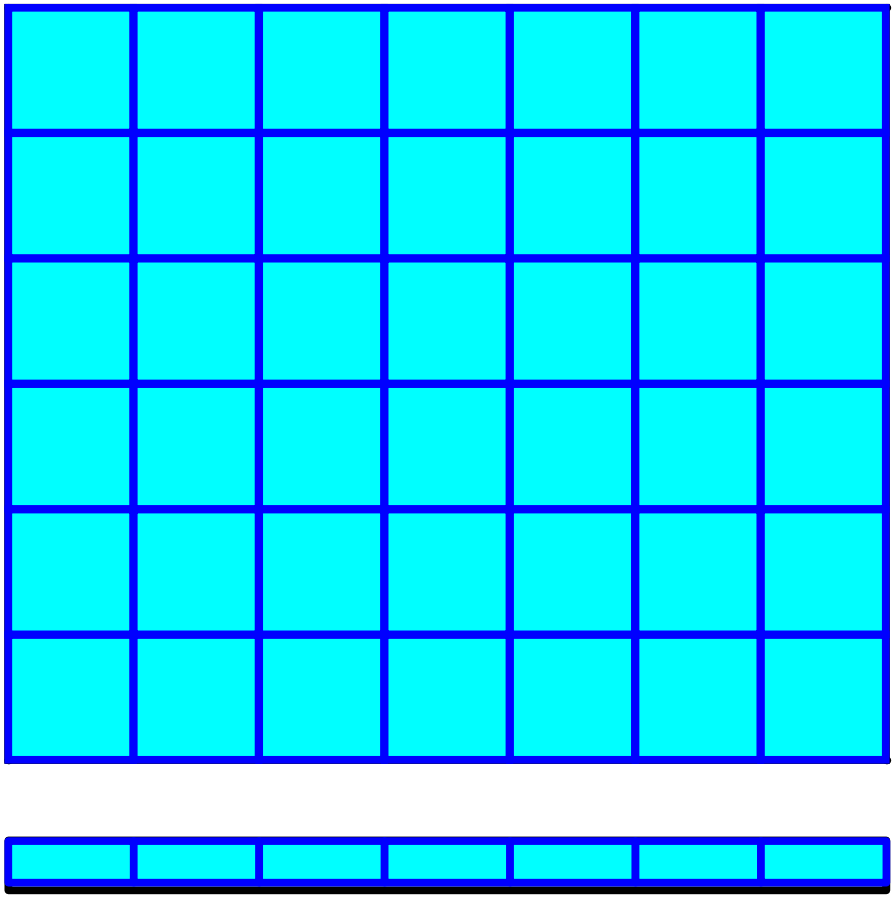
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

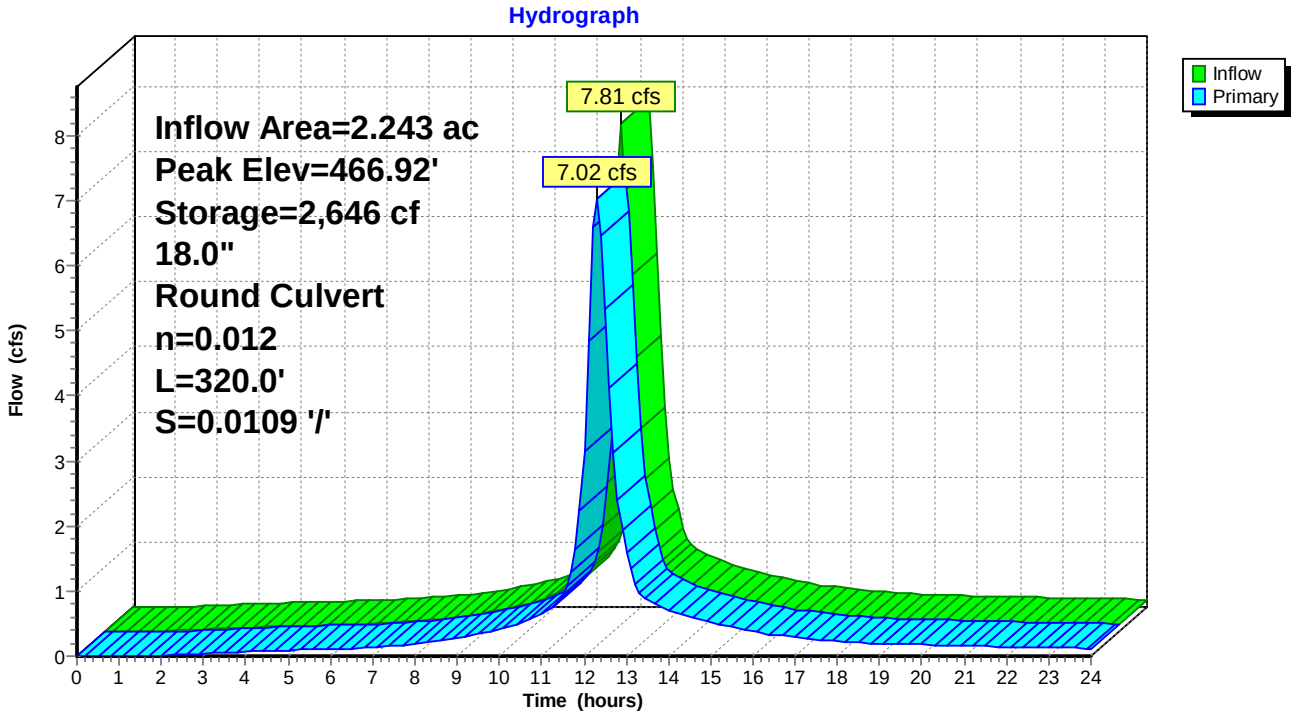
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 113P: DETN. POND 3B



Summary for Pond 114P: DETN. POND 4B

Inflow Area = 0.656 ac, 81.20% Impervious, Inflow Depth > 5.36" for 10-Year event
Inflow = 3.12 cfs @ 12.11 hrs, Volume= 0.293 af
Outflow = 2.36 cfs @ 12.23 hrs, Volume= 0.291 af, Atten= 24%, Lag= 6.9 min
Primary = 2.36 cfs @ 12.23 hrs, Volume= 0.291 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 463.69' @ 12.23 hrs Surf.Area= 2,368 sf Storage= 1,263 cf

Plug-Flow detention time= 16.0 min calculated for 0.290 af (99% of inflow)
Center-of-Mass det. time= 12.0 min (768.2 - 756.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.80'	461 cf	**96.00'W x 24.00'L x 4.17'H Field A** 9,600 cf Overall - 8,448 cf Embedded = 1,152 cf x 40.0% Voids
#2A	463.30'	6,000 cf	**retain_it retain_it 3.0'** x 36 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 12 Rows adjusted for 141.6 cf perimeter wall
#3	465.80'	42 cf	**3.00'D x 3.00'H Riser** x 2
#4	462.80'	78 cf	**18.0" Round Pipe Storage** L= 44.0' S= 0.0114 '/'
		6,581 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	462.80'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 462.80' / 462.30' S= 0.0114 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.30 cfs @ 12.23 hrs HW=463.67' (Free Discharge)
1=Culvert (Inlet Controls 2.30 cfs @ 3.18 fps)

Pond 114P: DETN. POND 4B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
12 Rows adjusted for 141.6 cf perimeter wall

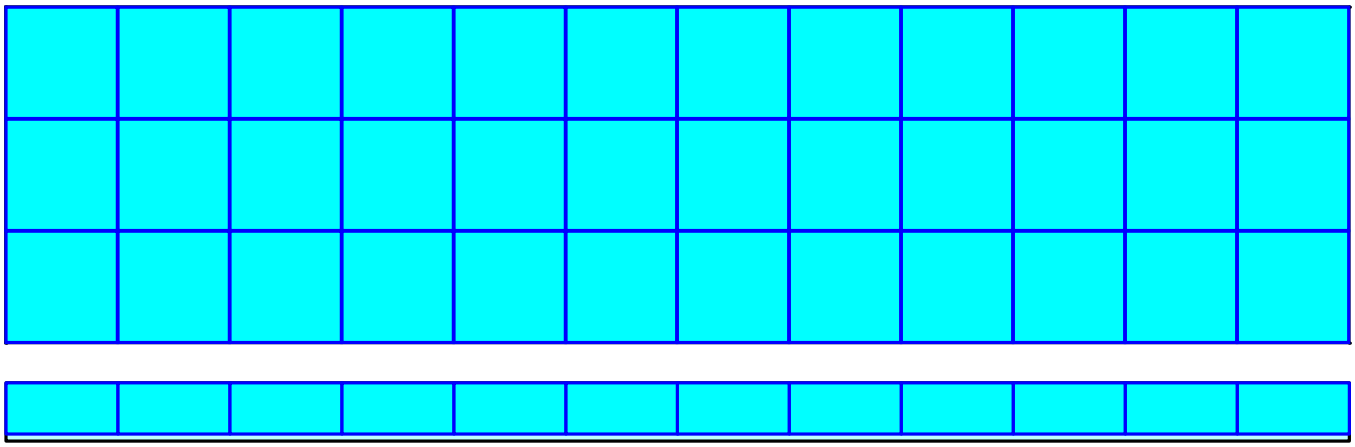
3 Chambers/Row x 8.00' Long = 24.00' Row Length
12 Rows x 96.0" Wide = 96.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 12 x 2 = 141.6 cf Perimeter Wall
36 Chambers x 170.6 cf - 141.6 cf Perimeter wall = 6,000.4 cf Chamber Storage
36 Chambers x 234.7 cf = 8,448.0 cf Displacement

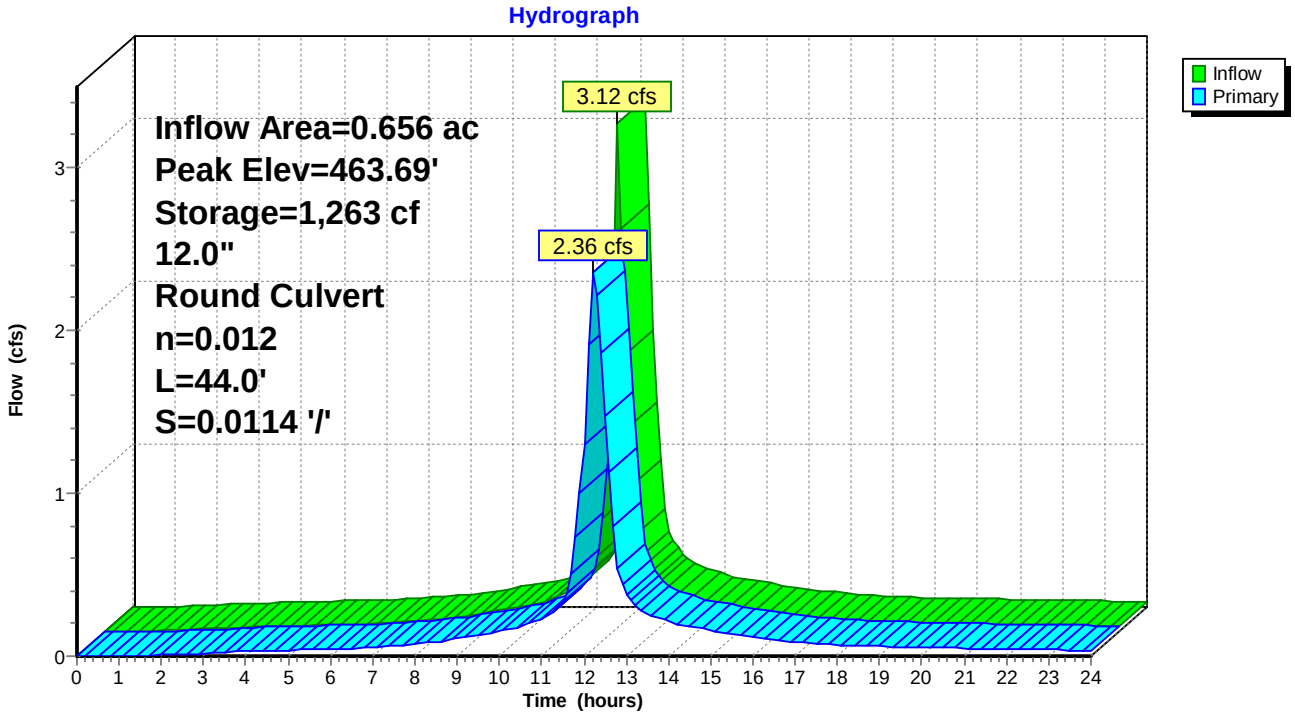
9,600.0 cf Field - 8,448.0 cf Chambers = 1,152.0 cf Stone x 40.0% Voids = 460.8 cf Stone Storage

Chamber Storage + Stone Storage = 6,461.2 cf = 0.148 af
Overall Storage Efficiency = 67.3%
Overall System Size = 24.00' x 96.00' x 4.17'

36 Chambers
355.6 cy Field
42.7 cy Stone



Pond 114P: DETN. POND 4B



Summary for Pond 210P: Northwest Wetland

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth > 3.15" for 10-Year event
Inflow = 2.71 cfs @ 12.29 hrs, Volume= 0.290 af
Outflow = 2.72 cfs @ 12.29 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.2 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 2.72 cfs @ 12.29 hrs, Volume= 0.290 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 465.42' @ 12.29 hrs Surf.Area= 109 sf Storage= 18 cf

Plug-Flow detention time= 0.1 min calculated for 0.290 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (841.3 - 841.3)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

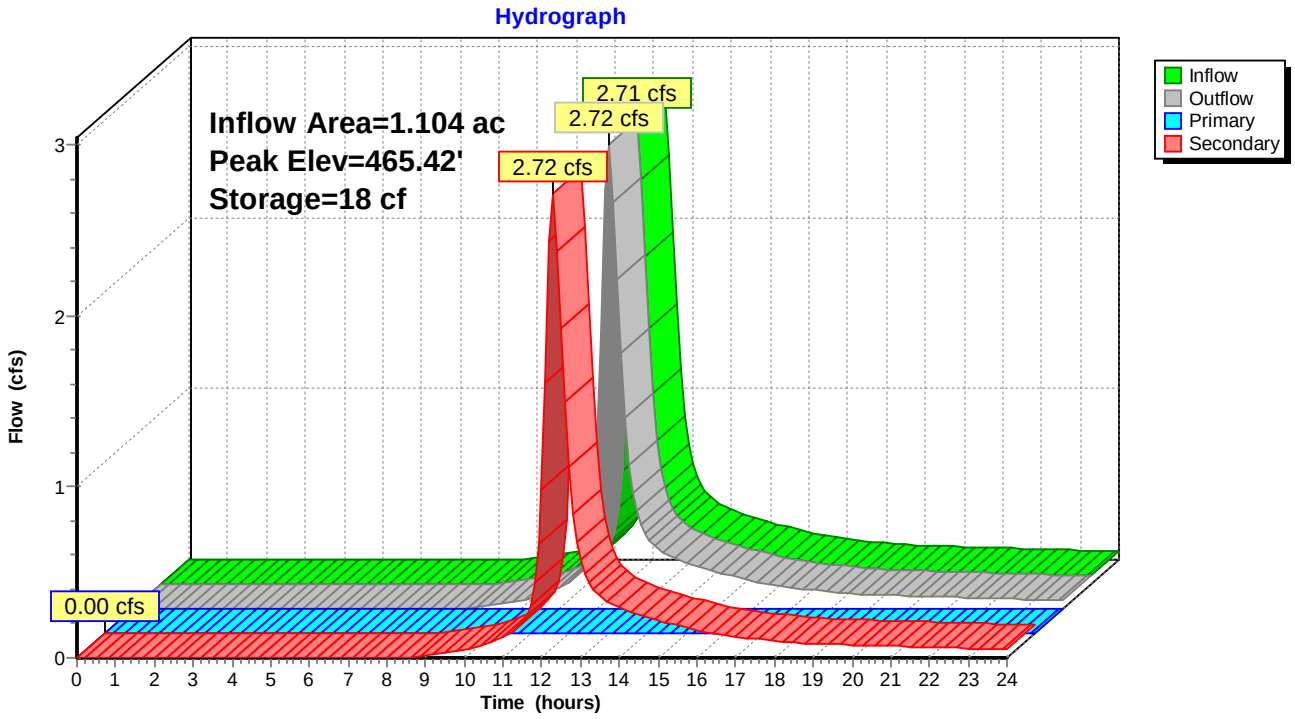
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing channel - model as b/c w** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**5.0' long x 1.0' breadth Flow to New Channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=465.00' (Free Discharge)
└**1=Discharge to West to Existing channel - model as b/c weir** (Controls 0.00 cfs)

Secondary OutFlow Max=2.70 cfs @ 12.29 hrs HW=465.42' (Free Discharge)
└**2=Flow to New Channel - model as b/c weir** (Weir Controls 2.70 cfs @ 1.58 fps)

Pond 210P: Northwest Wetland

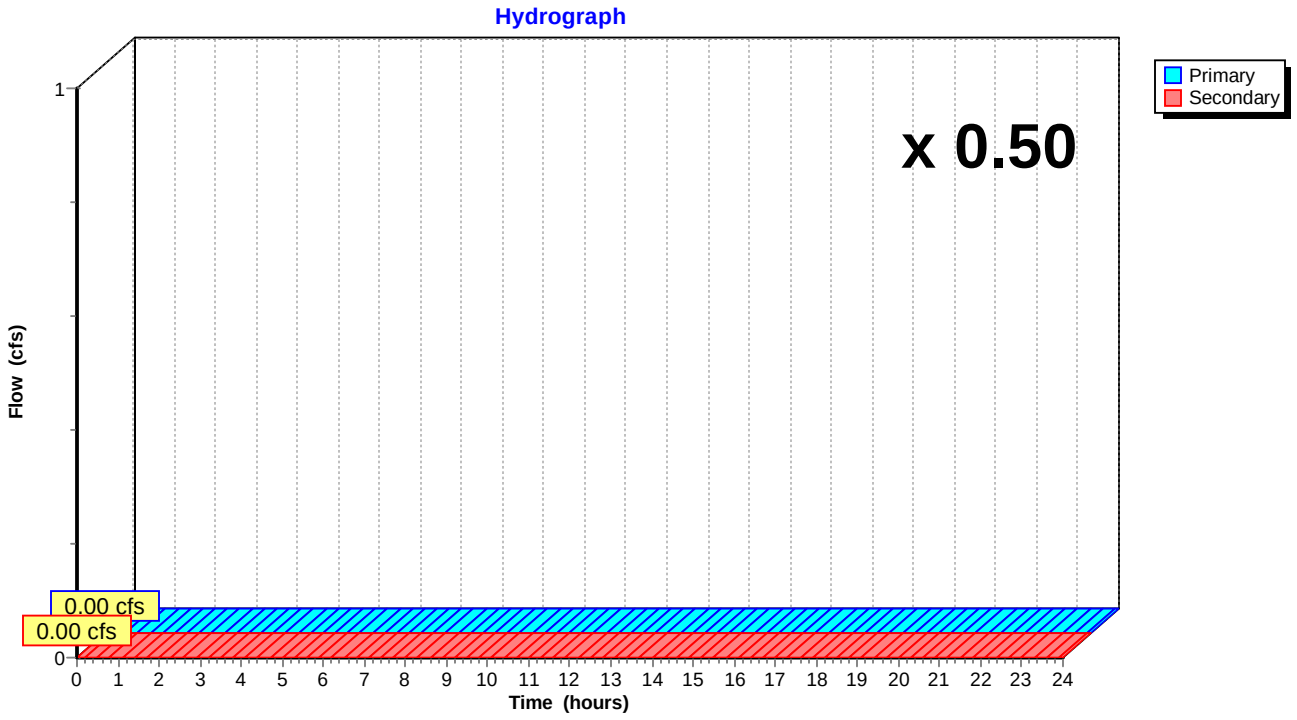


Summary for Link 9L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 9L: Diverging Flow



Time span=0.00-24.00 hrs, dt=0.10 hrs, 241 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 21S: BLDG 2 East and BLDG 1 Runoff Area=71,065 sf 79.38% Impervious Runoff Depth>7.01"
Tc=10.0 min CN=74/98 Runoff=9.77 cfs 0.953 af

Subcatchment 22S: BLDG 1 West Runoff Area=10,930 sf 74.42% Impervious Runoff Depth>6.87"
Tc=10.0 min CN=74/98 Runoff=1.48 cfs 0.144 af

Subcatchment 23S: PARKING DECK (top) Runoff Area=25,493 sf 94.05% Impervious Runoff Depth>7.43"
Tc=10.0 min CN=74/98 Runoff=3.66 cfs 0.362 af

Subcatchment 28S: BLDG 5 LL PKG Runoff Area=10,149 sf 91.42% Impervious Runoff Depth>7.35"
Tc=10.0 min CN=74/98 Runoff=1.45 cfs 0.143 af

Subcatchment 30S: BLDG 4 1/3 of ROOF Runoff Area=10,155 sf 100.00% Impervious Runoff Depth>7.60"
Tc=6.0 min CN=0/98 Runoff=1.67 cfs 0.148 af

Subcatchment 31S: BLDG 3 North Runoff Area=51,616 sf 68.73% Impervious Runoff Depth>6.68"
Flow Length=189' Slope=0.0237 '/' Tc=10.1 min CN=73/98 Runoff=6.81 cfs 0.659 af

Subcatchment 32S: BLDG 4 East and BLDG 3 Runoff Area=33,395 sf 67.17% Impervious Runoff Depth>6.97"
Tc=10.0 min CN=82/98 Runoff=4.63 cfs 0.445 af

Subcatchment 33S: Northerly Offsite to BLDG 3 Runoff Area=12,685 sf 0.00% Impervious Runoff Depth>4.32"
Flow Length=90' Slope=0.0322 '/' Tc=10.0 min CN=70/0 Runoff=1.21 cfs 0.105 af

Subcatchment 34S: BLDG 4 South Runoff Area=18,423 sf 70.83% Impervious Runoff Depth>6.77"
Tc=10.0 min CN=74/98 Runoff=2.47 cfs 0.239 af

Subcatchment 41S: BLDG 4 West and North Runoff Area=28,818 sf 81.57% Impervious Runoff Depth>7.07"
Tc=10.0 min CN=74/98 Runoff=3.99 cfs 0.390 af

Subcatchment 48S: West P-Stream Area Runoff Area=34,984 sf 0.00% Impervious Runoff Depth>3.87"
Flow Length=300' Slope=0.0500 '/' Tc=10.0 min CN=66/0 Runoff=2.97 cfs 0.259 af

Subcatchment 49S: P-Wetland Runoff Area=27,172 sf 0.00% Impervious Runoff Depth>3.76"
Flow Length=345' Slope=0.0600 '/' Tc=8.4 min CN=65/0 Runoff=2.39 cfs 0.195 af

Subcatchment 50S: Runoff from Proposed Runoff Area=60,868 sf 80.69% Impervious Runoff Depth>7.05"
Tc=12.0 min CN=74/98 Runoff=7.95 cfs 0.821 af

Subcatchment 51S: BLDG 5 area Runoff Area=32,450 sf 76.58% Impervious Runoff Depth>6.93"
Tc=10.0 min CN=74/98 Runoff=4.42 cfs 0.430 af

Subcatchment 71S: Amenities 1 and 2 Runoff Area=35,555 sf 51.73% Impervious Runoff Depth>6.23"
Flow Length=124' Slope=0.0106 '/' Tc=10.0 min CN=74/98 Runoff=4.49 cfs 0.424 af

Subcatchment 72S: Amenities 2 and 3 + Pave Runoff Area=28,428 sf 70.52% Impervious Runoff Depth>6.70"
Flow Length=380' Slope=0.0308 '/' Tc=10.0 min CN=72/98 Runoff=3.76 cfs 0.364 af

Subcatchment 90S: Northeast to Offsite Runoff Area=3,287 sf 0.00% Impervious Runoff Depth>4.32"
Flow Length=69' Slope=0.2520 '/' Tc=10.0 min CN=70/0 Runoff=0.31 cfs 0.027 af

Subcatchment 91S: Northwest Wooded and Runoff Area=48,103 sf 0.00% Impervious Runoff Depth>4.65"
Tc=20.0 min CN=73/0 Runoff=4.01 cfs 0.428 af

Subcatchment 92S: Easterly Wooded to Runoff Area=47,176 sf 0.00% Impervious Runoff Depth>4.43"
Flow Length=655' Slope=0.0674 '/' Tc=11.3 min CN=71/0 Runoff=4.43 cfs 0.400 af

Subcatchment 93S: Overland to Pine Hill Runoff Area=13,547 sf 0.00% Impervious Runoff Depth>4.55"
Tc=10.0 min CN=72/0 Runoff=1.36 cfs 0.118 af

Subcatchment 101S: Contributing Existing Runoff Area=182.196 ac 38.00% Impervious Runoff Depth>4.83"
Tc=120.0 min CN=61/98 Runoff=244.41 cfs 73.357 af

Subcatchment 102S: Contributing Existing Runoff Area=49.270 ac 48.27% Impervious Runoff Depth>6.07"
Tc=75.0 min CN=74/98 Runoff=113.11 cfs 24.909 af

Subcatchment 201S: BLDG 1 ROOF Runoff Area=28,260 sf 100.00% Impervious Runoff Depth>7.60"
Tc=6.0 min CN=0/98 Runoff=4.65 cfs 0.411 af

Subcatchment 202S: BLDG 2 ROOF Runoff Area=28,346 sf 100.00% Impervious Runoff Depth>7.60"
Tc=6.0 min CN=0/98 Runoff=4.66 cfs 0.412 af

Subcatchment 203S: BLDG 3 ROOF Runoff Area=38,210 sf 100.00% Impervious Runoff Depth>7.60"
Tc=6.0 min CN=0/98 Runoff=6.29 cfs 0.555 af

Subcatchment 204S: BLDG 4 2/3 of ROOF Runoff Area=20,310 sf 100.00% Impervious Runoff Depth>7.60"
Tc=6.0 min CN=0/98 Runoff=3.34 cfs 0.295 af

Subcatchment 205S: BLDG 5 ROOF Runoff Area=14,325 sf 100.00% Impervious Runoff Depth>7.60"
Tc=6.0 min CN=0/98 Runoff=2.36 cfs 0.208 af

Reach 13R: Stream Channel from Brandt to Avg. Flow Depth=0.56' Max Vel=5.86 fps Inflow=38.38 cfs 5.199 af
n=0.030 L=280.0' S=0.0371 '/' Capacity=593.73 cfs Outflow=37.91 cfs 5.196 af

Reach 20R: existing stream on west side Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=545.0' S=0.0073 '/' Capacity=371.73 cfs Outflow=0.00 cfs 0.000 af

Reach 22R: Combined stream into culvert Avg. Flow Depth=0.27' Max Vel=2.37 fps Inflow=5.60 cfs 0.684 af
n=0.040 L=282.0' S=0.0266 '/' Capacity=653.19 cfs Outflow=5.54 cfs 0.682 af

Reach 27R: (new Reach) Inflow=3.91 cfs 0.218 af
Outflow=3.91 cfs 0.218 af

Reach 81R: West Proposed Stream Avg. Flow Depth=0.44' Max Vel=2.23 fps Inflow=5.67 cfs 0.686 af
n=0.025 L=362.0' S=0.0061 '/' Capacity=205.07 cfs Outflow=5.60 cfs 0.684 af

Reach 83R: Northerly P-Stream Avg. Flow Depth=0.37' Max Vel=1.95 fps Inflow=4.02 cfs 0.428 af
n=0.025 L=300.0' S=0.0057 '/' Capacity=198.02 cfs Outflow=3.83 cfs 0.427 af

Reach 94R: Southeast BVW Inflow=4.43 cfs 0.400 af
Outflow=4.43 cfs 0.400 af

Reach 95R: Pine Hill Road Inflow=5.74 cfs 0.518 af
Outflow=5.74 cfs 0.518 af

Reach X2: Area Summary Post (Not a physical location) Inflow=41.30 cfs 5.741 af
Outflow=41.30 cfs 5.741 af

Pond 19P: INFL. POND 3C Peak Elev=475.11' Storage=7,476 cf Inflow=6.29 cfs 0.555 af
Discarded=0.17 cfs 0.267 af Primary=3.91 cfs 0.218 af Outflow=4.08 cfs 0.485 af

Pond 26P: Subsurface Infiltration Basin from Peak Elev=463.11' Storage=11,576 cf Inflow=7.95 cfs 0.821 af
Discarded=0.55 cfs 0.711 af Primary=2.90 cfs 0.110 af Outflow=3.46 cfs 0.821 af

Pond 29P: DETN. POND 5B Peak Elev=455.12' Storage=2,037 cf Inflow=1.45 cfs 0.143 af
Discarded=0.17 cfs 0.143 af Primary=0.00 cfs 0.000 af Outflow=0.17 cfs 0.143 af

Pond 82P: Proposed Wetland above new Box Peak Elev=456.86' Storage=515 cf Inflow=30.48 cfs 3.552 af
144.0" x 48.0" Box Culvert n=0.015 L=52.0' S=0.0135 '/' Outflow=30.49 cfs 3.551 af

Pond 101P: DETN. POND 1A Peak Elev=457.45' Storage=10,061 cf Inflow=9.77 cfs 0.953 af
12.0" Round Culvert n=0.012 L=140.0' S=0.0050 '/' Outflow=3.70 cfs 0.942 af

Pond 102P: INFIL. POND 2 Peak Elev=467.67' Storage=21,598 cf Inflow=11.95 cfs 1.138 af
Discarded=0.16 cfs 0.284 af Primary=4.95 cfs 0.504 af Outflow=5.12 cfs 0.789 af

Pond 103P: DETN. POND 3A Peak Elev=469.07' Storage=3,258 cf Inflow=8.01 cfs 0.764 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=6.03 cfs 0.761 af

Pond 104P: INFL. POND 4A Peak Elev=465.35' Storage=10,851 cf Inflow=7.25 cfs 0.685 af
Discarded=0.10 cfs 0.176 af Primary=4.22 cfs 0.365 af Outflow=4.32 cfs 0.541 af

Pond 105P: DETN. POND 5A Peak Elev=463.25' Storage=10,363 cf Inflow=6.71 cfs 0.639 af
Discarded=0.59 cfs 0.638 af Primary=0.00 cfs 0.000 af Outflow=0.59 cfs 0.638 af

Pond 111P: INFL. POND 1B Peak Elev=465.07' Storage=13,273 cf Inflow=10.49 cfs 0.978 af
Discarded=0.25 cfs 0.377 af Primary=2.83 cfs 0.596 af Outflow=3.08 cfs 0.973 af

Pond 113P: DETN. POND 3B Peak Elev=467.33' Storage=3,588 cf Inflow=10.06 cfs 1.206 af
18.0" Round Culvert n=0.012 L=320.0' S=0.0109 '/' Outflow=8.85 cfs 1.202 af

Pond 114P: DETN. POND 4B Peak Elev=463.90' Storage=1,714 cf Inflow=4.09 cfs 0.386 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0114 '/' Outflow=2.94 cfs 0.384 af

Pond 210P: Northwest Wetland Peak Elev=465.52' Storage=31 cf Inflow=4.01 cfs 0.428 af
Primary=0.00 cfs 0.000 af Secondary=4.02 cfs 0.428 af Outflow=4.02 cfs 0.428 af

Link 9L: Diverging Flow x 0.50
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 248.311 ac Runoff Volume = 107.203 af Average Runoff Depth = 5.18"
58.43% Pervious = 145.093 ac 41.57% Impervious = 103.218 ac

Summary for Subcatchment 21S: BLDG 2 East and BLDG 1 South

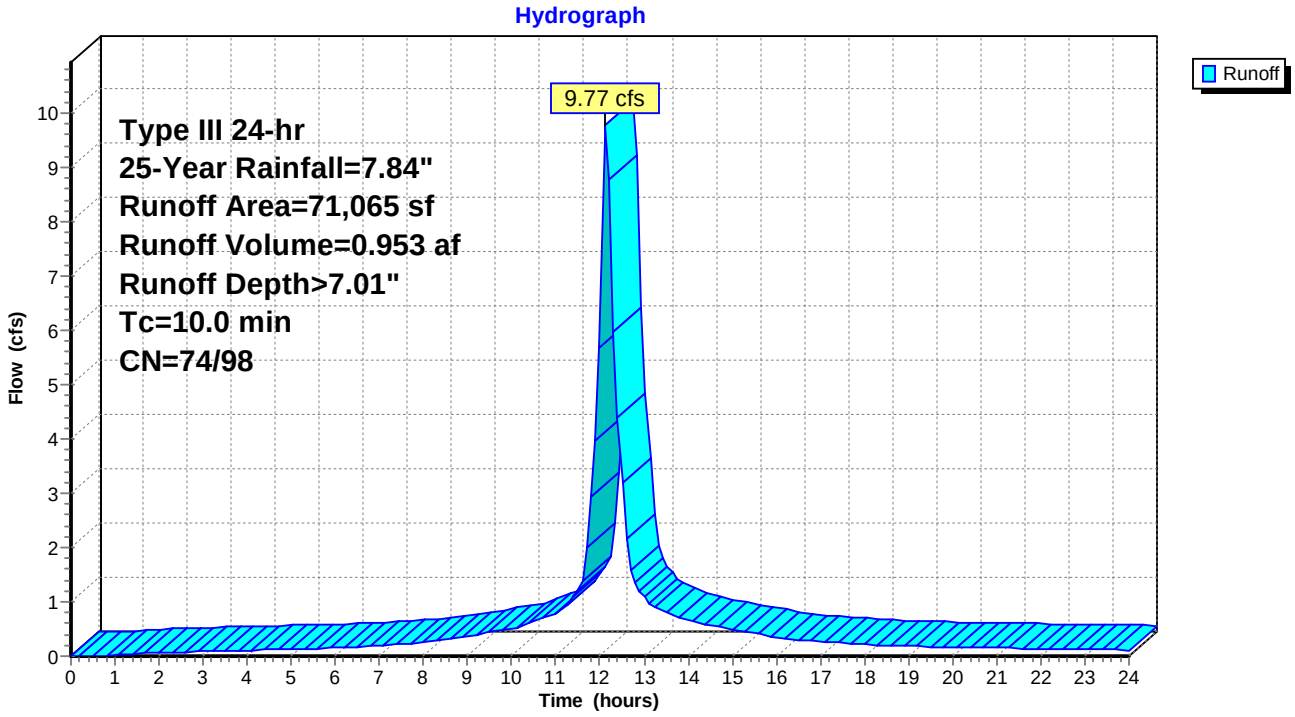
Runoff = 9.77 cfs @ 12.13 hrs, Volume= 0.953 af, Depth> 7.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	2,198	74	Grass, good, HSG C to CB16
*	10,610	98	Pavement to CB16
*	1,481	74	Grass, good, HSG C to CB18
*	8,712	98	Pavement to CB18
*	257	74	Grass, good, HSG C to CB14
*	4,521	98	Pavement to CB14
*	1,595	74	Grass, good, HSG C to CB12
*	9,297	98	Pavement to CB12
*	1,034	74	Grass, good, HSG C to CB28
*	4,655	98	Pavement to CB28
*	2,021	74	Grass, good, HSG C to CB26
*	4,692	98	Pavement to CB26
*	2,054	74	Grass, good, HSG C to CB24
*	7,783	98	Pavement to CB24
*	4,016	74	Grass, good, HSG C to CB20
*	6,139	98	Pavement to CB20
	71,065	93	Weighted Average
	14,656	74	20.62% Pervious Area
	56,409	98	79.38% Impervious Area

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

Subcatchment 21S: BLDG 2 East and BLDG 1 South



Summary for Subcatchment 22S: BLDG 1 West

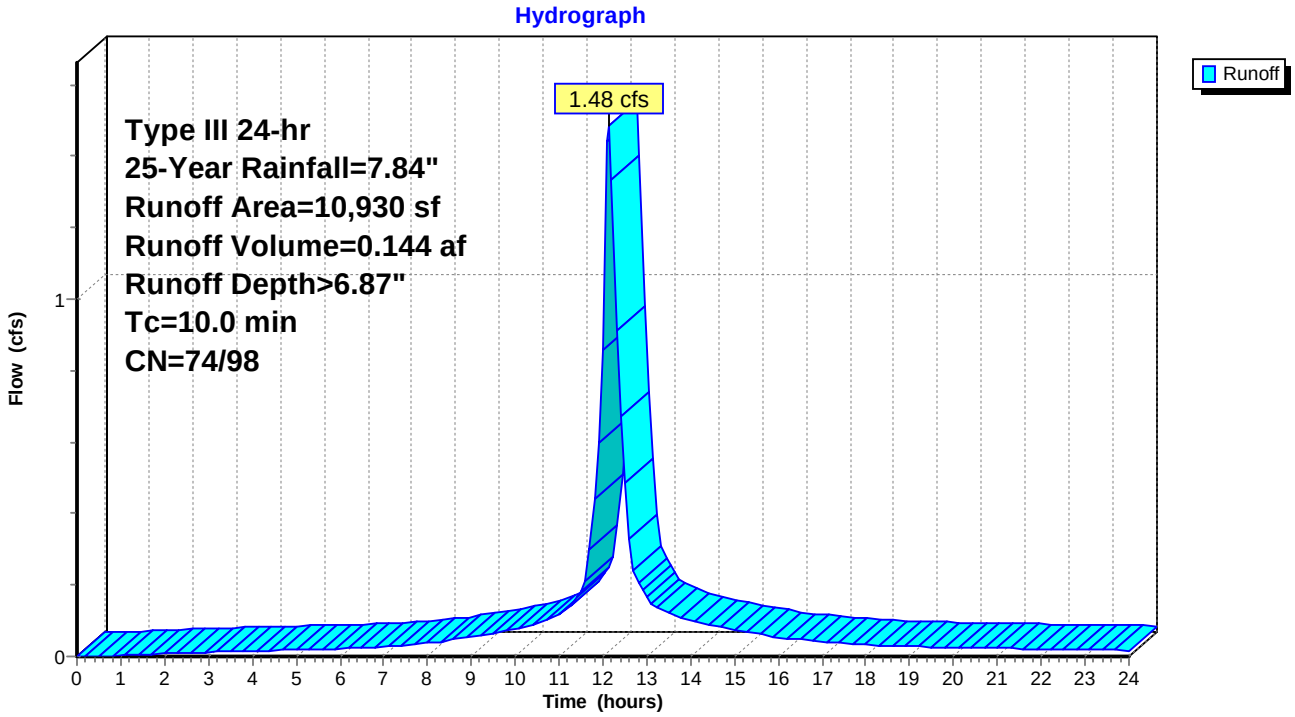
Runoff = 1.48 cfs @ 12.13 hrs, Volume= 0.144 af, Depth> 6.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
	2,796	74	>75% Grass cover, Good, HSG C
*	8,134	98	Pavement
	10,930	92	Weighted Average
	2,796	74	25.58% Pervious Area
	8,134	98	74.42% Impervious Area

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

Subcatchment 22S: BLDG 1 West



Summary for Subcatchment 23S: PARKING DECK (top)

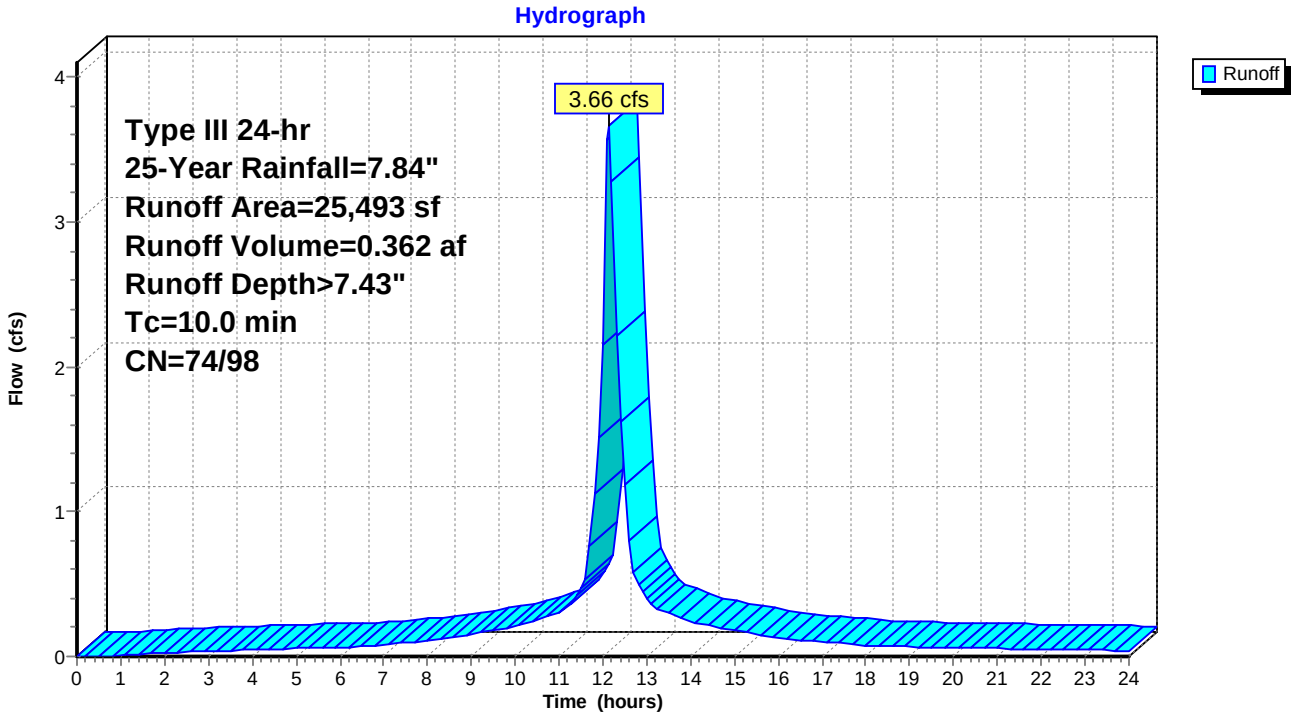
Runoff = 3.66 cfs @ 12.13 hrs, Volume= 0.362 af, Depth> 7.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
	1,518	74	>75% Grass cover, Good, HSG C
*	23,975	98	Pavement
	25,493	97	Weighted Average
	1,518	74	5.95% Pervious Area
	23,975	98	94.05% Impervious Area

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

Subcatchment 23S: PARKING DECK (top)



Summary for Subcatchment 28S: BLDG 5 LL PKG

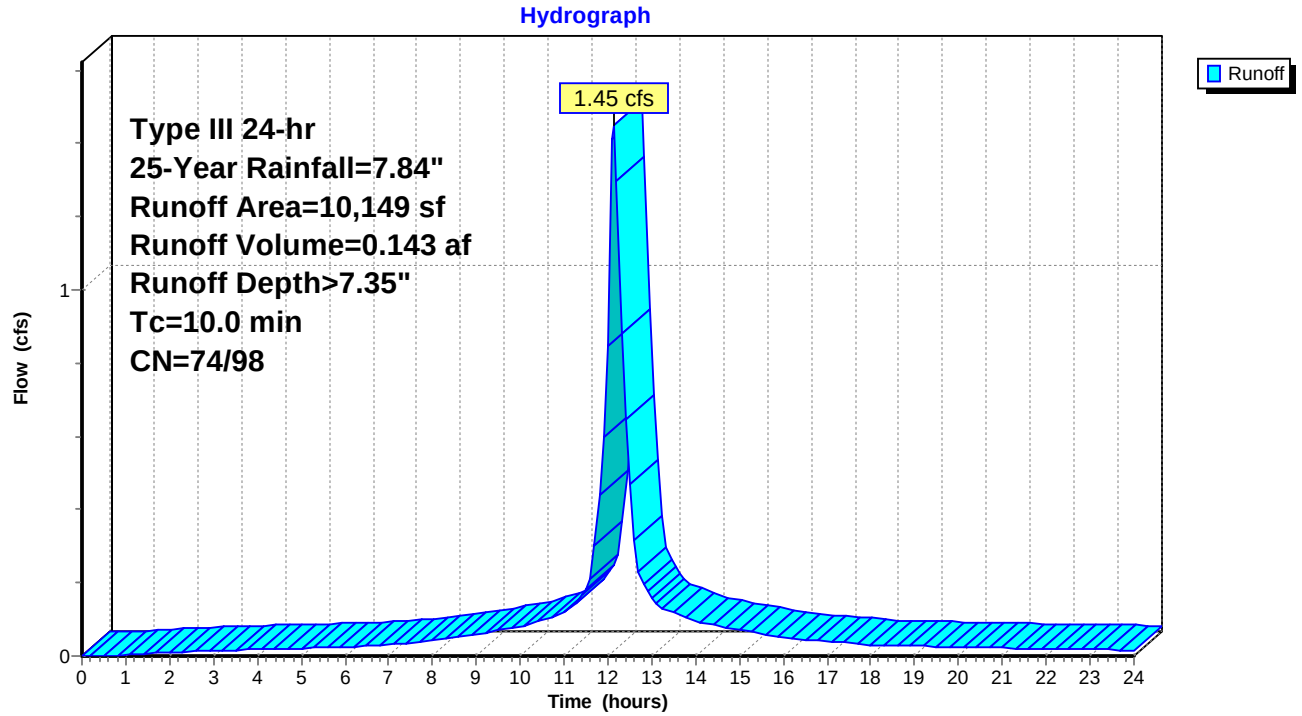
Runoff = 1.45 cfs @ 12.13 hrs, Volume= 0.143 af, Depth> 7.35"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	9,278	98	Impervious Pavement
	580	74	>75% Grass cover, Good, HSG C
*	291	74	Landscaped Areas
	10,149	96	Weighted Average
	871	74	8.58% Pervious Area
	9,278	98	91.42% Impervious Area

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

Subcatchment 28S: BLDG 5 LL PKG



Summary for Subcatchment 30S: BLDG 4 1/3 of ROOF

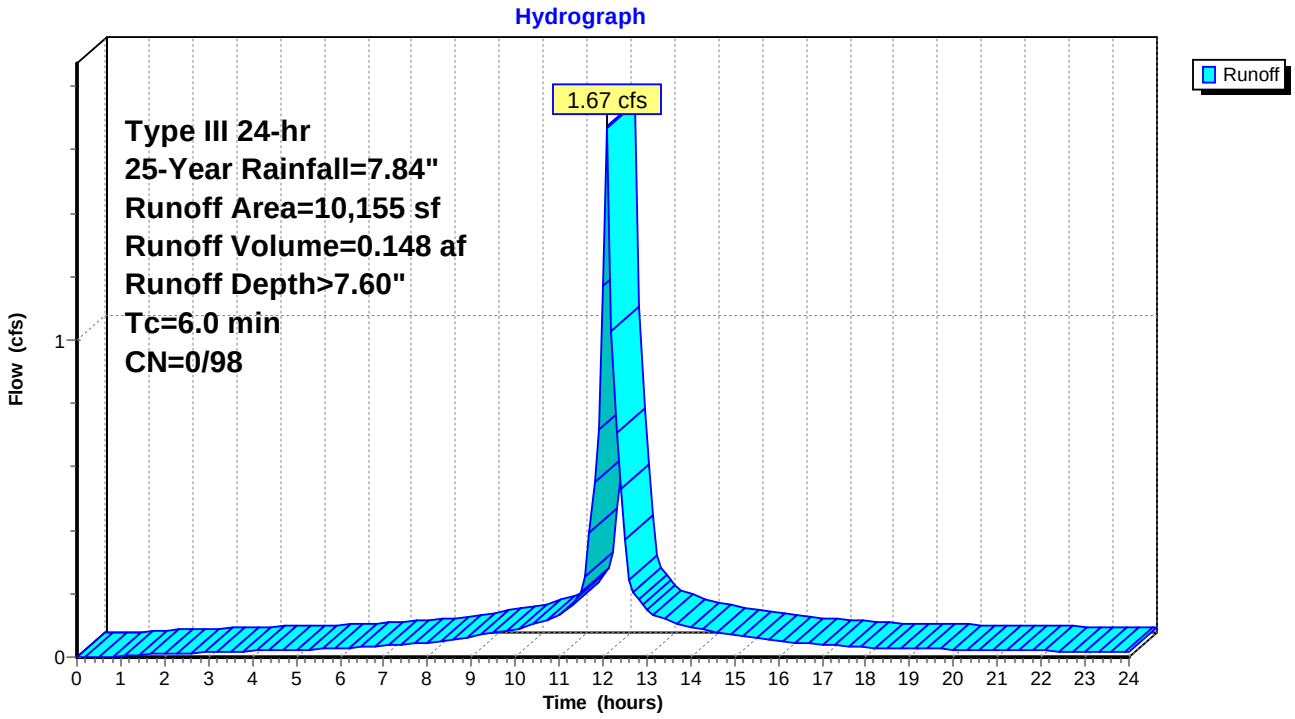
Runoff = 1.67 cfs @ 12.09 hrs, Volume= 0.148 af, Depth> 7.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	10,155	98	BLDG 4 ROOF
	10,155	98	100.00% Impervious Area

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

Subcatchment 30S: BLDG 4 1/3 of ROOF



Summary for Subcatchment 31S: BLDG 3 North

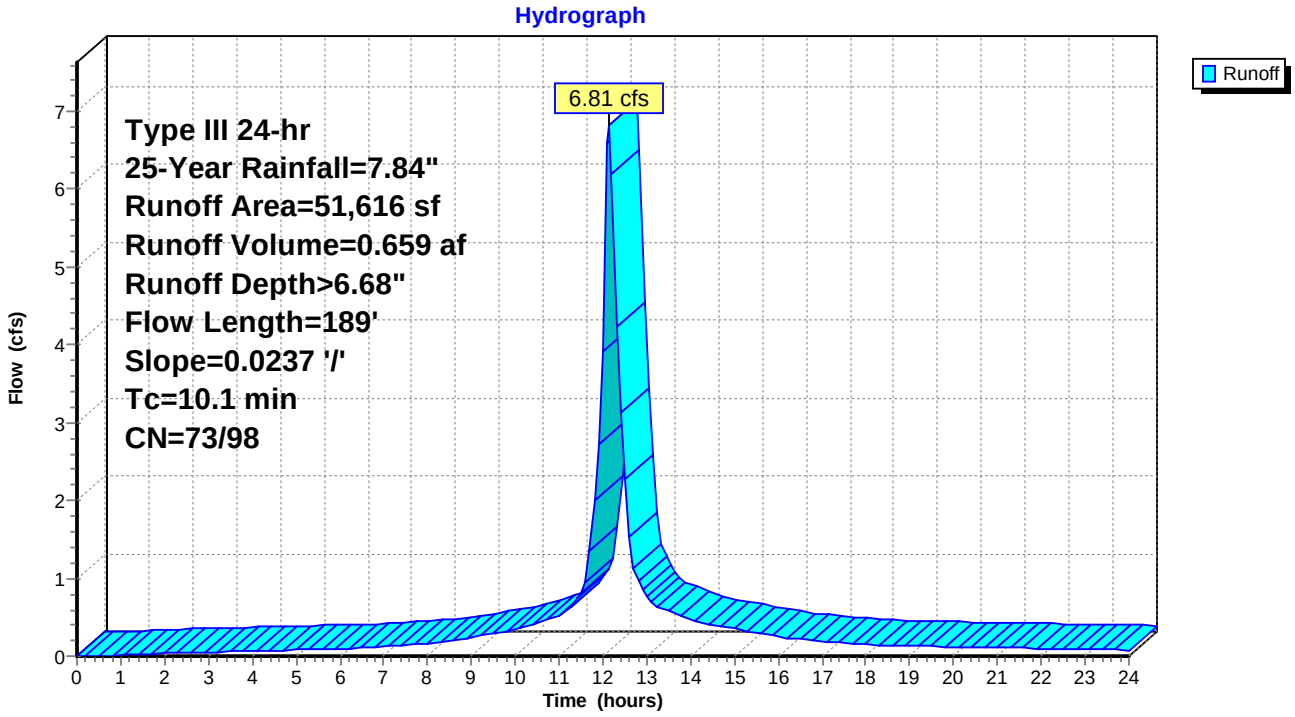
Runoff = 6.81 cfs @ 12.14 hrs, Volume= 0.659 af, Depth> 6.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	536	70	Woods, good, C to CB30
	4,684	74	>75% Grass cover, Good, HSG C
*	10,379	98	Pavement to CB30
*	1,010	74	Grass, good, C to CB30
*	1,892	70	Woods, good, C to CB32
*	642	74	Grass, good, C to CB32
*	3,648	98	Pavement to CB32
*	2,882	74	Grass, good, C to CB34
*	8,638	98	Pavement to CB34
*	3,104	74	Grass, good, C to CB58
*	9,564	98	Pavement to CB58
*	4,637	90	Amenity space, 70% impervious
	51,616	90	Weighted Average
	16,141	73	31.27% Pervious Area
	35,475	98	68.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	189	0.0237	0.82		**Lag/CN Method,**
6.3					**Direct Entry, round up to 10**
10.1	189	Total			

Subcatchment 31S: BLDG 3 North



Summary for Subcatchment 32S: BLDG 4 East and BLDG 3 West

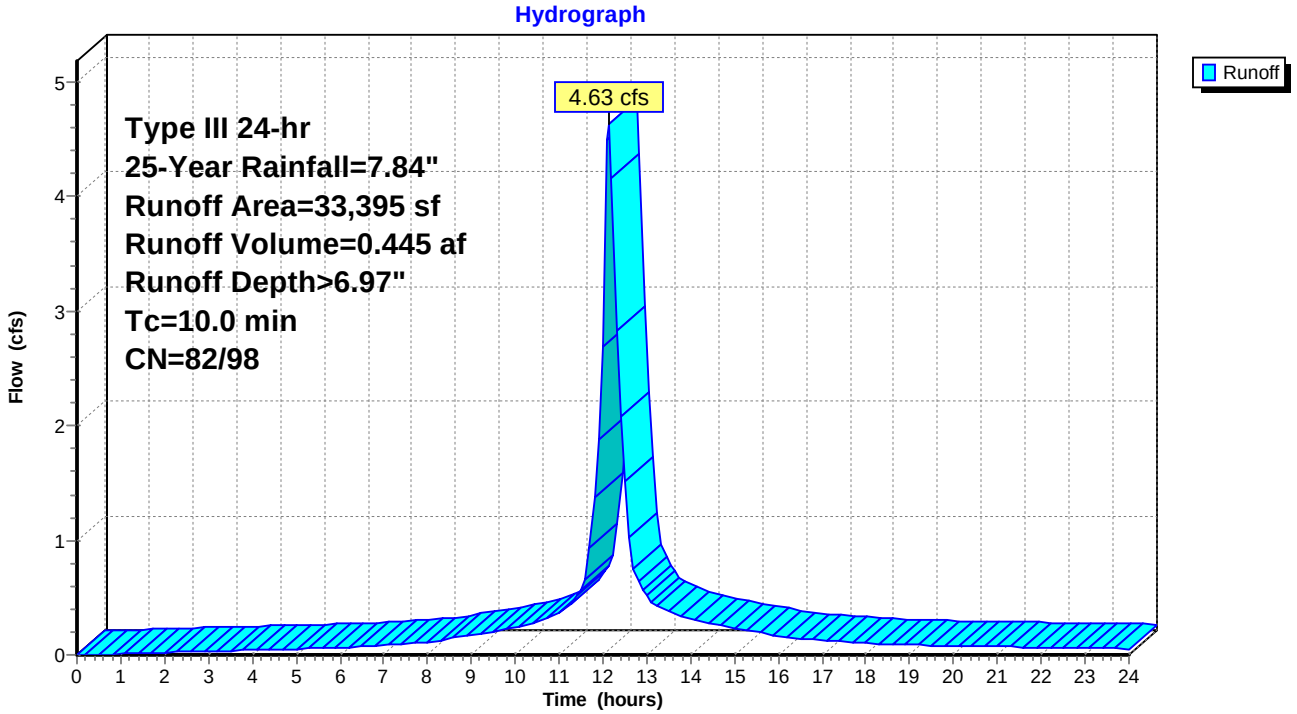
Runoff = 4.63 cfs @ 12.13 hrs, Volume= 0.445 af, Depth> 6.97"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	1,323	74	Grass, good, C to CB50
*	4,601	98	Pavement to CB50
*	1,023	74	Grass, good, C to CB52
*	6,739	98	Pavement to CB52
*	3,383	74	Grass, good, C to CB54
*	11,092	98	Pavement to CB54
*	5,234	90	Amenity area and landscaping
	33,395	93	Weighted Average
	10,963	82	32.83% Pervious Area
	22,432	98	67.17% Impervious Area

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

Subcatchment 32S: BLDG 4 East and BLDG 3 West



Summary for Subcatchment 33S: Northerly Offsite to BLDG 3 North

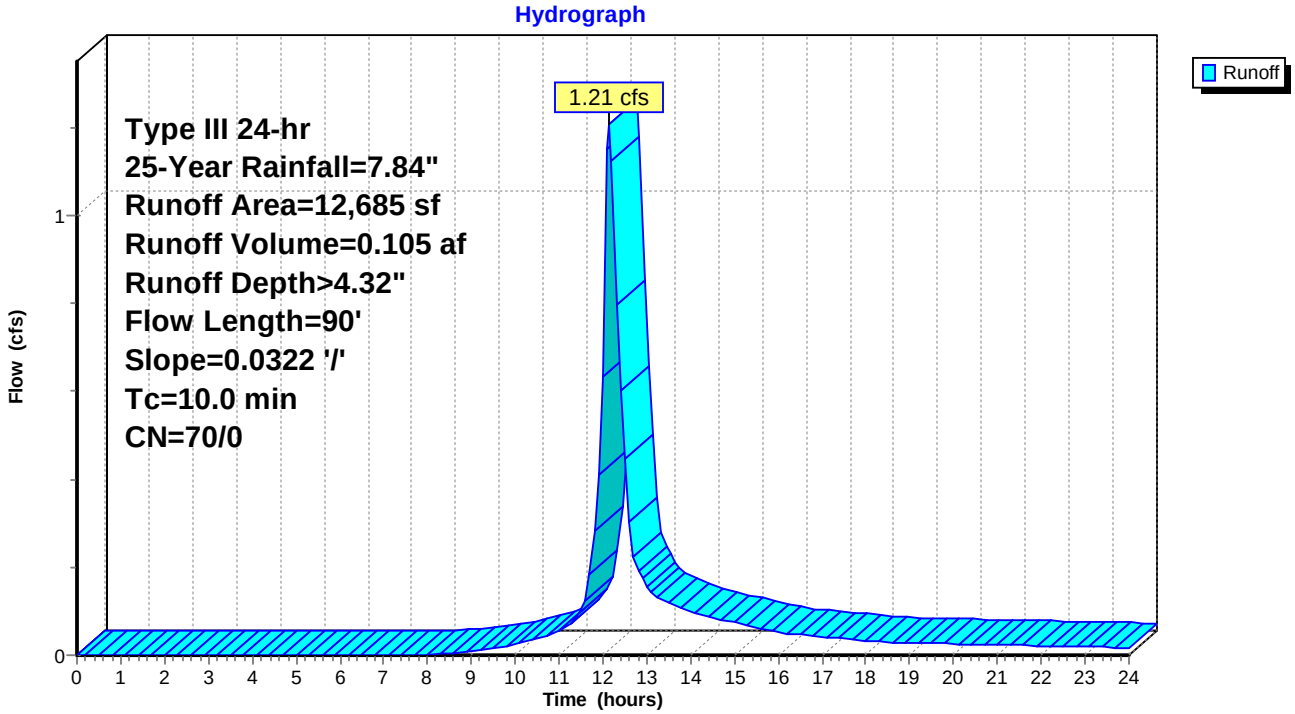
Runoff = 1.21 cfs @ 12.14 hrs, Volume= 0.105 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
12,685	70	Woods, Good, HSG C
12,685	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	90	0.0322	0.44		**Lag/CN Method,**
6.6					**Direct Entry, round up to 10**
10.0	90	Total			

Subcatchment 33S: Northerly Offsite to BLDG 3 North



Summary for Subcatchment 34S: BLDG 4 South

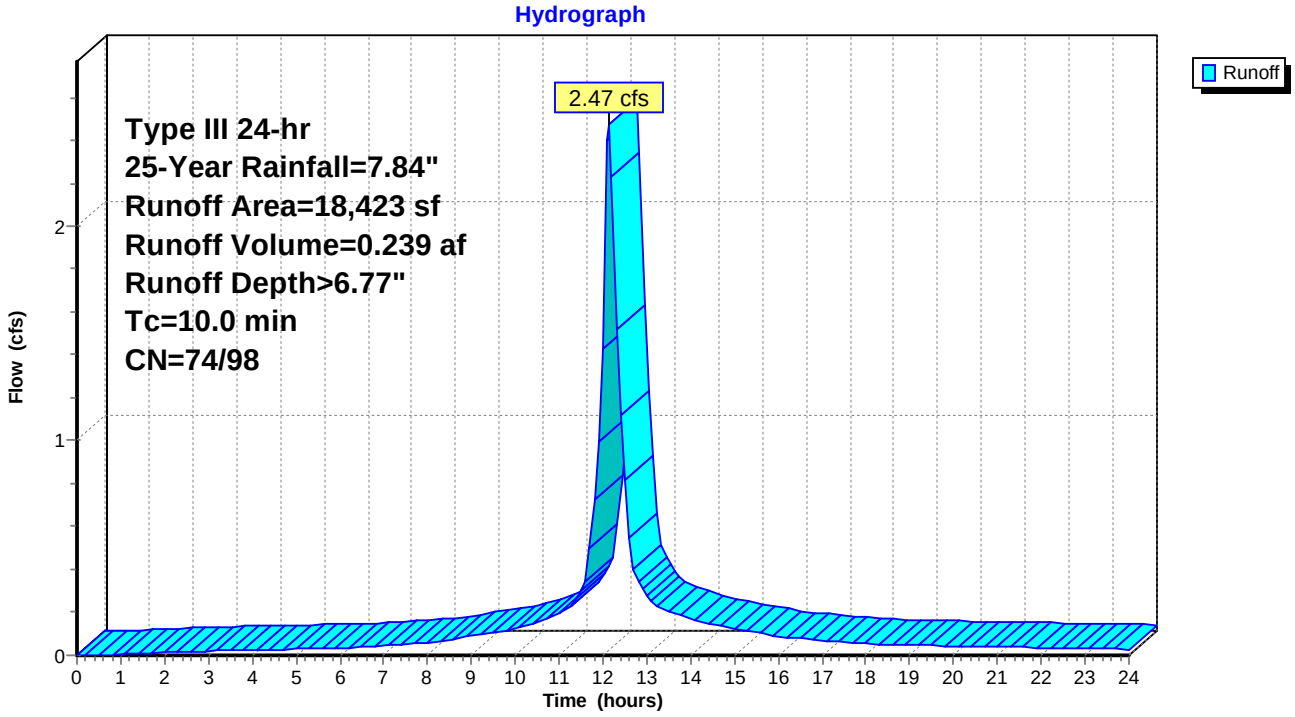
Runoff = 2.47 cfs @ 12.13 hrs, Volume= 0.239 af, Depth> 6.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	516	74	Grass, good, C to CB64
*	2,953	74	Park - Grass, good, C to CB64
*	6,515	98	Pavement to CB64
*	210	74	Grass, good, C to CB68
*	1,695	74	Park - Grass, good, C to CB68
*	6,534	98	Pavement to CB68
	18,423	91	Weighted Average
	5,374	74	29.17% Pervious Area
	13,049	98	70.83% Impervious Area

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

Subcatchment 34S: BLDG 4 South



Summary for Subcatchment 41S: BLDG 4 West and North

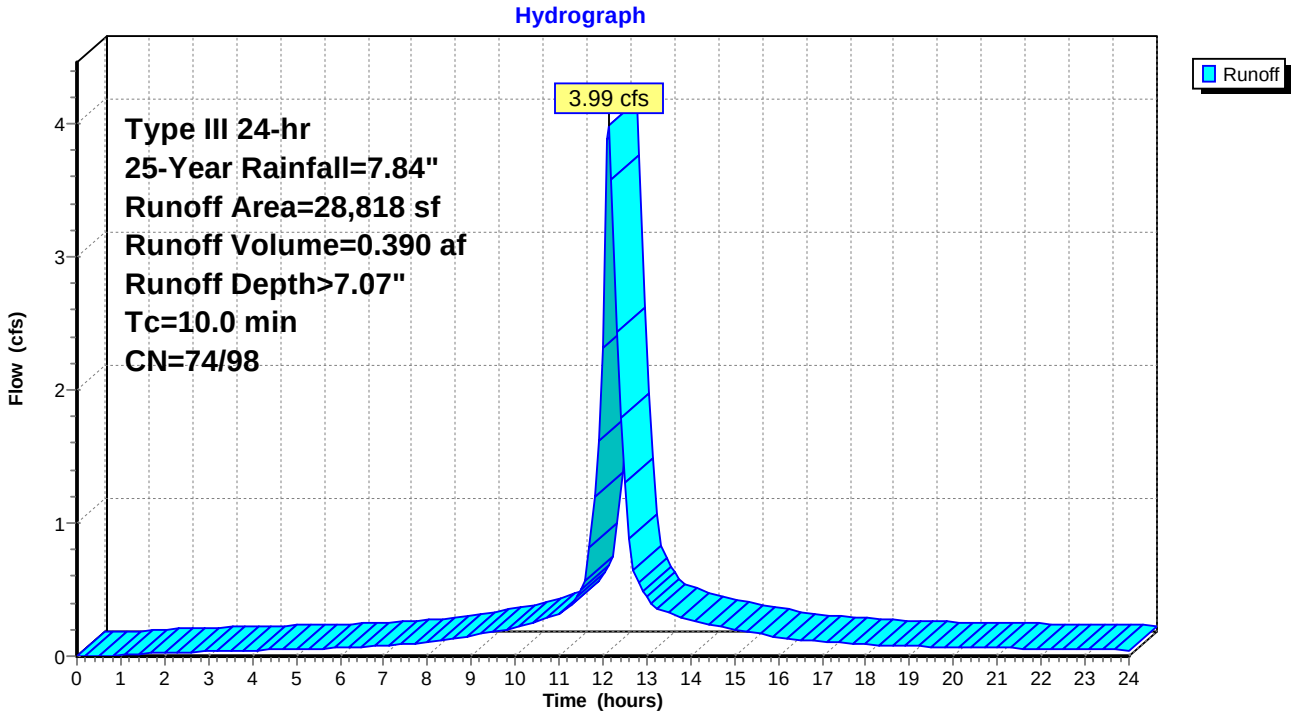
Runoff = 3.99 cfs @ 12.13 hrs, Volume= 0.390 af, Depth> 7.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	2,990	74	Grass, good, C to CB41
*	7,270	98	Pavement to CB41
*	603	74	Grass to CB43
*	6,402	98	Pavement to CB43
*	603	74	Grass, good, C to CB45
*	6,402	98	Pavement to CB45
*	1,115	74	Grass to CB91
*	3,433	98	Grass to CB91
	28,818	94	Weighted Average
	5,311	74	18.43% Pervious Area
	23,507	98	81.57% Impervious Area

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

Subcatchment 41S: BLDG 4 West and North



Summary for Subcatchment 48S: West P-Stream Area

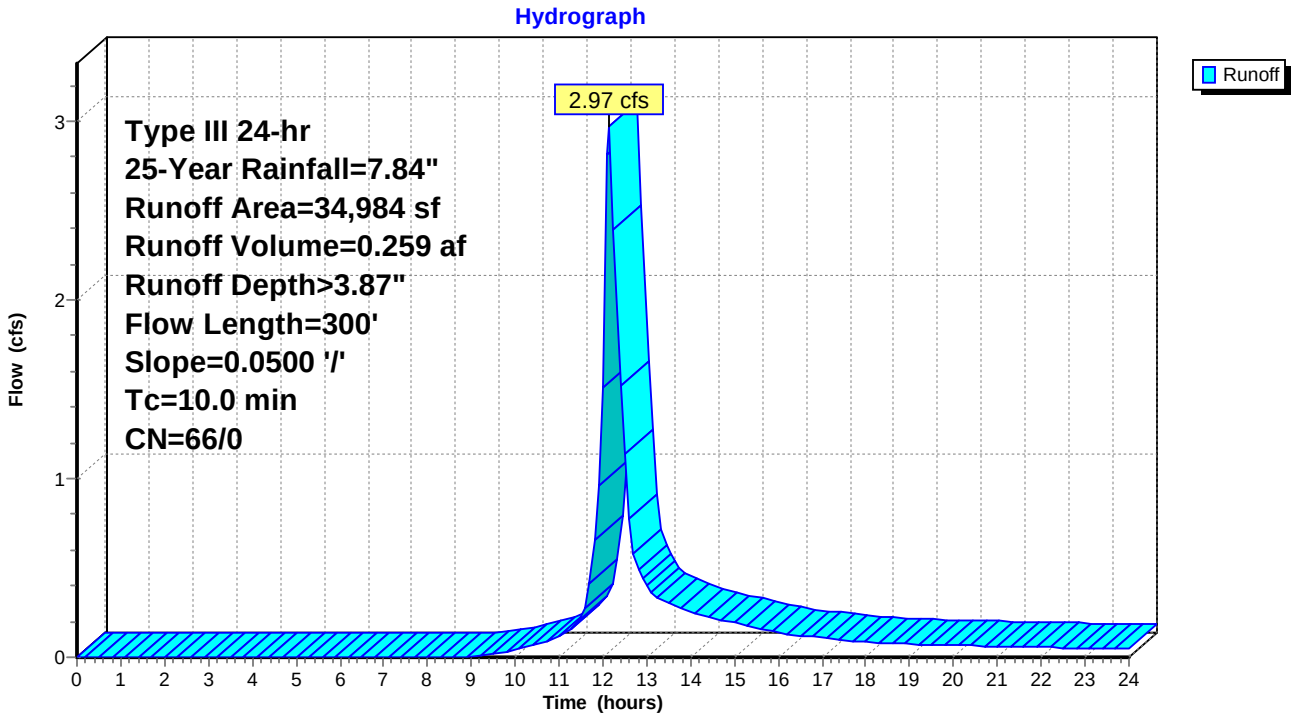
Runoff = 2.97 cfs @ 12.15 hrs, Volume= 0.259 af, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
5,350	74	>75% Grass cover, Good, HSG C
29,634	65	Brush, Good, HSG C
34,984	66	Weighted Average
34,984	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	300	0.0500	0.62		**Lag/CN Method,**
2.0					**Direct Entry, Round up to 10**
10.0	300	Total			

Subcatchment 48S: West P-Stream Area



Summary for Subcatchment 49S: P-Wetland

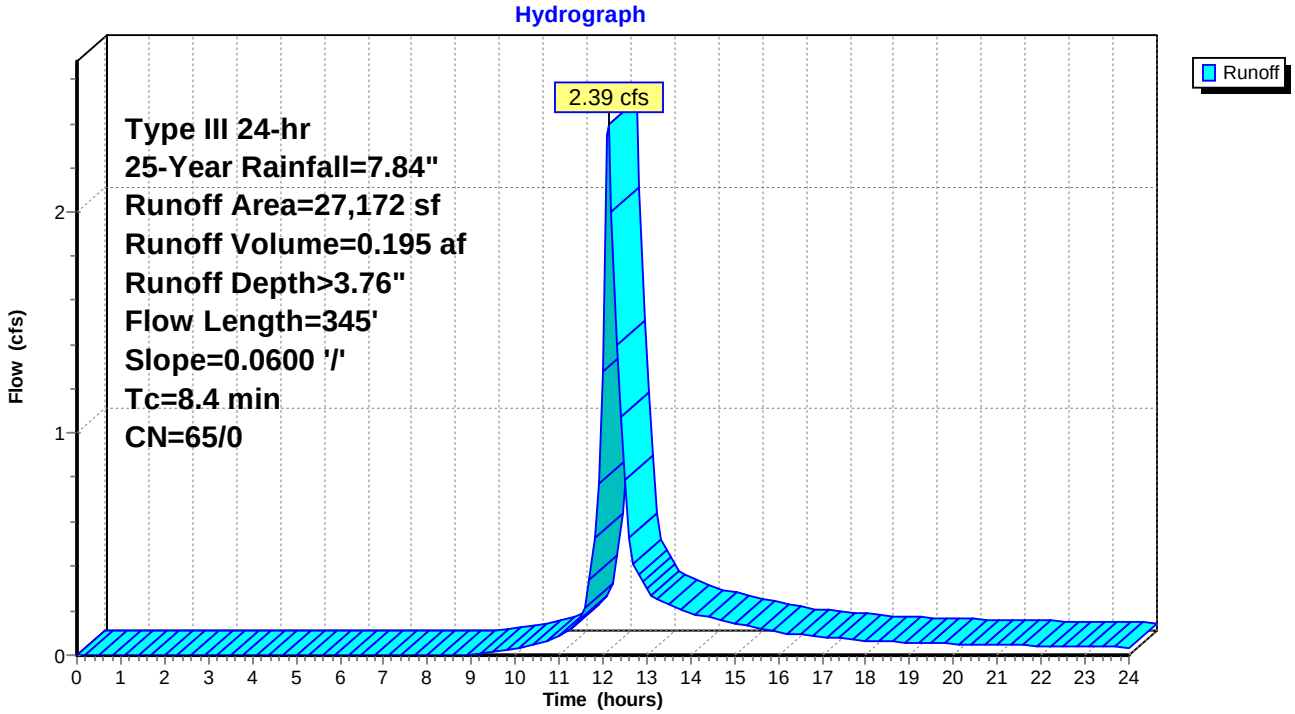
Runoff = 2.39 cfs @ 12.13 hrs, Volume= 0.195 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
27,172	65	Brush, Good, HSG C
27,172	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	345	0.0600	0.68		**Lag/CN Method,**
0.0					**Direct Entry, round up to 10**
8.4	345	Total			

Subcatchment 49S: P-Wetland



Summary for Subcatchment 50S: Runoff from Proposed Subdivision Road

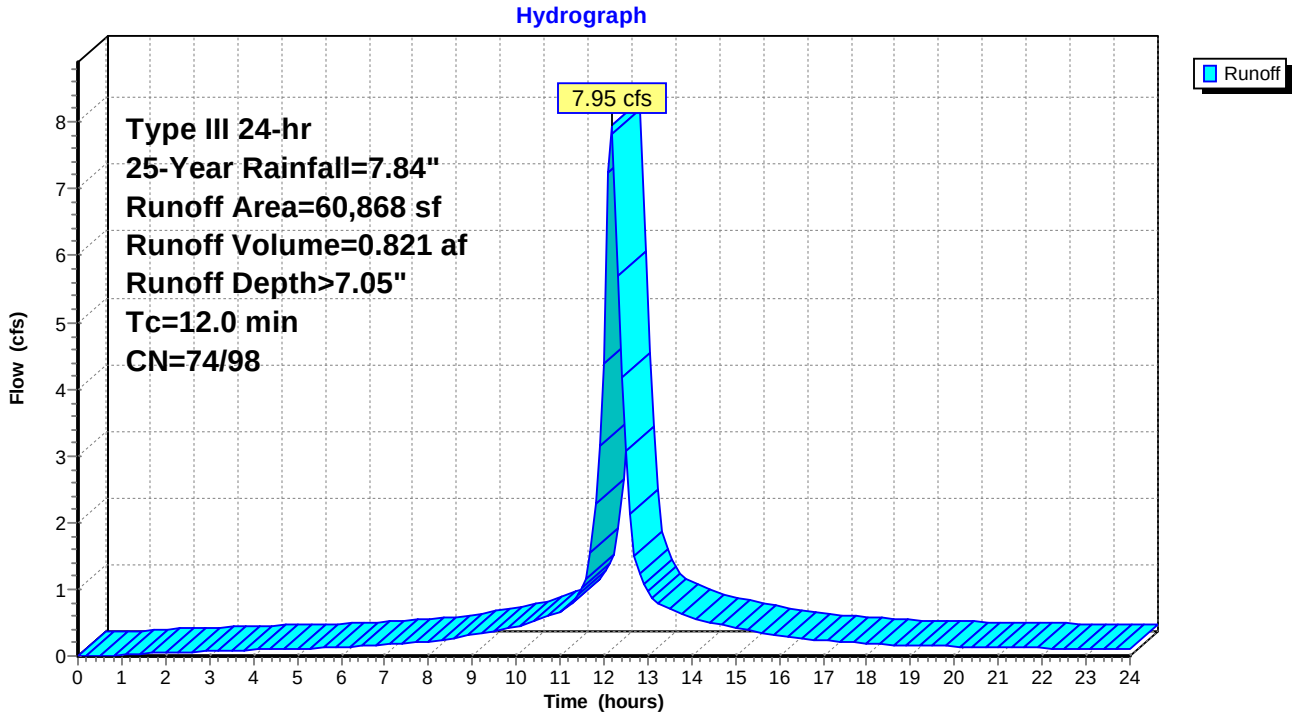
Runoff = 7.95 cfs @ 12.17 hrs, Volume= 0.821 af, Depth> 7.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	6,850	74	Landscaping
	4,904	74	>75% Grass cover, Good, HSG C
*	49,114	98	Pavement and Sidewalks
	60,868	93	Weighted Average
	11,754	74	19.31% Pervious Area
	49,114	98	80.69% Impervious Area

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

Subcatchment 50S: Runoff from Proposed Subdivision Road



Summary for Subcatchment 51S: BLDG 5 area

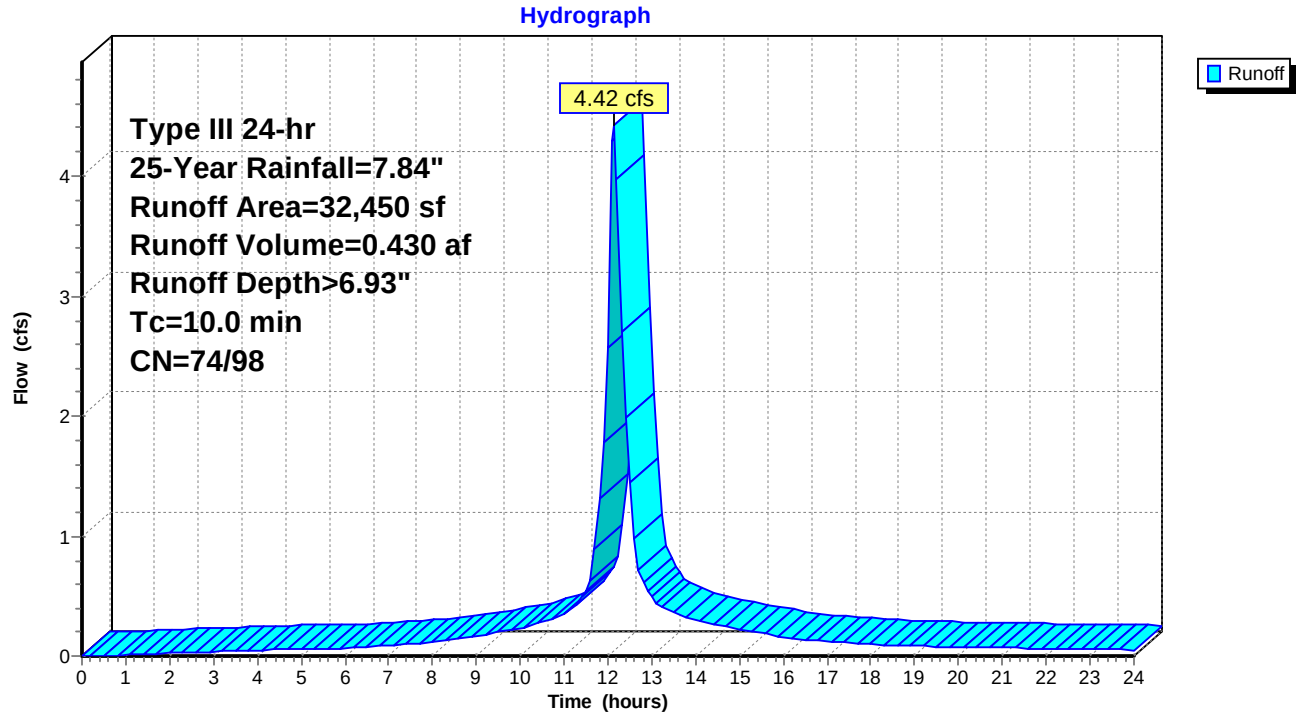
Runoff = 4.42 cfs @ 12.13 hrs, Volume= 0.430 af, Depth> 6.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	24,850	98	Impervious Pavement
	5,600	74	>75% Grass cover, Good, HSG C
*	2,000	74	Landscaped Areas
	32,450	92	Weighted Average
	7,600	74	23.42% Pervious Area
	24,850	98	76.58% Impervious Area

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

Subcatchment 51S: BLDG 5 area



Summary for Subcatchment 71S: Amenities 1 and 2

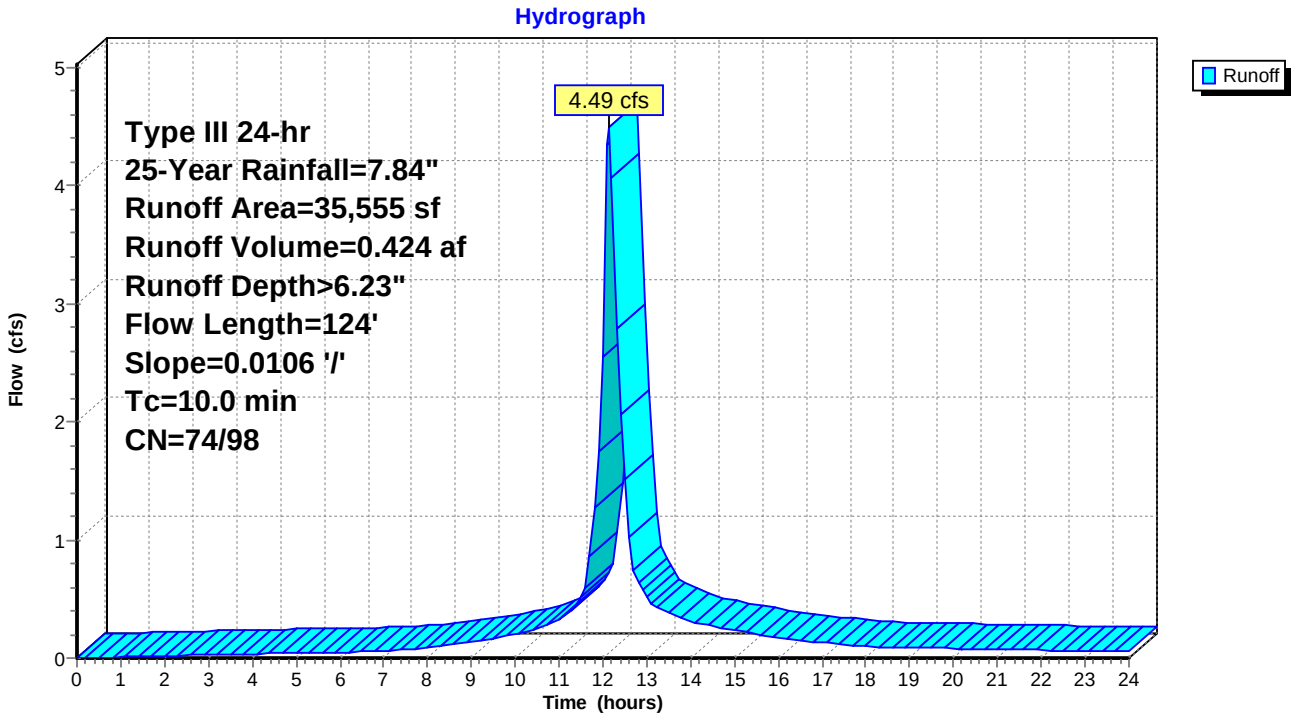
Runoff = 4.49 cfs @ 12.14 hrs, Volume= 0.424 af, Depth> 6.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	11,076	98	Athletic courts, impervious
	14,025	74	>75% Grass cover, Good, HSG C
*	10,454	90	BLDG 1&2 amenity space, 70% imp
	35,555	86	Weighted Average
	17,161	74	48.27% Pervious Area
	18,394	98	51.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	124	0.0106	0.43		**Lag/CN Method,**
5.2					**Direct Entry, round up to 10**
10.0	124	Total			

Subcatchment 71S: Amenities 1 and 2



Summary for Subcatchment 72S: Amenities 2 and 3 + Pave

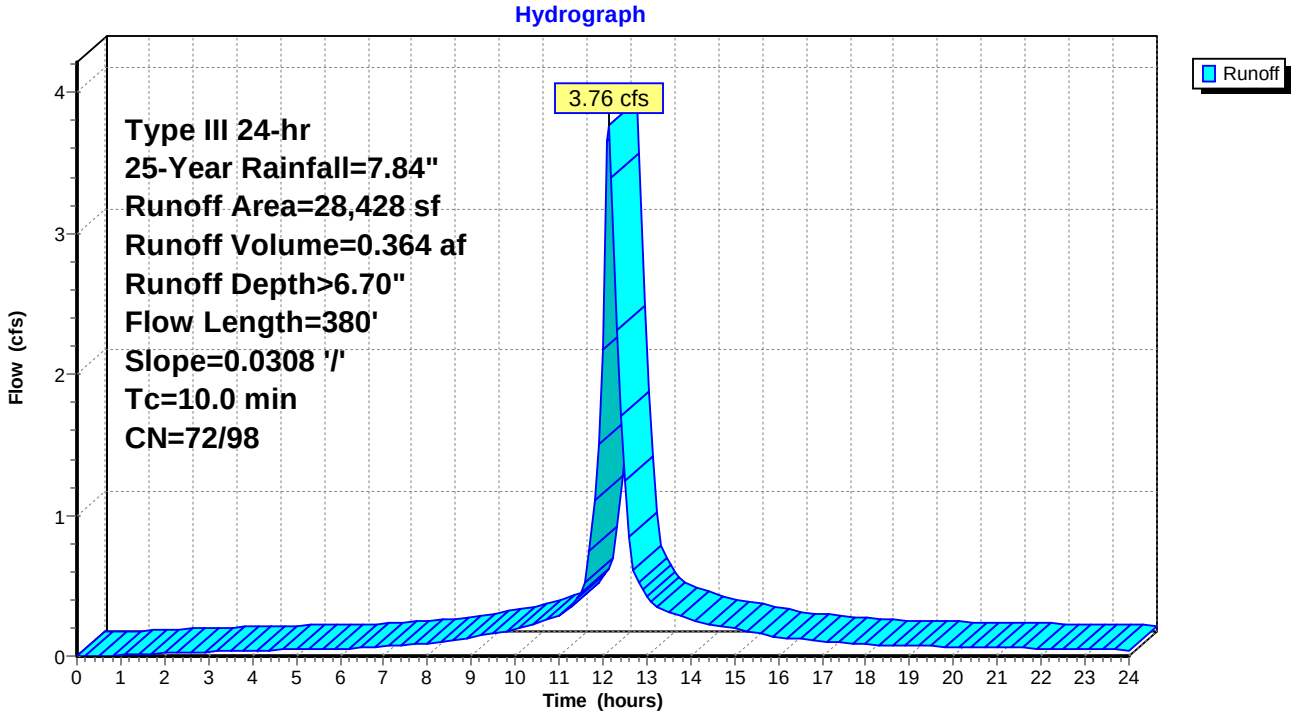
Runoff = 3.76 cfs @ 12.13 hrs, Volume= 0.364 af, Depth> 6.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	24,342	90	BLDG 2&3 amenity space, 70% imp
*	3,008	98	Pavement
	1,078	74	>75% Grass cover, Good, HSG C
	28,428	90	Weighted Average
	8,381	72	29.48% Pervious Area
	20,047	98	70.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	380	0.0308	1.08		**Lag/CN Method,**
4.1					**Direct Entry, round up to 10**
10.0	380	Total			

Subcatchment 72S: Amenities 2 and 3 + Pave



Summary for Subcatchment 90S: Northeast to Offsite

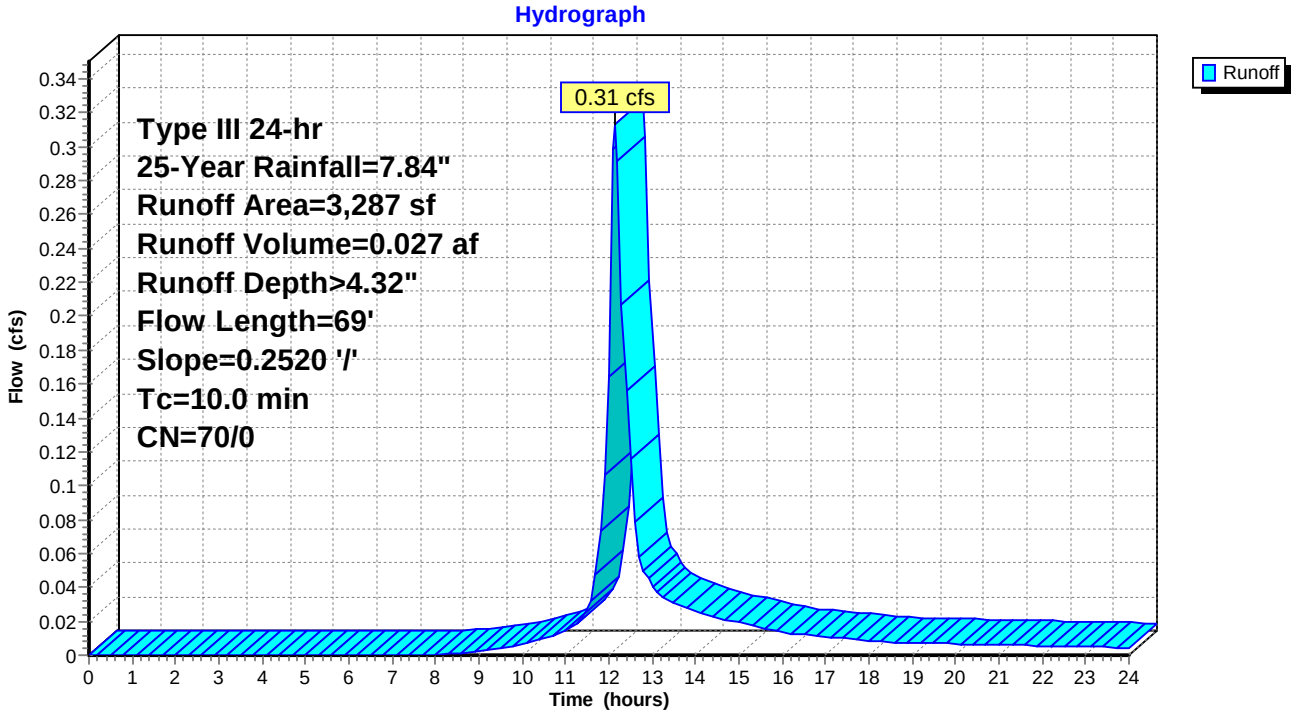
Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
3,287	70	Woods, Good, HSG C
3,287	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	69	0.2520	1.16		**Lag/CN Method,**
9.0					**Direct Entry, round up to 10**
10.0	69	Total			

Subcatchment 90S: Northeast to Offsite



Summary for Subcatchment 91S: Northwest Wooded and Wetland

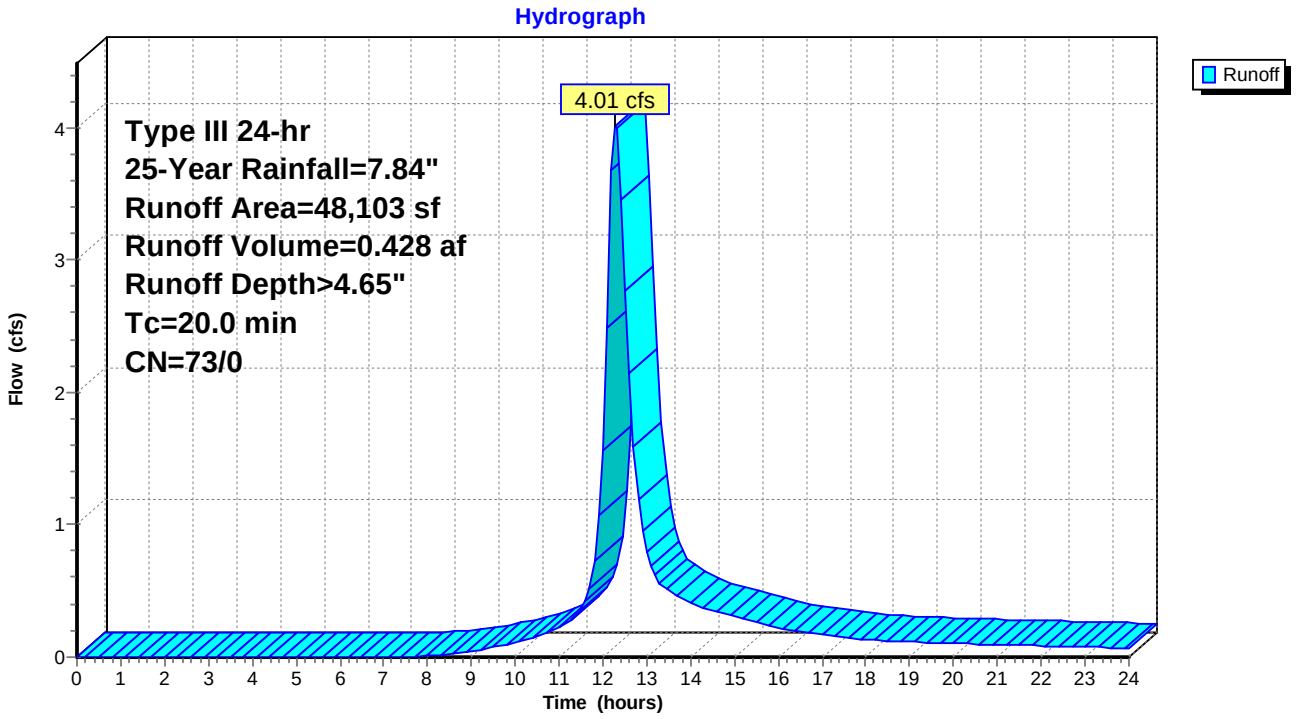
Runoff = 4.01 cfs @ 12.29 hrs, Volume= 0.428 af, Depth> 4.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
48,103	73	Brush, Good, HSG D
48,103	73	100.00% Pervious Area

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

Subcatchment 91S: Northwest Wooded and Wetland



Summary for Subcatchment 92S: Easterly Wooded to Southeast BVW

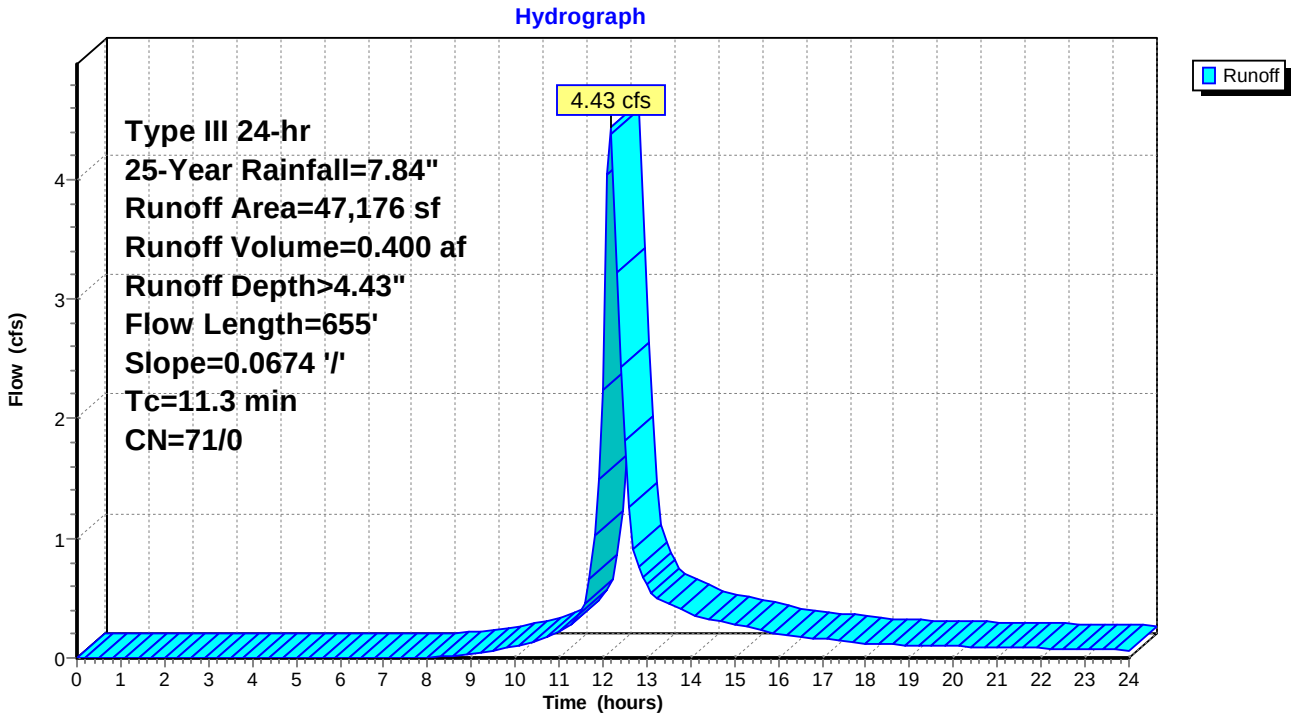
Runoff = 4.43 cfs @ 12.17 hrs, Volume= 0.400 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
38,558	70	Woods, Good, HSG C
8,618	74	>75% Grass cover, Good, HSG C
47,176	71	Weighted Average
47,176	71	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	655	0.0674	0.96		**Lag/CN Method,**

Subcatchment 92S: Easterly Wooded to Southeast BVW



Summary for Subcatchment 93S: Overland to Pine Hill

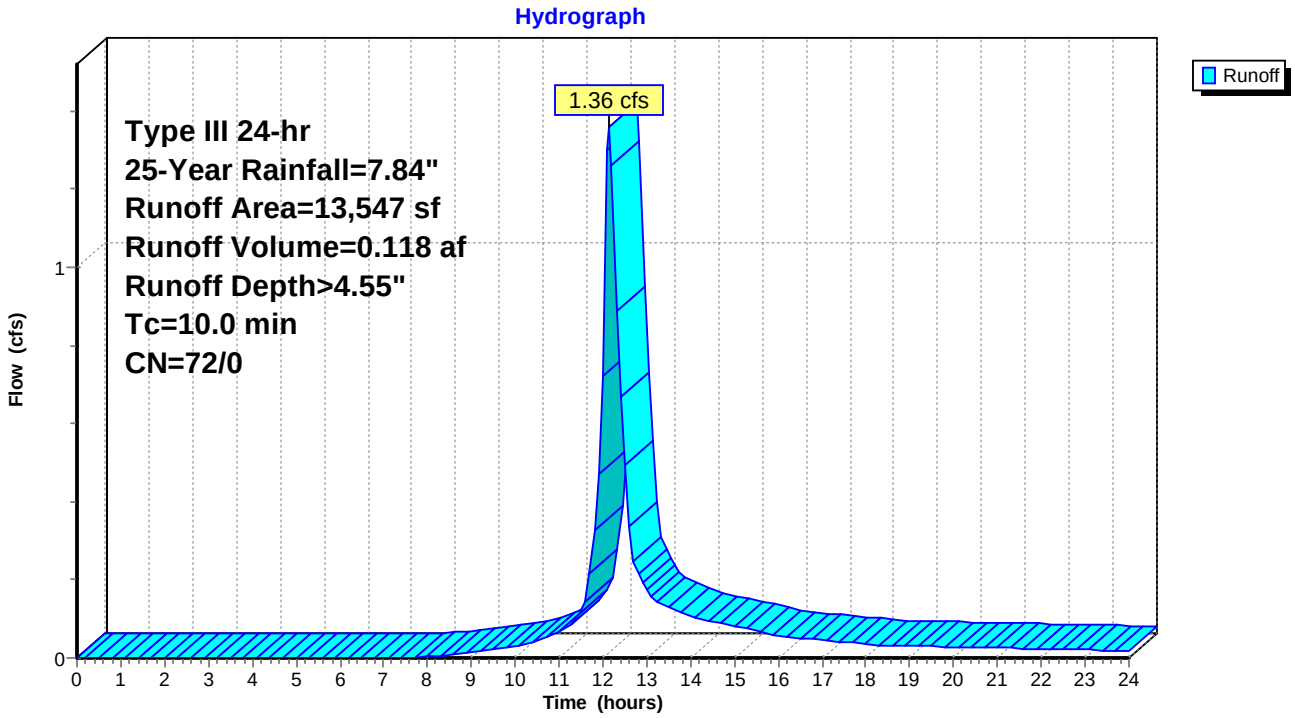
Runoff = 1.36 cfs @ 12.14 hrs, Volume= 0.118 af, Depth> 4.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (sf)	CN	Description
5,534	74	>75% Grass cover, Good, HSG C
8,013	70	Woods, Good, HSG C
13,547	72	Weighted Average
13,547	72	100.00% Pervious Area

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

Subcatchment 93S: Overland to Pine Hill



Summary for Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane

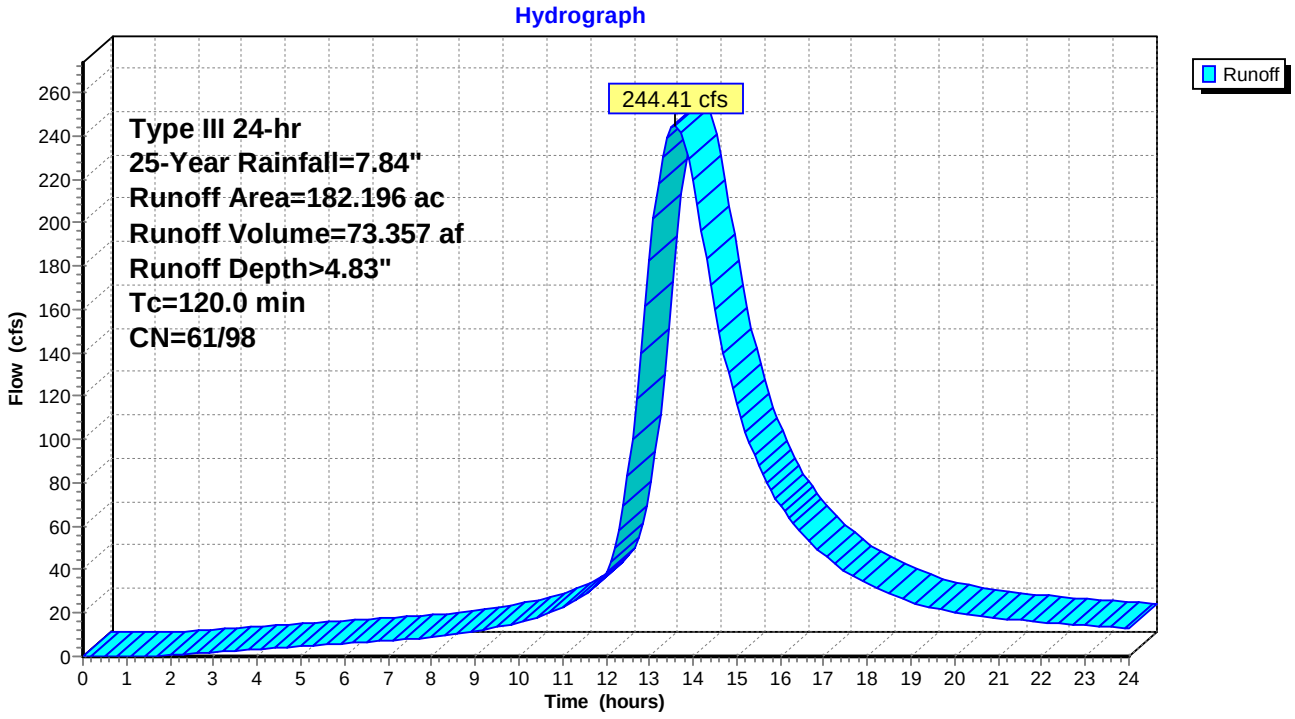
Runoff = 244.41 cfs @ 13.56 hrs, Volume= 73.357 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane



mmary for Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dr

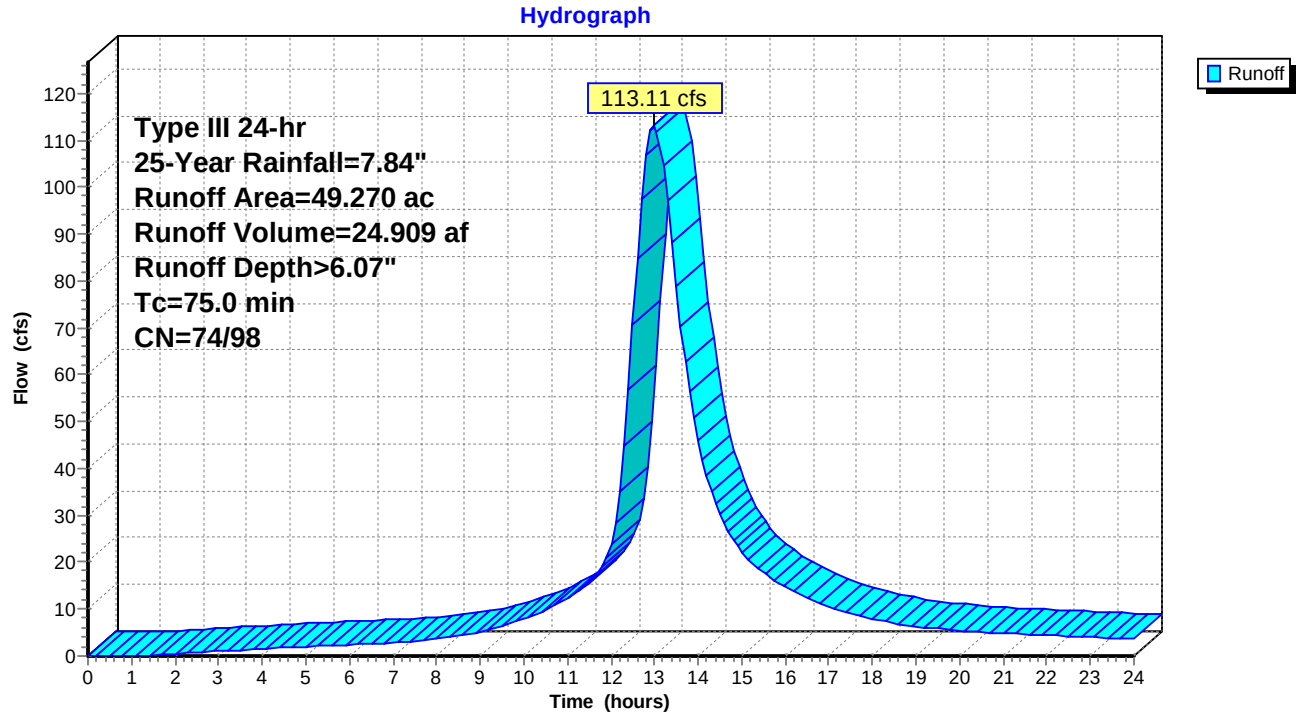
Runoff = 113.11 cfs @ 12.98 hrs, Volume= 24.909 af, Depth> 6.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 201S: BLDG 1 ROOF

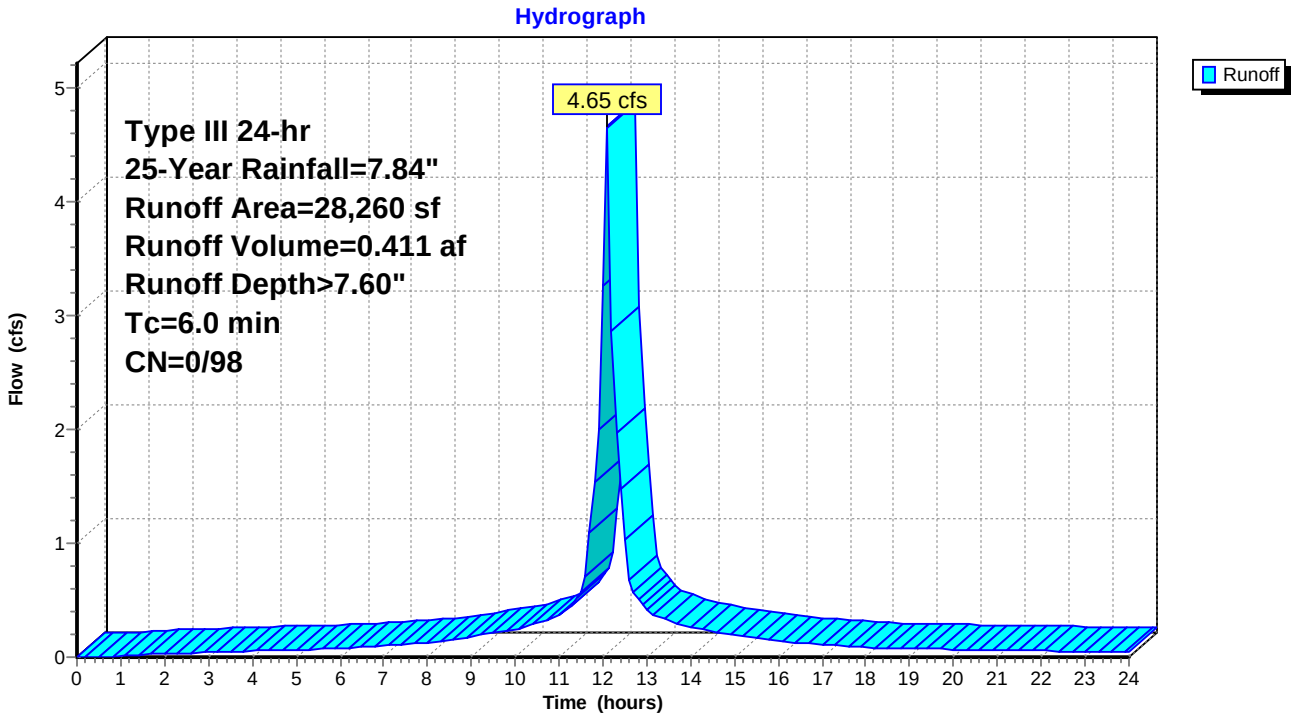
Runoff = 4.65 cfs @ 12.09 hrs, Volume= 0.411 af, Depth> 7.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	28,260	98	BLDG 1 ROOF
	28,260	98	100.00% Impervious Area

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

Subcatchment 201S: BLDG 1 ROOF



Summary for Subcatchment 202S: BLDG 2 ROOF

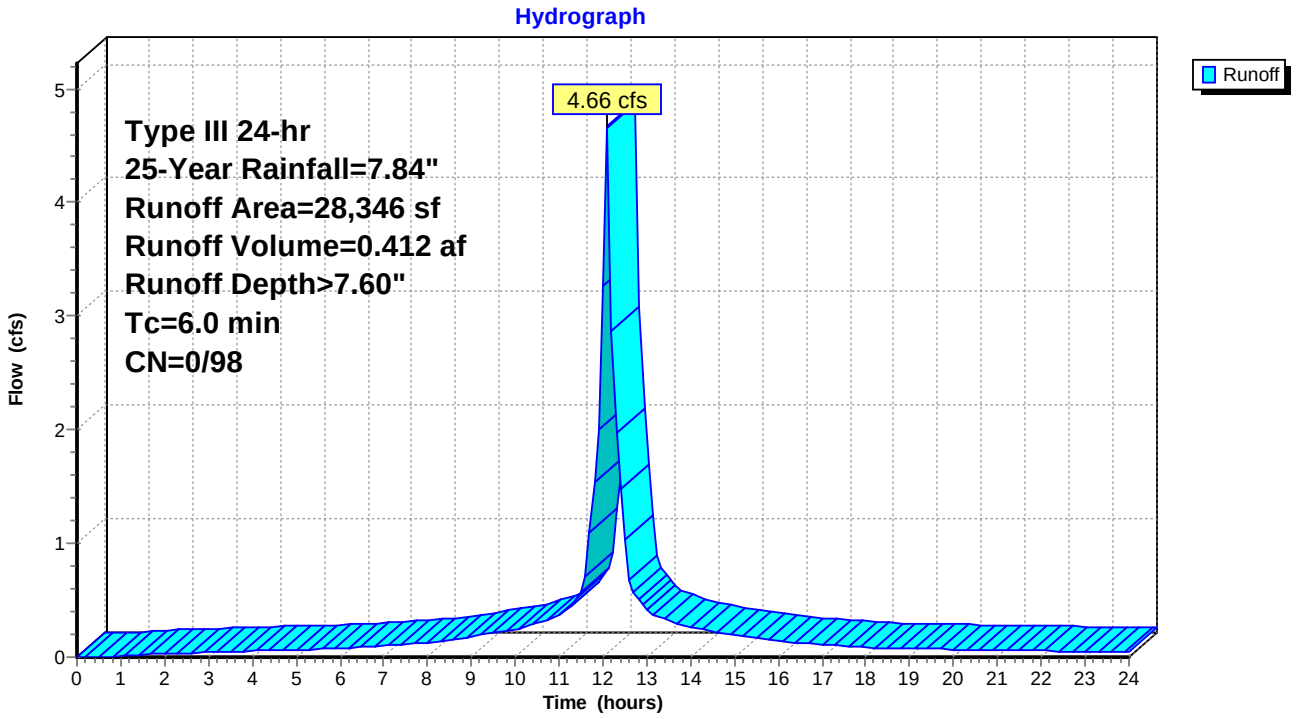
Runoff = 4.66 cfs @ 12.09 hrs, Volume= 0.412 af, Depth> 7.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	28,346	98	BLDG 2 ROOF
	28,346	98	100.00% Impervious Area

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

Subcatchment 202S: BLDG 2 ROOF



Summary for Subcatchment 203S: BLDG 3 ROOF

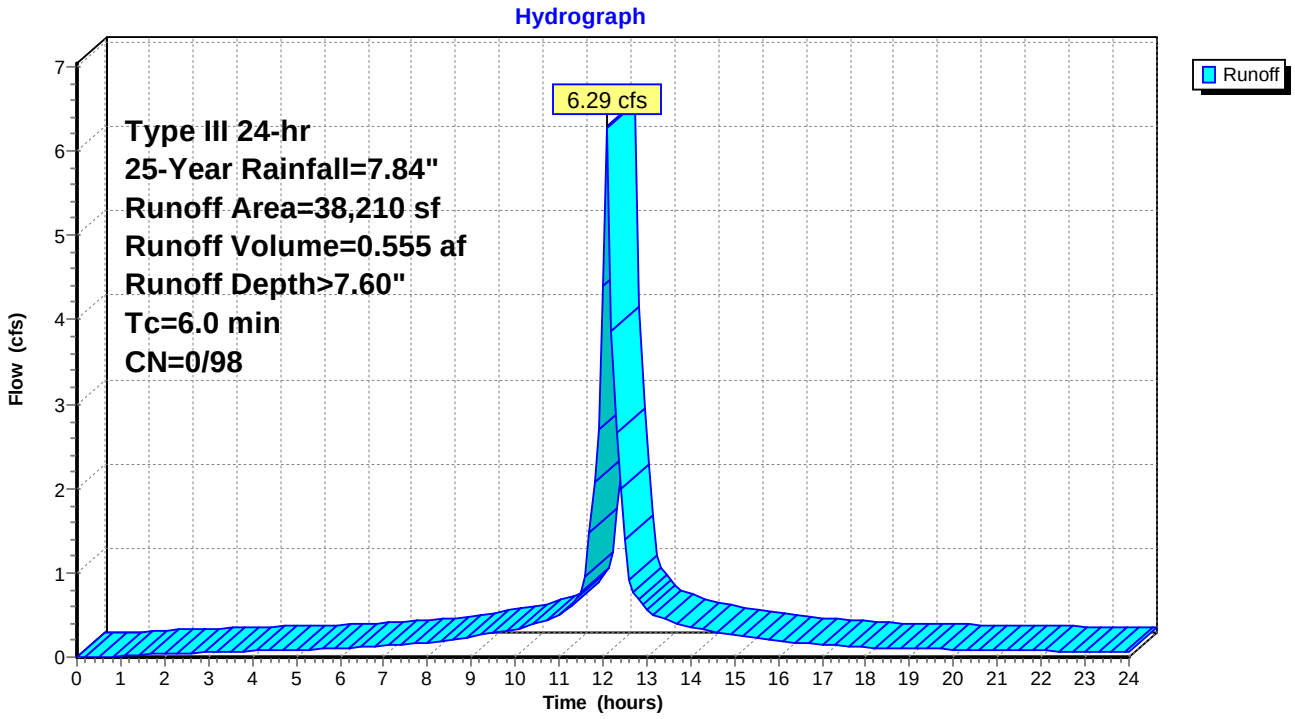
Runoff = 6.29 cfs @ 12.09 hrs, Volume= 0.555 af, Depth> 7.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	38,210	98	BLDG ROOF 3
	38,210	98	100.00% Impervious Area

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

Subcatchment 203S: BLDG 3 ROOF



Summary for Subcatchment 204S: BLDG 4 2/3 of ROOF

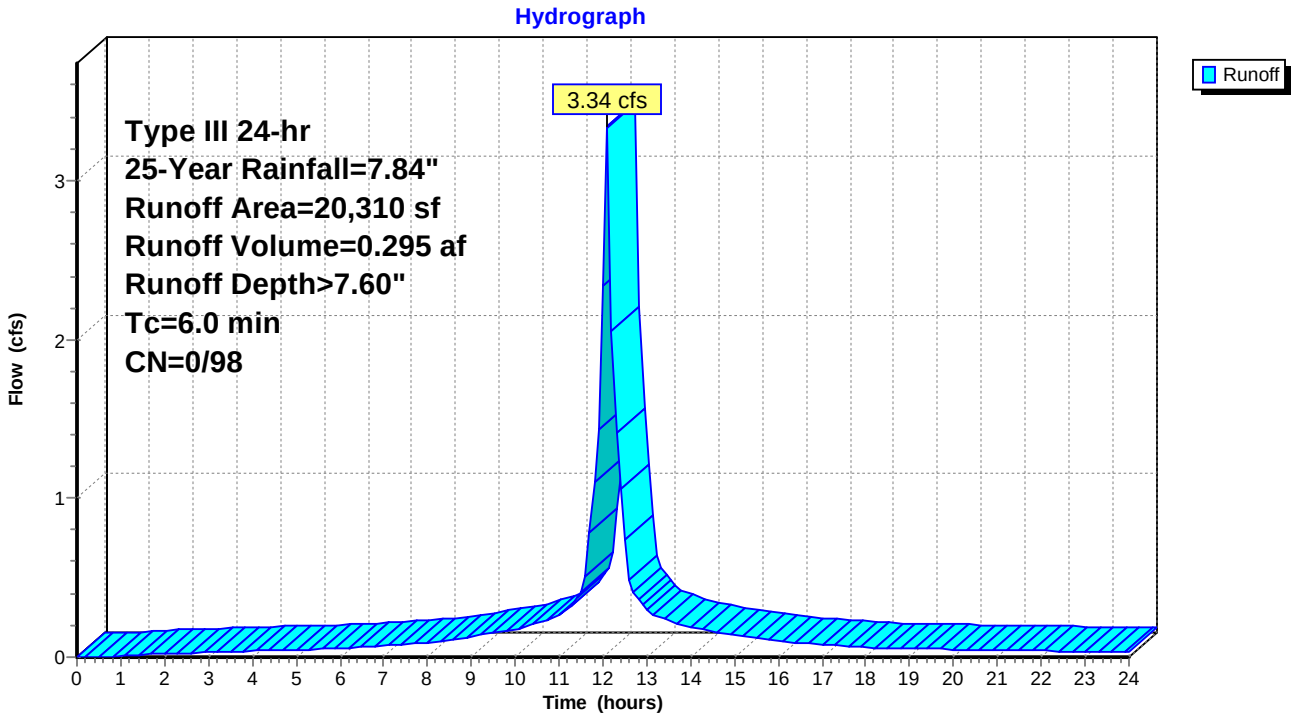
Runoff = 3.34 cfs @ 12.09 hrs, Volume= 0.295 af, Depth> 7.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	20,310	98	BLDG 4 ROOF
	20,310	98	100.00% Impervious Area

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

Subcatchment 204S: BLDG 4 2/3 of ROOF



Summary for Subcatchment 205S: BLDG 5 ROOF

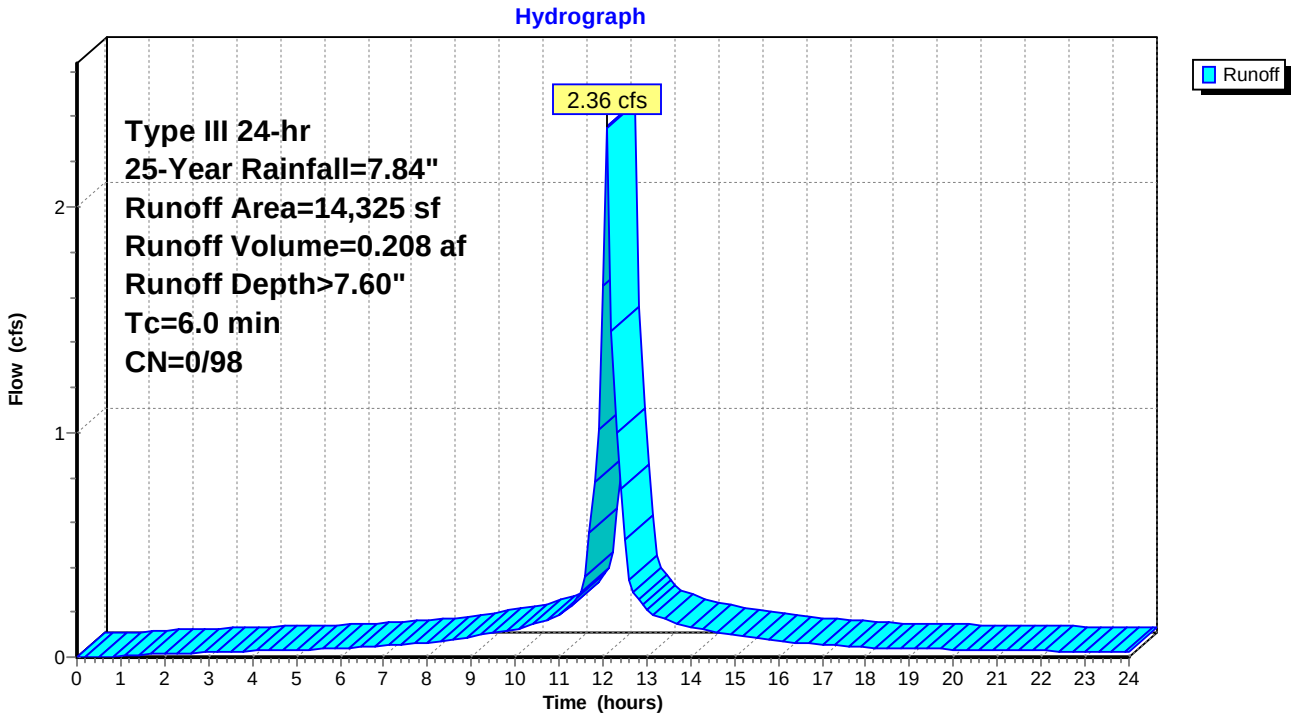
Runoff = 2.36 cfs @ 12.09 hrs, Volume= 0.208 af, Depth> 7.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=7.84"

	Area (sf)	CN	Description
*	14,325	98	BLDG 5 ROOF
	14,325	98	100.00% Impervious Area

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

Subcatchment 205S: BLDG 5 ROOF



Summary for Reach 13R: Stream Channel from Brandt to Pine Hill

Inflow Area = 15.375 ac, 66.33% Impervious, Inflow Depth > 4.06" for 25-Year event
Inflow = 38.38 cfs @ 12.38 hrs, Volume= 5.199 af
Outflow = 37.91 cfs @ 12.40 hrs, Volume= 5.196 af, Atten= 1%, Lag= 1.0 min

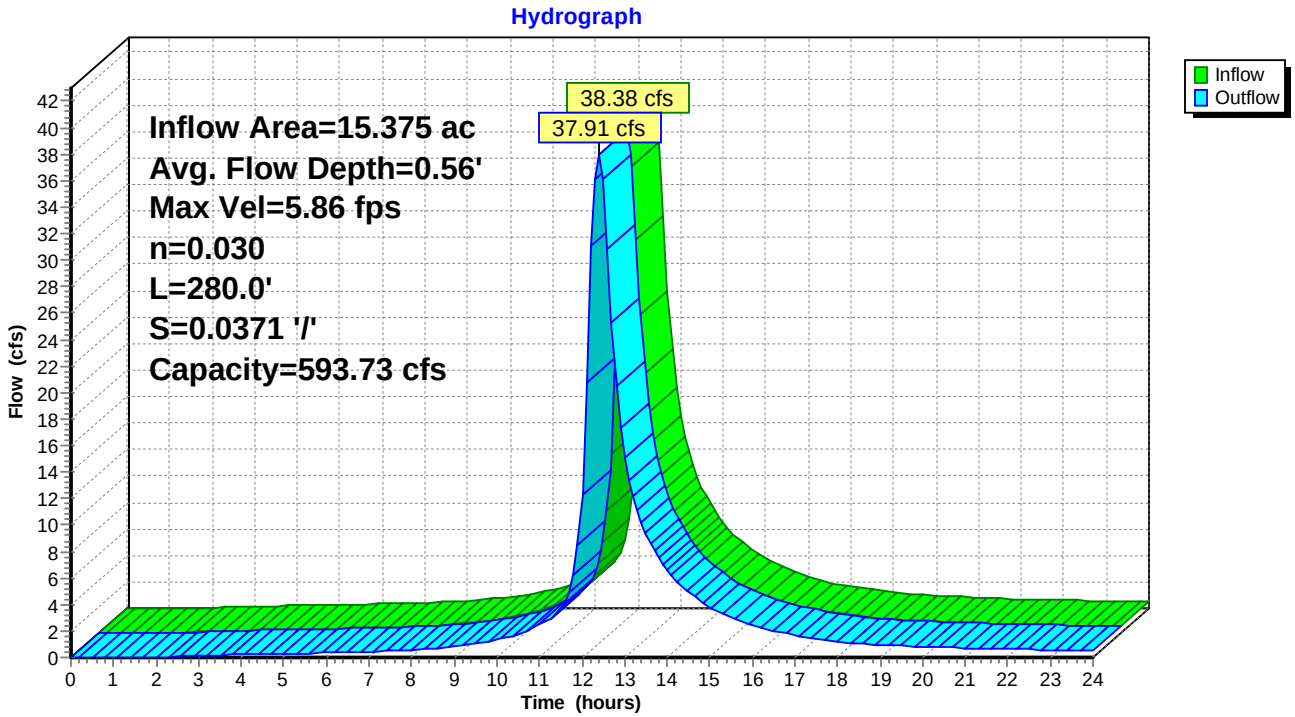
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 5.86 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.72 fps, Avg. Travel Time= 2.7 min

Peak Storage= 1,822 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 13R: Stream Channel from Brandt to Pine Hill



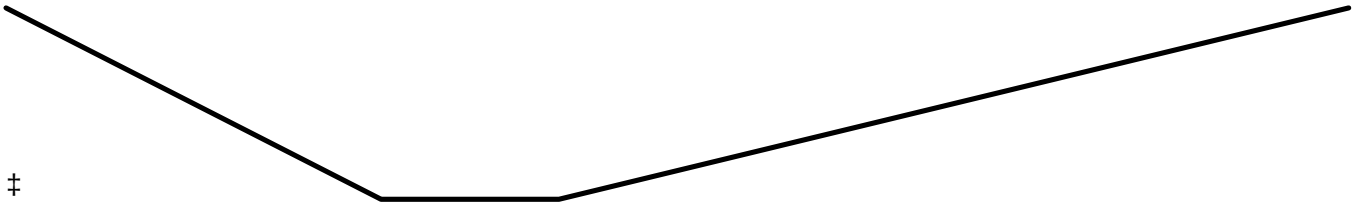
Summary for Reach 20R: existing stream on west side

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 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= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



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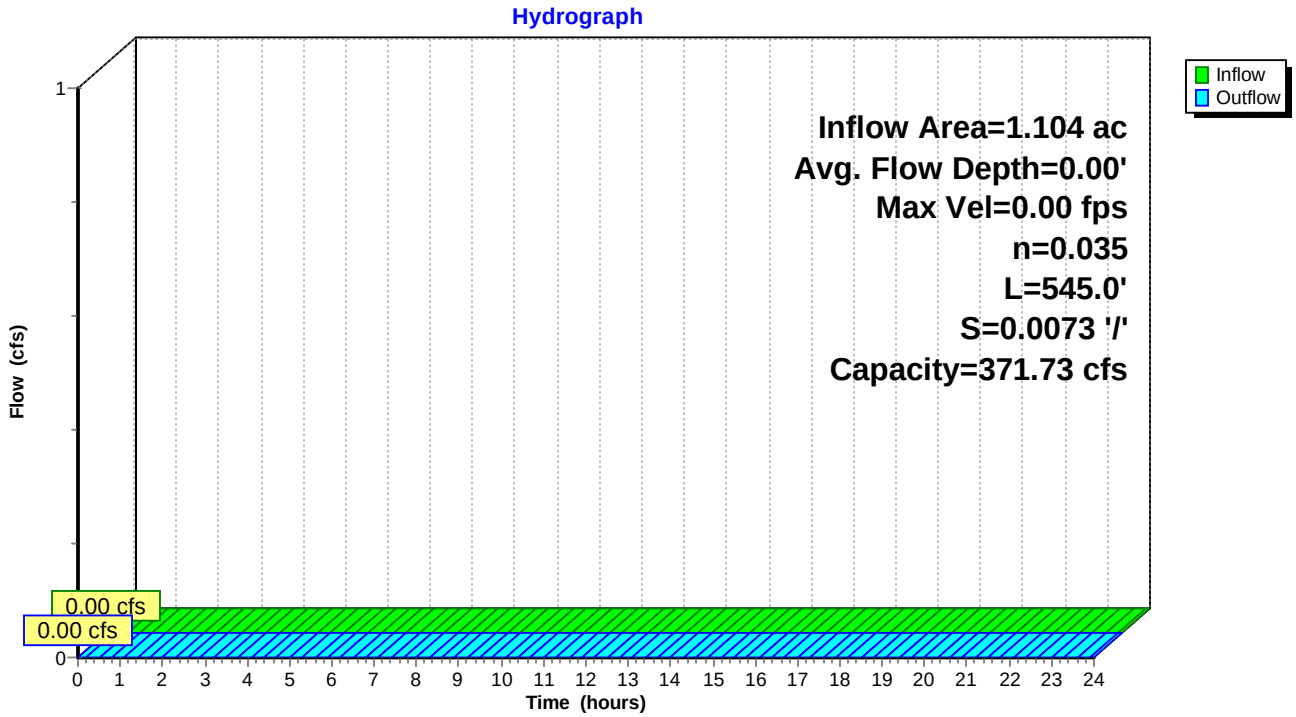
Reach 20R: existing stream on west side



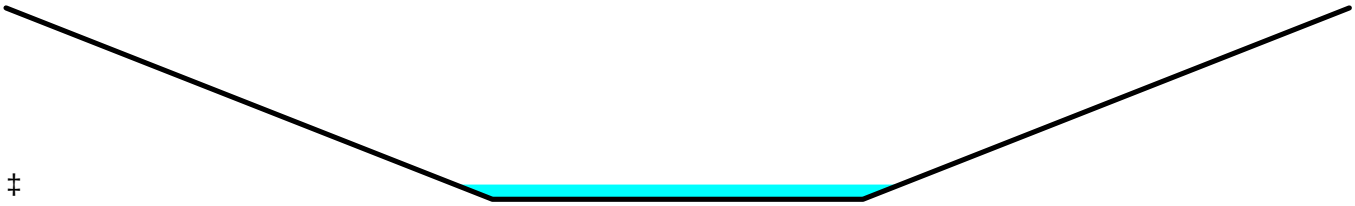
Summary for Reach 22R: Combined stream into culvert

Inflow Area = 1.907 ac, 0.00% Impervious, Inflow Depth > 4.30" for 25-Year event
Inflow = 5.60 cfs @ 12.36 hrs, Volume= 0.684 af
Outflow = 5.54 cfs @ 12.42 hrs, Volume= 0.682 af, Atten= 1%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.37 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 5.5 min

Peak Storage= 666 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 3.50' Flow Area= 64.8 sf, Capacity= 653.19 cfs

8.00' x 3.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 3.0 '/' Top Width= 29.00'
Length= 282.0' Slope= 0.0266 '/'
Inlet Invert= 463.50', Outlet Invert= 456.00'



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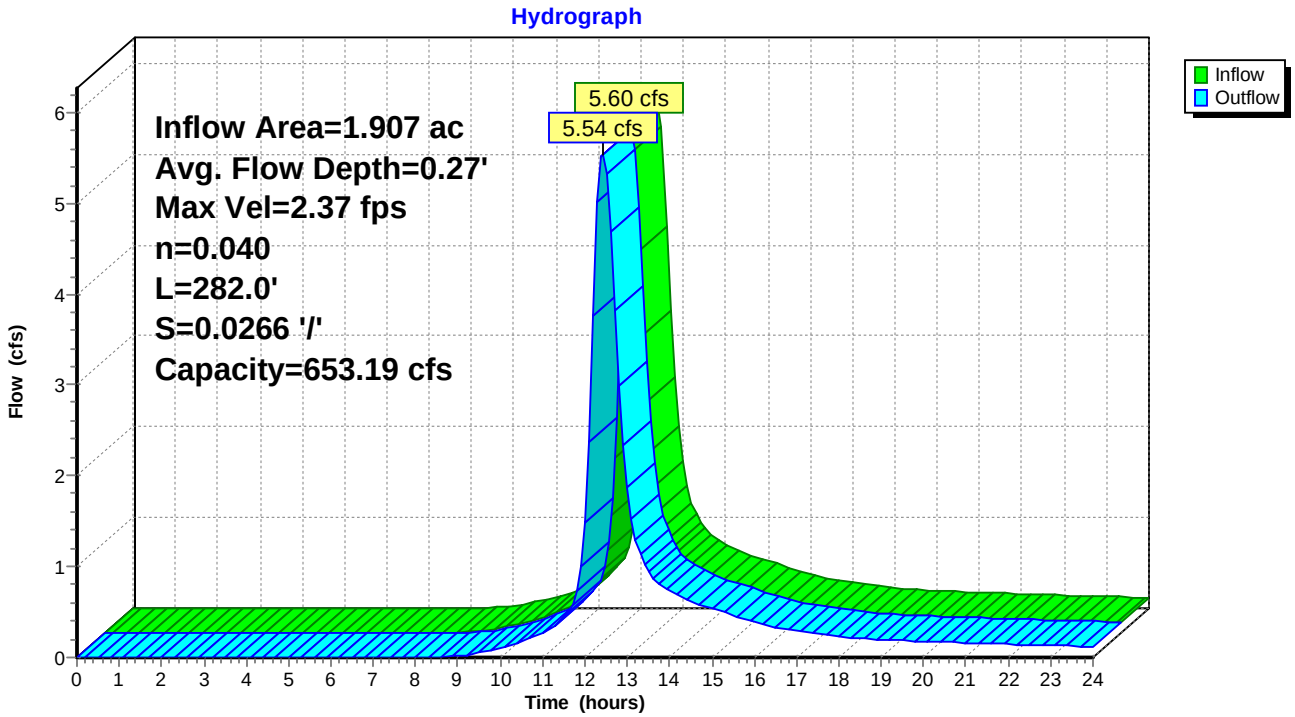
Reach 22R: Combined stream into culvert

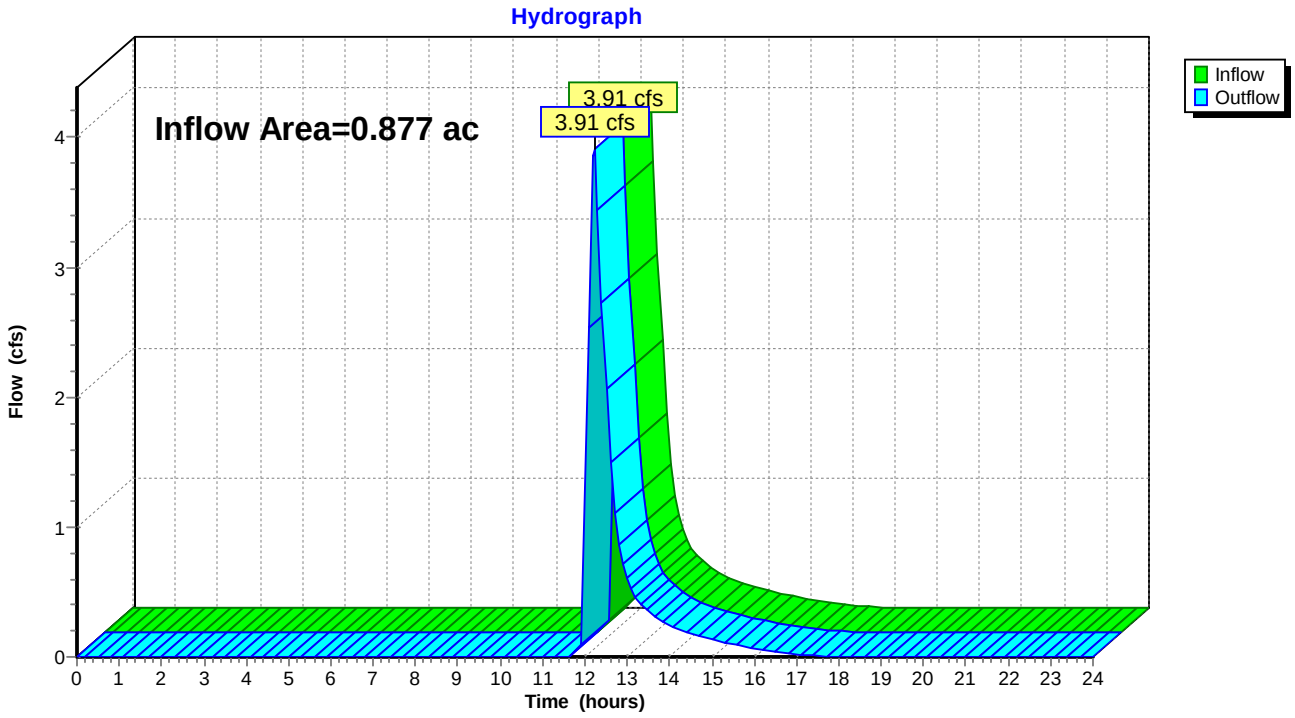


Summary for Reach 27R: (new Reach)

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth = 2.98" for 25-Year event
Inflow = 3.91 cfs @ 12.23 hrs, Volume= 0.218 af
Outflow = 3.91 cfs @ 12.23 hrs, Volume= 0.218 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 27R: (new Reach)



Summary for Reach 81R: West Proposed Stream

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 10.25" for 25-Year event
Inflow = 5.67 cfs @ 12.28 hrs, Volume= 0.686 af
Outflow = 5.60 cfs @ 12.36 hrs, Volume= 0.684 af, Atten= 1%, Lag= 5.0 min

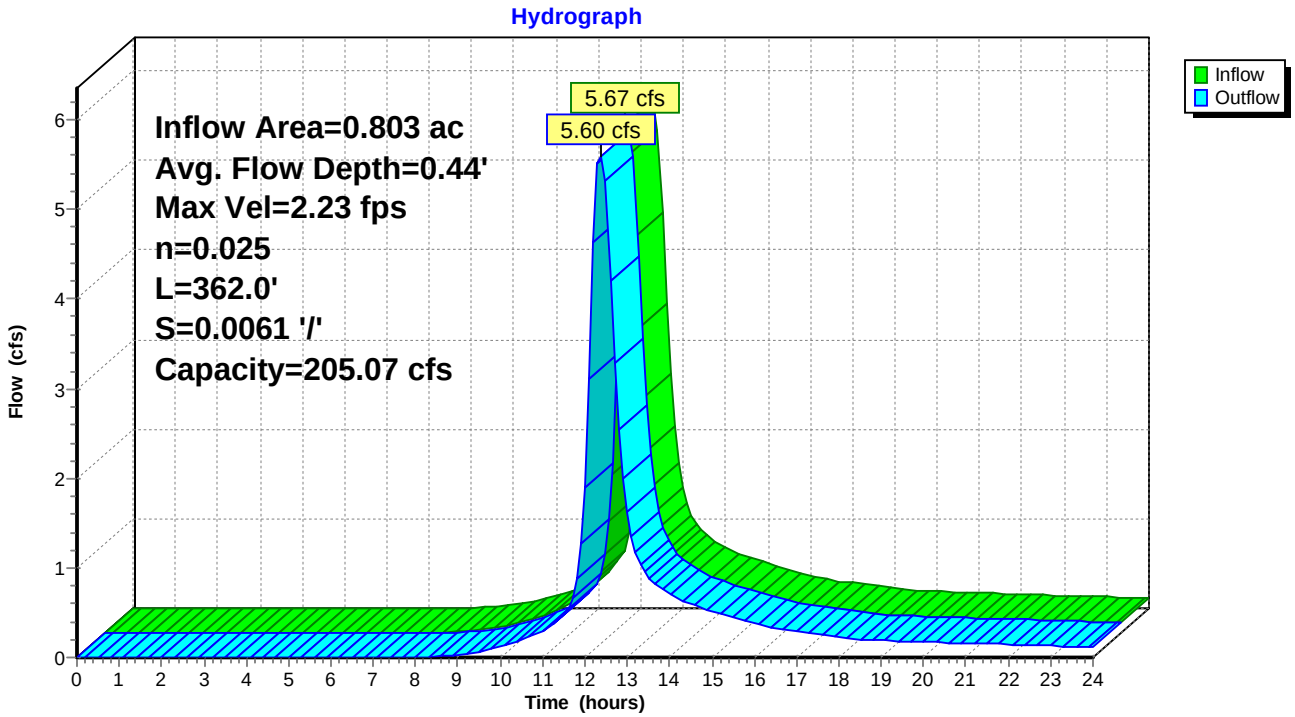
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.23 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 7.2 min

Peak Storage= 922 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 205.07 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 362.0' Slope= 0.0061 '/'
Inlet Invert= 466.70', Outlet Invert= 464.50'

‡

Reach 81R: West Proposed Stream



Summary for Reach 83R: Northerly P-Stream

Inflow = 4.02 cfs @ 12.29 hrs, Volume= 0.428 af
Outflow = 3.83 cfs @ 12.37 hrs, Volume= 0.427 af, Atten= 5%, Lag= 4.9 min

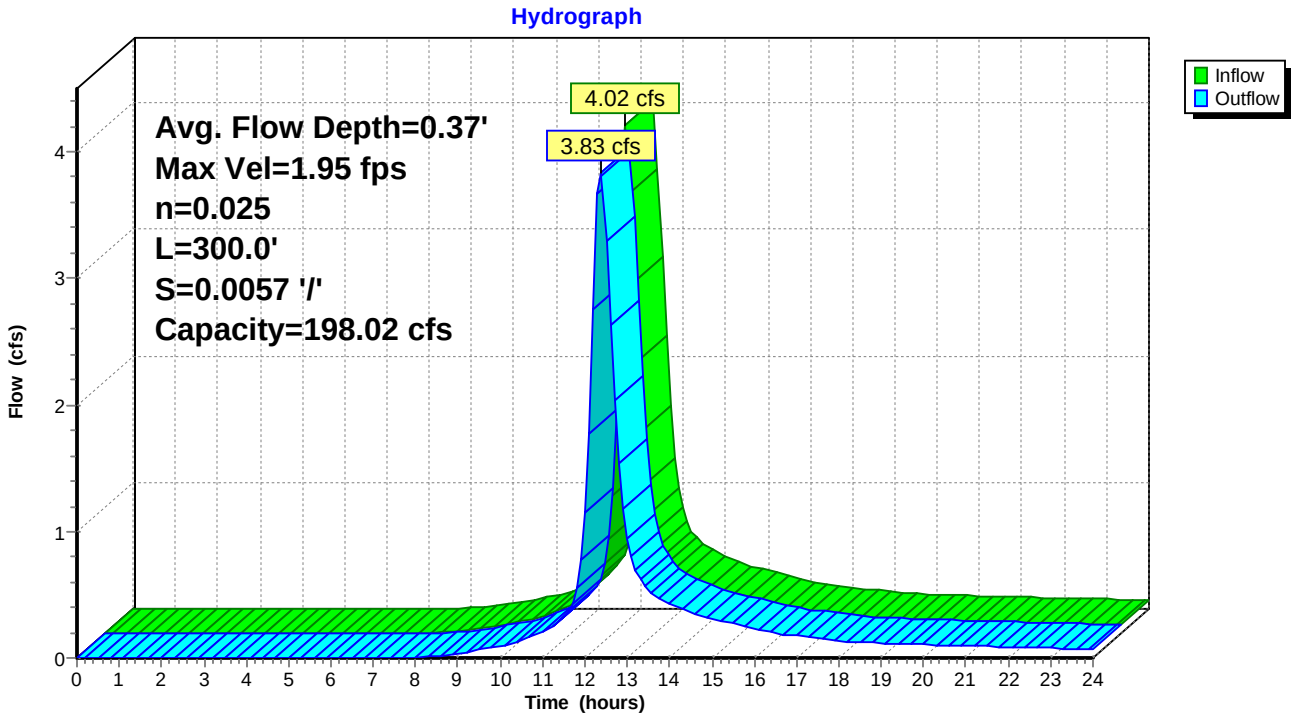
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 1.95 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 7.2 min

Peak Storage= 613 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 198.02 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 300.0' Slope= 0.0057 '/'
Inlet Invert= 468.40', Outlet Invert= 466.70'

‡

Reach 83R: Northerly P-Stream

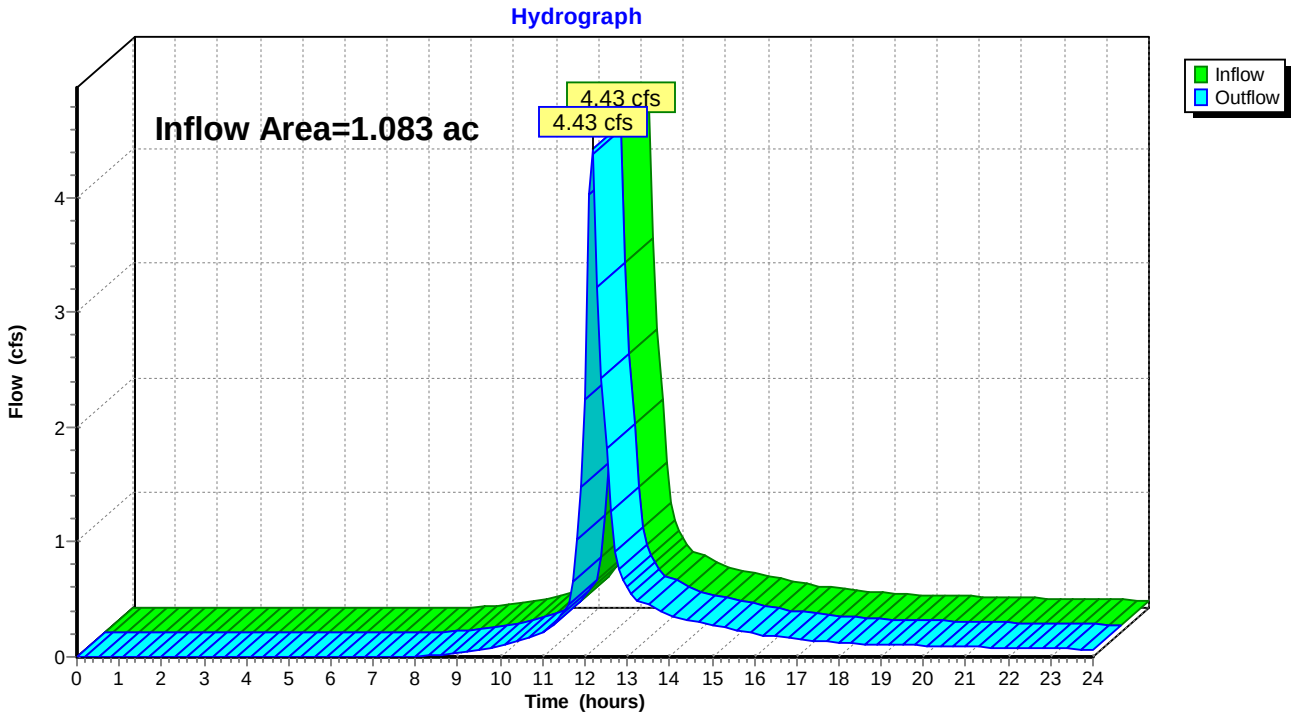


Summary for Reach 94R: Southeast BVW

Inflow Area = 1.083 ac, 0.00% Impervious, Inflow Depth > 4.43" for 25-Year event
Inflow = 4.43 cfs @ 12.17 hrs, Volume= 0.400 af
Outflow = 4.43 cfs @ 12.17 hrs, Volume= 0.400 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 94R: Southeast BVW

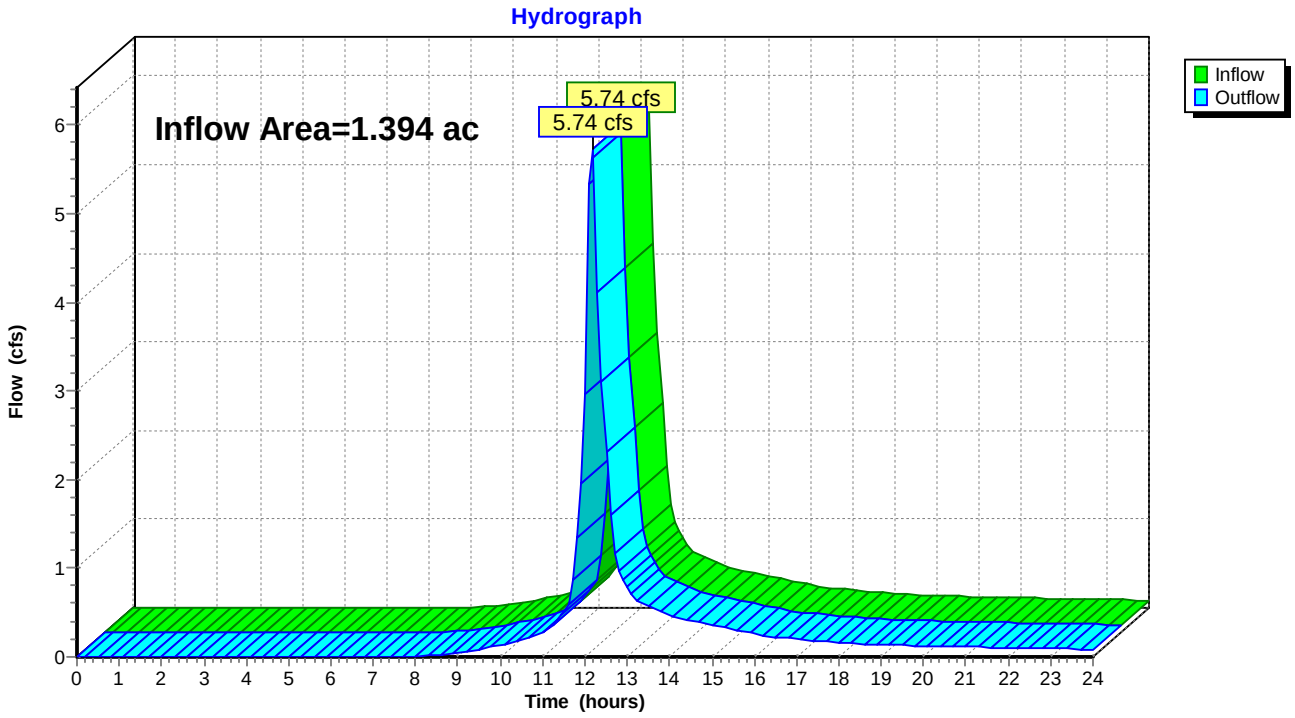


Summary for Reach 95R: Pine Hill Road

Inflow Area = 1.394 ac, 0.00% Impervious, Inflow Depth > 4.46" for 25-Year event
Inflow = 5.74 cfs @ 12.17 hrs, Volume= 0.518 af
Outflow = 5.74 cfs @ 12.17 hrs, Volume= 0.518 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 95R: Pine Hill Road

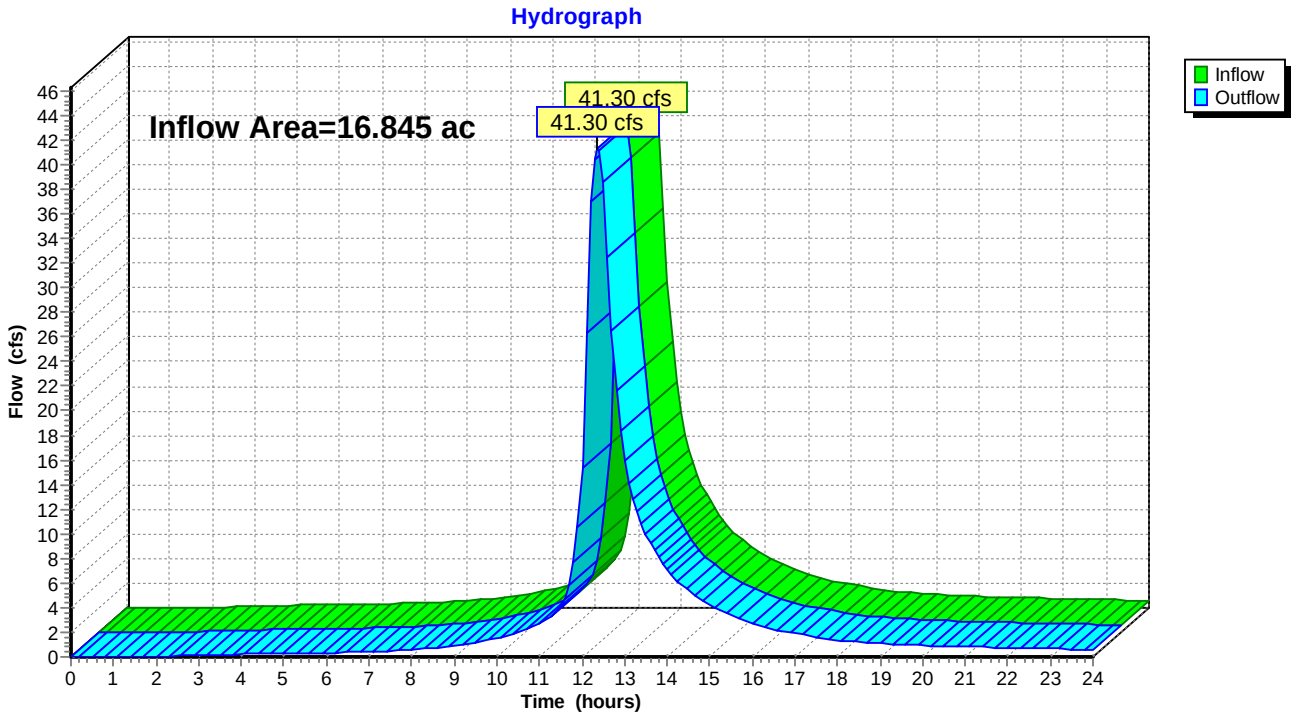


Summary for Reach X2: Area Summary Post (Not a physical location)

Inflow Area = 16.845 ac, 60.55% Impervious, Inflow Depth > 4.09" for 25-Year event
Inflow = 41.30 cfs @ 12.37 hrs, Volume= 5.741 af
Outflow = 41.30 cfs @ 12.37 hrs, Volume= 5.741 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X2: Area Summary Post (Not a physical location)



Summary for Pond 19P: INFL. POND 3C

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth > 7.60" for 25-Year event
Inflow = 6.29 cfs @ 12.09 hrs, Volume= 0.555 af
Outflow = 4.08 cfs @ 12.23 hrs, Volume= 0.485 af, Atten= 35%, Lag= 7.9 min
Discarded = 0.17 cfs @ 8.00 hrs, Volume= 0.267 af
Primary = 3.91 cfs @ 12.23 hrs, Volume= 0.218 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 475.11' @ 12.23 hrs Surf.Area= 2,964 sf Storage= 7,476 cf

Plug-Flow detention time= 130.5 min calculated for 0.483 af (87% of inflow)
Center-of-Mass det. time= 72.8 min (814.0 - 741.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	471.80'	998 cf	**114.00'W x 26.00'L x 4.17'H Field A** 12,350 cf Overall - 9,856 cf Embedded = 2,494 cf x 40.0% Voids
#2A	472.30'	7,005 cf	**retain_it retain_it 3.0'** x 42 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 14 Rows adjusted for 160.5 cf perimeter wall
#3	475.30'	38 cf	**3.00'D x 2.70'H Vertical Cone/Cylinder - Risers** x 2 -Impervious
		8,041 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	471.80'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	474.05'	**15.0" Round Culvert** L= 209.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 474.05' / 466.50' S= 0.0361 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.17 cfs @ 8.00 hrs HW=471.86' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=3.75 cfs @ 12.23 hrs HW=475.08' (Free Discharge)
2=Culvert (Inlet Controls 3.75 cfs @ 3.46 fps)

Pond 19P: INFL. POND 3C - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
14 Rows adjusted for 160.5 cf perimeter wall

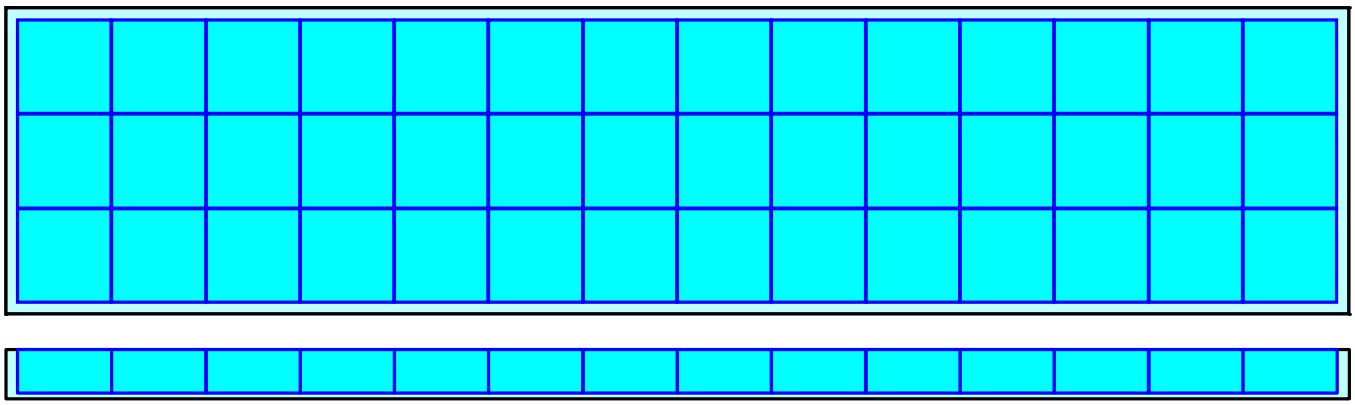
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
14 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 114.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 14 x 2 = 160.5 cf Perimeter Wall
42 Chambers x 170.6 cf - 160.5 cf Perimeter wall = 7,005.1 cf Chamber Storage
42 Chambers x 234.7 cf = 9,856.0 cf Displacement

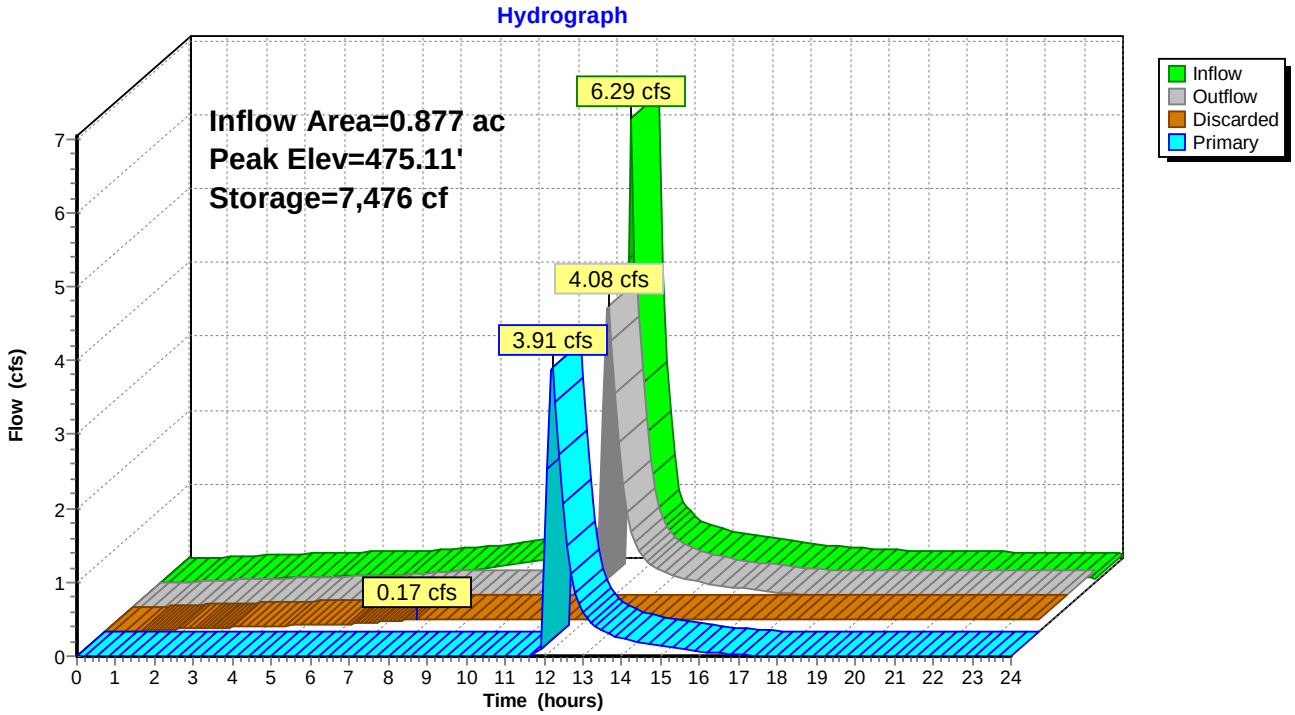
12,350.0 cf Field - 9,856.0 cf Chambers = 2,494.0 cf Stone x 40.0% Voids = 997.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,002.7 cf = 0.184 af
Overall Storage Efficiency = 64.8%
Overall System Size = 26.00' x 114.00' x 4.17'

42 Chambers
457.4 cy Field
92.4 cy Stone



Pond 19P: INFL. POND 3C



Summary for Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.

Inflow Area = 1.397 ac, 80.69% Impervious, Inflow Depth > 7.05" for 25-Year event
Inflow = 7.95 cfs @ 12.17 hrs, Volume= 0.821 af
Outflow = 3.46 cfs @ 12.48 hrs, Volume= 0.821 af, Atten= 56%, Lag= 18.3 min
Discarded = 0.55 cfs @ 12.60 hrs, Volume= 0.711 af
Primary = 2.90 cfs @ 12.48 hrs, Volume= 0.110 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs / 3
Peak Elev= 463.11' @ 12.48 hrs Surf.Area= 2,813 sf Storage= 11,576 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 136.0 min (892.1 - 756.1)

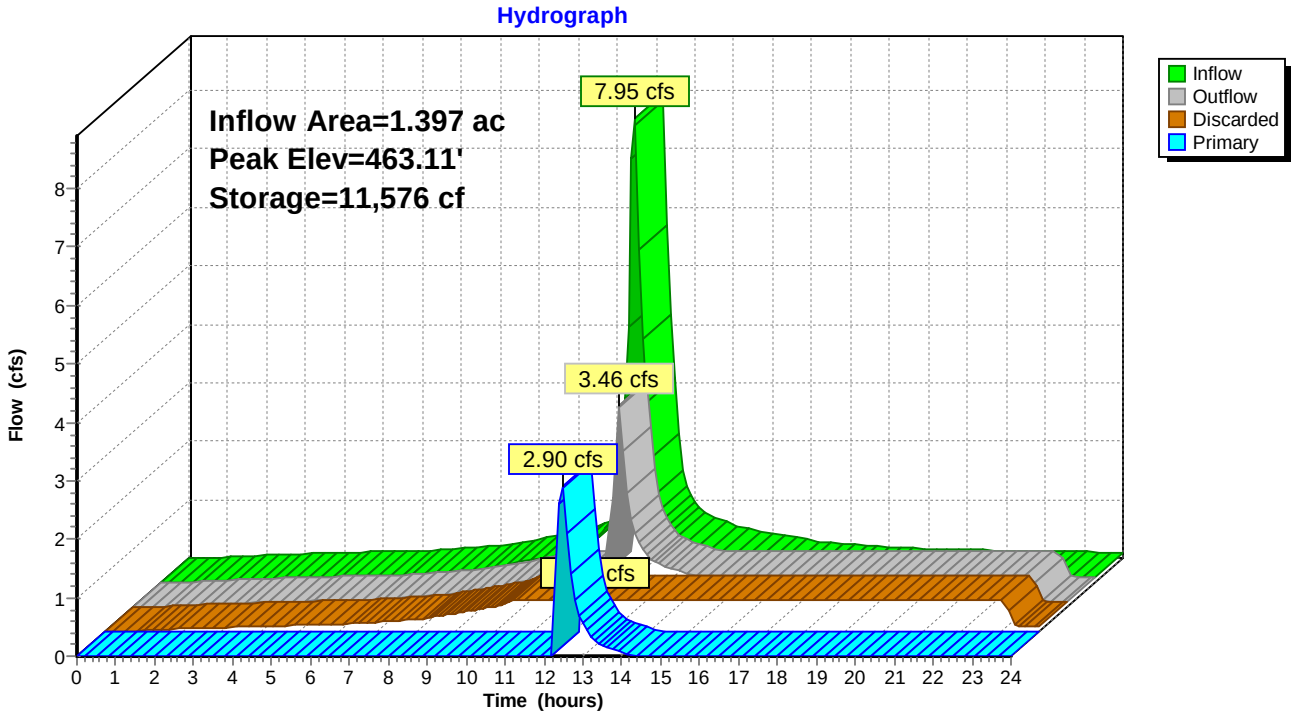
Volume	Invert	Avail.Storage	Storage Description
#1	458.00'	1,112 cf	**34.00'W x 82.00'L x 6.20'H Prismatoid of crushed stone** 17,286 cf Overall - 14,507 cf Embedded = 2,779 cf x 40.0% Voids
#2	458.50'	11,360 cf	**retain_it retain_it 5.0'** x 40 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 290.9 cf perimeter wall
#3	463.50'	170 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 3 -Impervious
#4	461.00'	119 cf	**18.0" Round Pipe Storage** L= 67.5' S= 0.0150 '/'
		12,761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	458.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	461.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.00' / 460.50' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#3	Device 2	462.75'	**4.0' long x 4.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.5' Crest Height
#4	Device 2	465.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.55 cfs @ 12.60 hrs HW=463.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.55 cfs)

Primary OutFlow Max=2.80 cfs @ 12.48 hrs HW=463.11' (Free Discharge)
└**2=Culvert** (Passes 2.80 cfs of 9.91 cfs potential flow)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.80 cfs @ 2.01 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.



Summary for Pond 29P: DETN. POND 5B

Inflow Area = 0.233 ac, 91.42% Impervious, Inflow Depth > 7.35" for 25-Year event
Inflow = 1.45 cfs @ 12.13 hrs, Volume= 0.143 af
Outflow = 0.17 cfs @ 11.50 hrs, Volume= 0.143 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.17 cfs @ 11.50 hrs, Volume= 0.143 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 455.12' @ 12.92 hrs Surf.Area= 900 sf Storage= 2,037 cf

Plug-Flow detention time= 78.5 min calculated for 0.142 af (100% of inflow)
Center-of-Mass det. time= 78.0 min (826.7 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	452.00'	374 cf	**50.00'W x 18.00'L x 4.17'H Field A** 3,750 cf Overall - 2,816 cf Embedded = 934 cf x 40.0% Voids
#2A	452.50'	1,972 cf	**retain_it retain_it 3.0'** x 12 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 6 Rows adjusted for 75.5 cf perimeter wall
#3	455.50'	35 cf	**3.00'D x 2.50'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	457.00'	633 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		3,014 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
457.00	368	128.8	0	0	368
458.00	942	158.0	633	633	1,050

Device	Routing	Invert	Outlet Devices
#1	Discarded	452.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	458.00'	**2.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.17 cfs @ 11.50 hrs HW=452.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=452.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29P: DETN. POND 5B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
6 Rows adjusted for 75.5 cf perimeter wall

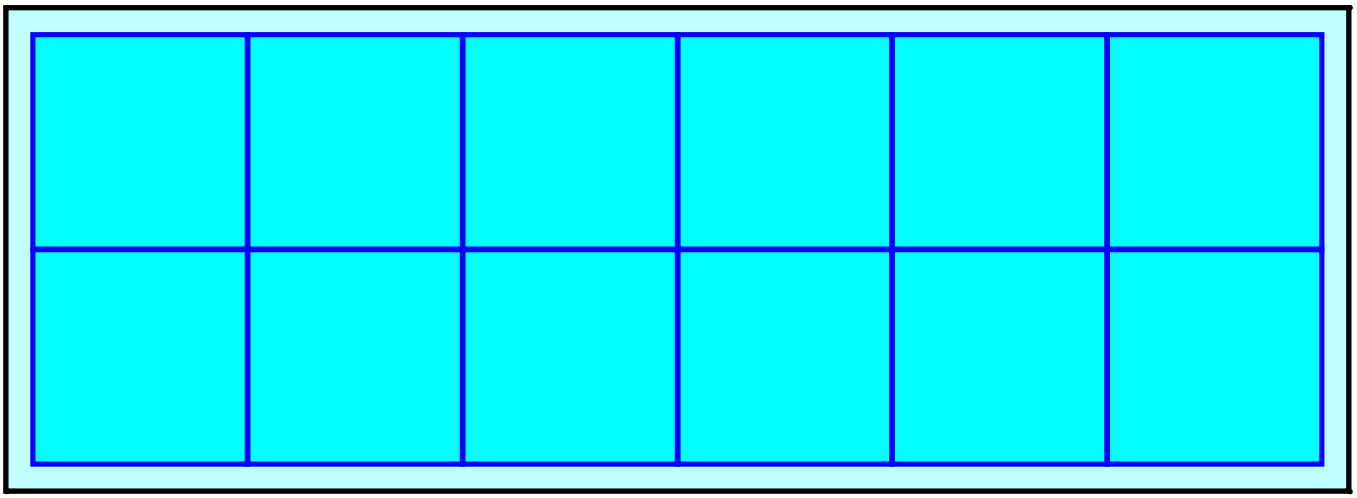
2 Chambers/Row x 8.00' Long = 16.00' Row Length +12.0" End Stone x 2 = 18.00' Base Length
6 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 50.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

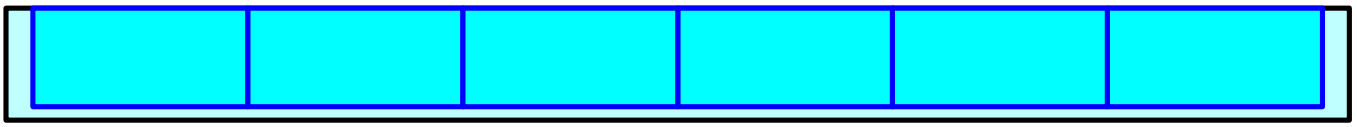
4.7 cf Sidewall x 2 x 2 + 4.7 cf Endwall x 6 x 2 = 75.5 cf Perimeter Wall
12 Chambers x 170.6 cf - 75.5 cf Perimeter wall = 1,971.8 cf Chamber Storage
12 Chambers x 234.7 cf = 2,816.0 cf Displacement

3,750.0 cf Field - 2,816.0 cf Chambers = 934.0 cf Stone x 40.0% Voids = 373.6 cf Stone Storage

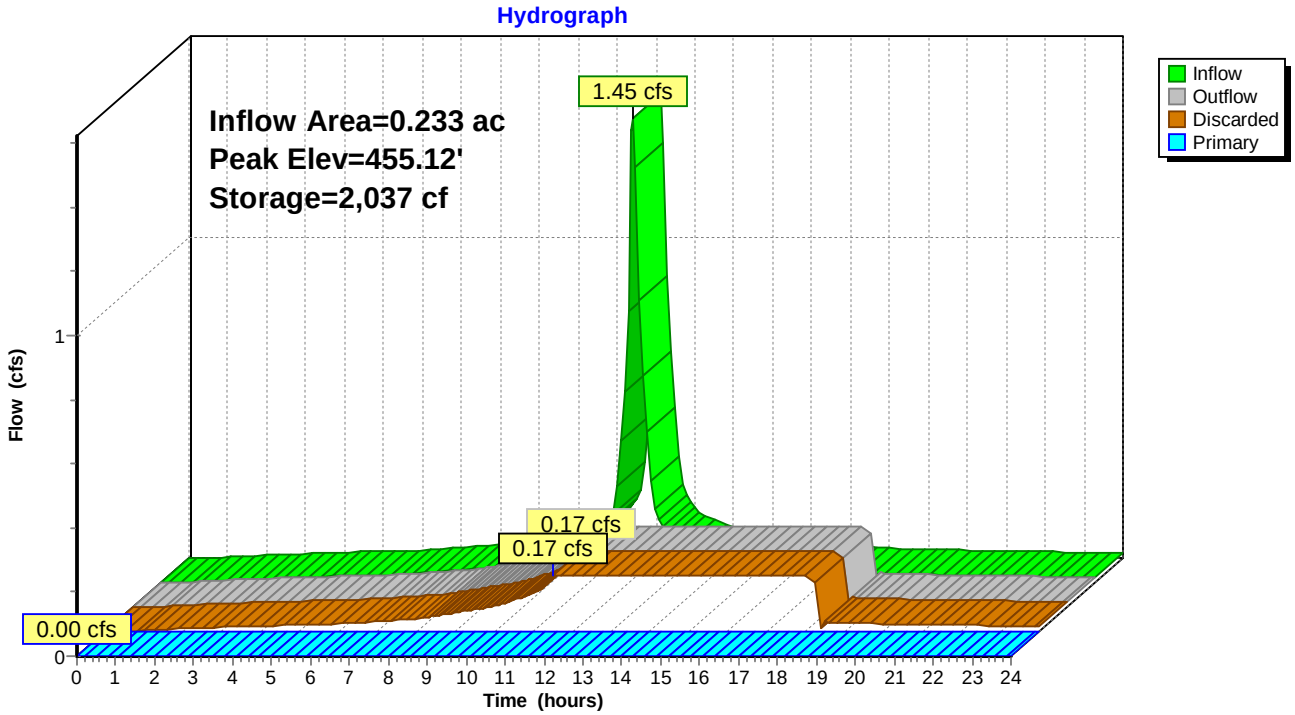
Chamber Storage + Stone Storage = 2,345.4 cf = 0.054 af
Overall Storage Efficiency = 62.5%
Overall System Size = 18.00' x 50.00' x 4.17'

12 Chambers
138.9 cy Field
34.6 cy Stone





Pond 29P: DETN. POND 5B



Summary for Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane

Inflow Area = 9.324 ac, 57.99% Impervious, Inflow Depth > 4.57" for 25-Year event
Inflow = 30.48 cfs @ 12.32 hrs, Volume= 3.552 af
Outflow = 30.49 cfs @ 12.32 hrs, Volume= 3.551 af, Atten= 0%, Lag= 0.3 min
Primary = 30.49 cfs @ 12.32 hrs, Volume= 3.551 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 456.86' @ 12.32 hrs Surf.Area= 911 sf Storage= 515 cf

Plug-Flow detention time= 0.4 min calculated for 3.537 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (804.6 - 804.2)

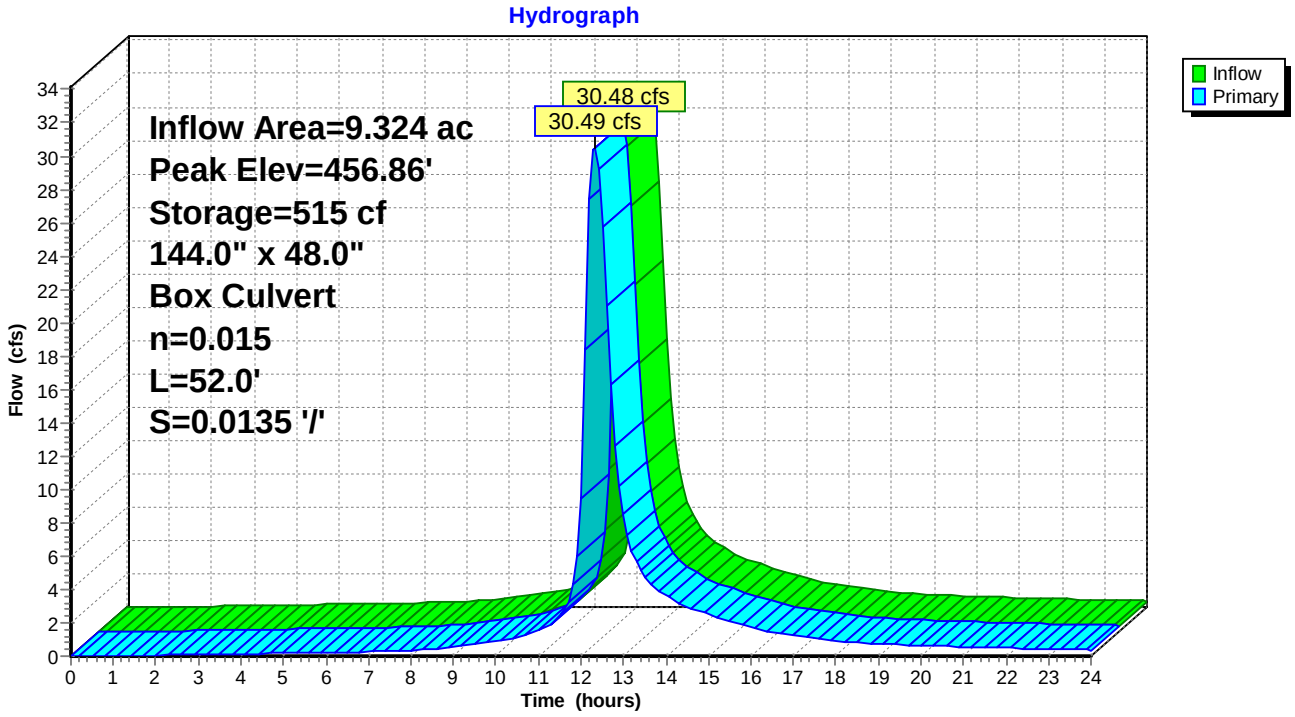
Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	90,081 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
456.00	340	69.0	0	0	340
458.00	2,107	180.0	2,196	2,196	2,553
460.00	5,971	358.0	7,750	9,946	10,193
462.00	11,082	505.0	16,792	26,737	20,325
464.00	16,612	607.0	27,508	54,245	29,419
466.00	19,256	663.0	35,835	90,081	35,220

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**144.0" W x 48.0" H Box Box Culvert** L= 52.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 456.00' / 455.30' S= 0.0135 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 48.00 sf

Primary OutFlow Max=30.10 cfs @ 12.32 hrs HW=456.85' (Free Discharge)
↑—**1=Box Culvert** (Inlet Controls 30.10 cfs @ 2.96 fps)

Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane



Summary for Pond 101P: DETN. POND 1A

Inflow Area = 1.631 ac, 79.38% Impervious, Inflow Depth > 7.01" for 25-Year event
Inflow = 9.77 cfs @ 12.13 hrs, Volume= 0.953 af
Outflow = 3.70 cfs @ 12.46 hrs, Volume= 0.942 af, Atten= 62%, Lag= 19.5 min
Primary = 3.70 cfs @ 12.46 hrs, Volume= 0.942 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 457.45' @ 12.46 hrs Surf.Area= 6,170 sf Storage= 10,061 cf

Plug-Flow detention time= 39.5 min calculated for 0.942 af (99% of inflow)
Center-of-Mass det. time= 31.7 min (786.8 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	455.35'	1,229 cf	**24.00'W x 256.00'L x 4.17'H Field A** 25,600 cf Overall - 22,528 cf Embedded = 3,072 cf x 40.0% Voids
#2A	455.85'	16,048 cf	**retain_it retain_it 3.0'** x 96 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 330.5 cf perimeter wall
#3	458.80'	47 cf	**3.00'D x 2.20'H Riser** x 3
#4	454.65'	251 cf	**18.0" Round Pipe Storage** L= 142.0' S= 0.0116 '/'
		17,575 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	455.35'	**12.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 455.35' / 454.65' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.69 cfs @ 12.46 hrs HW=457.45' (Free Discharge)
1=Culvert (Barrel Controls 3.69 cfs @ 4.70 fps)

Pond 101P: DETN. POND 1A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
3 Rows adjusted for 330.5 cf perimeter wall

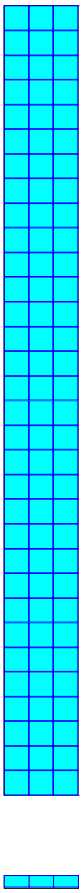
32 Chambers/Row x 8.00' Long = 256.00' Row Length
3 Rows x 96.0" Wide = 24.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 32 x 2 + 4.7 cf Endwall x 3 x 2 = 330.5 cf Perimeter Wall
96 Chambers x 170.6 cf - 330.5 cf Perimeter wall = 16,048.2 cf Chamber Storage
96 Chambers x 234.7 cf = 22,528.0 cf Displacement

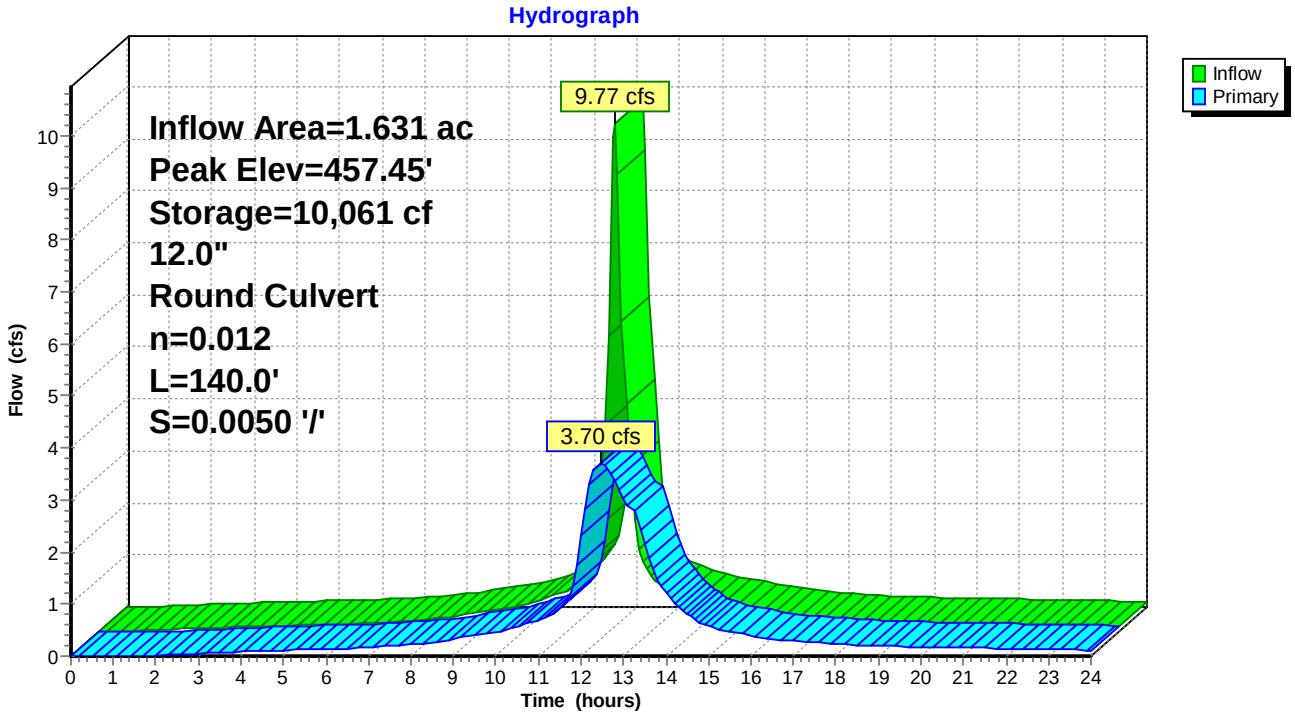
25,600.0 cf Field - 22,528.0 cf Chambers = 3,072.0 cf Stone x 40.0% Voids = 1,228.8 cf Stone Storage

Chamber Storage + Stone Storage = 17,277.0 cf = 0.397 af
Overall Storage Efficiency = 67.5%
Overall System Size = 256.00' x 24.00' x 4.17'

96 Chambers
948.1 cy Field
113.8 cy Stone



Pond 101P: DETN. POND 1A



Summary for Pond 102P: INFIL. POND 2

Inflow Area = 1.889 ac, 87.97% Impervious, Inflow Depth > 7.23" for 25-Year event
Inflow = 11.95 cfs @ 12.11 hrs, Volume= 1.138 af
Outflow = 5.12 cfs @ 12.40 hrs, Volume= 0.789 af, Atten= 57%, Lag= 16.9 min
Discarded = 0.16 cfs @ 4.90 hrs, Volume= 0.284 af
Primary = 4.95 cfs @ 12.40 hrs, Volume= 0.504 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 467.67' @ 12.40 hrs Surf.Area= 6,804 sf Storage= 21,598 cf

Plug-Flow detention time= 165.5 min calculated for 0.785 af (69% of inflow)
Center-of-Mass det. time= 70.0 min (819.3 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	463.80'	2,115 cf	**162.00'W x 42.00'L x 5.17'H Field A** 35,154 cf Overall - 29,867 cf Embedded = 5,287 cf x 40.0% Voids
#2A	464.30'	22,716 cf	**retain_it retain_it 4.0'** x 100 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 20 Rows adjusted for 377.5 cf perimeter wall
#3	468.30'	99 cf	**3.00'D x 3.50'H Riser** x 4 -Impervious
#4	461.50'	560 cf	**18.0" Round Pipe Storage** -Impervious L= 317.0' S= 0.0157 '/'
		25,491 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	463.80'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	466.57'	**18.0" Round 18" DRAIN** L= 317.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 466.57' / 461.50' S= 0.0160 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.16 cfs @ 4.90 hrs HW=463.80' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=4.94 cfs @ 12.40 hrs HW=467.67' (Free Discharge)
↑—**2=18" DRAIN** (Inlet Controls 4.94 cfs @ 3.57 fps)

Pond 102P: INFIL. POND 2 - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)
Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf
Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf
20 Rows adjusted for 377.5 cf perimeter wall

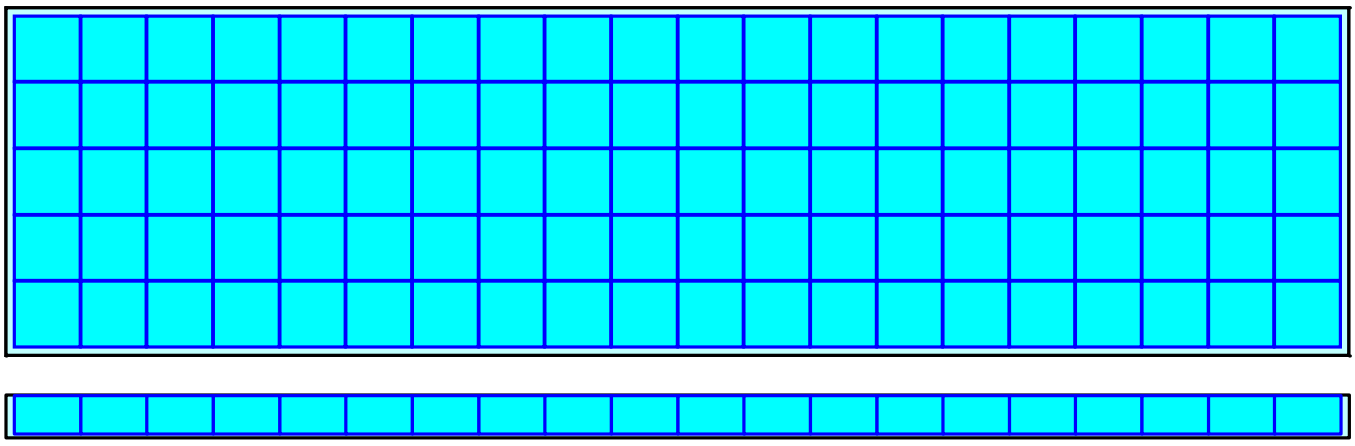
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 56.0" Chamber Height = 5.17' Field Height

7.5 cf Sidewall x 5 x 2 + 7.5 cf Endwall x 20 x 2 = 377.5 cf Perimeter Wall
100 Chambers x 230.9 cf - 377.5 cf Perimeter wall = 22,716.5 cf Chamber Storage
100 Chambers x 298.7 cf = 29,866.7 cf Displacement

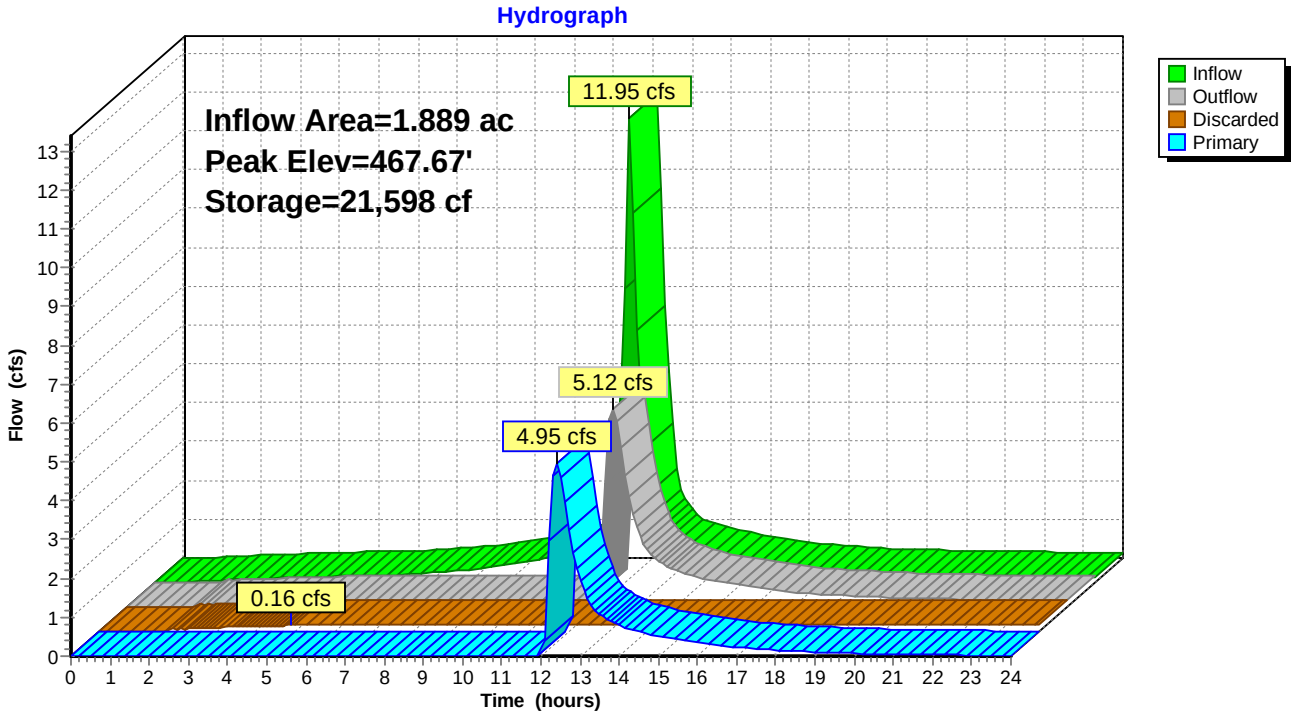
35,154.0 cf Field - 29,866.7 cf Chambers = 5,287.3 cf Stone x 40.0% Voids = 2,114.9 cf Stone Storage

Chamber Storage + Stone Storage = 24,831.4 cf = 0.570 af
Overall Storage Efficiency = 70.6%
Overall System Size = 42.00' x 162.00' x 5.17'

100 Chambers
1,302.0 cy Field
195.8 cy Stone



Pond 102P: INFIL. POND 2



Summary for Pond 103P: DETN. POND 3A

Inflow Area = 1.476 ac, 55.17% Impervious, Inflow Depth > 6.21" for 25-Year event
Inflow = 8.01 cfs @ 12.14 hrs, Volume= 0.764 af
Outflow = 6.03 cfs @ 12.26 hrs, Volume= 0.761 af, Atten= 25%, Lag= 7.5 min
Primary = 6.03 cfs @ 12.26 hrs, Volume= 0.761 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 469.07' @ 12.26 hrs Surf.Area= 2,688 sf Storage= 3,258 cf

Plug-Flow detention time= 12.4 min calculated for 0.757 af (99% of inflow)
Center-of-Mass det. time= 9.5 min (780.2 - 770.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	467.40'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	467.90'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	469.90'	28 cf	**3.00'D x 2.00'H Vetical Cone/Cylinder - Risers** x 2
#4	467.40'	39 cf	**12.0" Round Pipe Storage** L= 50.0'
		5,188 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	467.40'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 467.40' / 466.90' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.96 cfs @ 12.26 hrs HW=469.04' (Free Discharge)
1=Culvert (Inlet Controls 5.96 cfs @ 4.86 fps)

Pond 103P: DETN. POND 3A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

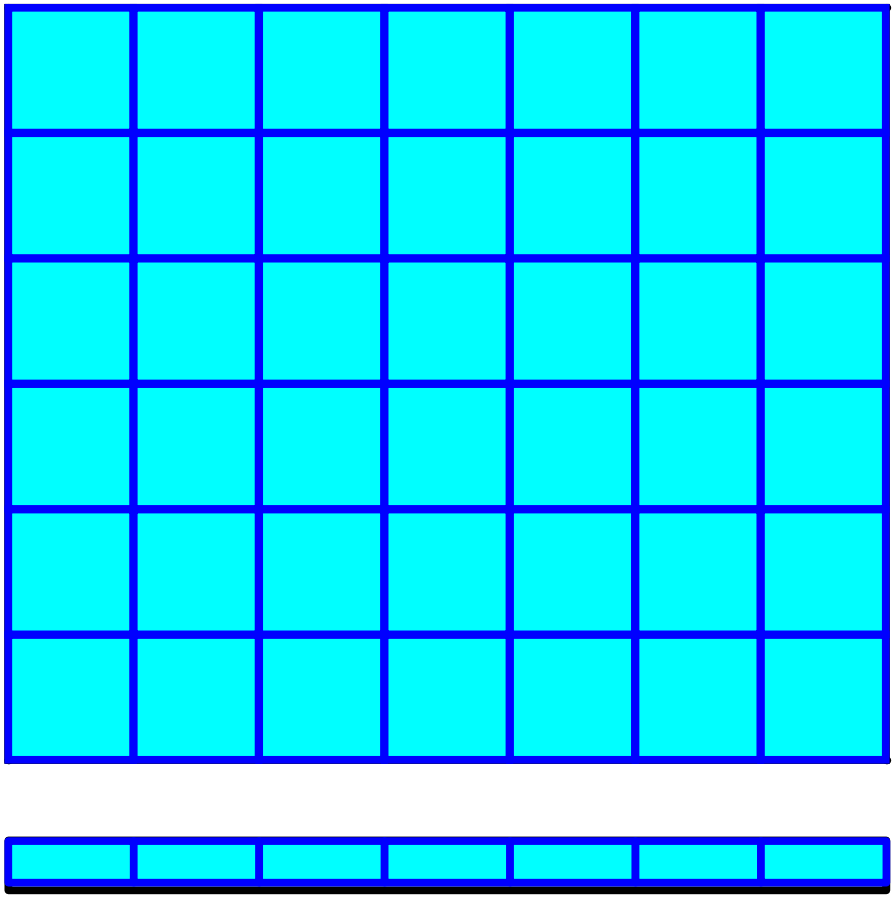
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

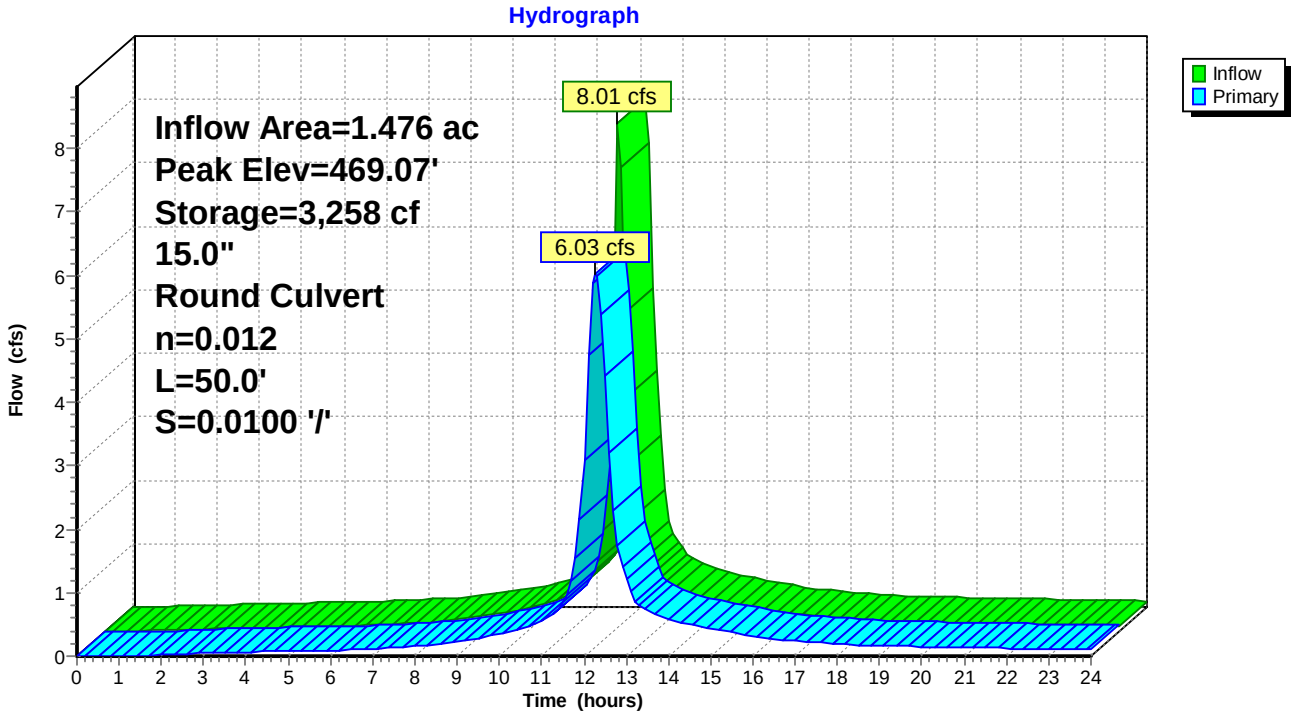
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 103P: DETN. POND 3A



Summary for Pond 104P: INFL. POND 4A

Inflow Area = 1.128 ac, 89.19% Impervious, Inflow Depth > 7.29" for 25-Year event
Inflow = 7.25 cfs @ 12.11 hrs, Volume= 0.685 af
Outflow = 4.32 cfs @ 12.29 hrs, Volume= 0.541 af, Atten= 40%, Lag= 10.9 min
Discarded = 0.10 cfs @ 5.30 hrs, Volume= 0.176 af
Primary = 4.22 cfs @ 12.29 hrs, Volume= 0.365 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 465.35' @ 12.29 hrs Surf.Area= 4,212 sf Storage= 10,851 cf

Plug-Flow detention time= 139.7 min calculated for 0.541 af (79% of inflow)
Center-of-Mass det. time= 59.7 min (808.1 - 748.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.00'	1,388 cf	**162.00'W x 26.00'L x 4.17'H Field A** 17,550 cf Overall - 14,080 cf Embedded = 3,470 cf x 40.0% Voids
#2A	462.50'	10,019 cf	**retain_it retain_it 3.0'** x 60 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 20 Rows adjusted for 217.2 cf perimeter wall
#3	465.50'	64 cf	**3.00'D x 3.00'H Riser** x 3 -Impervious
#4	464.00'	67 cf	**18.0" Round Pipe Storage** -Impervious L= 38.0' S= 0.0132 '/'
		11,538 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	462.00'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	464.00'	**18.0" Round Culvert** L= 38.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 464.00' / 464.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.10 cfs @ 5.30 hrs HW=462.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=4.20 cfs @ 12.29 hrs HW=465.35' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 4.20 cfs @ 3.31 fps)

Pond 104P: INFL. POND 4A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
20 Rows adjusted for 217.2 cf perimeter wall

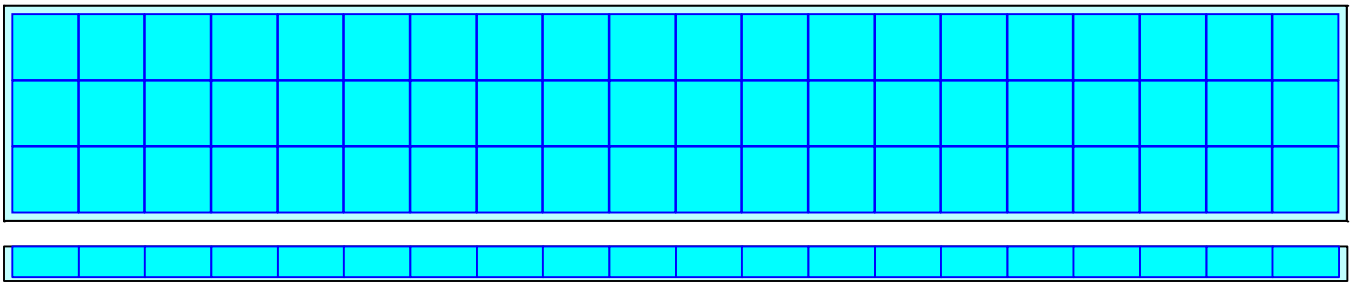
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 20 x 2 = 217.2 cf Perimeter Wall
60 Chambers x 170.6 cf - 217.2 cf Perimeter wall = 10,019.5 cf Chamber Storage
60 Chambers x 234.7 cf = 14,080.0 cf Displacement

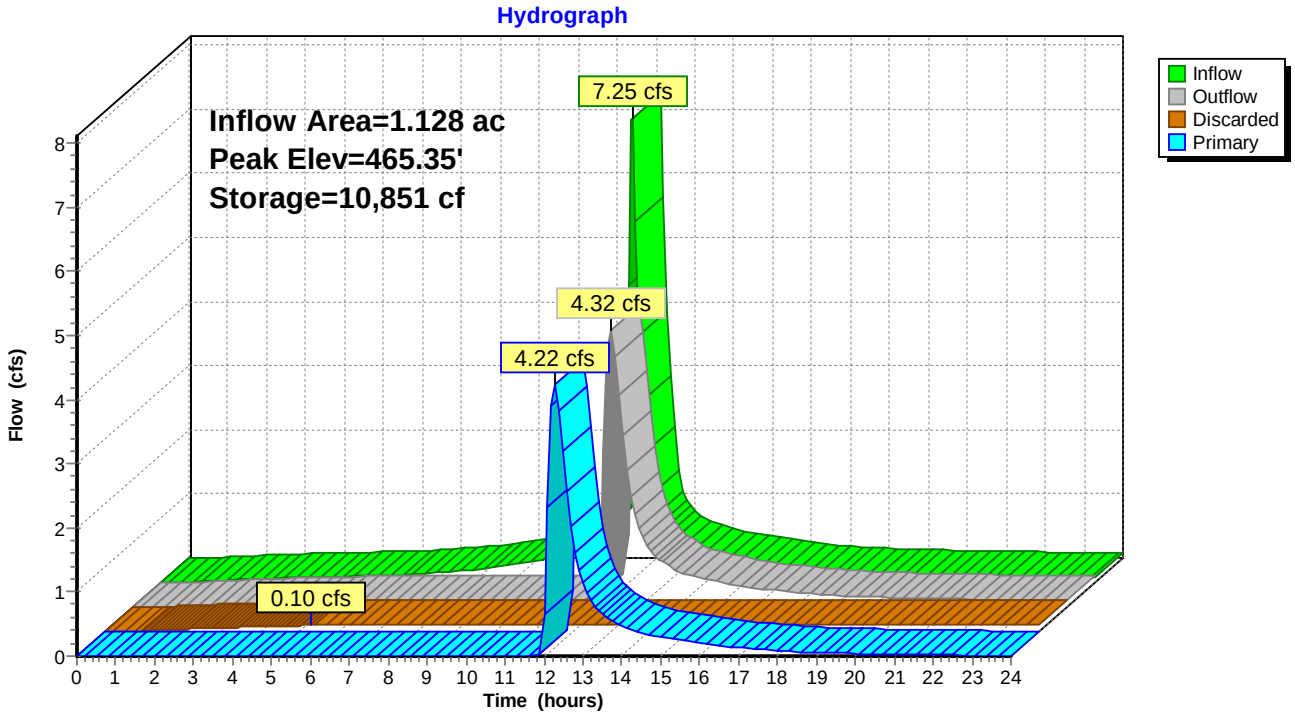
17,550.0 cf Field - 14,080.0 cf Chambers = 3,470.0 cf Stone x 40.0% Voids = 1,388.0 cf Stone Storage

Chamber Storage + Stone Storage = 11,407.5 cf = 0.262 af
Overall Storage Efficiency = 65.0%
Overall System Size = 26.00' x 162.00' x 4.17'

60 Chambers
650.0 cy Field
128.5 cy Stone



Pond 104P: INFL. POND 4A



Summary for Pond 105P: DETN. POND 5A

Inflow Area = 1.074 ac, 83.75% Impervious, Inflow Depth > 7.14" for 25-Year event
Inflow = 6.71 cfs @ 12.12 hrs, Volume= 0.639 af
Outflow = 0.59 cfs @ 11.20 hrs, Volume= 0.638 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.59 cfs @ 11.20 hrs, Volume= 0.638 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 463.25' @ 13.24 hrs Surf.Area= 3,060 sf Storage= 10,363 cf

Plug-Flow detention time= 131.0 min calculated for 0.636 af (100% of inflow)
Center-of-Mass det. time= 130.2 min (881.9 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	459.00'	1,165 cf	**34.00'W x 90.00'L x 6.17'H Field A** 18,870 cf Overall - 15,957 cf Embedded = 2,913 cf x 40.0% Voids
#2A	459.50'	12,505 cf	**retain_it retain_it 5.0'** x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	464.50'	28 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	463.50'	79 cf	**12.0" Round Pipe Storage** L= 100.0' S= 0.0100 '/'
		13,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	459.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	463.50'	**12.0" Round Culvert** L= 150.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 463.50' / 461.60' S= 0.0126 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.59 cfs @ 11.20 hrs HW=459.08' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.59 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=459.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 105P: DETN. POND 5A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
4 Rows adjusted for 311.7 cf perimeter wall

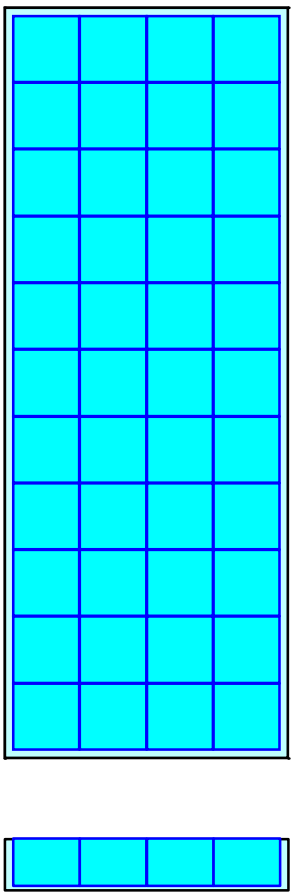
11 Chambers/Row x 8.00' Long = 88.00' Row Length +12.0" End Stone x 2 = 90.00' Base Length
4 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 34.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 11 x 2 + 10.4 cf Endwall x 4 x 2 = 311.7 cf Perimeter Wall
44 Chambers x 291.3 cf - 311.7 cf Perimeter wall = 12,504.6 cf Chamber Storage
44 Chambers x 362.7 cf = 15,957.3 cf Displacement

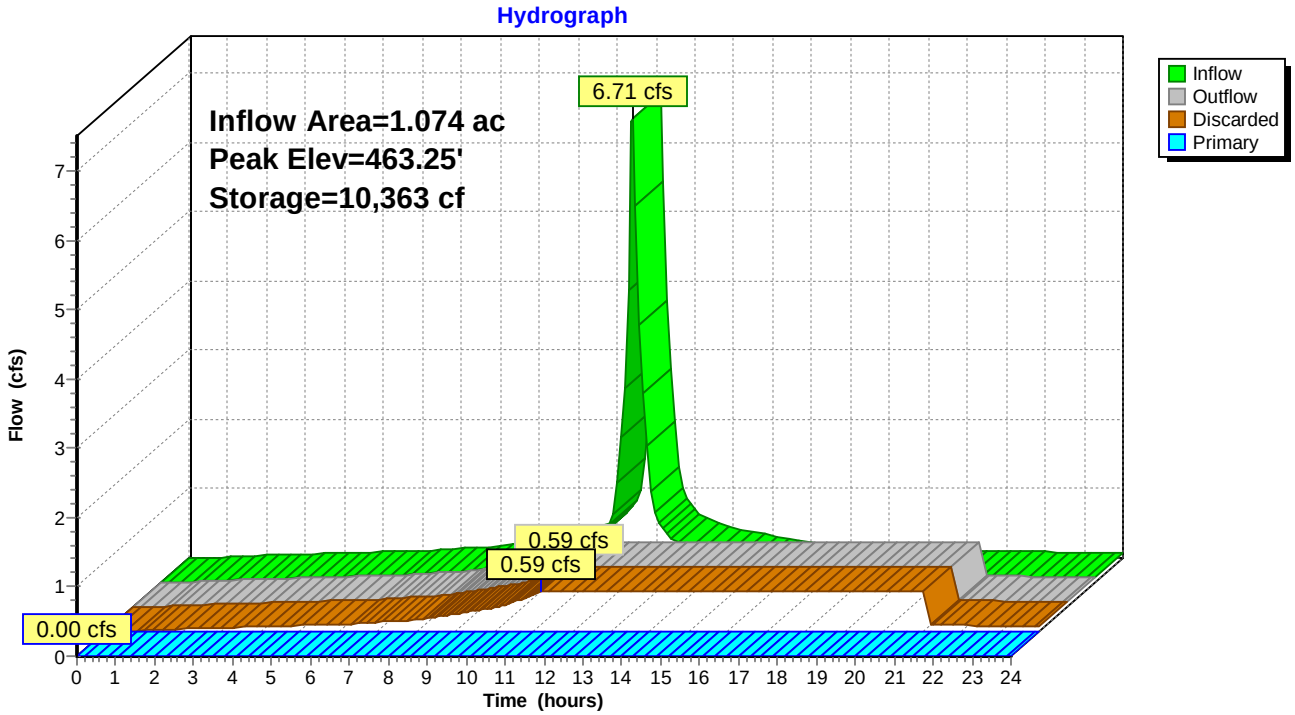
18,870.0 cf Field - 15,957.3 cf Chambers = 2,912.7 cf Stone x 40.0% Voids = 1,165.1 cf Stone Storage

Chamber Storage + Stone Storage = 13,669.7 cf = 0.314 af
Overall Storage Efficiency = 72.4%
Overall System Size = 90.00' x 34.00' x 6.17'

44 Chambers
698.9 cy Field
107.9 cy Stone



Pond 105P: DETN. POND 5A



Summary for Pond 111P: INFL. POND 1B

Inflow Area = 1.716 ac, 73.30% Impervious, Inflow Depth > 6.84" for 25-Year event
Inflow = 10.49 cfs @ 12.11 hrs, Volume= 0.978 af
Outflow = 3.08 cfs @ 12.50 hrs, Volume= 0.973 af, Atten= 71%, Lag= 23.2 min
Discarded = 0.25 cfs @ 8.00 hrs, Volume= 0.377 af
Primary = 2.83 cfs @ 12.50 hrs, Volume= 0.596 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 465.07' @ 12.50 hrs Surf.Area= 4,452 sf Storage= 13,273 cf

Plug-Flow detention time= 59.4 min calculated for 0.973 af (99% of inflow)
Center-of-Mass det. time= 55.9 min (813.1 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	461.40'	1,552 cf	**106.00'W x 42.00'L x 6.17'H Field A** 27,454 cf Overall - 23,573 cf Embedded = 3,881 cf x 40.0% Voids
#2A	461.90'	18,559 cf	**retain_it retain_it 5.0'** x 65 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 13 Rows adjusted for 374.0 cf perimeter wall
#3	466.50'	64 cf	**3.00'D x 4.50'H Riser** x 2 -Impervious
#4	454.65'	262 cf	**18.0" Round Pipe Storage** -Impervious L= 148.0' S= 0.0449 '/'
		20,437 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	461.90'	**8.0" Round Culvert** L= 148.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.90' / 454.65' S= 0.0490 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Discarded	461.40'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.25 cfs @ 8.00 hrs HW=461.40' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=2.83 cfs @ 12.50 hrs HW=465.07' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.83 cfs @ 8.10 fps)

Pond 111P: INFL. POND 1B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
13 Rows adjusted for 374.0 cf perimeter wall

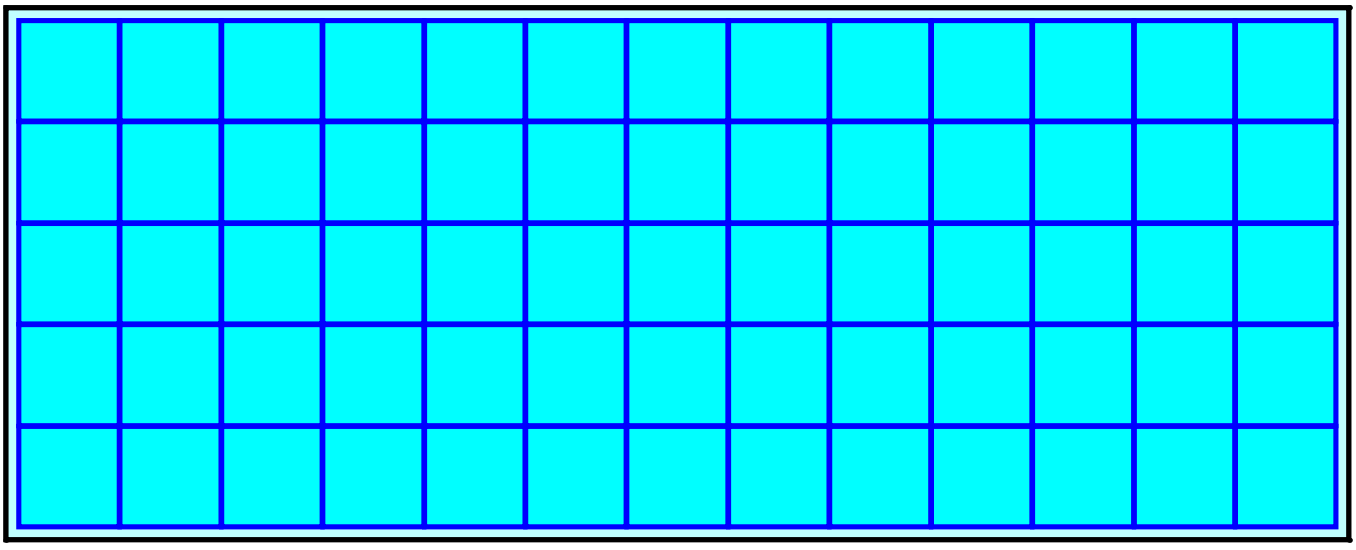
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
13 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 106.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 5 x 2 + 10.4 cf Endwall x 13 x 2 = 374.0 cf Perimeter Wall
65 Chambers x 291.3 cf - 374.0 cf Perimeter wall = 18,559.2 cf Chamber Storage
65 Chambers x 362.7 cf = 23,573.3 cf Displacement

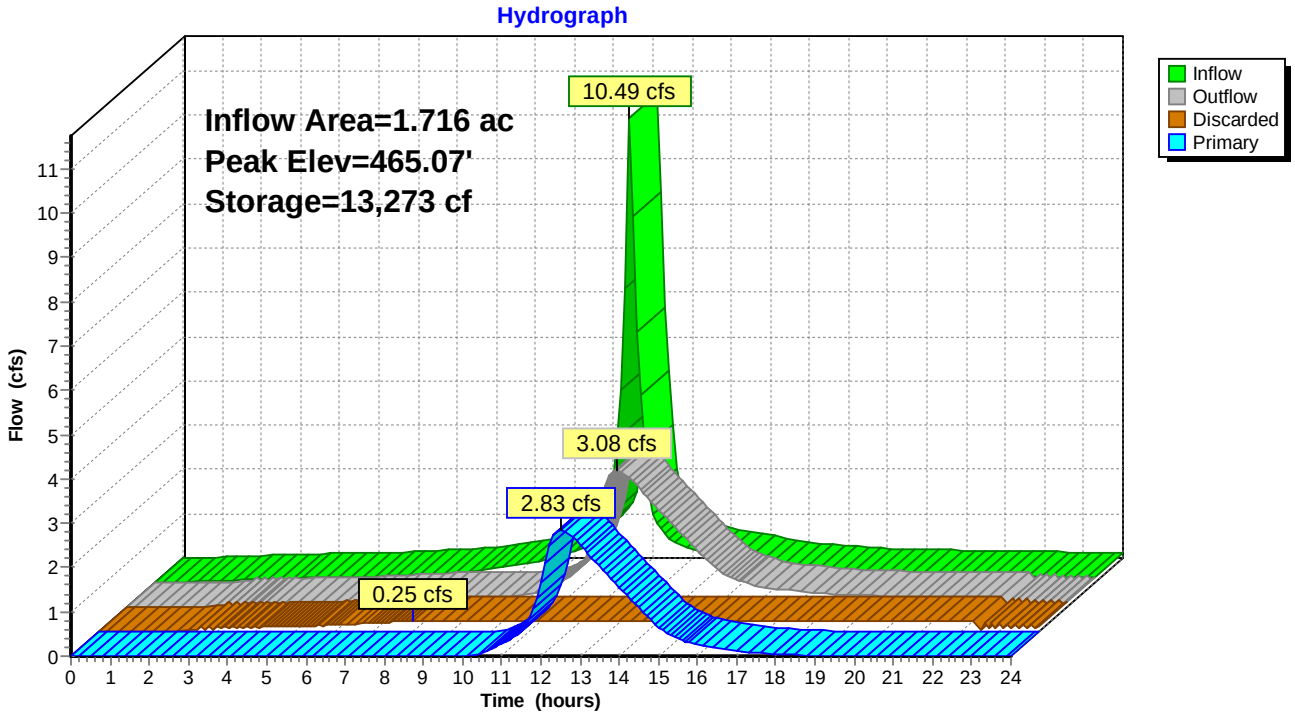
27,454.0 cf Field - 23,573.3 cf Chambers = 3,880.7 cf Stone x 40.0% Voids = 1,552.3 cf Stone Storage

Chamber Storage + Stone Storage = 20,111.4 cf = 0.462 af
Overall Storage Efficiency = 73.3%
Overall System Size = 42.00' x 106.00' x 6.17'

65 Chambers
1,016.8 cy Field
143.7 cy Stone



Pond 111P: INFL. POND 1B



Summary for Pond 113P: DETN. POND 3B

Inflow Area = 2.243 ac, 59.27% Impervious, Inflow Depth > 6.45" for 25-Year event
Inflow = 10.06 cfs @ 12.19 hrs, Volume= 1.206 af
Outflow = 8.85 cfs @ 12.31 hrs, Volume= 1.202 af, Atten= 12%, Lag= 7.4 min
Primary = 8.85 cfs @ 12.31 hrs, Volume= 1.202 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 467.33' @ 12.31 hrs Surf.Area= 2,688 sf Storage= 3,588 cf

Plug-Flow detention time= 9.3 min calculated for 1.197 af (99% of inflow)
Center-of-Mass det. time= 7.2 min (779.9 - 772.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	465.50'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	466.00'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	468.00'	14 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - risers**
		5,134 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	465.50'	**18.0" Round Culvert** L= 320.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.50' / 462.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=8.80 cfs @ 12.31 hrs HW=467.32' (Free Discharge)
1=Culvert (Inlet Controls 8.80 cfs @ 4.98 fps)

Pond 113P: DETN. POND 3B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

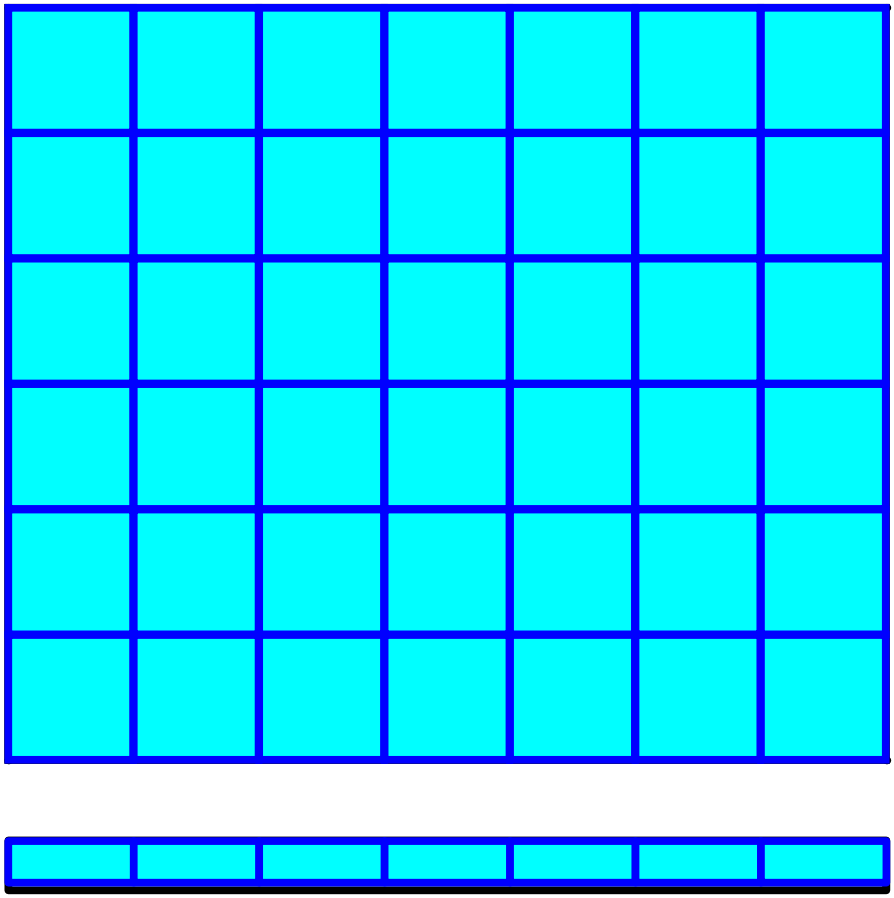
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

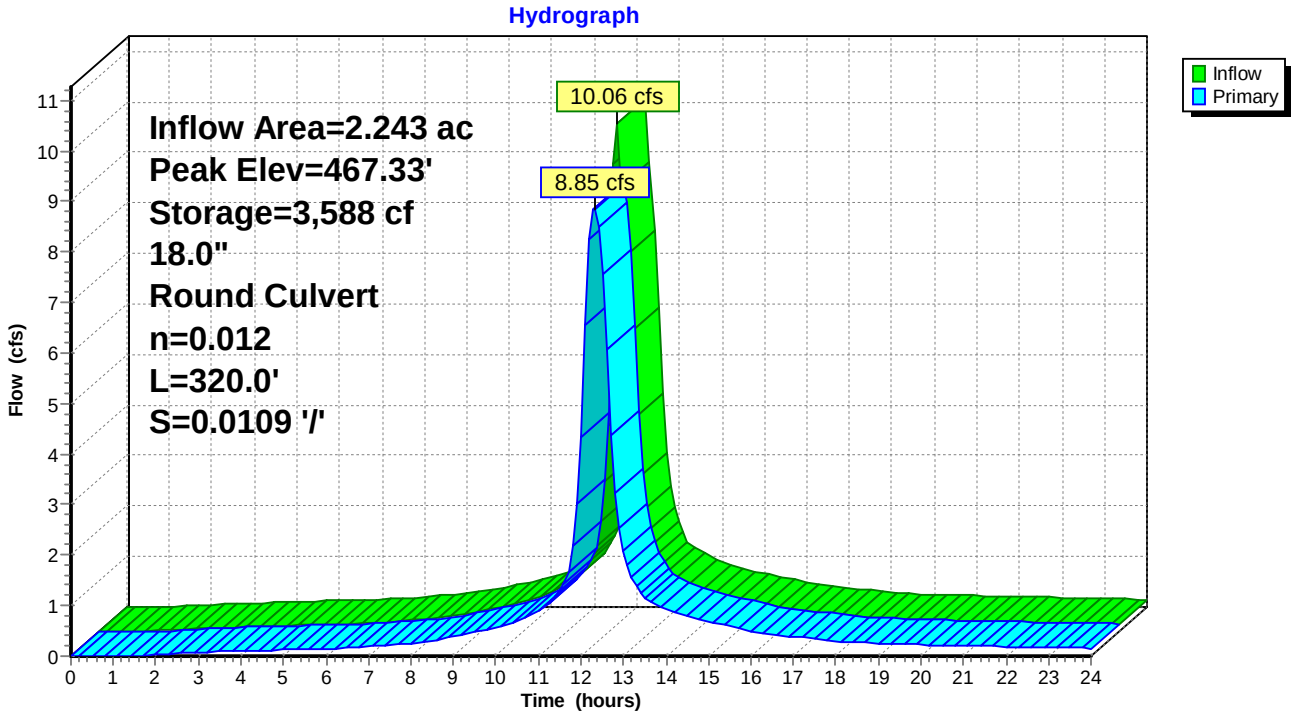
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 113P: DETN. POND 3B



Summary for Pond 114P: DETN. POND 4B

Inflow Area = 0.656 ac, 81.20% Impervious, Inflow Depth > 7.07" for 25-Year event
Inflow = 4.09 cfs @ 12.11 hrs, Volume= 0.386 af
Outflow = 2.94 cfs @ 12.24 hrs, Volume= 0.384 af, Atten= 28%, Lag= 7.4 min
Primary = 2.94 cfs @ 12.24 hrs, Volume= 0.384 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 463.90' @ 12.24 hrs Surf.Area= 2,368 sf Storage= 1,714 cf

Plug-Flow detention time= 14.7 min calculated for 0.383 af (99% of inflow)
Center-of-Mass det. time= 11.2 min (764.1 - 752.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.80'	461 cf	**96.00'W x 24.00'L x 4.17'H Field A** 9,600 cf Overall - 8,448 cf Embedded = 1,152 cf x 40.0% Voids
#2A	463.30'	6,000 cf	**retain_it retain_it 3.0'** x 36 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 12 Rows adjusted for 141.6 cf perimeter wall
#3	465.80'	42 cf	**3.00'D x 3.00'H Riser** x 2
#4	462.80'	78 cf	**18.0" Round Pipe Storage** L= 44.0' S= 0.0114 '/'
		6,581 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	462.80'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 462.80' / 462.30' S= 0.0114 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.88 cfs @ 12.24 hrs HW=463.88' (Free Discharge)
1=Culvert (Inlet Controls 2.88 cfs @ 3.67 fps)

Pond 114P: DETN. POND 4B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
12 Rows adjusted for 141.6 cf perimeter wall

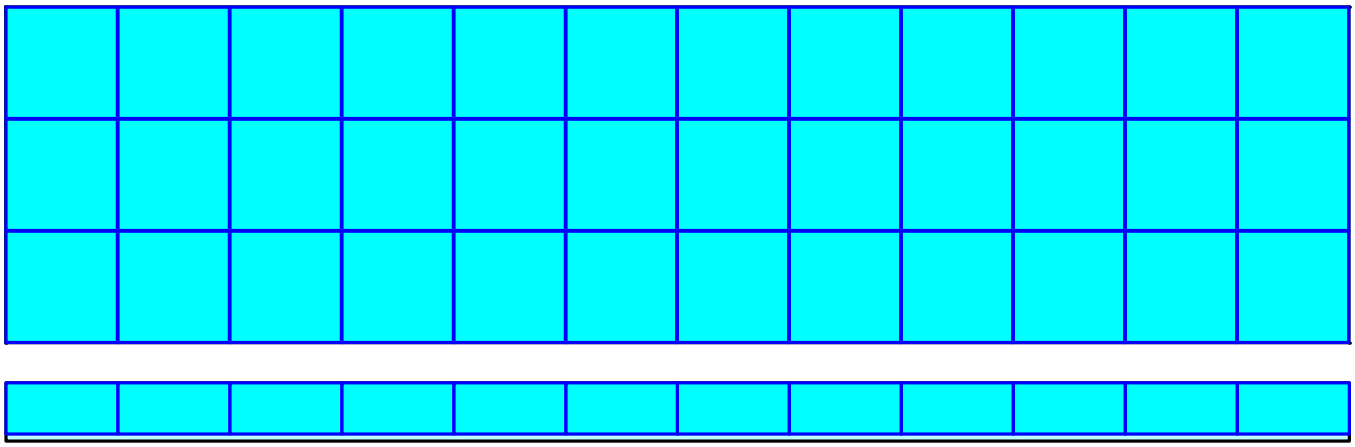
3 Chambers/Row x 8.00' Long = 24.00' Row Length
12 Rows x 96.0" Wide = 96.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 12 x 2 = 141.6 cf Perimeter Wall
36 Chambers x 170.6 cf - 141.6 cf Perimeter wall = 6,000.4 cf Chamber Storage
36 Chambers x 234.7 cf = 8,448.0 cf Displacement

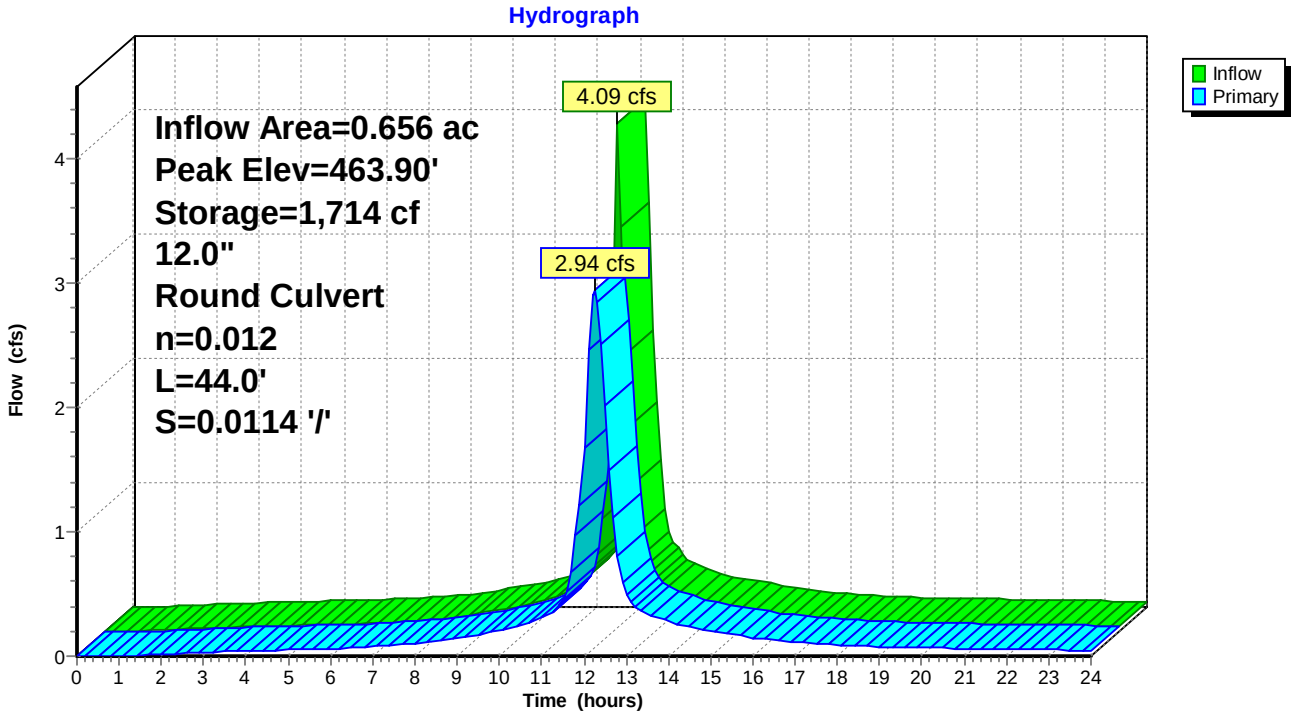
9,600.0 cf Field - 8,448.0 cf Chambers = 1,152.0 cf Stone x 40.0% Voids = 460.8 cf Stone Storage

Chamber Storage + Stone Storage = 6,461.2 cf = 0.148 af
Overall Storage Efficiency = 67.3%
Overall System Size = 24.00' x 96.00' x 4.17'

36 Chambers
355.6 cy Field
42.7 cy Stone



Pond 114P: DETN. POND 4B



Summary for Pond 210P: Northwest Wetland

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth > 4.65" for 25-Year event
Inflow = 4.01 cfs @ 12.29 hrs, Volume= 0.428 af
Outflow = 4.02 cfs @ 12.29 hrs, Volume= 0.428 af, Atten= 0%, Lag= 0.2 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 4.02 cfs @ 12.29 hrs, Volume= 0.428 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 465.52' @ 12.29 hrs Surf.Area= 156 sf Storage= 31 cf

Plug-Flow detention time= 0.1 min calculated for 0.428 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (830.3 - 830.2)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

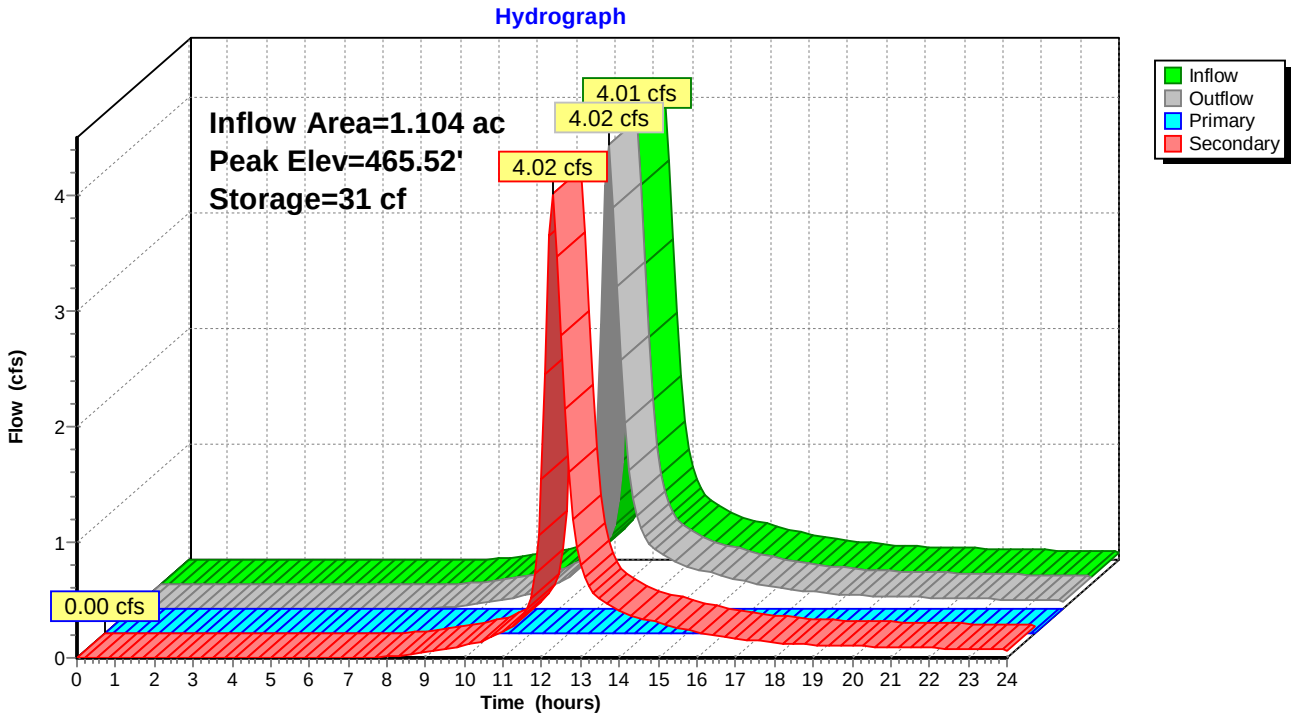
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing channel - model as b/c w** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**5.0' long x 1.0' breadth Flow to New Channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=465.00' (Free Discharge)
└**1=Discharge to West to Existing channel - model as b/c weir** (Controls 0.00 cfs)

Secondary OutFlow Max=3.97 cfs @ 12.29 hrs HW=465.52' (Free Discharge)
└**2=Flow to New Channel - model as b/c weir** (Weir Controls 3.97 cfs @ 1.81 fps)

Pond 210P: Northwest Wetland

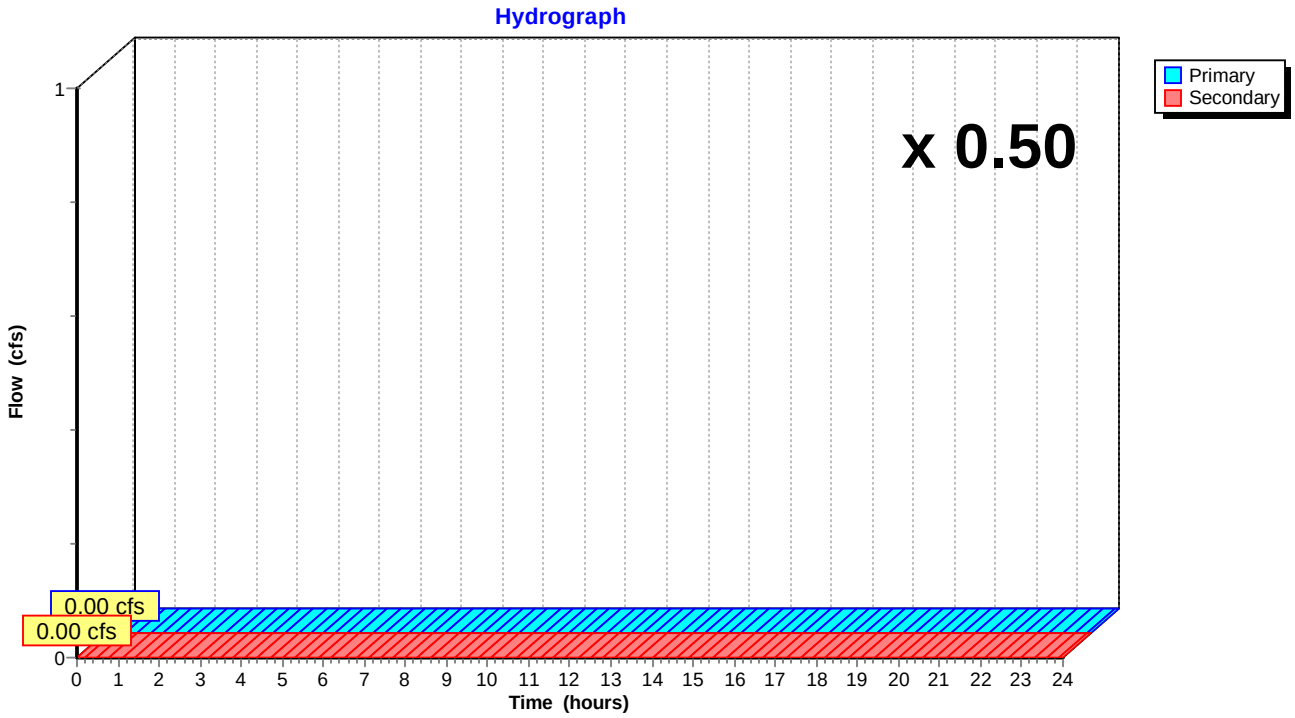


Summary for Link 9L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 9L: Diverging Flow



Time span=0.00-24.00 hrs, dt=0.10 hrs, 241 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 21S: BLDG 2 East and BLDG 1 Runoff Area=71,065 sf 79.38% Impervious Runoff Depth>9.92"
Tc=10.0 min CN=74/98 Runoff=13.74 cfs 1.348 af

Subcatchment 22S: BLDG 1 West Runoff Area=10,930 sf 74.42% Impervious Runoff Depth>9.76"
Tc=10.0 min CN=74/98 Runoff=2.09 cfs 0.204 af

Subcatchment 23S: PARKING DECK (top) Runoff Area=25,493 sf 94.05% Impervious Runoff Depth>10.37"
Tc=10.0 min CN=74/98 Runoff=5.07 cfs 0.506 af

Subcatchment 28S: BLDG 5 LL PKG Runoff Area=10,149 sf 91.42% Impervious Runoff Depth>10.29"
Tc=10.0 min CN=74/98 Runoff=2.01 cfs 0.200 af

Subcatchment 30S: BLDG 4 1/3 of ROOF Runoff Area=10,155 sf 100.00% Impervious Runoff Depth>10.55"
Tc=6.0 min CN=0/98 Runoff=2.30 cfs 0.205 af

Subcatchment 31S: BLDG 3 North Runoff Area=51,616 sf 68.73% Impervious Runoff Depth>9.55"
Flow Length=189' Slope=0.0237 '/' Tc=10.1 min CN=73/98 Runoff=9.69 cfs 0.943 af

Subcatchment 32S: BLDG 4 East and BLDG 3 Runoff Area=33,395 sf 67.17% Impervious Runoff Depth>9.89"
Tc=10.0 min CN=82/98 Runoff=6.51 cfs 0.632 af

Subcatchment 33S: Northerly Offsite to BLDG 3 Runoff Area=12,685 sf 0.00% Impervious Runoff Depth>6.94"
Flow Length=90' Slope=0.0322 '/' Tc=10.0 min CN=70/0 Runoff=1.93 cfs 0.168 af

Subcatchment 34S: BLDG 4 South Runoff Area=18,423 sf 70.83% Impervious Runoff Depth>9.65"
Tc=10.0 min CN=74/98 Runoff=3.50 cfs 0.340 af

Subcatchment 41S: BLDG 4 West and North Runoff Area=28,818 sf 81.57% Impervious Runoff Depth>9.98"
Tc=10.0 min CN=74/98 Runoff=5.60 cfs 0.550 af

Subcatchment 48S: West P-Stream Area Runoff Area=34,984 sf 0.00% Impervious Runoff Depth>6.39"
Flow Length=300' Slope=0.0500 '/' Tc=10.0 min CN=66/0 Runoff=4.92 cfs 0.428 af

Subcatchment 49S: P-Wetland Runoff Area=27,172 sf 0.00% Impervious Runoff Depth>6.25"
Flow Length=345' Slope=0.0600 '/' Tc=8.4 min CN=65/0 Runoff=3.99 cfs 0.325 af

Subcatchment 50S: Runoff from Proposed Runoff Area=60,868 sf 80.69% Impervious Runoff Depth>9.95"
Tc=12.0 min CN=74/98 Runoff=11.16 cfs 1.159 af

Subcatchment 51S: BLDG 5 area Runoff Area=32,450 sf 76.58% Impervious Runoff Depth>9.83"
Tc=10.0 min CN=74/98 Runoff=6.24 cfs 0.610 af

Subcatchment 71S: Amenities 1 and 2 Runoff Area=35,555 sf 51.73% Impervious Runoff Depth>9.07"
Flow Length=124' Slope=0.0106 '/' Tc=10.0 min CN=74/98 Runoff=6.50 cfs 0.617 af

Subcatchment 72S: Amenities 2 and 3 + Pave Runoff Area=28,428 sf 70.52% Impervious Runoff Depth>9.57"
Flow Length=380' Slope=0.0308 '/' Tc=10.0 min CN=72/98 Runoff=5.36 cfs 0.520 af

Subcatchment 90S: Northeast to Offsite Runoff Area=3,287 sf 0.00% Impervious Runoff Depth>6.94"
Flow Length=69' Slope=0.2520 '/' Tc=10.0 min CN=70/0 Runoff=0.50 cfs 0.044 af

Subcatchment 91S: Northwest Wooded and Runoff Area=48,103 sf 0.00% Impervious Runoff Depth>7.33"
Tc=20.0 min CN=73/0 Runoff=6.25 cfs 0.675 af

Subcatchment 92S: Easterly Wooded to Runoff Area=47,176 sf 0.00% Impervious Runoff Depth>7.07"
Flow Length=655' Slope=0.0674 '/' Tc=11.3 min CN=71/0 Runoff=7.01 cfs 0.638 af

Subcatchment 93S: Overland to Pine Hill Runoff Area=13,547 sf 0.00% Impervious Runoff Depth>7.21"
Tc=10.0 min CN=72/0 Runoff=2.14 cfs 0.187 af

Subcatchment 101S: Contributing Existing Runoff Area=182.196 ac 38.00% Impervious Runoff Depth>7.37"
Tc=120.0 min CN=61/98 Runoff=378.03 cfs 111.947 af

Subcatchment 102S: Contributing Existing Runoff Area=49.270 ac 48.27% Impervious Runoff Depth>8.86"
Tc=75.0 min CN=74/98 Runoff=164.78 cfs 36.396 af

Subcatchment 201S: BLDG 1 ROOF Runoff Area=28,260 sf 100.00% Impervious Runoff Depth>10.55"
Tc=6.0 min CN=0/98 Runoff=6.41 cfs 0.571 af

Subcatchment 202S: BLDG 2 ROOF Runoff Area=28,346 sf 100.00% Impervious Runoff Depth>10.55"
Tc=6.0 min CN=0/98 Runoff=6.43 cfs 0.572 af

Subcatchment 203S: BLDG 3 ROOF Runoff Area=38,210 sf 100.00% Impervious Runoff Depth>10.55"
Tc=6.0 min CN=0/98 Runoff=8.67 cfs 0.772 af

Subcatchment 204S: BLDG 4 2/3 of ROOF Runoff Area=20,310 sf 100.00% Impervious Runoff Depth>10.55"
Tc=6.0 min CN=0/98 Runoff=4.61 cfs 0.410 af

Subcatchment 205S: BLDG 5 ROOF Runoff Area=14,325 sf 100.00% Impervious Runoff Depth>10.55"
Tc=6.0 min CN=0/98 Runoff=3.25 cfs 0.289 af

Reach 13R: Stream Channel from Brandt to Avg. Flow Depth=0.77' Max Vel=7.06 fps Inflow=68.67 cfs 8.420 af
n=0.030 L=280.0' S=0.0371 '/' Capacity=593.73 cfs Outflow=66.69 cfs 8.416 af

Reach 20R: existing stream on west side Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=545.0' S=0.0073 '/' Capacity=371.73 cfs Outflow=0.00 cfs 0.000 af

Reach 22R: Combined stream into culvert Avg. Flow Depth=0.36' Max Vel=2.80 fps Inflow=9.11 cfs 1.098 af
n=0.040 L=282.0' S=0.0266 '/' Capacity=653.19 cfs Outflow=8.93 cfs 1.096 af

Reach 27R: (new Reach) Inflow=7.22 cfs 0.396 af
Outflow=7.22 cfs 0.396 af

Reach 81R: West Proposed Stream Avg. Flow Depth=0.57' Max Vel=2.56 fps Inflow=9.28 cfs 1.101 af
n=0.025 L=362.0' S=0.0061 '/' Capacity=205.07 cfs Outflow=9.11 cfs 1.098 af

Reach 83R: Northerly P-Stream Avg. Flow Depth=0.47' Max Vel=2.24 fps Inflow=6.27 cfs 0.675 af
n=0.025 L=300.0' S=0.0057 '/' Capacity=198.02 cfs Outflow=5.99 cfs 0.673 af

Reach 94R: Southeast BVW Inflow=7.01 cfs 0.638 af
Outflow=7.01 cfs 0.638 af

Reach 95R: Pine Hill Road Inflow=9.06 cfs 0.825 af
Outflow=9.06 cfs 0.825 af

Reach X2: Area Summary Post (Not a physical location) Inflow=73.96 cfs 9.285 af
Outflow=73.96 cfs 9.285 af

Pond 19P: INFL. POND 3C Peak Elev=476.14' Storage=8,015 cf Inflow=8.67 cfs 0.772 af
Discarded=0.17 cfs 0.286 af Primary=7.22 cfs 0.396 af Outflow=7.38 cfs 0.682 af

Pond 26P: Subsurface Infiltration Basin from Peak Elev=463.47' Storage=12,433 cf Inflow=11.16 cfs 1.159 af
Discarded=0.55 cfs 0.795 af Primary=8.24 cfs 0.340 af Outflow=8.79 cfs 1.135 af

Pond 29P: DETN. POND 5B Peak Elev=457.90' Storage=2,926 cf Inflow=2.01 cfs 0.200 af
Discarded=0.34 cfs 0.200 af Primary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.200 af

Pond 82P: Proposed Wetland above new Box Peak Elev=457.23' Storage=924 cf Inflow=52.90 cfs 5.663 af
144.0" x 48.0" Box Culvert n=0.015 L=52.0' S=0.0135 '/' Outflow=52.79 cfs 5.663 af

Pond 101P: DETN. POND 1A Peak Elev=458.43' Storage=15,284 cf Inflow=13.74 cfs 1.348 af
12.0" Round Culvert n=0.012 L=140.0' S=0.0050 '/' Outflow=4.59 cfs 1.335 af

Pond 102P: INFIL. POND 2 Peak Elev=469.26' Storage=25,419 cf Inflow=16.68 cfs 1.598 af
Discarded=0.16 cfs 0.297 af Primary=11.87 cfs 0.942 af Outflow=12.03 cfs 1.240 af

Pond 103P: DETN. POND 3A Peak Elev=470.05' Storage=5,162 cf Inflow=11.62 cfs 1.111 af
15.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=8.42 cfs 1.107 af

Pond 104P: INFL. POND 4A Peak Elev=466.75' Storage=11,501 cf Inflow=10.09 cfs 0.961 af
Discarded=0.10 cfs 0.184 af Primary=10.95 cfs 0.627 af Outflow=11.05 cfs 0.811 af

Pond 105P: DETN. POND 5A Peak Elev=464.36' Storage=13,272 cf Inflow=9.39 cfs 0.900 af
Discarded=0.60 cfs 0.772 af Primary=2.27 cfs 0.128 af Outflow=2.87 cfs 0.899 af

Pond 111P: INFL. POND 1B Peak Elev=466.77' Storage=19,819 cf Inflow=14.83 cfs 1.392 af
Discarded=0.25 cfs 0.422 af Primary=3.29 cfs 0.954 af Outflow=3.54 cfs 1.377 af

Pond 113P: DETN. POND 3B Peak Elev=469.05' Storage=5,128 cf Inflow=13.66 cfs 1.739 af
18.0" Round Culvert n=0.012 L=320.0' S=0.0109 '/' Outflow=13.11 cfs 1.734 af

Pond 114P: DETN. POND 4B Peak Elev=464.33' Storage=2,584 cf Inflow=5.74 cfs 0.545 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0114 '/' Outflow=3.83 cfs 0.543 af

Pond 210P: Northwest Wetland Peak Elev=465.67' Storage=61 cf Inflow=6.25 cfs 0.675 af
Primary=0.00 cfs 0.000 af Secondary=6.27 cfs 0.675 af Outflow=6.27 cfs 0.675 af

Link 9L: Diverging Flow x 0.50
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 248.311 ac Runoff Volume = 161.256 af Average Runoff Depth = 7.79"
58.43% Pervious = 145.093 ac 41.57% Impervious = 103.218 ac

Summary for Subcatchment 21S: BLDG 2 East and BLDG 1 South

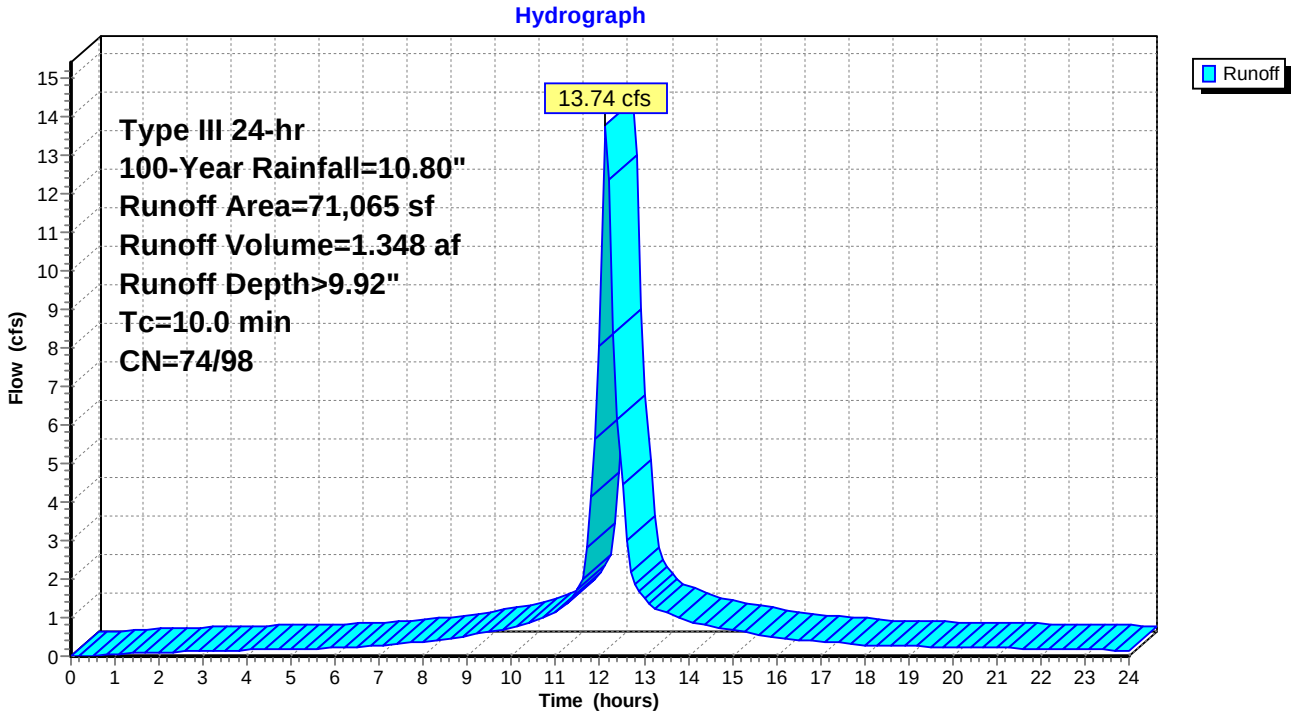
Runoff = 13.74 cfs @ 12.13 hrs, Volume= 1.348 af, Depth> 9.92"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	2,198	74	Grass, good, HSG C to CB16
*	10,610	98	Pavement to CB16
*	1,481	74	Grass, good, HSG C to CB18
*	8,712	98	Pavement to CB18
*	257	74	Grass, good, HSG C to CB14
*	4,521	98	Pavement to CB14
*	1,595	74	Grass, good, HSG C to CB12
*	9,297	98	Pavement to CB12
*	1,034	74	Grass, good, HSG C to CB28
*	4,655	98	Pavement to CB28
*	2,021	74	Grass, good, HSG C to CB26
*	4,692	98	Pavement to CB26
*	2,054	74	Grass, good, HSG C to CB24
*	7,783	98	Pavement to CB24
*	4,016	74	Grass, good, HSG C to CB20
*	6,139	98	Pavement to CB20
	71,065	93	Weighted Average
	14,656	74	20.62% Pervious Area
	56,409	98	79.38% Impervious Area

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

Subcatchment 21S: BLDG 2 East and BLDG 1 South



Summary for Subcatchment 22S: BLDG 1 West

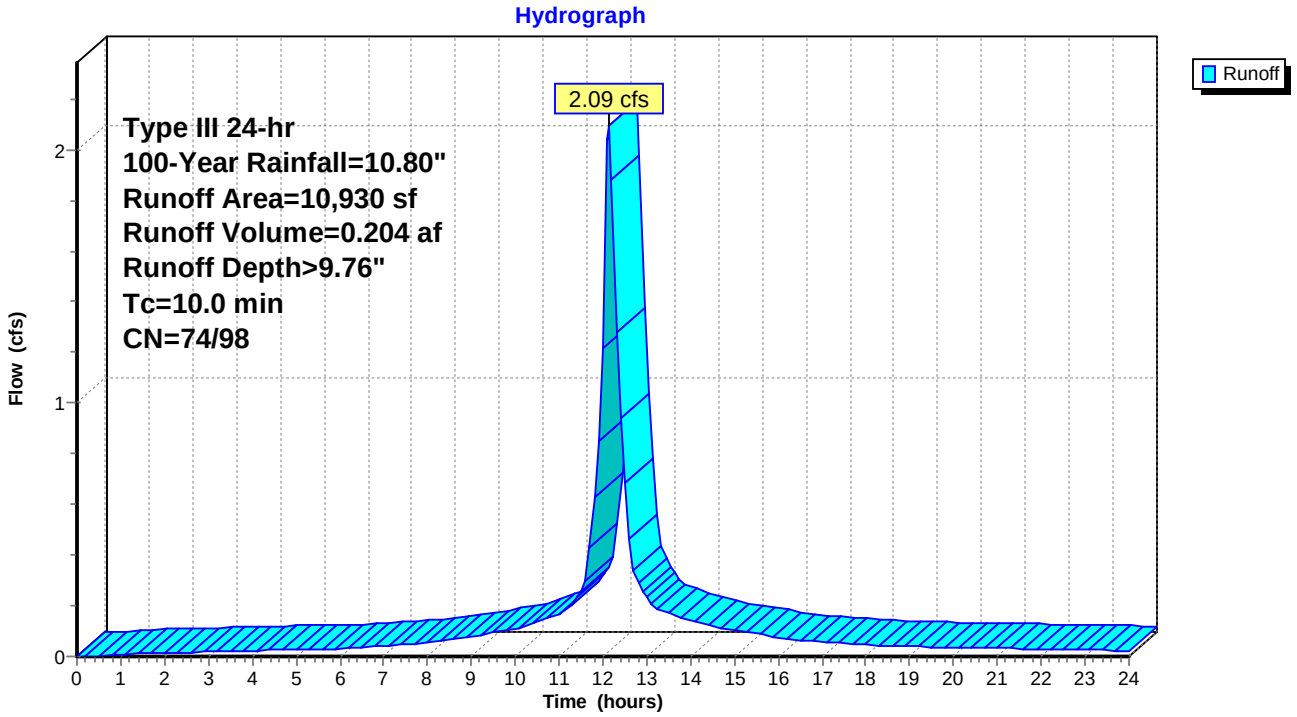
Runoff = 2.09 cfs @ 12.13 hrs, Volume= 0.204 af, Depth> 9.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
	2,796	74	>75% Grass cover, Good, HSG C
*	8,134	98	Pavement
	10,930	92	Weighted Average
	2,796	74	25.58% Pervious Area
	8,134	98	74.42% Impervious Area

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

Subcatchment 22S: BLDG 1 West



Summary for Subcatchment 23S: PARKING DECK (top)

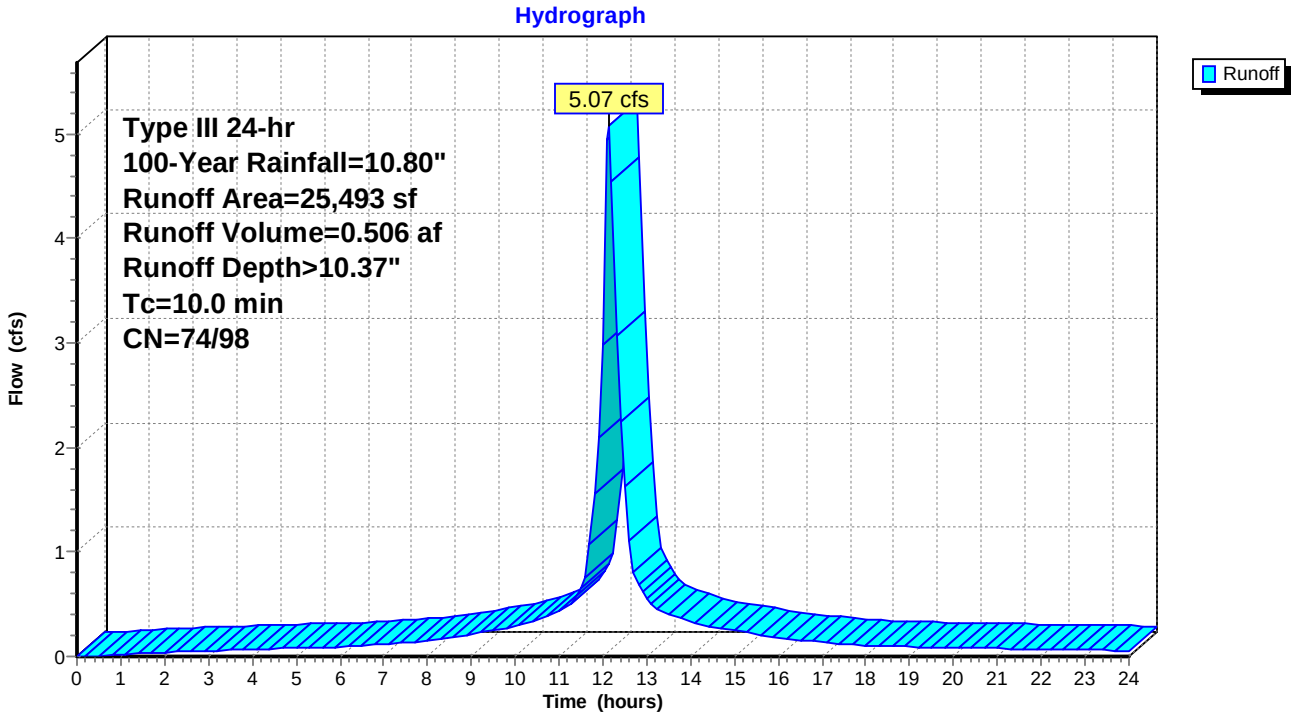
Runoff = 5.07 cfs @ 12.13 hrs, Volume= 0.506 af, Depth>10.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
	1,518	74	>75% Grass cover, Good, HSG C
*	23,975	98	Pavement
	25,493	97	Weighted Average
	1,518	74	5.95% Pervious Area
	23,975	98	94.05% Impervious Area

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

Subcatchment 23S: PARKING DECK (top)



Summary for Subcatchment 28S: BLDG 5 LL PKG

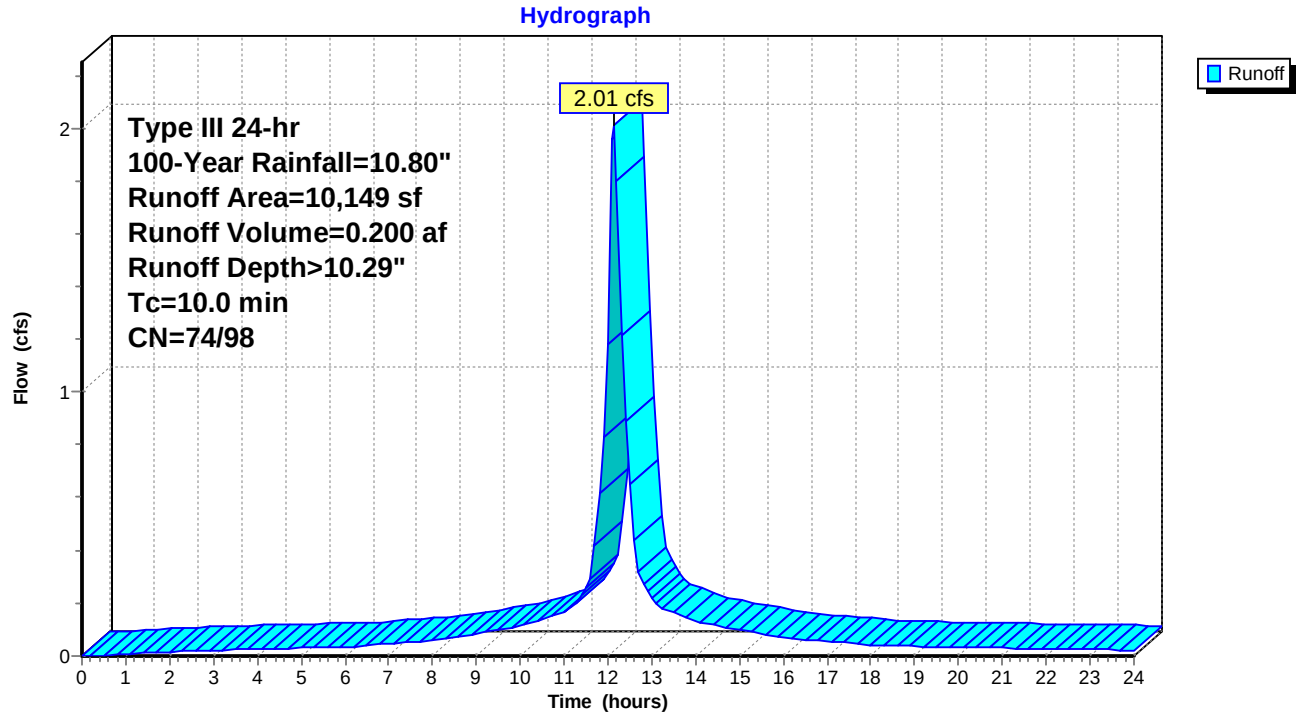
Runoff = 2.01 cfs @ 12.13 hrs, Volume= 0.200 af, Depth>10.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	9,278	98	Impervious Pavement
	580	74	>75% Grass cover, Good, HSG C
*	291	74	Landscaped Areas
	10,149	96	Weighted Average
	871	74	8.58% Pervious Area
	9,278	98	91.42% Impervious Area

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

Subcatchment 28S: BLDG 5 LL PKG



Summary for Subcatchment 30S: BLDG 4 1/3 of ROOF

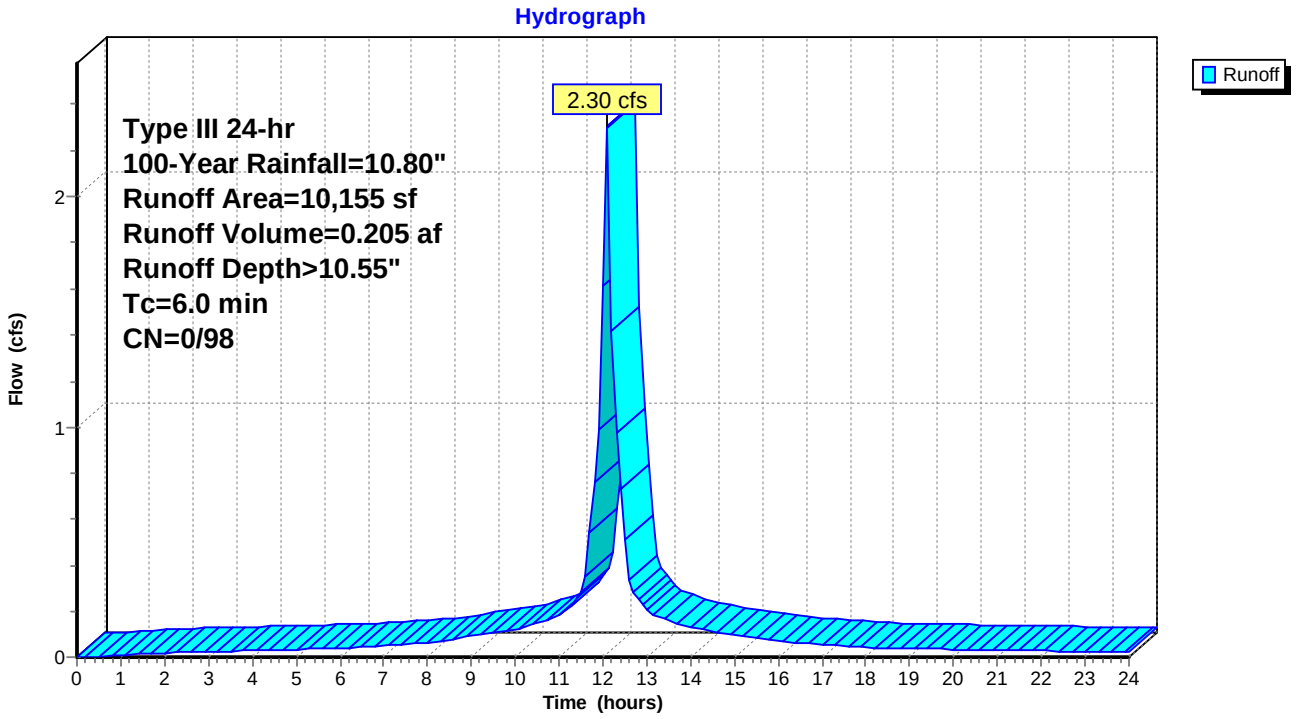
Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.205 af, Depth>10.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	10,155	98	BLDG 4 ROOF
	10,155	98	100.00% Impervious Area

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

Subcatchment 30S: BLDG 4 1/3 of ROOF



Summary for Subcatchment 31S: BLDG 3 North

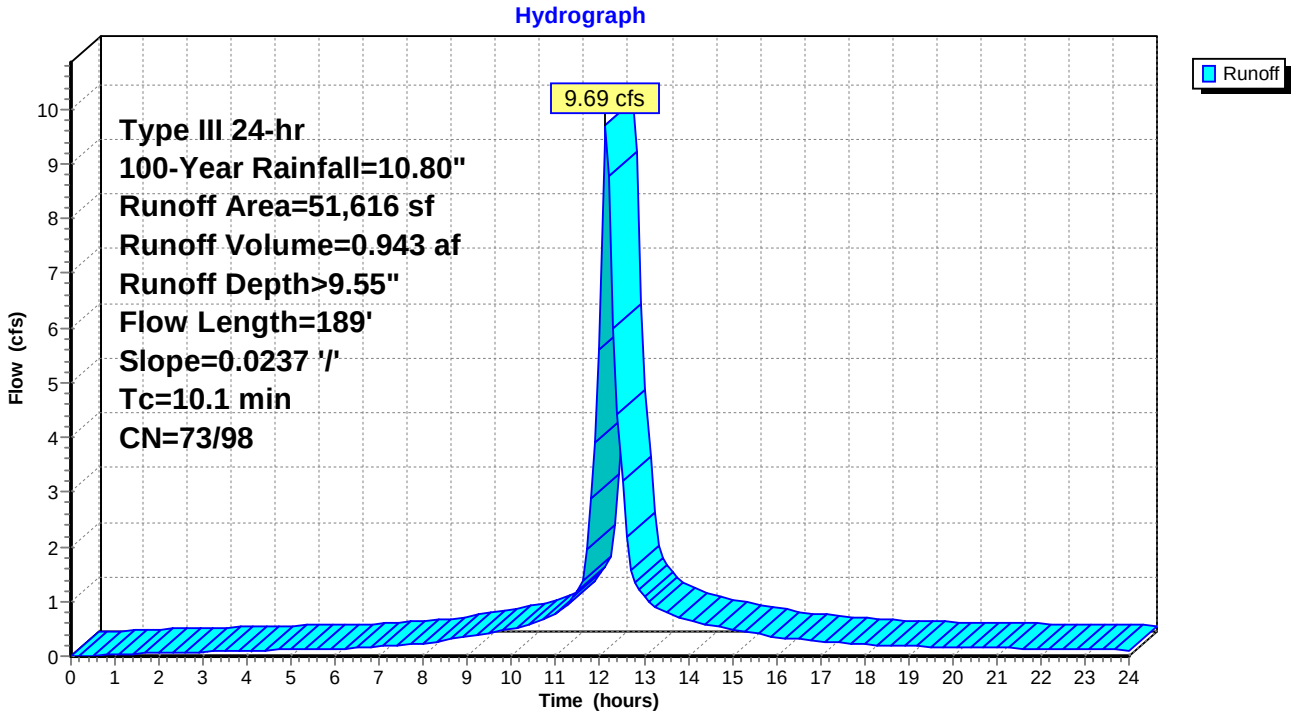
Runoff = 9.69 cfs @ 12.14 hrs, Volume= 0.943 af, Depth> 9.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	536	70	Woods, good, C to CB30
	4,684	74	>75% Grass cover, Good, HSG C
*	10,379	98	Pavement to CB30
*	1,010	74	Grass, good, C to CB30
*	1,892	70	Woods, good, C to CB32
*	642	74	Grass, good, C to CB32
*	3,648	98	Pavement to CB32
*	2,882	74	Grass, good, C to CB34
*	8,638	98	Pavement to CB34
*	3,104	74	Grass, good, C to CB58
*	9,564	98	Pavement to CB58
*	4,637	90	Amenity space, 70% impervious
	51,616	90	Weighted Average
	16,141	73	31.27% Pervious Area
	35,475	98	68.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	189	0.0237	0.82		**Lag/CN Method,**
6.3					**Direct Entry, round up to 10**
10.1	189	Total			

Subcatchment 31S: BLDG 3 North



Summary for Subcatchment 32S: BLDG 4 East and BLDG 3 West

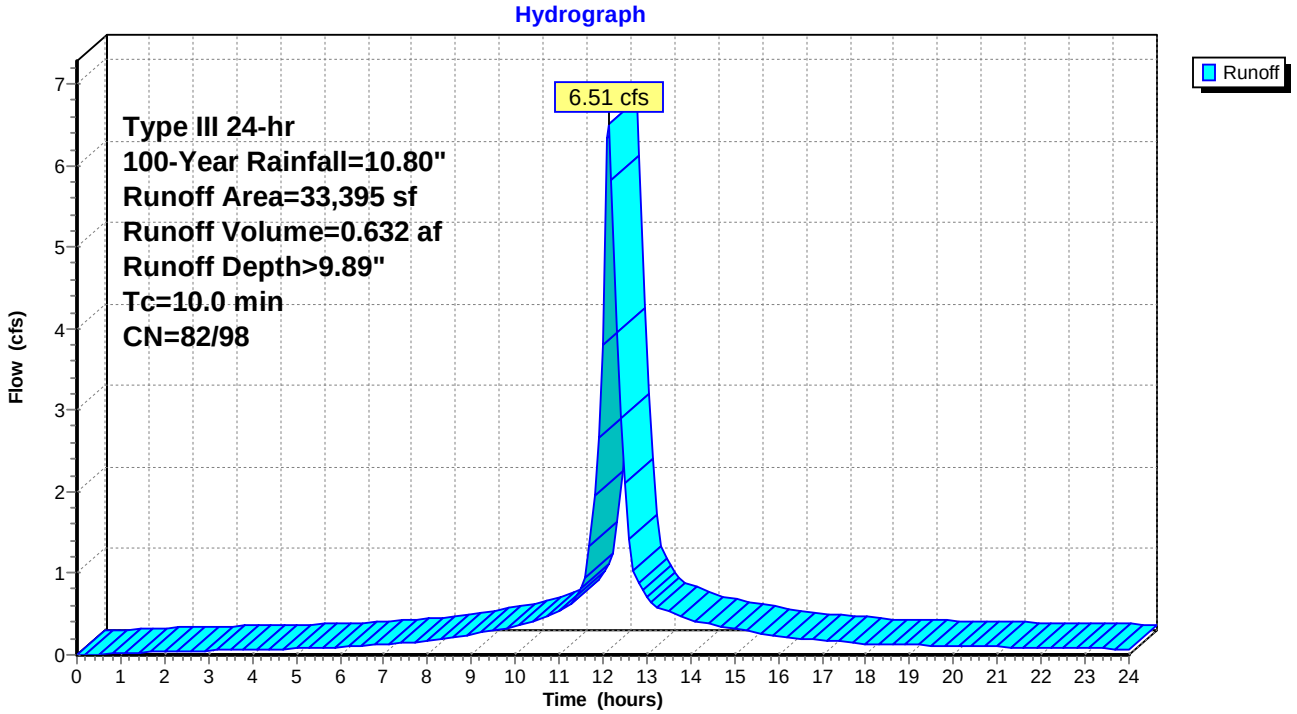
Runoff = 6.51 cfs @ 12.13 hrs, Volume= 0.632 af, Depth> 9.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	1,323	74	Grass, good, C to CB50
*	4,601	98	Pavement to CB50
*	1,023	74	Grass, good, C to CB52
*	6,739	98	Pavement to CB52
*	3,383	74	Grass, good, C to CB54
*	11,092	98	Pavement to CB54
*	5,234	90	Amenity area and landscaping
	33,395	93	Weighted Average
	10,963	82	32.83% Pervious Area
	22,432	98	67.17% Impervious Area

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

Subcatchment 32S: BLDG 4 East and BLDG 3 West



Summary for Subcatchment 33S: Northerly Offsite to BLDG 3 North

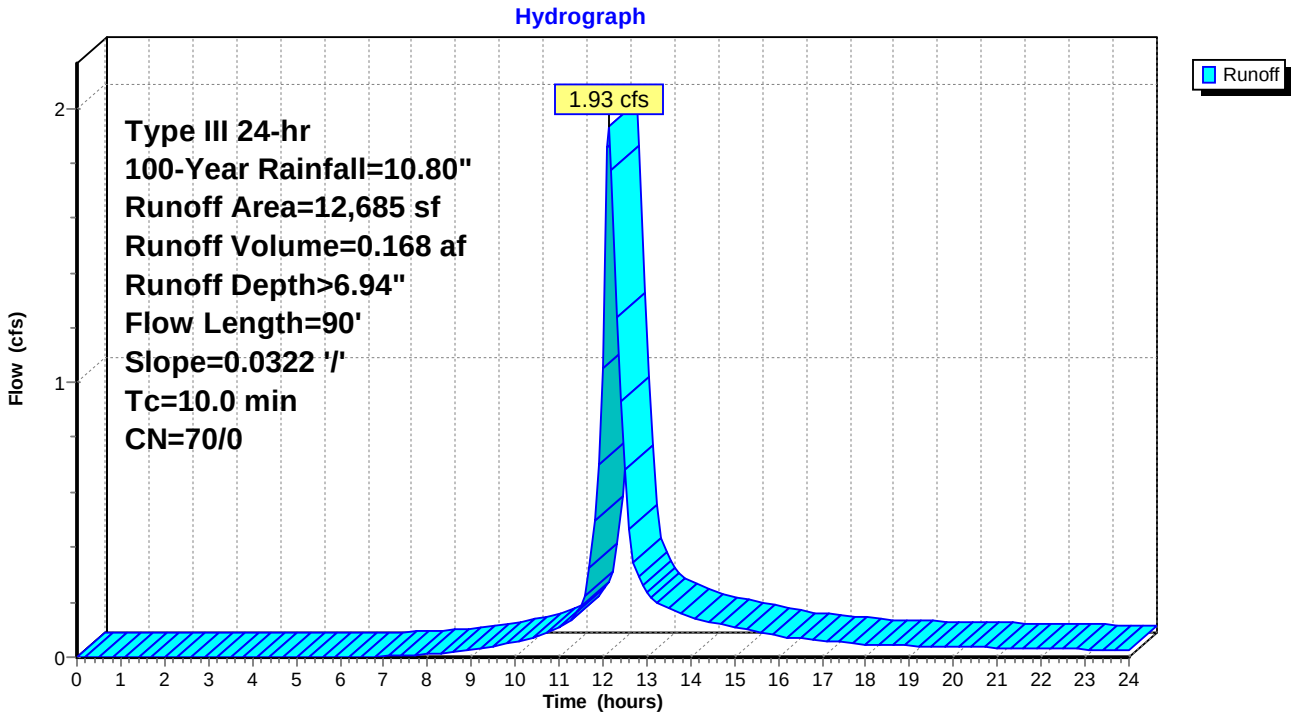
Runoff = 1.93 cfs @ 12.14 hrs, Volume= 0.168 af, Depth> 6.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
12,685	70	Woods, Good, HSG C
12,685	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.4	90	0.0322	0.44		**Lag/CN Method,**
6.6					**Direct Entry, round up to 10**
10.0	90	Total			

Subcatchment 33S: Northerly Offsite to BLDG 3 North



Summary for Subcatchment 34S: BLDG 4 South

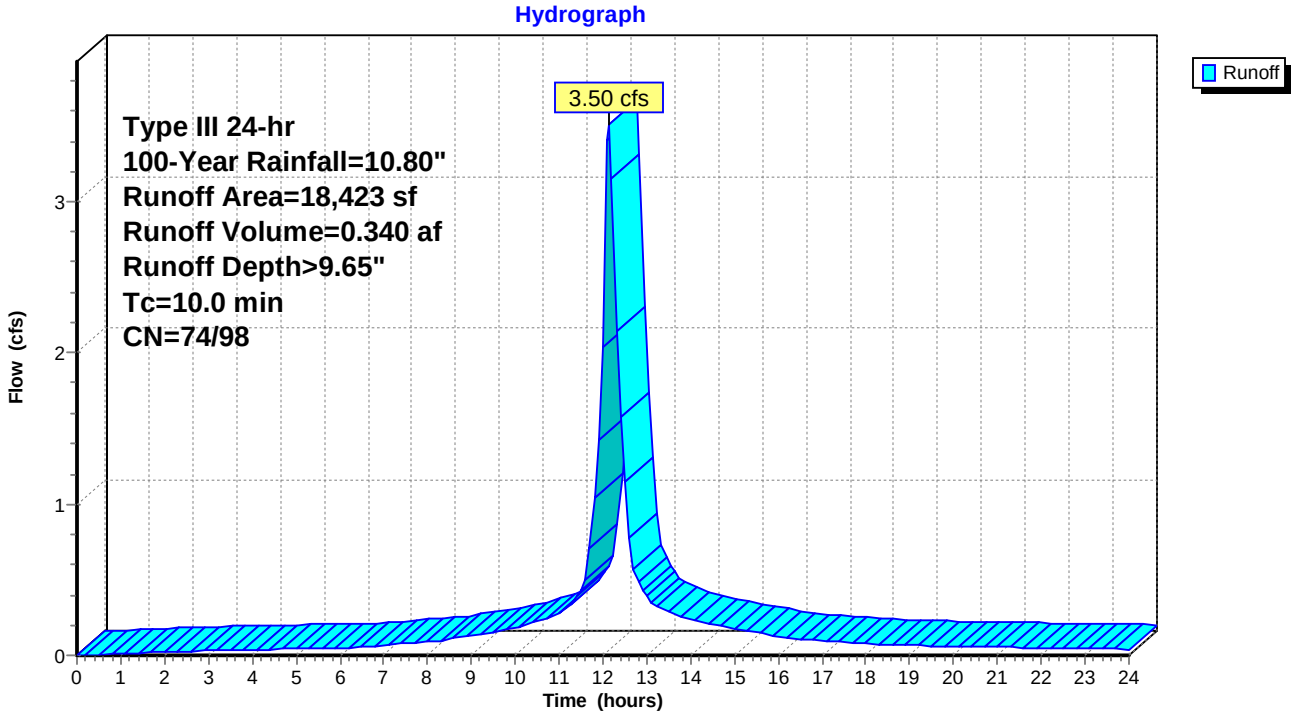
Runoff = 3.50 cfs @ 12.13 hrs, Volume= 0.340 af, Depth> 9.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	516	74	Grass, good, C to CB64
*	2,953	74	Park - Grass, good, C to CB64
*	6,515	98	Pavement to CB64
*	210	74	Grass, good, C to CB68
*	1,695	74	Park - Grass, good, C to CB68
*	6,534	98	Pavement to CB68
	18,423	91	Weighted Average
	5,374	74	29.17% Pervious Area
	13,049	98	70.83% Impervious Area

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

Subcatchment 34S: BLDG 4 South



Summary for Subcatchment 41S: BLDG 4 West and North

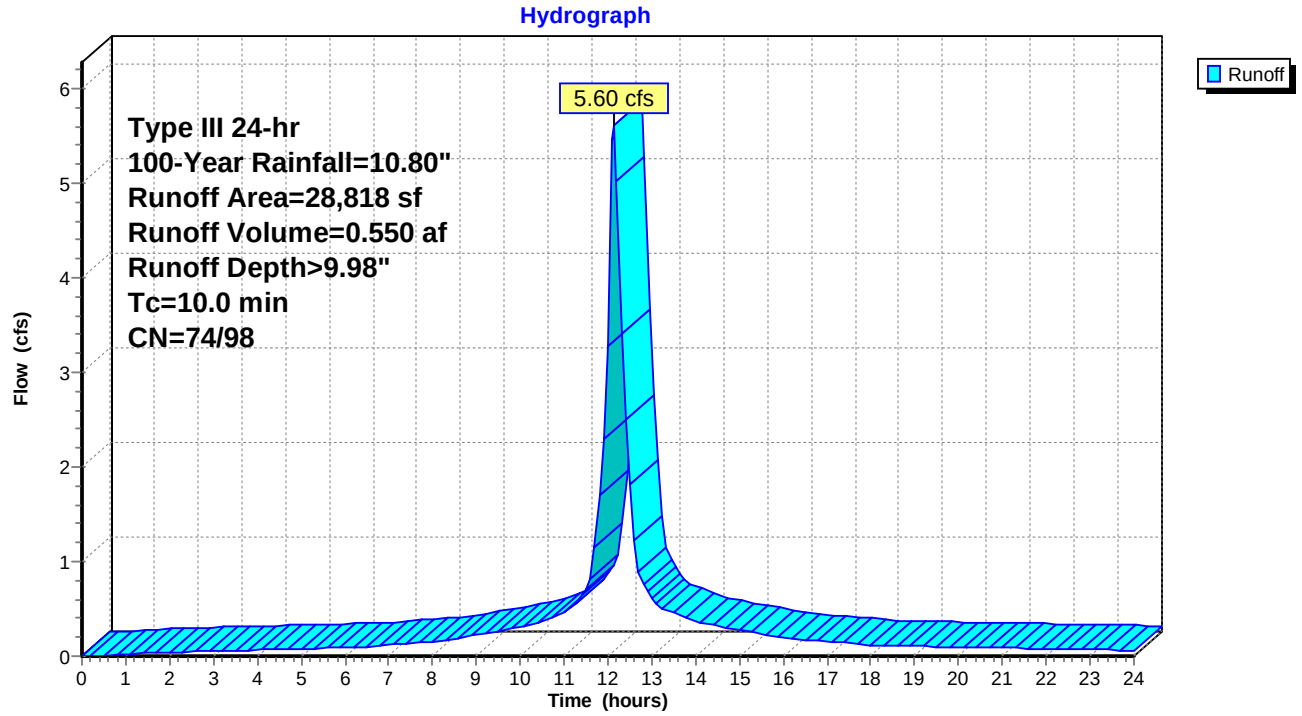
Runoff = 5.60 cfs @ 12.13 hrs, Volume= 0.550 af, Depth> 9.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	2,990	74	Grass, good, C to CB41
*	7,270	98	Pavement to CB41
*	603	74	Grass to CB43
*	6,402	98	Pavement to CB43
*	603	74	Grass, good, C to CB45
*	6,402	98	Pavement to CB45
*	1,115	74	Grass to CB91
*	3,433	98	Grass to CB91
	28,818	94	Weighted Average
	5,311	74	18.43% Pervious Area
	23,507	98	81.57% Impervious Area

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

Subcatchment 41S: BLDG 4 West and North



Summary for Subcatchment 48S: West P-Stream Area

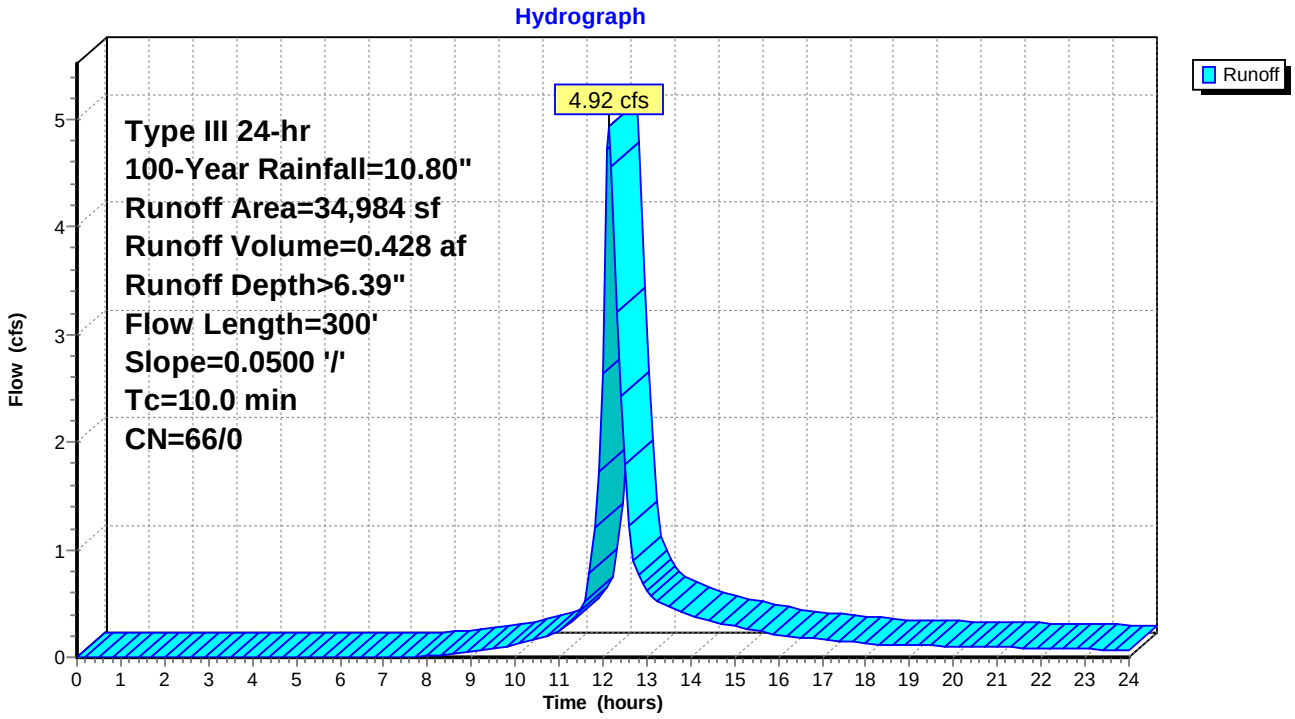
Runoff = 4.92 cfs @ 12.14 hrs, Volume= 0.428 af, Depth> 6.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
5,350	74	>75% Grass cover, Good, HSG C
29,634	65	Brush, Good, HSG C
34,984	66	Weighted Average
34,984	66	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	300	0.0500	0.62		**Lag/CN Method,**
2.0					**Direct Entry, Round up to 10**
10.0	300	Total			

Subcatchment 48S: West P-Stream Area



Summary for Subcatchment 49S: P-Wetland

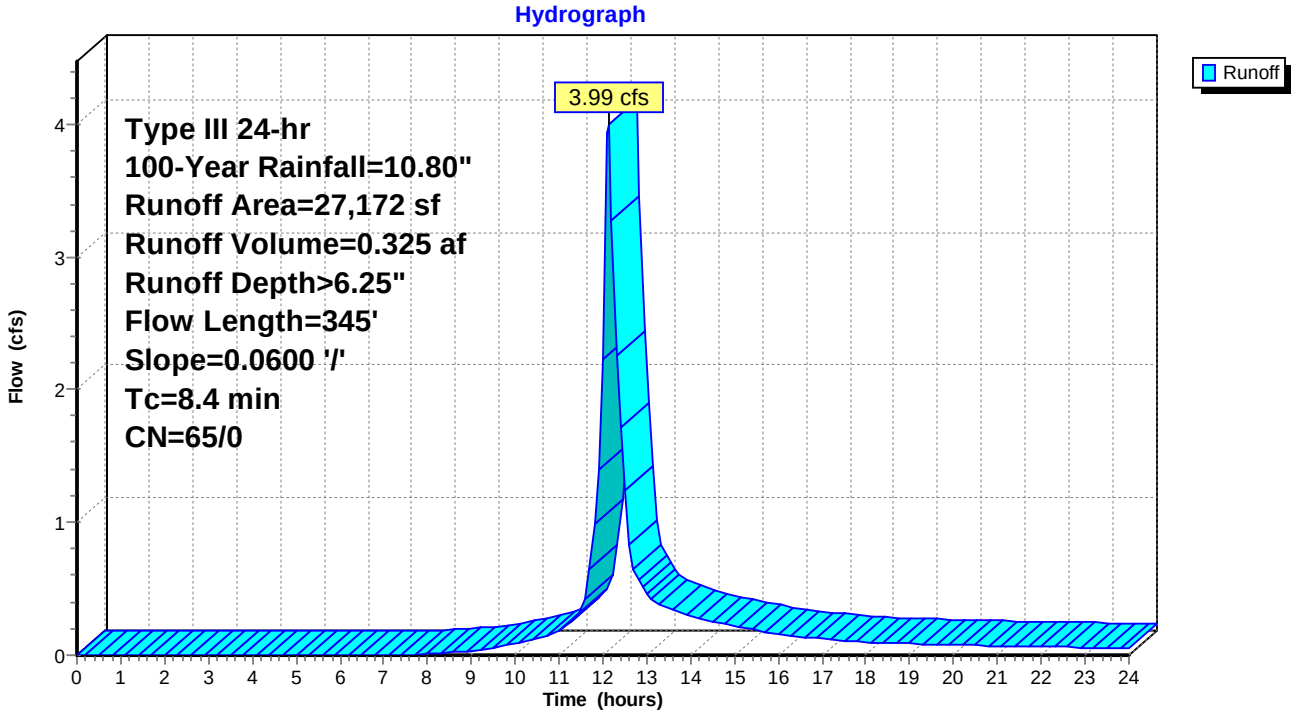
Runoff = 3.99 cfs @ 12.12 hrs, Volume= 0.325 af, Depth> 6.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
27,172	65	Brush, Good, HSG C
27,172	65	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	345	0.0600	0.68		**Lag/CN Method,**
0.0					**Direct Entry, round up to 10**
8.4	345	Total			

Subcatchment 49S: P-Wetland



Summary for Subcatchment 50S: Runoff from Proposed Subdivision Road

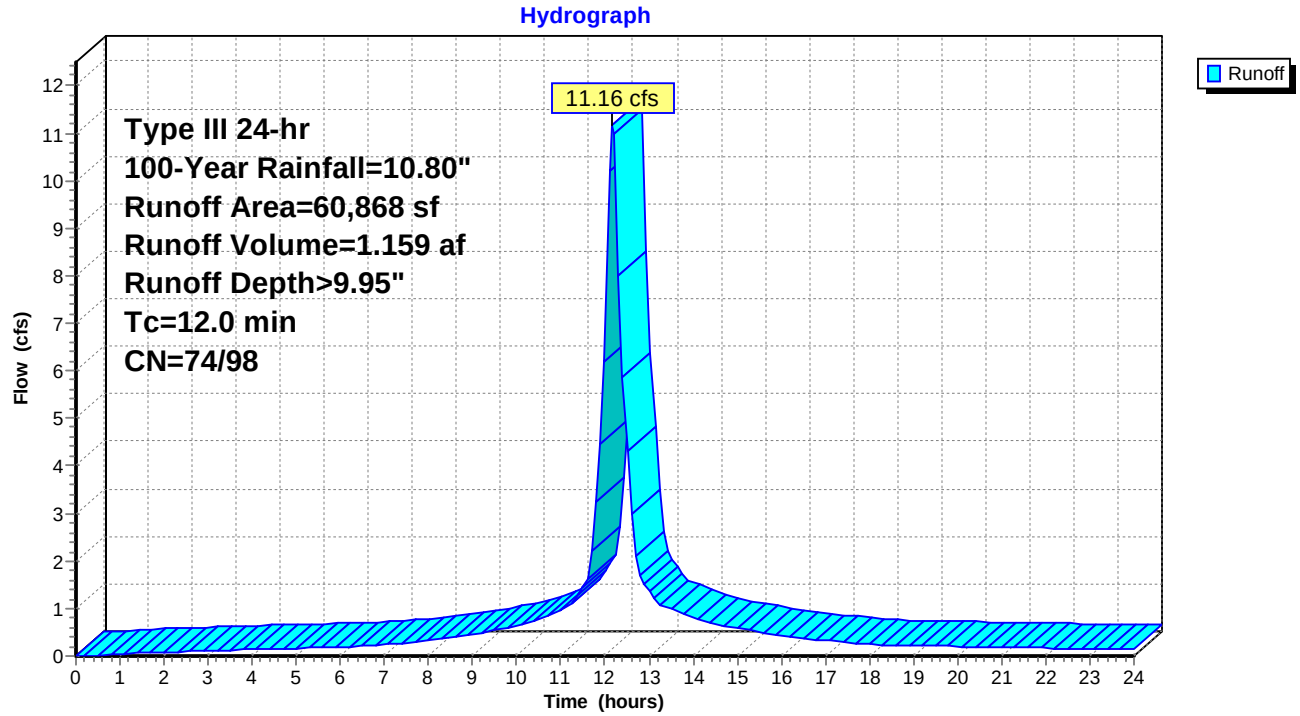
Runoff = 11.16 cfs @ 12.17 hrs, Volume= 1.159 af, Depth> 9.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	6,850	74	Landscaping
	4,904	74	>75% Grass cover, Good, HSG C
*	49,114	98	Pavement and Sidewalks
	60,868	93	Weighted Average
	11,754	74	19.31% Pervious Area
	49,114	98	80.69% Impervious Area

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

Subcatchment 50S: Runoff from Proposed Subdivision Road



Summary for Subcatchment 51S: BLDG 5 area

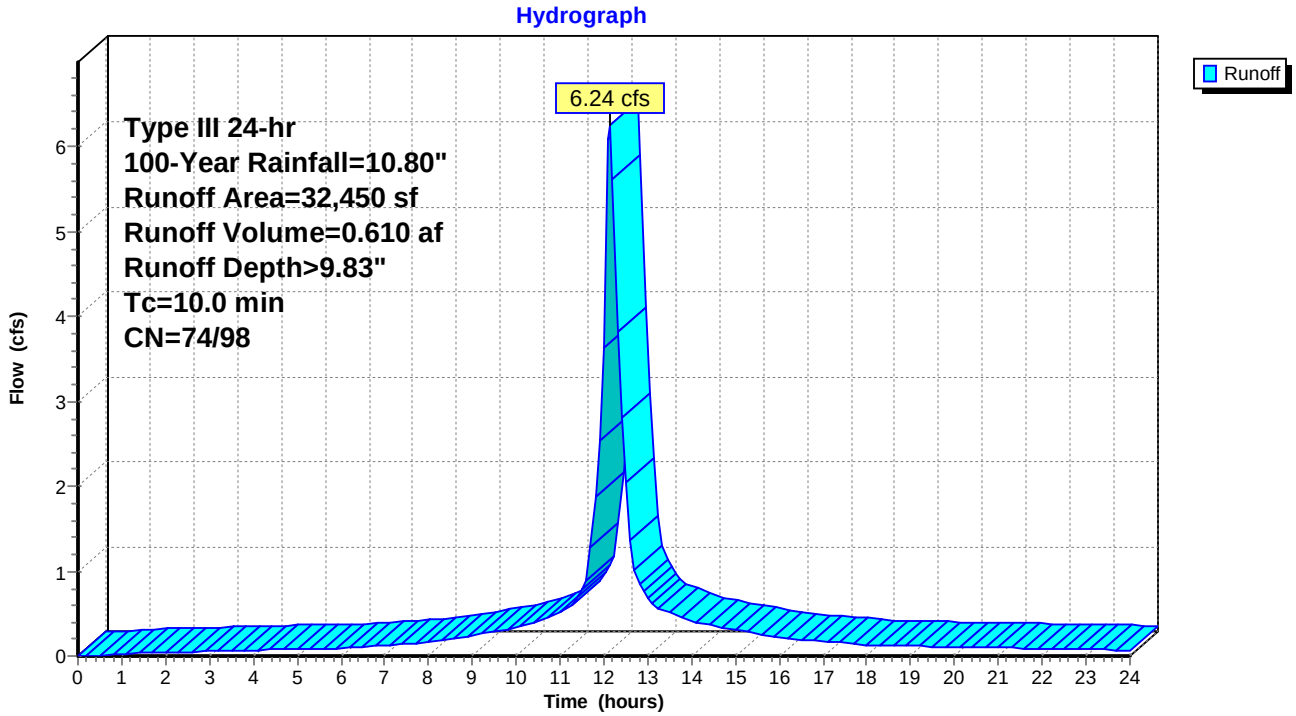
Runoff = 6.24 cfs @ 12.13 hrs, Volume= 0.610 af, Depth> 9.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	24,850	98	Impervious Pavement
	5,600	74	>75% Grass cover, Good, HSG C
*	2,000	74	Landscaped Areas
	32,450	92	Weighted Average
	7,600	74	23.42% Pervious Area
	24,850	98	76.58% Impervious Area

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

Subcatchment 51S: BLDG 5 area



Summary for Subcatchment 71S: Amenities 1 and 2

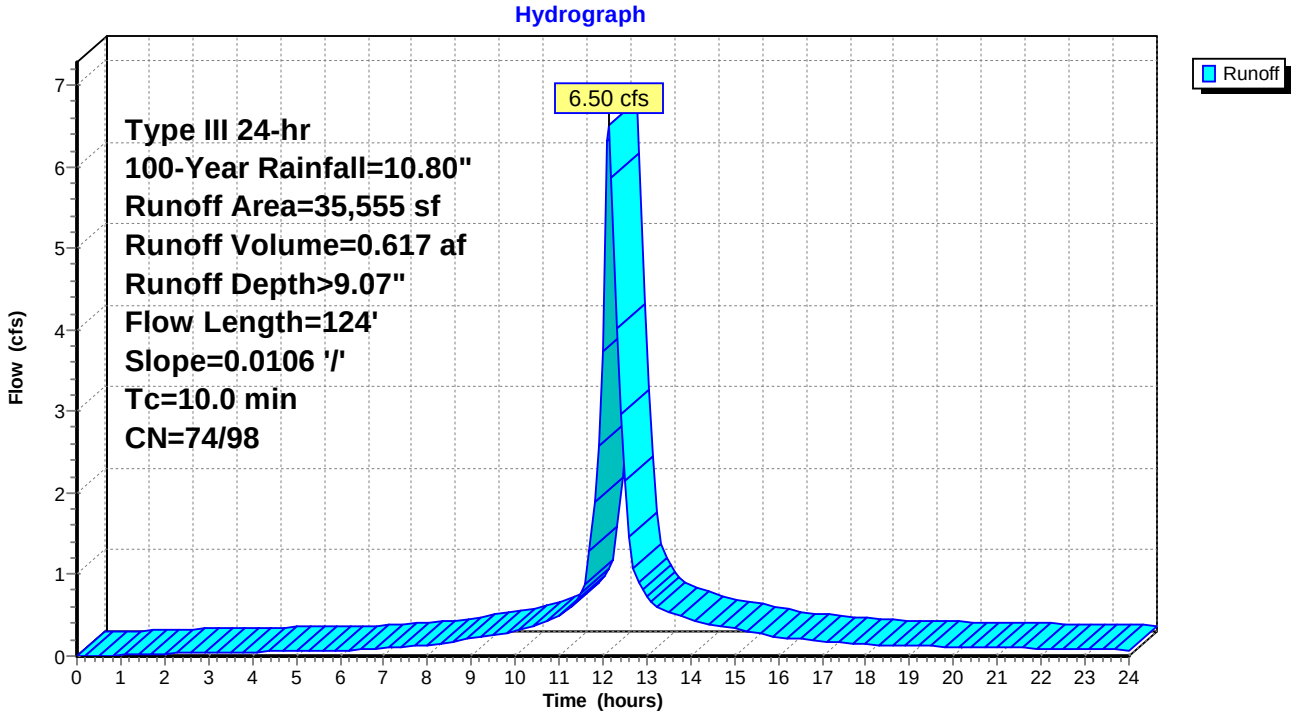
Runoff = 6.50 cfs @ 12.14 hrs, Volume= 0.617 af, Depth> 9.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	11,076	98	Athletic courts, impervious
	14,025	74	>75% Grass cover, Good, HSG C
*	10,454	90	BLDG 1&2 amenity space, 70% imp
	35,555	86	Weighted Average
	17,161	74	48.27% Pervious Area
	18,394	98	51.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	124	0.0106	0.43		**Lag/CN Method,**
5.2					**Direct Entry, round up to 10**
10.0	124	Total			

Subcatchment 71S: Amenities 1 and 2



Summary for Subcatchment 72S: Amenities 2 and 3 + Pave

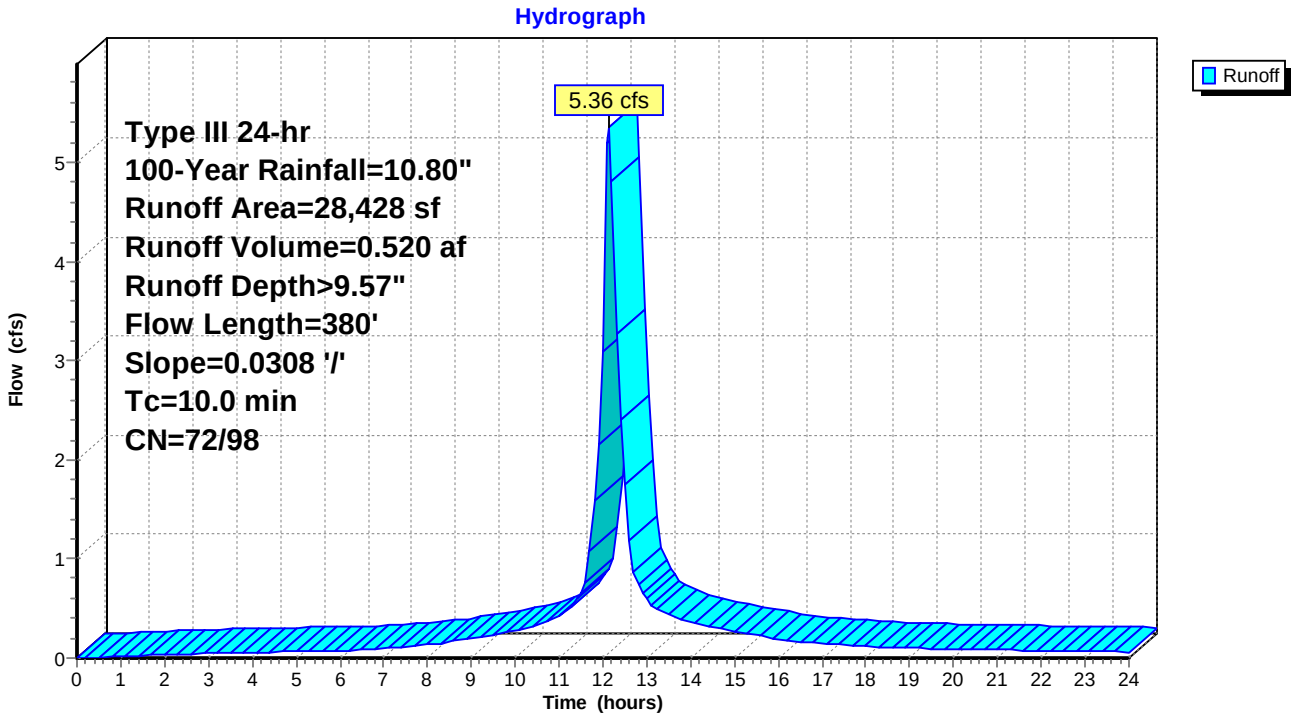
Runoff = 5.36 cfs @ 12.13 hrs, Volume= 0.520 af, Depth> 9.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	24,342	90	BLDG 2&3 amenity space, 70% imp
*	3,008	98	Pavement
	1,078	74	>75% Grass cover, Good, HSG C
	28,428	90	Weighted Average
	8,381	72	29.48% Pervious Area
	20,047	98	70.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	380	0.0308	1.08		**Lag/CN Method,**
4.1					**Direct Entry, round up to 10**
10.0	380	Total			

Subcatchment 72S: Amenities 2 and 3 + Pave



Summary for Subcatchment 90S: Northeast to Offsite

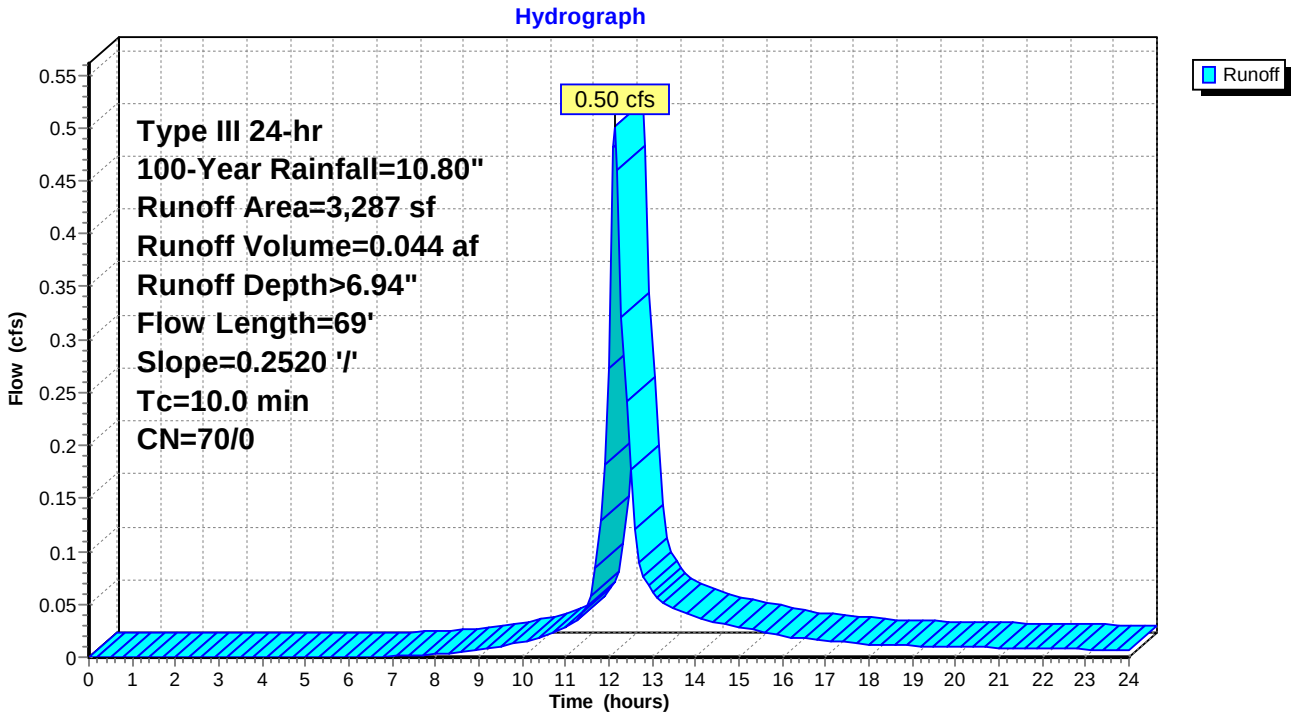
Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.044 af, Depth> 6.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
3,287	70	Woods, Good, HSG C
3,287	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	69	0.2520	1.16		**Lag/CN Method,**
9.0					**Direct Entry, round up to 10**
10.0	69	Total			

Subcatchment 90S: Northeast to Offsite



Summary for Subcatchment 91S: Northwest Wooded and Wetland

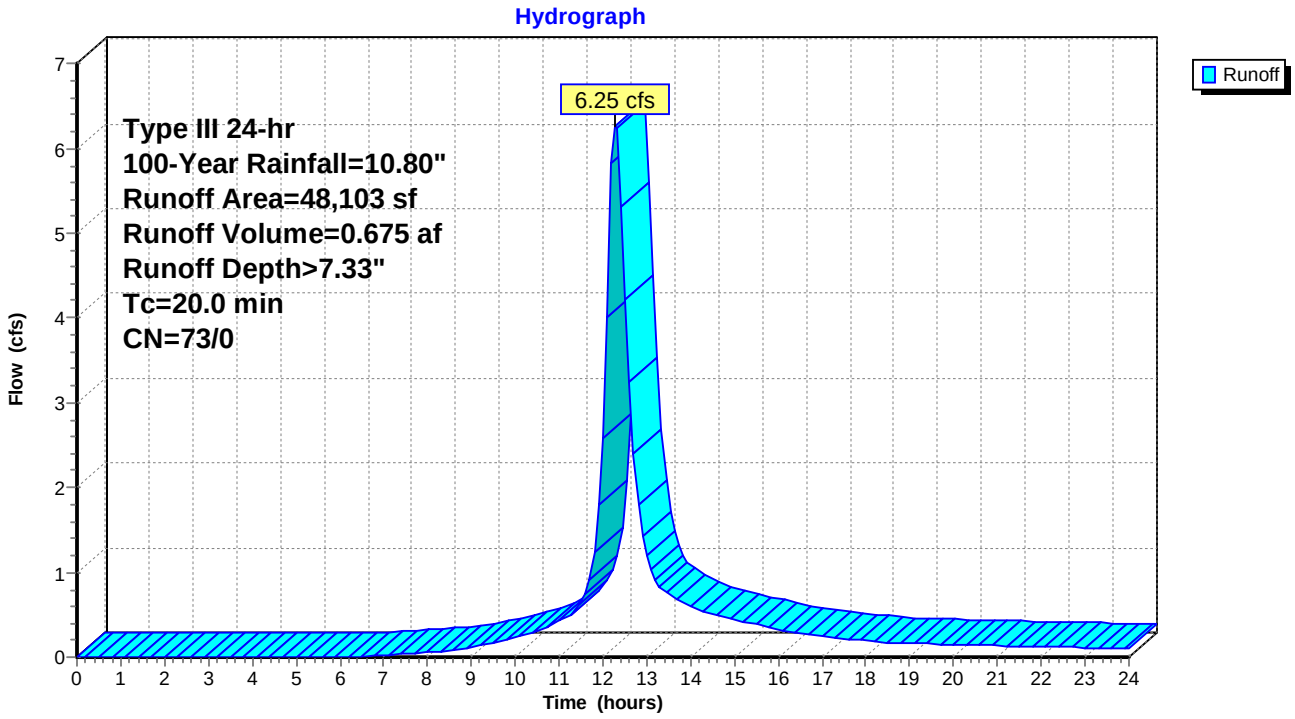
Runoff = 6.25 cfs @ 12.28 hrs, Volume= 0.675 af, Depth> 7.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
48,103	73	Brush, Good, HSG D
48,103	73	100.00% Pervious Area

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

Subcatchment 91S: Northwest Wooded and Wetland



Summary for Subcatchment 92S: Easterly Wooded to Southeast BVW

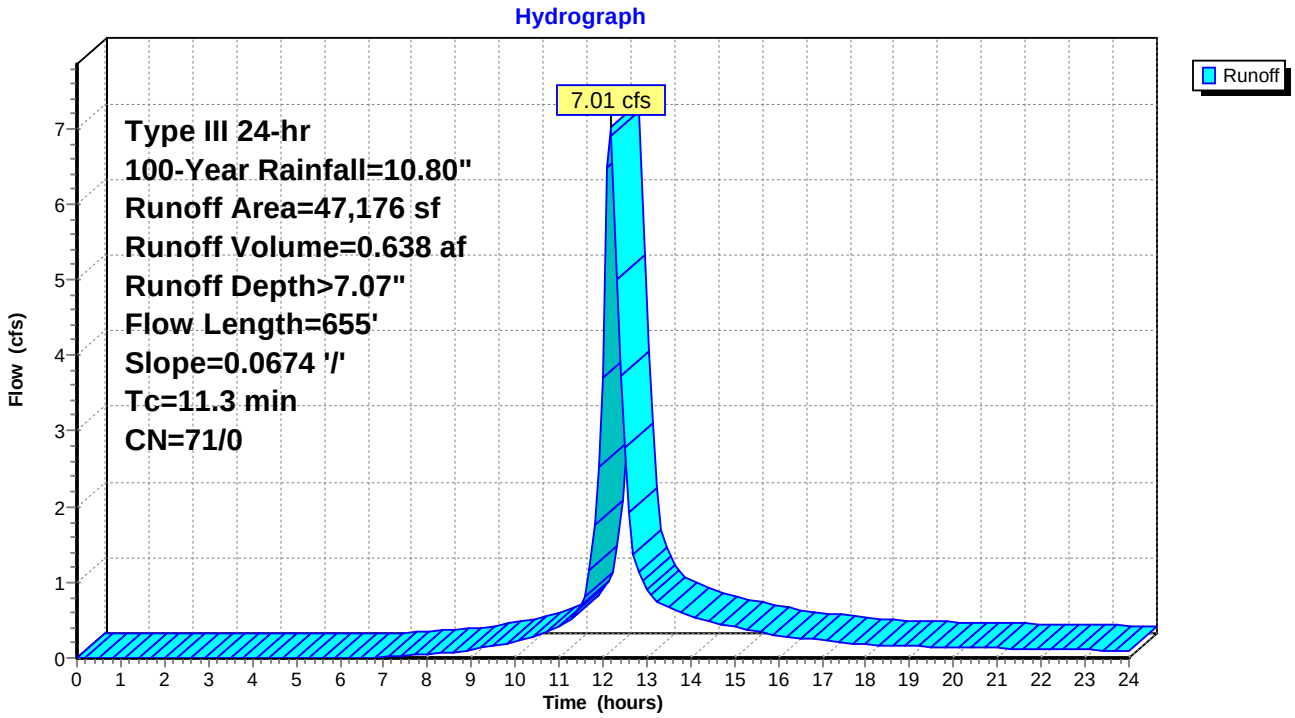
Runoff = 7.01 cfs @ 12.17 hrs, Volume= 0.638 af, Depth> 7.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
38,558	70	Woods, Good, HSG C
8,618	74	>75% Grass cover, Good, HSG C
47,176	71	Weighted Average
47,176	71	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	655	0.0674	0.96		**Lag/CN Method,**

Subcatchment 92S: Easterly Wooded to Southeast BVW



Summary for Subcatchment 93S: Overland to Pine Hill

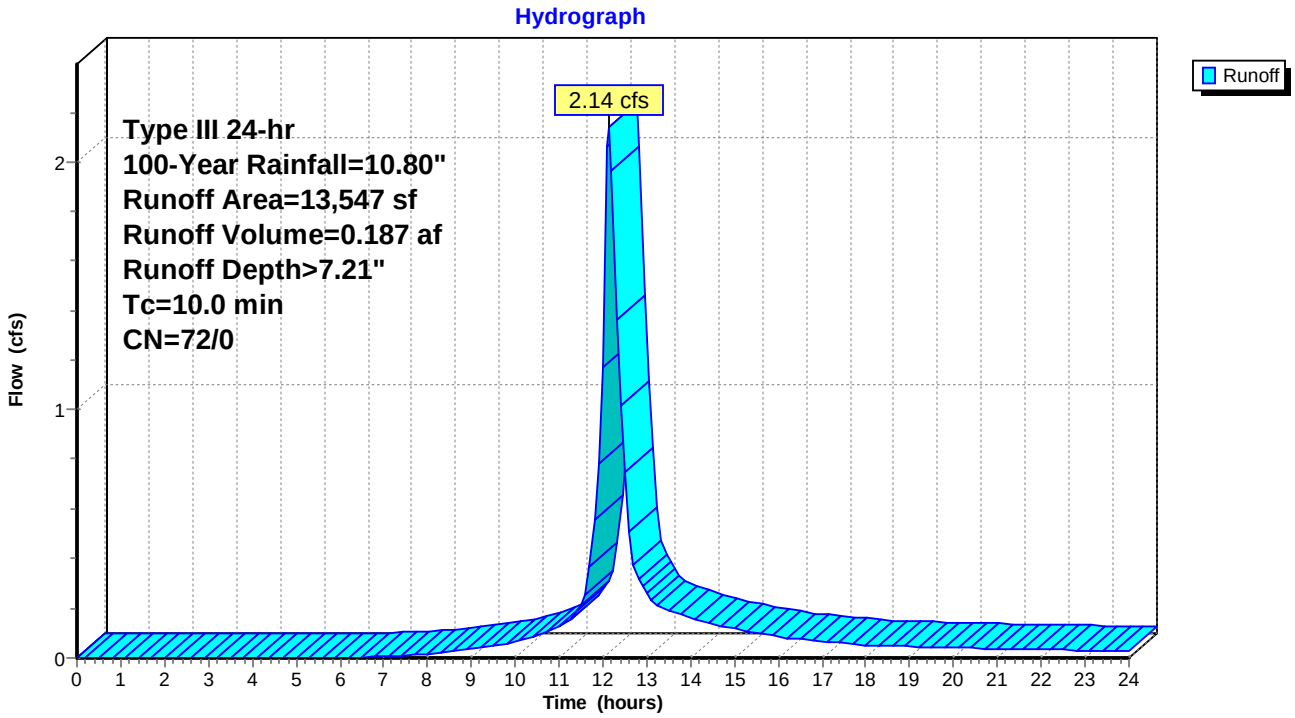
Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.187 af, Depth> 7.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (sf)	CN	Description
5,534	74	>75% Grass cover, Good, HSG C
8,013	70	Woods, Good, HSG C
13,547	72	Weighted Average
13,547	72	100.00% Pervious Area

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

Subcatchment 93S: Overland to Pine Hill



Summary for Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane

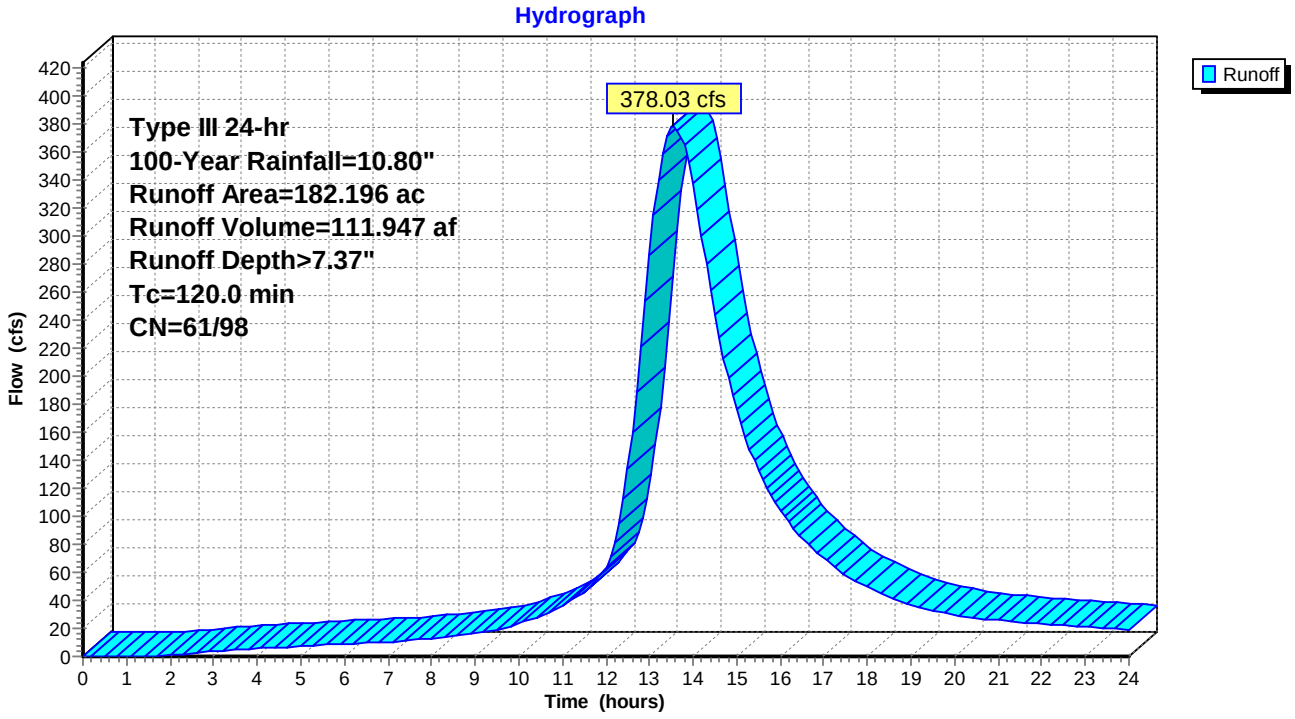
Runoff = 378.03 cfs @ 13.55 hrs, Volume= 111.947 af, Depth> 7.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (ac)	CN	Description
*	182.196	75	Urban 38% imp, HSG B
	112.962	61	62.00% Pervious Area
	69.234	98	38.00% Impervious Area

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

Subcatchment 101S: Contributing Existing Watershed to Culverts at Brandt Lane



mmary for Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" dr

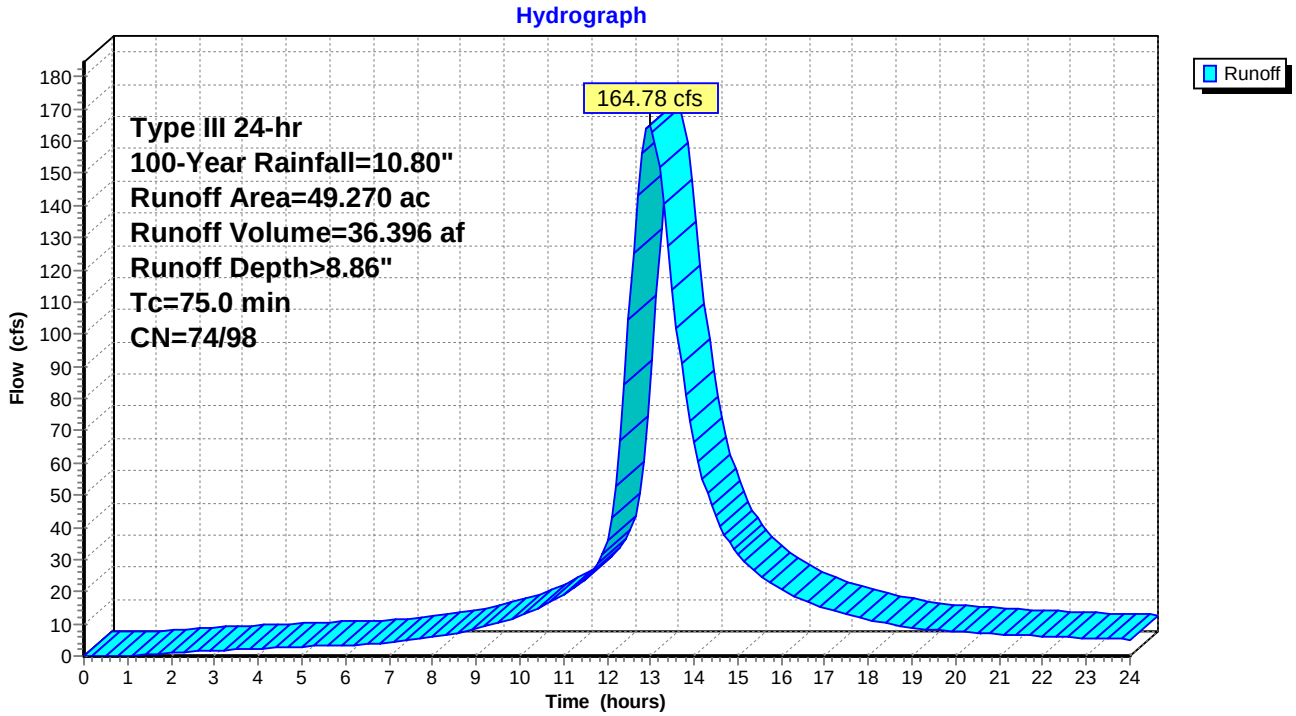
Runoff = 164.78 cfs @ 12.97 hrs, Volume= 36.396 af, Depth> 8.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

Area (ac)	CN	Description
26.720	80	1/2 acre lots, 25% imp, HSG C
4.390	83	1/4 acre lots, 38% imp, HSG C
18.160	94	Urban commercial, 85% imp, HSG C
49.270	85	Weighted Average
25.486	74	51.73% Pervious Area
23.784	98	48.27% Impervious Area

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

Subcatchment 102S: Contributing Existing Watershed to Stream below Brandt Lane from City 36" drain



Summary for Subcatchment 201S: BLDG 1 ROOF

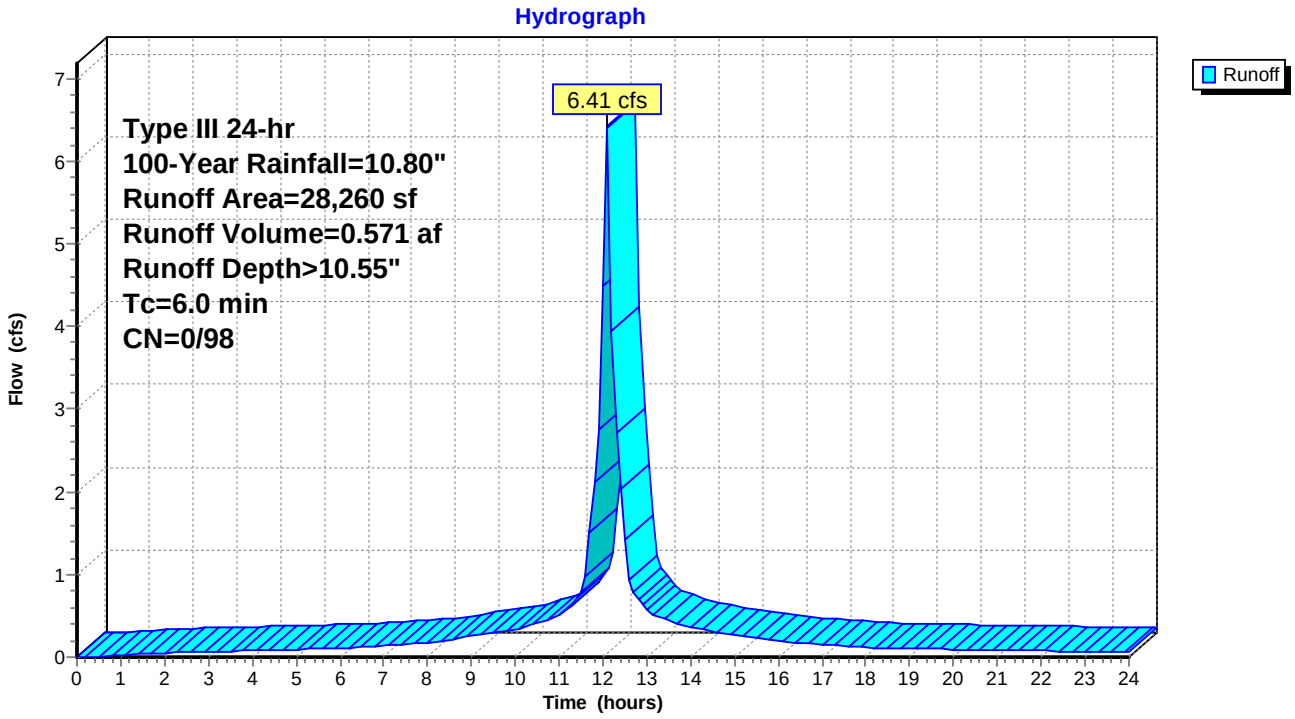
Runoff = 6.41 cfs @ 12.09 hrs, Volume= 0.571 af, Depth>10.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	28,260	98	BLDG 1 ROOF
	28,260	98	100.00% Impervious Area

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

Subcatchment 201S: BLDG 1 ROOF



Summary for Subcatchment 202S: BLDG 2 ROOF

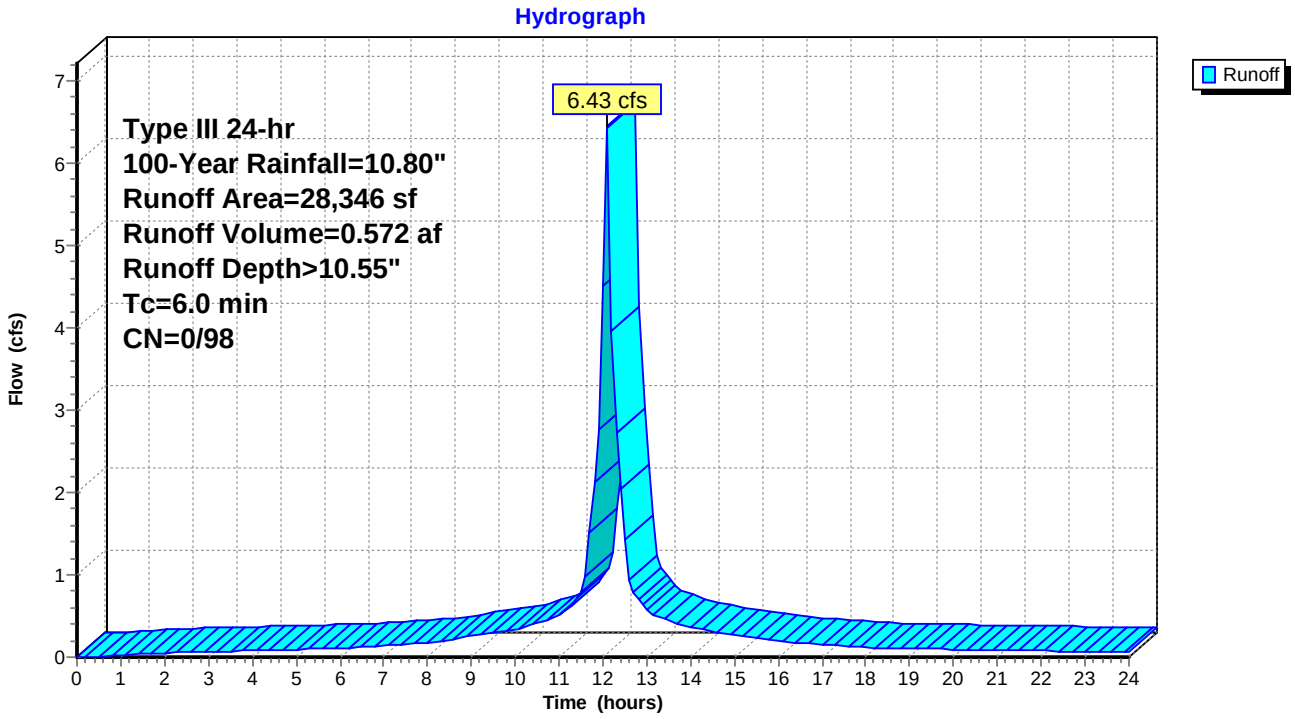
Runoff = 6.43 cfs @ 12.09 hrs, Volume= 0.572 af, Depth>10.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	28,346	98	BLDG 2 ROOF
	28,346	98	100.00% Impervious Area

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

Subcatchment 202S: BLDG 2 ROOF



Summary for Subcatchment 203S: BLDG 3 ROOF

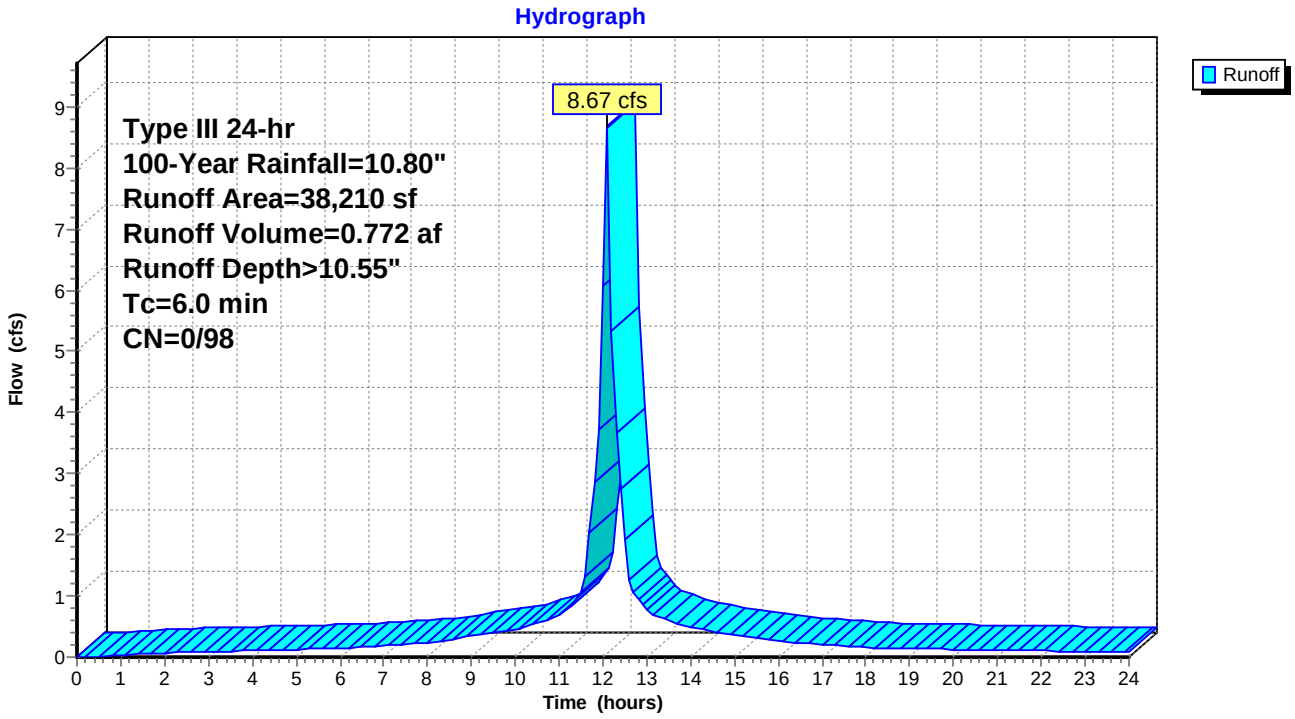
Runoff = 8.67 cfs @ 12.09 hrs, Volume= 0.772 af, Depth>10.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	38,210	98	BLDG ROOF 3
	38,210	98	100.00% Impervious Area

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

Subcatchment 203S: BLDG 3 ROOF



Summary for Subcatchment 204S: BLDG 4 2/3 of ROOF

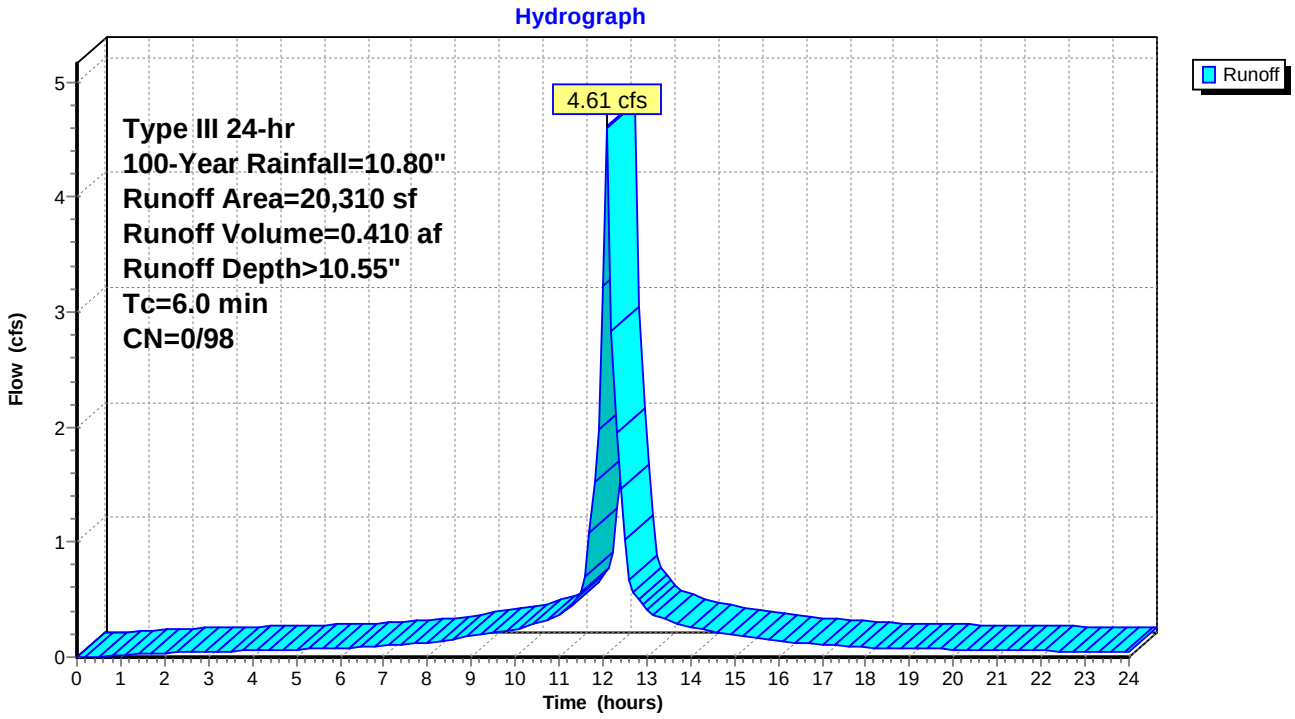
Runoff = 4.61 cfs @ 12.09 hrs, Volume= 0.410 af, Depth>10.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	20,310	98	BLDG 4 ROOF
	20,310	98	100.00% Impervious Area

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

Subcatchment 204S: BLDG 4 2/3 of ROOF



Summary for Subcatchment 205S: BLDG 5 ROOF

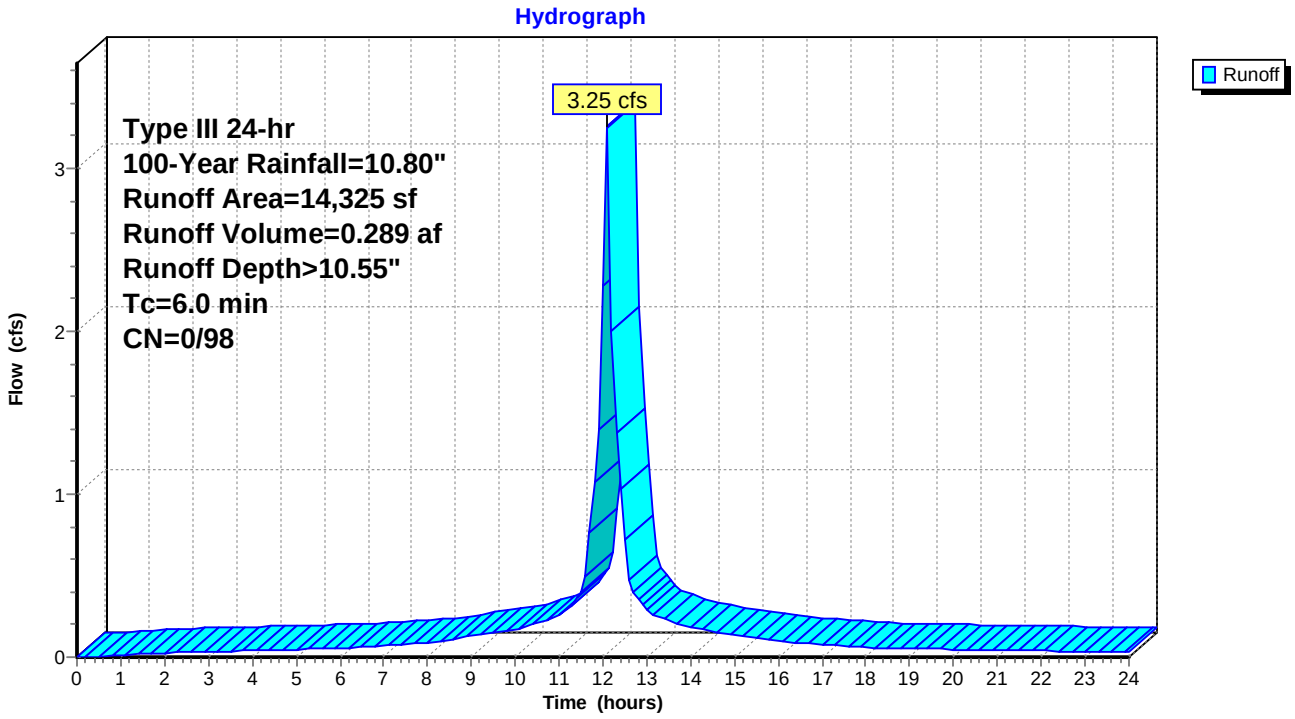
Runoff = 3.25 cfs @ 12.09 hrs, Volume= 0.289 af, Depth>10.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100-Year Rainfall=10.80"

	Area (sf)	CN	Description
*	14,325	98	BLDG 5 ROOF
	14,325	98	100.00% Impervious Area

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

Subcatchment 205S: BLDG 5 ROOF



Summary for Reach 13R: Stream Channel from Brandt to Pine Hill

Inflow Area = 15.375 ac, 66.33% Impervious, Inflow Depth > 6.57" for 100-Year event
Inflow = 68.67 cfs @ 12.25 hrs, Volume= 8.420 af
Outflow = 66.69 cfs @ 12.28 hrs, Volume= 8.416 af, Atten= 3%, Lag= 2.3 min

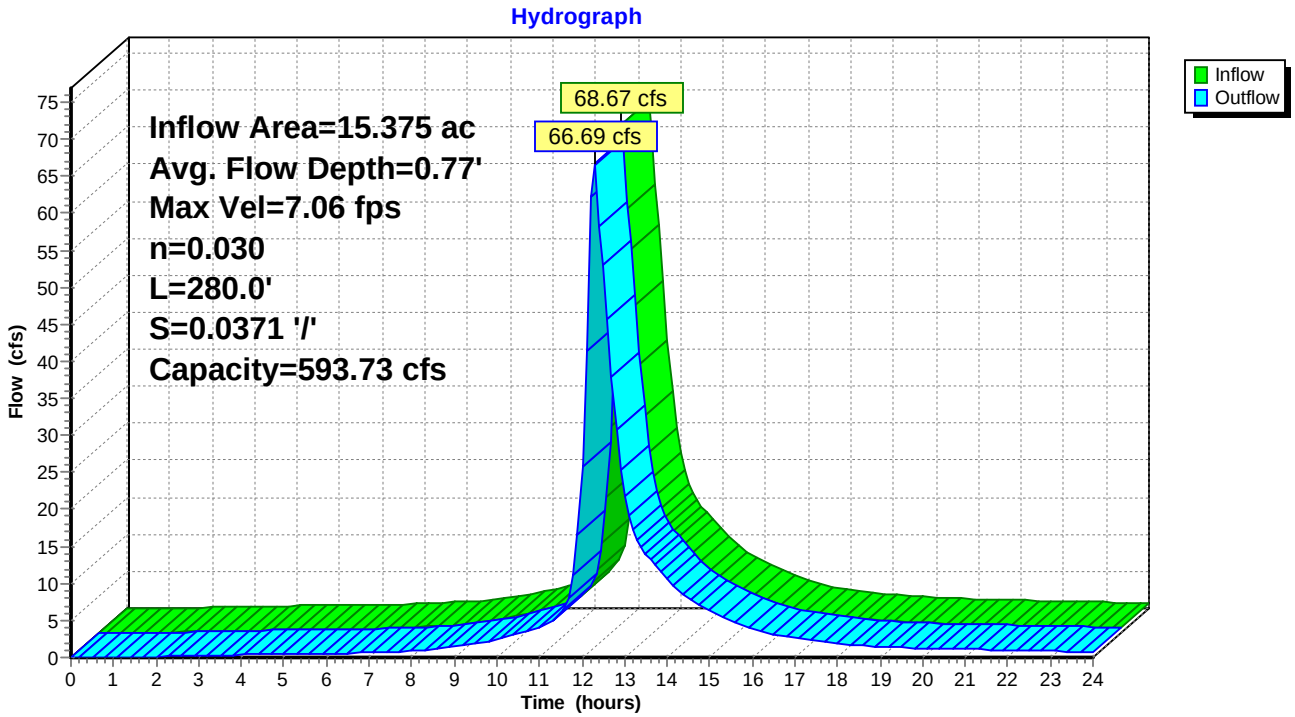
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 7.06 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.03 fps, Avg. Travel Time= 2.3 min

Peak Storage= 2,663 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.77'
Bank-Full Depth= 2.50' Flow Area= 43.8 sf, Capacity= 593.73 cfs

10.00' x 2.50' deep channel, n= 0.030 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 25.00'
Length= 280.0' Slope= 0.0371 '/'
Inlet Invert= 458.40', Outlet Invert= 448.00'

‡

Reach 13R: Stream Channel from Brandt to Pine Hill



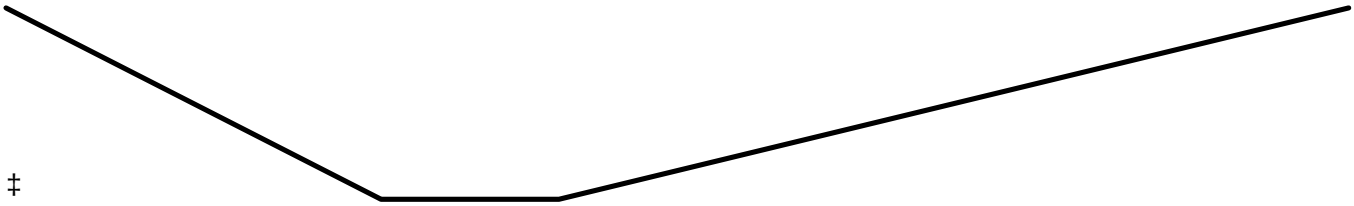
Summary for Reach 20R: existing stream on west side

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

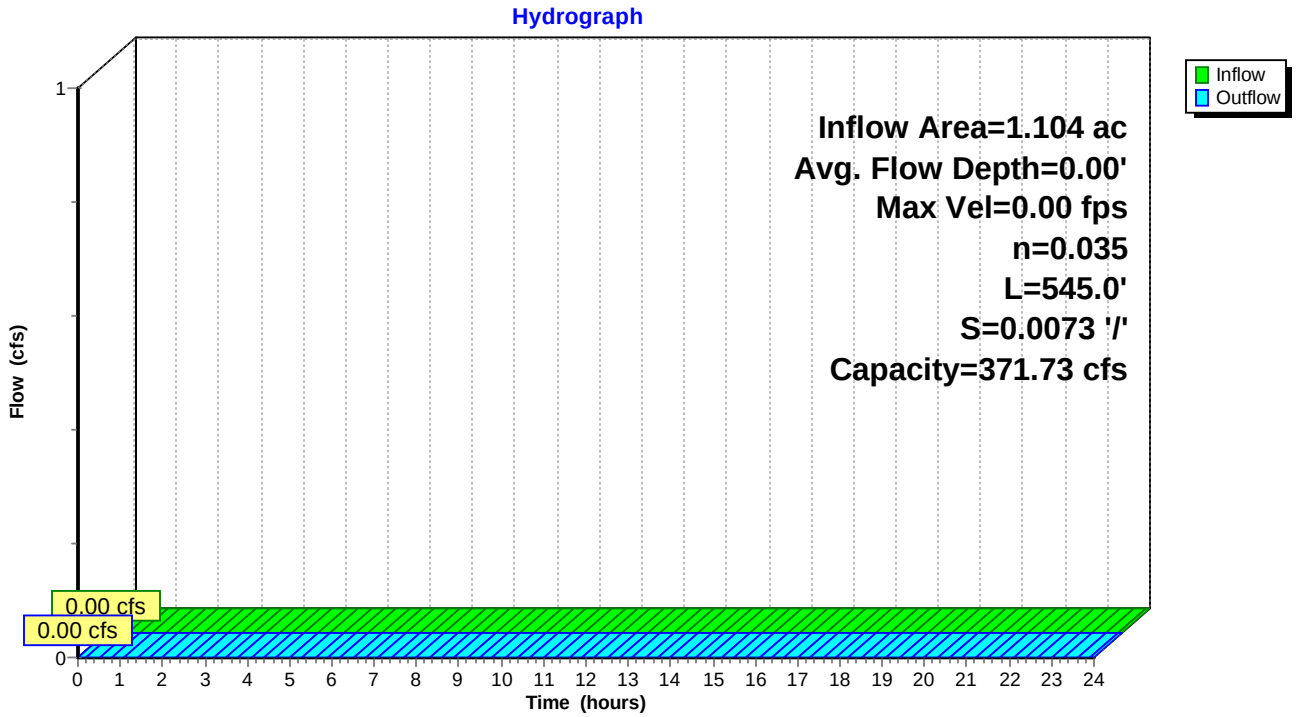
Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 3.05' Flow Area= 71.7 sf, Capacity= 371.73 cfs

5.50' x 3.05' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.8 8.0 '/' Top Width= 41.49'
Length= 545.0' Slope= 0.0073 '/'
Inlet Invert= 467.00', Outlet Invert= 463.00'



‡

Reach 20R: existing stream on west side



Summary for Reach 22R: Combined stream into culvert

Inflow Area = 1.907 ac, 0.00% Impervious, Inflow Depth > 6.91" for 100-Year event
Inflow = 9.11 cfs @ 12.33 hrs, Volume= 1.098 af
Outflow = 8.93 cfs @ 12.38 hrs, Volume= 1.096 af, Atten= 2%, Lag= 3.2 min

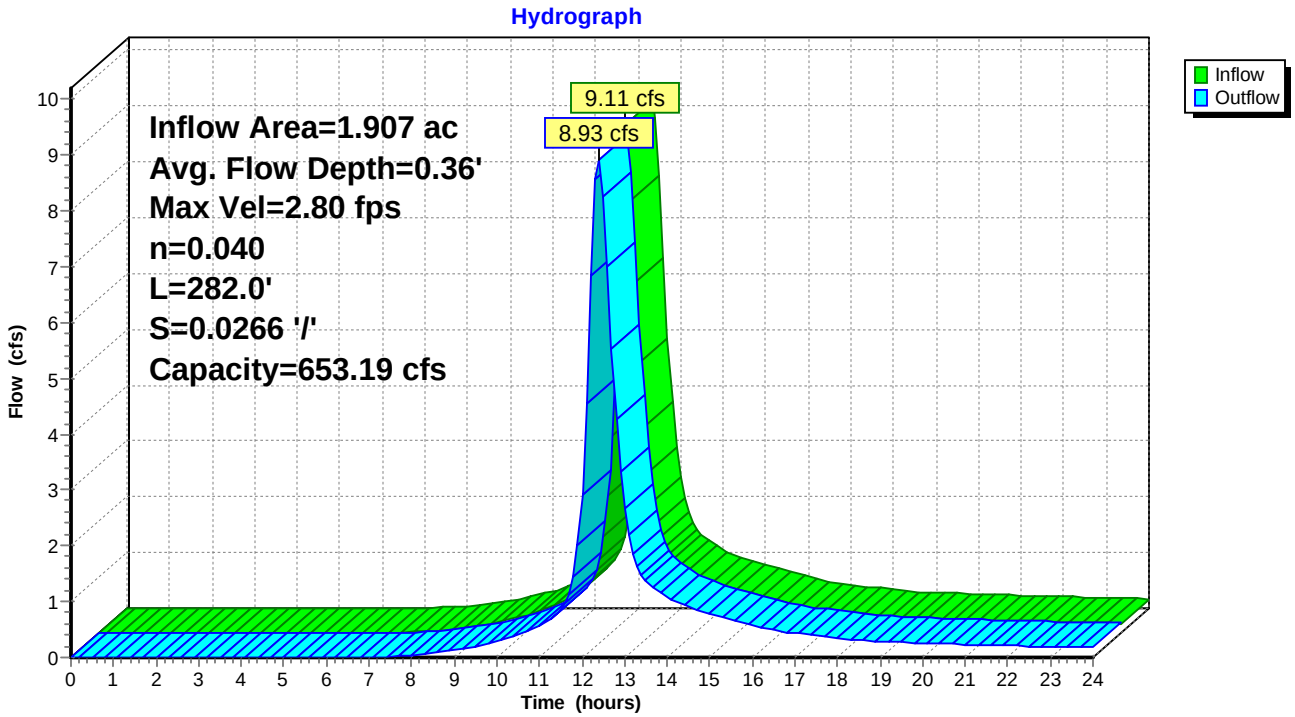
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.80 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 4.9 min

Peak Storage= 915 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 3.50' Flow Area= 64.8 sf, Capacity= 653.19 cfs

8.00' x 3.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 3.0 '/' Top Width= 29.00'
Length= 282.0' Slope= 0.0266 '/'
Inlet Invert= 463.50', Outlet Invert= 456.00'

‡

Reach 22R: Combined stream into culvert

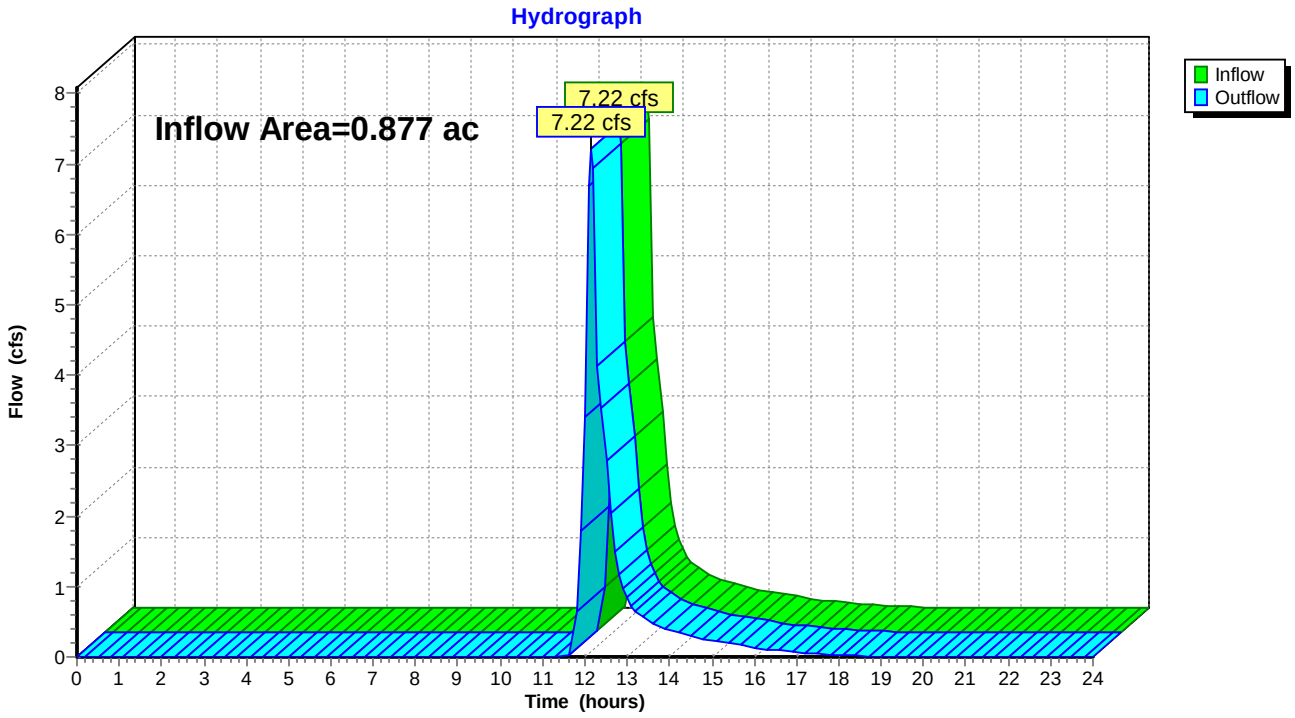


Summary for Reach 27R: (new Reach)

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth = 5.42" for 100-Year event
Inflow = 7.22 cfs @ 12.16 hrs, Volume= 0.396 af
Outflow = 7.22 cfs @ 12.16 hrs, Volume= 0.396 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 27R: (new Reach)



Summary for Reach 81R: West Proposed Stream

Inflow Area = 0.803 ac, 0.00% Impervious, Inflow Depth > 16.45" for 100-Year event
Inflow = 9.28 cfs @ 12.25 hrs, Volume= 1.101 af
Outflow = 9.11 cfs @ 12.33 hrs, Volume= 1.098 af, Atten= 2%, Lag= 5.0 min

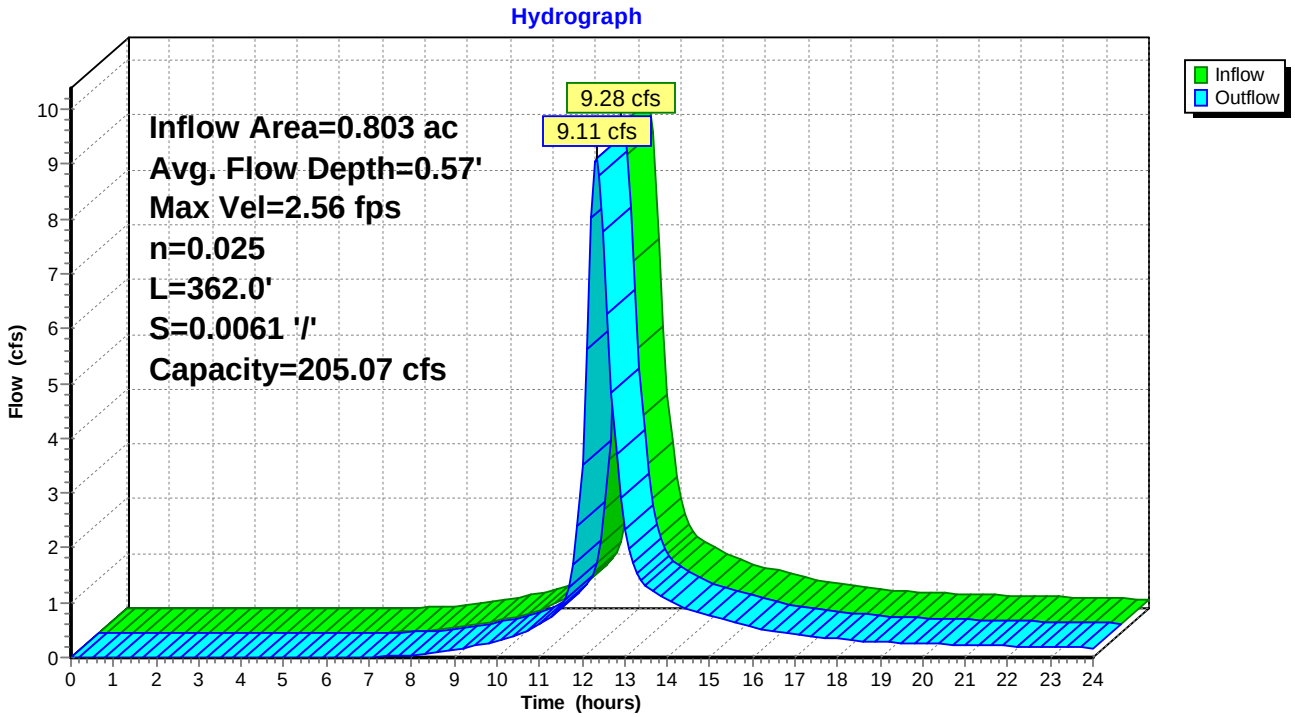
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.56 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 6.4 min

Peak Storage= 1,295 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 205.07 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 362.0' Slope= 0.0061 '/'
Inlet Invert= 466.70', Outlet Invert= 464.50'

‡

Reach 81R: West Proposed Stream



Summary for Reach 83R: Northerly P-Stream

Inflow = 6.27 cfs @ 12.29 hrs, Volume= 0.675 af
Outflow = 5.99 cfs @ 12.35 hrs, Volume= 0.673 af, Atten= 5%, Lag= 4.0 min

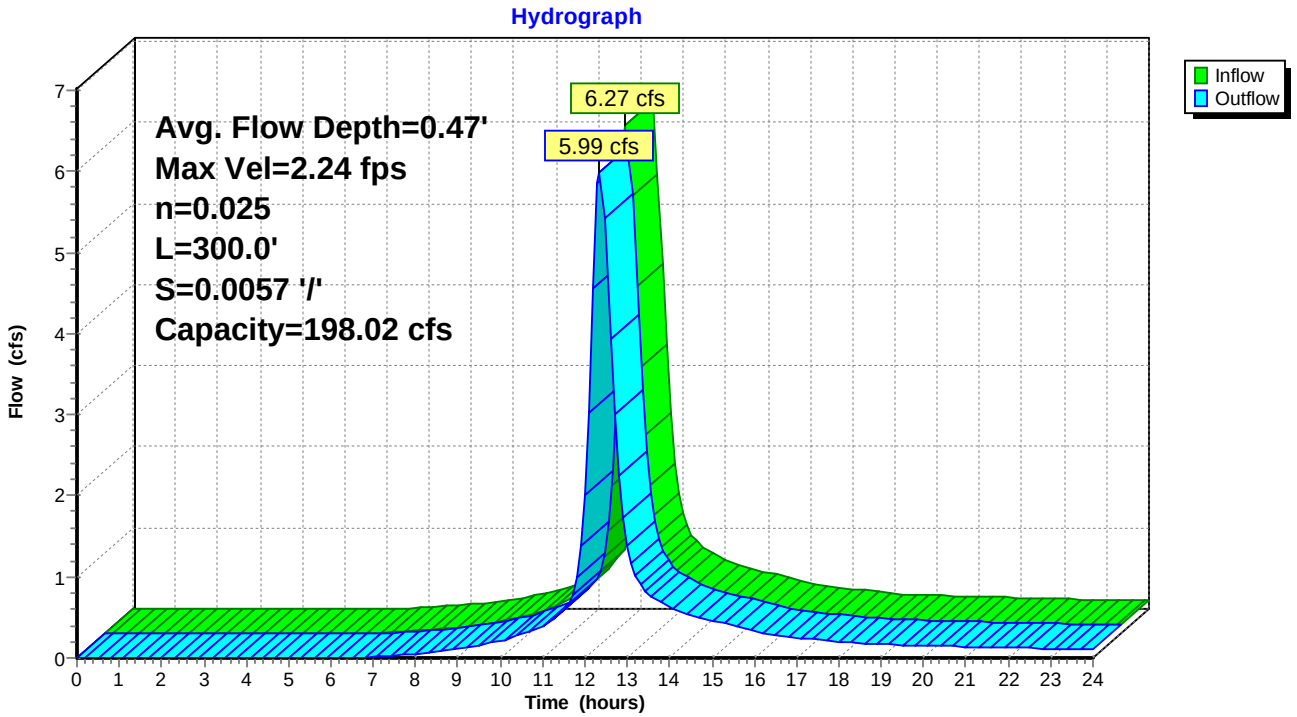
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.24 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 6.4 min

Peak Storage= 839 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 2.50' Flow Area= 35.0 sf, Capacity= 198.02 cfs

4.00' x 2.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 24.00'
Length= 300.0' Slope= 0.0057 '/'
Inlet Invert= 468.40', Outlet Invert= 466.70'

‡

Reach 83R: Northerly P-Stream

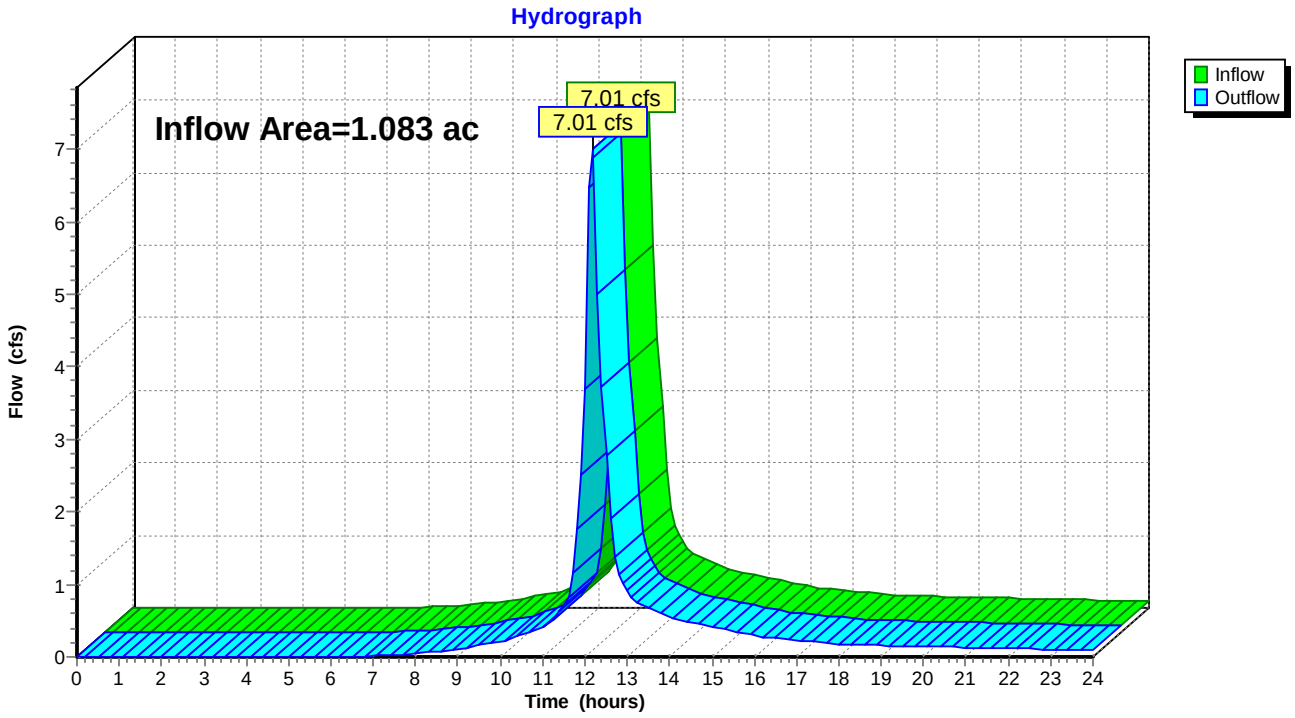


Summary for Reach 94R: Southeast BVW

Inflow Area = 1.083 ac, 0.00% Impervious, Inflow Depth > 7.07" for 100-Year event
Inflow = 7.01 cfs @ 12.17 hrs, Volume= 0.638 af
Outflow = 7.01 cfs @ 12.17 hrs, Volume= 0.638 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 94R: Southeast BVW

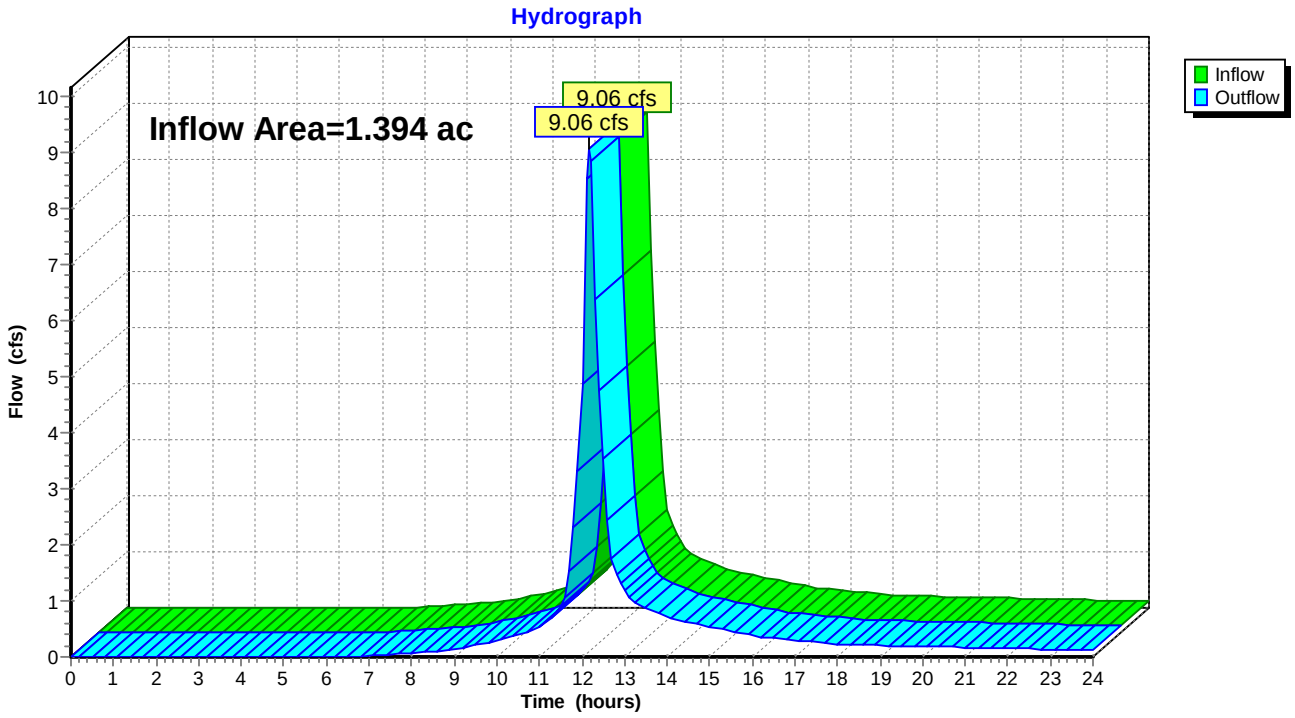


Summary for Reach 95R: Pine Hill Road

Inflow Area = 1.394 ac, 0.00% Impervious, Inflow Depth > 7.10" for 100-Year event
Inflow = 9.06 cfs @ 12.16 hrs, Volume= 0.825 af
Outflow = 9.06 cfs @ 12.16 hrs, Volume= 0.825 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach 95R: Pine Hill Road

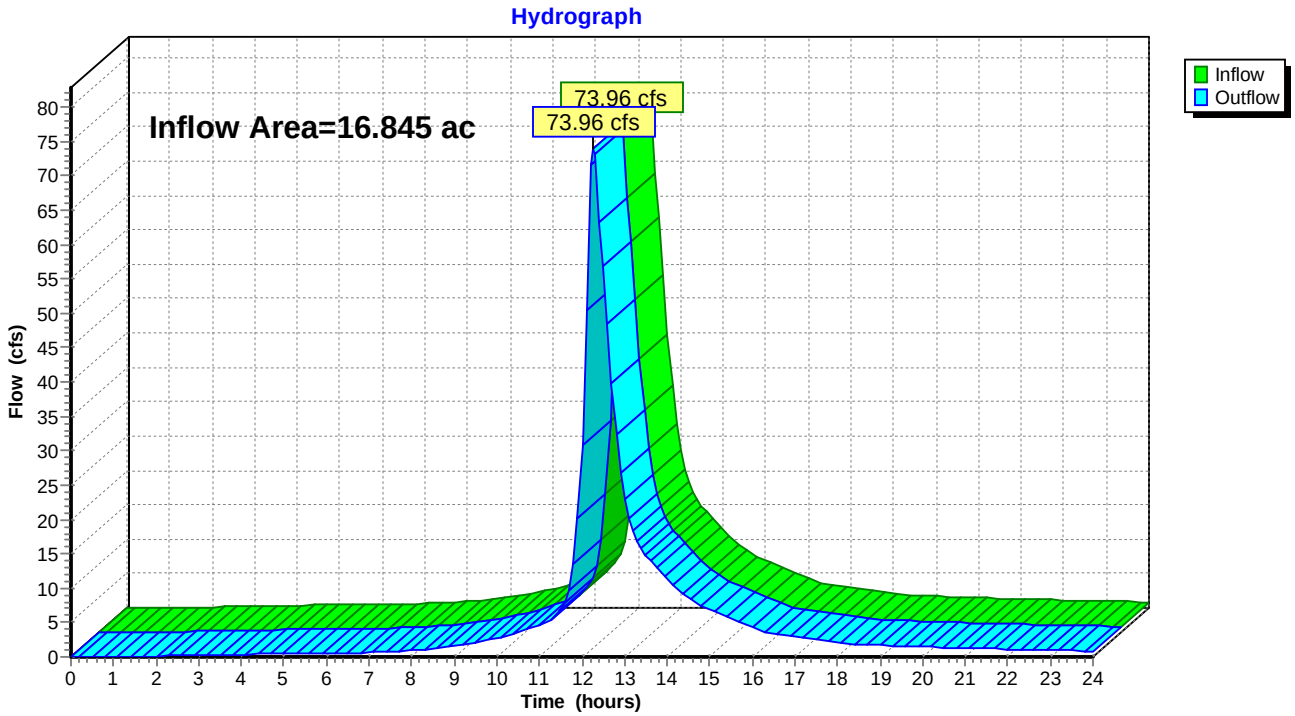


Summary for Reach X2: Area Summary Post (Not a physical location)

Inflow Area = 16.845 ac, 60.55% Impervious, Inflow Depth > 6.61" for 100-Year event
Inflow = 73.96 cfs @ 12.26 hrs, Volume= 9.285 af
Outflow = 73.96 cfs @ 12.26 hrs, Volume= 9.285 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach X2: Area Summary Post (Not a physical location)



Summary for Pond 19P: INFL. POND 3C

Inflow Area = 0.877 ac,100.00% Impervious, Inflow Depth > 10.55" for 100-Year event
Inflow = 8.67 cfs @ 12.09 hrs, Volume= 0.772 af
Outflow = 7.38 cfs @ 12.16 hrs, Volume= 0.682 af, Atten= 15%, Lag= 3.9 min
Discarded = 0.17 cfs @ 6.70 hrs, Volume= 0.286 af
Primary = 7.22 cfs @ 12.16 hrs, Volume= 0.396 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 476.14' @ 12.16 hrs Surf.Area= 2,964 sf Storage= 8,015 cf

Plug-Flow detention time= 105.0 min calculated for 0.682 af (88% of inflow)
Center-of-Mass det. time= 49.2 min (786.7 - 737.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	471.80'	998 cf	**114.00'W x 26.00'L x 4.17'H Field A** 12,350 cf Overall - 9,856 cf Embedded = 2,494 cf x 40.0% Voids
#2A	472.30'	7,005 cf	**retain_it retain_it 3.0'** x 42 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 14 Rows adjusted for 160.5 cf perimeter wall
#3	475.30'	38 cf	**3.00'D x 2.70'H Vertical Cone/Cylinder - Risers** x 2 -Impervious
		8,041 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	471.80'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	474.05'	**15.0" Round Culvert** L= 209.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 474.05' / 466.50' S= 0.0361 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.17 cfs @ 6.70 hrs HW=471.86' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=6.84 cfs @ 12.16 hrs HW=476.02' (Free Discharge)
2=Culvert (Inlet Controls 6.84 cfs @ 5.58 fps)

Pond 19P: INFL. POND 3C - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
14 Rows adjusted for 160.5 cf perimeter wall

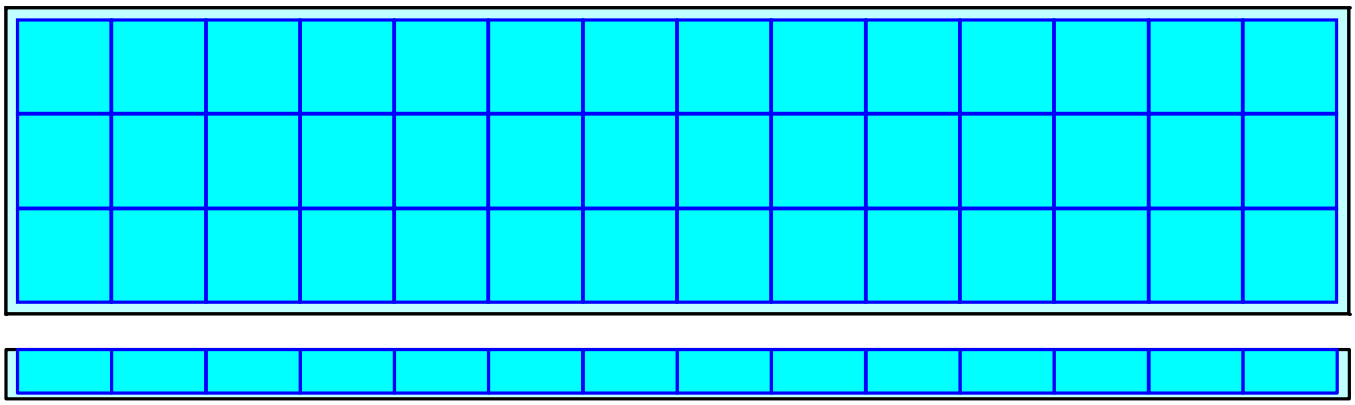
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
14 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 114.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 14 x 2 = 160.5 cf Perimeter Wall
42 Chambers x 170.6 cf - 160.5 cf Perimeter wall = 7,005.1 cf Chamber Storage
42 Chambers x 234.7 cf = 9,856.0 cf Displacement

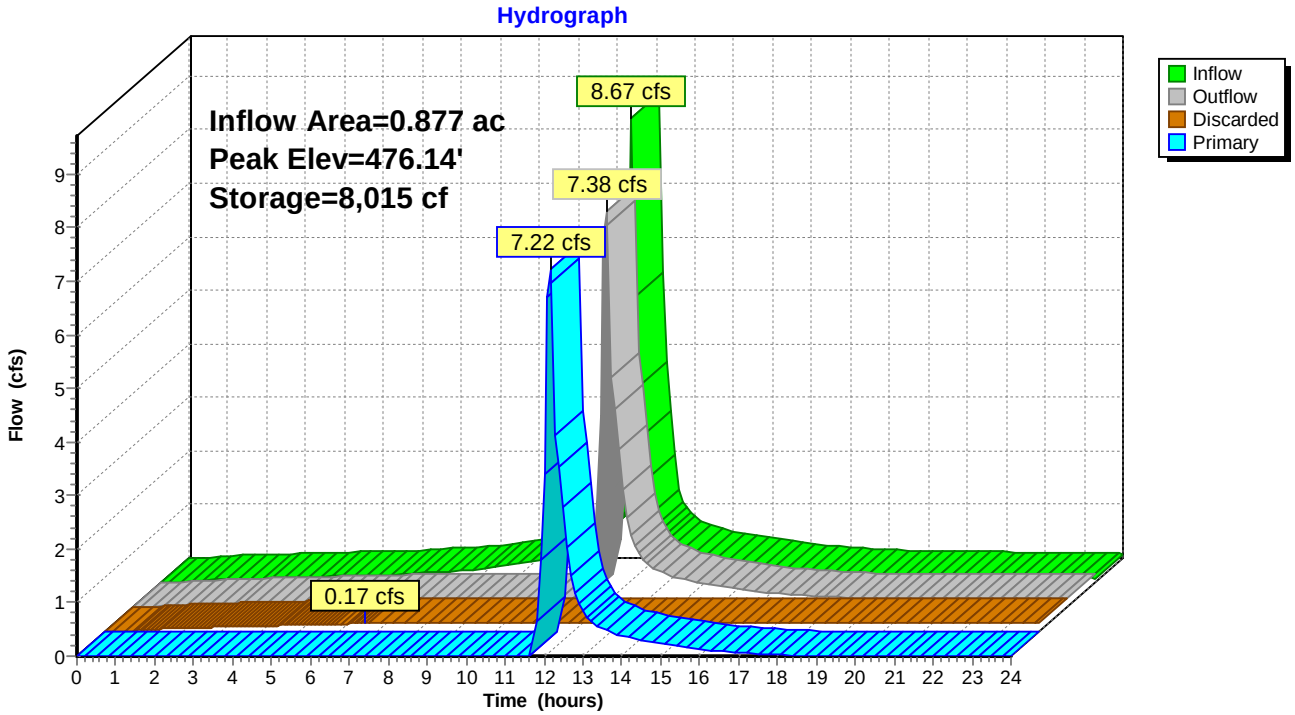
12,350.0 cf Field - 9,856.0 cf Chambers = 2,494.0 cf Stone x 40.0% Voids = 997.6 cf Stone Storage

Chamber Storage + Stone Storage = 8,002.7 cf = 0.184 af
Overall Storage Efficiency = 64.8%
Overall System Size = 26.00' x 114.00' x 4.17'

42 Chambers
457.4 cy Field
92.4 cy Stone



Pond 19P: INFL. POND 3C



Summary for Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.

Inflow Area = 1.397 ac, 80.69% Impervious, Inflow Depth > 9.95" for 100-Year event
Inflow = 11.16 cfs @ 12.17 hrs, Volume= 1.159 af
Outflow = 8.79 cfs @ 12.28 hrs, Volume= 1.135 af, Atten= 21%, Lag= 6.8 min
Discarded = 0.55 cfs @ 12.20 hrs, Volume= 0.795 af
Primary = 8.24 cfs @ 12.28 hrs, Volume= 0.340 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs / 3
Peak Elev= 463.47' @ 12.28 hrs Surf.Area= 2,789 sf Storage= 12,433 cf

Plug-Flow detention time= 115.9 min calculated for 1.130 af (98% of inflow)
Center-of-Mass det. time= 102.6 min (854.8 - 752.2)

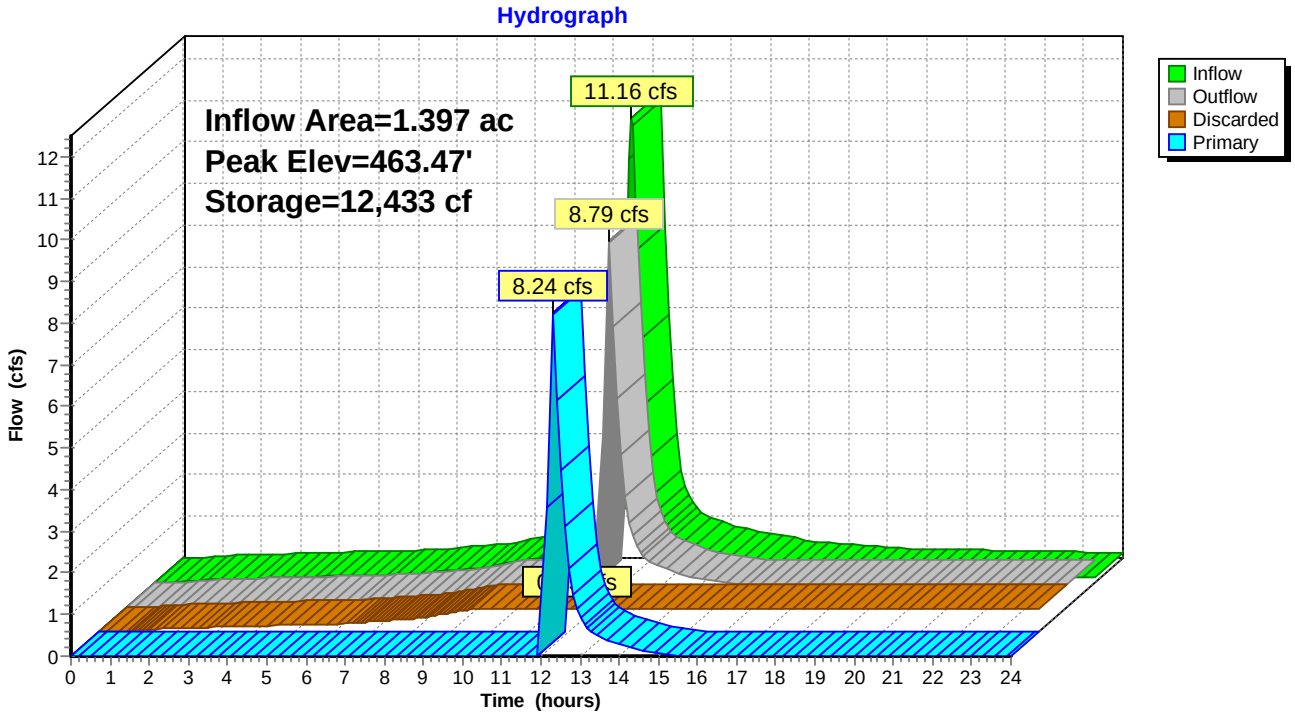
Volume	Invert	Avail.Storage	Storage Description
#1	458.00'	1,112 cf	**34.00'W x 82.00'L x 6.20'H Prismatoid of crushed stone** 17,286 cf Overall - 14,507 cf Embedded = 2,779 cf x 40.0% Voids
#2	458.50'	11,360 cf	**retain_it retain_it 5.0'** x 40 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 290.9 cf perimeter wall
#3	463.50'	170 cf	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 3 -Impervious
#4	461.00'	119 cf	**18.0" Round Pipe Storage** L= 67.5' S= 0.0150 '/'
		12,761 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	458.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	461.00'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.00' / 460.50' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#3	Device 2	462.75'	**4.0' long x 4.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.5' Crest Height
#4	Device 2	465.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.55 cfs @ 12.20 hrs HW=463.41' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.55 cfs)

Primary OutFlow Max=8.02 cfs @ 12.28 hrs HW=463.46' (Free Discharge)
└**2=Culvert** (Passes 8.02 cfs of 11.13 cfs potential flow)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 8.02 cfs @ 2.92 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 26P: Subsurface Infiltration Basin from Def. Subdiv.



Summary for Pond 29P: DETN. POND 5B

Inflow Area = 0.233 ac, 91.42% Impervious, Inflow Depth > 10.29" for 100-Year event
Inflow = 2.01 cfs @ 12.13 hrs, Volume= 0.200 af
Outflow = 0.34 cfs @ 12.70 hrs, Volume= 0.200 af, Atten= 83%, Lag= 33.8 min
Discarded = 0.34 cfs @ 12.70 hrs, Volume= 0.200 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 457.90' @ 12.70 hrs Surf.Area= 1,776 sf Storage= 2,926 cf

Plug-Flow detention time= 93.8 min calculated for 0.200 af (100% of inflow)
Center-of-Mass det. time= 93.5 min (838.6 - 745.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	452.00'	374 cf	**50.00'W x 18.00'L x 4.17'H Field A** 3,750 cf Overall - 2,816 cf Embedded = 934 cf x 40.0% Voids
#2A	452.50'	1,972 cf	**retain_it retain_it 3.0'** x 12 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 6 Rows adjusted for 75.5 cf perimeter wall
#3	455.50'	35 cf	**3.00'D x 2.50'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	457.00'	633 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		3,014 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
457.00	368	128.8	0	0	368
458.00	942	158.0	633	633	1,050

Device	Routing	Invert	Outlet Devices
#1	Discarded	452.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	458.00'	**2.0' long x 2.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.34 cfs @ 12.70 hrs HW=457.90' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=452.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29P: DETN. POND 5B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
6 Rows adjusted for 75.5 cf perimeter wall

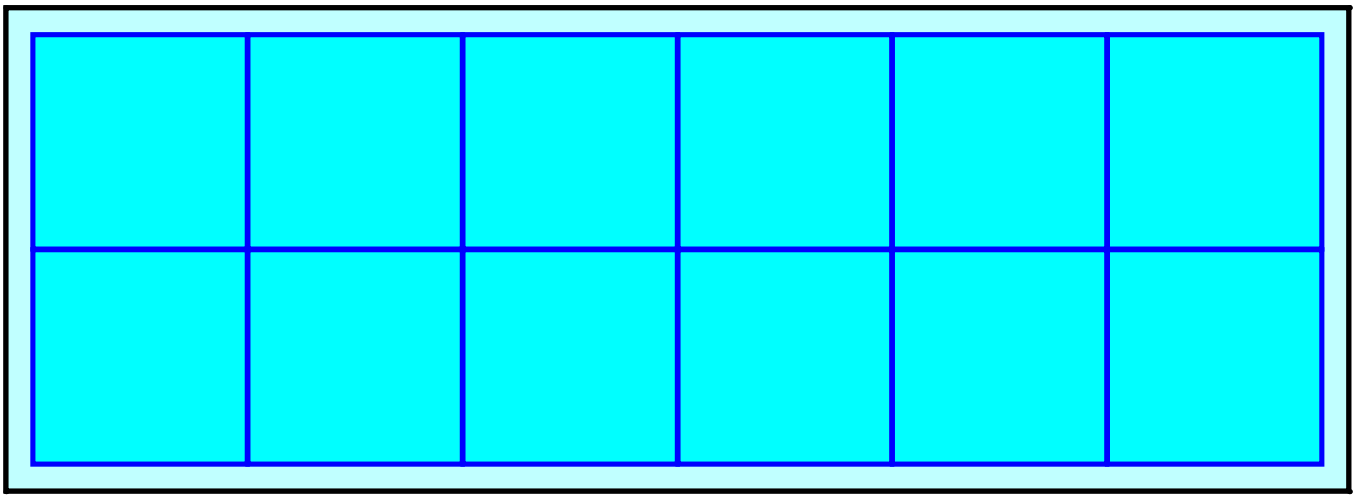
2 Chambers/Row x 8.00' Long = 16.00' Row Length +12.0" End Stone x 2 = 18.00' Base Length
6 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 50.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

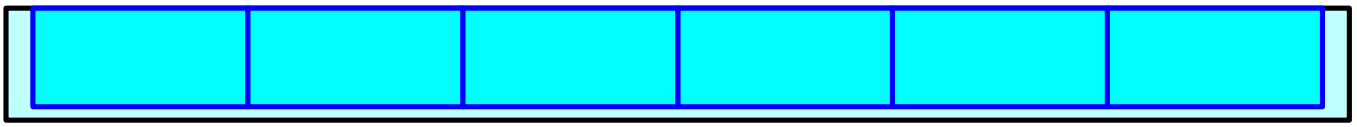
4.7 cf Sidewall x 2 x 2 + 4.7 cf Endwall x 6 x 2 = 75.5 cf Perimeter Wall
12 Chambers x 170.6 cf - 75.5 cf Perimeter wall = 1,971.8 cf Chamber Storage
12 Chambers x 234.7 cf = 2,816.0 cf Displacement

3,750.0 cf Field - 2,816.0 cf Chambers = 934.0 cf Stone x 40.0% Voids = 373.6 cf Stone Storage

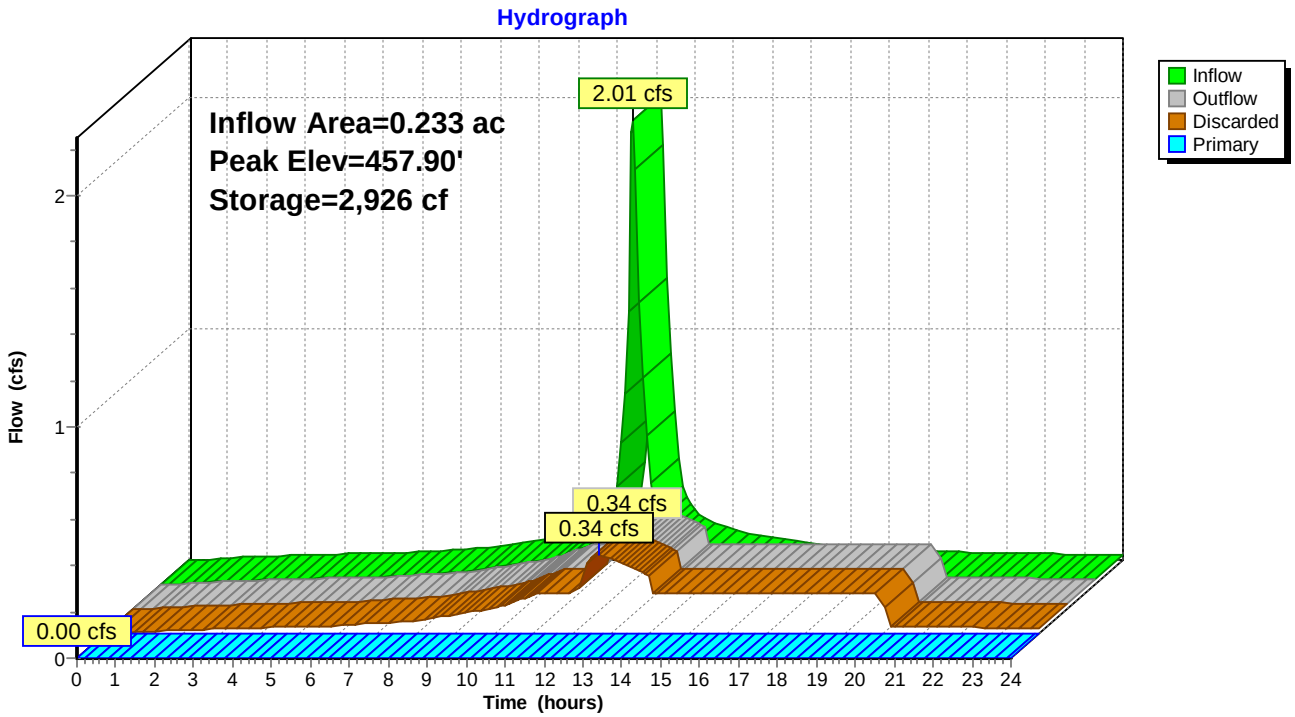
Chamber Storage + Stone Storage = 2,345.4 cf = 0.054 af
Overall Storage Efficiency = 62.5%
Overall System Size = 18.00' x 50.00' x 4.17'

12 Chambers
138.9 cy Field
34.6 cy Stone





Pond 29P: DETN. POND 5B



Summary for Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane

Inflow Area = 9.324 ac, 57.99% Impervious, Inflow Depth > 7.29" for 100-Year event
Inflow = 52.90 cfs @ 12.22 hrs, Volume= 5.663 af
Outflow = 52.79 cfs @ 12.23 hrs, Volume= 5.663 af, Atten= 0%, Lag= 0.4 min
Primary = 52.79 cfs @ 12.23 hrs, Volume= 5.663 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 457.23' @ 12.23 hrs Surf.Area= 1,252 sf Storage= 924 cf

Plug-Flow detention time= 0.3 min calculated for 5.663 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (798.3 - 798.0)

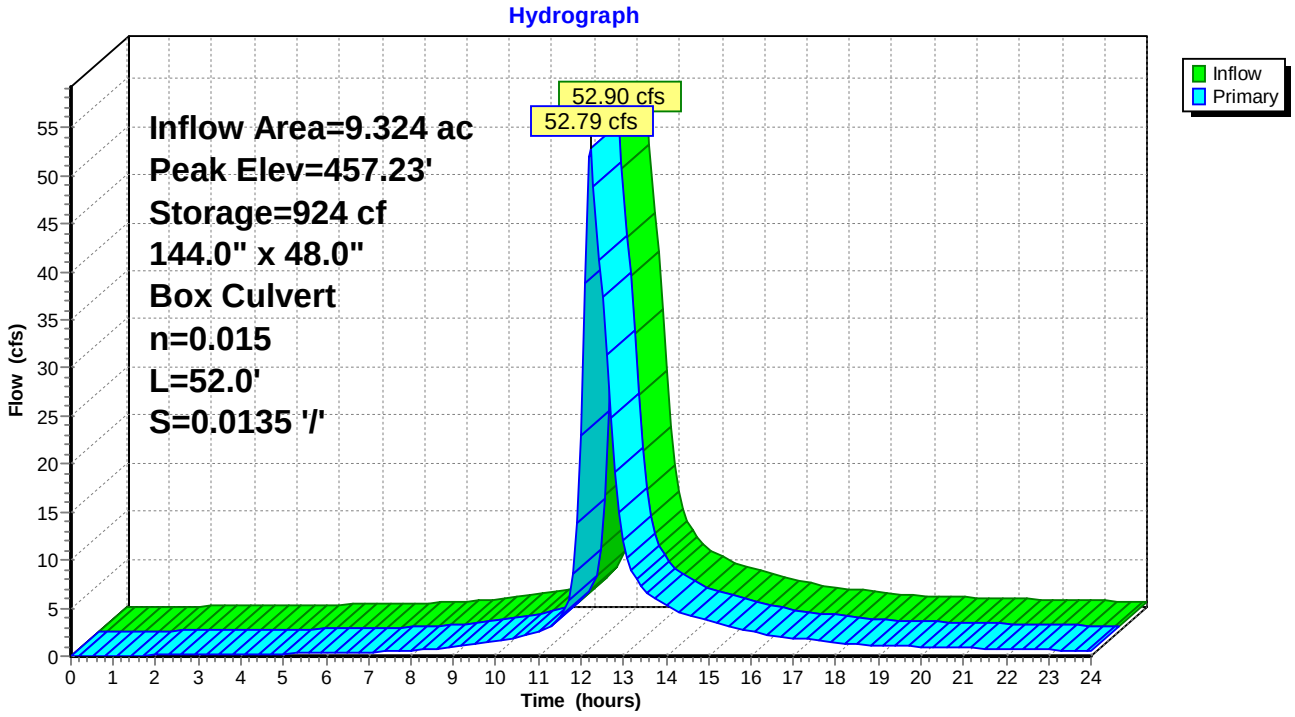
Volume	Invert	Avail.Storage	Storage Description
#1	456.00'	90,081 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
456.00	340	69.0	0	0	340
458.00	2,107	180.0	2,196	2,196	2,553
460.00	5,971	358.0	7,750	9,946	10,193
462.00	11,082	505.0	16,792	26,737	20,325
464.00	16,612	607.0	27,508	54,245	29,419
466.00	19,256	663.0	35,835	90,081	35,220

Device	Routing	Invert	Outlet Devices
#1	Primary	456.00'	**144.0" W x 48.0" H Box Box Culvert** L= 52.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 456.00' / 455.30' S= 0.0135 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 48.00 sf

Primary OutFlow Max=51.03 cfs @ 12.23 hrs HW=457.21' (Free Discharge)
1=Box Culvert (Inlet Controls 51.03 cfs @ 3.53 fps)

Pond 82P: Proposed Wetland above new Box Culvert at Brandt Lane



Summary for Pond 101P: DETN. POND 1A

Inflow Area = 1.631 ac, 79.38% Impervious, Inflow Depth > 9.92" for 100-Year event
Inflow = 13.74 cfs @ 12.13 hrs, Volume= 1.348 af
Outflow = 4.59 cfs @ 12.50 hrs, Volume= 1.335 af, Atten= 67%, Lag= 21.8 min
Primary = 4.59 cfs @ 12.50 hrs, Volume= 1.335 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 458.43' @ 12.50 hrs Surf.Area= 6,144 sf Storage= 15,284 cf

Plug-Flow detention time= 41.0 min calculated for 1.335 af (99% of inflow)
Center-of-Mass det. time= 34.5 min (785.7 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	455.35'	1,229 cf	**24.00'W x 256.00'L x 4.17'H Field A** 25,600 cf Overall - 22,528 cf Embedded = 3,072 cf x 40.0% Voids
#2A	455.85'	16,048 cf	**retain_it retain_it 3.0'** x 96 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 330.5 cf perimeter wall
#3	458.80'	47 cf	**3.00'D x 2.20'H Riser** x 3
#4	454.65'	251 cf	**18.0" Round Pipe Storage** L= 142.0' S= 0.0116 '/'
		17,575 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	455.35'	**12.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 455.35' / 454.65' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.59 cfs @ 12.50 hrs HW=458.43' (Free Discharge)
1=Culvert (Barrel Controls 4.59 cfs @ 5.84 fps)

Pond 101P: DETN. POND 1A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
3 Rows adjusted for 330.5 cf perimeter wall

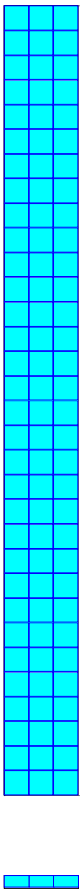
32 Chambers/Row x 8.00' Long = 256.00' Row Length
3 Rows x 96.0" Wide = 24.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 32 x 2 + 4.7 cf Endwall x 3 x 2 = 330.5 cf Perimeter Wall
96 Chambers x 170.6 cf - 330.5 cf Perimeter wall = 16,048.2 cf Chamber Storage
96 Chambers x 234.7 cf = 22,528.0 cf Displacement

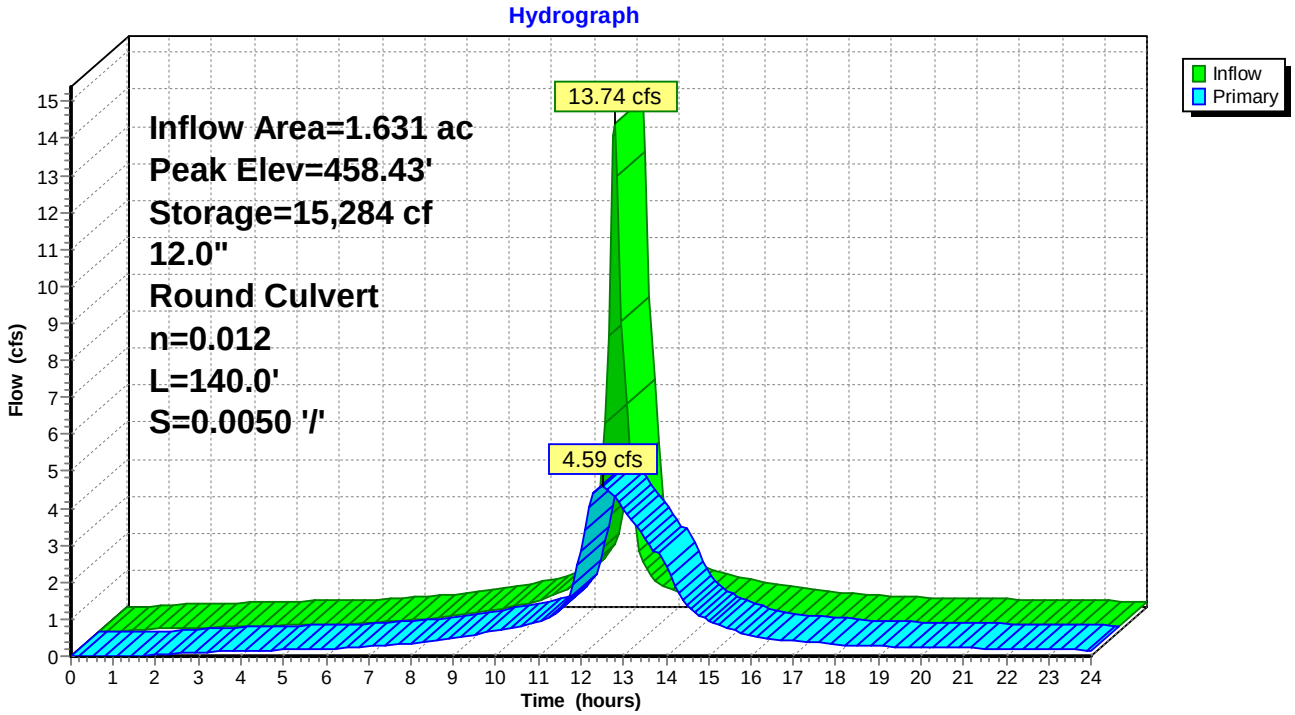
25,600.0 cf Field - 22,528.0 cf Chambers = 3,072.0 cf Stone x 40.0% Voids = 1,228.8 cf Stone Storage

Chamber Storage + Stone Storage = 17,277.0 cf = 0.397 af
Overall Storage Efficiency = 67.5%
Overall System Size = 256.00' x 24.00' x 4.17'

96 Chambers
948.1 cy Field
113.8 cy Stone



Pond 101P: DETN. POND 1A



Summary for Pond 102P: INFIL. POND 2

Inflow Area = 1.889 ac, 87.97% Impervious, Inflow Depth > 10.15" for 100-Year event
Inflow = 16.68 cfs @ 12.11 hrs, Volume= 1.598 af
Outflow = 12.03 cfs @ 12.28 hrs, Volume= 1.240 af, Atten= 28%, Lag= 10.1 min
Discarded = 0.16 cfs @ 2.90 hrs, Volume= 0.297 af
Primary = 11.87 cfs @ 12.28 hrs, Volume= 0.942 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 469.26' @ 12.28 hrs Surf.Area= 6,804 sf Storage= 25,419 cf

Plug-Flow detention time= 144.4 min calculated for 1.235 af (77% of inflow)
Center-of-Mass det. time= 63.2 min (808.9 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	463.80'	2,115 cf	**162.00'W x 42.00'L x 5.17'H Field A** 35,154 cf Overall - 29,867 cf Embedded = 5,287 cf x 40.0% Voids
#2A	464.30'	22,716 cf	**retain_it retain_it 4.0'** x 100 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 20 Rows adjusted for 377.5 cf perimeter wall
#3	468.30'	99 cf	**3.00'D x 3.50'H Riser** x 4 -Impervious
#4	461.50'	560 cf	**18.0" Round Pipe Storage** -Impervious L= 317.0' S= 0.0157 '/'
		25,491 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	463.80'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	466.57'	**18.0" Round 18" DRAIN** L= 317.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 466.57' / 461.50' S= 0.0160 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.16 cfs @ 2.90 hrs HW=463.80' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=11.49 cfs @ 12.28 hrs HW=469.14' (Free Discharge)
↑—**2=18" DRAIN** (Inlet Controls 11.49 cfs @ 6.50 fps)

Pond 102P: INFIL. POND 2 - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)
Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf
Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf
20 Rows adjusted for 377.5 cf perimeter wall

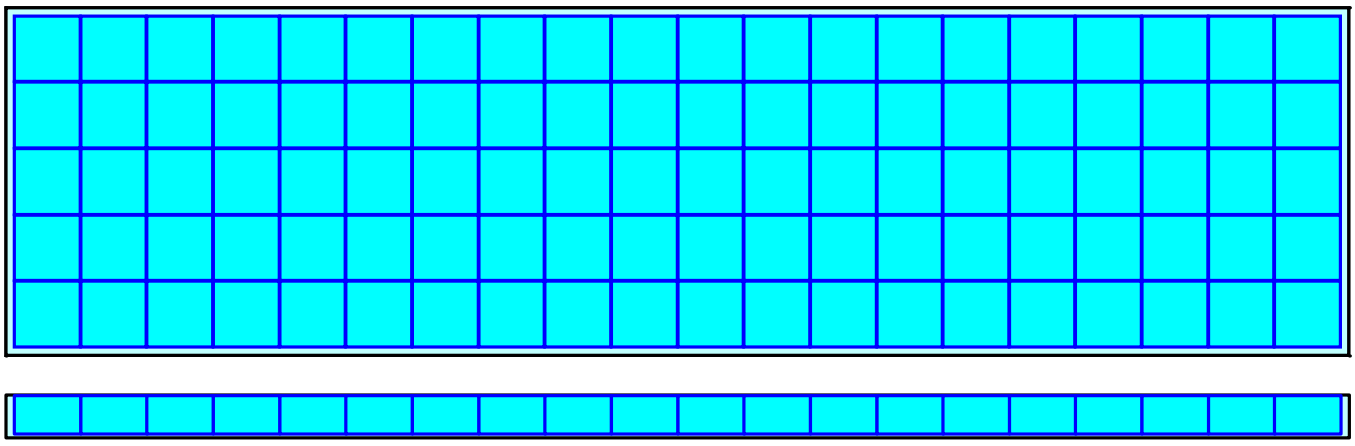
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 56.0" Chamber Height = 5.17' Field Height

7.5 cf Sidewall x 5 x 2 + 7.5 cf Endwall x 20 x 2 = 377.5 cf Perimeter Wall
100 Chambers x 230.9 cf - 377.5 cf Perimeter wall = 22,716.5 cf Chamber Storage
100 Chambers x 298.7 cf = 29,866.7 cf Displacement

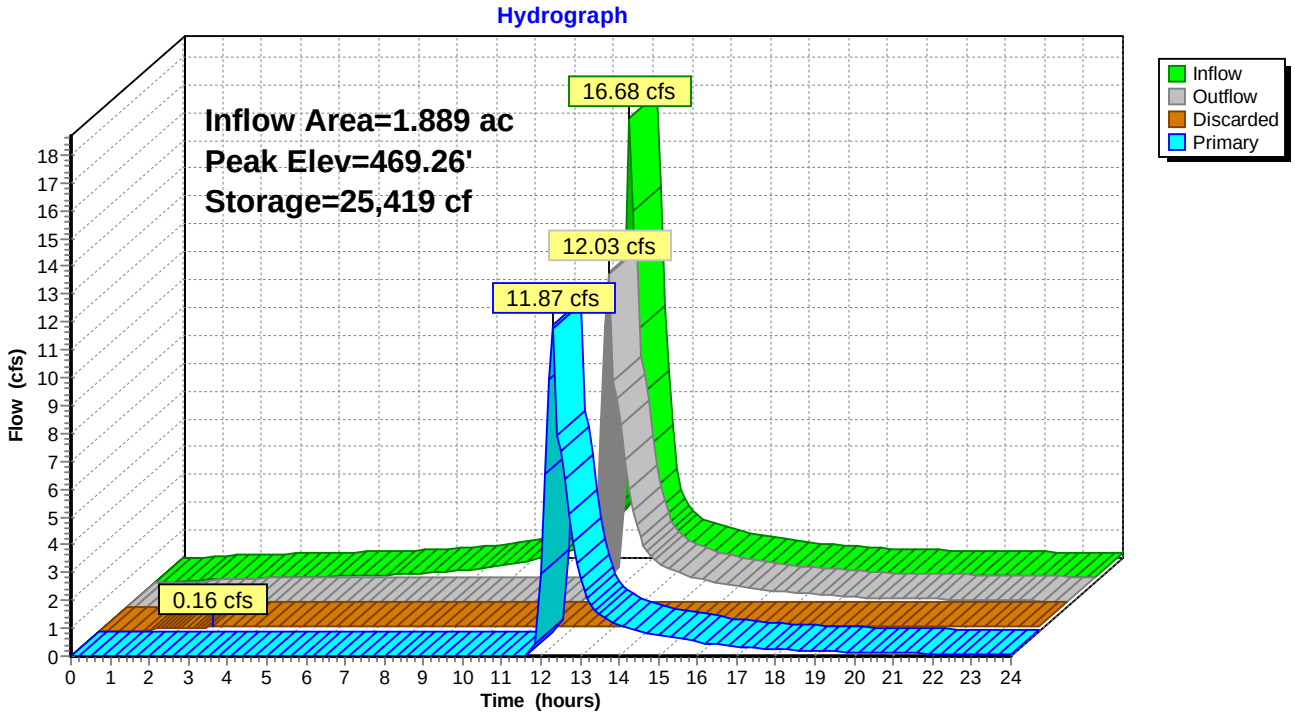
35,154.0 cf Field - 29,866.7 cf Chambers = 5,287.3 cf Stone x 40.0% Voids = 2,114.9 cf Stone Storage

Chamber Storage + Stone Storage = 24,831.4 cf = 0.570 af
Overall Storage Efficiency = 70.6%
Overall System Size = 42.00' x 162.00' x 5.17'

100 Chambers
1,302.0 cy Field
195.8 cy Stone



Pond 102P: INFIL. POND 2



Summary for Pond 103P: DETN. POND 3A

Inflow Area = 1.476 ac, 55.17% Impervious, Inflow Depth > 9.03" for 100-Year event
Inflow = 11.62 cfs @ 12.14 hrs, Volume= 1.111 af
Outflow = 8.42 cfs @ 12.29 hrs, Volume= 1.107 af, Atten= 28%, Lag= 9.2 min
Primary = 8.42 cfs @ 12.29 hrs, Volume= 1.107 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 470.05' @ 12.29 hrs Surf.Area= 2,702 sf Storage= 5,162 cf

Plug-Flow detention time= 11.5 min calculated for 1.107 af (100% of inflow)
Center-of-Mass det. time= 9.0 min (775.2 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	467.40'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	467.90'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	469.90'	28 cf	**3.00'D x 2.00'H Vetical Cone/Cylinder - Risers** x 2
#4	467.40'	39 cf	**12.0" Round Pipe Storage** L= 50.0'
		5,188 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	467.40'	**15.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 467.40' / 466.90' S= 0.0100 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=8.35 cfs @ 12.29 hrs HW=470.02' (Free Discharge)
1=Culvert (Inlet Controls 8.35 cfs @ 6.80 fps)

Pond 103P: DETN. POND 3A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

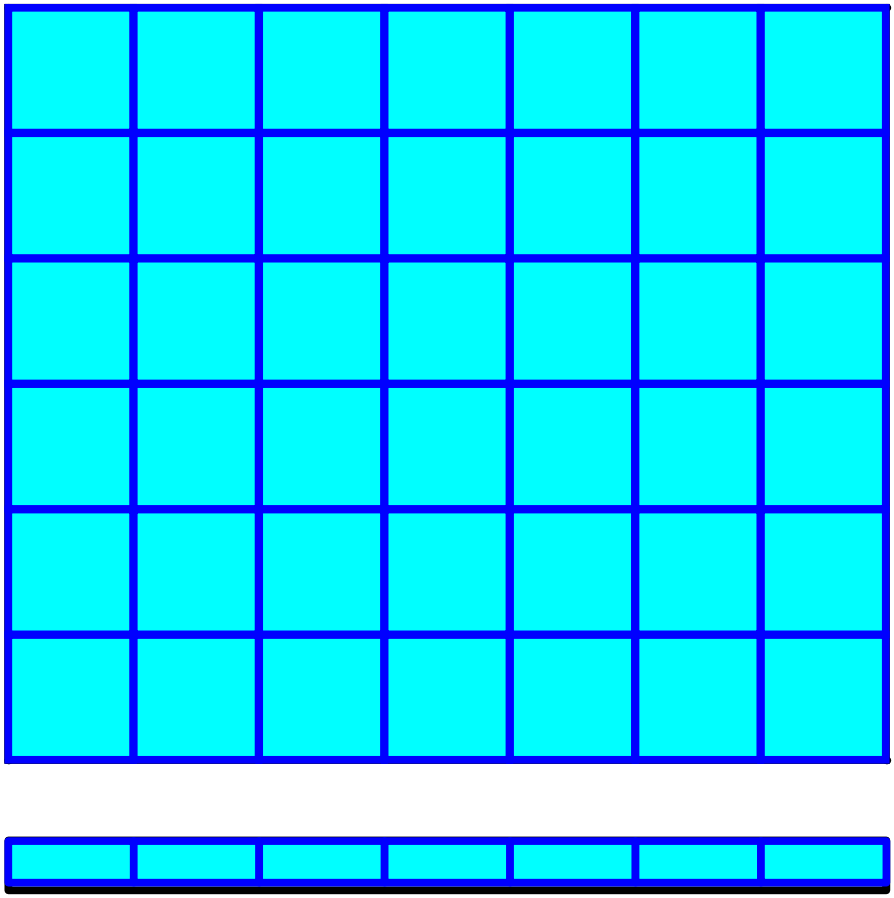
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

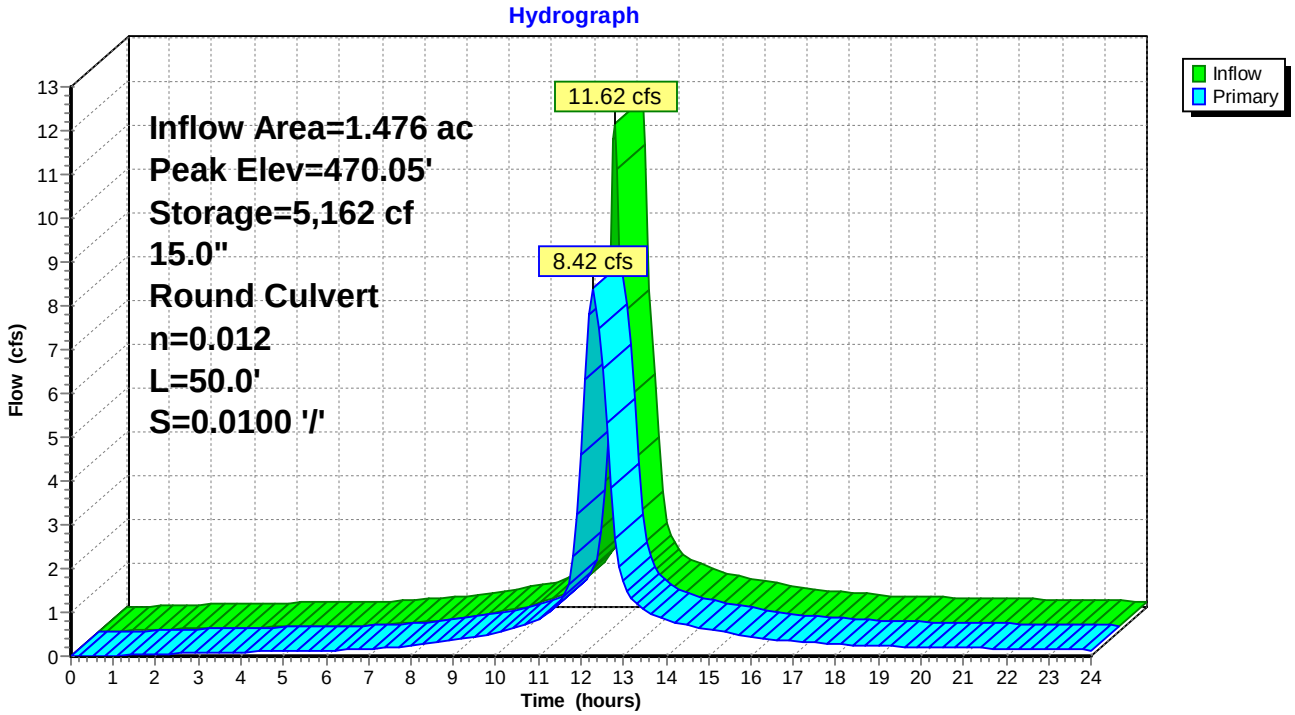
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 103P: DETN. POND 3A



Summary for Pond 104P: INFL. POND 4A

Inflow Area = 1.128 ac, 89.19% Impervious, Inflow Depth > 10.22" for 100-Year event
Inflow = 10.09 cfs @ 12.11 hrs, Volume= 0.961 af
Outflow = 11.05 cfs @ 12.19 hrs, Volume= 0.811 af, Atten= 0%, Lag= 4.8 min
Discarded = 0.10 cfs @ 3.30 hrs, Volume= 0.184 af
Primary = 10.95 cfs @ 12.19 hrs, Volume= 0.627 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.75' @ 12.19 hrs Surf.Area= 4,212 sf Storage= 11,501 cf

Plug-Flow detention time= 119.9 min calculated for 0.807 af (84% of inflow)
Center-of-Mass det. time= 54.3 min (799.0 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.00'	1,388 cf	**162.00'W x 26.00'L x 4.17'H Field A** 17,550 cf Overall - 14,080 cf Embedded = 3,470 cf x 40.0% Voids
#2A	462.50'	10,019 cf	**retain_it retain_it 3.0'** x 60 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 20 Rows adjusted for 217.2 cf perimeter wall
#3	465.50'	64 cf	**3.00'D x 3.00'H Riser** x 3 -Impervious
#4	464.00'	67 cf	**18.0" Round Pipe Storage** -Impervious L= 38.0' S= 0.0132 '/'
		11,538 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	462.00'	**1.020 in/hr Exfiltration over Horizontal area**
#2	Primary	464.00'	**18.0" Round Culvert** L= 38.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 464.00' / 464.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.10 cfs @ 3.30 hrs HW=462.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=10.55 cfs @ 12.19 hrs HW=466.66' (Free Discharge)
↑—**2=Culvert** (Barrel Controls 10.55 cfs @ 5.97 fps)

Pond 104P: INFL. POND 4A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
20 Rows adjusted for 217.2 cf perimeter wall

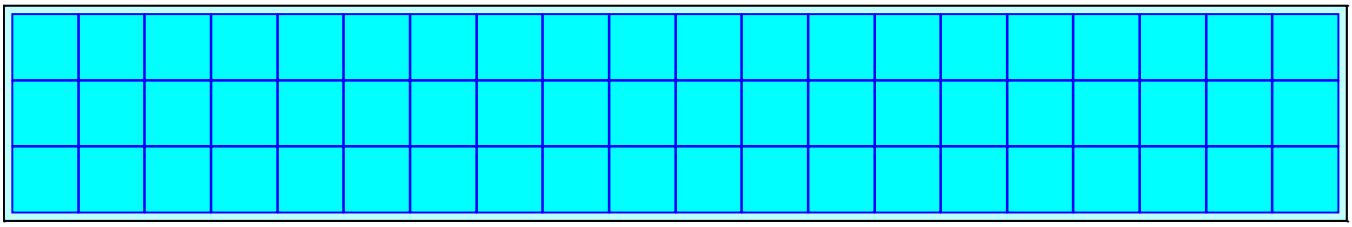
3 Chambers/Row x 8.00' Long = 24.00' Row Length +12.0" End Stone x 2 = 26.00' Base Length
20 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 162.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

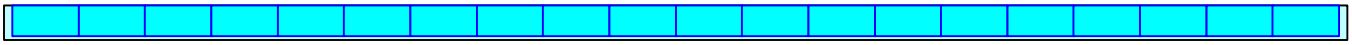
4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 20 x 2 = 217.2 cf Perimeter Wall
60 Chambers x 170.6 cf - 217.2 cf Perimeter wall = 10,019.5 cf Chamber Storage
60 Chambers x 234.7 cf = 14,080.0 cf Displacement

17,550.0 cf Field - 14,080.0 cf Chambers = 3,470.0 cf Stone x 40.0% Voids = 1,388.0 cf Stone Storage

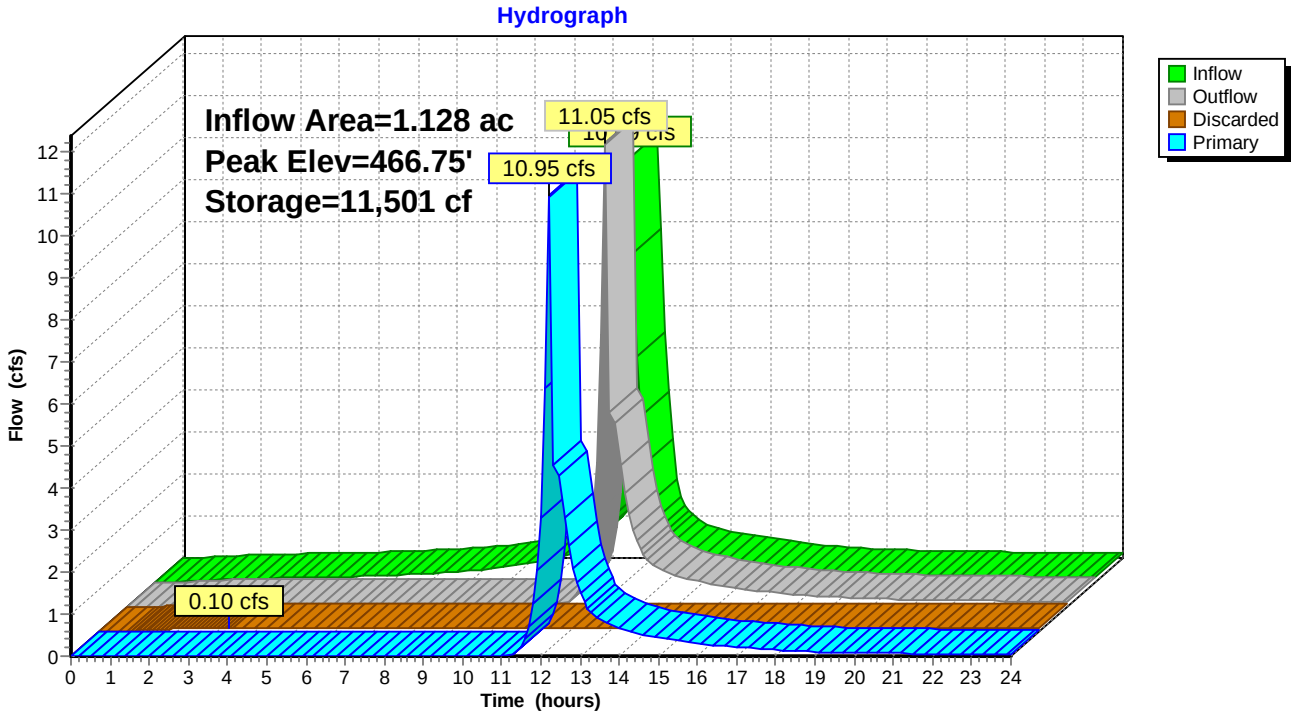
Chamber Storage + Stone Storage = 11,407.5 cf = 0.262 af
Overall Storage Efficiency = 65.0%
Overall System Size = 26.00' x 162.00' x 4.17'

60 Chambers
650.0 cy Field
128.5 cy Stone





Pond 104P: INFL. POND 4A



Summary for Pond 105P: DETN. POND 5A

Inflow Area = 1.074 ac, 83.75% Impervious, Inflow Depth > 10.05" for 100-Year event
Inflow = 9.39 cfs @ 12.12 hrs, Volume= 0.900 af
Outflow = 2.87 cfs @ 12.51 hrs, Volume= 0.899 af, Atten= 69%, Lag= 23.3 min
Discarded = 0.60 cfs @ 12.50 hrs, Volume= 0.772 af
Primary = 2.27 cfs @ 12.51 hrs, Volume= 0.128 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 464.36' @ 12.50 hrs Surf.Area= 3,132 sf Storage= 13,272 cf

Plug-Flow detention time= 131.2 min calculated for 0.899 af (100% of inflow)
Center-of-Mass det. time= 130.9 min (878.8 - 747.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	459.00'	1,165 cf	**34.00'W x 90.00'L x 6.17'H Field A** 18,870 cf Overall - 15,957 cf Embedded = 2,913 cf x 40.0% Voids
#2A	459.50'	12,505 cf	**retain_it retain_it 5.0'** x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	464.50'	28 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - Risers to surface** x 2 -Impervious
#4	463.50'	79 cf	**12.0" Round Pipe Storage** L= 100.0' S= 0.0100 '/'
		13,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	459.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	463.50'	**12.0" Round Culvert** L= 150.4' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 463.50' / 461.60' S= 0.0126 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Discarded OutFlow Max=0.60 cfs @ 12.50 hrs HW=464.36' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.60 cfs)

Primary OutFlow Max=2.26 cfs @ 12.51 hrs HW=464.36' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 2.26 cfs @ 3.15 fps)

Pond 105P: DETN. POND 5A - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
4 Rows adjusted for 311.7 cf perimeter wall

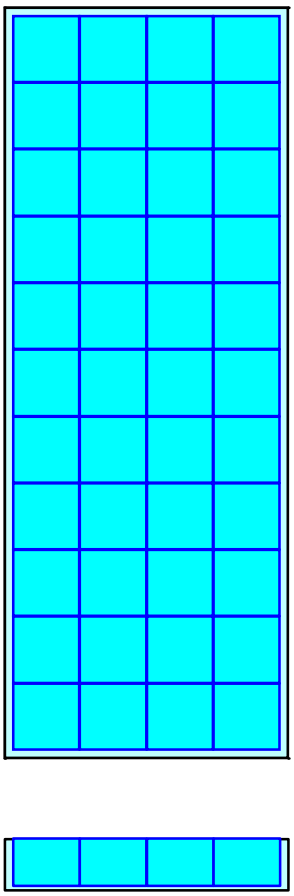
11 Chambers/Row x 8.00' Long = 88.00' Row Length +12.0" End Stone x 2 = 90.00' Base Length
4 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 34.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 11 x 2 + 10.4 cf Endwall x 4 x 2 = 311.7 cf Perimeter Wall
44 Chambers x 291.3 cf - 311.7 cf Perimeter wall = 12,504.6 cf Chamber Storage
44 Chambers x 362.7 cf = 15,957.3 cf Displacement

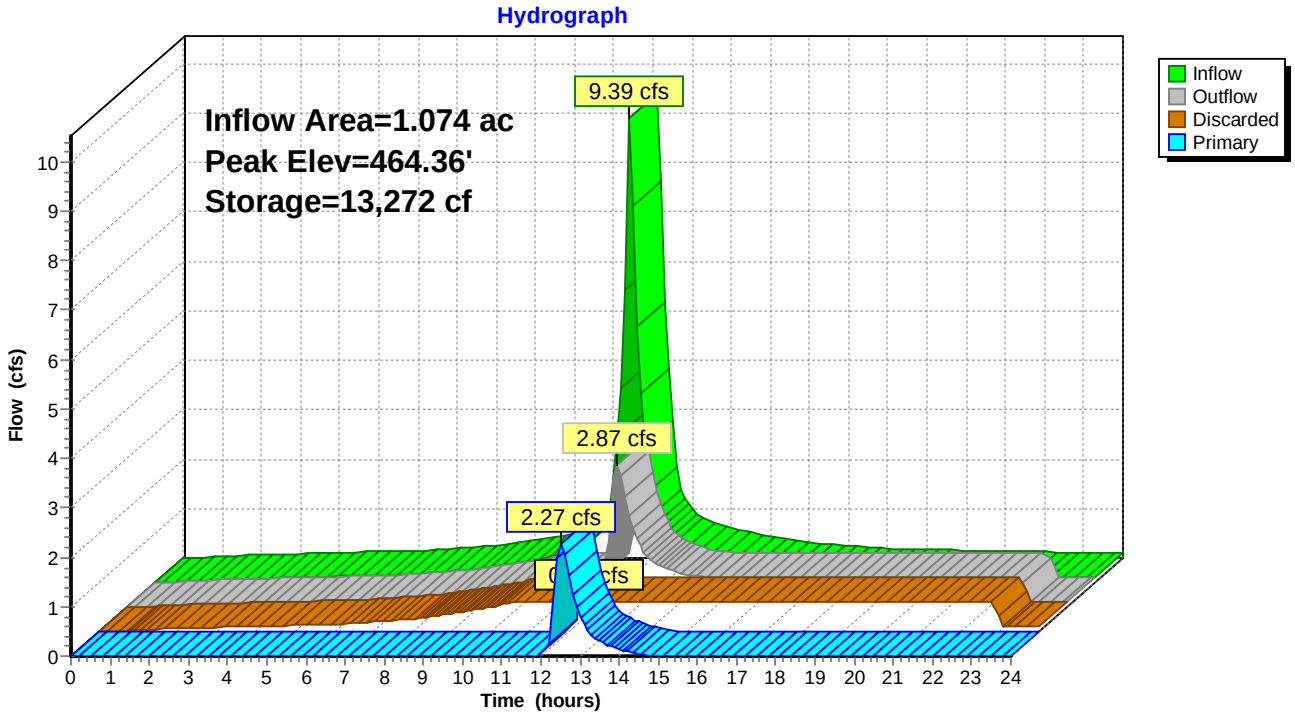
18,870.0 cf Field - 15,957.3 cf Chambers = 2,912.7 cf Stone x 40.0% Voids = 1,165.1 cf Stone Storage

Chamber Storage + Stone Storage = 13,669.7 cf = 0.314 af
Overall Storage Efficiency = 72.4%
Overall System Size = 90.00' x 34.00' x 6.17'

44 Chambers
698.9 cy Field
107.9 cy Stone



Pond 105P: DETN. POND 5A



Summary for Pond 111P: INFL. POND 1B

Inflow Area = 1.716 ac, 73.30% Impervious, Inflow Depth > 9.73" for 100-Year event
Inflow = 14.83 cfs @ 12.11 hrs, Volume= 1.392 af
Outflow = 3.54 cfs @ 12.55 hrs, Volume= 1.377 af, Atten= 76%, Lag= 26.3 min
Discarded = 0.25 cfs @ 6.60 hrs, Volume= 0.422 af
Primary = 3.29 cfs @ 12.55 hrs, Volume= 0.954 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 466.77' @ 12.55 hrs Surf.Area= 4,452 sf Storage= 19,819 cf

Plug-Flow detention time= 66.7 min calculated for 1.377 af (99% of inflow)
Center-of-Mass det. time= 59.7 min (812.9 - 753.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	461.40'	1,552 cf	**106.00'W x 42.00'L x 6.17'H Field A** 27,454 cf Overall - 23,573 cf Embedded = 3,881 cf x 40.0% Voids
#2A	461.90'	18,559 cf	**retain_it retain_it 5.0'** x 65 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 13 Rows adjusted for 374.0 cf perimeter wall
#3	466.50'	64 cf	**3.00'D x 4.50'H Riser** x 2 -Impervious
#4	454.65'	262 cf	**18.0" Round Pipe Storage** -Impervious L= 148.0' S= 0.0449 '/'
		20,437 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	461.90'	**8.0" Round Culvert** L= 148.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 461.90' / 454.65' S= 0.0490 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.35 sf
#2	Discarded	461.40'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.25 cfs @ 6.60 hrs HW=461.40' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=3.29 cfs @ 12.55 hrs HW=466.76' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.29 cfs @ 9.43 fps)

Pond 111P: INFL. POND 1B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 5.0' (retain-it®)
Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf
Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf
13 Rows adjusted for 374.0 cf perimeter wall

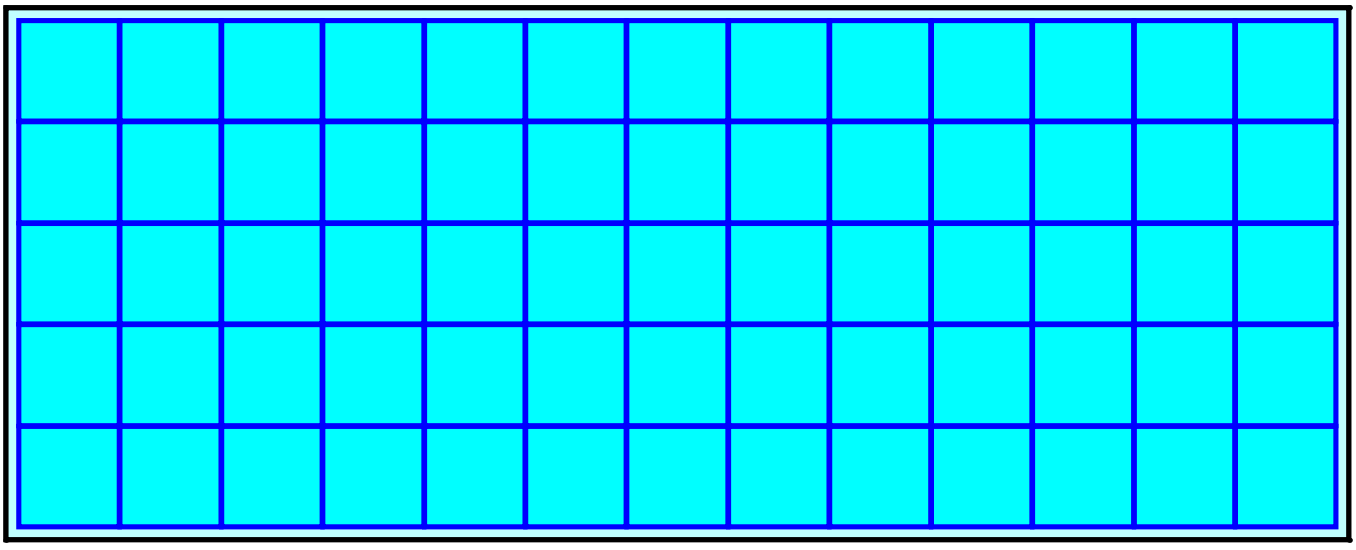
5 Chambers/Row x 8.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
13 Rows x 96.0" Wide + 12.0" Side Stone x 2 = 106.00' Base Width
6.0" Base + 68.0" Chamber Height = 6.17' Field Height

10.4 cf Sidewall x 5 x 2 + 10.4 cf Endwall x 13 x 2 = 374.0 cf Perimeter Wall
65 Chambers x 291.3 cf - 374.0 cf Perimeter wall = 18,559.2 cf Chamber Storage
65 Chambers x 362.7 cf = 23,573.3 cf Displacement

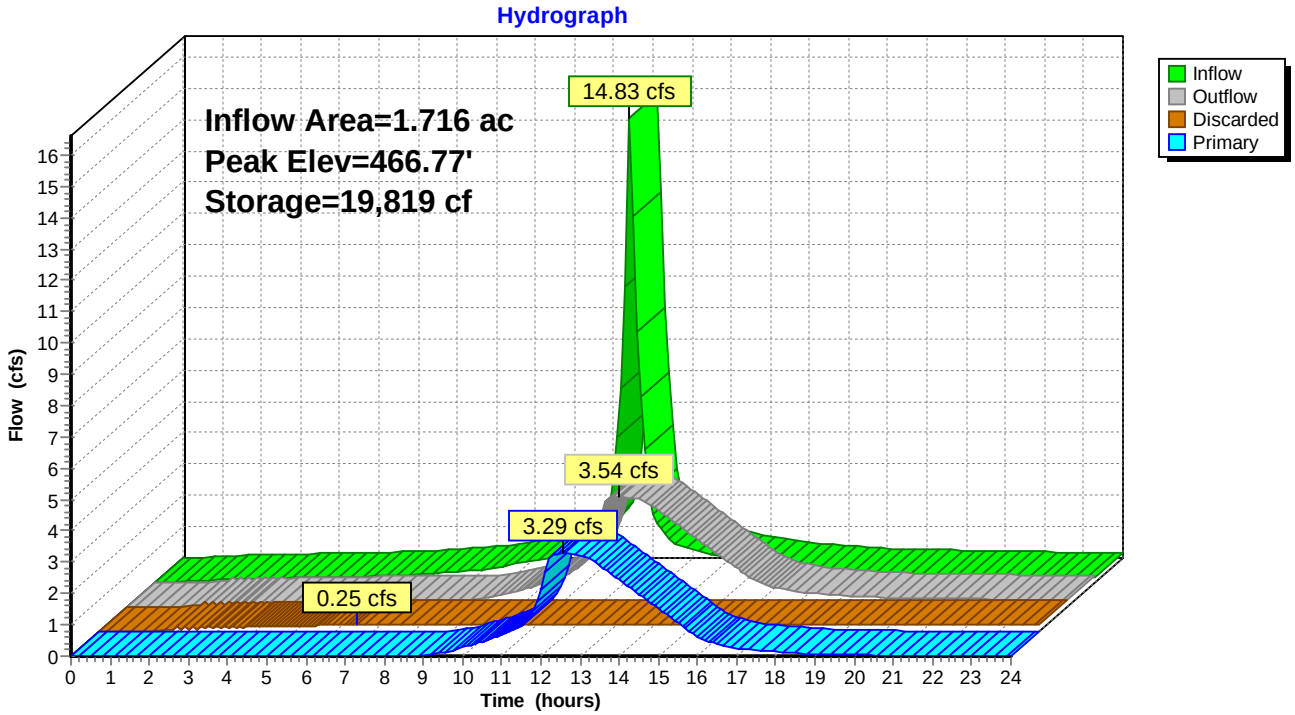
27,454.0 cf Field - 23,573.3 cf Chambers = 3,880.7 cf Stone x 40.0% Voids = 1,552.3 cf Stone Storage

Chamber Storage + Stone Storage = 20,111.4 cf = 0.462 af
Overall Storage Efficiency = 73.3%
Overall System Size = 42.00' x 106.00' x 6.17'

65 Chambers
1,016.8 cy Field
143.7 cy Stone



Pond 111P: INFL. POND 1B



Summary for Pond 113P: DETN. POND 3B

Inflow Area = 2.243 ac, 59.27% Impervious, Inflow Depth > 9.30" for 100-Year event
Inflow = 13.66 cfs @ 12.19 hrs, Volume= 1.739 af
Outflow = 13.11 cfs @ 12.30 hrs, Volume= 1.734 af, Atten= 4%, Lag= 6.5 min
Primary = 13.11 cfs @ 12.30 hrs, Volume= 1.734 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 469.05' @ 12.30 hrs Surf.Area= 2,695 sf Storage= 5,128 cf

Plug-Flow detention time= 8.6 min calculated for 1.734 af (100% of inflow)
Center-of-Mass det. time= 6.8 min (774.7 - 767.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	465.50'	538 cf	**56.00'W x 48.00'L x 3.17'H Field A** 8,512 cf Overall - 7,168 cf Embedded = 1,344 cf x 40.0% Voids
#2A	466.00'	4,583 cf	**retain_it retain_it 2.0'** x 42 Inside #1 Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf 7 Rows adjusted for 49.1 cf perimeter wall
#3	468.00'	14 cf	**3.00'D x 2.00'H Vertical Cone/Cylinder - risers**
		5,134 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	465.50'	**18.0" Round Culvert** L= 320.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 465.50' / 462.00' S= 0.0109 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=13.08 cfs @ 12.30 hrs HW=469.01' (Free Discharge)
1=Culvert (Barrel Controls 13.08 cfs @ 7.40 fps)

Pond 113P: DETN. POND 3B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 2.0' (retain-it®)
Inside= 84.0"W x 24.0"H => 13.78 sf x 8.00'L = 110.3 cf
Outside= 96.0"W x 32.0"H => 21.33 sf x 8.00'L = 170.7 cf
7 Rows adjusted for 49.1 cf perimeter wall

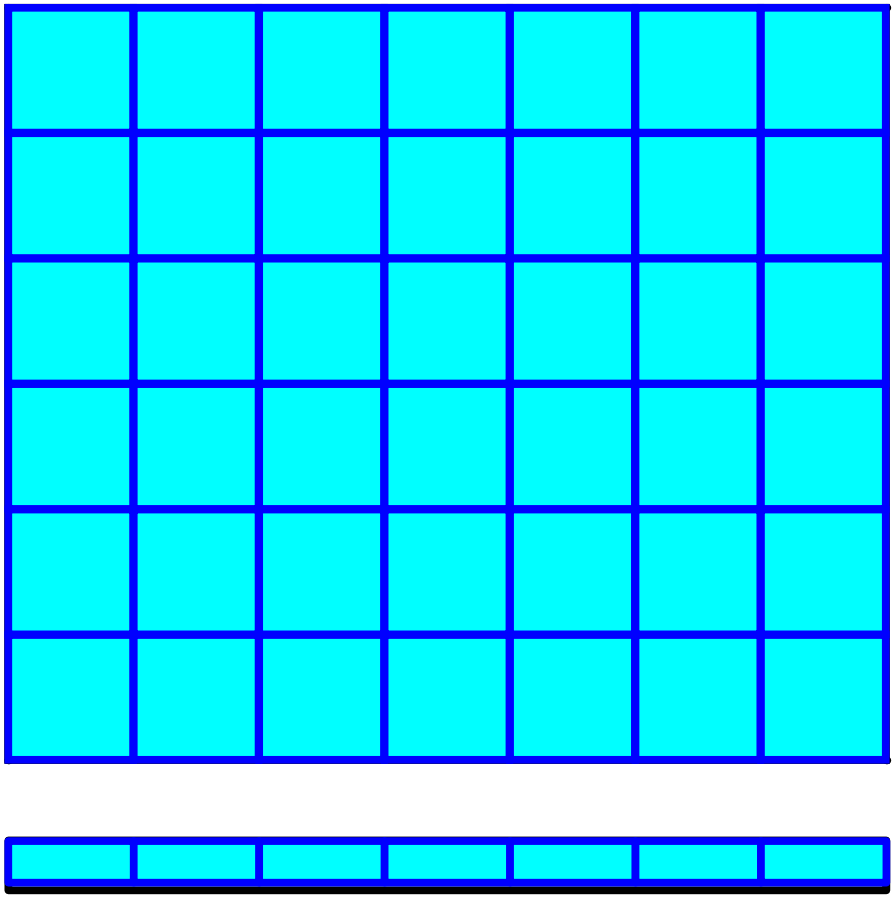
6 Chambers/Row x 8.00' Long = 48.00' Row Length
7 Rows x 96.0" Wide = 56.00' Base Width
6.0" Base + 32.0" Chamber Height = 3.17' Field Height

1.9 cf Sidewall x 6 x 2 + 1.9 cf Endwall x 7 x 2 = 49.1 cf Perimeter Wall
42 Chambers x 110.3 cf - 49.1 cf Perimeter wall = 4,582.6 cf Chamber Storage
42 Chambers x 170.7 cf = 7,168.0 cf Displacement

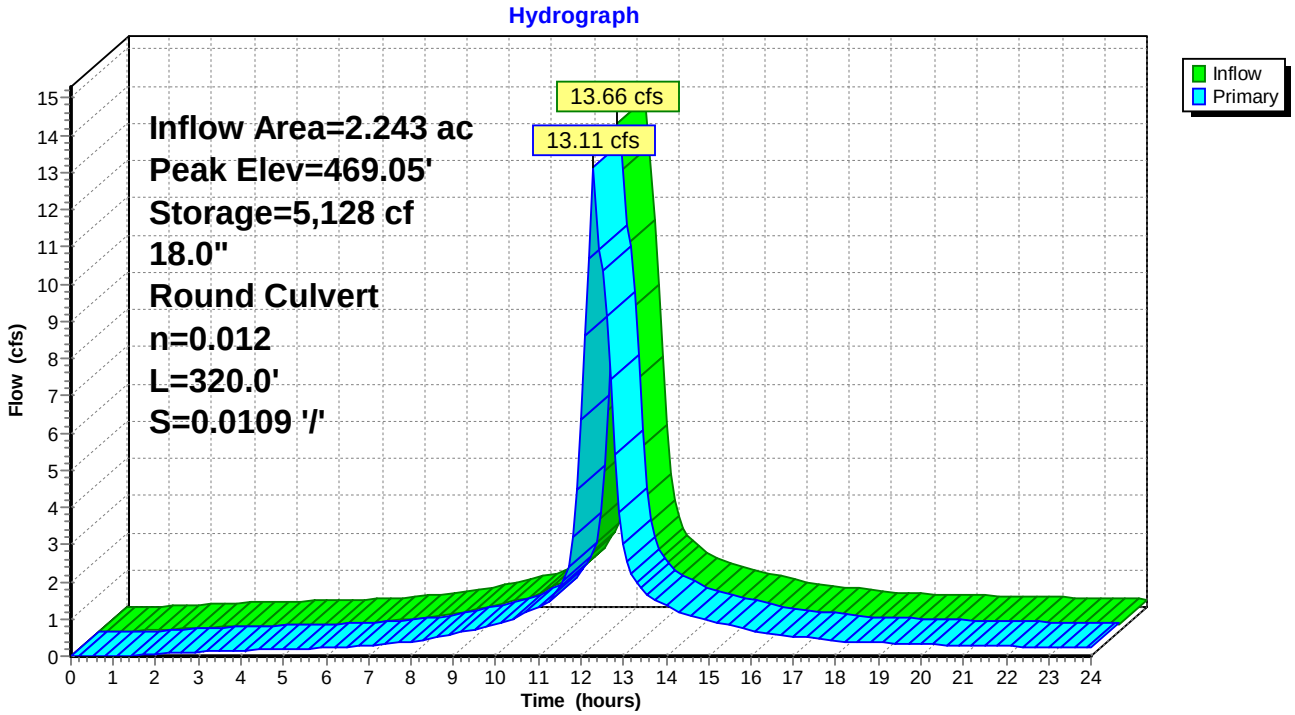
8,512.0 cf Field - 7,168.0 cf Chambers = 1,344.0 cf Stone x 40.0% Voids = 537.6 cf Stone Storage

Chamber Storage + Stone Storage = 5,120.2 cf = 0.118 af
Overall Storage Efficiency = 60.2%
Overall System Size = 48.00' x 56.00' x 3.17'

42 Chambers
315.3 cy Field
49.8 cy Stone



Pond 113P: DETN. POND 3B



Summary for Pond 114P: DETN. POND 4B

Inflow Area = 0.656 ac, 81.20% Impervious, Inflow Depth > 9.97" for 100-Year event
Inflow = 5.74 cfs @ 12.11 hrs, Volume= 0.545 af
Outflow = 3.83 cfs @ 12.25 hrs, Volume= 0.543 af, Atten= 33%, Lag= 8.4 min
Primary = 3.83 cfs @ 12.25 hrs, Volume= 0.543 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 464.33' @ 12.26 hrs Surf.Area= 2,346 sf Storage= 2,584 cf

Plug-Flow detention time= 13.5 min calculated for 0.541 af (99% of inflow)
Center-of-Mass det. time= 10.5 min (759.5 - 749.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	462.80'	461 cf	**96.00'W x 24.00'L x 4.17'H Field A** 9,600 cf Overall - 8,448 cf Embedded = 1,152 cf x 40.0% Voids
#2A	463.30'	6,000 cf	**retain_it retain_it 3.0'** x 36 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 12 Rows adjusted for 141.6 cf perimeter wall
#3	465.80'	42 cf	**3.00'D x 3.00'H Riser** x 2
#4	462.80'	78 cf	**18.0" Round Pipe Storage** L= 44.0' S= 0.0114 '/'
		6,581 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	462.80'	**12.0" Round Culvert** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 462.80' / 462.30' S= 0.0114 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.79 cfs @ 12.25 hrs HW=464.31' (Free Discharge)
1=Culvert (Inlet Controls 3.79 cfs @ 4.83 fps)

Pond 114P: DETN. POND 4B - Chamber Wizard Field A

Chamber Model = retain_it retain_it 3.0' (retain-it®)
Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
12 Rows adjusted for 141.6 cf perimeter wall

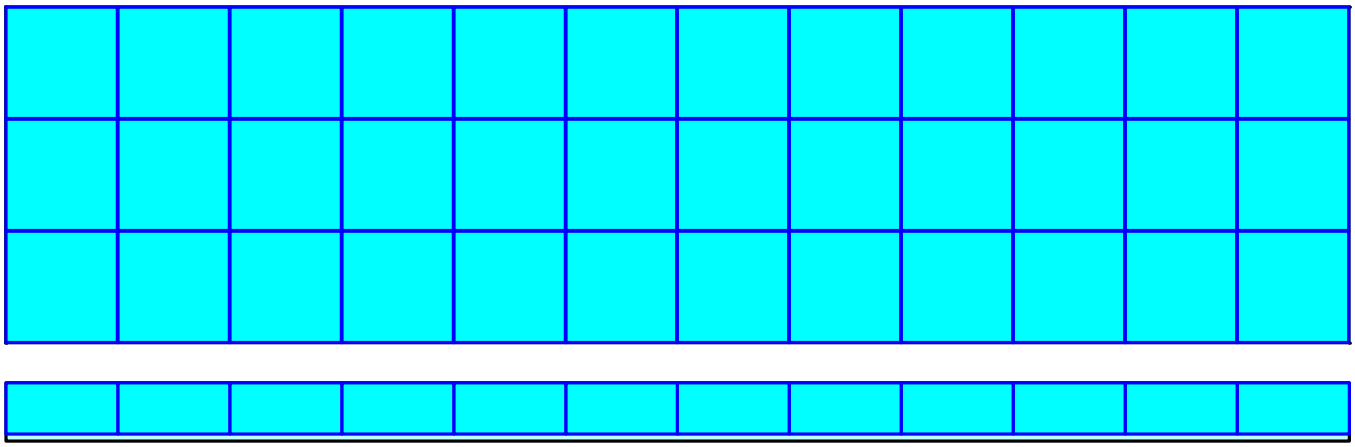
3 Chambers/Row x 8.00' Long = 24.00' Row Length
12 Rows x 96.0" Wide = 96.00' Base Width
6.0" Base + 44.0" Chamber Height = 4.17' Field Height

4.7 cf Sidewall x 3 x 2 + 4.7 cf Endwall x 12 x 2 = 141.6 cf Perimeter Wall
36 Chambers x 170.6 cf - 141.6 cf Perimeter wall = 6,000.4 cf Chamber Storage
36 Chambers x 234.7 cf = 8,448.0 cf Displacement

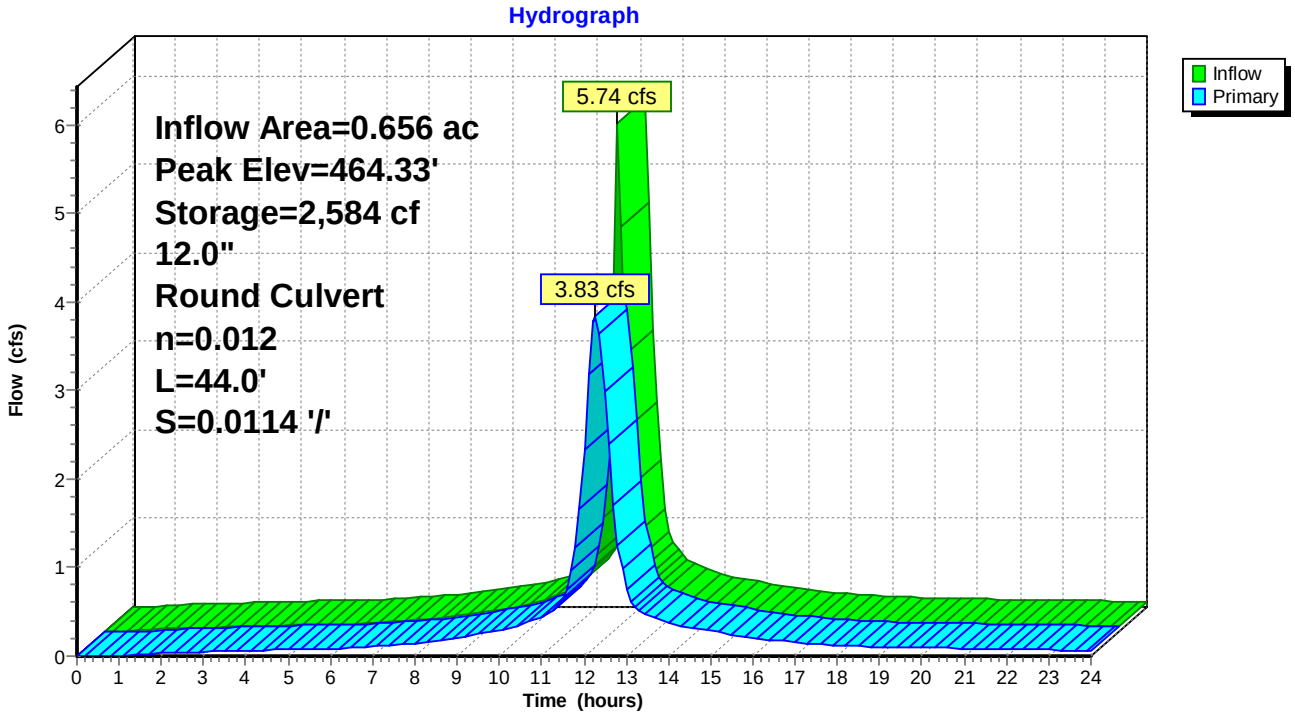
9,600.0 cf Field - 8,448.0 cf Chambers = 1,152.0 cf Stone x 40.0% Voids = 460.8 cf Stone Storage

Chamber Storage + Stone Storage = 6,461.2 cf = 0.148 af
Overall Storage Efficiency = 67.3%
Overall System Size = 24.00' x 96.00' x 4.17'

36 Chambers
355.6 cy Field
42.7 cy Stone



Pond 114P: DETN. POND 4B



Summary for Pond 210P: Northwest Wetland

Inflow Area = 1.104 ac, 0.00% Impervious, Inflow Depth > 7.33" for 100-Year event
Inflow = 6.25 cfs @ 12.28 hrs, Volume= 0.675 af
Outflow = 6.27 cfs @ 12.29 hrs, Volume= 0.675 af, Atten= 0%, Lag= 0.3 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 6.27 cfs @ 12.29 hrs, Volume= 0.675 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Peak Elev= 465.67' @ 12.29 hrs Surf.Area= 242 sf Storage= 61 cf

Plug-Flow detention time= 0.1 min calculated for 0.672 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (817.5 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1	465.00'	4,977 cf	**Wetland East (Irregular)** Listed below (Recalc)
#2	467.50'	9,112 cf	**Wetland Common (Irregular)** Listed below (Recalc)
#3	468.00'	6,846 cf	**Wetland West (Irregular)** Listed below (Recalc)
		20,936 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
465.00	3	6.3	0	0	3
466.00	498	90.0	180	180	646
468.00	1,183	240.8	1,632	1,812	4,630
468.50	3,792	370.9	1,182	2,994	10,964
469.00	4,141	345.9	1,983	4,977	12,402

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
467.50	0	0.0	0	0	0
468.00	3,441	263.4	574	574	5,521
469.00	14,993	575.4	8,539	9,112	26,352

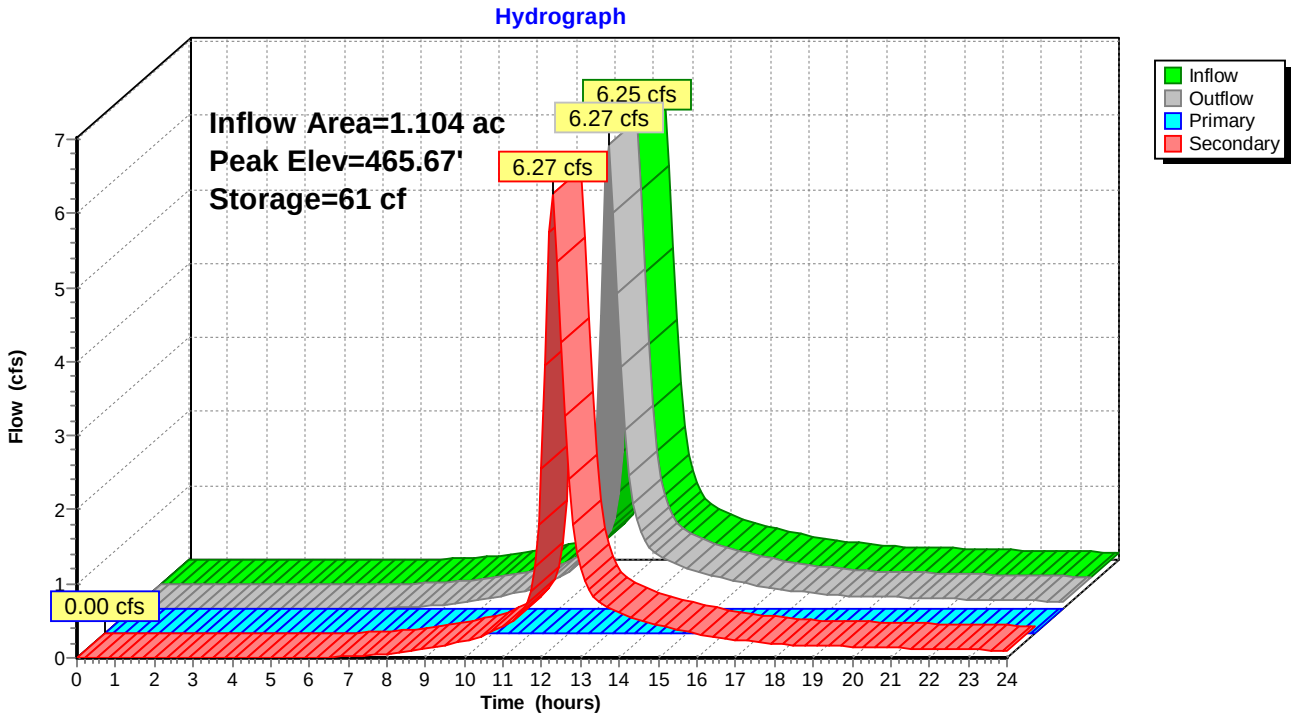
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
468.00	0	0.0	0	0	0
469.00	3,732	297.4	1,244	1,244	7,040
470.00	7,711	475.5	5,602	6,846	18,001

Device	Routing	Invert	Outlet Devices
#1	Primary	466.20'	**260.0' long x 20.0' breadth Discharge to West to Existing channel - model as b/c w** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	465.08'	**5.0' long x 1.0' breadth Flow to New Channel - model as b/c weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=465.00' (Free Discharge)
└**1=Discharge to West to Existing channel - model as b/c weir** (Controls 0.00 cfs)

Secondary OutFlow Max=6.18 cfs @ 12.29 hrs HW=465.67' (Free Discharge)
└**2=Flow to New Channel - model as b/c weir** (Weir Controls 6.18 cfs @ 2.11 fps)

Pond 210P: Northwest Wetland

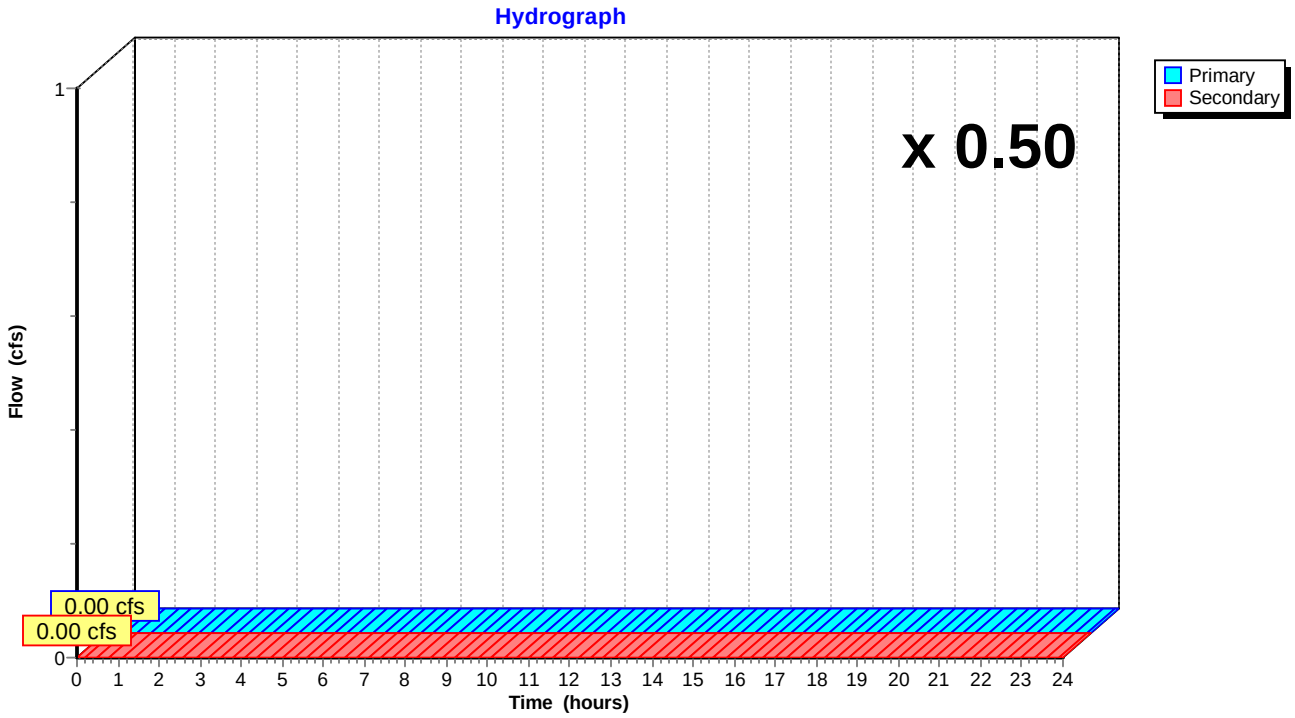


Summary for Link 9L: Diverging Flow

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Link 9L: Diverging Flow



Alex S Wood

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P O Box 570, Boylston MA 01505
info@tlainc.net (508) 869-6151

DATE:	DWG NO.
OCTOBER 21, 2024	GRAFTONWOODSDEFINITIVE

REVISIONS

DATE:	DESCRIPTION

SCALE: 1 INCH = 60 FEET

FEET 0 30 60 120 180

METERS 0 10 20 40 60

Grafton Woods
LUXURY LIVING

4 BRANDT LANE
WORCESTER, MASSACHUSETTS

OWNED BY:
BRANDT LANE DEVELOPMENT, LLC
38 BRENTWOOD DRIVE
HOLDEN, MASSACHUSETTS 01520

PRE–DEVELOPMENT DRAINAGE AREA PLAN
SHEET 1 OF 2 SHEETS

COMMONWEALTH OF MASSACHUSETTS
PATRICK J. HEALY
CIVIL
No. 30804
REGISTERED PROFESSIONAL ENGINEER

Alex J Wood

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Erosion Control Specialists
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SCALE: 1 INCH = 60 FEET

FEET: 0 30 60 120 180

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Grafton Woods
LUXURY LIVING

4 BRANDT LANE
WORCESTER, MASSACHUSETTS

OWNED BY:
BRANDT LANE DEVELOPMENT, LLC
38 BRENTWOOD DRIVE
HOLDEN, MASSACHUSETTS 01520

POST-DEVELOPMENT DRAINAGE AREA PLAN
SHEET 2 OF 2 SHEETS