

# ***STORMWATER REPORT***

Atkins Road Cluster Subdivision  
SANDWICH, MASSACHUSETTS

FEBRUARY 5, 2014  
REVISED: DECEMBER 2, 2014

## **Applicant/Developer:**

Monomoy Properties, LLC  
79 Cove Road  
South Dennis, MA 02660

## **Owner:**

Monomoy Properties, LLC  
79 Cove Road  
South Dennis, MA 02660

**BSC Job Number: 4-9675.00**

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Prepared by:



349 Route 28, Unit D  
West Yarmouth, MA 02673

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## **SECTION 1.0**

### **PROJECT NARRATIVE**

## **1.1 PROJECT DESCRIPTION**

The project is located at the terminus of Atkins Road in Sandwich, Massachusetts. The property is bordered by the Mid-Cape Highway (Route 6) to the southwest, residential properties to the north and west, Fox Meadow Condominiums to the northeast and undeveloped land, owned by the Town of Sandwich, to the south and east. The site is undeveloped, with the exception of two isolated areas, where sand and gravel mining operations occurred at one point in time.

The proposed project entails the development of a 23-lot clustered subdivision. The development will be serviced by paved roads, underground utilities, municipal water, stormwater best management practices (BMPs), and individual septic systems with nitrogen reduction.

## **1.2 PRE-DEVELOPMENT DRAINAGE CONDITIONS**

The project site is an undeveloped forested parcel of land in Sandwich, Massachusetts. The topography consists of undulating terrain with multiple peaks and valleys. The NRCS Web Soil Survey has identified three primary soil classifications underlying the project site. The Soil Map Units classified as 485C and 483D together account for approximately 90% of the project site. These soils belong to the Barnstable-Plymouth and Plymouth-Barnstable complexes, are typically located on the slopes and ridges of glacial moraines, and are excessively drained. The remaining 10% of the soils underlying the project site have been classified NRCS as belonging to Soil Map Unit 600 - Pits, sand and gravel. BSC conducted onsite soil testing in October 2012, which was witnessed by the Town of Sandwich. The results of the soil testing confirm the NRCS soil classifications for this property, and as such, have been modeled as Hydrologic Soil Group A.

Due to the nature of the existing soils, there is very little stormwater runoff to abutting properties from the subject site. BSC has modeled seven (7) subcatchments in the pre-development scenario. Of these subcatchments, four (4) of them do not generate offsite stormwater flow. Stormwater runoff in these areas is conveyed via overland flow to existing natural depressions, where it infiltrates the ground.

Stormwater runoff from Subcatchments 1S, 2S and 4S flows offsite to abutting properties. However, given nature of these soils, there is very little runoff even resulting from a 100-year storm.

## **1.3 POST-DEVELOPMENT DRAINAGE CONDITIONS**

The proposed BMPs for this project have been designed in accordance with the DEP Stormwater Management Guidelines and the Town of Sandwich Zoning Bylaws.

Stormwater runoff from the northerly portion of Road A (Sta. 0+00 to the intersection of Road B) will drain along the sidelines of the roadway towards the start of the new road. It will be collected via catch basins and conveyed to a Stormceptor® water quality unit for removal of Total Suspended Solids (TSS). Effluent from this structure will be conveyed a subsurface groundwater recharge facility consisting of 32 Stormtech SC-740 leaching chambers contained within a field of washed crushed stone. The land on the west side of this section of Road A rises in elevation to a

height that is approximately 40-50 feet above the proposed roadway. Modeled as Subcatchment 13S, this area will contain portions of proposed Lots 1 & 2. A curve number associated with 12% impervious area was assumed for this portion of the subcatchment. The remaining portions of 13S were modeled as either lawn or woods, based on the extent of the proposed grading activities along the sideline of the roadway. The proposed subsurface recharge facility is modeled in HydroCAD as Pond 3P.

Stormwater runoff from the remainder of Road A and the entirety of Road B will be collected, conveyed and treated in a similar fashion, and discharged to an infiltration basin. The infiltration basin is a large existing depression located in the west-central region of the property. The depression and surrounding area will remain in its naturally existing state. Stormwater runoff collected on the roadway will be conveyed to the infiltration basin through an 18-inch RCP drain that will terminate in a flared-end section with a stone-lined apron. This facility is modeled in HydroCAD as Pond 1P. It has been designed to accommodate stormwater flows from the areas designated in the HydroCAD model as Subcatchments 3S, 7S, 8S, 9S, 10S & 12S.

Subcatchments 3S, 9S and 7S represent, in large part, the majority of the building lots of the proposed development. Both 3S and 9S will be graded to drain towards the roadway (Road A), while the majority of the building lots in Subcatchment 7S will drain towards Road B. A culvert located south and west of the intersecting streets will capture stormwater runoff from the rear yards of Lots 8-12 and convey this flow into the stormdrain network tributary to the infiltration basin (1P).

Outside the footprint of the developed area, stormwater runoff will travel via overland flow as it does in the pre-development condition. Runoff from Subcatchment 4S will be intercepted before it reaches Road A. A stone-lined infiltration trench located off the eastern sideline of the roadway will capture and infiltrate stormwater runoff originating on the adjacent property as well as remaining undeveloped portions of the locus. This facility is designated as Pond 2P in the post-development HydroCAD model.

All stormwater runoff from impervious surfaces will be treated prior to discharge in accordance with the Massachusetts DEP Stormwater Management Standards, which require 80% removal of Total Suspended Solids (TSS) prior to exfiltration. The BMP treatment train will include deep sump and hooded catchbasins, proprietary stormwater treatment units and infiltration facilities.

#### Water Runoff Rates

The proposed drainage systems provide adequate detention to maintain or reduce peak flows from the site during the 2, 10, 25 and 100-year storms as follows:

**Peak Flow Rates Summary**

**Node 1R**

	Existing Flows (cfs)	Proposed Flows (cfs)	Peak Runoff Decrease (cfs)
2-year Peak Runoff	0	0	0
10-year Peak Runoff	0	0	0
25-year Peak Runoff	0.04	0.04	0
100-year Peak Runoff	0.25	0.25	0

**Node 2R**

	Existing Flows (cfs)	Proposed Flows (cfs)	Peak Runoff Decrease (cfs)
2-year Peak Runoff	0	0	0
10-year Peak Runoff	0	0	0
25-year Peak Runoff	0.03	0.03	0
100-year Peak Runoff	0.18	0.18	0

**Node 3R**

	Existing Flows (cfs)	Proposed Flows (cfs)	Peak Runoff Decrease (cfs)
2-year Peak Runoff	0	0	0
10-year Peak Runoff	0	0	0
25-year Peak Runoff	0.03	0.02	0.01
100-year Peak Runoff	0.18	0.14	0.04

### Water Quality

The proposed drainage systems have been designed to exceed the recommended 80% TSS removal goal with the implementation of the following:

- Deep Sump (4-foot) and Hooded Catch Basins
- Proprietary Water Quality Treatment Units
- Infiltration Systems

### Groundwater Recharge

The proposed project has been designed to utilize an existing natural depression for the attenuation and recharge of stormwater runoff from the project site. In addition, the project also includes a man-made infiltration trench and a subsurface infiltration system consisting of StormTech SC-740 leaching chambers. The groundwater recharge facilities, as proposed, comply with the requirements of both the DEP Stormwater Management Standards and the Town of Sandwich.

### Conclusions

The project has been designed in accordance with DEP Stormwater Management Standards and the Town of Sandwich Subdivision Rules & Regulations. Through the construction of the aforementioned stormwater systems, the project will provide peak rate attenuation, TSS removal and groundwater recharge. These systems have been designed to accommodate a 100-year storm, thereby exceeding the requirements of both DEP and the Town of Sandwich.

**SECTION 2.0**

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION  
CHECKLIST FOR STORMWATER REPORT**



# 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.<sup>1</sup> 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<sup>2</sup>
- 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.

<sup>1</sup> 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.

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



# Checklist for Stormwater Report

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## 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.

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### 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

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Signature and Date

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## 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

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## Checklist (continued)

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

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

### Standard 1: No New Untreated Discharges

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



# Checklist for Stormwater Report

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## 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<sup>1</sup>
- 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.

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



# Checklist for Stormwater Report

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## 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

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## 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

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## 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

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## 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.

## **SECTION 3.0**

# **LONG-TERM POLLUTION PREVENTION PLAN & OPERATION AND MAINTENANCE PLAN**

### **3.0 LONG-TERM POLLUTION PREVENTION & OPERATION AND MAINTENANCE PLAN**

As required by Standard 4 of the Massachusetts Stormwater Handbook, this Long-Term Pollution Prevention Plan has been developed for source control and pollution prevention at the site after construction.

#### **MAINTENANCE RESPONSIBILITY**

The enforcement of the Long-Term Operation and Maintenance Plan will be the responsibility of the owner of the property, Monomoy Properties LLC.

#### **GOOD HOUSEKEEPING PRACTICES**

The site is to be kept clean of trash and debris at all times. Trash, junk, etc. is not to be left outside and will be subject to removal at the owner's expense.

#### **REQUIREMENTS FOR ROUTINE INSPECTIONS AND MAINTENANCE OF STORMWATER BEST MANAGEMENT PRACTICES**

All stormwater Best Management Practices (BMPs) are to be inspected and maintained as follows:

##### ***Stormceptor Water Quality Treatment Units***

The water quality treatment structures require periodic inspection and cleaning to maintain operation and function. Owners should have these units inspected on a semi-annual basis and after periods of intense precipitation. Inspections can be done by using a clear Plexiglas tube ("sludge judge") to extract a water column sample. When sediment accumulation reaches 15% of storage capacity, cleaning of the unit is required.

These water quality structures must and will be checked and cleaned immediately after petroleum spills; contact appropriate regulatory agencies.

Maintenance of these units should be done by a vacuum truck that will remove the water, sediment, debris, floating hydrocarbons and other materials in unit. Proper cleaning and disposal of the removed materials and liquid must be followed.

##### ***Deep Sump & Hooded Catch Basins***

Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Inspect or clean deep sump basins at least four times per year and at the end of the foliage and snow removal seasons. Sediment must also be removed four (4) times per year or whenever the depth of the deposits in the catch basin sump is greater than or equal to one (1) foot from the bottom of the basin.

### ***Infiltration Systems***

Maintenance is required for the proper operation of the underground infiltration and detention systems. This includes both the leaching pit clusters and the infiltration basins. Infiltration systems are prone to failure due to clogging if the upstream water quality units are not maintained. The use of pretreatment BMPs will minimize failure and maintenance requirements.

After construction, the infiltration systems should be inspected after every major storm for the first few months to ensure proper stabilization and function. Water levels in the access ports should be recorded over several days to check the drainage of the systems. It is recommended that a log book be maintained showing the depth of water in the detention/infiltration systems at each observation in order to determine the rate at which the system dewateres after runoff producing storm events. Once the performance characteristics of the infiltration systems have been verified, the monitoring schedule can be reduced to an annual basis, unless the performance data suggests that a more frequent schedule is required.

Preventive maintenance on the infiltration systems should be performed at least twice a year, and sediment should be removed from any and all pretreatment and collection structures. Sediment should be removed when deposits approach within six inches of the invert heights of connecting pipes between unit rows, or in sumped inlet structures. Removal of sediment should be performed by a vacuum truck.

### **SNOW DISPOSAL AND PLOWING**

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance that are acceptable to the Department of Environmental Protection, Bureau of Resource Protection.

For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious upland areas away from paved areas for smaller storms. There are adequate snow storage areas located within parking lot islands and edges of paved areas away from the wetland resource areas for small, more frequent snowfall events. For larger snowfall events or for additional snow storage space, snowfall will be required to be hauled offsite to a snow stockpile area meeting DEP requirements.

The key to selecting effective snow disposal sites is to locate them adjacent to or on pervious surfaces in upland areas away from water resources. At these locations, the snow melt water can filter in to the soil, leaving behind sand and debris, which can be removed in the springtime. The following areas should be avoided:

- Avoid dumping of snow into any water body, including rivers, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.

- Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

### **WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS**

The use of sodium chloride salts, fertilizers or pesticides is prohibited on this site.

### **STREET SWEEPING SCHEDULES**

Effective sweeping requires access to the areas to be swept. It is essential that applicants or those responsible for stormwater maintenance have the ability to impose parking regulations to facilitate proper sweeping, particularly in densely populated or heavily traveled areas, so that sweepers can get as close to curbs as possible. Tenants are to be notified prior to street sweeping operations so that paved areas can be clear of vehicles and any other items.

There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter. Each has a different ability to remove TSS.

- 1) **Mechanical**: Mechanical sweepers use brooms or rotary brushes to scour the pavement. Although most of the sweepers currently in use in Massachusetts are mechanical sweepers, they are not effective at removing TSS (from 0% to 20% removal). Mechanical sweepers are especially ineffective at picking up fine particles (“fines”) (less than 100 microns).
- 2) **Regenerative Air**: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed. Regenerative air sweepers may blow fines off the vacuumed portion of the roadway or parking lot, where they contaminate stormwater when it rains.
- 3) **Vacuum filter**: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression. Research indicates vacuum sweepers are highly effective in removing TSS.

Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem. The following table summarizes the frequency of the site street sweeping based on the type of sweeper used.

### **Reuse and Disposal of Street Sweepings**

Once removed from paved surfaces, the sweepings must be handled and disposed of properly. Mass DEP’s Bureau of Waste Prevention has issued a written policy regarding the reuse and disposal of street sweepings. These sweepings are regulated as a solid waste, and can be used in three ways:

- In one of the ways already approved by MassDEP (e.g., daily cover in a landfill, additive to compost, fill in a public way);

- If approved under a Beneficial Use Determination;
- Disposed in a landfill.

**TRAINING OF STAFF OR PERSONNEL INVOLVED WITH IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN**

The Long-Term Pollution Prevention Plan is to be implemented by property owner of the site. Trained and, if required, licensed Professionals are to be hired by the owner as applicable to implement the Long-Term Pollution Prevention Plan.

**LIST OF EMERGENCY CONTACTS FOR IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN**

The Owner will be required to maintain an updated list of Emergency Contacts for the site.

## POST CONSTRUCTION PHASE INSPECTION SCHEDULE AND EVALUATION CHECKLIST

BMP	Inspection Schedule	Inspection/Maintenance Performed		Method	Notes / Remarks
		Date:	By:		
Deep Sump & Hooded Catch Basins	March			<ul style="list-style-type: none"> <li>Visually inspect quarterly.</li> <li>Clean when sediment exceeds 50% of the depth using clam shell or vacuum truck (preferred).</li> </ul>	
	June				
	September				
	December				
VortSentry HS Water Quality Units	March			<ul style="list-style-type: none"> <li>Inspect quarterly during initial year following installation.</li> <li>Reduce to semi-annual inspections after first year.</li> <li>Remove sediment by hand or vacuum truck (preferred).</li> </ul>	
	June				
	September				
	December				
StormTech SC-740 Chambers	March			<ul style="list-style-type: none"> <li>Monitor water level in the access ports for the first three (3) months after construction.</li> <li>Inspect inlets semi-annually.</li> <li>Remove debris that may clog the system.</li> </ul>	
	September				
Infiltration Basin	March			<ul style="list-style-type: none"> <li>Inspect after major storm during first 3 months of operation &amp; twice a year after.</li> <li>Mow the buffer area, side slopes &amp; basin floor, remove trash &amp; debris, grass clippings &amp; accumulated organic matter.</li> </ul>	
	September				

1. Refer to the Massachusetts Stormwater Handbook Volume Two: Stormwater Technical Handbook (2008) for recommendations regarding frequency for inspections and maintenance of specific BMP's.
2. Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.
3. The use of sodium chloride salts, fertilizers or pesticides is prohibited on this site.

Other Notes: (Include deviations from Conservation Commission Orders of Conditions, Planning Board Approvals and Approved Plans)

## **SECTION 4.0**

### **CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN (STORM WATER POLLUTION PREVENTION PLAN - SWPPP)**

#### **4.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN**

##### **(STORM WATER POLLUTION PREVENTION PLAN - SWPPP)**

This Section specifies requirements and suggestions for implementation of a Storm Water Pollution Prevention Plan (SWPPP) for the development of the **Atkins Road Cluster Subdivision** off Atkins Road in East Sandwich, Massachusetts. The SWPPP shall be provided and maintained on-site by the Contractor(s) during all construction activities. The SWPPP shall be updated as required to reflect changes to construction activity.

The storm water pollution prevention measures contained in the SWPPP shall be at least the minimum required by Local Regulations. The Contractor shall provide additional measures to prevent pollution from stormwater discharges in compliance with the National Pollution Discharge Elimination System (NPDES) Phase II permit requirements and all other local, state and federal requirements.

The SWPPP shall include provisions for, but not be limited to, the following:

1. Construction Trailers
2. Lay-down Areas
3. Equipment Storage Areas
4. Stockpile Areas
5. Disturbed Areas

The Contractor shall NOT begin construction without submitting evidence that a NPDES Notice of Intent (NOI) governing the discharge of storm water from the construction site for the entire construction period has been filed at least seven days prior to construction. It is the Contractor's responsibility to complete and file the NOI.

The cost of any fines, construction delays and remedial actions resulting from the Contractor's failure to comply with all provisions of local regulations and Federal NPDES permit requirements shall be paid for by the Contractor at no additional cost to the Owner.

As a requirement of the EPA's NPDES permitting program, each Contractor and Subcontractor responsible for implementing and maintaining stormwater Best Management Practices shall execute a Contractor's Certification form.

##### **Erosion and Sedimentation Control**

The Contractor shall be solely responsible for erosion and sedimentation control at the site. The Contractor shall utilize a system of operations and all necessary erosion and sedimentation control measures, even if not specified herein or elsewhere, to minimize erosion damage at the site to prevent the migration of sediment into environmentally sensitive areas. Environmentally sensitive areas include all wetland resource areas within, and downstream of, the site, and those areas of the site that are not being altered.

Erosion and sedimentation control shall be in accordance with this Section, the design drawings, and the following:

- ❑ "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices" (EPA 832-R92-005, Sept. 1992).
- ❑ "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices – Summary Guidance" (EPA 833-R92-001, Oct. 1992).
- ❑ Massachusetts Stormwater Management Policy Handbook (Volume I) and Technical Handbook (Volume II) issued by the Massachusetts Department of Environmental Protection, March 1997.
- ❑ Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, A Guide for Planners, Designers and Municipal Officials, March 1997.

The BMPs presented herein should be used as a guide for erosion and sedimentation control and are not intended to be considered specifications for construction. The most important BMP is maintaining a rapid construction process, resulting in prompt stabilization of surfaces, thereby reducing erosion potential. Given the primacy of rapid construction, these guidelines have been designed to allow construction to progress with essentially no hindrance by the erosion control methods prescribed. These guidelines have also been designed with sufficient flexibility to allow the contractor to modify the suggested methods as required to suit seasonal, atmospheric, and site-specific physical constraints.

Another important BMP is the prevention of concentrated water flow. Sheet flow does not have the erosive potential of a concentrated rivulet. These guidelines recommend construction methods that allow localized erosion control and a system of construction, which inhibits the development of shallow concentrated flow. These BMPs shall be maintained throughout the construction process.

## **CONTACT INFORMATION AND RESPONSIBLE PARTIES**

The following is a list of all project-associated parties:

### **Owner**

Monomoy Properties LLC  
79 Cove Road  
South Dennis, MA 02660

Contact: Ray Caterino  
Phone: (800) 287-9474  
Email: [raycat2013@yahoo.com](mailto:raycat2013@yahoo.com)

### **Contractor**

To Be Determined

**Environmental Consultant**

BSC Group, Inc.  
349 Route 28, Unit D  
West Yarmouth, MA 02673

Contact: Brian G. Yergatian, P.E., LEED AP  
Phone: (617) 896-4590  
Email: [byergatian@bscgroup.com](mailto:byergatian@bscgroup.com)

**Procedural Conditions of the Construction General Permit (CGP)**

The following list outlines the Stormwater responsibilities for all construction operators working on the Project. The operators below agree through a cooperative agreement to abide by the following conditions throughout the duration of the construction project, effective the date of signature of the required SWPPP. These conditions apply to all operators on the project site.

The project is subject to EPA's NPDES General Permit through the CGP. The goal of this permit is to prevent the discharge of pollutants associated with construction activity from entering the existing and proposed storm drain system or surface waters.

All contractors/operators involved in clearing, grading and excavation construction activities must sign the appropriate certification statement required, which will remain with the SWPPP. The owner must also sign a certification, which is to remain with the SWPPP in accordance with the signatory requirements of the SWPPP.

Once the SWPPP is finalized, a signed copy, plus supporting documents, must be held at the project site during construction. A copy must remain available to EPA, State and Local agencies, and other interested parties during normal business hours.

The following items associated with this SWPPP must be posted in a prominent place at the construction site until final stabilization has been achieved:

- The completed/submitted NOI form
- Location where the public can view the SWPPP during normal business hours
- A copy of the signed/submitted NOI, permit number issued by the EPA and a copy of the current CGP.

Project specific SWPPP documents are not submitted to the USEPA unless the agency specifically requests a copy for review. SWPPP documents requested by a permitting authority, the permittee(s) will submit it in a timely manner.

EPA inspectors will be allowed free and unrestricted access to the project site and all related documentation and records kept under the conditions of the permit.

The permittee is expected to keep all BMPs and Storm Water controls operating correctly and maintained regularly.

In all circumstances, you must **immediately** take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events.

*In this context, the term “immediately” requires construction operators to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if the problem is identified at a time in the work day when it is too late to initiate corrective action, the initiation of corrective action must begin on the following work day.*

If you become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1. In this case, you must notify your EPA Regional Office by the end of the next work day. You are required to submit your notification through EPA’s electronic NOI system, or “eNOI”, at [www.epa.gov/npdes/cgpenoi](http://www.epa.gov/npdes/cgpenoi).

Within 24 hours of discovering the occurrence of one of the triggering conditions in Part 5.2.1 at your site, you must complete a report of the following:

- 5.4.1.1 Which condition was identified at your site;
- 5.4.1.2 The nature of the condition identified; and
- 5.4.1.3 The date and time of the condition identified and how it was identified.

Within 7 calendar days of discovering the occurrence of one of the triggering conditions in Part 5.2.1 at your site, you must complete a report of the following:

- 5.4.2.1 Any follow-up actions taken to review the design, installation, and maintenance of stormwater controls, including the dates such actions occurred;
- 5.4.2.2 A summary of stormwater control modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed; and
- 5.4.2.3 Notice of whether SWPPP modifications are required as a result of the condition identified or corrective action.

Please note that some of the items above are direct quotations from the February 16, 2012 National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities (CGP).

It also needs to be noted that this SWPPP document shall be updated by the General Contractor before the start of construction.

In maintaining the SWPPP, all records and supporting documents will be compiled together in an orderly fashion. Inspection reports and amendments to the SWPPP must remain with the document. Federal regulations require permittee(s) to keep their Project Specific SWPPP and all reports and documents for at least three years after the project is complete.

### **Project Description and Intended Construction Sequence**

The applicant is planning to develop the site. The site is currently a largely undeveloped and heavily forested site. The construction activities will include the following major components:

- Roadway construction
- The construction of stormwater management systems
- Installation of utilities
- Landscaping

Soil disturbing activities will include site demolition, installing stabilized construction exits, installation of erosion and sedimentation controls, grading, storm drain inlets, utilities, building foundations, construction of roadways and parking lots and preparation for final seeding, mulching and landscaping. Please refer to Table 1 for the projects anticipated construction timetable. A description of BMP's associated with project timetable and construction-phasing elements are provided in Section 4.2 of this SWPPP.

***Table 1 – Anticipated Construction Timetable***

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<b>Construction Phasing Activity</b>	<b>Anticipated Timetable</b>
Demolition, Grubbing and Stripping of Limits of Construction	To be determined
Roadway Construction	To be determined
Construction of Stormwater Management Facilities	To be determined
Installation of Utilities	To be determined
Landscaping	To be determined
Final Clean-up	To be determined

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### **Potential Sources of Pollution**

Any project site activities that have the potential to add pollutants to runoff are subject to the requirements of this sample SWPPP. Listed below are a description of potential sources of pollution from both sedimentation to Storm Water runoff, and pollutants from sources other than sedimentation.

***Table 2 – Potential Sources of Sediment to Storm Water Runoff***

<b>Potential Source</b>	<b>Activities/Comments</b>
Construction Site Entrance and Site Vehicles	Vehicles leaving the site can track soils onto public roadways. Site Vehicles can readily transport exposed soils throughout the site and off-site areas.
Grading Operations	Exposed soils have the potential for erosion and discharge of sediment to off-site areas.
Material Excavation, Relocation, and Stockpiling	Stockpiling of materials during excavation and relocation of soils can contribute to erosion and sedimentation. In addition fugitive dust from stockpiled material, vehicle transport and site grading can be deposited in wetlands and waterway.
Landscaping Operations	Landscaping operations specifically associated with exposed soils can contribute to erosion and sedimentation. Hydroseeding if not properly applied can runoff to adjacent wetlands and waterways.

***Table 3 – Potential Pollutants and Sources, other than Sediment to Storm Water Runoff***

<b>Potential Source</b>	<b>Activities/Comments</b>
Staging Areas and Construction Vehicles	Vehicle refueling, minor equipment maintenance, sanitary facilities and hazardous waste storage
Materials Storage Area	General building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
Construction Activities	Construction, paving, curb/gutter installation, concrete pouring/mortar/stucco

**Erosion and Sedimentation Control Best Management Practices**

The project site is characterized by primarily impervious surface. All construction activities will implement Best Management Practices (BMPs) in order to minimize overall site disturbance and impacts to the sites natural features. Please refer to the following sections for a detailed description of site specific BMPs. In addition, an Erosion and Sedimentation Control Plan is provided in the Site Plans.

**Timetable and Construction Phasing**

This section provides the Owner and Contractor with a suggested order of construction that shall minimize erosion and the transport of sediments. The individual objectives of the construction techniques described herein shall be considered an integral component of the project design intent of each project phase. The construction sequence is not intended to prescribe definitive

construction methods and should not be interpreted as a construction specification document. However, the Contractor shall follow the general construction phase principles provided below:

- Protect and maintain existing vegetation wherever possible.
- Minimize the area of disturbance.
- To the extent possible, route unpolluted flows around disturbed areas.
- Install mitigation devices as early as possible.
- Minimize the time disturbed areas are left unstabilized.
- Maintain siltation control devices in proper condition.
- The contractor should use the suggested sequence and techniques as a general guide and modify the suggested methods and procedures as required to best suit seasonal, atmospheric, and site specific physical constraints for the purpose of minimizing the environmental impact of construction.

#### Demolition, Grubbing and Stripping of Limits of Construction Phase

- Install TEC devices as required to prevent sediment transport into resource areas.
- Place a ring of silt socks and/or hay bales around stockpiles.
- Stabilize all exposed surfaces that will not be under immediate construction.
- Store and/or dispose all pavement and building demolition debris as indicated in accordance with all applicable local, state, and federal regulations.

#### Parking Areas Sub-base Construction

- Install temporary culverts and diversion ditches and additional TEC devices as required by individual construction area constraints to direct potential runoff toward detention areas designated for the current construction phase.
- Compact gravel as work progresses to control erosion potential.
- Apply water to control air suspension of dust.
- Avoid creating an erosive condition due to over-watering.
- Install piped utility systems as required as work progresses, keeping all inlets sealed until all downstream drainage system components are functional.

#### Binder Construction

- Fine grade gravel base and install processed gravel to the design grades.
- Compact pavement base as work progresses.
- Install pavement binder coat starting from the downhill end of the site and work toward the top.

#### Finish Paving

- Repair and stabilize damaged side slopes.
- Clean inverts of drainage structures.
- Install final top coat of pavement.

#### Final Clean-up

- Clean inverts of culverts and catch basins.

- Remove sediment and debris from rip-rap outlet areas.
- Remove TEC devices only after permanent vegetation and erosion control has been fully established.

## **Site Stabilization**

### Grubbing Stripping and Grading

- Erosion control devices shall be in place as shown on the design plans before grading commences.
- Stripping shall be done in a manner, which will not concentrate runoff. If precipitation is expected, earthen berms shall be constructed around the area being stripped, with a silt sock, silt fence or hay bale dike situated in an arc at the low point of the berm.
- If intense precipitation is anticipated, silt socks, hay bales, dikes and /or silt fences shall be used as required to prevent erosion and sediment transport. The materials required shall be stored on site at all time.
- If water is required for soil compaction, it shall be added in a uniform manner that does not allow excess water to flow off the area being compacted.
- Dust shall be held at a minimum by sprinkling exposed soil with an appropriate amount of water.

### Maintenance of Disturbed Surfaces

- Runoff shall be diverted from disturbed side slopes in both cut and fill.
- Mulching may be used for temporary stabilization.
- Silt sock, hay bale or silt fences shall be set where required to trap products of erosion and shall be maintained on a continuing basis during the construction process.

### Loaming and Seeding

- Loam shall not be placed unless it is to be seeded directly thereafter.
- All disturbed areas shall have a minimum of 4 inches of loam placed before seeded and mulched.
- Consideration shall be given to hydro-mulching, especially on slopes in excess of 3 to 1.
- Loamed and seeded slopes shall be protected from washout by mulching or other acceptable slope protection until vegetation begins to grow.

### Storm Water Collection System Installation

- The Storm Water drainage system shall be installed from the downstream end up and in a manner which will not allow runoff from disturbed areas to enter pipes.
- Excavation for the drainage system shall not be left open when rainfall is expected overnight. If left open under other circumstances, pipe ends shall be closed by a staked board or by an equivalent method.
- All catch basin openings shall be covered by a silt bag between the grate and the frame or protected from sediment by silt fence surrounding the catch basin grate.
- The ADS detention system will remain off-line until all upgradient tributary areas have been fully stabilized.

### Completion of Paved Areas

- During the placement of sub-base and pavement, the entrance to the Storm Water drainage systems shall be sealed when rain is expected. When these entrances are closed, consideration must be given to the direction of run-off and measures shall be undertaken to minimize erosion and to provide for the collection of sediment.
- In some situations it may be necessary to keep catch basins open.
- Appropriate arrangements shall be made downstream to remove all sediment deposition.

### Stabilization of Surfaces

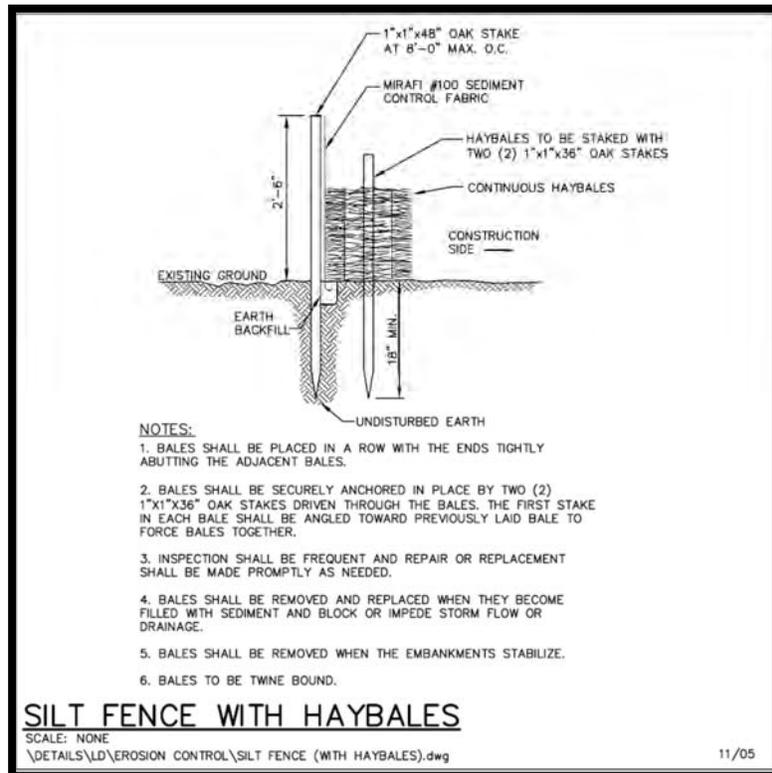
- Stabilization of surfaces includes the placement of pavement, rip-rap, wood bark mulch and the establishment of vegetated surfaces.
- Upon completion of construction, all surfaces shall be stabilized even though it is apparent that future construction efforts will cause their disturbance.
- Vegetated cover shall be established during the proper growing season and shall be enhanced by soil adjustment for proper pH, nutrients and moisture content.
- Surfaces that are disturbed by erosion processes or vandalism shall be stabilized as soon as possible.
- Areas where construction activities have permanently or temporarily ceased shall be stabilized within 7 days from the last construction activity, except when construction activity will resume within 21 days (e.g., the total time period that construction activity is temporarily ceased is less than 21 days).
- Hydro-mulching of grass surfaces is recommended, especially if seeding of the surfaces is required outside the normal growing season.
- Hay mulch is an effective method of temporarily stabilizing surfaces, but only if it is properly secured by branches, weighted snow fences or weighted chicken wire.

### Temporary Structural Erosion Control Measures

Temporary erosion control measures serve to minimize construction-associated impacts to wetland resource and undisturbed areas. Please refer to the following sections for a description of temporary erosion control measures implemented as part of the project and this sample SWPPP.

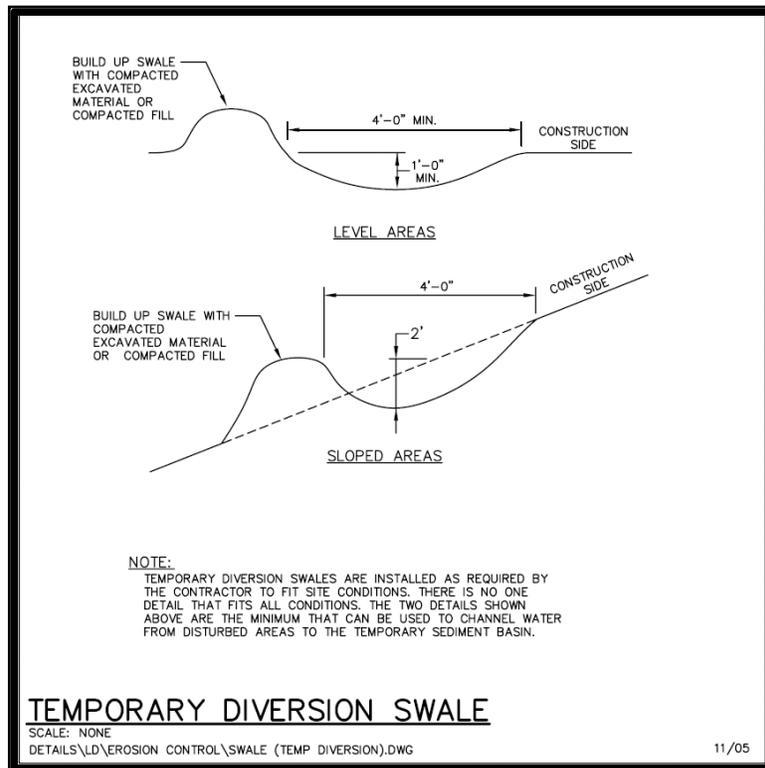
### *Silt Socks, Hay Bales, and Silt Fencing*

Siltation barriers composed of silt socks and staked hay bales and trenched silt fence will be installed within the 100-foot buffer zone along the upland side of delineated wetland resources. The siltation barriers will demarcate the limit of work, form a work envelope and provide additional assurance that construction equipment will not enter the adjacent wetlands or undisturbed portions of the site. All barriers will remain in place until disturbed areas are stabilized.



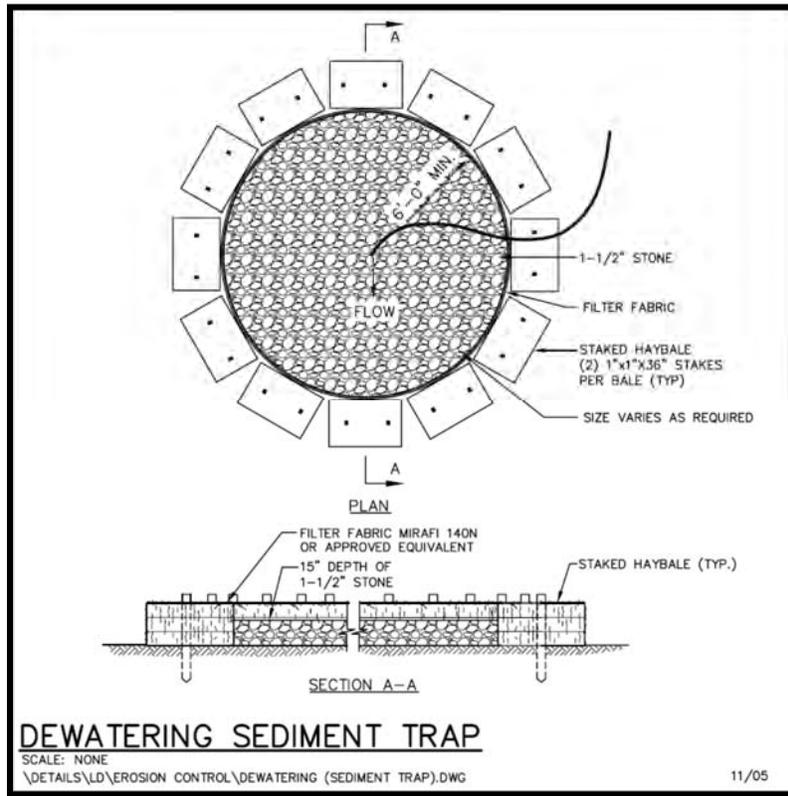
### ***Temporary Storm Water Diversion Swale***

A temporary diversion swale is an effective practice for temporarily diverting Storm Water flows and to reduce Storm Water runoff velocities during storm events. The swale channel can be installed before infrastructure construction begins at the site, or as needed throughout the construction process. The diversion swale should be routinely compacted or seeded to minimize the amount of exposed soil.



### ***Dewatering Basins***

Dewatering may be required during Storm Water system, foundation construction and utility installation. Should the need for dewatering arise, groundwater will be pumped directly into a temporary settling basin, which will act as a sediment trap during construction. All temporary settling basins will be located within close proximity of daily work activities. Prior to discharge, all groundwater will be treated by means of the settling basin or acceptable substitute. Discharges from sediment basins will be free of visible floating, suspended and settleable solids that would impair the functions of a wetland or degrade the chemical composition of the wetland resource area receiving ground or surface water flows and will be to the combined system.



### ***Material Stockpiling Locations***

There will be no storage of soil, gravel or construction debris within the 100-foot buffer zone to wetland resource areas. It is anticipated that all excavated material will be placed in a dump truck and stockpiled outside the 100-foot buffer zone during construction activities. Piping and trench excavate associated with the subsurface utility work will be contained with a single row of silt socks and/or hay bales.

### ***Permanent Structural Erosion Control Measures***

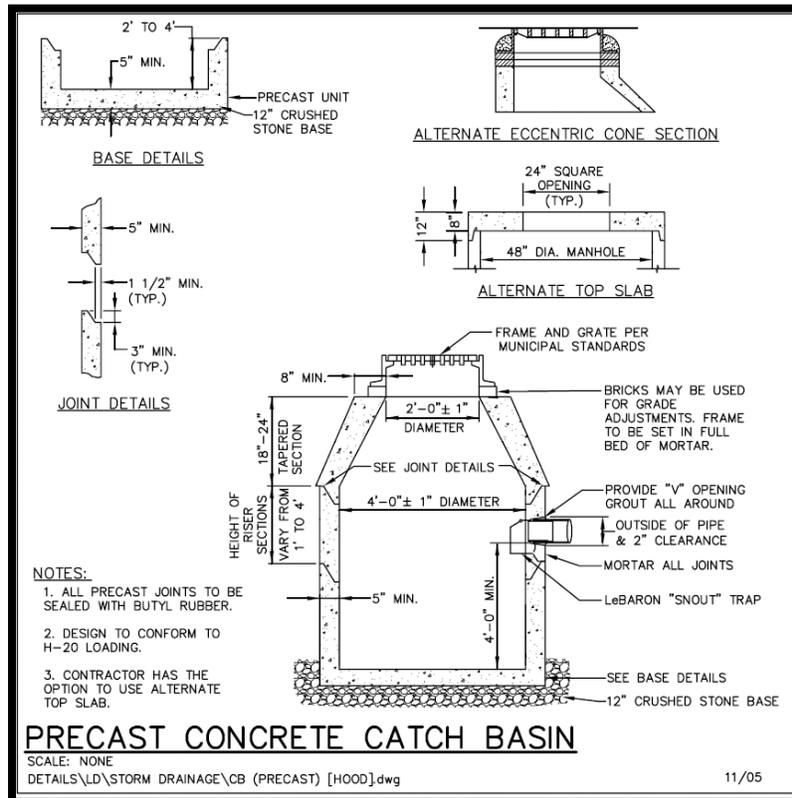
Permanent erosion control measures serve to minimize post-construction impacts to wetland resource areas and undisturbed areas. Please refer to the following sections for a description of permanent erosion control measures implemented as part of the project and this SWPPP.

### ***Catch Basins with Deep Sumps and Hooded Traps***

Parking lots will be bermed (or curbed) and provided with catch basins to collect runoff. The entire drainage system for each respective project phase will be installed during the initial phases of construction. The collection system will be installed from the downstream end up, and in a manner which will not allow runoff from disturbed areas to enter the pipes.

The catch basins will be inspected and cleaned as necessary (sediment depth of 12 inches) at least four (4) times per year. The optimum time for cleaning is during the period just after the

snowmelt of late winter and prior to the onset of heavy spring precipitation. All sediments and hydrocarbons will be properly handled and disposed of in accordance with local state and federal guidelines and regulations.



## Good Housekeeping Best Management Practices

### *Material Handling and Waste Management*

Solid waste generation during the construction period will be primarily construction debris. The debris will include scrap lumber (used forming and shoring pallets and other shipping containers), waste packaging materials (plastic sheeting and cardboard), scrap cable and wire, roll-off containers (or dumpsters) and will be removed by a contract hauler to a properly licensed landfill. The roll-off containers will be covered with a properly secured tarp before the hauler exists the site. In addition to construction debris, the construction work force will generate some amount of household-type wastes (food packing, soft drink containers, and other paper). Trash containers for these wastes will be located around the site and will be emptied regularly so as to prevent wind-blown litter. This waste will also be removed by a contract hauler.

All hazardous waste material such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed shipping containers in the hazardous-materials storage area and segregated from other non-waste materials. Secondary

containment will be provided for all materials in the hazardous materials storage area and will consist of commercially available spill pallets. Additionally, all hazardous materials will be disposed of in accordance with federal, state and municipal regulations.

Two temporary sanitary facilities (portable toilets) will be provided at the site in the combined staging area. The toilets will be away from a concentrated flow path and traffic flow and will have collection pans underneath as secondary treatment. All sanitary waste will be collected from an approved party at a minimum of three times per week.

### ***Building Material Staging Areas***

Construction equipment and maintenance materials will be stored at the combined staging area and materials storage areas. Silt fence will be installed around the perimeter to designate the staging and materials storage area. A watertight shipping container will be used to store hand tools, small parts and other construction materials.

Non-hazardous building materials such as packaging material (wood, plastic and glass) and construction scrap material (brick, wood, steel, metal scraps, and pine cuttings) will be stored in a separate covered storage facility adjacent to other stored materials. All hazardous-waste materials such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed containers under cover within the hazardous materials storage area.

Large items such as framing materials and stockpiled lumber will be stored in the open storage area. Such materials will be elevated on wood blocks to minimize contact with runoff.

The combined storage areas are expected to remain clean, well organized and equipped with ample cleaning supplies as appropriate for the materials being stored. Perimeter controls such as containment structures, covers and liners will be repaired or replaced as necessary to maintain proper function.

### ***Designated Washout Areas***

Designated temporary, below-ground concrete washout areas will be constructed, as required, to minimize the pollution potential associated with concrete, paint, stucco, mixers etc. Signs will, if required, be posted marking the location of the washout area to ensure that concrete equipment operators use the proper facility. Concrete pours will not be conducted during or before an anticipated precipitation event. All excess concrete and concrete washout slurries from the concrete mixer trucks and chutes will be discharged to the washout area or hauled off-site for disposal.

### ***Equipment/Vehicle Maintenance and Fueling Areas***

Several types of vehicles and equipment will be used on-site throughout the project including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes and forklifts. All major equipment/vehicle fueling and maintenance will be performed off-site. A small, 20-gallon pickup bed fuel tank will be kept on-site in the combined staging area. When

vehicle fueling must occur on-site, the fueling activity will occur in the staging area. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

### ***Equipment/Vehicle Wash down Area***

All equipment and vehicle washing will be performed off-site.

### ***Spill Prevention Plan***

A spill containment kit will be kept on-site in the Contractor's trailer and/or the designated staging area throughout the duration of construction. Should there be an accidental release of petroleum product into a wetland (or within 100-feet of a wetland), the appropriate agencies will be immediately notified.

### ***Inspections***

Maintenance of existing and proposed BMP's to address Storm Water management facilities during construction is an on-going process. The purpose of the inspections is to observe all sources of Storm Water or non-Storm Water discharge as identified in the SWPPP as well as the status of the receiving waters and fulfill the requirements of the Order of Conditions. The following sections describe the appropriate inspection measures to adequately implement the project's SWPPP. A blank inspection form is provided at the end of this section. Completed inspection forms are to be maintained on site.

#### **Inspection Personnel**

The owner's appointed representative will be responsible for performing regular inspections of erosion controls and ordering repairs as necessary.

#### **Inspection Frequency**

Inspections will be performed by qualified personnel once every 7 days and/or within 24-hours after a storm event of greater than one-quarter inch, in accordance with the CGP and as required by the OOC. The inspections must be documented on the inspection form provided at the end of this section, and completed forms will be provided to the on-site supervisor and maintained at the Owner's office throughout the entire duration of construction.

#### **Inspection Reporting**

Each inspection report will summarize the scope of the inspection, name(s) and qualifications of personnel making the inspection, and major observations relating to the implementation of the SWPPP, including compliance and non-compliance items. Completed inspection reports will remain with the completed SWPPP on site.

### **Amendment Requirements**

The final SWPPP is intended to be a working document that is utilized regularly on the construction site, and provides guidance to the Contractor. It must reflect changes made to the originally proposed plan and will be updated to include project specific activities and ensure that they are in compliance with the NPDES General Permit and state and local laws and regulations. It should be amended whenever there is a change in design, construction, operation or maintenance that affects discharge of pollutants. The following items should be addressed should an amendment to the SWPPP occur:

- Dates of certain construction activities such as major grading activities, clearing and initiation of and completion of stabilization measures should be recorded.
- Future amendments to the SWPPP will be recorded as required. As this SWPPP is amended, all amendments will be kept on site and made part of the SWPPP.
- Upon completion of site stabilization (completed as designed and/or 70% background vegetative cover), it can be documented and marked on the plans. Inspections are no longer required at this time.
- Inspections often identify areas not included in the original SWPPP, which will require the SWPPP to be amended. These updates should be made within seven days of being recognized by the inspector.

**SWPPP INSPECTION AND MAINTENANCE REPORT**

Monomoy Properties LLC  
 Sandwich, MA

TO BE COMPLETED AT LEAST EVERY 7 DAYS AND WITHIN 24 HOURS OF A STORM EVENT OF AT LEAST 0.5 INCHES. AFTER SITE STABILIZATION, TO BE COMPLETED AT LEAST ONCE PER MONTH FOR THREE YEARS OR UNTIL A NOTICE OF TERMINATION IS FILED.

INSPECTOR NAME /TITLE: \_\_\_\_\_ DATE: \_\_\_\_\_

START/END TIME: \_\_\_\_\_

**Type of Inspection**

Regular     Pre-storm event     During storm event     Post-storm event (inches \_\_\_\_\_)

Construction Activities: \_\_\_\_\_

Weather at Time of Inspection: \_\_\_\_\_

**Has it rained since the last inspection?**

Yes     No

**If yes, provide:**

Storm Start Date & Time: \_\_\_\_\_ Storm Duration (hrs): \_\_\_\_\_ Approximate Rainfall (in): \_\_\_\_\_

**Do you suspect that discharges may have occurred since the last inspection?**

Yes     No

**Are there any discharges at the time of inspection?**

Yes     No

BMP Description	In Conformance	Effective	Notes
Construction Entrance	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Haybales and Silt Fencing	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Storage/Disposal Areas	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Subsurface Infiltration System	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Catch Basins	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Other	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	
Other	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	

**SITE STABILIZATION STATUS:**

BMP/Activity	Implemented	Maintained	Status/Actions Required
All Slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are natural resource areas e.g., stream, wetlands, mature trees, etc.) protected with barriers or similar BMP's?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are perimeter controls and sediment barriers adequately installed and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are discharge points and receiving waters free of sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are Storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is there evidence of sediment being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is trash/littler from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are washout facilities available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are vehicle and equipment fueling, cleaning and maintenance areas free of spills, leaks or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Other - specify:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Other - specify:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

**ADDITIONAL OBSERVATIONS:** \_\_\_\_\_

**NEXT INSPECTON TO BE PERFORMED BY:** \_\_\_\_\_

**ON OR BEFORE:** \_\_\_\_\_

**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: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

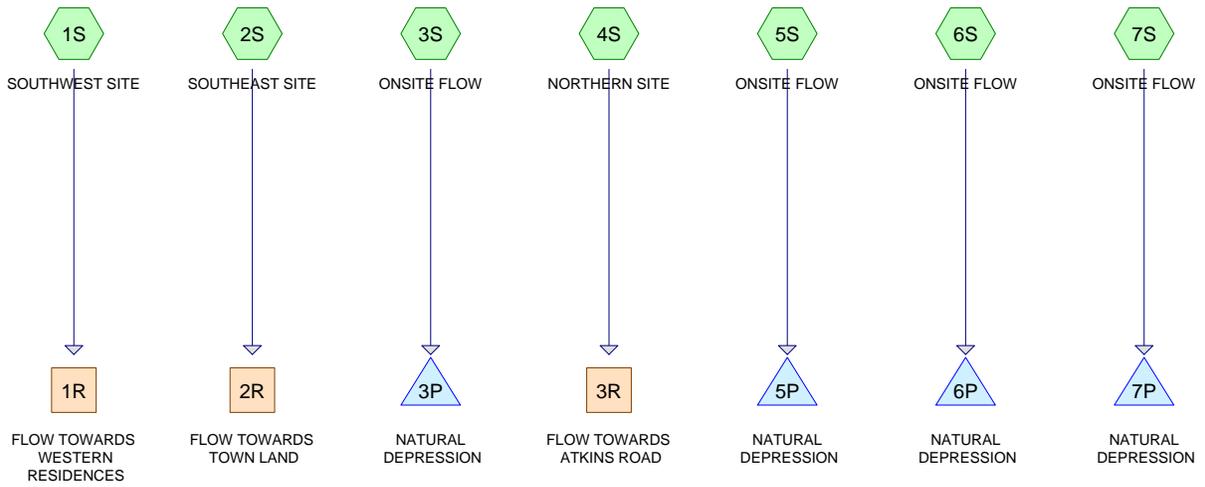
## **SECTION 5.0**

### **DRAINAGE CALCULATIONS**

5.1 EXISTING DRAINAGE CALCULATIONS AND WATERSHED PLAN

5.2 POST CONDITIONS DRAINAGE CALCULATIONS AND WATERSHED PLAN

## **5.1 EXISTING DRAINAGE CALCULATIONS AND WATERSHED PLAN**



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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: SOUTHWEST** Runoff Area=349,742 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 2S: SOUTHEAST** Runoff Area=244,125 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 3S: ONSITE FLOW** Runoff Area=271,849 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=434' Tc=13.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 4S: NORTHERN SITE** Runoff Area=243,811 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=437' Tc=13.1 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 5S: ONSITE FLOW** Runoff Area=139,555 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=312' Tc=13.8 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 6S: ONSITE FLOW** Runoff Area=218,161 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=504' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 7S: ONSITE FLOW** Runoff Area=214,351 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=454' Tc=10.4 min CN=30 Runoff=0.00 cfs 0.000 af

**Reach 1R: FLOW TOWARDS WESTERN RESIDENCES** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Reach 2R: FLOW TOWARDS TOWN LAND** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Reach 3R: FLOW TOWARDS ATKINS ROAD** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 3P: NATURAL DEPRESSION** Peak Elev=122.00' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 5P: NATURAL DEPRESSION** Peak Elev=132.00' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 6P: NATURAL DEPRESSION** Peak Elev=122.00' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 7P: NATURAL DEPRESSION** Peak Elev=127.50' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 38.604 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"**  
**100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac**

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**Summary for Subcatchment 1S: SOUTHWEST SITE**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

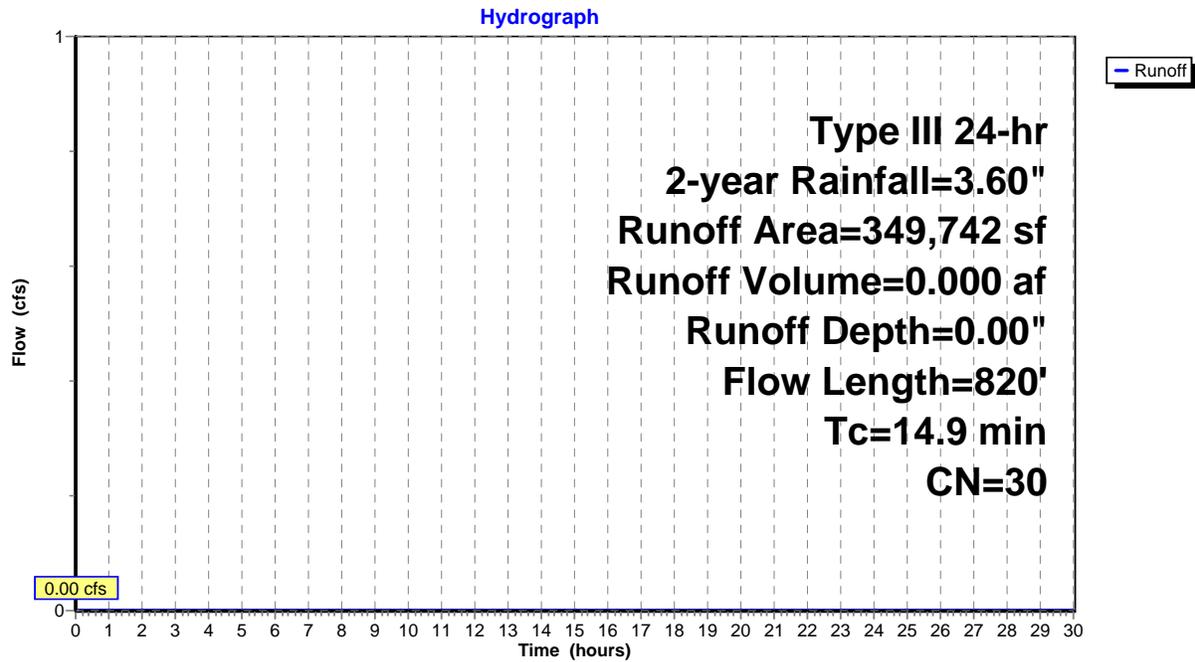
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
349,742	30	Woods, Good, HSG A
349,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
14.9	820	Total			

**Subcatchment 1S: SOUTHWEST SITE**



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**Summary for Subcatchment 2S: SOUTHEAST SITE**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

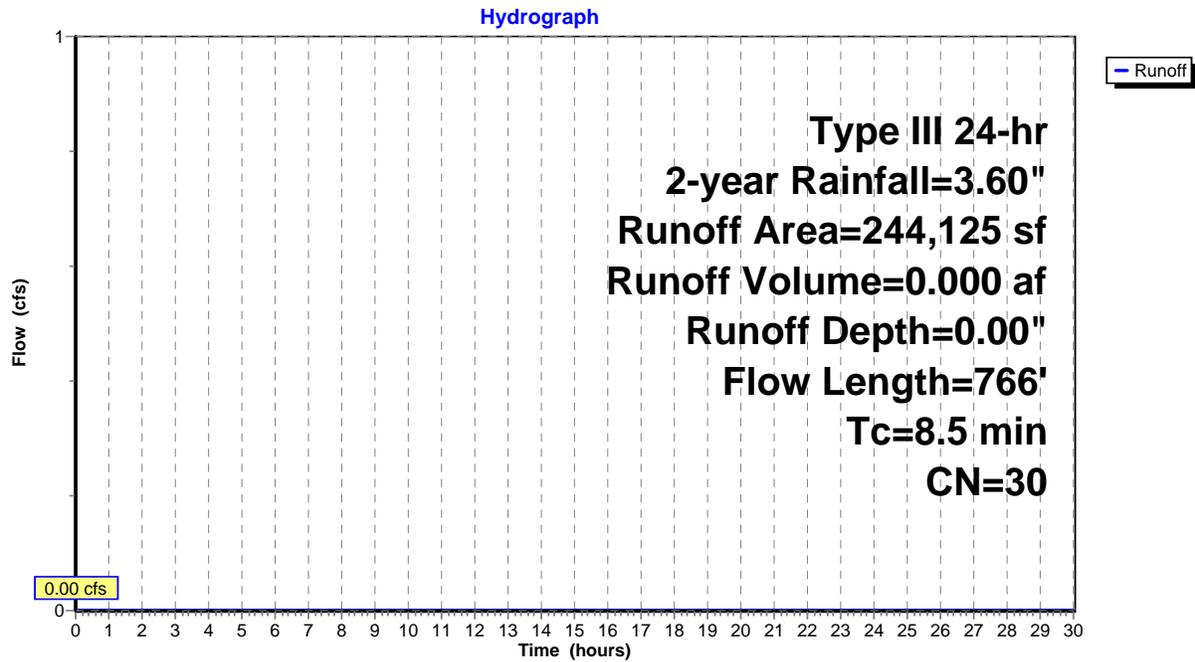
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
244,125	30	Woods, Good, HSG A
244,125		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

**Subcatchment 2S: SOUTHEAST SITE**



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**Summary for Subcatchment 3S: ONSITE FLOW**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

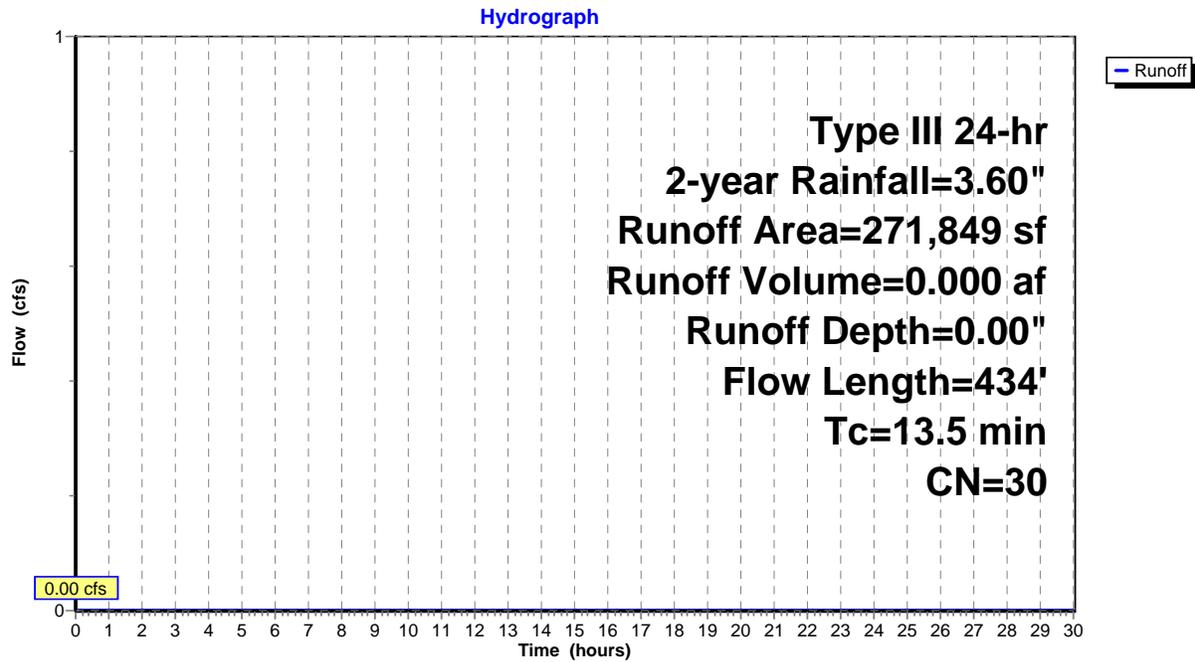
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
271,849	30	Woods, Good, HSG A
271,849		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.5	434	Total			

**Subcatchment 3S: ONSITE FLOW**



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**Summary for Subcatchment 4S: NORTHERN SITE**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

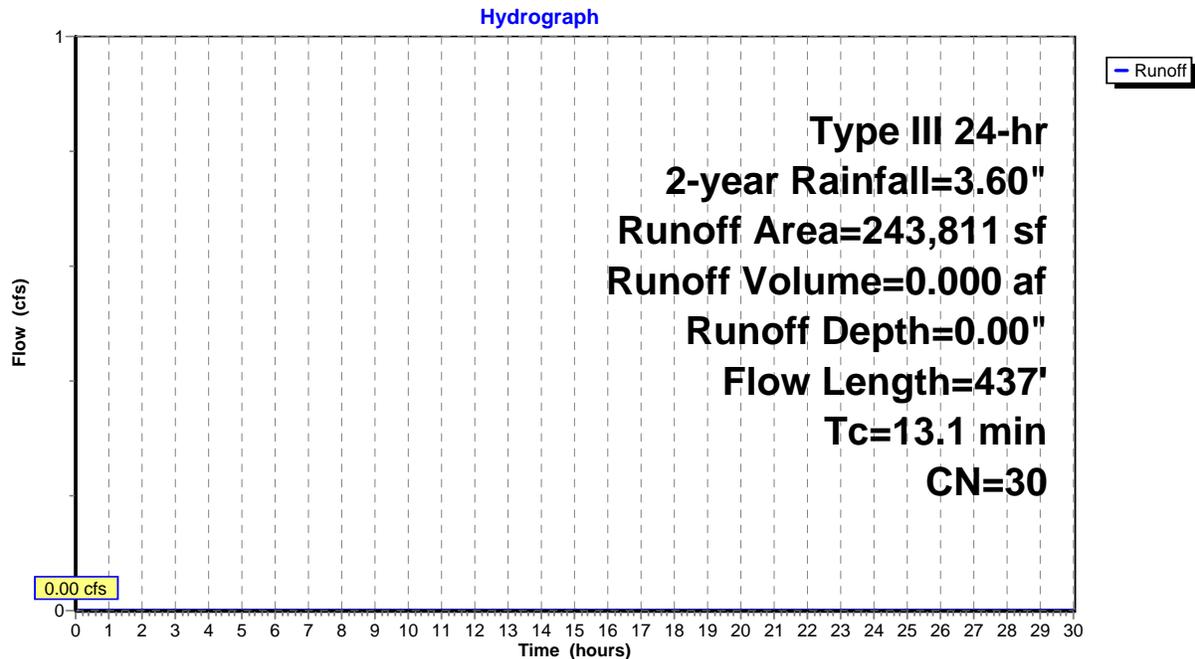
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
243,811	30	Woods, Good, HSG A
243,811		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.1	437	Total			

**Subcatchment 4S: NORTHERN SITE**



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**Summary for Subcatchment 5S: ONSITE FLOW**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

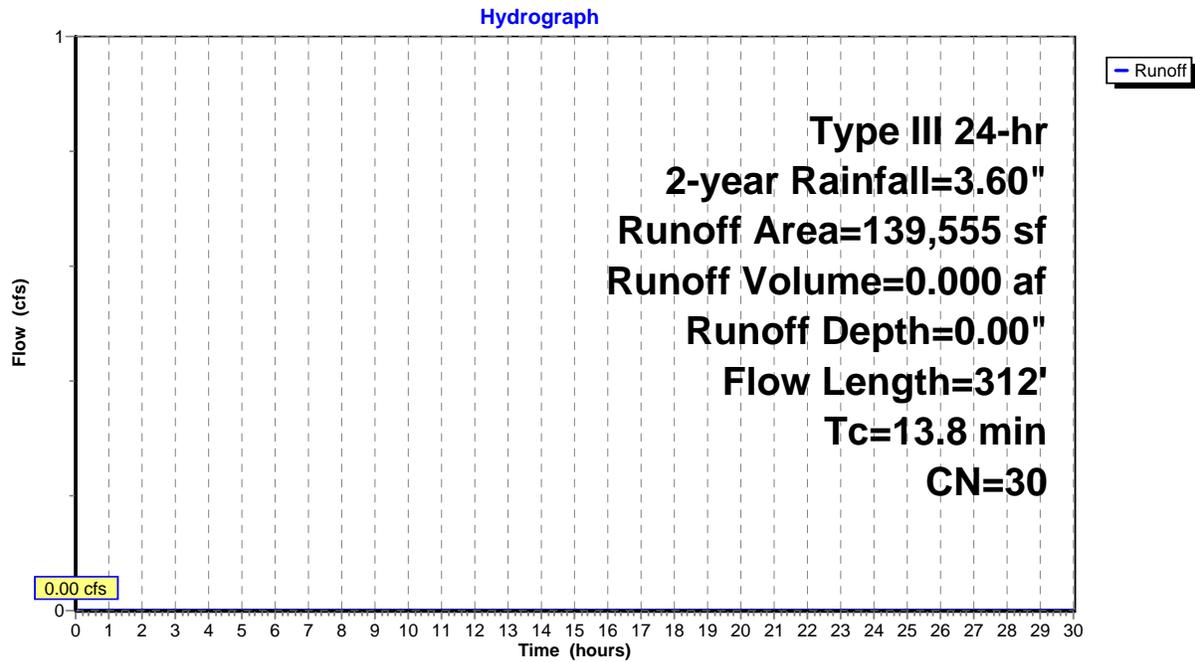
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
139,555	30	Woods, Good, HSG A
139,555		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0160	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	262	0.0616	4.00		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.8	312	Total			

**Subcatchment 5S: ONSITE FLOW**



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**Summary for Subcatchment 6S: ONSITE FLOW**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

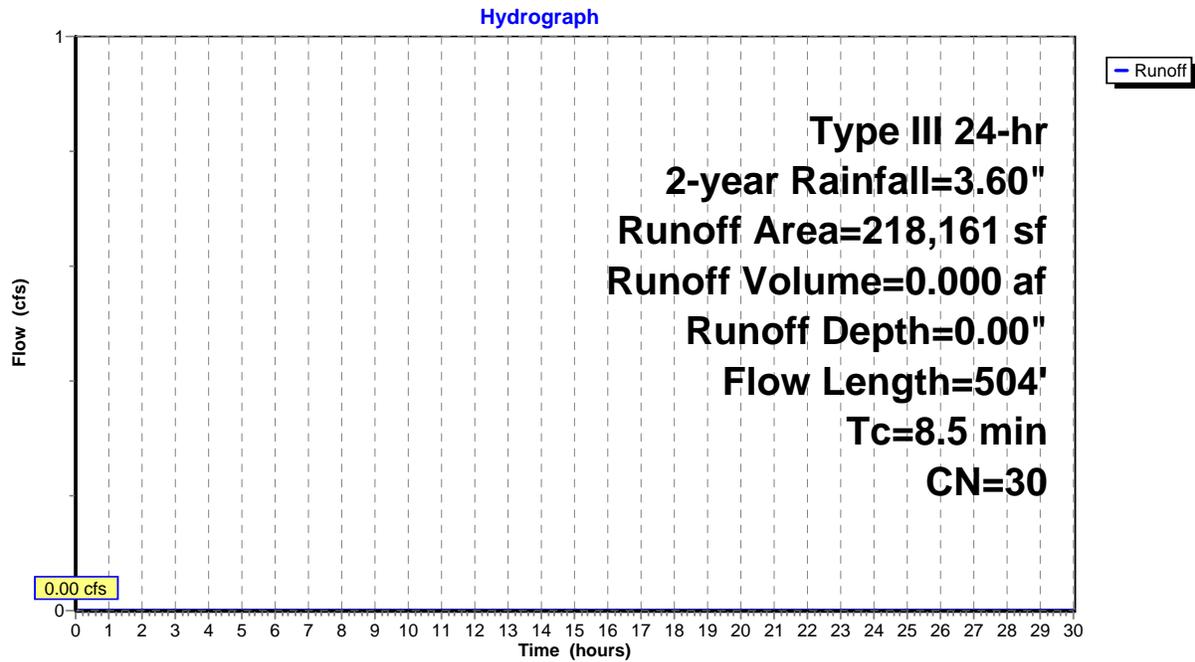
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
218,161	30	Woods, Good, HSG A
218,161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	504	Total			

**Subcatchment 6S: ONSITE FLOW**



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**Summary for Subcatchment 7S: ONSITE FLOW**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

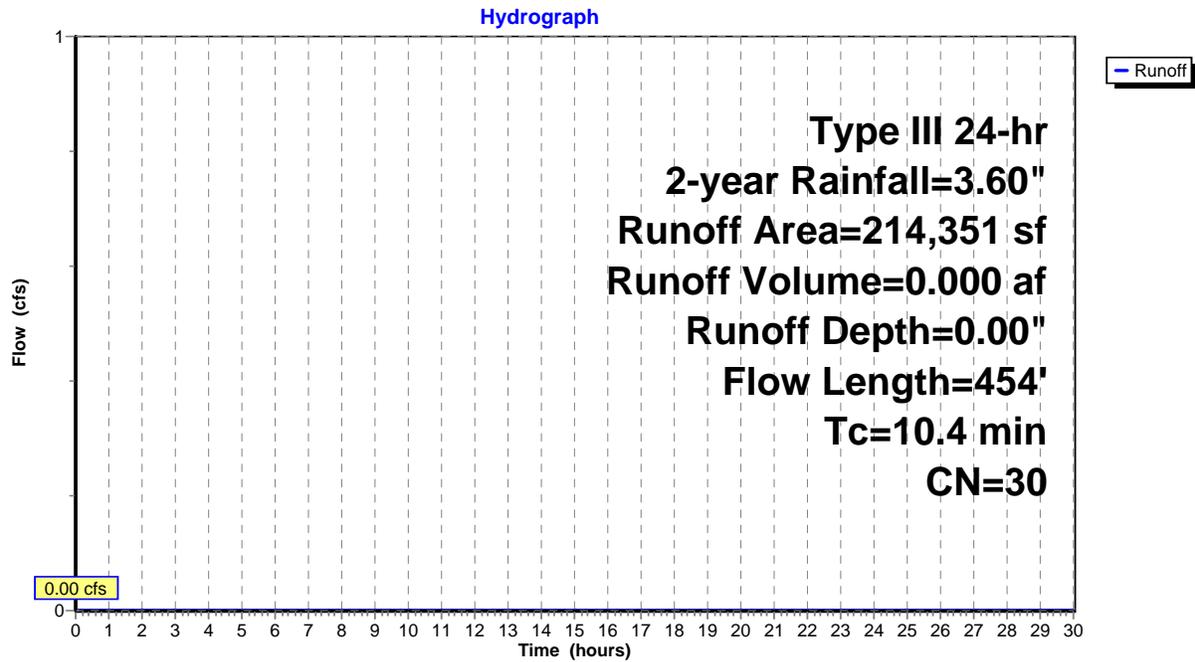
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
214,351	30	Woods, Good, HSG A
214,351		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0400	0.09		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	404	0.0718	4.31		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
10.4	454	Total			

**Subcatchment 7S: ONSITE FLOW**



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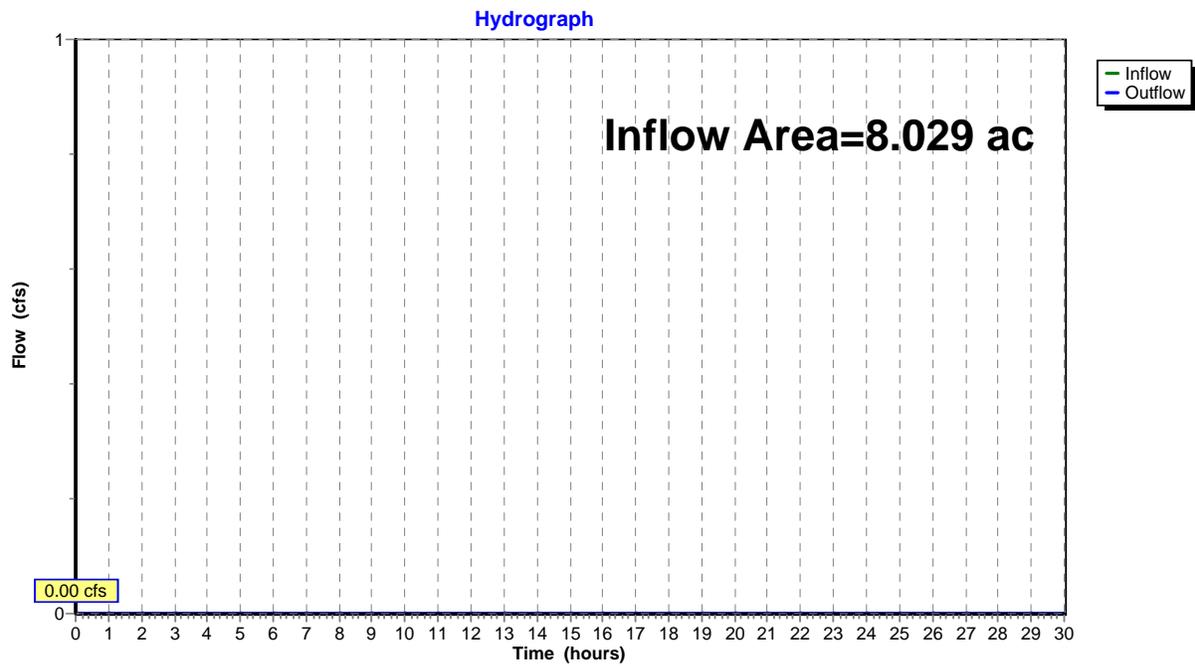
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**Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES**

Inflow Area = 8.029 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= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 1R: FLOW TOWARDS WESTERN RESIDENCES**



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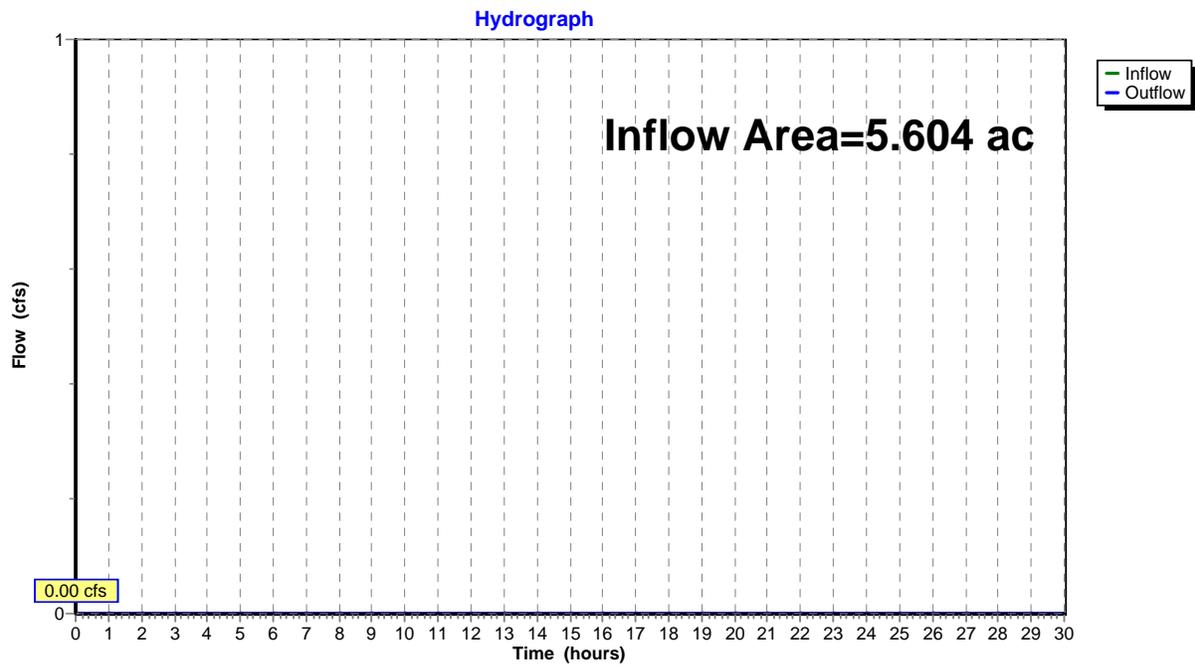
Page 11

**Summary for Reach 2R: FLOW TOWARDS TOWN LAND**

Inflow Area = 5.604 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= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 2R: FLOW TOWARDS TOWN LAND**



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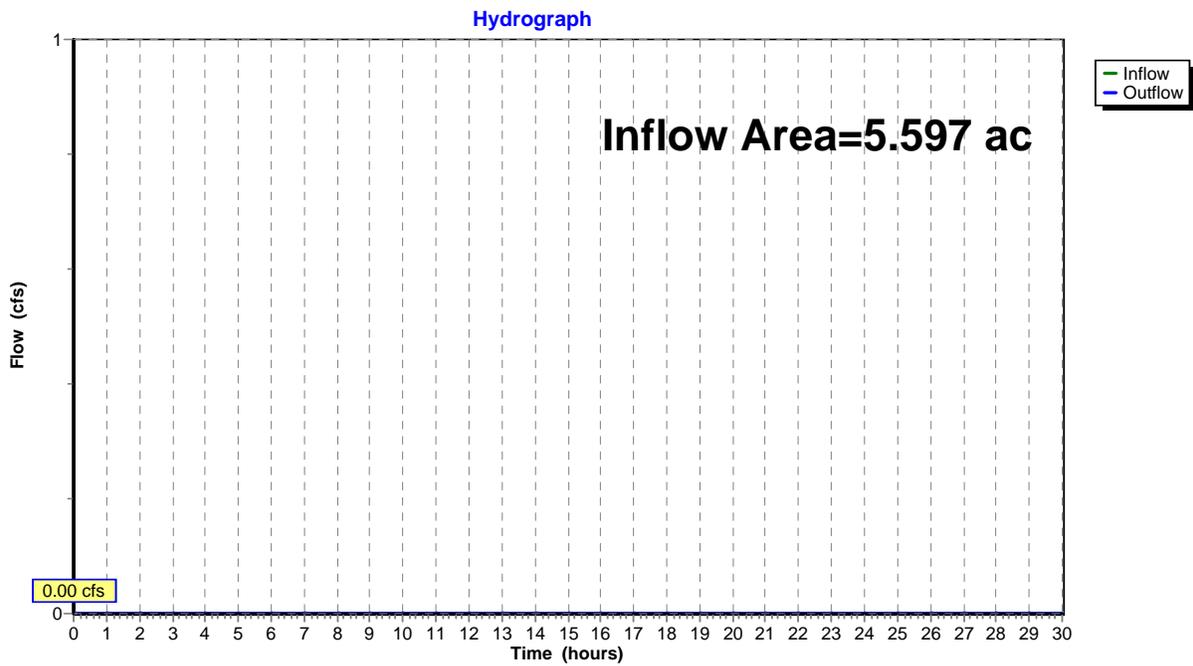
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**Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD**

Inflow Area = 5.597 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= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 3R: FLOW TOWARDS ATKINS ROAD**



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*Type III 24-hr 2-year Rainfall=3.60"*

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**Summary for Pond 3P: NATURAL DEPRESSION**

Inflow Area = 6.241 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  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 957 sf Storage= 0 cf

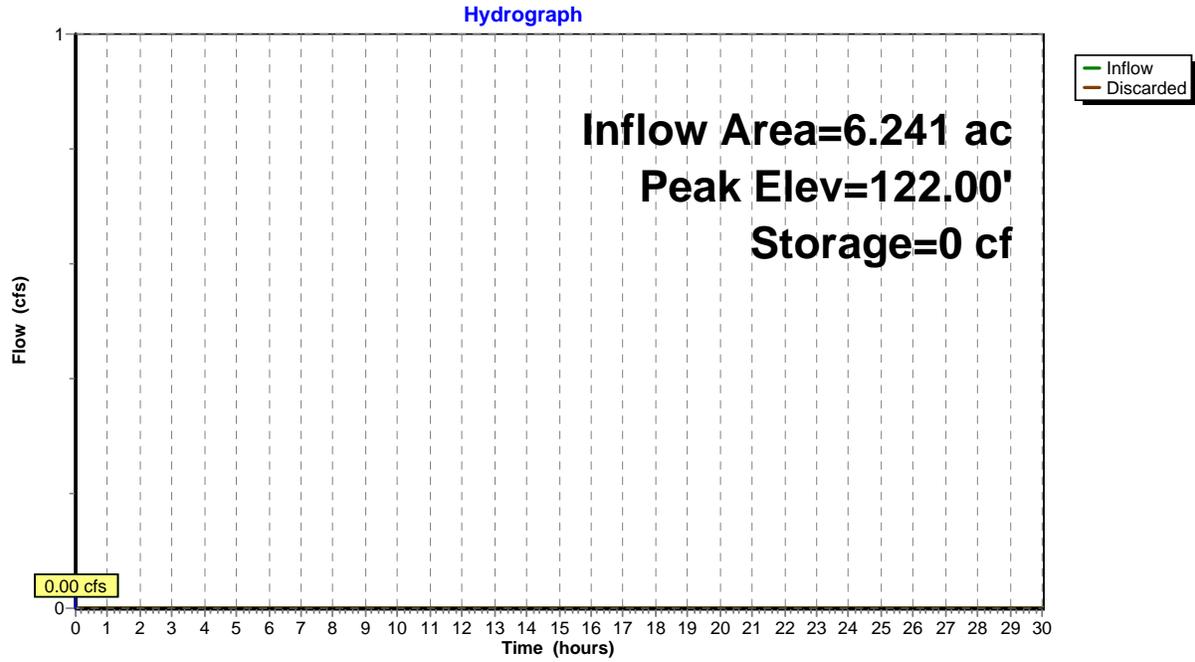
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	34,720 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)  
 ↳ **1=Exfiltration** (Passes 0.00 cfs of 0.18 cfs potential flow)

### Pond 3P: NATURAL DEPRESSION



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Type III 24-hr 2-year Rainfall=3.60"

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**Summary for Pond 5P: NATURAL DEPRESSION**

Inflow Area = 3.204 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  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 132.00' @ 0.00 hrs Surf.Area= 76 sf Storage= 0 cf

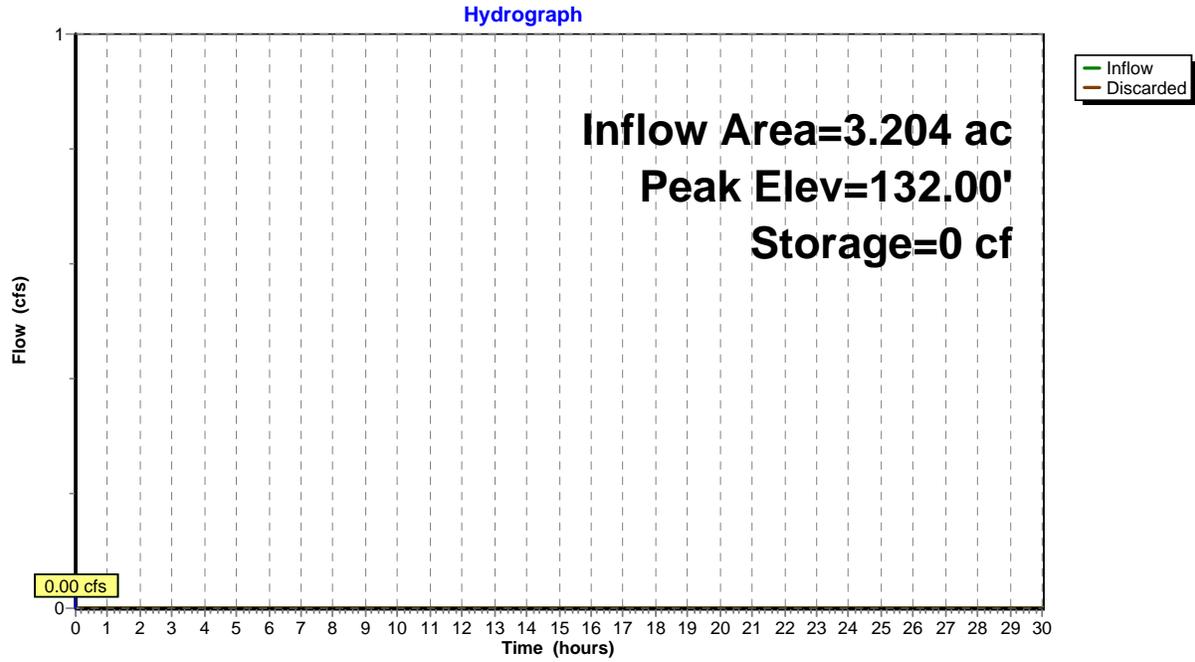
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	132.00'	5,089 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=132.00' (Free Discharge)  
 ↳ **1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

### Pond 5P: NATURAL DEPRESSION



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Type III 24-hr 2-year Rainfall=3.60"

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**Summary for Pond 6P: NATURAL DEPRESSION**

Inflow Area = 5.008 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  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 1,489 sf Storage= 0 cf

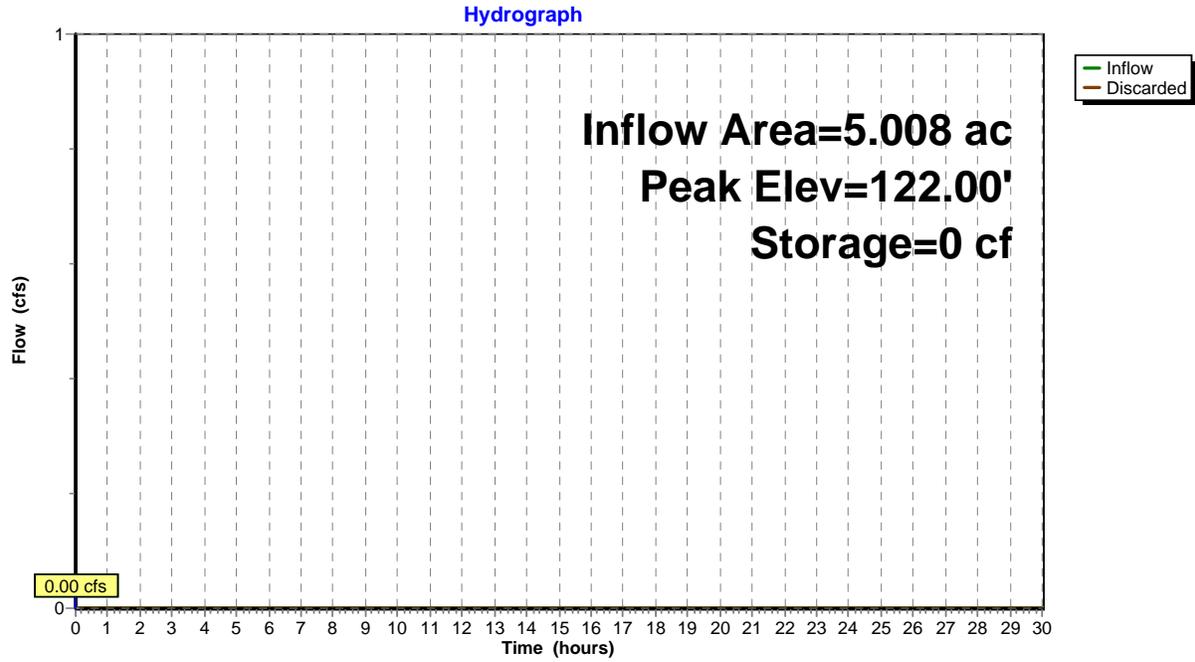
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,899 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)  
 ↑**1=Exfiltration** (Passes 0.00 cfs of 0.29 cfs potential flow)

### Pond 6P: NATURAL DEPRESSION



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Type III 24-hr 2-year Rainfall=3.60"

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**Summary for Pond 7P: NATURAL DEPRESSION**

Inflow Area = 4.921 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  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 127.50' @ 0.00 hrs Surf.Area= 2,227 sf Storage= 0 cf

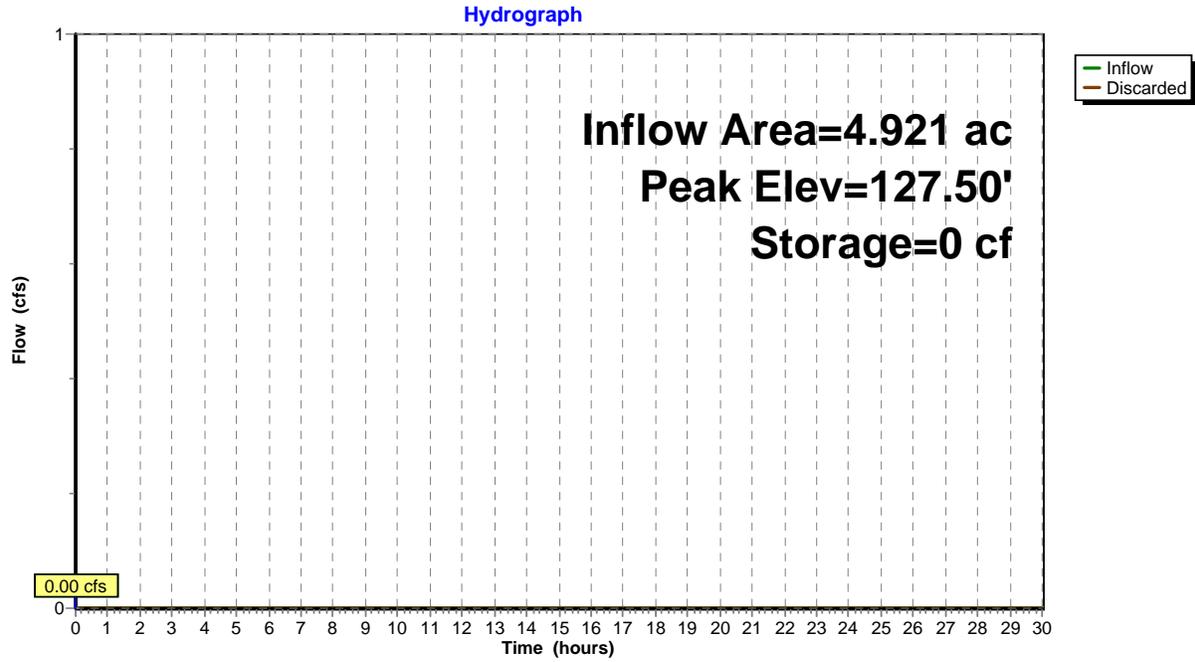
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	127.50'	25,103 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=127.50' (Free Discharge)  
 ↳ **1=Exfiltration** (Passes 0.00 cfs of 0.43 cfs potential flow)

### Pond 7P: NATURAL DEPRESSION



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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: SOUTHWEST** Runoff Area=349,742 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.001 af

**Subcatchment 2S: SOUTHEAST** Runoff Area=244,125 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 3S: ONSITE FLOW** Runoff Area=271,849 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=434' Tc=13.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 4S: NORTHERN SITE** Runoff Area=243,811 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=437' Tc=13.1 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 5S: ONSITE FLOW** Runoff Area=139,555 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=312' Tc=13.8 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 6S: ONSITE FLOW** Runoff Area=218,161 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=504' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 7S: ONSITE FLOW** Runoff Area=214,351 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=454' Tc=10.4 min CN=30 Runoff=0.00 cfs 0.000 af

**Reach 1R: FLOW TOWARDS WESTERN RESIDENCES** Inflow=0.00 cfs 0.001 af  
 Outflow=0.00 cfs 0.001 af

**Reach 2R: FLOW TOWARDS TOWN LAND** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Reach 3R: FLOW TOWARDS ATKINS ROAD** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 3P: NATURAL DEPRESSION** Peak Elev=122.00' Storage=1 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 5P: NATURAL DEPRESSION** Peak Elev=132.00' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 6P: NATURAL DEPRESSION** Peak Elev=122.00' Storage=1 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Pond 7P: NATURAL DEPRESSION** Peak Elev=127.50' Storage=0 cf Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 38.604 ac Runoff Volume = 0.002 af Average Runoff Depth = 0.00"**  
**100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac**



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**Summary for Subcatchment 2S: SOUTHEAST SITE**

Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

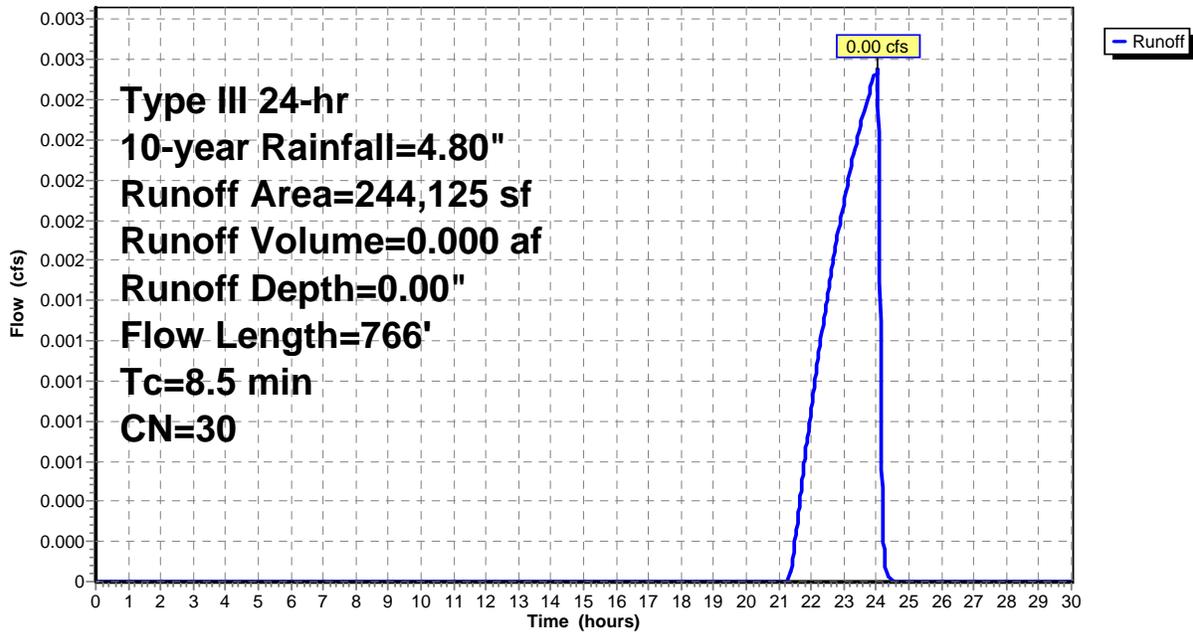
Area (sf)	CN	Description
244,125	30	Woods, Good, HSG A
244,125		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

**Subcatchment 2S: SOUTHEAST SITE**

Hydrograph



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**Summary for Subcatchment 3S: ONSITE FLOW**

Runoff = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Depth= 0.00"

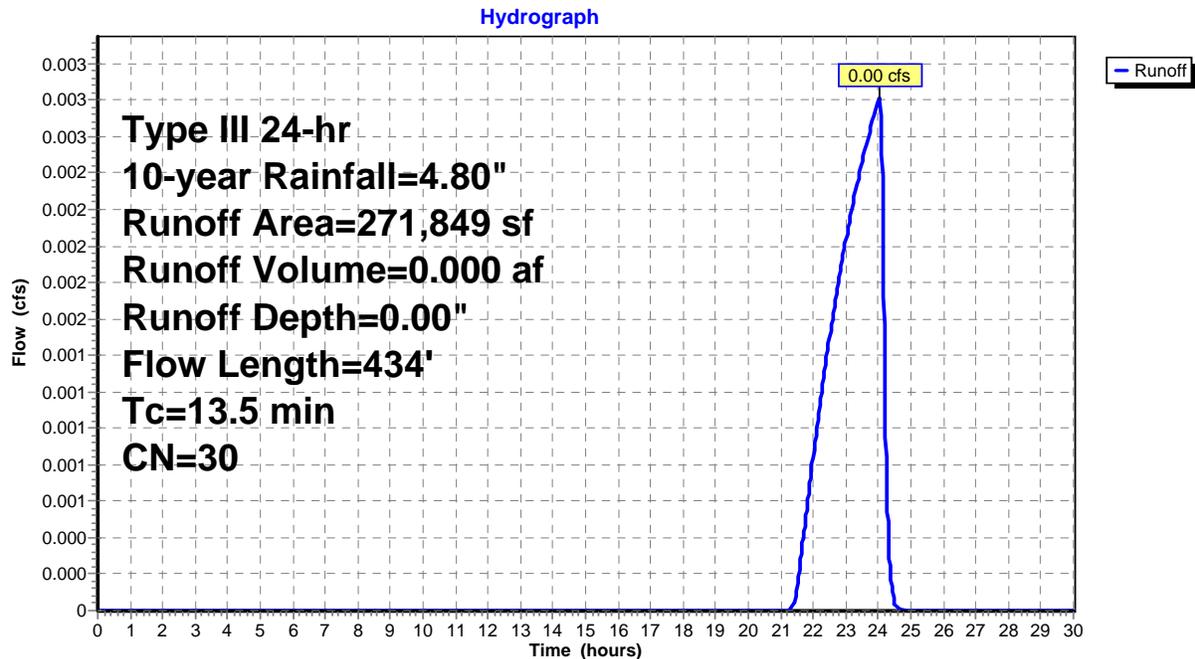
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
271,849	30	Woods, Good, HSG A
271,849		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.5	434	Total			

**Subcatchment 3S: ONSITE FLOW**



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**Summary for Subcatchment 4S: NORTHERN SITE**

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"

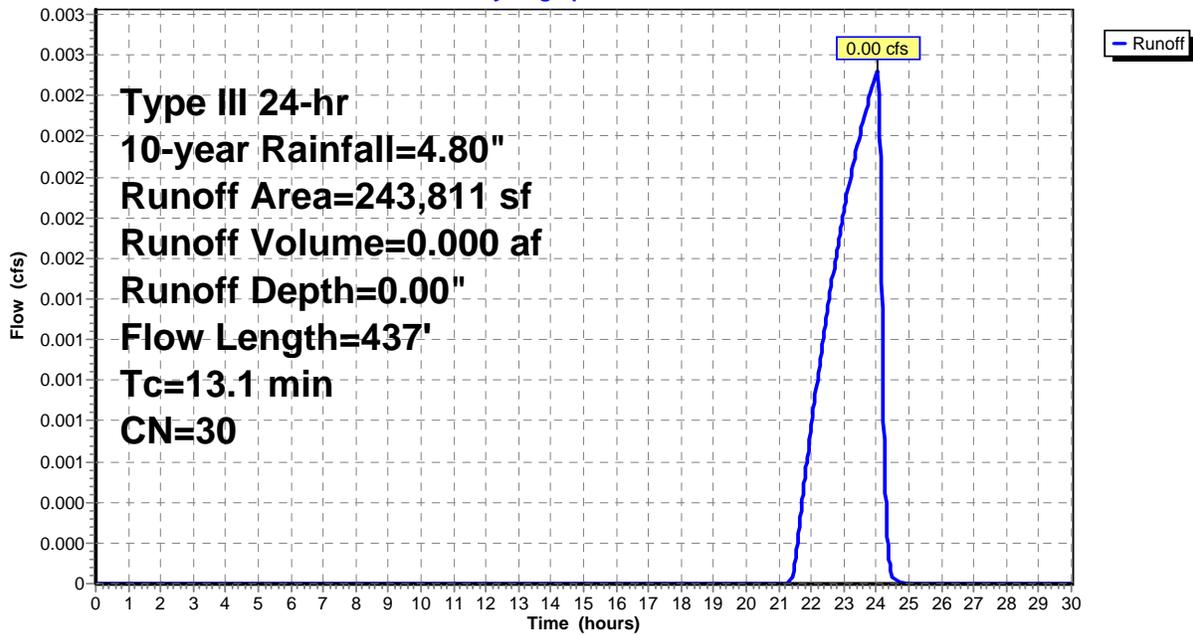
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
243,811	30	Woods, Good, HSG A
243,811		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.1	437	Total			

**Subcatchment 4S: NORTHERN SITE**

Hydrograph









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Type III 24-hr 10-year Rainfall=4.80"

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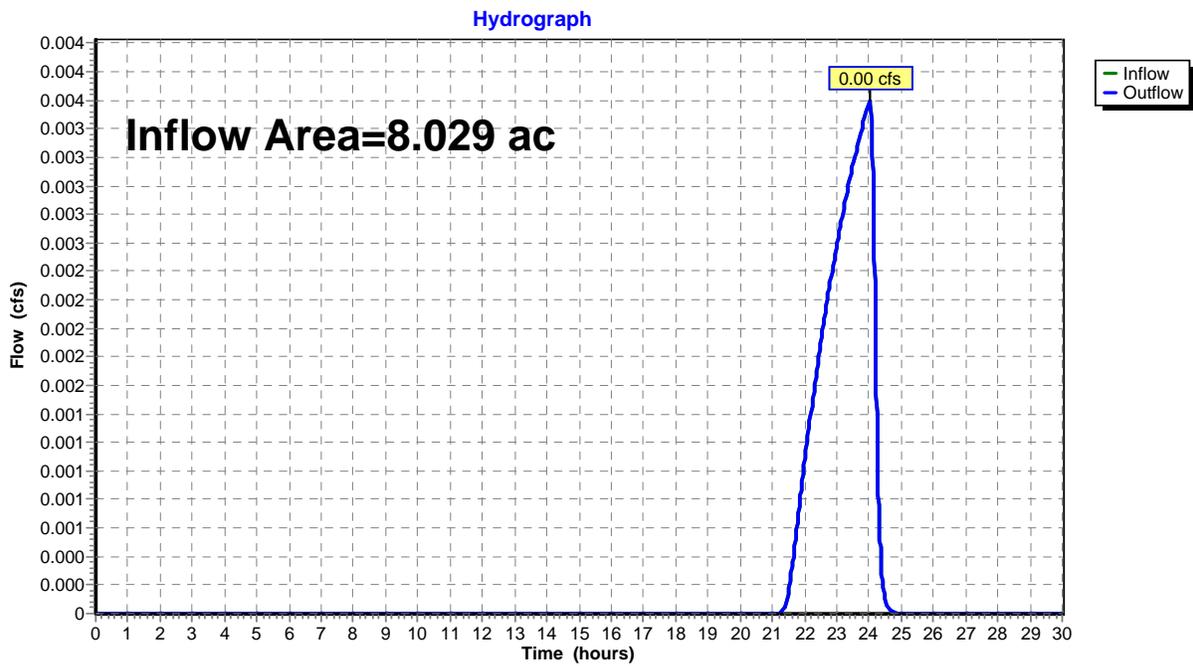
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**Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES**

Inflow Area = 8.029 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af  
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 1R: FLOW TOWARDS WESTERN RESIDENCES**



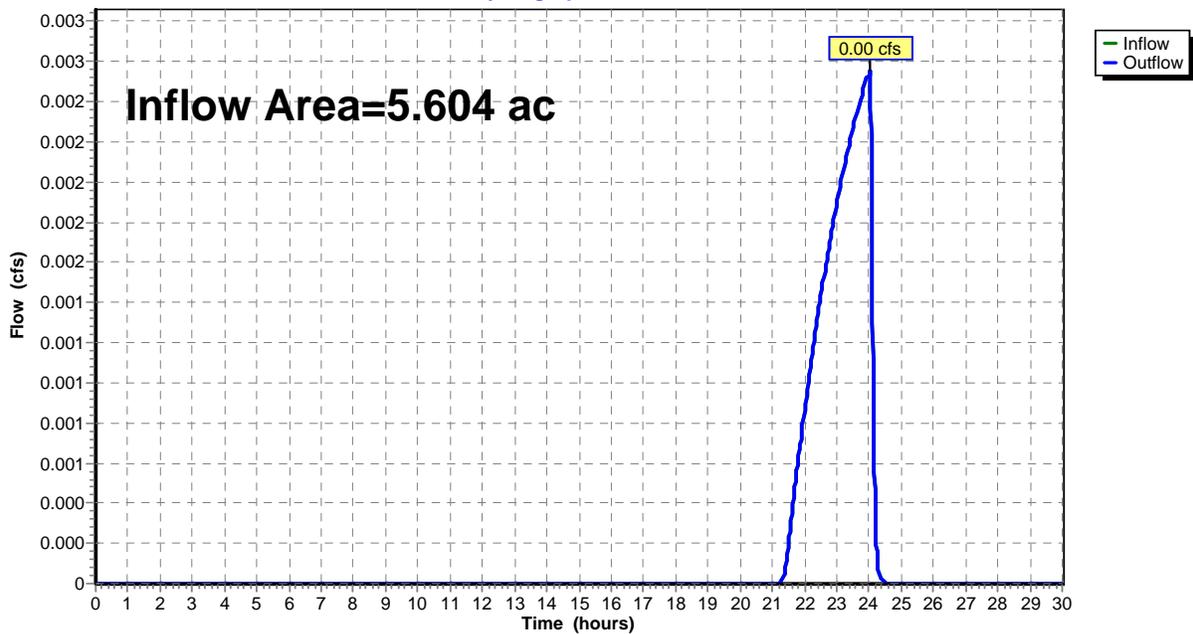
### Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 5.604 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 2R: FLOW TOWARDS TOWN LAND

Hydrograph

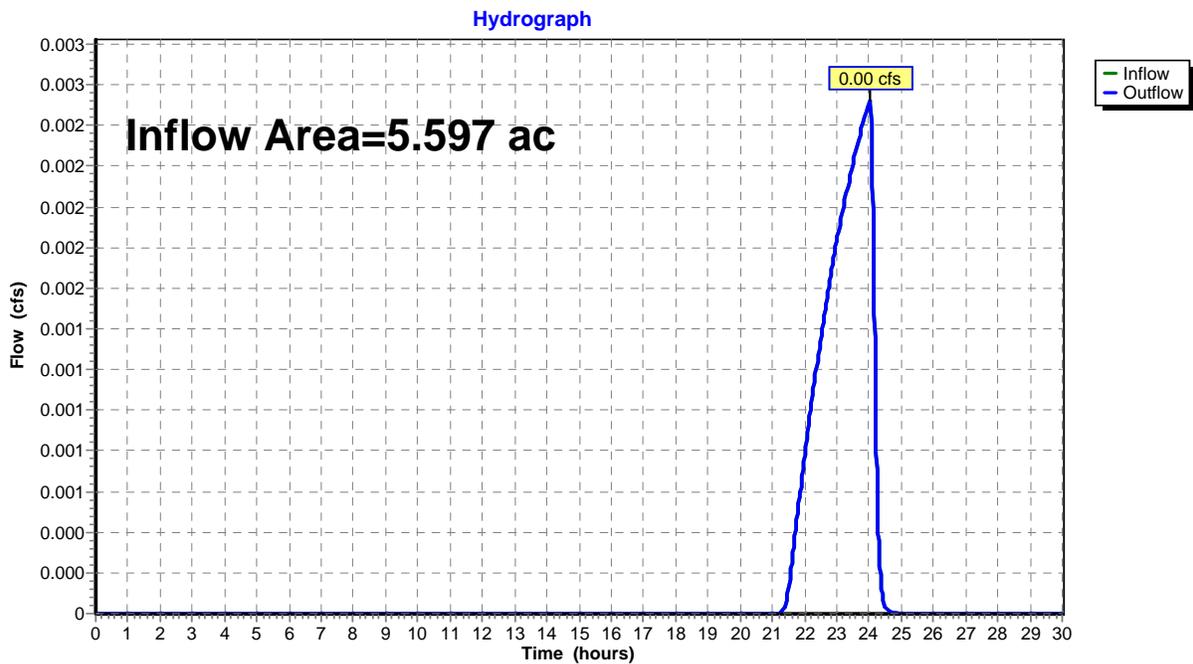


### Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD

Inflow Area = 5.597 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 3R: FLOW TOWARDS ATKINS ROAD



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Type III 24-hr 10-year Rainfall=4.80"

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**Summary for Pond 3P: NATURAL DEPRESSION**

Inflow Area = 6.241 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
 Inflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 24.06 hrs, Volume= 0.000 af, Atten= 1%, Lag= 1.3 min  
 Discarded = 0.00 cfs @ 24.06 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.00' @ 24.06 hrs Surf.Area= 958 sf Storage= 1 cf

Plug-Flow detention time= 3.3 min calculated for 0.000 af (100% of inflow)  
 Center-of-Mass det. time= 3.4 min ( 1,396.1 - 1,392.8 )

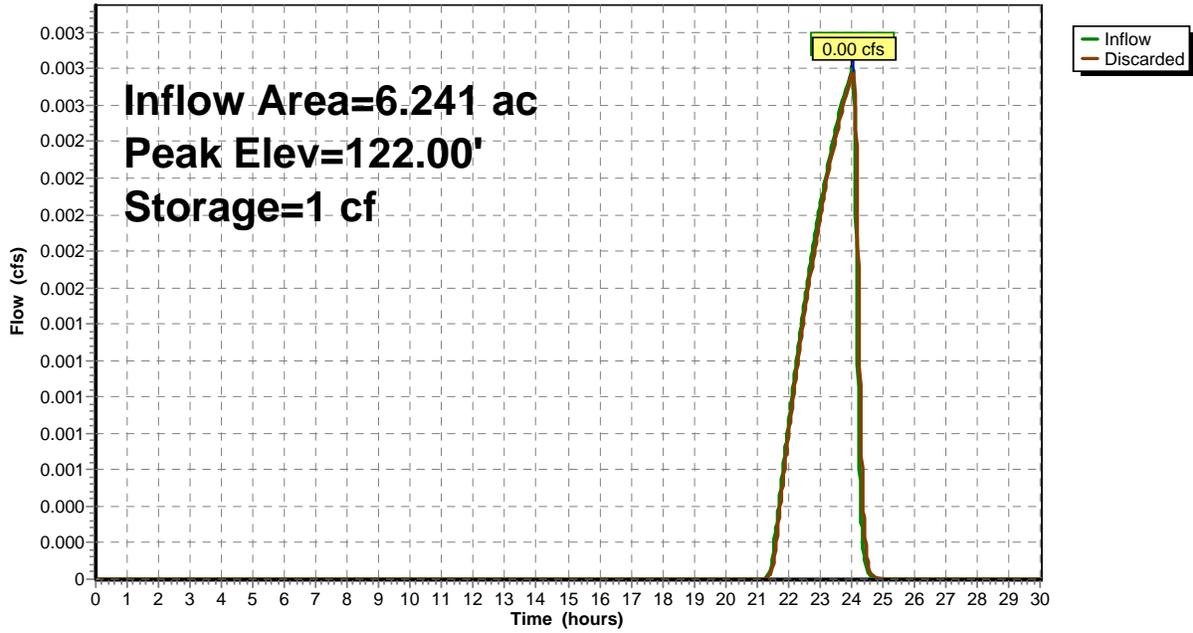
Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	34,720 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.18 cfs @ 24.06 hrs HW=122.00' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.18 cfs)

### Pond 3P: NATURAL DEPRESSION

Hydrograph



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Type III 24-hr 10-year Rainfall=4.80"

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**Summary for Pond 5P: NATURAL DEPRESSION**

Inflow Area = 3.204 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
 Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 24.05 hrs, Volume= 0.000 af, Atten= 1%, Lag= 1.3 min  
 Discarded = 0.00 cfs @ 24.05 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 132.00' @ 24.05 hrs Surf.Area= 77 sf Storage= 0 cf

Plug-Flow detention time= 2.5 min calculated for 0.000 af (100% of inflow)  
 Center-of-Mass det. time= 2.5 min ( 1,395.5 - 1,393.1 )

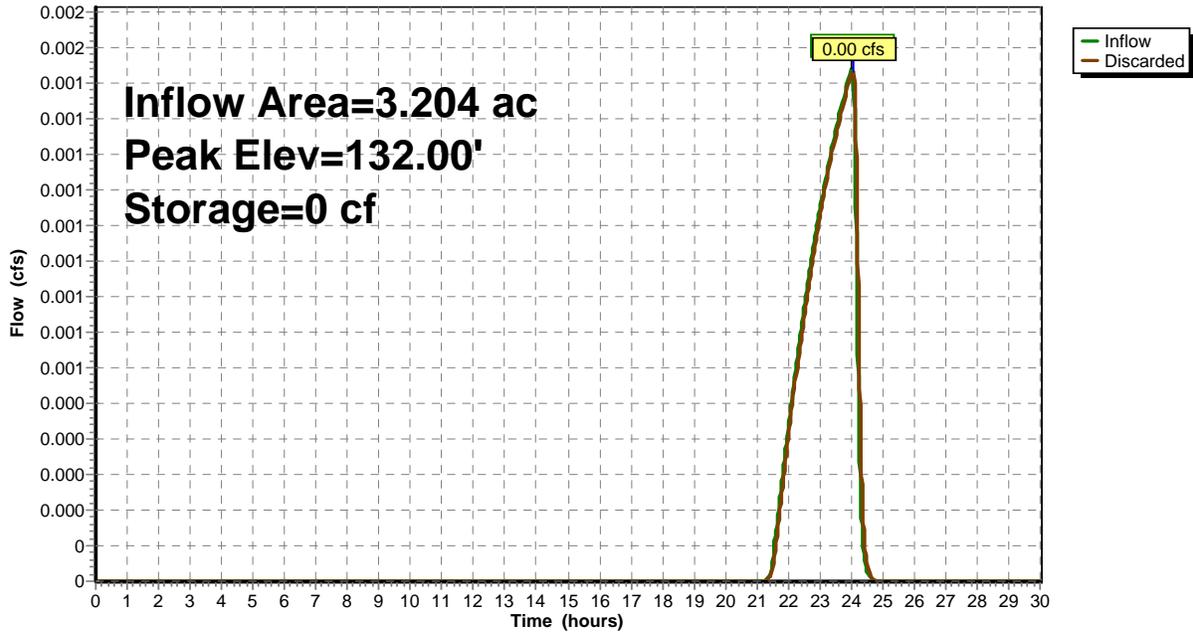
Volume	Invert	Avail.Storage	Storage Description		
#1	132.00'	5,089 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.01 cfs @ 24.05 hrs HW=132.00' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.01 cfs)

### Pond 5P: NATURAL DEPRESSION

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Type III 24-hr 10-year Rainfall=4.80"

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**Summary for Pond 6P: NATURAL DEPRESSION**

Inflow Area = 5.008 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
 Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Atten= 1%, Lag= 1.4 min  
 Discarded = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.00' @ 24.04 hrs Surf.Area= 1,490 sf Storage= 1 cf

Plug-Flow detention time= 5.1 min calculated for 0.000 af (100% of inflow)  
 Center-of-Mass det. time= 5.1 min ( 1,393.2 - 1,388.1 )

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,899 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.29 cfs @ 24.04 hrs HW=122.00' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.29 cfs)



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Type III 24-hr 10-year Rainfall=4.80"

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**Summary for Pond 7P: NATURAL DEPRESSION**

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
 Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.8 min  
 Discarded = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 127.50' @ 24.03 hrs Surf.Area= 2,228 sf Storage= 0 cf

Plug-Flow detention time= 1.7 min calculated for 0.000 af (100% of inflow)  
 Center-of-Mass det. time= 1.7 min ( 1,391.6 - 1,389.9 )

Volume	Invert	Avail.Storage	Storage Description		
#1	127.50'	25,103 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.43 cfs @ 24.03 hrs HW=127.50' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.43 cfs)



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*Type III 24-hr 25-year Rainfall=5.70"*

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: SOUTHWEST** Runoff Area=349,742 sf 0.00% Impervious Runoff Depth=0.04"  
 Flow Length=820' Tc=14.9 min CN=30 Runoff=0.04 cfs 0.029 af

**Subcatchment 2S: SOUTHEAST** Runoff Area=244,125 sf 0.00% Impervious Runoff Depth=0.04"  
 Flow Length=766' Tc=8.5 min CN=30 Runoff=0.03 cfs 0.020 af

**Subcatchment 3S: ONSITE FLOW** Runoff Area=271,849 sf 0.00% Impervious Runoff Depth=0.04"  
 Flow Length=434' Tc=13.5 min CN=30 Runoff=0.03 cfs 0.023 af

**Subcatchment 4S: NORTHERN SITE** Runoff Area=243,811 sf 0.00% Impervious Runoff Depth=0.04"  
 Flow Length=437' Tc=13.1 min CN=30 Runoff=0.03 cfs 0.020 af

**Subcatchment 5S: ONSITE FLOW** Runoff Area=139,555 sf 0.00% Impervious Runoff Depth=0.04"  
 Flow Length=312' Tc=13.8 min CN=30 Runoff=0.02 cfs 0.012 af

**Subcatchment 6S: ONSITE FLOW** Runoff Area=218,161 sf 0.00% Impervious Runoff Depth=0.04"  
 Flow Length=504' Tc=8.5 min CN=30 Runoff=0.03 cfs 0.018 af

**Subcatchment 7S: ONSITE FLOW** Runoff Area=214,351 sf 0.00% Impervious Runoff Depth=0.04"  
 Flow Length=454' Tc=10.4 min CN=30 Runoff=0.03 cfs 0.018 af

**Reach 1R: FLOW TOWARDS WESTERN RESIDENCES** Inflow=0.04 cfs 0.029 af  
 Outflow=0.04 cfs 0.029 af

**Reach 2R: FLOW TOWARDS TOWN LAND** Inflow=0.03 cfs 0.020 af  
 Outflow=0.03 cfs 0.020 af

**Reach 3R: FLOW TOWARDS ATKINS ROAD** Inflow=0.03 cfs 0.020 af  
 Outflow=0.03 cfs 0.020 af

**Pond 3P: NATURAL DEPRESSION** Peak Elev=122.01' Storage=6 cf Inflow=0.03 cfs 0.023 af  
 Outflow=0.03 cfs 0.023 af

**Pond 5P: NATURAL DEPRESSION** Peak Elev=132.03' Storage=2 cf Inflow=0.02 cfs 0.012 af  
 Outflow=0.02 cfs 0.012 af

**Pond 6P: NATURAL DEPRESSION** Peak Elev=122.01' Storage=8 cf Inflow=0.03 cfs 0.018 af  
 Outflow=0.03 cfs 0.018 af

**Pond 7P: NATURAL DEPRESSION** Peak Elev=127.50' Storage=3 cf Inflow=0.03 cfs 0.018 af  
 Outflow=0.03 cfs 0.018 af

**Total Runoff Area = 38.604 ac Runoff Volume = 0.141 af Average Runoff Depth = 0.04"**  
**100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac**

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Type III 24-hr 25-year Rainfall=5.70"

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**Summary for Subcatchment 1S: SOUTHWEST SITE**

Runoff = 0.04 cfs @ 17.17 hrs, Volume= 0.029 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

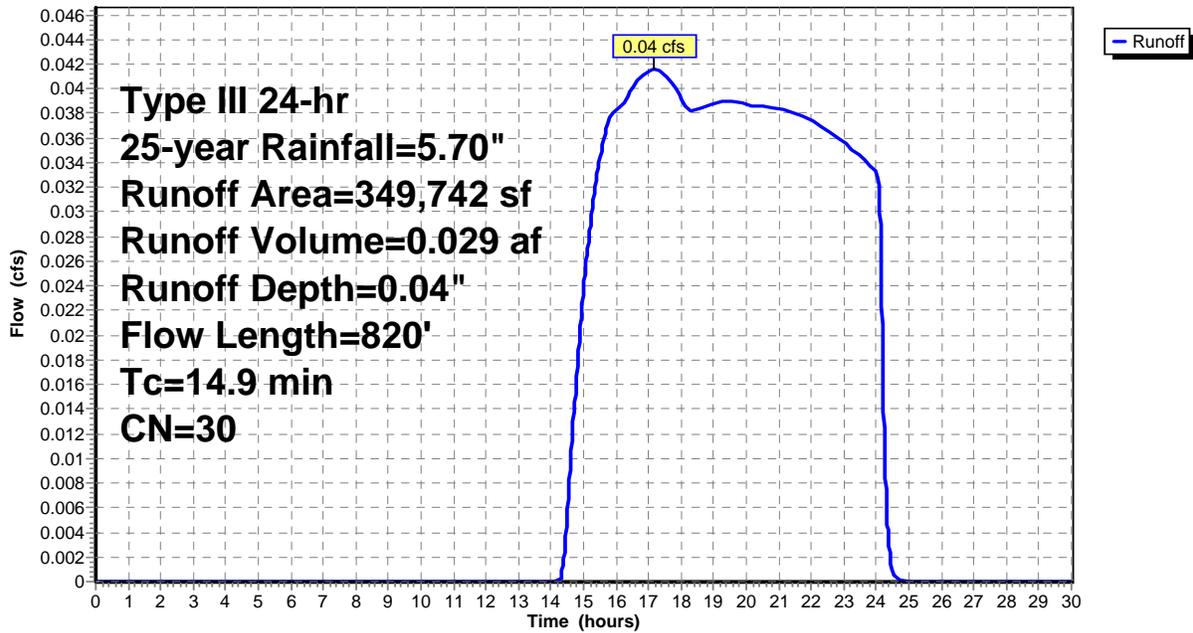
Area (sf)	CN	Description
349,742	30	Woods, Good, HSG A
349,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
14.9	820	Total			

**Subcatchment 1S: SOUTHWEST SITE**

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**Summary for Subcatchment 2S: SOUTHEAST SITE**

Runoff = 0.03 cfs @ 17.03 hrs, Volume= 0.020 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

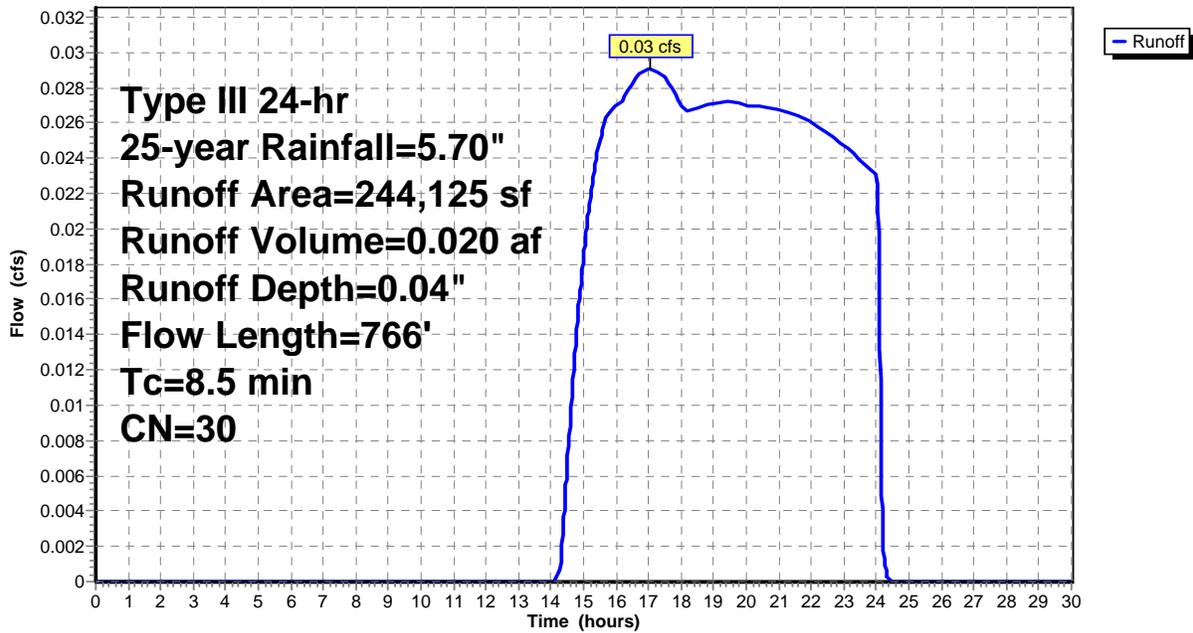
Area (sf)	CN	Description
244,125	30	Woods, Good, HSG A
244,125		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

**Subcatchment 2S: SOUTHEAST SITE**

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**Summary for Subcatchment 3S: ONSITE FLOW**

Runoff = 0.03 cfs @ 17.12 hrs, Volume= 0.023 af, Depth= 0.04"

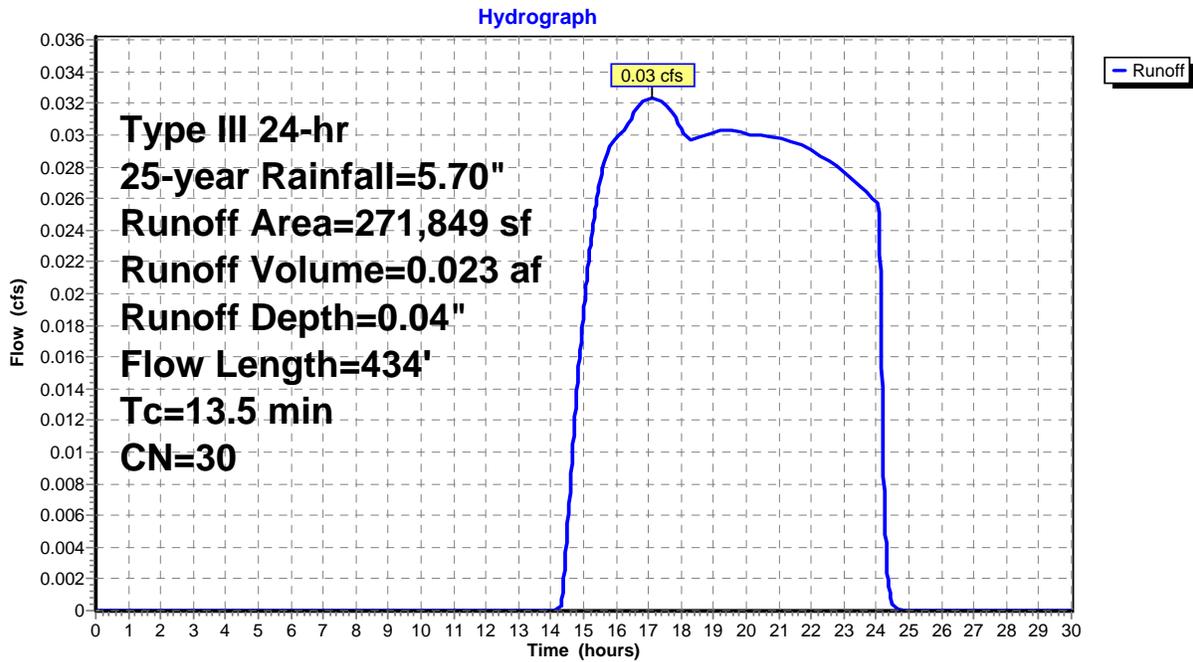
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
271,849	30	Woods, Good, HSG A
271,849		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.5	434	Total			

**Subcatchment 3S: ONSITE FLOW**



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**Summary for Subcatchment 4S: NORTHERN SITE**

Runoff = 0.03 cfs @ 17.13 hrs, Volume= 0.020 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

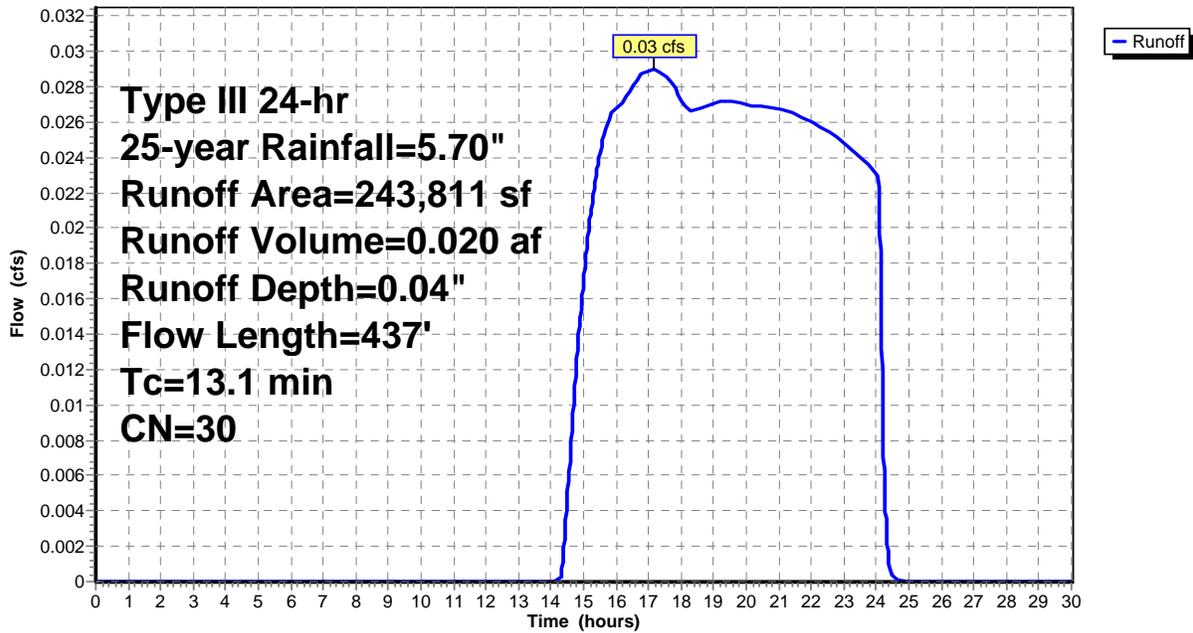
Area (sf)	CN	Description
243,811	30	Woods, Good, HSG A
243,811		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.1	437	Total			

**Subcatchment 4S: NORTHERN SITE**

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**Summary for Subcatchment 5S: ONSITE FLOW**

Runoff = 0.02 cfs @ 17.13 hrs, Volume= 0.012 af, Depth= 0.04"

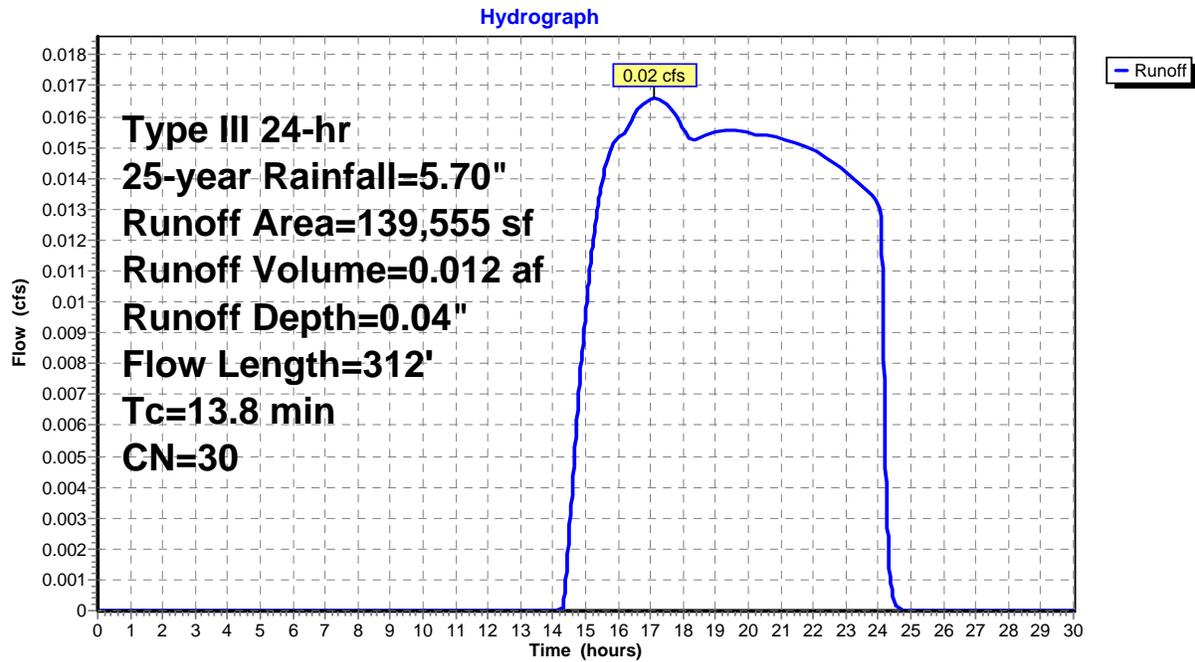
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
139,555	30	Woods, Good, HSG A
139,555		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0160	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	262	0.0616	4.00		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.8	312	Total			

**Subcatchment 5S: ONSITE FLOW**



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**Summary for Subcatchment 6S: ONSITE FLOW**

Runoff = 0.03 cfs @ 17.03 hrs, Volume= 0.018 af, Depth= 0.04"

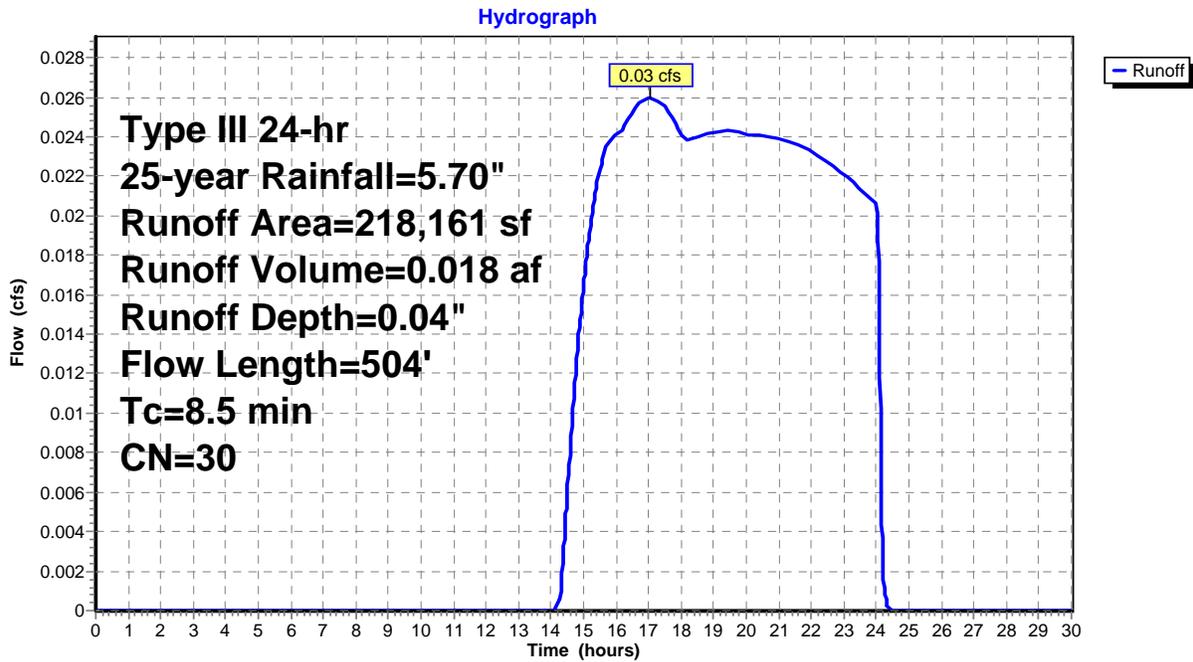
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
218,161	30	Woods, Good, HSG A
218,161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	504	Total			

**Subcatchment 6S: ONSITE FLOW**



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**Summary for Subcatchment 7S: ONSITE FLOW**

Runoff = 0.03 cfs @ 17.09 hrs, Volume= 0.018 af, Depth= 0.04"

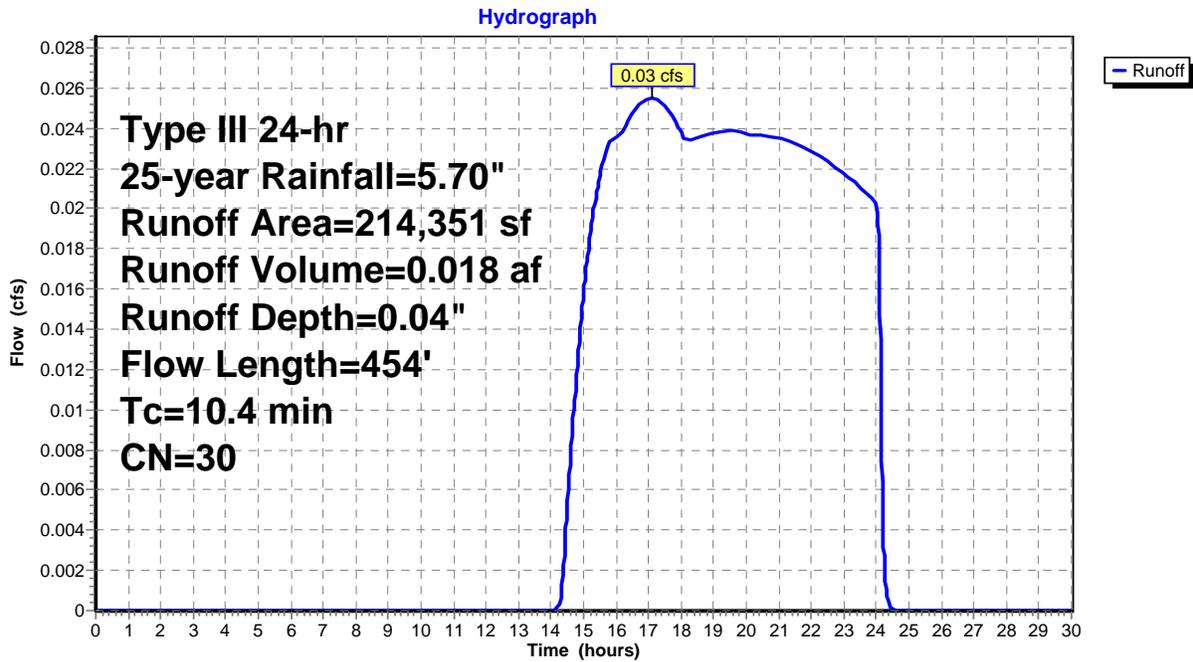
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
214,351	30	Woods, Good, HSG A
214,351		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0400	0.09		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	404	0.0718	4.31		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
10.4	454	Total			

**Subcatchment 7S: ONSITE FLOW**

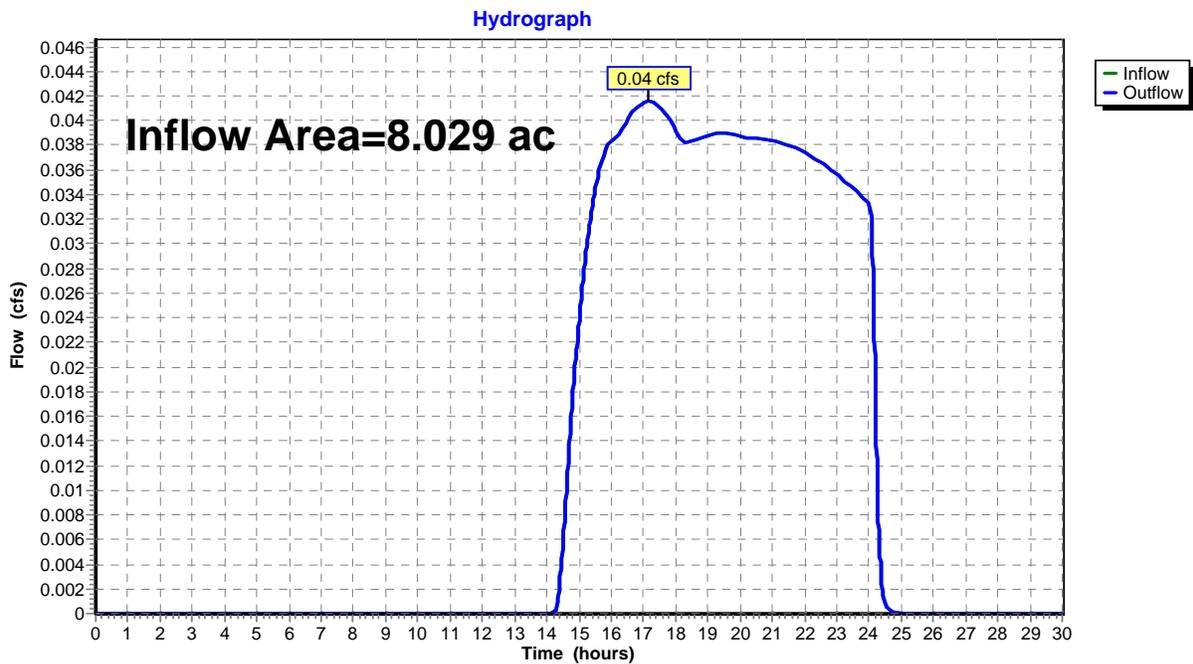


### Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 8.029 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
Inflow = 0.04 cfs @ 17.17 hrs, Volume= 0.029 af  
Outflow = 0.04 cfs @ 17.17 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

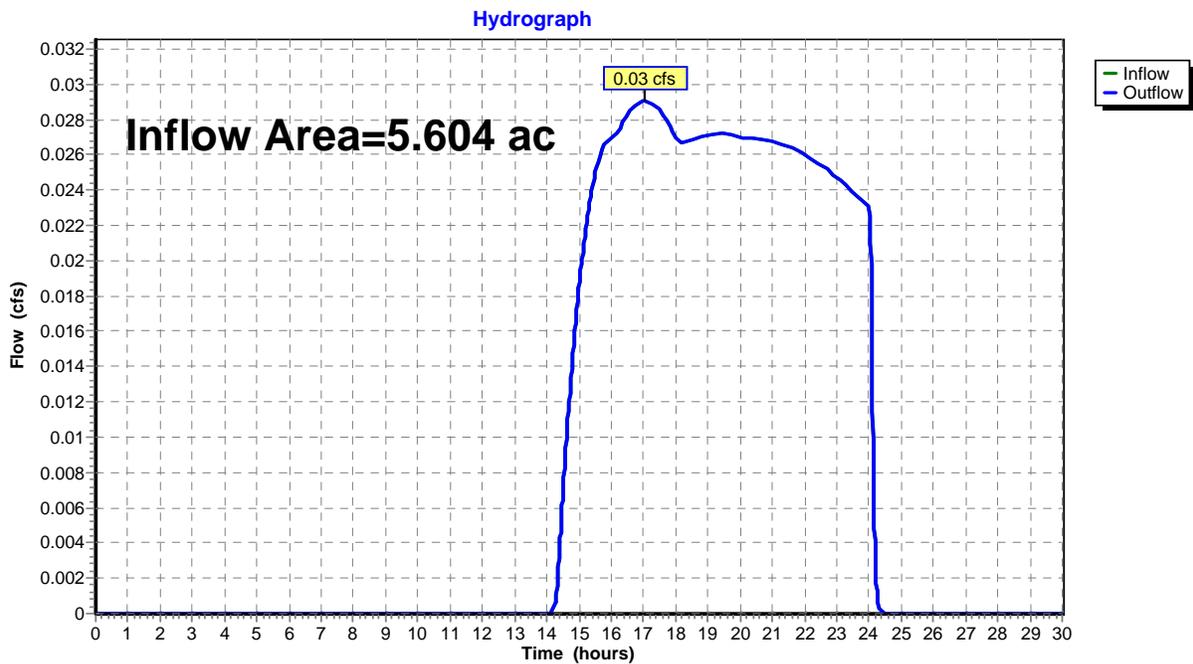


### Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 5.604 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
Inflow = 0.03 cfs @ 17.03 hrs, Volume= 0.020 af  
Outflow = 0.03 cfs @ 17.03 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 2R: FLOW TOWARDS TOWN LAND

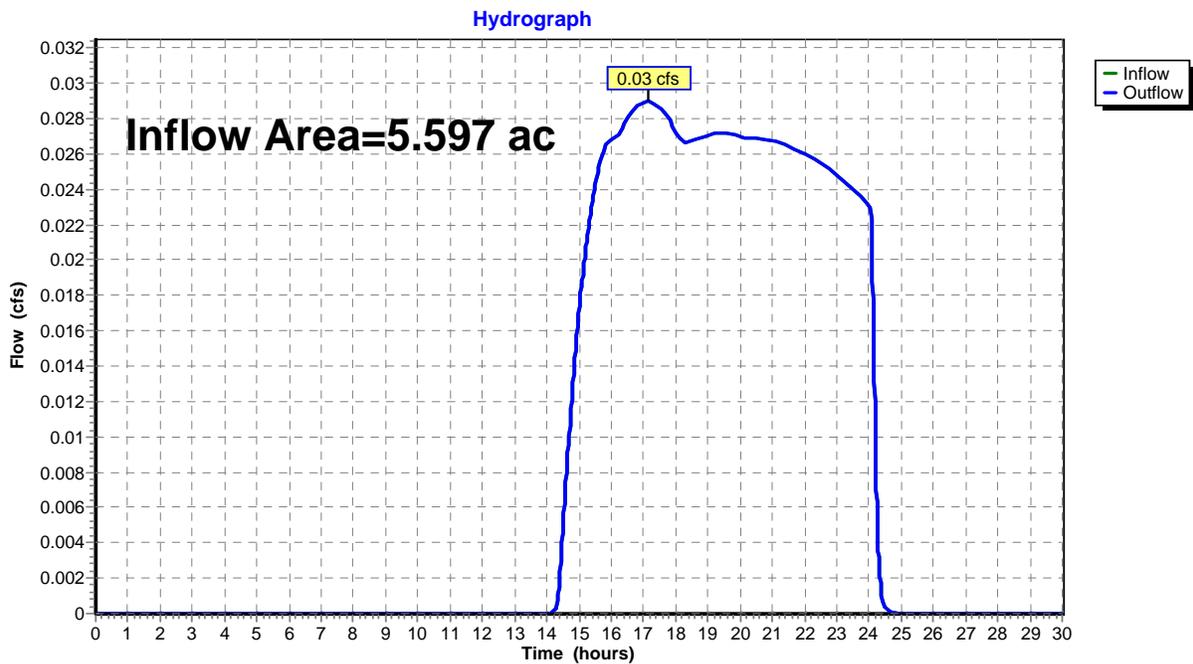


### Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD

Inflow Area = 5.597 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
Inflow = 0.03 cfs @ 17.13 hrs, Volume= 0.020 af  
Outflow = 0.03 cfs @ 17.13 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 3R: FLOW TOWARDS ATKINS ROAD



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**Summary for Pond 3P: NATURAL DEPRESSION**

Inflow Area = 6.241 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
 Inflow = 0.03 cfs @ 17.12 hrs, Volume= 0.023 af  
 Outflow = 0.03 cfs @ 17.18 hrs, Volume= 0.023 af, Atten= 0%, Lag= 3.7 min  
 Discarded = 0.03 cfs @ 17.18 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.01' @ 17.18 hrs Surf.Area= 969 sf Storage= 6 cf

Plug-Flow detention time= 3.3 min calculated for 0.023 af (100% of inflow)  
 Center-of-Mass det. time= 3.4 min ( 1,169.8 - 1,166.5 )

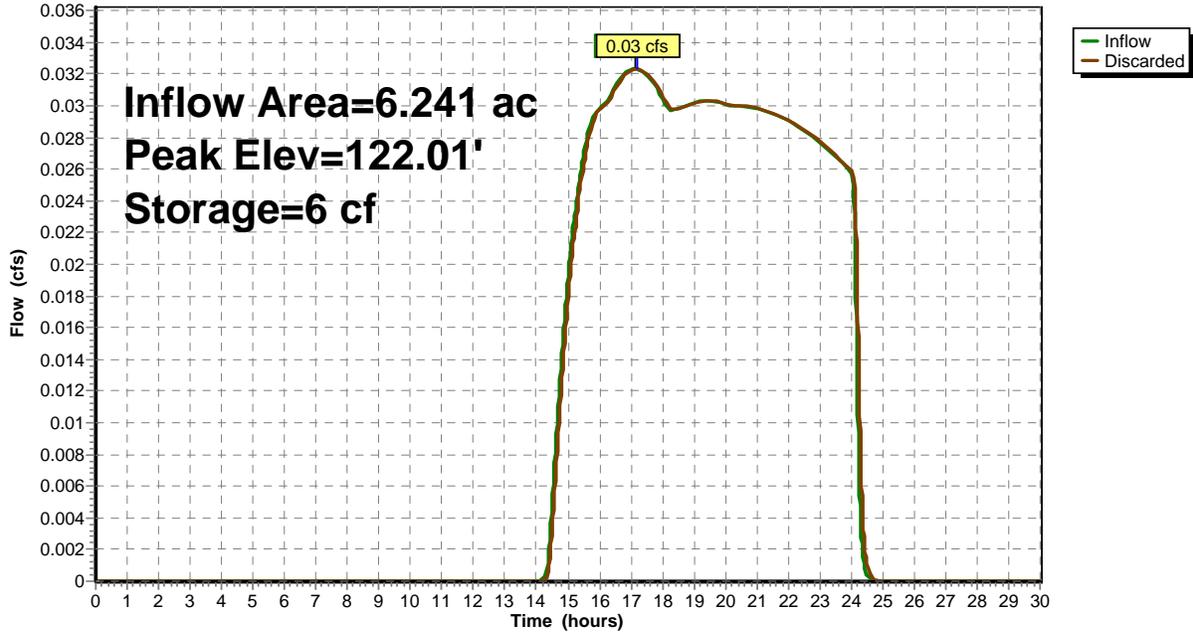
Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	34,720 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.19 cfs @ 17.18 hrs HW=122.01' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.19 cfs)

### Pond 3P: NATURAL DEPRESSION

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Type III 24-hr 25-year Rainfall=5.70"

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**Summary for Pond 5P: NATURAL DEPRESSION**

Inflow Area = 3.204 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
 Inflow = 0.02 cfs @ 17.13 hrs, Volume= 0.012 af  
 Outflow = 0.02 cfs @ 17.29 hrs, Volume= 0.012 af, Atten= 0%, Lag= 9.8 min  
 Discarded = 0.02 cfs @ 17.29 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 132.03' @ 17.29 hrs Surf.Area= 86 sf Storage= 2 cf

Plug-Flow detention time= 2.5 min calculated for 0.012 af (100% of inflow)  
 Center-of-Mass det. time= 2.5 min ( 1,169.2 - 1,166.7 )

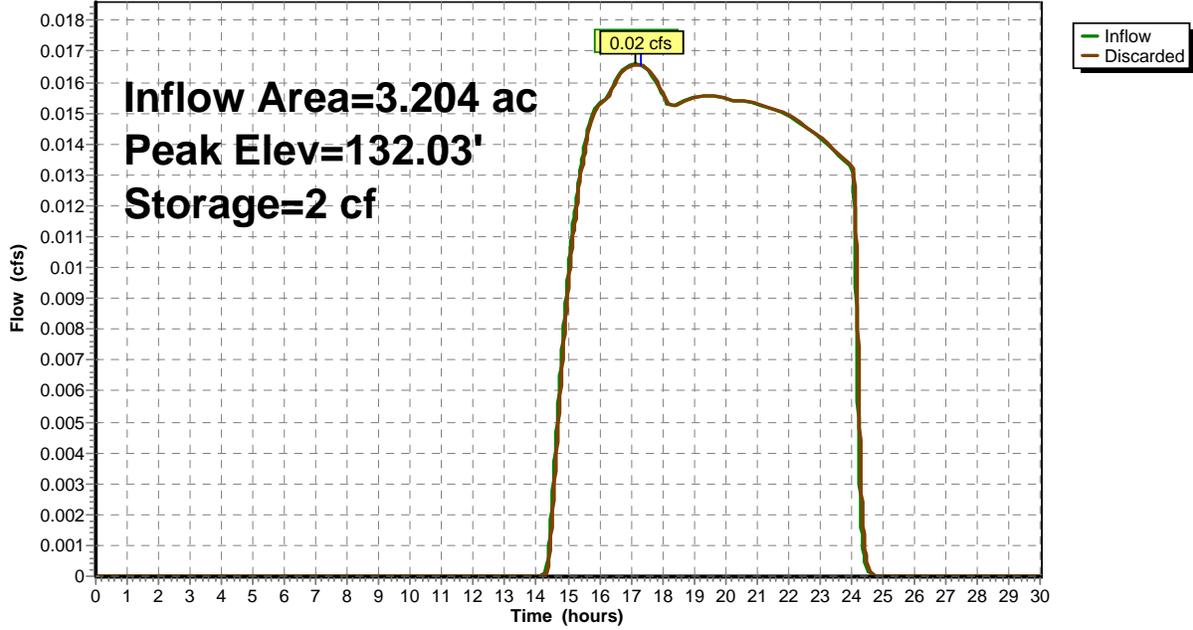
Volume	Invert	Avail.Storage	Storage Description		
#1	132.00'	5,089 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.02 cfs @ 17.29 hrs HW=132.03' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.02 cfs)

### Pond 5P: NATURAL DEPRESSION

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**Summary for Pond 6P: NATURAL DEPRESSION**

Inflow Area = 5.008 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
 Inflow = 0.03 cfs @ 17.03 hrs, Volume= 0.018 af  
 Outflow = 0.03 cfs @ 17.13 hrs, Volume= 0.018 af, Atten= 0%, Lag= 6.1 min  
 Discarded = 0.03 cfs @ 17.13 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.01' @ 17.13 hrs Surf.Area= 1,496 sf Storage= 8 cf

Plug-Flow detention time= 5.1 min calculated for 0.018 af (100% of inflow)  
 Center-of-Mass det. time= 5.1 min ( 1,166.9 - 1,161.8 )

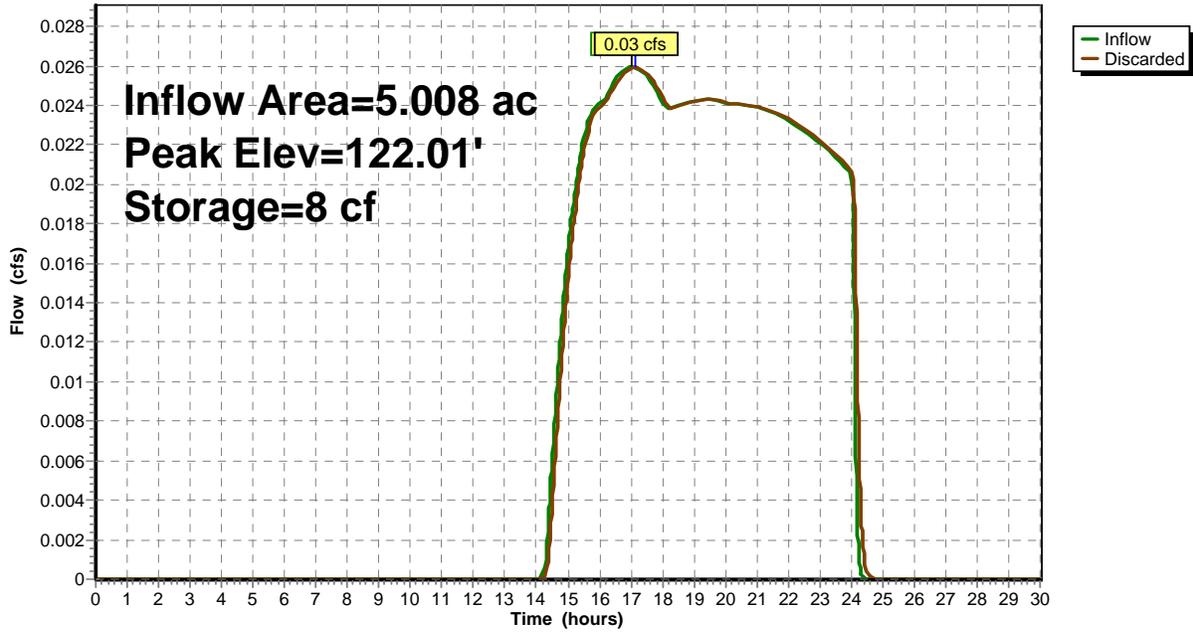
Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,899 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.29 cfs @ 17.13 hrs HW=122.01' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.29 cfs)

### Pond 6P: NATURAL DEPRESSION

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Type III 24-hr 25-year Rainfall=5.70"

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**Summary for Pond 7P: NATURAL DEPRESSION**

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
 Inflow = 0.03 cfs @ 17.09 hrs, Volume= 0.018 af  
 Outflow = 0.03 cfs @ 17.10 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.03 cfs @ 17.10 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 127.50' @ 17.10 hrs Surf.Area= 2,234 sf Storage= 3 cf

Plug-Flow detention time= 1.7 min calculated for 0.018 af (100% of inflow)  
 Center-of-Mass det. time= 1.7 min ( 1,165.3 - 1,163.6 )

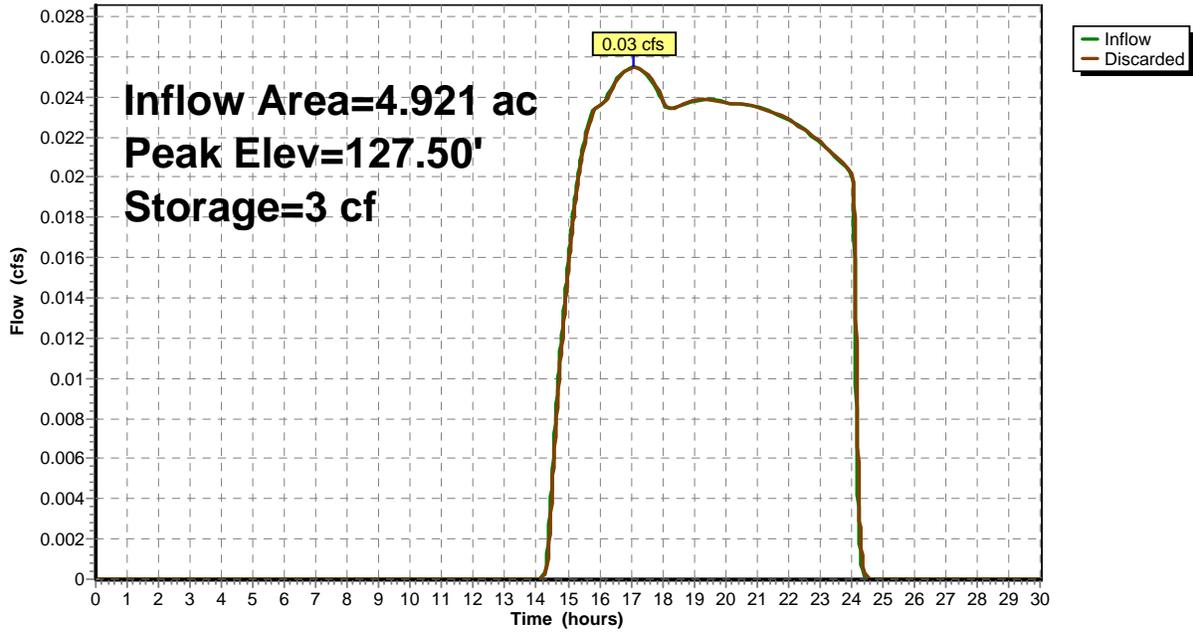
Volume	Invert	Avail.Storage	Storage Description		
#1	127.50'	25,103 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.43 cfs @ 17.10 hrs HW=127.50' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.43 cfs)

### Pond 7P: NATURAL DEPRESSION

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*Type III 24-hr 100-year Rainfall=7.10"*

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: SOUTHWEST** Runoff Area=349,742 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=820' Tc=14.9 min CN=30 Runoff=0.25 cfs 0.154 af

**Subcatchment 2S: SOUTHEAST** Runoff Area=244,125 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=766' Tc=8.5 min CN=30 Runoff=0.18 cfs 0.107 af

**Subcatchment 3S: ONSITE FLOW** Runoff Area=271,849 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=434' Tc=13.5 min CN=30 Runoff=0.20 cfs 0.120 af

**Subcatchment 4S: NORTHERN SITE** Runoff Area=243,811 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=437' Tc=13.1 min CN=30 Runoff=0.18 cfs 0.107 af

**Subcatchment 5S: ONSITE FLOW** Runoff Area=139,555 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=312' Tc=13.8 min CN=30 Runoff=0.10 cfs 0.061 af

**Subcatchment 6S: ONSITE FLOW** Runoff Area=218,161 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=504' Tc=8.5 min CN=30 Runoff=0.16 cfs 0.096 af

**Subcatchment 7S: ONSITE FLOW** Runoff Area=214,351 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=454' Tc=10.4 min CN=30 Runoff=0.16 cfs 0.094 af

**Reach 1R: FLOW TOWARDS WESTERN RESIDENCES** Inflow=0.25 cfs 0.154 af  
 Outflow=0.25 cfs 0.154 af

**Reach 2R: FLOW TOWARDS TOWN LAND** Inflow=0.18 cfs 0.107 af  
 Outflow=0.18 cfs 0.107 af

**Reach 3R: FLOW TOWARDS ATKINS ROAD** Inflow=0.18 cfs 0.107 af  
 Outflow=0.18 cfs 0.107 af

**Pond 3P: NATURAL DEPRESSION** Peak Elev=122.04' Storage=40 cf Inflow=0.20 cfs 0.120 af  
 Outflow=0.20 cfs 0.120 af

**Pond 5P: NATURAL DEPRESSION** Peak Elev=132.71' Storage=182 cf Inflow=0.10 cfs 0.061 af  
 Outflow=0.10 cfs 0.061 af

**Pond 6P: NATURAL DEPRESSION** Peak Elev=122.03' Storage=48 cf Inflow=0.16 cfs 0.096 af  
 Outflow=0.16 cfs 0.096 af

**Pond 7P: NATURAL DEPRESSION** Peak Elev=127.51' Storage=16 cf Inflow=0.16 cfs 0.094 af  
 Outflow=0.16 cfs 0.094 af

**Total Runoff Area = 38.604 ac Runoff Volume = 0.739 af Average Runoff Depth = 0.23"**  
**100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac**

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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Subcatchment 1S: SOUTHWEST SITE**

Runoff = 0.25 cfs @ 13.86 hrs, Volume= 0.154 af, Depth= 0.23"

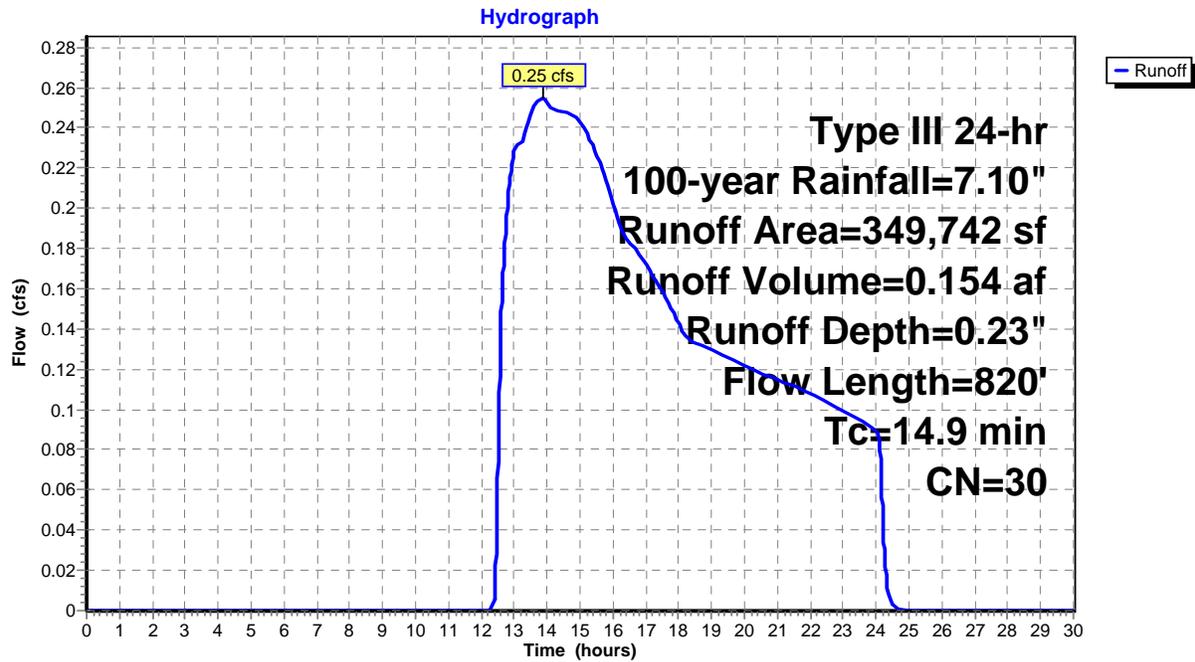
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
349,742	30	Woods, Good, HSG A
349,742		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
14.9	820	Total			

**Subcatchment 1S: SOUTHWEST SITE**



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**Summary for Subcatchment 2S: SOUTHEAST SITE**

Runoff = 0.18 cfs @ 13.76 hrs, Volume= 0.107 af, Depth= 0.23"

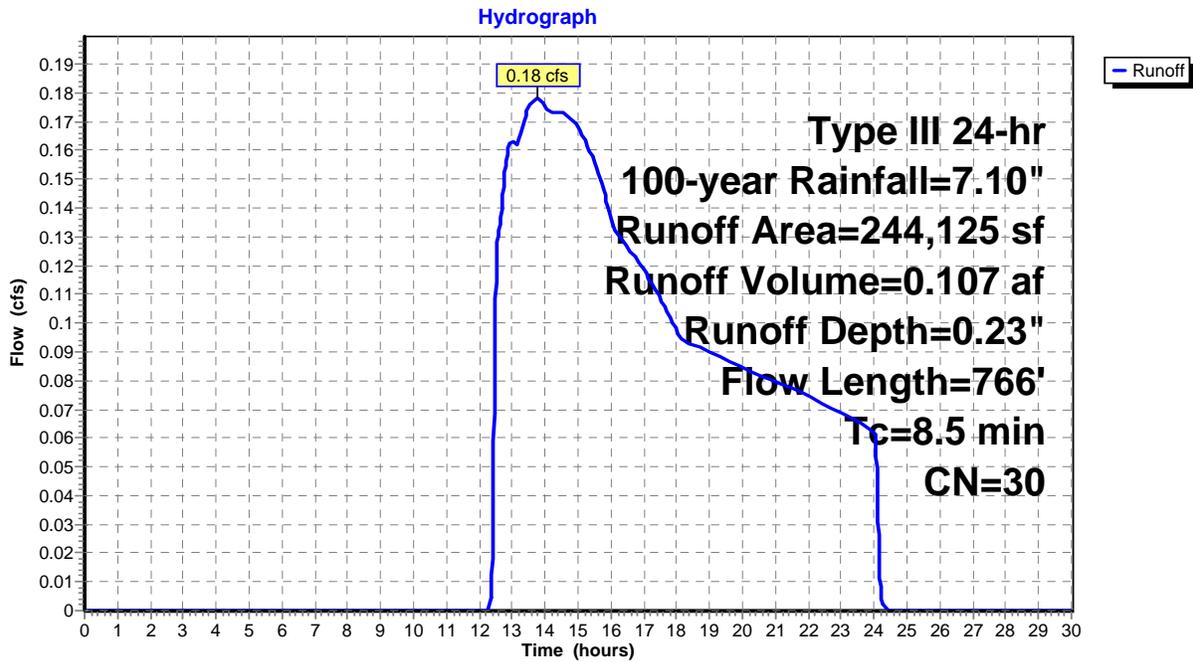
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
244,125	30	Woods, Good, HSG A
244,125		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

**Subcatchment 2S: SOUTHEAST SITE**



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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Subcatchment 3S: ONSITE FLOW**

Runoff = 0.20 cfs @ 13.82 hrs, Volume= 0.120 af, Depth= 0.23"

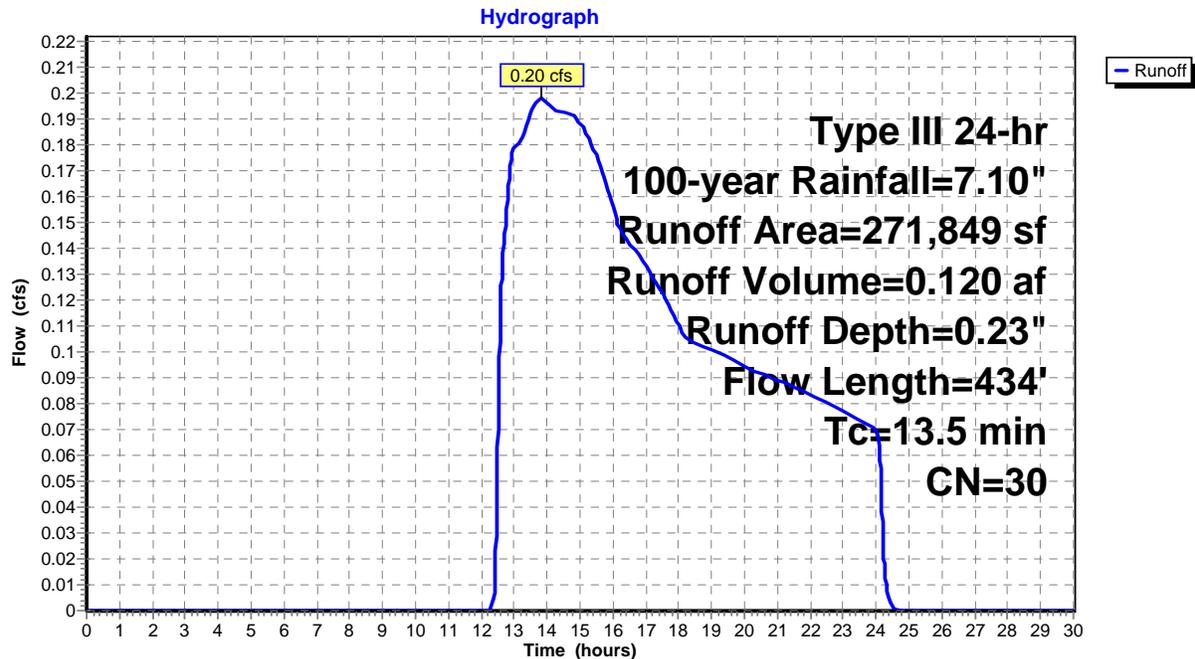
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
271,849	30	Woods, Good, HSG A
271,849		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.5	434	Total			

**Subcatchment 3S: ONSITE FLOW**



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**Summary for Subcatchment 4S: NORTHERN SITE**

Runoff = 0.18 cfs @ 13.81 hrs, Volume= 0.107 af, Depth= 0.23"

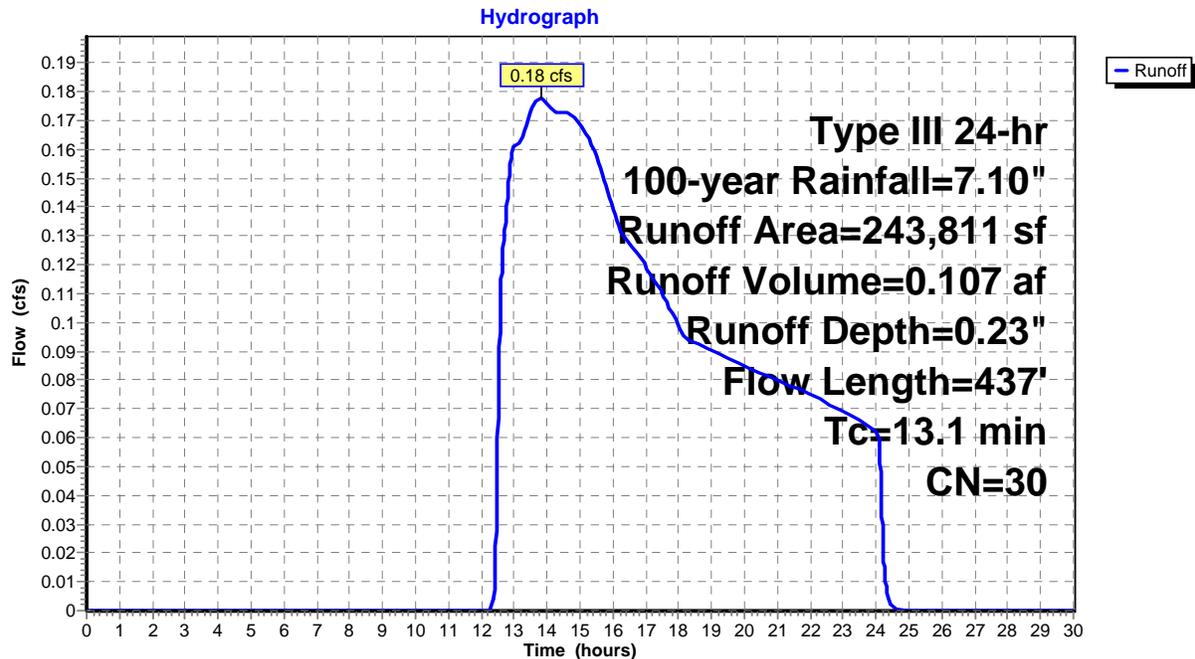
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
243,811	30	Woods, Good, HSG A
243,811		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.1	437	Total			

**Subcatchment 4S: NORTHERN SITE**



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**Summary for Subcatchment 5S: ONSITE FLOW**

Runoff = 0.10 cfs @ 13.85 hrs, Volume= 0.061 af, Depth= 0.23"

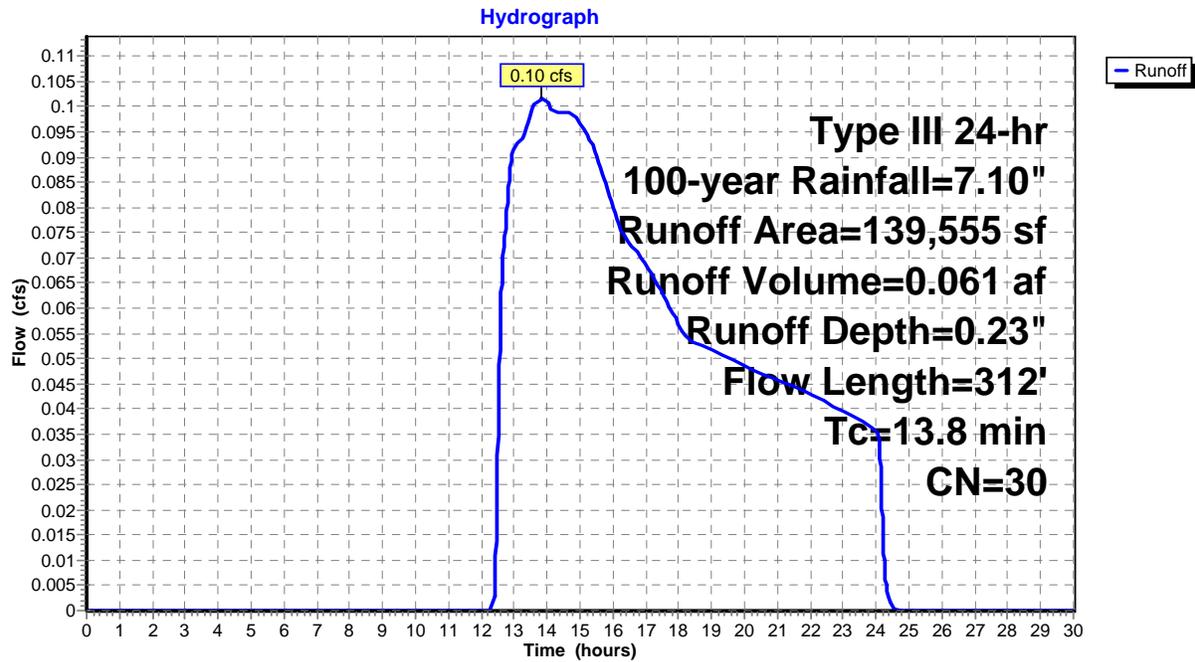
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
139,555	30	Woods, Good, HSG A
139,555		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0160	0.07		<b>Sheet Flow, A-B</b>
					Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	262	0.0616	4.00		<b>Shallow Concentrated Flow, B-C</b>
					Unpaved Kv= 16.1 fps
13.8	312	Total			

**Subcatchment 5S: ONSITE FLOW**



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**Summary for Subcatchment 6S: ONSITE FLOW**

Runoff = 0.16 cfs @ 13.76 hrs, Volume= 0.096 af, Depth= 0.23"

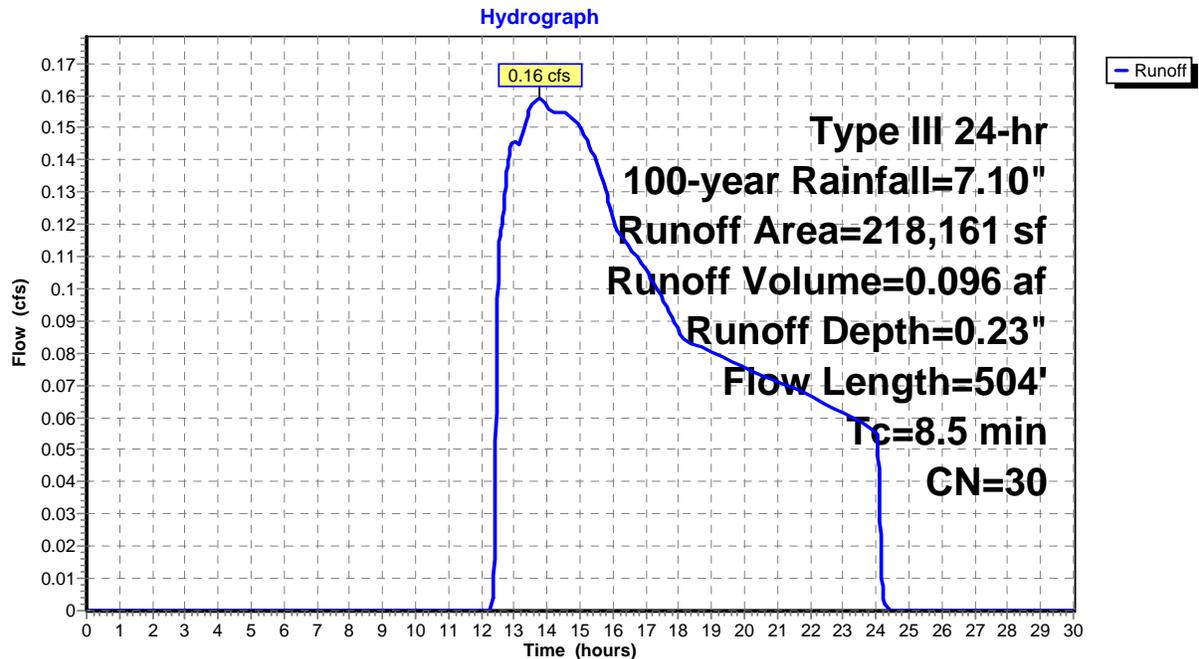
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
218,161	30	Woods, Good, HSG A
218,161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	504	Total			

**Subcatchment 6S: ONSITE FLOW**



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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Subcatchment 7S: ONSITE FLOW**

Runoff = 0.16 cfs @ 13.76 hrs, Volume= 0.094 af, Depth= 0.23"

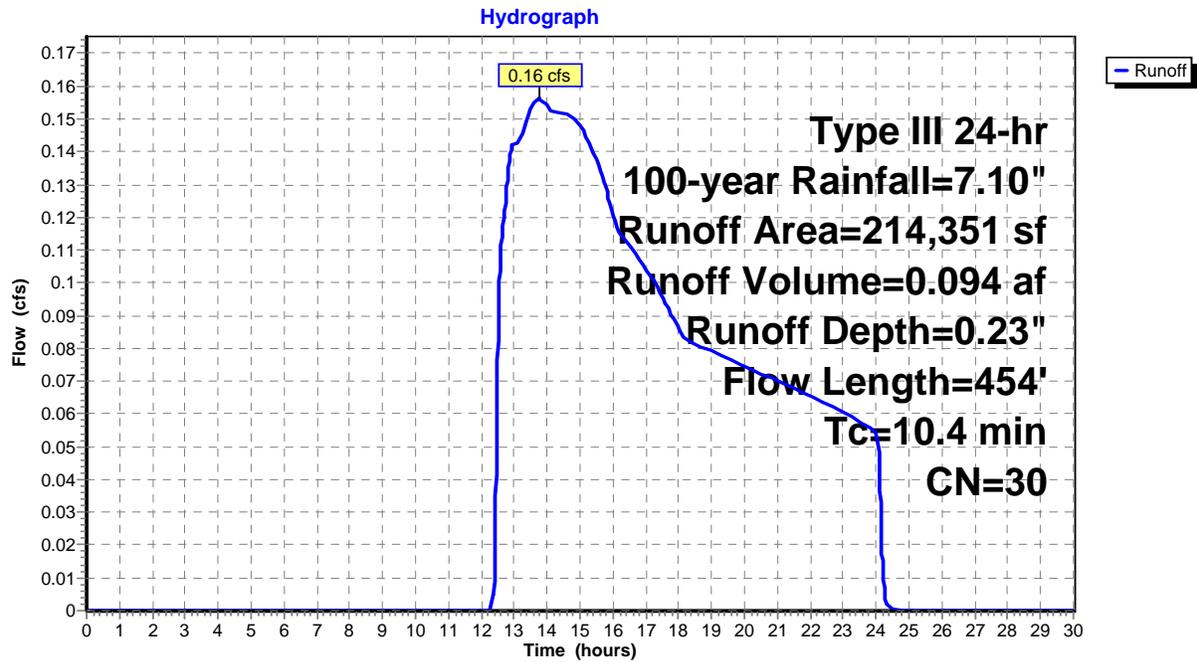
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
214,351	30	Woods, Good, HSG A
214,351		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0400	0.09		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	404	0.0718	4.31		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
10.4	454	Total			

**Subcatchment 7S: ONSITE FLOW**

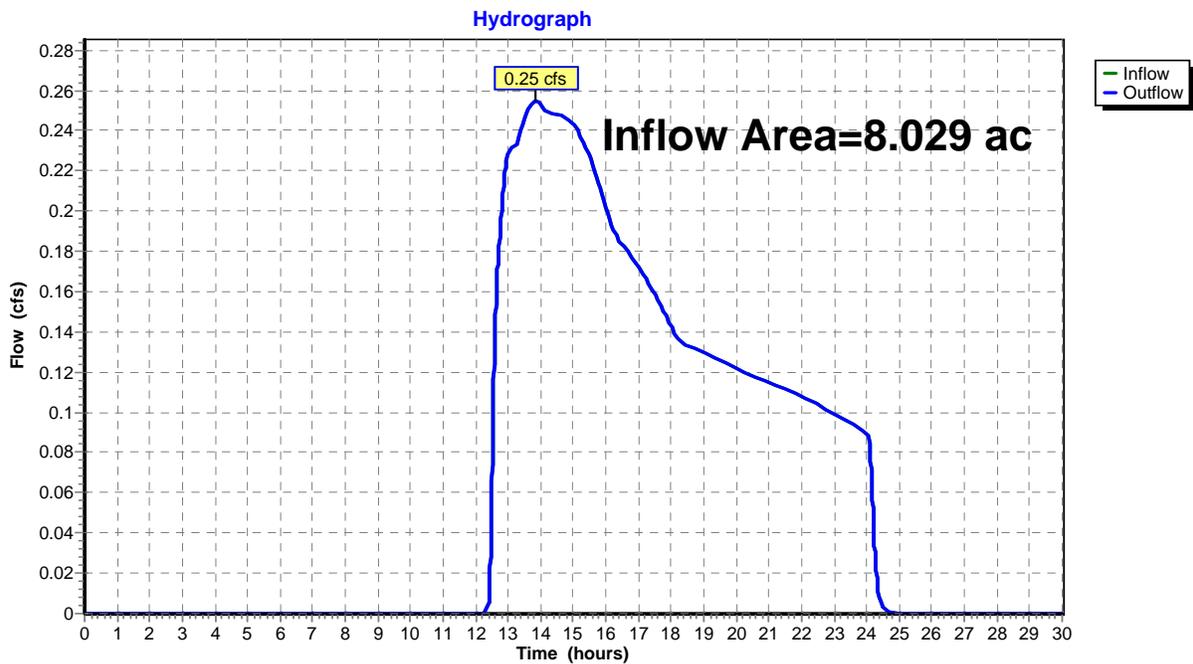


### Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 8.029 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
Inflow = 0.25 cfs @ 13.86 hrs, Volume= 0.154 af  
Outflow = 0.25 cfs @ 13.86 hrs, Volume= 0.154 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

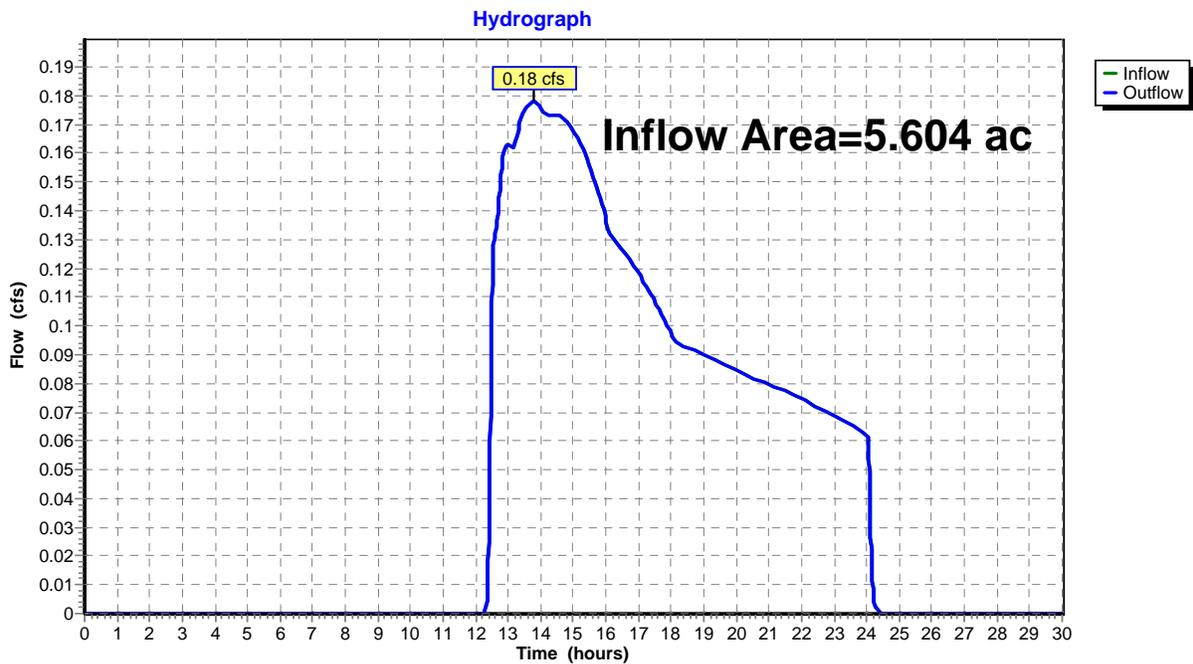


### Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 5.604 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
Inflow = 0.18 cfs @ 13.76 hrs, Volume= 0.107 af  
Outflow = 0.18 cfs @ 13.76 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 2R: FLOW TOWARDS TOWN LAND

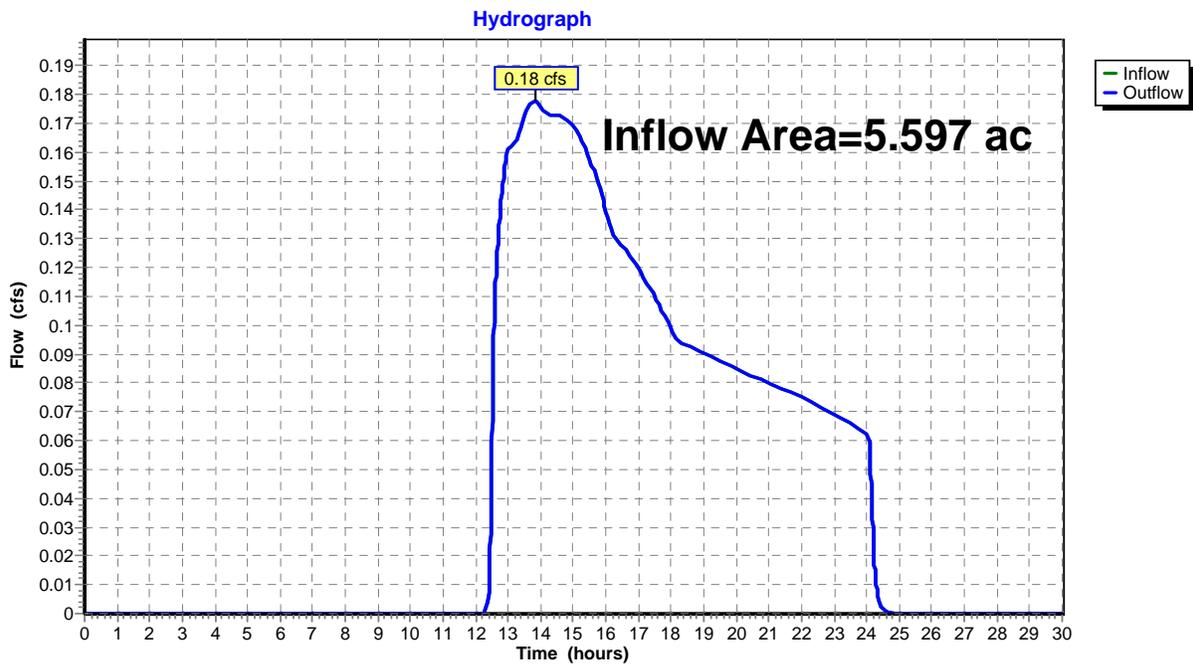


### Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD

Inflow Area = 5.597 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
Inflow = 0.18 cfs @ 13.81 hrs, Volume= 0.107 af  
Outflow = 0.18 cfs @ 13.81 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

### Reach 3R: FLOW TOWARDS ATKINS ROAD



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**Summary for Pond 3P: NATURAL DEPRESSION**

Inflow Area = 6.241 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
 Inflow = 0.20 cfs @ 13.82 hrs, Volume= 0.120 af  
 Outflow = 0.20 cfs @ 13.88 hrs, Volume= 0.120 af, Atten= 0%, Lag= 3.7 min  
 Discarded = 0.20 cfs @ 13.88 hrs, Volume= 0.120 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.04' @ 13.88 hrs Surf.Area= 1,034 sf Storage= 40 cf

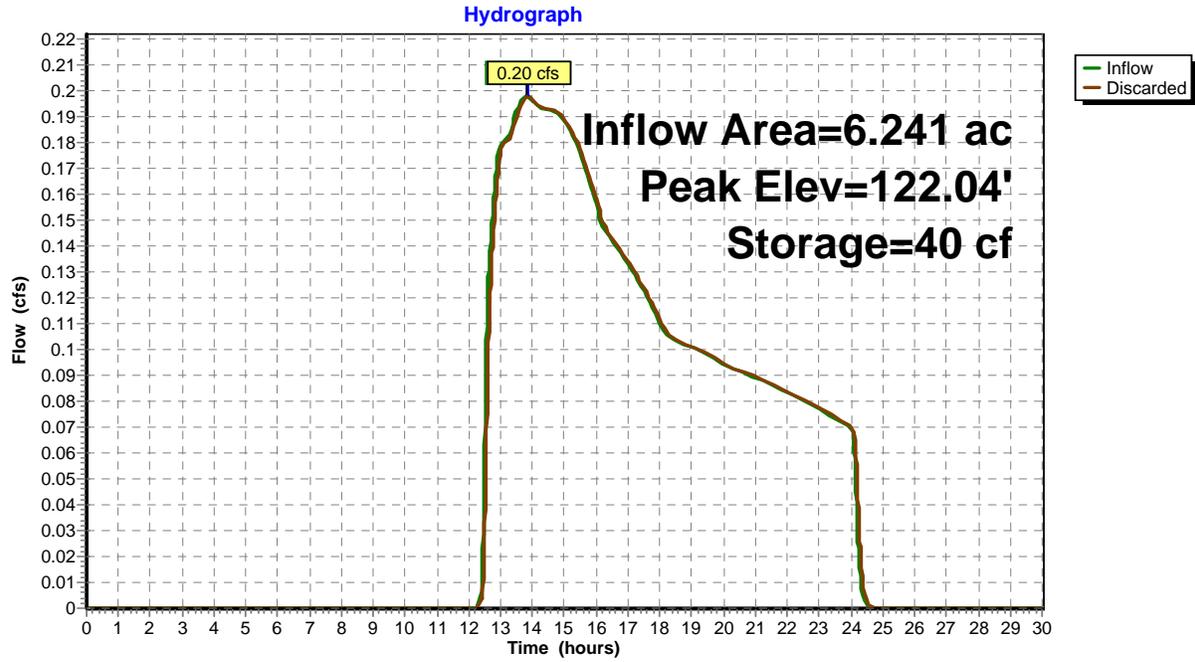
Plug-Flow detention time= 3.3 min calculated for 0.119 af (100% of inflow)  
 Center-of-Mass det. time= 3.4 min ( 1,039.3 - 1,035.9 )

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	34,720 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.20 cfs @ 13.88 hrs HW=122.04' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.20 cfs)

### Pond 3P: NATURAL DEPRESSION



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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Pond 5P: NATURAL DEPRESSION**

Inflow Area = 3.204 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
 Inflow = 0.10 cfs @ 13.85 hrs, Volume= 0.061 af  
 Outflow = 0.10 cfs @ 15.14 hrs, Volume= 0.061 af, Atten= 6%, Lag= 77.9 min  
 Discarded = 0.10 cfs @ 15.14 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 132.71' @ 15.14 hrs Surf.Area= 496 sf Storage= 182 cf

Plug-Flow detention time= 25.2 min calculated for 0.061 af (100% of inflow)  
 Center-of-Mass det. time= 25.2 min ( 1,061.4 - 1,036.2 )

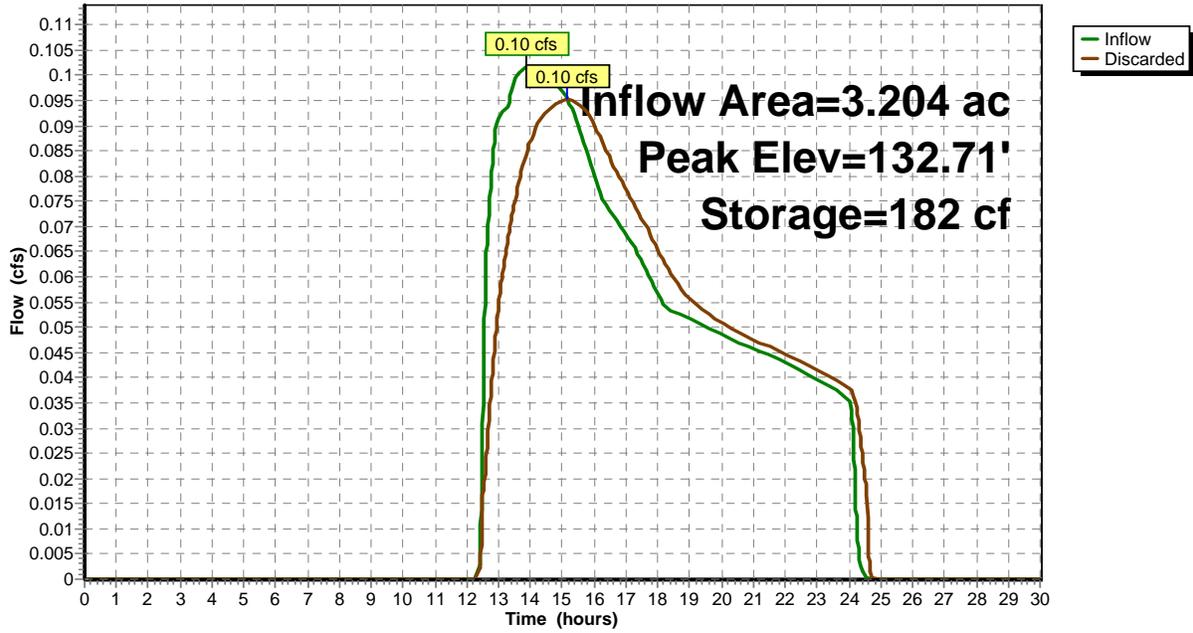
Volume	Invert	Avail.Storage	Storage Description		
#1	132.00'	5,089 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.10 cfs @ 15.14 hrs HW=132.71' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.10 cfs)

### Pond 5P: NATURAL DEPRESSION

Hydrograph



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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Pond 6P: NATURAL DEPRESSION**

Inflow Area = 5.008 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
 Inflow = 0.16 cfs @ 13.76 hrs, Volume= 0.096 af  
 Outflow = 0.16 cfs @ 13.83 hrs, Volume= 0.096 af, Atten= 0%, Lag= 4.4 min  
 Discarded = 0.16 cfs @ 13.83 hrs, Volume= 0.096 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.03' @ 13.83 hrs Surf.Area= 1,531 sf Storage= 48 cf

Plug-Flow detention time= 5.1 min calculated for 0.096 af (100% of inflow)  
 Center-of-Mass det. time= 5.1 min ( 1,036.4 - 1,031.3 )

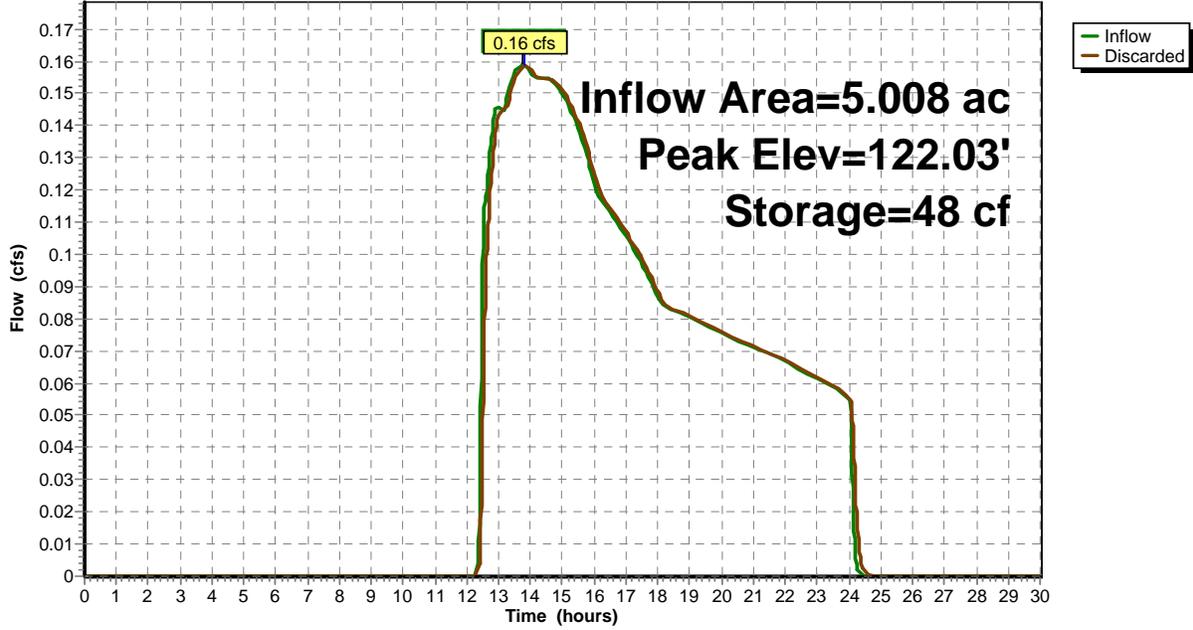
Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,899 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.29 cfs @ 13.83 hrs HW=122.03' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.29 cfs)

### Pond 6P: NATURAL DEPRESSION

Hydrograph



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**Summary for Pond 7P: NATURAL DEPRESSION**

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
 Inflow = 0.16 cfs @ 13.76 hrs, Volume= 0.094 af  
 Outflow = 0.16 cfs @ 13.81 hrs, Volume= 0.094 af, Atten= 0%, Lag= 2.8 min  
 Discarded = 0.16 cfs @ 13.81 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 127.51' @ 13.81 hrs Surf.Area= 2,273 sf Storage= 16 cf

Plug-Flow detention time= 1.7 min calculated for 0.094 af (100% of inflow)  
 Center-of-Mass det. time= 1.7 min ( 1,034.8 - 1,033.1 )

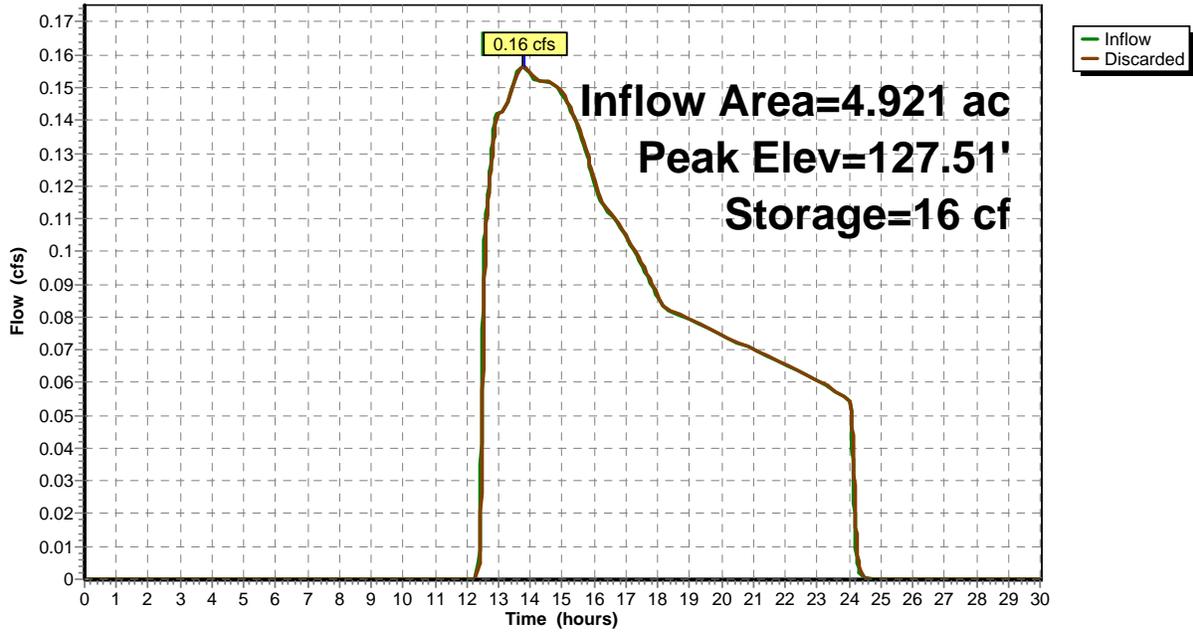
Volume	Invert	Avail.Storage	Storage Description		
#1	127.50'	25,103 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

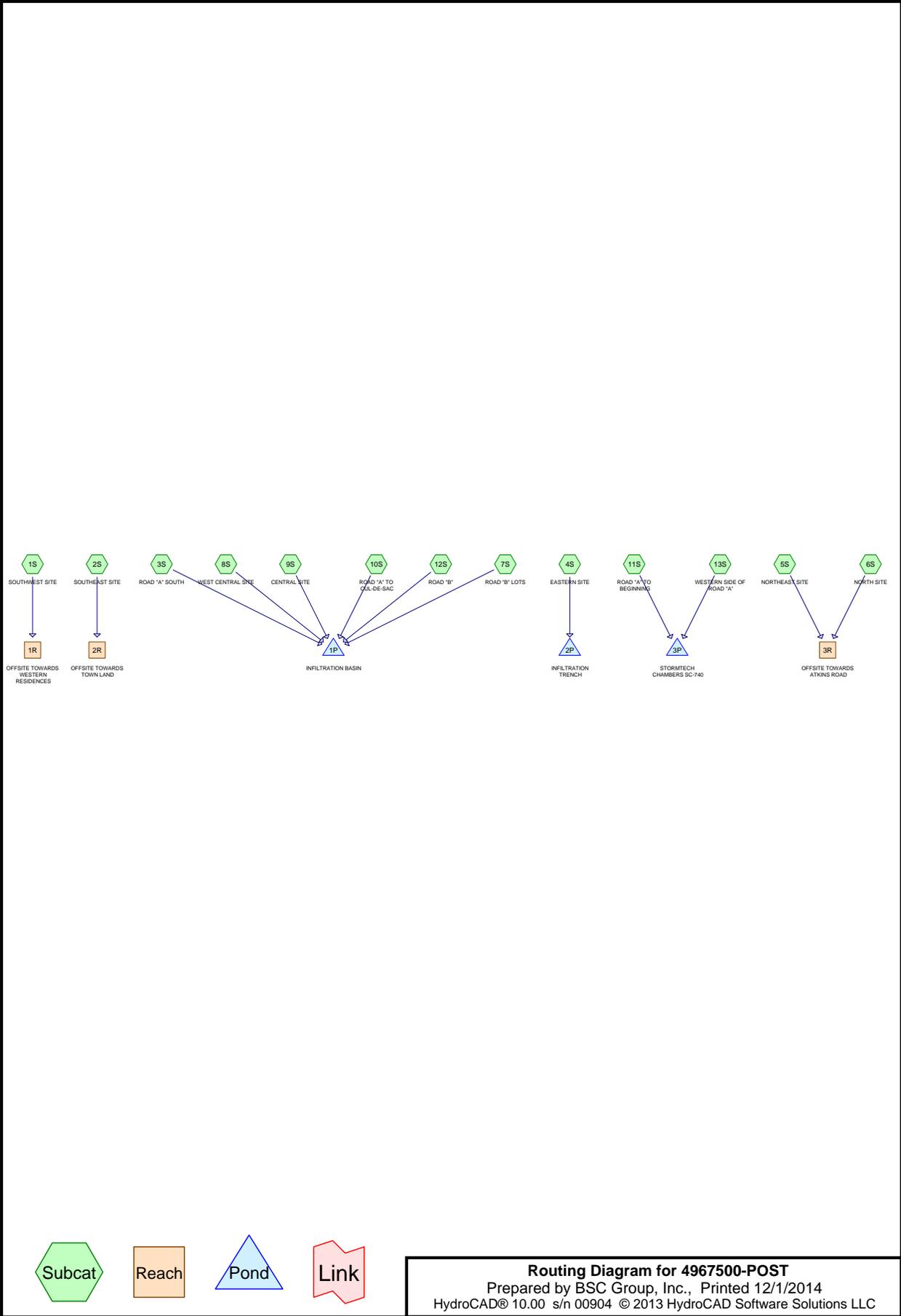
**Discarded OutFlow** Max=0.44 cfs @ 13.81 hrs HW=127.51' (Free Discharge)  
 ↳ **1=Exfiltration** ( Controls 0.44 cfs)

### Pond 7P: NATURAL DEPRESSION

Hydrograph



**5.2 PROPOSED DRAINAGE CALCULATIONS AND WATERSHED PLAN**



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*Type III 24-hr 2-year Rainfall=3.60"*

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 1S: SOUTHWEST** Runoff Area=339,473 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 2S: SOUTHEAST** Runoff Area=245,162 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 3S: ROAD "A"** Runoff Area=123,422 sf 10.60% Impervious Runoff Depth=0.03"  
 Flow Length=680' Tc=7.7 min CN=41 Runoff=0.01 cfs 0.008 af

**Subcatchment 4S: EASTERN SITE** Runoff Area=161,622 sf 1.22% Impervious Runoff Depth=0.00"  
 Flow Length=422' Tc=13.8 min CN=33 Runoff=0.00 cfs 0.000 af

**Subcatchment 5S: NORTHEAST** Runoff Area=109,388 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=437' Tc=13.1 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 6S: NORTH SITE** Runoff Area=83,544 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=420' Tc=8.2 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 7S: ROAD "B"** Runoff Area=195,281 sf 15.54% Impervious Runoff Depth=0.12"  
 Flow Length=1,429' Tc=13.3 min CN=46 Runoff=0.08 cfs 0.045 af

**Subcatchment 8S: WEST CENTRAL** Runoff Area=227,937 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=504' Tc=8.5 min CN=33 Runoff=0.00 cfs 0.000 af

**Subcatchment 9S: CENTRAL SITE** Runoff Area=102,082 sf 25.00% Impervious Runoff Depth=0.35"  
 Flow Length=387' Tc=10.1 min CN=54 Runoff=0.37 cfs 0.067 af

**Subcatchment 10S: ROAD "A" TO** Runoff Area=18,623 sf 85.32% Impervious Runoff Depth=2.45"  
 Tc=6.0 min CN=89 Runoff=1.21 cfs 0.087 af

**Subcatchment 11S: ROAD "A" TO** Runoff Area=12,984 sf 70.97% Impervious Runoff Depth=1.79"  
 Tc=6.0 min CN=81 Runoff=0.62 cfs 0.044 af

**Subcatchment 12S: ROAD "B"** Runoff Area=17,758 sf 84.60% Impervious Runoff Depth=2.45"  
 Tc=6.0 min CN=89 Runoff=1.16 cfs 0.083 af

**Subcatchment 13S: WESTERN SIDE** Runoff Area=44,330 sf 2.24% Impervious Runoff Depth=0.00"  
 Flow Length=243' Tc=7.5 min CN=35 Runoff=0.00 cfs 0.000 af

**Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Reach 2R: OFFSITE TOWARDS TOWN LAND** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Reach 3R: OFFSITE TOWARDS ATKINS ROAD** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

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**Pond 1P: INFILTRATION BASIN**      Peak Elev=123.07'   Storage=2,449 cf   Inflow=2.44 cfs   0.291 af  
Outflow=0.62 cfs   0.291 af

**Pond 2P: INFILTRATION TRENCH**      Peak Elev=122.00'   Storage=0 cf   Inflow=0.00 cfs   0.000 af  
Outflow=0.00 cfs   0.000 af

**Pond 3P: STORMTECH CHAMBERS**      Peak Elev=100.51'   Storage=249 cf   Inflow=0.62 cfs   0.044 af  
Outflow=0.23 cfs   0.044 af

**Total Runoff Area = 38.604 ac   Runoff Volume = 0.336 af   Average Runoff Depth = 0.10"**  
**93.34% Pervious = 36.033 ac   6.66% Impervious = 2.572 ac**

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**Summary for Subcatchment 1S: SOUTHWEST SITE**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

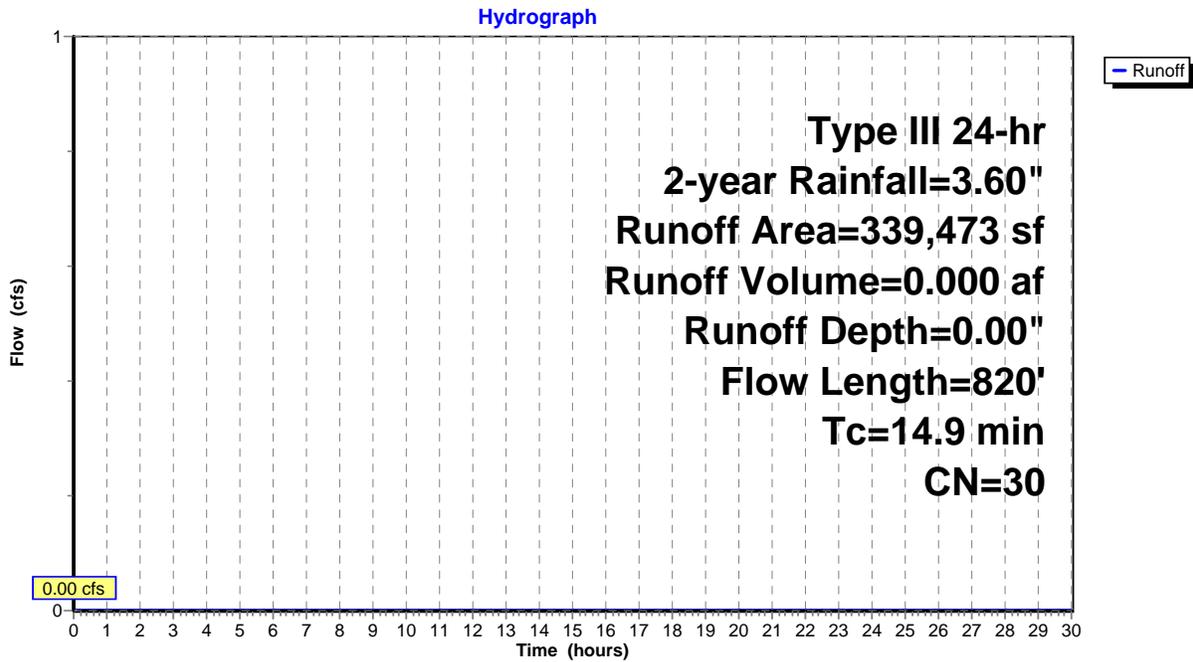
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
339,473	30	Woods, Good, HSG A
339,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
14.9	820	Total			

**Subcatchment 1S: SOUTHWEST SITE**



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**Summary for Subcatchment 2S: SOUTHEAST SITE**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

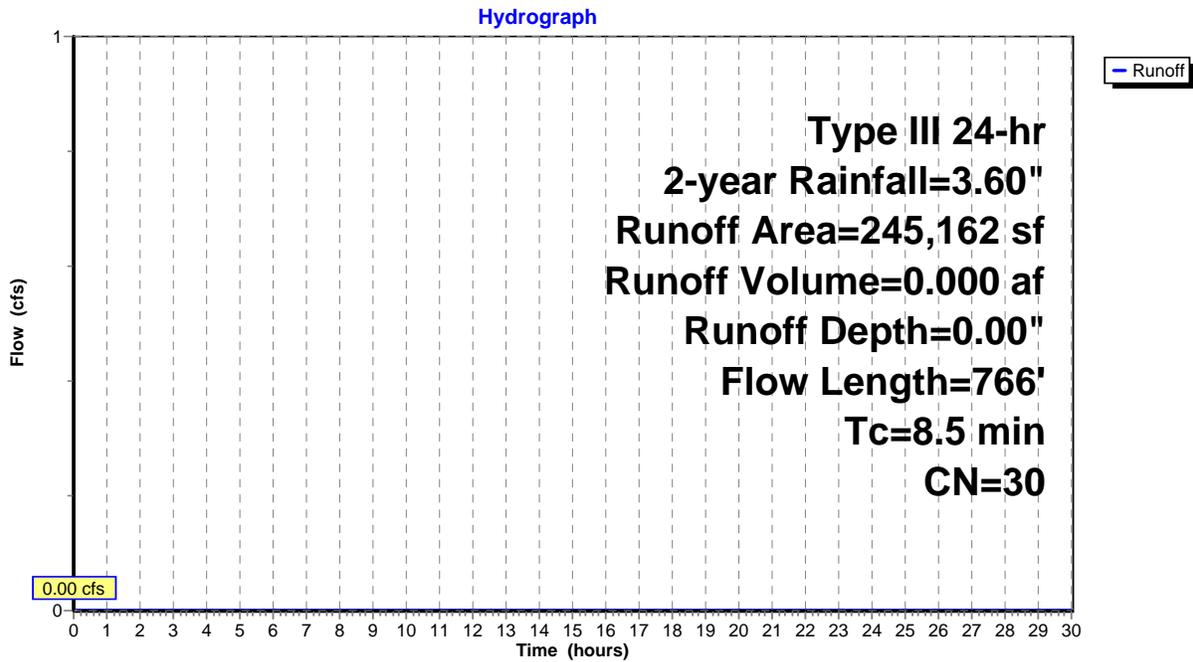
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
245,162	30	Woods, Good, HSG A
245,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

**Subcatchment 2S: SOUTHEAST SITE**



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**Summary for Subcatchment 3S: ROAD "A" SOUTH**

Runoff = 0.01 cfs @ 16.71 hrs, Volume= 0.008 af, Depth= 0.03"

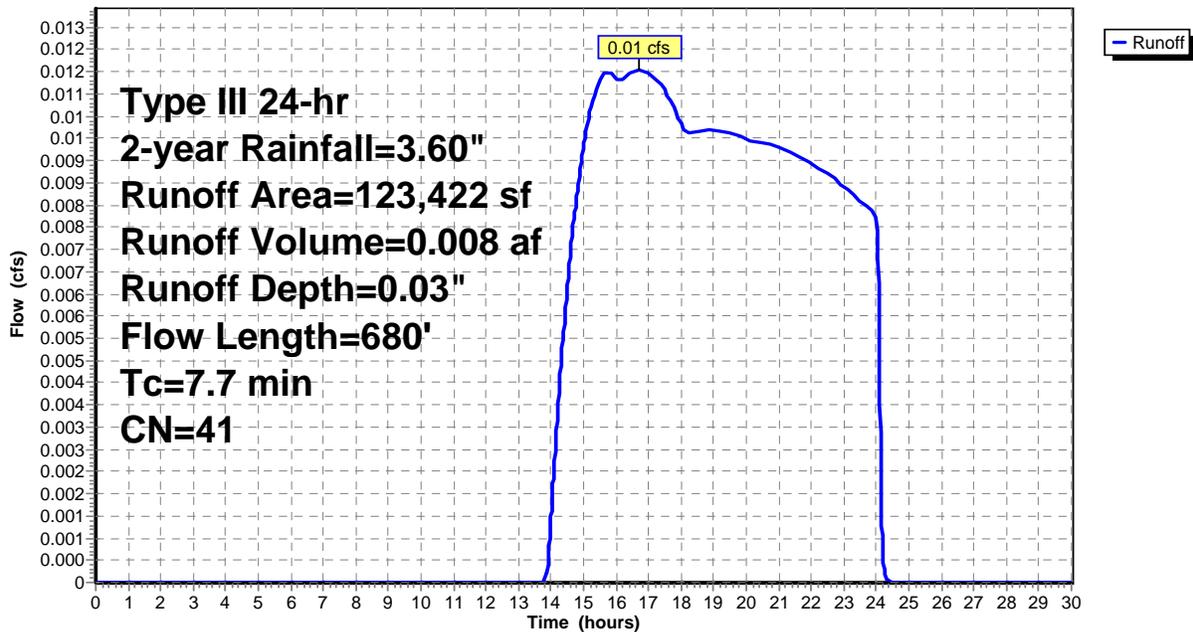
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
58,032	30	Woods, Good, HSG A
65,390	51	1 acre lots, 20% imp, HSG A
123,422	41	Weighted Average
110,344		89.40% Pervious Area
13,078		10.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1400	0.16		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	497	0.1000	5.09		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.8	133	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
7.7	680	Total			

**Subcatchment 3S: ROAD "A" SOUTH**

Hydrograph



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 Type III 24-hr 2-year Rainfall=3.60"

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**Summary for Subcatchment 4S: EASTERN SITE**

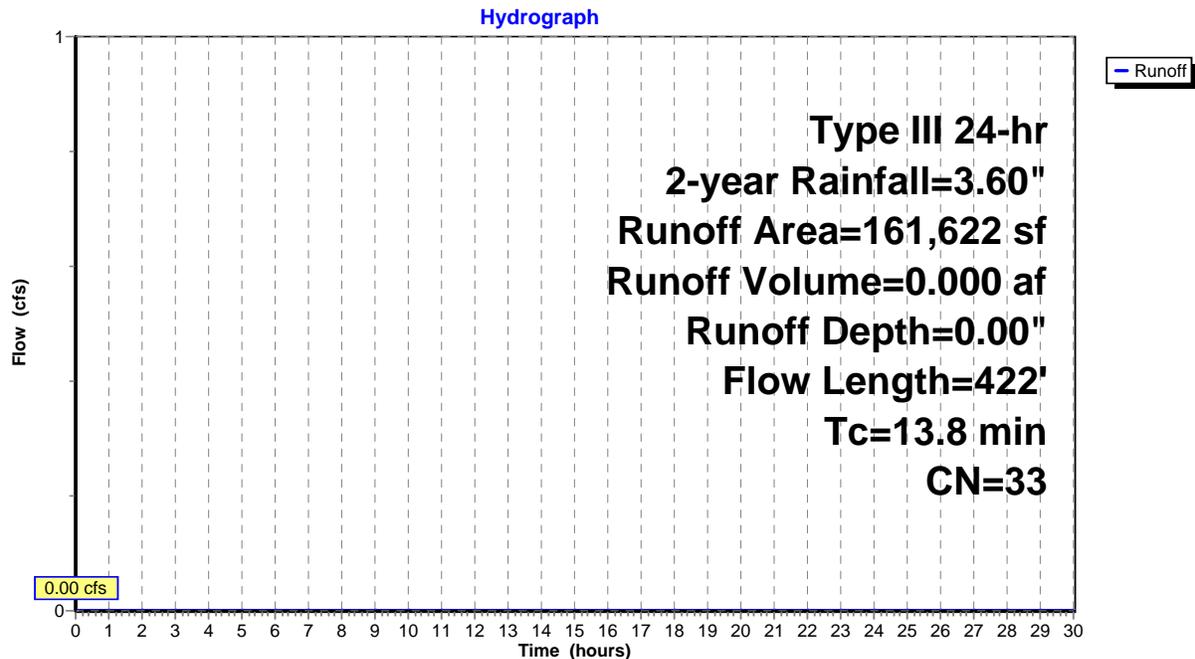
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
114,244	30	Woods, Good, HSG A
30,995	39	>75% Grass cover, Good, HSG A
16,383	46	2 acre lots, 12% imp, HSG A
161,622	33	Weighted Average
159,656		98.78% Pervious Area
1,966		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	372	0.0320	2.88		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.8	422	Total			

**Subcatchment 4S: EASTERN SITE**



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**Summary for Subcatchment 5S: NORTHEAST SITE**

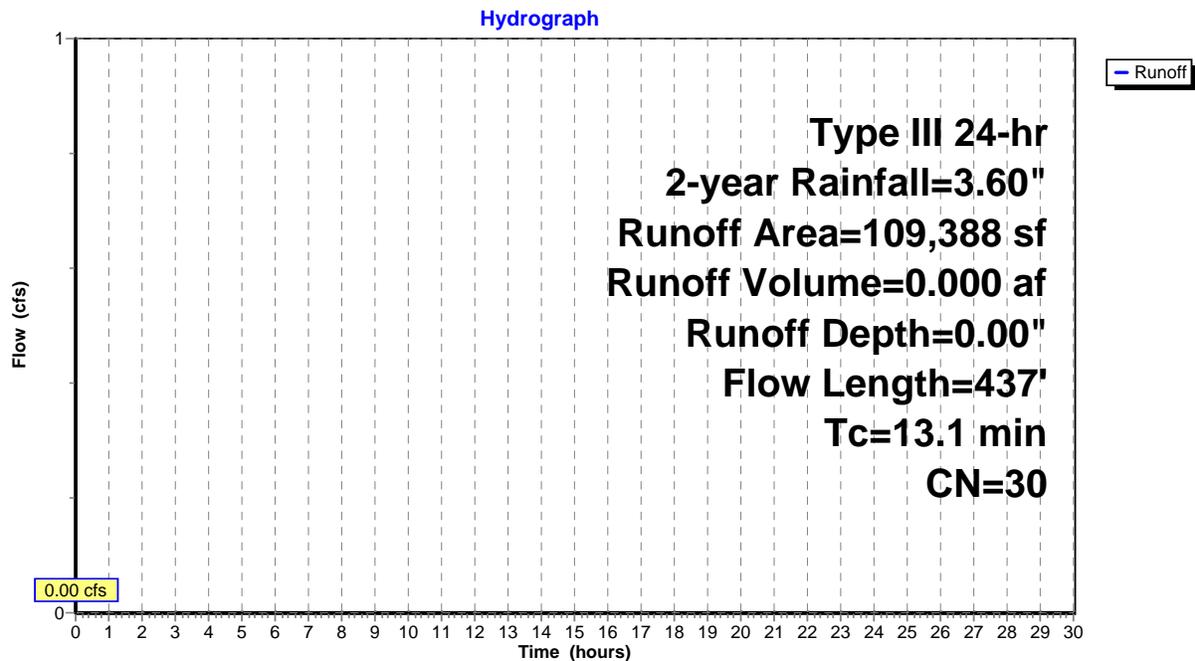
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
107,608	30	Woods, Good, HSG A
1,780	39	>75% Grass cover, Good, HSG A
109,388	30	Weighted Average
109,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b>
					Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b>
					Unpaved Kv= 16.1 fps
13.1	437	Total			

**Subcatchment 5S: NORTHEAST SITE**



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**Summary for Subcatchment 6S: NORTH SITE**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

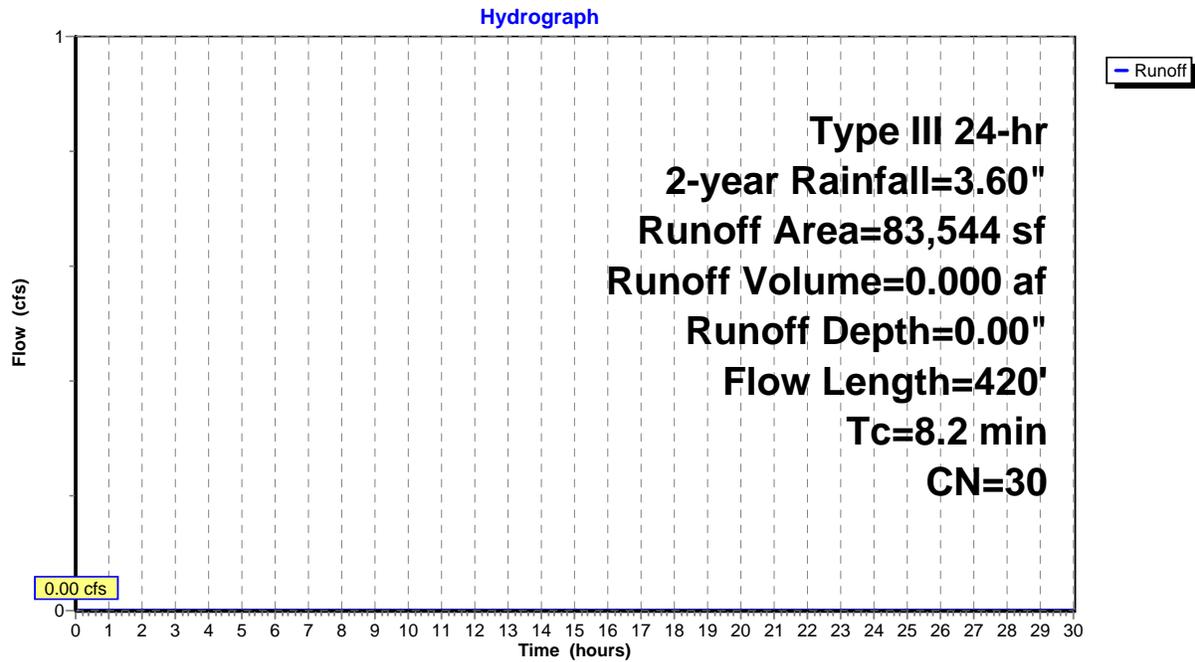
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
83,544	30	Woods, Good, HSG A
83,544		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0800	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	370	0.0620	4.01		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.2	420	Total			

**Subcatchment 6S: NORTH SITE**



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**Summary for Subcatchment 7S: ROAD "B" LOTS**

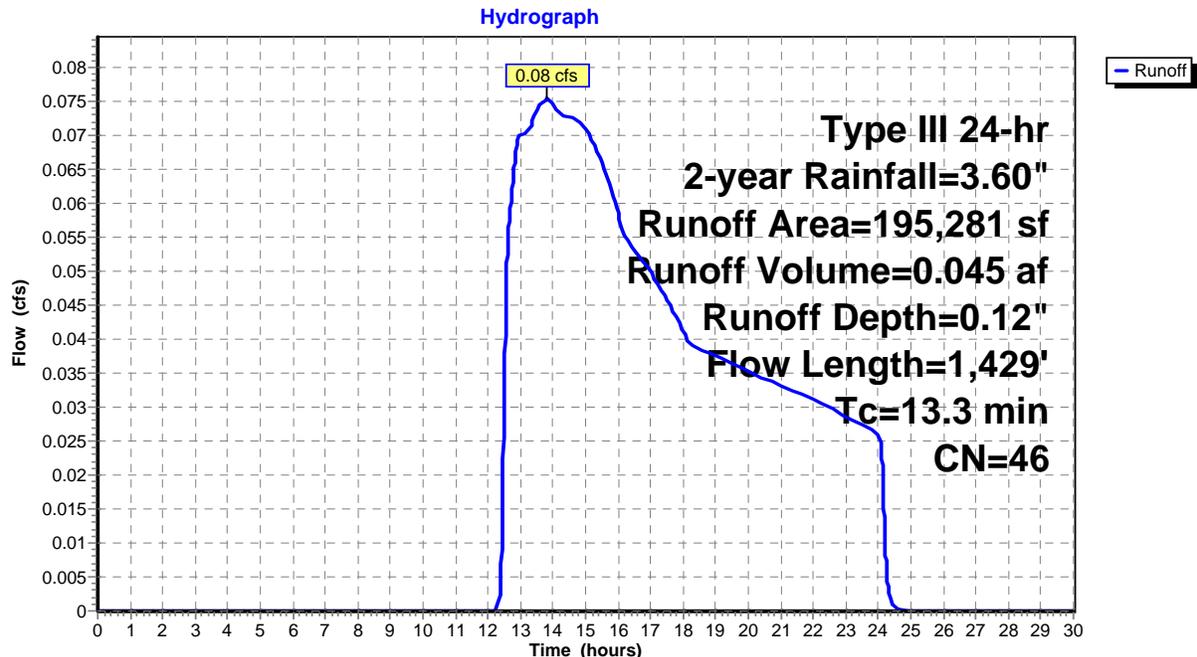
Runoff = 0.08 cfs @ 13.79 hrs, Volume= 0.045 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
151,707	51	1 acre lots, 20% imp, HSG A
43,574	30	Woods, Good, HSG A
195,281	46	Weighted Average
164,940		84.46% Pervious Area
30,341		15.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0700	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.6	539	0.0445	3.40		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
3.7	840	0.0050	3.79	2.98	<b>Pipe Channel, C-D</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
13.3	1,429	Total			

**Subcatchment 7S: ROAD "B" LOTS**



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**Summary for Subcatchment 8S: WEST CENTRAL SITE**

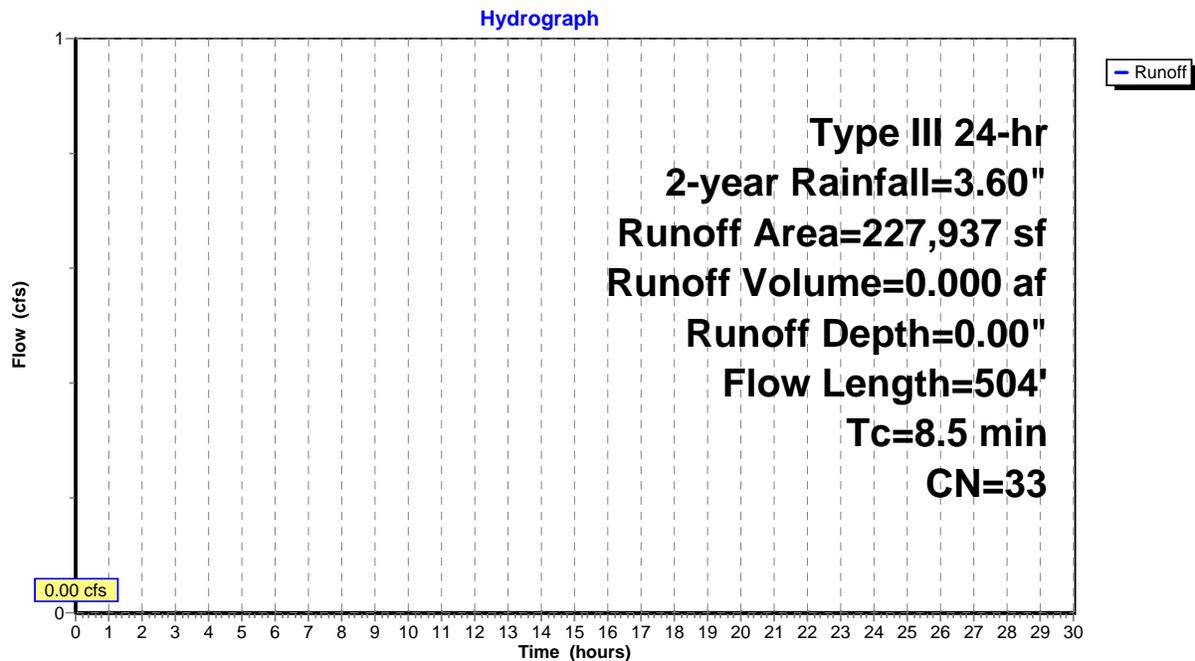
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
217,334	30	Woods, Good, HSG A
10,603	96	Gravel surface, HSG A
227,937	33	Weighted Average
227,937		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	504	Total			

**Subcatchment 8S: WEST CENTRAL SITE**



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## Summary for Subcatchment 9S: CENTRAL SITE

Runoff = 0.37 cfs @ 12.35 hrs, Volume= 0.067 af, Depth= 0.35"

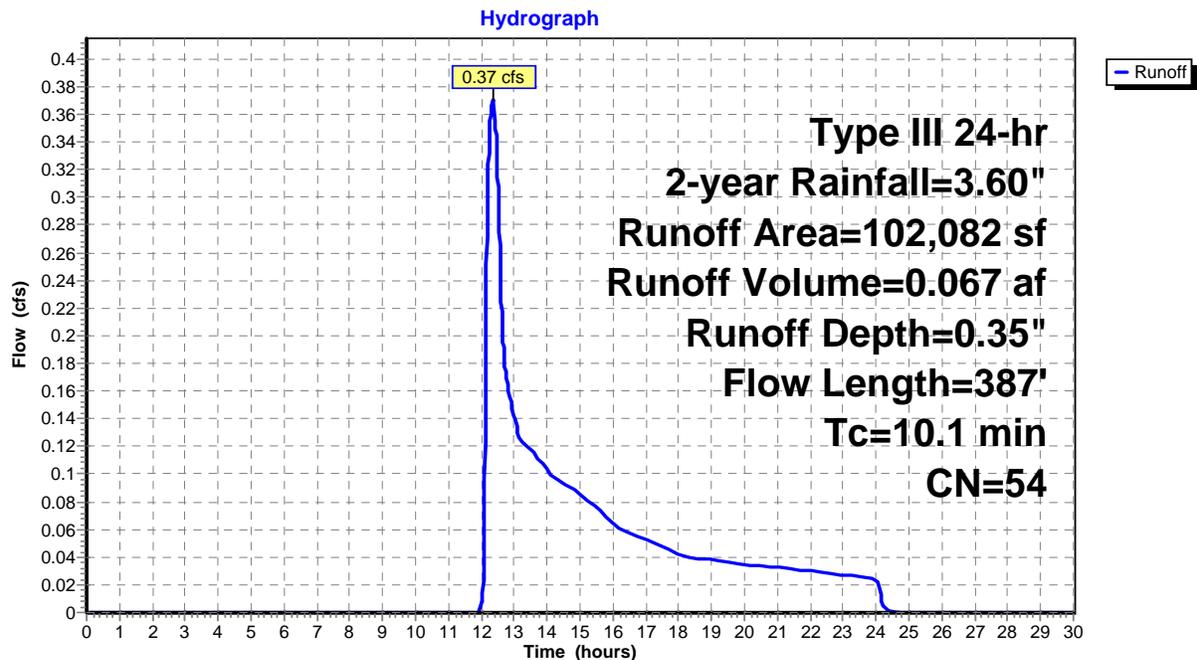
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
102,082	54	1/2 acre lots, 25% imp, HSG A
76,562		75.00% Pervious Area
25,521		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0400	0.09		<b>Sheet Flow, A=B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.0	290	0.0840	4.67		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.3	47	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
10.1	387	Total			

## Subcatchment 9S: CENTRAL SITE



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**Summary for Subcatchment 10S: ROAD "A" TO CUL-DE-SAC**

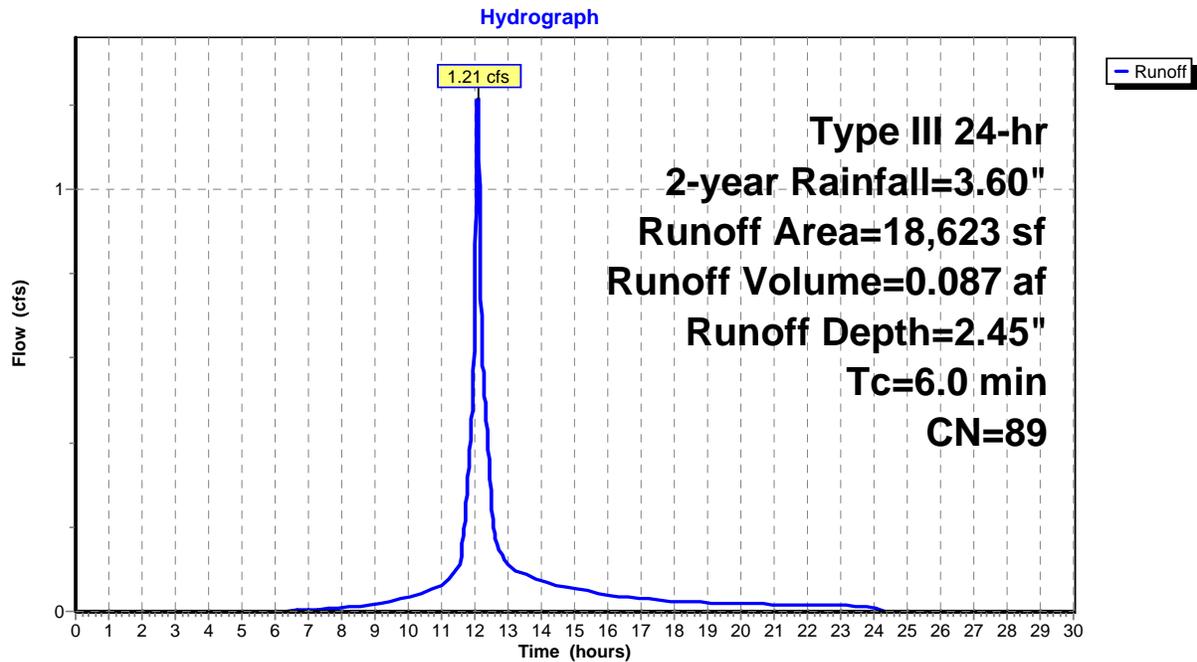
Runoff = 1.21 cfs @ 12.09 hrs, Volume= 0.087 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
15,889	98	Paved roads w/curbs & sewers, HSG A
2,734	39	>75% Grass cover, Good, HSG A
18,623	89	Weighted Average
2,734		14.68% Pervious Area
15,889		85.32% Impervious Area

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

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**Summary for Subcatchment 11S: ROAD "A" TO BEGINNING**

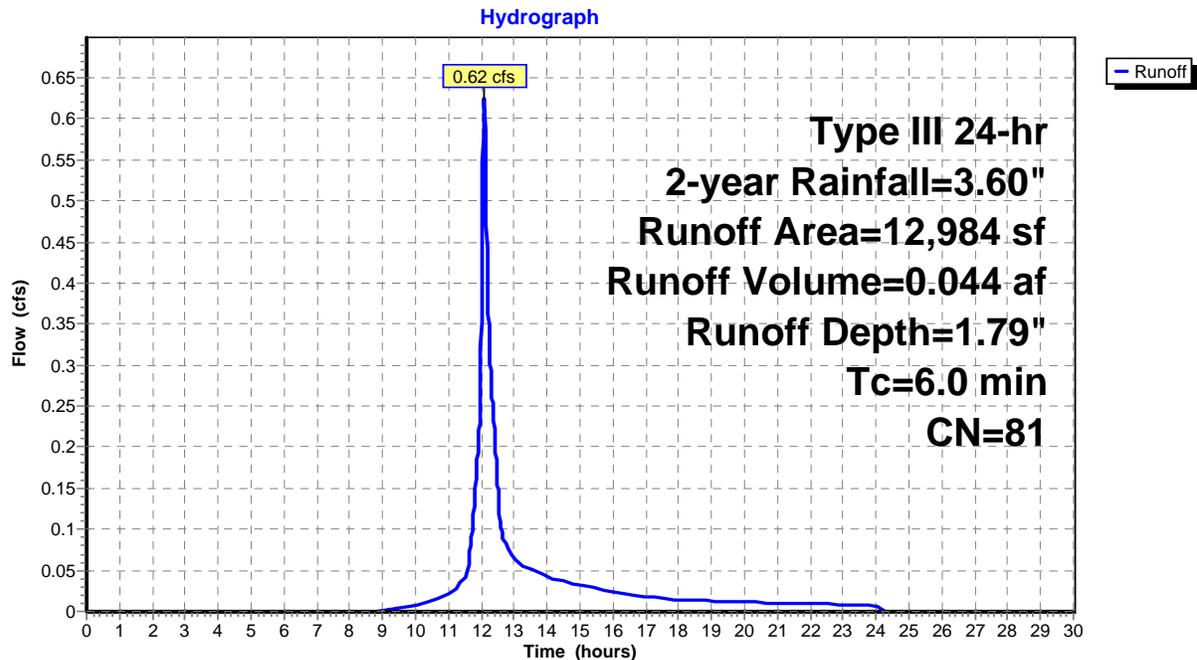
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
9,215	98	Paved roads w/curbs & sewers, HSG A
3,769	39	>75% Grass cover, Good, HSG A
12,984	81	Weighted Average
3,769		29.03% Pervious Area
9,215		70.97% Impervious Area

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

**Subcatchment 11S: ROAD "A" TO BEGINNING**



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**Summary for Subcatchment 12S: ROAD "B"**

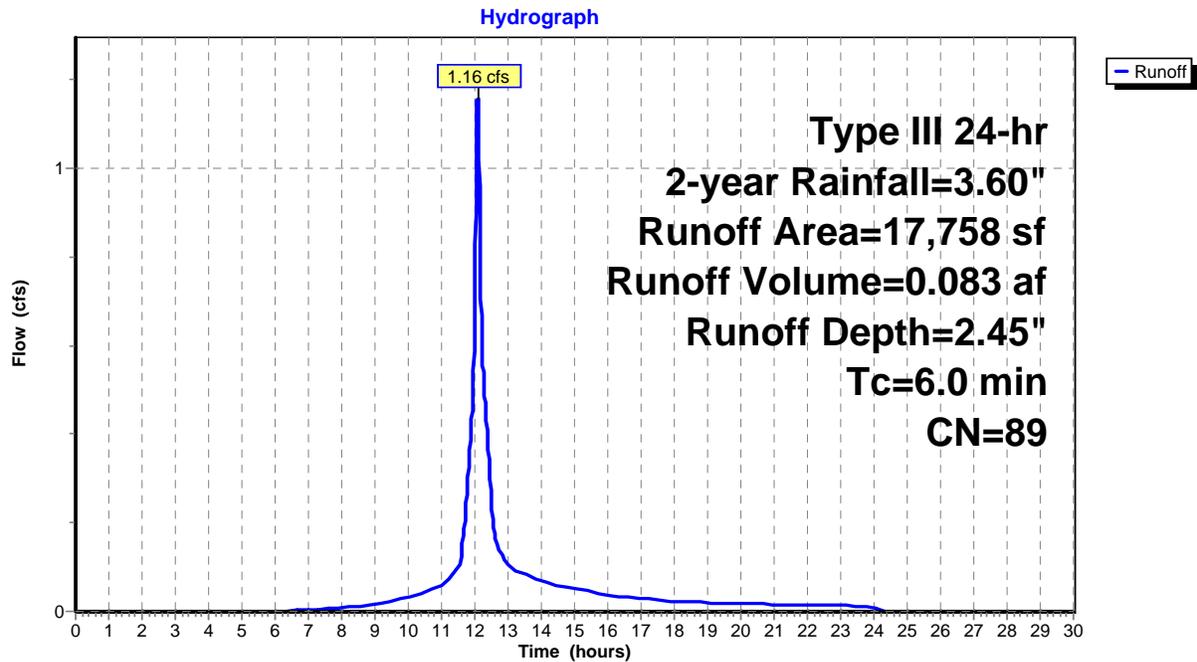
Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.083 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
15,024	98	Paved parking, HSG A
2,734	39	>75% Grass cover, Good, HSG A
17,758	89	Weighted Average
2,734		15.40% Pervious Area
15,024		84.60% Impervious Area

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

**Subcatchment 12S: ROAD "B"**



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**Summary for Subcatchment 13S: WESTERN SIDE OF ROAD "A"**

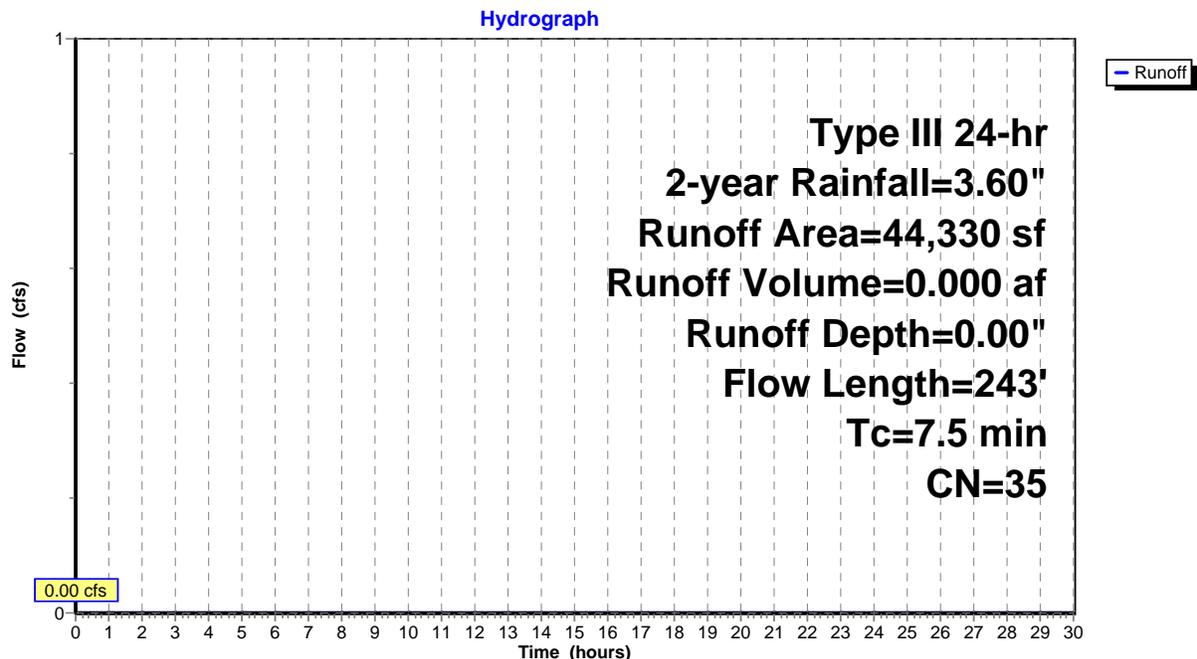
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
28,330	30	Woods, Good, HSG A
8,290	46	2 acre lots, 12% imp, HSG A
7,710	39	>75% Grass cover, Good, HSG A
44,330	35	Weighted Average
43,335		97.76% Pervious Area
995		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0100	0.12		<b>Sheet Flow, A-B</b> Grass: Short n= 0.150 P2= 3.60"
0.3	59	0.0420	3.30		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.2	134	0.3130	9.01		<b>Shallow Concentrated Flow, C-D</b> Unpaved Kv= 16.1 fps
7.5	243	Total			

**Subcatchment 13S: WESTERN SIDE OF ROAD "A"**



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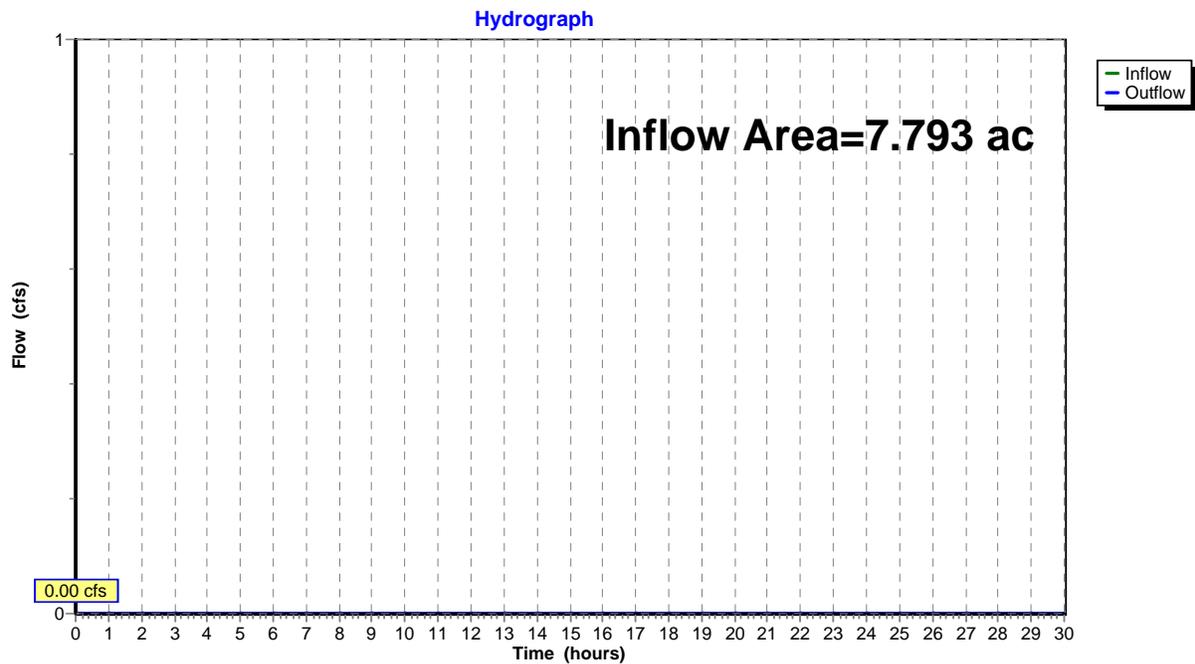
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**Summary for Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES**

Inflow Area = 7.793 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 Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES**



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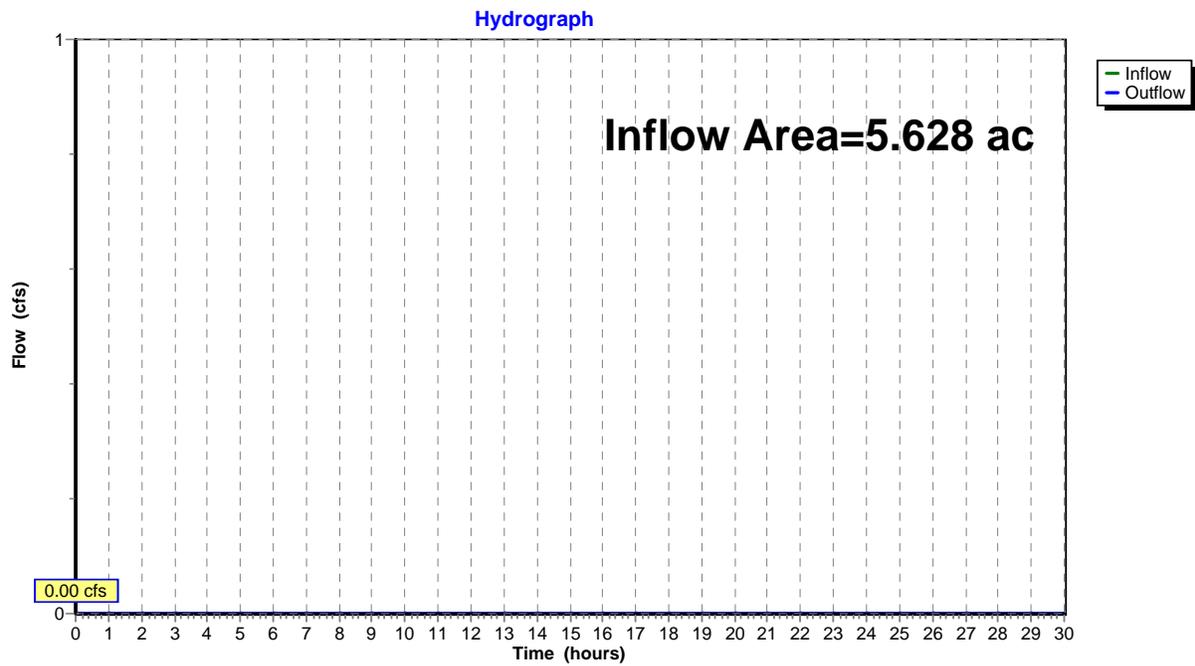
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**Summary for Reach 2R: OFFSITE TOWARDS TOWN LAND**

Inflow Area = 5.628 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 Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 2R: OFFSITE TOWARDS TOWN LAND**



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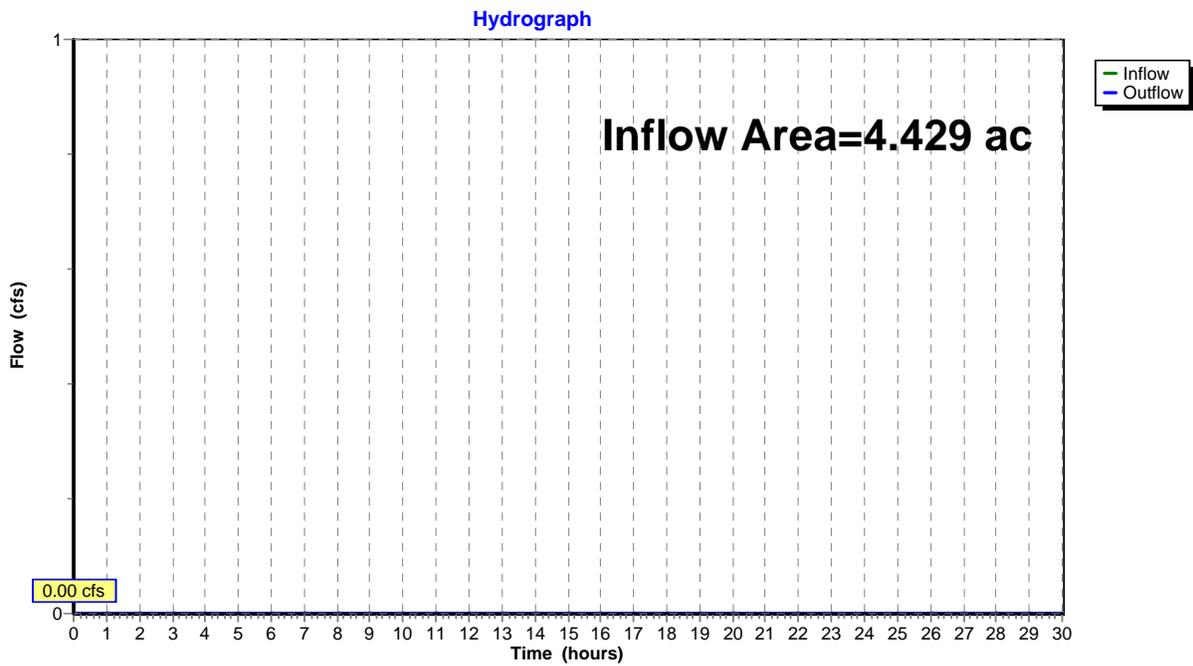
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**Summary for Reach 3R: OFFSITE TOWARDS ATKINS ROAD**

Inflow Area = 4.429 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 Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 3R: OFFSITE TOWARDS ATKINS ROAD**



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Type III 24-hr 2-year Rainfall=3.60"

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**Summary for Pond 1P: INFILTRATION BASIN**

Inflow Area = 15.728 ac, 14.57% Impervious, Inflow Depth = 0.22" for 2-year event  
 Inflow = 2.44 cfs @ 12.09 hrs, Volume= 0.291 af  
 Outflow = 0.62 cfs @ 12.61 hrs, Volume= 0.291 af, Atten= 75%, Lag= 30.9 min  
 Discarded = 0.62 cfs @ 12.61 hrs, Volume= 0.291 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.07' @ 12.61 hrs Surf.Area= 3,207 sf Storage= 2,449 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 29.3 min ( 912.0 - 882.8 )

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,887 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.0	0	0	1,489
124.00	5,241	280.0	6,349	6,349	5,400
126.00	9,048	366.0	14,117	20,466	9,868
128.00	12,464	423.0	21,421	41,887	13,533

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.62 cfs @ 12.61 hrs HW=123.07' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.62 cfs)

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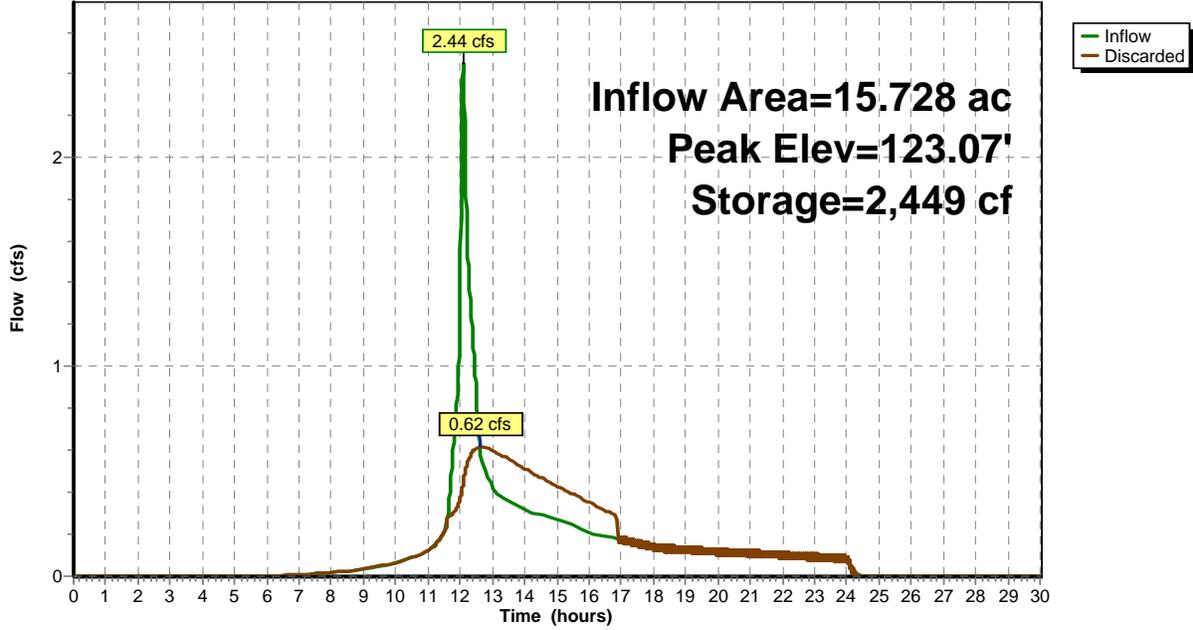
Type III 24-hr 2-year Rainfall=3.60"

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**Pond 1P: INFILTRATION BASIN**

Hydrograph



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**Summary for Pond 2P: INFILTRATION TRENCH**

Inflow Area = 3.710 ac, 1.22% 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  
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 1,554 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description			
#1	122.00'	10,251 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,554	785.0	0.0	0	0	1,554
126.00	1,554	785.0	40.0	2,486	2,486	4,694
127.00	3,938	804.0	100.0	2,655	5,142	7,224
128.00	6,378	823.0	100.0	5,109	10,251	9,815

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)  
 ↳ **1=Exfiltration** (Passes 0.00 cfs of 0.30 cfs potential flow)

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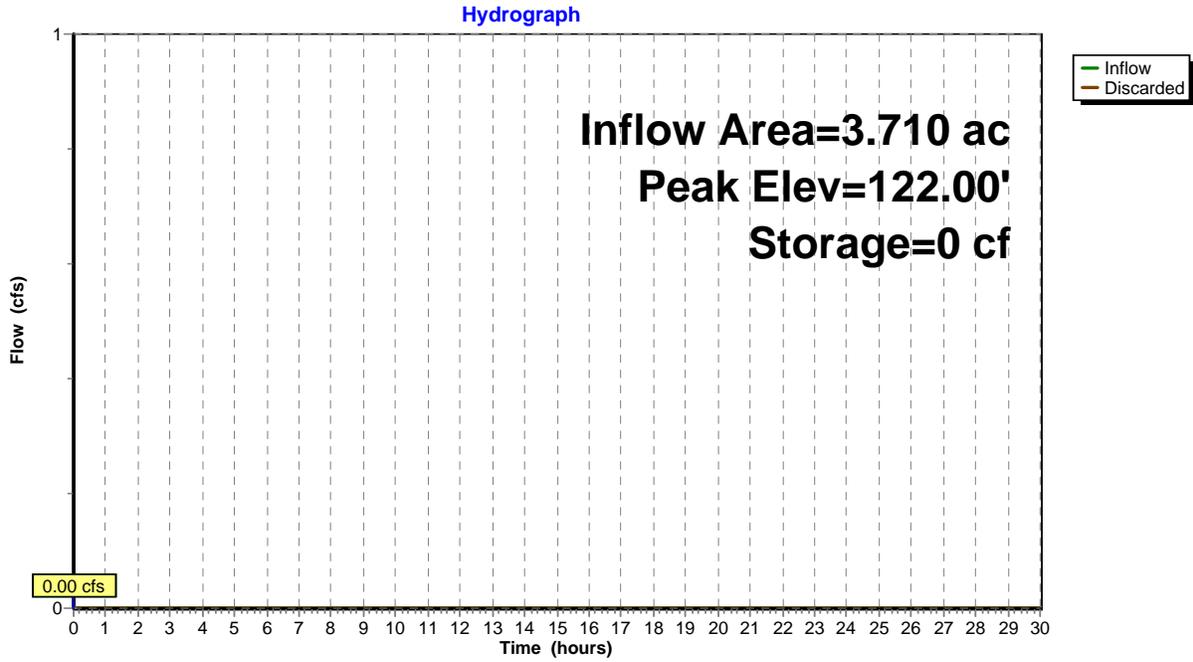
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**Pond 2P: INFILTRATION TRENCH**



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**Summary for Pond 3P: STORMTECH CHAMBERS SC-740**

Inflow Area = 1.316 ac, 17.81% Impervious, Inflow Depth = 0.41" for 2-year event  
 Inflow = 0.62 cfs @ 12.09 hrs, Volume= 0.044 af  
 Outflow = 0.23 cfs @ 12.37 hrs, Volume= 0.044 af, Atten= 62%, Lag= 16.9 min  
 Discarded = 0.23 cfs @ 12.37 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 100.51' @ 12.37 hrs Surf.Area= 1,218 sf Storage= 249 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 4.7 min ( 838.5 - 833.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	1,112 cf	<b>20.50'W x 59.40'L x 3.50'H Field A</b> 4,262 cf Overall - 1,481 cf Embedded = 2,781 cf x 40.0% Voids
#2A	100.50'	1,481 cf	<b>ADS StormTech SC-740 x 32 Inside #1</b> Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		2,594 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.23 cfs @ 12.37 hrs HW=100.51' (Free Discharge)  
 ↑ **1=Exfiltration** ( Controls 0.23 cfs)

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**Pond 3P: STORMTECH CHAMBERS SC-740 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 (ADS StormTech® SC-740)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 4 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

8 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 57.40' Row Length +12.0" End Stone x 2 = 59.40' Base Length

4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width

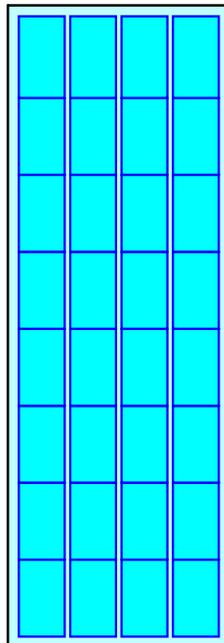
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

32 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 4 Rows = 1,481.4 cf Chamber Storage

4,262.0 cf Field - 1,481.4 cf Chambers = 2,780.5 cf Stone x 40.0% Voids = 1,112.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,593.6 cf = 0.060 af  
Overall Storage Efficiency = 60.9%

32 Chambers  
157.9 cy Field  
103.0 cy Stone



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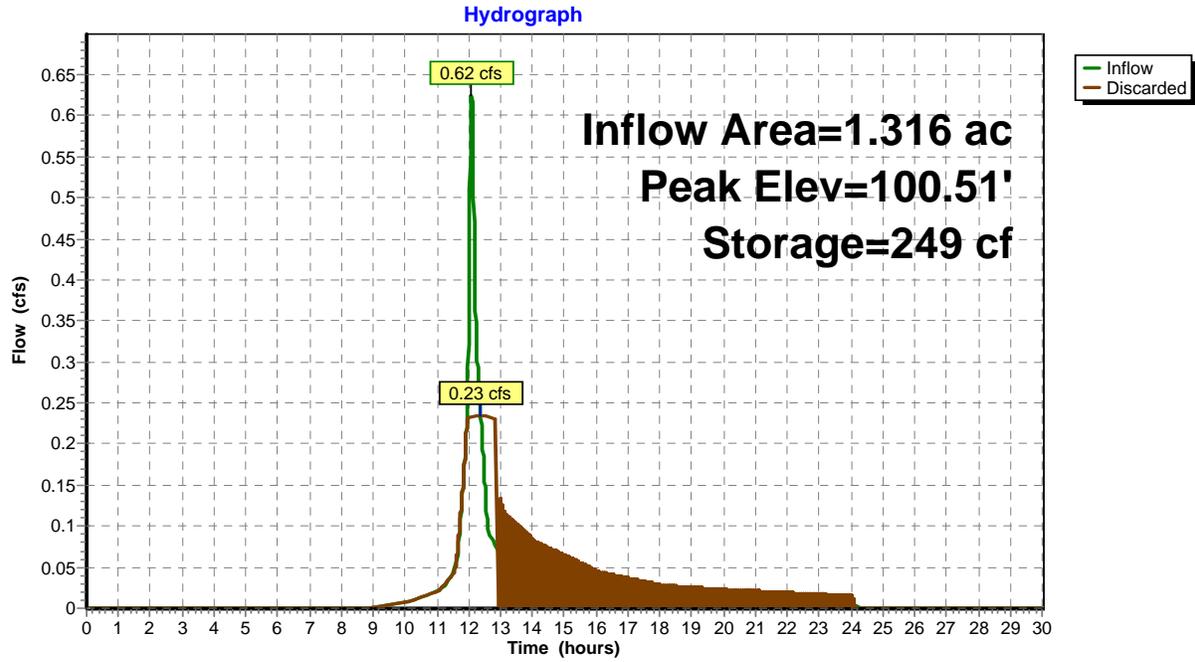
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**Pond 3P: STORMTECH CHAMBERS SC-740**



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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 1S: SOUTHWEST** Runoff Area=339,473 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 2S: SOUTHEAST** Runoff Area=245,162 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 3S: ROAD "A"** Runoff Area=123,422 sf 10.60% Impervious Runoff Depth=0.23"  
 Flow Length=680' Tc=7.7 min CN=41 Runoff=0.16 cfs 0.053 af

**Subcatchment 4S: EASTERN SITE** Runoff Area=161,622 sf 1.22% Impervious Runoff Depth=0.03"  
 Flow Length=422' Tc=13.8 min CN=33 Runoff=0.01 cfs 0.008 af

**Subcatchment 5S: NORTHEAST** Runoff Area=109,388 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=437' Tc=13.1 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 6S: NORTH SITE** Runoff Area=83,544 sf 0.00% Impervious Runoff Depth=0.00"  
 Flow Length=420' Tc=8.2 min CN=30 Runoff=0.00 cfs 0.000 af

**Subcatchment 7S: ROAD "B"** Runoff Area=195,281 sf 15.54% Impervious Runoff Depth=0.42"  
 Flow Length=1,429' Tc=13.3 min CN=46 Runoff=0.79 cfs 0.158 af

**Subcatchment 8S: WEST CENTRAL** Runoff Area=227,937 sf 0.00% Impervious Runoff Depth=0.03"  
 Flow Length=504' Tc=8.5 min CN=33 Runoff=0.02 cfs 0.011 af

**Subcatchment 9S: CENTRAL SITE** Runoff Area=102,082 sf 25.00% Impervious Runoff Depth=0.83"  
 Flow Length=387' Tc=10.1 min CN=54 Runoff=1.44 cfs 0.161 af

**Subcatchment 10S: ROAD "A" TO** Runoff Area=18,623 sf 85.32% Impervious Runoff Depth=3.58"  
 Tc=6.0 min CN=89 Runoff=1.75 cfs 0.128 af

**Subcatchment 11S: ROAD "A" TO** Runoff Area=12,984 sf 70.97% Impervious Runoff Depth=2.81"  
 Tc=6.0 min CN=81 Runoff=0.98 cfs 0.070 af

**Subcatchment 12S: ROAD "B"** Runoff Area=17,758 sf 84.60% Impervious Runoff Depth=3.58"  
 Tc=6.0 min CN=89 Runoff=1.67 cfs 0.122 af

**Subcatchment 13S: WESTERN SIDE** Runoff Area=44,330 sf 2.24% Impervious Runoff Depth=0.06"  
 Flow Length=243' Tc=7.5 min CN=35 Runoff=0.01 cfs 0.005 af

**Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Reach 2R: OFFSITE TOWARDS TOWN LAND** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

**Reach 3R: OFFSITE TOWARDS ATKINS ROAD** Inflow=0.00 cfs 0.000 af  
 Outflow=0.00 cfs 0.000 af

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**Pond 1P: INFILTRATION BASIN**      Peak Elev=124.07' Storage=6,717 cf Inflow=4.52 cfs 0.634 af  
Outflow=1.04 cfs 0.634 af

**Pond 2P: INFILTRATION TRENCH**      Peak Elev=122.00' Storage=0 cf Inflow=0.01 cfs 0.008 af  
Outflow=0.01 cfs 0.008 af

**Pond 3P: STORMTECH CHAMBERS**      Peak Elev=100.92' Storage=656 cf Inflow=0.98 cfs 0.075 af  
Outflow=0.24 cfs 0.075 af

**Total Runoff Area = 38.604 ac    Runoff Volume = 0.718 af    Average Runoff Depth = 0.22"**  
**93.34% Pervious = 36.033 ac    6.66% Impervious = 2.572 ac**

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## Summary for Subcatchment 1S: SOUTHWEST SITE

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

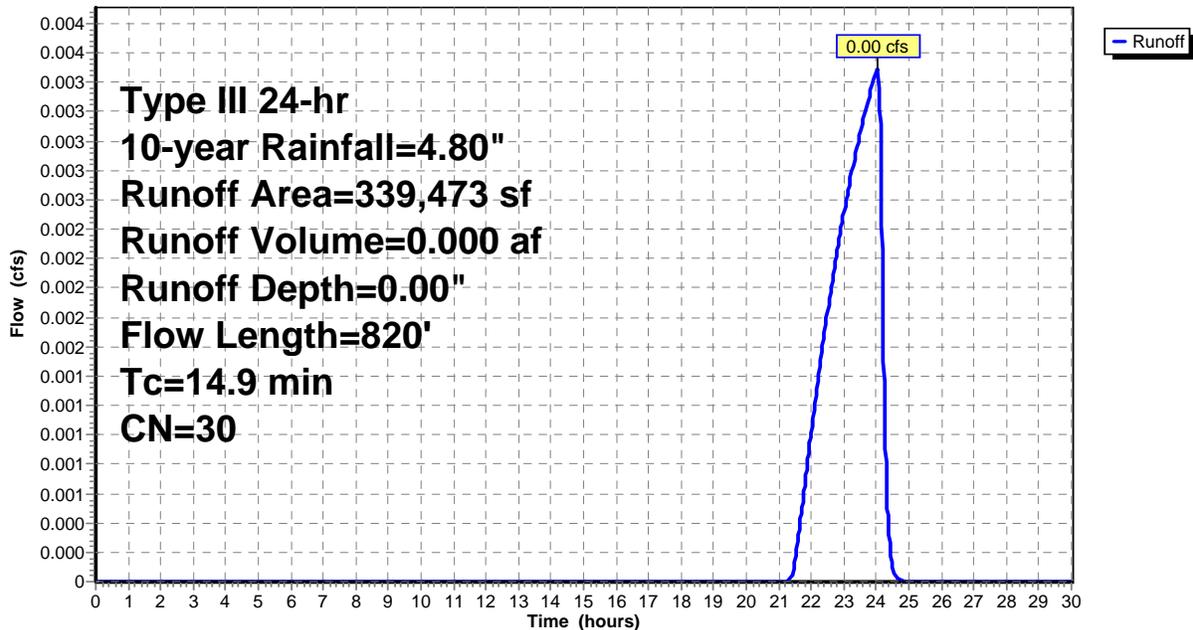
Area (sf)	CN	Description
339,473	30	Woods, Good, HSG A
339,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b>
					Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		<b>Shallow Concentrated Flow, B-C</b>
					Unpaved Kv= 16.1 fps
14.9	820	Total			

## Subcatchment 1S: SOUTHWEST SITE

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Type III 24-hr 10-year Rainfall=4.80"

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## Summary for Subcatchment 2S: SOUTHEAST SITE

Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

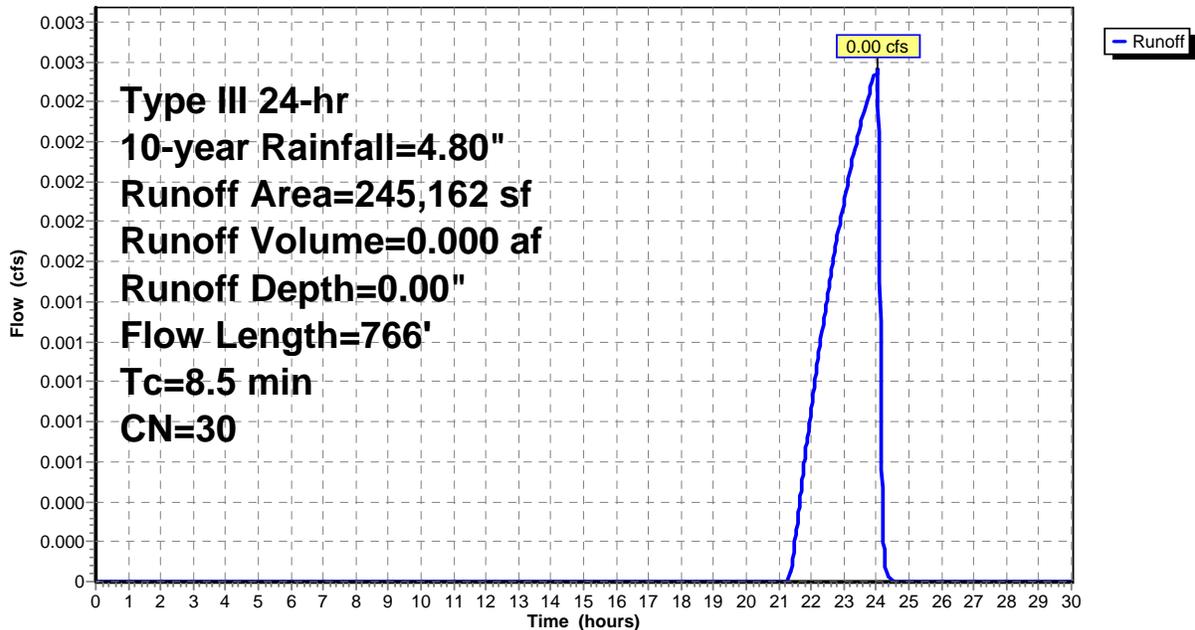
Area (sf)	CN	Description
245,162	30	Woods, Good, HSG A
245,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

## Subcatchment 2S: SOUTHEAST SITE

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**Summary for Subcatchment 3S: ROAD "A" SOUTH**

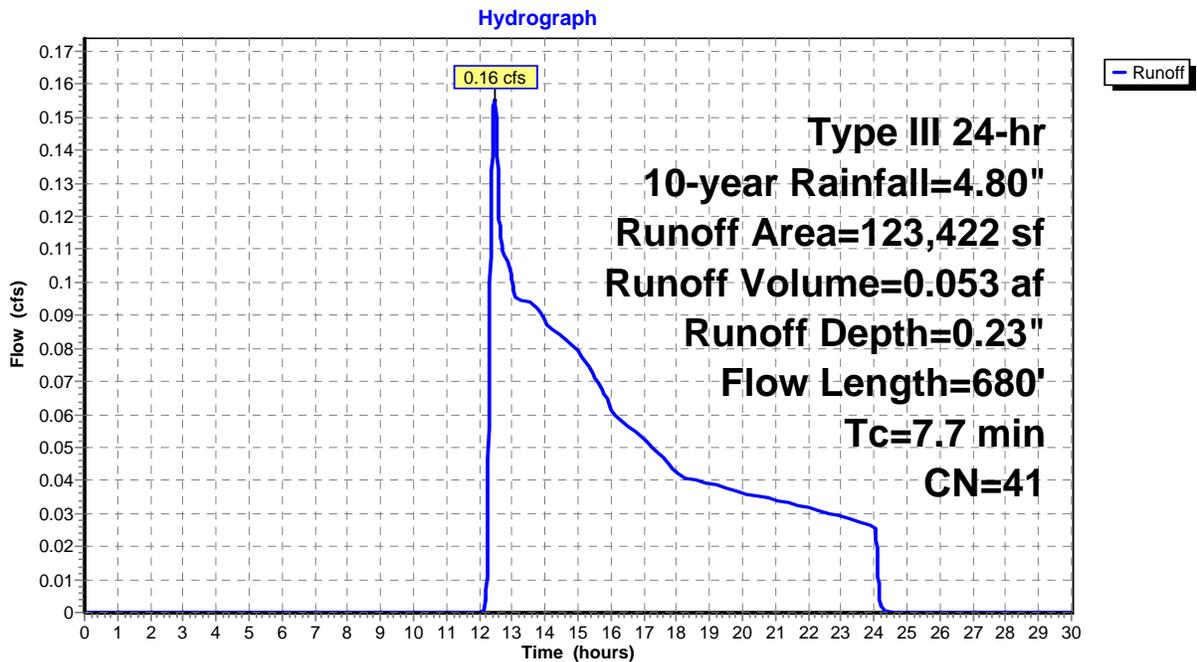
Runoff = 0.16 cfs @ 12.47 hrs, Volume= 0.053 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
58,032	30	Woods, Good, HSG A
65,390	51	1 acre lots, 20% imp, HSG A
123,422	41	Weighted Average
110,344		89.40% Pervious Area
13,078		10.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1400	0.16		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	497	0.1000	5.09		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.8	133	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
7.7	680	Total			

**Subcatchment 3S: ROAD "A" SOUTH**



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 Type III 24-hr 10-year Rainfall=4.80"

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**Summary for Subcatchment 4S: EASTERN SITE**

Runoff = 0.01 cfs @ 21.05 hrs, Volume= 0.008 af, Depth= 0.03"

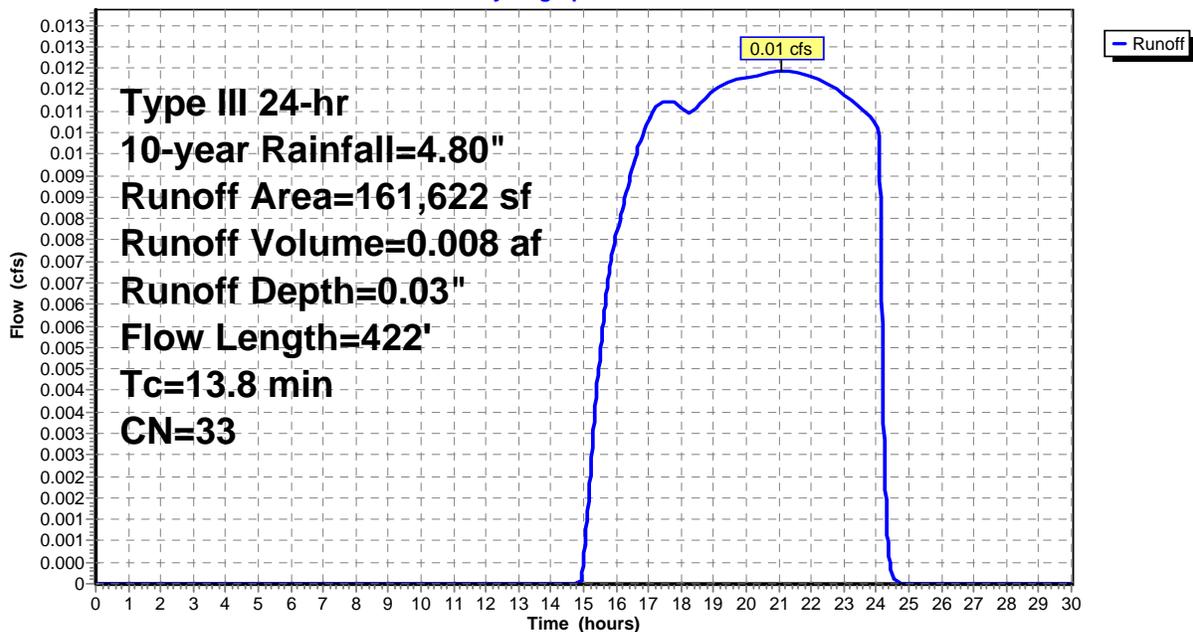
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
114,244	30	Woods, Good, HSG A
30,995	39	>75% Grass cover, Good, HSG A
16,383	46	2 acre lots, 12% imp, HSG A
161,622	33	Weighted Average
159,656		98.78% Pervious Area
1,966		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	372	0.0320	2.88		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.8	422	Total			

**Subcatchment 4S: EASTERN SITE**

Hydrograph







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**Summary for Subcatchment 7S: ROAD "B" LOTS**

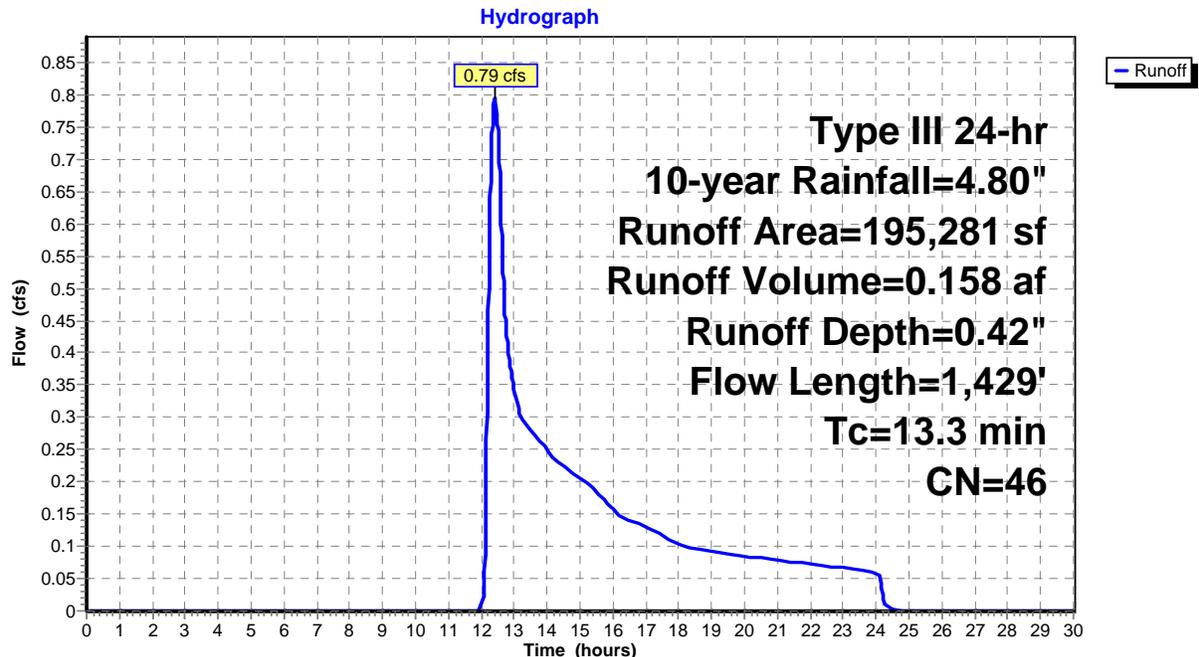
Runoff = 0.79 cfs @ 12.43 hrs, Volume= 0.158 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
151,707	51	1 acre lots, 20% imp, HSG A
43,574	30	Woods, Good, HSG A
195,281	46	Weighted Average
164,940		84.46% Pervious Area
30,341		15.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0700	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.6	539	0.0445	3.40		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
3.7	840	0.0050	3.79	2.98	<b>Pipe Channel, C-D</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
13.3	1,429	Total			

**Subcatchment 7S: ROAD "B" LOTS**



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## Summary for Subcatchment 8S: WEST CENTRAL SITE

Runoff = 0.02 cfs @ 21.07 hrs, Volume= 0.011 af, Depth= 0.03"

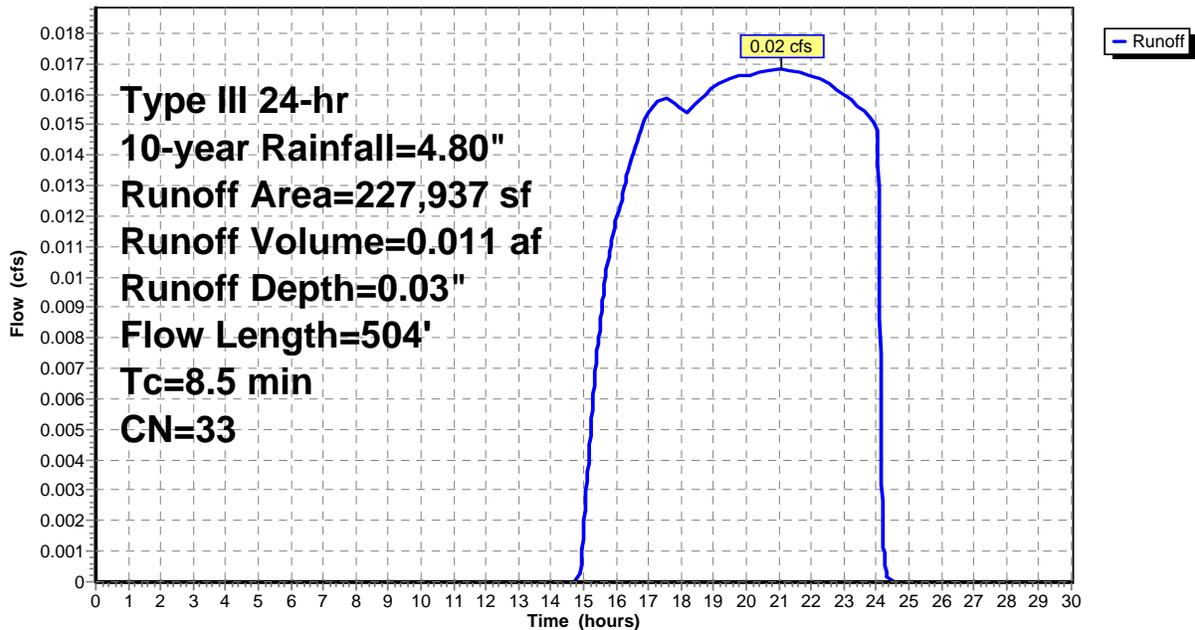
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
217,334	30	Woods, Good, HSG A
10,603	96	Gravel surface, HSG A
227,937	33	Weighted Average
227,937		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	504	Total			

## Subcatchment 8S: WEST CENTRAL SITE

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Type III 24-hr 10-year Rainfall=4.80"

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## Summary for Subcatchment 9S: CENTRAL SITE

Runoff = 1.44 cfs @ 12.17 hrs, Volume= 0.161 af, Depth= 0.83"

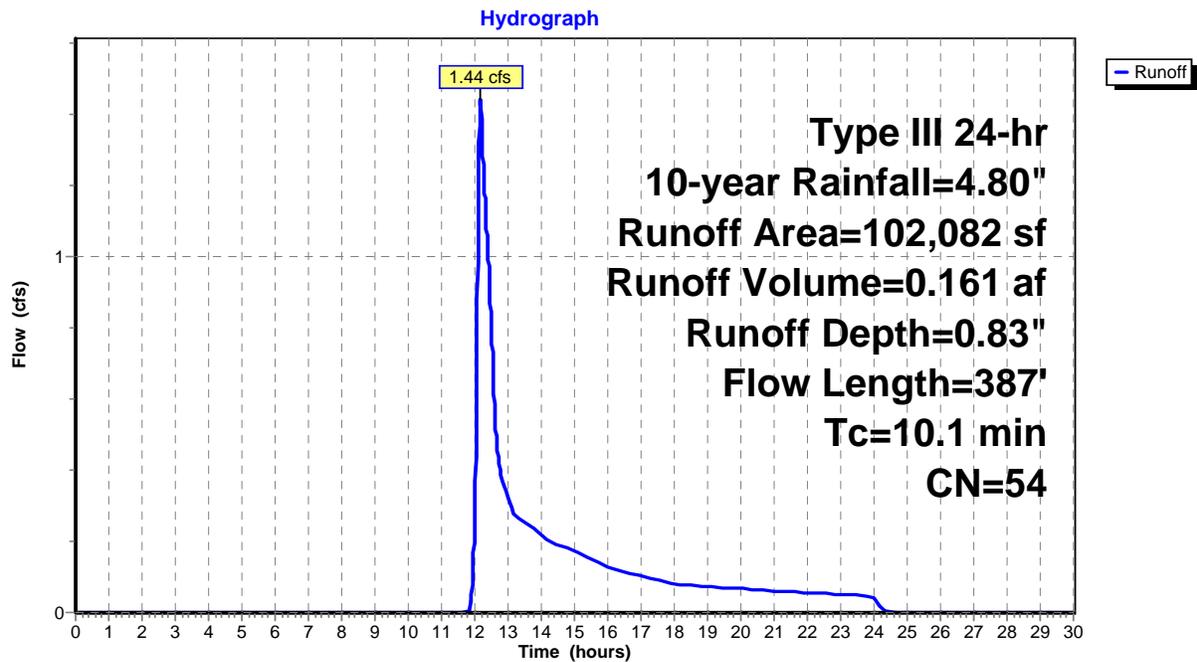
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
102,082	54	1/2 acre lots, 25% imp, HSG A
76,562		75.00% Pervious Area
25,521		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0400	0.09		<b>Sheet Flow, A=B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.0	290	0.0840	4.67		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.3	47	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
10.1	387	Total			

## Subcatchment 9S: CENTRAL SITE



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**Summary for Subcatchment 10S: ROAD "A" TO CUL-DE-SAC**

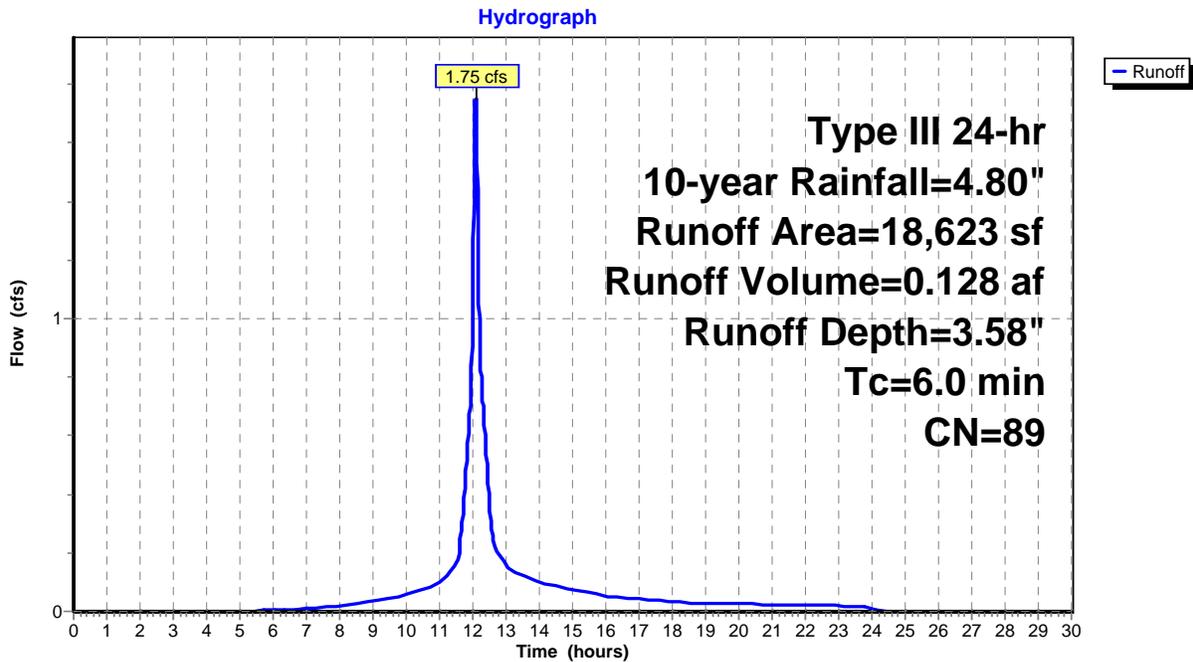
Runoff = 1.75 cfs @ 12.09 hrs, Volume= 0.128 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
15,889	98	Paved roads w/curbs & sewers, HSG A
2,734	39	>75% Grass cover, Good, HSG A
18,623	89	Weighted Average
2,734		14.68% Pervious Area
15,889		85.32% Impervious Area

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

**Subcatchment 10S: ROAD "A" TO CUL-DE-SAC**



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**Summary for Subcatchment 11S: ROAD "A" TO BEGINNING**

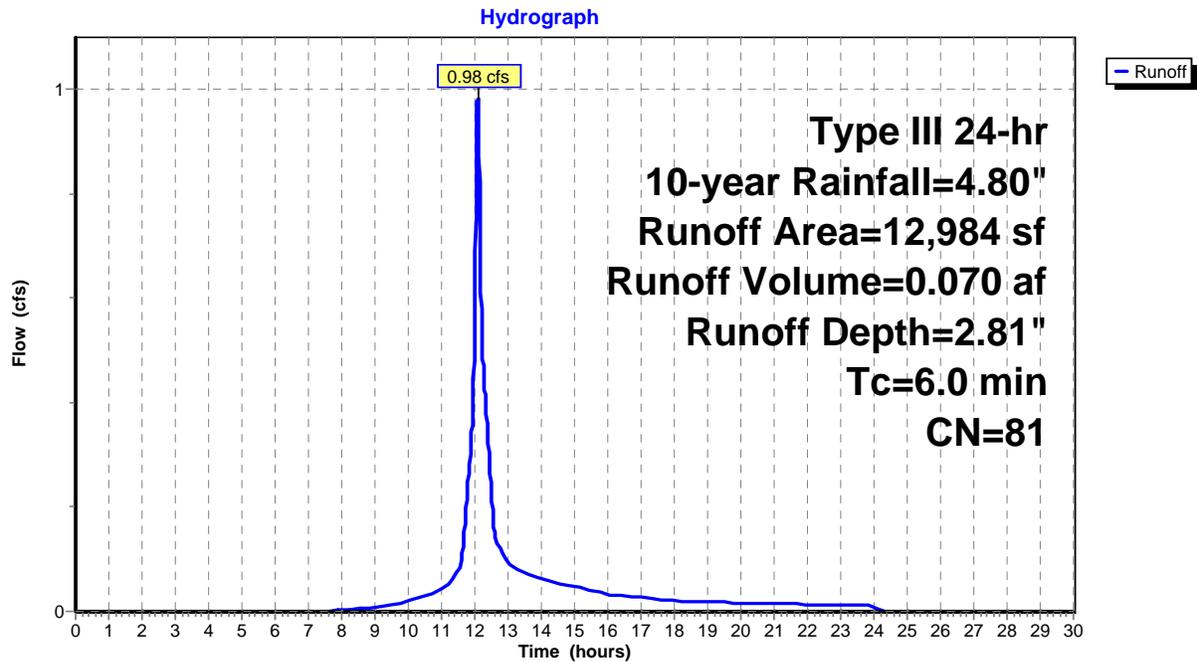
Runoff = 0.98 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
9,215	98	Paved roads w/curbs & sewers, HSG A
3,769	39	>75% Grass cover, Good, HSG A
12,984	81	Weighted Average
3,769		29.03% Pervious Area
9,215		70.97% Impervious Area

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

**Subcatchment 11S: ROAD "A" TO BEGINNING**



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**Summary for Subcatchment 12S: ROAD "B"**

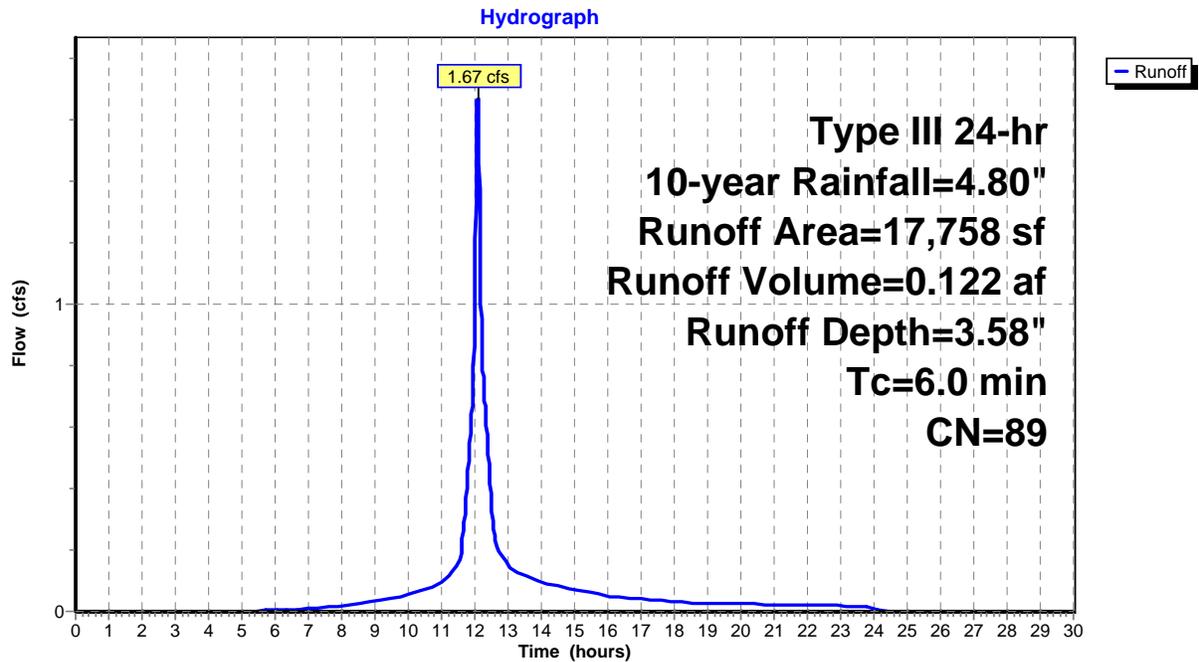
Runoff = 1.67 cfs @ 12.09 hrs, Volume= 0.122 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
15,024	98	Paved parking, HSG A
2,734	39	>75% Grass cover, Good, HSG A
17,758	89	Weighted Average
2,734		15.40% Pervious Area
15,024		84.60% Impervious Area

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

**Subcatchment 12S: ROAD "B"**



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**Summary for Subcatchment 13S: WESTERN SIDE OF ROAD "A"**

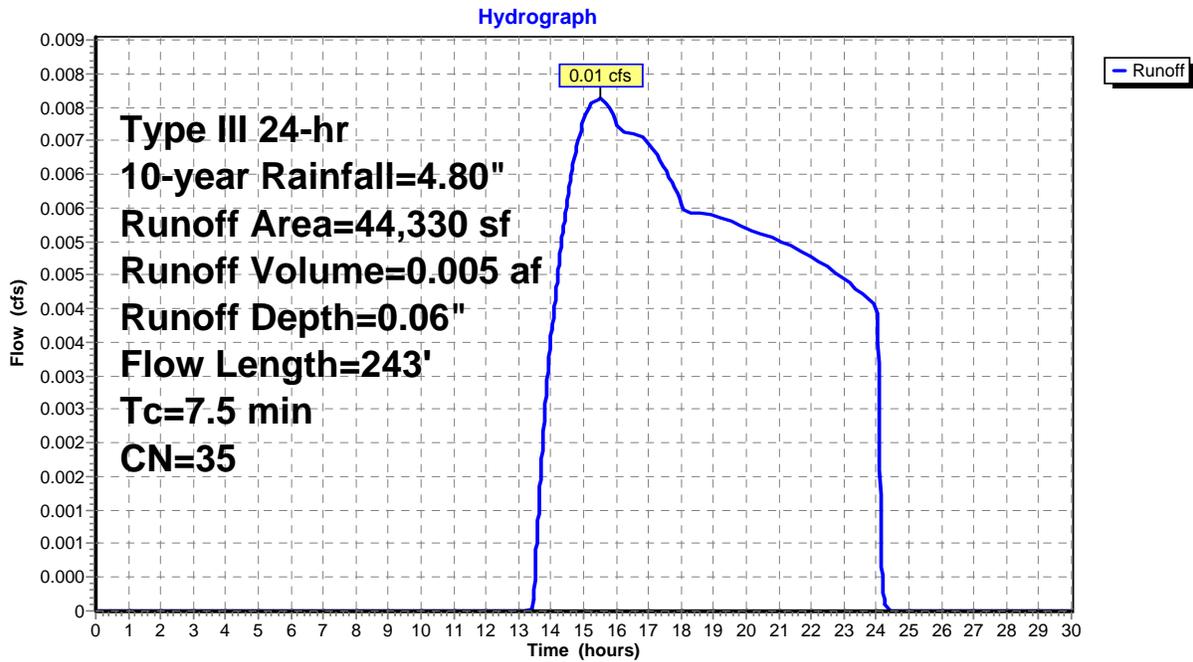
Runoff = 0.01 cfs @ 15.49 hrs, Volume= 0.005 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
28,330	30	Woods, Good, HSG A
8,290	46	2 acre lots, 12% imp, HSG A
7,710	39	>75% Grass cover, Good, HSG A
44,330	35	Weighted Average
43,335		97.76% Pervious Area
995		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0100	0.12		<b>Sheet Flow, A-B</b> Grass: Short n= 0.150 P2= 3.60"
0.3	59	0.0420	3.30		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.2	134	0.3130	9.01		<b>Shallow Concentrated Flow, C-D</b> Unpaved Kv= 16.1 fps
7.5	243	Total			

**Subcatchment 13S: WESTERN SIDE OF ROAD "A"**



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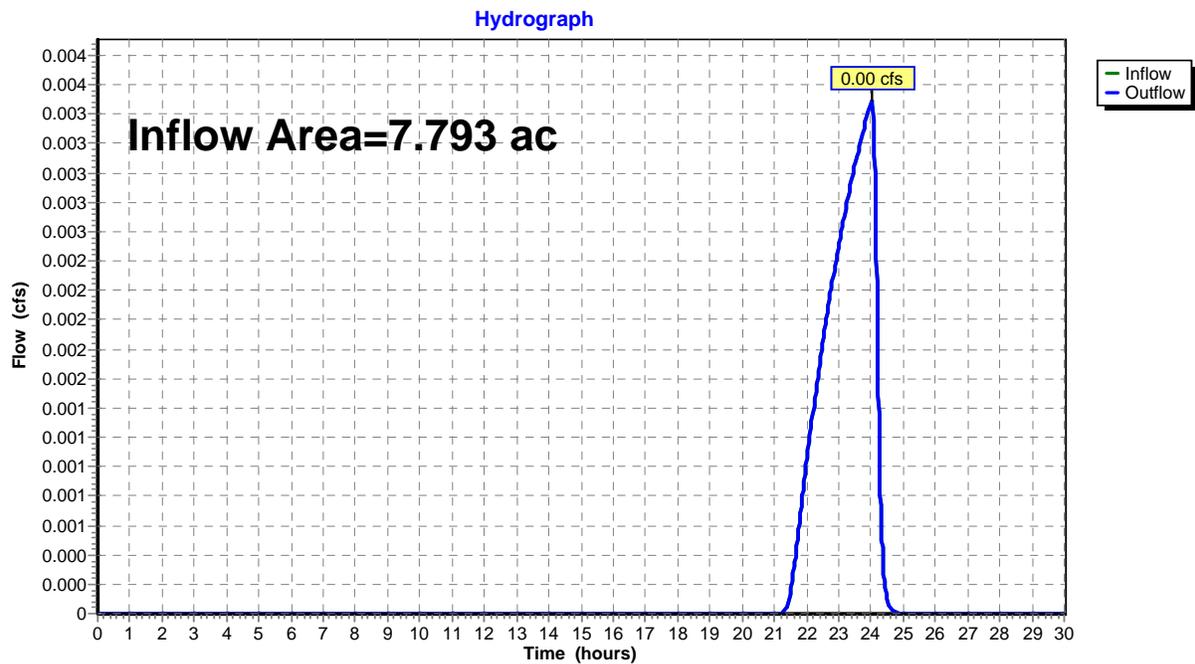
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**Summary for Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES**

Inflow Area = 7.793 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES**



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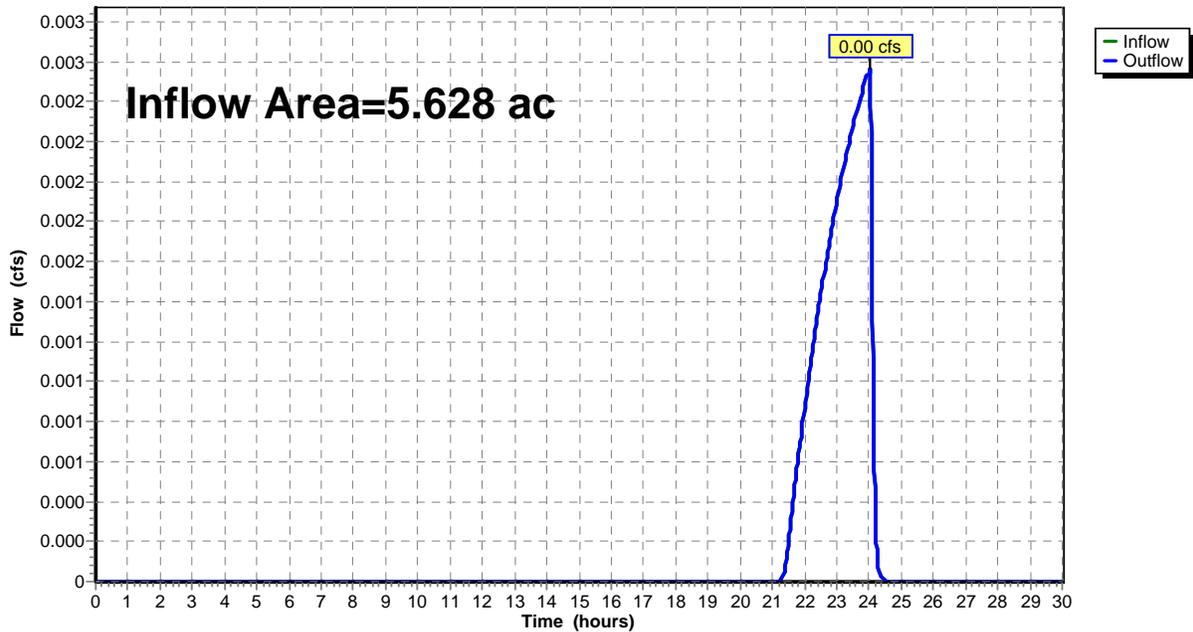
**Summary for Reach 2R: OFFSITE TOWARDS TOWN LAND**

Inflow Area = 5.628 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 2R: OFFSITE TOWARDS TOWN LAND**

Hydrograph



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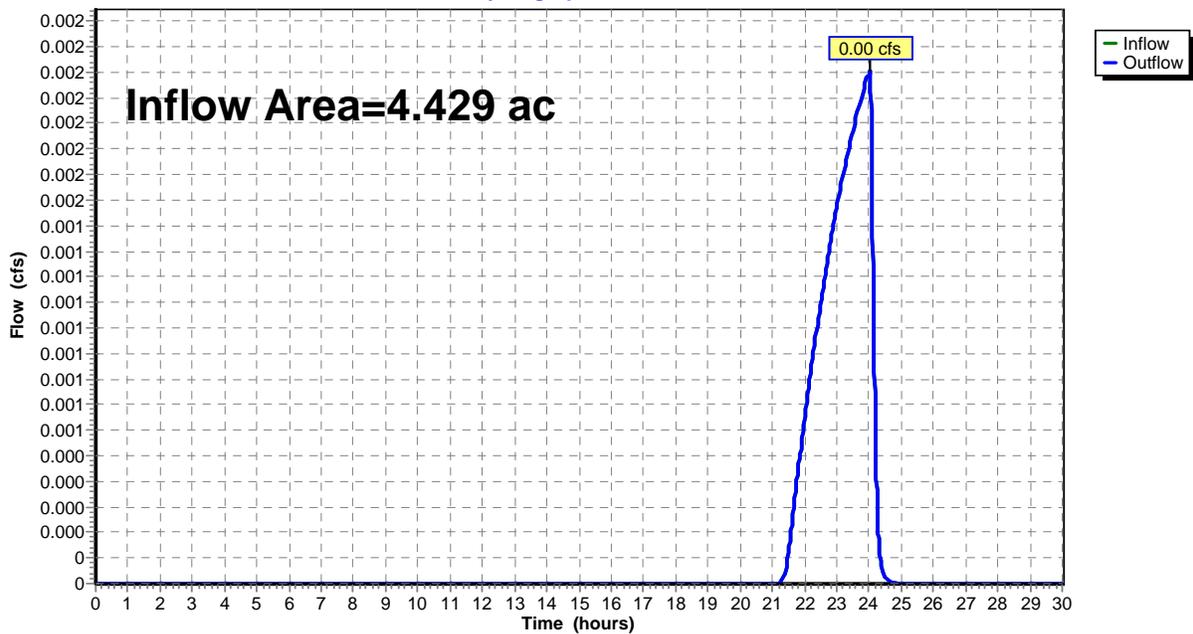
**Summary for Reach 3R: OFFSITE TOWARDS ATKINS ROAD**

Inflow Area = 4.429 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event  
Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af  
Outflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 3R: OFFSITE TOWARDS ATKINS ROAD**

Hydrograph



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**Summary for Pond 1P: INFILTRATION BASIN**

Inflow Area = 15.728 ac, 14.57% Impervious, Inflow Depth = 0.48" for 10-year event  
 Inflow = 4.52 cfs @ 12.11 hrs, Volume= 0.634 af  
 Outflow = 1.04 cfs @ 13.04 hrs, Volume= 0.634 af, Atten= 77%, Lag= 55.7 min  
 Discarded = 1.04 cfs @ 13.04 hrs, Volume= 0.634 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 124.07' @ 13.04 hrs Surf.Area= 5,356 sf Storage= 6,717 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 67.1 min ( 954.1 - 887.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,887 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.0	0	0	1,489
124.00	5,241	280.0	6,349	6,349	5,400
126.00	9,048	366.0	14,117	20,466	9,868
128.00	12,464	423.0	21,421	41,887	13,533

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=1.04 cfs @ 13.04 hrs HW=124.07' (Free Discharge)  
 ↑1=Exfiltration ( Controls 1.04 cfs)

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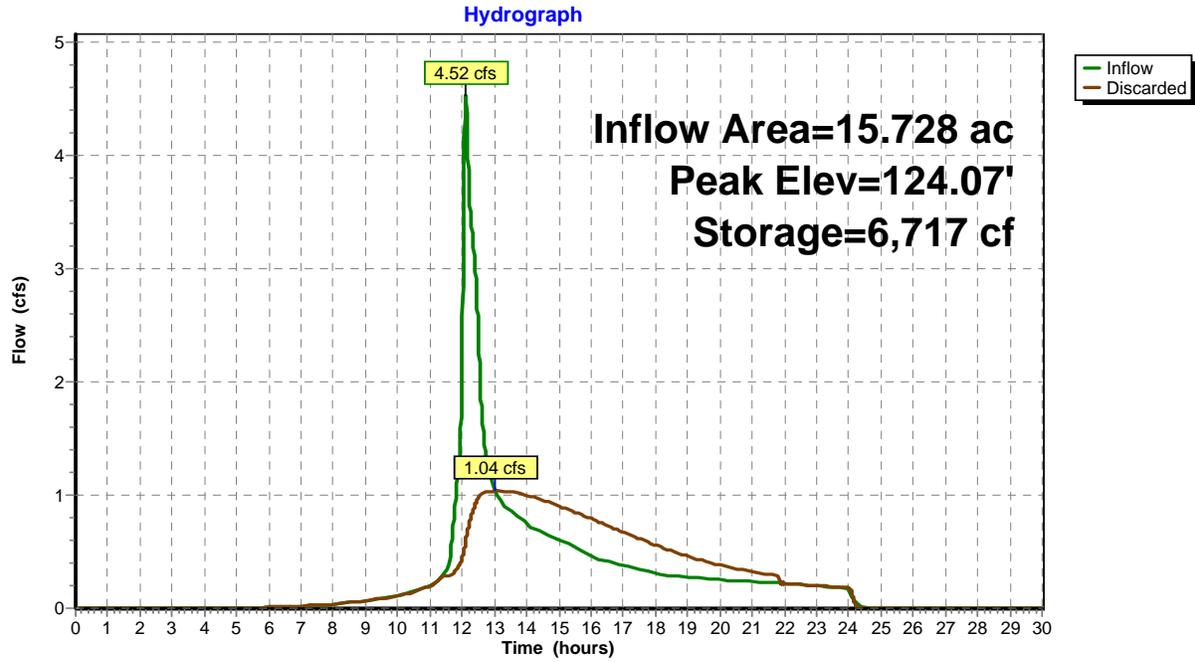
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**Pond 1P: INFILTRATION BASIN**



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**Summary for Pond 2P: INFILTRATION TRENCH**

Inflow Area = 3.710 ac, 1.22% Impervious, Inflow Depth = 0.03" for 10-year event  
 Inflow = 0.01 cfs @ 21.05 hrs, Volume= 0.008 af  
 Outflow = 0.01 cfs @ 21.05 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.01 cfs @ 21.05 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 1,554 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.0 min ( 1,197.2 - 1,197.2 )

Volume	Invert	Avail.Storage	Storage Description			
#1	122.00'	10,251 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,554	785.0	0.0	0	0	1,554
126.00	1,554	785.0	40.0	2,486	2,486	4,694
127.00	3,938	804.0	100.0	2,655	5,142	7,224
128.00	6,378	823.0	100.0	5,109	10,251	9,815

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 21.05 hrs HW=122.00' (Free Discharge)  
 ↑**1=Exfiltration** (Passes 0.00 cfs of 0.30 cfs potential flow)

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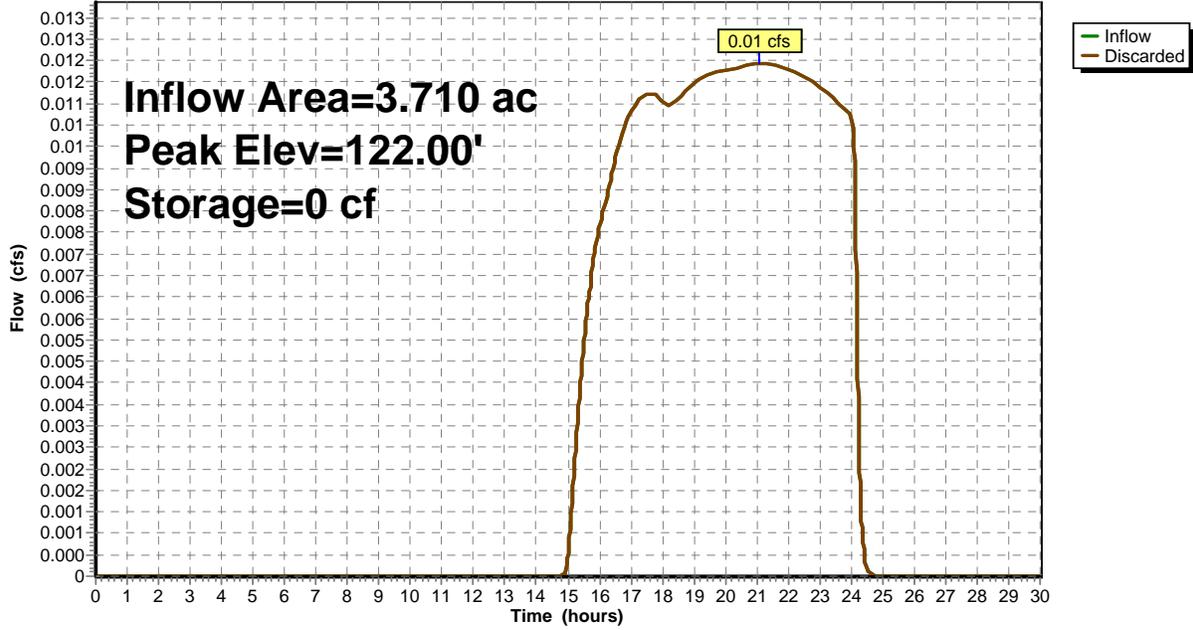
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**Pond 2P: INFILTRATION TRENCH**

Hydrograph



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**Summary for Pond 3P: STORMTECH CHAMBERS SC-740**

Inflow Area = 1.316 ac, 17.81% Impervious, Inflow Depth = 0.68" for 10-year event  
 Inflow = 0.98 cfs @ 12.09 hrs, Volume= 0.075 af  
 Outflow = 0.24 cfs @ 12.49 hrs, Volume= 0.075 af, Atten= 76%, Lag= 24.4 min  
 Discarded = 0.24 cfs @ 12.49 hrs, Volume= 0.075 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 100.92' @ 12.49 hrs Surf.Area= 1,218 sf Storage= 656 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 13.6 min ( 854.5 - 840.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	1,112 cf	<b>20.50'W x 59.40'L x 3.50'H Field A</b> 4,262 cf Overall - 1,481 cf Embedded = 2,781 cf x 40.0% Voids
#2A	100.50'	1,481 cf	<b>ADS StormTech SC-740 x 32 Inside #1</b> Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		2,594 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.24 cfs @ 12.49 hrs HW=100.92' (Free Discharge)  
 ↑**1=Exfiltration** ( Controls 0.24 cfs)

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**Pond 3P: STORMTECH CHAMBERS SC-740 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 (ADS StormTech® SC-740)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 4 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

8 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 57.40' Row Length +12.0" End Stone x 2 = 59.40' Base Length

4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width

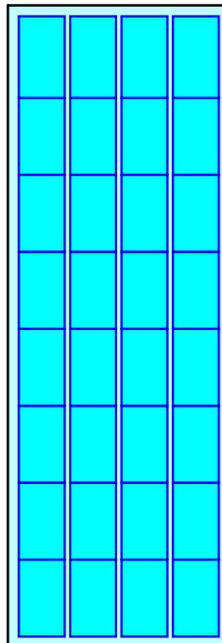
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

32 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 4 Rows = 1,481.4 cf Chamber Storage

4,262.0 cf Field - 1,481.4 cf Chambers = 2,780.5 cf Stone x 40.0% Voids = 1,112.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,593.6 cf = 0.060 af  
Overall Storage Efficiency = 60.9%

32 Chambers  
157.9 cy Field  
103.0 cy Stone



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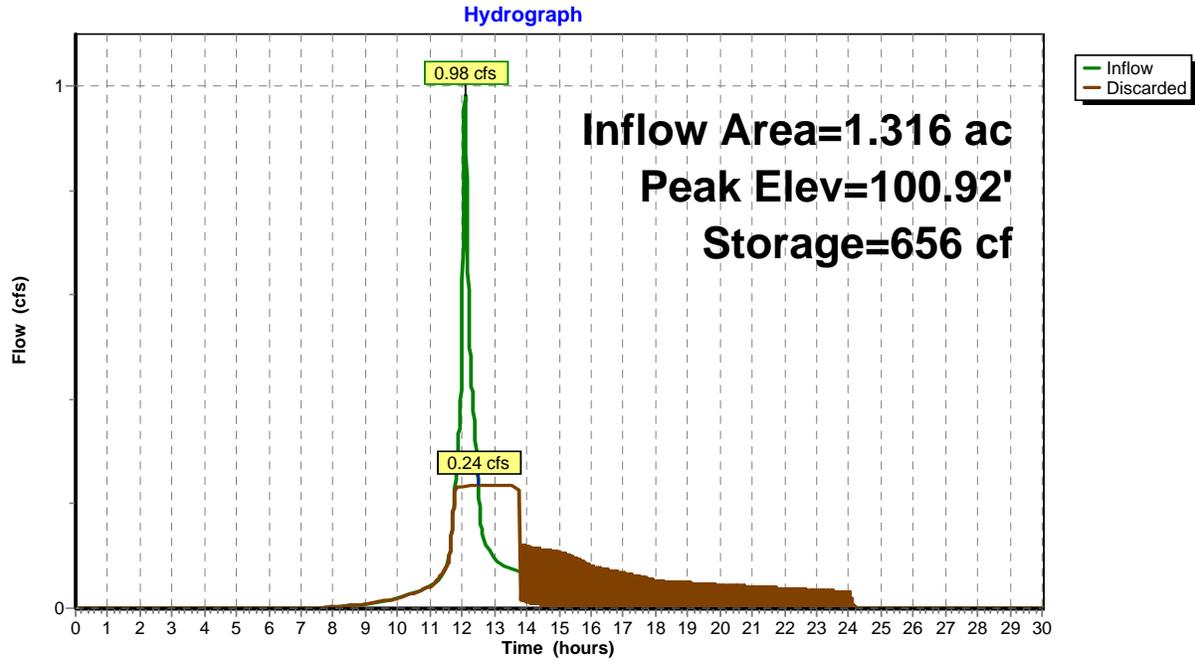
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**Pond 3P: STORMTECH CHAMBERS SC-740**



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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

<b>Subcatchment 1S: SOUTHWEST</b>	Runoff Area=339,473 sf 0.00% Impervious Runoff Depth=0.04" Flow Length=820' Tc=14.9 min CN=30 Runoff=0.04 cfs 0.028 af
<b>Subcatchment 2S: SOUTHEAST</b>	Runoff Area=245,162 sf 0.00% Impervious Runoff Depth=0.04" Flow Length=766' Tc=8.5 min CN=30 Runoff=0.03 cfs 0.021 af
<b>Subcatchment 3S: ROAD "A"</b>	Runoff Area=123,422 sf 10.60% Impervious Runoff Depth=0.46" Flow Length=680' Tc=7.7 min CN=41 Runoff=0.55 cfs 0.109 af
<b>Subcatchment 4S: EASTERN SITE</b>	Runoff Area=161,622 sf 1.22% Impervious Runoff Depth=0.12" Flow Length=422' Tc=13.8 min CN=33 Runoff=0.06 cfs 0.038 af
<b>Subcatchment 5S: NORTHEAST</b>	Runoff Area=109,388 sf 0.00% Impervious Runoff Depth=0.04" Flow Length=437' Tc=13.1 min CN=30 Runoff=0.01 cfs 0.009 af
<b>Subcatchment 6S: NORTH SITE</b>	Runoff Area=83,544 sf 0.00% Impervious Runoff Depth=0.04" Flow Length=420' Tc=8.2 min CN=30 Runoff=0.01 cfs 0.007 af
<b>Subcatchment 7S: ROAD "B"</b>	Runoff Area=195,281 sf 15.54% Impervious Runoff Depth=0.74" Flow Length=1,429' Tc=13.3 min CN=46 Runoff=1.84 cfs 0.278 af
<b>Subcatchment 8S: WEST CENTRAL</b>	Runoff Area=227,937 sf 0.00% Impervious Runoff Depth=0.12" Flow Length=504' Tc=8.5 min CN=33 Runoff=0.09 cfs 0.053 af
<b>Subcatchment 9S: CENTRAL SITE</b>	Runoff Area=102,082 sf 25.00% Impervious Runoff Depth=1.28" Flow Length=387' Tc=10.1 min CN=54 Runoff=2.57 cfs 0.249 af
<b>Subcatchment 10S: ROAD "A" TO</b>	Runoff Area=18,623 sf 85.32% Impervious Runoff Depth=4.45" Tc=6.0 min CN=89 Runoff=2.15 cfs 0.158 af
<b>Subcatchment 11S: ROAD "A" TO</b>	Runoff Area=12,984 sf 70.97% Impervious Runoff Depth=3.61" Tc=6.0 min CN=81 Runoff=1.26 cfs 0.090 af
<b>Subcatchment 12S: ROAD "B"</b>	Runoff Area=17,758 sf 84.60% Impervious Runoff Depth=4.45" Tc=6.0 min CN=89 Runoff=2.05 cfs 0.151 af
<b>Subcatchment 13S: WESTERN SIDE</b>	Runoff Area=44,330 sf 2.24% Impervious Runoff Depth=0.19" Flow Length=243' Tc=7.5 min CN=35 Runoff=0.03 cfs 0.016 af
<b>Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES</b>	Inflow=0.04 cfs 0.028 af Outflow=0.04 cfs 0.028 af
<b>Reach 2R: OFFSITE TOWARDS TOWN LAND</b>	Inflow=0.03 cfs 0.021 af Outflow=0.03 cfs 0.021 af
<b>Reach 3R: OFFSITE TOWARDS ATKINS ROAD</b>	Inflow=0.02 cfs 0.016 af Outflow=0.02 cfs 0.016 af

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*Type III 24-hr 25-year Rainfall=5.70"*

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**Pond 1P: INFILTRATION BASIN**      Peak Elev=125.01' Storage=12,546 cf Inflow=7.37 cfs 0.999 af  
Outflow=1.37 cfs 1.000 af

**Pond 2P: INFILTRATION TRENCH**      Peak Elev=122.00' Storage=0 cf Inflow=0.06 cfs 0.038 af  
Outflow=0.06 cfs 0.038 af

**Pond 3P: STORMTECH CHAMBERS**      Peak Elev=101.30' Storage=1,030 cf Inflow=1.26 cfs 0.106 af  
Outflow=0.24 cfs 0.106 af

**Total Runoff Area = 38.604 ac    Runoff Volume = 1.208 af    Average Runoff Depth = 0.38"**  
**93.34% Pervious = 36.033 ac    6.66% Impervious = 2.572 ac**

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**Summary for Subcatchment 1S: SOUTHWEST SITE**

Runoff = 0.04 cfs @ 17.17 hrs, Volume= 0.028 af, Depth= 0.04"

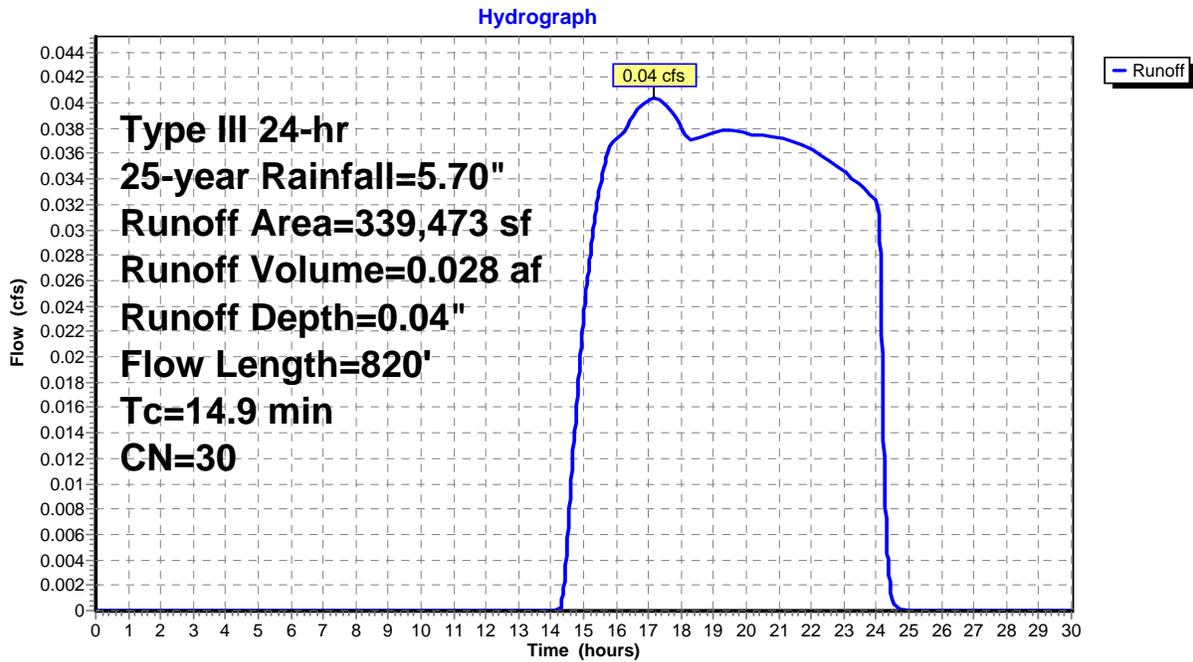
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
339,473	30	Woods, Good, HSG A
339,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b>
					Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		<b>Shallow Concentrated Flow, B-C</b>
					Unpaved Kv= 16.1 fps
14.9	820	Total			

**Subcatchment 1S: SOUTHWEST SITE**



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## Summary for Subcatchment 2S: SOUTHEAST SITE

Runoff = 0.03 cfs @ 17.03 hrs, Volume= 0.021 af, Depth= 0.04"

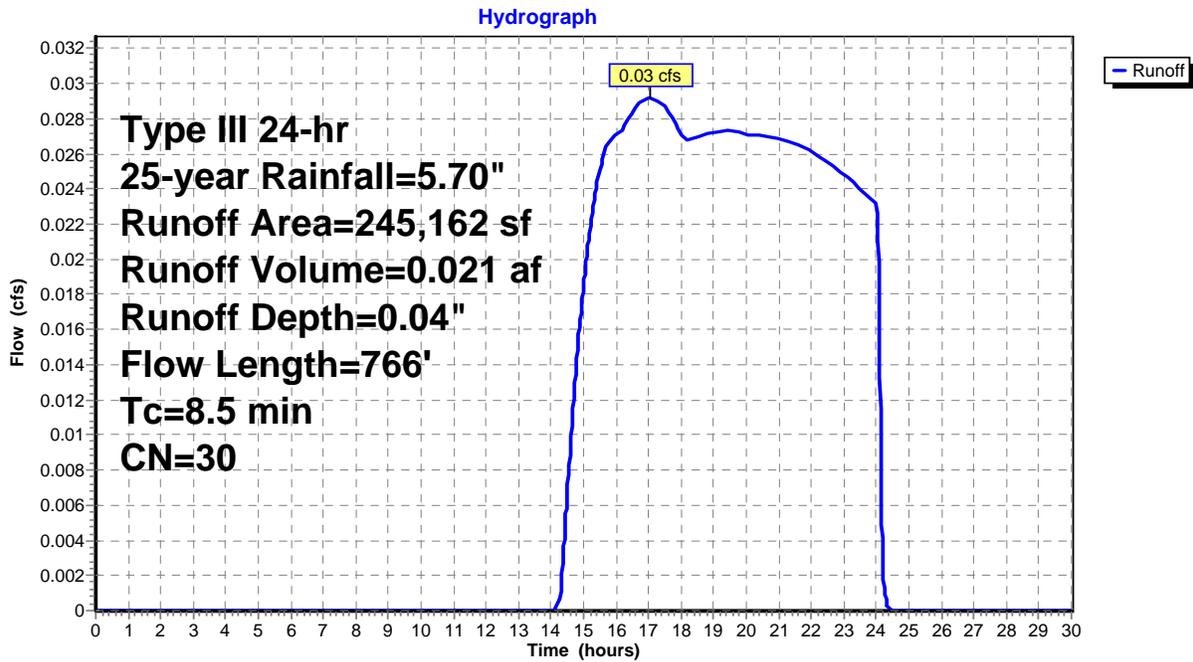
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
245,162	30	Woods, Good, HSG A
245,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

## Subcatchment 2S: SOUTHEAST SITE



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 Type III 24-hr 25-year Rainfall=5.70"

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**Summary for Subcatchment 3S: ROAD "A" SOUTH**

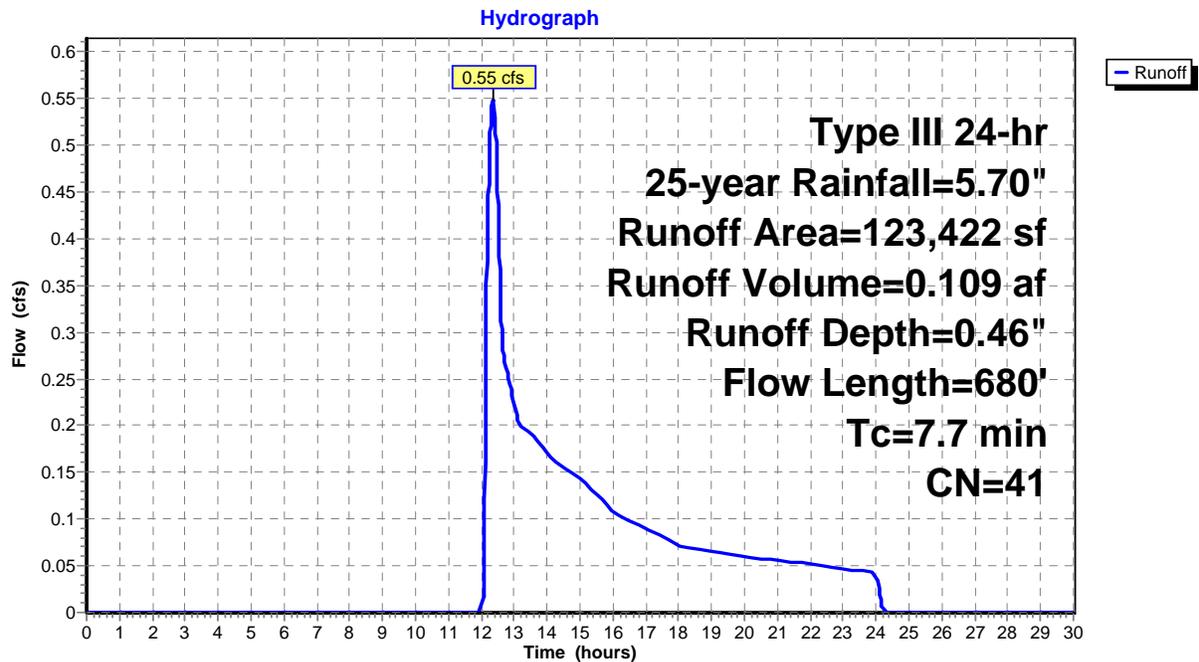
Runoff = 0.55 cfs @ 12.35 hrs, Volume= 0.109 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
58,032	30	Woods, Good, HSG A
65,390	51	1 acre lots, 20% imp, HSG A
123,422	41	Weighted Average
110,344		89.40% Pervious Area
13,078		10.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1400	0.16		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	497	0.1000	5.09		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.8	133	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
7.7	680	Total			

**Subcatchment 3S: ROAD "A" SOUTH**



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## Summary for Subcatchment 4S: EASTERN SITE

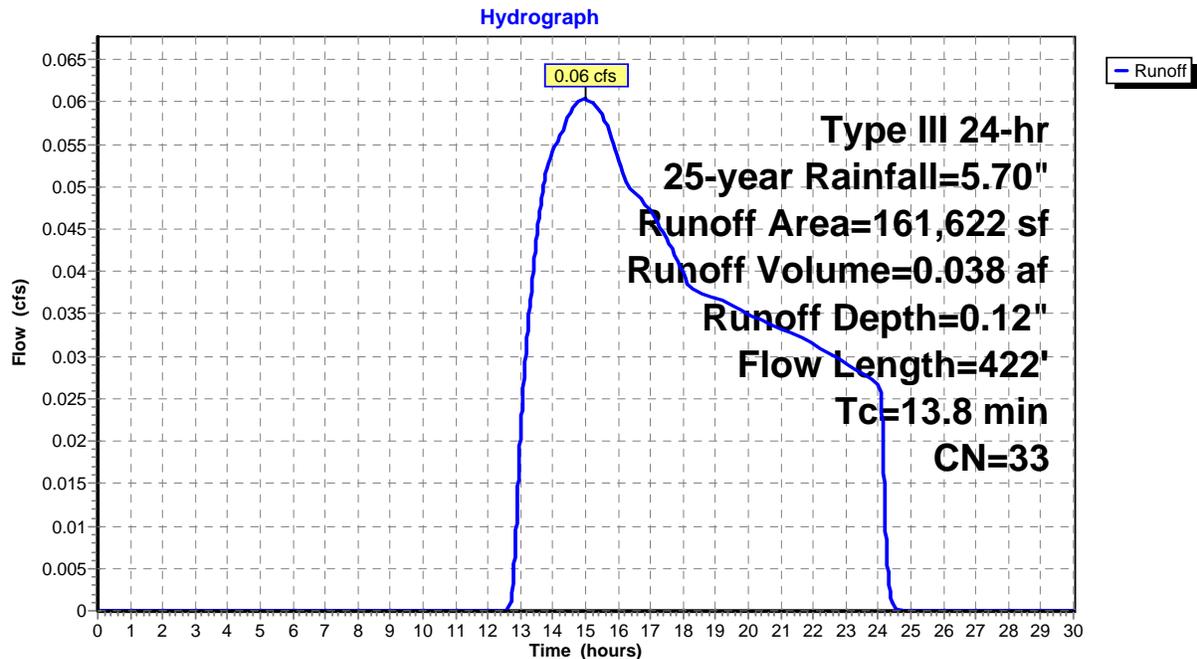
Runoff = 0.06 cfs @ 14.98 hrs, Volume= 0.038 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
114,244	30	Woods, Good, HSG A
30,995	39	>75% Grass cover, Good, HSG A
16,383	46	2 acre lots, 12% imp, HSG A
161,622	33	Weighted Average
159,656		98.78% Pervious Area
1,966		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	372	0.0320	2.88		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.8	422	Total			

## Subcatchment 4S: EASTERN SITE



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## Summary for Subcatchment 5S: NORTHEAST SITE

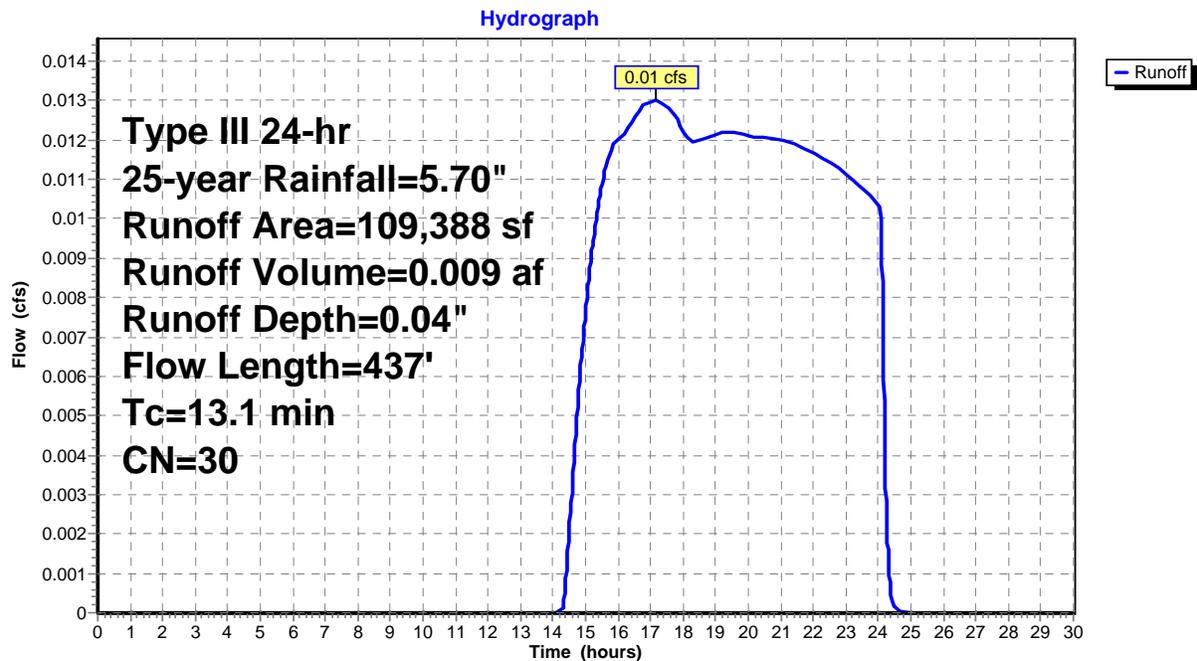
Runoff = 0.01 cfs @ 17.13 hrs, Volume= 0.009 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
107,608	30	Woods, Good, HSG A
1,780	39	>75% Grass cover, Good, HSG A
109,388	30	Weighted Average
109,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b>
					Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b>
					Unpaved Kv= 16.1 fps
13.1	437	Total			

## Subcatchment 5S: NORTHEAST SITE



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## Summary for Subcatchment 6S: NORTH SITE

Runoff = 0.01 cfs @ 17.03 hrs, Volume= 0.007 af, Depth= 0.04"

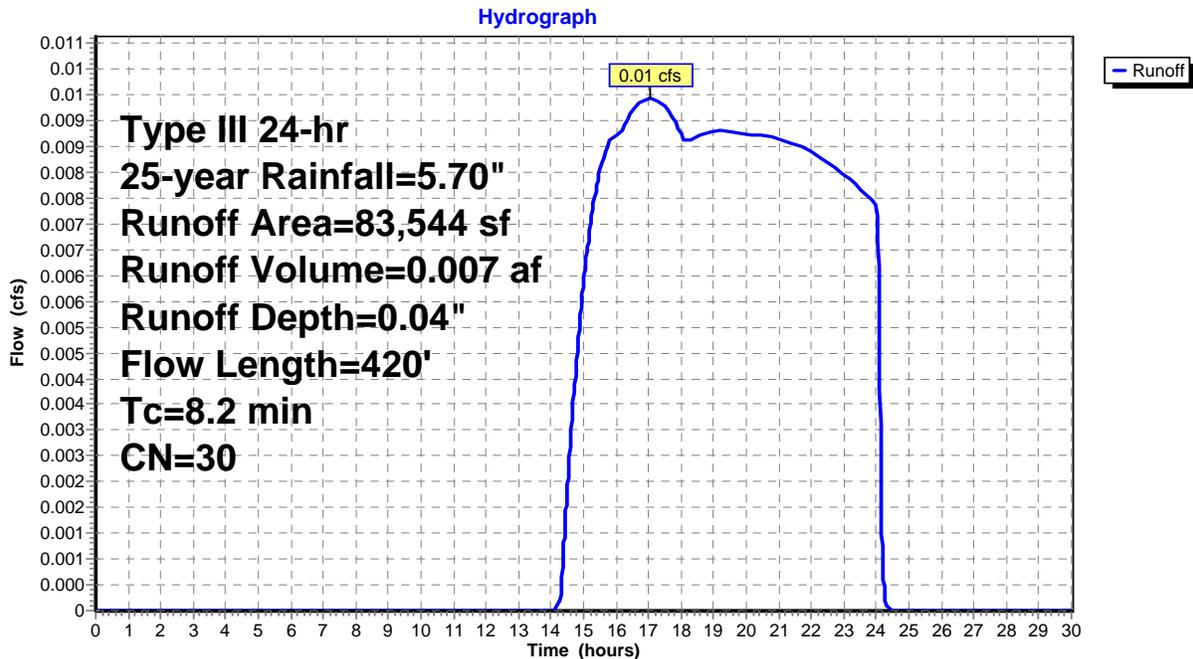
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
83,544	30	Woods, Good, HSG A
83,544		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0800	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	370	0.0620	4.01		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.2	420	Total			

## Subcatchment 6S: NORTH SITE



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**Summary for Subcatchment 7S: ROAD "B" LOTS**

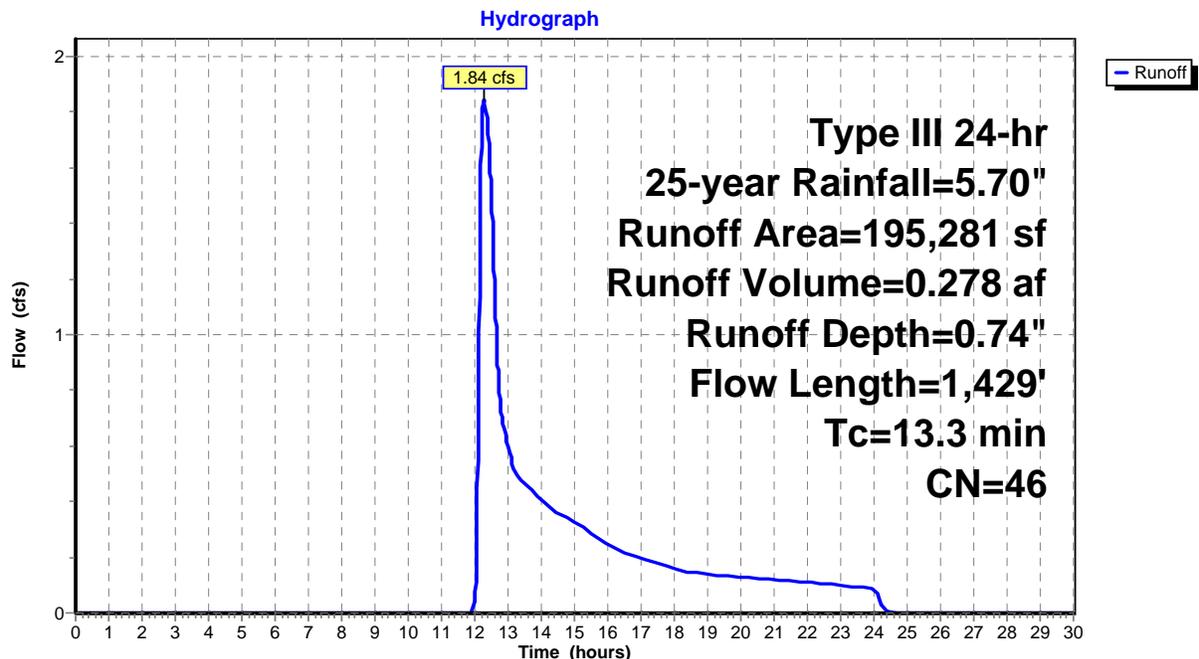
Runoff = 1.84 cfs @ 12.28 hrs, Volume= 0.278 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
151,707	51	1 acre lots, 20% imp, HSG A
43,574	30	Woods, Good, HSG A
195,281	46	Weighted Average
164,940		84.46% Pervious Area
30,341		15.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0700	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.6	539	0.0445	3.40		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
3.7	840	0.0050	3.79	2.98	<b>Pipe Channel, C-D</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
13.3	1,429	Total			

**Subcatchment 7S: ROAD "B" LOTS**



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## Summary for Subcatchment 8S: WEST CENTRAL SITE

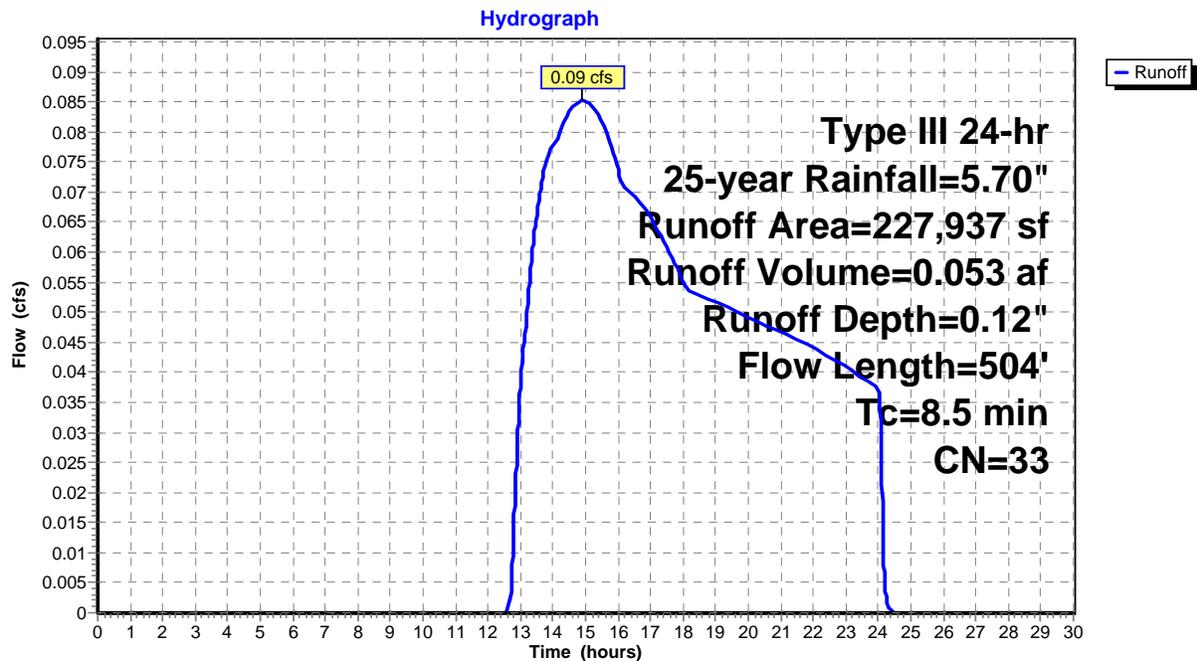
Runoff = 0.09 cfs @ 14.91 hrs, Volume= 0.053 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
217,334	30	Woods, Good, HSG A
10,603	96	Gravel surface, HSG A
227,937	33	Weighted Average
227,937		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	504	Total			

## Subcatchment 8S: WEST CENTRAL SITE



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**Summary for Subcatchment 9S: CENTRAL SITE**

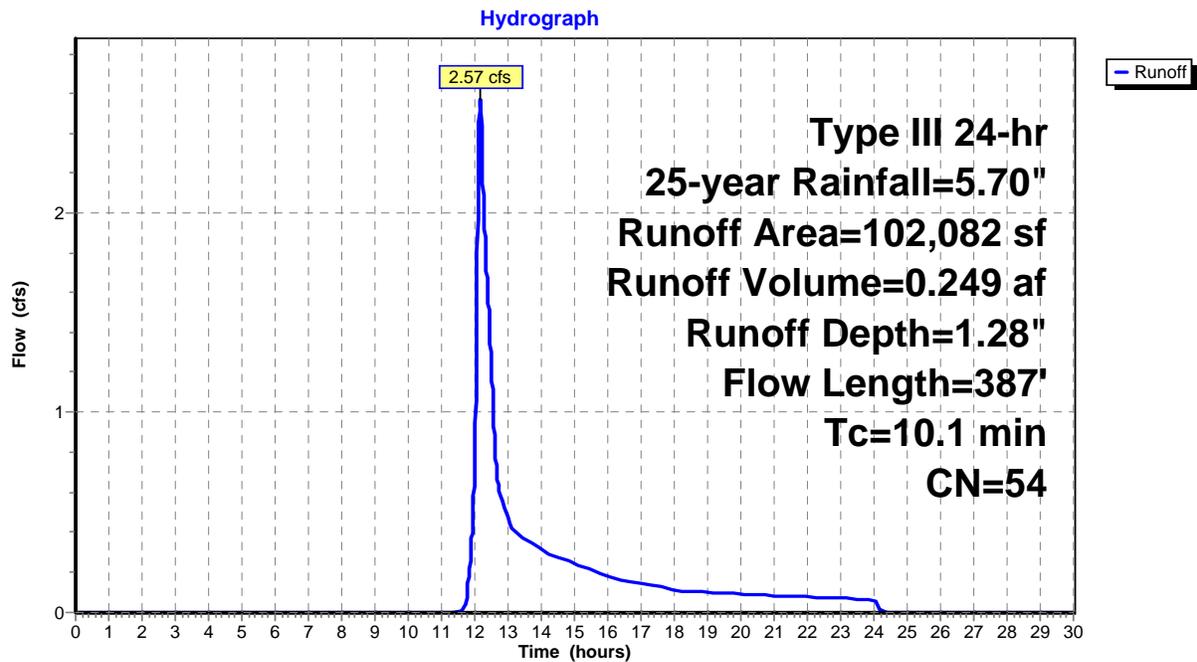
Runoff = 2.57 cfs @ 12.16 hrs, Volume= 0.249 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
102,082	54	1/2 acre lots, 25% imp, HSG A
76,562		75.00% Pervious Area
25,521		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0400	0.09		<b>Sheet Flow, A=B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.0	290	0.0840	4.67		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.3	47	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
10.1	387	Total			

**Subcatchment 9S: CENTRAL SITE**



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**Summary for Subcatchment 10S: ROAD "A" TO CUL-DE-SAC**

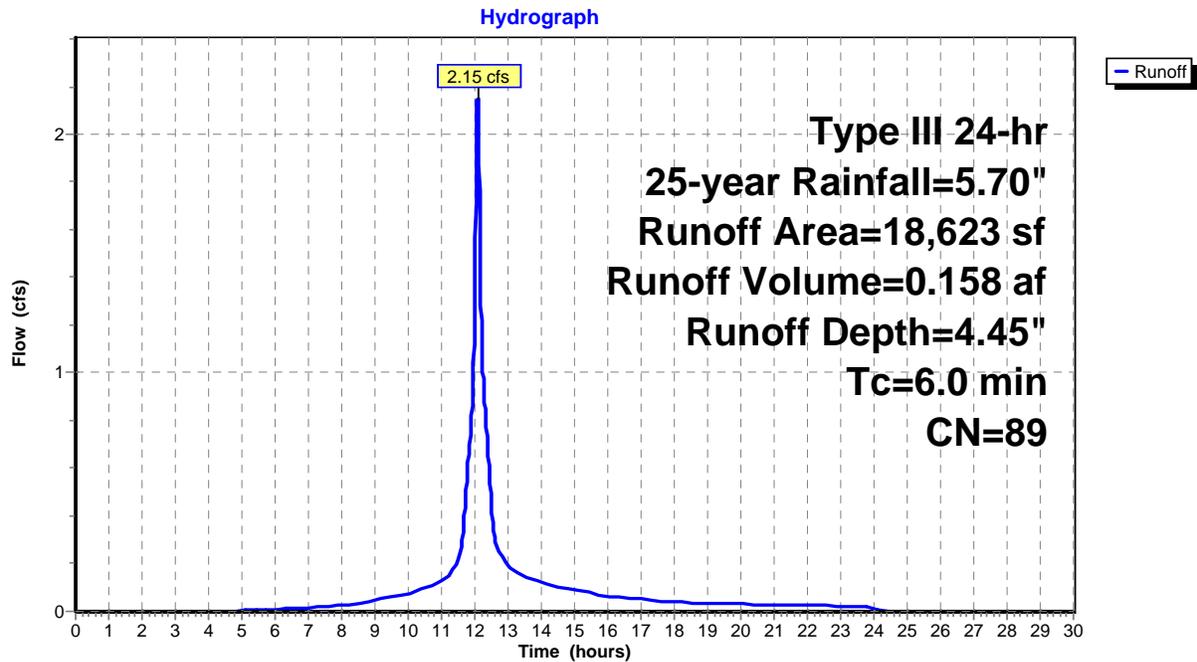
Runoff = 2.15 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
15,889	98	Paved roads w/curbs & sewers, HSG A
2,734	39	>75% Grass cover, Good, HSG A
18,623	89	Weighted Average
2,734		14.68% Pervious Area
15,889		85.32% Impervious Area

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

**Subcatchment 10S: ROAD "A" TO CUL-DE-SAC**



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**Summary for Subcatchment 11S: ROAD "A" TO BEGINNING**

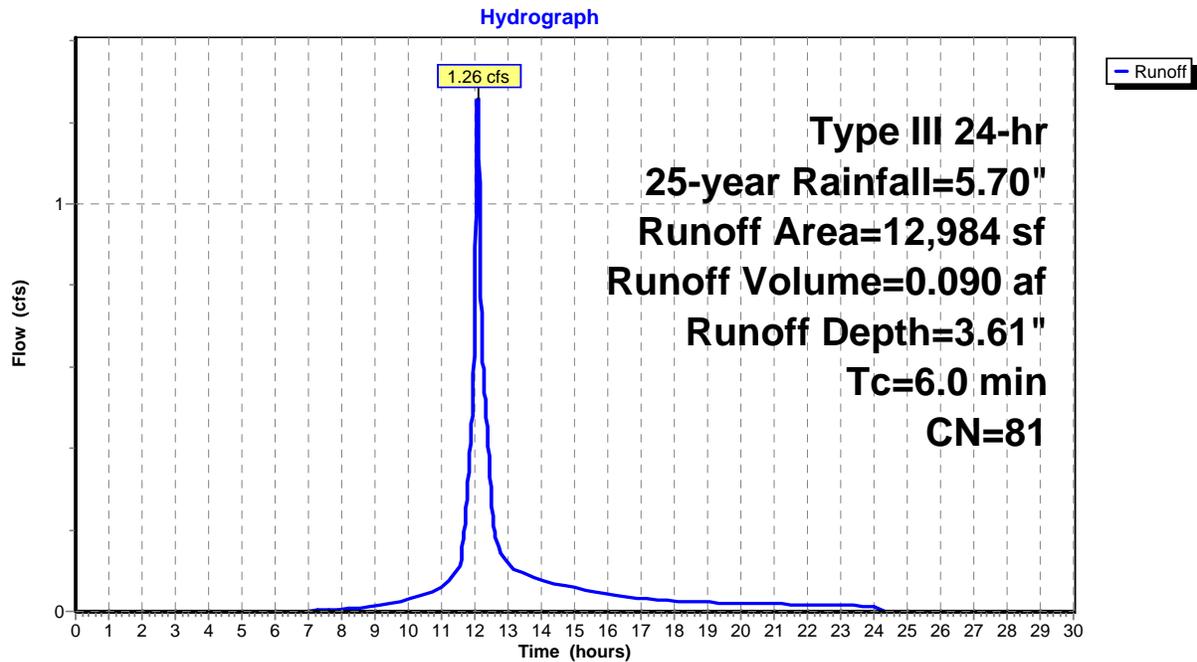
Runoff = 1.26 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
9,215	98	Paved roads w/curbs & sewers, HSG A
3,769	39	>75% Grass cover, Good, HSG A
12,984	81	Weighted Average
3,769		29.03% Pervious Area
9,215		70.97% Impervious Area

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

**Subcatchment 11S: ROAD "A" TO BEGINNING**



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**Summary for Subcatchment 12S: ROAD "B"**

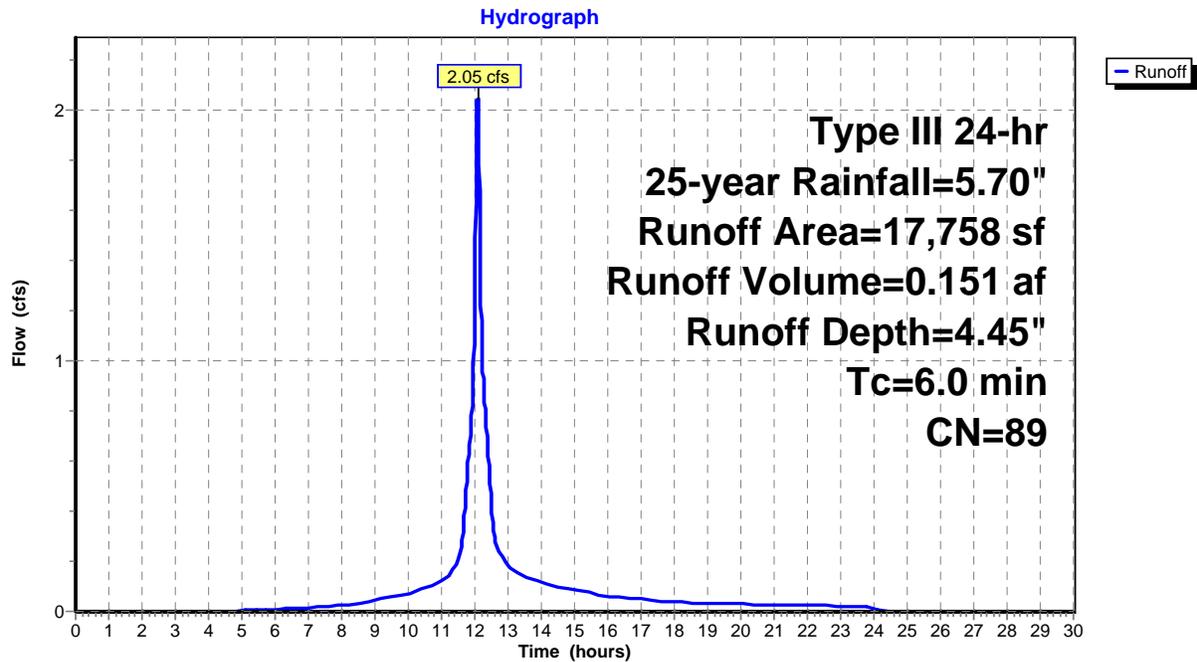
Runoff = 2.05 cfs @ 12.09 hrs, Volume= 0.151 af, Depth= 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
15,024	98	Paved parking, HSG A
2,734	39	>75% Grass cover, Good, HSG A
17,758	89	Weighted Average
2,734		15.40% Pervious Area
15,024		84.60% Impervious Area

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

**Subcatchment 12S: ROAD "B"**



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**Summary for Subcatchment 13S: WESTERN SIDE OF ROAD "A"**

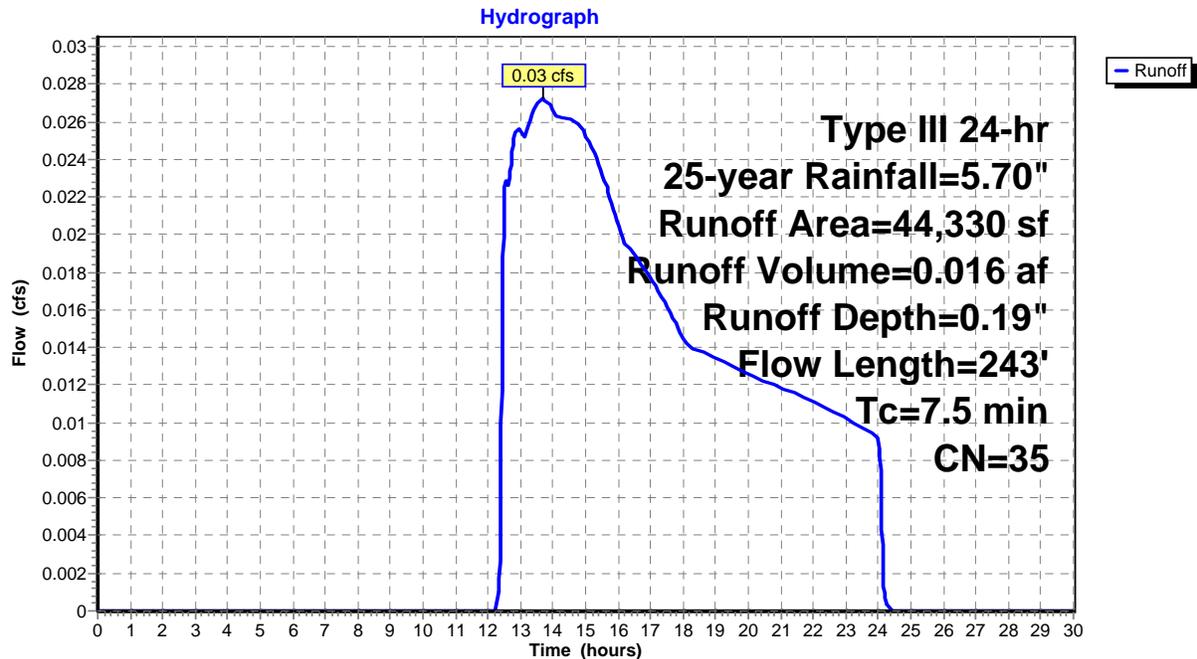
Runoff = 0.03 cfs @ 13.69 hrs, Volume= 0.016 af, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
28,330	30	Woods, Good, HSG A
8,290	46	2 acre lots, 12% imp, HSG A
7,710	39	>75% Grass cover, Good, HSG A
44,330	35	Weighted Average
43,335		97.76% Pervious Area
995		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0100	0.12		<b>Sheet Flow, A-B</b> Grass: Short n= 0.150 P2= 3.60"
0.3	59	0.0420	3.30		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.2	134	0.3130	9.01		<b>Shallow Concentrated Flow, C-D</b> Unpaved Kv= 16.1 fps
7.5	243	Total			

**Subcatchment 13S: WESTERN SIDE OF ROAD "A"**



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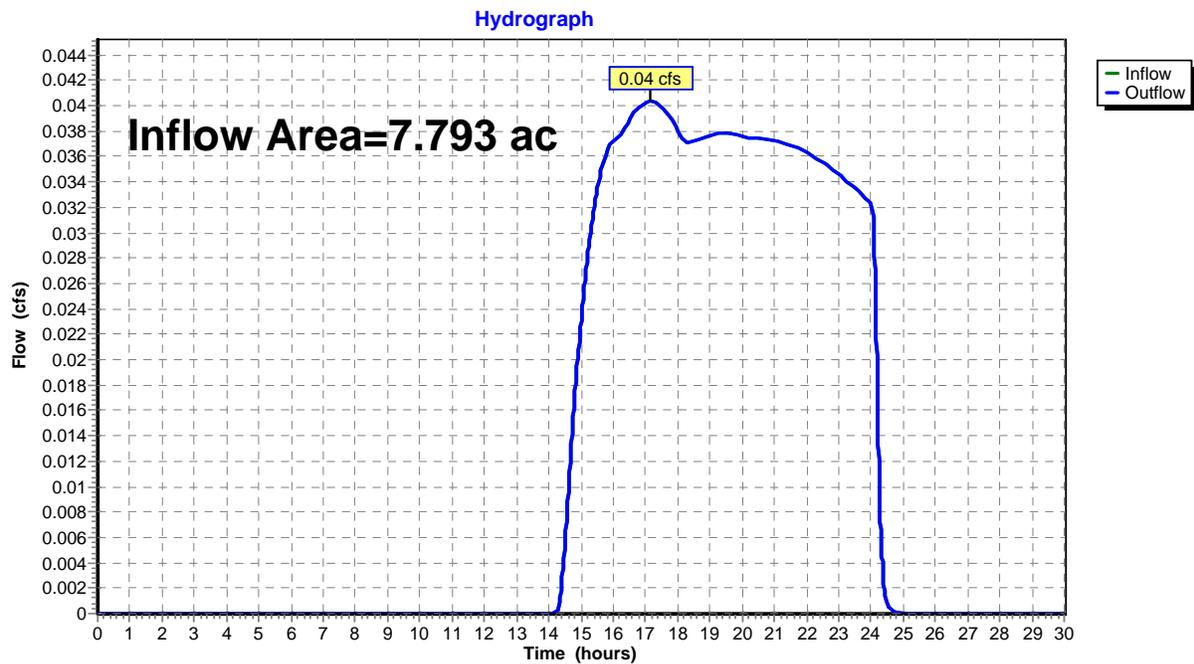
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## Summary for Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES

Inflow Area = 7.793 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
Inflow = 0.04 cfs @ 17.17 hrs, Volume= 0.028 af  
Outflow = 0.04 cfs @ 17.17 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

## Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES



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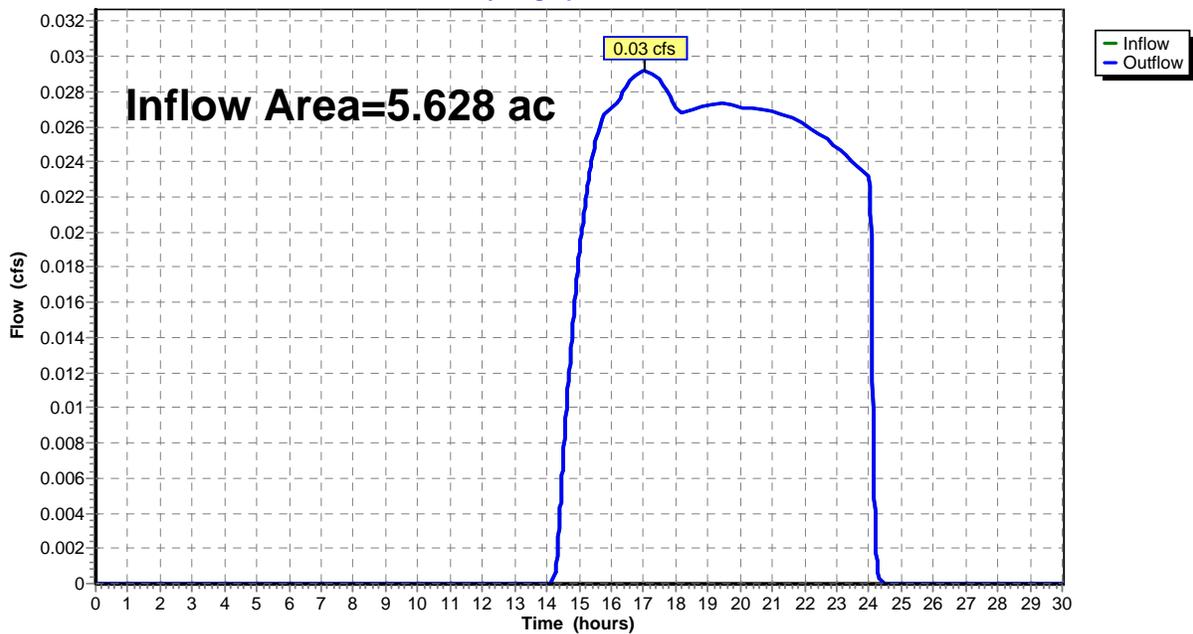
**Summary for Reach 2R: OFFSITE TOWARDS TOWN LAND**

Inflow Area = 5.628 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
Inflow = 0.03 cfs @ 17.03 hrs, Volume= 0.021 af  
Outflow = 0.03 cfs @ 17.03 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 2R: OFFSITE TOWARDS TOWN LAND**

Hydrograph



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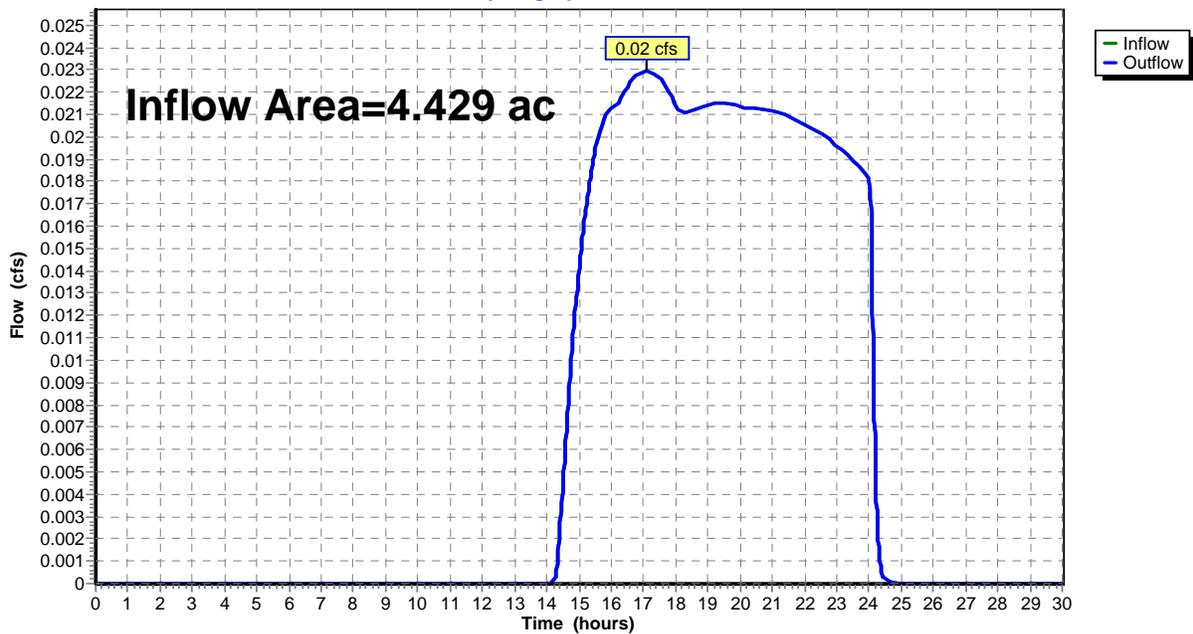
**Summary for Reach 3R: OFFSITE TOWARDS ATKINS ROAD**

Inflow Area = 4.429 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event  
Inflow = 0.02 cfs @ 17.10 hrs, Volume= 0.016 af  
Outflow = 0.02 cfs @ 17.10 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 3R: OFFSITE TOWARDS ATKINS ROAD**

Hydrograph



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Type III 24-hr 25-year Rainfall=5.70"

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**Summary for Pond 1P: INFILTRATION BASIN**

Inflow Area = 15.728 ac, 14.57% Impervious, Inflow Depth = 0.76" for 25-year event  
 Inflow = 7.37 cfs @ 12.14 hrs, Volume= 0.999 af  
 Outflow = 1.37 cfs @ 13.55 hrs, Volume= 1.000 af, Atten= 81%, Lag= 84.6 min  
 Discarded = 1.37 cfs @ 13.55 hrs, Volume= 1.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 125.01' @ 13.55 hrs Surf.Area= 7,040 sf Storage= 12,546 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 105.9 min ( 991.0 - 885.0 )

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,887 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.0	0	0	1,489
124.00	5,241	280.0	6,349	6,349	5,400
126.00	9,048	366.0	14,117	20,466	9,868
128.00	12,464	423.0	21,421	41,887	13,533

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=1.37 cfs @ 13.55 hrs HW=125.01' (Free Discharge)  
 ↑1=Exfiltration ( Controls 1.37 cfs)

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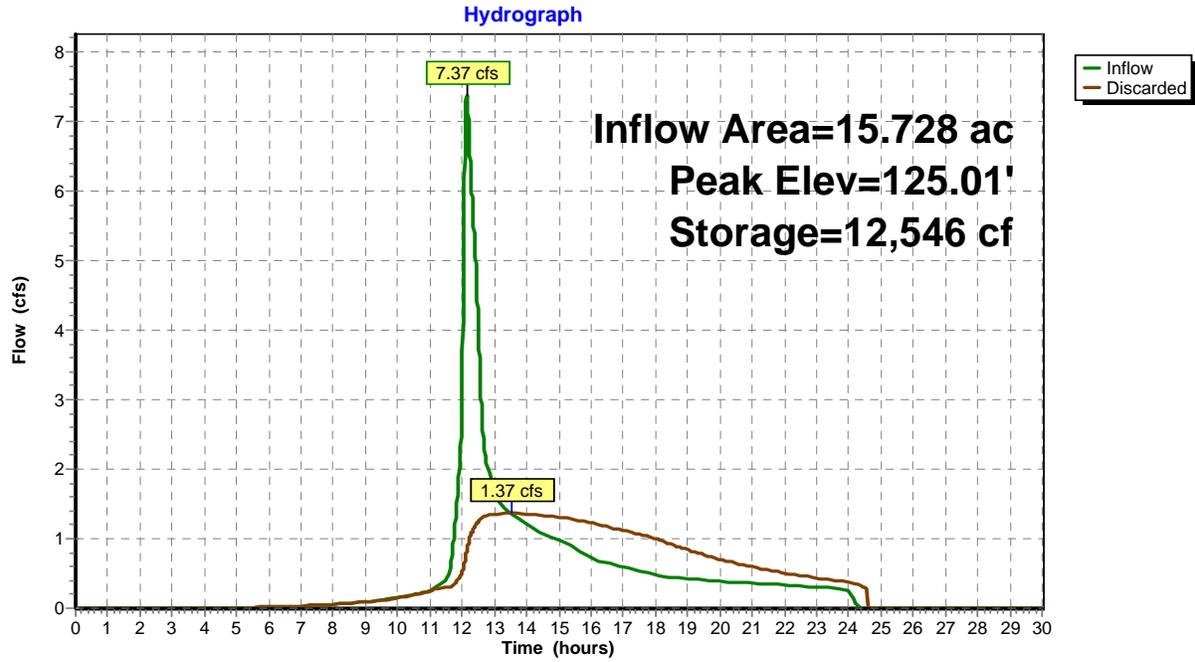
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**Pond 1P: INFILTRATION BASIN**



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**Summary for Pond 2P: INFILTRATION TRENCH**

Inflow Area = 3.710 ac, 1.22% Impervious, Inflow Depth = 0.12" for 25-year event  
 Inflow = 0.06 cfs @ 14.98 hrs, Volume= 0.038 af  
 Outflow = 0.06 cfs @ 14.98 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min  
 Discarded = 0.06 cfs @ 14.98 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 1,554 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.0 min ( 1,073.3 - 1,073.3 )

Volume	Invert	Avail.Storage	Storage Description			
#1	122.00'	10,251 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,554	785.0	0.0	0	0	1,554
126.00	1,554	785.0	40.0	2,486	2,486	4,694
127.00	3,938	804.0	100.0	2,655	5,142	7,224
128.00	6,378	823.0	100.0	5,109	10,251	9,815

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.00 cfs @ 14.98 hrs HW=122.00' (Free Discharge)  
 ↑**1=Exfiltration** (Passes 0.00 cfs of 0.30 cfs potential flow)

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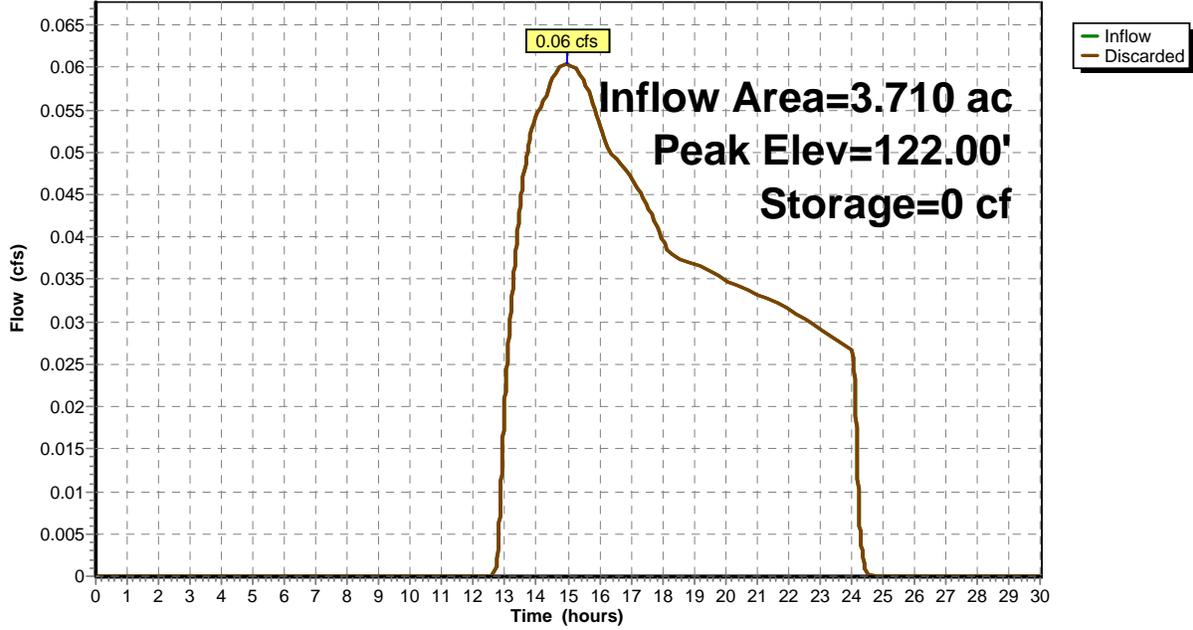
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Type III 24-hr 25-year Rainfall=5.70"

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**Pond 2P: INFILTRATION TRENCH**

Hydrograph



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Type III 24-hr 25-year Rainfall=5.70"

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**Summary for Pond 3P: STORMTECH CHAMBERS SC-740**

Inflow Area = 1.316 ac, 17.81% Impervious, Inflow Depth = 0.97" for 25-year event  
 Inflow = 1.26 cfs @ 12.09 hrs, Volume= 0.106 af  
 Outflow = 0.24 cfs @ 12.56 hrs, Volume= 0.106 af, Atten= 81%, Lag= 28.6 min  
 Discarded = 0.24 cfs @ 12.56 hrs, Volume= 0.106 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 101.30' @ 12.56 hrs Surf.Area= 1,218 sf Storage= 1,030 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 24.7 min ( 871.1 - 846.4 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	1,112 cf	<b>20.50'W x 59.40'L x 3.50'H Field A</b> 4,262 cf Overall - 1,481 cf Embedded = 2,781 cf x 40.0% Voids
#2A	100.50'	1,481 cf	<b>ADS StormTech SC-740 x 32 Inside #1</b> Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		2,594 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.24 cfs @ 12.56 hrs HW=101.30' (Free Discharge)  
 ↑**1=Exfiltration** ( Controls 0.24 cfs)

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**Pond 3P: STORMTECH CHAMBERS SC-740 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 (ADS StormTech® SC-740)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 4 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

8 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 57.40' Row Length +12.0" End Stone x 2 = 59.40' Base Length

4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width

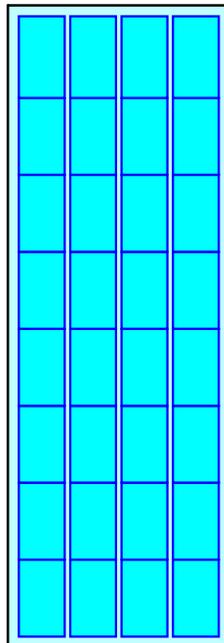
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

32 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 4 Rows = 1,481.4 cf Chamber Storage

4,262.0 cf Field - 1,481.4 cf Chambers = 2,780.5 cf Stone x 40.0% Voids = 1,112.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,593.6 cf = 0.060 af  
Overall Storage Efficiency = 60.9%

32 Chambers  
157.9 cy Field  
103.0 cy Stone



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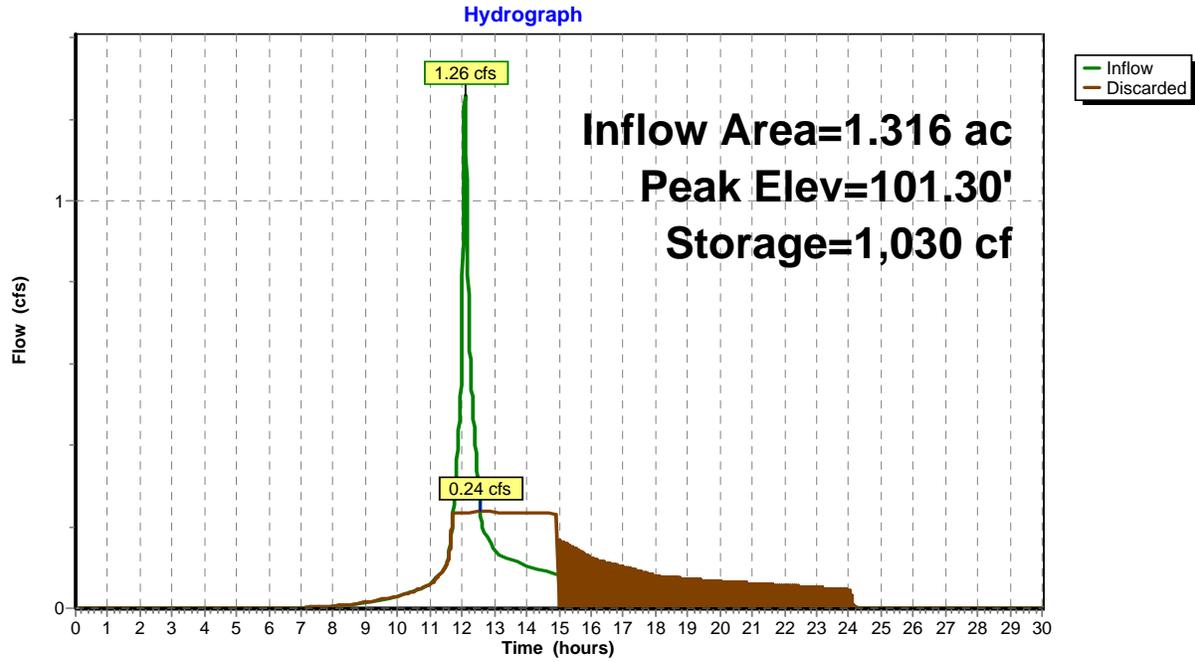
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**Pond 3P: STORMTECH CHAMBERS SC-740**



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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 1S: SOUTHWEST** Runoff Area=339,473 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=820' Tc=14.9 min CN=30 Runoff=0.25 cfs 0.149 af

**Subcatchment 2S: SOUTHEAST** Runoff Area=245,162 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=766' Tc=8.5 min CN=30 Runoff=0.18 cfs 0.108 af

**Subcatchment 3S: ROAD "A"** Runoff Area=123,422 sf 10.60% Impervious Runoff Depth=0.96"  
 Flow Length=680' Tc=7.7 min CN=41 Runoff=1.81 cfs 0.226 af

**Subcatchment 4S: EASTERN SITE** Runoff Area=161,622 sf 1.22% Impervious Runoff Depth=0.40"  
 Flow Length=422' Tc=13.8 min CN=33 Runoff=0.40 cfs 0.122 af

**Subcatchment 5S: NORTHEAST** Runoff Area=109,388 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=437' Tc=13.1 min CN=30 Runoff=0.08 cfs 0.048 af

**Subcatchment 6S: NORTH SITE** Runoff Area=83,544 sf 0.00% Impervious Runoff Depth=0.23"  
 Flow Length=420' Tc=8.2 min CN=30 Runoff=0.06 cfs 0.037 af

**Subcatchment 7S: ROAD "B"** Runoff Area=195,281 sf 15.54% Impervious Runoff Depth=1.37"  
 Flow Length=1,429' Tc=13.3 min CN=46 Runoff=4.45 cfs 0.512 af

**Subcatchment 8S: WEST CENTRAL** Runoff Area=227,937 sf 0.00% Impervious Runoff Depth=0.40"  
 Flow Length=504' Tc=8.5 min CN=33 Runoff=0.62 cfs 0.173 af

**Subcatchment 9S: CENTRAL SITE** Runoff Area=102,082 sf 25.00% Impervious Runoff Depth=2.09"  
 Flow Length=387' Tc=10.1 min CN=54 Runoff=4.62 cfs 0.409 af

**Subcatchment 10S: ROAD "A" TO** Runoff Area=18,623 sf 85.32% Impervious Runoff Depth=5.81"  
 Tc=6.0 min CN=89 Runoff=2.76 cfs 0.207 af

**Subcatchment 11S: ROAD "A" TO** Runoff Area=12,984 sf 70.97% Impervious Runoff Depth=4.90"  
 Tc=6.0 min CN=81 Runoff=1.69 cfs 0.122 af

**Subcatchment 12S: ROAD "B"** Runoff Area=17,758 sf 84.60% Impervious Runoff Depth=5.81"  
 Tc=6.0 min CN=89 Runoff=2.63 cfs 0.197 af

**Subcatchment 13S: WESTERN SIDE** Runoff Area=44,330 sf 2.24% Impervious Runoff Depth=0.52"  
 Flow Length=243' Tc=7.5 min CN=35 Runoff=0.21 cfs 0.044 af

**Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES** Inflow=0.25 cfs 0.149 af  
 Outflow=0.25 cfs 0.149 af

**Reach 2R: OFFSITE TOWARDS TOWN LAND** Inflow=0.18 cfs 0.108 af  
 Outflow=0.18 cfs 0.108 af

**Reach 3R: OFFSITE TOWARDS ATKINS ROAD** Inflow=0.14 cfs 0.085 af  
 Outflow=0.14 cfs 0.085 af

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**Pond 1P: INFILTRATION BASIN** Peak Elev=126.67' Storage=26,935 cf Inflow=14.41 cfs 1.723 af  
Outflow=1.98 cfs 1.723 af

**Pond 2P: INFILTRATION TRENCH** Peak Elev=122.13' Storage=78 cf Inflow=0.40 cfs 0.122 af  
Outflow=0.30 cfs 0.122 af

**Pond 3P: STORMTECH CHAMBERS** Peak Elev=102.43' Storage=2,001 cf Inflow=1.70 cfs 0.166 af  
Outflow=0.24 cfs 0.166 af

**Total Runoff Area = 38.604 ac Runoff Volume = 2.353 af Average Runoff Depth = 0.73"**  
**93.34% Pervious = 36.033 ac 6.66% Impervious = 2.572 ac**

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## Summary for Subcatchment 1S: SOUTHWEST SITE

Runoff = 0.25 cfs @ 13.86 hrs, Volume= 0.149 af, Depth= 0.23"

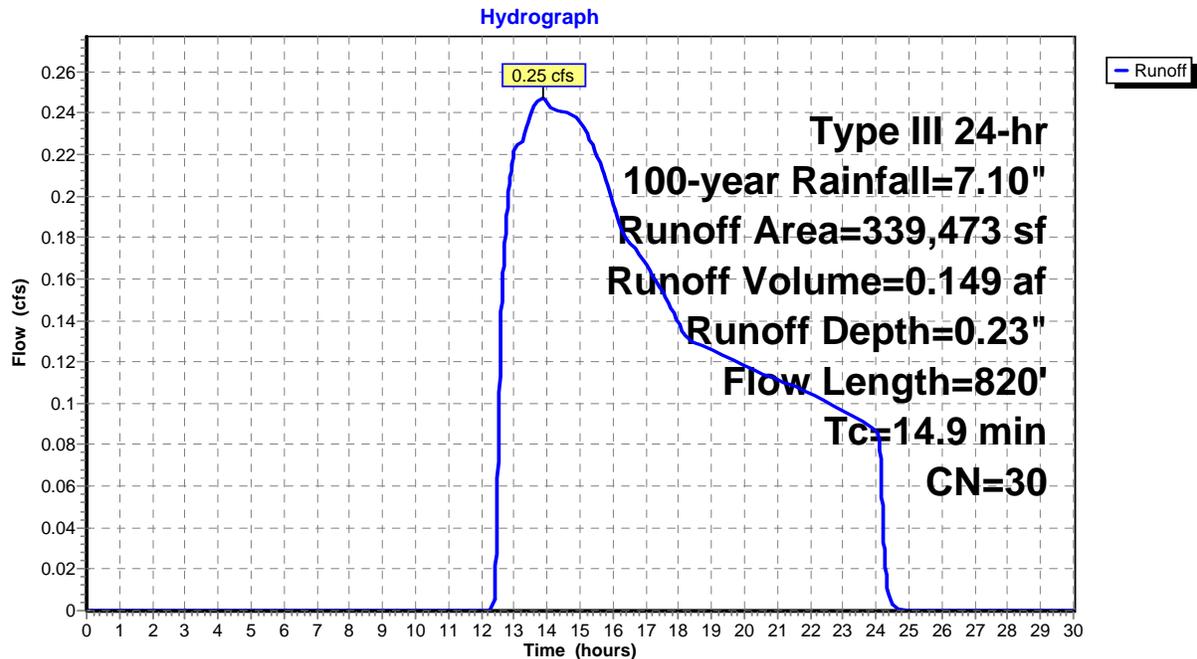
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
339,473	30	Woods, Good, HSG A
339,473		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
14.9	820	Total			

## Subcatchment 1S: SOUTHWEST SITE



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**Summary for Subcatchment 2S: SOUTHEAST SITE**

Runoff = 0.18 cfs @ 13.76 hrs, Volume= 0.108 af, Depth= 0.23"

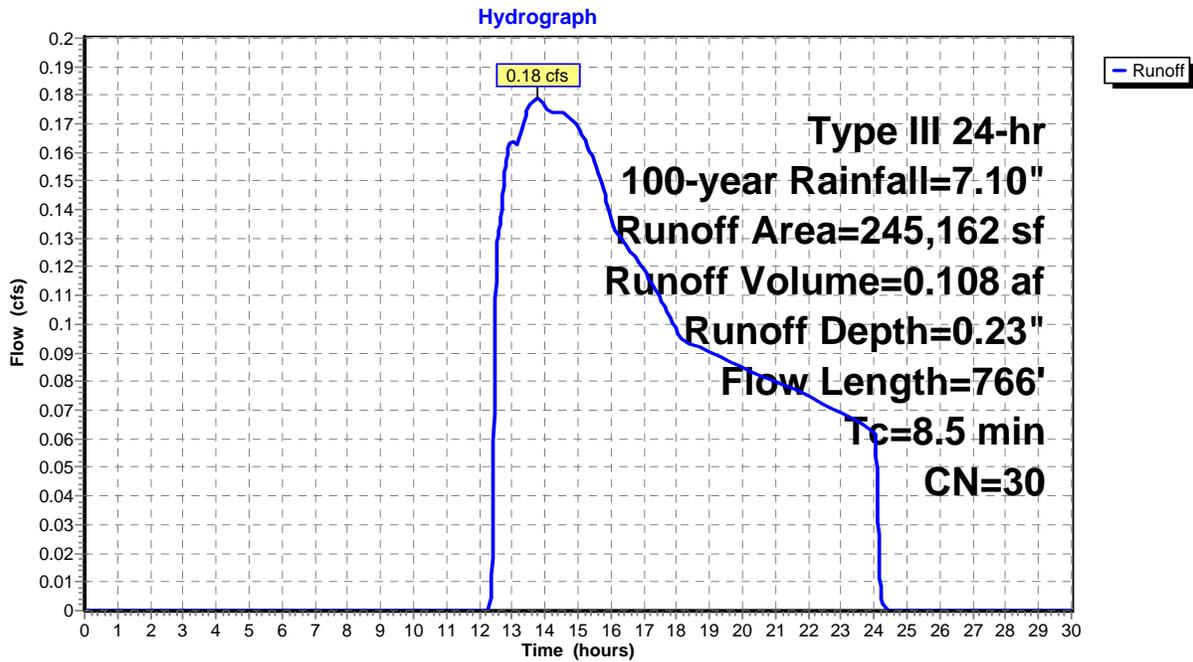
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
245,162	30	Woods, Good, HSG A
245,162		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	766	Total			

**Subcatchment 2S: SOUTHEAST SITE**



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**Summary for Subcatchment 3S: ROAD "A" SOUTH**

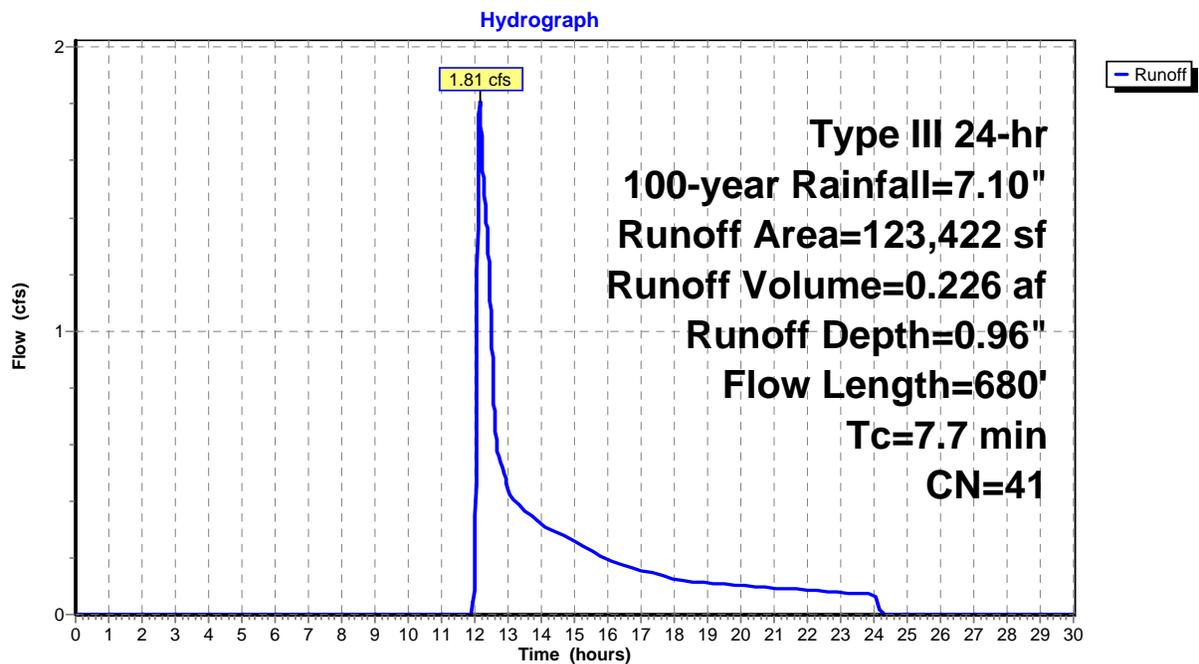
Runoff = 1.81 cfs @ 12.15 hrs, Volume= 0.226 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
58,032	30	Woods, Good, HSG A
65,390	51	1 acre lots, 20% imp, HSG A
123,422	41	Weighted Average
110,344		89.40% Pervious Area
13,078		10.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1400	0.16		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	497	0.1000	5.09		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.8	133	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
7.7	680	Total			

**Subcatchment 3S: ROAD "A" SOUTH**



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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Subcatchment 4S: EASTERN SITE**

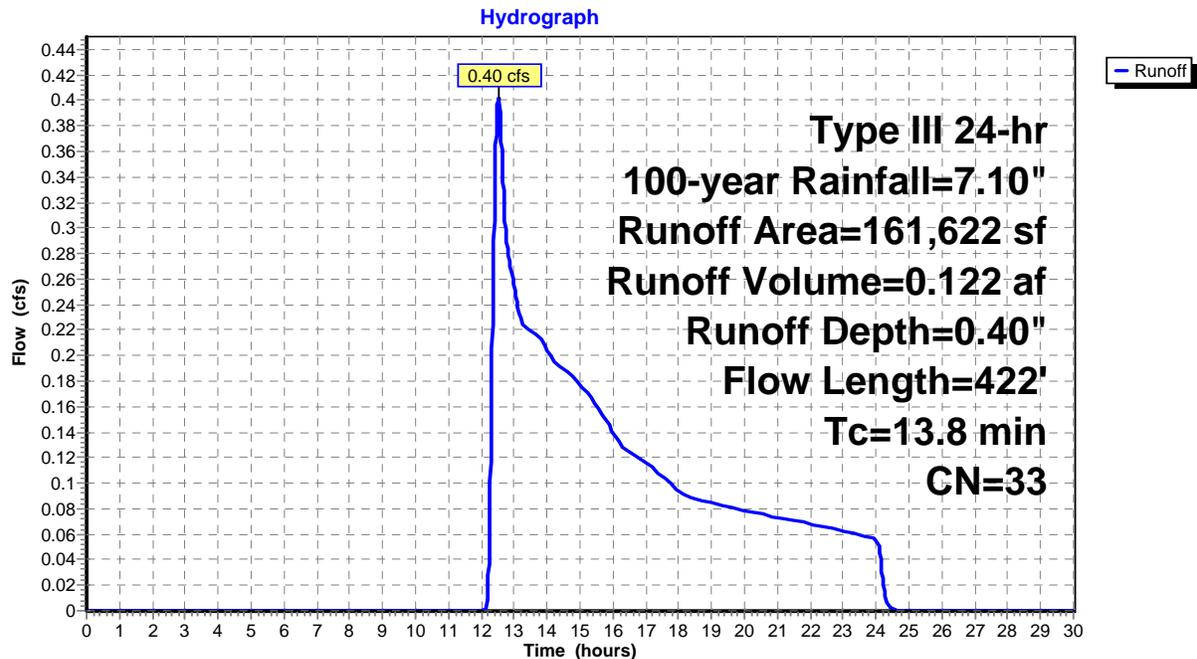
Runoff = 0.40 cfs @ 12.52 hrs, Volume= 0.122 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
114,244	30	Woods, Good, HSG A
30,995	39	>75% Grass cover, Good, HSG A
16,383	46	2 acre lots, 12% imp, HSG A
161,622	33	Weighted Average
159,656		98.78% Pervious Area
1,966		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.2	372	0.0320	2.88		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.8	422	Total			

**Subcatchment 4S: EASTERN SITE**



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**Summary for Subcatchment 5S: NORTHEAST SITE**

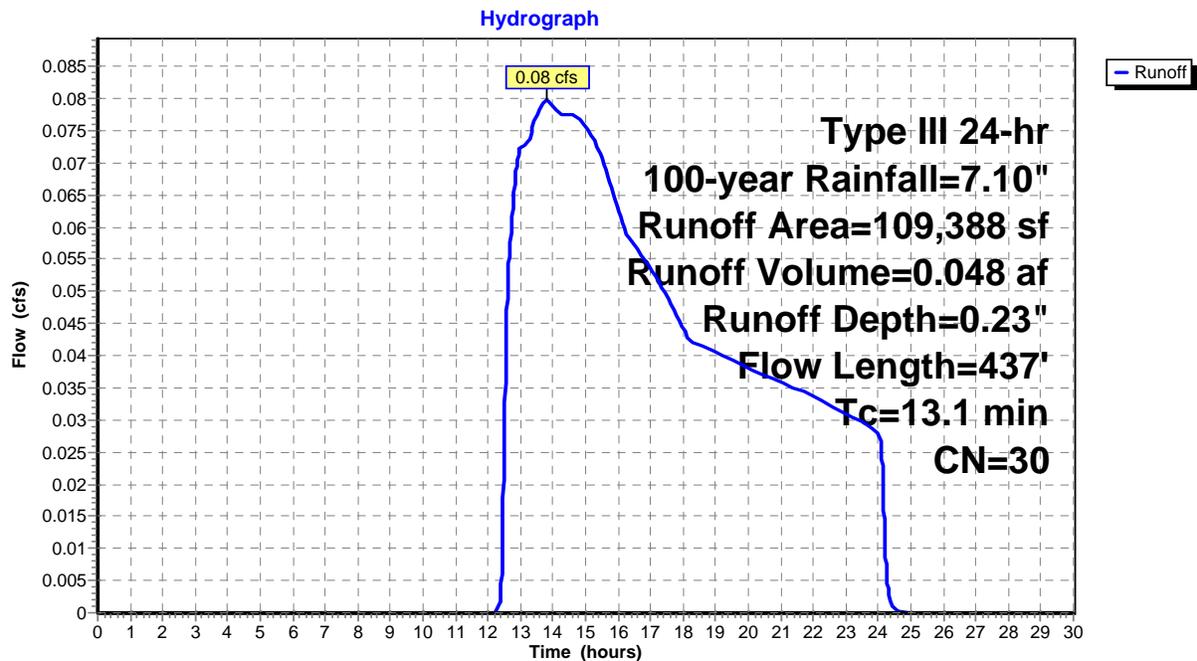
Runoff = 0.08 cfs @ 13.81 hrs, Volume= 0.048 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
107,608	30	Woods, Good, HSG A
1,780	39	>75% Grass cover, Good, HSG A
109,388	30	Weighted Average
109,388		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
13.1	437	Total			

**Subcatchment 5S: NORTHEAST SITE**



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## Summary for Subcatchment 6S: NORTH SITE

Runoff = 0.06 cfs @ 13.75 hrs, Volume= 0.037 af, Depth= 0.23"

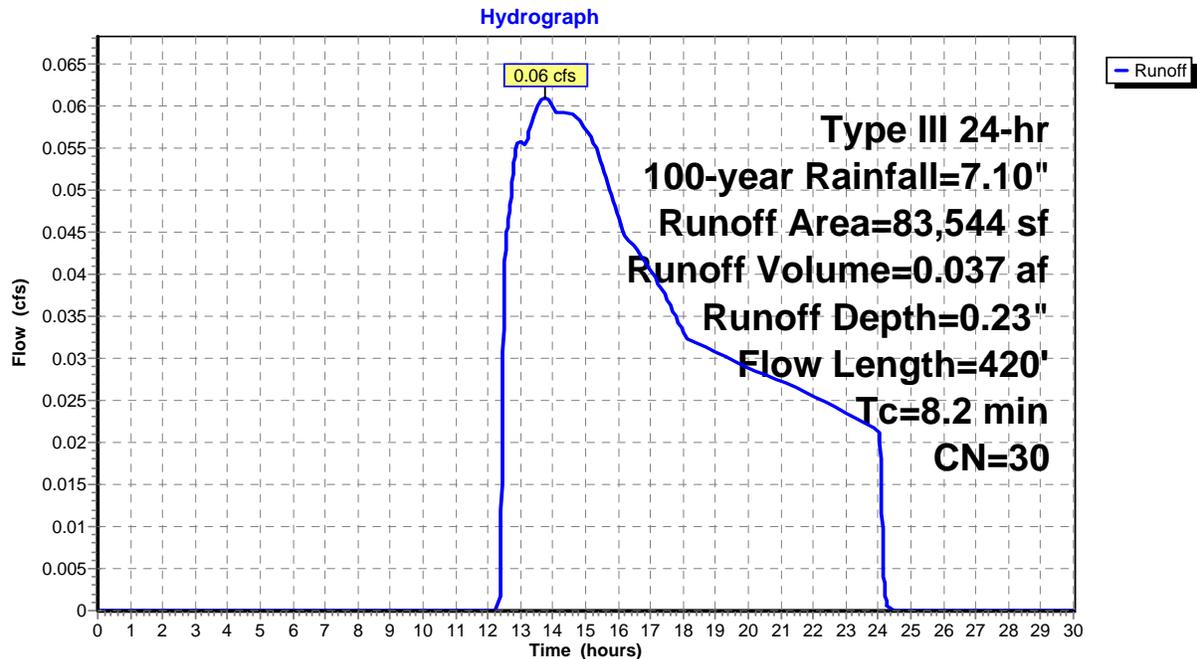
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
83,544	30	Woods, Good, HSG A
83,544		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0800	0.12		<b>Sheet Flow, A-B</b>
					Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	370	0.0620	4.01		<b>Shallow Concentrated Flow, B-C</b>
					Unpaved Kv= 16.1 fps
8.2	420	Total			

## Subcatchment 6S: NORTH SITE



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**Summary for Subcatchment 7S: ROAD "B" LOTS**

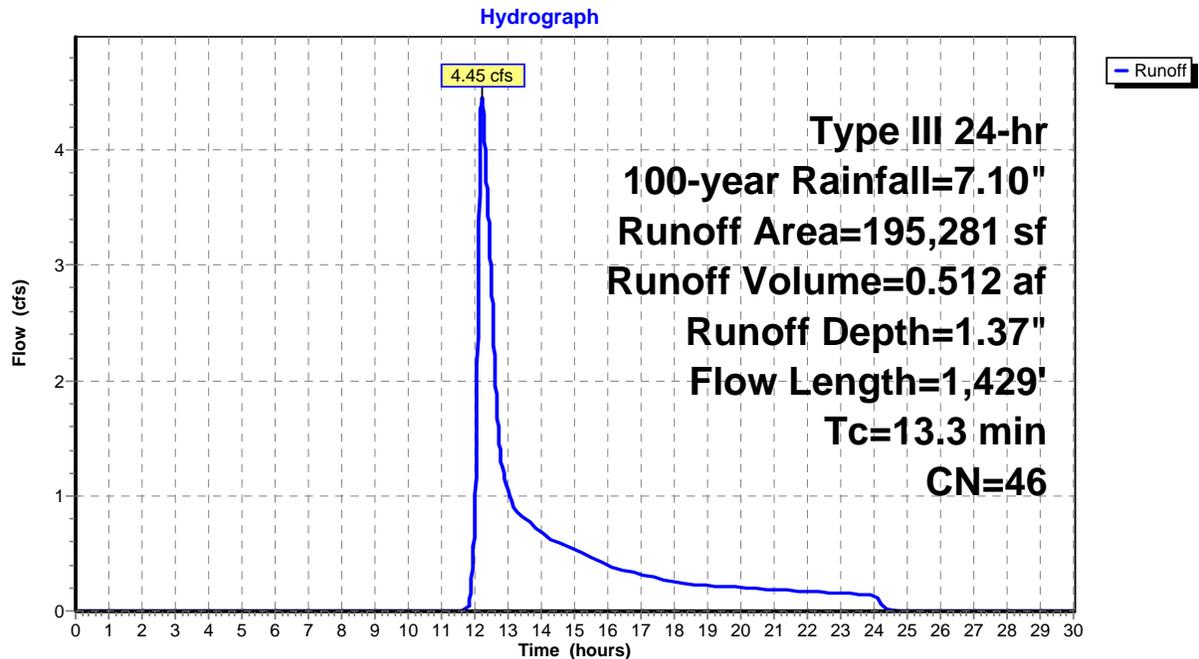
Runoff = 4.45 cfs @ 12.22 hrs, Volume= 0.512 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
151,707	51	1 acre lots, 20% imp, HSG A
43,574	30	Woods, Good, HSG A
195,281	46	Weighted Average
164,940		84.46% Pervious Area
30,341		15.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0700	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
2.6	539	0.0445	3.40		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
3.7	840	0.0050	3.79	2.98	<b>Pipe Channel, C-D</b> 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 Concrete pipe, straight & clean
13.3	1,429	Total			

**Subcatchment 7S: ROAD "B" LOTS**



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**Summary for Subcatchment 8S: WEST CENTRAL SITE**

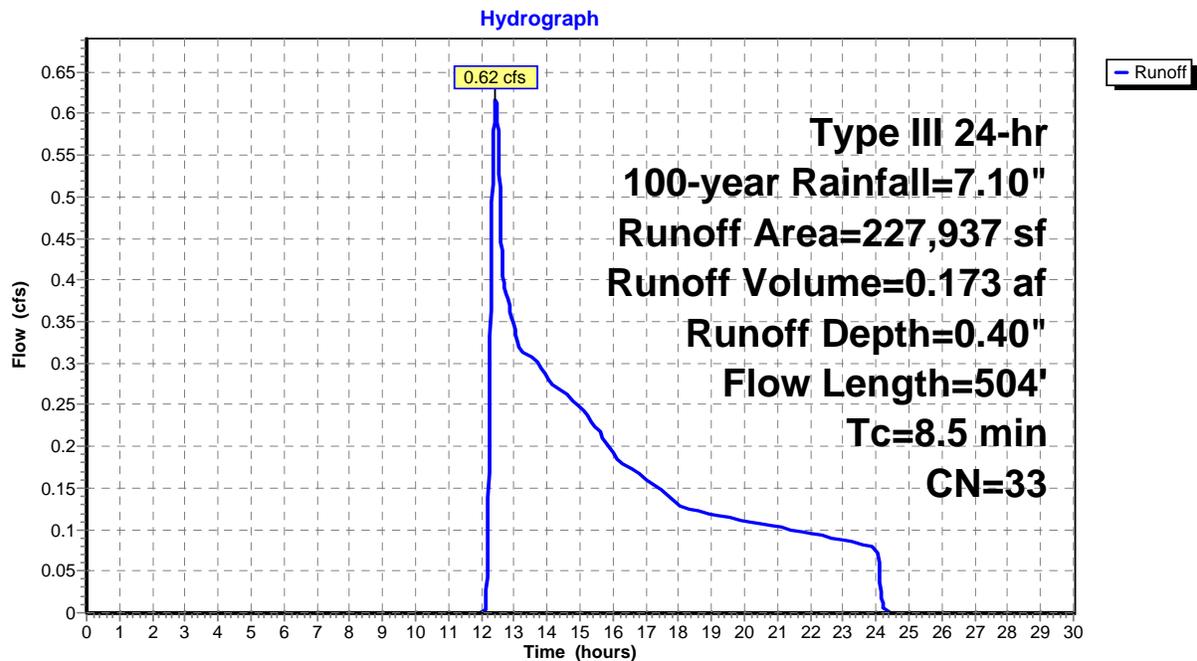
Runoff = 0.62 cfs @ 12.44 hrs, Volume= 0.173 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
217,334	30	Woods, Good, HSG A
10,603	96	Gravel surface, HSG A
227,937	33	Weighted Average
227,937		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		<b>Sheet Flow, A-B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
8.5	504	Total			

**Subcatchment 8S: WEST CENTRAL SITE**



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## Summary for Subcatchment 9S: CENTRAL SITE

Runoff = 4.62 cfs @ 12.15 hrs, Volume= 0.409 af, Depth= 2.09"

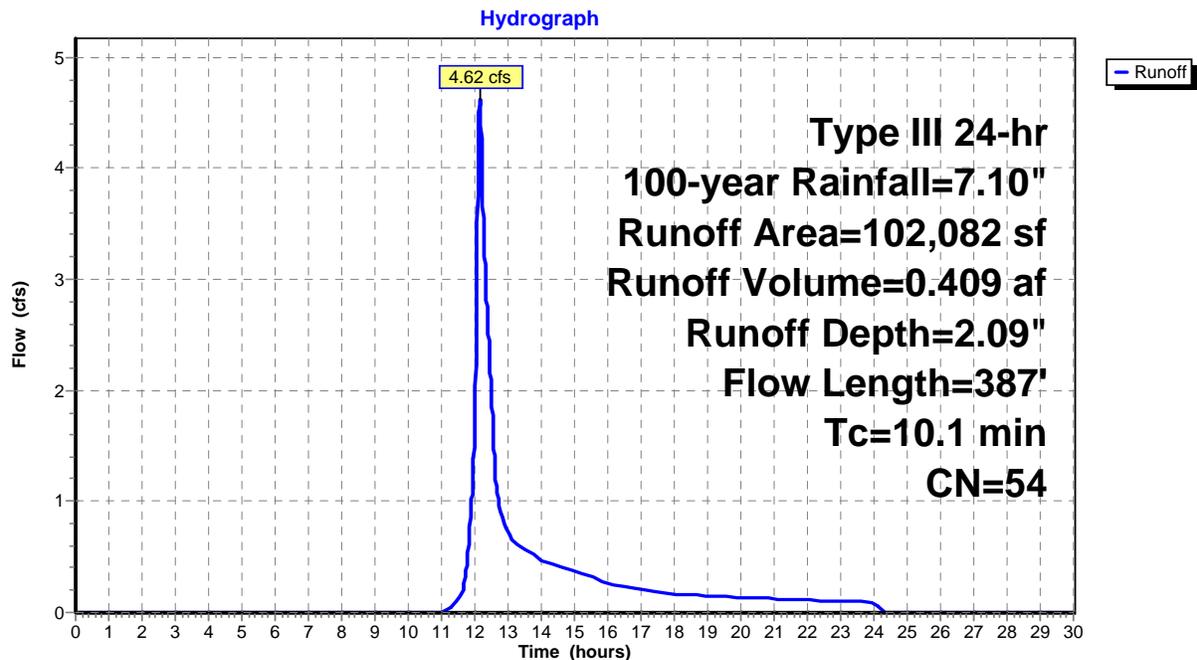
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
102,082	54	1/2 acre lots, 25% imp, HSG A
76,562		75.00% Pervious Area
25,521		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0400	0.09		<b>Sheet Flow, A=B</b> Woods: Light underbrush n= 0.400 P2= 3.60"
1.0	290	0.0840	4.67		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.3	47	0.0200	2.87		<b>Shallow Concentrated Flow, C-D</b> Paved Kv= 20.3 fps
10.1	387	Total			

## Subcatchment 9S: CENTRAL SITE



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**Summary for Subcatchment 10S: ROAD "A" TO CUL-DE-SAC**

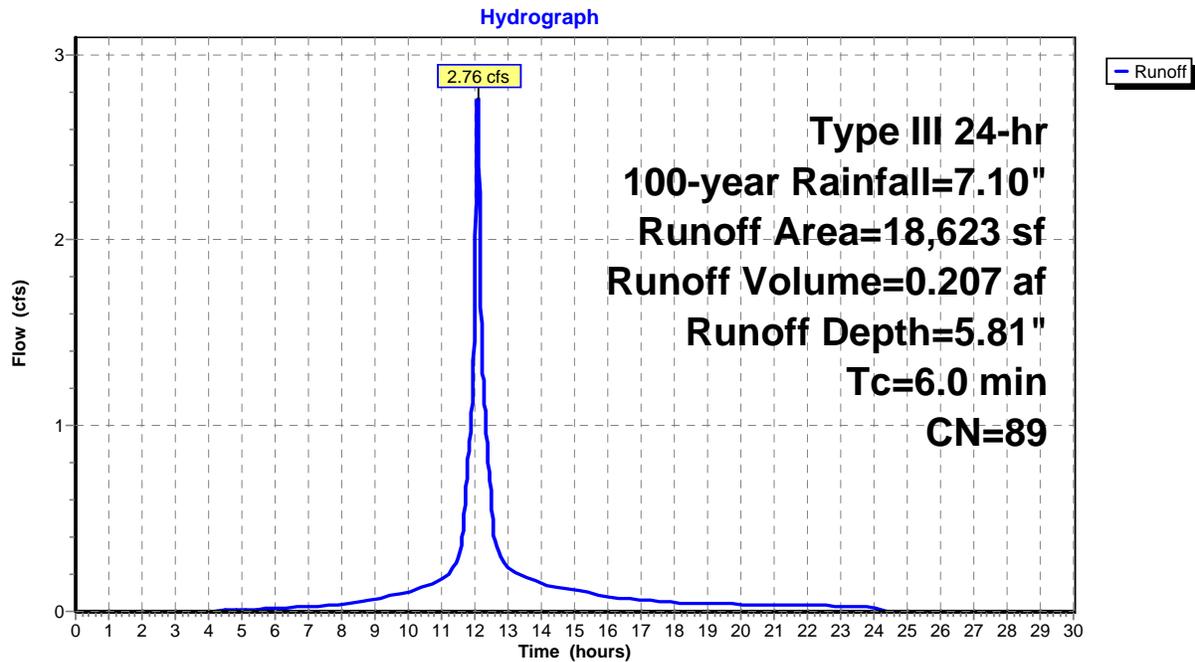
Runoff = 2.76 cfs @ 12.08 hrs, Volume= 0.207 af, Depth= 5.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
15,889	98	Paved roads w/curbs & sewers, HSG A
2,734	39	>75% Grass cover, Good, HSG A
18,623	89	Weighted Average
2,734		14.68% Pervious Area
15,889		85.32% Impervious Area

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

**Subcatchment 10S: ROAD "A" TO CUL-DE-SAC**



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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Subcatchment 11S: ROAD "A" TO BEGINNING**

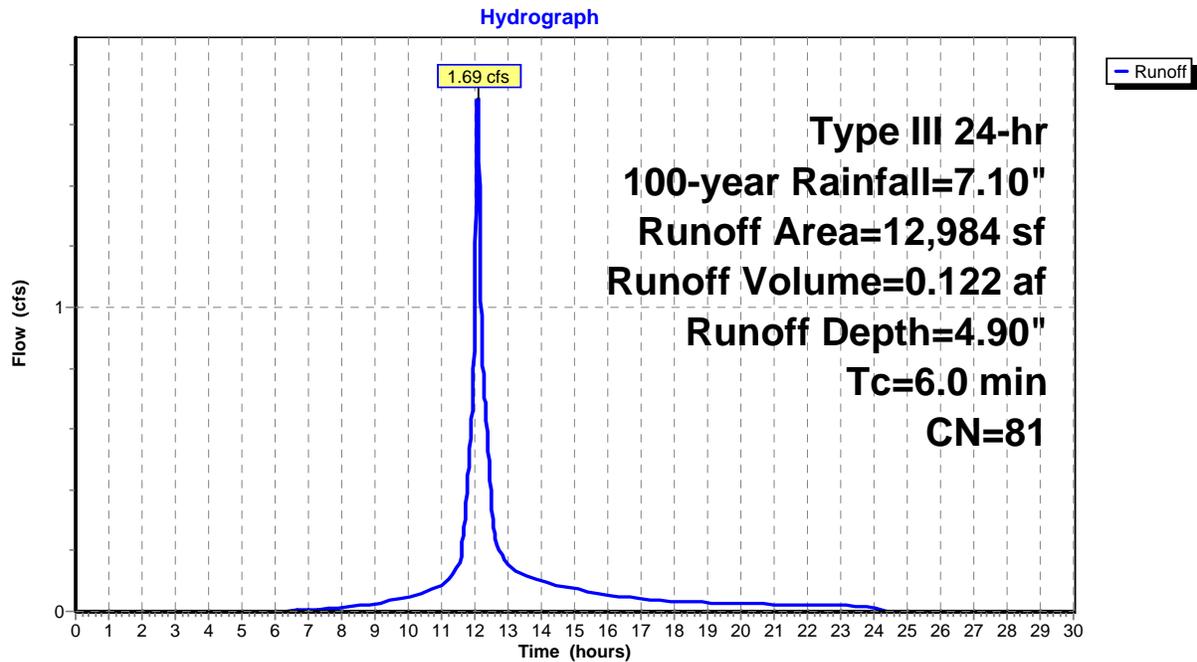
Runoff = 1.69 cfs @ 12.09 hrs, Volume= 0.122 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
9,215	98	Paved roads w/curbs & sewers, HSG A
3,769	39	>75% Grass cover, Good, HSG A
12,984	81	Weighted Average
3,769		29.03% Pervious Area
9,215		70.97% Impervious Area

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

**Subcatchment 11S: ROAD "A" TO BEGINNING**



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**Summary for Subcatchment 12S: ROAD "B"**

Runoff = 2.63 cfs @ 12.08 hrs, Volume= 0.197 af, Depth= 5.81"

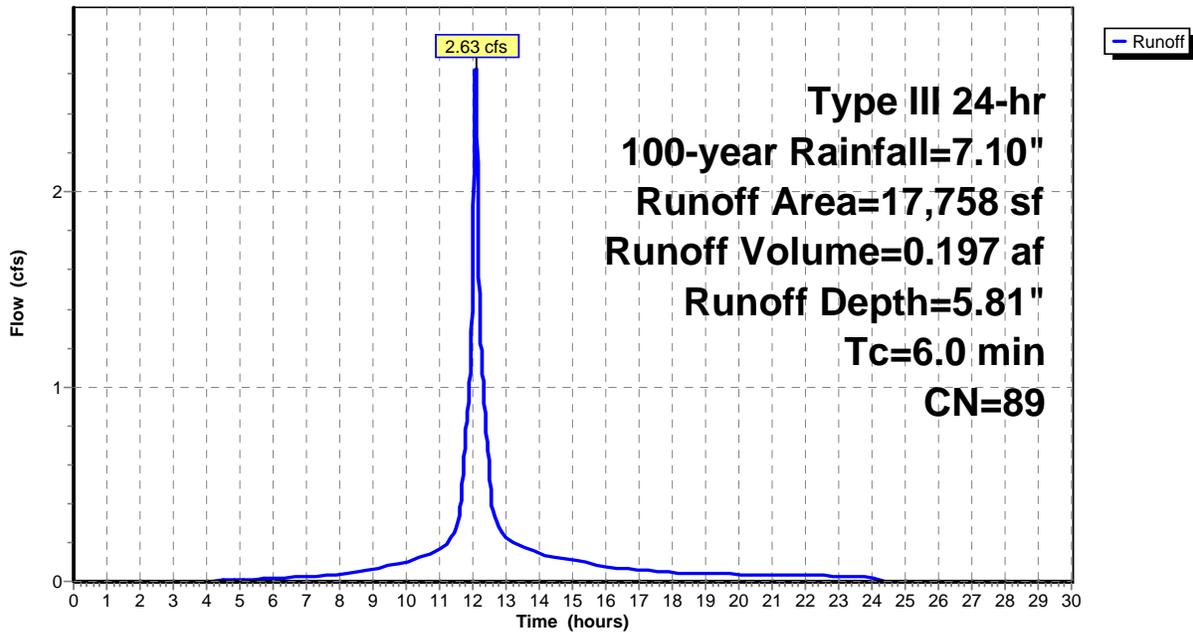
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
15,024	98	Paved parking, HSG A
2,734	39	>75% Grass cover, Good, HSG A
17,758	89	Weighted Average
2,734		15.40% Pervious Area
15,024		84.60% Impervious Area

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

**Subcatchment 12S: ROAD "B"**

Hydrograph



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**Summary for Subcatchment 13S: WESTERN SIDE OF ROAD "A"**

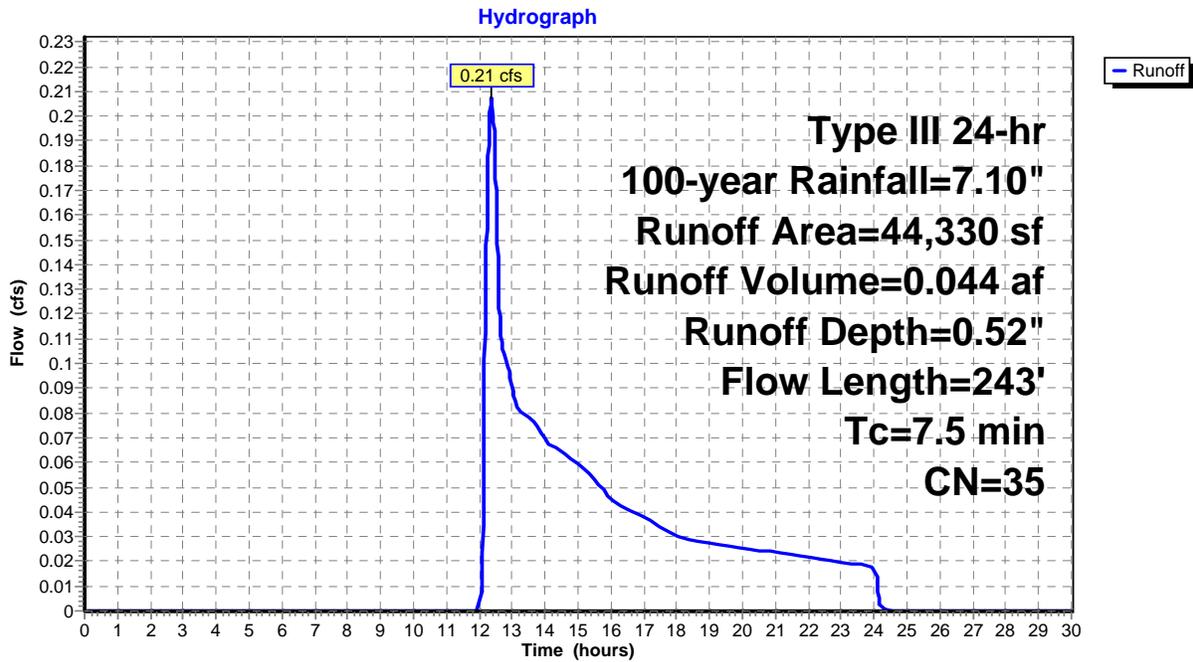
Runoff = 0.21 cfs @ 12.37 hrs, Volume= 0.044 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
28,330	30	Woods, Good, HSG A
8,290	46	2 acre lots, 12% imp, HSG A
7,710	39	>75% Grass cover, Good, HSG A
44,330	35	Weighted Average
43,335		97.76% Pervious Area
995		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0100	0.12		<b>Sheet Flow, A-B</b> Grass: Short n= 0.150 P2= 3.60"
0.3	59	0.0420	3.30		<b>Shallow Concentrated Flow, B-C</b> Unpaved Kv= 16.1 fps
0.2	134	0.3130	9.01		<b>Shallow Concentrated Flow, C-D</b> Unpaved Kv= 16.1 fps
7.5	243	Total			

**Subcatchment 13S: WESTERN SIDE OF ROAD "A"**



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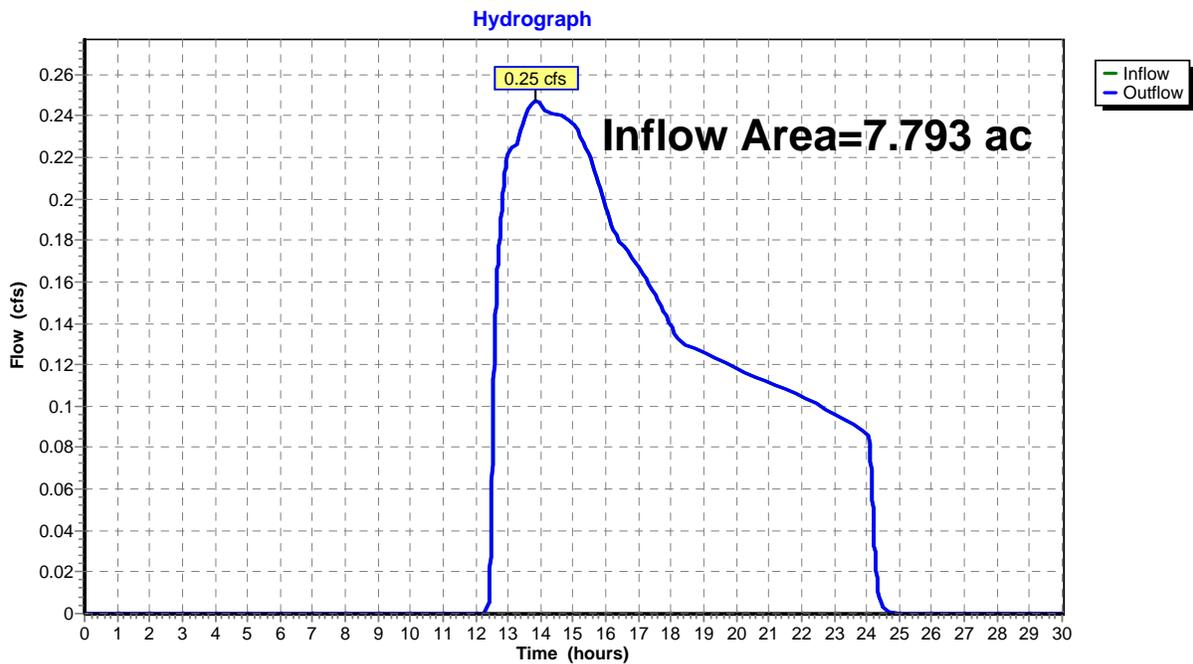
Page 92

**Summary for Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES**

Inflow Area = 7.793 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
Inflow = 0.25 cfs @ 13.86 hrs, Volume= 0.149 af  
Outflow = 0.25 cfs @ 13.86 hrs, Volume= 0.149 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 1R: OFFSITE TOWARDS WESTERN RESIDENCES**



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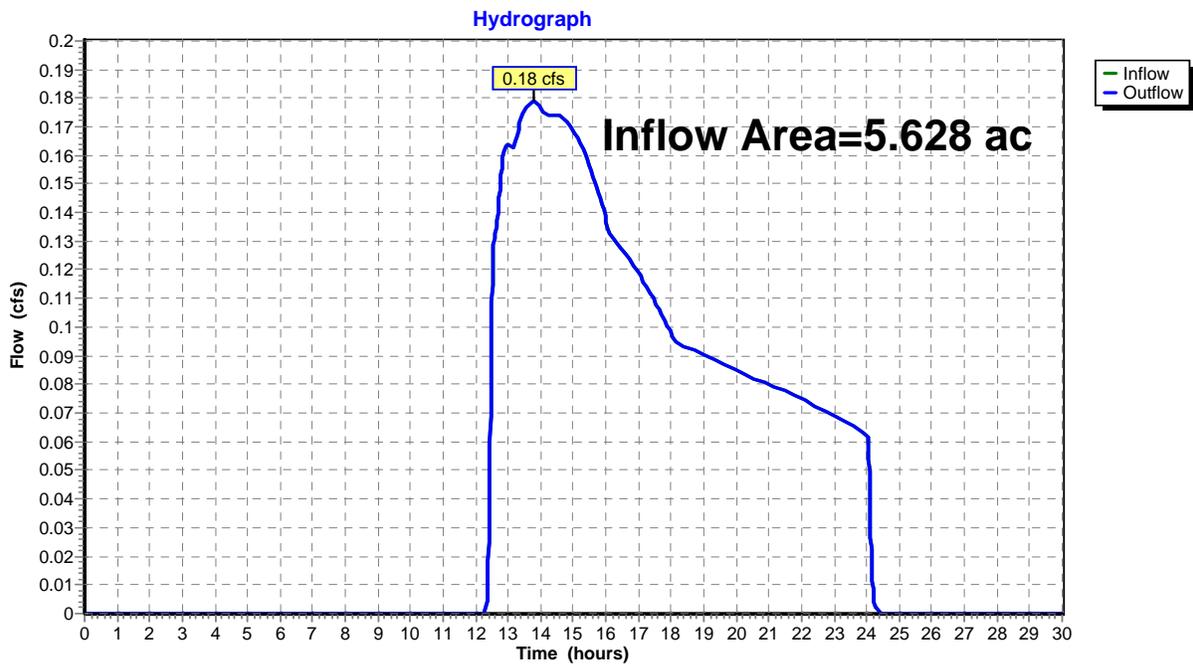
Page 93

**Summary for Reach 2R: OFFSITE TOWARDS TOWN LAND**

Inflow Area = 5.628 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
Inflow = 0.18 cfs @ 13.76 hrs, Volume= 0.108 af  
Outflow = 0.18 cfs @ 13.76 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 2R: OFFSITE TOWARDS TOWN LAND**



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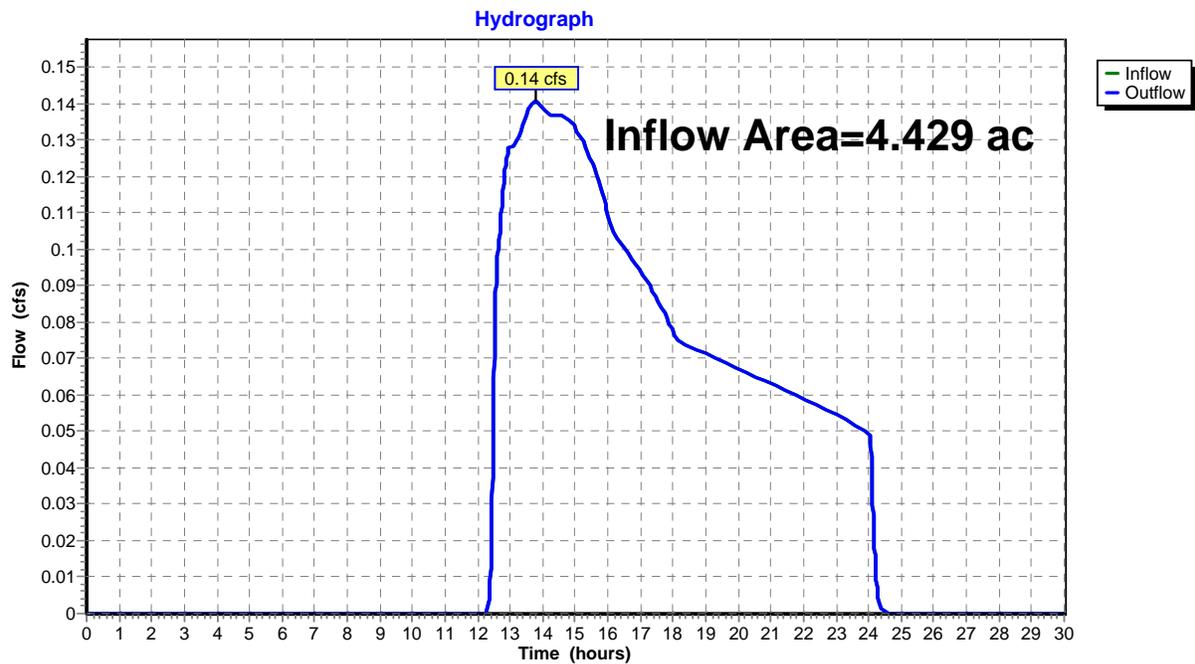
Page 94

**Summary for Reach 3R: OFFSITE TOWARDS ATKINS ROAD**

Inflow Area = 4.429 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event  
Inflow = 0.14 cfs @ 13.78 hrs, Volume= 0.085 af  
Outflow = 0.14 cfs @ 13.78 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

**Reach 3R: OFFSITE TOWARDS ATKINS ROAD**



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**Summary for Pond 1P: INFILTRATION BASIN**

Inflow Area = 15.728 ac, 14.57% Impervious, Inflow Depth = 1.31" for 100-year event  
 Inflow = 14.41 cfs @ 12.14 hrs, Volume= 1.723 af  
 Outflow = 1.98 cfs @ 14.09 hrs, Volume= 1.723 af, Atten= 86%, Lag= 117.0 min  
 Discarded = 1.98 cfs @ 14.09 hrs, Volume= 1.723 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 126.67' @ 14.09 hrs Surf.Area= 10,139 sf Storage= 26,935 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 166.5 min ( 1,043.3 - 876.8 )

Volume	Invert	Avail.Storage	Storage Description		
#1	122.00'	41,887 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.0	0	0	1,489
124.00	5,241	280.0	6,349	6,349	5,400
126.00	9,048	366.0	14,117	20,466	9,868
128.00	12,464	423.0	21,421	41,887	13,533

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Horizontal area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=1.98 cfs @ 14.09 hrs HW=126.67' (Free Discharge)  
 ↑**1=Exfiltration** ( Controls 1.98 cfs)

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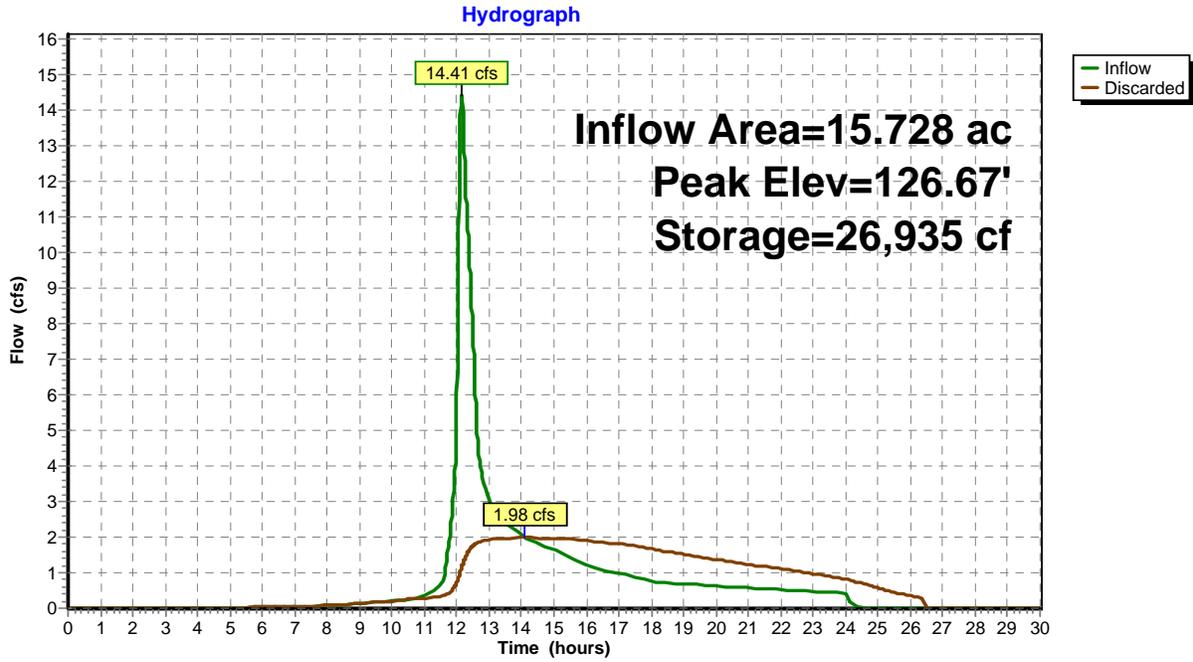
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Type III 24-hr 100-year Rainfall=7.10"

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**Pond 1P: INFILTRATION BASIN**



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Type III 24-hr 100-year Rainfall=7.10"

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**Summary for Pond 2P: INFILTRATION TRENCH**

Inflow Area = 3.710 ac, 1.22% Impervious, Inflow Depth = 0.40" for 100-year event  
 Inflow = 0.40 cfs @ 12.52 hrs, Volume= 0.122 af  
 Outflow = 0.30 cfs @ 12.74 hrs, Volume= 0.122 af, Atten= 26%, Lag= 13.0 min  
 Discarded = 0.30 cfs @ 12.74 hrs, Volume= 0.122 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 122.13' @ 12.74 hrs Surf.Area= 1,554 sf Storage= 78 cf

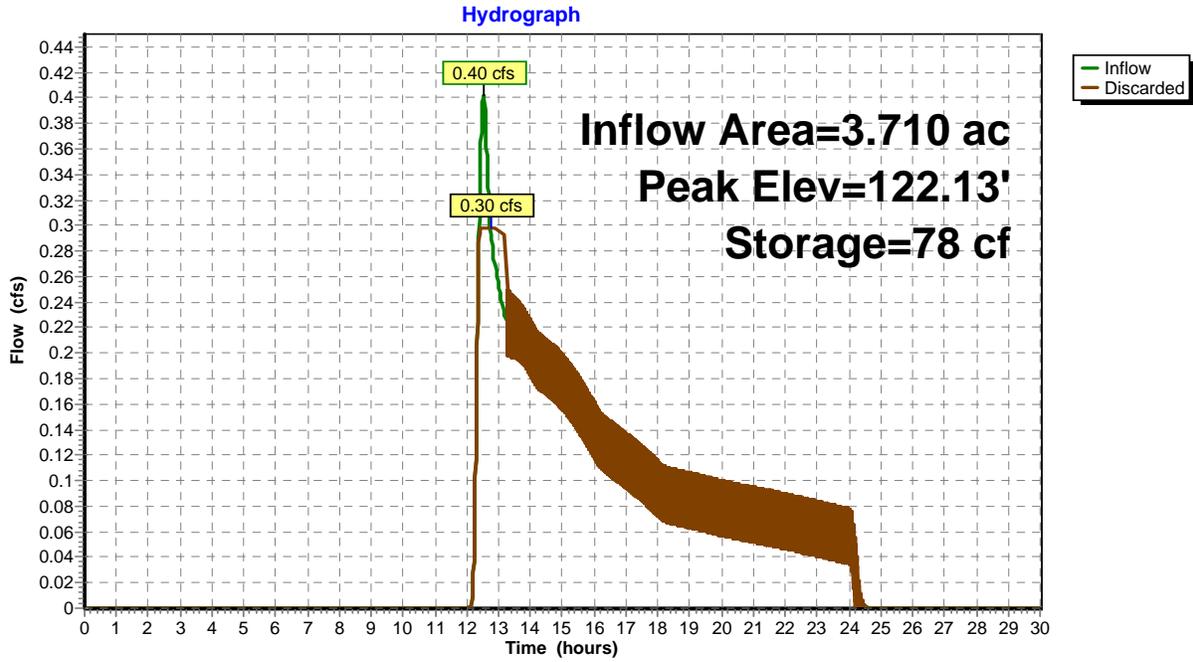
Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.5 min ( 990.1 - 989.6 )

Volume	Invert	Avail.Storage	Storage Description			
#1	122.00'	10,251 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,554	785.0	0.0	0	0	1,554
126.00	1,554	785.0	40.0	2,486	2,486	4,694
127.00	3,938	804.0	100.0	2,655	5,142	7,224
128.00	6,378	823.0	100.0	5,109	10,251	9,815

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.30 cfs @ 12.74 hrs HW=122.13' (Free Discharge)  
 ↑1=Exfiltration ( Controls 0.30 cfs)

### Pond 2P: INFILTRATION TRENCH



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**Summary for Pond 3P: STORMTECH CHAMBERS SC-740**

Inflow Area = 1.316 ac, 17.81% Impervious, Inflow Depth = 1.51" for 100-year event  
 Inflow = 1.70 cfs @ 12.09 hrs, Volume= 0.166 af  
 Outflow = 0.24 cfs @ 13.03 hrs, Volume= 0.166 af, Atten= 86%, Lag= 56.2 min  
 Discarded = 0.24 cfs @ 13.03 hrs, Volume= 0.166 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs  
 Peak Elev= 102.43' @ 13.03 hrs Surf.Area= 1,218 sf Storage= 2,001 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 64.8 min ( 911.6 - 846.8 )

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	1,112 cf	<b>20.50'W x 59.40'L x 3.50'H Field A</b> 4,262 cf Overall - 1,481 cf Embedded = 2,781 cf x 40.0% Voids
#2A	100.50'	1,481 cf	<b>ADS StormTech SC-740 x 32 Inside #1</b> Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 4 rows
		2,594 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	<b>8.270 in/hr Exfiltration over Surface area</b> Conductivity to Groundwater Elevation = 0.00'

**Discarded OutFlow** Max=0.24 cfs @ 13.03 hrs HW=102.43' (Free Discharge)  
 ↑ **1=Exfiltration** ( Controls 0.24 cfs)

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Type III 24-hr 100-year Rainfall=7.10"

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**Pond 3P: STORMTECH CHAMBERS SC-740 - Chamber Wizard Field A**

**Chamber Model = ADS\_StormTech SC-740 (ADS StormTech® SC-740)**

Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf

Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

Row Length Adjustment= +0.44' x 6.45 sf x 4 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

8 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 57.40' Row Length +12.0" End Stone x 2 = 59.40' Base Length

4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width

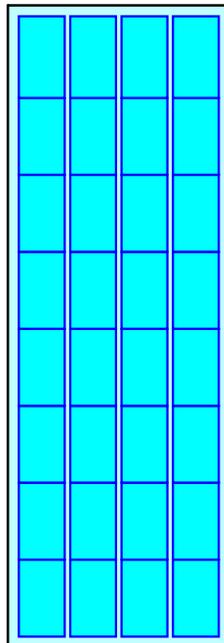
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

32 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 4 Rows = 1,481.4 cf Chamber Storage

4,262.0 cf Field - 1,481.4 cf Chambers = 2,780.5 cf Stone x 40.0% Voids = 1,112.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,593.6 cf = 0.060 af  
Overall Storage Efficiency = 60.9%

32 Chambers  
157.9 cy Field  
103.0 cy Stone



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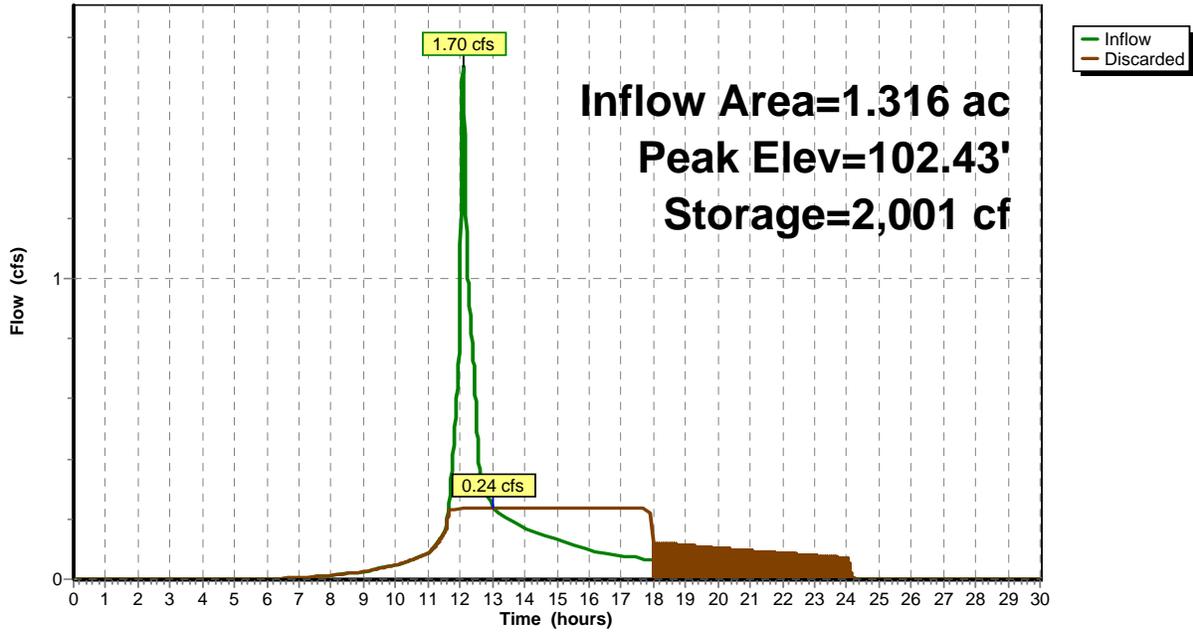
Type III 24-hr 100-year Rainfall=7.10"

Printed 12/1/2014

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**Pond 3P: STORMTECH CHAMBERS SC-740**

Hydrograph



## **SECTION 6.0**

### **ADDITIONAL DRAINAGE CALCULATIONS**

6.1 TOTAL SUSPENDED SOLIDS REMOVAL (TSS)

6.2 GROUNDWATER RECHARGE CALCULATIONS

6.3 WATER QUALITY VOLUME CALCULATIONS

**6.1 TOTAL SUSPENDED SOLIDS REMOVAL (TSS)**

# TSS Removal Calculation Worksheet

Location: Infiltration Basin  
 Project: Atkins Road Subdivision  
 Prepared By: B. Yergatian  
 Date: 12/1/2014



A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
Deep Sump and Hooded Catchbasins	0.25	1.00	0.25	0.75
VortSentry HS	0.8	0.75	0.60	0.15
Infiltration Basin	0.80	0.15	0.12	0.03

**TSS Removal = 0.97**

\*Equals remaining load from previous BMP (E)

# TSS Removal Calculation Worksheet

Location: Infiltration Trench  
 Project: Atkins Road Subdivision  
 Prepared By: B. Yergatian  
 Date: 12/1/2014



A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
Infiltration Trench	0.80	1.00	0.80	0.20

**TSS Removal = 0.80**

\*Equals remaining load from previous BMP (E)

# TSS Removal Calculation Worksheet

Location: StormTech SC-740 System  
 Project: Atkins Road Subdivision  
 Prepared By: B. Yergatian  
 Date: 12/1/2014



A	B	C	D	E
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)
Deep Sump and Hooded Catchbasins	0.25	1.00	0.25	0.75
VortSentry HS	0.80	0.75	0.60	0.15
Subsurface Infiltration Structure	0.80	0.15	0.12	0.03

**TSS Removal = 0.97**

\*Equals remaining load from previous BMP (E)

## **6.2 GROUNDWATER RECHARGE CALCULATIONS**

### ***Required Recharge Volume***

$$R_v = F \times \text{Impervious Area}$$

$R_v$  = Required Recharge Volume ( $\text{ft}^3$ )

$F$  = Target Depth Factor (0.6 inches for Hydrologic Soil Group A)

Impervious Area = Pavement and rooftop area on site

### **Infiltration Basin**

$$R_v = (0.6 \text{ inches} \times \text{ft}/12 \text{ inches}) \times 99,853 \text{ ft}^2$$

$$R_v = 4,993 \text{ ft}^3$$

### **Infiltration Trench**

$$R_v = (0.6 \text{ inches} \times \text{ft}/12 \text{ inches}) \times 1,966 \text{ ft}^2$$

$$R_v = 99 \text{ ft}^3$$

### **ADS StormTech Chambers**

$$R_v = (0.6 \text{ inches} \times \text{ft}/12 \text{ inches}) \times 10,210 \text{ ft}^2$$

$$R_v = 511 \text{ ft}^3$$

### ***Drawdown within 72 Hours***

$$T_{\text{drawdown}} = \frac{S_v}{(K)(\text{Bottom Area})}$$

$S_v$  = Storage Volume (100-year storm)

$K$  = Saturated Hydraulic Conductivity (inches/hour)

#### **Infiltration Basin**

$$T_{\text{drawdown}} = \frac{26,935 \text{ ft}^3}{(8.27 \text{ in/hr} \times \text{ft}/12 \text{ in})(1,489 \text{ ft}^2)}$$

$$T_{\text{drawdown}} = 26.25 \text{ hours}$$

#### **Infiltration Trench**

$$T_{\text{drawdown}} = \frac{78 \text{ ft}^3}{(8.27 \text{ in/hr} \times \text{ft}/12 \text{ in})(1,554 \text{ ft}^2)}$$

$$T_{\text{drawdown}} = 0.073 \text{ hours}$$

#### **StormTech SC-740 Chamber System**

$$T_{\text{drawdown}} = \frac{2,001 \text{ ft}^3}{(8.27 \text{ in/hr} \times \text{ft}/12 \text{ in})(1,217 \text{ ft}^2)}$$

$$T_{\text{drawdown}} = 2.39 \text{ hours}$$

### **6.3 WATER QUALITY VOLUME CALCULATIONS**

## ***Water Quality Volume***

$$V_{wQ} = (D_{wQ}/12 \text{ inches/foot}) \times (A_{imp} \times 43,560 \text{ ft}^2/\text{acre})$$

$V_{wQ}$  = Required Water Quality Volume (ft<sup>3</sup>)

$D_{wQ}$  = Water Quality Depth: one-inch for discharges within a Zone II or Interim Wellhead Protection Area, or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour, 1/2-inch for discharges near or to other areas.

$A_{imp}$  = Impervious Area (acres)

## **Infiltration Basin**

$$V_{wQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (99,853 \text{ ft}^2)$$

$$V_{wQ} = 8,322 \text{ ft}^3$$

## **Infiltration Trench**

$$V_{wQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (1,966 \text{ ft}^2)$$

$$V_{wQ} = 164 \text{ ft}^3$$

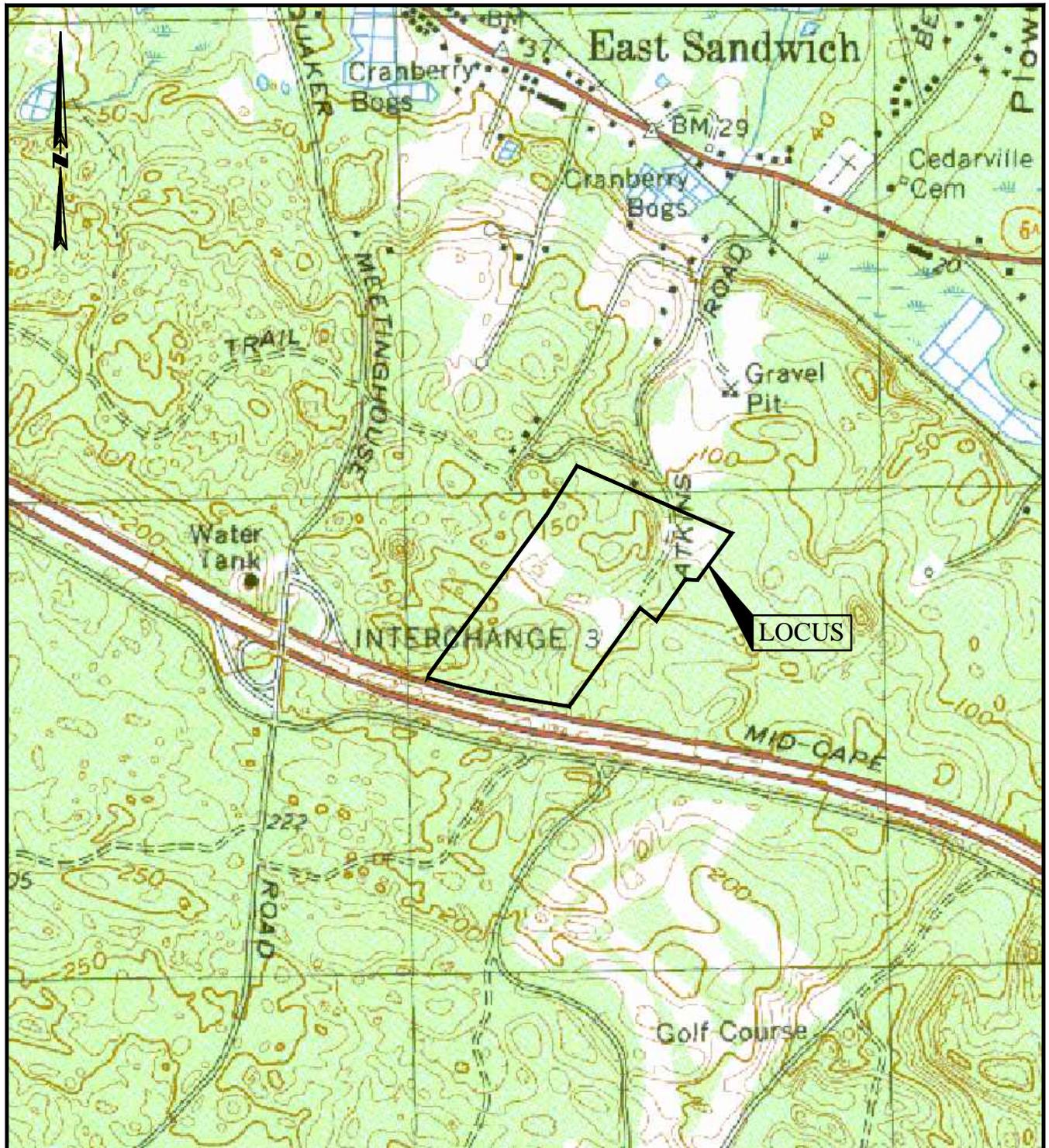
## **StormTech SC-740 System**

$$V_{wQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (10,210 \text{ ft}^2)$$

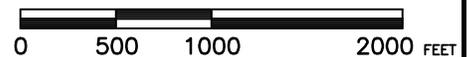
$$V_{wQ} = 851 \text{ ft}^3$$

## **APPENDICES**

**USGS LOCUS MAP**



SCALE: 1" = 1000'



PREPARED FOR:  
 MONOMOY PROPERTIES, LLC  
 79 COVE ROAD  
 SOUTH DENNIS, MA 02660

USGS LOCUS MAP  
Source: MassGIS  
 ATKINS ROAD CLUSTER  
 SUBDIVISION  
 EAST SANDWICH, MA

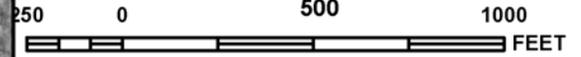
**BSC GROUP**  
 349 Route 28, Unit D  
 W. Yarmouth, Massachusetts  
 02673  
 508 778 8919

Job No.: 4-9675.00 Date: 9/20/13  
 Scale: AS NOTED Revised: \_\_\_\_\_  
 Dwg. No.: \_\_\_\_\_ Figure: \_\_\_\_\_

**FEMA MAP**



MAP SCALE 1" = 500'



PANEL 0527J

# FIRM

FLOOD INSURANCE RATE MAP  
**BARNSTABLE COUNTY,  
 MASSACHUSETTS**  
 (ALL JURISDICTIONS)

**PANEL 527 OF 875**

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SANDWICH, TOWN OF	250012	0527	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.



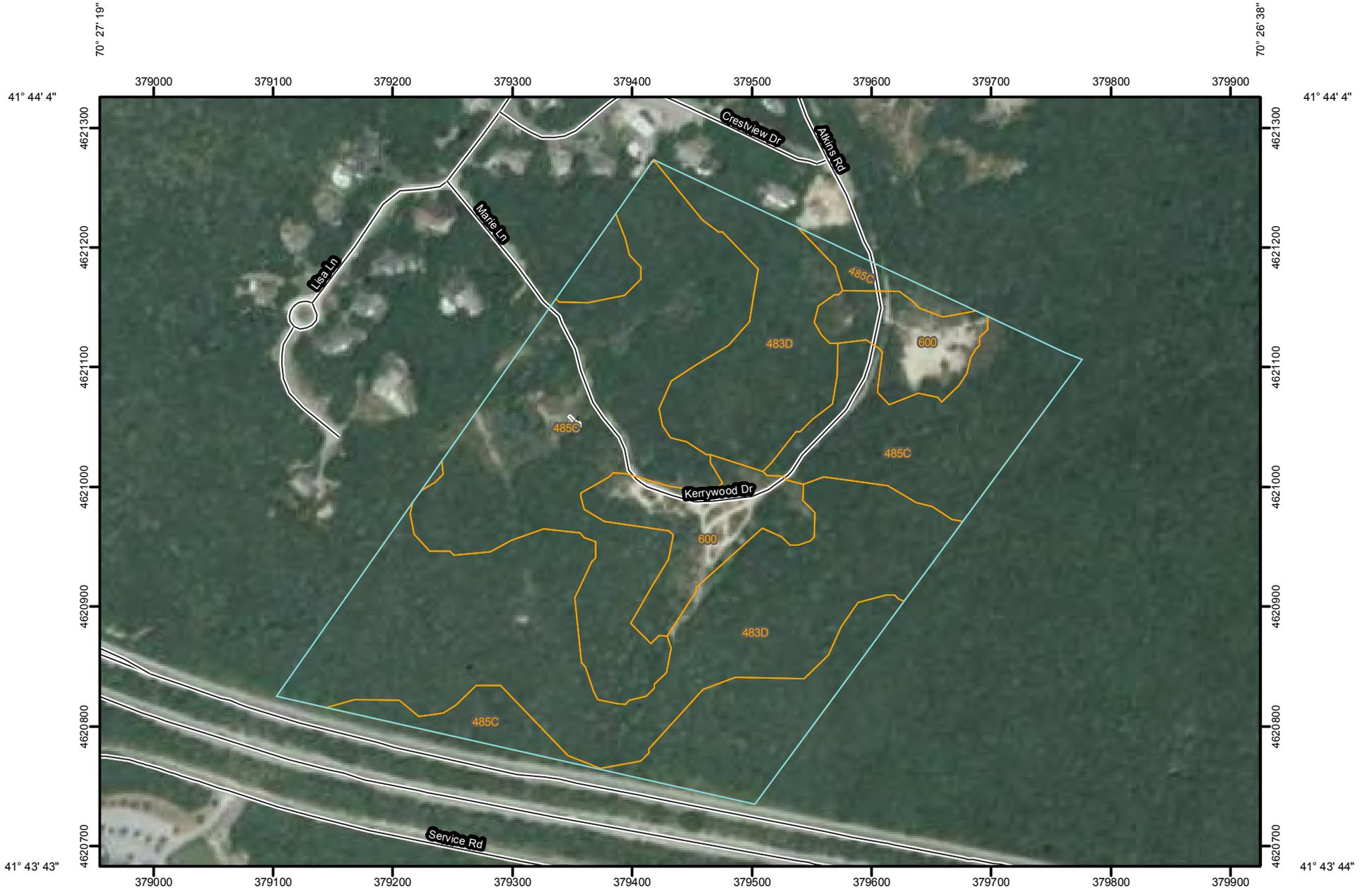
**MAP NUMBER**  
 25001C0527J  
**EFFECTIVE DATE**  
 JULY 16, 2014

Federal Emergency Management Agency

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## SOIL SURVEY MAP

Soil Map—Barnstable County, Massachusetts  
(Atkins Road Cluster Subdivision)



Map Scale: 1:4,600 if printed on A size (8.5" x 11") sheet.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Units

### 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

-  Gully
-  Short Steep Slope
-  Other

### Political Features

 Cities

### Water Features

 Streams and Canals

### Transportation

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

## MAP INFORMATION

Map Scale: 1:4,600 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:25,000.

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 accurate map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: UTM Zone 19N NAD83

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

Soil Survey Area: Barnstable County, Massachusetts

Survey Area Data: Version 9, Jul 23, 2010

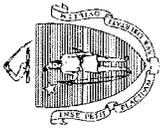
Date(s) aerial images were photographed: 7/25/2003

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

Barnstable County, Massachusetts (MA001)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
483D	Plymouth-Barnstable complex, hilly, very bouldery	19.8	41.4%
485C	Barnstable-Plymouth complex, rolling	23.0	48.1%
600	Pits, sand and gravel	5.0	10.4%
<b>Totals for Area of Interest</b>		<b>47.7</b>	<b>100.0%</b>

## **SOIL TEST PIT LOGS**



**Commonwealth of Massachusetts**  
 City/Town of  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**A. Facility Information**

Owner Name Monomoy Properties LLC Assessors Map 34  
 Street Address Atkins Road Map/Lot # \_\_\_\_\_  
East Sandwich City Massachusetts State 02537 Zip Code \_\_\_\_\_

**B. Site Information**

1. (Check one)  New Construction  Upgrade  Repair

2. Published Soil Survey Available?  Yes  No  
 1. Plymouth-Barnstable complex, hilly, very bouldery 2. Barnstable-Plymouth complex, rolling 3. Pits, sand and gravel  
 Soil Name \_\_\_\_\_  
 Web Soil Survey accessed 10/9/12 483D, 485C, 600  
 Year Published \_\_\_\_\_ Publication Scale \_\_\_\_\_ Soil Map Unit \_\_\_\_\_

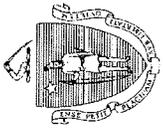
3. Surficial Geological Report Available?  Yes  No  
 If yes: \_\_\_\_\_ Year Published \_\_\_\_\_ Publication Scale \_\_\_\_\_ Map Unit \_\_\_\_\_

4. Flood Rate Insurance Map  
 Geologic Material \_\_\_\_\_ Landform \_\_\_\_\_  
 Above the 500-year flood boundary?  Yes  No Within the 100-year flood boundary?  Yes  No  
 Within the 500-year flood boundary?  Yes  No Within a velocity zone?  Yes  No

5. Wetland Area: National Wetland Inventory Map \_\_\_\_\_ Name \_\_\_\_\_  
 Wetlands Conservancy Program Map \_\_\_\_\_ Name \_\_\_\_\_

6. Current Water Resource Conditions (USGS): \_\_\_\_\_  
 Range:  Above Normal  Normal  Below Normal

7. Other references reviewed: \_\_\_\_\_

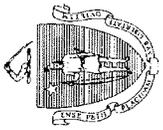


# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

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

Deep Observation Hole Number: TP-1 Date: 10/16/2012 Time: Weather:

- Location
- Ground Elevation at Surface of Hole: 170+/- Location (identify on plan):  
 Land Use: Woodland  
 (e.g., woodland, agricultural field, vacant lot, etc.)  
 Vegetation: Trees, brush  
 Surface Stones: None  
 Slope (%): 5 to 10%  
 Landform: Outwash plain  
 Shoulder: Position on Landscape (attach sheet)
- Distances from: Open Water Body: feet Drainage Way: feet Possible Wet Area: feet  
 Property Line: feet Drinking Water Well: feet Other: feet  
 Glacial outwash
- Parent Material: Unsuitable Materials Present:  Yes  No  
 If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock  
 Groundwater Observed:  Yes  No  
 If yes: Depth Weeping from Pit: Depth Standing Water in Hole: inches elevation
- Estimated Depth to High Groundwater: inches



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

## C. On-Site Review (continued)

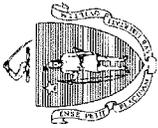
TP-1

Deep Observation Hole Number: \_\_\_\_\_

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 3	A	10YR 3/2				LS					
3 - 9	E	10YR 6/2				LS					
9 - 26	Bw	10YR 5/8				LS					
26 - 124	C	2.5Y 6/3				M. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.

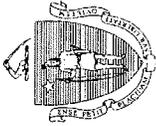


# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-2 Date: 10/16/12 Time: Weather:

- Location
- Ground Elevation at Surface of Hole: 189+/- Location (identify on plan):  
 Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) None 10 to 15%  
 Trees, brush Surface Stones Slope (%)  
 Vegetation Landform Outwash plain Summit  
 Position on Landscape (attach sheet)
- Distances from: Open Water Body feet Drainage Way feet Possible Wet Area feet  
 Property Line feet Drinking Water Well feet Other feet  
 Glacial outwash
- Parent Material: Unsuitable Materials Present:  Yes  No  
 If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock  
 Groundwater Observed:  Yes  No If yes: Depth Weeping from Pit Depth Standing Water in Hole  
 Estimated Depth to High Groundwater: inches elevation



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

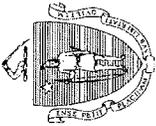
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 5	A	10YR 3/2				LS					
5 - 19	Bw	10YR 5/8				LS					
19 - 21	Ab	10YR 2/2				SL					
21 - 25	E	10YR 6/2				LS					
25 - 40	Bwd	10YR 6/8				LS					
40 - 60	C1d	2.5Y 7/3				LS					
60 - 120	C2d	2.5Y 6/3				C. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-3 Date: 10/16/12 Time: \_\_\_\_\_ Weather: \_\_\_\_\_

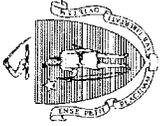
1. Location  
Ground Elevation at Surface of Hole: 161+/- Location (identify on plan): \_\_\_\_\_

2. Land Use Woodland None  
(e.g., woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%) 5 to 10%  
Trees, brush Outwash plain Landform Toe of slope  
Vegetation Position on Landscape (attach sheet)

3. Distances from: Open Water Body \_\_\_\_\_ feet Drainage Way \_\_\_\_\_ feet Possible Wet Area \_\_\_\_\_ feet  
Property Line \_\_\_\_\_ feet Drinking Water Well \_\_\_\_\_ feet Other \_\_\_\_\_ feet  
Glacial outwash

4. Parent Material: \_\_\_\_\_ Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_  
Estimated Depth to High Groundwater: \_\_\_\_\_ inches \_\_\_\_\_ elevation



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

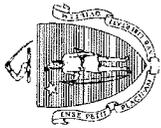
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-3

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 5	A	10YR 3/2				LS				granular	
5 - 30	Bw	10YR 5/8				SL				blocky	
30 - 110	C	2.5Y 6/3				M. Sand				single grain	

Additional Notes:

No groundwater or redoximorphic features observed.

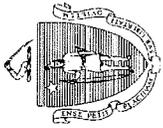


# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-4 Date: 10/16/12 Time: Weather:

- Location: Ground Elevation at Surface of Hole: 163+/- Location (identify on plan):
- Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) None Slope (%) 5 to 10%  
Trees, brush Surface Stones On slope  
Vegetation Landform Position on Landscape (attach sheet)
- Distances from: Open Water Body feet Drainage Way feet Possible Wet Area feet  
Property Line feet Drinking Water Well feet Other feet  
Glacial outwash Unsuitable Materials Present:  Yes  No
- If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock  
Groundwater Observed:  Yes  No If yes: Depth Weeping from Pit Depth Standing Water in Hole  
Estimated Depth to High Groundwater: inches elevation



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

## C. On-Site Review (continued)

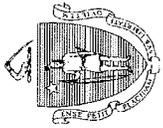
TP-4

Deep Observation Hole Number: \_\_\_\_\_

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 5	A	10YR 3/2				LS			granular		
5 - 15	Bw	10YR 4/6				LS			blocky		
15 - 120	C1	2.5Y 6/3				M. Sand			single grain		

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-5 Date: 10/16/12 Time: Weather:

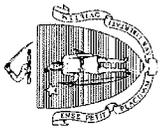
1. Location  
Ground Elevation at Surface of Hole: 129+/- Location (identify on plan): None 0 to 5%

2. Land Use  
Woodland  
(e.g., woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)  
Trees, brush Outwash plain Landform Position on Landscape (attach sheet) Toe of slope  
Vegetation

3. Distances from: Open Water Body feet Drainage Way feet Possible Wet Area feet  
Property Line feet Drinking Water Well feet Other feet  
Glacial outwash

4. Parent Material: Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: Depth Weeping from Pit Depth Standing Water in Hole  
Estimated Depth to High Groundwater: inches elevation



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

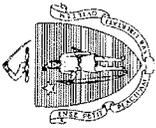
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-5

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 18	Bw	10YR 6/8				LS			granular		
18 - 120	C	2.5Y 6/3				M/C Sand	15%		single grain		

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-6 Date: 10/16/12 Time: \_\_\_\_\_ Weather: \_\_\_\_\_

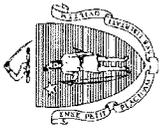
1. Location  
Ground Elevation at Surface of Hole: 128.5+/- Location (identify on plan): \_\_\_\_\_

2. Land Use Woodland None 0 to 5%  
(e.g., woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)  
Trees, brush Outwash plain Valley  
Vegetation Landform Position on Landscape (attach sheet)

3. Distances from: Open Water Body \_\_\_\_\_ feet \_\_\_\_\_ Drainage Way \_\_\_\_\_ feet \_\_\_\_\_ Possible Wet Area \_\_\_\_\_ feet \_\_\_\_\_  
Property Line \_\_\_\_\_ feet \_\_\_\_\_ Drinking Water Well \_\_\_\_\_ feet \_\_\_\_\_ Other \_\_\_\_\_ feet \_\_\_\_\_  
Glacial outwash \_\_\_\_\_

4. Parent Material: \_\_\_\_\_ Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_  
Estimated Depth to High Groundwater: \_\_\_\_\_ inches \_\_\_\_\_ elevation



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

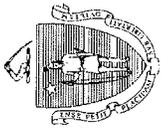
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-6

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)		Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent	Gravel	Cobbles & Stones					
0 - 5	A	10YR 3/2				LS				granular		
5 - 13	Bw	10YR 4/4				LS				single grain		
13 - 100	C	2.5Y 6/3				M. Sand				single grain		

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-7 Date: 10/16/12 Time: \_\_\_\_\_ Weather: \_\_\_\_\_

1. Location

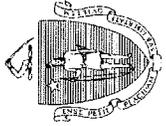
Ground Elevation at Surface of Hole: 149+/- Location (identify on plan): \_\_\_\_\_

2. Land Use Woodland None 0 to 5%  
(e.g., woodland, agricultural field, vacant lot, etc.) Slope (%)  
Vegetation Trees, brush Surface Stones \_\_\_\_\_  
Shoulder \_\_\_\_\_  
Landform \_\_\_\_\_ Position on Landscape (attach sheet)

3. Distances from: Open Water Body \_\_\_\_\_ feet \_\_\_\_\_ Drainage Way \_\_\_\_\_ feet \_\_\_\_\_ Possible Wet Area \_\_\_\_\_ feet \_\_\_\_\_  
Property Line \_\_\_\_\_ feet \_\_\_\_\_ Drinking Water Well \_\_\_\_\_ feet \_\_\_\_\_ Other \_\_\_\_\_ feet \_\_\_\_\_  
Glacial outwash \_\_\_\_\_

4. Parent Material: \_\_\_\_\_ Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_  
Estimated Depth to High Groundwater: \_\_\_\_\_ inches \_\_\_\_\_ elevation



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

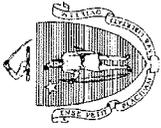
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-7

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 112	C	2.5Y 6/3				M. Sand			single grain		

Additional Notes:

No groundwater or redoximorphic features observed.

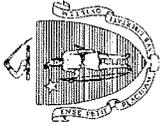


# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-8 Date: 10/16/12 Time: Weather:

- Location
- Ground Elevation at Surface of Hole: 125+/- Location (identify on plan):  
 Land Use: Woodland  
 (e.g., woodland, agricultural field, vacant lot, etc.)  
 Vegetation: Trees, brush  
 Surface Stones: None  
 Slope (%): 5 to 10%  
 Position on Landscape (attach sheet): Valley
- Distances from:
  - Open Water Body: feet
  - Drainage Way: feet
  - Property Line: feet
  - Drinking Water Well: feet
  - Other: feet
  - Glacial outwash
- Parent Material:
  - Unsuitable Materials Present:  Yes  No
  - If Yes:
    - Disturbed Soil
    - Fill Material
    - Impervious Layer(s)
    - Weathered/Fractured Rock
    - Bedrock
- Groundwater Observed:  Yes  No
  - Estimated Depth to High Groundwater: inches
  - Depth Weeping from Pit: feet
  - Depth Standing Water in Hole: feet



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

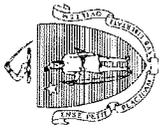
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-8

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 14	Bw	10YR 6/8				LS				granular	
14 - 120	C	2.5Y 7/3				M/F Sand				single grain	

Additional Notes:

No groundwater or redoximorphic features observed.



Commonwealth of Massachusetts  
City/Town of

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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-9 Date: 10/16/12 Time: Weather:

- Location

Ground Elevation at Surface of Hole: 142.5+/- Location (identify on plan):
- Land Use: Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation: Trees, brush

Surface Stones: None

On slope: 5 to 10%

Position on Landscape (attach sheet)
- Distances from:

Open Water Body: feet

Drainage Way: feet

Possible Wet Area: feet

Property Line: feet

Drinking Water Well: feet

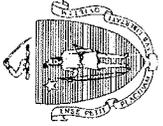
Other: feet
- Parent Material: Glacial outwash

Unsuitable Materials Present:  Yes  No

If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock
- Groundwater Observed:  Yes  No

Estimated Depth to High Groundwater: inches

If yes: Depth Weeping from Pit: Depth Standing Water in Hole: elevation



Commonwealth of Massachusetts  
City/Town of

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

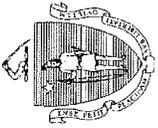
**C. On-Site Review** (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-9

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 7	FILL										
7 - 9	Ab	10YR 2/2				SL					
9 - 12	E	10YR 6/2				LS					
12 - 31	Bw	10YR 5/8				LS					
31 - 72	C1	5Y 5/3				SL					
72 - 162	C2	5Y 6/4				Fine SL					

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-10 Date: 10/16/12 Time: Weather:

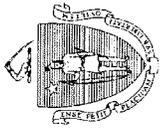
1. Location  
Ground Elevation at Surface of Hole: 155.5+/- Location (identify on plan):

2. Land Use Woodland None Slope (%) 0 to 5%  
(e.g., woodland, agricultural field, vacant lot, etc.) Surface Stones  
Vegetation Trees, brush Outwash plain Shoulder  
Position on Landscape (attach sheet)

3. Distances from: Open Water Body feet Drainage Way feet Possible Wet Area feet  
Property Line feet Drinking Water Well feet Other feet  
Glacial outwash

4. Parent Material: Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No  
Estimated Depth to High Groundwater: inches elevation  
If yes: Depth Weeping from Pit Depth Standing Water in Hole



Commonwealth of Massachusetts  
City/Town of

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

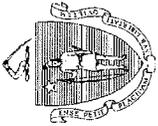
**C. On-Site Review** (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
0 - 4	A	10YR 3/2			LS					
4 - 9	E	10YR 6/2			LS					
9 - 28	Bw	10YR 5/8			LS					
28 - 120	C	2.5Y 6/3			M. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.

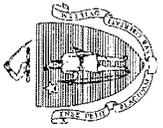


# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-11 Date: 10/16/12 Time: Weather:

- Location: \_\_\_\_\_
- Ground Elevation at Surface of Hole: 151 +/- \_\_\_\_\_ Location (identify on plan): \_\_\_\_\_  
 Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) Surface Stones: None Slope (%): 10 to 15%  
 Vegetation: Trees, brush Landform: Outwash plain Valley Position on Landscape (attach sheet): \_\_\_\_\_  
 Distances from: Open Water Body \_\_\_\_\_ feet Drainage Way \_\_\_\_\_ feet Possible Wet Area \_\_\_\_\_ feet  
 Property Line \_\_\_\_\_ feet Drinking Water Well \_\_\_\_\_ feet Other \_\_\_\_\_ feet  
 Parent Material: Glacial outwash Unsuitable Materials Present:  Yes  No  
 If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock  
 Groundwater Observed:  Yes  No If yes: Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_  
 Estimated Depth to High Groundwater: \_\_\_\_\_ inches \_\_\_\_\_ elevation



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

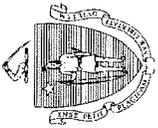
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-11

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 3	A	10YR 3/2				LS					
3 - 8	E	10YR 6/2				LS					
8 - 28	Bw	10YR 5/8				LS					
28 - 72	C1	2.5Y 6/4				LS					
72 - 128	C2	2.5Y 6/3				C. Sand	15%	15%			

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-12 Date: 10/16/12 Time: \_\_\_\_\_ Weather: \_\_\_\_\_

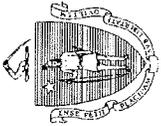
1. Location  
Ground Elevation at Surface of Hole: 139+/- Location (identify on plan): \_\_\_\_\_  
None

2. Land Use Woodland Surface Stones \_\_\_\_\_ Slope (%) 5 to 10%  
(e.g., woodland, agricultural field, vacant lot, etc.)  
Vegetation Trees, brush Landform Outwash plain Shoulder \_\_\_\_\_  
Position on Landscape (attach sheet)

3. Distances from: Open Water Body \_\_\_\_\_ feet Drainage Way \_\_\_\_\_ feet Possible Wet Area \_\_\_\_\_ feet  
Property Line \_\_\_\_\_ feet Drinking Water Well \_\_\_\_\_ feet Other \_\_\_\_\_ feet  
Glacial outwash

4. Parent Material: \_\_\_\_\_ Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_  
Estimated Depth to High Groundwater: \_\_\_\_\_ inches \_\_\_\_\_ elevation



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

## C. On-Site Review (continued)

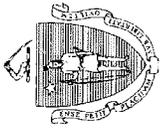
TP-12

Deep Observation Hole Number: \_\_\_\_\_

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)		Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent	Gravel	Cobbles & Stones					
0 - 3	A	10YR 3/2				LS						
3 - 8	E	10YR 6/2				LS						
8 - 20	Bw	10YR 5/8				SL						
20 - 44	C1	10YR 6/8				LS						
44 - 120	C2	2.5Y 6/3				M. Sand						

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-13 Date: 10/16/12 Time: \_\_\_\_\_ Weather: \_\_\_\_\_

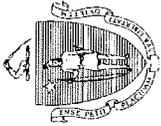
1. Location  
Ground Elevation at Surface of Hole: 133+/- Location (identify on plan): \_\_\_\_\_

2. Land Use Woodland None 5 to 10%  
(e.g., woodland, agricultural field, vacant lot, etc.) Surface Stones Slope (%)  
Trees, brush Valley  
Vegetation Landform \_\_\_\_\_ Position on Landscape (attach sheet)

3. Distances from: Open Water Body \_\_\_\_\_ feet \_\_\_\_\_ Possible Wet Area \_\_\_\_\_ feet  
Property Line \_\_\_\_\_ feet \_\_\_\_\_ Other \_\_\_\_\_ feet  
Glacial outwash

4. Parent Material: \_\_\_\_\_ Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No  
Estimated Depth to High Groundwater: \_\_\_\_\_ inches \_\_\_\_\_ elevation  
If yes: \_\_\_\_\_ Depth Weeping from Pit \_\_\_\_\_ Depth Standing Water in Hole \_\_\_\_\_



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

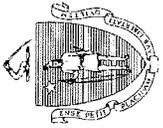
## C. On-Site Review (continued)

Deep Observation Hole Number: TP-13

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 2	A	10YR 3/2				LS					
2 - 6	E	10YR 6/2				LS					
6 - 26	Bw	10YR 6/8				LS					
26 - 156	C	2.5Y 5/4				LS					

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-14 Date: 10/16/12 Time: Weather:

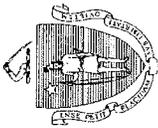
1. Location  
Ground Elevation at Surface of Hole: 145 +/- Location (identify on plan):

2. Land Use: Woodland  
(e.g., woodland, agricultural field, vacant lot, etc.)  
Vegetation: Trees, brush  
None  
Surface Stones  
Outwash plain  
On slope  
Position on Landscape (attach sheet)

3. Distances from:  
Open Water Body: feet  
Drainage Way: feet  
Property Line: feet  
Drinking Water Well: feet  
Other: feet  
Possible Wet Area: feet

4. Parent Material: Glacial outwash  
Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No  
If yes: Depth Weeping from Pit: Depth Standing Water in Hole:  
Estimated Depth to High Groundwater: inches elevation



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

## C. On-Site Review (continued)

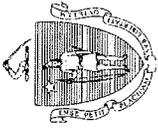
TP-14

Deep Observation Hole Number: \_\_\_\_\_

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 3	A	10YR 3/2				LS					
3 - 9	E	10YR 6/2				LS					
9 - 25	Bw	10YR 5/8				LS					
25 - 120	C	2.5Y 6/3				M. Sand	15%	15%			

Additional Notes:

No groundwater or redoximorphic features observed.



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

## C. On-Site Review (continued)

Deep Observation Hole Number: TP-15 Date: 10/16/12 Time: Weather:

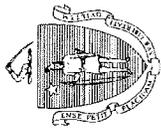
1. Location  
Ground Elevation at Surface of Hole: 115 +/- Location (identify on plan):

2. Land Use  
(e.g., woodland, agricultural field, vacant lot, etc.)  
Vegetation: Woodland  
Trees, brush: None  
Surface Stones: 0 to 5%  
Slope (%):  
Outwash plain: Toe of slope  
Landform: Position on Landscape (attach sheet)

3. Distances from:  
Open Water Body: feet  
Drainage Way: feet  
Property Line: feet  
Drinking Water Well: feet  
Glacial outwash: Other

4. Parent Material:  
Unsuitable Materials Present:  Yes  No  
If Yes:  Disturbed Soil  Fill Material  Impervious Layer(s)  Weathered/Fractured Rock  Bedrock

5. Groundwater Observed:  Yes  No  
Estimated Depth to High Groundwater: inches  
If yes: Depth Weeping from Pit: Depth Standing Water in Hole: elevation



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

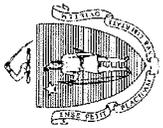
## C. On-Site Review (continued)

Deep Observation Hole Number: \_\_\_\_\_ TP-15

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
0 - 120	C	2.5Y 6/3			M. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.



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

## D. Determination of High Groundwater Elevation

1. Method Used:

- Depth observed standing water in observation hole  
A. \_\_\_\_\_ inches      B. \_\_\_\_\_ inches
- Depth weeping from side of observation hole  
A. \_\_\_\_\_ inches      B. \_\_\_\_\_ inches
- Depth to soil redoximorphic features (mottles)  
A. \_\_\_\_\_ inches      B. \_\_\_\_\_ inches
- Groundwater adjustment (USGS methodology)  
A. \_\_\_\_\_ inches      B. \_\_\_\_\_ inches

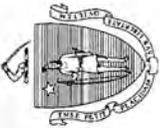
2.

Index Well Number \_\_\_\_\_ Reading Date \_\_\_\_\_ Index Well Level \_\_\_\_\_  
 Adjustment Factor \_\_\_\_\_ Adjusted Groundwater Level \_\_\_\_\_

## 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?  
Upper boundary: \_\_\_\_\_ inches      Lower boundary: \_\_\_\_\_ inches



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## 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

Brian G. Yergatian, P.E. / #SE 3009

Typed or Printed Name of Soil Evaluator / License #

Samuel J. Jensen, P.E.

Name of Board of Health Witness

February 5, 2014

Date

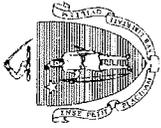
October 24, 2005

Date of Soil Evaluator Exam

Engineering Department

Board of Health

**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](#).



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

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### Field Diagrams

Use this sheet for field diagrams:

For test pit locations, see attached plan.