

**STORMWATER MANAGEMENT PLAN WITH
STORMWATER POLLUTION PREVENTION PLAN
(SWPPP)**

AND

**EROSION CONTROL PLAN
FOR
CONNECTICUT SITING COUNCIL**

WIND COLEBROOK SOUTH

COLEBROOK, CONNECTICUT

Prepared for:



BNE Energy
29 South Main Street
Town Center, Suite 200
West Hartford, CT 06107

by:



6302 Fairview Road, Suite 600
Charlotte, NC 28210

MARCH 2011

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Contact Information / Responsible Parties:

Permittee(s):

BNE Energy
29 South Main Street
Town Center, Suite 200
West Hartford, CT 06107
(800) 450-0503

Contractor Co-Permittee:

To be determined

Contractor Operator(s):

To be determined

Stormwater Manager and SWPPP Contact(s):

BNE Energy
29 South Main Street
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**Section 1.0
PROJECT INTRODUCTION**

1.0 PROJECT INTRODUCTION

Project/Site Information:

Project/Site Name: Wind Colebrook South

Location: 29 Flagg Hill Road
Colebrook, Connecticut

Latitude/Longitude: Latitude: Longitude:
 41° 57' 50" N 73° 08' 46" W

Method for determining latitude/longitude: Google Earth

1.1 SITE SUMMARY

1.1.1 Existing Conditions

Located at 29 Flagg Hill Road and consists of approximately 79.74 acres and is undeveloped with the exception of the meteorological tower, which is approximately 197 feet in height. The Property is located along the Norfolk town line and approximately 600 feet from the Winsted/Winchester town line. Though the surrounding land uses are mixed, consisting of both commercial and residential development, the property is located in the R-2 residential zone. The Colebrook zoning regulations do not address wind turbine installations. The Property is abutted by the undeveloped land owned by the Nature Conservancy to the west, land owned by the Gun Club to the north and residential properties to the east and south. The site is currently accessed via Flagg Hill Road. This access point will be maintained throughout the construction process. Currently, there are no structural stormwater discharge points. All stormwater flows over land to discharge points off site.

1.1.2 Project Description

The developer plans to install three GE 1.6 MW wind turbines at the Property: one in the northwest corner of the Property, one in the northeast corner of the Property and one in the southern area of the Property where the meteorological tower is currently located. In addition to the three turbines, the project will include construction of temporary equipment lay-down areas for each turbine, crane assembly area, access road, permanent support building and associated ground equipment including an electrical collector yard and associated utility infrastructure so that the turbines can be interconnected to the electrical grid. Following completion of the project, all temporary structures will be removed and the site returned to pre-construction conditions.

1.2 PROJECT OWNER AND OPERATOR

The project owner and operator, BNE Energy, will be the responsible entity for completing the project. The address and telephone is:

BNE Energy
29 South Main Street
Town Center Suite 200
West Hartford, CT 06107
(800) 450-0503

1.3 PERMIT COVERAGE AND ELIGIBILITY

The U.S. Environmental Protection Agency (EPA) requires a National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges from construction sites that disturb more than one acre of land or from smaller sites that are part of a larger, common plan of development. For the purposes of the NPDES program, construction activities are defined as clearing, excavating, grading, or other land disturbing activities.

The General Permit for the Discharge of Stormwater and dewatering Wastewaters associated with Construction Activities (CGP) authorizes stormwater discharges from construction activities which result in the disturbance of one or more acres of land area on a site regardless of project phasing. In the case of a larger plan of development, the estimate of total acres of site disturbance shall include, but is not limited to, road and utility construction, individual lot construction, and all other construction associated with the overall plan, regardless of the individual parties responsible for the construction of these various elements. These conditions are subject to the conditions outlined in DEP-PED-GP-015. The effective dates of this CGP are April 9, 2010 thru October 1, 2011, and cover all areas of Connecticut. This CGP includes provisions for the development of this Stormwater Pollution Prevention Plan (SWPPP) to maximize the potential benefits of pollution prevention and sediment and erosion control measures at a construction site.

CGP eligibility is limited to discharges from “large” and “small” construction activity as defined in Section 3 of 2010 Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters. A copy of DEP-PED-GP-015 is included in Appendix J of this document. The permittee has requested coverage under this CGP by submission of a complete and accurate General Permit Registration Form and Transmittal. Copies of these are included in Appendix A. A map detailing the limits of disturbance, for the disturbed area indicated on the registration form, and covered under this CGP, is included in Appendix D. The permittee is granted coverage under this CGP when they have received a Letter of Coverage (LOC) from DEP. A copy of the LOC is to be included in Appendix A.

1.4 CERTIFICATION REQUIREMENTS

All permittees and operators are required to sign a SWPPP certification as a condition of the CGP. The signed certifications confirm that the contractor has been informed that a SWPPP has been prepared for the project and they will be required to perform necessary actions that have been identified to comply with both the SWPPP and the CGP. No permittee or operator shall commence work on this project site until they have familiarized themselves with this plan and signed the appropriate SWPPP certification. It may be necessary for the contractor to implement additional erosion control and pollution prevention measures not previously identified to maintain compliance with the CGP. The following signed SWPPP certifications are included in

Appendix B:

- Preparer
- Permittee and Co-Permittee
- Operator
- Inspector

1.5 COASTAL CONSISTENCY REVIEW

After review of the applicable policies and standards in Connecticut's Coastal Management Act (CCMA), codified in Sections 22a-90 through 22a-112 of the Connecticut General Statutes (CGS), as amended, it has been determined that this project does not require a coastal consistency review.

1.6 ENDANGERED OR THREATENED SPECIES

The existence and/or mitigation for endangered or threatened species is discussed within the comprehensive assessment of all potential environmental impacts associated with Wind Colebrook South.

1.7 SOILS, SLOPES, VEGETATION, AND CURRENT DRAINAGE PATTERNS

1.7.1 Soil Type(s)

Based upon a review of typical geologic conditions and the National Soil Cooperative Survey, the soils have been classified as (1) Bice- Millsite complex soils slopes 3 to 45 percent slopes – very rocky; (2) Westminster- Millsite- Rock Outcrop complex 3 to 15 percent slopes; (3) Bice fine sandy loams ranging from 3 to 15 percent slopes – very stony; (4) Schroon fine sandy loams ranging from 2 to 15 percent slopes - very stony; (5) Shelburne fine sandy loam, 8 to 35 percent slopes – extremely stony; (6) Ashfield fine sandy loam, 8 to 15 percent slopes – very stony, (7) Wonsqueak mucky peat; and (8) Brayton-loonmeadow complex – extremely stony.

1.7.2 Slopes

The project site consists of varying slope conditions ranging from relatively flat conditions in the area of the meteorological tower to steep slopes along the eastern and western property boundary.

1.7.3 Drainage Patterns

Existing site topography is such that runoff migrates, typically via overland sheet flow, through the site to either the existing pond or to an existing ditch line along Flagg Hill Road. An unnamed perennial watercourse outlets from the pond in the vicinity of the southern Property boundary, flowing south.

1.7.4 Vegetation

The property is generally characterized by second growth and upland hardwood forest. Forested uplands in the eastern portion of the Property are dominated by deciduous pole timber (trees 4.0 to 11.9 inches diameter at breast height [DBH]) and small sawtimber size trees (12 to 15 inches DBH). In the northwest and southwest corners of the property, vegetation is characterized as red oak-northern hardwood forest.

1.8 SITE FEATURES AND SENSITIVE AREAS TO BE PROTECTED

1.8.1 Receiving Waters and TMDL Applicability

There are currently zero impaired waterways on the most current 303(d) listing of impaired waterways within the vicinity of the project site.

1.8.2 Wetlands

Within to the property boundary several wetland areas have been identified and delineated. Mitigation and impacts are discussed in the environmental assessment completed by VHB, Inc.

1.9 FINAL STABILIZATION AND TERMINATION OF COVERAGE

At the completion of a construction project registered pursuant to Section 4 of the general permit, a Notice of Termination must be filed with the commissioner. A project shall be considered complete after the site has been stabilized for at least three months following the cessation of construction activities. A site is not considered stabilized until there is no active erosion or sedimentation present and no disturbed areas remain exposed.

The termination notice shall be filed on forms prescribed and provided by the commissioner and shall include the following: (1) The permit number as provided to the permittee on the permit certificate; (2) The name of the registrant as reported on the general permit registration form DEP-PED-REG-015; (3) The address of the completed construction site; (4) The date all storm drainage structures were cleaned of construction debris pursuant to Section 6(b)(6)(C)(iv) of the general permit, the date of completion of construction, and the date of the final inspections pursuant to Section 6(b)(6)(D) of this general permit; (5) A description of the post-construction activities at the site; and (6) Signature of the permittee. The termination form should be filed with the commissioner at the following address:

Water Permitting & Enforcement Division
Bureau of Materials Management & Compliance Assurance
Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

1.10 RETENTION OF RECORDS

The SWPPP document will be maintained by the contractor in the appropriate construction office or location from the date the construction is initiated until the project is concluded. Records will be maintained during grading operations, construction activities either temporarily or permanently ceased, stabilization measures are initiated and final stabilization is achieved. The project owner will maintain the SWPPP for a period of three years following termination of coverage. Records to be maintained include but are not limited to:

- SWPPP and any amendments
- Copy of permit and/or certification of coverage
- General Permit Registration Form

- All reports and actions required
- Site inspection records
- Contractor certifications
- Notice of Termination

**Section 2.0
CONSTRUCTION ACTIVITIES**

2.0 CONSTRUCTION ACTIVITIES

2.1 DESCRIPTION OF CONSTRUCTION ACTIVITY

Prior to construction BNE will complete all pre-construction planning activities. BNE will continue to consult with municipalities, state agencies and federal agencies, as applicable, and will conduct site surveys to determine construction methodologies and procedures to minimize adverse effects to the environment and public.

Construction will typically consist of activities such as:

- Surveys to stake access roads and structural locations
- Wetland delineation
- Geotechnical investigations
- Establishment of construction staging area
- Installation of sediment and erosion control devices
- Excavation and installation of access roads
- Excavation and installation of lay-down and equipment assembly areas
- Excavation and installation of foundations and erection of new structures
- Installation of conductors
- Restoration of site, including re-establishment of vegetative areas

2.2 CONSTRUCTION SITE ESTIMATES

The following are estimates of the construction site:

Area to be disturbed: 14.17 acres

Total Project area: 80.0 acres

Percentage impervious area before construction: 0 %

Runoff coefficient before construction: 55

Percentage impervious area after construction: 2.7 %

Runoff coefficient after construction: 56

Summary of peak flows: See 2.3.6

Summary of groundwater recharge: 0.018 AC-FT

2.3 PROPOSED STORMWATER MANAGEMENT PRACTICES

2.3.1 Stormwater Treatment Practices

Permanent structural controls will not be required for the treatment of stormwater runoff. Following construction of the tower units, the site will be returned to pre-construction conditions. The constructed access road will remain in place; however the width will be reduced by approximately one-half. The diversion swale constructed as part of the Erosion and Sediment Control Plan will remain in place and will be converted to a water quality swale. Once site

conditions and vegetation have been reestablished, stormwater discharges will return to the pre-construction state for quality and quantity.

2.3.2 Flood Control and Peak Runoff Attenuation Management Practices

Construction within the project area is such that flooding caused by an increase in impervious area or the reconfiguration of stormwater conveyance through the drainage area is not a primary concern. The total increase in impervious area on the site is 2.7%. Permanent stormwater bio-retention ponds are planned in order to treat the water quality volume and the attenuation peak discharge rate. As indicated in the summary below, the proposed development will not result in a net increase of the stormwater discharge rate as required.

2.3.3 10 Year Storm

	Pre-Construction
Description	Basin A
Time of concentration (Tc)	33.2 minutes
Percent impervious	0%
NRCS runoff curve	55
Peak rates	6.22 cfs @ 12.57 hrs, depth > 0.83"
Hydrograph routing	– See Appendix K

	Pre-Construction
Description	Basin B
Time of concentration (Tc)	28.7 minutes
Percent impervious	0%
NRCS runoff curve	55
Peak rates	6.66 cfs @ 12.50 hrs, depth > 0.83"
Hydrograph routing	– See Appendix K

	Pre-Construction
Description	Basin C
Time of concentration (Tc)	9.6 minutes
Percent impervious	0%
NRCS runoff curve	65
Peak rates	6.08 cfs @ 12.61 hrs, depth > 0.82"
Hydrograph routing	– See Appendix K

	Pre-Construction
Description	Basin D
Time of concentration (Tc)	74.6 minutes
Percent impervious	0%
NRCS runoff curve	55
Peak rates	2.11 cfs @ 13.19 hrs, depth > 0.81"
Hydrograph routing	– See Appendix K

Post-Construction

Description Basin 1
Time of concentration (Tc) 6 minutes
Percent impervious 14%
NRCS runoff curve 61
Peak rates 0.21 cfs @ 12.95 hrs, depth> 1.17"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2
Time of concentration (Tc) 6 minutes
Percent impervious 36%
NRCS runoff curve 68
Peak rates 0.37 cfs @ 13.45 hrs, depth> 1.64"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2A
Time of concentration (Tc) 17.4 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 2.61 cfs @ 12.31 hrs, depth> 0.83"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2B
Time of concentration (Tc) 27.2 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 1.61 cfs @ 12.48 hrs, depth> 0.83"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2C
Time of concentration (Tc) 6 minutes
Percent impervious 17%
NRCS runoff curve 62
Peak rates 1.29 cfs @ 12.84 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3
Time of concentration (Tc) 6 minutes
Percent impervious 0%
NRCS runoff curve 58
Peak rates 0.26 cfs @ 13.13 hrs, depth> 0.99"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3A
Time of concentration (Tc) 35.9 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 5.29 cfs @ 12.61 hrs, depth> 0.82"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3B
Time of concentration (Tc) 43.7 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 0.91 cfs @ 12.73 hrs, depth> 0.82"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 4
Time of concentration (Tc) 6 minutes
Percent impervious 21%
NRCS runoff curve 64
Peak rates 0.29 cfs @ 12.96 hrs, depth> 1.37"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 4A
Time of concentration (Tc) 28.9 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 4.55 cfs @ 12.51 hrs, depth> 0.83"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 5
Time of concentration (Tc) 6 minutes
Percent impervious 18%
NRCS runoff curve 63
Peak rates 0.36 cfs @ 12.86 hrs, depth> 1.31"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 6
Time of concentration (Tc) 6 minutes
Percent impervious 8%
NRCS runoff curve 59
Peak rates 0.85 cfs @ 12.46 hrs, depth> 1.05"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 6A
Time of concentration (Tc) 48.8 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 1.98 cfs @ 12.80 hrs, depth> 0.82"
Hydrograph routing – See Appendix K

2.3.4 25 Year Storm

Pre-Construction

Description Basin A
Time of concentration (Tc) 33.2 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 10.18 cfs @ 12.54 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Pre-Construction

Description Basin B
Time of concentration (Tc) 28.7 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 10.92 cfs @ 12.47 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Pre-Construction

Description Basin C
Time of concentration (Tc) 9.6 minutes
Percent impervious 0%
NRCS runoff curve 65
Peak rates 9.93 cfs @ 12.58 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Pre-Construction

Description Basin D
Time of concentration (Tc) 74.6 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 3.43 cfs @ 13.14 hrs, depth> 1.21"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 1
Time of concentration (Tc) 6 minutes
Percent impervious 14%
NRCS runoff curve 61
Peak rates 0.27 cfs @ 13.01 hrs, depth> 1.66"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2
Time of concentration (Tc) 6 minutes
Percent impervious 36%
NRCS runoff curve 68
Peak rates 0.76 cfs @ 13.22 hrs, depth> 2.19"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2A
Time of concentration (Tc) 17.4 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 4.33 cfs @ 12.28 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2B
Time of concentration (Tc) 27.2 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 2.65 cfs @ 12.45 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2C
Time of concentration (Tc) 6 minutes
Percent impervious 17%
NRCS runoff curve 62
Peak rates 1.84 cfs @ 12.64 hrs, depth> 1.70"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3
Time of concentration (Tc) 6 minutes
Percent impervious 0%
NRCS runoff curve 58
Peak rates 0.69 cfs @ 12.57 hrs, depth> 1.44"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3A
Time of concentration (Tc) 35.9 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 8.65 cfs @ 12.58 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3B
Time of concentration (Tc) 43.7 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 1.49 cfs @ 12.69 hrs, depth> 1.22"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 4
Time of concentration (Tc) 6 minutes
Percent impervious 21%
NRCS runoff curve 64
Peak rates 0.36 cfs @ 13.02 hrs, depth> 1.90"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 4A
Time of concentration (Tc) 28.9 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 7.45 cfs @ 12.47 hrs, depth> 1.23"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 5
Time of concentration (Tc) 6 minutes
Percent impervious 18%
NRCS runoff curve 63
Peak rates 0.96 cfs @ 12.51 hrs, depth> 1.82"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 6
Time of concentration (Tc) 6 minutes
Percent impervious 8%
NRCS runoff curve 59
Peak rates 1.29 cfs @ 12.44 hrs, depth> 1.51"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 6A
Time of concentration (Tc) 48.8 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 3.24 cfs @ 12.76 hrs, depth> 1.22"
Hydrograph routing – See Appendix K

2.3.5 100 Year Storm

Pre-Construction

Description Basin A
Time of concentration (Tc) 33.2 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 18.98 cfs @ 12.51 hrs, depth> 2.10"
Hydrograph routing – See Appendix K

Pre-Construction

Description Basin B
Time of concentration (Tc) 28.7 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 20.36 cfs @ 12.44 hrs, depth> 2.11"
Hydrograph routing – See Appendix K

Pre-Construction

Description Basin C
Time of concentration (Tc) 9.6 minutes
Percent impervious 0%
NRCS runoff curve 65
Peak rates 18.51 cfs @ 12.55 hrs, depth> 2.10"
Hydrograph routing – See Appendix K

Pre-Construction

Description Basin D
Time of concentration (Tc) 74.6 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 6.51 cfs @ 13.08 hrs, depth> 2.08"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 1
Time of concentration (Tc) 6 minutes
Percent impervious 14%
NRCS runoff curve 61
Peak rates 0.43 cfs @ 12.98 hrs, depth> 2.68"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2
Time of concentration (Tc) 6 minutes
Percent impervious 36%
NRCS runoff curve 68
Peak rates 1.93 cfs @ 12.52 hrs, depth> 3.30"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2A
Time of concentration (Tc) 17.4 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 8.18 cfs @ 12.26 hrs, depth> 2.11"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2B
Time of concentration (Tc) 27.2 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 4.95 cfs @ 12.42 hrs, depth> 2.11"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 2C
Time of concentration (Tc) 6 minutes
Percent impervious 17%
NRCS runoff curve 62
Peak rates 3.22 cfs @ 12.40 hrs, depth> 2.71"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3
Time of concentration (Tc) 6 minutes
Percent impervious 0%
NRCS runoff curve 58
Peak rates 1.53 cfs @ 12.48 hrs, depth> 2.39"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3A
Time of concentration (Tc) 35.9 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 16.13 cfs @ 12.55 hrs, depth> 2.10"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 3B
Time of concentration (Tc) 43.7 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 2.78 cfs @ 12.66 hrs, depth> 2.10"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 4
Time of concentration (Tc) 6 minutes
Percent impervious 21%
NRCS runoff curve 64
Peak rates 1.09 cfs @ 12.54 hrs, depth> 2.98"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 4A
Time of concentration (Tc) 28.9 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 13.90 cfs @ 12.44 hrs, depth> 2.11"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 5
Time of concentration (Tc) 6 minutes
Percent impervious 18%
NRCS runoff curve 63
Peak rates 1.90 cfs @ 12.43 hrs, depth> 2.88"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 6
Time of concentration (Tc) 6 minutes
Percent impervious 8%
NRCS runoff curve 59
Peak rates 2.05 cfs @ 12.44 hrs, depth> 2.49"
Hydrograph routing – See Appendix K

Post-Construction

Description Basin 6A
Time of concentration (Tc) 48.8 minutes
Percent impervious 0%
NRCS runoff curve 55
Peak rates 6.04 cfs @ 12.73 hrs, depth> 2.09"
Hydrograph routing – See Appendix K

2.3.6 Runoff Attenuation Summary

	10 Year	25 Year	100 Year
Pre-Development Total Peak Runoff (cfs):	21.07	34.46	64.36
Post-Development Total Peak Runoff (cfs):	20.58	33.98	64.13
Peak Runoff Reduction (cfs):	0.49	0.48	0.23

Section 3.0
BEST MANAGEMENT PRACTICES

3.0 BEST MANAGEMENT PRACTICES

Soil erosion and sediment controls are measures that are used to reduce the amount of soil particles that are carried from a land area and deposited in receiving waters. This section provides a general description of the most appropriate control measures proposed for the Project. The permittee's construction contractor(s) and their subcontractors will be responsible for amending the erosion and sediment controls in the SWPPP for their portion(s) of the project. Based on field conditions at the time of construction, the contractors or subcontractors may adjust the locations and types of BMPs so that erosion and sedimentation are controlled to the maximum extent practicable. However, in no case will modifications to the SWPPP result in any less stringent erosion and sedimentation control measures than specified herein.

Any revision to the SWPPP will be recorded on the Record of Revisions form. The application of the techniques in the field will be determined by the professional judgment of the permittee's field construction personnel and will depend on site-specific conditions. All applicable soil erosion and sediment control measures will be implemented in accordance with this SWPPP and the Permit prior to commencement of field construction activities. Measures will be maintained during and after the construction activity, until final stabilization of the soil is accomplished. Upon final stabilization of disturbed areas, all temporary soil erosion and sediment control measures will be removed.

3.1 STRUCTURAL CONTROL PRACTICES

Structural control practices divert flows from exposed soils, store water flow, or otherwise limit runoff from exposed areas of the site. Such practices may include silt fences, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, rock outlet protection (rip-rap), reinforced soil retaining systems, and temporary or permanent sediment basins. Some of these practices may be used as both temporary and permanent control measures. Structural control practices should be placed in upland areas to the degree practicable to prevent erosion and reduce sedimentation in lower elevation areas.

3.2 TEMPORARY EROSION CONTROL PRACTICES

Erosion and sediment control measures will be in place prior to the initiation of soil disturbing activities and will be maintained throughout construction. The contractor may need erosion control measures in other locations of the project as work progresses to keep sediment from leaving the construction site. These measures will be determined by the contractor in the field; if measures are changed in the field, the SWPPP must be modified accordingly. All temporary erosion controls will be removed after the protected area is finally stabilized. The minimum temporary erosion and sediment control practices that will be used for the Project are discussed in the following sections.

3.2.1 Sediment Fence (GSF)

Will retain sediment from small disturbed areas. Sediment fence will be placed along slopes as shown on construction details. The contractor will use his best judgment to install additional sediment fence as necessary to prevent loss of sediment. Refer to section 5-11 of 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

Maintenance: Inspect the silt fence at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. When used for dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits, or if room allows, install a second silt fence up slope from the existing fence when deposits reach approximately one half the height of the existing fence. Replace or repair within 24 hours of an observed failure. Refer to Connecticut Guidelines for Soil Erosion and Sediment Control figure GF-5 for troubleshooting failures. Maintain silt fence until the contributing area is stabilized.

3.2.2 Hay Bale Barrier (HB)

Will retain sediment from small disturbed areas. Hay bales will be placed along slopes as shown on construction details. The contractor will use his best judgment to install additional hay bales as necessary to prevent loss of sediment. Refer to section 5-11 of 2002 Connecticut Guidelines for Soil and Sediment Control.

Maintenance: Inspect the hay bale barrier at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. When used for dewatering operations, inspect frequently before, during and after pumping operations. Remove the sediment deposits, or if room allows, install a secondary barrier up slope from the existing barrier when deposits reach approximately one half the height of the barrier. Replace or repair within 24 hours of an observed failure. Refer to Connecticut Guidelines for Soil Erosion and Sediment Control figure HB-5 for troubleshooting failures. Maintain hay bale barrier until the contributing area is stabilized.

3.2.3 Stone Check Dam (SCD)

Will be used to reduce velocity of concentrated flows, thus reducing of the drainage way.

Maintenance: Inspect the stone check dam at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Remove the sediment deposits when deposits reach approximately one half the height of the check dam. Replace or repair within 24 hours of an observed failure. Maintain until the contributing area is stabilized.

3.2.4 Temporary Pipe Slope Drain (TSD)

Will be used to carry water over excessive changes in grade. TSD's will convey concentrated stormwater runoff flows without causing erosion problems either on or at the toe of the slope.

Maintenance: Inspect the temporary pipe slope drain at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Repair damage as necessary. Avoid the placement of any material on the top of the pipe and prevent vehicular traffic from crossing the slope drain.

3.2.5 Temporary Diversion (TD)

Will be used to divert sediment laden runoff from a disturbed area to a sediment trapping facility.

Maintenance: When the temporary diversion is located within close proximity to ongoing construction activities, inspect the diversion at the end of each work day and immediately repair damage caused by construction equipment. Otherwise, inspect the temporary diversion and associated measures at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Repair within 24 hours of an observed failure.

3.2.6 Temporary Fill Berm (TFB)

Will be used to divert runoff from unprotected fill slopes during construction to a stabilized outlet or sediment trapping facility.

Maintenance: Inspect the temporary fill berm and associated controls at the end of each work day to ensure the criteria for installing the measures have been met. Determine if repair or modification is needed. This measure is temporary and under most situations will be covered the next work day. Maintenance requirements should be minimal. The contractor should avoid placing other material over the berm and construction traffic should not be allowed to cross.

3.2.7 Temporary Sediment Trap (TST)

Will be used to detain sediment laden runoff from small disturbed areas long enough to allow the majority of sediment to settle out.

Maintenance: Inspect the temporary sediment trap and associated controls at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Check the outlet to verify that it is structurally sound and has not been damaged by erosion or construction equipment. The height of the stone outlet should be maintained at least 1 foot below the crest of the embankment. When sediment has accumulated more than one quarter of the minimum wet storage volume, dewater and remove sediment as necessary to restore the trap to its original dimensions.

3.2.8 Construction Entrance (CE)

Will be used to reduce tracking of sediment off site to paved areas.

Maintenance: Maintain the entrance in a condition which will prevent tracking and washing of sediment onto paved surfaces. Provide periodic top dressing with additional stone or additional length as required. Immediately remove all sediment spilled, dropped, washed or tracked onto paved surfaces.

3.2.9 Tree Protection (TP)

Will be used to ensure the survival of existing desirable trees for their effectiveness in soil erosion and sediment control during construction.

Maintenance: Inspect tree protection zones weekly during site construction for damage to the tree crown, trunk and root system. When trees have been damaged or the protection zone has been compromised, consult an arborist licensed in CT to determine how damage should be addressed.

3.2.10 Temporary Erosion Control Blankets (ECB)

Will be used to provide temporary surface protection to disturbed soils to absorb raindrop impact and to reduce sheet and rill erosion.

Maintenance: Inspect temporary erosion control blankets at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inches or greater to determine maintenance needs. Repair any dislodged or failed blankets immediately.

3.3 SOIL STABILIZATION PRACTICES

Soil stabilization involves covering disturbed soils with grass, mulch, straw, geotextiles, trees, vines, or shrubs. Stabilization practices for exposed disturbed soils are extremely important while conducting construction activities. Vegetative cover serves to reduce the erosion potential by absorbing the energy of raindrops, promoting infiltration in lieu of runoff, and reducing the velocity of runoff. Stabilization measures shall be initiated as soon as practicable, but no more than 14 days after construction activities have temporarily or permanently ceased on any portion of the site.

3.4 MAINTENANCE AND INSPECTIONS

All erosion and sediment control devices shall be installed pursuant to the specifications in the construction details. They will be maintained so that they remain effective at all times.

Erosion and sediment control devices will be inspected by qualified personnel at least once every seven calendar days or at least once every 14 calendar days and within 24 hours of each 0.1-inch or greater rainfall event. During each inspection, the construction inspector will complete the Inspection and Maintenance Report Form located in the appendix. This form will be copied and used as necessary. Ineffective temporary erosion control measures will be repaired or replaced before the next storm event or as soon as practicable. The permittee will immediately install additional temporary erosion control devices in any area deemed in need of protection.

Following temporary or final stabilization, inspections must be conducted at least once a month. If construction has been halted due to frozen conditions, regular inspections are not mandatory until one month before the expected thaw. If vegetation establishment is not satisfactory, special steps to correct the problem will be implemented such as over seeding, mulching, sodding, or the use of erosion control blankets. Once a definable area of the construction site has been finally stabilized, no further inspection requirements apply to that area.

3.5 FINAL STABILIZATION

3.5.1 Seeding

The contractor will be responsible for labor, materials, tools, equipment, and other related items required for preparing ground, providing for sowing of seeds, fertilizing, mulching and top dressing, and other management practices required for erosion control and to achieve final stabilization. It will be the contractor's responsibility to make sure that the soil seedbed is not blown, washed, or otherwise removed from the site. The contractor will make repairs (including replacement of lost topsoil and mulch) to the seedbed preparation site in the event of heavy rain,

wind, or other natural events that cause damage. When practicable, native plant species should be used for landscaping.

3.5.2 Fertilizer

Soil in areas of disturbance may need supplementation from fertilizer. Soil tests may be necessary to determine the most appropriate fertilizer for each location. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Fertilizer spills will be cleaned up immediately and will not be applied along or in a waterway.

3.5.3 Mulching

Mulching will be used in conjunction with both temporary and permanent seeding practices to enhance success by providing erosion protection prior to the onset of vegetative growth. Mulches enhance plant establishment by moderating soil temperatures and conserving moisture. After seeding, straw or hay mulch will be applied at a rate of two to three tons per acre on the disturbed areas. Other forms of mulch will be applied at a rate designated by the Project Engineer. Mulch will not be applied in wetlands, on lawns, and areas where hydro-mulch is used. Mulch will be anchored immediately after placement on steep slopes and stream banks. Mulch will be held in place by a very thin covering of topsoil, small brush, pins, stakes, wire mesh, asphalt binder, or other adhesive material approved by the project engineer.

3.5.4 Topsoiling

Topsoil should be applied in areas where the subsoil or existing surface soil does not provide an adequate growth medium for the desired vegetation, where soil is too shallow to provide adequate rooting depth, or where the soil contains substances toxic to the desired vegetation. Topsoil shall be reasonably free from subsoil and stumps, roots, brush, stones, and clay lumps or similar objects.

3.5.5 Temporary Control Removal

Temporary erosion controls will be left in place until the Project site is stabilized with a uniform vegetative cover of 70 percent density of the native background vegetative cover on all unpaved areas. Following re-vegetation, the permittee will conduct periodic site visits to make sure that vegetation establishment is satisfactory. If sufficient vegetative cover has not been achieved, additional restoration measures will be implemented. Inspection results will be documented using the Inspection and Maintenance Report Form found in the appendix. All temporary soil erosion and sediment control measures will be removed and disposed of after final site stabilization is achieved and before submitting the NOT.

Section 4.0
GOOD HOUSEKEEPING BMP'S

4.0 GOOD HOUSKEEPING BMP'S

4.1 POTENTIAL SOURCES OF POLLUTION

Potential exists for construction sediment to be contained in any runoff that occurs on the project site. This sediment is a result of clearing and grading activities.

4.2 CONTROLS TO REDUCE POLLUTION FROM THE CONSTRUCTION SITE

Minimize Disturbed Area, Protect Natural Features, and Soil:

This project will not be mass graded. Only areas required for construction activities will be graded. This practice will reduce sediment transport into receiving bodies.

4.2.1 Material Handling and Waste Management

The contractor will establish control measures to prevent discharge and dispose of construction and sanitary waste on site.

4.2.2 Establish Proper Building Material Staging Areas

The contractor will establish a permanent staging area within the project site for materials and equipment storage.

4.2.3 Allowable Non-Stormwater Discharge Management

Non-stormwater discharges are allowable provided the non-stormwater component of the discharge is in compliance applicable state regulation. Prior to any non-storm discharge, the appropriate BMP will be installed and inspected.

4.2.4 Maintenance of Controls

All erosion and sediment control practices will be checked for stability and operation following every runoff-producing rainfall, but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed.

All sediment control features shall be maintained until final stabilization has been obtained.

Contractor will maintain appropriate recording keepings as required by DEP-PED-GP-015. Maintenance records shall describe repair, replacement, and maintenance of BMPs undertaken based on the inspections and maintenance procedures described above and the individual requirements of the BMPs. Actions related to the findings of inspections should reference the specific inspection report. Records should describe actions taken, dates completed, and note the party that completed the work.

During construction the contractor will be responsible for maintaining integrity of all permanent and temporary structures. Prior to submittal of NOT, the contractor and owner will inspect permanent structures to remain in place and correct all noted deficiencies. Upon acceptance from contractor, the owner will maintain responsibility for inspection of the structure semi-annually.

Section 5.0
HAZARDOUS SUBSTANCE OR OIL SPILL REPORTING

5.0 HAZARDOUS SUBSTANCE OR OIL SPILL REPORTING

The Spill Prevention Control and Countermeasure Plan (SPCC) describes measures to prevent, control, and minimize impacts from a spill of a hazardous, toxic, or petroleum substance during construction of the proposed project. This SPCC plan identifies the potentially hazardous materials to be used during this project, describes the transport, storage, and disposal procedures for these substances, and outlines the procedures to be followed in the event of a spill of a contaminating or toxic substance.

As per 40 CFR 112, a Spill Prevention Control and Countermeasures Plan (SPCC) must be prepared if the construction site will have 1,320 gallons of above ground storage capacity (or 42,000 gallons in underground storage not regulated by UST rules) or more in 55-gallon-sized (or larger) containers. This would include any temporary tanks or fueling trucks used to “store” petroleum on-site. The truck would be subject to the SPCC Plan rules when parked on the construction site and used for “storage.” If, at any time, a subcontractor’s cumulative above ground storage capacity on-site exceeds 1,320 gallons, the subcontractor shall maintain a certified SPCC Plan (40 CFR 112).

5.1 MATERIAL MANAGEMENT PRACTICES

Properly managing materials on the construction site will greatly reduce the potential for stormwater pollution of materials. Good housekeeping, along with proper use and storage of construction materials, form the basis for proper management of potentially hazardous materials.

5.2 NON-PETROLEUM PRODUCTS

Due to the chemical makeup of specific products, certain handling and storage procedures are required to promote the safety of handlers and prevent the possibility of pollution. Care shall be taken to follow all directions and warnings for products used on the site. All pertinent information can be found on the MSDS for each product. The MSDS will be kept on-site.

5.3 PETROLEUM PRODUCTS

On-site vehicles will be monitored for leaks and receive regular maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Preferably, the containers will be stored in a covered truck or trailer that provides secondary containment for the products. Bulk storage tanks having a capacity of greater than 55 gallons will be provided with secondary containment. Containment can be provided by a temporary earthen berm or other means. After each rainfall event, the contractor shall inspect the contents of the secondary containment area for excess water. If no sheen is visible, the collected water can be pumped to the ground in a manner that does not cause scouring. If any sheen is present, it must be treated prior to discharging the water. Otherwise, the contaminated water must be transported and disposed off-site in accordance with local, state, and federal requirements. Bulk fuel or lubricating oil dispensers shall not have a self-locking mechanism that allows for unsupervised fueling. Fueling operations shall be observed to immediately detect and contain spills. No waste oil or other petroleum-based products will be disposed of on-site (e.g., buried, poured, etc.), but shall be taken off-site for proper disposal.

5.4 SPILL CONTROL AND CLEAN UP

In addition to the material management practices discussed previously, the following spill control and cleanup practices will be adhered to prevent stormwater pollution in the event of a spill:

- Personnel on-site will be made aware of cleanup procedures and the location of spill cleanup.
- Equipment spills will be contained and cleaned up immediately after discovery.
- Manufacturer methods for spill cleanup of a material will be followed as described on the material's MSDS.
- Materials and equipment needed for cleanup procedures will be kept readily available on the site, either at an equipment storage area or on contractor's trucks; equipment to be kept on the site will include, but not be limited to, brooms, dust pans, shovels, granular absorbents, sand, saw dust, absorbent pads and booms, plastic and metal trash containers, gloves, and goggles.
- Toxic, hazardous or petroleum product spills required to be reported by regulation will be documented to the appropriate federal, state, and local agencies.
- Spills will be documented and a record of the spills will be kept with this SWPPP.

The federal reportable spill quantity for petroleum products is defined in 40 CFR 110 as any oil spill that:

- violates applicable water quality standards;
- causes a film or sheen upon or discoloration of the water surface or adjoining shoreline; or
- causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

**Section 6.0
SWPPP APPENDICES**

6.0 SWPPP APPENDICES

Attach the following documentation to the SWPPP in the following appendices.

Appendix A – Permit Coverage

- Submitted General Permit Registration Form and Transmittal
- Issued CT Letter of Coverage
- Other applicable permits

Appendix B – Certifications

- Preparer
- Permittee or Co-Permittee
- Operator
- Inspector

Appendix C – Pre-Construction Meeting – Items to be added upon completion of meeting includes:

- Agenda
- Attendees
- Minutes

Appendix D – Maps and Drawings

- Site Maps
- Site Plan

Appendix E – Construction Records

- Construction Activities and Control Installation Log

Appendix F – Inspection and Maintenance Records

- Inspection & Maintenance Log
- Inspection Report
- Maintenance Report

Appendix G – Hazardous Material or Oil Spill Records

- Spill Report

Appendix H – Update Records

- Plan Update Description
- Plan Update Log

Appendix I – Copy of CT DEP Notice of Termination (Form DHEC 2610, 04/1998)

Appendix J – Connecticut General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities (DEP-PED-GP-015)

Appendix K – Supporting Calculations

**APPENDIX A
PERMIT COVERAGE**



General Permit Registration Form for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Please complete this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your registration. Print or type unless otherwise noted. You must submit the *Permit Application Transmittal Form* (DEP-APP-001) and the registration fee along with this form.

DEP USE ONLY
Application No. _____
Permit No. _____
Facility I.D. _____

Part I: Registration Type

Enter a check mark in the appropriate box identifying the registration type.

This registration is for (check one): <input type="checkbox"/> A <i>new</i> general permit registration <input type="checkbox"/> A <i>modification</i> of an existing general permit	Please identify any existing permit number in the space provided: Existing permit number: GSN
--	--

Part II: Fee Information

<input type="checkbox"/> Registration only	A registration fee of \$625.00 is to be submitted with <i>each</i> registration that you are submitting at least 30 days before the initiation of construction activities.
<input type="checkbox"/> Registration and Plan Review	All construction projects that result in the disturbance of ten or more acres require the submittal of a Stormwater Pollution Control Plan and a \$625.00 plan review fee. The plan and the fee must be submitted 30 days prior to initiation of the construction activity. \$625.00 registration fee + \$625.00 review fee = \$1,250.00 total fee
For municipalities, a 50% discount applies. The registration will not be processed without the fee. The fee shall be non-refundable and shall be paid by certified check or money order payable to the Department of Environmental Protection.	

Part III: Registrant Information

1. Fill in the name of the registrant(s) as indicated on the <i>Permit Application Transmittal Form</i> (DEP-APP-001): Registrant: Phone: _____ ext. _____ Fax: _____
<input type="checkbox"/> Check here if there are co-registrants. If so, label and attach additional sheet(s) with the required information as supplied above.

Part III: Registrant Information (cont.)

2. List primary contact for departmental correspondence and inquiries, if different than the registrant.			
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	
Business Phone:	ext.	Fax:	
Site Phone:	Emergency Phone:		
Contact Person:	Title:		
Association (e.g. developer, general or site contractor, etc.):			
3. List owner of the property on which the activity will take place, if different from registrant:			
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	
Business Phone:	ext.	Fax:	
Contact Person:	Title:		
4. List developer, if different from registrant or primary contact:			
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	
Business Phone:	ext.	Fax:	
Contact Person:	Title:		
5. Name and address of general contractor:			
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	
Business Phone:	ext.	Fax:	
Site Phone:	Off-hours Phone:		
Contact Person:	Title:		
6. List any engineer(s) or other consultant(s) employed or retained to assist in preparing the registration and Stormwater Pollution Plan.			
<input type="checkbox"/> Check here if additional sheets are necessary, and label and attach them to this sheet.			
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	
Business Phone:	ext.	Fax:	
Contact Person:	Title:		
Service Provided:			

Part IV: Site Information

1. Site or Project Name (if any):			
Street Address or Description of Location:			
City/Town:	State:	Zip Code:	
2. Brief description of construction activity:			
3. Start Date:	Anticipated Completion Date:		
4. Estimated total number of acres to be disturbed:			

Part V: Stormwater Discharge Information

1. Where does stormwater discharge to:	
<input type="checkbox"/> Municipal Separate Storm System?	<input type="checkbox"/> Yes <input type="checkbox"/> No (Name):
<input type="checkbox"/> Surface water body or wetlands?	<input type="checkbox"/> Yes <input type="checkbox"/> No (Name):
2. Is the discharge located less than 500 feet from a tidal wetland, which is not a fresh-tidal wetland?	
<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Name of the watershed where the site is located OR nearest waterbody to which it discharges:	
4. Is construction in accordance with the Guidelines established under Section 22a-329 of the Soil Erosion and Sedimentation Act? <input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Is construction in accordance with local soil erosion and sediment ordinances? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Note: A copy of this registration and the Stormwater Pollution Control Plan must be available to the town wetlands enforcement officials, wetlands commission, or their equivalent.	
6. Will the construction project disturb over ten acres? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, enclose a copy of the Stormwater Pollution Control Plan and plan review fee.	
7. Has the construction project been reviewed for compliance with the following DEP programs?	
a. Coastal Management Act (Section 22a-92 of the Connecticut General Statutes)	<input type="checkbox"/> Yes <input type="checkbox"/> No
b. Endangered and Threatened Species (Section 26-306 of the Connecticut General Statutes)	<input type="checkbox"/> Yes <input type="checkbox"/> No
c. State and Federal Historic Preservation statutes?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Part VI: Supporting Documents

Check the box by the attachments being submitted as verification that *all* applicable attachments have been submitted with this registration form. When submitting any supporting documents, please label the documents as indicated in this part (e.g., Attachment A, etc.) and be sure to include the registrant's name as indicated on the *Permit Application Transmittal Form*.

<input type="checkbox"/>	Attachment A:	An 8 1/2" x 11" copy of the relevant portion or a full-sized original of a USGS Quadrangle Map indicating the exact location of the facility or site. Indicate the quadrangle name on the map. (To obtain a copy of the relevant USGS Quadrangle Map, call your town hall or DEP Maps and Publications Sales at 860-424-3555.)
<input type="checkbox"/>	Attachment B:	A copy of the Stormwater Pollution Control Plan and plan review fee of \$500.00, if the construction project disturbs over 10 acres

Part VII: Environmental Professional Certification

The following certification must be signed by a professional engineer, licensed to practice in Connecticut.

<p>"I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements."</p>	
Signature of Professional Engineer	Date
Name of Professional Engineer (print or type)	P. E. Number (if applicable)
<p>Affix P. E. Stamp Here</p> <div style="border: 1px solid black; width: 150px; height: 100px; margin: 0 auto;"></div>	

Part VIII: Registrant Certification

The registrant *and* the individual(s) responsible for actually preparing the registration must sign this part. A registration will be considered incomplete unless all required signatures are provided.

<p>"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I certify that this general permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with section 22a-6 of the Connecticut General Statutes, pursuant to section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute.</p> <p>I also certify under penalty of law that I have read and understand all conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, that all conditions for eligibility for authorization under the general permit are met, all terms and conditions of the general permit are being met for all discharges which have been initiated and are the subject of this registration, and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowingly making false statements."</p>	
<p>_____ Signature of Registrant</p>	<p>_____ Date</p>
<p>_____ Name of Registrant (print or type)</p>	<p>_____ Title (if applicable)</p>
<p>_____ Signature of Preparer (if different than above)</p>	<p>_____ Date</p>
<p>_____ Name of Preparer (print or type)</p>	<p>_____ Title (if applicable)</p>
<p><input type="checkbox"/> Check here if additional signatures are necessary. If so, please reproduce this sheet and attach signed copies to this sheet.</p>	

Note: Please submit the *Permit Application Transmittal Form*, the Registration Form, Fee(s), and all Supporting Documents to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Note: If discharging to municipal separate storm sewer, send a copy of this completed registration form to the owner or operator of that system.

If discharging to a public drinking water supply watershed or aquifer area, send a copy of this completed registration form to the appropriate water company.



**STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION**
Central Permit Processing Unit
79 Elm Street
Hartford, CT 06106-5127

CPPU USE ONLY	
App #:	_____
Doc #:	_____
Check #:	_____

Permit Application Transmittal Form

Please complete this transmittal form in accordance with the instructions in order to ensure the proper handling of your application(s) and the associated fee(s). Print legibly or type.

Part I: Applicant Information:

- **If an applicant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of State. If applicable, applicant's name shall be stated **exactly** as it is registered with the Secretary of State.*
- *If an applicant is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).*

Applicant:					
Mailing Address:					
City/Town:	State:	Zip Code:			
Business Phone:	ext.:	Fax:			
Contact Person:	Phone:		ext.		
E-Mail:					
Applicant (check one): <input type="checkbox"/> individual <input type="checkbox"/> *company <input type="checkbox"/> federal gov't <input type="checkbox"/> state agency <input type="checkbox"/> municipality					
*If a company, list company type (e.g., corporation, limited partnership, etc.):					
<input type="checkbox"/> Check if any co-applicants. If so, attach additional sheet(s) with the required information as supplied above.					
Please provide the following information to be used for <i>billing purposes only</i> , if different:					
Company/Individual Name:					
Mailing Address:					
City/Town:	State:	Zip Code:			
Contact Person:	Phone:		ext.		

Part II: Project Information

Brief Description of Project: <i>(Example: Development of a 50 slip marina on Long Island Sound)</i>					
Location (City/Town):					
Other Project Related Permits <i>(not included with this form)</i> :					
Permit Description	Issuing Authority	Submittal Date	Issuance Date	Denial Date	Permit #

Part III: Individual Permit Application and Fee Information

New, Mod. or Renew	Individual Permit Applications	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
	AIR EMISSIONS				
	New Source Review	\$940.00			1 + 0
	Title V Operating Permits	none			1 + 0
	Title IV	none			1 + 0
	Clean Air Interstate Rule (CAIR)	none			1 + 0
	WATER DISCHARGES				
	To Groundwater	\$1300.00			1 + 1
	To Sanitary Sewer (POTW)	\$1300.00			1 + 1
	To Surface Water (NPDES)	\$1300.00			1 + 2
	INLAND WATER RESOURCES-multiple permits 1 + 6 total copies				
	Dam Construction	none			1 + 2
	Flood Management Certification	none			1 + 1
	Inland 401 Water Quality Certification	none			1 + 5
	Inland Wetlands and Watercourses	none			
	Stream Channel Encroachment Lines	★			1 + 5
	Water Diversion	★			
	OFFICE OF LONG ISLAND SOUND PROGRAMS				
	Certificate of Permission	\$375.00			1 + 3
	Coastal 401 Water Quality Certification	none			1 + 3
	Structures and Dredging/Tidal Wetlands	\$660.00			1 + 3
	WASTE MANAGEMENT				
	Aerial Pesticide Application	★			1 + 2
	Aquatic Pesticide Application	\$200.00			1 + 0
	CGS Section 22a-454 Waste Facilities	★			1 + 1
	Hazardous Waste Treatment, Storage and Disposal Facilities	★			1 + 1
	Marine Terminal License	\$125.00			1 + 0
	Stewardship	\$4000.00			1 + 1
	Solid Waste Facilities	★			1 + 1
	Waste Transportation	★			1 + 0
	Subtotal ➡				
	GENERAL PERMITS and AUTHORIZATIONS				
	Subtotals Page 3 ➡				
	Enter subtotals from Part IV, pages 3 & 4 & 5 of this form Subtotals Page 4 ➡				
	Subtotals Page 5 ➡				
	TOTAL ➡				
	<input type="checkbox"/> Indicate whether municipal discount or state waiver applies. Less Applicable Discount ➡				
	AMOUNT REMITTED ➡				
	Check # ➡ <input style="width: 100px; height: 20px;" type="text"/>				
	Check or money order should be made payable to: "Department of Environmental Protection"				

★ See fee schedule on individual application.

**Part IV: General Permit Registrations and Requests for Other Authorizations
Application and Fee Information**

✓ General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fees	Original + Required Copies
AIR EMISSIONS				
<input type="checkbox"/> Limit Potential to Emit from Major Stationary Sources of Air Pollution	\$5000.00			1 + 0
<input type="checkbox"/> Ionizing Radiation Registration	\$200.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
WATER DISCHARGES				
<input type="checkbox"/> Domestic Sewage	\$500.00			1 + 0
<input type="checkbox"/> Food Processing Wastewater	\$500.00			1 + 0
<input type="checkbox"/> Groundwater Remediation Wastewater to a Sanitary Sewer	\$500.00			1 + 0
<input type="checkbox"/> Groundwater Remediation Wastewater to a Surface Water Registration Only	\$625.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEP	\$1250.00			
<input type="checkbox"/> Hydrostatic Pressure Testing Wastewater Registration Only	\$625.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEP (natural gas pipelines)	\$1250.00			
<input type="checkbox"/> Miscellaneous Discharges of Sewer Compatible Wastewater Flow < 5,000 gpd and fire sprinkler system testwater	\$500.00			1 + 1
<input type="checkbox"/> Flow > 5,000 gpd	\$1000.00			
<input type="checkbox"/> Non-Contact Cooling and Heat Pump Water (Minor)	\$625.00			1 + 1
<input type="checkbox"/> Photographic Processing Wastewater (Minor)	\$100.00			1 + 0
<input type="checkbox"/> Printing & Publishing Wastewater (Minor) Flow < 40 gpd	\$500.00 \$100.00			1 + 0
<input type="checkbox"/> Stormwater Associated with Commercial Activities	\$500.00			1 + 0
<input type="checkbox"/> Stormwater Associated with Industrial Activities	\$500.00			1 + 0
<input type="checkbox"/> Stormwater & Dewatering Wastewaters-Construction Activities 5 - 10 acres	\$625.00			1 + 0
<input type="checkbox"/> > 10 acres	\$1250.00			
<input type="checkbox"/> Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)	\$250.00			1 + 0
<input type="checkbox"/> Swimming Pool Wastewater - Public Pools and Contractors	\$500.00			1 + 0
<input type="checkbox"/> Tumbling or Cleaning of Parts Wastewater (Minor)	\$1000.00			1 + 1
<input type="checkbox"/> Vehicle Maintenance Wastewater Registration Only	\$500.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEP	\$1000.00			
<input type="checkbox"/> Water Treatment Wastewater	\$625.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization - Discharge to POTW	\$1500.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization - Discharge to Surface Water	\$1500.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization - Discharge to Groundwater	\$1500.00			1 + 0
<input type="checkbox"/> Other, (please specify):				
Note: Carry subtotals over to Part III, page 2 of this form.		Subtotal ➡		

★★ Contact the specific permit program for this information (Contact numbers are provided in the instructions).

Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

✓ General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
AQUIFER PROTECTION PROGRAM				
<input type="checkbox"/> Registration for Regulated Activities	\$625.00			1 + 0
<input type="checkbox"/> Permit Application to Add a Regulated Activity	\$1250.00			1 + 0
<input type="checkbox"/> Exemption Application from Registration	\$1250.00			1 + 0
INLAND WATER RESOURCES				
<input type="checkbox"/> Dam Safety Repair and Alteration	\$1000.00			1 + 2
<input type="checkbox"/> Diversion of Water for Consumptive Use: Reauthorization Categories	\$1000.00			1 + 2
<input type="checkbox"/> Diversion of Water for Consumptive Use: Authorization Required	\$2500.00			1 + 5
<input type="checkbox"/> Diversion of Water for Consumptive Use: Filing Only	\$1500.00			1 + 4
<input type="checkbox"/> Habitat Conservation	\$1000.00			1 + 2
<input type="checkbox"/> Lake, Pond and Basin Dredging	\$1000.00			1 + 2
<input type="checkbox"/> Minor Grading	\$1000.00			1 + 2
<input type="checkbox"/> Minor Structures	\$1000.00			1 + 2
<input type="checkbox"/> Utilities and Drainage	\$1000.00			1 + 2
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
OFFICE OF LONG ISLAND SOUND PROGRAMS				
<input type="checkbox"/> 4/40 Docks	\$700.00			1 + 1
<input type="checkbox"/> Beach Grading	\$100.00			1 + 1
<input type="checkbox"/> Coastal Remedial Activities Required by Order	\$700.00			1 + 1
<input type="checkbox"/> Marina and Mooring Field Reconfiguration	\$700.00			1 + 1
<input type="checkbox"/> Non-harbor Moorings	\$100.00			1 + 1
<input type="checkbox"/> Osprey Platforms and Perch Poles	none			1 + 1
<input type="checkbox"/> Pump-out Facilities (no fee for Clean Vessel Act grant recipients)	\$100.00			1 + 1
<input type="checkbox"/> Removal of Derelict Structures	\$100.00			1 + 1
<input type="checkbox"/> Residential Flood Hazard Mitigation	\$100.00			1 + 1
<input type="checkbox"/> Swim Floats	\$100.00			1 + 1
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
Note: Carry subtotals over to Part III, page 2 of this form.		Subtotal		

★ See fee schedule on registration/application.

★★ Contact the specific permit program for this information.

Part IV: General Permit Registrations and Requests for Other Authorizations (continued)

<input checked="" type="checkbox"/> General Permits and Other Authorizations	Initial Fees	No. of Permits Applied For	Total Initial Fee	Original + Required Copies
WASTE MANAGEMENT				
<input type="checkbox"/> Addition of Grass Clippings at Registered Leaf Composting Facilities	\$500.00			1 + 0
<input type="checkbox"/> Asbestos Disposal Authorization	\$300.00			1 + 0
Certain Recycling Facilities				
<input type="checkbox"/> Drop-site Recycling Facility	\$200.00			1 + 0
<input type="checkbox"/> Limited Processing Recycling Facility	\$500.00			1 + 0
<input type="checkbox"/> Recyclables Transfer Facility	\$500.00			1 + 0
<input type="checkbox"/> Single Item Recycling Facility	\$500.00			1 + 0
Contaminated Soil and/or Staging Management (Staging/Transfer)				
<input type="checkbox"/> Registration Only	\$250.00			1 + 0
<input type="checkbox"/> Approval of Registration by DEP	\$1500.00			1 + 0
<input type="checkbox"/> Connecticut Solid Waste Demonstration Project	\$1000.00			1 + 0
<input type="checkbox"/> Disassembling Used Electronics	\$400.00			1 + 0
<input type="checkbox"/> Leaf Composting Facility	none			1 + 1
<input type="checkbox"/> Municipal Transfer Station	\$800.00			1 + 1
<input type="checkbox"/> One Day Collection of Certain Wastes and Household Hazardous Waste	\$1000.00			1 + 0
<input type="checkbox"/> Special Waste Authorization	\$660.00			1 + 0
<input type="checkbox"/> Storage and Distribution of Two (2) Inch Nominal Tire Chip Aggregate	\$500.00			1 + 0
<input type="checkbox"/> Storage and Processing of Asphalt Roofing Shingle Waste and/or Storage and Distribution of Ground Asphalt Aggregate	★			1 + 0
<input type="checkbox"/> Storage and Processing of Scrap Tires for Beneficial Use	\$1000.00			1 + 0
<input type="checkbox"/> Emergency/Temporary Authorization	★★			★★
<input type="checkbox"/> Other, (please specify):				
REMEDIATION				
<input type="checkbox"/> In Situ Groundwater Remediation: Enhance Aerobic Biodegradation	★			1 + 2
Note: Carry subtotals over to Part III, page 2 of this form.		Subtotal ➡		

★ See fee schedule on registration/application.

★★ Contact the specific permit program for this information.

In conformance with the ADA, individuals with disabilities who need information in an alternative format to allow them to benefit and/or participate in the agency's programs and services, should call 860-424-3051 or 860-418-5937, or e-mail Marcia Z. Bonitto, ADA Coordinator at Marcia.Bonitto@ct.gov.



Applicant Compliance Information

DEP ONLY
App. No. _____
Co./Ind. No. _____

Applicant Name:
(as indicated on the *Permit Application Transmittal Form*)

If you answer *yes* to any of the questions below, you must complete the Table of Enforcement Actions on the reverse side of this sheet as directed in the instructions for your permit application.

- A. During the five years immediately preceding submission of this application, has the applicant been convicted in any jurisdiction of a criminal violation of any environmental law?
- Yes No
- B. During the five years immediately preceding submission of this application, has a civil penalty been imposed upon the applicant in any state, including Connecticut, or federal judicial proceeding for any violation of an environmental law?
- Yes No
- C. During the five years immediately preceding submission of this application, has a civil penalty exceeding five thousand dollars been imposed on the applicant in any state, including Connecticut, or federal administrative proceeding for any violation of an environmental law?
- Yes No
- D. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal court issued any order or entered any judgement to the applicant concerning a violation of any environmental law?
- Yes No
- E. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal administrative agency issued any order to the applicant concerning a violation of any environmental law?
- Yes No

Table of Enforcement Actions

(1) Type of Action	(2a) Date Commenced	(2b) Date Terminated	(3) Jurisdiction	(4) Case/Docket/ Order No.	(5) Description of Violation

Check the box if additional sheets are attached. Copies of this form may be duplicated for additional space.



Applicant Background Information

Please enter a check mark by the entity which best describes the applicant and complete the requested information. **You must choose one of the following.**

Corporation

1.	Parent Corporation				
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Contact Person:	Title:			
2.	Subsidiary Corporation:				
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Contact Person:	Title:			
3.	Directors:				
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.				
4.	Officers:				
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.				

Applicant Background Information (continued)

Limited Liability Company

1.	List each member.
	Name:
	Mailing Address:
	City/Town: State: Zip Code: -
	Business Phone: - - ext. Fax: - -
	Name:
	Mailing Address:
	City/Town: State: Zip Code: -
	Business Phone: - - ext. Fax: - -
	Name:
	Mailing Address:
	City/Town: State: Zip Code: -
	Business Phone: - - ext. Fax: - -
	<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.
2.	List any manager(s) who, through the articles of organization, are vested the management of the business, property and affairs of the limited liability company.
	Name:
	Mailing Address:
	City/Town: State: Zip Code: -
	Business Phone: - - ext. Fax: - -
	Name:
	Mailing Address:
	City/Town: State: Zip Code: -
	Business Phone: - - ext. Fax: - -
	Name:
	Mailing Address:
	City/Town: State: Zip Code: -
	Business Phone: - - ext. Fax: - -
	<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.

Applicant Background Information (continued)

Limited Partnership

1.	General Partners:			
	Name:			
	Mailing Address:			
	City/Town:	State:	Zip Code:	-
	Business Phone:	- -	ext.	Fax: - -
	Name:			
	Mailing Address:			
	City/Town:	State:	Zip Code:	-
	Business Phone:	- -	ext.	Fax: - -
	Name:			
	Mailing Address:			
	City/Town:	State:	Zip Code:	-
	Business Phone:	- -	ext.	Fax: - -
	<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.			
2.	Limited Partners:			
	Name:			
	Mailing Address:			
	City/Town:	State:	Zip Code:	-
	Business Phone:	- -	ext.	Fax: - -
	Name:			
	Mailing Address:			
	City/Town:	State:	Zip Code:	-
	Business Phone:	- -	ext.	Fax: - -
	Name:			
	Mailing Address:			
	City/Town:	State:	Zip Code:	-
	Business Phone:	- -	ext.	Fax: - -
	<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.			

Applicant Background Information (continued)

General Partnership

1.	General Partners:				
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	Name:				
	Mailing Address:				
	City/Town:	State:	Zip Code:	-	
	Business Phone:	- -	ext.	Fax:	- -
	<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.				

Applicant Background Information (continued)

Voluntary Association

1. List authorized persons of association or list all members of association.			
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	-
Business Phone: - -	ext.	Fax: - -	
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	-
Business Phone: - -	ext.	Fax: - -	
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	-
Business Phone: - -	ext.	Fax: - -	
Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	-
Business Phone: - -	ext.	Fax: - -	
<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.			

Individual or Other Business Type

1. Name:			
Mailing Address:			
City/Town:	State:	Zip Code:	-
Business Phone: - -	ext.	Fax: - -	
2. State other names by which the applicant is known, including business names.			
Name:			
<input type="checkbox"/> Please enter a check mark, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information as supplied above.			

**APPENDIX B
CERTIFICATIONS**

PREPARER'S CERTIFICATION

Project:	Wind Colebrook South
Project Location:	29 Flagg Hill Road Colebrook, Connecticut
Permittee:	BNE Energy
	29 South Main Street Town Center Suite 200 West Hartford, CT 06107 (800) 450-0503
Contractor:	To Be Determined
Preparer:	Shane Smith, PE
	Zapata Incorporated 6302 Fairview Road, Suite 600 Charlotte, North Carolina 28210
Phone:	704-358-8240
Fax:	704-358-8342

Certification Statement:

I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Name:	Shane Smith, PE
Company:	Zapata Incorporated
Title:	Civil Engineer
Signature:	
Date:	

CONTRACTOR / CO-PERMITTEE CERTIFICATION

Project:	Wind Colebrook South
Project Location:	29 Flagg Hill Road Colebrook, Connecticut
Contractor:	
Address:	
Phone:	
Fax:	

Certification Statement:

I certify by my signature below that I participated in a pre-construction conference with the individual who is responsible for the operational control of this Stormwater Pollution Prevention Plan (SWPPP). I accept the terms and conditions of this SWPPP as required by the general National Pollutant Discharge Elimination System issued to the Owner/Operator of the construction activity for which I have been contracted to perform construction related professional services. Further, by my signature below, I understand that I am becoming a Co-permittee with the Owner/Operator and other contractors that have become Co-permittees to the general NPDES permit issued to the Owner/Operator of the facility for which I have been contracted to perform professional construction services. As a Co-permittee, I understand that I, and my company, as the case may be, am legally accountable to the Connecticut Department Environmental Protection to ensure compliance with the terms and conditions of this SWPPP. I also understand that DEP enforcement actions may be taken against any specific Co-permittee or combination of Co-permittees if the terms and conditions of this SWPPP are not met. Therefore, having understood the above information, I am signing this certification and am receiving Co-permittee status to the aforementioned general NPDES permit.

Company Official's Signature:

Name: _____ Title: _____
(Please print) (Please print)

Signature: _____ Date: _____

CONTRACTOR / OPERATOR CERTIFICATION

Project:	Wind Colebrook South
Project Location:	29 Flagg Hill Road Colebrook, Connecticut
Contractor:	
Address:	
Phone:	
Fax:	

Certification Statement:

I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I certify that this permit registration is on complete and accurate forms as prescribed by the commissioner without alteration of the text. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Bureau of Materials Management & Compliance Assurance DEP-PED-GP-015 10 of 24 Connecticut General Statutes, and in accordance with any other applicable statute. I also certify under penalty of law that I have read and understand all conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), that all conditions for eligibility for authorization under the general permit are met, all terms and conditions of the general permit are being met for all discharges which have been initiated and are the subject of this registration, and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowingly making false statements.

Corporate Official's Signature:

Name: _____ Title: _____
(Please print) (Please print)

Signature: _____ Date: _____

INSPECTOR CERTIFICATION

Project:	Wind Colebrook South
Project Location:	29 Flagg Hill Road Colebrook, Connecticut
Contractor:	
Address:	
Phone:	
Fax:	

Certification Statement:

I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the site. I further certify, based on such review and in my professional judgment, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the conditions for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities issued on October 1, 2002 (or as reissued or modified), and the controls required for such Plan are appropriate for the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

Inspector's Signature:

Name: _____ Title: _____
(Please print) (Please print)

Signature: _____ Date: _____

**APPENDIX C
PRE-CONSTRUCTION MEETING**

Although a pre-construction meeting is not a requirement for this CGP, a meeting will be conducted. A copy of this documentation should be kept in this appendix.

**APPENDIX D
MAPS AND DRAWINGS**

Stormwater Management Plan with
Stormwater Pollution Prevention Plan (SWPPP)
Wind Colebrook South
Colebrook, Connecticut



Time of Concentration Data

Basin Characteristics

Basin ID	Sheet Flow Length (<300ft)	Upstream Elevation	Downstream Elevation	Sheet Flow Slope	Shallow Concentrated Flow Length (ft)	Upstream Elevation	Downstream Elevation	Shallow Concentrated Flow Slope
Basin 1								
Basin 2								
Basin 2A	217	1320.000	1286.000	16%	N/A	N/A	N/A	
Basin 2B	300	1501	1470.000	10%	275	1470	1423	17%
Basin 2C								
Basin 3								
Basin 3A	300	1501	1480.000	7%	461	1480	1429	11%
Basin 3B	273	1501	1476.000	9%	1041	1476	1430	4%
Basin 4								
Basin 4A	300	1450.000	1396.000	18%	796	1396	1290	13%
Basin 5								
Basin 6								
Basin 6A	300	1450.000	1442.000	3%	286	1442	1430	4%

Basin Characteristics

Basin ID	Sheet Flow Length (<300ft)	Upstream Elevation	Downstream Elevation	Sheet Flow Slope	Shallow Concentrated Flow Length (ft)	Upstream Elevation	Downstream Elevation	Shallow Concentrated Flow Slope
Basin A	300	1501	1466	12%	1002	1466	1290	18%
Basin B	300	1501	1465	12%	367	1465	1418	13%
Basin C	300	1501	1480	7%	461	1480	1429	11%
Basin D	300	1450	1446	1%	428	1446	1424	5%

POST DEVELOPMENT BASIN 1

Cover	Area		Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road/Parking	0.170	0.144	B	N/A	85	12.27
Woods	0.24	0.204	B	Good	55	11.21
Meadow	0.718	0.610	B	Good	58	35.35
Bioretention (Planted Area)	0.05	0.042	B	Good	58	2.44

1.178

61.29 Basin 1 CN
14% % Impervious

POST DEVELOPMENT BASIN 2

Cover	Area		Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road/Parking	0.562	0.336	B	N/A	85	28.57
Building	0.046	0.028	B	N/A	98	2.70
Woods	0	0.000	B	Good	55	0.00
Meadow	0.936	0.560	B	Good	58	32.47
Bioretention (Planted Area)	0.128	0.077	B	Good	58	4.44

1.672

68.18 Basin 2 CN
36% % Impervious

POST DEVELOPMENT BASIN 2A

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road		0.000	B	N/A	85	0.00
Woods	4.984	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention (Planted Area)		0.000	B	Good	58	0.00

Totals 4.984

55.00 Basin 2A CN
0% % Impervious

POST DEVELOPMENT BASIN 2B

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road		0.000	B	N/A	85	0.00
Woods	3.619	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention (Planted Area)		0.000	B	Good	58	0.00

Totals 3.619

55.00 Basin 2B CN
0% % Impervious

POST DEVELOPMENT BASIN 2C

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road	0.602	0.173	B	N/A	85	14.67
Woods	1.025	0.294	B	Good	55	16.16
Meadow	1.812	0.519	B	Good	58	30.12
Bioretention (Planted Area)	0.05	0.014	B	Good	58	0.83

Totals 3.489

61.78 Basin 2C CN
17% % Impervious

POST DEVELOPMENT BASIN 3

Cover	Area		Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road/Parking	0.000	0.000	B	N/A	85	0.00
Woods	0	0.000	B	Good	55	0.00
Meadow	1.784	0.955	B	Good	58	55.36
Bioretention (Planted Area)	0.085	0.045	B	Good	58	2.64

1.869

58.00 Basin 3 CN
0% % Impervious

POST DEVELOPMENT BASIN 3A

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road		0.000	B	N/A	85	0.00
Woods	13.298	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention (Planted Area)		0.000	B	Good	58	0.00

Totals 13.298

55.00 Basin 3A CN
0% % Impervious

POST DEVELOPMENT BASIN 3B

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road		0.000	B	N/A	85	0.00
Woods	2.473	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention (Planted Area)		0.000	B	Good	58	0.00

Totals 2.473

55.00 Basin 3B CN

0% % Impervious

POST DEVELOPMENT BASIN 4

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road/Parking	0.298	0.211	B	N/A	85	17.95
Woods	0	0.000	B	Good	55	0.00
Meadow	1.008	0.714	B	Good	58	41.43
Bioretention (Planted Area)	0.105	0.074	B	Good	58	4.32

1.411

63.70 Basin 4 CN

21% % Impervious

POST DEVELOPMENT BASIN 4A

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road		0.000	B	N/A	85	0.00
Woods	9.615	0.921	B	Good	55	50.63
Meadow	0.83	0.079	B	Good	58	4.61
Bioretention (Planted Area)		0.000	B	Good	58	0.00

Totals

10.445

55.24 Basin 4A CN

0% % Impervious

POST DEVELOPMENT BASIN 5

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road	0.304	0.183	B	N/A	85	15.57
Woods	0	0.000	B	Good	55	0.00
Meadow	1.204	0.725	B	Good	58	42.07
Bioretention (Planted Area)	0.152	0.092	B	Good	58	5.31

1.660

62.94 Basin 5 CN

18% % Impervious

POST DEVELOPMENT BASIN 6

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road	0.166	0.081	B	N/A	85	6.87
Woods	0.633	0.308	B	Good	55	16.92
Meadow	1.189	0.578	B	Good	58	33.52
Bioretention (Planted Area)	0.069	0.034	B	Good	58	1.95

Totals

2.057

59.26 Basin 6 CN

8% % Impervious

POST DEVELOPMENT BASIN 6A

Cover	Area	Percent	Soil Type	Condition	Curve Number	Weighted Curve Number
Gravel Road		0.000	B	N/A	85	0.00
Woods	5.898	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention (Planted Area)		0.000	B	Good	58	0.00

Totals

5.898

55.00 Basin 6A CN

0% % Impervious

SUMMARY

PRE-DEVELOPMENT		POST DEVELOPMENT	
Basin	Area (ac)	Basin	Area (ac)
Basin A	15.176	Basin 1	1.178
Basin B	15.242	Basin 2	1.672
Basin C	15.366	Basin 2A	4.984
Basin C	8.131	Basin 2B	3.619
Total Pre-Development	53.915	Basin 2C	3.489
		Basin 3	1.869
		Basin 3A	13.298
		Basin 3B	2.473
		Basin 4	1.411
		Basin 4A	10.445
		Basin 5	1.660
		Basin 6	2.057
		Basin 6A	5.898
		Total Post Development	54.053

PRE DEVELOPMENT BASIN A

Cover	Area	Percent	Soil Type	Condition	Curve Num	Weighted Curve Number
Gravel Road		0.000	B	N/A	98	0.00
Woods	15.176	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention		0.000	B	Good	98	0.00

Totals 15.176

55.00 Basin 6 CN**PRE DEVELOPMENT BASIN B**

Cover	Area	Percent	Soil Type	Condition	Curve Num	Weighted Curve Number
Gravel Road		0.000	B	N/A	98	0.00
Woods	15.242	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention		0.000	B	Good	98	0.00

15.242

55.00 Basin 4 CN**PRE DEVELOPMENT BASIN C**

Cover	Area	Percent	Soil Type	Condition	Curve Num	Weighted Curve Number
Gravel Road/Parking		0.000	B	N/A	98	0.00
Building		0.000	B	N/A	98	0.00
Woods	15.366	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention		0.000	B	Good	98	0.00

15.366

55.00 Basin 4 CN**PRE DEVELOPMENT BASIN D**

Cover	Area	Percent	Soil Type	Condition	Curve Num	Weighted Curve Number
Gravel Road/Parking		0.000	B	N/A	98	0.00
Woods	8.131	1.000	B	Good	55	55.00
Meadow		0.000	B	Good	58	0.00
Bioretention		0.000	B	Good	98	0.00

8.131

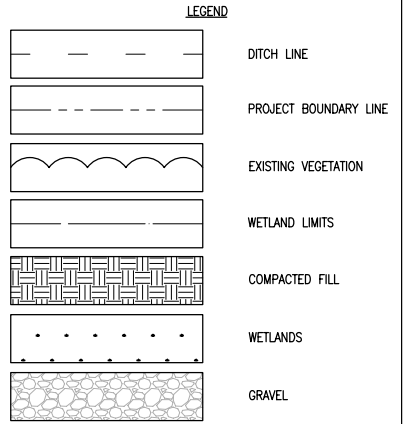
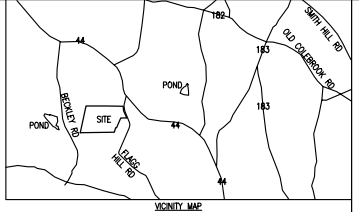
55.00 Basin 4 CN

GENERAL NOTES

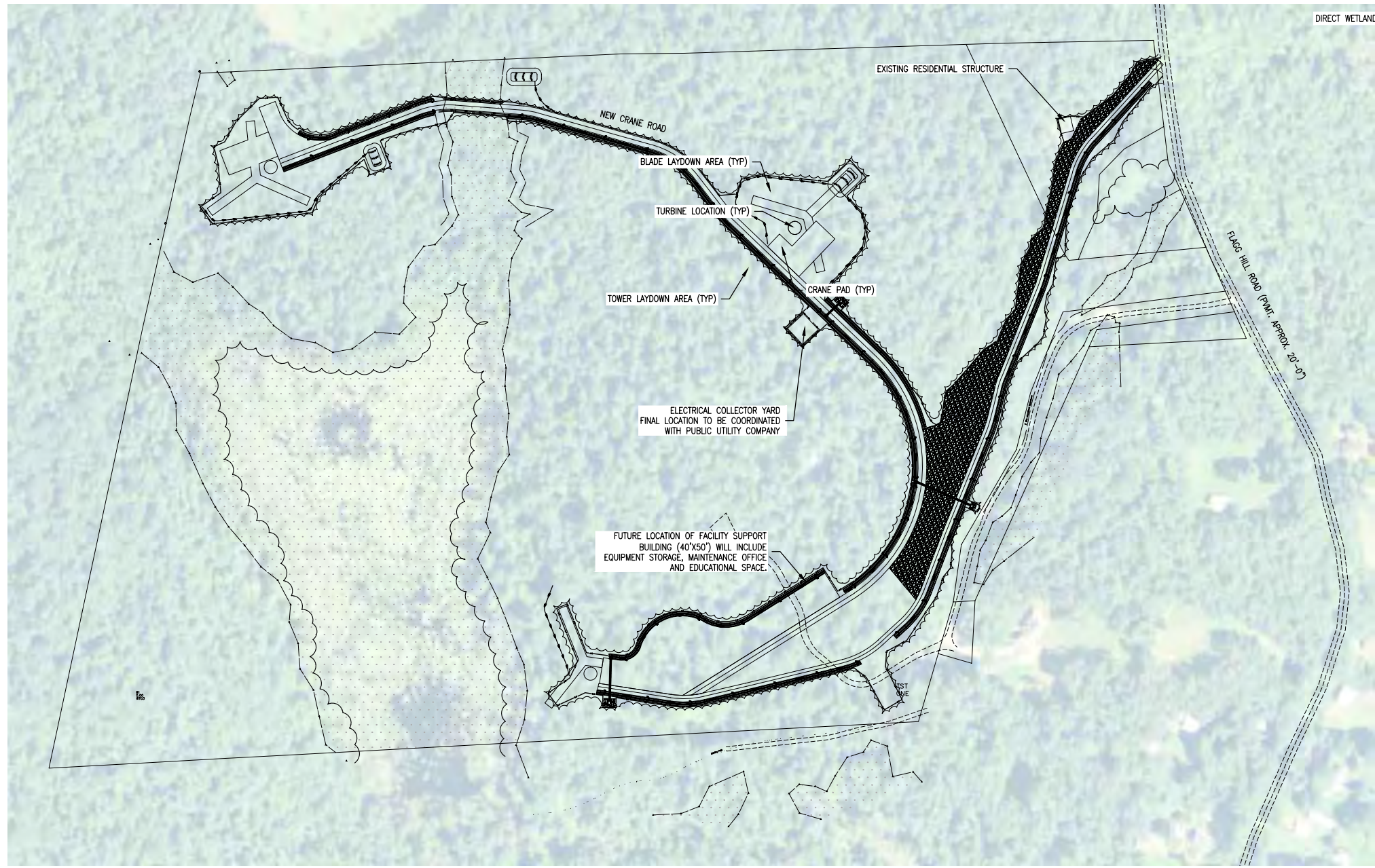
- CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS, LOCAL REQUIREMENTS AND GOVERNMENT REQUIREMENTS.
- AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE SIX INCHES OF TOPSOIL AND SHALL BE SEEDED, UNLESS OTHERWISE NOTED.
- UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS.
- TRAFFIC SIGNAGE AND PAVEMENT MARKINGS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, UNLESS OTHERWISE INDICATED.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE AS SOON AS PRACTICABLE.
- IN THE EVENT THAT SUSPECTED CONTAMINATED SOILS ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, THE CONTRACTOR SHALL STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL, AND SHALL NOTIFY THE OWNER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.
- CONTRACTOR SHALL PREVENT DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE AND SHALL BE RESPONSIBLE FOR CLEANUP, REPAIRS AND CORRECTIVE ACTION IF SUCH OCCURS. CONTRACTOR SHALL DISPOSE OF DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES, AND STATUTES.
- DAMAGE RESULTING FROM CONSTRUCTION LOADS SHALL BE REPAIRED BY THE CONTRACTOR.
- CONTRACTOR SHALL CONTROL STORMWATER RUNOFF DURING CONSTRUCTION TO PREVENT ADVERSE IMPACTS TO OFF SITE AREAS, AND SHALL BE RESPONSIBLE TO REPAIR RESULTING DAMAGES, IF ANY. ALL PAVEMENT, DITCHES, CURB AND GUTTER, UTILITIES, DRIVEWAYS, SIDEWALKS, SIGNS, FENCES, ETC. DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED AND/OR RESTORED.
- ALL ON SITE VEHICLE TRANSPORTATION ROUTES SHALL BE TEMPORARILY STABILIZED WITH STONE IMMEDIATELY AFTER GRADING TO PROVIDE READY ACCESS FOR EMERGENCY VEHICLES TO TRAVEL THROUGH AND AROUND THE CONSTRUCTION SITE DURING BOTH DRY AND WET WEATHER.
- EXCESS EXCAVATION MATERIAL SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE CONTRACTOR OR IN ON SITE AREAS APPROVED BY THE OWNER. NO SPOILS SHALL BE STORED ON SITE BEYOND SUBSTANTIAL COMPLETION.
- DEWATERING SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION AND SEQUENCING OF DEMOLITION AS DESCRIBED BY THESE DOCUMENTS AND SPECIFICATIONS. CONTRACTOR IS TO OBTAIN ALL PERMITS.
- CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF DEMOLITION OR RELOCATION WITH APPLICABLE UTILITY COMPANIES, IE, GAS, CABLE, POWER, TELEPHONE, WATER, SEWER, ETC.
- EQUIPMENT OPERATION, ACTIVITIES, OR PROCESSES PERFORMED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH ALL FEDERAL AND STATE AIR EMISSION AND PERFORMANCE LAWS AND STANDARDS.
- CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL DURING CONSTRUCTION.
- BURNING WILL NOT BE ALLOWED ON THE PROJECT SITE UNLESS AUTHORIZED IN WRITING BY THE OWNER. THE SPECIFIC TIME, LOCATION AND MANNER OF BURNING SHALL BE SUBJECT TO APPROVAL.
- SOLID WASTES (EXCLUDING CLEARING DEBRIS) SHALL BE PLACED IN CONTAINERS WHICH ARE EMPTIED ON A REGULAR SCHEDULE. HANDLING, STORAGE, AND DISPOSAL SHALL BE CONDUCTED TO PREVENT CONTAMINATION. SEGREGATION MEASURES SHALL BE EMPLOYED SO THAT NO HAZARDOUS OR TOXIC WASTE WILL BECOME CO-MINGLED WITH SOLID WASTE. THE CONTRACTOR SHALL TRANSPORT SOLID WASTE OFF SITE AND DISPOSE OF IT IN COMPLIANCE WITH FEDERAL, STATE AND LOCAL REQUIREMENTS FOR SOLID WASTE DISPOSAL. A SUBTITLE D RCRA PERMITTED LANDFILL SHALL BE THE MINIMUM ACCEPTABLE OFFSITE SOLID WASTE DISPOSAL OPTION. THE CONTRACTOR SHALL VERIFY THAT THE SELECTED TRANSPORTERS AND DISPOSAL FACILITIES HAVE THE NECESSARY PERMITS AND LICENSES TO OPERATE. THE CONTRACTOR SHALL COMPLY WITH FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS PERTAINING TO THE USE OF LANDFILL AREAS.
- PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL MARK THE AREAS THAT NEED NOT BE DISTURBED UNDER THIS CONTRACT. ISOLATED AREAS WITHIN THE GENERAL WORK AREA WHICH ARE NOT TO BE DISTURBED SHALL BE MARKED OR FENCED. MONUMENTS AND MARKERS SHALL BE PROTECTED BEFORE CONSTRUCTION OPERATIONS COMMENCE.
- THE CONTRACTOR SHALL MONITOR CONSTRUCTION ACTIVITIES TO PREVENT POLLUTION OF SURFACE AND GROUND WATERS AND SHALL COMPLY WITH THE CLEAN WATER ACT SECTION 404 REGULATIONS.
- CONTRACTOR SHALL ESTABLISH AND VERIFY POINT OF BEGINNING (P.O.B) AND STAKE SITE AS INDICATED ON CONSTRUCTION DOCUMENTS PRIOR TO COMMENCEMENT OF CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
- ALL DIMENSIONS ARE TO BACK OF CURB, FACE OF BUILDING, OR CENTERLINE UNLESS OTHERWISE NOTED.
- ALL DETAILS SHALL BE CONSTRUCTED IN STRICT COMPLIANCE WITH SPECIFICATIONS AND CONSTRUCTION DOCUMENTS.

LAYOUT AND MATERIALS NOTES

- PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING PAVEMENT ELEVATIONS AT INTERFACE WITH PROPOSED PAVEMENTS AND EXISTING GROUND ELEVATIONS TO ASSURE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED FACILITIES.
- SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SCALED TO THEIR ACTUAL DIMENSIONS OR LOCATIONS ON THE DRAWINGS. THE CONTRACTOR SHALL REFER TO THE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS, AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
- CONTRACTOR SHALL NOT RELY SOLELY ON ELECTRONIC VERSIONS OF PLANS, SPECIFICATIONS, AND DATA FILES THAT ARE OBTAINED FROM THE DESIGNERS, BUT SHALL VERIFY LOCATION OF PROJECT FEATURES IN ACCORDANCE WITH THE PAPER COPIES OF THE PLANS AND SPECIFICATIONS THAT ARE SUPPLIED AS PART OF THE CONTRACT DOCUMENTS.



AREA TO BE CLEARED - 493,277 SQ. FT. / 11.32 ACRES
 AREA WITHIN 100' WETLAND OFFSET - 39,000 SQ. FT. / 0.89 ACRES
 DIRECT WETLAND IMPACT NOT TO EXCEED 4915 SQ. FT.



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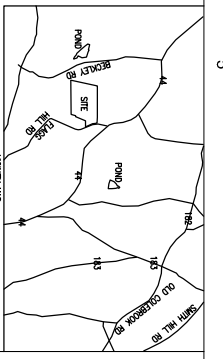
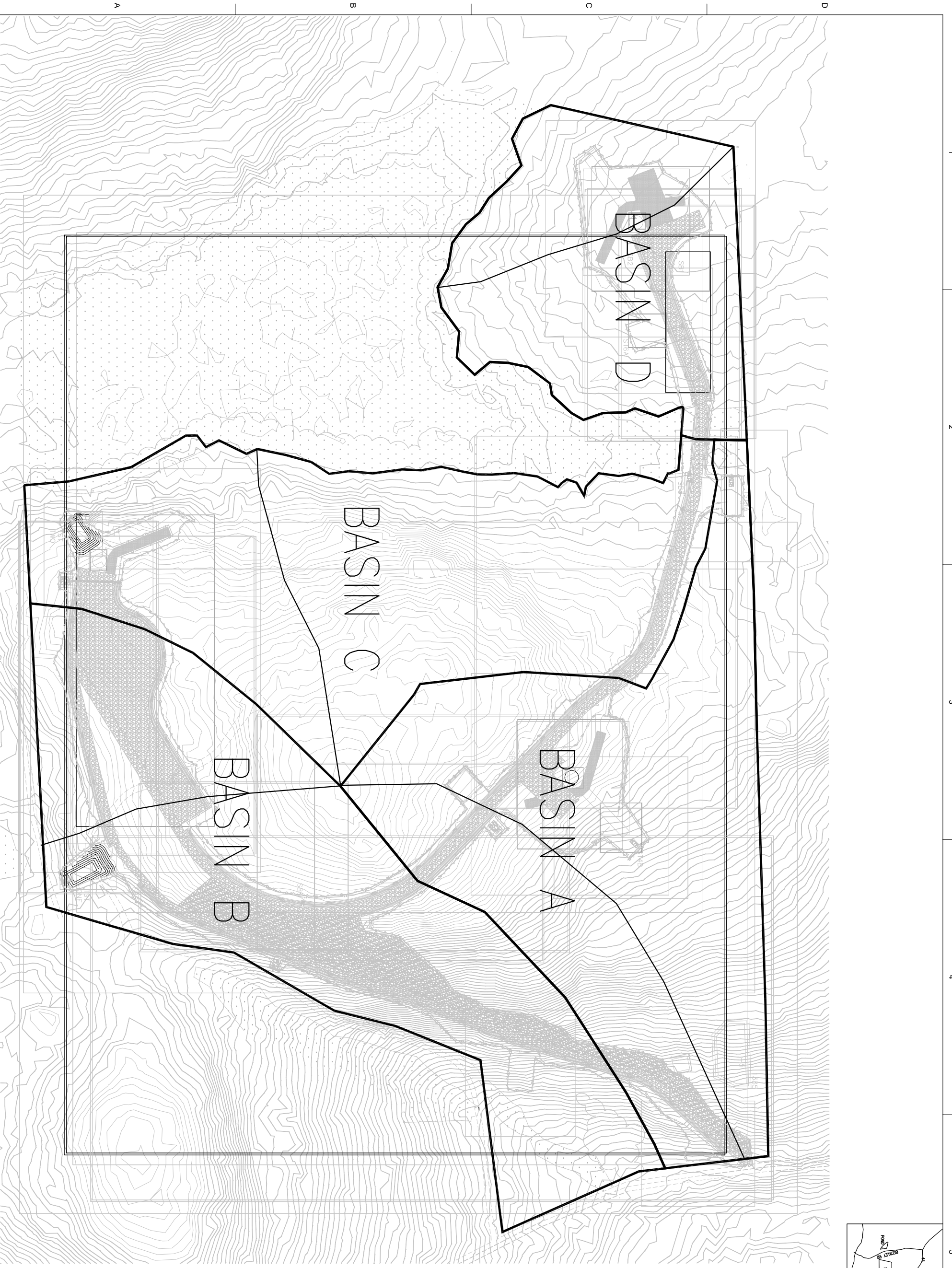
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DRAWN BY:	CHKD BY:	
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SUBMITTED BY:	BNE ENERGY	
PLOT SCALE:	AS SHOWN	
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WIND COLEBROOK SOUTH CONNECTICUT
 SITE PLAN WITH AERIAL IMAGERY



SHEET IDENTIFICATION
C-002



SHEET
IDENTIFICATION
BM-1

WIND COLEBROOK SOUTH
CONNECTICUT

PRE-DEVELOPMENT BASIN MAP



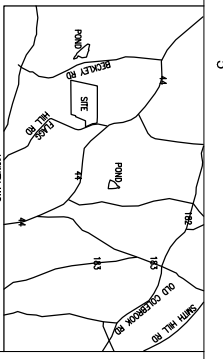
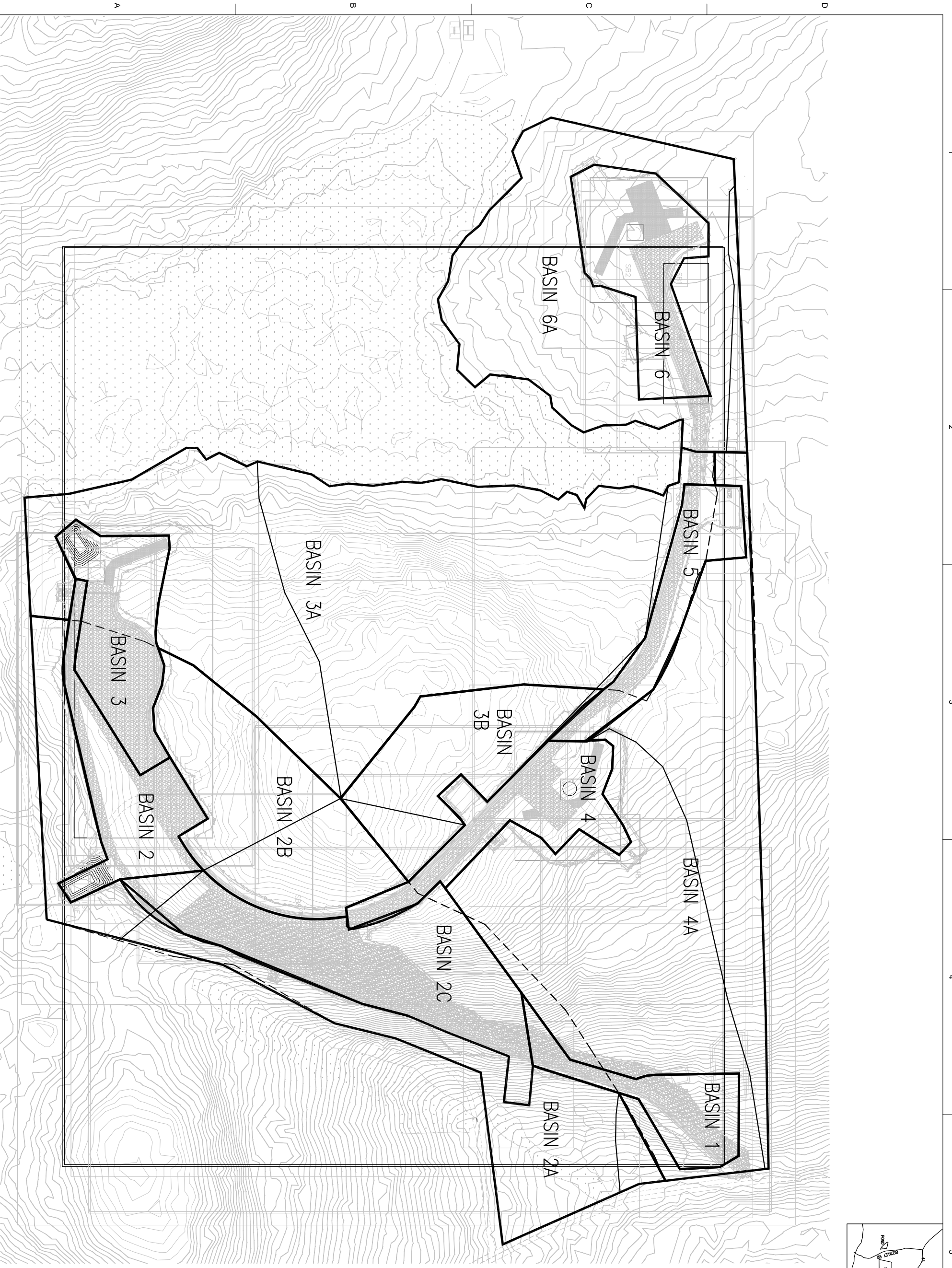
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CHARLOTTE, NC 28210 FAX: (704) 358-8342
ZAPATA@ZAPATAINC.COM WWW.ZAPATAINC.COM

DESIGNED BY: RSS	DATE: 03-14-11
DRAWN BY: RSW	CKD BY: TLK
SUBMITTED BY: BNE ENERGY	
PLOT SCALE: AS SHOWN	PLOT DATE: 03-14-11
SIZE: ANSI D	FILE NAME: B:\Projects\BNE Energy Inc\Wind Colebrook South\Connecticut\Wind Map 011-03-11.dwg
	FILE NUMBER: 1355

MARK	DESCRIPTION	DATE	APPR.
2	INCORPORATED REQUESTED REVISIONS	03-14-11	MLC
1	CONNECTICUT SITING COUNCIL SUBMISSION	11-19-10	TLK

NOT FOR CONSTRUCTION - CONNECTICUT SITING COUNCIL USE ONLY





SHEET IDENTIFICATION
BM-2
 WIND COLEBROOK SOUTH CONNECTICUT
 POST-DEVELOPMENT BASIN MAP


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DESIGNED BY: RSS	DATE: 03-14-11
DRAWN BY: RSW	CKD BY: TLK
SUBMITTED BY: BNE ENERGY	
PLOT SCALE: AS SHOWN	PLOT DATE: 03-14-11
FILE NAME: ANSI D	FILE NUMBER: 1355

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2	INCORPORATED REQUESTED REVISIONS	03-14-11	MLC
1	CONNECTICUT SITING COUNCIL SUBMISSION	11-19-10	TLK

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**Wind Colbrook South
Stormwater Treatment Sizing Calculations**

Basin Characteristics

Basin ID	Total Size (AC)	% Impervious (Post)
Basin 1	1.18	14.43%
Basin 2	1.67	36.36%
Basin 2A	4.98	0.00%
Basin 2B	3.62	0.00%
Basin 2C	3.49	17.25%
Basin 3	1.87	0.00%
Basin 3A	13.30	0.00%
Basin 3B	2.47	0.00%
Basin 4	1.41	21.12%
Basin 4A	10.45	0.00%
Basin 5	1.66	18.31%
Basin 6	2.06	8.08%
Basin 6A	5.90	0.00%

Water Quality Volume (WQV) (equivalent to Runoff Capture Volume, RCV)

Per 2004 Connecticut Stormwater Quality Manual, Table 7-1, $WQV = (I)(R)(A)/12$

WQV = water quality volume (ac-ft)

R = volumetric runoff coefficient = $0.05 + 0.009(I)$

I = percent impervious cover

A = site area in acres

Basin ID	Basin Area (AC)	% Impervious Cover	Runoff Coefficient	Water Quality Volume (ac-ft)	Water Quality Volume (cu-ft)
Basin 1	1.18	0.14	0.05	0.005	219
Basin 2	1.67	0.36	0.05	0.007	323
Basin 2C	3.49	0.17	0.05	0.015	653
Basin 3	1.87	0.00	0.05	0.008	339
Basin 4	1.41	0.21	0.05	0.006	266
Basin 5	1.66	0.18	0.05	0.007	311
Basin 6	2.06	0.08	0.05	0.009	379
Total Water Quality Volume:				0.057	2491

Excludes segregated runoff.

*Post-Construction Characteristics

Groundwater Recharge Volume (GRV)

Per 2004 Connecticut Stormwater Quality Manual, Sect. 7.5.1, $GRV = (D)(A)(I) / 12$

GRV = groundwater recharge volume (ac-ft)

D = depth of runoff to be recharged (inches)

A = site area (acres)

I = post-development site imperviousness (decimal, not percent) for new development projects or the net increase in site imperviousness for re-development projects

NRCS Hydrologic Soil Group: C

Per Table 7-4, for NRC Hydrologic Soil Group C, Groundwater Recharge Depth (D) is 0.10 inches.

Basin ID	Site Area (AC)	Site Imperviousness	Recharge Depth (in)	Groundwater Recharge Volume (ac-ft)	Groundwater Recharge Volume (cu-ft)
Basin 1	1.18	0.14	0.10	0.001	62
Basin 2	1.67	0.36	0.10	0.005	221
Basin 2C	3.49	0.17	0.10	0.005	219
Basin 3	1.87	0.00	0.10	0.000	0
Basin 4	1.41	0.21	0.10	0.002	108
Basin 5	1.66	0.18	0.10	0.003	110
Basin 6	2.06	0.08	0.10	0.001	60
Total Groundwater Recharge Volume:				0.018	780

Excludes segregated runoff.

*Post-Construction Characteristics

Peak Runoff Attenuation

Per TR-55

Per 2004 Connecticut Stormwater Quality Manual, Sect. 7.6.3, "post-development peak discharge rates from the 10-year, 25-year, and 100-year storms to the corresponding pre-development peak discharge rates".

Pretreatment Bay Sizing

Per 2004 Connecticut Stormwater Quality Manual, Page 11-P4-6, $As = (-Q/W)\ln(1-E)$

As = Sedimentation surface area (sq. ft)

Q = discharge rate from drainage area

W = particle settling velocity (.0004 ft/s recommended for silt)

E = sediment removal efficiency (assume 0.9 or 90% per 2004 Connecticut Stormwater Quality Manual)

Basin ID	Discharge rate from drainage basin cfs	Particle Settling Velocity (sq-ft)	Sediment Removal Efficiency	Required Sedimentation Surface Area (sq-ft)	Required Pretreatment Sedimentation Volume (cu-ft)
Basin 1	1.44	0.0004	0.90	8289	55
Basin 2	3.1	0.0004	0.90	17845	81
Basin 2C	4.58	0.0004	0.90	26365	163
Basin 3	1.82	0.0004	0.90	10477	85
Basin 4	2.1	0.0004	0.90	12089	66
Basin 5	2.33	0.0004	0.90	13413	78
Basin 6	2.17	0.0004	0.90	12492	95
Total Water Quality Volume:				100968	623

*Post-Construction Characteristics

Filter Bed Sizing

Per 2004 Connecticut Stormwater Quality Manual, Page 11-P4-6, $A_f = (WQV \cdot d) / ((k \cdot t) \cdot (b + d))$

A_f = filter bed surface area (sq-ft)

WQV = water quality volume (cu-ft)

d = filter bed depth (ft) - minimum 18 inches

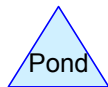
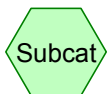
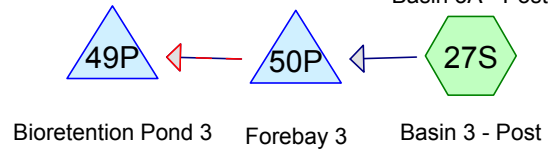
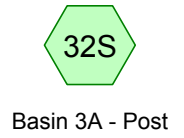
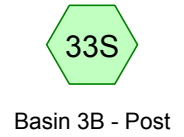
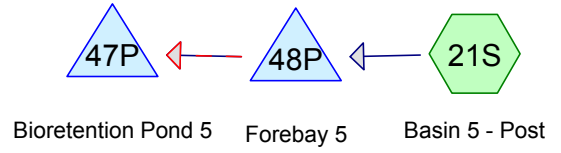
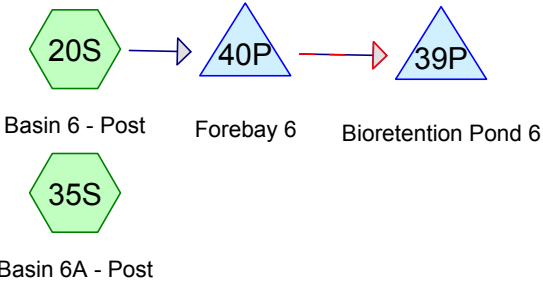
k = hydraulic conductivity of filter media (ft/day) - typically 20 ft/day for medium sand

t = time for the WQV to drain from the system (24 hours)

b = average height of water above filter bed during water quality design storm

Basin ID	WQV Water Quality Volume (cu-ft)	d Depth of Filter Bed (ft)	k Hydraulic Conductivity (ft/day)	t Time for WQV to Drain (hrs)	b Average Height of Water Above Filter Bed During Water Quality Design Storm (ft)	A _f Filter Bed Surface Area (sf)	Required Treatment Volume (cu-ft)
Basin 1	219	3.0000	20.00	1	36	1	165
Basin 2	323	3.0000	20.00	1	36	1	242
Basin 2C	653	3.0000	20.00	1	36	3	490
Basin 3	339	3.0000	20.00	1	36	1	254
Basin 4	266	3.0000	20.00	1	36	1	199
Basin 5	311	3.0000	20.00	1	36	1	233
Basin 6	379	3.0000	20.00	1	36	1	284
Total Water Quality Volume:							1868

*Post-Construction Characteristics



Wind-Colbrook South On-site Wetlands 2011-03-10

Prepared by Zapata Engineering

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
45.799	55	Woods, Good, HSG B (18S, 19S, 20S, 32S, 33S, 35S)
4.653	58	Meadow, non-grazed, HSG B (20S, 21S, 27S, 32S, 33S)
0.470	85	Gravel roads, HSG B (20S, 21S)
50.922	56	TOTAL AREA

Wind-Colbrook South On-site Wetlands 2011-03-10

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
50.922	HSG B	18S, 19S, 20S, 21S, 27S, 32S, 33S, 35S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
50.922		TOTAL AREA

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Land-Use Listing (all nodes)

Area (acres)	Land Use	Subcatchment Numbers
0.000	Commercial Roof	27S, 32S, 33S
0.470	Driveway	20S, 21S, 27S, 32S, 33S, 35S
49.976	Rural open/forest	18S, 19S, 20S, 21S, 27S, 32S, 33S, 35S
0.476	Water/wetland	20S, 21S, 27S, 32S, 33S, 35S
50.922	TOTAL	

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Pollutant Concentrations

Line#	Land Use	TSS (mg/l)	TP (mg/l)	TN (mg/l)
1	Commercial Roof	9.00	0.14	2.10
2	Driveway	173.00	0.56	2.10
3	Rural open/forest	51.00	0.11	1.78
4	Water/wetland	6.00	0.08	1.38

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Subcatchment Loading

Line#	Subcat Number	TSS (pounds)	TP (pounds)	TN (pounds)
1	18S	0.00	0.00	0.00
2	19S	0.00	0.00	0.00
3	20S	0.00	0.00	0.00
4	21S	0.00	0.00	0.00
5	27S	0.00	0.00	0.00
6	32S	0.00	0.00	0.00
7	33S	0.00	0.00	0.00
8	35S	0.00	0.00	0.00
	TOTAL	0.00	0.00	0.00

Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: Basin C - Pre	Runoff Area=15.366 ac 0.00% Impervious Runoff Depth>0.10" Flow Length=761' Tc=35.9 min CN=55 Runoff=0.22 cfs 0.127 af
Subcatchment19S: Basin D - Pre	Runoff Area=8.131 ac 0.00% Impervious Runoff Depth>0.10" Flow Length=728' Tc=74.6 min CN=55 Runoff=0.11 cfs 0.065 af
Subcatchment20S: Basin 6 - Post	Runoff Area=2.057 ac 0.00% Impervious Runoff Depth>0.18" Tc=6.0 min CN=59 Runoff=0.14 cfs 0.031 af
Subcatchment21S: Basin 5 - Post	Runoff Area=1.660 ac 0.00% Impervious Runoff Depth>0.28" Tc=6.0 min CN=63 Runoff=0.25 cfs 0.038 af
Subcatchment27S: Basin 3 - Post	Runoff Area=1.869 ac 0.00% Impervious Runoff Depth>0.16" Tc=6.0 min CN=58 Runoff=0.10 cfs 0.025 af
Subcatchment32S: Basin 3A - Post	Runoff Area=13.383 ac 0.00% Impervious Runoff Depth>0.10" Flow Length=761' Tc=35.9 min CN=55 Runoff=0.19 cfs 0.111 af
Subcatchment33S: Basin 3B - Post	Runoff Area=2.558 ac 0.00% Impervious Runoff Depth>0.10" Flow Length=1,314' Tc=43.7 min CN=55 Runoff=0.04 cfs 0.021 af
Subcatchment35S: Basin 6A - Post	Runoff Area=5.898 ac 0.00% Impervious Runoff Depth>0.10" Flow Length=586' Tc=48.8 min CN=55 Runoff=0.08 cfs 0.048 af
Pond 39P: Bioretention Pond 6	Peak Elev=1,432.05' Storage=24 cf Inflow=0.13 cfs 0.028 af Primary=0.11 cfs 0.028 af Secondary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.028 af
Pond 40P: Forebay 6	Peak Elev=1,433.40' Storage=107 cf Inflow=0.14 cfs 0.031 af Primary=0.13 cfs 0.028 af Secondary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.028 af
Pond 47P: Bioretention Pond 5	Peak Elev=1,430.34' Storage=147 cf Inflow=0.27 cfs 0.036 af Primary=0.11 cfs 0.036 af Secondary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.036 af
Pond 48P: Forebay 5	Peak Elev=1,431.31' Storage=95 cf Inflow=0.25 cfs 0.038 af Primary=0.27 cfs 0.036 af Secondary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.036 af
Pond 49P: Bioretention Pond 3	Peak Elev=1,430.03' Storage=13 cf Inflow=0.09 cfs 0.022 af Primary=0.06 cfs 0.022 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.022 af
Pond 50P: Forebay 3	Peak Elev=1,431.30' Storage=94 cf Inflow=0.10 cfs 0.025 af Primary=0.09 cfs 0.022 af Secondary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.022 af

Total Runoff Area = 50.922 ac Runoff Volume = 0.466 af Average Runoff Depth = 0.11"
100.00% Pervious = 50.922 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 18S: Basin C - Pre

Runoff = 0.22 cfs @ 13.92 hrs, Volume= 0.127 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
15.366	55	Woods, Good, HSG B	Rural open/forest
15.366		100.00% Pervious Area	

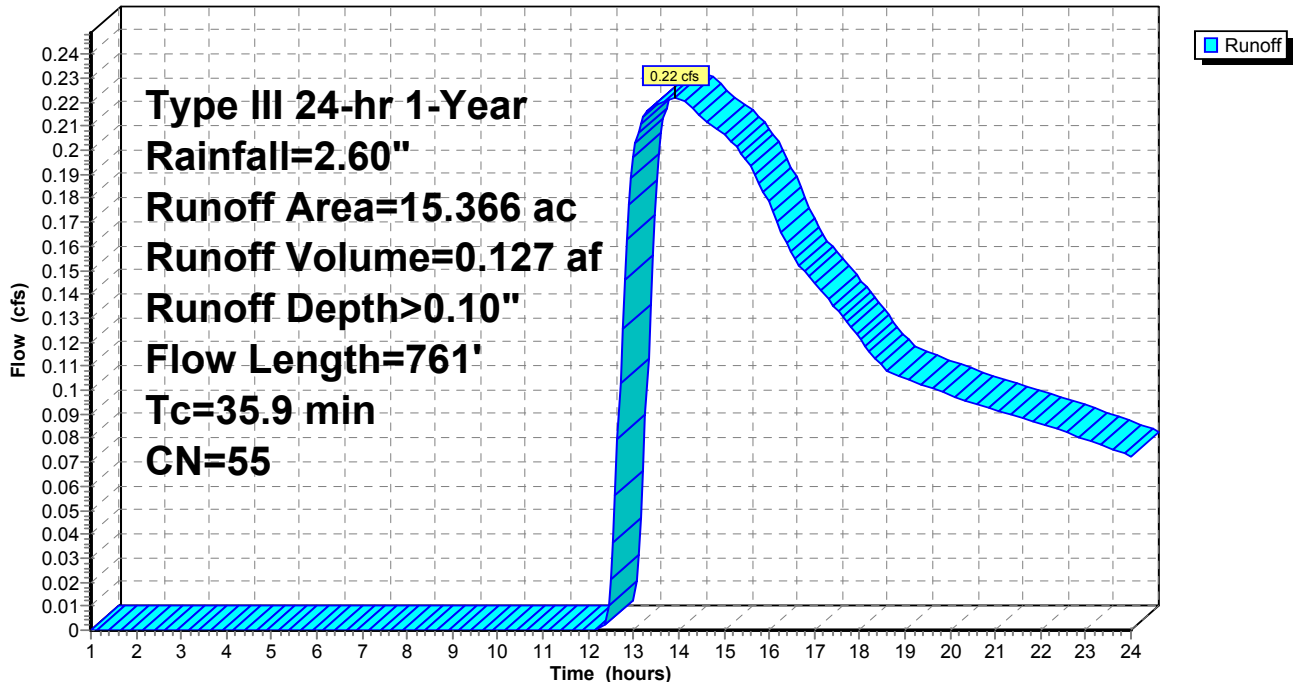
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.366	Rural open/forest	17.60	0.04	0.61
15.366	Total	17.60	0.04	0.61

Subcatchment 18S: Basin C - Pre

Hydrograph



Summary for Subcatchment 19S: Basin D - Pre

Runoff = 0.11 cfs @ 14.68 hrs, Volume= 0.065 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
8.131	55	Woods, Good, HSG B	Rural open/forest
8.131		100.00% Pervious Area	

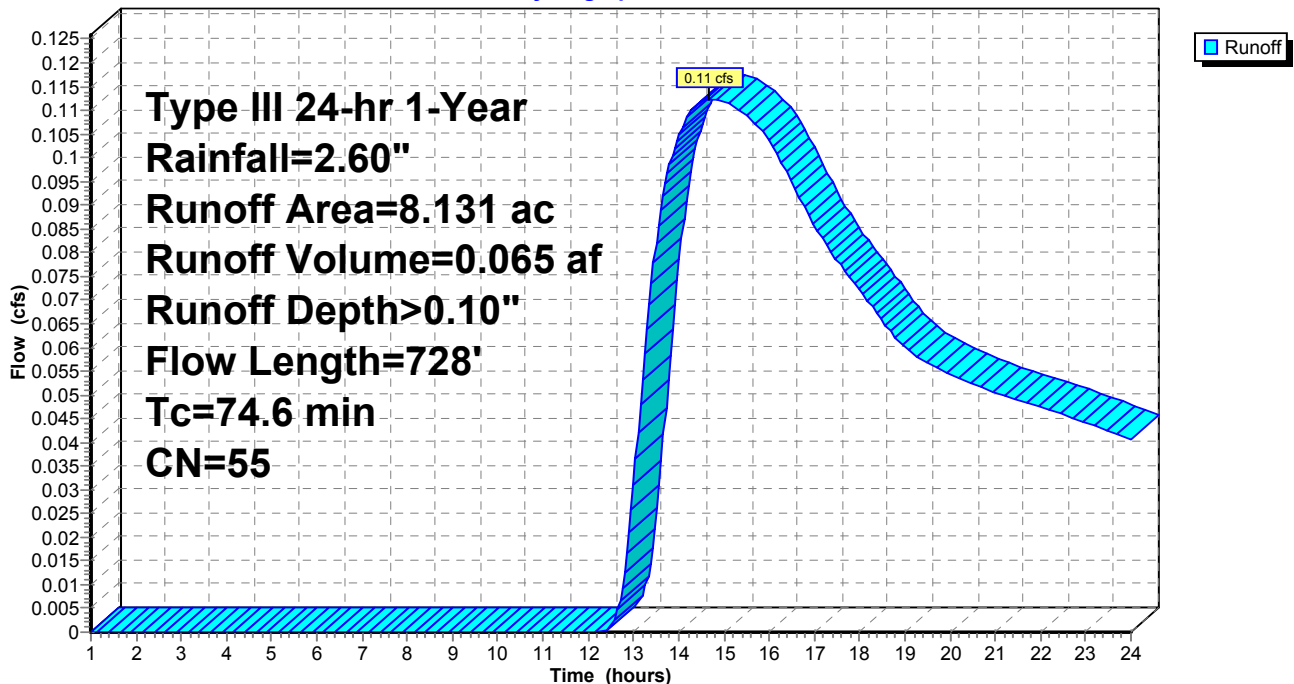
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.2	300	0.0100	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.4	428	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
74.6	728	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
8.131	Rural open/forest	9.04	0.02	0.32
8.131	Total	9.04	0.02	0.32

Subcatchment 19S: Basin D - Pre

Hydrograph



Summary for Subcatchment 20S: Basin 6 - Post

Runoff = 0.14 cfs @ 12.36 hrs, Volume= 0.031 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

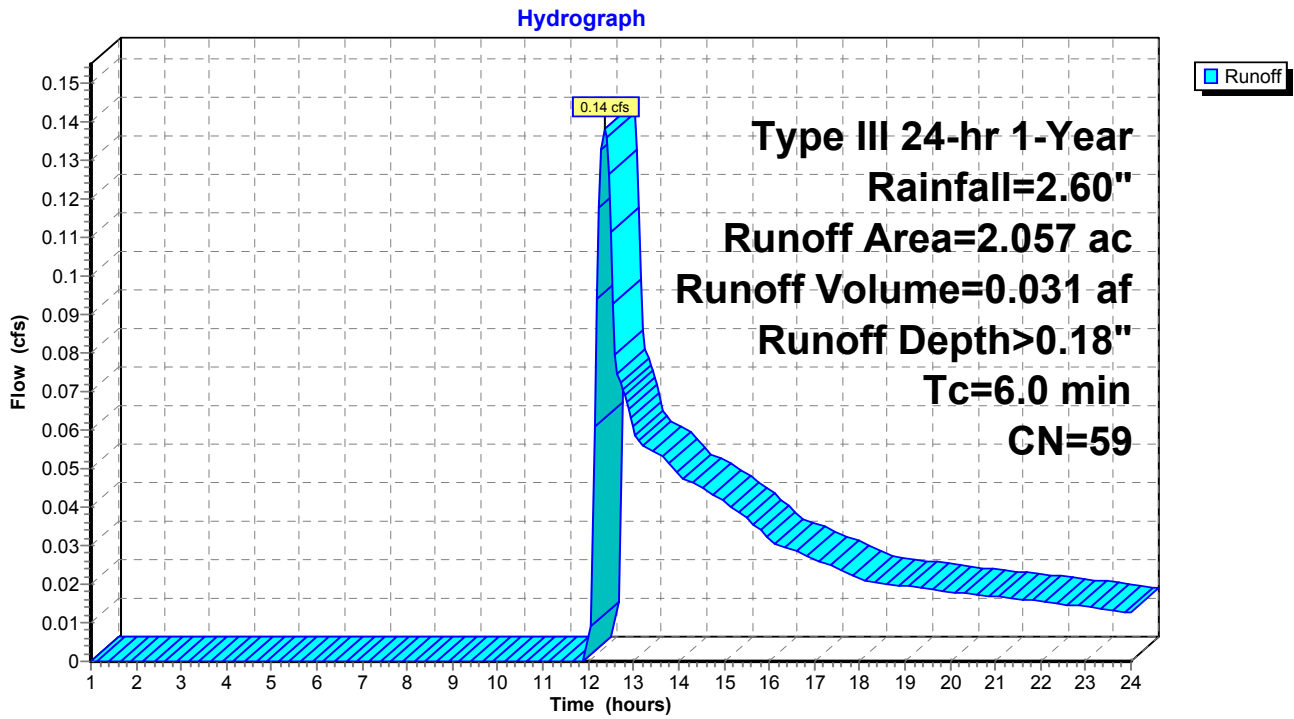
Area (ac)	CN	Description	Land Use
0.166	85	Gravel roads, HSG B	Driveway
0.633	55	Woods, Good, HSG B	Rural open/forest
1.189	58	Meadow, non-grazed, HSG B	Rural open/forest
0.069	58	Meadow, non-grazed, HSG B	Water/wetland
2.057	59	Weighted Average	
2.057		100.00% Pervious Area	

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

Pollutant Loading for 0.18" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.166	Driveway	1.17	0.00	0.01
1.822	Rural open/forest	3.77	0.01	0.13
0.069	Water/wetland	0.02	0.00	0.00
2.057	Total	4.95	0.01	0.15

Subcatchment 20S: Basin 6 - Post



Summary for Subcatchment 21S: Basin 5 - Post

Runoff = 0.25 cfs @ 12.17 hrs, Volume= 0.038 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

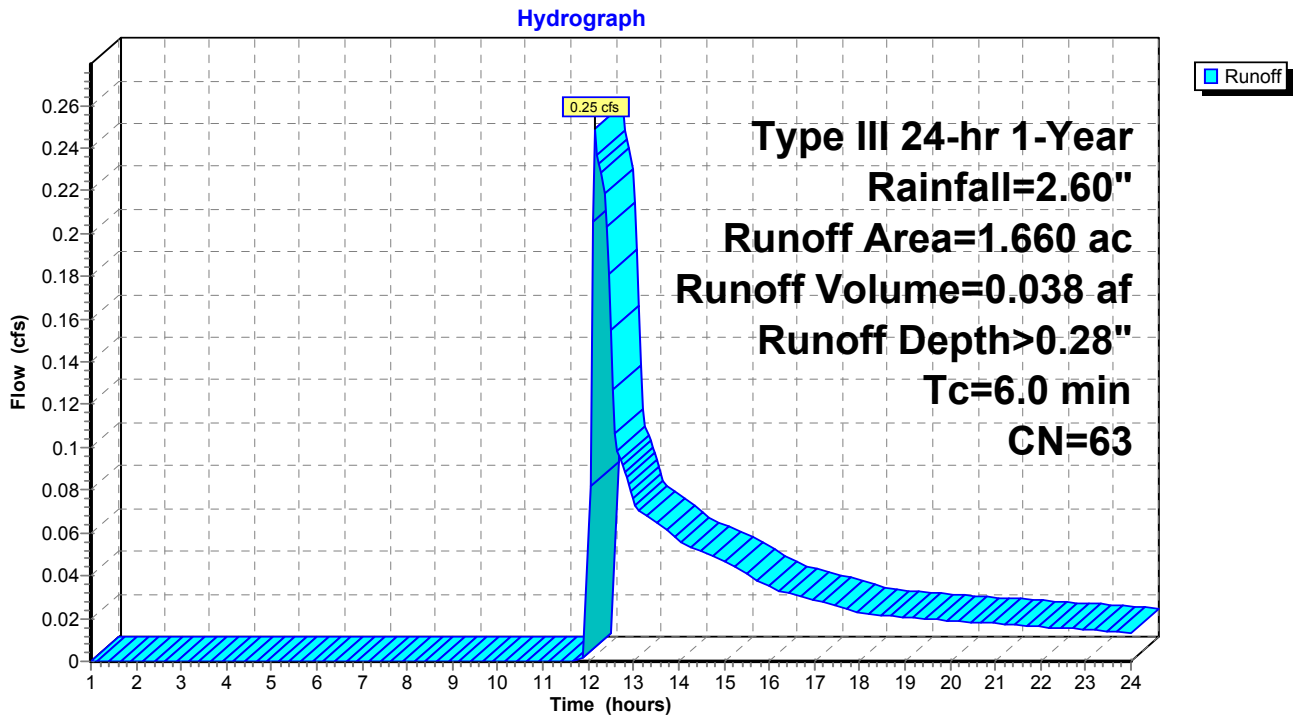
Area (ac)	CN	Description	Land Use
0.304	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.204	58	Meadow, non-grazed, HSG B	Rural open/forest
0.152	58	Meadow, non-grazed, HSG B	Water/wetland
1.660	63	Weighted Average	
1.660		100.00% Pervious Area	

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

Pollutant Loading for 0.28" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.304	Driveway	3.31	0.01	0.04
1.204	Rural open/forest	3.87	0.01	0.13
0.152	Water/wetland	0.06	0.00	0.01
1.660	Total	7.24	0.02	0.19

Subcatchment 21S: Basin 5 - Post



Summary for Subcatchment 27S: Basin 3 - Post

Runoff = 0.10 cfs @ 12.39 hrs, Volume= 0.025 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

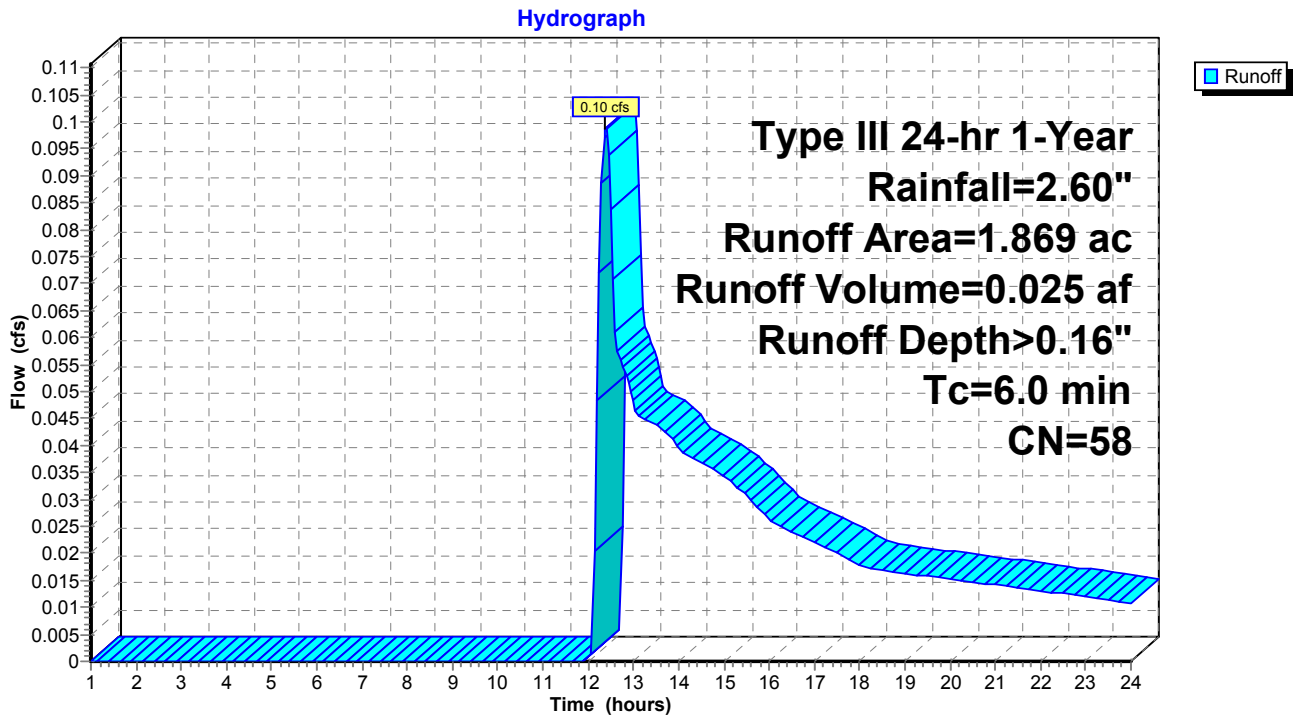
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.784	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.869	58	Weighted Average	
1.869		100.00% Pervious Area	

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

Pollutant Loading for 0.16" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
1.784	Rural open/forest	3.25	0.01	0.11
0.085	Water/wetland	0.02	0.00	0.00
1.869	Total	3.27	0.01	0.12

Subcatchment 27S: Basin 3 - Post



Summary for Subcatchment 32S: Basin 3A - Post

Runoff = 0.19 cfs @ 13.92 hrs, Volume= 0.111 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

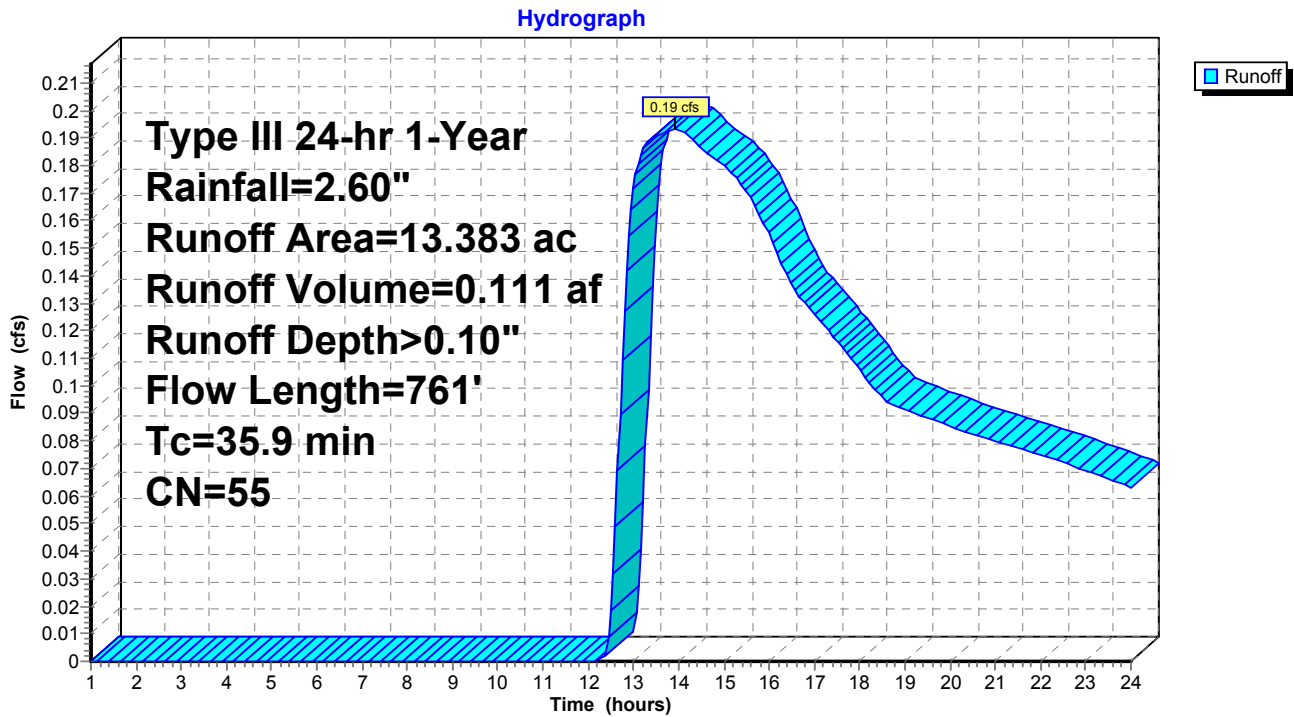
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
13.298	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
13.383	55	Weighted Average	
13.383		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
13.298	Rural open/forest	15.23	0.03	0.53
0.085	Water/wetland	0.01	0.00	0.00
13.383	Total	15.24	0.03	0.53

Subcatchment 32S: Basin 3A - Post



Summary for Subcatchment 33S: Basin 3B - Post

Runoff = 0.04 cfs @ 14.05 hrs, Volume= 0.021 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

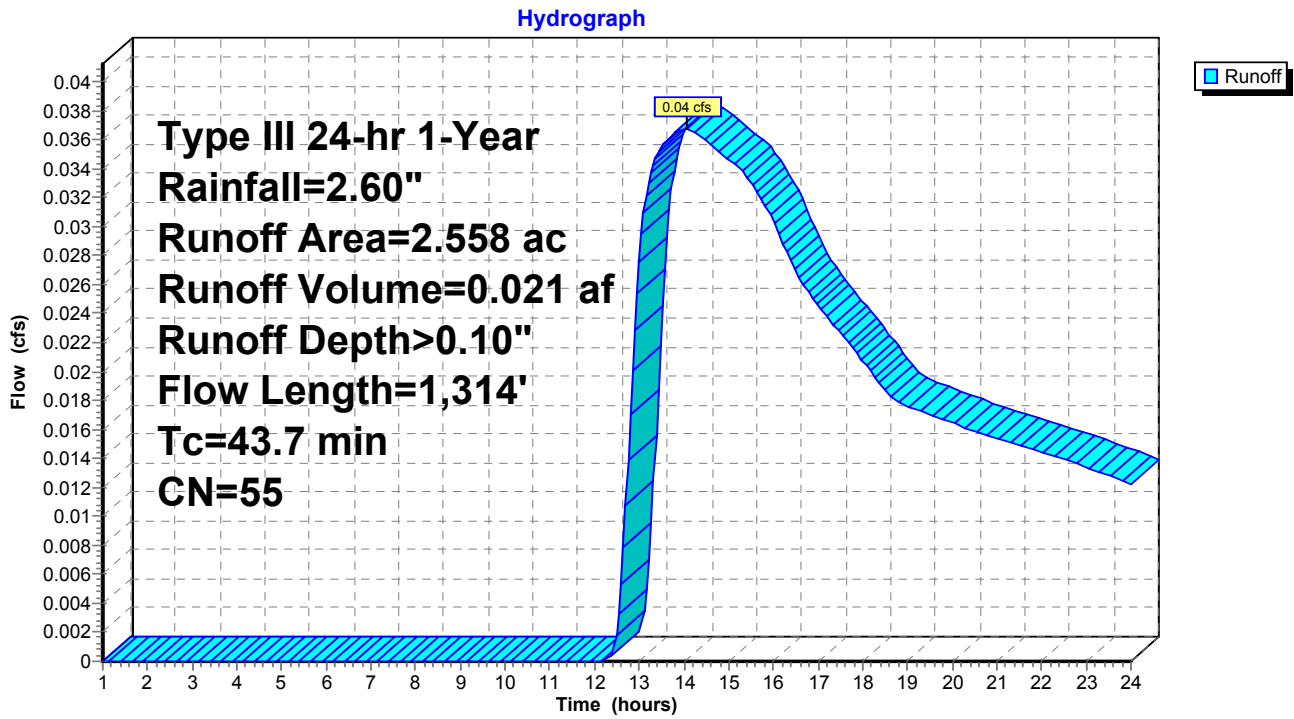
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
2.473	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
2.558	55	Weighted Average	
2.558		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	273	0.0900	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
17.3	1,041	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.7	1,314	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
2.473	Rural open/forest	2.82	0.01	0.10
0.085	Water/wetland	0.01	0.00	0.00
2.558	Total	2.83	0.01	0.10

Subcatchment 33S: Basin 3B - Post



Summary for Subcatchment 35S: Basin 6A - Post

Runoff = 0.08 cfs @ 14.15 hrs, Volume= 0.048 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

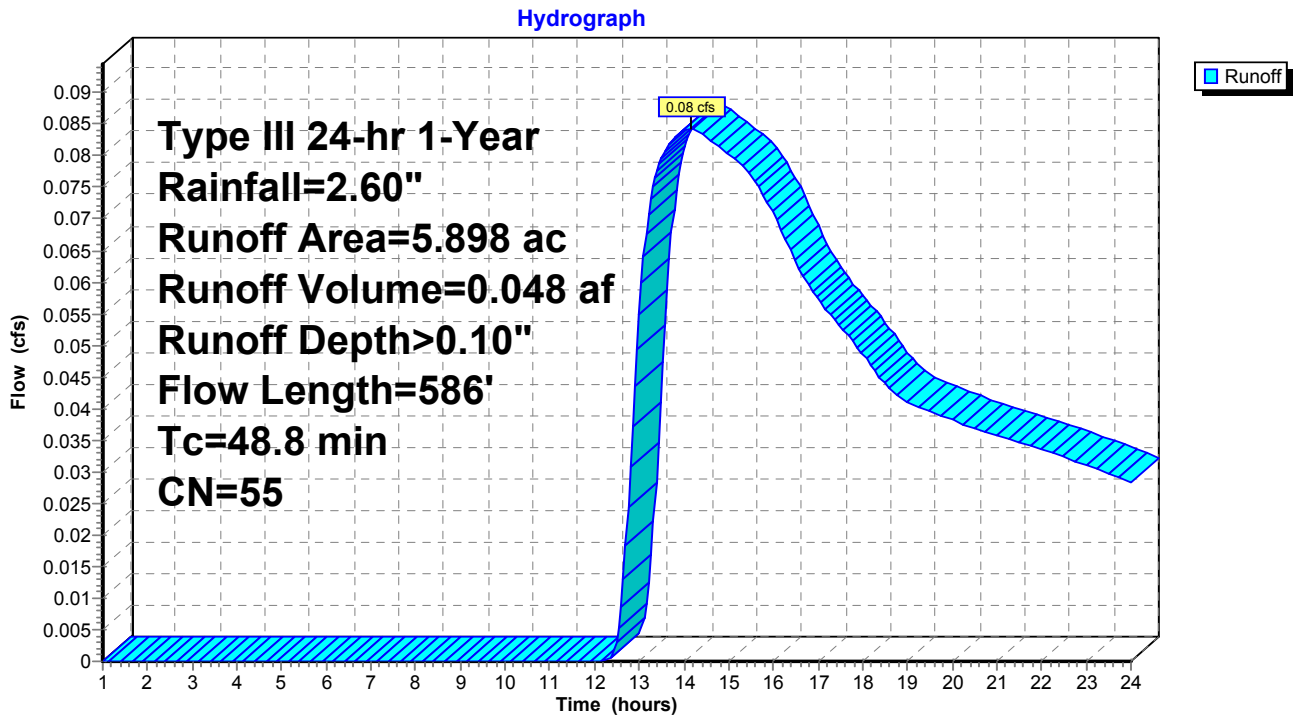
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
5.898	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
5.898	55	Weighted Average	
5.898		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0	300	0.0300	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.8	286	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
48.8	586	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Driveway	0.00	0.00	0.00
5.898	Rural open/forest	6.69	0.01	0.23
0.000	Water/wetland	0.00	0.00	0.00
5.898	Total	6.69	0.01	0.23

Subcatchment 35S: Basin 6A - Post



Summary for Pond 39P: Bioretention Pond 6

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 0.17" for 1-Year event
 Inflow = 0.13 cfs @ 12.43 hrs, Volume= 0.028 af
 Outflow = 0.11 cfs @ 12.52 hrs, Volume= 0.028 af, Atten= 16%, Lag= 5.5 min
 Primary = 0.11 cfs @ 12.52 hrs, Volume= 0.028 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,432.05' @ 12.52 hrs Surf.Area= 461 sf Storage= 24 cf

Plug-Flow detention time= 3.5 min calculated for 0.028 af (100% of inflow)
 Center-of-Mass det. time= 2.5 min (985.1 - 982.6)

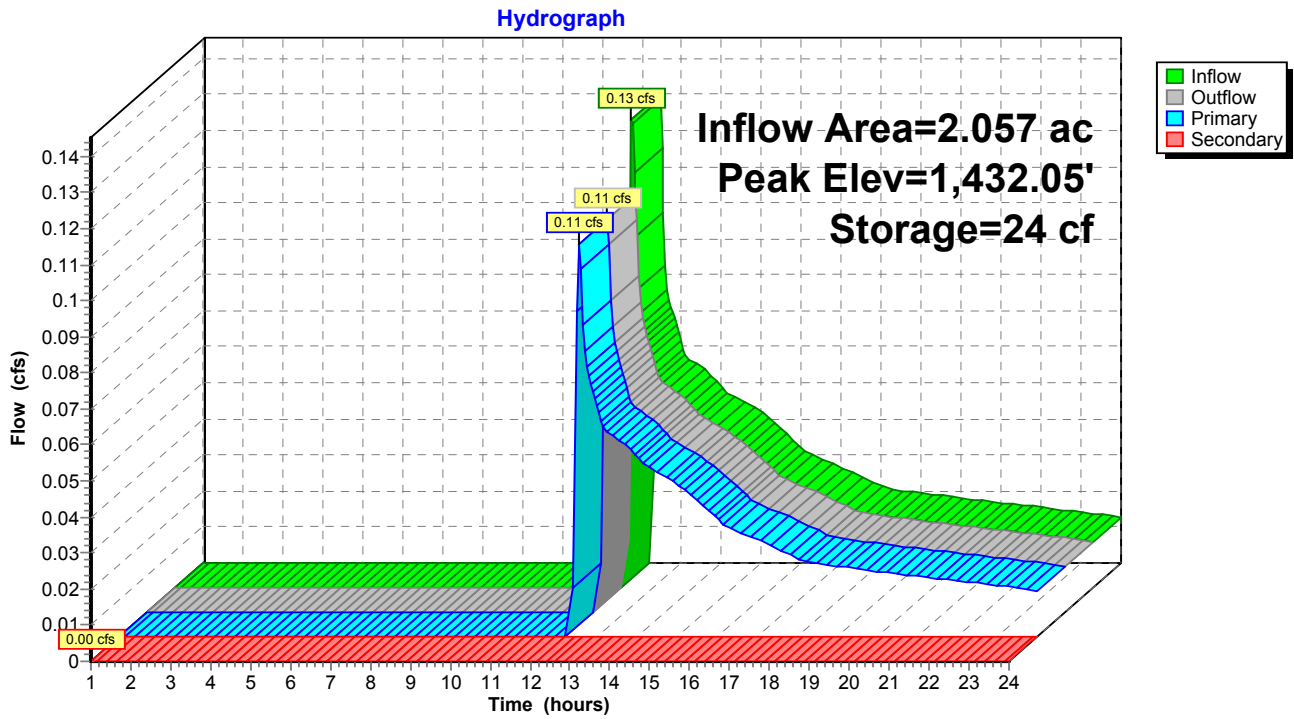
Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 0.00 0.08

Primary OutFlow Max=0.11 cfs @ 12.52 hrs HW=1,432.05' (Free Discharge)
 ↑1=Exfiltration (Controls 0.11 cfs)
 ↓2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 39P: Bioretention Pond 6



Summary for Pond 40P: Forebay 6

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 0.18" for 1-Year event
 Inflow = 0.14 cfs @ 12.36 hrs, Volume= 0.031 af
 Outflow = 0.13 cfs @ 12.43 hrs, Volume= 0.028 af, Atten= 6%, Lag= 4.4 min
 Primary = 0.13 cfs @ 12.43 hrs, Volume= 0.028 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.40' @ 12.43 hrs Surf.Area= 131 sf Storage= 107 cf

Plug-Flow detention time= 51.1 min calculated for 0.028 af (93% of inflow)
 Center-of-Mass det. time= 18.5 min (982.6 - 964.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatoid Z=2.0

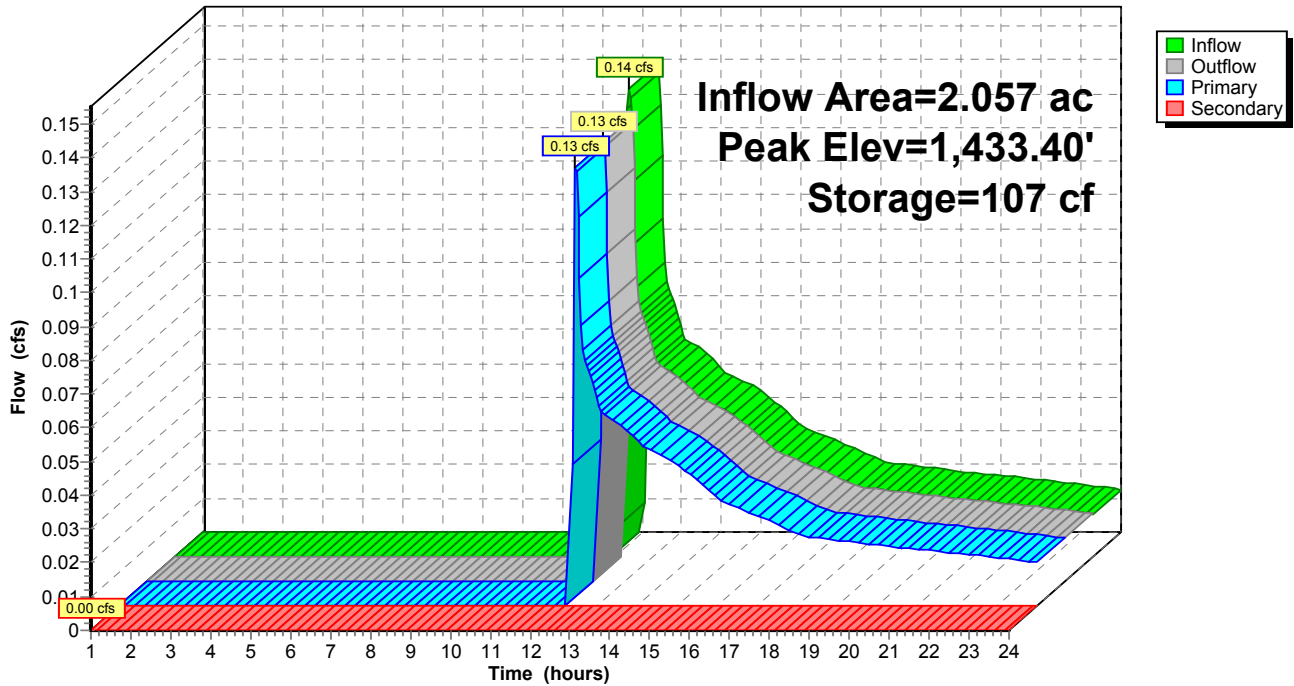
Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=0.13 cfs @ 12.43 hrs HW=1,433.40' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 0.13 cfs @ 0.76 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Forebay 6

Hydrograph



Summary for Pond 47P: Bioretention Pond 5

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 0.26" for 1-Year event
 Inflow = 0.27 cfs @ 12.22 hrs, Volume= 0.036 af
 Outflow = 0.11 cfs @ 12.62 hrs, Volume= 0.036 af, Atten= 60%, Lag= 23.7 min
 Primary = 0.11 cfs @ 12.62 hrs, Volume= 0.036 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,430.34' @ 12.62 hrs Surf.Area= 470 sf Storage= 147 cf

Plug-Flow detention time= 7.8 min calculated for 0.036 af (100% of inflow)
 Center-of-Mass det. time= 7.1 min (950.3 - 943.3)

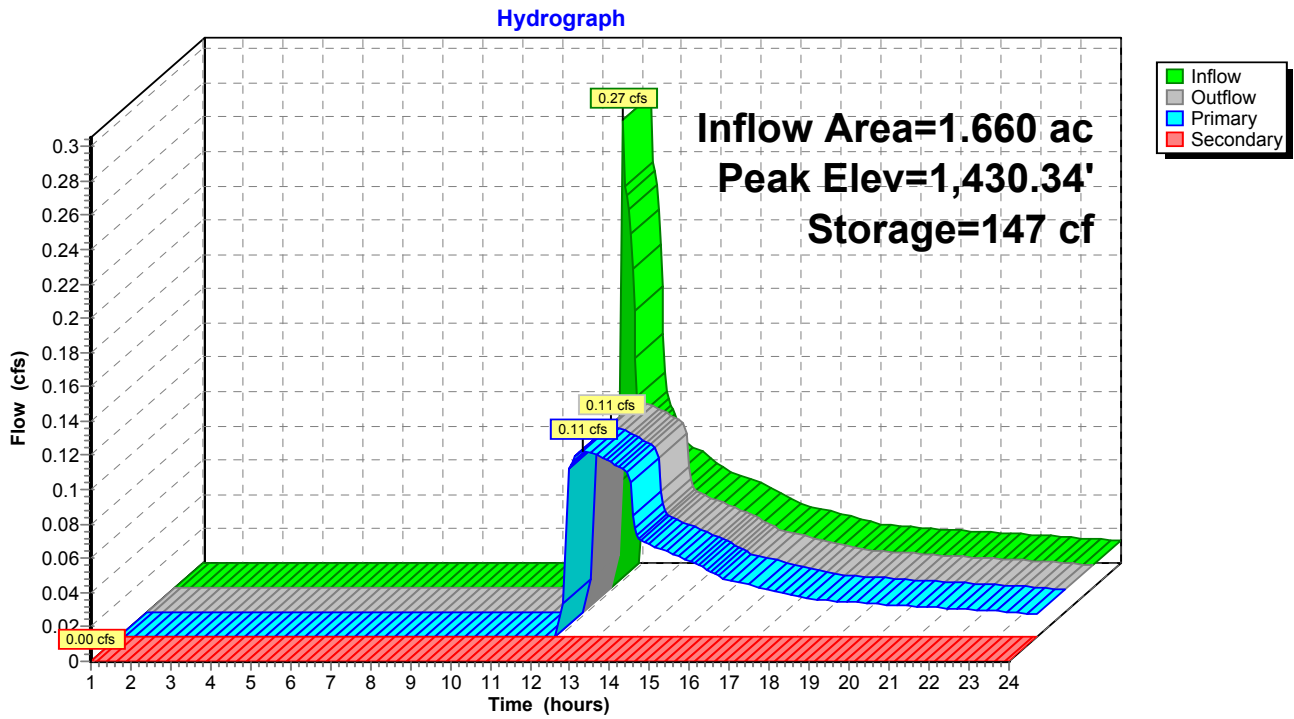
Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.25

Primary OutFlow Max=0.11 cfs @ 12.62 hrs HW=1,430.34' (Free Discharge)
 ↑1=Exfiltration (Controls 0.11 cfs)
 ↓2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 47P: Bioretention Pond 5



Summary for Pond 48P: Forebay 5

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

[88] Warning: Qout>Qin may require Finer Routing>1

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 0.28" for 1-Year event
 Inflow = 0.25 cfs @ 12.17 hrs, Volume= 0.038 af
 Outflow = 0.27 cfs @ 12.22 hrs, Volume= 0.036 af, Atten= 0%, Lag= 3.4 min
 Primary = 0.27 cfs @ 12.22 hrs, Volume= 0.036 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.31' @ 12.20 hrs Surf.Area= 122 sf Storage= 95 cf

Plug-Flow detention time= 36.0 min calculated for 0.036 af (95% of inflow)
 Center-of-Mass det. time= 11.7 min (943.3 - 931.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

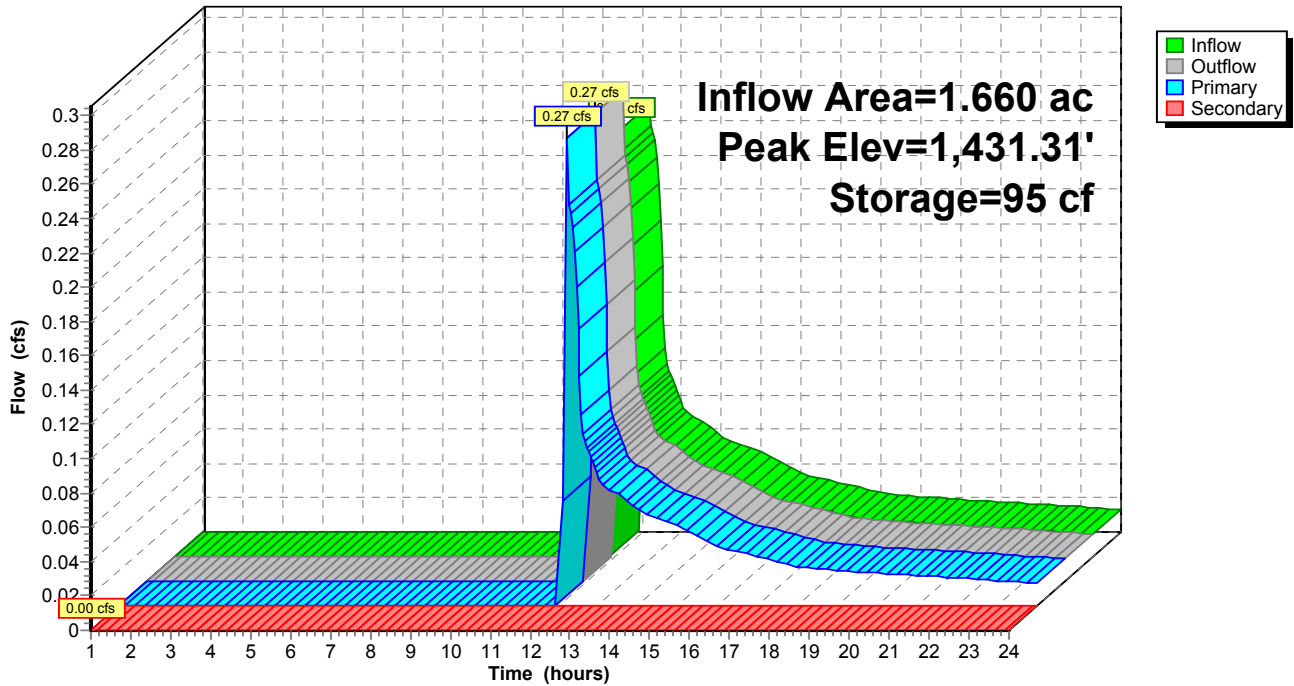
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.20'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.80 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=0.24 cfs @ 12.22 hrs HW=1,431.31' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 0.24 cfs @ 1.07 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 48P: Forebay 5

Hydrograph



Summary for Pond 49P: Bioretention Pond 3

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 0.14" for 1-Year event
 Inflow = 0.09 cfs @ 12.52 hrs, Volume= 0.022 af
 Outflow = 0.06 cfs @ 12.62 hrs, Volume= 0.022 af, Atten= 28%, Lag= 5.8 min
 Primary = 0.06 cfs @ 12.62 hrs, Volume= 0.022 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,430.03' @ 12.62 hrs Surf.Area= 407 sf Storage= 13 cf

Plug-Flow detention time= 3.6 min calculated for 0.022 af (100% of inflow)
 Center-of-Mass det. time= 2.5 min (998.8 - 996.3)

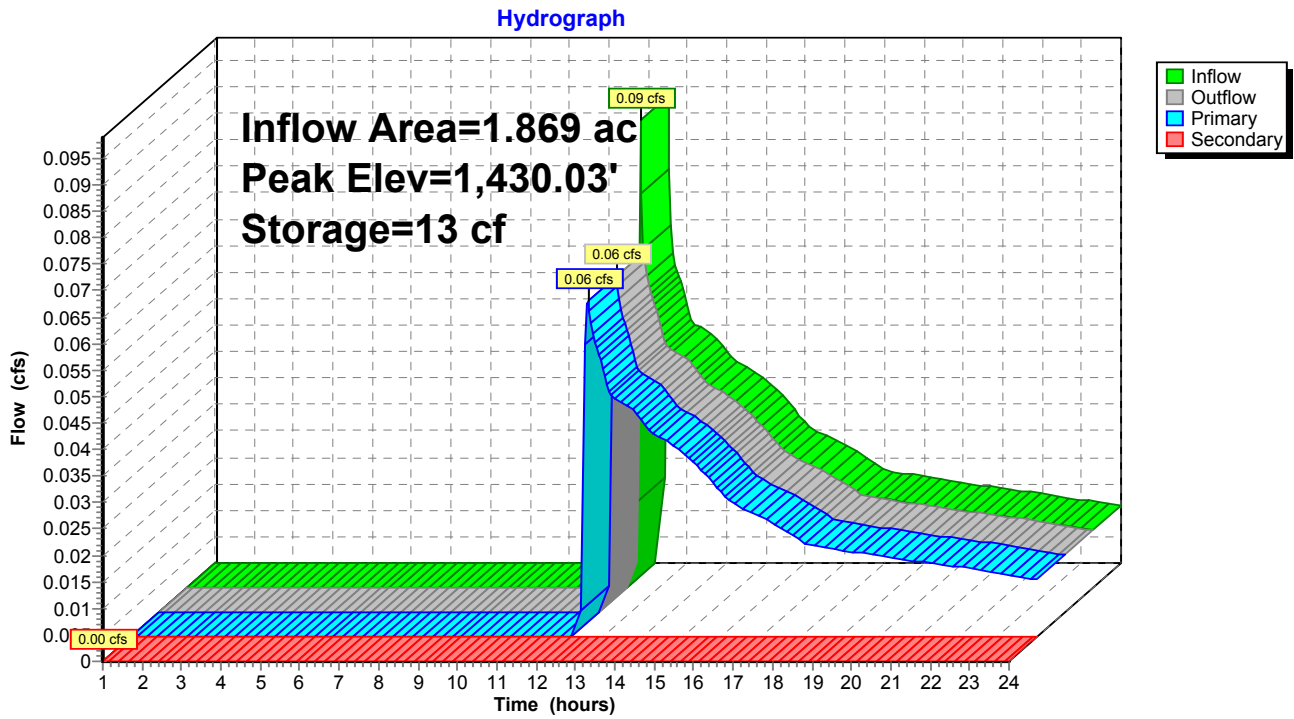
Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.08

Primary OutFlow Max=0.09 cfs @ 12.62 hrs HW=1,430.03' (Free Discharge)
 ↑1=Exfiltration (Controls 0.09 cfs)
 ↓2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 49P: Bioretention Pond 3



Summary for Pond 50P: Forebay 3

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 0.16" for 1-Year event
 Inflow = 0.10 cfs @ 12.39 hrs, Volume= 0.025 af
 Outflow = 0.09 cfs @ 12.52 hrs, Volume= 0.022 af, Atten= 11%, Lag= 8.1 min
 Primary = 0.09 cfs @ 12.52 hrs, Volume= 0.022 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.30' @ 12.50 hrs Surf.Area= 122 sf Storage= 94 cf

Plug-Flow detention time= 58.9 min calculated for 0.022 af (91% of inflow)
 Center-of-Mass det. time= 22.2 min (996.3 - 974.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

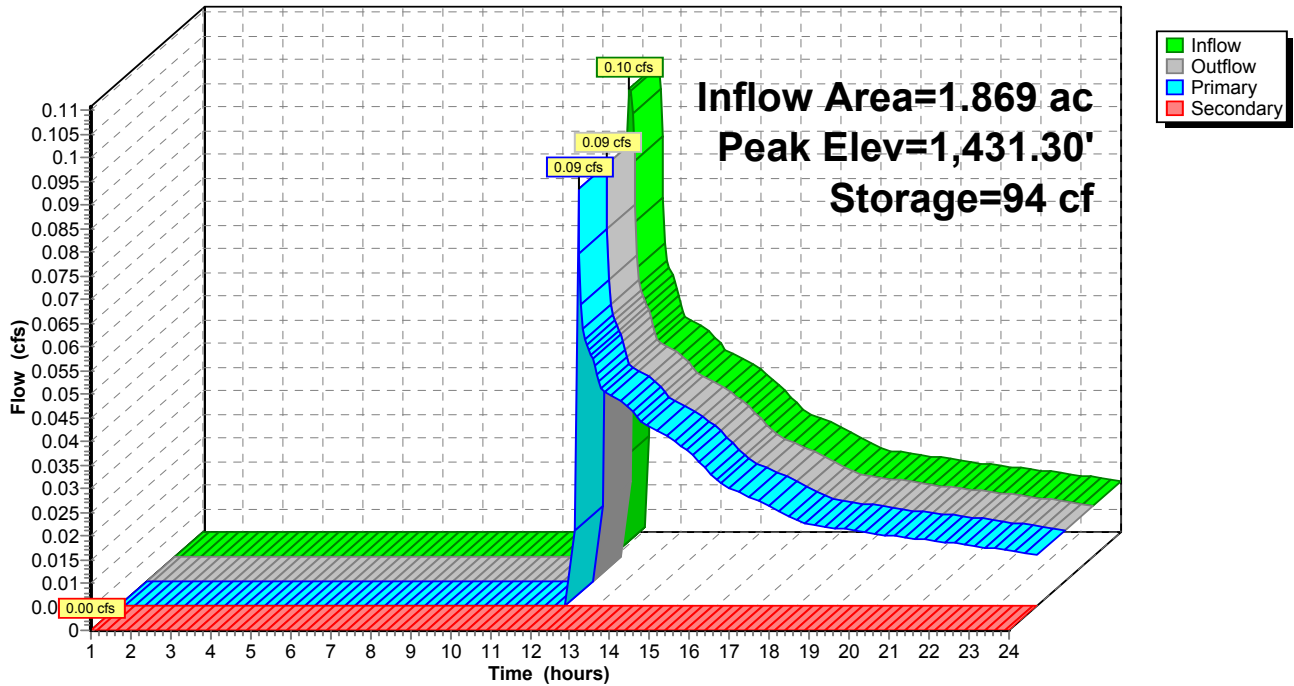
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=0.08 cfs @ 12.52 hrs HW=1,431.30' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 0.08 cfs @ 0.73 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 50P: Forebay 3

Hydrograph



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: Basin C - Pre	Runoff Area=15.366 ac 0.00% Impervious Runoff Depth>0.25" Flow Length=761' Tc=35.9 min CN=55 Runoff=1.07 cfs 0.316 af
Subcatchment19S: Basin D - Pre	Runoff Area=8.131 ac 0.00% Impervious Runoff Depth>0.24" Flow Length=728' Tc=74.6 min CN=55 Runoff=0.40 cfs 0.163 af
Subcatchment20S: Basin 6 - Post	Runoff Area=2.057 ac 0.00% Impervious Runoff Depth>0.37" Tc=6.0 min CN=59 Runoff=0.46 cfs 0.064 af
Subcatchment21S: Basin 5 - Post	Runoff Area=1.660 ac 0.00% Impervious Runoff Depth>0.52" Tc=6.0 min CN=63 Runoff=0.71 cfs 0.072 af
Subcatchment27S: Basin 3 - Post	Runoff Area=1.869 ac 0.00% Impervious Runoff Depth>0.34" Tc=6.0 min CN=58 Runoff=0.34 cfs 0.053 af
Subcatchment32S: Basin 3A - Post	Runoff Area=13.383 ac 0.00% Impervious Runoff Depth>0.25" Flow Length=761' Tc=35.9 min CN=55 Runoff=0.93 cfs 0.275 af
Subcatchment33S: Basin 3B - Post	Runoff Area=2.558 ac 0.00% Impervious Runoff Depth>0.25" Flow Length=1,314' Tc=43.7 min CN=55 Runoff=0.16 cfs 0.052 af
Subcatchment35S: Basin 6A - Post	Runoff Area=5.898 ac 0.00% Impervious Runoff Depth>0.24" Flow Length=586' Tc=48.8 min CN=55 Runoff=0.36 cfs 0.120 af
Pond 39P: Bioretention Pond 6	Peak Elev=1,432.74' Storage=397 cf Inflow=0.55 cfs 0.062 af Primary=0.14 cfs 0.062 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.062 af
Pond 40P: Forebay 6	Peak Elev=1,433.49' Storage=118 cf Inflow=0.46 cfs 0.064 af Primary=0.55 cfs 0.062 af Secondary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.062 af
Pond 47P: Bioretention Pond 5	Peak Elev=1,431.22' Storage=650 cf Inflow=0.67 cfs 0.070 af Primary=0.15 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.070 af
Pond 48P: Forebay 5	Peak Elev=1,431.41' Storage=108 cf Inflow=0.71 cfs 0.072 af Primary=0.67 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=0.67 cfs 0.070 af
Pond 49P: Bioretention Pond 3	Peak Elev=1,430.58' Storage=268 cf Inflow=0.33 cfs 0.051 af Primary=0.12 cfs 0.051 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.051 af
Pond 50P: Forebay 3	Peak Elev=1,431.38' Storage=104 cf Inflow=0.34 cfs 0.053 af Primary=0.33 cfs 0.051 af Secondary=0.00 cfs 0.000 af Outflow=0.33 cfs 0.051 af

Total Runoff Area = 50.922 ac Runoff Volume = 1.115 af Average Runoff Depth = 0.26"
100.00% Pervious = 50.922 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 18S: Basin C - Pre

Runoff = 1.07 cfs @ 12.78 hrs, Volume= 0.316 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
15.366	55	Woods, Good, HSG B	Rural open/forest
15.366		100.00% Pervious Area	

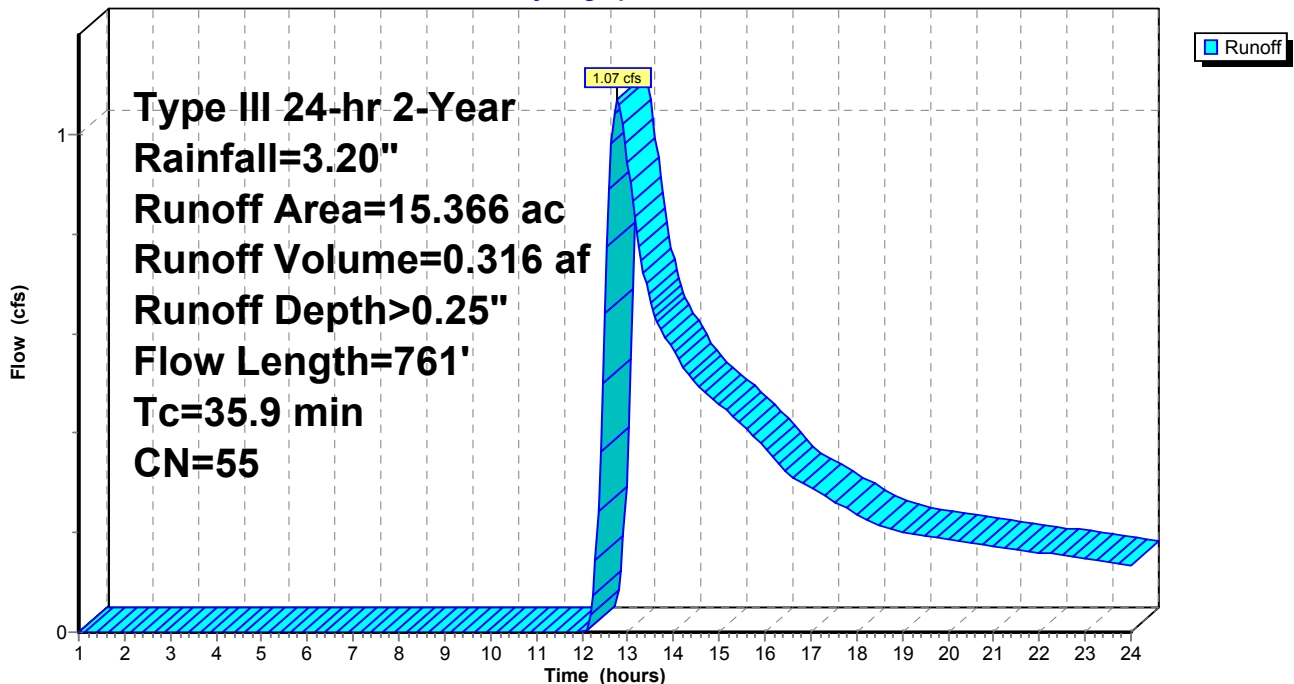
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.366	Rural open/forest	43.77	0.09	1.53
15.366	Total	43.77	0.09	1.53

Subcatchment 18S: Basin C - Pre

Hydrograph



Summary for Subcatchment 19S: Basin D - Pre

Runoff = 0.40 cfs @ 13.46 hrs, Volume= 0.163 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
8.131	55	Woods, Good, HSG B	Rural open/forest
8.131		100.00% Pervious Area	

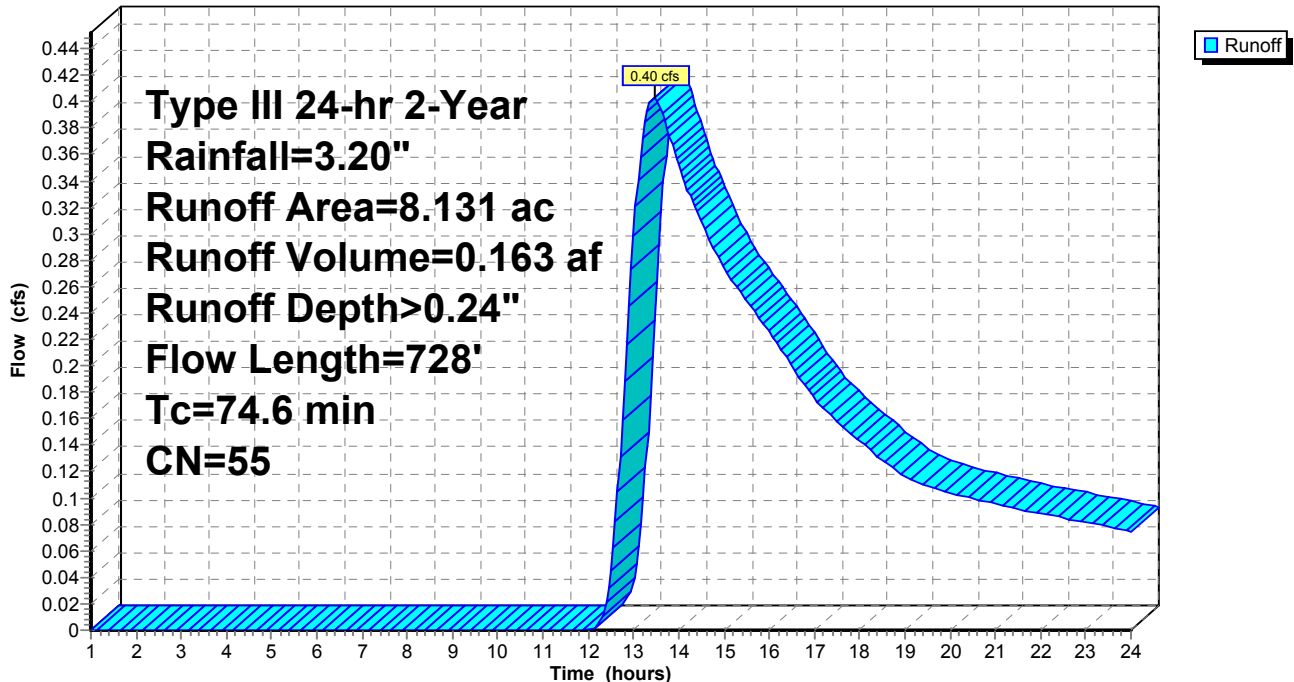
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.2	300	0.0100	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.4	428	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
74.6	728	Total			

Pollutant Loading for 0.24" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
8.131	Rural open/forest	22.66	0.05	0.79
8.131	Total	22.66	0.05	0.79

Subcatchment 19S: Basin D - Pre

Hydrograph



Summary for Subcatchment 20S: Basin 6 - Post

Runoff = 0.46 cfs @ 12.15 hrs, Volume= 0.064 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

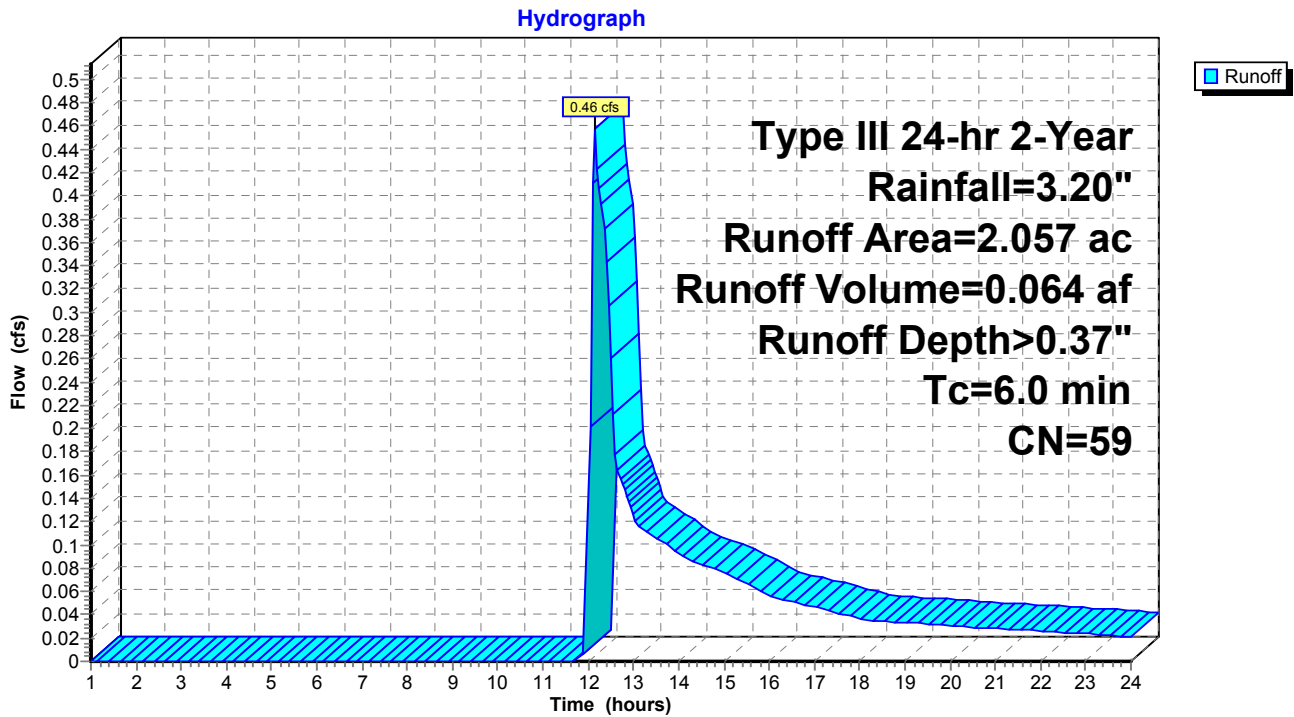
Area (ac)	CN	Description	Land Use
0.166	85	Gravel roads, HSG B	Driveway
0.633	55	Woods, Good, HSG B	Rural open/forest
1.189	58	Meadow, non-grazed, HSG B	Rural open/forest
0.069	58	Meadow, non-grazed, HSG B	Water/wetland
2.057	59	Weighted Average	
2.057		100.00% Pervious Area	

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

Pollutant Loading for 0.37" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.166	Driveway	2.43	0.01	0.03
1.822	Rural open/forest	7.86	0.02	0.27
0.069	Water/wetland	0.04	0.00	0.01
2.057	Total	10.33	0.03	0.31

Subcatchment 20S: Basin 6 - Post



Summary for Subcatchment 21S: Basin 5 - Post

Runoff = 0.71 cfs @ 12.12 hrs, Volume= 0.072 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

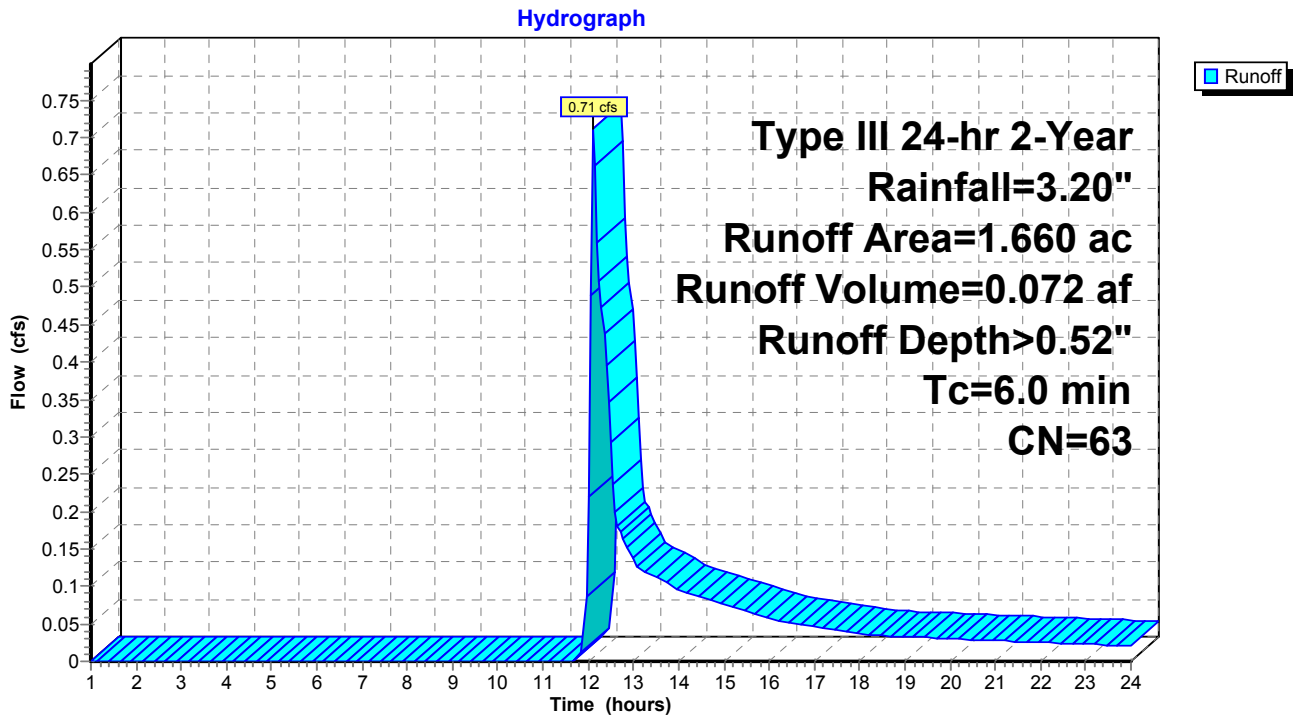
Area (ac)	CN	Description	Land Use
0.304	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.204	58	Meadow, non-grazed, HSG B	Rural open/forest
0.152	58	Meadow, non-grazed, HSG B	Water/wetland
1.660	63	Weighted Average	
1.660		100.00% Pervious Area	

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

Pollutant Loading for 0.52" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.304	Driveway	6.18	0.02	0.08
1.204	Rural open/forest	7.22	0.02	0.25
0.152	Water/wetland	0.11	0.00	0.02
1.660	Total	13.50	0.04	0.35

Subcatchment 21S: Basin 5 - Post



Summary for Subcatchment 27S: Basin 3 - Post

Runoff = 0.34 cfs @ 12.17 hrs, Volume= 0.053 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

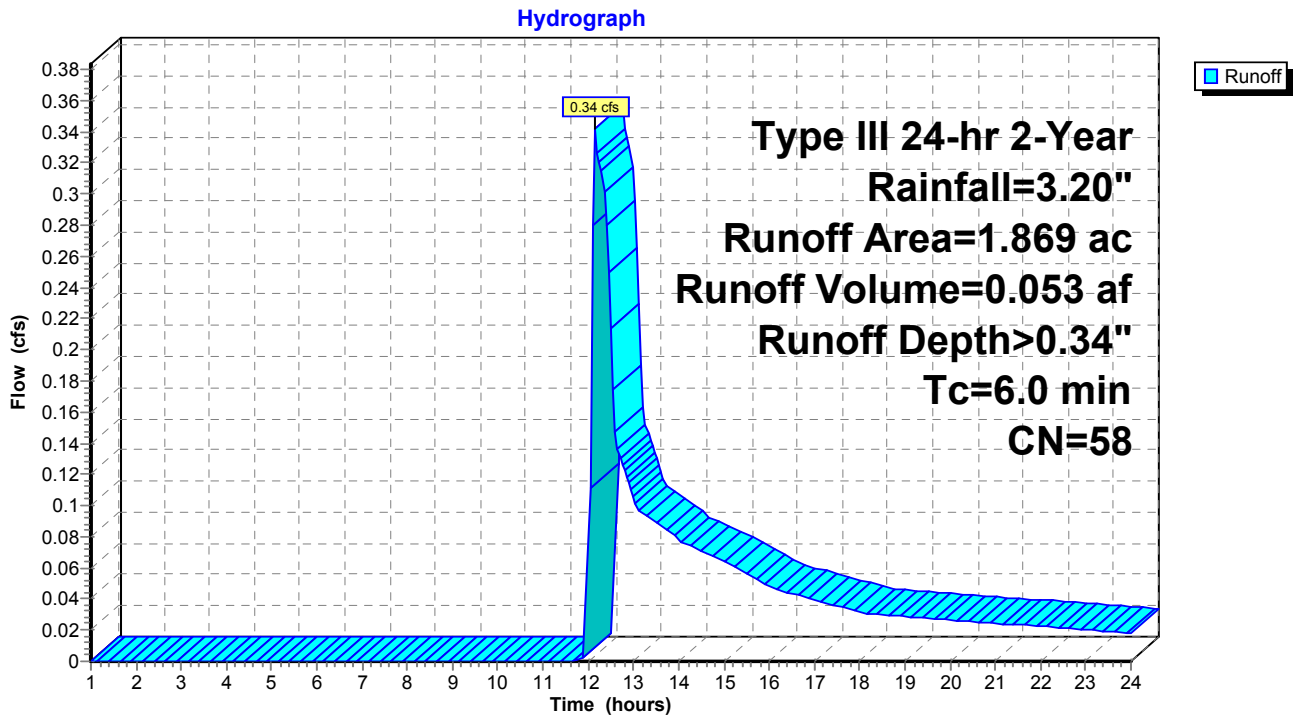
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.784	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.869	58	Weighted Average	
1.869		100.00% Pervious Area	

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

Pollutant Loading for 0.34" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
1.784	Rural open/forest	7.02	0.02	0.25
0.085	Water/wetland	0.04	0.00	0.01
1.869	Total	7.06	0.02	0.25

Subcatchment 27S: Basin 3 - Post



Summary for Subcatchment 32S: Basin 3A - Post

Runoff = 0.93 cfs @ 12.78 hrs, Volume= 0.275 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

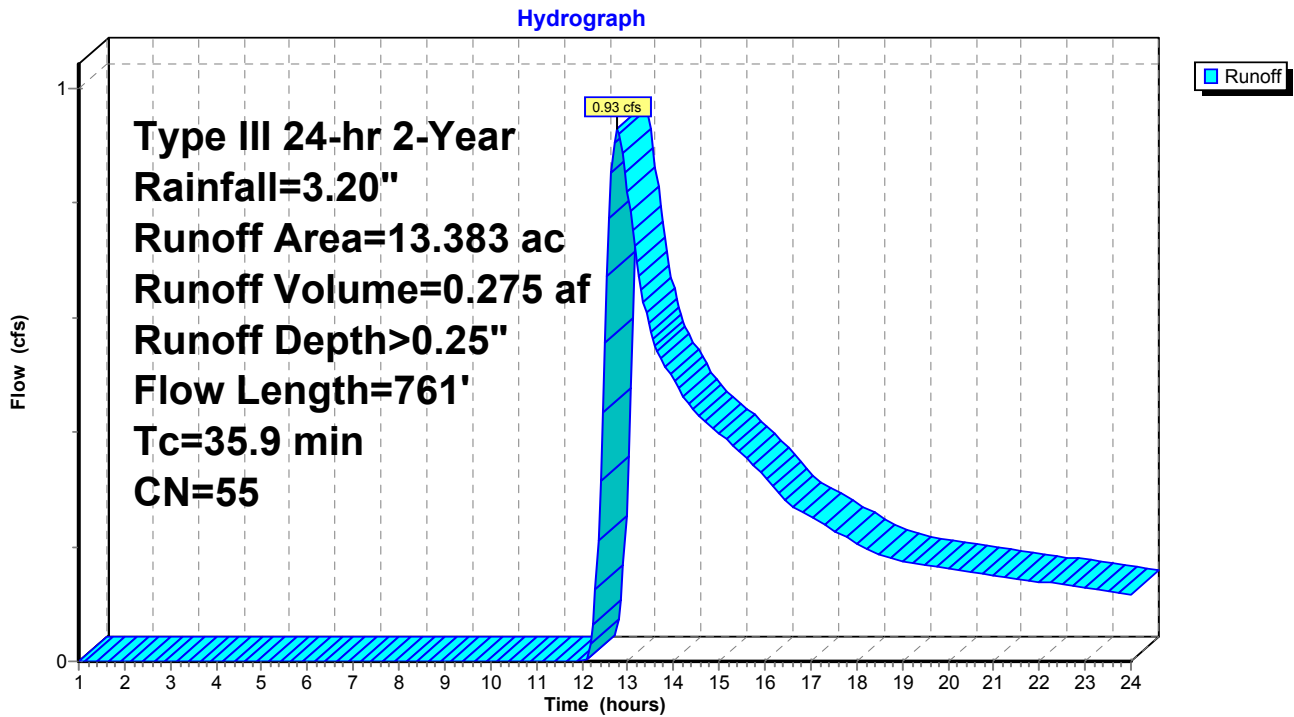
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
13.298	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
13.383	55	Weighted Average	
13.383		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
13.298	Rural open/forest	37.88	0.08	1.32
0.085	Water/wetland	0.03	0.00	0.01
13.383	Total	37.91	0.08	1.33

Subcatchment 32S: Basin 3A - Post



Summary for Subcatchment 33S: Basin 3B - Post

Runoff = 0.16 cfs @ 12.91 hrs, Volume= 0.052 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

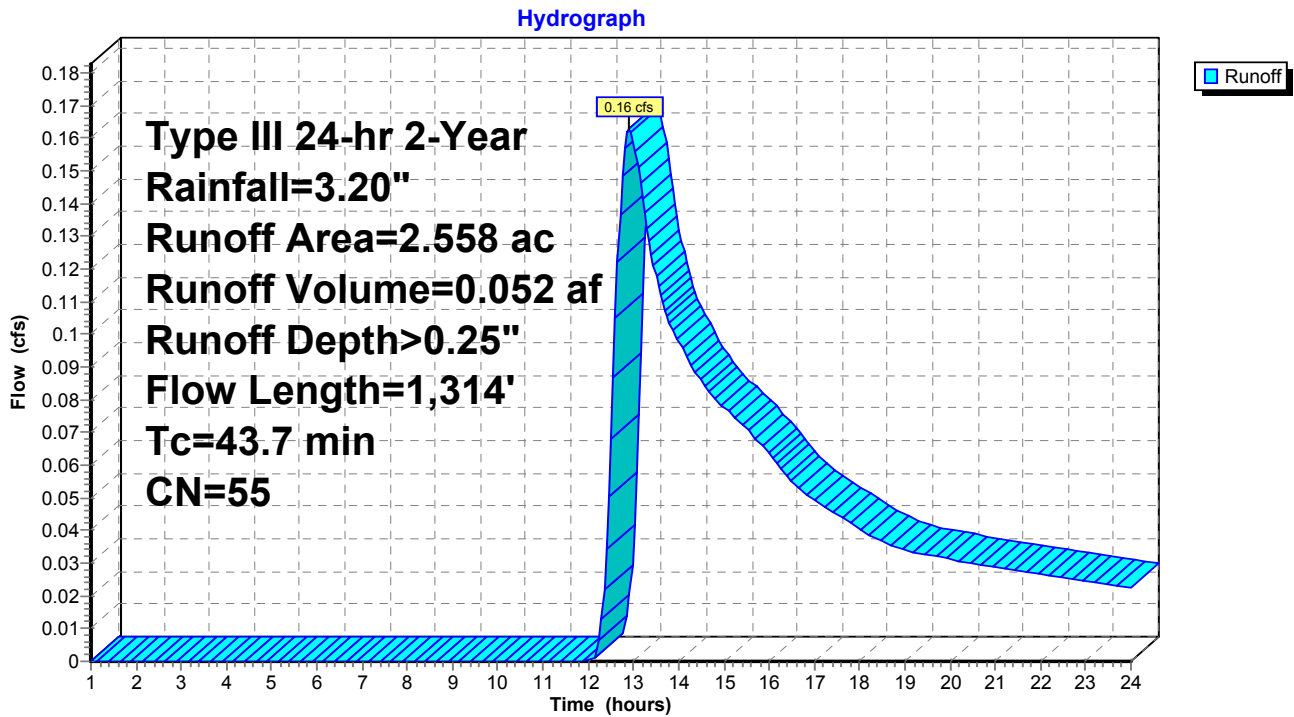
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
2.473	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
2.558	55	Weighted Average	
2.558		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	273	0.0900	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
17.3	1,041	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.7	1,314	Total			

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
2.473	Rural open/forest	7.01	0.02	0.24
0.085	Water/wetland	0.03	0.00	0.01
2.558	Total	7.04	0.02	0.25

Subcatchment 33S: Basin 3B - Post



Summary for Subcatchment 35S: Basin 6A - Post

Runoff = 0.36 cfs @ 12.99 hrs, Volume= 0.120 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

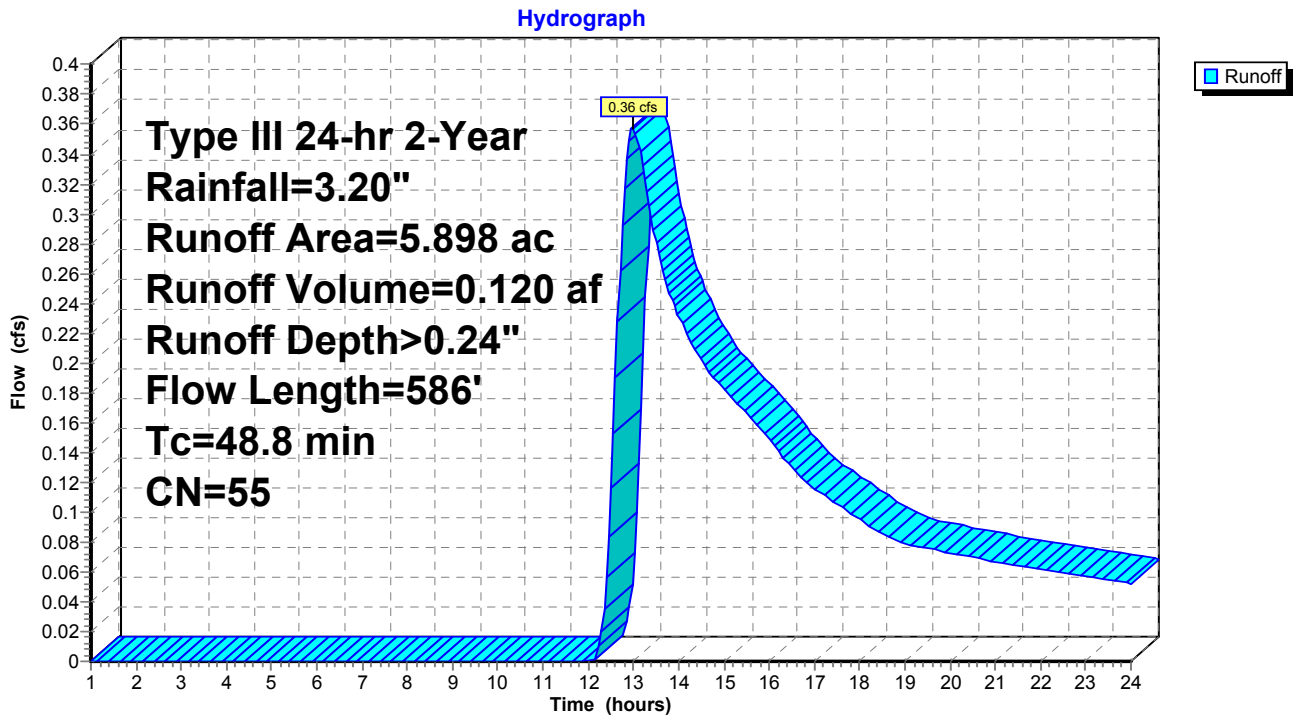
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
5.898	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
5.898	55	Weighted Average	
5.898		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0	300	0.0300	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.8	286	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
48.8	586	Total			

Pollutant Loading for 0.24" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Driveway	0.00	0.00	0.00
5.898	Rural open/forest	16.68	0.04	0.58
0.000	Water/wetland	0.00	0.00	0.00
5.898	Total	16.68	0.04	0.58

Subcatchment 35S: Basin 6A - Post



Summary for Pond 39P: Bioretention Pond 6

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 0.36" for 2-Year event
 Inflow = 0.55 cfs @ 12.17 hrs, Volume= 0.062 af
 Outflow = 0.14 cfs @ 12.84 hrs, Volume= 0.062 af, Atten= 74%, Lag= 40.4 min
 Primary = 0.14 cfs @ 12.84 hrs, Volume= 0.062 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,432.74' @ 12.84 hrs Surf.Area= 622 sf Storage= 397 cf

Plug-Flow detention time= 20.5 min calculated for 0.062 af (100% of inflow)
 Center-of-Mass det. time= 19.8 min (952.6 - 932.8)

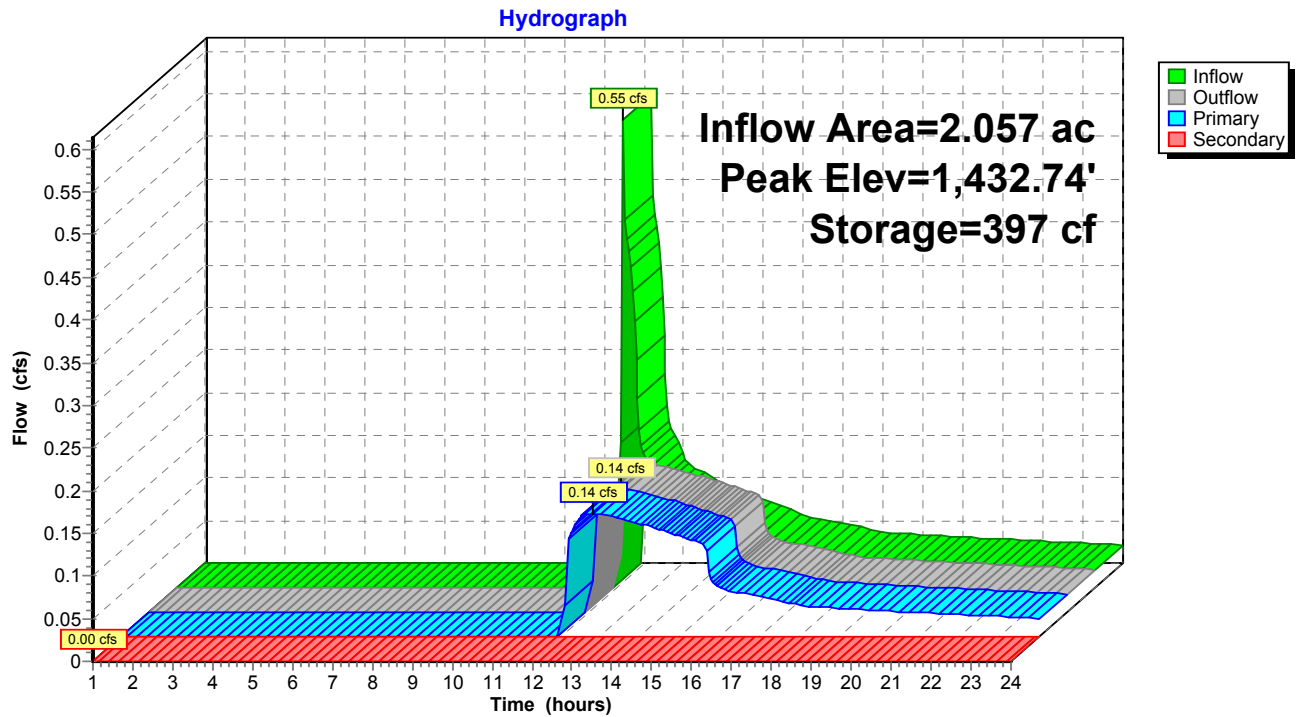
Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 0.00 0.08

Primary OutFlow Max=0.14 cfs @ 12.84 hrs HW=1,432.74' (Free Discharge)
 ↑1=Exfiltration (Controls 0.14 cfs)
 ↓2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 39P: Bioretention Pond 6



Summary for Pond 40P: Forebay 6

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

[88] Warning: Qout>Qin may require Finer Routing>1

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 0.37" for 2-Year event
 Inflow = 0.46 cfs @ 12.15 hrs, Volume= 0.064 af
 Outflow = 0.55 cfs @ 12.17 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.9 min
 Primary = 0.55 cfs @ 12.17 hrs, Volume= 0.062 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.49' @ 12.15 hrs Surf.Area= 139 sf Storage= 118 cf

Plug-Flow detention time= 23.6 min calculated for 0.062 af (97% of inflow)
 Center-of-Mass det. time= 7.4 min (932.8 - 925.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

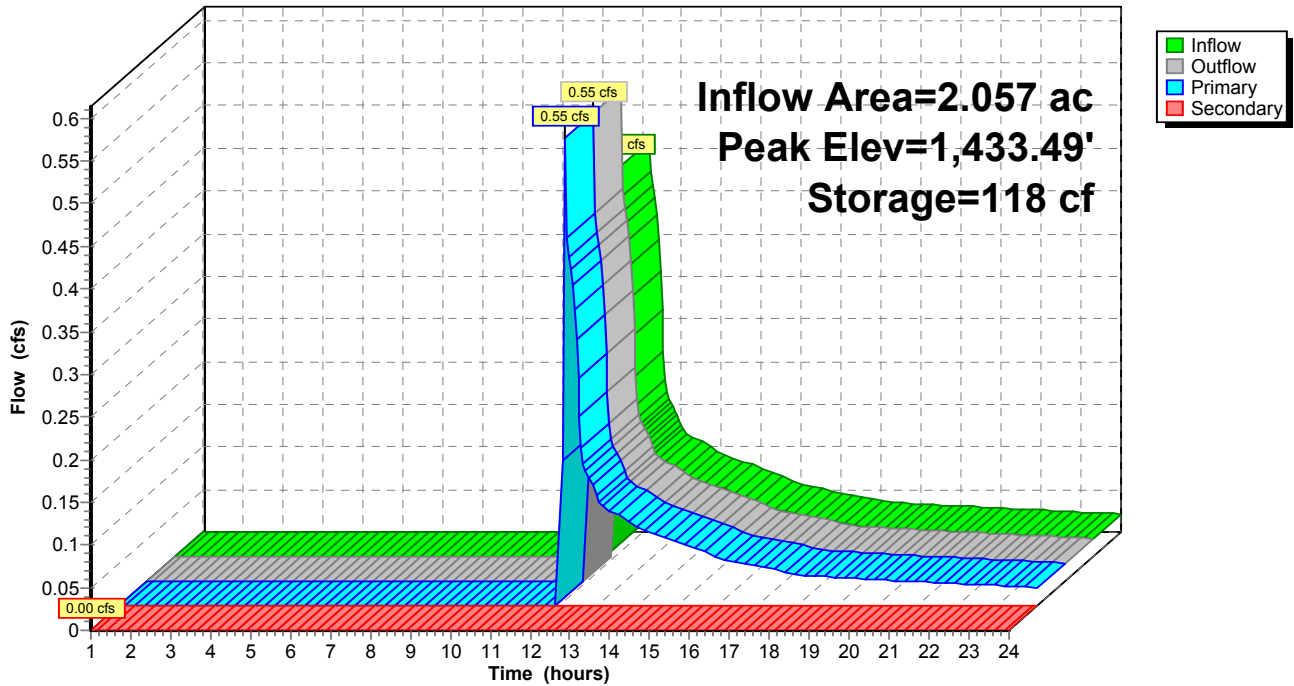
Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=0.48 cfs @ 12.17 hrs HW=1,433.48' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 0.48 cfs @ 1.18 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Forebay 6

Hydrograph



Summary for Pond 47P: Bioretention Pond 5

[79] Warning: Submerged Pond 48P Primary device # 1 by 0.02'

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 0.50" for 2-Year event
 Inflow = 0.67 cfs @ 12.13 hrs, Volume= 0.070 af
 Outflow = 0.15 cfs @ 12.86 hrs, Volume= 0.070 af, Atten= 77%, Lag= 43.7 min
 Primary = 0.15 cfs @ 12.86 hrs, Volume= 0.070 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.22' @ 12.86 hrs Surf.Area= 669 sf Storage= 650 cf

Plug-Flow detention time= 36.4 min calculated for 0.069 af (100% of inflow)
 Center-of-Mass det. time= 35.7 min (945.5 - 909.7)

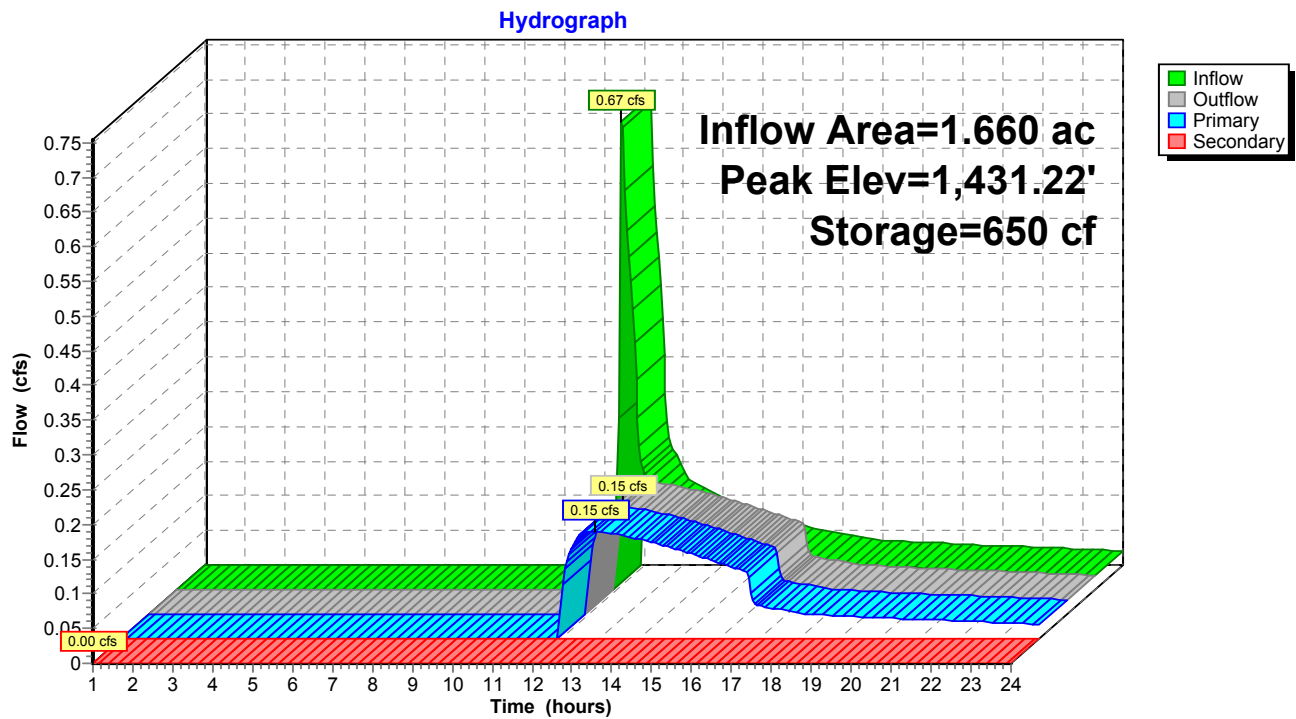
Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.25

Primary OutFlow Max=0.15 cfs @ 12.86 hrs HW=1,431.22' (Free Discharge)
 ↑1=Exfiltration (Controls 0.15 cfs)
 ↓2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 47P: Bioretention Pond 5



Summary for Pond 48P: Forebay 5

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 0.52" for 2-Year event
 Inflow = 0.71 cfs @ 12.12 hrs, Volume= 0.072 af
 Outflow = 0.67 cfs @ 12.13 hrs, Volume= 0.070 af, Atten= 5%, Lag= 0.7 min
 Primary = 0.67 cfs @ 12.13 hrs, Volume= 0.070 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.41' @ 12.13 hrs Surf.Area= 132 sf Storage= 108 cf

Plug-Flow detention time= 20.8 min calculated for 0.070 af (97% of inflow)
 Center-of-Mass det. time= 6.1 min (909.7 - 903.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatoid Z=2.0

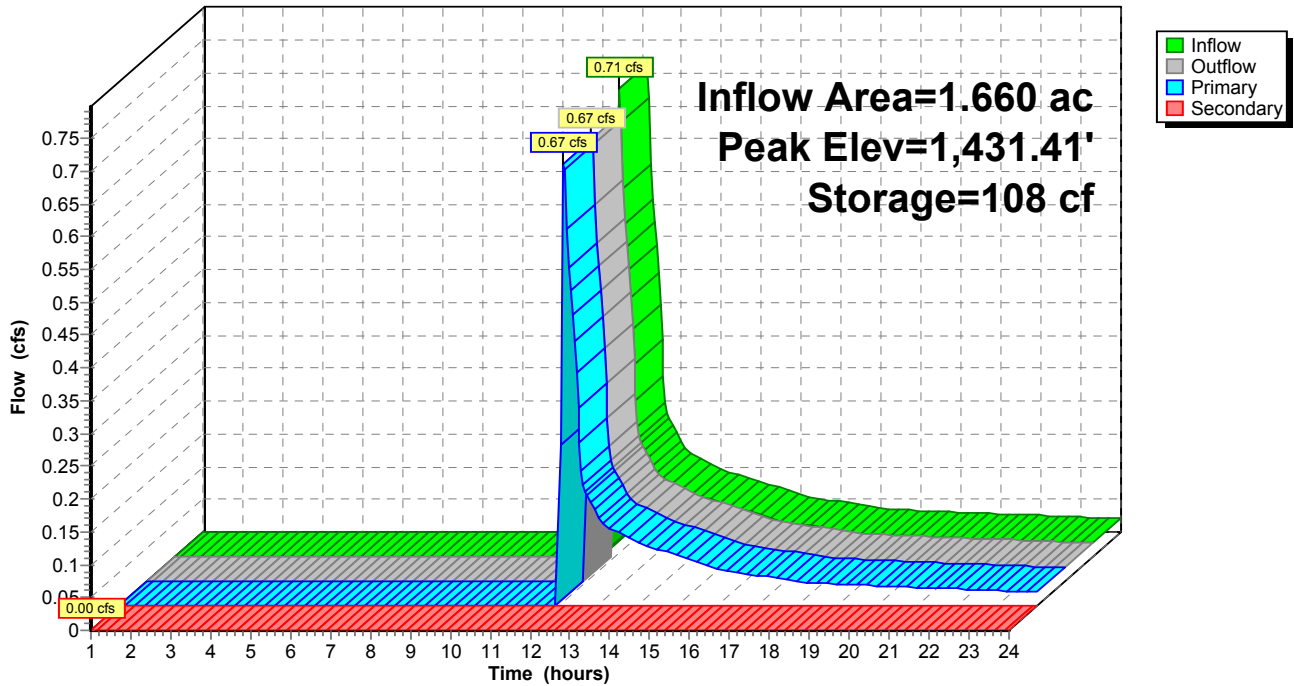
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.20'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.80 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=0.66 cfs @ 12.13 hrs HW=1,431.41' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 0.66 cfs @ 1.48 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 48P: Forebay 5

Hydrograph



Summary for Pond 49P: Bioretention Pond 3

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 0.33" for 2-Year event
 Inflow = 0.33 cfs @ 12.20 hrs, Volume= 0.051 af
 Outflow = 0.12 cfs @ 12.83 hrs, Volume= 0.051 af, Atten= 63%, Lag= 37.9 min
 Primary = 0.12 cfs @ 12.83 hrs, Volume= 0.051 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,430.58' @ 12.83 hrs Surf.Area= 522 sf Storage= 268 cf

Plug-Flow detention time= 15.9 min calculated for 0.051 af (100% of inflow)
 Center-of-Mass det. time= 14.8 min (956.1 - 941.4)

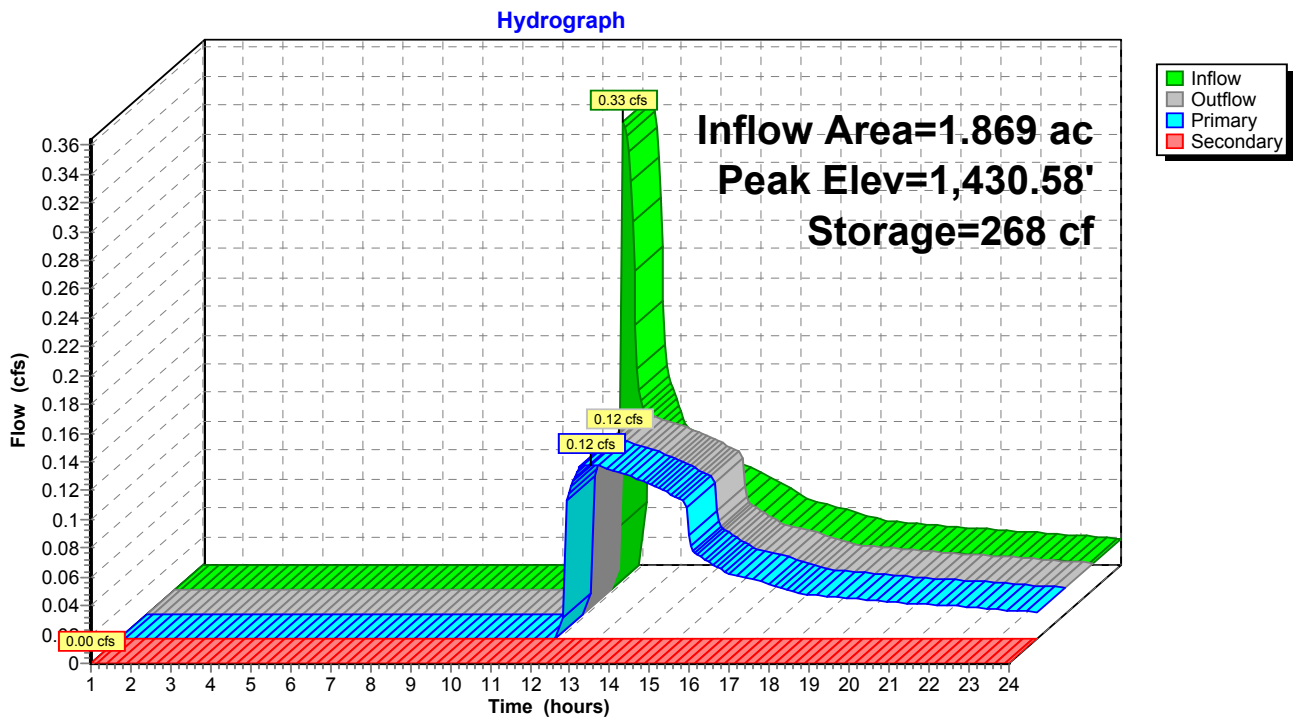
Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.08

Primary OutFlow Max=0.12 cfs @ 12.83 hrs HW=1,430.58' (Free Discharge)
 ↑1=Exfiltration (Controls 0.12 cfs)
 ↓2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 49P: Bioretention Pond 3



Summary for Pond 50P: Forebay 3

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 0.34" for 2-Year event
 Inflow = 0.34 cfs @ 12.17 hrs, Volume= 0.053 af
 Outflow = 0.33 cfs @ 12.20 hrs, Volume= 0.051 af, Atten= 5%, Lag= 2.1 min
 Primary = 0.33 cfs @ 12.20 hrs, Volume= 0.051 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.38' @ 12.20 hrs Surf.Area= 129 sf Storage= 104 cf

Plug-Flow detention time= 29.7 min calculated for 0.051 af (96% of inflow)
 Center-of-Mass det. time= 9.5 min (941.4 - 931.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

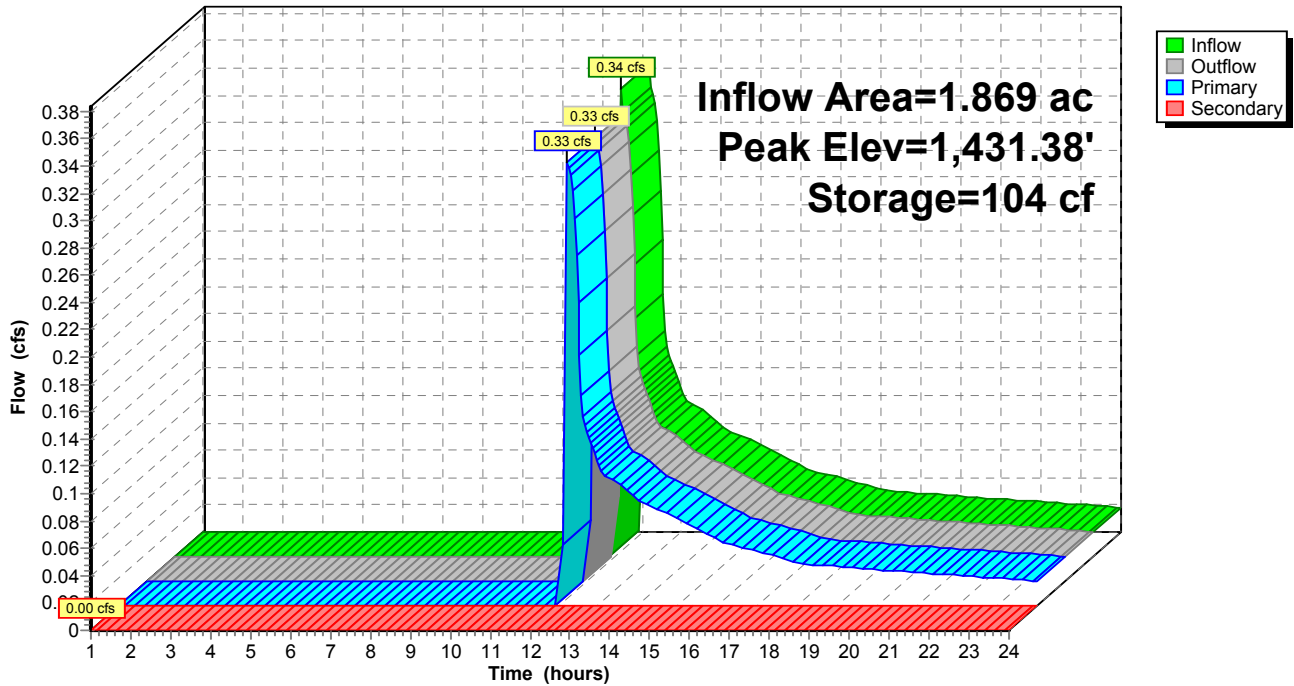
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=0.32 cfs @ 12.20 hrs HW=1,431.38' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 0.32 cfs @ 1.18 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 50P: Forebay 3

Hydrograph



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: Basin C - Pre	Runoff Area=15.366 ac 0.00% Impervious Runoff Depth>0.82" Flow Length=761' Tc=35.9 min CN=55 Runoff=6.08 cfs 1.055 af
Subcatchment19S: Basin D - Pre	Runoff Area=8.131 ac 0.00% Impervious Runoff Depth>0.81" Flow Length=728' Tc=74.6 min CN=55 Runoff=2.11 cfs 0.550 af
Subcatchment20S: Basin 6 - Post	Runoff Area=2.057 ac 0.00% Impervious Runoff Depth>1.07" Tc=6.0 min CN=59 Runoff=2.17 cfs 0.183 af
Subcatchment21S: Basin 5 - Post	Runoff Area=1.660 ac 0.00% Impervious Runoff Depth>1.32" Tc=6.0 min CN=63 Runoff=2.33 cfs 0.183 af
Subcatchment27S: Basin 3 - Post	Runoff Area=1.869 ac 0.00% Impervious Runoff Depth>1.01" Tc=6.0 min CN=58 Runoff=1.82 cfs 0.157 af
Subcatchment32S: Basin 3A - Post	Runoff Area=13.383 ac 0.00% Impervious Runoff Depth>0.82" Flow Length=761' Tc=35.9 min CN=55 Runoff=5.29 cfs 0.919 af
Subcatchment33S: Basin 3B - Post	Runoff Area=2.558 ac 0.00% Impervious Runoff Depth>0.82" Flow Length=1,314' Tc=43.7 min CN=55 Runoff=0.91 cfs 0.175 af
Subcatchment35S: Basin 6A - Post	Runoff Area=5.898 ac 0.00% Impervious Runoff Depth>0.82" Flow Length=586' Tc=48.8 min CN=55 Runoff=1.98 cfs 0.403 af
Pond 39P: Bioretention Pond 6	Peak Elev=1,434.37' Storage=1,750 cf Inflow=2.14 cfs 0.180 af Primary=0.85 cfs 0.180 af Secondary=0.00 cfs 0.000 af Outflow=0.85 cfs 0.180 af
Pond 40P: Forebay 6	Peak Elev=1,433.70' Storage=149 cf Inflow=2.17 cfs 0.183 af Primary=2.14 cfs 0.180 af Secondary=0.00 cfs 0.000 af Outflow=2.14 cfs 0.180 af
Pond 47P: Bioretention Pond 5	Peak Elev=1,433.40' Storage=2,723 cf Inflow=2.28 cfs 0.181 af Primary=0.36 cfs 0.181 af Secondary=0.00 cfs 0.000 af Outflow=0.36 cfs 0.181 af
Pond 48P: Forebay 5	Peak Elev=1,431.66' Storage=144 cf Inflow=2.33 cfs 0.183 af Primary=2.28 cfs 0.181 af Secondary=0.00 cfs 0.000 af Outflow=2.28 cfs 0.181 af
Pond 49P: Bioretention Pond 3	Peak Elev=1,432.89' Storage=2,116 cf Inflow=1.78 cfs 0.155 af Primary=0.26 cfs 0.154 af Secondary=0.00 cfs 0.000 af Outflow=0.26 cfs 0.154 af
Pond 50P: Forebay 3	Peak Elev=1,431.64' Storage=141 cf Inflow=1.82 cfs 0.157 af Primary=1.78 cfs 0.155 af Secondary=0.00 cfs 0.000 af Outflow=1.78 cfs 0.155 af

Total Runoff Area = 50.922 ac Runoff Volume = 3.625 af Average Runoff Depth = 0.85"
100.00% Pervious = 50.922 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 18S: Basin C - Pre

Runoff = 6.08 cfs @ 12.61 hrs, Volume= 1.055 af, Depth> 0.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description	Land Use
15.366	55	Woods, Good, HSG B	Rural open/forest
15.366		100.00% Pervious Area	

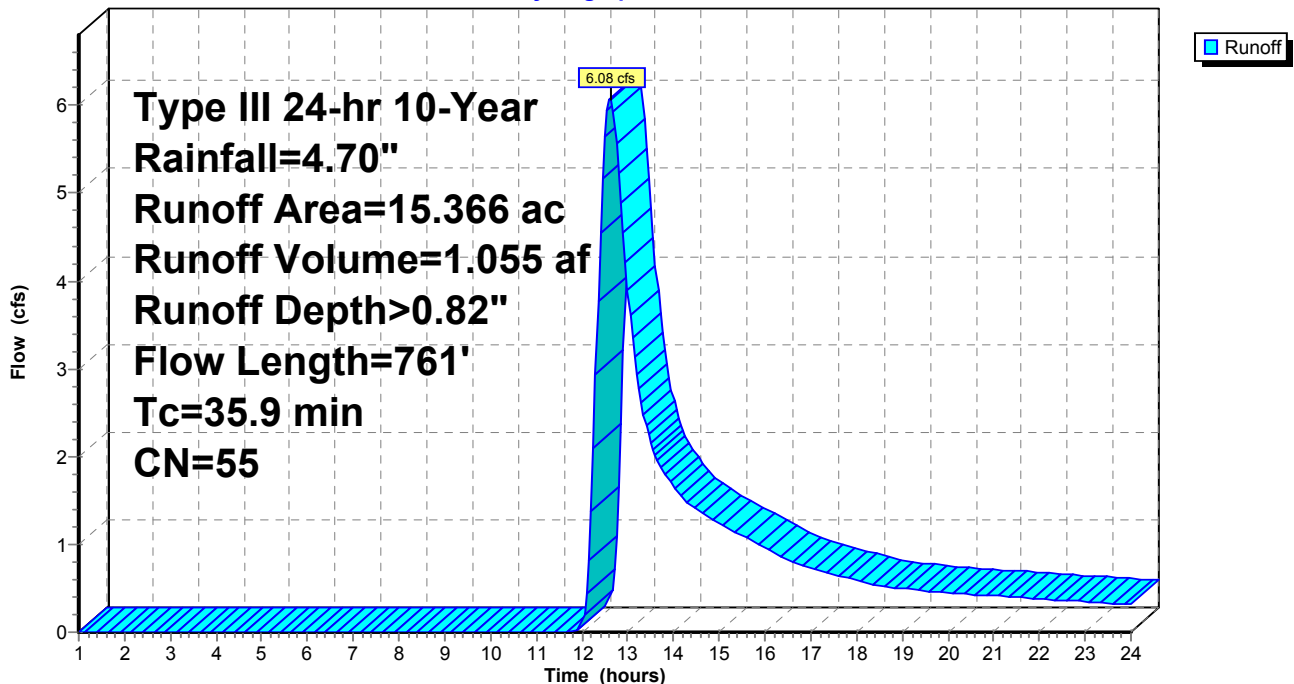
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 0.82" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.366	Rural open/forest	146.38	0.32	5.11
15.366	Total	146.38	0.32	5.11

Subcatchment 18S: Basin C - Pre

Hydrograph



Summary for Subcatchment 19S: Basin D - Pre

Runoff = 2.11 cfs @ 13.19 hrs, Volume= 0.550 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description	Land Use
8.131	55	Woods, Good, HSG B	Rural open/forest
8.131		100.00% Pervious Area	

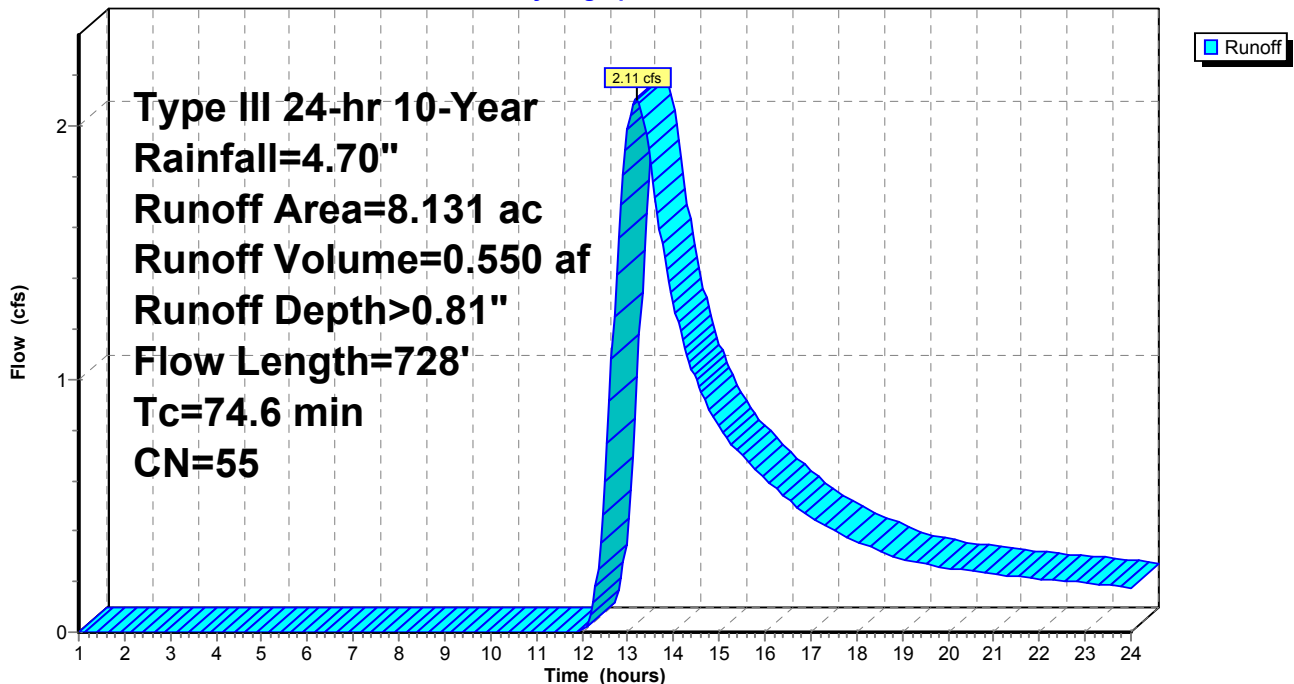
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.2	300	0.0100	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.4	428	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
74.6	728	Total			

Pollutant Loading for 0.81" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
8.131	Rural open/forest	76.27	0.16	2.66
8.131	Total	76.27	0.16	2.66

Subcatchment 19S: Basin D - Pre

Hydrograph



Summary for Subcatchment 20S: Basin 6 - Post

Runoff = 2.17 cfs @ 12.11 hrs, Volume= 0.183 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

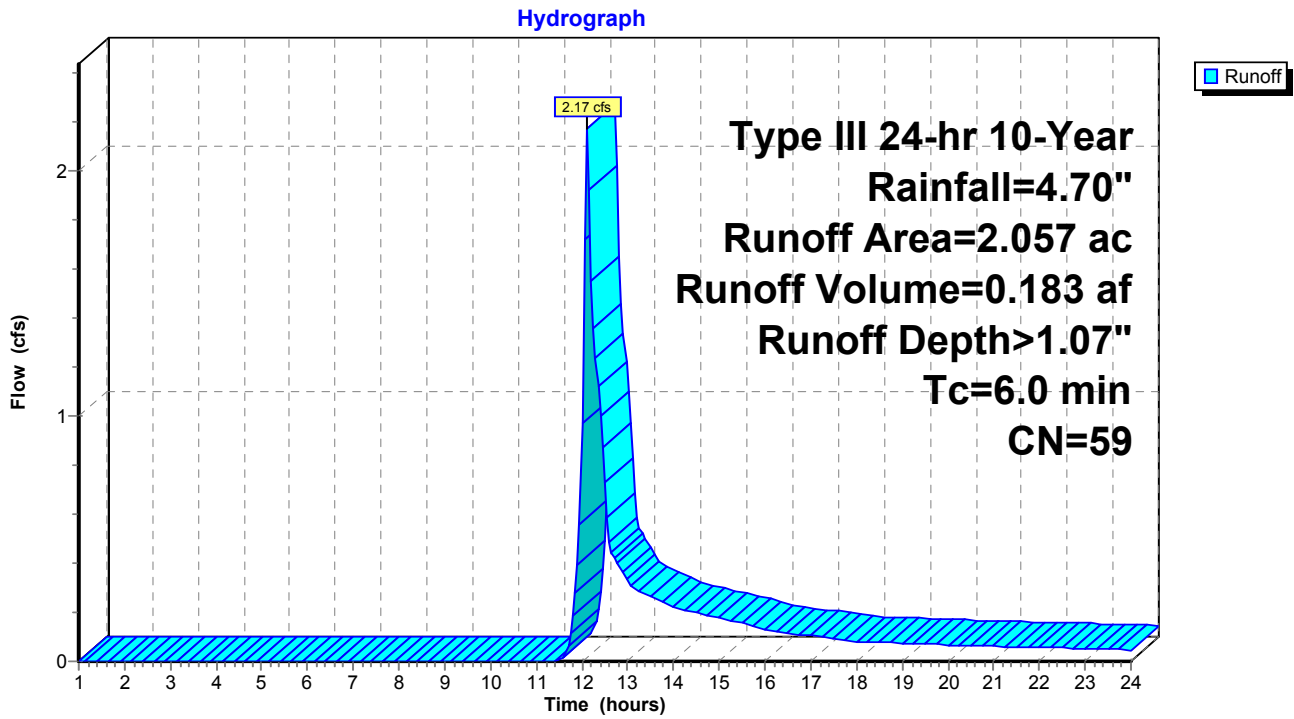
Area (ac)	CN	Description	Land Use
0.166	85	Gravel roads, HSG B	Driveway
0.633	55	Woods, Good, HSG B	Rural open/forest
1.189	58	Meadow, non-grazed, HSG B	Rural open/forest
0.069	58	Meadow, non-grazed, HSG B	Water/wetland
2.057	59	Weighted Average	
2.057		100.00% Pervious Area	

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

Pollutant Loading for 1.07" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.166	Driveway	6.94	0.02	0.08
1.822	Rural open/forest	22.46	0.05	0.78
0.069	Water/wetland	0.10	0.00	0.02
2.057	Total	29.50	0.07	0.89

Subcatchment 20S: Basin 6 - Post



Summary for Subcatchment 21S: Basin 5 - Post

Runoff = 2.33 cfs @ 12.10 hrs, Volume= 0.183 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

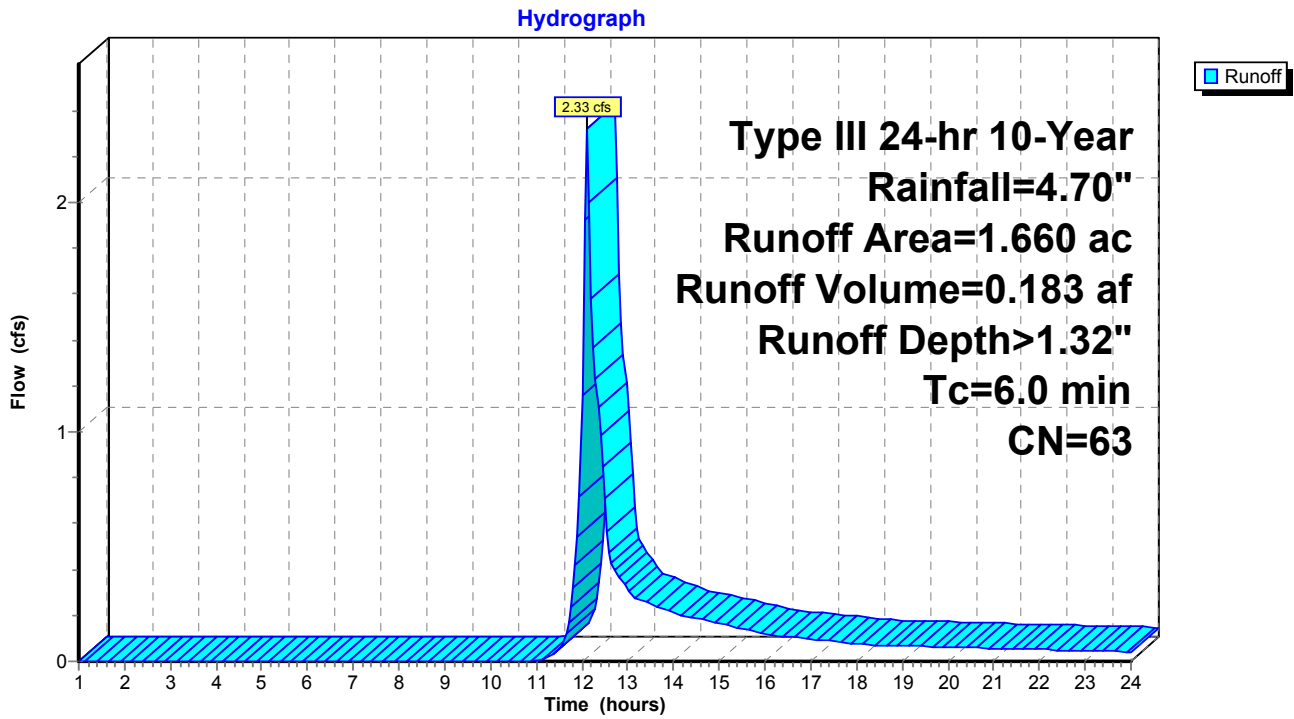
Area (ac)	CN	Description	Land Use
0.304	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.204	58	Meadow, non-grazed, HSG B	Rural open/forest
0.152	58	Meadow, non-grazed, HSG B	Water/wetland
1.660	63	Weighted Average	
1.660		100.00% Pervious Area	

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

Pollutant Loading for 1.32" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.304	Driveway	15.74	0.05	0.19
1.204	Rural open/forest	18.38	0.04	0.64
0.152	Water/wetland	0.27	0.00	0.06
1.660	Total	34.39	0.09	0.90

Subcatchment 21S: Basin 5 - Post



Summary for Subcatchment 27S: Basin 3 - Post

Runoff = 1.82 cfs @ 12.11 hrs, Volume= 0.157 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

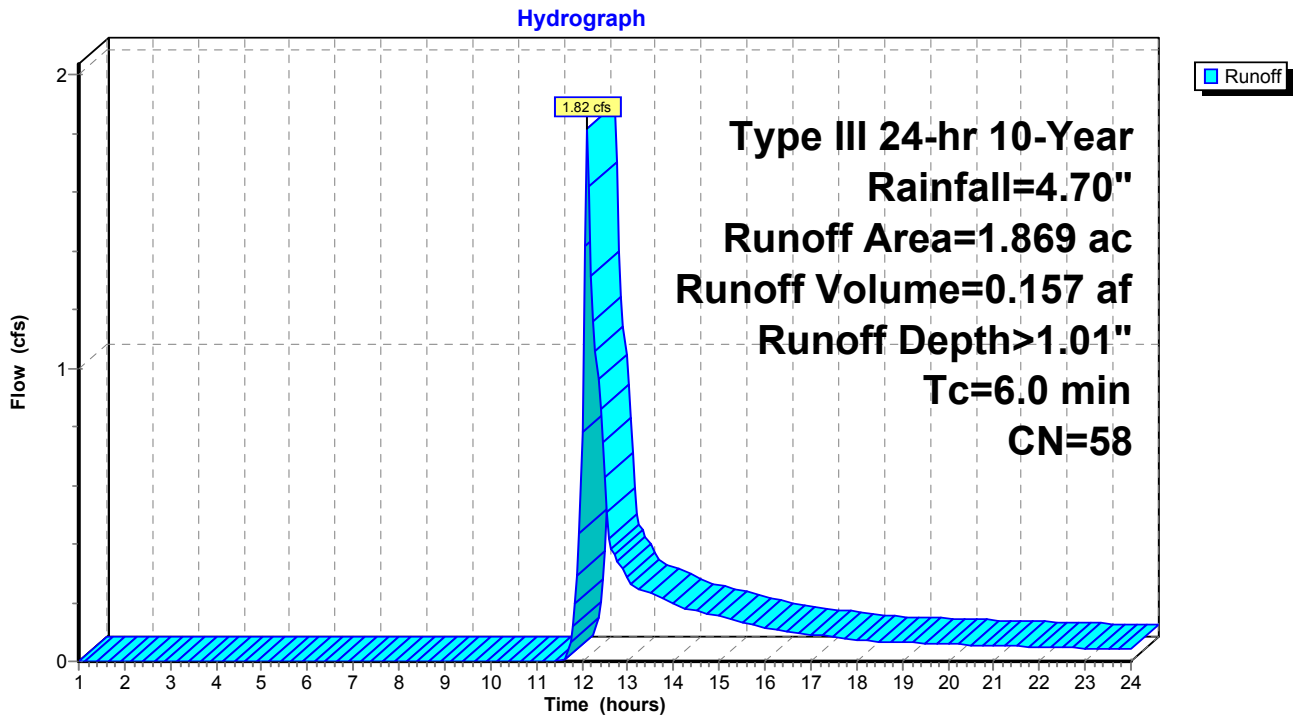
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.784	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.869	58	Weighted Average	
1.869		100.00% Pervious Area	

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

Pollutant Loading for 1.01" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
1.784	Rural open/forest	20.75	0.04	0.72
0.085	Water/wetland	0.12	0.00	0.03
1.869	Total	20.86	0.05	0.75

Subcatchment 27S: Basin 3 - Post



Summary for Subcatchment 32S: Basin 3A - Post

Runoff = 5.29 cfs @ 12.61 hrs, Volume= 0.919 af, Depth> 0.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

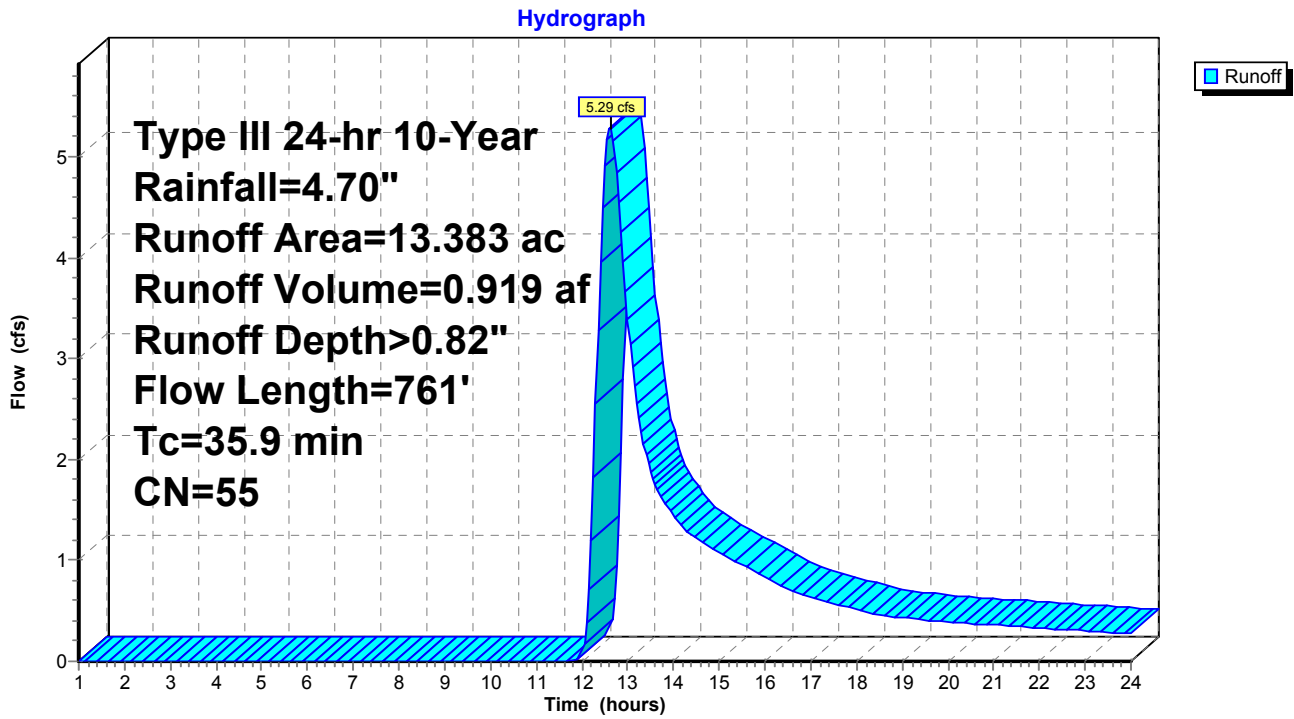
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
13.298	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
13.383	55	Weighted Average	
13.383		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 0.82" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
13.298	Rural open/forest	126.68	0.27	4.42
0.085	Water/wetland	0.10	0.00	0.02
13.383	Total	126.78	0.27	4.44

Subcatchment 32S: Basin 3A - Post



Summary for Subcatchment 33S: Basin 3B - Post

Runoff = 0.91 cfs @ 12.73 hrs, Volume= 0.175 af, Depth> 0.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

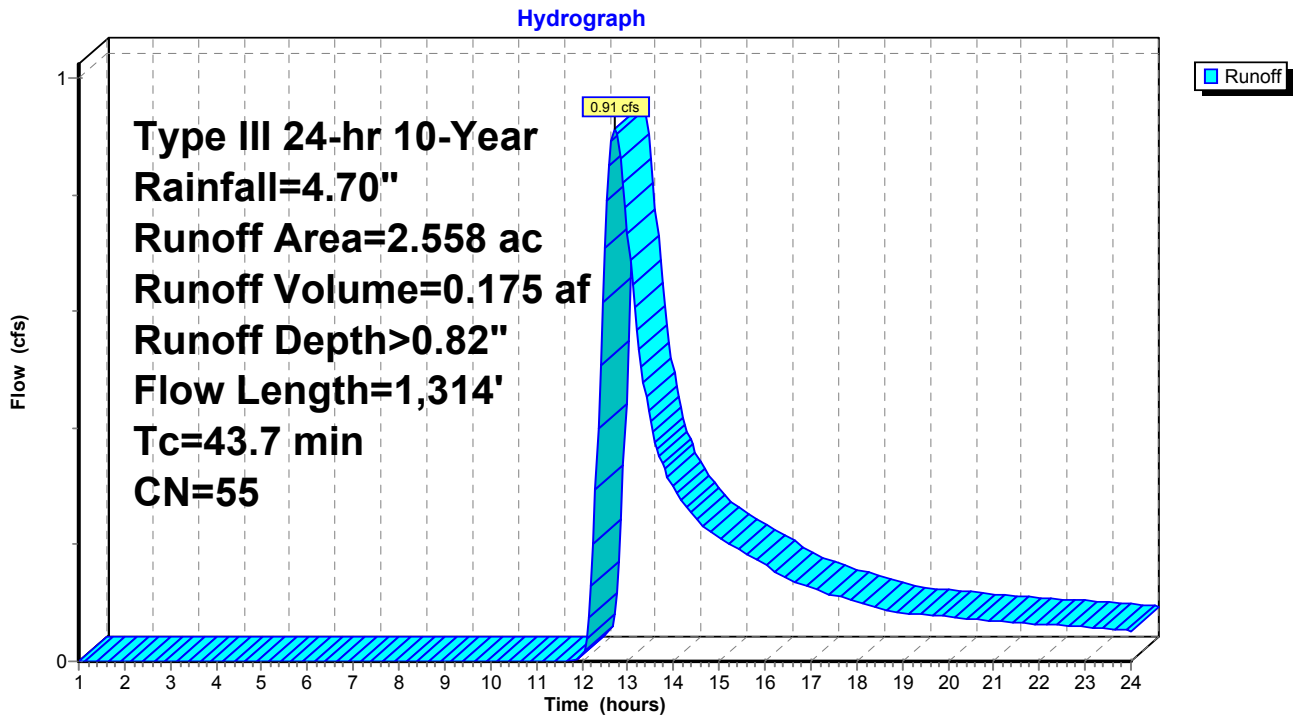
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
2.473	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
2.558	55	Weighted Average	
2.558		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	273	0.0900	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
17.3	1,041	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.7	1,314	Total			

Pollutant Loading for 0.82" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
2.473	Rural open/forest	23.49	0.05	0.82
0.085	Water/wetland	0.09	0.00	0.02
2.558	Total	23.58	0.05	0.84

Subcatchment 33S: Basin 3B - Post



Summary for Subcatchment 35S: Basin 6A - Post

Runoff = 1.98 cfs @ 12.80 hrs, Volume= 0.403 af, Depth> 0.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

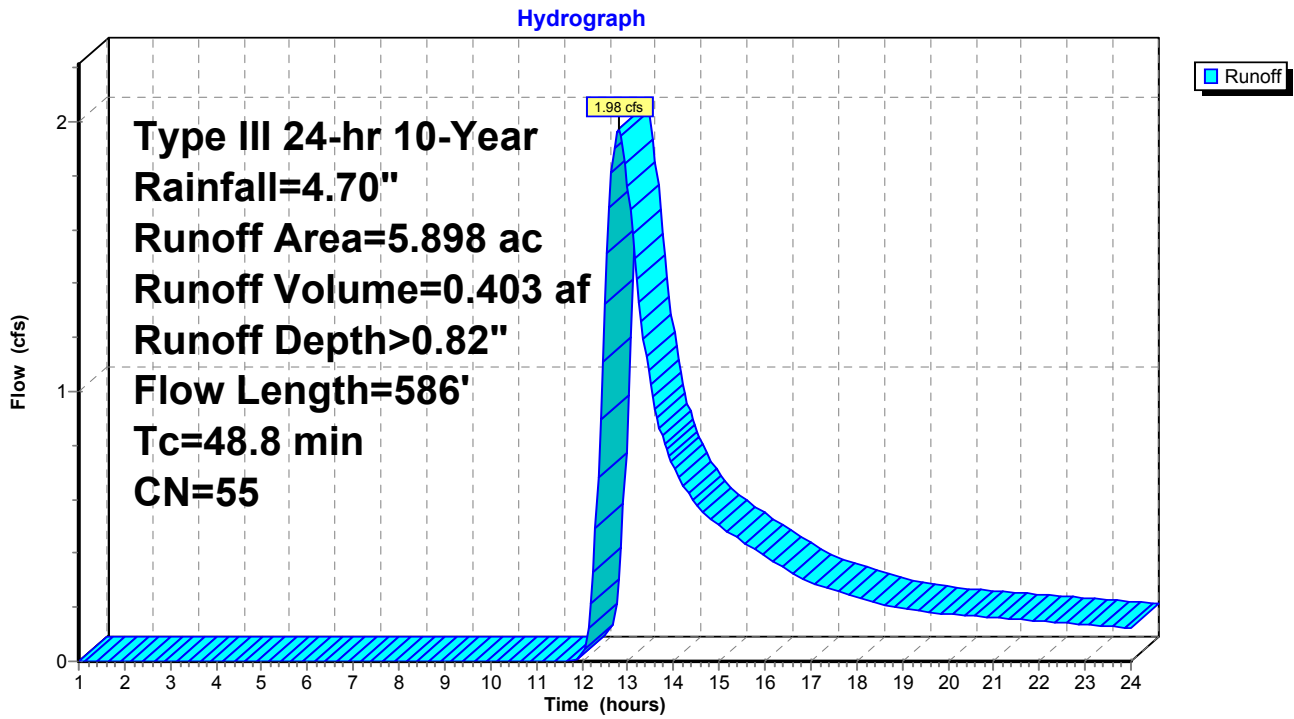
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
5.898	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
5.898	55	Weighted Average	
5.898		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0	300	0.0300	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.8	286	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
48.8	586	Total			

Pollutant Loading for 0.82" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Driveway	0.00	0.00	0.00
5.898	Rural open/forest	55.91	0.12	1.95
0.000	Water/wetland	0.00	0.00	0.00
5.898	Total	55.91	0.12	1.95

Subcatchment 35S: Basin 6A - Post



Summary for Pond 39P: Bioretention Pond 6

[81] Warning: Exceeded Pond 40P by 0.83' @ 12.50 hrs

[81] Warning: Exceeded Pond 40P by 0.83' @ 12.50 hrs

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 1.05" for 10-Year event
 Inflow = 2.14 cfs @ 12.11 hrs, Volume= 0.180 af
 Outflow = 0.85 cfs @ 12.46 hrs, Volume= 0.180 af, Atten= 60%, Lag= 21.1 min
 Primary = 0.85 cfs @ 12.46 hrs, Volume= 0.180 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,434.37' @ 12.46 hrs Surf.Area= 1,060 sf Storage= 1,750 cf

Plug-Flow detention time= 52.9 min calculated for 0.180 af (100% of inflow)
 Center-of-Mass det. time= 52.4 min (938.1 - 885.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 0.00 0.08

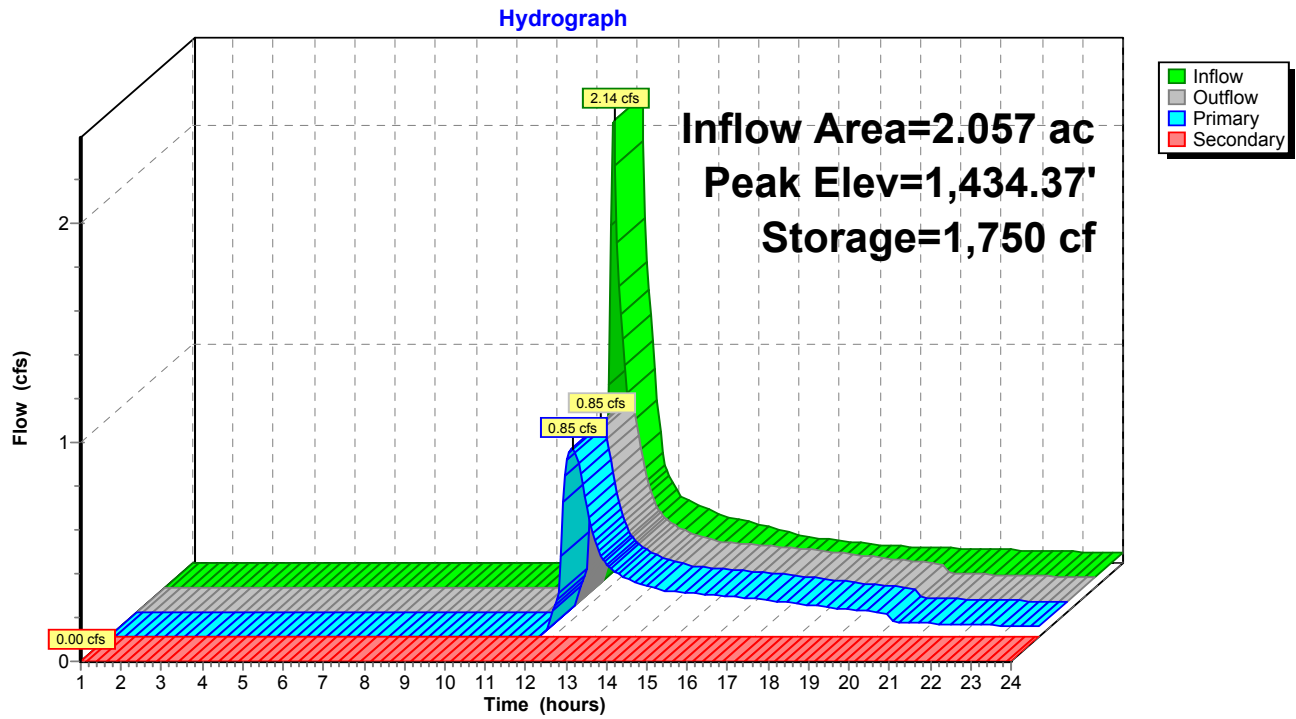
Primary OutFlow Max=0.85 cfs @ 12.46 hrs HW=1,434.36' (Free Discharge)

- ↑1=Exfiltration (Controls 0.25 cfs)
- ↑2=Orifice/Grate (Orifice Controls 0.61 cfs @ 3.09 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)

- ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 39P: Bioretention Pond 6



Summary for Pond 40P: Forebay 6

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 1.07" for 10-Year event
 Inflow = 2.17 cfs @ 12.11 hrs, Volume= 0.183 af
 Outflow = 2.14 cfs @ 12.11 hrs, Volume= 0.180 af, Atten= 2%, Lag= 0.2 min
 Primary = 2.14 cfs @ 12.11 hrs, Volume= 0.180 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.70' @ 12.11 hrs Surf.Area= 159 sf Storage= 149 cf

Plug-Flow detention time= 10.5 min calculated for 0.180 af (99% of inflow)
 Center-of-Mass det. time= 2.9 min (885.7 - 882.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

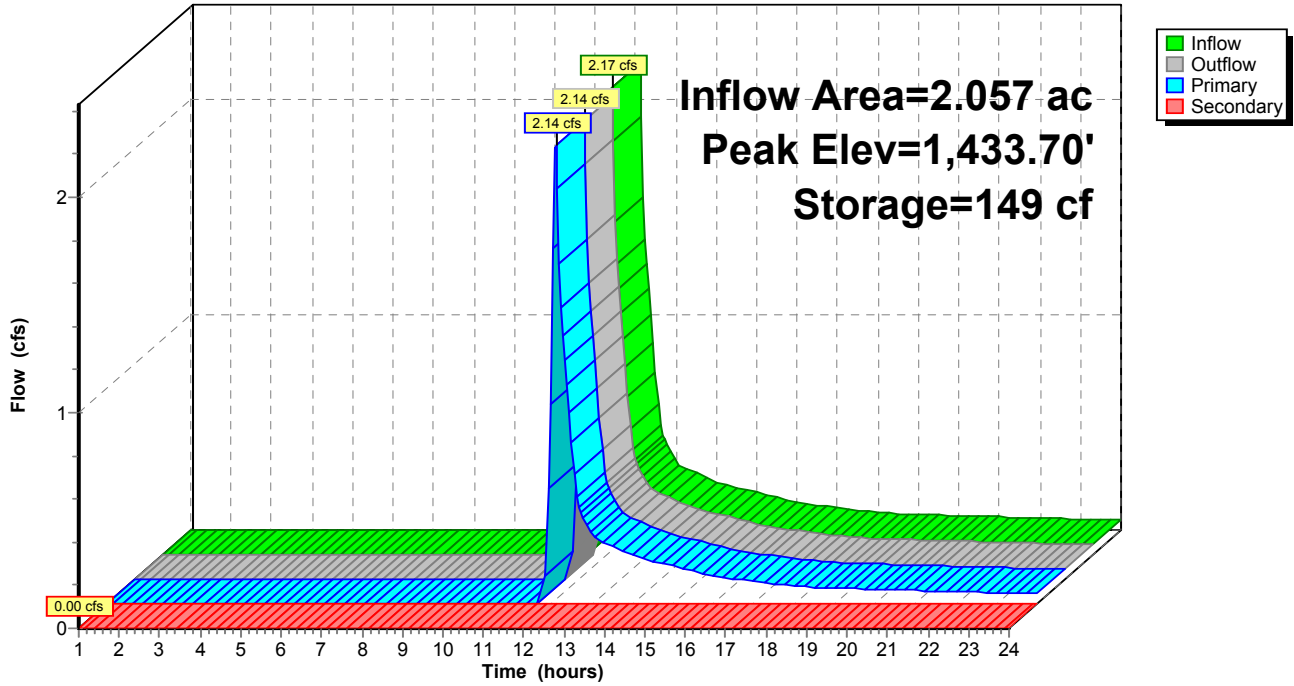
Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=2.08 cfs @ 12.11 hrs HW=1,433.69' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 2.08 cfs @ 1.88 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Forebay 6

Hydrograph



Summary for Pond 47P: Bioretention Pond 5

[81] Warning: Exceeded Pond 48P by 2.06' @ 12.95 hrs

[81] Warning: Exceeded Pond 48P by 2.06' @ 12.95 hrs

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-Year event
 Inflow = 2.28 cfs @ 12.11 hrs, Volume= 0.181 af
 Outflow = 0.36 cfs @ 12.86 hrs, Volume= 0.181 af, Atten= 84%, Lag= 45.4 min
 Primary = 0.36 cfs @ 12.86 hrs, Volume= 0.181 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.40' @ 12.86 hrs Surf.Area= 1,264 sf Storage= 2,723 cf

Plug-Flow detention time= 104.7 min calculated for 0.180 af (100% of inflow)
 Center-of-Mass det. time= 103.8 min (976.2 - 872.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.25

Primary OutFlow Max=0.36 cfs @ 12.86 hrs HW=1,433.40' (Free Discharge)

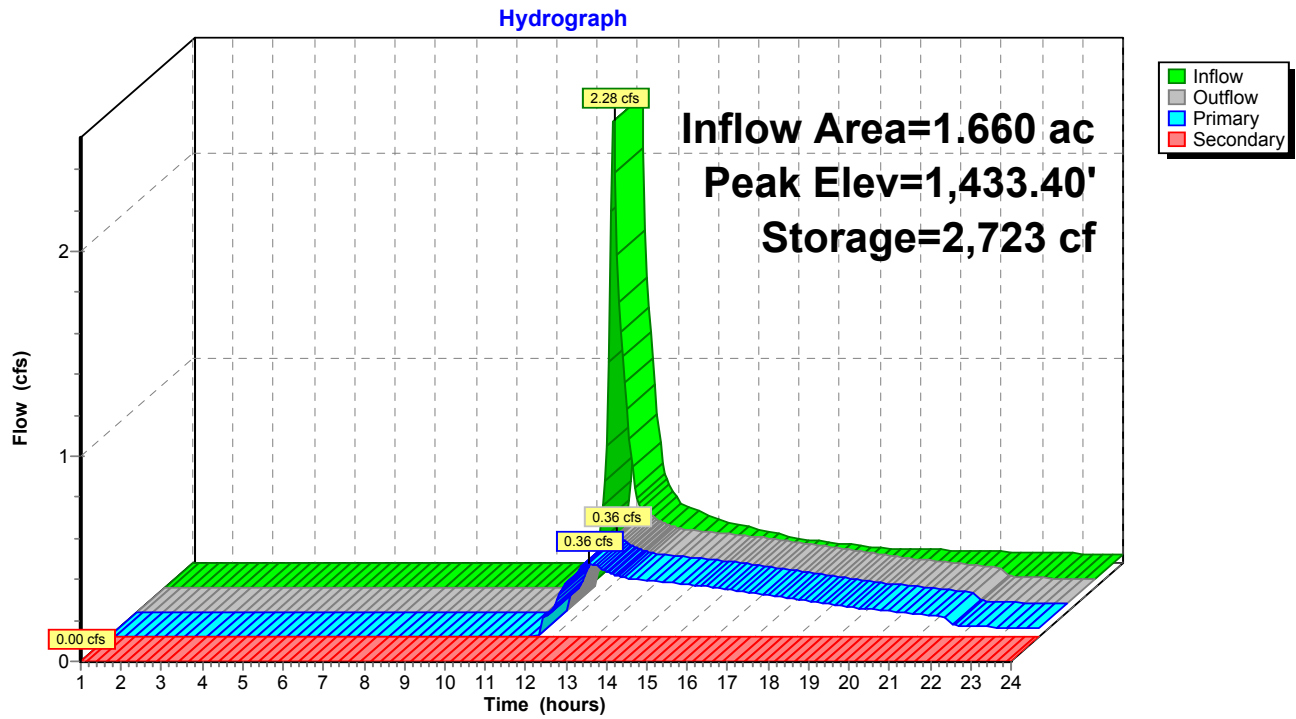
↑1=Exfiltration (Controls 0.29 cfs)

└2=Orifice/Grate (Orifice Controls 0.06 cfs @ 1.31 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)

↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 47P: Bioretention Pond 5



Summary for Pond 48P: Forebay 5

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 1.32" for 10-Year event
 Inflow = 2.33 cfs @ 12.10 hrs, Volume= 0.183 af
 Outflow = 2.28 cfs @ 12.11 hrs, Volume= 0.181 af, Atten= 2%, Lag= 0.2 min
 Primary = 2.28 cfs @ 12.11 hrs, Volume= 0.181 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.66' @ 12.11 hrs Surf.Area= 156 sf Storage= 144 cf

Plug-Flow detention time= 8.1 min calculated for 0.181 af (99% of inflow)
 Center-of-Mass det. time= 2.4 min (872.3 - 870.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

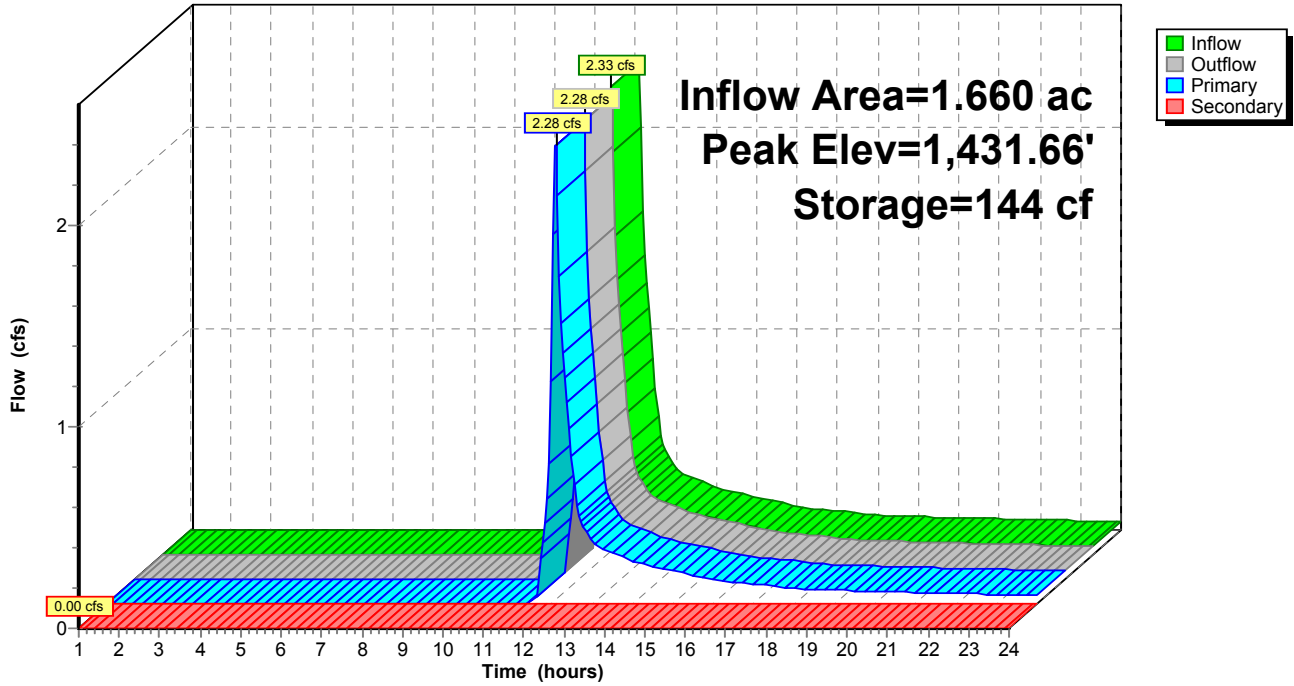
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.20'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.80 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=2.24 cfs @ 12.11 hrs HW=1,431.66' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 2.24 cfs @ 2.15 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 48P: Forebay 5

Hydrograph



Summary for Pond 49P: Bioretention Pond 3

[81] Warning: Exceeded Pond 50P by 1.52' @ 13.20 hrs

[81] Warning: Exceeded Pond 50P by 1.52' @ 13.20 hrs

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 0.99" for 10-Year event
 Inflow = 1.78 cfs @ 12.11 hrs, Volume= 0.155 af
 Outflow = 0.26 cfs @ 13.13 hrs, Volume= 0.154 af, Atten= 86%, Lag= 61.1 min
 Primary = 0.26 cfs @ 13.13 hrs, Volume= 0.154 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,432.89' @ 13.13 hrs Surf.Area= 1,111 sf Storage= 2,116 cf

Plug-Flow detention time= 93.5 min calculated for 0.154 af (100% of inflow)
 Center-of-Mass det. time= 92.7 min (982.0 - 889.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.08

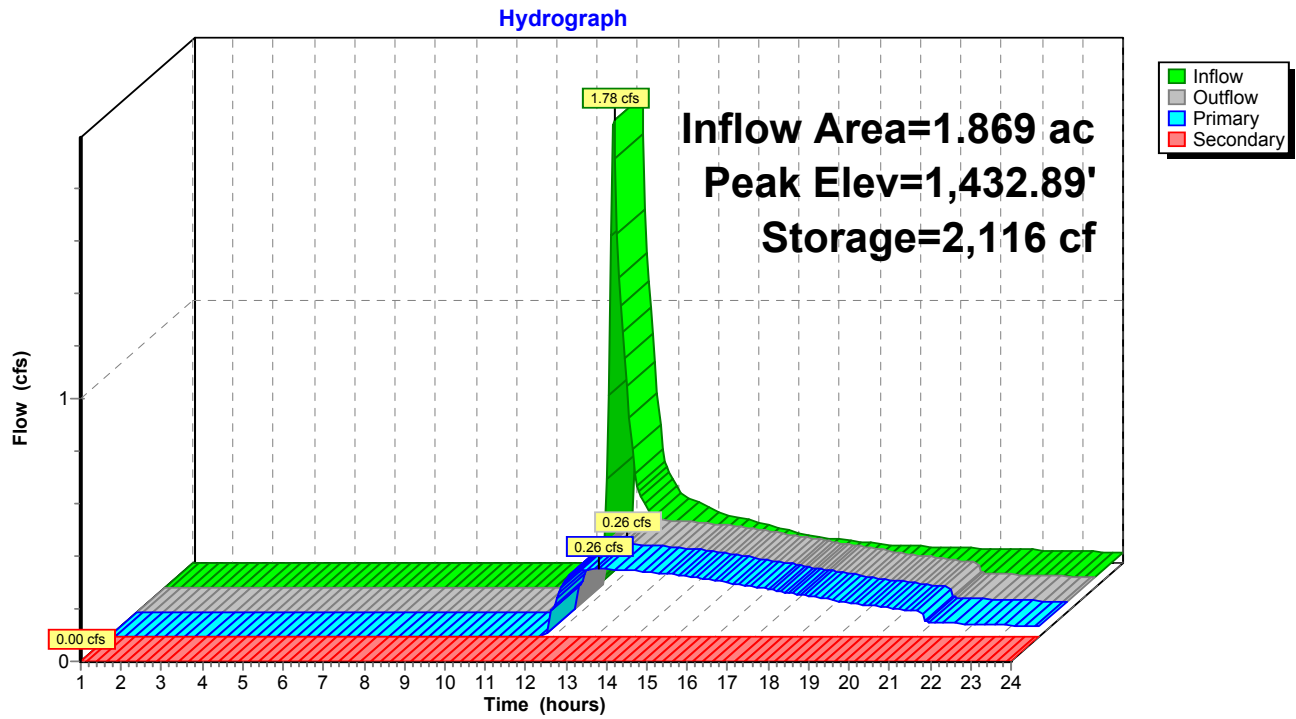
Primary OutFlow Max=0.26 cfs @ 13.13 hrs HW=1,432.89' (Free Discharge)

- ↑1=Exfiltration (Controls 0.26 cfs)
- ↑2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)

- ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 49P: Bioretention Pond 3



Summary for Pond 50P: Forebay 3

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 1.01" for 10-Year event
 Inflow = 1.82 cfs @ 12.11 hrs, Volume= 0.157 af
 Outflow = 1.78 cfs @ 12.11 hrs, Volume= 0.155 af, Atten= 2%, Lag= 0.3 min
 Primary = 1.78 cfs @ 12.11 hrs, Volume= 0.155 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.64' @ 12.11 hrs Surf.Area= 154 sf Storage= 141 cf

Plug-Flow detention time= 10.6 min calculated for 0.154 af (98% of inflow)
 Center-of-Mass det. time= 3.0 min (889.4 - 886.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

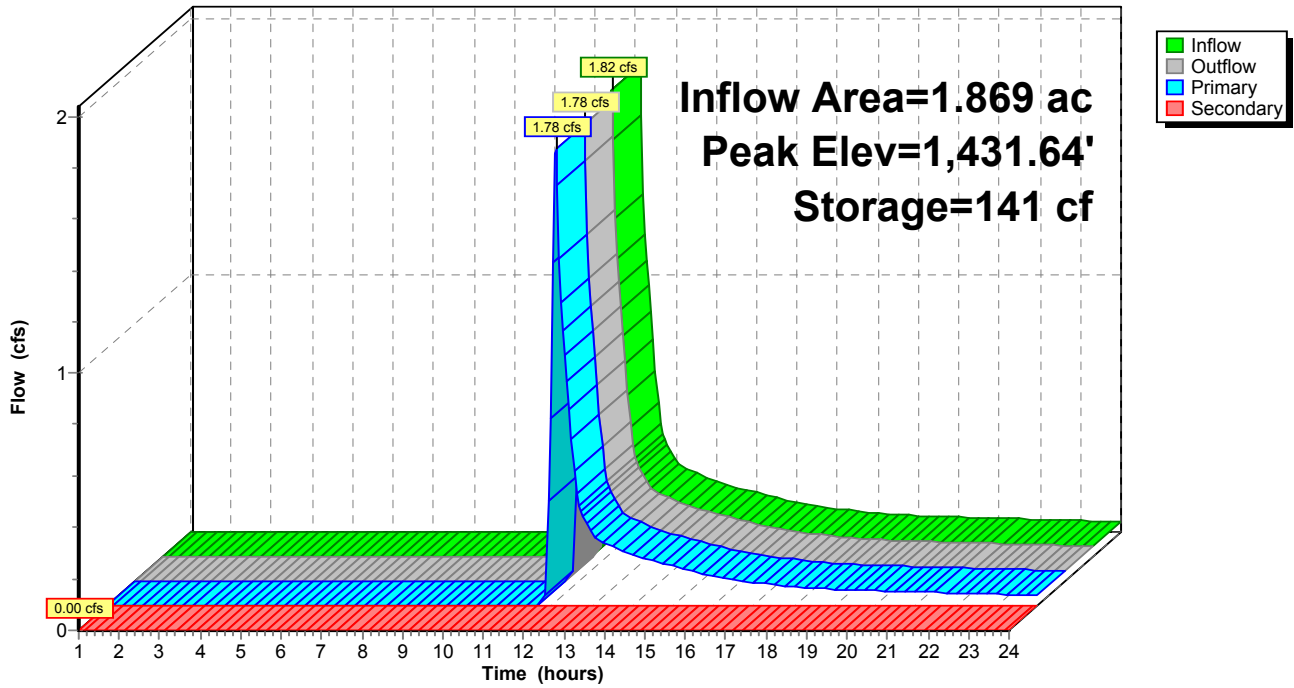
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=1.73 cfs @ 12.11 hrs HW=1,431.63' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 1.73 cfs @ 1.99 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 50P: Forebay 3

Hydrograph



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: Basin C - Pre	Runoff Area=15.366 ac 0.00% Impervious Runoff Depth>1.23" Flow Length=761' Tc=35.9 min CN=55 Runoff=9.93 cfs 1.569 af
Subcatchment19S: Basin D - Pre	Runoff Area=8.131 ac 0.00% Impervious Runoff Depth>1.21" Flow Length=728' Tc=74.6 min CN=55 Runoff=3.43 cfs 0.819 af
Subcatchment20S: Basin 6 - Post	Runoff Area=2.057 ac 0.00% Impervious Runoff Depth>1.53" Tc=6.0 min CN=59 Runoff=3.32 cfs 0.262 af
Subcatchment21S: Basin 5 - Post	Runoff Area=1.660 ac 0.00% Impervious Runoff Depth>1.83" Tc=6.0 min CN=63 Runoff=3.35 cfs 0.253 af
Subcatchment27S: Basin 3 - Post	Runoff Area=1.869 ac 0.00% Impervious Runoff Depth>1.45" Tc=6.0 min CN=58 Runoff=2.83 cfs 0.226 af
Subcatchment32S: Basin 3A - Post	Runoff Area=13.383 ac 0.00% Impervious Runoff Depth>1.23" Flow Length=761' Tc=35.9 min CN=55 Runoff=8.65 cfs 1.367 af
Subcatchment33S: Basin 3B - Post	Runoff Area=2.558 ac 0.00% Impervious Runoff Depth>1.22" Flow Length=1,314' Tc=43.7 min CN=55 Runoff=1.49 cfs 0.261 af
Subcatchment35S: Basin 6A - Post	Runoff Area=5.898 ac 0.00% Impervious Runoff Depth>1.22" Flow Length=586' Tc=48.8 min CN=55 Runoff=3.24 cfs 0.600 af
Pond 39P: Bioretention Pond 6	Peak Elev=1,435.06' Storage=2,561 cf Inflow=3.26 cfs 0.259 af Primary=1.29 cfs 0.259 af Secondary=0.00 cfs 0.000 af Outflow=1.29 cfs 0.259 af
Pond 40P: Forebay 6	Peak Elev=1,433.80' Storage=167 cf Inflow=3.32 cfs 0.262 af Primary=3.26 cfs 0.259 af Secondary=0.00 cfs 0.000 af Outflow=3.26 cfs 0.259 af
Pond 47P: Bioretention Pond 5	Peak Elev=1,433.94' Storage=3,447 cf Inflow=3.29 cfs 0.251 af Primary=0.96 cfs 0.251 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.251 af
Pond 48P: Forebay 5	Peak Elev=1,431.78' Storage=163 cf Inflow=3.35 cfs 0.253 af Primary=3.29 cfs 0.251 af Secondary=0.00 cfs 0.000 af Outflow=3.29 cfs 0.251 af
Pond 49P: Bioretention Pond 3	Peak Elev=1,433.66' Storage=3,068 cf Inflow=2.78 cfs 0.224 af Primary=0.69 cfs 0.224 af Secondary=0.00 cfs 0.000 af Outflow=0.69 cfs 0.224 af
Pond 50P: Forebay 3	Peak Elev=1,431.77' Storage=161 cf Inflow=2.83 cfs 0.226 af Primary=2.78 cfs 0.224 af Secondary=0.00 cfs 0.000 af Outflow=2.78 cfs 0.224 af

Total Runoff Area = 50.922 ac Runoff Volume = 5.356 af Average Runoff Depth = 1.26"
100.00% Pervious = 50.922 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 18S: Basin C - Pre

Runoff = 9.93 cfs @ 12.58 hrs, Volume= 1.569 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
15.366	55	Woods, Good, HSG B	Rural open/forest
15.366		100.00% Pervious Area	

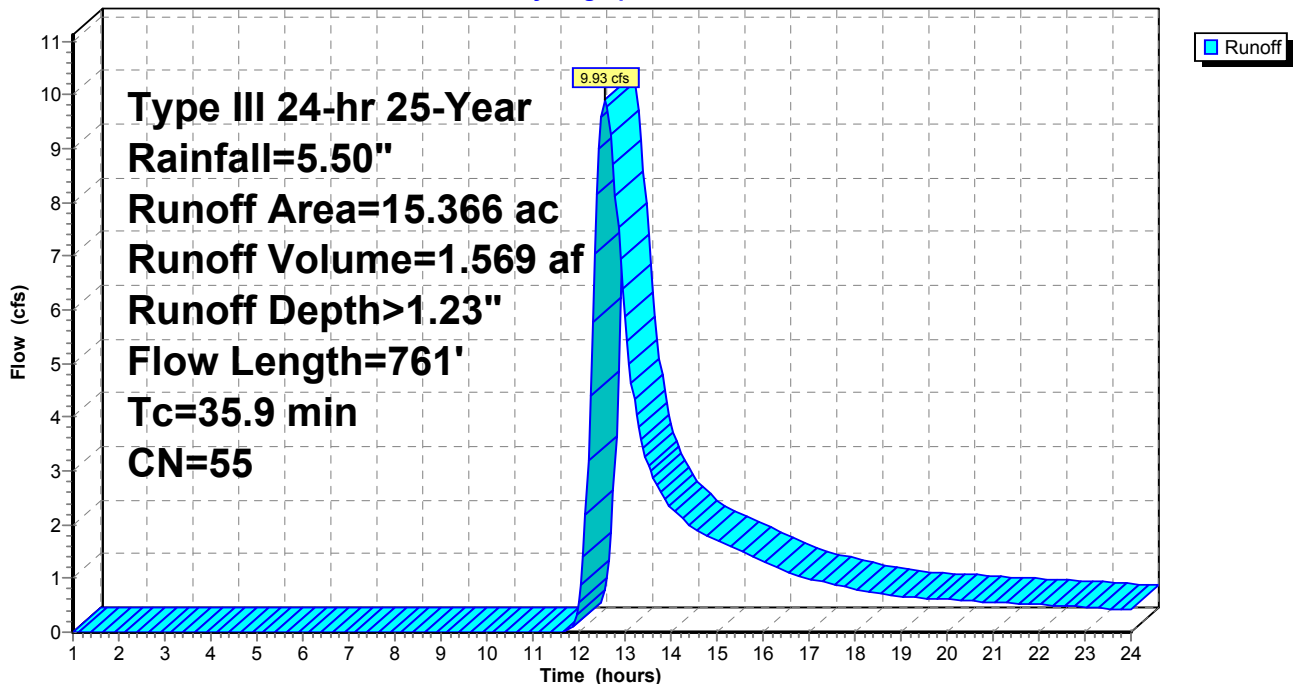
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 1.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.366	Rural open/forest	217.62	0.47	7.60
15.366	Total	217.62	0.47	7.60

Subcatchment 18S: Basin C - Pre

Hydrograph



Summary for Subcatchment 19S: Basin D - Pre

Runoff = 3.43 cfs @ 13.14 hrs, Volume= 0.819 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
8.131	55	Woods, Good, HSG B	Rural open/forest
8.131		100.00% Pervious Area	

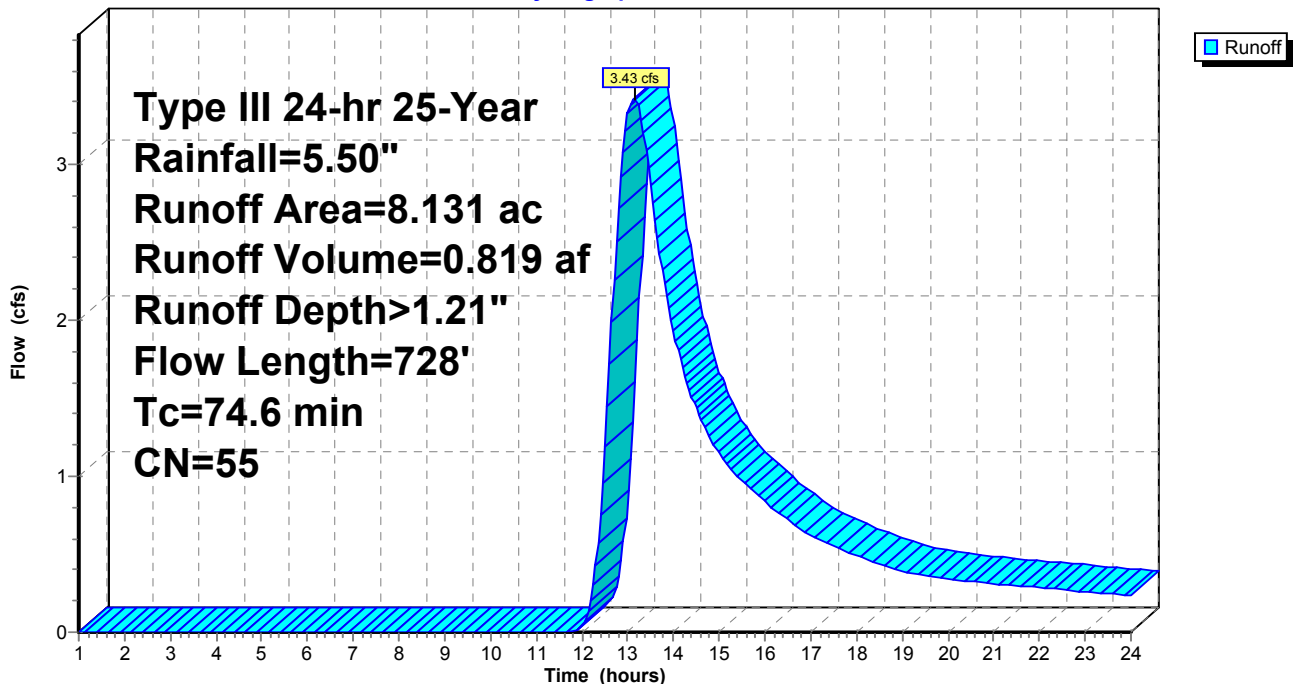
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.2	300	0.0100	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.4	428	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
74.6	728	Total			

Pollutant Loading for 1.21" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
8.131	Rural open/forest	113.56	0.24	3.96
8.131	Total	113.56	0.24	3.96

Subcatchment 19S: Basin D - Pre

Hydrograph



Summary for Subcatchment 20S: Basin 6 - Post

Runoff = 3.32 cfs @ 12.10 hrs, Volume= 0.262 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

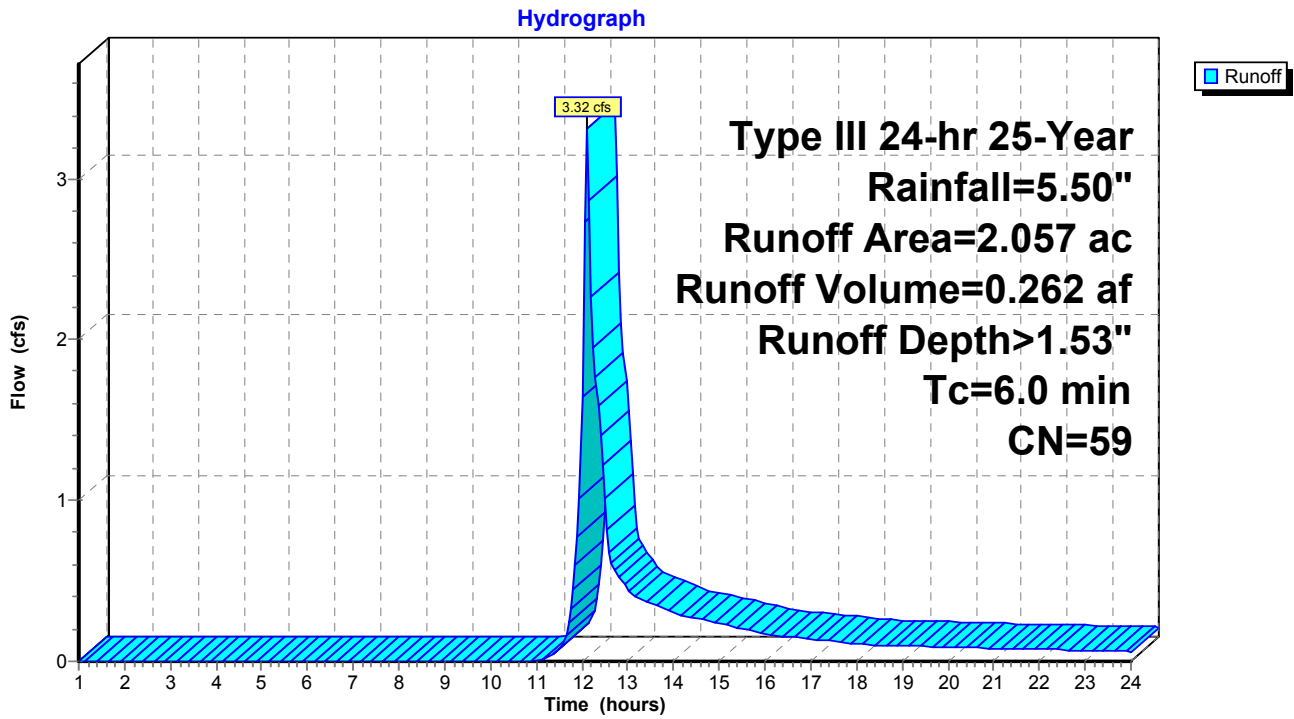
Area (ac)	CN	Description	Land Use
0.166	85	Gravel roads, HSG B	Driveway
0.633	55	Woods, Good, HSG B	Rural open/forest
1.189	58	Meadow, non-grazed, HSG B	Rural open/forest
0.069	58	Meadow, non-grazed, HSG B	Water/wetland
2.057	59	Weighted Average	
2.057		100.00% Pervious Area	

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

Pollutant Loading for 1.53" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.166	Driveway	9.93	0.03	0.12
1.822	Rural open/forest	32.13	0.07	1.12
0.069	Water/wetland	0.14	0.00	0.03
2.057	Total	42.20	0.10	1.27

Subcatchment 20S: Basin 6 - Post



Summary for Subcatchment 21S: Basin 5 - Post

Runoff = 3.35 cfs @ 12.10 hrs, Volume= 0.253 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

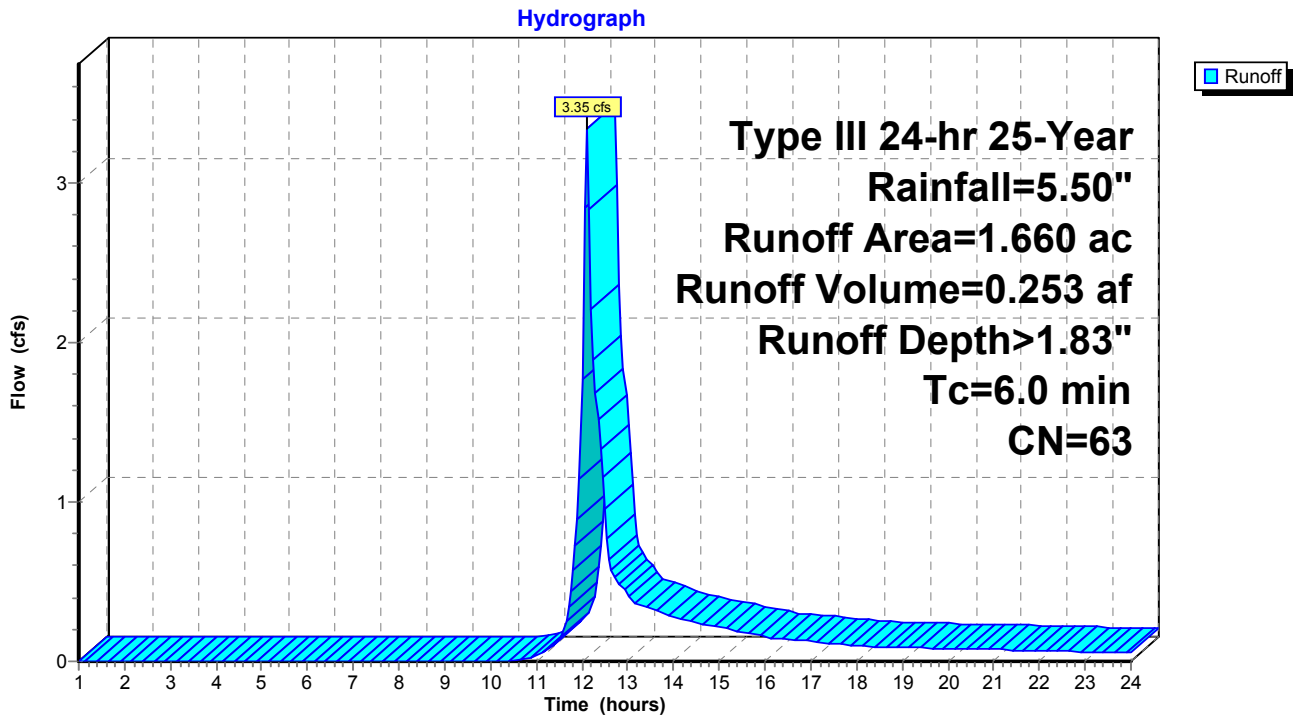
Area (ac)	CN	Description	Land Use
0.304	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.204	58	Meadow, non-grazed, HSG B	Rural open/forest
0.152	58	Meadow, non-grazed, HSG B	Water/wetland
1.660	63	Weighted Average	
1.660		100.00% Pervious Area	

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

Pollutant Loading for 1.83" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.304	Driveway	21.84	0.07	0.27
1.204	Rural open/forest	25.50	0.05	0.89
0.152	Water/wetland	0.38	0.01	0.09
1.660	Total	47.71	0.13	1.24

Subcatchment 21S: Basin 5 - Post



Summary for Subcatchment 27S: Basin 3 - Post

Runoff = 2.83 cfs @ 12.10 hrs, Volume= 0.226 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

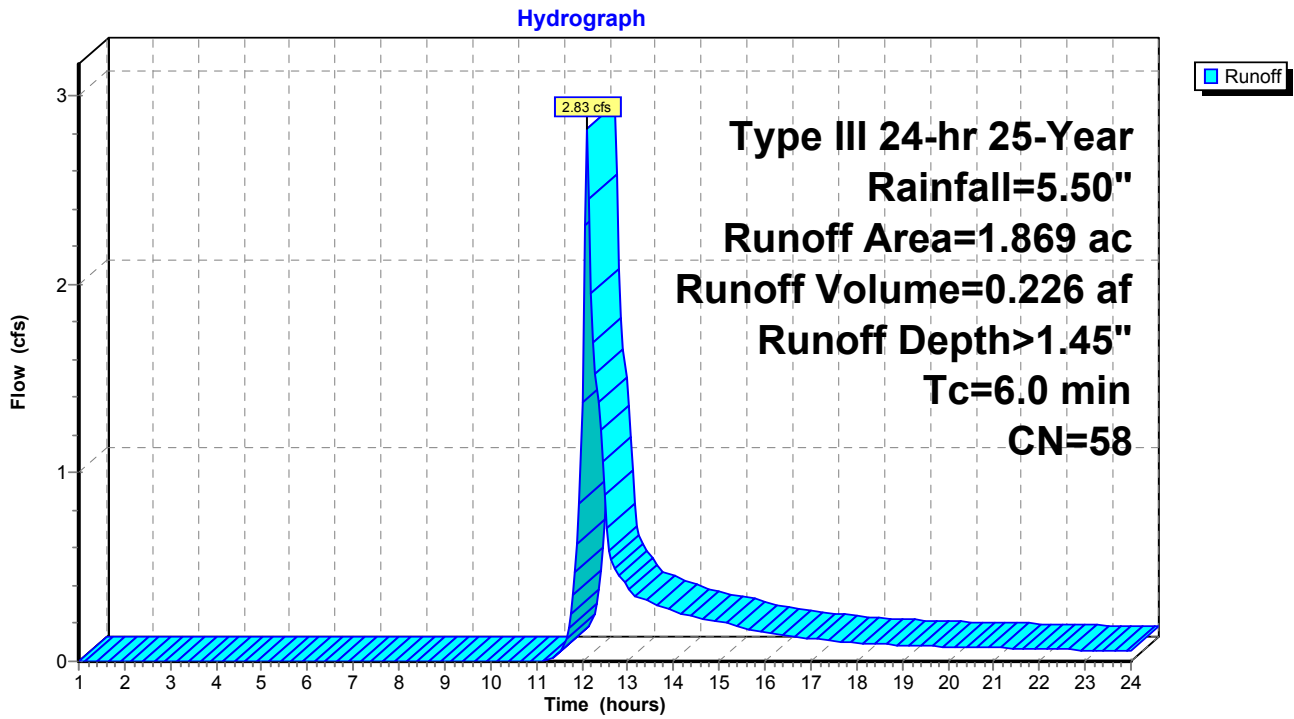
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.784	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.869	58	Weighted Average	
1.869		100.00% Pervious Area	

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

Pollutant Loading for 1.45" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
1.784	Rural open/forest	29.93	0.06	1.04
0.085	Water/wetland	0.17	0.00	0.04
1.869	Total	30.10	0.07	1.08

Subcatchment 27S: Basin 3 - Post



Summary for Subcatchment 32S: Basin 3A - Post

Runoff = 8.65 cfs @ 12.58 hrs, Volume= 1.367 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

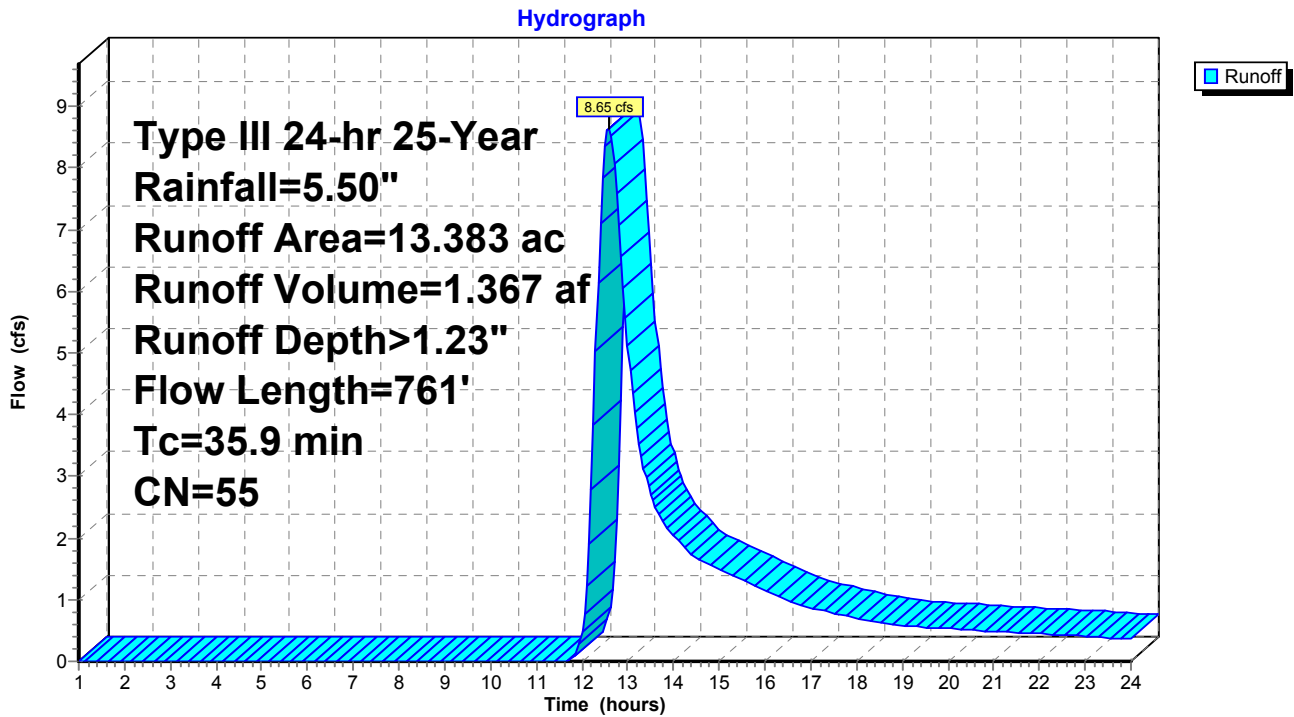
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
13.298	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
13.383	55	Weighted Average	
13.383		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 1.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
13.298	Rural open/forest	188.33	0.41	6.57
0.085	Water/wetland	0.14	0.00	0.03
13.383	Total	188.47	0.41	6.61

Subcatchment 32S: Basin 3A - Post



Summary for Subcatchment 33S: Basin 3B - Post

Runoff = 1.49 cfs @ 12.69 hrs, Volume= 0.261 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

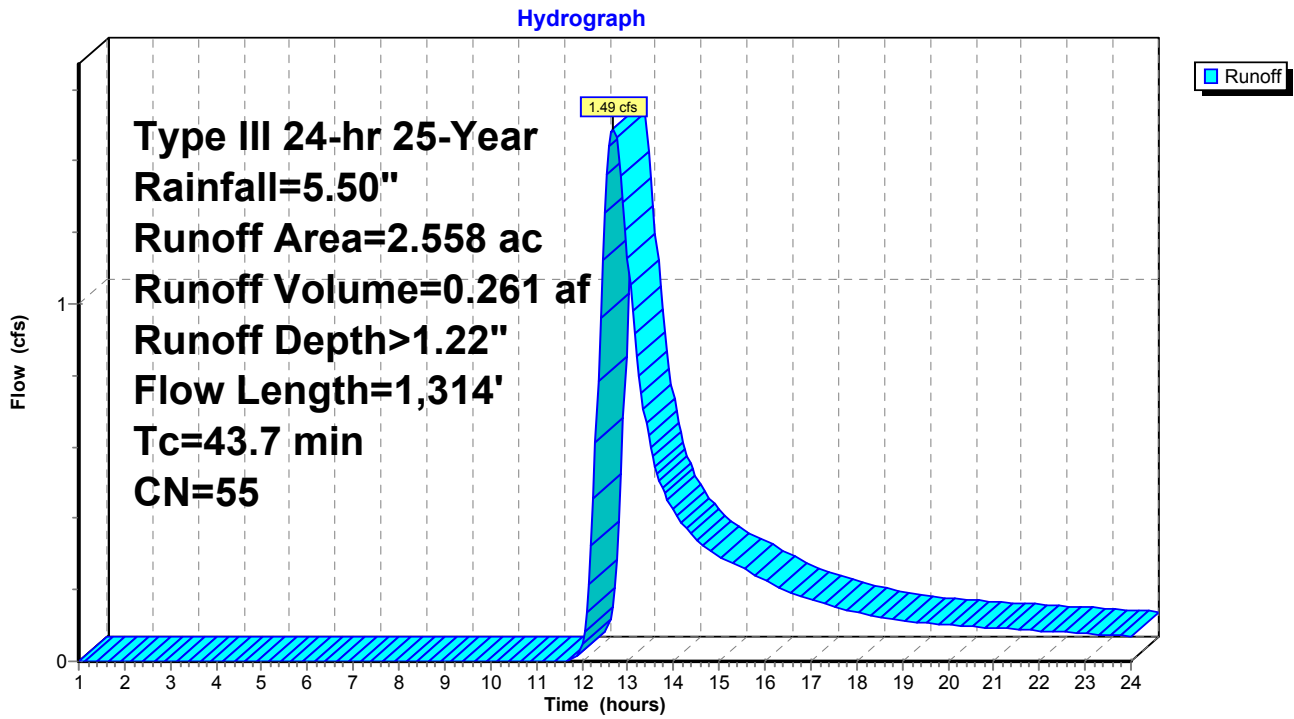
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
2.473	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
2.558	55	Weighted Average	
2.558		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	273	0.0900	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
17.3	1,041	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.7	1,314	Total			

Pollutant Loading for 1.22" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
2.473	Rural open/forest	34.93	0.08	1.22
0.085	Water/wetland	0.14	0.00	0.03
2.558	Total	35.07	0.08	1.25

Subcatchment 33S: Basin 3B - Post



Summary for Subcatchment 35S: Basin 6A - Post

Runoff = 3.24 cfs @ 12.76 hrs, Volume= 0.600 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

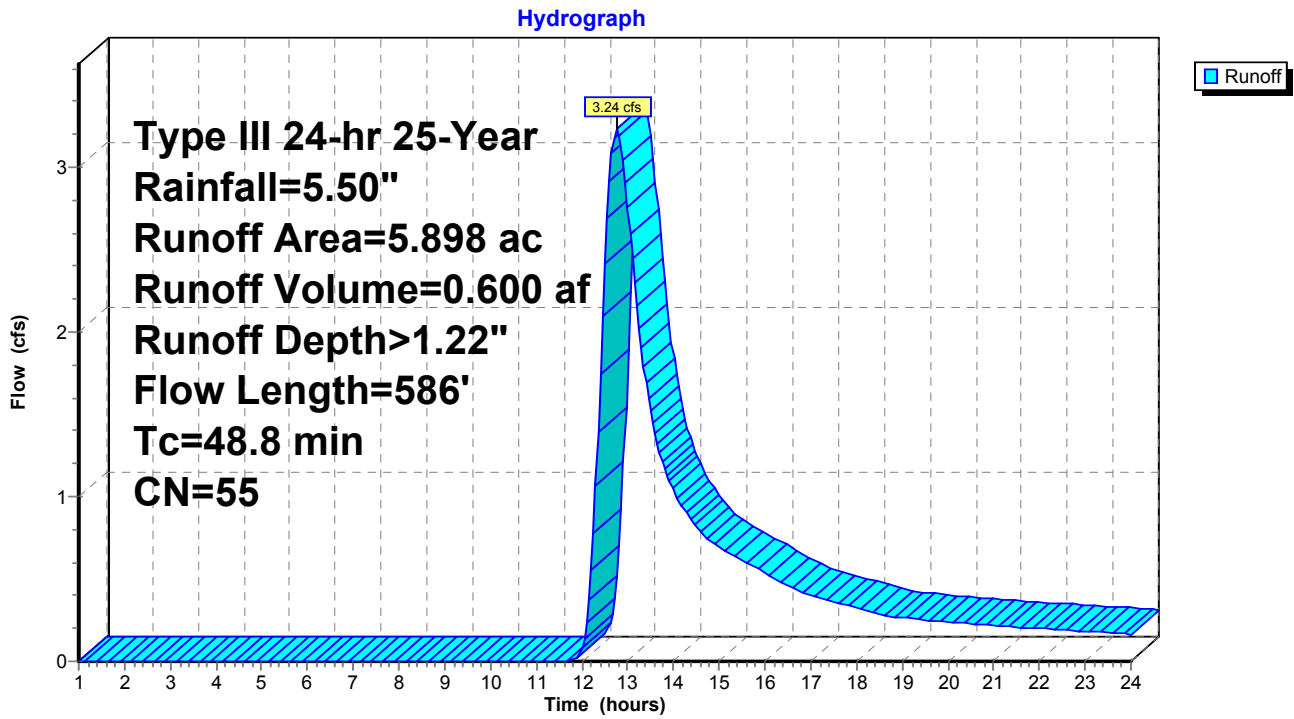
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
5.898	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
5.898	55	Weighted Average	
5.898		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0	300	0.0300	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.8	286	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
48.8	586	Total			

Pollutant Loading for 1.22" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Driveway	0.00	0.00	0.00
5.898	Rural open/forest	83.15	0.18	2.90
0.000	Water/wetland	0.00	0.00	0.00
5.898	Total	83.15	0.18	2.90

Subcatchment 35S: Basin 6A - Post



Summary for Pond 39P: Bioretention Pond 6

[81] Warning: Exceeded Pond 40P by 1.47' @ 12.50 hrs

[81] Warning: Exceeded Pond 40P by 1.47' @ 12.50 hrs

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 1.51" for 25-Year event
 Inflow = 3.26 cfs @ 12.11 hrs, Volume= 0.259 af
 Outflow = 1.29 cfs @ 12.44 hrs, Volume= 0.259 af, Atten= 60%, Lag= 19.8 min
 Primary = 1.29 cfs @ 12.44 hrs, Volume= 0.259 af
 Secondary = 0.00 cfs @ 12.44 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,435.06' @ 12.44 hrs Surf.Area= 1,273 sf Storage= 2,561 cf

Plug-Flow detention time= 49.5 min calculated for 0.259 af (100% of inflow)
 Center-of-Mass det. time= 49.0 min (921.8 - 872.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 0.00 0.08

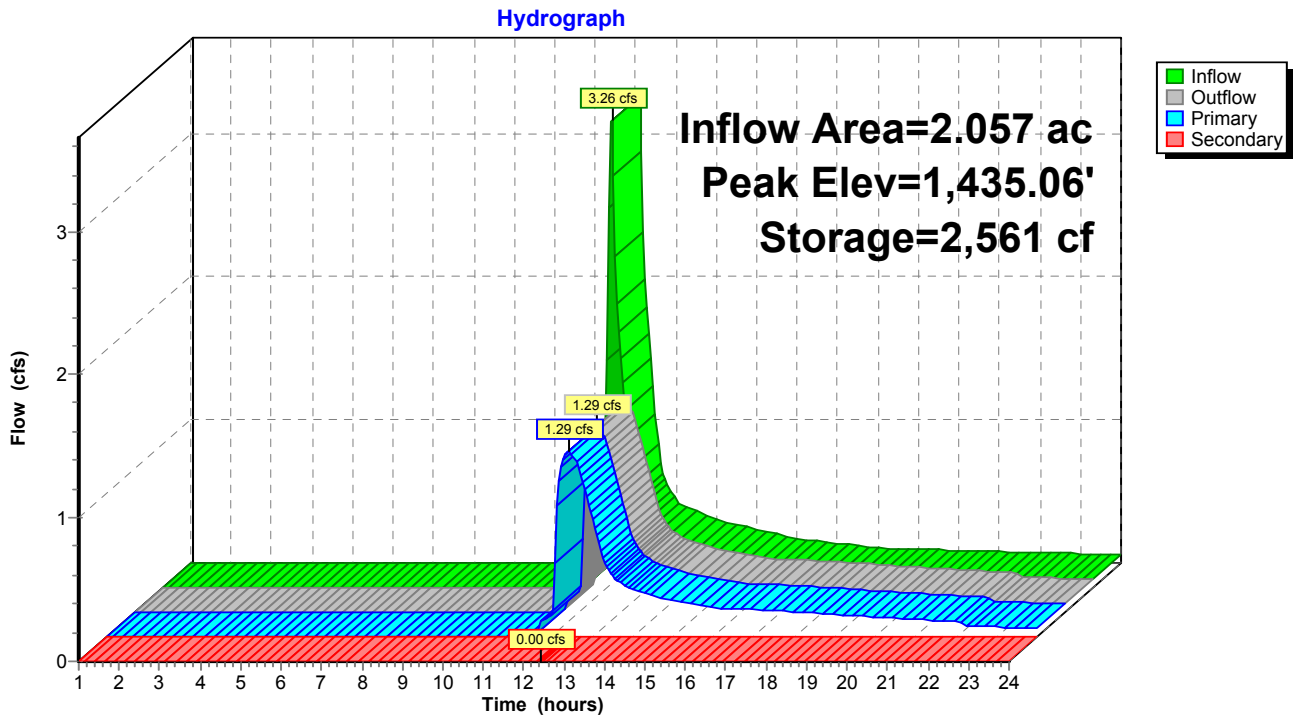
Primary OutFlow Max=1.29 cfs @ 12.44 hrs HW=1,435.06' (Free Discharge)

- ↑1=Exfiltration (Controls 0.29 cfs)
- ↑2=Orifice/Grate (Orifice Controls 1.00 cfs @ 5.07 fps)

Secondary OutFlow Max=0.00 cfs @ 12.44 hrs HW=1,435.06' (Free Discharge)

- ↑3=Custom Weir/Orifice (Weir Controls 0.00 cfs @ 0.64 fps)

Pond 39P: Bioretention Pond 6



Summary for Pond 40P: Forebay 6

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 1.53" for 25-Year event
 Inflow = 3.32 cfs @ 12.10 hrs, Volume= 0.262 af
 Outflow = 3.26 cfs @ 12.11 hrs, Volume= 0.259 af, Atten= 2%, Lag= 0.2 min
 Primary = 3.26 cfs @ 12.11 hrs, Volume= 0.259 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.80' @ 12.11 hrs Surf.Area= 170 sf Storage= 167 cf

Plug-Flow detention time= 7.1 min calculated for 0.259 af (99% of inflow)
 Center-of-Mass det. time= 2.0 min (872.8 - 870.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

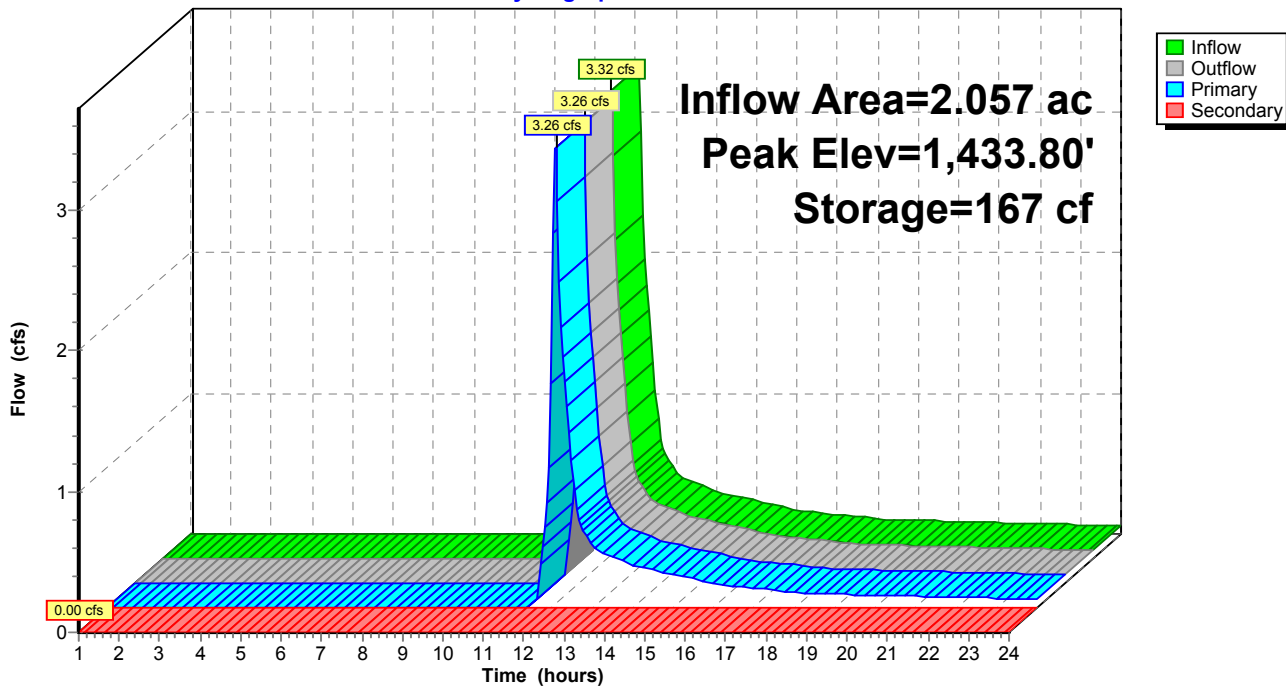
Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=3.21 cfs @ 12.11 hrs HW=1,433.80' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 3.21 cfs @ 2.15 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Forebay 6

Hydrograph



Summary for Pond 47P: Bioretention Pond 5

[81] Warning: Exceeded Pond 48P by 2.49' @ 12.60 hrs

[81] Warning: Exceeded Pond 48P by 2.49' @ 12.60 hrs

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 1.82" for 25-Year event
 Inflow = 3.29 cfs @ 12.10 hrs, Volume= 0.251 af
 Outflow = 0.96 cfs @ 12.51 hrs, Volume= 0.251 af, Atten= 71%, Lag= 24.3 min
 Primary = 0.96 cfs @ 12.51 hrs, Volume= 0.251 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.94' @ 12.51 hrs Surf.Area= 1,435 sf Storage= 3,447 cf

Plug-Flow detention time= 95.8 min calculated for 0.251 af (100% of inflow)
 Center-of-Mass det. time= 95.0 min (956.6 - 861.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.25

Primary OutFlow Max=0.96 cfs @ 12.51 hrs HW=1,433.93' (Free Discharge)

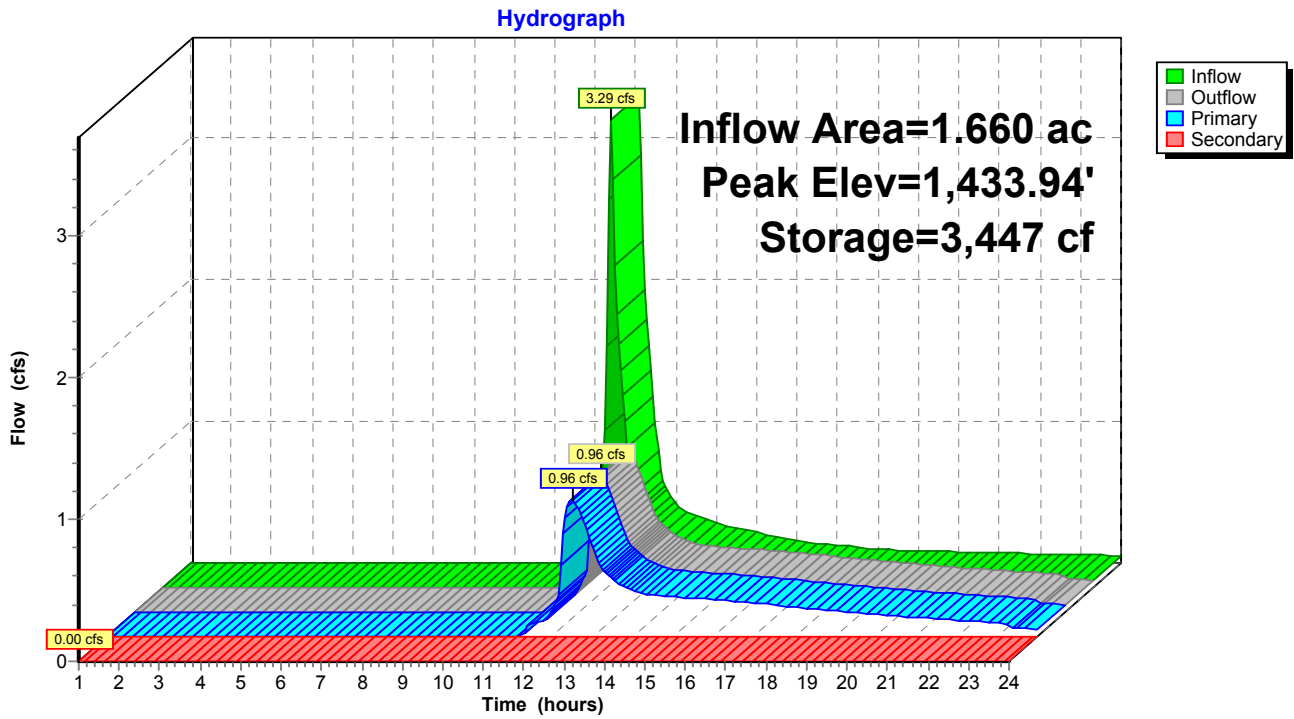
↑1=Exfiltration (Controls 0.33 cfs)

└2=Orifice/Grate (Orifice Controls 0.62 cfs @ 3.17 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)

↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 47P: Bioretention Pond 5



Summary for Pond 48P: Forebay 5

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 1.83" for 25-Year event
 Inflow = 3.35 cfs @ 12.10 hrs, Volume= 0.253 af
 Outflow = 3.29 cfs @ 12.10 hrs, Volume= 0.251 af, Atten= 2%, Lag= 0.2 min
 Primary = 3.29 cfs @ 12.10 hrs, Volume= 0.251 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.78' @ 12.10 hrs Surf.Area= 168 sf Storage= 163 cf

Plug-Flow detention time= 6.5 min calculated for 0.251 af (99% of inflow)
 Center-of-Mass det. time= 2.0 min (861.7 - 859.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

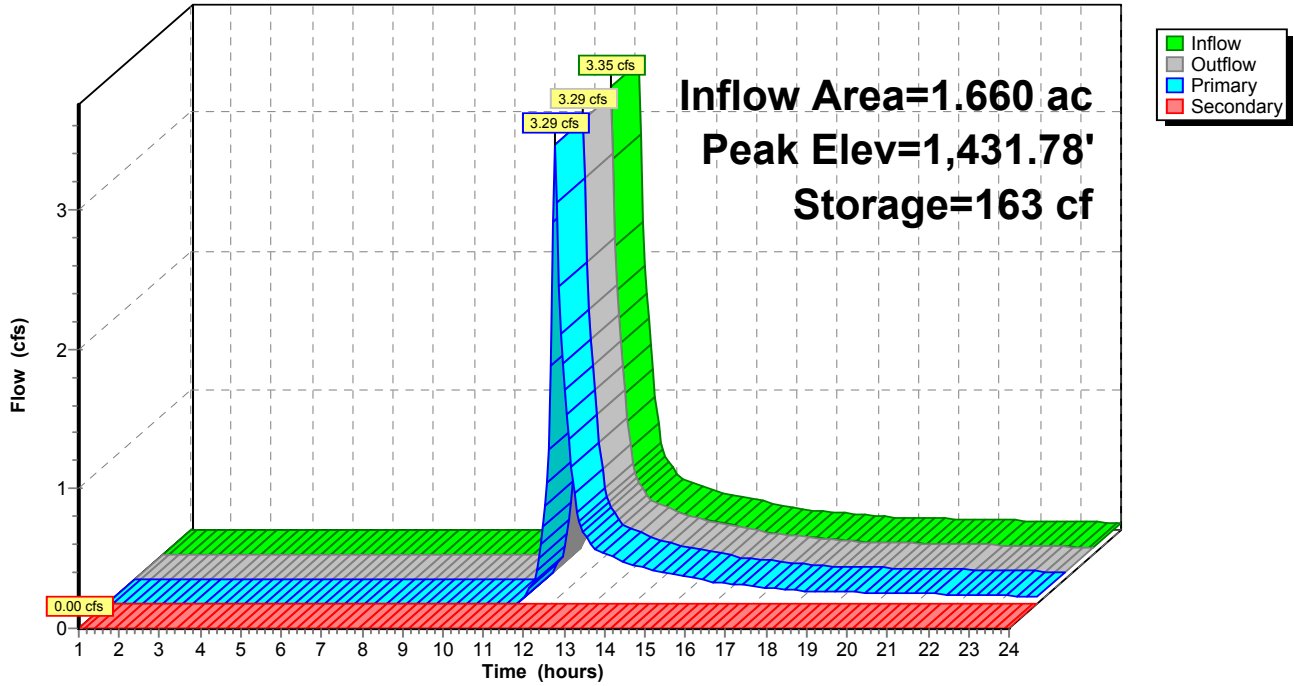
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.20'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.80 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=3.26 cfs @ 12.10 hrs HW=1,431.77' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 3.26 cfs @ 2.41 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 48P: Forebay 5

Hydrograph



Summary for Pond 49P: Bioretention Pond 3

[81] Warning: Exceeded Pond 50P by 2.21' @ 12.65 hrs

[81] Warning: Exceeded Pond 50P by 2.21' @ 12.65 hrs

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 1.44" for 25-Year event
 Inflow = 2.78 cfs @ 12.11 hrs, Volume= 0.224 af
 Outflow = 0.69 cfs @ 12.57 hrs, Volume= 0.224 af, Atten= 75%, Lag= 27.7 min
 Primary = 0.69 cfs @ 12.57 hrs, Volume= 0.224 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.66' @ 12.57 hrs Surf.Area= 1,347 sf Storage= 3,068 cf

Plug-Flow detention time= 102.0 min calculated for 0.224 af (100% of inflow)
 Center-of-Mass det. time= 101.4 min (977.3 - 875.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.08

Primary OutFlow Max=0.69 cfs @ 12.57 hrs HW=1,433.66' (Free Discharge)

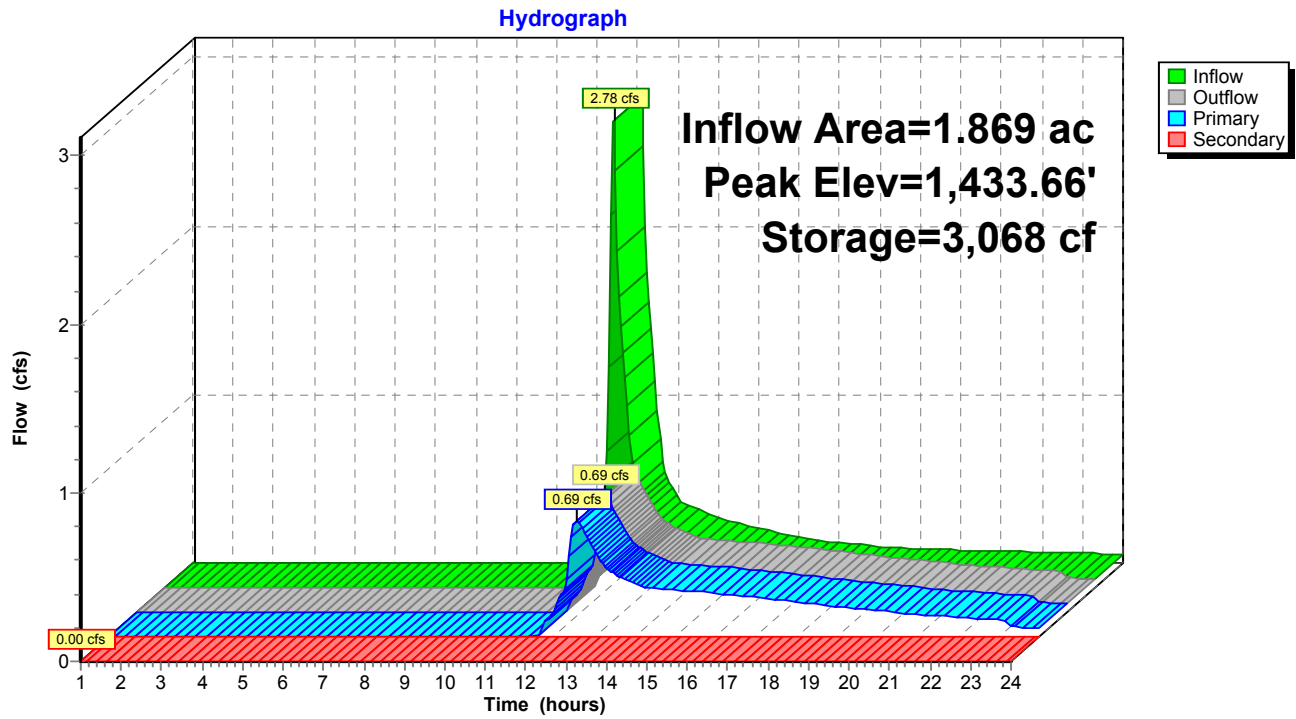
↑1=Exfiltration (Controls 0.31 cfs)

↑2=Orifice/Grate (Orifice Controls 0.38 cfs @ 2.18 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)

↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 49P: Bioretention Pond 3



Summary for Pond 50P: Forebay 3

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 1.45" for 25-Year event
 Inflow = 2.83 cfs @ 12.10 hrs, Volume= 0.226 af
 Outflow = 2.78 cfs @ 12.11 hrs, Volume= 0.224 af, Atten= 2%, Lag= 0.2 min
 Primary = 2.78 cfs @ 12.11 hrs, Volume= 0.224 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.77' @ 12.11 hrs Surf.Area= 167 sf Storage= 161 cf

Plug-Flow detention time= 7.2 min calculated for 0.224 af (99% of inflow)
 Center-of-Mass det. time= 2.1 min (875.8 - 873.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

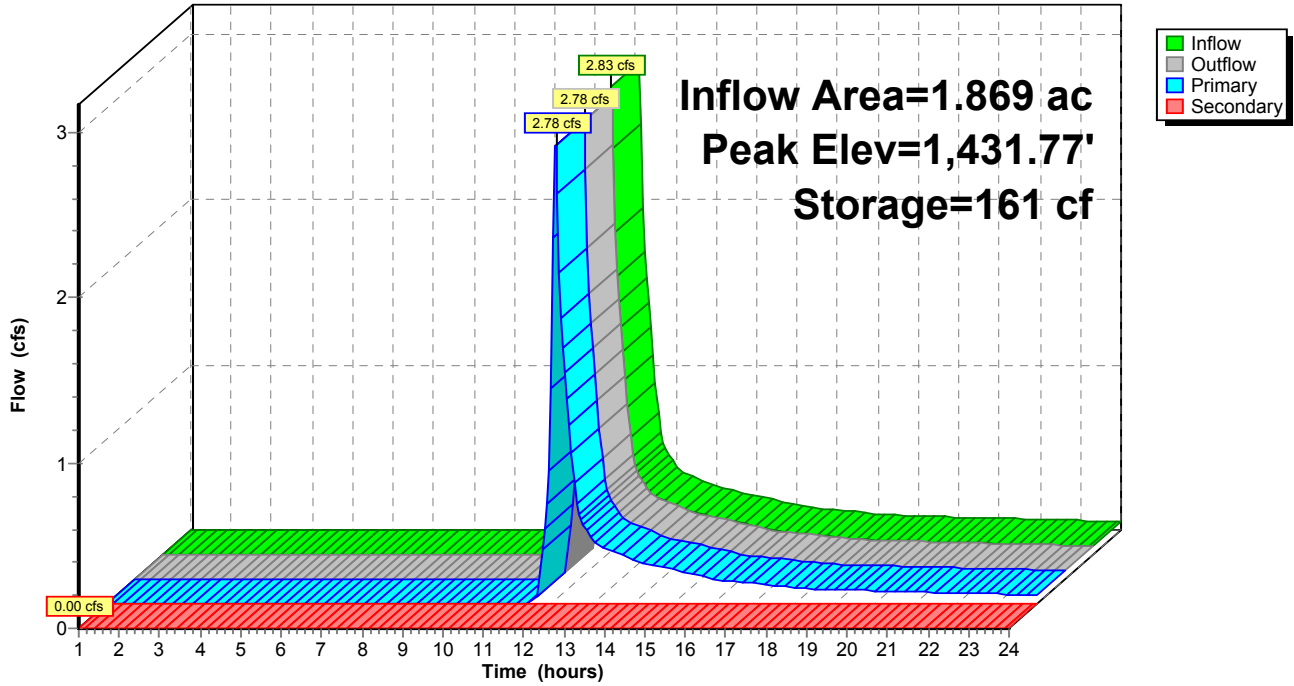
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=2.72 cfs @ 12.11 hrs HW=1,431.76' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 2.72 cfs @ 2.27 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 50P: Forebay 3

Hydrograph



Wind-Colbrook South On-site Wetlands 2011-03-10 Type III 24-hr 100-Year Rainfall=7.00"

Prepared by Zapata Engineering

Printed 3/12/2011

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Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment18S: Basin C - Pre Runoff Area=15.366 ac 0.00% Impervious Runoff Depth>2.10"
Flow Length=761' Tc=35.9 min CN=55 Runoff=18.51 cfs 2.693 af

Subcatchment19S: Basin D - Pre Runoff Area=8.131 ac 0.00% Impervious Runoff Depth>2.08"
Flow Length=728' Tc=74.6 min CN=55 Runoff=6.41 cfs 1.408 af

Subcatchment20S: Basin 6 - Post Runoff Area=2.057 ac 0.00% Impervious Runoff Depth>2.50"
Tc=6.0 min CN=59 Runoff=5.73 cfs 0.429 af

Subcatchment21S: Basin 5 - Post Runoff Area=1.660 ac 0.00% Impervious Runoff Depth>2.90"
Tc=6.0 min CN=63 Runoff=5.46 cfs 0.401 af

Subcatchment27S: Basin 3 - Post Runoff Area=1.869 ac 0.00% Impervious Runoff Depth>2.41"
Tc=6.0 min CN=58 Runoff=4.98 cfs 0.375 af

Subcatchment32S: Basin 3A - Post Runoff Area=13.383 ac 0.00% Impervious Runoff Depth>2.10"
Flow Length=761' Tc=35.9 min CN=55 Runoff=16.13 cfs 2.345 af

Subcatchment33S: Basin 3B - Post Runoff Area=2.558 ac 0.00% Impervious Runoff Depth>2.10"
Flow Length=1,314' Tc=43.7 min CN=55 Runoff=2.78 cfs 0.447 af

Subcatchment35S: Basin 6A - Post Runoff Area=5.898 ac 0.00% Impervious Runoff Depth>2.09"
Flow Length=586' Tc=48.8 min CN=55 Runoff=6.04 cfs 1.030 af

Pond 39P: Bioretention Pond 6 Peak Elev=1,436.47' Storage=4,692 cf Inflow=5.66 cfs 0.427 af
Primary=1.91 cfs 0.417 af Secondary=0.14 cfs 0.006 af Outflow=2.05 cfs 0.423 af

Pond 40P: Forebay 6 Peak Elev=1,433.99' Storage=200 cf Inflow=5.73 cfs 0.429 af
Primary=5.66 cfs 0.427 af Secondary=0.00 cfs 0.000 af Outflow=5.66 cfs 0.427 af

Pond 47P: Bioretention Pond 5 Peak Elev=1,435.00' Storage=5,164 cf Inflow=5.37 cfs 0.399 af
Primary=1.57 cfs 0.380 af Secondary=0.33 cfs 0.012 af Outflow=1.90 cfs 0.392 af

Pond 48P: Forebay 5 Peak Elev=1,431.98' Storage=199 cf Inflow=5.46 cfs 0.401 af
Primary=5.37 cfs 0.399 af Secondary=0.00 cfs 0.000 af Outflow=5.37 cfs 0.399 af

Pond 49P: Bioretention Pond 3 Peak Elev=1,434.79' Storage=4,798 cf Inflow=4.90 cfs 0.373 af
Primary=1.47 cfs 0.363 af Secondary=0.06 cfs 0.002 af Outflow=1.53 cfs 0.365 af

Pond 50P: Forebay 3 Peak Elev=1,431.98' Storage=199 cf Inflow=4.98 cfs 0.375 af
Primary=4.90 cfs 0.373 af Secondary=0.00 cfs 0.000 af Outflow=4.90 cfs 0.373 af

Total Runoff Area = 50.922 ac Runoff Volume = 9.127 af Average Runoff Depth = 2.15"
100.00% Pervious = 50.922 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 18S: Basin C - Pre

Runoff = 18.51 cfs @ 12.55 hrs, Volume= 2.693 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
15.366	55	Woods, Good, HSG B	Rural open/forest
15.366		100.00% Pervious Area	

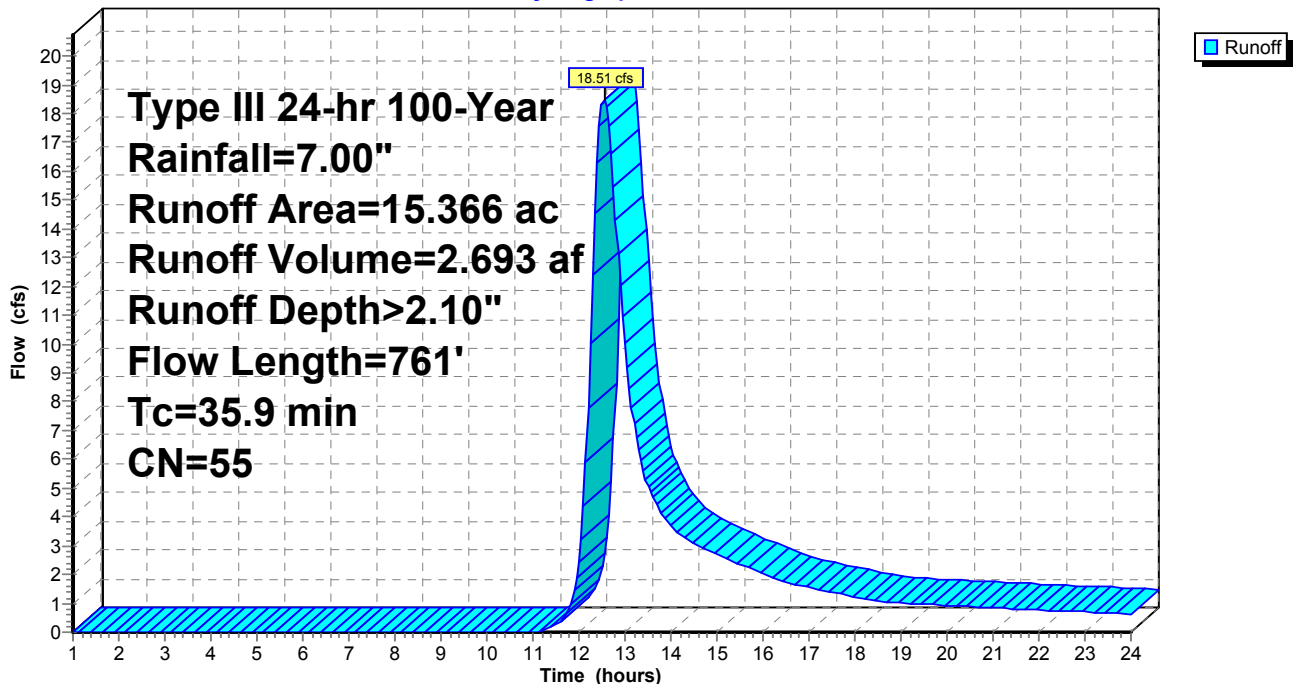
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 2.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.366	Rural open/forest	373.47	0.81	13.03
15.366	Total	373.47	0.81	13.03

Subcatchment 18S: Basin C - Pre

Hydrograph



Summary for Subcatchment 19S: Basin D - Pre

Runoff = 6.41 cfs @ 13.08 hrs, Volume= 1.408 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
8.131	55	Woods, Good, HSG B	Rural open/forest
8.131		100.00% Pervious Area	

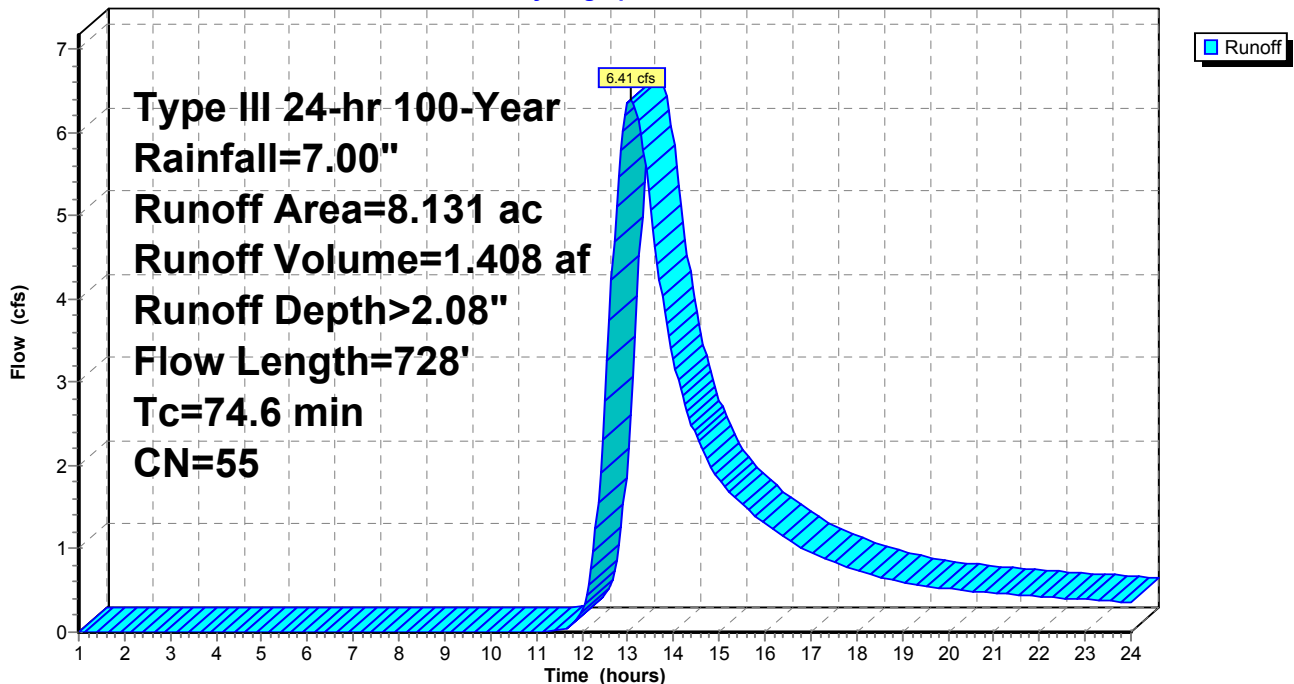
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.2	300	0.0100	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
6.4	428	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
74.6	728	Total			

Pollutant Loading for 2.08" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
8.131	Rural open/forest	195.22	0.42	6.81
8.131	Total	195.22	0.42	6.81

Subcatchment 19S: Basin D - Pre

Hydrograph



Summary for Subcatchment 20S: Basin 6 - Post

Runoff = 5.73 cfs @ 12.10 hrs, Volume= 0.429 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

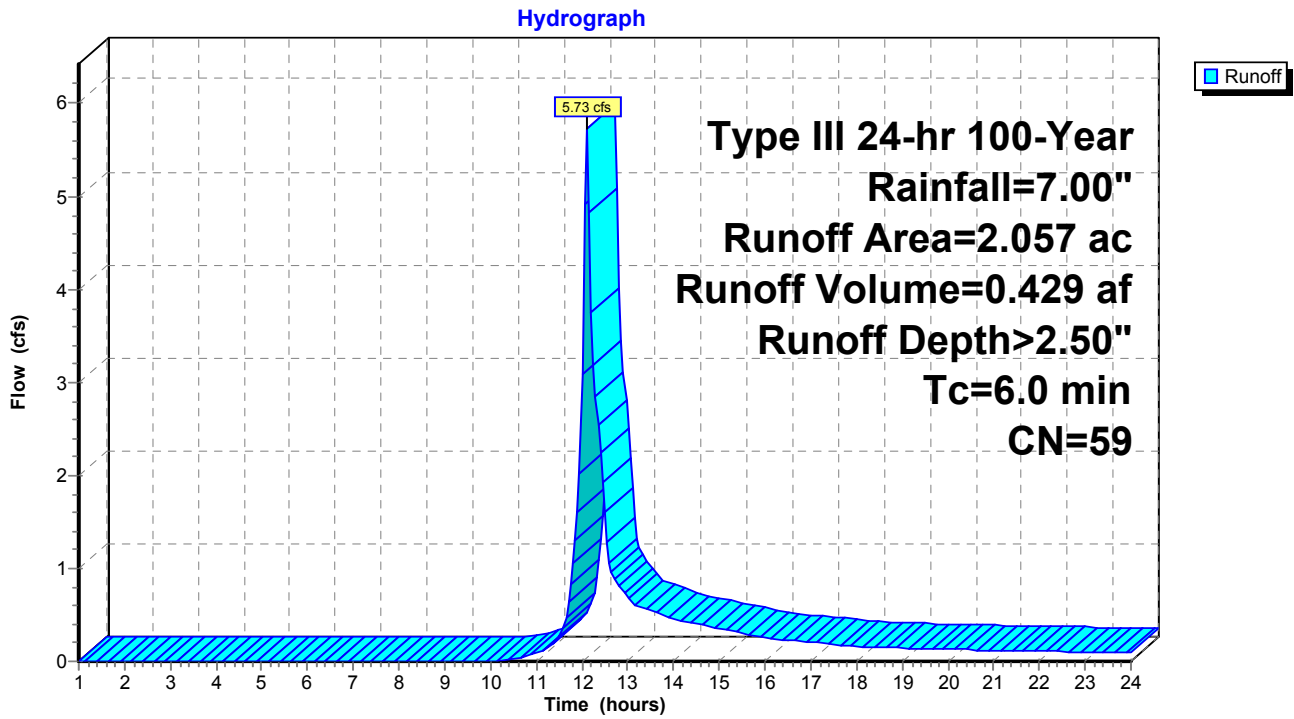
Area (ac)	CN	Description	Land Use
0.166	85	Gravel roads, HSG B	Driveway
0.633	55	Woods, Good, HSG B	Rural open/forest
1.189	58	Meadow, non-grazed, HSG B	Rural open/forest
0.069	58	Meadow, non-grazed, HSG B	Water/wetland
2.057	59	Weighted Average	
2.057		100.00% Pervious Area	

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

Pollutant Loading for 2.50" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.166	Driveway	16.29	0.05	0.20
1.822	Rural open/forest	52.71	0.11	1.84
0.069	Water/wetland	0.23	0.00	0.05
2.057	Total	69.24	0.17	2.09

Subcatchment 20S: Basin 6 - Post



Summary for Subcatchment 21S: Basin 5 - Post

Runoff = 5.46 cfs @ 12.10 hrs, Volume= 0.401 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

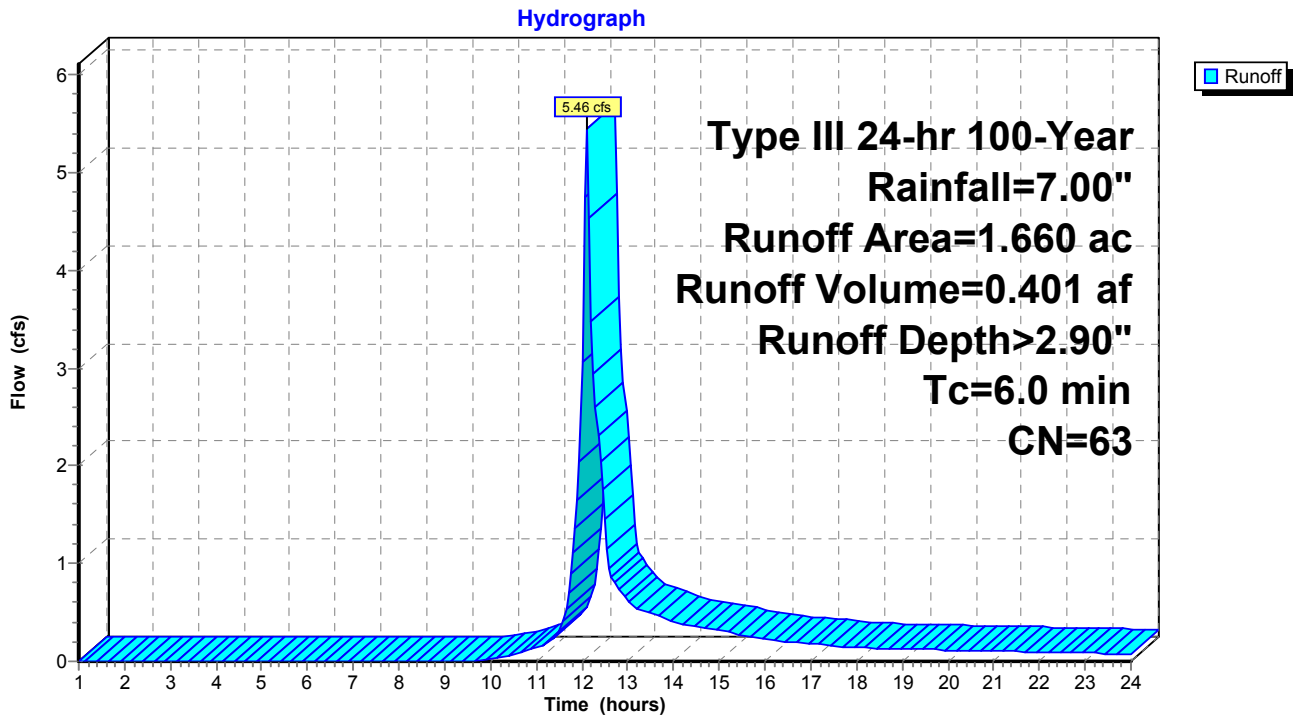
Area (ac)	CN	Description	Land Use
0.304	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.204	58	Meadow, non-grazed, HSG B	Rural open/forest
0.152	58	Meadow, non-grazed, HSG B	Water/wetland
1.660	63	Weighted Average	
1.660		100.00% Pervious Area	

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

Pollutant Loading for 2.90" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.304	Driveway	34.54	0.11	0.42
1.204	Rural open/forest	40.32	0.09	1.41
0.152	Water/wetland	0.60	0.01	0.14
1.660	Total	75.46	0.21	1.96

Subcatchment 21S: Basin 5 - Post



Summary for Subcatchment 27S: Basin 3 - Post

Runoff = 4.98 cfs @ 12.10 hrs, Volume= 0.375 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

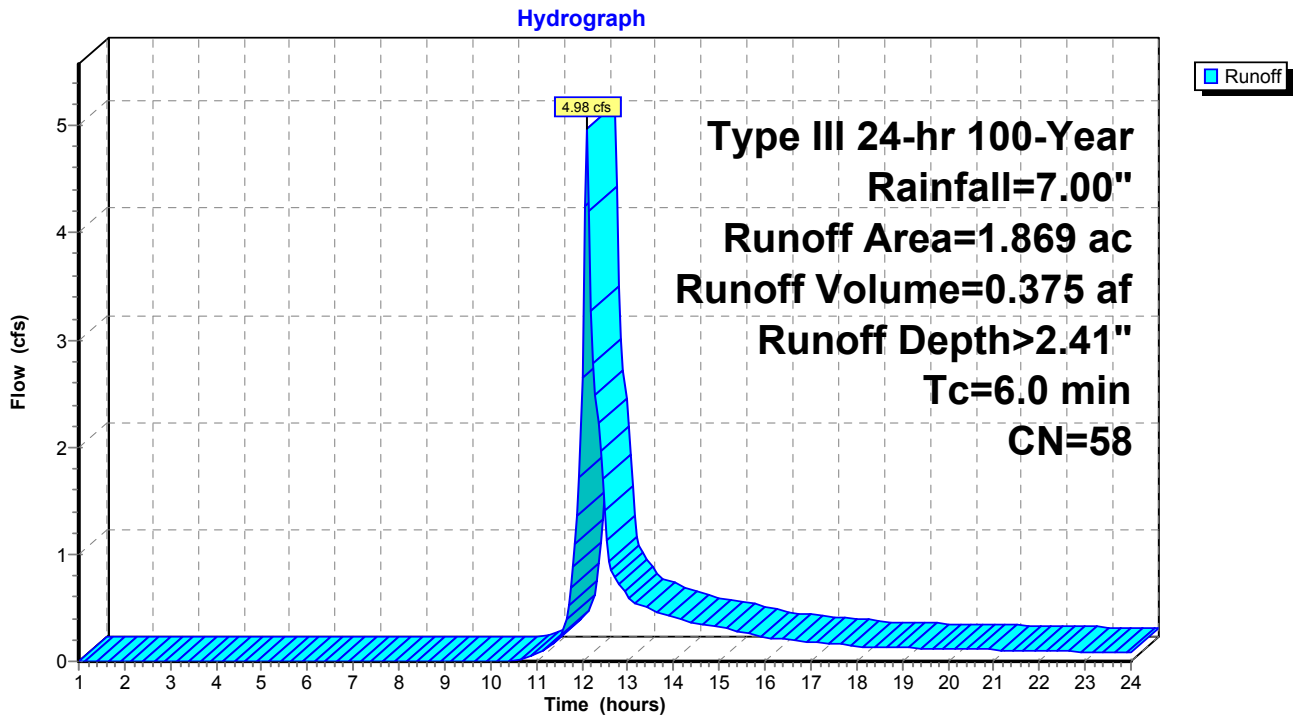
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.784	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.869	58	Weighted Average	
1.869		100.00% Pervious Area	

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

Pollutant Loading for 2.41" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
1.784	Rural open/forest	49.62	0.11	1.73
0.085	Water/wetland	0.28	0.00	0.06
1.869	Total	49.90	0.11	1.80

Subcatchment 27S: Basin 3 - Post



Summary for Subcatchment 32S: Basin 3A - Post

Runoff = 16.13 cfs @ 12.55 hrs, Volume= 2.345 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
13.298	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
13.383	55	Weighted Average	
13.383		100.00% Pervious Area	

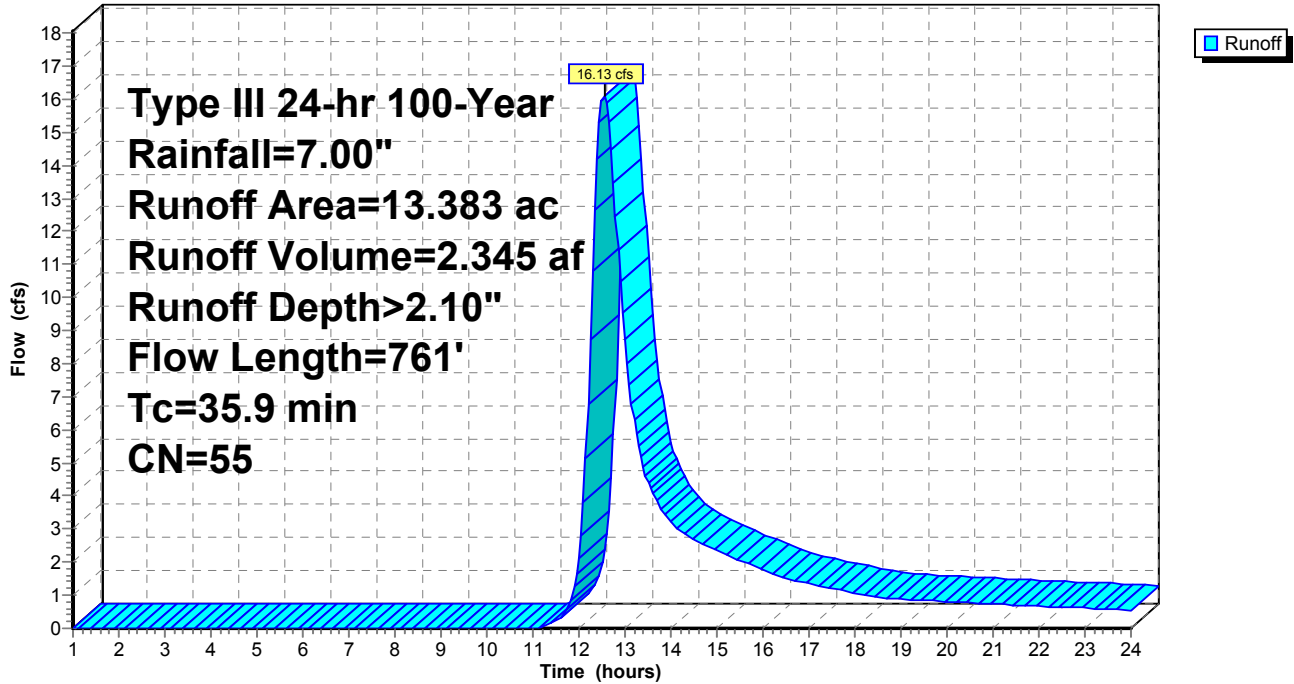
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.3	300	0.0700	0.16		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.6	461	0.1100	1.66		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
35.9	761	Total			

Pollutant Loading for 2.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
13.298	Rural open/forest	323.21	0.70	11.28
0.085	Water/wetland	0.24	0.00	0.06
13.383	Total	323.45	0.70	11.34

Subcatchment 32S: Basin 3A - Post

Hydrograph



Summary for Subcatchment 33S: Basin 3B - Post

Runoff = 2.78 cfs @ 12.66 hrs, Volume= 0.447 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

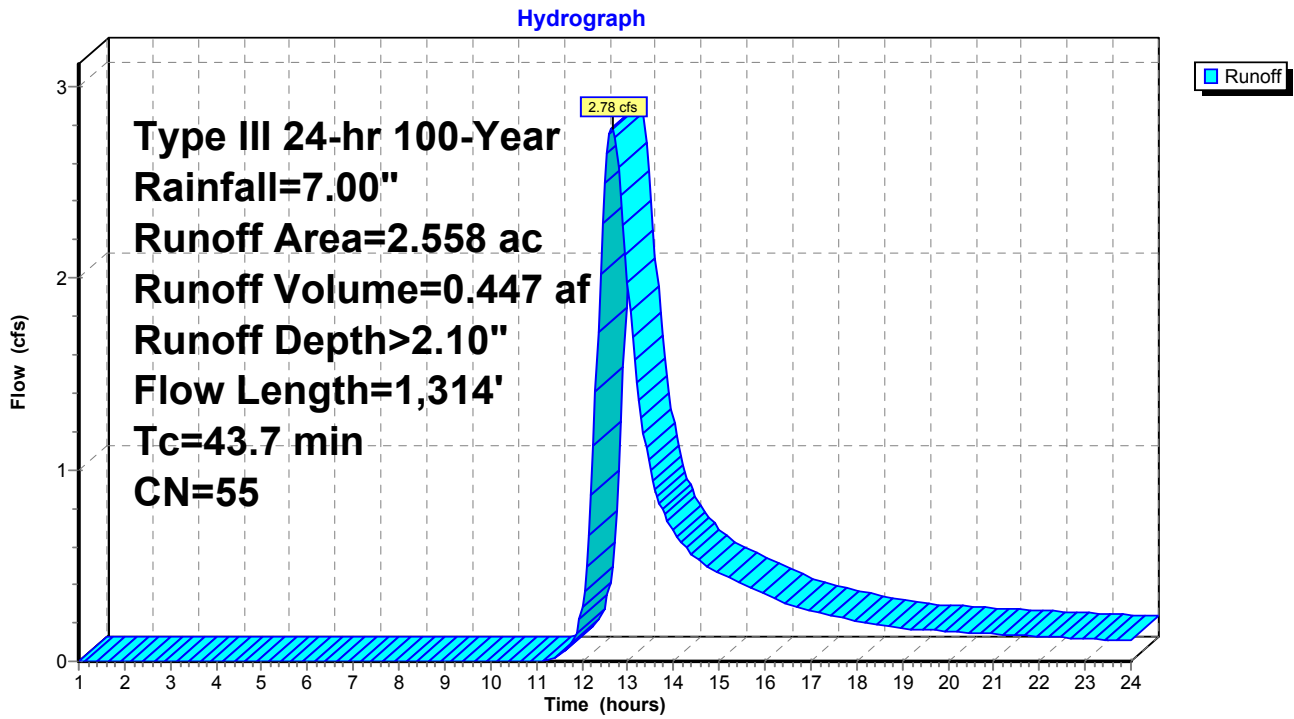
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
2.473	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.085	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
2.558	55	Weighted Average	
2.558		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.3	273	0.0900	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
17.3	1,041	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
43.7	1,314	Total			

Pollutant Loading for 2.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
2.473	Rural open/forest	59.96	0.13	2.09
0.085	Water/wetland	0.24	0.00	0.06
2.558	Total	60.21	0.13	2.15

Subcatchment 33S: Basin 3B - Post



Summary for Subcatchment 35S: Basin 6A - Post

Runoff = 6.04 cfs @ 12.73 hrs, Volume= 1.030 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

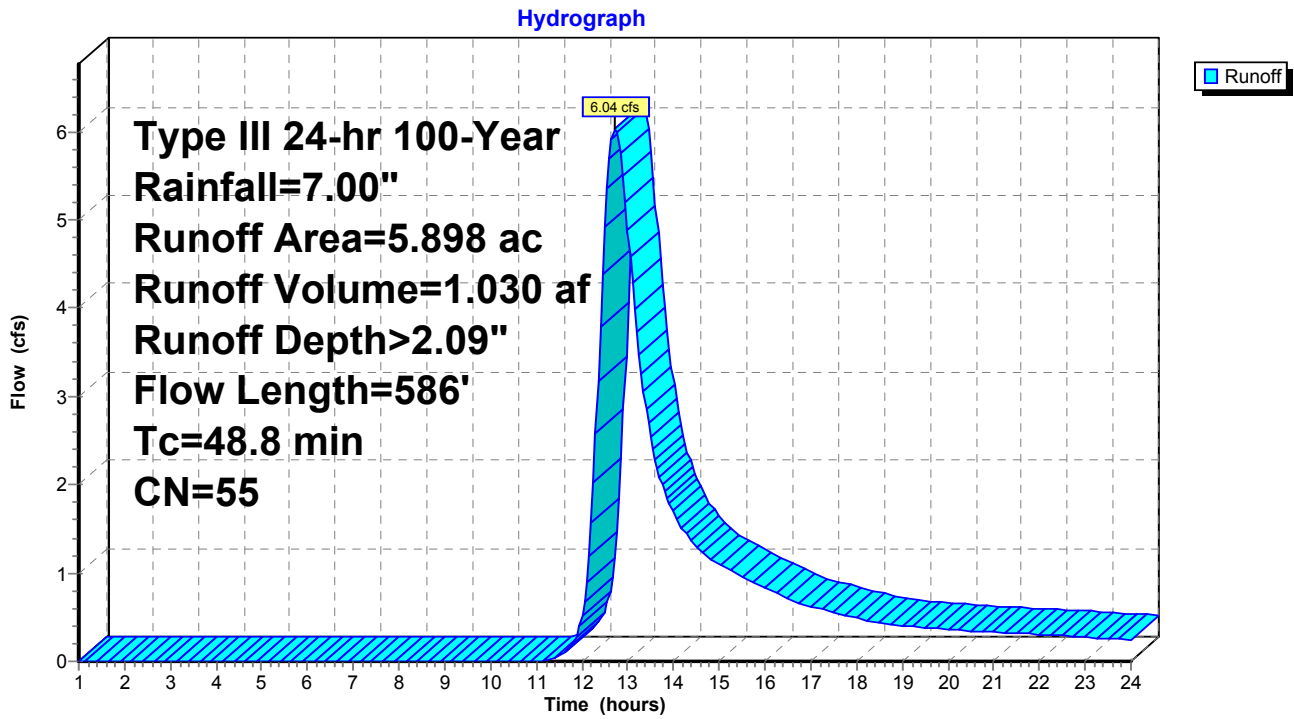
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
5.898	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
5.898	55	Weighted Average	
5.898		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0	300	0.0300	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
4.8	286	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
48.8	586	Total			

Pollutant Loading for 2.09" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Driveway	0.00	0.00	0.00
5.898	Rural open/forest	142.79	0.31	4.98
0.000	Water/wetland	0.00	0.00	0.00
5.898	Total	142.79	0.31	4.98

Subcatchment 35S: Basin 6A - Post



Summary for Pond 39P: Bioretention Pond 6

[81] Warning: Exceeded Pond 40P by 2.81' @ 12.50 hrs

[81] Warning: Exceeded Pond 40P by 2.81' @ 12.50 hrs

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 2.49" for 100-Year event
 Inflow = 5.66 cfs @ 12.10 hrs, Volume= 0.427 af
 Outflow = 2.05 cfs @ 12.44 hrs, Volume= 0.423 af, Atten= 64%, Lag= 20.1 min
 Primary = 1.91 cfs @ 12.44 hrs, Volume= 0.417 af
 Secondary = 0.14 cfs @ 12.44 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,436.47' @ 12.44 hrs Surf.Area= 1,754 sf Storage= 4,692 cf

Plug-Flow detention time= 48.5 min calculated for 0.422 af (99% of inflow)
 Center-of-Mass det. time= 43.2 min (900.0 - 856.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 0.00 0.08

Primary OutFlow Max=1.91 cfs @ 12.44 hrs HW=1,436.47' (Free Discharge)

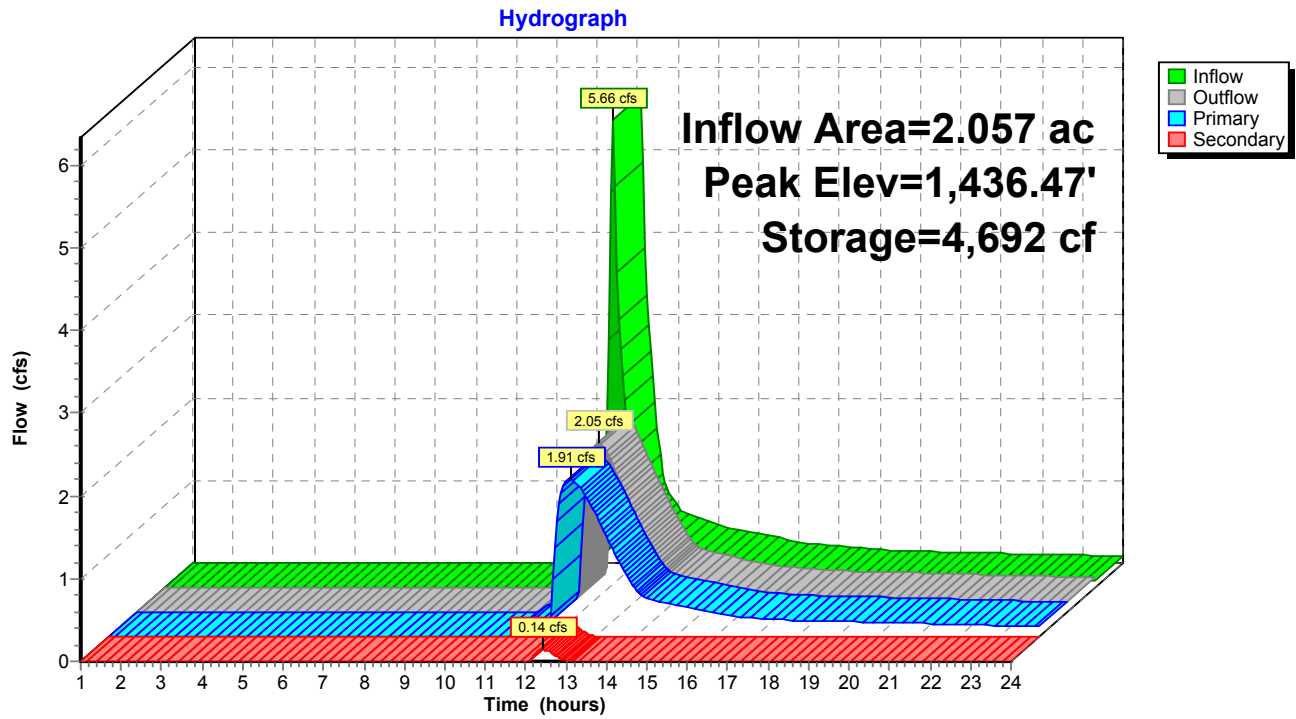
↑1=Exfiltration (Controls 0.41 cfs)

└2=Orifice/Grate (Orifice Controls 1.50 cfs @ 7.64 fps)

Secondary OutFlow Max=0.14 cfs @ 12.44 hrs HW=1,436.47' (Free Discharge)

↑3=Custom Weir/Orifice (Weir Controls 0.14 cfs @ 3.18 fps)

Pond 39P: Bioretention Pond 6



Summary for Pond 40P: Forebay 6

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 2.057 ac, 0.00% Impervious, Inflow Depth > 2.50" for 100-Year event
 Inflow = 5.73 cfs @ 12.10 hrs, Volume= 0.429 af
 Outflow = 5.66 cfs @ 12.10 hrs, Volume= 0.427 af, Atten= 1%, Lag= 0.1 min
 Primary = 5.66 cfs @ 12.10 hrs, Volume= 0.427 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.99' @ 12.10 hrs Surf.Area= 191 sf Storage= 200 cf

Plug-Flow detention time= 4.8 min calculated for 0.427 af (99% of inflow)
 Center-of-Mass det. time= 1.5 min (856.8 - 855.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

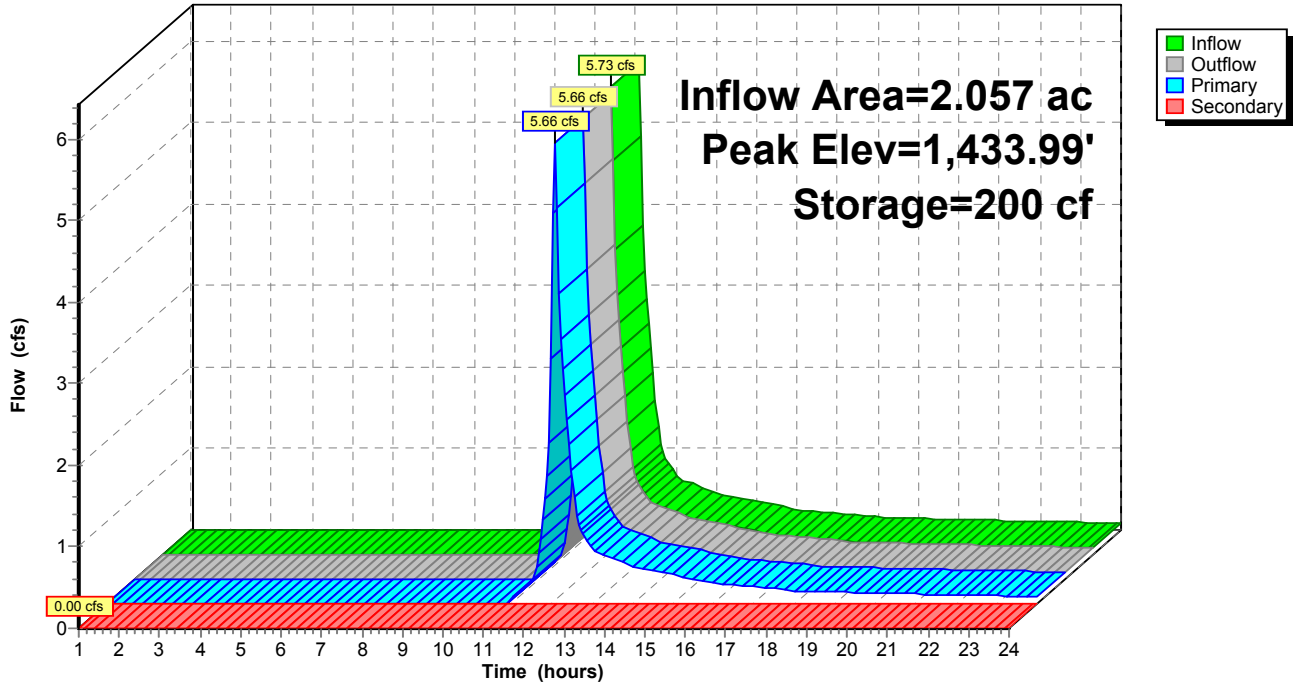
Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=5.64 cfs @ 12.10 hrs HW=1,433.99' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 5.64 cfs @ 2.54 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Forebay 6

Hydrograph



Summary for Pond 47P: Bioretention Pond 5

[81] Warning: Exceeded Pond 48P by 3.42' @ 12.50 hrs

[81] Warning: Exceeded Pond 48P by 3.42' @ 12.50 hrs

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 2.88" for 100-Year event
 Inflow = 5.37 cfs @ 12.10 hrs, Volume= 0.399 af
 Outflow = 1.90 cfs @ 12.43 hrs, Volume= 0.392 af, Atten= 65%, Lag= 19.8 min
 Primary = 1.57 cfs @ 12.43 hrs, Volume= 0.380 af
 Secondary = 0.33 cfs @ 12.43 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,435.00' @ 12.43 hrs Surf.Area= 1,799 sf Storage= 5,164 cf

Plug-Flow detention time= 83.8 min calculated for 0.391 af (98% of inflow)
 Center-of-Mass det. time= 74.3 min (921.8 - 847.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.25

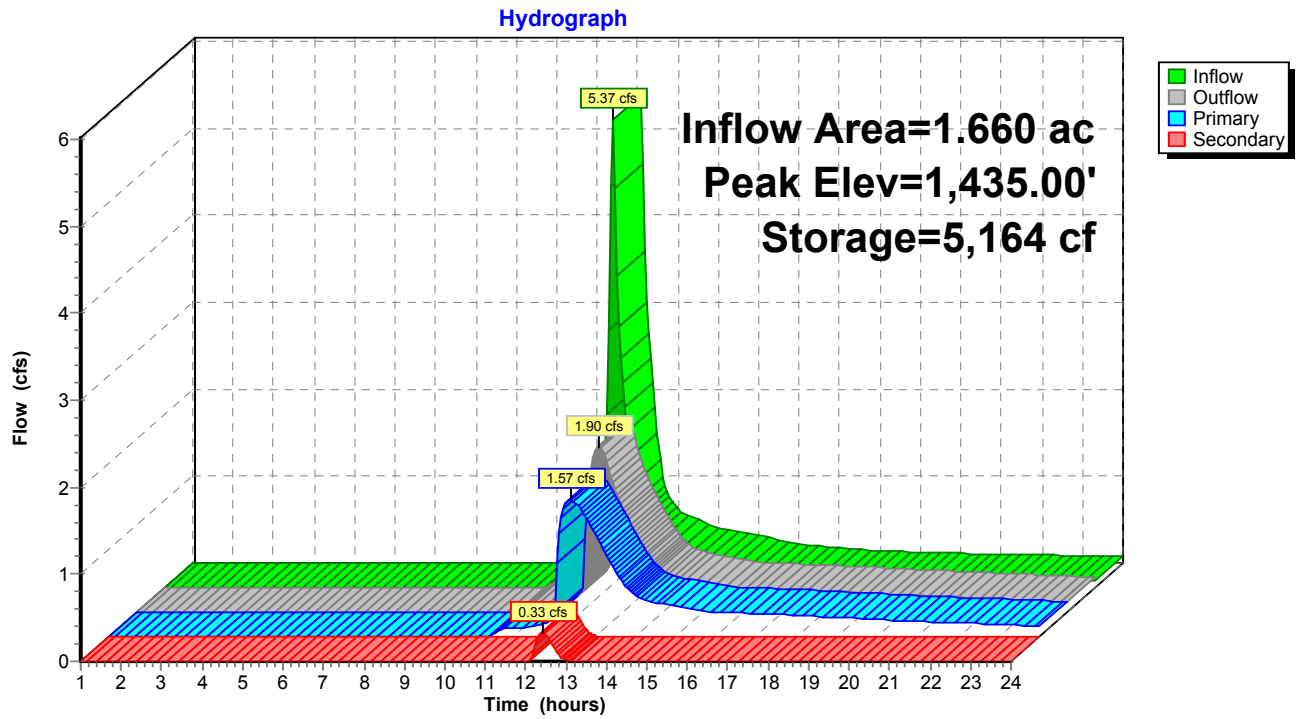
Primary OutFlow Max=1.57 cfs @ 12.43 hrs HW=1,435.00' (Free Discharge)

- ↑1=Exfiltration (Controls 0.42 cfs)
- ↑2=Orifice/Grate (Orifice Controls 1.16 cfs @ 5.89 fps)

Secondary OutFlow Max=0.32 cfs @ 12.43 hrs HW=1,435.00' (Free Discharge)

- ↑3=Custom Weir/Orifice (Weir Controls 0.32 cfs @ 2.61 fps)

Pond 47P: Bioretention Pond 5



Summary for Pond 48P: Forebay 5

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.660 ac, 0.00% Impervious, Inflow Depth > 2.90" for 100-Year event
 Inflow = 5.46 cfs @ 12.10 hrs, Volume= 0.401 af
 Outflow = 5.37 cfs @ 12.10 hrs, Volume= 0.399 af, Atten= 2%, Lag= 0.2 min
 Primary = 5.37 cfs @ 12.10 hrs, Volume= 0.399 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.98' @ 12.10 hrs Surf.Area= 190 sf Storage= 199 cf

Plug-Flow detention time= 4.5 min calculated for 0.399 af (100% of inflow)
 Center-of-Mass det. time= 1.6 min (847.5 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

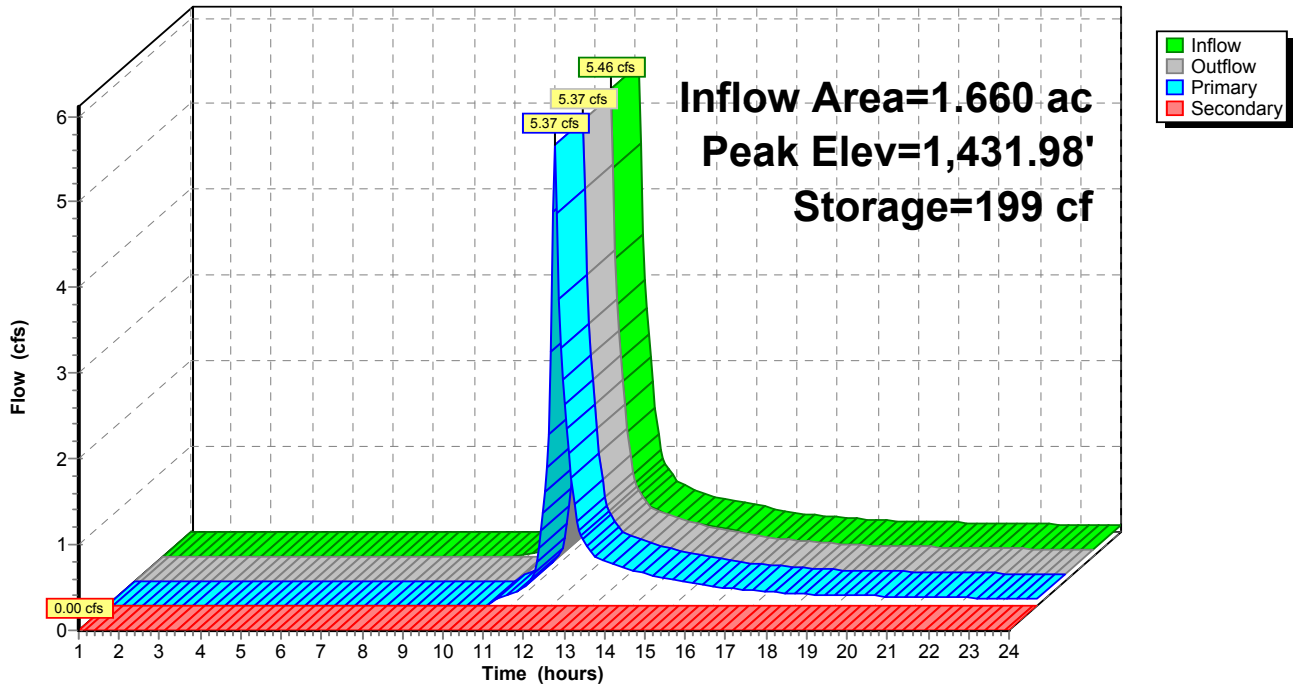
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.20'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.80 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=5.37 cfs @ 12.10 hrs HW=1,431.98' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 5.37 cfs @ 2.78 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 48P: Forebay 5

Hydrograph



Summary for Pond 49P: Bioretention Pond 3

[81] Warning: Exceeded Pond 50P by 3.22' @ 12.55 hrs

[81] Warning: Exceeded Pond 50P by 3.22' @ 12.55 hrs

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 2.39" for 100-Year event
 Inflow = 4.90 cfs @ 12.10 hrs, Volume= 0.373 af
 Outflow = 1.53 cfs @ 12.48 hrs, Volume= 0.365 af, Atten= 69%, Lag= 22.9 min
 Primary = 1.47 cfs @ 12.48 hrs, Volume= 0.363 af
 Secondary = 0.06 cfs @ 12.48 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,434.79' @ 12.48 hrs Surf.Area= 1,725 sf Storage= 4,798 cf

Plug-Flow detention time= 88.7 min calculated for 0.365 af (98% of inflow)
 Center-of-Mass det. time= 77.7 min (937.0 - 859.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,430.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.25'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.08

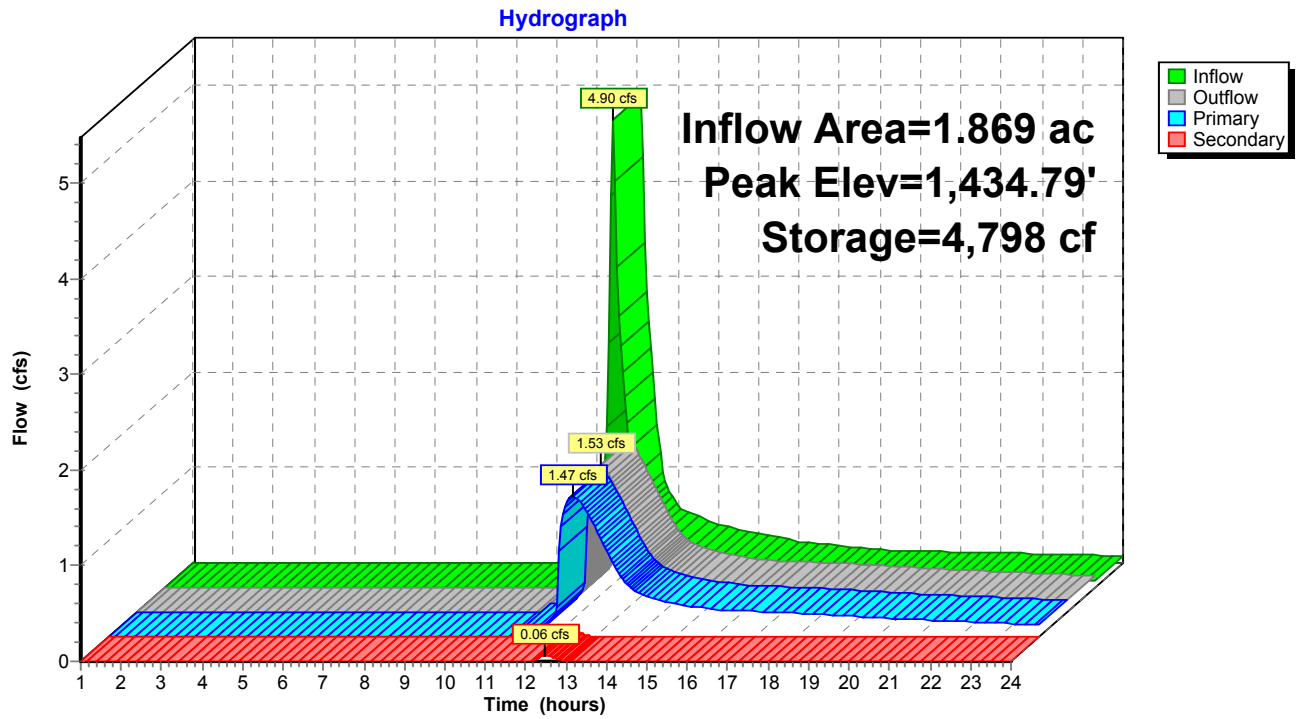
Primary OutFlow Max=1.47 cfs @ 12.48 hrs HW=1,434.79' (Free Discharge)

- ↑1=Exfiltration (Controls 0.40 cfs)
- ↑2=Orifice/Grate (Orifice Controls 1.07 cfs @ 5.46 fps)

Secondary OutFlow Max=0.06 cfs @ 12.48 hrs HW=1,434.79' (Free Discharge)

- ↑3=Custom Weir/Orifice (Weir Controls 0.06 cfs @ 2.33 fps)

Pond 49P: Bioretention Pond 3



Summary for Pond 50P: Forebay 3

For pretreatment and storage of at least 25% of the WQV.
 Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 1.869 ac, 0.00% Impervious, Inflow Depth > 2.41" for 100-Year event
 Inflow = 4.98 cfs @ 12.10 hrs, Volume= 0.375 af
 Outflow = 4.90 cfs @ 12.10 hrs, Volume= 0.373 af, Atten= 2%, Lag= 0.2 min
 Primary = 4.90 cfs @ 12.10 hrs, Volume= 0.373 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,431.98' @ 12.10 hrs Surf.Area= 190 sf Storage= 199 cf

Plug-Flow detention time= 4.8 min calculated for 0.372 af (99% of inflow)
 Center-of-Mass det. time= 1.6 min (859.3 - 857.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,430.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatoid Z=2.0

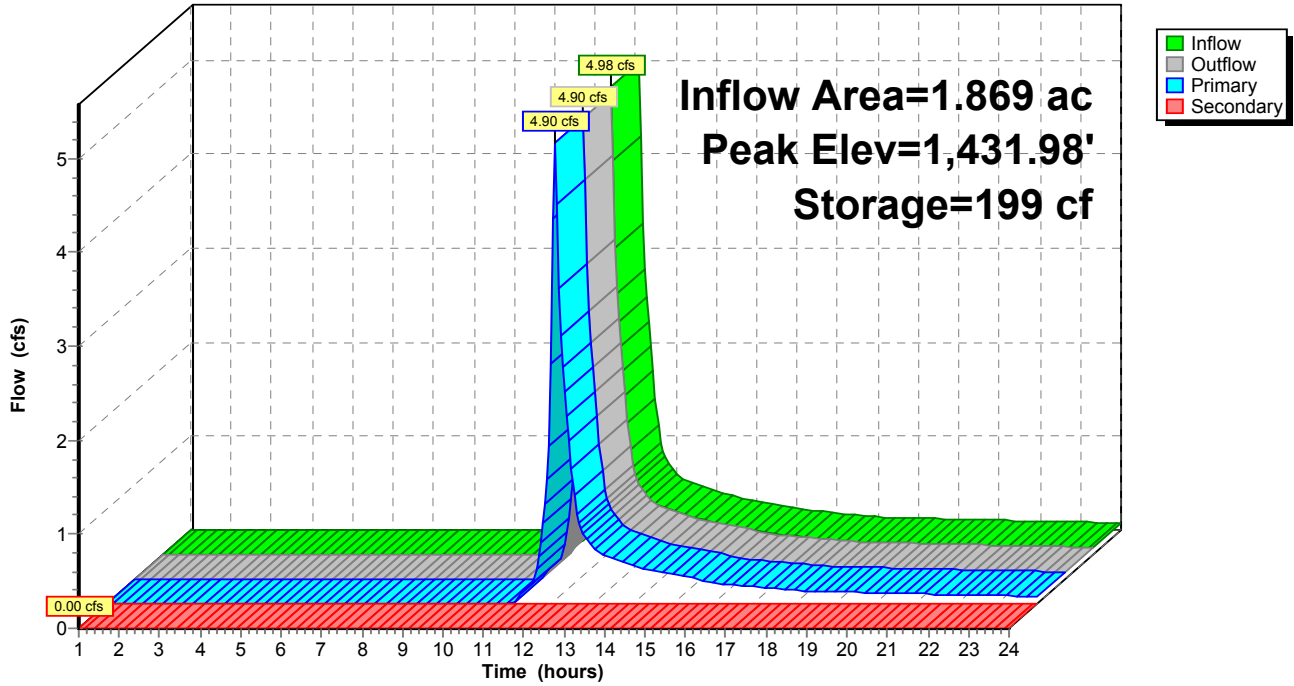
Device	Routing	Invert	Outlet Devices
#1	Primary	1,431.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.00
#2	Secondary	1,432.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=4.86 cfs @ 12.10 hrs HW=1,431.98' (Free Discharge)
 ↑1=Custom Weir/Orifice (Weir Controls 4.86 cfs @ 2.69 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,430.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

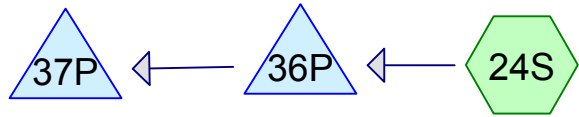
Pond 50P: Forebay 3

Hydrograph

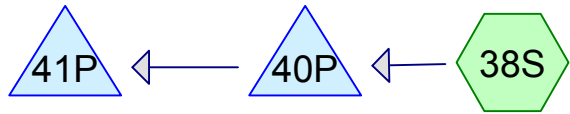




Basin A - Pre



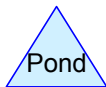
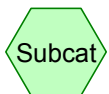
Bioretention Pond 4 Forebay 4 Basin 4 - Post



Bioretention Pond 1 Forebay 1 Basin 1 - Post



Basin 4A - Post



Wind-Colbrook South NE Discharge 2011-03-10

Prepared by Zapata Engineering

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
25.031	55	Woods, Good, HSG B (16S, 34S, 38S)
2.711	58	Meadow, non-grazed, HSG B (24S, 34S, 38S)
0.468	85	Gravel roads, HSG B (24S, 38S)
28.210	56	TOTAL AREA

Wind-Colbrook South NE Discharge 2011-03-10

Prepared by Zapata Engineering

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
28.210	HSG B	16S, 24S, 34S, 38S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
28.210		TOTAL AREA

Wind-Colbrook South NE Discharge 2011-03-10

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Land-Use Listing (all nodes)

Area (acres)	Land Use	Subcatchment Numbers
0.000	Commercial Roof	24S, 34S, 38S
0.468	Driveway	24S, 34S, 38S
27.587	Rural open/forest	16S, 24S, 34S, 38S
0.155	Water/wetland	24S, 34S, 38S
28.210	TOTAL	

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Pollutant Concentrations

Line#	Land Use	TSS (mg/l)	TP (mg/l)	TN (mg/l)
1	Commercial Roof	9.00	0.14	2.10
2	Driveway	173.00	0.56	2.10
3	Rural open/forest	51.00	0.11	1.78
4	Water/wetland	6.00	0.08	1.38

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Subcatchment Loading

Line#	Subcat Number	TSS (pounds)	TP (pounds)	TN (pounds)
1	16S	0.00	0.00	0.00
2	24S	0.00	0.00	0.00
3	34S	0.00	0.00	0.00
4	38S	0.00	0.00	0.00
	TOTAL	0.00	0.00	0.00

Wind-Colbrook South NE Discharge 2011-03-10

Type III 24-hr 1-Year Rainfall=2.60"

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Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment16S: Basin A - Pre	Runoff Area=15.176 ac 0.00% Impervious Runoff Depth>0.10" Flow Length=1,302' Tc=33.2 min CN=55 Runoff=0.22 cfs 0.126 af
Subcatchment24S: Basin 4 - Post	Runoff Area=1.411 ac 0.00% Impervious Runoff Depth>0.31" Tc=6.0 min CN=64 Runoff=0.26 cfs 0.036 af
Subcatchment34S: Basin 4A - Post	Runoff Area=10.445 ac 0.00% Impervious Runoff Depth>0.10" Flow Length=1,096' Tc=28.9 min CN=55 Runoff=0.15 cfs 0.087 af
Subcatchment38S: Basin 1 - Post	Runoff Area=1.178 ac 0.00% Impervious Runoff Depth>0.23" Tc=6.0 min CN=61 Runoff=0.12 cfs 0.022 af
Pond 36P: Forebay 4	Peak Elev=1,421.49' Storage=77 cf Inflow=0.26 cfs 0.036 af Outflow=0.31 cfs 0.035 af
Pond 37P: Bioretention Pond 4	Peak Elev=1,420.31' Storage=149 cf Inflow=0.31 cfs 0.035 af Primary=0.12 cfs 0.035 af Secondary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.035 af
Pond 40P: Forebay 1	Peak Elev=1,421.45' Storage=73 cf Inflow=0.12 cfs 0.022 af Outflow=0.14 cfs 0.021 af
Pond 41P: Bioretention Pond 1	Peak Elev=1,420.09' Storage=32 cf Inflow=0.14 cfs 0.021 af Primary=0.08 cfs 0.021 af Secondary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.021 af
Total Runoff Area = 28.210 ac Runoff Volume = 0.270 af Average Runoff Depth = 0.12"	
100.00% Pervious = 28.210 ac 0.00% Impervious = 0.000 ac	

Summary for Subcatchment 16S: Basin A - Pre

Runoff = 0.22 cfs @ 13.89 hrs, Volume= 0.126 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
15.176	55	Woods, Good, HSG B	Rural open/forest
15.176		100.00% Pervious Area	

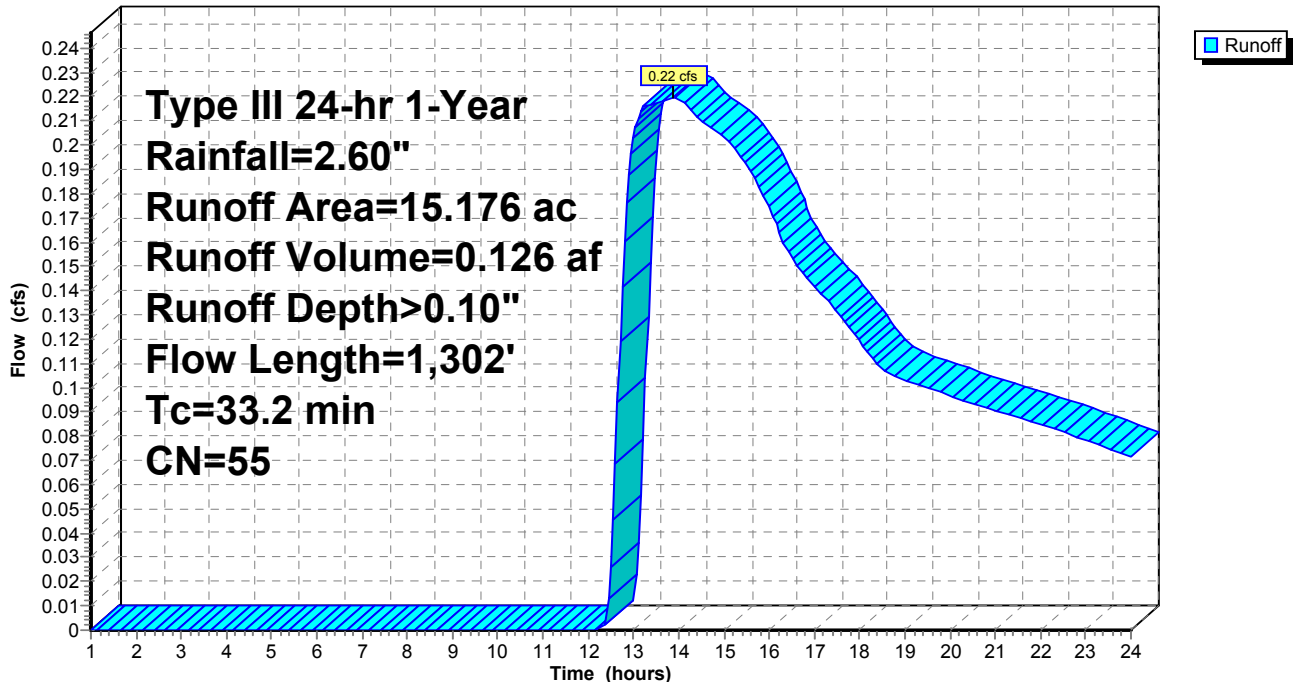
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.9	1,002	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
33.2	1,302	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.176	Rural open/forest	17.42	0.04	0.61
15.176	Total	17.42	0.04	0.61

Subcatchment 16S: Basin A - Pre

Hydrograph



Summary for Subcatchment 24S: Basin 4 - Post

Runoff = 0.26 cfs @ 12.15 hrs, Volume= 0.036 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
0.298	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.008	58	Meadow, non-grazed, HSG B	Rural open/forest
0.105	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.411	64	Weighted Average	
1.411		100.00% Pervious Area	

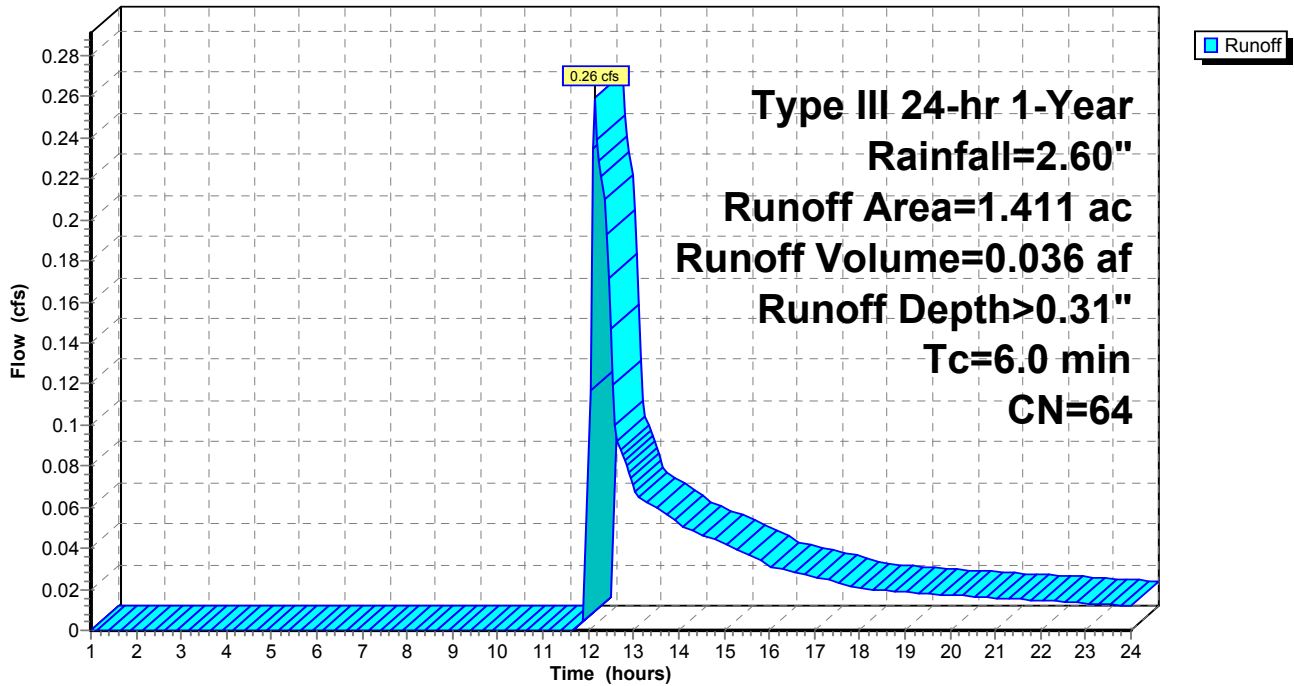
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 0.31" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.298	Driveway	3.57	0.01	0.04
1.008	Rural open/forest	3.56	0.01	0.12
0.105	Water/wetland	0.04	0.00	0.01
1.411	Total	7.18	0.02	0.18

Subcatchment 24S: Basin 4 - Post

Hydrograph



Summary for Subcatchment 34S: Basin 4A - Post

Runoff = 0.15 cfs @ 13.84 hrs, Volume= 0.087 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
9.615	55	Woods, Good, HSG B	Rural open/forest
0.830	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
10.445	55	Weighted Average	
10.445		100.00% Pervious Area	

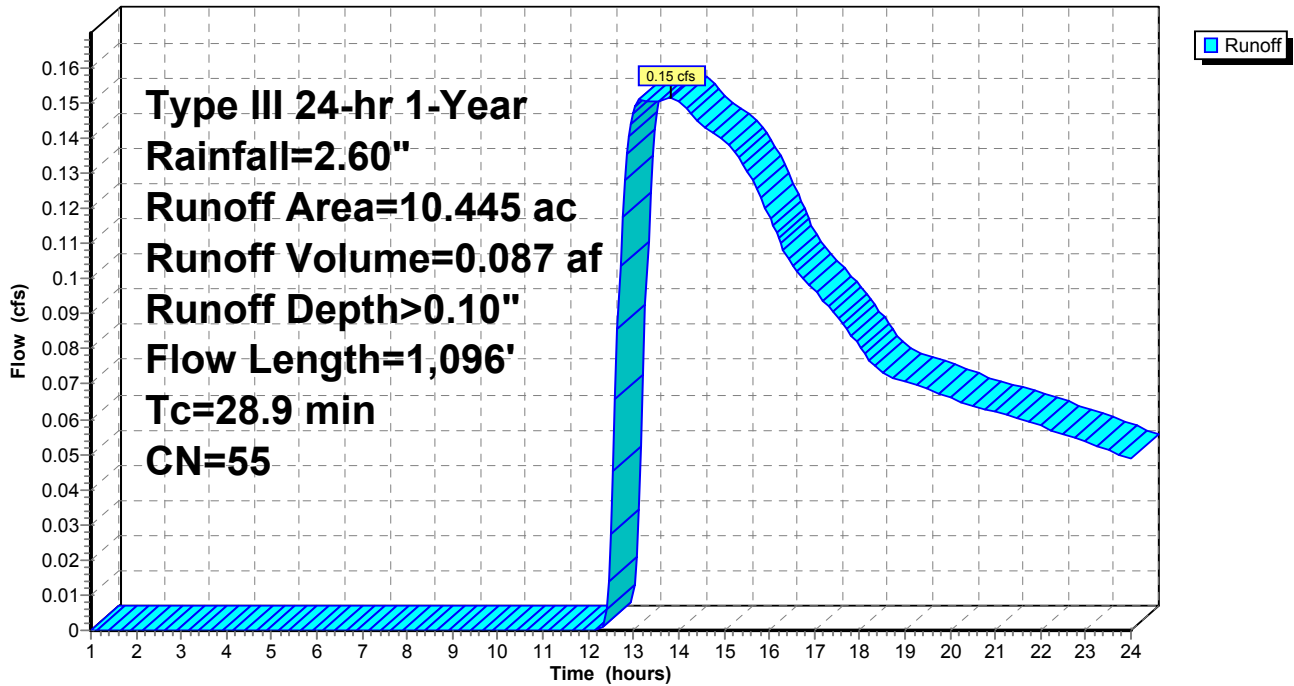
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	300	0.1800	0.23		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.4	796	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.9	1,096	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
10.445	Rural open/forest	12.03	0.03	0.42
0.000	Water/wetland	0.00	0.00	0.00
10.445	Total	12.03	0.03	0.42

Subcatchment 34S: Basin 4A - Post

Hydrograph



Summary for Subcatchment 38S: Basin 1 - Post

Runoff = 0.12 cfs @ 12.31 hrs, Volume= 0.022 af, Depth> 0.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
0.170	85	Gravel roads, HSG B	Driveway
0.240	55	Woods, Good, HSG B	Rural open/forest
0.718	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.178	61	Weighted Average	
1.178		100.00% Pervious Area	

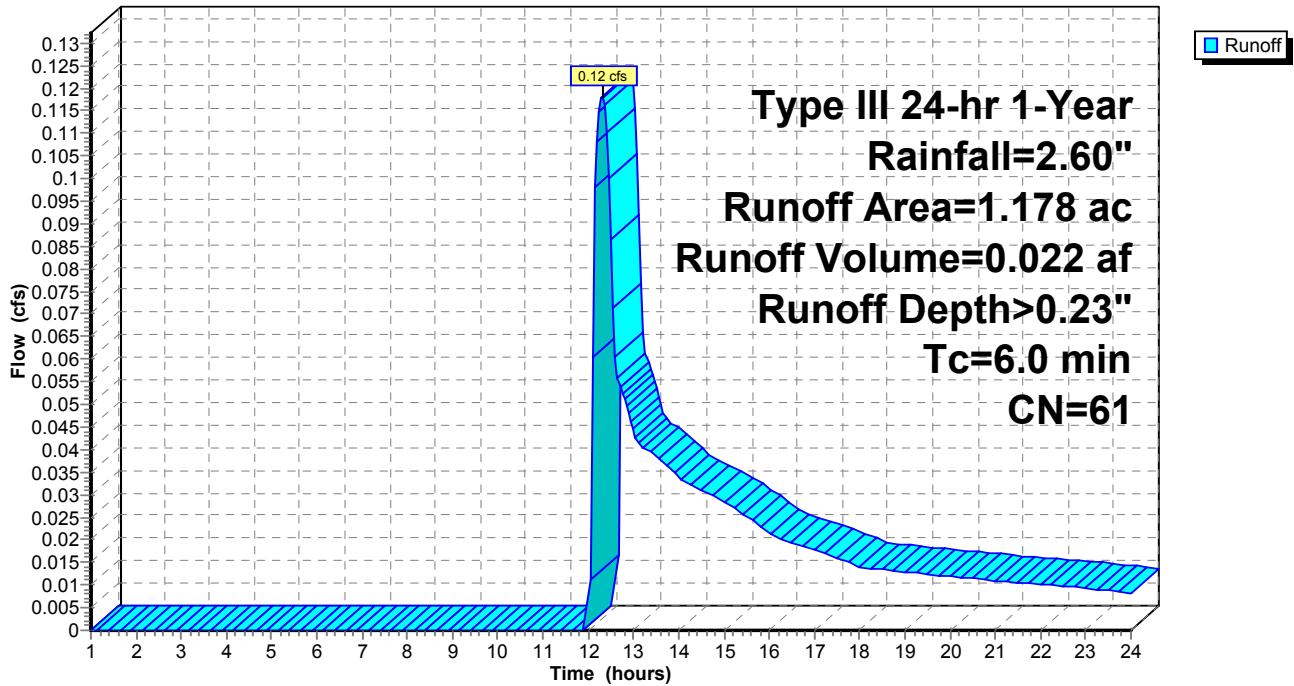
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 0.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.170	Driveway	1.51	0.00	0.02
0.958	Rural open/forest	2.50	0.01	0.09
0.050	Water/wetland	0.02	0.00	0.00
1.178	Total	4.02	0.01	0.11

Subcatchment 38S: Basin 1 - Post

Hydrograph



Summary for Pond 36P: Forebay 4

[88] Warning: Qout>Qin may require Finer Routing>1

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 0.31" for 1-Year event
 Inflow = 0.26 cfs @ 12.15 hrs, Volume= 0.036 af
 Outflow = 0.31 cfs @ 12.17 hrs, Volume= 0.035 af, Atten= 0%, Lag= 1.0 min
 Primary = 0.31 cfs @ 12.17 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.49' @ 12.15 hrs Surf.Area= 99 sf Storage= 77 cf

Plug-Flow detention time= 24.4 min calculated for 0.035 af (96% of inflow)
 Center-of-Mass det. time= 7.6 min (932.4 - 924.9)

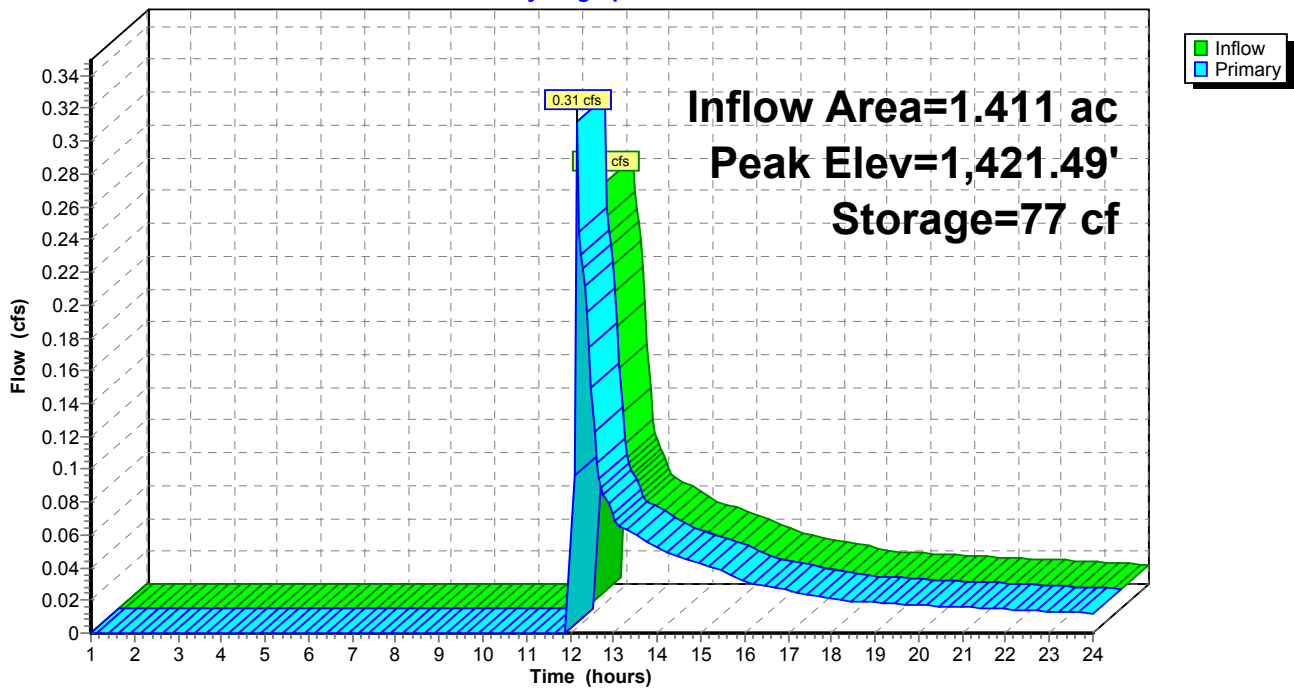
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=0.27 cfs @ 12.17 hrs HW=1,421.49' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 0.27 cfs @ 0.97 fps)

Pond 36P: Forebay 4

Hydrograph



Summary for Pond 37P: Bioretention Pond 4

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 0.30" for 1-Year event
 Inflow = 0.31 cfs @ 12.17 hrs, Volume= 0.035 af
 Outflow = 0.12 cfs @ 12.56 hrs, Volume= 0.035 af, Atten= 61%, Lag= 23.5 min
 Primary = 0.12 cfs @ 12.56 hrs, Volume= 0.035 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,420.31' @ 12.56 hrs Surf.Area= 519 sf Storage= 149 cf

Plug-Flow detention time= 7.3 min calculated for 0.035 af (100% of inflow)
 Center-of-Mass det. time= 6.4 min (938.9 - 932.4)

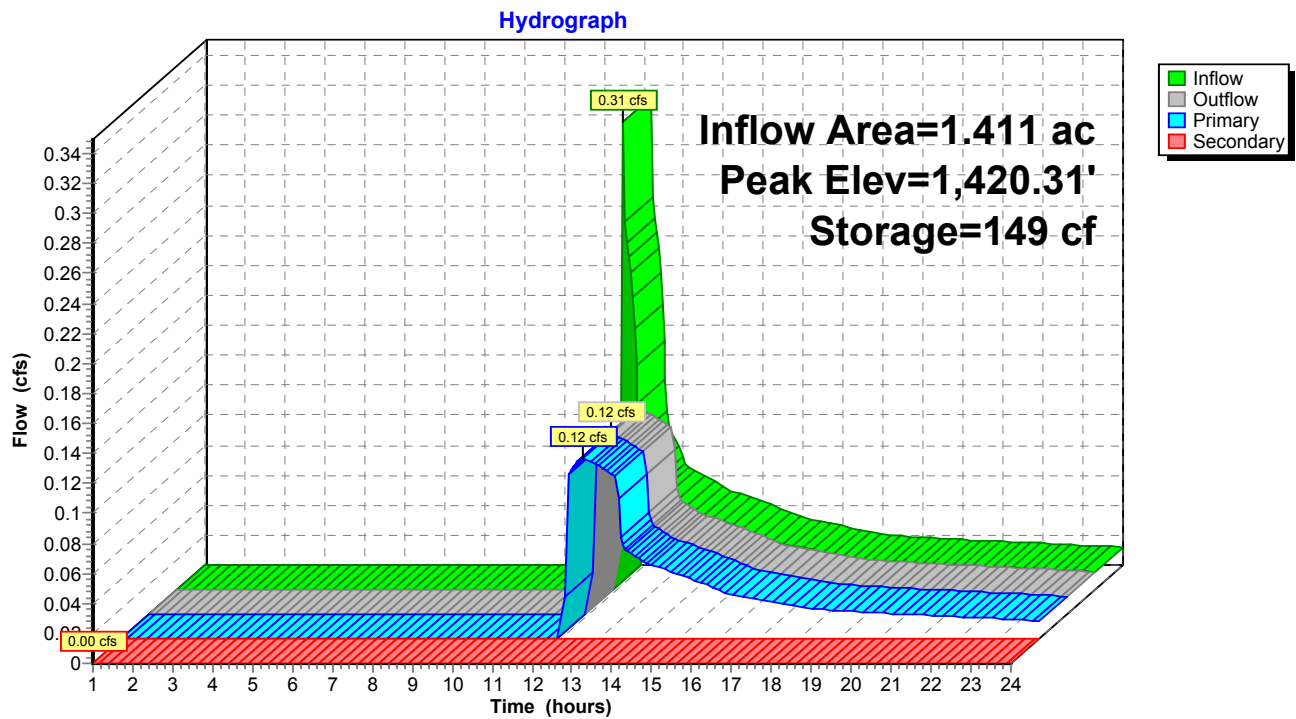
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.50

Primary OutFlow Max=0.12 cfs @ 12.56 hrs HW=1,420.31' (Free Discharge)
 ↑1=Exfiltration (Controls 0.12 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 37P: Bioretention Pond 4



Summary for Pond 40P: Forebay 1

[88] Warning: Qout>Qin may require Finer Routing>1

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 0.23" for 1-Year event
 Inflow = 0.12 cfs @ 12.31 hrs, Volume= 0.022 af
 Outflow = 0.14 cfs @ 12.32 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.7 min
 Primary = 0.14 cfs @ 12.32 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.45' @ 12.30 hrs Surf.Area= 96 sf Storage= 73 cf

Plug-Flow detention time= 46.8 min calculated for 0.021 af (93% of inflow)
 Center-of-Mass det. time= 15.9 min (962.4 - 946.5)

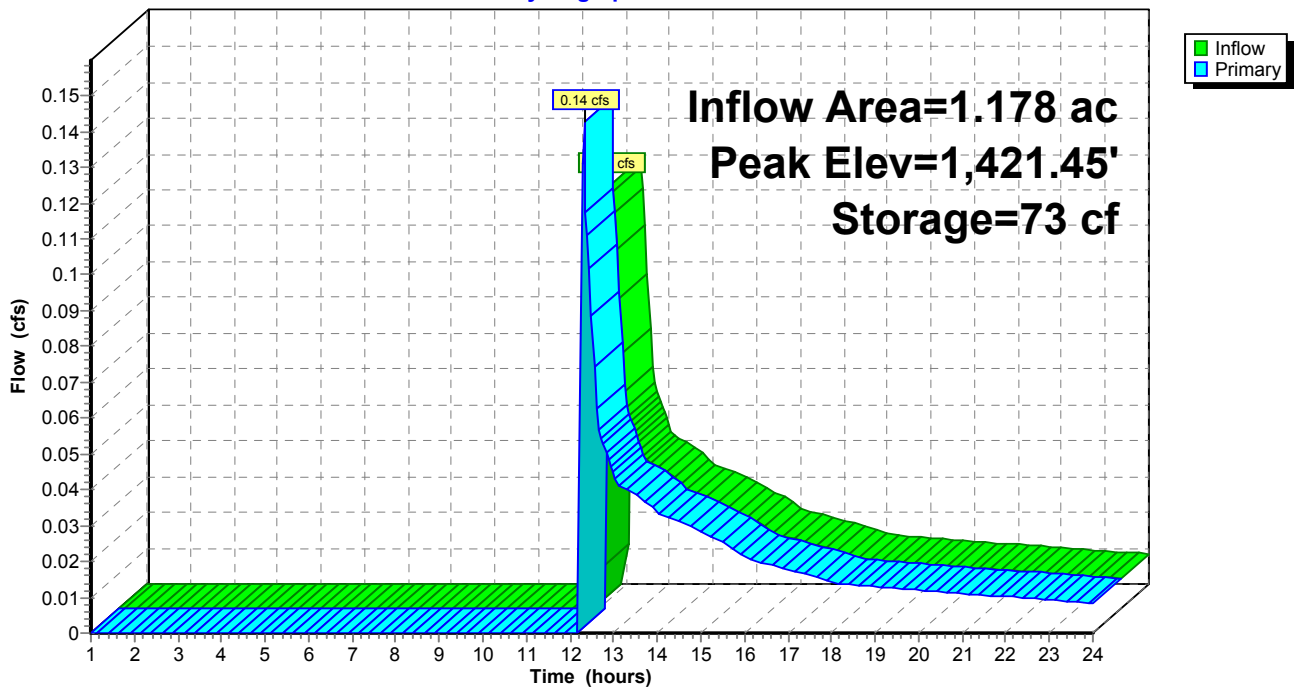
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=0.12 cfs @ 12.32 hrs HW=1,421.45' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 0.12 cfs @ 0.75 fps)

Pond 40P: Forebay 1

Hydrograph



Summary for Pond 41P: Bioretention Pond 1

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 0.21" for 1-Year event
 Inflow = 0.14 cfs @ 12.32 hrs, Volume= 0.021 af
 Outflow = 0.08 cfs @ 12.51 hrs, Volume= 0.021 af, Atten= 41%, Lag= 11.6 min
 Primary = 0.08 cfs @ 12.51 hrs, Volume= 0.021 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,420.09' @ 12.51 hrs Surf.Area= 366 sf Storage= 32 cf

Plug-Flow detention time= 4.2 min calculated for 0.021 af (100% of inflow)
 Center-of-Mass det. time= 3.1 min (965.5 - 962.4)

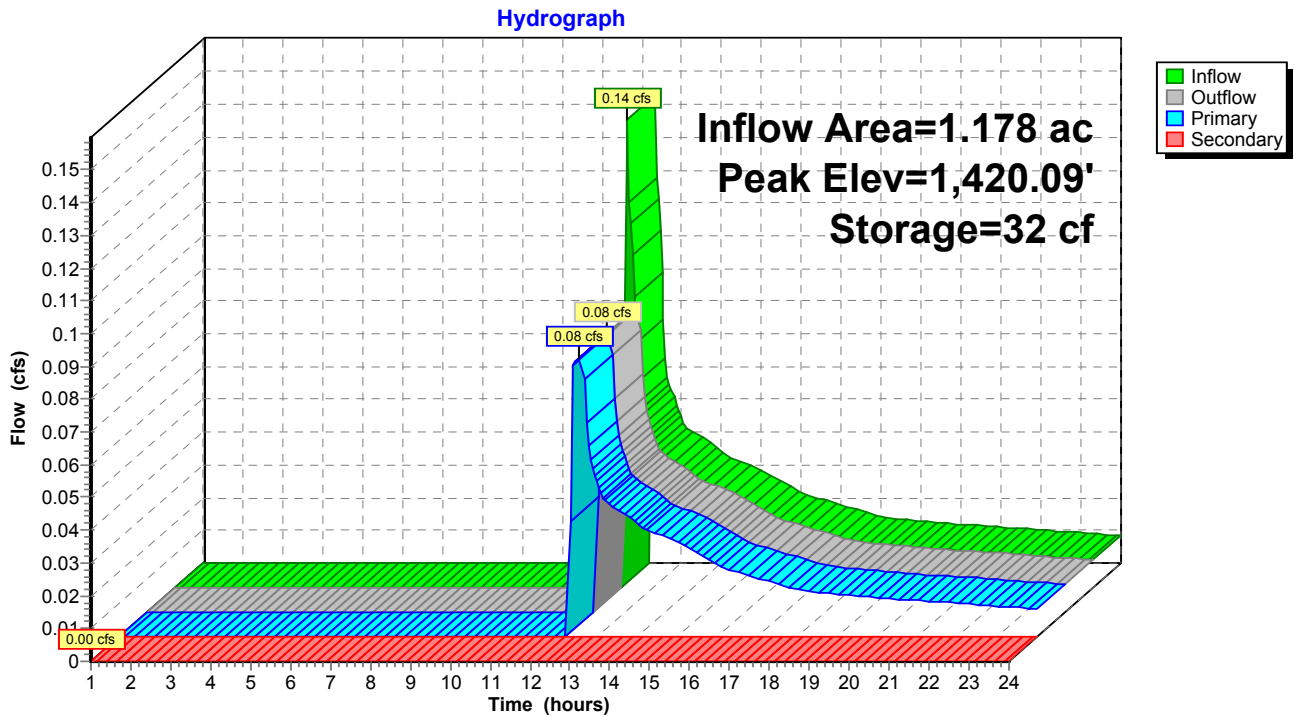
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	4,667 cf	10.00'W x 35.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.75'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 1.33

Primary OutFlow Max=0.08 cfs @ 12.51 hrs HW=1,420.09' (Free Discharge)
 ↑1=Exfiltration (Controls 0.08 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 41P: Bioretention Pond 1



Wind-Colbrook South NE Discharge 2011-03-10

Type III 24-hr 2-Year Rainfall=3.20"

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Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment16S: Basin A - Pre	Runoff Area=15.176 ac 0.00% Impervious Runoff Depth>0.25" Flow Length=1,302' Tc=33.2 min CN=55 Runoff=1.09 cfs 0.312 af
Subcatchment24S: Basin 4 - Post	Runoff Area=1.411 ac 0.00% Impervious Runoff Depth>0.56" Tc=6.0 min CN=64 Runoff=0.69 cfs 0.066 af
Subcatchment34S: Basin 4A - Post	Runoff Area=10.445 ac 0.00% Impervious Runoff Depth>0.25" Flow Length=1,096' Tc=28.9 min CN=55 Runoff=0.80 cfs 0.215 af
Subcatchment38S: Basin 1 - Post	Runoff Area=1.178 ac 0.00% Impervious Runoff Depth>0.44" Tc=6.0 min CN=61 Runoff=0.37 cfs 0.044 af
Pond 36P: Forebay 4	Peak Elev=1,421.56' Storage=84 cf Inflow=0.69 cfs 0.066 af Outflow=0.68 cfs 0.064 af
Pond 37P: Bioretention Pond 4	Peak Elev=1,421.05' Storage=600 cf Inflow=0.68 cfs 0.064 af Primary=0.16 cfs 0.064 af Secondary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.064 af
Pond 40P: Forebay 1	Peak Elev=1,421.50' Storage=78 cf Inflow=0.37 cfs 0.044 af Outflow=0.35 cfs 0.042 af
Pond 41P: Bioretention Pond 1	Peak Elev=1,420.69' Storage=288 cf Inflow=0.35 cfs 0.042 af Primary=0.11 cfs 0.042 af Secondary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.042 af
Total Runoff Area = 28.210 ac Runoff Volume = 0.637 af Average Runoff Depth = 0.27" 100.00% Pervious = 28.210 ac 0.00% Impervious = 0.000 ac	

Wind-Colbrook South NE Discharge 2011-03-10

Type III 24-hr 2-Year Rainfall=3.20"

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Summary for Subcatchment 16S: Basin A - Pre

Runoff = 1.09 cfs @ 12.74 hrs, Volume= 0.312 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
15.176	55	Woods, Good, HSG B	Rural open/forest
15.176		100.00% Pervious Area	

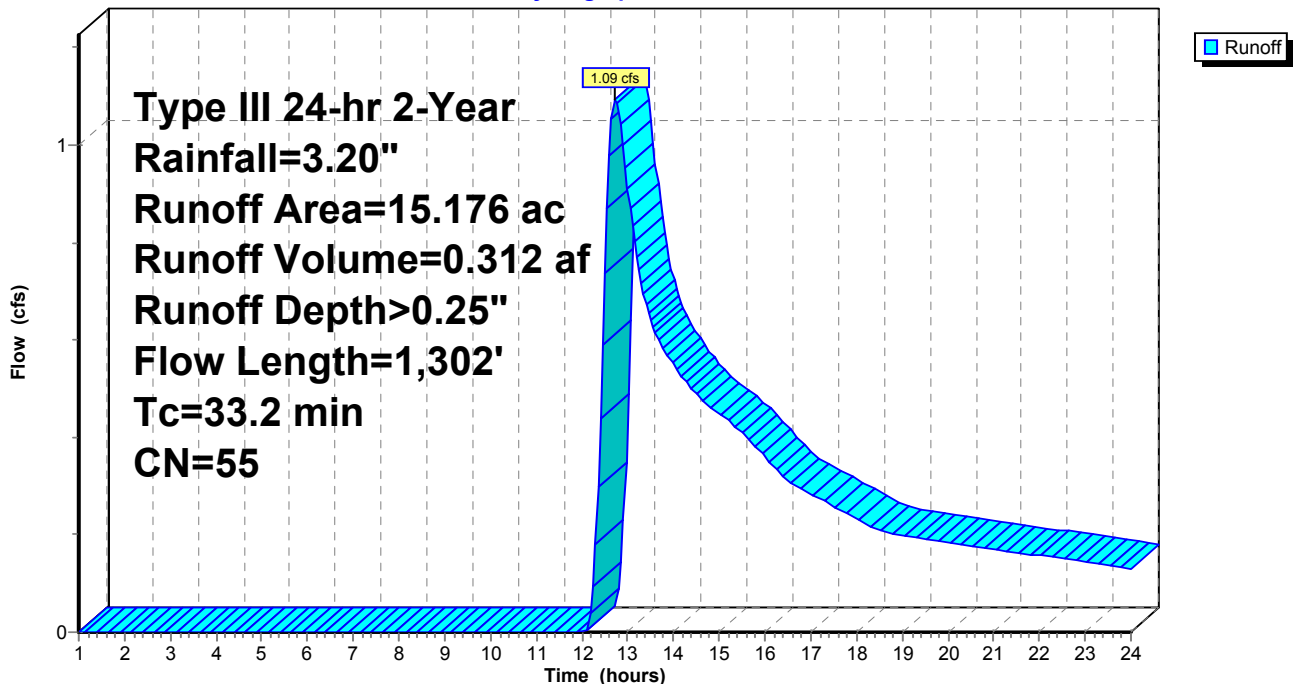
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.9	1,002	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
33.2	1,302	Total			

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.176	Rural open/forest	43.29	0.09	1.51
15.176	Total	43.29	0.09	1.51

Subcatchment 16S: Basin A - Pre

Hydrograph



Summary for Subcatchment 24S: Basin 4 - Post

Runoff = 0.69 cfs @ 12.12 hrs, Volume= 0.066 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
0.298	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.008	58	Meadow, non-grazed, HSG B	Rural open/forest
0.105	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.411	64	Weighted Average	
1.411		100.00% Pervious Area	

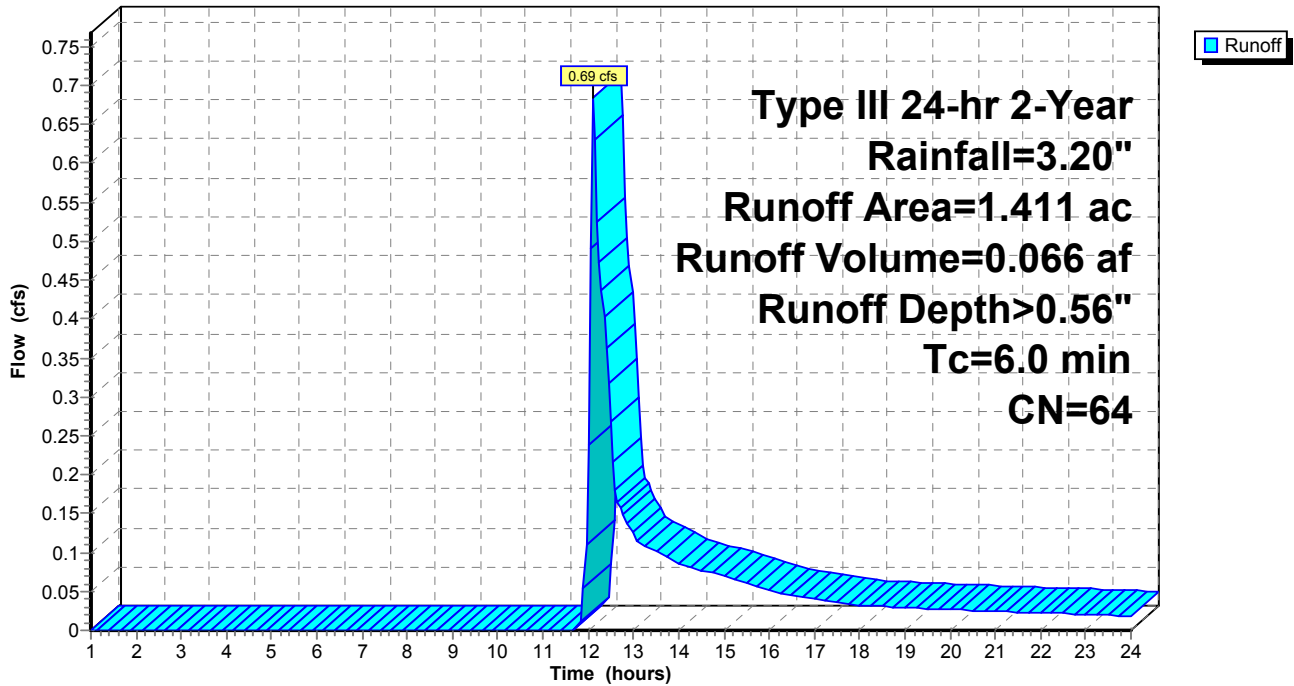
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 0.56" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.298	Driveway	6.52	0.02	0.08
1.008	Rural open/forest	6.50	0.01	0.23
0.105	Water/wetland	0.08	0.00	0.02
1.411	Total	13.11	0.04	0.32

Subcatchment 24S: Basin 4 - Post

Hydrograph



Summary for Subcatchment 34S: Basin 4A - Post

Runoff = 0.80 cfs @ 12.67 hrs, Volume= 0.215 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
9.615	55	Woods, Good, HSG B	Rural open/forest
0.830	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
10.445	55	Weighted Average	
10.445		100.00% Pervious Area	

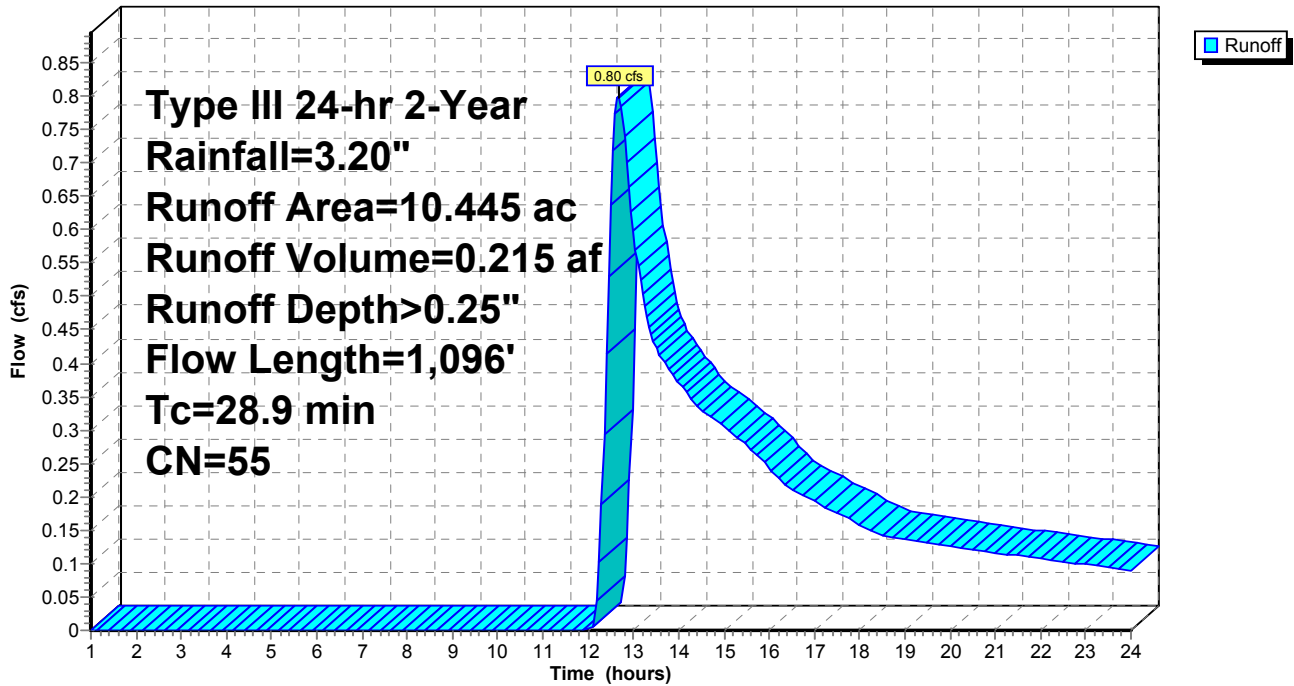
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	300	0.1800	0.23		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.4	796	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.9	1,096	Total			

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
10.445	Rural open/forest	29.86	0.06	1.04
0.000	Water/wetland	0.00	0.00	0.00
10.445	Total	29.86	0.06	1.04

Subcatchment 34S: Basin 4A - Post

Hydrograph



Summary for Subcatchment 38S: Basin 1 - Post

Runoff = 0.37 cfs @ 12.13 hrs, Volume= 0.044 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
0.170	85	Gravel roads, HSG B	Driveway
0.240	55	Woods, Good, HSG B	Rural open/forest
0.718	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.178	61	Weighted Average	
1.178		100.00% Pervious Area	

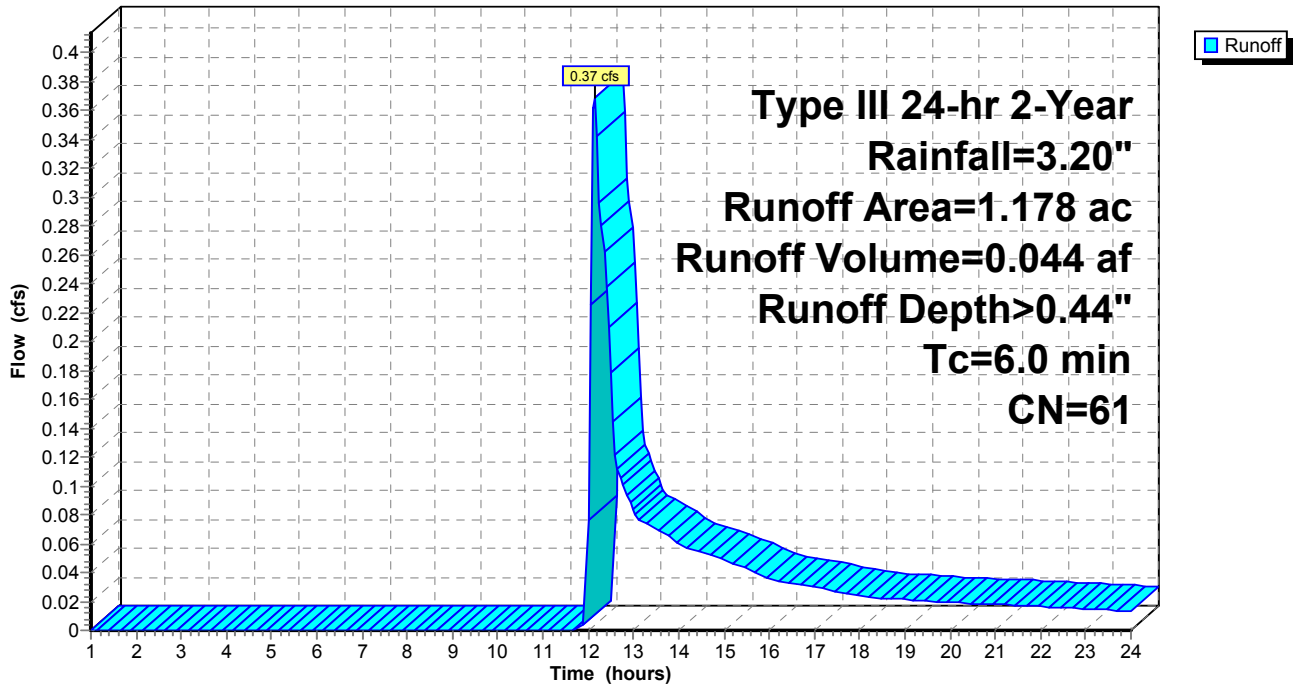
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 0.44" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.170	Driveway	2.95	0.01	0.04
0.958	Rural open/forest	4.91	0.01	0.17
0.050	Water/wetland	0.03	0.00	0.01
1.178	Total	7.89	0.02	0.21

Subcatchment 38S: Basin 1 - Post

Hydrograph



Summary for Pond 36P: Forebay 4

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 0.56" for 2-Year event
 Inflow = 0.69 cfs @ 12.12 hrs, Volume= 0.066 af
 Outflow = 0.68 cfs @ 12.12 hrs, Volume= 0.064 af, Atten= 1%, Lag= 0.0 min
 Primary = 0.68 cfs @ 12.12 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.56' @ 12.12 hrs Surf.Area= 105 sf Storage= 84 cf

Plug-Flow detention time= 14.8 min calculated for 0.064 af (98% of inflow)
 Center-of-Mass det. time= 4.2 min (903.2 - 899.0)

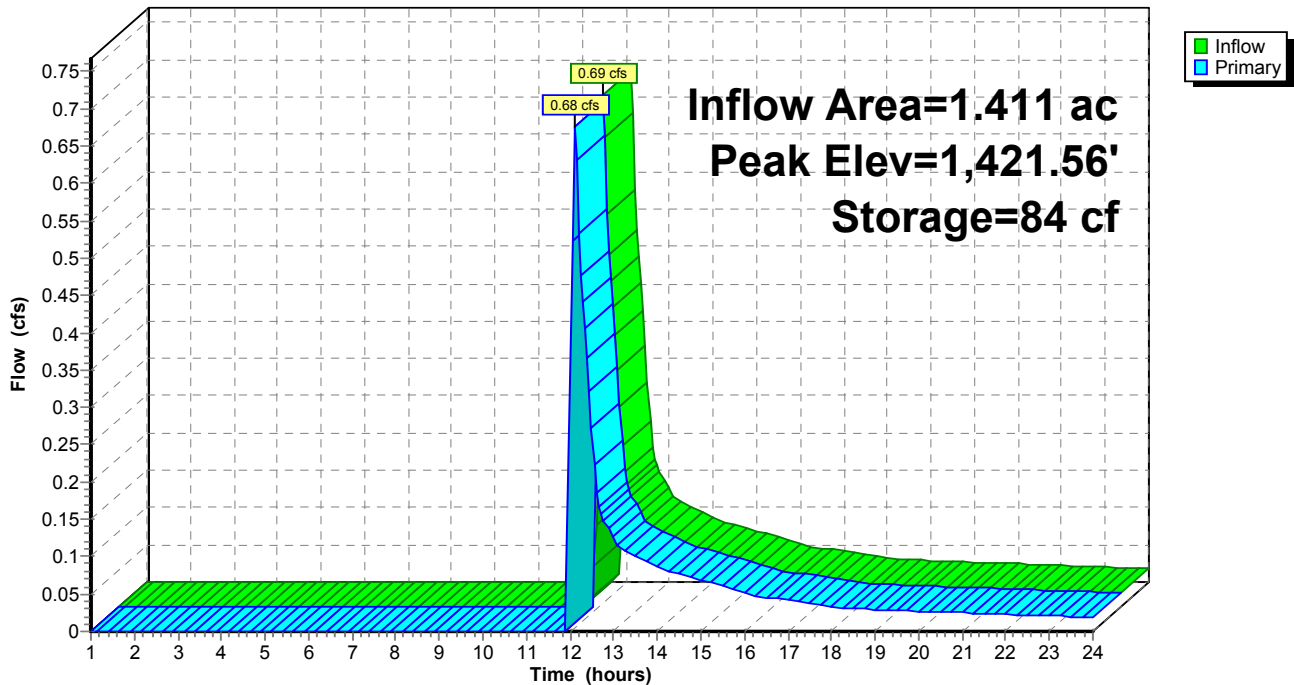
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=0.66 cfs @ 12.12 hrs HW=1,421.56' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 0.66 cfs @ 1.30 fps)

Pond 36P: Forebay 4

Hydrograph



Summary for Pond 37P: Bioretention Pond 4

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 0.55" for 2-Year event
 Inflow = 0.68 cfs @ 12.12 hrs, Volume= 0.064 af
 Outflow = 0.16 cfs @ 12.68 hrs, Volume= 0.064 af, Atten= 76%, Lag= 33.8 min
 Primary = 0.16 cfs @ 12.68 hrs, Volume= 0.064 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,421.05' @ 12.68 hrs Surf.Area= 699 sf Storage= 600 cf

Plug-Flow detention time= 29.8 min calculated for 0.064 af (100% of inflow)
 Center-of-Mass det. time= 29.0 min (932.2 - 903.2)

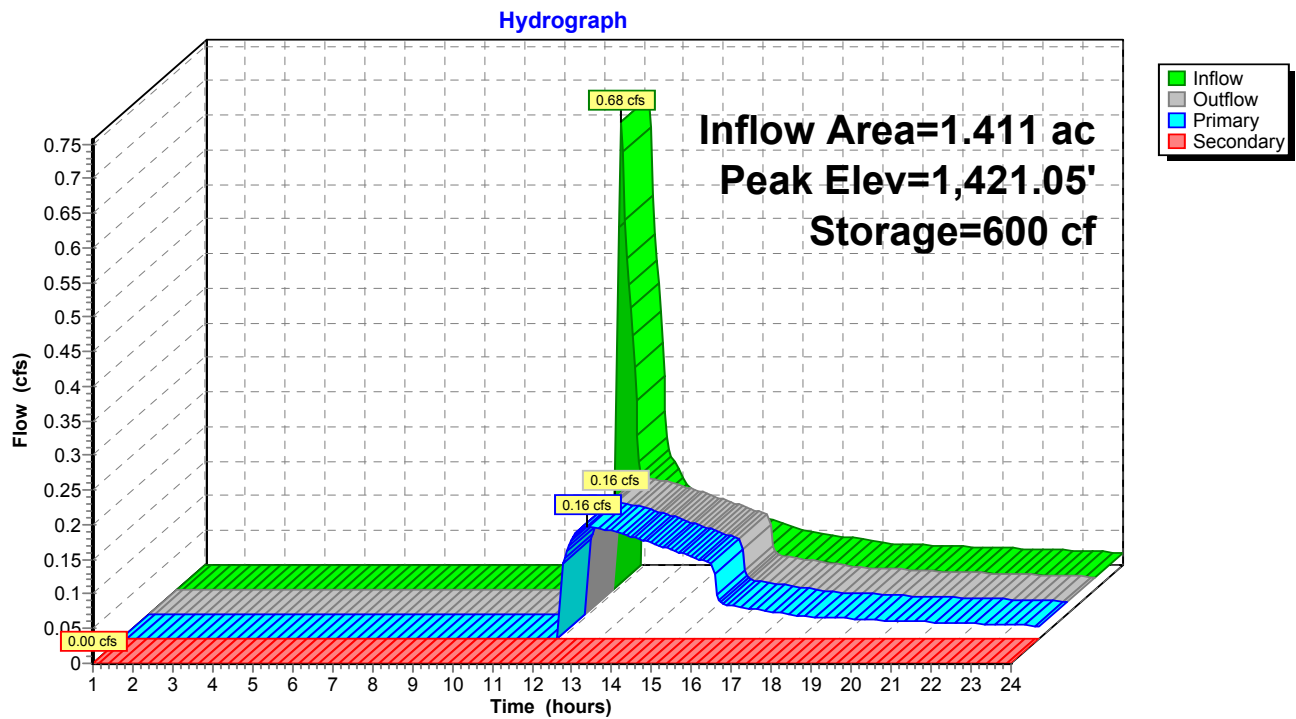
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.50

Primary OutFlow Max=0.16 cfs @ 12.68 hrs HW=1,421.05' (Free Discharge)
 ↑1=Exfiltration (Controls 0.16 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 37P: Bioretention Pond 4



Summary for Pond 40P: Forebay 1

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 0.44" for 2-Year event
 Inflow = 0.37 cfs @ 12.13 hrs, Volume= 0.044 af
 Outflow = 0.35 cfs @ 12.16 hrs, Volume= 0.042 af, Atten= 4%, Lag= 1.9 min
 Primary = 0.35 cfs @ 12.16 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.50' @ 12.15 hrs Surf.Area= 100 sf Storage= 78 cf

Plug-Flow detention time= 24.7 min calculated for 0.042 af (97% of inflow)
 Center-of-Mass det. time= 7.3 min (921.2 - 913.9)

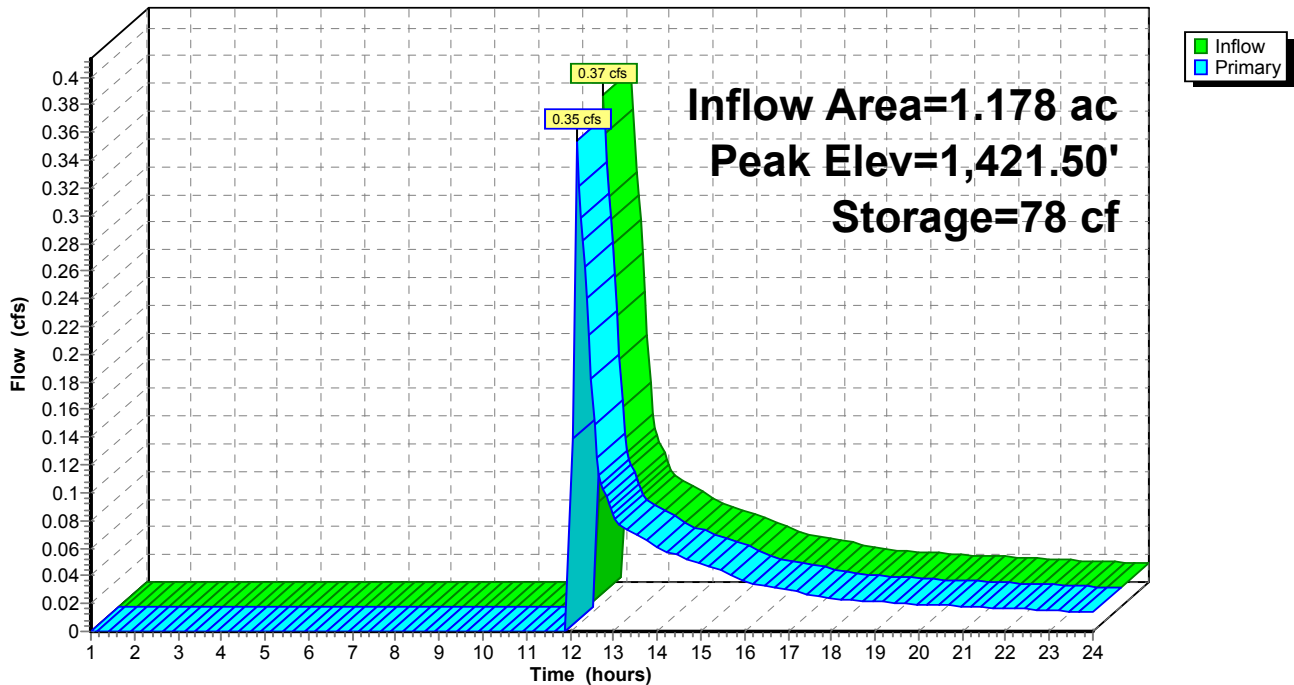
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=0.34 cfs @ 12.16 hrs HW=1,421.50' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 0.34 cfs @ 1.05 fps)

Pond 40P: Forebay 1

Hydrograph



Summary for Pond 41P: Bioretention Pond 1

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 0.43" for 2-Year event
 Inflow = 0.35 cfs @ 12.16 hrs, Volume= 0.042 af
 Outflow = 0.11 cfs @ 12.66 hrs, Volume= 0.042 af, Atten= 68%, Lag= 30.2 min
 Primary = 0.11 cfs @ 12.66 hrs, Volume= 0.042 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,420.69' @ 12.66 hrs Surf.Area= 483 sf Storage= 288 cf

Plug-Flow detention time= 18.3 min calculated for 0.042 af (100% of inflow)
 Center-of-Mass det. time= 17.4 min (938.5 - 921.2)

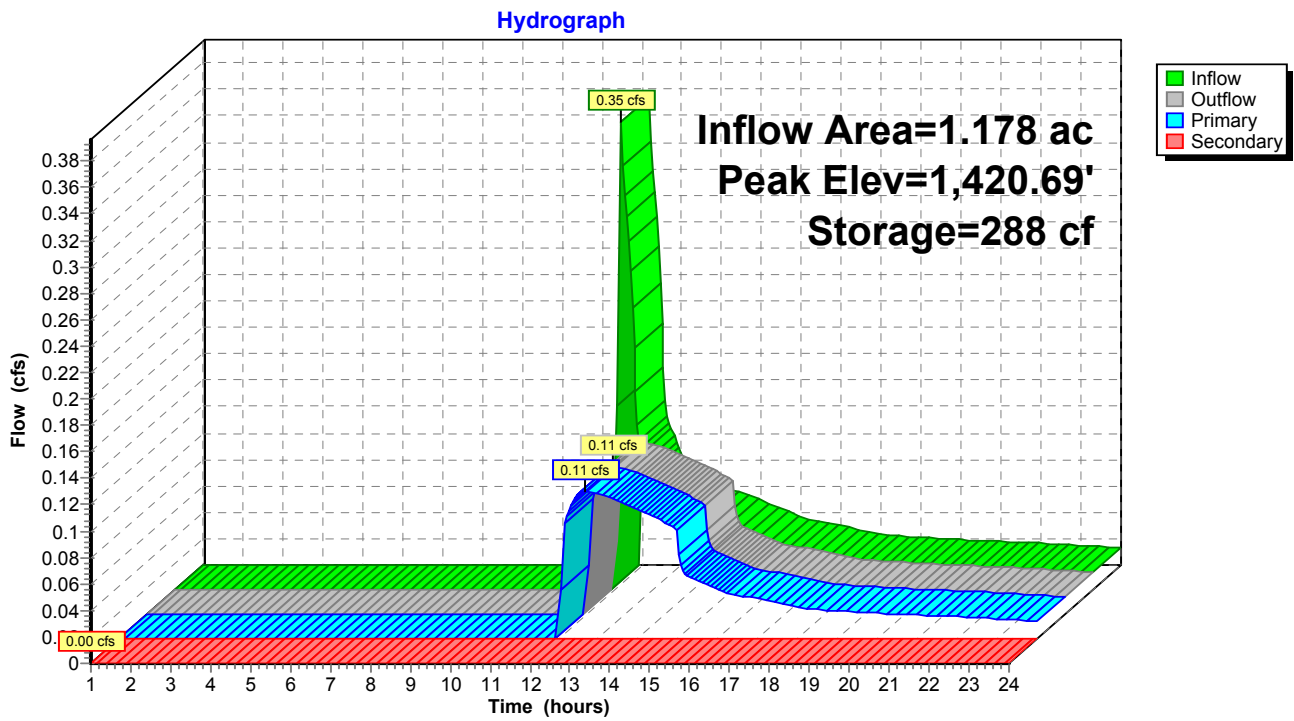
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	4,667 cf	10.00'W x 35.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.75'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 1.33

Primary OutFlow Max=0.11 cfs @ 12.66 hrs HW=1,420.69' (Free Discharge)
 ↑1=Exfiltration (Controls 0.11 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 41P: Bioretention Pond 1



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment16S: Basin A - Pre Runoff Area=15.176 ac 0.00% Impervious Runoff Depth>0.83"
Flow Length=1,302' Tc=33.2 min CN=55 Runoff=6.22 cfs 1.043 af

Subcatchment24S: Basin 4 - Post Runoff Area=1.411 ac 0.00% Impervious Runoff Depth>1.39"
Tc=6.0 min CN=64 Runoff=2.10 cfs 0.163 af

Subcatchment34S: Basin 4A - Post Runoff Area=10.445 ac 0.00% Impervious Runoff Depth>0.83"
Flow Length=1,096' Tc=28.9 min CN=55 Runoff=4.55 cfs 0.719 af

Subcatchment38S: Basin 1 - Post Runoff Area=1.178 ac 0.00% Impervious Runoff Depth>1.19"
Tc=6.0 min CN=61 Runoff=1.44 cfs 0.117 af

Pond 36P: Forebay 4 Peak Elev=1,421.74' Storage=105 cf Inflow=2.10 cfs 0.163 af
Outflow=2.07 cfs 0.161 af

Pond 37P: Bioretention Pond 4 Peak Elev=1,422.96' Storage=2,438 cf Inflow=2.07 cfs 0.161 af
Primary=0.29 cfs 0.161 af Secondary=0.00 cfs 0.000 af Outflow=0.29 cfs 0.161 af

Pond 40P: Forebay 1 Peak Elev=1,421.67' Storage=96 cf Inflow=1.44 cfs 0.117 af
Outflow=1.42 cfs 0.115 af

Pond 41P: Bioretention Pond 1 Peak Elev=1,422.60' Storage=1,609 cf Inflow=1.42 cfs 0.115 af
Primary=0.21 cfs 0.115 af Secondary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.115 af

Total Runoff Area = 28.210 ac Runoff Volume = 2.043 af Average Runoff Depth = 0.87"
100.00% Pervious = 28.210 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 16S: Basin A - Pre

Runoff = 6.22 cfs @ 12.57 hrs, Volume= 1.043 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description	Land Use
15.176	55	Woods, Good, HSG B	Rural open/forest
15.176		100.00% Pervious Area	

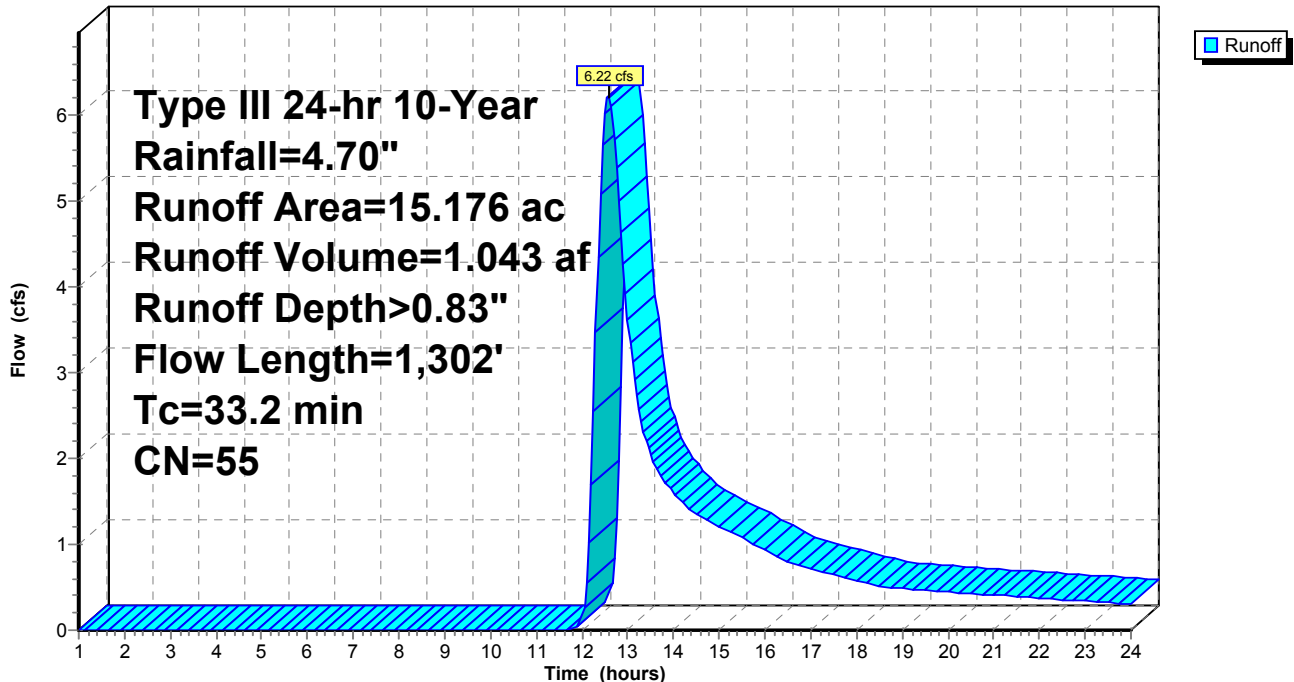
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.9	1,002	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
33.2	1,302	Total			

Pollutant Loading for 0.83" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.176	Rural open/forest	144.72	0.31	5.05
15.176	Total	144.72	0.31	5.05

Subcatchment 16S: Basin A - Pre

Hydrograph



Summary for Subcatchment 24S: Basin 4 - Post

Runoff = 2.10 cfs @ 12.10 hrs, Volume= 0.163 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

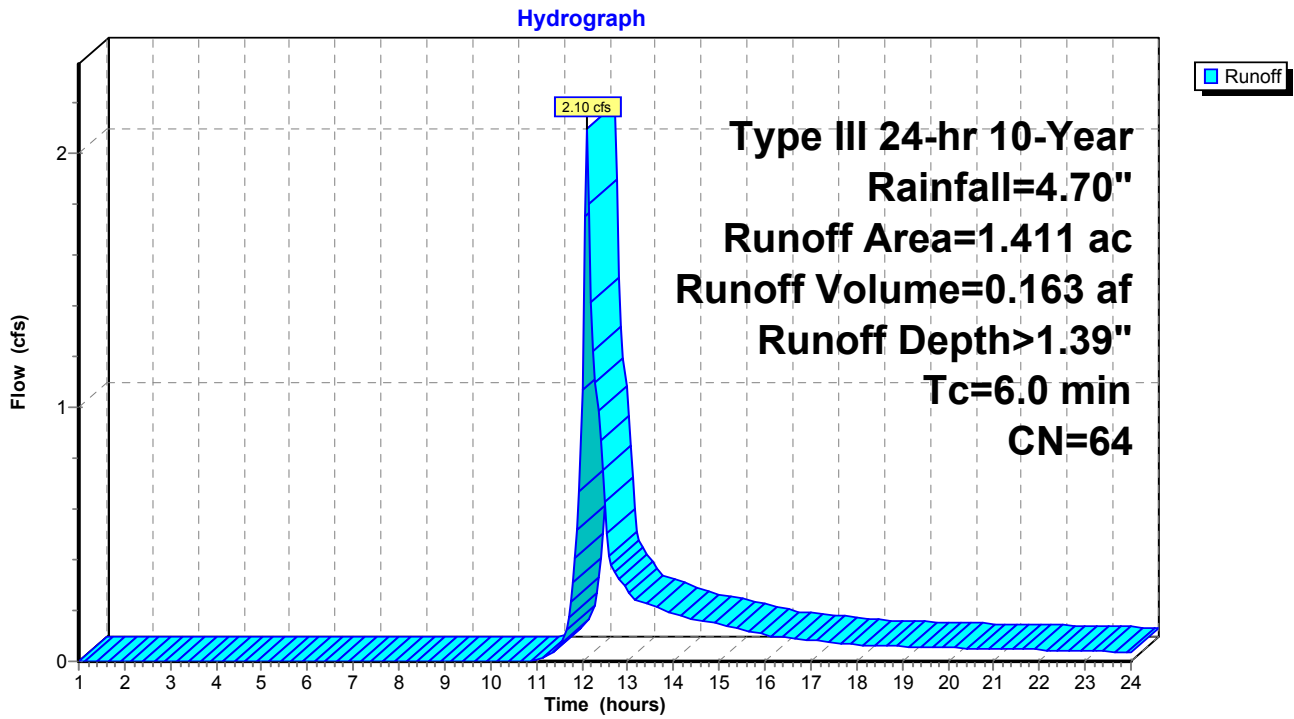
Area (ac)	CN	Description	Land Use
0.298	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.008	58	Meadow, non-grazed, HSG B	Rural open/forest
0.105	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.411	64	Weighted Average	
1.411		100.00% Pervious Area	

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

Pollutant Loading for 1.39" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.298	Driveway	16.21	0.05	0.20
1.008	Rural open/forest	16.16	0.03	0.56
0.105	Water/wetland	0.20	0.00	0.05
1.411	Total	32.57	0.09	0.81

Subcatchment 24S: Basin 4 - Post



Summary for Subcatchment 34S: Basin 4A - Post

Runoff = 4.55 cfs @ 12.51 hrs, Volume= 0.719 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
9.615	55	Woods, Good, HSG B	Rural open/forest
0.830	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
10.445	55	Weighted Average	
10.445		100.00% Pervious Area	

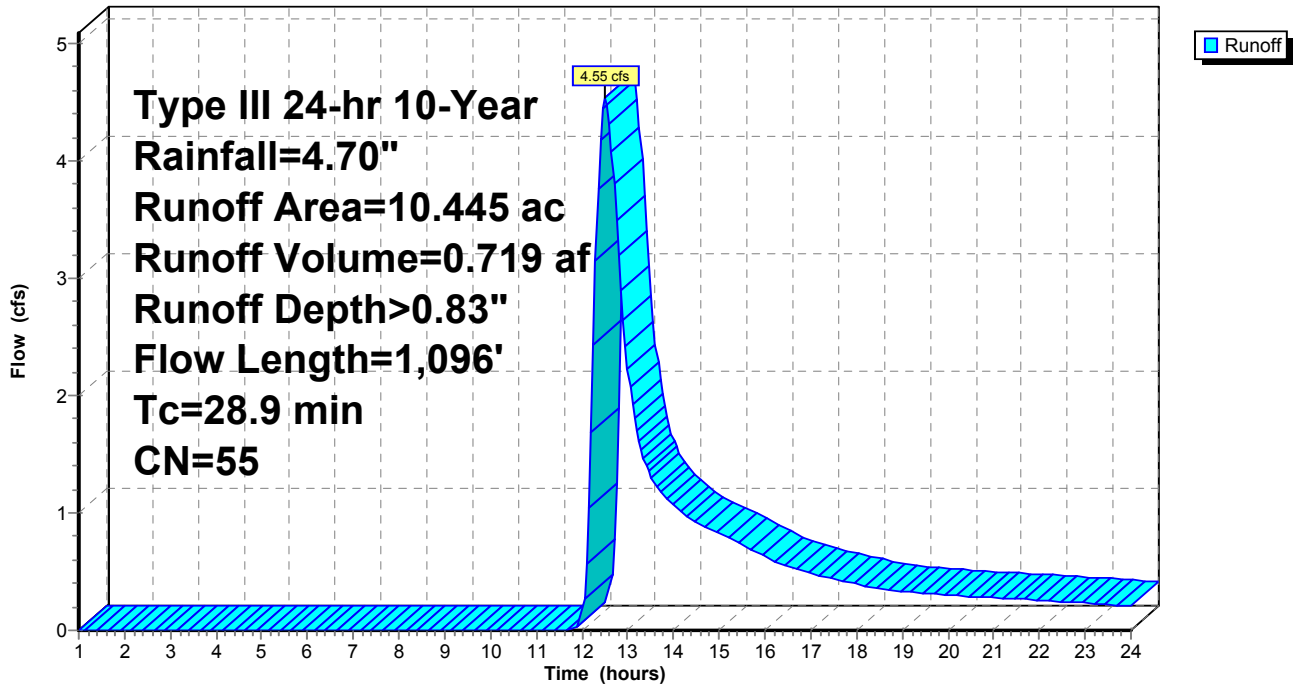
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	300	0.1800	0.23		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.4	796	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.9	1,096	Total			

Pollutant Loading for 0.83" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
10.445	Rural open/forest	99.77	0.22	3.48
0.000	Water/wetland	0.00	0.00	0.00
10.445	Total	99.77	0.22	3.48

Subcatchment 34S: Basin 4A - Post

Hydrograph



Summary for Subcatchment 38S: Basin 1 - Post

Runoff = 1.44 cfs @ 12.10 hrs, Volume= 0.117 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

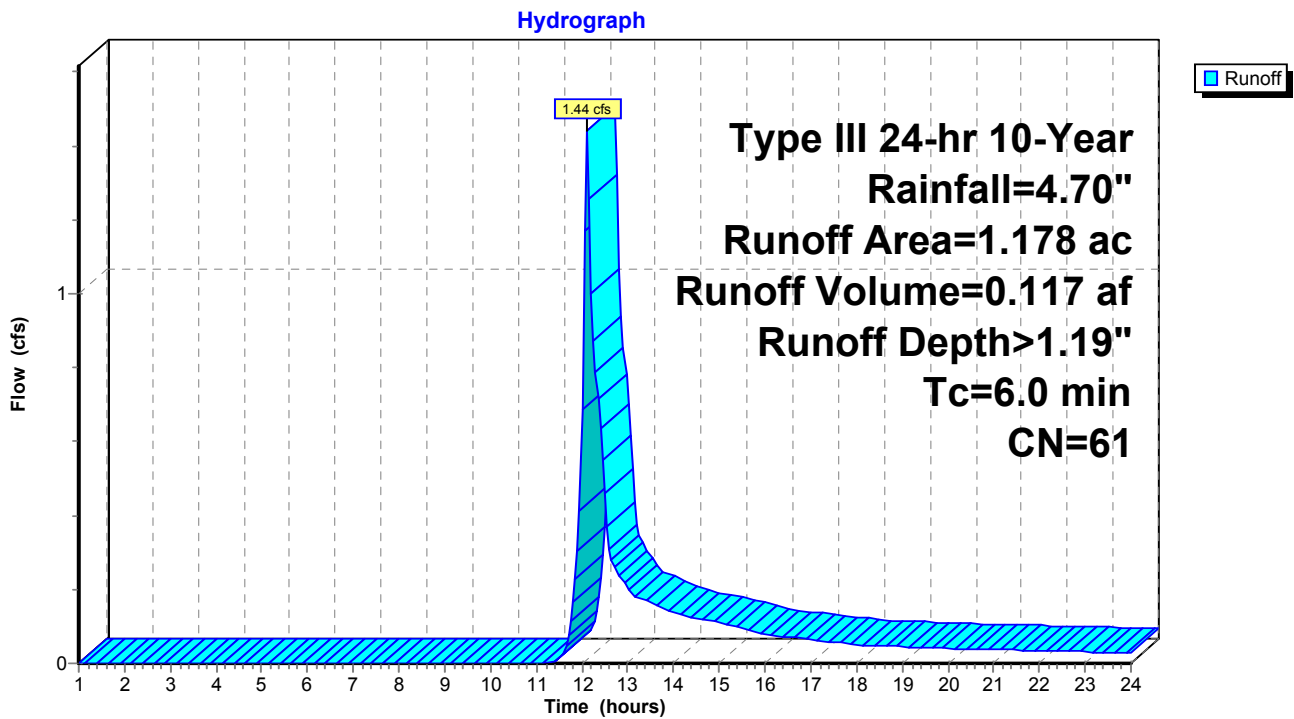
Area (ac)	CN	Description	Land Use
0.170	85	Gravel roads, HSG B	Driveway
0.240	55	Woods, Good, HSG B	Rural open/forest
0.718	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.178	61	Weighted Average	
1.178		100.00% Pervious Area	

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

Pollutant Loading for 1.19" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.170	Driveway	7.94	0.03	0.10
0.958	Rural open/forest	13.19	0.03	0.46
0.050	Water/wetland	0.08	0.00	0.02
1.178	Total	21.21	0.06	0.58

Subcatchment 38S: Basin 1 - Post



Summary for Pond 36P: Forebay 4

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 1.39" for 10-Year event
 Inflow = 2.10 cfs @ 12.10 hrs, Volume= 0.163 af
 Outflow = 2.07 cfs @ 12.10 hrs, Volume= 0.161 af, Atten= 1%, Lag= 0.1 min
 Primary = 2.07 cfs @ 12.10 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.74' @ 12.10 hrs Surf.Area= 120 sf Storage= 105 cf

Plug-Flow detention time= 8.0 min calculated for 0.161 af (99% of inflow)
 Center-of-Mass det. time= 2.2 min (869.2 - 867.0)

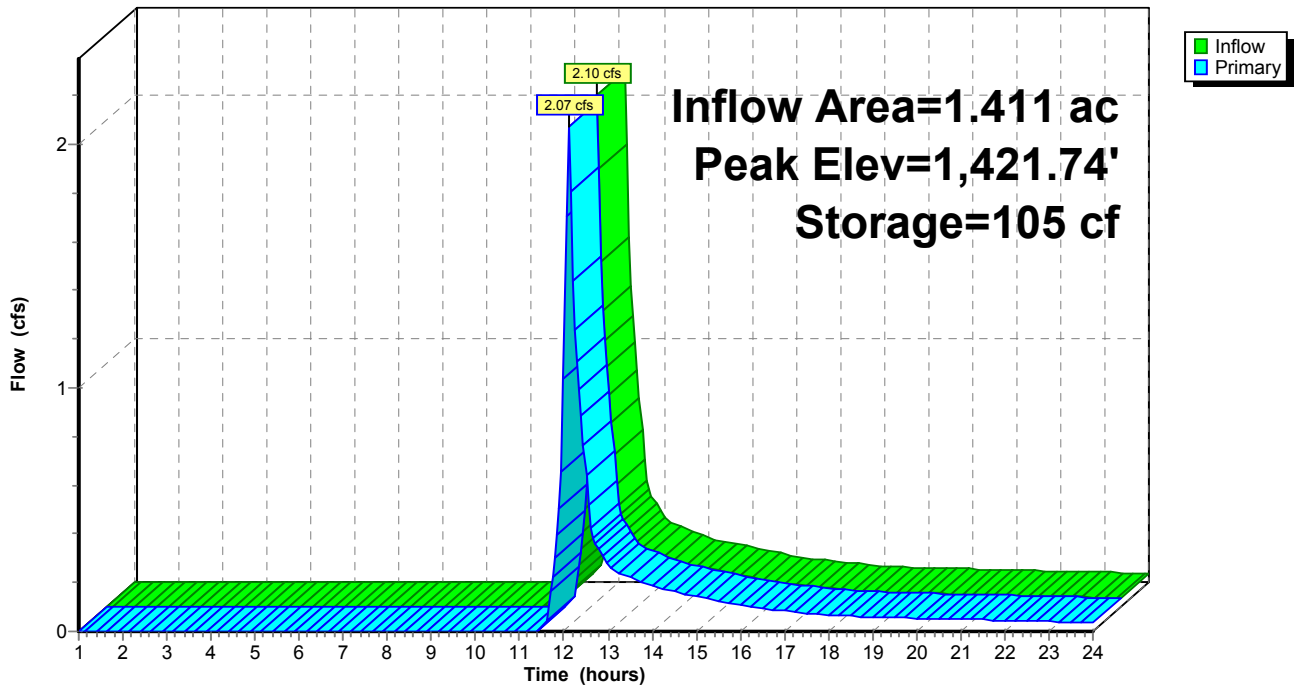
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=2.05 cfs @ 12.10 hrs HW=1,421.74' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 2.05 cfs @ 1.91 fps)

Pond 36P: Forebay 4

Hydrograph



Summary for Pond 37P: Bioretention Pond 4

[81] Warning: Exceeded Pond 36P by 1.47' @ 13.05 hrs

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 1.37" for 10-Year event
 Inflow = 2.07 cfs @ 12.10 hrs, Volume= 0.161 af
 Outflow = 0.29 cfs @ 12.96 hrs, Volume= 0.161 af, Atten= 86%, Lag= 51.3 min
 Primary = 0.29 cfs @ 12.96 hrs, Volume= 0.161 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,422.96' @ 12.96 hrs Surf.Area= 1,242 sf Storage= 2,438 cf

Plug-Flow detention time= 92.9 min calculated for 0.161 af (100% of inflow)
 Center-of-Mass det. time= 92.1 min (961.3 - 869.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatoid Z=2.0

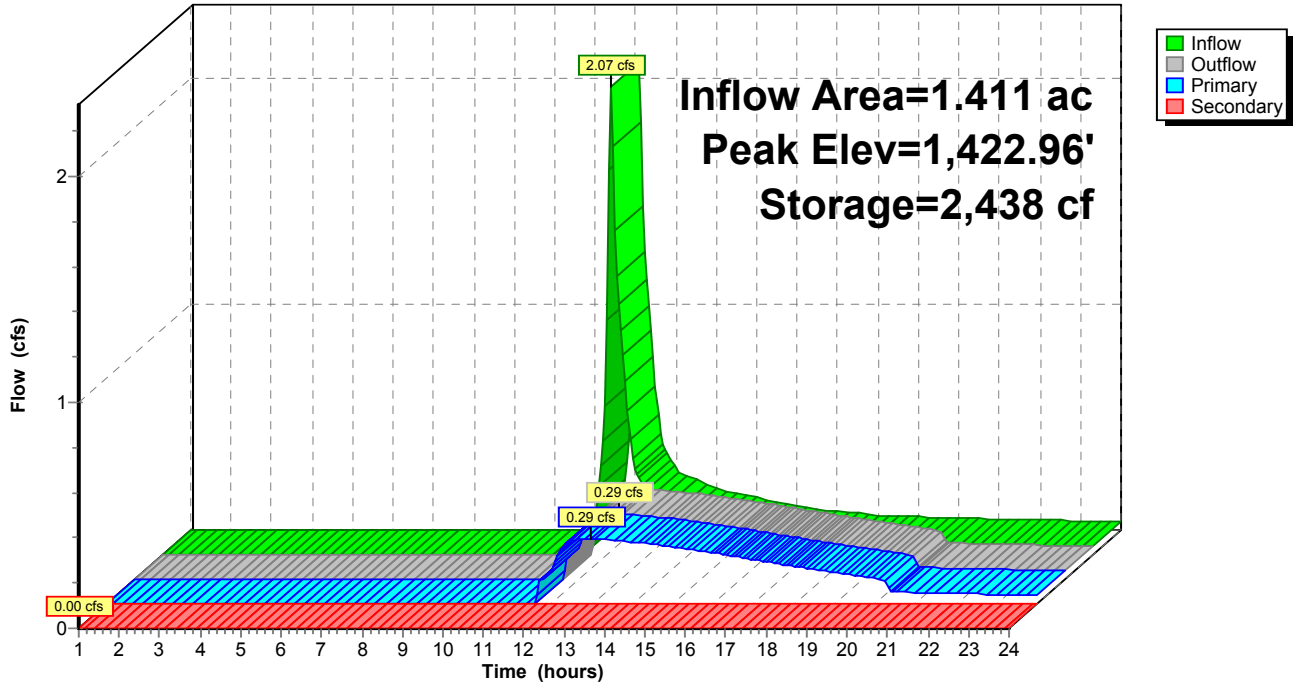
Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.50

Primary OutFlow Max=0.29 cfs @ 12.96 hrs HW=1,422.96' (Free Discharge)
 ↳1=Exfiltration (Controls 0.29 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 37P: Bioretention Pond 4

Hydrograph



Summary for Pond 40P: Forebay 1

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 1.19" for 10-Year event
 Inflow = 1.44 cfs @ 12.10 hrs, Volume= 0.117 af
 Outflow = 1.42 cfs @ 12.11 hrs, Volume= 0.115 af, Atten= 2%, Lag= 0.1 min
 Primary = 1.42 cfs @ 12.11 hrs, Volume= 0.115 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.67' @ 12.11 hrs Surf.Area= 114 sf Storage= 96 cf

Plug-Flow detention time= 11.2 min calculated for 0.115 af (98% of inflow)
 Center-of-Mass det. time= 3.0 min (879.2 - 876.2)

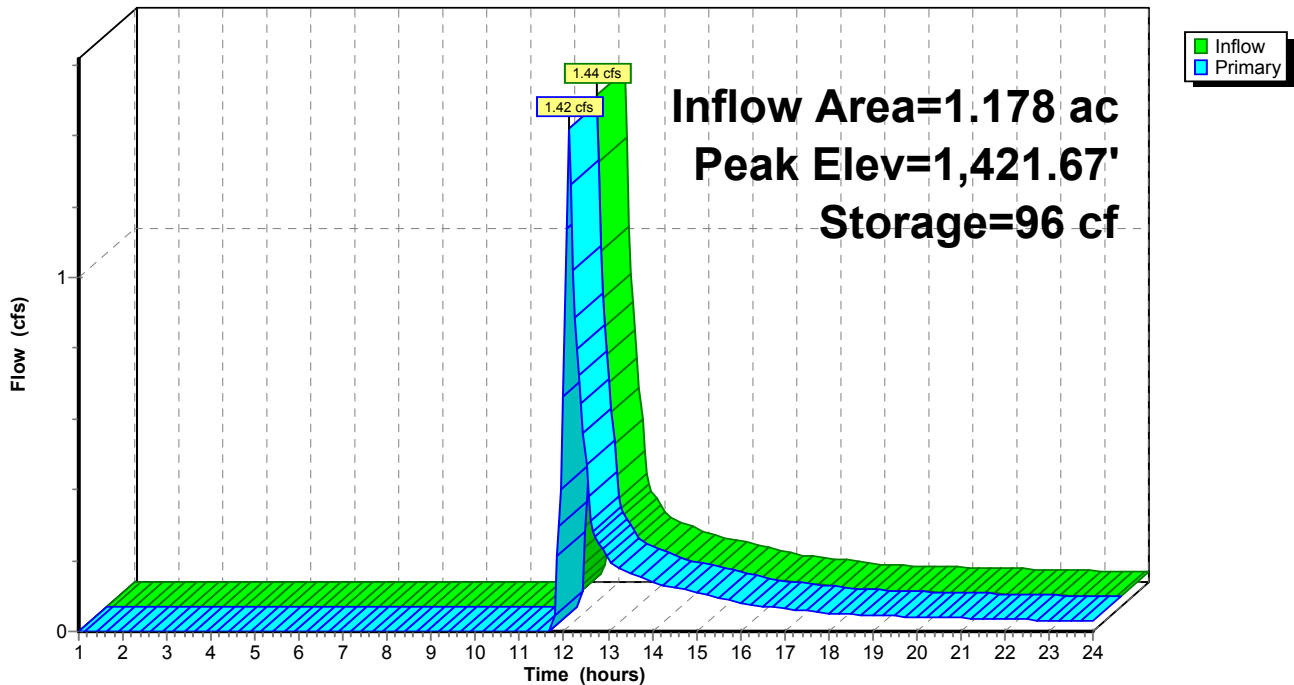
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=1.39 cfs @ 12.11 hrs HW=1,421.66' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 1.39 cfs @ 1.68 fps)

Pond 40P: Forebay 1

Hydrograph



Summary for Pond 41P: Bioretention Pond 1

[81] Warning: Exceeded Pond 40P by 1.12' @ 13.00 hrs

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 1.17" for 10-Year event
 Inflow = 1.42 cfs @ 12.11 hrs, Volume= 0.115 af
 Outflow = 0.21 cfs @ 12.95 hrs, Volume= 0.115 af, Atten= 85%, Lag= 50.9 min
 Primary = 0.21 cfs @ 12.95 hrs, Volume= 0.115 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,422.60' @ 12.95 hrs Surf.Area= 925 sf Storage= 1,609 cf

Plug-Flow detention time= 81.1 min calculated for 0.115 af (100% of inflow)
 Center-of-Mass det. time= 80.2 min (959.4 - 879.2)

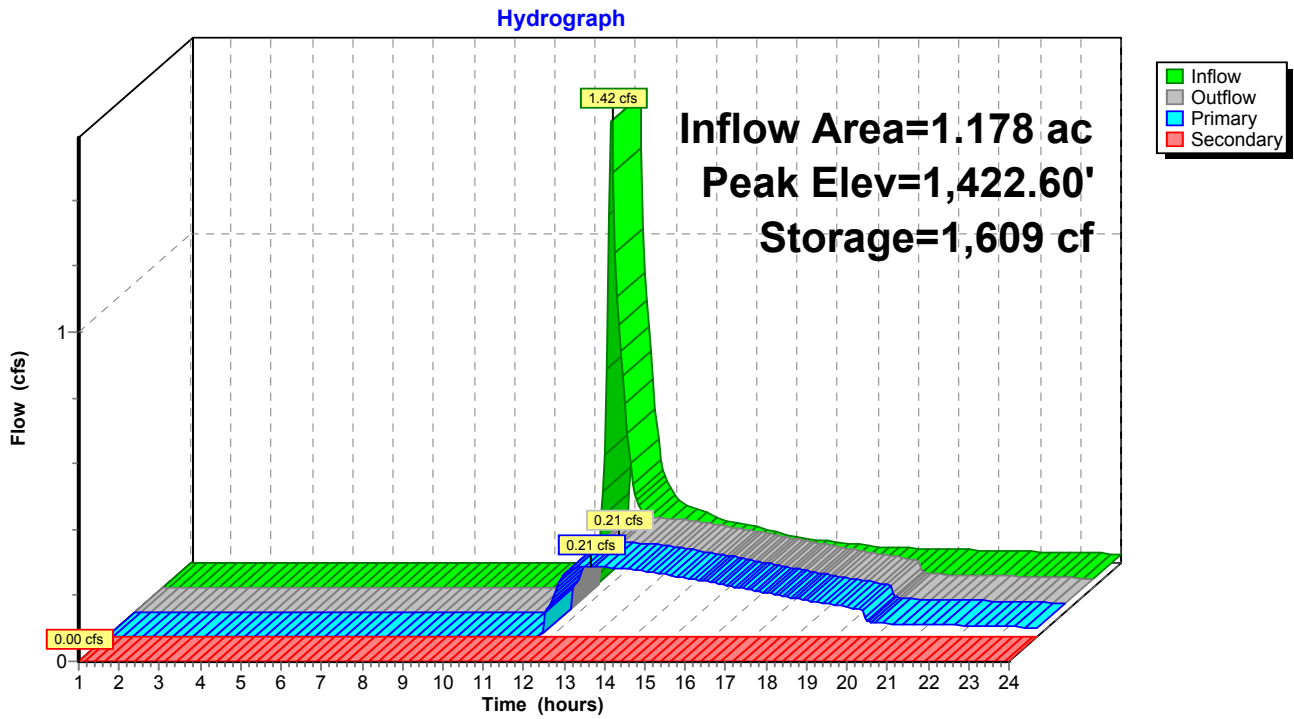
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	4,667 cf	10.00'W x 35.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.75'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 1.33

Primary OutFlow Max=0.21 cfs @ 12.95 hrs HW=1,422.60' (Free Discharge)
 ↳1=Exfiltration (Controls 0.21 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 41P: Bioretention Pond 1



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment16S: Basin A - Pre Runoff Area=15.176 ac 0.00% Impervious Runoff Depth>1.23"
Flow Length=1,302' Tc=33.2 min CN=55 Runoff=10.18 cfs 1.551 af

Subcatchment24S: Basin 4 - Post Runoff Area=1.411 ac 0.00% Impervious Runoff Depth>1.91"
Tc=6.0 min CN=64 Runoff=2.99 cfs 0.225 af

Subcatchment34S: Basin 4A - Post Runoff Area=10.445 ac 0.00% Impervious Runoff Depth>1.23"
Flow Length=1,096' Tc=28.9 min CN=55 Runoff=7.45 cfs 1.069 af

Subcatchment38S: Basin 1 - Post Runoff Area=1.178 ac 0.00% Impervious Runoff Depth>1.68"
Tc=6.0 min CN=61 Runoff=2.14 cfs 0.165 af

Pond 36P: Forebay 4 Peak Elev=1,421.83' Storage=116 cf Inflow=2.99 cfs 0.225 af
Outflow=2.95 cfs 0.223 af

Pond 37P: Bioretention Pond 4 Peak Elev=1,423.87' Storage=3,701 cf Inflow=2.95 cfs 0.223 af
Primary=0.36 cfs 0.223 af Secondary=0.00 cfs 0.000 af Outflow=0.36 cfs 0.223 af

Pond 40P: Forebay 1 Peak Elev=1,421.75' Storage=105 cf Inflow=2.14 cfs 0.165 af
Outflow=2.11 cfs 0.163 af

Pond 41P: Bioretention Pond 1 Peak Elev=1,423.52' Storage=2,576 cf Inflow=2.11 cfs 0.163 af
Primary=0.27 cfs 0.163 af Secondary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.163 af

Total Runoff Area = 28.210 ac Runoff Volume = 3.010 af Average Runoff Depth = 1.28"
100.00% Pervious = 28.210 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 16S: Basin A - Pre

Runoff = 10.18 cfs @ 12.54 hrs, Volume= 1.551 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
15.176	55	Woods, Good, HSG B	Rural open/forest
15.176		100.00% Pervious Area	

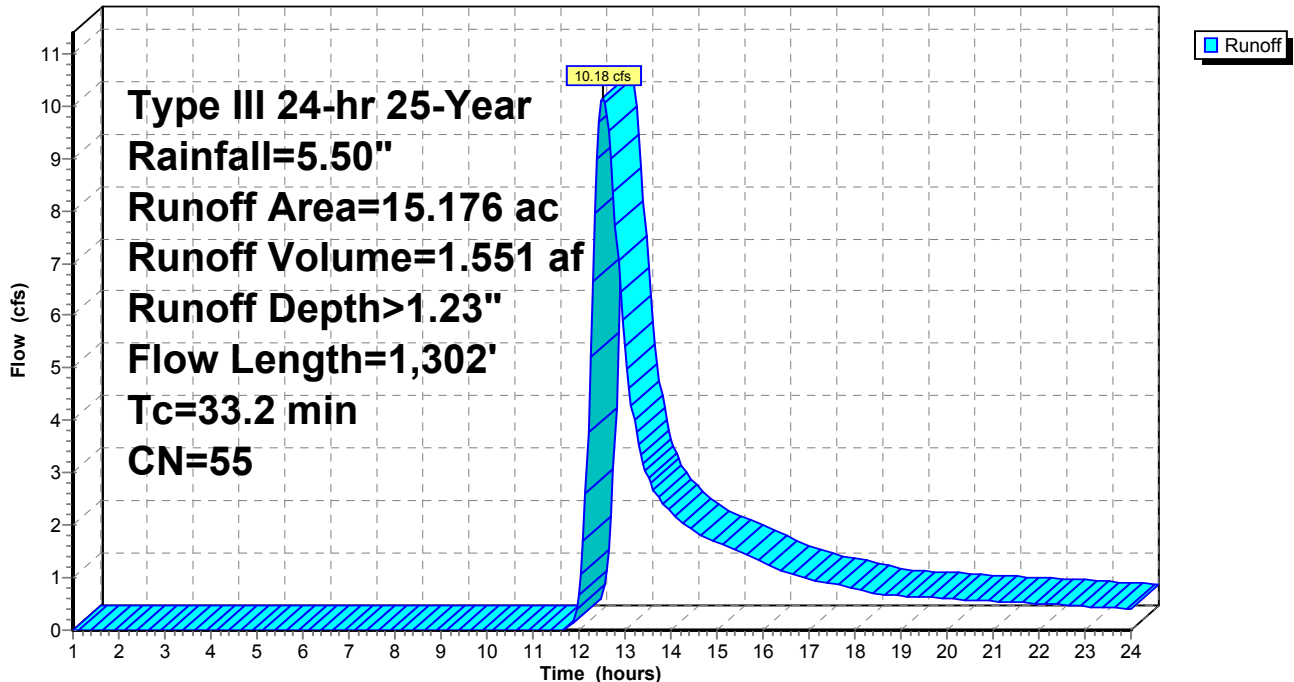
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.9	1,002	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
33.2	1,302	Total			

Pollutant Loading for 1.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.176	Rural open/forest	215.12	0.46	7.51
15.176	Total	215.12	0.46	7.51

Subcatchment 16S: Basin A - Pre

Hydrograph



Summary for Subcatchment 24S: Basin 4 - Post

Runoff = 2.99 cfs @ 12.10 hrs, Volume= 0.225 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
0.298	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.008	58	Meadow, non-grazed, HSG B	Rural open/forest
0.105	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.411	64	Weighted Average	
1.411		100.00% Pervious Area	

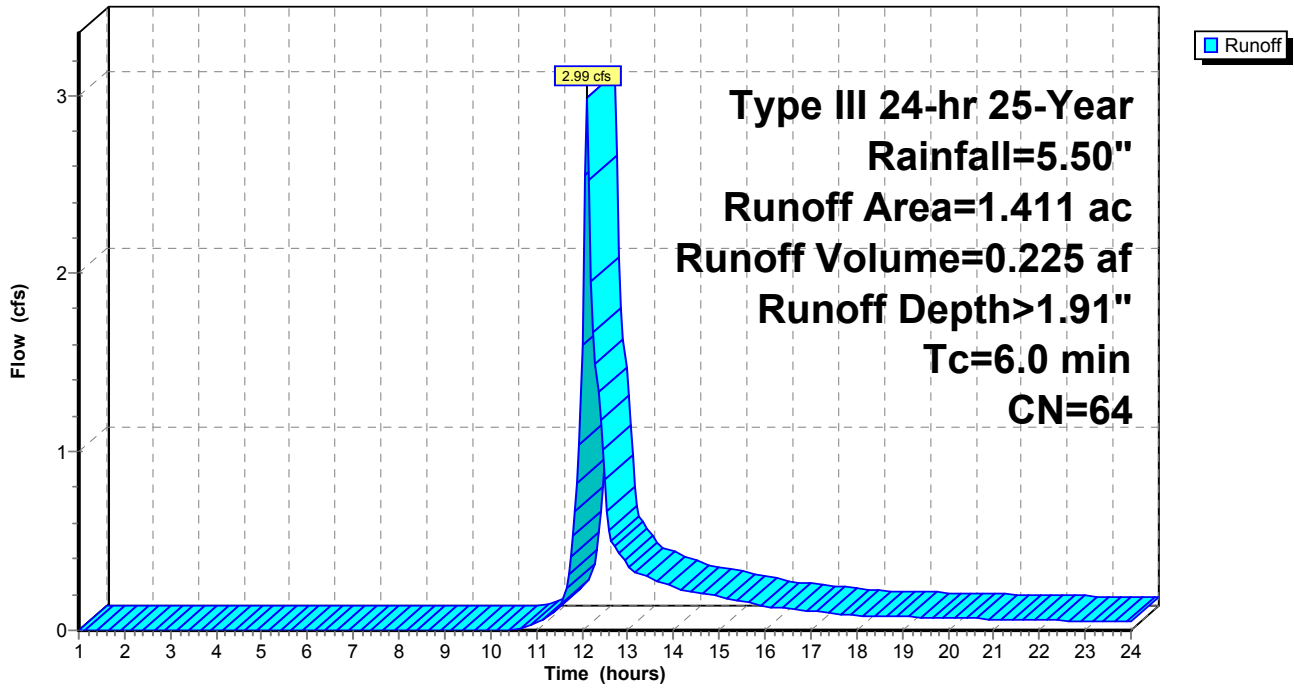
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 1.91" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.298	Driveway	22.34	0.07	0.27
1.008	Rural open/forest	22.27	0.05	0.78
0.105	Water/wetland	0.27	0.00	0.06
1.411	Total	44.88	0.12	1.11

Subcatchment 24S: Basin 4 - Post

Hydrograph



Summary for Subcatchment 34S: Basin 4A - Post

Runoff = 7.45 cfs @ 12.47 hrs, Volume= 1.069 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
9.615	55	Woods, Good, HSG B	Rural open/forest
0.830	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
10.445	55	Weighted Average	
10.445		100.00% Pervious Area	

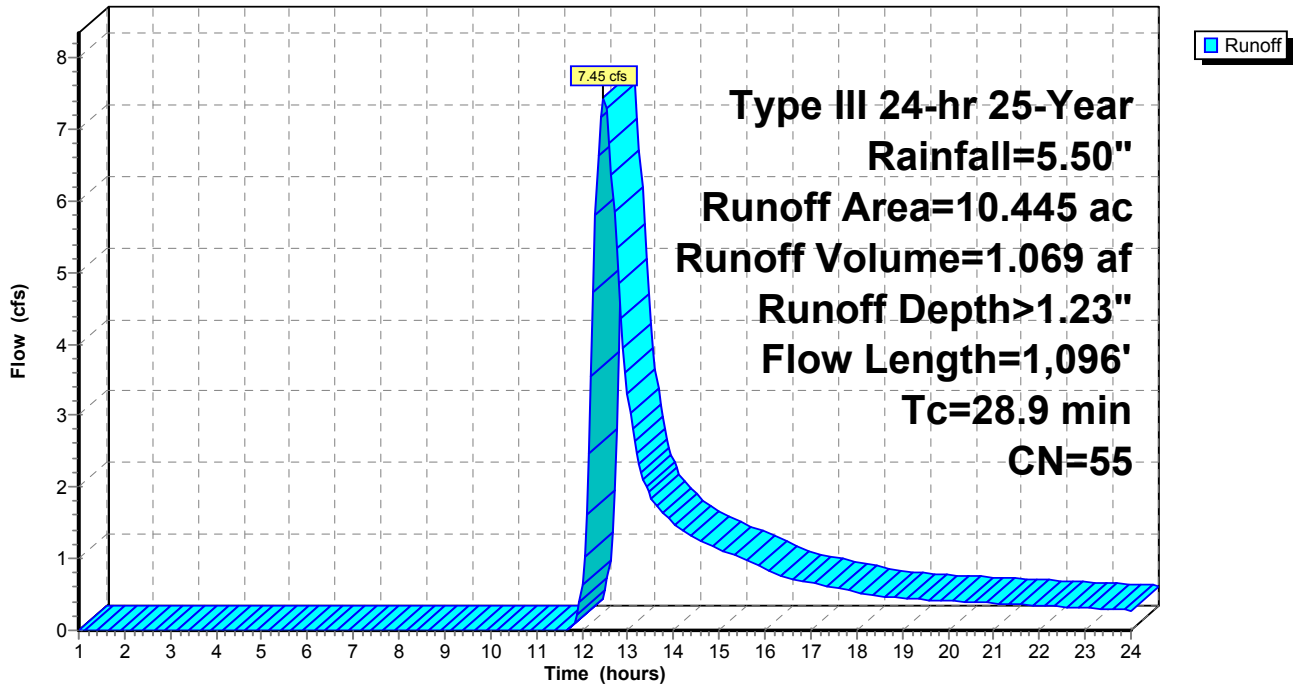
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	300	0.1800	0.23		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.4	796	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.9	1,096	Total			

Pollutant Loading for 1.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
10.445	Rural open/forest	148.28	0.32	5.18
0.000	Water/wetland	0.00	0.00	0.00
10.445	Total	148.28	0.32	5.18

Subcatchment 34S: Basin 4A - Post

Hydrograph



Summary for Subcatchment 38S: Basin 1 - Post

Runoff = 2.14 cfs @ 12.10 hrs, Volume= 0.165 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

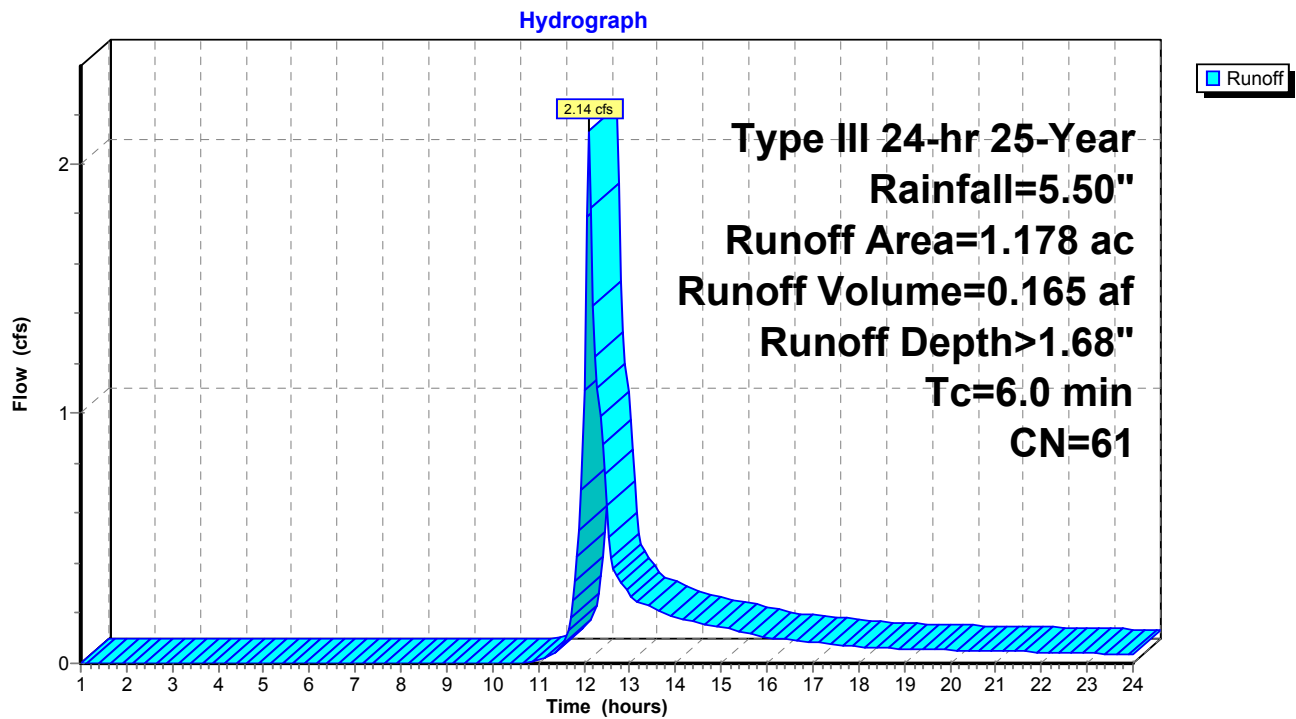
Area (ac)	CN	Description	Land Use
0.170	85	Gravel roads, HSG B	Driveway
0.240	55	Woods, Good, HSG B	Rural open/forest
0.718	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.178	61	Weighted Average	
1.178		100.00% Pervious Area	

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

Pollutant Loading for 1.68" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.170	Driveway	11.17	0.04	0.14
0.958	Rural open/forest	18.56	0.04	0.65
0.050	Water/wetland	0.11	0.00	0.03
1.178	Total	29.85	0.08	0.81

Subcatchment 38S: Basin 1 - Post



Summary for Pond 36P: Forebay 4

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 1.91" for 25-Year event
 Inflow = 2.99 cfs @ 12.10 hrs, Volume= 0.225 af
 Outflow = 2.95 cfs @ 12.10 hrs, Volume= 0.223 af, Atten= 1%, Lag= 0.1 min
 Primary = 2.95 cfs @ 12.10 hrs, Volume= 0.223 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.83' @ 12.10 hrs Surf.Area= 128 sf Storage= 116 cf

Plug-Flow detention time= 5.7 min calculated for 0.223 af (99% of inflow)
 Center-of-Mass det. time= 1.7 min (858.8 - 857.0)

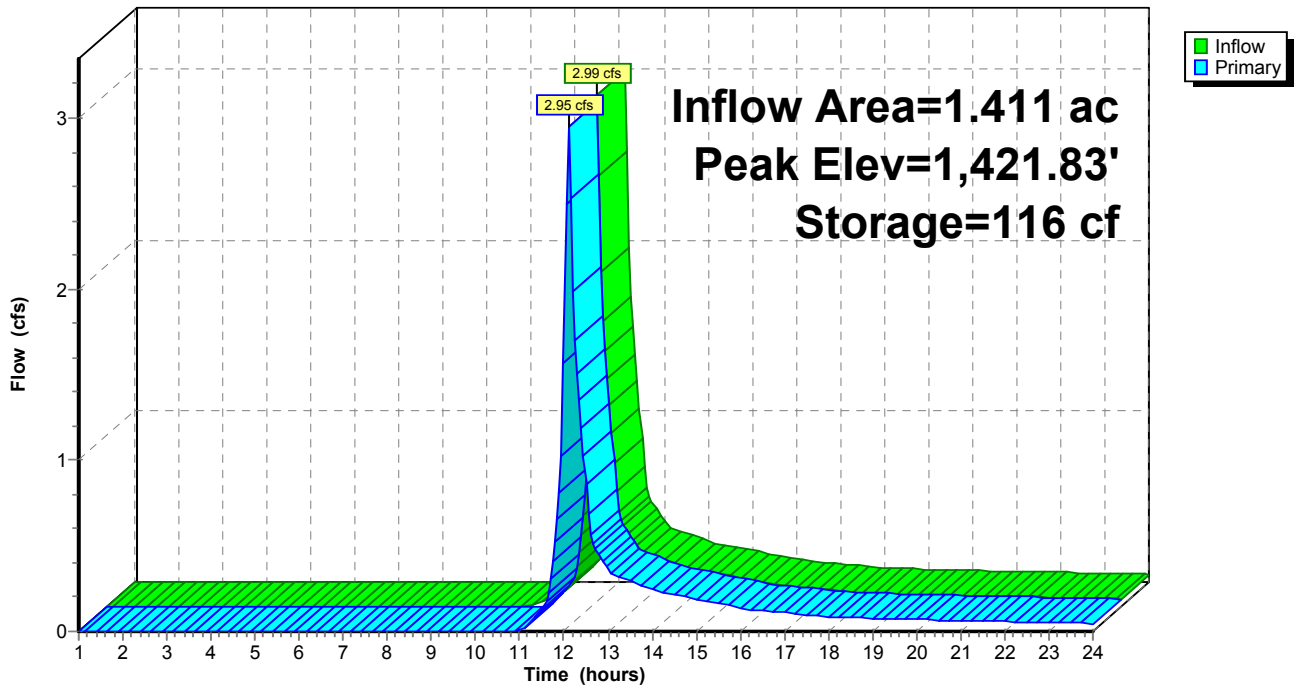
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=2.94 cfs @ 12.10 hrs HW=1,421.83' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 2.94 cfs @ 2.15 fps)

Pond 36P: Forebay 4

Hydrograph



Summary for Pond 37P: Bioretention Pond 4

[81] Warning: Exceeded Pond 36P by 2.37' @ 13.10 hrs

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 1.90" for 25-Year event
 Inflow = 2.95 cfs @ 12.10 hrs, Volume= 0.223 af
 Outflow = 0.36 cfs @ 13.02 hrs, Volume= 0.223 af, Atten= 88%, Lag= 55.3 min
 Primary = 0.36 cfs @ 13.02 hrs, Volume= 0.223 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,423.87' @ 13.02 hrs Surf.Area= 1,542 sf Storage= 3,701 cf

Plug-Flow detention time= 119.8 min calculated for 0.223 af (100% of inflow)
 Center-of-Mass det. time= 119.2 min (978.0 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismatic Z=2.0

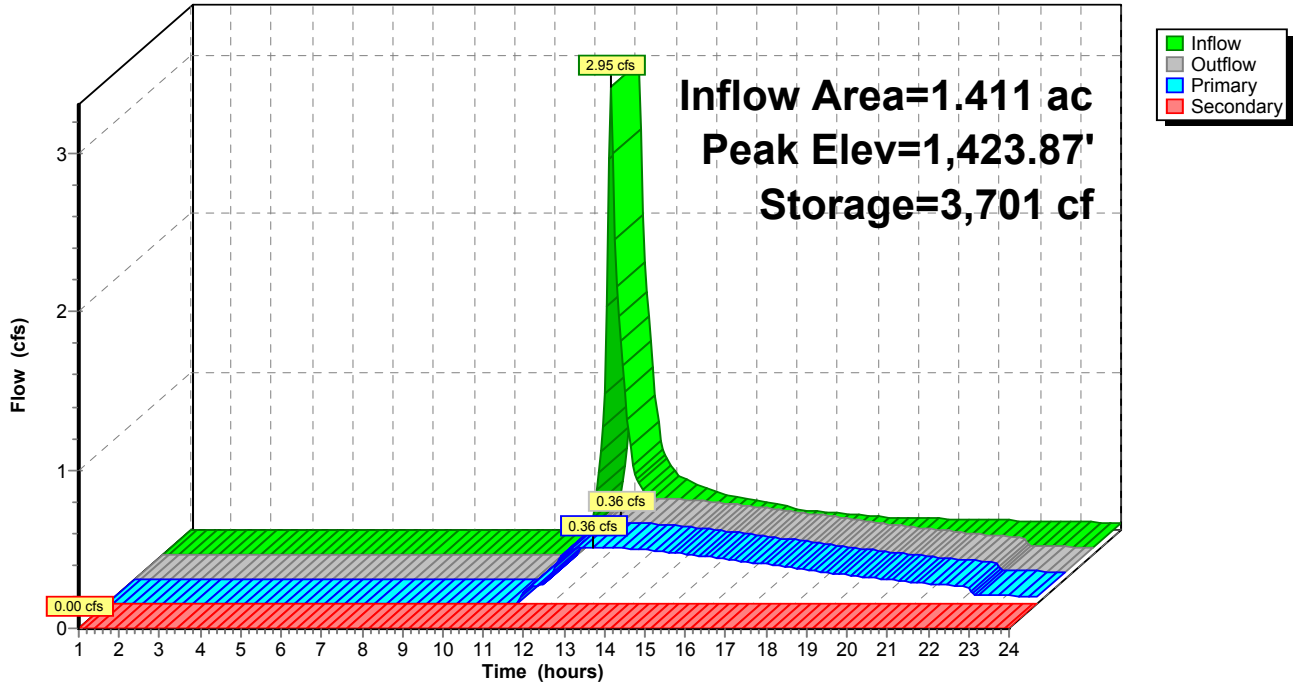
Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.50

Primary OutFlow Max=0.36 cfs @ 13.02 hrs HW=1,423.87' (Free Discharge)
 ↳1=Exfiltration (Controls 0.36 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 37P: Bioretention Pond 4

Hydrograph



Summary for Pond 40P: Forebay 1

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 1.68" for 25-Year event
 Inflow = 2.14 cfs @ 12.10 hrs, Volume= 0.165 af
 Outflow = 2.11 cfs @ 12.10 hrs, Volume= 0.163 af, Atten= 1%, Lag= 0.1 min
 Primary = 2.11 cfs @ 12.10 hrs, Volume= 0.163 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.75' @ 12.10 hrs Surf.Area= 121 sf Storage= 105 cf

Plug-Flow detention time= 7.7 min calculated for 0.163 af (99% of inflow)
 Center-of-Mass det. time= 2.2 min (867.2 - 865.1)

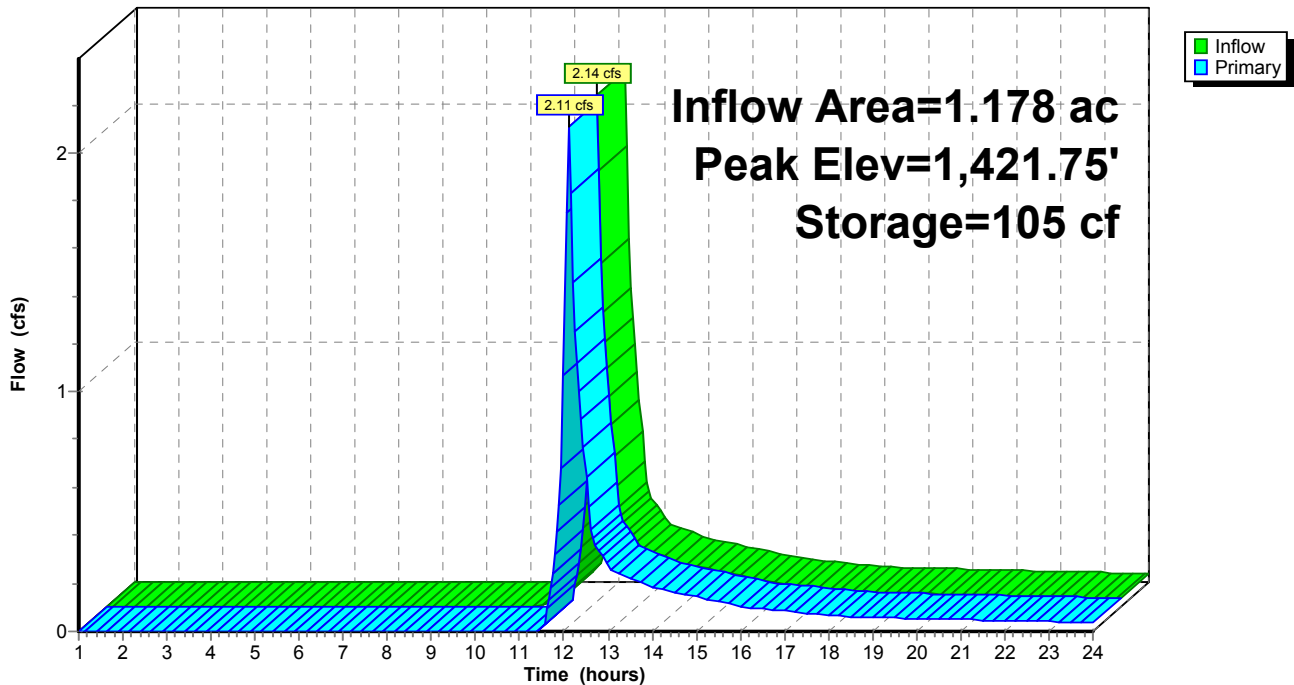
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=2.09 cfs @ 12.10 hrs HW=1,421.74' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 2.09 cfs @ 1.92 fps)

Pond 40P: Forebay 1

Hydrograph



Summary for Pond 41P: Bioretention Pond 1

[81] Warning: Exceeded Pond 40P by 2.03' @ 13.05 hrs

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 1.66" for 25-Year event
 Inflow = 2.11 cfs @ 12.10 hrs, Volume= 0.163 af
 Outflow = 0.27 cfs @ 13.01 hrs, Volume= 0.163 af, Atten= 87%, Lag= 54.5 min
 Primary = 0.27 cfs @ 13.01 hrs, Volume= 0.163 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,423.52' @ 13.01 hrs Surf.Area= 1,181 sf Storage= 2,576 cf

Plug-Flow detention time= 109.1 min calculated for 0.162 af (100% of inflow)
 Center-of-Mass det. time= 108.1 min (975.4 - 867.2)

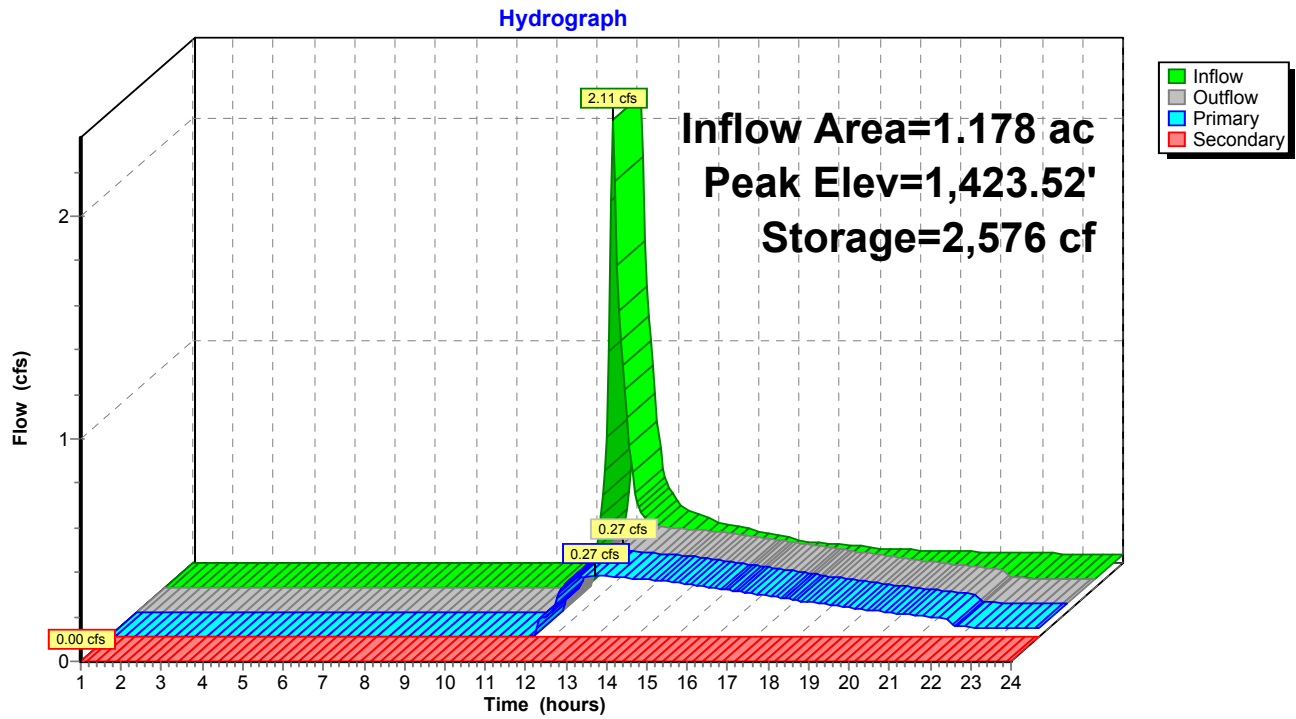
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	4,667 cf	10.00'W x 35.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.75'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 1.33

Primary OutFlow Max=0.27 cfs @ 13.01 hrs HW=1,423.52' (Free Discharge)
 ↳1=Exfiltration (Controls 0.27 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,420.00' (Free Discharge)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 41P: Bioretention Pond 1



Wind-Colbrook South NE Discharge 2011-03-10

Type III 24-hr 100-Year Rainfall=7.00"

Prepared by Zapata Engineering

Printed 3/12/2011

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Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment16S: Basin A - Pre Runoff Area=15.176 ac 0.00% Impervious Runoff Depth>2.10"
Flow Length=1,302' Tc=33.2 min CN=55 Runoff=18.98 cfs 2.662 af

Subcatchment24S: Basin 4 - Post Runoff Area=1.411 ac 0.00% Impervious Runoff Depth>3.00"
Tc=6.0 min CN=64 Runoff=4.82 cfs 0.353 af

Subcatchment34S: Basin 4A - Post Runoff Area=10.445 ac 0.00% Impervious Runoff Depth>2.11"
Flow Length=1,096' Tc=28.9 min CN=55 Runoff=13.90 cfs 1.834 af

Subcatchment38S: Basin 1 - Post Runoff Area=1.178 ac 0.00% Impervious Runoff Depth>2.70"
Tc=6.0 min CN=61 Runoff=3.58 cfs 0.265 af

Pond 36P: Forebay 4 Peak Elev=1,421.99' Storage=138 cf Inflow=4.82 cfs 0.353 af
Outflow=4.76 cfs 0.351 af

Pond 37P: Bioretention Pond 4 Peak Elev=1,424.99' Storage=5,646 cf Inflow=4.76 cfs 0.351 af
Primary=0.45 cfs 0.299 af Secondary=0.64 cfs 0.048 af Outflow=1.09 cfs 0.347 af

Pond 40P: Forebay 1 Peak Elev=1,421.89' Storage=123 cf Inflow=3.58 cfs 0.265 af
Outflow=3.53 cfs 0.263 af

Pond 41P: Bioretention Pond 1 Peak Elev=1,424.98' Storage=4,637 cf Inflow=3.53 cfs 0.263 af
Primary=0.38 cfs 0.256 af Secondary=0.05 cfs 0.003 af Outflow=0.43 cfs 0.260 af

Total Runoff Area = 28.210 ac Runoff Volume = 5.114 af Average Runoff Depth = 2.18"
100.00% Pervious = 28.210 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 16S: Basin A - Pre

Runoff = 18.98 cfs @ 12.51 hrs, Volume= 2.662 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
15.176	55	Woods, Good, HSG B	Rural open/forest
15.176		100.00% Pervious Area	

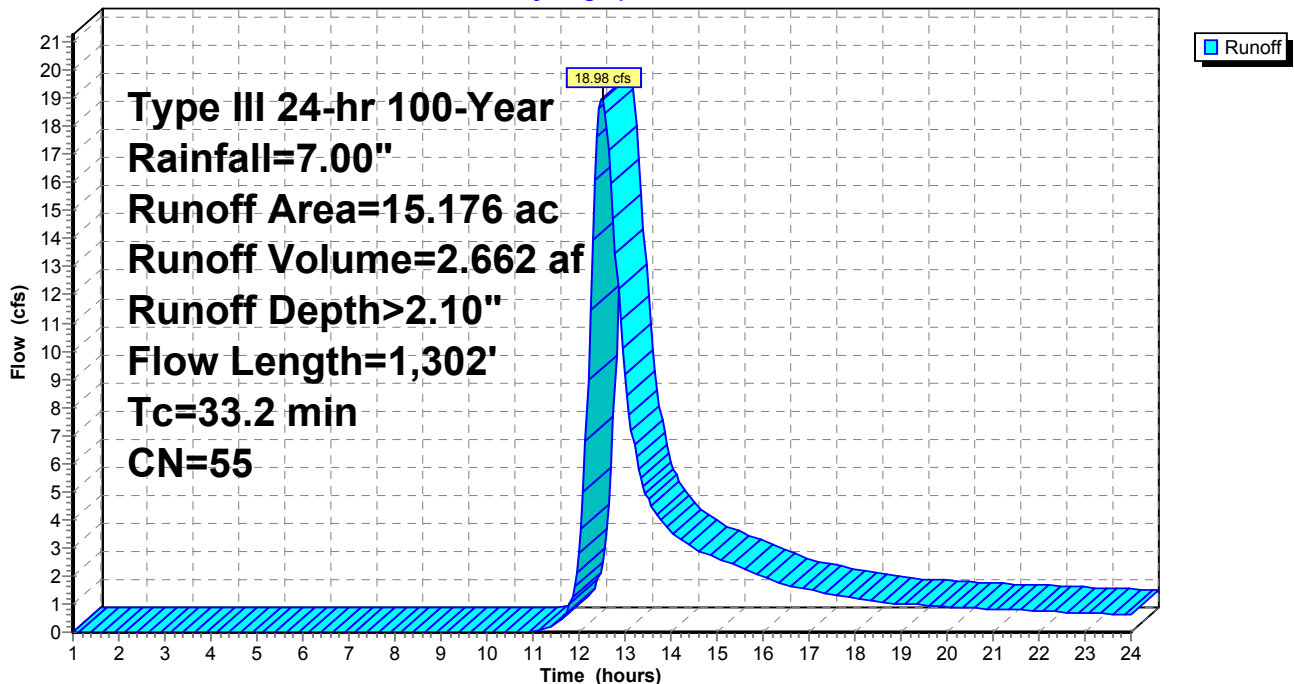
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.9	1,002	0.1800	2.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
33.2	1,302	Total			

Pollutant Loading for 2.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.176	Rural open/forest	369.15	0.80	12.88
15.176	Total	369.15	0.80	12.88

Subcatchment 16S: Basin A - Pre

Hydrograph



Summary for Subcatchment 24S: Basin 4 - Post

Runoff = 4.82 cfs @ 12.10 hrs, Volume= 0.353 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
0.298	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
1.008	58	Meadow, non-grazed, HSG B	Rural open/forest
0.105	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.411	64	Weighted Average	
1.411		100.00% Pervious Area	

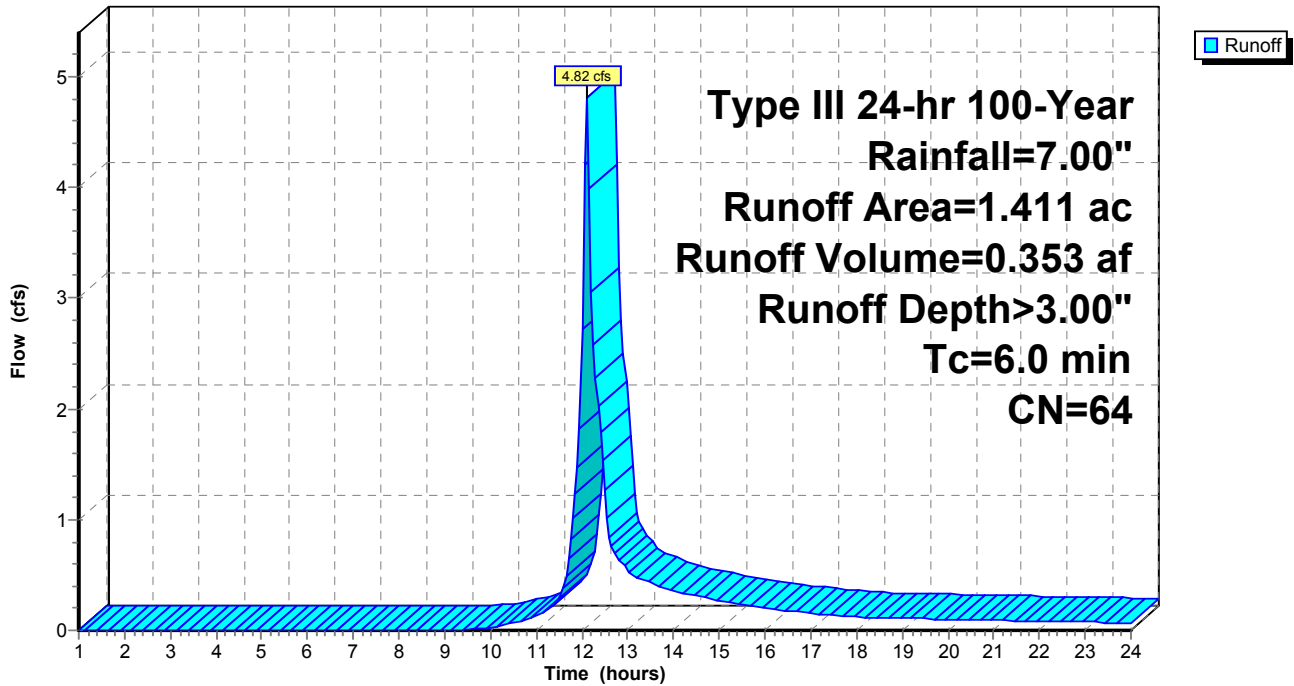
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 3.00" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.298	Driveway	35.03	0.11	0.43
1.008	Rural open/forest	34.93	0.08	1.22
0.105	Water/wetland	0.43	0.01	0.10
1.411	Total	70.39	0.19	1.74

Subcatchment 24S: Basin 4 - Post

Hydrograph



Summary for Subcatchment 34S: Basin 4A - Post

Runoff = 13.90 cfs @ 12.44 hrs, Volume= 1.834 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
9.615	55	Woods, Good, HSG B	Rural open/forest
0.830	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
10.445	55	Weighted Average	
10.445		100.00% Pervious Area	

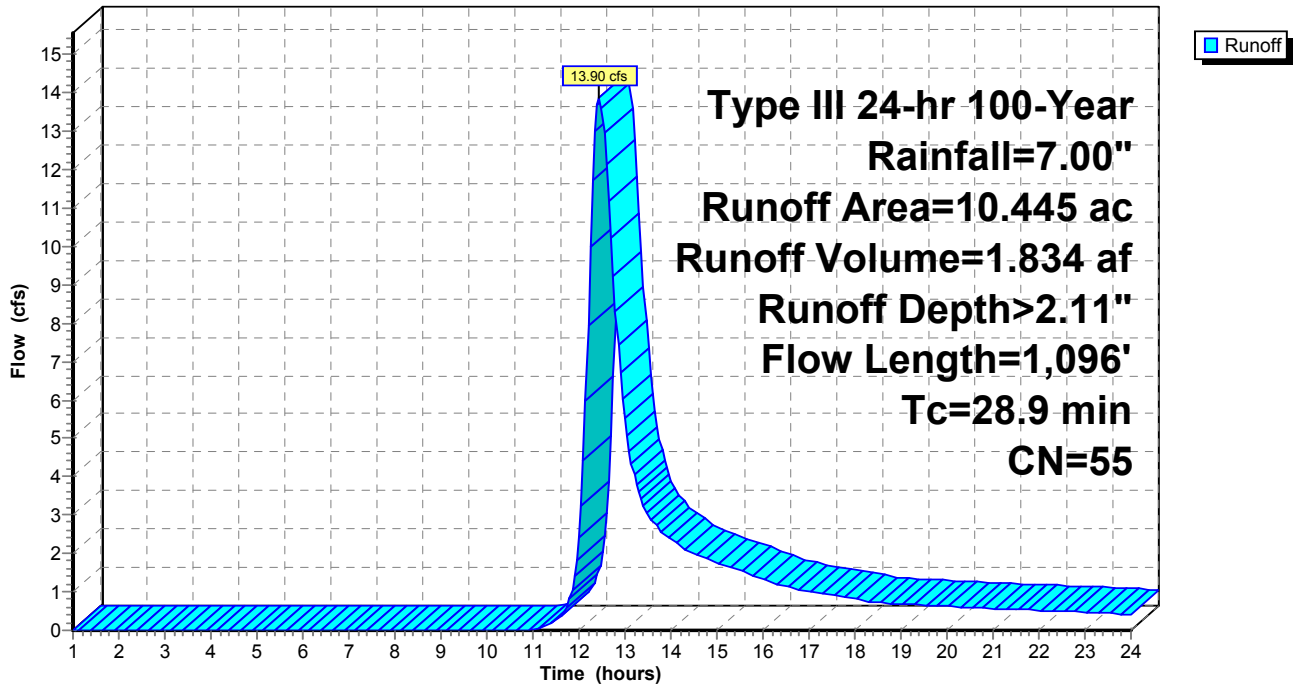
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	300	0.1800	0.23		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
7.4	796	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.9	1,096	Total			

Pollutant Loading for 2.11" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
10.445	Rural open/forest	254.39	0.55	8.88
0.000	Water/wetland	0.00	0.00	0.00
10.445	Total	254.39	0.55	8.88

Subcatchment 34S: Basin 4A - Post

Hydrograph



Summary for Subcatchment 38S: Basin 1 - Post

Runoff = 3.58 cfs @ 12.10 hrs, Volume= 0.265 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=7.00"

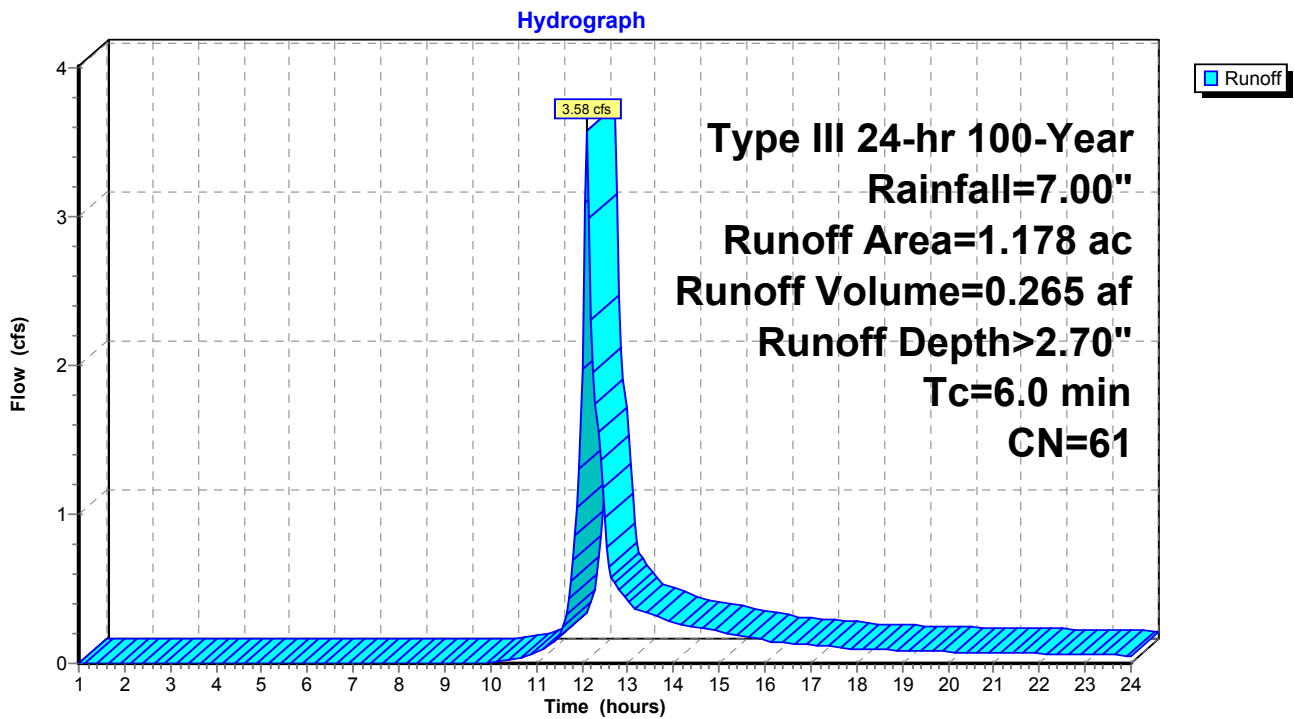
Area (ac)	CN	Description	Land Use
0.170	85	Gravel roads, HSG B	Driveway
0.240	55	Woods, Good, HSG B	Rural open/forest
0.718	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
1.178	61	Weighted Average	
1.178		100.00% Pervious Area	

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

Pollutant Loading for 2.70" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.170	Driveway	17.99	0.06	0.22
0.958	Rural open/forest	29.88	0.06	1.04
0.050	Water/wetland	0.18	0.00	0.04
1.178	Total	48.05	0.13	1.30

Subcatchment 38S: Basin 1 - Post



Summary for Pond 36P: Forebay 4

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 3.00" for 100-Year event
 Inflow = 4.82 cfs @ 12.10 hrs, Volume= 0.353 af
 Outflow = 4.76 cfs @ 12.10 hrs, Volume= 0.351 af, Atten= 1%, Lag= 0.1 min
 Primary = 4.76 cfs @ 12.10 hrs, Volume= 0.351 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.99' @ 12.10 hrs Surf.Area= 143 sf Storage= 138 cf

Plug-Flow detention time= 4.0 min calculated for 0.351 af (100% of inflow)
 Center-of-Mass det. time= 1.4 min (845.0 - 843.6)

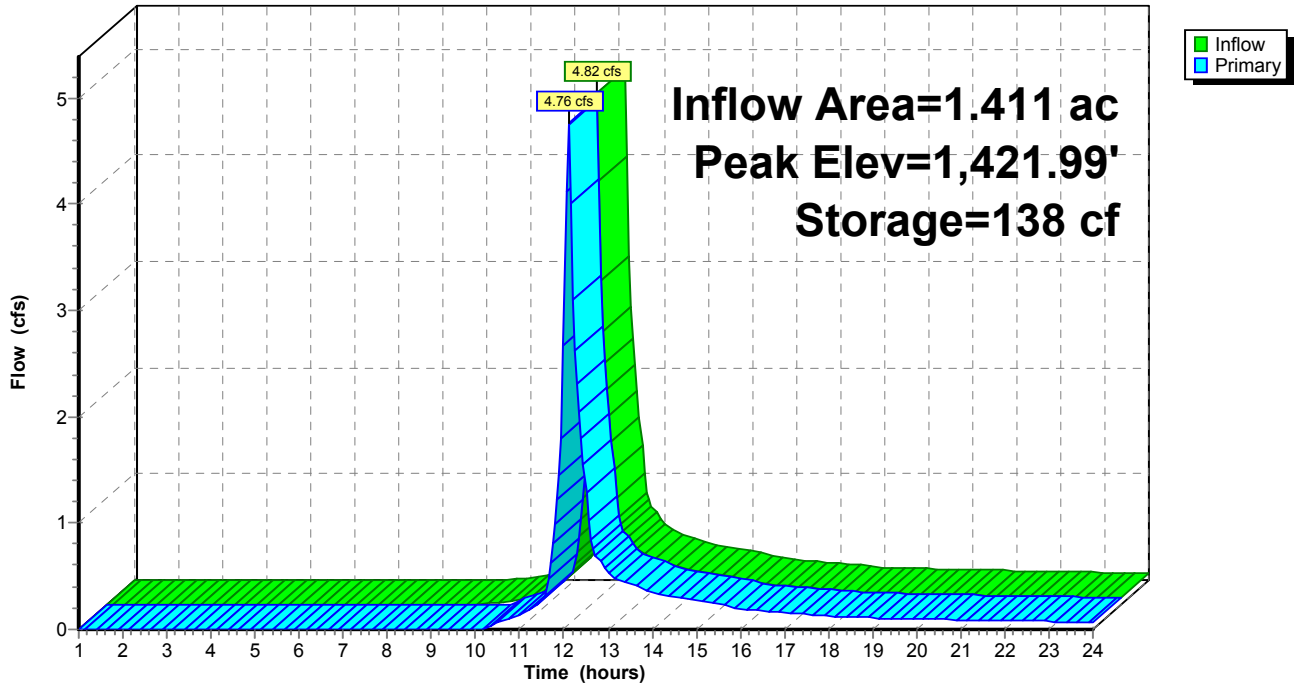
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=4.73 cfs @ 12.10 hrs HW=1,421.99' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 4.73 cfs @ 2.52 fps)

Pond 36P: Forebay 4

Hydrograph



Summary for Pond 37P: Bioretention Pond 4

[81] Warning: Exceeded Pond 36P by 3.39' @ 12.60 hrs

Inflow Area = 1.411 ac, 0.00% Impervious, Inflow Depth > 2.98" for 100-Year event
 Inflow = 4.76 cfs @ 12.10 hrs, Volume= 0.351 af
 Outflow = 1.09 cfs @ 12.54 hrs, Volume= 0.347 af, Atten= 77%, Lag= 26.7 min
 Primary = 0.45 cfs @ 12.54 hrs, Volume= 0.299 af
 Secondary = 0.64 cfs @ 12.54 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,424.99' @ 12.54 hrs Surf.Area= 1,946 sf Storage= 5,646 cf

Plug-Flow detention time= 124.1 min calculated for 0.347 af (99% of inflow)
 Center-of-Mass det. time= 118.2 min (963.1 - 845.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	5,667 cf	10.00'W x 45.00'L x 5.00'H Prismaoid Z=2.0

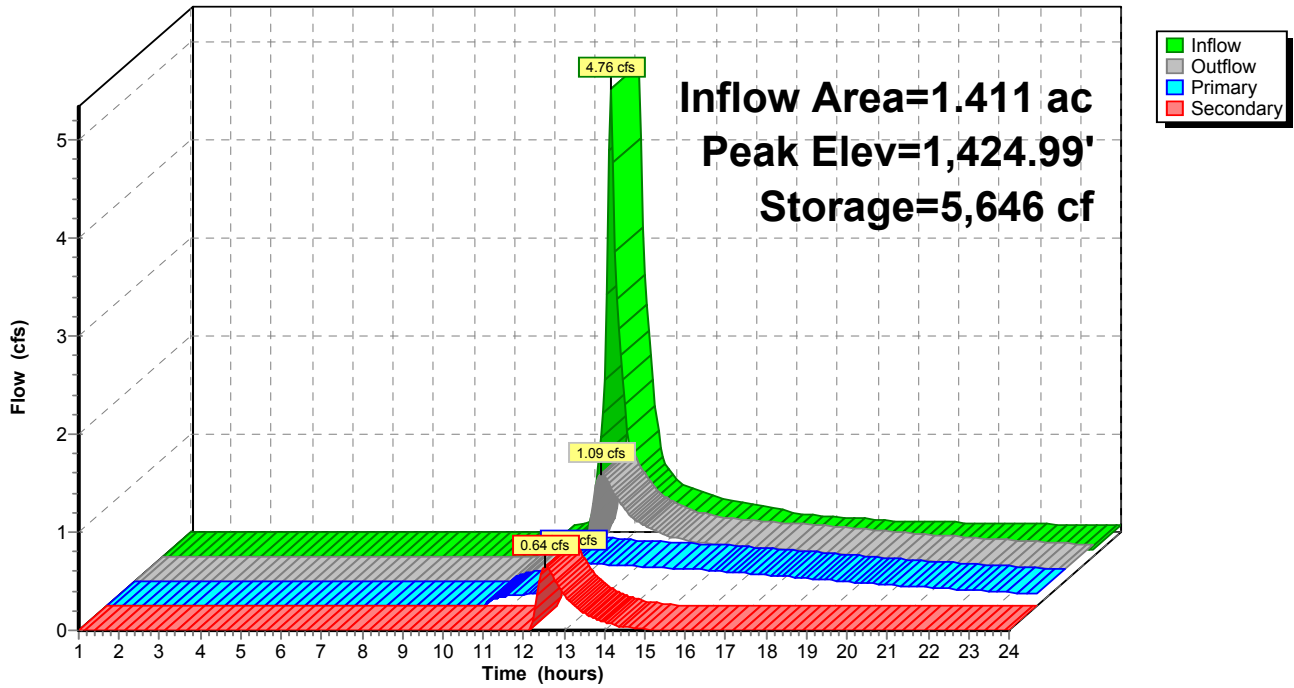
Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 0.50

Primary OutFlow Max=0.45 cfs @ 12.54 hrs HW=1,424.99' (Free Discharge)
 ↑1=Exfiltration (Controls 0.45 cfs)

Secondary OutFlow Max=0.64 cfs @ 12.54 hrs HW=1,424.99' (Free Discharge)
 ↑2=Custom Weir/Orifice (Weir Controls 0.64 cfs @ 2.60 fps)

Pond 37P: Bioretention Pond 4

Hydrograph



Summary for Pond 40P: Forebay 1

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 2.70" for 100-Year event
 Inflow = 3.58 cfs @ 12.10 hrs, Volume= 0.265 af
 Outflow = 3.53 cfs @ 12.10 hrs, Volume= 0.263 af, Atten= 1%, Lag= 0.1 min
 Primary = 3.53 cfs @ 12.10 hrs, Volume= 0.263 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,421.89' @ 12.10 hrs Surf.Area= 133 sf Storage= 123 cf

Plug-Flow detention time= 5.3 min calculated for 0.263 af (99% of inflow)
 Center-of-Mass det. time= 1.7 min (852.2 - 850.5)

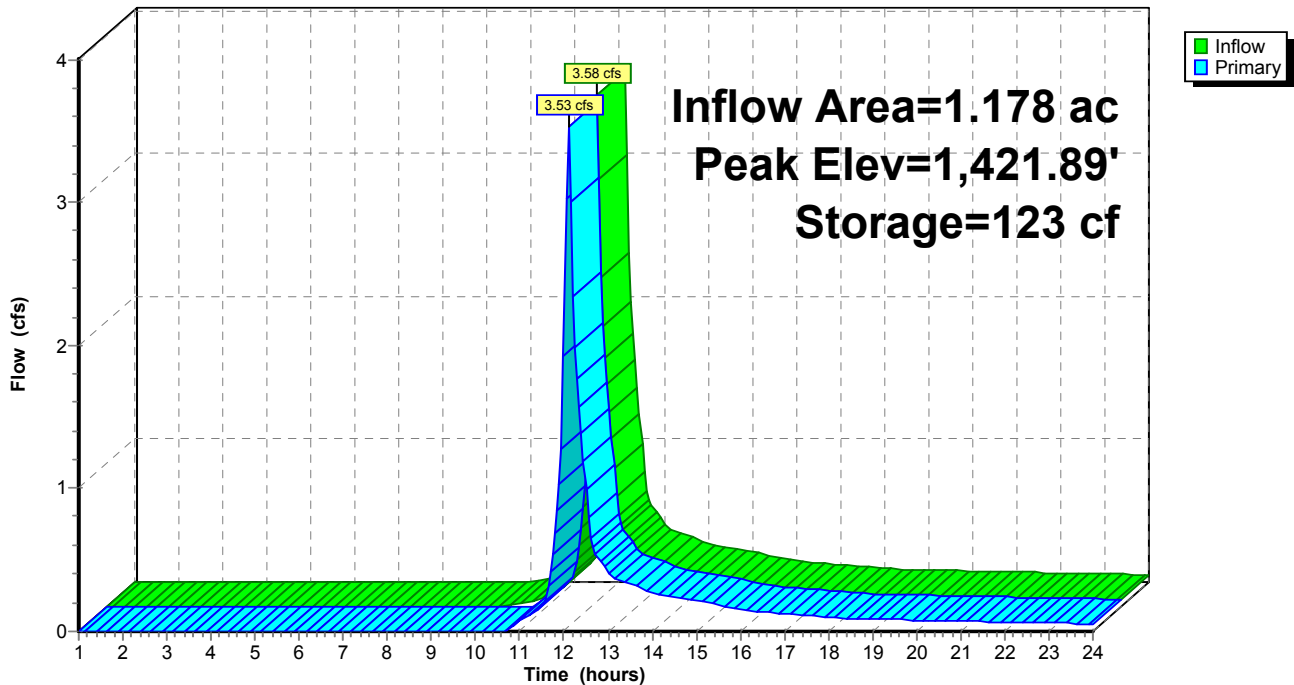
Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	139 cf	4.00'W x 4.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,421.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.60 Width (feet) 3.17 3.17

Primary OutFlow Max=3.53 cfs @ 12.10 hrs HW=1,421.89' (Free Discharge)
 ←1=Custom Weir/Orifice (Weir Controls 3.53 cfs @ 2.29 fps)

Pond 40P: Forebay 1

Hydrograph



Summary for Pond 41P: Bioretention Pond 1

[81] Warning: Exceeded Pond 40P by 3.47' @ 13.05 hrs

Inflow Area = 1.178 ac, 0.00% Impervious, Inflow Depth > 2.68" for 100-Year event
 Inflow = 3.53 cfs @ 12.10 hrs, Volume= 0.263 af
 Outflow = 0.43 cfs @ 12.98 hrs, Volume= 0.260 af, Atten= 88%, Lag= 53.0 min
 Primary = 0.38 cfs @ 12.98 hrs, Volume= 0.256 af
 Secondary = 0.05 cfs @ 12.98 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 1,424.98' @ 12.98 hrs Surf.Area= 1,644 sf Storage= 4,637 cf

Plug-Flow detention time= 148.8 min calculated for 0.260 af (99% of inflow)
 Center-of-Mass det. time= 141.0 min (993.2 - 852.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,420.00'	4,667 cf	10.00'W x 35.00'L x 5.00'H Prismatic Z=2.0

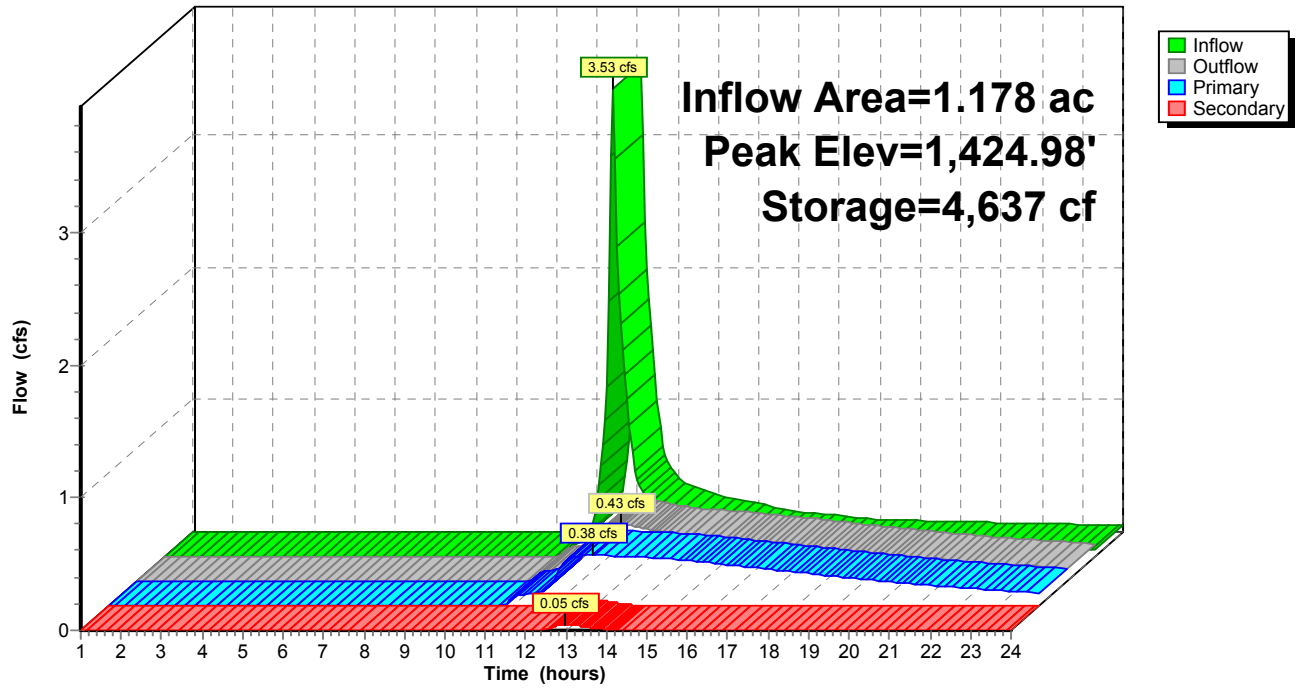
Device	Routing	Invert	Outlet Devices
#1	Primary	1,420.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,424.75'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 0.00 1.33

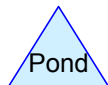
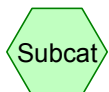
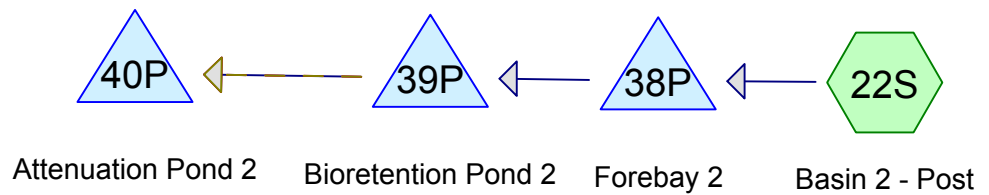
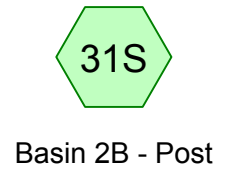
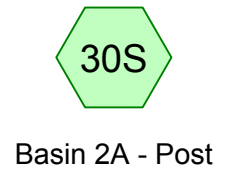
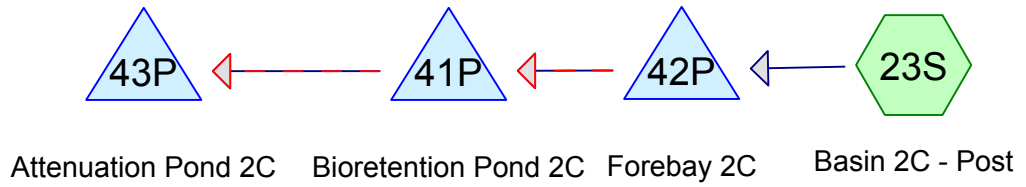
Primary OutFlow Max=0.38 cfs @ 12.98 hrs HW=1,424.98' (Free Discharge)
 ↳1=Exfiltration (Controls 0.38 cfs)

Secondary OutFlow Max=0.05 cfs @ 12.98 hrs HW=1,424.98' (Free Discharge)
 ↳2=Custom Weir/Orifice (Weir Controls 0.05 cfs @ 1.26 fps)

Pond 41P: Bioretention Pond 1

Hydrograph





Wind-Colbrook South SE Wetlands 2011-03-10

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
24.870	55	Woods, Good, HSG B (17S, 23S, 30S, 31S)
2.926	58	Meadow, non-grazed, HSG B (22S, 23S)
1.164	85	Gravel roads, HSG B (22S, 23S)
0.046	98	Unconnected roofs, HSG B (22S)
29.006	57	TOTAL AREA

Wind-Colbrook South SE Wetlands 2011-03-10

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
29.006	HSG B	17S, 22S, 23S, 30S, 31S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
29.006		TOTAL AREA

Wind-Colbrook South SE Wetlands 2011-03-10

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Land-Use Listing (all nodes)

Area (acres)	Land Use	Subcatchment Numbers
0.046	Commercial Roof	22S, 23S, 30S, 31S
1.164	Driveway	22S, 23S, 30S, 31S
27.618	Rural open/forest	17S, 22S, 23S, 30S, 31S
0.178	Water/wetland	22S, 23S, 30S, 31S
29.006	TOTAL	

Wind-Colbrook South SE Wetlands 2011-03-10

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Pollutant Concentrations

Line#	Land Use	TSS (mg/l)	TP (mg/l)	TN (mg/l)
1	Commercial Roof	9.00	0.14	2.10
2	Driveway	173.00	0.56	2.10
3	Rural open/forest	51.00	0.11	1.78
4	Water/wetland	6.00	0.08	1.38

Wind-Colbrook South SE Wetlands 2011-03-10

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Subcatchment Loading

Line#	Subcat Number	TSS (pounds)	TP (pounds)	TN (pounds)
1	17S	0.00	0.00	0.00
2	22S	0.00	0.00	0.00
3	23S	157.97	0.41	4.05
4	30S	0.00	0.00	0.00
5	31S	0.00	0.00	0.00
	TOTAL	157.97	0.41	4.05

Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment17S: Basin B - Pre Runoff Area=15.242 ac 0.00% Impervious Runoff Depth>0.10"
Flow Length=667' Tc=28.7 min CN=55 Runoff=0.22 cfs 0.127 af

Subcatchment22S: Basin 2 - Post Runoff Area=1.672 ac 2.75% Impervious Runoff Depth>0.43"
Tc=6.0 min CN=68 Runoff=0.61 cfs 0.060 af

Subcatchment23S: Basin 2C - Post Runoff Area=3.489 ac 0.00% Impervious Runoff Depth>0.25"
Tc=6.0 min CN=62 Runoff=0.42 cfs 0.073 af

Subcatchment30S: Basin 2A - Post Runoff Area=4.984 ac 0.00% Impervious Runoff Depth>0.10"
Flow Length=217' Slope=0.1600 '/' Tc=17.4 min CN=55 Runoff=0.07 cfs 0.042 af

Subcatchment31S: Basin 2B - Post Runoff Area=3.619 ac 0.00% Impervious Runoff Depth>0.10"
Flow Length=300' Slope=0.1000 '/' Tc=27.2 min CN=55 Runoff=0.05 cfs 0.030 af

Pond 38P: Forebay 2 Peak Elev=1,301.01' Storage=203 cf Inflow=0.61 cfs 0.060 af
Outflow=0.48 cfs 0.058 af

Pond 39P: Bioretention Pond 2 Peak Elev=1,301.32' Storage=546 cf Inflow=0.48 cfs 0.058 af
Primary=0.12 cfs 0.058 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.058 af

Pond 40P: Attenuation Pond 2 Peak Elev=1,302.84' Storage=2,515 cf Inflow=0.12 cfs 0.058 af
Primary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 41P: Bioretention Pond 2C Peak Elev=1,432.87' Storage=424 cf Inflow=0.41 cfs 0.070 af
Primary=0.14 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.070 af

Pond 42P: Forebay 2C Peak Elev=1,433.47' Storage=116 cf Inflow=0.42 cfs 0.073 af
Primary=0.41 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=0.41 cfs 0.070 af

Pond 43P: Attenuation Pond 2C Peak Elev=1,300.22' Storage=139 cf Inflow=0.14 cfs 0.070 af
Primary=0.13 cfs 0.069 af Secondary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.069 af

Total Runoff Area = 29.006 ac Runoff Volume = 0.332 af Average Runoff Depth = 0.14"
99.84% Pervious = 28.960 ac 0.16% Impervious = 0.046 ac

Summary for Subcatchment 17S: Basin B - Pre

Runoff = 0.22 cfs @ 13.82 hrs, Volume= 0.127 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
15.242	55	Woods, Good, HSG B	Rural open/forest
15.242		100.00% Pervious Area	

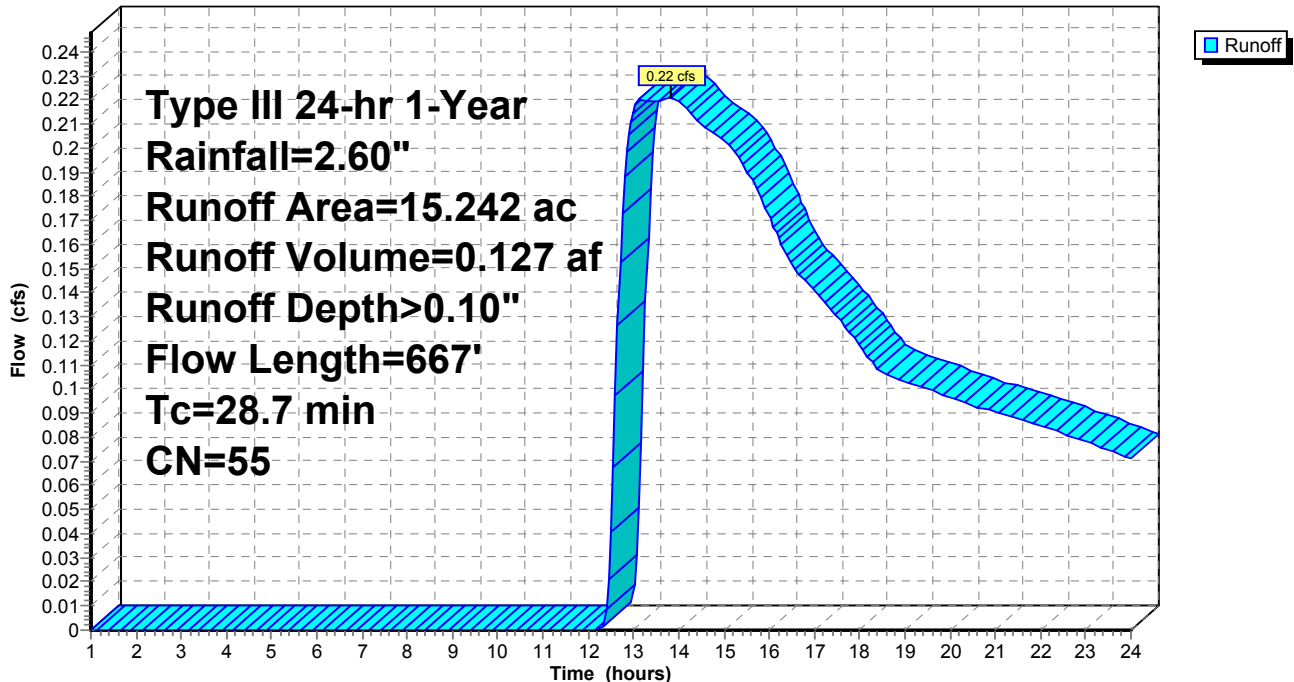
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.4	367	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.7	667	Total			

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.242	Rural open/forest	17.55	0.04	0.61
15.242	Total	17.55	0.04	0.61

Subcatchment 17S: Basin B - Pre

Hydrograph



Summary for Subcatchment 22S: Basin 2 - Post

Runoff = 0.61 cfs @ 12.12 hrs, Volume= 0.060 af, Depth> 0.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
0.562	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
0.936	58	Meadow, non-grazed, HSG B	Rural open/forest
0.128	58	Meadow, non-grazed, HSG B	Water/wetland
0.046	98	Unconnected roofs, HSG B	Commercial Roof
1.672	68	Weighted Average	
1.626		97.25% Pervious Area	
0.046		2.75% Impervious Area	
0.046		100.00% Unconnected	

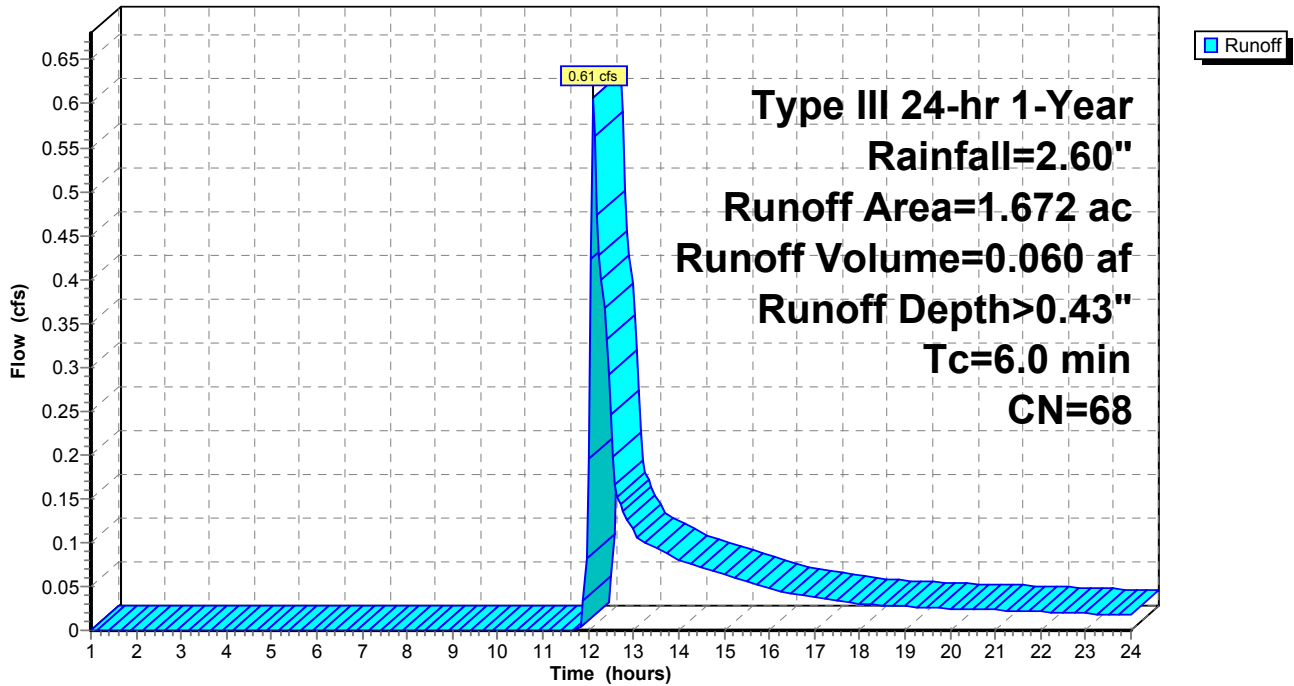
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 0.43" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.046	Commercial Roof	0.04	0.00	0.01
0.562	Driveway	9.51	0.03	0.12
0.936	Rural open/forest	4.67	0.01	0.16
0.128	Water/wetland	0.08	0.00	0.02
1.672	Total	14.30	0.04	0.31

Subcatchment 22S: Basin 2 - Post

Hydrograph



Summary for Subcatchment 23S: Basin 2C - Post

Runoff = 0.42 cfs @ 12.28 hrs, Volume= 0.073 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
0.602	85	Gravel roads, HSG B	Driveway
1.025	55	Woods, Good, HSG B	Rural open/forest
1.812	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.489	62	Weighted Average	
3.489		100.00% Pervious Area	

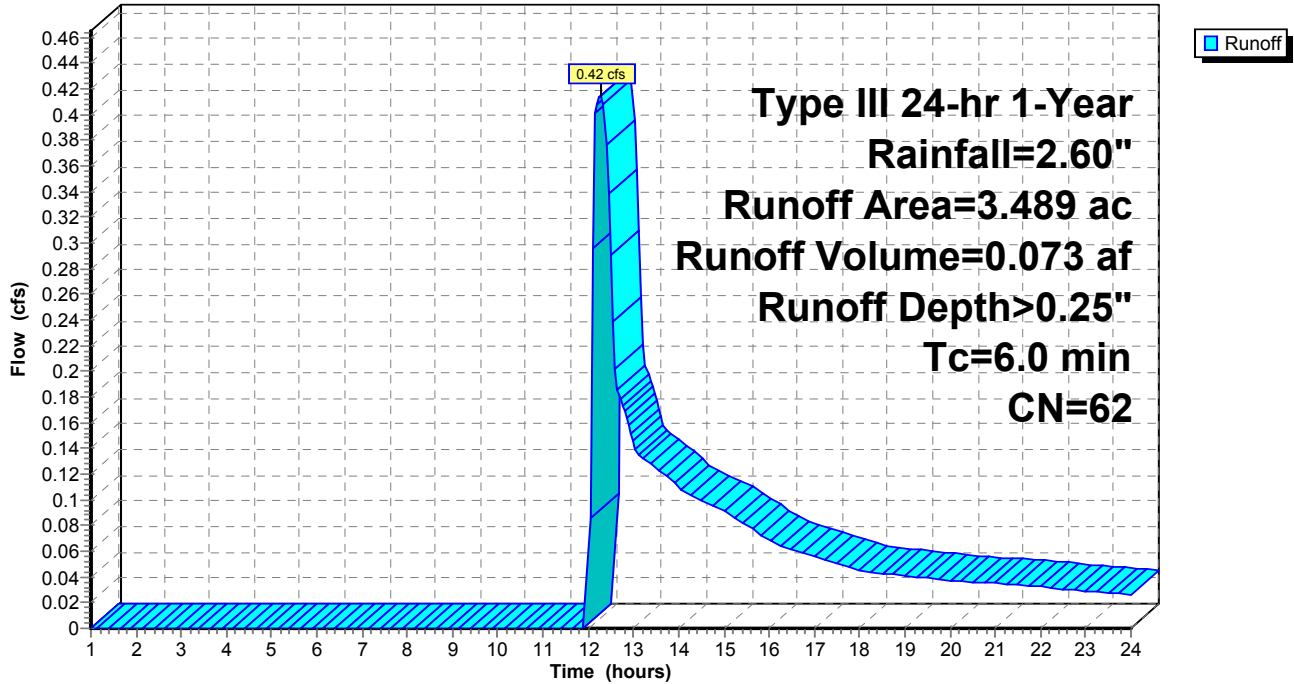
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.602	Driveway	5.93	0.02	0.07
2.837	Rural open/forest	8.24	0.02	0.29
0.050	Water/wetland	0.02	0.00	0.00
3.489	Total	14.18	0.04	0.36

Subcatchment 23S: Basin 2C - Post

Hydrograph



Summary for Subcatchment 30S: Basin 2A - Post

Runoff = 0.07 cfs @ 12.97 hrs, Volume= 0.042 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
4.984	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
4.984	55	Weighted Average	
4.984		100.00% Pervious Area	

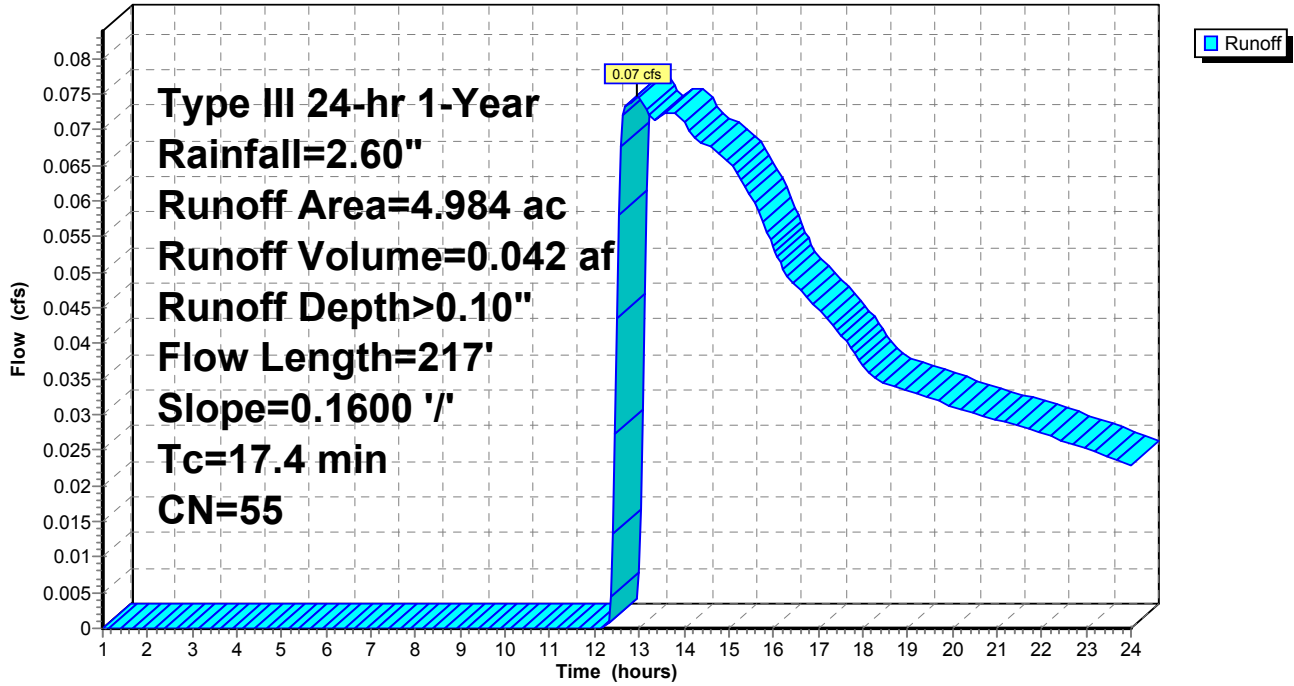
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	217	0.1600	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
4.984	Rural open/forest	5.79	0.01	0.20
0.000	Water/wetland	0.00	0.00	0.00
4.984	Total	5.79	0.01	0.20

Subcatchment 30S: Basin 2A - Post

Hydrograph



Summary for Subcatchment 31S: Basin 2B - Post

Runoff = 0.05 cfs @ 13.15 hrs, Volume= 0.030 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.60"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
3.619	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.619	55	Weighted Average	
3.619		100.00% Pervious Area	

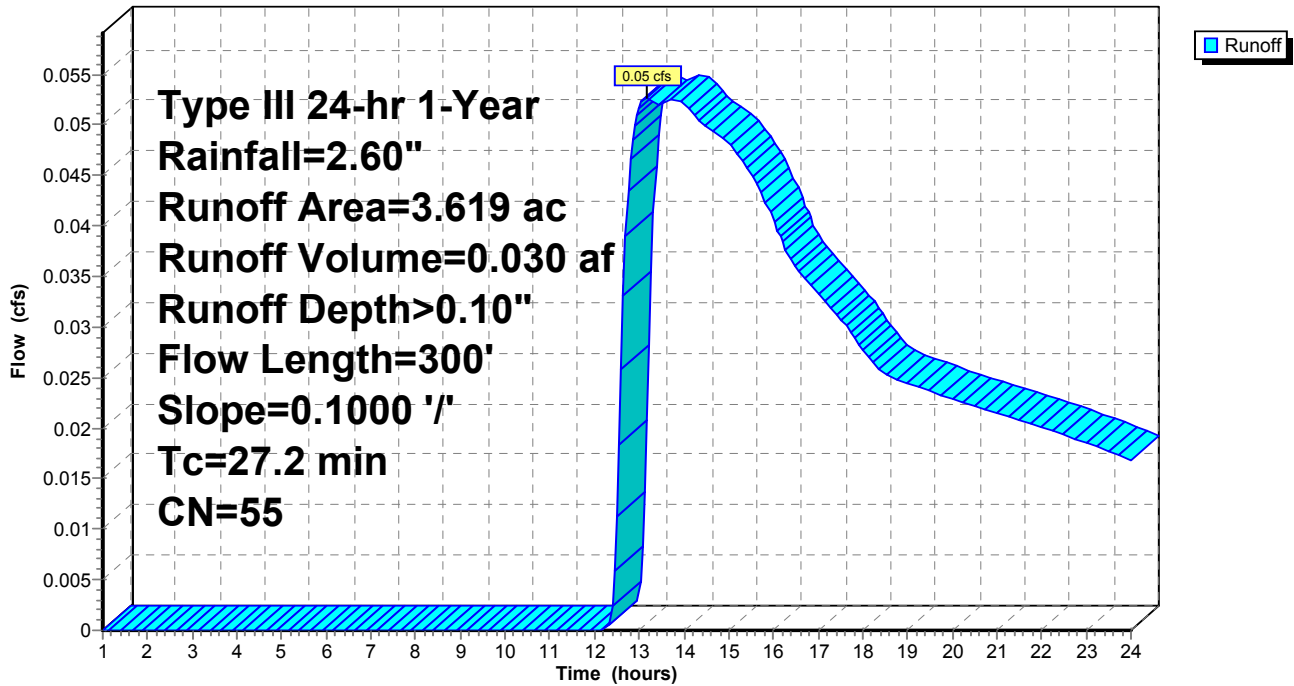
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	300	0.1000	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 0.10" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
3.619	Rural open/forest	4.17	0.01	0.15
0.000	Water/wetland	0.00	0.00	0.00
3.619	Total	4.17	0.01	0.15

Subcatchment 31S: Basin 2B - Post

Hydrograph



Summary for Pond 38P: Forebay 2

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 0.43" for 1-Year event
 Inflow = 0.61 cfs @ 12.12 hrs, Volume= 0.060 af
 Outflow = 0.48 cfs @ 12.21 hrs, Volume= 0.058 af, Atten= 20%, Lag= 5.3 min
 Primary = 0.48 cfs @ 12.21 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,301.01' @ 12.21 hrs Surf.Area= 266 sf Storage= 203 cf

Plug-Flow detention time= 30.3 min calculated for 0.058 af (96% of inflow)
 Center-of-Mass det. time= 10.7 min (912.8 - 902.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	539 cf	7.00'W x 20.00'L x 2.00'H Prismatic Z=2.0

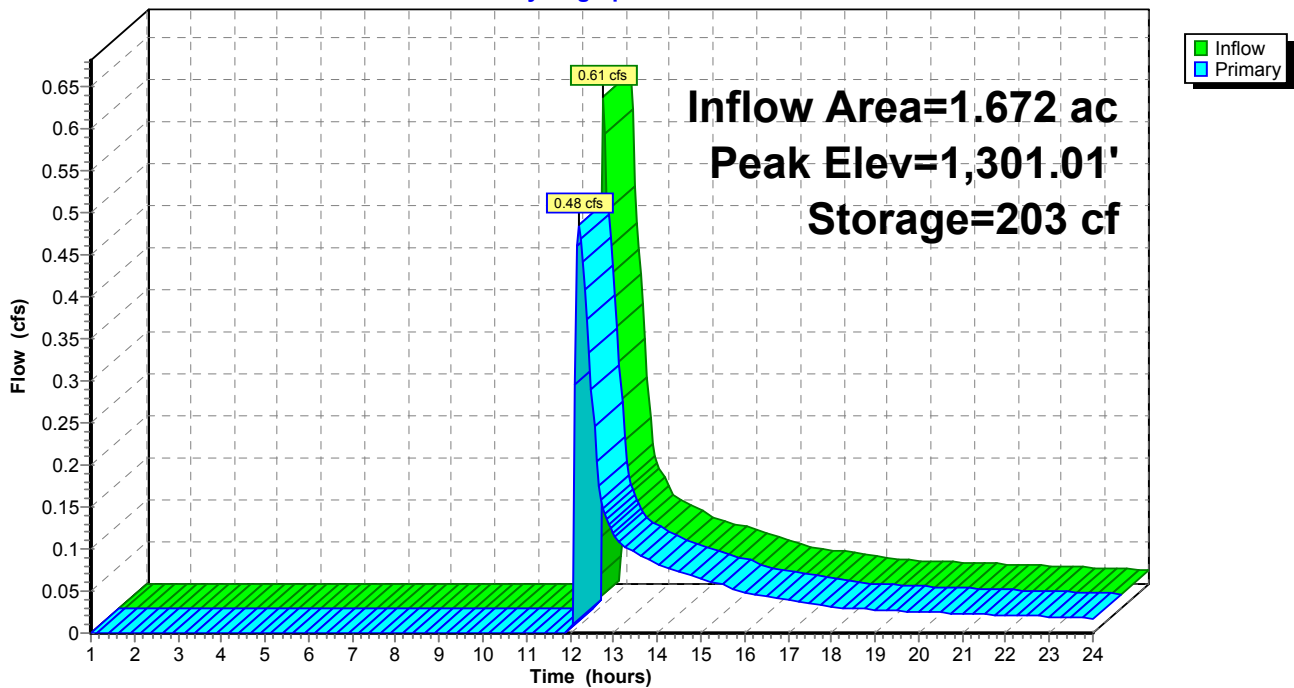
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,301.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.50

Primary OutFlow Max=0.48 cfs @ 12.21 hrs HW=1,301.01' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.48 cfs @ 2.46 fps)
- 2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 38P: Forebay 2

Hydrograph



Summary for Pond 39P: Bioretention Pond 2

[81] Warning: Exceeded Pond 38P by 0.61' @ 13.10 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 0.42" for 1-Year event
 Inflow = 0.48 cfs @ 12.21 hrs, Volume= 0.058 af
 Outflow = 0.12 cfs @ 12.95 hrs, Volume= 0.058 af, Atten= 74%, Lag= 44.7 min
 Primary = 0.12 cfs @ 12.95 hrs, Volume= 0.058 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,301.32' @ 12.95 hrs Surf.Area= 538 sf Storage= 546 cf

Plug-Flow detention time= 39.4 min calculated for 0.058 af (100% of inflow)
 Center-of-Mass det. time= 38.8 min (951.6 - 912.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	4,167 cf	10.00'W x 30.00'L x 5.00'H Prismaoid Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Tertiary	1,304.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.50 Width (feet) 5.00 5.00

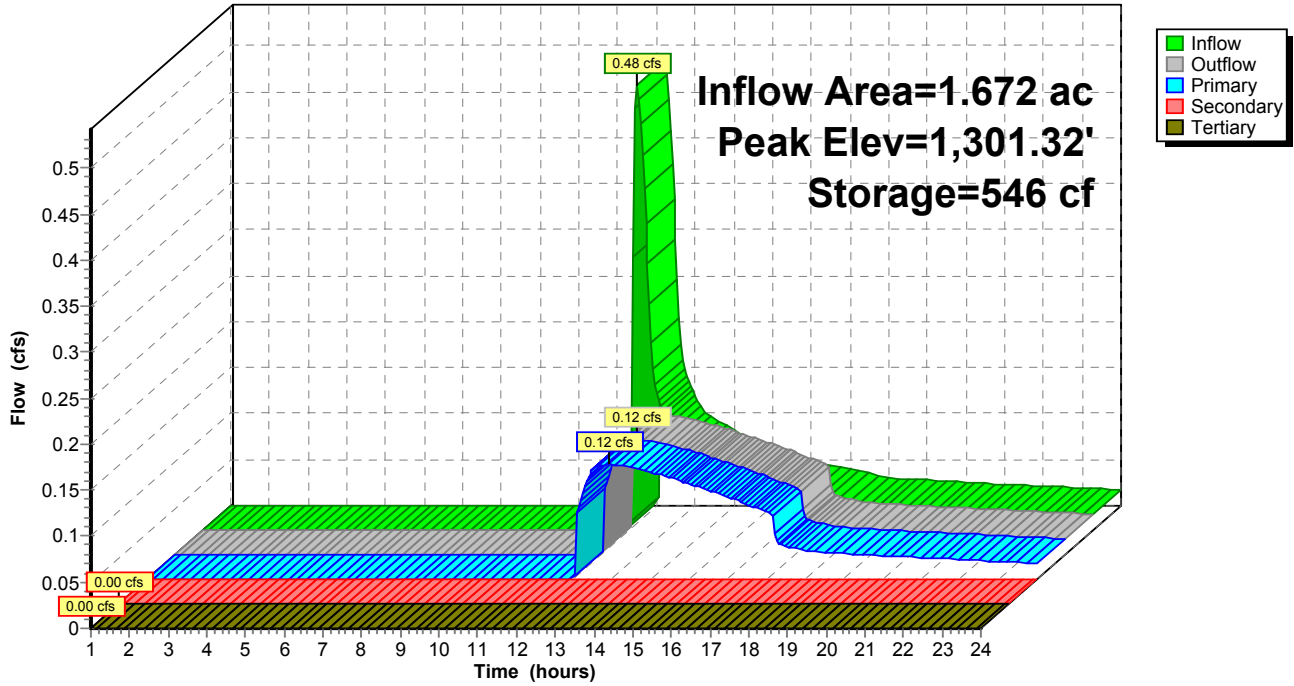
Primary OutFlow Max=0.12 cfs @ 12.95 hrs HW=1,301.32' (Free Discharge)
 ↑1=Exfiltration (Controls 0.12 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 39P: Bioretention Pond 2

Hydrograph



Summary for Pond 40P: Attenuation Pond 2

[78] Warning: Submerged Pond 39P Primary device # 1 by 2.84'

[81] Warning: Exceeded Pond 39P by 2.83' @ 23.95 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 0.41" for 1-Year event
 Inflow = 0.12 cfs @ 12.95 hrs, Volume= 0.058 af
 Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,302.84' @ 24.00 hrs Surf.Area= 1,312 sf Storage= 2,515 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	6,167 cf	10.00'W x 50.00'L x 5.00'H Prismatic Z=2.0

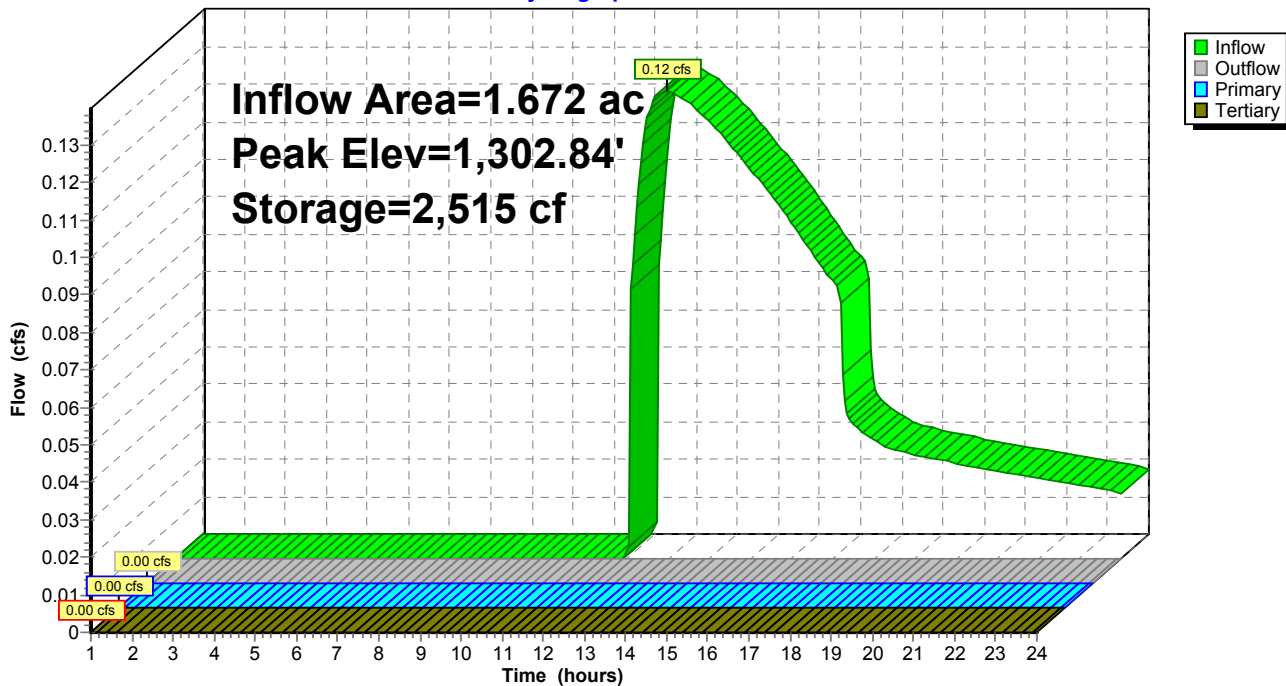
Device	Routing	Invert	Outlet Devices
#1	Primary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,304.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 0.67 0.67
#3	Tertiary	1,304.82'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.25 Width (feet) 10.00 10.00

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑1=Orifice/Grate (Controls 0.00 cfs)
 ↓2=Custom Weir/Orifice (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Attenuation Pond 2

Hydrograph



Summary for Pond 41P: Bioretention Pond 2C

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 0.24" for 1-Year event
 Inflow = 0.41 cfs @ 12.28 hrs, Volume= 0.070 af
 Outflow = 0.14 cfs @ 13.12 hrs, Volume= 0.070 af, Atten= 67%, Lag= 50.1 min
 Primary = 0.14 cfs @ 13.12 hrs, Volume= 0.070 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,432.87' @ 13.12 hrs Surf.Area= 585 sf Storage= 424 cf

Plug-Flow detention time= 27.0 min calculated for 0.070 af (100% of inflow)
 Center-of-Mass det. time= 26.1 min (973.9 - 947.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.44'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 1.00 1.08

Primary OutFlow Max=0.14 cfs @ 13.12 hrs HW=1,432.86' (Free Discharge)

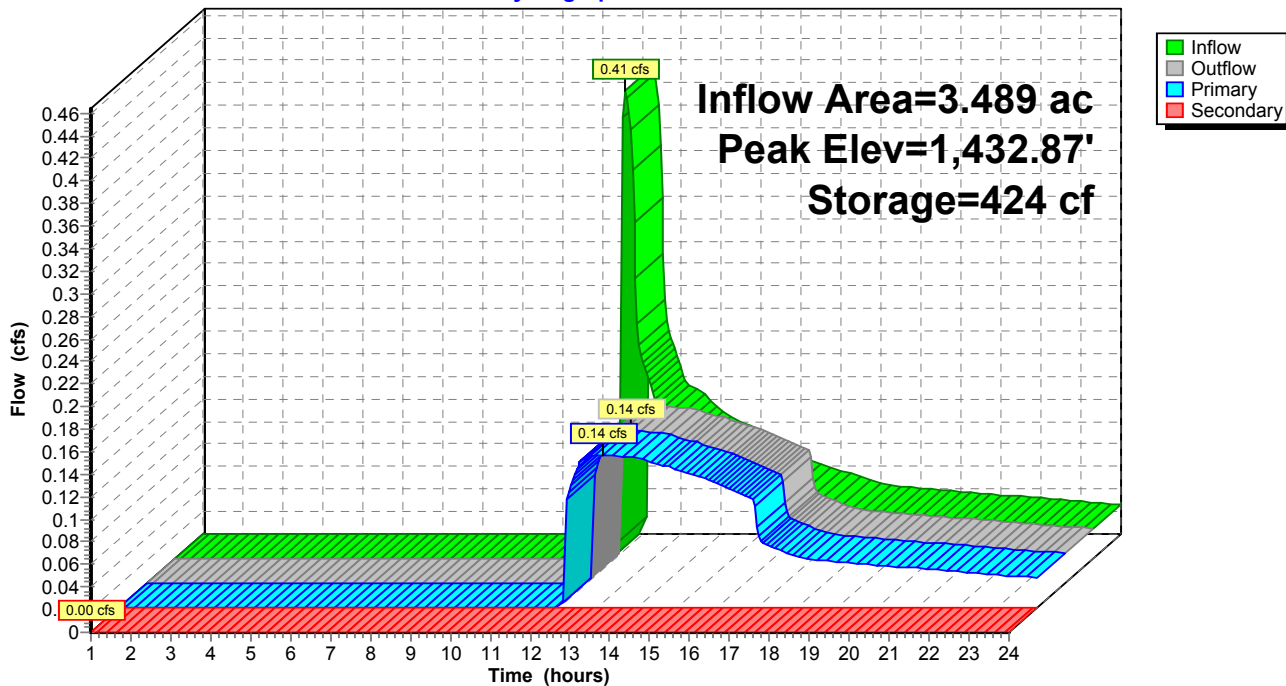
- ↑1=Exfiltration (Controls 0.14 cfs)
- ↑2=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)

- ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 41P: Bioretention Pond 2C

Hydrograph



Summary for Pond 42P: Forebay 2C

For pretreatment and storage of at least 25% of the WQV.

Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 0.25" for 1-Year event
 Inflow = 0.42 cfs @ 12.28 hrs, Volume= 0.073 af
 Outflow = 0.41 cfs @ 12.28 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.4 min
 Primary = 0.41 cfs @ 12.28 hrs, Volume= 0.070 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.47' @ 12.28 hrs Surf.Area= 137 sf Storage= 116 cf

Plug-Flow detention time= 27.8 min calculated for 0.070 af (96% of inflow)
 Center-of-Mass det. time= 9.1 min (947.8 - 938.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatoid Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=0.41 cfs @ 12.28 hrs HW=1,433.47' (Free Discharge)

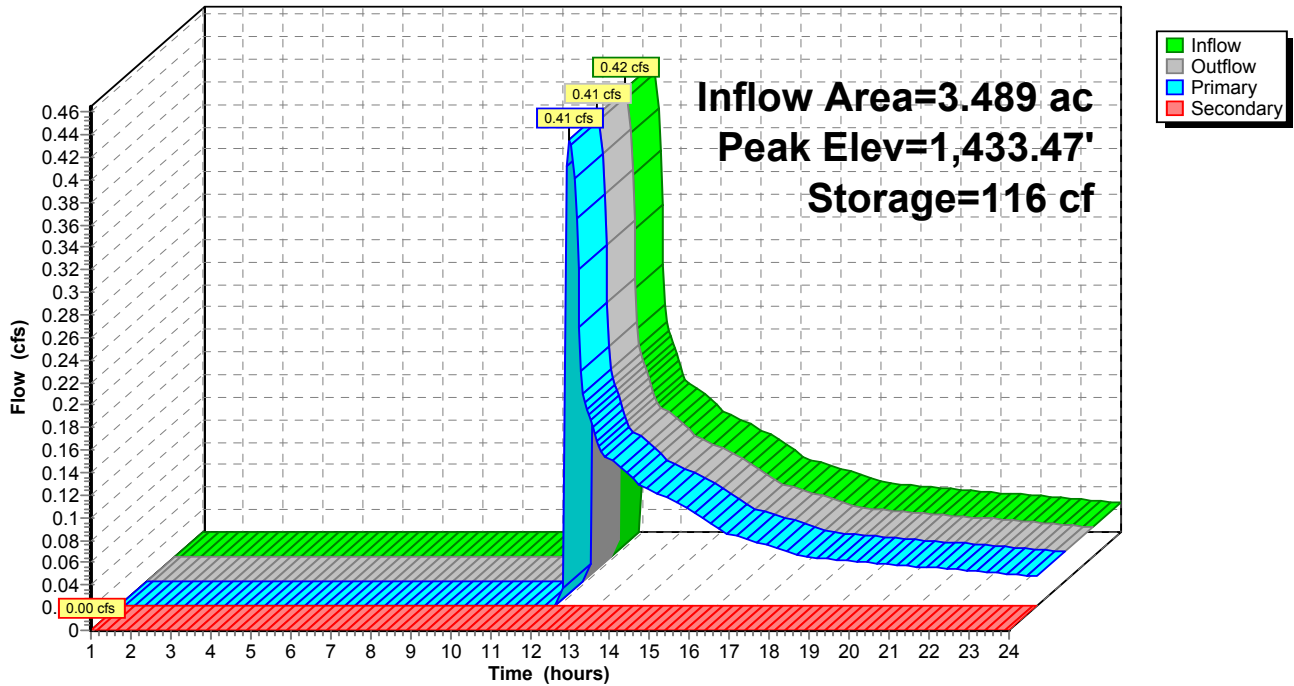
↑1=Custom Weir/Orifice (Weir Controls 0.41 cfs @ 1.12 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)

↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 42P: Forebay 2C

Hydrograph



Summary for Pond 43P: Attenuation Pond 2C

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 0.24" for 1-Year event
 Inflow = 0.14 cfs @ 13.12 hrs, Volume= 0.070 af
 Outflow = 0.13 cfs @ 13.48 hrs, Volume= 0.069 af, Atten= 0%, Lag= 21.4 min
 Primary = 0.13 cfs @ 13.48 hrs, Volume= 0.069 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,300.22' @ 13.48 hrs Surf.Area= 663 sf Storage= 139 cf

Plug-Flow detention time= 21.6 min calculated for 0.069 af (98% of inflow)
 Center-of-Mass det. time= 13.0 min (986.9 - 973.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	7,167 cf	10.00'W x 60.00'L x 5.00'H Prismatic Z=2.0

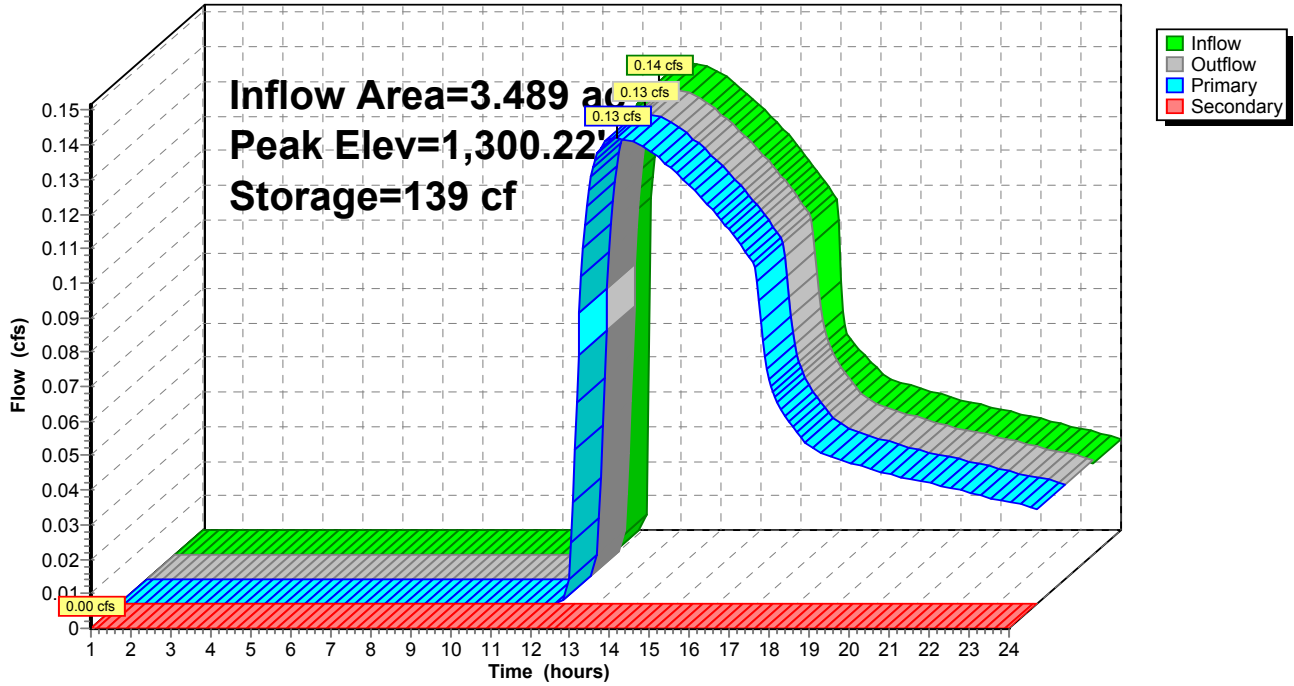
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,302.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 0.00 0.17

Primary OutFlow Max=0.13 cfs @ 13.48 hrs HW=1,300.22' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.13 cfs @ 1.60 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 43P: Attenuation Pond 2C

Hydrograph



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment17S: Basin B - Pre Runoff Area=15.242 ac 0.00% Impervious Runoff Depth>0.25"
Flow Length=667' Tc=28.7 min CN=55 Runoff=1.17 cfs 0.314 af

Subcatchment22S: Basin 2 - Post Runoff Area=1.672 ac 2.75% Impervious Runoff Depth>0.73"
Tc=6.0 min CN=68 Runoff=1.22 cfs 0.102 af

Subcatchment23S: Basin 2C - Post Runoff Area=3.489 ac 0.00% Impervious Runoff Depth>0.48"
Tc=6.0 min CN=62 Runoff=1.31 cfs 0.140 af

Subcatchment30S: Basin 2A - Post Runoff Area=4.984 ac 0.00% Impervious Runoff Depth>0.25"
Flow Length=217' Slope=0.1600 '/' Tc=17.4 min CN=55 Runoff=0.45 cfs 0.103 af

Subcatchment31S: Basin 2B - Post Runoff Area=3.619 ac 0.00% Impervious Runoff Depth>0.25"
Flow Length=300' Slope=0.1000 '/' Tc=27.2 min CN=55 Runoff=0.28 cfs 0.075 af

Pond 38P: Forebay 2 Peak Elev=1,301.39' Storage=312 cf Inflow=1.22 cfs 0.102 af
Outflow=1.11 cfs 0.100 af

Pond 39P: Bioretention Pond 2 Peak Elev=1,302.48' Storage=1,321 cf Inflow=1.11 cfs 0.100 af
Primary=0.18 cfs 0.099 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.18 cfs 0.099 af

Pond 40P: Attenuation Pond 2 Peak Elev=1,303.19' Storage=2,986 cf Inflow=0.18 cfs 0.099 af
Primary=0.10 cfs 0.034 af Tertiary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.034 af

Pond 41P: Bioretention Pond 2C Peak Elev=1,434.02' Storage=1,261 cf Inflow=1.25 cfs 0.138 af
Primary=0.46 cfs 0.138 af Secondary=0.00 cfs 0.000 af Outflow=0.46 cfs 0.138 af

Pond 42P: Forebay 2C Peak Elev=1,433.59' Storage=134 cf Inflow=1.31 cfs 0.140 af
Primary=1.25 cfs 0.138 af Secondary=0.00 cfs 0.000 af Outflow=1.25 cfs 0.138 af

Pond 43P: Attenuation Pond 2C Peak Elev=1,300.42' Storage=280 cf Inflow=0.46 cfs 0.138 af
Primary=0.39 cfs 0.136 af Secondary=0.00 cfs 0.000 af Outflow=0.39 cfs 0.136 af

Total Runoff Area = 29.006 ac Runoff Volume = 0.734 af Average Runoff Depth = 0.30"
99.84% Pervious = 28.960 ac 0.16% Impervious = 0.046 ac

Summary for Subcatchment 17S: Basin B - Pre

Runoff = 1.17 cfs @ 12.67 hrs, Volume= 0.314 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
15.242	55	Woods, Good, HSG B	Rural open/forest
15.242		100.00% Pervious Area	

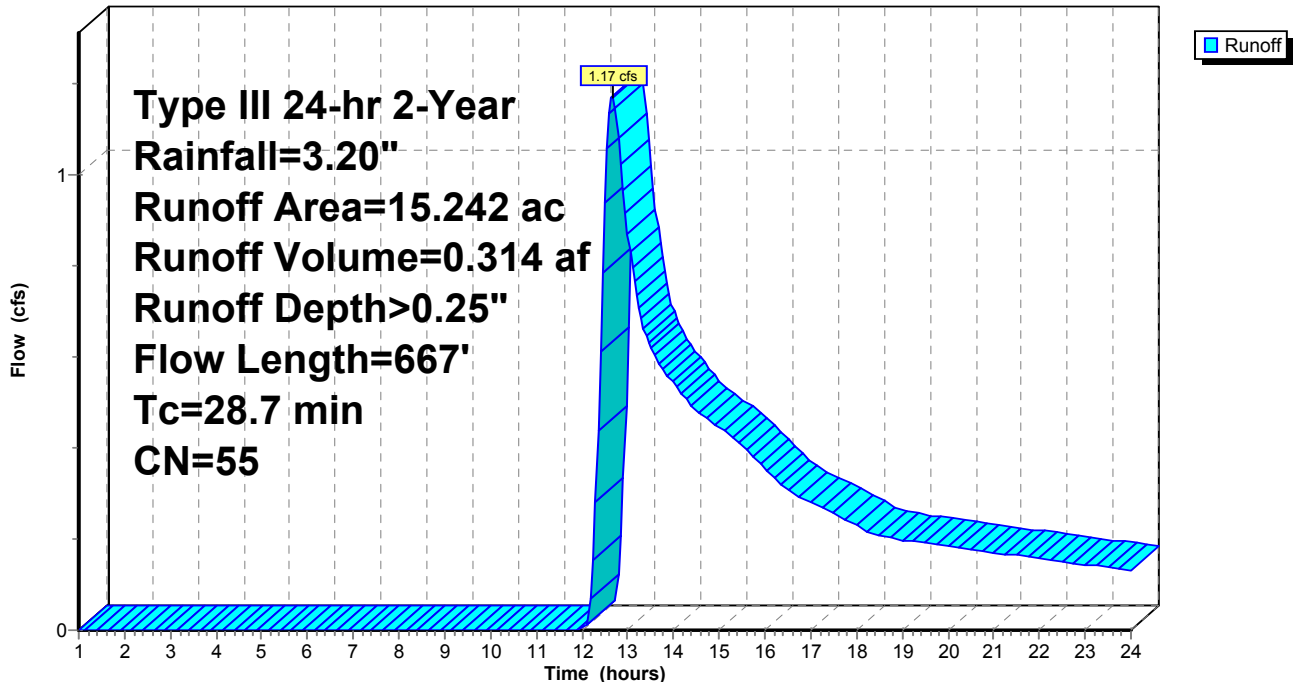
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.4	367	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.7	667	Total			

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.242	Rural open/forest	43.58	0.09	1.52
15.242	Total	43.58	0.09	1.52

Subcatchment 17S: Basin B - Pre

Hydrograph



Summary for Subcatchment 22S: Basin 2 - Post

Runoff = 1.22 cfs @ 12.11 hrs, Volume= 0.102 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

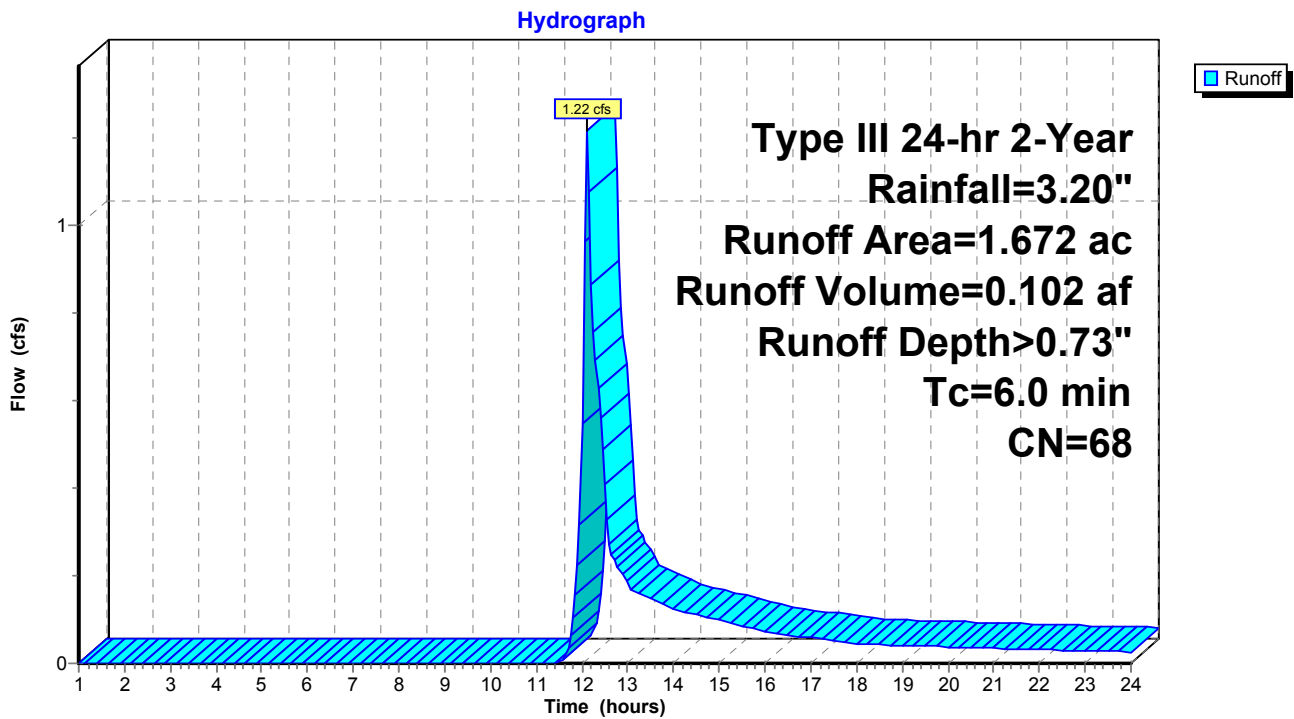
Area (ac)	CN	Description	Land Use
0.562	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
0.936	58	Meadow, non-grazed, HSG B	Rural open/forest
0.128	58	Meadow, non-grazed, HSG B	Water/wetland
0.046	98	Unconnected roofs, HSG B	Commercial Roof
1.672	68	Weighted Average	
1.626		97.25% Pervious Area	
0.046		2.75% Impervious Area	
0.046		100.00% Unconnected	

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

Pollutant Loading for 0.73" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.046	Commercial Roof	0.07	0.00	0.02
0.562	Driveway	16.12	0.05	0.20
0.936	Rural open/forest	7.91	0.02	0.28
0.128	Water/wetland	0.13	0.00	0.03
1.672	Total	24.23	0.07	0.52

Subcatchment 22S: Basin 2 - Post



Summary for Subcatchment 23S: Basin 2C - Post

Runoff = 1.31 cfs @ 12.12 hrs, Volume= 0.140 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

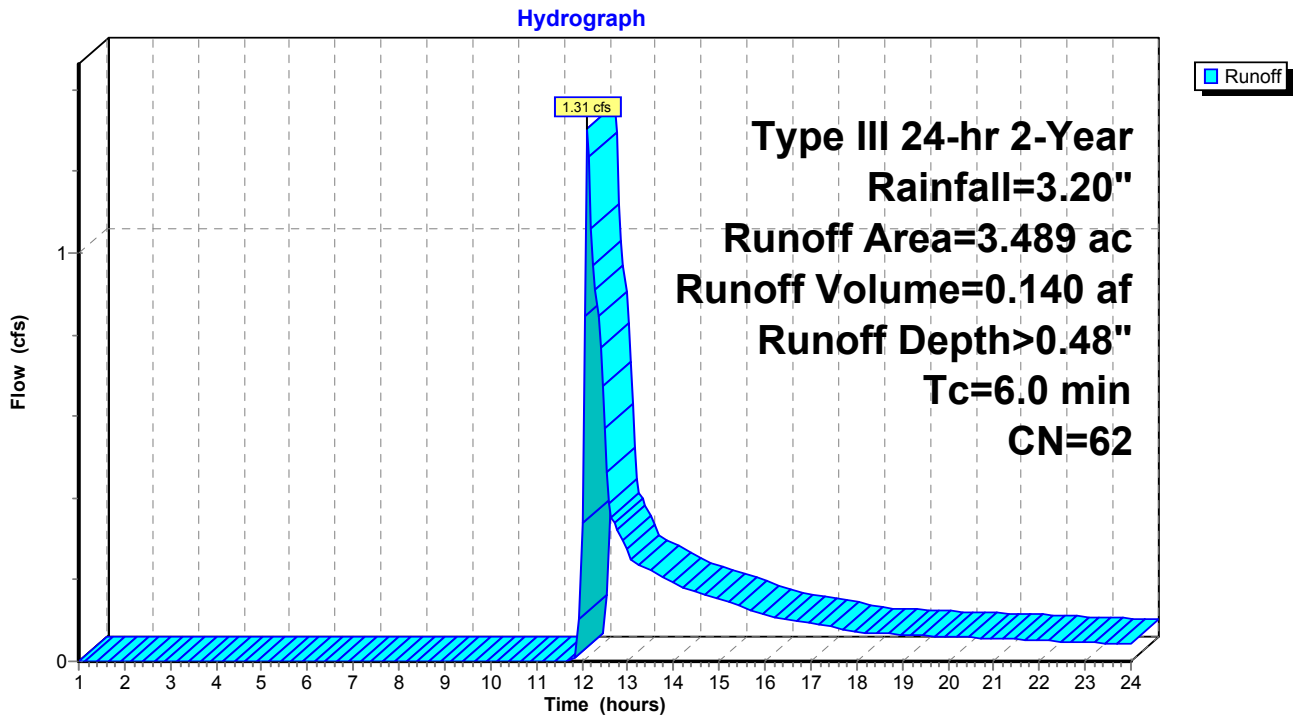
Area (ac)	CN	Description	Land Use
0.602	85	Gravel roads, HSG B	Driveway
1.025	55	Woods, Good, HSG B	Rural open/forest
1.812	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.489	62	Weighted Average	
3.489		100.00% Pervious Area	

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

Pollutant Loading for 0.48" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.602	Driveway	11.33	0.04	0.14
2.837	Rural open/forest	15.74	0.03	0.55
0.050	Water/wetland	0.03	0.00	0.01
3.489	Total	27.11	0.07	0.69

Subcatchment 23S: Basin 2C - Post



Summary for Subcatchment 30S: Basin 2A - Post

Runoff = 0.45 cfs @ 12.51 hrs, Volume= 0.103 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
4.984	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
4.984	55	Weighted Average	
4.984		100.00% Pervious Area	

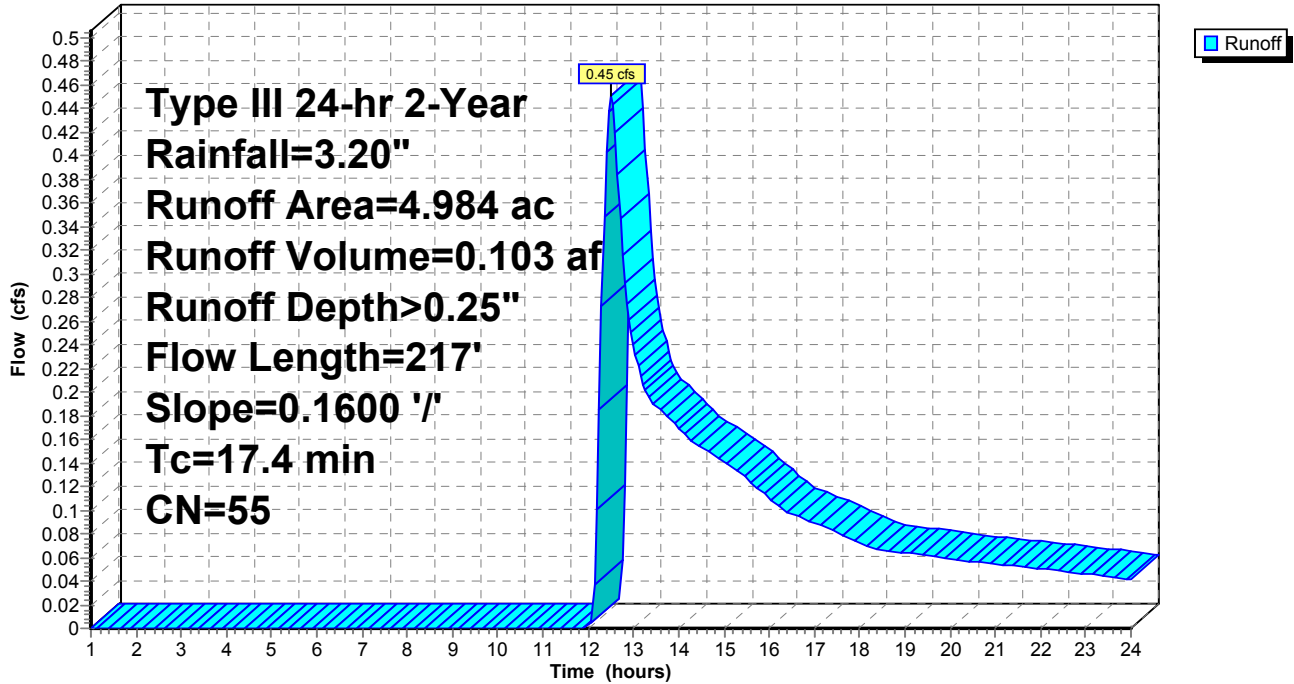
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	217	0.1600	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
4.984	Rural open/forest	14.34	0.03	0.50
0.000	Water/wetland	0.00	0.00	0.00
4.984	Total	14.34	0.03	0.50

Subcatchment 30S: Basin 2A - Post

Hydrograph



Summary for Subcatchment 31S: Basin 2B - Post

Runoff = 0.28 cfs @ 12.65 hrs, Volume= 0.075 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
3.619	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.619	55	Weighted Average	
3.619		100.00% Pervious Area	

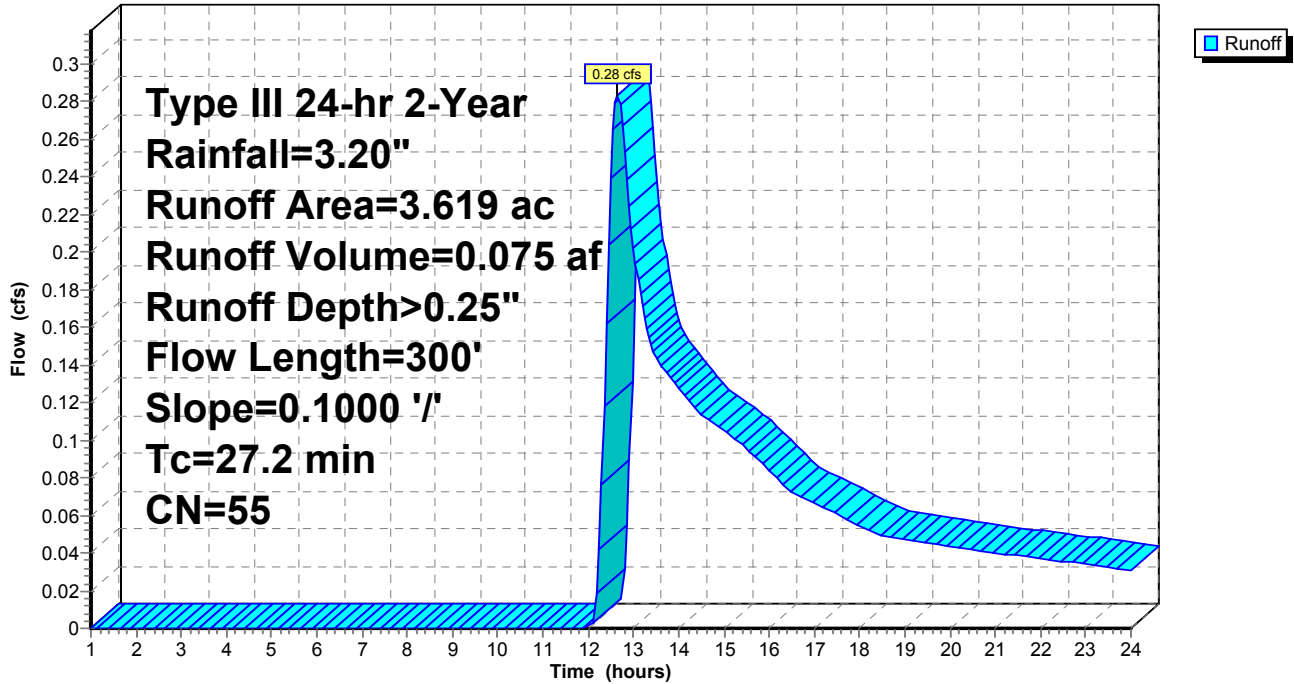
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	300	0.1000	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 0.25" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
3.619	Rural open/forest	10.36	0.02	0.36
0.000	Water/wetland	0.00	0.00	0.00
3.619	Total	10.36	0.02	0.36

Subcatchment 31S: Basin 2B - Post

Hydrograph



Summary for Pond 38P: Forebay 2

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 0.73" for 2-Year event
 Inflow = 1.22 cfs @ 12.11 hrs, Volume= 0.102 af
 Outflow = 1.11 cfs @ 12.15 hrs, Volume= 0.100 af, Atten= 9%, Lag= 2.8 min
 Primary = 1.11 cfs @ 12.15 hrs, Volume= 0.100 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,301.39' @ 12.15 hrs Surf.Area= 321 sf Storage= 312 cf

Plug-Flow detention time= 19.7 min calculated for 0.099 af (97% of inflow)
 Center-of-Mass det. time= 7.3 min (889.6 - 882.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	539 cf	7.00'W x 20.00'L x 2.00'H Prismatic Z=2.0

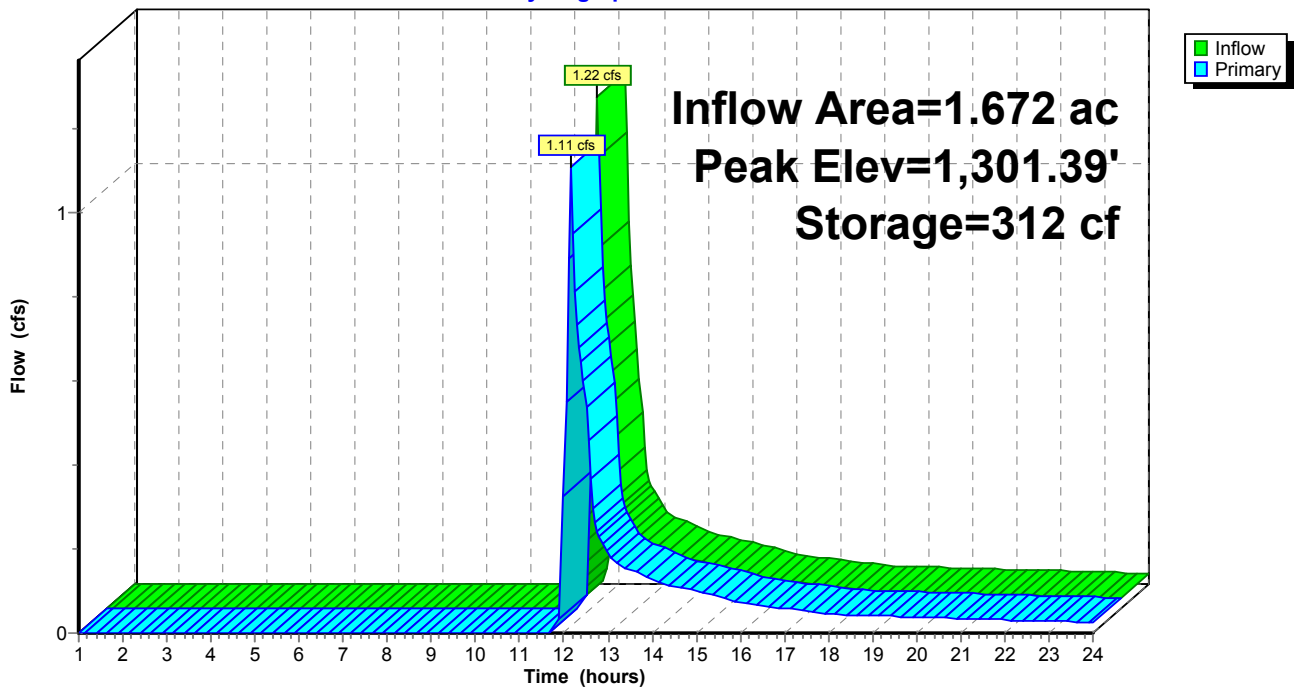
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,301.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.50

Primary OutFlow Max=1.09 cfs @ 12.15 hrs HW=1,301.38' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.75 cfs @ 3.83 fps)
- 2=Custom Weir/Orifice (Weir Controls 0.34 cfs @ 1.18 fps)

Pond 38P: Forebay 2

Hydrograph



Summary for Pond 39P: Bioretention Pond 2

[81] Warning: Exceeded Pond 38P by 1.73' @ 13.15 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 0.71" for 2-Year event
 Inflow = 1.11 cfs @ 12.15 hrs, Volume= 0.100 af
 Outflow = 0.18 cfs @ 13.04 hrs, Volume= 0.099 af, Atten= 83%, Lag= 52.9 min
 Primary = 0.18 cfs @ 13.04 hrs, Volume= 0.099 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,302.48' @ 13.04 hrs Surf.Area= 796 sf Storage= 1,321 cf

Plug-Flow detention time= 77.6 min calculated for 0.099 af (100% of inflow)
 Center-of-Mass det. time= 76.8 min (966.4 - 889.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	4,167 cf	10.00'W x 30.00'L x 5.00'H Prismaoid Z=2.0

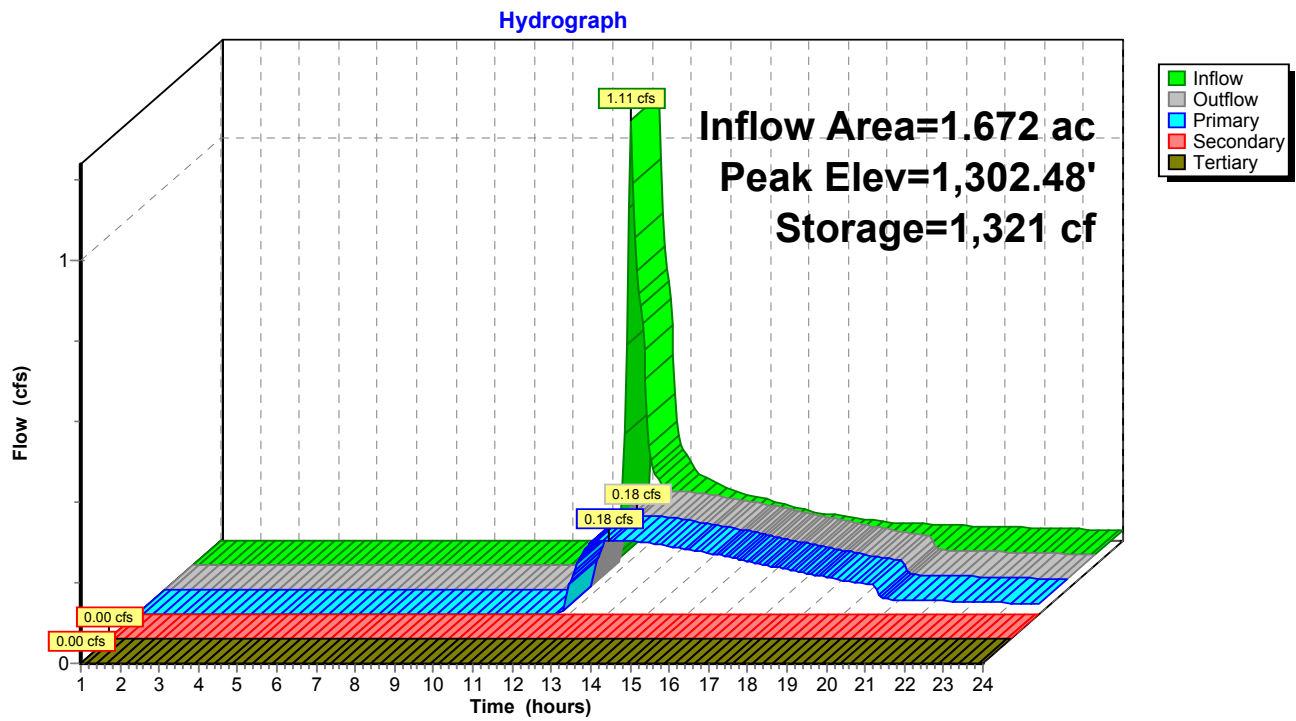
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Tertiary	1,304.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.50 Width (feet) 5.00 5.00

Primary OutFlow Max=0.18 cfs @ 13.04 hrs HW=1,302.48' (Free Discharge)
 ↑1=Exfiltration (Controls 0.18 cfs)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 39P: Bioretention Pond 2



Summary for Pond 40P: Attenuation Pond 2

[78] Warning: Submerged Pond 39P Primary device # 1 by 3.19'

[81] Warning: Exceeded Pond 39P by 3.13' @ 19.95 hrs

[81] Warning: Exceeded Pond 39P by 3.13' @ 19.95 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 0.71" for 2-Year event
 Inflow = 0.18 cfs @ 13.04 hrs, Volume= 0.099 af
 Outflow = 0.10 cfs @ 18.14 hrs, Volume= 0.034 af, Atten= 46%, Lag= 306.5 min
 Primary = 0.10 cfs @ 18.14 hrs, Volume= 0.034 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,303.19' @ 18.14 hrs Surf.Area= 1,428 sf Storage= 2,986 cf

Plug-Flow detention time= 387.2 min calculated for 0.034 af (34% of inflow)
 Center-of-Mass det. time= 215.8 min (1,182.2 - 966.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	6,167 cf	10.00'W x 50.00'L x 5.00'H Prismatic Z=2.0

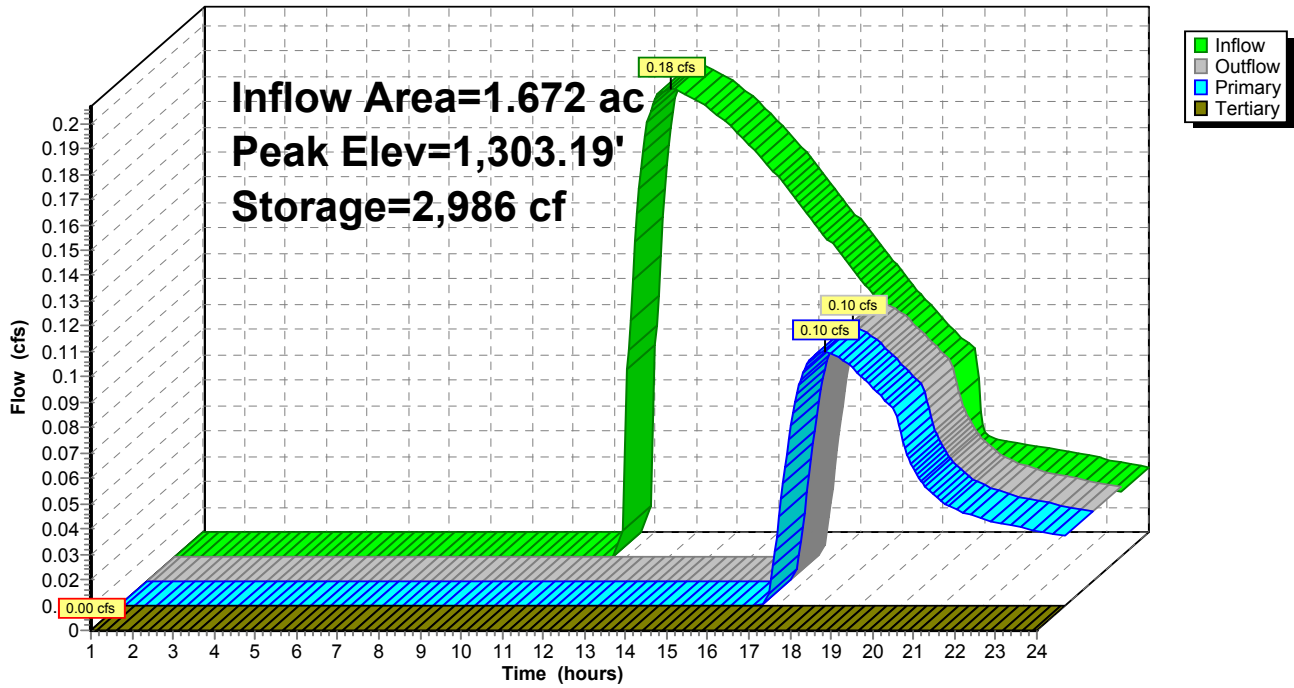
Device	Routing	Invert	Outlet Devices
#1	Primary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,304.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 0.67 0.67
#3	Tertiary	1,304.82'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.25 Width (feet) 10.00 10.00

Primary OutFlow Max=0.10 cfs @ 18.14 hrs HW=1,303.19' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.10 cfs @ 1.48 fps)
 ↓2=Custom Weir/Orifice (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Attenuation Pond 2

Hydrograph



Summary for Pond 41P: Bioretention Pond 2C

[81] Warning: Exceeded Pond 42P by 0.55' @ 12.60 hrs

[81] Warning: Exceeded Pond 42P by 0.55' @ 12.60 hrs

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 0.47" for 2-Year event
 Inflow = 1.25 cfs @ 12.13 hrs, Volume= 0.138 af
 Outflow = 0.46 cfs @ 12.57 hrs, Volume= 0.138 af, Atten= 63%, Lag= 26.2 min
 Primary = 0.46 cfs @ 12.57 hrs, Volume= 0.138 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,434.02' @ 12.57 hrs Surf.Area= 870 sf Storage= 1,261 cf

Plug-Flow detention time= 57.8 min calculated for 0.137 af (100% of inflow)
 Center-of-Mass det. time= 56.6 min (968.0 - 911.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.44'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 1.00 1.08

Primary OutFlow Max=0.46 cfs @ 12.57 hrs HW=1,434.02' (Free Discharge)

↑1=Exfiltration (Controls 0.20 cfs)

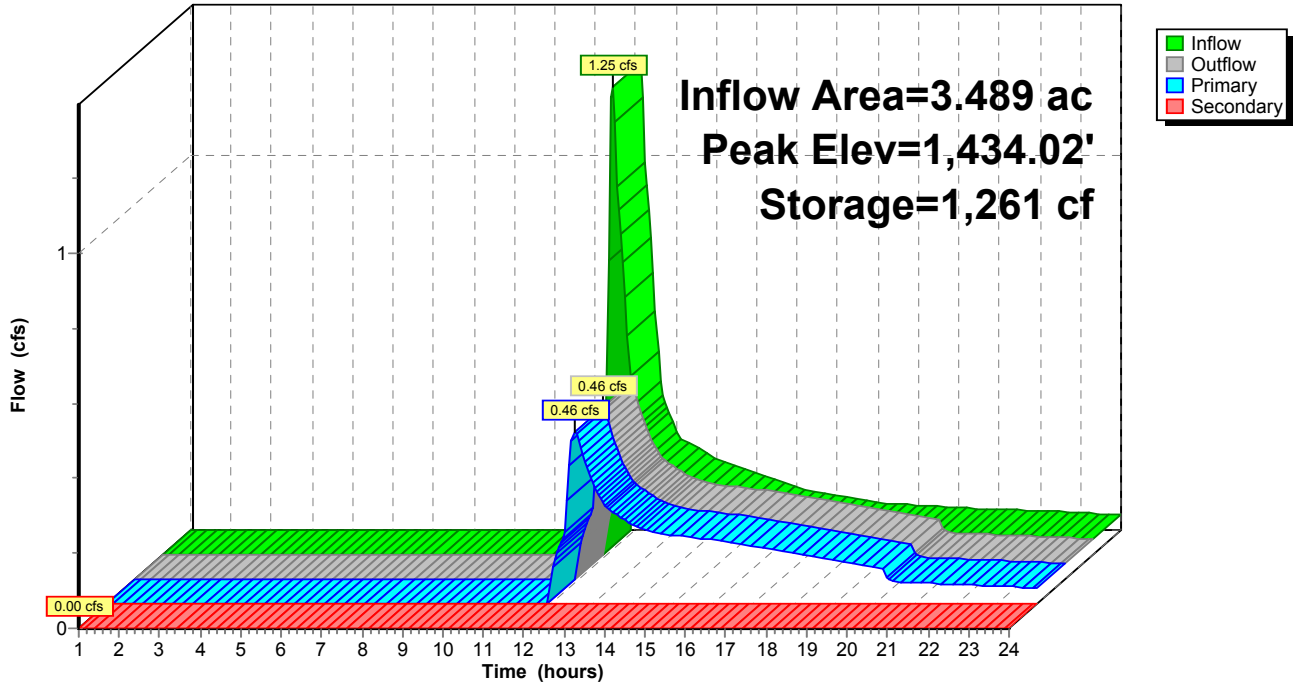
↑2=Orifice/Grate (Orifice Controls 0.25 cfs @ 1.92 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)

↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 41P: Bioretention Pond 2C

Hydrograph



Summary for Pond 42P: Forebay 2C

For pretreatment and storage of at least 25% of the WQV.

Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area =	3.489 ac,	0.00% Impervious,	Inflow Depth > 0.48"	for 2-Year event
Inflow =	1.31 cfs @	12.12 hrs,	Volume=	0.140 af
Outflow =	1.25 cfs @	12.13 hrs,	Volume=	0.138 af, Atten= 5%, Lag= 0.4 min
Primary =	1.25 cfs @	12.13 hrs,	Volume=	0.138 af
Secondary =	0.00 cfs @	1.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.59' @ 12.13 hrs Surf.Area= 149 sf Storage= 134 cf

Plug-Flow detention time= 9.1 min calculated for 0.138 af (99% of inflow)
 Center-of-Mass det. time= 2.8 min (911.4 - 908.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=1.22 cfs @ 12.13 hrs HW=1,433.59' (Free Discharge)

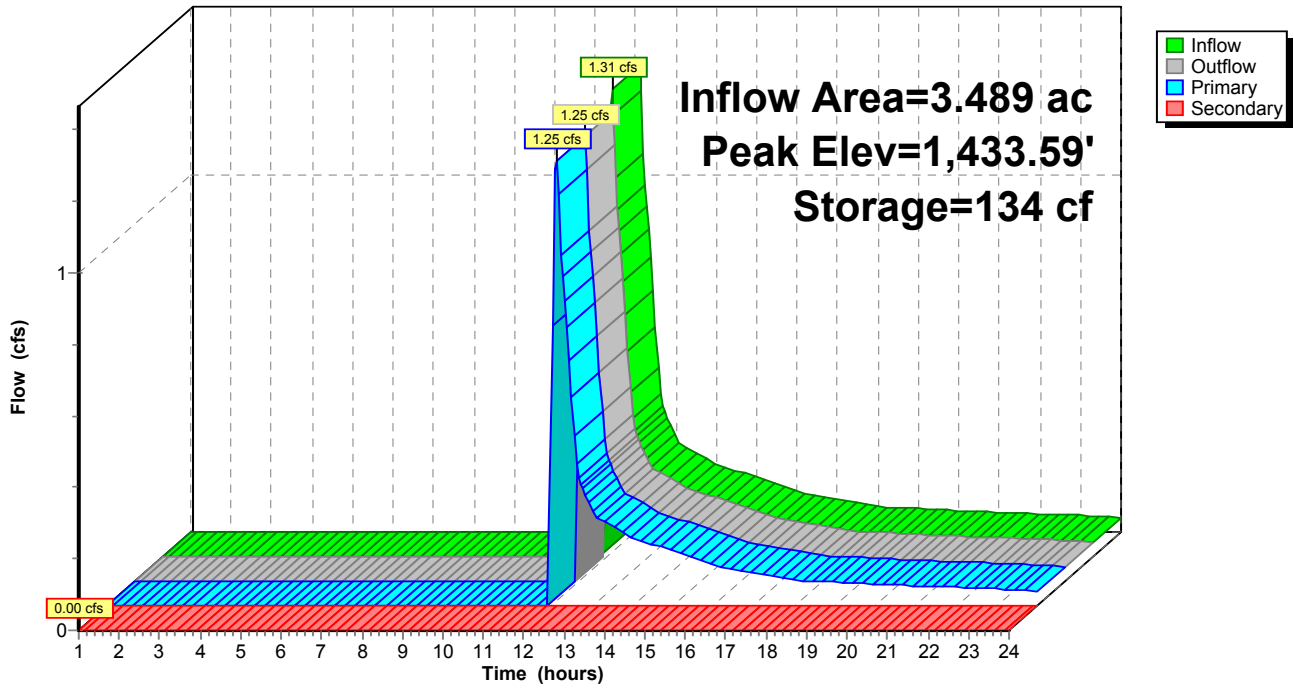
↑1=Custom Weir/Orifice (Weir Controls 1.22 cfs @ 1.59 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)

↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 42P: Forebay 2C

Hydrograph



Summary for Pond 43P: Attenuation Pond 2C

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 0.47" for 2-Year event
 Inflow = 0.46 cfs @ 12.57 hrs, Volume= 0.138 af
 Outflow = 0.39 cfs @ 12.76 hrs, Volume= 0.136 af, Atten= 14%, Lag= 11.6 min
 Primary = 0.39 cfs @ 12.76 hrs, Volume= 0.136 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,300.42' @ 12.76 hrs Surf.Area= 722 sf Storage= 280 cf

Plug-Flow detention time= 16.4 min calculated for 0.136 af (99% of inflow)
 Center-of-Mass det. time= 10.7 min (978.8 - 968.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	7,167 cf	10.00'W x 60.00'L x 5.00'H Prismatic Z=2.0

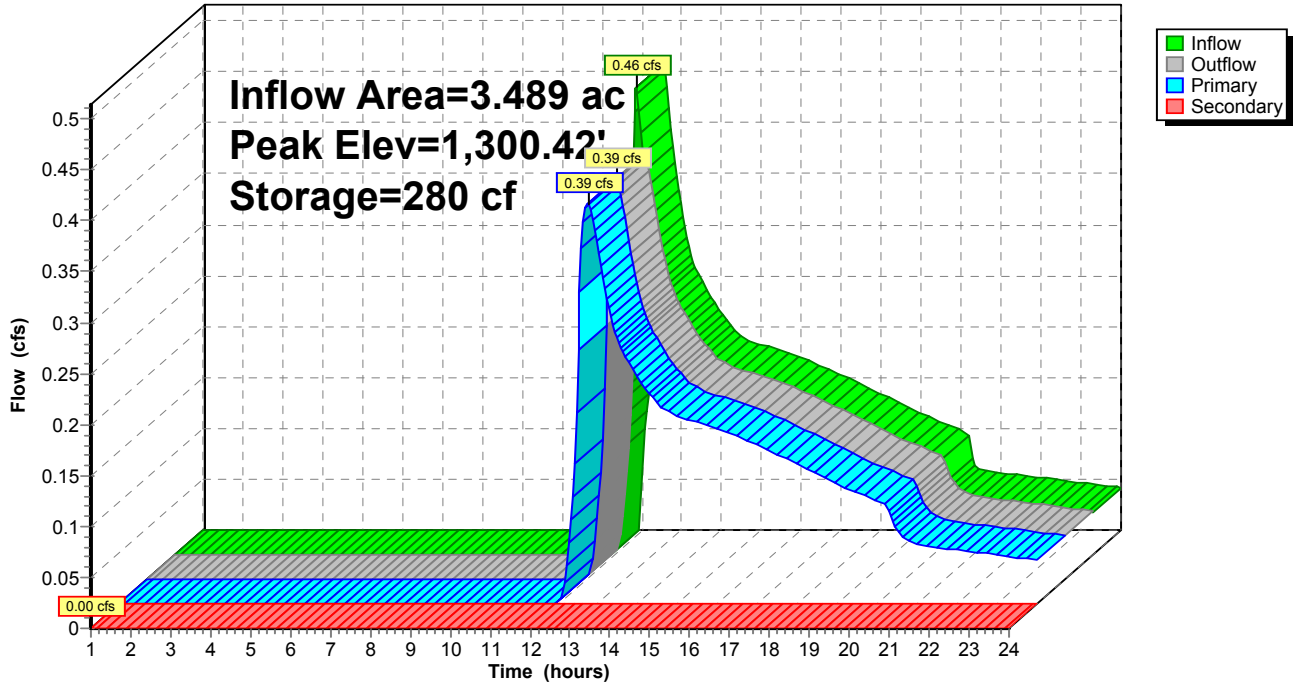
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,302.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 0.00 0.17

Primary OutFlow Max=0.39 cfs @ 12.76 hrs HW=1,300.42' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.39 cfs @ 2.22 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 43P: Attenuation Pond 2C

Hydrograph



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment17S: Basin B - Pre	Runoff Area=15.242 ac 0.00% Impervious Runoff Depth>0.83" Flow Length=667' Tc=28.7 min CN=55 Runoff=6.66 cfs 1.050 af
Subcatchment22S: Basin 2 - Post	Runoff Area=1.672 ac 2.75% Impervious Runoff Depth>1.67" Tc=6.0 min CN=68 Runoff=3.10 cfs 0.232 af
Subcatchment23S: Basin 2C - Post	Runoff Area=3.489 ac 0.00% Impervious Runoff Depth>1.26" Tc=6.0 min CN=62 Runoff=4.58 cfs 0.365 af
Subcatchment30S: Basin 2A - Post	Runoff Area=4.984 ac 0.00% Impervious Runoff Depth>0.83" Flow Length=217' Slope=0.1600 '/' Tc=17.4 min CN=55 Runoff=2.61 cfs 0.345 af
Subcatchment31S: Basin 2B - Post	Runoff Area=3.619 ac 0.00% Impervious Runoff Depth>0.83" Flow Length=300' Slope=0.1000 '/' Tc=27.2 min CN=55 Runoff=1.61 cfs 0.249 af
Pond 38P: Forebay 2	Peak Elev=1,301.67' Storage=410 cf Inflow=3.10 cfs 0.232 af Outflow=3.01 cfs 0.230 af
Pond 39P: Bioretention Pond 2	Peak Elev=1,303.96' Storage=2,772 cf Inflow=3.01 cfs 0.230 af Primary=0.27 cfs 0.168 af Secondary=0.80 cfs 0.061 af Tertiary=0.00 cfs 0.000 af Outflow=1.07 cfs 0.229 af
Pond 40P: Attenuation Pond 2	Peak Elev=1,303.41' Storage=3,305 cf Inflow=1.07 cfs 0.229 af Primary=0.37 cfs 0.161 af Tertiary=0.00 cfs 0.000 af Outflow=0.37 cfs 0.161 af
Pond 41P: Bioretention Pond 2C	Peak Elev=1,435.77' Storage=3,211 cf Inflow=4.51 cfs 0.362 af Primary=1.59 cfs 0.344 af Secondary=0.62 cfs 0.014 af Outflow=2.21 cfs 0.357 af
Pond 42P: Forebay 2C	Peak Elev=1,433.90' Storage=185 cf Inflow=4.58 cfs 0.365 af Primary=4.51 cfs 0.362 af Secondary=0.00 cfs 0.000 af Outflow=4.51 cfs 0.362 af
Pond 43P: Attenuation Pond 2C	Peak Elev=1,302.11' Storage=1,943 cf Inflow=2.21 cfs 0.357 af Primary=1.29 cfs 0.354 af Secondary=0.00 cfs 0.000 af Outflow=1.29 cfs 0.354 af

Total Runoff Area = 29.006 ac Runoff Volume = 2.241 af Average Runoff Depth = 0.93"
99.84% Pervious = 28.960 ac 0.16% Impervious = 0.046 ac

Summary for Subcatchment 17S: Basin B - Pre

Runoff = 6.66 cfs @ 12.50 hrs, Volume= 1.050 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description	Land Use
15.242	55	Woods, Good, HSG B	Rural open/forest
15.242		100.00% Pervious Area	

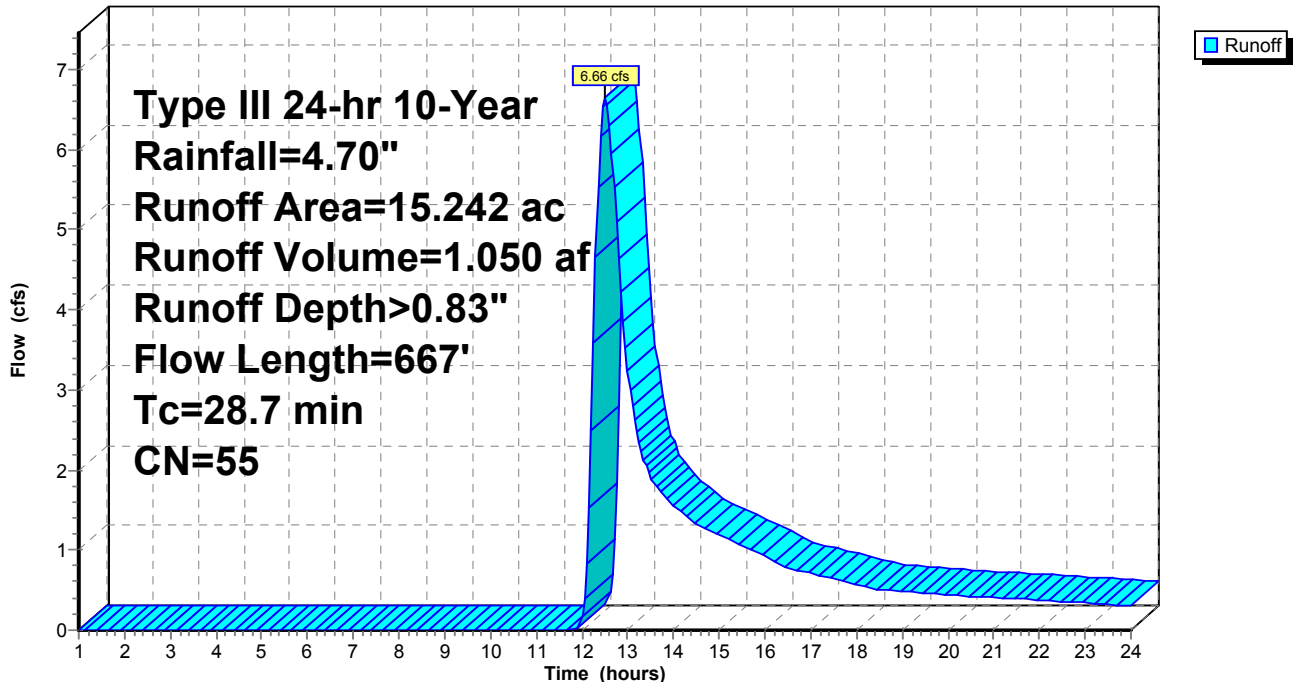
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.4	367	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.7	667	Total			

Pollutant Loading for 0.83" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.242	Rural open/forest	145.59	0.31	5.08
15.242	Total	145.59	0.31	5.08

Subcatchment 17S: Basin B - Pre

Hydrograph



Summary for Subcatchment 22S: Basin 2 - Post

Runoff = 3.10 cfs @ 12.10 hrs, Volume= 0.232 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

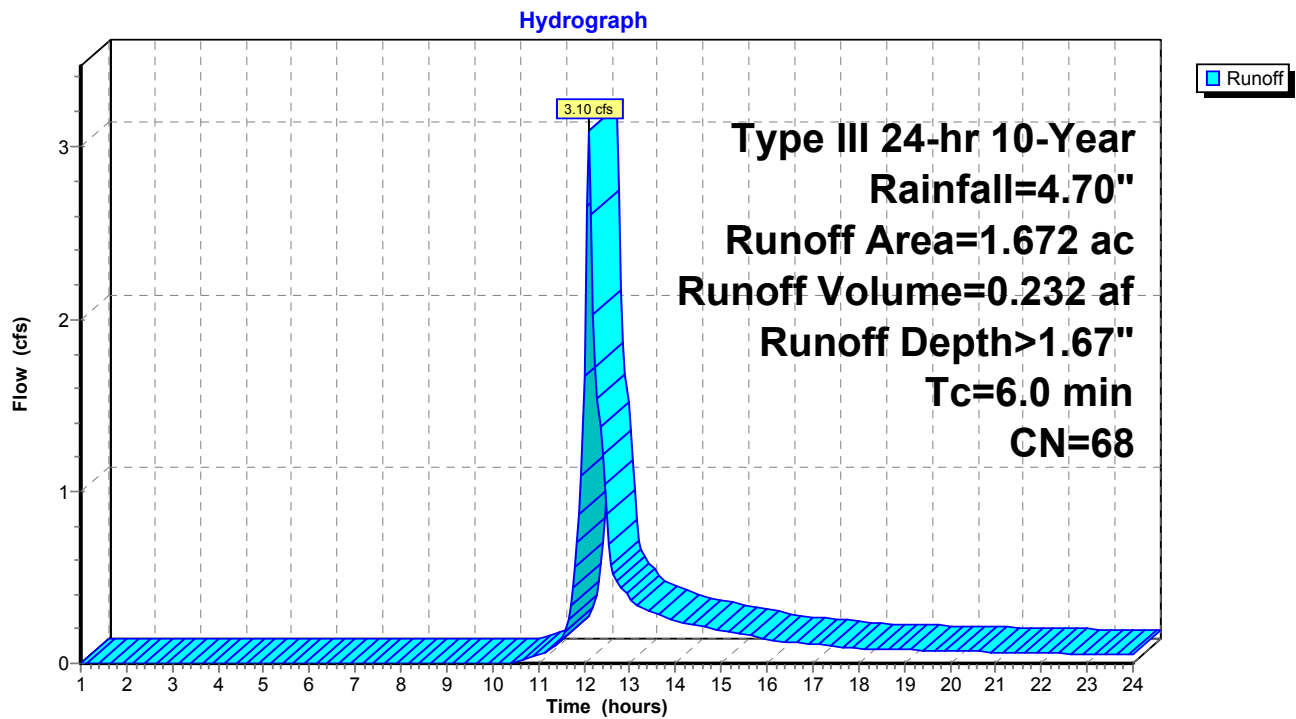
Area (ac)	CN	Description	Land Use
0.562	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
0.936	58	Meadow, non-grazed, HSG B	Rural open/forest
0.128	58	Meadow, non-grazed, HSG B	Water/wetland
0.046	98	Unconnected roofs, HSG B	Commercial Roof
1.672	68	Weighted Average	
1.626		97.25% Pervious Area	
0.046		2.75% Impervious Area	
0.046		100.00% Unconnected	

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

Pollutant Loading for 1.67" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.046	Commercial Roof	0.16	0.00	0.04
0.562	Driveway	36.73	0.12	0.45
0.936	Rural open/forest	18.04	0.04	0.63
0.128	Water/wetland	0.29	0.00	0.07
1.672	Total	55.22	0.16	1.18

Subcatchment 22S: Basin 2 - Post



Summary for Subcatchment 23S: Basin 2C - Post

Runoff = 4.58 cfs @ 12.10 hrs, Volume= 0.365 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

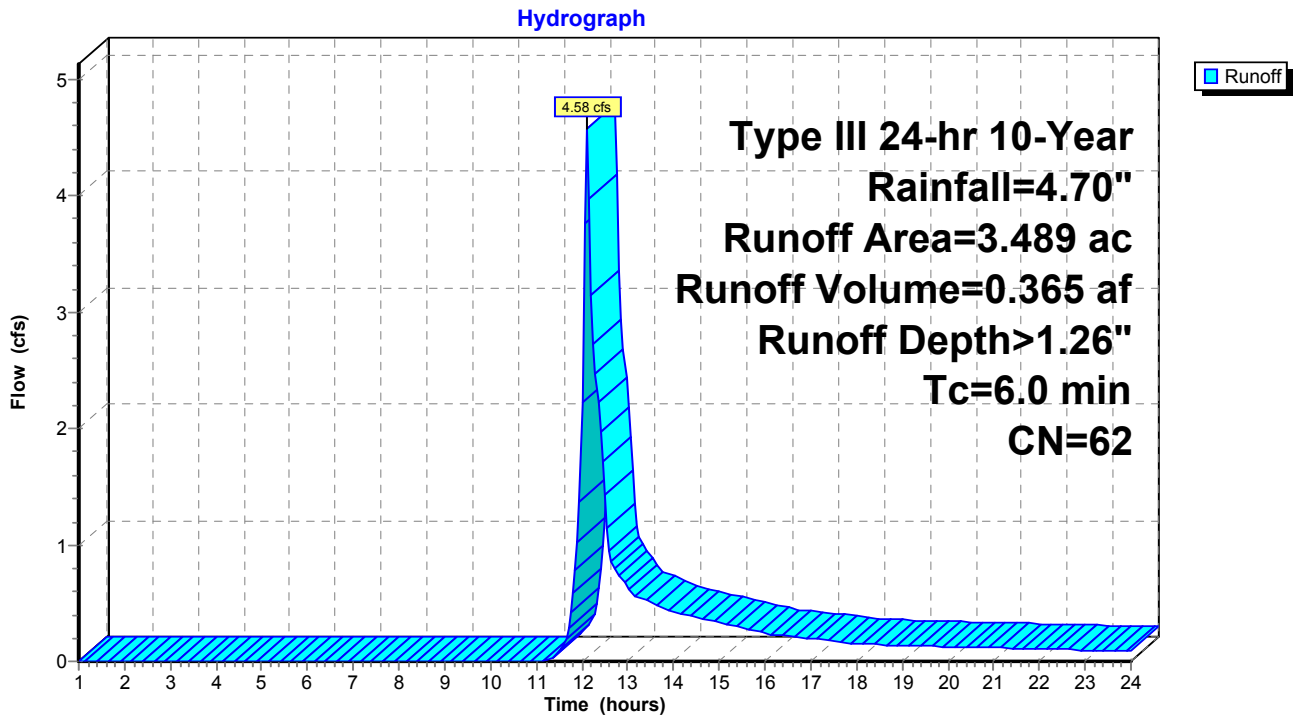
Area (ac)	CN	Description	Land Use
0.602	85	Gravel roads, HSG B	Driveway
1.025	55	Woods, Good, HSG B	Rural open/forest
1.812	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.489	62	Weighted Average	
3.489		100.00% Pervious Area	

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

Pollutant Loading for 1.26" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.602	Driveway	29.63	0.10	0.36
2.837	Rural open/forest	41.16	0.09	1.44
0.050	Water/wetland	0.09	0.00	0.02
3.489	Total	70.87	0.19	1.82

Subcatchment 23S: Basin 2C - Post



Summary for Subcatchment 30S: Basin 2A - Post

Runoff = 2.61 cfs @ 12.31 hrs, Volume= 0.345 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
4.984	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
4.984	55	Weighted Average	
4.984		100.00% Pervious Area	

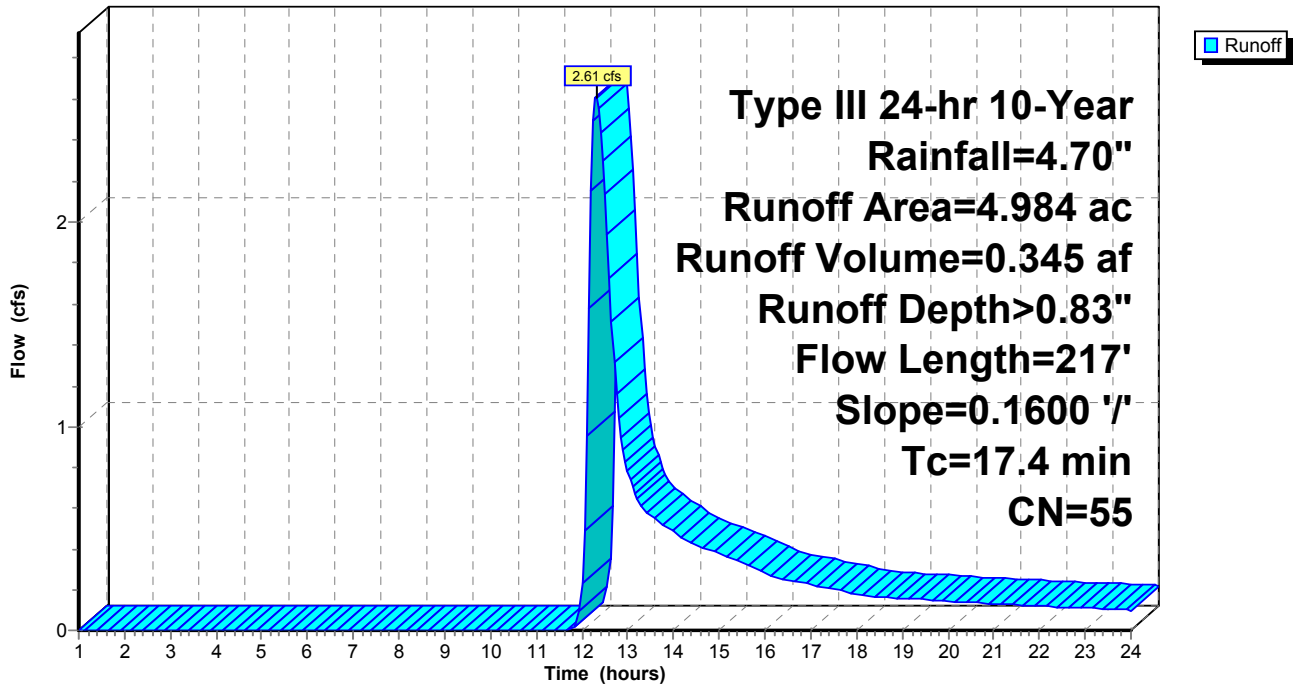
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	217	0.1600	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 0.83" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
4.984	Rural open/forest	47.81	0.10	1.67
0.000	Water/wetland	0.00	0.00	0.00
4.984	Total	47.81	0.10	1.67

Subcatchment 30S: Basin 2A - Post

Hydrograph



Summary for Subcatchment 31S: Basin 2B - Post

Runoff = 1.61 cfs @ 12.48 hrs, Volume= 0.249 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
3.619	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.619	55	Weighted Average	
3.619		100.00% Pervious Area	

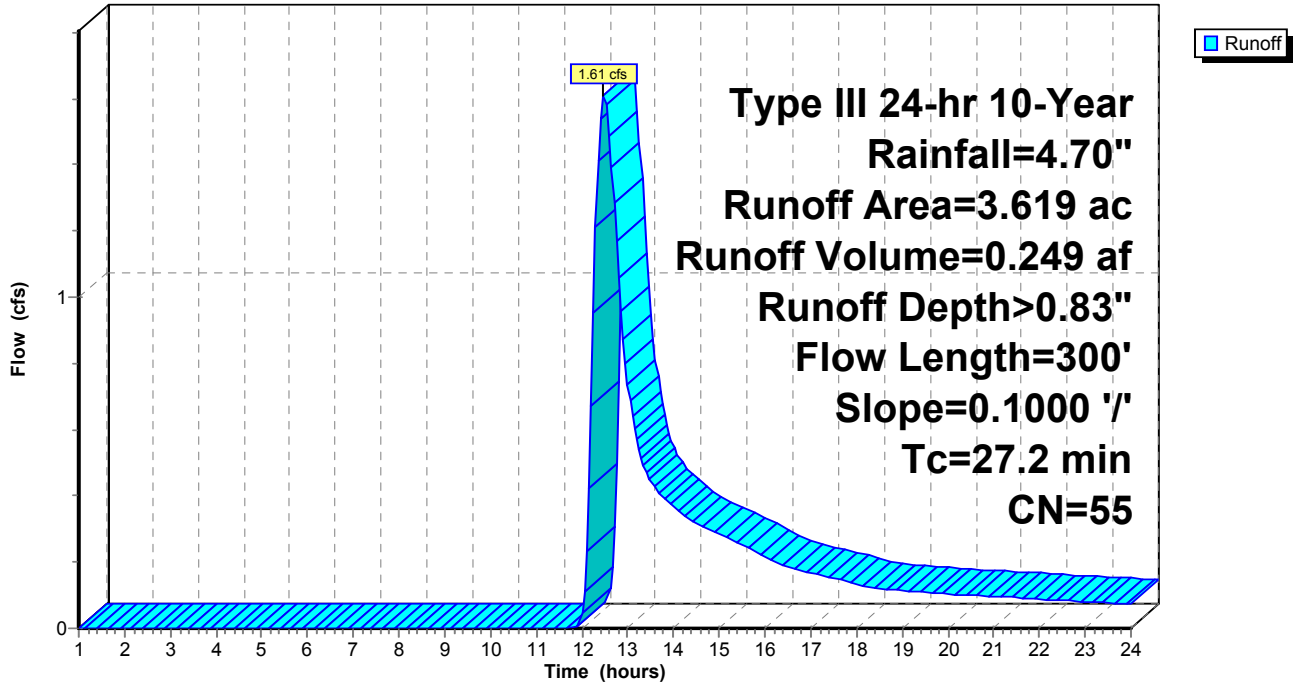
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	300	0.1000	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 0.83" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
3.619	Rural open/forest	34.59	0.07	1.21
0.000	Water/wetland	0.00	0.00	0.00
3.619	Total	34.59	0.07	1.21

Subcatchment 31S: Basin 2B - Post

Hydrograph



Summary for Pond 38P: Forebay 2

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 1.67" for 10-Year event
 Inflow = 3.10 cfs @ 12.10 hrs, Volume= 0.232 af
 Outflow = 3.01 cfs @ 12.11 hrs, Volume= 0.230 af, Atten= 3%, Lag= 0.7 min
 Primary = 3.01 cfs @ 12.11 hrs, Volume= 0.230 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,301.67' @ 12.11 hrs Surf.Area= 365 sf Storage= 410 cf

Plug-Flow detention time= 10.7 min calculated for 0.230 af (99% of inflow)
 Center-of-Mass det. time= 4.6 min (860.3 - 855.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	539 cf	7.00'W x 20.00'L x 2.00'H Prismatic Z=2.0

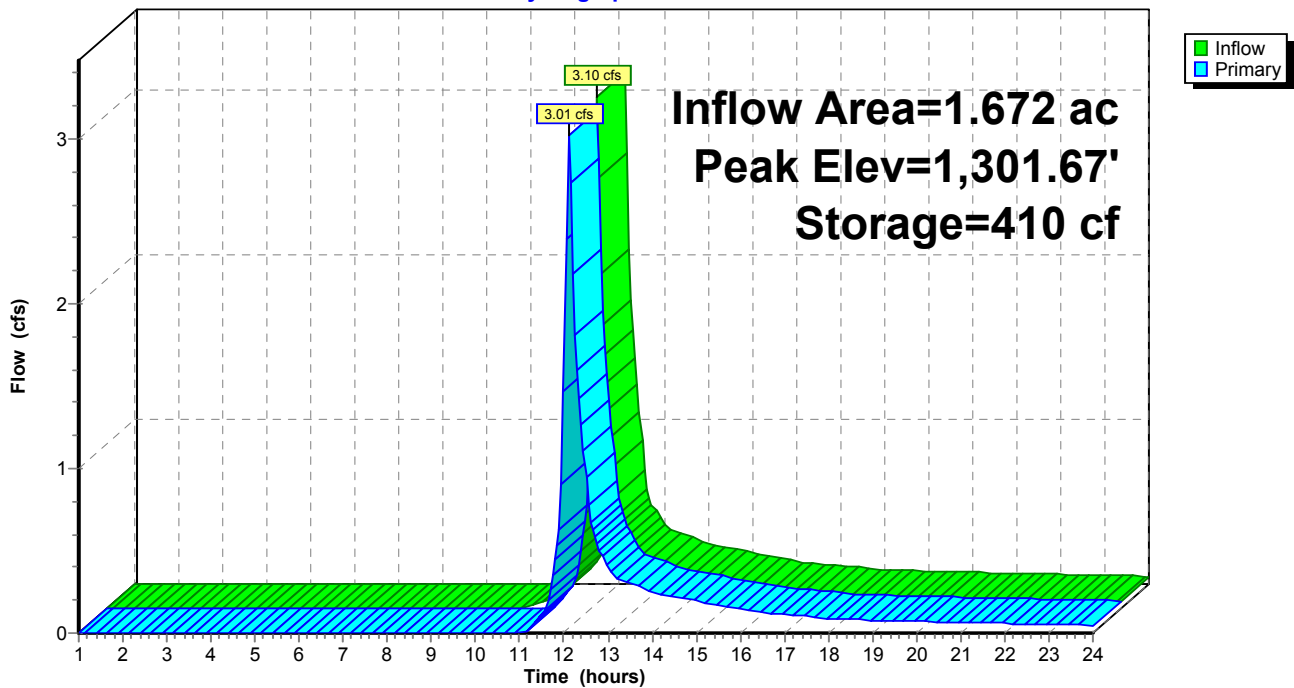
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,301.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.50

Primary OutFlow Max=2.94 cfs @ 12.11 hrs HW=1,301.66' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.90 cfs @ 4.60 fps)
- 2=Custom Weir/Orifice (Weir Controls 2.04 cfs @ 2.04 fps)

Pond 38P: Forebay 2

Hydrograph



Summary for Pond 39P: Bioretention Pond 2

[81] Warning: Exceeded Pond 38P by 2.64' @ 12.70 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 1.65" for 10-Year event
 Inflow = 3.01 cfs @ 12.11 hrs, Volume= 0.230 af
 Outflow = 1.07 cfs @ 12.46 hrs, Volume= 0.229 af, Atten= 64%, Lag= 21.1 min
 Primary = 0.27 cfs @ 12.46 hrs, Volume= 0.168 af
 Secondary = 0.80 cfs @ 12.46 hrs, Volume= 0.061 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,303.96' @ 12.46 hrs Surf.Area= 1,184 sf Storage= 2,772 cf

Plug-Flow detention time= 81.6 min calculated for 0.229 af (100% of inflow)
 Center-of-Mass det. time= 79.8 min (940.1 - 860.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	4,167 cf	10.00'W x 30.00'L x 5.00'H Prismaoid Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Tertiary	1,304.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.50 Width (feet) 5.00 5.00

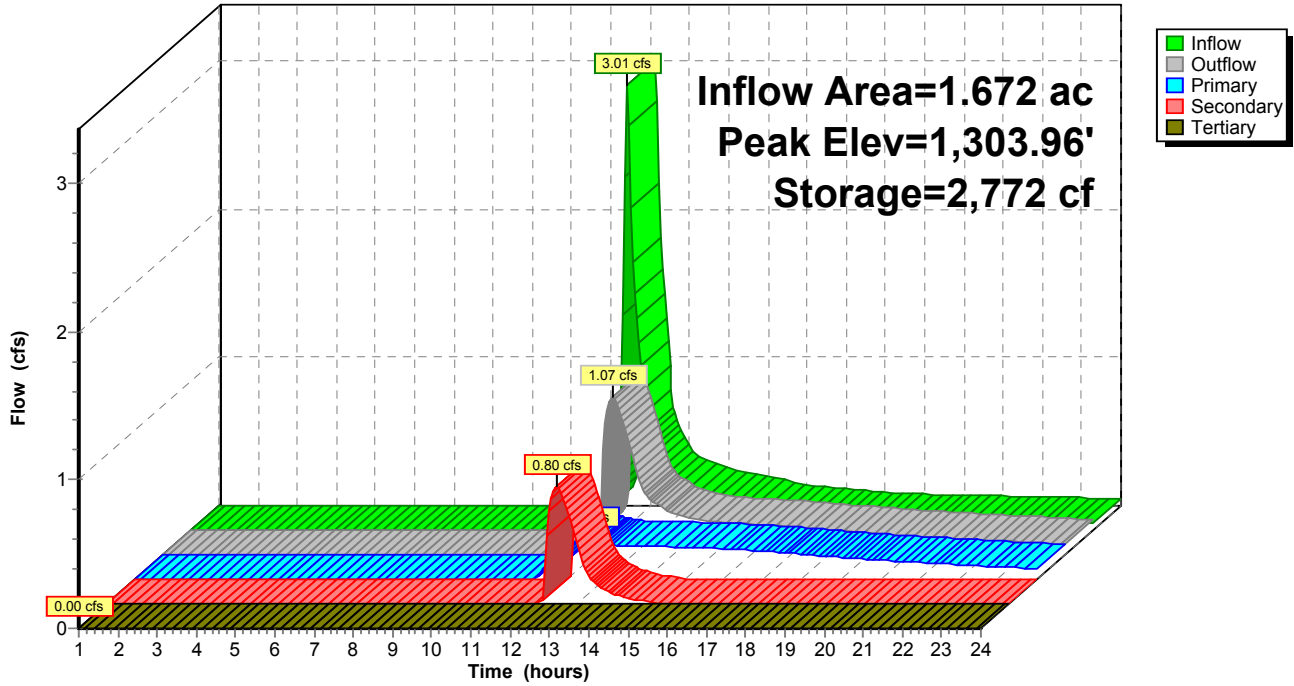
Primary OutFlow Max=0.27 cfs @ 12.46 hrs HW=1,303.96' (Free Discharge)
 ↑1=Exfiltration (Controls 0.27 cfs)

Secondary OutFlow Max=0.79 cfs @ 12.46 hrs HW=1,303.96' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.79 cfs @ 4.05 fps)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 39P: Bioretention Pond 2

Hydrograph



Summary for Pond 40P: Attenuation Pond 2

[78] Warning: Submerged Pond 39P Primary device # 1 by 3.41'

[81] Warning: Exceeded Pond 39P by 3.06' @ 23.95 hrs

[81] Warning: Exceeded Pond 39P by 3.06' @ 23.95 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 1.64" for 10-Year event
 Inflow = 1.07 cfs @ 12.46 hrs, Volume= 0.229 af
 Outflow = 0.37 cfs @ 13.45 hrs, Volume= 0.161 af, Atten= 66%, Lag= 59.2 min
 Primary = 0.37 cfs @ 13.45 hrs, Volume= 0.161 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,303.41' @ 13.45 hrs Surf.Area= 1,503 sf Storage= 3,305 cf

Plug-Flow detention time= 205.2 min calculated for 0.161 af (70% of inflow)
 Center-of-Mass det. time= 92.7 min (1,032.9 - 940.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	6,167 cf	10.00'W x 50.00'L x 5.00'H Prismatic Z=2.0

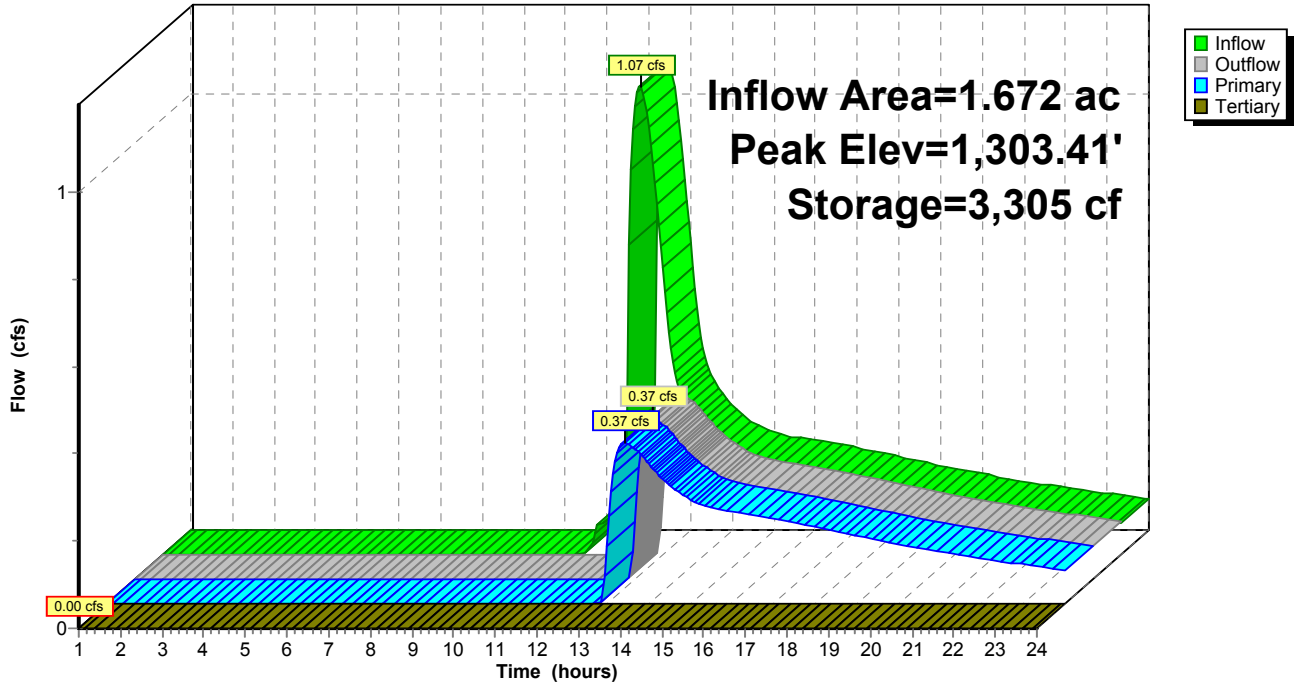
Device	Routing	Invert	Outlet Devices
#1	Primary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,304.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 0.67 0.67
#3	Tertiary	1,304.82'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.25 Width (feet) 10.00 10.00

Primary OutFlow Max=0.37 cfs @ 13.45 hrs HW=1,303.41' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.37 cfs @ 2.17 fps)
 ↓2=Custom Weir/Orifice (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Attenuation Pond 2

Hydrograph



Summary for Pond 41P: Bioretention Pond 2C

[81] Warning: Exceeded Pond 42P by 2.08' @ 12.40 hrs

[81] Warning: Exceeded Pond 42P by 2.08' @ 12.40 hrs

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 1.25" for 10-Year event
 Inflow = 4.51 cfs @ 12.11 hrs, Volume= 0.362 af
 Outflow = 2.21 cfs @ 12.36 hrs, Volume= 0.357 af, Atten= 51%, Lag= 15.2 min
 Primary = 1.59 cfs @ 12.36 hrs, Volume= 0.344 af
 Secondary = 0.62 cfs @ 12.36 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,435.77' @ 12.36 hrs Surf.Area= 1,381 sf Storage= 3,211 cf

Plug-Flow detention time= 47.2 min calculated for 0.357 af (98% of inflow)
 Center-of-Mass det. time= 39.3 min (913.9 - 874.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.44'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 1.00 1.08

Primary OutFlow Max=1.59 cfs @ 12.36 hrs HW=1,435.76' (Free Discharge)

↑1=Exfiltration (Controls 0.32 cfs)

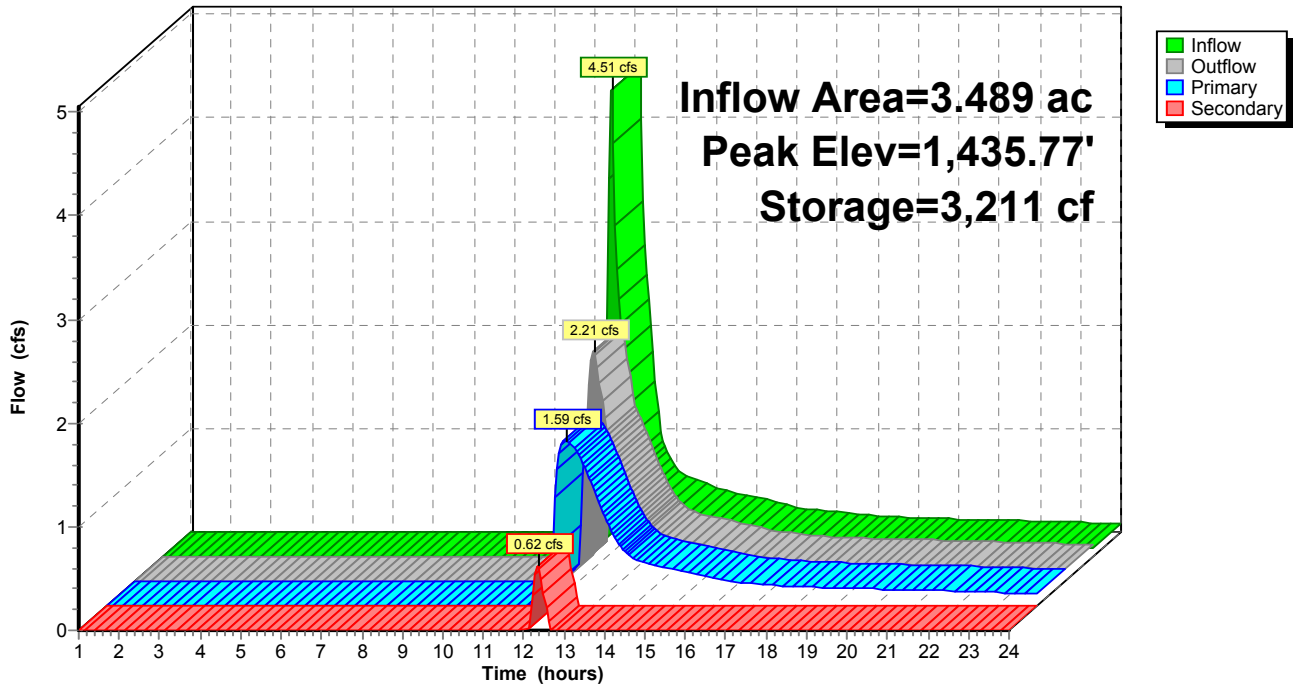
└2=Orifice/Grate (Orifice Controls 1.27 cfs @ 6.49 fps)

Secondary OutFlow Max=0.61 cfs @ 12.36 hrs HW=1,435.76' (Free Discharge)

↑3=Custom Weir/Orifice (Weir Controls 0.61 cfs @ 1.86 fps)

Pond 41P: Bioretention Pond 2C

Hydrograph



Summary for Pond 42P: Forebay 2C

For pretreatment and storage of at least 25% of the WQV.

Length-to-width ratio should be between 1.5:1 and 3:1.

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 1.26" for 10-Year event
 Inflow = 4.58 cfs @ 12.10 hrs, Volume= 0.365 af
 Outflow = 4.51 cfs @ 12.11 hrs, Volume= 0.362 af, Atten= 1%, Lag= 0.1 min
 Primary = 4.51 cfs @ 12.11 hrs, Volume= 0.362 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,433.90' @ 12.11 hrs Surf.Area= 181 sf Storage= 185 cf

Plug-Flow detention time= 5.5 min calculated for 0.362 af (99% of inflow)
 Center-of-Mass det. time= 1.6 min (874.6 - 873.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatoid Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=4.44 cfs @ 12.11 hrs HW=1,433.90' (Free Discharge)

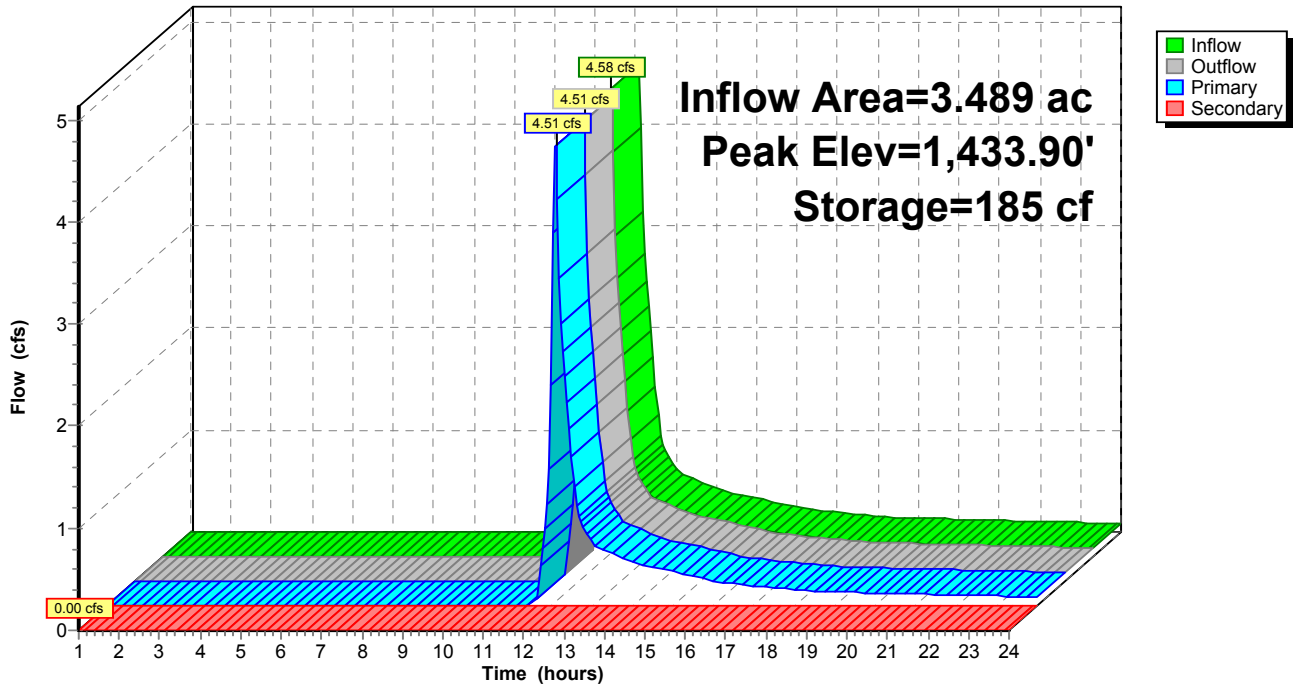
↑1=Custom Weir/Orifice (Weir Controls 4.44 cfs @ 2.37 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,432.00' (Free Discharge)

↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 42P: Forebay 2C

Hydrograph



Summary for Pond 43P: Attenuation Pond 2C

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 1.23" for 10-Year event
 Inflow = 2.21 cfs @ 12.36 hrs, Volume= 0.357 af
 Outflow = 1.29 cfs @ 12.84 hrs, Volume= 0.354 af, Atten= 42%, Lag= 29.1 min
 Primary = 1.29 cfs @ 12.84 hrs, Volume= 0.354 af
 Secondary = 0.00 cfs @ 12.84 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,302.11' @ 12.84 hrs Surf.Area= 1,263 sf Storage= 1,943 cf

Plug-Flow detention time= 17.8 min calculated for 0.354 af (99% of inflow)
 Center-of-Mass det. time= 13.4 min (927.3 - 913.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	7,167 cf	10.00'W x 60.00'L x 5.00'H Prismatic Z=2.0

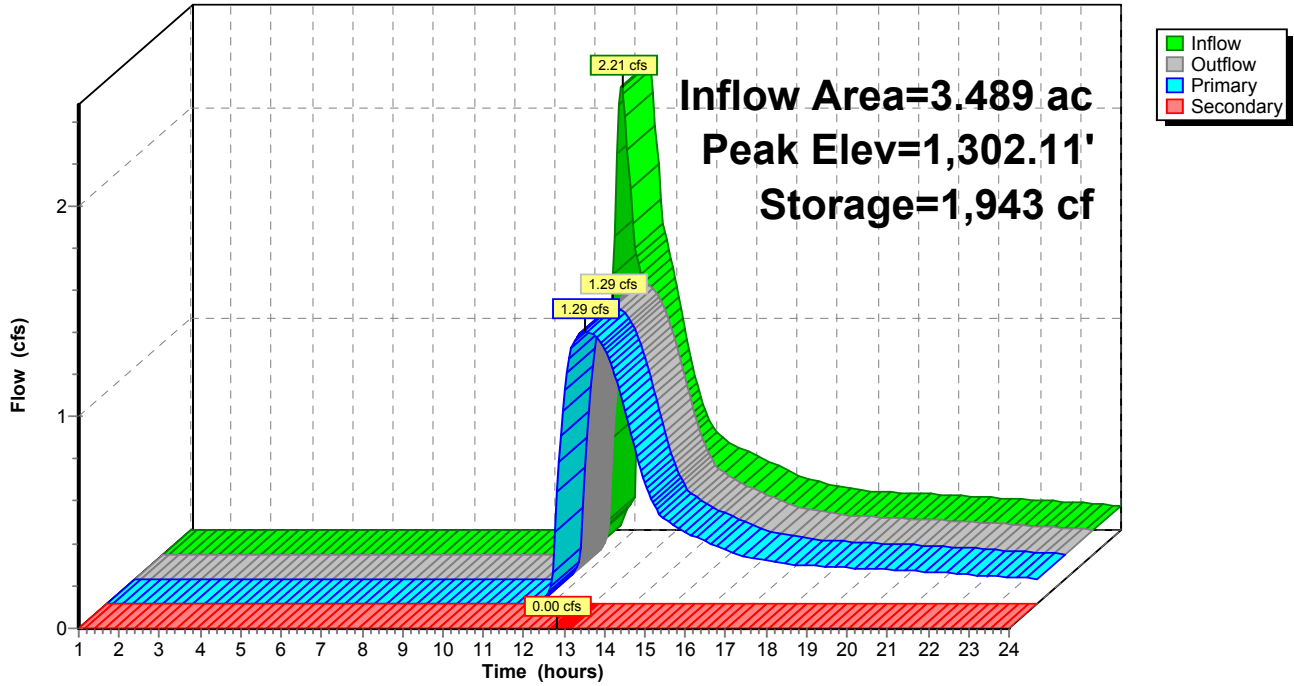
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,302.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 0.00 0.17

Primary OutFlow Max=1.29 cfs @ 12.84 hrs HW=1,302.11' (Free Discharge)
 ↳1=Orifice/Grate (Orifice Controls 1.29 cfs @ 6.57 fps)

Secondary OutFlow Max=0.00 cfs @ 12.84 hrs HW=1,302.11' (Free Discharge)
 ↳2=Custom Weir/Orifice (Weir Controls 0.00 cfs @ 0.88 fps)

Pond 43P: Attenuation Pond 2C

Hydrograph



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment17S: Basin B - Pre	Runoff Area=15.242 ac 0.00% Impervious Runoff Depth>1.23" Flow Length=667' Tc=28.7 min CN=55 Runoff=10.92 cfs 1.560 af
Subcatchment22S: Basin 2 - Post	Runoff Area=1.672 ac 2.75% Impervious Runoff Depth>2.24" Tc=6.0 min CN=68 Runoff=4.24 cfs 0.312 af
Subcatchment23S: Basin 2C - Post	Runoff Area=3.489 ac 0.00% Impervious Runoff Depth>1.75" Tc=6.0 min CN=62 Runoff=6.68 cfs 0.510 af
Subcatchment30S: Basin 2A - Post	Runoff Area=4.984 ac 0.00% Impervious Runoff Depth>1.23" Flow Length=217' Slope=0.1600 '/' Tc=17.4 min CN=55 Runoff=4.33 cfs 0.512 af
Subcatchment31S: Basin 2B - Post	Runoff Area=3.619 ac 0.00% Impervious Runoff Depth>1.23" Flow Length=300' Slope=0.1000 '/' Tc=27.2 min CN=55 Runoff=2.65 cfs 0.371 af
Pond 38P: Forebay 2	Peak Elev=1,301.79' Storage=455 cf Inflow=4.24 cfs 0.312 af Outflow=4.13 cfs 0.310 af
Pond 39P: Bioretention Pond 2	Peak Elev=1,304.59' Storage=3,583 cf Inflow=4.13 cfs 0.310 af Primary=0.32 cfs 0.190 af Secondary=1.10 cfs 0.108 af Tertiary=0.47 cfs 0.006 af Outflow=1.89 cfs 0.305 af
Pond 40P: Attenuation Pond 2	Peak Elev=1,303.89' Storage=4,080 cf Inflow=1.89 cfs 0.305 af Primary=0.76 cfs 0.237 af Tertiary=0.00 cfs 0.000 af Outflow=0.76 cfs 0.237 af
Pond 41P: Bioretention Pond 2C	Peak Elev=1,436.25' Storage=3,909 cf Inflow=6.64 cfs 0.508 af Primary=1.79 cfs 0.427 af Secondary=2.40 cfs 0.068 af Outflow=4.19 cfs 0.495 af
Pond 42P: Forebay 2C	Peak Elev=1,434.05' Storage=203 cf Inflow=6.68 cfs 0.510 af Primary=6.48 cfs 0.507 af Secondary=0.17 cfs 0.001 af Outflow=6.64 cfs 0.508 af
Pond 43P: Attenuation Pond 2C	Peak Elev=1,303.38' Storage=3,833 cf Inflow=4.19 cfs 0.495 af Primary=1.67 cfs 0.482 af Secondary=0.17 cfs 0.010 af Outflow=1.84 cfs 0.492 af

Total Runoff Area = 29.006 ac Runoff Volume = 3.265 af Average Runoff Depth = 1.35"
99.84% Pervious = 28.960 ac 0.16% Impervious = 0.046 ac

Summary for Subcatchment 17S: Basin B - Pre

Runoff = 10.92 cfs @ 12.47 hrs, Volume= 1.560 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
15.242	55	Woods, Good, HSG B	Rural open/forest
15.242		100.00% Pervious Area	

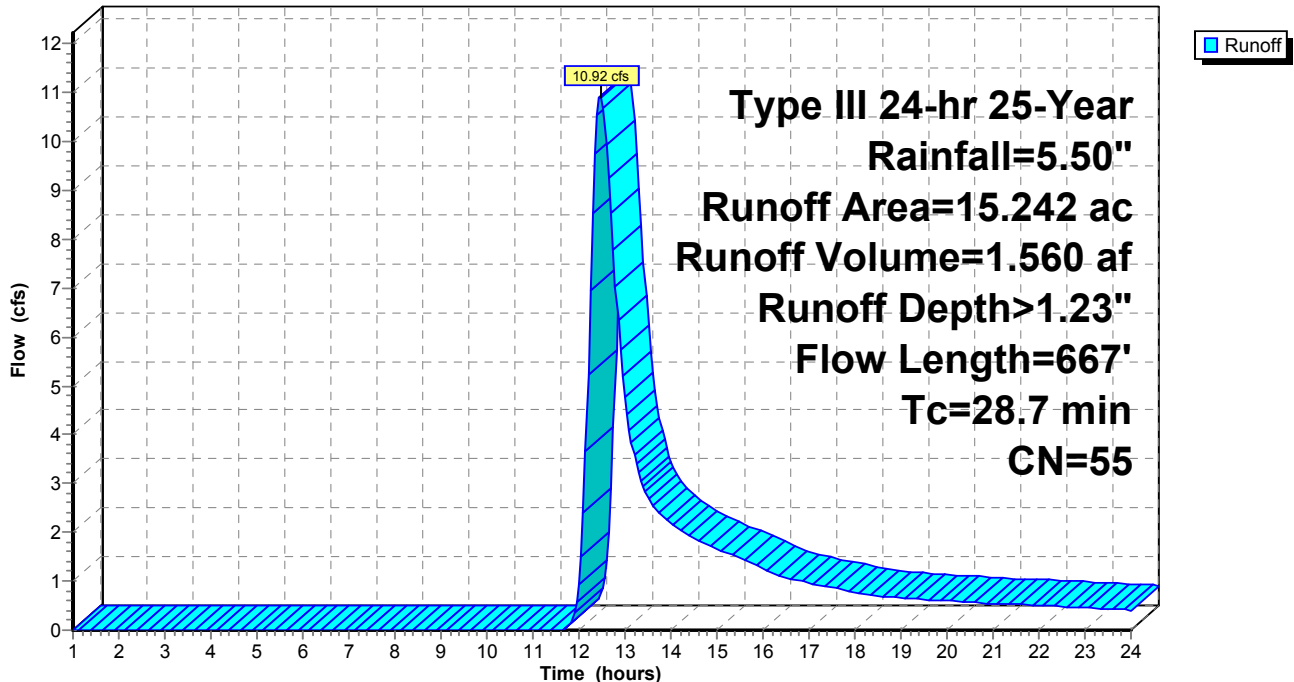
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.4	367	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.7	667	Total			

Pollutant Loading for 1.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.242	Rural open/forest	216.39	0.47	7.55
15.242	Total	216.39	0.47	7.55

Subcatchment 17S: Basin B - Pre

Hydrograph



Summary for Subcatchment 22S: Basin 2 - Post

Runoff = 4.24 cfs @ 12.10 hrs, Volume= 0.312 af, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
0.562	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
0.936	58	Meadow, non-grazed, HSG B	Rural open/forest
0.128	58	Meadow, non-grazed, HSG B	Water/wetland
0.046	98	Unconnected roofs, HSG B	Commercial Roof
1.672	68	Weighted Average	
1.626		97.25% Pervious Area	
0.046		2.75% Impervious Area	
0.046		100.00% Unconnected	

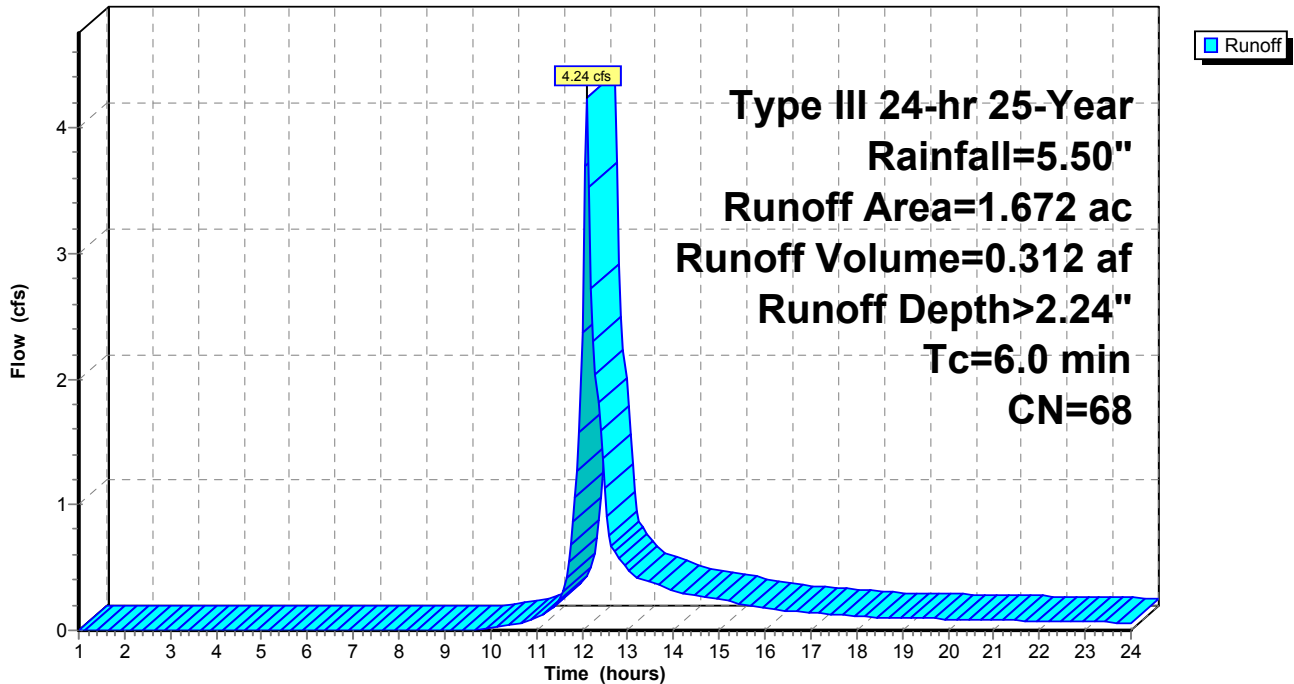
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 2.24" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.046	Commercial Roof	0.21	0.00	0.05
0.562	Driveway	49.37	0.16	0.60
0.936	Rural open/forest	24.24	0.05	0.85
0.128	Water/wetland	0.39	0.01	0.09
1.672	Total	74.21	0.22	1.58

Subcatchment 22S: Basin 2 - Post

Hydrograph



Summary for Subcatchment 23S: Basin 2C - Post

Runoff = 6.68 cfs @ 12.10 hrs, Volume= 0.510 af, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
0.602	85	Gravel roads, HSG B	Driveway
1.025	55	Woods, Good, HSG B	Rural open/forest
1.812	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.489	62	Weighted Average	
3.489		100.00% Pervious Area	

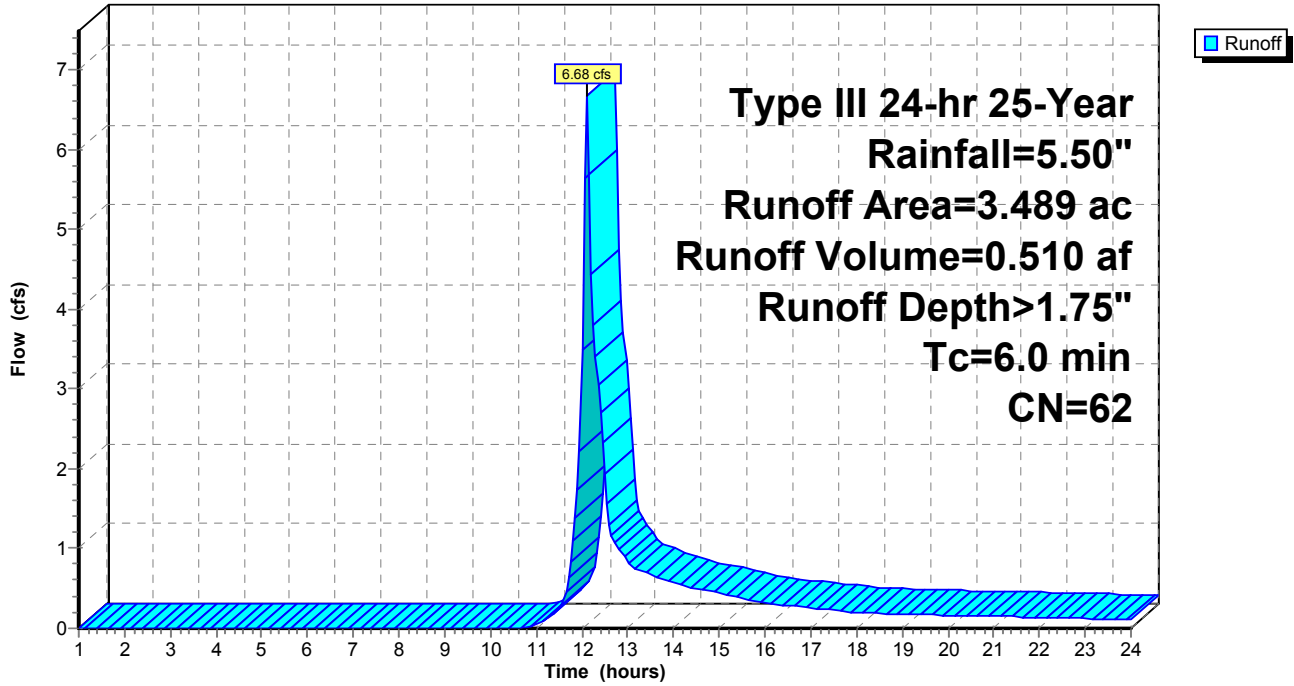
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 1.75" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.602	Driveway	41.40	0.13	0.50
2.837	Rural open/forest	57.51	0.12	2.01
0.050	Water/wetland	0.12	0.00	0.03
3.489	Total	99.02	0.26	2.54

Subcatchment 23S: Basin 2C - Post

Hydrograph



Summary for Subcatchment 30S: Basin 2A - Post

Runoff = 4.33 cfs @ 12.28 hrs, Volume= 0.512 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

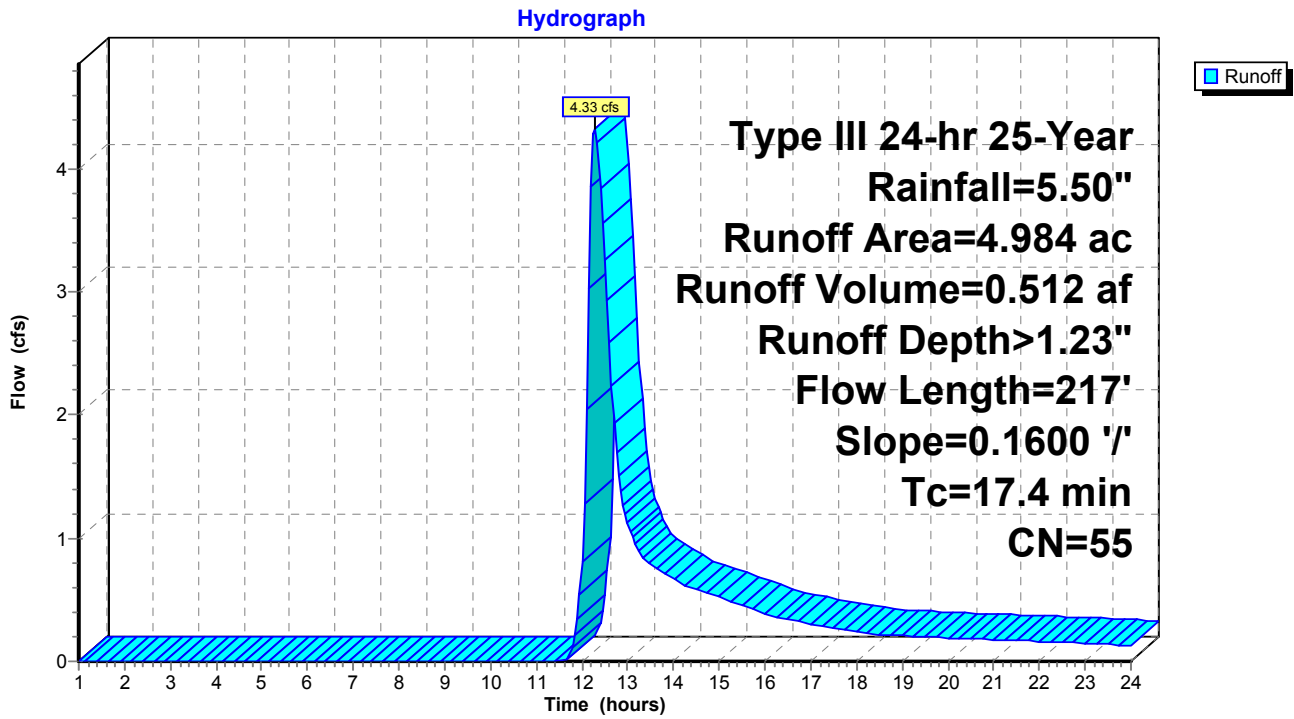
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
4.984	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
4.984	55	Weighted Average	
4.984		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	217	0.1600	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 1.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
4.984	Rural open/forest	71.02	0.15	2.48
0.000	Water/wetland	0.00	0.00	0.00
4.984	Total	71.02	0.15	2.48

Subcatchment 30S: Basin 2A - Post



Summary for Subcatchment 31S: Basin 2B - Post

Runoff = 2.65 cfs @ 12.45 hrs, Volume= 0.371 af, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
3.619	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.619	55	Weighted Average	
3.619		100.00% Pervious Area	

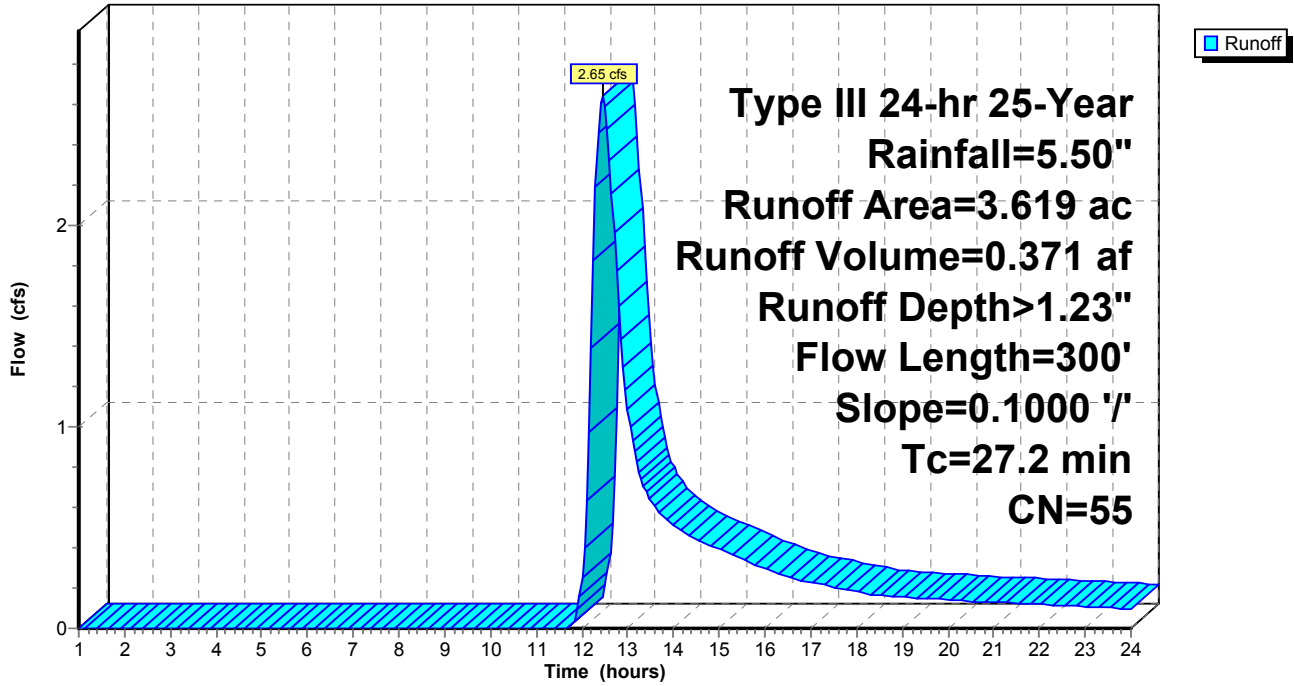
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	300	0.1000	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 1.23" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
3.619	Rural open/forest	51.40	0.11	1.79
0.000	Water/wetland	0.00	0.00	0.00
3.619	Total	51.40	0.11	1.79

Subcatchment 31S: Basin 2B - Post

Hydrograph



Summary for Pond 38P: Forebay 2

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 2.24" for 25-Year event
 Inflow = 4.24 cfs @ 12.10 hrs, Volume= 0.312 af
 Outflow = 4.13 cfs @ 12.11 hrs, Volume= 0.310 af, Atten= 3%, Lag= 0.6 min
 Primary = 4.13 cfs @ 12.11 hrs, Volume= 0.310 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,301.79' @ 12.11 hrs Surf.Area= 385 sf Storage= 455 cf

Plug-Flow detention time= 8.8 min calculated for 0.310 af (99% of inflow)
 Center-of-Mass det. time= 4.1 min (851.0 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	539 cf	7.00'W x 20.00'L x 2.00'H Prismatic Z=2.0

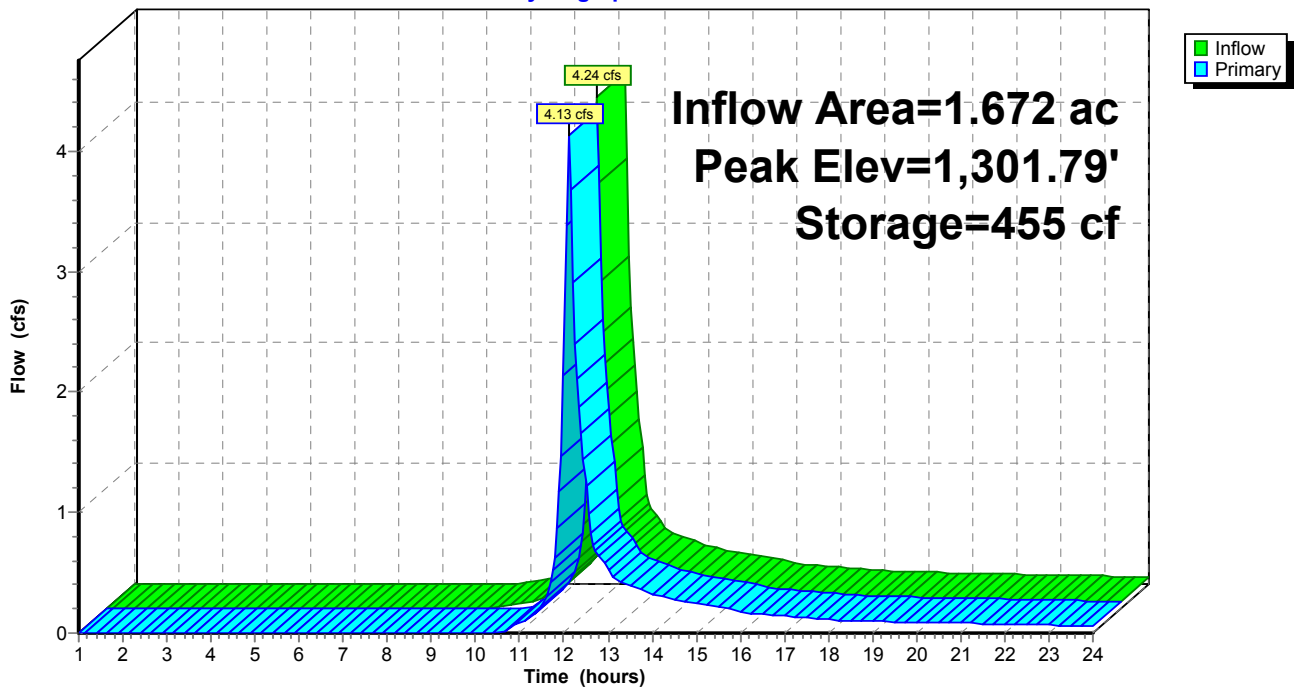
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,301.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.50

Primary OutFlow Max=4.07 cfs @ 12.11 hrs HW=1,301.78' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.96 cfs @ 4.90 fps)
- 2=Custom Weir/Orifice (Weir Controls 3.11 cfs @ 2.29 fps)

Pond 38P: Forebay 2

Hydrograph



Summary for Pond 39P: Bioretention Pond 2

[81] Warning: Exceeded Pond 38P by 3.13' @ 12.55 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 2.22" for 25-Year event
 Inflow = 4.13 cfs @ 12.11 hrs, Volume= 0.310 af
 Outflow = 1.89 cfs @ 12.36 hrs, Volume= 0.305 af, Atten= 54%, Lag= 15.1 min
 Primary = 0.32 cfs @ 12.36 hrs, Volume= 0.190 af
 Secondary = 1.10 cfs @ 12.36 hrs, Volume= 0.108 af
 Tertiary = 0.47 cfs @ 12.36 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,304.59' @ 12.36 hrs Surf.Area= 1,373 sf Storage= 3,583 cf

Plug-Flow detention time= 74.2 min calculated for 0.305 af (99% of inflow)
 Center-of-Mass det. time= 65.8 min (916.8 - 851.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	4,167 cf	10.00'W x 30.00'L x 5.00'H Prismatoid Z=2.0

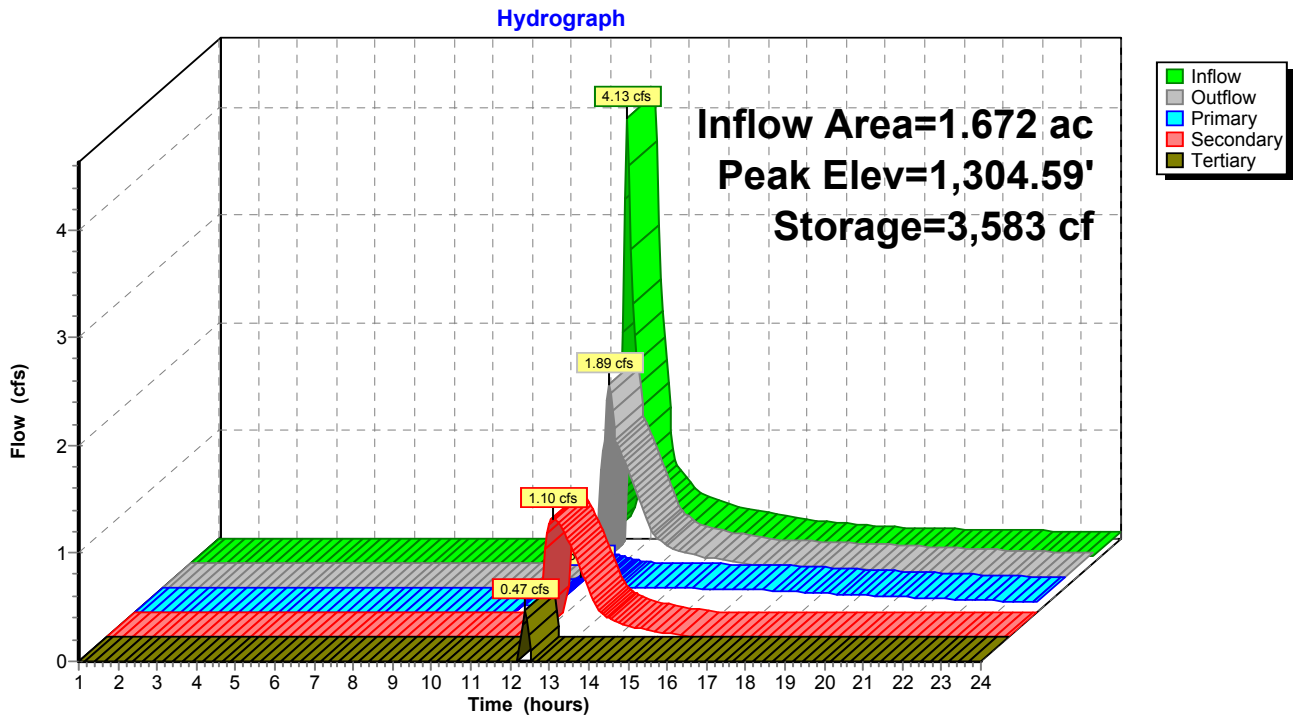
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Tertiary	1,304.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.50 Width (feet) 5.00 5.00

Primary OutFlow Max=0.32 cfs @ 12.36 hrs HW=1,304.59' (Free Discharge)
 ↑1=Exfiltration (Controls 0.32 cfs)

Secondary OutFlow Max=1.10 cfs @ 12.36 hrs HW=1,304.59' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 1.10 cfs @ 5.58 fps)

Tertiary OutFlow Max=0.45 cfs @ 12.36 hrs HW=1,304.59' (Free Discharge)
 ↑3=Custom Weir/Orifice (Weir Controls 0.45 cfs @ 0.99 fps)

Pond 39P: Bioretention Pond 2



Summary for Pond 40P: Attenuation Pond 2

[78] Warning: Submerged Pond 39P Primary device # 1 by 3.89'

[81] Warning: Exceeded Pond 39P by 2.58' @ 23.95 hrs

[81] Warning: Exceeded Pond 39P by 2.58' @ 23.95 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 2.19" for 25-Year event
 Inflow = 1.89 cfs @ 12.36 hrs, Volume= 0.305 af
 Outflow = 0.76 cfs @ 13.22 hrs, Volume= 0.237 af, Atten= 60%, Lag= 51.8 min
 Primary = 0.76 cfs @ 13.22 hrs, Volume= 0.237 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,303.89' @ 13.22 hrs Surf.Area= 1,677 sf Storage= 4,080 cf

Plug-Flow detention time= 159.4 min calculated for 0.236 af (77% of inflow)
 Center-of-Mass det. time= 67.1 min (983.9 - 916.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	6,167 cf	10.00'W x 50.00'L x 5.00'H Prismatic Z=2.0

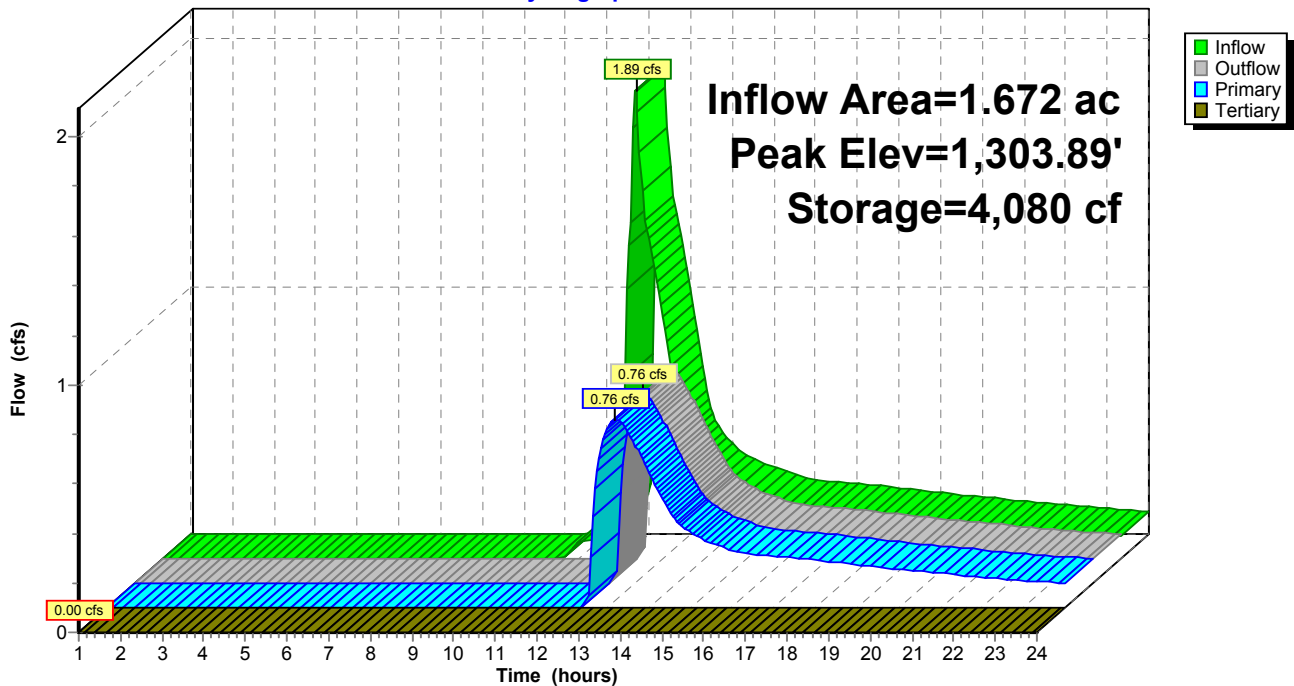
Device	Routing	Invert	Outlet Devices
#1	Primary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,304.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 0.67 0.67
#3	Tertiary	1,304.82'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.25 Width (feet) 10.00 10.00

Primary OutFlow Max=0.76 cfs @ 13.22 hrs HW=1,303.89' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.76 cfs @ 3.86 fps)
 ↓2=Custom Weir/Orifice (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Attenuation Pond 2

Hydrograph



Summary for Pond 41P: Bioretention Pond 2C

[81] Warning: Exceeded Pond 42P by 2.39' @ 12.25 hrs

[81] Warning: Exceeded Pond 42P by 2.39' @ 12.25 hrs

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 1.75" for 25-Year event
 Inflow = 6.64 cfs @ 12.10 hrs, Volume= 0.508 af
 Outflow = 4.19 cfs @ 12.23 hrs, Volume= 0.495 af, Atten= 37%, Lag= 7.4 min
 Primary = 1.79 cfs @ 12.23 hrs, Volume= 0.427 af
 Secondary = 2.40 cfs @ 12.23 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,436.25' @ 12.23 hrs Surf.Area= 1,538 sf Storage= 3,909 cf

Plug-Flow detention time= 41.3 min calculated for 0.495 af (98% of inflow)
 Center-of-Mass det. time= 27.7 min (891.3 - 863.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.44'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 1.00 1.08

Primary OutFlow Max=1.79 cfs @ 12.23 hrs HW=1,436.24' (Free Discharge)

↑1=Exfiltration (Controls 0.36 cfs)

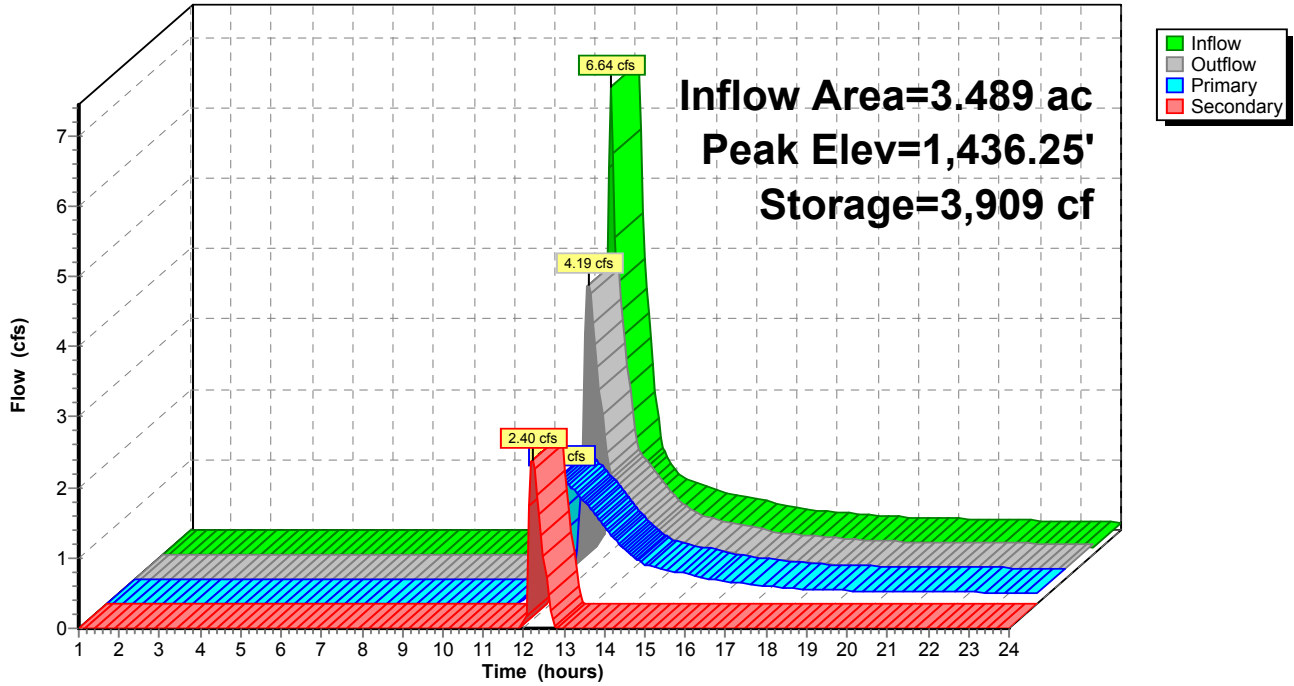
└2=Orifice/Grate (Orifice Controls 1.43 cfs @ 7.29 fps)

Secondary OutFlow Max=2.37 cfs @ 12.23 hrs HW=1,436.24' (Free Discharge)

↑3=Custom Weir/Orifice (Weir Controls 2.37 cfs @ 2.92 fps)

Pond 41P: Bioretention Pond 2C

Hydrograph



Summary for Pond 42P: Forebay 2C

For pretreatment and storage of at least 25% of the WQV.

Length-to-width ratio should be between 1.5:1 and 3:1.

[93] Warning: Storage range exceeded by 0.05'

[95] Warning: Outlet Device #1 rise exceeded

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 1.75" for 25-Year event
 Inflow = 6.68 cfs @ 12.10 hrs, Volume= 0.510 af
 Outflow = 6.64 cfs @ 12.10 hrs, Volume= 0.508 af, Atten= 1%, Lag= 0.1 min
 Primary = 6.48 cfs @ 12.10 hrs, Volume= 0.507 af
 Secondary = 0.17 cfs @ 12.10 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,434.05' @ 12.10 hrs Surf.Area= 192 sf Storage= 203 cf

Plug-Flow detention time= 3.8 min calculated for 0.508 af (100% of inflow)
 Center-of-Mass det. time= 1.2 min (863.5 - 862.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

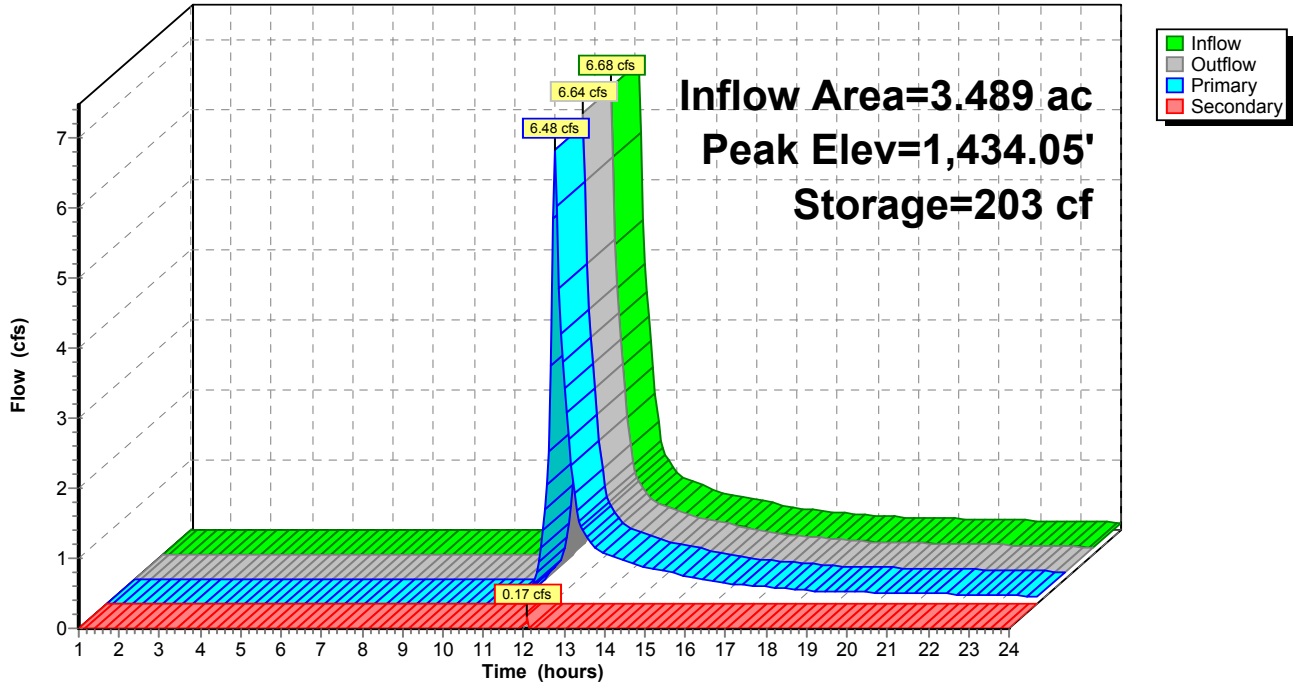
Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=6.44 cfs @ 12.10 hrs HW=1,434.05' (Free Discharge)
 ↑1=Custom Weir/Orifice (Orifice Controls 6.44 cfs @ 2.83 fps)

Secondary OutFlow Max=0.16 cfs @ 12.10 hrs HW=1,434.05' (Free Discharge)
 ↑2=Custom Weir/Orifice (Weir Controls 0.16 cfs @ 0.76 fps)

Pond 42P: Forebay 2C

Hydrograph



Summary for Pond 43P: Attenuation Pond 2C

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 1.70" for 25-Year event
 Inflow = 4.19 cfs @ 12.23 hrs, Volume= 0.495 af
 Outflow = 1.84 cfs @ 12.64 hrs, Volume= 0.492 af, Atten= 56%, Lag= 25.1 min
 Primary = 1.67 cfs @ 12.64 hrs, Volume= 0.482 af
 Secondary = 0.17 cfs @ 12.64 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,303.38' @ 12.64 hrs Surf.Area= 1,729 sf Storage= 3,833 cf

Plug-Flow detention time= 22.6 min calculated for 0.491 af (99% of inflow)
 Center-of-Mass det. time= 18.8 min (910.1 - 891.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	7,167 cf	10.00'W x 60.00'L x 5.00'H Prismatic Z=2.0

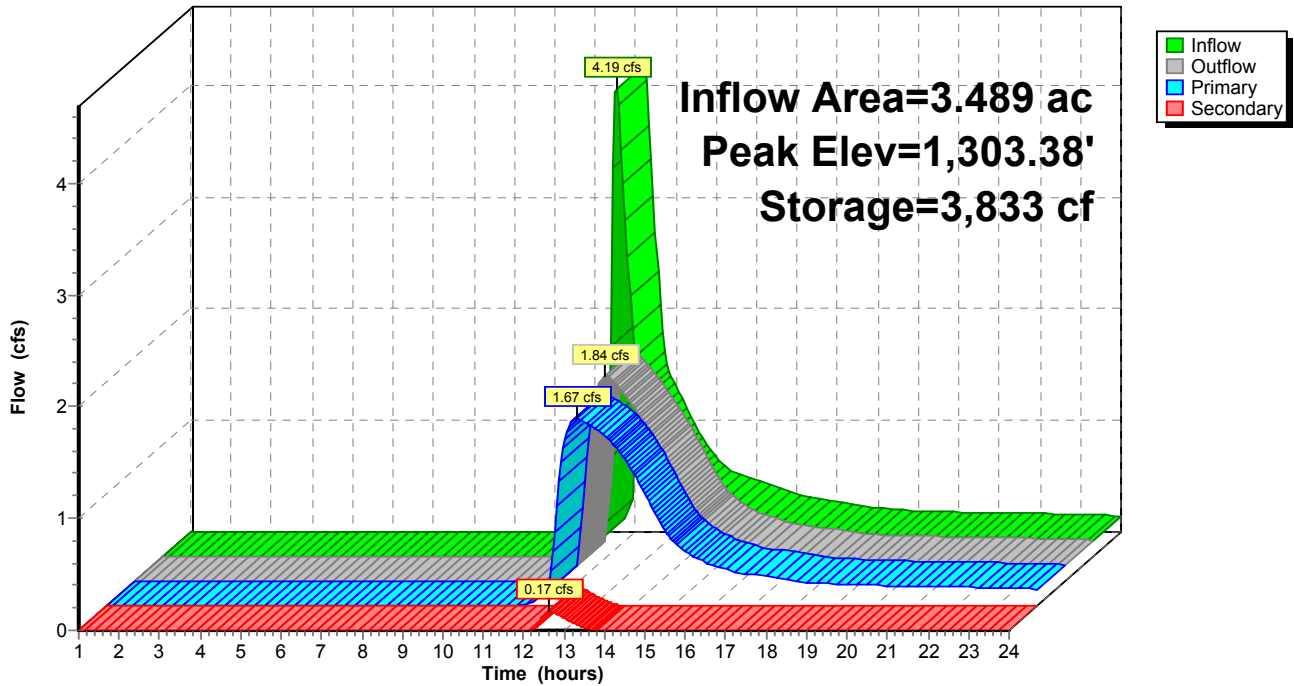
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,302.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 0.00 0.17

Primary OutFlow Max=1.67 cfs @ 12.64 hrs HW=1,303.38' (Free Discharge)
 ↖1=Orifice/Grate (Orifice Controls 1.67 cfs @ 8.52 fps)

Secondary OutFlow Max=0.17 cfs @ 12.64 hrs HW=1,303.38' (Free Discharge)
 ↖2=Custom Weir/Orifice (Weir Controls 0.17 cfs @ 3.08 fps)

Pond 43P: Attenuation Pond 2C

Hydrograph



Time span=1.00-24.00 hrs, dt=0.05 hrs, 461 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment17S: Basin B - Pre Runoff Area=15.242 ac 0.00% Impervious Runoff Depth>2.11"
Flow Length=667' Tc=28.7 min CN=55 Runoff=20.36 cfs 2.677 af

Subcatchment22S: Basin 2 - Post Runoff Area=1.672 ac 2.75% Impervious Runoff Depth>3.41"
Tc=6.0 min CN=68 Runoff=6.54 cfs 0.475 af

Subcatchment23S: Basin 2C - Post Runoff Area=3.489 ac 0.00% Impervious Runoff Depth>2.80"
Tc=6.0 min CN=62 Runoff=11.04 cfs 0.814 af

Subcatchment30S: Basin 2A - Post Runoff Area=4.984 ac 0.00% Impervious Runoff Depth>2.11"
Flow Length=217' Slope=0.1600 '/' Tc=17.4 min CN=55 Runoff=8.18 cfs 0.878 af

Subcatchment31S: Basin 2B - Post Runoff Area=3.619 ac 0.00% Impervious Runoff Depth>2.11"
Flow Length=300' Slope=0.1000 '/' Tc=27.2 min CN=55 Runoff=4.95 cfs 0.636 af

Pond 38P: Forebay 2 Peak Elev=1,301.98' Storage=532 cf Inflow=6.54 cfs 0.475 af
Outflow=6.39 cfs 0.472 af

Pond 39P: Bioretention Pond 2 Peak Elev=1,304.90' Storage=4,014 cf Inflow=6.39 cfs 0.472 af
Primary=0.34 cfs 0.221 af Secondary=1.21 cfs 0.163 af Tertiary=4.08 cfs 0.076 af Outflow=5.63 cfs 0.460 af

Pond 40P: Attenuation Pond 2 Peak Elev=1,304.54' Storage=5,235 cf Inflow=5.63 cfs 0.460 af
Primary=1.93 cfs 0.391 af Tertiary=0.00 cfs 0.000 af Outflow=1.93 cfs 0.391 af

Pond 41P: Bioretention Pond 2C Peak Elev=1,437.00' Storage=5,167 cf Inflow=10.97 cfs 0.810 af
Primary=2.07 cfs 0.584 af Secondary=6.57 cfs 0.204 af Outflow=8.64 cfs 0.788 af

Pond 42P: Forebay 2C Peak Elev=1,434.31' Storage=203 cf Inflow=11.04 cfs 0.814 af
Primary=8.70 cfs 0.788 af Secondary=2.27 cfs 0.022 af Outflow=10.97 cfs 0.810 af

Pond 43P: Attenuation Pond 2C Peak Elev=1,305.00' Storage=7,165 cf Inflow=8.64 cfs 0.788 af
Primary=2.06 cfs 0.683 af Secondary=1.16 cfs 0.088 af Outflow=3.22 cfs 0.770 af

Total Runoff Area = 29.006 ac Runoff Volume = 5.479 af Average Runoff Depth = 2.27"
99.84% Pervious = 28.960 ac 0.16% Impervious = 0.046 ac

Summary for Subcatchment 17S: Basin B - Pre

Runoff = 20.36 cfs @ 12.44 hrs, Volume= 2.677 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
15.242	55	Woods, Good, HSG B	Rural open/forest
15.242		100.00% Pervious Area	

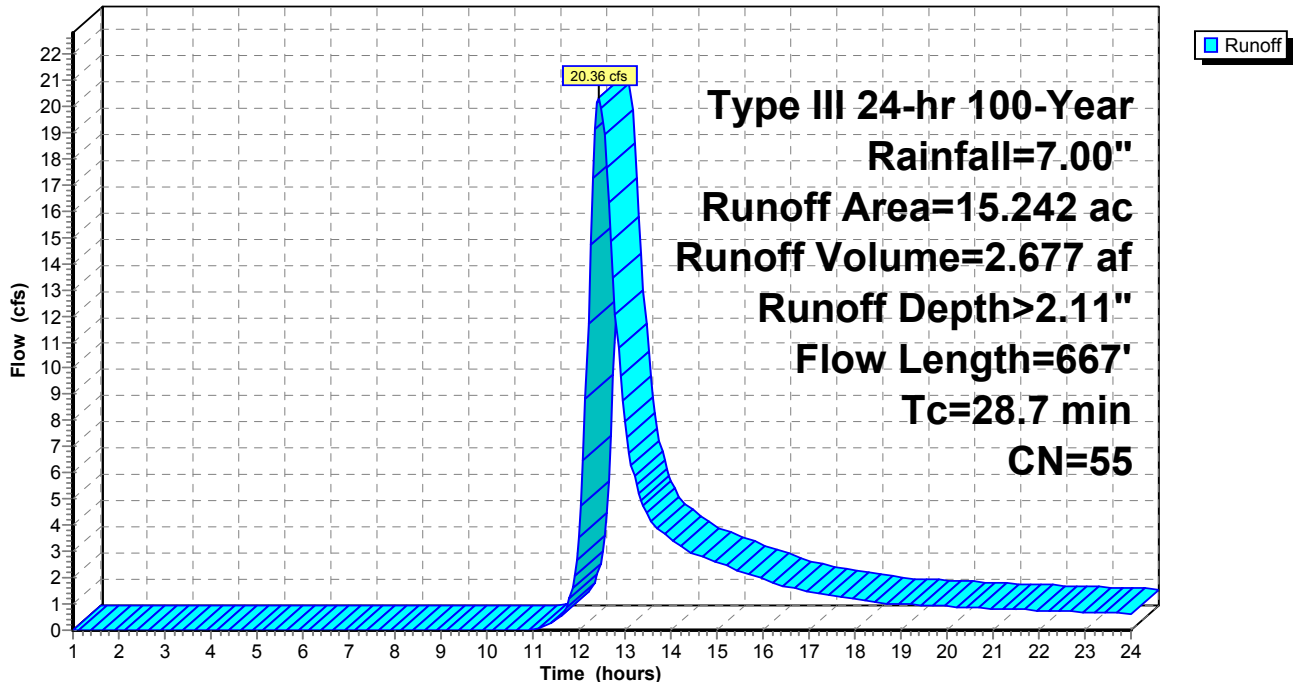
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.3	300	0.1200	0.20		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
3.4	367	0.1300	1.80		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
28.7	667	Total			

Pollutant Loading for 2.11" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
15.242	Rural open/forest	371.25	0.80	12.96
15.242	Total	371.25	0.80	12.96

Subcatchment 17S: Basin B - Pre

Hydrograph



Summary for Subcatchment 22S: Basin 2 - Post

Runoff = 6.54 cfs @ 12.09 hrs, Volume= 0.475 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
0.562	85	Gravel roads, HSG B	Driveway
0.000	55	Woods, Good, HSG B	Rural open/forest
0.936	58	Meadow, non-grazed, HSG B	Rural open/forest
0.128	58	Meadow, non-grazed, HSG B	Water/wetland
0.046	98	Unconnected roofs, HSG B	Commercial Roof
1.672	68	Weighted Average	
1.626		97.25% Pervious Area	
0.046		2.75% Impervious Area	
0.046		100.00% Unconnected	

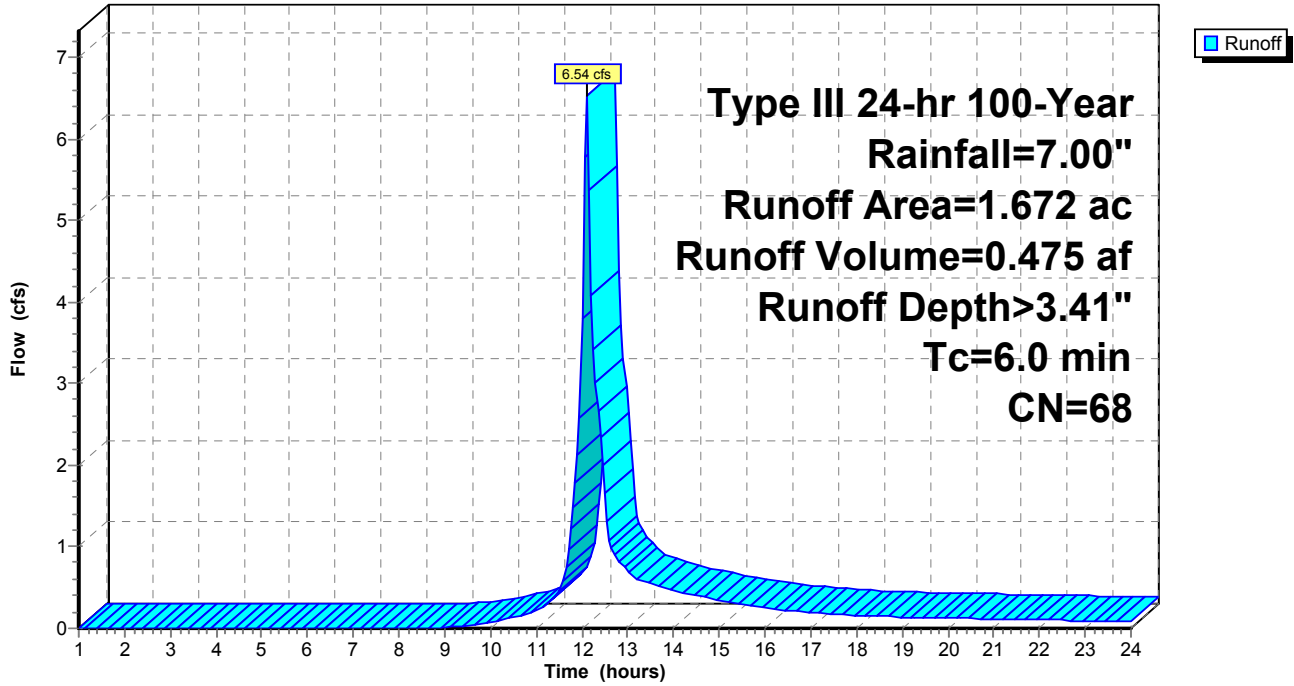
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 3.41" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.046	Commercial Roof	0.32	0.00	0.07
0.562	Driveway	75.06	0.24	0.91
0.936	Rural open/forest	36.85	0.08	1.29
0.128	Water/wetland	0.59	0.01	0.14
1.672	Total	112.83	0.34	2.41

Subcatchment 22S: Basin 2 - Post

Hydrograph



Summary for Subcatchment 23S: Basin 2C - Post

Runoff = 11.04 cfs @ 12.10 hrs, Volume= 0.814 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
0.602	85	Gravel roads, HSG B	Driveway
1.025	55	Woods, Good, HSG B	Rural open/forest
1.812	58	Meadow, non-grazed, HSG B	Rural open/forest
0.050	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.489	62	Weighted Average	
3.489		100.00% Pervious Area	

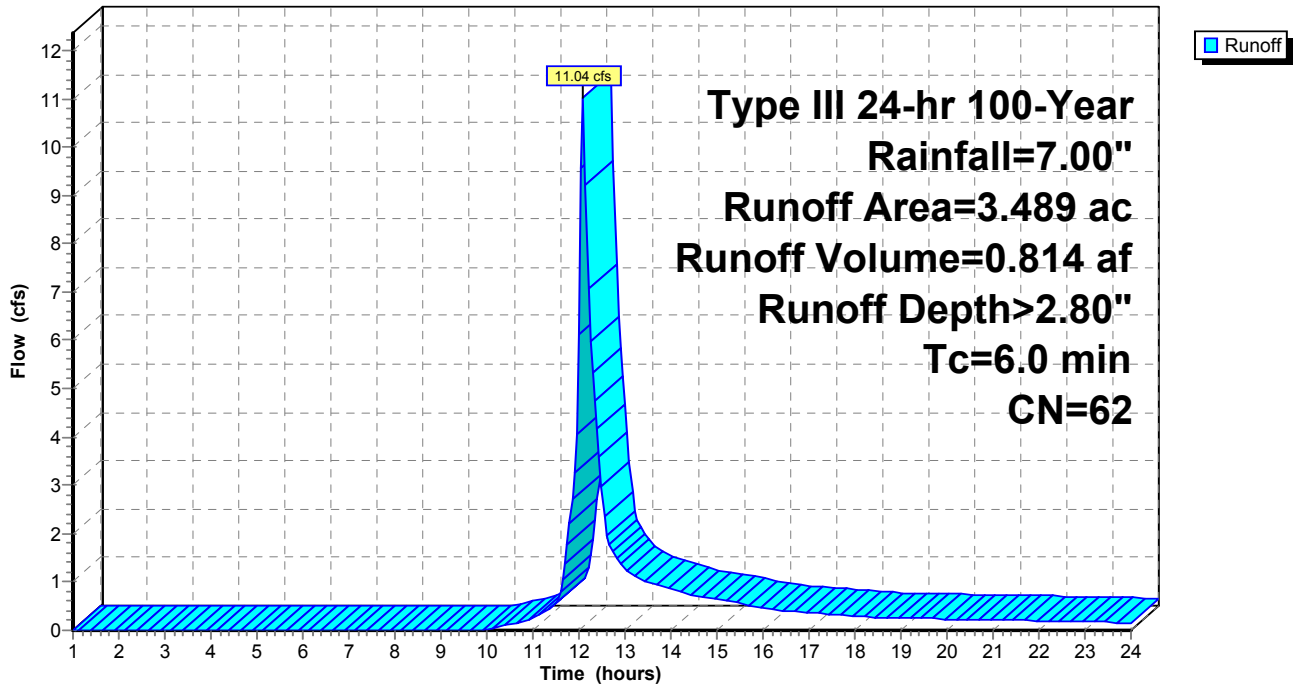
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Pollutant Loading for 2.80" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.602	Driveway	66.04	0.21	0.80
2.837	Rural open/forest	91.74	0.20	3.20
0.050	Water/wetland	0.19	0.00	0.04
3.489	Total	157.97	0.41	4.05

Subcatchment 23S: Basin 2C - Post

Hydrograph



Summary for Subcatchment 30S: Basin 2A - Post

Runoff = 8.18 cfs @ 12.26 hrs, Volume= 0.878 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
4.984	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
4.984	55	Weighted Average	
4.984		100.00% Pervious Area	

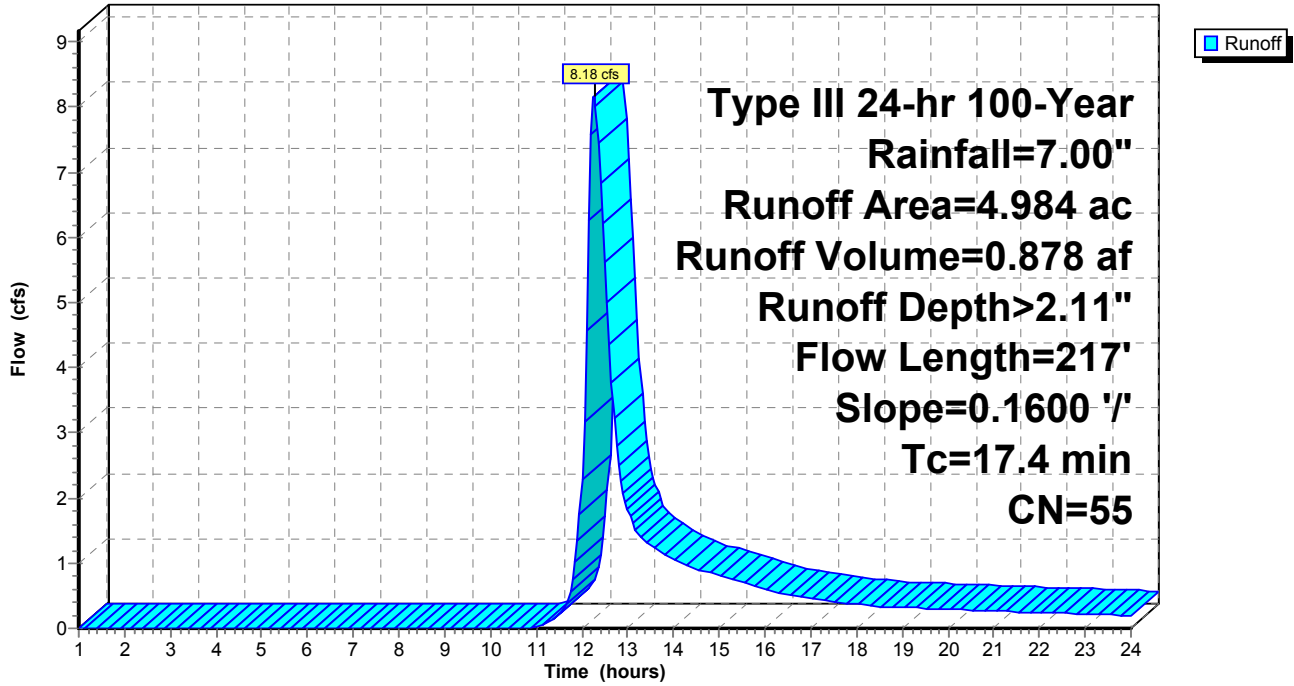
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	217	0.1600	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 2.11" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
4.984	Rural open/forest	121.80	0.26	4.25
0.000	Water/wetland	0.00	0.00	0.00
4.984	Total	121.80	0.26	4.25

Subcatchment 30S: Basin 2A - Post

Hydrograph



Summary for Subcatchment 31S: Basin 2B - Post

Runoff = 4.95 cfs @ 12.42 hrs, Volume= 0.636 af, Depth> 2.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

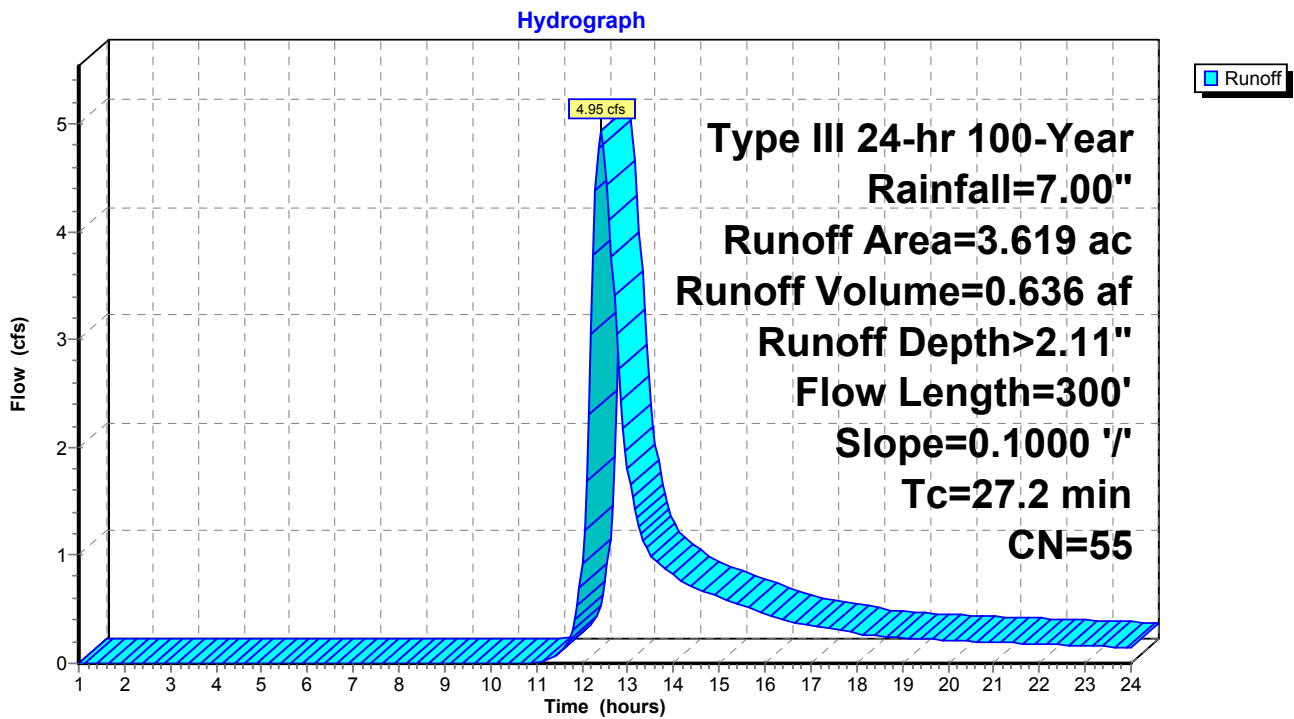
Area (ac)	CN	Description	Land Use
0.000	85	Gravel roads, HSG B	Driveway
3.619	55	Woods, Good, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Rural open/forest
0.000	58	Meadow, non-grazed, HSG B	Water/wetland
0.000	98	Unconnected roofs, HSG B	Commercial Roof
3.619	55	Weighted Average	
3.619		100.00% Pervious Area	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.2	300	0.1000	0.18		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"

Pollutant Loading for 2.11" runoff

Area (acres)	Land Use	TSS (pounds)	TP (pounds)	TN (pounds)
0.000	Commercial Roof	0.00	0.00	0.00
0.000	Driveway	0.00	0.00	0.00
3.619	Rural open/forest	88.19	0.19	3.08
0.000	Water/wetland	0.00	0.00	0.00
3.619	Total	88.19	0.19	3.08

Subcatchment 31S: Basin 2B - Post



Summary for Pond 38P: Forebay 2

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 3.41" for 100-Year event
 Inflow = 6.54 cfs @ 12.09 hrs, Volume= 0.475 af
 Outflow = 6.39 cfs @ 12.10 hrs, Volume= 0.472 af, Atten= 2%, Lag= 0.5 min
 Primary = 6.39 cfs @ 12.10 hrs, Volume= 0.472 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,301.98' @ 12.10 hrs Surf.Area= 417 sf Storage= 532 cf

Plug-Flow detention time= 7.0 min calculated for 0.472 af (99% of inflow)
 Center-of-Mass det. time= 3.5 min (838.2 - 834.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	539 cf	7.00'W x 20.00'L x 2.00'H Prismatic Z=2.0

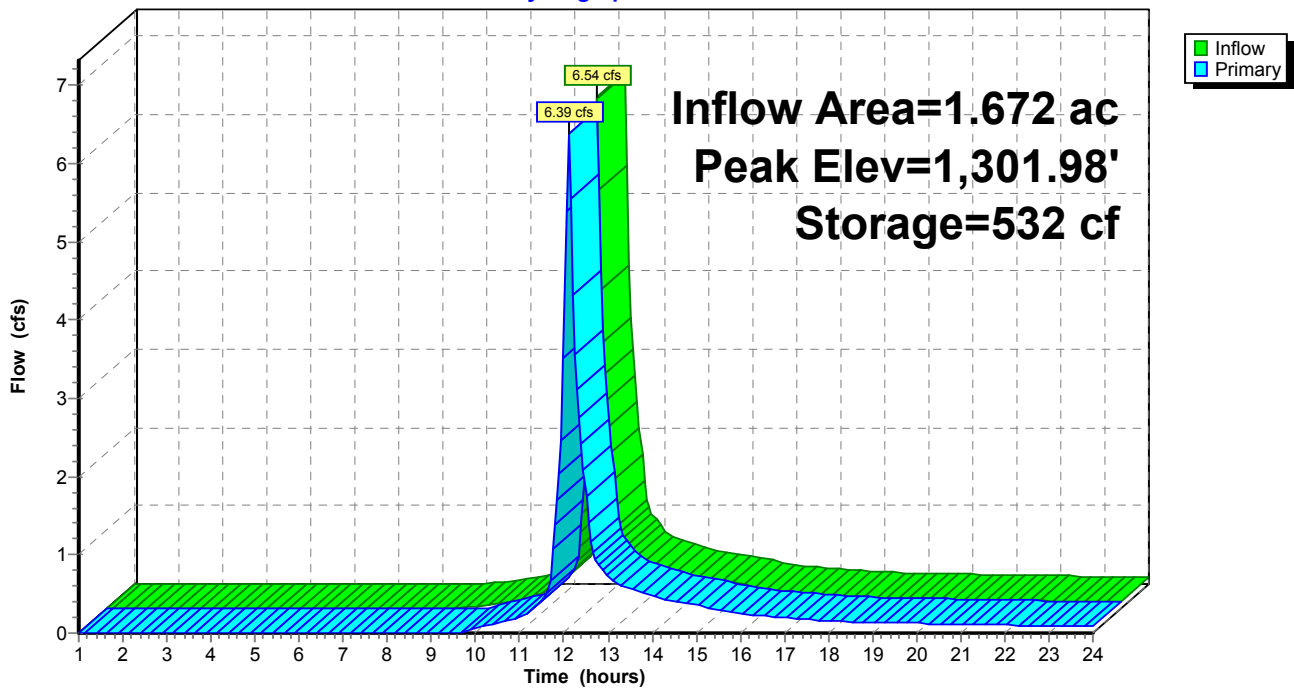
Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,301.25'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 2.00 3.50

Primary OutFlow Max=6.35 cfs @ 12.10 hrs HW=1,301.98' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 1.05 cfs @ 5.34 fps)
- 2=Custom Weir/Orifice (Weir Controls 5.30 cfs @ 2.65 fps)

Pond 38P: Forebay 2

Hydrograph



Summary for Pond 39P: Bioretention Pond 2

[81] Warning: Exceeded Pond 38P by 3.13' @ 12.60 hrs

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 3.39" for 100-Year event
 Inflow = 6.39 cfs @ 12.10 hrs, Volume= 0.472 af
 Outflow = 5.63 cfs @ 12.16 hrs, Volume= 0.460 af, Atten= 12%, Lag= 3.7 min
 Primary = 0.34 cfs @ 12.16 hrs, Volume= 0.221 af
 Secondary = 1.21 cfs @ 12.16 hrs, Volume= 0.163 af
 Tertiary = 4.08 cfs @ 12.16 hrs, Volume= 0.076 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,304.90' @ 12.16 hrs Surf.Area= 1,467 sf Storage= 4,014 cf

Plug-Flow detention time= 59.7 min calculated for 0.459 af (97% of inflow)
 Center-of-Mass det. time= 45.4 min (883.7 - 838.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	4,167 cf	10.00'W x 30.00'L x 5.00'H Prismatoid Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Secondary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Tertiary	1,304.50'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.50 Width (feet) 5.00 5.00

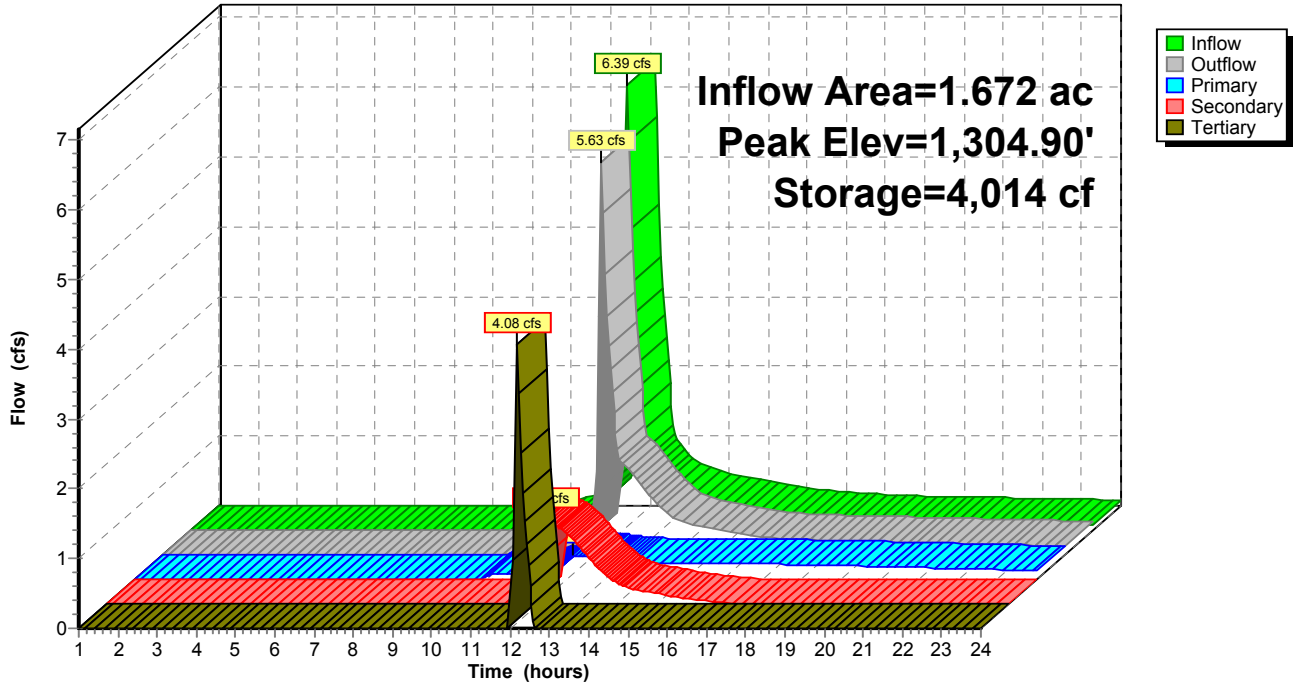
Primary OutFlow Max=0.34 cfs @ 12.16 hrs HW=1,304.88' (Free Discharge)
 ↑1=Exfiltration (Controls 0.34 cfs)

Secondary OutFlow Max=1.21 cfs @ 12.16 hrs HW=1,304.88' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 1.21 cfs @ 6.14 fps)

Tertiary OutFlow Max=3.81 cfs @ 12.16 hrs HW=1,304.88' (Free Discharge)
 ↑3=Custom Weir/Orifice (Weir Controls 3.81 cfs @ 2.01 fps)

Pond 39P: Bioretention Pond 2

Hydrograph



Summary for Pond 40P: Attenuation Pond 2

[78] Warning: Submerged Pond 39P Primary device # 1 by 4.53'

[81] Warning: Exceeded Pond 39P by 1.87' @ 23.95 hrs

[81] Warning: Exceeded Pond 39P by 1.87' @ 23.95 hrs

[79] Warning: Submerged Pond 39P Tertiary device # 3 by 0.03'

Inflow Area = 1.672 ac, 2.75% Impervious, Inflow Depth > 3.30" for 100-Year event
 Inflow = 5.63 cfs @ 12.16 hrs, Volume= 0.460 af
 Outflow = 1.93 cfs @ 12.52 hrs, Volume= 0.391 af, Atten= 66%, Lag= 21.2 min
 Primary = 1.93 cfs @ 12.52 hrs, Volume= 0.391 af
 Tertiary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,304.54' @ 12.52 hrs Surf.Area= 1,918 sf Storage= 5,235 cf

Plug-Flow detention time= 115.5 min calculated for 0.391 af (85% of inflow)
 Center-of-Mass det. time= 46.4 min (930.0 - 883.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	6,167 cf	10.00'W x 50.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,303.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	1,304.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.75 Width (feet) 0.67 0.67
#3	Tertiary	1,304.82'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.25 Width (feet) 10.00 10.00

Primary OutFlow Max=1.92 cfs @ 12.52 hrs HW=1,304.53' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 1.07 cfs @ 5.45 fps)

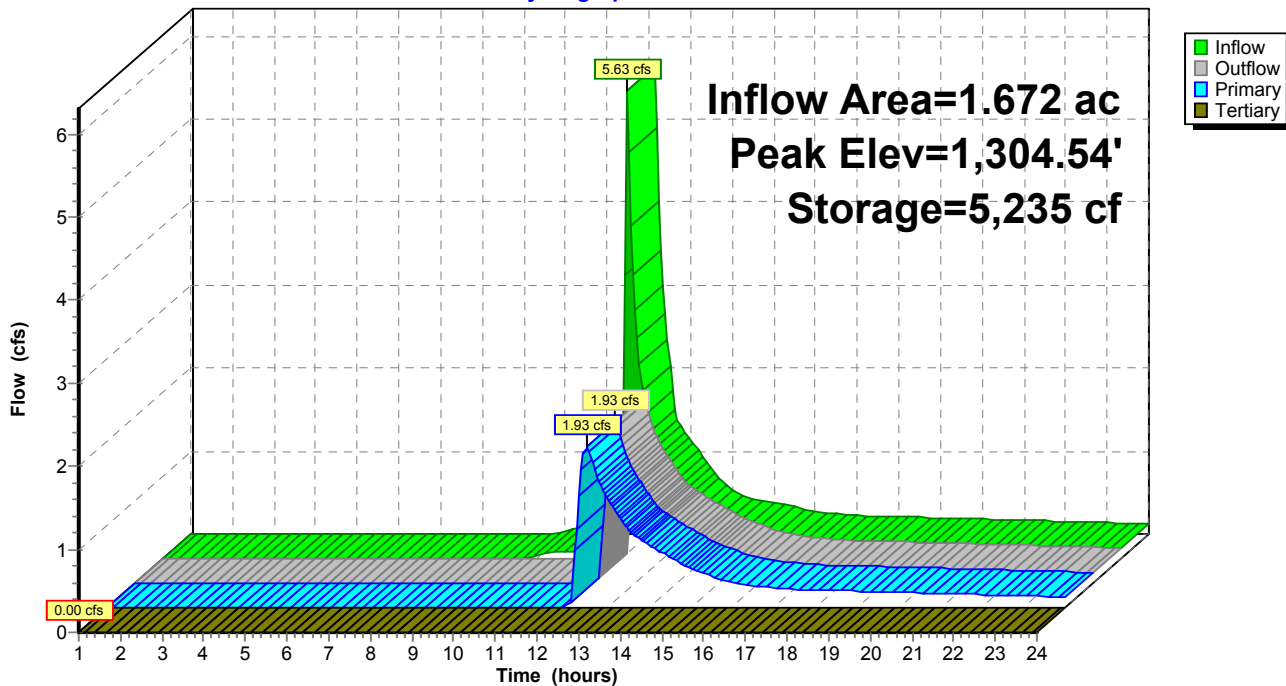
└2=Custom Weir/Orifice (Weir Controls 0.85 cfs @ 2.39 fps)

Tertiary OutFlow Max=0.00 cfs @ 1.00 hrs HW=1,300.00' (Free Discharge)

↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 40P: Attenuation Pond 2

Hydrograph



Summary for Pond 41P: Bioretention Pond 2C

[81] Warning: Exceeded Pond 42P by 2.87' @ 12.20 hrs

[81] Warning: Exceeded Pond 42P by 2.87' @ 12.20 hrs

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 2.79" for 100-Year event
 Inflow = 10.97 cfs @ 12.10 hrs, Volume= 0.810 af
 Outflow = 8.64 cfs @ 12.17 hrs, Volume= 0.788 af, Atten= 21%, Lag= 4.2 min
 Primary = 2.07 cfs @ 12.17 hrs, Volume= 0.584 af
 Secondary = 6.57 cfs @ 12.17 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,437.00' @ 12.17 hrs Surf.Area= 1,800 sf Storage= 5,167 cf

Plug-Flow detention time= 31.6 min calculated for 0.786 af (97% of inflow)
 Center-of-Mass det. time= 16.7 min (866.0 - 849.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	5,167 cf	10.00'W x 40.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,432.00'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,433.70'	6.0" Vert. Orifice/Grate C= 0.600
#3	Secondary	1,435.44'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 Width (feet) 1.00 1.08

Primary OutFlow Max=2.06 cfs @ 12.17 hrs HW=1,436.98' (Free Discharge)

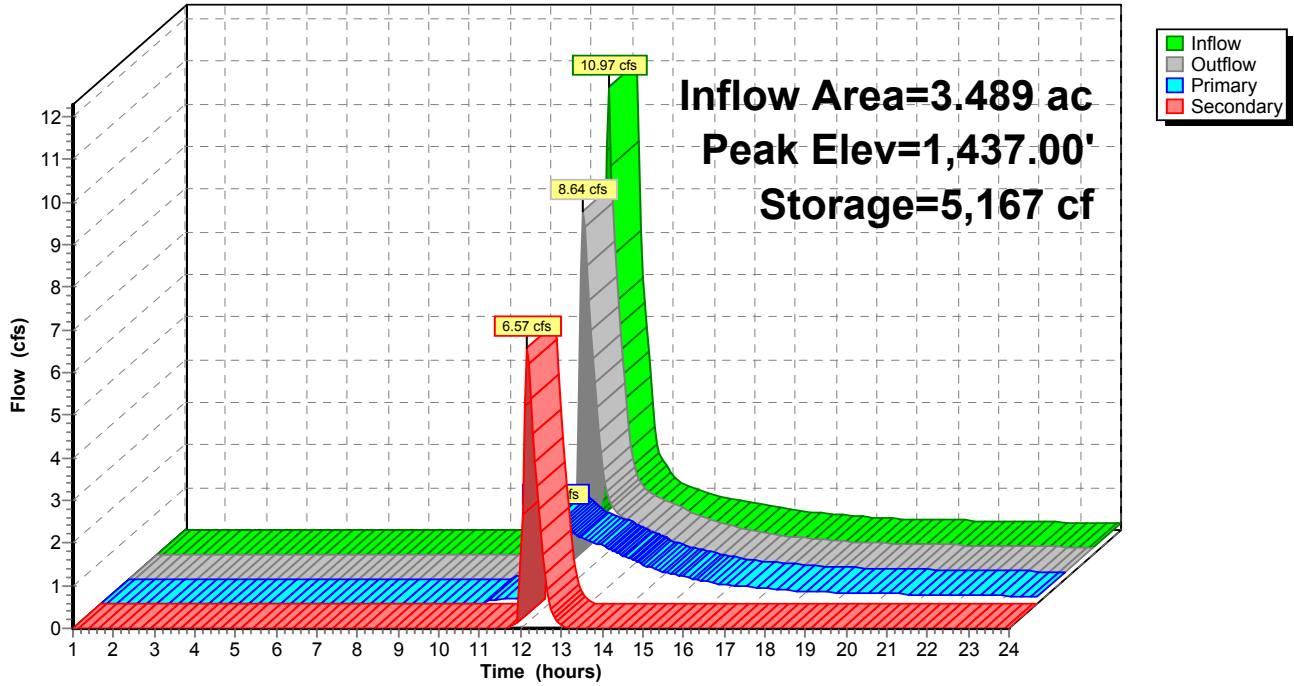
- ↑1=Exfiltration (Controls 0.42 cfs)
- ↑2=Orifice/Grate (Orifice Controls 1.64 cfs @ 8.38 fps)

Secondary OutFlow Max=6.40 cfs @ 12.17 hrs HW=1,436.98' (Free Discharge)

- ↑3=Custom Weir/Orifice (Weir Controls 6.40 cfs @ 4.04 fps)

Pond 41P: Bioretention Pond 2C

Hydrograph



Summary for Pond 42P: Forebay 2C

For pretreatment and storage of at least 25% of the WQV.

Length-to-width ratio should be between 1.5:1 and 3:1.

[93] Warning: Storage range exceeded by 0.31'

[95] Warning: Outlet Device #1 rise exceeded

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 2.80" for 100-Year event
 Inflow = 11.04 cfs @ 12.10 hrs, Volume= 0.814 af
 Outflow = 10.97 cfs @ 12.10 hrs, Volume= 0.810 af, Atten= 1%, Lag= 0.0 min
 Primary = 8.70 cfs @ 12.10 hrs, Volume= 0.788 af
 Secondary = 2.27 cfs @ 12.10 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,434.31' @ 12.10 hrs Surf.Area= 192 sf Storage= 203 cf

Plug-Flow detention time= 3.7 min calculated for 0.808 af (99% of inflow)
 Center-of-Mass det. time= 1.1 min (849.3 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,432.00'	203 cf	4.00'W x 8.00'L x 2.00'H Prismatic Z=2.0

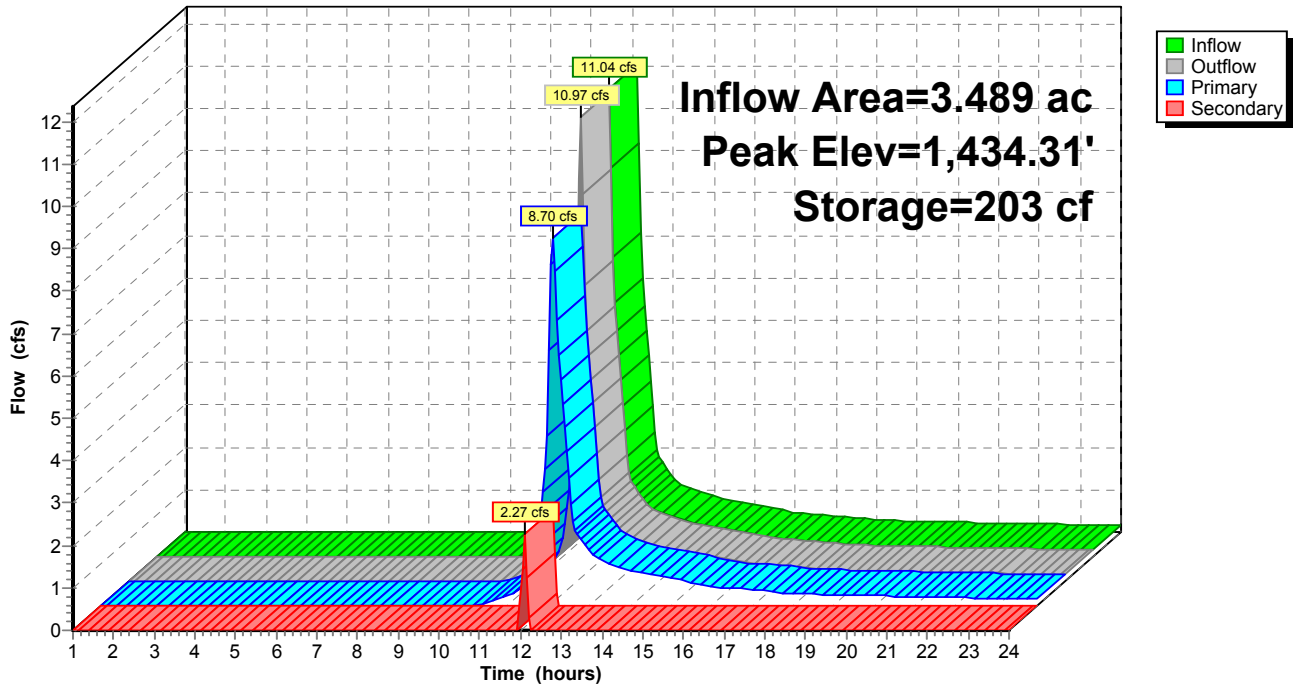
Device	Routing	Invert	Outlet Devices
#1	Primary	1,433.35'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.65 Width (feet) 3.00 4.00
#2	Secondary	1,434.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=8.66 cfs @ 12.10 hrs HW=1,434.31' (Free Discharge)
 ↑1=Custom Weir/Orifice (Orifice Controls 8.66 cfs @ 3.81 fps)

Secondary OutFlow Max=2.22 cfs @ 12.10 hrs HW=1,434.31' (Free Discharge)
 ↑2=Custom Weir/Orifice (Weir Controls 2.22 cfs @ 1.81 fps)

Pond 42P: Forebay 2C

Hydrograph



Summary for Pond 43P: Attenuation Pond 2C

Inflow Area = 3.489 ac, 0.00% Impervious, Inflow Depth > 2.71" for 100-Year event
 Inflow = 8.64 cfs @ 12.17 hrs, Volume= 0.788 af
 Outflow = 3.22 cfs @ 12.40 hrs, Volume= 0.770 af, Atten= 63%, Lag= 14.0 min
 Primary = 2.06 cfs @ 12.40 hrs, Volume= 0.683 af
 Secondary = 1.16 cfs @ 12.40 hrs, Volume= 0.088 af

Routing by Stor-Ind method, Time Span= 1.00-24.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 1,305.00' @ 12.40 hrs Surf.Area= 2,400 sf Storage= 7,165 cf

Plug-Flow detention time= 38.9 min calculated for 0.770 af (98% of inflow)
 Center-of-Mass det. time= 26.3 min (892.3 - 866.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,300.00'	7,167 cf	10.00'W x 60.00'L x 5.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Primary	1,300.00'	6.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	1,302.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.00 Width (feet) 0.00 0.17

Primary OutFlow Max=2.06 cfs @ 12.40 hrs HW=1,305.00' (Free Discharge)
 ↖1=Orifice/Grate (Orifice Controls 2.06 cfs @ 10.49 fps)

Secondary OutFlow Max=1.16 cfs @ 12.40 hrs HW=1,305.00' (Free Discharge)
 ↖2=Custom Weir/Orifice (Weir Controls 1.16 cfs @ 4.54 fps)

Pond 43P: Attenuation Pond 2C

Hydrograph

