# *Silo Ridge Resort Community*

## *Amended Master Development Plan*

Prepared for**Silo Ridge Ventures, LLC.**
**5021 US Route 44**
**Amenia, NY 12501**
**845-373-8020**

Prepared By**VHB Engineering, Surveying and Landscape Architecture P.C.**
**50 Main Street, Suite 360**
**White Plains, NY 10606**
**914-467-6600**

**April 2014**

**Revised March 2015**

Amanda Catherine De Cesare, P.E.

**New York License # 084690**

# Table of Contents

# Introduction and Instruction to Owner/Operator

This Erosion and Sediment Control / Pollution Prevention Manual has been developed as a base for the Stormwater Pollution Prevention Plan (SWPPP) to be prepared by the Owner/Operator as required under New York's State Pollutant Discharge Elimination System (SPDES) Permit for Construction Activites (GP-0-10-001). This manual provides the following information, as required for the SWPPP by the SPDES Permit:

- Site Description
- Development Description
- Drainage Characteristics
- Soil Characteristics
- Construction Phasing Information
- Pollution Prevention Practices
- Erosion and Sediment Control BMPs
- Operations and Maintenance Plans
- Grading, Drainage and Erosion Control Plans
- SPDES Permit and Fact Sheet
- Notice of Intent (NOI) Form (to be finalized and Certified by the Owner/Operator)
- Notice of Termination (NOT) Form
- Inspection Forms, Monitoring and Reporting Requirements
- Contractor Certification Form

The SWPPP must be prepared prior to filing of the Notice of Intent (NOI). If the SWPPP conforms to the Department's technical standards and the activities will not discharge a pollutant of concern to an impaired water or a TMDL watershed, authorization to discharge under this permit may occur five (5) business days after the date on which the NOI is received by the Department. For activities which do not comply with the technical standards or for construction site activities subject to a TMDL, authorization to discharge begins no sooner than sixty (60) business days from receipt of the NOI by the DEC unless notified otherwise. NOI forms can be found on the NYS DEC website (http://www.dec.ny.gov/) and must be mailed to the NYSDEC Central Office in Albany (Division of Water, 625 Broadway, 4th Floor, Albany, NY 12233-3505).

In order to complete the pre-construction SWPPP, the Owner/Operator must complete the following:

- Certify that they have read and understand the terms of the SPDES Permit.
- Review the manual and update and/or revise as necessary.

- Update location and types of erosion and sediment control materials as required by the site.
- Include designation letters to authorize implementation of the SWPPP.
- Designate areas for stockpiles, sanitary facilities, dumpsters, wash-down, lay-down and construction trailers and appropriate erosion and sediment control features (these can be hand drawn on a copy of the site plan).
- Designate project contact person(s) and include contact information.

The SWPPP is a dynamic document, and must be continually updated by the Owner/Operator throughout construction. This manual does not comprise a complete SWPPP. It is the responsibility of the Owner/Operator to update this manual and perform the activities herein, including, but not limited to:

- Post a sign at the site construction entrance that includes a copy of the Notice of Intent and a brief description of the project, location of the SWPPP, and a person to contact should the public want to review the SWPPP.
- Perform inspections and maintenance as designated in this manual, and as required as the project phases change.
- Prepare and certify inspection reports and include reports in the SWPPP.
- Update plans, as necessary, to denote major site changes and/or changes in the site BMPs.
- Update Plans to reflect changes in stockpile, sanitary facility, lay-down and other site areas.
- Maintain schedule of dates of major earthwork, stabilization and/or erosion control installations.
- Document any spills.
- Document off-site sedimentation resulting from this construction.

The Owner/Operator completed SWPPP must be updated throughout construction, until a Notice of Termination (NOT) Form has been submitted to the DEC. From the date of submital of the NOT form, the SWPPP documents must be maintained by the Site operator for a period of five years.

# I

# Notice of Intent (NOI) Form

The Department of Environmental Conservation must receive the completed NOI at least five (5) business days prior to the start of construction. VHB has supplied some of the information necessary for portions of this form. The remainder of the information must be completely filled out, reviewed, and submitted by the owner and construction site operator. The completed NOI Form must be certified and submitted by the owner/operator in order for it to take effect.

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# NOTICE OF INTENT

**New York State Department of Environmental Conservation**
**Division of Water**
**625 Broadway, 4th Floor**
**Albany, New York 12233-3505**

NYR [ ] (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-10-001

**All sections must be completed unless otherwise noted.** Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

**-IMPORTANT-**

**RETURN THIS FORM TO THE ADDRESS ABOVE**

OWNER/OPERATOR **MUST SIGN FORM**

**Owner/Operator Information**

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
Silo Ridge Ventures LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Torres

Owner/Operator Contact Person First Name
Pedro

Owner/Operator Mailing Address
5021 Route 44

City
Amenia

State
NY

Zip
12501-

Phone (Owner/Operator)
845-373-8020

Fax (Owner/Operator)
- -

Email (Owner/Operator)
ptorres@stoneleafpartners.com

FED TAX ID
13-4139599 (not required for individuals)

## Project Site Information

Project/Site Name
Silo Ridge Country Club

Street Address (NOT P.O. BOX)
4651 Route 22

Side of Street
○ **North** ○ **South** ○ **East** ● **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Amenia

| State | Zip | County | DEC Region |
|---|---|---|---|
| NY | 12501 - | Dutchess | 3 |

Name of Nearest Cross Street
Lake Amenia Road

Distance to Nearest Cross Street (Feet)
2800

Project In Relation to Cross Street
● **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel
7066-00

Tax Map Numbers
732810 670717

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

**www.dec.ny.gov/imsmaps/stormwater/viewer.htm**

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

| **X Coordinates (Easting)** | **Y Coordinates (Northing)** |
|---|---|
| 618532 | 4632264 |

2. What is the nature of this construction project?

● **New Construction**

○ **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

2682147112

3. Select the predominant land use for both pre and post development conditions.
**SELECT ONLY ONE CHOICE FOR EACH**

**Pre-Development Existing Land Use**

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ● RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

**Post-Development Future Land Use**

- ○ SINGLE FAMILY HOME
- ● SINGLE FAMILY SUBDIVISION — Number of Lots: 159
- ● TOWN HOME RESIDENTIAL
- ● MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ● COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ● RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ● PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note:** for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

| **Total Site Area** | **Total Area To Be Disturbed** | **Existing Impervious Area To Be Disturbed** | **Future Impervious Area** |
|---|---|---|---|
| 684.9 | 275.5 | 14.0 | 42.1 |

5. Do you plan to disturb more than 5 acres of soil at any one time? ● **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

| **A** | **B** | **C** | **D** |
|---|---|---|---|
| 29 % | 5 % | 29 % | 37 % |

7. Is this a phased project? ● **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

**Start Date** 08/01/2014 - **End Date** 08/31/2021

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Amenia Brook

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ● Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-10-001? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-10-001? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?
**If no, skip question 13.** ○ **Yes** ● **No**

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey?
**If Yes, what is the acreage to be disturbed?** ○ **Yes** ○ **No**

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ● **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
● Yes ○ No ○ Unknown

16. What is the name of the municipality/entity that owns the separate storm sewer system?

NYSDOT

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?
○ Yes ● No ○ Unknown

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?
○ Yes ● No

19. Is this property owned by a state authority, state agency, federal government or local government?
○ Yes ● No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.)
○ Yes ● No

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?
● Yes ○ No

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)?
**If No, skip questions 23 and 27-39.**
● Yes ○ No

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual?
● Yes ○ No

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

● **Professional Engineer (P.E.)**

○ **Soil and Water Conservation District (SWCD)**

○ **Registered Landscape Architect (R.L.A)**

○ **Certified Professional in Erosion and Sediment Control (CPESC)**

○ **Owner/Operator**

○ **Other**

SWPPP Preparer
VHB ENG.,SURV. & LANDSCAPE ARCH. PC

Contact Name (Last, Space, First)
DeCesare, Amanda

Mailing Address
50 Main Street, Suite 360

City
white Plains

State: NY
Zip: 10606-

Phone: 914-467-6614
Fax: 914-761-3759

Email
adecesare@vhb.com

**SWPPP Preparer Certification**

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-10-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

**First Name**: Amanda
**MI**: C

**Last Name**: DeCesare

**Signature**: Amanda DeCesare

**Date**: 01/08/2015

25. Has a construction sequence schedule for the planned management practices been prepared? ● Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

**Temporary Structural**

- ○ Check Dams
- ● Construction Road Stabilization
- ● Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ● Sediment Basin
- ○ Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ● Storm Drain Inlet Protection
- ● Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ● Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

**Biotechnical**

- ○ Brush Matting
- ○ Wattling

**Vegetative Measures**

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ● Mulching
- ● Protecting Vegetation
- ● Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ● Streambank Protection
- ● Temporary Swale
- ● Topsoiling
- ○ Vegetating Waterways

**Permanent Structural**

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ● Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ● Retaining Wall
- ○ Riprap Slope Protection
- ● Rock Outlet Protection
- ○ Streambank Protection

Other

**Post-construction Stormwater Management Practice (SMP) Requirements**

**Important: Completion of Questions 27-39 is not required if response to Question 22 is No.**

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

● **Preservation of Undisturbed Areas**

● **Preservation of Buffers**

● **Reduction of Clearing and Grading**

○ **Locating Development in Less Sensitive Areas**

● **Roadway Reduction**

○ **Sidewalk Reduction**

○ **Driveway Reduction**

○ **Cul-de-sac Reduction**

○ **Building Footprint Reduction**

○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

**Total WQv Required**

35.726 **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

**Note:** Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

# Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

| RR Techniques (Area Reduction) | Total Contributing Area (acres) | | Total Contributing Impervious Area (acres) |
|---|---|---|---|
| ● Conservation of Natural Areas (RR-1) | 453.5 | and/or | . |
| ● Sheetflow to Riparian Buffers/Filters Strips (RR-2) | 5.6 | and/or | . |
| ○ Tree Planting/Tree Pit (RR-3) | . | and/or | . |
| ○ Disconnection of Rooftop Runoff (RR-4) | . | and/or | . |

| RR Techniques (Volume Reduction) | |
|---|---|
| ○ Vegetated Swale (RR-5) | . |
| ○ Rain Garden (RR-6) | . |
| ○ Stormwater Planter (RR-7) | . |
| ○ Rain Barrel/Cistern (RR-8) | . |
| ○ Porous Pavement (RR-9) | . |
| ○ Green Roof (RR-10) | . |

| Standard SMPs with RRv Capacity | |
|---|---|
| ○ Infiltration Trench (I-1) | . |
| ○ Infiltration Basin (I-2) | 0.225 ac-ft |
| ○ Dry Well (I-3) | . |
| ○ Underground Infiltration System (I-4) | . |
| ○ Bioretention (F-5) | . |
| ○ Dry Swale (O-1) | . |

| Standard SMPs | |
|---|---|
| ○ Micropool Extended Detention (P-1) | . |
| ○ Wet Pond (P-2) | . |
| ● Wet Extended Detention (P-3) | 16.503 ac-ft |
| ○ Multiple Pond System (P-4) | . |
| ○ Pocket Pond (P-5) | . |
| ○ Surface Sand Filter (F-1) | . |
| ● Underground Sand Filter (F-2) | 1.387 ac-ft |
| ○ Perimeter Sand Filter (F-3) | . |
| ○ Organic Filter (F-4) | . |
| ○ Shallow Wetland (W-1) | . |
| ○ Extended Detention Wetland (W-2) | . |
| ○ Pond/Wetland System (W-3) | . |
| ○ Pocket Wetland (W-4) | . |
| ○ Wet Swale (O-2) | . |

**Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)**

| Alternative SMP | Total Contributing Impervious Area (acres) |
|---|---|
| ○ Hydrodynamic | . |
| ○ Wet Vault | . |
| ○ Media Filter | . |
| ○ Other | . |

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

**Note:** Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

**Total RRv provided**

23.741 **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ Yes ● No

**If Yes, go to question 36.**
**If No, go to question 32.**

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

**Minimum RRv Required**

8.53 **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

● Yes ○ No

**If Yes, go to question 33.**
**If No, the sizing criteria has not been met. Contact Regional Office stormwater contact person to discuss next steps.**

**Note:** Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

**Note**: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

**WQv Provided**

18.115 **acre-feet**

**Note**: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). 41.855

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ● **Yes** ○ **No**

**If Yes, go to question 36.**
**If No, the sizing criteria has not been met. Contact Regional Office stormwater contact person to discuss next steps.**

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

**CPv Required**

0. **acre-feet**

**CPv Provided**

0. **acre-feet**

*CPv is waived because under proposed conditions, there is NO increase in peak flows for the 1-yr or 100-yr storm events

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

**Total Overbank Flood Control Criteria (Qp)**

| **Pre-Development** | **Post-development** |
|---|---|
| 227.68 **CFS** | 200.58 **CFS** |

**Total Extreme Flood Control Criteria (Qf)**

| **Pre-Development** | **Post-development** |
|---|---|
| 1177.65 **CFS** | 858.82 **CFS** |

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ● Yes ○ No

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Silo Ridge Ventures LLC

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

The Five Step Process for Stormwater Site Planning and Practices Selection has been followed and identifies the projects limitations and justifications for not meeting the 100% runoff reduction requirements in the Stormwater Pollution Prevention Plan: Silo Ridge Resort Community Master Development Plan.

The project's stormwater management plan is designed to meet the "East of Hudson Standards," which is not legally required because the project is not located within the NYC East of Hudson watershed. Meeting this standard provides more than double the required water quality volume under the SPDES General Permit which increases the project's ability to provide 100% runoff reduction more difficult.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ● Solid Waste
- ● Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ● Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ● Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP NYR
- ● Other Army Corps Nationwide
- ○ None

Protection of Waters Permit (6 NYCRR Part 608); Clean Water Act Section 401 Water Quality Certification; Water Withdrawal Permit (6NYCRR Part 601; ACOE Nationwide Permit.

41. Does this project require a US Army Corps of Engineers Wetland Permit? ● Yes ○ No
**If Yes, Indicate Size of Impact.** 1.3

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ Yes ● No
**(If No, skip question 43)**

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ Yes ○ No

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. NYR10X867

## Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

**Print First Name** Pedro

**MI**

**Print Last Name** Torres

**Owner/Operator Signature**

**Date** 02/15/2015

# II
# Contractor Certifications and Designation Letters

It is a requirement of the SPDES Permit that all those implementing the SWPPP certify that they have read and understand the permit. Certification Forms are included in this manual.

In addition, those implementing the SWPPP must be certified as designees of the contract firm's owner as described in Part III, Subsection A of the SPDES Permit. A copy of the New York State SPDES Permit GP-0-15-002 is included in Section XII of this manual.

**CERTIFICATION OF PROJECT CONSTRUCTION CONTRACTORS**

**Silo Ridge**
**4651 US Route 22**
**Amenia, NY 12501**

The following certification shall be signed by each contractor and subcontractor responsible for on-site activities, or any other subcontractor who will perform any action that may reasonably be expected to cause or have the potential to cause pollution of the waters of New York.

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. "

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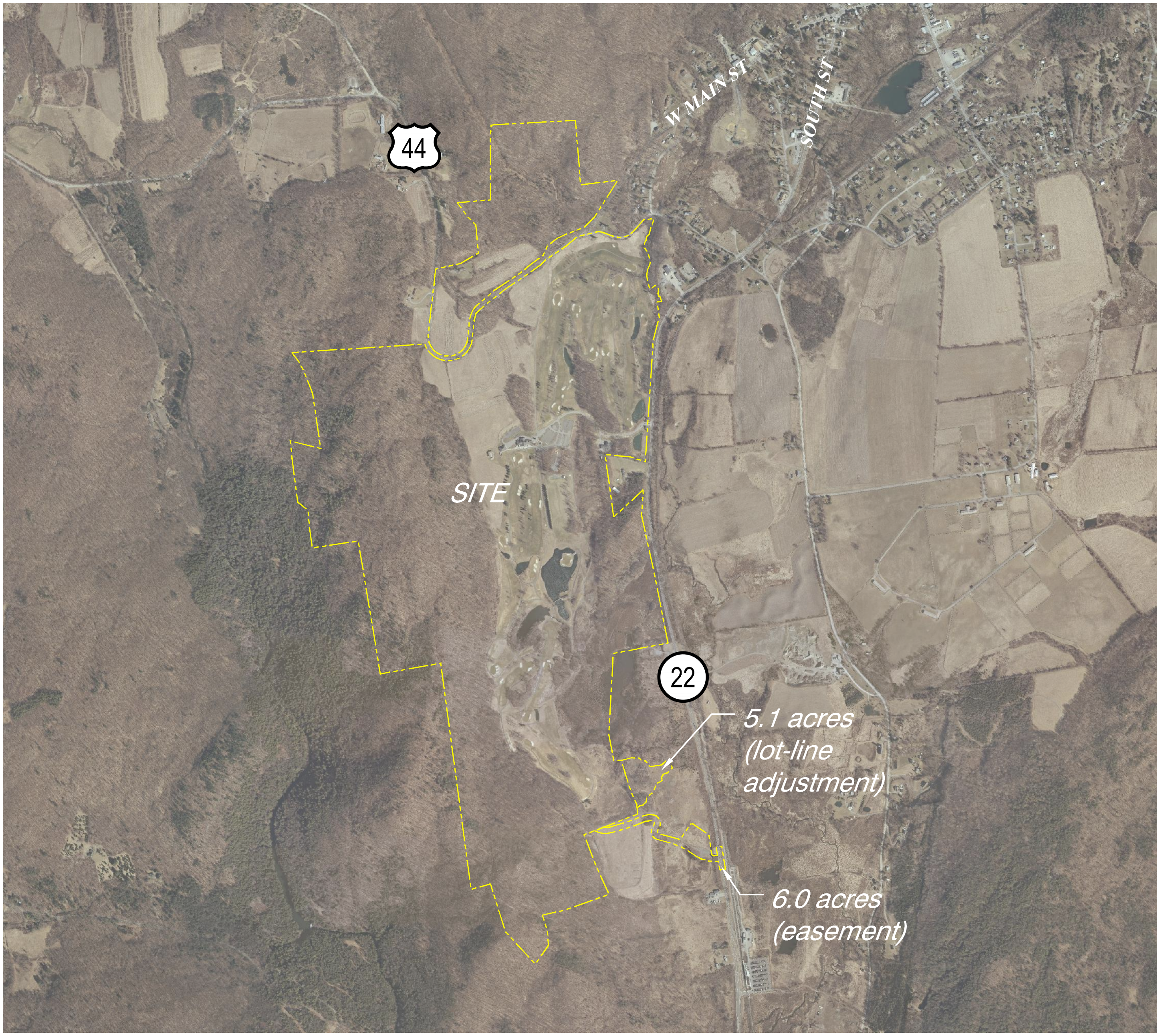
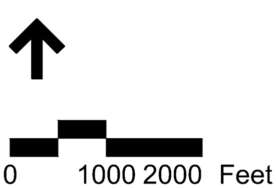
| **Owner/Operator** | **Contractor** | **Subcontractor** |
|---|---|---|
| ______________________ | ______________________ | ______________________ |
| Signature and Date | Signature and Date | Signature and Date |
| ______________________ | ______________________ | ______________________ |
| Title | Title | Title |
| ______________________ | ______________________ | ______________________ |
| ______________________ | ______________________ | ______________________ |
| ______________________ | ______________________ | ______________________ |
| Company and Address | Company and Address | Company and Address |

| **Subcontractor** | **Subcontractor** | **Subcontractor** |
|---|---|---|
| ______________________ | ______________________ | ______________________ |
| Signature and Date | Signature and Date | Signature and Date |
| ______________________ | ______________________ | ______________________ |
| Title | Title | Title |
| ______________________ | ______________________ | ______________________ |
| ______________________ | ______________________ | ______________________ |
| ______________________ | ______________________ | ______________________ |
| Company and Address | Company and Address | Company and Address |

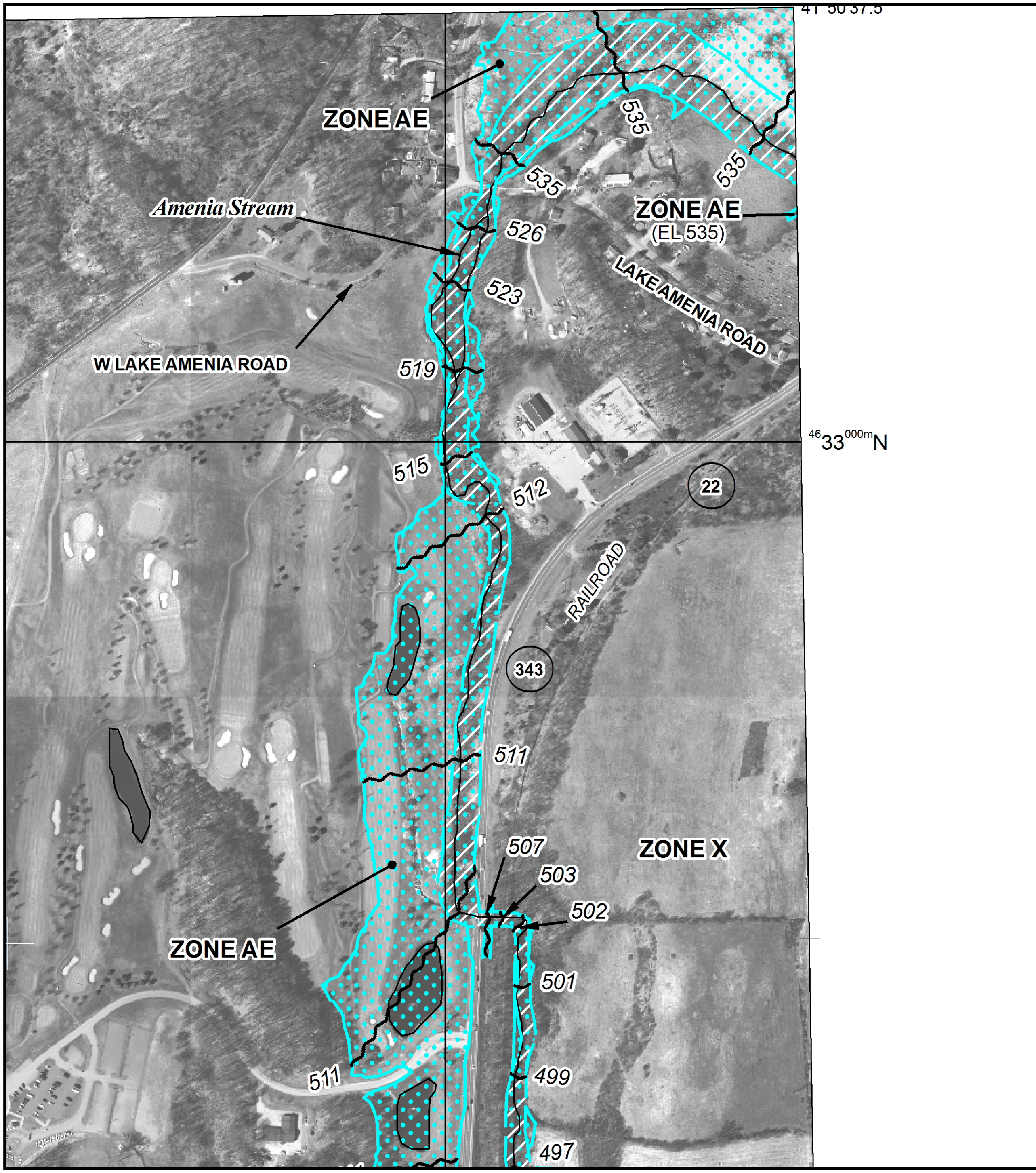
# III
# Project Figures




**Vanasse Hangen Brustlin, Inc.**

Site Location Map
Silo Ridge Resort Community
4651 Route 22
Amenia, New York 12501




MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0329E

# FIRM

## FLOOD INSURANCE RATE MAP

for DUTCHESS COUNTY, NEW YORK
(ALL JURISDICTIONS)

CONTAINS:

| COMMUNITY | NUMBER |
|---|---|
| AMENIA, TOWN OF | 361332 |

**PANEL 329 OF 602**
**MAP SUFFIX: E**
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

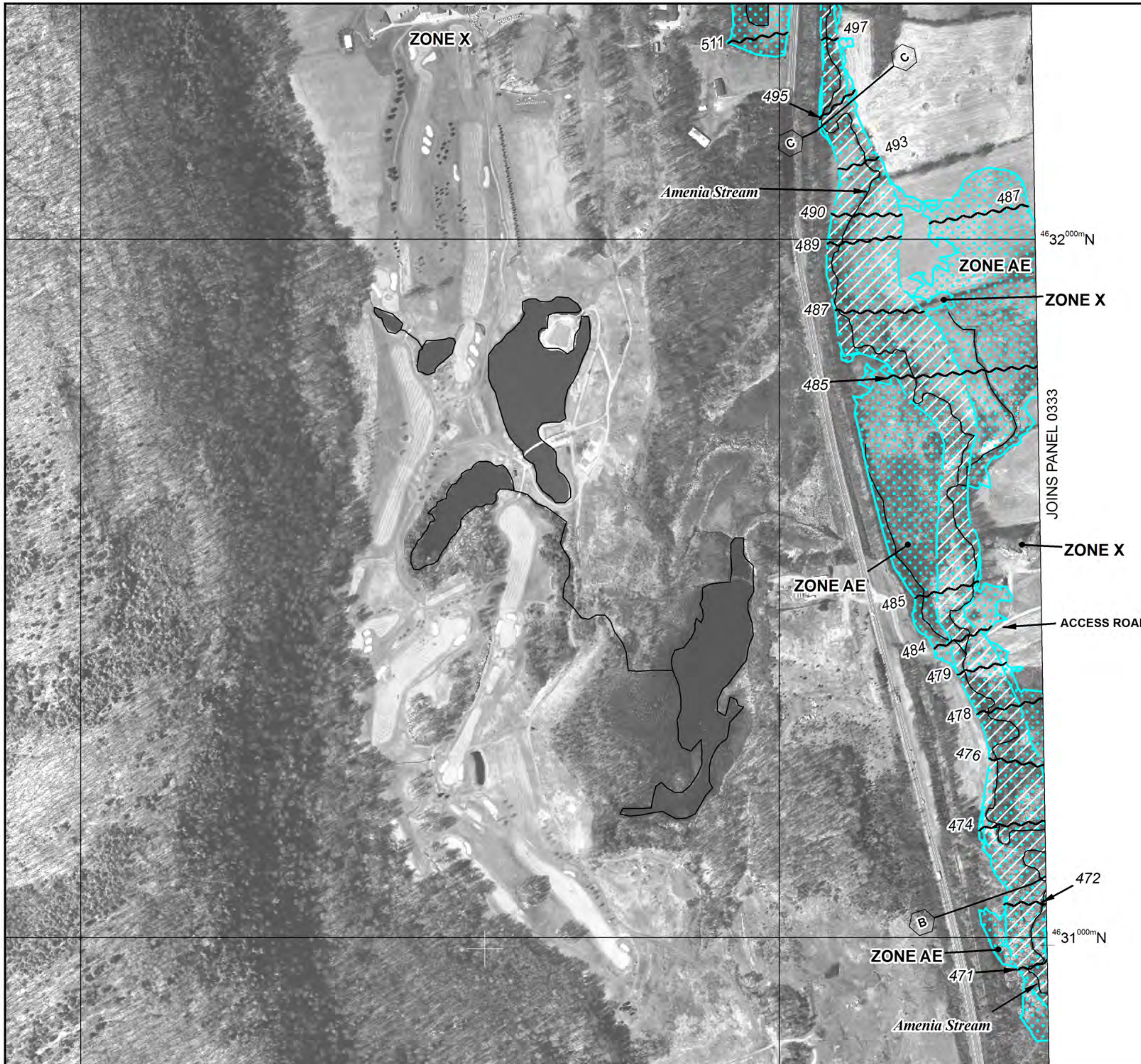
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

U.S. DEPARTMENT OF HOMELAND SECURITY

**MAP NUMBER**
**36027C0329E**

**EFFECTIVE DATE**
**MAY 2, 2012**

Federal Emergency Management Agency

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0329E

# FIRM

FLOOD INSURANCE RATE MAP

for DUTCHESS COUNTY, NEW YORK
(ALL JURISDICTIONS)

CONTAINS:

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**PANEL 329 OF 602**
**MAP SUFFIX: E**
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**
**36027C0329E**

**EFFECTIVE DATE**
**MAY 2, 2012**

Federal Emergency Management Agency

# IV
# Project Description

## Site Location and Summary

The Silo Ridge site (the “Site”) is a total of approximately 684.9 ± acres, comprised of: (i) the 669.9± acre site of the former Silo Ridge Golf Course; (ii) 6.4 ± acres from the adjoining property of record owned by Harlem Valley Landfill Corp., to be made part of the Site by lot line adjustment; and (iii) an approximately 8.6 ± acre easement area on the Harlem Valley Landfill Corp. property, within which an access road, the golf maintenance facility, and the wastewater treatment plant for the Project will be located. The project site is located in Town of Amenia, Dutchess County, NY, with a contributing drainage area of 783 +/- acres. The site is bounded to the West and South by Wassaic Creek, the East by Route 22, and the North by Lake Amenia Road and tributary to Amenia Stream. The Modified Project is not located within a TMDL watershed nor does it discharge into a 303(d) listed waterbody. The site location is shown on Figures 1 and 2.

## Existing Conditions

Currently, the majority of the project site consists of the existing golf course and wooded area. It also consists of a club house, parking lot and few existing ponds and wetlands. In general, the site rainfall runoff drains eastward to existing wetland and Amenia Stream along the Route 22.

According to the Flood Insurance Rate Map (FIRM) prepared by Federal Emergency Management Agency (FEMA) includes as Figure 2, a portion of the project site is located within the 100-year floodplain. [FIRM map number 36027C0329E, effective date May 2, 2012]

According to the NRCS soil survey for Dutchess County, NY, the majority hydrology soil groups for the site are hydrology soil group A, C and D. Soil boring logs, test pit locations, and an NRCS soils information are included in Attachment D.

## Proposed Conditions

The proposed development consists of two phases of construction (with a zero phase for early golf construction) and are shown in the amended master development plan.

Phase 0 construction includes:

- Modification of the existing eighteen (18) golf holes including driving range
- Restoration of ground cover including tee boxes, fairways and greens
- Landscaping enhancements
- Reconfiguring of existing pond
- Construction of water quality swales
- Installation of drainage pipes

Phase I construction includes:

- Main Entry and Gatehouse
- Sales office, Design Center and General Store
- Artisan Park Overlook
- Golf Course Renovations
- South Entry Access and Golf Maintenance Facility
- Village Green Lodging Units, Condominiums
- Clubhouse, Fitness, Yoga and Pool
- Activity Barn and Lake Pavilion
- Single Family Homes
- Roads and Utilities
- Wastewater Treatment Plant and Conveyance
- Water Treatment Facilities, Storage and Distribution
- Drainage Piping Network and Stormwater Management Features

Phase II construction includes:

- Vineyard Cottages
- Winery Restaurant
- Roads and Utilities
- Drainage Piping Network and Stormwater Management Features

The total disturbance area of the development is 275.5 acres.

A majority of the runoff from the site is conveyed through the proposed drainage system to the proposed detention basins before discharging out of the site. The proposed detention basins serve as the water quality and water quantity control measures.

## Five Step Process for Stormwater Site Planning and Practices Selection

The NYS Stormwater Management Design Manual (SMDM) required a five step process that integrates site planning, usage of green infrastructure practices and standard stormwater management practices to treat stormwater. The five step process is:

1. Site Planning to preserve natural area and reduce impervious cover;

2. Calculate initial required Water Quality Volume for the site;
3. Provide Runoff Reduction by incorporating green infrastructure technique and standard stormwater management practice (SMP) with Runoff Reduction Volume (RRv) capacity;
4. Provide standard SMP's to treat remaining portion of water quality volume (WQv) not addressed by green infrastructure and standard SMP's with RRv capacity, and
5. Provide volume and peak rate control practices where required.

## *Step 1: Site Planning*

During the site planning process, the designer tries to conserve natural resources and reduce proposed impervious coverage to reduce the impact of water quality from proposed development.

Preservation of Natural Resources includes:

- Preservation of undisturbed areas
- Preservation of buffer areas
- Minimizing site clearing and grading
- Avoiding sensitive area
- Open space design

Reduction of impervious coverage includes:

- Roadway reduction
- Sidewalk reduction
- Driveway reduction
- Cul-de-sac reduction
- Building footprint reduction
- Parking reduction

## *Step 2: Required Water Quality Volume (WQv)*

Required WQv was calculated for the site based on Chapter 10 of SWDM – Enhanced Phosphorus Removal Standard (East of Hudson Standard) as per agreement with the Town although the site is not located within the East of Hudson Watershed. One-year rainfall of 2.8 inches was used for the WQv calculation. Weighted CN value was calculated based on the proposed development. Refer to Attachment E3 for detailed calculation (WQv and RRv Analysis).

## *Step 3: Runoff Reduction Volume (RRv)*

RRv requirement can be achieved through application of green infrastructure and standard SWM with runoff reduction capacity. If RRv provided by these techniques is greater than the required WQv, the RRv requirement is met. However if the RRv is less than the required WQv, the designer must at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on site. The percent reduction is based on the Hydrologic Soil Groups present on the site, and is determined by the Specific Reduction Factor (S). The Specific Reduction Factor (S) used for this site is conservative and assumes 0.55 based on hydrologic soil group A. Refer to Attachment E3 for detailed calculations (WQv and RRv Analysis). Below is the list of green infrastructure techniques and standard SMPs with runoff reduction capacity and an evaluation of its use for this project.

### Conservation of Natural Area

Conserving the natural area can avoid the unnecessary disturbance of the natural soil and maintain the water quality. The project preserves most of the natural area throughout the perimeter of the property totaling approximately 453.5 ± acres. Most of the preserved areas are wooded area. Refer to Figure E3 (Water Quality Map) in Attachment E3 for conservation area boundary. Conservation area is used for calculating the runoff reduction volume.
Also, to meet the requirements of the RDO District, the project proposes to maintain at a minimum 80% of the site as Open Space. The Modified Project preserves approximately 538 ± acres of open space of which 298 ± acres are forested habitat.
Additionally, the project proposes restoration of the stream connecting to and the floodplain adjacent to the Amenia Cascade brook, as well as stream restoration of Wetland P located near the Estate Homes.

### Sheetflow to Riparian Buffers / Filter Strips

The 100-foot buffer around the NYSDEC wetland is the ideal green infrastructure technique which falls under this category. The riparian buffer area on site that is used for runoff reduction volume calculation is shown on Figure E3 as mentioned above. The riparian buffer area hatch on Figure E3 will sheet flow toward the 100-foot buffer before entering the wetland. The slope of contributing area is within the acceptable range as per the requirement.
Additionally as part of the project's extensive Habitat Management Plan (HMP), the project proposes interior buffering of the wetlands (both constructed and natural) and stormwater management practices. These proposed buffers were not used to calculate the proposed RRv, but do pose a significant improvement to water quality. The project proposes to increase buffers greater than 30' in width along aquatic edges from 83%± to 99%± to the existing natural sensitive habitats. Of note, the Amenia Cascade Brook buffer increases from 46% to 98% and the buffer along Stream L increases from 41%± to 90%±.

### Vegetated Open Swales

RRv is not applicable for this green infrastructure technique due to the site topography constraints that prevent the required design flows and exceeding the slope requirement of 4 percent.
However, where the existing or proposed topography allows, the design has sited vegetated open swales to enhance the project's stormwater management and water quality. These swales are not included in the project's RRv calculation.

## Tree Planting/Tree Box

RRv is not applicable for this green infrastructure technique. However, there are many natural trees that are being preserved throughout the site as well as an extensive landscape plan being reviewed by the Town of Amenia's Environmental Consultant. The landscape plan proposes many trees on slopes less than 5%. These trees are not included in the project's RRv calculation.

## Disconnection of Rooftop Runoff

RRv is not applicable for this green infrastructure technique due to the siting of buildings located on undesired soil HSG groups C and D. This credit is not included in the project's RRv calculation.

## Stream Daylighting

RRv is not applicable for this green infrastructure technique because this project is not considered as a redevelopment project. However, the project does propose to daylight a portion of Stream "N/P" located in the southwestern portion of the site. This credit is not included in the project's RRv calculation.

## Rain Garden

RRv is not applicable for this green infrastructure technique. The contributing drainage area for individual building exceeds the maximum contributing area of 1,000± sf (for a rain garden). This credit is not included in the project's RRv calculation.

## Green Roof

RRv is not applied for this green infrastructure technique because the design and architecture of the proposed buildings is not consistent with that of green roofs.

## Stormwater Planters

RRv is not applied for this green infrastructure technique because stormwater planters are typically suitable for urban redevelopment site which is not the case for this project site.

## Rain Tanks/Cisterns

There are no traditional rain tanks/cisterns proposed for this project.
However, the proposed irrigation pond is designed as a traditional stormwater management practice (SWM#3), with a static water elevation and capability to store the runoff and attenuate the larger storm events. Nevertheless, this is not applied to the RRv because of the uncertainty of how the calculation would apply because the pond will function for attenuation and storage device for re-use.

Additionally, it will be encouraged by the Homeowner's Association to use rain tanks as part of the individual lot stormwater management design. These rain tanks are not included in the project's RRv calculation.

### Porous Pavement

The parking lot by the proposed tennis court will be constructed as permeable paver. It is about 0.53 ac in area. Refer to Attachment G for detailed calculations. However, no credit is included in the project's RRv calculation for this technique.

## *Step 4: Water Quality Volume by Standard Stormwater Management Practice*

Any remaining required water quality volume that is not being reduced by applying the green infrastructure will be treated by standard stormwater management practices. Below are the standard stormwater management practices applied to the project. Refer to Attachment E3 for detailed calculations.

### Underground Sand Filter

Underground sand filter is a filtering practice that treats, captures and temporarily stores the stormwater as it flows through a filter bed of sand. There are a total of five proposed underground sand filters. Three underground sand filters will be constructed during phase 1 (SWM #12, SWM #15 and SWM #16) and two will be constructed during phase II (SWM #13 and SWM #14). Please refer to Attachment E3 for detailed calculations and the Amended MDP Drawing SW-1: Overall Stormwater Management Practice Identification Plan.

### Wet Extended Detention/ Pocket Pond

Forebay, permanent pool and extended detention of the pond provides water quality volume. Forebays are sized to contain 10% of the water quality volume, and shall be four to six feet deep. Combined forebay and permanent pool are sized to contain at least 50% of the water quality volume. The remaining 50% of the water quality volume will be stored at the extended detention. Proposed wet extended ponds with water quality storage capability are labeled as SWM #1, SWM #2, SWM #5, SWM #6 and SWM# 7A. Please refer to Attachment E3 for detailed calculations and the Amended MDP Drawing SW-1: Overall Stormwater Management Practice Identification Plan.

## *Step 5: Volume and Peak Rate Control Practices*

After satisfying the required water quality volume, the designer needs to satisfy the channel protection volume (CPv), overbank flood control and extreme flood control. Design criteria for channel protection volume, overbank flood control and extreme flood control are the 1-year storm, 10-year storm and 100-year storm.

After consulting with NYSDEC, the CPv requirement can be waived if there is no increase in peak discharge rate for the 1-year storm under proposed condition. In addition, the design criteria for water quality volume is based on the 1-year storm, therefore it will satisfy the CPv. Overbank flood control and extreme flood control requirement is satisfied through utilizing wet extended detention pond/dry detention basin and underground detention pipe system.

All of the practices have outlet control devices that consists of orifices and or weirs to control the proposed 10-year and 100-year peak discharge rate to be less than existing condition.

Those detention pond/basin stormwater practices are labeled as SWM #1, SWM #2, SWM 3#, SWM #4, SWM #5, SWM #6, SWM #7, SWM #7A and SWM #8. The underground detention pipe is labeled as SWM #17. Please refer to Attachment E2 for detailed analysis and the Amended MDP Drawing SW-1: Overall Stormwater Management Practice Identification Plan.

## Hydrologic Analysis

The proposed site generally maintains the drainage pattern as close to existing conditions as possible. Study Points A, B and C as indicated on the attached drainage maps (Attachment E), were utilized to evaluate site runoff under pre- and post-development conditions. Study Points A and C discharge into NYSDOT right-of-way; thus requiring approval by NYSDOT (the MS4 having jurisdiction over that discharge).

All drainage area delineations for existing and proposed conditions are indicated on Existing and Proposed Drainage Maps provided in Attachment E.

Times of concentration were calculated under existing and proposed conditions by following TR-55 Handbook Guideline. Flows were established for existing and developed conditions utilizing the SCS Method.

The hydrograph calculations and summations were prepared using the HydroCAD software. The 1-, 5-, 10-, 25- and 100-year, 24-hour storm precipitation values that were provided in the software were used and were updated based on the latest rainfall depth as per NYSDEC design manual published on January 2015.

In order to assure that the maximum allowable impervious coverage is accounted for on all lots (including the Estate Home lots), the hydrologic analysis uses the Maximum Lot Coverage % for each residence type from the Silo Ridge Community MDP Bulk Design Standards in the Amended MDP.

The analysis indicates that the proposed conditions peak flows at all study points A B and C are less than the existing peak flows for all storms ranging from the 1-year to the 100-year design frequencies.

The drainage pipes (in conjunction with drainage swales for specific locations) have been designed to handle the 50-year storm runoff as required. Hydraulic grade line calculations have been performed utilizing StormCAD software and the analysis output is showed in Attachment F.

Refer to Summary Tables #1 and #2 for a comparison of flows produced under existing and developed conditions.

Refer to Attachment E for supporting calculations for the hydrologic analysis for both existing and proposed conditions.

**Table 1 – Existing Conditions Peak Flows**

| | | Peak Discharges (cfs) of Various Storm Frequency | | | | | |
|---|---|---|---|---|---|---|---|
| Study Point | Area (AC) | 1-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr |
| A | 249.16 | 17.71 | 77.00 | 94.02 | 164.66 | 226.07 | 343.08 |
| B | 462.9 | 20.44 | 111.01 | 130.82 | 263.57 | 427.78 | 791.92 |
| C | 70.89 | 0.02 | 1.81 | 2.84 | 11.17 | 21.18 | 42.65 |
| Total | 782.95 | 38.17 | 189.82 | 227.68 | 439.4 | 675.03 | 1177.65 |

**Table 2 – Proposed Conditions Peak Flows**

| | | Peak Discharges (cfs) of Various Storm Frequency | | | | | |
|---|---|---|---|---|---|---|---|
| Study Point | Area (AC) | 1-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr |
| A | 251.66 | 16.57 | 68.68 | 77.78 | 129.21 | 185.7 | 283.15 |
| B | 463.0 | 17.06 | 99.31 | 120.61 | 242.5 | 342.38 | 538.33 |
| C | 68.35 | 0.02 | 1.39 | 2.19 | 9.33 | 18.16 | 37.34 |
| Total | 783.01 | 33.65 | 169.38 | 200.58 | 381.04 | 546.24 | 858.82 |

There is NO INCREASE in peak discharge for the all storm events up to the 100- year storm under proposed conditions.

## Water Quality & Runoff Reduction

The proposed site utilized infiltration basins during the golf phase for water quality control. As per NYSDEC requirement, WQv of these infiltration basins (for the golf phase) are designed according to the 90% rule not the East of Hudson Standards. Only infiltration basin E will be utilized to receive runoff from the full build development and is sized as such that it will still satisfy the WQv requirement under East of Hudson Standards.

Some of these infiltration basins that are constructed during the golf phase will be eliminated during the full build development. The Amended MDP Drawing SW-1: Overall Stormwater

Management Practice Identification Plan shows the infiltration basins that will remain under full build conditions.

Under full build conditions, wet extended detention ponds and underground sand filters are proposed to provide WQv to meet the East of Hudson Standards. The WQv provided for the full build condition are self-satisfied by these proposed ponds and underground sand filters even without considering the WQv contributed by the remaining infiltration basin from the golf phase. In fact the total WQv provided is more than the required WQv. Therefore, the WQv provided by any of these infiltration basins is additional to the full build condition. Refer to Attachment E3 for detailed water quality calculations.

Note: RRv and WQv provided by the infiltration basins that are constructed during the golf phase are not being considered in the RRv and WQv analysis under full build conditions. This approach provides a more conservative and simple analysis. However, infiltration basin (SWM #11) was considered for the RRv and WQv credit as per the town review engineer recommendation.

Below is the summary of the Runoff Reduction Volume (RRv) & Water Quality Volume (WQv) analysis for the full build condition. Refer to Attachment E3 for the detailed RRv and WQv analysis.

| |
|---|
| *Required Water Quality Volume (WQv) =* ***35.726 ac-ft***<br>*With a Minimum Required Runoff Reduction Volume (RRv) based on HSG = 8.53 ac-ft*<br><br>*Total RRv Provided = 23.74 ac-ft*<br>*Total WQv Provided = 18.115 ac-ft*<br>*Total RRv + WQv Provided =* ***41.855 ac-ft*** |
| Total RRv + WQv Provided = **41.855 ac-ft** and is greater than WQv required of **35.726 ac-ft** |

## General Project Phasing

Site development for each phase will occur in three overlapping stages:

1. Site Preparation,
2. Construction, and
3. Final grading and Stabilization.

## *Site Preparation Stage*

Prior to beginning any construction activities, construction fences will be installed as shown on the attached project plans. Silt fencing and hay bale barriers will be entrenched to eliminate sediment underflow. Fencing will be placed around trees to be protected and will be at a minimum at the drip line of the longest branches. The erosion control barriers will be inspected and maintained routinely throughout the duration of the project. Following the installation of erosion and sediment controls, the site grading and excavation will occur.

The following steps will be followed to ensure that the controls are installed correctly and will be effective.

### Resource Protection

- Evaluate, mark and protect important trees and associated rooting zones, wetlands, and on-site septic systems absorption fields, etc.
- Fencing will be placed around trees to be protected and will be at a minimum at the drip line of the longest branches.
- Protect existing vegetated areas suitable for filter strips, especially in perimeter areas.
- Protect stream buffers and phasing lines as neccessary.

### Surface Water Protection

- Identify the drainage area in the plan. Divide the site into natural drainage areas.
- Divert the off-site clean runoff from entering disturbed areas.
- Identify bodies of water located either on-site or in the vicinity of the site.
- Plan appropriate practices to protect on-site or downstream surface water and its buffer.

### Stabilized Construction Exit

- Establish a temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway.

- Stabilize bare areas (entrances, construction routes, equipment parking areas) immediately as work takes place. Top these areas with gravel or maintain vegetative cover.
- Sediment tracked onto public streets should be removed or cleaned on a daily basis.
- A description of the Stabilized Construction Exit is included in Section VI Required Erosion and Sediment Control Practices.

## Perimeter Sediment Controls

- Silt fence material and installation must comply with the standard drawing and specifications.
- Silt fence and hay bale barriers will be entrenched to eliminate sediment underflow.
- Silt fences will be installed based on appropriate spacing intervals. This interval will decrease as the slope increases. Silt fence should be placed on or parallel to contours where there is no concentration of water flowing to the silt fence and where erosion occurs in the form of sheet erosion. On sloped areas, the area below the final silt fence shall be undisturbed ground.
- Principal sediment basins will be installed after construction site is assessed.
- Additional sediment traps and barriers will be installed as needed during grading.
- Erosion control blankets will be stapled and/or staked into place on slopes 4:1 or greater.
- The erosion control barriers will be inspected and maintained routinely throughout the duration of the project.

## Runoff Control

- Install practices after sediment traps are installed and before land grading starts.
- Control the runoff in each small drainage area before flow reaches runoff from entire site.
- Divert offsite or clean runoff from disturbed areas.
- Convey surface flows from highly erodible soil and steep slopes to more suitable stable areas.
- Runoff from existing or proposed cut and fill slopes should be redirected to reduce water velocity without causing erosion.
- Final site drainage should be designed to prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.

## Runoff Conveyance System

- Stabilize conveyance system.
- Channels and streambanks need to be seeded at the outlet points.
- Install check dams to slow down the velocity of concentrated flow.

- Protect existing natural drainage systems and streams by maintaining vegetative buffers and by implementing other appropriate practices.

### Groundwater Recharge Measures

- Install practices to infiltrate the runoff on the site as much as possible.
- Provide groundwater recharge to maintain the hydrologic regime of the downstream water bodies and simulate predevelopment hydrology.
- Use infiltration practices to prevent concentrated flows.
- 
- Provide soil decompaction or minimizing unneccessary soil compaction on site.

Temporary sediment basins will be constructed during this phase. Temporary berms and swales will be used to direct runoff to the basins on the site.

No sediment-laden water will be allowed to discharge to resource areas or to the existing stormwater management system on the site. Following the installation of erosion and sediment controls, the site grading and excavation will occur.

## *Construction Stage*

The proposed building, access drive, utility/infrastructure, stormwater management system, and landscaping will be constructed during this phase. Temporary swales and berms will be constructed and maintained and relocated by the contractor as necessary to control and direct runoff to temporary basins during this phase.

### Grading

- Limit the initial clearing and earth disturbance to that necessary to install sediment control measures. Excavation for footings, clearing, or other earth disturbance may only take place after the sediment and erosion controls are installed.
- Stockpile the topsoil removed from the site. The topsoil should be protected, stabilized and sited in a location away from the storm drains and waterbodies, and saved on-site for reuse if not contaminated.
- Changes in grade or removal of vegetation should not disturb established buffers and should not be allowed within any regulated distance from wetlands, the high water line of a body of water affected by tidal action, or other such protected zones.
- Avoid unnecessary disturbance of steep slopes.
- An undisturbed buffer should be maintained to control runoff from steep slopes within sensitive areas.
- Proposed grading should not impair existing surface drainage resulting in a potential erosion hazard impacting adjacent land or waterbodies.

## Erosion Control (Stabilization)

- Implement erosion control practices to keep the soil in place.
- Stabilization should be completed immediately for the surface of all perimeter controls and perimeter slopes.
- When activities temporarily cease during construction, soil stockpiles and exposed soil should be stabilized by seed, mulch or other appropriate measures as soon as possible, but in no case more than 14 days after construction activity has ceased.
- Apply temporary or permanent stabilization measures immediately on all disturbed areas where work is delayed or completed.
- Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable;
- Where more than five (5) acres is disturbed at one time; in areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specification for Erosion and Sediment Control. *Please note that NYSDEC approval is required prior to disturbing more than 5 acres at any one time.*
- Consult the local Soil and Water Conservation District for proper timing and application rate of seed, fertilizer and mulch.

## Sediment Control

- At any location where surface runoff from disturbed or graded areas may flow off the construction area, sediment control measures must be installed to prevent sediment from being transported off site. No grading, filling or other disturbance is allowed within existing drainage swales.
- Swales or other areas that transport concentrated flow should be appropriately stabilized.
- Downspout or sump pump discharges must have acceptable outfalls that are protected by splash blocks, sod, or piping as required by site conditions (i.e., no concentrated flow directed over fill slopes).

## Maintenance and Inspections

- Identify the type, number and frequency of maintenance actions required for stormwater management and erosion control during construction and for permanent practices that remain on the site once construction is finalized.
- Inspections must be indicated on the Construction Sequence Schedule to be prepared by the owner/contractor.

- Inspections must be performed every 7 calendar days.
- For construction where soil disturbance activities are greater than five (5) acres of soil at any one time, the inspection must be performed at least two (2) times every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.
- Inspections must verify that all practices are adequately operational, maintained properly, and that sediment is removed from all control structures.
- Inspections must look for evidence of the soil erosion on the site, potential of pollutants entering drainage systems, problems at discharge points (such as turbidity in receiving water), and signs of soil and mud transport from the site to the public road at the entrance.
- Routine maintenance must be identified on the schedule and performed on a regular basis and as soon as a problem is identified.
- Identify the person or entities responsible for conducting the maintenance actions during construction and post-construction.
- Retain a copy of the inspection on-site with the SWPPP.
- Color photographs shall be taken during inspection and shall be included in the inspection report.
- Inspection and maintenance shall be in compliance with Part IV of the SPDES Permit requirements.

## *Final Grading and Stabilization Stage*

Final site grading and stabilization will be completed as soon as practicable to eliminate exposed soils and potential sources of erosion. Areas to be paved will be covered by bituminous pavement after final subgrades are established. All litter, as well as debris generated by construction activities, will be removed by hand from the site and adjacent undeveloped areas.

### Finalize Grading & Landscaping

- Identify the final grading and stabilization plan once the construction is completed.
- All open areas, including borrow and spoil areas must be stabilized.
- Plan a permanent top soil, seed, sod, mulch, riprap or other stabilization practices in the remaining disturbed areas as appropriate.
- Stabilization must be undertaken no later than 14 days after construction activity has ceased except as noted in the GP-0-10-001.
- Remove the temporary control measures.
- 
- Provide soil decompaction or minimizing unneccessary soil compaction on site.

### Post-construction Controls

- Identify the permanent structural or non-structural practices that will remain on the site.
- Ensure that the permanent structural or non-structural practices utilized during construction are properly designed to suit the post-construction site conditions.
- In finalizing the plan, evaluate the post-construction runoff condition on the site.
- Minimize the risk of concentrated flow and erosion.
- On-site runoff controls help reduce the risk of increased runoff velocity, erosion and point source discharge. In addition to the standard runoff and erosion control practices identified in NY Standards for Erosion and Sediment Control, some of the techniques discussed under on-site runoff control in the discussion of Site Preparation may be applied.

## Project Materials

The materials or substances below are expected to be present on-site during the construction period:

| | |
|---|---|
| *Structural Steel* | *Welding Supplies* |
| *Concrete* | *Petroleum-Based Products* |
| *Metal Studs* | *Paints* |
| *Cleaning Solvents* | *Wood* |
| *Detergents* | *Fertilizer* |

This materials list will be updated by the contractor, as necessary, prior to and during the construction process.

## Non-Industrial Discharges

The following non-stormwater discharges may occur on this construction site:

- Fire hydrant flushing;
- Potable water including uncontaminated water line flushing;
- Pavement wash water where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
- Uncontaminated air conditioning or compressor condensate;
- Uncontaminated ground water or spring water;
- Foundation or footing drains where flows are not contaminated with process materials such as solvents; and
- Uncontaminated excavation dewatering.

# V
# Construction Schedule and Sequence

Construction of the Modified Project is expected to occur over two phases, taking approximately eight years. The construction phasing that is currently anticipated is illustrated conceptually on Amended MDP Drawing SP-5 “Overall Phasing Plan”. Refer to Attachment H: Construction Sequence Plans for detailed phasing. It is noted that the sequencing of each of the residential components will depend on market demand.

PHASE 0/I: Year 1 to Year 6

- Clear, grub and rough grade the first phase area
- Construct/install infrastructure for first phase
- Construct water system and WWTP
- Sales Office and General Store
- Golf Course improvements, Golf Academy, Comfort Stations and Golf Maintenance Facility
- Clubhouse/Lodge
- Village Green neighborhood, Golf Villas neighborhood, South Lawn neighborhood homes and Estate Homes
- Artisan’s Park Overlook

PHASE II: Year 6 to Year 8

- Clear, grub and rough grade the second phase area
- Construct/install infrastructure for second phase
- Winery Restaurant
- Vineyard Cottages

The Owner/Operator will update his construction schedule and sequence as needed and maintain a list of construction milestones.

The Site Contractor shall follow construction sequence scheduling as shown on the Site Plans provided for each construction phase. The sequence of actions in an Erosion and Sediment

Control (E&SC) plan is runoff control, stabilization, and then sediment control. The management practices used in each phase of the plan must be identified on the Construction Sequence Schedule and/or on appropriate maps.

Erosion and sediment control provisions should be included for all construction activities where any excavation, stripping, filling, grading or earth movement takes place. Provide dimensional details of proposed practices. The details must include plan & vertical view (cross sectional design) calculations used in the sizing and justification for the siting of selectedpractices.

# VI
# Required Erosion and Sediment Control

The Owner/Operator will be responsible for ensuring that the specified stormwater pollution control measures are installed, maintained, relocated and added as necessary. Details of recommended stormwater pollution control techniques are provided below.

## Erosion and Sediment Controls

The purpose of an erosion and Sediment control program is to minimize temporary impacts to down gradient wetlands during the construction phase of the project by retaining sediment on site to the maximum extent practicable. The program incorporates BMPs specified in guidelines developed by the DEC[1] and complies with the requirements of the SPDES General Permit for Storm Water Discharges from Construction Activities.

Proper implementation of the erosion and sediment control program will:

- Minimize exposed soil areas through temporary seeding and construction sequencing;
- Place structures to manage stormwater runoff and erosion; and
- Establish a permanent vegetative cover or other forms of stabilization as soon as practicable.

All manufactured control measures must be installed and maintained in accordance with the manufacturer's specifications. The following sections describe the erosion and sediment controls that will be used on this site. The Owner/Operator will implement and add to these site conditions, when required.

### *Stabilization Practices*

*Stabilization practices to be used on this site include mulching and temporary seeding. Stabilization practices will be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased. The project has been designed to preserve existing vegetation where possible.*

1 New York State Department of Environmental Conservation (DEC). *New York Stormwater Management Design Manual*, August 2010 and *New York Standards and Specifications for Erosion and Sediment Control*, August 2005

## *Site Layout*

*A naturally occurring vegetated buffer that will be flagged on site before construction will provide protection for the on-site wetland areas and resources adjacent to the site in addition to the various selected BMPs.*

## *Mulching*

*Straw mulching will be employed on all inactive and disturbed areas that will remain unstabilized for more than 14 days. Mulch materials will be spread uniformly by hand or machine at a rate of approximately 100 pounds per 1,000 square feet. Mulch will be spread such that at least 75 percent of the ground surface is covered. Mulching may be used with temporary or permanent seeding, or with slope stabilization techniques. Hydro mulch may also be used for temporary soil stabilization*

- Where more than five (5) acres is disturbed at any one time; in areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the most current version of the technical standard, New York State Standards and Specification for Erosion and Sediment Control. *Please note that NYSDEC approval is required prior to disturbing more than 5 acres at any one time.*

## *Erosion Control Slope Blankets*

*Upon completion of final grading, any areas not covered by pavement, other forms of stabilization or landscaping and which are on slopes of 4:1 and greater will be protected with erosion control slope blankets and seeded with an erosion control seed mix. The blanket will be installed from the top of the slope, with the upper edge of the blanket secured in a trench. Blankets shall be unrolled down the slope or swale in the direction of the water flow. Edges of blanket shall be stapled with approximately four inches of overlap where two or more strip widths are required. The end of an upper blanket shall overlap the end of a lower blanket by at least six inches and both ends shall be stapled in place. The blankets will be staked and/or stapled into place as per manufacturer's recommendations.*

## *Temporary Seeding*

*A temporary vegetative cover will be established on areas of exposed soils (including stockpiles) that remain inactive and unstabilized for a period of more than 14 days for slopes. The seeded surfaces will be covered with a layer of straw mulch or hydro mulch as described above.*

### *Permanent Seeding*

*Upon completion of final grading, any areas not covered by pavement, other forms of stabilization, or other methods of landscaping will be seeded with an erosion control seed mix. Loamed and seeded areas will be mulched with hay to prevent erosion prior to germination of the seed.*

## *Structural Practices*

Structural erosion and Sediment controls to be used on the site include the following:

### *Hay Bale and Silt Fence Barriers*

*Prior to any ground disturbance, a professional engineer or land surveyor will certify that a barrier of staked hay bales and silt fence is in place at the down gradient limit of work in accordance with the plan filed with the Conservation Commission (see relevant plans). When necessary, additional hay bales and silt fence barriers will be installed immediately down gradient of erosion-prone areas, such as the base of steep exposed slopes and around the base of stockpiles, throughout the construction phase of the project. The barriers will be entrenched into the substrate to prevent underflow.*

*The erosion control barriers will be inspected weekly and after every storm event. Any sediment that collects behind the barriers will be removed and will be either reused at the site or disposed of at a suitable offsite location. Any damaged sections of silt fence or hay bales will be repaired or replaced.*

### *Catch Basin Inlet Protection*

*The inlets of proposed catch basins will be protected from sediment inflow during the work period by following the guidelines specified by New York State Standards and Specifications for Erosion and Sediment Control (aka blue book) or approved equal.*

### *Stabilized Construction Exits*

*Stone anti-tracking pads will be installed at each access point to the work area to prevent the off-site transport of sediment by construction vehicles. The stabilized construction exits will be at least fifty feet long and will consist of a 6-inch thick layer of crushed stone (1.5 to 2.5 inches in diameter). The stone will be placed over a layer of non-woven filter fabric. The anti-tracking pads will remain in place until a binder coat of pavement has been established in areas to be paved.*

## *Diversion Channels*

*Diversions will also be used to collect runoff from construction areas and convey it to a temporary sediment basin or trap. Diversion Channels must be constructed properly with stabilized beds using crushed stone, plastic or other approved materials, and crushed stone check dams as necessary.*

*Temporary diversions will remain in place until slopes are permanently stabilized or graded level. If vegetation of the diversion channel is required to avoid erosion of the channel, the channel will be temporarily stabilized to ensure viability of the grass seed.*

## *Temporary Sediment Basins*

*Temporary sediment basins will be designed either as excavations or bermed stormwater detention structures (depending on grading) that will retain runoff for a sufficient period of time to allow suspended soil particles to settle out prior to discharge. These temporary basins will be located at the low points on the site and will receive runoff via temporary diversion swales. A perforated riser surrounded by a crushed stone filter will control discharge from the basin. Points of discharge from sediment basins will be stabilized to minimize erosion. Refer to Attachment E for detailed calculations.*

## *Riprap Outlet Protection*

*The purpose of riprap outlet protection is to reduce velocity and energy of water such that the flow will not erode the receiving downstream reach. The riprap outlet protection is placed at the outlet of the culvert, drainage pipe, and channel. Refer to Attachment E5 for detailed calculations.*

## *Construction Details of Erosion & Sediment Control Practices*

*The construction details of erosion & sediment control practices can be found at page C14.03 in the site plan set.*

# VII
# Additional Erosion and Sediment Controls

The following controls may be implemented on the site if necessary.

## Interior Site Erosion Controls

Additional erosion controls may be used in the central portions of the site in the event that excessive erosion occurs. Placement of temporary silt fence, hay bales or earthen berms may be used to control the movement of material within the site. If such controls are deemed necessary for adequate protection, they will be installed perpendicular to the flow direction to contain sediment. These measures will be installed to prevent perimeter erosion controls and diversion swales from becoming compromised.

## Dust Control

Fugitive dust from large areas of unstabilized soil can be a problem during construction. On dry and windy days when dust generation is a concern, a water truck will traverse the site and spray water as necessary to prevent dust from forming.

# VIII
# Water Quality and Water Quantity Controls

The Owner/Operator will be responsible for ensuring that the specified water quality and water quantity control measures are installed and maintained as necessary. Details of recommended stormwater pollution control techniques are provided below.

## Water Quality Controls

Water quality control measures are designed to minimize impact to receiving waterbodies from stormwater pollution. As stormwater runoff travels across impervious surfaces, it collects pollutants such as sediments, oil, and trash and carries them to a receiving waterbody. Properly installed and maintained stormwater best management practices (BMPs) can capture these pollutants and reduce the impact that the proposed development has on the environment. The BMPs selected for this project were designed based on guidelines developed in the New York State Stormwater Management Design Manual[2].

Proper implementation of the water quality control measures will:

- reduce post-construction sediment impacts; and
- promote infiltration of stormwater to maintain pre-construction hydrology

All manufactured control measures must be installed and maintained in accordance with the manufacturer's specifications. The following sections describe the water quality controls that will be used on this site. The Owner/Operator will implement and add to these site conditions, when required.

2 New York State Department of Environmental Conservation (DEC). *New York Stormwater Management Design Manual*, August 2010

## *Non-structural Practices*

### Pavement Sweeping

The sweeping program will remove sediments and contaminants directly from paved surfaces before their release into stormwater runoff. Pavement sweeping has been demonstrated to be an effective initial treatment for reducing pollutant loading.

### Catch Basin Cleaning

Sediments and other contaminants that are not removed by pavement sweeping are transported by stormwater runoff to the site's catch basin system. Once in the catch basin, the sediment settles to the bottom of the system. This material will be removed on a regular basis to prevent contaminants from migrating out of the drainage system during high flow events or reducing the infiltration capacity of the devices.

## *Structural Practices*

Structural erosion and sediment controls to be used on the site include the following:

### Underground Sand Filter

Underground sand filter is an infiltration practice that treats, captures and temporarily stores the stormwater as it flows through a filter bed of sand. Sediment chamber need to be cleaned when the sediment chamber reaches more than 6" in depth. Silt/sediment removed from the filter bed after it reaches one inch.

### Wet Extended Detention /Pocket Pond

Forebay and permanent pool are part of the proposed detention basin. The purpose of the forebay and permanent pool are to trap sediment from on-site runoff. Sediment removal in the forebay and permanent pool shall be performed every five to six years or after 50% of its capacity have been lost.

## *Infiltration Practices*

The following infiltration practices have been selected and approved for installation at this site.

### Infiltration Basin

Infiltration basin captures and temporarily stores the WQv before allowing it to infiltrate into the soil. An underdrain pipe is proposed at the infiltration basin to enhance the infiltration process. All of the proposed infiltration basins are for the golf phase except SWM #11 where it also receives some of the runoff from the full build conditions as indicated on the Amended MDP Drawing SW-1: Overall Stormwater Management Practice Identification Plan.

## Water Quantity Controls

*Water quantity controls are implemented to manage the discharge rate of stormwater runoff generated from the proposed development. The primary goals of stormwater quantity management are to make sure the 10-year storm (overbank flood) and 100-year storm (Extreme flood) flow rates under proposed conditions are equal or less than the existing conditions.*

### *Detention Practices*

#### Wet Extended Detention Pond / Dry Detention Basin

The detention pond/basin storage volume and a set of outlet openings that consists of orifice(s), weir(s) and an emergency spillway are a major component in water quantity control measures. The outlet openings are designed such that all the proposed flow rates under proposed conditions are equal or less than the existing conditions.

#### Underground Detention Pipe

The underground pipes temporarily store the flood volume and slowly discharge the volume through an outlet structure. The outlet openings are designed such that all the proposed flow rates under proposed conditions are equal or less than the existing conditions.

# IX
# Maintenance, Inspections and Project Documentation

The SPDES Construction General Permit requires that the Owner/Operator be responsible for implementing, inspecting and maintaining each of the stormwater controls described in the plan. In addition, the Owner/Operator must document compliance with the permit throughout construction.

## Inspections

The operator shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP and required by this permit have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Following the commencement of construction, site inspections shall be conducted by the qualified professional at least every 7 calendar days. If the soil disturbance is greater than five (5) acres at any one time, the qualified inspector shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days. During each inspection, the qualified professional shall record the information required by Part IV.C.4 of the Permit. Color photographs shall be taken during inspection and shall be included in the inspection report

Inspections shall include all areas of the site disturbed by construction activity and used for material storage that is exposed to precipitation. The Inspector must look for evidence of, or the potential for, pollutants entering the stormwater system. Additionally, the inspector must inspect the BMPs installed as part of the Plan, the site drainage outfalls and the site egress points for tracking. If, in the course of the inspection, the inspector identifies an eroded area or an area impacted by sedimentation, additional erosion and sediment controls will be implemented, and the SWPPP will be revised to include these changes.

For each inspection, the Inspector must complete a written inspection report in accordance with the permit. A sample inspection form has been included at the end of this section. The operator shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction, the operator shall certify in the site log book that the SWPPP, prepared in accordance with Part III of this permit, meets all Federal, State and local erosion and sediment control requirements. The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

The completed forms become part of the Owner/Operator's SWPPP and should be maintained for five years after the filing of the Notice of Termination. Prior to filing of the Notice of Termination or the end of permit term, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.

## Maintenance

All erosion and sediment controls and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections identify BMPs that are not operating effectively, maintenance, modification or replacement with an alternative or additional BMPs must be performed as soon as possible, and before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation must be documented in the SWPPP and alternative BMPs must be implemented as soon as possible.

The following maintenance program is proposed to ensure the effectiveness of the structural controls during the construction phase of this project:

- The on-site representative will inspect all sediment and erosion control structures and records of the inspections will be prepared and maintained on-site by the Owner/Operator.
- Silt shall be removed from behind barriers if greater than 6-inches deep or as needed.
- Paved areas of the site will be swept on an as needed basis during the site construction.
- Damaged or deteriorated items will be repaired immediately after identification.
- The underside of hay bales should be kept in close contact with the earth and reset as necessary.
- Sediment from sediment traps or sedimentation ponds must be removed when design capacity has been reduced by 50 percent or every five to six years.
- Sediment that is collected in structures shall be disposed of properly and covered if stored on-site.
- Erosion control structures shall remain in place until all disturbed earth has been securely stabilized. After removal of structures, disturbed areas shall be re-graded and stabilized as necessary.

- A conspicuous and legible sign of not less than 18 inches by 24 inches shall be erect or post in the immediate vicinity of each stormwater management practices bearing the following information:

  Stormwater Management Practice – (name of practice)
  Project Identification - (SPDES Construction Permit #, other)
  Must Be Maintained In Accordance With O&M Plan
  DO NOT REMOVE OR ALTER

- Refer to Silo Ridge Resort Community Phase 1 Site Plan Drawings C-14.01 and C14.02 for stormwater management details.
- Refer to Attachment B for the maintenance inspection checklist for each stormwater management practice.

If, in the course of the inspection, the inspector identifies an eroded area or an area impacted by sedimentation, additional erosion and sediment controls will be implemented, and the SWPPP will be revised to include these changes.

## Documentation

The following records must be maintained as part of the Owner/Operator's SWPPP:

- Dates when major grading activities occur;
- Dates when construction activities temporarily or permanently cease on a portion of the site;
- Dates when stabilization measures are initiated;
- Inspection dates and processes.

# X
# Spill Prevention Plan and Response Procedures

All construction personnel will be instructed regarding spill prevention practices and procedures. Notices stating these practices will be posted in the office trailer, and the site construction supervisor will be responsible for overseeing that these procedures are followed.

## Material Management Practices

The following material management practices will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. These include good housekeeping practices and guidelines for the handling of hazardous products.

The following good housekeeping practices will be followed on-site during the construction period.

- An effort will be made to store only enough products required to do the job.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers, and (if possible) under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The site superintendent will inspect the storage area daily to ensure proper use and disposal of materials on-site.

The following practices will reduce the risks associated with hazardous materials (e.g., petroleum products, solvents):

- A copy of all Material Safety Data Sheets (MSDS) for materials or products used during construction will be kept in the office trailer.
- Products will be kept in original containers unless they are not re-sealable.

- Original labels and material safety data (MSD sheets) will be retained; they contain important product information.
- If surplus product must be disposed, manufacturer's or local- and state-recommended methods for proper disposal will be followed.

## Product-Specific Practices

The following product-specific practices will be followed on-site. Recommendations are provided for petroleum products, fertilizers, solvents, paints, and other hazardous substances, and concrete.

### Petroleum Products

All on-site vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. No vehicle maintenance or handling of petroleum products will occur within 100 feet of a wetland or waterway. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on-site will be applied according to manufacturer's recommendations. No petroleum-based or asphalt substances will be stored within 100 feet of a wetland or waterway.

### Fertilizers

Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered shed; and the contents of any partially used bags will be transferred to a sealable, plastic bin to avoid spills. No fertilizer storage will occur within 100 feet of a wetland or waterway. Refer to the “NYS Dishwater Detergent and Nutrient Runoff Law” for regulations regarding the usage of fertilizers. Usage of fertilizers also shall be restricted in the aquifer overlay district and any restrictions from the habitat management plan. Refer to Natural Resources Management Plan (NRMP).

### Solvents, Paints, and other Hazardous Substances

All containers will be tightly sealed and stored when not required for use. Excess materials will not be discharged to the storm sewer system, but will be properly disposed according to manufacturer's instructions or state and local regulations. No storage will occur within 100 feet of a wetland or waterway.

### Concrete Trucks

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water within 100 feet of wetland resources or into catch basins that are already in place.

## Spill Control/Notification Practices

In addition to the good housekeeping and material management practices discussed above, the following practices will be followed for spill control, notification and cleanup.

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but will not be limited to, shovels, wheelbarrows, brooms, dustpans, mops, rags, gloves, goggles, kitty litter or Speedi-Dry, sand, sawdust, and plastic and metal trash containers specifically designated for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material in excess of reportable quantities, as established by the New York State Department of Environmental Conservation (NYSDEC), will be reported to the NYSDEC Spill Hotline: 1-800-457-7362 (within NYS) or 1-518 457-7362 (from outside NYS) or to the National Response Center: 1-800-424-8802. The Emergency Spill Response Procedure is attached.
- The construction superintendent responsible for the daily operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel to receive spill prevention and cleanup training. The names of the responsible spill personnel will be posted in the material storage area and in the on-site office trailer.

## *Source Control*

Trash removal, designated trash storage areas, pavement sweeping and the controlled use of fertilizer and deicing agents on the site will reduce the pollutant load in the site's stormwater management system.

### Construction Trash Removal

Daily loose trash removal will prevent litter, construction debris, and construction chemicals exposed to stormwater from becoming a pollutant source for stormwater discharges. All loose trash will be placed in appropriate storage containers until disposed of properly off-site.

### Covered Trash/Storage Areas

Areas to be used for storing dumpsters, compactors or other raw or waste materials will be covered to prevent contact with stormwater.

### Pavement Sweeping

Pavement sweeping may be required daily or even more frequently during construction where sediment tracking from construction equipment is a problem.

### Fertilizer

Only slow-release organic fertilizers will be used in landscaped areas. This will limit the amount of nutrients that could enter the stormwater and wetland systems. Fertilizer use will be reduced once the proposed landscaping is established. Refer to the “NYS Dishwater Detergent and Nutrient Runoff Law” for regulations regarding the usage of fertilizers.

## *Waste Disposal*

All waste materials will be collected and stored in securely lidded metal dumpsters leased from a licensed solid waste management company and the dumpster will be emptied as necessary. Trash will be hauled by a licensed contractor and disposed in accordance with federal, state, and local environmental regulations. No trash or construction waste will be buried on-site, and all personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and the site construction supervisor will be responsible for seeing that these procedures are followed.

### Hazardous Waste

All hazardous waste materials (e.g., petroleum products, solvents) will be disposed in the manner specified by local and state regulation, or by the manufacturer. Site personnel will be instructed in these practices, and the site construction supervisor will be responsible for seeing that these procedures are followed.

### Sanitary Waste

All sanitary waste will be collected from the portable units by a licensed contractor a minimum of three times weekly, and disposed in compliance with state and local regulation.

# Spill Response Procedure

### Initial Notification

In the event of a spill, the facility and/or construction manager or supervisor will be notified immediately.

Facility Manager: (name) ______________________________

(phone) ______________________________

Construction Manager: (name) ______________________________

(phone) ______________________________

### Assessment - Initial Containment

The supervisor or manager will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. The supervisor will first contact the *Town of Amenia* Fire Department and then notify the *Town of Amenia* Police Department and *Dutchess County* Public Health Commission. The fire department is ultimately responsible for matters of public health and safety and should be notified immediately.

Fire Department: 911 or *(845) 373-8467*

Police Department: *(845) 373-4300*

*Dutchess County* Public Health Commission: *(845) 486-3400*
*(845) 431-6465 (after hours)*

### Further Notification

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The New York Department of Environmental Conservation and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of cleanup and notification required. The attached list of emergency phone numbers shall be posted in the main construction/facility office and readily accessible to all employees.

NYSDEC Spill Hotline: 1-800-457-7362 (within NYS)

National Response Center: 1-800-424-8802 / (518) 457-7362 (outside NYS)

For further information, contact:

New York State Department of Environmental Conservation

Division of Environmental Remediation

Bureau of Spill Prevention & Response

625 Broadway – 11th Floor

Albany, NY 12233-7020

(518) 402-9546

## HAZARDOUS WASTE / OIL SPILL REPORT

Date____/_____/______ Time_____________ AM / PM

Exact location (Transformer #)__________________________________________________________

Type of equipment_____________________________Make______________Size_______________

S / N____________________________________Weather Conditions__________________________

On or near water ☐ Yes If yes, name of body of water_____________________

☐ No

Type of chemical / oil spilled____________________________

Amount of chemical / oil spilled_________________________

Cause of spill____________________________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

Measures taken to contain or clean up spill______________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

Amount of chemical / oil recovered_________________Method______________________________

Material collected as a result of clean up

______________drums containing_______________________________________________________

______________drums containing_______________________________________________________

______________drums containing_______________________________________________________

Location and method of debris disposal_________________________________________________

__________________________________________________________________________________

Name and address of any person, firm, or corporation suffering damages____________________

__________________________________________________________________________________

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring___

__________________________________________________________________________________

Spill reported to General Office by____________________________Time______________AM / PM

Spill reported to DEC / National Response Center by_______________________________________

DEC Date____/_____/______ Time__________ AM / PM Inspector________________

NRC Date____/_____/______ Time__________ AM / PM Inspector________________

Additional comments_______________________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

## EMERGENCY RESPONSE EQUIPMENT INVENTORY

The following equipment and materials shall be maintained at all times and stored in a secure area for construction activities emergency response need.

| | | |
|---|---|---|
| -- | SORBENT PADS | 5 PADS |
| -- | SAND BAGS (empty) | 10 |
| -- | SPEEDI-DRI ABSORBENT | 5 40# BAGS |
| -- | SHOVEL | 1 |
| -- | PICK | 1 |
| -- | PRY BAR | 1 |

The following items shall be placed in a convenient, readily accessible location on site.

| | | |
|---|---|---|
| -- | HAY BALES & GRADE STAKES | 10 |
| -- | SAND | 2 CUBIC YARDS |

**EMERGENCY NOTIFICATION PHONE NUMBERS**

1. SUPERVISOR/MANAGER
   NAME: ________________ BEEPER: ______________________
   PHONE: ________________ HOME PHONE: ________________

   ALTERNATE:
   NAME: ________________ BEEPER: ______________________
   PHONE: ________________ HOME PHONE: ________________

2. *Town of Amenia* FIRE DEPARTMENT
   EMERGENCY: 911 or *(845) 373-8467*

   *Town of Amenia* POLICE DEPARTMENT
   GENERAL NUMBER: *(845) 373-4300*

3. CLEANUP CONTRACTOR: ___________________________
   ADDRESS: _________________________________
   PHONE: ___________________________________

4. NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION
   EMERGENCY: 1-800-457-7362
   OUTSIDE NEW YORK: 1-518 457-7362

5. NATIONAL RESPONSE CENTER
   PHONE: 1-800-424-8802

   ALTERNATE: U.S. ENVIRONMENTAL PROTECTION AGENCY
   BUSINESS: 1-212-637-3660

6. *Dutchess County* PUBLIC HEALTH COMMISSION – ENVIRONMENTAL PROTECTION
   PHONE: *(845) 486-3400*
   *(845) 431-6465 (after hours)*

# XI
# Notice of Termination Form

**New York State Department of Environmental Conservation**
**Division of Water**
**625 Broadway, 4th Floor**
**Albany, New York 12233-3505**
***(NOTE: Submit completed form to address above)***

# NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

**Please indicate your permit identification number:** NYR ___ ___ ___ ___ ___ ___

**I. Owner or Operator Information**

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

5. Contact Person E-Mail:

**II. Project Site Information**

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

**III. Reason for Termination**

9a. ☐ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP.
***Date final stabilization completed** (month/year): ________________________________________

9b. ☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. ☐ Other (Explain on Page 2)

**IV. Final Site Information**:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? ☐ yes ☐ no ( If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed?
☐ yes ☐ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

__________________________________________________________________

## NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? ☐ yes ☐ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):
- ☐ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practices that are privately owned, the deed of record has been modified to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? ______________________________ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? ☐ yes ☐ no
(If Yes, complete section VI - "MS4 Acceptance" statement

**V. Additional Information/Explanation:**
(Use this section to answer questions 9c. and 10b., if applicable)

**VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative** (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

| Signature: | Date: |
|---|---|

**NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued**

| |
|---|
| **VII. Qualified Inspector Certification - Final Stabilization**: |
| I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. |
| Printed Name: |
| Title/Position: |
| Signature:      Date: |
| **VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):** |
| I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. |
| Printed Name: |
| Title/Position: |
| Signature:      Date: |
| **IX. Owner or Operator Certification** |
| I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings. |
| Printed Name: |
| Title/Position: |
| Signature:      Date: |

# XII
# SPDES Permit & Fact Sheet

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

**CONSTRUCTION ACTIVITY**

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015 Expiration Date: January 28, 2020

John J. Ferguson
Chief Permit Administrator

1 / 12 / 15

Authorized Signature Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

## PREFACE

Pursuant to Section 402 of the Clean Water Act (“CWA”), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System (“NPDES”)* permit or by a state permit program. New York’s *State Pollutant Discharge Elimination System (“SPDES”)* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law (“ECL”).*

This general permit (“permit”) is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation (“the Department”) regional office (see Appendix G).They are also available on the Department’s website at:
http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of “*construction activity*”, as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES**
**FROM CONSTRUCTION ACTIVITIES**

# Part I. PERMIT COVERAGE AND LIMITATIONS

## A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

## B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

(i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s;

(ii) Control stormwater *discharge*s to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;

(iii) *Minimize* the amount of soil exposed during *construction activity*;

(iv) *Minimize* the disturbance of *steep slopes*;

(v) *Minimize* sediment *discharge*s from the site;

(vi) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

(vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and

(viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from dewatering activities, including *discharge*s from dewatering of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharges*.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

### C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

   a. ***Sizing Criteria* for *New Development***

      (i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

      (ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

      **In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual**. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

b. ***Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed**

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

**In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual.** The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

*c.* ***Sizing Criteria* for *Redevelopment Activity***

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or
(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

*d.* ***Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development***

Construction projects that include both *New Development* and *Redevelopment Activity* shall provide post-construction stormwater management controls that meet the *sizing criteria* calculated as an aggregate of the *Sizing Criteria* in Part I.C.2.a. or b. of this permit for the *New Development* portion of the project and Part I.C.2.c of this permit for *Redevelopment Activity* portion of the project.

**D. Maintaining Water Quality**

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

**E. Eligibility Under This General Permit**

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater *discharges* may be authorized by this permit: *discharge*s from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated *groundwater* or spring water; uncontaminated *discharge*s from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these *discharge*s must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

**F. Activities Which Are Ineligible for Coverage Under This General Permit**

All of the following are **<u>not</u>** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an endangered or threatened species unless the *owner or operator* has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb one or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture (“USDA”) Soil Survey for the County where the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb two or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.C.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
      (i) No Affect
      (ii) No Adverse Affect

(Part I.F.8.c.iii)

(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharges* from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

## II. Part II. OBTAINING PERMIT COVERAGE

### A. Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to *discharge* under this permit. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/ ). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

**NOTICE OF INTENT**
**NYS DEC, Bureau of Water Permits**
**625 Broadway, 4$^{th}$ Floor**
**Albany, New York 12233-3505**

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI.

   The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

**B. Permit Authorization**

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

   c. the final SWPPP has been prepared, and

   d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

(ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

(iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. The Department may suspend or deny an *owner's or operator's* coverage

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.B. of this permit.

## C. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-15-002), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

   a. The *owner or operator* shall

have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the *regulated, traditional land use control MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice

**D. Permit Coverage for Discharges Authorized Under GP-0-10-001**

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

**E. Change of *Owner or Operator***

2. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

(Part III)

## III. Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

### A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

   a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

   b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the

SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.C.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   > "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

   In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

**B. Required SWPPP Contents**

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project;

   b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

   c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

   d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

   b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

   c. A Stormwater Modeling and Analysis Report that includes:

      (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

      (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

      (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

      (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

## C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

## Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

### A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

### B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

### C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

   d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* <u>and</u> all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of *discharge* from the construction site.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

   a. Date and time of inspection;

   b. Name and title of person(s) performing inspection;

   c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

   d. A description of the condition of the runoff at all points of *discharge* from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

   e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

   f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

   g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

   h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.C.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

## V. Part V. TERMINATION OF PERMIT COVERAGE

### A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

   b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

   c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E. of this permit.

   d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

(Part V.A.5)

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

   a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

   b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

   c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

   d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

## VI. Part VI. REPORTING AND RETENTION OF RECORDS

### A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

### B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the  Regional Office listed in Appendix F.

# VII. Part VII. STANDARD PERMIT CONDITIONS

## A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

## B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

## C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

## D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

**E. Duty to Mitigate**

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

**F. Duty to Provide Information**

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

**G. Other Information**

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

**H. Signatory Requirements**

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

        (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

### I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

### J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

### K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharge*r authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharge*r in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

*discharge* under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

**L. Proper Operation and Maintenance**

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

**M. Inspection and Entry**

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a construction site which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

**N. Permit Actions**

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

**O. Definitions**

Definitions of key terms are included in Appendix A of this permit.

**P. Re-Opener Clause**

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

**Q. Penalties for Falsification of Forms and Reports**

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

**R. Other Permits**

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

VIII. **APPENDIX A**

# Definitions

**Alter Hydrology from Pre to Post-Development Conditions -** means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

**Combined Sewer -** means a sewer that is designed to collect and convey both “sewage” and “stormwater”.

**Commence (Commencement of) Construction Activities -** means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for “*Construction Activity(ies)*” also.

***Construction Activity*****(ies) -** means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal*.* Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

**Direct Discharge (to a specific surface waterbody) -** means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

**Discharge(s)** - means any addition of any pollutant to waters of the State through an outlet or point source.

**Environmental Conservation Law (ECL)** - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

**Equivalent (Equivalence)** – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

**Final Stabilization -** means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

**General SPDES permit** - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

**Groundwater(s)** - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

**Historic Property** – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State
or National Registers of Historic Places.

**Impervious Area (Cover) -** means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

**Infeasible** – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

**Larger Common Plan of Development or Sale -** means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

**Minimize** – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

**Municipal Separate Storm Sewer (MS4)** - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made
channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

**National Pollutant Discharge Elimination System (NPDES)** - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

**New Development** – means any land disturbance that does meet the definition of Redevelopment Activity included in this appendix.

**NOI Acknowledgment Letter** - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

**Owner or Operator** - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

**Performance Criteria** – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf ) in Part I.C.2. of the permit.

**Pollutant** - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

**Qualified Inspector** - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

**Qualified Professional -** means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York..

**Redevelopment Activity(ies)** – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

**Regulated, Traditional Land Use Control MS4 -** means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

**Routine Maintenance Activity -** means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

**Site limitations –** means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

**Sizing Criteria** – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), Overbank Flood (Qp), and Extreme Flood (Qf).

**State Pollutant Discharge Elimination System (SPDES)** - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

**Steep Slope** – means land area with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

**Surface Waters of the State** - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

**Temporarily Ceased** – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

**Temporary Stabilization** - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

**Total Maximum Daily Loads** (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

**Trained Contractor -** means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

**Uniform Procedures Act (UPA) Permit** - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

**Water Quality Standard** - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

IX. **APPENDIX B**

## Required SWPPP Components by Project Type

### Table 1

### CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

| |
|---|
| **The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:**<br>• Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E<br>• Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E<br>• Construction of a barn or other agricultural building, silo, stock yard or pen. |
| **The following construction activities that involve soil disturbances of one (1) or more acres of land:**<br>• Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains<br>• Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects<br>• Bike paths and trails<br>• Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project<br>• Slope stabilization projects<br>• Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics<br>• Spoil areas that will be covered with vegetation<br>• Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions<br>• Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions<br>• Demolition project where vegetation will be established and no redevelopment is planned<br>• Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*<br>• Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area |
| **The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:**<br>• All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land. |

## Table 2

### CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

**The following construction activities that involve soil disturbances of one (1) or more acres of land:**

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* <u>or</u> *alter the hydrology from pre to post development* conditions, <u>and</u> are not listed in Table 1

## X. APPENDIX C

### Watersheds Where Enhanced Phosphorus Removal Standards Are Required

**Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").**

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

**Figure 1 - New York City Watershed East of the Hudson**

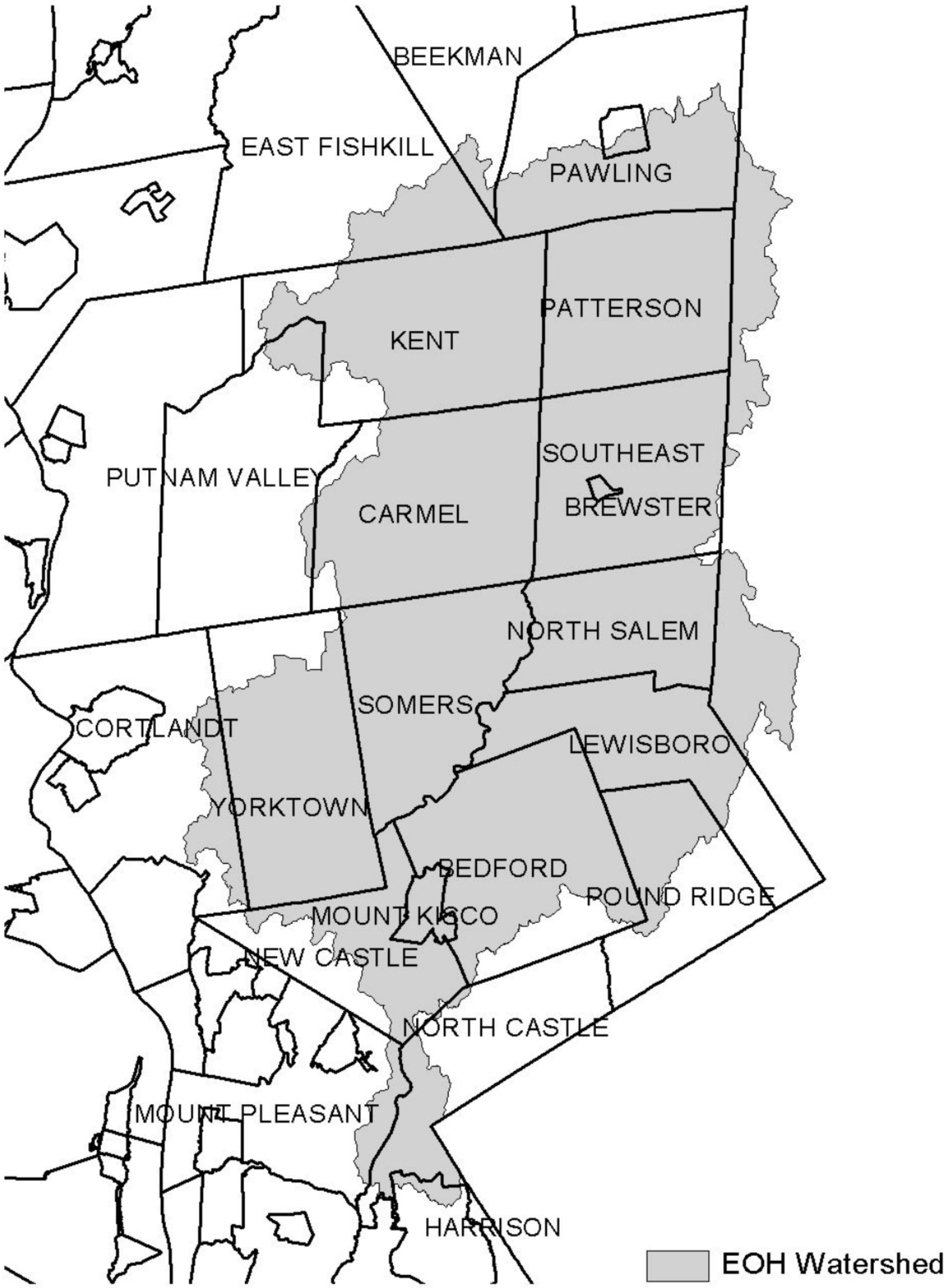
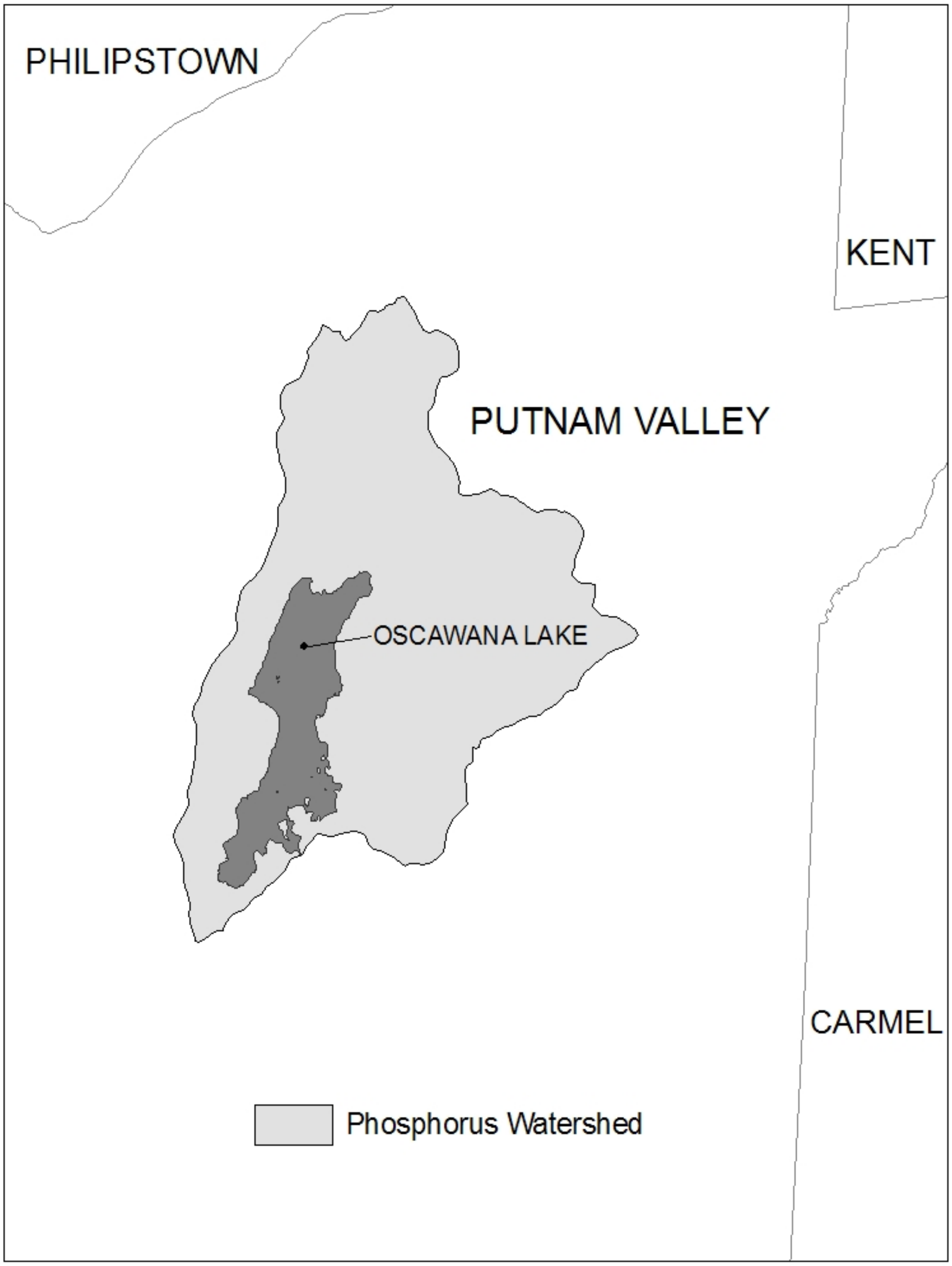


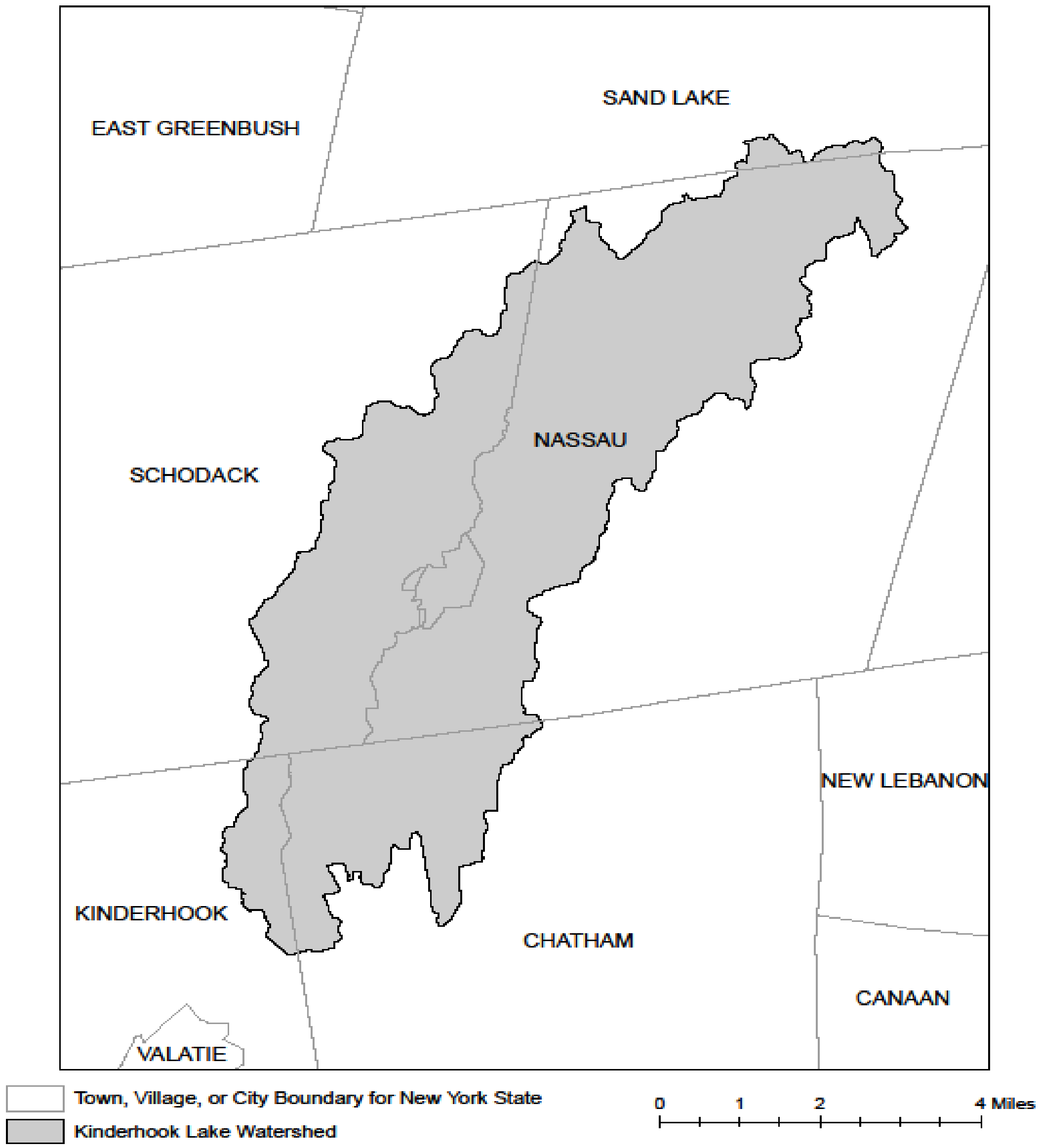
**Figure 2 - Onondaga Lake Watershed**

**Figure 3 - Greenwood Lake Watershed**

**Figure 4 - Oscawana Lake Watershed**



## Figure 5: Kinderhook Lake Watershed



## XI. APPENDIX D

**Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.**

| |
|---|
| Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C |

## XII. APPENDIX E

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

| COUNTY | WATERBODY |
|---|---|
| Albany | Ann Lee (Shakers) Pond, Stump Pond |
| Albany | Basic Creek Reservoir |
| Allegheny | Amity Lake, Saunders Pond |
| Bronx | Van Cortlandt Lake |
| Broome | Whitney Point Lake/Reservoir |
| Broome | Fly Pond, Deer Lake |
| Broome | Minor Tribs to Lower Susquehanna (north) |
| Cattaraugus | Allegheny River/Reservoir |
| Cattaraugus | Case Lake |
| Cattaraugus | Linlyco/Club Pond |
| Cayuga | Duck Lake |
| Chautauqua | Chautauqua Lake, North |
| Chautauqua | Chautauqua Lake, South |
| Chautauqua | Bear Lake |
| Chautauqua | Chadakoin River and tribs |
| Chautauqua | Lower Cassadaga Lake |
| Chautauqua | Middle Cassadaga Lake |
| Chautauqua | Findley Lake |
| Clinton | Great Chazy River, Lower, Main Stem |
| Columbia | Kinderhook Lake |
| Columbia | Robinson Pond |
| Dutchess | Hillside Lake |
| Dutchess | Wappinger Lakes |
| Dutchess | Fall Kill and tribs |
| Erie | Green Lake |
| Erie | Scajaquada Creek, Lower, and tribs |
| Erie | Scajaquada Creek, Middle, and tribs |
| Erie | Scajaquada Creek, Upper, and tribs |
| Erie | Rush Creek and tribs |
| Erie | Ellicott Creek, Lower, and tribs |
| Erie | Beeman Creek and tribs |
| Erie | Murder Creek, Lower, and tribs |
| Erie | South Branch Smoke Cr, Lower, and tribs |
| Erie | Little Sister Creek, Lower, and tribs |
| Essex | Lake George (primary county: Warren) |
| Genesee | Black Creek, Upper, and minor tribs |
| Genesee | Tonawanda Creek, Middle, Main Stem |
| Genesee | Oak Orchard Creek, Upper, and tribs |
| Genesee | Bowen Brook and tribs |
| Genesee | Bigelow Creek and tribs |
| Genesee | Black Creek, Middle, and minor tribs |
| Genesee | LeRoy Reservoir |
| Greene | Schoharie Reservoir |

| COUNTY | WATERBODY |
|---|---|
| Greene | Sleepy Hollow Lake |
| Herkimer | Steele Creek tribs |
| Kings | Hendrix Creek |
| Lewis | Mill Creek/South Branch and tribs |
| Livingston | Conesus Lake |
| Livingston | Jaycox Creek and tribs |
| Livingston | Mill Creek and minor tribs |
| Livingston | Bradner Creek and tribs |
| Livingston | Christie Creek and tribs |
| Monroe | Lake Ontario Shoreline, Western |
| Monroe | Mill Creek/Blue Pond Outlet and tribs |
| Monroe | Rochester Embayment - East |
| Monroe | Rochester Embayment - West |
| Monroe | Unnamed Trib to Honeoye Creek |
| Monroe | Genesee River, Lower, Main Stem |
| Monroe | Genesee River, Middle, Main Stem |
| Monroe | Black Creek, Lower, and minor tribs |
| Monroe | Buck Pond |
| Monroe | Long Pond |
| Monroe | Cranberry Pond |
| Monroe | Mill Creek and tribs |
| Monroe | Shipbuilders Creek and tribs |
| Monroe | Minor tribs to Irondequoit Bay |
| Monroe | Thomas Creek/White Brook and tribs |
| Nassau | Glen Cove Creek, Lower, and tribs |
| Nassau | LI Tribs (fresh) to East Bay |
| Nassau | East Meadow Brook, Upper, and tribs |
| Nassau | Hempstead Bay |
| Nassau | Hempstead Lake |
| Nassau | Grant Park Pond |
| Nassau | Beaver Lake |
| Nassau | Camaans Pond |
| Nassau | Halls Pond |
| Nassau | LI Tidal Tribs to Hempstead Bay |
| Nassau | Massapequa Creek and tribs |
| Nassau | Reynolds Channel, east |
| Nassau | Reynolds Channel, west |
| Nassau | Silver Lake, Lofts Pond |
| Nassau | Woodmere Channel |
| Niagara | Hyde Park Lake |
| Niagara | Lake Ontario Shoreline, Western |
| Niagara | Bergholtz Creek and tribs |
| Oneida | Ballou, Nail Creeks |
| Onondaga | Ley Creek and tribs |
| Onondaga | Onondaga Creek, Lower and tribs |

## APPENDIX E

**List of 303(d) segments impaired by pollutants related to construction activity, cont'd.**

| COUNTY | WATERBODY | COUNTY | WATERBODY |
|---|---|---|---|
| Onondaga | Onondaga Creek, Middle and tribs | Suffolk | Great South Bay, West |
| Onondaga | Onondaga Creek, Upp, and minor tribs | Suffolk | Mill and Seven Ponds |
| Onondaga | Harbor Brook, Lower, and tribs | Suffolk | Moriches Bay, East |
| Onondaga | Ninemile Creek, Lower, and tribs | Suffolk | Moriches Bay, West |
| Onondaga | Minor tribs to Onondaga Lake | Suffolk | Quantuck Bay |
| Onondaga | Onondaga Creek, Lower, and tribs | Suffolk | Shinnecock Bay (and Inlet) |
| Ontario | Honeoye Lake | Sullivan | Bodine, Montgomery Lakes |
| Ontario | Hemlock Lake Outlet and minor tribs | Sullivan | Davies Lake |
| Ontario | Great Brook and minor tribs | Sullivan | Pleasure Lake |
| Orange | Monhagen Brook and tribs | Sullivan | Swan Lake |
| Orange | Orange Lake | Tompkins | Cayuga Lake, Southern End |
| Orleans | Lake Ontario Shoreline, Western | Tompkins | Owasco Inlet, Upper, and tribs |
| Oswego | Pleasant Lake | Ulster | Ashokan Reservoir |
| Oswego | Lake Neatahwanta | Ulster | Esopus Creek, Upper, and minor tribs |
| Putnam | Oscawana Lake | | |
| Putnam | Palmer Lake | Ulster | Esopus Creek, Lower, Main Stem |
| Putnam | Lake Carmel | Ulster | Esopus Creek, Middle, and minor tribs |
| Queens | Jamaica Bay, Eastern, and tribs (Queens) | | |
| Queens | Bergen Basin | Warren | Lake George |
| Queens | Shellbank Basin | Warren | Tribs to L.George, Village of L George |
| Rensselaer | Nassau Lake | | |
| Rensselaer | Snyders Lake | Warren | Huddle/Finkle Brooks and tribs |
| Richmond | Grasmere, Arbutus and Wolfes Lakes | Warren | Indian Brook and tribs |
| Rockland | Congers Lake, Swartout Lake | Warren | Hague Brook and tribs |
| Rockland | Rockland Lake | Washington | Tribs to L.George, East Shr Lk George |
| Saratoga | Ballston Lake | | |
| Saratoga | Round Lake | Washington | Cossayuna Lake |
| Saratoga | Dwaas Kill and tribs | Washington | Wood Cr/Champlain Canal, minor tribs |
| Saratoga | Tribs to Lake Lonely | | |
| Saratoga | Lake Lonely | Wayne | Port Bay |
| Schenectady | Collins Lake | Wayne | Marbletown Creek and tribs |
| Schenectady | Duane Lake | Westchester | Lake Katonah |
| Schenectady | Mariaville Lake | Westchester | Lake Mohegan |
| Schoharie | Engleville Pond | Westchester | Lake Shenorock |
| Schoharie | Summit Lake | Westchester | Reservoir No.1 (Lake Isle) |
| Schuyler | Cayuta Lake | Westchester | Saw Mill River, Middle, and tribs |
| St. Lawrence | Fish Creek and minor tribs | Westchester | Silver Lake |
| St. Lawrence | Black Lake Outlet/Black Lake | Westchester | Teatown Lake |
| Steuben | Lake Salubria | Westchester | Truesdale Lake |
| Steuben | Smith Pond | Westchester | Wallace Pond |
| Suffolk | Millers Pond | Westchester | Peach Lake |
| Suffolk | Mattituck (Marratooka) Pond | Westchester | Mamaroneck River, Lower |
| Suffolk | Tidal tribs to West Moriches Bay | Westchester | Mamaroneck River, Upp, and tribs |
| Suffolk | Canaan Lake | Westchester | Sheldrake River and tribs |
| Suffolk | Lake Ronkonkoma | Westchester | Blind Brook, Lower |
| Suffolk | Beaverdam Creek and tribs | Westchester | Blind Brook, Upper, and tribs |
| Suffolk | Big/Little Fresh Ponds | Westchester | Lake Lincolndale |
| Suffolk | Fresh Pond | Westchester | Lake Meahaugh |
| Suffolk | Great South Bay, East | Wyoming | Java Lake |
| Suffolk | Great South Bay, Middle | Wyoming | Silver Lake |

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

XIII. **APPENDIX F**

## LIST OF NYS DEC REGIONAL OFFICES

| Region | COVERING THE FOLLOWING COUNTIES: | DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS | DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM |
|---|---|---|---|
| 1 | NASSAU AND SUFFOLK | 50 CIRCLE ROAD<br>STONY BROOK, NY 11790<br>TEL. (631) 444-0365 | 50 CIRCLE ROAD<br>STONY BROOK, NY 11790-3409<br>TEL. (631) 444-0405 |
| 2 | BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND | 1 HUNTERS POINT PLAZA,<br>47-40 21ST ST.<br>LONG ISLAND CITY, NY 11101-5407<br>TEL. (718) 482-4997 | 1 HUNTERS POINT PLAZA,<br>47-40 21ST ST.<br>LONG ISLAND CITY, NY 11101-5407<br>TEL. (718) 482-4933 |
| 3 | DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER | 21 SOUTH PUTT CORNERS ROAD<br>NEW PALTZ, NY 12561-1696<br>TEL. (845) 256-3059 | 100 HILLSIDE AVENUE, SUITE 1W<br>WHITE PLAINS, NY 10603<br>TEL. (914) 428 - 2505 |
| 4 | ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE | 1150 NORTH WESTCOTT ROAD<br>SCHENECTADY, NY 12306-2014<br>TEL. (518) 357-2069 | 1130 NORTH WESTCOTT ROAD<br>SCHENECTADY, NY 12306-2014<br>TEL. (518) 357-2045 |
| 5 | CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON | 1115 STATE ROUTE 86, PO BOX 296<br>RAY BROOK, NY 12977-0296<br>TEL. (518) 897-1234 | 232 GOLF COURSE ROAD<br>WARRENSBURG, NY 12885-1172<br>TEL. (518) 623-1200 |
| 6 | HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE | STATE OFFICE BUILDING<br>317 WASHINGTON STREET<br>WATERTOWN, NY 13601-3787<br>TEL. (315) 785-2245 | STATE OFFICE BUILDING<br>207 GENESEE STREET<br>UTICA, NY 13501-2885<br>TEL. (315) 793-2554 |
| 7 | BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS | 615 ERIE BLVD. WEST<br>SYRACUSE, NY 13204-2400<br>TEL. (315) 426-7438 | 615 ERIE BLVD. WEST<br>SYRACUSE, NY 13204-2400<br>TEL. (315) 426-7500 |
| 8 | CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES | 6274 EAST AVON-LIMA ROAD<br>AVON, NY 14414-9519<br>TEL. (585) 226-2466 | 6274 EAST AVON-LIMA RD.<br>AVON, NY 14414-9519<br>TEL. (585) 226-2466 |
| 9 | ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING | 270 MICHIGAN AVENUE<br>BUFFALO, NY 14203-2999<br>TEL. (716) 851-7165 | 270 MICHIGAN AVE.<br>BUFFALO, NY 14203-2999<br>TEL. (716) 851-7070 |

# FACT SHEET

**For**

# NEW YORK STATE
# DEPARTMENT OF ENVIRONMENTAL CONSERVATION
# SPDES GENERAL PERMIT
# FOR STORMWATER DISCHARGES
# from
# CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

January 2015

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# INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) has renewed the SPDES General Permit for Stormwater Discharges from Construction Activity as GP-0-15-002. The new general permit is effective on January 29, 2015. GP-0-15-002 replaces the previous general permit, GP-0-10-001 which expires on January 28, 2015.

The SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) is a five (5) year permit intended to cover discharges of stormwater to surface waters of the State from construction activities as defined in 40 CFR Part 122.26(b)(14)(x) and (b)(15)(i - ii). This general permit may also authorize discharges of stormwater to groundwater in cases where the NYSDEC has determined that a permit is necessary.

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater discharges from certain construction activities (including discharges through a municipal separate storm sewer system) are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York's State Pollutant Discharge Elimination System (SPDES) is a NPDES-approved program with permits issued in accordance with the Environmental Conservation Law ("ECL"). An owner or operator of a construction activity must obtain permit coverage through either an individual SPDES permit which address the stormwater discharges or obtain coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) prior to the commencement of construction activity.

## GENERAL CHANGES

**Addition of EPA's Construction and Development Effluent Guidelines (ELGs)**: Part I.B.1 of the general permit contains new source performance standards (ELGs) as required by 40 CFR 450.21. The ELGs apply primarily to the selection, design, and implementation of the erosion and sediment controls (i.e. during construction controls) to be used on the site. These are technology based effluent limitations that represent the degree of reduction attainable by the application of best practicable technology currently available. These non-numeric effluent limits require an owner or operator to ensure that water quality standards are being met and the discharge of pollutants are minimized through the selection, design and implementation of erosion and sediment control measures. As newly defined in the general permit, the term "minimize" means to reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically achievable (BAT) and practicable (BPT) in light of best industry practice. The control measures specified in the New York State Standards & Specifications for Erosion & Sediment Control ("Blue Book") have been determined to be technologically available and economically achievable and practicable. The erosion and sediment control measures documented in the Stormwater Pollution Prevention Plan (SWPPP) must be installed and implemented to achieve the effluent limits contained in Part I.B.

**Addition of Sizing Criteria from the New York State Stormwater Management Design Manual ("Design Manual")**: Part I.C. of the general permit specifies the criteria for post construction stormwater management practices.

> **Performance Criteria** - Part I.C.1 clarifies when deviations from the Design Manual are allowed. The general permit specifies that where post construction stormwater management practices are not designed in conformance with the *performance criteria* contained in the Design Manual, the owner or operator must demonstrate that the deviation or alternative design is equivalent to the Design Manual. The general permit defines *performance criteria* to be that criteria listed under "required elements" in sections in Chapters 5, 6 and 10 of the Design Manual. The general permit defines e*quivalent (equivalence)* to mean that the practice or measure meets all performance, longevity, maintenance and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.
>
> **Sizing Criteria -** Part I.C.2 requires that post-construction stormwater management practices must meet the applicable sizing criteria contained in Part I.C.2(a),(b),(c) or (d) of the general permit. The sizing criteria are defined as the criteria included in Chapters 4, 9 and 10 of the Design Manual (i.e. WQv, RRv, CPv, Qp and Qf). Associated changes to the Design Manual were also made to ensure consistency between the general permit and Design Manual and to provide clarifications to the requirements. Deviations from the sizing criteria are

not allowed. If an owner cannot meet the required sizing criteria they would need to apply for coverage under an individual SPDES permit. The Department has been applying this criterion in the review of the Notice of Intent (NOI) since the Phase II program went into effect in 2003.

**Discharges to Impaired Waters:** For construction sites that directly discharge to one of the 303(d) segments listed in Appendix E[1] or is located in one of the watersheds listed in Appendix C, the general permit now requires more frequent inspections by a qualified inspector (see Part IV.C.2.e.) and shortened timeframes for stabilization of exposed soils (see Part I.B.1.b.) to ensure that discharges to impaired waters are in compliance with the terms and conditions of the general permit. The Department believes that this additional oversight will provide the protection necessary for impaired waters that will allow construction activities to be covered under the General Permit rather than excluding them from eligibility. This is consistent with how EPA addressed this issue in their 2012 Construction General Permit ("CGP"). The Department expects that compliance with the conditions and effluent limitations in the general permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards for ALL waters.

**Authorization Period using eNOI:** The general permit modifies Part II.B.3(a) and (b) to reflect that electronic filing of the NOI will be authorized within 5 business days from the date DEC receives a complete NOI for projects that conform to the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005; and the New York State Stormwater Management Design Manual, dated January 2015 ("technical standards") for projects that require post-construction stormwater management practices pursuant to Part III.C of the general permit. The timeframe for authorization of coverage for paper NOIs has been increased from 5 to 10 business days for projects that conform to the technical standards. No changes proposed for projects that deviate from the technical standards (60 business days)

**State Historic Preservation Act (SHPA) Review Process/Consultation with Office of Parks Recreation & Historic Preservation (OPRHP):** A Letter of Resolution (LOR) has been finalized with OPRHP on the general permit that satisfies DEC's obligation under the NYS Historic Preservation Act, Section 14.09, 9 NYCRR 428.4 for both the renewal and implementation of the general permit. The LOR formalizes and fine tunes a process for owners/operators to identify and address potential impacts on archeological and historic resources well in advance of submission of the NOI. Construction activities that have the potential to affect historic and/or archeological resources are not eligible for coverage under the general permit unless there is documentation that such impacts have been resolved prior to submission of the NOI. The general permit requires that documentation demonstrating that potential impacts will be avoided or mitigated are in place at the time the NOI is submitted. Part I.F.8 of

[1] Appendix E of the general permit has been updated to list the 2014 303(d) waterbodies impaired by silt, sediment or nutrients.

the general permit specifies the documentation necessary to demonstrate eligibility. The NOI will require the owner/operator to specify the documentation used to demonstrate that potential impacts will be avoided or mitigated and certify that the documentation demonstrating eligibility is available upon request and will be maintained on site. Part II.C.2 specifies that the required documentation must be maintained on-site and available for inspection along with the SWPPP documents. Part VII.F of the general permit requires that the owner or operator provide copies of the documentation demonstrating eligibility to DEC within a reasonable specified time period of a written request. The LOR identifies certain categories of projects as exempt from SHPA review.(see Attachment 2 of the LOR). All other projects will be required to follow DEC's screening and consultation process that was developed with OPRHP. The final LOR (including attachments) and supporting guidance documents (i.e. Flow Charts) will be available on the following Department webpage:
http://www.dec.ny.gov/chemical/43133.html.

**Watersheds Where Enhanced Phosphorus Removal Standards are Required:** The Total Maximum Daily Load (TMDL) for Phosphorus in Kinderhook Lake was approved by EPA in September 2011. The approved report specifies that all new development throughout the watershed will be covered by enhanced phosphorus design requirements when GP-0-10-001 is renewed in 2015 as GP-0-15-002. In order to ensure compliance with the requirements necessary to implement this TMDL, the general permit adds the Kinderhook Lake Watershed to the list of watersheds specified in Appendix C where application of the Enhanced Phosphorus Removal Standards (Chapter 10 of the New York State Stormwater Management Design Manual) is required.

**Trained Contractor Inspections:** Part IV.B of the general permit has been updated to specify that the "Trained Contractor" shall perform the required maintenance inspections of the erosion and sediment controls being used on the site. This inspection requirement applies to all construction projects that are subject to the general permit.

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

**CONSTRUCTION ACTIVITY**

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015 Expiration Date: January 28, 2020

John J. Ferguson
Chief Permit Administrator

1 / 12 / 15

Authorized Signature Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

# PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York's *State Pollutant Discharge Elimination System ("SPDES")* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law ("ECL").*

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at:
http://www.dec.ny.gov/

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES**
**FROM CONSTRUCTION ACTIVITIES**

(Part I)

# Part I. PERMIT COVERAGE AND LIMITATIONS

## A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

## B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

(i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s;

(ii) Control stormwater *discharge*s to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;

(iii) *Minimize* the amount of soil exposed during *construction activity*;

(iv) *Minimize* the disturbance of *steep slopes*;

(v) *Minimize* sediment *discharge*s from the site;

(vi) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

(vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and

(viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from dewatering activities, including *discharge*s from dewatering of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharges*.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

## C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

### a. ***Sizing Criteria*** **for** ***New Development***

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

**In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual**. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

b. ***Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed**

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

**In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual.** The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

*c.* ***Sizing Criteria* for *Redevelopment Activity***

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or
(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

*d.* ***Sizing Criteria* for Combination of *Redevelopment Activity* and *New Development***

Construction projects that include both *New Development* and *Redevelopment Activity* shall provide post-construction stormwater management controls that meet the *sizing criteria* calculated as an aggregate of the *Sizing Criteria* in Part I.C.2.a. or b. of this permit for the *New Development* portion of the project and Part I.C.2.c of this permit for *Redevelopment Activity* portion of the project.

**D. Maintaining Water Quality**

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

**E. Eligibility Under This General Permit**

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater *discharges* may be authorized by this permit: *discharge*s from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated *groundwater* or spring water; uncontaminated *discharge*s from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these *discharge*s must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

**F. Activities Which Are Ineligible for Coverage Under This General Permit**

All of the following are **not** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an endangered or threatened species unless the *owner or operator* has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb one or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture (“USDA”) Soil Survey for the County where the disturbance will occur.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which disturb two or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.C.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
      (i) No Affect
      (ii) No Adverse Affect

(Part I.F.8.c.iii)

(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

II. **Part II. OBTAINING PERMIT COVERAGE**

**A. Notice of Intent (NOI) Submittal**

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to *discharge* under this permit. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/ ). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

**NOTICE OF INTENT**
**NYS DEC, Bureau of Water Permits**
**625 Broadway, 4th Floor**
**Albany, New York 12233-3505**

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI.

The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

**B. Permit Authorization**

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

   c. the final SWPPP has been prepared, and

   d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

(ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

(iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. The Department may suspend or deny an *owner's or operator's* coverage

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.B. of this permit.

### C. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-15-002), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:
   a. The *owner or operator* shall

have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

5. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the *regulated, traditional land use control MS4* in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice

**D. Permit Coverage for Discharges Authorized Under GP-0-10-001**

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

**E. Change of *Owner or Operator***

2. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

# III. Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

## A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:

   a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

   b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the *discharge* of *pollutants*; and

   c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority.

5. The Department may notify the *owner or operator* at any time that the

SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.C.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   > "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

   In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

**B. Required SWPPP Contents**

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

a. Background information about the scope of the project, including the location, type and size of project;

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

   b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

   c. A Stormwater Modeling and Analysis Report that includes:

      (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

      (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

      (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

      (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

(v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

(vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

## C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

IV. **Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS**

**A. General Construction Site Inspection and Maintenance Requirements**

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

**B. Contractor Maintenance Inspection Requirements**

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

**C. Qualified Inspector Inspection Requirements**

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:
- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;

   c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

   d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* <u>and</u> all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.A.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of *discharge* from the construction site.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

   a. Date and time of inspection;

   b. Name and title of person(s) performing inspection;

   c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

   d. A description of the condition of the runoff at all points of *discharge* from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

   e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

   f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

   g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

   h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

(Part IV.C.4.i)

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.C.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

V. **Part V. TERMINATION OF PERMIT COVERAGE**

**A. Termination of Permit Coverage**

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

   b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

   c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E. of this permit.

   d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

(Part V.A.5)

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

   a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

   b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

   c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

   d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

## VI. Part VI. REPORTING AND RETENTION OF RECORDS

### A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

### B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

VII. **Part VII. STANDARD PERMIT CONDITIONS**

**A. Duty to Comply**

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

**B. Continuation of the Expired General Permit**

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

**C. Enforcement**

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

**D. Need to Halt or Reduce Activity Not a Defense**

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

**E. Duty to Mitigate**

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

**F. Duty to Provide Information**

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

**G. Other Information**

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

**H. Signatory Requirements**

1. All NOIs and NOTs shall be signed as follows:

   a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

      (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

## I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

## J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

## K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharge*r authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharge*r in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

*discharge* under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

**L. Proper Operation and Maintenance**

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

**M. Inspection and Entry**

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a construction site which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

**N. Permit Actions**

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

**O. Definitions**

Definitions of key terms are included in Appendix A of this permit.

**P. Re-Opener Clause**

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

**Q. Penalties for Falsification of Forms and Reports**

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

**R. Other Permits**

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

VIII. **APPENDIX A**

# Definitions

**Alter Hydrology from Pre to Post-Development Conditions -** means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

**Combined Sewer -** means a sewer that is designed to collect and convey both “sewage” and “stormwater”.

**Commence (Commencement of) Construction Activities -** means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for “*Construction Activity(ies)*” also.

***Construction Activity*(ies) -** means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal*.* Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

**Direct Discharge (to a specific surface waterbody) -** means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

**Discharge(s)** - means any addition of any pollutant to waters of the State through an outlet or point source.

**Environmental Conservation Law (ECL)** - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

**Equivalent (Equivalence)** – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

**Final Stabilization -** means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

**General SPDES permit** - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

**Groundwater(s)** - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

**Historic Property** – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State
or National Registers of Historic Places.

**Impervious Area (Cover) -** means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

**Infeasible** – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

**Larger Common Plan of Development or Sale -** means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

**Minimize** – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

**Municipal Separate Storm Sewer (MS4)** - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made
channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

**National Pollutant Discharge Elimination System (NPDES)** - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

**New Development** – means any land disturbance that does meet the definition of Redevelopment Activity included in this appendix.

**NOI Acknowledgment Letter** - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

**Owner or Operator** - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

**Performance Criteria** – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf ) in Part I.C.2. of the permit.

**Pollutant** - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

**Qualified Inspector** - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

**Qualified Professional -** means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer <u>licensed to practice in the State of New York..</u>

**Redevelopment Activity(ies)** – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

**Regulated, Traditional Land Use Control MS4 -** means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

**Routine Maintenance Activity -** means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Stream bank restoration projects (does not include the placement of spoil material),
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

**Site limitations –** means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

**Sizing Criteria** – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), Overbank Flood (Qp), and Extreme Flood (Qf).

**State Pollutant Discharge Elimination System (SPDES)** - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

**Steep Slope** – means land area with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

**Surface Waters of the State** - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

**Temporarily Ceased** – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

**Temporary Stabilization** - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

**Total Maximum Daily Loads** (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

**Trained Contractor -** means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

**Uniform Procedures Act (UPA) Permit** - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

**Water Quality Standard** - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

IX. **APPENDIX B**

## Required SWPPP Components by Project Type

### Table 1

### CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

| |
|---|
| **The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:**<br><br>• Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E<br>• Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E<br>• Construction of a barn or other agricultural building, silo, stock yard or pen. |
| **The following construction activities that involve soil disturbances of one (1) or more acres of land:**<br><br>• Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains<br>• Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects<br>• Bike paths and trails<br>• Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project<br>• Slope stabilization projects<br>• Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics<br>• Spoil areas that will be covered with vegetation<br>• Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions<br>• Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions<br>• Demolition project where vegetation will be established and no redevelopment is planned<br>• Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*<br>• Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area |
| **The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:**<br><br>• All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land. |

## Table 2

### CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

**The following construction activities that involve soil disturbances of one (1) or more acres of land:**

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

X. **APPENDIX C**

**Watersheds Where Enhanced Phosphorus Removal Standards Are Required**

**Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").**

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

**Figure 1 - New York City Watershed East of the Hudson**

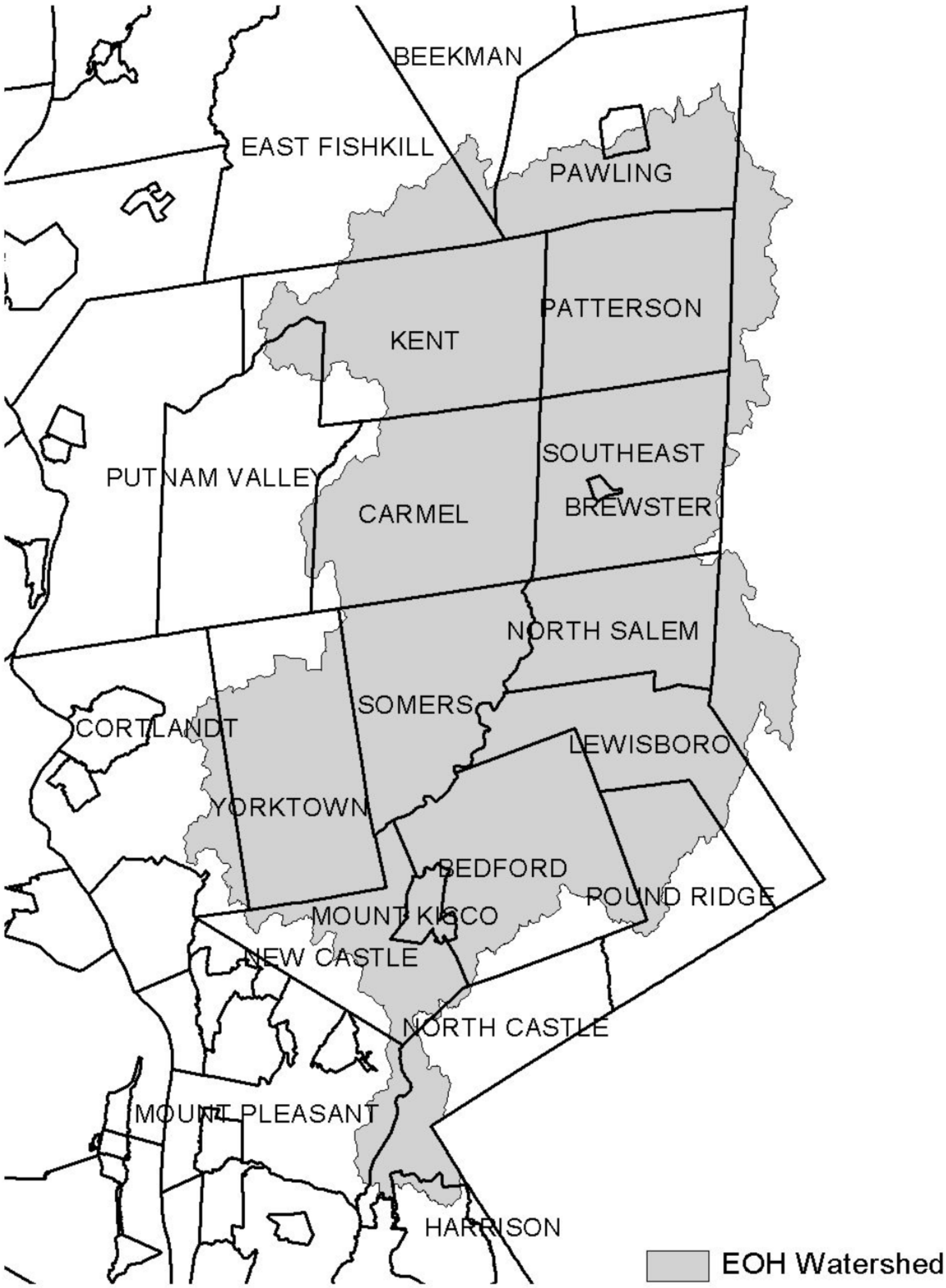
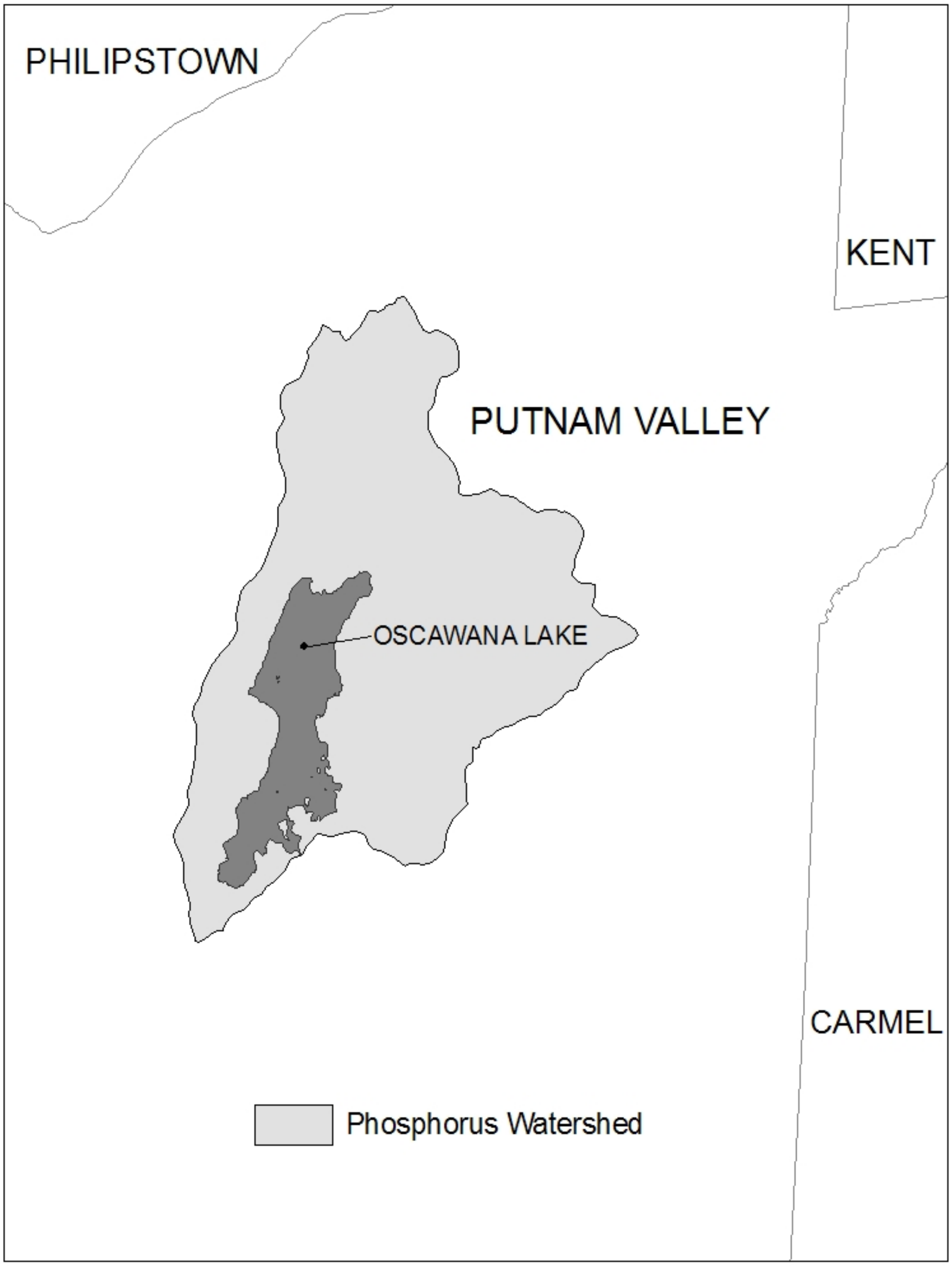


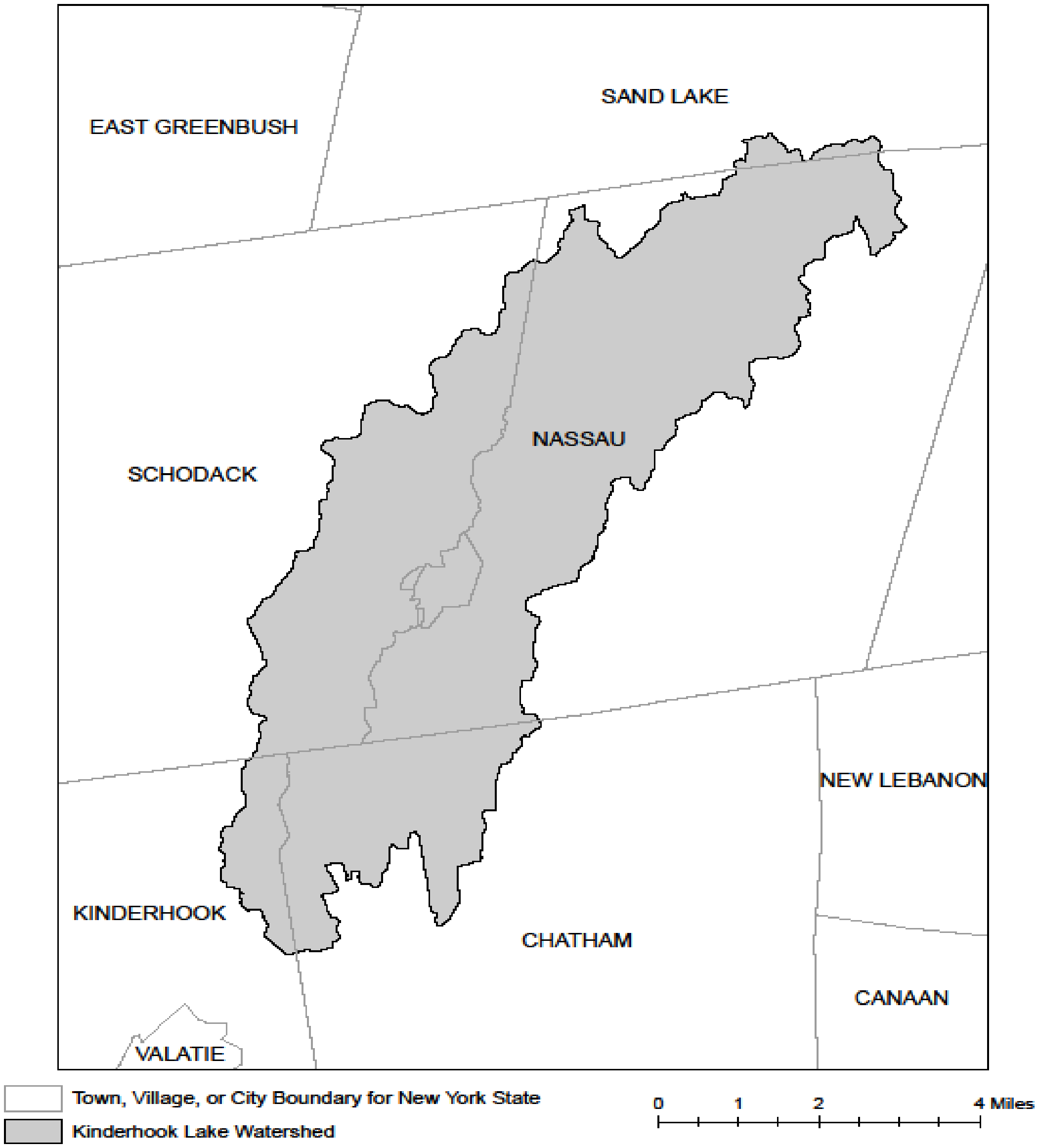
**Figure 2 - Onondaga Lake Watershed**

**Figure 3 - Greenwood Lake Watershed**

**Figure 4 - Oscawana Lake Watershed**



## Figure 5: Kinderhook Lake Watershed



## XI. APPENDIX D

**Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.**

| |
|---|
| Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C |

## XII. APPENDIX E

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual (“Design Manual”), dated January 2015.

| COUNTY | WATERBODY |
|---|---|
| Albany | Ann Lee (Shakers) Pond, Stump Pond |
| Albany | Basic Creek Reservoir |
| Allegheny | Amity Lake, Saunders Pond |
| Bronx | Van Cortlandt Lake |
| Broome | Whitney Point Lake/Reservoir |
| Broome | Fly Pond, Deer Lake |
| Broome | Minor Tribs to Lower Susquehanna (north) |
| Cattaraugus | Allegheny River/Reservoir |
| Cattaraugus | Case Lake |
| Cattaraugus | Linlyco/Club Pond |
| Cayuga | Duck Lake |
| Chautauqua | Chautauqua Lake, North |
| Chautauqua | Chautauqua Lake, South |
| Chautauqua | Bear Lake |
| Chautauqua | Chadakoin River and tribs |
| Chautauqua | Lower Cassadaga Lake |
| Chautauqua | Middle Cassadaga Lake |
| Chautauqua | Findley Lake |
| Clinton | Great Chazy River, Lower, Main Stem |
| Columbia | Kinderhook Lake |
| Columbia | Robinson Pond |
| Dutchess | Hillside Lake |
| Dutchess | Wappinger Lakes |
| Dutchess | Fall Kill and tribs |
| Erie | Green Lake |
| Erie | Scajaquada Creek, Lower, and tribs |
| Erie | Scajaquada Creek, Middle, and tribs |
| Erie | Scajaquada Creek, Upper, and tribs |
| Erie | Rush Creek and tribs |
| Erie | Ellicott Creek, Lower, and tribs |
| Erie | Beeman Creek and tribs |
| Erie | Murder Creek, Lower, and tribs |
| Erie | South Branch Smoke Cr, Lower, and tribs |
| Erie | Little Sister Creek, Lower, and tribs |
| Essex | Lake George (primary county: Warren) |
| Genesee | Black Creek, Upper, and minor tribs |
| Genesee | Tonawanda Creek, Middle, Main Stem |
| Genesee | Oak Orchard Creek, Upper, and tribs |
| Genesee | Bowen Brook and tribs |
| Genesee | Bigelow Creek and tribs |
| Genesee | Black Creek, Middle, and minor tribs |
| Genesee | LeRoy Reservoir |
| Greene | Schoharie Reservoir |

| COUNTY | WATERBODY |
|---|---|
| Greene | Sleepy Hollow Lake |
| Herkimer | Steele Creek tribs |
| Kings | Hendrix Creek |
| Lewis | Mill Creek/South Branch and tribs |
| Livingston | Conesus Lake |
| Livingston | Jaycox Creek and tribs |
| Livingston | Mill Creek and minor tribs |
| Livingston | Bradner Creek and tribs |
| Livingston | Christie Creek and tribs |
| Monroe | Lake Ontario Shoreline, Western |
| Monroe | Mill Creek/Blue Pond Outlet and tribs |
| Monroe | Rochester Embayment - East |
| Monroe | Rochester Embayment - West |
| Monroe | Unnamed Trib to Honeoye Creek |
| Monroe | Genesee River, Lower, Main Stem |
| Monroe | Genesee River, Middle, Main Stem |
| Monroe | Black Creek, Lower, and minor tribs |
| Monroe | Buck Pond |
| Monroe | Long Pond |
| Monroe | Cranberry Pond |
| Monroe | Mill Creek and tribs |
| Monroe | Shipbuilders Creek and tribs |
| Monroe | Minor tribs to Irondequoit Bay |
| Monroe | Thomas Creek/White Brook and tribs |
| Nassau | Glen Cove Creek, Lower, and tribs |
| Nassau | LI Tribs (fresh) to East Bay |
| Nassau | East Meadow Brook, Upper, and tribs |
| Nassau | Hempstead Bay |
| Nassau | Hempstead Lake |
| Nassau | Grant Park Pond |
| Nassau | Beaver Lake |
| Nassau | Camaans Pond |
| Nassau | Halls Pond |
| Nassau | LI Tidal Tribs to Hempstead Bay |
| Nassau | Massapequa Creek and tribs |
| Nassau | Reynolds Channel, east |
| Nassau | Reynolds Channel, west |
| Nassau | Silver Lake, Lofts Pond |
| Nassau | Woodmere Channel |
| Niagara | Hyde Park Lake |
| Niagara | Lake Ontario Shoreline, Western |
| Niagara | Bergholtz Creek and tribs |
| Oneida | Ballou, Nail Creeks |
| Onondaga | Ley Creek and tribs |
| Onondaga | Onondaga Creek, Lower and tribs |

## APPENDIX E

**List of 303(d) segments impaired by pollutants related to construction activity, cont'd.**

| COUNTY | WATERBODY | COUNTY | WATERBODY |
|---|---|---|---|
| Onondaga | Onondaga Creek, Middle and tribs | Suffolk | Great South Bay, West |
| Onondaga | Onondaga Creek, Upp, and minor tribs | Suffolk | Mill and Seven Ponds |
| Onondaga | Harbor Brook, Lower, and tribs | Suffolk | Moriches Bay, East |
| Onondaga | Ninemile Creek, Lower, and tribs | Suffolk | Moriches Bay, West |
| Onondaga | Minor tribs to Onondaga Lake | Suffolk | Quantuck Bay |
| Onondaga | Onondaga Creek, Lower, and tribs | Suffolk | Shinnecock Bay (and Inlet) |
| Ontario | Honeoye Lake | Sullivan | Bodine, Montgomery Lakes |
| Ontario | Hemlock Lake Outlet and minor tribs | Sullivan | Davies Lake |
| Ontario | Great Brook and minor tribs | Sullivan | Pleasure Lake |
| Orange | Monhagen Brook and tribs | Sullivan | Swan Lake |
| Orange | Orange Lake | Tompkins | Cayuga Lake, Southern End |
| Orleans | Lake Ontario Shoreline, Western | Tompkins | Owasco Inlet, Upper, and tribs |
| Oswego | Pleasant Lake | Ulster | Ashokan Reservoir |
| Oswego | Lake Neatahwanta | Ulster | Esopus Creek, Upper, and minor tribs |
| Putnam | Oscawana Lake | | |
| Putnam | Palmer Lake | Ulster | Esopus Creek, Lower, Main Stem |
| Putnam | Lake Carmel | Ulster | Esopus Creek, Middle, and minor tribs |
| Queens | Jamaica Bay, Eastern, and tribs (Queens) | | |
| Queens | Bergen Basin | Warren | Lake George |
| Queens | Shellbank Basin | Warren | Tribs to L.George, Village of L George |
| Rensselaer | Nassau Lake | | |
| Rensselaer | Snyders Lake | Warren | Huddle/Finkle Brooks and tribs |
| Richmond | Grasmere, Arbutus and Wolfes Lakes | Warren | Indian Brook and tribs |
| Rockland | Congers Lake, Swartout Lake | Warren | Hague Brook and tribs |
| Rockland | Rockland Lake | Washington | Tribs to L.George, East Shr Lk George |
| Saratoga | Ballston Lake | | |
| Saratoga | Round Lake | Washington | Cossayuna Lake |
| Saratoga | Dwaas Kill and tribs | Washington | Wood Cr/Champlain Canal, minor tribs |
| Saratoga | Tribs to Lake Lonely | | |
| Saratoga | Lake Lonely | Wayne | Port Bay |
| Schenectady | Collins Lake | Wayne | Marbletown Creek and tribs |
| Schenectady | Duane Lake | Westchester | Lake Katonah |
| Schenectady | Mariaville Lake | Westchester | Lake Mohegan |
| Schoharie | Engleville Pond | Westchester | Lake Shenorock |
| Schoharie | Summit Lake | Westchester | Reservoir No.1 (Lake Isle) |
| Schuyler | Cayuta Lake | Westchester | Saw Mill River, Middle, and tribs |
| St. Lawrence | Fish Creek and minor tribs | Westchester | Silver Lake |
| St. Lawrence | Black Lake Outlet/Black Lake | Westchester | Teatown Lake |
| Steuben | Lake Salubria | Westchester | Truesdale Lake |
| Steuben | Smith Pond | Westchester | Wallace Pond |
| Suffolk | Millers Pond | Westchester | Peach Lake |
| Suffolk | Mattituck (Marratooka) Pond | Westchester | Mamaroneck River, Lower |
| Suffolk | Tidal tribs to West Moriches Bay | Westchester | Mamaroneck River, Upp, and tribs |
| Suffolk | Canaan Lake | Westchester | Sheldrake River and tribs |
| Suffolk | Lake Ronkonkoma | Westchester | Blind Brook, Lower |
| Suffolk | Beaverdam Creek and tribs | Westchester | Blind Brook, Upper, and tribs |
| Suffolk | Big/Little Fresh Ponds | Westchester | Lake Lincolndale |
| Suffolk | Fresh Pond | Westchester | Lake Meahaugh |
| Suffolk | Great South Bay, East | Wyoming | Java Lake |
| Suffolk | Great South Bay, Middle | Wyoming | Silver Lake |

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

XIII. APPENDIX F

## LIST OF NYS DEC REGIONAL OFFICES

| Region | COVERING THE FOLLOWING COUNTIES: | DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS | DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM |
|---|---|---|---|
| 1 | NASSAU AND SUFFOLK | 50 CIRCLE ROAD<br>STONY BROOK, NY 11790<br>TEL. (631) 444-0365 | 50 CIRCLE ROAD<br>STONY BROOK, NY 11790-3409<br>TEL. (631) 444-0405 |
| 2 | BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND | 1 HUNTERS POINT PLAZA,<br>47-40 21ST ST.<br>LONG ISLAND CITY, NY 11101-5407<br>TEL. (718) 482-4997 | 1 HUNTERS POINT PLAZA,<br>47-40 21ST ST.<br>LONG ISLAND CITY, NY 11101-5407<br>TEL. (718) 482-4933 |
| 3 | DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER | 21 SOUTH PUTT CORNERS ROAD<br>NEW PALTZ, NY 12561-1696<br>TEL. (845) 256-3059 | 100 HILLSIDE AVENUE, SUITE 1W<br>WHITE PLAINS, NY 10603<br>TEL. (914) 428 - 2505 |
| 4 | ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE | 1150 NORTH WESTCOTT ROAD<br>SCHENECTADY, NY 12306-2014<br>TEL. (518) 357-2069 | 1130 NORTH WESTCOTT ROAD<br>SCHENECTADY, NY 12306-2014<br>TEL. (518) 357-2045 |
| 5 | CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON | 1115 STATE ROUTE 86, PO BOX 296<br>RAY BROOK, NY 12977-0296<br>TEL. (518) 897-1234 | 232 GOLF COURSE ROAD<br>WARRENSBURG, NY 12885-1172<br>TEL. (518) 623-1200 |
| 6 | HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE | STATE OFFICE BUILDING<br>317 WASHINGTON STREET<br>WATERTOWN, NY 13601-3787<br>TEL. (315) 785-2245 | STATE OFFICE BUILDING<br>207 GENESEE STREET<br>UTICA, NY 13501-2885<br>TEL. (315) 793-2554 |
| 7 | BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS | 615 ERIE BLVD. WEST<br>SYRACUSE, NY 13204-2400<br>TEL. (315) 426-7438 | 615 ERIE BLVD. WEST<br>SYRACUSE, NY 13204-2400<br>TEL. (315) 426-7500 |
| 8 | CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES | 6274 EAST AVON-LIMA ROAD<br>AVON, NY 14414-9519<br>TEL. (585) 226-2466 | 6274 EAST AVON-LIMA RD.<br>AVON, NY 14414-9519<br>TEL. (585) 226-2466 |
| 9 | ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING | 270 MICHIGAN AVENUE<br>BUFFALO, NY 14203-2999<br>TEL. (716) 851-7165 | 270 MICHIGAN AVE.<br>BUFFALO, NY 14203-2999<br>TEL. (716) 851-7070 |

# FACT SHEET

**For**

# NEW YORK STATE
# DEPARTMENT OF ENVIRONMENTAL CONSERVATION
# SPDES GENERAL PERMIT
# FOR STORMWATER DISCHARGES
# from
# CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

January 2015

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# INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) has renewed the SPDES General Permit for Stormwater Discharges from Construction Activity as GP-0-15-002. The new general permit is effective on January 29, 2015. GP-0-15-002 replaces the previous general permit, GP-0-10-001 which expires on January 28, 2015.

The SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) is a five (5) year permit intended to cover discharges of stormwater to surface waters of the State from construction activities as defined in 40 CFR Part 122.26(b)(14)(x) and (b)(15)(i - ii). This general permit may also authorize discharges of stormwater to groundwater in cases where the NYSDEC has determined that a permit is necessary.

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater discharges from certain construction activities (including discharges through a municipal separate storm sewer system) are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York's State Pollutant Discharge Elimination System (SPDES) is a NPDES-approved program with permits issued in accordance with the Environmental Conservation Law ("ECL"). An owner or operator of a construction activity must obtain permit coverage through either an individual SPDES permit which address the stormwater discharges or obtain coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002) prior to the commencement of construction activity.

## GENERAL CHANGES

**Addition of EPA's Construction and Development Effluent Guidelines (ELGs)**: Part I.B.1 of the general permit contains new source performance standards (ELGs) as required by 40 CFR 450.21. The ELGs apply primarily to the selection, design, and implementation of the erosion and sediment controls (i.e. during construction controls) to be used on the site. These are technology based effluent limitations that represent the degree of reduction attainable by the application of best practicable technology currently available. These non-numeric effluent limits require an owner or operator to ensure that water quality standards are being met and the discharge of pollutants are minimized through the selection, design and implementation of erosion and sediment control measures. As newly defined in the general permit, the term "minimize" means to reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically achievable (BAT) and practicable (BPT) in light of best industry practice. The control measures specified in the New York State Standards & Specifications for Erosion & Sediment Control ("Blue Book") have been determined to be technologically available and economically achievable and practicable. The erosion and sediment control measures documented in the Stormwater Pollution Prevention Plan (SWPPP) must be installed and implemented to achieve the effluent limits contained in Part I.B.

**Addition of Sizing Criteria from the New York State Stormwater Management Design Manual ("Design Manual")**: Part I.C. of the general permit specifies the criteria for post construction stormwater management practices.

> **Performance Criteria** - Part I.C.1 clarifies when deviations from the Design Manual are allowed. The general permit specifies that where post construction stormwater management practices are not designed in conformance with the *performance criteria* contained in the Design Manual, the owner or operator must demonstrate that the deviation or alternative design is equivalent to the Design Manual. The general permit defines *performance criteria* to be that criteria listed under "required elements" in sections in Chapters 5, 6 and 10 of the Design Manual. The general permit defines e*quivalent (equivalence)* to mean that the practice or measure meets all performance, longevity, maintenance and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.
>
> **Sizing Criteria -** Part I.C.2 requires that post-construction stormwater management practices must meet the applicable sizing criteria contained in Part I.C.2(a),(b),(c) or (d) of the general permit. The sizing criteria are defined as the criteria included in Chapters 4, 9 and 10 of the Design Manual (i.e. WQv, RRv, CPv, Qp and Qf). Associated changes to the Design Manual were also made to ensure consistency between the general permit and Design Manual and to provide clarifications to the requirements. Deviations from the sizing criteria are

not allowed. If an owner cannot meet the required sizing criteria they would need to apply for coverage under an individual SPDES permit. The Department has been applying this criterion in the review of the Notice of Intent (NOI) since the Phase II program went into effect in 2003.

**Discharges to Impaired Waters:** For construction sites that directly discharge to one of the 303(d) segments listed in Appendix E[1] or is located in one of the watersheds listed in Appendix C, the general permit now requires more frequent inspections by a qualified inspector (see Part IV.C.2.e.) and shortened timeframes for stabilization of exposed soils (see Part I.B.1.b.) to ensure that discharges to impaired waters are in compliance with the terms and conditions of the general permit. The Department believes that this additional oversight will provide the protection necessary for impaired waters that will allow construction activities to be covered under the General Permit rather than excluding them from eligibility. This is consistent with how EPA addressed this issue in their 2012 Construction General Permit ("CGP"). The Department expects that compliance with the conditions and effluent limitations in the general permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards for ALL waters.

**Authorization Period using eNOI:** The general permit modifies Part II.B.3(a) and (b) to reflect that electronic filing of the NOI will be authorized within 5 business days from the date DEC receives a complete NOI for projects that conform to the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005; and the New York State Stormwater Management Design Manual, dated January 2015 ("technical standards") for projects that require post-construction stormwater management practices pursuant to Part III.C of the general permit. The timeframe for authorization of coverage for paper NOIs has been increased from 5 to 10 business days for projects that conform to the technical standards. No changes proposed for projects that deviate from the technical standards (60 business days)

**State Historic Preservation Act (SHPA) Review Process/Consultation with Office of Parks Recreation & Historic Preservation (OPRHP):** A Letter of Resolution (LOR) has been finalized with OPRHP on the general permit that satisfies DEC's obligation under the NYS Historic Preservation Act, Section 14.09, 9 NYCRR 428.4 for both the renewal and implementation of the general permit. The LOR formalizes and fine tunes a process for owners/operators to identify and address potential impacts on archeological and historic resources well in advance of submission of the NOI. Construction activities that have the potential to affect historic and/or archeological resources are not eligible for coverage under the general permit unless there is documentation that such impacts have been resolved prior to submission of the NOI. The general permit requires that documentation demonstrating that potential impacts will be avoided or mitigated are in place at the time the NOI is submitted. Part I.F.8 of

[1] Appendix E of the general permit has been updated to list the 2014 303(d) waterbodies impaired by silt, sediment or nutrients.

the general permit specifies the documentation necessary to demonstrate eligibility. The NOI will require the owner/operator to specify the documentation used to demonstrate that potential impacts will be avoided or mitigated and certify that the documentation demonstrating eligibility is available upon request and will be maintained on site. Part II.C.2 specifies that the required documentation must be maintained on-site and available for inspection along with the SWPPP documents. Part VII.F of the general permit requires that the owner or operator provide copies of the documentation demonstrating eligibility to DEC within a reasonable specified time period of a written request. The LOR identifies certain categories of projects as exempt from SHPA review.(see Attachment 2 of the LOR). All other projects will be required to follow DEC's screening and consultation process that was developed with OPRHP. The final LOR (including attachments) and supporting guidance documents (i.e. Flow Charts) will be available on the following Department webpage:
http://www.dec.ny.gov/chemical/43133.html.

**Watersheds Where Enhanced Phosphorus Removal Standards are Required:** The Total Maximum Daily Load (TMDL) for Phosphorus in Kinderhook Lake was approved by EPA in September 2011. The approved report specifies that all new development throughout the watershed will be covered by enhanced phosphorus design requirements when GP-0-10-001 is renewed in 2015 as GP-0-15-002. In order to ensure compliance with the requirements necessary to implement this TMDL, the general permit adds the Kinderhook Lake Watershed to the list of watersheds specified in Appendix C where application of the Enhanced Phosphorus Removal Standards (Chapter 10 of the New York State Stormwater Management Design Manual) is required.

**Trained Contractor Inspections:** Part IV.B of the general permit has been updated to specify that the "Trained Contractor" shall perform the required maintenance inspections of the erosion and sediment controls being used on the site. This inspection requirement applies to all construction projects that are subject to the general permit.

# Attachment A
# BMP Construction Inspection Checklist

# Stormwater/Wetland Pond Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **Pre-Construction/Materials and Equipment** | | |
| Pre-construction meeting | | |
| Pipe and appurtenances on-site prior to construction and dimensions checked | | |
| 1. Material (including protective coating, if specified) | | |
| 2. Diameter | | |
| 3. Dimensions of metal riser or pre-cast concrete outlet structure | | |
| 4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans | | |
| 5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope | | |
| 6. Number and dimensions of prefabricated anti-seep collars | | |
| 7. Watertight connectors and gaskets | | |
| 8. Outlet drain valve | | |
| Project benchmark near pond site | | |
| Equipment for temporary de-watering | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **2. Subgrade Preparation** | | |
| Area beneath embankment stripped of all vegetation, topsoil, and organic matter | | |
| **3. Pipe Spillway Installation** | | |
| Method of installation detailed on plans | | |
| A. Bed preparation | | |
| Installation trench excavated with specified side slopes | | |
| Stable, uniform, dry subgrade of relatively impervious material (If subgrade is wet, contractor shall have defined steps before proceeding with installation) | | |
| Invert at proper elevation and grade | | |
| B. Pipe placement | | |
| Metal / plastic pipe | | |
| 1. Watertight connectors and gaskets properly installed | | |
| 2. Anti-seep collars properly spaced and having watertight connections to pipe | | |
| 3. Backfill placed and tamped by hand under “haunches” of pipe | | |
| 4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2 feet cover over pipe is reached | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **3. Pipe Spillway Installation** | | |
| Concrete pipe | | |
| 1. Pipe set on blocks or concrete slab for pouring of low cradle | | |
| 2. Pipe installed with rubber gasket joints with no spalling in gasket interface area | | |
| 3. Excavation for lower half of anti-seep collar(s) with reinforcing steel set | | |
| 4. Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant | | |
| 5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix | | |
| 6. Upper half of anti-seep collar(s) formed with reinforcing steel set | | |
| 7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary) | | |
| 8. Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary. | | |
| C. Backfilling | | |
| Fill placed in maximum 8 inch lifts | | |
| Backfill taken minimum 2 feet above top of anti-seep collar elevation before traversing with heavy equipment | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **4. Riser / Outlet Structure Installation** | | |
| Riser located within embankment | | |
| A. Metal riser | | |
| Riser base excavated or formed on stable subgrade to design dimensions | | |
| Set on blocks to design elevations and plumbed | | |
| Reinforcing bars placed at right angles and projecting into sides of riser | | |
| Concrete poured so as to fill inside of riser to invert of barrel | | |
| B. Pre-cast concrete structure | | |
| Dry and stable subgrade | | |
| Riser base set to design elevation | | |
| If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely | | |
| Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway | | |
| C. Poured concrete structure | | |
| Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set | | |
| Structure formed to design dimensions, with reinforcing steel set as per plan | | |
| Concrete of an approved mix and vibrated into place (protected from freezing while curing, if necessary) | | |
| Forms stripped & inspected for “honeycomb” prior to backfilling; parge if necessary | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **5. Embankment Construction** | | |
| Fill material | | |
| Compaction | | |
| Embankment | | |
| 1. Fill placed in specified lifts and compacted with appropriate equipment | | |
| 2. Constructed to design cross-section, side slopes and top width | | |
| 3. Constructed to design elevation plus allowance for settlement | | |
| **6. Impounded Area Construction** | | |
| Excavated / graded to design contours and side slopes | | |
| Inlet pipes have adequate outfall protection | | |
| Forebay(s) | | |
| Pond benches | | |
| **7. Earth Emergency Spillway Construction** | | |
| Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc. | | |
| Excavated to proper cross-section, side slopes and bottom width | | |
| Entrance channel, crest, and exit channel constructed to design grades and elevations | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY / UNSATISFACTORY | COMMENTS |
|---|---|---|
| **8. Outlet Protection** | | |
| A. End section | | |
| Securely in place and properly backfilled | | |
| B. Endwall | | |
| Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified | | |
| Endwall formed to design dimensions with reinforcing steel set as per plan | | |
| Concrete of an approved mix and vibrated into place (protected from freezing, if necessary) | | |
| Forms stripped and structure inspected for “honeycomb” prior to backfilling; parge if necessary | | |
| C. Riprap apron / channel | | |
| Apron / channel excavated to design cross-section with proper transition to existing ground | | |
| Filter fabric in place | | |
| Stone sized as per plan and uniformly place at the thickness specified | | |
| **9. Vegetative Stabilization** | | |
| Approved seed mixture or sod | | |
| Proper surface preparation and required soil amendments | | |
| Excelsior mat or other stabilization, as per plan | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **10. Miscellaneous** | | |
| Drain for ponds having a permanent pool | | |
| Trash rack / anti-vortex device secured to outlet structure | | |
| Trash protection for low flow pipes, orifices, etc. | | |
| Fencing (when required) | | |
| Access road | | |
| Set aside for clean-out maintenance | | |
| **11. Stormwater Wetlands** | | |
| Adequate water balance | | |
| Variety of depth zones present | | |
| Approved pondscaping plan in place<br>Reinforcement budget for additional plantings | | |
| Plants and materials ordered 6 months prior to construction | | |
| Construction planned to allow for adequate planting and establishment of plant community<br>(April-June planting window) | | |
| Wetland buffer area preserved to maximum extent possible | | |

## Comments:

**Actions to be Taken:**

# Infiltration Basin Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **1. Pre-Construction** | | |
| Runoff diverted | | |
| Soil permeability tested | | |
| Groundwater / bedrock depth | | |
| **2. Excavation** | | |
| Size and location | | |
| Side slopes stable | | |
| Excavation does not compact subsoils | | |
| **3. Embankment** | | |
| Barrel | | |
| Anti-seep collar or Filter diaphragm | | |
| Fill material | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY/ UNSATISFACTORY | COMMENTS |
|---|---|---|
| **4. Final Excavation** | | |
| Drainage area stabilized | | |
| Sediment removed from facility | | |
| Basin floor tilled | | |
| Facility stabilized | | |
| **5. Final Inspection** | | |
| Pretreatment facility in place | | |
| Inlets / outlets | | |
| Contributing watershed stabilized before flow is routed to the factility | | |

**Comments:**

**Actions to be Taken:**

# Sand/Organic Filter System Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

| CONSTRUCTION SEQUENCE | SATISFACTORY / UNSATISFACTORY | COMMENTS |
|---|---|---|
| **1. Pre-construction** | | |
| Pre-construction meeting | | |
| Runoff diverted | | |
| Facility area cleared | | |
| Facility location staked out | | |
| **2. Excavation** | | |
| Size and location | | |
| Side slopes stable | | |
| Foundation cleared of debris | | |
| If designed as exfilter, excavation does not compact subsoils | | |
| Foundation area compacted | | |
| **3. Structural Components** | | |
| Dimensions and materials | | |
| Forms adequately sized | | |
| Concrete meets standards | | |
| Prefabricated joints sealed | | |
| Underdrains (size, materials) | | |
| | | |

| CONSTRUCTION SEQUENCE | SATISFACTORY / UNSATISFACTORY | COMMENTS |
|---|---|---|
| **4. Completed Facility Components** | | |
| 24 hour water filled test | | |
| Contributing area stabilized | | |
| Filter material per specification | | |
| Underdrains installed to grade | | |
| Flow diversion structure properly installed | | |
| Pretreatment devices properly installed | | |
| Level overflow weirs, multiple orifices, distribution slots | | |
| **5. Final Inspection** | | |
| Dimensions | | |
| Surface completely level | | |
| Structural components | | |
| Proper outlet | | |
| Ensure that site is properly stabilized before flow is directed to the structure. | | |

**Comments:**

**Actions to be Taken:**

# Attachment B
# BMP Maintenance Inspection Checklist

# Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project ______________________________
Location: ______________________________
Site Status: ______________________________

Date: ______________________________
Time: ______________________________

Inspector: ______________________________

| Maintenance Item | Satisfactory/ Unsatisfactory | Comments |
|---|---|---|
| **1. Embankment and emergency spillway (Annual, After Major Storms)** | | |
| 1. Vegetation and ground cover adequate | | |
| 2. Embankment erosion | | |
| 3. Animal burrows | | |
| 4. Unauthorized planting | | |
| 5. Cracking, bulging, or sliding of dam | | |
| a. Upstream face | | |
| b. Downstream face | | |
| c. At or beyond toe | | |
| downstream | | |
| upstream | | |
| d. Emergency spillway | | |
| 6.Pond, toe & chimney drains clear and functioning | | |
| 7.Seeps/leaks on downstream face | | |
| 8.Slope protection or riprap failure | | |
| 9. Vertical/horizontal alignment of top of dam “As-Built” | | |
| | | |

| Maintenance Item | Satisfactory/ Unsatisfactory | Comments |
|---|---|---|
| 10. Emergency spillway clear of obstructions and debris | | |
| 11. Other (specify) | | |
| **2. Riser and principal spillway (Annual)** | | |
| Type: Reinforced concrete _______<br>Corrugated pipe _______<br>Masonry _______<br>1. Low flow orifice obstructed | | |
| 2. Low flow trash rack.<br>a. Debris removal necessary | | |
| b. Corrosion control | | |
| 3. Weir trash rack maintenance<br>a. Debris removal necessary | | |
| b. corrosion control | | |
| 4. Excessive sediment accumulation insider riser | | |
| 5. Concrete/masonry condition riser and barrels<br>a. cracks or displacement | | |
| b. Minor spalling (<1" ) | | |
| c. Major spalling (rebars exposed) | | |
| d. Joint failures | | |
| e. Water tightness | | |
| 6. Metal pipe condition | | |
| 7. Control valve<br>a. Operational/exercised | | |
| b. Chained and locked | | |
| 8. Pond drain valve<br>a. Operational/exercised | | |
| b. Chained and locked | | |
| 9. Outfall channels functioning | | |
| 10. Other (specify) | | |

| Maintenance Item | Satisfactory/ Unsatisfactory | Comments |
|---|---|---|
| **3. Permanent Pool (Wet Ponds) (monthly)** | | |
| 1. Undesirable vegetative growth | | |
| 2. Floating or floatable debris removal required | | |
| 3. Visible pollution | | |
| 4. Shoreline problem | | |
| 5. Other (specify) | | |
| **4. Sediment Forebays** | | |
| 1.Sedimentation noted | | |
| 2. Sediment cleanout when depth < 50% design depth | | |
| **5. Dry Pond Areas** | | |
| 1. Vegetation adequate | | |
| 2. Undesirable vegetative growth | | |
| 3. Undesirable woody vegetation | | |
| 4. Low flow channels clear of obstructions | | |
| 5. Standing water or wet spots | | |
| 6. Sediment and / or trash accumulation | | |
| 7. Other (specify) | | |
| **6. Condition of Outfalls (Annual , After Major Storms)** | | |
| 1. Riprap failures | | |
| 2. Slope erosion | | |
| 3. Storm drain pipes | | |
| 4.Endwalls / Headwalls | | |
| 5. Other (specify) | | |
| **7. Other ( Monthly)** | | |
| 1. Encroachment on pond, wetland or easement area | | |

| Maintenance Item | Satisfactory/ Unsatisfactory | Comments |
|---|---|---|
| 2. Complaints from residents | | |
| 3.Aesthetics<br>a. Grass growing required | | |
| b. Graffiti removal needed | | |
| c. Other (specify) | | |
| 4. Conditions of maintenance access routes. | | |
| 5. Signs of hydrocarbon build-up | | |
| 6. Any public hazards (specify) | | |
| **8. Wetland Vegetation (Annual)** | | |
| 1. Vegetation healthy and growing<br>Wetland maintaining 50% surface area coverage of wetland plants after the second growing season.<br>(If unsatisfactory, reinforcement plantings needed) | | |
| 2. Dominant wetland plants:<br>Survival of desired wetland plant species<br>Distribution according to landscaping plan? | | |
| 3. Evidence of invasive species | | |
| 4. Maintenance of adequate water depths for desired wetland plant species | | |
| 5. Harvesting of emergent plantings needed | | |
| 6. Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment | | |
| 7. Eutrophication level of the wetland. | | |
| 8. Other (specify) | | |

**Comments:**

## Actions to be Taken:

# Infiltration Basin Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

| MAINTENANCE ITEM | SATISFACTORY / UNSATISFACTORY | COMMENTS |
|---|---|---|
| **1. Debris Cleanout (Monthly)** | | |
| Basin surface clear of debris | | |
| Inflow pipes clear of debris | | |
| Overflow spillway clear of debris | | |
| Inlet area clear of debris | | |
| **2. Sediment Traps or Forebays (Annual)** | | |
| Obviously trapping sediment | | |
| Greater than 50% of storage volume remaining | | |
| **3. Dewatering (Monthly)** | | |
| Basin dewaters between storms | | |
| **4. Sediment Cleanout of Basin (Annual)** | | |
| No evidence of sedimentation in basin | | |
| Sediment accumulation doesn't yet require cleanout | | |
| **5. Inlets (Annual)** | | |

| MAINTENANCE ITEM | SATISFACTORY / UNSATISFACTORY | COMMENTS |
|---|---|---|
| Good condition | | |
| No evidence of erosion | | |
| **6. Outlet/Overflow Spillway (Annual)** | | |
| Good condition, no need for repair | | |
| No evidence of erosion | | |
| **7. Aggregate Repairs (Annual)** | | |
| Surface of aggregate clean | | |
| Top layer of stone does not need replacement | | |
| Basin does not need rehabilitation | | |

## Comments:

## Actions to be Taken:

# Sand/Organic Filter Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

| MAINTENANCE ITEM | SATISFACTORY / UNSATISFACTORY | COMMENTS |
|---|---|---|
| **1. Debris Cleanout (Monthly)** | | |
| Contributing areas clean of debris | | |
| Filtration facility clean of debris | | |
| Inlet and outlets clear of debris | | |
| **2. Oil and Grease (Monthly)** | | |
| No evidence of filter surface clogging | | |
| Activities in drainage area minimize oil and grease entry | | |
| **3. Vegetation (Monthly)** | | |
| Contributing drainage area stabilized | | |
| No evidence of erosion | | |
| Area mowed and clipping removed | | |
| **4. Water Retention Where Required (Monthly)** | | |
| Water holding chambers at normal pool | | |
| No evidence of leakage | | |
| **5. Sediment Deposition (Annual)** | | |

| MAINTENANCE ITEM | SATISFACTORY / UNSATISFACTORY | COMMENTS |
|---|---|---|
| Filter chamber free of sediments | | |
| Sedimentation chamber not more than half full of sediments | | |
| **6. Structural Components (Annual)** | | |
| No evidence of structural deterioration | | |
| Any grates are in good condition | | |
| No evidence of spalling or cracking of structural parts | | |
| **7. Outlet/Overflow Spillway (Annual)** | | |
| Good condition, no need for repairs | | |
| No evidence of erosion (if draining into a natural channel) | | |
| **8. Overall Function of Facility (Annual)** | | |
| Evidence of flow bypassing facility | | |
| No noticeable odors outside of facility | | |

**Comments:**

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**Actions to be Taken:**

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# Attachment C
# Site Plan (See attached CD)

# Attachment D
# Soils Information

TransTech Engineering Services, PC ◆ 1594 State Street ◆ Schenectady, NY 12304 ◆ ph: 1.800.724.6306 ◆ fx: 518.370.5538

# GEOTECHNICAL ENGINEERING REPORT
# PROPOSED APWAN DEVELOPMENT
# SILO RIDGE COUNTRY CLUB
# 4651 ROUTE 22
# AMENIA, NEW YORK

**PREPARED FOR:**

VHB Engineering, Surveying and Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**PREPARED BY:**

TransTech Engineering Services, P.C. for
TransTech Geotechnical Services
1594 State Street
Schenectady, New York 12304


**October 14, 2013**
**TransTech Project No. G13-3523**

# TABLE OF CONTENTS

## 1.0 INTRODUCTION

This report presents the results of a subsurface exploration program and geotechnical engineering evaluation completed by TransTech Engineering Services, P.C., on behalf of TransTech Geotechnical Services, for the proposed Apwan Development planned at Silo Ridge Country Club in the Town of Amenia, New York. VHB Engineering, Surveying and Landscape Architecture, P.C. (VHB) retained TransTech Geotechnical Services to complete this work, which was done in general accordance with our August 21, 2013 Proposal.

Based on the information provided by VHB, we understand the project will consist of a new residential development centered around the existing Silo Ridge Country Club. The development will include a new Lodge/Clubhouse with restaurant, Spa/Fitness center and Kid's Barn arranged around a central village green. The development will also include Custom Homes, Village Green Homes, Townhomes and Cottages.

The site topography is generally comprised of rolling hills with a mixture of open golf course areas and wooded areas. The site is flanked to the north and west by taller ridges. Exposed ledge rock is exposed at various locations and there are several ponds located in the lower-lying areas of the site. The approximate location of the site is shown on the attached Figure No. 1.

## 2.0 SUBSURFACE EXPLORATION

The subsurface exploration program consisted of twelve (12) test borings, seventeen (17) probe borings, six (6) test pits and six (6) infiltration tests. The test borings were designated as BB-1 through BB-7, BB-8A and BB-9 through BB-12. The probe borings were designated as GB-1 through GB-17 and the test pits were designated as DT-1 through DT-6. The test borings were generally located in proposed building areas. The test boring, probe boring and test pit locations were established and marked in the field by others. The approximate boring and test pit locations are shown on the attached Figure No. 2.

Auger refusal was encountered in test borings BB-1, BB-3, BB-5, BB-8, BB-9, BB-10, BB-11 and BB-12 at depths of 11.0, 44.0, 21.0, 24.0, 19.5, 19.5, 20.0 and 11.0 feet, respectively. The remaining test borings were terminated at a depth of 25 feet.

Auger refusal was encountered in probe borings GB-3, GB-8, GB-9, GB-13, GB-15 and GB-17 at depths of 19.0, 11.0, 2.0, 11.0, 18.0 and 11.0 feet, respectively. The remaining probe borings were terminated at a depth of 20 feet, with the exception of probe boring GB-6 which was terminated at a depth of 25 feet.

The test borings and probe borings were made with a Central Mine Equipment (CME) model 75 all-terrain drill rig, using hollow stem auger techniques. Split spoon samples and Standard Penetration Tests (SPTs) were taken in the test borings continuously from the ground surface to a depth of 10 feet and at intervals of 5 feet thereafter. The split spoon sampling and SPTs were completed in general accordance with *ASTM D 1586 - "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils"*. No sampling was performed in the probe borings.

The test pits were excavated by others using a rubber tire backhoe. The test pits were excavated prior to our inspector's arrival and were left open for our observation. Photos of the test pit excavations are presented in Appendix B.

Infiltration testing was performed by TransTech at each test pit location. The infiltration tests were performed using 4 inch diameter steel casing, which was installed to a depth of 4 feet below grade.

The test boring and test pit logs were prepared by a geotechnical engineer based on visual observation of the recovered soil and rock samples and review of the driller's field notes. The soil samples were described based on a visual/manual estimation of the grain size distribution, along with characteristics such as color, relative density, consistency, moisture, etc. The test boring and test pit logs are presented in Appendix A, along with general information and a key of terms and symbols used to prepare the logs.

## 3.0 LABORATORY TESTING

Laboratory testing was performed on selected soil samples recovered from the test borings. The laboratory tests were performed to confirm the visual soil classifications. The laboratory testing included the following tests:

- Natural moisture content testing was performed on ten (10) samples in accordance with ASTM D 2216 – *"Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass."*
- Grain size analysis testing was performed on ten (10) samples in general accordance with ASTM D 422 – *"Standard Test Method for Particle-Size Analysis of Soils"*, and ASTM D 1140 – *"Standard Test Method for Amount of Material in Soils Finer Than the No. 200 Sieve."*

The laboratory test results are presented in Appendix C.

## 4.0 INFILTRATION TEST RESULTS

Infiltration testing was performed in 4 inch diameter steel cased holes at a depth of 4 feet in general accordance with the New York State Stormwater Design Manual, Appendix D. The holes were pre-soaked overnight prior to the infiltration testing. It was observed that the pre-soak water was still present in the steel casing after 24 hours at each infiltration test location. Water was added to achieve a 24 inch water depth at each location and the water levels were recorded over a period of 3 hours at each location. The infiltration test results are provided in the following table.

| Infiltration Test Location | Groundwater Depth (ft) | Test Depth (ft) | Final Infiltration Rate (inches/hour) |
|---|---|---|---|
| DT-1 | > 11 | 4 | 0.25 |
| DT-2 | 7.5 | 4 | 0 |
| DT-3 | 6.5 | 4 | 0.25 |
| DT-4 | > 9.5 | 4 | 0 |
| DT-5 | > 9.7 | 4 | 0 |
| DT-6 | > 11.3 | 4 | 0 |

## 5.0 SUBSURFACE CONDITIONS

### 5.1 Soil Profile

The subsurface profile encountered at the test boring locations generally consisted of indigenous overburden soils, with the exception of test borings BB-5, BB-6 and BB-10 where possible fill type soils were encountered overlying indigenous overburden soils. The possible fill type soils appeared to consist of re-worked indigenous soils. The possible fill type soils and indigenous soils consisted of varying fractions of clay, silt, sand and gravel soils with zones containing intermixed cobbles at various depths and locations.

SPT "N" values obtained within the cohesive possible fill type soils ranged from 5 to 17 indicating the consistency of these soils varies from "medium" to "very stiff". SPT "N" values obtained within the cohesionless possible fill type soils ranged from 12 to 26 indicating a "firm" relative density. SPT "N" values obtained within the cohesive indigenous soils ranged from 1 to 46 indicating the consistency of these soils varies from "very soft" to "very stiff". SPT "N" values obtained in the cohesionless indigenous overburden soils ranged from 3 to greater than 50 indicating the relative density of these soils varies from "very loose" to "very compact".

### 5.2 Bedrock Conditions

Auger refusal (apparent top of bedrock) was encountered in the test borings and probe borings at depths ranging from 2.0 to 44.0 feet. In addition, highly decomposed and highly weathered bedrock was encountered in the test borings at depths ranging from 4 to 23 feet. At many locations, the test borings were advanced many feet into the top of the highly decomposed and weathered bedrock before reaching auger refusal, indicating the top of more sound rock had been encountered.

The following table presents the auger refusal depths (apparent top of more sound bedrock) for each test boring and probe boring.

| Test Boring No. | Approximate Depth of Auger Refusal (Apparent Top of Bedrock) (feet) |
|---|---|
| BB-1 | 11.0 |
| BB-2 | NA |
| BB-3 | NA |
| BB-4 | NA |
| BB-5 | 21.0 |
| BB-6 | NA |
| BB-7 | NA |
| BB-8 | 24.0 |
| BB-9 | 19.5 |
| BB-10 | 19.5 |
| BB-11 | 20.0 |
| BB-12 | 11.0 |
| GB-1 | NA |
| GB-2 | NA |
| GB-3 | 19.0 |
| GB-4 | NA |
| GB-5 | NA |
| GB-6 | NA |
| GB-7 | NA |
| GB-8 | 11.0 |
| GB-9 | 2.0 |
| GB-10 | NA |
| GB-11 | NA |
| GB-12 | NA |
| GB-13 | 11.0 |
| GB-14 | NA |
| GB-15 | 18.0 |
| GB-16 | NA |
| GB-17 | 11.0 |

## 5.3 Groundwater Conditions

Groundwater was encountered in test borings BB-1, BB-2, BB-3, BB-4, BB-5 and BB-8 at depths ranging from 6.6 to 19.0 feet. Groundwater was also present in test pits DT-2 and DT-3 at depths of 7.5 and 6.5 feet, respectively. The following table presents the depths at which groundwater conditions were encountered in the test borings and test pits.

| Test Boring No. | Depth to Free Standing Water (feet) |
|---|---|
| BB-1 | 10.3 |
| BB-2 | 19.0 |
| BB-3 | 6.6 |
| BB-4 | 17.2* |
| BB-5 | 14.7* |
| BB-6 | NA |
| BB-7 | NA |
| BB-8 | 12.8 |
| BB-9 | NA |
| BB-10 | NA |
| BB-11 | NA |
| BB-12 | NA |
| DT-1 | NA |
| DT-2 | 7.5* |
| DT-3 | 6.5* |
| DT-4 | NA |
| DT-5 | NA |
| DT-6 | NA |

*Indicates groundwater level measured 24 hours after drilling/excavation.
NA indicates free standing water was not present.

It should be expected that groundwater conditions could vary with changes in soil conditions, precipitation and seasonal conditions.

## 6.0 GEOTECHNICAL RECOMMENDATIONS

### 6.1 General

The primary geotechnical considerations impacting development of the site are the presence of existing fill type soils and bedrock. We recommend that existing fill type soils, which are associated with previous grading activities at the site, be removed where present beneath proposed building areas. Undercut excavations on the order of approximately 4 to 8 feet will be required to remove possible fill type soils at test boring locations BB-5, BB-6 and BB-10. Very soft soil conditions were encountered at the transition from possible fill type soils to indigenous soils in test boring BB-6 from a depth of 8 to 10 feet. These very soft soils are susceptible to potentially excessive settlement under building foundation loads and should be undercut and replaced with imported Structural Fill within proposed building areas. Recommendations for Structural Fill material along with placement and compaction recommendations are presented in Appendix D.

It is also anticipated that bedrock could be encountered in relatively shallow foundation or utility excavations in some areas. Based on the conditions encountered in the test borings, it is anticipated that the upper more weathered and fractured bedrock zone can be excavated using a large track-mounted excavator equipped with rock teeth or a large bulldozer equipped with a single-tooth ripper. However, it is possible that zones of more competent bedrock (i.e. auger refusal depths encountered in the borings) could be encountered that may require controlled blasting to loosen the rock for excavation. Blasting should be performed by a licensed contractor and should be controlled to limit the maximum peak particle velocity (PPV) to less than two (2) inches per second (ips) at the property limits and one (1) ips at the nearest adjacent occupied structure. In addition, the peak airblast overpressure limit should be controlled to less than 0.014 pounds per square inch (psi) at the nearest adjacent occupied structure.

We point out that the controlled blasting guidelines described above are intended to prevent damage to existing structures and greatly exceed the threshold at which humans will notice vibration (approximately 0.02 ips). Accordingly, we recommend that blast vibrations be monitored and recorded at the property limits during each blast event to confirm that the limits recommended above are not exceeded. In addition, we recommend that pre-condition surveys be performed on all adjacent structures to document the condition of existing structures prior to the start of blasting operations.

No blasting should be performed within proposed building areas due to the potential for over-breakage, which could impact the integrity of building foundations.

## 6.2 Site Preparation

Existing topsoil, vegetation, and any other deleterious materials within the proposed building and pavement areas should be removed. Any existing fill type soils should also be removed within proposed building areas and extending 10 feet beyond the building footprint. Following removal of surface materials and excavation to design subgrade elevations, the exposed subgrades should be evaluated by a geotechnical engineer. Exposed soil subgrades should be thoroughly proof-rolled using a loaded tandem axle dump truck prior to any required fill placement. The proofrolling should be observed by a geotechnical engineer. Any areas that appear wet, loose, soft, unstable or otherwise unsuitable should be undercut based on guidance provided by the geotechnical engineer.

Undercut excavations (if required) beneath proposed foundation, floor slab and pavement areas should be backfilled with controlled imported Structural Fill. Recommendations for Structural Fill material, along with placement and compaction requirements, are presented in Appendix D. Placement of all fill and/or backfill beneath proposed building and pavement areas should be observed and tested by qualified geotechnical personnel.

It is anticipated that the on-site sand and gravel soils can be re-used as Structural Fill to raise existing site grades. The on-site clay and silt soils will lose strength and become unstable if they become wet during construction and are not well suited for re-use as Structural Fill beneath building areas. It should be anticipated that cut and fill grading activities will require separating the sand and gravel soil layers from the silt and clay soil layers for re-use as Structural Fill beneath building areas.

## 6.3 Spread Foundations

It is our opinion that spread foundations can be used to support the proposed buildings. Spread foundations should bear on firm, undisturbed indigenous soil bearing grades. Existing fill type soils should be removed where present beneath proposed foundation bearing grades. The exposed soil bearing grades for foundations should be compacted to densify any soils loosened by the excavation process.

The exposed bearing grades should be observed and evaluated by a geotechnical engineer. Any soft or otherwise unsuitable soils should be undercut and replaced with compacted imported Structural Fill based on guidance provided by the geotechnical engineer. All final bearing grades should be firm, stable and free of loose soil, mud, water, frost or other deleterious materials.

Continuous wall foundations should be at least 1.5 feet in width and column/individual foundations should be at least 2.5 feet in width. Exterior foundations of heated spaces and all foundations of unheated spaces should be embedded a minimum of 4.0 feet below finished exterior grades for frost protection. Interior foundations in heated spaces should be embedded a minimum of 1.5 feet below finished floor slab elevation to develop adequate bearing capacity.

Spread foundations, which are designed and constructed in accordance with our recommendations, can be sized using a maximum allowable soil bearing pressure of 3,000 pounds per square foot (psf). The allowable soil bearing pressure is based on a factor of safety of at least 3.0.

It is estimated that spread foundations, sized and properly constructed in accordance with our recommendations, will undergo total settlement of less than 1 inch, and differential settlements should be less than ½ inch.

## 6.4 Slabs-on-Grade

At-grade floor slabs can be constructed as slab-on-grade following proper site preparation as outlined in Section 6.2 above. A minimum of 6 inches of Subbase Stone, as described in Appendix D, is recommended directly beneath lightly loaded interior slabs-on-grade in heated spaces. The floor slabs can be designed in accordance with procedures recommended by the Portland Cement Association or the American Concrete Institute, using a modulus of subgrade reaction of 150 pounds per cubic inch at the top of the Subbase Stone layer.

Frost heaving of non-vehicle loaded exterior slabs and sidewalks can be minimized by constructing sensitive slab areas (i.e. doorways and sidewalk/pavement transitions) over 18 inches of Drainage Stone, as described in Appendix D. The Drainage Stone layer should have an underdrain within it to provide positive drainage to a suitable downslope outlet. Although this may not eliminate all movement associated with frost heave, it should provide adequate protection against excessive differential frost heave during most winters.

We recommend a vapor barrier be provided beneath interior floor slabs, which are designated to receive a moisture sensitive floor covering, in accordance with the American Concrete Institute (ACI) Guide for Concrete Floor and Slab Construction. It is recommended that the slab-on-grade be constructed such that it floats on the subbase and subgrades and is not structurally connected to, or resting directly on, perimeter walls or column footings in order to limit differential settlement effects.

### 6.5 Lateral Earth Pressure Design Parameters for Basement/Retaining Walls

The design of basement walls and site retaining walls should be based on lateral earth pressures caused by the load of backfill against the walls and the surcharge effects from permanent or temporary loads. Basement walls, which are designed for restrained or non-yielding conditions, should be designed using "at rest" lateral earth pressures. Site retaining walls, which are designed to "yield" can be designed using "active" lateral earth pressures. The basement and site retaining walls should be backfilled in accordance with the recommendations presented in Section 6.6 below.

The lateral earth pressures can be computed using the following soil parameters where the wall backfill consists of imported Structural Fill, as described in Appendix D, and contains proper foundation drain(s) as discussed below. Water must not be allowed to collect against the backside of the exposed wall section unless the wall is designed for the additional hydrostatic pressure.

Recommended Soil Parameters for Basement Wall Design:

Coefficient of At-Rest Lateral Earth Pressure – 0.50
Coefficient of Active Lateral Earth Pressure – 0.33
Coefficient of Passive Lateral Earth Pressure – 3.00*
Coefficient of Sliding Friction – 0.30
Angle of Internal Friction (Structural Fill backfill) – 30 Degrees
Total Moist Unit Weight of Soil (Structural Fill backfill) – 120 pcf

* It should be noted that a horizontal displacement of approximately 0.005 x the height of the resisting soils (i.e. embedment depth of footing/wall on the resisting side) is required to achieve the full passive earth pressure coefficient of 3.00. If it is determined that the

magnitude of horizontal displacement of the footing/wall required to achieve the full passive earth pressure is too large, a reduced coefficient of passive earth pressure should be used for design.

### 6.6 Basement/Retaining Wall Drainage and Backfill

Basement walls and site retaining walls and should be constructed with foundation drainage systems to intercept any perched or trapped groundwater and relieve potential hydrostatic pressures from acting on the walls. The drainage system should consist of a footing drain and pervious media placed against the wall.

The footing drain should include a non-woven drainage/separation geotextile (i.e. Mirafi 160N or suitable equivalent) installed around Drainage Stone, as described in Appendix D, which surrounds a slotted under-drain pipe. The foundation Drainage Stone and surrounding geotextile should extend 1 foot above the drain pipe. The drain pipes should include clean-outs to allow periodic flushing and maintenance of the system. The drain pipes should be set at the bottom of footing elevation and should discharge to a suitable downslope outlet.

Pervious Granular Backfill or a suitable geosynthetic drainage composite should be placed against the walls, above the footing drain, to allow infiltration to the footing drain. Pervious Granular Backfill, if used against the wall, should be at least 2 feet in width. The remaining excavated area beyond the drainage composite or Pervious Granular Backfill should be backfilled with controlled Structural Fill. The Pervious Granular Fill and/or drainage composite against the wall should extend up to about 1 foot below finished exterior grade where it should be capped off with less permeable on-site soils to reduce surface infiltration. Recommendations for Pervious Granular Fill and Structural Fill material are presented in Appendix D.

### 6.7 Seismic Design

Based on the conditions encountered in the borings, it is our opinion the site should be classified as **Seismic Site Class "D"** according Table 1615.1.1 of the Building Code of New York State.

The mapped spectral accelerations in the project area for Site Class "B" were determined using the USGS online Seismic "Design Maps" web application, which is based on 2008 National Seismic Hazard Map data.

The spectral response accelerations for site class "B" are as follows:

- Short Period Response ($S_S$) - 0.182g
- 1 Second Period Response ($S_1$) - 0.065g

Adjusted Spectral Response Acceleration for Site Class "D":

- Short Period Response ($S_{MS}$) - 0.291g
- 1 Second Period Response ($S_{M1}$) - 0.156g

The corresponding five percent damped design spectral response accelerations ($S_{DS}$ and $S_{D1}$) are as follows:

- **$S_{DS}$ - 0.194g**
- **$S_{D1}$ - 0.104g**

6.8 Pavement Design

Pavement design recommendations are provided for a Light Duty Asphalt Concrete Pavement and Commercial Duty Asphalt Concrete Pavement sections. The Light Duty pavement section can be used for car parking areas and the Commercial Duty pavement section should be used for main drive areas. The pavement sections recommended below are based on the assumption that the subgrades will be prepared as discussed in Section 6.2 above.

Light Duty Asphalt Concrete Pavement:

- 1.0 inches – Top Course
- 2.0 inches – Binder Course
- 10 inches – Subbase Course

Commercial Duty Asphalt Concrete Pavement:

- 1.5 inches – Top Course
- 2.5 inches – Binder Course
- 12 inches – Subbase Course
- Woven Geotextile Fabric

We point out that the pavement sections provided above are not intended for heavy construction vehicle traffic. Construction traffic should not be routed across finished pavement areas.

The installation of an underdrain or edge drain is recommended to drain the pavement subbase course and subgrades in order to limit the potential for frost action and improve pavement structure performance and design life.

Proper grading of the pavement structure subgrades is also recommended. Accumulation of water on pavement subgrades should be avoided by grading the subgrade to a slope of at least 2 percent to allow drainage to the underdrains or drainage swale.

The underdrain system must be properly designed, installed and maintained for long term performance. The underdrain system design should include a filtration geotextile (i.e. Mirafi 160N or suitable equivalent), selected considering drainage and filtration, installed around Drainage Stone surrounding a slotted or perforated drain pipe. The Drainage Stone and surrounding geotextile should extend above the drainpipe and should be hydraulically connected to the pavement subbase.

Alternatively, a "geotextile wrapped slotted pipe" system would also be acceptable, if placed in the subbase material provided the subbase layer is thickened along the underdrains. In all cases, the underdrain (i.e. pipe invert) should be set at least 6-inches below the bottom of the overall subbase layer.

Materials for the above pavement structure components should consist of the following:

A. Asphalt Concrete Top Course - NYSDOT Standard Specifications, Item No. 402.12 - Hot Mix Asphalt, Top Course.

B. Asphalt Concrete Binder Course - NYSDOT Standard Specifications, Item No. 402.25 - Hot Mix Asphalt, Binder Course.

C. Subbase Course – Should comply with NYSDOT Standard Specifications, Item No. 304.12 - Type 2 Subbase or Item No. 304.14 – Type 4 Subbase.

D. Woven Geotextile Fabric – Woven polypropylene stabilization/separation geotextile (i.e., Mirafi 500X or approved equivalent).

Adjacent geotextile panels should have a minimum overlap of 18 inches. The Subbase Stone should be placed and compacted in accordance with the recommendations presented in Appendix D. Construction of the asphaltic concrete courses (i.e., binder and top) should be performed in accordance with NYSDOT Standard Specification Section 400.

6.9 Temporary and Permanent Cut and Fill Slopes

Temporary excavations must be adequately sloped back and/or properly supported (i.e. sheeted, shored, braced, shielded etc.) in accordance with OSHA requirements as a minimum. Based on the test boring and test pit information, it would appear that the overall soil conditions encountered would be generally classified as Type C soil in accordance with OSHA criteria.

Based on the OSHA Type C soil criteria, unsupported excavations less than 20 feet would need to be sloped backed to at least a 1.5 horizontal (min) to 1 vertical slope. The contractor should confirm the OSHA soil classification and excavation requirements at the time of construction based on actual location and soil and groundwater conditions present. The contractor shall be solely responsible for all excavation safety, including the design of all excavation support systems.

We recommend that permanent cut slopes be sloped back to at least a 2.0 horizontal to 1 vertical slope and permanent fill slopes be sloped back to at least a 3.0 horizontal to 1 vertical slope. It should be understood that cut slopes may require stabilization measures if groundwater is seeping from the slopes. Stabilization measures could include placement of rip-rap or geosynthetic stabilization mats.

## 7.0 CONCLUDING REMARKS

This report was prepared to assist in planning the design and construction of the proposed Apwan Development planned at Silo Ridge Country Club in the Town of Amenia, New York. The report has been prepared for specific application to this site and this project only.

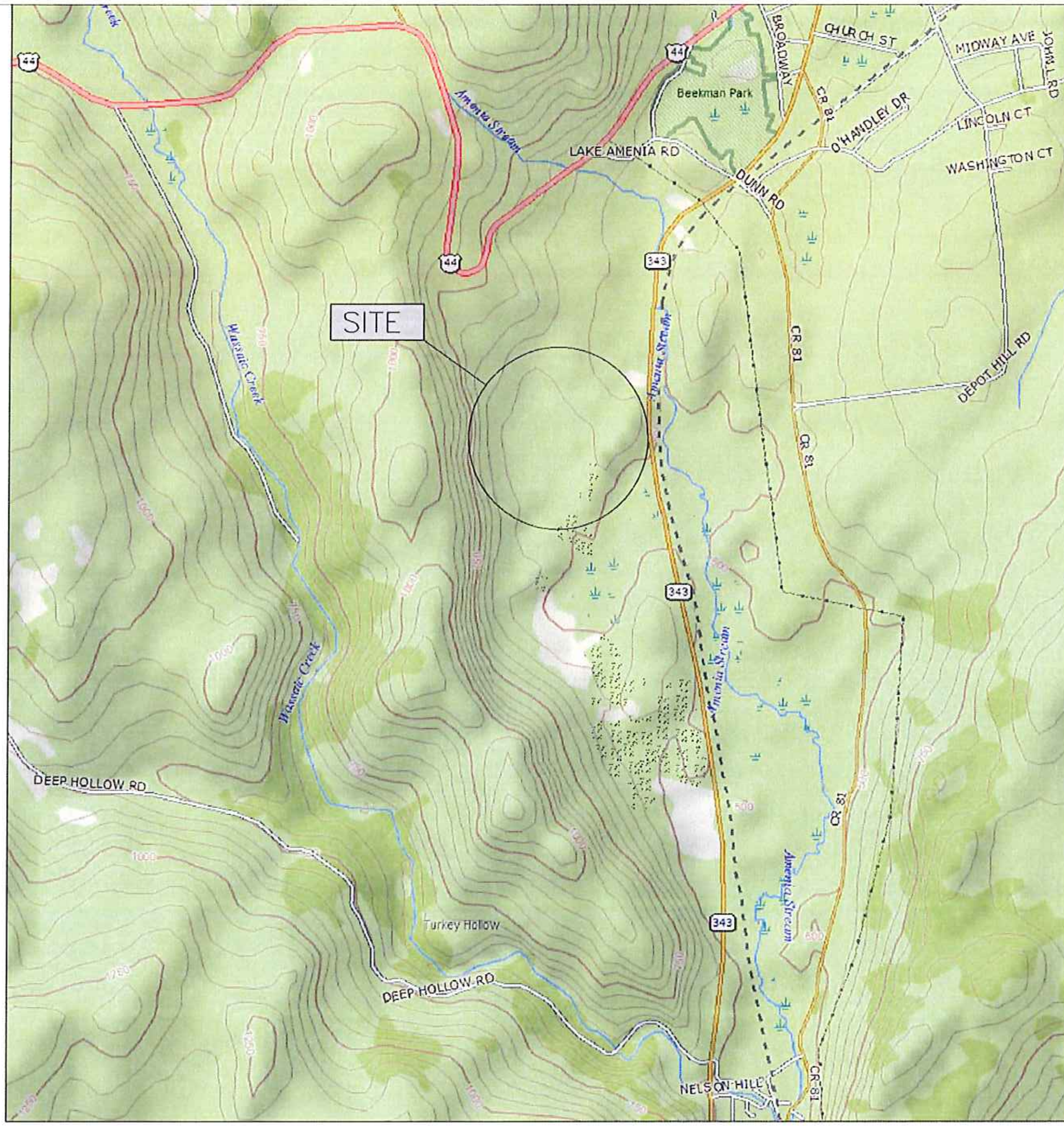
The recommendations were prepared based on our understanding of the proposed project, as described herein, and through the application of generally accepted soils and foundation engineering practices. No warranties, expressed or implied are made by the conclusions, opinions, recommendations or services provided.

Important information regarding the use and interpretation of this report is presented in Appendix E.

Respectfully Submitted:
**TransTech Engineering Services, P.C.**

Tod M. Kobik, P.E.
Geotechnical Engineer

# FIGURES



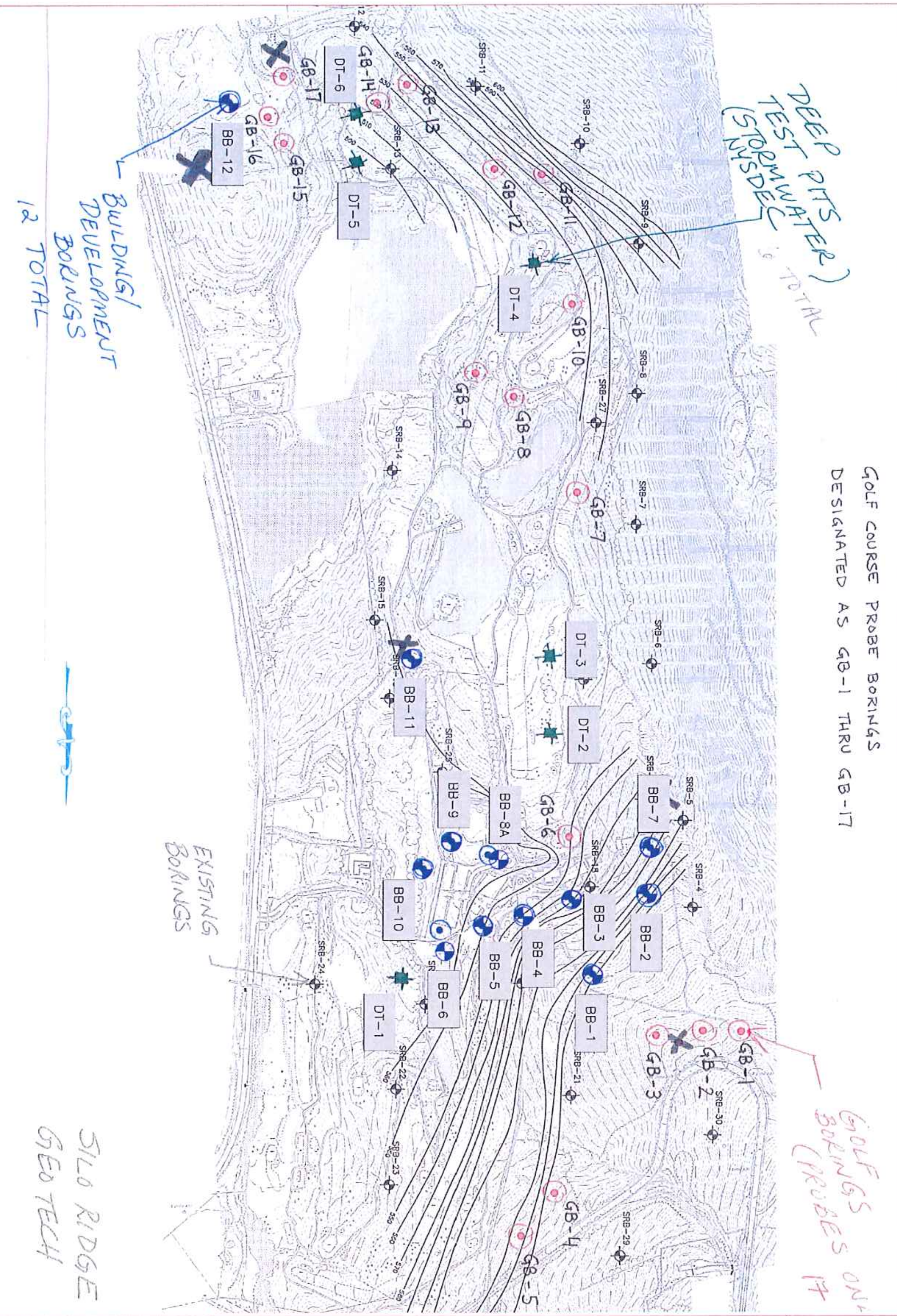



MN (13.6° W)

0 800 1600 2400 3200 4000 ft

Data Zoom 13-0

| | | |
|---|---|---|
| Trans Tech GEOTECHNICAL SERVICES | SCALE: AS SHOWN | SITE LOCATION MAP |
| | DRAWN BY: *TMK* | |
| 1594 STATE STREET<br>SCHENECTADY, NEW YORK 12304<br>PHONE (518) 370-5558<br>FAX (518) 370-5538 | DATE: 10/14/2013 | PROPOSED APWAN DEVELOPMENT<br>SILO RIDGE COUNTRY CLUB<br>4651 ROUTE 22<br>AMENIA, NEW YORK |
| | PROJECT No.: G13-3523 | |
| | FIGURE No.: 1 | |




| | | | |
|---|---|---|---|
| Trans Tech<br>GEOTECHNICAL SERVICES<br>1594 STATE STREET<br>SCHENECTADY, NEW YORK 12304<br>PHONE (518) 370-5558<br>FAX (518) 370-5538 | SUBSURFACE EXPLORATION<br>LOCATION PLAN | PROPOSED APWAN DEVELOPMENT<br>SILO RIDGE COUNTRY CLUB<br>4651 ROUTE 22<br>AMENIA, NEW YORK | SCALE: N.T.S.<br>DRAWN BY: TMK<br>DATE 10/14/13<br>PROJECT No.: G13-3523<br>FIGURE No.: 2 |

# APPENDIX A

# SUBSURFACE EXPLORATION LOGS

| | | |
|---|---|---|
| DATE<br>START: 9/12/2013<br>FINISH: 9/12/2013<br>SHEET 1 OF 1 | Trans Tech DRILLING SERVICES<br>**SUBSURFACE EXPLORATION LOG** | BORING NO. **BB-1**<br>PROJ. NO. G13-3523<br>SURF. ELEV. G.S.<br>G.W. DEPTH See Notes |

PROJECT: Proposed Apwan Development, Silo Ridge Country Club

LOCATION: 4651 Route 22, Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 2 | 2 | 4 | 7 | 6 | 0.8 | Brown Loose Fine-Coarse SAND AND CLAY, Little Gravel, Moist | |
| | / | 2 | 4 | 6 | 6 | 5 | 12 | 1.3 | Firm, Grades to "Some" Silt, "Some" Gravel, "Trace" Clay | |
| 5 | / | 3 | 3 | 6 | 4 | 16 | 10 | 1.2 | Brown-Gray Firm SILT, Some Fine-Coarse Sand, Trace Gravel, Moist | |
| | / | 4 | 56 | 55 | 42 | 50/0.4 | 97 | 1.3 | Highly Decomposed Rock, sampled as Gray Very Compact SILT with rock fragments | REF = Sample spoon refusal |
| | / | 5 | 34 | 50/0.5 | | | REF | 0.7 | | |
| 10 | | | | | | | | | | |
| | | | | | | | | | Boring terminated with auger refusal at 11.0 feet. | Free standing water was measured at a depth of 10.3' upon completion of drilling and sampling. |
| 15 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE: CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

DATE
START: 9/12/2013
FINISH: 9/12/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

**SUBSURFACE EXPLORATION LOG**

BORING NO. **BB-2**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 19.0'

PROJECT: Proposed Apwan Development, Silo Ridge Country Club
LOCATION: 4651 Route 22, Amenia, New York

| DEPTH (ft.) | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 6 | 7 | 1.3 | Brown Loose Fine-Coarse SAND AND SILT, Little Gravel, Moist | 3" Topsoil at ground surface |
| | 2 | 4 | 7 | 11 | 11 | 18 | 0.7 | Brown Firm SILT, Some Fine-Coarse Sand, Trace Gravel, Moist | |
| 5 | 3 | 8 | 4 | 4 | 4 | 8 | 1.4 | Loose, Grades to "Trace" Clay | |
| | 4 | 5 | 4 | 6 | 4 | 10 | 0.7 | Wet | |
| 10 | 5 | 2 | 3 | 4 | 3 | 7 | 1.5 | Brown Loose Fine-Coarse SAND, Some Silt, Some Gravel, Moist | |
| 15 | 6 | 2 | 1 | 2 | 1 | 3 | 1.0 | Brown Very Loose GRAVEL AND Fine-Coarse SAND, Some Silt, Trace Clay, Wet | Driller noted "wet" soil layer at a depth of 14'. |
| 20 | 7 | 5 | 9 | 14 | 20 | 23 | 0.8 | Brown-Gray Firm SILT, Some Gravel, Some Fine-Coarse Sand, Little Rock fragments, Wet | |
| 25 | 8 | 22 | 40 | 50/0.5 | | REF | 1.3 | Very Compact, Dry | REF = Sample spoon refusal |
| | | | | | | | | Boring terminated at a depth of 25.0 feet. | Free standing water was measured at a depth of 19.0' upon completion of drilling and sampling. |
| 30 | | | | | | | | | |
| 35 | | | | | | | | | |
| 40 | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

DATE
START: 9/12/2013
FINISH: 9/12/2013

SHEET 1 OF 2

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. BB-3
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 6.6'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | | 6 | 8 | 8 | 14 | 1.0 | Brown Firm SILT, Some Fine-Coarse SAND, Some Gravel, Dry | 6" Asphalt at ground surface |
| | / | 2 | 21 | 10 | 8 | 8 | 18 | 0.5 | Gray Firm Fine-Coarse SAND, Some Gravel, Little Silt, Dry | |
| 5 | / | 3 | 3 | 5 | 7 | 8 | 12 | 1.5 | Gray Highly Decomposed Rock, sampled as Gray Firm SILT with rock fragments | |
| | / | 4 | 9 | 10 | 15 | 15 | 25 | 1.4 | | |
| | / | 5 | 4 | 18 | 16 | 15 | 34 | 1.9 | Compact | Boring was advanced to a depth of 25 feet on 9/12/13 using hollow stem auger drilling technique. Boring was completed on 9/18/13 using rotary wash drilling technique. |
| 10 | | | | | | | | | | |
| | / | 6 | 8 | 18 | 17 | 17 | 35 | 1.2 | | |
| 15 | | | | | | | | | | |
| | / | 7 | 7 | 20 | 23 | 24 | 43 | 1.9 | Light Gray | |
| 20 | | | | | | | | | | |
| | / | 8 | 18 | 47 | 50/0.5 | | REF | 1.4 | White-Gray, Very Compact, with Fine Sand Seams, Moist | REF = Sample spoon refusal |
| 25 | | | | | | | | | | Free standing water was measured at a depth of 6.6' with augers at a depth of 25.0 feet on 9/12/13. |
| | / | 9 | 33 | 75 | 59 | 50 | 144 | 1.5 | | |
| 30 | | | | | | | | | | |
| | / | 10 | 42 | 49 | 50/0.3 | | REF | 1.0 | | |
| 35 | | | | | | | | | | |
| | / | 11 | 50/0.1 | | | | REF | 0.1 | Contains Seam of Coarse SAND, Wet | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

| | | |
|---|---|---|
| DATE<br>START: 9/12/2013<br>FINISH: 9/18/2013<br><br>SHEET 2 OF 2 | Trans Tech<br>DRILLING SERVICES<br><br>**SUBSURFACE EXPLORATION LOG** | BORING NO. **BB-3**<br>PROJ. NO. G13-3523<br>SURF. ELEV. G.S.<br><br>G.W. DEPTH 6.6' |

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Highly Decomposed Rock, sampled as White-Gray Very Compact SILT with rock fragments | REF = Sample spoon refusal<br>NR = No recovery |
| 45 | | 12 | 50/0 | | | | REF | NR | Boring terminated with auger refusal at 44.0 feet. | |
| 50 | | | | | | | | | | |
| 55 | | | | | | | | | | |
| 60 | | | | | | | | | | |
| 65 | | | | | | | | | | |
| 70 | | | | | | | | | | |
| 75 | | | | | | | | | | |
| 80 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers and Rotary Wash Drilling

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

| | | |
|---|---|---|
| DATE<br>START: 9/10/2013<br>FINISH: 9/10/2013<br>SHEET 1 OF 1 | Trans Tech<br>DRILLING SERVICES<br>**SUBSURFACE EXPLORATION LOG** | BORING NO. **BB-4**<br>PROJ. NO. G13-3523<br>SURF. ELEV. G.S.<br>G.W. DEPTH 17.2' |

PROJECT: Proposed Apwan Development, Silo Ridge Country Club

LOCATION: 4651 Route 22, Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 6 | 11 | 9 | 6 | 20 | 1.5 | Brown Firm Fine-Coarse SAND AND SILT, Trace rock fragments, Moist | 3" Topsoil at ground surface |
| | / | 2 | 5 | 5 | 6 | 6 | 11 | 0.7 | | |
| 5 | / | 3 | 3 | 4 | 5 | 6 | 9 | 1.5 | Loose | |
| | / | 4 | 6 | 7 | 10 | 7 | 17 | 0.8 | Brown Very Stiff CLAY AND GRAVEL, Little Fine-Coarse Sand, Moist | |
| 10 | / | 5 | 2 | 5 | 10 | 16 | 15 | 2.0 | | |
| 15 | / | 6 | 7 | 19 | 39 | 28 | 58 | 2.0 | Gray Very Compact GRAVEL AND SILT, Some Fine-Coarse Sand, Dry | |
| 20 | / | 7 | 15 | 34 | 33 | 40 | 67 | 1.5 | Gray Very Compact SILT AND GRAVEL, Some Fine-Coarse Sand, Dry | |
| 25 | / | 8 | 7 | 19 | 26 | 25 | 45 | 1.5 | Brown-Gray Compact Fine-Coarse SAND AND GRAVEL, Some Clay, Wet | |
| 30 | | | | | | | | | Boring terminated at a depth of 25.0 feet. | Free standing water was measured at a depth of 23.1' upon completion of drilling and sampling.<br><br>Bore hole was left open overnight and free standing water was measured at a depth of 17.2' after 24 hours. |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

DATE
START: 9/10/2013
FINISH: 9/10/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

**SUBSURFACE EXPLORATION LOG**

BORING NO. **BB-5**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 14.7'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 3 | 2 | 3 | 3 | 5 | 1.5 | POSSIBLE FILL: Brown Medium CLAY AND Fine-Coarse Sand, Little Gravel, Moist | 3" Topsoil at ground surface |
| | / | 2 | 12 | 15 | 11 | 12 | 26 | 0.8 | POSSIBLE FILL: Brown Firm SILT AND Fine-Coarse SAND, Little Gravel, Dry | |
| 5 | / | 3 | 5 | 8 | 8 | 9 | 16 | 1.9 | Grades to "Little" Fine-Coarse Sand | |
| | / | 4 | 5 | 9 | 8 | 7 | 17 | 0.7 | POSSIBLE FILL: Brown Very Stiff CLAY, Some Fine-Coarse Sand, Little Gravel, Moist | |
| 10 | / | 5 | 6 | 9 | 9 | 7 | 18 | 0.4 | Brown Firm SILT AND Fine SAND, Little Gravel, Trace Organics, Moist | |
| 15 | / | 6 | 6 | 16 | 30 | 20 | 46 | 1.8 | Compact, Grades to "Some" Fine Sand, "Trace" Gravel, Dry | |
| 20 | / | 7 | 10 | 16 | 16 | 100/0.3 | 32 | 1.5 | Highly Decomposed Rock, sampled as Dark Gray Fine-Medium SAND, Some Silt, Some rock fragments, Wet | |
| 25 | | | | | | | | | Boring terminated with auger refusal at a depth of 21.0 feet. | Free standing water was measured at a depth of 20.0' upon completion of drilling and sampling. Bore hole was left open overnight and free standing water was measured at a depth of 14.7' after 24 hours. |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

DATE
START: 9/9/2013
FINISH: 9/9/2013

SHEET 1 OF 1

Trans Tech
DRILLING SERVICES

**SUBSURFACE EXPLORATION LOG**

BORING NO. **BB-6**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 3 | 8 | 11 | 12 | 19 | 0.9 | POSSIBLE FILL: Brown Firm Fine-Coarse SAND AND SILT, Some Gravel, Dry | 2" Topsoil at ground surface |
| | / | 2 | 12 | 10 | 11 | 11 | 21 | 1.5 | Brown-Gray | |
| 5 | / | 3 | 4 | 10 | 12 | 12 | 22 | 0.8 | | |
| | / | 4 | 10 | 7 | 5 | 4 | 12 | 0.4 | Grades to "Little" Gravel | |
| 10 | / | 5 | WH | WH | 1 | 1 | 1 | 0.3 | Brown Very Stiff CLAY, Some Fine-Coarse Sand, Trace Gravel, Trace Organics, Moist | WH = Weight of hammer and drilling rods. |
| 15 | / | 6 | 2 | 3 | 4 | 4 | 7 | 0.5 | Brown Loose Fine-Coarse SAND, Some Gravel, Little Silt, Dry | |
| 20 | / | 7 | 49 | 49 | 43 | 32 | 92 | 0.4 | Very Compact | |
| 25 | / | 8 | 4 | 14 | 16 | 17 | 30 | 0.4 | Dark Gray, Very Compact Grades to "AND" CLAY, "Little" Gravel, Moist | |
| 30 | | | | | | | | | Boring terminated at a depth of 25.0 feet. | Free standing water was not encountered upon completion of drilling and sampling. Bore hole was left open overnight and caved in at a depth of 16.7' after 24 hours. |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

DATE
START: 9/12/2013
FINISH: 9/12/2013

SHEET 1 OF 1

Trans Tech
DRILLING SERVICES

**SUBSURFACE EXPLORATION LOG**

BORING NO. **BB-7**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 2 | 2 | 2 | 2 | 4 | 0.5 | Brown Medium CLAY AND Fine-Coarse SAND, Little Gravel, Dry | 4" Topsoil at ground surface |
| | / | 2 | 3 | 4 | 5 | 5 | 9 | 1.0 | Stiff | |
| 5 | / | 3 | 2 | 5 | 5 | 6 | 10 | 1.3 | | |
| | / | 4 | 11 | 7 | 6 | 5 | 13 | 0.5 | | |
| | / | 5 | 2 | 6 | 8 | 13 | 14 | 1.8 | Grades to "AND" GRAVEL, "Little" Fine-Coarse Sand | |
| 10 | | | | | | | | | | |
| | / | 6 | 9 | 22 | 25 | 37 | 46 | 1.8 | Hard | |
| 15 | | | | | | | | | | |
| | / | 7 | 9 | 17 | 20 | 23 | 37 | 1.2 | Gray Compact SILT AND GRAVEL, Little Fine-Coarse Sand, Dry | |
| 20 | | | | | | | | | | |
| | / | 8 | 43 | 33 | 60 | 63 | 93 | 1.0 | Highly Decomposed Rock, sampled as Gray Very Compact SILT with rock fragments, Dry | |
| 25 | | | | | | | | | Boring terminated at a depth of 25.0 feet. | Free standing water was not encountered upon completion of drilling and sampling. |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

DATE
START: 9/11/2013
FINISH: 9/11/2013

SHEET 1 OF 1

# Trans Tech
DRILLING SERVICES

## SUBSURFACE EXPLORATION LOG

BORING NO. **BB-8**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 12.8'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 6 | 6 | 5 | 6 | 11 | 0.5 | Brown Firm SILT, Some Fine-Medium SAND, Little Gravel, Dry | |
| | / | 2 | 6 | 6 | 7 | 6 | 13 | 1.1 | | |
| 5 | / | 3 | 4 | 6 | 6 | 7 | 12 | 0.6 | Grades to "Some" Gravel | |
| | / | 4 | 4 | 2 | 2 | 4 | 4 | 1.1 | Loose, Grades to "Little" Gravel, Moist | |
| 10 | / | 5 | 10 | 9 | 17 | 17 | 26 | 1.9 | Firm, Dry | |
| 15 | / | 6 | 5 | 12 | 14 | 14 | 26 | 1.0 | Brown Firm GRAVEL, Some Clay, Some Fine-Coarse Sand, Wet | Driller noted "wet" soil layer at a depth of 15 feet. |
| 20 | / | 7 | 5 | 10 | 9 | 12 | 19 | 0.8 | Grades to "AND" Fine-Coarse SAND | REF = Sample spoon refusal |
| | / | 8 | 100/0.4 | | | | REF | 0.2 | Dark Gray Weathered Rock | |
| 25 | | | | | | | | | Boring terminated with auger refusal at a depth of 24.0 feet. | Free standing water was measured at a depth of 12.8' upon completion of drilling and sampling. |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge
DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

| | | |
|---|---|---|
| DATE<br>START: 9/11/2013<br>FINISH: 9/11/2013<br>SHEET 1 OF 1 | Trans Tech DRILLING SERVICES<br>**SUBSURFACE EXPLORATION LOG** | BORING NO. **BB-9**<br>PROJ. NO. G13-3523<br>SURF. ELEV. G.S.<br>G.W. DEPTH 12.8' |

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 2 | 3 | 4 | 4 | 7 | 0.5 | Brown Loose Fine-Coarse SAND AND CLAY, Some Gravel, Trace Organics, Moist | 4" Topsoil at ground surface |
| | / | 2 | 3 | 3 | 3 | 4 | 6 | 0.8 | Grades to "AND" SILT, "Trace" Clay | |
| 5 | / | 3 | 2 | 3 | 3 | 4 | 6 | 0.8 | Contains rock fragments, Dry | |
| | / | 4 | 5 | 8 | 11 | 7 | 19 | 0.5 | Firm | |
| | / | 5 | 3 | 6 | 19 | 39 | 25 | 1.0 | Highly Decomposed Rock, sampled as Gray Firm SILT with rock fragments, Dry | |
| 10 | | | | | | | | | | |
| | / | 6 | 6 | 9 | 22 | 25 | 31 | 1.2 | Compact | |
| 15 | | | | | | | | | | |
| | / | 7 | 100/0.1 | | | | REF | 0.1 | Very Compact | REF = Sample spoon refusal |
| 20 | | | | | | | | | Boring terminated with auger refusal at a depth of 19.5 feet. | Free standing water was not encountered upon completion of drilling and sampling. |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

| | |
|---|---|
| DATE START: 9/9/2013 FINISH: 9/10/2013 SHEET 1 OF 1 | BORING NO. **BB-10** PROJ. NO. G13-3523 SURF. ELEV. G.S. G.W. DEPTH See Notes |

**Trans Tech** DRILLING SERVICES

**SUBSURFACE EXPLORATION LOG**

PROJECT: Proposed Apwan Development, Silo Ridge Country Club

LOCATION: 4651 Route 22, Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 4 | 8 | 10 | 12 | 1.5 | 0.5 | POSSIBLE FILL: Brown Firm Fine-Coarse SAND, Some Gravel, Some Silt, Trace Organics, Dry | 3" Topsoil at ground surface |
| | / | 2 | 4 | 6 | 6 | 7 | 12 | 0.5 | | Driller noted boulders at a depth of 2'. |
| 5 | / | 3 | 4 | 6 | 5 | 7 | 11 | 0.9 | Brown Firm SILT, Little Fine Sand, Trace Organics, Dry | |
| | / | 4 | 7 | 6 | 3 | 5 | 9 | 0.5 | Loose, Grades to "Little" Gravel, "Little" Rock Fragments | |
| 10 | / | 5 | 7 | 12 | 11 | 12 | 23 | 1.0 | Highly Decomposed Rock, sampled as Gray Firm SILT with rock fragments, Dry | |
| | / | 6 | 11 | 18 | 15 | 16 | 33 | 1.5 | | |
| 15 | | | | | | | | | | Driller noted boulder at a depth of 17'. |
| | / | 7 | 100/0.5 | | | | REF | 0.3 | Sampled as Dark Gray Fine-Coarse SAND, Wet | REF = Sample spoon refusal |
| 20 | | | | | | | | | Boring terminated with auger refusal at a depth of 19.5 feet. | Free standing water was not encountered upon completion of drilling and sampling. |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

DATE
START: 9/11/2013
FINISH: 9/11/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

**SUBSURFACE EXPLORATION LOG**

BORING NO. BB-11
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 4 | 6 | 7 | 9 | 13 | 1.0 | Brown Firm Fine-Coarse SAND, Some Gravel, Some Silt, Dry | 1" Topsoil |
| | / | 2 | 9 | 13 | 14 | 14 | 27 | 0.6 | | |
| 5 | / | 3 | 6 | 12 | 9 | 8 | 21 | 1.0 | Grades to "AND" GRAVEL | |
| | / | 4 | 17 | 16 | 26 | 28 | 42 | 0.6 | Gray, Compact, Grades to "Little" Silt, "Little" rock fragments | |
| 10 | / | 5 | 12 | 28 | 39 | 41 | 67 | 1.2 | Highly Decomposed Rock, sampled as Dark Gray Very Compact Rock Fragments | |
| 15 | / | 6 | 59 | 45 | 56 | 100/0.4 | 101 | 1.5 | Sampled as Brown-Gray Very Compact SILT with Rock Fragments | |
| | / | 7 | 100/0.3 | | | | REF | 0.2 | Dark Gray | REF = Sample spoon refusal |
| 20 | | | | | | | | | Boring terminated with auger refusal at a depth of 20.0 feet. | Free standing water was not encountered upon completion of drilling and sampling. |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

| | | |
|---|---|---|
| DATE<br>START: 9/17/2013<br>FINISH: 9/17/2013<br><br>SHEET 1 OF 1 | Trans Tech DRILLING SERVICES<br><br>SUBSURFACE EXPLORATION LOG | BORING NO. **BB-12**<br>PROJ. NO. G13-3523<br>SURF. ELEV. G.S.<br><br>G.W. DEPTH See Notes |

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

| DEPTH (ft.) | SAMPLES | SAMPLE NO. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | REC. (ft.) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | / | 1 | 5 | 12 | 15 | 20 | 27 | 0.3 | Brown Firm Fine-Coarse SAND, Some Gravel, Some Silt, Dry | 1" Topsoil |
| | / | 2 | 28 | 33 | 36 | 41 | 69 | 1.0 | Gray Very Compact GRAVEL AND Fine-Coarse Sand, Little Silt, Cobbles, Dry | |
| 5 | / | 3 | 41 | 45 | 49 | 16 | 94 | 1.0 | Highly Decomposed Rock, sampled as Light Gray Very Compact Rock Fragments with Little Silt, Dry | |
| | / | 4 | 23 | 88 | 72 | 45 | 160 | 0.8 | | |
| 10 | / | 5 | 7 | 36 | 44 | 50/0.1 | REF | 0.6 | | REF = Sample spoon refusal |
| | | | | | | | | | Boring terminated with auger refusal at a depth of 11.0 feet. | Free standing water was not encountered upon completion of drilling and sampling. |
| 15 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

**All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.**

Trans Tech
GEOTECHNICAL SERVICES

1594 State Street
Schenectady, NY 12304
Phone (518) 372-4067
Fax (518) 372-6739

# TEST PIT LOG

**DATE:** 9/13/13

**PROJECT:** Apwan Development

**TEST PIT NO.:** DT-1

**GROUND ELEV.:** NA

**PROJECT NO.:** G13-3523

**INSPECTOR:** Tod Kobik, P.E.

**WEATHER:** Sunny, Warm

**EXCAVATION EQUIPMENT:** Backhoe

| DEPTH (Feet) | SOIL DESCRIPTION | NOTES |
|---|---|---|
| 0 - 0.5' | Topsoil | |
| 0.5' - 3.0' | Brown Fine-Coarse GRAVEL AND SAND, Some Clayey Silt, Moist | No groundwater was observed. |
| 3.0' - 11.0' | Gray Fine-Coarse GRAVEL AND SAND, Trace Silt, Moist | |

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Fax (518) 372-6739

# TEST PIT LOG

**DATE:** 9/13/13

**PROJECT:** Apwan Development

**TEST PIT NO.:** DT-2

**GROUND ELEV.:** NA

**PROJECT NO.:** G13-3523

**INSPECTOR:** Tod Kobik, P.E.

**WEATHER:** Sunny, Warm

**EXCAVATION EQUIPMENT:** Backhoe

| DEPTH (Feet) | SOIL DESCRIPTION | NOTES |
|---|---|---|
| 0 - 1.0' | Dark Brown Fine-Coarse SAND AND Clayey SILT with organics, Moist | |
| 1.0' - 1.7' | Brown Fine-Coarse SAND AND Clayey Silt, Little Gravel, Moist | Groundwater was present at a depth of 7.5 feet. |
| 1.7' - 8.0' | Gray Fine-Coarse GRAVEL AND SAND, Cobbles, Trace Silt, Moist | |

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Fax (518) 372-6739

# TEST PIT LOG

**DATE:** 9/13/13

**PROJECT:** Apwan Development

**TEST PIT NO.:** DT-3

**GROUND ELEV.:** NA

**PROJECT NO.:** G13-3523

**INSPECTOR:** Tod Kobik, P.E.

**WEATHER:** Sunny, Warm

**EXCAVATION EQUIPMENT:** Backhoe

| DEPTH (Feet) | SOIL DESCRIPTION | NOTES |
|---|---|---|
| 0 - 1.3' | Dark Brown Fine-Coarse SAND AND Clayey SILT with organics, Moist | |
| 1.3' - 2.3' | Brown Fine-Coarse SAND AND Clayey Silt, Little Gravel, Moist | Groundwater was present at a depth of 6.5 feet. |
| 2.3' - 5.3' | Gray Fine-Coarse GRAVEL AND SAND, Cobbles, Trace Silt, Moist | |
| 5.5' - 7.5' | Gray Silty CLAY, Wet | |

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# TEST PIT LOG

**DATE:** 9/13/13

**PROJECT:** Apwan Development

**TEST PIT NO.:** DT-4

**GROUND ELEV.:** NA

**PROJECT NO.:** G13-3523

**INSPECTOR:** Tod Kobik, P.E.

**WEATHER:** Sunny, Warm

**EXCAVATION EQUIPMENT:** Backhoe

| DEPTH (Feet) | SOIL DESCRIPTION | NOTES |
|---|---|---|
| 0 - 0.7' | Topsoil | |
| 0.7' - 9.5' | Gray Fine-Coarse GRAVEL AND SAND, Trace-Little Silt, Moist | No groundwater was observed. |

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# TEST PIT LOG

**DATE:** 9/13/13

**PROJECT:** Apwan Development

**TEST PIT NO.:** DT-5

**GROUND ELEV.:** NA

**PROJECT NO.:** G13-3523

**INSPECTOR:** Tod Kobik, P.E.

**WEATHER:** Sunny, Warm

**EXCAVATION EQUIPMENT:** Backhoe

| DEPTH (Feet) | SOIL DESCRIPTION | NOTES |
|---|---|---|
| 0 - 0.6' | Topsoil | |
| 0.6' - 11.3' | Gray Fine-Coarse GRAVEL AND SAND, Some Cobbles, Trace Silt, Moist | No groundwater was observed. |

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# TEST PIT LOG

**DATE:** 9/13/13

**PROJECT:** Apwan Development

**TEST PIT NO.:** DT-6

**GROUND ELEV.:** NA

**PROJECT NO.:** G13-3523

**INSPECTOR:** Tod Kobik, P.E.

**WEATHER:** Sunny, Warm

**EXCAVATION EQUIPMENT:** Backhoe

| DEPTH (Feet) | SOIL DESCRIPTION | NOTES |
|---|---|---|
| 0 - 0.5' | Topsoil | |
| 0.5' - 9.7' | Gray Fine-Coarse GRAVEL AND SAND, Some Cobbles, Trace Silt, Moist. | No groundwater was observed.<br><br>A vein of Fine-Coarse SAND was present to a depth of 4.5' in west side of test pit. |

# EXAMPLE KEY TO SUBSURFACE EXPLORATION LOGS

| | | |
|---|---|---|
| DATE<br>START: XX/XX/XX<br>FINISH: XX/XX/XX<br>SHEET X OF X | Trans Tech DRILLING SERVICES | PROJ. NO. XX-XXXX<br>HOLE NO. X-X<br>SURF. ELEV. XXX.X'<br>G.W. DEPTH X.X' |

PROJECT: PROJECT NAME / PROJECT NAME LOCATION: PROJECT LOCATION / PROJECT LOCATION

| DEPTH (ft) | SAMPLES | SAMPLE No. | BLOWS ON SAMPLER 0/6 | 6/12 | 12/18 | 18/24 | N | RECOVERY (ft) | SOIL OR ROCK CLASSIFICATION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 1 | 3 | 3 | 4 | 8 | 7 | 1.0 | 3" TOPSOIL<br>Brown SILT, some Sand, trace clay, ML (Moist-Loose) | Groundwater at 10' upon completion, and 5' 24 hrs. after completion |
| 5 | | 2 | 50/.5 | | | | 50/.5 | NR | Gray SHALE, medium hard, weathered, thin bedded, some fractures | Run#1, 3.5'-6.0'<br>95% Recovery<br>50% RQD |

①  ②  ③  ④  ⑤  ⑥  ⑦ *(numbered features explained on reverse)*  ⑧  ⑨  ⑩

## TABLE I

| | |
|---|---|
| ▯ | Split Spoon Sample |
| ▮ | Shelby Tube Sample |
| ☒ | Geoprobe Macro-Core |
| ▯ | Auger or Test Pit Sample |
| ■ | Rock Core |

## TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

| Soil Type | Soil Particle Size | |
|---|---|---|
| Boulder | >12" | Coarse Grained (Granular) |
| Cobble | 3" - 12" | |
| Gravel - Coarse | 3" - 3/4" | |
| - Fine | 3/4" - #4 | |
| Sand - Coarse | #4 - #10 | |
| - Medium | #10 - #40 | |
| - Fine | #40 - #200 | |
| Silt - Non Plastic (Granular)<br>Clay - Plastic (Cohesive) | <#200 | Fine Grained |

## TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

| Term | Percent of Total Sample |
|---|---|
| "and" | 35 - 50 |
| "some" | 20 - 35 |
| "little" | 10 - 20 |
| "trace" | less than 10 |

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

## TABLE IV

The relative compactness or consistency is described in accordance with the following terms:

| Granular Soils Term | Blows per Foot, N | Cohesive Soils Term | Blows per Foot, N |
|---|---|---|---|
| Very Loose | 0 - 4 | Very Soft | 0 - 2 |
| Loose | 4 - 10 | Soft | 2 - 4 |
| Firm | 10 - 30 | Medium | 4 - 8 |
| Compact | 30 - 50 | Stiff | 8 - 15 |
| Very Compact | >50 | Very Stiff | 15 - 30 |
| | | Hard | >30 |

(Large particles in the soils will often significantly influence the blows per foot recorded during the penetration test)

## TABLE V

| | |
|---|---|
| **Varved** | Horizontal uniform layers or seams of soil(s). |
| **Layer** | Soil deposit more than 6" thick. |
| **Seam** | Soil deposit less than 6" thick. |
| **Parting** | Soil deposit less than 1/8" thick. |
| **Laminated** | Irregular, horizontal and angled seams and partings of soil(s). |

## TABLE VI

| Rock Classification Term | | Meaning |
|---|---|---|
| Hardness | - Soft | Scratched by fingernail |
| | - Medium Hard | Scratched easily by penknife |
| | - Hard | Scratched with difficulty by penknife |
| | - Very Hard | Cannot be scratched by penknife |
| Weathering | - Very Weathered<br>- Weathered<br>- Sound | Judged from the relative amounts of disintegration, iron staining, core recovery, clay seams, etc. |

| Rock Classification Term | | Meaning | |
|---|---|---|---|
| Bedding | - Laminated | (<1") | Natural breaks in Rock Layers |
| | - Thin Bedded | (1" - 4") | |
| | - Bedded | (4" - 12") | |
| | - Thick Bedded | (12" - 36") | |
| | - Massive | (>36") | |

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers)

# GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the general observations and mechanical data collected by the driller at the site, supplemented by classificiation of the material removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a small fraction of the soils at the site and may not be representative of subusurface conditions between and/or away from the boring locations or betweeen the sampled intervals. The data presented on the Subsurface Logs along with the recovered samples provide a basis for estimating the engineering characteristics of the soils at the site. The evaluation must consider all the recorded details and their relative significance to the project. It is common that evaluation of standard subsurface data indicates the need for additional testing and/or sampling to more accurately evaluate the subsurface conditions. Any evaluation of the data presented on the Subsurface Logs must be performed by qualified professionals. The following information defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered. The paragraph numbers below correspond to the numbered features identified on the opposite page.

1. The figures in the Depth column define the scale of the Subsurface Log.

2. The Samples column shows a graphical representation of the depth and type of sampling performed. See Table I for descriptions of the symbols used to represent the various types of samples.

3. The Sample No. is used for identification on sample containers and laboratory test reports.

4. Blows on Sampler - shows the results of the "Standard Penetration Test" (SPT), recording the number of blows required to drive a split spoon sampler into the soil. The number of blows required to drive the sampler for each six inch increment is recorded. The first six inches of penetration is considered a seating drive. The sum of the number of blows required for the second and third six inch increments is termed the penetration resistance, N. The outside diameter of the sampler, hammer weight and length of drop are noted at the bottom of the Subsurface Log.

5. Recovery - Shows the length of the recovered sample.

6. All recovered soil samples are reviewed in the laboratory by an engineering technician or geotechnical engineer, unless noted otherwise. Visual descriptions are made on the basis of a combination of the driller's field descriptions and noted observations together with the sample as received in the laboratory. The method of visual classification is based primarily on the Unified Soil Classificiation System (ASTM D 2487) with regard to the particle size and plasticity (See Table No. II), and the Unified Soil Classification group symbols for the soil types are sometimes included with the soil classification. Additionally, the relative portion, by weight, of two or more granular soil types is described in accordance with "Suggested Methods of Test for Identification of Soils" by D.M. Burmister, ASTM Special Technical Publication 479, June 1970, (See Table No. III). Description of the relative soil density or consistency is based upon the penetration records as defined in Table No. IV. The description of the soil moisture is based upon the relative wetness of the soil as recovered and is decribed as dry, moist, wet or saturated. Water introduced into the boring either naturally or during drilling may have affected the moisture condition of the recovered samples. Special terms are used as required to describe soil deposition in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two inch diameter split spoon sampler, the true percentage of gravel is often not recovered due to the relatively small samper diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the sampler blows or through the action of the drill rig as reported by the driller.

7. Rock descriptions are based on review of the recovered rock core samples and the driller's notes. Typical rock classification terms are included in Table VI.

8. The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Solid stratification lines delineate apparent changes in soil type, based upon review of recovered soil samples and the driller's notes. Dashed lines indicate a lesser degree of certainty with respect to either a change in soil type or where such a change may occur.

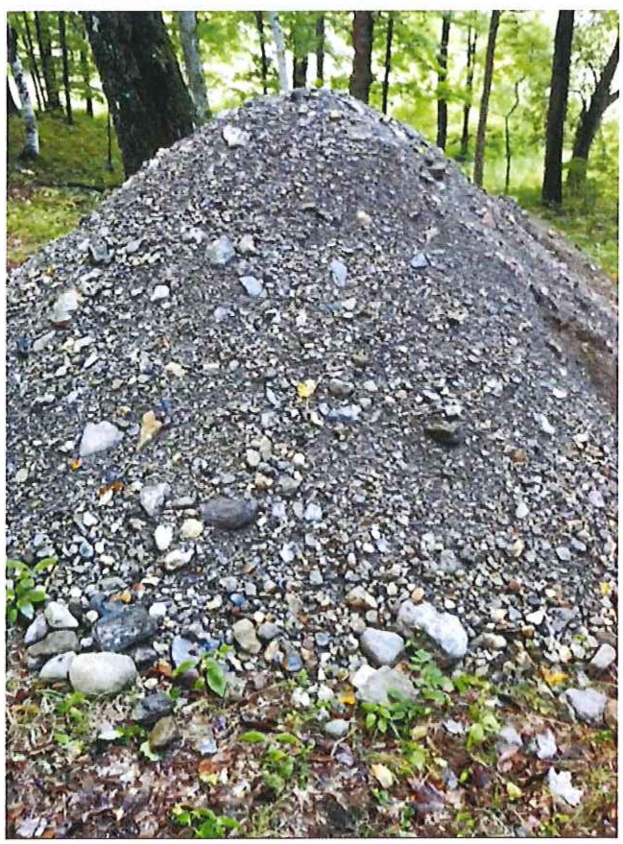
9. Miscellaneous observations and procedures noted by the driller are shown in this column, including water level observations. It is important to understand that the reliability of the water observations depends upon the soil type (water level does not readily stabilize in a bore hole through fine grained soils), and that any drill water used to advance the boring may have influenced the observations. Typically, the ground water level will fluctuate with seasonal changes in precipitation patterns. One or more perched or trapped water levels may exist in the ground seasonally. Generally, it is prudent to install a groundwater observation well to better define water levels.

10. The length of core run is defined as the length of penetration of the core barrel. Core recovery is the length of core recovered divided by the core run length. The Rock Quality Designation (RQD) is the total length of pieces of recovered core exceeding 4 inches divided by the core run length. The size of the core barrel used is also noted.

# APPENDIX B

# TEST PIT PHOTOS

Test Pit DT-1



Test Pit DT-1 Spoil Pile

Test Pit DT-2, Note Standing Water

Test Pit DT-2 Spoil Pile

Test Pit DT-3, Note Standing Water & Clay Soil Layer

Test Pit DT-3 Spoil Pile

Test Pit DT-4

Test Pit DT-4 Spoil Pile

Test Pit DT-5

Test Pit DT-5 Spoil Pile

Test Pit DT-6

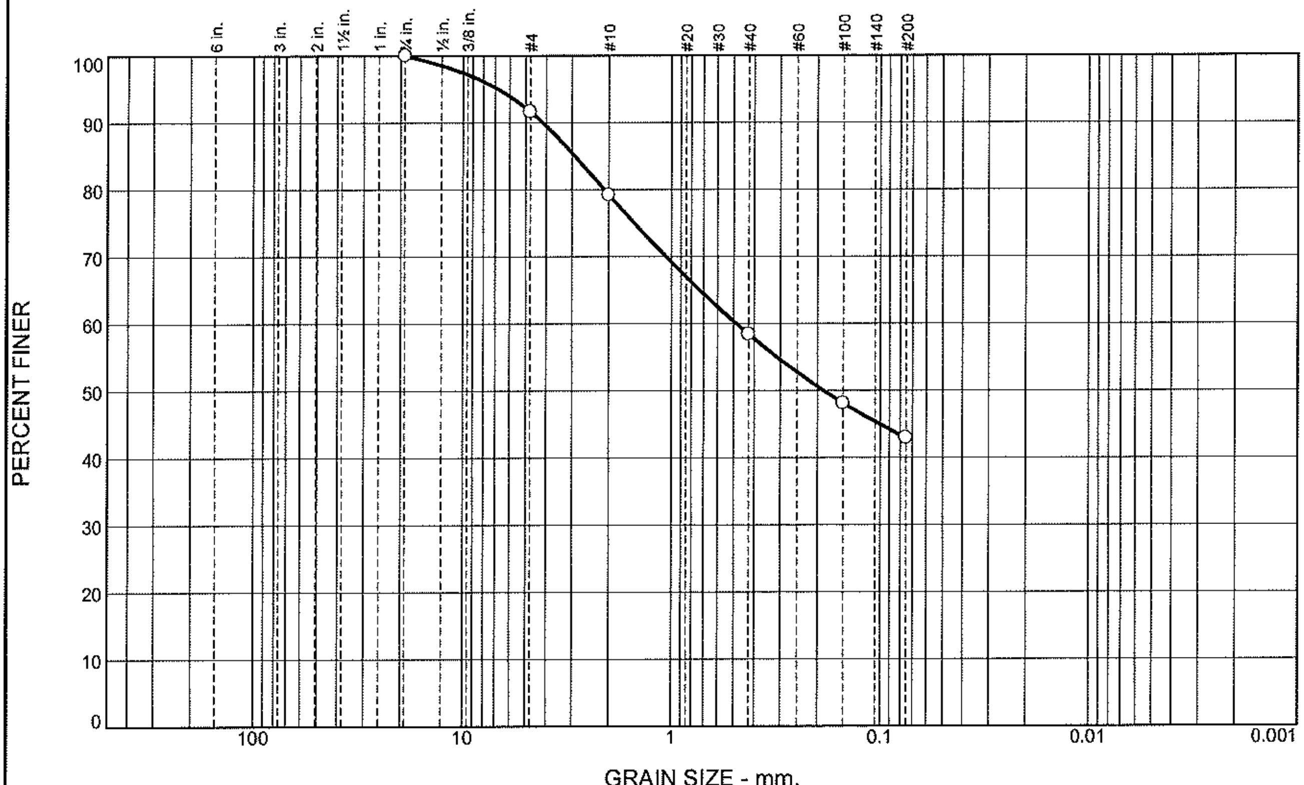
Test Pit DT-6, Note Vein of Fine-Coarse Sand in Side of Excavation

Test Pit DT-6 Spoil Pile

# APPENDIX C

# LABORATORY TEST RESULTS

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 8.4 | 12.4 | 20.8 | 15.5 | 42.9 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .75 | 100.0 | | |
| #4 | 91.6 | | |
| #10 | 79.2 | | |
| #40 | 58.4 | | |
| #100 | 48.1 | | |
| #200 | 42.9 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 4.1604 $D_{85}$= 2.9160 $D_{60}$= 0.4878
$D_{50}$= 0.1870 $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 16.8 %

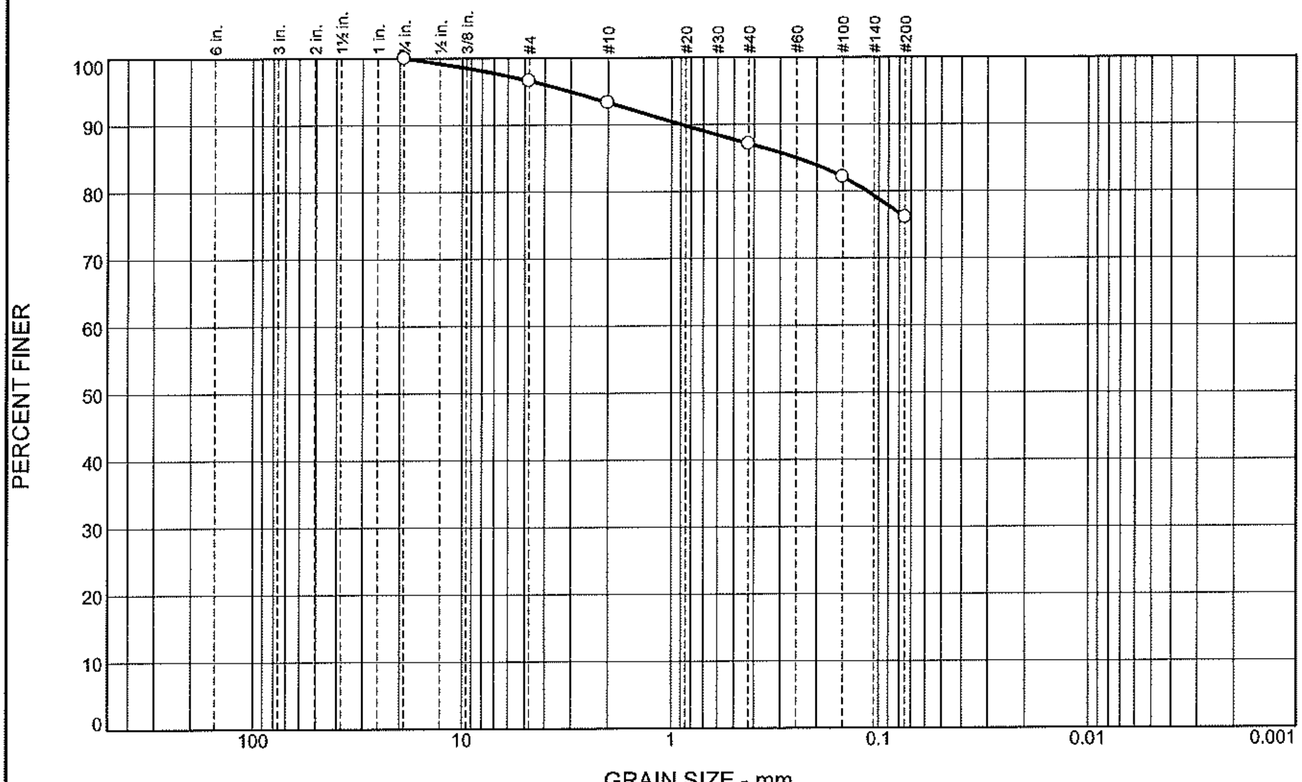
**Location:** B-1, S-1, 2 - 4'
**Sample Number:** S-2 **Depth:** 2-4' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B1/S2

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 3.4 | 3.3 | 6.2 | 11.0 | 76.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .75 | 100.0 | | |
| #4 | 96.6 | | |
| #10 | 93.3 | | |
| #40 | 87.1 | | |
| #100 | 82.1 | | |
| #200 | 76.1 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 0.8906 $D_{85}$= 0.2508 $D_{60}$=
$D_{50}$= $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 18.4 %

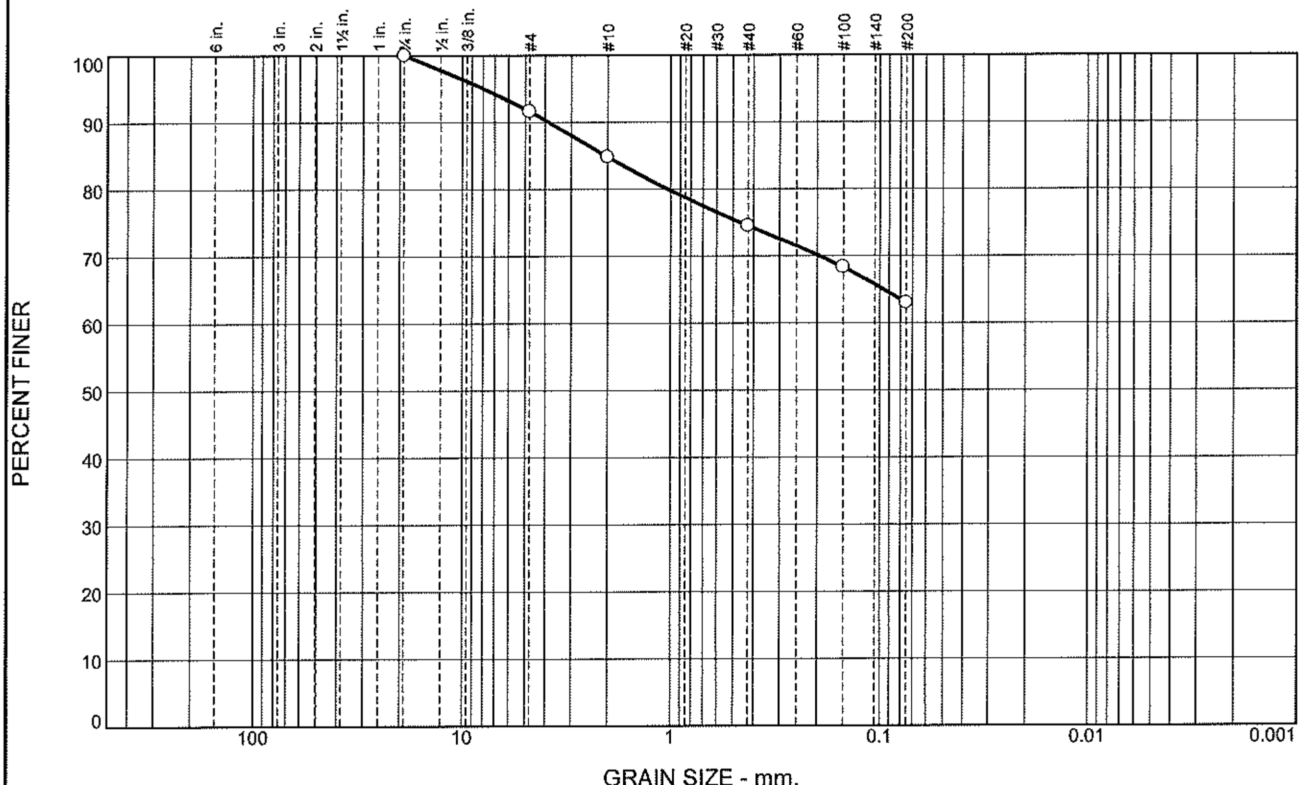
**Location:** B-1, S-3, 4 - 6'
**Sample Number:** S-3 **Depth:** 4-6' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B1/S3

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 8.4 | 6.8 | 10.3 | 11.5 | 63.0 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .75 | 100.0 | | |
| #4 | 91.6 | | |
| #10 | 84.8 | | |
| #40 | 74.5 | | |
| #100 | 68.3 | | |
| #200 | 63.0 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 3.8447 $D_{85}$= 2.0520 $D_{60}$=
$D_{50}$= $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

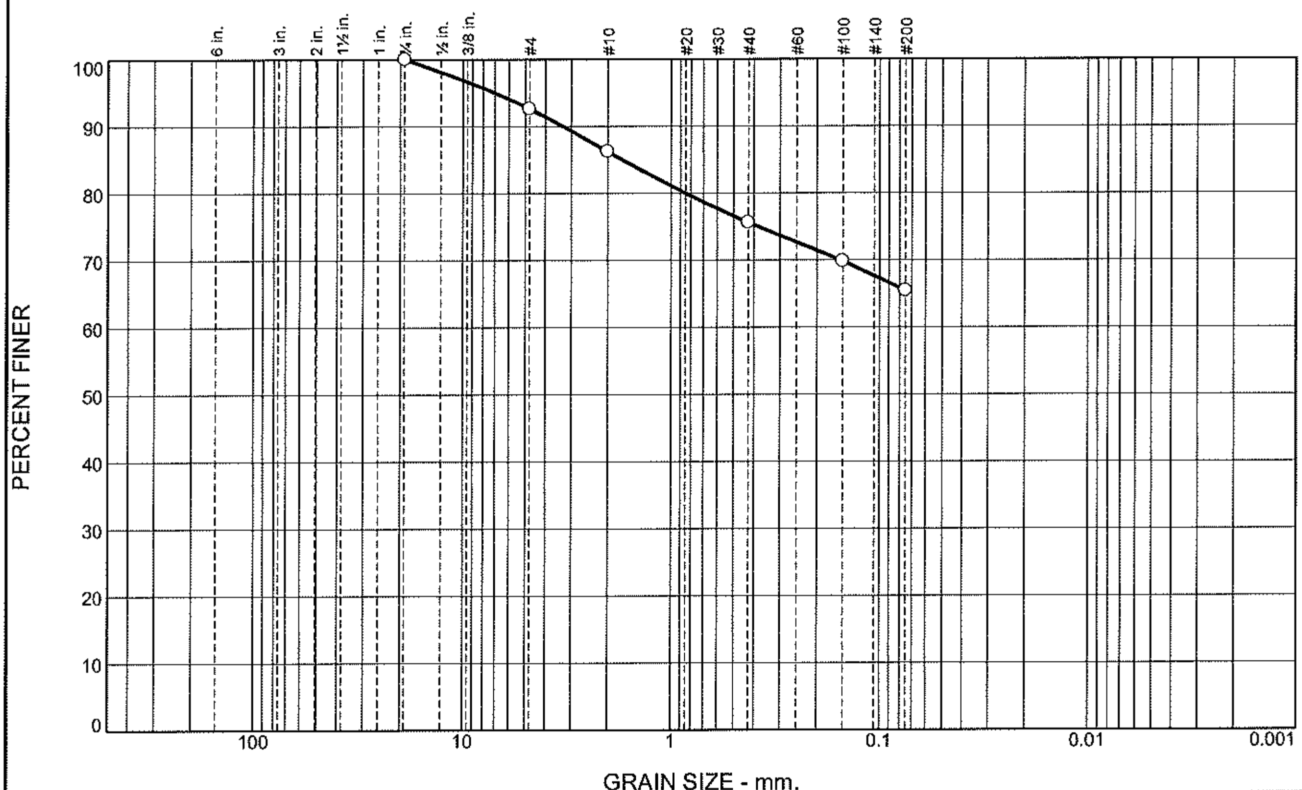
Water Content: 15.4 %

**Location:** B-2, S-3, 4 - 6'
**Sample Number:** S-3 **Depth:** 4-6' **Date:** 10/11/13

**QCQA Laboratories, Inc.**
**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B2/S3

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 7.4 | 6.4 | 10.6 | 10.2 | 65.4 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .75 | 100.0 | | |
| #4 | 92.6 | | |
| #10 | 86.2 | | |
| #40 | 75.6 | | |
| #100 | 69.8 | | |
| #200 | 65.4 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 3.2936 $D_{85}$= 1.7065 $D_{60}$=
$D_{50}$= $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 16.2 %

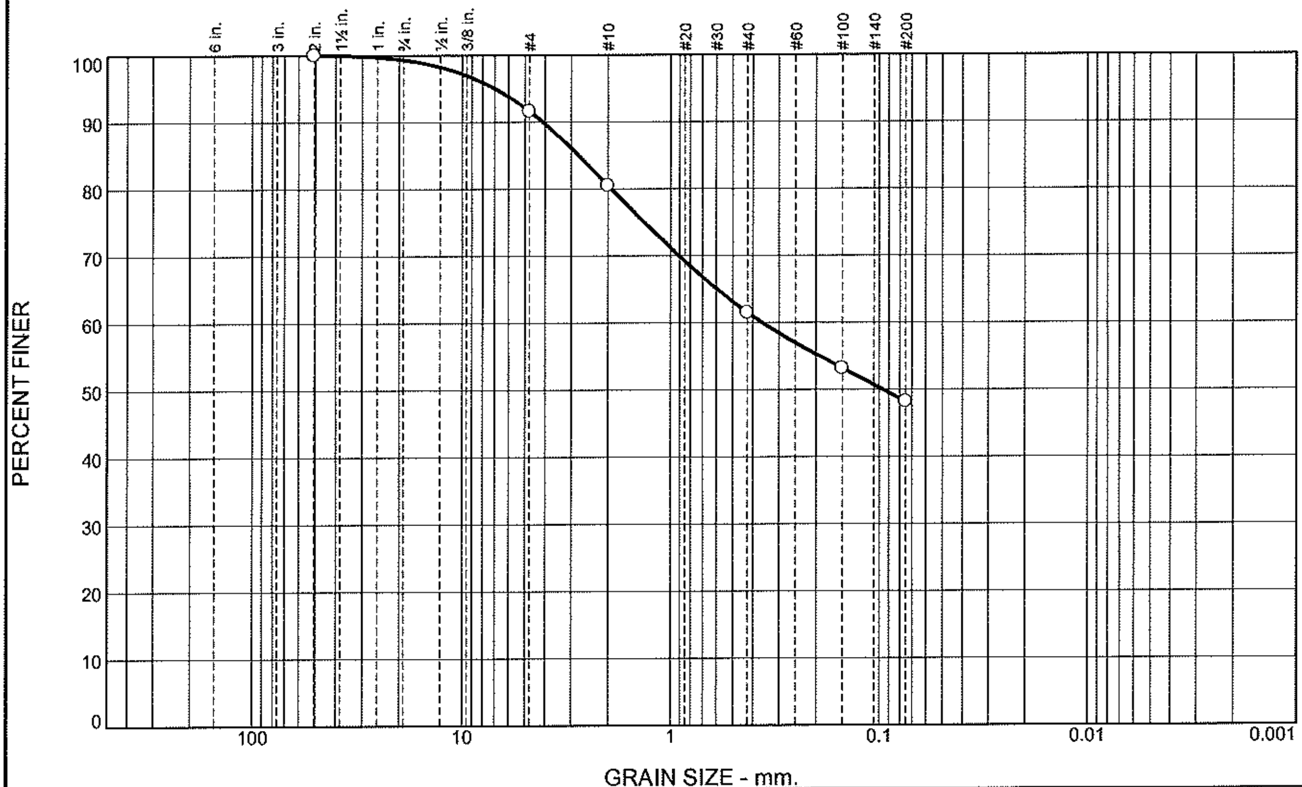
**Location:** B-2, S-4, 6 - 8'
**Sample Number:** S-4 **Depth:** 6-8' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B2/S4

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.7 | 7.7 | 11.1 | 19.0 | 13.3 | 48.2 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 2 | 100.0 | | |
| #4 | 91.6 | | |
| #10 | 80.5 | | |
| #40 | 61.5 | | |
| #100 | 53.2 | | |
| #200 | 48.2 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 4.1081 $D_{85}$= 2.7708 $D_{60}$= 0.3613
$D_{50}$= 0.0962 $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 12.8 %

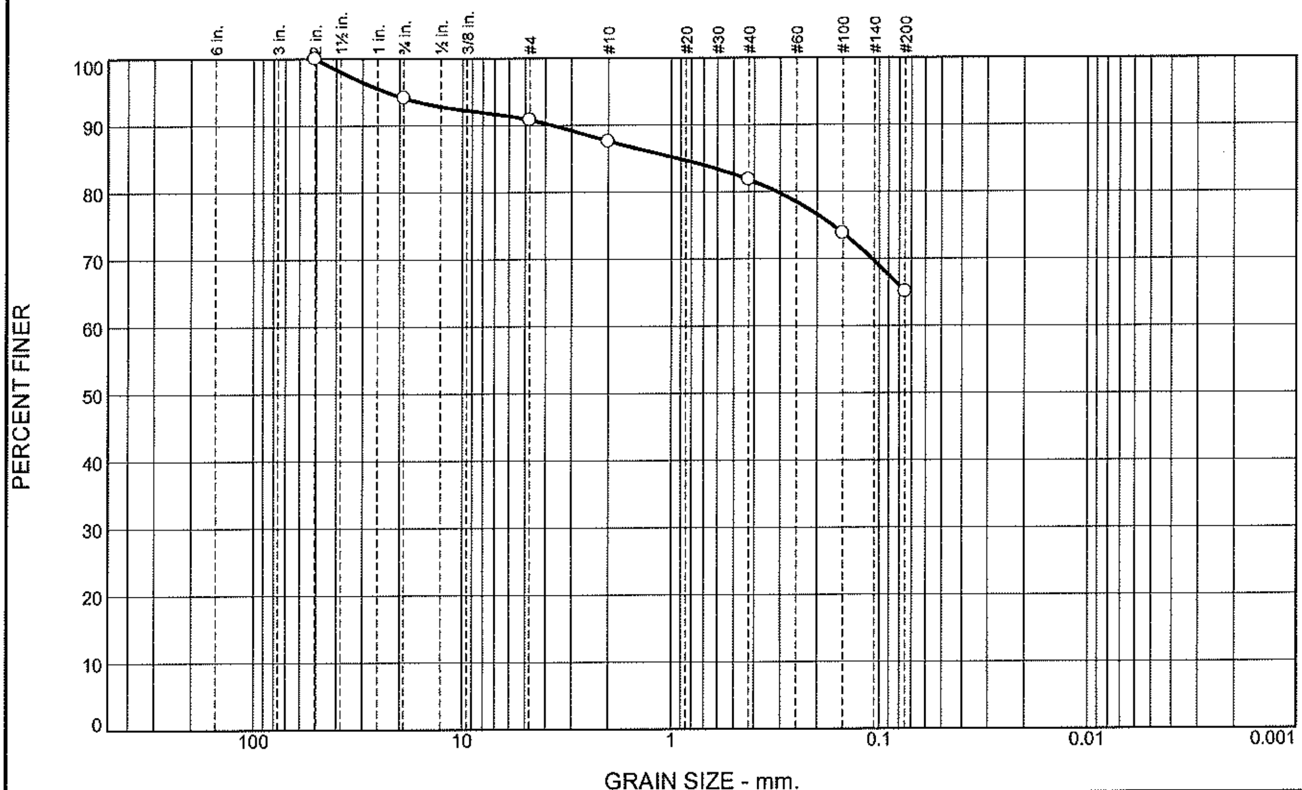
**Location:** B-4, S-2, 2 - 4'
**Sample Number:** S-2 **Depth:** 2-4' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B4/S2

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 5.9 | 3.3 | 3.2 | 5.8 | 16.7 | 65.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 2 | 100.0 | | |
| .75 | 94.1 | | |
| #4 | 90.8 | | |
| #10 | 87.6 | | |
| #40 | 81.8 | | |
| #100 | 73.8 | | |
| #200 | 65.1 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 3.7141 $D_{85}$= 0.9293 $D_{60}$=
$D_{50}$= $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 17.9 %

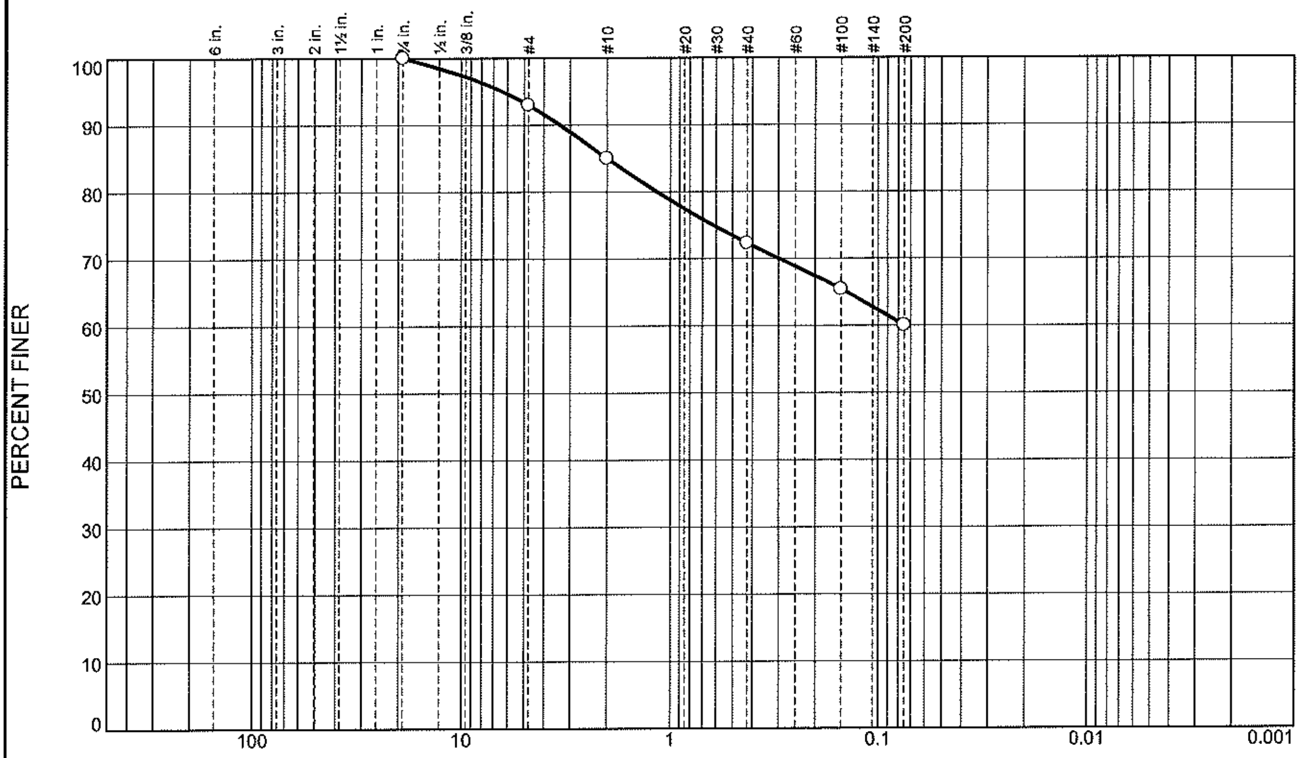
**Location:** B-5, S-6, 14 - 16'
**Sample Number:** S-6 **Depth:** 14-16' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B5/S6

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 7.0 | 8.0 | 12.7 | 12.3 | 60.0 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .75 | 100.0 | | |
| #4 | 93.0 | | |
| #10 | 85.0 | | |
| #40 | 72.3 | | |
| #100 | 65.4 | | |
| #200 | 60.0 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 3.3572 $D_{85}$= 2.0000 $D_{60}$= 0.0750
$D_{50}$= $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 16.7 %

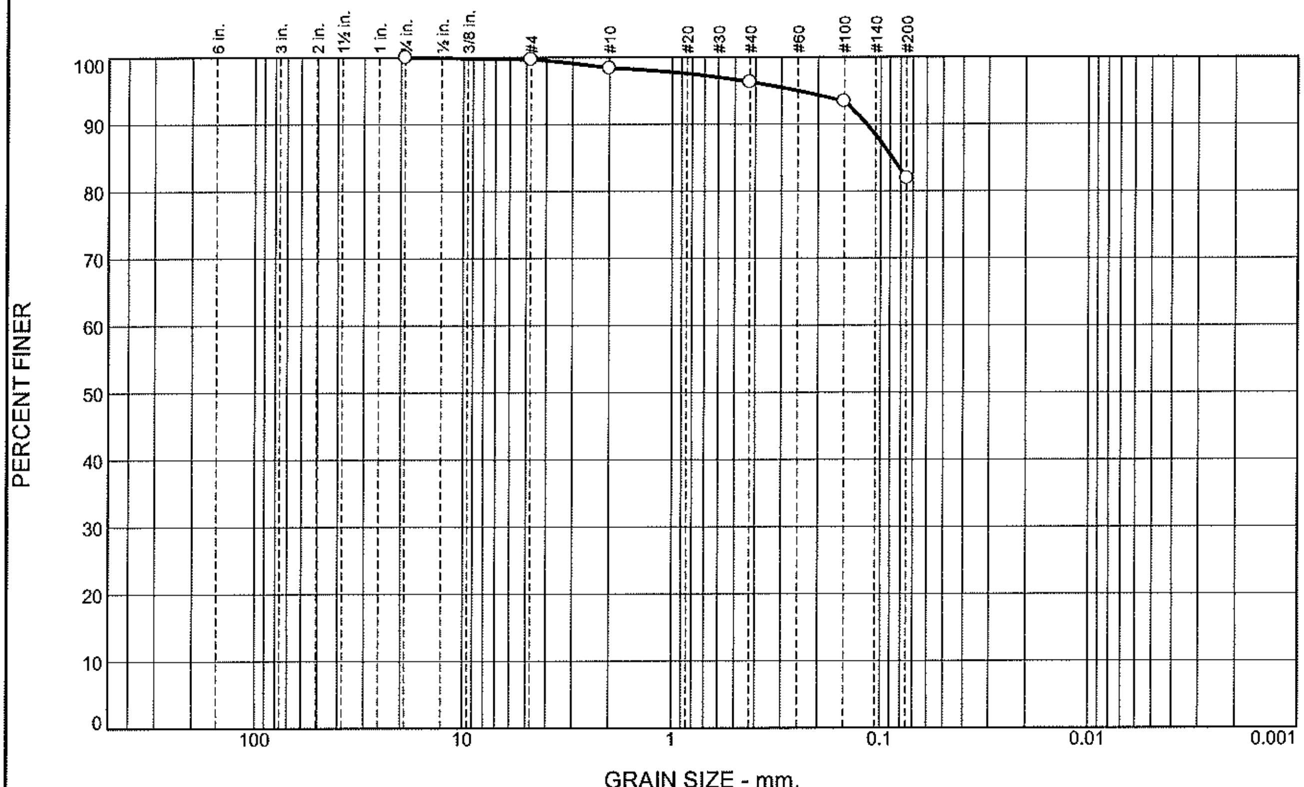
**Location:** B-6, S-5, 8 - 10'
**Sample Number:** S-5 **Depth:** 8-10 **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B6/S5

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.3 | 1.3 | 2.1 | 14.4 | 81.9 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .75 | 100.0 | | |
| #4 | 99.7 | | |
| #10 | 98.4 | | |
| #40 | 96.3 | | |
| #100 | 93.4 | | |
| #200 | 81.9 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 0.1168 $D_{85}$= 0.0881 $D_{60}$=
$D_{50}$= $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 22.6 %

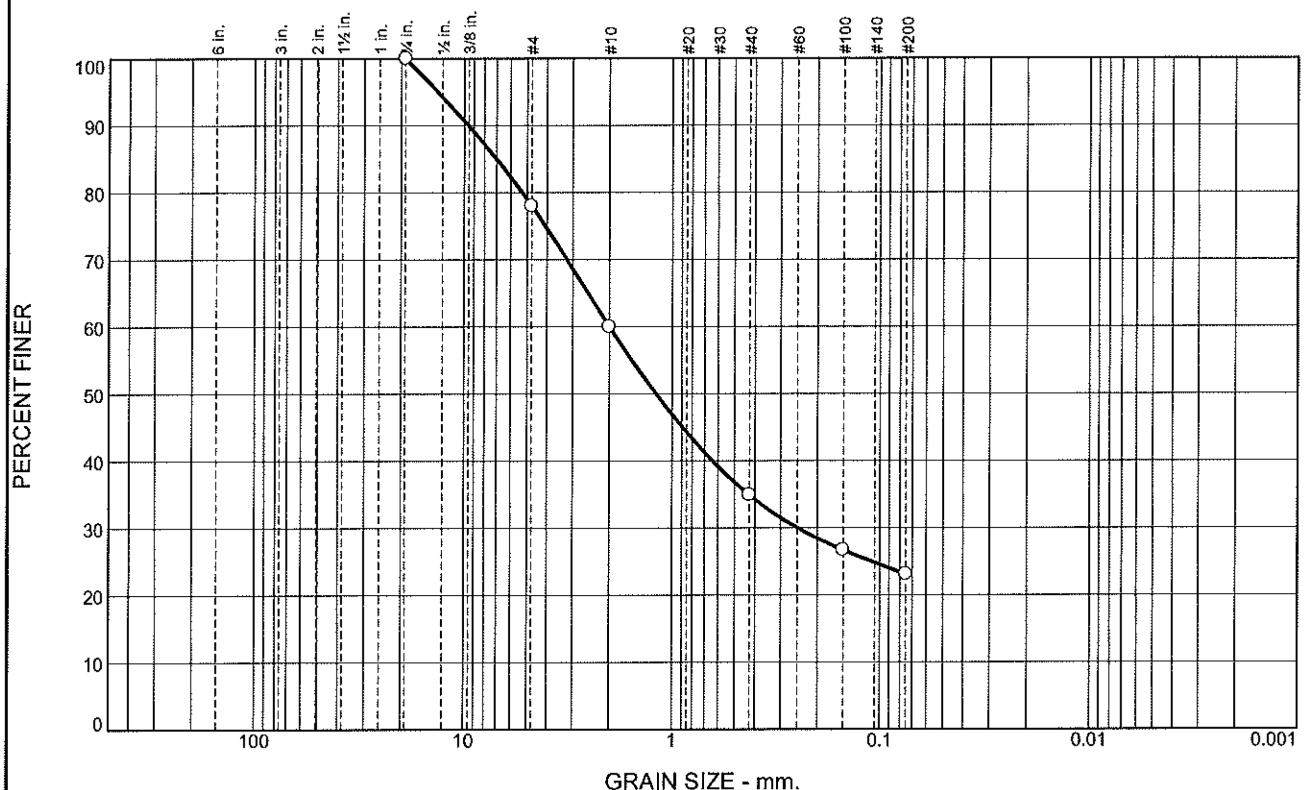
**Location:** B-10, S-3, 4 - 6'
**Sample Number:** S-3 **Depth:** 4-6' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B10/S3

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 22.0 | 18.0 | 25.1 | 11.8 | 23.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| .75 | 100.0 | | |
| #4 | 78.0 | | |
| #10 | 60.0 | | |
| #40 | 34.9 | | |
| #100 | 26.7 | | |
| #200 | 23.1 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 9.5727 $D_{85}$= 7.0101 $D_{60}$= 2.0000
$D_{50}$= 1.1914 $D_{30}$= 0.2487 $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 5.1 %

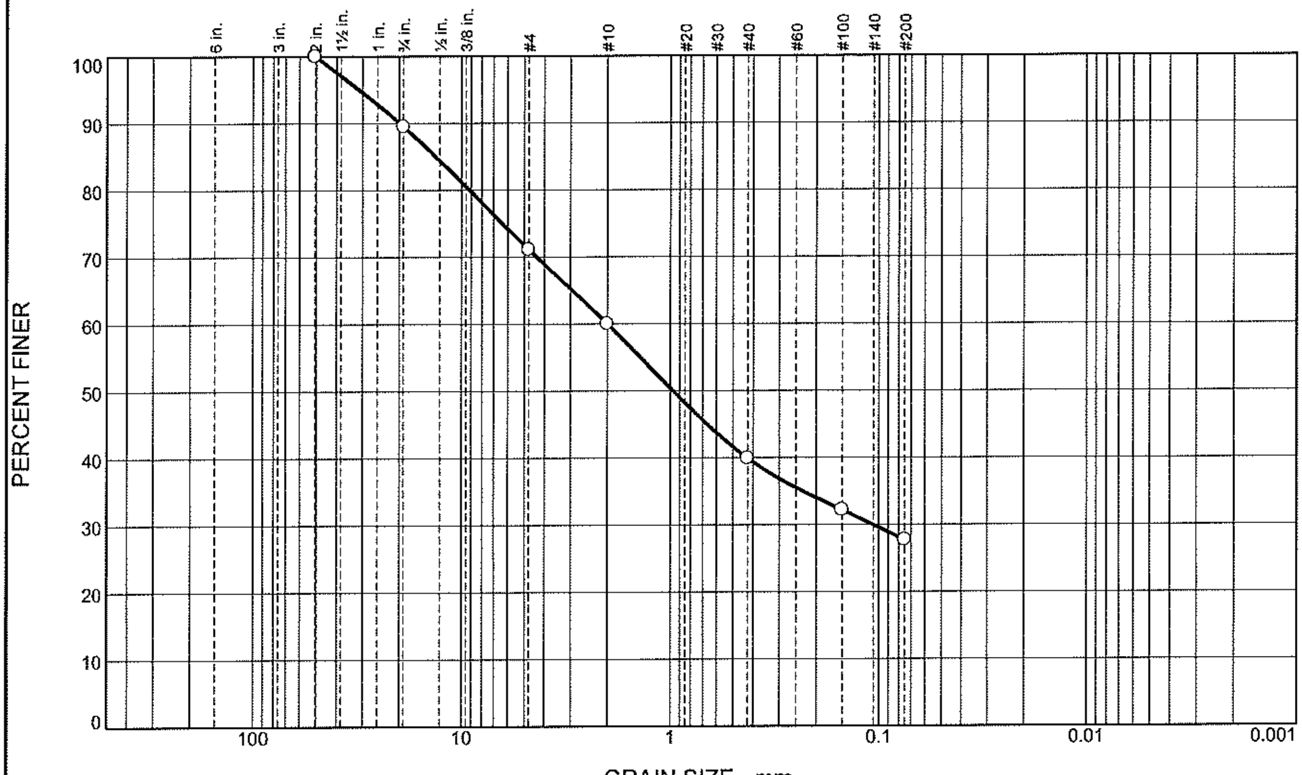
**Location:** B-11, S-2, 2 - 4'
**Sample Number:** S-2 **Depth:** 2 - 4' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B11/S2

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 10.5 | 18.4 | 11.1 | 20.1 | 12.2 | 27.7 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 2 | 100.0 | | |
| .75 | 89.5 | | |
| #4 | 71.1 | | |
| #10 | 60.0 | | |
| #40 | 39.9 | | |
| #100 | 32.2 | | |
| #200 | 27.7 | | |

* (no specification provided)

**Soil Description**

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{90}$= 19.8675 $D_{85}$= 13.3223 $D_{60}$= 2.0000
$D_{50}$= 0.9720 $D_{30}$= 0.1065 $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Classification**

USCS= AASHTO=

**Remarks**

Water Content: 7.4 %

**Location:** B-12, S-1, 0 - 2'
**Sample Number:** S-1 **Depth:** 0-2' **Date:** 10/11/13

**QCQA Laboratories, Inc.**

**Schenectady, NY**

**Client:** VHB
**Project:** APWAN Development - Silo Ridge
**Project No:** G13-3523 **Figure** B12/S1

# APPENDIX D

# FILL MATERIAL AND PLACEMENT RECOMMENDATIONS

## FILL MATERIAL AND PLACEMENT RECOMMENDATIONS

I. Fill Material Recommendations

A. Subbase Stone

The subbase stone course placed as the aggregate course beneath slab-on-grade and pavement construction should consist of a crusher run stone meeting the material and gradation requirements of New York State Department of Transportation (NYSDOT), Standard Specifications, Item 304.12 – Type 2 Subbase Course (Item 304.14 could also be used beneath pavement construction).

B. Structural Fill

Structural Fill should consist of a well graded crusher-run stone or bank-run sand and gravel, which is free of clay, expansive shale, organics and friable or deleterious particles. Imported Structural Fill should also conform to the following gradation requirements.

| Sieve Size | Percent Finer by Weight |
|---|---|
| 3 inch | 100 |
| ¼ inch | 25-85 |
| No. 40 | 5-50 |
| No. 200 | 0-10 |

C. Drainage Stone

Drainage Stone should consist of a blend of crusher run stone or crushed gravel meeting the material and gradation requirements of NYSDOT, Standard Specifications Section 703-02, Size Designations No. 1 and No. 2 (½-inch and 1-inch washed gravel or stone).

D. Pervious Granular Backfill

Pervious Granular Backfill should consist of a free draining granular fill, which meets the minimum requirements of NYSDOT, Standard Specifications Section 703-07, Concrete Sand, with 100 percent passing 3/8 inch sieve to maximum of 3 percent passing a No. 200 sieve.

E. General Fill

General Fill may be used for backfill in non-loaded areas outside of foundation, structure and slab-on-grade areas. General Fill may consist of on-site or imported soils, which are free of topsoil, organics, debris and deleterious materials and are of a moisture content suitable for proper compaction.

## II. Fill Placement and Compaction Recommendations

All controlled fill placed beneath foundations, structures, utilities, slab-on-grade and pavement construction should be compacted to a minimum of 95 percent of the maximum dry density as measured by the modified Proctor test (ASTM D1557), or as directed by the geotechnical engineer. Fill placed in non-loaded grass areas can be compacted to a minimum of 90 percent of the maximum dry density (ASTM D1557).

Placement of fill should not exceed a maximum loose lift thickness of 6 to 9 inches and should be reduced in conjunction with the compaction equipment used so that the required density is attained.

Fill should have a moisture content within two percent of the optimum moisture content prior to compaction. Subgrades should be properly drained and protected from moisture and frost. Placement of fill on frozen subgrades is not acceptable. It is recommended that all fill placement and compaction be monitored and tested by qualified geotechnical personnel.

## III. Quality Assurance Testing

The following minimum laboratory and field quality assurance testing frequencies are recommended to confirm fill material quality and post placement and compaction conditions. These minimum frequencies are based on generally uniform material properties and placement conditions. Should material properties vary or conditions at the time of placement vary (i.e. moisture content, placement and compaction, procedures or equipment, etc.), then additional testing is recommended. Additional testing, if required, should be determined by qualified geotechnical personnel based on evaluation of the actual fill material and construction conditions.

### A. Laboratory Testing of Material Properties

- Moisture content (ASTM D-2216) - 1 test per 4000 cubic yards or no less than 2 tests per each material type.
- Grain Size Analysis (ASTM D-422) - 1 test per 4000 cubic yards or no less than 2 tests per each material type.
- Modified Proctor Moisture Density Relationship (ASTM D-1557) 1 test per 4000 cubic yards or no less than 1 test per each material type.

B. Field In-Place Moisture/Density Testing (ASTM D D-6938)

- Backfilling along trenches and foundation walls - 1 test per 50 lineal feet per lift.
- Backfilling Isolated Excavations (i.e. column foundations) - 1 test per lift.
- Filling in open areas for slab-on-grade and pavement construction - 1 test per 2500 square feet per lift.

# APPENDIX E

# INFORMATION REGARDING THIS GEOTECHNICAL ENGINEERING REPORT

Trans Tech

# IMPORTANT INFORMATION REGARDING THIS GEOTECHNICAL ENGINEERING REPORT

Transtech Engineering Services, P.C. (TransTech), has endeavored to prepare this report in accordance with generally accepted geotechnical engineering principles and practices. Geotechnical engineering analyses and evaluations are based partly on judgment and opinion, and are therefore far less exact than other engineering disciplines. Accordingly, TransTech believes that providing the report user with information regarding the preparation and limitations of this report will aid in the proper interpretation and implementation of the conclusions and recommendations presented in this report. The following information is provided in an effort to reduce potential geotechnical-related delays, cost over-runs and other problems that can develop during the design and construction process.

SCOPE OF SERVICES: The scope of this report is limited to the specific items identified in TransTech's Proposal for services for this project. The scope of services is limited to a geotechnical engineering evaluation of the conditions disclosed by the subsurface exploration and does not include any geoenvironmental assessment or investigation for the presence, absence or prevention of any hazardous or toxic materials or conditions (or mold) in the soil, groundwater or surface water within or beyond the project site. Unanticipated environmental problems can lead to significant project cost over-runs and TransTech recommends that the Owner retain a geoenvironmental consultant to discuss risk management guidance.

PROJECT-SPECIFIC FACTORS: The conclusions and recommendations presented in this report were prepared based on project-specific factors described in the report, such as the size, loading, type of construction and intended use of the structure; the location of the structure on the site; planned structure elevation(s) and site grading; other planned or existing site improvements, such as access roads, parking lots, underground utilities; and any other pertinent project information. Changes to the project details may alter the factors considered in development of the report conclusions and recommendations. As such, TransTech cannot accept responsibility or liability for problems that may develop if we are not consulted regarding any changes to the project-specific factors that were assumed during preparation of the report.

SUBSURFACE CONDITIONS: The subsurface exploration program for this project consisted of sampling only at discrete test locations. TransTech has used judgment to infer the subsurface conditions between the discrete test locations. The conclusions and recommendations presented in this report were based on the subsurface conditions disclosed/inferred at and between the discrete test locations at the time the subsurface exploration program was performed. We point out that surface and subsurface conditions at the site are subject to change subsequent to preparation of this report. Such changes may include floods, earthquakes, groundwater fluctuations, and construction activities at the site and/or adjoining properties. It should be understood that the actual subsurface conditions could vary from the conditions inferred by TransTech between and away from the discrete test locations, which could be revealed during construction. As such, TransTech should be retained during construction to confirm that the subsurface conditions are consistent with the conditions disclosed by the subsurface exploration program, and to refine our conclusions and recommendations in the event that the subsurface conditions differ from those disclosed by the subsurface exploration program.

USE OF THIS GEOTECHNICAL ENGINEERING REPORT: This report has been prepared for the exclusive use of our client, and any other parties specifically identified in the report, for specific application to the site and project-specific conditions described in the report. This report should not be applied to any other site or project, or for any uses other than those originally intended without TransTech's consent.

MISINTERPRETATION OF THIS REPORT: The conclusions and recommendations presented in this report are subject to misinterpretation by the design team and contractors, which can result in costly problems. The risk of misinterpretation by the design team can be reduced by having appropriate members of the design team confer with TransTech regarding the conclusions and recommendations presented in this report prior to completing the plans and specifications. In addition, TransTech should be retained to review pertinent elements of the design team's final plans and specifications prior to bidding to confirm that the recommendations presented in this report have been properly interpreted and applied. The risk of misinterpretation by contractors can be reduced by retaining TransTech to attend prebid and preconstruction conferences, and to provide construction observation.

COMPONENTS OF THIS REPORT: Subsurface exploration logs, figures, tables and any other report components are subject to misinterpretation if they are separated from this report. This may occur if copies of the boring logs or other report components are given to the contractors during the bid preparation process. To minimize this risk, report components should not be separated from the report and only complete copies of this report should be distributed as appropriate.

ALTERATION OF THIS REPORT: It is a violation of Section 7209 Subdivision 2 of the New York State Education Law for any person to alter this report in any way, except under the direction of a licensed professional engineer.

United States Department of Agriculture

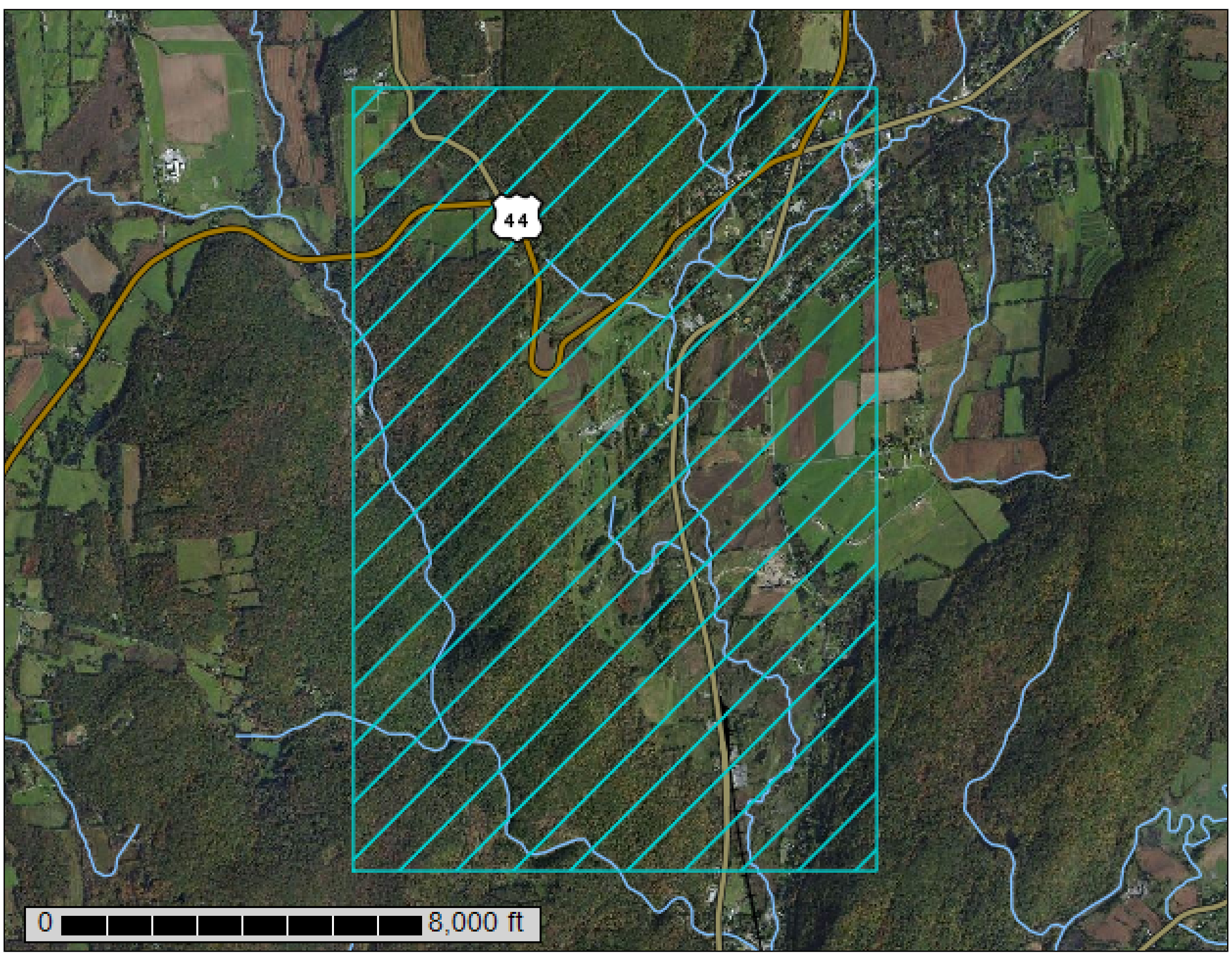
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for

# Dutchess County, New York




September 3, 2013

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

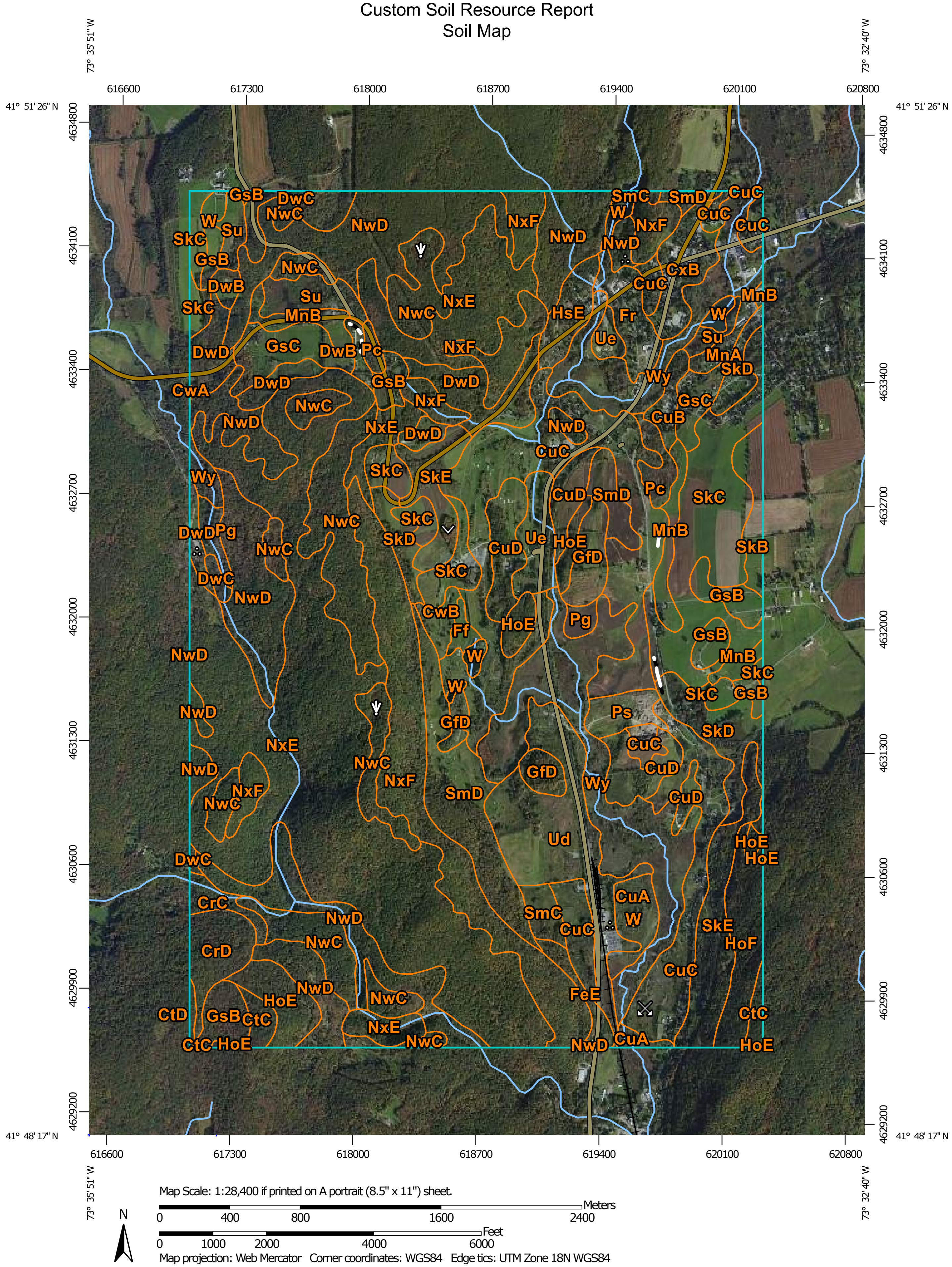
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Soil Map


73° 35' 51" W
73° 32' 40" W
41° 51' 26" N
41° 48' 17" N
616600
617300
618000
618700
619400
620100
620800
4634800
4634100
4633400
4632700
4632000
4631300
4630600
4629900
4629200
GsB
DwC
NwC
NwD
NxF
NwD
SmC
SmD
CuC
W
Su
SkC
GsB
NwC
DwB
SkC
Su
MnB
NwC
NxE
HsE
Fr
CxB
MnB
W
Su
DwD
GsC
DwB
Pc
NxF
Ue
MnA
SkD
CwA
DwD
NwC
GsB
DwD
NxF
Wy
GsC
CuB
NwD
NxE
DwD
NwD
CuC
Wy
SkC
SkE
CuD
SmD
Pc
SkC
DwD
Pg
NwC
SkC
SkD
MnB
NwC
CuD
Ue
HoE
GfD
SkB
DwC
SkC
NwD
GsB
CwB
Ff
HoE
Pg
GsB
NwD
W
MnB
SkC
W
SkC
GsB
NwD
GfD
Ps
SkD
NxE
CuC
NwD
NwC
GfD
CuD
Wy
NxF
NxF
NwC
SmD
CuD
Ud
HoE
HoE
DwC
CuA
CrC
SmC
W
NwD
CuC
SkE
NwC
HoF
CrD
CuC
NwD
NwC
FeE
HoE
CtD
GsB
CtC
CtC
NxE
NwC
NwD
CuA
HoE
CtC
HoE
Map Scale: 1:28,400 if printed on A portrait (8.5" x 11") sheet.
Meters
0
400
800
1600
2400
N
Feet
0
1000
2000
4000
6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

**Special Point Features**

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Dutchess County, New York
Survey Area Data: Version 9, Sep 21, 2012

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

Date(s) aerial images were photographed: Mar 28, 2011—Oct 9, 2011

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

# Map Unit Legend

| Dutchess County, New York (NY027) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| CrC | Charlton-Chatfield complex, rolling, rocky | 14.4 | 0.4% |
| CrD | Charlton-Chatfield complex, hilly, rocky | 37.0 | 0.9% |
| CtC | Chatfield-Hollis complex, rolling, very rocky | 18.4 | 0.5% |
| CtD | Chatfield-Hollis complex, hilly, very rocky | 2.8 | 0.1% |
| CuA | Copake gravelly silt loam, nearly level | 30.1 | 0.8% |
| CuB | Copake gravelly silt loam, undulating | 14.8 | 0.4% |
| CuC | Copake gravelly silt loam, rolling | 363.4 | 9.3% |
| CuD | Copake gravelly silt loam, hilly | 87.5 | 2.2% |
| CwA | Copake channery silt loam, fan, 0 to 3 percent slopes | 0.4 | 0.0% |
| CwB | Copake channery silt loam, fan, 3 to 8 percent slopes | 11.9 | 0.3% |
| CxB | Copake-Urban land complex, undulating | 39.3 | 1.0% |
| DwB | Dutchess-Cardigan complex, undulating, rocky | 14.6 | 0.4% |
| DwC | Dutchess-Cardigan complex, rolling, rocky | 32.2 | 0.8% |
| DwD | Dutchess-Cardigan complex, hilly, rocky | 94.6 | 2.4% |
| FeE | Farmington-Rock outcrop complex, steep | 13.4 | 0.3% |
| Ff | Fluvaquents-Udifluvents complex, frequently flooded | 7.2 | 0.2% |
| Fr | Fredon silt loam | 33.2 | 0.8% |
| GfD | Galway-Farmington complex, hilly | 45.8 | 1.2% |
| GsB | Georgia silt loam, 3 to 8 percent slopes | 78.0 | 2.0% |
| GsC | Georgia silt loam, 8 to 15 percent slopes | 57.2 | 1.5% |
| HoE | Hollis-Chatfield-Rock outcrop complex, steep | 57.4 | 1.5% |
| HoF | Hollis-Chatfield-Rock outcrop complex, very steep | 49.7 | 1.3% |
| HsE | Hoosic gravelly loam, 25 to 45 percent slopes | 27.4 | 0.7% |

| Dutchess County, New York (NY027) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| MnA | Massena silt loam, 0 to 3 percent slopes | 12.2 | 0.3% |
| MnB | Massena silt loam, 3 to 8 percent slopes | 46.1 | 1.2% |
| NwC | Nassau-Cardigan complex, rolling, very rocky | 237.2 | 6.1% |
| NwD | Nassau-Cardigan complex, hilly, very rocky | 410.3 | 10.5% |
| NxE | Nassau-Rock outcrop complex, steep | 697.8 | 17.8% |
| NxF | Nassau-Rock outcrop complex, very steep | 258.3 | 6.6% |
| Pc | Palms muck | 21.4 | 0.5% |
| Pg | Pawling silt loam | 19.1 | 0.5% |
| Ps | Pits, gravel | 21.2 | 0.5% |
| SkB | Stockbridge silt loam, 3 to 8 percent slopes | 35.7 | 0.9% |
| SkC | Stockbridge silt loam, 8 to 15 percent slopes | 202.5 | 5.2% |
| SkD | Stockbridge silt loam, 15 to 25 percent slopes | 82.4 | 2.1% |
| SkE | Stockbridge silt loam, 25 to 45 percent slopes | 103.8 | 2.6% |
| SmC | Stockbridge-Farmington complex, rolling, rocky | 16.0 | 0.4% |
| SmD | Stockbridge-Farmington complex, hilly, rocky | 113.5 | 2.9% |
| Su | Sun silt loam | 46.2 | 1.2% |
| Ud | Udorthents, smoothed | 126.9 | 3.2% |
| Ue | Udorthents, wet substratum | 39.5 | 1.0% |
| W | Water | 19.9 | 0.5% |
| Wy | Wayland silt loam | 277.4 | 7.1% |
| **Totals for Area of Interest** | | **3,918.4** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Dutchess County, New York

## CrC—Charlton-Chatfield complex, rolling, rocky

### Map Unit Setting

*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Charlton and similar soils:* 50 percent
*Chatfield and similar soils:* 30 percent
*Minor components:* 20 percent

### Description of Charlton

#### Setting

*Landform:* Hills, ridges, till plains
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Acid loamy till derived mainly from schist, gneiss, or granite

#### Properties and qualities

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 7.6 inches)

#### Interpretive groups

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e
*Hydrologic Soil Group:* B

#### Typical profile

*0 to 8 inches:* Loam
*8 to 30 inches:* Gravelly loam
*30 to 72 inches:* Gravelly loam

### Description of Chatfield

#### Setting

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from granite, gneiss, or schist

**Properties and qualities**

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 1 percent
*Available water capacity:* Low (about 4.0 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e
*Hydrologic Soil Group:* B

**Typical profile**

*0 to 9 inches:* Fine sandy loam
*9 to 30 inches:* Loam
*30 to 34 inches:* Unweathered bedrock

**Minor Components**

**Hollis**

*Percent of map unit:* 9 percent

**Georgia**

*Percent of map unit:* 5 percent

**Massena**

*Percent of map unit:* 4 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## CrD—Charlton-Chatfield complex, hilly, rocky

**Map Unit Setting**

*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Chatfield and similar soils:* 40 percent
*Charlton and similar soils:* 40 percent

*Minor components:* 20 percent

**Description of Charlton**

**Setting**

*Landform:* Hills, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Acid loamy till derived mainly from schist, gneiss, or granite

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 7.6 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e
*Hydrologic Soil Group:* B

**Typical profile**

*0 to 8 inches:* Loam
*8 to 30 inches:* Gravelly loam
*30 to 72 inches:* Gravelly loam

**Description of Chatfield**

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from granite, gneiss, or schist

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 1 percent
*Available water capacity:* Low (about 4.0 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e

*Hydrologic Soil Group:* B

**Typical profile**

*0 to 9 inches:* Fine sandy loam
*9 to 30 inches:* Loam
*30 to 34 inches:* Unweathered bedrock

**Minor Components**

**Sun**

*Percent of map unit:* 10 percent
*Landform:* Depressions

**Hollis**

*Percent of map unit:* 9 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

## CtC—Chatfield-Hollis complex, rolling, very rocky

**Map Unit Setting**

*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Hollis and similar soils:* 40 percent
*Chatfield and similar soils:* 40 percent
*Minor components:* 20 percent

**Description of Chatfield**

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from granite, gneiss, or schist

**Properties and qualities**

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 1 percent
*Available water capacity:* Low (about 4.0 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 6s
*Hydrologic Soil Group:* B

**Typical profile**

*0 to 9 inches:* Fine sandy loam
*9 to 30 inches:* Loam
*30 to 34 inches:* Unweathered bedrock

### Description of Hollis

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* A thin mantle of loamy till derived mainly from schist, granite, and gneiss

**Properties and qualities**

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.9 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 6s
*Hydrologic Soil Group:* D

**Typical profile**

*0 to 3 inches:* Loam
*3 to 15 inches:* Loam
*15 to 19 inches:* Unweathered bedrock

### Minor Components

**Charlton**

*Percent of map unit:* 10 percent

**Rock outcrop**

*Percent of map unit:* 5 percent

**Georgia**

*Percent of map unit:* 3 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

**Massena**

*Percent of map unit:* 1 percent

## CtD—Chatfield-Hollis complex, hilly, very rocky

### Map Unit Setting

*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Hollis and similar soils:* 40 percent
*Chatfield and similar soils:* 40 percent
*Minor components:* 20 percent

### Description of Chatfield

#### Setting

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from granite, gneiss, or schist

#### Properties and qualities

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 1 percent
*Available water capacity:* Low (about 4.0 inches)

#### Interpretive groups

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* B

#### Typical profile

*0 to 9 inches:* Fine sandy loam
*9 to 30 inches:* Loam
*30 to 34 inches:* Unweathered bedrock

#### Description of Hollis

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* A thin mantle of loamy till derived mainly from schist, granite, and gneiss

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.9 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* D

**Typical profile**

*0 to 3 inches:* Loam
*3 to 15 inches:* Loam
*15 to 19 inches:* Unweathered bedrock

#### Minor Components

**Charlton**

*Percent of map unit:* 10 percent

**Rock outcrop**

*Percent of map unit:* 5 percent

**Sun**

*Percent of map unit:* 5 percent
*Landform:* Depressions

### CuA—Copake gravelly silt loam, nearly level

#### Map Unit Setting

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Copake and similar soils:* 80 percent
*Minor components:* 20 percent

### Description of Copake

#### Setting

*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy over calcareous sandy and gravelly glaciofluvial deposits

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.3 inches)

#### Interpretive groups

*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 1
*Hydrologic Soil Group:* A

#### Typical profile

*0 to 6 inches:* Gravelly silt loam
*6 to 36 inches:* Gravelly loam
*36 to 80 inches:* Stratified very gravelly coarse sand to gravelly loamy fine sand

### Minor Components

#### Hoosic

*Percent of map unit:* 10 percent

#### Halsey

*Percent of map unit:* 5 percent
*Landform:* Depressions

#### Fredon

*Percent of map unit:* 5 percent
*Landform:* Depressions

## CuB—Copake gravelly silt loam, undulating

### Map Unit Setting

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Copake and similar soils:* 80 percent
*Minor components:* 20 percent

### Description of Copake

#### Setting

*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy over calcareous sandy and gravelly glaciofluvial deposits

#### Properties and qualities

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.3 inches)

#### Interpretive groups

*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 2e
*Hydrologic Soil Group:* A

#### Typical profile

*0 to 6 inches:* Gravelly silt loam
*6 to 36 inches:* Gravelly loam
*36 to 80 inches:* Stratified very gravelly coarse sand to gravelly loamy fine sand

### Minor Components

#### Hoosic

*Percent of map unit:* 10 percent

#### Fredon

*Percent of map unit:* 5 percent
*Landform:* Depressions

**Halsey**

*Percent of map unit:* 5 percent
*Landform:* Depressions

## CuC—Copake gravelly silt loam, rolling

### Map Unit Setting

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Copake and similar soils:* 85 percent
*Minor components:* 15 percent

### Description of Copake

**Setting**

*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy over calcareous sandy and gravelly glaciofluvial deposits

**Properties and qualities**

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.3 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e
*Hydrologic Soil Group:* A

**Typical profile**

*0 to 6 inches:* Gravelly silt loam
*6 to 36 inches:* Gravelly loam
*36 to 80 inches:* Stratified very gravelly coarse sand to gravelly loamy fine sand

### Minor Components

**Hoosic**

*Percent of map unit:* 10 percent

**Fredon**

*Percent of map unit:* 3 percent
*Landform:* Depressions

**Halsey**

*Percent of map unit:* 2 percent
*Landform:* Depressions

## CuD—Copake gravelly silt loam, hilly

**Map Unit Setting**

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Copake and similar soils:* 85 percent
*Minor components:* 15 percent

**Description of Copake**

**Setting**

*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy over calcareous sandy and gravelly glaciofluvial deposits

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.3 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e
*Hydrologic Soil Group:* A

**Typical profile**

*0 to 6 inches:* Gravelly silt loam
*6 to 36 inches:* Gravelly loam
*36 to 80 inches:* Stratified very gravelly coarse sand to gravelly loamy fine sand

#### Minor Components

##### Hoosic

*Percent of map unit:* 10 percent

##### Fredon

*Percent of map unit:* 5 percent
*Landform:* Depressions

## CwA—Copake channery silt loam, fan, 0 to 3 percent slopes

#### Map Unit Setting

*Elevation:* 300 to 850 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

#### Map Unit Composition

*Copake and similar soils:* 80 percent
*Minor components:* 20 percent

#### Description of Copake

##### Setting

*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy over calcareous sandy and gravelly glaciofluvial deposits

##### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* About 36 to 72 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.3 inches)

##### Interpretive groups

*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 1
*Hydrologic Soil Group:* A

##### Typical profile

*0 to 6 inches:* Channery silt loam
*6 to 36 inches:* Channery loam

*36 to 80 inches:* Stratified very gravelly coarse sand to gravelly loamy fine sand

**Minor Components**

**Hoosic**
*Percent of map unit:* 10 percent

**Fredon**
*Percent of map unit:* 5 percent
*Landform:* Depressions

**Halsey**
*Percent of map unit:* 5 percent
*Landform:* Depressions

## CwB—Copake channery silt loam, fan, 3 to 8 percent slopes

**Map Unit Setting**
*Elevation:* 300 to 850 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**
*Copake and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Copake**

**Setting**
*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy over calcareous sandy and gravelly glaciofluvial deposits

**Properties and qualities**
*Slope:* 3 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* About 36 to 72 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.3 inches)

**Interpretive groups**
*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 2e

*Hydrologic Soil Group:* A

**Typical profile**

*0 to 6 inches:* Channery silt loam
*6 to 36 inches:* Channery loam
*36 to 80 inches:* Stratified very gravelly coarse sand to gravelly loamy fine sand

**Minor Components**

**Hoosic**

*Percent of map unit:* 10 percent

**Fredon**

*Percent of map unit:* 5 percent
*Landform:* Depressions

**Halsey**

*Percent of map unit:* 5 percent
*Landform:* Depressions

## CxB—Copake-Urban land complex, undulating

**Map Unit Setting**

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Copake and similar soils:* 40 percent
*Urban land:* 35 percent
*Minor components:* 25 percent

**Description of Copake**

**Setting**

*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy over calcareous sandy and gravelly glaciofluvial deposits

**Properties and qualities**

*Slope:* 1 to 6 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent

*Available water capacity:* Moderate (about 6.3 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 2e
*Hydrologic Soil Group:* A

**Typical profile**

*0 to 6 inches:* Gravelly silt loam
*6 to 36 inches:* Gravelly loam
*36 to 80 inches:* Stratified very gravelly coarse sand to gravelly loamy fine sand

### Description of Urban Land

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 8s

**Typical profile**

*0 to 6 inches:* Variable

### Minor Components

**Udorthents**

*Percent of map unit:* 10 percent

**Fredon**

*Percent of map unit:* 5 percent
*Landform:* Depressions

**Hoosic**

*Percent of map unit:* 5 percent

**Halsey**

*Percent of map unit:* 5 percent
*Landform:* Depressions

## DwB—Dutchess-Cardigan complex, undulating, rocky

### Map Unit Setting

*Elevation:* 50 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Dutchess and similar soils:* 40 percent
*Cardigan and similar soils:* 30 percent
*Minor components:* 30 percent

### Description of Dutchess

#### Setting

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from phyllite, slate, schist, and shale

#### Properties and qualities

*Slope:* 1 to 6 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* High (about 9.6 inches)

#### Interpretive groups

*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 2e
*Hydrologic Soil Group:* B

#### Typical profile

*0 to 8 inches:* Silt loam
*8 to 28 inches:* Silt loam
*28 to 86 inches:* Channery silt loam

### Description of Cardigan

#### Setting

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or colluvium derived from phyllite, slate, shale, and schist

#### Properties and qualities

*Slope:* 1 to 6 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 4.1 inches)

#### Interpretive groups

*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 2e
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 8 inches:* Channery silt loam
*8 to 20 inches:* Channery loam
*20 to 30 inches:* Channery silt loam
*30 to 34 inches:* Unweathered bedrock

**Minor Components**

**Georgia**

*Percent of map unit:* 10 percent

**Massena**

*Percent of map unit:* 9 percent

**Nassau**

*Percent of map unit:* 9 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## DwC—Dutchess-Cardigan complex, rolling, rocky

**Map Unit Setting**

*Elevation:* 50 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Dutchess and similar soils:* 40 percent
*Cardigan and similar soils:* 30 percent
*Minor components:* 30 percent

**Description of Dutchess**

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from phyllite, slate, schist, and shale

**Properties and qualities**

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* High (about 9.6 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e
*Hydrologic Soil Group:* B

**Typical profile**

*0 to 8 inches:* Silt loam
*8 to 28 inches:* Silt loam
*28 to 86 inches:* Channery silt loam

**Description of Cardigan**

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or colluvium derived from phyllite, slate, shale, and schist

**Properties and qualities**

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 4.1 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 8 inches:* Channery silt loam
*8 to 20 inches:* Channery loam
*20 to 30 inches:* Channery silt loam
*30 to 34 inches:* Unweathered bedrock

**Minor Components**

**Georgia**

*Percent of map unit:* 10 percent

**Massena**

*Percent of map unit:* 9 percent

**Nassau**

*Percent of map unit:* 9 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## DwD—Dutchess-Cardigan complex, hilly, rocky

### Map Unit Setting

*Elevation:* 50 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Dutchess and similar soils:* 40 percent
*Cardigan and similar soils:* 30 percent
*Minor components:* 30 percent

### Description of Dutchess

#### Setting

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from phyllite, slate, schist, and shale

#### Properties and qualities

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* High (about 9.6 inches)

#### Interpretive groups

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e
*Hydrologic Soil Group:* B

#### Typical profile

*0 to 8 inches:* Silt loam
*8 to 28 inches:* Silt loam
*28 to 86 inches:* Channery silt loam

### Description of Cardigan

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or colluvium derived from phyllite, slate, shale, and schist

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 4.1 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 8 inches:* Channery silt loam
*8 to 20 inches:* Channery loam
*20 to 30 inches:* Channery silt loam
*30 to 34 inches:* Unweathered bedrock

### Minor Components

**Sun**

*Percent of map unit:* 10 percent
*Landform:* Depressions

**Nassau**

*Percent of map unit:* 9 percent

**Georgia**

*Percent of map unit:* 5 percent

**Massena**

*Percent of map unit:* 5 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

## FeE—Farmington-Rock outcrop complex, steep

### Map Unit Setting

*Elevation:* 100 to 900 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Farmington and similar soils:* 60 percent
*Rock outcrop:* 20 percent
*Minor components:* 20 percent

### Description of Farmington

#### Setting

*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or congeliturbate derived from limestone, dolomite, shale, and sandstone, and in many places mixed with wind and water deposits

#### Properties and qualities

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Available water capacity:* Very low (about 2.1 inches)

#### Interpretive groups

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* D

#### Typical profile

*0 to 7 inches:* Loam
*7 to 15 inches:* Very fine sandy loam
*15 to 19 inches:* Unweathered bedrock

#### Description of Rock Outcrop

**Properties and qualities**

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* 0 inches to lithic bedrock
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s

**Typical profile**

*0 to 60 inches:* Unweathered bedrock

#### Minor Components

**Galway**

*Percent of map unit:* 10 percent

**Stockbridge**

*Percent of map unit:* 9 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

### Ff—Fluvaquents-Udifluvents complex, frequently flooded

#### Map Unit Setting

*Elevation:* 100 to 3,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

#### Map Unit Composition

*Fluvaquents and similar soils:* 50 percent
*Udifluvents and similar soils:* 40 percent
*Minor components:* 10 percent

#### Description of Fluvaquents

**Setting**

*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Alluvium with highly variable texture

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to very high (0.06 to 19.98 in/hr)
*Depth to water table:* About 0 inches
*Frequency of flooding:* FrequentNone
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.1 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 5w
*Hydrologic Soil Group:* A/D

**Typical profile**

*0 to 5 inches:* Gravelly silt loam
*5 to 70 inches:* Very gravelly silt loam

#### Description of Udifluvents

**Setting**

*Landform:* Flood plains
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium with a wide range of texture

**Properties and qualities**

*Slope:* 0 to 5 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to very high (0.06 to 19.98 in/hr)
*Depth to water table:* About 24 to 72 inches
*Frequency of flooding:* FrequentNone
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Low (about 5.9 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 5w
*Hydrologic Soil Group:* A

**Typical profile**

*0 to 4 inches:* Gravelly loam
*4 to 70 inches:* Very gravelly loam

#### Minor Components

**Linlithgo**

*Percent of map unit:* 2 percent
*Landform:* Depressions

**Wayland**

*Percent of map unit:* 2 percent
*Landform:* Flood plains

**Wappinger**

*Percent of map unit:* 1 percent
*Landform:* Depressions

**Pawling**

*Percent of map unit:* 1 percent
*Landform:* Depressions

**Carlisle**

*Percent of map unit:* 1 percent
*Landform:* Swamps, marshes

**Palms**

*Percent of map unit:* 1 percent
*Landform:* Marshes, swamps

**Hoosic, fan**

*Percent of map unit:* 1 percent

**Copake, fan**

*Percent of map unit:* 1 percent

## Fr—Fredon silt loam

### Map Unit Setting

*Elevation:* 250 to 1,200 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Fredon and similar soils:* 85 percent
*Minor components:* 15 percent

### Description of Fredon

#### Setting

*Landform:* Depressions
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Loamy over sandy and gravelly glaciofluvial deposits

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.20 to 1.98 in/hr)
*Depth to water table:* About 6 to 18 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.1 inches)

**Interpretive groups**
*Farmland classification:* Prime farmland if drained
*Land capability (nonirrigated):* 3w
*Hydrologic Soil Group:* B/D

**Typical profile**
*0 to 9 inches:* Silt loam
*9 to 31 inches:* Very fine sandy loam
*31 to 70 inches:* Stratified very gravelly sand to loamy fine sand

**Minor Components**

**Fredon, poorly drained**
*Percent of map unit:* 5 percent
*Landform:* Depressions

**Unnamed soils, glacial outwash**
*Percent of map unit:* 5 percent

**Halsey**
*Percent of map unit:* 5 percent
*Landform:* Depressions

## GfD—Galway-Farmington complex, hilly

**Map Unit Setting**
*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**
*Galway and similar soils:* 40 percent
*Farmington and similar soils:* 35 percent
*Minor components:* 25 percent

**Description of Galway**

**Setting**
*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex

*Across-slope shape:* Convex
*Parent material:* Calcareous loamy till

**Properties and qualities**
*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 25 percent
*Available water capacity:* Low (about 4.2 inches)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e
*Hydrologic Soil Group:* C

**Typical profile**
*0 to 6 inches:* Gravelly loam
*6 to 30 inches:* Gravelly loam
*30 to 31 inches:* Gravelly loam
*31 to 35 inches:* Unweathered bedrock

### Description of Farmington

**Setting**
*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or congeliturbate derived from limestone, dolomite, shale, and sandstone, and in many places mixed with wind and water deposits

**Properties and qualities**
*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Available water capacity:* Very low (about 2.1 inches)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 6e
*Hydrologic Soil Group:* D

**Typical profile**
*0 to 7 inches:* Loam
*7 to 15 inches:* Very fine sandy loam
*15 to 19 inches:* Unweathered bedrock

**Minor Components**

**Stockbridge**

*Percent of map unit:* 10 percent

**Sun**

*Percent of map unit:* 9 percent
*Landform:* Depressions

**Georgia**

*Percent of map unit:* 5 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

## GsB—Georgia silt loam, 3 to 8 percent slopes

**Map Unit Setting**

*Elevation:* 90 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Georgia and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Georgia**

**Setting**

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from limestone, shale, or slate

**Properties and qualities**

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 18 to 36 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 8.6 inches)

**Interpretive groups**

*Farmland classification:* All areas are prime farmland

*Land capability (nonirrigated):* 2e
*Hydrologic Soil Group:* C

**Typical profile**
*0 to 8 inches:* Silt loam
*8 to 27 inches:* Loam
*27 to 80 inches:* Gravelly fine sandy loam

**Minor Components**

**Charlton**
*Percent of map unit:* 5 percent

**Massena**
*Percent of map unit:* 5 percent

**Stockbridge**
*Percent of map unit:* 5 percent

**Dutchess**
*Percent of map unit:* 3 percent

**Pittstown**
*Percent of map unit:* 2 percent

## GsC—Georgia silt loam, 8 to 15 percent slopes

**Map Unit Setting**
*Elevation:* 90 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**
*Georgia and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Georgia**

**Setting**
*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from limestone, shale, or slate

**Properties and qualities**
*Slope:* 8 to 15 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)

*Depth to water table:* About 18 to 36 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 8.6 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 8 inches:* Silt loam
*8 to 27 inches:* Loam
*27 to 80 inches:* Gravelly fine sandy loam

### Minor Components

**Massena**

*Percent of map unit:* 5 percent

**Stockbridge**

*Percent of map unit:* 5 percent

**Charlton**

*Percent of map unit:* 3 percent

**Dutchess**

*Percent of map unit:* 3 percent

**Pittstown**

*Percent of map unit:* 2 percent

**Sun**

*Percent of map unit:* 2 percent
*Landform:* Depressions

## HoE—Hollis-Chatfield-Rock outcrop complex, steep

### Map Unit Setting

*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Hollis and similar soils:* 40 percent
*Chatfield and similar soils:* 30 percent
*Rock outcrop:* 20 percent
*Minor components:* 10 percent

### Description of Hollis

#### Setting

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* A thin mantle of loamy till derived mainly from schist, granite, and gneiss

#### Properties and qualities

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.9 inches)

#### Interpretive groups

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* D

#### Typical profile

*0 to 3 inches:* Loam
*3 to 15 inches:* Loam
*15 to 19 inches:* Unweathered bedrock

### Description of Chatfield

#### Setting

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from granite, gneiss, or schist

#### Properties and qualities

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 1 percent
*Available water capacity:* Low (about 4.0 inches)

#### Interpretive groups

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s

*Hydrologic Soil Group:* B

**Typical profile**

*0 to 9 inches:* Fine sandy loam
*9 to 30 inches:* Loam
*30 to 34 inches:* Unweathered bedrock

**Description of Rock Outcrop**

**Properties and qualities**

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* 0 inches to lithic bedrock
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high (0.00 to 19.98 in/hr)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s

**Typical profile**

*0 to 60 inches:* Unweathered bedrock

**Minor Components**

**Charlton**

*Percent of map unit:* 5 percent

**Sun**

*Percent of map unit:* 5 percent
*Landform:* Depressions

## HoF—Hollis-Chatfield-Rock outcrop complex, very steep

**Map Unit Setting**

*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Hollis and similar soils:* 40 percent
*Rock outcrop:* 25 percent
*Chatfield and similar soils:* 25 percent
*Minor components:* 10 percent

**Description of Hollis**

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* A thin mantle of loamy till derived mainly from schist, granite, and gneiss

**Properties and qualities**

*Slope:* 45 to 60 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.9 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* D

**Typical profile**

*0 to 3 inches:* Loam
*3 to 15 inches:* Loam
*15 to 19 inches:* Unweathered bedrock

### Description of Chatfield

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till derived mainly from granite, gneiss, or schist

**Properties and qualities**

*Slope:* 45 to 70 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 1 percent
*Available water capacity:* Low (about 4.0 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* B

**Typical profile**

*0 to 9 inches:* Fine sandy loam
*9 to 30 inches:* Loam
*30 to 34 inches:* Unweathered bedrock

**Description of Rock Outcrop**

**Properties and qualities**

*Slope:* 45 to 70 percent
*Depth to restrictive feature:* 0 inches to lithic bedrock
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high (0.00 to 19.98 in/hr)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s

**Typical profile**

*0 to 60 inches:* Unweathered bedrock

**Minor Components**

**Charlton**

*Percent of map unit:* 5 percent

**Sun**

*Percent of map unit:* 5 percent
*Landform:* Depressions

## HsE—Hoosic gravelly loam, 25 to 45 percent slopes

**Map Unit Setting**

*Elevation:* 100 to 1,100 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Hoosic and similar soils:* 85 percent
*Minor components:* 15 percent

**Description of Hoosic**

**Setting**

*Landform:* Deltas, outwash plains, terraces
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Sandy and gravelly glaciofluvial deposits

**Properties and qualities**

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (1.98 to 19.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 3.1 inches)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7e
*Hydrologic Soil Group:* A

**Typical profile**
*0 to 9 inches:* Gravelly loam
*9 to 24 inches:* Very gravelly sandy loam
*24 to 70 inches:* Extremely gravelly loamy sand

**Minor Components**

**Copake**
*Percent of map unit:* 5 percent

**Fredon**
*Percent of map unit:* 5 percent
*Landform:* Depressions

**Knickerbocker**
*Percent of map unit:* 5 percent

## MnA—Massena silt loam, 0 to 3 percent slopes

**Map Unit Setting**
*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**
*Massena and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Massena**

**Setting**
*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Footslope, summit
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Concave
*Across-slope shape:* Linear
*Parent material:* Loamy till dominated by siliceous rocks with varying proportions of limestone

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* About 12 to 18 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 10 percent
*Available water capacity:* Moderate (about 7.0 inches)

**Interpretive groups**

*Farmland classification:* Prime farmland if drained
*Land capability (nonirrigated):* 3w
*Hydrologic Soil Group:* C/D

**Typical profile**

*0 to 7 inches:* Silt loam
*7 to 33 inches:* Loam
*33 to 72 inches:* Fine sandy loam

**Minor Components**

**Sun**

*Percent of map unit:* 10 percent
*Landform:* Depressions

**Georgia**

*Percent of map unit:* 5 percent

**Punsit**

*Percent of map unit:* 5 percent

## MnB—Massena silt loam, 3 to 8 percent slopes

**Map Unit Setting**

*Elevation:* 100 to 1,000 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Massena and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Massena**

**Setting**

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Footslope, summit

*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Concave
*Across-slope shape:* Linear
*Parent material:* Loamy till dominated by siliceous rocks with varying proportions of limestone

**Properties and qualities**

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* About 12 to 18 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 10 percent
*Available water capacity:* Moderate (about 7.0 inches)

**Interpretive groups**

*Farmland classification:* Prime farmland if drained
*Land capability (nonirrigated):* 3w
*Hydrologic Soil Group:* C/D

**Typical profile**

*0 to 7 inches:* Silt loam
*7 to 33 inches:* Loam
*33 to 72 inches:* Fine sandy loam

### Minor Components

**Sun**

*Percent of map unit:* 10 percent
*Landform:* Depressions

**Georgia**

*Percent of map unit:* 5 percent

**Punsit**

*Percent of map unit:* 5 percent

## NwC—Nassau-Cardigan complex, rolling, very rocky

### Map Unit Setting

*Elevation:* 600 to 1,800 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Cardigan and similar soils:* 40 percent
*Nassau and similar soils:* 40 percent
*Minor components:* 20 percent

#### Description of Nassau

**Setting**

*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Channery loamy till derived mainly from local slate or shale

**Properties and qualities**

*Slope:* 5 to 15 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.7 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 6s
*Hydrologic Soil Group:* D

**Typical profile**

*0 to 5 inches:* Channery silt loam
*5 to 16 inches:* Very channery silt loam
*16 to 20 inches:* Unweathered bedrock

#### Description of Cardigan

**Setting**

*Landform:* Hills, ridges
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or colluvium derived from phyllite, slate, shale, and schist

**Properties and qualities**

*Slope:* 5 to 15 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 4.1 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 6s
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 8 inches:* Channery silt loam
*8 to 20 inches:* Channery loam
*20 to 30 inches:* Channery silt loam
*30 to 34 inches:* Unweathered bedrock

**Minor Components**

**Dutchess**

*Percent of map unit:* 9 percent

**Rock outcrop**

*Percent of map unit:* 5 percent

**Unnamed soils, very shallow**

*Percent of map unit:* 5 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## NwD—Nassau-Cardigan complex, hilly, very rocky

**Map Unit Setting**

*Elevation:* 600 to 1,800 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Nassau and similar soils:* 45 percent
*Cardigan and similar soils:* 30 percent
*Minor components:* 25 percent

**Description of Nassau**

**Setting**

*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Channery loamy till derived mainly from local slate or shale

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.7 inches)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* D

**Typical profile**
*0 to 5 inches:* Channery silt loam
*5 to 16 inches:* Very channery silt loam
*16 to 20 inches:* Unweathered bedrock

**Description of Cardigan**

**Setting**
*Landform:* Hills, ridges
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or colluvium derived from phyllite, slate, shale, and schist

**Properties and qualities**
*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 4.1 inches)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* C

**Typical profile**
*0 to 8 inches:* Channery silt loam
*8 to 20 inches:* Channery loam
*20 to 30 inches:* Channery silt loam
*30 to 34 inches:* Unweathered bedrock

**Minor Components**

**Dutchess**
*Percent of map unit:* 10 percent

**Sun**
*Percent of map unit:* 10 percent
*Landform:* Depressions

**Rock outcrop**
*Percent of map unit:* 5 percent

## NxE—Nassau-Rock outcrop complex, steep

### Map Unit Setting

*Elevation:* 600 to 1,800 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Nassau and similar soils:* 45 percent
*Rock outcrop:* 30 percent
*Minor components:* 25 percent

### Description of Nassau

#### Setting

*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Channery loamy till derived mainly from local slate or shale

#### Properties and qualities

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.7 inches)

#### Interpretive groups

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* D

#### Typical profile

*0 to 5 inches:* Channery silt loam
*5 to 16 inches:* Very channery silt loam
*16 to 20 inches:* Unweathered bedrock

### Description of Rock Outcrop

#### Properties and qualities

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* 0 inches to lithic bedrock

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s

**Typical profile**

*0 to 60 inches:* Unweathered bedrock

**Minor Components**

**Cardigan**

*Percent of map unit:* 10 percent

**Dutchess**

*Percent of map unit:* 10 percent

**Sun**

*Percent of map unit:* 5 percent
*Landform:* Depressions

## NxF—Nassau-Rock outcrop complex, very steep

**Map Unit Setting**

*Elevation:* 600 to 1,800 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Nassau and similar soils:* 50 percent
*Rock outcrop:* 30 percent
*Minor components:* 20 percent

**Description of Nassau**

**Setting**

*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Channery loamy till derived mainly from local slate or shale

**Properties and qualities**

*Slope:* 45 to 65 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately low (0.00 to 0.06 in/hr)

*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Very low (about 1.7 inches)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s
*Hydrologic Soil Group:* D

**Typical profile**
*0 to 5 inches:* Channery silt loam
*5 to 16 inches:* Very channery silt loam
*16 to 20 inches:* Unweathered bedrock

#### Description of Rock Outcrop

**Properties and qualities**
*Slope:* 45 to 70 percent
*Depth to restrictive feature:* 0 inches to lithic bedrock
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7s

**Typical profile**
*0 to 60 inches:* Unweathered bedrock

#### Minor Components

**Cardigan**
*Percent of map unit:* 10 percent

**Sun**
*Percent of map unit:* 10 percent
*Landform:* Depressions

## Pc—Palms muck

#### Map Unit Setting
*Elevation:* 250 to 1,500 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

#### Map Unit Composition
*Palms and similar soils:* 80 percent
*Minor components:* 20 percent

### Description of Palms

**Setting**

*Landform:* Swamps, marshes
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Organic material over loamy glacial drift

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Very poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.20 to 1.98 in/hr)
*Depth to water table:* About 0 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 20 percent
*Available water capacity:* Very high (about 17.4 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 5w
*Hydrologic Soil Group:* B/D

**Typical profile**

*0 to 12 inches:* Muck
*12 to 30 inches:* Muck
*30 to 80 inches:* Gravelly fine sandy loam

### Minor Components

**Carlisle**

*Percent of map unit:* 10 percent
*Landform:* Swamps, marshes

**Sun**

*Percent of map unit:* 5 percent
*Landform:* Depressions

**Fluvaquents**

*Percent of map unit:* 3 percent
*Landform:* Flood plains

**Udifluvents**

*Percent of map unit:* 2 percent
*Landform:* Marshes

## Pg—Pawling silt loam

### Map Unit Setting

*Elevation:* 50 to 500 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Pawling and similar soils:* 80 percent
*Minor components:* 20 percent

### Description of Pawling

#### Setting

*Landform:* Flood plains
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Loamy over sandy and gravelly alluvium

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* About 18 to 24 inches
*Frequency of flooding:* OccasionalNone
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 2 percent
*Available water capacity:* Moderate (about 6.6 inches)

#### Interpretive groups

*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 5w
*Hydrologic Soil Group:* B/D

#### Typical profile

*0 to 8 inches:* Silt loam
*8 to 33 inches:* Silt loam
*33 to 72 inches:* Very gravelly sand

### Minor Components

#### Linlithgo

*Percent of map unit:* 10 percent

#### Wayland

*Percent of map unit:* 5 percent

*Landform:* Flood plains

**Wappinger**

*Percent of map unit:* 5 percent

## Ps—Pits, gravel

**Map Unit Setting**

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Pits, gravel:* 70 percent
*Minor components:* 30 percent

**Description of Pits, Gravel**

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 8s

**Typical profile**

*0 to 6 inches:* Very gravelly sand
*6 to 60 inches:* Very gravelly coarse sand

**Minor Components**

**Udorthents**

*Percent of map unit:* 10 percent

**Copake**

*Percent of map unit:* 5 percent

**Fredon**

*Percent of map unit:* 5 percent
*Landform:* Depressions

**Halsey**

*Percent of map unit:* 5 percent
*Landform:* Depressions

**Hoosic**

*Percent of map unit:* 5 percent

## SkB—Stockbridge silt loam, 3 to 8 percent slopes

**Map Unit Setting**

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Stockbridge and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Stockbridge**

**Setting**

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Summit
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Calcareous loamy till

**Properties and qualities**

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 8.4 inches)

**Interpretive groups**

*Farmland classification:* All areas are prime farmland
*Land capability (nonirrigated):* 2e
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 6 inches:* Silt loam
*6 to 23 inches:* Silt loam
*23 to 80 inches:* Silt loam

**Minor Components**

**Georgia**

*Percent of map unit:* 5 percent

**Galway**

*Percent of map unit:* 4 percent

**Massena**

*Percent of map unit:* 4 percent

**Charlton**

*Percent of map unit:* 3 percent

**Bernardston**

*Percent of map unit:* 2 percent

**Farmington**

*Percent of map unit:* 1 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## SkC—Stockbridge silt loam, 8 to 15 percent slopes

**Map Unit Setting**

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Stockbridge and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Stockbridge**

**Setting**

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Calcareous loamy till

**Properties and qualities**

*Slope:* 8 to 15 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 8.4 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e

*Hydrologic Soil Group:* C

**Typical profile**

*0 to 6 inches:* Silt loam
*6 to 23 inches:* Silt loam
*23 to 80 inches:* Silt loam

**Minor Components**

**Georgia**

*Percent of map unit:* 5 percent

**Galway**

*Percent of map unit:* 4 percent

**Massena**

*Percent of map unit:* 4 percent

**Charlton**

*Percent of map unit:* 3 percent

**Bernardston**

*Percent of map unit:* 2 percent

**Farmington**

*Percent of map unit:* 1 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## SkD—Stockbridge silt loam, 15 to 25 percent slopes

**Map Unit Setting**

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Stockbridge and similar soils:* 80 percent
*Minor components:* 20 percent

**Description of Stockbridge**

**Setting**

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Calcareous loamy till

**Properties and qualities**

*Slope:* 15 to 25 percent

*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 8.4 inches)

**Interpretive groups**
*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e
*Hydrologic Soil Group:* C

**Typical profile**
*0 to 6 inches:* Silt loam
*6 to 23 inches:* Silt loam
*23 to 80 inches:* Silt loam

### Minor Components

**Bernardston**
*Percent of map unit:* 5 percent

**Charlton**
*Percent of map unit:* 5 percent

**Galway**
*Percent of map unit:* 4 percent

**Georgia**
*Percent of map unit:* 4 percent

**Farmington**
*Percent of map unit:* 1 percent

**Sun**
*Percent of map unit:* 1 percent
*Landform:* Depressions

## SkE—Stockbridge silt loam, 25 to 45 percent slopes

### Map Unit Setting
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition
*Stockbridge and similar soils:* 85 percent
*Minor components:* 15 percent

### Description of Stockbridge

**Setting**

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Calcareous loamy till

**Properties and qualities**

*Slope:* 25 to 45 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 8.4 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 7e
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 6 inches:* Silt loam
*6 to 23 inches:* Silt loam
*23 to 80 inches:* Silt loam

### Minor Components

**Charlton**

*Percent of map unit:* 5 percent

**Bernardston**

*Percent of map unit:* 4 percent

**Galway**

*Percent of map unit:* 4 percent

**Farmington**

*Percent of map unit:* 1 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## SmC—Stockbridge-Farmington complex, rolling, rocky

### Map Unit Setting

*Elevation:* 100 to 900 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Stockbridge and similar soils:* 50 percent
*Farmington and similar soils:* 30 percent
*Minor components:* 20 percent

### Description of Stockbridge

#### Setting

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Shoulder
*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Calcareous loamy till

#### Properties and qualities

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 8.4 inches)

#### Interpretive groups

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 3e
*Hydrologic Soil Group:* C

#### Typical profile

*0 to 6 inches:* Silt loam
*6 to 23 inches:* Silt loam
*23 to 80 inches:* Silt loam

### Description of Farmington

#### Setting

*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Shoulder

*Landform position (three-dimensional):* Crest
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or congeliturbate derived from limestone, dolomite, shale, and sandstone, and in many places mixed with wind and water deposits

**Properties and qualities**

*Slope:* 5 to 16 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Available water capacity:* Very low (about 2.1 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 6s
*Hydrologic Soil Group:* D

**Typical profile**

*0 to 7 inches:* Loam
*7 to 15 inches:* Very fine sandy loam
*15 to 19 inches:* Unweathered bedrock

### Minor Components

**Galway**

*Percent of map unit:* 10 percent

**Georgia**

*Percent of map unit:* 5 percent

**Massena**

*Percent of map unit:* 3 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

**Sun**

*Percent of map unit:* 1 percent
*Landform:* Depressions

## SmD—Stockbridge-Farmington complex, hilly, rocky

### Map Unit Setting

*Elevation:* 100 to 900 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F

*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Stockbridge and similar soils:* 50 percent
*Farmington and similar soils:* 30 percent
*Minor components:* 20 percent

**Description of Stockbridge**

**Setting**

*Landform:* Drumlinoid ridges, hills, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Calcareous loamy till

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 8.4 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 4e
*Hydrologic Soil Group:* C

**Typical profile**

*0 to 6 inches:* Silt loam
*6 to 23 inches:* Silt loam
*23 to 80 inches:* Silt loam

**Description of Farmington**

**Setting**

*Landform:* Benches, ridges, till plains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Loamy till or congeliturbate derived from limestone, dolomite, shale, and sandstone, and in many places mixed with wind and water deposits

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Drainage class:* Somewhat excessively drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
*Depth to water table:* More than 80 inches

*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Available water capacity:* Very low (about 2.1 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 6s
*Hydrologic Soil Group:* D

**Typical profile**

*0 to 7 inches:* Loam
*7 to 15 inches:* Very fine sandy loam
*15 to 19 inches:* Unweathered bedrock

### Minor Components

**Galway**

*Percent of map unit:* 10 percent

**Sun**

*Percent of map unit:* 9 percent
*Landform:* Depressions

**Rock outcrop**

*Percent of map unit:* 1 percent

## Su—Sun silt loam

### Map Unit Setting

*Elevation:* 600 to 1,800 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Sun and similar soils:* 80 percent
*Minor components:* 20 percent

### Description of Sun

**Setting**

*Landform:* Depressions
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Loamy till derived primarily from limestone and sandstone, with a component of schist, shale, or granitic rocks in some areas

**Properties and qualities**

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 0 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Moderate (about 6.2 inches)

**Interpretive groups**

*Farmland classification:* Farmland of statewide importance
*Land capability (nonirrigated):* 4w
*Hydrologic Soil Group:* C/D

**Typical profile**

*0 to 4 inches:* Silt loam
*4 to 22 inches:* Loam
*22 to 80 inches:* Gravelly loam

**Minor Components**

**Canandaigua**

*Percent of map unit:* 5 percent
*Landform:* Depressions

**Massena**

*Percent of map unit:* 5 percent

**Palms**

*Percent of map unit:* 5 percent
*Landform:* Marshes, swamps

**Sun, stony**

*Percent of map unit:* 5 percent
*Landform:* Depressions

## Ud—Udorthents, smoothed

**Map Unit Setting**

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Udorthents, smoothed, and similar soils:* 75 percent
*Minor components:* 25 percent

**Description of Udorthents, Smoothed**

**Properties and qualities**

*Slope:* 0 to 8 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.06 to 5.95 in/hr)
*Depth to water table:* About 36 to 72 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Low (about 5.5 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 6s
*Hydrologic Soil Group:* A

**Typical profile**

*0 to 4 inches:* Gravelly loam
*4 to 70 inches:* Very gravelly loam

**Minor Components**

**Urban land**

*Percent of map unit:* 10 percent

**Udorthents, wet substratum**

*Percent of map unit:* 10 percent

**Unnamed soils, undisturbed**

*Percent of map unit:* 4 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

## Ue—Udorthents, wet substratum

**Map Unit Setting**

*Elevation:* 50 to 2,400 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

**Map Unit Composition**

*Udorthents, wet substratum, and similar soils:* 80 percent
*Minor components:* 20 percent

### Description of Udorthents, Wet Substratum

**Properties and qualities**

*Slope:* 0 to 5 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.06 to 5.95 in/hr)
*Depth to water table:* About 12 to 36 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 15 percent
*Available water capacity:* Low (about 5.5 inches)

**Interpretive groups**

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 5w
*Hydrologic Soil Group:* B

**Typical profile**

*0 to 4 inches:* Gravelly loam
*4 to 72 inches:* Very gravelly loam

### Minor Components

**Udorthents, smoothed**

*Percent of map unit:* 10 percent

**Urban land**

*Percent of map unit:* 5 percent

**Unnamed soils, undisturbed**

*Percent of map unit:* 4 percent

**Rock outcrop**

*Percent of map unit:* 1 percent

## W—Water

### Map Unit Setting

*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Water:* 100 percent

## Wy—Wayland silt loam

### Map Unit Setting

*Elevation:* 200 to 1,500 feet
*Mean annual precipitation:* 41 to 47 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 115 to 195 days

### Map Unit Composition

*Wayland and similar soils:* 80 percent
*Minor components:* 20 percent

### Description of Wayland

#### Setting

*Landform:* Flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Silty and clayey alluvium washed from uplands that contain some calcareous drift

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 0 inches
*Frequency of flooding:* FrequentNone
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 1 percent
*Available water capacity:* High (about 11.0 inches)

#### Interpretive groups

*Farmland classification:* Not prime farmland
*Land capability (nonirrigated):* 5w
*Hydrologic Soil Group:* C/D

#### Typical profile

*0 to 9 inches:* Silt loam
*9 to 80 inches:* Silt loam

### Minor Components

#### Pawling

*Percent of map unit:* 5 percent
*Landform:* Depressions

#### Linlithgo

*Percent of map unit:* 5 percent

**Fluvaquents**

*Percent of map unit:* 3 percent
*Landform:* Flood plains

**Palms**

*Percent of map unit:* 3 percent
*Landform:* Marshes, swamps

**Carlisle**

*Percent of map unit:* 2 percent
*Landform:* Swamps, marshes

**Udifluvents**

*Percent of map unit:* 2 percent

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

### Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

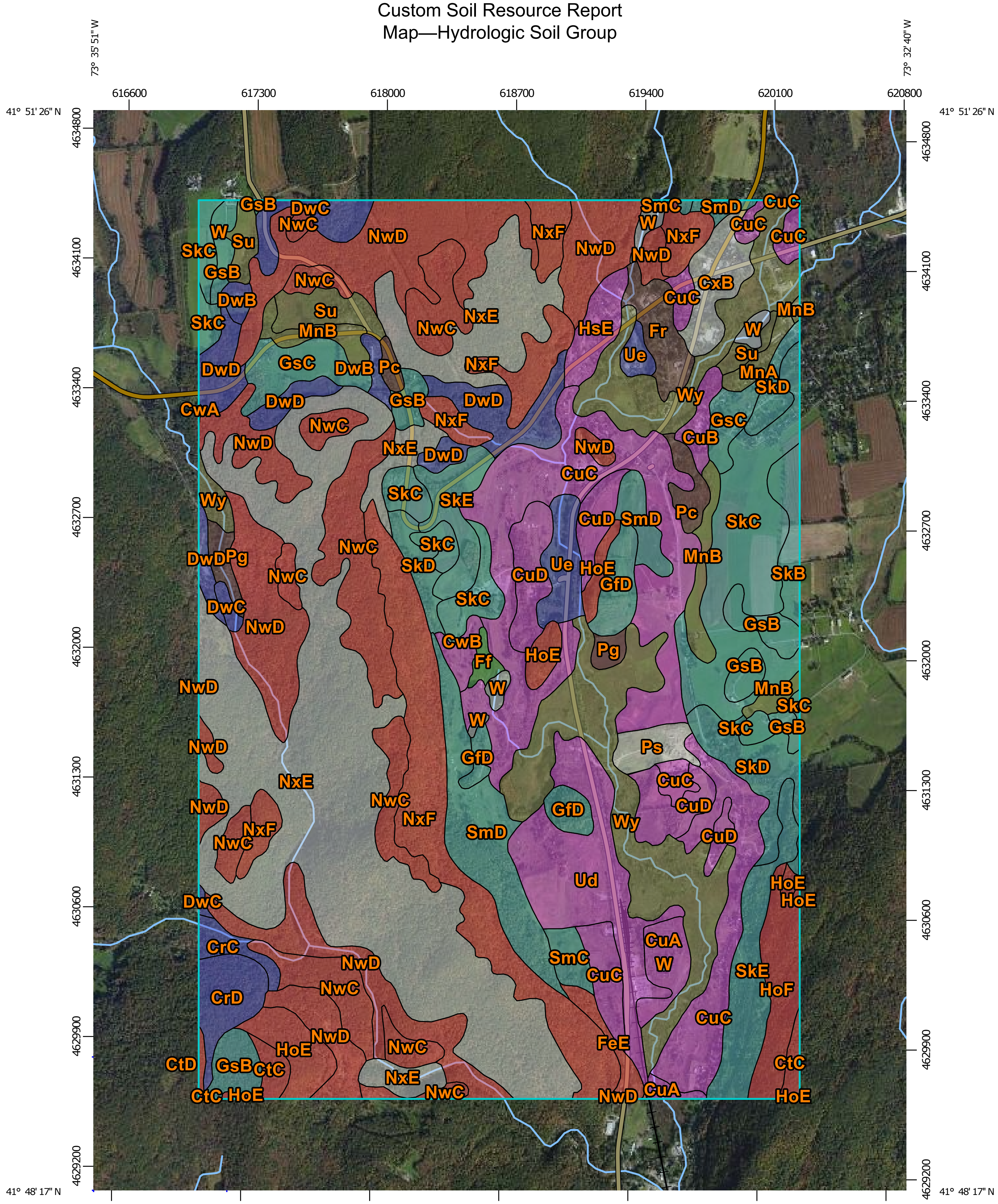
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group




Map Scale: 1:28,400 if printed on A portrait (8.5" x 11") sheet.

Meters
0 400 800 1600 2400

N

Feet
0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Lines**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Points**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Dutchess County, New York
Survey Area Data: Version 9, Sep 21, 2012

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

Date(s) aerial images were photographed: Mar 28, 2011—Oct 9, 2011

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

## Table—Hydrologic Soil Group

| Hydrologic Soil Group— Summary by Map Unit — Dutchess County, New York (NY027) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| CrC | Charlton-Chatfield complex, rolling, rocky | B | 14.4 | 0.4% |
| CrD | Charlton-Chatfield complex, hilly, rocky | B | 37.0 | 0.9% |
| CtC | Chatfield-Hollis complex, rolling, very rocky | D | 18.4 | 0.5% |
| CtD | Chatfield-Hollis complex, hilly, very rocky | D | 2.8 | 0.1% |
| CuA | Copake gravelly silt loam, nearly level | A | 30.1 | 0.8% |
| CuB | Copake gravelly silt loam, undulating | A | 14.8 | 0.4% |
| CuC | Copake gravelly silt loam, rolling | A | 363.4 | 9.3% |
| CuD | Copake gravelly silt loam, hilly | A | 87.5 | 2.2% |
| CwA | Copake channery silt loam, fan, 0 to 3 percent slopes | A | 0.4 | 0.0% |
| CwB | Copake channery silt loam, fan, 3 to 8 percent slopes | A | 11.9 | 0.3% |
| CxB | Copake-Urban land complex, undulating | | 39.3 | 1.0% |
| DwB | Dutchess-Cardigan complex, undulating, rocky | B | 14.6 | 0.4% |
| DwC | Dutchess-Cardigan complex, rolling, rocky | B | 32.2 | 0.8% |
| DwD | Dutchess-Cardigan complex, hilly, rocky | B | 94.6 | 2.4% |
| FeE | Farmington-Rock outcrop complex, steep | D | 13.4 | 0.3% |
| Ff | Fluvaquents-Udifluvents complex, frequently flooded | A/D | 7.2 | 0.2% |
| Fr | Fredon silt loam | B/D | 33.2 | 0.8% |
| GfD | Galway-Farmington complex, hilly | C | 45.8 | 1.2% |
| GsB | Georgia silt loam, 3 to 8 percent slopes | C | 78.0 | 2.0% |
| GsC | Georgia silt loam, 8 to 15 percent slopes | C | 57.2 | 1.5% |
| HoE | Hollis-Chatfield-Rock outcrop complex, steep | D | 57.4 | 1.5% |

| Hydrologic Soil Group— Summary by Map Unit — Dutchess County, New York (NY027) | | | | |
|---|---|---|---|---|
| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
| HoF | Hollis-Chatfield-Rock outcrop complex, very steep | D | 49.7 | 1.3% |
| HsE | Hoosic gravelly loam, 25 to 45 percent slopes | A | 27.4 | 0.7% |
| MnA | Massena silt loam, 0 to 3 percent slopes | C/D | 12.2 | 0.3% |
| MnB | Massena silt loam, 3 to 8 percent slopes | C/D | 46.1 | 1.2% |
| NwC | Nassau-Cardigan complex, rolling, very rocky | D | 237.2 | 6.1% |
| NwD | Nassau-Cardigan complex, hilly, very rocky | D | 410.3 | 10.5% |
| NxE | Nassau-Rock outcrop complex, steep | | 697.8 | 17.8% |
| NxF | Nassau-Rock outcrop complex, very steep | D | 258.3 | 6.6% |
| Pc | Palms muck | B/D | 21.4 | 0.5% |
| Pg | Pawling silt loam | B/D | 19.1 | 0.5% |
| Ps | Pits, gravel | | 21.2 | 0.5% |
| SkB | Stockbridge silt loam, 3 to 8 percent slopes | C | 35.7 | 0.9% |
| SkC | Stockbridge silt loam, 8 to 15 percent slopes | C | 202.5 | 5.2% |
| SkD | Stockbridge silt loam, 15 to 25 percent slopes | C | 82.4 | 2.1% |
| SkE | Stockbridge silt loam, 25 to 45 percent slopes | C | 103.8 | 2.6% |
| SmC | Stockbridge-Farmington complex, rolling, rocky | C | 16.0 | 0.4% |
| SmD | Stockbridge-Farmington complex, hilly, rocky | C | 113.5 | 2.9% |
| Su | Sun silt loam | C/D | 46.2 | 1.2% |
| Ud | Udorthents, smoothed | A | 126.9 | 3.2% |
| Ue | Udorthents, wet substratum | B | 39.5 | 1.0% |
| W | Water | | 19.9 | 0.5% |
| Wy | Wayland silt loam | C/D | 277.4 | 7.1% |
| **Totals for Area of Interest** | | | **3,918.4** | **100.0%** |

## Rating Options—Hydrologic Soil Group

*Aggregation Method:* Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

*Component Percent Cutoff:  None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

*Tie-break Rule:*  Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

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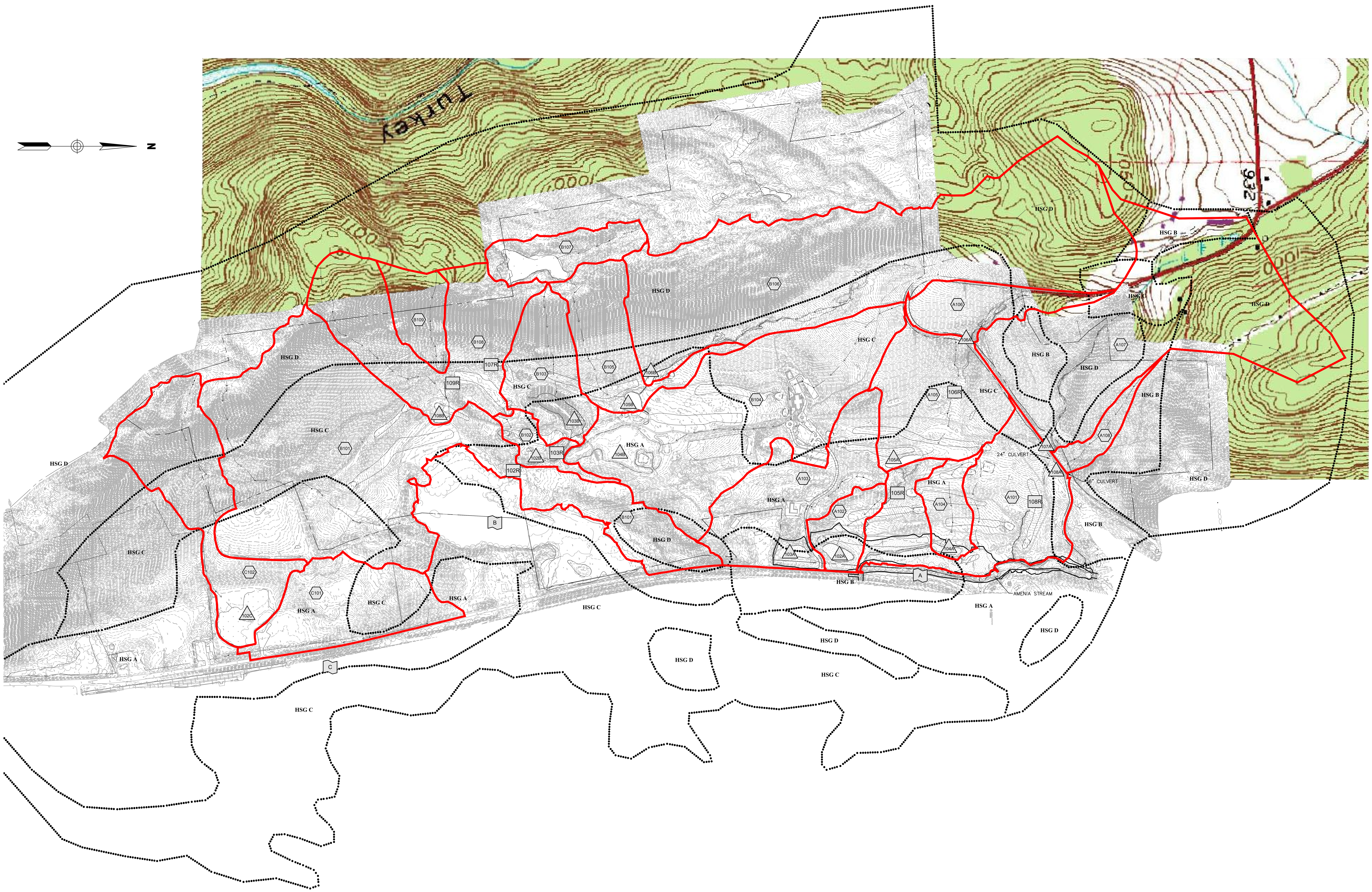
# Attachment E
# Drainage Drawings and Calculations
# (HydroCAD outputs see attached CD)

# Attachment E1
# Drainage Area Maps





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*Engineering, Surveying & Landscape Architecture, P.C.*

Planning
Transportation
Land Development
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50 Main Street - Suite 360
White Plains, NY 10606
914.761.3582 • FAX 914.761.3582


| Symbol | Description |
|---|---|
| # | Drainage Area |
| | Drainage Area Boundary |
| # | Detention Basin/Pond |
| # | Reach |
| # | Discharge Point |
| | Tc Path |
| HSG | Soil Boundary |

400 0 400 800

SCALE IN FEET

| No. | Revision | Date | Appvd. |
|---|---|---|---|
| 1 | PER TOWN COMMENTS | 1/8/15 | ACD |

Designed by | Drawn by | Checked by

CAD checked by | Approved by

Scale 1"=400' | Date February 18, 2014

Project Title

# Silo Ridge Resort Community

4651 Route 22
Amenia, New York

Issued for

Permitting

Not Approved for Construction

Drawing Title

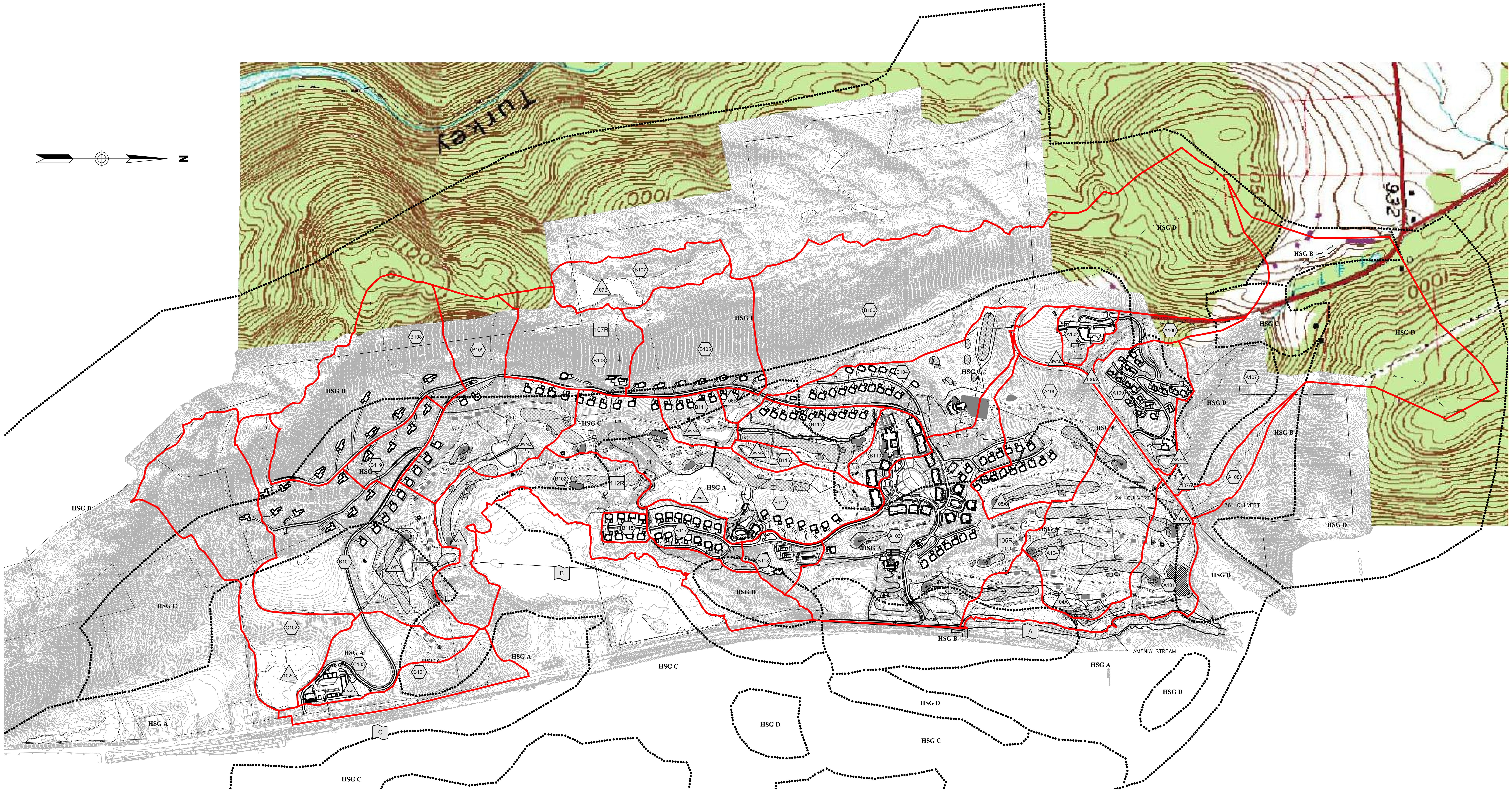
# Existing Conditions Drainage Area Map

Drawing Number

Fig. 1

Sheet 1 of 1

Project Number
29011.00





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White Plains, NY 10606
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| Symbol | Description |
|---|---|
| # | Drainage Area |
| | Drainage Area Boundary |
| # | Detention Basin/Pond |
| # | Reach |
| # | Discharge Point |
| | Tc Path |
| HSG | Soil Boundary |

400 0 400 800
SCALE IN FEET

| No. | Revision | Date | Appvd |
|---|---|---|---|
| 2 | PER TOWN COMMENTS | 1/8/15 | ACD |
| 1 | PER TOWN COMMENTS | 6/19/14 | ACD |

Designed by | Drawn by | Checked by

CAD checked by | Approved by

Scale AS NOTED | Date February 18, 2014

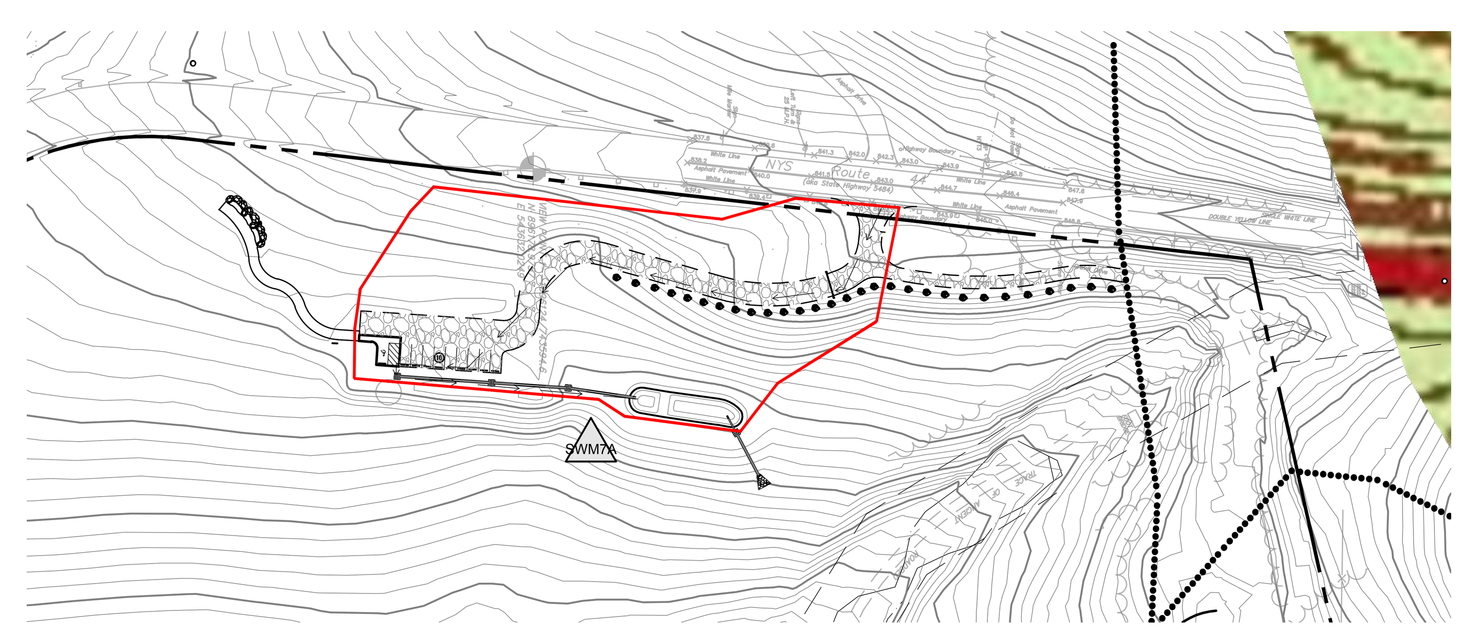
Project Title
Silo Ridge Resort Community

4651 Route 22
Amenia, New York

Issued for
Permitting

Not Approved for Construction

Drawing Title
Proposed Conditions Drainage Area Map




**Phase 1 Overlook**

N

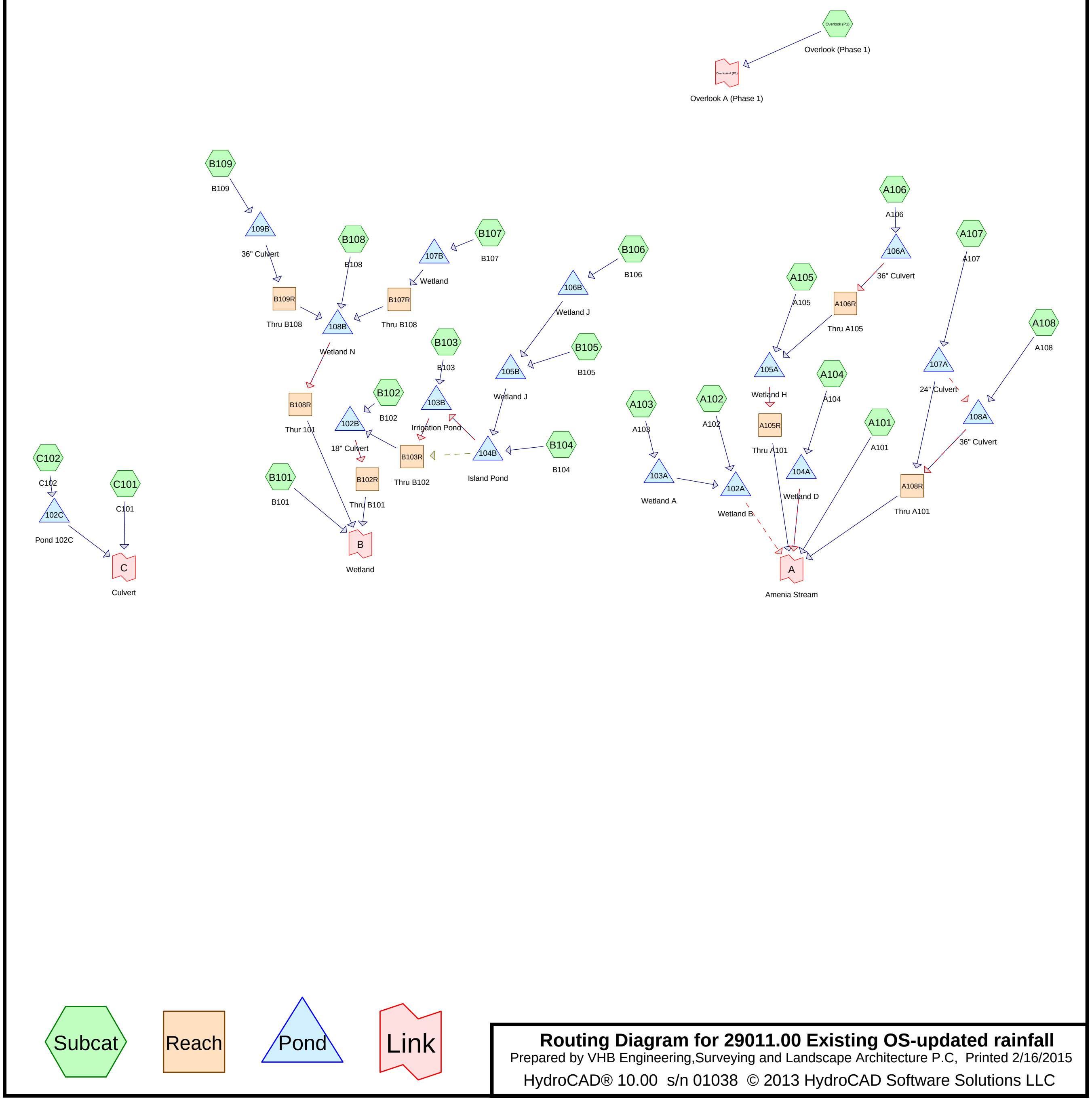
100 0 100 200
SCALE IN FEET

Drawing Number
Fig. 2

Sheet 1 of 1

Project Number
29011.00

# Attachment E2
# HydroCAD output (see attached CD)




**Routing Diagram for 29011.00 Existing OS-updated rainfall**
Prepared by VHB Engineering,Surveying and Landscape Architecture P.C, Printed 2/16/2015
HydroCAD® 10.00 s/n 01038 © 2013 HydroCAD Software Solutions LLC

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 170.428 | 39 | >75% Grass cover, Good, HSG A (A101, A102, A103, A104, A105, B101, B102, B103, B104, B105, B106, C101, C102) |
| 26.805 | 61 | >75% Grass cover, Good, HSG B (A101, A102, A103, A104, A106, A107, A108, B106) |
| 137.826 | 74 | >75% Grass cover, Good, HSG C (A101, A103, A105, A106, A107, B101, B102, B103, B104, B105, B106, B108, B109, C101, C102, Overlook (P1)) |
| 11.938 | 80 | >75% Grass cover, Good, HSG D (A103, A106, A107, B101, B103, B105, B106, B107, B108, C102) |
| 1.220 | 98 | Building roof (A103, A106, A107, A108, B101, B104, B106) |
| 6.869 | 96 | Gravel surface (A101, A103, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B107, B108, C101, C102) |
| 18.932 | 98 | Paved surface (A101, A102, A103, A104, A105, A106, A107, B101, B102, B103, B104, B105, B106, B108, B109, C101) |
| 1.027 | 98 | Rock Outcrop/Ledge (C101, C102) |
| 0.441 | 30 | Sand Trap, HSG C (A103, B101, B102, B103, B104, B108) |
| 0.757 | 30 | Sand trap, HSG A (A101, A102, A103, A104, A105, B104, B105, B106) |
| 0.031 | 30 | Sand trap, HSG B (A101, A102) |
| 10.757 | 98 | Water Surface (A101, A102, A103, A104, A107, A108, B101, B103, B104, B105, B106, C102) |
| 27.787 | 30 | Woods, Good, HSG A (A101, A102, A103, A104, A105, A106, B101, B102, B104, B106, C101, C102) |
| 15.395 | 55 | Woods, Good, HSG B (A101, A103, A104, A107, A108) |
| 81.217 | 70 | Woods, Good, HSG C (A101, A103, A105, A106, A107, B101, B103, B104, B105, B106, B108, B109, C101, C102, Overlook (P1)) |
| 272.523 | 77 | Woods, Good, HSG D (A103, A106, A107, B101, B103, B104, B105, B106, B107, B108, B109, C102) |
| **783.953** | **66** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 198.972 | HSG A | A101, A102, A103, A104, A105, A106, B101, B102, B103, B104, B105, B106, C101, C102 |
| 42.231 | HSG B | A101, A102, A103, A104, A106, A107, A108, B106 |
| 219.484 | HSG C | A101, A103, A105, A106, A107, B101, B102, B103, B104, B105, B106, B108, B109, C101, C102, Overlook (P1) |
| 284.461 | HSG D | A103, A106, A107, B101, B103, B104, B105, B106, B107, B108, B109, C102 |
| 38.805 | Other | A101, A102, A103, A104, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B107, B108, B109, C101, C102 |
| **783.953** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 170.428 | 26.805 | 137.826 | 11.938 | 0.000 | 346.997 | >75% Grass cover, Good | A101, A102, A103, A104, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B107, B108, B109, C101, C102, Overlook (P1) |
| 0.000 | 0.000 | 0.000 | 0.000 | 1.220 | 1.220 | Building roof | A103, A106, A107, A108, B101, B104, B106 |
| 0.000 | 0.000 | 0.000 | 0.000 | 6.869 | 6.869 | Gravel surface | A101, A103, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B107, B108, C101, C102 |

## Ground Covers (all nodes) (continued)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 0.000 | 18.932 | 18.932 | Paved surface | A101, A102, A103, A104, A105, A106, A107, B101, B102, B103, B104, B105, B106, B108, B109, C101 |
| 0.000 | 0.000 | 0.000 | 0.000 | 1.027 | 1.027 | Rock Outcrop/Ledge | C101, C102 |
| 0.000 | 0.000 | 0.441 | 0.000 | 0.000 | 0.441 | Sand Trap | A103, B101, B102, B103, B104, B108 |
| 0.757 | 0.031 | 0.000 | 0.000 | 0.000 | 0.788 | Sand trap | A101, A102, A103, A104, A105, B104, B105, B106 |
| 0.000 | 0.000 | 0.000 | 0.000 | 10.757 | 10.757 | Water Surface | A101, A102, A103, A104, A107, A108, B101, B103, B104, B105, B106, C102 |

## Ground Covers (all nodes) (continued)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 27.787 | 15.395 | 81.217 | 272.523 | 0.000 | 396.922 | Woods, Good | A101, A102, A103, A104, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B107, B108, B109, C101, C102, Overlook (P1) |
| **198.972** | **42.231** | **219.484** | **284.461** | **38.805** | **783.953** | **TOTAL AREA** | |

## Pipe Listing (all nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Diam/Width (inches) | Height (inches) | Inside-Fill (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 102A | 501.90 | 500.90 | 80.0 | 0.0125 | 0.013 | 24.0 | 0.0 | 0.0 |
| 2 | 102B | 492.20 | 491.10 | 20.0 | 0.0550 | 0.025 | 18.0 | 0.0 | 0.0 |
| 3 | 103A | 500.90 | 501.90 | 80.0 | -0.0125 | 0.013 | 24.0 | 0.0 | 0.0 |
| 4 | 104A | 507.70 | 507.30 | 20.0 | 0.0200 | 0.025 | 12.0 | 0.0 | 0.0 |
| 5 | 104B | 508.22 | 505.43 | 111.0 | 0.0251 | 0.025 | 24.0 | 0.0 | 0.0 |
| 6 | 105A | 572.90 | 572.00 | 20.0 | 0.0450 | 0.025 | 18.0 | 0.0 | 0.0 |
| 7 | 106A | 716.70 | 686.00 | 133.0 | 0.2308 | 0.025 | 36.0 | 0.0 | 0.0 |
| 8 | 107A | 619.80 | 607.40 | 145.0 | 0.0855 | 0.010 | 24.0 | 0.0 | 0.0 |
| 9 | 108A | 608.80 | 606.90 | 45.0 | 0.0422 | 0.025 | 36.0 | 0.0 | 0.0 |
| 10 | 108B | 500.10 | 499.60 | 20.0 | 0.0250 | 0.025 | 18.0 | 0.0 | 0.0 |
| 11 | 109B | 545.20 | 532.20 | 96.0 | 0.1354 | 0.025 | 36.0 | 0.0 | 0.0 |

Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=43.269 ac 4.21% Impervious Runoff Depth=0.00"
Flow Length=1,315' Tc=31.0 min CN=46 Runoff=0.00 cfs 0.000 af

**Subcatchment A102: A102** Runoff Area=9.187 ac 13.40% Impervious Runoff Depth=0.00"
Flow Length=675' Tc=29.1 min CN=50 Runoff=0.00 cfs 0.000 af

**Subcatchment A103: A103** Runoff Area=36.735 ac 8.79% Impervious Runoff Depth=0.00"
Flow Length=1,190' Tc=45.1 min CN=52 Runoff=0.00 cfs 0.000 af

**Subcatchment A104: A104** Runoff Area=9.432 ac 9.40% Impervious Runoff Depth=0.00"
Flow Length=1,015' Tc=29.2 min CN=45 Runoff=0.00 cfs 0.000 af

**Subcatchment A105: A105** Runoff Area=34.264 ac 3.27% Impervious Runoff Depth=0.09"
Flow Length=1,326' Tc=19.2 min CN=60 Runoff=0.39 cfs 0.245 af

**Subcatchment A106: A106** Runoff Area=15.338 ac 8.12% Impervious Runoff Depth=0.69"
Flow Length=1,260' Tc=26.7 min CN=76 Runoff=6.09 cfs 0.876 af

**Subcatchment A107: A107** Runoff Area=95.411 ac 2.35% Impervious Runoff Depth=0.53"
Flow Length=3,685' Tc=61.0 min CN=73 Runoff=16.59 cfs 4.216 af

**Subcatchment A108: A108** Runoff Area=5.526 ac 2.32% Impervious Runoff Depth=0.04"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=0.02 cfs 0.016 af

**Subcatchment B101: B101** Runoff Area=127.641 ac 0.75% Impervious Runoff Depth=0.16"
Flow Length=2,934' Tc=43.8 min CN=63 Runoff=2.88 cfs 1.659 af

**Subcatchment B102: B102** Runoff Area=6.499 ac 2.62% Impervious Runoff Depth=0.00"
Flow Length=637' Tc=19.6 min CN=53 Runoff=0.00 cfs 0.001 af

**Subcatchment B103: B103** Runoff Area=21.581 ac 11.93% Impervious Runoff Depth=0.48"
Flow Length=1,130' Tc=38.7 min CN=72 Runoff=4.17 cfs 0.869 af

**Subcatchment B104: B104** Runoff Area=80.536 ac 13.45% Impervious Runoff Depth=0.16"
Flow Length=3,223' Tc=33.2 min CN=63 Runoff=1.83 cfs 1.046 af

**Subcatchment B105: B105** Runoff Area=23.978 ac 2.94% Impervious Runoff Depth=0.35"
Flow Length=1,400' Tc=38.0 min CN=69 Runoff=2.73 cfs 0.709 af

**Subcatchment B106: B106** Runoff Area=130.289 ac 0.83% Impervious Runoff Depth=0.69"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=26.83 cfs 7.437 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=0.74"
Flow Length=907' Tc=37.9 min CN=77 Runoff=5.44 cfs 0.885 af

**Subcatchment B108: B108** Runoff Area=46.768 ac 1.07% Impervious Runoff Depth=0.69"
Flow Length=2,241' Tc=39.8 min CN=76 Runoff=15.41 cfs 2.670 af

**Subcatchment B109: B109** Runoff Area=11.276 ac 0.04% Impervious Runoff Depth=0.74"
Flow Length=1,048' Tc=28.5 min CN=77 Runoff=4.89 cfs 0.696 af

**Subcatchment C101: C101** Runoff Area=30.507 ac 4.58% Impervious Runoff Depth=0.00"
Flow Length=1,500' Tc=31.9 min CN=53 Runoff=0.02 cfs 0.006 af

**Subcatchment C102: C102** Runoff Area=40.386 ac 4.49% Impervious Runoff Depth=0.18"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=1.18 cfs 0.618 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=0.53"
Flow Length=176' Tc=7.5 min CN=73 Runoff=0.39 cfs 0.044 af

**Reach A105R: Thru A101** Avg. Flow Depth=0.29' Max Vel=2.38 fps Inflow=1.61 cfs 1.105 af
n=0.050 L=1,075.0' S=0.0577 '/' Capacity=152.54 cfs Outflow=1.61 cfs 1.104 af

**Reach A106R: Thru A105** Avg. Flow Depth=0.44' Max Vel=4.08 fps Inflow=6.09 cfs 0.876 af
n=0.050 L=1,215.0' S=0.0922 '/' Capacity=153.12 cfs Outflow=5.90 cfs 0.876 af

**Reach A108R: Thru A101** Avg. Flow Depth=0.83' Max Vel=5.66 fps Inflow=16.59 cfs 4.232 af
n=0.050 L=1,090.0' S=0.0862 '/' Capacity=244.78 cfs Outflow=16.52 cfs 4.232 af

**Reach B102R: Thru B101** Avg. Flow Depth=0.41' Max Vel=1.60 fps Inflow=4.88 cfs 8.210 af
n=0.050 L=122.0' S=0.0164 '/' Capacity=356.26 cfs Outflow=4.88 cfs 8.209 af

**Reach B103R: Thru B102** Avg. Flow Depth=0.53' Max Vel=1.92 fps Inflow=4.88 cfs 8.216 af
n=0.050 L=585.0' S=0.0171 '/' Capacity=374.39 cfs Outflow=4.88 cfs 8.209 af

**Reach B107R: Thru B108** Avg. Flow Depth=0.11' Max Vel=2.43 fps Inflow=1.11 cfs 0.609 af
n=0.050 L=2,040.0' S=0.2294 '/' Capacity=144.21 cfs Outflow=1.11 cfs 0.609 af

**Reach B108R: Thur 101** Avg. Flow Depth=0.54' Max Vel=3.18 fps Inflow=19.74 cfs 3.950 af
n=0.050 L=233.0' S=0.0318 '/' Capacity=474.00 cfs Outflow=19.73 cfs 3.950 af

**Reach B109R: Thru B108** Avg. Flow Depth=0.40' Max Vel=3.75 fps Inflow=4.89 cfs 0.696 af
n=0.050 L=355.0' S=0.0851 '/' Capacity=147.09 cfs Outflow=4.88 cfs 0.696 af

**Pond 102A: Wetland B** Peak Elev=498.10' Storage=0 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 102B: 18" Culvert** Peak Elev=493.48' Storage=281 cf Inflow=4.88 cfs 8.210 af
Primary=4.88 cfs 8.210 af Secondary=0.00 cfs 0.000 af Outflow=4.88 cfs 8.210 af

**Pond 102C: Pond 102C** Peak Elev=507.20' Storage=26,930 cf Inflow=1.18 cfs 0.618 af
Outflow=0.00 cfs 0.000 af

**Pond 103A: Wetland A** Peak Elev=497.40' Storage=14 cf Inflow=0.00 cfs 0.000 af
24.0" Round Culvert n=0.013 L=80.0' S=-0.0125 '/' Outflow=0.00 cfs 0.000 af

**Pond 103B: Irrigation Pond** Peak Elev=506.07' Storage=23,735 cf Inflow=4.88 cfs 8.409 af
Primary=2.26 cfs 5.508 af Secondary=2.62 cfs 2.708 af Outflow=4.88 cfs 8.216 af

**Pond 104A: Wetland D** Peak Elev=507.70' Storage=0 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 104B: Island Pond** Peak Elev=509.26' Storage=248,028 cf Inflow=29.67 cfs 9.192 af
Primary=4.50 cfs 7.540 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=4.50 cfs 7.540 af

**Pond 105A: Wetland H** Peak Elev=573.47' Storage=13,428 cf Inflow=5.90 cfs 1.120 af
Primary=1.61 cfs 1.105 af Secondary=0.00 cfs 0.000 af Outflow=1.61 cfs 1.105 af

**Pond 105B: Wetland J** Peak Elev=515.93' Storage=35,560 cf Inflow=28.51 cfs 8.146 af
Outflow=27.86 cfs 8.145 af

**Pond 106A: 36" Culvert** Peak Elev=717.63' Storage=3 cf Inflow=6.09 cfs 0.876 af
Primary=6.09 cfs 0.876 af Secondary=0.00 cfs 0.000 af Outflow=6.09 cfs 0.876 af

**Pond 106B: Wetland J** Peak Elev=526.39' Storage=15,482 cf Inflow=26.83 cfs 7.437 af
Outflow=26.80 cfs 7.437 af

**Pond 107A: 24" Culvert** Peak Elev=621.56' Storage=90 cf Inflow=16.59 cfs 4.216 af
Primary=16.59 cfs 4.216 af Secondary=0.00 cfs 0.000 af Outflow=16.59 cfs 4.216 af

**Pond 107B: Wetland** Peak Elev=972.65' Storage=17,749 cf Inflow=5.44 cfs 0.885 af
Outflow=1.11 cfs 0.609 af

**Pond 108A: 36" Culvert** Peak Elev=608.88' Storage=1 cf Inflow=0.02 cfs 0.016 af
Primary=0.02 cfs 0.016 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.016 af

**Pond 108B: Wetland N** Peak Elev=501.14' Storage=11,324 cf Inflow=19.77 cfs 3.975 af
Primary=3.58 cfs 2.527 af Secondary=16.17 cfs 1.423 af Outflow=19.74 cfs 3.950 af

**Pond 109B: 36" Culvert** Peak Elev=546.13' Storage=7 cf Inflow=4.89 cfs 0.696 af
Outflow=4.89 cfs 0.696 af

**Link A: Amenia Stream** Inflow=17.71 cfs 5.337 af
Primary=17.71 cfs 5.337 af

**Link B: Wetland** Inflow=20.44 cfs 13.817 af
Primary=20.44 cfs 13.817 af

**Link C: Culvert** Inflow=0.02 cfs 0.006 af
Primary=0.02 cfs 0.006 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=0.39 cfs 0.044 af
Primary=0.39 cfs 0.044 af

**Total Runoff Area = 783.953 ac Runoff Volume = 21.993 af Average Runoff Depth = 0.34"**
**95.93% Pervious = 752.017 ac 4.07% Impervious = 31.936 ac**

## Summary for Subcatchment A101: A101

[45] Hint: Runoff=Zero

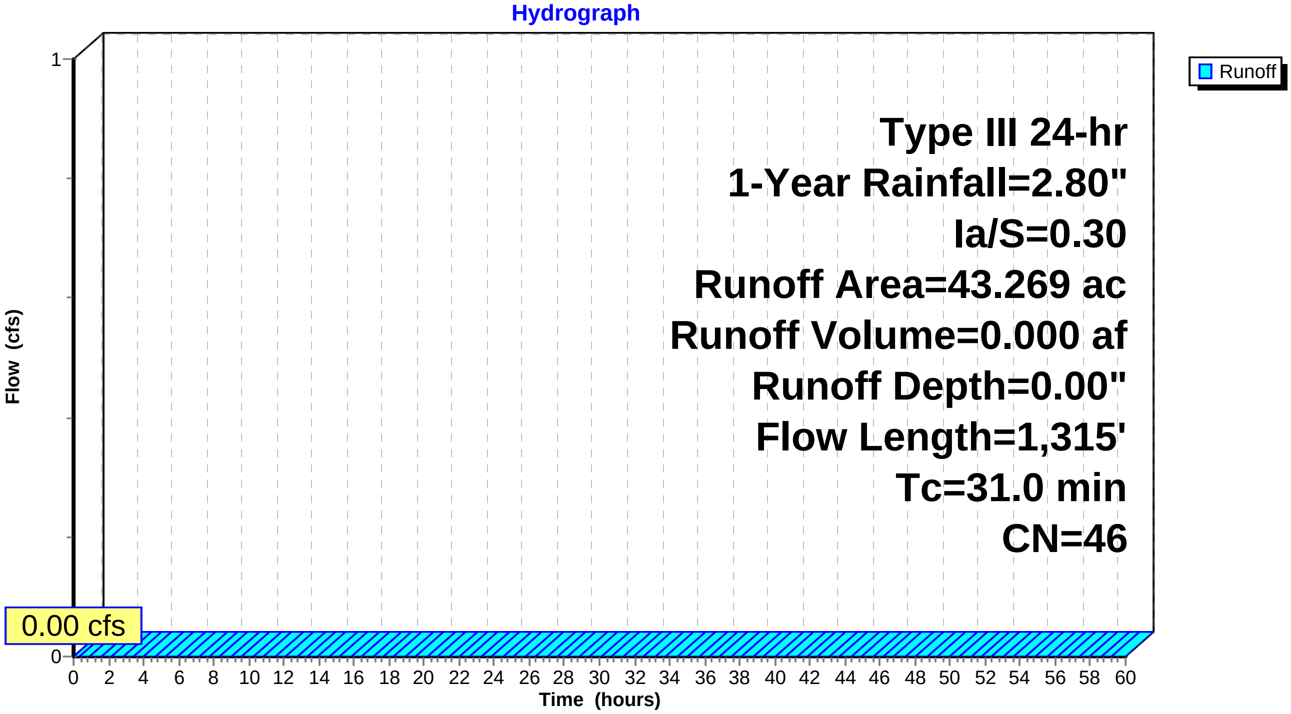
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.819 | 98 | Paved surface |
| * | 0.089 | 96 | Gravel surface |
| * | 0.001 | 98 | Water Surface |
| | 31.250 | 39 | >75% Grass cover, Good, HSG A |
| | 6.738 | 61 | >75% Grass cover, Good, HSG B |
| | 1.730 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 1.164 | 30 | Woods, Good, HSG A |
| | 0.152 | 55 | Woods, Good, HSG B |
| | 0.088 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.223 | 30 | Sand trap, HSG A |
| * | 0.015 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 43.269 | 46 | Weighted Average |
| | 41.449 | | 95.79% Pervious Area |
| | 1.820 | | 4.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.9 | 100 | 0.0400 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.0 | 430 | 0.1200 | 2.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.5 | 360 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.6 | 425 | 0.0140 | 0.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 31.0 | 1,315 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

[45] Hint: Runoff=Zero

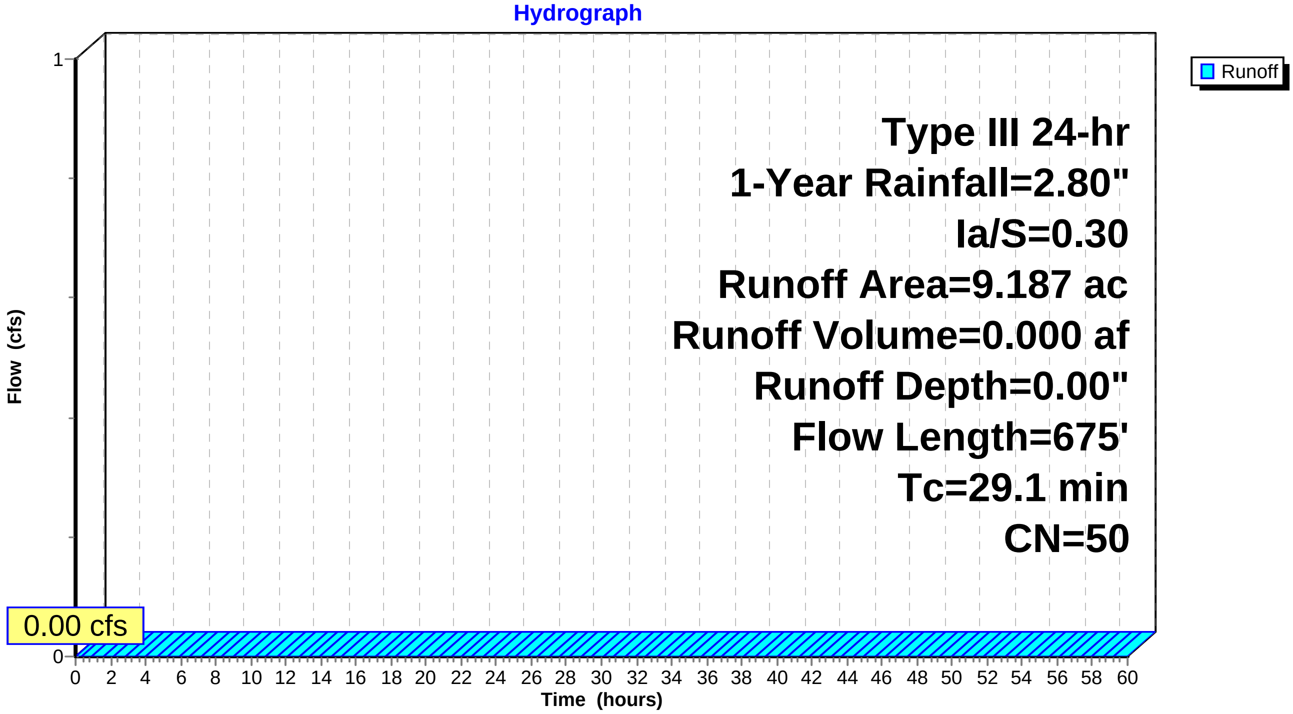
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.387 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.844 | 98 | Water Surface |
| | 3.520 | 39 | >75% Grass cover, Good, HSG A |
| | 2.156 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.260 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.004 | 30 | Sand trap, HSG A |
| * | 0.016 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.187 | 50 | Weighted Average |
| | 7.956 | | 86.60% Pervious Area |
| | 1.231 | | 13.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 23.0 | 100 | 0.0600 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.1 | 575 | 0.0500 | 1.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.1 | 675 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

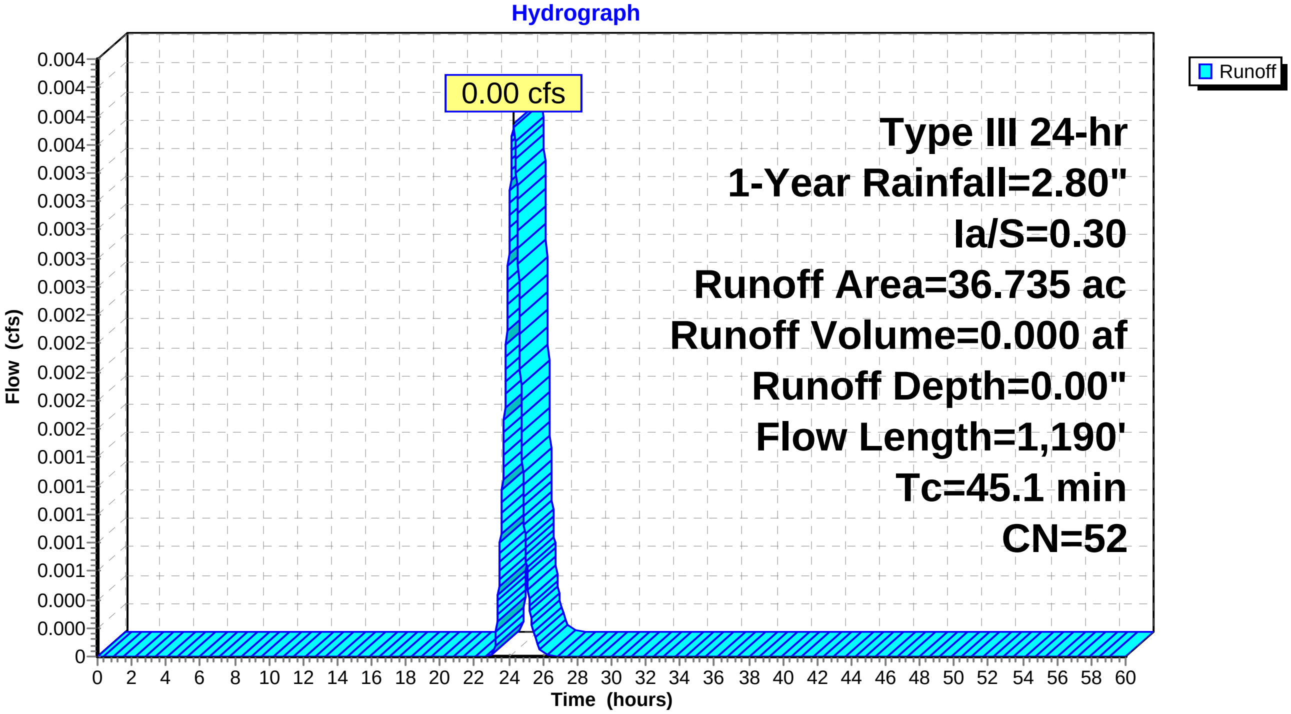
Runoff = 0.00 cfs @ 24.30 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.334 | 98 | Building roof |
| * | 2.378 | 98 | Paved surface |
| * | 0.402 | 96 | Gravel surface |
| * | 0.516 | 98 | Water Surface |
| | 14.616 | 39 | >75% Grass cover, Good, HSG A |
| | 3.182 | 61 | >75% Grass cover, Good, HSG B |
| | 4.088 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 6.882 | 30 | Woods, Good, HSG A |
| | 1.635 | 55 | Woods, Good, HSG B |
| | 1.432 | 70 | Woods, Good, HSG C |
| | 1.137 | 77 | Woods, Good, HSG D |
| * | 0.095 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.009 | 30 | Sand Trap, HSG C |
| | 36.735 | 52 | Weighted Average |
| | 33.507 | | 91.21% Pervious Area |
| | 3.228 | | 8.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 35.7 | 100 | 0.0200 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.9 | 227 | 0.0190 | 0.96 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 75 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 343 | 0.0400 | 4.54 | 18.14 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' n= 0.050 |
| 3.7 | 445 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 45.1 | 1,190 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

[45] Hint: Runoff=Zero

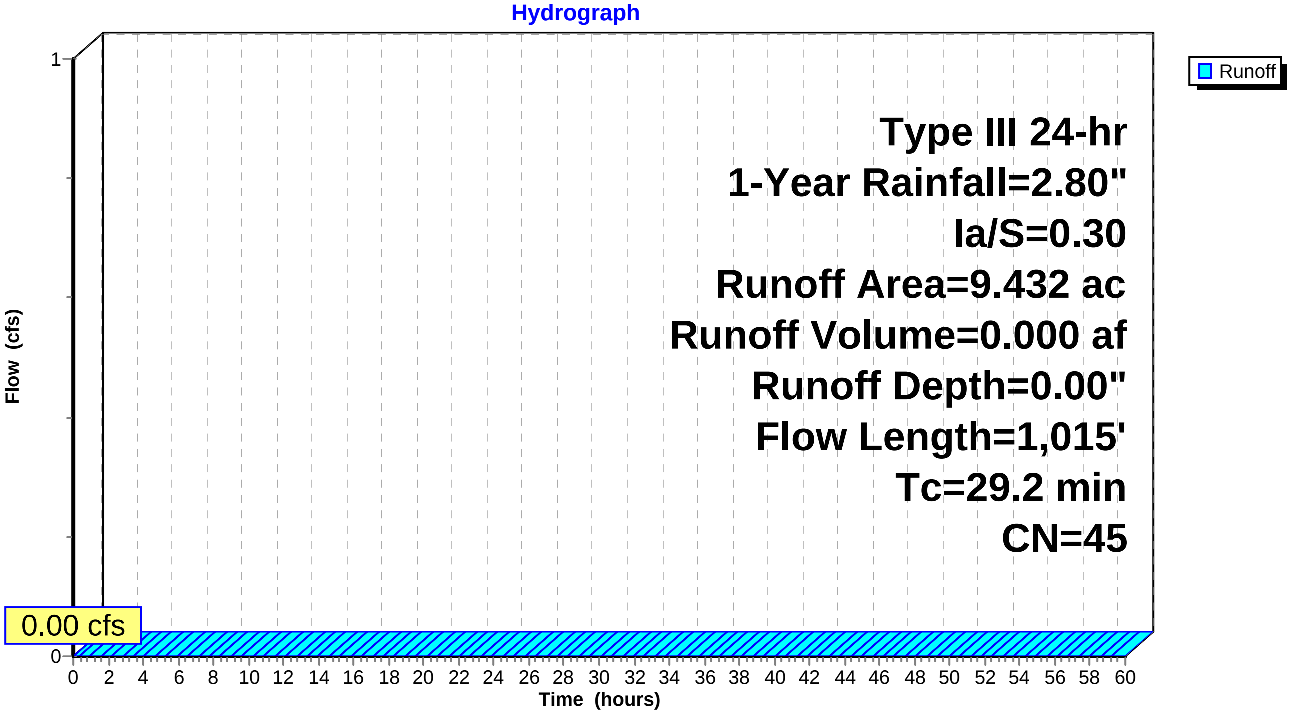
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.458 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.429 | 98 | Water Surface |
| | 8.361 | 39 | >75% Grass cover, Good, HSG A |
| | 0.043 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.071 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.053 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.432 | 45 | Weighted Average |
| | 8.545 | | 90.60% Pervious Area |
| | 0.887 | | 9.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.9 | 100 | 0.0200 | 0.08 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.4 | 375 | 0.0700 | 1.85 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.5 | 255 | 0.1600 | 2.80 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 3.4 | 285 | 0.0400 | 1.40 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 29.2 | 1,015 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

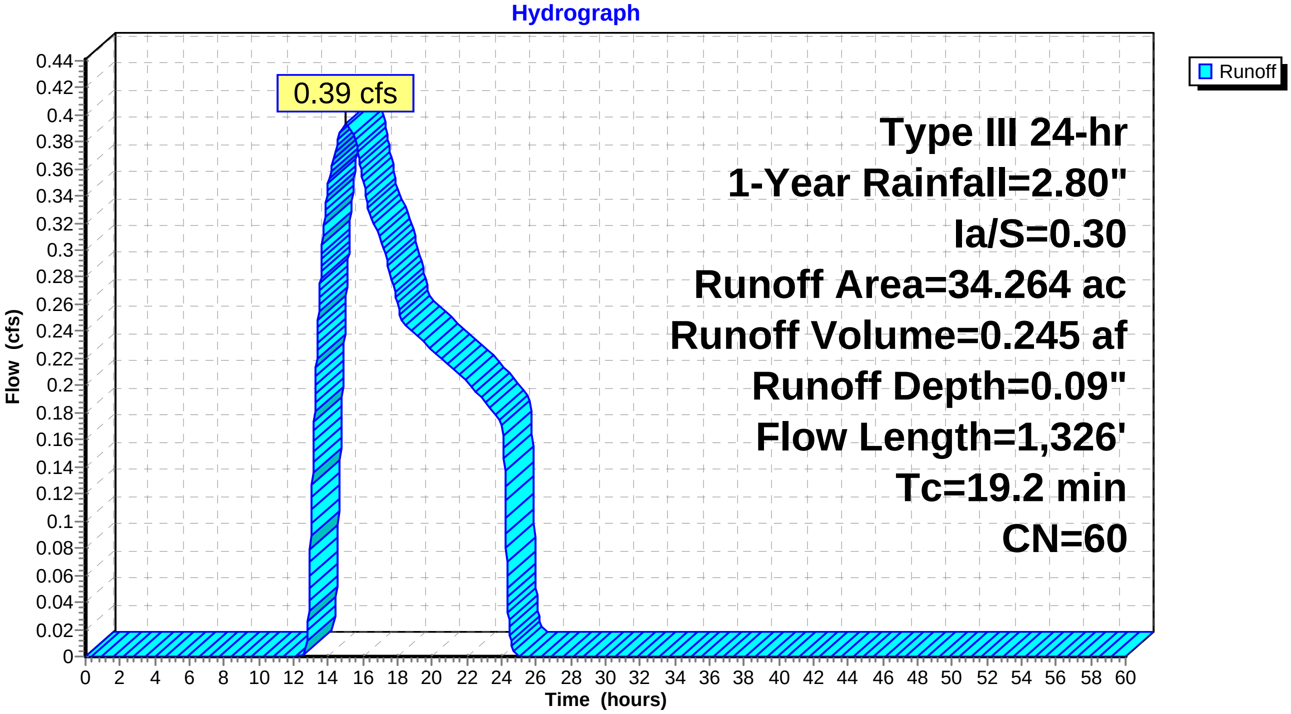
Runoff = 0.39 cfs @ 15.04 hrs, Volume= 0.245 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.119 | 98 | Paved surface |
| * | 0.088 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.167 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 15.618 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.226 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.911 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.135 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 34.264 | 60 | Weighted Average |
| | 33.145 | | 96.73% Pervious Area |
| | 1.119 | | 3.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 23 | 0.1700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.8 | 77 | 0.3000 | 0.13 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 150 | 0.3700 | 1.52 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.3 | 526 | 0.0950 | 6.52 | 32.61 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.8 | 550 | 0.0600 | 4.98 | 16.59 | **Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.035 High grass |
| 19.2 | 1,326 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

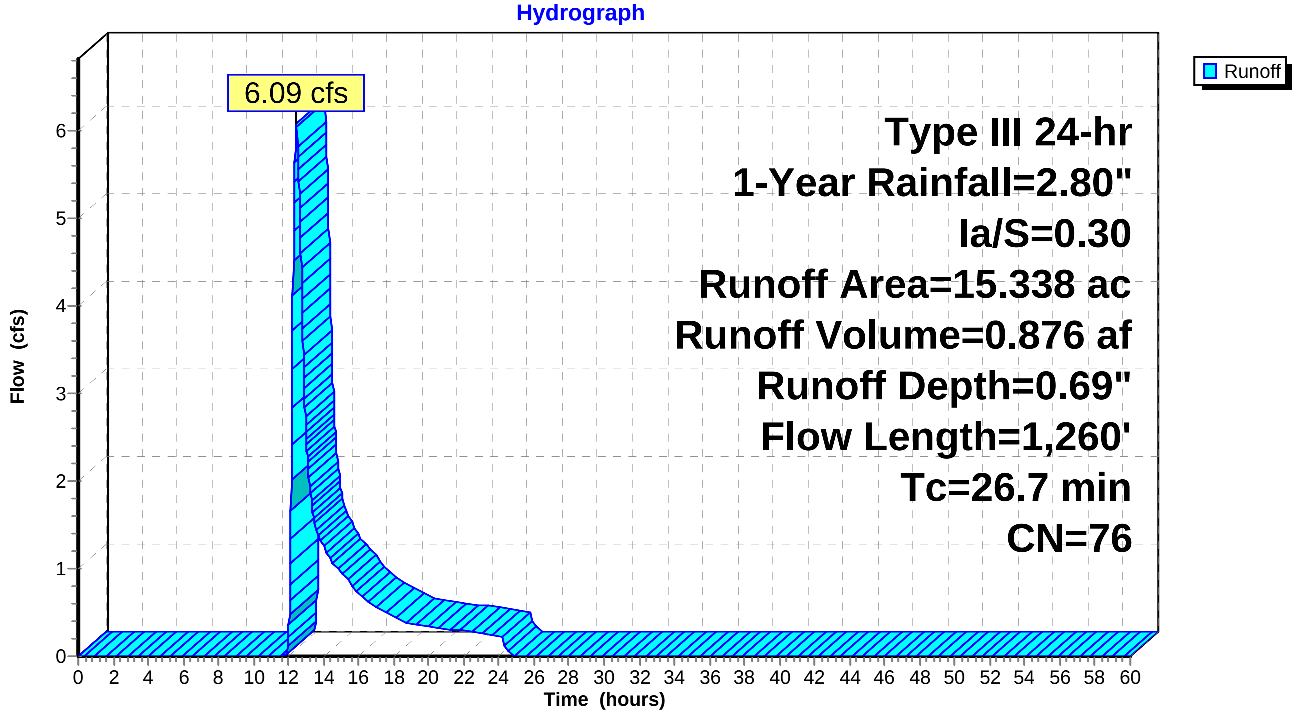
Runoff = 6.09 cfs @ 12.45 hrs, Volume= 0.876 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.013 | 98 | Building roof |
| * | 1.232 | 98 | Paved surface |
| * | 0.200 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.050 | 61 | >75% Grass cover, Good, HSG B |
| | 9.227 | 74 | >75% Grass cover, Good, HSG C |
| | 2.194 | 80 | >75% Grass cover, Good, HSG D |
| | 0.097 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.706 | 70 | Woods, Good, HSG C |
| | 0.619 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.338 | 76 | Weighted Average |
| | 14.093 | | 91.88% Pervious Area |
| | 1.245 | | 8.12% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

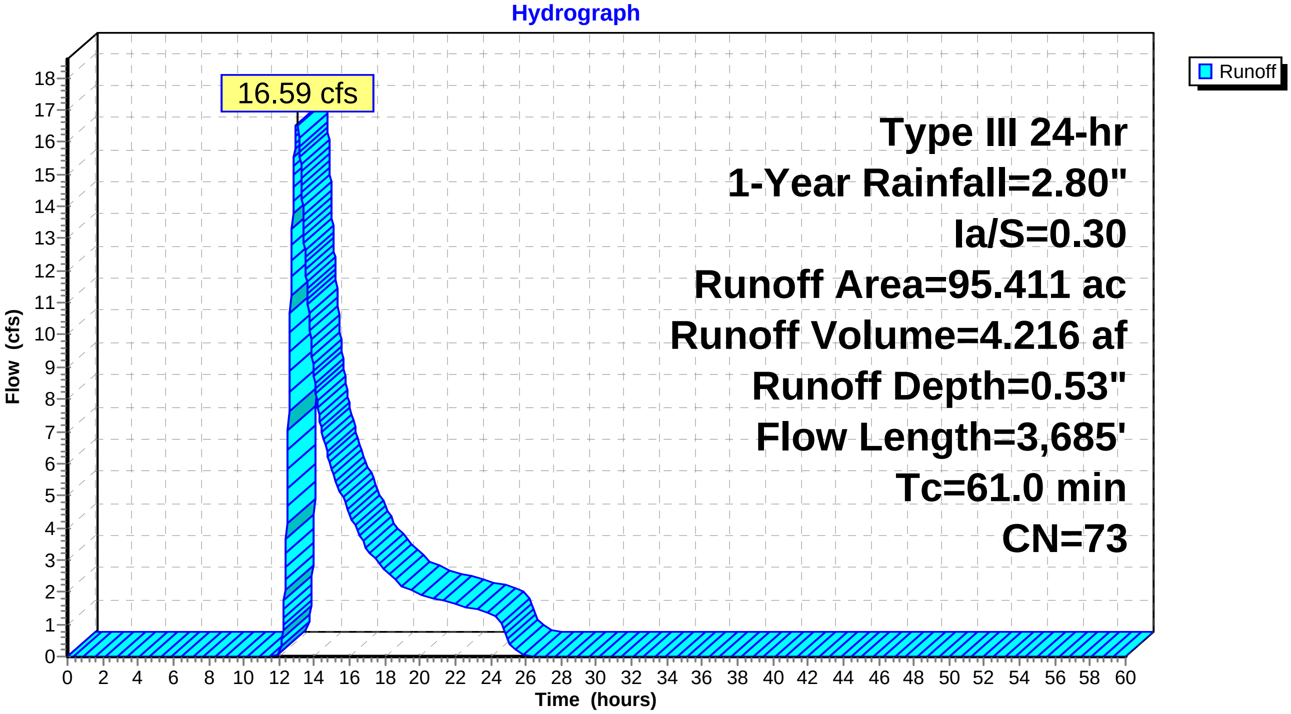
Runoff = 16.59 cfs @ 13.02 hrs, Volume= 4.216 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.392 | 98 | Building roof |
| * | 1.725 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.129 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 13.413 | 61 | >75% Grass cover, Good, HSG B |
| | 9.311 | 74 | >75% Grass cover, Good, HSG C |
| | 4.029 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 8.871 | 55 | Woods, Good, HSG B |
| | 4.853 | 70 | Woods, Good, HSG C |
| | 52.617 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 95.411 | 73 | Weighted Average |
| | 93.165 | | 97.65% Pervious Area |
| | 2.246 | | 2.35% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

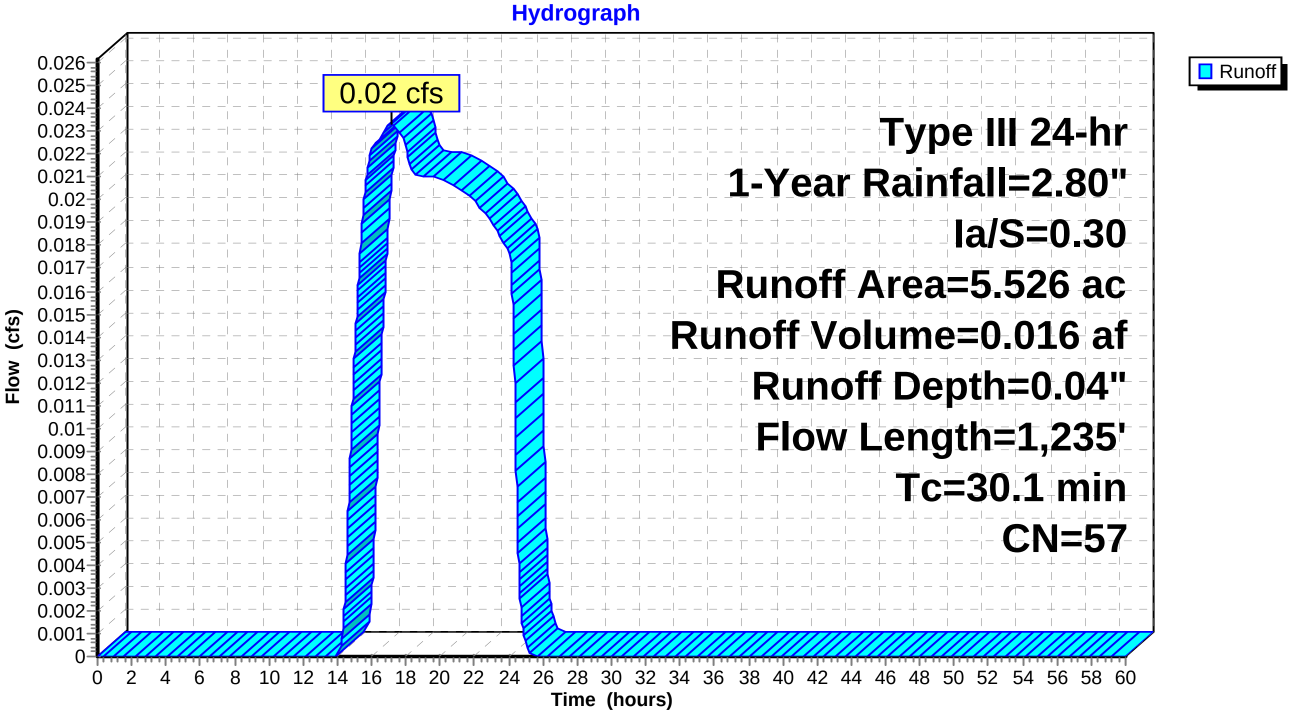
Runoff = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.088 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.629 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.526 | 57 | Weighted Average |
| | 5.398 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment B101: B101

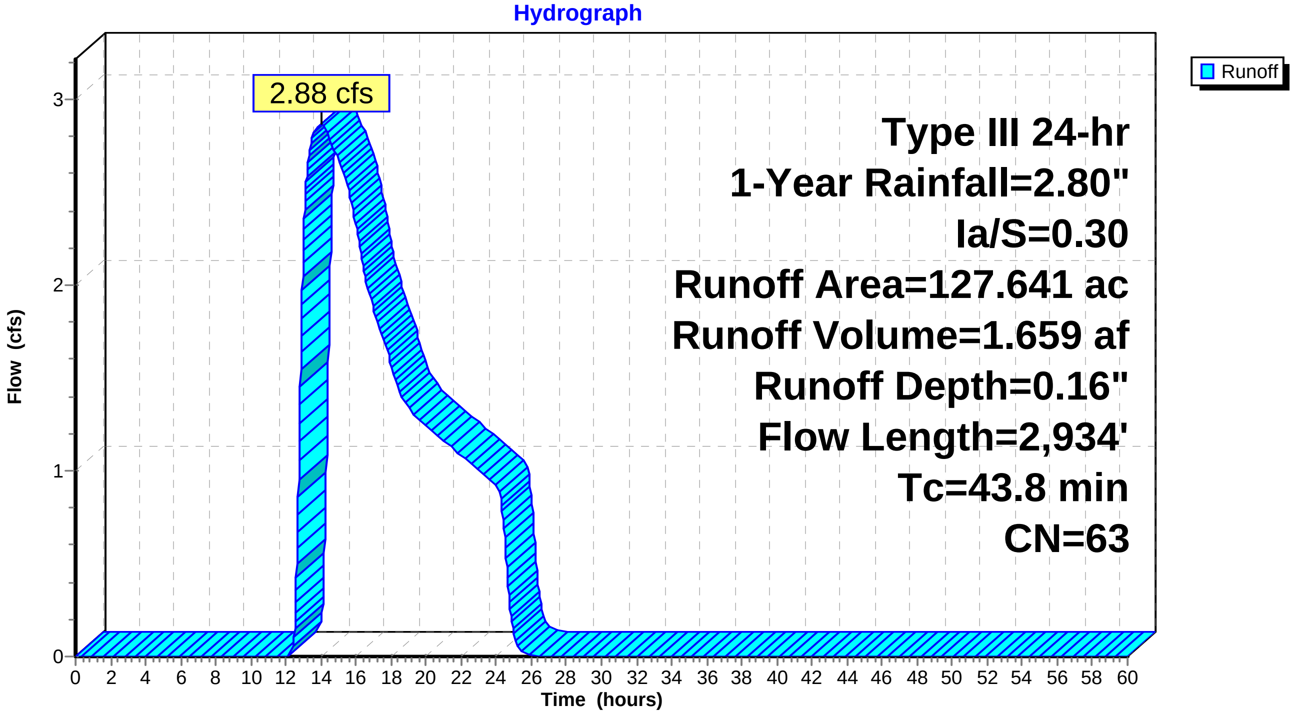
Runoff = 2.88 cfs @ 14.06 hrs, Volume= 1.659 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.005 | 98 | Building roof |
| * | 0.948 | 98 | Paved surface |
| * | 2.079 | 96 | Gravel surface |
| * | 0.002 | 98 | Water Surface |
| | 29.023 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 22.752 | 74 | >75% Grass cover, Good, HSG C |
| | 0.768 | 80 | >75% Grass cover, Good, HSG D |
| | 9.025 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 35.889 | 70 | Woods, Good, HSG C |
| | 27.094 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.056 | 30 | Sand Trap, HSG C |
| | 127.641 | 63 | Weighted Average |
| | 126.686 | | 99.25% Pervious Area |
| | 0.955 | | 0.75% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 506 | 0.1600 | 12.61 | 201.73 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.7 | 112 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.5 | 355 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 184 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 642 | 0.0500 | 9.49 | 63.28 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.035 High grass |
| 43.8 | 2,934 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

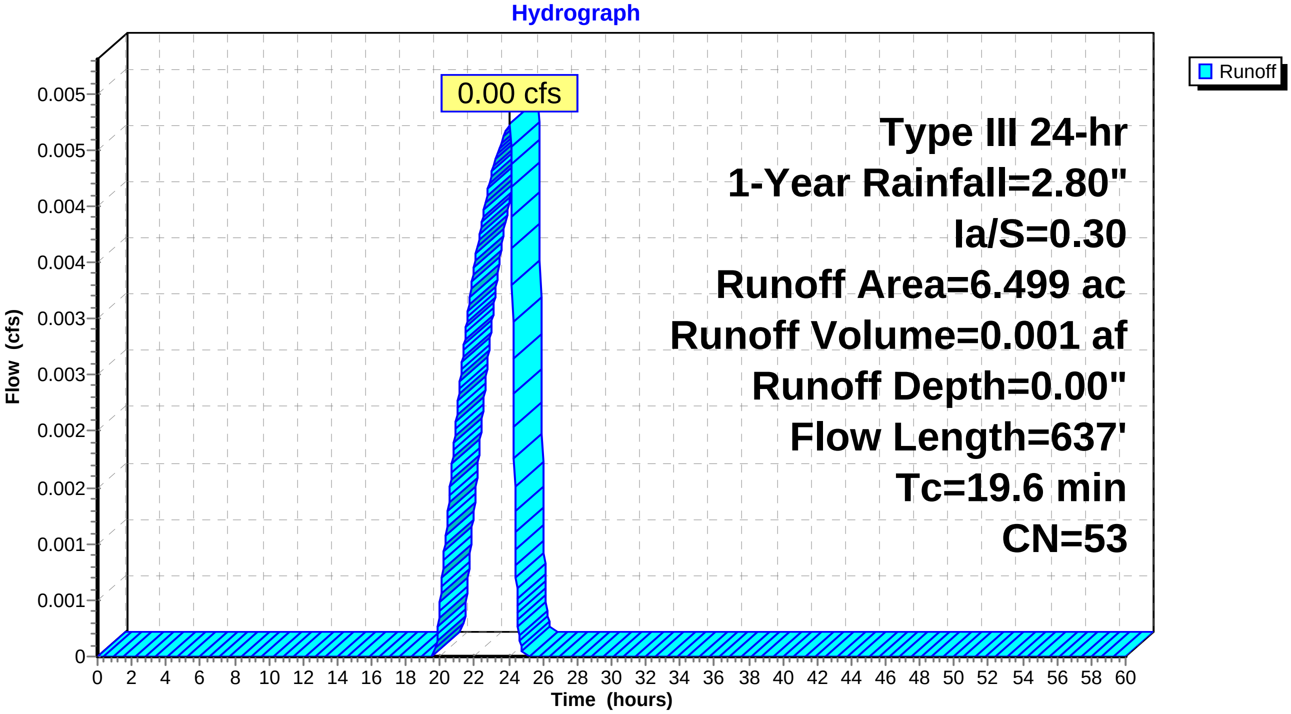
Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.170 | 98 | Paved surface |
| * | 0.290 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 3.039 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.097 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.839 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.064 | 30 | Sand Trap, HSG C |
| | 6.499 | 53 | Weighted Average |
| | 6.329 | | 97.38% Pervious Area |
| | 0.170 | | 2.62% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.6 | 637 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

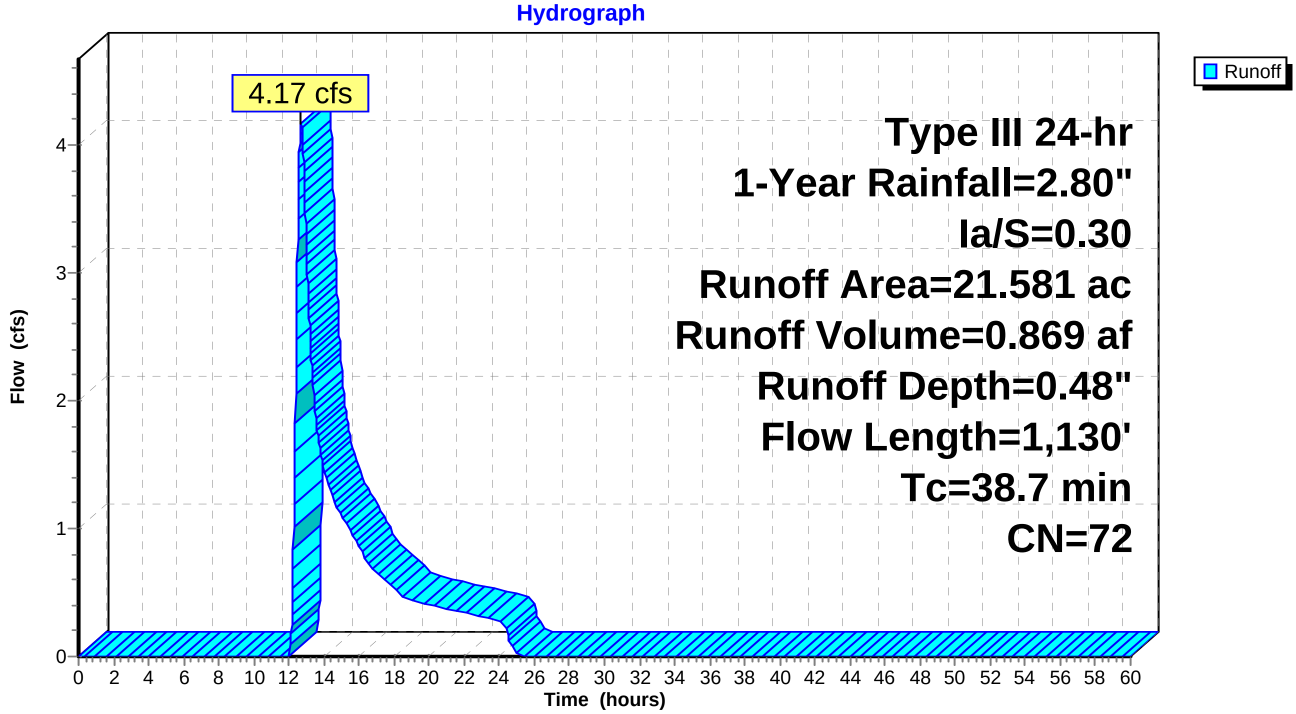
Runoff = 4.17 cfs @ 12.69 hrs, Volume= 0.869 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.550 | 98 | Paved surface |
| * | 0.039 | 96 | Gravel surface |
| * | 2.025 | 98 | Water Surface |
| | 3.869 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 6.689 | 74 | >75% Grass cover, Good, HSG C |
| | 0.522 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.459 | 70 | Woods, Good, HSG C |
| | 7.399 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.029 | 30 | Sand Trap, HSG C |
| | 21.581 | 72 | Weighted Average |
| | 19.006 | | 88.07% Pervious Area |
| | 2.575 | | 11.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.3 | 700 | 0.5500 | 1.85 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.6 | 280 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 50 | 0.7600 | 2.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 38.7 | 1,130 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

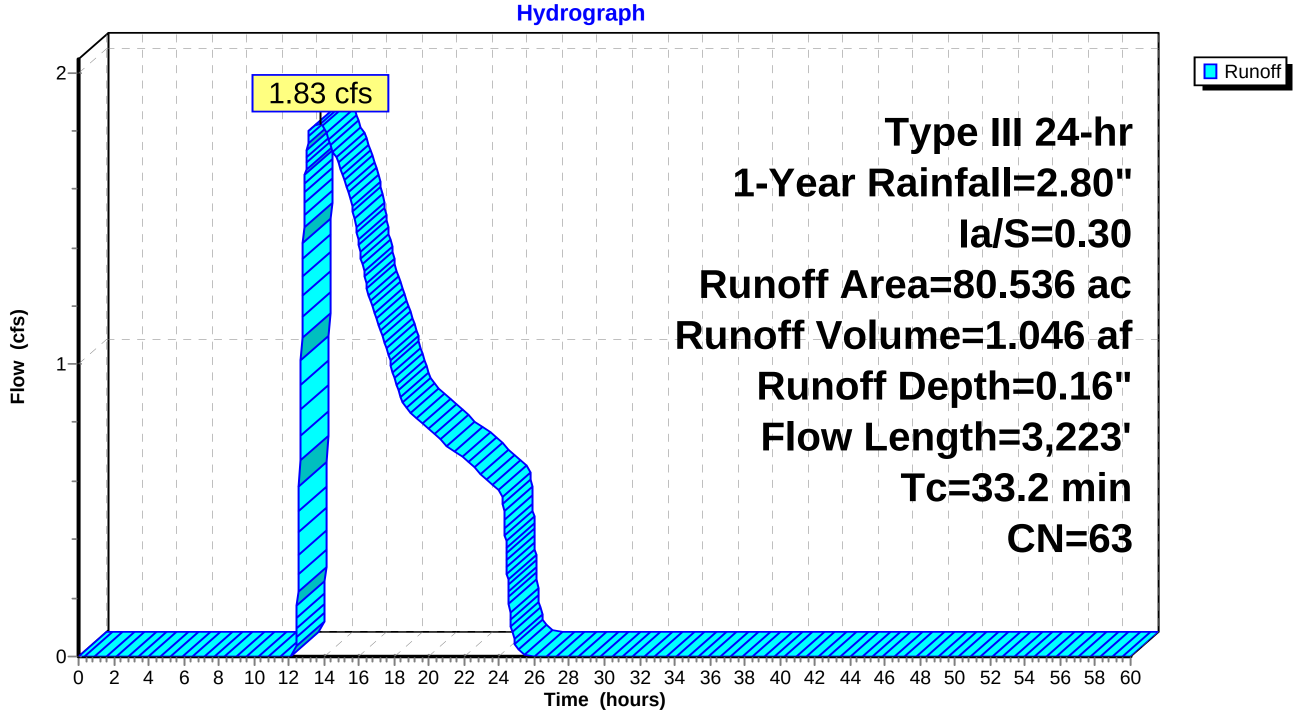
Runoff = 1.83 cfs @ 13.84 hrs, Volume= 1.046 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.411 | 98 | Building roof |
| * | 5.140 | 98 | Paved surface |
| * | 1.201 | 96 | Gravel surface |
| * | 5.280 | 98 | Water Surface |
| | 29.268 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 32.742 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.144 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.770 | 70 | Woods, Good, HSG C |
| | 1.252 | 77 | Woods, Good, HSG D |
| * | 0.185 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.143 | 30 | Sand Trap, HSG C |
| | 80.536 | 63 | Weighted Average |
| | 69.705 | | 86.55% Pervious Area |
| | 10.831 | | 13.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.9 | 100 | 0.1300 | 0.17 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 7.3 | 1,150 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.6 | 130 | 0.0300 | 3.52 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.4 | 1,843 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 33.2 | 3,223 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

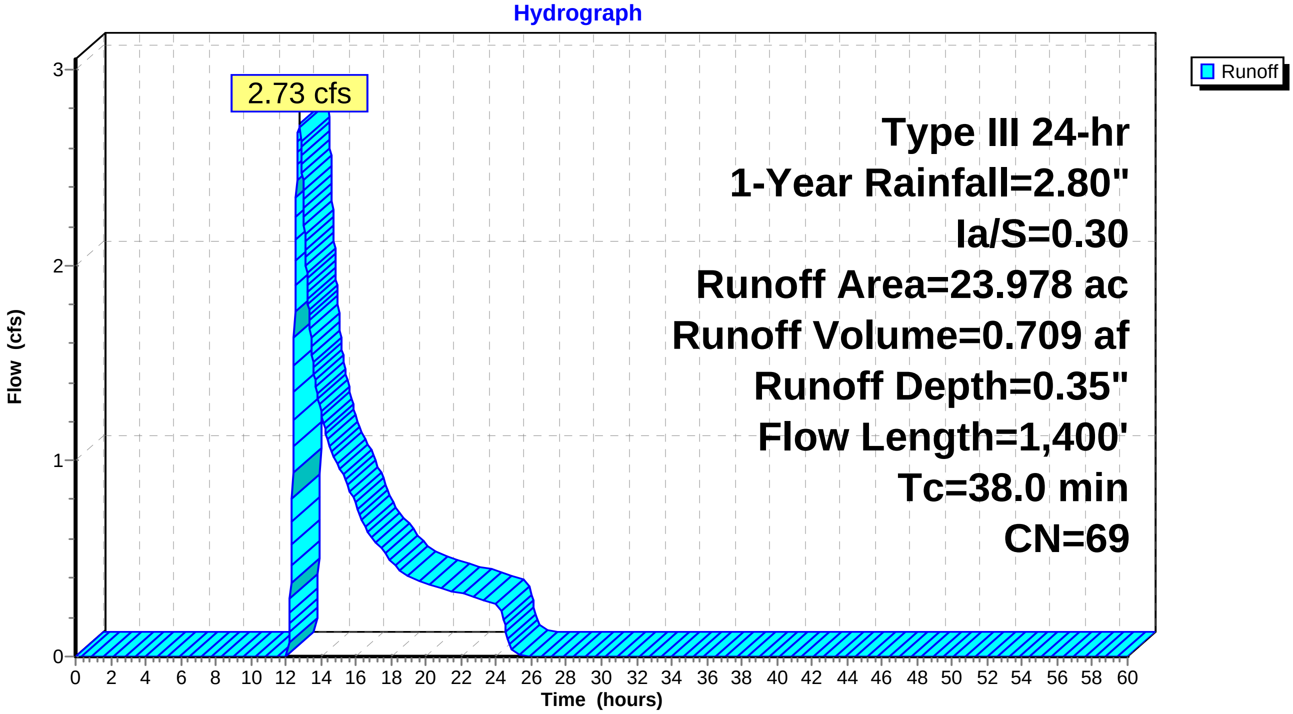
Runoff = 2.73 cfs @ 12.76 hrs, Volume= 0.709 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.248 | 98 | Paved surface |
| * | 0.181 | 96 | Gravel surface |
| * | 0.458 | 98 | Water Surface |
| | 5.222 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 4.132 | 74 | >75% Grass cover, Good, HSG C |
| | 0.513 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.204 | 70 | Woods, Good, HSG C |
| | 11.982 | 77 | Woods, Good, HSG D |
| * | 0.038 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 23.978 | 69 | Weighted Average |
| | 23.272 | | 97.06% Pervious Area |
| | 0.706 | | 2.94% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.5 | 698 | 0.5200 | 1.80 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 335 | 0.1900 | 3.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 267 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 38.0 | 1,400 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

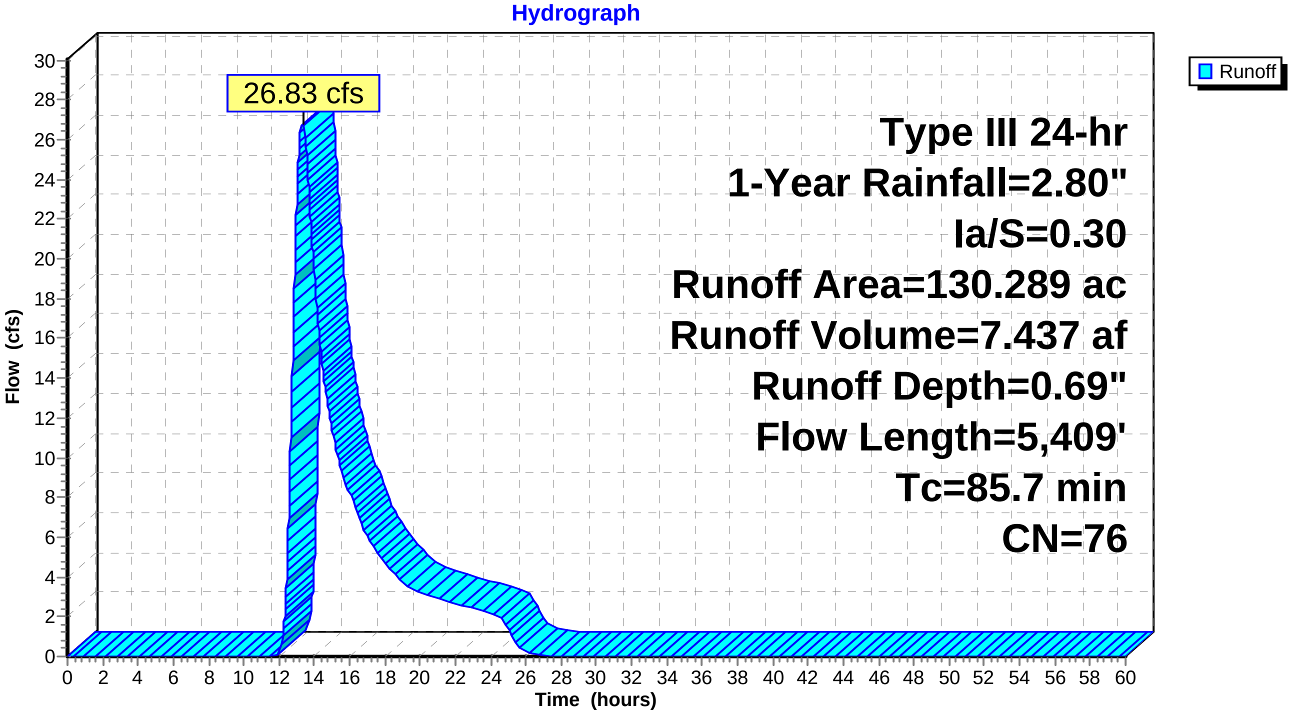
Runoff = 26.83 cfs @ 13.33 hrs, Volume= 7.437 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.025 | 98 | Building roof |
| * | 0.905 | 98 | Paved surface |
| * | 0.933 | 96 | Gravel surface |
| * | 0.153 | 98 | Water Surface |
| | 0.907 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 13.921 | 74 | >75% Grass cover, Good, HSG C |
| | 2.396 | 80 | >75% Grass cover, Good, HSG D |
| | 0.745 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 11.966 | 70 | Woods, Good, HSG C |
| | 97.720 | 77 | Woods, Good, HSG D |
| * | 0.024 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 130.289 | 76 | Weighted Average |
| | 129.206 | | 99.17% Pervious Area |
| | 1.083 | | 0.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

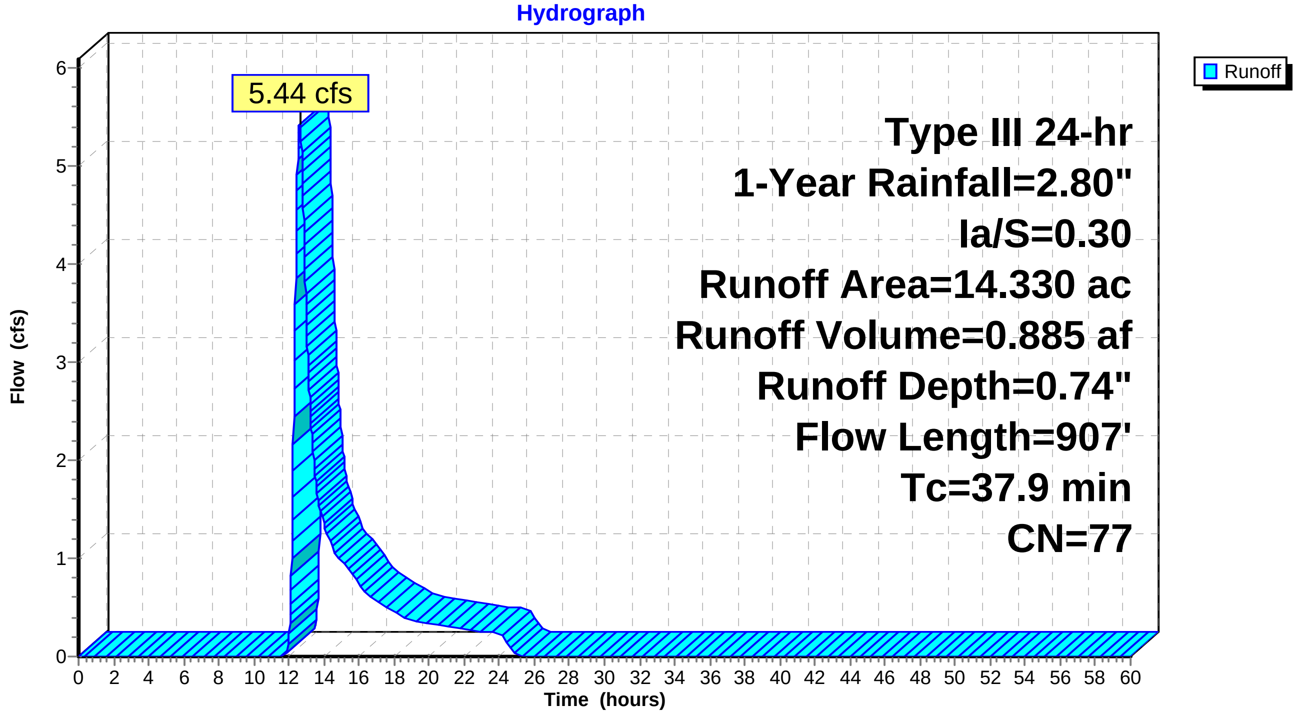
Runoff = 5.44 cfs @ 12.61 hrs, Volume= 0.885 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

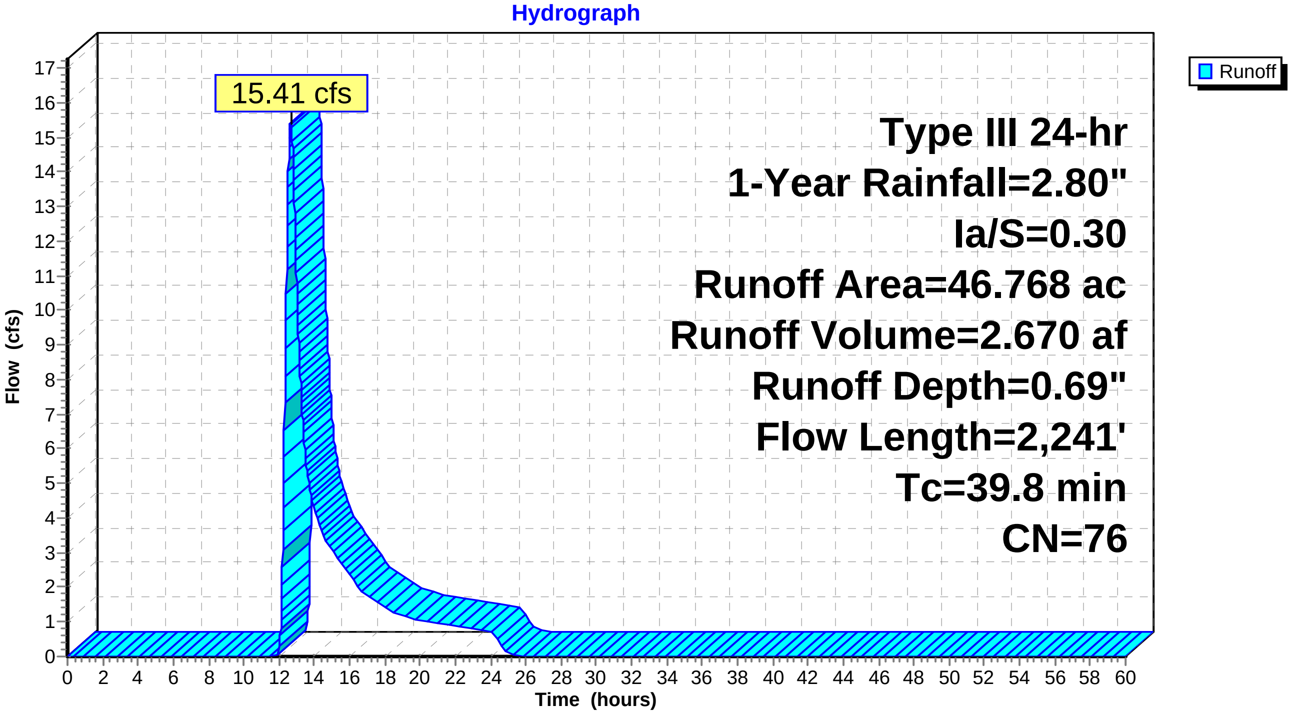
Runoff = 15.41 cfs @ 12.65 hrs, Volume= 2.670 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.499 | 98 | Paved surface |
| * | 0.098 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.546 | 74 | >75% Grass cover, Good, HSG C |
| | 0.657 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.391 | 70 | Woods, Good, HSG C |
| | 32.437 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.140 | 30 | Sand Trap, HSG C |
| | 46.768 | 76 | Weighted Average |
| | 46.269 | | 98.93% Pervious Area |
| | 0.499 | | 1.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.9 | 1,071 | 0.4300 | 1.64 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 3.2 | 490 | 0.1300 | 2.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 190 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 39.8 | 2,241 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

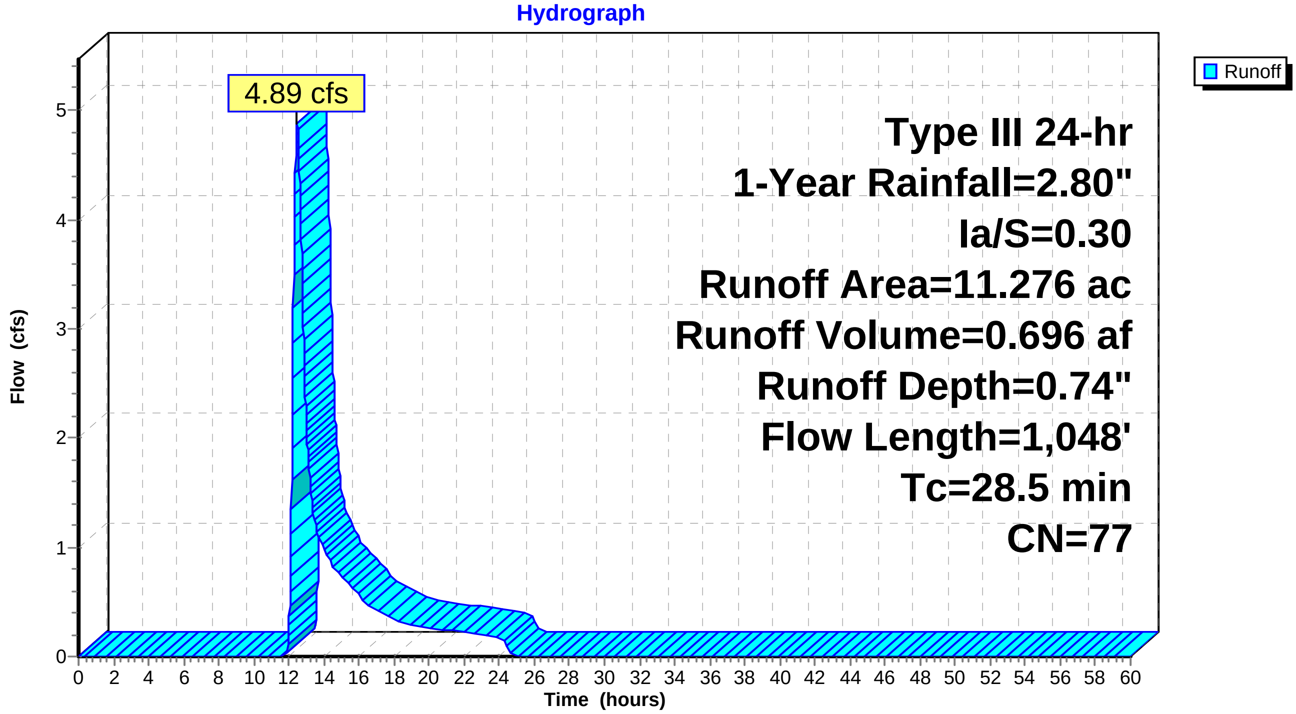
Runoff = 4.89 cfs @ 12.47 hrs, Volume= 0.696 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.004 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.045 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.299 | 70 | Woods, Good, HSG C |
| | 10.928 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 11.276 | 77 | Weighted Average |
| | 11.272 | | 99.96% Pervious Area |
| | 0.004 | | 0.04% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4500 | 1.68 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 4.3 | 288 | 0.2010 | 1.12 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 28.5 | 1,048 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment C101: C101

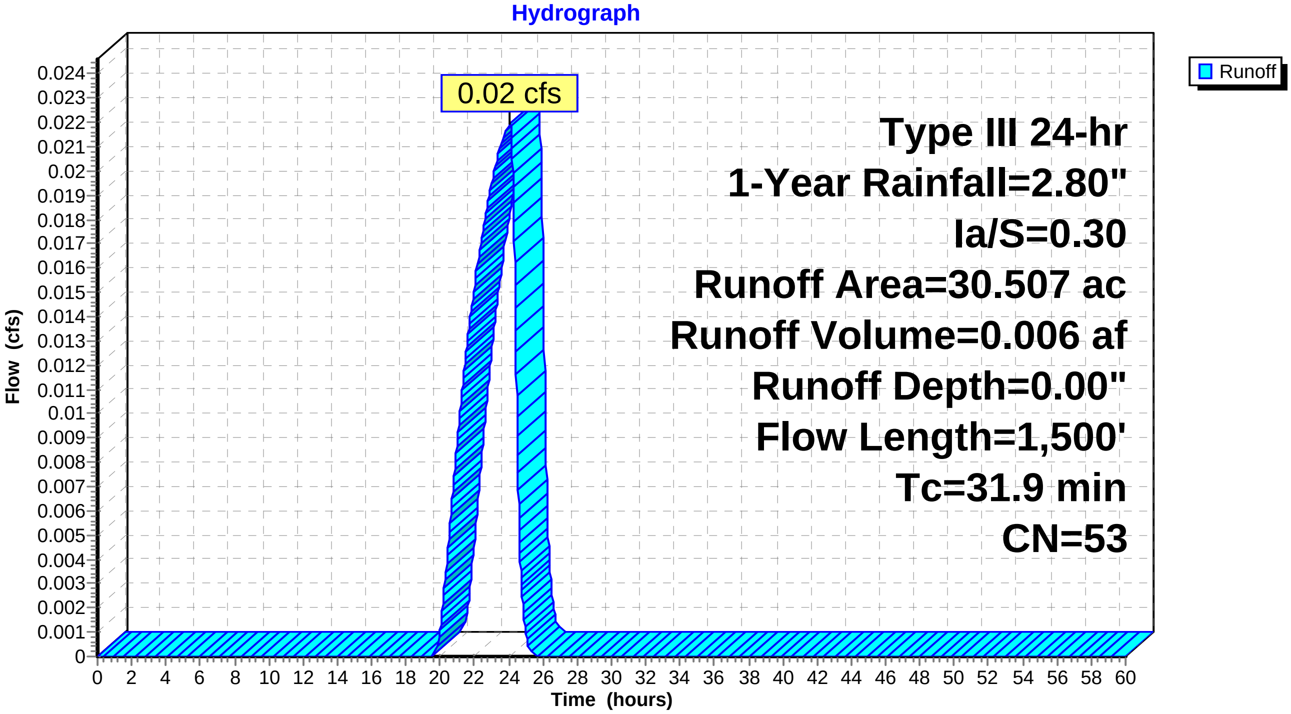
Runoff = 0.02 cfs @ 24.06 hrs, Volume= 0.006 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.350 | 98 | Paved surface |
| * | 0.425 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.046 | 98 | Rock Outcrop/Ledge |
| | 15.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.955 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.210 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 6.521 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 30.507 | 53 | Weighted Average |
| | 29.111 | | 95.42% Pervious Area |
| | 1.396 | | 4.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

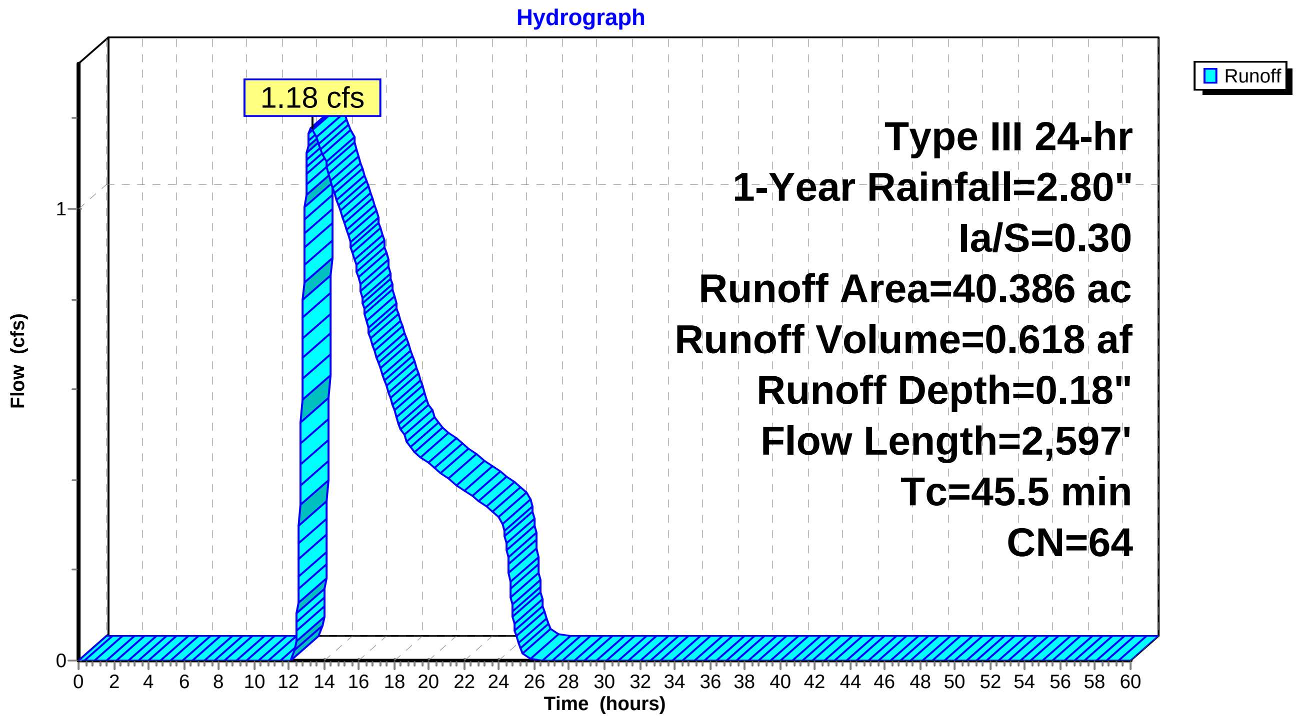
Runoff = 1.18 cfs @ 13.29 hrs, Volume= 0.618 af, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.618 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.981 | 98 | Rock Outcrop/Ledge |
| | 13.186 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.123 | 74 | >75% Grass cover, Good, HSG C |
| | 0.529 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.578 | 70 | Woods, Good, HSG C |
| | 15.415 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.386 | 64 | Weighted Average |
| | 38.573 | | 95.51% Pervious Area |
| | 1.813 | | 4.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

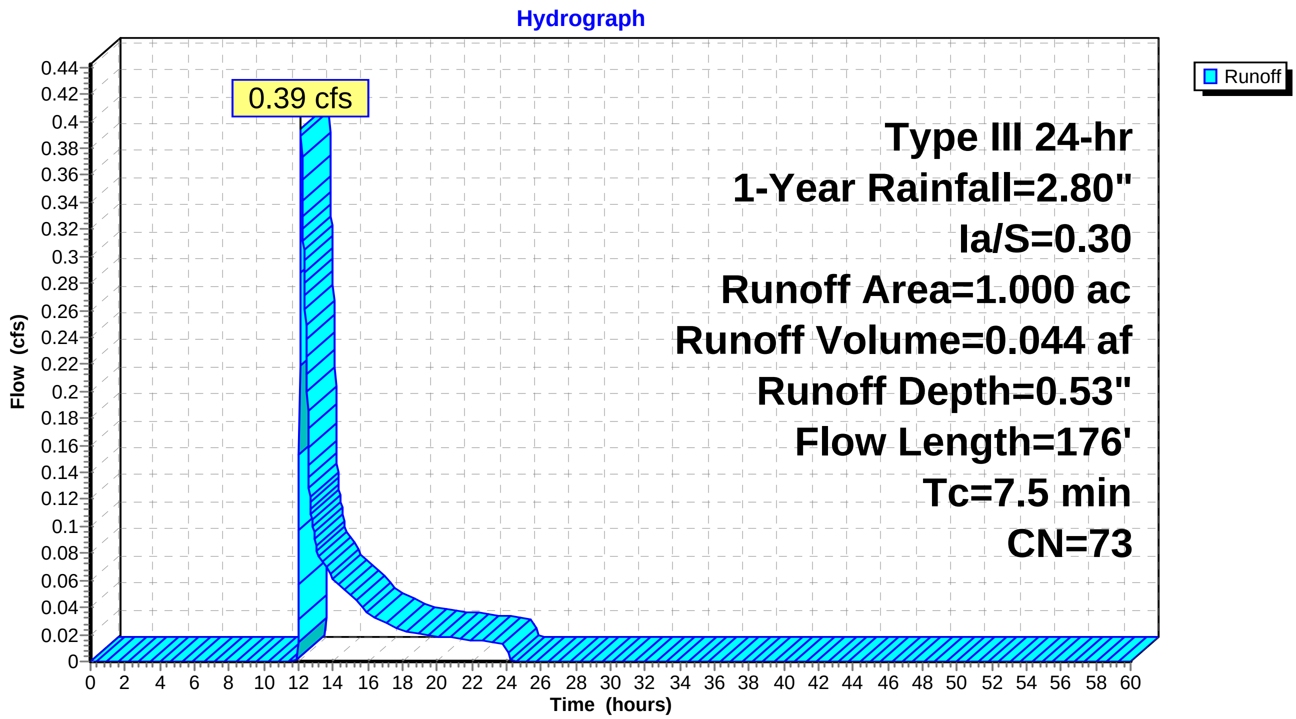
Runoff = 0.39 cfs @ 12.14 hrs, Volume= 0.044 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.850 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.000 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 73 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C** Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1570 | 6.38 | | **Shallow Concentrated Flow, C to D** Unpaved Kv= 16.1 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



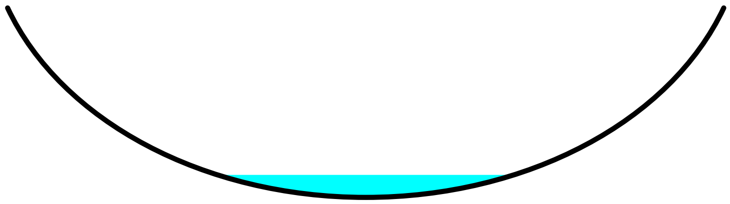
## Summary for Reach A105R: Thru A101

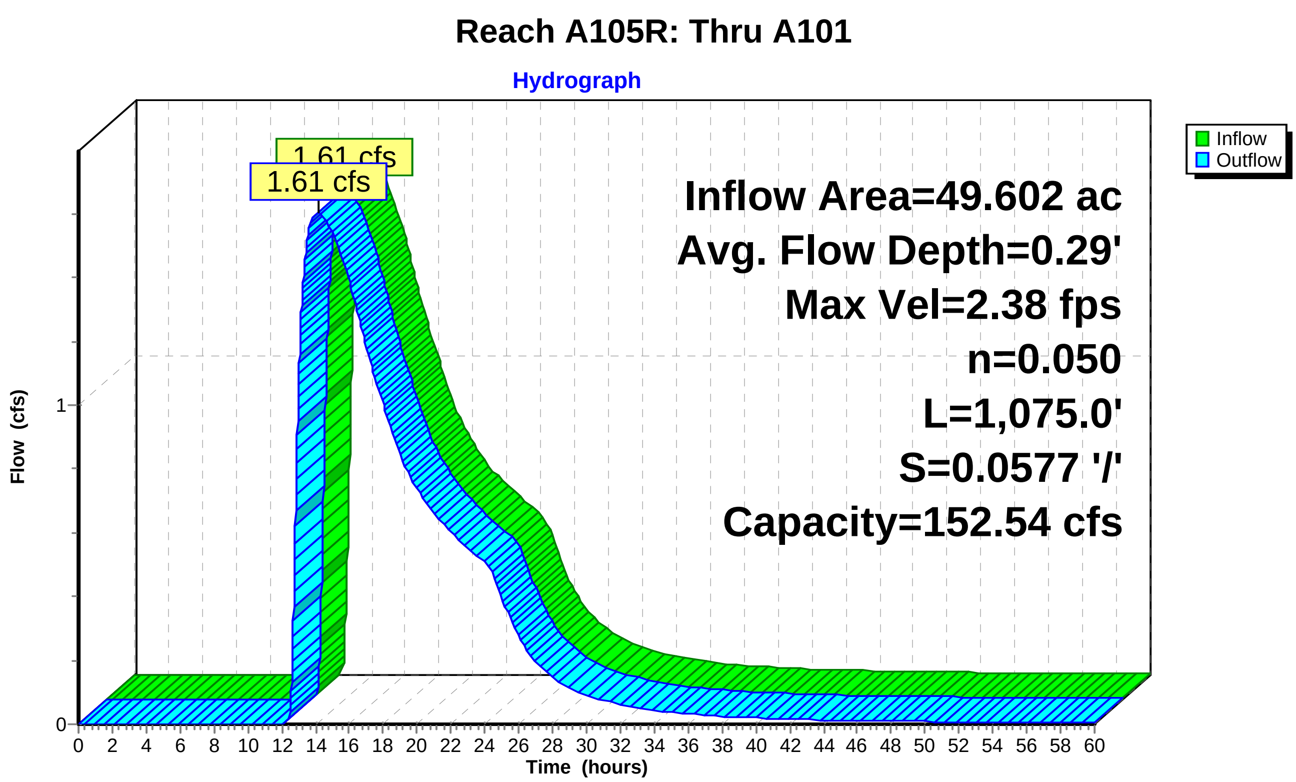
Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth > 0.27" for 1-Year event
Inflow = 1.61 cfs @ 14.08 hrs, Volume= 1.105 af
Outflow = 1.61 cfs @ 14.17 hrs, Volume= 1.104 af, Atten= 0%, Lag= 5.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.38 fps, Min. Travel Time= 7.5 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 17.4 min

Peak Storage= 725 cf @ 14.17 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 152.54 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,075.0' Slope= 0.0577 '/'
Inlet Invert= 566.00', Outlet Invert= 504.00'





## Summary for Reach A106R: Thru A105

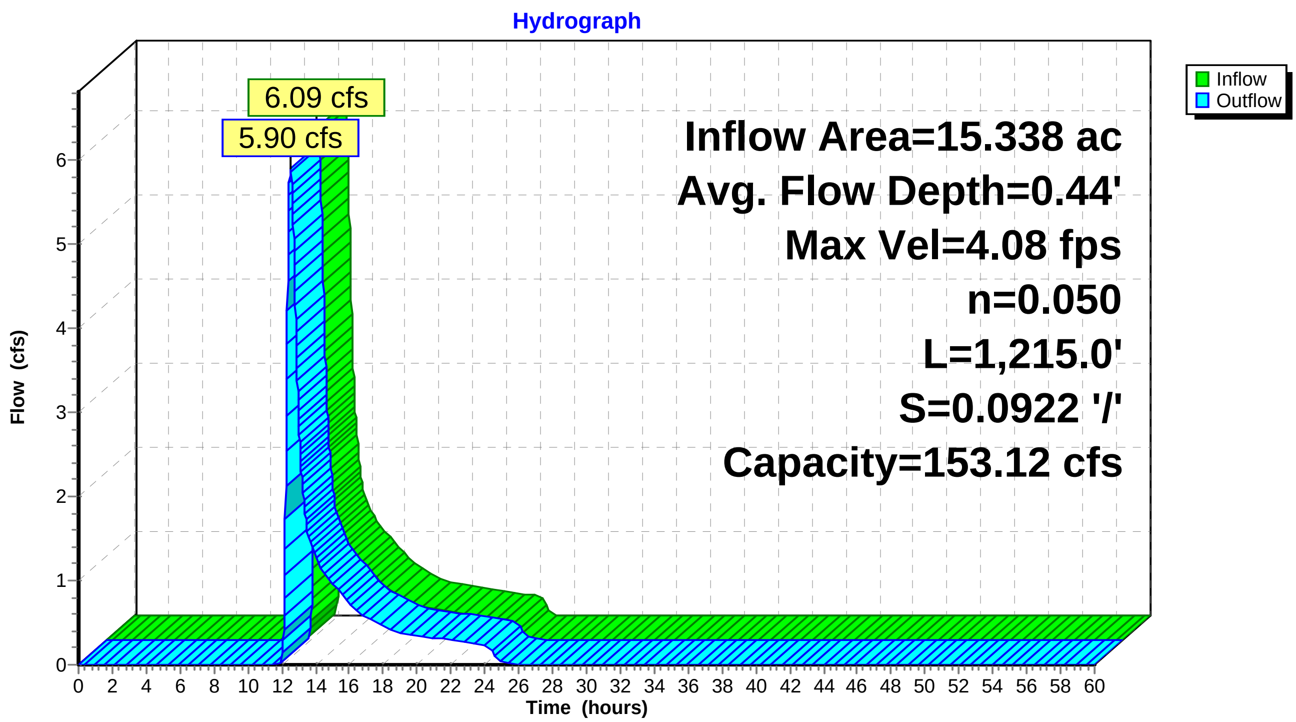
Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 0.69" for 1-Year event
Inflow = 6.09 cfs @ 12.45 hrs, Volume= 0.876 af
Outflow = 5.90 cfs @ 12.52 hrs, Volume= 0.876 af, Atten= 3%, Lag= 4.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.08 fps, Min. Travel Time= 5.0 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 11.8 min

Peak Storage= 1,759 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 153.12 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 1,215.0' Slope= 0.0922 '/'
Inlet Invert= 686.00', Outlet Invert= 574.00'

### Reach A106R: Thru A105



## Summary for Reach A108R: Thru A101

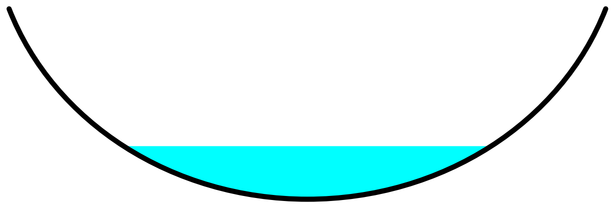
[80] Warning: Exceeded Pond 108A by 0.03' @ 13.06 hrs (0.00 cfs 0.000 af)

Inflow Area = 100.937 ac, 2.35% Impervious, Inflow Depth = 0.50" for 1-Year event
Inflow = 16.59 cfs @ 13.02 hrs, Volume= 4.232 af
Outflow = 16.52 cfs @ 13.07 hrs, Volume= 4.232 af, Atten= 0%, Lag= 2.6 min

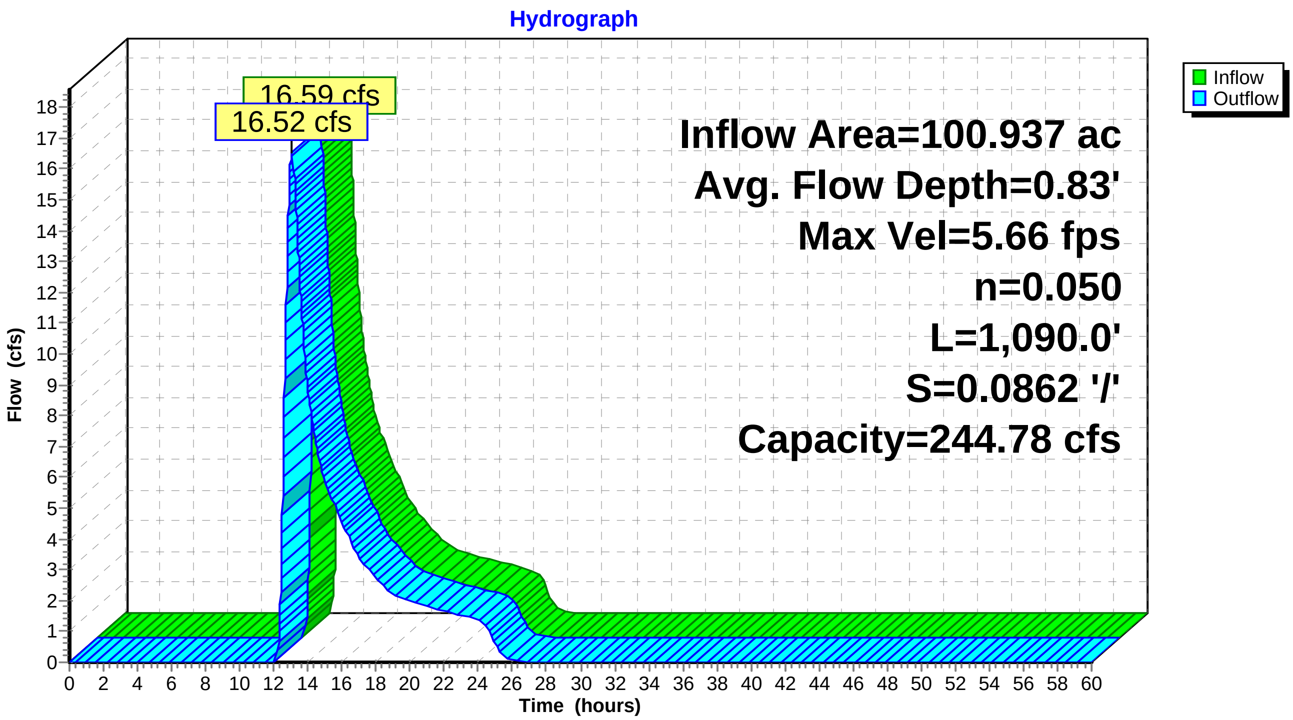
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.66 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 2.77 fps, Avg. Travel Time= 6.6 min

Peak Storage= 3,184 cf @ 13.07 hrs
Average Depth at Peak Storage= 0.83'
Bank-Full Depth= 3.00' Flow Area= 20.0 sf, Capacity= 244.78 cfs

10.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 1,090.0' Slope= 0.0862 '/'
Inlet Invert= 608.00', Outlet Invert= 514.00'



## Reach A108R: Thru A101



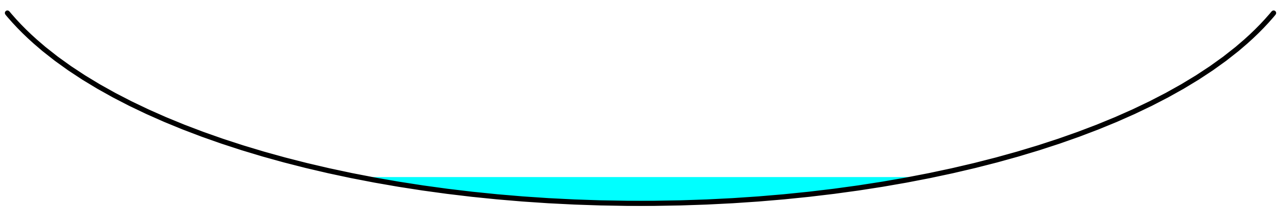
## Summary for Reach B102R: Thru B101

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 0.37" for 1-Year event
Inflow = 4.88 cfs @ 20.72 hrs, Volume= 8.210 af
Outflow = 4.88 cfs @ 20.74 hrs, Volume= 8.209 af, Atten= 0%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 1.60 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 1.8 min

Peak Storage= 371 cf @ 20.74 hrs
Average Depth at Peak Storage= 0.41'
Bank-Full Depth= 3.00' Flow Area= 60.0 sf, Capacity= 356.26 cfs

30.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 122.0' Slope= 0.0164 '/'
Inlet Invert= 492.00', Outlet Invert= 490.00'



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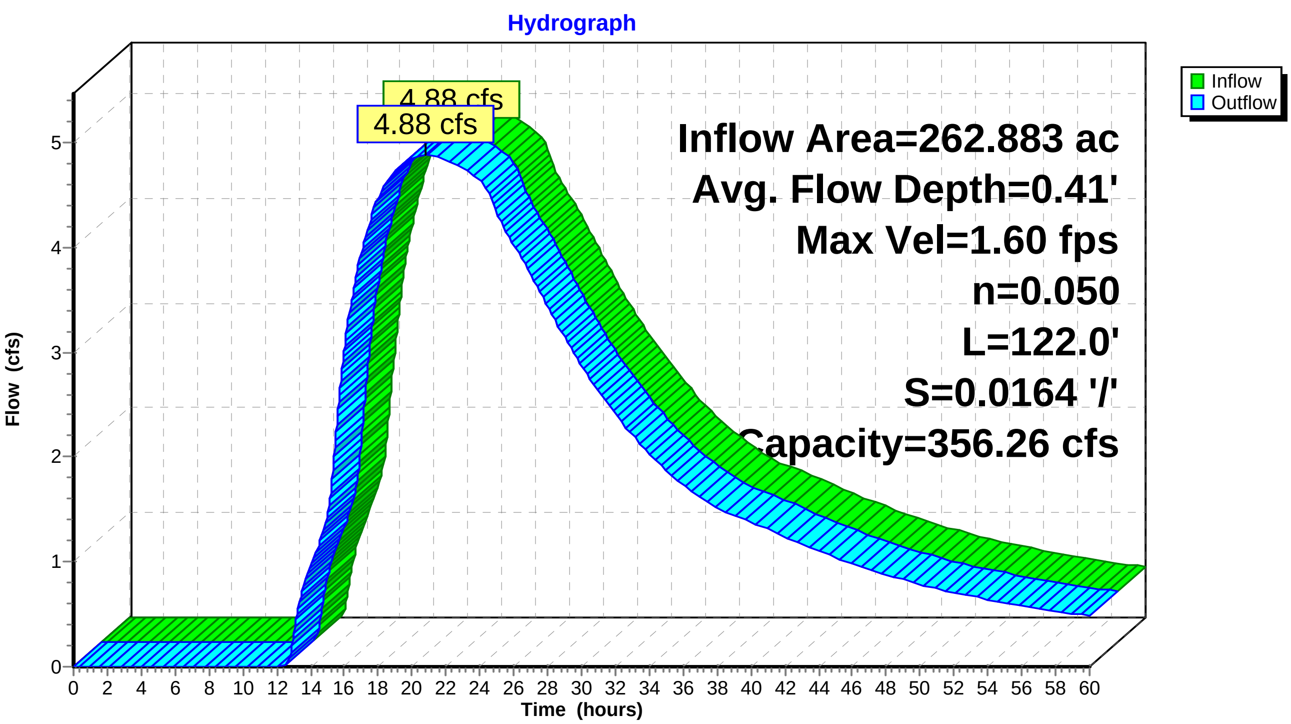
### Reach B102R: Thru B101



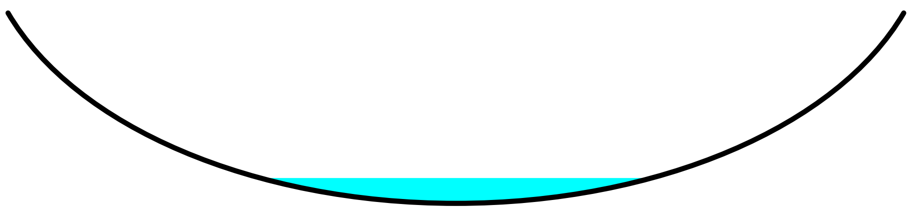
## Summary for Reach B103R: Thru B102

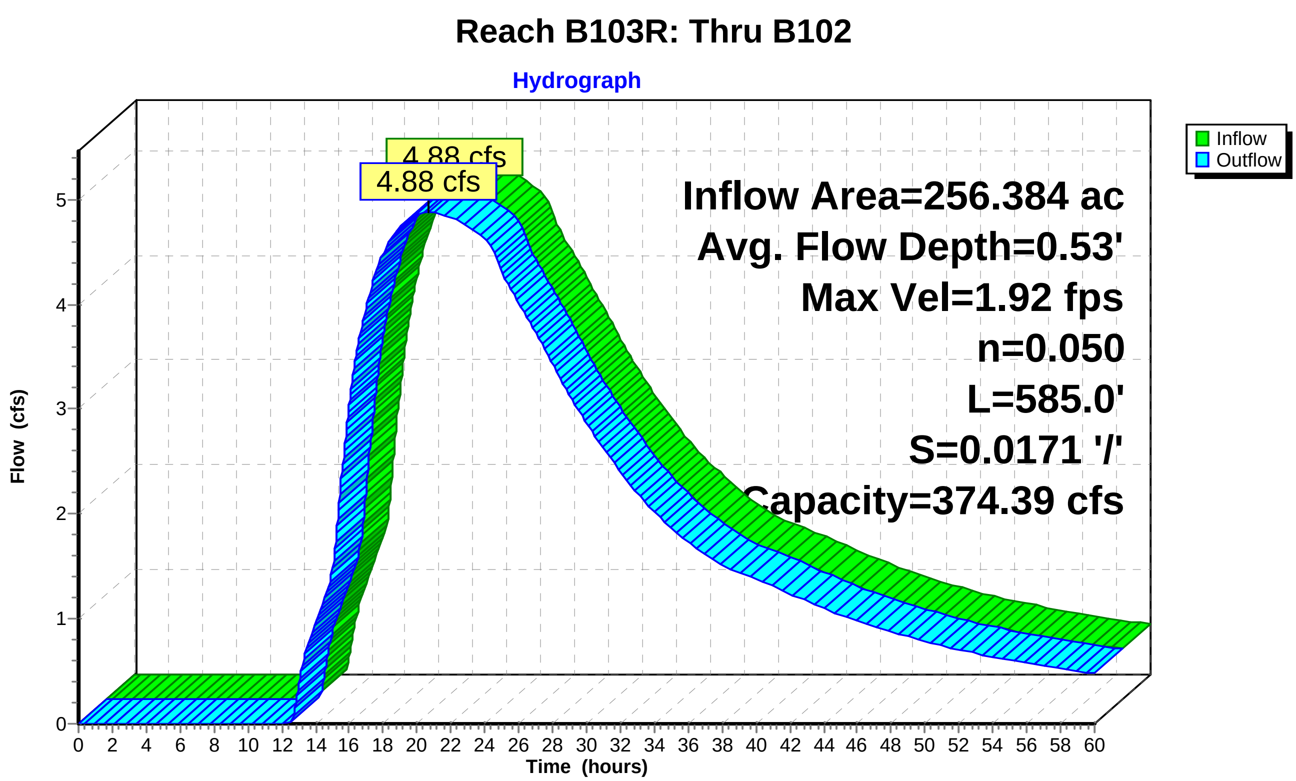
Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 0.38" for 1-Year event
Inflow = 4.88 cfs @ 20.61 hrs, Volume= 8.216 af
Outflow = 4.88 cfs @ 20.66 hrs, Volume= 8.209 af, Atten= 0%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 1.92 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 7.0 min

Peak Storage= 1,489 cf @ 20.66 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 374.39 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 585.0' Slope= 0.0171 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'





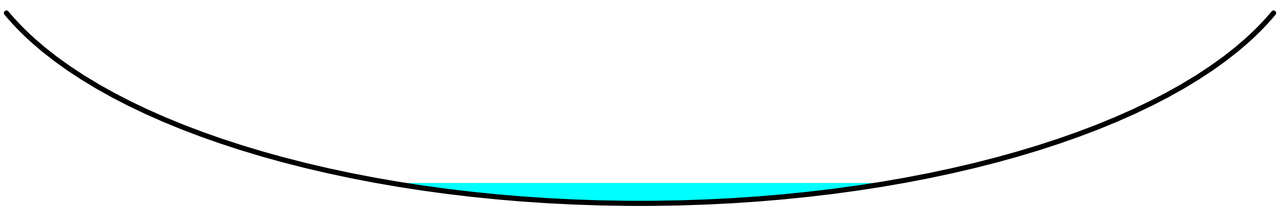
## Summary for Reach B107R: Thru B108

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth > 0.51" for 1-Year event
Inflow = 1.11 cfs @ 14.48 hrs, Volume= 0.609 af
Outflow = 1.11 cfs @ 14.69 hrs, Volume= 0.609 af, Atten= 1%, Lag= 12.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.43 fps, Min. Travel Time= 14.0 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 36.0 min

Peak Storage= 930 cf @ 14.69 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 144.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 2,040.0' Slope= 0.2294 '/'
Inlet Invert= 972.00', Outlet Invert= 504.00'



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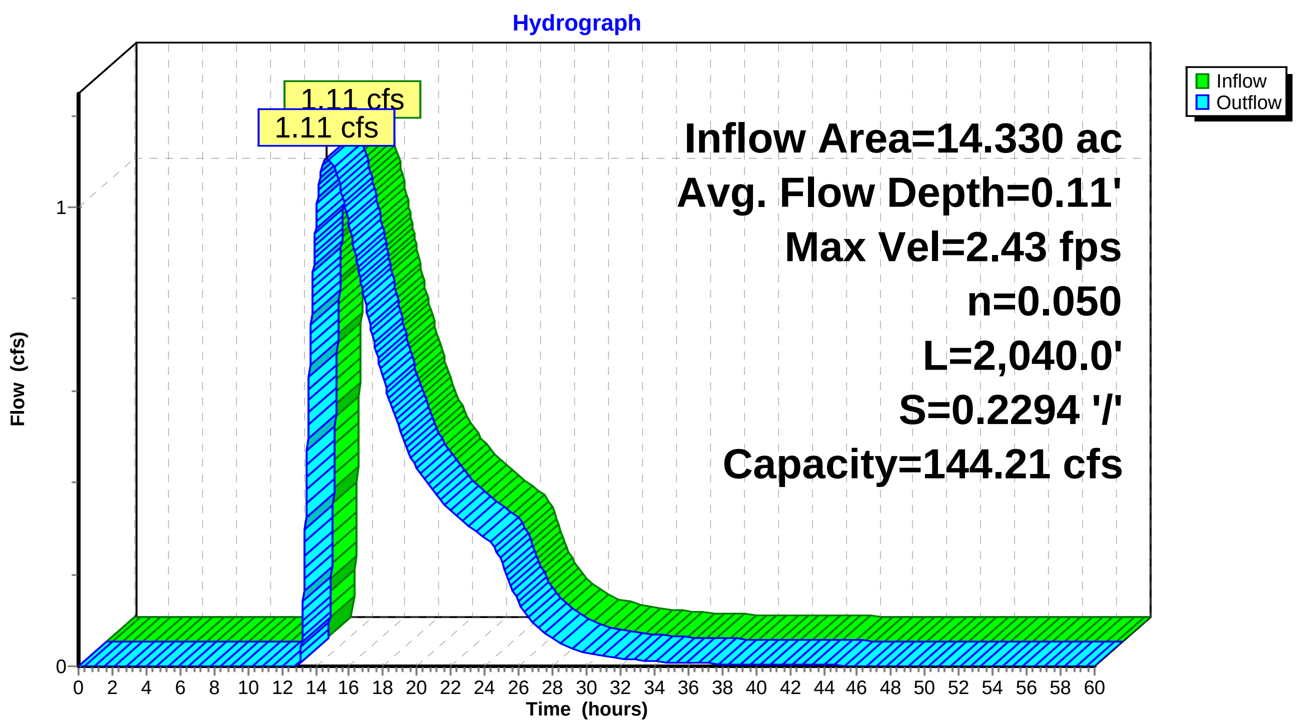
### Reach B107R: Thru B108



## Summary for Reach B108R: Thur 101

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth > 0.65" for 1-Year event
Inflow = 19.74 cfs @ 12.63 hrs, Volume= 3.950 af
Outflow = 19.73 cfs @ 12.65 hrs, Volume= 3.950 af, Atten= 0%, Lag= 0.9 min

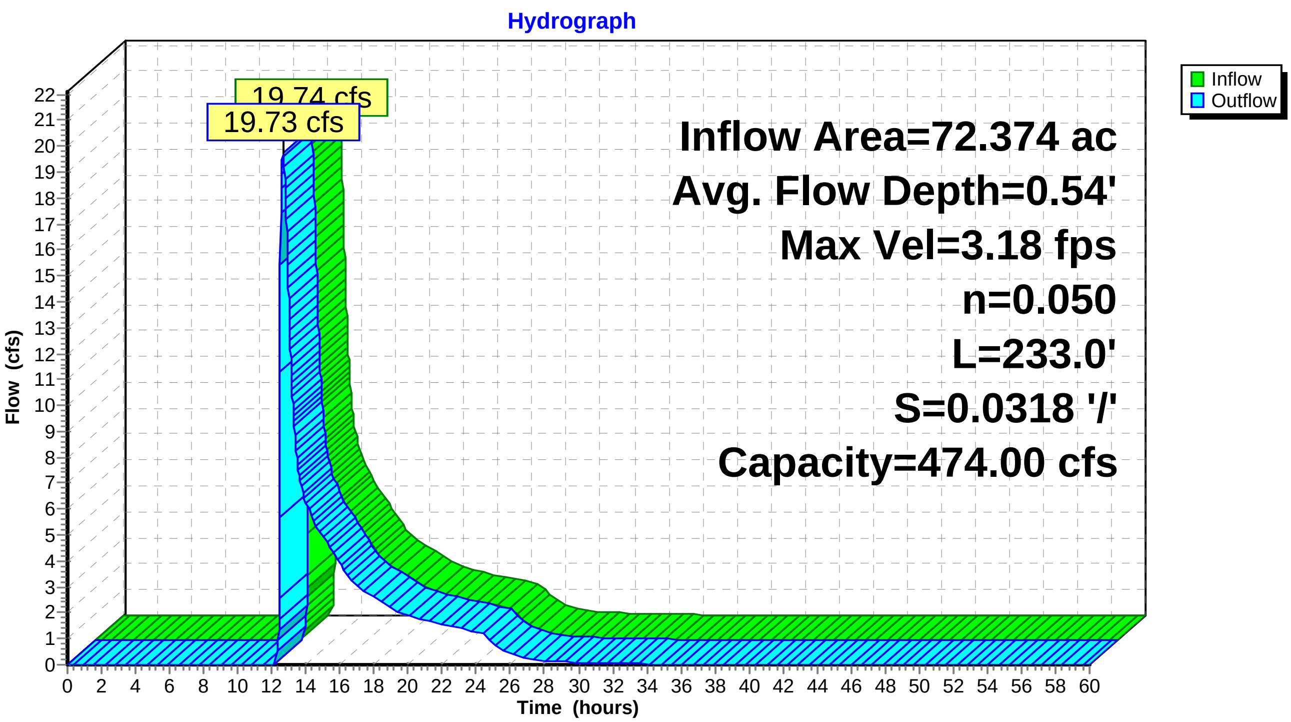
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.18 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 4.8 min

Peak Storage= 1,448 cf @ 12.65 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 474.00 cfs

10.00' x 3.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 233.0' Slope= 0.0318 '/'
Inlet Invert= 499.60', Outlet Invert= 492.20'

‡

### Reach B108R: Thur 101



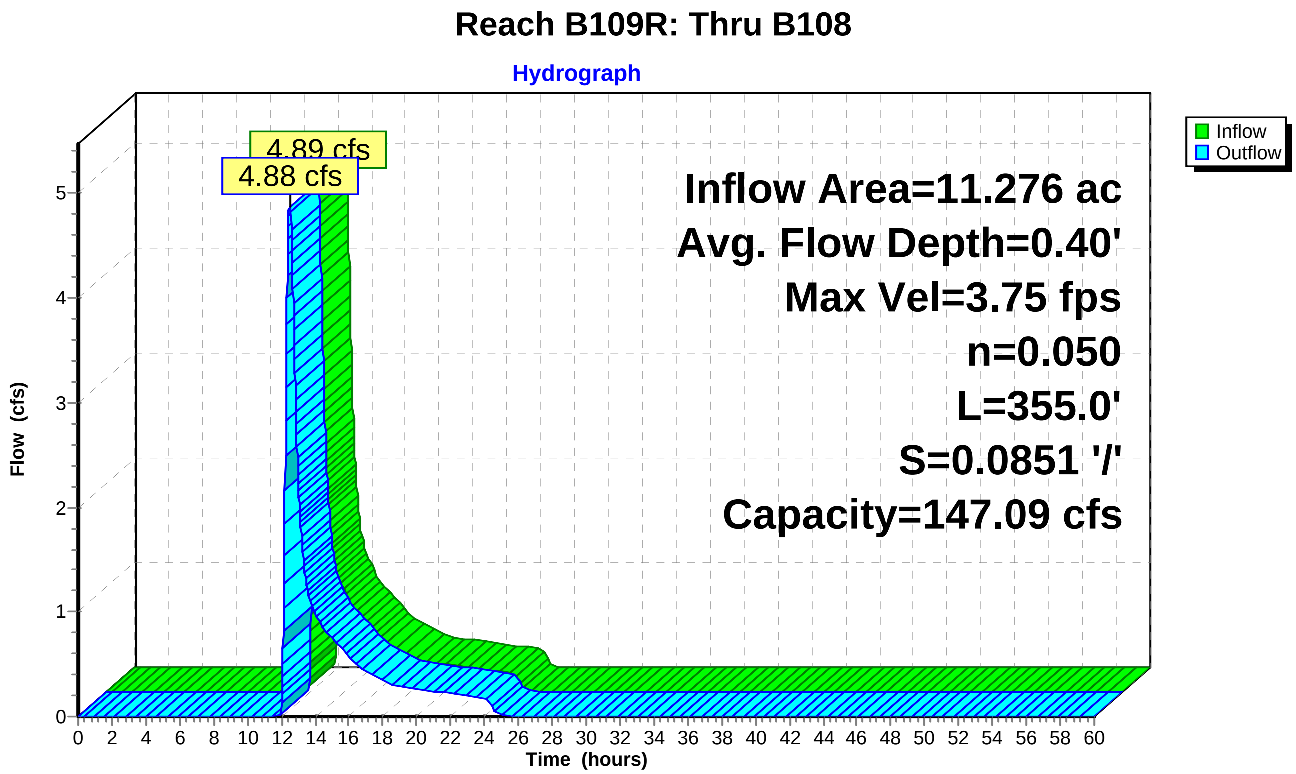
## Summary for Reach B109R: Thru B108

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 4.89 cfs @ 12.47 hrs, Volume= 0.696 af
Outflow = 4.88 cfs @ 12.49 hrs, Volume= 0.696 af, Atten= 0%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.75 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 3.5 min

Peak Storage= 461 cf @ 12.49 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 147.09 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 355.0' Slope= 0.0851 '/'
Inlet Invert= 532.20', Outlet Invert= 502.00'



## Summary for Pond 102A: Wetland B

Inflow Area = 45.922 ac, 9.71% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.10' @ 0.00 hrs Surf.Area= 37,121 sf Storage= 0 cf

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

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.10' | 740,168 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

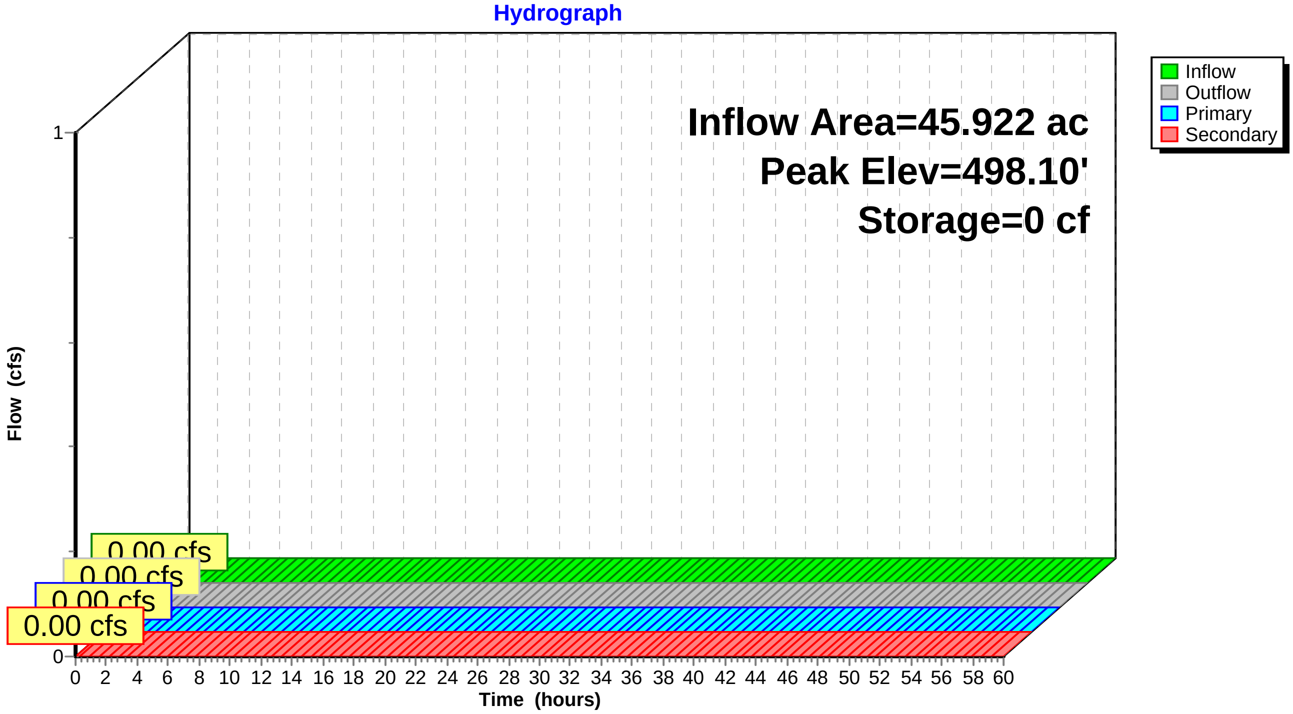
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 498.10 | 37,121 | 782.0 | 0 | 0 | 37,121 |
| 500.00 | 42,629 | 822.0 | 75,702 | 75,702 | 42,449 |
| 502.00 | 54,696 | 1,028.0 | 97,075 | 172,777 | 72,833 |
| 504.00 | 78,374 | 1,409.0 | 132,362 | 305,139 | 146,760 |
| 506.00 | 108,988 | 1,330.0 | 186,523 | 491,662 | 164,196 |
| 508.00 | 140,171 | 1,485.0 | 248,506 | 740,168 | 199,031 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 501.90' / 500.90' S= 0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #2 | Secondary | 506.10' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' (Free Discharge)
└─**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102A: Wetland B



## Summary for Pond 102B: 18" Culvert

[62] Hint: Exceeded Reach B103R OUTLET depth by 0.95' @ 20.74 hrs

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 0.37" for 1-Year event
Inflow = 4.88 cfs @ 20.69 hrs, Volume= 8.210 af
Outflow = 4.88 cfs @ 20.72 hrs, Volume= 8.210 af, Atten= 0%, Lag= 2.1 min
Primary = 4.88 cfs @ 20.72 hrs, Volume= 8.210 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 493.48' @ 20.72 hrs Surf.Area= 659 sf Storage= 281 cf

Plug-Flow detention time= 0.7 min calculated for 8.210 af (100% of inflow)
Center-of-Mass det. time= 0.6 min ( 1,737.4 - 1,736.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 492.20' | 27,470 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

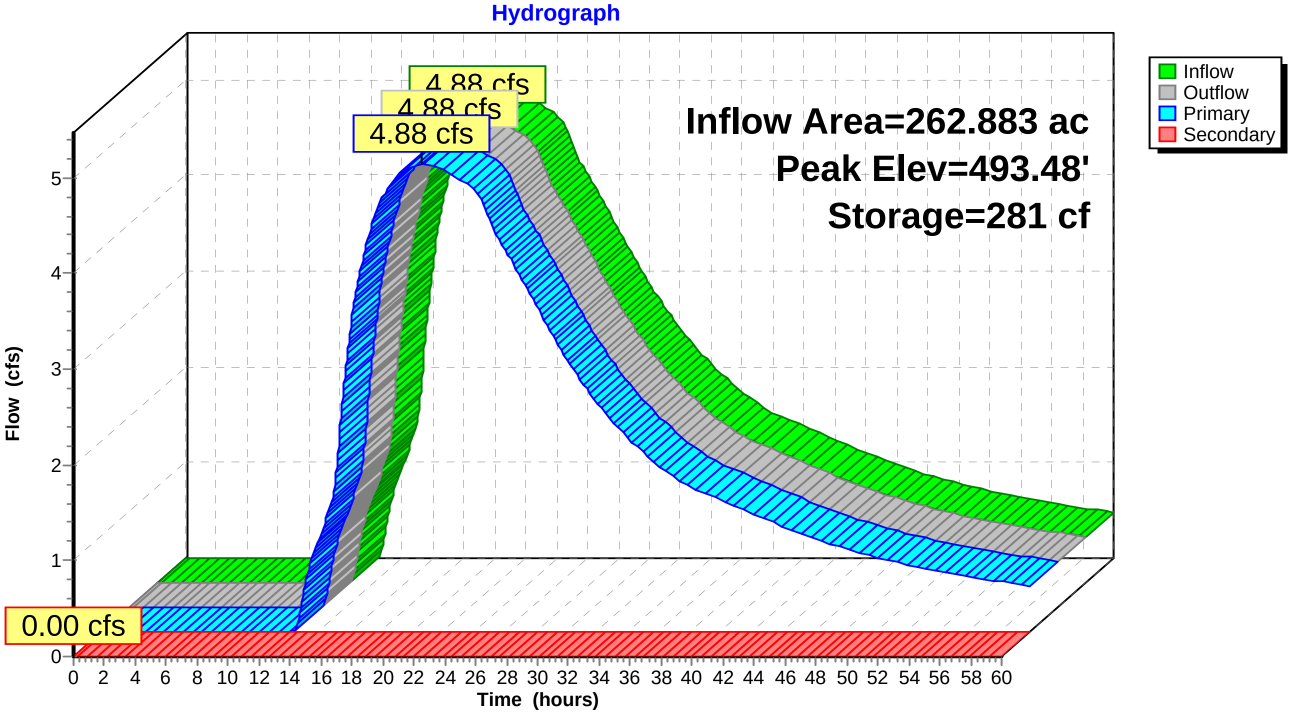
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 492.20 | 0 | 0.0 | 0 | 0 | 0 |
| 496.00 | 5,819 | 521.0 | 7,371 | 7,371 | 21,623 |
| 498.00 | 14,990 | 910.0 | 20,099 | 27,470 | 65,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 492.20' | **18.0" Round Culvert**<br>L= 20.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 492.20' / 491.10' S= 0.0550 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 495.00' | **100.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=4.88 cfs @ 20.72 hrs HW=493.48' TW=492.41' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.88 cfs @ 3.04 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=492.20' TW=492.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102B: 18" Culvert



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.386 ac, 4.49% Impervious, Inflow Depth = 0.18" for 1-Year event
Inflow = 1.18 cfs @ 13.29 hrs, Volume= 0.618 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.20' @ 26.62 hrs Surf.Area= 74,491 sf Storage= 26,930 cf

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

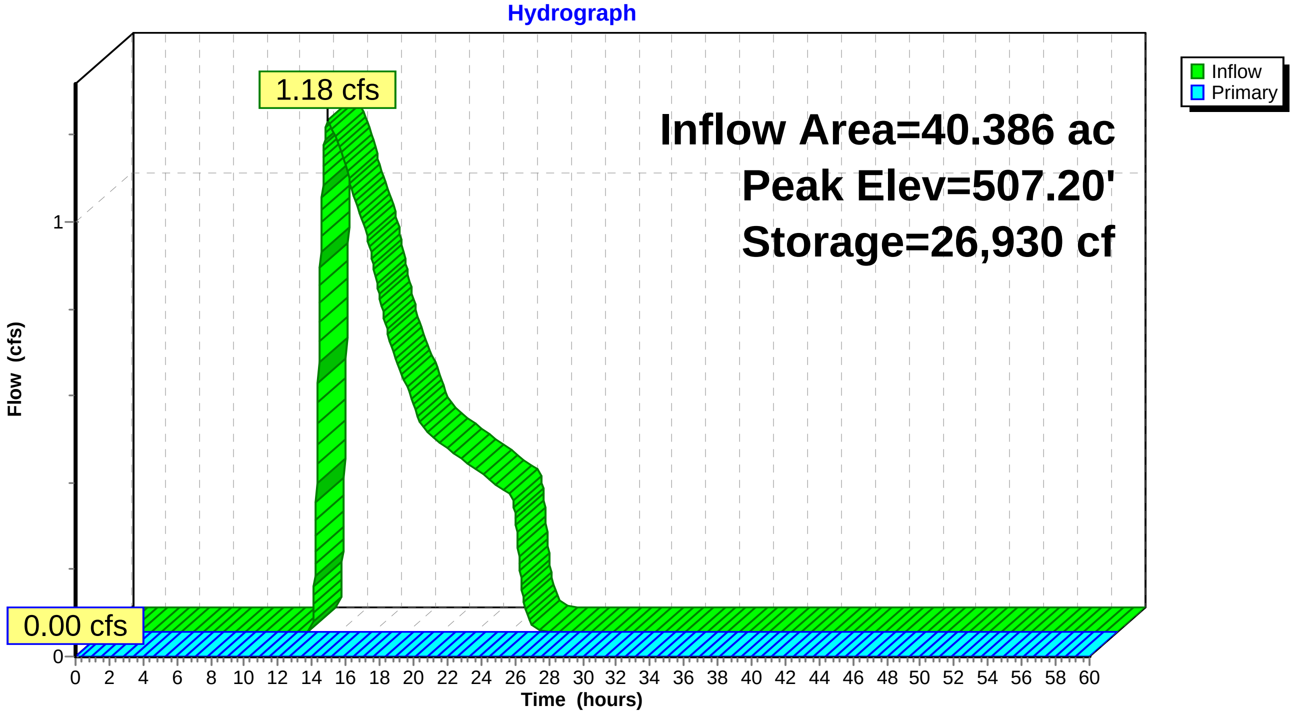
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 103A: Wetland A

Inflow Area = 36.735 ac, 8.79% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 24.30 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 497.40' @ 26.58 hrs Surf.Area= 22,581 sf Storage= 14 cf

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

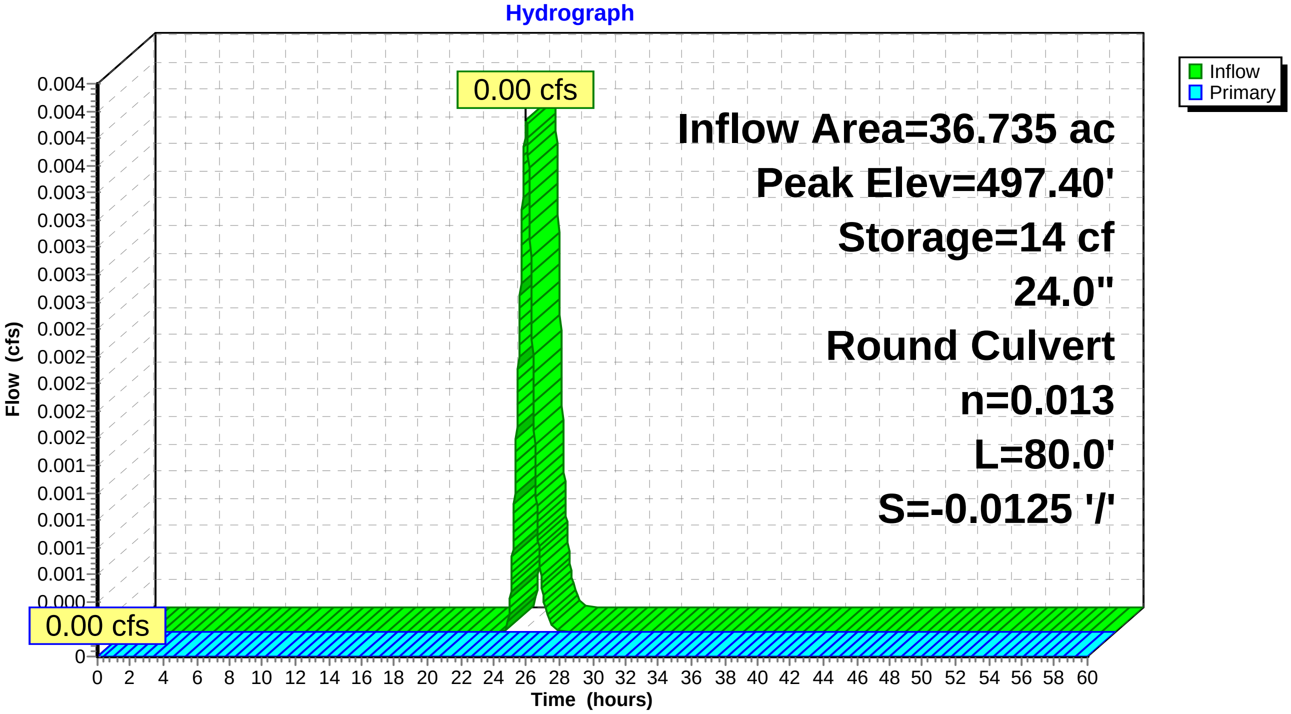
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 497.40' | 751,373 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 497.40 | 22,575 | 625.0 | 0 | 0 | 22,575 |
| 500.00 | 52,914 | 979.0 | 95,378 | 95,378 | 67,808 |
| 502.00 | 73,309 | 1,110.0 | 125,670 | 221,048 | 89,686 |
| 504.00 | 83,807 | 1,169.0 | 156,999 | 378,047 | 100,626 |
| 506.00 | 92,176 | 1,226.0 | 175,917 | 553,963 | 111,750 |
| 508.00 | 105,381 | 1,351.0 | 197,410 | 751,373 | 137,513 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 500.90' / 501.90' S= -0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=497.40' TW=498.10' (Dynamic Tailwater)
**1=Culvert** ( Controls 0.00 cfs)

## Pond 103A: Wetland A



## Summary for Pond 103B: Irrigation Pond

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 0.39" for 1-Year event
Inflow = 4.88 cfs @ 20.17 hrs, Volume= 8.409 af
Outflow = 4.88 cfs @ 20.61 hrs, Volume= 8.216 af, Atten= 0%, Lag= 26.5 min
Primary = 2.26 cfs @ 20.61 hrs, Volume= 5.508 af
Secondary = 2.62 cfs @ 20.61 hrs, Volume= 2.708 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 506.07' @ 20.61 hrs Surf.Area= 89,515 sf Storage= 23,735 cf

Plug-Flow detention time= 130.3 min calculated for 8.213 af (98% of inflow)
Center-of-Mass det. time= 88.1 min ( 1,732.2 - 1,644.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 505.80' | 416,210 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

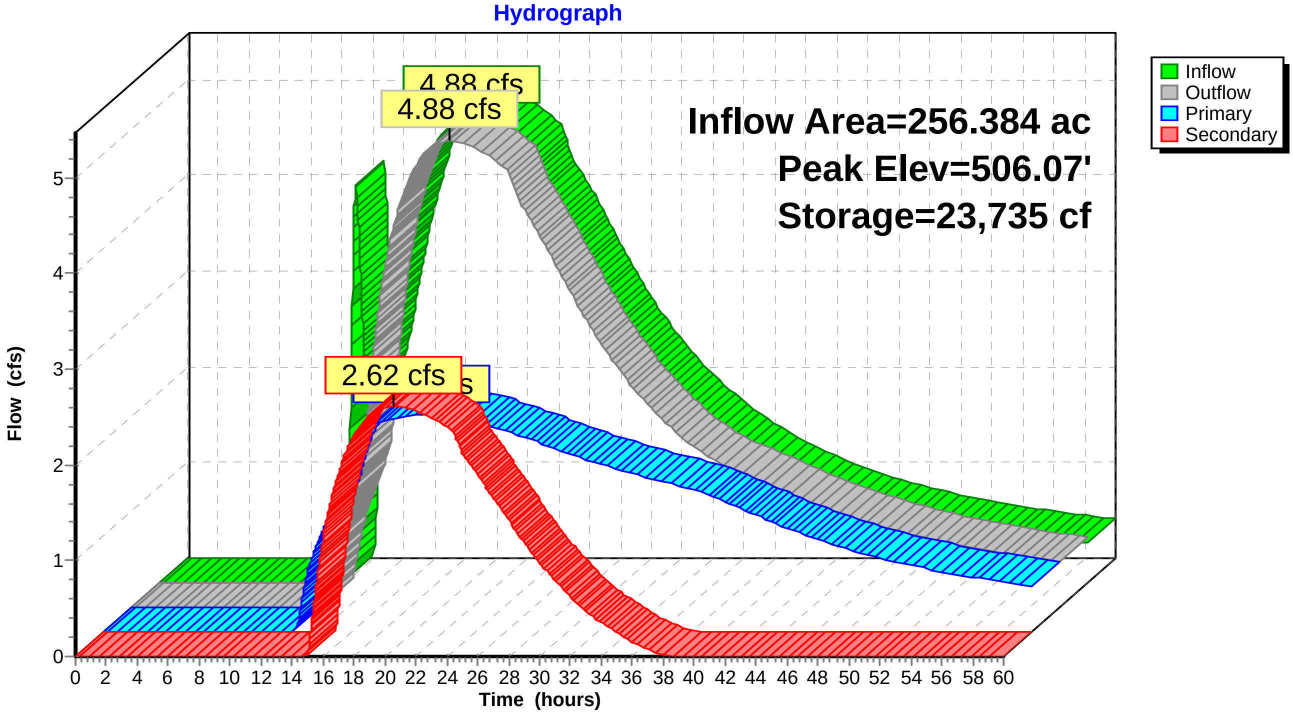
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 505.80 | 88,106 | 1,403.0 | 0 | 0 | 88,106 |
| 508.00 | 100,033 | 1,579.0 | 206,814 | 206,814 | 129,999 |
| 510.00 | 109,433 | 1,610.0 | 209,396 | 416,210 | 138,488 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 505.80' | **5.0' long x 1.80' rise Sharp-Crested Vee/Trap Weir**<br>Cv= 2.62 (C= 3.28) |
| #2 | Secondary | 506.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00<br>Width (feet) 45.00 60.00 80.00 95.00 120.00 |

**Primary OutFlow** Max=2.26 cfs @ 20.61 hrs HW=506.07' TW=502.53' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 2.26 cfs @ 1.69 fps)

**Secondary OutFlow** Max=2.62 cfs @ 20.61 hrs HW=506.07' TW=502.53' (Dynamic Tailwater)
└─**2=Custom Weir/Orifice** (Weir Controls 2.62 cfs @ 0.85 fps)

## Pond 103B: Irrigation Pond



## Summary for Pond 104A: Wetland D

Inflow Area = 9.432 ac, 9.40% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.70' @ 0.00 hrs Surf.Area= 18,708 sf Storage= 0 cf

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

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

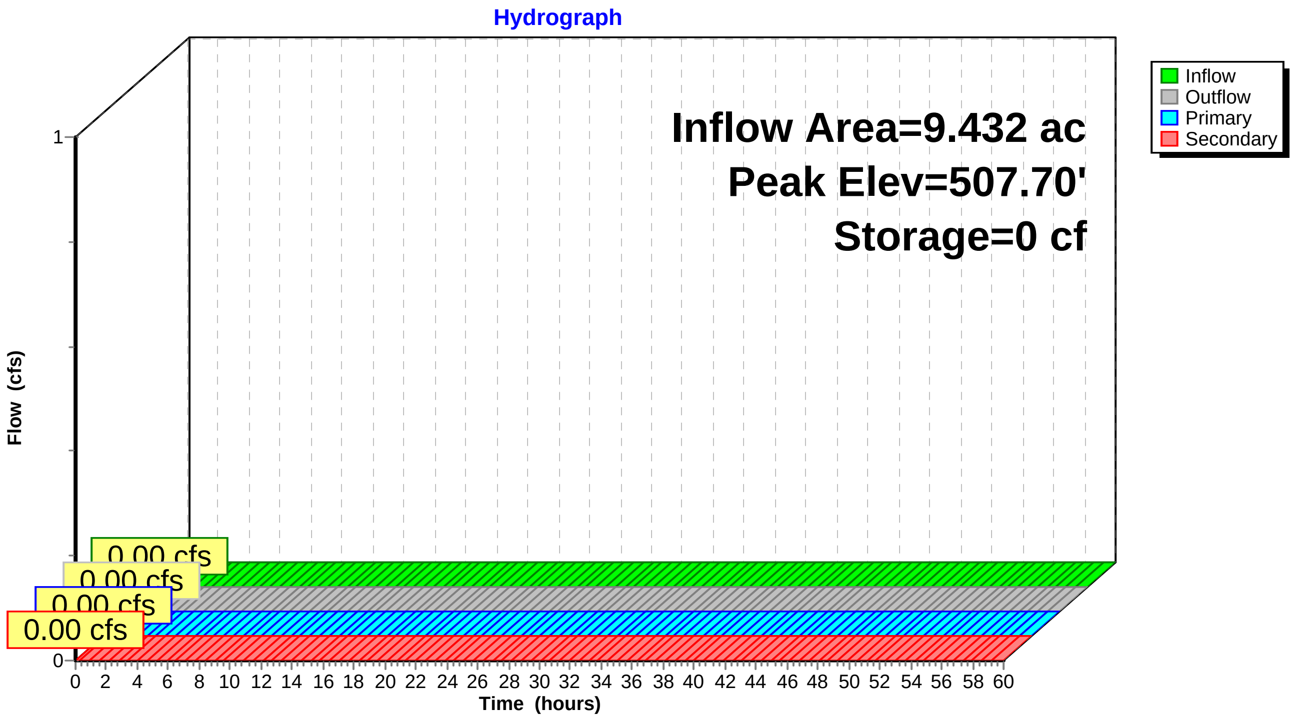
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 104A: Wetland D



## Summary for Pond 104B: Island Pond

Inflow Area = 234.803 ac, 5.37% Impervious, Inflow Depth = 0.47" for 1-Year event
Inflow = 29.67 cfs @ 13.49 hrs, Volume= 9.192 af
Outflow = 4.50 cfs @ 20.72 hrs, Volume= 7.540 af, Atten= 85%, Lag= 433.9 min
Primary = 4.50 cfs @ 20.72 hrs, Volume= 7.540 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 509.26' @ 20.72 hrs Surf.Area= 240,821 sf Storage= 248,028 cf

Plug-Flow detention time= 784.5 min calculated for 7.540 af (82% of inflow)
Center-of-Mass det. time= 699.5 min ( 1,724.6 - 1,025.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 508.20' | 1,023,136 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 508.20 | 228,830 | 3,183.0 | 0 | 0 | 228,830 |
| 510.00 | 249,447 | 3,224.0 | 430,316 | 430,316 | 250,515 |
| 512.00 | 346,000 | 3,042.0 | 592,820 | 1,023,136 | 341,482 |

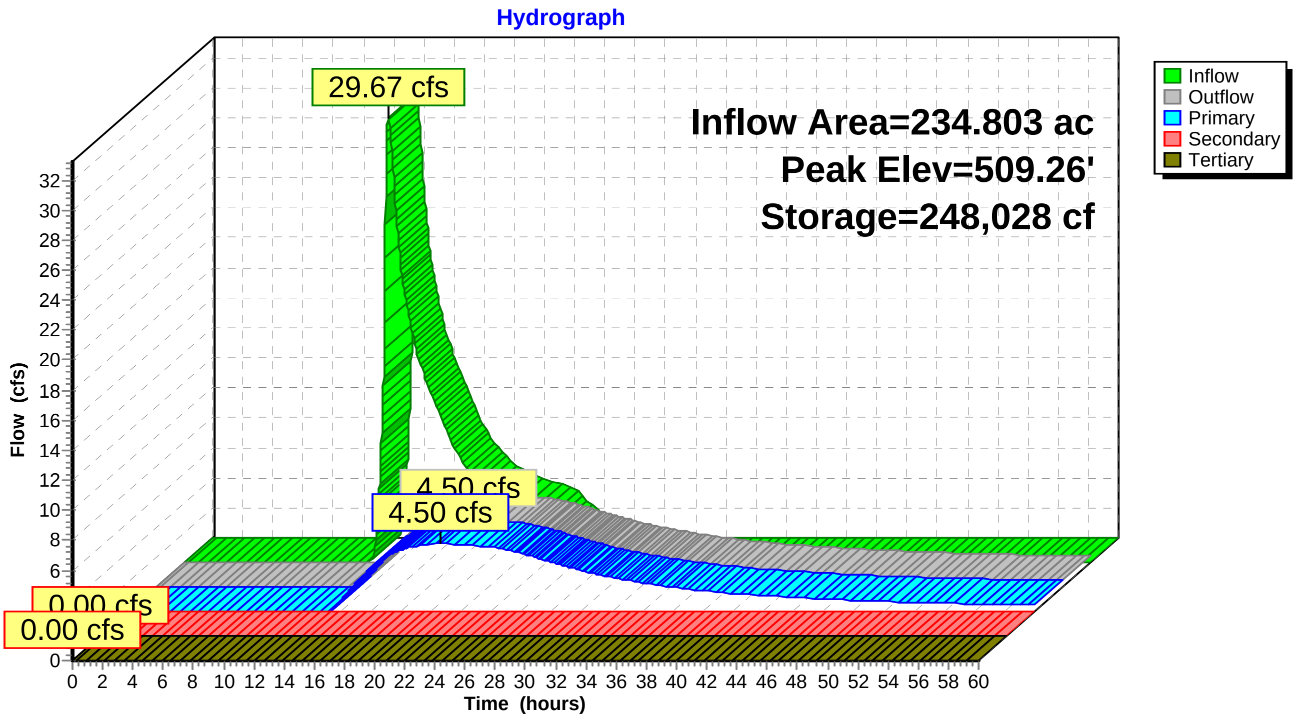
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 508.22' | **24.0" Round Culvert**<br>L= 111.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 508.22' / 505.43' S= 0.0251 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 3.14 sf |
| #2 | Secondary | 510.00' | **50.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Tertiary | 510.00' | **80.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=4.50 cfs @ 20.72 hrs HW=509.26' TW=506.07' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.50 cfs @ 2.74 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=508.20' TW=505.80' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=508.20' TW=502.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 104B: Island Pond



## Summary for Pond 105A: Wetland H

Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 0.27" for 1-Year event
Inflow = 5.90 cfs @ 12.52 hrs, Volume= 1.120 af
Outflow = 1.61 cfs @ 14.08 hrs, Volume= 1.105 af, Atten= 73%, Lag= 93.4 min
Primary = 1.61 cfs @ 14.08 hrs, Volume= 1.105 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 573.47' @ 14.08 hrs Surf.Area= 24,885 sf Storage= 13,428 cf

Plug-Flow detention time= 195.1 min calculated for 1.105 af (99% of inflow)
Center-of-Mass det. time= 187.8 min ( 1,140.0 - 952.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

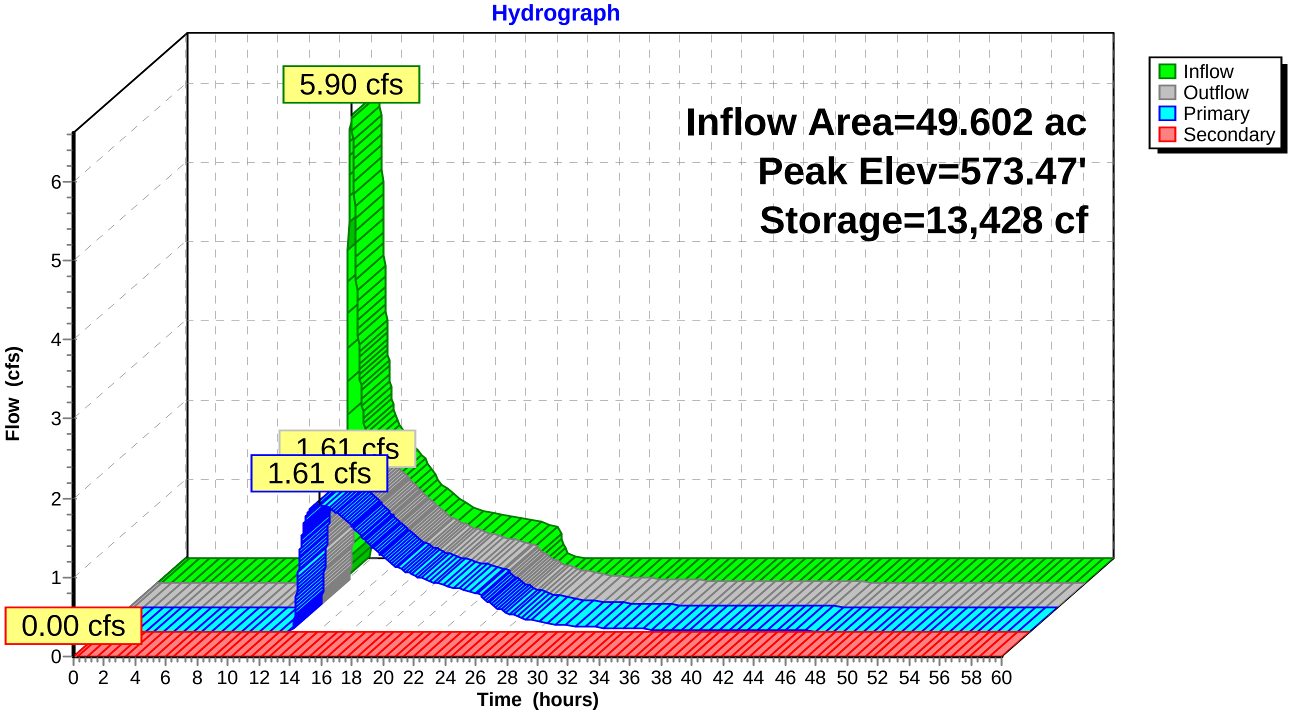
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=1.61 cfs @ 14.08 hrs HW=573.47' TW=566.29' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.61 cfs @ 2.58 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=572.90' TW=566.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 105A: Wetland H



## Summary for Pond 105B: Wetland J

Inflow Area = 154.267 ac, 1.16% Impervious, Inflow Depth = 0.63" for 1-Year event
Inflow = 28.51 cfs @ 13.34 hrs, Volume= 8.146 af
Outflow = 27.86 cfs @ 13.49 hrs, Volume= 8.145 af, Atten= 2%, Lag= 9.1 min
Primary = 27.86 cfs @ 13.49 hrs, Volume= 8.145 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 515.93' @ 13.49 hrs Surf.Area= 26,740 sf Storage= 35,560 cf

Plug-Flow detention time= 44.4 min calculated for 8.143 af (100% of inflow)
Center-of-Mass det. time= 44.6 min ( 1,023.9 - 979.3 )

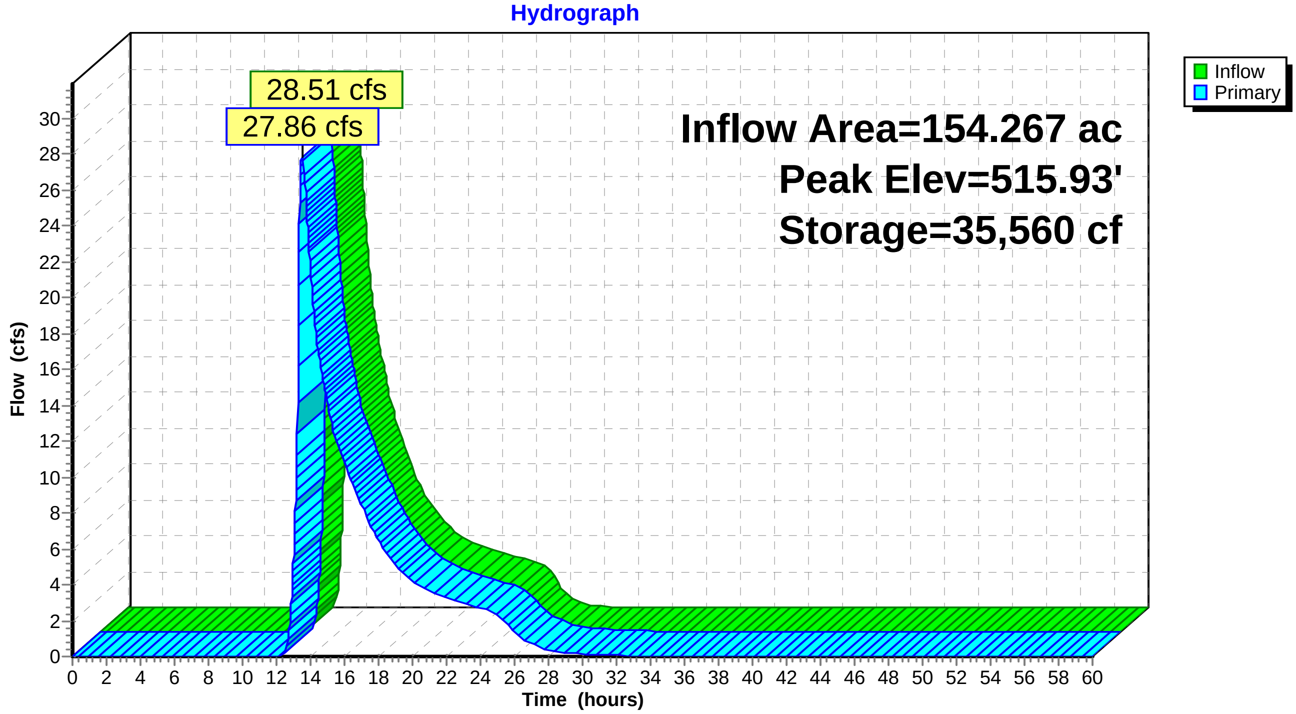
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 514.40' | 102,307 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 514.40 | 19,952 | 567.0 | 0 | 0 | 19,952 |
| 516.00 | 27,082 | 686.0 | 37,482 | 37,482 | 31,860 |
| 516.50 | 28,121 | 699.0 | 13,800 | 51,282 | 33,334 |
| 518.00 | 40,275 | 840.0 | 51,025 | 102,307 | 50,641 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 514.40' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.25 1.60 2.60 3.60<br>Width (feet) 2.33 2.33 90.00 120.00 170.00 |

**Primary OutFlow** Max=27.85 cfs @ 13.49 hrs HW=515.93' TW=508.36' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 27.85 cfs @ 2.10 fps)

## Pond 105B: Wetland J



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 0.69" for 1-Year event
Inflow = 6.09 cfs @ 12.45 hrs, Volume= 0.876 af
Outflow = 6.09 cfs @ 12.45 hrs, Volume= 0.876 af, Atten= 0%, Lag= 0.0 min
Primary = 6.09 cfs @ 12.45 hrs, Volume= 0.876 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 717.63' @ 12.45 hrs Surf.Area= 10 sf Storage= 3 cf

Plug-Flow detention time= 0.0 min calculated for 0.875 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 908.9 - 908.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

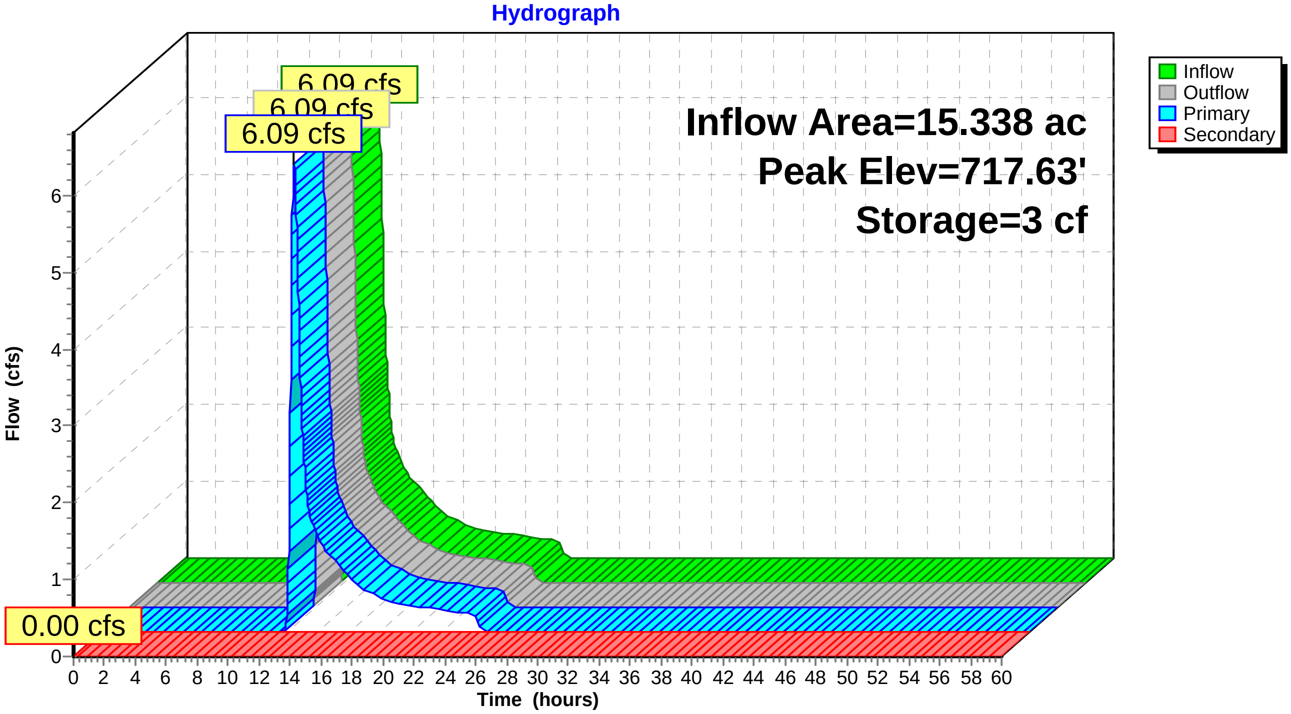
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=6.08 cfs @ 12.45 hrs HW=717.63' TW=686.43' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 6.08 cfs @ 3.28 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=686.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 130.289 ac, 0.83% Impervious, Inflow Depth = 0.69" for 1-Year event
Inflow = 26.83 cfs @ 13.33 hrs, Volume= 7.437 af
Outflow = 26.80 cfs @ 13.35 hrs, Volume= 7.437 af, Atten= 0%, Lag= 1.4 min
Primary = 26.80 cfs @ 13.35 hrs, Volume= 7.437 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.39' @ 13.35 hrs Surf.Area= 11,415 sf Storage= 15,482 cf

Plug-Flow detention time= 16.9 min calculated for 7.437 af (100% of inflow)
Center-of-Mass det. time= 16.7 min ( 980.3 - 963.7 )

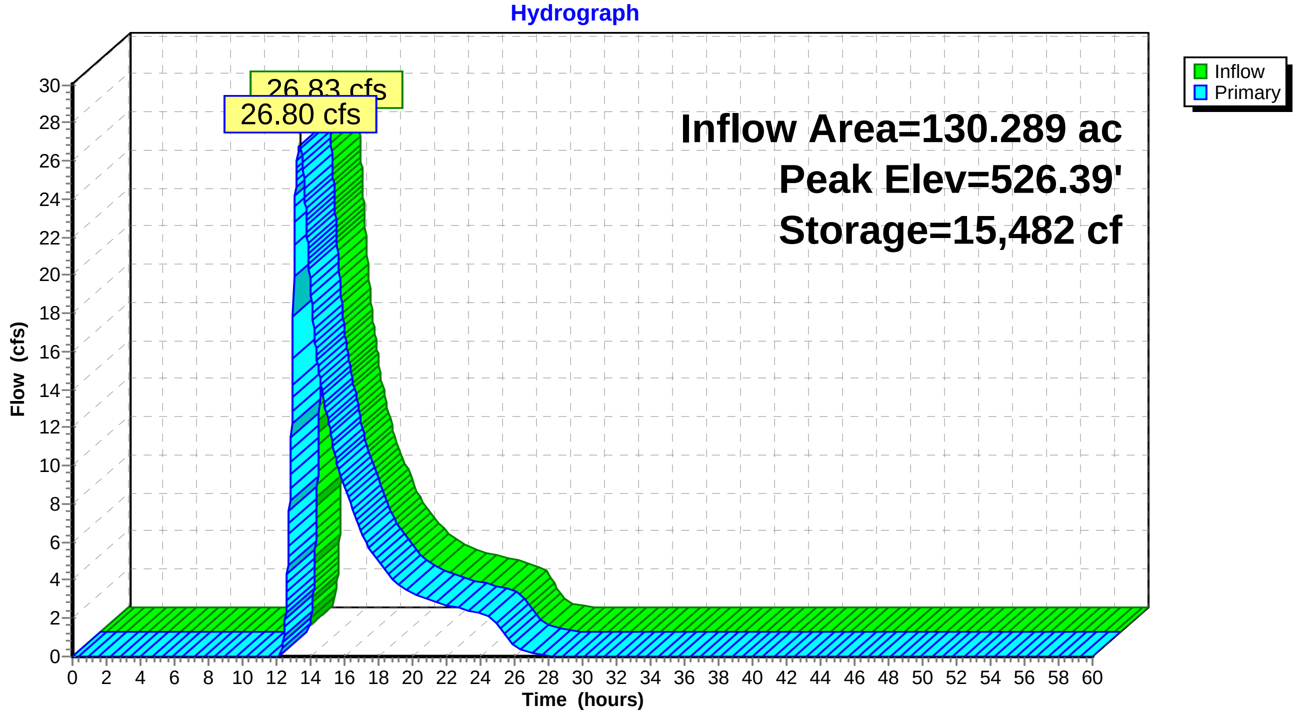
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=26.80 cfs @ 13.35 hrs HW=526.39' TW=515.91' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 26.80 cfs @ 2.23 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

Inflow Area = 95.411 ac, 2.35% Impervious, Inflow Depth = 0.53" for 1-Year event
Inflow = 16.59 cfs @ 13.02 hrs, Volume= 4.216 af
Outflow = 16.59 cfs @ 13.02 hrs, Volume= 4.216 af, Atten= 0%, Lag= 0.2 min
Primary = 16.59 cfs @ 13.02 hrs, Volume= 4.216 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 621.56' @ 13.02 hrs Surf.Area= 137 sf Storage= 90 cf

Plug-Flow detention time= 0.1 min calculated for 4.214 af (100% of inflow)
Center-of-Mass det. time= 0.1 min ( 959.1 - 959.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

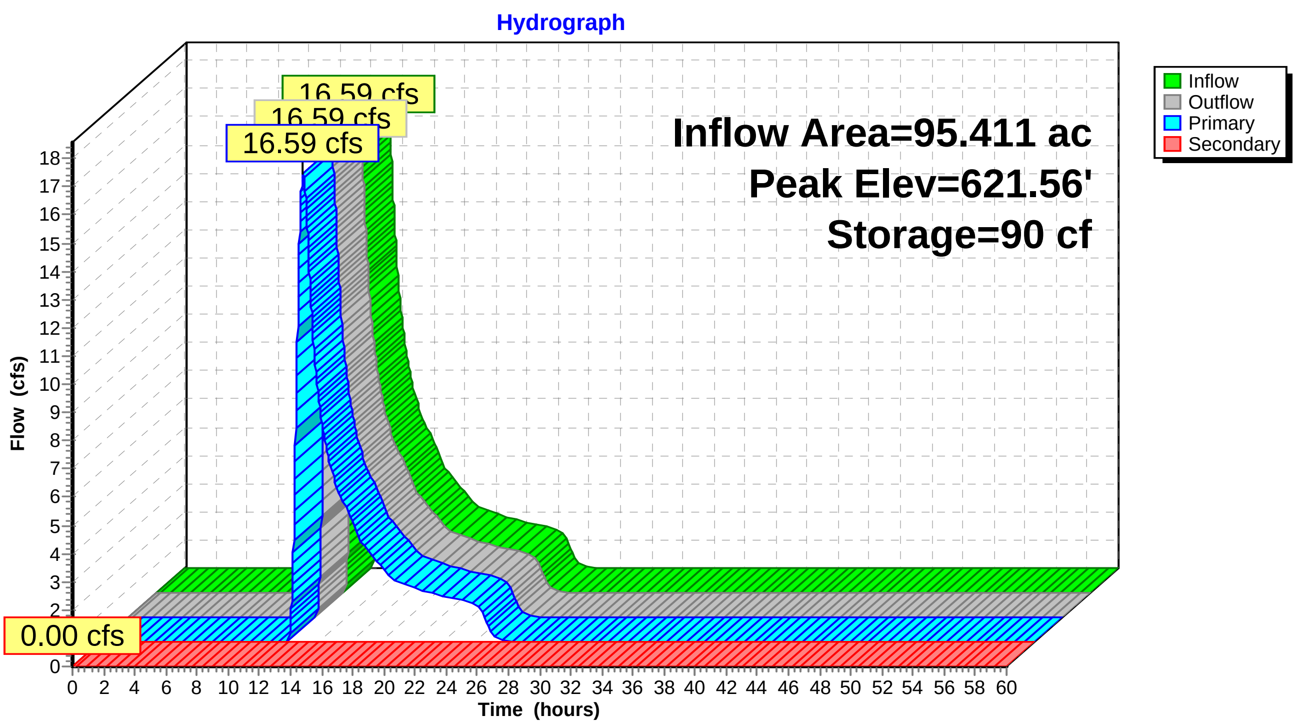
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=16.58 cfs @ 13.02 hrs HW=621.56' TW=608.83' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 16.58 cfs @ 5.65 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=619.60' TW=608.80' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** ( Controls 0.00 cfs)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 5.44 cfs @ 12.61 hrs, Volume= 0.885 af
Outflow = 1.11 cfs @ 14.48 hrs, Volume= 0.609 af, Atten= 80%, Lag= 112.5 min
Primary = 1.11 cfs @ 14.48 hrs, Volume= 0.609 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.65' @ 14.48 hrs Surf.Area= 121,235 sf Storage= 17,749 cf

Plug-Flow detention time= 294.9 min calculated for 0.609 af (69% of inflow)
Center-of-Mass det. time= 184.5 min ( 1,098.3 - 913.8 )

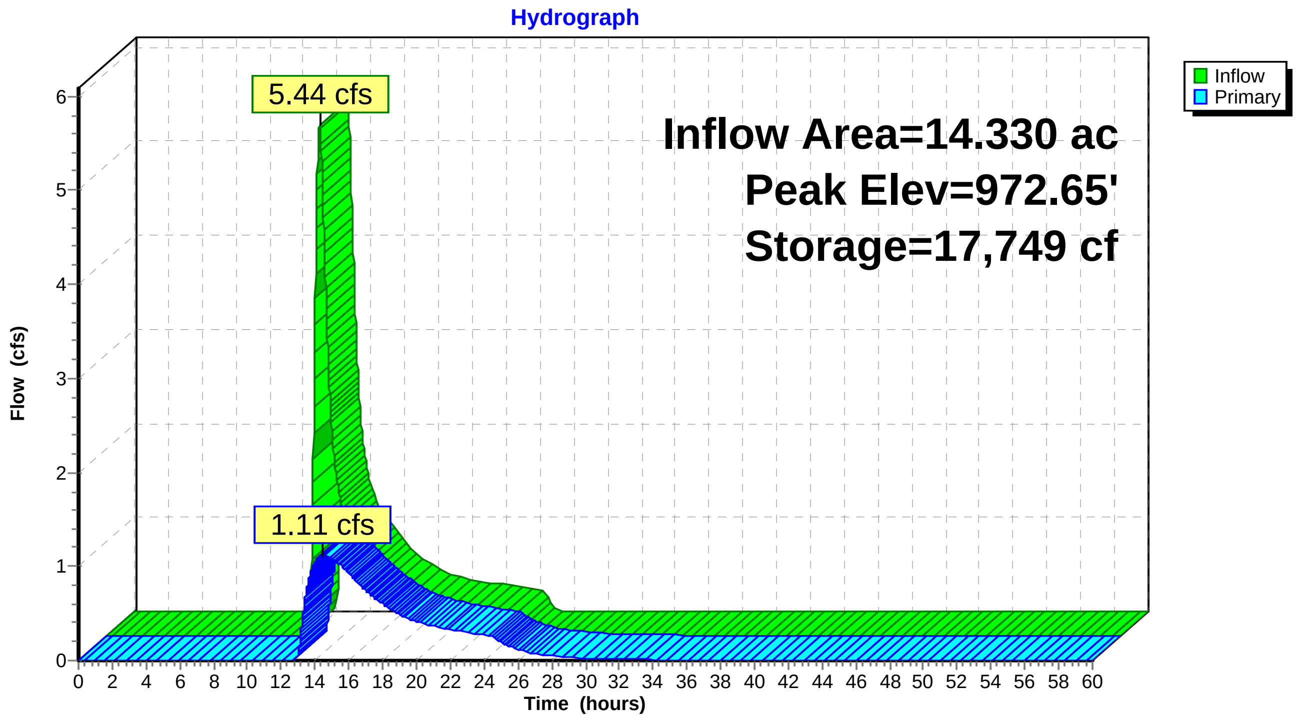
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=1.11 cfs @ 14.48 hrs HW=972.65' TW=972.10' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.11 cfs @ 0.58 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

Inflow Area = 5.526 ac, 2.32% Impervious, Inflow Depth = 0.04" for 1-Year event
Inflow = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af
Outflow = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.3 min
Primary = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 608.88' @ 16.09 hrs Surf.Area= 13 sf Storage= 1 cf

Plug-Flow detention time= 0.8 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 0.8 min ( 1,170.6 - 1,169.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

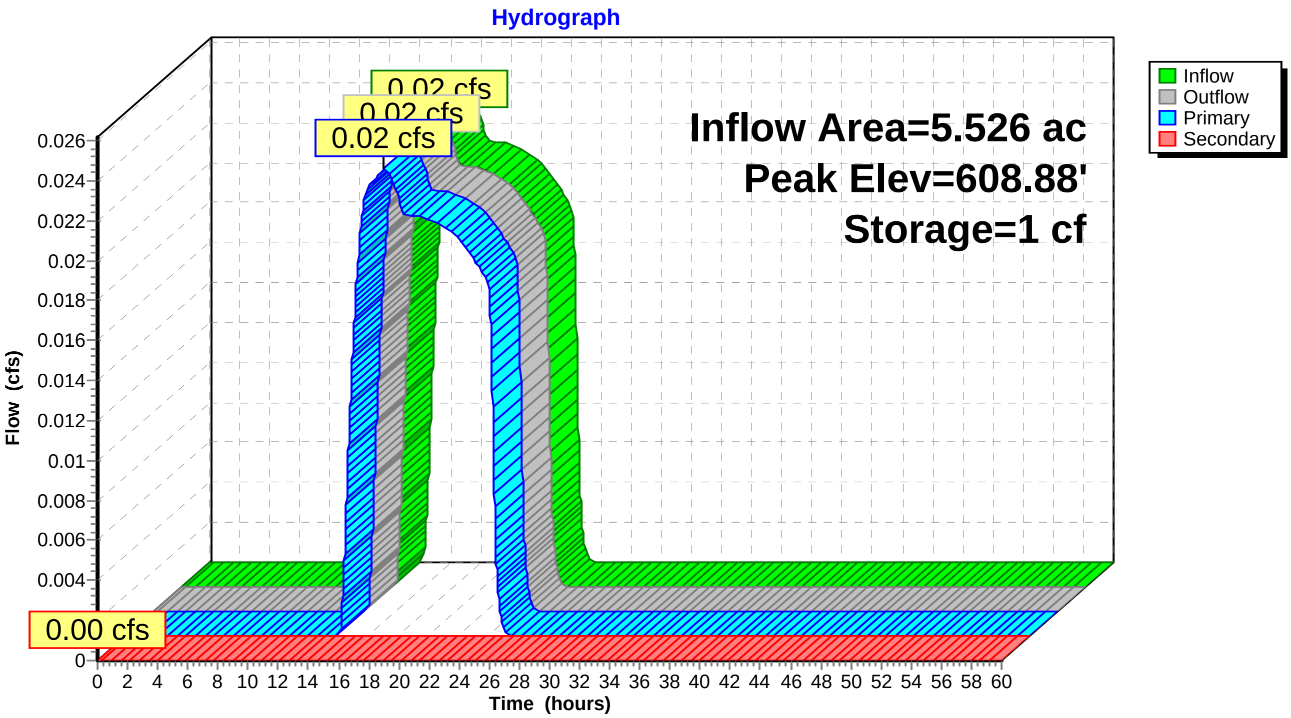
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.02 cfs @ 17.16 hrs HW=608.88' TW=608.39' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.02 cfs @ 0.70 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=608.80' TW=608.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 108A: 36" Culvert



## Summary for Pond 108B: Wetland N

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 0.66" for 1-Year event
Inflow = 19.77 cfs @ 12.61 hrs, Volume= 3.975 af
Outflow = 19.74 cfs @ 12.63 hrs, Volume= 3.950 af, Atten= 0%, Lag= 1.3 min
Primary = 3.58 cfs @ 12.63 hrs, Volume= 2.527 af
Secondary = 16.17 cfs @ 12.63 hrs, Volume= 1.423 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.14' @ 12.63 hrs Surf.Area= 10,734 sf Storage= 11,324 cf

Plug-Flow detention time= 47.0 min calculated for 3.950 af (99% of inflow)
Center-of-Mass det. time= 41.0 min ( 989.6 - 948.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 32,385 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

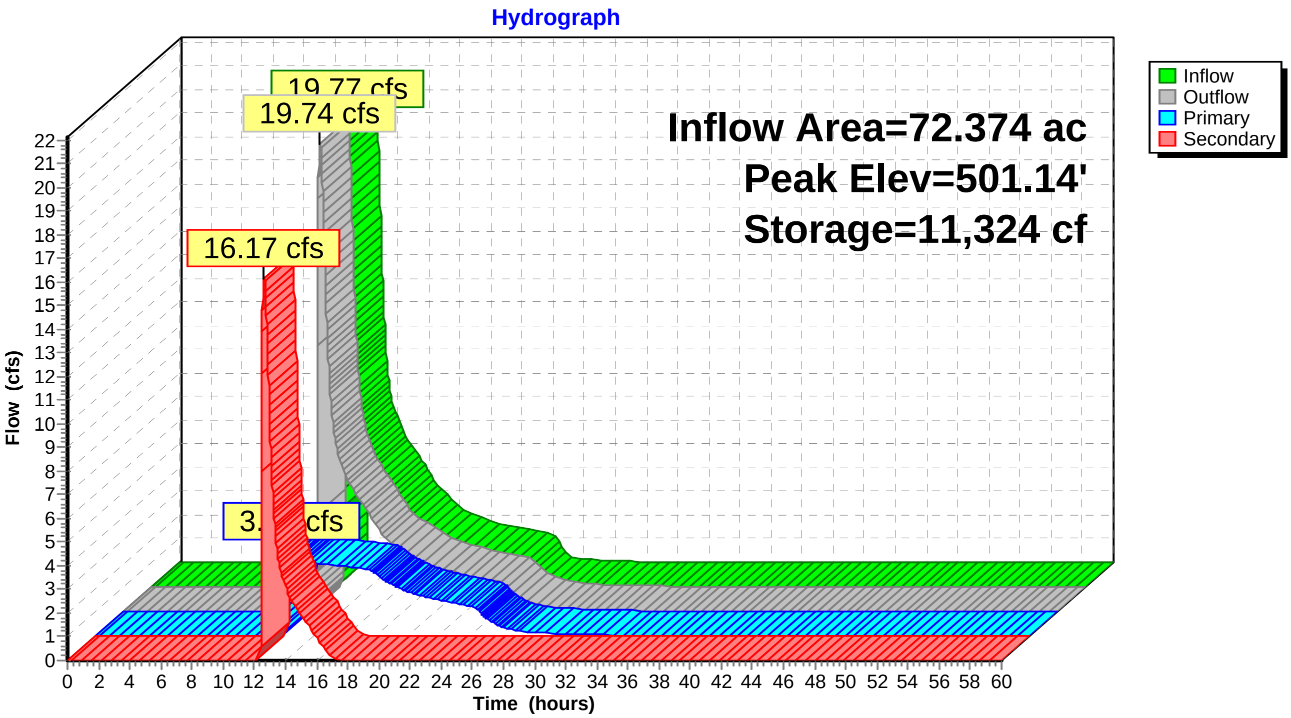
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 500.00 | 8,398 | 412.0 | 0 | 0 | 8,398 |
| 500.50 | 10,185 | 434.0 | 4,639 | 4,639 | 9,894 |
| 502.00 | 11,496 | 452.0 | 16,251 | 20,889 | 11,327 |
| 503.00 | 11,496 | 452.0 | 11,496 | 32,385 | 11,779 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.10' | **18.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 500.10' / 499.60' S= 0.0250 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 501.00' | **125.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=3.58 cfs @ 12.63 hrs HW=501.14' TW=500.13' (Dynamic Tailwater)
└—**1=Culvert** (Inlet Controls 3.58 cfs @ 2.74 fps)

**Secondary OutFlow** Max=16.16 cfs @ 12.63 hrs HW=501.14' TW=500.13' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 16.16 cfs @ 0.93 fps)

## Pond 108B: Wetland N



## Summary for Pond 109B: 36" Culvert

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 4.89 cfs @ 12.47 hrs, Volume= 0.696 af
Outflow = 4.89 cfs @ 12.47 hrs, Volume= 0.696 af, Atten= 0%, Lag= 0.0 min
Primary = 4.89 cfs @ 12.47 hrs, Volume= 0.696 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 546.13' @ 12.47 hrs Surf.Area= 23 sf Storage= 7 cf

Plug-Flow detention time= 0.0 min calculated for 0.696 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 905.1 - 905.1 )

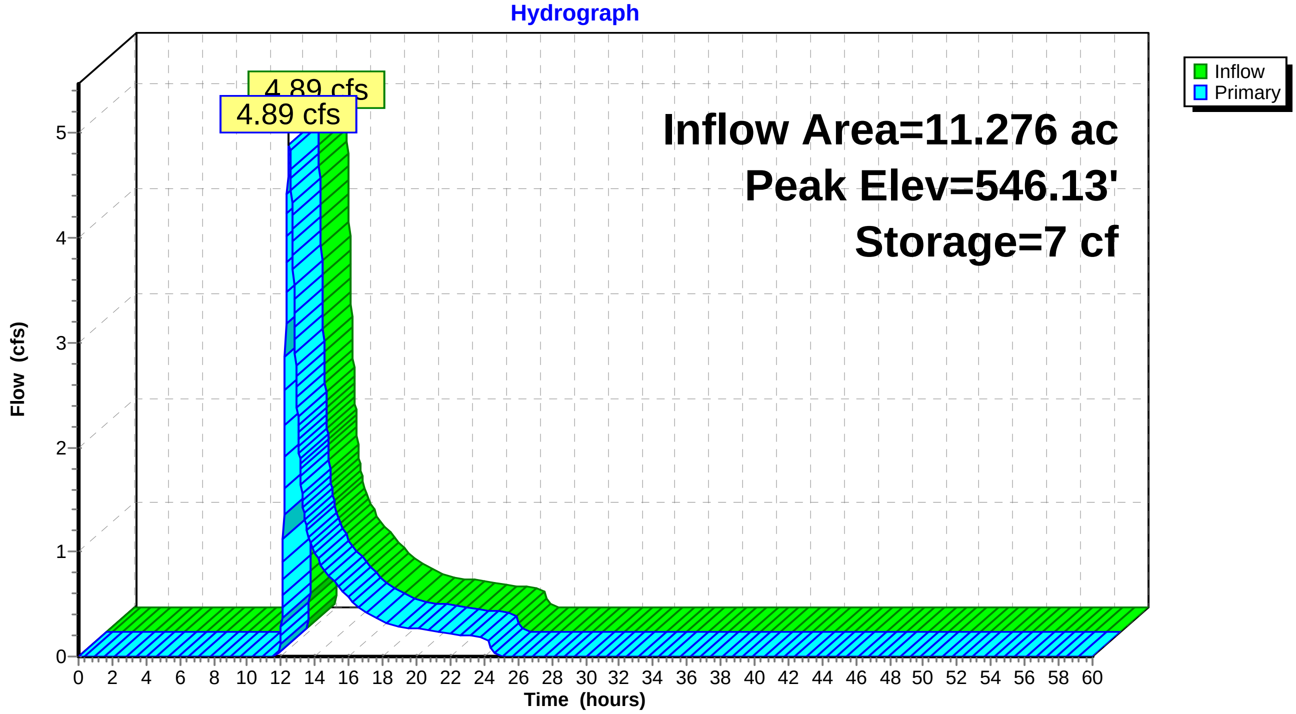
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 545.20' | 5,884 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 545.20 | 0 | 0.0 | 0 | 0 | 0 |
| 548.00 | 203 | 65.0 | 189 | 189 | 348 |
| 550.00 | 519 | 101.0 | 698 | 887 | 852 |
| 552.00 | 1,050 | 140.0 | 1,538 | 2,425 | 1,638 |
| 554.00 | 2,514 | 230.0 | 3,459 | 5,884 | 4,313 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 545.20' | **36.0" Round Culvert**<br>L= 96.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 545.20' / 532.20' S= 0.1354 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Primary | 552.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 65.00 95.00<br>Height (feet) 2.00 0.60 0.00 2.00 |

**Primary OutFlow** Max=4.88 cfs @ 12.47 hrs HW=546.13' TW=532.60' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 4.88 cfs @ 2.60 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond 109B: 36" Culvert

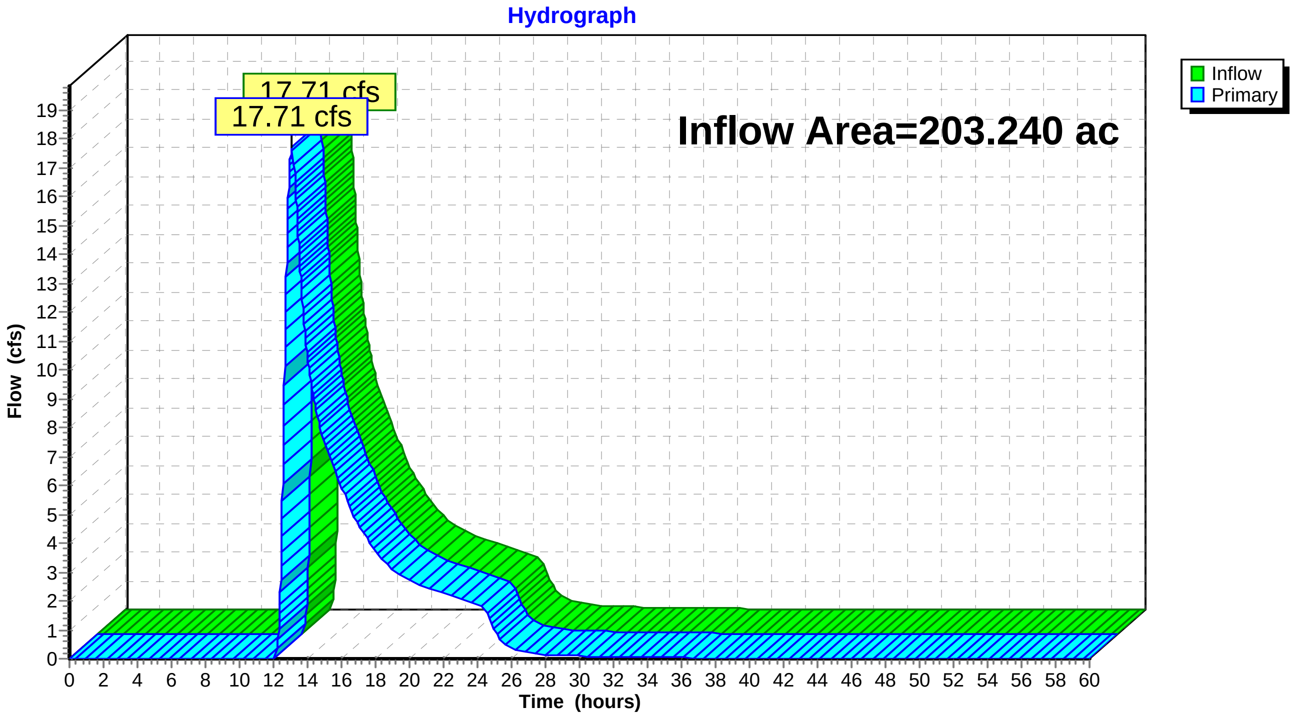


## Summary for Link A: Amenia Stream

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 203.240 ac, | 3.66% Impervious, | Inflow Depth > 0.32" | for 1-Year event |
| Inflow = | 17.71 cfs @ | 13.09 hrs, Volume= | 5.337 af | |
| Primary = | 17.71 cfs @ | 13.09 hrs, Volume= | 5.337 af, Atten= 0%, Lag= 0.0 min | |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link A: Amenia Stream

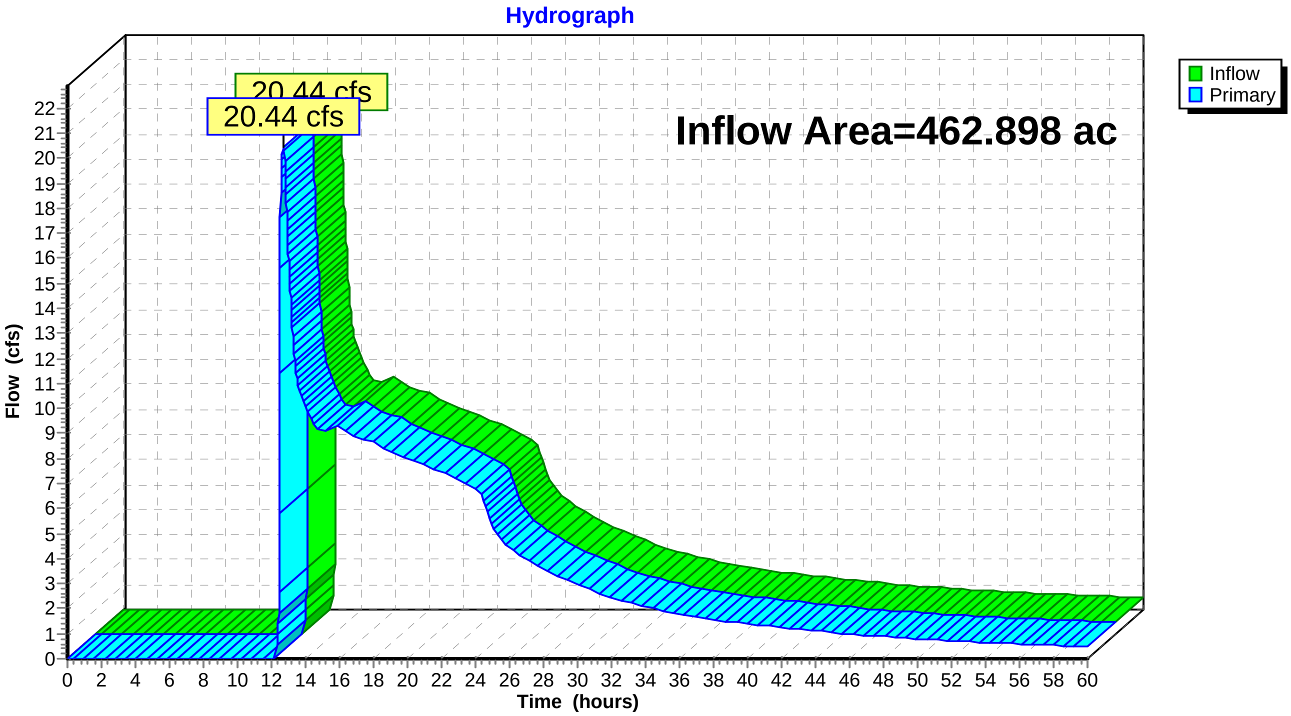


## Summary for Link B: Wetland

| | | | |
|---|---|---|---|
| Inflow Area = | 462.898 ac, | 3.63% Impervious, Inflow Depth > 0.36" | for 1-Year event |
| Inflow = | 20.44 cfs @ | 12.68 hrs, Volume= | 13.817 af |
| Primary = | 20.44 cfs @ | 12.68 hrs, Volume= | 13.817 af, Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link B: Wetland

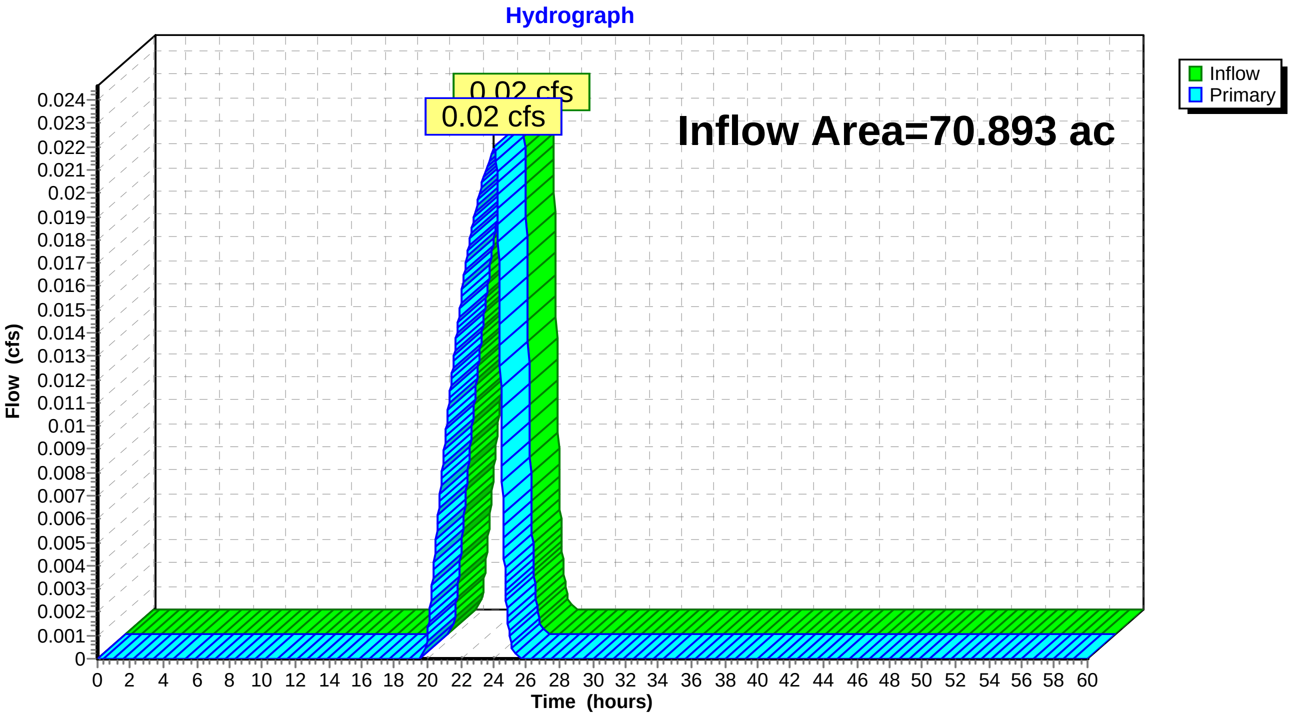


## Summary for Link C: Culvert

| | | | | | |
|---|---|---|---|---|---|
| Inflow Area = | 70.893 ac, | 4.53% Impervious, | Inflow Depth = 0.00" | for 1-Year event | |
| Inflow = | 0.02 cfs @ | 24.06 hrs, | Volume= | 0.006 af | |
| Primary = | 0.02 cfs @ | 24.06 hrs, | Volume= | 0.006 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

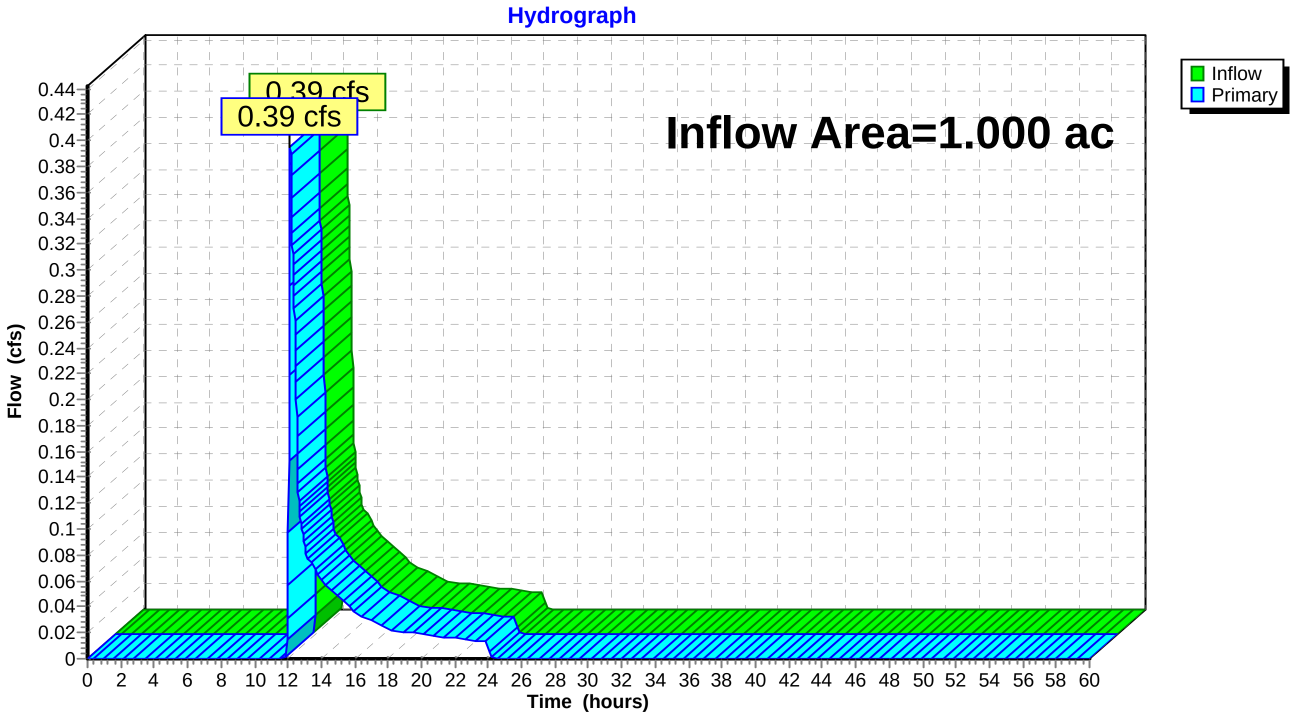


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 0.53" for 1-Year event
Inflow = 0.39 cfs @ 12.14 hrs, Volume= 0.044 af
Primary = 0.39 cfs @ 12.14 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=43.269 ac 4.21% Impervious Runoff Depth=0.08"
Flow Length=1,315' Tc=31.0 min CN=46 Runoff=0.40 cfs 0.271 af

**Subcatchment A102: A102** Runoff Area=9.187 ac 13.40% Impervious Runoff Depth=0.20"
Flow Length=675' Tc=29.1 min CN=50 Runoff=0.25 cfs 0.150 af

**Subcatchment A103: A103** Runoff Area=36.735 ac 8.79% Impervious Runoff Depth=0.27"
Flow Length=1,190' Tc=45.1 min CN=52 Runoff=1.50 cfs 0.837 af

**Subcatchment A104: A104** Runoff Area=9.432 ac 9.40% Impervious Runoff Depth=0.05"
Flow Length=1,015' Tc=29.2 min CN=45 Runoff=0.06 cfs 0.042 af

**Subcatchment A105: A105** Runoff Area=34.264 ac 3.27% Impervious Runoff Depth=0.68"
Flow Length=1,326' Tc=19.2 min CN=60 Runoff=11.08 cfs 1.947 af

**Subcatchment A106: A106** Runoff Area=15.338 ac 8.12% Impervious Runoff Depth=1.88"
Flow Length=1,260' Tc=26.7 min CN=76 Runoff=19.99 cfs 2.404 af

**Subcatchment A107: A107** Runoff Area=95.411 ac 2.35% Impervious Runoff Depth=1.62"
Flow Length=3,685' Tc=61.0 min CN=73 Runoff=67.03 cfs 12.892 af

**Subcatchment A108: A108** Runoff Area=5.526 ac 2.32% Impervious Runoff Depth=0.51"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=0.92 cfs 0.236 af

**Subcatchment B101: B101** Runoff Area=127.641 ac 0.75% Impervious Runoff Depth=0.87"
Flow Length=2,934' Tc=43.8 min CN=63 Runoff=44.77 cfs 9.261 af

**Subcatchment B102: B102** Runoff Area=6.499 ac 2.62% Impervious Runoff Depth=0.32"
Flow Length=637' Tc=19.6 min CN=53 Runoff=0.45 cfs 0.171 af

**Subcatchment B103: B103** Runoff Area=21.581 ac 11.93% Impervious Runoff Depth=1.54"
Flow Length=1,130' Tc=38.7 min CN=72 Runoff=18.45 cfs 2.767 af

**Subcatchment B104: B104** Runoff Area=80.536 ac 13.45% Impervious Runoff Depth=0.87"
Flow Length=3,223' Tc=33.2 min CN=63 Runoff=32.46 cfs 5.843 af

**Subcatchment B105: B105** Runoff Area=23.978 ac 2.94% Impervious Runoff Depth=1.30"
Flow Length=1,400' Tc=38.0 min CN=69 Runoff=16.51 cfs 2.597 af

**Subcatchment B106: B106** Runoff Area=130.289 ac 0.83% Impervious Runoff Depth=1.88"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=88.13 cfs 20.421 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=1.97"
Flow Length=907' Tc=37.9 min CN=77 Runoff=16.70 cfs 2.353 af

**Subcatchment B108: B108** Runoff Area=46.768 ac 1.07% Impervious Runoff Depth=1.88"
Flow Length=2,241' Tc=39.8 min CN=76 Runoff=50.42 cfs 7.330 af

**Subcatchment B109: B109** Runoff Area=11.276 ac 0.04% Impervious Runoff Depth=1.97"
Flow Length=1,048' Tc=28.5 min CN=77 Runoff=15.06 cfs 1.852 af

**Subcatchment C101: C101** Runoff Area=30.507 ac 4.58% Impervious Runoff Depth=0.32"
Flow Length=1,500' Tc=31.9 min CN=53 Runoff=1.81 cfs 0.803 af

**Subcatchment C102: C102** Runoff Area=40.386 ac 4.49% Impervious Runoff Depth=0.94"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=15.58 cfs 3.155 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=1.62"
Flow Length=176' Tc=7.5 min CN=73 Runoff=1.74 cfs 0.135 af

**Reach A105R: Thru A101** Avg. Flow Depth=0.68' Max Vel=4.09 fps Inflow=9.67 cfs 4.335 af
n=0.050 L=1,075.0' S=0.0577 '/' Capacity=152.54 cfs Outflow=9.66 cfs 4.334 af

**Reach A106R: Thru A105** Avg. Flow Depth=0.79' Max Vel=5.65 fps Inflow=19.98 cfs 2.404 af
n=0.050 L=1,215.0' S=0.0922 '/' Capacity=153.12 cfs Outflow=19.65 cfs 2.404 af

**Reach A108R: Thru A101** Avg. Flow Depth=1.62' Max Vel=8.53 fps Inflow=67.88 cfs 13.128 af
n=0.050 L=1,090.0' S=0.0862 '/' Capacity=244.78 cfs Outflow=67.67 cfs 13.128 af

**Reach B102R: Thru B101** Avg. Flow Depth=1.28' Max Vel=3.40 fps Inflow=56.70 cfs 29.629 af
n=0.050 L=122.0' S=0.0164 '/' Capacity=356.26 cfs Outflow=56.70 cfs 29.627 af

**Reach B103R: Thru B102** Avg. Flow Depth=1.64' Max Vel=4.02 fps Inflow=56.48 cfs 29.467 af
n=0.050 L=585.0' S=0.0171 '/' Capacity=374.39 cfs Outflow=56.43 cfs 29.458 af

**Reach B107R: Thru B108** Avg. Flow Depth=0.27' Max Vel=4.49 fps Inflow=8.35 cfs 2.077 af
n=0.050 L=2,040.0' S=0.2294 '/' Capacity=144.21 cfs Outflow=8.19 cfs 2.077 af

**Reach B108R: Thur 101** Avg. Flow Depth=1.05' Max Vel=4.68 fps Inflow=64.68 cfs 11.234 af
n=0.050 L=233.0' S=0.0318 '/' Capacity=474.00 cfs Outflow=64.68 cfs 11.234 af

**Reach B109R: Thru B108** Avg. Flow Depth=0.71' Max Vel=5.11 fps Inflow=15.06 cfs 1.852 af
n=0.050 L=355.0' S=0.0851 '/' Capacity=147.09 cfs Outflow=15.04 cfs 1.852 af

**Pond 102A: Wetland B** Peak Elev=498.27' Storage=6,525 cf Inflow=0.25 cfs 0.150 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 102B: 18" Culvert** Peak Elev=495.33' Storage=4,102 cf Inflow=56.71 cfs 29.630 af
Primary=10.05 cfs 18.373 af Secondary=47.09 cfs 11.256 af Outflow=56.70 cfs 29.629 af

**Pond 102C: Pond 102C** Peak Elev=508.10' Storage=137,439 cf Inflow=15.58 cfs 3.155 af
Outflow=0.00 cfs 0.000 af

**Pond 103A: Wetland A** Peak Elev=498.66' Storage=36,441 cf Inflow=1.50 cfs 0.837 af
24.0" Round Culvert n=0.013 L=80.0' S=-0.0125 '/' Outflow=0.00 cfs 0.000 af

**Pond 103B: Irrigation Pond** Peak Elev=506.29' Storage=43,823 cf Inflow=31.39 cfs 24.439 af
Primary=5.62 cfs 8.652 af Secondary=24.82 cfs 15.549 af Outflow=30.44 cfs 24.200 af

**Pond 104A: Wetland D** Peak Elev=507.78' Storage=1,562 cf Inflow=0.06 cfs 0.042 af
Primary=0.02 cfs 0.027 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.027 af

**Pond 104B: Island Pond** Peak Elev=510.26' Storage=496,599 cf Inflow=111.84 cfs 28.860 af
Primary=12.18 cfs 18.568 af Secondary=15.80 cfs 3.104 af Tertiary=26.58 cfs 5.267 af Outflow=54.56 cfs 26.939 af

**Pond 105A: Wetland H** Peak Elev=574.94' Storage=55,214 cf Inflow=30.73 cfs 4.351 af
Primary=9.67 cfs 4.335 af Secondary=0.00 cfs 0.000 af Outflow=9.67 cfs 4.335 af

**Pond 105B: Wetland J** Peak Elev=516.23' Storage=43,738 cf Inflow=95.41 cfs 23.018 af
Outflow=95.34 cfs 23.017 af

**Pond 106A: 36" Culvert** Peak Elev=718.49' Storage=22 cf Inflow=19.99 cfs 2.404 af
Primary=19.98 cfs 2.404 af Secondary=0.00 cfs 0.000 af Outflow=19.98 cfs 2.404 af

**Pond 106B: Wetland J** Peak Elev=526.74' Storage=19,655 cf Inflow=88.13 cfs 20.421 af
Outflow=88.06 cfs 20.421 af

**Pond 107A: 24" Culvert** Peak Elev=625.51' Storage=2,437 cf Inflow=67.03 cfs 12.892 af
Primary=41.02 cfs 11.585 af Secondary=26.00 cfs 1.307 af Outflow=67.02 cfs 12.892 af

**Pond 107B: Wetland** Peak Elev=972.78' Storage=34,203 cf Inflow=16.70 cfs 2.353 af
Outflow=8.35 cfs 2.077 af

**Pond 108A: 36" Culvert** Peak Elev=611.15' Storage=31 cf Inflow=26.78 cfs 1.543 af
Primary=26.86 cfs 1.543 af Secondary=0.00 cfs 0.000 af Outflow=26.86 cfs 1.543 af

**Pond 108B: Wetland N** Peak Elev=501.33' Storage=13,398 cf Inflow=64.71 cfs 11.259 af
Primary=4.36 cfs 3.562 af Secondary=60.36 cfs 7.672 af Outflow=64.68 cfs 11.234 af

**Pond 109B: 36" Culvert** Peak Elev=546.94' Storage=45 cf Inflow=15.06 cfs 1.852 af
Outflow=15.06 cfs 1.852 af

**Link A: Amenia Stream** Inflow=77.00 cfs 17.761 af
Primary=77.00 cfs 17.761 af

**Link B: Wetland** Inflow=111.01 cfs 50.122 af
Primary=111.01 cfs 50.122 af

**Link C: Culvert** Inflow=1.81 cfs 0.803 af
Primary=1.81 cfs 0.803 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=1.74 cfs 0.135 af
Primary=1.74 cfs 0.135 af

**Total Runoff Area = 783.953 ac Runoff Volume = 75.467 af Average Runoff Depth = 1.16"**
**95.93% Pervious = 752.017 ac 4.07% Impervious = 31.936 ac**

## Summary for Subcatchment A101: A101

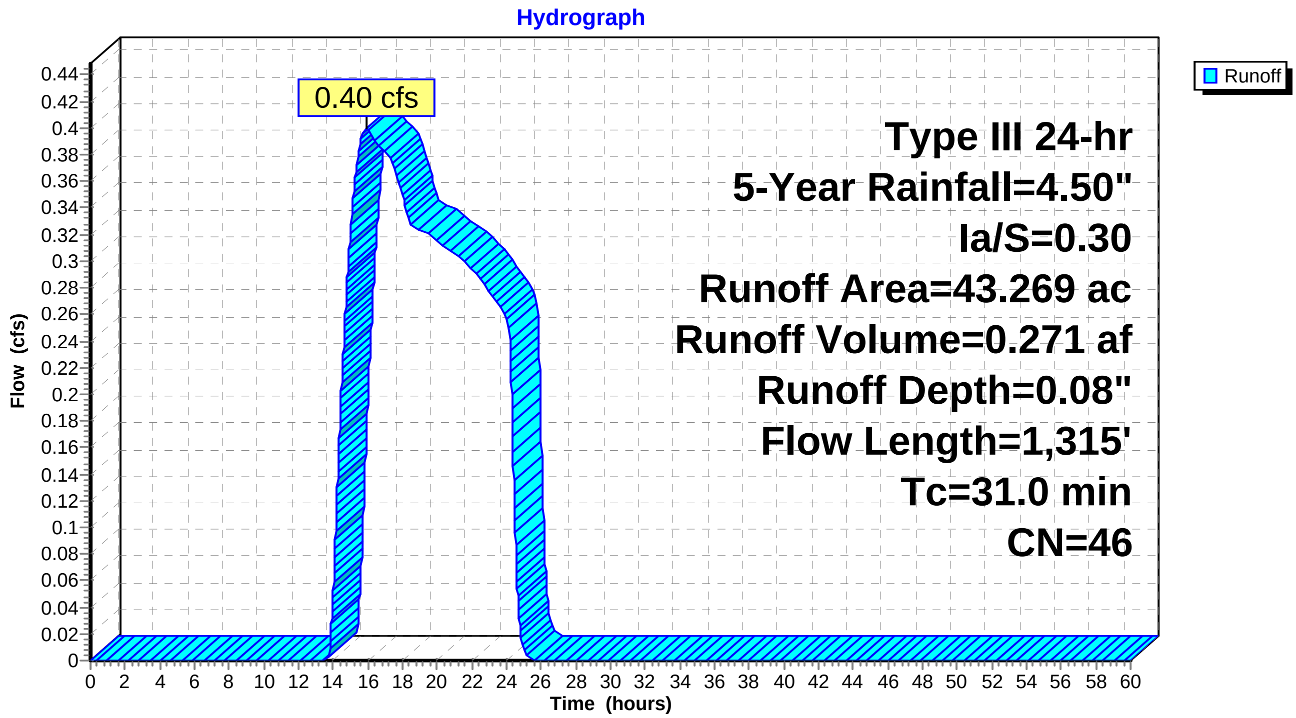
Runoff = 0.40 cfs @ 15.94 hrs, Volume= 0.271 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.819 | 98 | Paved surface |
| * | 0.089 | 96 | Gravel surface |
| * | 0.001 | 98 | Water Surface |
| | 31.250 | 39 | >75% Grass cover, Good, HSG A |
| | 6.738 | 61 | >75% Grass cover, Good, HSG B |
| | 1.730 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 1.164 | 30 | Woods, Good, HSG A |
| | 0.152 | 55 | Woods, Good, HSG B |
| | 0.088 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.223 | 30 | Sand trap, HSG A |
| * | 0.015 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 43.269 | 46 | Weighted Average |
| | 41.449 | | 95.79% Pervious Area |
| | 1.820 | | 4.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.9 | 100 | 0.0400 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.0 | 430 | 0.1200 | 2.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.5 | 360 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.6 | 425 | 0.0140 | 0.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 31.0 | 1,315 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

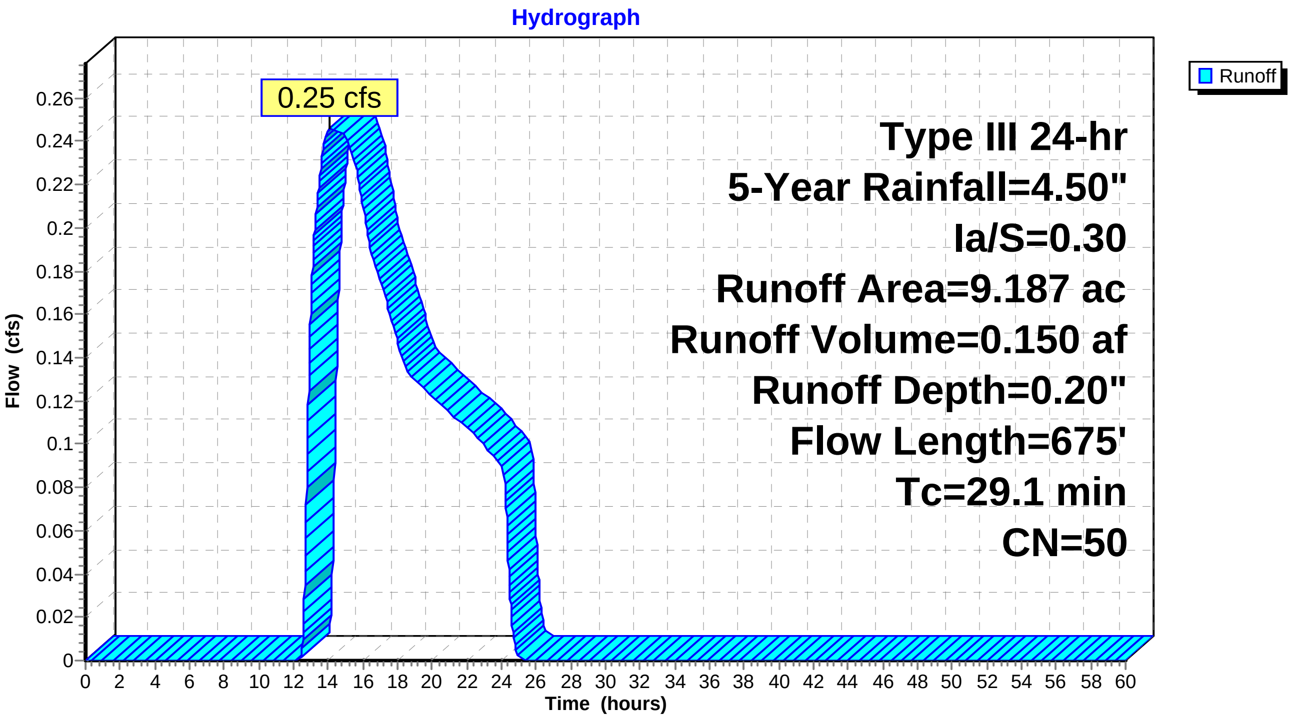
Runoff = 0.25 cfs @ 14.13 hrs, Volume= 0.150 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.387 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.844 | 98 | Water Surface |
| | 3.520 | 39 | >75% Grass cover, Good, HSG A |
| | 2.156 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.260 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.004 | 30 | Sand trap, HSG A |
| * | 0.016 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.187 | 50 | Weighted Average |
| | 7.956 | | 86.60% Pervious Area |
| | 1.231 | | 13.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 23.0 | 100 | 0.0600 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.1 | 575 | 0.0500 | 1.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.1 | 675 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

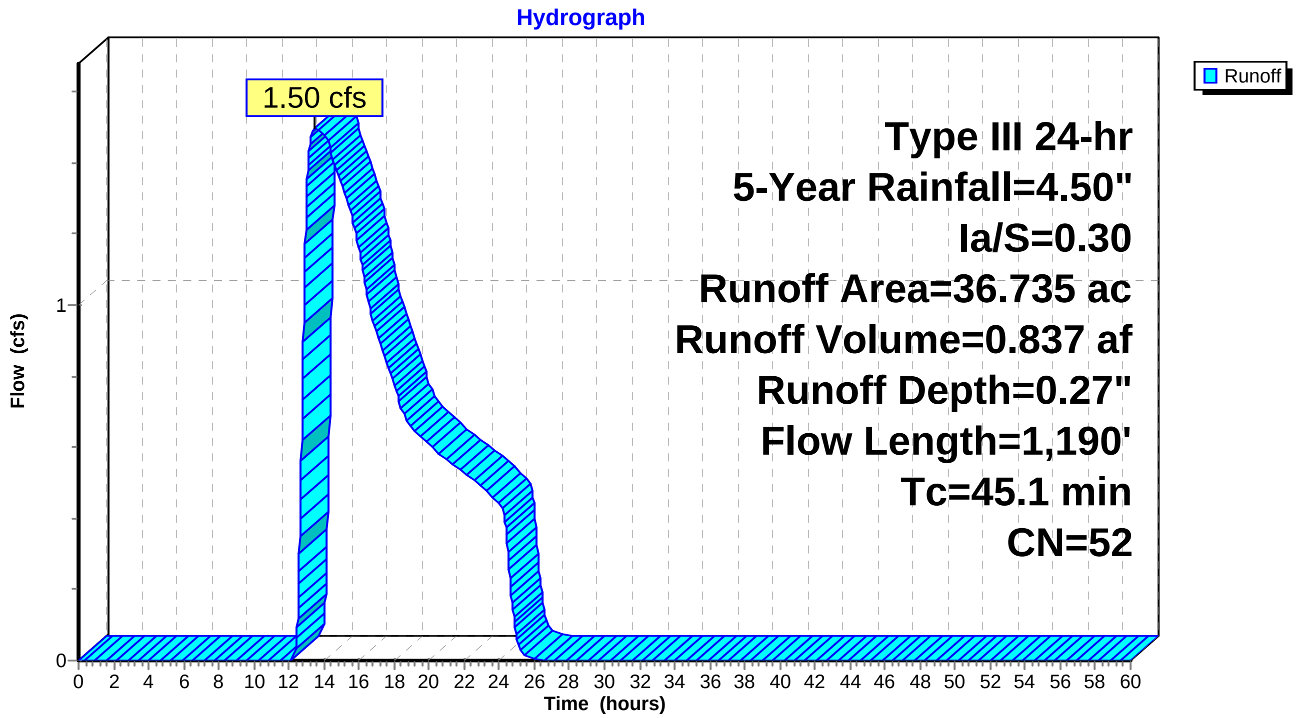
Runoff = 1.50 cfs @ 13.48 hrs, Volume= 0.837 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.334 | 98 | Building roof |
| * | 2.378 | 98 | Paved surface |
| * | 0.402 | 96 | Gravel surface |
| * | 0.516 | 98 | Water Surface |
| | 14.616 | 39 | >75% Grass cover, Good, HSG A |
| | 3.182 | 61 | >75% Grass cover, Good, HSG B |
| | 4.088 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 6.882 | 30 | Woods, Good, HSG A |
| | 1.635 | 55 | Woods, Good, HSG B |
| | 1.432 | 70 | Woods, Good, HSG C |
| | 1.137 | 77 | Woods, Good, HSG D |
| * | 0.095 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.009 | 30 | Sand Trap, HSG C |
| | 36.735 | 52 | Weighted Average |
| | 33.507 | | 91.21% Pervious Area |
| | 3.228 | | 8.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 35.7 | 100 | 0.0200 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.9 | 227 | 0.0190 | 0.96 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 75 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 343 | 0.0400 | 4.54 | 18.14 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' n= 0.050 |
| 3.7 | 445 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 45.1 | 1,190 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

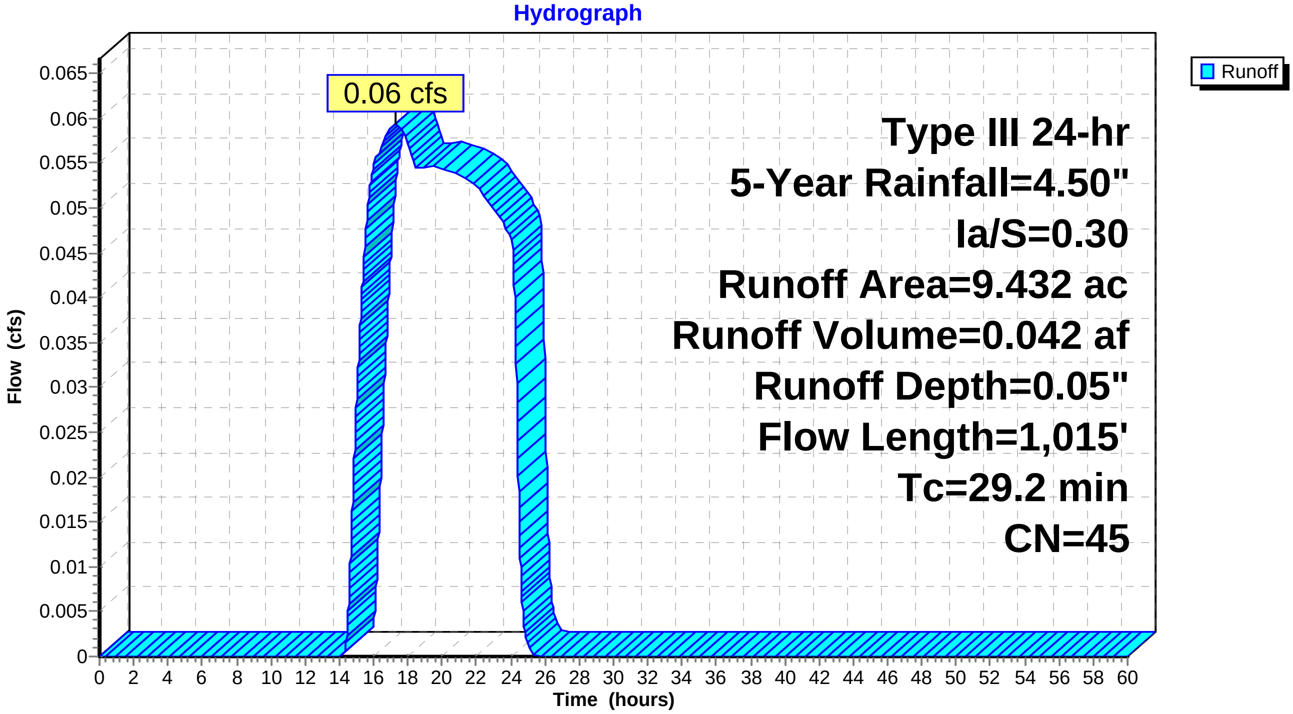
Runoff = 0.06 cfs @ 17.29 hrs, Volume= 0.042 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.458 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.429 | 98 | Water Surface |
| | 8.361 | 39 | >75% Grass cover, Good, HSG A |
| | 0.043 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.071 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.053 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.432 | 45 | Weighted Average |
| | 8.545 | | 90.60% Pervious Area |
| | 0.887 | | 9.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.9 | 100 | 0.0200 | 0.08 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.4 | 375 | 0.0700 | 1.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.5 | 255 | 0.1600 | 2.80 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.4 | 285 | 0.0400 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.2 | 1,015 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

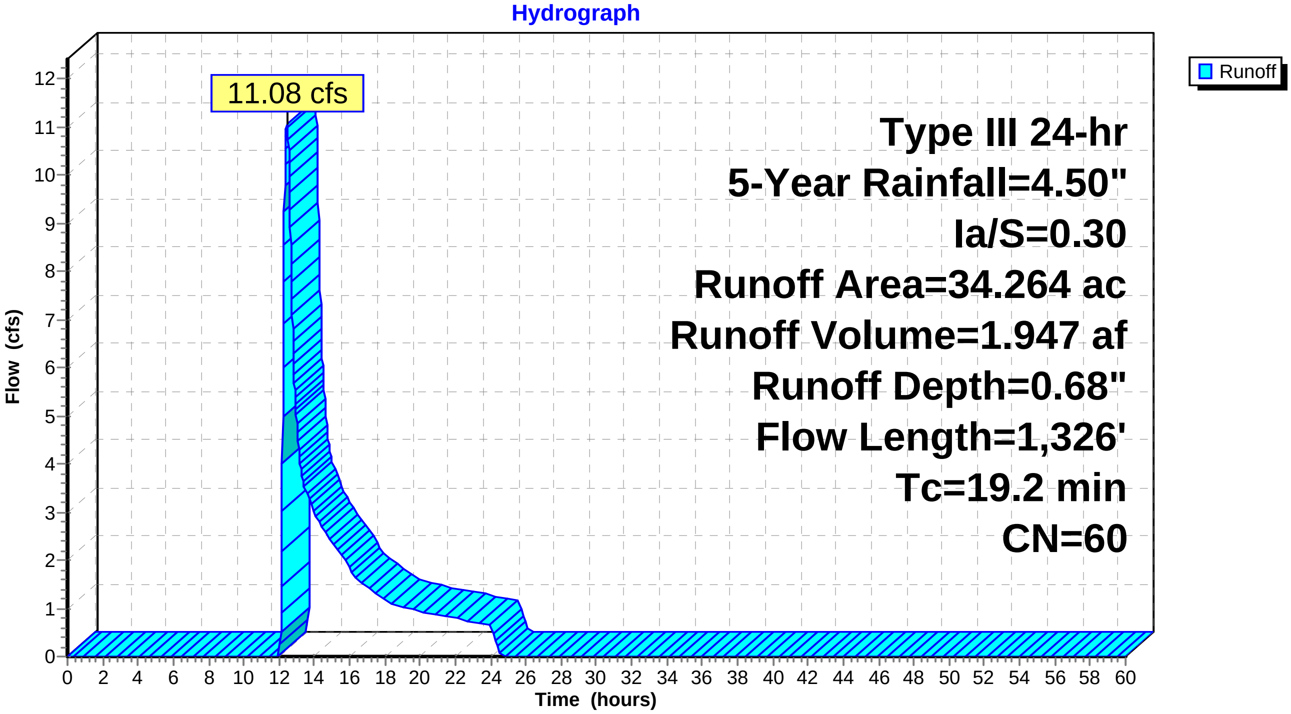
Runoff = 11.08 cfs @ 12.44 hrs, Volume= 1.947 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.119 | 98 | Paved surface |
| * | 0.088 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.167 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 15.618 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.226 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.911 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.135 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 34.264 | 60 | Weighted Average |
| | 33.145 | | 96.73% Pervious Area |
| | 1.119 | | 3.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 23 | 0.1700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.8 | 77 | 0.3000 | 0.13 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 150 | 0.3700 | 1.52 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.3 | 526 | 0.0950 | 6.52 | 32.61 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.8 | 550 | 0.0600 | 4.98 | 16.59 | **Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.035 High grass |
| 19.2 | 1,326 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

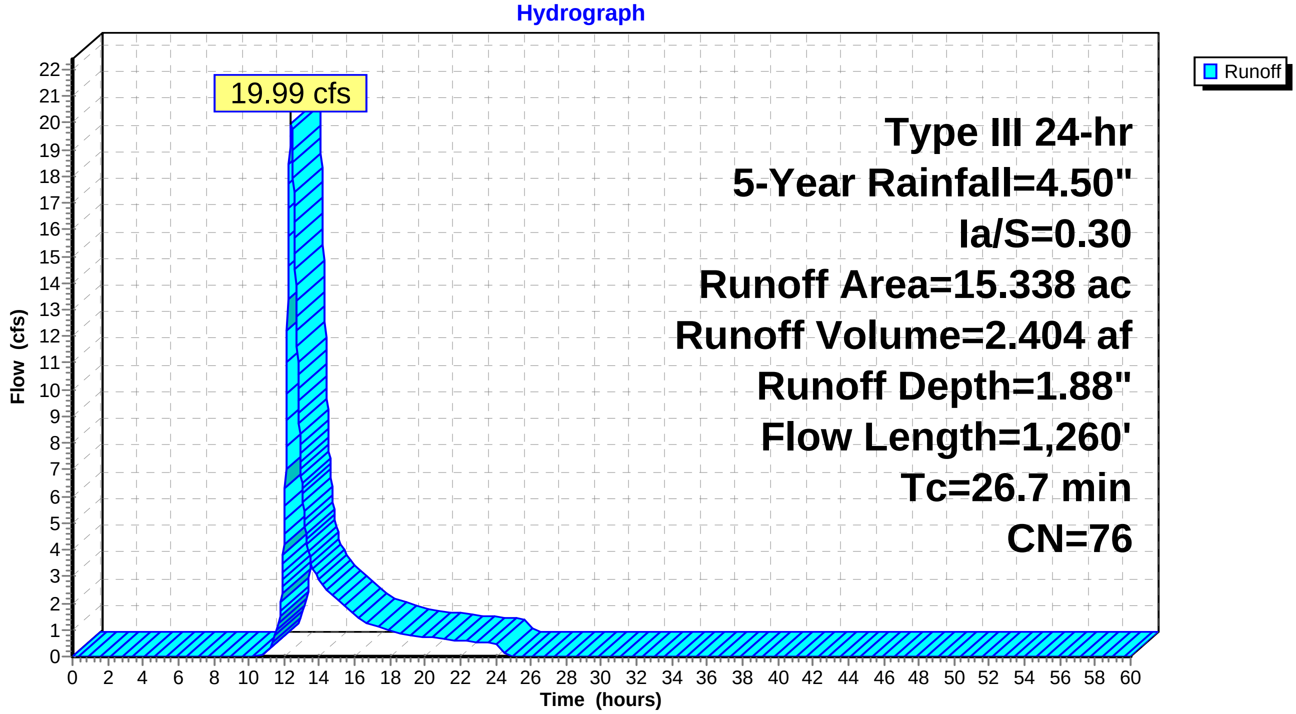
Runoff = 19.99 cfs @ 12.39 hrs, Volume= 2.404 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.013 | 98 | Building roof |
| * | 1.232 | 98 | Paved surface |
| * | 0.200 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.050 | 61 | >75% Grass cover, Good, HSG B |
| | 9.227 | 74 | >75% Grass cover, Good, HSG C |
| | 2.194 | 80 | >75% Grass cover, Good, HSG D |
| | 0.097 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.706 | 70 | Woods, Good, HSG C |
| | 0.619 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.338 | 76 | Weighted Average |
| | 14.093 | | 91.88% Pervious Area |
| | 1.245 | | 8.12% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

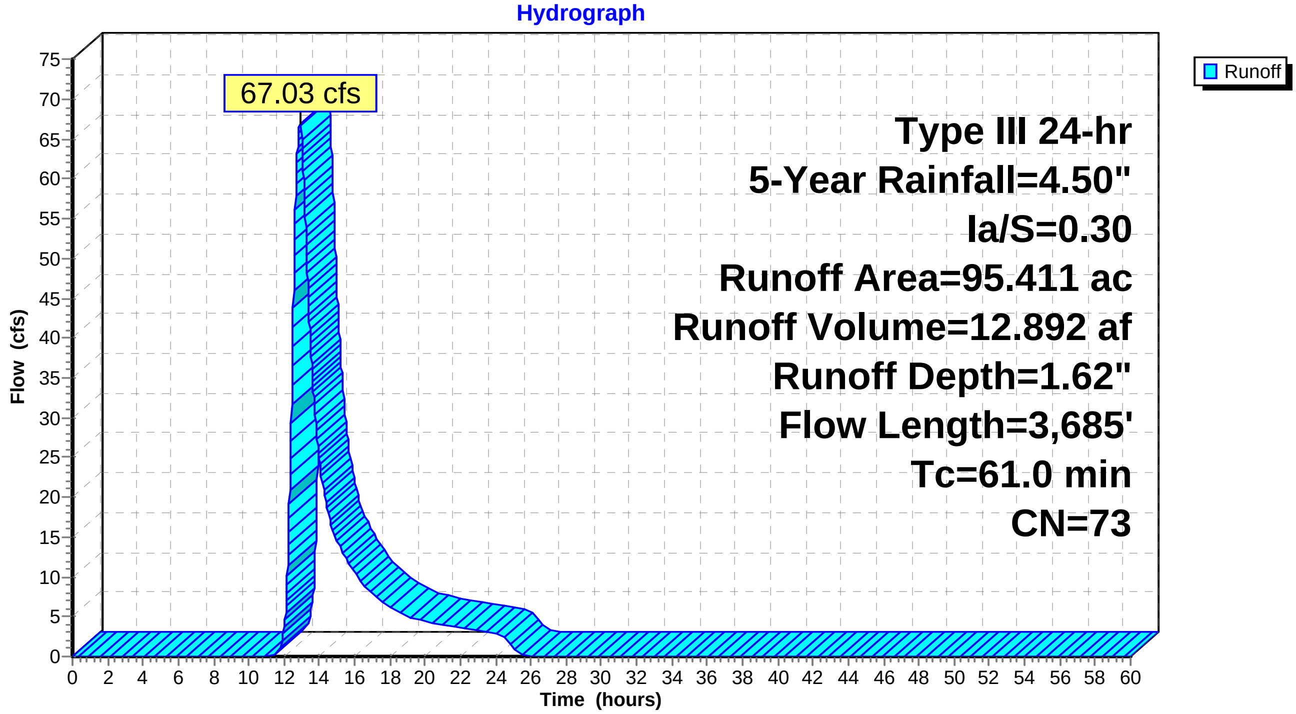
Runoff = 67.03 cfs @ 12.88 hrs, Volume= 12.892 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.392 | 98 | Building roof |
| * | 1.725 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.129 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 13.413 | 61 | >75% Grass cover, Good, HSG B |
| | 9.311 | 74 | >75% Grass cover, Good, HSG C |
| | 4.029 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 8.871 | 55 | Woods, Good, HSG B |
| | 4.853 | 70 | Woods, Good, HSG C |
| | 52.617 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 95.411 | 73 | Weighted Average |
| | 93.165 | | 97.65% Pervious Area |
| | 2.246 | | 2.35% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

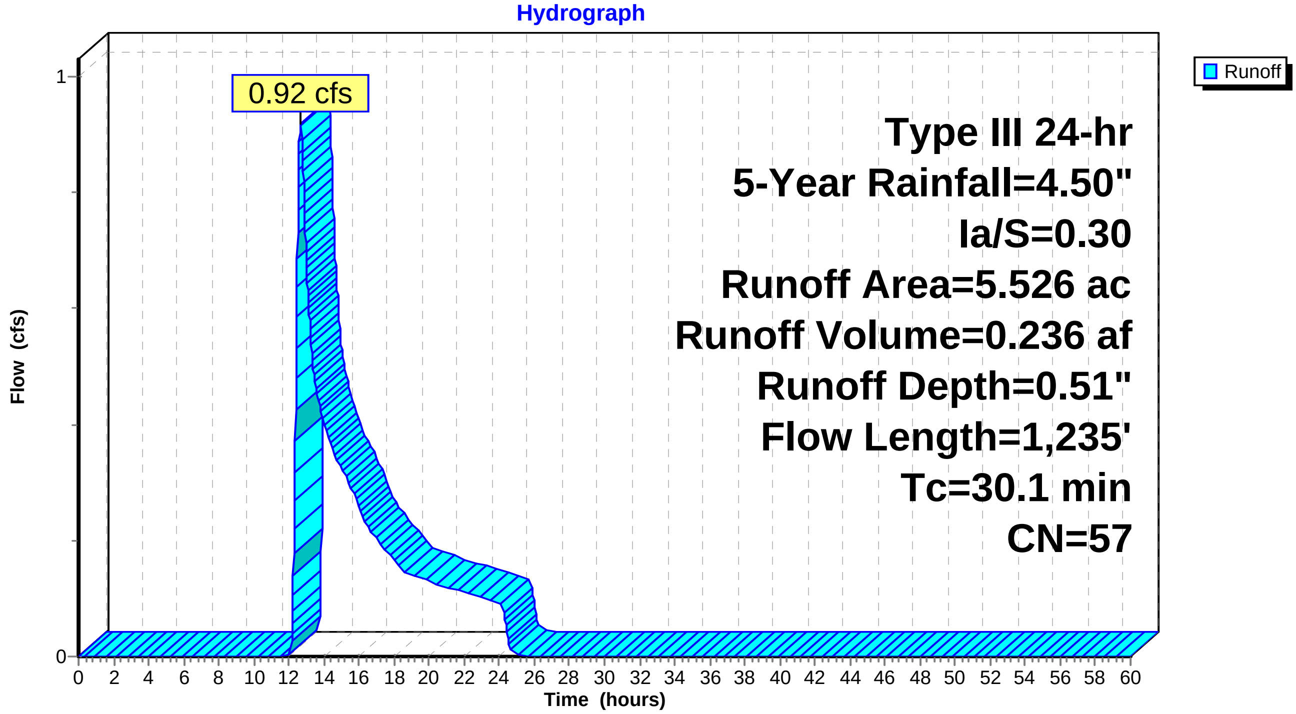
Runoff = 0.92 cfs @ 12.67 hrs, Volume= 0.236 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.088 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.629 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.526 | 57 | Weighted Average |
| | 5.398 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment B101: B101

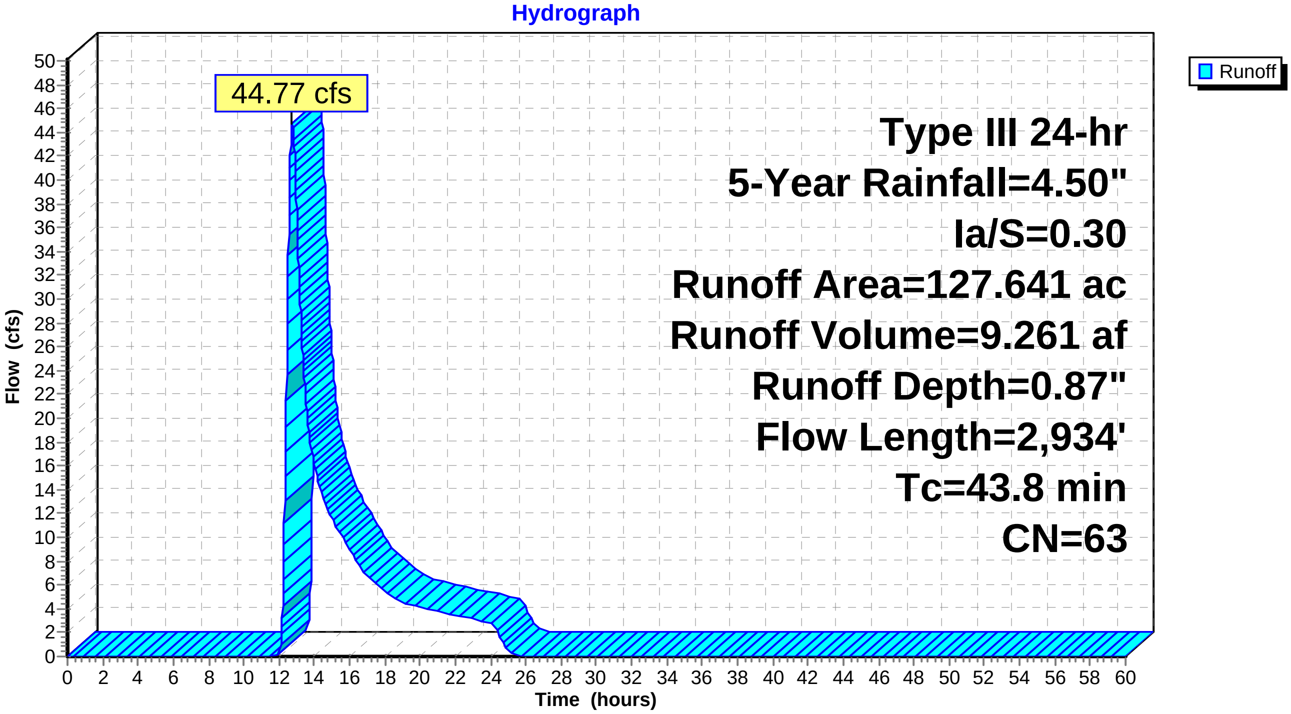
Runoff = 44.77 cfs @ 12.76 hrs, Volume= 9.261 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.005 | 98 | Building roof |
| * | 0.948 | 98 | Paved surface |
| * | 2.079 | 96 | Gravel surface |
| * | 0.002 | 98 | Water Surface |
| | 29.023 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 22.752 | 74 | >75% Grass cover, Good, HSG C |
| | 0.768 | 80 | >75% Grass cover, Good, HSG D |
| | 9.025 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 35.889 | 70 | Woods, Good, HSG C |
| | 27.094 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.056 | 30 | Sand Trap, HSG C |
| | 127.641 | 63 | Weighted Average |
| | 126.686 | | 99.25% Pervious Area |
| | 0.955 | | 0.75% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 506 | 0.1600 | 12.61 | 201.73 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.7 | 112 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.5 | 355 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 184 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 642 | 0.0500 | 9.49 | 63.28 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.035 High grass |
| 43.8 | 2,934 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

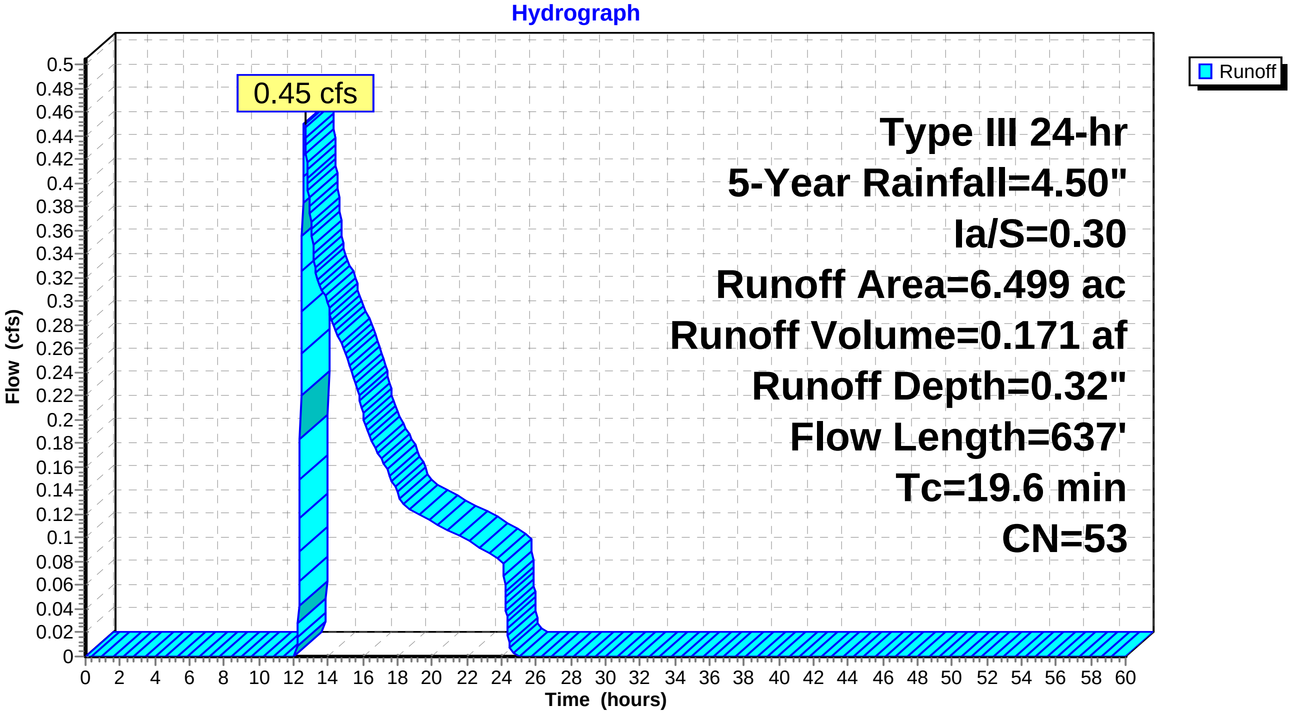
Runoff = 0.45 cfs @ 12.64 hrs, Volume= 0.171 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.170 | 98 | Paved surface |
| * | 0.290 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 3.039 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.097 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.839 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.064 | 30 | Sand Trap, HSG C |
| | 6.499 | 53 | Weighted Average |
| | 6.329 | | 97.38% Pervious Area |
| | 0.170 | | 2.62% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.6 | 637 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

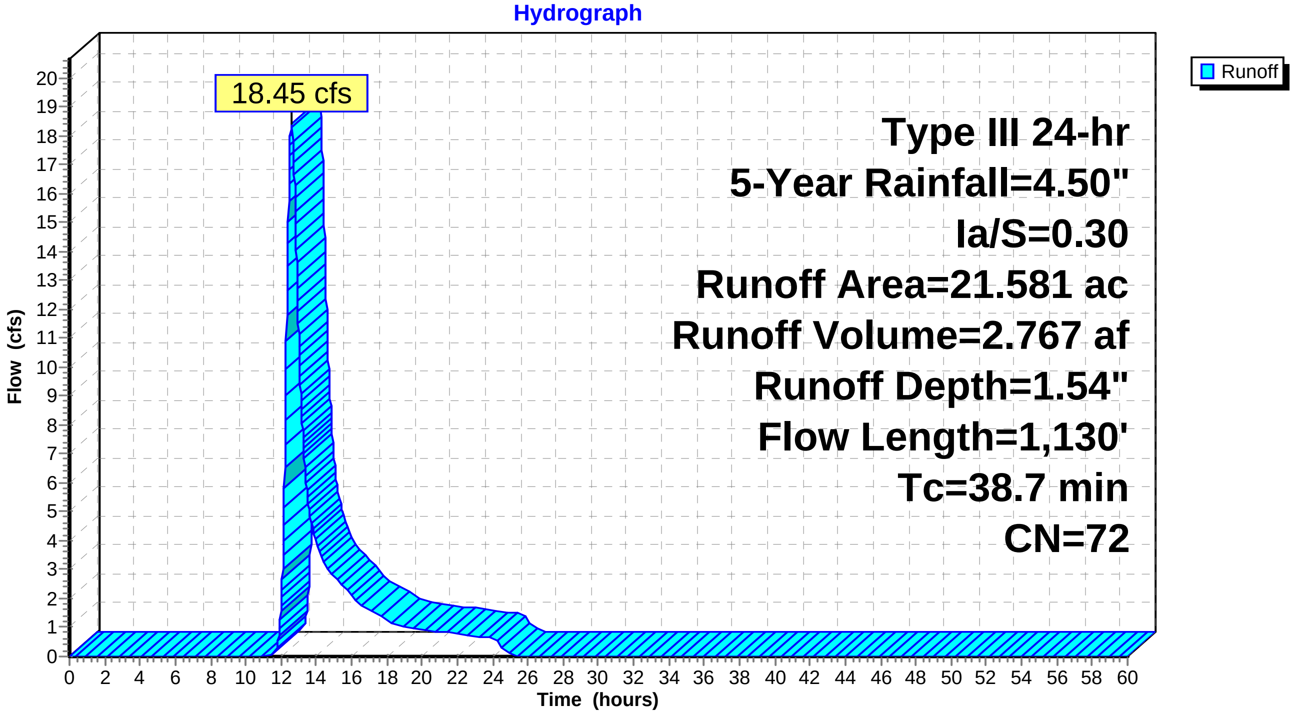
Runoff = 18.45 cfs @ 12.60 hrs, Volume= 2.767 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.550 | 98 | Paved surface |
| * | 0.039 | 96 | Gravel surface |
| * | 2.025 | 98 | Water Surface |
| | 3.869 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 6.689 | 74 | >75% Grass cover, Good, HSG C |
| | 0.522 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.459 | 70 | Woods, Good, HSG C |
| | 7.399 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.029 | 30 | Sand Trap, HSG C |
| | 21.581 | 72 | Weighted Average |
| | 19.006 | | 88.07% Pervious Area |
| | 2.575 | | 11.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.3 | 700 | 0.5500 | 1.85 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 1.6 | 280 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 50 | 0.7600 | 2.18 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 38.7 | 1,130 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

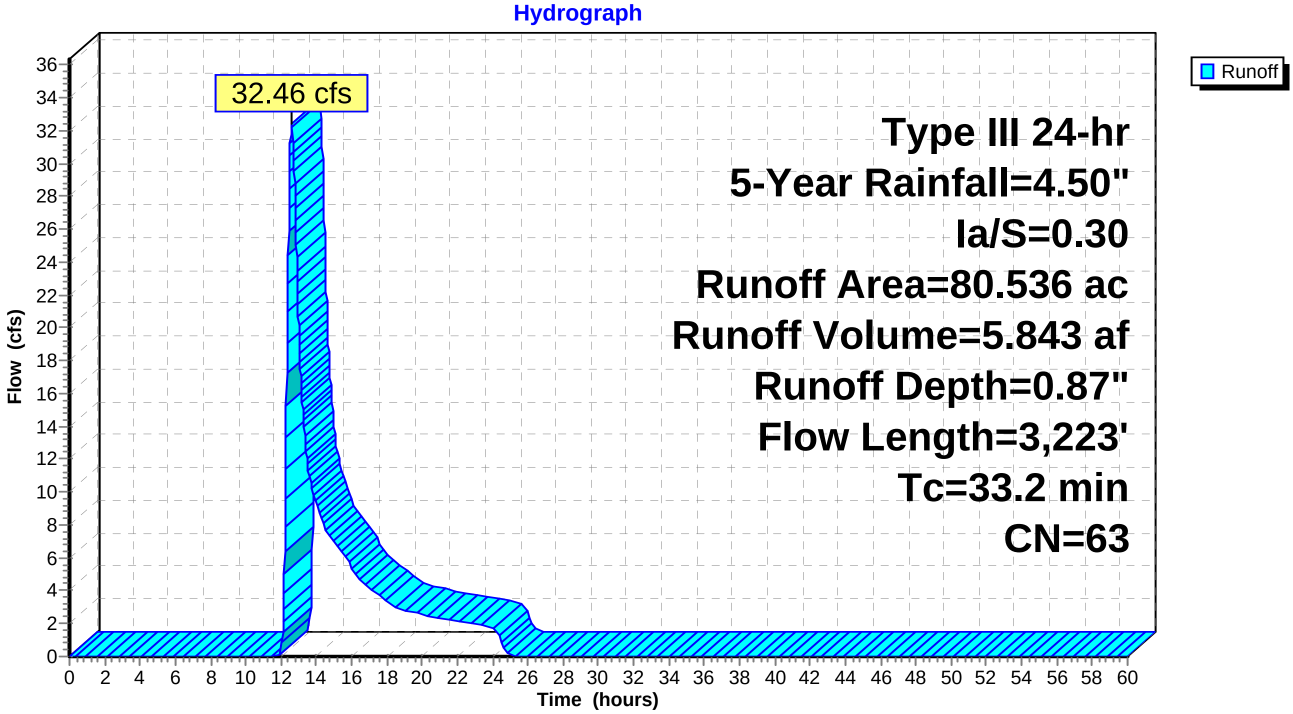
Runoff = 32.46 cfs @ 12.59 hrs, Volume= 5.843 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.411 | 98 | Building roof |
| * | 5.140 | 98 | Paved surface |
| * | 1.201 | 96 | Gravel surface |
| * | 5.280 | 98 | Water Surface |
| | 29.268 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 32.742 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.144 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.770 | 70 | Woods, Good, HSG C |
| | 1.252 | 77 | Woods, Good, HSG D |
| * | 0.185 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.143 | 30 | Sand Trap, HSG C |
| | 80.536 | 63 | Weighted Average |
| | 69.705 | | 86.55% Pervious Area |
| | 10.831 | | 13.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.9 | 100 | 0.1300 | 0.17 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 7.3 | 1,150 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.6 | 130 | 0.0300 | 3.52 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.4 | 1,843 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 33.2 | 3,223 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

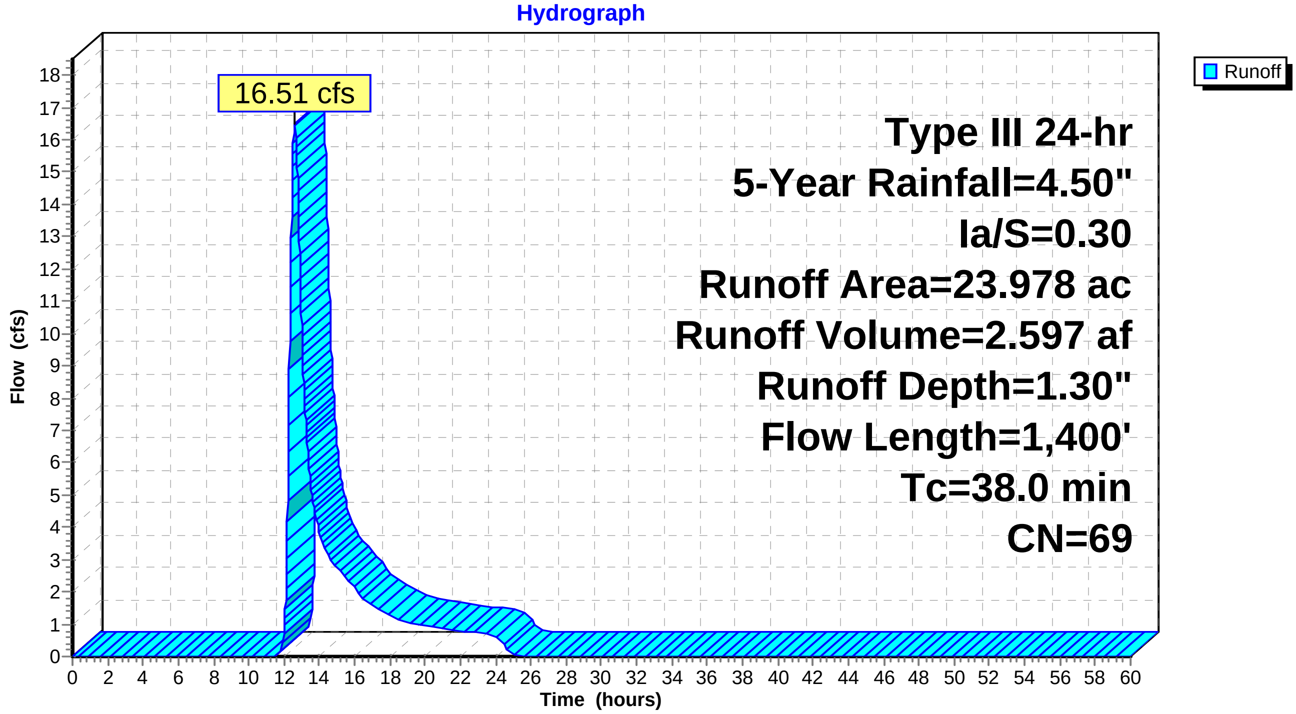
Runoff = 16.51 cfs @ 12.61 hrs, Volume= 2.597 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.248 | 98 | Paved surface |
| * | 0.181 | 96 | Gravel surface |
| * | 0.458 | 98 | Water Surface |
| | 5.222 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 4.132 | 74 | >75% Grass cover, Good, HSG C |
| | 0.513 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.204 | 70 | Woods, Good, HSG C |
| | 11.982 | 77 | Woods, Good, HSG D |
| * | 0.038 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 23.978 | 69 | Weighted Average |
| | 23.272 | | 97.06% Pervious Area |
| | 0.706 | | 2.94% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.5 | 698 | 0.5200 | 1.80 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 335 | 0.1900 | 3.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 267 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 38.0 | 1,400 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

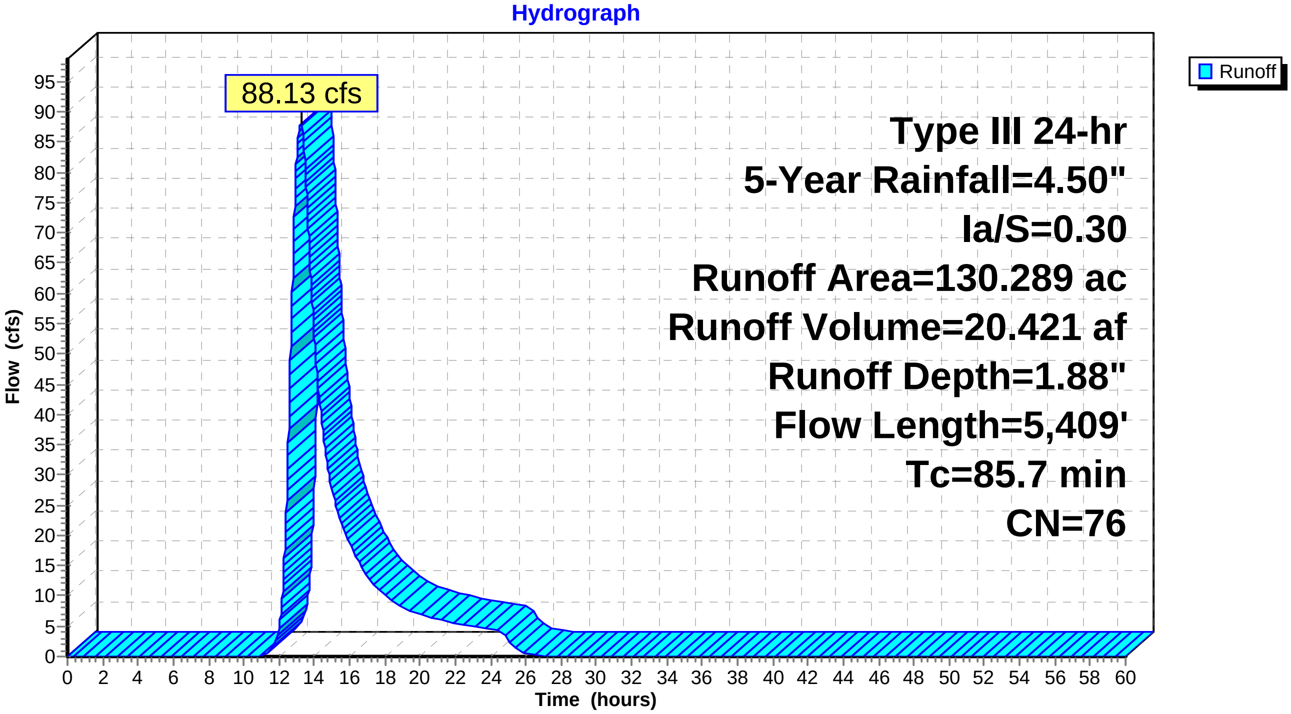
Runoff = 88.13 cfs @ 13.23 hrs, Volume= 20.421 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.025 | 98 | Building roof |
| * | 0.905 | 98 | Paved surface |
| * | 0.933 | 96 | Gravel surface |
| * | 0.153 | 98 | Water Surface |
| | 0.907 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 13.921 | 74 | >75% Grass cover, Good, HSG C |
| | 2.396 | 80 | >75% Grass cover, Good, HSG D |
| | 0.745 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 11.966 | 70 | Woods, Good, HSG C |
| | 97.720 | 77 | Woods, Good, HSG D |
| * | 0.024 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 130.289 | 76 | Weighted Average |
| | 129.206 | | 99.17% Pervious Area |
| | 1.083 | | 0.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00'<br>n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

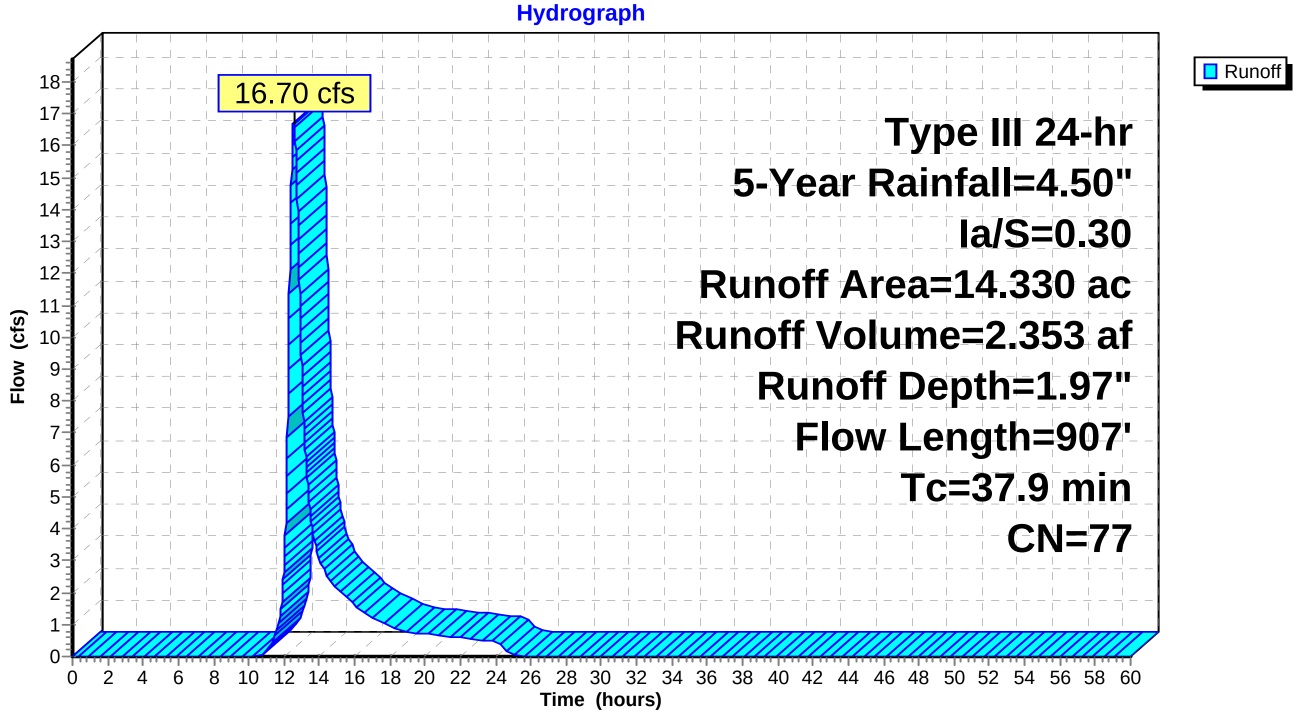
Runoff = 16.70 cfs @ 12.55 hrs, Volume= 2.353 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

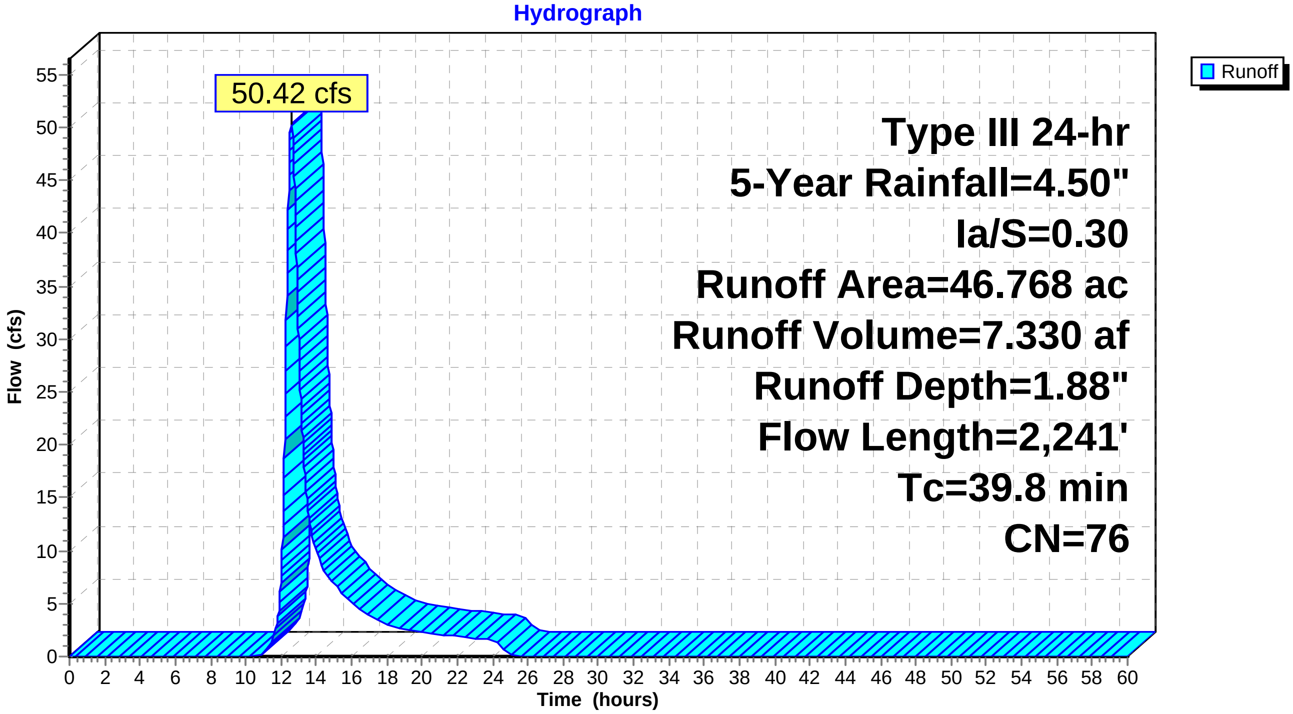
Runoff = 50.42 cfs @ 12.59 hrs, Volume= 7.330 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.499 | 98 | Paved surface |
| * | 0.098 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.546 | 74 | >75% Grass cover, Good, HSG C |
| | 0.657 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.391 | 70 | Woods, Good, HSG C |
| | 32.437 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.140 | 30 | Sand Trap, HSG C |
| | 46.768 | 76 | Weighted Average |
| | 46.269 | | 98.93% Pervious Area |
| | 0.499 | | 1.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.9 | 1,071 | 0.4300 | 1.64 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 3.2 | 490 | 0.1300 | 2.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 190 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 39.8 | 2,241 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

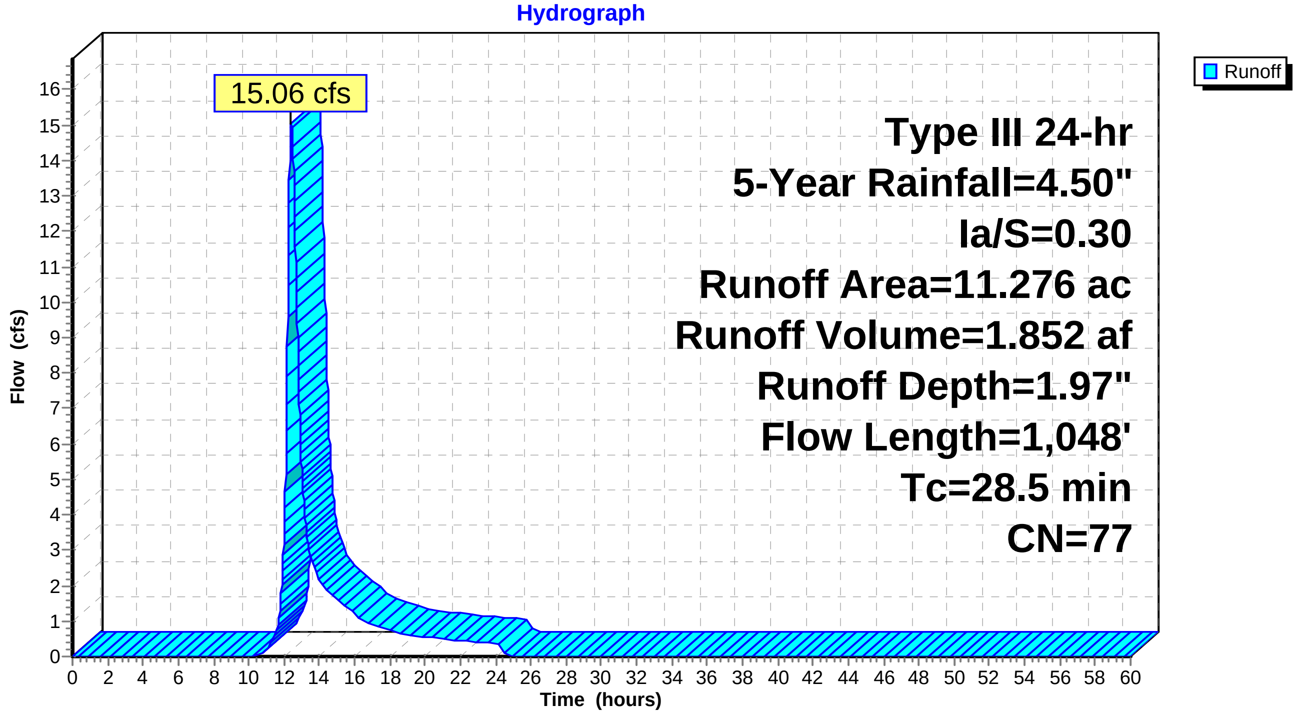
Runoff = 15.06 cfs @ 12.42 hrs, Volume= 1.852 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.004 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.045 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.299 | 70 | Woods, Good, HSG C |
| | 10.928 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 11.276 | 77 | Weighted Average |
| | 11.272 | | 99.96% Pervious Area |
| | 0.004 | | 0.04% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4500 | 1.68 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.3 | 288 | 0.2010 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 28.5 | 1,048 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment C101: C101

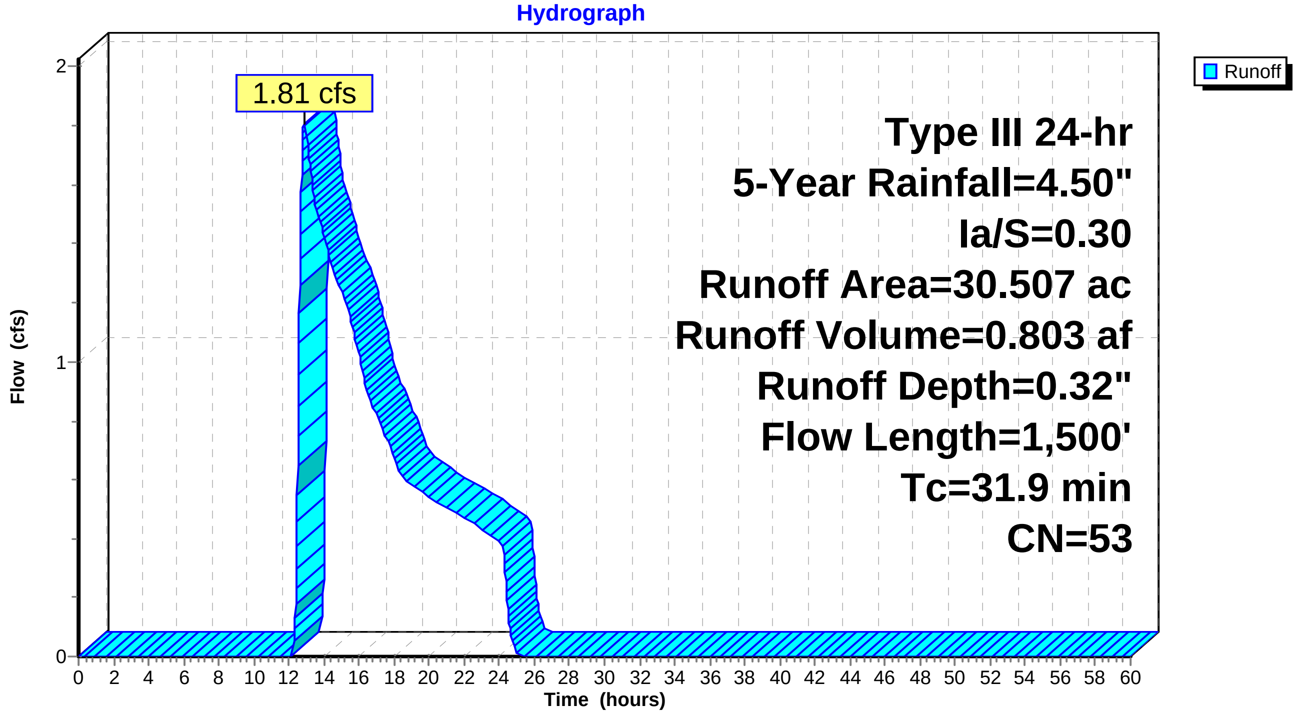
Runoff = 1.81 cfs @ 12.87 hrs, Volume= 0.803 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.350 | 98 | Paved surface |
| * | 0.425 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.046 | 98 | Rock Outcrop/Ledge |
| | 15.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.955 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.210 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 6.521 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 30.507 | 53 | Weighted Average |
| | 29.111 | | 95.42% Pervious Area |
| | 1.396 | | 4.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

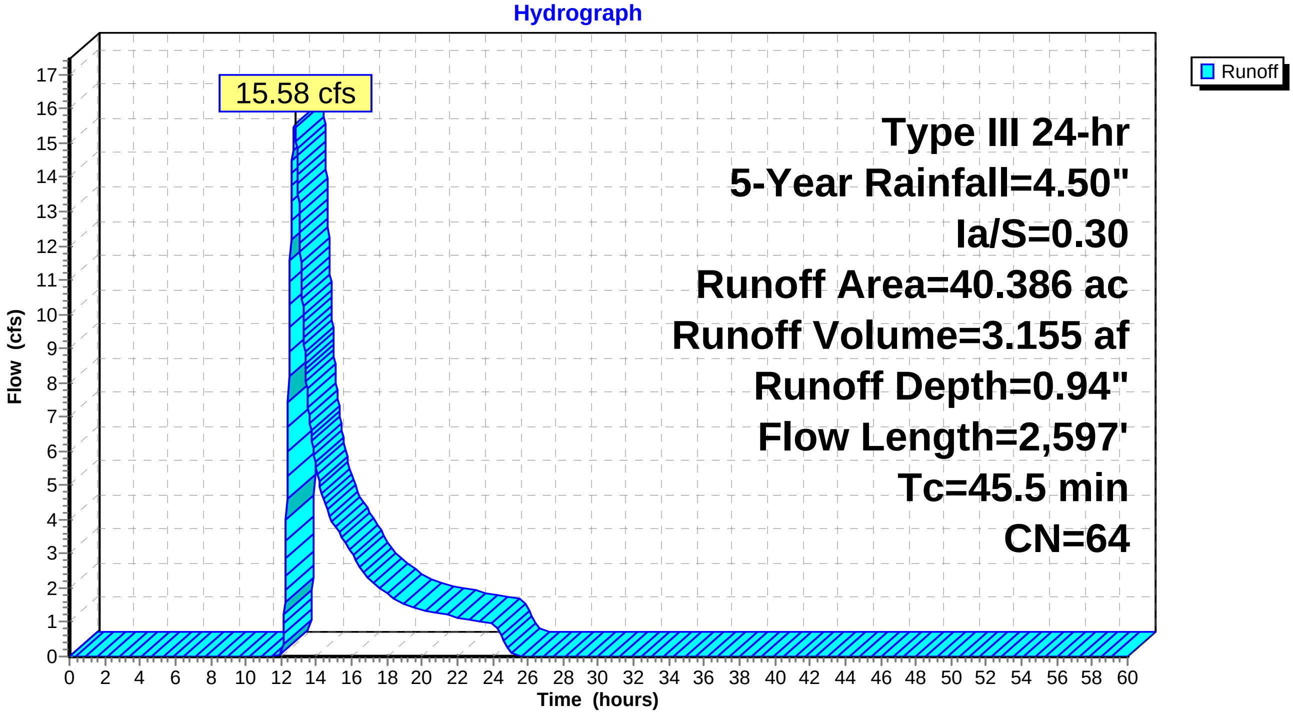
Runoff = 15.58 cfs @ 12.77 hrs, Volume= 3.155 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.618 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.981 | 98 | Rock Outcrop/Ledge |
| | 13.186 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.123 | 74 | >75% Grass cover, Good, HSG C |
| | 0.529 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.578 | 70 | Woods, Good, HSG C |
| | 15.415 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.386 | 64 | Weighted Average |
| | 38.573 | | 95.51% Pervious Area |
| | 1.813 | | 4.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

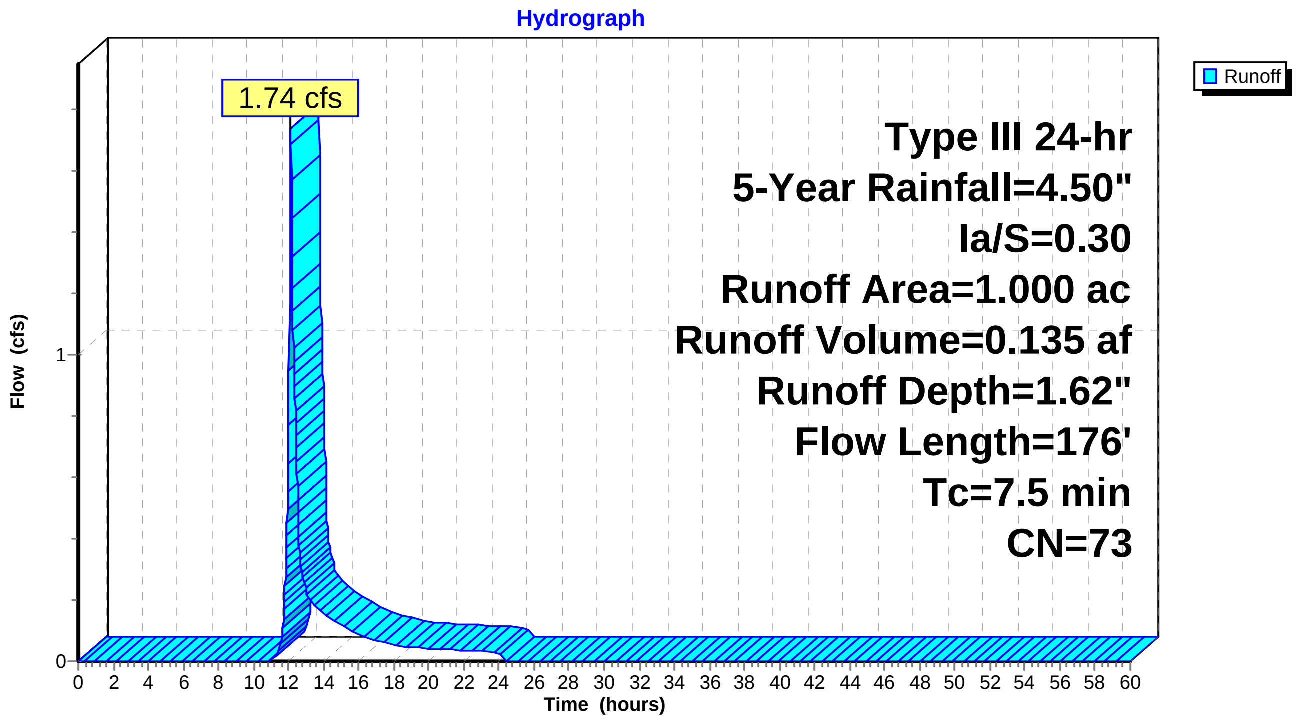
Runoff = 1.74 cfs @ 12.12 hrs, Volume= 0.135 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.850 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.000 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 73 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1570 | 6.38 | | **Shallow Concentrated Flow, C to D**<br>Unpaved Kv= 16.1 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



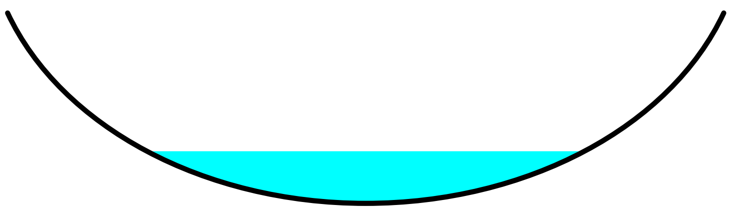
## Summary for Reach A105R: Thru A101

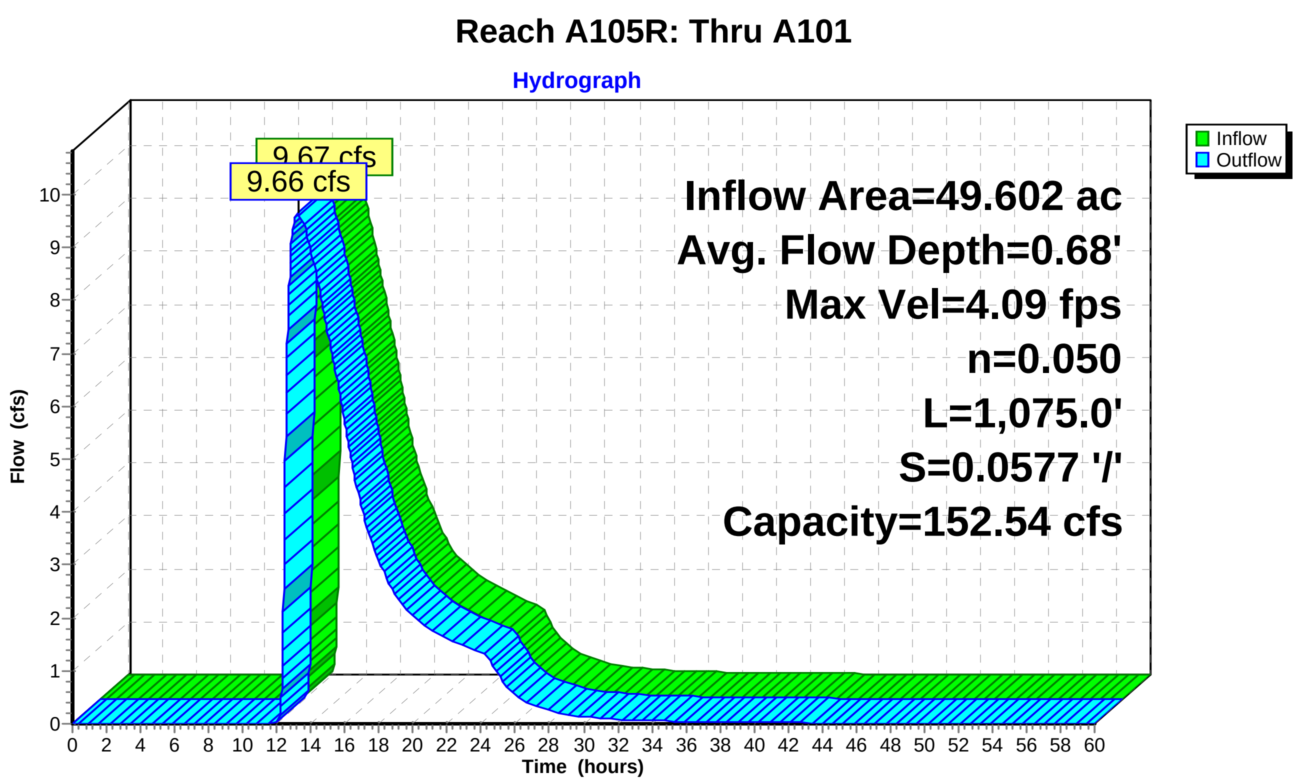
Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth > 1.05" for 5-Year event
Inflow = 9.67 cfs @ 13.16 hrs, Volume= 4.335 af
Outflow = 9.66 cfs @ 13.22 hrs, Volume= 4.334 af, Atten= 0%, Lag= 3.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.09 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 13.5 min

Peak Storage= 2,539 cf @ 13.22 hrs
Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 152.54 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,075.0' Slope= 0.0577 '/'
Inlet Invert= 566.00', Outlet Invert= 504.00'





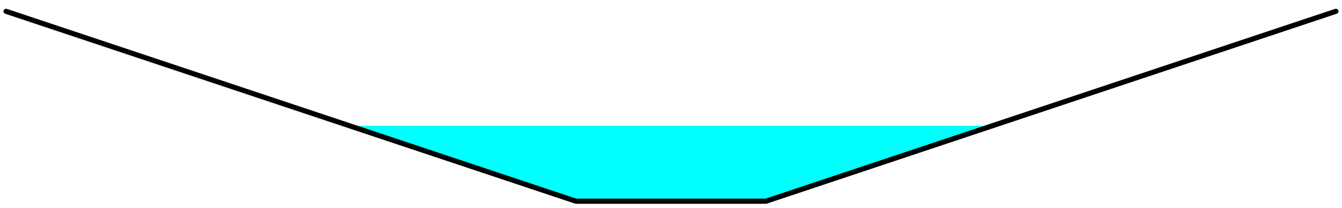
## Summary for Reach A106R: Thru A105

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 1.88" for 5-Year event
Inflow = 19.98 cfs @ 12.39 hrs, Volume= 2.404 af
Outflow = 19.65 cfs @ 12.44 hrs, Volume= 2.404 af, Atten= 2%, Lag= 3.1 min

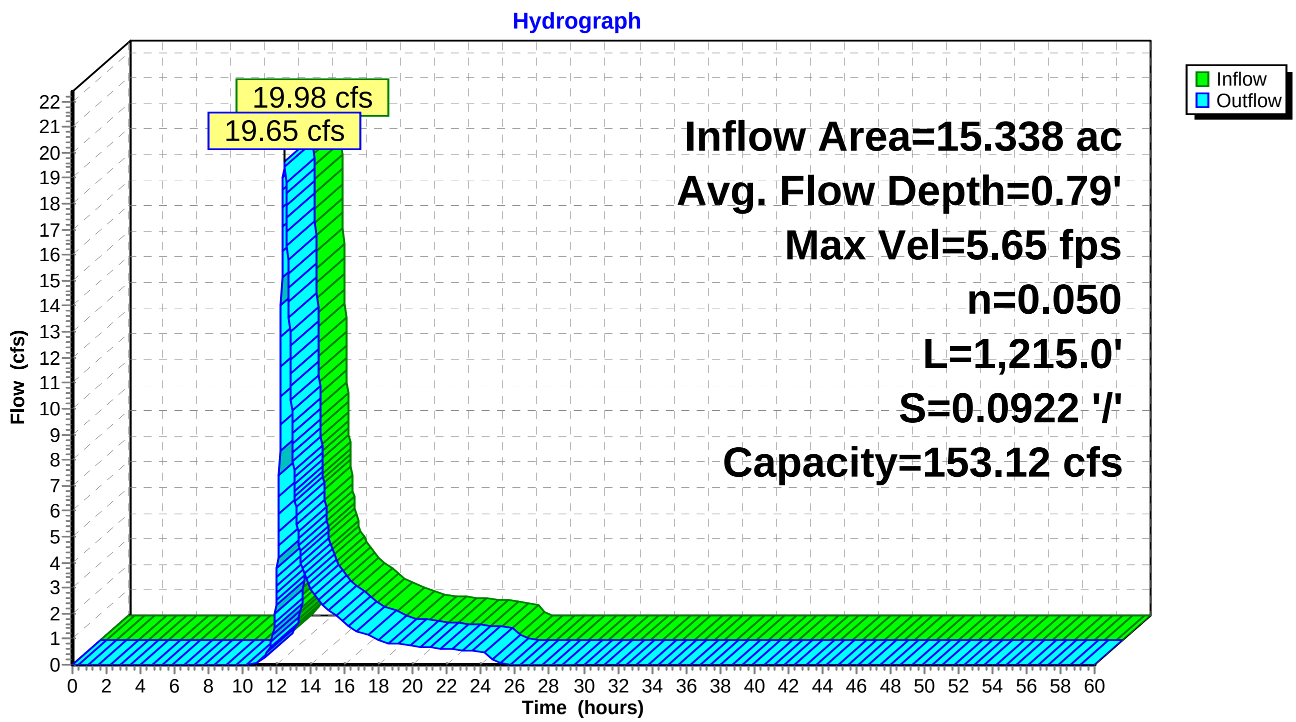
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.65 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 2.16 fps, Avg. Travel Time= 9.4 min

Peak Storage= 4,226 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 153.12 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 1,215.0' Slope= 0.0922 '/'
Inlet Invert= 686.00', Outlet Invert= 574.00'



### Reach A106R: Thru A105



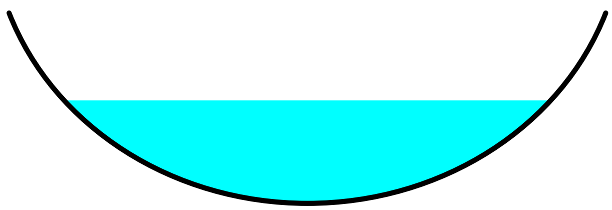
## Summary for Reach A108R: Thru A101

Inflow Area = 100.937 ac, 2.35% Impervious, Inflow Depth = 1.56" for 5-Year event
Inflow = 67.88 cfs @ 12.88 hrs, Volume= 13.128 af
Outflow = 67.67 cfs @ 12.92 hrs, Volume= 13.128 af, Atten= 0%, Lag= 2.0 min

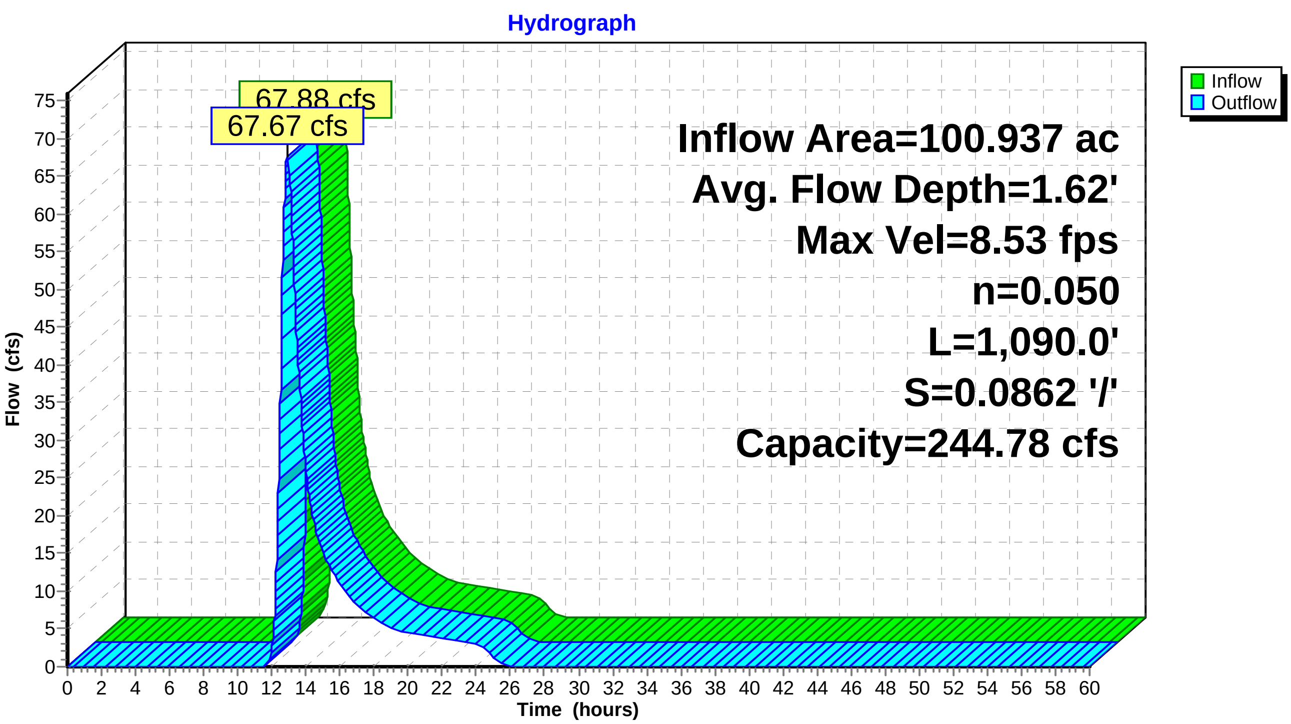
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 8.53 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 3.59 fps, Avg. Travel Time= 5.1 min

Peak Storage= 8,648 cf @ 12.92 hrs
Average Depth at Peak Storage= 1.62'
Bank-Full Depth= 3.00' Flow Area= 20.0 sf, Capacity= 244.78 cfs

10.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 1,090.0' Slope= 0.0862 '/'
Inlet Invert= 608.00', Outlet Invert= 514.00'



### Reach A108R: Thru A101



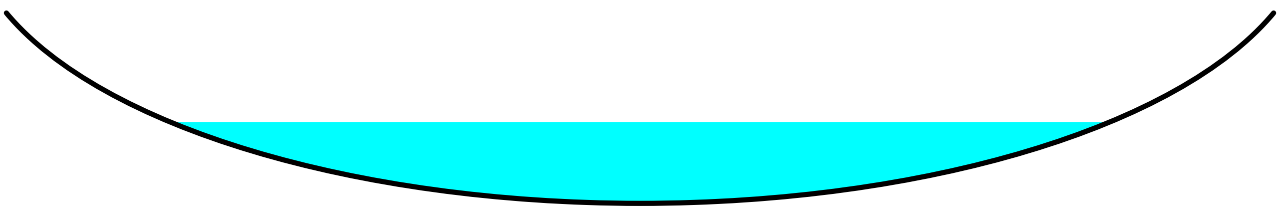
## Summary for Reach B102R: Thru B101

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 1.35" for 5-Year event
Inflow = 56.70 cfs @ 14.46 hrs, Volume= 29.629 af
Outflow = 56.70 cfs @ 14.46 hrs, Volume= 29.627 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.40 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.55 fps, Avg. Travel Time= 1.3 min

Peak Storage= 2,037 cf @ 14.46 hrs
Average Depth at Peak Storage= 1.28'
Bank-Full Depth= 3.00' Flow Area= 60.0 sf, Capacity= 356.26 cfs

30.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 122.0' Slope= 0.0164 '/'
Inlet Invert= 492.00', Outlet Invert= 490.00'



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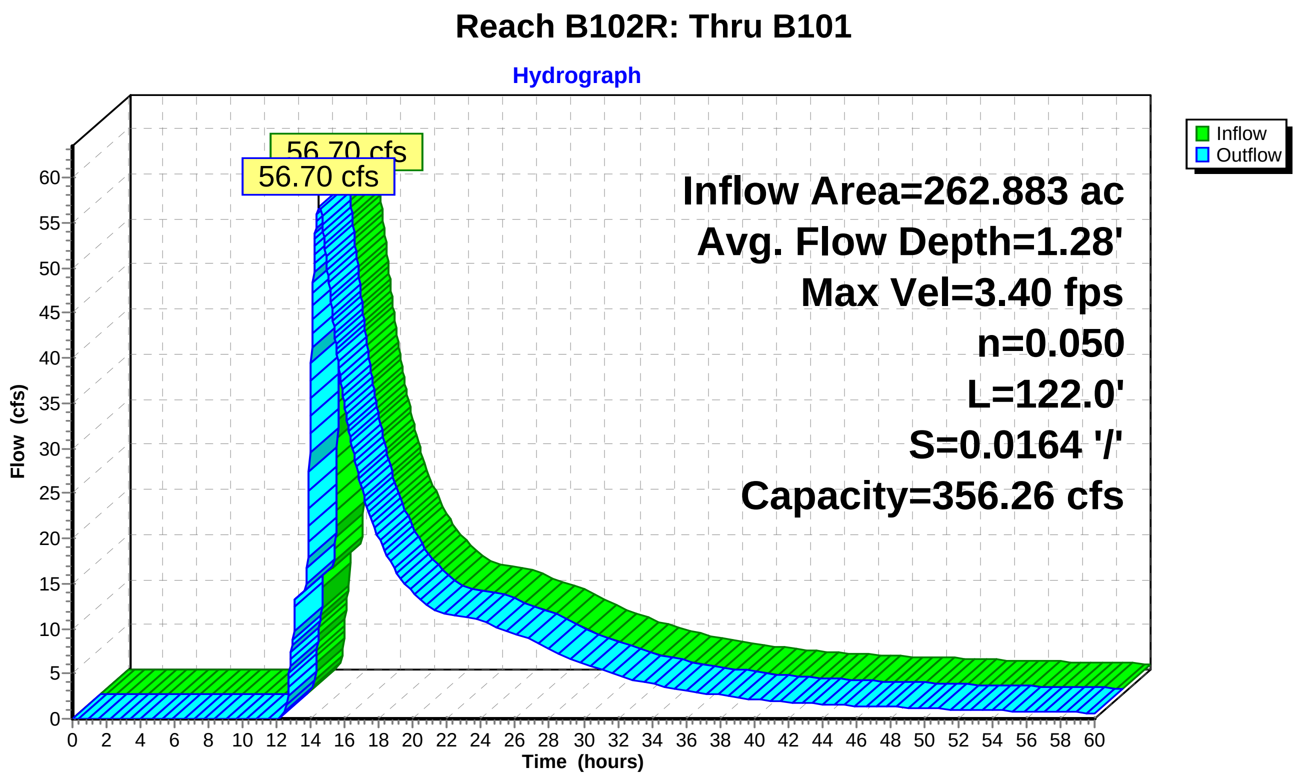


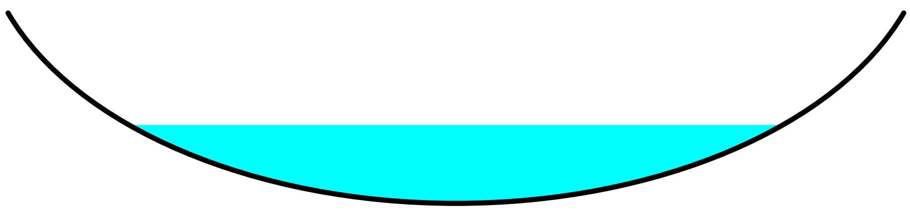
## Summary for Reach B103R: Thru B102

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 1.38" for 5-Year event
Inflow = 56.48 cfs @ 14.42 hrs, Volume= 29.467 af
Outflow = 56.43 cfs @ 14.45 hrs, Volume= 29.458 af, Atten= 0%, Lag= 1.8 min

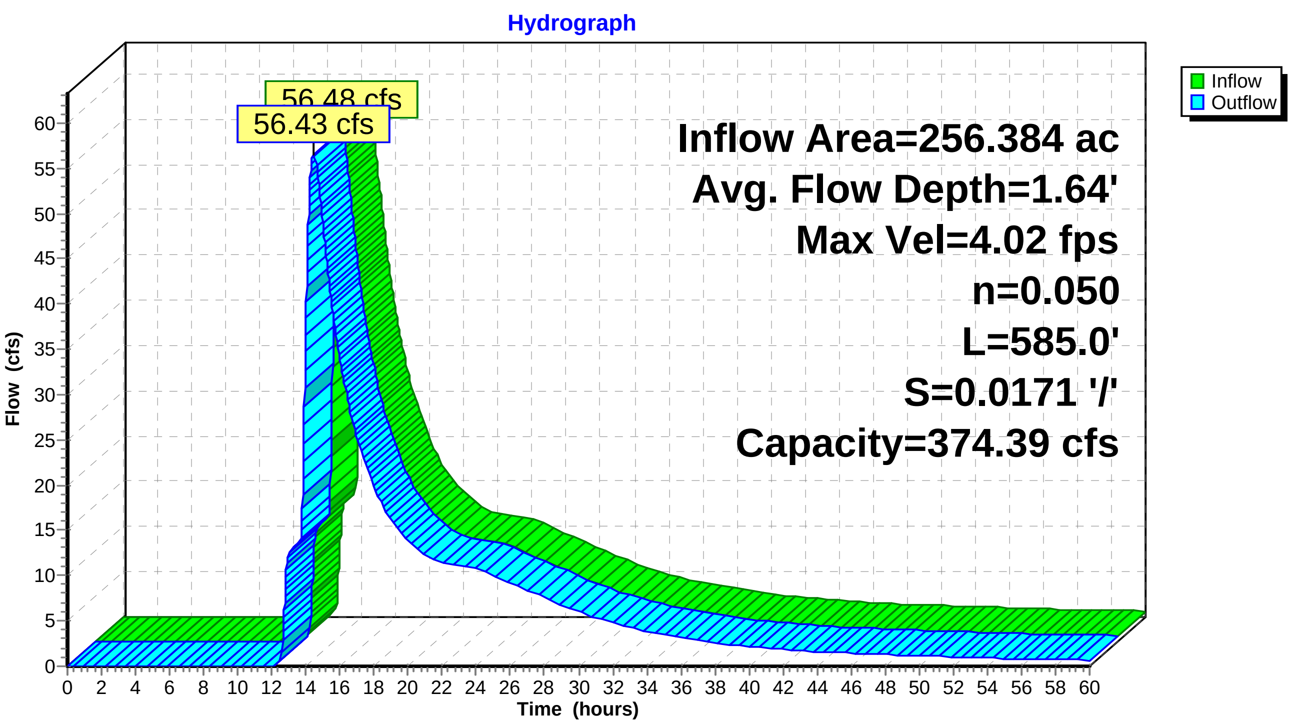
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.02 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 5.3 min

Peak Storage= 8,217 cf @ 14.45 hrs
Average Depth at Peak Storage= 1.64'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 374.39 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 585.0' Slope= 0.0171 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'



### Reach B103R: Thru B102



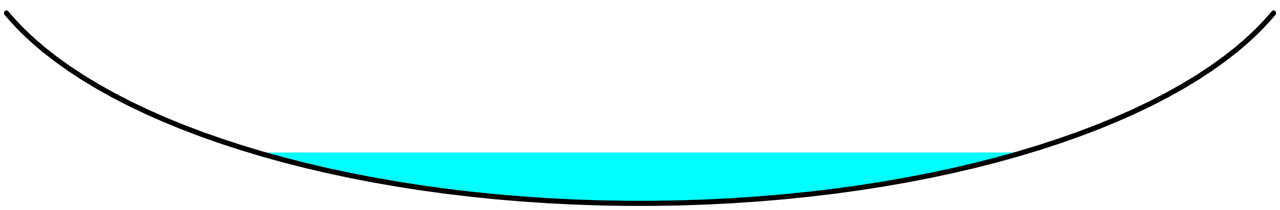
## Summary for Reach B107R: Thru B108

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 1.74" for 5-Year event
Inflow = 8.35 cfs @ 13.05 hrs, Volume= 2.077 af
Outflow = 8.19 cfs @ 13.16 hrs, Volume= 2.077 af, Atten= 2%, Lag= 6.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.49 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 29.0 min

Peak Storage= 3,726 cf @ 13.16 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 144.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 2,040.0' Slope= 0.2294 '/'
Inlet Invert= 972.00', Outlet Invert= 504.00'



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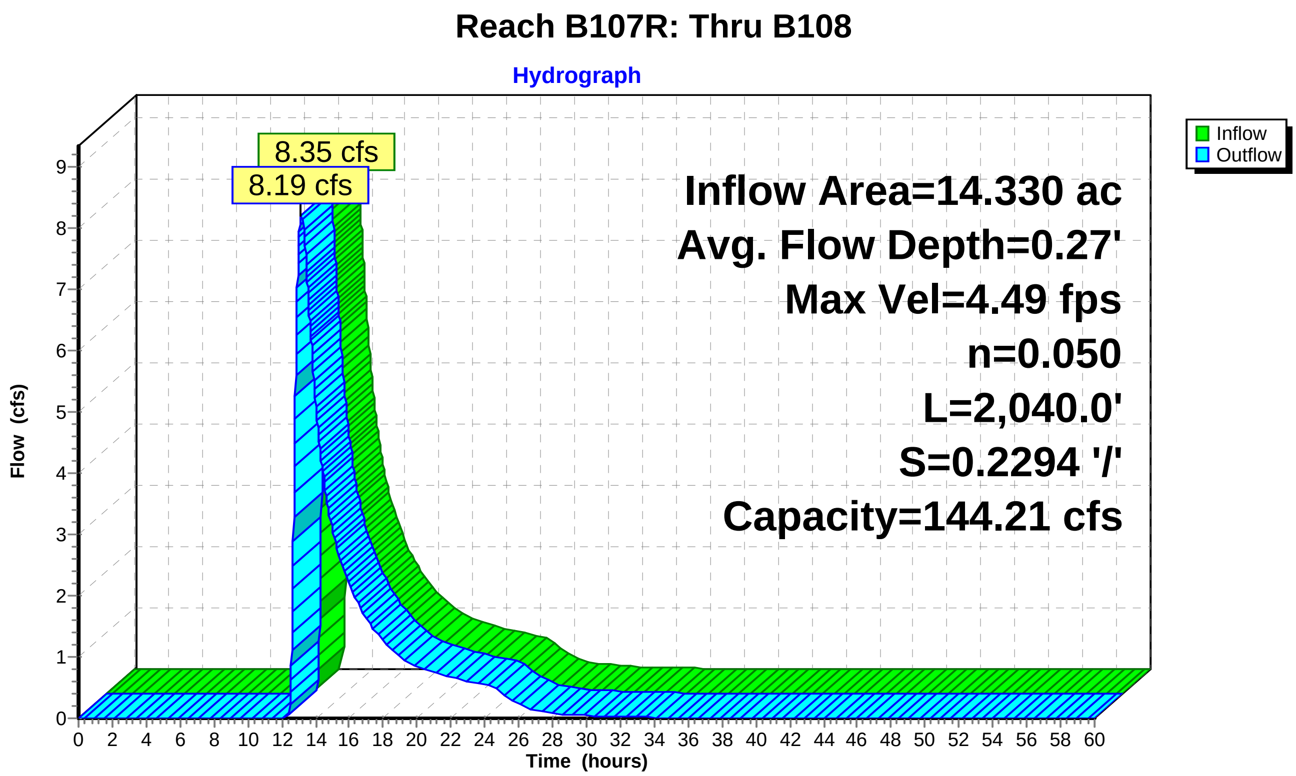


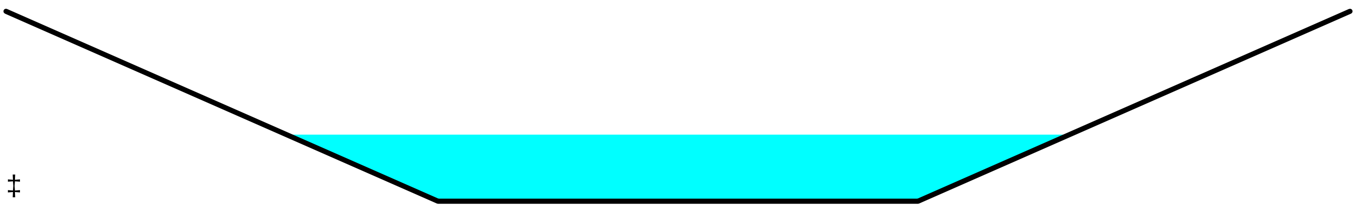
## Summary for Reach B108R: Thur 101

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 1.86" for 5-Year event
Inflow = 64.68 cfs @ 12.58 hrs, Volume= 11.234 af
Outflow = 64.68 cfs @ 12.59 hrs, Volume= 11.234 af, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.68 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 3.9 min

Peak Storage= 3,221 cf @ 12.59 hrs
Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 474.00 cfs

10.00' x 3.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 233.0' Slope= 0.0318 '/'
Inlet Invert= 499.60', Outlet Invert= 492.20'



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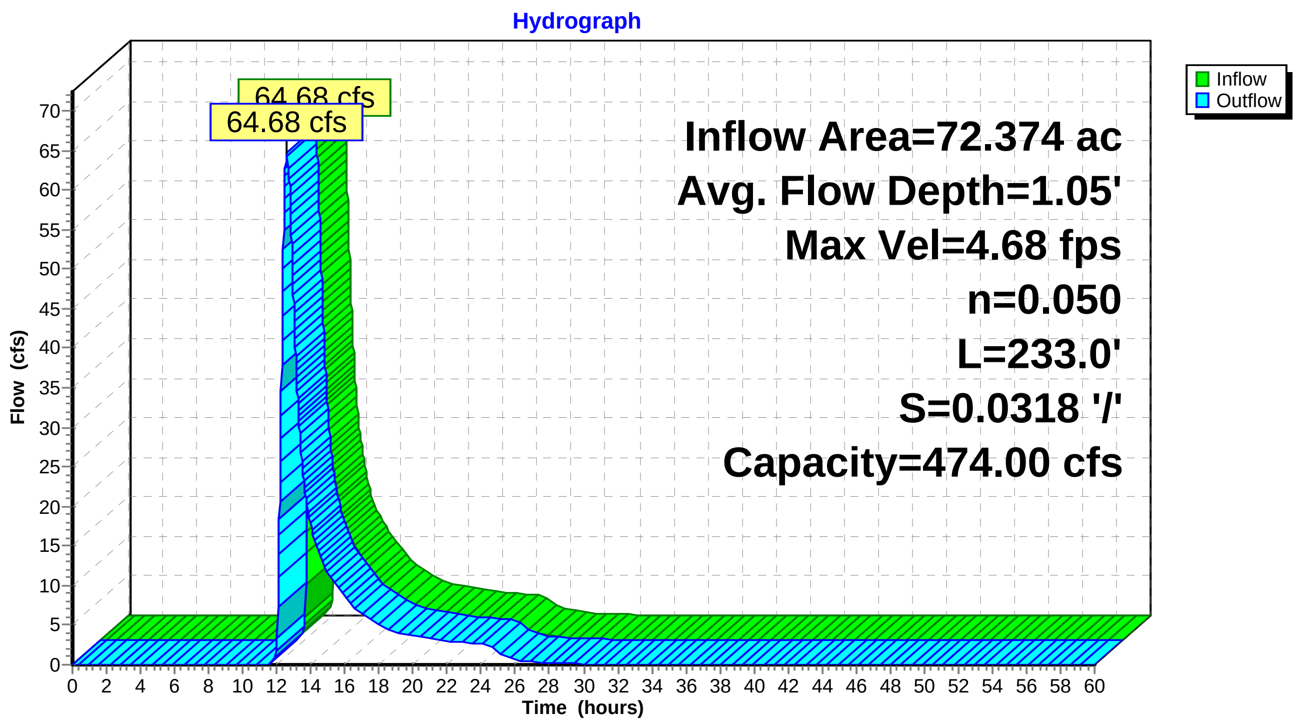
### Reach B108R: Thur 101



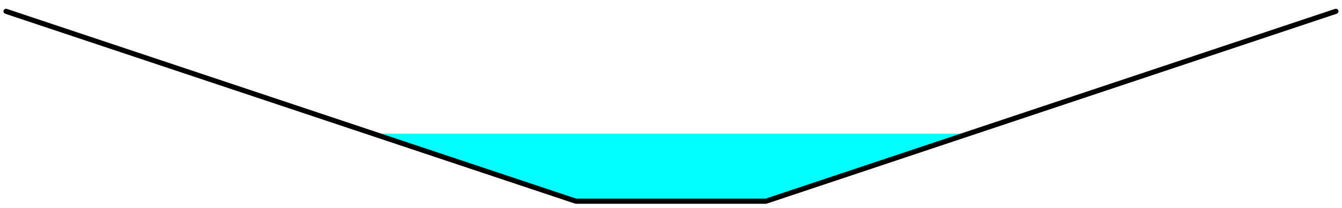
## Summary for Reach B109R: Thru B108

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 1.97" for 5-Year event
Inflow = 15.06 cfs @ 12.42 hrs, Volume= 1.852 af
Outflow = 15.04 cfs @ 12.43 hrs, Volume= 1.852 af, Atten= 0%, Lag= 0.9 min

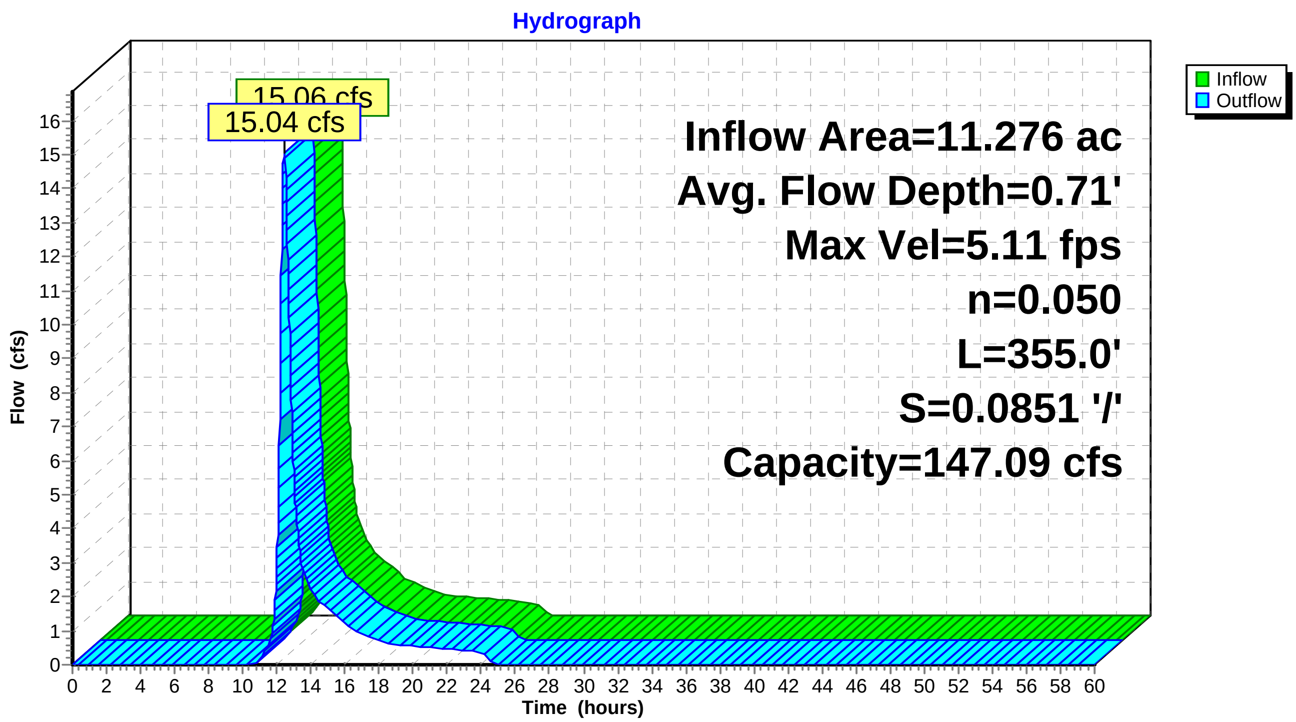
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.11 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 2.13 fps, Avg. Travel Time= 2.8 min

Peak Storage= 1,045 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 147.09 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 355.0' Slope= 0.0851 '/'
Inlet Invert= 532.20', Outlet Invert= 502.00'



**Reach B109R: Thru B108**



## Summary for Pond 102A: Wetland B

Inflow Area = 45.922 ac, 9.71% Impervious, Inflow Depth = 0.04" for 5-Year event
Inflow = 0.25 cfs @ 14.13 hrs, Volume= 0.150 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.27' @ 25.70 hrs Surf.Area= 37,611 sf Storage= 6,525 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 | 498.10' | 740,168 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

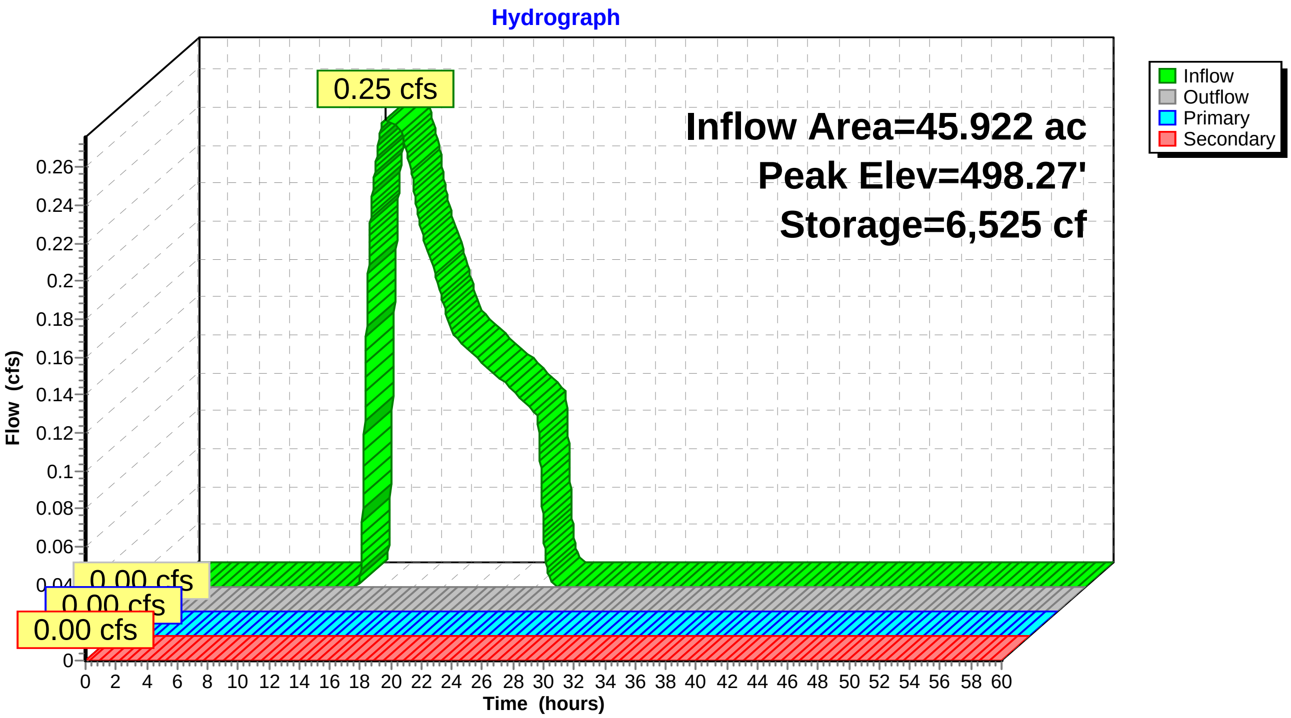
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 498.10 | 37,121 | 782.0 | 0 | 0 | 37,121 |
| 500.00 | 42,629 | 822.0 | 75,702 | 75,702 | 42,449 |
| 502.00 | 54,696 | 1,028.0 | 97,075 | 172,777 | 72,833 |
| 504.00 | 78,374 | 1,409.0 | 132,362 | 305,139 | 146,760 |
| 506.00 | 108,988 | 1,330.0 | 186,523 | 491,662 | 164,196 |
| 508.00 | 140,171 | 1,485.0 | 248,506 | 740,168 | 199,031 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 501.90' / 500.90' S= 0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #2 | Secondary | 506.10' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' (Free Discharge)
└─**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102A: Wetland B



## Summary for Pond 102B: 18" Culvert

[62] Hint: Exceeded Reach B103R OUTLET depth by 2.28' @ 25.38 hrs

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 1.35" for 5-Year event
Inflow = 56.71 cfs @ 14.45 hrs, Volume= 29.630 af
Outflow = 56.70 cfs @ 14.46 hrs, Volume= 29.629 af, Atten= 0%, Lag= 0.3 min
Primary = 10.05 cfs @ 13.92 hrs, Volume= 18.373 af
Secondary = 47.09 cfs @ 14.46 hrs, Volume= 11.256 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 495.33' @ 14.46 hrs Surf.Area= 3,937 sf Storage= 4,102 cf

Plug-Flow detention time= 2.4 min calculated for 29.629 af (100% of inflow)
Center-of-Mass det. time= 2.4 min ( 1,341.6 - 1,339.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 492.20' | 27,470 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

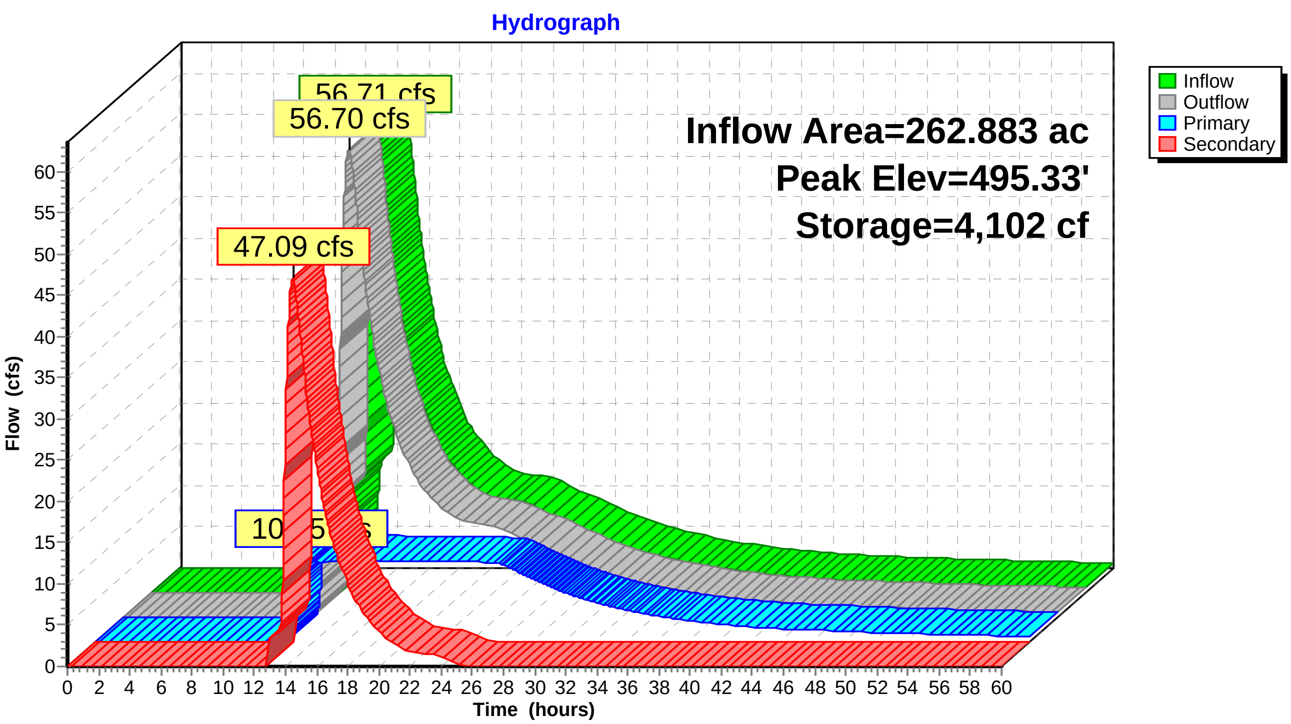
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 492.20 | 0 | 0.0 | 0 | 0 | 0 |
| 496.00 | 5,819 | 521.0 | 7,371 | 7,371 | 21,623 |
| 498.00 | 14,990 | 910.0 | 20,099 | 27,470 | 65,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 492.20' | **18.0" Round Culvert**<br>L= 20.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 492.20' / 491.10' S= 0.0550 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 495.00' | **100.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=10.05 cfs @ 13.92 hrs HW=495.19' TW=492.95' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 10.05 cfs @ 5.69 fps)

**Secondary OutFlow** Max=47.09 cfs @ 14.46 hrs HW=495.33' TW=493.28' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 47.09 cfs @ 1.45 fps)

## Pond 102B: 18" Culvert



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.386 ac, 4.49% Impervious, Inflow Depth = 0.94" for 5-Year event
Inflow = 15.58 cfs @ 12.77 hrs, Volume= 3.155 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.10' @ 26.62 hrs Surf.Area= 170,474 sf Storage= 137,439 cf

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

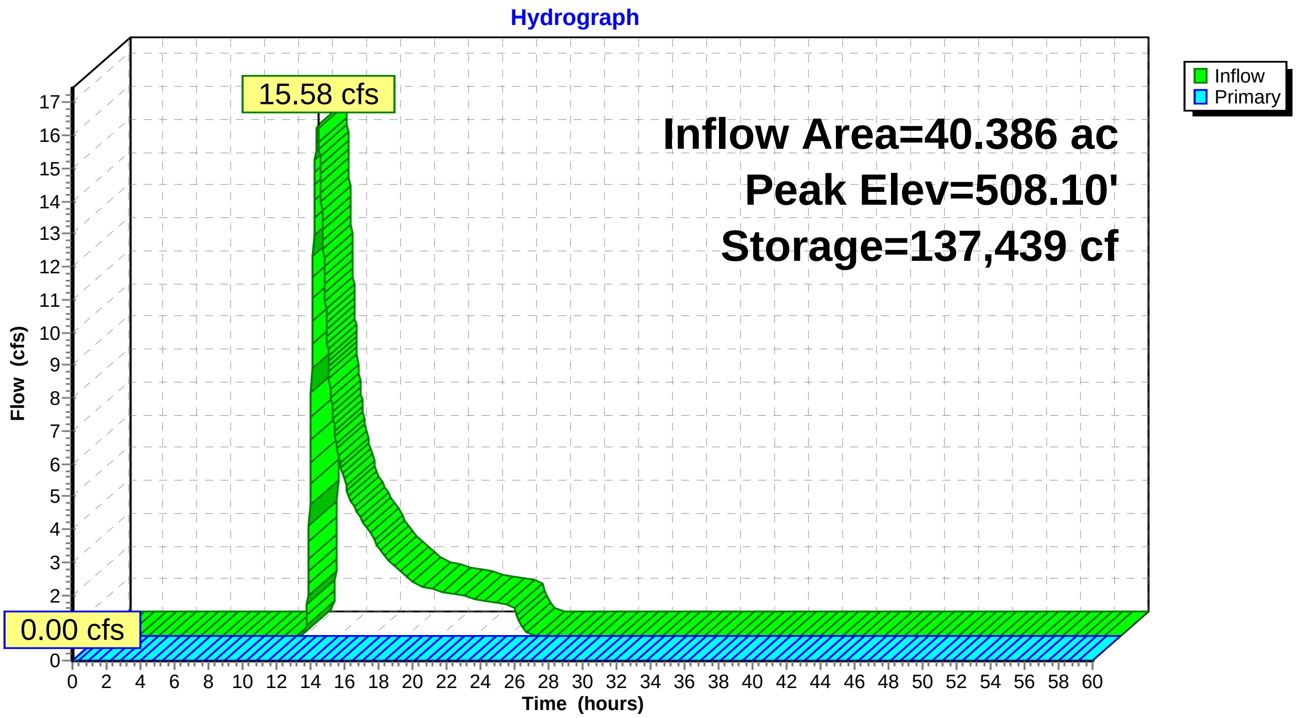
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 103A: Wetland A

Inflow Area = 36.735 ac, 8.79% Impervious, Inflow Depth = 0.27" for 5-Year event
Inflow = 1.50 cfs @ 13.48 hrs, Volume= 0.837 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.66' @ 26.58 hrs Surf.Area= 35,704 sf Storage= 36,441 cf

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

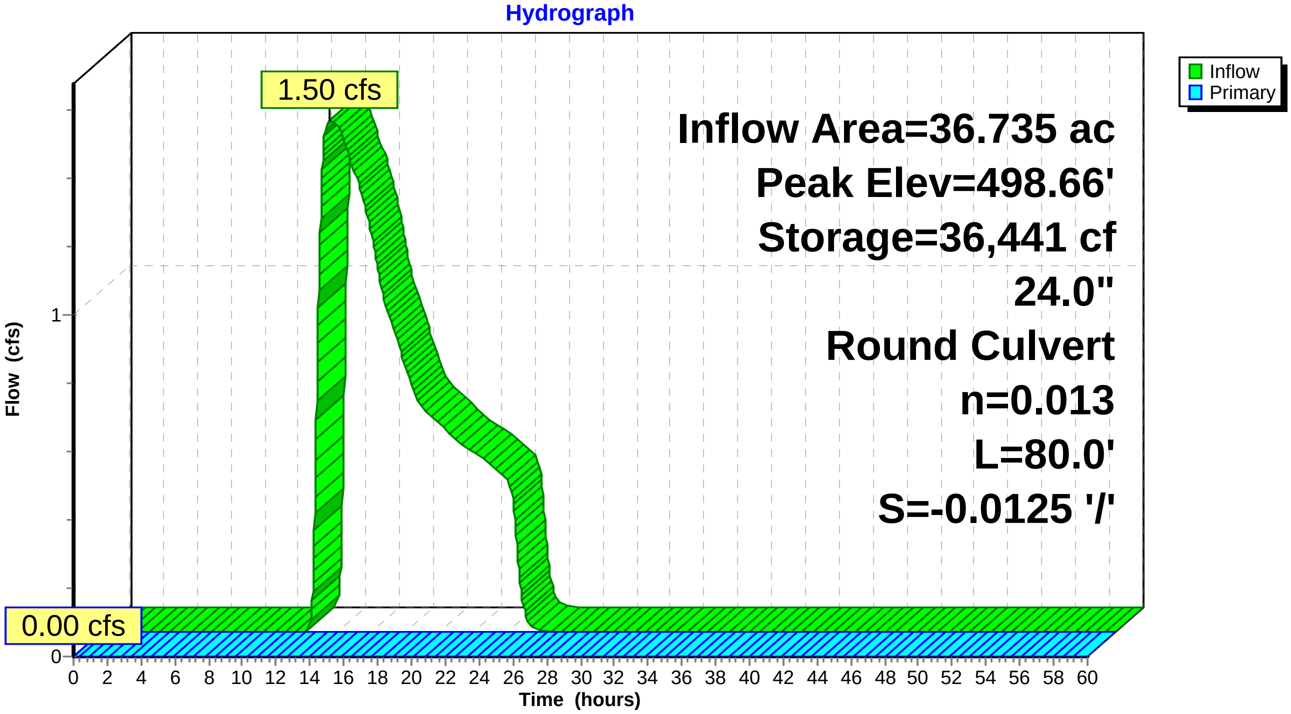
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 497.40' | 751,373 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 497.40 | 22,575 | 625.0 | 0 | 0 | 22,575 |
| 500.00 | 52,914 | 979.0 | 95,378 | 95,378 | 67,808 |
| 502.00 | 73,309 | 1,110.0 | 125,670 | 221,048 | 89,686 |
| 504.00 | 83,807 | 1,169.0 | 156,999 | 378,047 | 100,626 |
| 506.00 | 92,176 | 1,226.0 | 175,917 | 553,963 | 111,750 |
| 508.00 | 105,381 | 1,351.0 | 197,410 | 751,373 | 137,513 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 500.90' / 501.90' S= -0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=497.40' TW=498.10' (Dynamic Tailwater)
└─**1=Culvert** ( Controls 0.00 cfs)

## Pond 103A: Wetland A



## Summary for Pond 103B: Irrigation Pond

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 1.14" for 5-Year event
Inflow = 31.39 cfs @ 14.30 hrs, Volume= 24.439 af
Outflow = 30.44 cfs @ 14.53 hrs, Volume= 24.200 af, Atten= 3%, Lag= 13.5 min
Primary = 5.62 cfs @ 14.53 hrs, Volume= 8.652 af
Secondary = 24.82 cfs @ 14.53 hrs, Volume= 15.549 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 506.29' @ 14.53 hrs Surf.Area= 90,698 sf Storage= 43,823 cf

Plug-Flow detention time= 59.8 min calculated for 24.192 af (99% of inflow)
Center-of-Mass det. time= 39.5 min ( 1,424.6 - 1,385.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 505.80' | 416,210 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

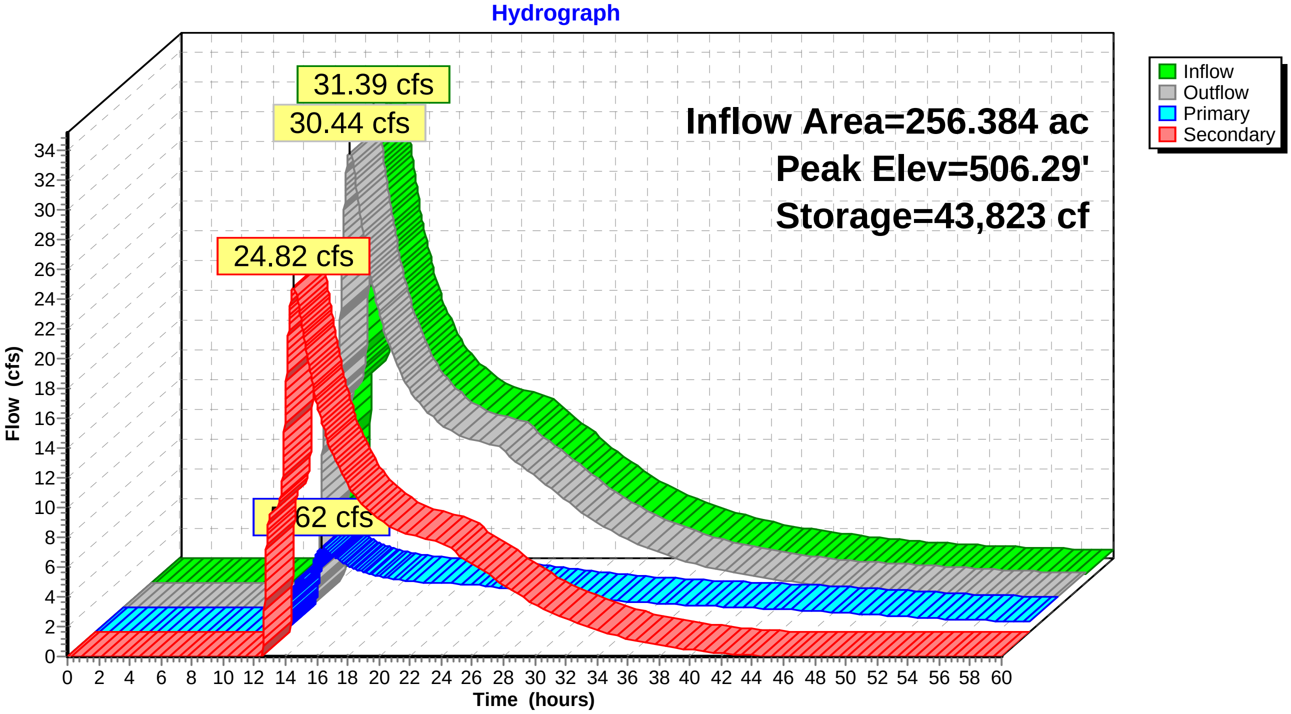
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 505.80 | 88,106 | 1,403.0 | 0 | 0 | 88,106 |
| 508.00 | 100,033 | 1,579.0 | 206,814 | 206,814 | 129,999 |
| 510.00 | 109,433 | 1,610.0 | 209,396 | 416,210 | 138,488 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 505.80' | **5.0' long x 1.80' rise Sharp-Crested Vee/Trap Weir**<br>Cv= 2.62 (C= 3.28) |
| #2 | Secondary | 506.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00<br>Width (feet) 45.00 60.00 80.00 95.00 120.00 |

**Primary OutFlow** Max=5.62 cfs @ 14.53 hrs HW=506.29' TW=503.64' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 5.62 cfs @ 2.29 fps)

**Secondary OutFlow** Max=24.82 cfs @ 14.53 hrs HW=506.29' TW=503.64' (Dynamic Tailwater)
└─**2=Custom Weir/Orifice** (Weir Controls 24.82 cfs @ 1.73 fps)

## Pond 103B: Irrigation Pond



## Summary for Pond 104A: Wetland D

Inflow Area = 9.432 ac, 9.40% Impervious, Inflow Depth = 0.05" for 5-Year event
Inflow = 0.06 cfs @ 17.29 hrs, Volume= 0.042 af
Outflow = 0.02 cfs @ 24.46 hrs, Volume= 0.027 af, Atten= 69%, Lag= 430.0 min
Primary = 0.02 cfs @ 24.46 hrs, Volume= 0.027 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.78' @ 24.46 hrs Surf.Area= 20,361 sf Storage= 1,562 cf

Plug-Flow detention time= 947.1 min calculated for 0.027 af (65% of inflow)
Center-of-Mass det. time= 848.4 min ( 2,024.2 - 1,175.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

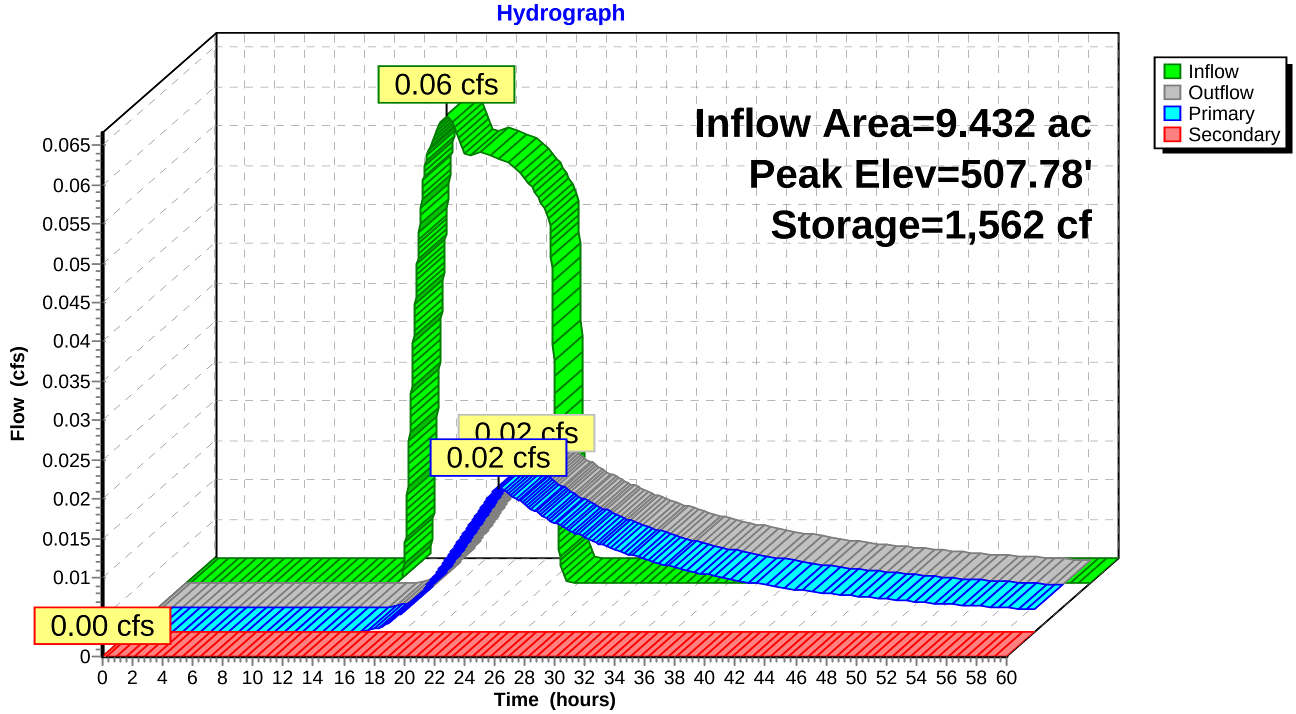
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.02 cfs @ 24.46 hrs HW=507.78' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.02 cfs @ 0.95 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 104A: Wetland D



## Summary for Pond 104B: Island Pond

Inflow Area = 234.803 ac, 5.37% Impervious, Inflow Depth = 1.47" for 5-Year event
Inflow = 111.84 cfs @ 13.09 hrs, Volume= 28.860 af
Outflow = 54.56 cfs @ 14.33 hrs, Volume= 26.939 af, Atten= 51%, Lag= 74.5 min
Primary = 12.18 cfs @ 14.33 hrs, Volume= 18.568 af
Secondary = 15.80 cfs @ 14.33 hrs, Volume= 3.104 af
Tertiary = 26.58 cfs @ 14.33 hrs, Volume= 5.267 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 510.26' @ 14.33 hrs Surf.Area= 261,093 sf Storage= 496,599 cf

Plug-Flow detention time= 434.7 min calculated for 26.939 af (93% of inflow)
Center-of-Mass det. time= 396.8 min ( 1,348.3 - 951.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 508.20' | 1,023,136 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 508.20 | 228,830 | 3,183.0 | 0 | 0 | 228,830 |
| 510.00 | 249,447 | 3,224.0 | 430,316 | 430,316 | 250,515 |
| 512.00 | 346,000 | 3,042.0 | 592,820 | 1,023,136 | 341,482 |

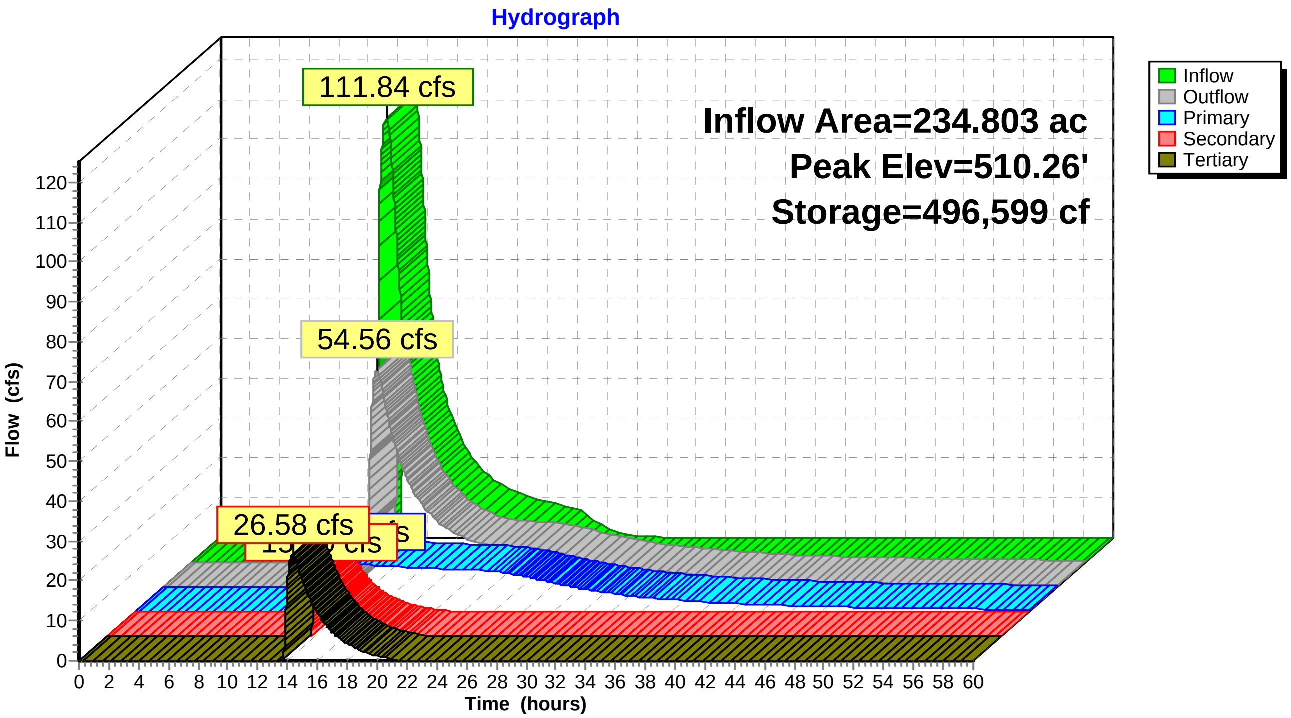
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 508.22' | **24.0" Round Culvert**<br>L= 111.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 508.22' / 505.43' S= 0.0251 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 3.14 sf |
| #2 | Secondary | 510.00' | **50.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Tertiary | 510.00' | **80.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=12.18 cfs @ 14.33 hrs HW=510.26' TW=506.28' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 12.18 cfs @ 3.88 fps)

**Secondary OutFlow** Max=15.80 cfs @ 14.33 hrs HW=510.26' TW=506.28' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 15.80 cfs @ 1.22 fps)

**Tertiary OutFlow** Max=26.58 cfs @ 14.33 hrs HW=510.26' TW=503.63' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 26.58 cfs @ 1.28 fps)

## Pond 104B: Island Pond



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach A106R OUTLET depth by 0.55' @ 13.38 hrs

Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 1.05" for 5-Year event
Inflow = 30.73 cfs @ 12.44 hrs, Volume= 4.351 af
Outflow = 9.67 cfs @ 13.16 hrs, Volume= 4.335 af, Atten= 69%, Lag= 43.2 min
Primary = 9.67 cfs @ 13.16 hrs, Volume= 4.335 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 574.94' @ 13.16 hrs Surf.Area= 31,613 sf Storage= 55,214 cf

Plug-Flow detention time= 111.4 min calculated for 4.333 af (100% of inflow)
Center-of-Mass det. time= 109.9 min ( 1,014.0 - 904.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

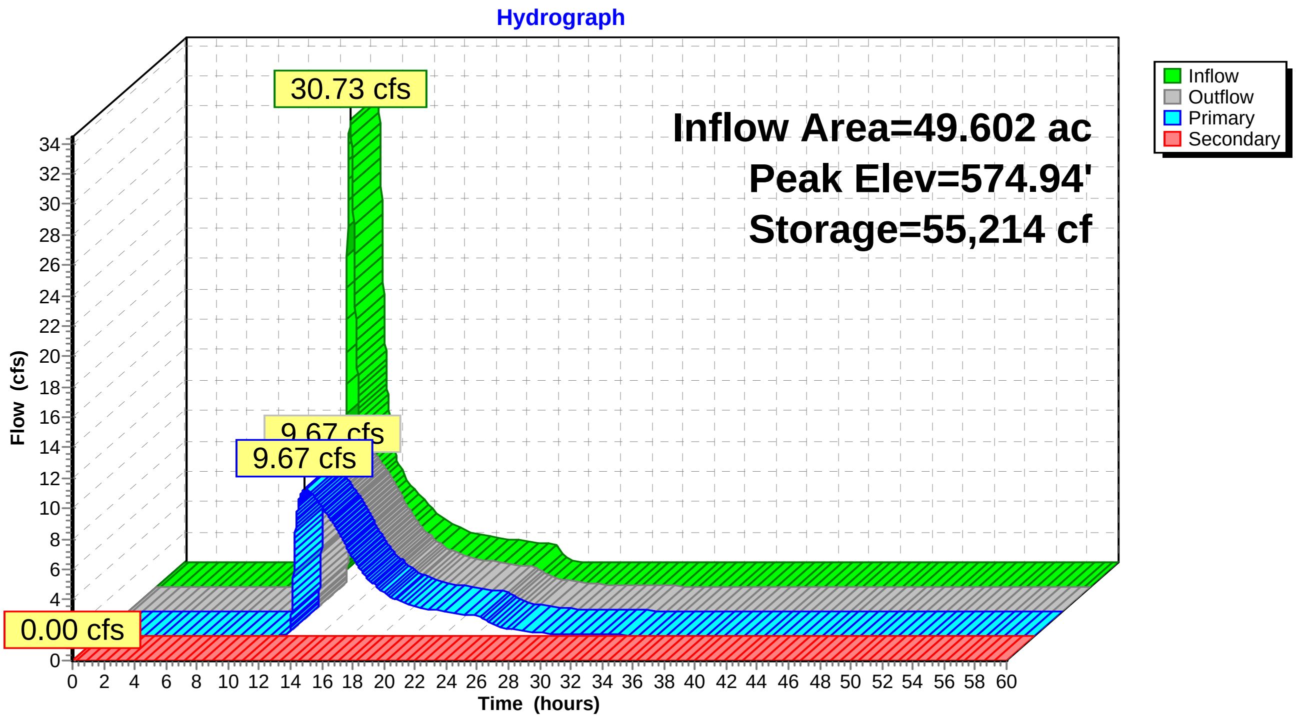
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=9.67 cfs @ 13.16 hrs HW=574.94' TW=566.68' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 9.67 cfs @ 5.47 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=572.90' TW=566.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 105A: Wetland H



## Summary for Pond 105B: Wetland J

Inflow Area = 154.267 ac, 1.16% Impervious, Inflow Depth = 1.79" for 5-Year event
Inflow = 95.41 cfs @ 13.17 hrs, Volume= 23.018 af
Outflow = 95.34 cfs @ 13.21 hrs, Volume= 23.017 af, Atten= 0%, Lag= 2.3 min
Primary = 95.34 cfs @ 13.21 hrs, Volume= 23.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 516.23' @ 13.21 hrs Surf.Area= 27,555 sf Storage= 43,738 cf

Plug-Flow detention time= 23.9 min calculated for 23.017 af (100% of inflow)
Center-of-Mass det. time= 23.7 min ( 956.5 - 932.8 )

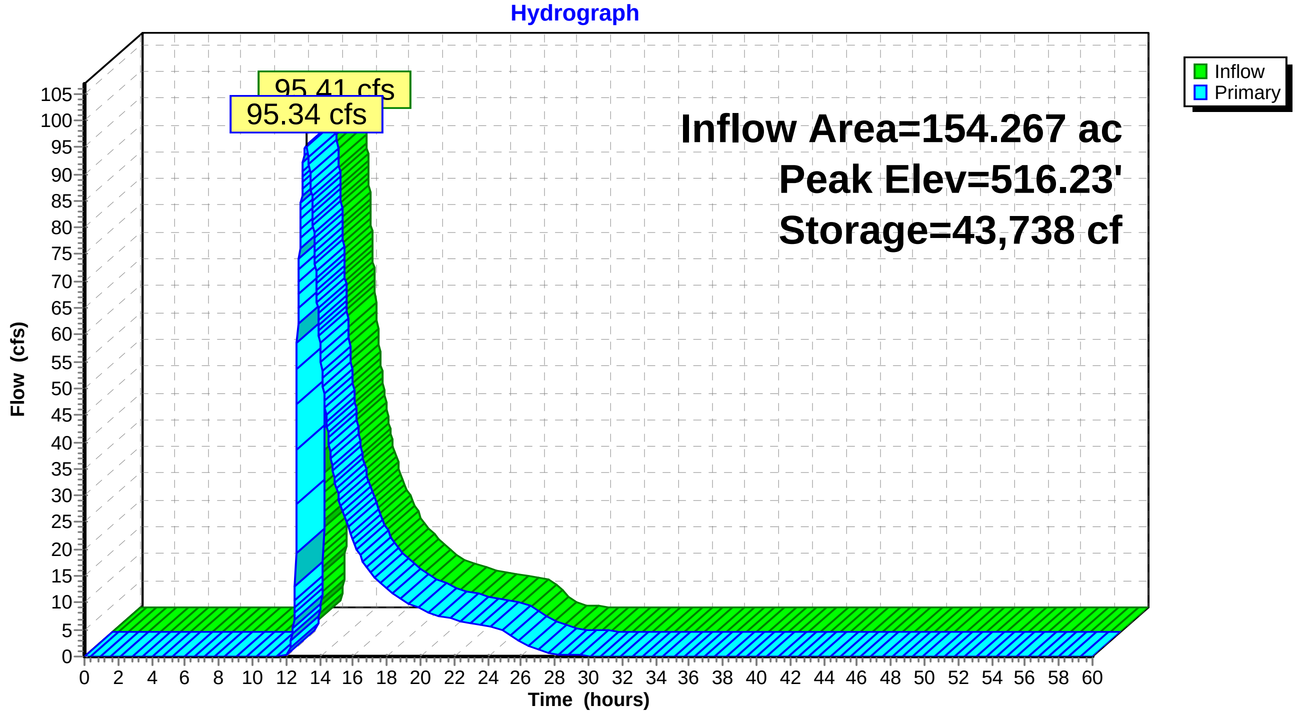
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 514.40' | 102,307 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 514.40 | 19,952 | 567.0 | 0 | 0 | 19,952 |
| 516.00 | 27,082 | 686.0 | 37,482 | 37,482 | 31,860 |
| 516.50 | 28,121 | 699.0 | 13,800 | 51,282 | 33,334 |
| 518.00 | 40,275 | 840.0 | 51,025 | 102,307 | 50,641 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 514.40' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.25 1.60 2.60 3.60<br>Width (feet) 2.33 2.33 90.00 120.00 170.00 |

**Primary OutFlow** Max=95.33 cfs @ 13.21 hrs HW=516.23' TW=509.34' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 95.33 cfs @ 2.36 fps)

## Pond 105B: Wetland J



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 1.88" for 5-Year event
Inflow = 19.99 cfs @ 12.39 hrs, Volume= 2.404 af
Outflow = 19.98 cfs @ 12.39 hrs, Volume= 2.404 af, Atten= 0%, Lag= 0.0 min
Primary = 19.98 cfs @ 12.39 hrs, Volume= 2.404 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 718.49' @ 12.39 hrs Surf.Area= 37 sf Storage= 22 cf

Plug-Flow detention time= 0.0 min calculated for 2.403 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 871.5 - 871.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

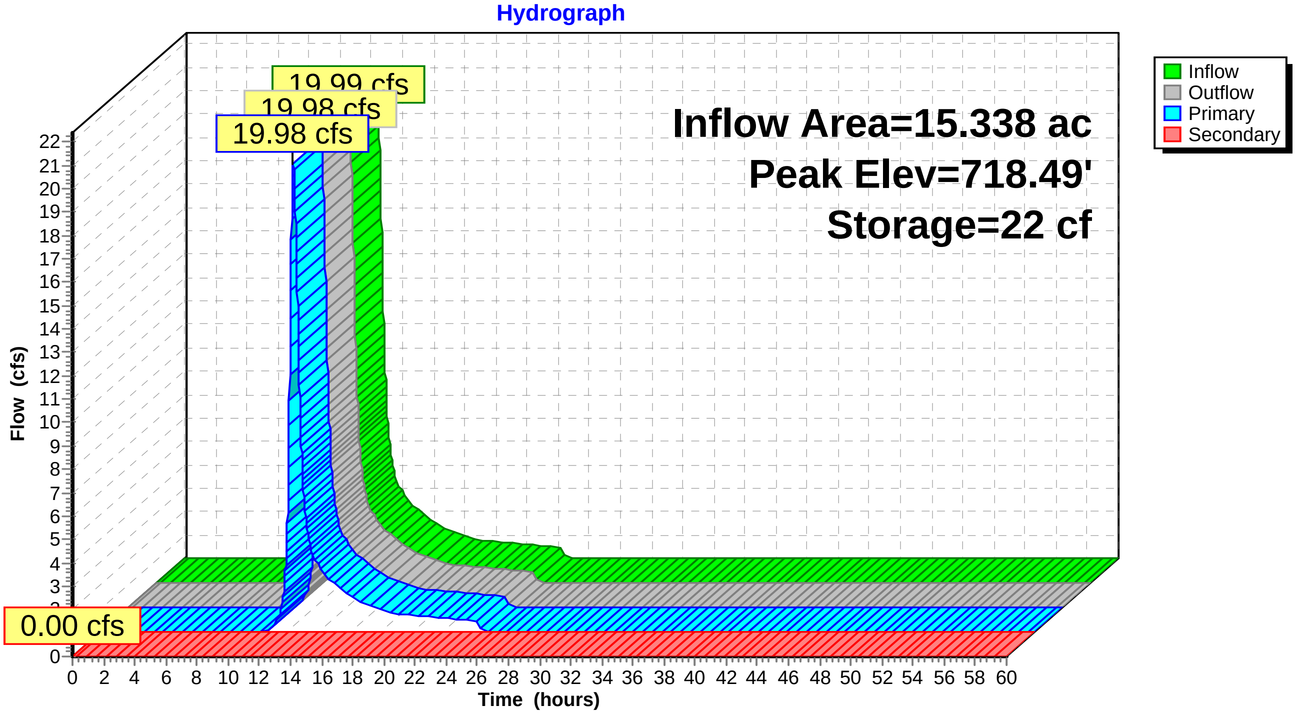
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=19.97 cfs @ 12.39 hrs HW=718.49' TW=686.79' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 19.97 cfs @ 4.55 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=686.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 130.289 ac, 0.83% Impervious, Inflow Depth = 1.88" for 5-Year event
Inflow = 88.13 cfs @ 13.23 hrs, Volume= 20.421 af
Outflow = 88.06 cfs @ 13.24 hrs, Volume= 20.421 af, Atten= 0%, Lag= 0.5 min
Primary = 88.06 cfs @ 13.24 hrs, Volume= 20.421 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.74' @ 13.24 hrs Surf.Area= 12,131 sf Storage= 19,655 cf

Plug-Flow detention time= 10.1 min calculated for 20.421 af (100% of inflow)
Center-of-Mass det. time= 9.8 min ( 936.0 - 926.2 )

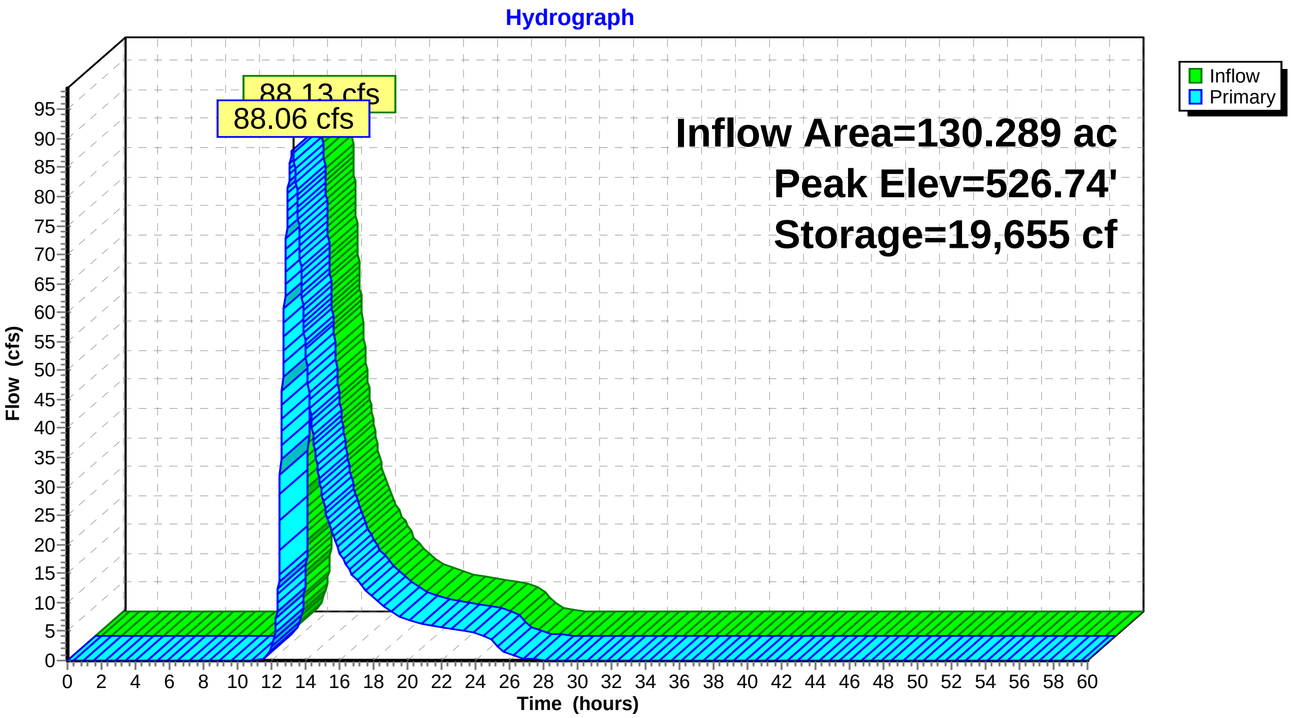
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=88.05 cfs @ 13.24 hrs HW=526.74' TW=516.23' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 88.05 cfs @ 2.65 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

Inflow Area = 95.411 ac, 2.35% Impervious, Inflow Depth = 1.62" for 5-Year event
Inflow = 67.03 cfs @ 12.88 hrs, Volume= 12.892 af
Outflow = 67.02 cfs @ 12.89 hrs, Volume= 12.892 af, Atten= 0%, Lag= 0.3 min
Primary = 41.02 cfs @ 12.89 hrs, Volume= 11.585 af
Secondary = 26.00 cfs @ 12.89 hrs, Volume= 1.307 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 625.51' @ 12.89 hrs Surf.Area= 1,238 sf Storage= 2,437 cf

Plug-Flow detention time= 0.5 min calculated for 12.892 af (100% of inflow)
Center-of-Mass det. time= 0.3 min ( 914.1 - 913.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

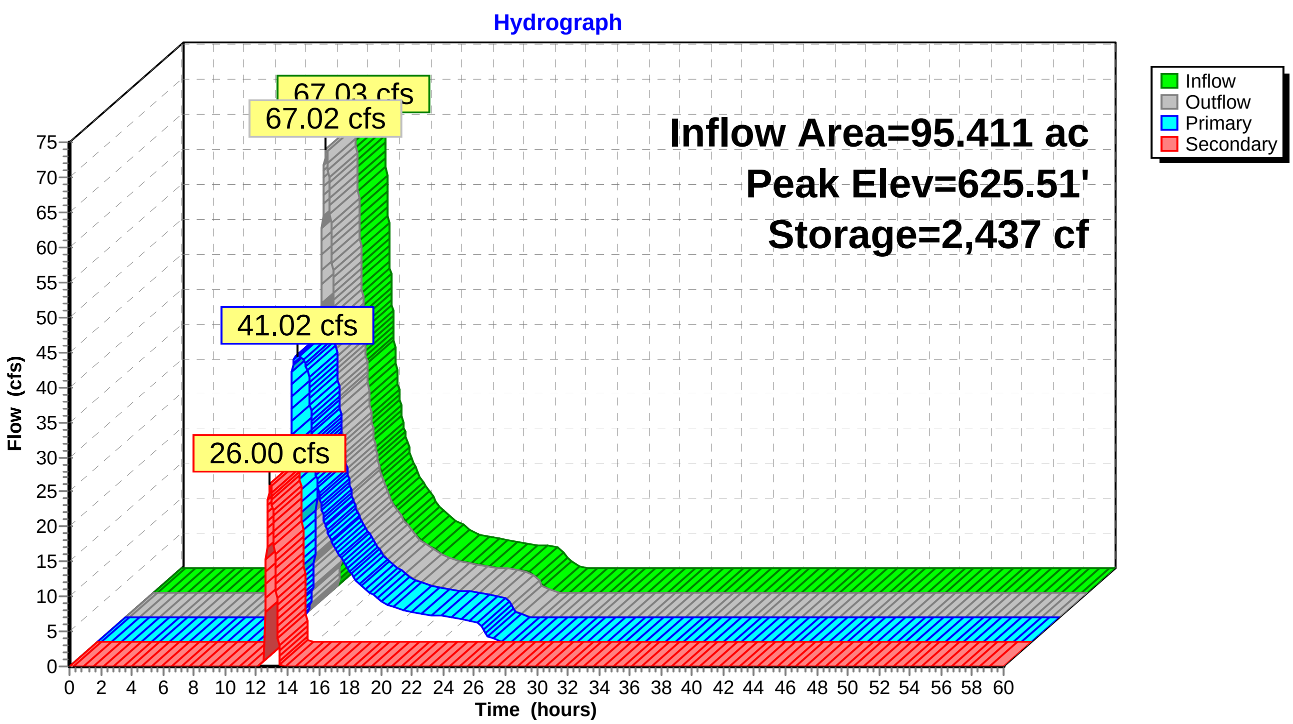
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=41.02 cfs @ 12.89 hrs HW=625.51' TW=609.62' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 41.02 cfs @ 13.06 fps)

**Secondary OutFlow** Max=25.98 cfs @ 12.89 hrs HW=625.51' TW=611.15' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 25.98 cfs @ 2.28 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 1.97" for 5-Year event
Inflow = 16.70 cfs @ 12.55 hrs, Volume= 2.353 af
Outflow = 8.35 cfs @ 13.05 hrs, Volume= 2.077 af, Atten= 50%, Lag= 29.9 min
Primary = 8.35 cfs @ 13.05 hrs, Volume= 2.077 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.78' @ 13.05 hrs Surf.Area= 123,028 sf Storage= 34,203 cf

Plug-Flow detention time= 145.2 min calculated for 2.077 af (88% of inflow)
Center-of-Mass det. time= 90.1 min ( 968.5 - 878.4 )

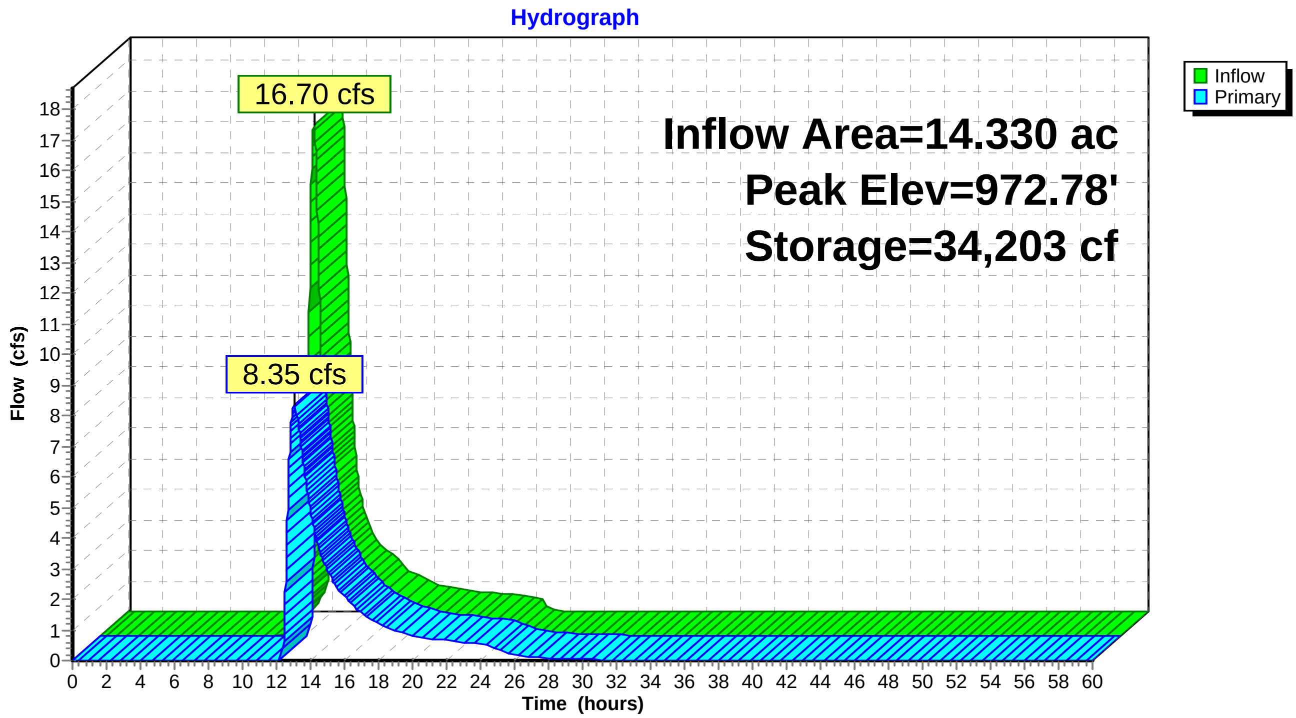
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=8.34 cfs @ 13.05 hrs HW=972.78' TW=972.26' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 8.34 cfs @ 1.14 fps)

# Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 5.526 ac, 2.32% Impervious, Inflow Depth = 3.35" for 5-Year event
Inflow = 26.78 cfs @ 12.89 hrs, Volume= 1.543 af
Outflow = 26.86 cfs @ 12.88 hrs, Volume= 1.543 af, Atten= 0%, Lag= 0.0 min
Primary = 26.86 cfs @ 12.88 hrs, Volume= 1.543 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 611.15' @ 12.88 hrs Surf.Area= 13 sf Storage= 31 cf

Plug-Flow detention time= 0.4 min calculated for 1.543 af (100% of inflow)
Center-of-Mass det. time= 0.1 min ( 806.4 - 806.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

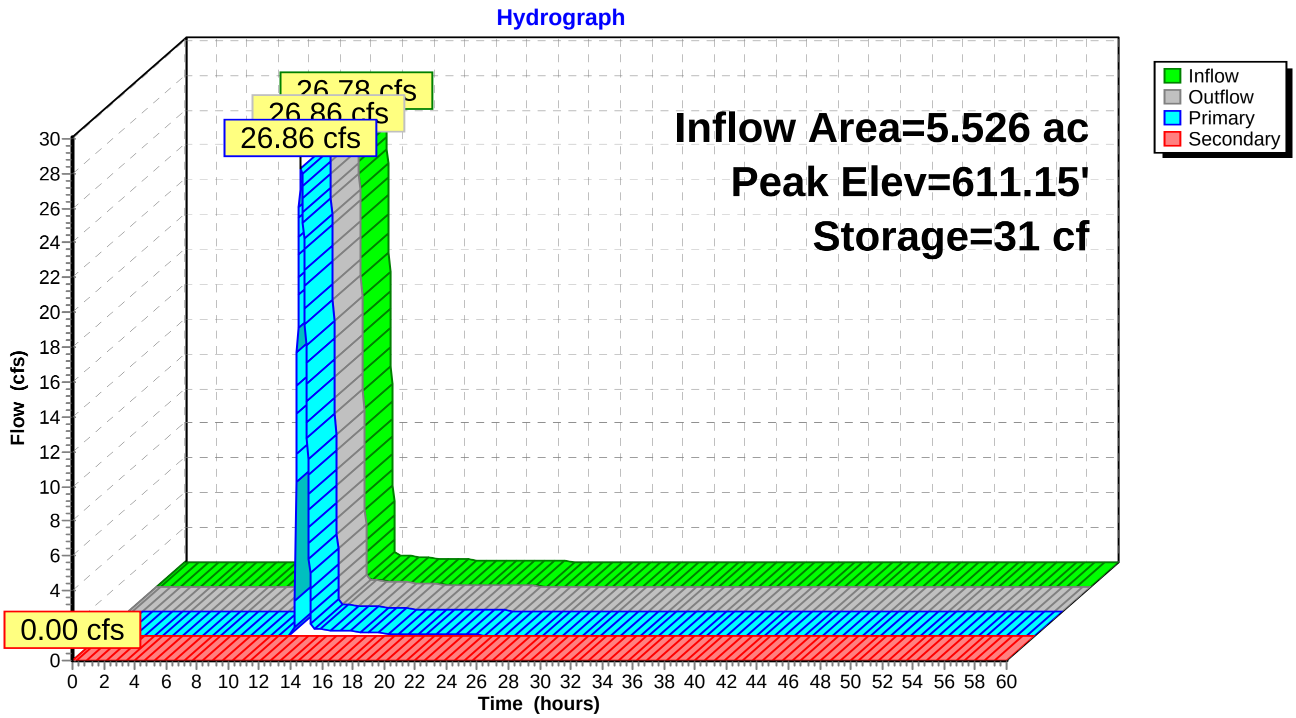
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=26.83 cfs @ 12.88 hrs HW=611.15' TW=609.62' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 26.83 cfs @ 6.21 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=608.80' TW=608.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 108A: 36" Culvert



## Summary for Pond 108B: Wetland N

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 1.87" for 5-Year event
Inflow = 64.71 cfs @ 12.57 hrs, Volume= 11.259 af
Outflow = 64.68 cfs @ 12.58 hrs, Volume= 11.234 af, Atten= 0%, Lag= 0.9 min
Primary = 4.36 cfs @ 12.36 hrs, Volume= 3.562 af
Secondary = 60.36 cfs @ 12.58 hrs, Volume= 7.672 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.33' @ 12.58 hrs Surf.Area= 10,901 sf Storage= 13,398 cf

Plug-Flow detention time= 20.0 min calculated for 11.230 af (100% of inflow)
Center-of-Mass det. time= 18.1 min ( 917.6 - 899.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 32,385 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

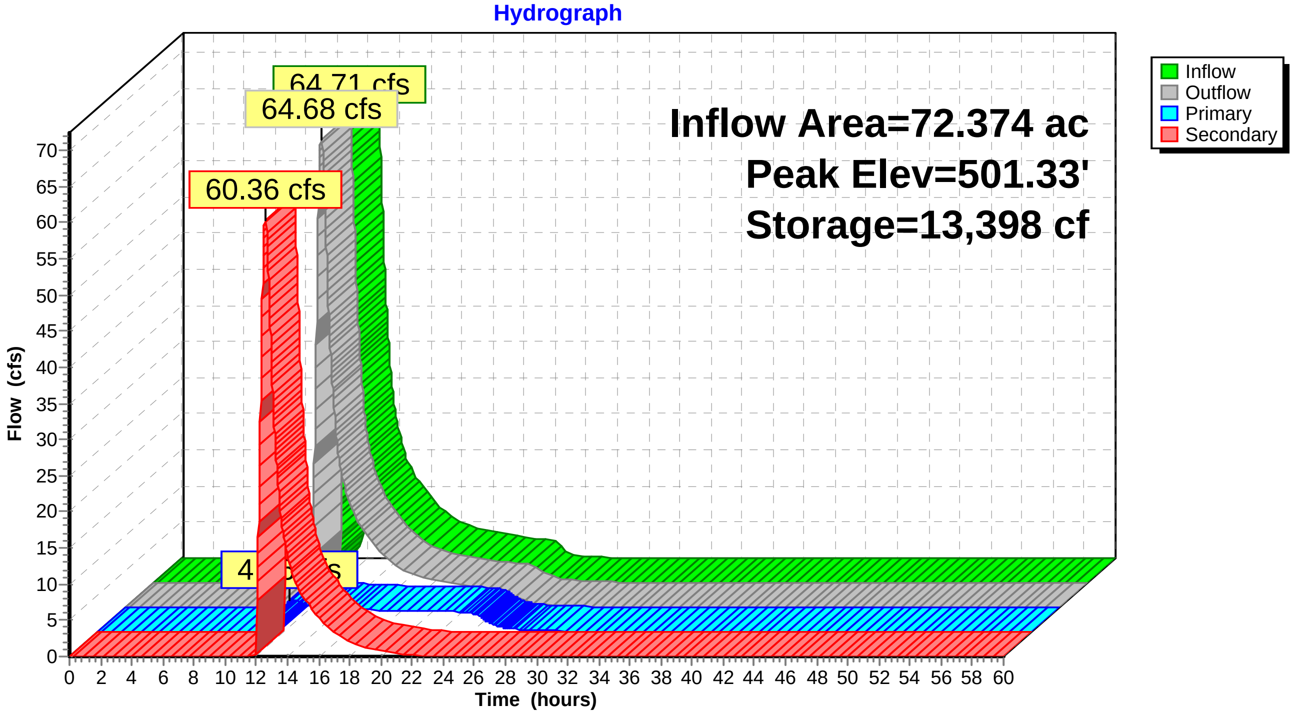
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 500.00 | 8,398 | 412.0 | 0 | 0 | 8,398 |
| 500.50 | 10,185 | 434.0 | 4,639 | 4,639 | 9,894 |
| 502.00 | 11,496 | 452.0 | 16,251 | 20,889 | 11,327 |
| 503.00 | 11,496 | 452.0 | 11,496 | 32,385 | 11,779 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.10' | **18.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 500.10' / 499.60' S= 0.0250 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 501.00' | **125.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=4.36 cfs @ 12.36 hrs HW=501.28' TW=500.51' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 4.36 cfs @ 4.01 fps)

**Secondary OutFlow** Max=60.36 cfs @ 12.58 hrs HW=501.33' TW=500.65' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 60.36 cfs @ 1.46 fps)

## Pond 108B: Wetland N



## Summary for Pond 109B: 36" Culvert

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 1.97" for 5-Year event
Inflow = 15.06 cfs @ 12.42 hrs, Volume= 1.852 af
Outflow = 15.06 cfs @ 12.42 hrs, Volume= 1.852 af, Atten= 0%, Lag= 0.1 min
Primary = 15.06 cfs @ 12.42 hrs, Volume= 1.852 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 546.94' @ 12.42 hrs Surf.Area= 78 sf Storage= 45 cf

Plug-Flow detention time= 0.0 min calculated for 1.851 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 869.7 - 869.7 )

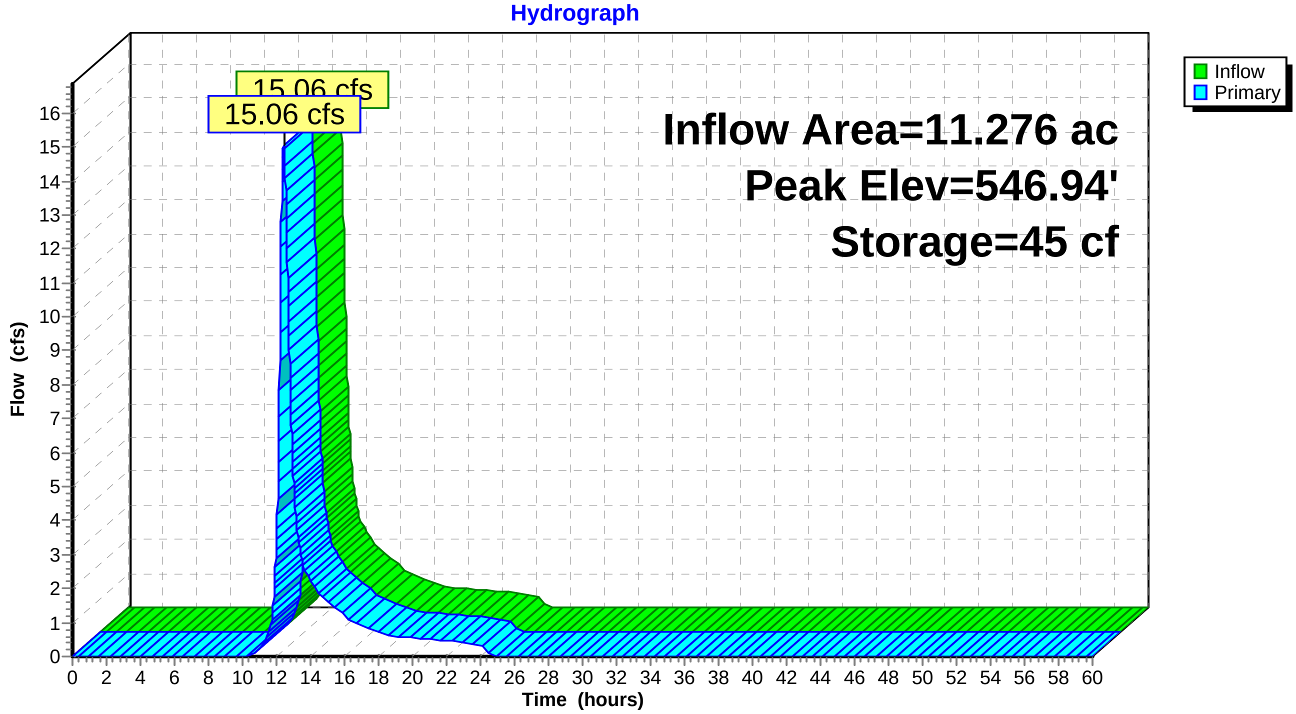
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 545.20' | 5,884 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 545.20 | 0 | 0.0 | 0 | 0 | 0 |
| 548.00 | 203 | 65.0 | 189 | 189 | 348 |
| 550.00 | 519 | 101.0 | 698 | 887 | 852 |
| 552.00 | 1,050 | 140.0 | 1,538 | 2,425 | 1,638 |
| 554.00 | 2,514 | 230.0 | 3,459 | 5,884 | 4,313 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 545.20' | **36.0" Round Culvert**<br>L= 96.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 545.20' / 532.20' S= 0.1354 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Primary | 552.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 65.00 95.00<br>Height (feet) 2.00 0.60 0.00 2.00 |

**Primary OutFlow** Max=15.05 cfs @ 12.42 hrs HW=546.94' TW=532.91' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 15.05 cfs @ 3.54 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond 109B: 36" Culvert

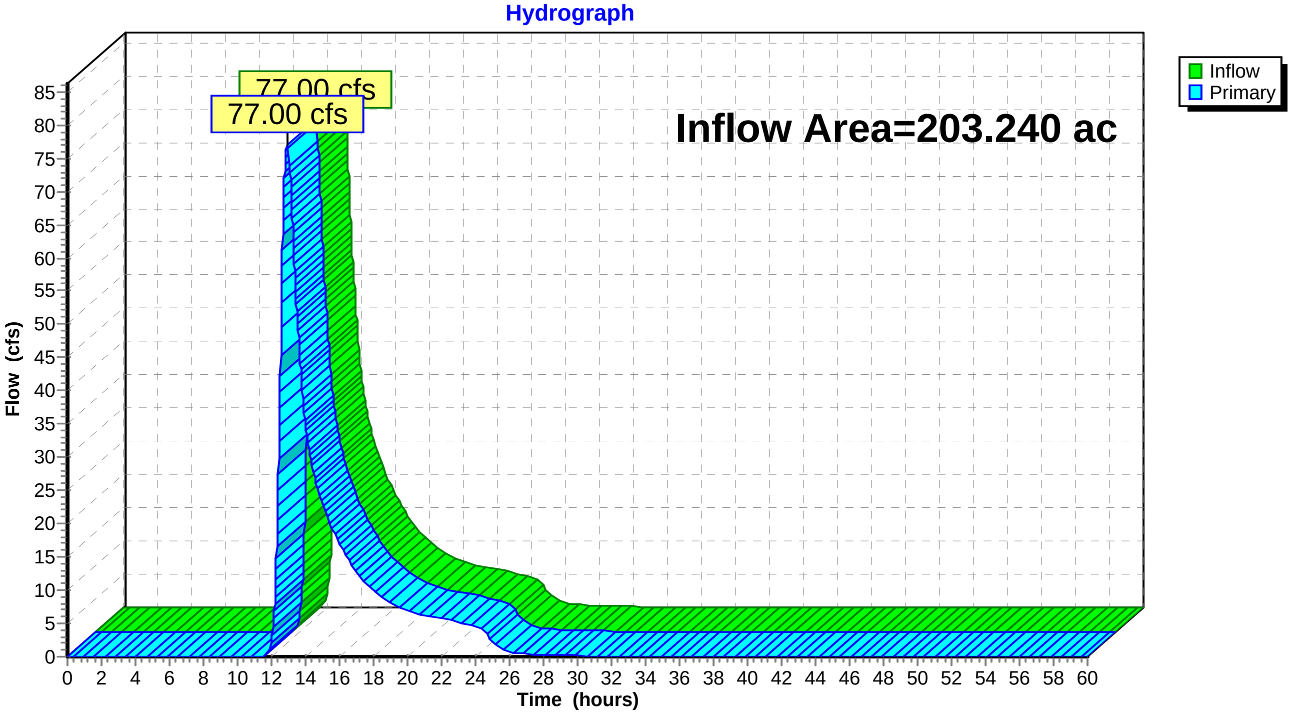


## Summary for Link A: Amenia Stream

Inflow Area = 203.240 ac, 3.66% Impervious, Inflow Depth > 1.05" for 5-Year event
Inflow = 77.00 cfs @ 12.93 hrs, Volume= 17.761 af
Primary = 77.00 cfs @ 12.93 hrs, Volume= 17.761 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link A: Amenia Stream

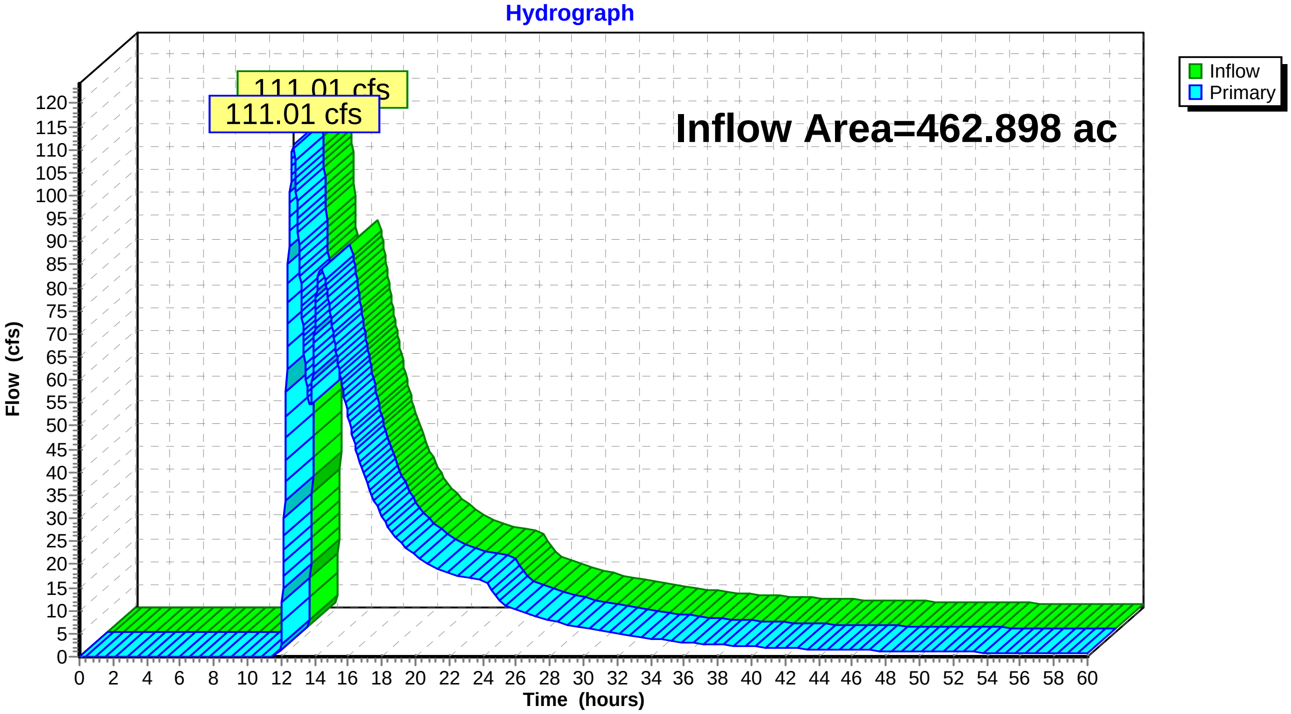


## Summary for Link B: Wetland

Inflow Area = 462.898 ac, 3.63% Impervious, Inflow Depth > 1.30" for 5-Year event
Inflow = 111.01 cfs @ 12.71 hrs, Volume= 50.122 af
Primary = 111.01 cfs @ 12.71 hrs, Volume= 50.122 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link B: Wetland

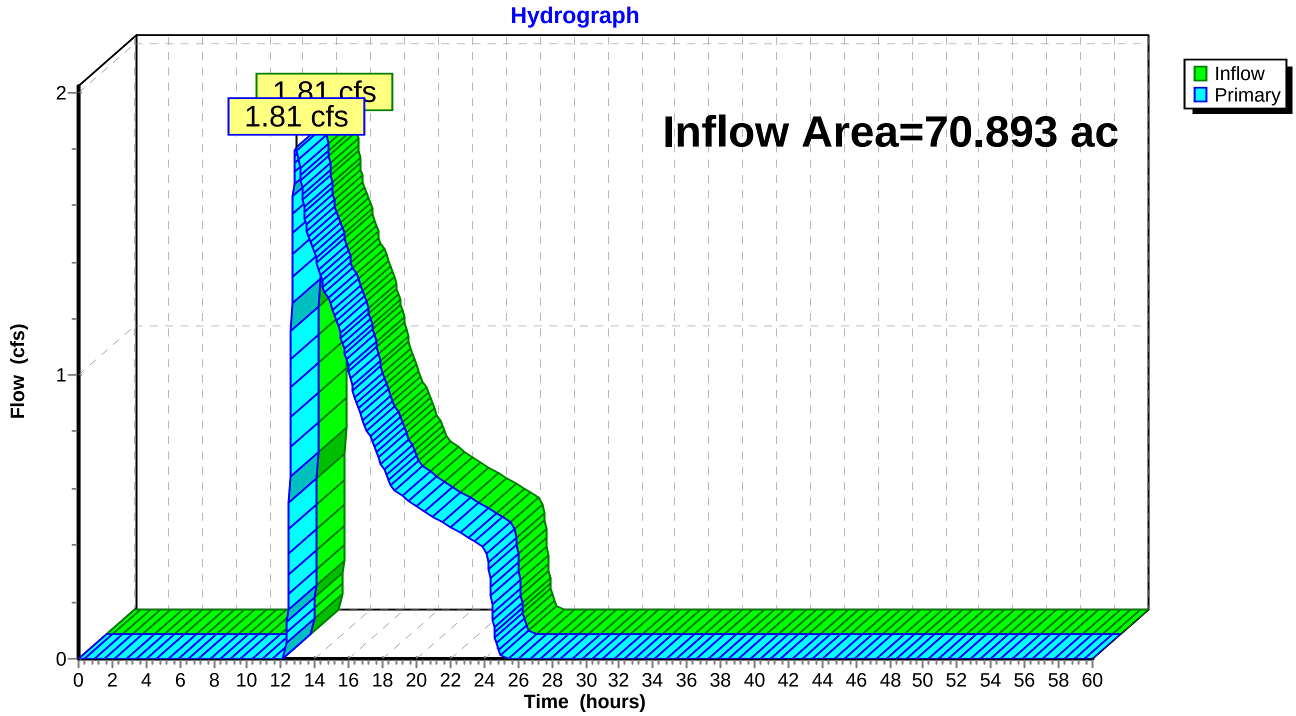


## Summary for Link C: Culvert

Inflow Area = 70.893 ac, 4.53% Impervious, Inflow Depth = 0.14" for 5-Year event
Inflow = 1.81 cfs @ 12.87 hrs, Volume= 0.803 af
Primary = 1.81 cfs @ 12.87 hrs, Volume= 0.803 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

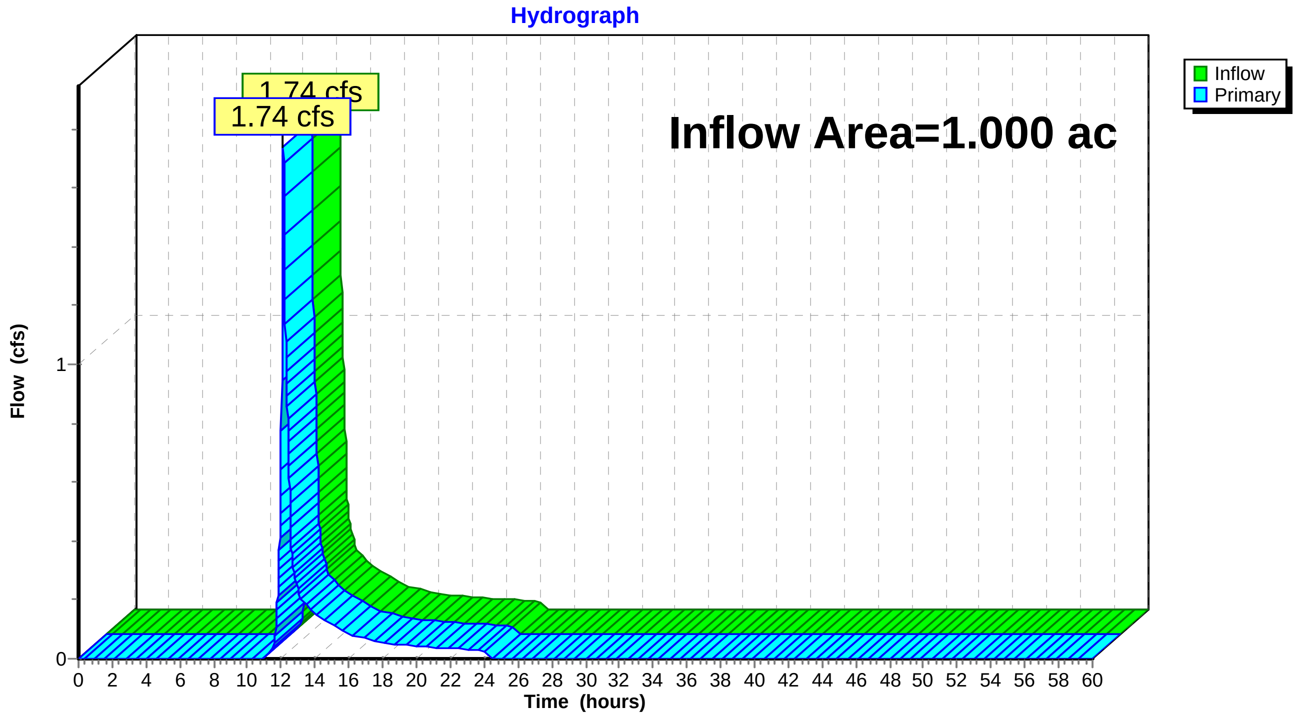


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

| | | | | | |
|---|---|---|---|---|---|
| Inflow Area = | 1.000 ac, | 0.00% Impervious, | Inflow Depth = 1.62" | for 5-Year event | |
| Inflow = | 1.74 cfs @ | 12.12 hrs, | Volume= | 0.135 af | |
| Primary = | 1.74 cfs @ | 12.12 hrs, | Volume= | 0.135 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=43.269 ac 4.21% Impervious Runoff Depth=0.12"
Flow Length=1,315' Tc=31.0 min CN=46 Runoff=0.66 cfs 0.419 af

**Subcatchment A102: A102** Runoff Area=9.187 ac 13.40% Impervious Runoff Depth=0.26"
Flow Length=675' Tc=29.1 min CN=50 Runoff=0.35 cfs 0.200 af

**Subcatchment A103: A103** Runoff Area=36.735 ac 8.79% Impervious Runoff Depth=0.35"
Flow Length=1,190' Tc=45.1 min CN=52 Runoff=2.30 cfs 1.071 af

**Subcatchment A104: A104** Runoff Area=9.432 ac 9.40% Impervious Runoff Depth=0.09"
Flow Length=1,015' Tc=29.2 min CN=45 Runoff=0.10 cfs 0.069 af

**Subcatchment A105: A105** Runoff Area=34.264 ac 3.27% Impervious Runoff Depth=0.80"
Flow Length=1,326' Tc=19.2 min CN=60 Runoff=14.13 cfs 2.293 af

**Subcatchment A106: A106** Runoff Area=15.338 ac 8.12% Impervious Runoff Depth=2.08"
Flow Length=1,260' Tc=26.7 min CN=76 Runoff=22.25 cfs 2.655 af

**Subcatchment A107: A107** Runoff Area=95.411 ac 2.35% Impervious Runoff Depth=1.81"
Flow Length=3,685' Tc=61.0 min CN=73 Runoff=75.71 cfs 14.357 af

**Subcatchment A108: A108** Runoff Area=5.526 ac 2.32% Impervious Runoff Depth=0.62"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=1.24 cfs 0.284 af

**Subcatchment B101: B101** Runoff Area=127.641 ac 0.75% Impervious Runoff Depth=1.01"
Flow Length=2,934' Tc=43.8 min CN=63 Runoff=54.60 cfs 10.718 af

**Subcatchment B102: B102** Runoff Area=6.499 ac 2.62% Impervious Runoff Depth=0.40"
Flow Length=637' Tc=19.6 min CN=53 Runoff=0.72 cfs 0.216 af

**Subcatchment B103: B103** Runoff Area=21.581 ac 11.93% Impervious Runoff Depth=1.72"
Flow Length=1,130' Tc=38.7 min CN=72 Runoff=20.92 cfs 3.090 af

**Subcatchment B104: B104** Runoff Area=80.536 ac 13.45% Impervious Runoff Depth=1.01"
Flow Length=3,223' Tc=33.2 min CN=63 Runoff=39.70 cfs 6.763 af

**Subcatchment B105: B105** Runoff Area=23.978 ac 2.94% Impervious Runoff Depth=1.47"
Flow Length=1,400' Tc=38.0 min CN=69 Runoff=19.07 cfs 2.930 af

**Subcatchment B106: B106** Runoff Area=130.289 ac 0.83% Impervious Runoff Depth=2.08"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=98.12 cfs 22.556 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=2.17"
Flow Length=907' Tc=37.9 min CN=77 Runoff=18.51 cfs 2.593 af

**Subcatchment B108: B108** Runoff Area=46.768 ac 1.07% Impervious Runoff Depth=2.08"
Flow Length=2,241' Tc=39.8 min CN=76 Runoff=56.04 cfs 8.096 af

**Subcatchment B109: B109** Runoff Area=11.276 ac 0.04% Impervious Runoff Depth=2.17"
Flow Length=1,048' Tc=28.5 min CN=77 Runoff=16.69 cfs 2.040 af

**Subcatchment C101: C101** Runoff Area=30.507 ac 4.58% Impervious Runoff Depth=0.40"
Flow Length=1,500' Tc=31.9 min CN=53 Runoff=2.84 cfs 1.013 af

**Subcatchment C102: C102** Runoff Area=40.386 ac 4.49% Impervious Runoff Depth=1.08"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=18.79 cfs 3.633 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=1.81"
Flow Length=176' Tc=7.5 min CN=73 Runoff=1.97 cfs 0.150 af

**Reach A105R: Thru A101** Avg. Flow Depth=0.90' Max Vel=4.88 fps Inflow=18.23 cfs 4.932 af
n=0.050 L=1,075.0' S=0.0577 '/' Capacity=152.54 cfs Outflow=17.45 cfs 4.932 af

**Reach A106R: Thru A105** Avg. Flow Depth=0.84' Max Vel=5.81 fps Inflow=22.25 cfs 2.655 af
n=0.050 L=1,215.0' S=0.0922 '/' Capacity=153.12 cfs Outflow=21.89 cfs 2.655 af

**Reach A108R: Thru A101** Avg. Flow Depth=1.72' Max Vel=8.84 fps Inflow=76.75 cfs 14.641 af
n=0.050 L=1,090.0' S=0.0862 '/' Capacity=244.78 cfs Outflow=76.58 cfs 14.641 af

**Reach B102R: Thru B101** Avg. Flow Depth=1.45' Max Vel=3.69 fps Inflow=74.30 cfs 33.371 af
n=0.050 L=122.0' S=0.0164 '/' Capacity=356.26 cfs Outflow=74.30 cfs 33.369 af

**Reach B103R: Thru B102** Avg. Flow Depth=1.86' Max Vel=4.36 fps Inflow=74.02 cfs 33.164 af
n=0.050 L=585.0' S=0.0171 '/' Capacity=374.39 cfs Outflow=73.95 cfs 33.155 af

**Reach B107R: Thru B108** Avg. Flow Depth=0.29' Max Vel=4.72 fps Inflow=9.81 cfs 2.317 af
n=0.050 L=2,040.0' S=0.2294 '/' Capacity=144.21 cfs Outflow=9.64 cfs 2.317 af

**Reach B108R: Thur 101** Avg. Flow Depth=1.12' Max Vel=4.85 fps Inflow=72.57 cfs 12.428 af
n=0.050 L=233.0' S=0.0318 '/' Capacity=474.00 cfs Outflow=72.56 cfs 12.428 af

**Reach B109R: Thru B108** Avg. Flow Depth=0.75' Max Vel=5.25 fps Inflow=16.68 cfs 2.040 af
n=0.050 L=355.0' S=0.0851 '/' Capacity=147.09 cfs Outflow=16.67 cfs 2.040 af

**Pond 102A: Wetland B** Peak Elev=498.33' Storage=8,692 cf Inflow=0.35 cfs 0.200 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 102B: 18" Culvert** Peak Elev=495.40' Storage=4,404 cf Inflow=74.31 cfs 33.371 af
Primary=10.04 cfs 18.623 af Secondary=64.92 cfs 14.748 af Outflow=74.30 cfs 33.371 af

**Pond 102C: Pond 102C** Peak Elev=508.22' Storage=158,269 cf Inflow=18.79 cfs 3.633 af
Outflow=0.00 cfs 0.000 af

**Pond 103A: Wetland A** Peak Elev=498.94' Storage=46,665 cf Inflow=2.30 cfs 1.071 af
24.0" Round Culvert n=0.013 L=80.0' S=-0.0125 '/' Outflow=0.00 cfs 0.000 af

**Pond 103B: Irrigation Pond** Peak Elev=506.34' Storage=47,985 cf Inflow=39.10 cfs 26.320 af
Primary=6.43 cfs 8.915 af Secondary=31.28 cfs 17.164 af Outflow=37.70 cfs 26.079 af

**Pond 104A: Wetland D** Peak Elev=507.82' Storage=2,308 cf Inflow=0.10 cfs 0.069 af
Primary=0.04 cfs 0.053 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.053 af

**Pond 104B: Island Pond** Peak Elev=510.32' Storage=513,102 cf Inflow=126.09 cfs 32.247 af
Primary=12.54 cfs 19.031 af Secondary=22.33 cfs 4.199 af Tertiary=37.12 cfs 7.084 af Outflow=71.99 cfs 30.314 af

**Pond 105A: Wetland H** Peak Elev=575.07' Storage=59,350 cf Inflow=35.95 cfs 4.948 af
Primary=10.15 cfs 4.733 af Secondary=8.08 cfs 0.199 af Outflow=18.23 cfs 4.932 af

**Pond 105B: Wetland J** Peak Elev=516.27' Storage=44,742 cf Inflow=106.53 cfs 25.485 af
Outflow=106.44 cfs 25.484 af

**Pond 106A: 36" Culvert** Peak Elev=718.61' Storage=27 cf Inflow=22.25 cfs 2.655 af
Primary=22.25 cfs 2.655 af Secondary=0.00 cfs 0.000 af Outflow=22.25 cfs 2.655 af

**Pond 106B: Wetland J** Peak Elev=526.79' Storage=20,209 cf Inflow=98.12 cfs 22.556 af
Outflow=98.09 cfs 22.555 af

**Pond 107A: 24" Culvert** Peak Elev=625.60' Storage=2,557 cf Inflow=75.71 cfs 14.357 af
Primary=41.43 cfs 12.452 af Secondary=34.27 cfs 1.905 af Outflow=75.70 cfs 14.357 af

**Pond 107B: Wetland** Peak Elev=972.80' Storage=36,760 cf Inflow=18.51 cfs 2.593 af
Outflow=9.81 cfs 2.317 af

**Pond 108A: 36" Culvert** Peak Elev=611.53' Storage=35 cf Inflow=35.26 cfs 2.189 af
Primary=35.32 cfs 2.189 af Secondary=0.00 cfs 0.000 af Outflow=35.32 cfs 2.189 af

**Pond 108B: Wetland N** Peak Elev=501.36' Storage=13,697 cf Inflow=72.59 cfs 12.453 af
Primary=4.37 cfs 3.652 af Secondary=68.26 cfs 8.776 af Outflow=72.57 cfs 12.428 af

**Pond 109B: 36" Culvert** Peak Elev=547.05' Storage=54 cf Inflow=16.69 cfs 2.040 af
Outflow=16.68 cfs 2.040 af

**Link A: Amenia Stream** Inflow=94.02 cfs 20.045 af
Primary=94.02 cfs 20.045 af

**Link B: Wetland** Inflow=130.82 cfs 56.515 af
Primary=130.82 cfs 56.515 af

**Link C: Culvert** Inflow=2.84 cfs 1.013 af
Primary=2.84 cfs 1.013 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=1.97 cfs 0.150 af
Primary=1.97 cfs 0.150 af

**Total Runoff Area = 783.953 ac Runoff Volume = 85.147 af Average Runoff Depth = 1.30"**
**95.93% Pervious = 752.017 ac 4.07% Impervious = 31.936 ac**

## Summary for Subcatchment A101: A101

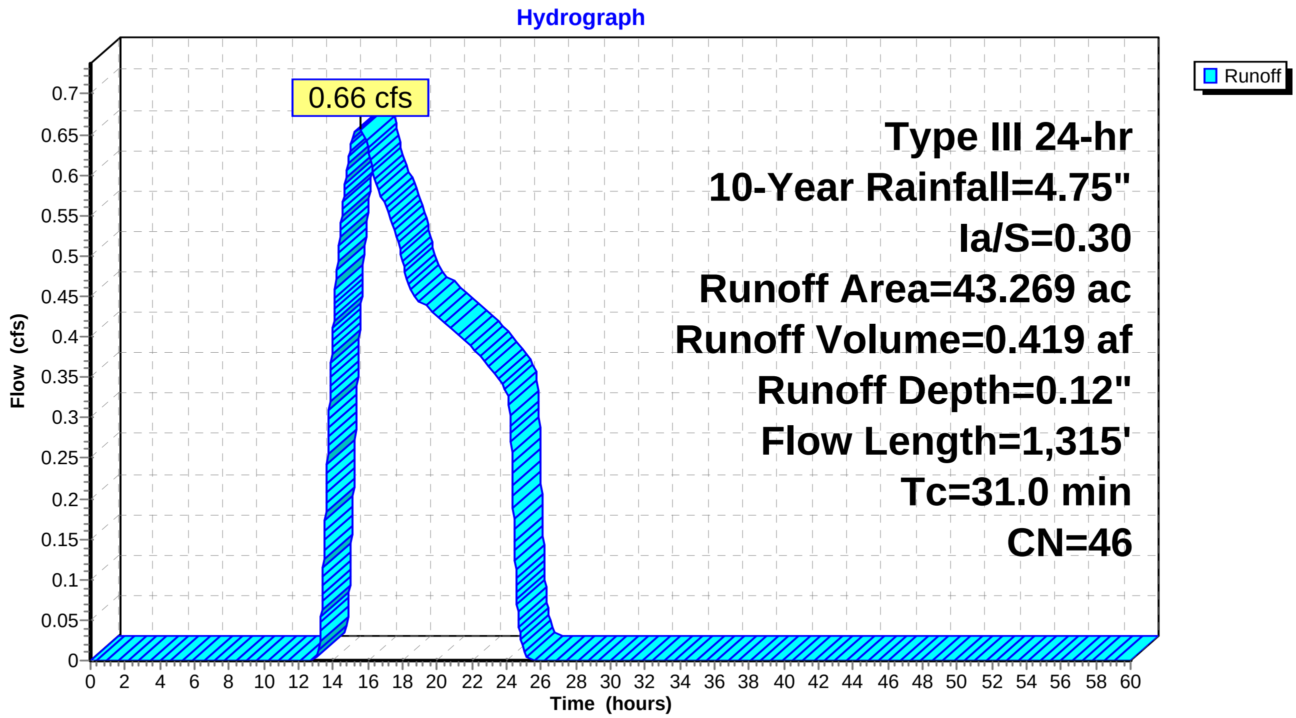
Runoff = 0.66 cfs @ 15.53 hrs, Volume= 0.419 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.819 | 98 | Paved surface |
| * | 0.089 | 96 | Gravel surface |
| * | 0.001 | 98 | Water Surface |
| | 31.250 | 39 | >75% Grass cover, Good, HSG A |
| | 6.738 | 61 | >75% Grass cover, Good, HSG B |
| | 1.730 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 1.164 | 30 | Woods, Good, HSG A |
| | 0.152 | 55 | Woods, Good, HSG B |
| | 0.088 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.223 | 30 | Sand trap, HSG A |
| * | 0.015 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 43.269 | 46 | Weighted Average |
| | 41.449 | | 95.79% Pervious Area |
| | 1.820 | | 4.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.9 | 100 | 0.0400 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.0 | 430 | 0.1200 | 2.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.5 | 360 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.6 | 425 | 0.0140 | 0.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 31.0 | 1,315 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

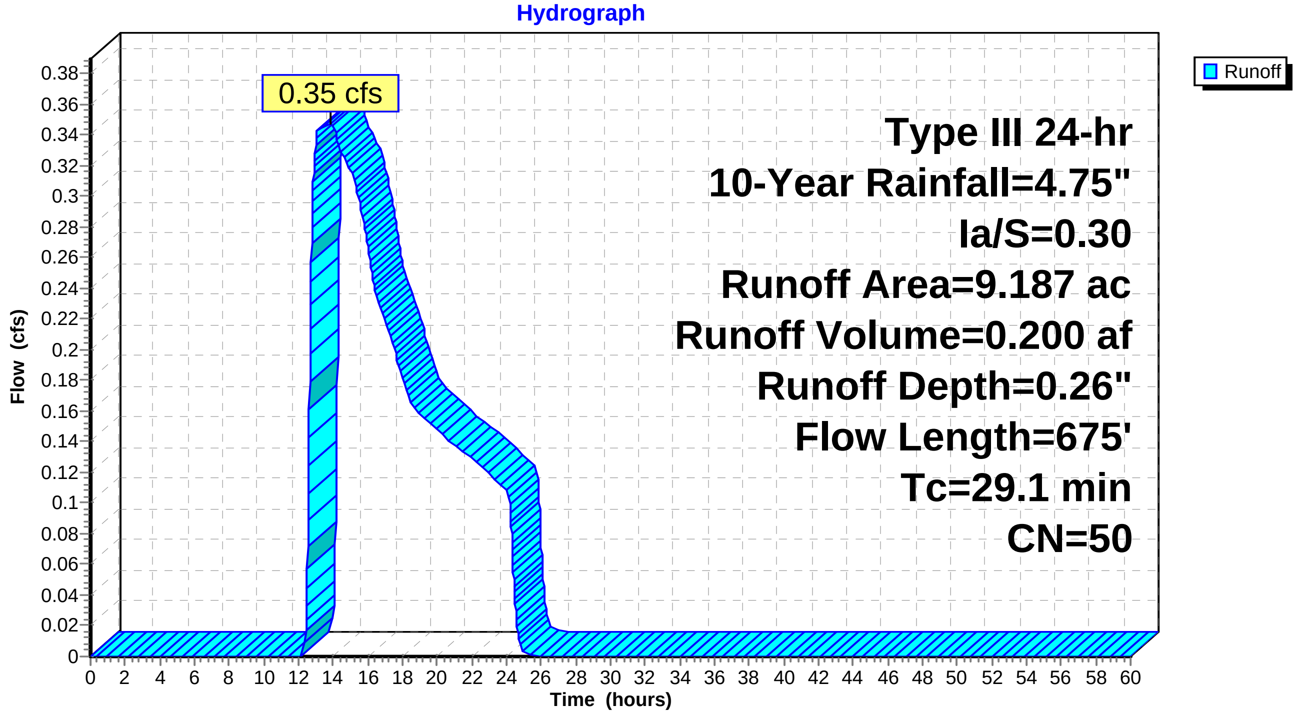
Runoff = 0.35 cfs @ 13.81 hrs, Volume= 0.200 af, Depth= 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.387 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.844 | 98 | Water Surface |
| | 3.520 | 39 | >75% Grass cover, Good, HSG A |
| | 2.156 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.260 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.004 | 30 | Sand trap, HSG A |
| * | 0.016 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.187 | 50 | Weighted Average |
| | 7.956 | | 86.60% Pervious Area |
| | 1.231 | | 13.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 23.0 | 100 | 0.0600 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.1 | 575 | 0.0500 | 1.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.1 | 675 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

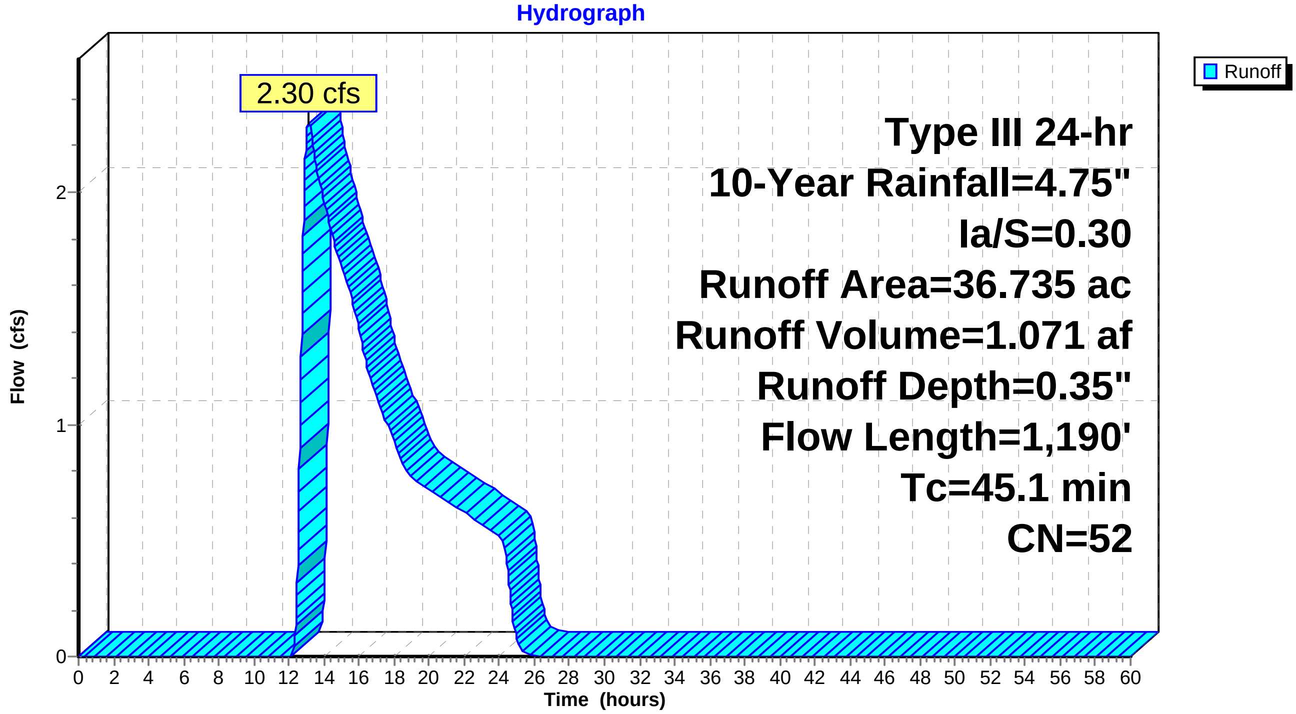
Runoff = 2.30 cfs @ 13.12 hrs, Volume= 1.071 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.334 | 98 | Building roof |
| * | 2.378 | 98 | Paved surface |
| * | 0.402 | 96 | Gravel surface |
| * | 0.516 | 98 | Water Surface |
| | 14.616 | 39 | >75% Grass cover, Good, HSG A |
| | 3.182 | 61 | >75% Grass cover, Good, HSG B |
| | 4.088 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 6.882 | 30 | Woods, Good, HSG A |
| | 1.635 | 55 | Woods, Good, HSG B |
| | 1.432 | 70 | Woods, Good, HSG C |
| | 1.137 | 77 | Woods, Good, HSG D |
| * | 0.095 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.009 | 30 | Sand Trap, HSG C |
| | 36.735 | 52 | Weighted Average |
| | 33.507 | | 91.21% Pervious Area |
| | 3.228 | | 8.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 35.7 | 100 | 0.0200 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.9 | 227 | 0.0190 | 0.96 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 75 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 343 | 0.0400 | 4.54 | 18.14 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' n= 0.050 |
| 3.7 | 445 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 45.1 | 1,190 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

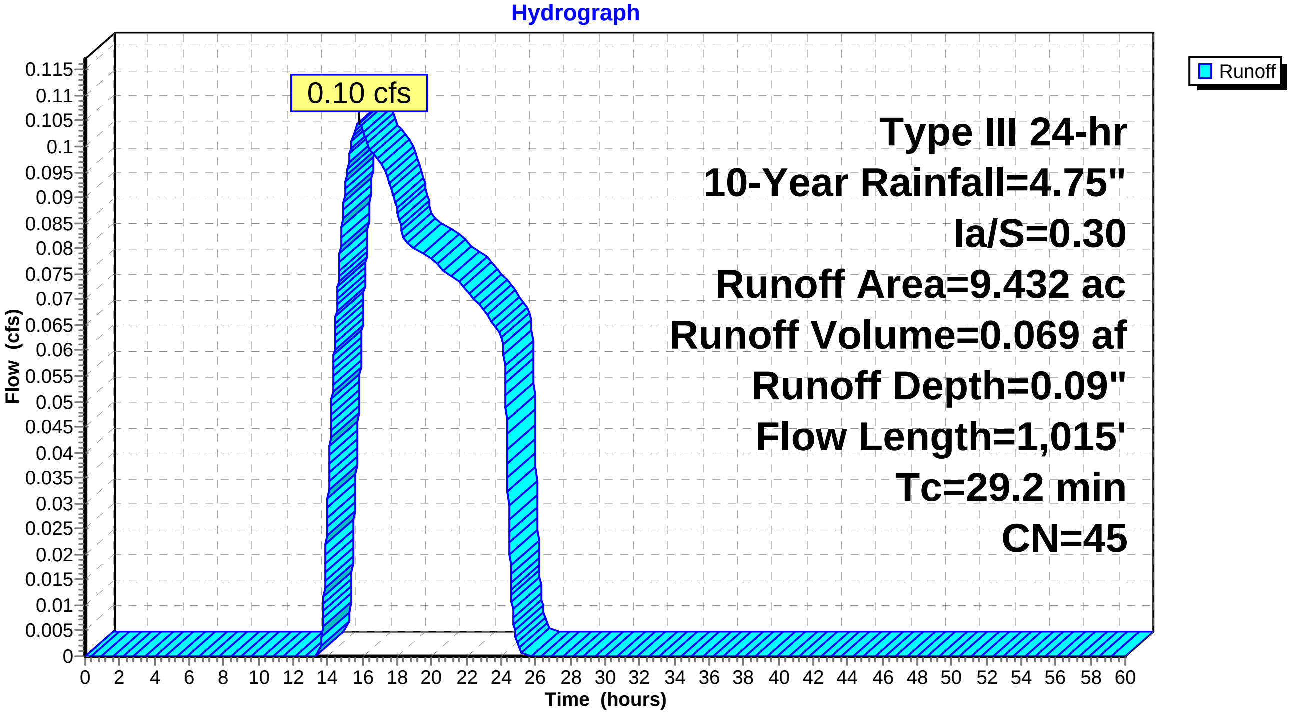
Runoff = 0.10 cfs @ 15.80 hrs, Volume= 0.069 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.458 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.429 | 98 | Water Surface |
| | 8.361 | 39 | >75% Grass cover, Good, HSG A |
| | 0.043 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.071 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.053 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.432 | 45 | Weighted Average |
| | 8.545 | | 90.60% Pervious Area |
| | 0.887 | | 9.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.9 | 100 | 0.0200 | 0.08 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.4 | 375 | 0.0700 | 1.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.5 | 255 | 0.1600 | 2.80 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.4 | 285 | 0.0400 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.2 | 1,015 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

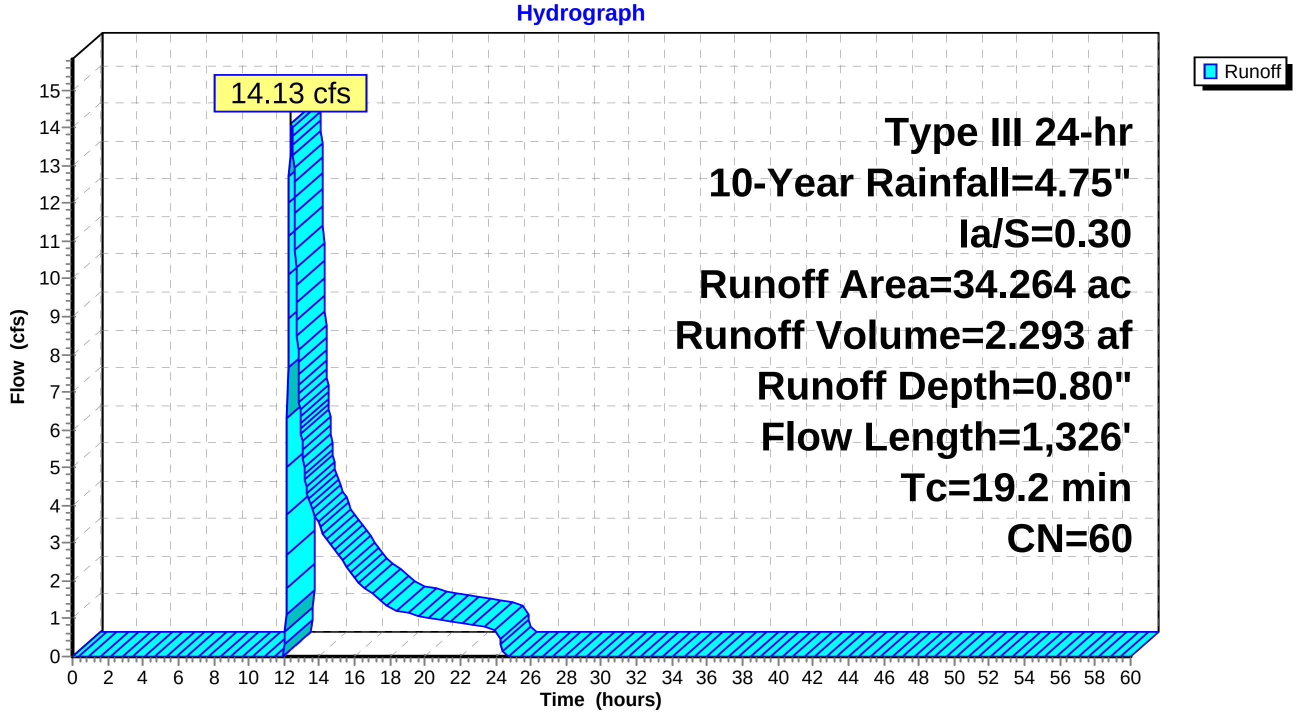
Runoff = 14.13 cfs @ 12.40 hrs, Volume= 2.293 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.119 | 98 | Paved surface |
| * | 0.088 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.167 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 15.618 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.226 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.911 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.135 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 34.264 | 60 | Weighted Average |
| | 33.145 | | 96.73% Pervious Area |
| | 1.119 | | 3.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 23 | 0.1700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.8 | 77 | 0.3000 | 0.13 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 150 | 0.3700 | 1.52 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.3 | 526 | 0.0950 | 6.52 | 32.61 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.8 | 550 | 0.0600 | 4.98 | 16.59 | **Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.035 High grass |
| 19.2 | 1,326 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

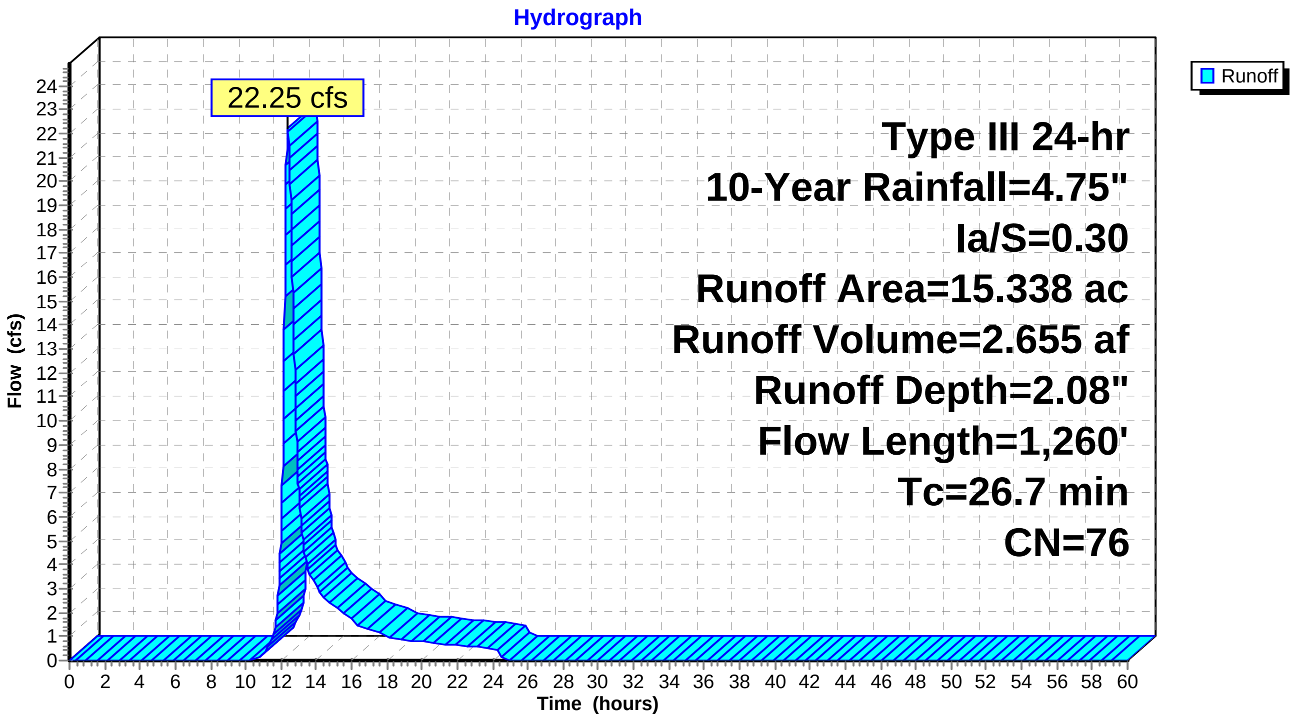
Runoff = 22.25 cfs @ 12.39 hrs, Volume= 2.655 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.013 | 98 | Building roof |
| * | 1.232 | 98 | Paved surface |
| * | 0.200 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.050 | 61 | >75% Grass cover, Good, HSG B |
| | 9.227 | 74 | >75% Grass cover, Good, HSG C |
| | 2.194 | 80 | >75% Grass cover, Good, HSG D |
| | 0.097 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.706 | 70 | Woods, Good, HSG C |
| | 0.619 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.338 | 76 | Weighted Average |
| | 14.093 | | 91.88% Pervious Area |
| | 1.245 | | 8.12% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

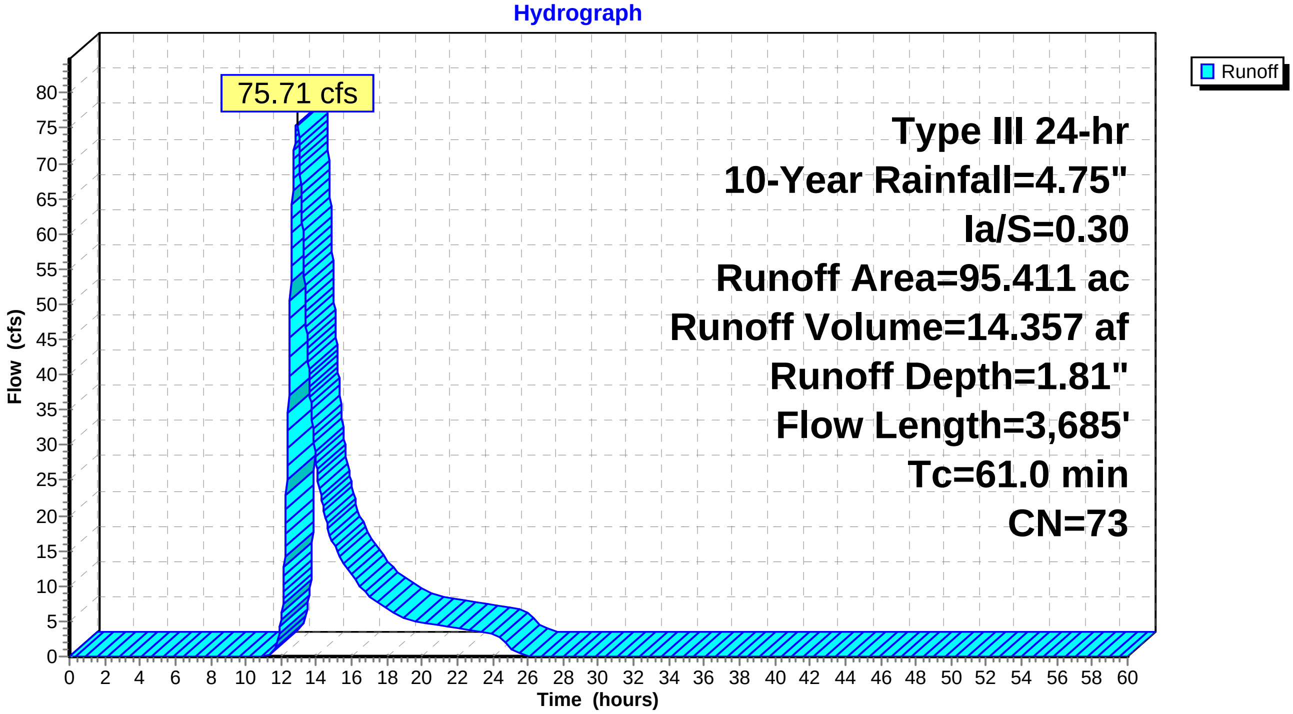
Runoff = 75.71 cfs @ 12.88 hrs, Volume= 14.357 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.392 | 98 | Building roof |
| * | 1.725 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.129 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 13.413 | 61 | >75% Grass cover, Good, HSG B |
| | 9.311 | 74 | >75% Grass cover, Good, HSG C |
| | 4.029 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 8.871 | 55 | Woods, Good, HSG B |
| | 4.853 | 70 | Woods, Good, HSG C |
| | 52.617 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 95.411 | 73 | Weighted Average |
| | 93.165 | | 97.65% Pervious Area |
| | 2.246 | | 2.35% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,**<br>W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,**<br>W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

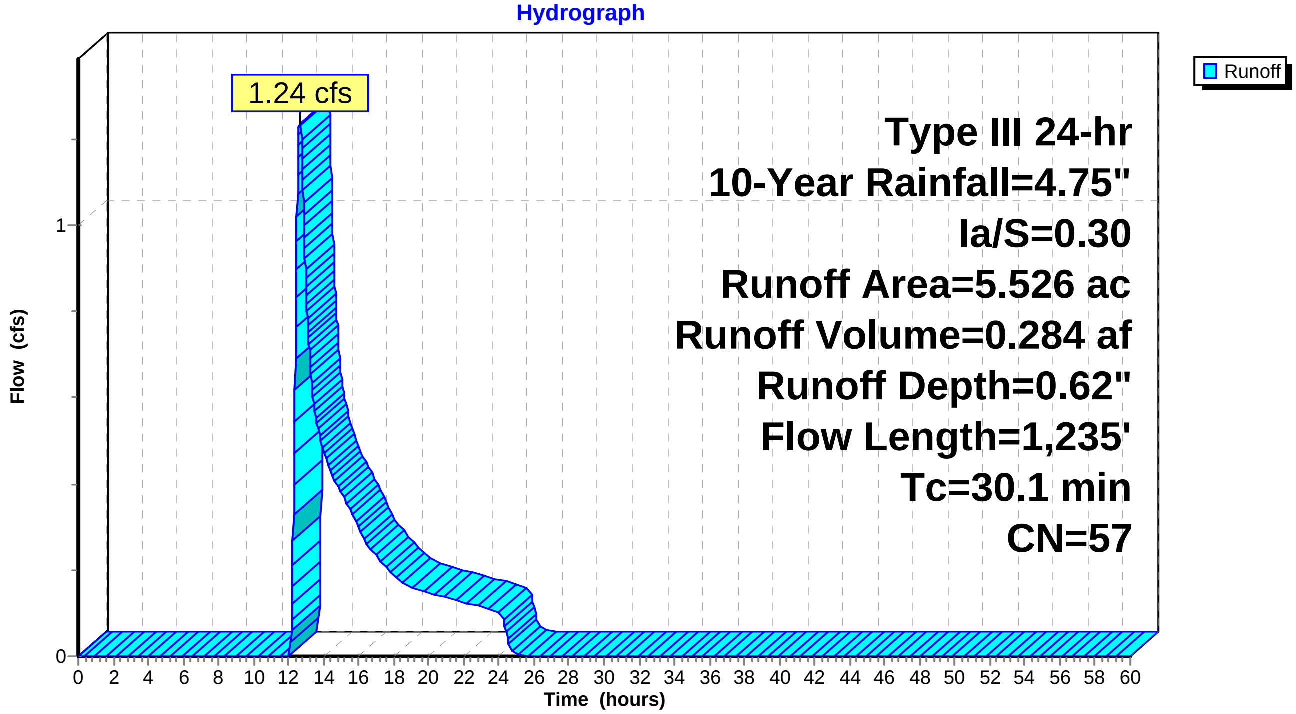
Runoff = 1.24 cfs @ 12.64 hrs, Volume= 0.284 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.088 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.629 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.526 | 57 | Weighted Average |
| | 5.398 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment B101: B101

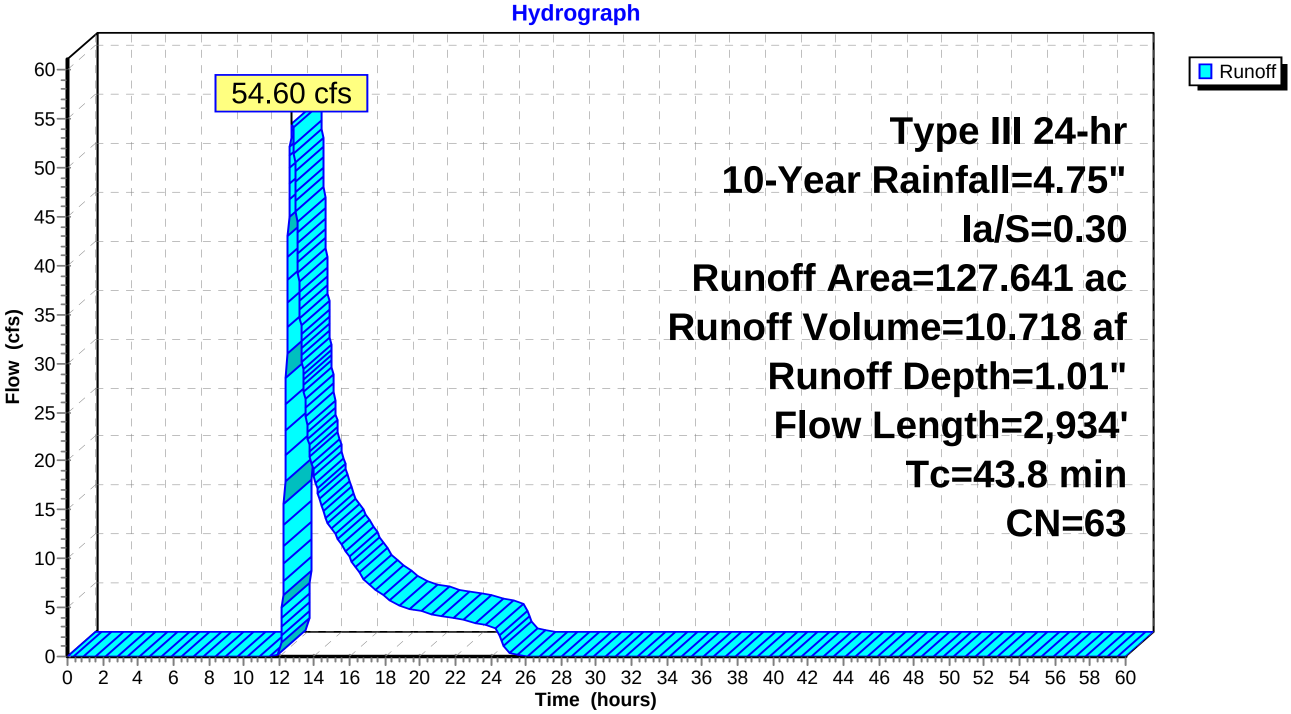
Runoff = 54.60 cfs @ 12.74 hrs, Volume= 10.718 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.005 | 98 | Building roof |
| * | 0.948 | 98 | Paved surface |
| * | 2.079 | 96 | Gravel surface |
| * | 0.002 | 98 | Water Surface |
| | 29.023 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 22.752 | 74 | >75% Grass cover, Good, HSG C |
| | 0.768 | 80 | >75% Grass cover, Good, HSG D |
| | 9.025 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 35.889 | 70 | Woods, Good, HSG C |
| | 27.094 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.056 | 30 | Sand Trap, HSG C |
| | 127.641 | 63 | Weighted Average |
| | 126.686 | | 99.25% Pervious Area |
| | 0.955 | | 0.75% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 506 | 0.1600 | 12.61 | 201.73 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.7 | 112 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.5 | 355 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 184 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 642 | 0.0500 | 9.49 | 63.28 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.035 High grass |
| 43.8 | 2,934 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

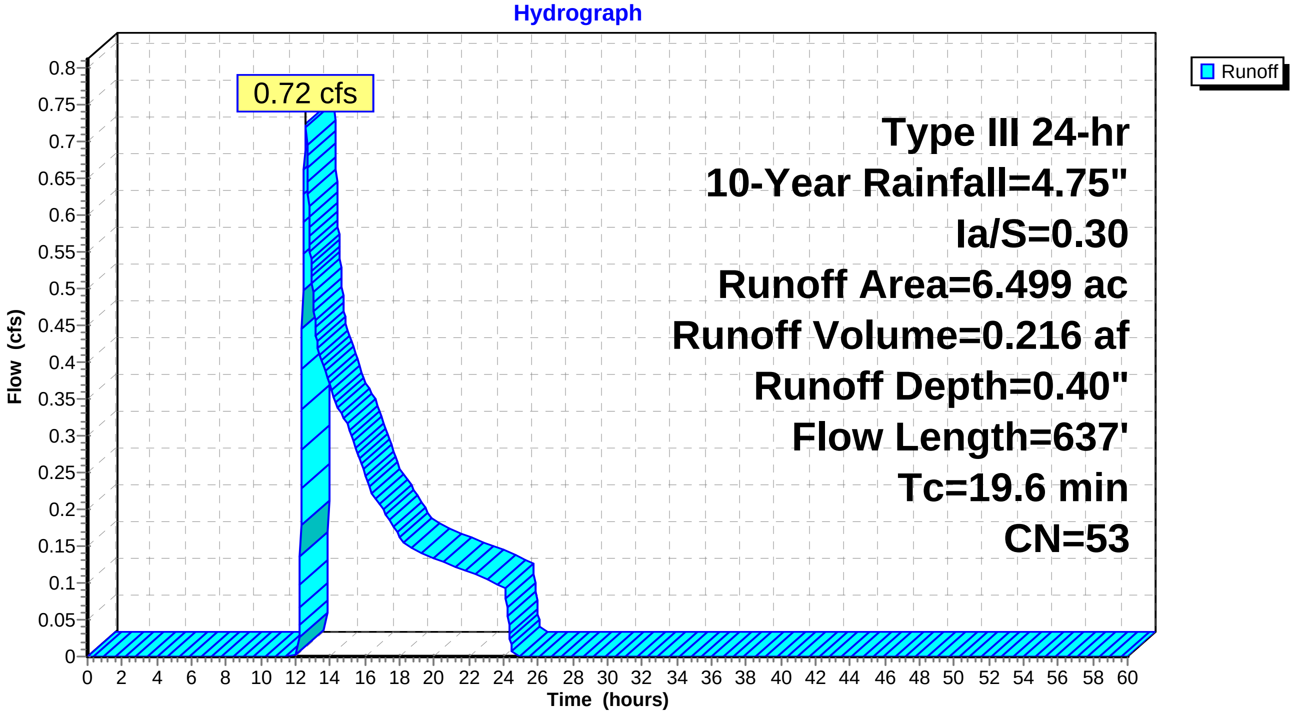
Runoff = 0.72 cfs @ 12.59 hrs, Volume= 0.216 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.170 | 98 | Paved surface |
| * | 0.290 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 3.039 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.097 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.839 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.064 | 30 | Sand Trap, HSG C |
| | 6.499 | 53 | Weighted Average |
| | 6.329 | | 97.38% Pervious Area |
| | 0.170 | | 2.62% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.6 | 637 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

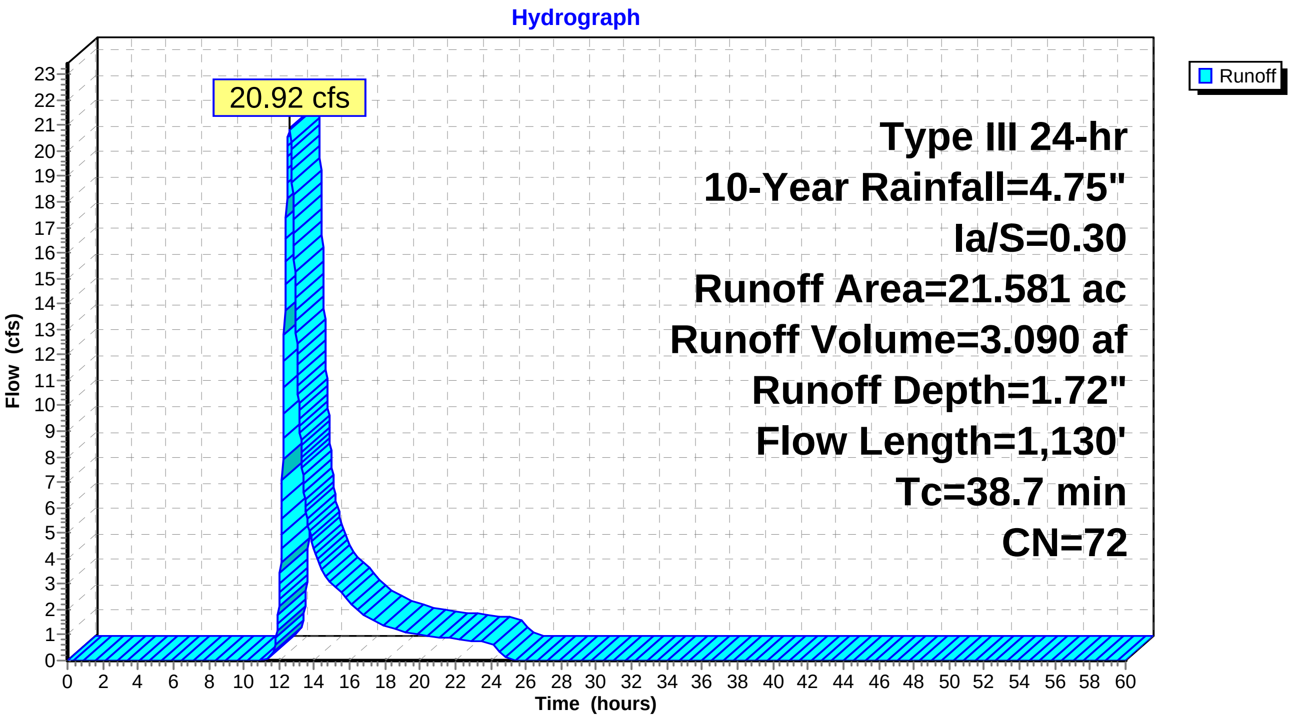
Runoff = 20.92 cfs @ 12.59 hrs, Volume= 3.090 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.550 | 98 | Paved surface |
| * | 0.039 | 96 | Gravel surface |
| * | 2.025 | 98 | Water Surface |
| | 3.869 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 6.689 | 74 | >75% Grass cover, Good, HSG C |
| | 0.522 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.459 | 70 | Woods, Good, HSG C |
| | 7.399 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.029 | 30 | Sand Trap, HSG C |
| | 21.581 | 72 | Weighted Average |
| | 19.006 | | 88.07% Pervious Area |
| | 2.575 | | 11.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.3 | 700 | 0.5500 | 1.85 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.6 | 280 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 50 | 0.7600 | 2.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 38.7 | 1,130 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

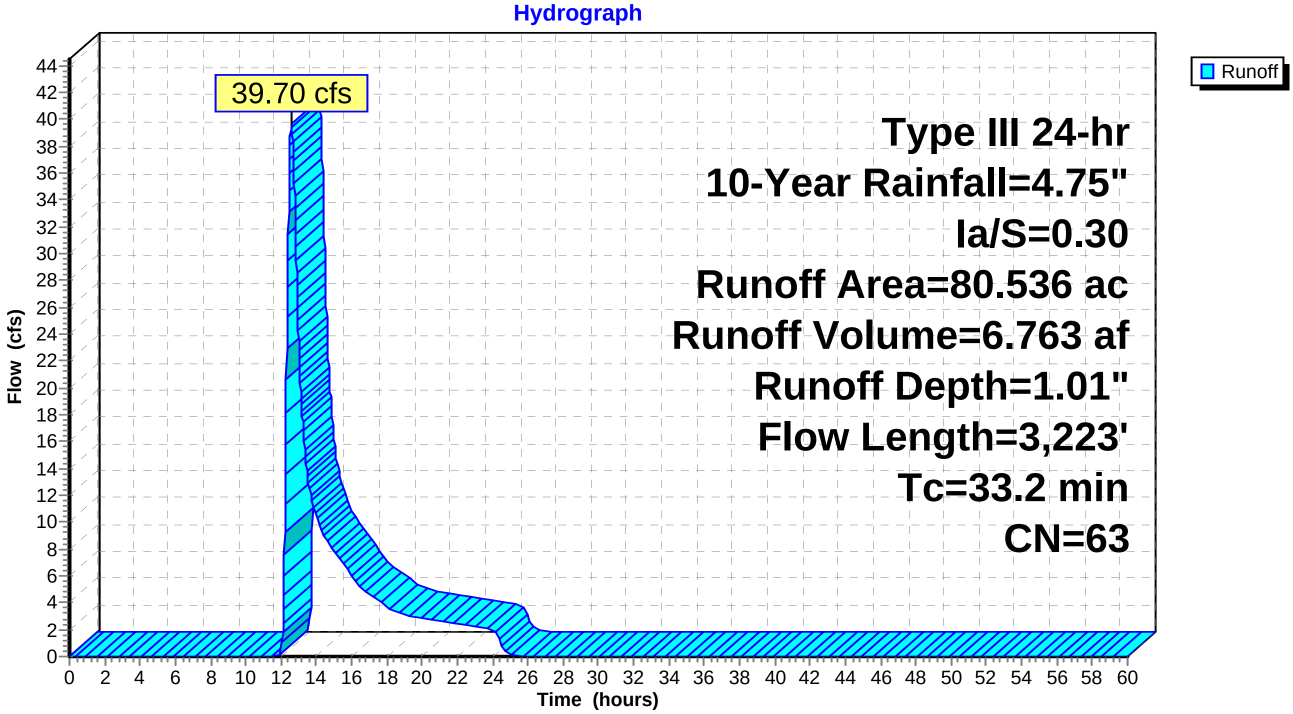
Runoff = 39.70 cfs @ 12.58 hrs, Volume= 6.763 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.411 | 98 | Building roof |
| * | 5.140 | 98 | Paved surface |
| * | 1.201 | 96 | Gravel surface |
| * | 5.280 | 98 | Water Surface |
| | 29.268 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 32.742 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.144 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.770 | 70 | Woods, Good, HSG C |
| | 1.252 | 77 | Woods, Good, HSG D |
| * | 0.185 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.143 | 30 | Sand Trap, HSG C |
| | 80.536 | 63 | Weighted Average |
| | 69.705 | | 86.55% Pervious Area |
| | 10.831 | | 13.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.9 | 100 | 0.1300 | 0.17 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 7.3 | 1,150 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.6 | 130 | 0.0300 | 3.52 | | **Shallow Concentrated Flow,**<br>Paved Kv= 20.3 fps |
| 15.4 | 1,843 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 33.2 | 3,223 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

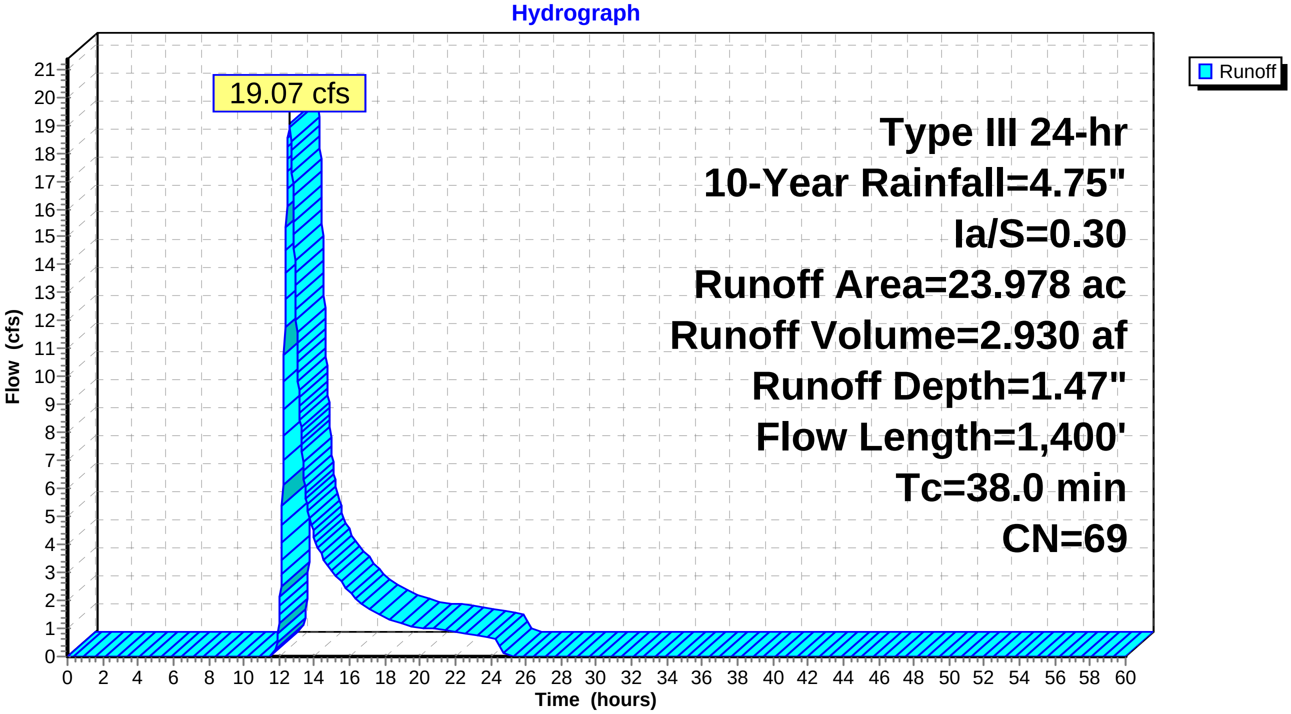
Runoff = 19.07 cfs @ 12.59 hrs, Volume= 2.930 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.248 | 98 | Paved surface |
| * | 0.181 | 96 | Gravel surface |
| * | 0.458 | 98 | Water Surface |
| | 5.222 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 4.132 | 74 | >75% Grass cover, Good, HSG C |
| | 0.513 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.204 | 70 | Woods, Good, HSG C |
| | 11.982 | 77 | Woods, Good, HSG D |
| * | 0.038 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 23.978 | 69 | Weighted Average |
| | 23.272 | | 97.06% Pervious Area |
| | 0.706 | | 2.94% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.5 | 698 | 0.5200 | 1.80 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 335 | 0.1900 | 3.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 267 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 38.0 | 1,400 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

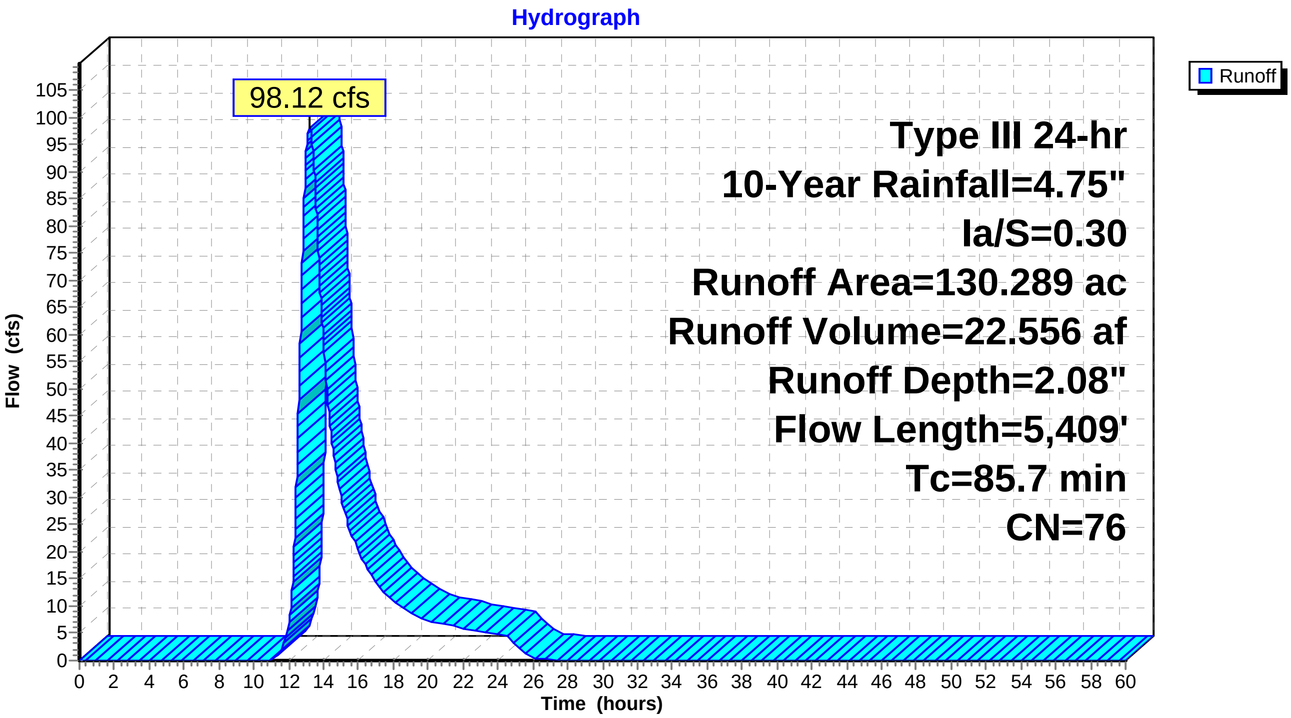
Runoff = 98.12 cfs @ 13.23 hrs, Volume= 22.556 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.025 | 98 | Building roof |
| * | 0.905 | 98 | Paved surface |
| * | 0.933 | 96 | Gravel surface |
| * | 0.153 | 98 | Water Surface |
| | 0.907 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 13.921 | 74 | >75% Grass cover, Good, HSG C |
| | 2.396 | 80 | >75% Grass cover, Good, HSG D |
| | 0.745 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 11.966 | 70 | Woods, Good, HSG C |
| | 97.720 | 77 | Woods, Good, HSG D |
| * | 0.024 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 130.289 | 76 | Weighted Average |
| | 129.206 | | 99.17% Pervious Area |
| | 1.083 | | 0.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

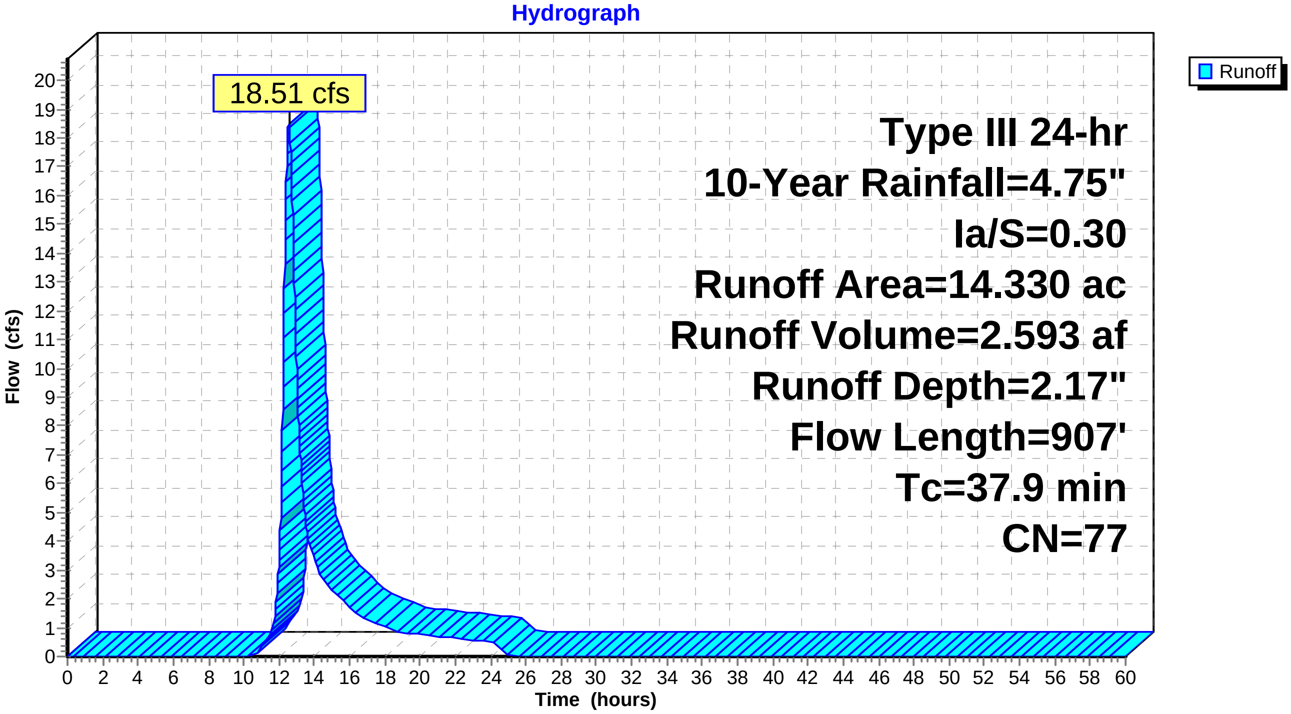
Runoff = 18.51 cfs @ 12.54 hrs, Volume= 2.593 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

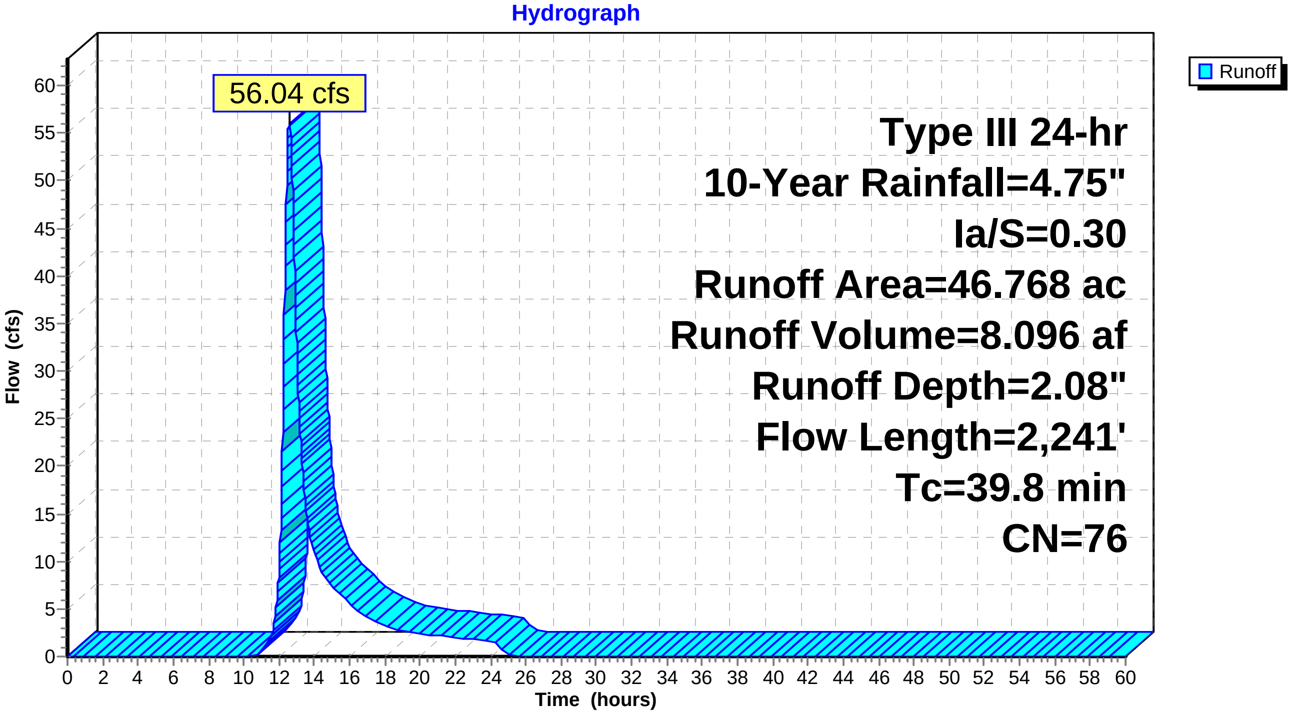
Runoff = 56.04 cfs @ 12.59 hrs, Volume= 8.096 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.499 | 98 | Paved surface |
| * | 0.098 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.546 | 74 | >75% Grass cover, Good, HSG C |
| | 0.657 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.391 | 70 | Woods, Good, HSG C |
| | 32.437 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.140 | 30 | Sand Trap, HSG C |
| | 46.768 | 76 | Weighted Average |
| | 46.269 | | 98.93% Pervious Area |
| | 0.499 | | 1.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.9 | 1,071 | 0.4300 | 1.64 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 3.2 | 490 | 0.1300 | 2.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 190 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 39.8 | 2,241 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

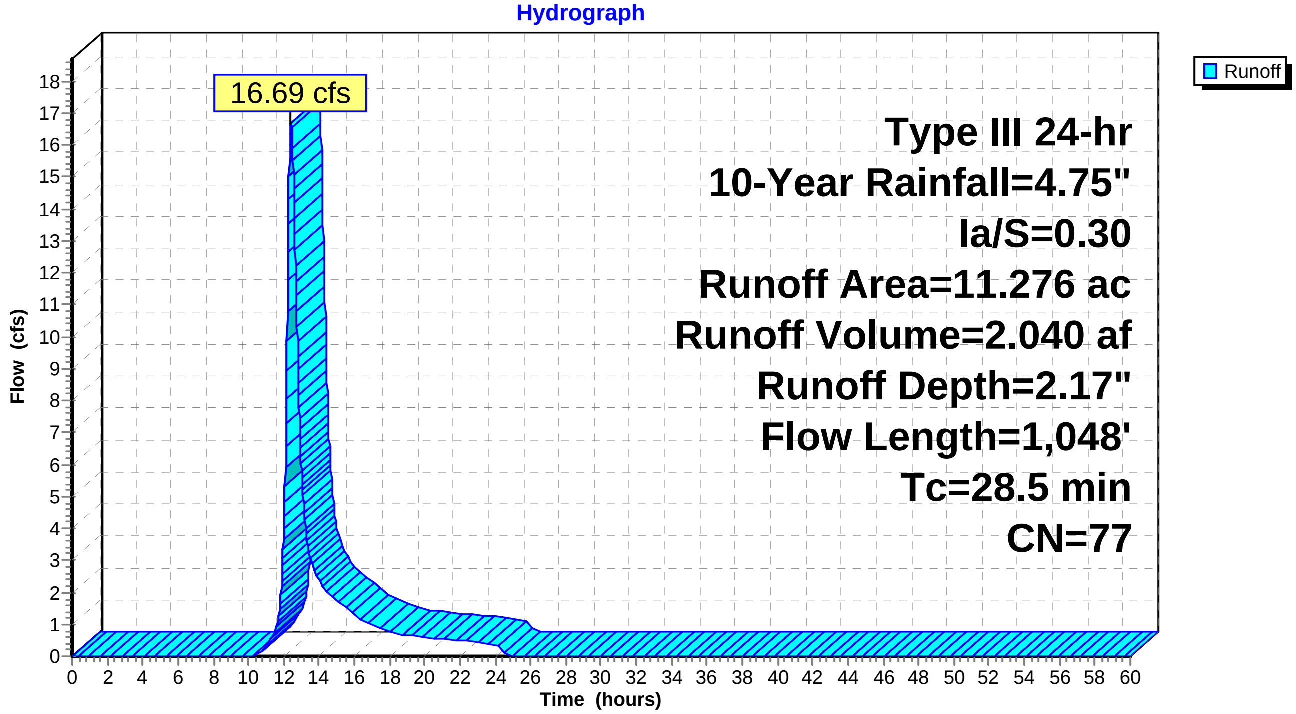
Runoff = 16.69 cfs @ 12.41 hrs, Volume= 2.040 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.004 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.045 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.299 | 70 | Woods, Good, HSG C |
| | 10.928 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 11.276 | 77 | Weighted Average |
| | 11.272 | | 99.96% Pervious Area |
| | 0.004 | | 0.04% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4500 | 1.68 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.3 | 288 | 0.2010 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 28.5 | 1,048 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment C101: C101

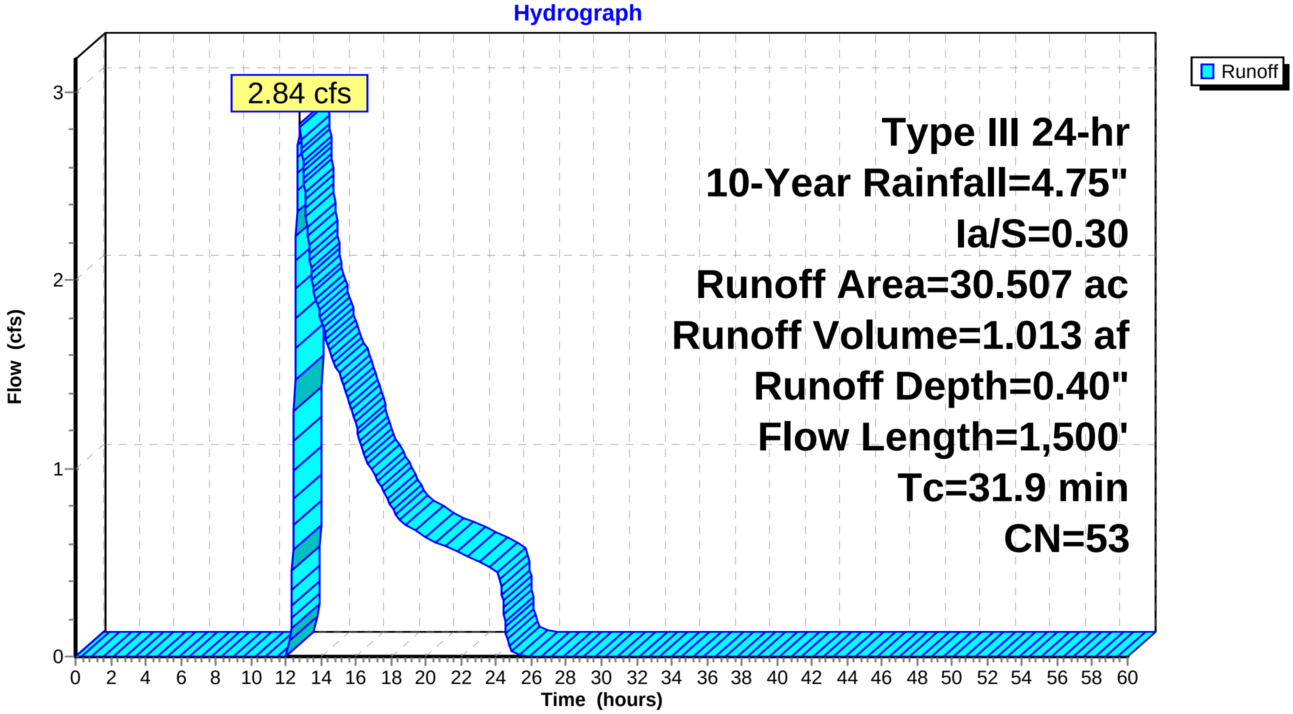
Runoff = 2.84 cfs @ 12.79 hrs, Volume= 1.013 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.350 | 98 | Paved surface |
| * | 0.425 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.046 | 98 | Rock Outcrop/Ledge |
| | 15.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.955 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.210 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 6.521 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 30.507 | 53 | Weighted Average |
| | 29.111 | | 95.42% Pervious Area |
| | 1.396 | | 4.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

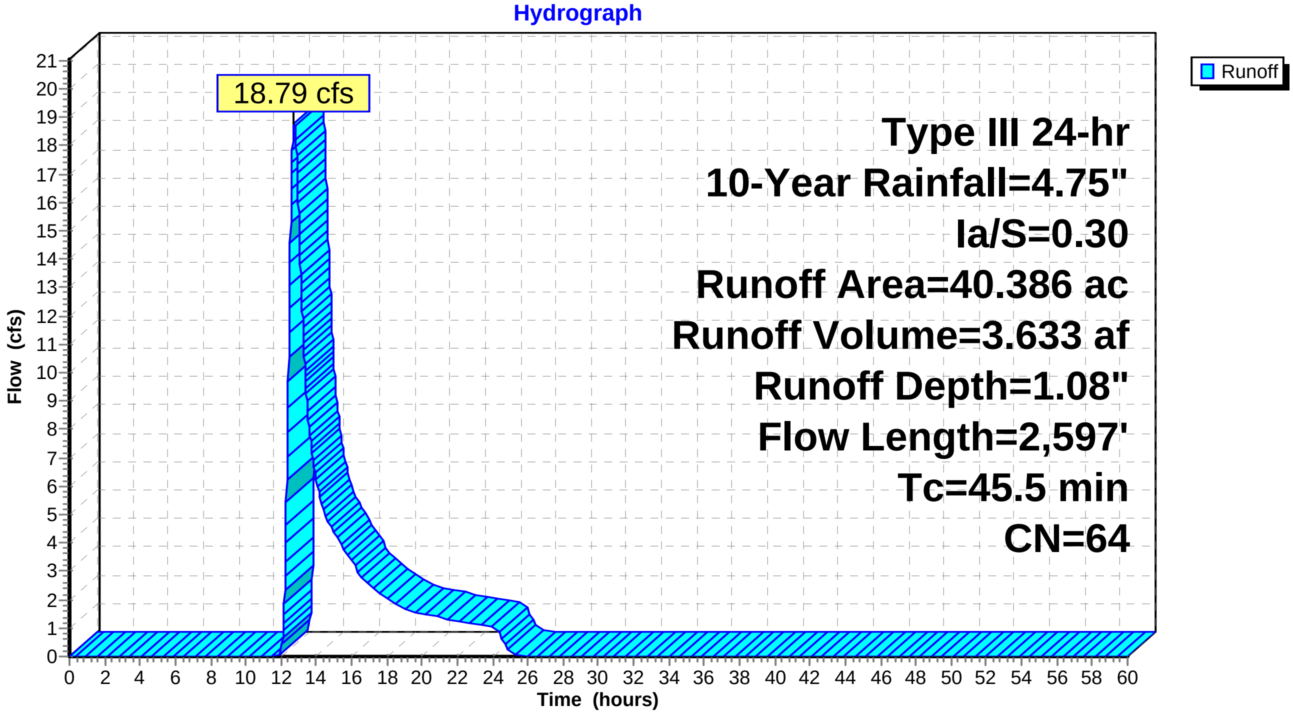
Runoff = 18.79 cfs @ 12.75 hrs, Volume= 3.633 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.618 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.981 | 98 | Rock Outcrop/Ledge |
| | 13.186 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.123 | 74 | >75% Grass cover, Good, HSG C |
| | 0.529 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.578 | 70 | Woods, Good, HSG C |
| | 15.415 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.386 | 64 | Weighted Average |
| | 38.573 | | 95.51% Pervious Area |
| | 1.813 | | 4.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00'<br>n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,**<br>W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,**<br>Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

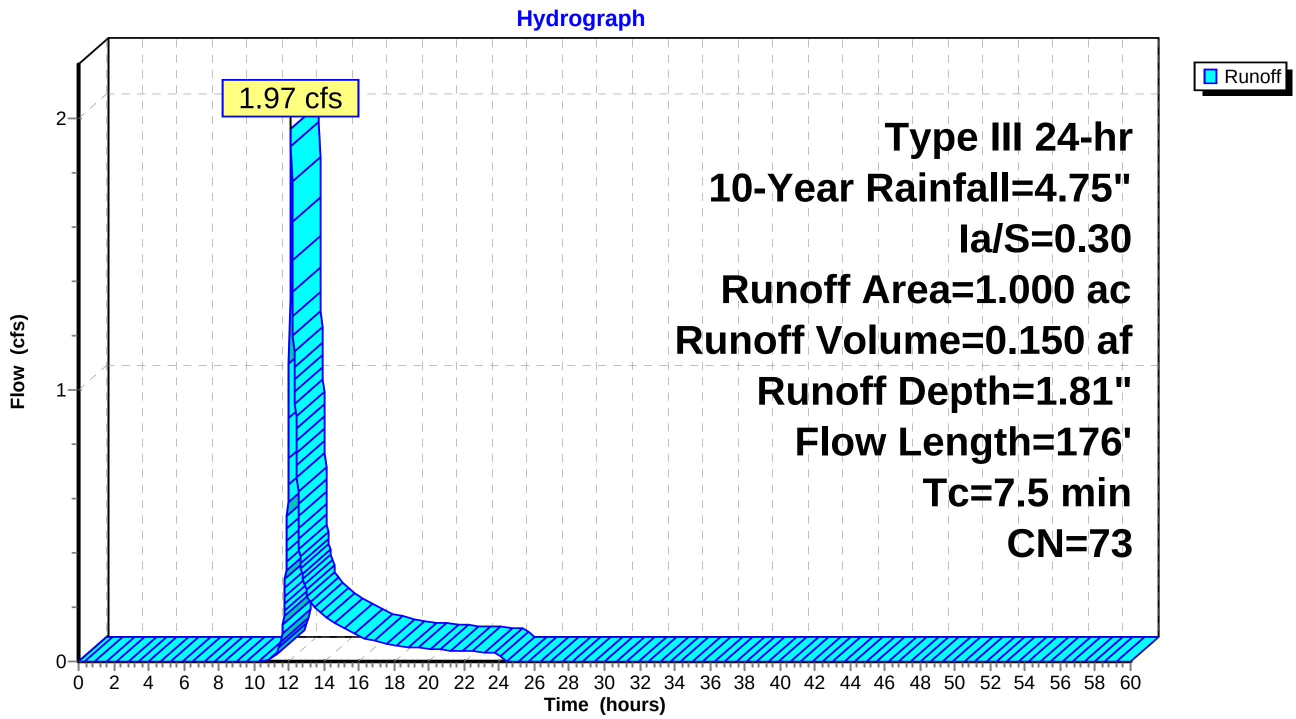
Runoff = 1.97 cfs @ 12.12 hrs, Volume= 0.150 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.850 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.000 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 73 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1570 | 6.38 | | **Shallow Concentrated Flow, C to D**<br>Unpaved Kv= 16.1 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



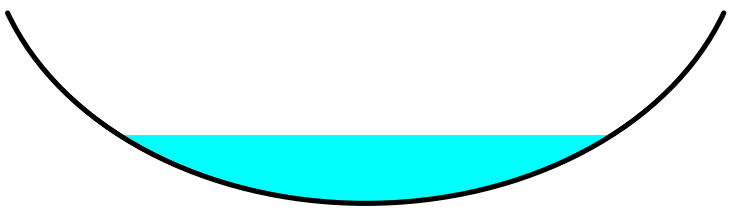
## Summary for Reach A105R: Thru A101

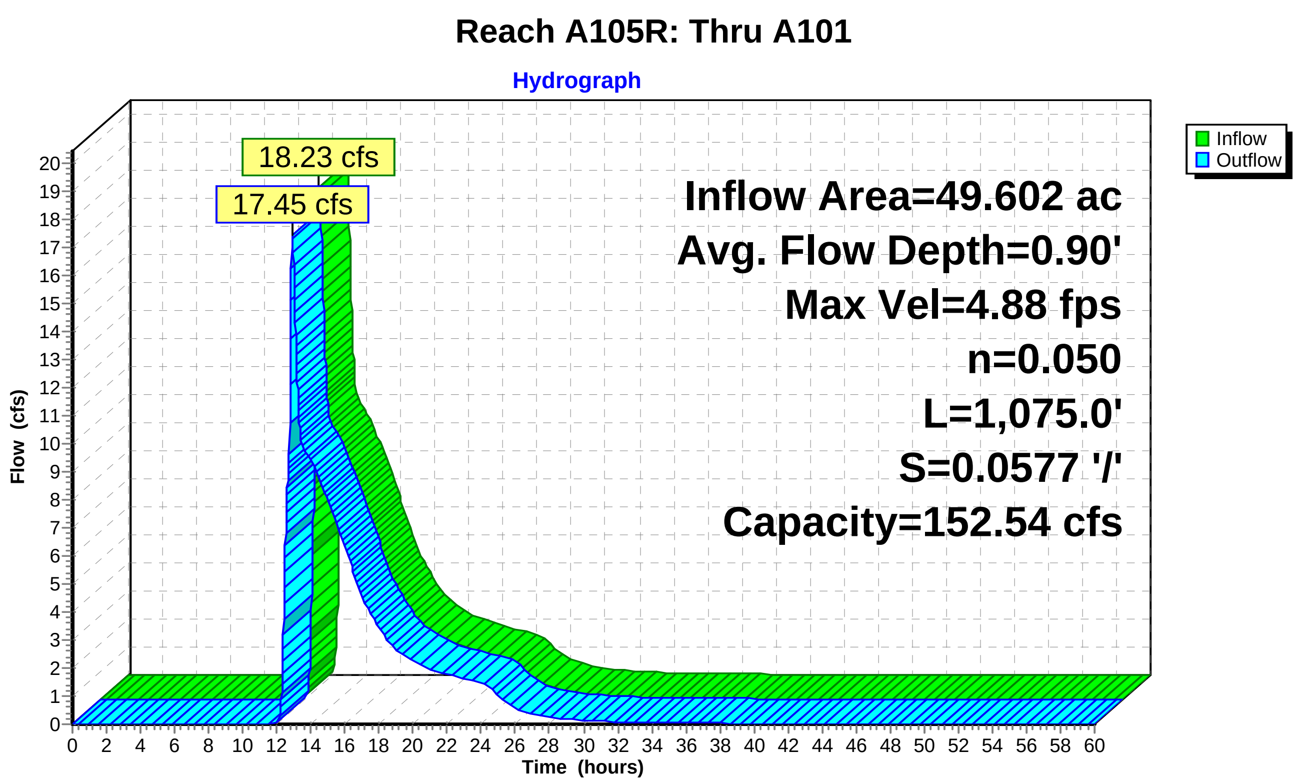
Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth > 1.19" for 10-Year event
Inflow = 18.23 cfs @ 12.84 hrs, Volume= 4.932 af
Outflow = 17.45 cfs @ 12.90 hrs, Volume= 4.932 af, Atten= 4%, Lag= 3.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.88 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 13.2 min

Peak Storage= 3,844 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.90'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 152.54 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,075.0' Slope= 0.0577 '/'
Inlet Invert= 566.00', Outlet Invert= 504.00'





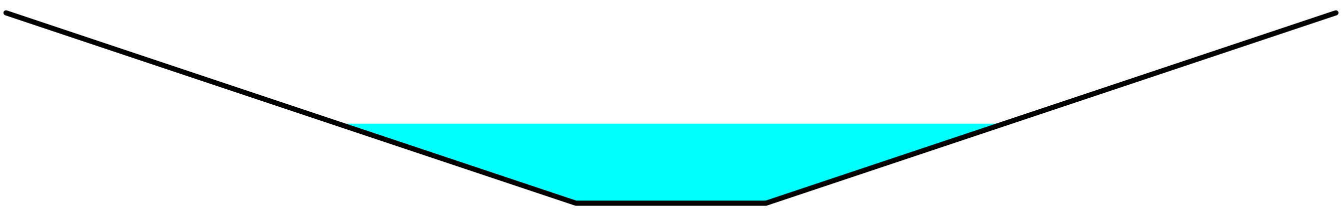
## Summary for Reach A106R: Thru A105

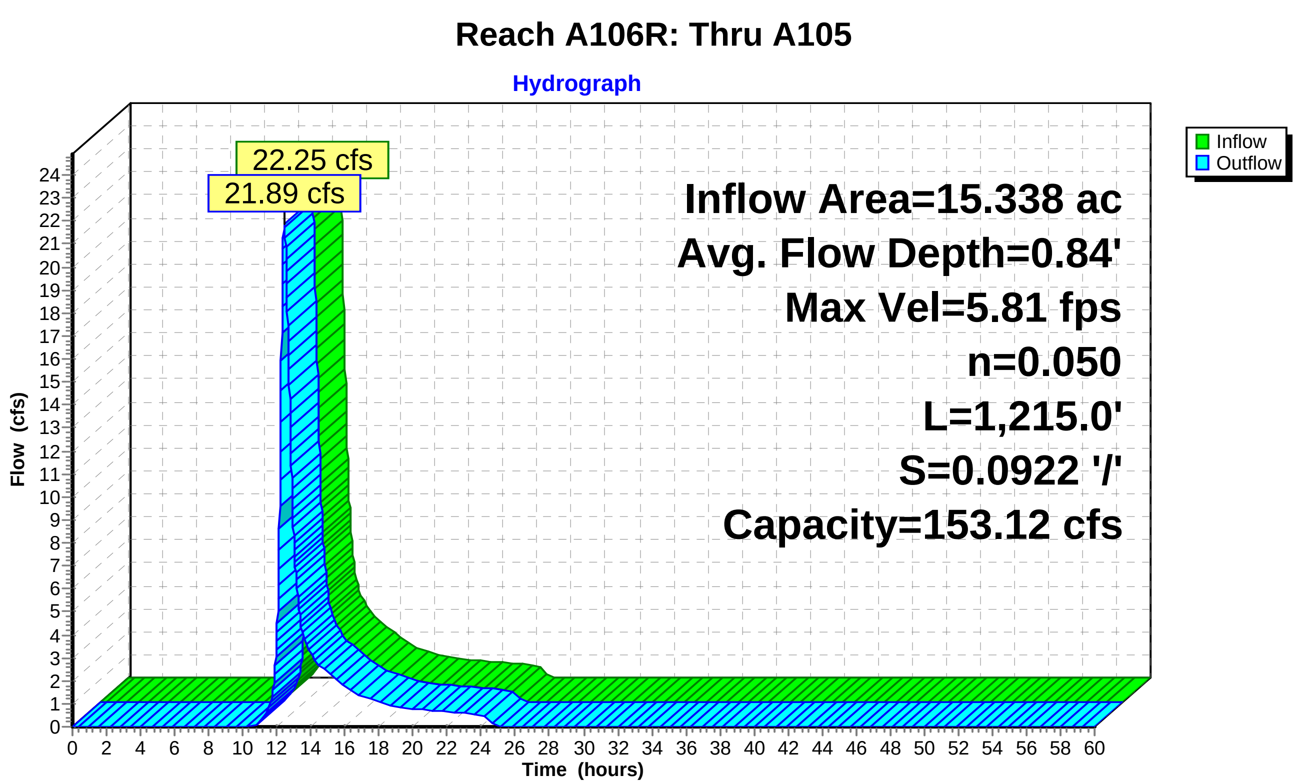
Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 2.08" for 10-Year event
Inflow = 22.25 cfs @ 12.39 hrs, Volume= 2.655 af
Outflow = 21.89 cfs @ 12.44 hrs, Volume= 2.655 af, Atten= 2%, Lag= 3.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.81 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 2.22 fps, Avg. Travel Time= 9.1 min

Peak Storage= 4,575 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 153.12 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 1,215.0' Slope= 0.0922 '/'
Inlet Invert= 686.00', Outlet Invert= 574.00'





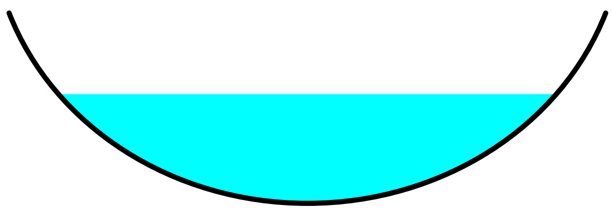
## Summary for Reach A108R: Thru A101

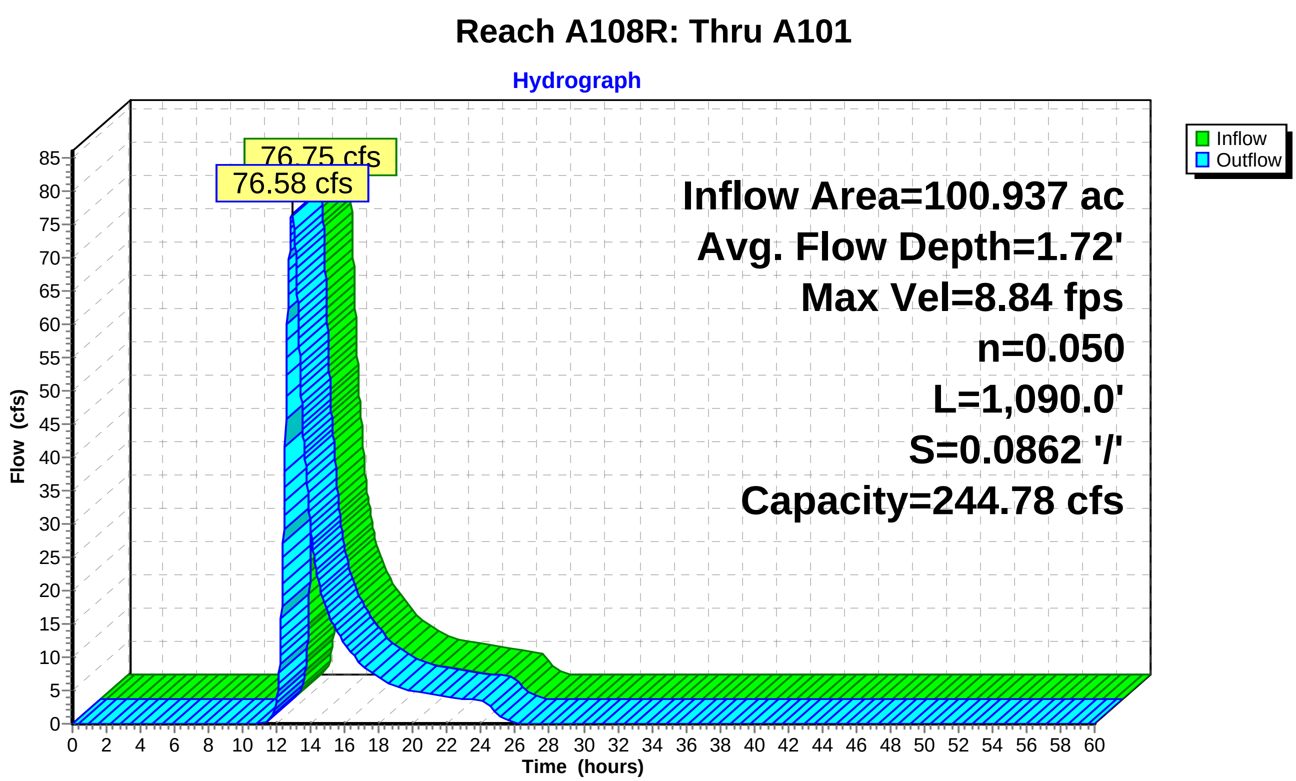
Inflow Area = 100.937 ac, 2.35% Impervious, Inflow Depth = 1.74" for 10-Year event
Inflow = 76.75 cfs @ 12.88 hrs, Volume= 14.641 af
Outflow = 76.58 cfs @ 12.90 hrs, Volume= 14.641 af, Atten= 0%, Lag= 1.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 8.84 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 3.67 fps, Avg. Travel Time= 5.0 min

Peak Storage= 9,445 cf @ 12.90 hrs
Average Depth at Peak Storage= 1.72'
Bank-Full Depth= 3.00' Flow Area= 20.0 sf, Capacity= 244.78 cfs

10.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 1,090.0' Slope= 0.0862 '/'
Inlet Invert= 608.00', Outlet Invert= 514.00'





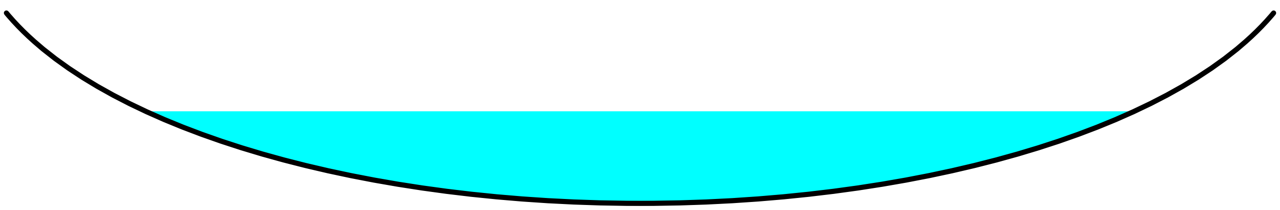
## Summary for Reach B102R: Thru B101

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 1.52" for 10-Year event
Inflow = 74.30 cfs @ 14.18 hrs, Volume= 33.371 af
Outflow = 74.30 cfs @ 14.19 hrs, Volume= 33.369 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.69 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 1.3 min

Peak Storage= 2,458 cf @ 14.19 hrs
Average Depth at Peak Storage= 1.45'
Bank-Full Depth= 3.00' Flow Area= 60.0 sf, Capacity= 356.26 cfs

30.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 122.0' Slope= 0.0164 '/'
Inlet Invert= 492.00', Outlet Invert= 490.00'



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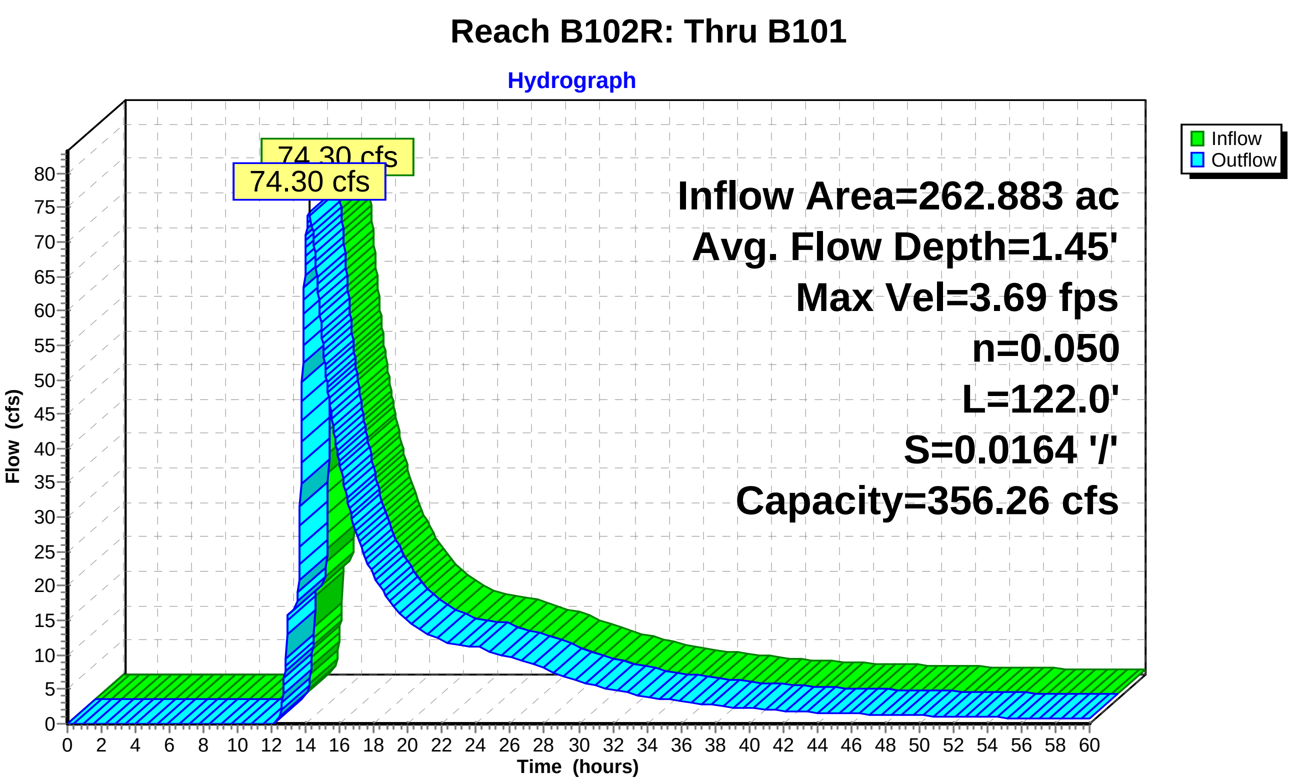


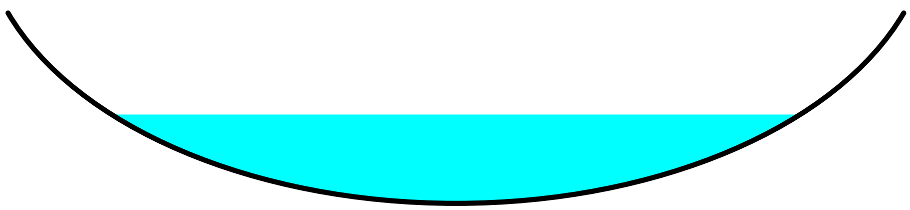
## Summary for Reach B103R: Thru B102

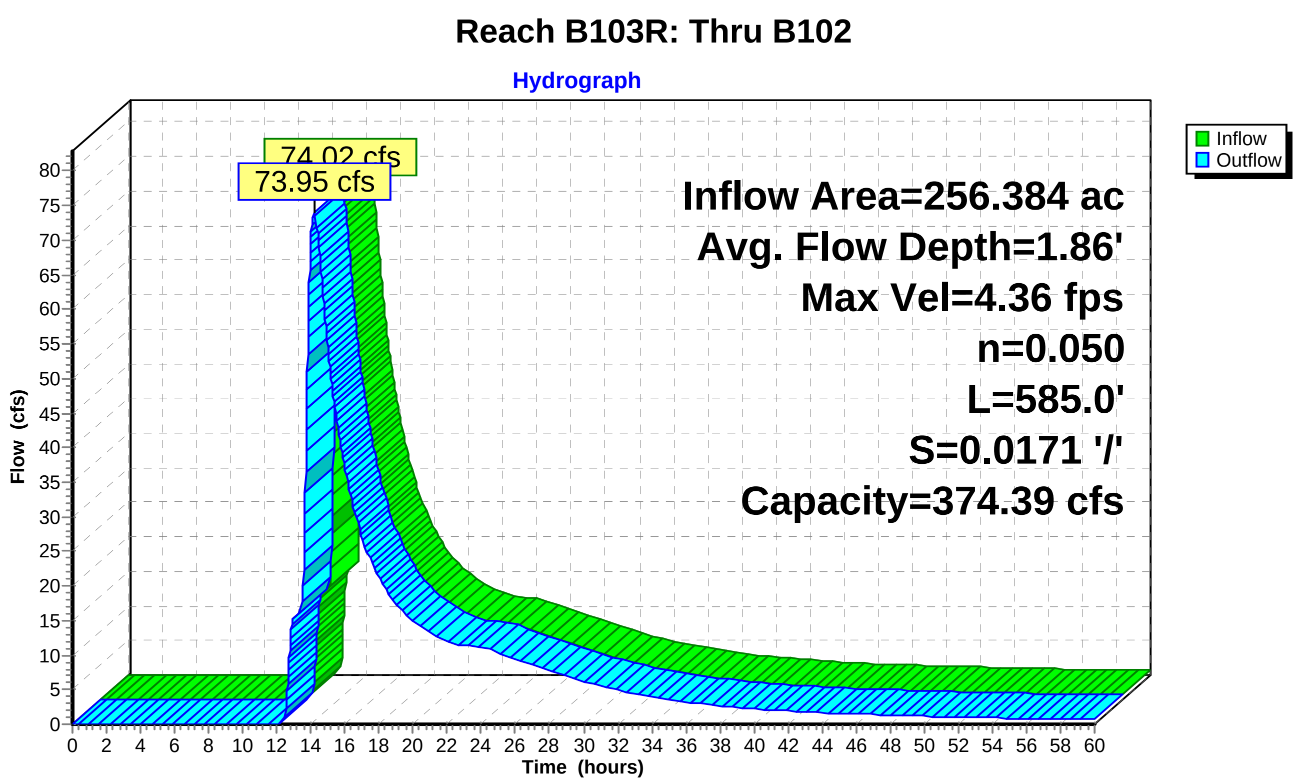
Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 1.55" for 10-Year event
Inflow = 74.02 cfs @ 14.15 hrs, Volume= 33.164 af
Outflow = 73.95 cfs @ 14.18 hrs, Volume= 33.155 af, Atten= 0%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.36 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 5.2 min

Peak Storage= 9,932 cf @ 14.18 hrs
Average Depth at Peak Storage= 1.86'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 374.39 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 585.0' Slope= 0.0171 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'





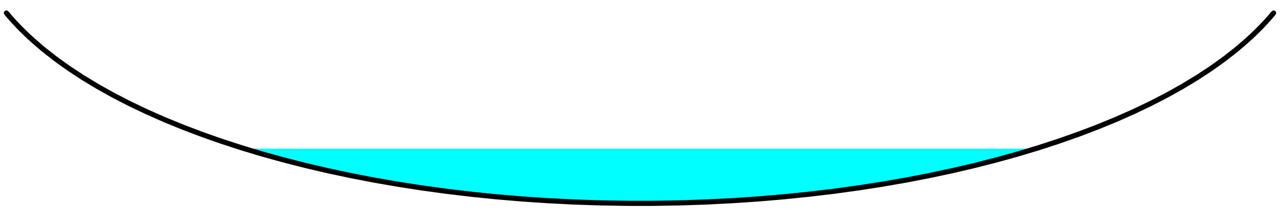
## Summary for Reach B107R: Thru B108

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 1.94" for 10-Year event
Inflow = 9.81 cfs @ 13.01 hrs, Volume= 2.317 af
Outflow = 9.64 cfs @ 13.11 hrs, Volume= 2.317 af, Atten= 2%, Lag= 6.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.72 fps, Min. Travel Time= 7.2 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 28.4 min

Peak Storage= 4,170 cf @ 13.11 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 144.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 2,040.0' Slope= 0.2294 '/'
Inlet Invert= 972.00', Outlet Invert= 504.00'



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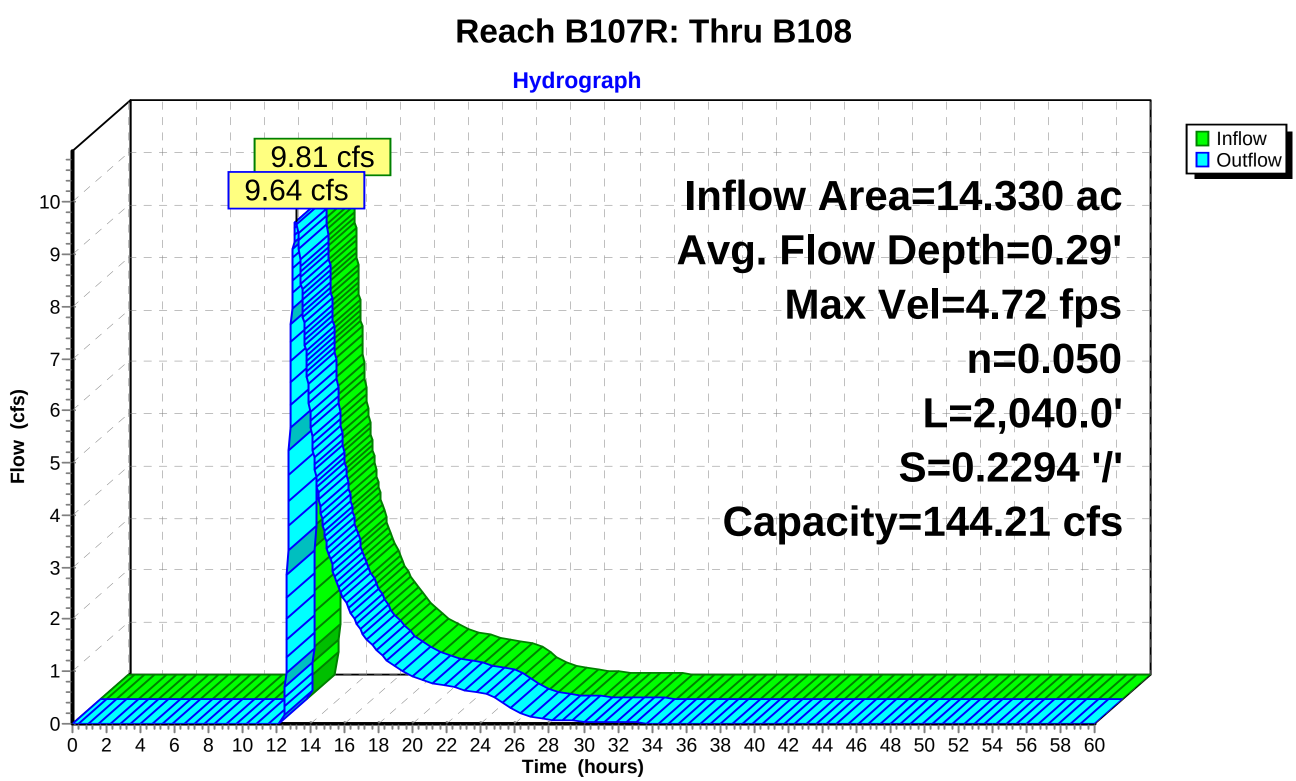


## Summary for Reach B108R: Thur 101

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 2.06" for 10-Year event
Inflow = 72.57 cfs @ 12.59 hrs, Volume= 12.428 af
Outflow = 72.56 cfs @ 12.59 hrs, Volume= 12.428 af, Atten= 0%, Lag= 0.5 min

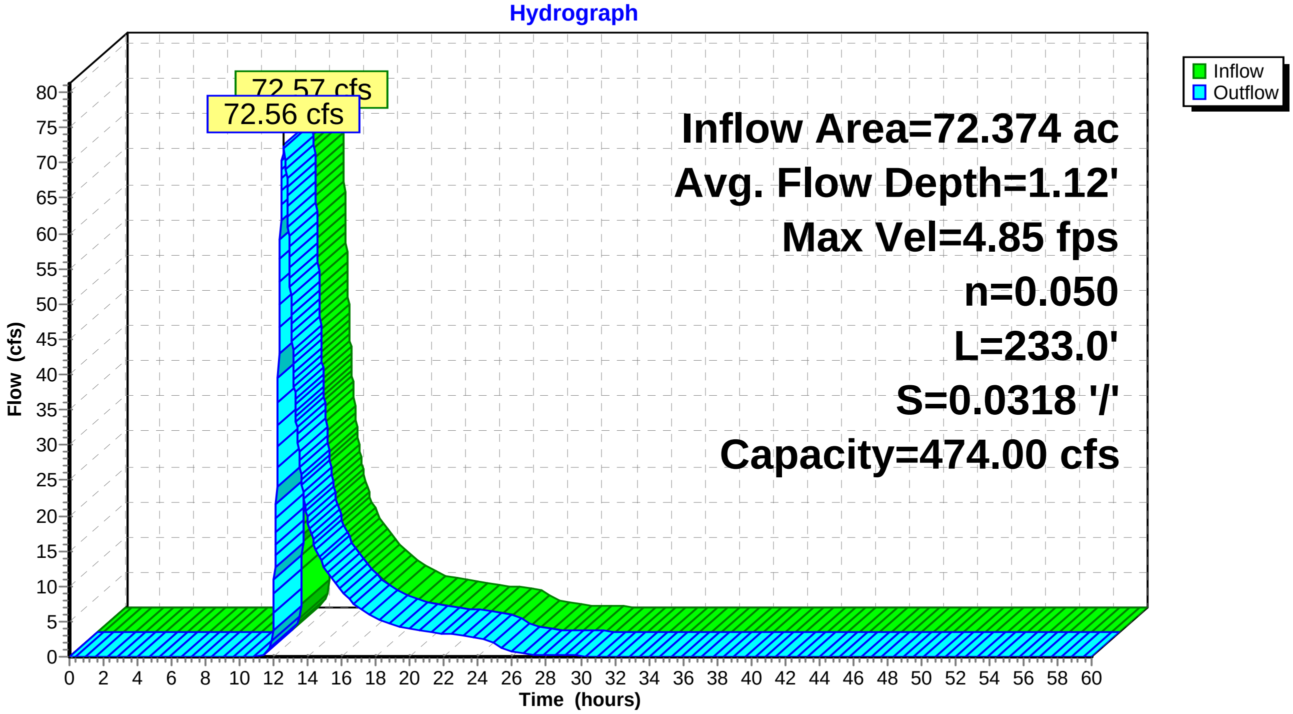
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.85 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 3.8 min

Peak Storage= 3,487 cf @ 12.59 hrs
Average Depth at Peak Storage= 1.12'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 474.00 cfs

10.00' x 3.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 233.0' Slope= 0.0318 '/'
Inlet Invert= 499.60', Outlet Invert= 492.20'

‡

### Reach B108R: Thur 101



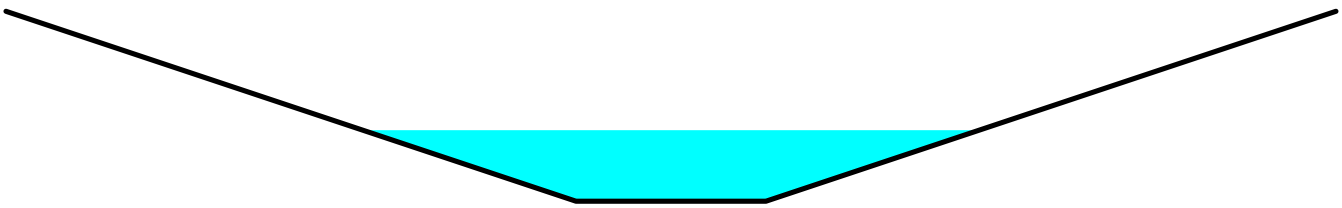
## Summary for Reach B109R: Thru B108

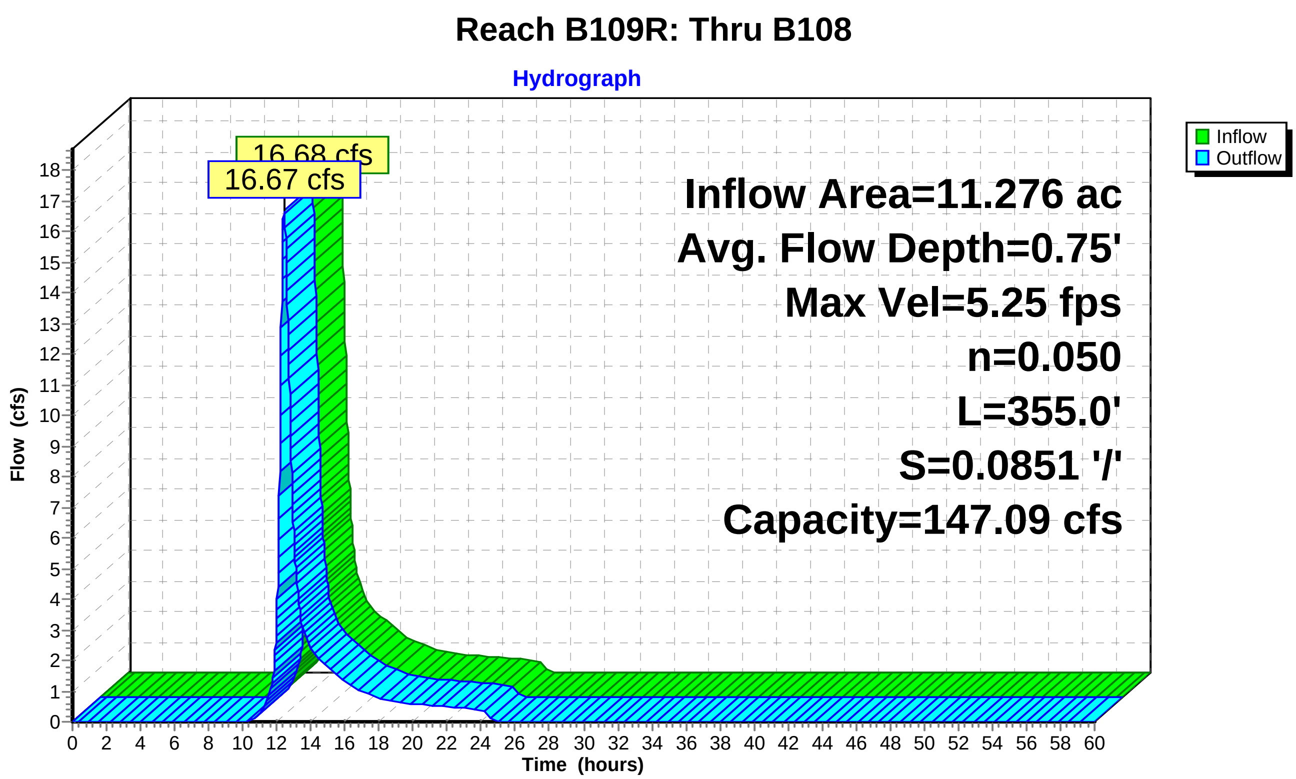
Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 2.17" for 10-Year event
Inflow = 16.68 cfs @ 12.41 hrs, Volume= 2.040 af
Outflow = 16.67 cfs @ 12.43 hrs, Volume= 2.040 af, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.25 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 2.17 fps, Avg. Travel Time= 2.7 min

Peak Storage= 1,127 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 147.09 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 355.0' Slope= 0.0851 '/'
Inlet Invert= 532.20', Outlet Invert= 502.00'





## Summary for Pond 102A: Wetland B

Inflow Area = 45.922 ac, 9.71% Impervious, Inflow Depth = 0.05" for 10-Year event
Inflow = 0.35 cfs @ 13.81 hrs, Volume= 0.200 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.33' @ 25.70 hrs Surf.Area= 37,773 sf Storage= 8,692 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 | 498.10' | 740,168 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

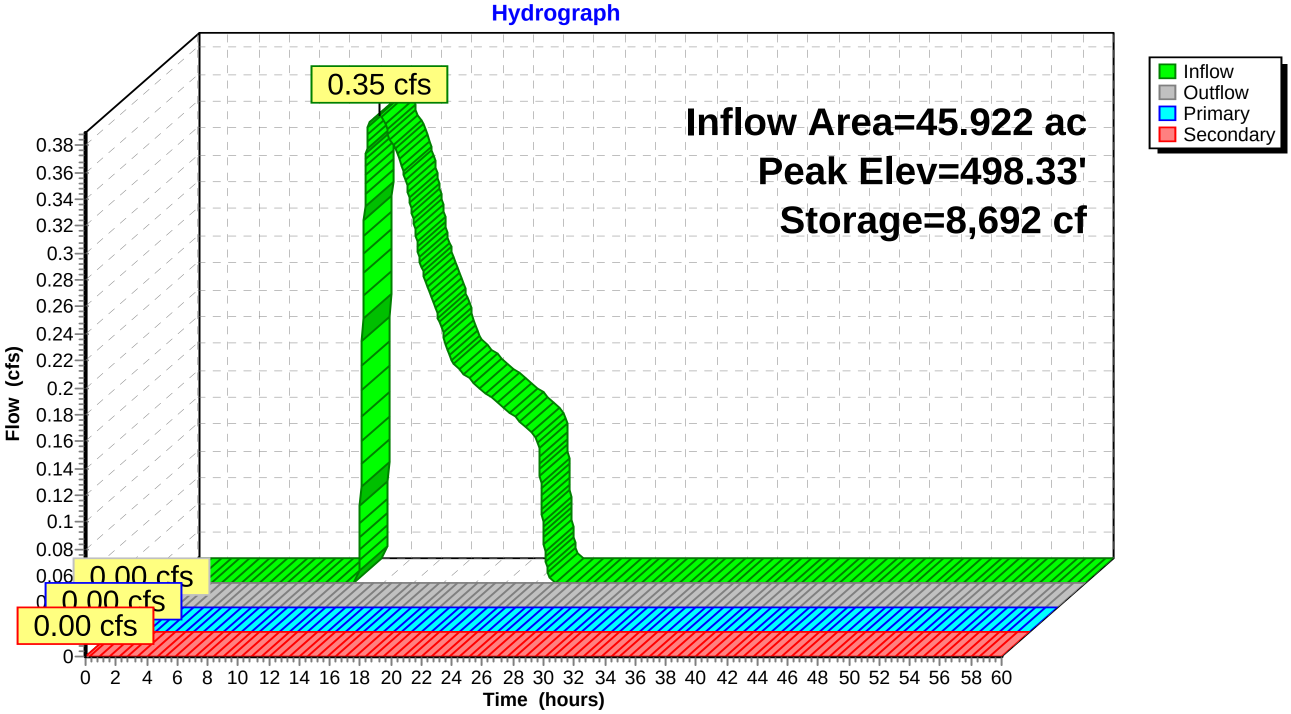
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 498.10 | 37,121 | 782.0 | 0 | 0 | 37,121 |
| 500.00 | 42,629 | 822.0 | 75,702 | 75,702 | 42,449 |
| 502.00 | 54,696 | 1,028.0 | 97,075 | 172,777 | 72,833 |
| 504.00 | 78,374 | 1,409.0 | 132,362 | 305,139 | 146,760 |
| 506.00 | 108,988 | 1,330.0 | 186,523 | 491,662 | 164,196 |
| 508.00 | 140,171 | 1,485.0 | 248,506 | 740,168 | 199,031 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 501.90' / 500.90' S= 0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #2 | Secondary | 506.10' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' (Free Discharge)
└─**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102A: Wetland B



## Summary for Pond 102B: 18" Culvert

[62] Hint: Exceeded Reach B103R OUTLET depth by 2.28' @ 25.72 hrs

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 1.52" for 10-Year event
Inflow = 74.31 cfs @ 14.17 hrs, Volume= 33.371 af
Outflow = 74.30 cfs @ 14.18 hrs, Volume= 33.371 af, Atten= 0%, Lag= 0.3 min
Primary = 10.04 cfs @ 13.64 hrs, Volume= 18.623 af
Secondary = 64.92 cfs @ 14.18 hrs, Volume= 14.748 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 495.40' @ 14.18 hrs Surf.Area= 4,128 sf Storage= 4,404 cf

Plug-Flow detention time= 2.2 min calculated for 33.360 af (100% of inflow)
Center-of-Mass det. time= 2.2 min ( 1,299.7 - 1,297.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 492.20' | 27,470 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

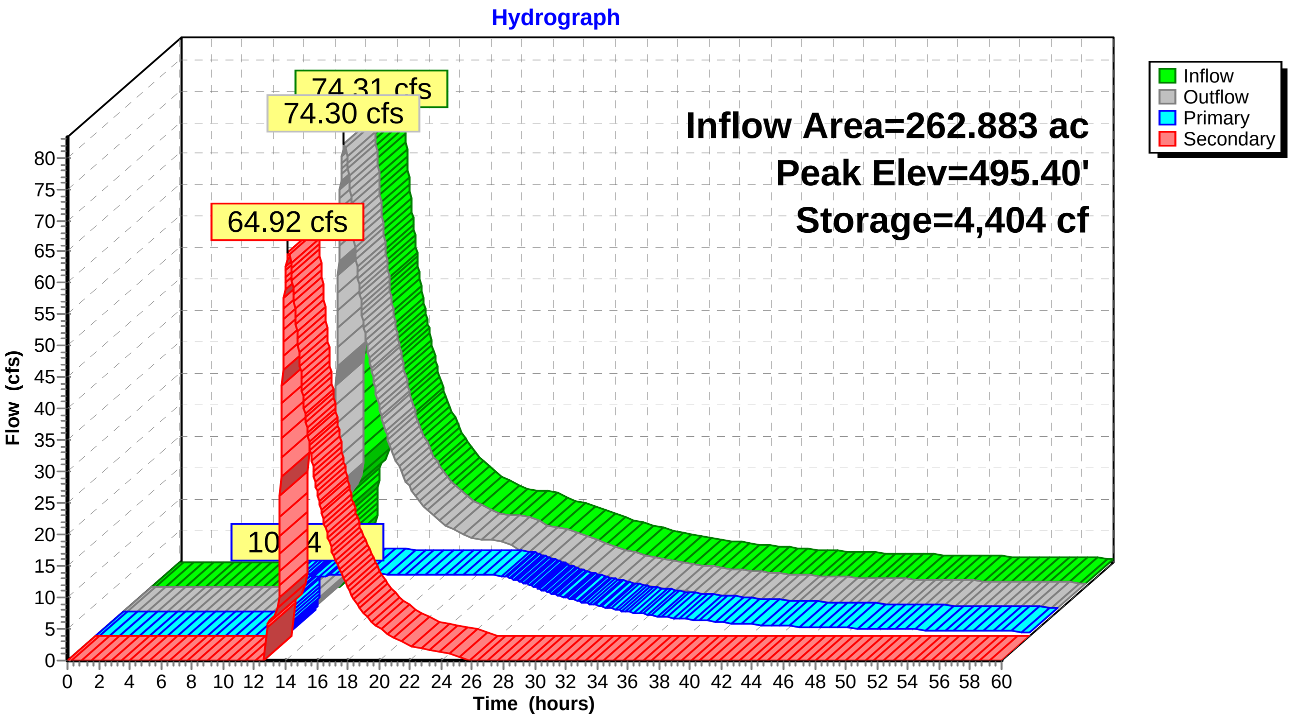
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 492.20 | 0 | 0.0 | 0 | 0 | 0 |
| 496.00 | 5,819 | 521.0 | 7,371 | 7,371 | 21,623 |
| 498.00 | 14,990 | 910.0 | 20,099 | 27,470 | 65,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 492.20' | **18.0" Round Culvert**<br>L= 20.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 492.20' / 491.10' S= 0.0550 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 495.00' | **100.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=10.05 cfs @ 13.64 hrs HW=495.19' TW=492.94' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 10.05 cfs @ 5.69 fps)

**Secondary OutFlow** Max=64.92 cfs @ 14.18 hrs HW=495.40' TW=493.45' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 64.92 cfs @ 1.62 fps)

## Pond 102B: 18" Culvert



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.386 ac, 4.49% Impervious, Inflow Depth = 1.08" for 10-Year event
Inflow = 18.79 cfs @ 12.75 hrs, Volume= 3.633 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.22' @ 26.62 hrs Surf.Area= 176,031 sf Storage= 158,269 cf

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

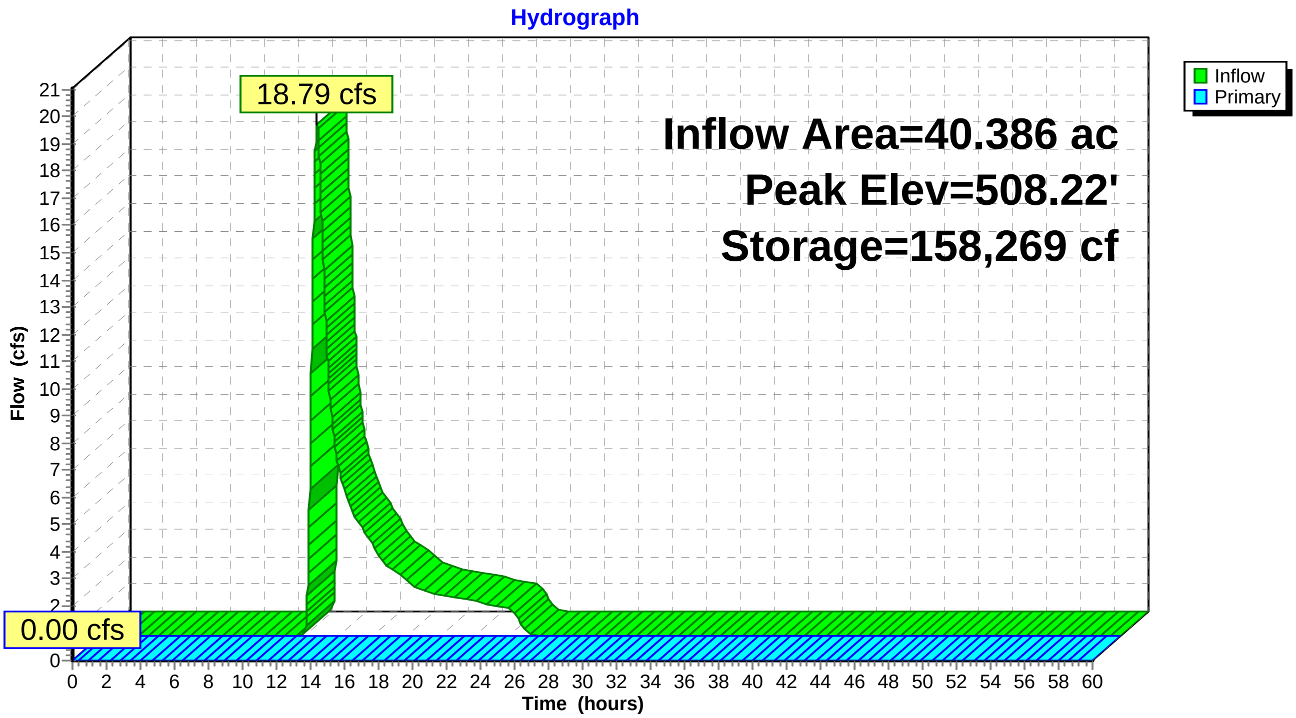
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 103A: Wetland A

Inflow Area = 36.735 ac, 8.79% Impervious, Inflow Depth = 0.35" for 10-Year event
Inflow = 2.30 cfs @ 13.12 hrs, Volume= 1.071 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.94' @ 26.58 hrs Surf.Area= 38,952 sf Storage= 46,665 cf

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

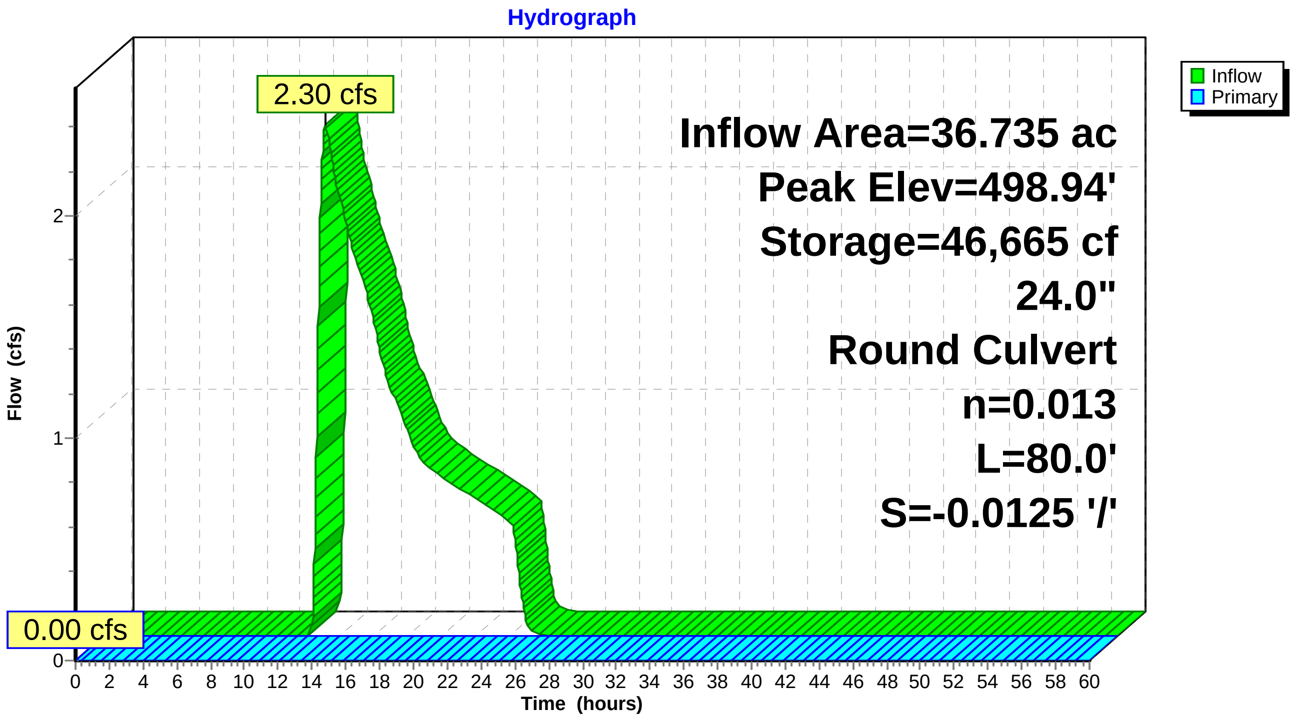
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 497.40' | 751,373 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 497.40 | 22,575 | 625.0 | 0 | 0 | 22,575 |
| 500.00 | 52,914 | 979.0 | 95,378 | 95,378 | 67,808 |
| 502.00 | 73,309 | 1,110.0 | 125,670 | 221,048 | 89,686 |
| 504.00 | 83,807 | 1,169.0 | 156,999 | 378,047 | 100,626 |
| 506.00 | 92,176 | 1,226.0 | 175,917 | 553,963 | 111,750 |
| 508.00 | 105,381 | 1,351.0 | 197,410 | 751,373 | 137,513 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 500.90' / 501.90' S= -0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=497.40' TW=498.10' (Dynamic Tailwater)
└─**1=Culvert** ( Controls 0.00 cfs)

## Pond 103A: Wetland A



## Summary for Pond 103B: Irrigation Pond

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 1.23" for 10-Year event
Inflow = 39.10 cfs @ 14.04 hrs, Volume= 26.320 af
Outflow = 37.70 cfs @ 14.25 hrs, Volume= 26.079 af, Atten= 4%, Lag= 12.4 min
Primary = 6.43 cfs @ 14.25 hrs, Volume= 8.915 af
Secondary = 31.28 cfs @ 14.25 hrs, Volume= 17.164 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 506.34' @ 14.25 hrs Surf.Area= 90,942 sf Storage= 47,985 cf

Plug-Flow detention time= 56.6 min calculated for 26.079 af (99% of inflow)
Center-of-Mass det. time= 37.3 min ( 1,396.1 - 1,358.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 505.80' | 416,210 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

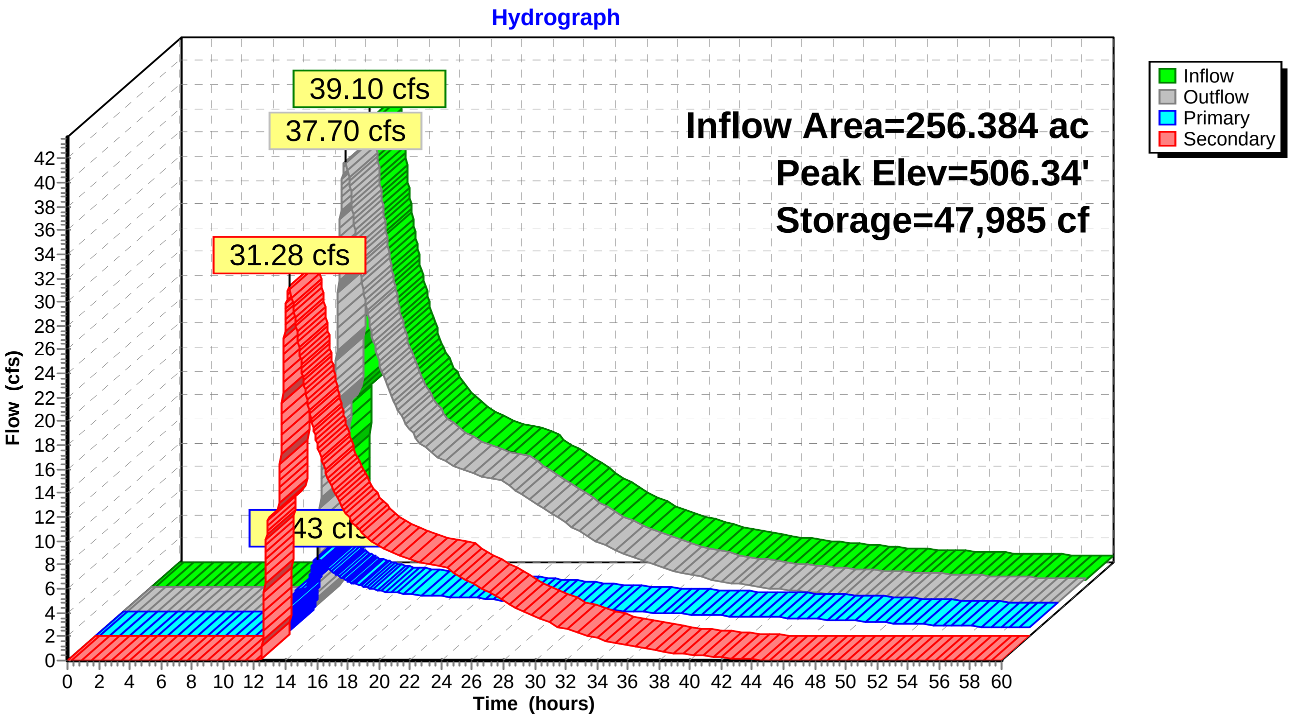
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 505.80 | 88,106 | 1,403.0 | 0 | 0 | 88,106 |
| 508.00 | 100,033 | 1,579.0 | 206,814 | 206,814 | 129,999 |
| 510.00 | 109,433 | 1,610.0 | 209,396 | 416,210 | 138,488 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 505.80' | **5.0' long x 1.80' rise Sharp-Crested Vee/Trap Weir**<br>Cv= 2.62 (C= 3.28) |
| #2 | Secondary | 506.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00<br>Width (feet) 45.00 60.00 80.00 95.00 120.00 |

**Primary OutFlow** Max=6.43 cfs @ 14.25 hrs HW=506.34' TW=503.86' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 6.43 cfs @ 2.40 fps)

**Secondary OutFlow** Max=31.28 cfs @ 14.25 hrs HW=506.34' TW=503.86' (Dynamic Tailwater)
↑—**2=Custom Weir/Orifice** (Weir Controls 31.28 cfs @ 1.86 fps)

## Pond 103B: Irrigation Pond



## Summary for Pond 104A: Wetland D

Inflow Area = 9.432 ac, 9.40% Impervious, Inflow Depth = 0.09" for 10-Year event
Inflow = 0.10 cfs @ 15.80 hrs, Volume= 0.069 af
Outflow = 0.04 cfs @ 24.34 hrs, Volume= 0.053 af, Atten= 62%, Lag= 512.7 min
Primary = 0.04 cfs @ 24.34 hrs, Volume= 0.053 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.82' @ 24.34 hrs Surf.Area= 21,128 sf Storage= 2,308 cf

Plug-Flow detention time= 815.7 min calculated for 0.053 af (76% of inflow)
Center-of-Mass det. time= 739.4 min ( 1,873.4 - 1,134.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

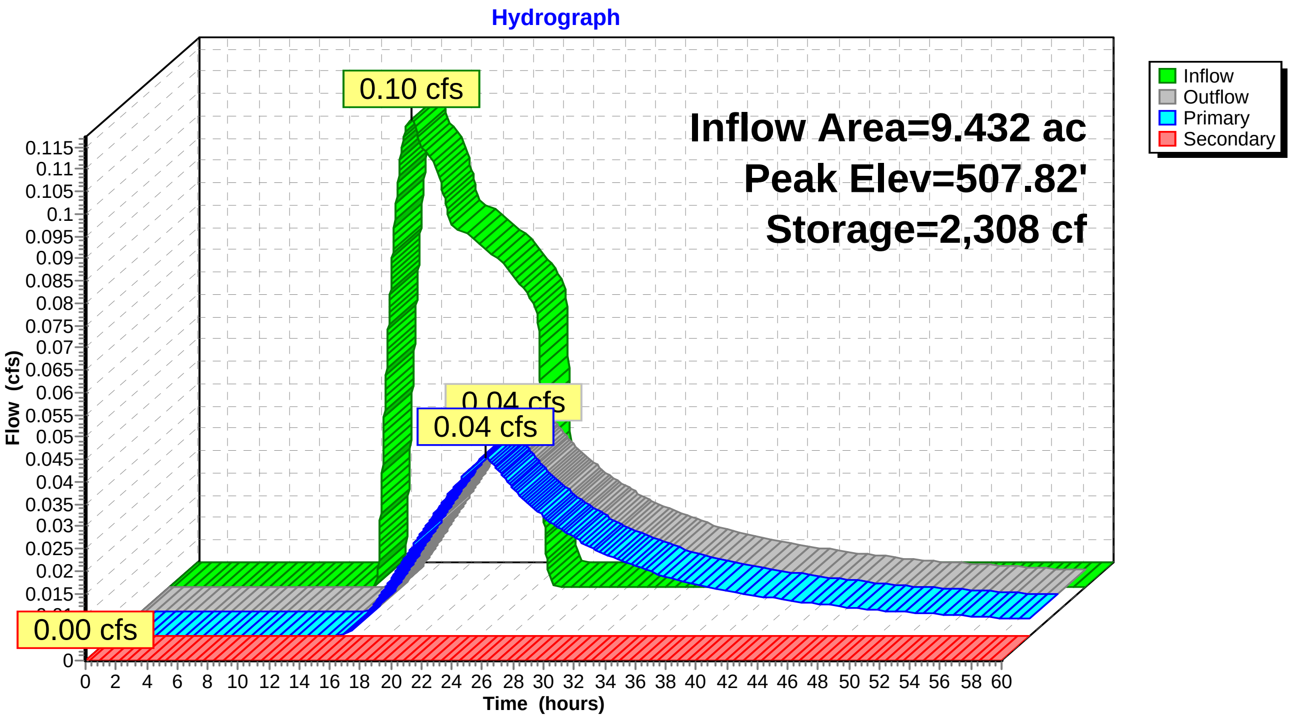
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.04 cfs @ 24.34 hrs HW=507.82' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.04 cfs @ 1.20 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 104A: Wetland D



## Summary for Pond 104B: Island Pond

Inflow Area = 234.803 ac, 5.37% Impervious, Inflow Depth = 1.65" for 10-Year event
Inflow = 126.09 cfs @ 13.07 hrs, Volume= 32.247 af
Outflow = 71.99 cfs @ 14.06 hrs, Volume= 30.314 af, Atten= 43%, Lag= 59.2 min
Primary = 12.54 cfs @ 14.06 hrs, Volume= 19.031 af
Secondary = 22.33 cfs @ 14.06 hrs, Volume= 4.199 af
Tertiary = 37.12 cfs @ 14.06 hrs, Volume= 7.084 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 510.32' @ 14.06 hrs Surf.Area= 263,952 sf Storage= 513,102 cf

Plug-Flow detention time= 395.0 min calculated for 30.314 af (94% of inflow)
Center-of-Mass det. time= 360.4 min ( 1,306.0 - 945.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 508.20' | 1,023,136 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 508.20 | 228,830 | 3,183.0 | 0 | 0 | 228,830 |
| 510.00 | 249,447 | 3,224.0 | 430,316 | 430,316 | 250,515 |
| 512.00 | 346,000 | 3,042.0 | 592,820 | 1,023,136 | 341,482 |

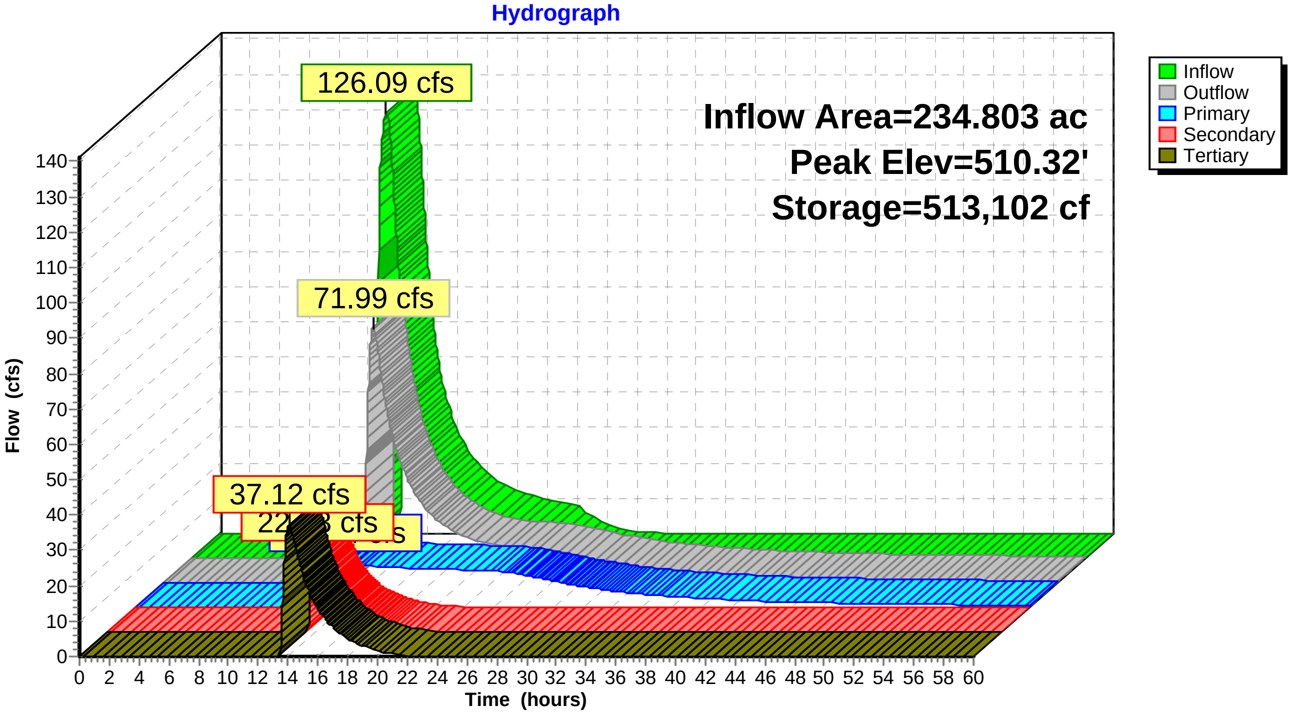
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 508.22' | **24.0" Round Culvert**<br>L= 111.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 508.22' / 505.43' S= 0.0251 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 3.14 sf |
| #2 | Secondary | 510.00' | **50.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Tertiary | 510.00' | **80.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=12.54 cfs @ 14.06 hrs HW=510.32' TW=506.33' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 12.54 cfs @ 3.99 fps)

**Secondary OutFlow** Max=22.33 cfs @ 14.06 hrs HW=510.32' TW=506.33' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 22.33 cfs @ 1.38 fps)

**Tertiary OutFlow** Max=37.12 cfs @ 14.06 hrs HW=510.32' TW=503.85' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 37.12 cfs @ 1.44 fps)

## Pond 104B: Island Pond



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach A106R OUTLET depth by 0.62' @ 13.46 hrs

Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 1.20" for 10-Year event
Inflow = 35.95 cfs @ 12.43 hrs, Volume= 4.948 af
Outflow = 18.23 cfs @ 12.84 hrs, Volume= 4.932 af, Atten= 49%, Lag= 24.9 min
Primary = 10.15 cfs @ 12.84 hrs, Volume= 4.733 af
Secondary = 8.08 cfs @ 12.84 hrs, Volume= 0.199 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.07' @ 12.84 hrs Surf.Area= 31,986 sf Storage= 59,350 cf

Plug-Flow detention time= 106.1 min calculated for 4.932 af (100% of inflow)
Center-of-Mass det. time= 104.2 min ( 1,003.5 - 899.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

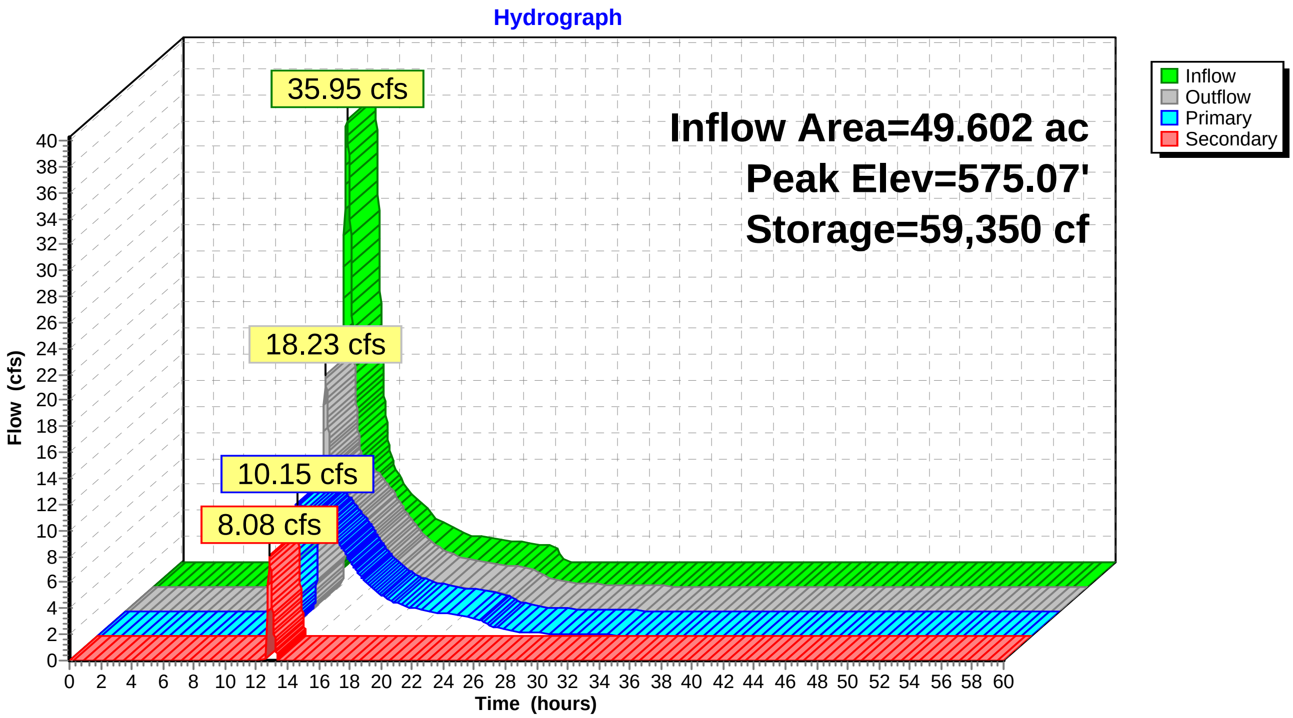
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=10.14 cfs @ 12.84 hrs HW=575.07' TW=566.87' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.14 cfs @ 5.74 fps)

**Secondary OutFlow** Max=8.06 cfs @ 12.84 hrs HW=575.07' TW=566.87' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 8.06 cfs @ 0.63 fps)

## Pond 105A: Wetland H



## Summary for Pond 105B: Wetland J

Inflow Area = 154.267 ac, 1.16% Impervious, Inflow Depth = 1.98" for 10-Year event
Inflow = 106.53 cfs @ 13.16 hrs, Volume= 25.485 af
Outflow = 106.44 cfs @ 13.19 hrs, Volume= 25.484 af, Atten= 0%, Lag= 1.6 min
Primary = 106.44 cfs @ 13.19 hrs, Volume= 25.484 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 516.27' @ 13.19 hrs Surf.Area= 27,631 sf Storage= 44,742 cf

Plug-Flow detention time= 22.4 min calculated for 25.484 af (100% of inflow)
Center-of-Mass det. time= 22.2 min ( 951.1 - 928.8 )

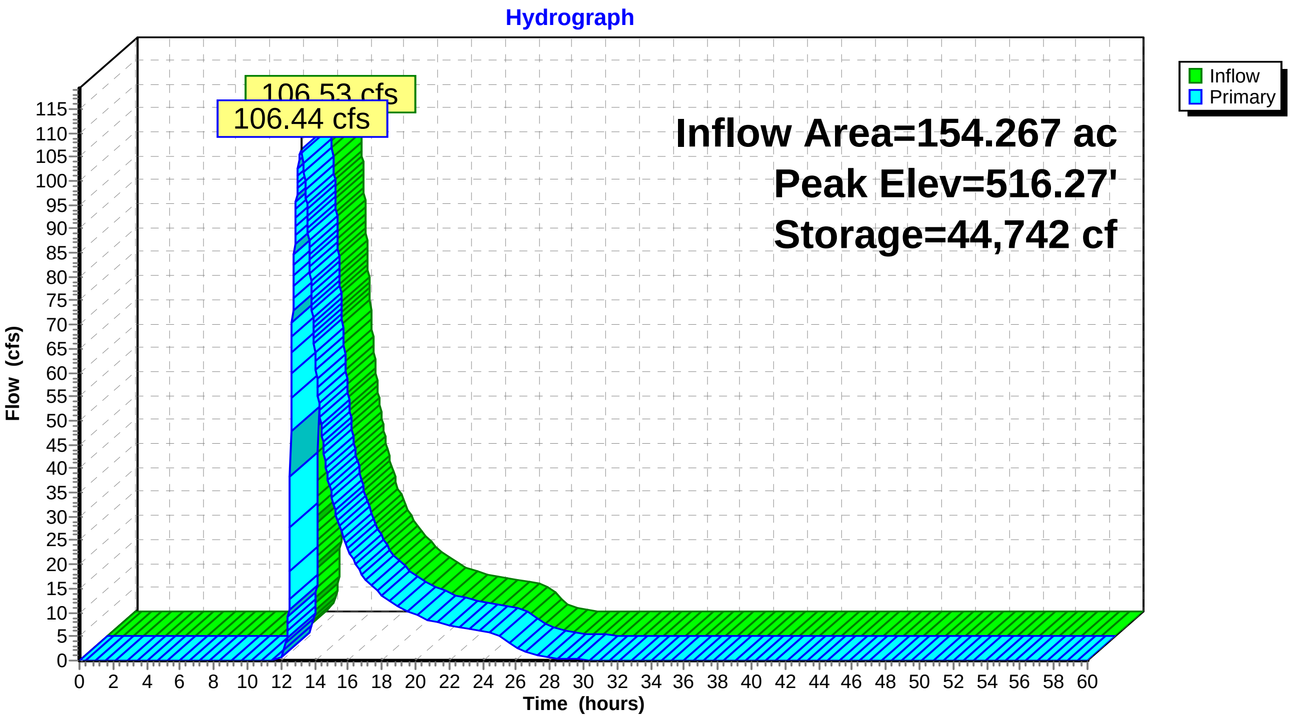
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 514.40' | 102,307 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 514.40 | 19,952 | 567.0 | 0 | 0 | 19,952 |
| 516.00 | 27,082 | 686.0 | 37,482 | 37,482 | 31,860 |
| 516.50 | 28,121 | 699.0 | 13,800 | 51,282 | 33,334 |
| 518.00 | 40,275 | 840.0 | 51,025 | 102,307 | 50,641 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 514.40' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.25 1.60 2.60 3.60<br>Width (feet) 2.33 2.33 90.00 120.00 170.00 |

**Primary OutFlow** Max=106.43 cfs @ 13.19 hrs HW=516.27' TW=509.53' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 106.43 cfs @ 2.42 fps)

## Pond 105B: Wetland J



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 2.08" for 10-Year event
Inflow = 22.25 cfs @ 12.39 hrs, Volume= 2.655 af
Outflow = 22.25 cfs @ 12.39 hrs, Volume= 2.655 af, Atten= 0%, Lag= 0.0 min
Primary = 22.25 cfs @ 12.39 hrs, Volume= 2.655 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 718.61' @ 12.39 hrs Surf.Area= 42 sf Storage= 27 cf

Plug-Flow detention time= 0.0 min calculated for 2.654 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 868.2 - 868.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

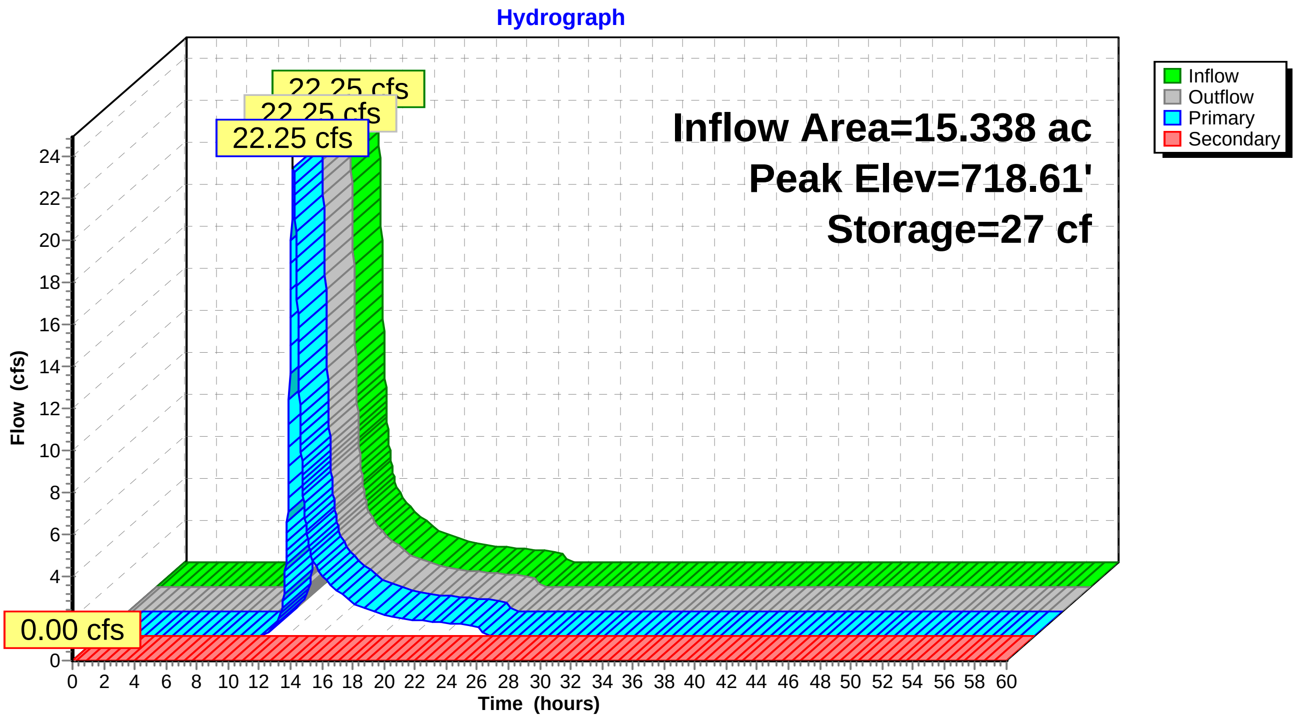
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=22.23 cfs @ 12.39 hrs HW=718.60' TW=686.83' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 22.23 cfs @ 4.70 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=686.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 130.289 ac, 0.83% Impervious, Inflow Depth = 2.08" for 10-Year event
Inflow = 98.12 cfs @ 13.23 hrs, Volume= 22.556 af
Outflow = 98.09 cfs @ 13.24 hrs, Volume= 22.555 af, Atten= 0%, Lag= 0.5 min
Primary = 98.09 cfs @ 13.24 hrs, Volume= 22.555 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.79' @ 13.24 hrs Surf.Area= 12,224 sf Storage= 20,209 cf

Plug-Flow detention time= 9.2 min calculated for 22.548 af (100% of inflow)
Center-of-Mass det. time= 9.3 min ( 932.2 - 922.9 )

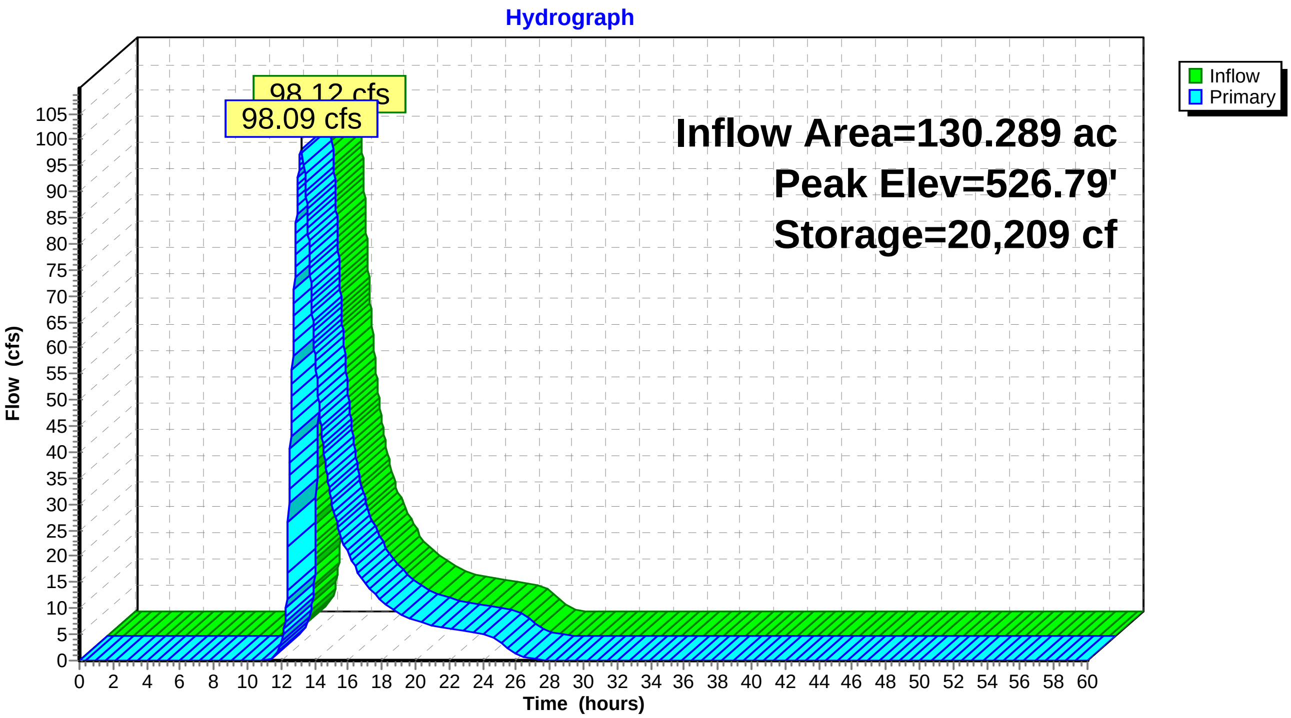
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=98.07 cfs @ 13.24 hrs HW=526.79' TW=516.26' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 98.07 cfs @ 2.72 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

Inflow Area = 95.411 ac, 2.35% Impervious, Inflow Depth = 1.81" for 10-Year event
Inflow = 75.71 cfs @ 12.88 hrs, Volume= 14.357 af
Outflow = 75.70 cfs @ 12.88 hrs, Volume= 14.357 af, Atten= 0%, Lag= 0.2 min
Primary = 41.43 cfs @ 12.88 hrs, Volume= 12.452 af
Secondary = 34.27 cfs @ 12.88 hrs, Volume= 1.905 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 625.60' @ 12.88 hrs Surf.Area= 1,278 sf Storage= 2,557 cf

Plug-Flow detention time= 0.3 min calculated for 14.353 af (100% of inflow)
Center-of-Mass det. time= 0.3 min ( 910.4 - 910.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

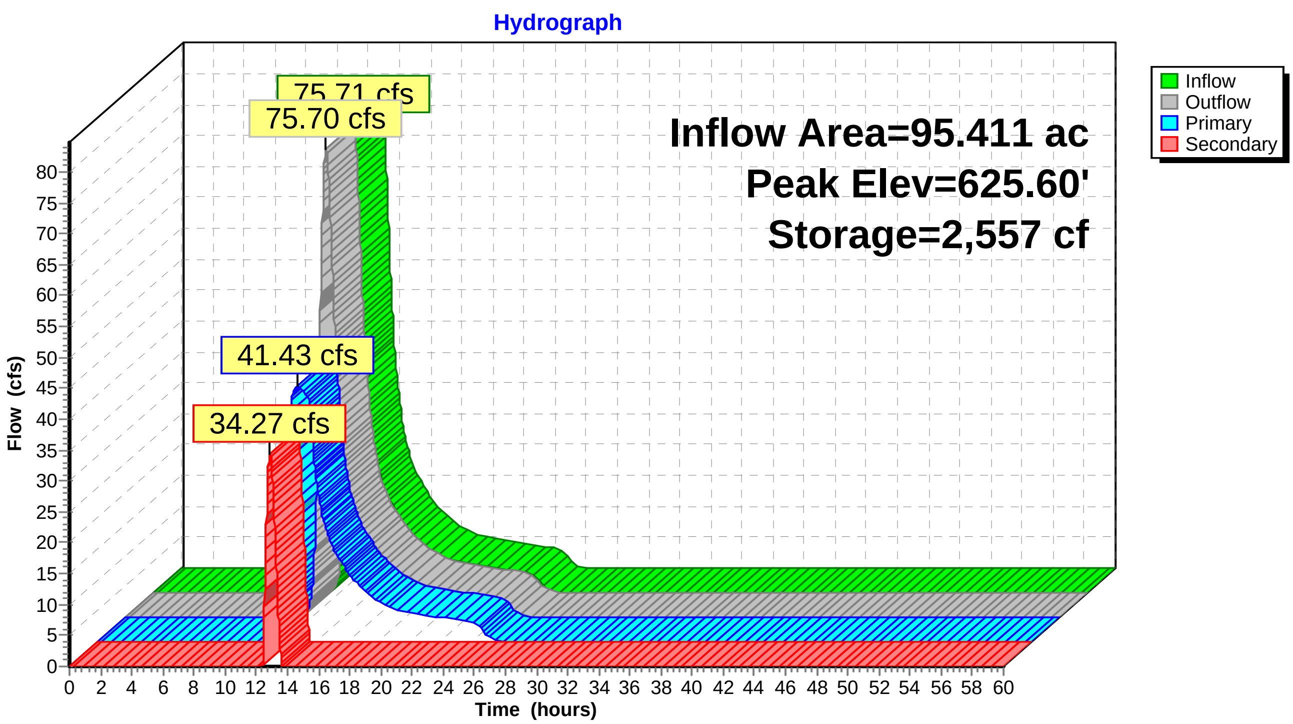
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=41.43 cfs @ 12.88 hrs HW=625.60' TW=609.72' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 41.43 cfs @ 13.19 fps)

**Secondary OutFlow** Max=34.25 cfs @ 12.88 hrs HW=625.60' TW=611.53' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 34.25 cfs @ 2.47 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 2.17" for 10-Year event
Inflow = 18.51 cfs @ 12.54 hrs, Volume= 2.593 af
Outflow = 9.81 cfs @ 13.01 hrs, Volume= 2.317 af, Atten= 47%, Lag= 27.9 min
Primary = 9.81 cfs @ 13.01 hrs, Volume= 2.317 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.80' @ 13.01 hrs Surf.Area= 123,306 sf Storage= 36,760 cf

Plug-Flow detention time= 136.3 min calculated for 2.317 af (89% of inflow)
Center-of-Mass det. time= 85.2 min ( 960.5 - 875.2 )

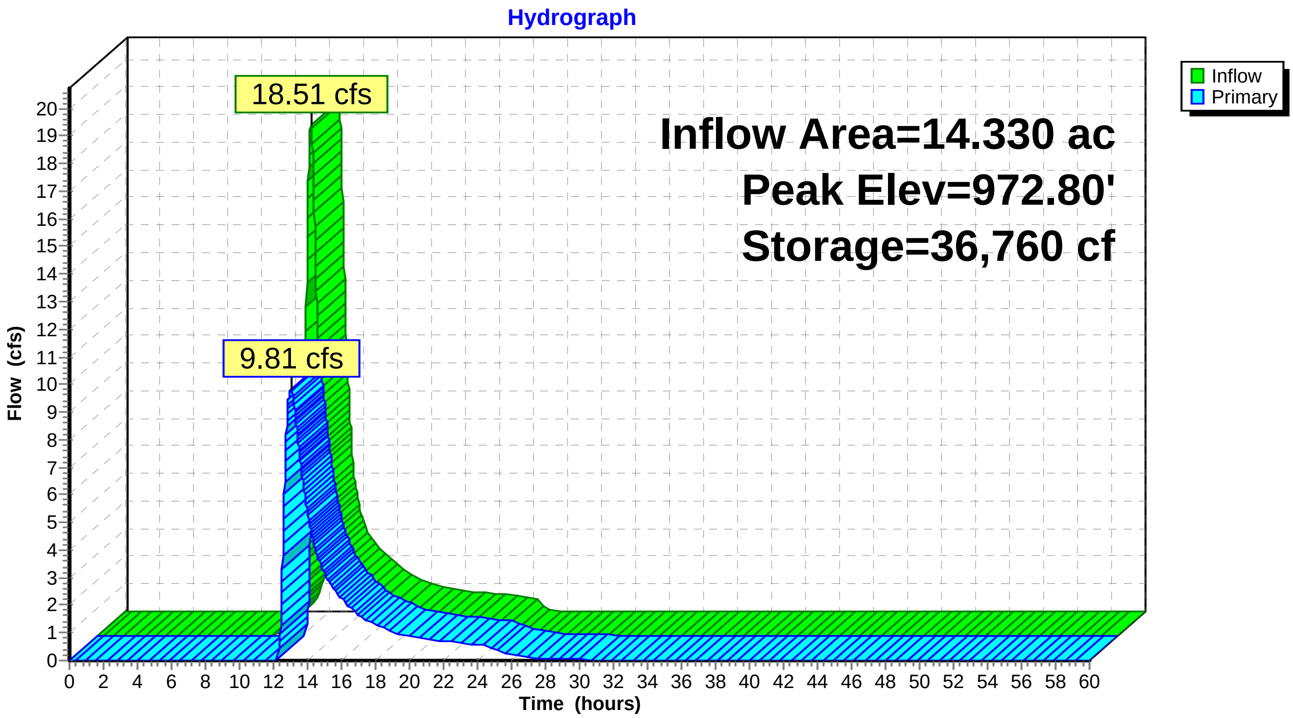
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=9.81 cfs @ 13.01 hrs HW=972.80' TW=972.28' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 9.81 cfs @ 1.21 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 5.526 ac, 2.32% Impervious, Inflow Depth = 4.75" for 10-Year event
Inflow = 35.26 cfs @ 12.88 hrs, Volume= 2.189 af
Outflow = 35.32 cfs @ 12.88 hrs, Volume= 2.189 af, Atten= 0%, Lag= 0.0 min
Primary = 35.32 cfs @ 12.88 hrs, Volume= 2.189 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 611.53' @ 12.88 hrs Surf.Area= 13 sf Storage= 35 cf

Plug-Flow detention time= 0.4 min calculated for 2.189 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 800.8 - 800.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

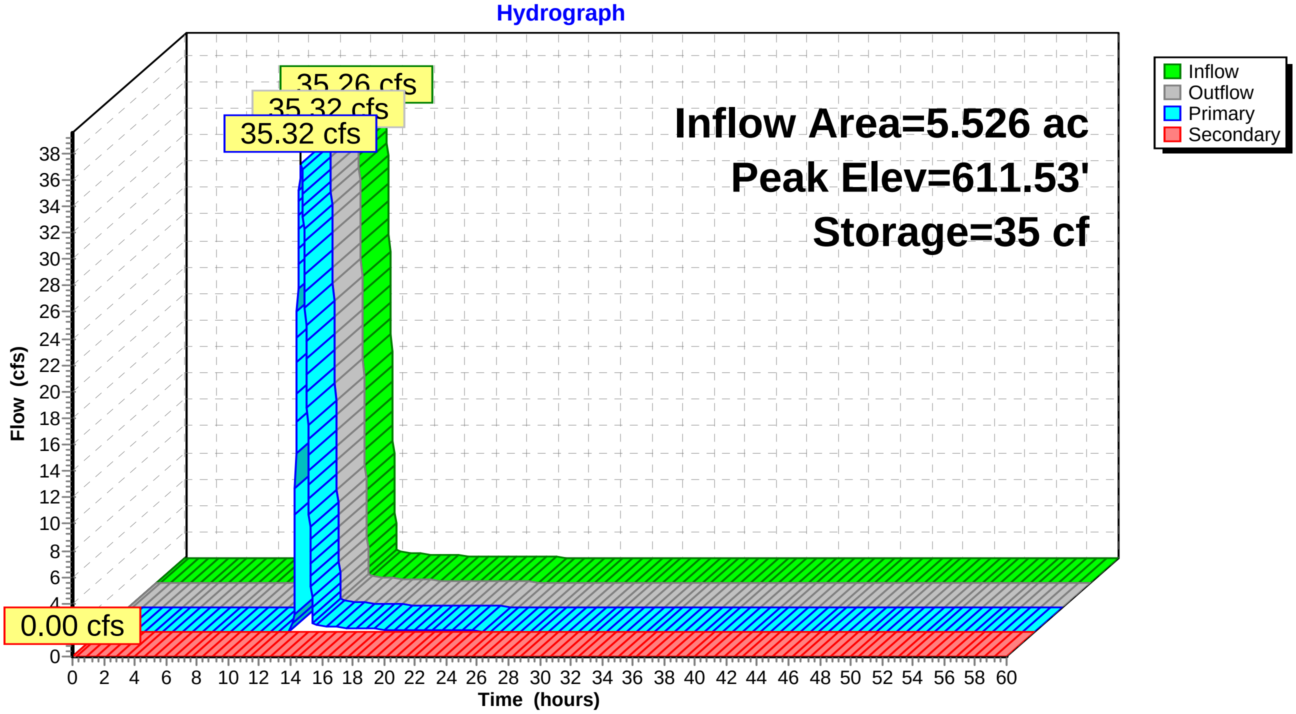
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=35.31 cfs @ 12.88 hrs HW=611.53' TW=609.72' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 35.31 cfs @ 6.87 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=608.80' TW=608.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 108A: 36" Culvert



## Summary for Pond 108B: Wetland N

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 2.06" for 10-Year event
Inflow = 72.59 cfs @ 12.57 hrs, Volume= 12.453 af
Outflow = 72.57 cfs @ 12.59 hrs, Volume= 12.428 af, Atten= 0%, Lag= 1.0 min
Primary = 4.37 cfs @ 12.32 hrs, Volume= 3.652 af
Secondary = 68.26 cfs @ 12.59 hrs, Volume= 8.776 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.36' @ 12.59 hrs Surf.Area= 10,926 sf Storage= 13,697 cf

Plug-Flow detention time= 18.4 min calculated for 12.424 af (100% of inflow)
Center-of-Mass det. time= 16.7 min ( 912.1 - 895.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 32,385 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

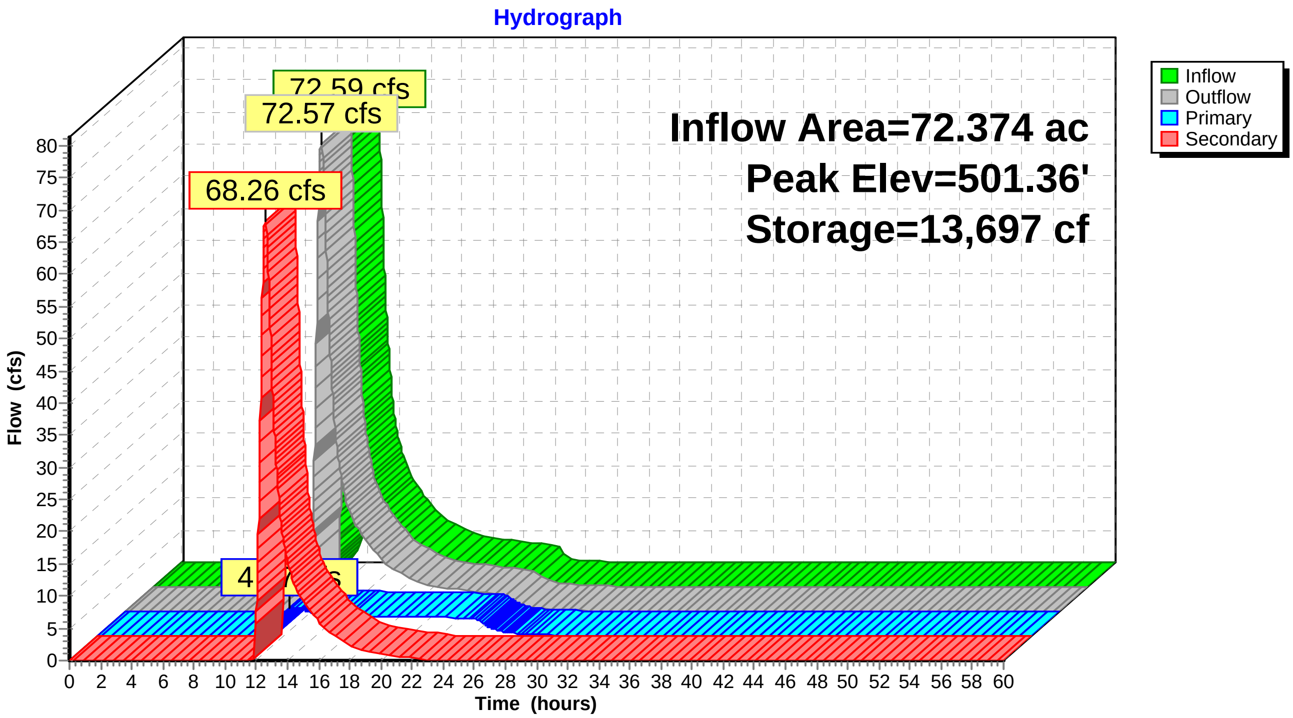
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 500.00 | 8,398 | 412.0 | 0 | 0 | 8,398 |
| 500.50 | 10,185 | 434.0 | 4,639 | 4,639 | 9,894 |
| 502.00 | 11,496 | 452.0 | 16,251 | 20,889 | 11,327 |
| 503.00 | 11,496 | 452.0 | 11,496 | 32,385 | 11,779 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.10' | **18.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 500.10' / 499.60' S= 0.0250 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 501.00' | **125.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=4.37 cfs @ 12.32 hrs HW=501.28' TW=500.51' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 4.37 cfs @ 4.01 fps)

**Secondary OutFlow** Max=68.25 cfs @ 12.59 hrs HW=501.36' TW=500.72' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 68.25 cfs @ 1.52 fps)

## Pond 108B: Wetland N



## Summary for Pond 109B: 36" Culvert

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 2.17" for 10-Year event
Inflow = 16.69 cfs @ 12.41 hrs, Volume= 2.040 af
Outflow = 16.68 cfs @ 12.41 hrs, Volume= 2.040 af, Atten= 0%, Lag= 0.0 min
Primary = 16.68 cfs @ 12.41 hrs, Volume= 2.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 547.05' @ 12.41 hrs Surf.Area= 88 sf Storage= 54 cf

Plug-Flow detention time= 0.0 min calculated for 2.039 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 866.5 - 866.5 )

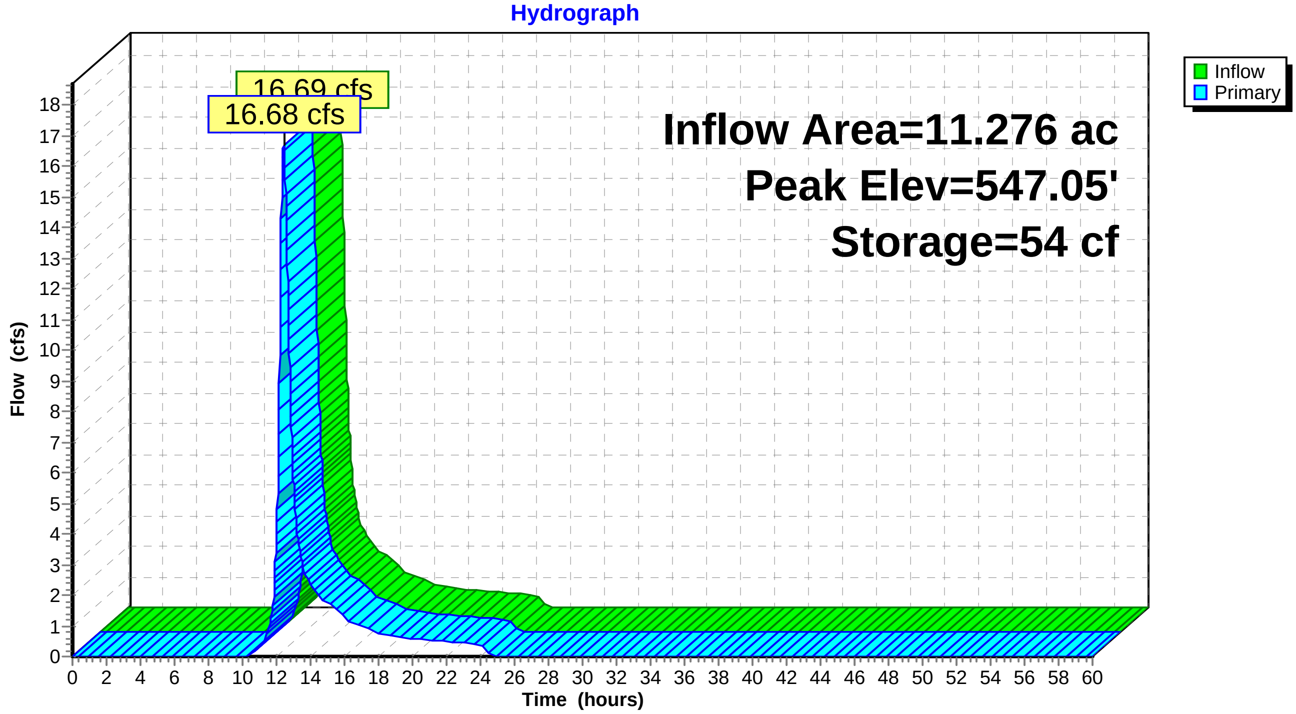
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 545.20' | 5,884 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 545.20 | 0 | 0.0 | 0 | 0 | 0 |
| 548.00 | 203 | 65.0 | 189 | 189 | 348 |
| 550.00 | 519 | 101.0 | 698 | 887 | 852 |
| 552.00 | 1,050 | 140.0 | 1,538 | 2,425 | 1,638 |
| 554.00 | 2,514 | 230.0 | 3,459 | 5,884 | 4,313 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 545.20' | **36.0" Round Culvert**<br>L= 96.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 545.20' / 532.20' S= 0.1354 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Primary | 552.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 65.00 95.00<br>Height (feet) 2.00 0.60 0.00 2.00 |

**Primary OutFlow** Max=16.68 cfs @ 12.41 hrs HW=547.05' TW=532.95' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 16.68 cfs @ 3.65 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond 109B: 36" Culvert

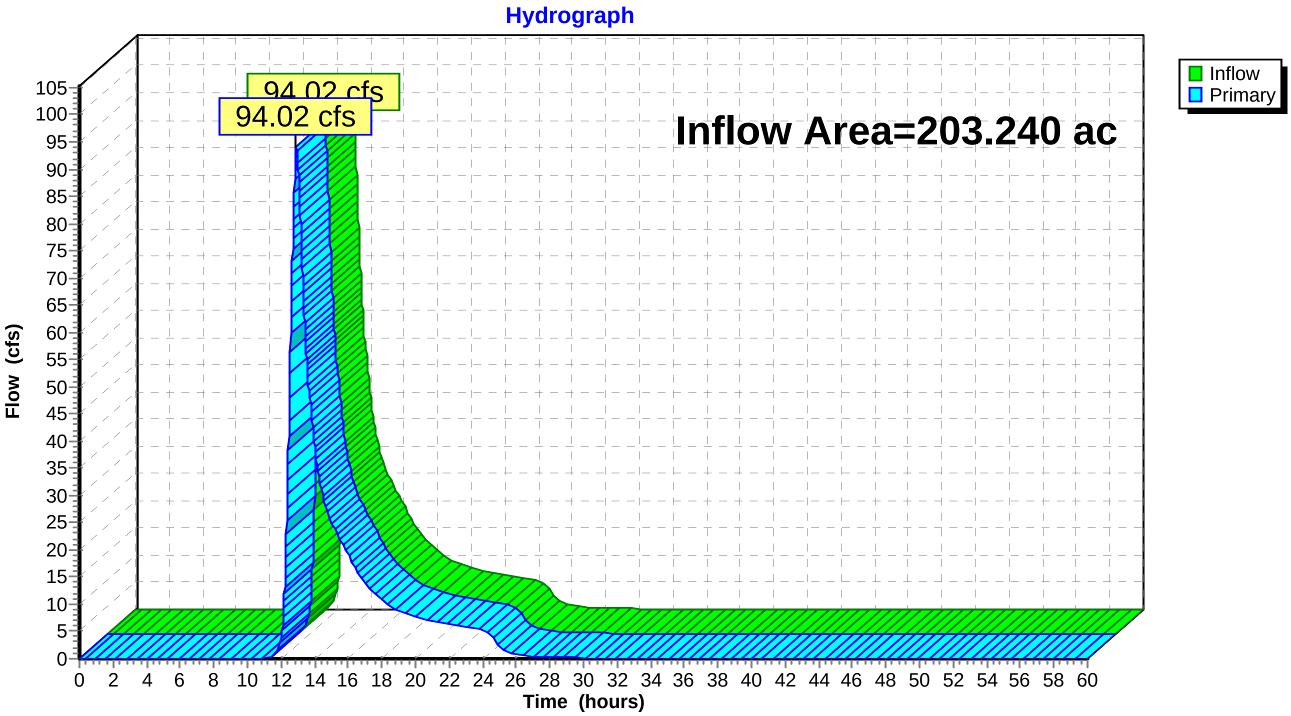


## Summary for Link A: Amenia Stream

| | | | |
|---|---|---|---|
| Inflow Area = | 203.240 ac, | 3.66% Impervious, Inflow Depth = 1.18" | for 10-Year event |
| Inflow = | 94.02 cfs @ | 12.90 hrs, Volume= | 20.045 af |
| Primary = | 94.02 cfs @ | 12.90 hrs, Volume= | 20.045 af, Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link A: Amenia Stream

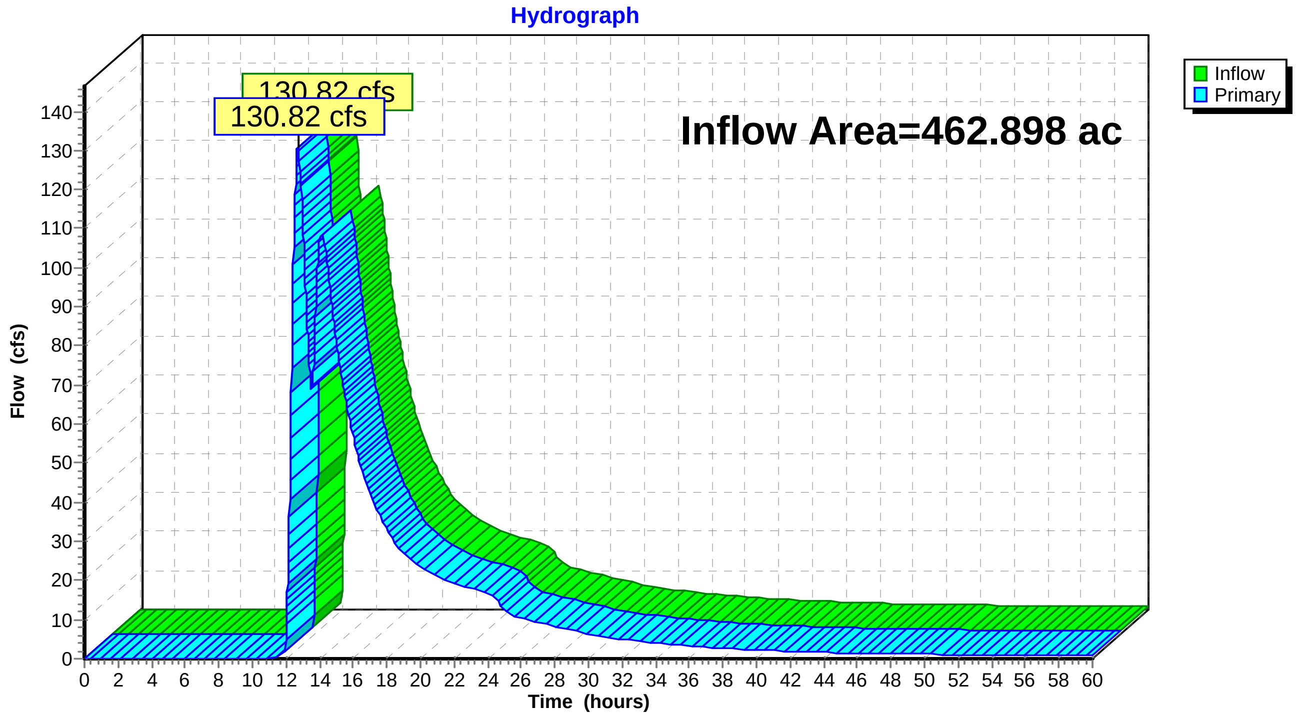


## Summary for Link B: Wetland

Inflow Area = 462.898 ac, 3.63% Impervious, Inflow Depth > 1.47" for 10-Year event
Inflow = 130.82 cfs @ 12.70 hrs, Volume= 56.515 af
Primary = 130.82 cfs @ 12.70 hrs, Volume= 56.515 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link B: Wetland

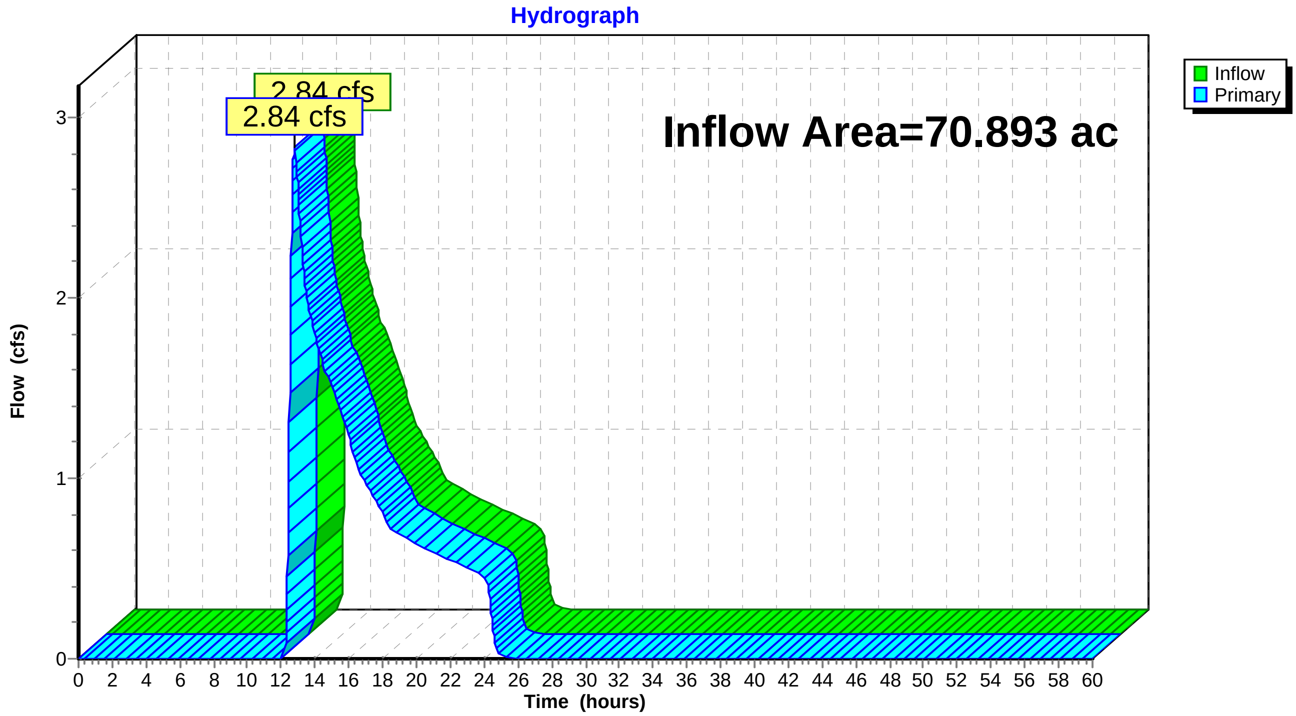


## Summary for Link C: Culvert

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 70.893 ac, | 4.53% Impervious, | Inflow Depth = 0.17" | for 10-Year event |
| Inflow = | 2.84 cfs @ | 12.79 hrs, Volume= | 1.013 af | |
| Primary = | 2.84 cfs @ | 12.79 hrs, Volume= | 1.013 af, Atten= 0%, Lag= 0.0 min | |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

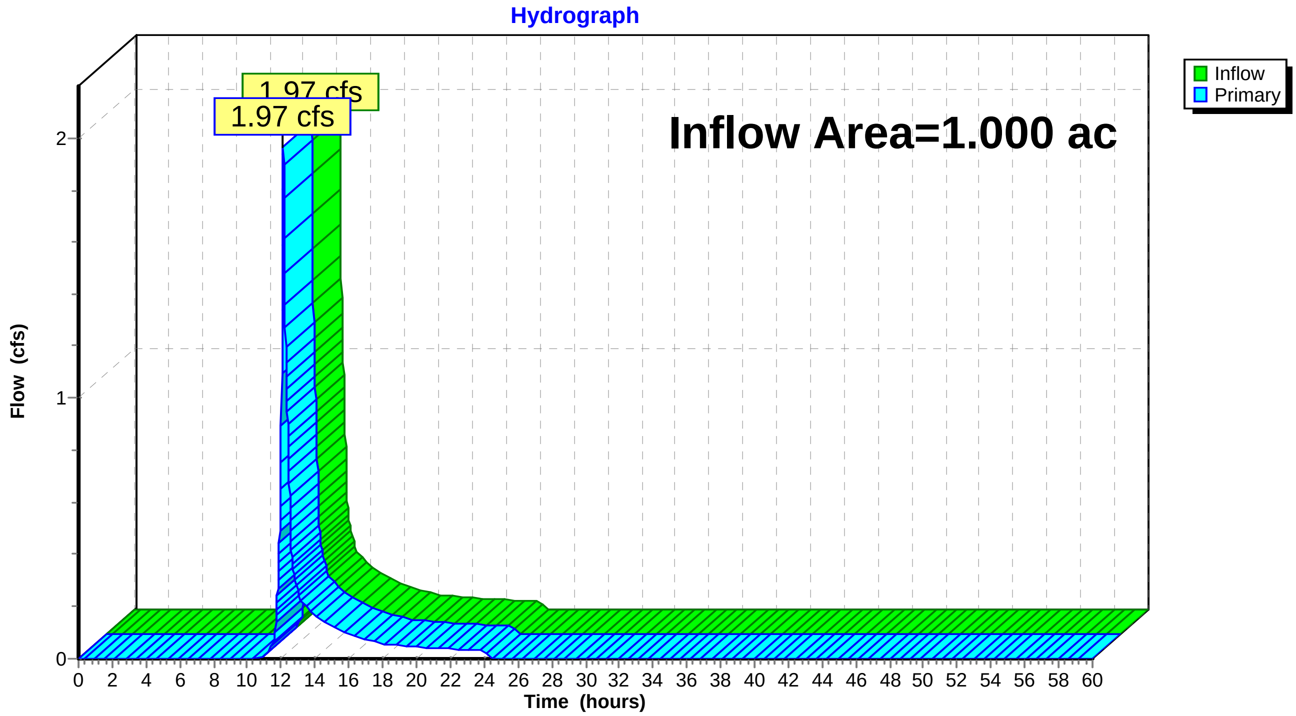


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 1.81" for 10-Year event
Inflow = 1.97 cfs @ 12.12 hrs, Volume= 0.150 af
Primary = 1.97 cfs @ 12.12 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=43.269 ac 4.21% Impervious Runoff Depth=0.43"
Flow Length=1,315' Tc=31.0 min CN=46 Runoff=3.65 cfs 1.558 af

**Subcatchment A102: A102** Runoff Area=9.187 ac 13.40% Impervious Runoff Depth=0.69"
Flow Length=675' Tc=29.1 min CN=50 Runoff=2.12 cfs 0.530 af

**Subcatchment A103: A103** Runoff Area=36.735 ac 8.79% Impervious Runoff Depth=0.84"
Flow Length=1,190' Tc=45.1 min CN=52 Runoff=9.78 cfs 2.564 af

**Subcatchment A104: A104** Runoff Area=9.432 ac 9.40% Impervious Runoff Depth=0.37"
Flow Length=1,015' Tc=29.2 min CN=45 Runoff=0.58 cfs 0.294 af

**Subcatchment A105: A105** Runoff Area=34.264 ac 3.27% Impervious Runoff Depth=1.50"
Flow Length=1,326' Tc=19.2 min CN=60 Runoff=34.18 cfs 4.283 af

**Subcatchment A106: A106** Runoff Area=15.338 ac 8.12% Impervious Runoff Depth=3.11"
Flow Length=1,260' Tc=26.7 min CN=76 Runoff=33.90 cfs 3.974 af

**Subcatchment A107: A107** Runoff Area=95.411 ac 2.35% Impervious Runoff Depth=2.78"
Flow Length=3,685' Tc=61.0 min CN=73 Runoff=121.41 cfs 22.139 af

**Subcatchment A108: A108** Runoff Area=5.526 ac 2.32% Impervious Runoff Depth=1.24"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=3.44 cfs 0.570 af

**Subcatchment B101: B101** Runoff Area=127.641 ac 0.75% Impervious Runoff Depth=1.78"
Flow Length=2,934' Tc=43.8 min CN=63 Runoff=112.41 cfs 18.895 af

**Subcatchment B102: B102** Runoff Area=6.499 ac 2.62% Impervious Runoff Depth=0.91"
Flow Length=637' Tc=19.6 min CN=53 Runoff=2.81 cfs 0.495 af

**Subcatchment B103: B103** Runoff Area=21.581 ac 11.93% Impervious Runoff Depth=2.68"
Flow Length=1,130' Tc=38.7 min CN=72 Runoff=33.93 cfs 4.817 af

**Subcatchment B104: B104** Runoff Area=80.536 ac 13.45% Impervious Runoff Depth=1.78"
Flow Length=3,223' Tc=33.2 min CN=63 Runoff=81.71 cfs 11.922 af

**Subcatchment B105: B105** Runoff Area=23.978 ac 2.94% Impervious Runoff Depth=2.37"
Flow Length=1,400' Tc=38.0 min CN=69 Runoff=32.95 cfs 4.729 af

**Subcatchment B106: B106** Runoff Area=130.289 ac 0.83% Impervious Runoff Depth=3.11"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=150.07 cfs 33.759 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=3.22"
Flow Length=907' Tc=37.9 min CN=77 Runoff=27.84 cfs 3.845 af

**Subcatchment B108: B108** Runoff Area=46.768 ac 1.07% Impervious Runoff Depth=3.11"
Flow Length=2,241' Tc=39.8 min CN=76 Runoff=85.40 cfs 12.118 af

**Subcatchment B109: B109** Runoff Area=11.276 ac 0.04% Impervious Runoff Depth=3.22"
Flow Length=1,048' Tc=28.5 min CN=77 Runoff=25.08 cfs 3.025 af

**Subcatchment C101: C101** Runoff Area=30.507 ac 4.58% Impervious Runoff Depth=0.91"
Flow Length=1,500' Tc=31.9 min CN=53 Runoff=11.17 cfs 2.323 af

**Subcatchment C102: C102** Runoff Area=40.386 ac 4.49% Impervious Runoff Depth=1.87"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=37.37 cfs 6.298 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=2.78"
Flow Length=176' Tc=7.5 min CN=73 Runoff=3.13 cfs 0.232 af

**Reach A105R: Thru A101** Avg. Flow Depth=1.61' Max Vel=7.02 fps Inflow=62.36 cfs 8.241 af
n=0.050 L=1,075.0' S=0.0577 '/' Capacity=152.54 cfs Outflow=60.33 cfs 8.240 af

**Reach A106R: Thru A105** Avg. Flow Depth=1.02' Max Vel=6.49 fps Inflow=33.90 cfs 3.974 af
n=0.050 L=1,215.0' S=0.0922 '/' Capacity=153.12 cfs Outflow=33.43 cfs 3.974 af

**Reach A108R: Thru A101** Avg. Flow Depth=2.16' Max Vel=10.12 fps Inflow=123.82 cfs 22.709 af
n=0.050 L=1,090.0' S=0.0862 '/' Capacity=244.78 cfs Outflow=123.61 cfs 22.709 af

**Reach B102R: Thru B101** Avg. Flow Depth=2.17' Max Vel=4.81 fps Inflow=178.17 cfs 53.499 af
n=0.050 L=122.0' S=0.0164 '/' Capacity=356.26 cfs Outflow=178.16 cfs 53.497 af

**Reach B103R: Thru B102** Avg. Flow Depth=2.81' Max Vel=5.64 fps Inflow=177.44 cfs 53.013 af
n=0.050 L=585.0' S=0.0171 '/' Capacity=374.39 cfs Outflow=177.30 cfs 53.004 af

**Reach B107R: Thru B108** Avg. Flow Depth=0.38' Max Vel=5.68 fps Inflow=17.88 cfs 3.569 af
n=0.050 L=2,040.0' S=0.2294 '/' Capacity=144.21 cfs Outflow=17.63 cfs 3.569 af

**Reach B108R: Thur 101** Avg. Flow Depth=1.45' Max Vel=5.58 fps Inflow=115.72 cfs 18.687 af
n=0.050 L=233.0' S=0.0318 '/' Capacity=474.00 cfs Outflow=115.70 cfs 18.687 af

**Reach B109R: Thru B108** Avg. Flow Depth=0.91' Max Vel=5.85 fps Inflow=25.09 cfs 3.025 af
n=0.050 L=355.0' S=0.0851 '/' Capacity=147.09 cfs Outflow=25.06 cfs 3.025 af

**Pond 102A: Wetland B** Peak Elev=498.71' Storage=23,088 cf Inflow=2.12 cfs 0.530 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 102B: 18" Culvert** Peak Elev=495.74' Storage=5,935 cf Inflow=178.17 cfs 53.499 af
Primary=10.05 cfs 19.285 af Secondary=169.77 cfs 34.214 af Outflow=178.17 cfs 53.499 af

**Pond 102C: Pond 102C** Peak Elev=508.83' Storage=274,359 cf Inflow=37.37 cfs 6.298 af
Outflow=0.00 cfs 0.000 af

**Pond 103A: Wetland A** Peak Elev=500.30' Storage=111,693 cf Inflow=9.78 cfs 2.564 af
24.0" Round Culvert n=0.013 L=80.0' S=-0.0125 '/' Outflow=0.00 cfs 0.000 af

**Pond 103B: Irrigation Pond** Peak Elev=506.56' Storage=68,385 cf Inflow=83.96 cfs 35.871 af
Primary=10.83 cfs 10.112 af Secondary=70.76 cfs 25.512 af Outflow=81.59 cfs 35.624 af

**Pond 104A: Wetland D** Peak Elev=507.97' Storage=5,919 cf Inflow=0.58 cfs 0.294 af
Primary=0.23 cfs 0.274 af Secondary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.274 af

**Pond 104B: Island Pond** Peak Elev=510.59' Storage=584,402 cf Inflow=203.30 cfs 50.409 af
Primary=13.96 cfs 20.508 af Secondary=60.35 cfs 10.546 af Tertiary=96.71 cfs 17.389 af Outflow=171.02 cfs 48.443 af

**Pond 105A: Wetland H** Peak Elev=575.24' Storage=64,897 cf Inflow=66.12 cfs 8.257 af
Primary=10.74 cfs 6.186 af Secondary=51.62 cfs 2.055 af Outflow=62.36 cfs 8.241 af

**Pond 105B: Wetland J** Peak Elev=516.43' Storage=49,390 cf Inflow=164.35 cfs 38.488 af
Outflow=164.33 cfs 38.487 af

**Pond 106A: 36" Culvert** Peak Elev=719.20' Storage=60 cf Inflow=33.90 cfs 3.974 af
Primary=33.90 cfs 3.974 af Secondary=0.00 cfs 0.000 af Outflow=33.90 cfs 3.974 af

**Pond 106B: Wetland J** Peak Elev=527.00' Storage=22,824 cf Inflow=150.07 cfs 33.759 af
Outflow=150.04 cfs 33.759 af

**Pond 107A: 24" Culvert** Peak Elev=626.00' Storage=3,096 cf Inflow=121.41 cfs 22.139 af
Primary=43.11 cfs 16.460 af Secondary=78.24 cfs 5.679 af Outflow=121.35 cfs 22.139 af

**Pond 107B: Wetland** Peak Elev=972.90' Storage=49,049 cf Inflow=27.84 cfs 3.845 af
Outflow=17.88 cfs 3.569 af

**Pond 108A: 36" Culvert** Peak Elev=613.19' Storage=120 cf Inflow=80.76 cfs 6.249 af
Primary=57.90 cfs 5.492 af Secondary=22.82 cfs 0.757 af Outflow=80.72 cfs 6.249 af

**Pond 108B: Wetland N** Peak Elev=501.49' Storage=15,155 cf Inflow=115.78 cfs 18.712 af
Primary=4.39 cfs 4.011 af Secondary=111.65 cfs 14.676 af Outflow=115.72 cfs 18.687 af

**Pond 109B: 36" Culvert** Peak Elev=547.59' Storage=118 cf Inflow=25.08 cfs 3.025 af
Outflow=25.09 cfs 3.025 af

**Link A: Amenia Stream** Inflow=164.66 cfs 32.781 af
Primary=164.66 cfs 32.781 af

**Link B: Wetland** Inflow=263.57 cfs 91.079 af
Primary=263.57 cfs 91.079 af

**Link C: Culvert** Inflow=11.17 cfs 2.323 af
Primary=11.17 cfs 2.323 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=3.13 cfs 0.232 af
Primary=3.13 cfs 0.232 af

**Total Runoff Area = 783.953 ac Runoff Volume = 138.370 af Average Runoff Depth = 2.12"**
**95.93% Pervious = 752.017 ac 4.07% Impervious = 31.936 ac**

## Summary for Subcatchment A101: A101

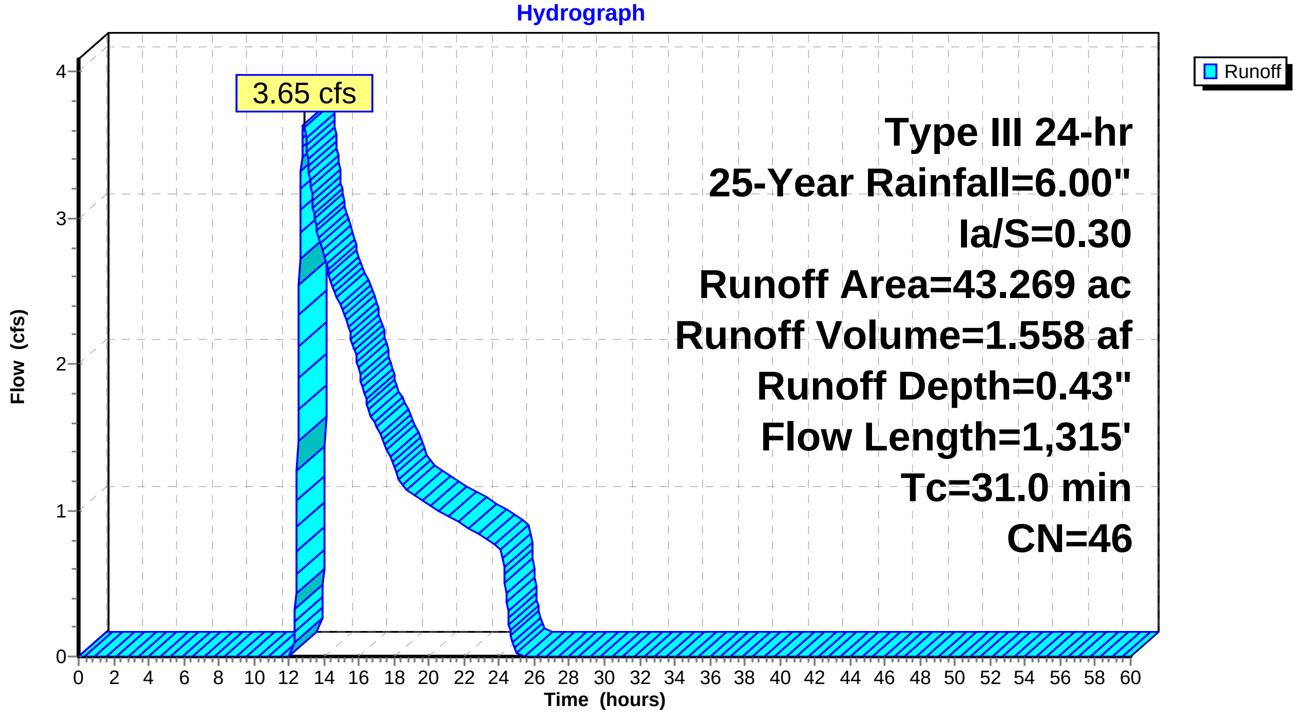
Runoff = 3.65 cfs @ 12.84 hrs, Volume= 1.558 af, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.819 | 98 | Paved surface |
| * | 0.089 | 96 | Gravel surface |
| * | 0.001 | 98 | Water Surface |
| | 31.250 | 39 | >75% Grass cover, Good, HSG A |
| | 6.738 | 61 | >75% Grass cover, Good, HSG B |
| | 1.730 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 1.164 | 30 | Woods, Good, HSG A |
| | 0.152 | 55 | Woods, Good, HSG B |
| | 0.088 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.223 | 30 | Sand trap, HSG A |
| * | 0.015 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 43.269 | 46 | Weighted Average |
| | 41.449 | | 95.79% Pervious Area |
| | 1.820 | | 4.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.9 | 100 | 0.0400 | 0.11 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.0 | 430 | 0.1200 | 2.42 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 3.5 | 360 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 8.6 | 425 | 0.0140 | 0.83 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 31.0 | 1,315 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

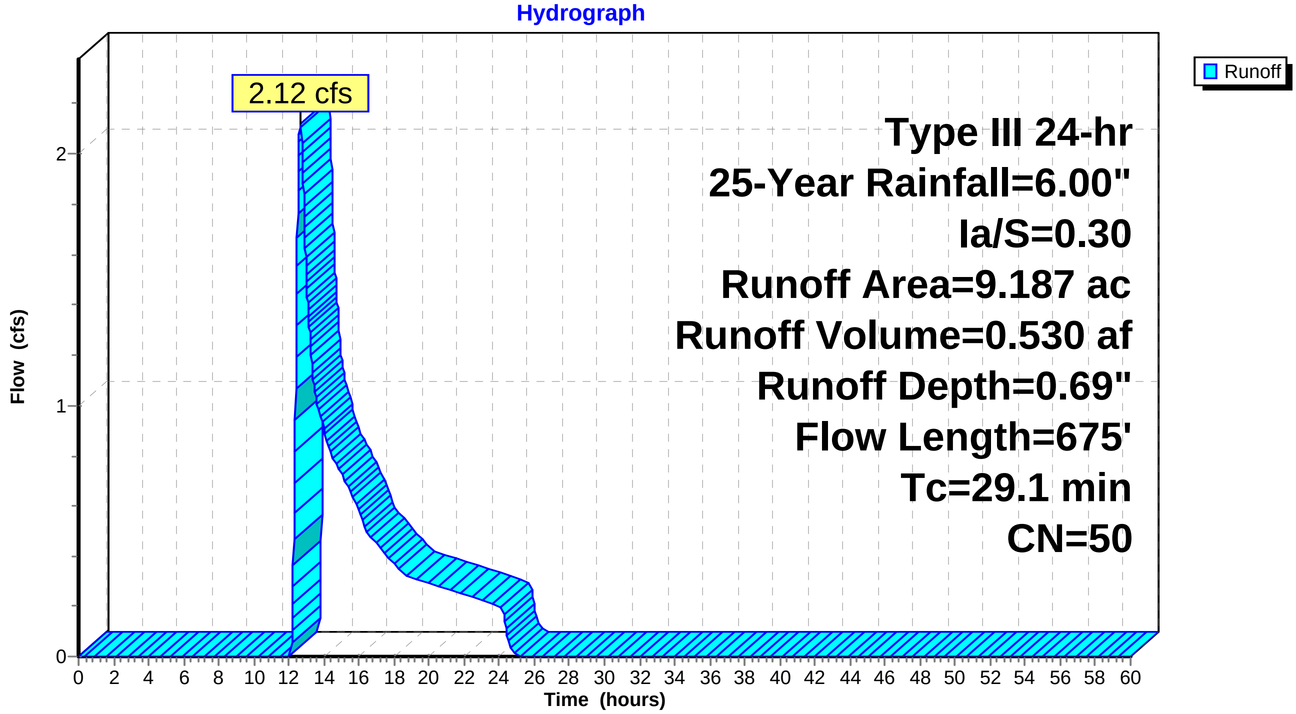
Runoff = 2.12 cfs @ 12.65 hrs, Volume= 0.530 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.387 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.844 | 98 | Water Surface |
| | 3.520 | 39 | >75% Grass cover, Good, HSG A |
| | 2.156 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.260 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.004 | 30 | Sand trap, HSG A |
| * | 0.016 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.187 | 50 | Weighted Average |
| | 7.956 | | 86.60% Pervious Area |
| | 1.231 | | 13.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 23.0 | 100 | 0.0600 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.1 | 575 | 0.0500 | 1.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.1 | 675 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

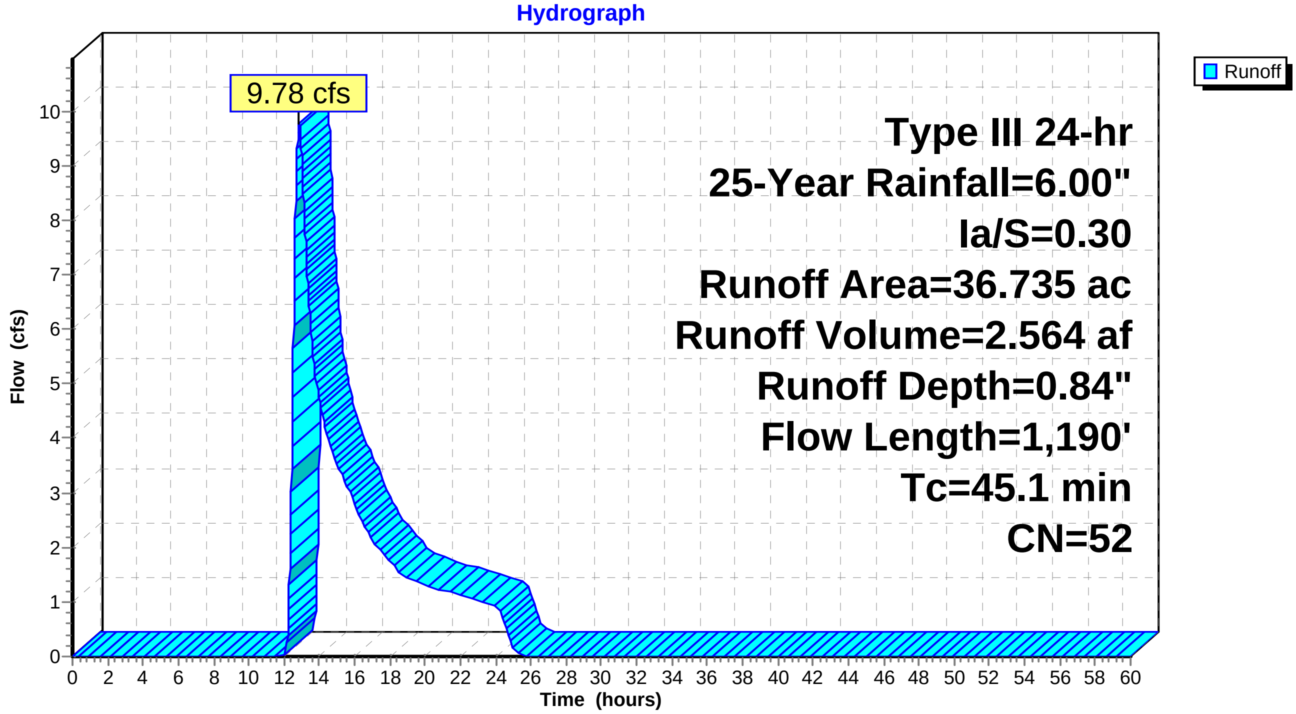
Runoff = 9.78 cfs @ 12.86 hrs, Volume= 2.564 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.334 | 98 | Building roof |
| * | 2.378 | 98 | Paved surface |
| * | 0.402 | 96 | Gravel surface |
| * | 0.516 | 98 | Water Surface |
| | 14.616 | 39 | >75% Grass cover, Good, HSG A |
| | 3.182 | 61 | >75% Grass cover, Good, HSG B |
| | 4.088 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 6.882 | 30 | Woods, Good, HSG A |
| | 1.635 | 55 | Woods, Good, HSG B |
| | 1.432 | 70 | Woods, Good, HSG C |
| | 1.137 | 77 | Woods, Good, HSG D |
| * | 0.095 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.009 | 30 | Sand Trap, HSG C |
| | 36.735 | 52 | Weighted Average |
| | 33.507 | | 91.21% Pervious Area |
| | 3.228 | | 8.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 35.7 | 100 | 0.0200 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.9 | 227 | 0.0190 | 0.96 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 75 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 343 | 0.0400 | 4.54 | 18.14 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' n= 0.050 |
| 3.7 | 445 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 45.1 | 1,190 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

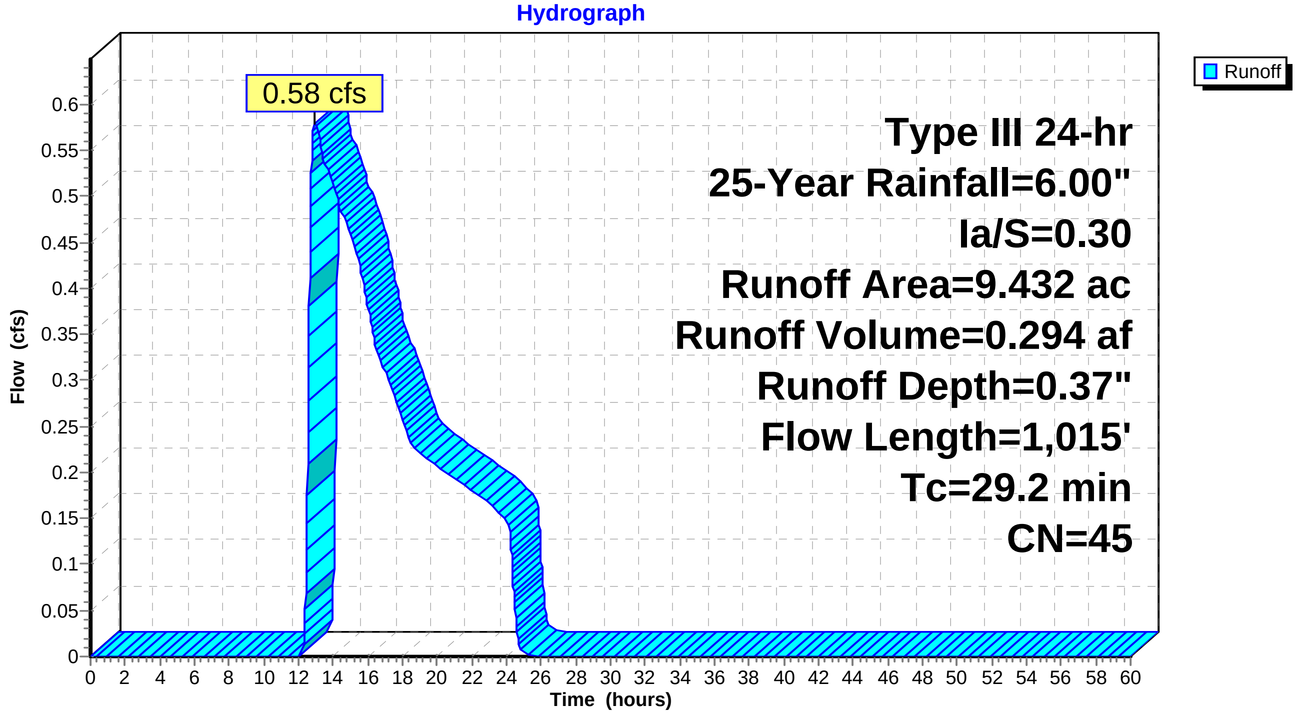
Runoff = 0.58 cfs @ 12.95 hrs, Volume= 0.294 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.458 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.429 | 98 | Water Surface |
| | 8.361 | 39 | >75% Grass cover, Good, HSG A |
| | 0.043 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.071 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.053 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.432 | 45 | Weighted Average |
| | 8.545 | | 90.60% Pervious Area |
| | 0.887 | | 9.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.9 | 100 | 0.0200 | 0.08 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.4 | 375 | 0.0700 | 1.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.5 | 255 | 0.1600 | 2.80 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.4 | 285 | 0.0400 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.2 | 1,015 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

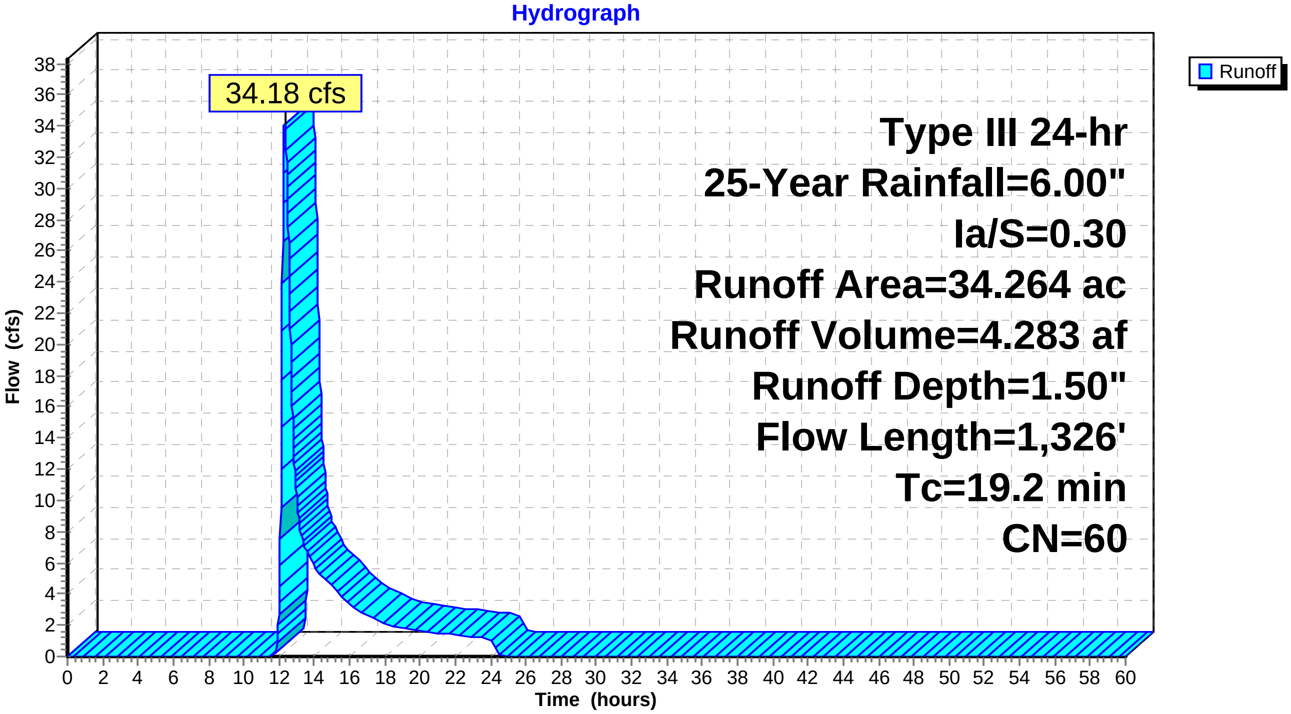
Runoff = 34.18 cfs @ 12.32 hrs, Volume= 4.283 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.119 | 98 | Paved surface |
| * | 0.088 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.167 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 15.618 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.226 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.911 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.135 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 34.264 | 60 | Weighted Average |
| | 33.145 | | 96.73% Pervious Area |
| | 1.119 | | 3.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 23 | 0.1700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.8 | 77 | 0.3000 | 0.13 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 150 | 0.3700 | 1.52 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.3 | 526 | 0.0950 | 6.52 | 32.61 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.8 | 550 | 0.0600 | 4.98 | 16.59 | **Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.035 High grass |
| 19.2 | 1,326 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

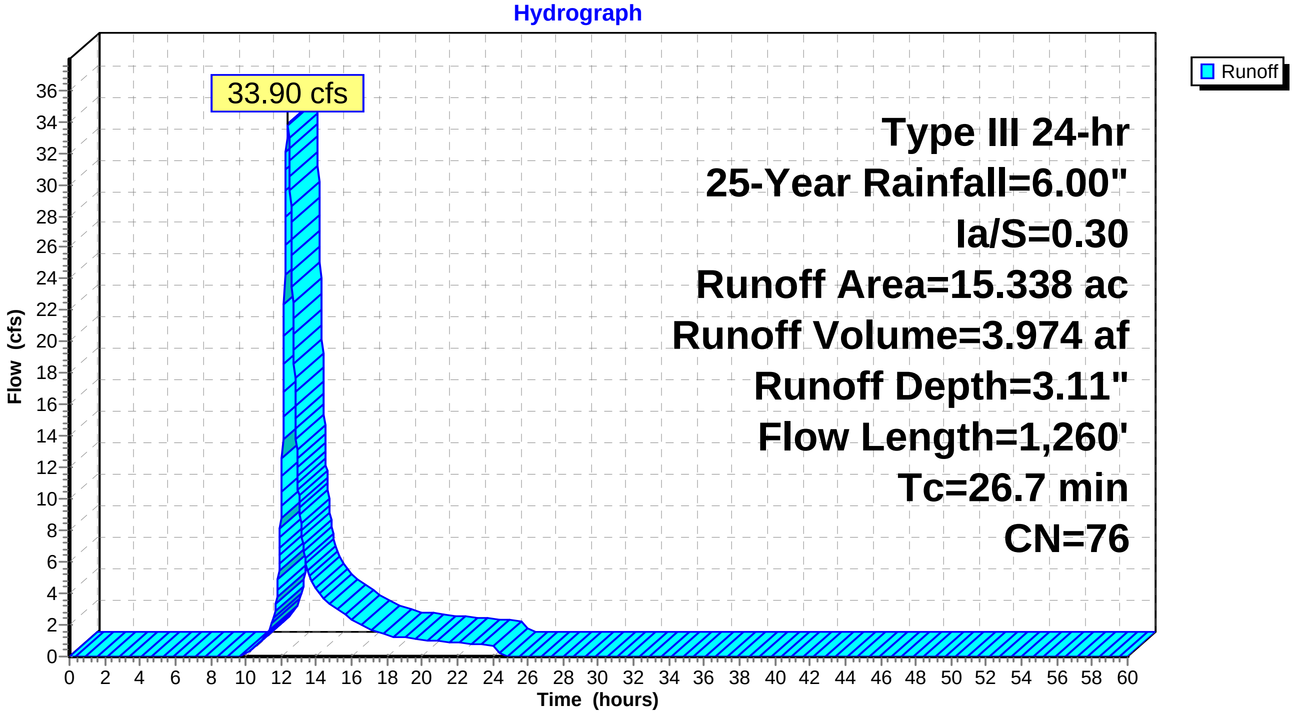
Runoff = 33.90 cfs @ 12.38 hrs, Volume= 3.974 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.013 | 98 | Building roof |
| * | 1.232 | 98 | Paved surface |
| * | 0.200 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.050 | 61 | >75% Grass cover, Good, HSG B |
| | 9.227 | 74 | >75% Grass cover, Good, HSG C |
| | 2.194 | 80 | >75% Grass cover, Good, HSG D |
| | 0.097 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.706 | 70 | Woods, Good, HSG C |
| | 0.619 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.338 | 76 | Weighted Average |
| | 14.093 | | 91.88% Pervious Area |
| | 1.245 | | 8.12% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

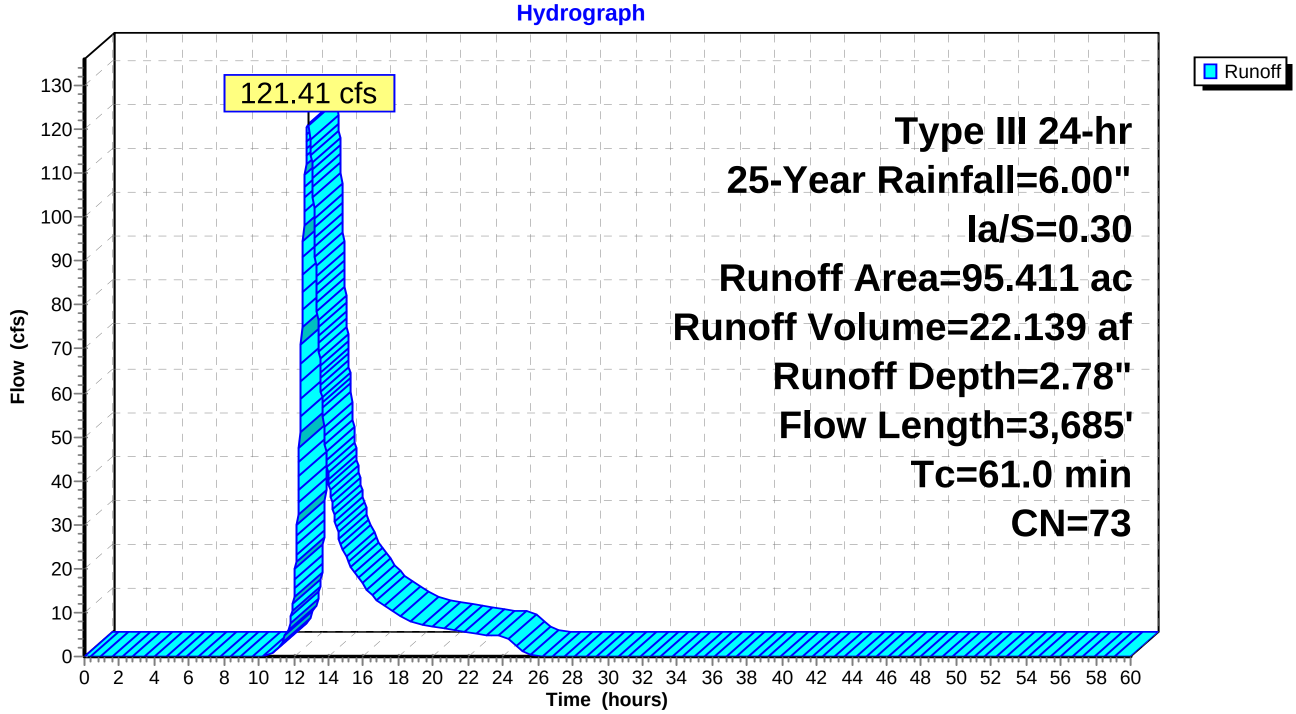
Runoff = 121.41 cfs @ 12.83 hrs, Volume= 22.139 af, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.392 | 98 | Building roof |
| * | 1.725 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.129 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 13.413 | 61 | >75% Grass cover, Good, HSG B |
| | 9.311 | 74 | >75% Grass cover, Good, HSG C |
| | 4.029 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 8.871 | 55 | Woods, Good, HSG B |
| | 4.853 | 70 | Woods, Good, HSG C |
| | 52.617 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 95.411 | 73 | Weighted Average |
| | 93.165 | | 97.65% Pervious Area |
| | 2.246 | | 2.35% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

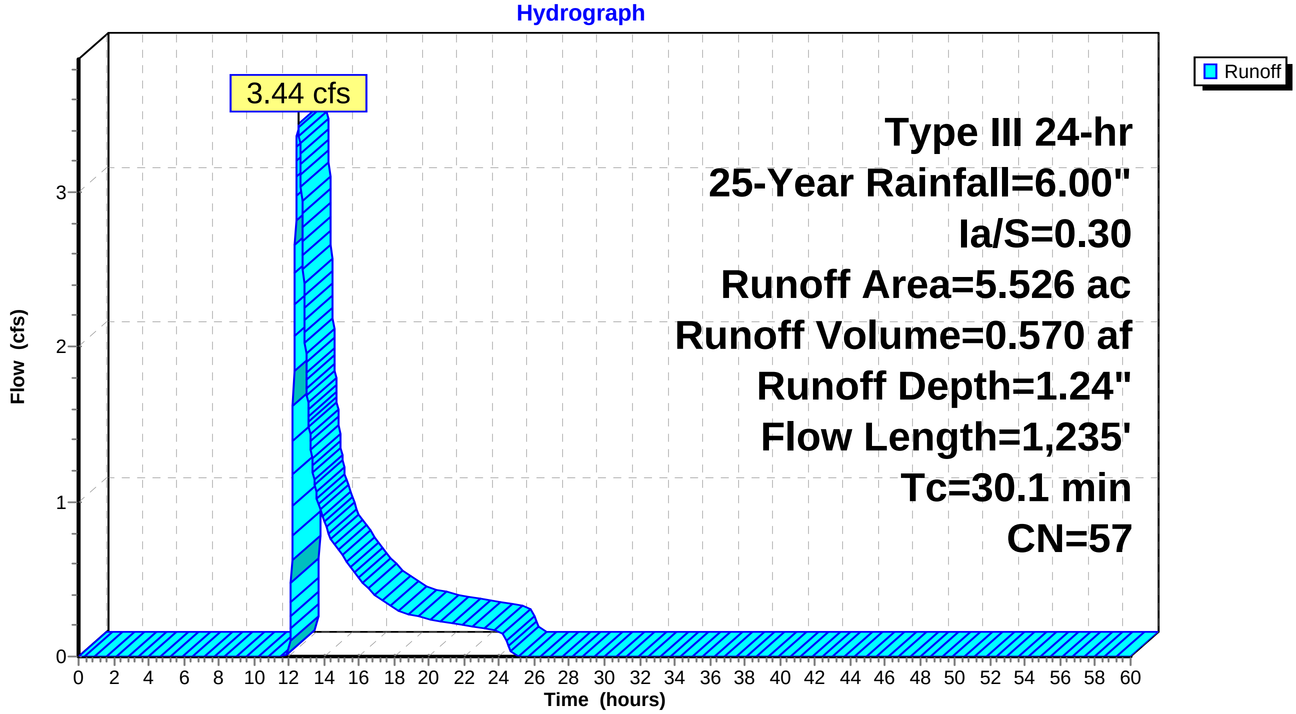
Runoff = 3.44 cfs @ 12.54 hrs, Volume= 0.570 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.088 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.629 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.526 | 57 | Weighted Average |
| | 5.398 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment B101: B101

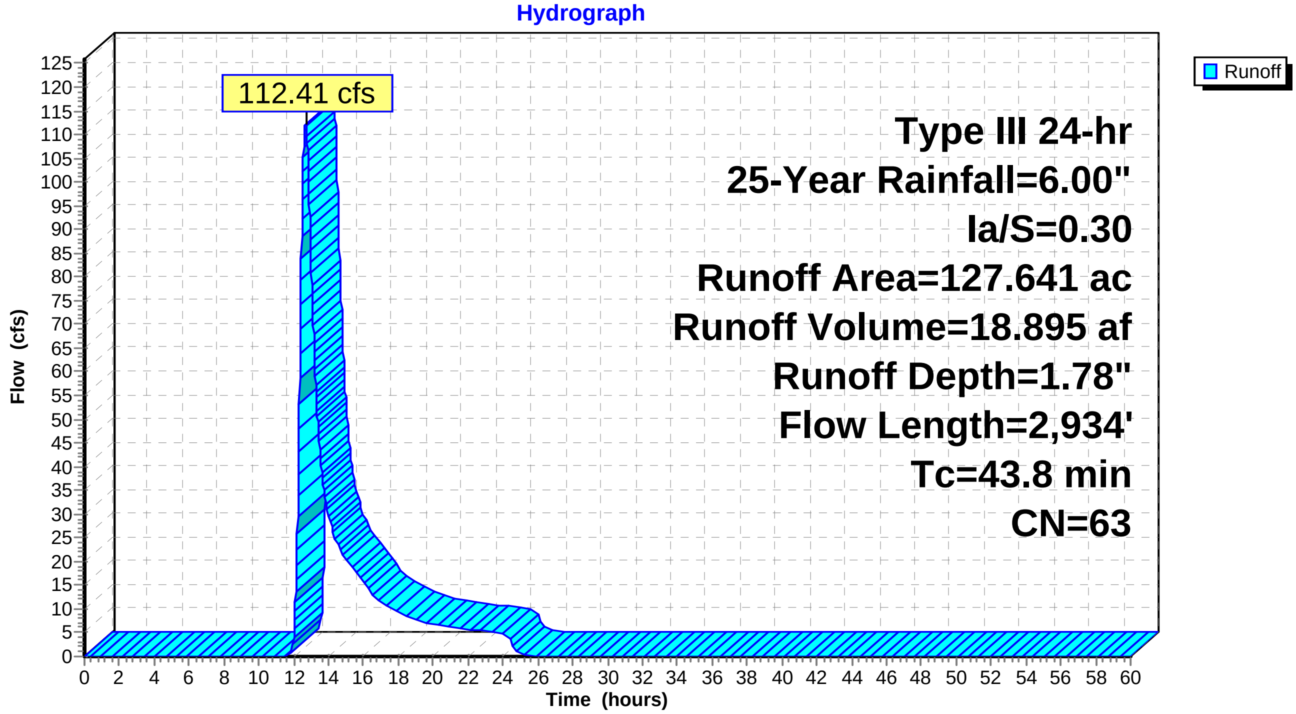
Runoff = 112.41 cfs @ 12.69 hrs, Volume= 18.895 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.005 | 98 | Building roof |
| * | 0.948 | 98 | Paved surface |
| * | 2.079 | 96 | Gravel surface |
| * | 0.002 | 98 | Water Surface |
| | 29.023 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 22.752 | 74 | >75% Grass cover, Good, HSG C |
| | 0.768 | 80 | >75% Grass cover, Good, HSG D |
| | 9.025 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 35.889 | 70 | Woods, Good, HSG C |
| | 27.094 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.056 | 30 | Sand Trap, HSG C |
| | 127.641 | 63 | Weighted Average |
| | 126.686 | | 99.25% Pervious Area |
| | 0.955 | | 0.75% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 506 | 0.1600 | 12.61 | 201.73 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.7 | 112 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.5 | 355 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 184 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 642 | 0.0500 | 9.49 | 63.28 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.035 High grass |
| 43.8 | 2,934 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

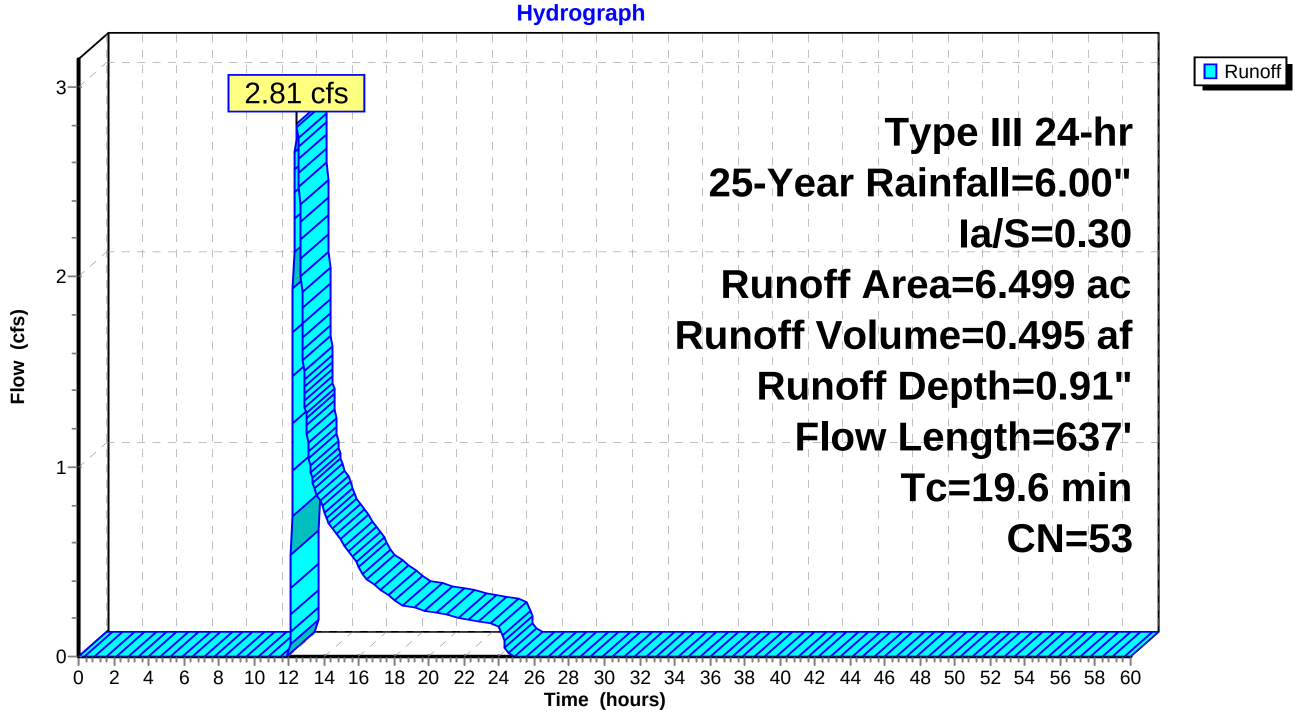
Runoff = 2.81 cfs @ 12.45 hrs, Volume= 0.495 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.170 | 98 | Paved surface |
| * | 0.290 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 3.039 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.097 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.839 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.064 | 30 | Sand Trap, HSG C |
| | 6.499 | 53 | Weighted Average |
| | 6.329 | | 97.38% Pervious Area |
| | 0.170 | | 2.62% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.6 | 637 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

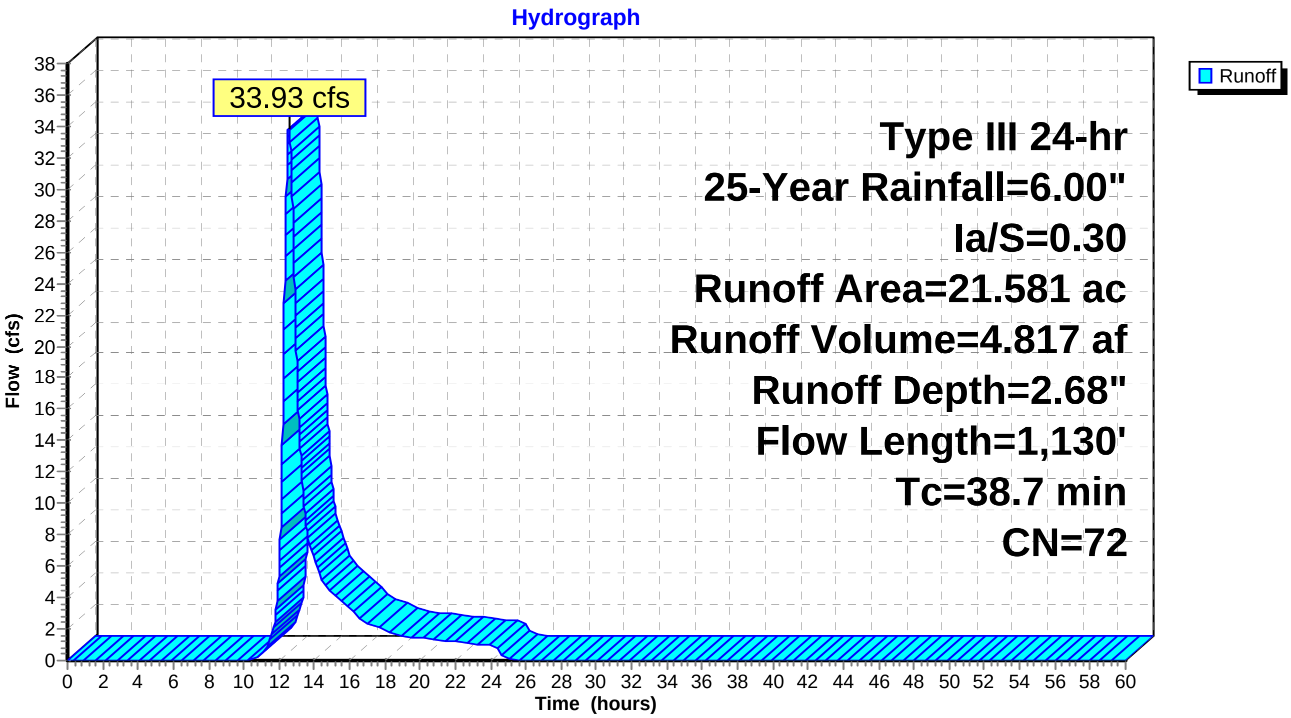
Runoff = 33.93 cfs @ 12.56 hrs, Volume= 4.817 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.550 | 98 | Paved surface |
| * | 0.039 | 96 | Gravel surface |
| * | 2.025 | 98 | Water Surface |
| | 3.869 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 6.689 | 74 | >75% Grass cover, Good, HSG C |
| | 0.522 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.459 | 70 | Woods, Good, HSG C |
| | 7.399 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.029 | 30 | Sand Trap, HSG C |
| | 21.581 | 72 | Weighted Average |
| | 19.006 | | 88.07% Pervious Area |
| | 2.575 | | 11.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.3 | 700 | 0.5500 | 1.85 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.6 | 280 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 50 | 0.7600 | 2.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 38.7 | 1,130 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

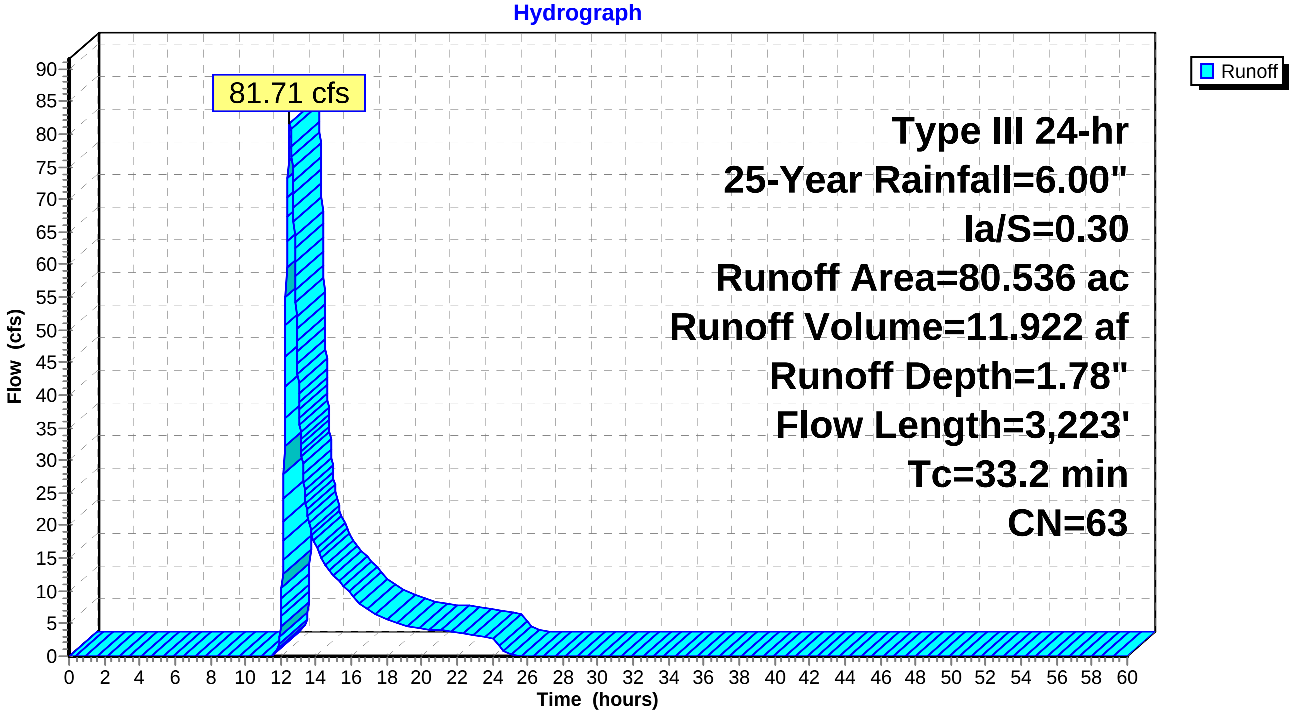
Runoff = 81.71 cfs @ 12.53 hrs, Volume= 11.922 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.411 | 98 | Building roof |
| * | 5.140 | 98 | Paved surface |
| * | 1.201 | 96 | Gravel surface |
| * | 5.280 | 98 | Water Surface |
| | 29.268 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 32.742 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.144 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.770 | 70 | Woods, Good, HSG C |
| | 1.252 | 77 | Woods, Good, HSG D |
| * | 0.185 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.143 | 30 | Sand Trap, HSG C |
| | 80.536 | 63 | Weighted Average |
| | 69.705 | | 86.55% Pervious Area |
| | 10.831 | | 13.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.9 | 100 | 0.1300 | 0.17 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 7.3 | 1,150 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.6 | 130 | 0.0300 | 3.52 | | **Shallow Concentrated Flow,**<br>Paved Kv= 20.3 fps |
| 15.4 | 1,843 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 33.2 | 3,223 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

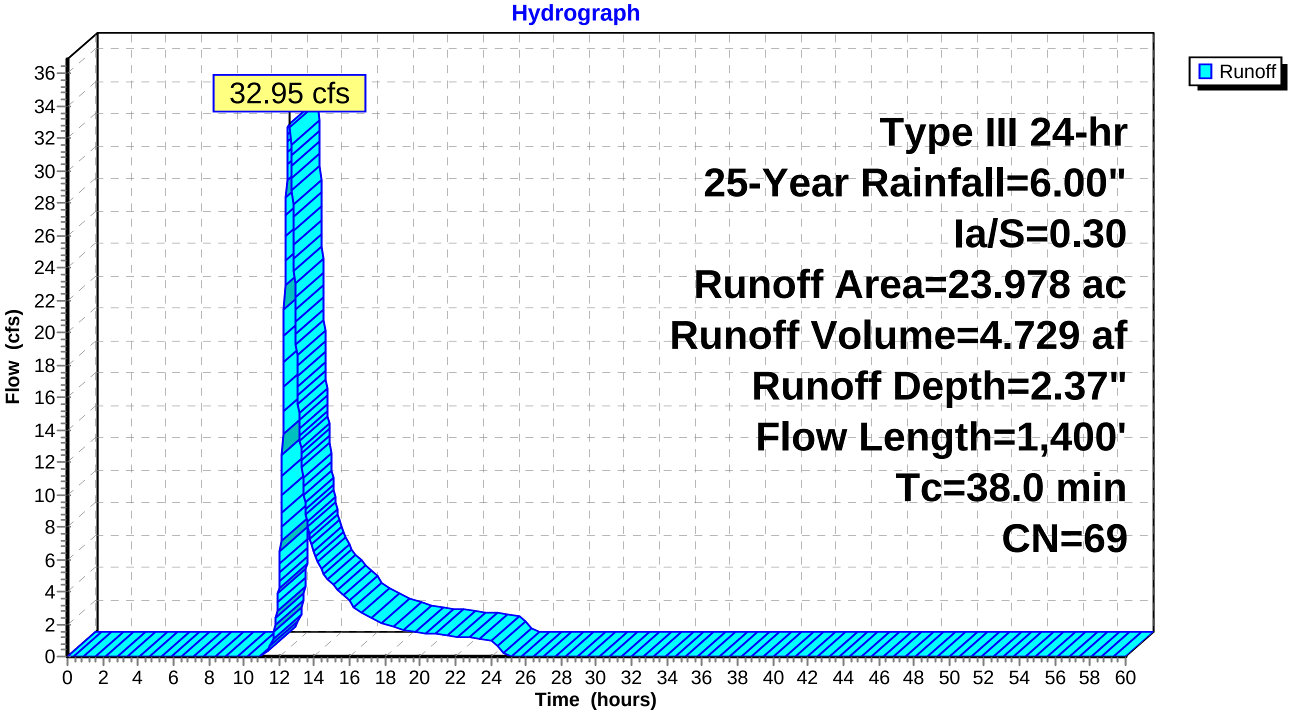
Runoff = 32.95 cfs @ 12.56 hrs, Volume= 4.729 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.248 | 98 | Paved surface |
| * | 0.181 | 96 | Gravel surface |
| * | 0.458 | 98 | Water Surface |
| | 5.222 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 4.132 | 74 | >75% Grass cover, Good, HSG C |
| | 0.513 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.204 | 70 | Woods, Good, HSG C |
| | 11.982 | 77 | Woods, Good, HSG D |
| * | 0.038 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 23.978 | 69 | Weighted Average |
| | 23.272 | | 97.06% Pervious Area |
| | 0.706 | | 2.94% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.5 | 698 | 0.5200 | 1.80 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 335 | 0.1900 | 3.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 267 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 38.0 | 1,400 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

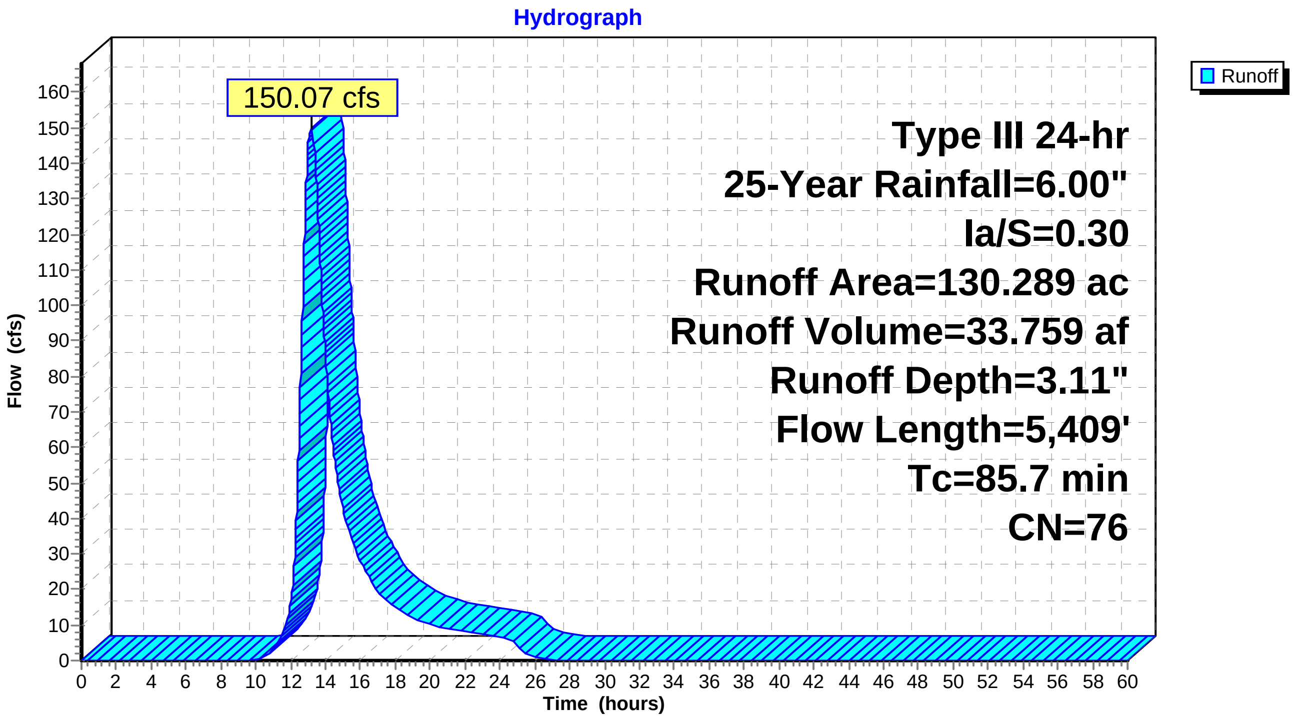
Runoff = 150.07 cfs @ 13.16 hrs, Volume= 33.759 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.025 | 98 | Building roof |
| * | 0.905 | 98 | Paved surface |
| * | 0.933 | 96 | Gravel surface |
| * | 0.153 | 98 | Water Surface |
| | 0.907 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 13.921 | 74 | >75% Grass cover, Good, HSG C |
| | 2.396 | 80 | >75% Grass cover, Good, HSG D |
| | 0.745 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 11.966 | 70 | Woods, Good, HSG C |
| | 97.720 | 77 | Woods, Good, HSG D |
| * | 0.024 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 130.289 | 76 | Weighted Average |
| | 129.206 | | 99.17% Pervious Area |
| | 1.083 | | 0.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

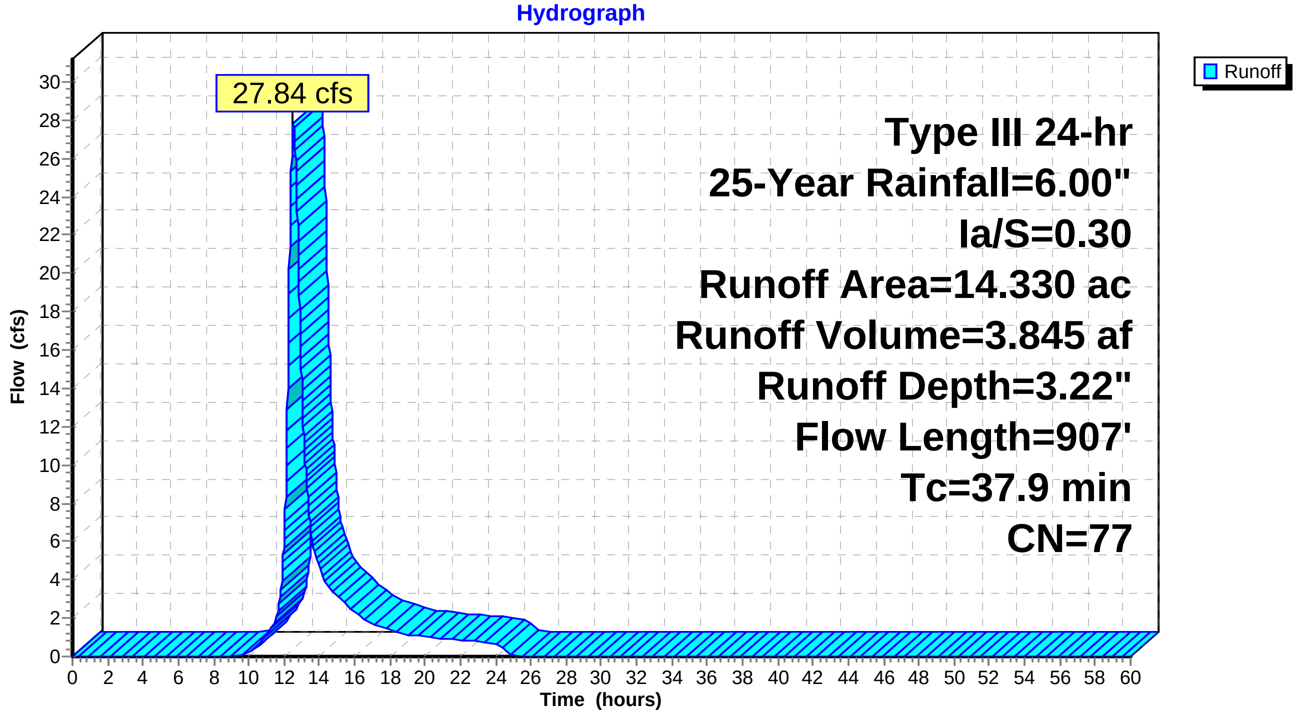
Runoff = 27.84 cfs @ 12.53 hrs, Volume= 3.845 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

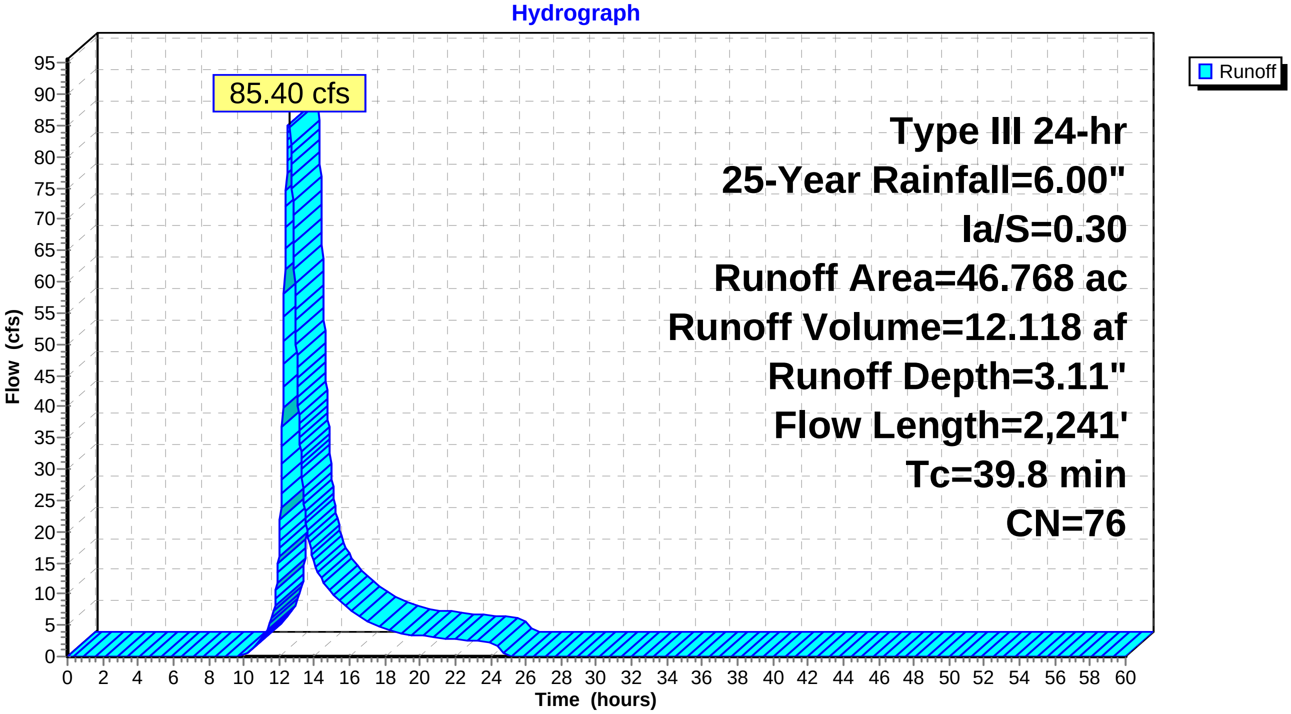
Runoff = 85.40 cfs @ 12.56 hrs, Volume= 12.118 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.499 | 98 | Paved surface |
| * | 0.098 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.546 | 74 | >75% Grass cover, Good, HSG C |
| | 0.657 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.391 | 70 | Woods, Good, HSG C |
| | 32.437 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.140 | 30 | Sand Trap, HSG C |
| | 46.768 | 76 | Weighted Average |
| | 46.269 | | 98.93% Pervious Area |
| | 0.499 | | 1.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.9 | 1,071 | 0.4300 | 1.64 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 3.2 | 490 | 0.1300 | 2.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 190 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 39.8 | 2,241 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

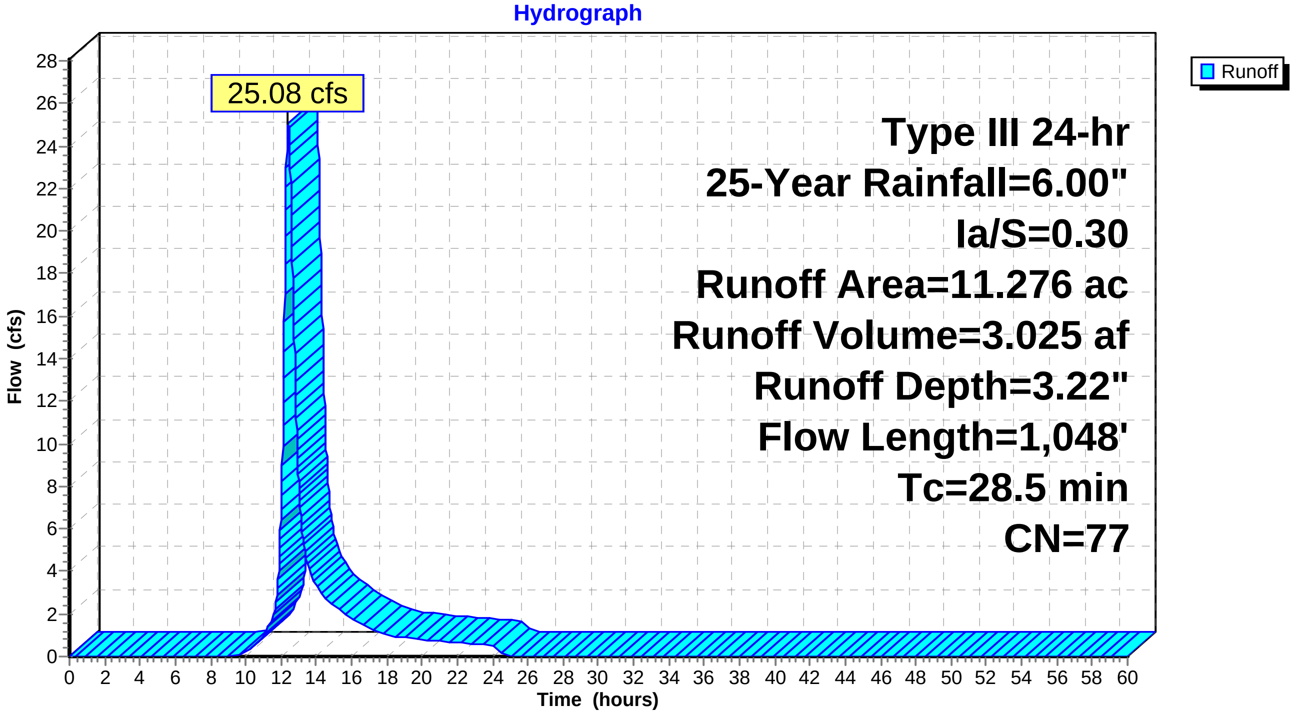
Runoff = 25.08 cfs @ 12.40 hrs, Volume= 3.025 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.004 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.045 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.299 | 70 | Woods, Good, HSG C |
| | 10.928 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 11.276 | 77 | Weighted Average |
| | 11.272 | | 99.96% Pervious Area |
| | 0.004 | | 0.04% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4500 | 1.68 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.3 | 288 | 0.2010 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 28.5 | 1,048 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment C101: C101

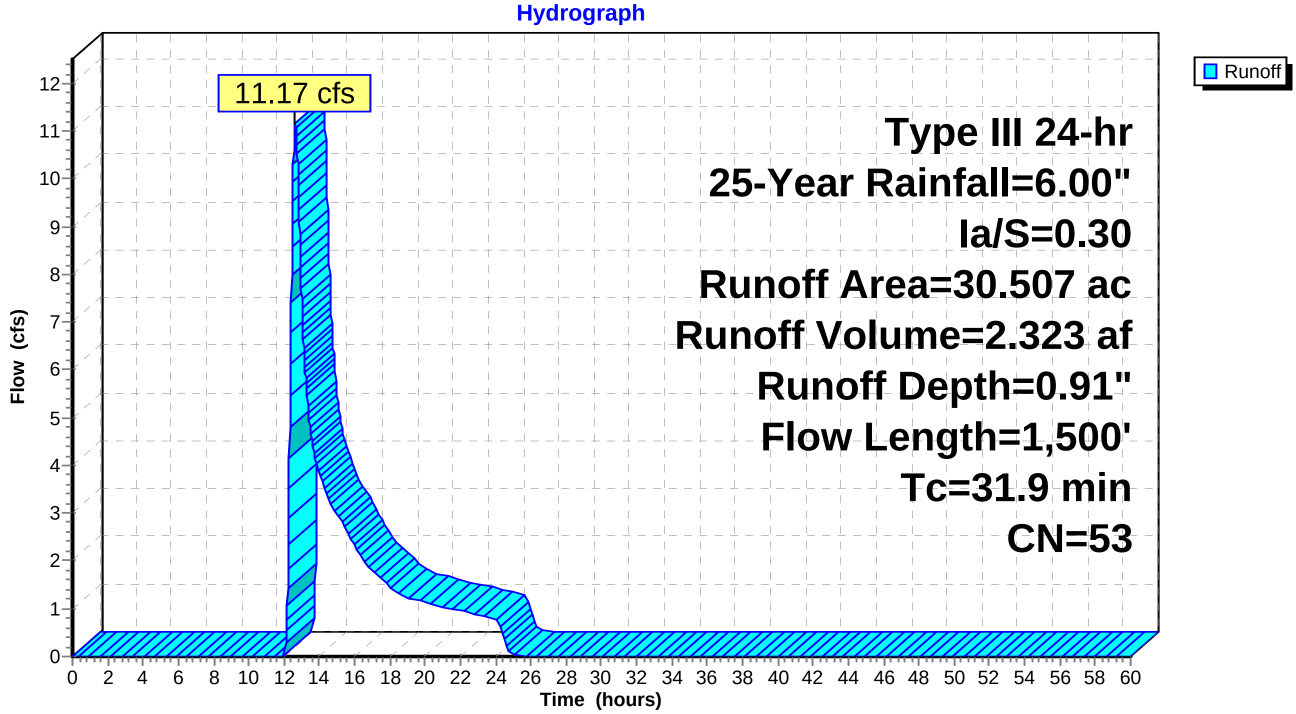
Runoff = 11.17 cfs @ 12.63 hrs, Volume= 2.323 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.350 | 98 | Paved surface |
| * | 0.425 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.046 | 98 | Rock Outcrop/Ledge |
| | 15.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.955 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.210 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 6.521 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 30.507 | 53 | Weighted Average |
| | 29.111 | | 95.42% Pervious Area |
| | 1.396 | | 4.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00'<br>n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00'<br>n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

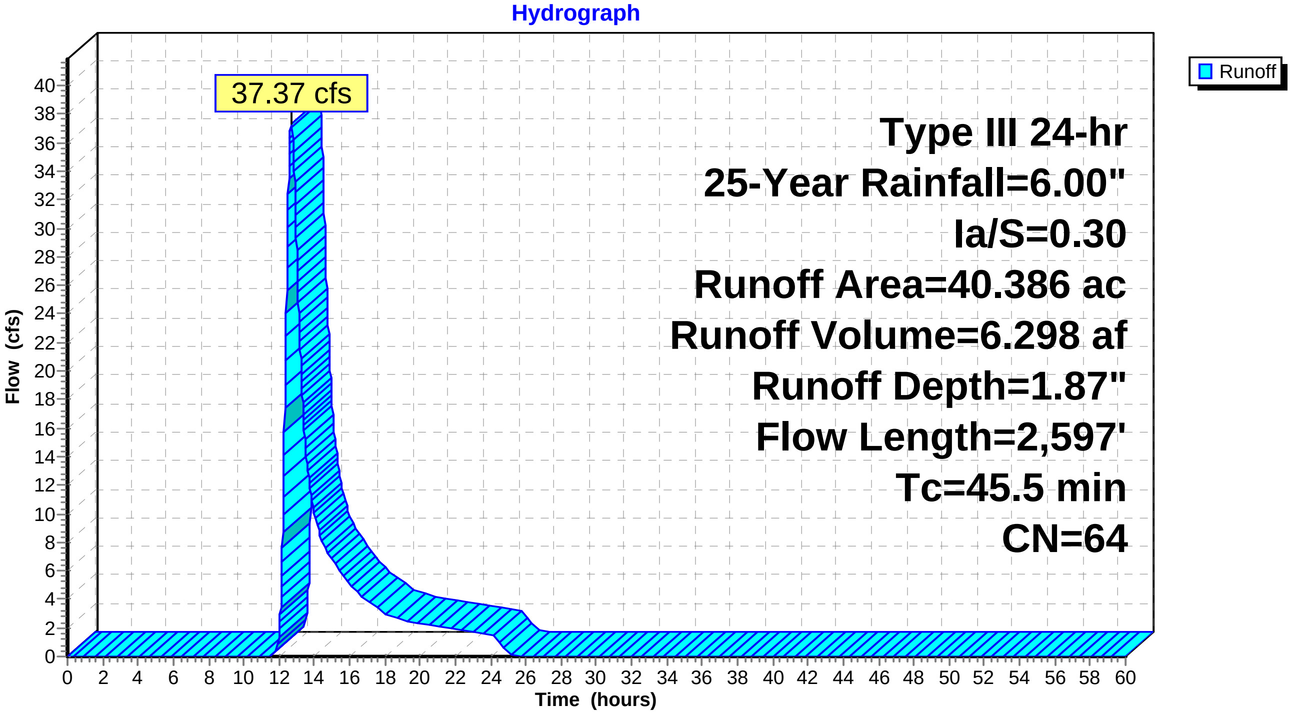
Runoff = 37.37 cfs @ 12.70 hrs, Volume= 6.298 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.618 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.981 | 98 | Rock Outcrop/Ledge |
| | 13.186 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.123 | 74 | >75% Grass cover, Good, HSG C |
| | 0.529 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.578 | 70 | Woods, Good, HSG C |
| | 15.415 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.386 | 64 | Weighted Average |
| | 38.573 | | 95.51% Pervious Area |
| | 1.813 | | 4.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

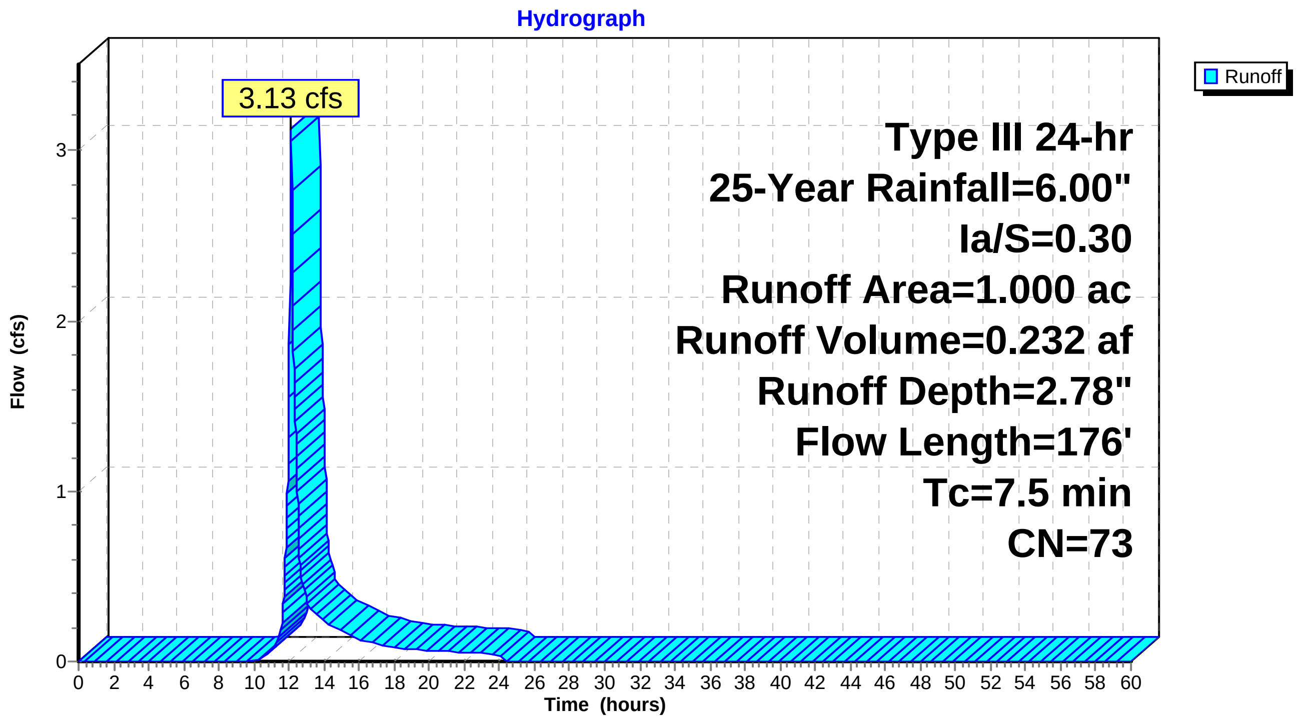
Runoff = 3.13 cfs @ 12.11 hrs, Volume= 0.232 af, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.850 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.000 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 73 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1570 | 6.38 | | **Shallow Concentrated Flow, C to D**<br>Unpaved Kv= 16.1 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



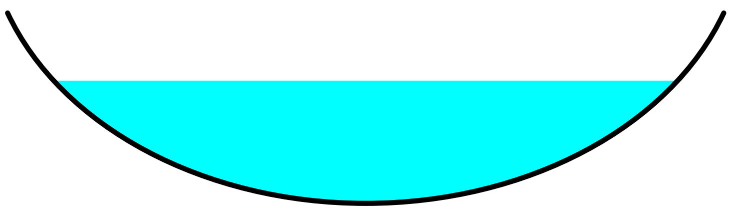
## Summary for Reach A105R: Thru A101

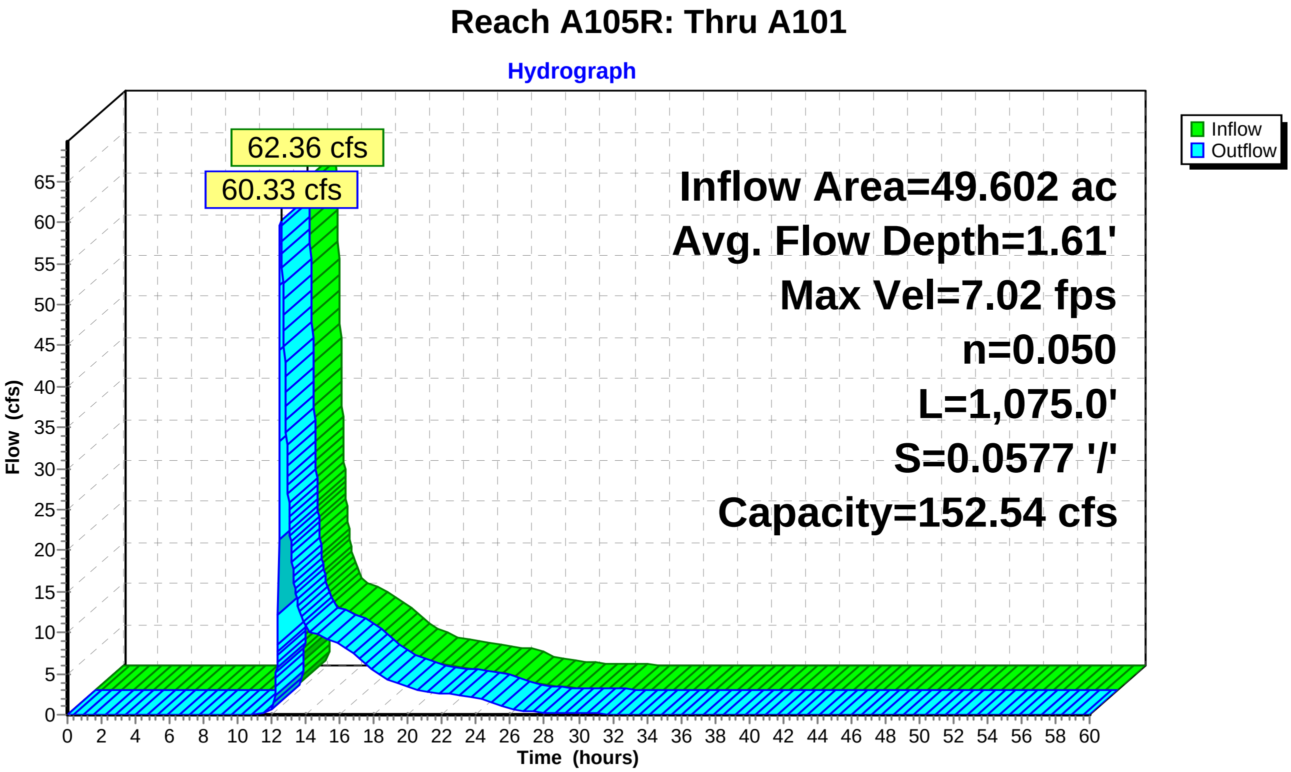
Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 1.99" for 25-Year event
Inflow = 62.36 cfs @ 12.47 hrs, Volume= 8.241 af
Outflow = 60.33 cfs @ 12.52 hrs, Volume= 8.240 af, Atten= 3%, Lag= 3.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 7.02 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 12.0 min

Peak Storage= 9,238 cf @ 12.52 hrs
Average Depth at Peak Storage= 1.61'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 152.54 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,075.0' Slope= 0.0577 '/'
Inlet Invert= 566.00', Outlet Invert= 504.00'





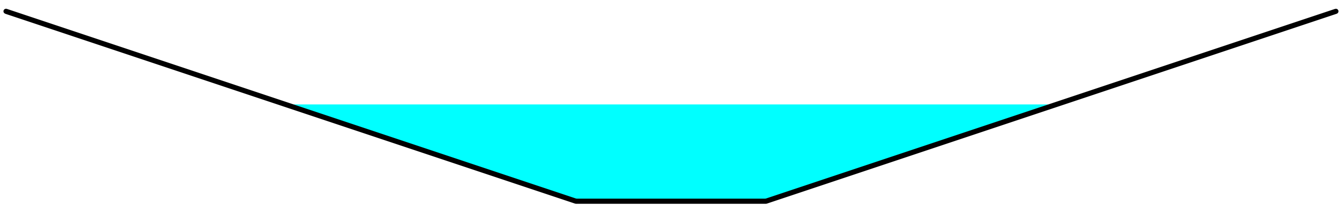
## Summary for Reach A106R: Thru A105

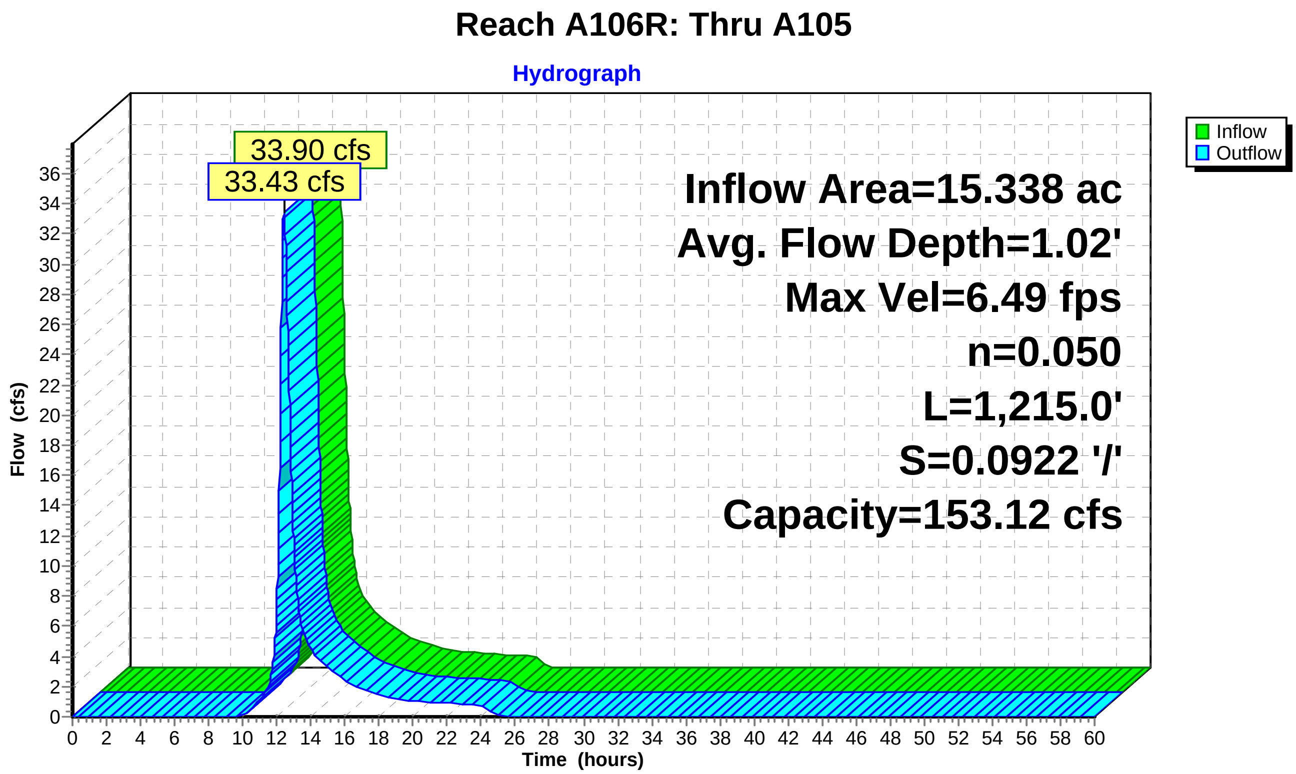
Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 3.11" for 25-Year event
Inflow = 33.90 cfs @ 12.38 hrs, Volume= 3.974 af
Outflow = 33.43 cfs @ 12.42 hrs, Volume= 3.974 af, Atten= 1%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.49 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 2.44 fps, Avg. Travel Time= 8.3 min

Peak Storage= 6,259 cf @ 12.42 hrs
Average Depth at Peak Storage= 1.02'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 153.12 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 1,215.0' Slope= 0.0922 '/'
Inlet Invert= 686.00', Outlet Invert= 574.00'





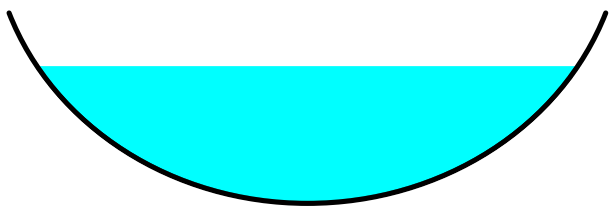
## Summary for Reach A108R: Thru A101

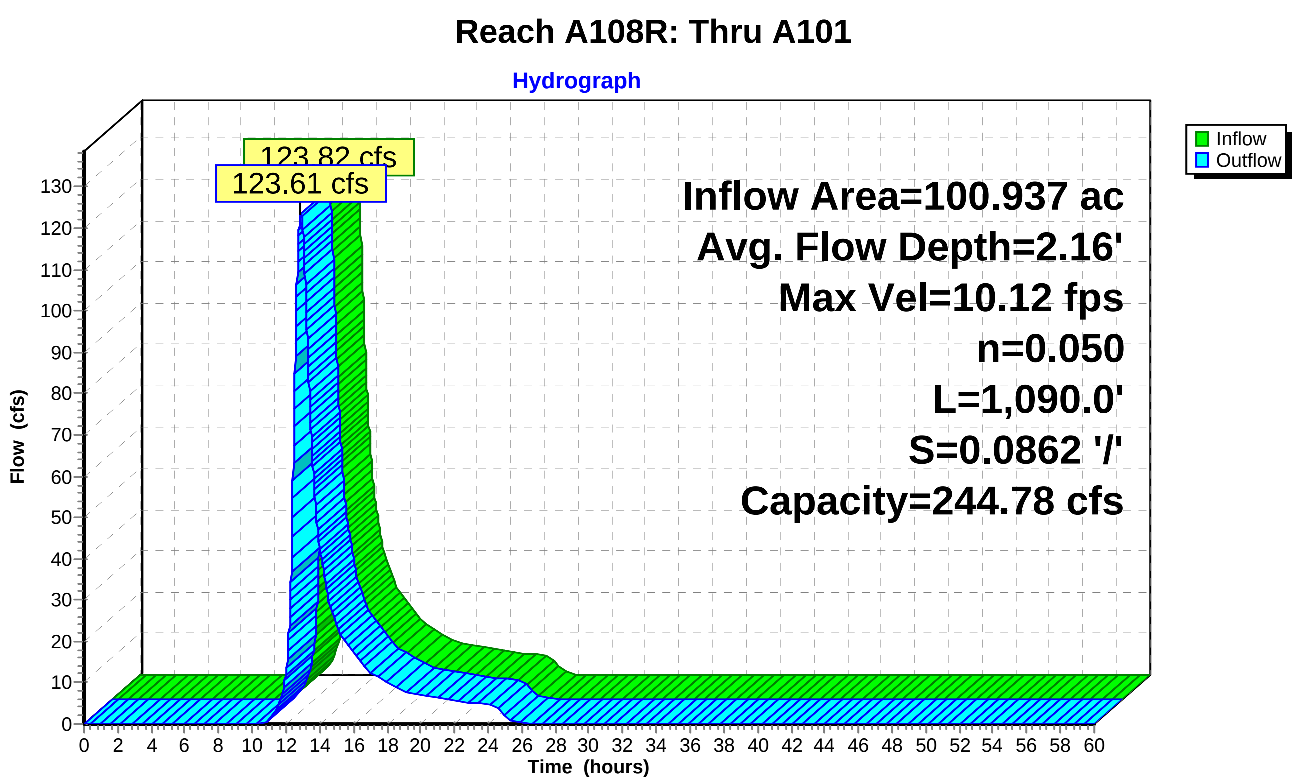
Inflow Area = 100.937 ac, 2.35% Impervious, Inflow Depth = 2.70" for 25-Year event
Inflow = 123.82 cfs @ 12.83 hrs, Volume= 22.709 af
Outflow = 123.61 cfs @ 12.86 hrs, Volume= 22.709 af, Atten= 0%, Lag= 1.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 10.12 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 4.06 fps, Avg. Travel Time= 4.5 min

Peak Storage= 13,312 cf @ 12.86 hrs
Average Depth at Peak Storage= 2.16'
Bank-Full Depth= 3.00' Flow Area= 20.0 sf, Capacity= 244.78 cfs

10.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 1,090.0' Slope= 0.0862 '/'
Inlet Invert= 608.00', Outlet Invert= 514.00'





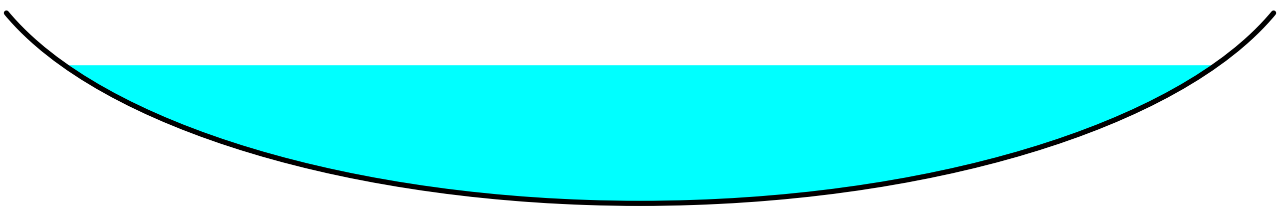
## Summary for Reach B102R: Thru B101

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 2.44" for 25-Year event
Inflow = 178.17 cfs @ 13.53 hrs, Volume= 53.499 af
Outflow = 178.16 cfs @ 13.54 hrs, Volume= 53.497 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.81 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 1.2 min

Peak Storage= 4,516 cf @ 13.54 hrs
Average Depth at Peak Storage= 2.17'
Bank-Full Depth= 3.00' Flow Area= 60.0 sf, Capacity= 356.26 cfs

30.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 122.0' Slope= 0.0164 '/'
Inlet Invert= 492.00', Outlet Invert= 490.00'



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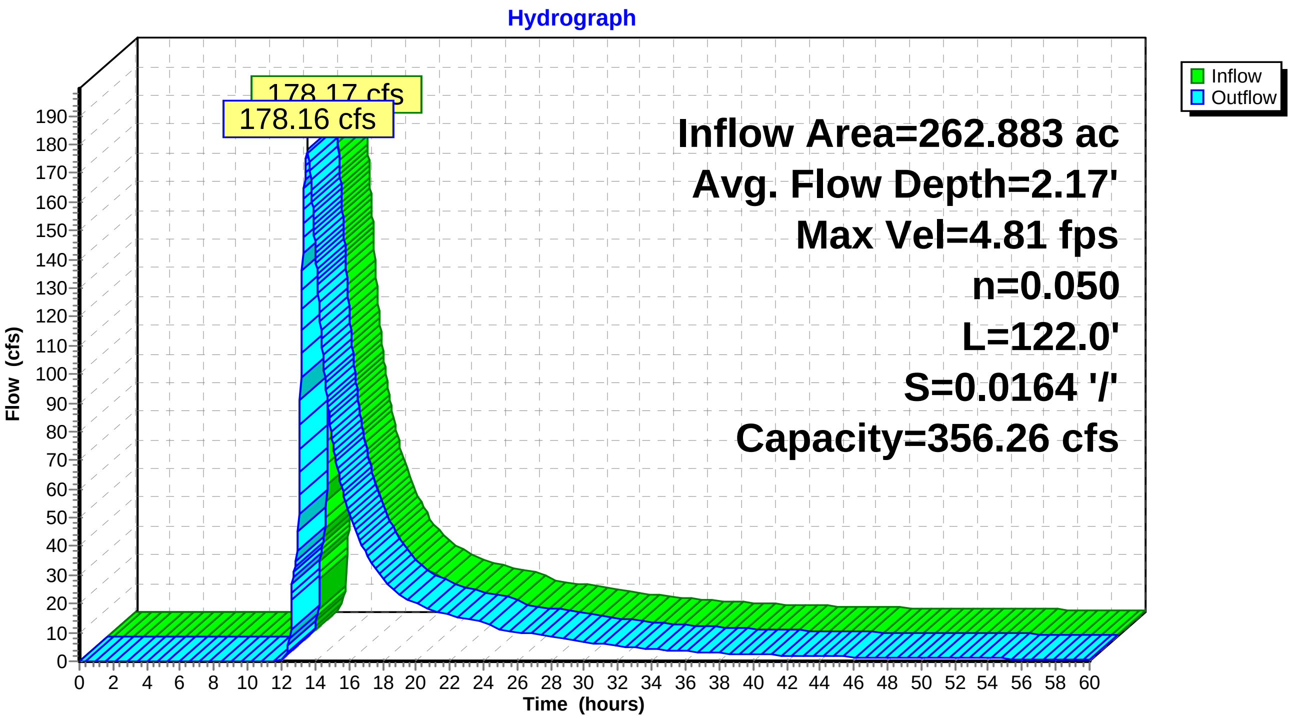


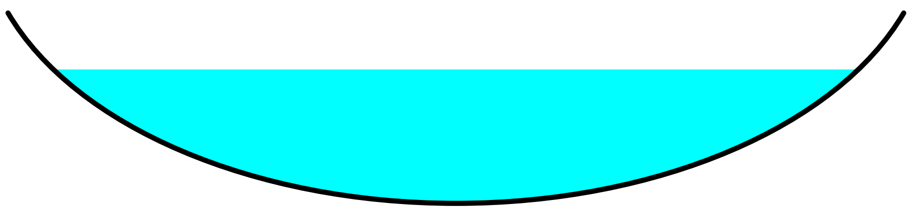
## Summary for Reach B103R: Thru B102

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 2.48" for 25-Year event
Inflow = 177.44 cfs @ 13.51 hrs, Volume= 53.013 af
Outflow = 177.30 cfs @ 13.53 hrs, Volume= 53.004 af, Atten= 0%, Lag= 1.3 min

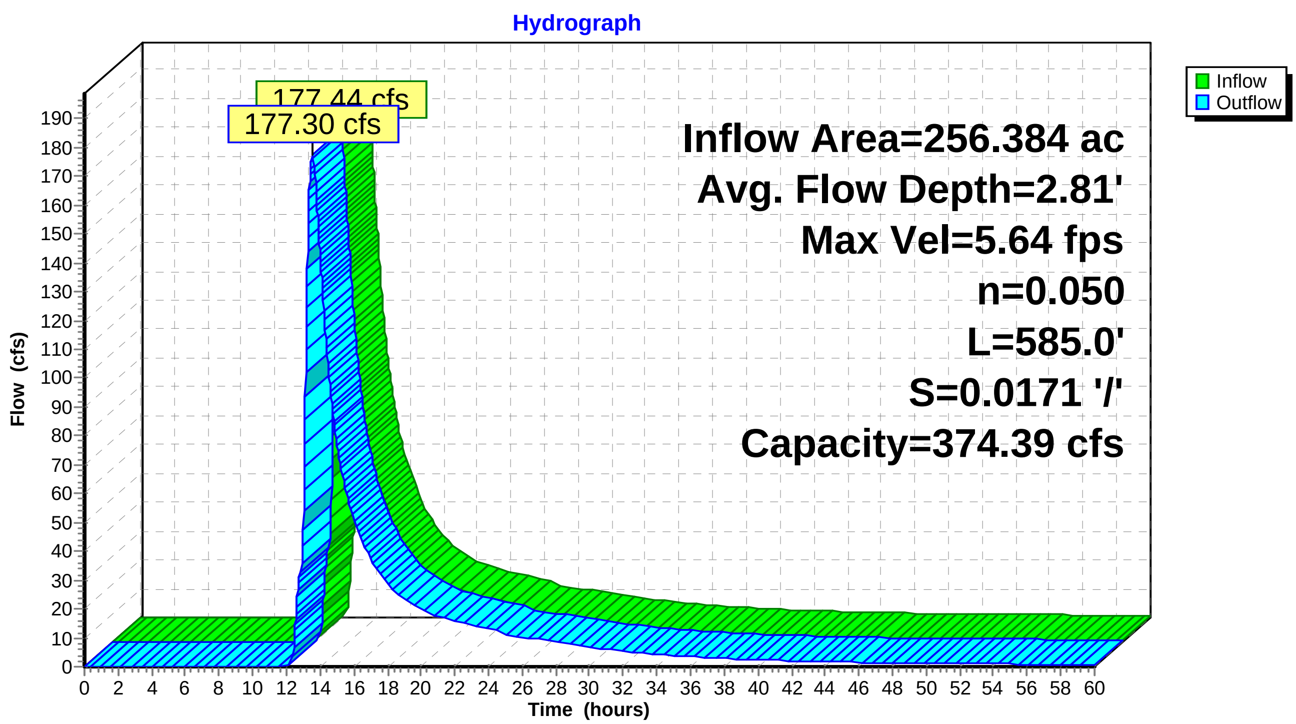
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.64 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.00 fps, Avg. Travel Time= 4.9 min

Peak Storage= 18,378 cf @ 13.53 hrs
Average Depth at Peak Storage= 2.81'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 374.39 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 585.0' Slope= 0.0171 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'



### Reach B103R: Thru B102



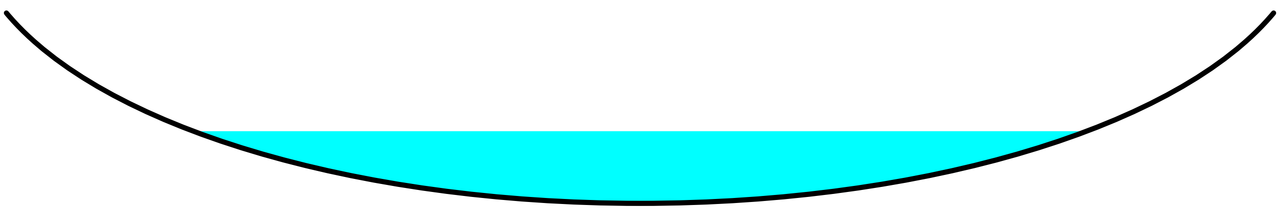
## Summary for Reach B107R: Thru B108

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 2.99" for 25-Year event
Inflow = 17.88 cfs @ 12.89 hrs, Volume= 3.569 af
Outflow = 17.63 cfs @ 12.97 hrs, Volume= 3.569 af, Atten= 1%, Lag= 4.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.68 fps, Min. Travel Time= 6.0 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 26.2 min

Peak Storage= 6,336 cf @ 12.97 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 144.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 2,040.0' Slope= 0.2294 '/'
Inlet Invert= 972.00', Outlet Invert= 504.00'



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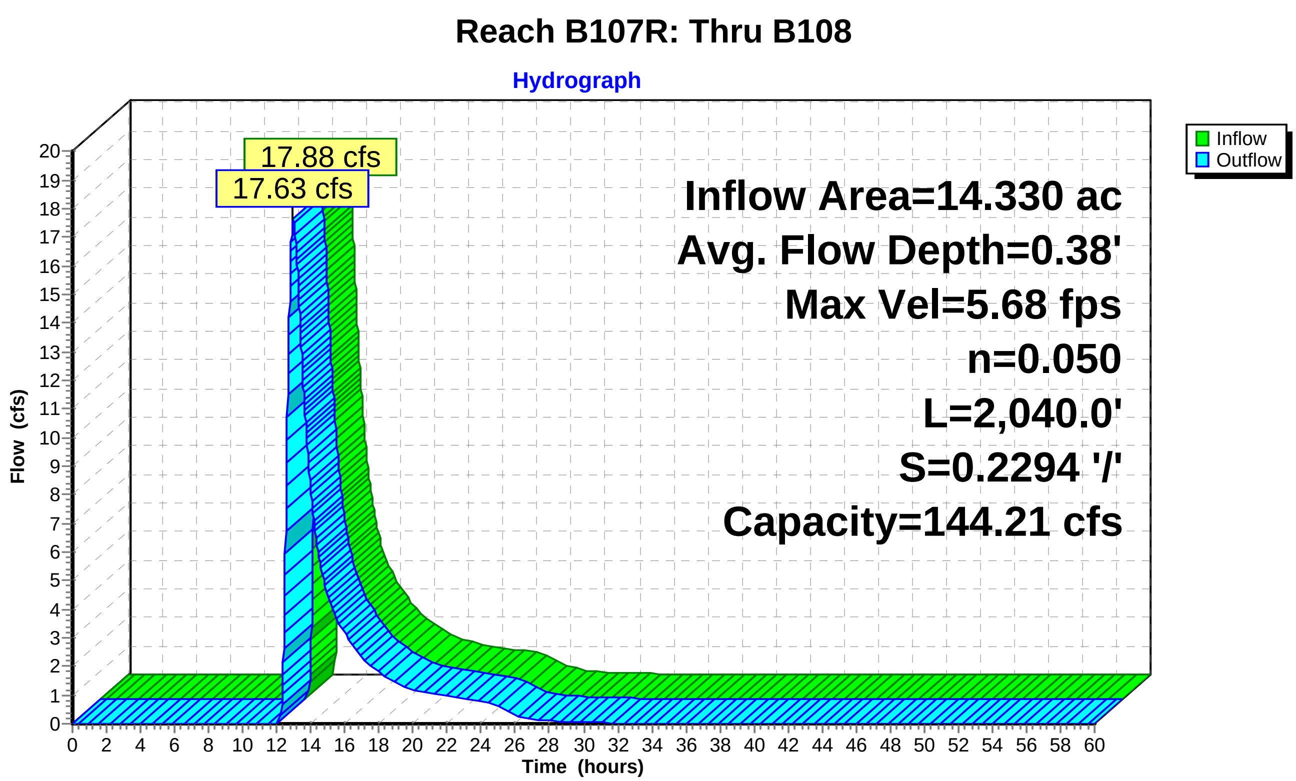


## Summary for Reach B108R: Thur 101

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 3.10" for 25-Year event
Inflow = 115.72 cfs @ 12.58 hrs, Volume= 18.687 af
Outflow = 115.70 cfs @ 12.59 hrs, Volume= 18.687 af, Atten= 0%, Lag= 0.5 min

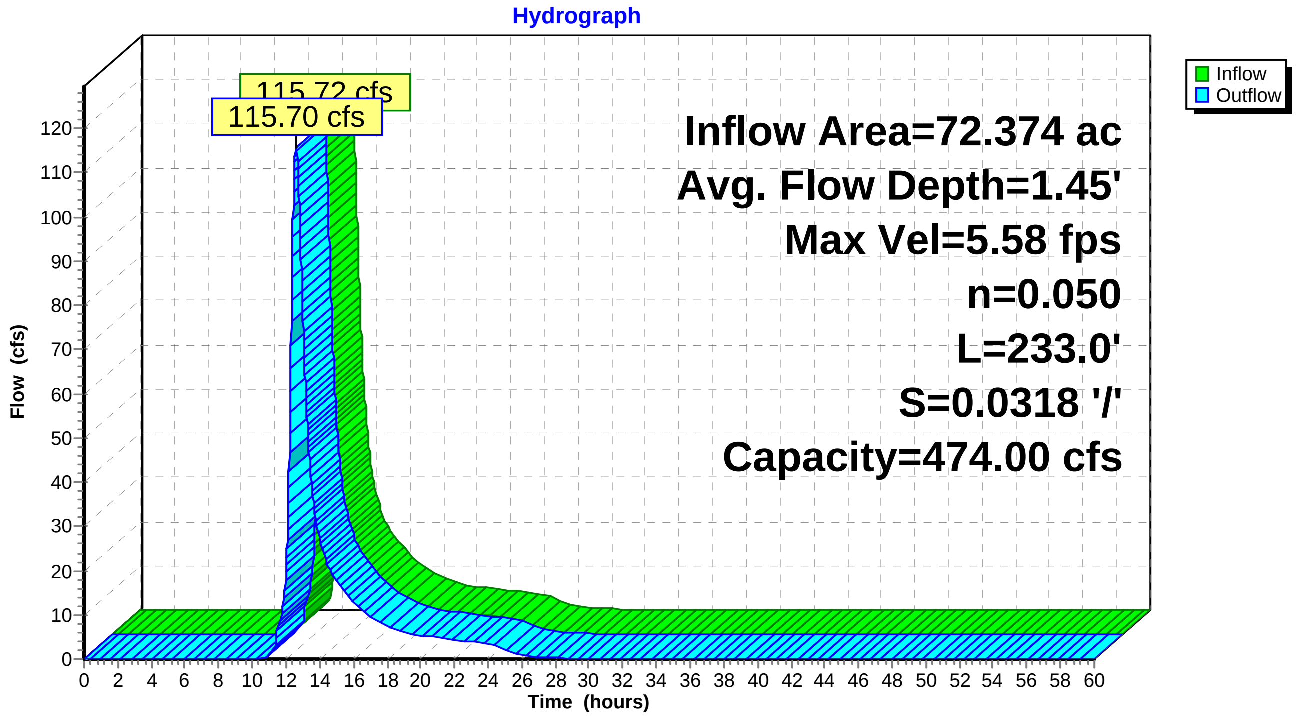
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.58 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 3.5 min

Peak Storage= 4,828 cf @ 12.59 hrs
Average Depth at Peak Storage= 1.45'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 474.00 cfs

10.00' x 3.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 233.0' Slope= 0.0318 '/'
Inlet Invert= 499.60', Outlet Invert= 492.20'

‡

### Reach B108R: Thur 101



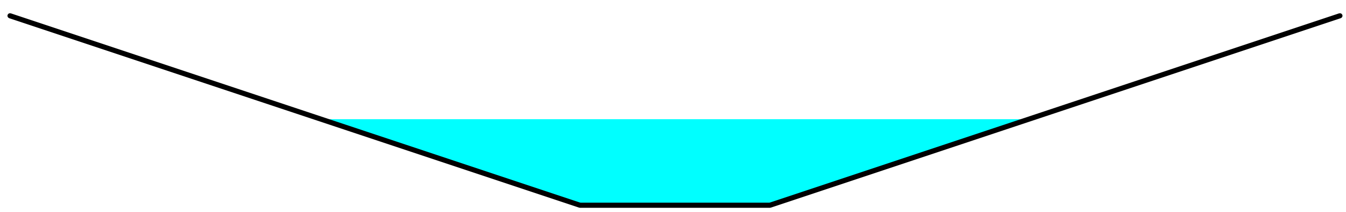
## Summary for Reach B109R: Thru B108

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 3.22" for 25-Year event
Inflow = 25.09 cfs @ 12.40 hrs, Volume= 3.025 af
Outflow = 25.06 cfs @ 12.41 hrs, Volume= 3.025 af, Atten= 0%, Lag= 0.8 min

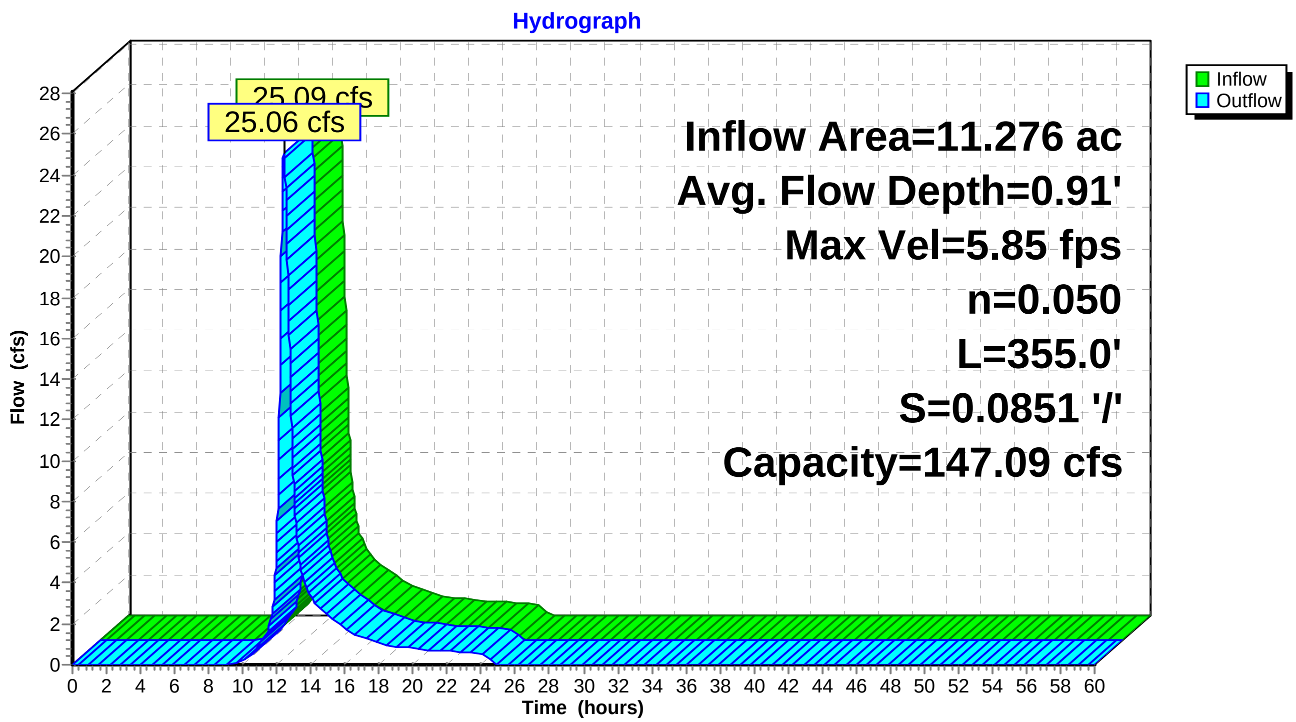
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.85 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.39 fps, Avg. Travel Time= 2.5 min

Peak Storage= 1,522 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 147.09 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 355.0' Slope= 0.0851 '/'
Inlet Invert= 532.20', Outlet Invert= 502.00'



### Reach B109R: Thru B108



## Summary for Pond 102A: Wetland B

Inflow Area = 45.922 ac, 9.71% Impervious, Inflow Depth = 0.14" for 25-Year event
Inflow = 2.12 cfs @ 12.65 hrs, Volume= 0.530 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.71' @ 25.70 hrs Surf.Area= 38,842 sf Storage= 23,088 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 | 498.10' | 740,168 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

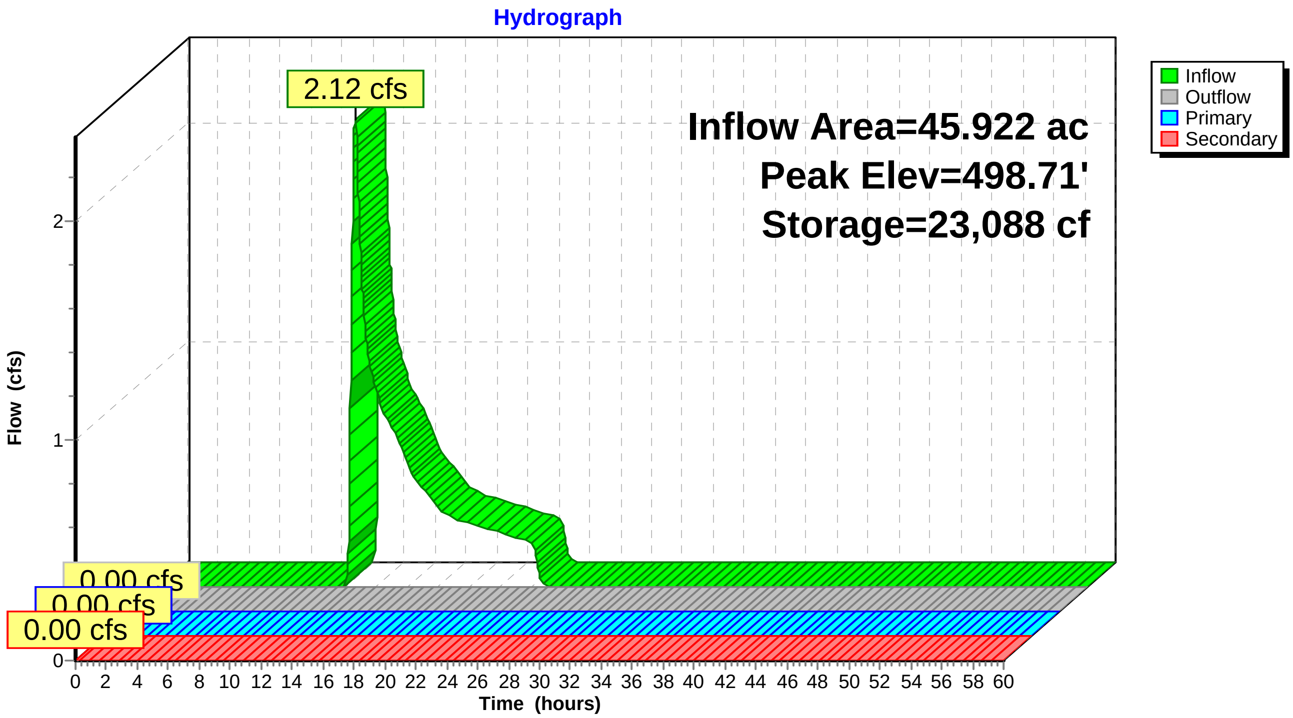
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 498.10 | 37,121 | 782.0 | 0 | 0 | 37,121 |
| 500.00 | 42,629 | 822.0 | 75,702 | 75,702 | 42,449 |
| 502.00 | 54,696 | 1,028.0 | 97,075 | 172,777 | 72,833 |
| 504.00 | 78,374 | 1,409.0 | 132,362 | 305,139 | 146,760 |
| 506.00 | 108,988 | 1,330.0 | 186,523 | 491,662 | 164,196 |
| 508.00 | 140,171 | 1,485.0 | 248,506 | 740,168 | 199,031 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 501.90' / 500.90' S= 0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #2 | Secondary | 506.10' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' (Free Discharge)
└—**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' TW=0.00' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102A: Wetland B



## Summary for Pond 102B: 18" Culvert

[62] Hint: Exceeded Reach B103R OUTLET depth by 2.28' @ 26.68 hrs

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 2.44" for 25-Year event
Inflow = 178.17 cfs @ 13.53 hrs, Volume= 53.499 af
Outflow = 178.17 cfs @ 13.53 hrs, Volume= 53.499 af, Atten= 0%, Lag= 0.3 min
Primary = 10.05 cfs @ 12.70 hrs, Volume= 19.285 af
Secondary = 169.77 cfs @ 13.53 hrs, Volume= 34.214 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 495.74' @ 13.53 hrs Surf.Area= 5,036 sf Storage= 5,935 cf

Plug-Flow detention time= 1.6 min calculated for 53.499 af (100% of inflow)
Center-of-Mass det. time= 1.6 min ( 1,161.0 - 1,159.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 492.20' | 27,470 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

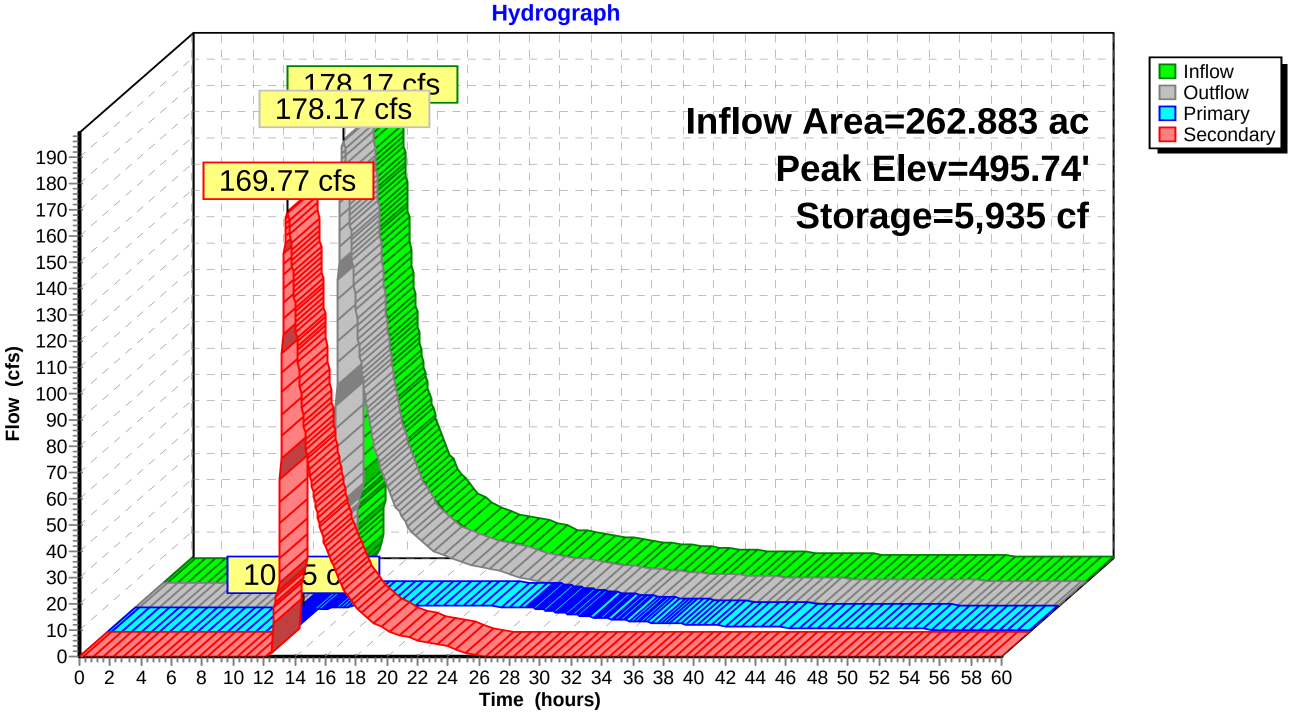
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 492.20 | 0 | 0.0 | 0 | 0 | 0 |
| 496.00 | 5,819 | 521.0 | 7,371 | 7,371 | 21,623 |
| 498.00 | 14,990 | 910.0 | 20,099 | 27,470 | 65,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 492.20' | **18.0" Round Culvert**<br>L= 20.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 492.20' / 491.10' S= 0.0550 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 495.00' | **100.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=10.05 cfs @ 12.70 hrs HW=495.19' TW=492.95' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 10.05 cfs @ 5.69 fps)

**Secondary OutFlow** Max=169.75 cfs @ 13.53 hrs HW=495.74' TW=494.17' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 169.75 cfs @ 2.31 fps)

## Pond 102B: 18" Culvert



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.386 ac, 4.49% Impervious, Inflow Depth = 1.87" for 25-Year event
Inflow = 37.37 cfs @ 12.70 hrs, Volume= 6.298 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.83' @ 26.62 hrs Surf.Area= 205,549 sf Storage= 274,359 cf

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

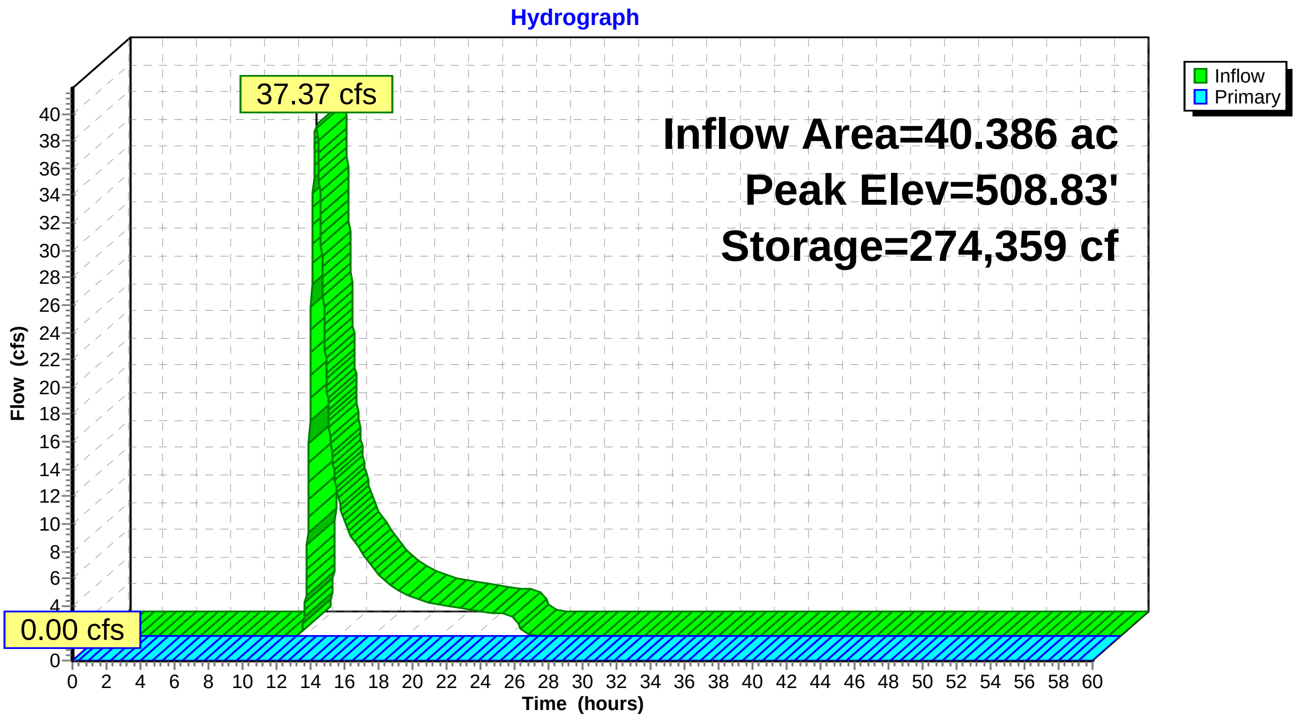
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 103A: Wetland A

Inflow Area = 36.735 ac, 8.79% Impervious, Inflow Depth = 0.84" for 25-Year event
Inflow = 9.78 cfs @ 12.86 hrs, Volume= 2.564 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 500.30' @ 26.58 hrs Surf.Area= 55,765 sf Storage= 111,693 cf

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

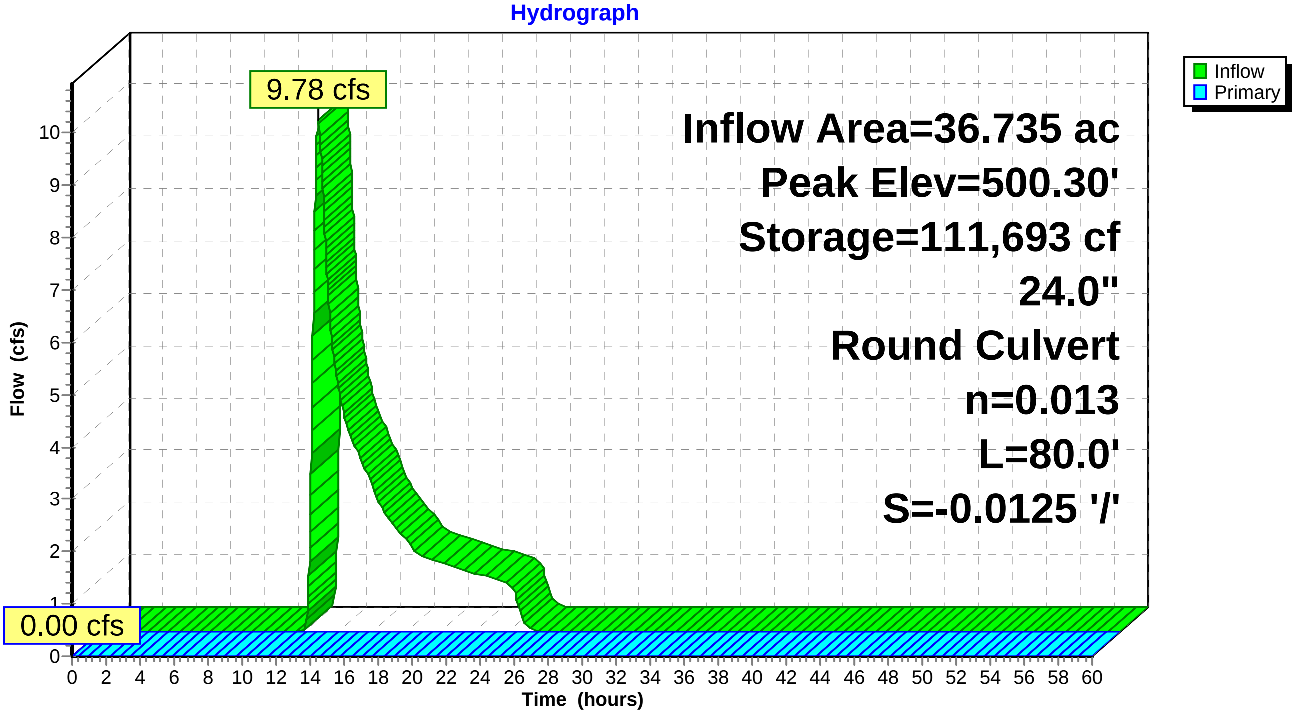
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 497.40' | 751,373 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 497.40 | 22,575 | 625.0 | 0 | 0 | 22,575 |
| 500.00 | 52,914 | 979.0 | 95,378 | 95,378 | 67,808 |
| 502.00 | 73,309 | 1,110.0 | 125,670 | 221,048 | 89,686 |
| 504.00 | 83,807 | 1,169.0 | 156,999 | 378,047 | 100,626 |
| 506.00 | 92,176 | 1,226.0 | 175,917 | 553,963 | 111,750 |
| 508.00 | 105,381 | 1,351.0 | 197,410 | 751,373 | 137,513 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 500.90' / 501.90' S= -0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=497.40' TW=498.10' (Dynamic Tailwater)
└─**1=Culvert** ( Controls 0.00 cfs)

## Pond 103A: Wetland A



## Summary for Pond 103B: Irrigation Pond

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 1.68" for 25-Year event
Inflow = 83.96 cfs @ 13.42 hrs, Volume= 35.871 af
Outflow = 81.59 cfs @ 13.57 hrs, Volume= 35.624 af, Atten= 3%, Lag= 8.6 min
Primary = 10.83 cfs @ 13.57 hrs, Volume= 10.112 af
Secondary = 70.76 cfs @ 13.57 hrs, Volume= 25.512 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 506.56' @ 13.57 hrs Surf.Area= 92,135 sf Storage= 68,385 cf

Plug-Flow detention time= 44.7 min calculated for 35.624 af (99% of inflow)
Center-of-Mass det. time= 29.5 min ( 1,281.1 - 1,251.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 505.80' | 416,210 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

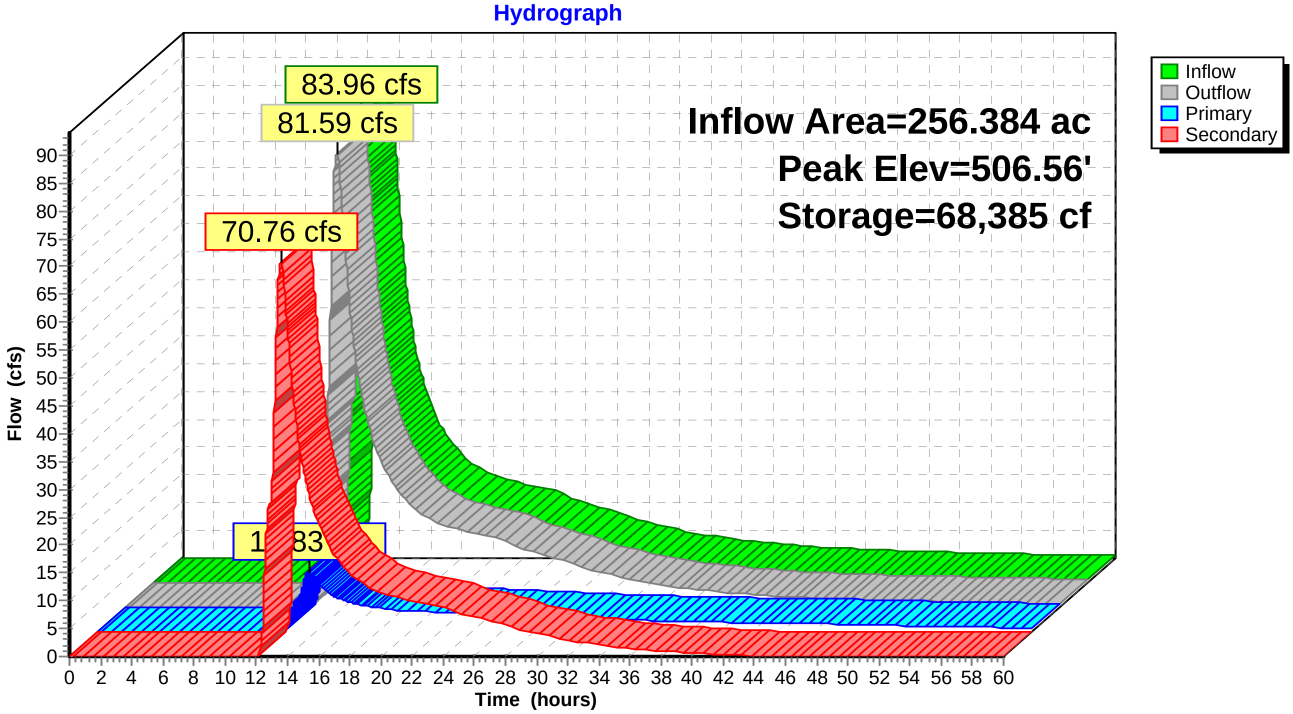
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 505.80 | 88,106 | 1,403.0 | 0 | 0 | 88,106 |
| 508.00 | 100,033 | 1,579.0 | 206,814 | 206,814 | 129,999 |
| 510.00 | 109,433 | 1,610.0 | 209,396 | 416,210 | 138,488 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 505.80' | **5.0' long x 1.80' rise Sharp-Crested Vee/Trap Weir**<br>Cv= 2.62 (C= 3.28) |
| #2 | Secondary | 506.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00<br>Width (feet) 45.00 60.00 80.00 95.00 120.00 |

**Primary OutFlow** Max=10.82 cfs @ 13.57 hrs HW=506.56' TW=504.81' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 10.82 cfs @ 2.85 fps)

**Secondary OutFlow** Max=70.75 cfs @ 13.57 hrs HW=506.56' TW=504.81' (Dynamic Tailwater)
└─**2=Custom Weir/Orifice** (Weir Controls 70.75 cfs @ 2.37 fps)

## Pond 103B: Irrigation Pond



## Summary for Pond 104A: Wetland D

Inflow Area = 9.432 ac, 9.40% Impervious, Inflow Depth = 0.37" for 25-Year event
Inflow = 0.58 cfs @ 12.95 hrs, Volume= 0.294 af
Outflow = 0.23 cfs @ 18.67 hrs, Volume= 0.274 af, Atten= 61%, Lag= 343.4 min
Primary = 0.23 cfs @ 18.67 hrs, Volume= 0.274 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.97' @ 18.67 hrs Surf.Area= 24,660 sf Storage= 5,919 cf

Plug-Flow detention time= 475.7 min calculated for 0.274 af (93% of inflow)
Center-of-Mass det. time= 446.2 min ( 1,466.6 - 1,020.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

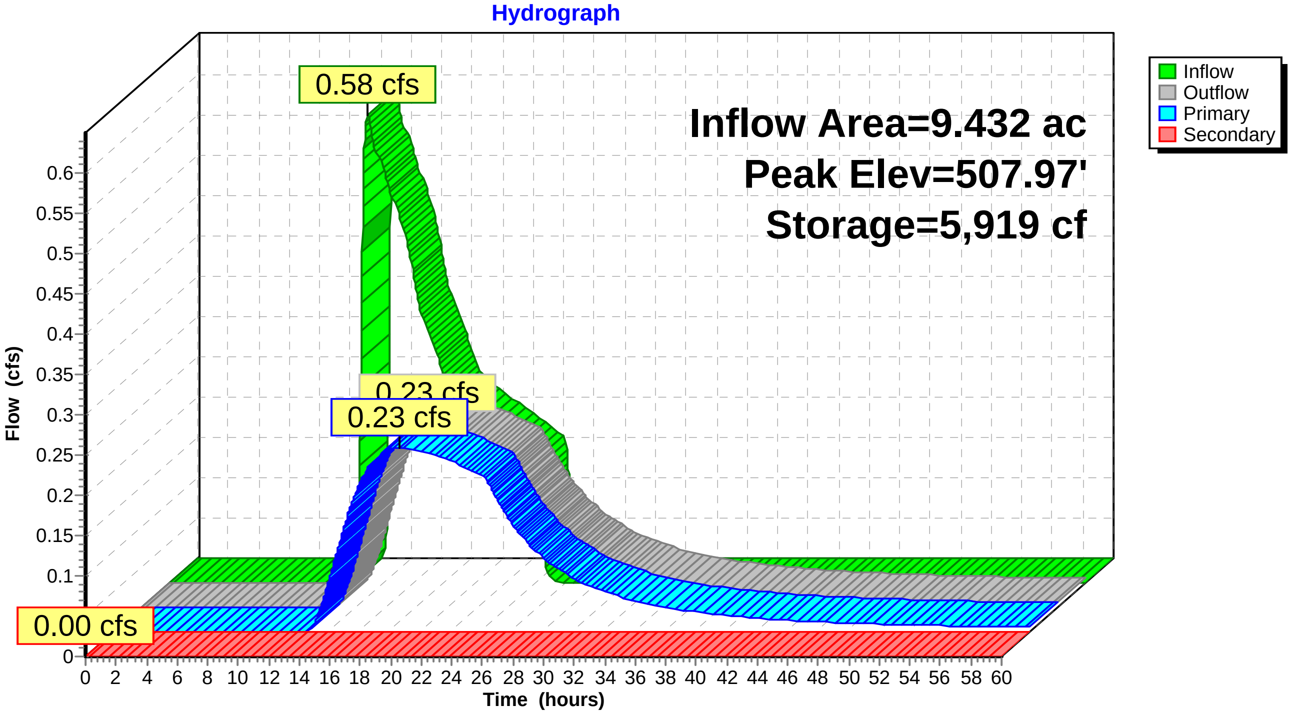
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.23 cfs @ 18.67 hrs HW=507.97' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.23 cfs @ 1.96 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 104A: Wetland D



## Summary for Pond 104B: Island Pond

Inflow Area = 234.803 ac, 5.37% Impervious, Inflow Depth = 2.58" for 25-Year event
Inflow = 203.30 cfs @ 12.89 hrs, Volume= 50.409 af
Outflow = 171.02 cfs @ 13.46 hrs, Volume= 48.443 af, Atten= 16%, Lag= 34.5 min
Primary = 13.96 cfs @ 13.46 hrs, Volume= 20.508 af
Secondary = 60.35 cfs @ 13.46 hrs, Volume= 10.546 af
Tertiary = 96.71 cfs @ 13.46 hrs, Volume= 17.389 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 510.59' @ 13.46 hrs Surf.Area= 276,133 sf Storage= 584,402 cf

Plug-Flow detention time= 265.8 min calculated for 48.443 af (96% of inflow)
Center-of-Mass det. time= 242.0 min ( 1,165.7 - 923.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 508.20' | 1,023,136 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 508.20 | 228,830 | 3,183.0 | 0 | 0 | 228,830 |
| 510.00 | 249,447 | 3,224.0 | 430,316 | 430,316 | 250,515 |
| 512.00 | 346,000 | 3,042.0 | 592,820 | 1,023,136 | 341,482 |

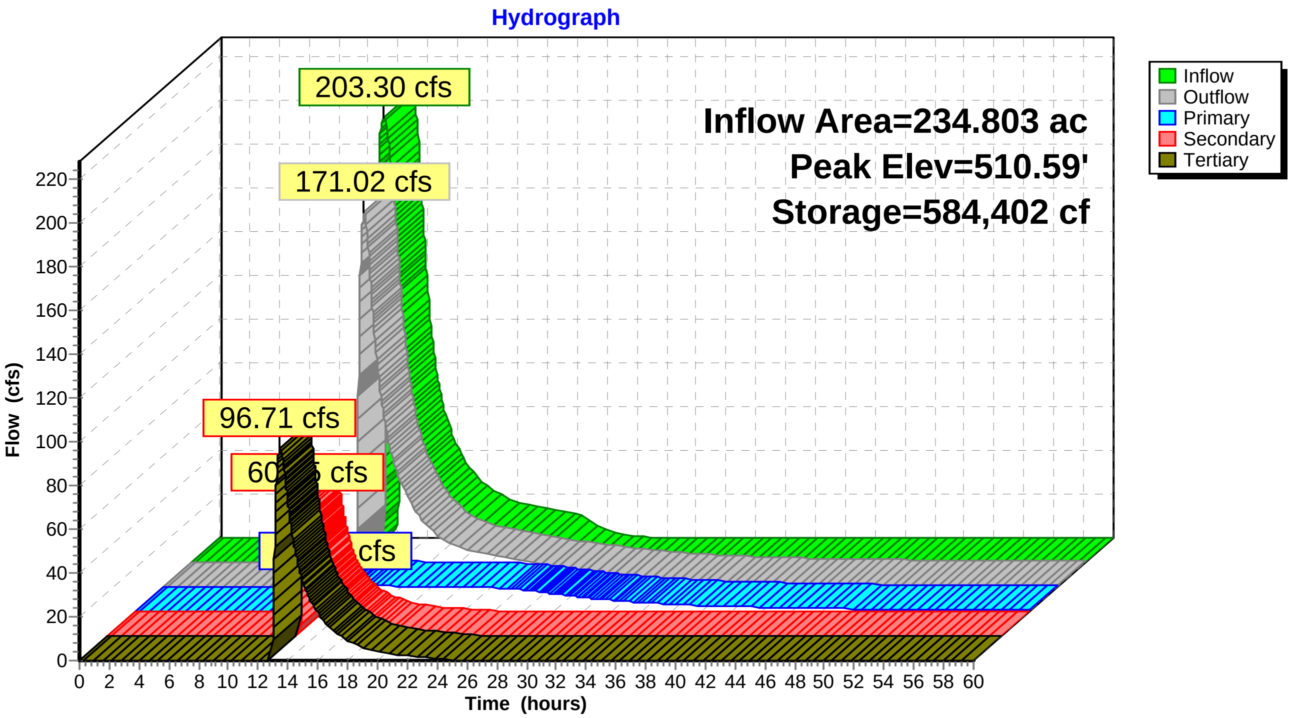
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 508.22' | **24.0" Round Culvert**<br>L= 111.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 508.22' / 505.43' S= 0.0251 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 3.14 sf |
| #2 | Secondary | 510.00' | **50.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Tertiary | 510.00' | **80.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=13.96 cfs @ 13.46 hrs HW=510.59' TW=506.55' (Dynamic Tailwater)
└—**1=Culvert** (Inlet Controls 13.96 cfs @ 4.44 fps)

**Secondary OutFlow** Max=60.34 cfs @ 13.46 hrs HW=510.59' TW=506.55' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 60.34 cfs @ 2.06 fps)

**Tertiary OutFlow** Max=96.69 cfs @ 13.46 hrs HW=510.59' TW=504.80' (Dynamic Tailwater)
└—**3=Broad-Crested Rectangular Weir** (Weir Controls 96.69 cfs @ 2.06 fps)

## Pond 104B: Island Pond



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach A106R OUTLET depth by 0.64' @ 14.30 hrs

Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 2.00" for 25-Year event
Inflow = 66.12 cfs @ 12.37 hrs, Volume= 8.257 af
Outflow = 62.36 cfs @ 12.47 hrs, Volume= 8.241 af, Atten= 6%, Lag= 6.2 min
Primary = 10.74 cfs @ 12.47 hrs, Volume= 6.186 af
Secondary = 51.62 cfs @ 12.47 hrs, Volume= 2.055 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.24' @ 12.47 hrs Surf.Area= 32,295 sf Storage= 64,897 cf

Plug-Flow detention time= 79.6 min calculated for 8.241 af (100% of inflow)
Center-of-Mass det. time= 78.4 min ( 959.4 - 881.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

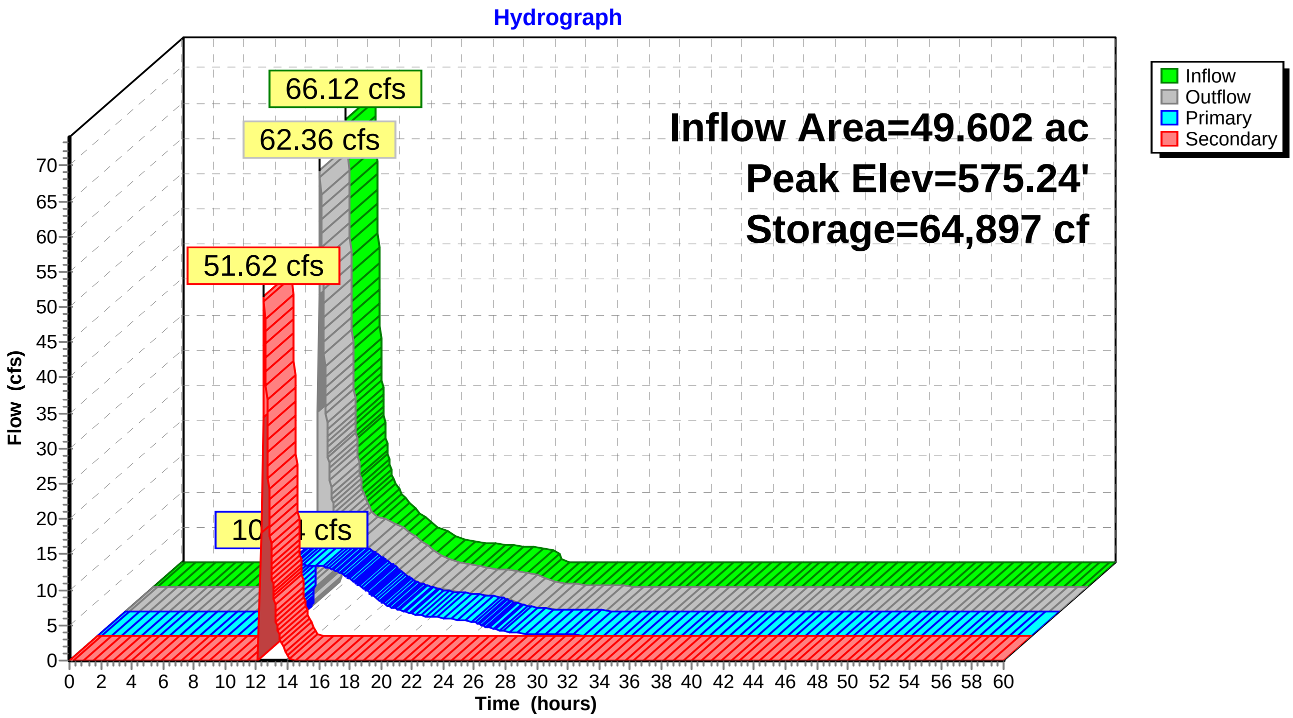
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=10.74 cfs @ 12.47 hrs HW=575.24' TW=567.55' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 10.74 cfs @ 6.08 fps)

**Secondary OutFlow** Max=51.53 cfs @ 12.47 hrs HW=575.24' TW=567.55' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 51.53 cfs @ 1.17 fps)

## Pond 105A: Wetland H



## Summary for Pond 105B: Wetland J

Inflow Area = 154.267 ac, 1.16% Impervious, Inflow Depth = 2.99" for 25-Year event
Inflow = 164.35 cfs @ 13.08 hrs, Volume= 38.488 af
Outflow = 164.33 cfs @ 13.14 hrs, Volume= 38.487 af, Atten= 0%, Lag= 3.3 min
Primary = 164.33 cfs @ 13.14 hrs, Volume= 38.487 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 516.43' @ 13.14 hrs Surf.Area= 27,980 sf Storage= 49,390 cf

Plug-Flow detention time= 17.0 min calculated for 38.474 af (100% of inflow)
Center-of-Mass det. time= 17.2 min ( 930.6 - 913.4 )

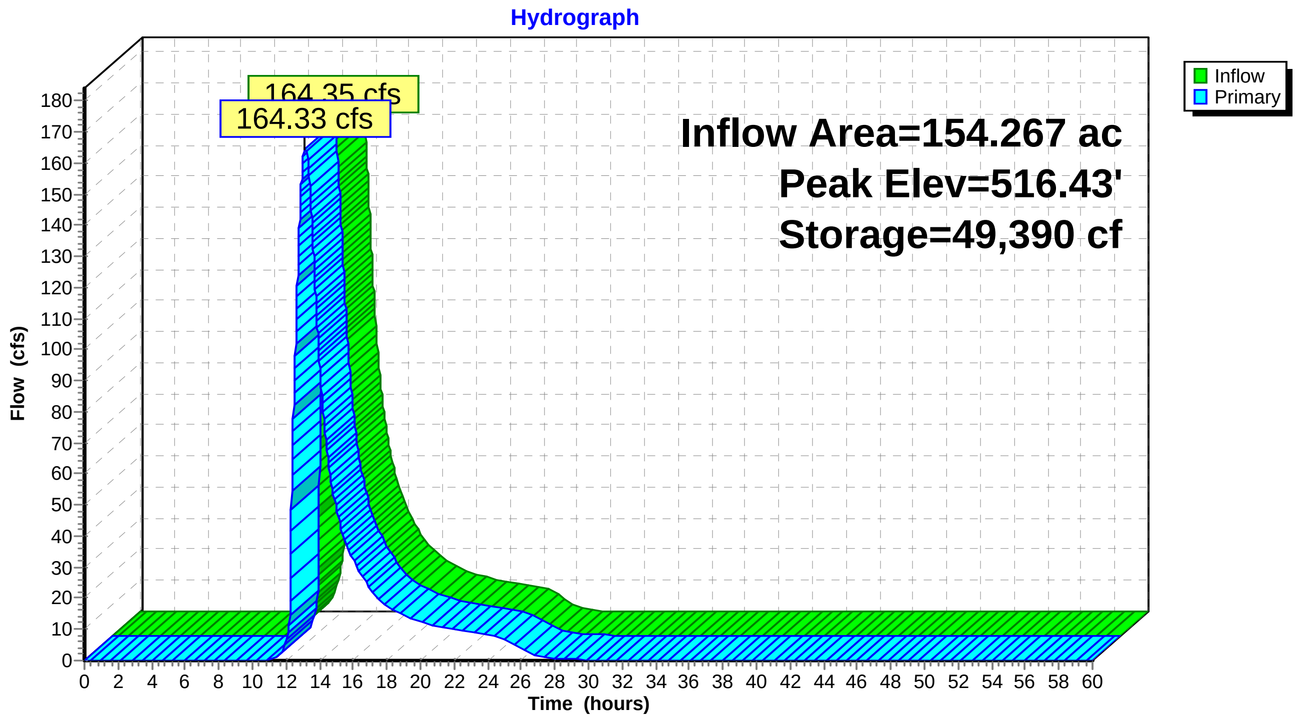
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 514.40' | 102,307 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 514.40 | 19,952 | 567.0 | 0 | 0 | 19,952 |
| 516.00 | 27,082 | 686.0 | 37,482 | 37,482 | 31,860 |
| 516.50 | 28,121 | 699.0 | 13,800 | 51,282 | 33,334 |
| 518.00 | 40,275 | 840.0 | 51,025 | 102,307 | 50,641 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 514.40' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.25 1.60 2.60 3.60<br>Width (feet) 2.33 2.33 90.00 120.00 170.00 |

**Primary OutFlow** Max=164.32 cfs @ 13.14 hrs HW=516.43' TW=510.45' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 164.32 cfs @ 2.70 fps)

## Pond 105B: Wetland J



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 3.11" for 25-Year event
Inflow = 33.90 cfs @ 12.38 hrs, Volume= 3.974 af
Outflow = 33.90 cfs @ 12.38 hrs, Volume= 3.974 af, Atten= 0%, Lag= 0.1 min
Primary = 33.90 cfs @ 12.38 hrs, Volume= 3.974 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 719.20' @ 12.38 hrs Surf.Area= 72 sf Storage= 60 cf

Plug-Flow detention time= 0.0 min calculated for 3.973 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 855.0 - 855.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

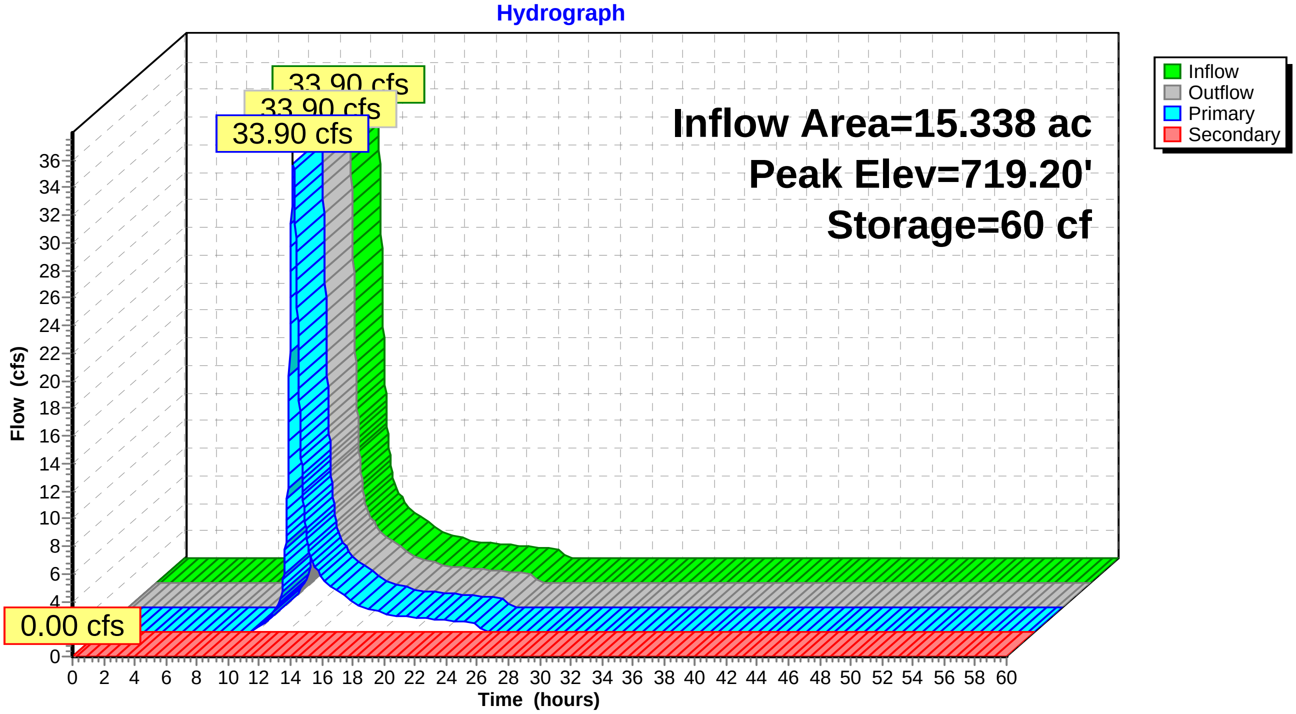
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=33.89 cfs @ 12.38 hrs HW=719.20' TW=687.01' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 33.89 cfs @ 5.38 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=686.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 130.289 ac, 0.83% Impervious, Inflow Depth = 3.11" for 25-Year event
Inflow = 150.07 cfs @ 13.16 hrs, Volume= 33.759 af
Outflow = 150.04 cfs @ 13.18 hrs, Volume= 33.759 af, Atten= 0%, Lag= 1.3 min
Primary = 150.04 cfs @ 13.18 hrs, Volume= 33.759 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 527.00' @ 13.18 hrs Surf.Area= 12,660 sf Storage= 22,824 cf

Plug-Flow detention time= 7.5 min calculated for 33.748 af (100% of inflow)
Center-of-Mass det. time= 7.5 min ( 917.3 - 909.8 )

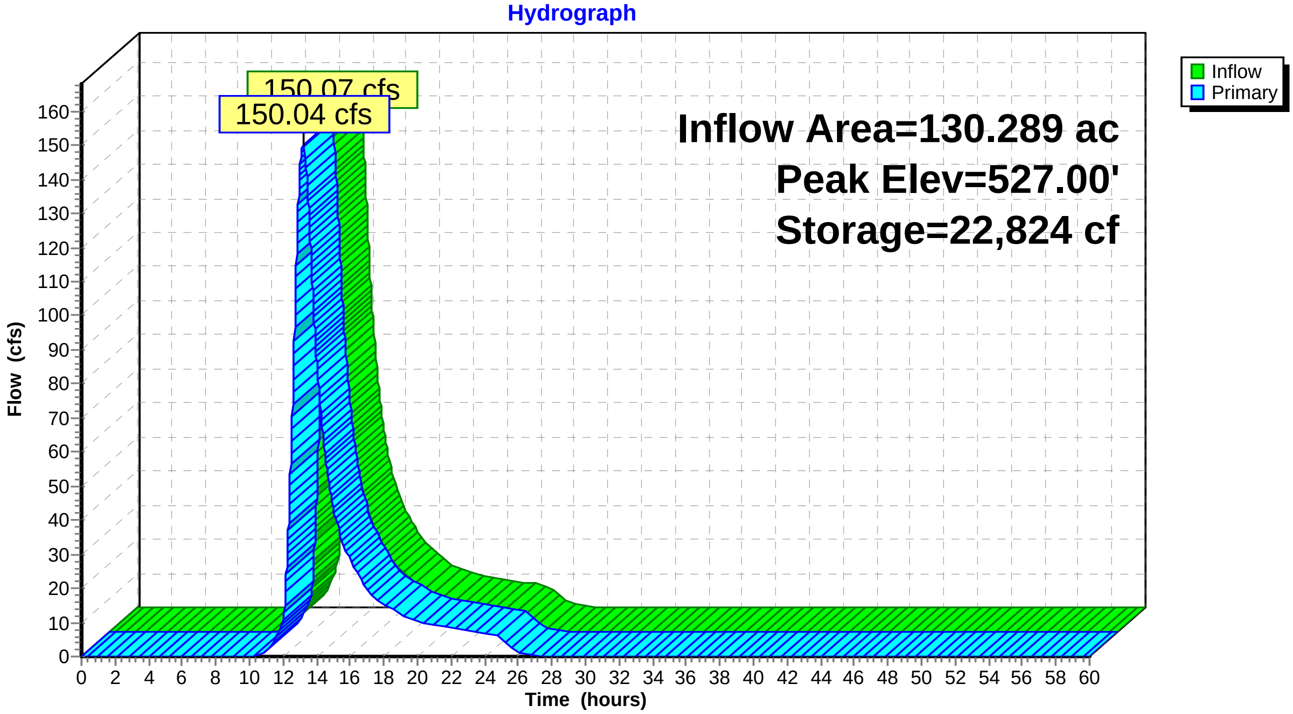
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=150.04 cfs @ 13.18 hrs HW=527.00' TW=516.43' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 150.04 cfs @ 3.06 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

Inflow Area = 95.411 ac, 2.35% Impervious, Inflow Depth = 2.78" for 25-Year event
Inflow = 121.41 cfs @ 12.83 hrs, Volume= 22.139 af
Outflow = 121.35 cfs @ 12.83 hrs, Volume= 22.139 af, Atten= 0%, Lag= 0.3 min
Primary = 43.11 cfs @ 12.83 hrs, Volume= 16.460 af
Secondary = 78.24 cfs @ 12.83 hrs, Volume= 5.679 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 626.00' @ 12.83 hrs Surf.Area= 1,452 sf Storage= 3,096 cf

Plug-Flow detention time= 0.4 min calculated for 22.132 af (100% of inflow)
Center-of-Mass det. time= 0.4 min ( 895.9 - 895.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

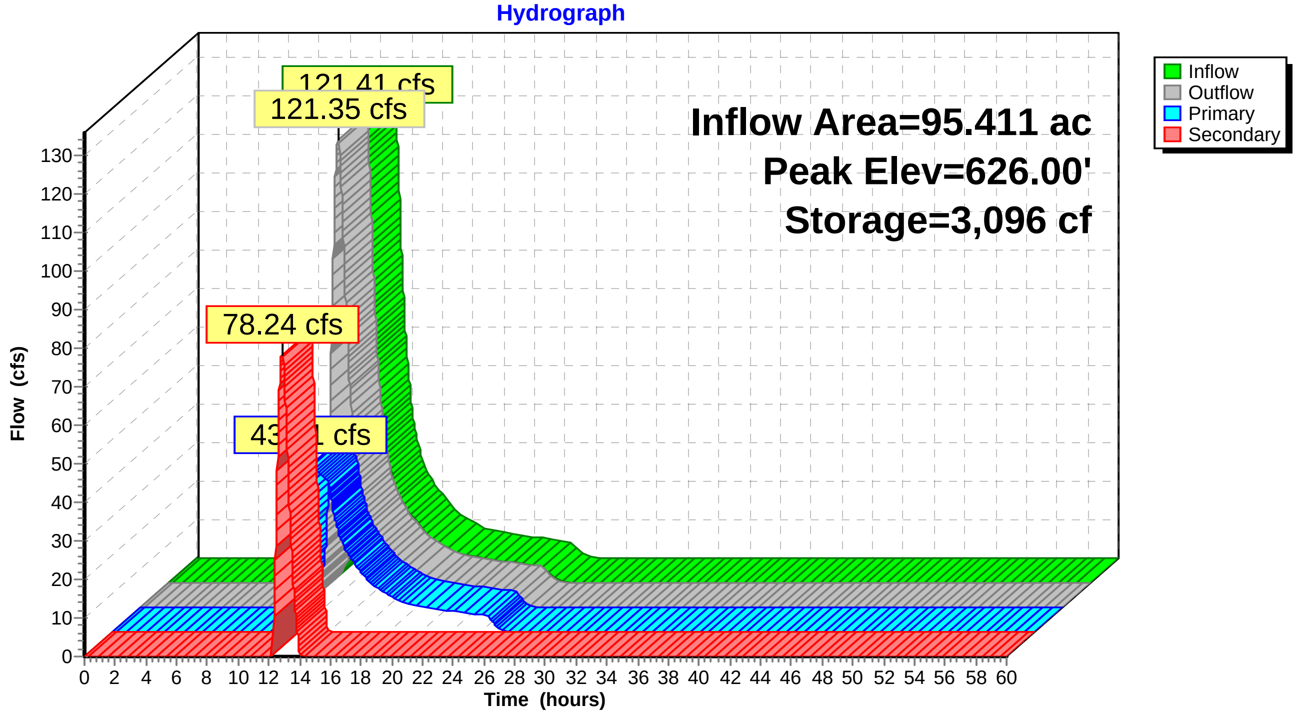
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=43.11 cfs @ 12.83 hrs HW=626.00' TW=610.16' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 43.11 cfs @ 13.72 fps)

**Secondary OutFlow** Max=78.23 cfs @ 12.83 hrs HW=626.00' TW=613.19' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 78.23 cfs @ 3.14 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 3.22" for 25-Year event
Inflow = 27.84 cfs @ 12.53 hrs, Volume= 3.845 af
Outflow = 17.88 cfs @ 12.89 hrs, Volume= 3.569 af, Atten= 36%, Lag= 21.7 min
Primary = 17.88 cfs @ 12.89 hrs, Volume= 3.569 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.90' @ 12.89 hrs Surf.Area= 124,635 sf Storage= 49,049 cf

Plug-Flow detention time= 107.0 min calculated for 3.569 af (93% of inflow)
Center-of-Mass det. time= 69.8 min ( 932.4 - 862.5 )

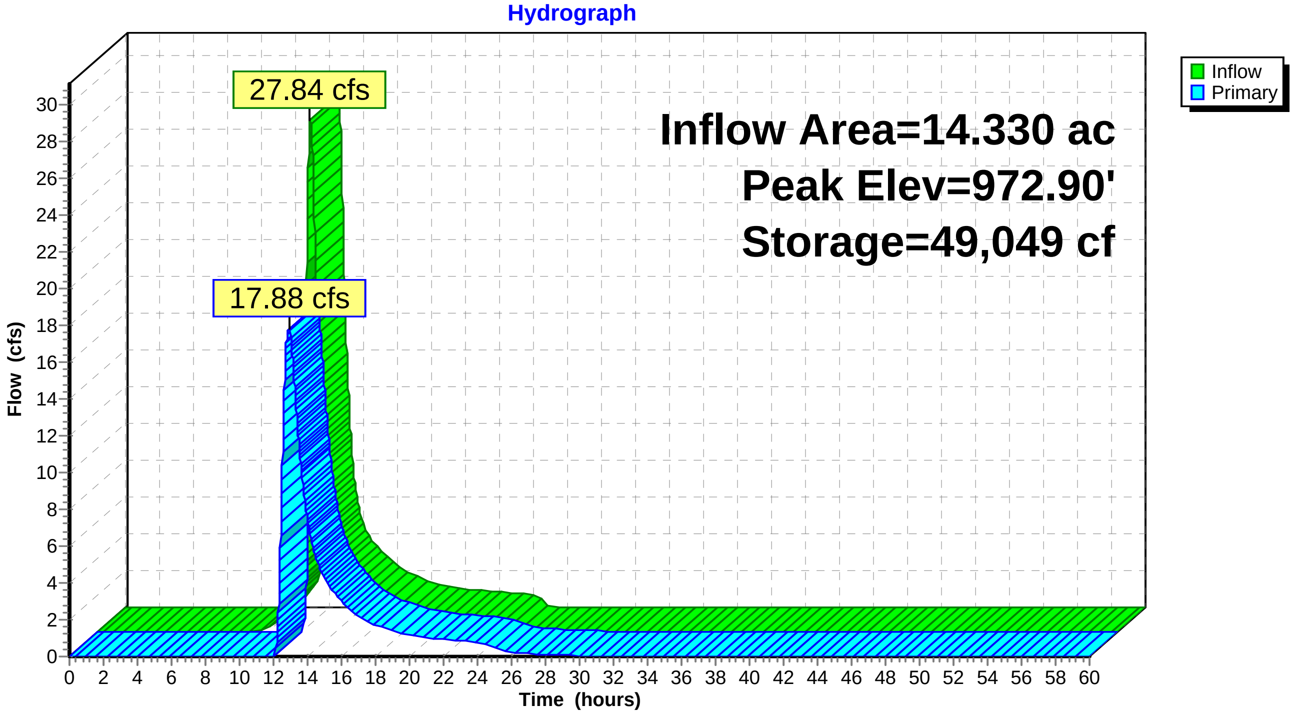
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=17.87 cfs @ 12.89 hrs HW=972.90' TW=972.38' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 17.87 cfs @ 1.48 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

Inflow Area = 5.526 ac, 2.32% Impervious, Inflow Depth = 13.57" for 25-Year event
Inflow = 80.76 cfs @ 12.83 hrs, Volume= 6.249 af
Outflow = 80.72 cfs @ 12.83 hrs, Volume= 6.249 af, Atten= 0%, Lag= 0.2 min
Primary = 57.90 cfs @ 12.83 hrs, Volume= 5.492 af
Secondary = 22.82 cfs @ 12.83 hrs, Volume= 0.757 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 613.19' @ 12.83 hrs Surf.Area= 341 sf Storage= 120 cf

Plug-Flow detention time= 0.0 min calculated for 6.247 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 792.1 - 792.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

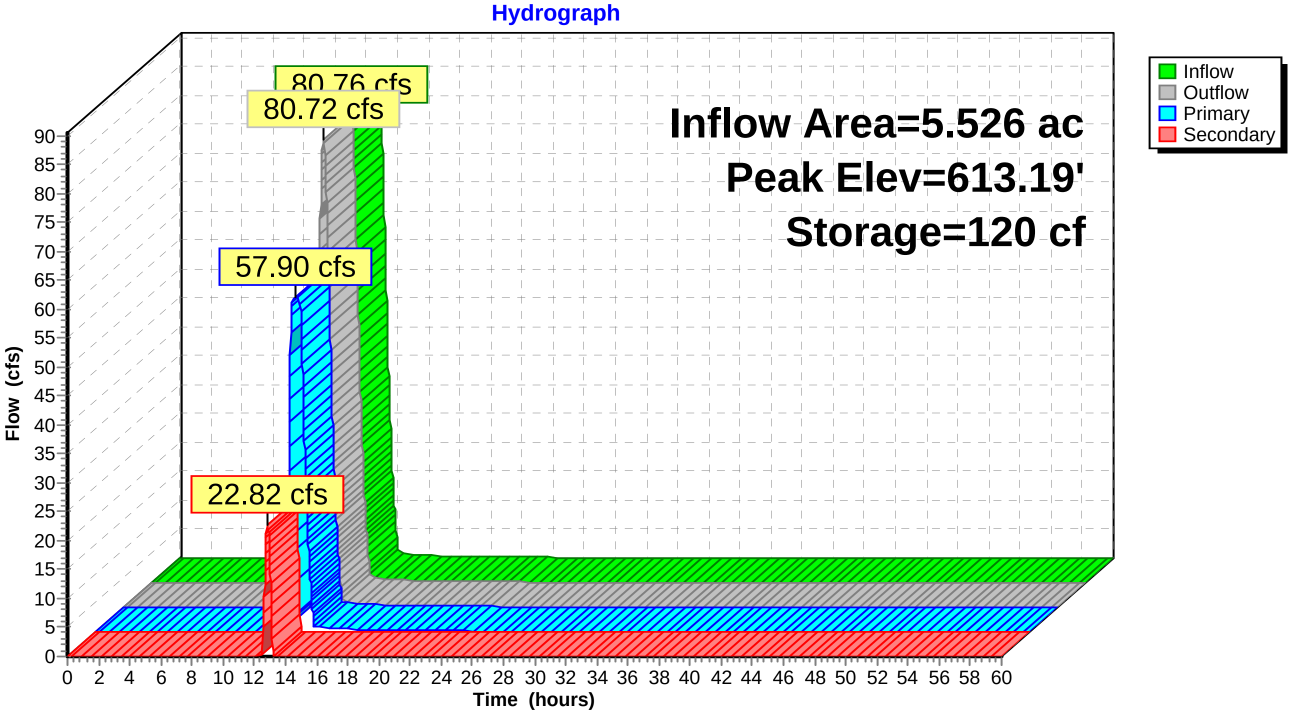
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=57.89 cfs @ 12.83 hrs HW=613.19' TW=610.16' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 57.89 cfs @ 8.19 fps)

**Secondary OutFlow** Max=22.79 cfs @ 12.83 hrs HW=613.19' TW=610.16' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 22.79 cfs @ 1.18 fps)

## Pond 108A: 36" Culvert



## Summary for Pond 108B: Wetland N

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 3.10" for 25-Year event
Inflow = 115.78 cfs @ 12.57 hrs, Volume= 18.712 af
Outflow = 115.72 cfs @ 12.58 hrs, Volume= 18.687 af, Atten= 0%, Lag= 0.8 min
Primary = 4.39 cfs @ 12.23 hrs, Volume= 4.011 af
Secondary = 111.65 cfs @ 12.58 hrs, Volume= 14.676 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.49' @ 12.58 hrs Surf.Area= 11,042 sf Storage= 15,155 cf

Plug-Flow detention time= 13.2 min calculated for 18.681 af (100% of inflow)
Center-of-Mass det. time= 12.2 min ( 891.7 - 879.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 32,385 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

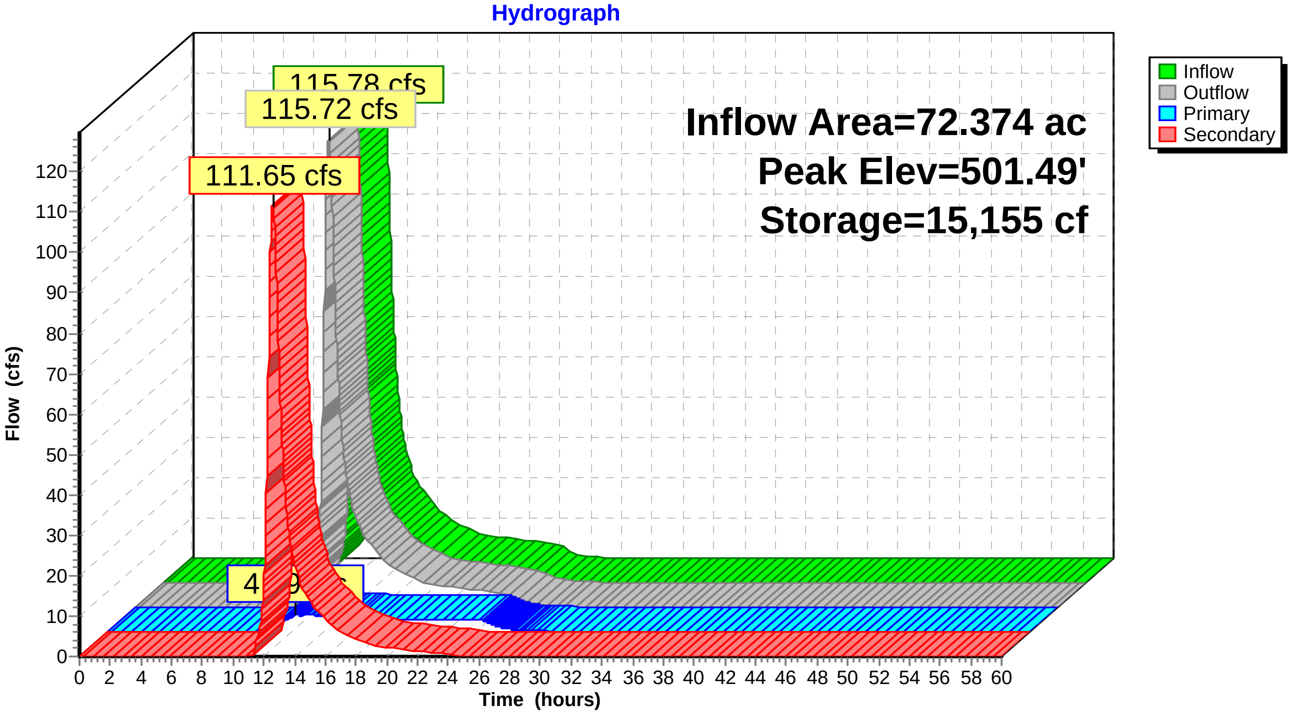
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 500.00 | 8,398 | 412.0 | 0 | 0 | 8,398 |
| 500.50 | 10,185 | 434.0 | 4,639 | 4,639 | 9,894 |
| 502.00 | 11,496 | 452.0 | 16,251 | 20,889 | 11,327 |
| 503.00 | 11,496 | 452.0 | 11,496 | 32,385 | 11,779 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.10' | **18.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 500.10' / 499.60' S= 0.0250 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 501.00' | **125.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=4.39 cfs @ 12.23 hrs HW=501.32' TW=500.59' (Dynamic Tailwater)
└—**1=Culvert** (Outlet Controls 4.39 cfs @ 3.91 fps)

**Secondary OutFlow** Max=111.65 cfs @ 12.58 hrs HW=501.49' TW=501.05' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir** (Weir Controls 111.65 cfs @ 1.82 fps)

## Pond 108B: Wetland N



## Summary for Pond 109B: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 3.22" for 25-Year event
Inflow = 25.08 cfs @ 12.40 hrs, Volume= 3.025 af
Outflow = 25.09 cfs @ 12.40 hrs, Volume= 3.025 af, Atten= 0%, Lag= 0.2 min
Primary = 25.09 cfs @ 12.40 hrs, Volume= 3.025 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 547.59' @ 12.40 hrs Surf.Area= 148 sf Storage= 118 cf

Plug-Flow detention time= 0.0 min calculated for 3.024 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 853.8 - 853.8 )

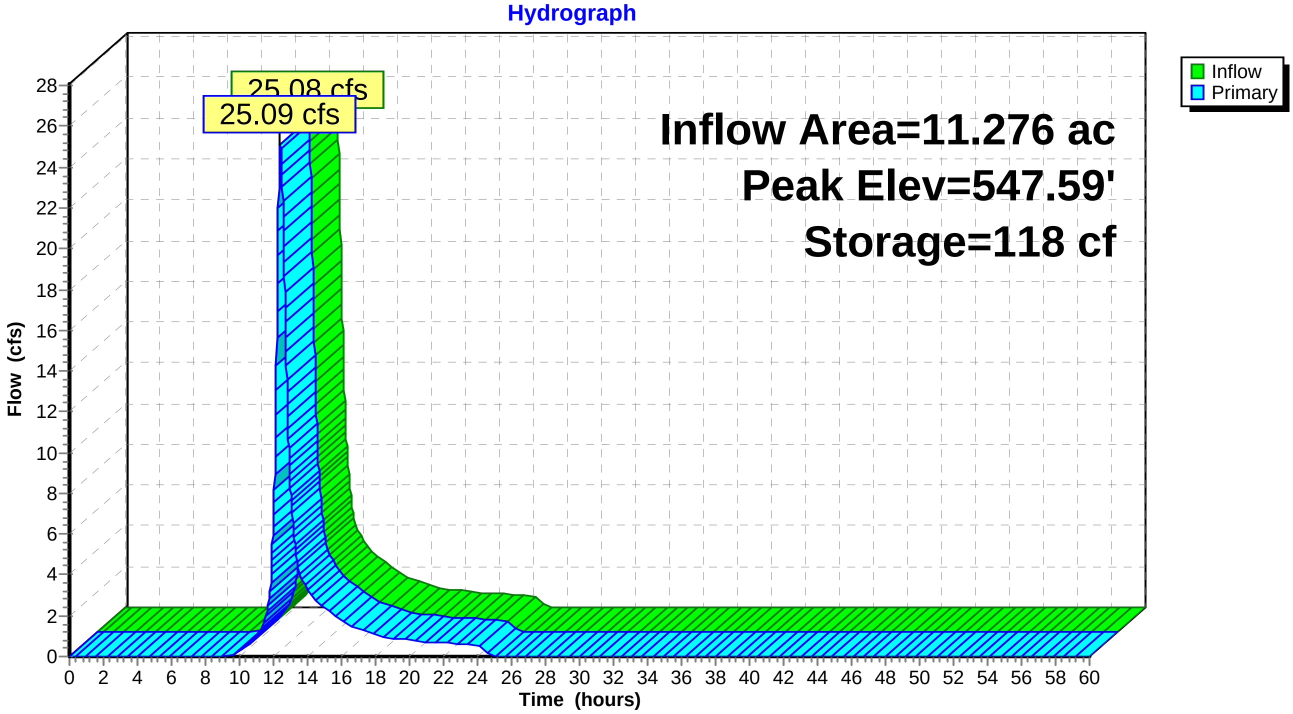
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 545.20' | 5,884 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 545.20 | 0 | 0.0 | 0 | 0 | 0 |
| 548.00 | 203 | 65.0 | 189 | 189 | 348 |
| 550.00 | 519 | 101.0 | 698 | 887 | 852 |
| 552.00 | 1,050 | 140.0 | 1,538 | 2,425 | 1,638 |
| 554.00 | 2,514 | 230.0 | 3,459 | 5,884 | 4,313 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 545.20' | **36.0" Round Culvert**<br>L= 96.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 545.20' / 532.20' S= 0.1354 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Primary | 552.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 65.00 95.00<br>Height (feet) 2.00 0.60 0.00 2.00 |

**Primary OutFlow** Max=25.09 cfs @ 12.40 hrs HW=547.59' TW=533.11' (Dynamic Tailwater)
├─**1=Culvert** (Inlet Controls 25.09 cfs @ 4.16 fps)
└─**2=Asymmetrical Weir** ( Controls 0.00 cfs)

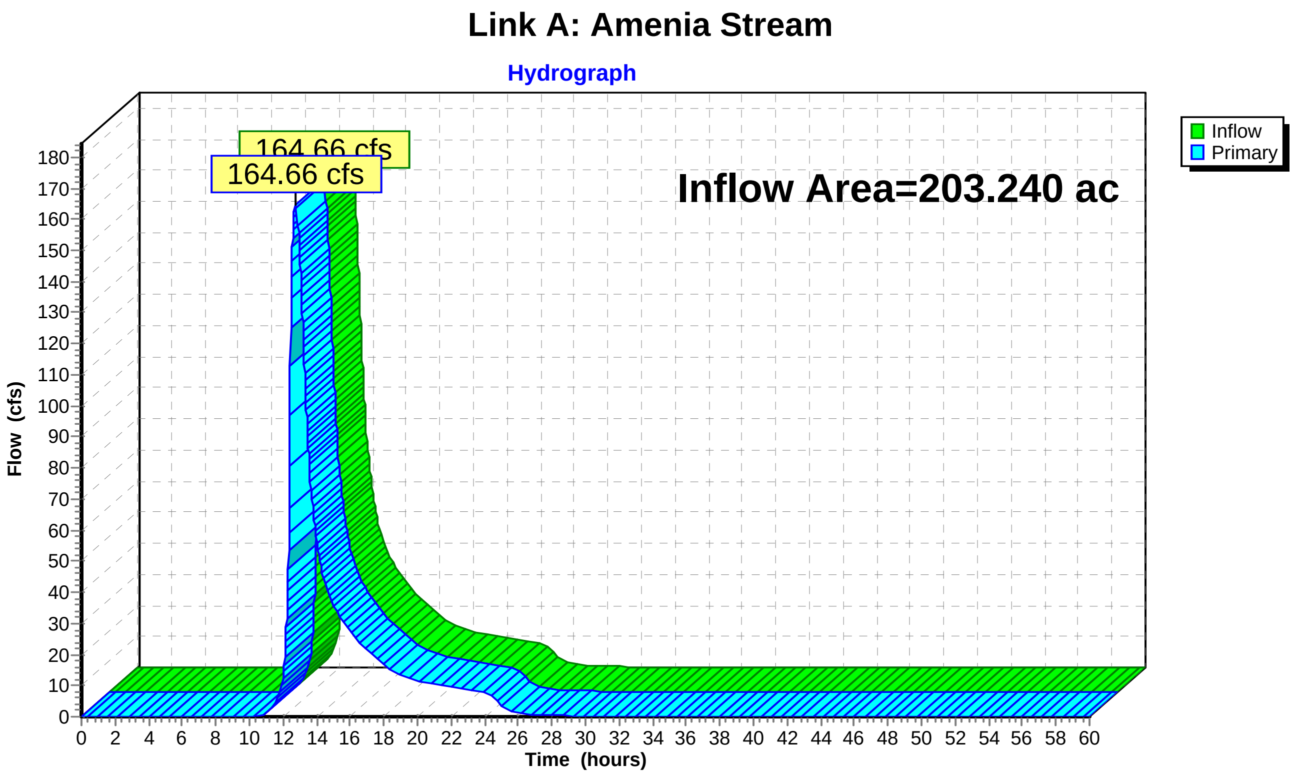
## Pond 109B: 36" Culvert



## Summary for Link A: Amenia Stream

Inflow Area = 203.240 ac, 3.66% Impervious, Inflow Depth = 1.94" for 25-Year event
Inflow = 164.66 cfs @ 12.72 hrs, Volume= 32.781 af
Primary = 164.66 cfs @ 12.72 hrs, Volume= 32.781 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

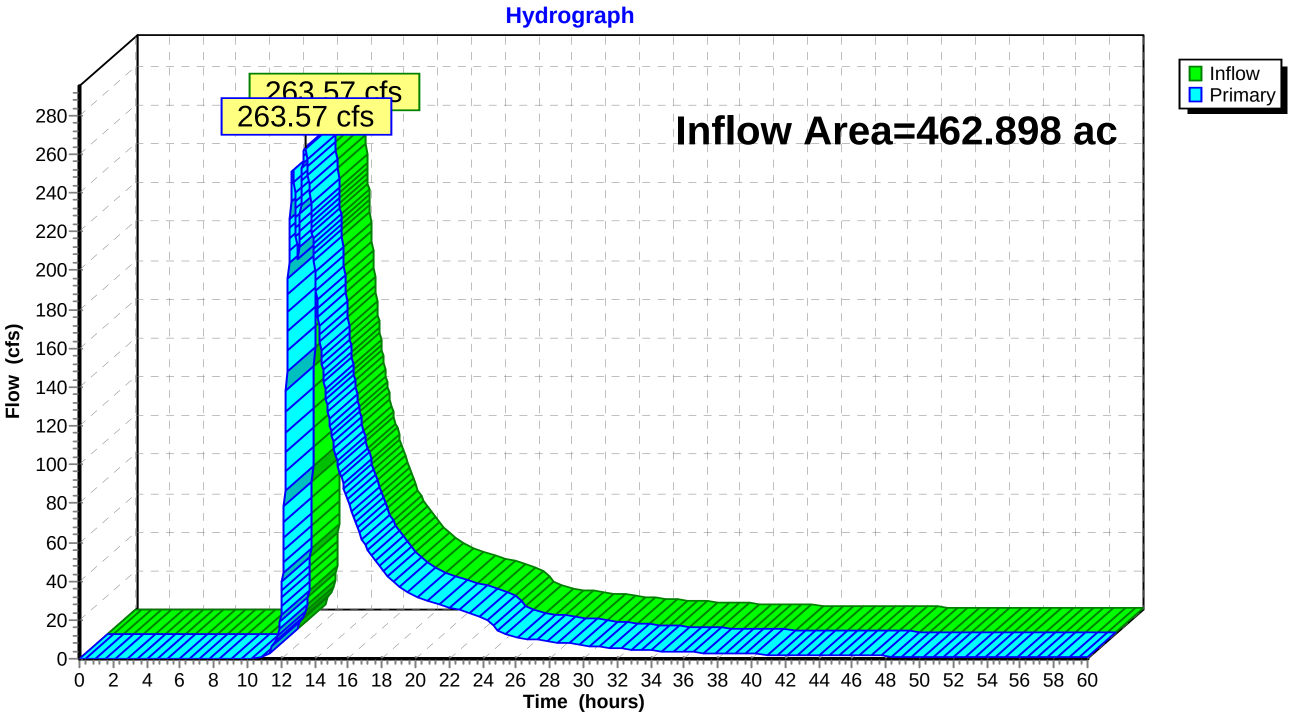


## Summary for Link B: Wetland

Inflow Area = 462.898 ac, 3.63% Impervious, Inflow Depth > 2.36" for 25-Year event
Inflow = 263.57 cfs @ 13.41 hrs, Volume= 91.079 af
Primary = 263.57 cfs @ 13.41 hrs, Volume= 91.079 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

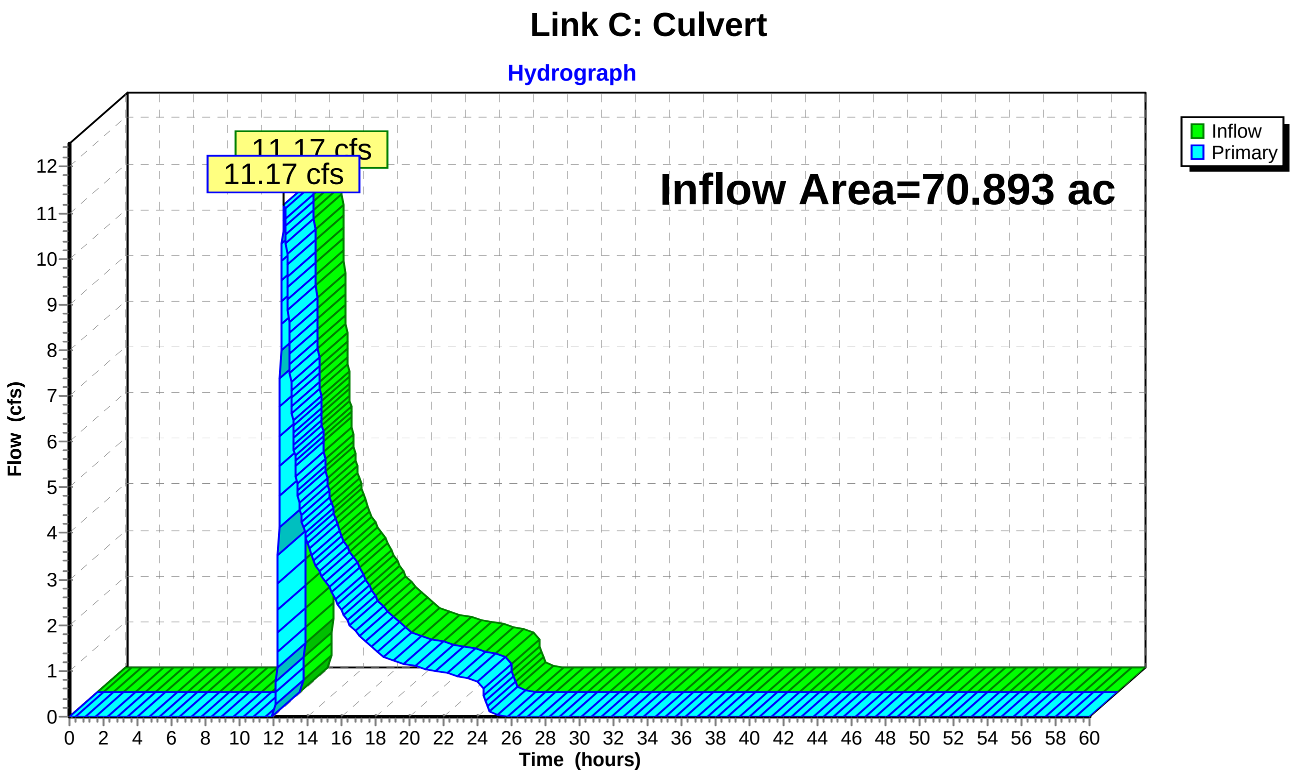
### Link B: Wetland



## Summary for Link C: Culvert

Inflow Area = 70.893 ac, 4.53% Impervious, Inflow Depth = 0.39" for 25-Year event
Inflow = 11.17 cfs @ 12.63 hrs, Volume= 2.323 af
Primary = 11.17 cfs @ 12.63 hrs, Volume= 2.323 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

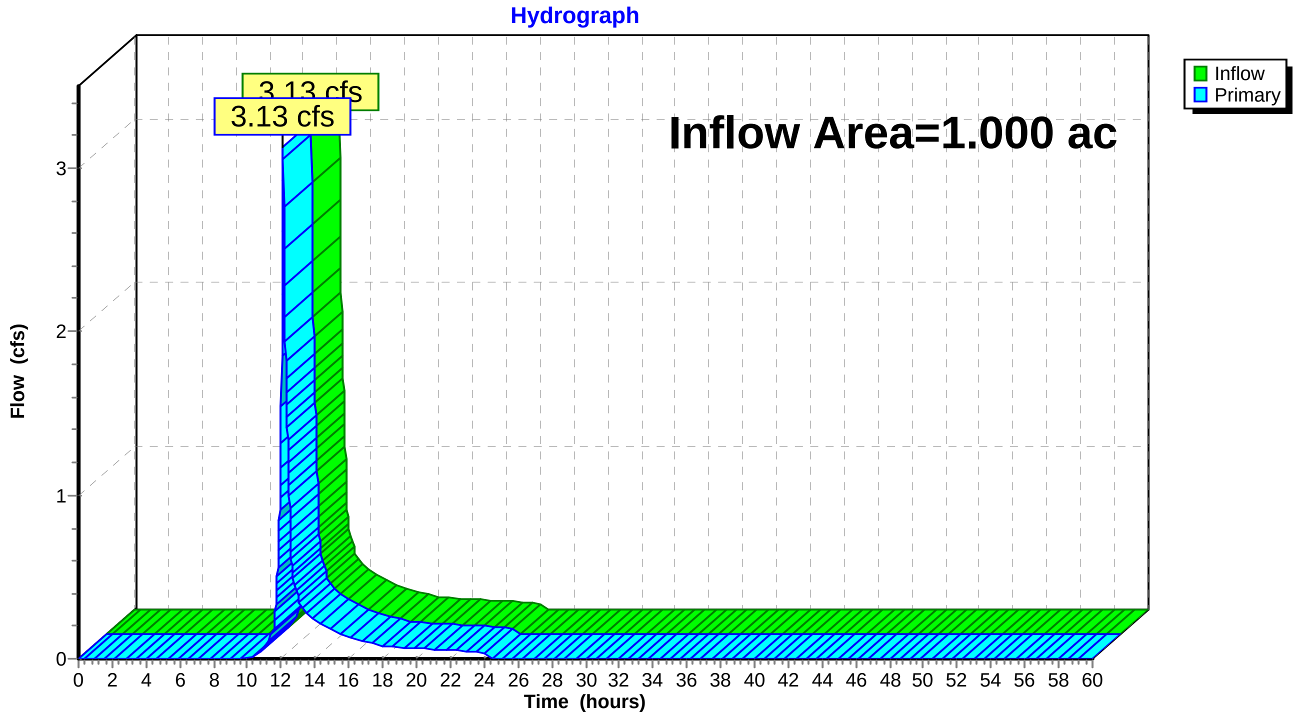


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 1.000 ac, | 0.00% Impervious, Inflow Depth = 2.78" | for 25-Year event | |
| Inflow = | 3.13 cfs @ | 12.11 hrs, Volume= | 0.232 af | |
| Primary = | 3.13 cfs @ | 12.11 hrs, Volume= | 0.232 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=43.269 ac 4.21% Impervious Runoff Depth=0.80"
Flow Length=1,315' Tc=31.0 min CN=46 Runoff=11.02 cfs 2.867 af

**Subcatchment A102: A102** Runoff Area=9.187 ac 13.40% Impervious Runoff Depth=1.14"
Flow Length=675' Tc=29.1 min CN=50 Runoff=4.60 cfs 0.875 af

**Subcatchment A103: A103** Runoff Area=36.735 ac 8.79% Impervious Runoff Depth=1.33"
Flow Length=1,190' Tc=45.1 min CN=52 Runoff=19.17 cfs 4.070 af

**Subcatchment A104: A104** Runoff Area=9.432 ac 9.40% Impervious Runoff Depth=0.71"
Flow Length=1,015' Tc=29.2 min CN=45 Runoff=2.01 cfs 0.561 af

**Subcatchment A105: A105** Runoff Area=34.264 ac 3.27% Impervious Runoff Depth=2.14"
Flow Length=1,326' Tc=19.2 min CN=60 Runoff=53.62 cfs 6.119 af

**Subcatchment A106: A106** Runoff Area=15.338 ac 8.12% Impervious Runoff Depth=3.98"
Flow Length=1,260' Tc=26.7 min CN=76 Runoff=43.48 cfs 5.084 af

**Subcatchment A107: A107** Runoff Area=95.411 ac 2.35% Impervious Runoff Depth=3.62"
Flow Length=3,685' Tc=61.0 min CN=73 Runoff=159.87 cfs 28.770 af

**Subcatchment A108: A108** Runoff Area=5.526 ac 2.32% Impervious Runoff Depth=1.83"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=5.73 cfs 0.841 af

**Subcatchment B101: B101** Runoff Area=127.641 ac 0.75% Impervious Runoff Depth=2.47"
Flow Length=2,934' Tc=43.8 min CN=63 Runoff=165.21 cfs 26.266 af

**Subcatchment B102: B102** Runoff Area=6.499 ac 2.62% Impervious Runoff Depth=1.43"
Flow Length=637' Tc=19.6 min CN=53 Runoff=5.40 cfs 0.772 af

**Subcatchment B103: B103** Runoff Area=21.581 ac 11.93% Impervious Runoff Depth=3.50"
Flow Length=1,130' Tc=38.7 min CN=72 Runoff=44.87 cfs 6.294 af

**Subcatchment B104: B104** Runoff Area=80.536 ac 13.45% Impervious Runoff Depth=2.47"
Flow Length=3,223' Tc=33.2 min CN=63 Runoff=120.25 cfs 16.573 af

**Subcatchment B105: B105** Runoff Area=23.978 ac 2.94% Impervious Runoff Depth=3.15"
Flow Length=1,400' Tc=38.0 min CN=69 Runoff=44.91 cfs 6.292 af

**Subcatchment B106: B106** Runoff Area=130.289 ac 0.83% Impervious Runoff Depth=3.98"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=193.32 cfs 43.185 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=4.10"
Flow Length=907' Tc=37.9 min CN=77 Runoff=35.50 cfs 4.894 af

**Subcatchment B108: B108** Runoff Area=46.768 ac 1.07% Impervious Runoff Depth=3.98"
Flow Length=2,241' Tc=39.8 min CN=76 Runoff=109.58 cfs 15.501 af

**Subcatchment B109: B109** Runoff Area=11.276 ac 0.04% Impervious Runoff Depth=4.10"
Flow Length=1,048' Tc=28.5 min CN=77 Runoff=31.99 cfs 3.851 af

**Subcatchment C101: C101** Runoff Area=30.507 ac 4.58% Impervious Runoff Depth=1.43"
Flow Length=1,500' Tc=31.9 min CN=53 Runoff=21.18 cfs 3.625 af

**Subcatchment C102: C102** Runoff Area=40.386 ac 4.49% Impervious Runoff Depth=2.58"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=54.14 cfs 8.684 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=3.62"
Flow Length=176' Tc=7.5 min CN=73 Runoff=4.10 cfs 0.302 af

**Reach A105R: Thru A101** Avg. Flow Depth=1.96' Max Vel=7.91 fps Inflow=92.87 cfs 11.186 af
n=0.050 L=1,075.0' S=0.0577 '/' Capacity=152.54 cfs Outflow=91.49 cfs 11.186 af

**Reach A106R: Thru A105** Avg. Flow Depth=1.14' Max Vel=6.92 fps Inflow=43.49 cfs 5.084 af
n=0.050 L=1,215.0' S=0.0922 '/' Capacity=153.12 cfs Outflow=42.95 cfs 5.084 af

**Reach A108R: Thru A101** Avg. Flow Depth=2.47' Max Vel=10.94 fps Inflow=163.71 cfs 29.611 af
n=0.050 L=1,090.0' S=0.0862 '/' Capacity=244.78 cfs Outflow=163.32 cfs 29.611 af

**Reach B102R: Thru B101** Avg. Flow Depth=2.60' Max Vel=5.41 fps Inflow=261.69 cfs 70.878 af
n=0.050 L=122.0' S=0.0164 '/' Capacity=356.26 cfs Outflow=261.69 cfs 70.876 af

**Reach B103R: Thru B102** Avg. Flow Depth=3.37' Max Vel=6.32 fps Inflow=260.40 cfs 70.115 af
n=0.050 L=585.0' S=0.0171 '/' Capacity=374.39 cfs Outflow=260.28 cfs 70.106 af

**Reach B107R: Thru B108** Avg. Flow Depth=0.44' Max Vel=6.27 fps Inflow=24.74 cfs 4.618 af
n=0.050 L=2,040.0' S=0.2294 '/' Capacity=144.21 cfs Outflow=24.44 cfs 4.618 af

**Reach B108R: Thur 101** Avg. Flow Depth=1.67' Max Vel=6.05 fps Inflow=152.20 cfs 23.945 af
n=0.050 L=233.0' S=0.0318 '/' Capacity=474.00 cfs Outflow=152.18 cfs 23.945 af

**Reach B109R: Thru B108** Avg. Flow Depth=1.02' Max Vel=6.23 fps Inflow=31.97 cfs 3.851 af
n=0.050 L=355.0' S=0.0851 '/' Capacity=147.09 cfs Outflow=31.93 cfs 3.851 af

**Pond 102A: Wetland B** Peak Elev=499.09' Storage=38,113 cf Inflow=4.60 cfs 0.875 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 102B: 18" Culvert** Peak Elev=495.96' Storage=7,163 cf Inflow=261.70 cfs 70.878 af
Primary=10.04 cfs 19.524 af Secondary=253.85 cfs 51.354 af Outflow=261.69 cfs 70.878 af

**Pond 102C: Pond 102C** Peak Elev=509.05' Storage=321,933 cf Inflow=54.14 cfs 8.684 af
Outflow=2.88 cfs 1.557 af

**Pond 103A: Wetland A** Peak Elev=501.37' Storage=177,309 cf Inflow=19.17 cfs 4.070 af
24.0" Round Culvert n=0.013 L=80.0' S=-0.0125 '/' Outflow=0.00 cfs 0.000 af

**Pond 103B: Irrigation Pond** Peak Elev=506.71' Storage=81,995 cf Inflow=120.16 cfs 43.784 af
Primary=14.12 cfs 11.007 af Secondary=104.13 cfs 32.528 af Outflow=118.25 cfs 43.535 af

**Pond 104A: Wetland D** Peak Elev=508.02' Storage=7,016 cf Inflow=2.01 cfs 0.561 af
Primary=0.30 cfs 0.390 af Secondary=0.62 cfs 0.151 af Outflow=0.93 cfs 0.541 af

**Pond 104B: Island Pond** Peak Elev=510.76' Storage=632,502 cf Inflow=272.01 cfs 66.049 af
Primary=14.81 cfs 21.244 af Secondary=88.62 cfs 16.245 af Tertiary=142.21 cfs 26.580 af Outflow=245.64 cfs 64.069 af

**Pond 105A: Wetland H** Peak Elev=575.33' Storage=67,549 cf Inflow=93.62 cfs 11.202 af
Primary=11.02 cfs 7.137 af Secondary=81.85 cfs 4.049 af Outflow=92.87 cfs 11.186 af

**Pond 105B: Wetland J** Peak Elev=516.55' Storage=52,775 cf Inflow=212.79 cfs 49.477 af
Outflow=212.56 cfs 49.476 af

**Pond 106A: 36" Culvert** Peak Elev=719.83' Storage=119 cf Inflow=43.48 cfs 5.084 af
Primary=43.49 cfs 5.084 af Secondary=0.00 cfs 0.000 af Outflow=43.49 cfs 5.084 af

**Pond 106B: Wetland J** Peak Elev=527.15' Storage=24,759 cf Inflow=193.32 cfs 43.185 af
Outflow=193.23 cfs 43.185 af

**Pond 107A: 24" Culvert** Peak Elev=626.26' Storage=3,490 cf Inflow=159.87 cfs 28.770 af
Primary=44.18 cfs 19.427 af Secondary=115.70 cfs 9.343 af Outflow=159.88 cfs 28.770 af

**Pond 107B: Wetland** Peak Elev=972.97' Storage=58,109 cf Inflow=35.50 cfs 4.894 af
Outflow=24.74 cfs 4.618 af

**Pond 108A: 36" Culvert** Peak Elev=613.37' Storage=201 cf Inflow=119.48 cfs 10.184 af
Primary=58.86 cfs 7.237 af Secondary=61.50 cfs 2.948 af Outflow=119.53 cfs 10.184 af

**Pond 108B: Wetland N** Peak Elev=501.63' Storage=16,699 cf Inflow=152.36 cfs 23.970 af
Primary=4.39 cfs 4.259 af Secondary=148.19 cfs 19.687 af Outflow=152.20 cfs 23.945 af

**Pond 109B: 36" Culvert** Peak Elev=548.10' Storage=209 cf Inflow=31.99 cfs 3.851 af
Outflow=31.97 cfs 3.851 af

**Link A: Amenia Stream** Inflow=226.07 cfs 44.204 af
Primary=226.07 cfs 44.204 af

**Link B: Wetland** Inflow=427.78 cfs 121.087 af
Primary=427.78 cfs 121.087 af

**Link C: Culvert** Inflow=21.18 cfs 5.182 af
Primary=21.18 cfs 5.182 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=4.10 cfs 0.302 af
Primary=4.10 cfs 0.302 af

**Total Runoff Area = 783.953 ac Runoff Volume = 185.427 af Average Runoff Depth = 2.84"**
**95.93% Pervious = 752.017 ac 4.07% Impervious = 31.936 ac**

## Summary for Subcatchment A101: A101

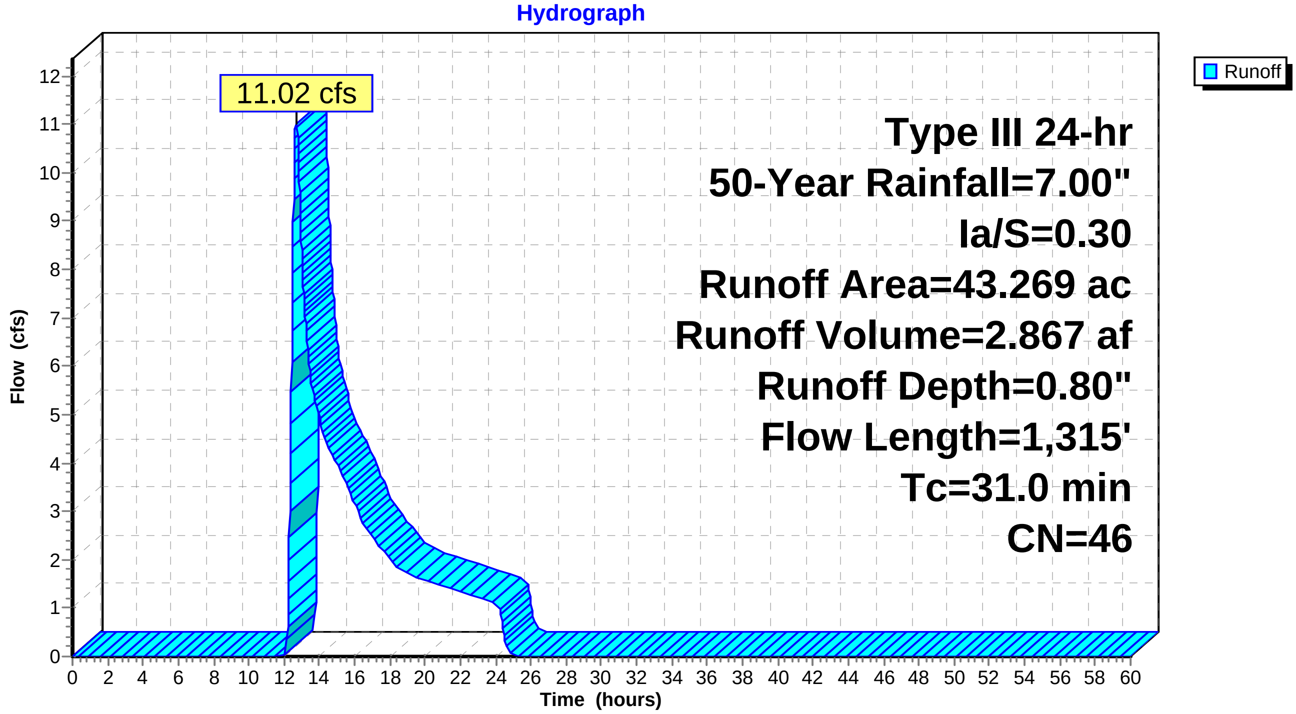
Runoff = 11.02 cfs @ 12.69 hrs, Volume= 2.867 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.819 | 98 | Paved surface |
| * | 0.089 | 96 | Gravel surface |
| * | 0.001 | 98 | Water Surface |
| | 31.250 | 39 | >75% Grass cover, Good, HSG A |
| | 6.738 | 61 | >75% Grass cover, Good, HSG B |
| | 1.730 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 1.164 | 30 | Woods, Good, HSG A |
| | 0.152 | 55 | Woods, Good, HSG B |
| | 0.088 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.223 | 30 | Sand trap, HSG A |
| * | 0.015 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 43.269 | 46 | Weighted Average |
| | 41.449 | | 95.79% Pervious Area |
| | 1.820 | | 4.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.9 | 100 | 0.0400 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.0 | 430 | 0.1200 | 2.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.5 | 360 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.6 | 425 | 0.0140 | 0.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 31.0 | 1,315 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

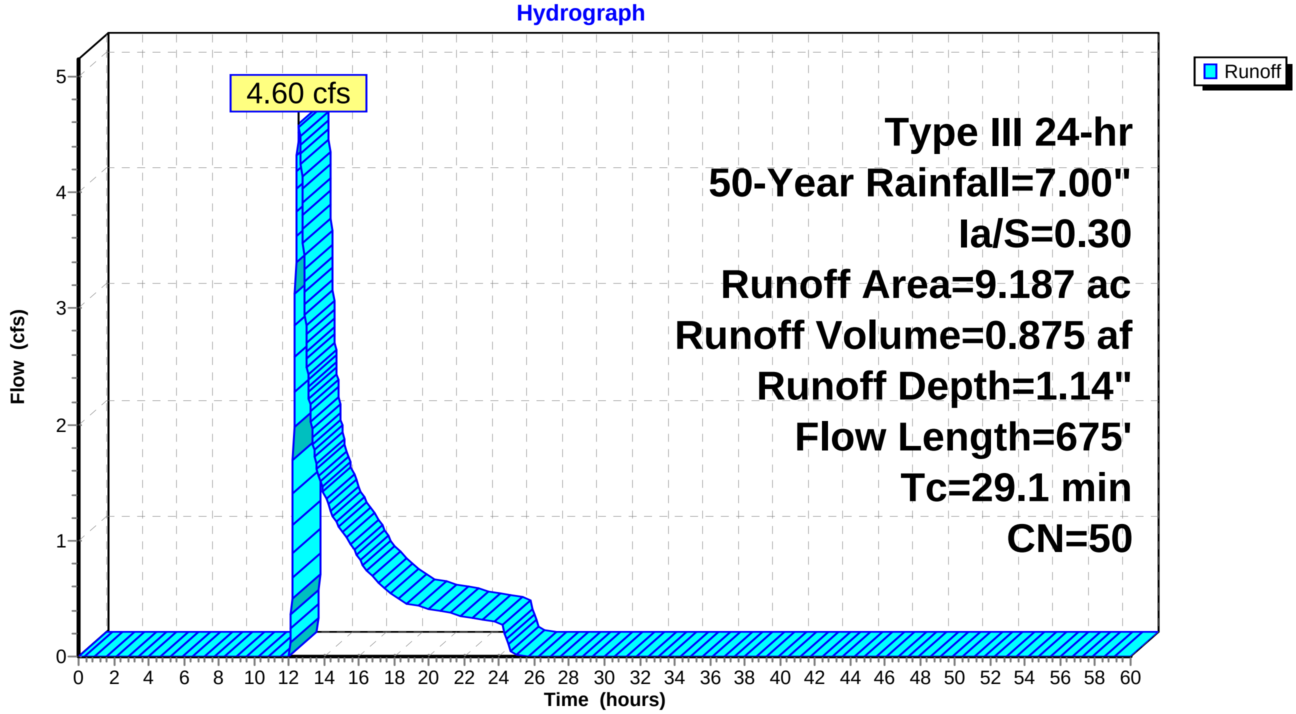
Runoff = 4.60 cfs @ 12.57 hrs, Volume= 0.875 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.387 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.844 | 98 | Water Surface |
| | 3.520 | 39 | >75% Grass cover, Good, HSG A |
| | 2.156 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.260 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.004 | 30 | Sand trap, HSG A |
| * | 0.016 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.187 | 50 | Weighted Average |
| | 7.956 | | 86.60% Pervious Area |
| | 1.231 | | 13.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 23.0 | 100 | 0.0600 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.1 | 575 | 0.0500 | 1.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.1 | 675 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

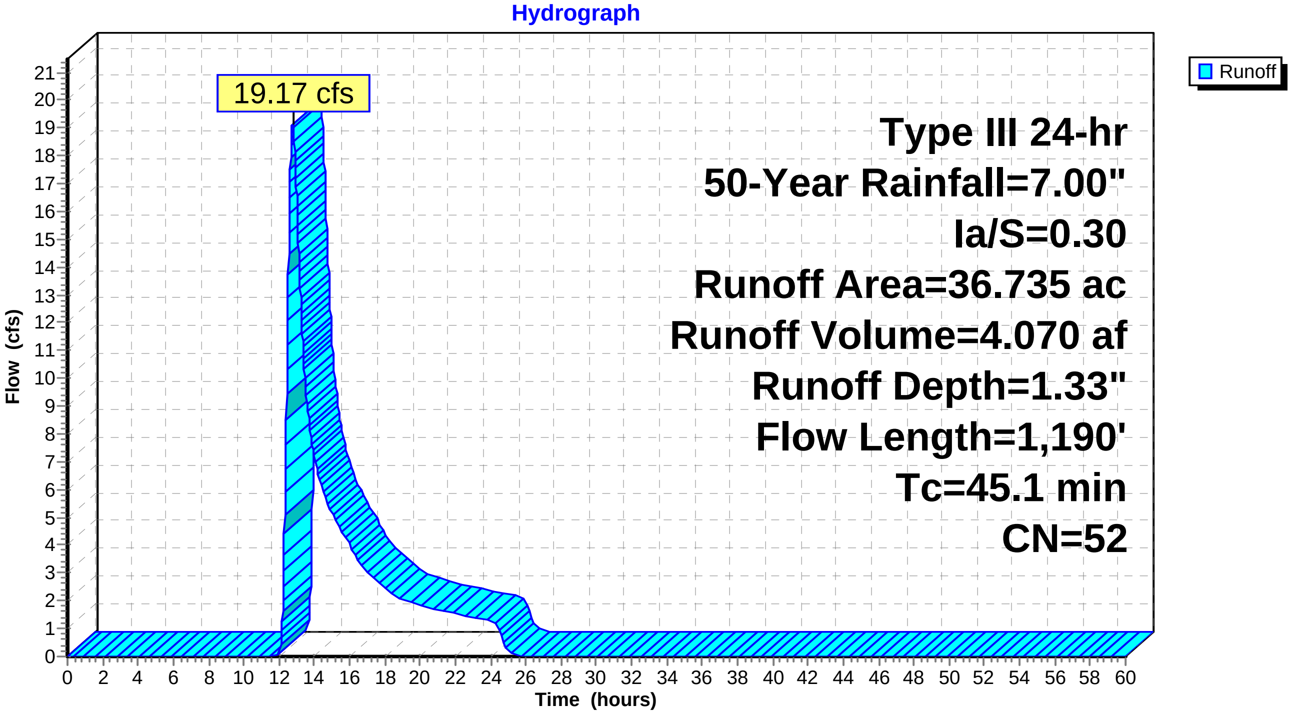
Runoff = 19.17 cfs @ 12.78 hrs, Volume= 4.070 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.334 | 98 | Building roof |
| * | 2.378 | 98 | Paved surface |
| * | 0.402 | 96 | Gravel surface |
| * | 0.516 | 98 | Water Surface |
| | 14.616 | 39 | >75% Grass cover, Good, HSG A |
| | 3.182 | 61 | >75% Grass cover, Good, HSG B |
| | 4.088 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 6.882 | 30 | Woods, Good, HSG A |
| | 1.635 | 55 | Woods, Good, HSG B |
| | 1.432 | 70 | Woods, Good, HSG C |
| | 1.137 | 77 | Woods, Good, HSG D |
| * | 0.095 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.009 | 30 | Sand Trap, HSG C |
| | 36.735 | 52 | Weighted Average |
| | 33.507 | | 91.21% Pervious Area |
| | 3.228 | | 8.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 35.7 | 100 | 0.0200 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.9 | 227 | 0.0190 | 0.96 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 75 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 343 | 0.0400 | 4.54 | 18.14 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' n= 0.050 |
| 3.7 | 445 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 45.1 | 1,190 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

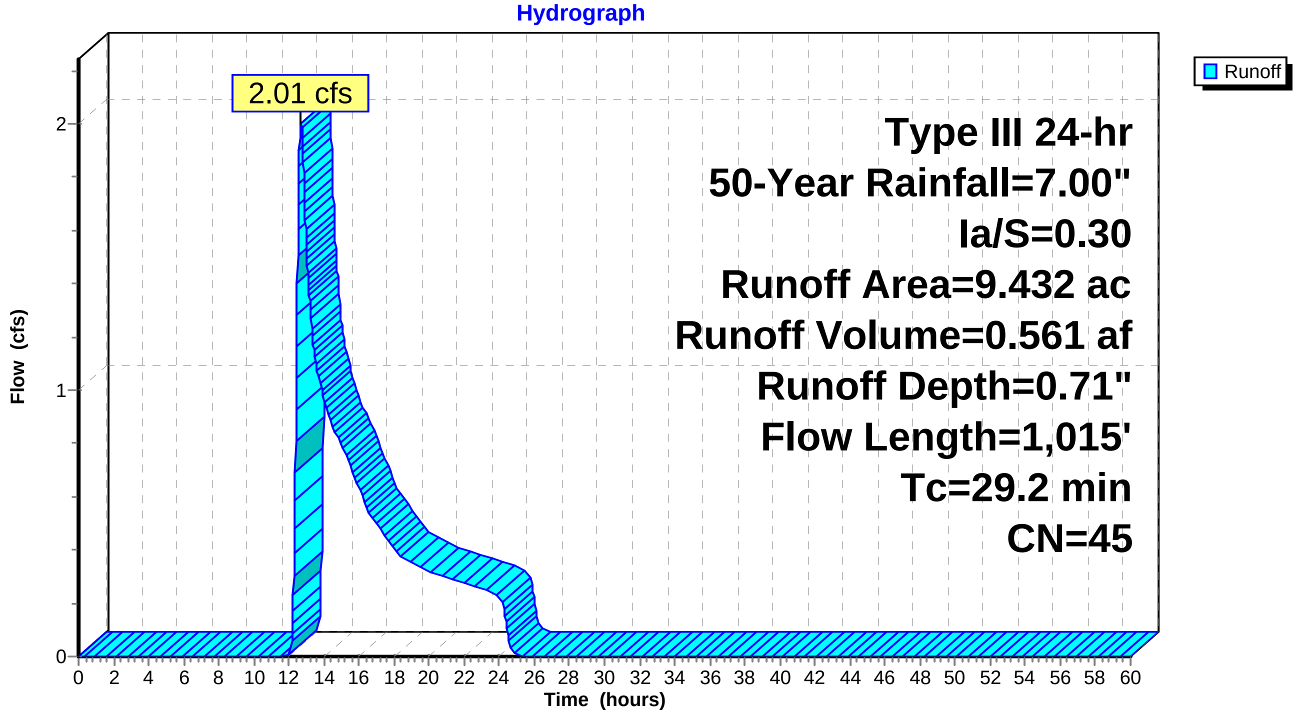
Runoff = 2.01 cfs @ 12.68 hrs, Volume= 0.561 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.458 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.429 | 98 | Water Surface |
| | 8.361 | 39 | >75% Grass cover, Good, HSG A |
| | 0.043 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.071 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.053 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.432 | 45 | Weighted Average |
| | 8.545 | | 90.60% Pervious Area |
| | 0.887 | | 9.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.9 | 100 | 0.0200 | 0.08 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.4 | 375 | 0.0700 | 1.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.5 | 255 | 0.1600 | 2.80 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.4 | 285 | 0.0400 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.2 | 1,015 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

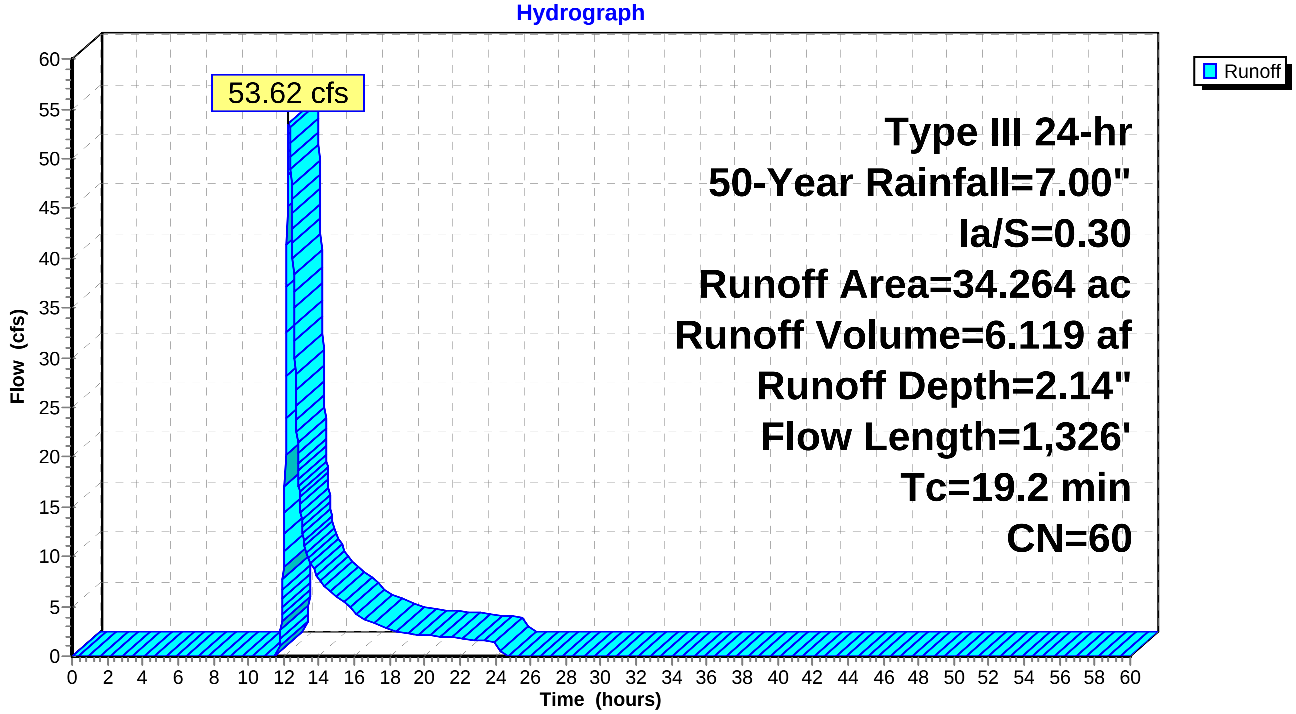
Runoff = 53.62 cfs @ 12.30 hrs, Volume= 6.119 af, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.119 | 98 | Paved surface |
| * | 0.088 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.167 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 15.618 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.226 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.911 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.135 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 34.264 | 60 | Weighted Average |
| | 33.145 | | 96.73% Pervious Area |
| | 1.119 | | 3.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 23 | 0.1700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.8 | 77 | 0.3000 | 0.13 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 150 | 0.3700 | 1.52 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.3 | 526 | 0.0950 | 6.52 | 32.61 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.8 | 550 | 0.0600 | 4.98 | 16.59 | **Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.035 High grass |
| 19.2 | 1,326 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

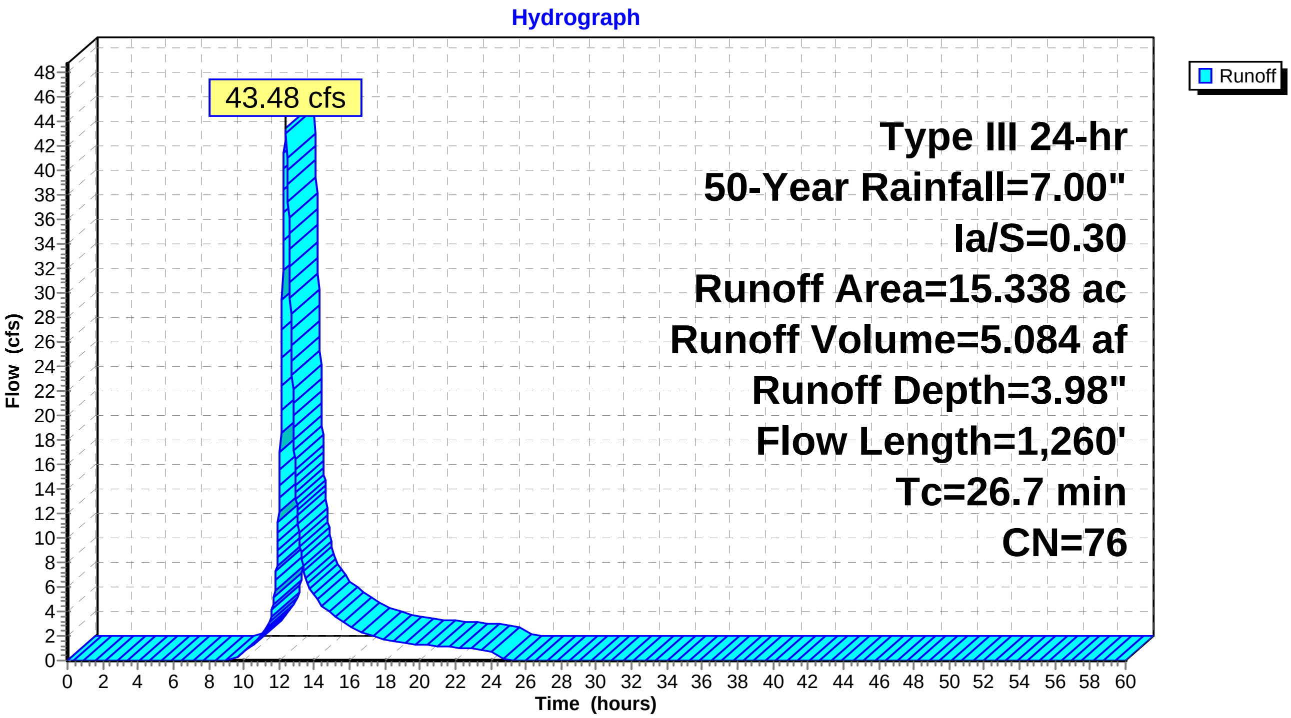
Runoff = 43.48 cfs @ 12.37 hrs, Volume= 5.084 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.013 | 98 | Building roof |
| * | 1.232 | 98 | Paved surface |
| * | 0.200 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.050 | 61 | >75% Grass cover, Good, HSG B |
| | 9.227 | 74 | >75% Grass cover, Good, HSG C |
| | 2.194 | 80 | >75% Grass cover, Good, HSG D |
| | 0.097 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.706 | 70 | Woods, Good, HSG C |
| | 0.619 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.338 | 76 | Weighted Average |
| | 14.093 | | 91.88% Pervious Area |
| | 1.245 | | 8.12% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

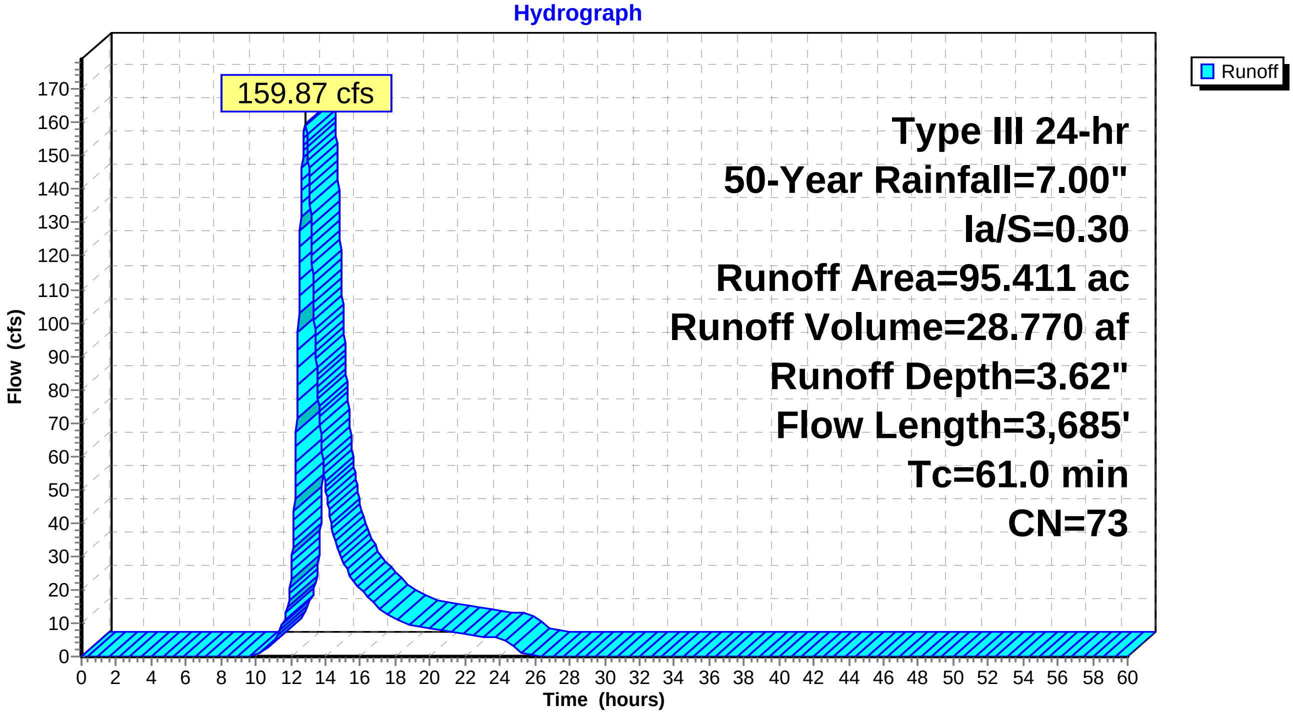
Runoff = 159.87 cfs @ 12.82 hrs, Volume= 28.770 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.392 | 98 | Building roof |
| * | 1.725 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.129 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 13.413 | 61 | >75% Grass cover, Good, HSG B |
| | 9.311 | 74 | >75% Grass cover, Good, HSG C |
| | 4.029 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 8.871 | 55 | Woods, Good, HSG B |
| | 4.853 | 70 | Woods, Good, HSG C |
| | 52.617 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 95.411 | 73 | Weighted Average |
| | 93.165 | | 97.65% Pervious Area |
| | 2.246 | | 2.35% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,**<br>W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,**<br>W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

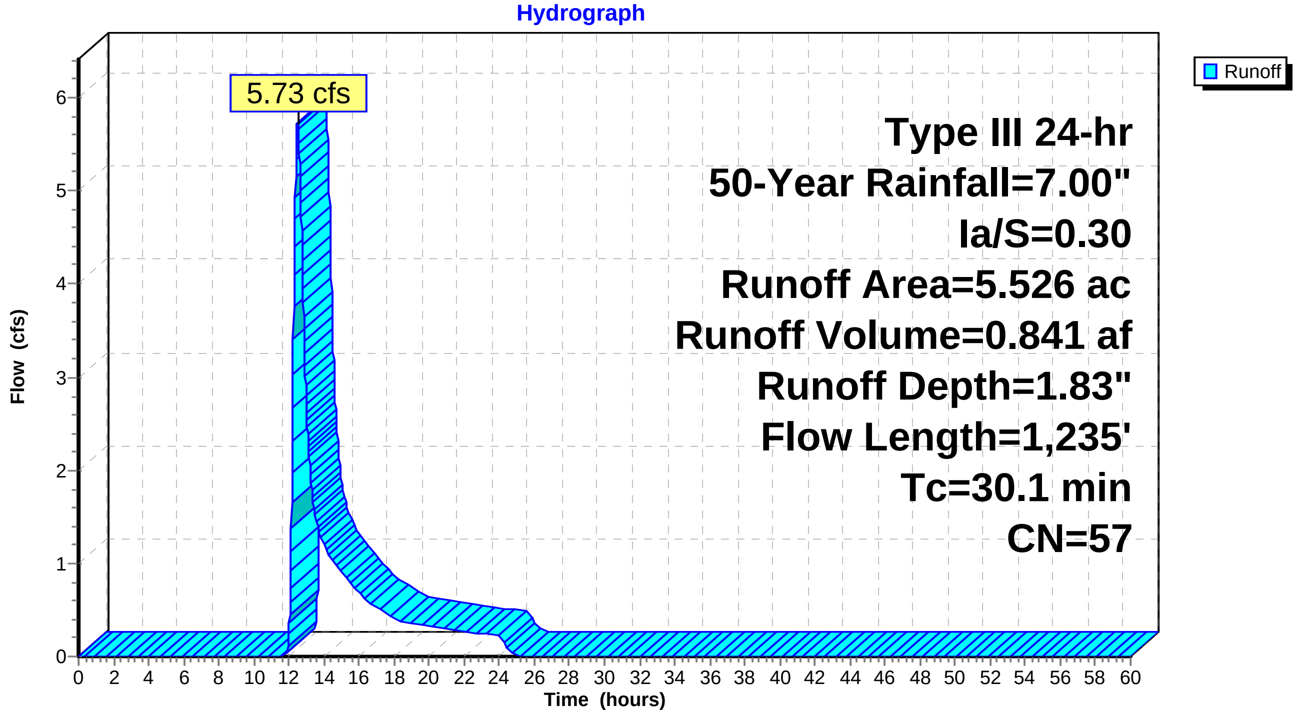
Runoff = 5.73 cfs @ 12.50 hrs, Volume= 0.841 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.088 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.629 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.526 | 57 | Weighted Average |
| | 5.398 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment B101: B101

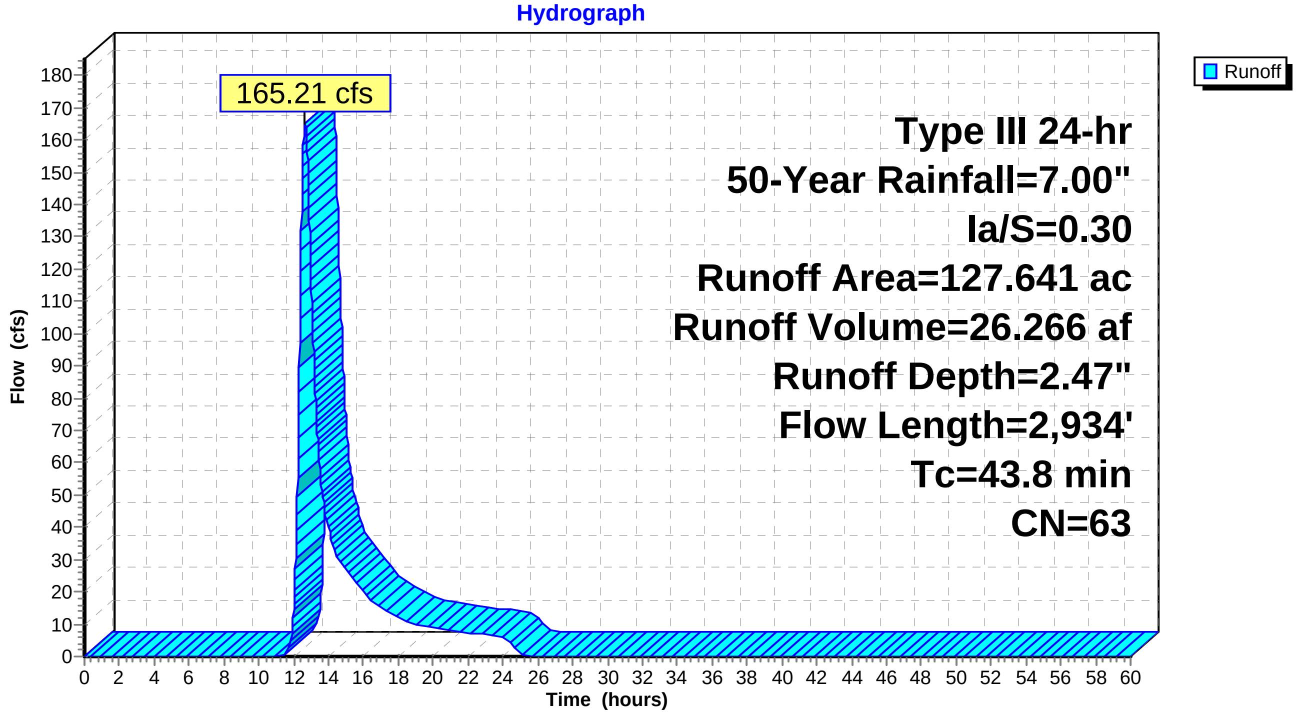
Runoff = 165.21 cfs @ 12.66 hrs, Volume= 26.266 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.005 | 98 | Building roof |
| * | 0.948 | 98 | Paved surface |
| * | 2.079 | 96 | Gravel surface |
| * | 0.002 | 98 | Water Surface |
| | 29.023 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 22.752 | 74 | >75% Grass cover, Good, HSG C |
| | 0.768 | 80 | >75% Grass cover, Good, HSG D |
| | 9.025 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 35.889 | 70 | Woods, Good, HSG C |
| | 27.094 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.056 | 30 | Sand Trap, HSG C |
| | 127.641 | 63 | Weighted Average |
| | 126.686 | | 99.25% Pervious Area |
| | 0.955 | | 0.75% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 506 | 0.1600 | 12.61 | 201.73 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.7 | 112 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.5 | 355 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 184 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 642 | 0.0500 | 9.49 | 63.28 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.035 High grass |
| 43.8 | 2,934 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

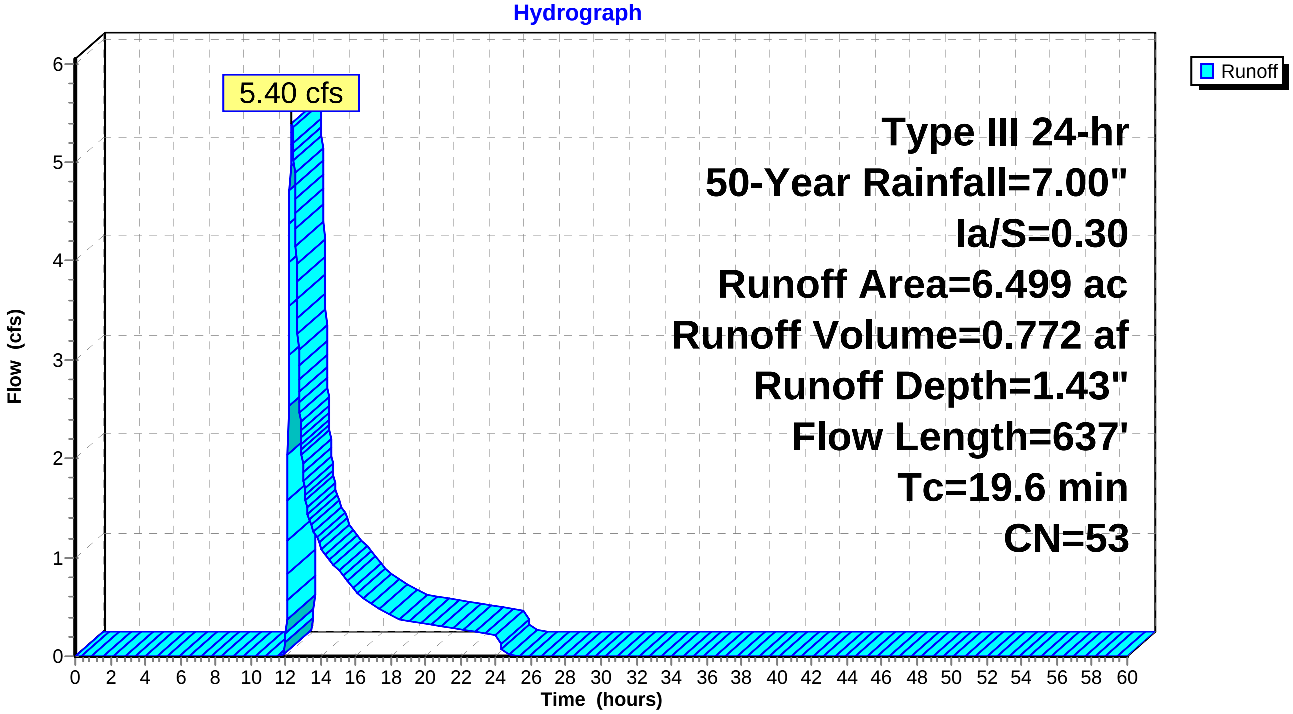
Runoff = 5.40 cfs @ 12.36 hrs, Volume= 0.772 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.170 | 98 | Paved surface |
| * | 0.290 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 3.039 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.097 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.839 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.064 | 30 | Sand Trap, HSG C |
| | 6.499 | 53 | Weighted Average |
| | 6.329 | | 97.38% Pervious Area |
| | 0.170 | | 2.62% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.6 | 637 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

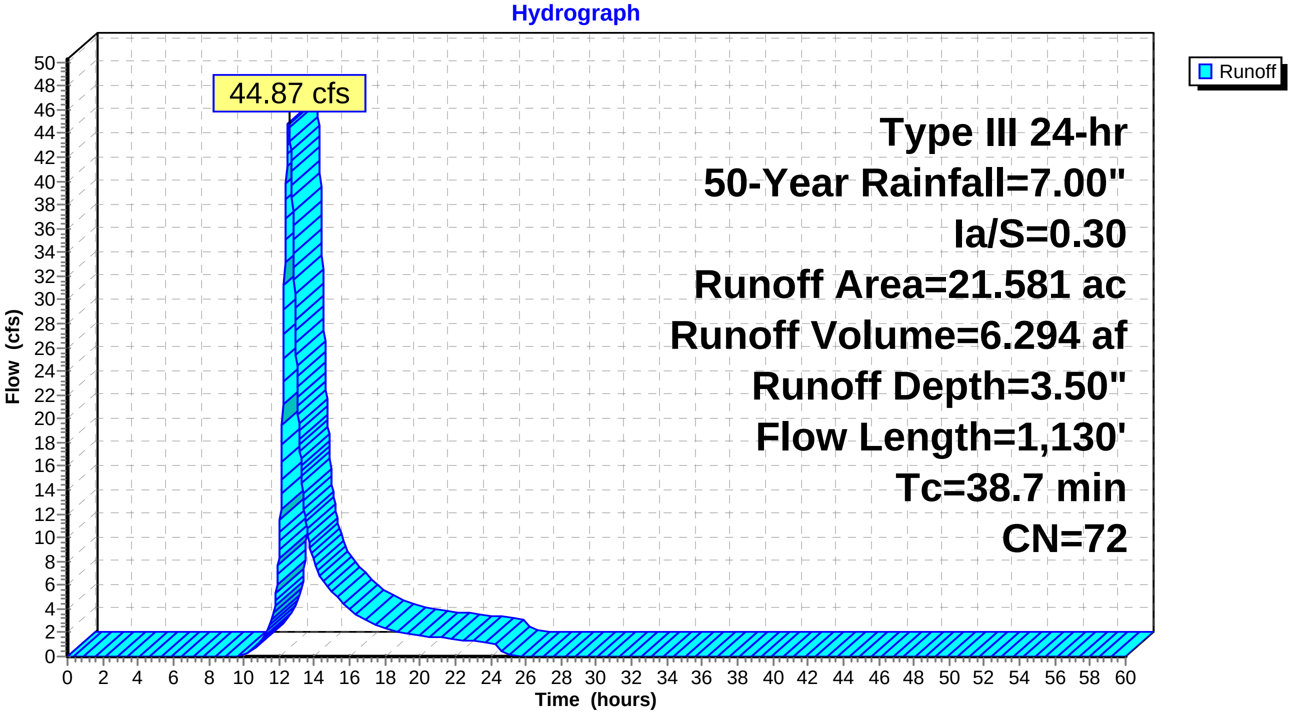
Runoff = 44.87 cfs @ 12.55 hrs, Volume= 6.294 af, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.550 | 98 | Paved surface |
| * | 0.039 | 96 | Gravel surface |
| * | 2.025 | 98 | Water Surface |
| | 3.869 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 6.689 | 74 | >75% Grass cover, Good, HSG C |
| | 0.522 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.459 | 70 | Woods, Good, HSG C |
| | 7.399 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.029 | 30 | Sand Trap, HSG C |
| | 21.581 | 72 | Weighted Average |
| | 19.006 | | 88.07% Pervious Area |
| | 2.575 | | 11.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.3 | 700 | 0.5500 | 1.85 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.6 | 280 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 50 | 0.7600 | 2.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 38.7 | 1,130 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

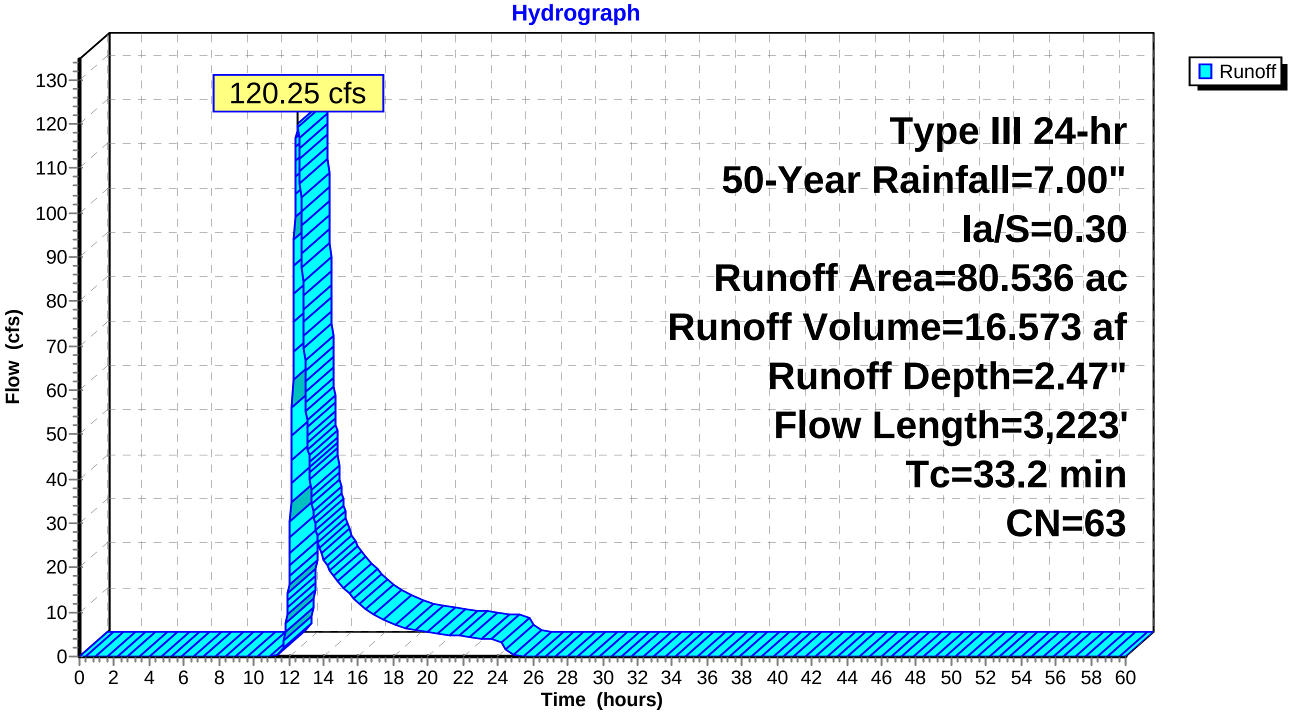
Runoff = 120.25 cfs @ 12.51 hrs, Volume= 16.573 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.411 | 98 | Building roof |
| * | 5.140 | 98 | Paved surface |
| * | 1.201 | 96 | Gravel surface |
| * | 5.280 | 98 | Water Surface |
| | 29.268 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 32.742 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.144 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.770 | 70 | Woods, Good, HSG C |
| | 1.252 | 77 | Woods, Good, HSG D |
| * | 0.185 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.143 | 30 | Sand Trap, HSG C |
| | 80.536 | 63 | Weighted Average |
| | 69.705 | | 86.55% Pervious Area |
| | 10.831 | | 13.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.9 | 100 | 0.1300 | 0.17 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 7.3 | 1,150 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.6 | 130 | 0.0300 | 3.52 | | **Shallow Concentrated Flow,**<br>Paved Kv= 20.3 fps |
| 15.4 | 1,843 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 33.2 | 3,223 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

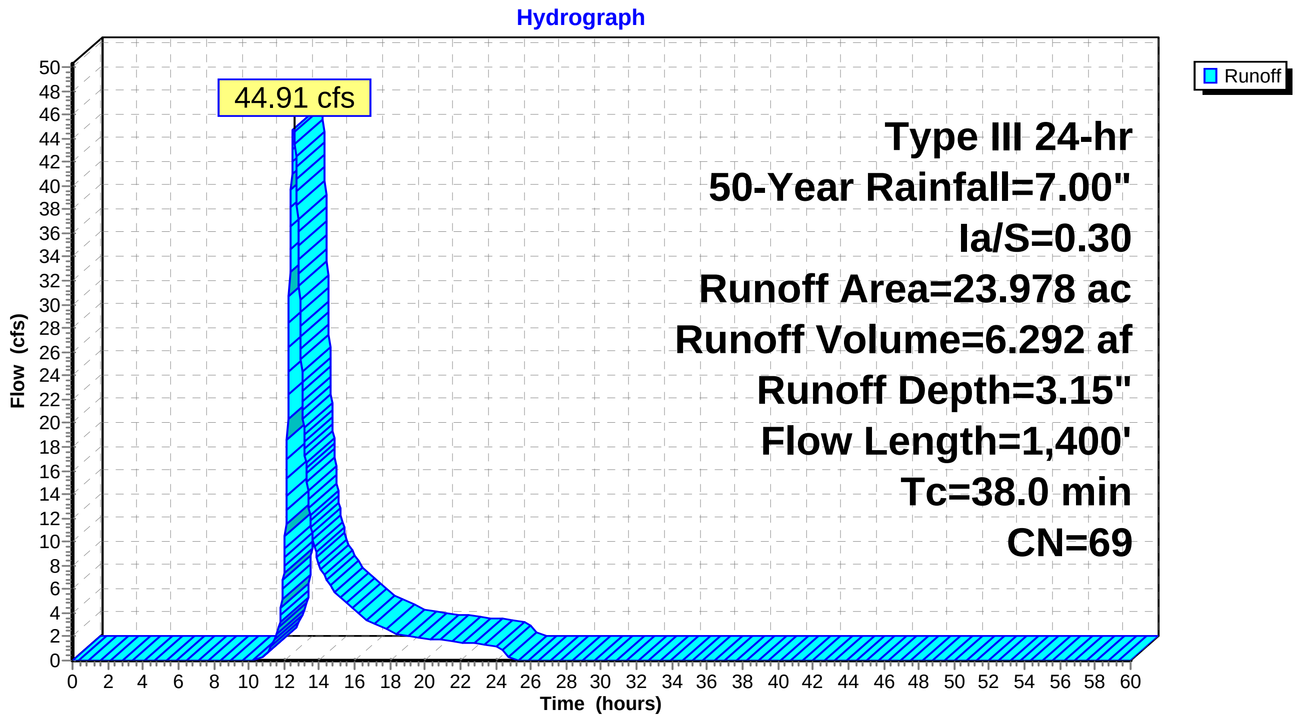
Runoff = 44.91 cfs @ 12.55 hrs, Volume= 6.292 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.248 | 98 | Paved surface |
| * | 0.181 | 96 | Gravel surface |
| * | 0.458 | 98 | Water Surface |
| | 5.222 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 4.132 | 74 | >75% Grass cover, Good, HSG C |
| | 0.513 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.204 | 70 | Woods, Good, HSG C |
| | 11.982 | 77 | Woods, Good, HSG D |
| * | 0.038 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 23.978 | 69 | Weighted Average |
| | 23.272 | | 97.06% Pervious Area |
| | 0.706 | | 2.94% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.5 | 698 | 0.5200 | 1.80 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 335 | 0.1900 | 3.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 267 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 38.0 | 1,400 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

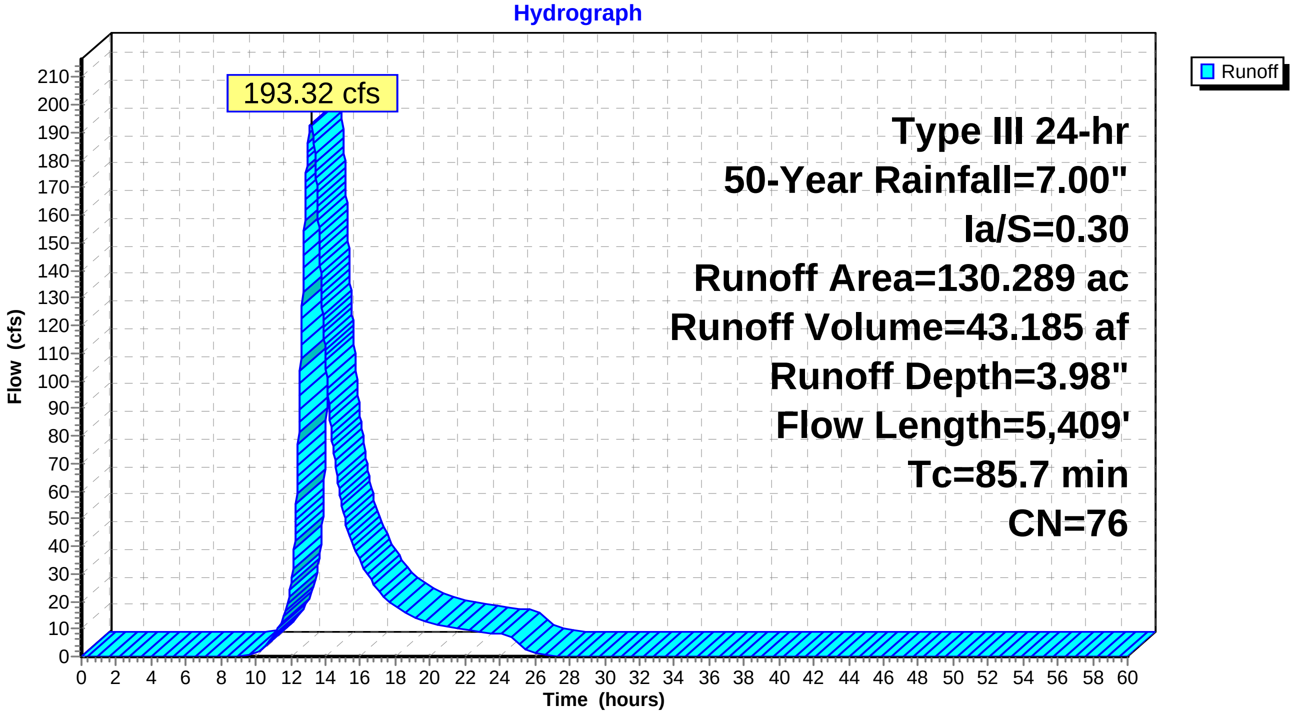
Runoff = 193.32 cfs @ 13.15 hrs, Volume= 43.185 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.025 | 98 | Building roof |
| * | 0.905 | 98 | Paved surface |
| * | 0.933 | 96 | Gravel surface |
| * | 0.153 | 98 | Water Surface |
| | 0.907 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 13.921 | 74 | >75% Grass cover, Good, HSG C |
| | 2.396 | 80 | >75% Grass cover, Good, HSG D |
| | 0.745 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 11.966 | 70 | Woods, Good, HSG C |
| | 97.720 | 77 | Woods, Good, HSG D |
| * | 0.024 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 130.289 | 76 | Weighted Average |
| | 129.206 | | 99.17% Pervious Area |
| | 1.083 | | 0.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

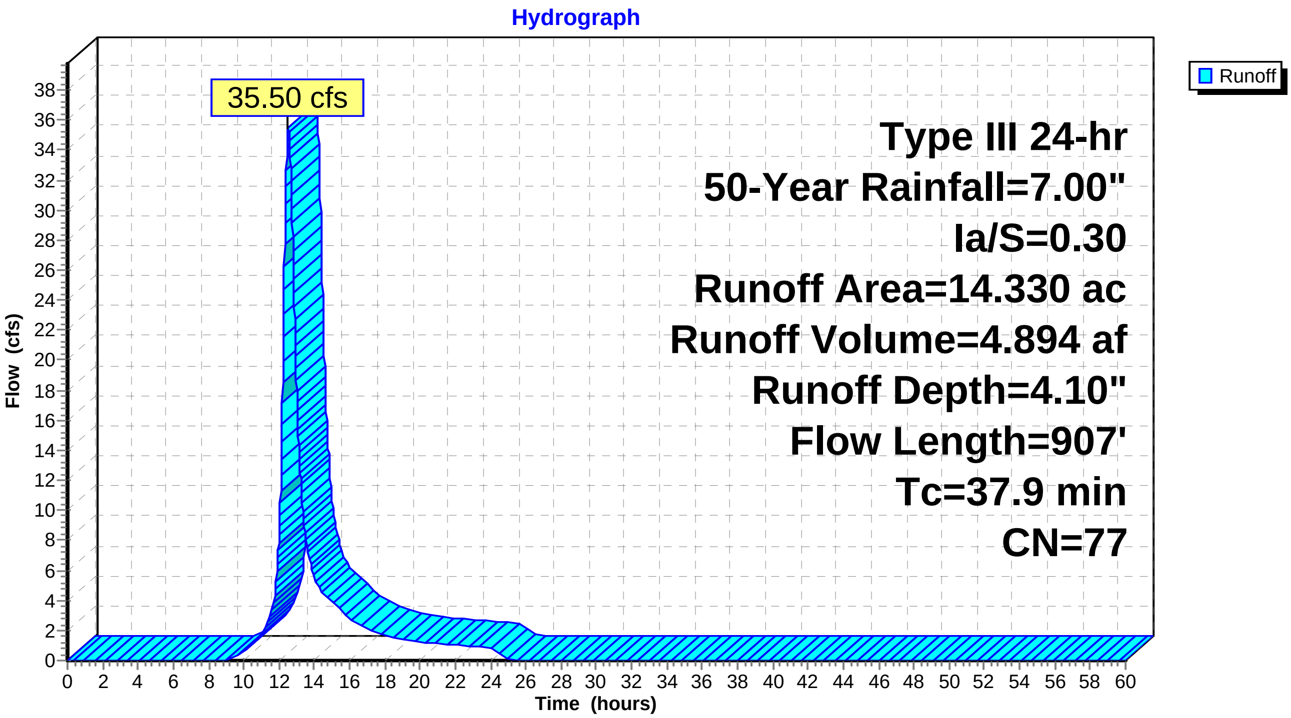
Runoff = 35.50 cfs @ 12.52 hrs, Volume= 4.894 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

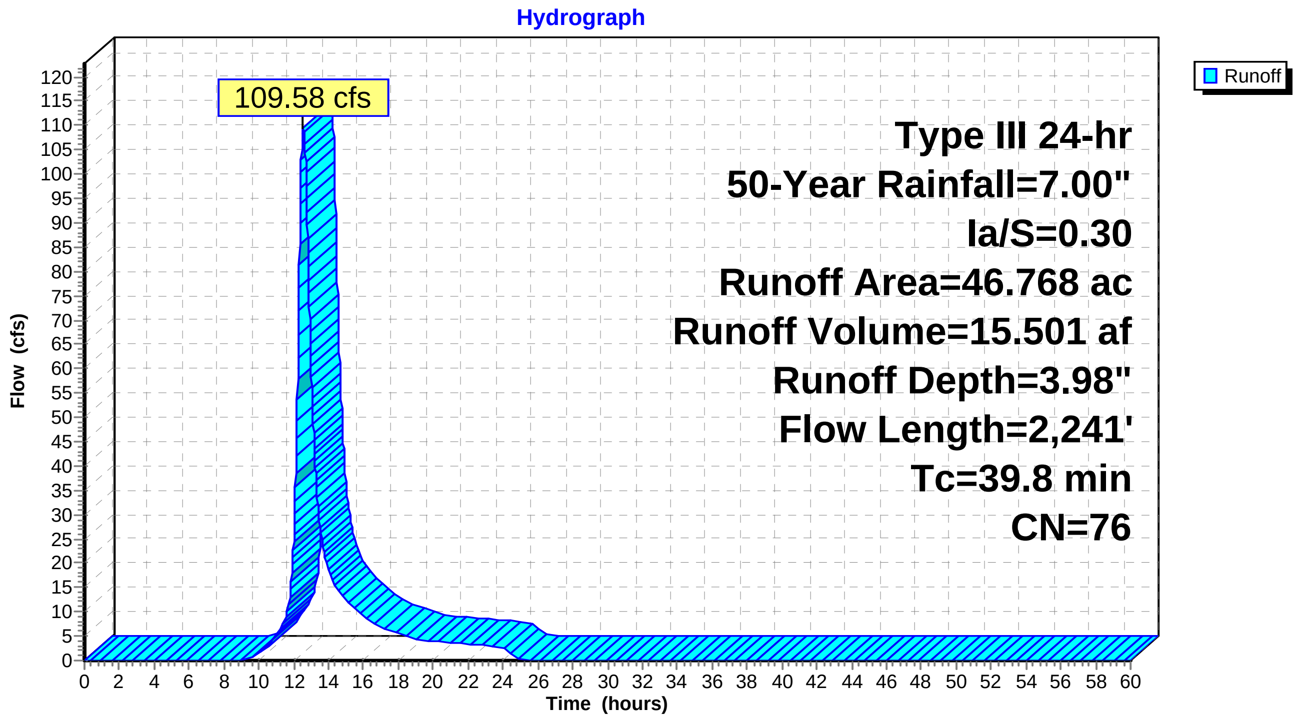
Runoff = 109.58 cfs @ 12.55 hrs, Volume= 15.501 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.499 | 98 | Paved surface |
| * | 0.098 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.546 | 74 | >75% Grass cover, Good, HSG C |
| | 0.657 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.391 | 70 | Woods, Good, HSG C |
| | 32.437 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.140 | 30 | Sand Trap, HSG C |
| | 46.768 | 76 | Weighted Average |
| | 46.269 | | 98.93% Pervious Area |
| | 0.499 | | 1.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.9 | 1,071 | 0.4300 | 1.64 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 3.2 | 490 | 0.1300 | 2.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 190 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 39.8 | 2,241 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

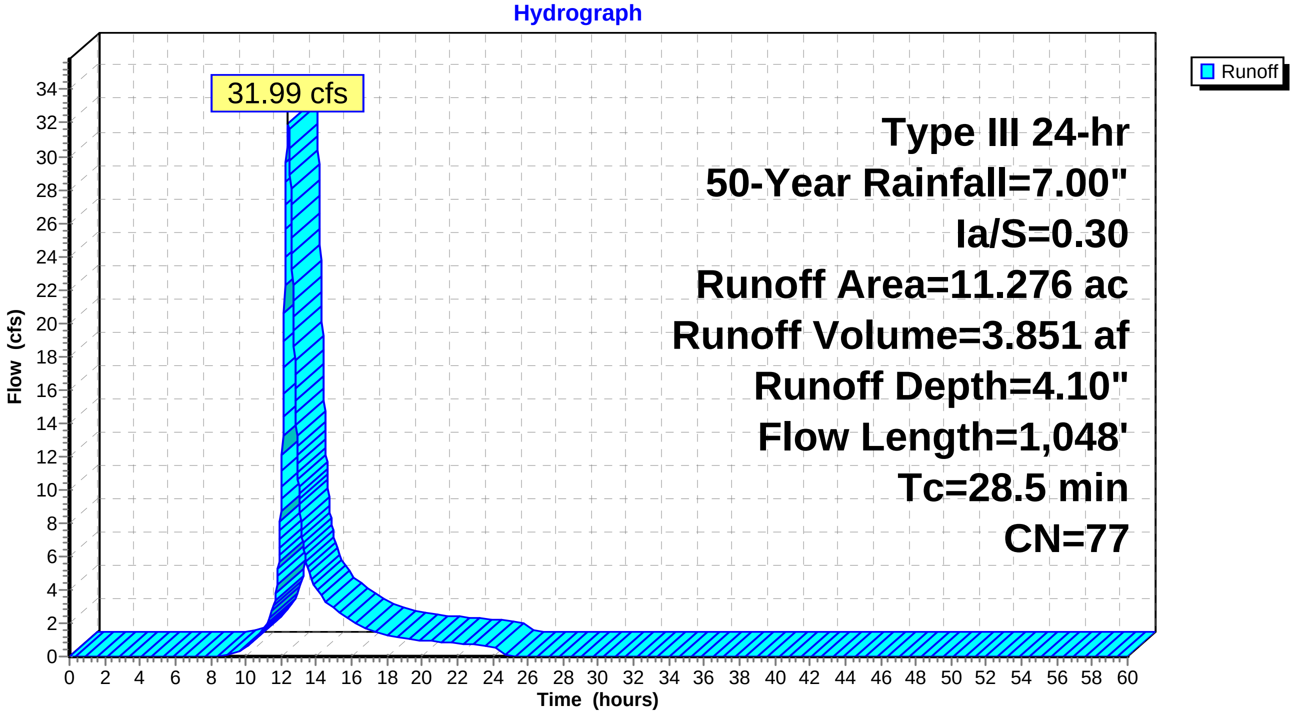
Runoff = 31.99 cfs @ 12.39 hrs, Volume= 3.851 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.004 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.045 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.299 | 70 | Woods, Good, HSG C |
| | 10.928 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 11.276 | 77 | Weighted Average |
| | 11.272 | | 99.96% Pervious Area |
| | 0.004 | | 0.04% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4500 | 1.68 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.3 | 288 | 0.2010 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 28.5 | 1,048 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment C101: C101

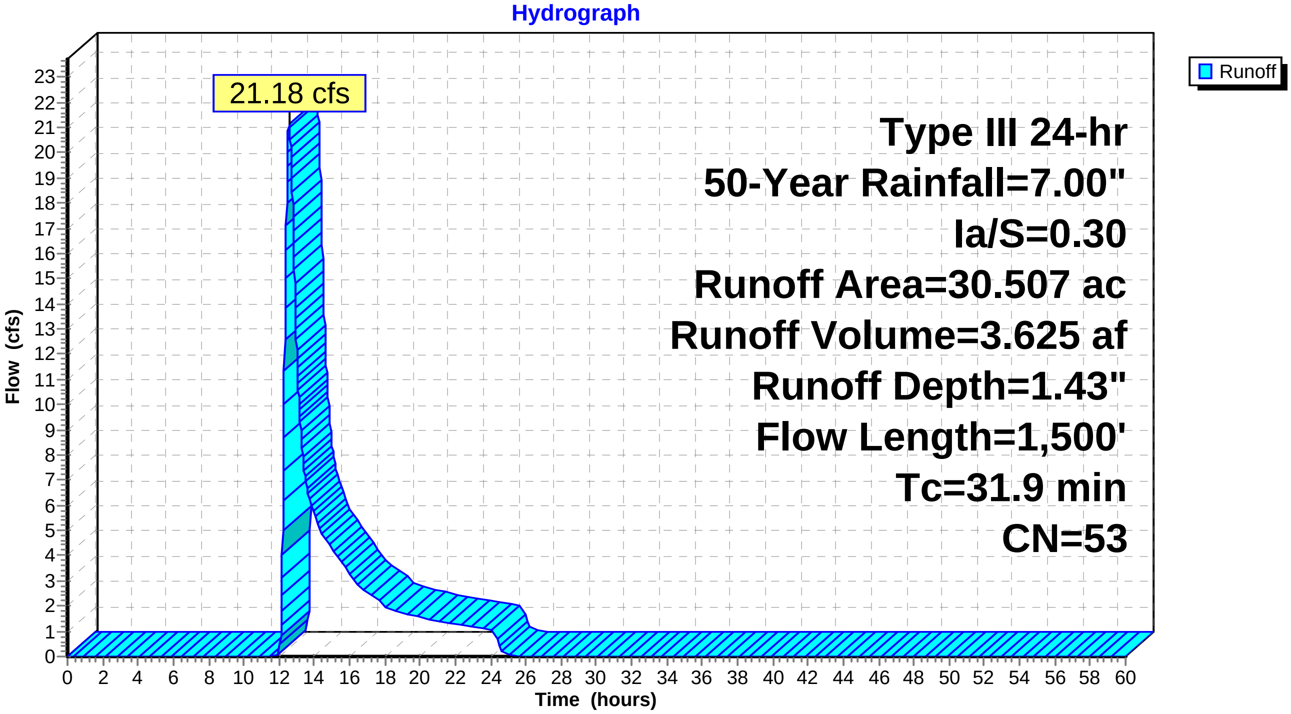
Runoff = 21.18 cfs @ 12.57 hrs, Volume= 3.625 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.350 | 98 | Paved surface |
| * | 0.425 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.046 | 98 | Rock Outcrop/Ledge |
| | 15.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.955 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.210 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 6.521 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 30.507 | 53 | Weighted Average |
| | 29.111 | | 95.42% Pervious Area |
| | 1.396 | | 4.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

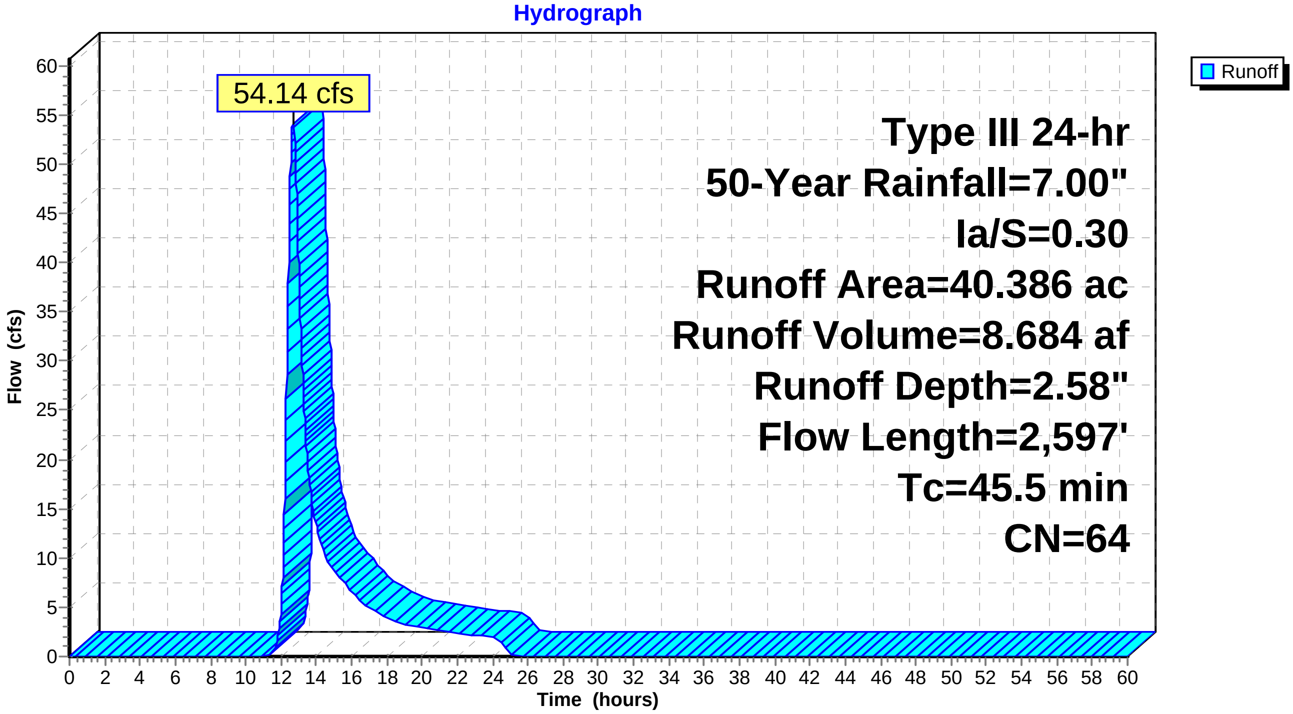
Runoff = 54.14 cfs @ 12.68 hrs, Volume= 8.684 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.618 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.981 | 98 | Rock Outcrop/Ledge |
| | 13.186 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.123 | 74 | >75% Grass cover, Good, HSG C |
| | 0.529 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.578 | 70 | Woods, Good, HSG C |
| | 15.415 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.386 | 64 | Weighted Average |
| | 38.573 | | 95.51% Pervious Area |
| | 1.813 | | 4.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

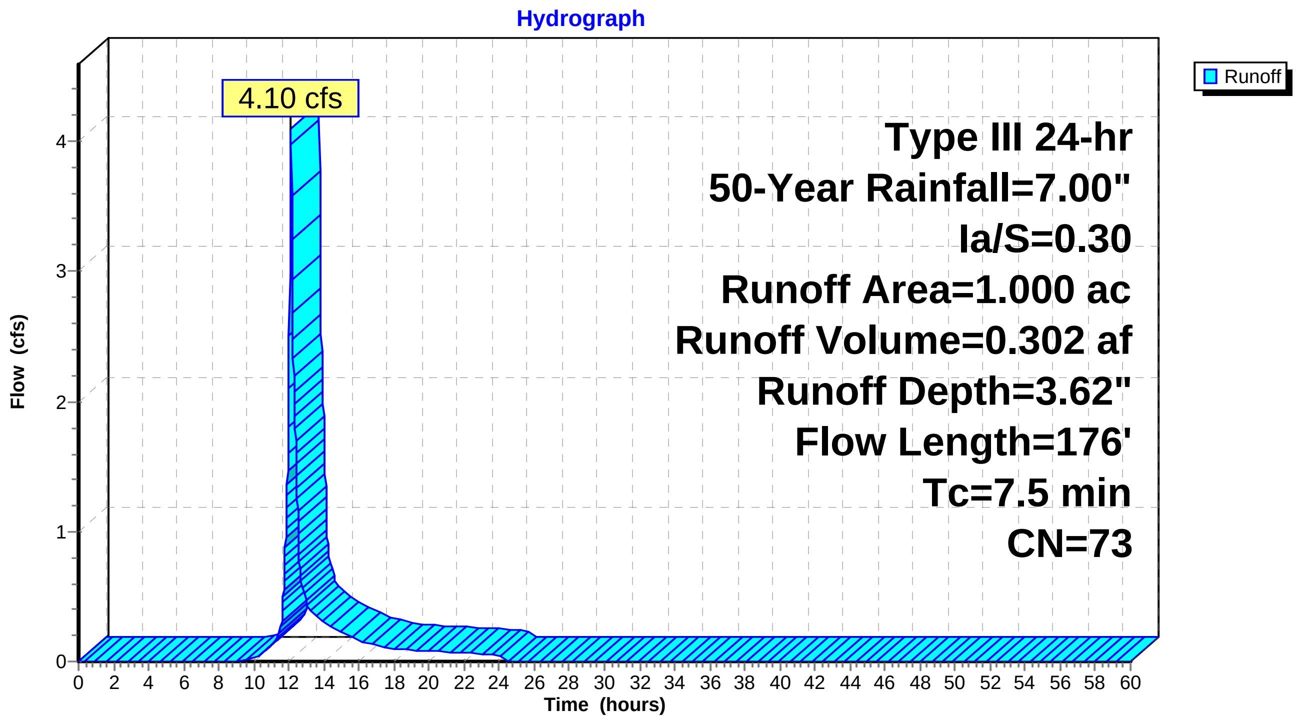
Runoff = 4.10 cfs @ 12.11 hrs, Volume= 0.302 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.850 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.000 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 73 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1570 | 6.38 | | **Shallow Concentrated Flow, C to D**<br>Unpaved Kv= 16.1 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



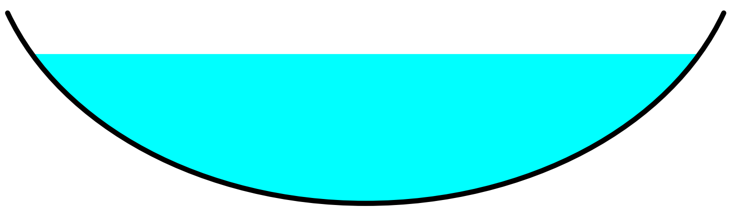
## Summary for Reach A105R: Thru A101

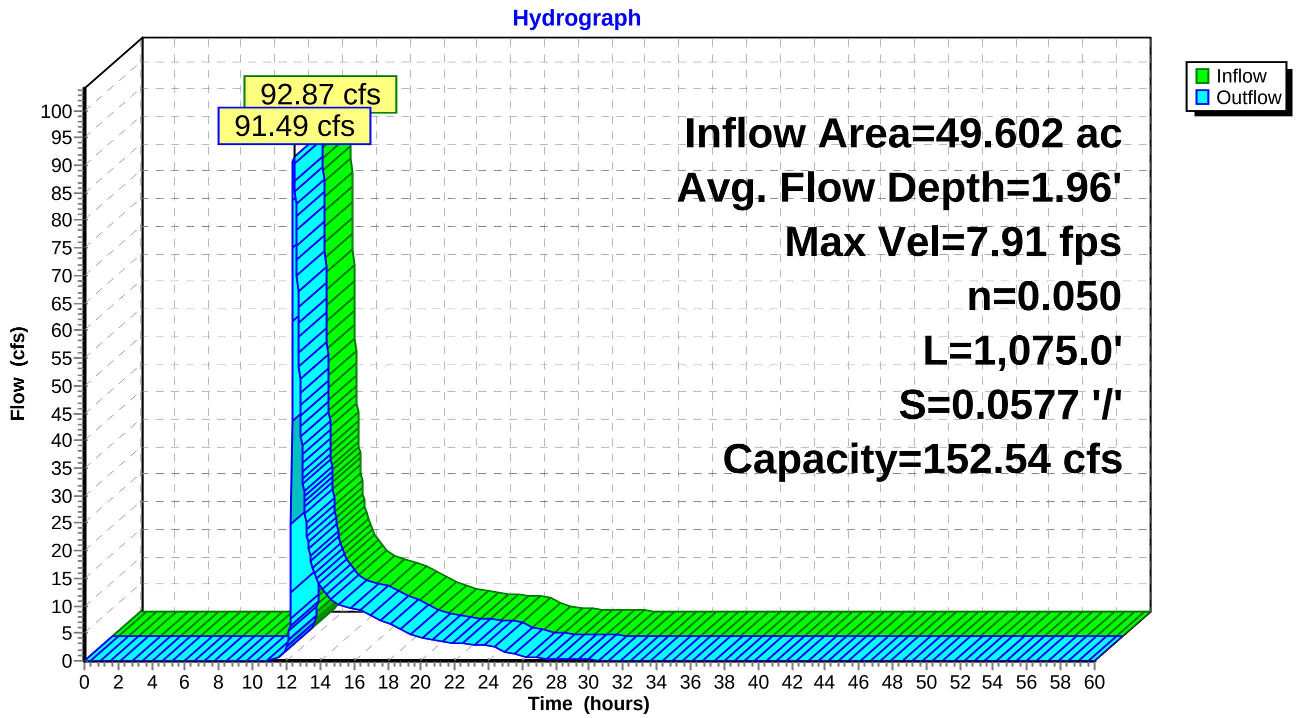
Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 2.71" for 50-Year event
Inflow = 92.87 cfs @ 12.38 hrs, Volume= 11.186 af
Outflow = 91.49 cfs @ 12.42 hrs, Volume= 11.186 af, Atten= 1%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 7.91 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 11.4 min

Peak Storage= 12,427 cf @ 12.42 hrs
Average Depth at Peak Storage= 1.96'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 152.54 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,075.0' Slope= 0.0577 '/'
Inlet Invert= 566.00', Outlet Invert= 504.00'





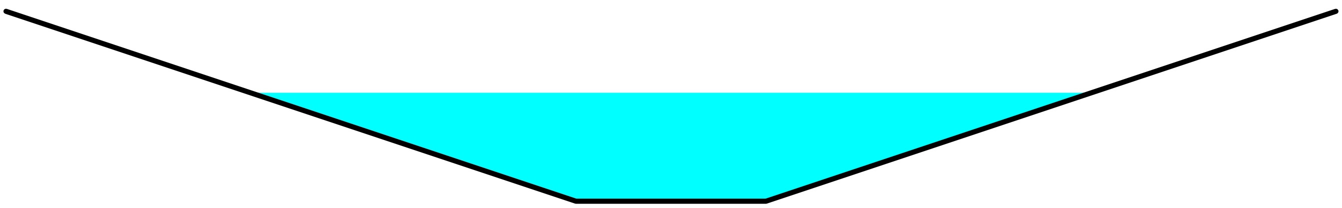
## Summary for Reach A106R: Thru A105

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 3.98" for 50-Year event
Inflow = 43.49 cfs @ 12.38 hrs, Volume= 5.084 af
Outflow = 42.95 cfs @ 12.41 hrs, Volume= 5.084 af, Atten= 1%, Lag= 2.2 min

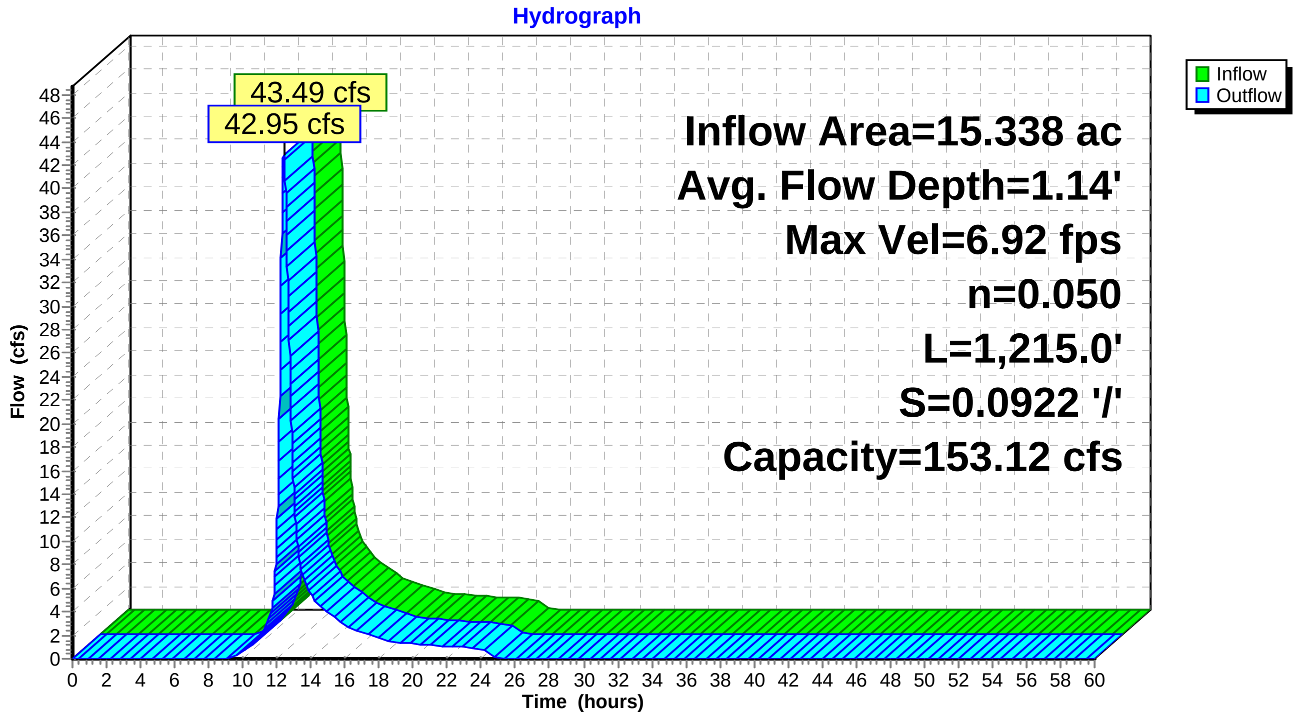
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.92 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.58 fps, Avg. Travel Time= 7.8 min

Peak Storage= 7,537 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.14'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 153.12 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 1,215.0' Slope= 0.0922 '/'
Inlet Invert= 686.00', Outlet Invert= 574.00'



### Reach A106R: Thru A105



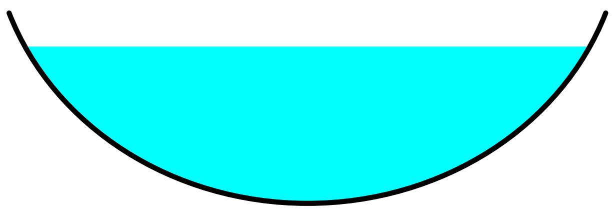
## Summary for Reach A108R: Thru A101

Inflow Area = 100.937 ac, 2.35% Impervious, Inflow Depth = 3.52" for 50-Year event
Inflow = 163.71 cfs @ 12.82 hrs, Volume= 29.611 af
Outflow = 163.32 cfs @ 12.84 hrs, Volume= 29.611 af, Atten= 0%, Lag= 1.4 min

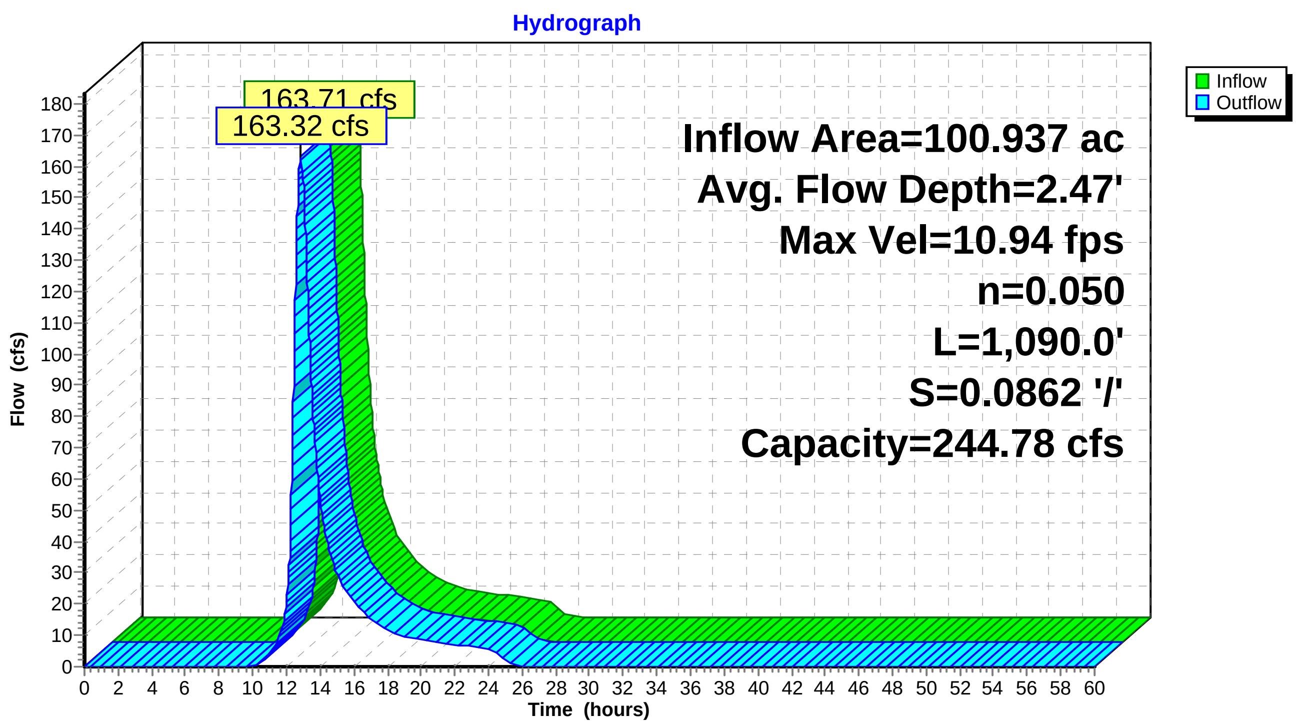
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 10.94 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 4.32 fps, Avg. Travel Time= 4.2 min

Peak Storage= 16,268 cf @ 12.84 hrs
Average Depth at Peak Storage= 2.47'
Bank-Full Depth= 3.00' Flow Area= 20.0 sf, Capacity= 244.78 cfs

10.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 1,090.0' Slope= 0.0862 '/'
Inlet Invert= 608.00', Outlet Invert= 514.00'



### Reach A108R: Thru A101



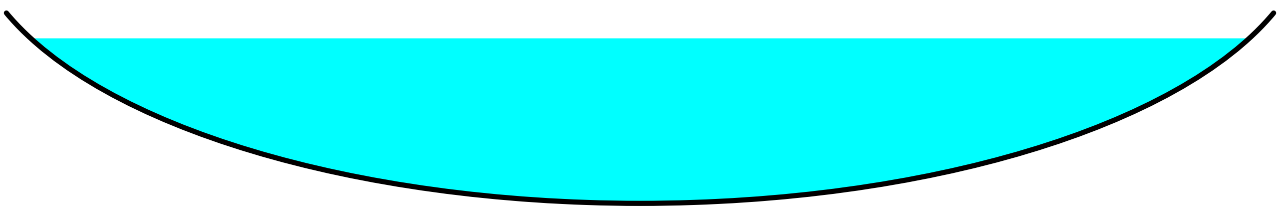
## Summary for Reach B102R: Thru B101

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 3.24" for 50-Year event
Inflow = 261.69 cfs @ 13.30 hrs, Volume= 70.878 af
Outflow = 261.69 cfs @ 13.31 hrs, Volume= 70.876 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.41 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 1.2 min

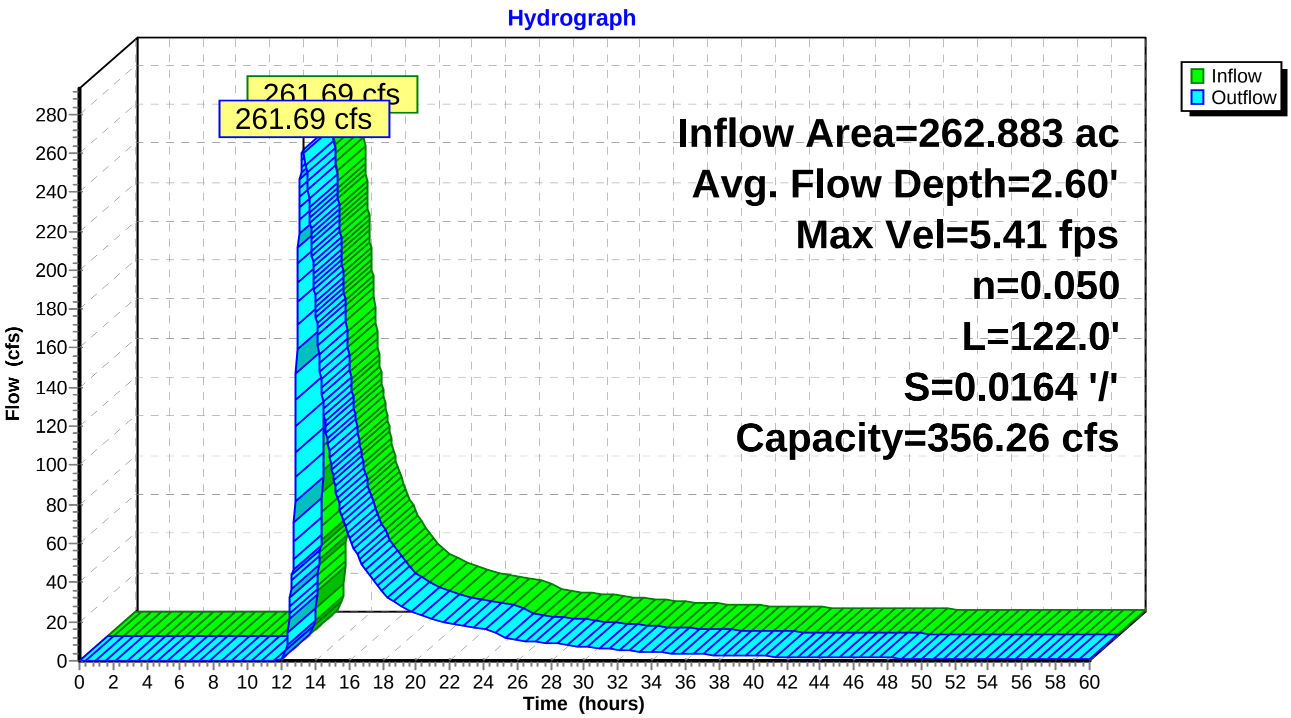
Peak Storage= 5,903 cf @ 13.31 hrs
Average Depth at Peak Storage= 2.60'
Bank-Full Depth= 3.00' Flow Area= 60.0 sf, Capacity= 356.26 cfs

30.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 122.0' Slope= 0.0164 '/'
Inlet Invert= 492.00', Outlet Invert= 490.00'



‡

### Reach B102R: Thru B101



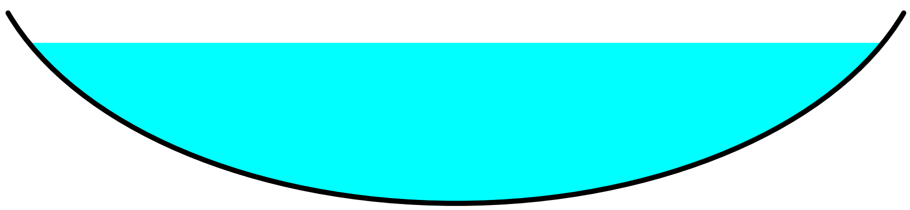
## Summary for Reach B103R: Thru B102

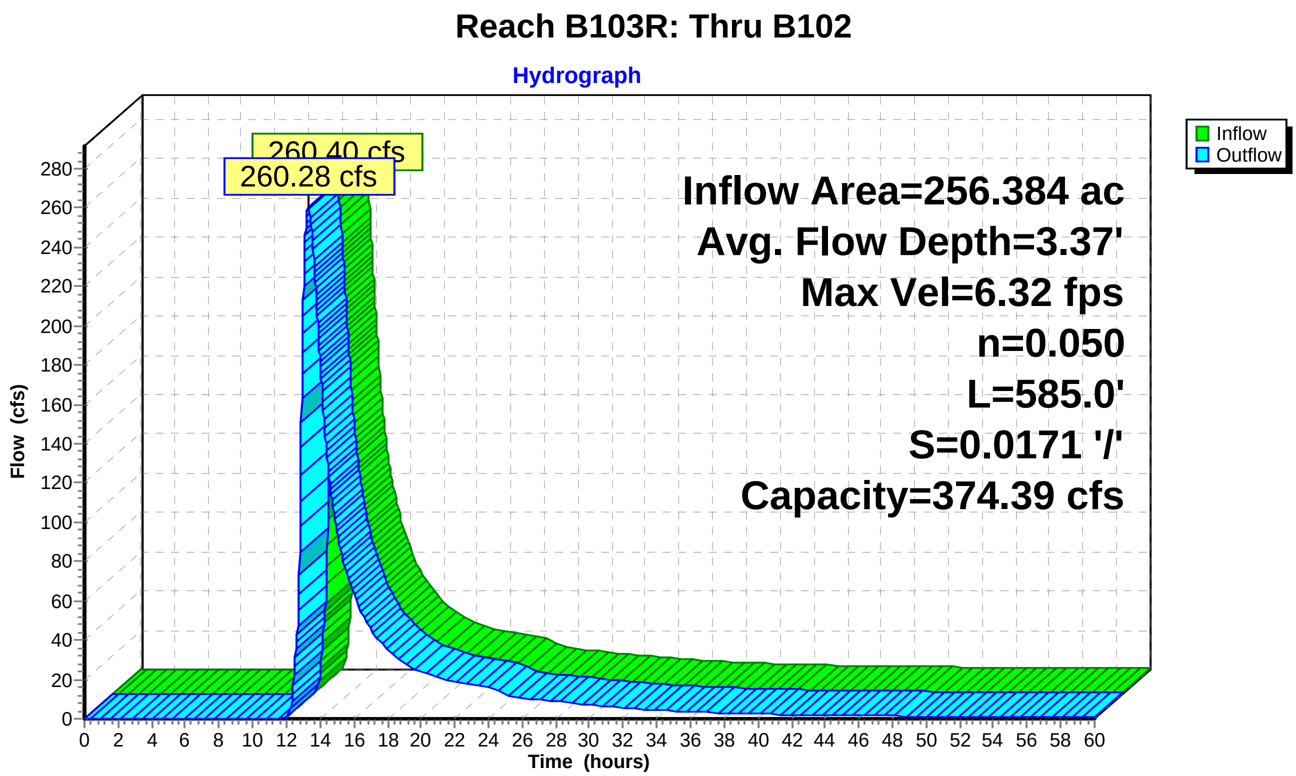
Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 3.28" for 50-Year event
Inflow = 260.40 cfs @ 13.28 hrs, Volume= 70.115 af
Outflow = 260.28 cfs @ 13.30 hrs, Volume= 70.106 af, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.32 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.07 fps, Avg. Travel Time= 4.7 min

Peak Storage= 24,109 cf @ 13.30 hrs
Average Depth at Peak Storage= 3.37'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 374.39 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 585.0' Slope= 0.0171 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'





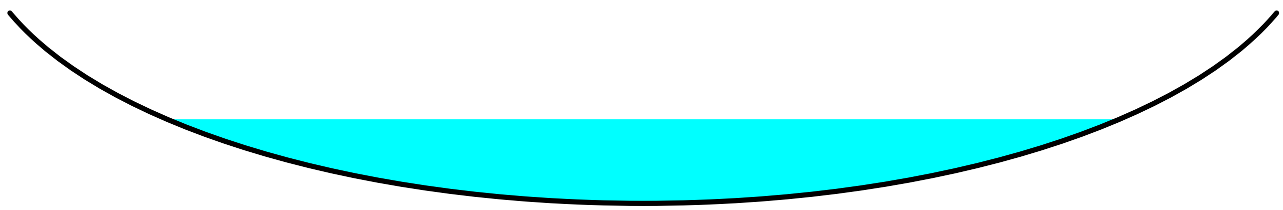
## Summary for Reach B107R: Thru B108

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 3.87" for 50-Year event
Inflow = 24.74 cfs @ 12.83 hrs, Volume= 4.618 af
Outflow = 24.44 cfs @ 12.91 hrs, Volume= 4.618 af, Atten= 1%, Lag= 4.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.27 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 24.9 min

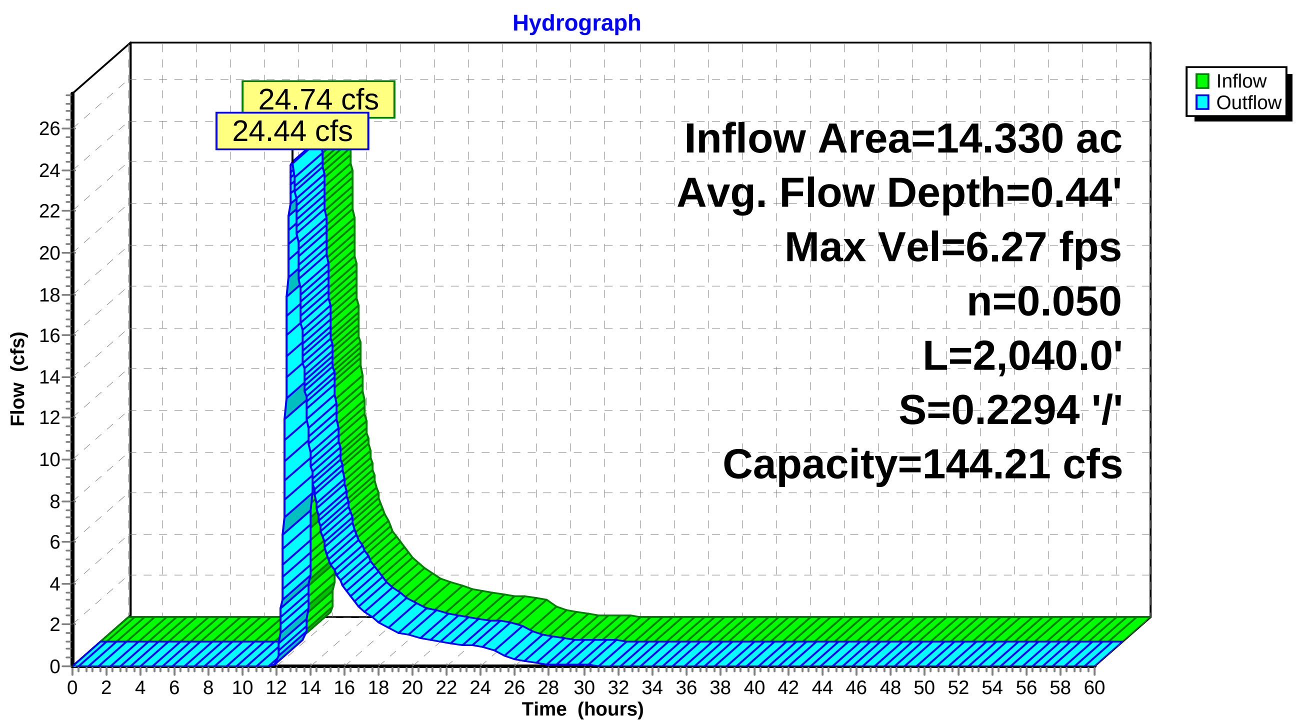
Peak Storage= 7,946 cf @ 12.91 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 144.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 2,040.0' Slope= 0.2294 '/'
Inlet Invert= 972.00', Outlet Invert= 504.00'



‡

### Reach B107R: Thru B108



## Summary for Reach B108R: Thur 101

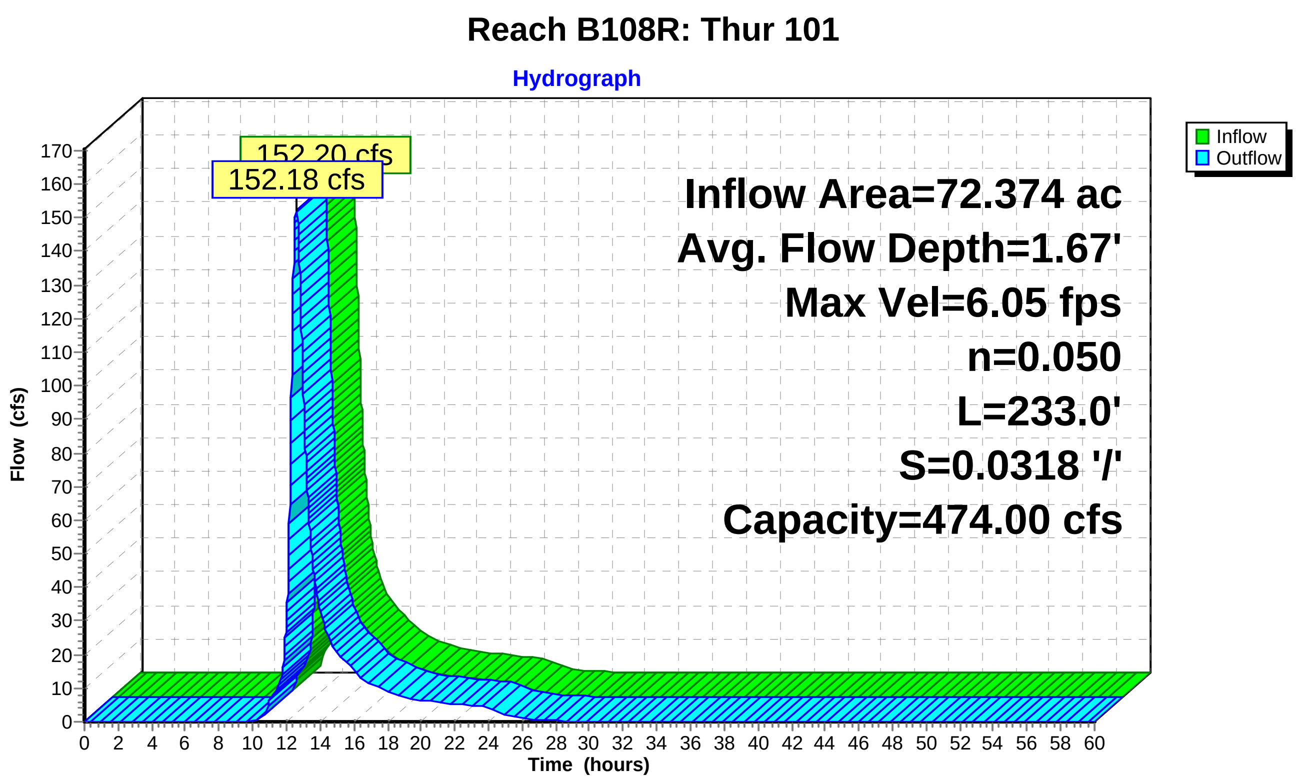
Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 3.97" for 50-Year event
Inflow = 152.20 cfs @ 12.57 hrs, Volume= 23.945 af
Outflow = 152.18 cfs @ 12.58 hrs, Volume= 23.945 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.05 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 3.3 min

Peak Storage= 5,859 cf @ 12.58 hrs
Average Depth at Peak Storage= 1.67'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 474.00 cfs

10.00' x 3.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 233.0' Slope= 0.0318 '/'
Inlet Invert= 499.60', Outlet Invert= 492.20'

‡



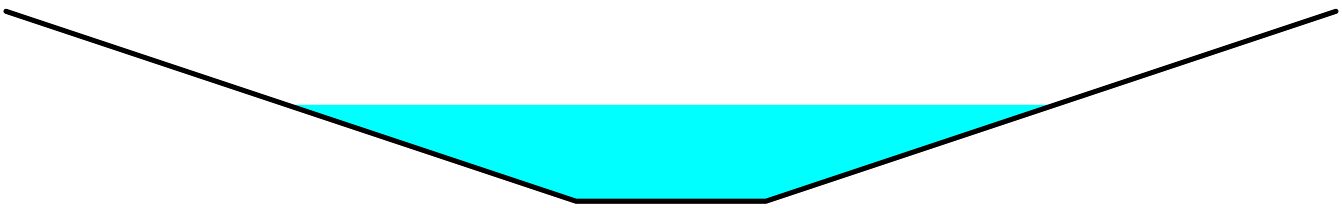
## Summary for Reach B109R: Thru B108

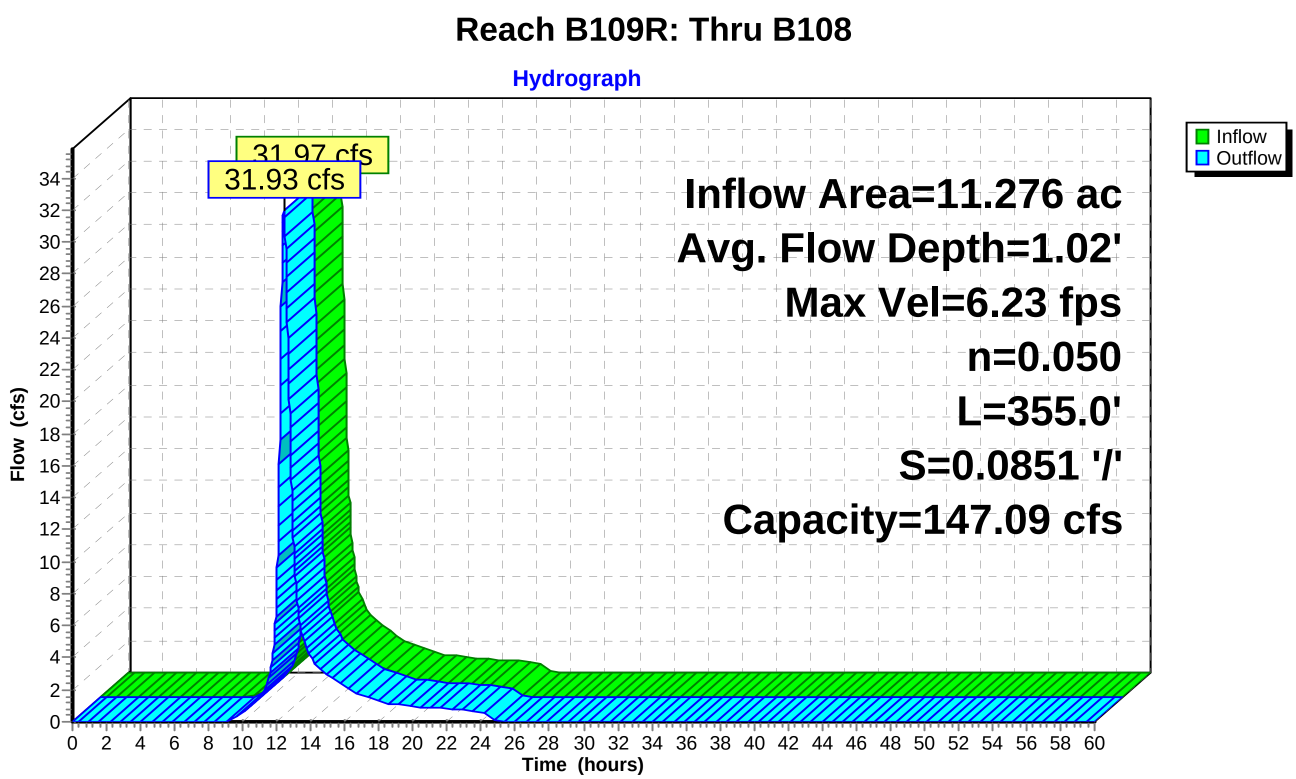
Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 4.10" for 50-Year event
Inflow = 31.97 cfs @ 12.40 hrs, Volume= 3.851 af
Outflow = 31.93 cfs @ 12.41 hrs, Volume= 3.851 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.23 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 2.53 fps, Avg. Travel Time= 2.3 min

Peak Storage= 1,821 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.02'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 147.09 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 355.0' Slope= 0.0851 '/'
Inlet Invert= 532.20', Outlet Invert= 502.00'





## Summary for Pond 102A: Wetland B

Inflow Area = 45.922 ac, 9.71% Impervious, Inflow Depth = 0.23" for 50-Year event
Inflow = 4.60 cfs @ 12.57 hrs, Volume= 0.875 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 499.09' @ 25.70 hrs Surf.Area= 39,942 sf Storage= 38,113 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 | 498.10' | 740,168 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

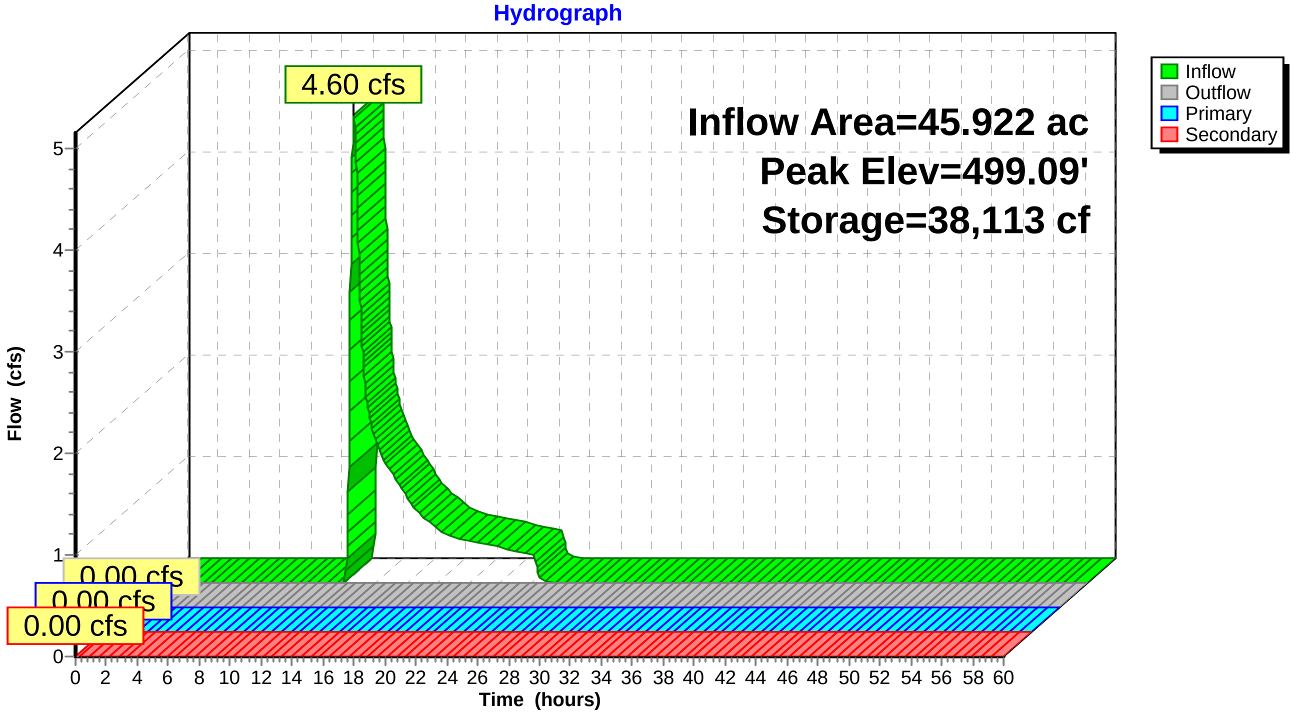
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 498.10 | 37,121 | 782.0 | 0 | 0 | 37,121 |
| 500.00 | 42,629 | 822.0 | 75,702 | 75,702 | 42,449 |
| 502.00 | 54,696 | 1,028.0 | 97,075 | 172,777 | 72,833 |
| 504.00 | 78,374 | 1,409.0 | 132,362 | 305,139 | 146,760 |
| 506.00 | 108,988 | 1,330.0 | 186,523 | 491,662 | 164,196 |
| 508.00 | 140,171 | 1,485.0 | 248,506 | 740,168 | 199,031 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 501.90' / 500.90' S= 0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #2 | Secondary | 506.10' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' (Free Discharge)
└—**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' TW=0.00' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102A: Wetland B



## Summary for Pond 102B: 18" Culvert

[62] Hint: Exceeded Reach B103R OUTLET depth by 2.28' @ 27.02 hrs

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 3.24" for 50-Year event
Inflow = 261.70 cfs @ 13.30 hrs, Volume= 70.878 af
Outflow = 261.69 cfs @ 13.30 hrs, Volume= 70.878 af, Atten= 0%, Lag= 0.2 min
Primary = 10.04 cfs @ 12.48 hrs, Volume= 19.524 af
Secondary = 253.85 cfs @ 13.30 hrs, Volume= 51.354 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 495.96' @ 13.30 hrs Surf.Area= 5,709 sf Storage= 7,163 cf

Plug-Flow detention time= 1.3 min calculated for 70.854 af (100% of inflow)
Center-of-Mass det. time= 1.3 min ( 1,097.9 - 1,096.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 492.20' | 27,470 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

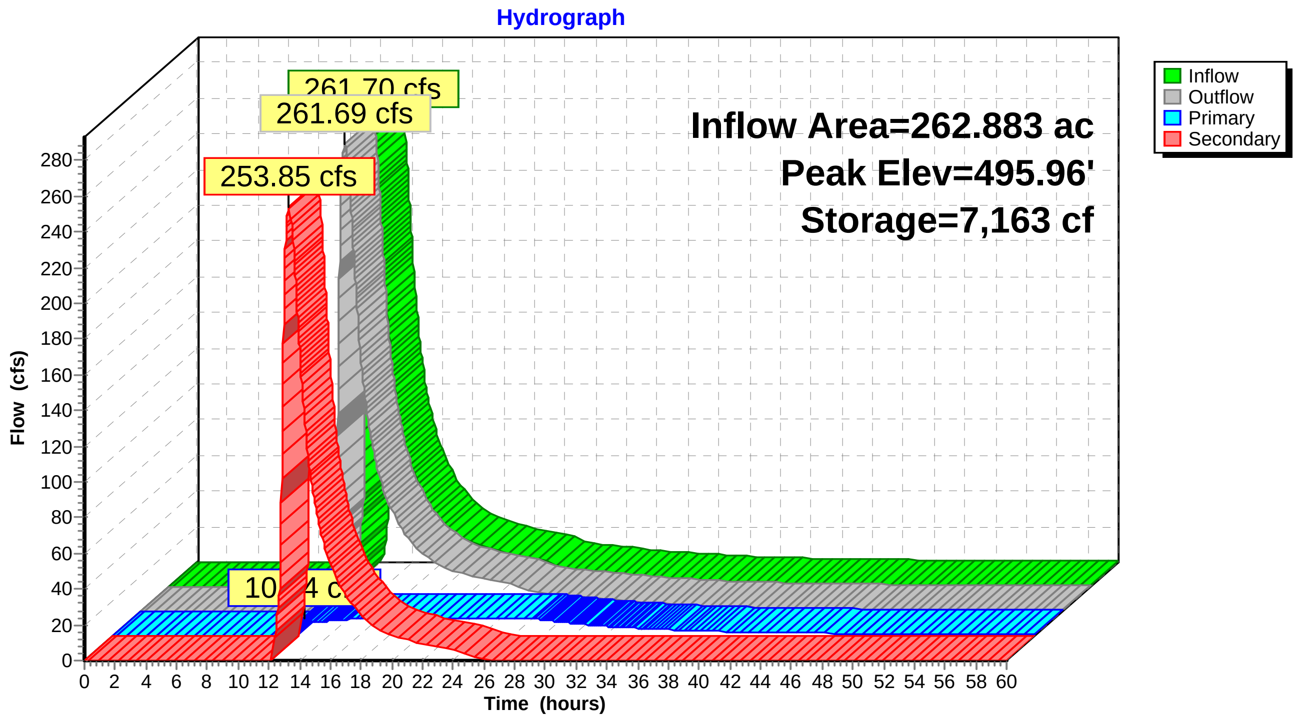
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 492.20 | 0 | 0.0 | 0 | 0 | 0 |
| 496.00 | 5,819 | 521.0 | 7,371 | 7,371 | 21,623 |
| 498.00 | 14,990 | 910.0 | 20,099 | 27,470 | 65,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 492.20' | **18.0" Round Culvert**<br>L= 20.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 492.20' / 491.10' S= 0.0550 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 495.00' | **100.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=10.05 cfs @ 12.48 hrs HW=495.19' TW=492.94' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.05 cfs @ 5.69 fps)

**Secondary OutFlow** Max=253.84 cfs @ 13.30 hrs HW=495.96' TW=494.60' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 253.84 cfs @ 2.63 fps)

## Pond 102B: 18" Culvert



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.386 ac, 4.49% Impervious, Inflow Depth = 2.58" for 50-Year event
Inflow = 54.14 cfs @ 12.68 hrs, Volume= 8.684 af
Outflow = 2.88 cfs @ 19.98 hrs, Volume= 1.557 af, Atten= 95%, Lag= 437.9 min
Primary = 2.88 cfs @ 19.98 hrs, Volume= 1.557 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 509.05' @ 19.98 hrs Surf.Area= 217,042 sf Storage= 321,933 cf

Plug-Flow detention time= 578.7 min calculated for 1.556 af (18% of inflow)
Center-of-Mass det. time= 424.7 min ( 1,322.5 - 897.8 )

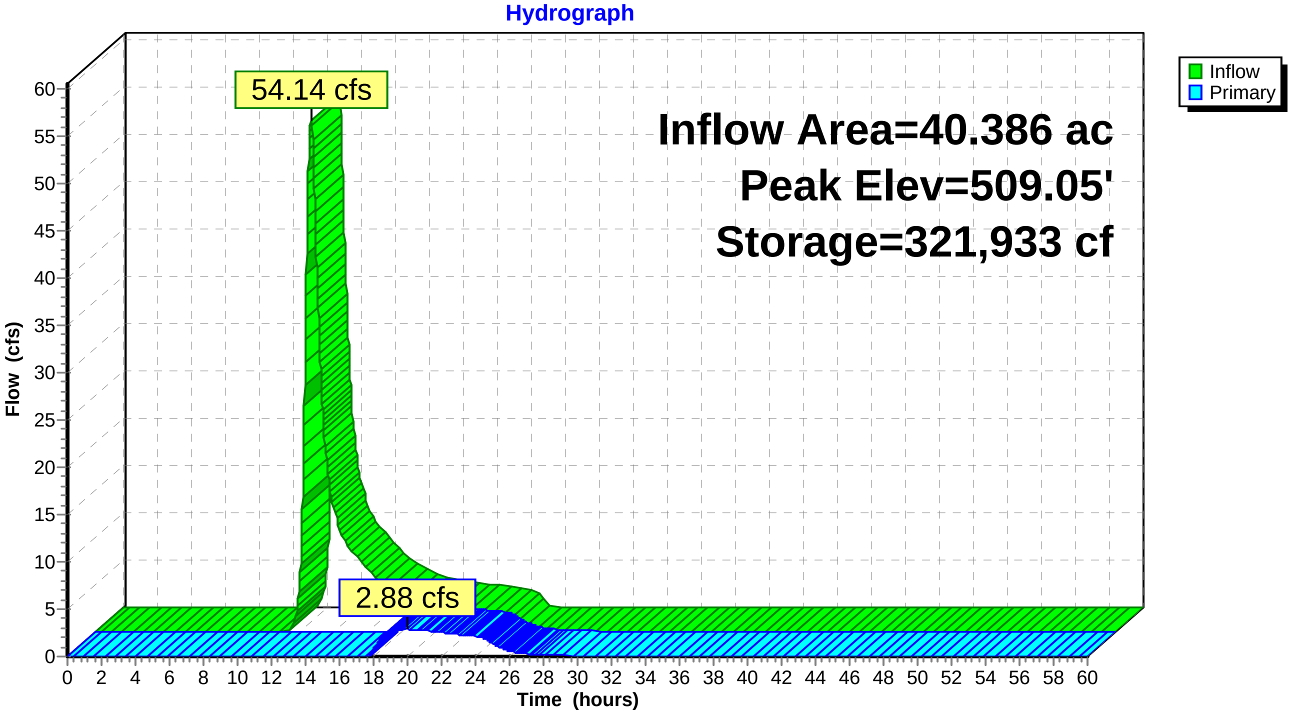
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=2.88 cfs @ 19.98 hrs HW=509.05' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.88 cfs @ 0.54 fps)

## Pond 102C: Pond 102C



## Summary for Pond 103A: Wetland A

Inflow Area = 36.735 ac, 8.79% Impervious, Inflow Depth = 1.33" for 50-Year event
Inflow = 19.17 cfs @ 12.78 hrs, Volume= 4.070 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.37' @ 26.58 hrs Surf.Area= 66,573 sf Storage= 177,309 cf

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

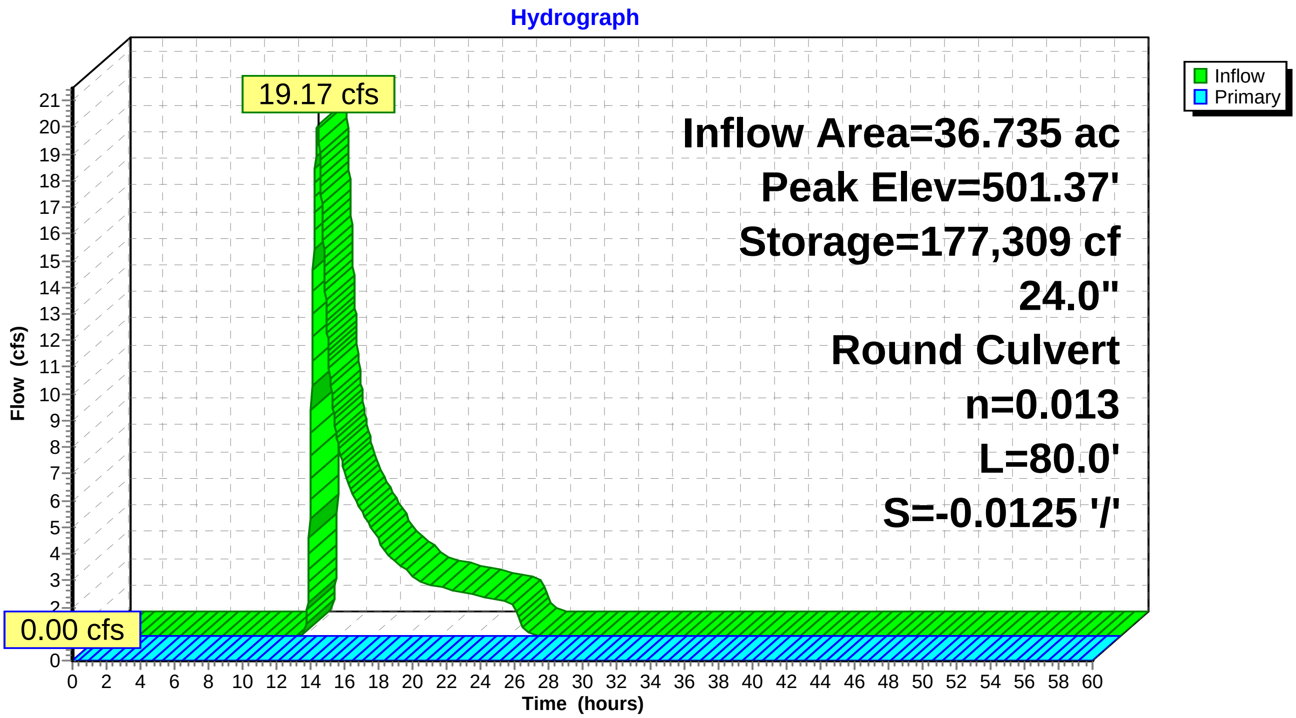
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 497.40' | 751,373 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 497.40 | 22,575 | 625.0 | 0 | 0 | 22,575 |
| 500.00 | 52,914 | 979.0 | 95,378 | 95,378 | 67,808 |
| 502.00 | 73,309 | 1,110.0 | 125,670 | 221,048 | 89,686 |
| 504.00 | 83,807 | 1,169.0 | 156,999 | 378,047 | 100,626 |
| 506.00 | 92,176 | 1,226.0 | 175,917 | 553,963 | 111,750 |
| 508.00 | 105,381 | 1,351.0 | 197,410 | 751,373 | 137,513 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 500.90' / 501.90' S= -0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=497.40' TW=498.10' (Dynamic Tailwater)
└─**1=Culvert** ( Controls 0.00 cfs)

## Pond 103A: Wetland A



## Summary for Pond 103B: Irrigation Pond

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 2.05" for 50-Year event
Inflow = 120.16 cfs @ 13.17 hrs, Volume= 43.784 af
Outflow = 118.25 cfs @ 13.29 hrs, Volume= 43.535 af, Atten= 2%, Lag= 7.5 min
Primary = 14.12 cfs @ 13.29 hrs, Volume= 11.007 af
Secondary = 104.13 cfs @ 13.29 hrs, Volume= 32.528 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 506.71' @ 13.29 hrs Surf.Area= 92,926 sf Storage= 81,995 cf

Plug-Flow detention time= 38.4 min calculated for 43.520 af (99% of inflow)
Center-of-Mass det. time= 25.5 min ( 1,215.5 - 1,190.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 505.80' | 416,210 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

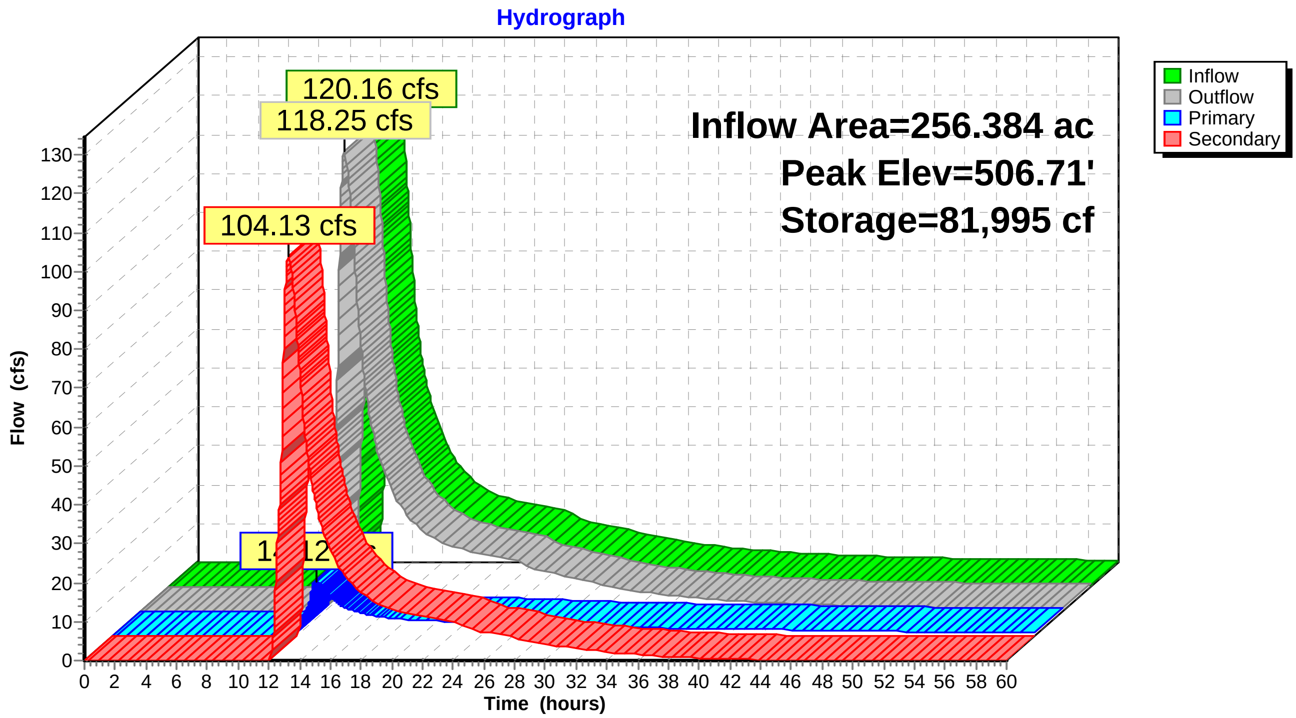
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 505.80 | 88,106 | 1,403.0 | 0 | 0 | 88,106 |
| 508.00 | 100,033 | 1,579.0 | 206,814 | 206,814 | 129,999 |
| 510.00 | 109,433 | 1,610.0 | 209,396 | 416,210 | 138,488 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 505.80' | **5.0' long x 1.80' rise Sharp-Crested Vee/Trap Weir**<br>Cv= 2.62 (C= 3.28) |
| #2 | Secondary | 506.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00<br>Width (feet) 45.00 60.00 80.00 95.00 120.00 |

**Primary OutFlow** Max=14.12 cfs @ 13.29 hrs HW=506.71' TW=505.37' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 14.12 cfs @ 3.12 fps)

**Secondary OutFlow** Max=104.12 cfs @ 13.29 hrs HW=506.71' TW=505.37' (Dynamic Tailwater)
└─**2=Custom Weir/Orifice** (Weir Controls 104.12 cfs @ 2.64 fps)

## Pond 103B: Irrigation Pond



## Summary for Pond 104A: Wetland D

Inflow Area = 9.432 ac, 9.40% Impervious, Inflow Depth = 0.71" for 50-Year event
Inflow = 2.01 cfs @ 12.68 hrs, Volume= 0.561 af
Outflow = 0.93 cfs @ 14.19 hrs, Volume= 0.541 af, Atten= 54%, Lag= 90.5 min
Primary = 0.30 cfs @ 14.19 hrs, Volume= 0.390 af
Secondary = 0.62 cfs @ 14.19 hrs, Volume= 0.151 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.02' @ 14.19 hrs Surf.Area= 25,348 sf Storage= 7,016 cf

Plug-Flow detention time= 303.6 min calculated for 0.541 af (96% of inflow)
Center-of-Mass det. time= 285.9 min ( 1,263.7 - 977.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

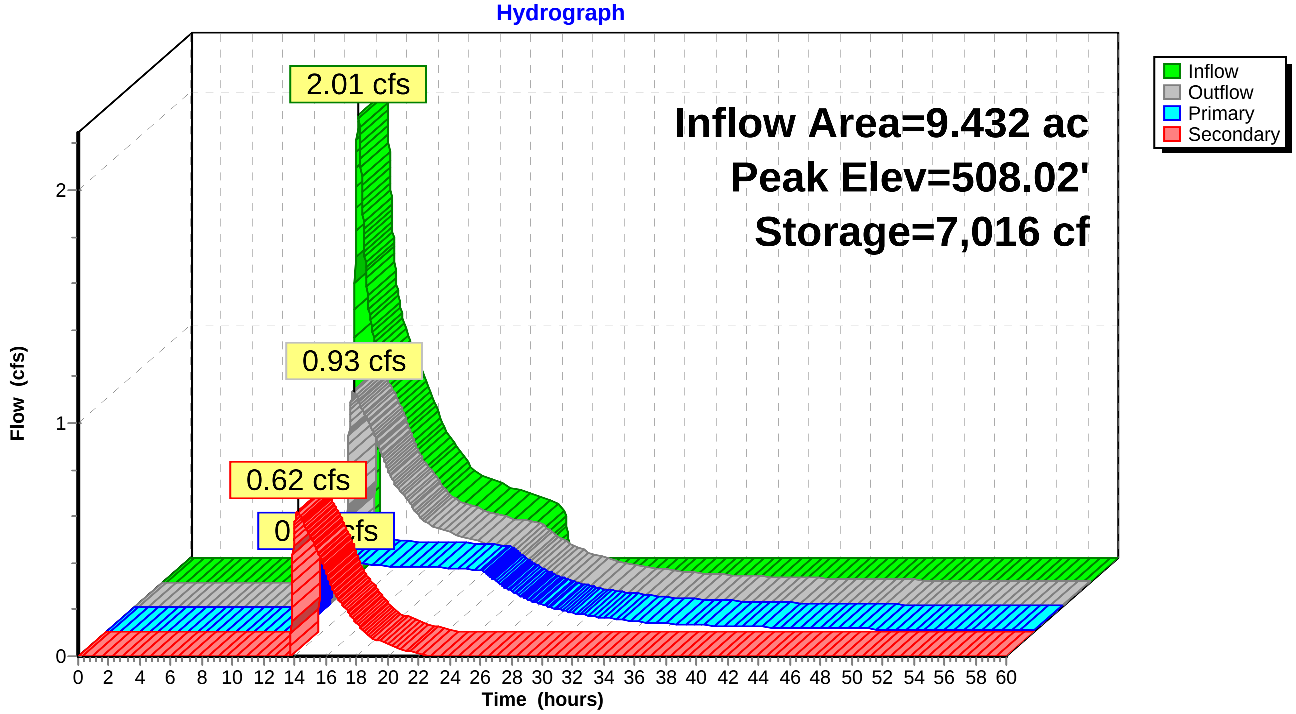
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.30 cfs @ 14.19 hrs HW=508.02' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.30 cfs @ 2.12 fps)

**Secondary OutFlow** Max=0.62 cfs @ 14.19 hrs HW=508.02' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.62 cfs @ 0.35 fps)

## Pond 104A: Wetland D



## Summary for Pond 104B: Island Pond

Inflow Area = 234.803 ac, 5.37% Impervious, Inflow Depth = 3.38" for 50-Year event
Inflow = 272.01 cfs @ 12.79 hrs, Volume= 66.049 af
Outflow = 245.64 cfs @ 13.27 hrs, Volume= 64.069 af, Atten= 10%, Lag= 28.5 min
Primary = 14.81 cfs @ 13.27 hrs, Volume= 21.244 af
Secondary = 88.62 cfs @ 13.27 hrs, Volume= 16.245 af
Tertiary = 142.21 cfs @ 13.27 hrs, Volume= 26.580 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 510.76' @ 13.27 hrs Surf.Area= 284,200 sf Storage= 632,502 cf

Plug-Flow detention time= 208.2 min calculated for 64.048 af (97% of inflow)
Center-of-Mass det. time= 189.9 min ( 1,101.7 - 911.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 508.20' | 1,023,136 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 508.20 | 228,830 | 3,183.0 | 0 | 0 | 228,830 |
| 510.00 | 249,447 | 3,224.0 | 430,316 | 430,316 | 250,515 |
| 512.00 | 346,000 | 3,042.0 | 592,820 | 1,023,136 | 341,482 |

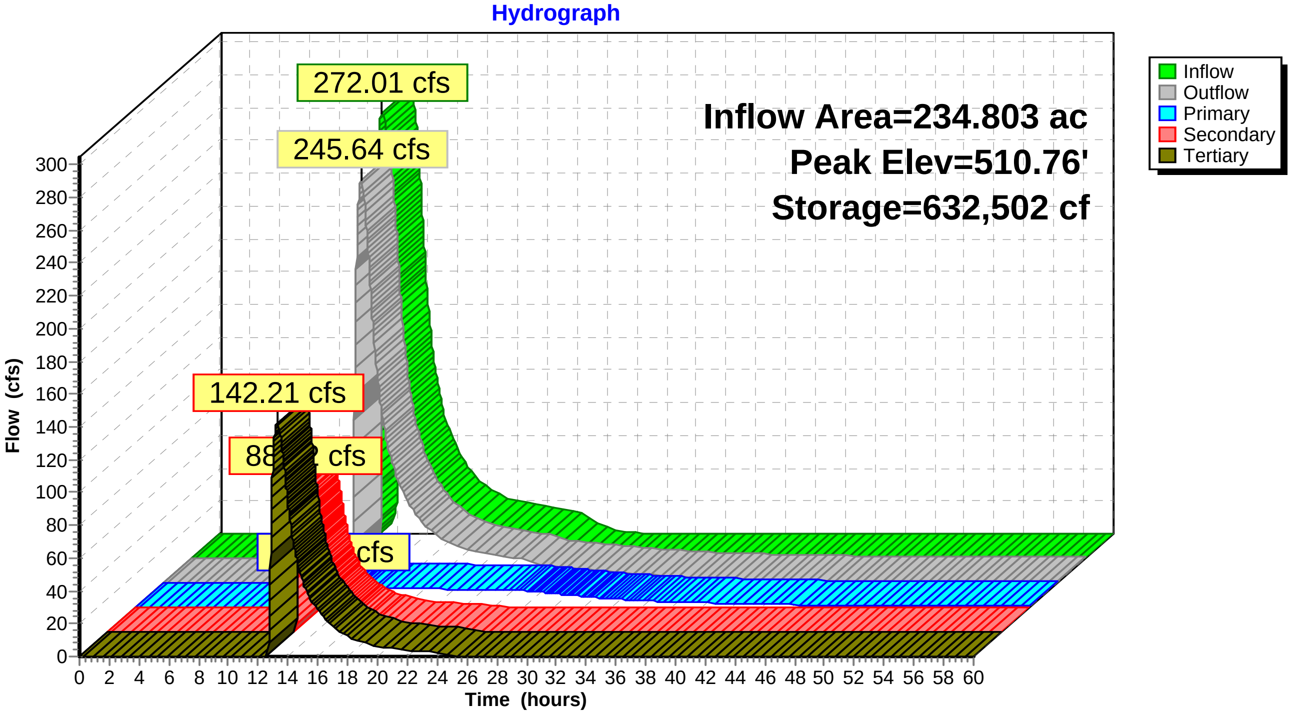
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 508.22' | **24.0" Round Culvert**<br>L= 111.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 508.22' / 505.43' S= 0.0251 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 3.14 sf |
| #2 | Secondary | 510.00' | **50.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Tertiary | 510.00' | **80.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=14.81 cfs @ 13.27 hrs HW=510.76' TW=506.71' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 14.81 cfs @ 4.71 fps)

**Secondary OutFlow** Max=88.61 cfs @ 13.27 hrs HW=510.76' TW=506.71' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 88.61 cfs @ 2.34 fps)

**Tertiary OutFlow** Max=142.19 cfs @ 13.27 hrs HW=510.76' TW=505.37' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 142.19 cfs @ 2.34 fps)

## Pond 104B: Island Pond



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach A106R OUTLET depth by 0.66' @ 15.16 hrs

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 49.602 ac, | 4.77% Impervious, | Inflow Depth = 2.71" | for 50-Year event |
| Inflow = | 93.62 cfs @ | 12.35 hrs, Volume= | 11.202 af | |
| Outflow = | 92.87 cfs @ | 12.38 hrs, Volume= | 11.186 af, | Atten= 1%, Lag= 2.1 min |
| Primary = | 11.02 cfs @ | 12.38 hrs, Volume= | 7.137 af | |
| Secondary = | 81.85 cfs @ | 12.38 hrs, Volume= | 4.049 af | |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.33' @ 12.38 hrs Surf.Area= 32,442 sf Storage= 67,549 cf

Plug-Flow detention time= 65.8 min calculated for 11.182 af (100% of inflow)
Center-of-Mass det. time= 65.5 min ( 936.3 - 870.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

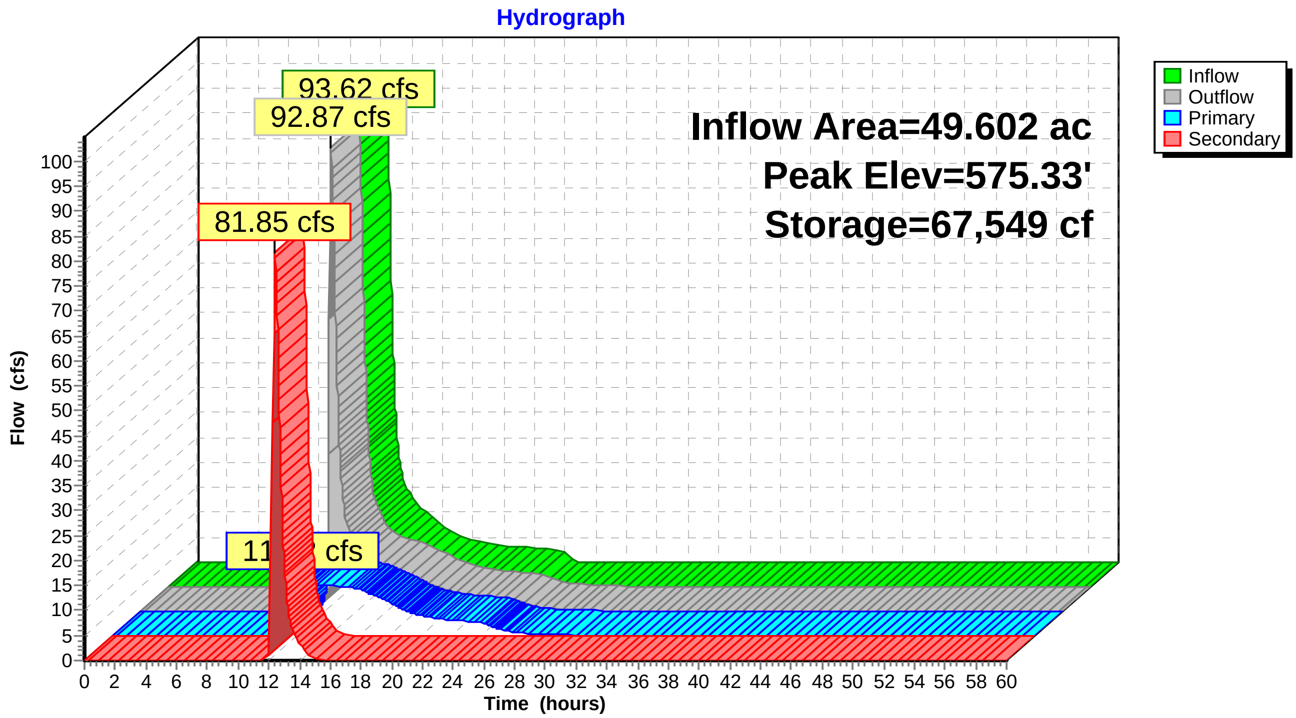
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=11.02 cfs @ 12.38 hrs HW=575.33' TW=567.93' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.02 cfs @ 6.23 fps)

**Secondary OutFlow** Max=81.81 cfs @ 12.38 hrs HW=575.33' TW=567.93' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 81.81 cfs @ 1.39 fps)

## Pond 105A: Wetland H



## Summary for Pond 105B: Wetland J

Inflow Area = 154.267 ac, 1.16% Impervious, Inflow Depth = 3.85" for 50-Year event
Inflow = 212.79 cfs @ 13.07 hrs, Volume= 49.477 af
Outflow = 212.56 cfs @ 13.10 hrs, Volume= 49.476 af, Atten= 0%, Lag= 1.6 min
Primary = 212.56 cfs @ 13.10 hrs, Volume= 49.476 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 516.55' @ 13.10 hrs Surf.Area= 28,511 sf Storage= 52,775 cf

Plug-Flow detention time= 14.8 min calculated for 49.476 af (100% of inflow)
Center-of-Mass det. time= 14.7 min ( 919.2 - 904.5 )

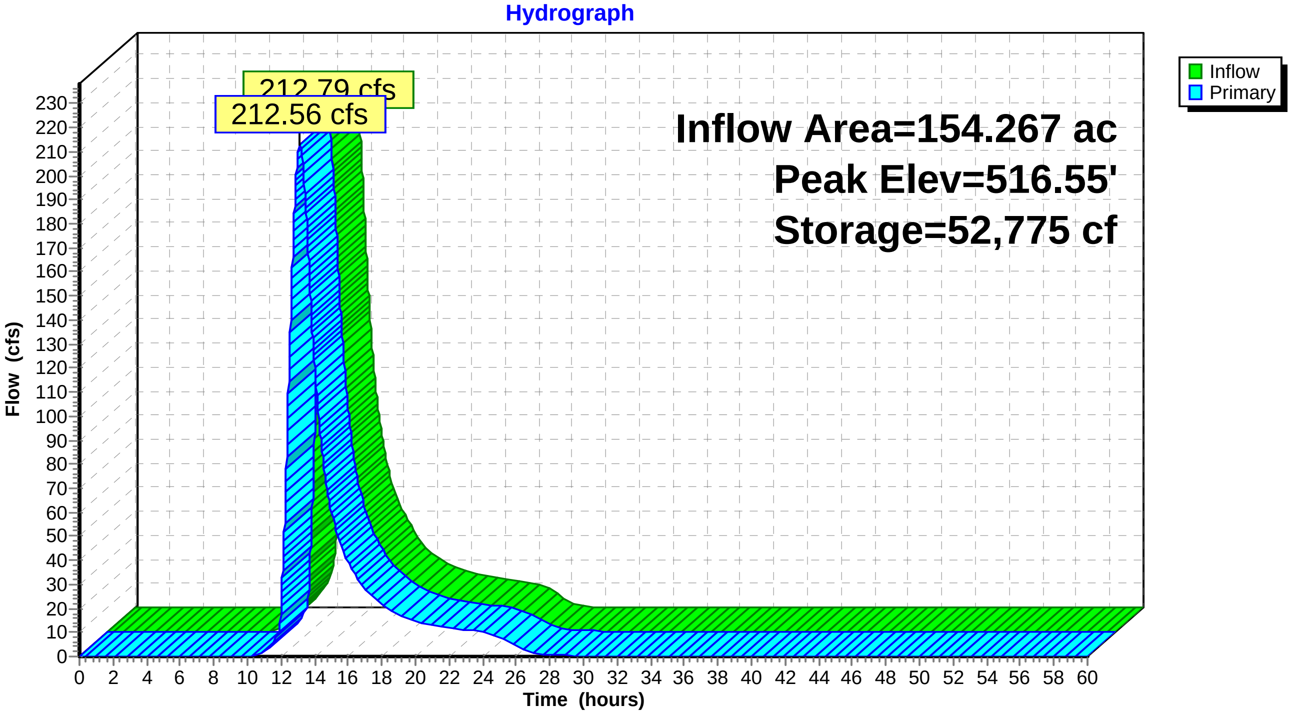
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 514.40' | 102,307 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 514.40 | 19,952 | 567.0 | 0 | 0 | 19,952 |
| 516.00 | 27,082 | 686.0 | 37,482 | 37,482 | 31,860 |
| 516.50 | 28,121 | 699.0 | 13,800 | 51,282 | 33,334 |
| 518.00 | 40,275 | 840.0 | 51,025 | 102,307 | 50,641 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 514.40' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.25 1.60 2.60 3.60<br>Width (feet) 2.33 2.33 90.00 120.00 170.00 |

**Primary OutFlow** Max=212.55 cfs @ 13.10 hrs HW=516.55' TW=510.73' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 212.55 cfs @ 2.90 fps)

## Pond 105B: Wetland J



## Summary for Pond 106A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 3.98" for 50-Year event
Inflow = 43.48 cfs @ 12.37 hrs, Volume= 5.084 af
Outflow = 43.49 cfs @ 12.38 hrs, Volume= 5.084 af, Atten= 0%, Lag= 0.2 min
Primary = 43.49 cfs @ 12.38 hrs, Volume= 5.084 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 719.83' @ 12.38 hrs Surf.Area= 114 sf Storage= 119 cf

Plug-Flow detention time= 0.0 min calculated for 5.082 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 847.2 - 847.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

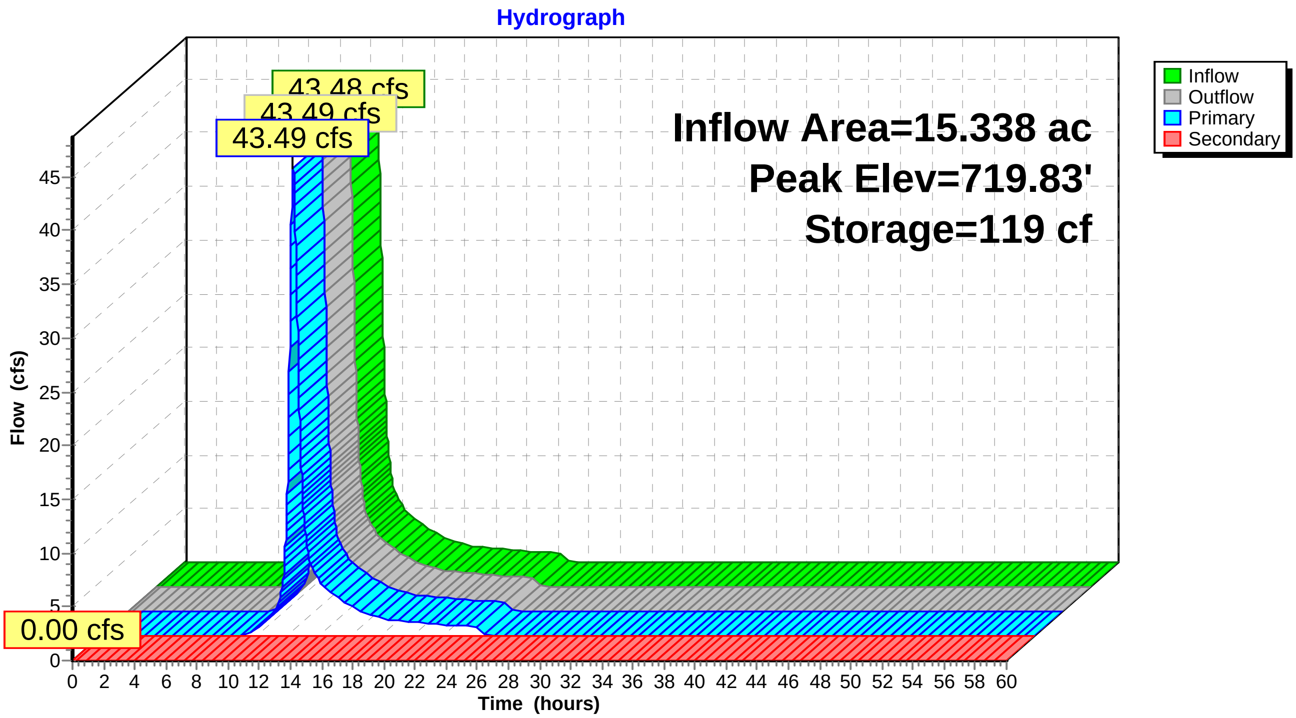
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=43.45 cfs @ 12.38 hrs HW=719.83' TW=687.14' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 43.45 cfs @ 6.15 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=686.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 130.289 ac, 0.83% Impervious, Inflow Depth = 3.98" for 50-Year event
Inflow = 193.32 cfs @ 13.15 hrs, Volume= 43.185 af
Outflow = 193.23 cfs @ 13.16 hrs, Volume= 43.185 af, Atten= 0%, Lag= 0.9 min
Primary = 193.23 cfs @ 13.16 hrs, Volume= 43.185 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 527.15' @ 13.16 hrs Surf.Area= 12,660 sf Storage= 24,759 cf

Plug-Flow detention time= 6.6 min calculated for 43.170 af (100% of inflow)
Center-of-Mass det. time= 6.6 min ( 908.6 - 902.0 )

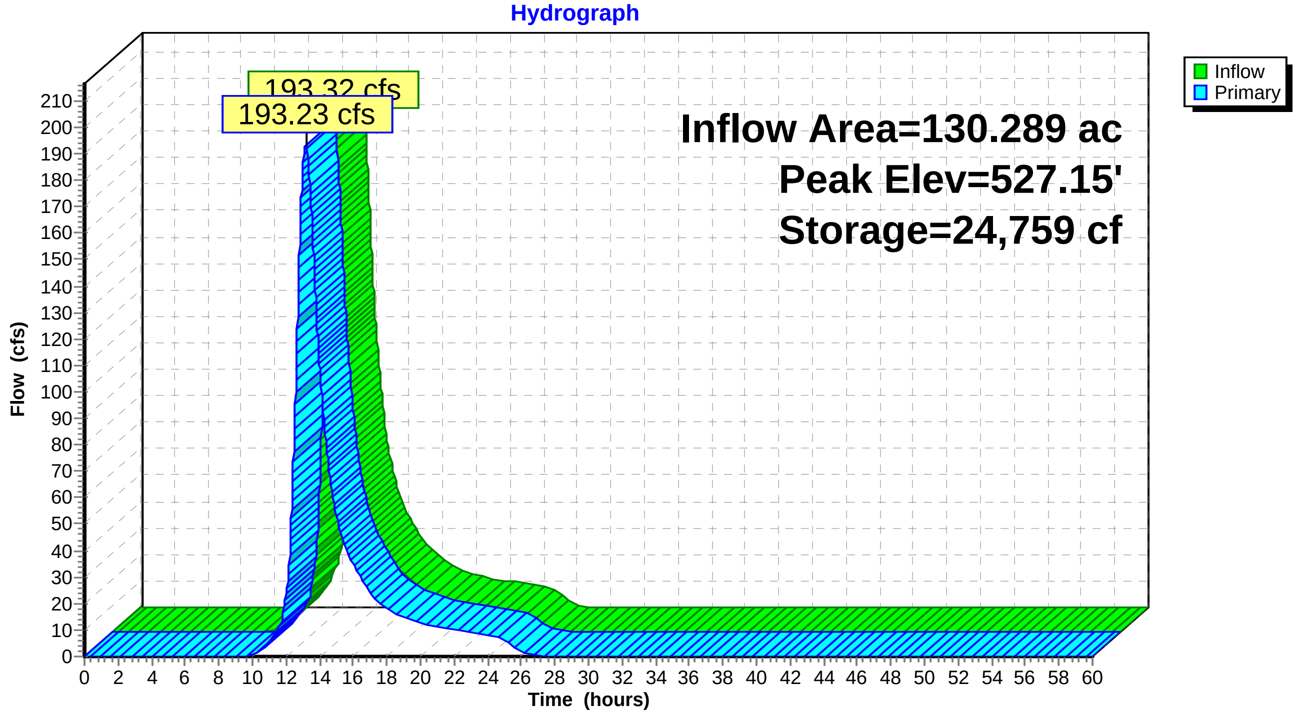
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=193.22 cfs @ 13.16 hrs HW=527.15' TW=516.55' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 193.22 cfs @ 3.29 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 95.411 ac, 2.35% Impervious, Inflow Depth = 3.62" for 50-Year event
Inflow = 159.87 cfs @ 12.82 hrs, Volume= 28.770 af
Outflow = 159.88 cfs @ 12.83 hrs, Volume= 28.770 af, Atten= 0%, Lag= 0.1 min
Primary = 44.18 cfs @ 12.83 hrs, Volume= 19.427 af
Secondary = 115.70 cfs @ 12.83 hrs, Volume= 9.343 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 626.26' @ 12.83 hrs Surf.Area= 1,572 sf Storage= 3,490 cf

Plug-Flow detention time= 0.4 min calculated for 28.760 af (100% of inflow)
Center-of-Mass det. time= 0.4 min ( 887.4 - 887.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

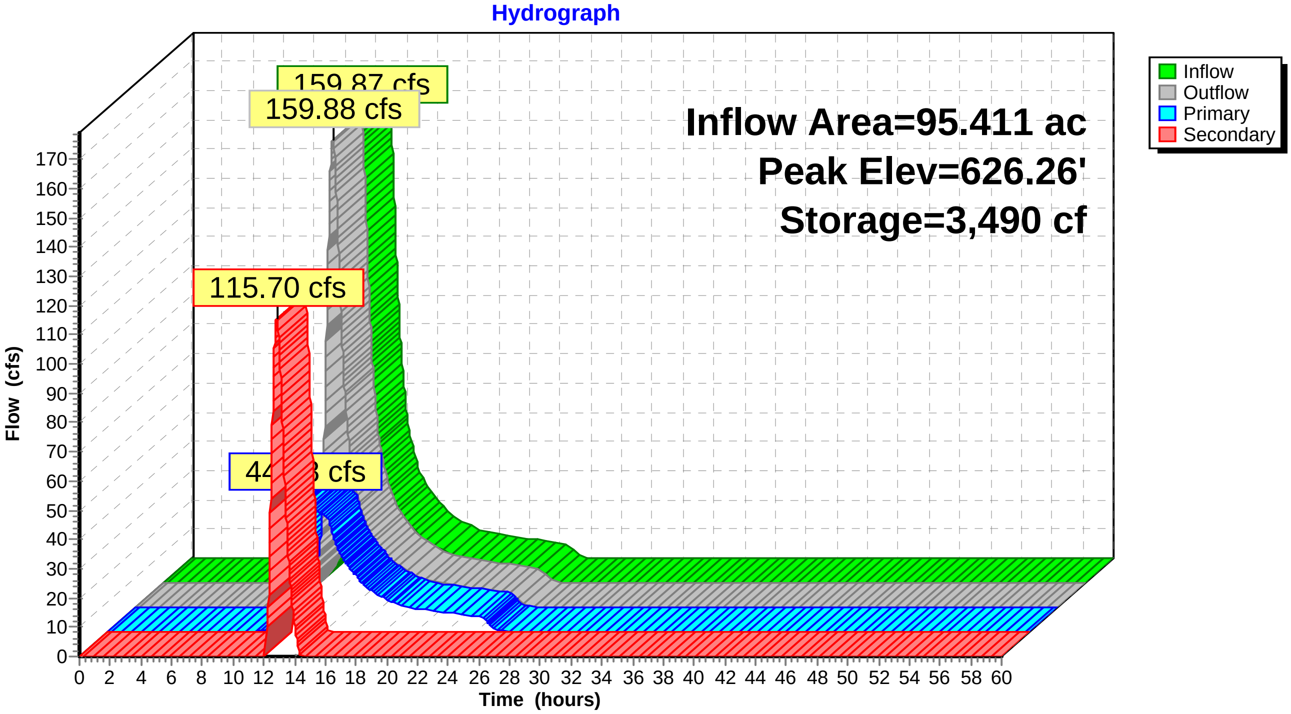
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=44.17 cfs @ 12.83 hrs HW=626.26' TW=610.47' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 44.17 cfs @ 14.06 fps)

**Secondary OutFlow** Max=115.62 cfs @ 12.83 hrs HW=626.26' TW=613.37' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 115.62 cfs @ 3.50 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 4.10" for 50-Year event
Inflow = 35.50 cfs @ 12.52 hrs, Volume= 4.894 af
Outflow = 24.74 cfs @ 12.83 hrs, Volume= 4.618 af, Atten= 30%, Lag= 18.9 min
Primary = 24.74 cfs @ 12.83 hrs, Volume= 4.618 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.97' @ 12.83 hrs Surf.Area= 125,610 sf Storage= 58,109 cf

Plug-Flow detention time= 92.8 min calculated for 4.616 af (94% of inflow)
Center-of-Mass det. time= 63.0 min ( 917.9 - 854.9 )

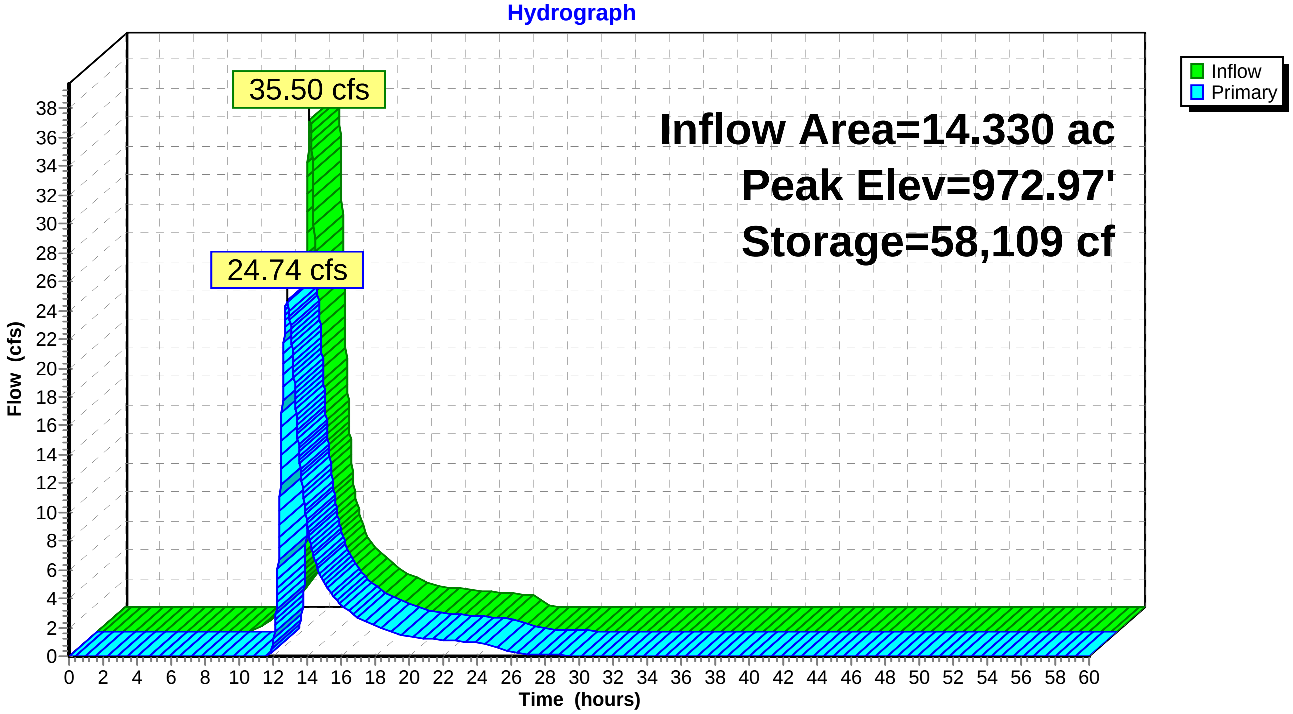
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=24.73 cfs @ 12.83 hrs HW=972.97' TW=972.44' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 24.73 cfs @ 1.65 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 5.526 ac, 2.32% Impervious, Inflow Depth = 22.12" for 50-Year event
Inflow = 119.48 cfs @ 12.82 hrs, Volume= 10.184 af
Outflow = 119.53 cfs @ 12.82 hrs, Volume= 10.184 af, Atten= 0%, Lag= 0.0 min
Primary = 58.86 cfs @ 12.62 hrs, Volume= 7.237 af
Secondary = 61.50 cfs @ 12.82 hrs, Volume= 2.948 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 613.37' @ 12.82 hrs Surf.Area= 570 sf Storage= 201 cf

Plug-Flow detention time= 0.4 min calculated for 10.184 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 790.7 - 790.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

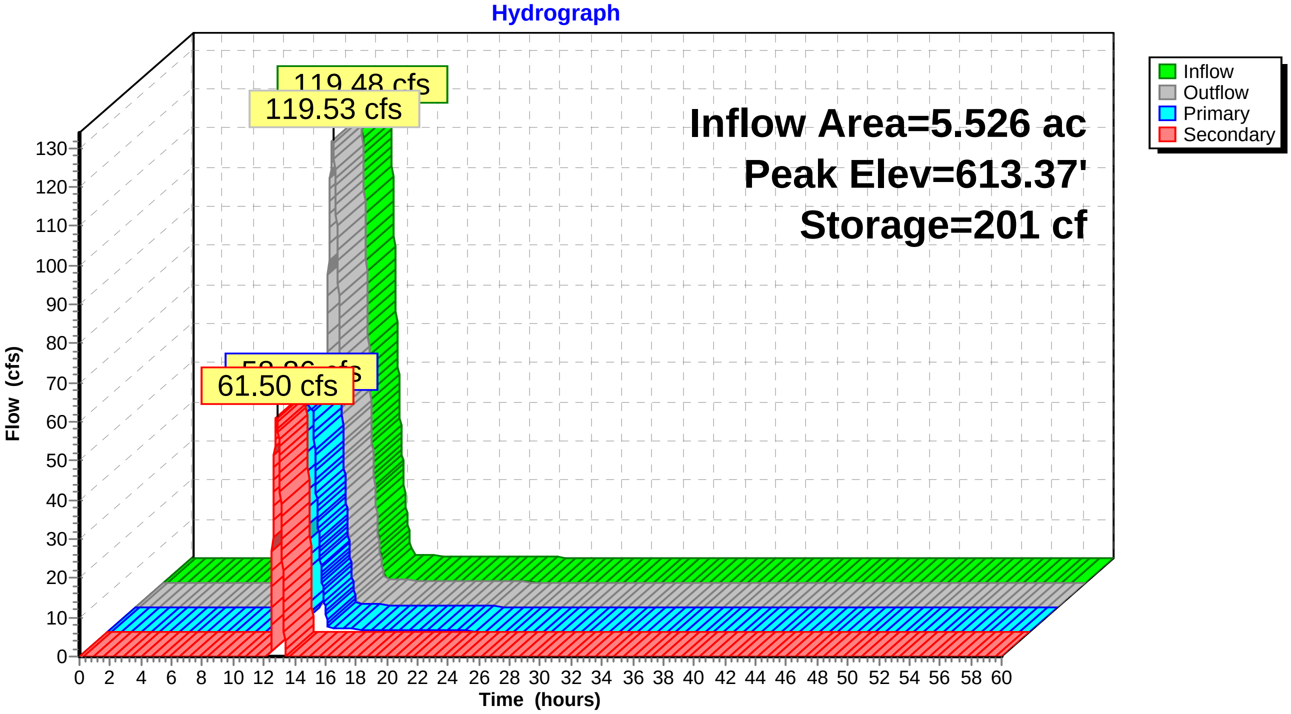
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=58.87 cfs @ 12.62 hrs HW=613.29' TW=610.30' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 58.87 cfs @ 8.33 fps)

**Secondary OutFlow** Max=61.44 cfs @ 12.82 hrs HW=613.37' TW=610.47' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 61.44 cfs @ 1.65 fps)

## Pond 108A: 36" Culvert



## Summary for Pond 108B: Wetland N

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 3.97" for 50-Year event
Inflow = 152.36 cfs @ 12.56 hrs, Volume= 23.970 af
Outflow = 152.20 cfs @ 12.57 hrs, Volume= 23.945 af, Atten= 0%, Lag= 0.8 min
Primary = 4.39 cfs @ 12.16 hrs, Volume= 4.259 af
Secondary = 148.19 cfs @ 12.57 hrs, Volume= 19.687 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.63' @ 12.57 hrs Surf.Area= 11,165 sf Storage= 16,699 cf

Plug-Flow detention time= 11.3 min calculated for 23.945 af (100% of inflow)
Center-of-Mass det. time= 10.1 min ( 880.5 - 870.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 32,385 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

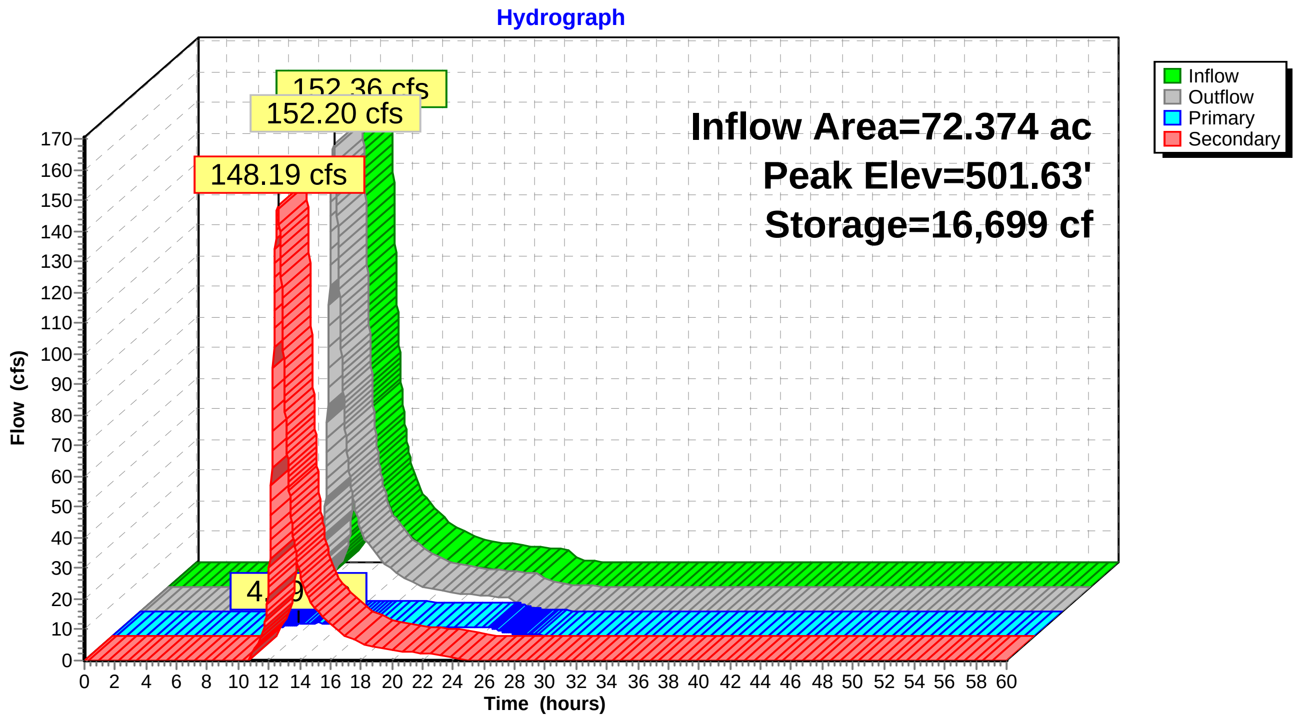
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 500.00 | 8,398 | 412.0 | 0 | 0 | 8,398 |
| 500.50 | 10,185 | 434.0 | 4,639 | 4,639 | 9,894 |
| 502.00 | 11,496 | 452.0 | 16,251 | 20,889 | 11,327 |
| 503.00 | 11,496 | 452.0 | 11,496 | 32,385 | 11,779 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.10' | **18.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 500.10' / 499.60' S= 0.0250 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 501.00' | **125.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=4.39 cfs @ 12.16 hrs HW=501.32' TW=500.60' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 4.39 cfs @ 3.88 fps)

**Secondary OutFlow** Max=148.14 cfs @ 12.57 hrs HW=501.63' TW=501.27' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 148.14 cfs @ 1.88 fps)

## Pond 108B: Wetland N



## Summary for Pond 109B: 36" Culvert

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 4.10" for 50-Year event
Inflow = 31.99 cfs @ 12.39 hrs, Volume= 3.851 af
Outflow = 31.97 cfs @ 12.40 hrs, Volume= 3.851 af, Atten= 0%, Lag= 0.5 min
Primary = 31.97 cfs @ 12.40 hrs, Volume= 3.851 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 548.10' @ 12.40 hrs Surf.Area= 215 sf Storage= 209 cf

Plug-Flow detention time= 0.0 min calculated for 3.850 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 846.3 - 846.2 )

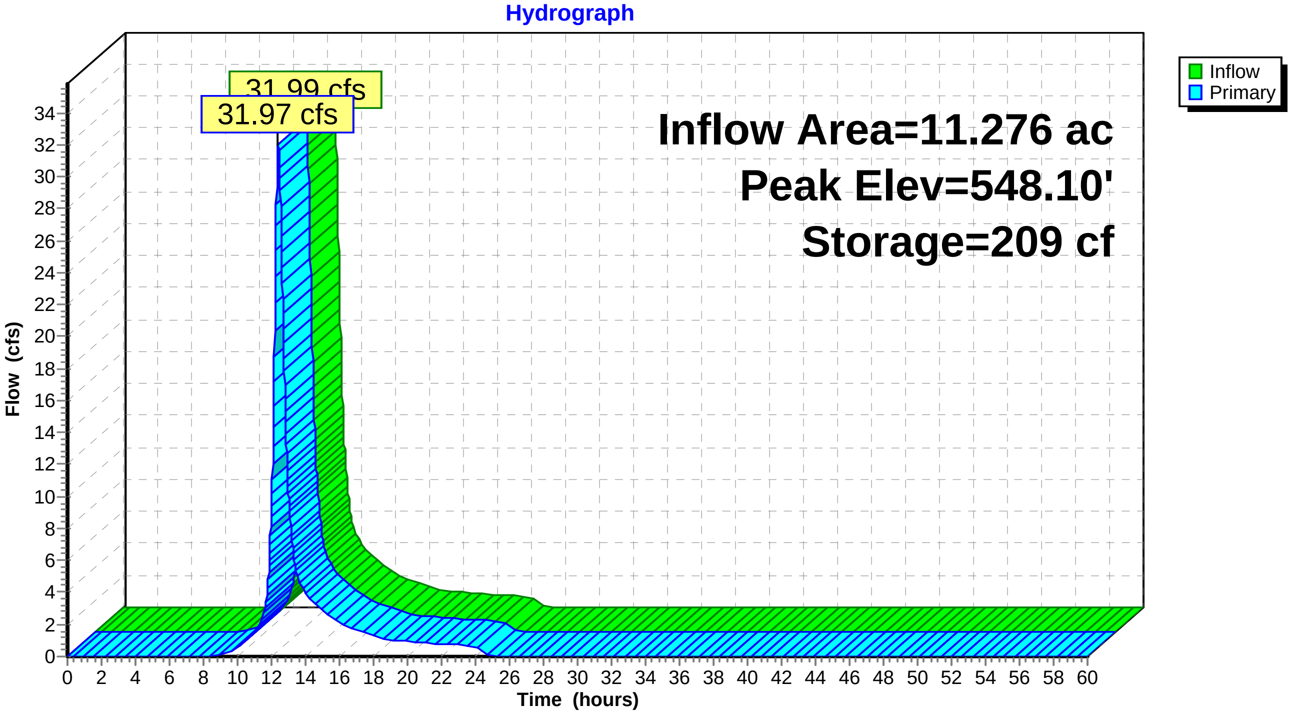
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 545.20' | 5,884 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 545.20 | 0 | 0.0 | 0 | 0 | 0 |
| 548.00 | 203 | 65.0 | 189 | 189 | 348 |
| 550.00 | 519 | 101.0 | 698 | 887 | 852 |
| 552.00 | 1,050 | 140.0 | 1,538 | 2,425 | 1,638 |
| 554.00 | 2,514 | 230.0 | 3,459 | 5,884 | 4,313 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 545.20' | **36.0" Round Culvert**<br>L= 96.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 545.20' / 532.20' S= 0.1354 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Primary | 552.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 65.00 95.00<br>Height (feet) 2.00 0.60 0.00 2.00 |

**Primary OutFlow** Max=31.97 cfs @ 12.40 hrs HW=548.09' TW=533.22' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 31.97 cfs @ 4.57 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond 109B: 36" Culvert

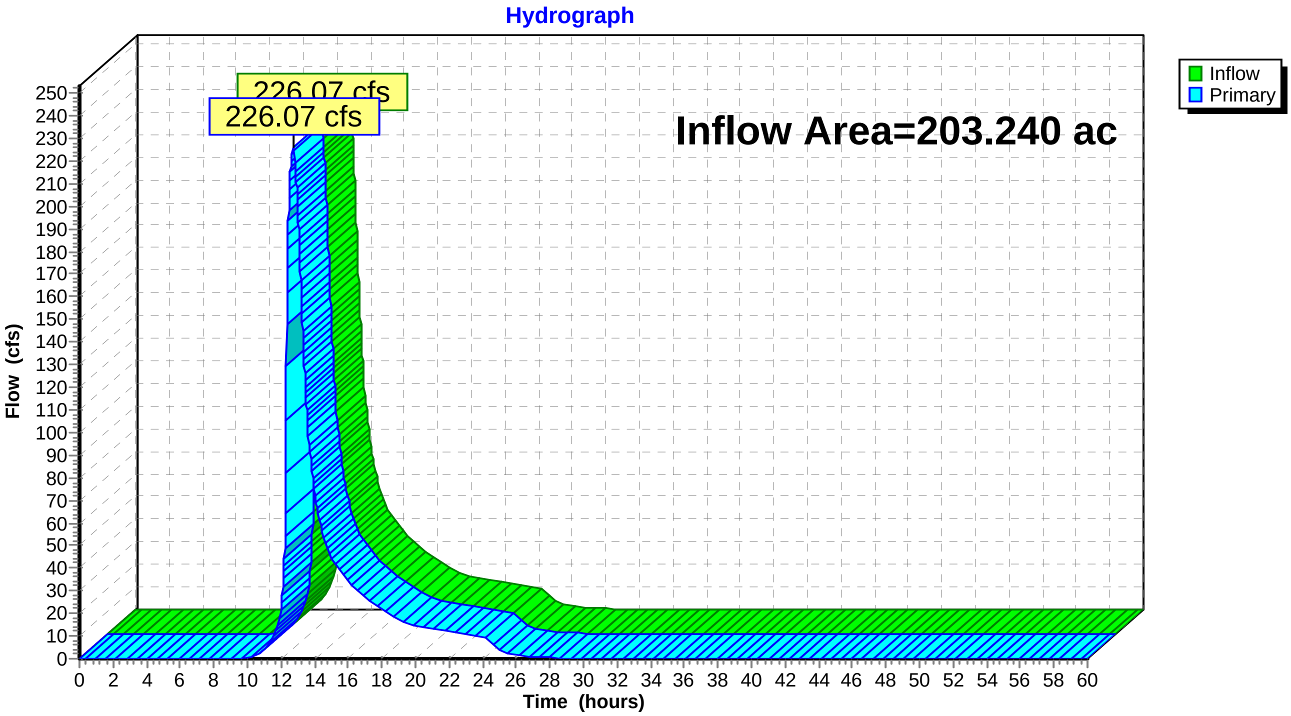


## Summary for Link A: Amenia Stream

Inflow Area = 203.240 ac, 3.66% Impervious, Inflow Depth = 2.61" for 50-Year event
Inflow = 226.07 cfs @ 12.69 hrs, Volume= 44.204 af
Primary = 226.07 cfs @ 12.69 hrs, Volume= 44.204 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

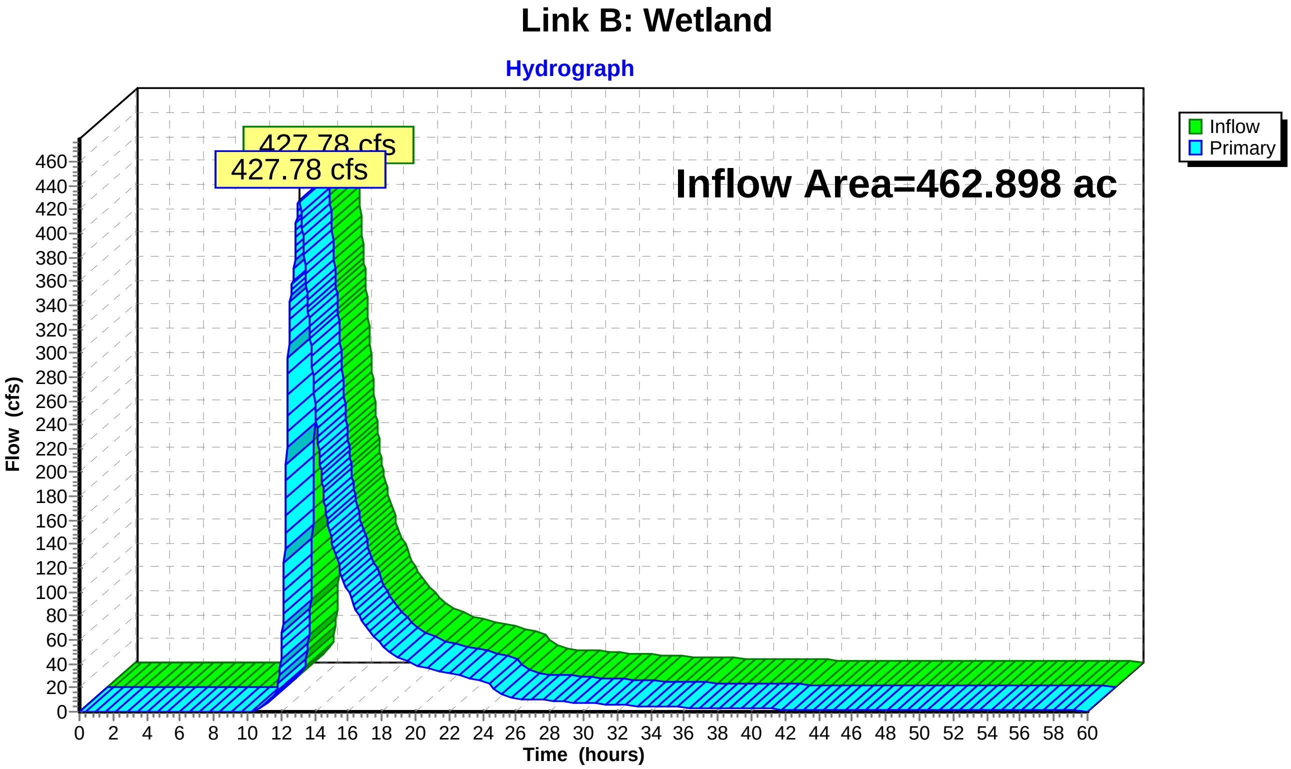
### Link A: Amenia Stream



## Summary for Link B: Wetland

Inflow Area = 462.898 ac, 3.63% Impervious, Inflow Depth > 3.14" for 50-Year event
Inflow = 427.78 cfs @ 13.05 hrs, Volume= 121.087 af
Primary = 427.78 cfs @ 13.05 hrs, Volume= 121.087 af, Atten= 0%, Lag= 0.0 min

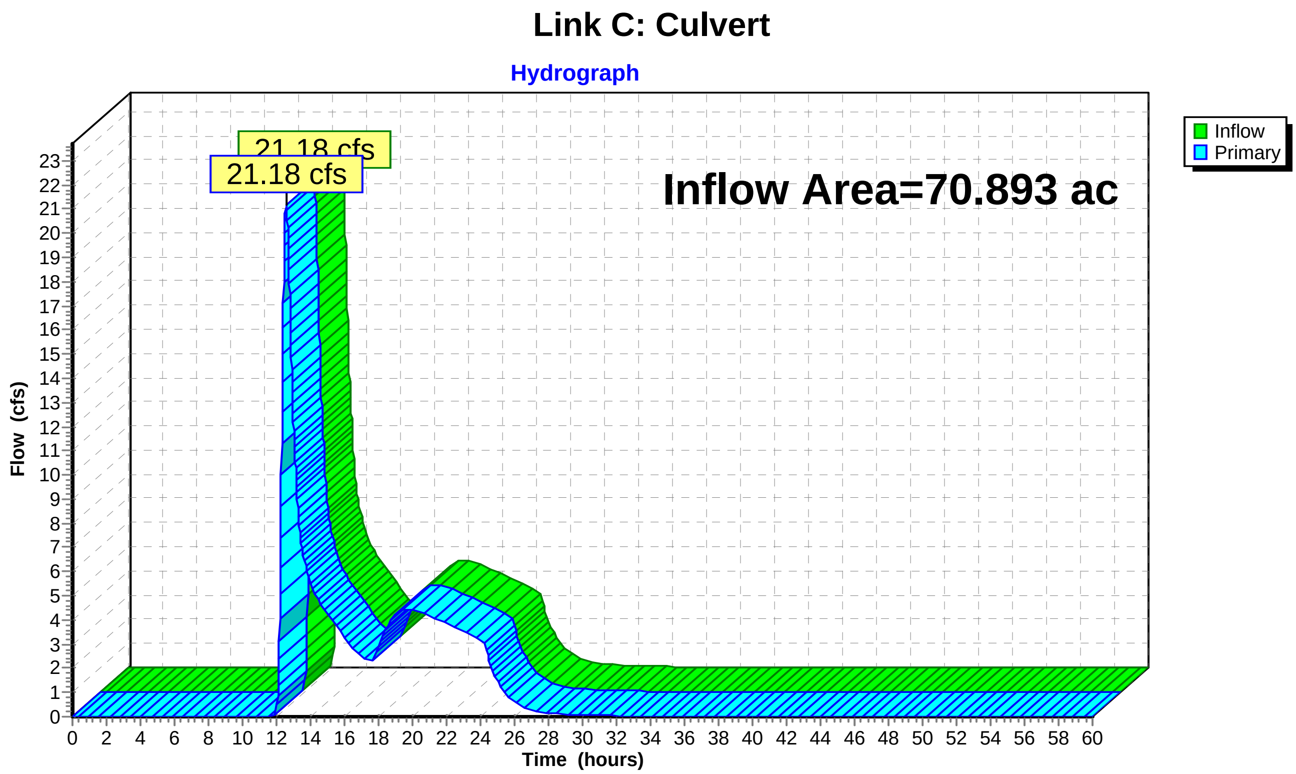
Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs



## Summary for Link C: Culvert

Inflow Area = 70.893 ac, 4.53% Impervious, Inflow Depth = 0.88" for 50-Year event
Inflow = 21.18 cfs @ 12.57 hrs, Volume= 5.182 af
Primary = 21.18 cfs @ 12.57 hrs, Volume= 5.182 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

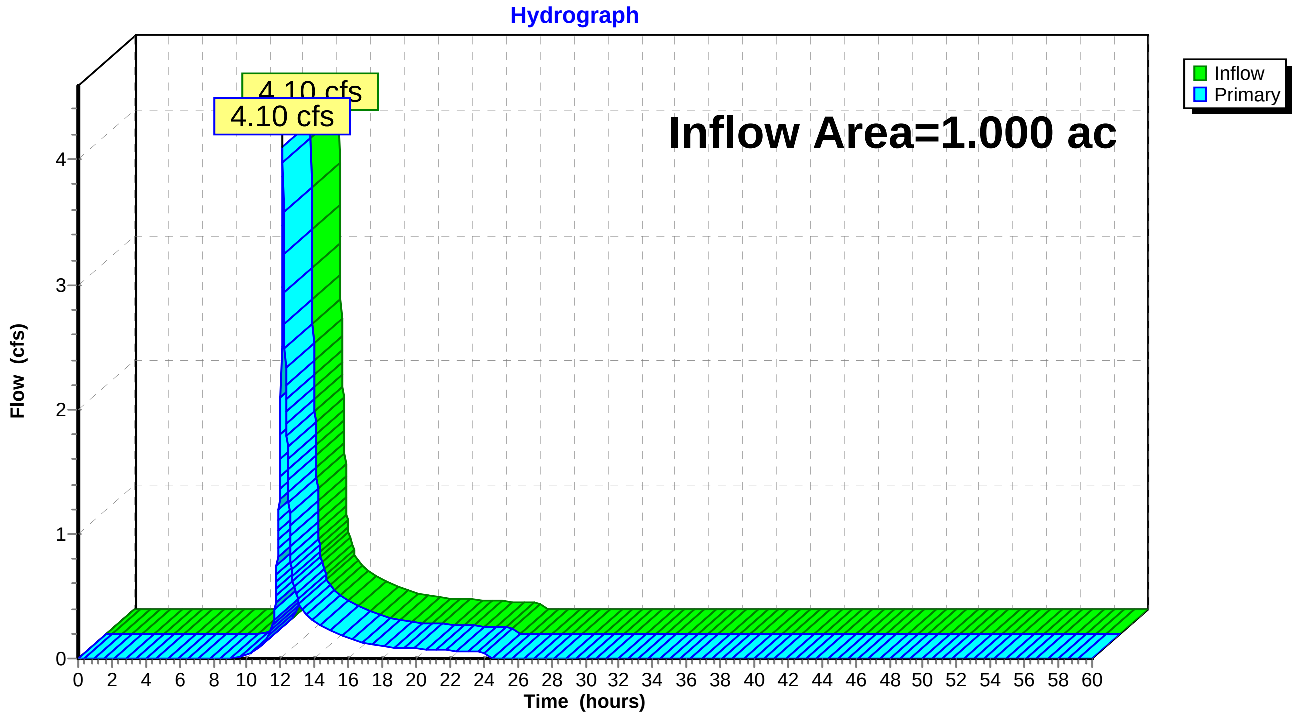


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 3.62" for 50-Year event
Inflow = 4.10 cfs @ 12.11 hrs, Volume= 0.302 af
Primary = 4.10 cfs @ 12.11 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=43.269 ac 4.21% Impervious Runoff Depth=1.59"
Flow Length=1,315' Tc=31.0 min CN=46 Runoff=31.55 cfs 5.715 af

**Subcatchment A102: A102** Runoff Area=9.187 ac 13.40% Impervious Runoff Depth=2.07"
Flow Length=675' Tc=29.1 min CN=50 Runoff=10.47 cfs 1.584 af

**Subcatchment A103: A103** Runoff Area=36.735 ac 8.79% Impervious Runoff Depth=2.32"
Flow Length=1,190' Tc=45.1 min CN=52 Runoff=39.81 cfs 7.102 af

**Subcatchment A104: A104** Runoff Area=9.432 ac 9.40% Impervious Runoff Depth=1.47"
Flow Length=1,015' Tc=29.2 min CN=45 Runoff=6.20 cfs 1.154 af

**Subcatchment A105: A105** Runoff Area=34.264 ac 3.27% Impervious Runoff Depth=3.36"
Flow Length=1,326' Tc=19.2 min CN=60 Runoff=90.16 cfs 9.589 af

**Subcatchment A106: A106** Runoff Area=15.338 ac 8.12% Impervious Runoff Depth=5.51"
Flow Length=1,260' Tc=26.7 min CN=76 Runoff=59.99 cfs 7.041 af

**Subcatchment A107: A107** Runoff Area=95.411 ac 2.35% Impervious Runoff Depth=5.10"
Flow Length=3,685' Tc=61.0 min CN=73 Runoff=226.93 cfs 40.578 af

**Subcatchment A108: A108** Runoff Area=5.526 ac 2.32% Impervious Runoff Depth=2.96"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=10.26 cfs 1.365 af

**Subcatchment B101: B101** Runoff Area=127.641 ac 0.75% Impervious Runoff Depth=3.76"
Flow Length=2,934' Tc=43.8 min CN=63 Runoff=262.76 cfs 39.967 af

**Subcatchment B102: B102** Runoff Area=6.499 ac 2.62% Impervious Runoff Depth=2.45"
Flow Length=637' Tc=19.6 min CN=53 Runoff=11.11 cfs 1.325 af

**Subcatchment B103: B103** Runoff Area=21.581 ac 11.93% Impervious Runoff Depth=4.97"
Flow Length=1,130' Tc=38.7 min CN=72 Runoff=64.15 cfs 8.935 af

**Subcatchment B104: B104** Runoff Area=80.536 ac 13.45% Impervious Runoff Depth=3.76"
Flow Length=3,223' Tc=33.2 min CN=63 Runoff=190.78 cfs 25.218 af

**Subcatchment B105: B105** Runoff Area=23.978 ac 2.94% Impervious Runoff Depth=4.56"
Flow Length=1,400' Tc=38.0 min CN=69 Runoff=66.02 cfs 9.119 af

**Subcatchment B106: B106** Runoff Area=130.289 ac 0.83% Impervious Runoff Depth=5.51"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=268.00 cfs 59.811 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=5.64"
Flow Length=907' Tc=37.9 min CN=77 Runoff=48.66 cfs 6.740 af

**Subcatchment B108: B108** Runoff Area=46.768 ac 1.07% Impervious Runoff Depth=5.51"
Flow Length=2,241' Tc=39.8 min CN=76 Runoff=151.30 cfs 21.469 af

**Subcatchment B109: B109** Runoff Area=11.276 ac 0.04% Impervious Runoff Depth=5.64"
Flow Length=1,048' Tc=28.5 min CN=77 Runoff=43.84 cfs 5.303 af

**Subcatchment C101: C101** Runoff Area=30.507 ac 4.58% Impervious Runoff Depth=2.45"
Flow Length=1,500' Tc=31.9 min CN=53 Runoff=42.65 cfs 6.221 af

**Subcatchment C102: C102** Runoff Area=40.386 ac 4.49% Impervious Runoff Depth=3.89"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=84.67 cfs 13.096 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=5.10"
Flow Length=176' Tc=7.5 min CN=73 Runoff=5.79 cfs 0.425 af

**Reach A105R: Thru A101** Avg. Flow Depth=2.42' Max Vel=8.98 fps Inflow=143.61 cfs 16.614 af
n=0.050 L=1,075.0' S=0.0577 '/' Capacity=152.54 cfs Outflow=142.75 cfs 16.613 af

**Reach A106R: Thru A105** Avg. Flow Depth=1.32' Max Vel=7.52 fps Inflow=59.96 cfs 7.041 af
n=0.050 L=1,215.0' S=0.0922 '/' Capacity=153.12 cfs Outflow=59.37 cfs 7.041 af

**Reach A108R: Thru A101** Avg. Flow Depth=2.93' Max Vel=12.07 fps Inflow=233.18 cfs 41.943 af
n=0.050 L=1,090.0' S=0.0862 '/' Capacity=244.78 cfs Outflow=232.77 cfs 41.943 af

**Reach B102R: Thru B101** Avg. Flow Depth=3.22' Max Vel=6.19 fps Inflow=411.29 cfs 102.151 af
n=0.050 L=122.0' S=0.0164 '/' Capacity=356.26 cfs Outflow=411.28 cfs 102.149 af

**Reach B103R: Thru B102** Avg. Flow Depth=4.17' Max Vel=7.19 fps Inflow=408.43 cfs 100.836 af
n=0.050 L=585.0' S=0.0171 '/' Capacity=374.39 cfs Outflow=408.31 cfs 100.827 af

**Reach B107R: Thru B108** Avg. Flow Depth=0.53' Max Vel=7.07 fps Inflow=36.37 cfs 6.463 af
n=0.050 L=2,040.0' S=0.2294 '/' Capacity=144.21 cfs Outflow=36.01 cfs 6.463 af

**Reach B108R: Thur 101** Avg. Flow Depth=2.01' Max Vel=6.68 fps Inflow=215.06 cfs 33.211 af
n=0.050 L=233.0' S=0.0318 '/' Capacity=474.00 cfs Outflow=215.04 cfs 33.211 af

**Reach B109R: Thru B108** Avg. Flow Depth=1.17' Max Vel=6.75 fps Inflow=43.75 cfs 5.303 af
n=0.050 L=355.0' S=0.0851 '/' Capacity=147.09 cfs Outflow=43.70 cfs 5.303 af

**Pond 102A: Wetland B** Peak Elev=501.74' Storage=158,749 cf Inflow=10.47 cfs 3.644 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 102B: 18" Culvert** Peak Elev=496.34' Storage=9,555 cf Inflow=411.31 cfs 102.152 af
Primary=10.04 cfs 19.789 af Secondary=404.17 cfs 82.363 af Outflow=411.29 cfs 102.151 af

**Pond 102C: Pond 102C** Peak Elev=509.15' Storage=343,608 cf Inflow=84.67 cfs 13.096 af
Outflow=13.87 cfs 5.968 af

**Pond 103A: Wetland A** Peak Elev=502.52' Storage=259,622 cf Inflow=39.81 cfs 7.102 af
24.0" Round Culvert n=0.013 L=80.0' S=-0.0125 '/' Outflow=2.20 cfs 2.060 af

**Pond 103B: Irrigation Pond** Peak Elev=506.94' Storage=104,254 cf Inflow=192.00 cfs 57.781 af
Primary=19.17 cfs 12.458 af Secondary=169.10 cfs 45.072 af Outflow=188.26 cfs 57.530 af

**Pond 104A: Wetland D** Peak Elev=508.07' Storage=8,242 cf Inflow=6.20 cfs 1.154 af
Primary=0.40 cfs 0.432 af Secondary=4.51 cfs 0.701 af Outflow=4.91 cfs 1.133 af

**Pond 104B: Island Pond** Peak Elev=511.02' Storage=708,244 cf Inflow=399.04 cfs 94.146 af
Primary=16.02 cfs 22.216 af Secondary=137.76 cfs 26.630 af Tertiary=220.65 cfs 43.306 af Outflow=374.43 cfs 92.151 af

**Pond 105A: Wetland H** Peak Elev=575.44' Storage=71,175 cf Inflow=144.07 cfs 16.630 af
Primary=11.38 cfs 8.502 af Secondary=132.23 cfs 8.112 af Outflow=143.61 cfs 16.614 af

**Pond 105B: Wetland J** Peak Elev=516.74' Storage=58,131 cf Inflow=296.68 cfs 68.929 af
Outflow=296.39 cfs 68.928 af

**Pond 106A: 36" Culvert** Peak Elev=721.30' Storage=377 cf Inflow=59.99 cfs 7.041 af
Primary=59.96 cfs 7.041 af Secondary=0.00 cfs 0.000 af Outflow=59.96 cfs 7.041 af

**Pond 106B: Wetland J** Peak Elev=527.39' Storage=27,726 cf Inflow=268.00 cfs 59.811 af
Outflow=267.88 cfs 59.811 af

**Pond 107A: 24" Culvert** Peak Elev=626.63' Storage=4,113 cf Inflow=226.93 cfs 40.578 af
Primary=45.67 cfs 24.164 af Secondary=181.28 cfs 16.414 af Outflow=226.95 cfs 40.578 af

**Pond 107B: Wetland** Peak Elev=973.08' Storage=71,937 cf Inflow=48.66 cfs 6.740 af
Outflow=36.37 cfs 6.463 af

**Pond 108A: 36" Culvert** Peak Elev=613.62' Storage=390 cf Inflow=187.52 cfs 17.778 af
Primary=58.93 cfs 9.574 af Secondary=131.65 cfs 8.205 af Outflow=187.51 cfs 17.778 af

**Pond 108B: Wetland N** Peak Elev=501.90' Storage=19,779 cf Inflow=215.30 cfs 33.236 af
Primary=4.38 cfs 4.619 af Secondary=211.41 cfs 28.592 af Outflow=215.06 cfs 33.211 af

**Pond 109B: 36" Culvert** Peak Elev=549.35' Storage=590 cf Inflow=43.84 cfs 5.303 af
Outflow=43.75 cfs 5.303 af

**Link A: Amenia Stream** Inflow=343.08 cfs 65.404 af
Primary=343.08 cfs 65.404 af

**Link B: Wetland** Inflow=791.92 cfs 175.327 af
Primary=791.92 cfs 175.327 af

**Link C: Culvert** Inflow=42.65 cfs 12.189 af
Primary=42.65 cfs 12.189 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=5.79 cfs 0.425 af
Primary=5.79 cfs 0.425 af

**Total Runoff Area = 783.953 ac Runoff Volume = 271.757 af Average Runoff Depth = 4.16"**
**95.93% Pervious = 752.017 ac 4.07% Impervious = 31.936 ac**

## Summary for Subcatchment A101: A101

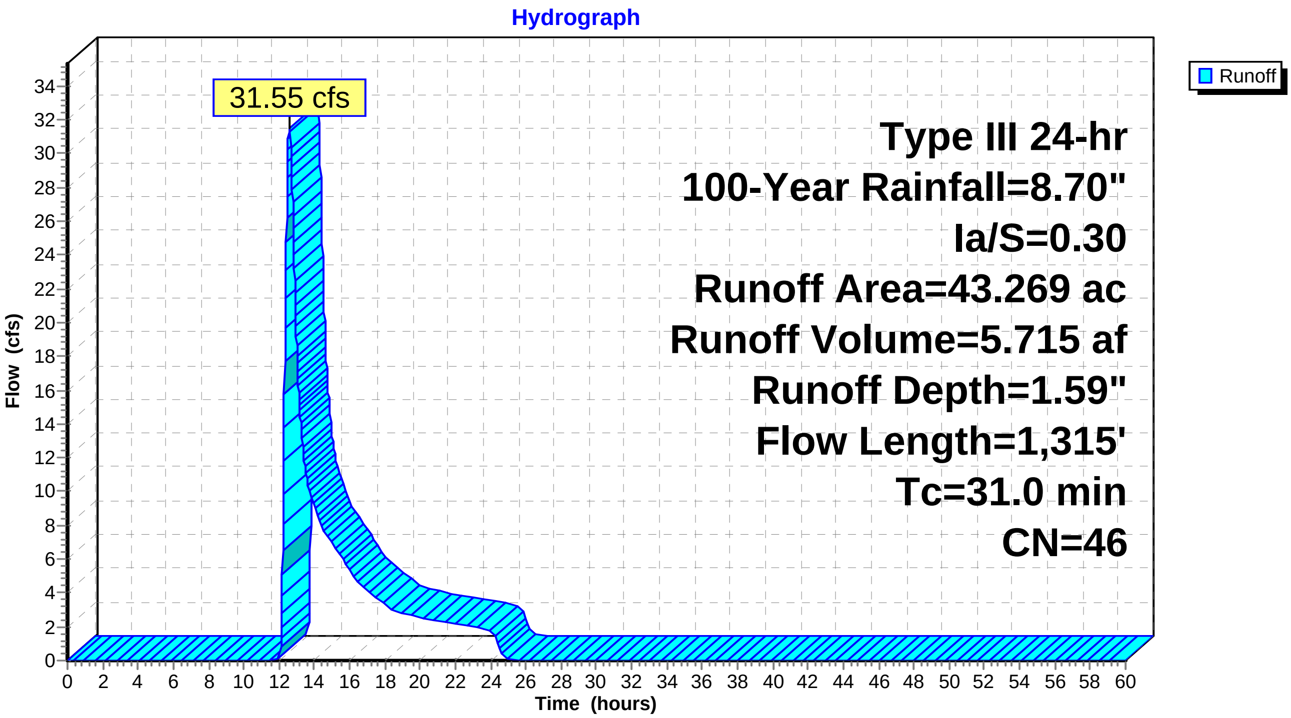
Runoff = 31.55 cfs @ 12.58 hrs, Volume= 5.715 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.819 | 98 | Paved surface |
| * | 0.089 | 96 | Gravel surface |
| * | 0.001 | 98 | Water Surface |
| | 31.250 | 39 | >75% Grass cover, Good, HSG A |
| | 6.738 | 61 | >75% Grass cover, Good, HSG B |
| | 1.730 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 1.164 | 30 | Woods, Good, HSG A |
| | 0.152 | 55 | Woods, Good, HSG B |
| | 0.088 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.223 | 30 | Sand trap, HSG A |
| * | 0.015 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 43.269 | 46 | Weighted Average |
| | 41.449 | | 95.79% Pervious Area |
| | 1.820 | | 4.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.9 | 100 | 0.0400 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.0 | 430 | 0.1200 | 2.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.5 | 360 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.6 | 425 | 0.0140 | 0.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 31.0 | 1,315 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

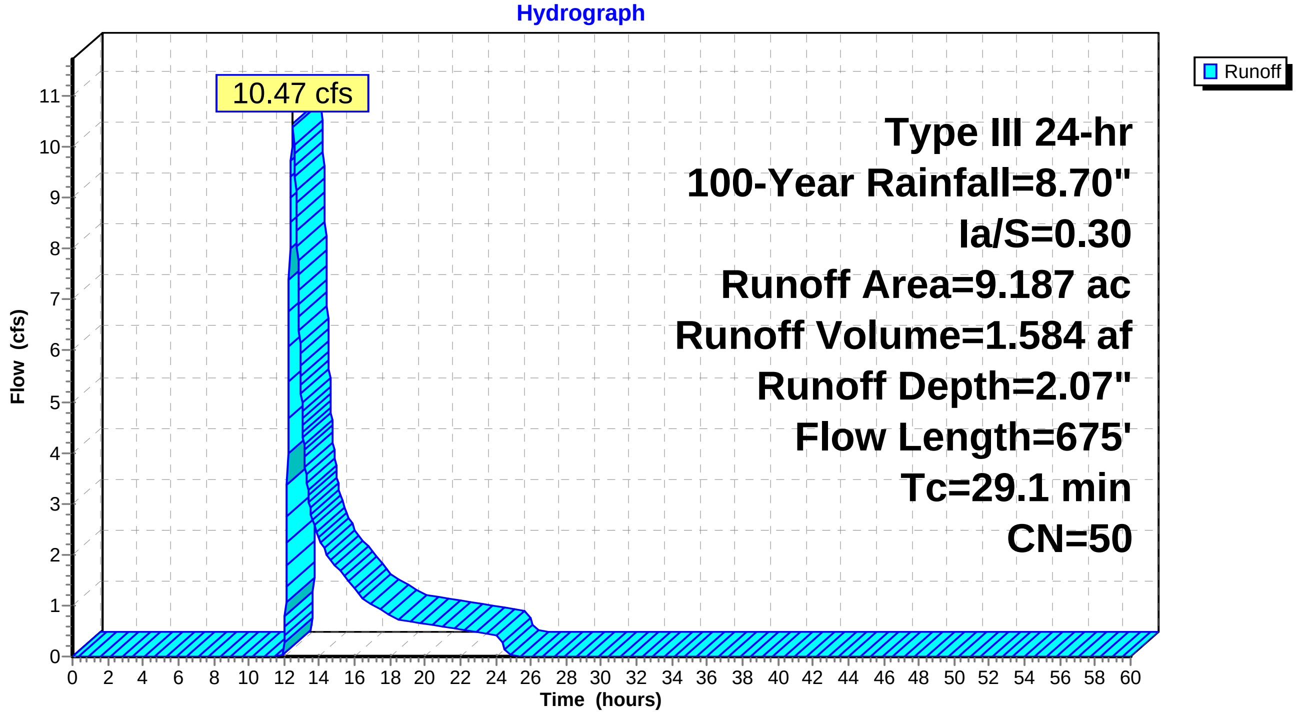
Runoff = 10.47 cfs @ 12.50 hrs, Volume= 1.584 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.387 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.844 | 98 | Water Surface |
| | 3.520 | 39 | >75% Grass cover, Good, HSG A |
| | 2.156 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.260 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.004 | 30 | Sand trap, HSG A |
| * | 0.016 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.187 | 50 | Weighted Average |
| | 7.956 | | 86.60% Pervious Area |
| | 1.231 | | 13.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 23.0 | 100 | 0.0600 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.1 | 575 | 0.0500 | 1.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.1 | 675 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

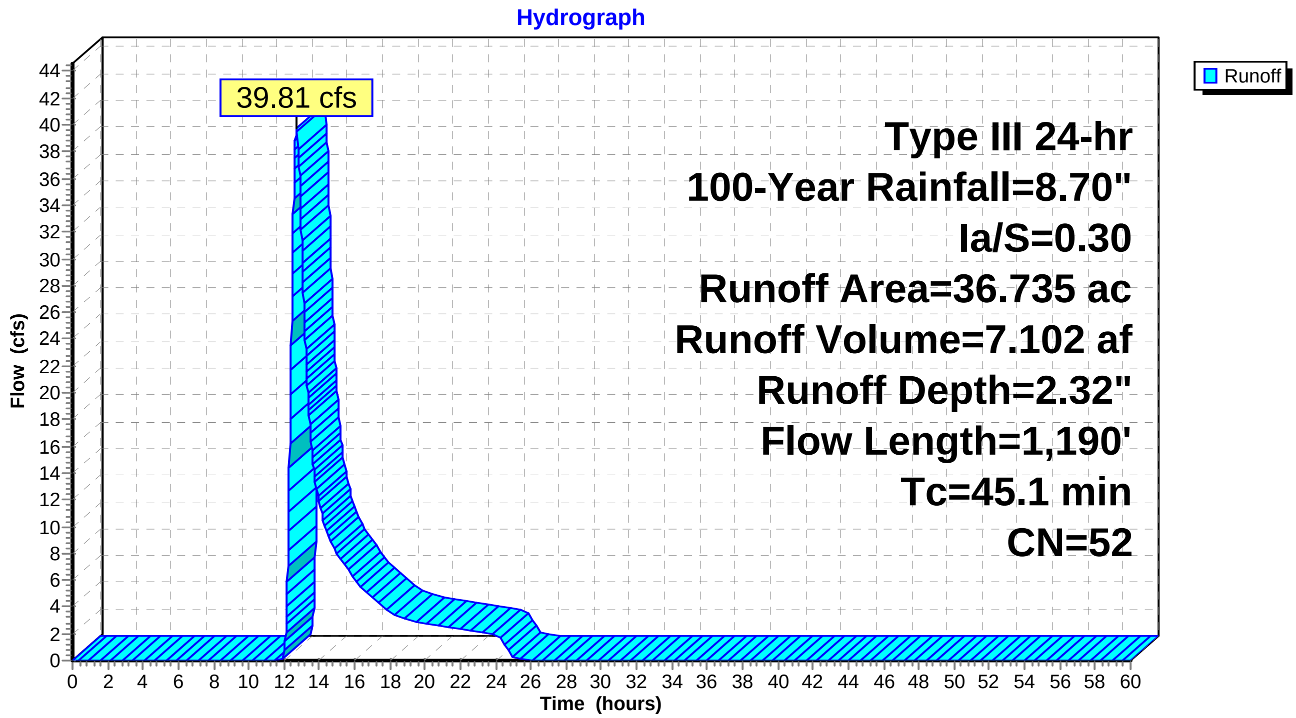
Runoff = 39.81 cfs @ 12.72 hrs, Volume= 7.102 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.334 | 98 | Building roof |
| * | 2.378 | 98 | Paved surface |
| * | 0.402 | 96 | Gravel surface |
| * | 0.516 | 98 | Water Surface |
| | 14.616 | 39 | >75% Grass cover, Good, HSG A |
| | 3.182 | 61 | >75% Grass cover, Good, HSG B |
| | 4.088 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 6.882 | 30 | Woods, Good, HSG A |
| | 1.635 | 55 | Woods, Good, HSG B |
| | 1.432 | 70 | Woods, Good, HSG C |
| | 1.137 | 77 | Woods, Good, HSG D |
| * | 0.095 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.009 | 30 | Sand Trap, HSG C |
| | 36.735 | 52 | Weighted Average |
| | 33.507 | | 91.21% Pervious Area |
| | 3.228 | | 8.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 35.7 | 100 | 0.0200 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.9 | 227 | 0.0190 | 0.96 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 75 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 343 | 0.0400 | 4.54 | 18.14 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' n= 0.050 |
| 3.7 | 445 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 45.1 | 1,190 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

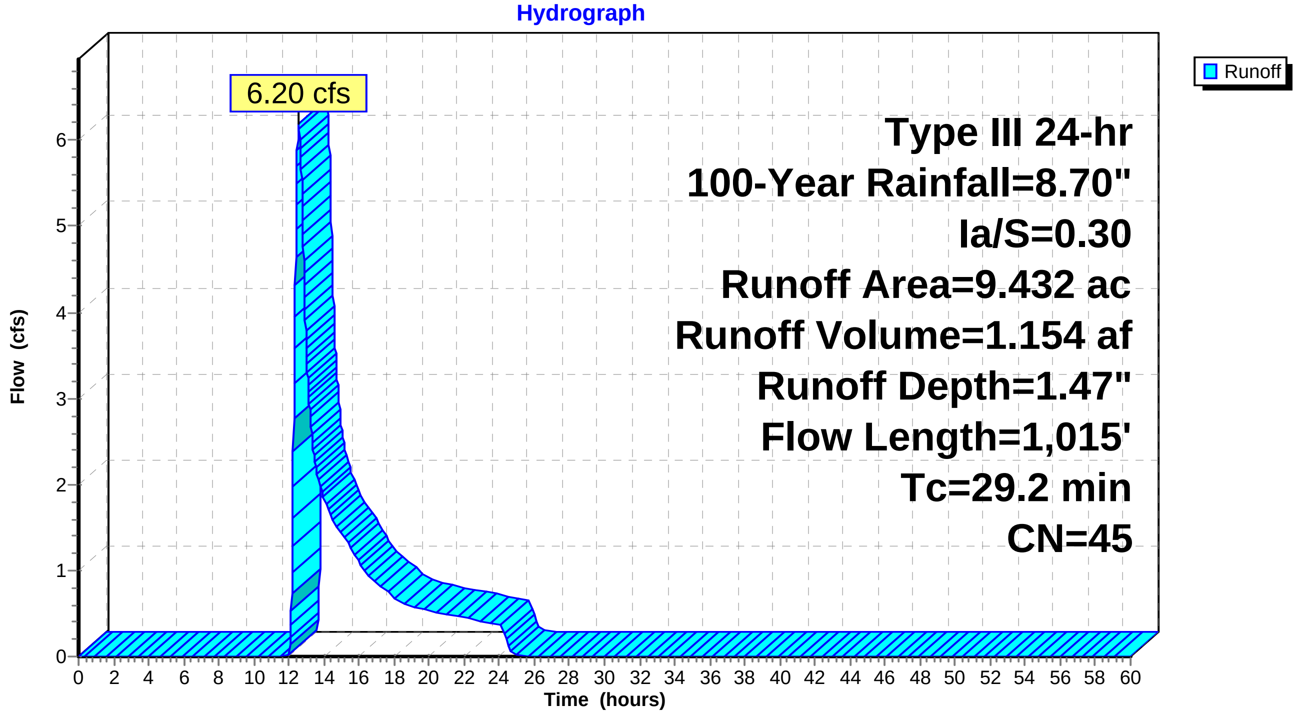
Runoff = 6.20 cfs @ 12.56 hrs, Volume= 1.154 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.458 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.429 | 98 | Water Surface |
| | 8.361 | 39 | >75% Grass cover, Good, HSG A |
| | 0.043 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.071 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.053 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 9.432 | 45 | Weighted Average |
| | 8.545 | | 90.60% Pervious Area |
| | 0.887 | | 9.40% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.9 | 100 | 0.0200 | 0.08 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.4 | 375 | 0.0700 | 1.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.5 | 255 | 0.1600 | 2.80 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.4 | 285 | 0.0400 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 29.2 | 1,015 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

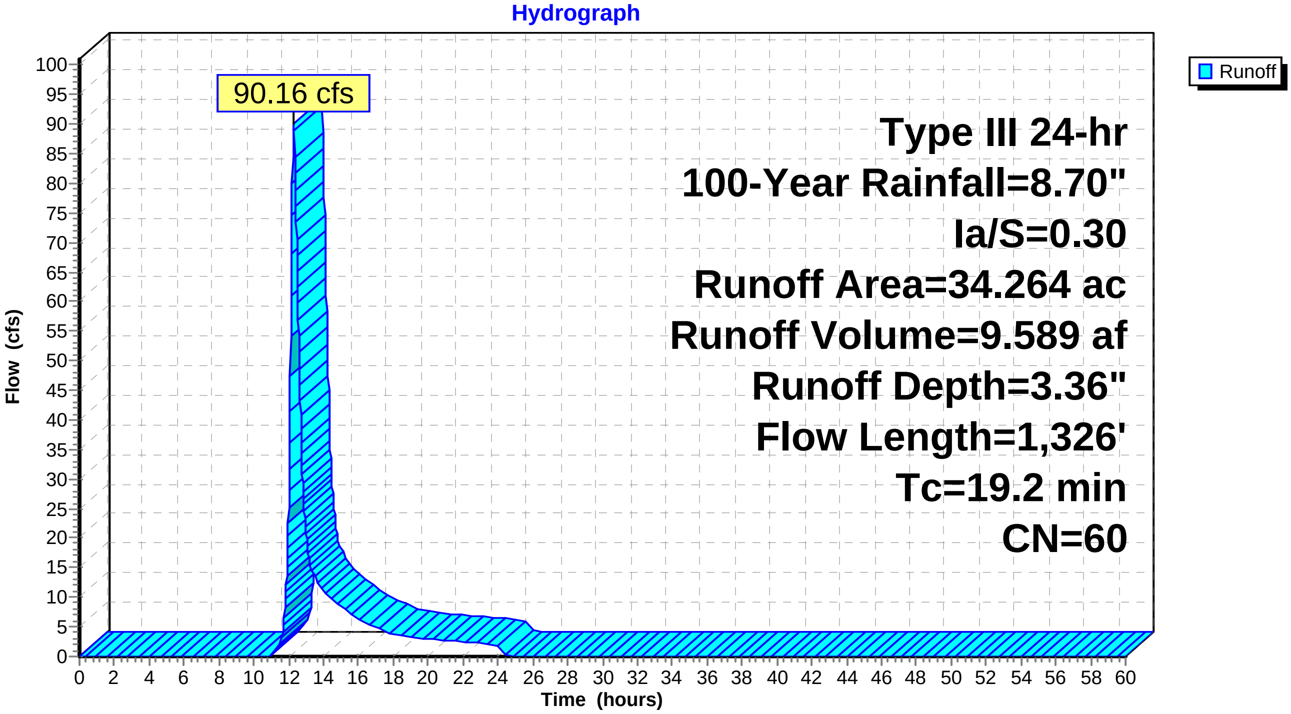
Runoff = 90.16 cfs @ 12.28 hrs, Volume= 9.589 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.119 | 98 | Paved surface |
| * | 0.088 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.167 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 15.618 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.226 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.911 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.135 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 34.264 | 60 | Weighted Average |
| | 33.145 | | 96.73% Pervious Area |
| | 1.119 | | 3.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 23 | 0.1700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.8 | 77 | 0.3000 | 0.13 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 150 | 0.3700 | 1.52 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.3 | 526 | 0.0950 | 6.52 | 32.61 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.8 | 550 | 0.0600 | 4.98 | 16.59 | **Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.035 High grass |
| 19.2 | 1,326 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

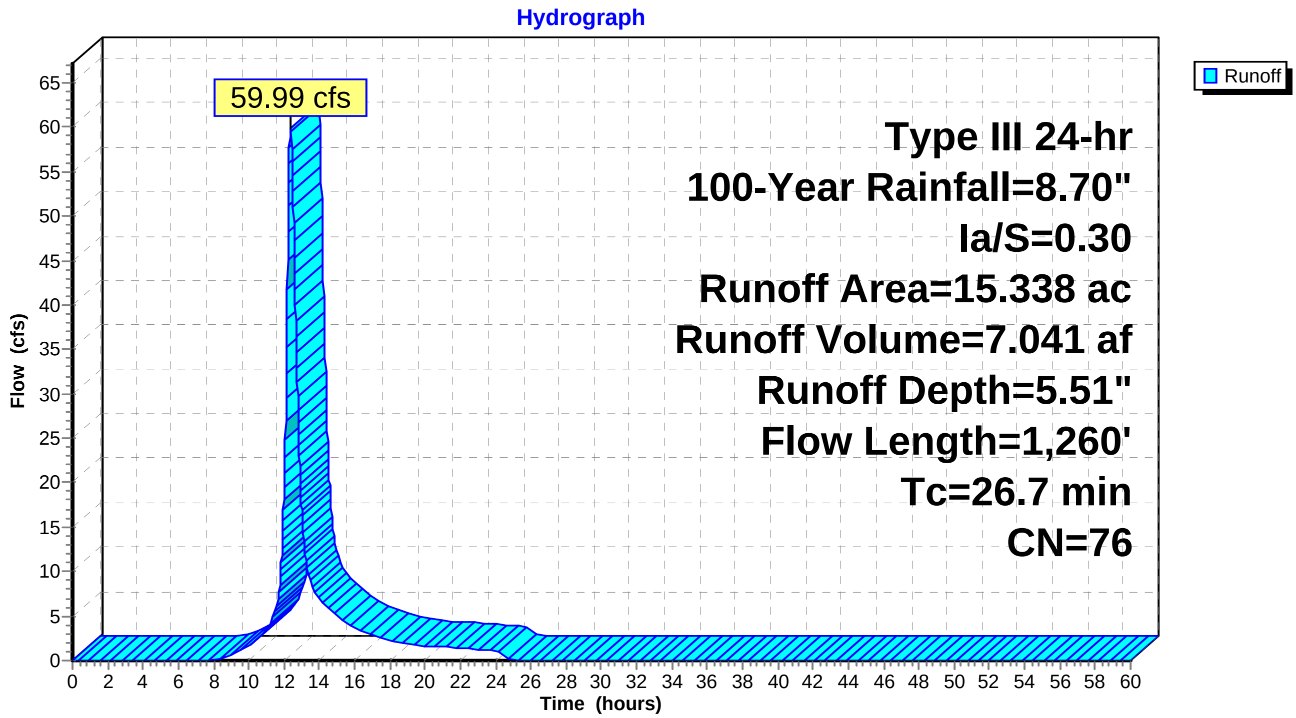
Runoff = 59.99 cfs @ 12.37 hrs, Volume= 7.041 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.013 | 98 | Building roof |
| * | 1.232 | 98 | Paved surface |
| * | 0.200 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.050 | 61 | >75% Grass cover, Good, HSG B |
| | 9.227 | 74 | >75% Grass cover, Good, HSG C |
| | 2.194 | 80 | >75% Grass cover, Good, HSG D |
| | 0.097 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.706 | 70 | Woods, Good, HSG C |
| | 0.619 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.338 | 76 | Weighted Average |
| | 14.093 | | 91.88% Pervious Area |
| | 1.245 | | 8.12% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00'<br>n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

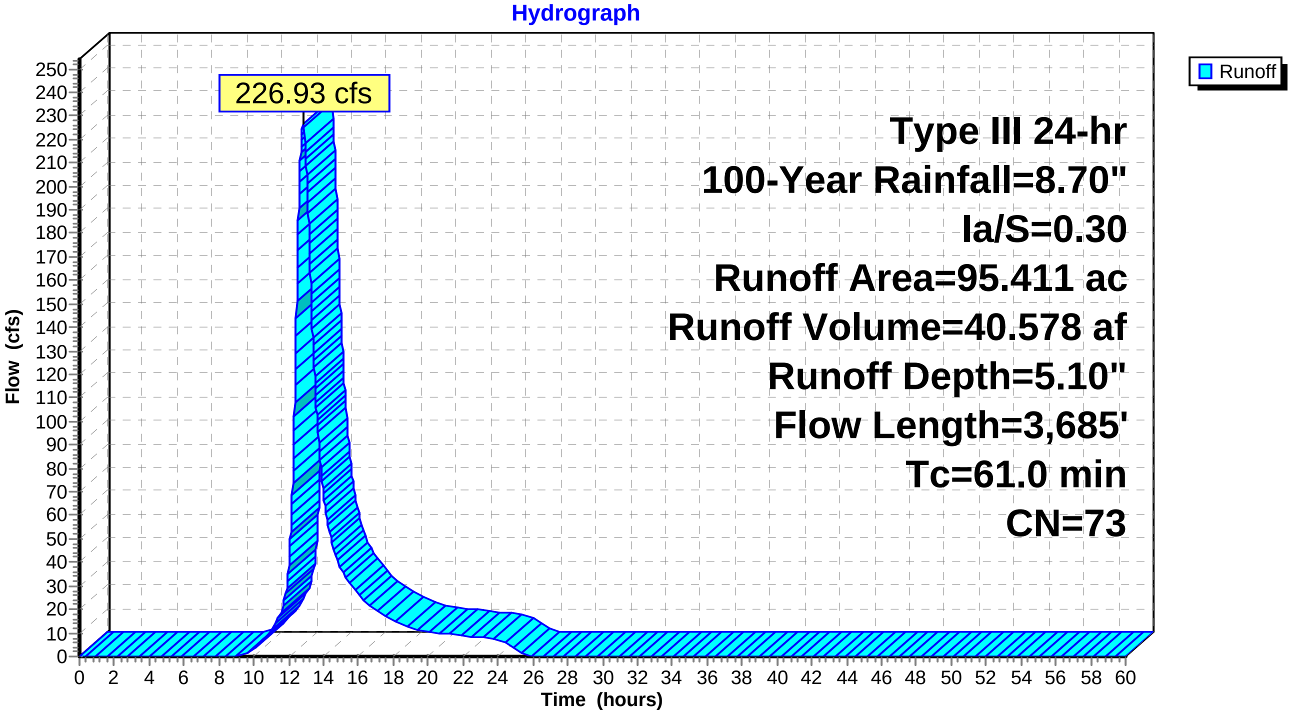
Runoff = 226.93 cfs @ 12.82 hrs, Volume= 40.578 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.392 | 98 | Building roof |
| * | 1.725 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.129 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 13.413 | 61 | >75% Grass cover, Good, HSG B |
| | 9.311 | 74 | >75% Grass cover, Good, HSG C |
| | 4.029 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 8.871 | 55 | Woods, Good, HSG B |
| | 4.853 | 70 | Woods, Good, HSG C |
| | 52.617 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 95.411 | 73 | Weighted Average |
| | 93.165 | | 97.65% Pervious Area |
| | 2.246 | | 2.35% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

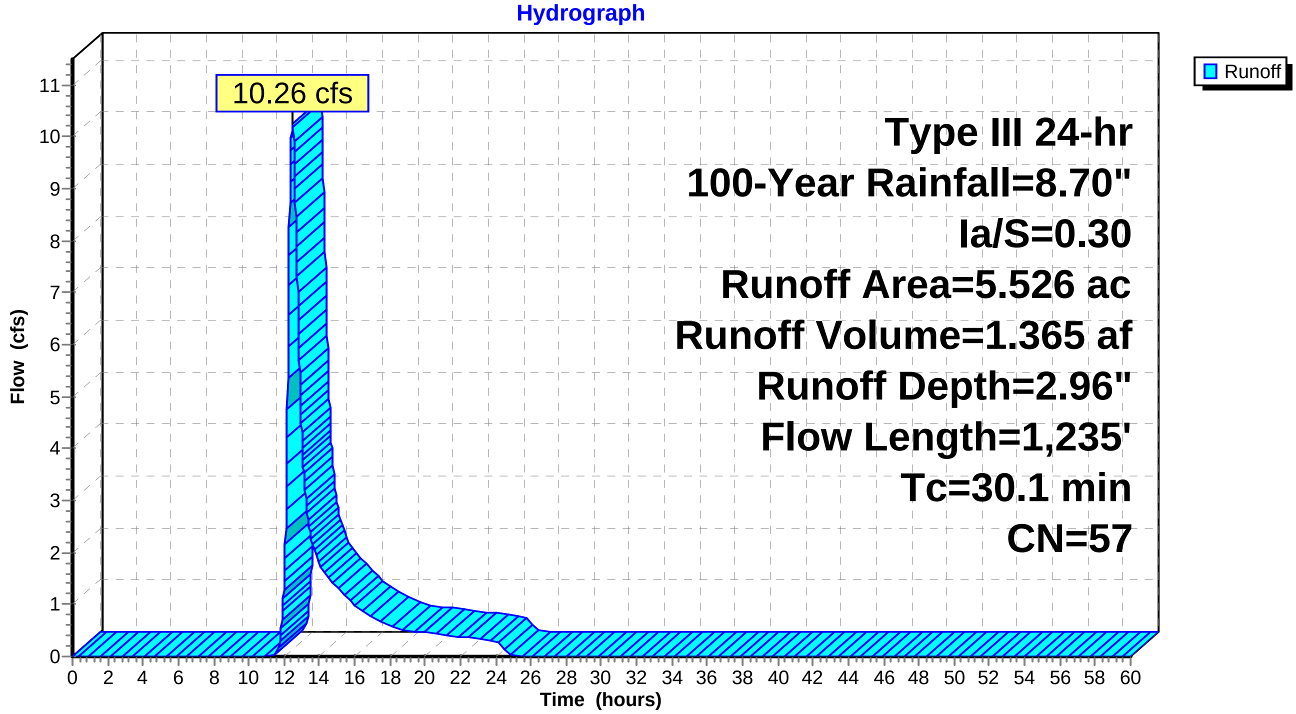
Runoff = 10.26 cfs @ 12.47 hrs, Volume= 1.365 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.088 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.629 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.526 | 57 | Weighted Average |
| | 5.398 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment B101: B101

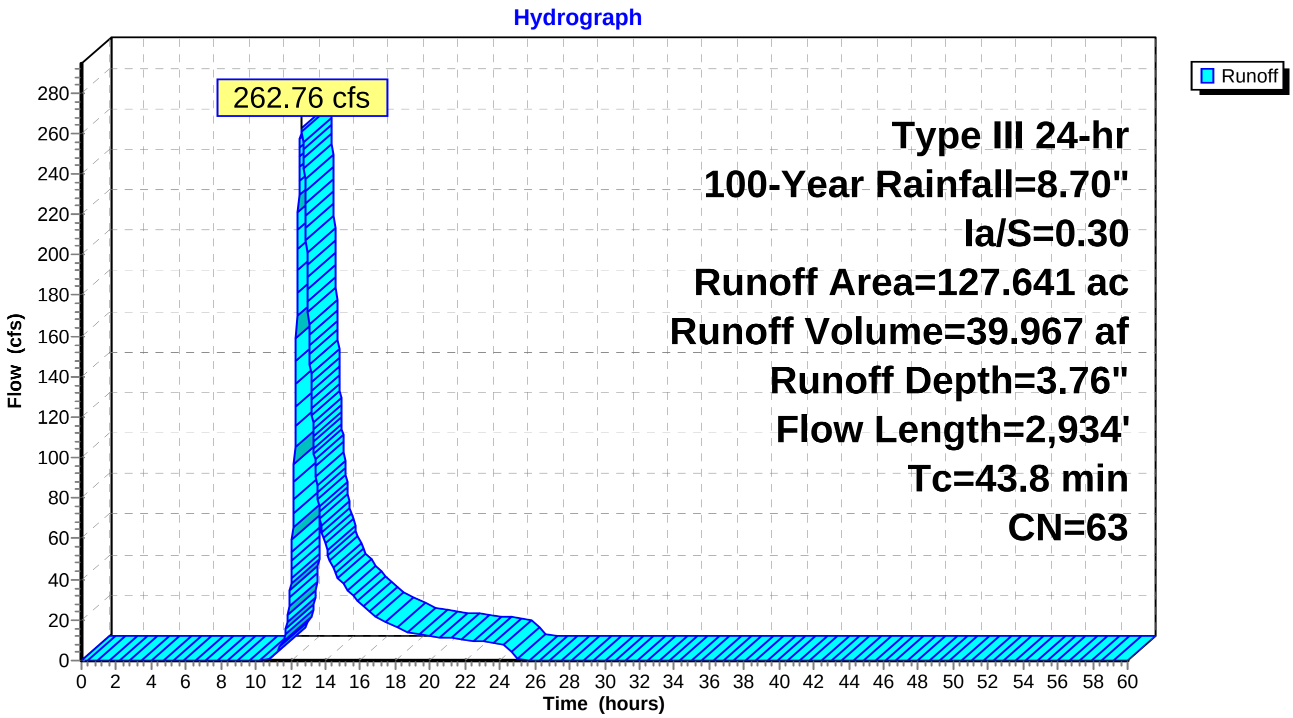
Runoff = 262.76 cfs @ 12.62 hrs, Volume= 39.967 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.005 | 98 | Building roof |
| * | 0.948 | 98 | Paved surface |
| * | 2.079 | 96 | Gravel surface |
| * | 0.002 | 98 | Water Surface |
| | 29.023 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 22.752 | 74 | >75% Grass cover, Good, HSG C |
| | 0.768 | 80 | >75% Grass cover, Good, HSG D |
| | 9.025 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 35.889 | 70 | Woods, Good, HSG C |
| | 27.094 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.056 | 30 | Sand Trap, HSG C |
| | 127.641 | 63 | Weighted Average |
| | 126.686 | | 99.25% Pervious Area |
| | 0.955 | | 0.75% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 506 | 0.1600 | 12.61 | 201.73 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.7 | 112 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.5 | 355 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 184 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 642 | 0.0500 | 9.49 | 63.28 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.035 High grass |
| 43.8 | 2,934 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

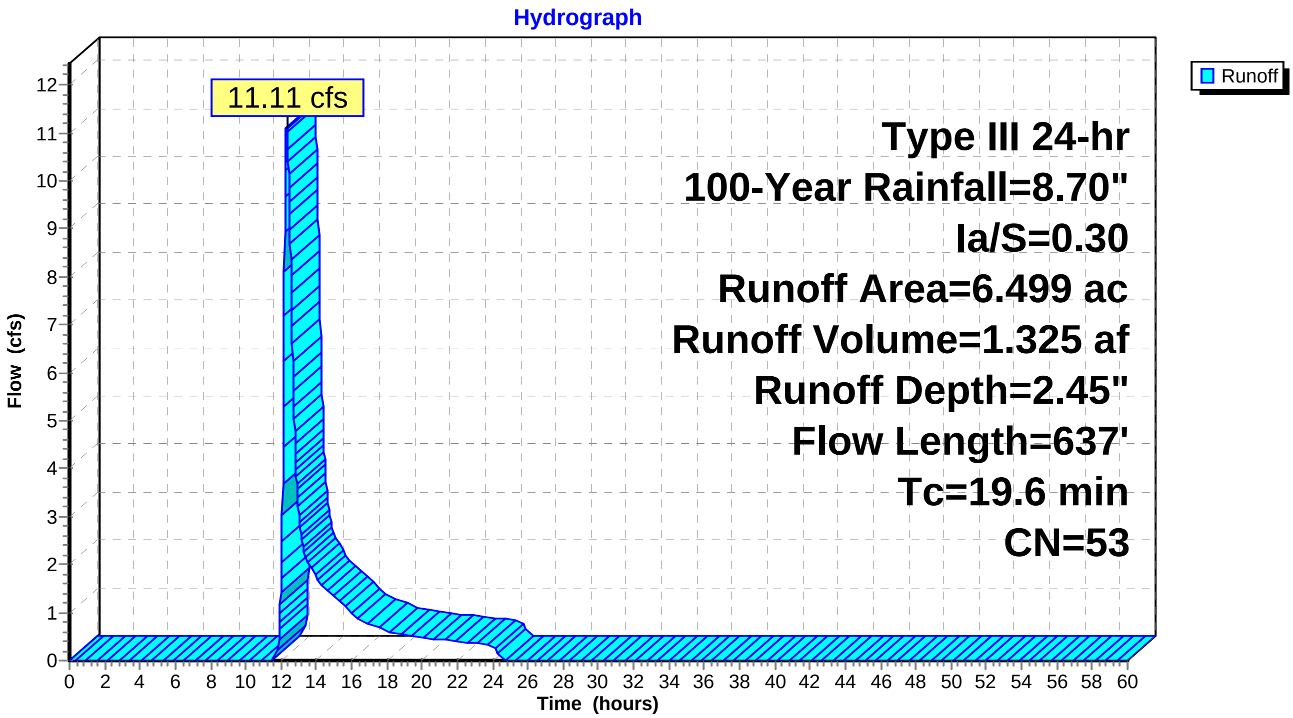
Runoff = 11.11 cfs @ 12.31 hrs, Volume= 1.325 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.170 | 98 | Paved surface |
| * | 0.290 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 3.039 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.097 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.839 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.064 | 30 | Sand Trap, HSG C |
| | 6.499 | 53 | Weighted Average |
| | 6.329 | | 97.38% Pervious Area |
| | 0.170 | | 2.62% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.6 | 637 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

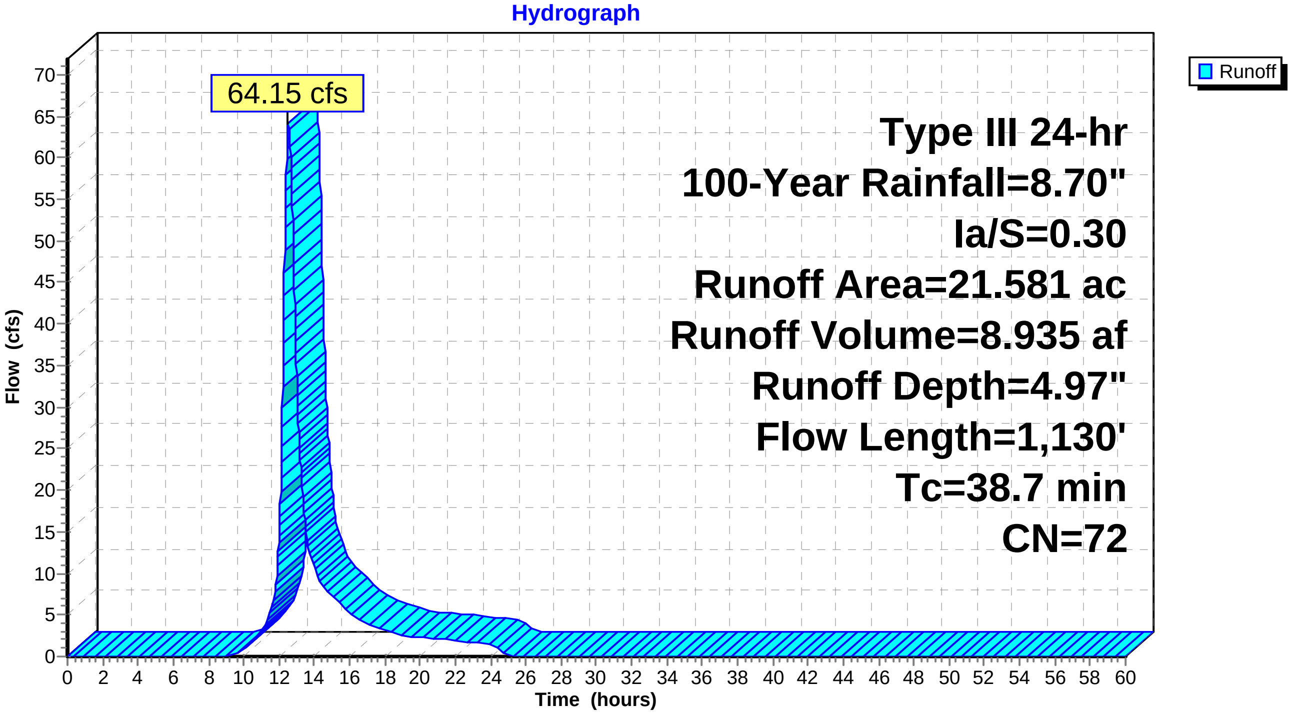
Runoff = 64.15 cfs @ 12.53 hrs, Volume= 8.935 af, Depth= 4.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.550 | 98 | Paved surface |
| * | 0.039 | 96 | Gravel surface |
| * | 2.025 | 98 | Water Surface |
| | 3.869 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 6.689 | 74 | >75% Grass cover, Good, HSG C |
| | 0.522 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.459 | 70 | Woods, Good, HSG C |
| | 7.399 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.029 | 30 | Sand Trap, HSG C |
| | 21.581 | 72 | Weighted Average |
| | 19.006 | | 88.07% Pervious Area |
| | 2.575 | | 11.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.3 | 700 | 0.5500 | 1.85 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 1.6 | 280 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 50 | 0.7600 | 2.18 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 38.7 | 1,130 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

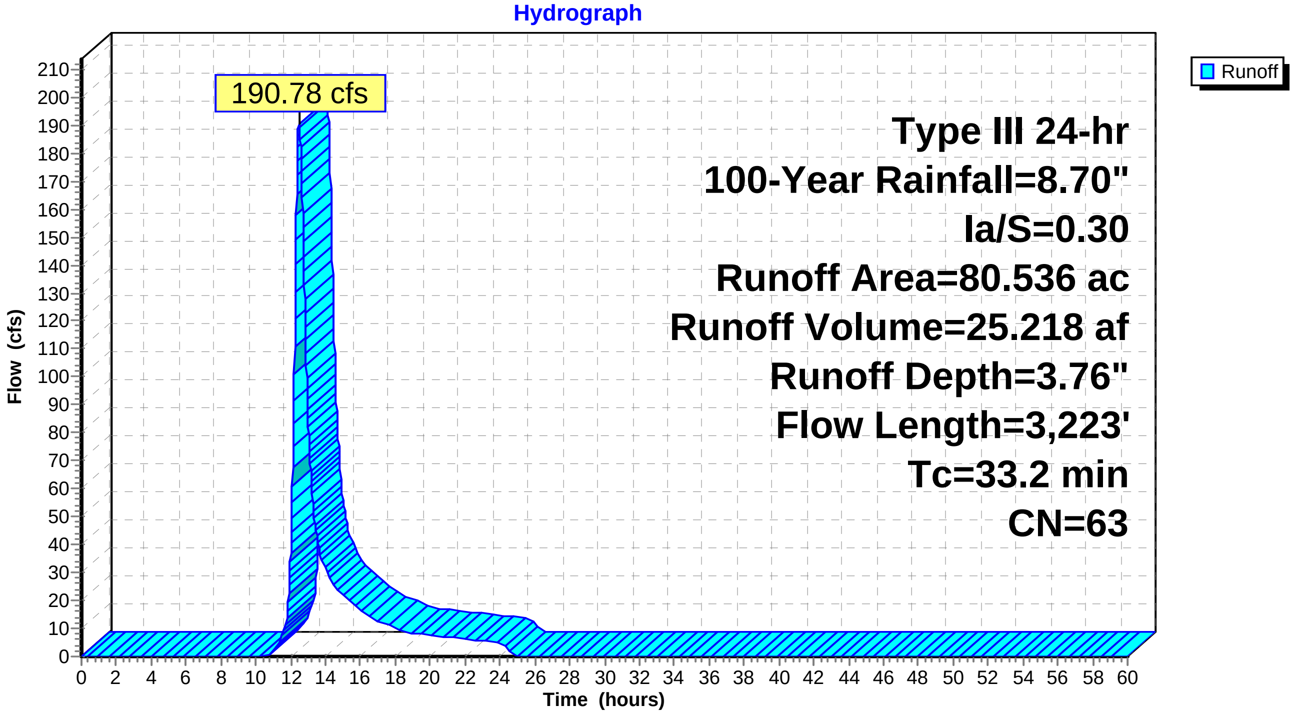
Runoff = 190.78 cfs @ 12.49 hrs, Volume= 25.218 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.411 | 98 | Building roof |
| * | 5.140 | 98 | Paved surface |
| * | 1.201 | 96 | Gravel surface |
| * | 5.280 | 98 | Water Surface |
| | 29.268 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 32.742 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.144 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.770 | 70 | Woods, Good, HSG C |
| | 1.252 | 77 | Woods, Good, HSG D |
| * | 0.185 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.143 | 30 | Sand Trap, HSG C |
| | 80.536 | 63 | Weighted Average |
| | 69.705 | | 86.55% Pervious Area |
| | 10.831 | | 13.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.9 | 100 | 0.1300 | 0.17 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 7.3 | 1,150 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.6 | 130 | 0.0300 | 3.52 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.4 | 1,843 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 33.2 | 3,223 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

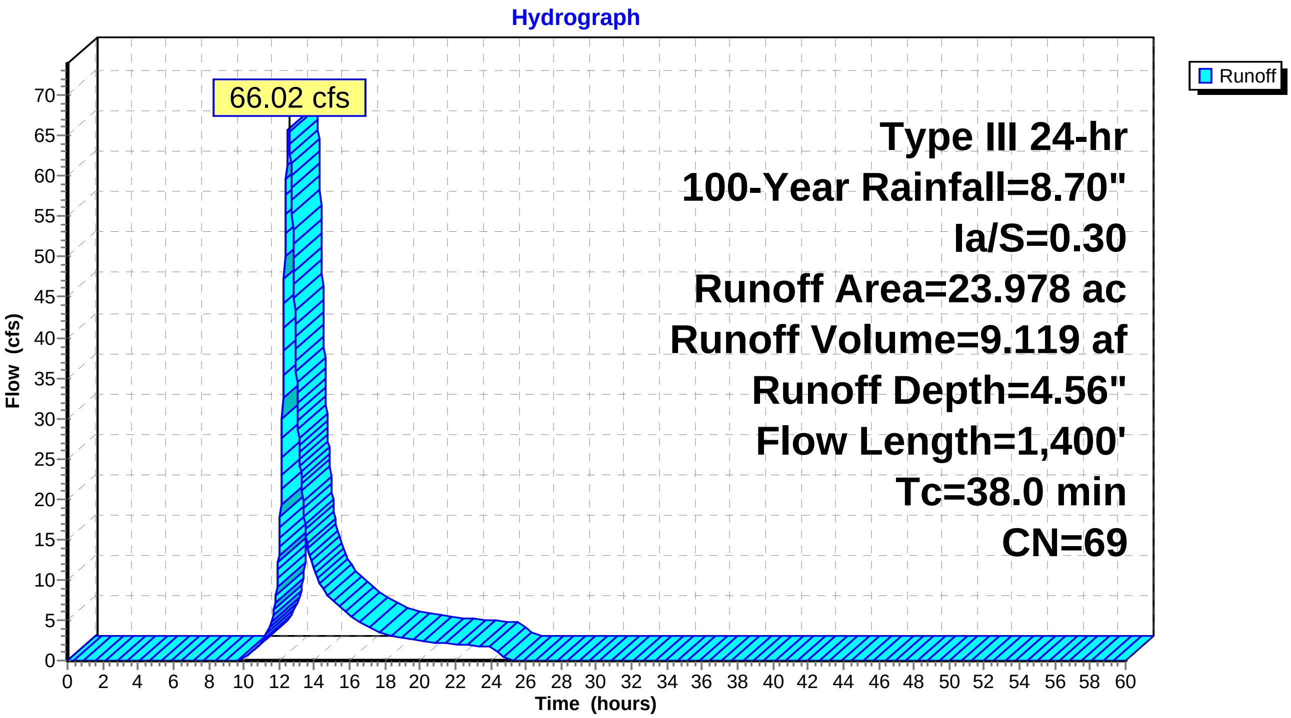
Runoff = 66.02 cfs @ 12.54 hrs, Volume= 9.119 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.248 | 98 | Paved surface |
| * | 0.181 | 96 | Gravel surface |
| * | 0.458 | 98 | Water Surface |
| | 5.222 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 4.132 | 74 | >75% Grass cover, Good, HSG C |
| | 0.513 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.204 | 70 | Woods, Good, HSG C |
| | 11.982 | 77 | Woods, Good, HSG D |
| * | 0.038 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 23.978 | 69 | Weighted Average |
| | 23.272 | | 97.06% Pervious Area |
| | 0.706 | | 2.94% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 6.5 | 698 | 0.5200 | 1.80 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 335 | 0.1900 | 3.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 267 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 38.0 | 1,400 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

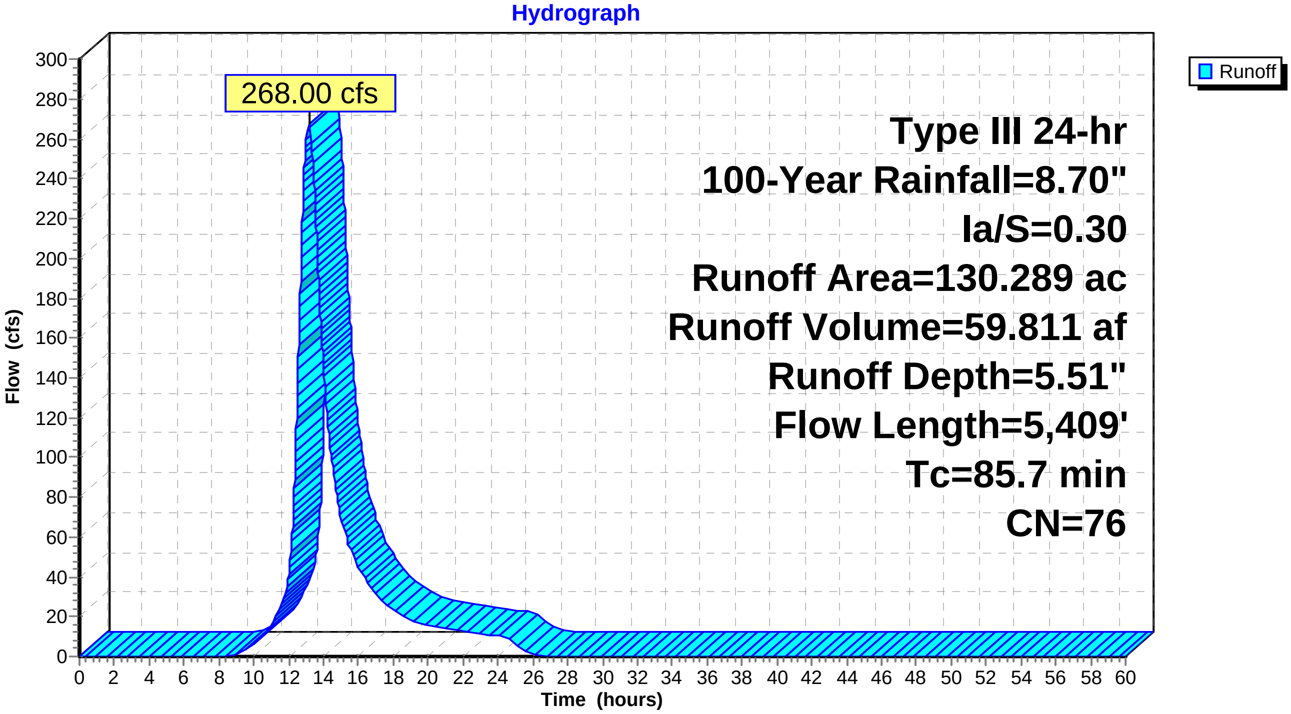
Runoff = 268.00 cfs @ 13.14 hrs, Volume= 59.811 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.025 | 98 | Building roof |
| * | 0.905 | 98 | Paved surface |
| * | 0.933 | 96 | Gravel surface |
| * | 0.153 | 98 | Water Surface |
| | 0.907 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 13.921 | 74 | >75% Grass cover, Good, HSG C |
| | 2.396 | 80 | >75% Grass cover, Good, HSG D |
| | 0.745 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 11.966 | 70 | Woods, Good, HSG C |
| | 97.720 | 77 | Woods, Good, HSG D |
| * | 0.024 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 130.289 | 76 | Weighted Average |
| | 129.206 | | 99.17% Pervious Area |
| | 1.083 | | 0.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

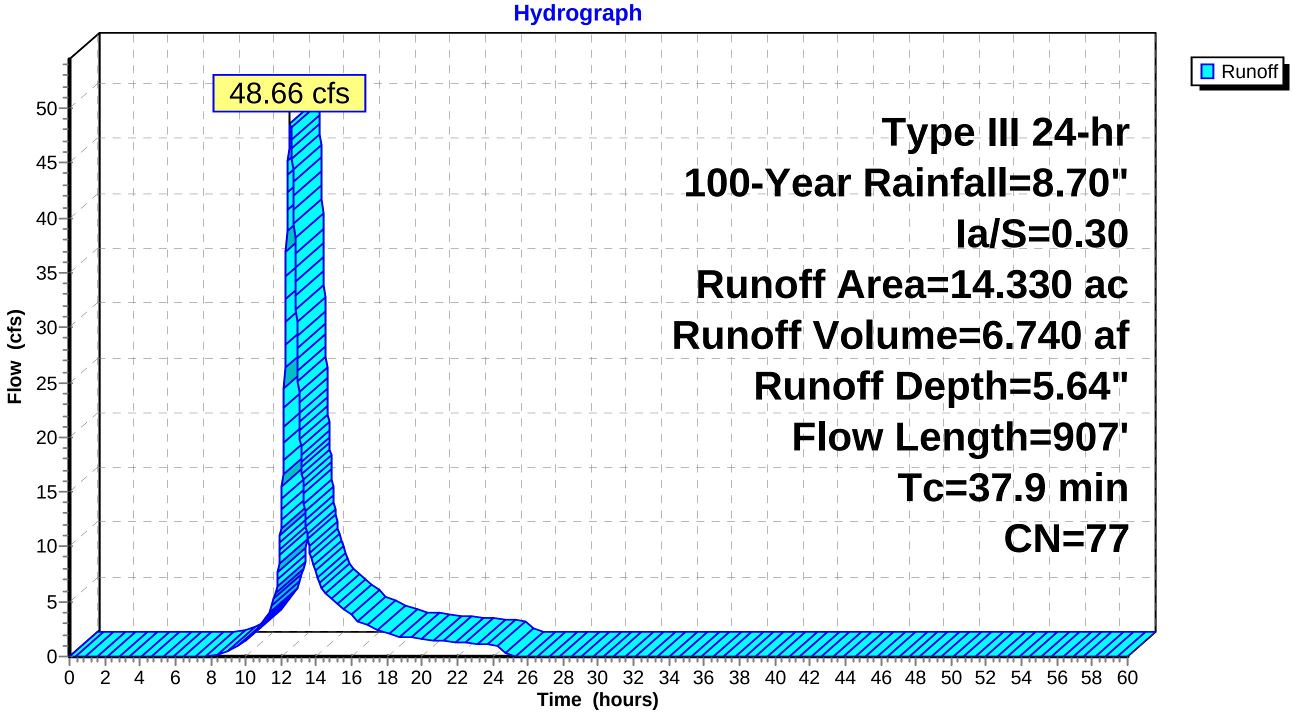
Runoff = 48.66 cfs @ 12.51 hrs, Volume= 6.740 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

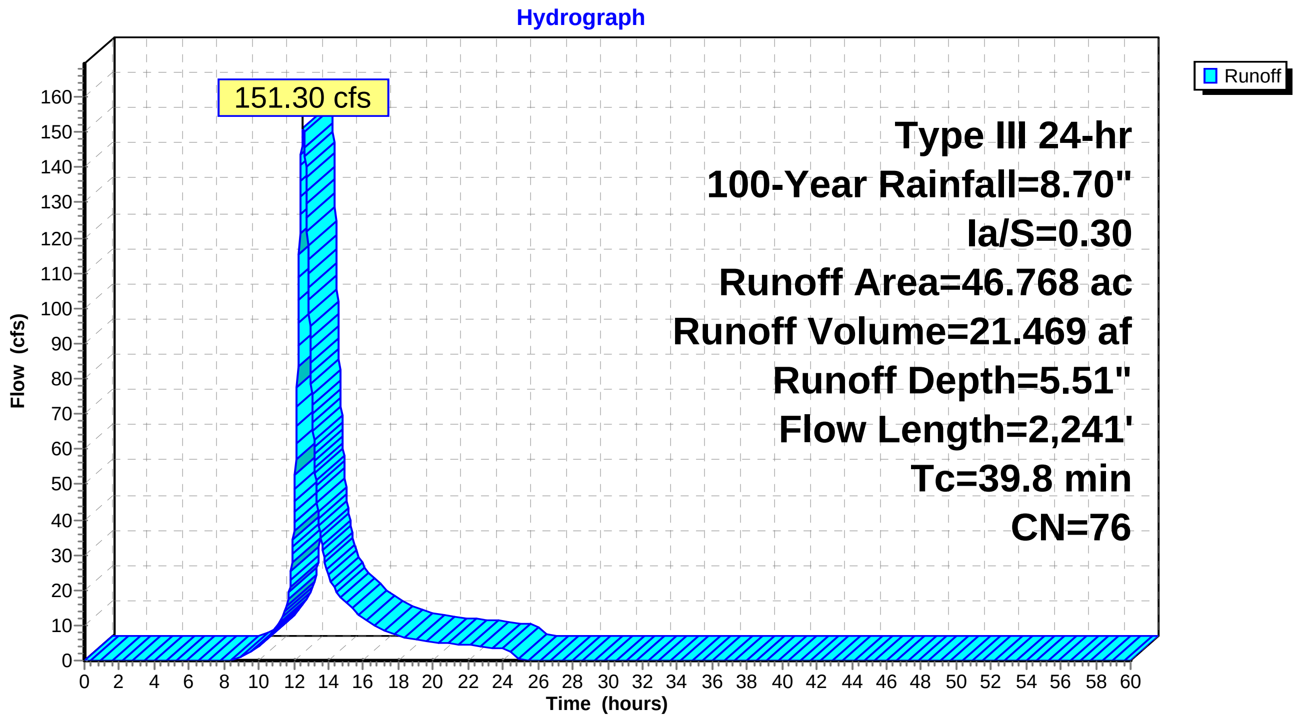
Runoff = 151.30 cfs @ 12.53 hrs, Volume= 21.469 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.499 | 98 | Paved surface |
| * | 0.098 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.546 | 74 | >75% Grass cover, Good, HSG C |
| | 0.657 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.391 | 70 | Woods, Good, HSG C |
| | 32.437 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.140 | 30 | Sand Trap, HSG C |
| | 46.768 | 76 | Weighted Average |
| | 46.269 | | 98.93% Pervious Area |
| | 0.499 | | 1.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.9 | 1,071 | 0.4300 | 1.64 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 3.2 | 490 | 0.1300 | 2.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 190 | | 2.00 | | **Direct Entry, Pipe Flow** |
| 39.8 | 2,241 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

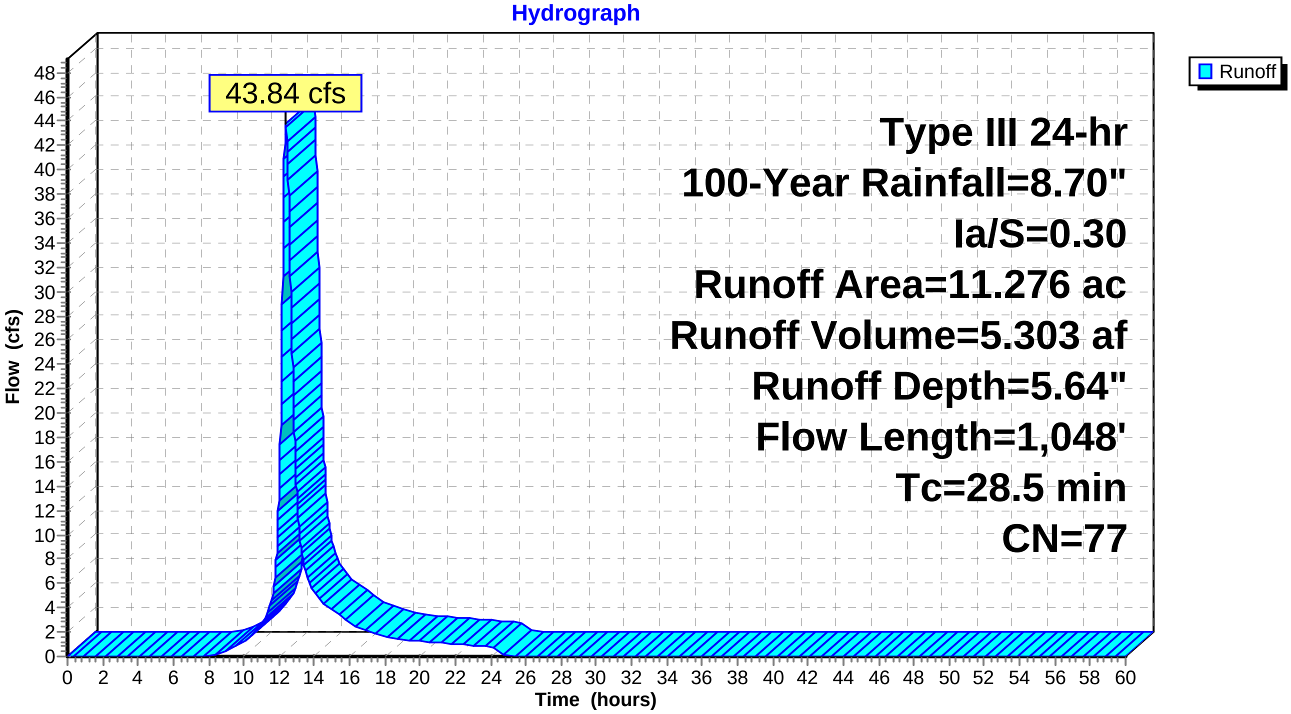
Runoff = 43.84 cfs @ 12.39 hrs, Volume= 5.303 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.004 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.045 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.299 | 70 | Woods, Good, HSG C |
| | 10.928 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 11.276 | 77 | Weighted Average |
| | 11.272 | | 99.96% Pervious Area |
| | 0.004 | | 0.04% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4500 | 1.68 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 4.3 | 288 | 0.2010 | 1.12 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 28.5 | 1,048 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment C101: C101

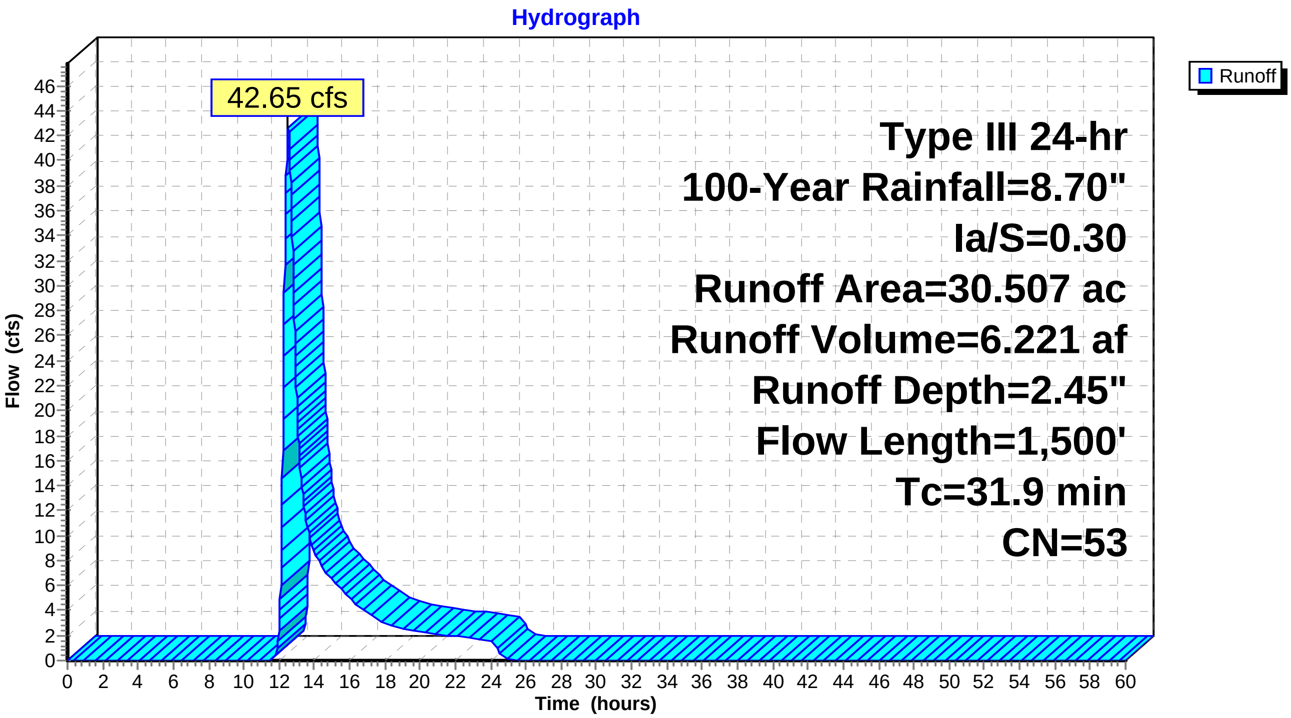
Runoff = 42.65 cfs @ 12.52 hrs, Volume= 6.221 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.350 | 98 | Paved surface |
| * | 0.425 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.046 | 98 | Rock Outcrop/Ledge |
| | 15.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.955 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 3.210 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 6.521 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 30.507 | 53 | Weighted Average |
| | 29.111 | | 95.42% Pervious Area |
| | 1.396 | | 4.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00'<br>n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00'<br>n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

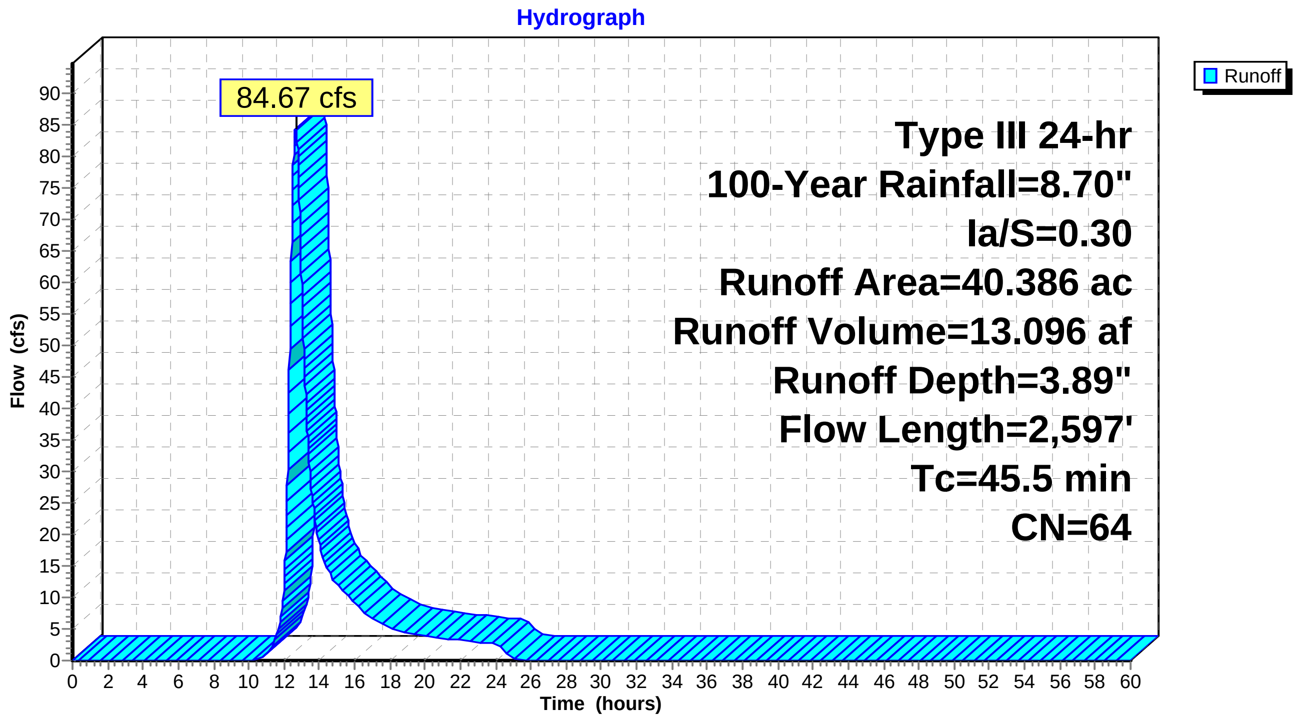
Runoff = 84.67 cfs @ 12.65 hrs, Volume= 13.096 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.618 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.981 | 98 | Rock Outcrop/Ledge |
| | 13.186 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.123 | 74 | >75% Grass cover, Good, HSG C |
| | 0.529 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.578 | 70 | Woods, Good, HSG C |
| | 15.415 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.386 | 64 | Weighted Average |
| | 38.573 | | 95.51% Pervious Area |
| | 1.813 | | 4.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

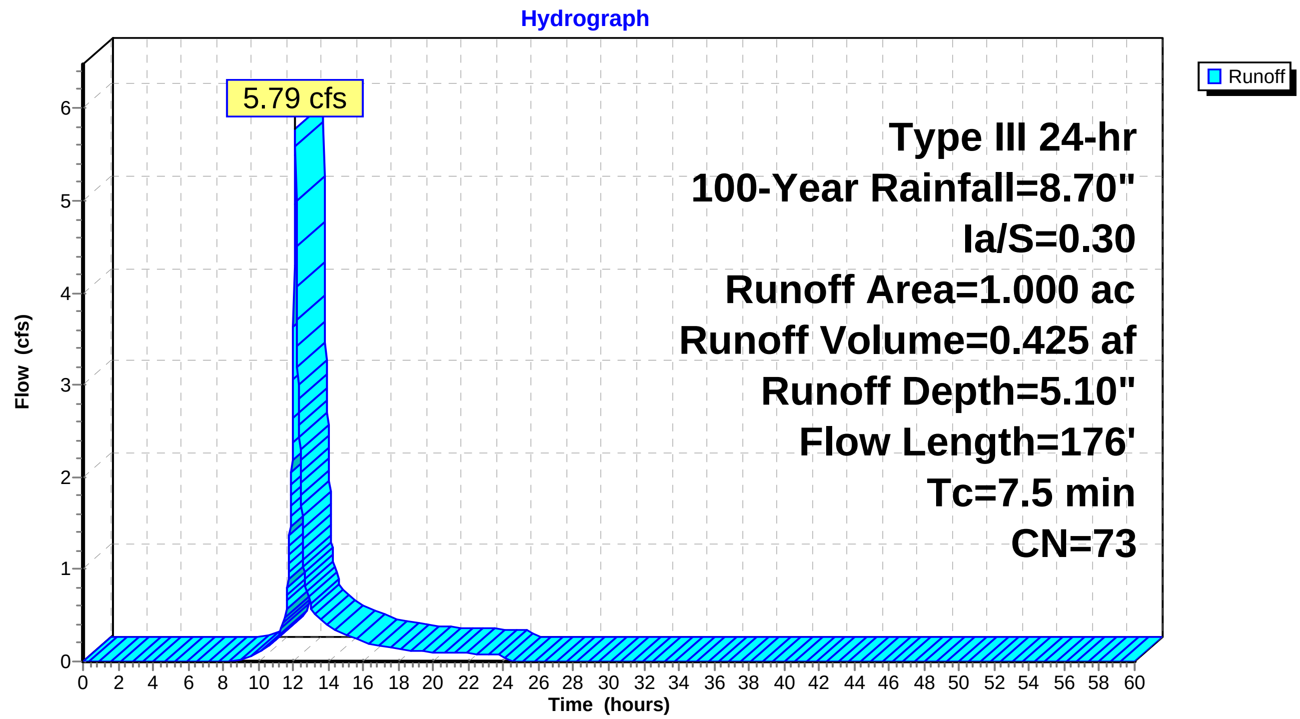
Runoff = 5.79 cfs @ 12.11 hrs, Volume= 0.425 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.850 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.000 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 73 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1570 | 6.38 | | **Shallow Concentrated Flow, C to D**<br>Unpaved Kv= 16.1 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



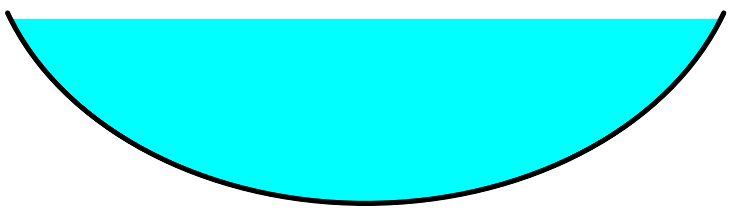
## Summary for Reach A105R: Thru A101

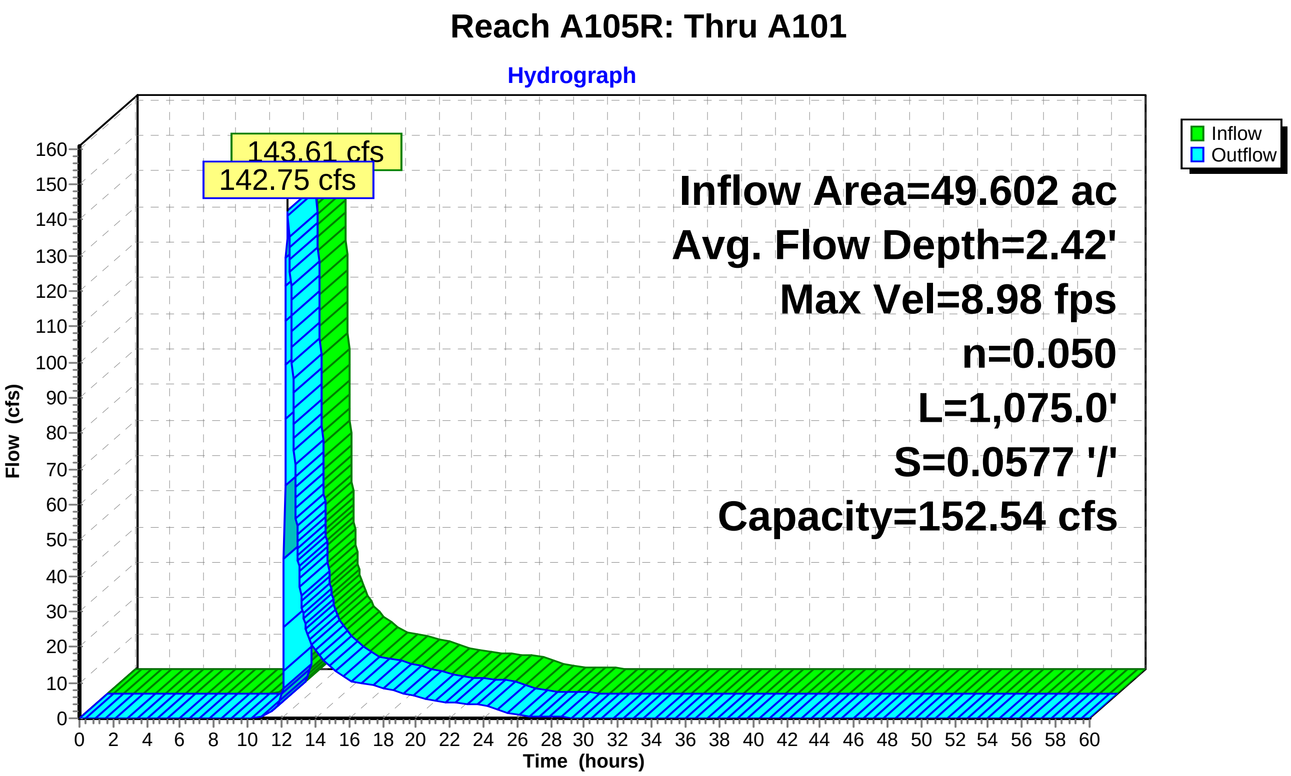
Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 4.02" for 100-Year event
Inflow = 143.61 cfs @ 12.34 hrs, Volume= 16.614 af
Outflow = 142.75 cfs @ 12.37 hrs, Volume= 16.613 af, Atten= 1%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 8.98 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 10.5 min

Peak Storage= 17,084 cf @ 12.37 hrs
Average Depth at Peak Storage= 2.42'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 152.54 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,075.0' Slope= 0.0577 '/'
Inlet Invert= 566.00', Outlet Invert= 504.00'





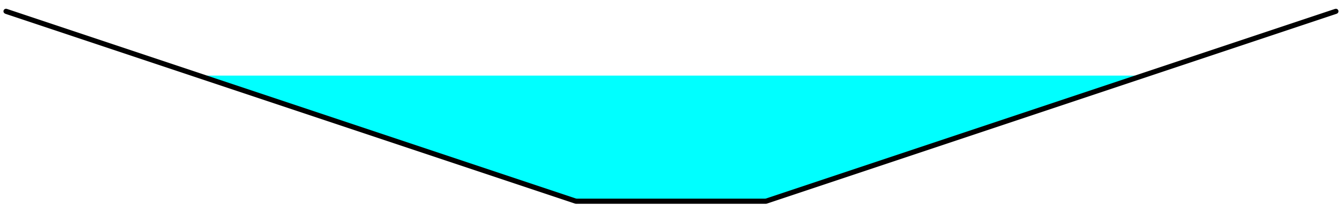
## Summary for Reach A106R: Thru A105

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 5.51" for 100-Year event
Inflow = 59.96 cfs @ 12.37 hrs, Volume= 7.041 af
Outflow = 59.37 cfs @ 12.41 hrs, Volume= 7.041 af, Atten= 1%, Lag= 2.0 min

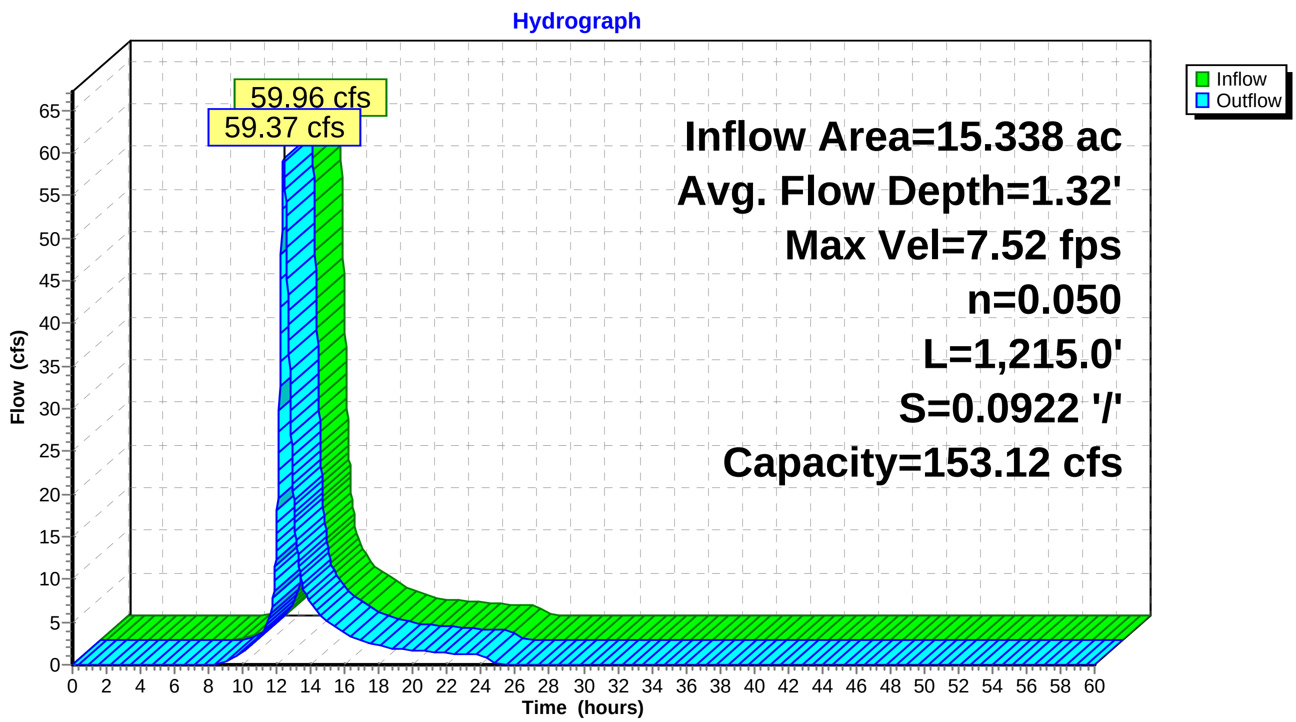
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 7.52 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 2.78 fps, Avg. Travel Time= 7.3 min

Peak Storage= 9,588 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.32'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 153.12 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 1,215.0' Slope= 0.0922 '/'
Inlet Invert= 686.00', Outlet Invert= 574.00'



### Reach A106R: Thru A105



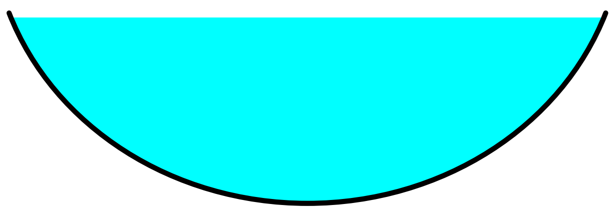
## Summary for Reach A108R: Thru A101

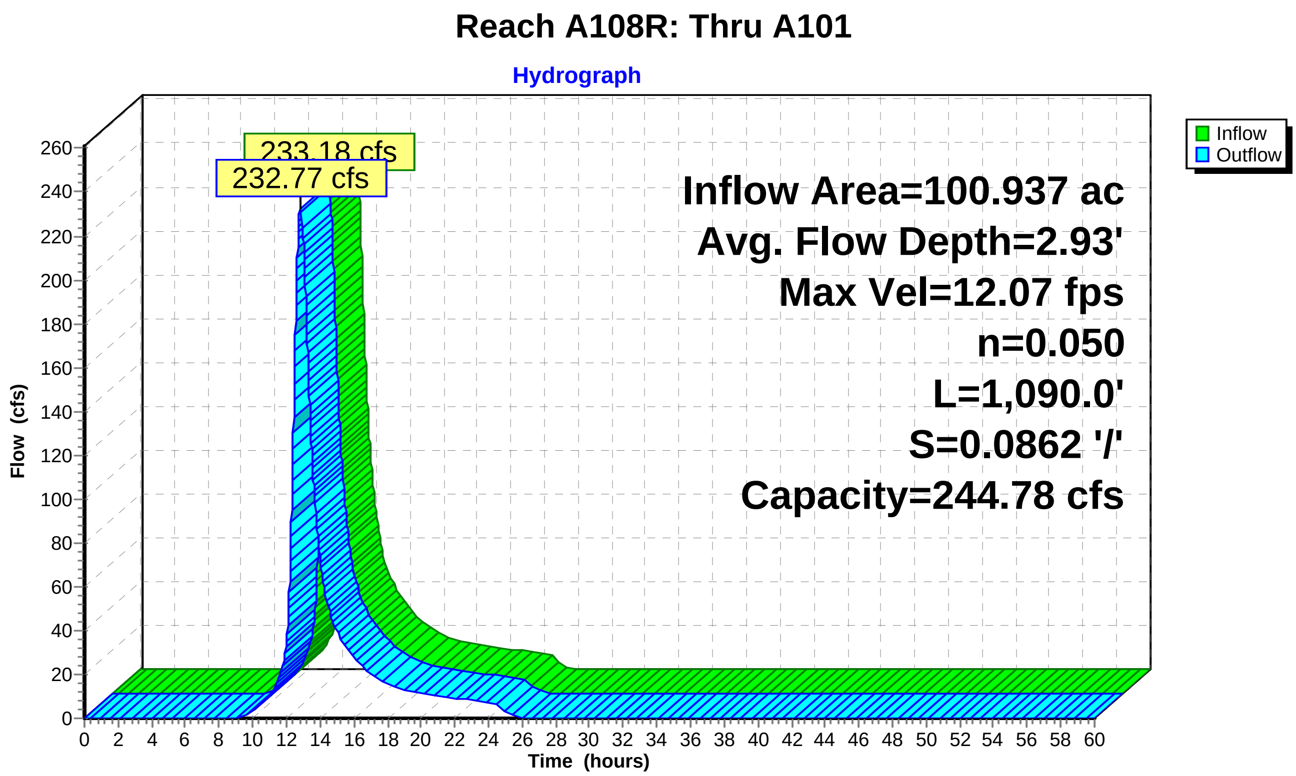
Inflow Area = 100.937 ac, 2.35% Impervious, Inflow Depth = 4.99" for 100-Year event
Inflow = 233.18 cfs @ 12.82 hrs, Volume= 41.943 af
Outflow = 232.77 cfs @ 12.83 hrs, Volume= 41.943 af, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 12.07 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 4.69 fps, Avg. Travel Time= 3.9 min

Peak Storage= 21,018 cf @ 12.83 hrs
Average Depth at Peak Storage= 2.93'
Bank-Full Depth= 3.00' Flow Area= 20.0 sf, Capacity= 244.78 cfs

10.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 1,090.0' Slope= 0.0862 '/'
Inlet Invert= 608.00', Outlet Invert= 514.00'





## Summary for Reach B102R: Thru B101

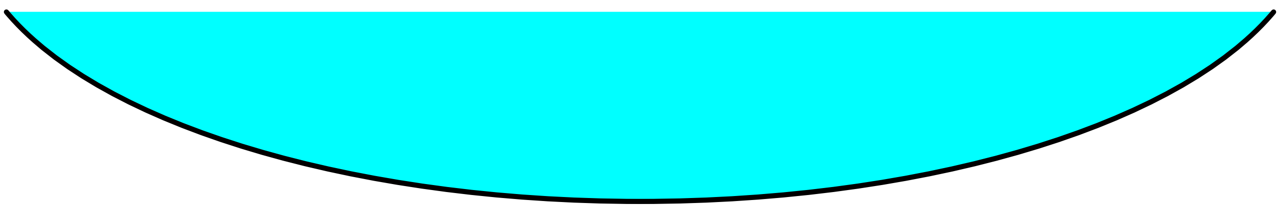
[91] Warning: Storage range exceeded by 0.22'
[55] Hint: Peak inflow is 115% of Manning's capacity

Inflow Area = 262.883 ac, 5.84% Impervious, Inflow Depth > 4.66" for 100-Year event
Inflow = 411.29 cfs @ 13.02 hrs, Volume= 102.151 af
Outflow = 411.28 cfs @ 13.03 hrs, Volume= 102.149 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.19 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.83 fps, Avg. Travel Time= 1.1 min

Peak Storage= 8,111 cf @ 13.03 hrs
Average Depth at Peak Storage= 3.22'
Bank-Full Depth= 3.00' Flow Area= 60.0 sf, Capacity= 356.26 cfs

30.00' x 3.00' deep Parabolic Channel, n= 0.050
Length= 122.0' Slope= 0.0164 '/'
Inlet Invert= 492.00', Outlet Invert= 490.00'



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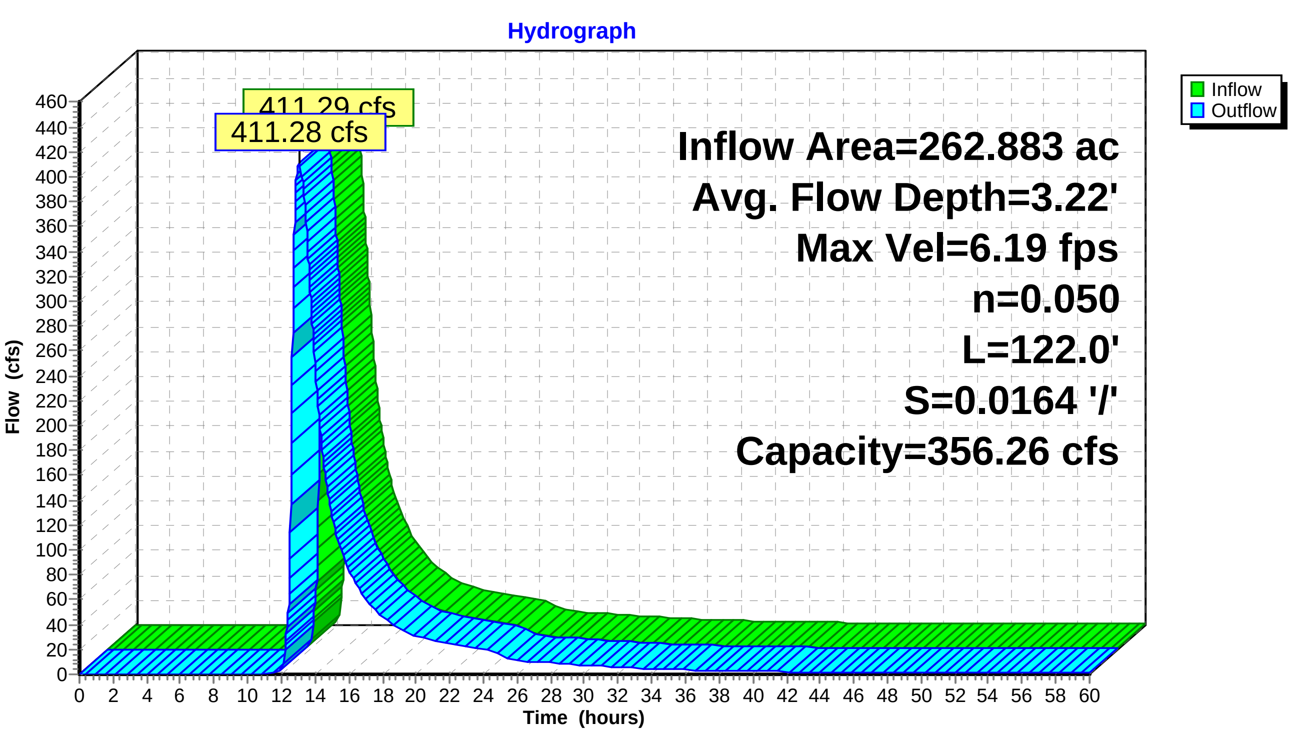


## Summary for Reach B103R: Thru B102

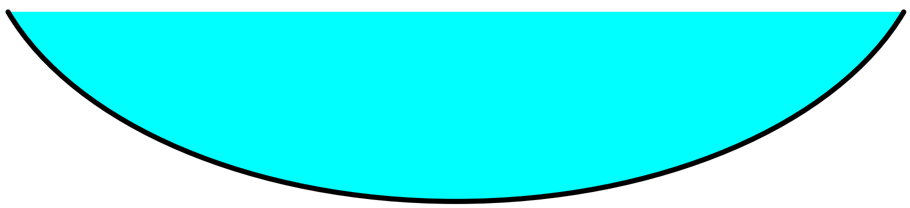
[91] Warning: Storage range exceeded by 0.17'
[55] Hint: Peak inflow is 109% of Manning's capacity

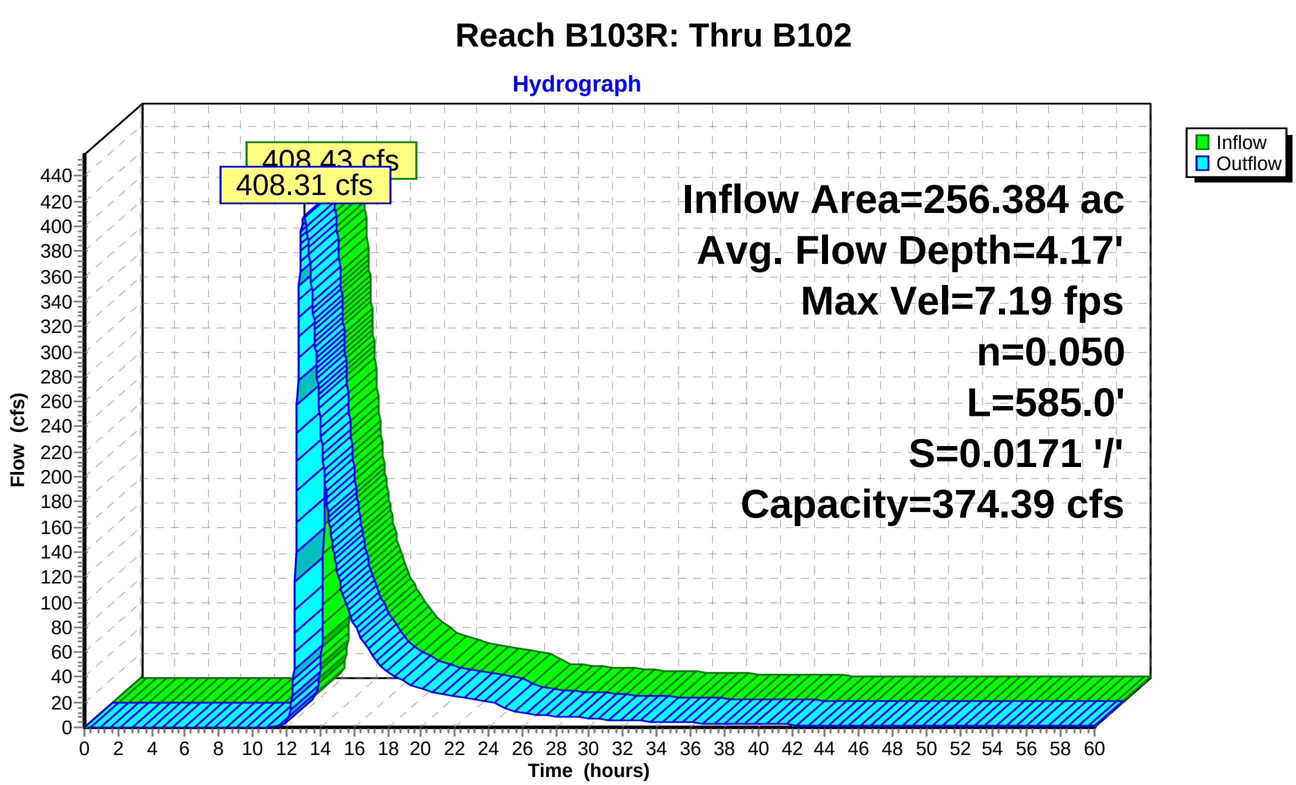
Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 4.72" for 100-Year event
Inflow = 408.43 cfs @ 13.01 hrs, Volume= 100.836 af
Outflow = 408.31 cfs @ 13.02 hrs, Volume= 100.827 af, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 7.19 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.17 fps, Avg. Travel Time= 4.5 min

Peak Storage= 33,214 cf @ 13.02 hrs
Average Depth at Peak Storage= 4.17'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 374.39 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 585.0' Slope= 0.0171 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'





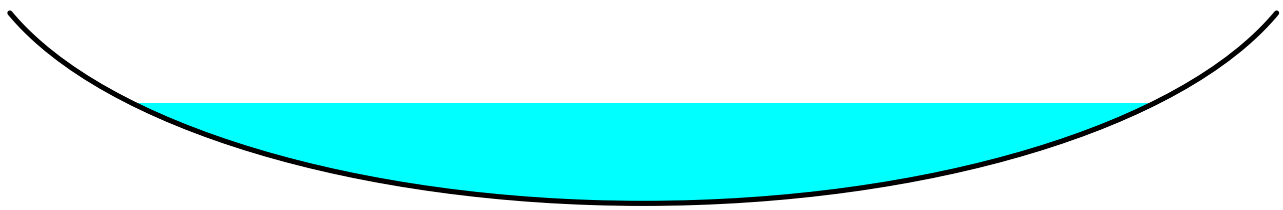
## Summary for Reach B107R: Thru B108

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 5.41" for 100-Year event
Inflow = 36.37 cfs @ 12.79 hrs, Volume= 6.463 af
Outflow = 36.01 cfs @ 12.85 hrs, Volume= 6.463 af, Atten= 1%, Lag= 3.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 7.07 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 1.47 fps, Avg. Travel Time= 23.1 min

Peak Storage= 10,394 cf @ 12.85 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 144.21 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 2,040.0' Slope= 0.2294 '/'
Inlet Invert= 972.00', Outlet Invert= 504.00'



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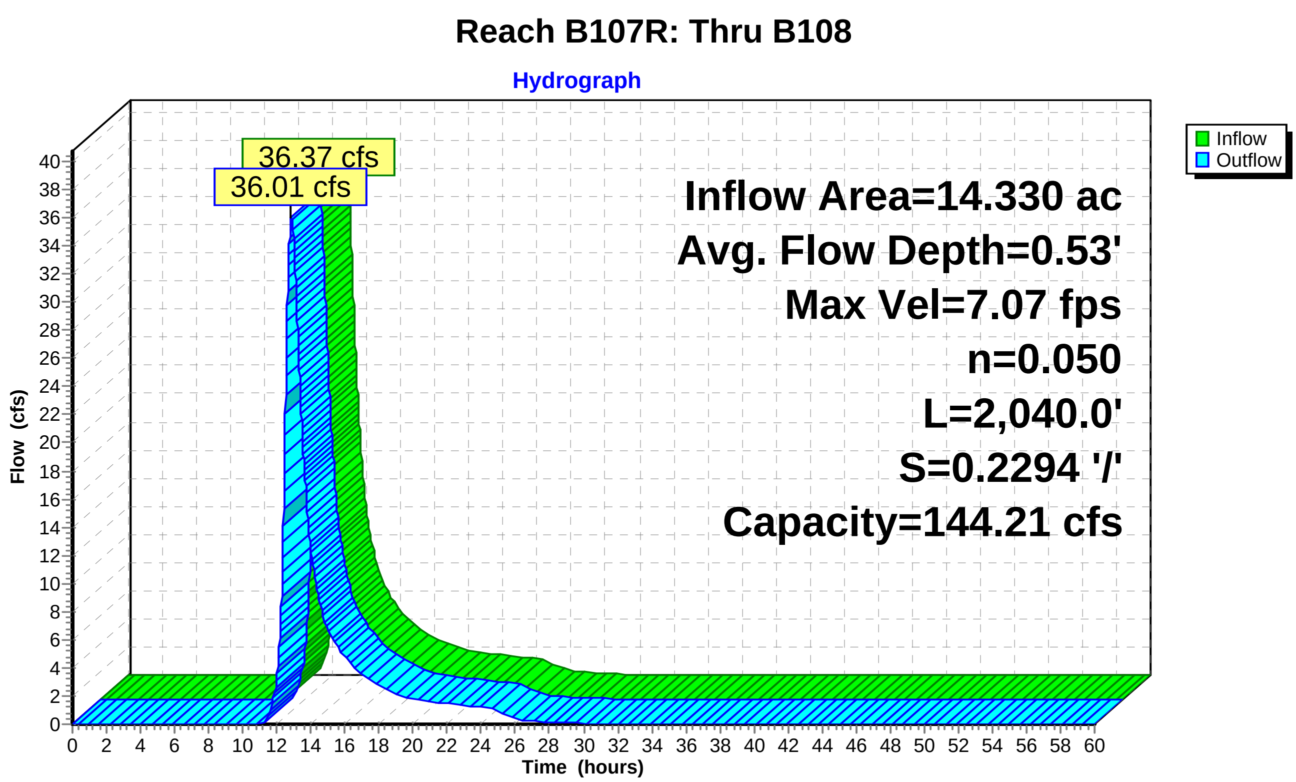


## Summary for Reach B108R: Thur 101

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 5.51" for 100-Year event
Inflow = 215.06 cfs @ 12.56 hrs, Volume= 33.211 af
Outflow = 215.04 cfs @ 12.56 hrs, Volume= 33.211 af, Atten= 0%, Lag= 0.4 min

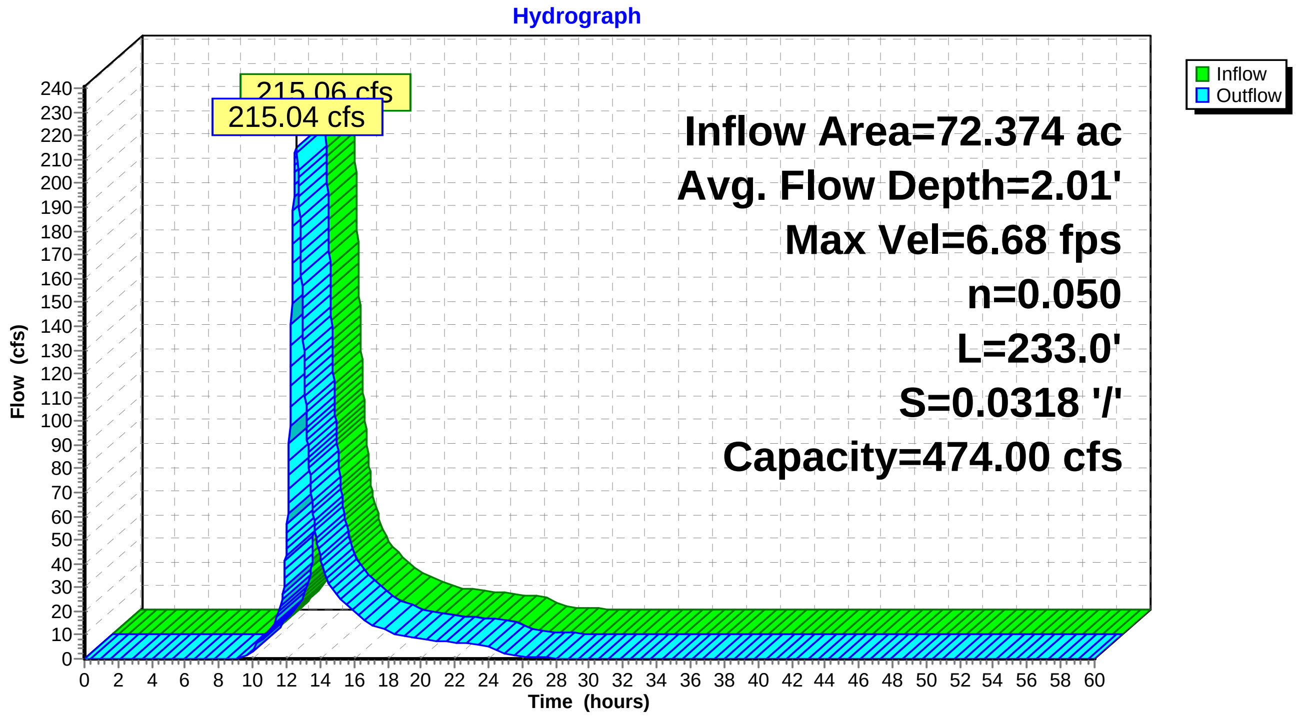
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.68 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 3.1 min

Peak Storage= 7,497 cf @ 12.56 hrs
Average Depth at Peak Storage= 2.01'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 474.00 cfs

10.00' x 3.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 233.0' Slope= 0.0318 '/'
Inlet Invert= 499.60', Outlet Invert= 492.20'

‡

### Reach B108R: Thur 101



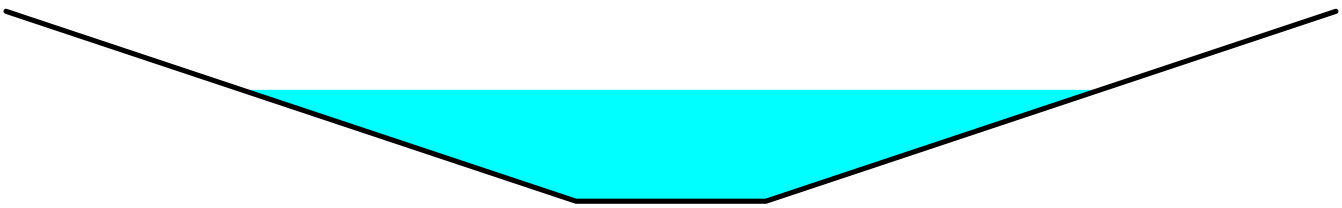
## Summary for Reach B109R: Thru B108

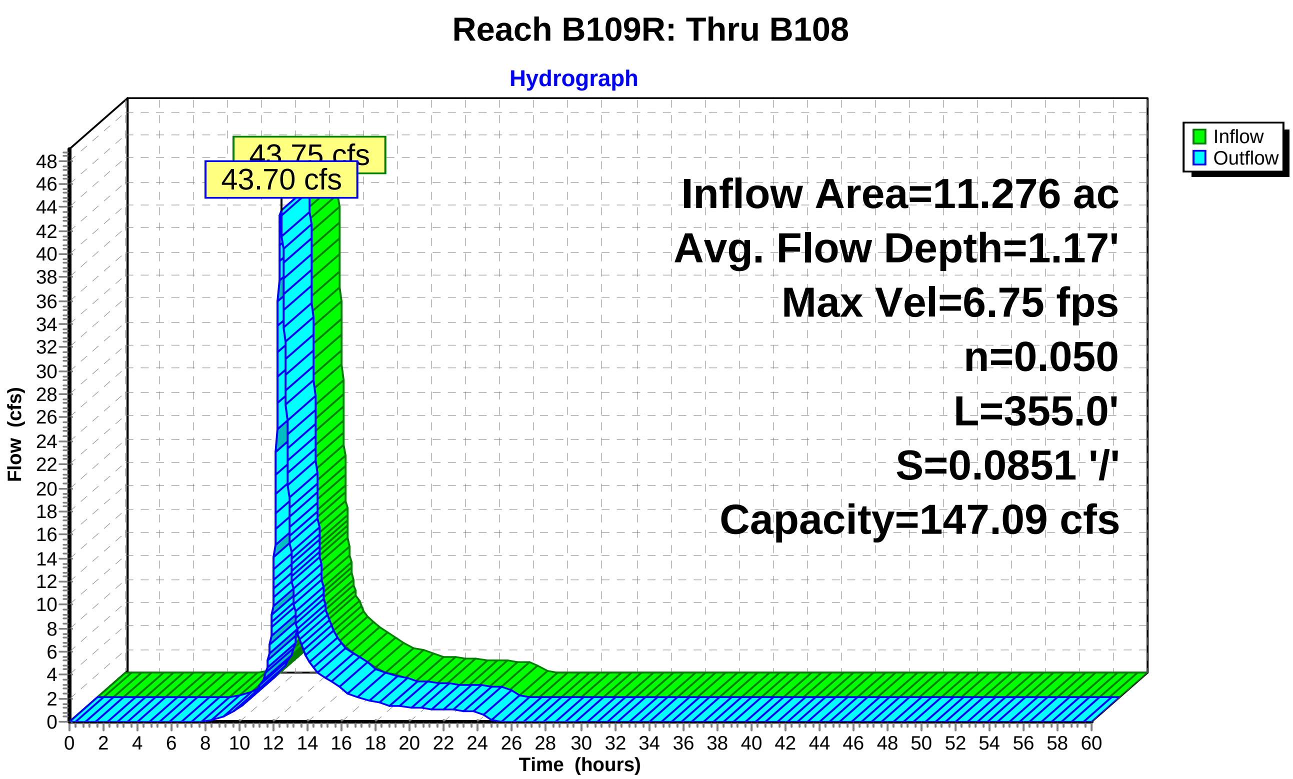
Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 43.75 cfs @ 12.40 hrs, Volume= 5.303 af
Outflow = 43.70 cfs @ 12.41 hrs, Volume= 5.303 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.75 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.72 fps, Avg. Travel Time= 2.2 min

Peak Storage= 2,298 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.17'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 147.09 cfs

2.00' x 2.00' deep channel, n= 0.050
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 355.0' Slope= 0.0851 '/'
Inlet Invert= 532.20', Outlet Invert= 502.00'





## Summary for Pond 102A: Wetland B

Inflow Area = 45.922 ac, 9.71% Impervious, Inflow Depth > 0.95" for 100-Year event
Inflow = 10.47 cfs @ 12.50 hrs, Volume= 3.644 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.74' @ 60.00 hrs Surf.Area= 53,040 sf Storage= 158,749 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 | 498.10' | 740,168 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

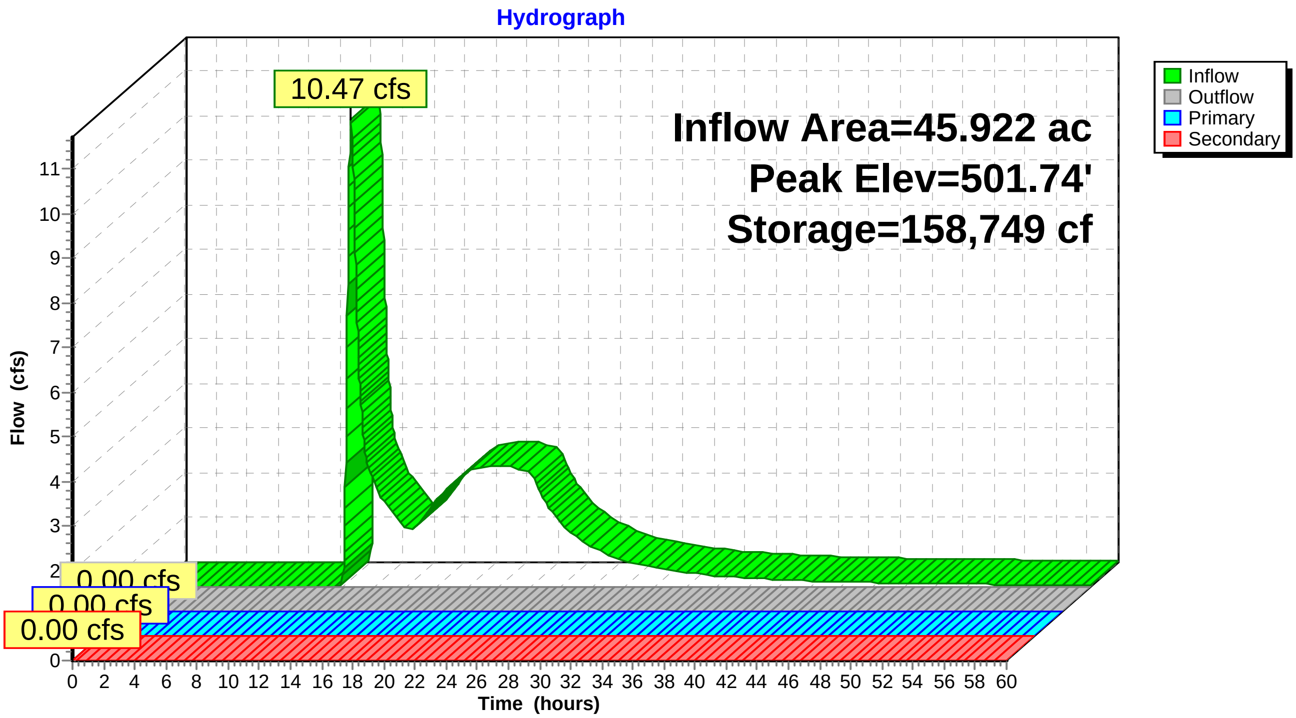
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 498.10 | 37,121 | 782.0 | 0 | 0 | 37,121 |
| 500.00 | 42,629 | 822.0 | 75,702 | 75,702 | 42,449 |
| 502.00 | 54,696 | 1,028.0 | 97,075 | 172,777 | 72,833 |
| 504.00 | 78,374 | 1,409.0 | 132,362 | 305,139 | 146,760 |
| 506.00 | 108,988 | 1,330.0 | 186,523 | 491,662 | 164,196 |
| 508.00 | 140,171 | 1,485.0 | 248,506 | 740,168 | 199,031 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 501.90' / 500.90' S= 0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #2 | Secondary | 506.10' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' (Free Discharge)
└—**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=498.10' TW=0.00' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102A: Wetland B



## Summary for Pond 102B: 18" Culvert

[62] Hint: Exceeded Reach B103R OUTLET depth by 2.28' @ 27.34 hrs

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 262.883 ac, | 5.84% Impervious, Inflow Depth > 4.66" | for 100-Year event | |
| Inflow = | 411.31 cfs @ | 13.02 hrs, Volume= | 102.152 af | |
| Outflow = | 411.29 cfs @ | 13.02 hrs, Volume= | 102.151 af, | Atten= 0%, Lag= 0.3 min |
| Primary = | 10.04 cfs @ | 20.27 hrs, Volume= | 19.789 af | |
| Secondary = | 404.17 cfs @ | 13.02 hrs, Volume= | 82.363 af | |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 496.34' @ 13.03 hrs Surf.Area= 7,075 sf Storage= 9,555 cf

Plug-Flow detention time= 1.0 min calculated for 102.151 af (100% of inflow)
Center-of-Mass det. time= 1.0 min ( 1,033.4 - 1,032.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 492.20' | 27,470 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

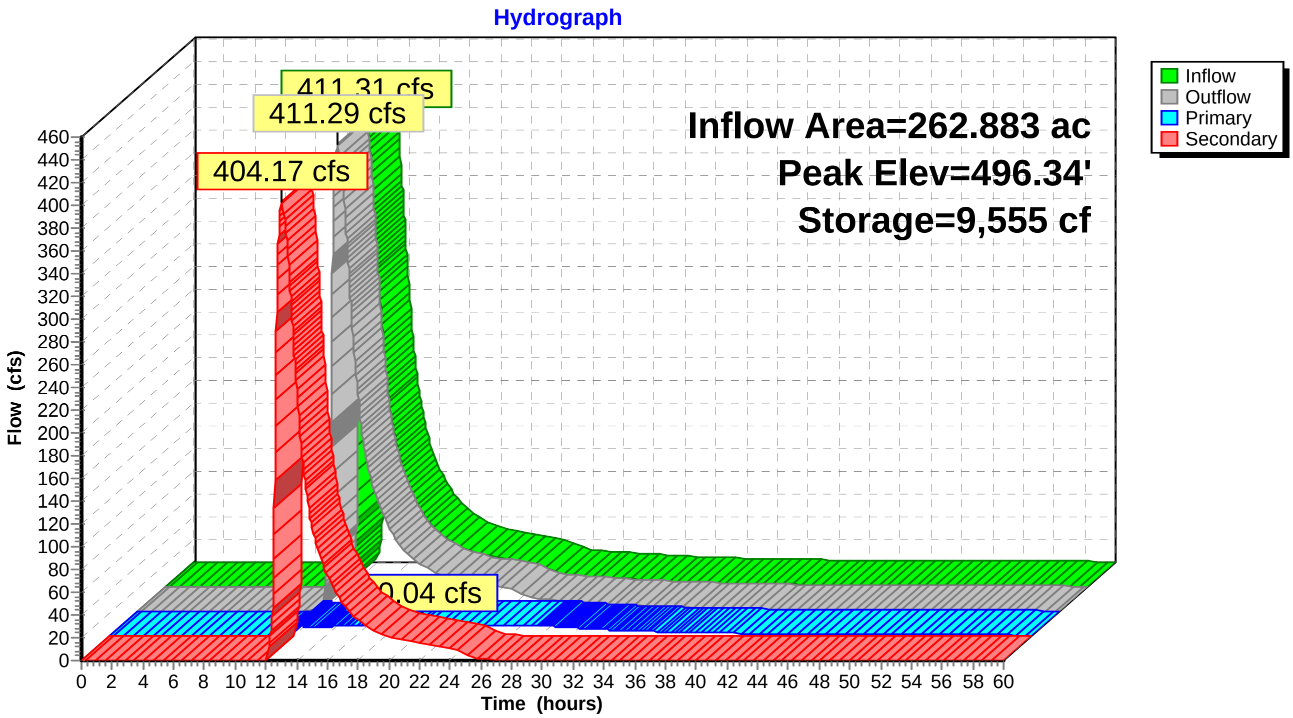
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 492.20 | 0 | 0.0 | 0 | 0 | 0 |
| 496.00 | 5,819 | 521.0 | 7,371 | 7,371 | 21,623 |
| 498.00 | 14,990 | 910.0 | 20,099 | 27,470 | 65,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 492.20' | **18.0" Round Culvert**<br>L= 20.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 492.20' / 491.10' S= 0.0550 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 495.00' | **100.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=10.04 cfs @ 20.27 hrs HW=495.18' TW=492.95' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 10.04 cfs @ 5.68 fps)

**Secondary OutFlow** Max=404.14 cfs @ 13.02 hrs HW=496.34' TW=495.22' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 404.14 cfs @ 3.02 fps)

## Pond 102B: 18" Culvert



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.386 ac, 4.49% Impervious, Inflow Depth = 3.89" for 100-Year event
Inflow = 84.67 cfs @ 12.65 hrs, Volume= 13.096 af
Outflow = 13.87 cfs @ 14.59 hrs, Volume= 5.968 af, Atten= 84%, Lag= 116.7 min
Primary = 13.87 cfs @ 14.59 hrs, Volume= 5.968 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 509.15' @ 14.59 hrs Surf.Area= 222,177 sf Storage= 343,608 cf

Plug-Flow detention time= 324.9 min calculated for 5.968 af (46% of inflow)
Center-of-Mass det. time= 196.9 min ( 1,080.8 - 883.9 )

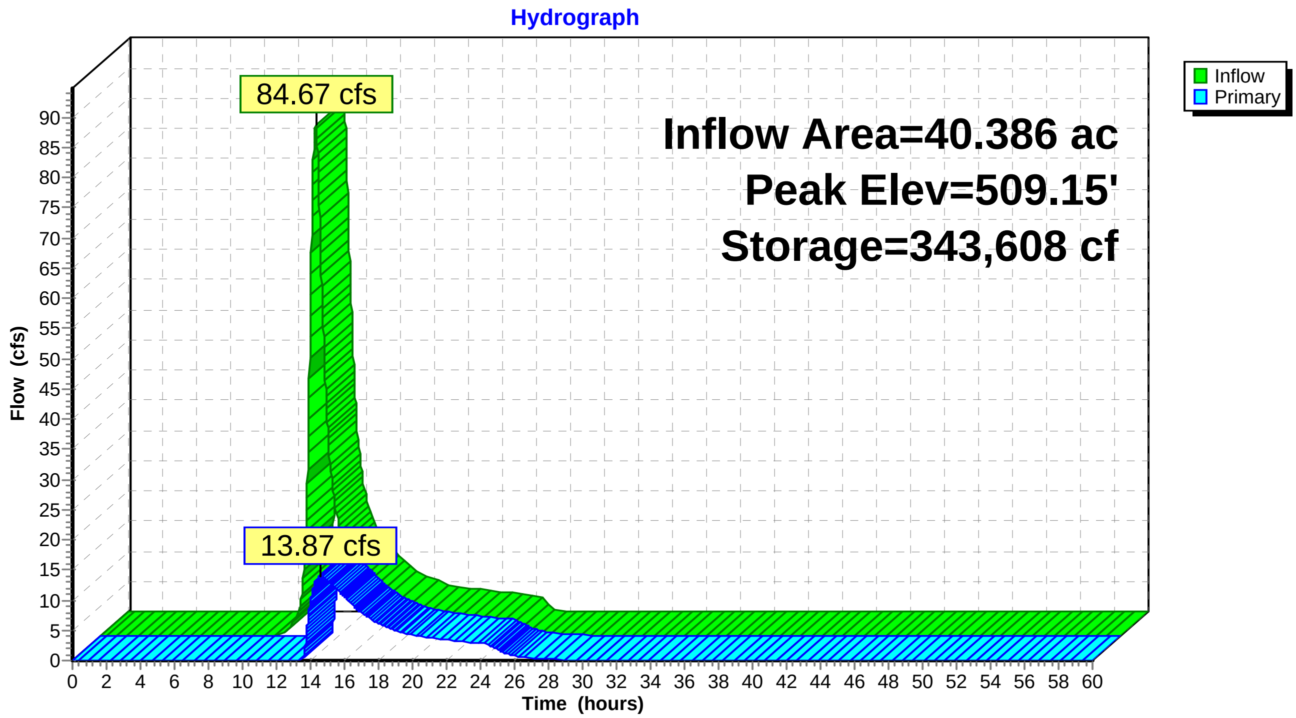
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=13.87 cfs @ 14.59 hrs HW=509.15' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 13.87 cfs @ 0.91 fps)

## Pond 102C: Pond 102C



## Summary for Pond 103A: Wetland A

| | | | |
|---|---|---|---|
| Inflow Area = | 36.735 ac, | 8.79% Impervious, Inflow Depth = 2.32" | for 100-Year event |
| Inflow = | 39.81 cfs @ | 12.72 hrs, Volume= | 7.102 af |
| Outflow = | 2.20 cfs @ | 22.44 hrs, Volume= | 2.060 af, Atten= 94%, Lag= 583.6 min |
| Primary = | 2.20 cfs @ | 22.44 hrs, Volume= | 2.060 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 502.52' @ 22.44 hrs Surf.Area= 75,955 sf Storage= 259,622 cf

Plug-Flow detention time= 796.5 min calculated for 2.060 af (29% of inflow)
Center-of-Mass det. time= 635.5 min ( 1,555.4 - 919.9 )

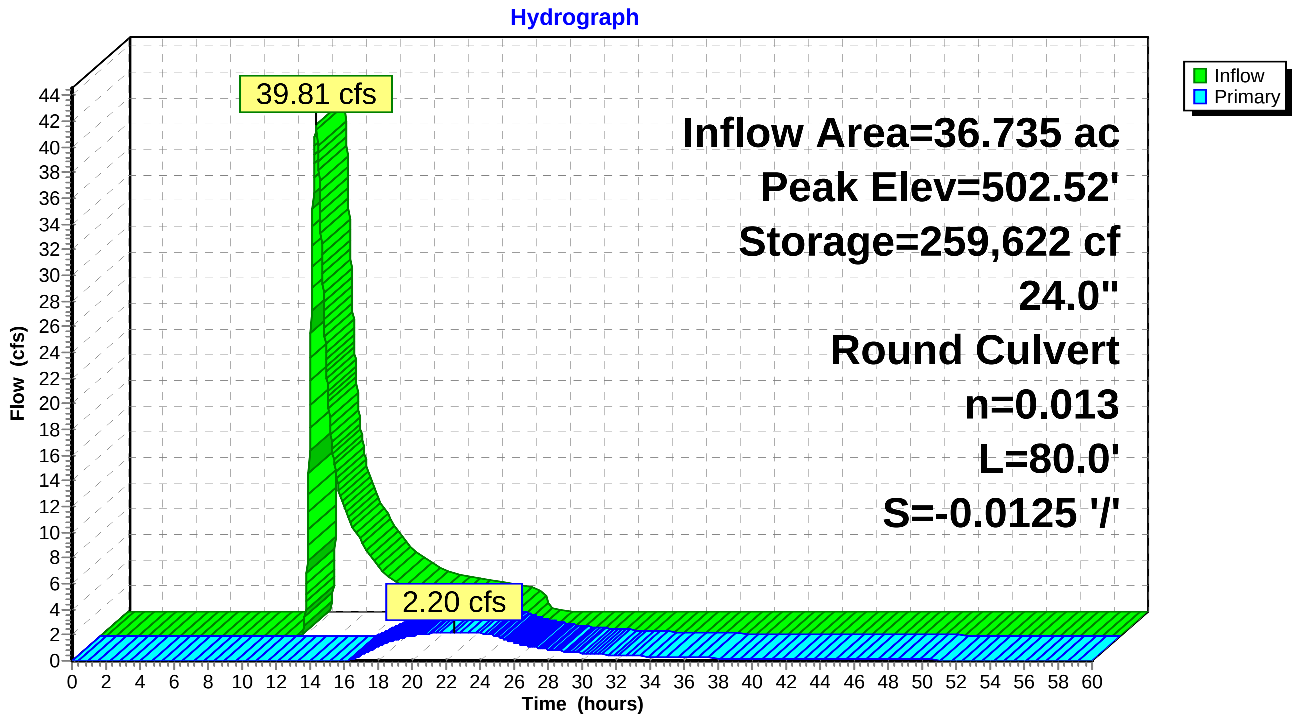
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 497.40' | 751,373 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 497.40 | 22,575 | 625.0 | 0 | 0 | 22,575 |
| 500.00 | 52,914 | 979.0 | 95,378 | 95,378 | 67,808 |
| 502.00 | 73,309 | 1,110.0 | 125,670 | 221,048 | 89,686 |
| 504.00 | 83,807 | 1,169.0 | 156,999 | 378,047 | 100,626 |
| 506.00 | 92,176 | 1,226.0 | 175,917 | 553,963 | 111,750 |
| 508.00 | 105,381 | 1,351.0 | 197,410 | 751,373 | 137,513 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 501.90' | **24.0" Round Culvert**<br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 500.90' / 501.90' S= -0.0125 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=2.20 cfs @ 22.44 hrs HW=502.52' TW=500.54' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.20 cfs @ 2.67 fps)

## Pond 103A: Wetland A



## Summary for Pond 103B: Irrigation Pond

Inflow Area = 256.384 ac, 5.93% Impervious, Inflow Depth > 2.70" for 100-Year event
Inflow = 192.00 cfs @ 12.86 hrs, Volume= 57.781 af
Outflow = 188.26 cfs @ 12.97 hrs, Volume= 57.530 af, Atten= 2%, Lag= 6.9 min
Primary = 19.17 cfs @ 12.94 hrs, Volume= 12.458 af
Secondary = 169.10 cfs @ 12.97 hrs, Volume= 45.072 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 506.94' @ 12.98 hrs Surf.Area= 94,213 sf Storage= 104,254 cf

Plug-Flow detention time= 31.2 min calculated for 57.511 af (100% of inflow)
Center-of-Mass det. time= 21.1 min ( 1,137.9 - 1,116.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 505.80' | 416,210 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

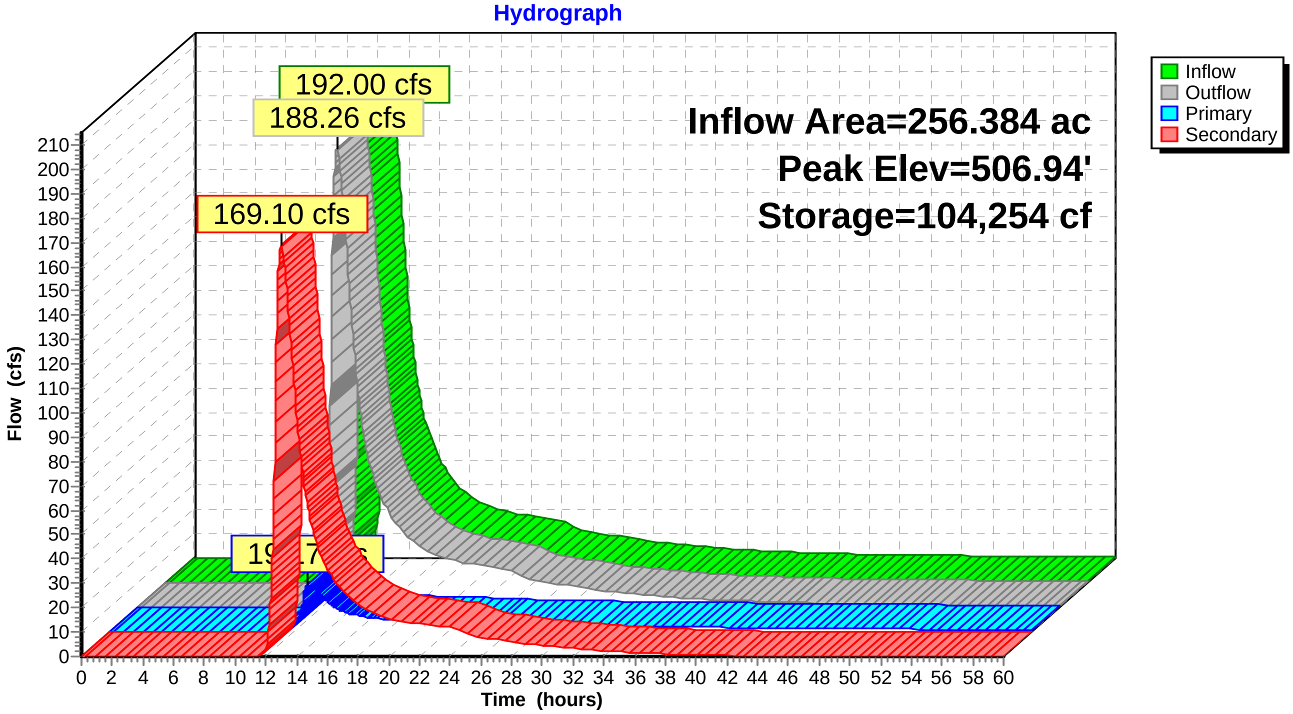
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 505.80 | 88,106 | 1,403.0 | 0 | 0 | 88,106 |
| 508.00 | 100,033 | 1,579.0 | 206,814 | 206,814 | 129,999 |
| 510.00 | 109,433 | 1,610.0 | 209,396 | 416,210 | 138,488 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 505.80' | **5.0' long x 1.80' rise Sharp-Crested Vee/Trap Weir**<br>Cv= 2.62 (C= 3.28) |
| #2 | Secondary | 506.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00<br>Width (feet) 45.00 60.00 80.00 95.00 120.00 |

**Primary OutFlow** Max=19.17 cfs @ 12.94 hrs HW=506.94' TW=506.15' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 19.17 cfs @ 3.36 fps)

**Secondary OutFlow** Max=169.08 cfs @ 12.97 hrs HW=506.94' TW=506.17' (Dynamic Tailwater)
└─**2=Custom Weir/Orifice** (Weir Controls 169.08 cfs @ 2.98 fps)

## Pond 103B: Irrigation Pond



## Summary for Pond 104A: Wetland D

Inflow Area = 9.432 ac, 9.40% Impervious, Inflow Depth = 1.47" for 100-Year event
Inflow = 6.20 cfs @ 12.56 hrs, Volume= 1.154 af
Outflow = 4.91 cfs @ 12.80 hrs, Volume= 1.133 af, Atten= 21%, Lag= 14.4 min
Primary = 0.40 cfs @ 12.80 hrs, Volume= 0.432 af
Secondary = 4.51 cfs @ 12.80 hrs, Volume= 0.701 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.07' @ 12.80 hrs Surf.Area= 25,559 sf Storage= 8,242 cf

Plug-Flow detention time= 155.4 min calculated for 1.133 af (98% of inflow)
Center-of-Mass det. time= 146.0 min ( 1,084.0 - 938.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

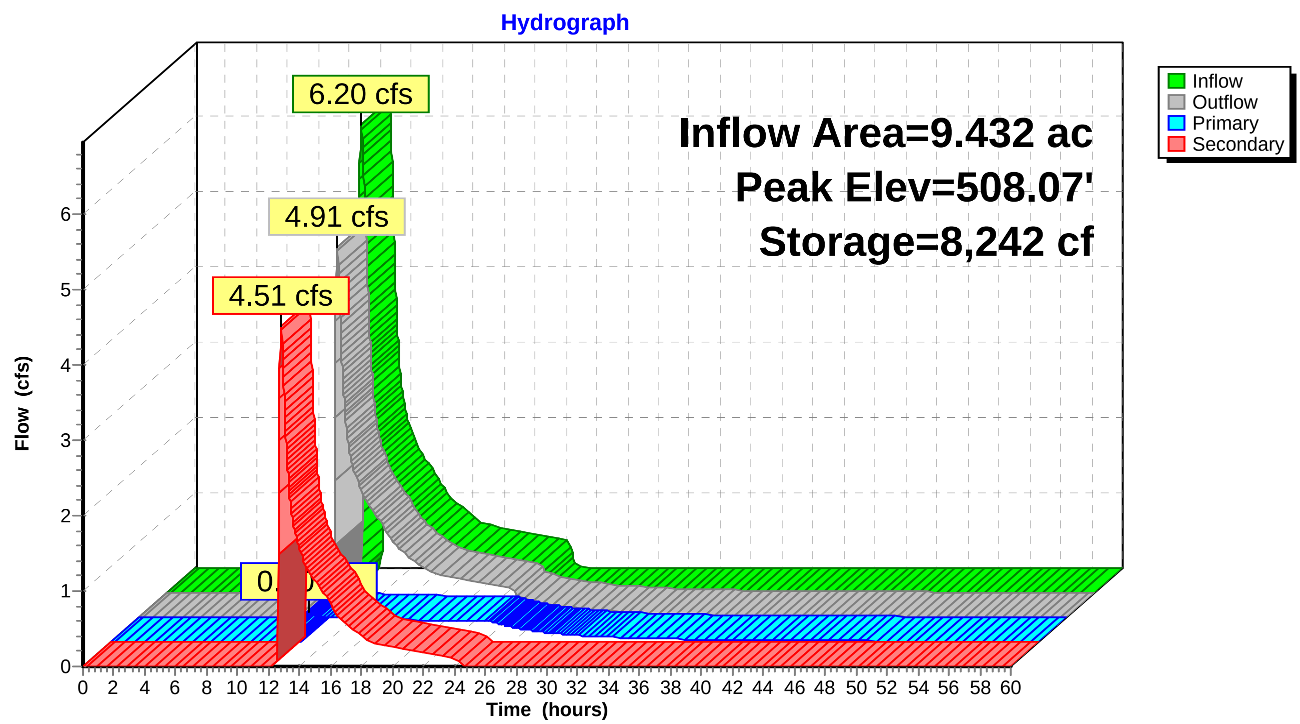
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.40 cfs @ 12.80 hrs HW=508.07' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 0.40 cfs @ 2.27 fps)

**Secondary OutFlow** Max=4.51 cfs @ 12.80 hrs HW=508.07' TW=0.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 4.51 cfs @ 0.69 fps)

## Pond 104A: Wetland D



## Summary for Pond 104B: Island Pond

Inflow Area = 234.803 ac, 5.37% Impervious, Inflow Depth = 4.81" for 100-Year event
Inflow = 399.04 cfs @ 12.67 hrs, Volume= 94.146 af
Outflow = 374.43 cfs @ 13.04 hrs, Volume= 92.151 af, Atten= 6%, Lag= 22.2 min
Primary = 16.02 cfs @ 13.04 hrs, Volume= 22.216 af
Secondary = 137.76 cfs @ 13.04 hrs, Volume= 26.630 af
Tertiary = 220.65 cfs @ 13.04 hrs, Volume= 43.306 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 511.02' @ 13.04 hrs Surf.Area= 296,676 sf Storage= 708,244 cf

Plug-Flow detention time= 153.2 min calculated for 92.151 af (98% of inflow)
Center-of-Mass det. time= 139.3 min ( 1,036.2 - 896.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 508.20' | 1,023,136 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 508.20 | 228,830 | 3,183.0 | 0 | 0 | 228,830 |
| 510.00 | 249,447 | 3,224.0 | 430,316 | 430,316 | 250,515 |
| 512.00 | 346,000 | 3,042.0 | 592,820 | 1,023,136 | 341,482 |

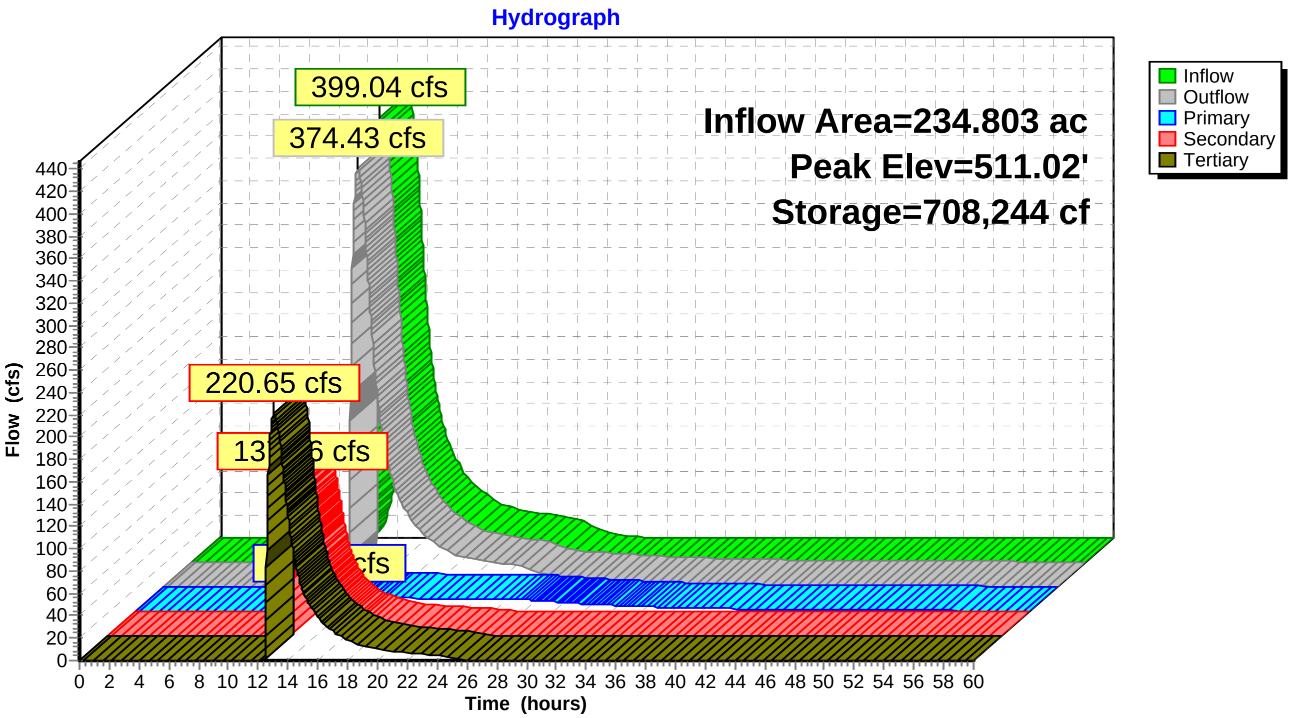
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 508.22' | **24.0" Round Culvert**<br>L= 111.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 508.22' / 505.43' S= 0.0251 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 3.14 sf |
| #2 | Secondary | 510.00' | **50.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Tertiary | 510.00' | **80.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=16.02 cfs @ 13.04 hrs HW=511.02' TW=506.94' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 16.02 cfs @ 5.10 fps)

**Secondary OutFlow** Max=137.76 cfs @ 13.04 hrs HW=511.02' TW=506.94' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 137.76 cfs @ 2.70 fps)

**Tertiary OutFlow** Max=220.64 cfs @ 13.04 hrs HW=511.02' TW=506.17' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 220.64 cfs @ 2.71 fps)

## Pond 104B: Island Pond



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach A106R OUTLET depth by 0.67' @ 16.20 hrs

Inflow Area = 49.602 ac, 4.77% Impervious, Inflow Depth = 4.02" for 100-Year event
Inflow = 144.07 cfs @ 12.33 hrs, Volume= 16.630 af
Outflow = 143.61 cfs @ 12.34 hrs, Volume= 16.614 af, Atten= 0%, Lag= 1.2 min
Primary = 11.38 cfs @ 12.34 hrs, Volume= 8.502 af
Secondary = 132.23 cfs @ 12.34 hrs, Volume= 8.112 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.44' @ 12.34 hrs Surf.Area= 32,642 sf Storage= 71,175 cf

Plug-Flow detention time= 51.7 min calculated for 16.608 af (100% of inflow)
Center-of-Mass det. time= 51.6 min ( 909.7 - 858.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

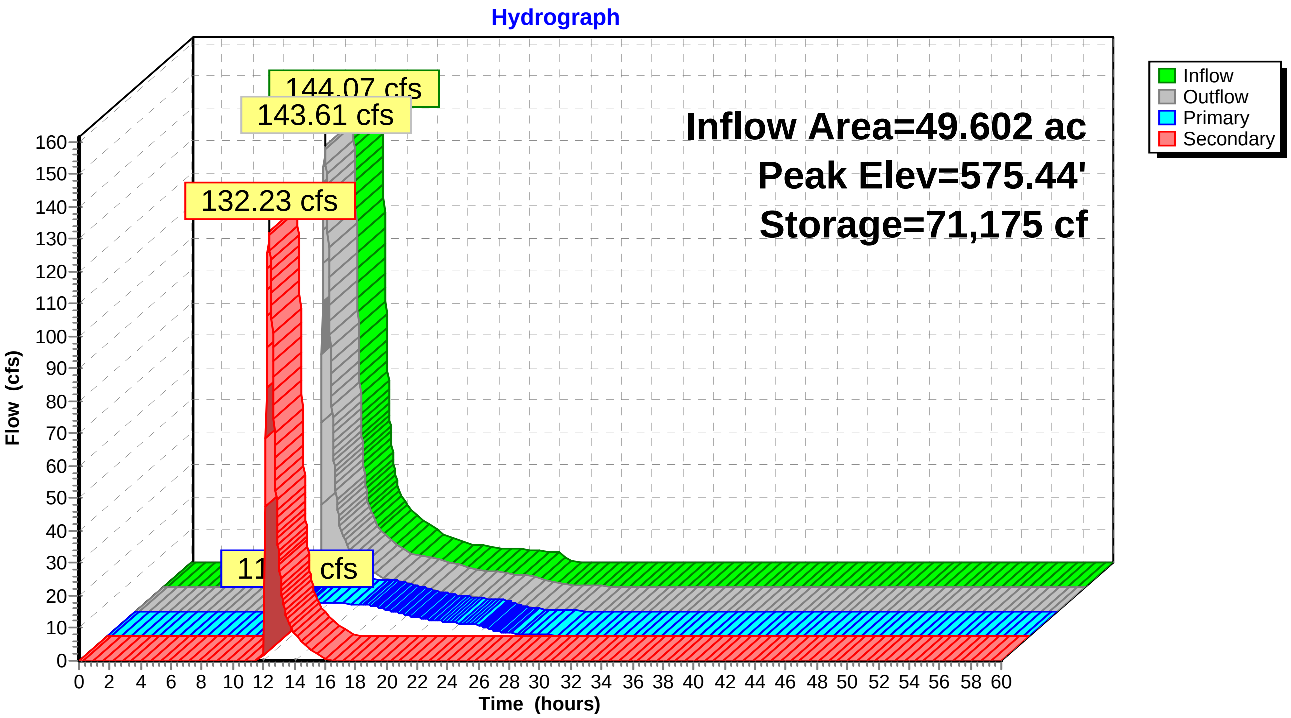
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=11.38 cfs @ 12.34 hrs HW=575.44' TW=568.41' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.38 cfs @ 6.44 fps)

**Secondary OutFlow** Max=132.13 cfs @ 12.34 hrs HW=575.44' TW=568.41' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 132.13 cfs @ 1.68 fps)

## Pond 105A: Wetland H



## Summary for Pond 105B: Wetland J

Inflow Area = 154.267 ac, 1.16% Impervious, Inflow Depth = 5.36" for 100-Year event
Inflow = 296.68 cfs @ 13.06 hrs, Volume= 68.929 af
Outflow = 296.39 cfs @ 13.08 hrs, Volume= 68.928 af, Atten= 0%, Lag= 1.1 min
Primary = 296.39 cfs @ 13.08 hrs, Volume= 68.928 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 516.74' @ 13.08 hrs Surf.Area= 29,890 sf Storage= 58,131 cf

Plug-Flow detention time= 12.0 min calculated for 68.928 af (100% of inflow)
Center-of-Mass det. time= 11.9 min ( 904.9 - 893.0 )

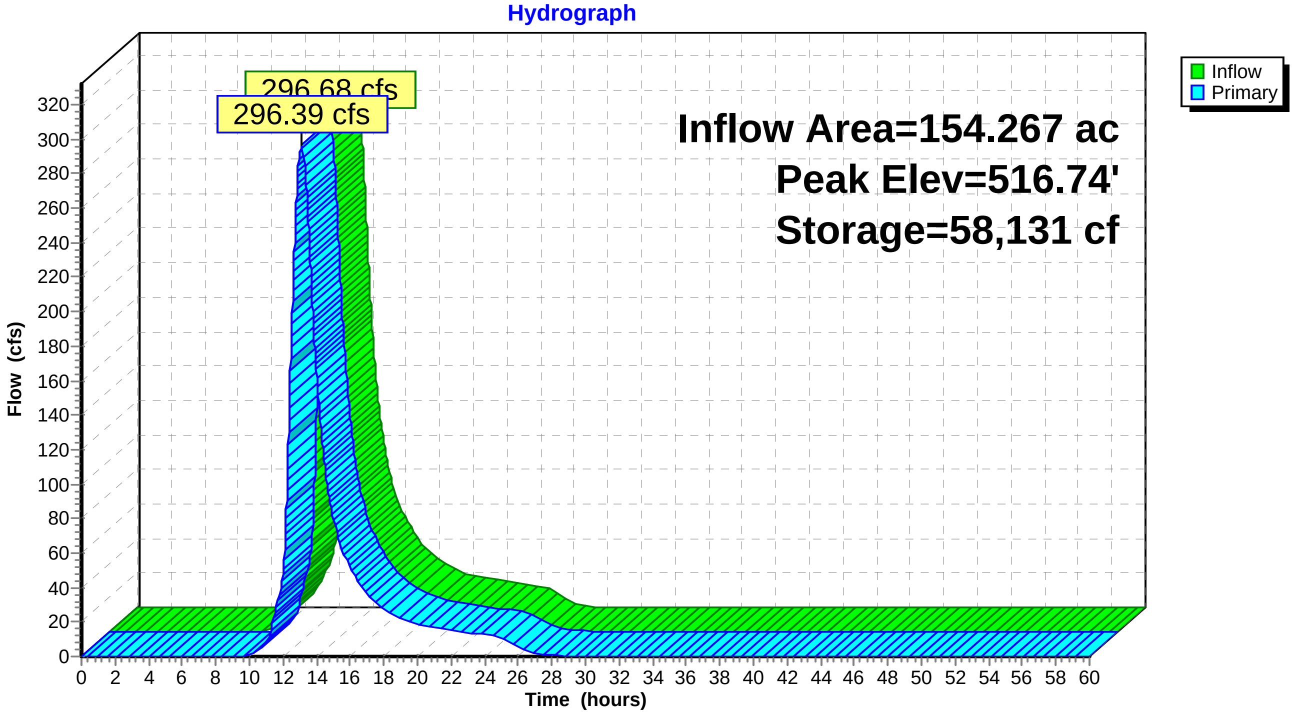
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 514.40' | 102,307 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 514.40 | 19,952 | 567.0 | 0 | 0 | 19,952 |
| 516.00 | 27,082 | 686.0 | 37,482 | 37,482 | 31,860 |
| 516.50 | 28,121 | 699.0 | 13,800 | 51,282 | 33,334 |
| 518.00 | 40,275 | 840.0 | 51,025 | 102,307 | 50,641 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 514.40' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.25 1.60 2.60 3.60<br>Width (feet) 2.33 2.33 90.00 120.00 170.00 |

**Primary OutFlow** Max=296.37 cfs @ 13.08 hrs HW=516.74' TW=511.02' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 296.37 cfs @ 3.17 fps)

## Pond 105B: Wetland J



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.338 ac, 8.12% Impervious, Inflow Depth = 5.51" for 100-Year event
Inflow = 59.99 cfs @ 12.37 hrs, Volume= 7.041 af
Outflow = 59.96 cfs @ 12.37 hrs, Volume= 7.041 af, Atten= 0%, Lag= 0.4 min
Primary = 59.96 cfs @ 12.37 hrs, Volume= 7.041 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 721.30' @ 12.37 hrs Surf.Area= 245 sf Storage= 377 cf

Plug-Flow detention time= 0.0 min calculated for 7.039 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 837.1 - 837.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

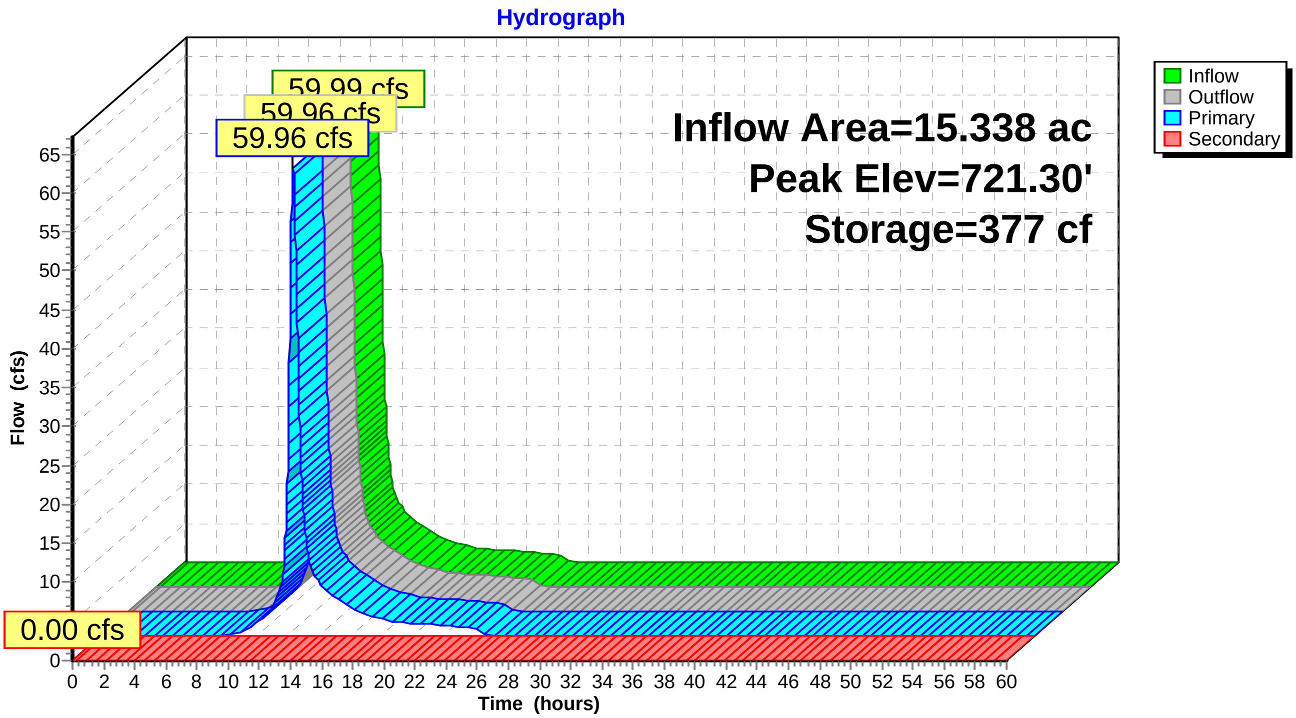
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=59.92 cfs @ 12.37 hrs HW=721.30' TW=687.32' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 59.92 cfs @ 8.48 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=686.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 130.289 ac, 0.83% Impervious, Inflow Depth = 5.51" for 100-Year event
Inflow = 268.00 cfs @ 13.14 hrs, Volume= 59.811 af
Outflow = 267.88 cfs @ 13.15 hrs, Volume= 59.811 af, Atten= 0%, Lag= 0.6 min
Primary = 267.88 cfs @ 13.15 hrs, Volume= 59.811 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 527.39' @ 13.15 hrs Surf.Area= 12,660 sf Storage= 27,726 cf

Plug-Flow detention time= 5.9 min calculated for 59.811 af (100% of inflow)
Center-of-Mass det. time= 5.6 min ( 897.4 - 891.8 )

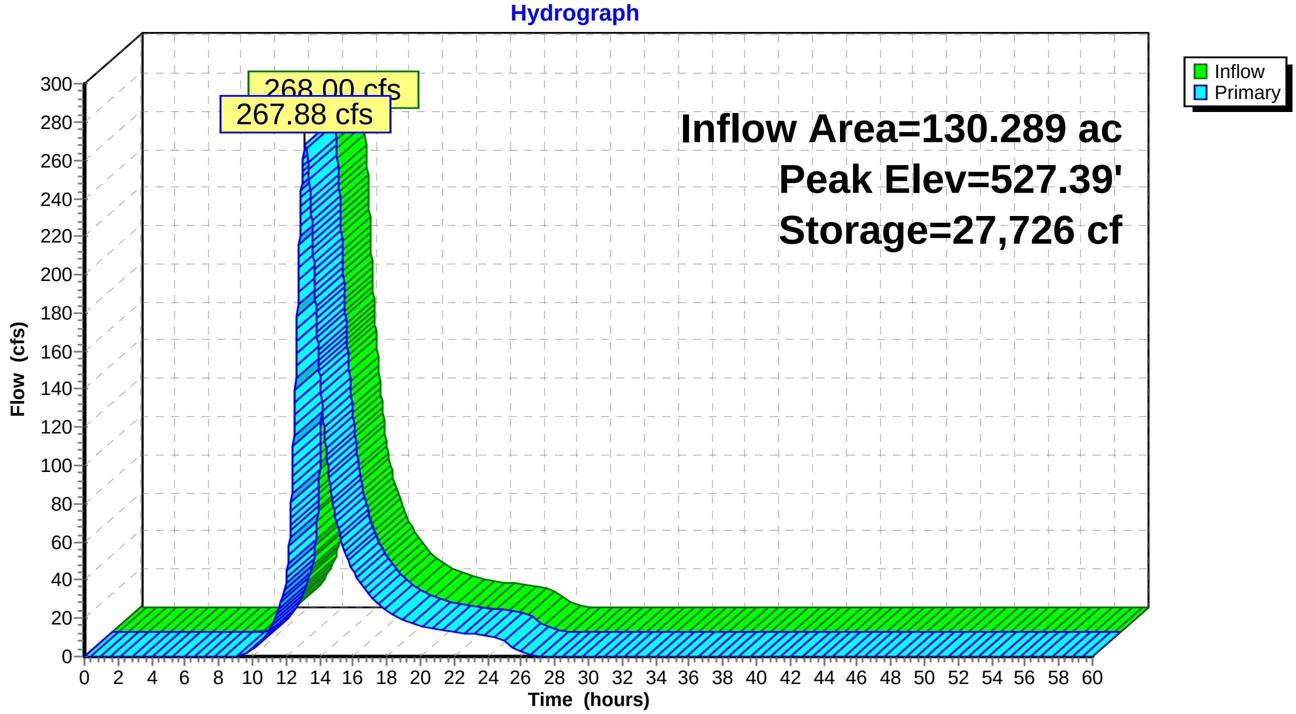
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=267.83 cfs @ 13.15 hrs HW=527.39' TW=516.73' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 267.83 cfs @ 3.61 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 95.411 ac, 2.35% Impervious, Inflow Depth = 5.10" for 100-Year event
Inflow = 226.93 cfs @ 12.82 hrs, Volume= 40.578 af
Outflow = 226.95 cfs @ 12.82 hrs, Volume= 40.578 af, Atten= 0%, Lag= 0.2 min
Primary = 45.67 cfs @ 12.82 hrs, Volume= 24.164 af
Secondary = 181.28 cfs @ 12.82 hrs, Volume= 16.414 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 626.63' @ 12.82 hrs Surf.Area= 1,754 sf Storage= 4,113 cf

Plug-Flow detention time= 0.5 min calculated for 40.578 af (100% of inflow)
Center-of-Mass det. time= 0.3 min ( 876.5 - 876.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

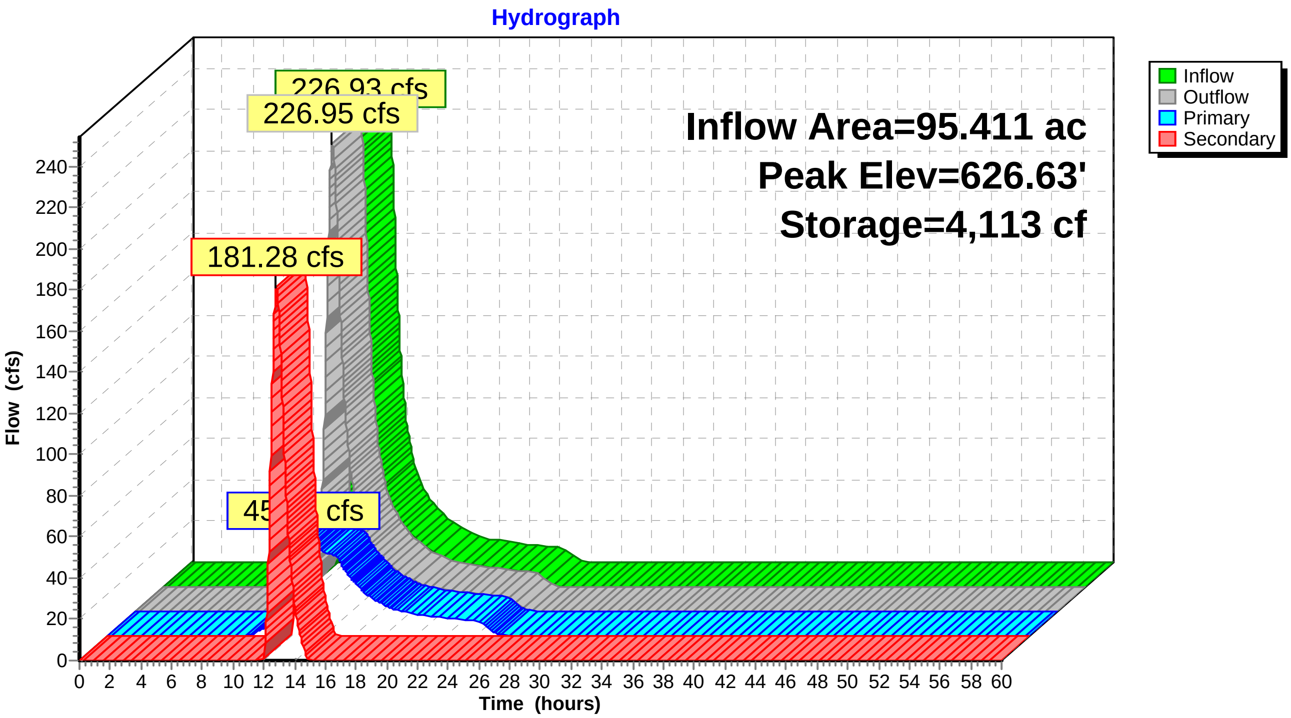
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=45.67 cfs @ 12.82 hrs HW=626.63' TW=610.93' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 45.67 cfs @ 14.54 fps)

**Secondary OutFlow** Max=181.26 cfs @ 12.82 hrs HW=626.63' TW=613.62' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 181.26 cfs @ 3.94 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 48.66 cfs @ 12.51 hrs, Volume= 6.740 af
Outflow = 36.37 cfs @ 12.79 hrs, Volume= 6.463 af, Atten= 25%, Lag= 16.5 min
Primary = 36.37 cfs @ 12.79 hrs, Volume= 6.463 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 973.08' @ 12.79 hrs Surf.Area= 127,092 sf Storage= 71,937 cf

Plug-Flow detention time= 78.5 min calculated for 6.461 af (96% of inflow)
Center-of-Mass det. time= 55.8 min ( 900.9 - 845.0 )

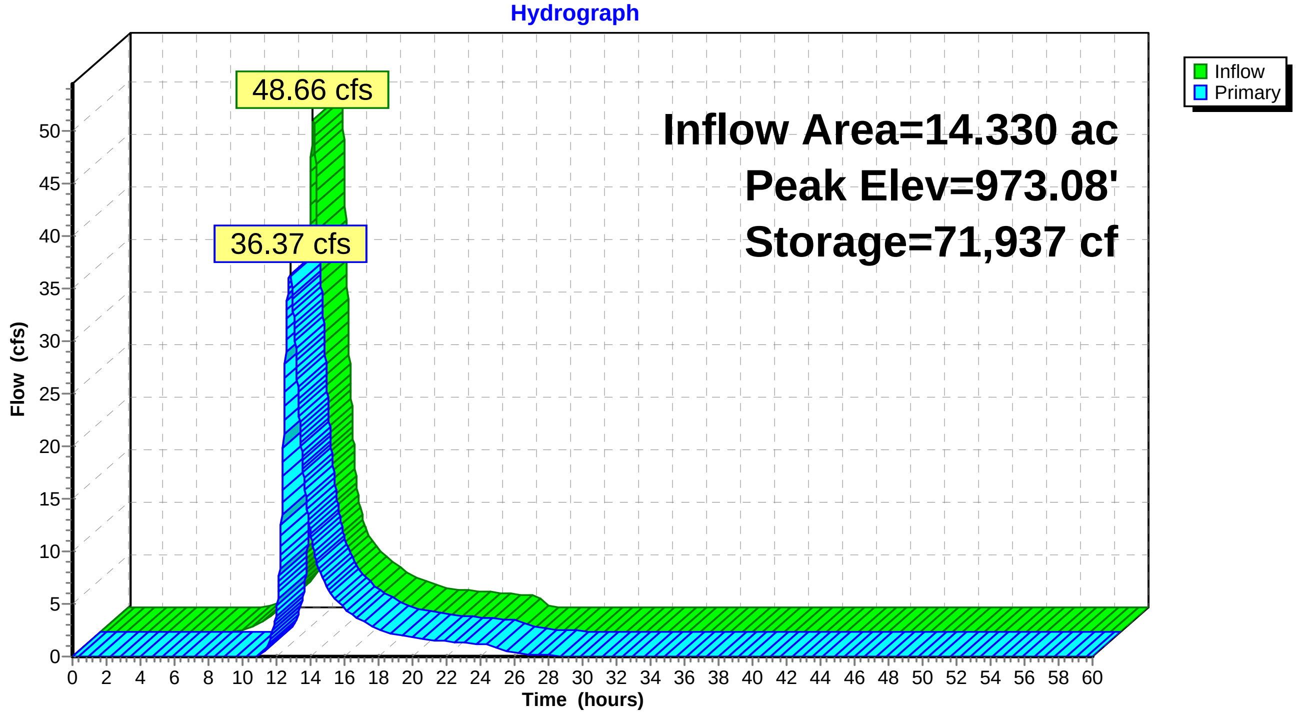
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=36.36 cfs @ 12.79 hrs HW=973.08' TW=972.52' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 36.36 cfs @ 1.88 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

Inflow Area = 5.526 ac, 2.32% Impervious, Inflow Depth = 38.61" for 100-Year event
Inflow = 187.52 cfs @ 12.81 hrs, Volume= 17.778 af
Outflow = 187.51 cfs @ 12.82 hrs, Volume= 17.778 af, Atten= 0%, Lag= 0.0 min
Primary = 58.93 cfs @ 12.43 hrs, Volume= 9.574 af
Secondary = 131.65 cfs @ 12.82 hrs, Volume= 8.205 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 613.62' @ 12.82 hrs Surf.Area= 981 sf Storage= 390 cf

Plug-Flow detention time= 0.4 min calculated for 17.778 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 790.5 - 790.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

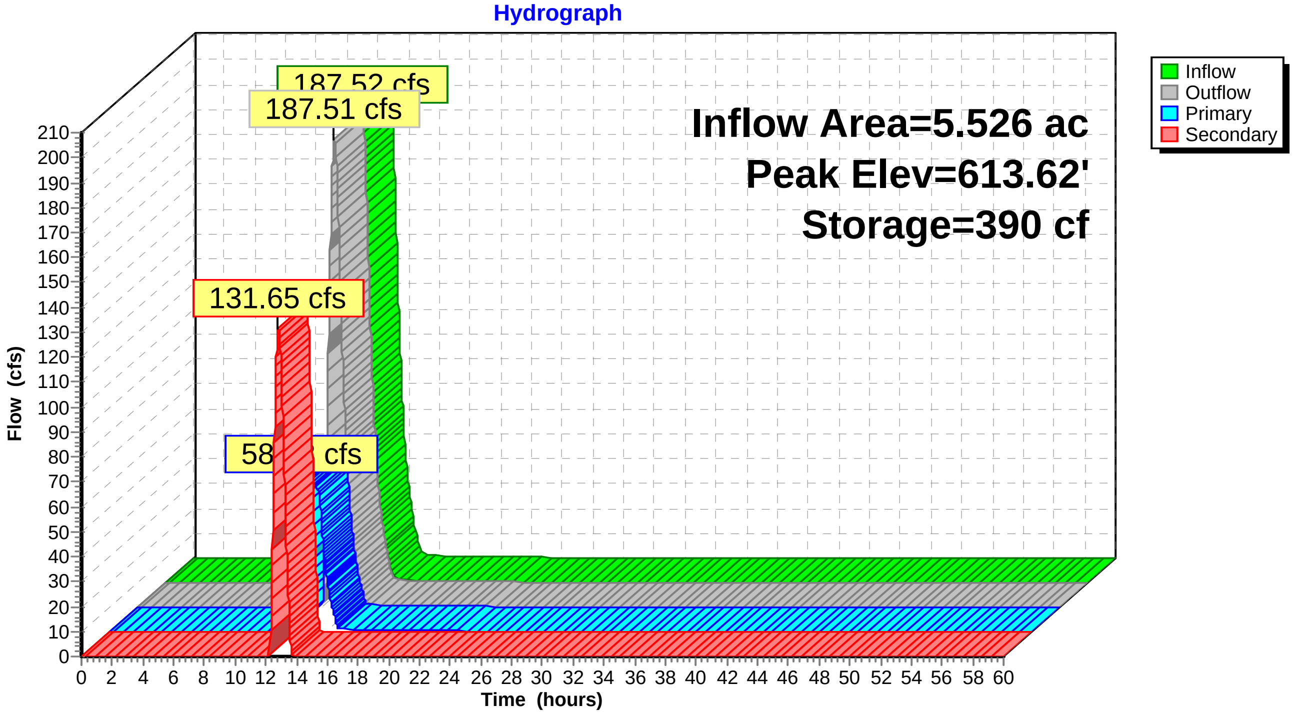
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=59.02 cfs @ 12.43 hrs HW=613.31' TW=610.31' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 59.02 cfs @ 8.35 fps)

**Secondary OutFlow** Max=131.56 cfs @ 12.82 hrs HW=613.62' TW=610.93' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 131.56 cfs @ 2.12 fps)

## Pond 108A: 36" Culvert



## Summary for Pond 108B: Wetland N

Inflow Area = 72.374 ac, 0.70% Impervious, Inflow Depth = 5.51" for 100-Year event
Inflow = 215.30 cfs @ 12.54 hrs, Volume= 33.236 af
Outflow = 215.06 cfs @ 12.56 hrs, Volume= 33.211 af, Atten= 0%, Lag= 1.0 min
Primary = 4.38 cfs @ 12.07 hrs, Volume= 4.619 af
Secondary = 211.41 cfs @ 12.56 hrs, Volume= 28.592 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.90' @ 12.56 hrs Surf.Area= 11,409 sf Storage= 19,779 cf

Plug-Flow detention time= 8.4 min calculated for 33.200 af (100% of inflow)
Center-of-Mass det. time= 7.9 min ( 866.9 - 858.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 32,385 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

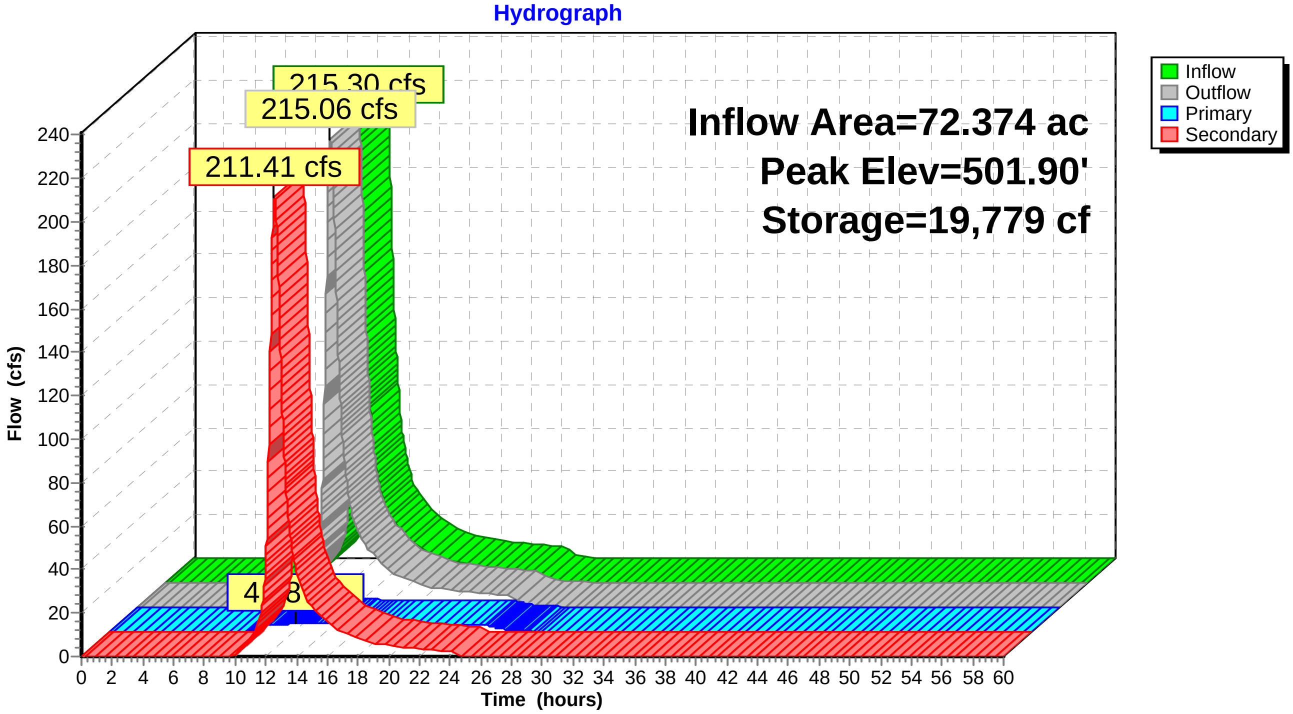
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 500.00 | 8,398 | 412.0 | 0 | 0 | 8,398 |
| 500.50 | 10,185 | 434.0 | 4,639 | 4,639 | 9,894 |
| 502.00 | 11,496 | 452.0 | 16,251 | 20,889 | 11,327 |
| 503.00 | 11,496 | 452.0 | 11,496 | 32,385 | 11,779 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.10' | **18.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 500.10' / 499.60' S= 0.0250 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 501.00' | **125.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=4.38 cfs @ 12.07 hrs HW=501.33' TW=500.63' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 4.38 cfs @ 3.84 fps)

**Secondary OutFlow** Max=211.32 cfs @ 12.56 hrs HW=501.90' TW=501.61' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 211.32 cfs @ 1.87 fps)

## Pond 108B: Wetland N



## Summary for Pond 109B: 36" Culvert

Inflow Area = 11.276 ac, 0.04% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 43.84 cfs @ 12.39 hrs, Volume= 5.303 af
Outflow = 43.75 cfs @ 12.40 hrs, Volume= 5.303 af, Atten= 0%, Lag= 0.9 min
Primary = 43.75 cfs @ 12.40 hrs, Volume= 5.303 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 549.35' @ 12.40 hrs Surf.Area= 401 sf Storage= 590 cf

Plug-Flow detention time= 0.1 min calculated for 5.301 af (100% of inflow)
Center-of-Mass det. time= 0.1 min ( 836.4 - 836.3 )

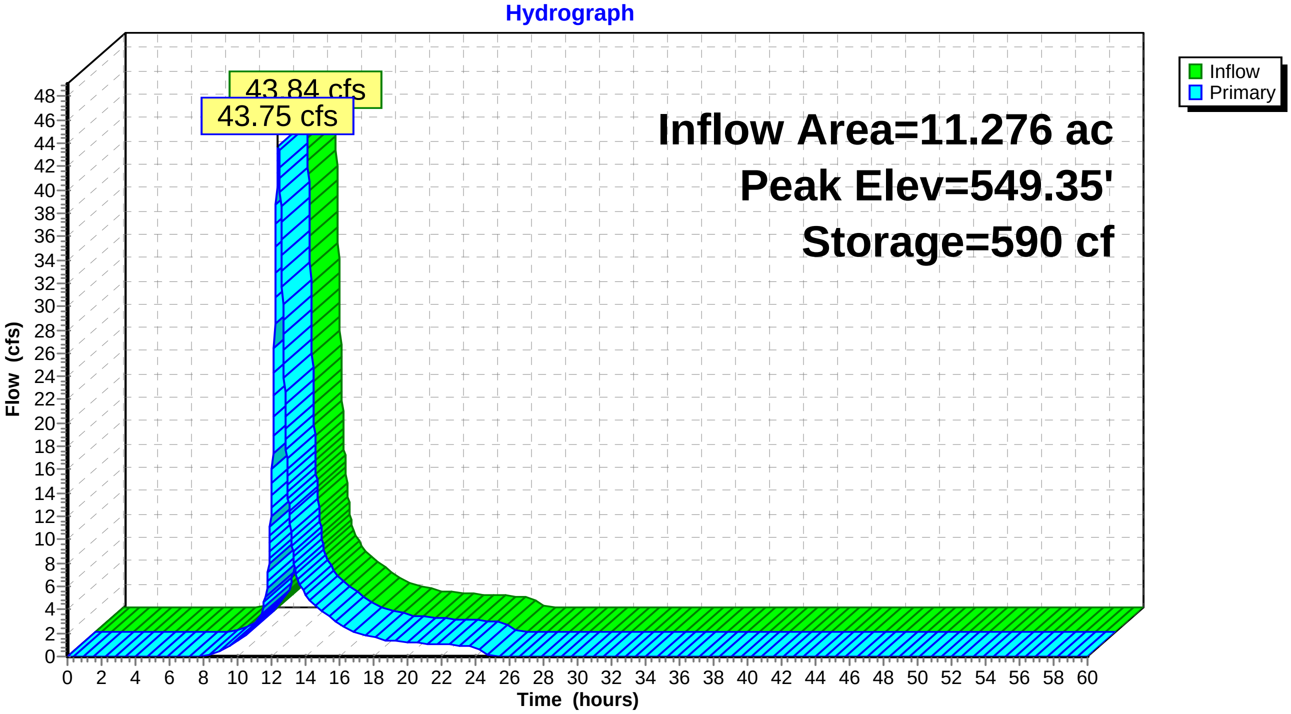
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 545.20' | 5,884 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 545.20 | 0 | 0.0 | 0 | 0 | 0 |
| 548.00 | 203 | 65.0 | 189 | 189 | 348 |
| 550.00 | 519 | 101.0 | 698 | 887 | 852 |
| 552.00 | 1,050 | 140.0 | 1,538 | 2,425 | 1,638 |
| 554.00 | 2,514 | 230.0 | 3,459 | 5,884 | 4,313 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 545.20' | **36.0" Round Culvert**<br>L= 96.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 545.20' / 532.20' S= 0.1354 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Primary | 552.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 65.00 95.00<br>Height (feet) 2.00 0.60 0.00 2.00 |

**Primary OutFlow** Max=43.74 cfs @ 12.40 hrs HW=549.35' TW=533.37' (Dynamic Tailwater)
├─**1=Culvert** (Inlet Controls 43.74 cfs @ 6.19 fps)
└─**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond 109B: 36" Culvert

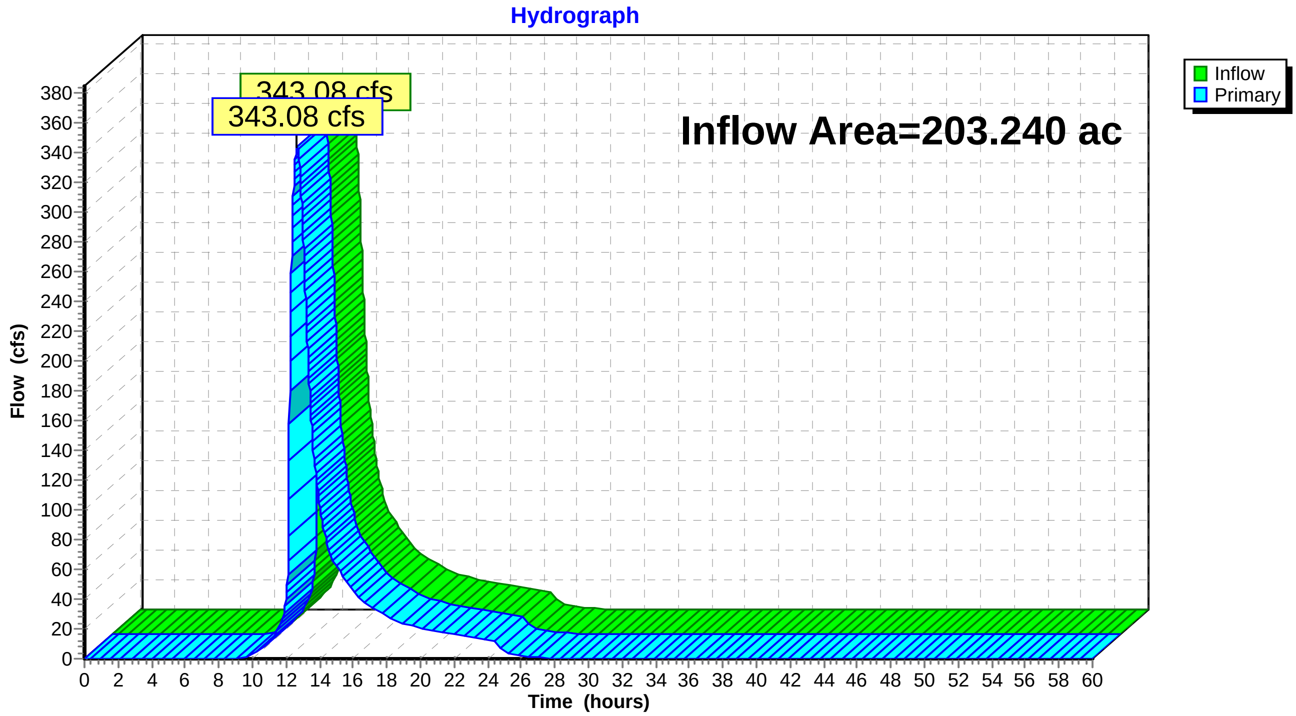


## Summary for Link A: Amenia Stream

Inflow Area = 203.240 ac, 3.66% Impervious, Inflow Depth = 3.86" for 100-Year event
Inflow = 343.08 cfs @ 12.67 hrs, Volume= 65.404 af
Primary = 343.08 cfs @ 12.67 hrs, Volume= 65.404 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

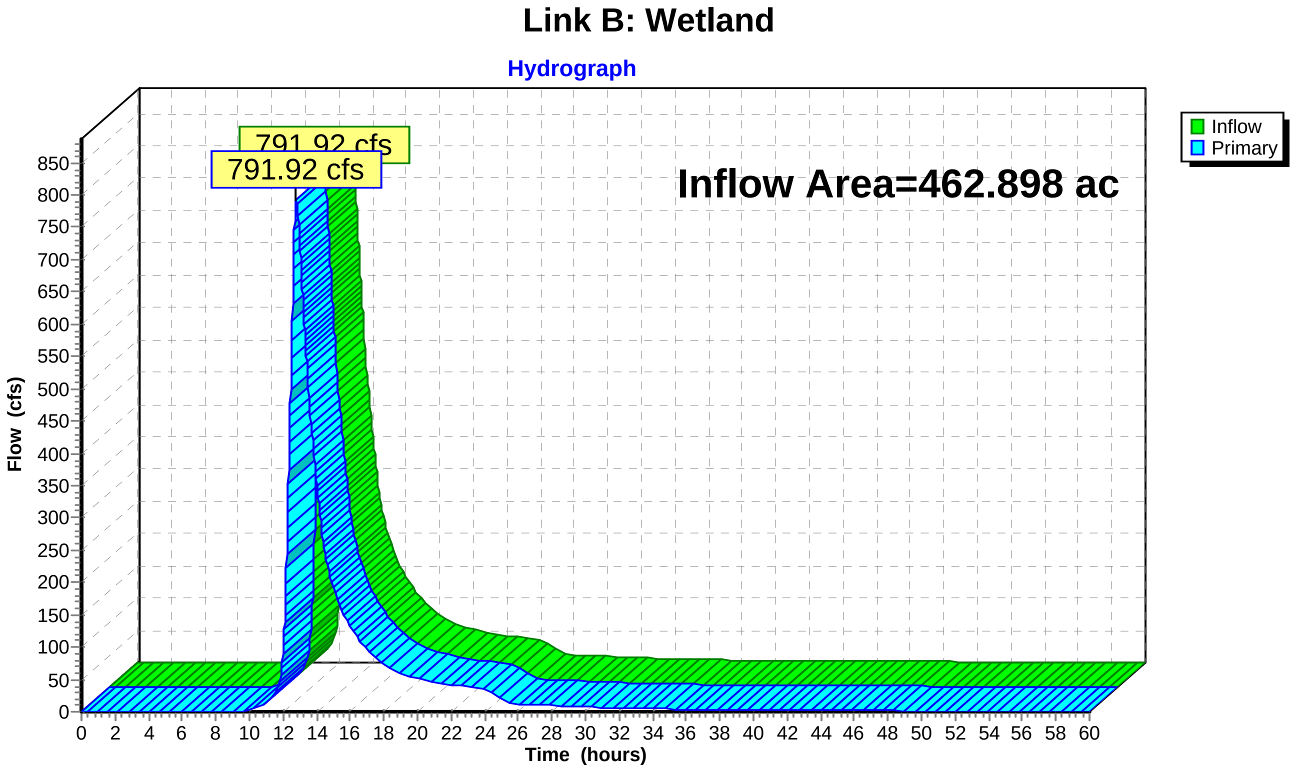
### Link A: Amenia Stream



## Summary for Link B: Wetland

Inflow Area = 462.898 ac, 3.63% Impervious, Inflow Depth > 4.55" for 100-Year event
Inflow = 791.92 cfs @ 12.78 hrs, Volume= 175.327 af
Primary = 791.92 cfs @ 12.78 hrs, Volume= 175.327 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

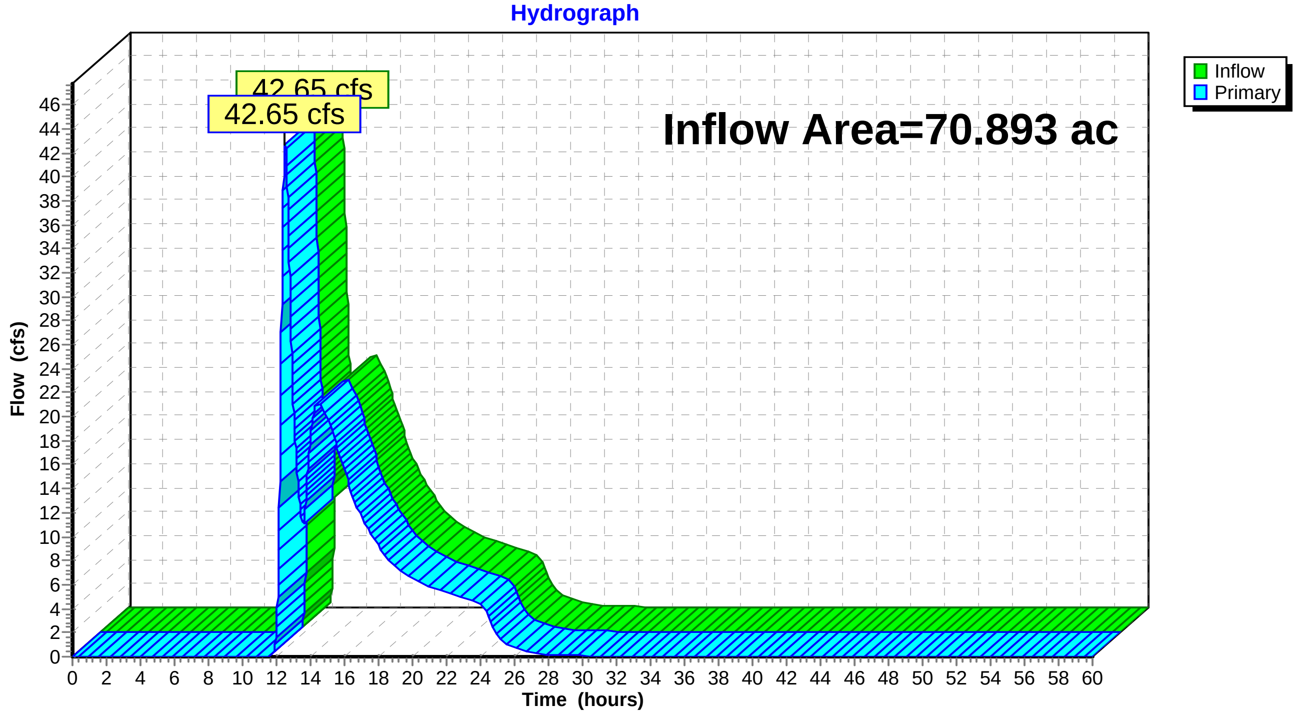


## Summary for Link C: Culvert

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 70.893 ac, | 4.53% Impervious, Inflow Depth = 2.06" | for 100-Year event | |
| Inflow = | 42.65 cfs @ | 12.52 hrs, Volume= | 12.189 af | |
| Primary = | 42.65 cfs @ | 12.52 hrs, Volume= | 12.189 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

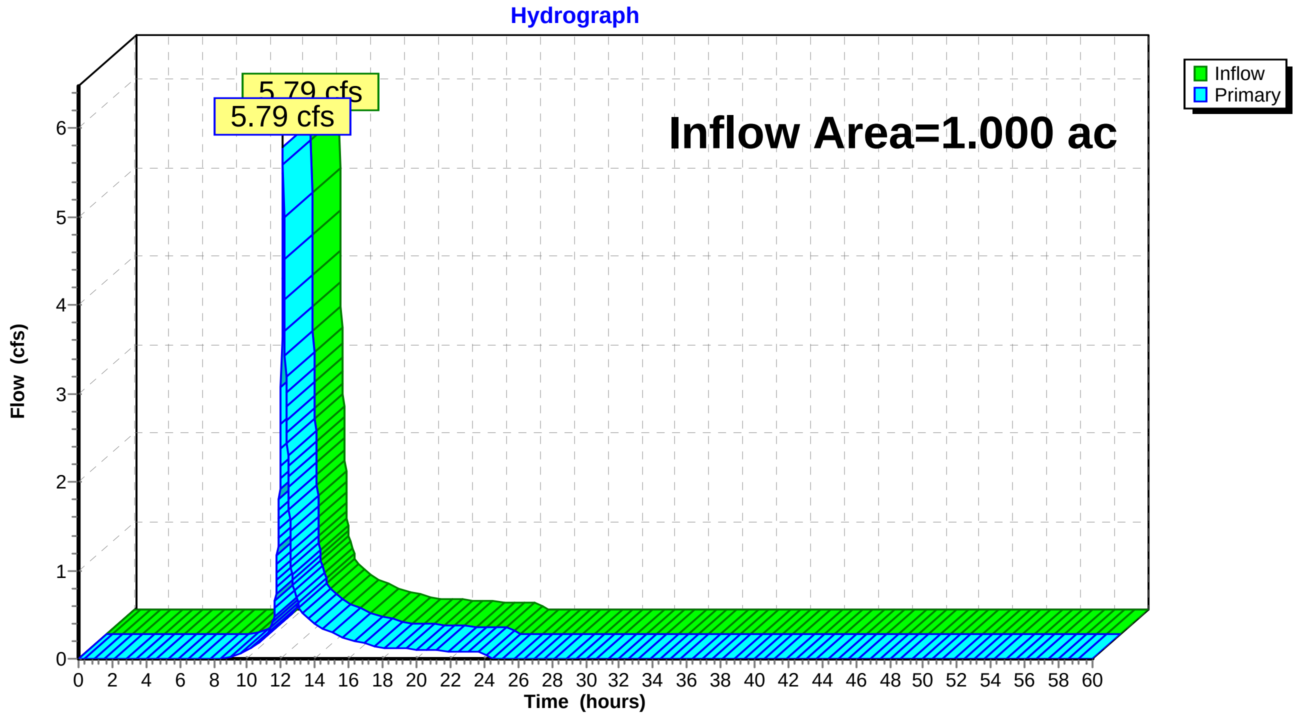


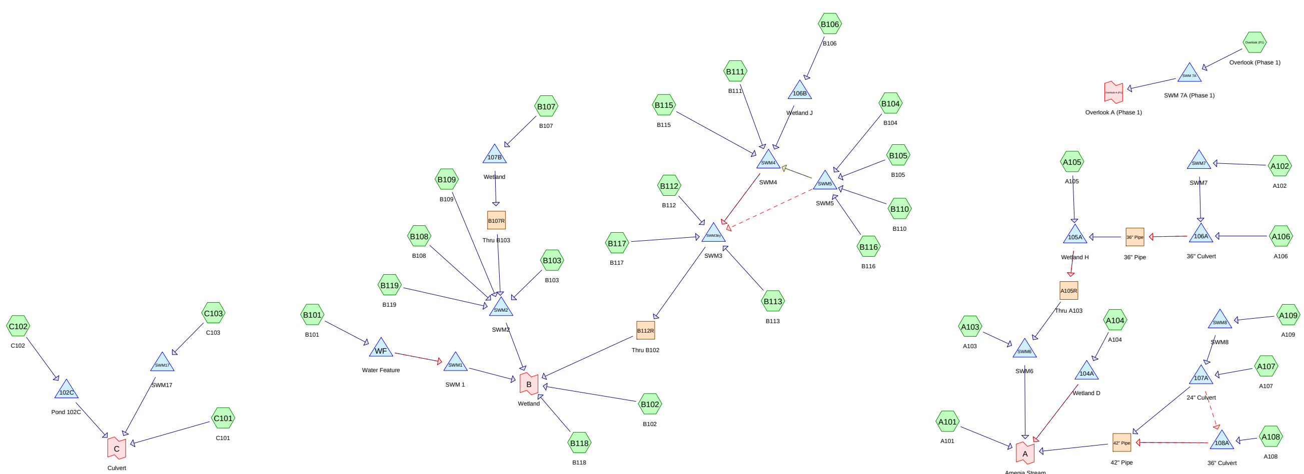
## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

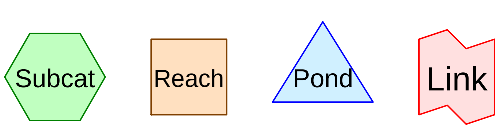
| | | | | | |
|---|---|---|---|---|---|
| Inflow Area = | 1.000 ac, | 0.00% Impervious, | Inflow Depth = 5.10" | for 100-Year event | |
| Inflow = | 5.79 cfs @ | 12.11 hrs, | Volume= | 0.425 af | |
| Primary = | 5.79 cfs @ | 12.11 hrs, | Volume= | 0.425 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)






**Routing Diagram for 29011.00 Proposed_FINAL - updated rainfall**
Prepared by VHB Engineering,Surveying and Landscape Architecture P.C, Printed 2/16/2015
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## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 164.752 | 39 | >75% Grass cover, Good, HSG A (A101, A103, A104, A105, B101, B102, B104, B105, B106, B111, B112, B113, B115, B116, B117, B118, C101, C102, C103) |
| 25.839 | 61 | >75% Grass cover, Good, HSG B (A101, A103, A104, A106, A107, A108, A109, B102, B106) |
| 136.910 | 74 | >75% Grass cover, Good, HSG C (A101, A102, A103, A104, A105, A106, A107, A109, B101, B102, B103, B104, B105, B106, B108, B109, B110, B111, B112, B115, C101, C102, C103, Overlook (P1)) |
| 18.105 | 80 | >75% Grass cover, Good, HSG D (A103, A106, A107, A109, B102, B103, B105, B106, B107, B108, B109, B112, B113, B117, C102) |
| 46.700 | 98 | Building roof (A101, A102, A103, A105, A107, A108, B101, B103, B104, B105, B106, B108, B109, B110, B111, B112, B113, B115, B117, B118, B119) |
| 0.260 | 89 | Gravel roads and parking, HSG C (Overlook (P1)) |
| 3.009 | 96 | Gravel surface (A103, A107, A108, B101, B102, B103, B104, B105, B106, B107, B113, C102) |
| 2.000 | 98 | Paved parking, HSG B (A109) |
| 31.413 | 98 | Paved surface (A101, A102, A103, A104, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B108, B109, B110, B111, B112, B113, B115, B116, B117, B118, B119, C102, C103) |
| 0.285 | 98 | Rock Outcrop/Ledge (C102) |
| 0.857 | 98 | Roofs, HSG B (A109) |
| 1.006 | 30 | Sand Trap, HSG C (A104, A105, B101, B102, B104, B109, B115) |
| 2.070 | 30 | Sand trap, HSG A (A101, A103, A104, A105, B101, B102, B112, B115) |
| 0.160 | 30 | Sand trap, HSG B (A101, A103) |
| 14.302 | 98 | Water Surface (A102, A103, A104, A105, A107, B101, B102, B109, B111, B112, B116, C102) |
| 18.039 | 30 | Woods, Good, HSG A (A101, A103, A104, A105, B101, B102, B112, B113, B115, B117, B118, C101, C102, C103) |
| 14.630 | 55 | Woods, Good, HSG B (A103, A104, A106, A107, A108, A109) |
| 49.961 | 70 | Woods, Good, HSG C (A102, A103, A104, A105, A106, A107, A109, B101, B102, B104, B106, B108, B109, B110, B112, B115, B119, C101, C102, C103, Overlook (P1)) |
| 253.721 | 77 | Woods, Good, HSG D (A103, A106, A107, A109, B101, B102, B103, B105, B106, B107, B108, B109, B113, B117, C102) |
| **784.019** | **69** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 184.861 | HSG A | A101, A103, A104, A105, B101, B102, B104, B105, B106, B111, B112, B113, B115, B116, B117, B118, C101, C102, C103 |
| 43.486 | HSG B | A101, A103, A104, A106, A107, A108, A109, B102, B106 |
| 188.137 | HSG C | A101, A102, A103, A104, A105, A106, A107, A109, B101, B102, B103, B104, B105, B106, B108, B109, B110, B111, B112, B115, B119, C101, C102, C103, Overlook (P1) |
| 271.826 | HSG D | A103, A106, A107, A109, B101, B102, B103, B105, B106, B107, B108, B109, B112, B113, B117, C102 |
| 95.709 | Other | A101, A102, A103, A104, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B107, B108, B109, B110, B111, B112, B113, B115, B116, B117, B118, B119, C102, C103 |
| **784.019** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 164.752 | 25.839 | 136.910 | 18.105 | 0.000 | 345.606 | >75% Grass cover, Good | A101, A102, A103, A104, A105, A106, A107, A108, A109, B101, B102, B103, B104, B105, B106, B107, B108, B109, B110, B111, B112, B113, B115, B116, B117, B118, C101, C102, C103, Overlook (P1) |
| 0.000 | 0.000 | 0.000 | 0.000 | 46.700 | 46.700 | Building roof | A101, A102, A103, A105, A107, A108, B101, B103, B104, B105, B106, B108, B109, B110, B111, |

## Ground Covers (all nodes) (continued)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.260 | 0.000 | 0.000 | 0.260 | Gravel roads and parking | Overlook (P1) |
| 0.000 | 0.000 | 0.000 | 0.000 | 3.009 | 3.009 | Gravel surface | A103, A107, A108, B101, B102, B103, B104, B105, B106, B107, B113, C102 |
| 0.000 | 2.000 | 0.000 | 0.000 | 0.000 | 2.000 | Paved parking | A109 |
| 0.000 | 0.000 | 0.000 | 0.000 | 31.413 | 31.413 | Paved surface | A101, A102, A103, A104, A105, A106, A107, A108, B101, B102, B103, B104, B105, B106, B108, B109, B110, B111, B112, B113, B115, B116, B117, B118, B119, C102, C103 |

### Ground Covers (all nodes) (continued)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.285 | 0.285 | Rock Outcrop/Ledge | C102 |
| 0.000 | 0.857 | 0.000 | 0.000 | 0.000 | 0.857 | Roofs | A109 |
| 0.000 | 0.000 | 1.006 | 0.000 | 0.000 | 1.006 | Sand Trap | A104, A105, B101, B102, B104, B109, B115 |
| 2.070 | 0.160 | 0.000 | 0.000 | 0.000 | 2.230 | Sand trap | A101, A103, A104, A105, B101, B102, B112, B115 |
| 0.000 | 0.000 | 0.000 | 0.000 | 14.302 | 14.302 | Water Surface | A102, A103, A104, A105, A107, B101, B102, B109, B111, B112, B116, C102 |
| 18.039 | 14.630 | 49.961 | 253.721 | 0.000 | 336.351 | Woods, Good | A101, A102, A103, A104, A105, A106, A107, A108, A109, B101, B102, B103, B104, B105, B106, B107, B108, |

## Ground Covers (all nodes) (continued)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchment Numbers |
|---|---|---|---|---|---|---|---|
| **184.861** | **43.486** | **188.137** | **271.826** | **95.709** | **784.019** | **TOTAL AREA** | |

## Pipe Listing (all nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Diam/Width (inches) | Height (inches) | Inside-Fill (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | A103 | 0.00 | 0.00 | 1,520.0 | 0.0690 | 0.012 | 30.0 | 0.0 | 0.0 |
| 2 | B101 | 0.00 | 0.00 | 1,880.0 | 0.0830 | 0.012 | 24.0 | 0.0 | 0.0 |
| 3 | B103 | 0.00 | 0.00 | 1,243.0 | 0.0670 | 0.012 | 36.0 | 0.0 | 0.0 |
| 4 | B104 | 0.00 | 0.00 | 1,035.0 | 0.0350 | 0.012 | 36.0 | 0.0 | 0.0 |
| 5 | B105 | 0.00 | 0.00 | 900.0 | 0.0400 | 0.012 | 36.0 | 0.0 | 0.0 |
| 6 | B108 | 0.00 | 0.00 | 725.0 | 0.1640 | 0.012 | 36.0 | 0.0 | 0.0 |
| 7 | B109 | 0.00 | 0.00 | 100.0 | 0.2800 | 0.012 | 36.0 | 0.0 | 0.0 |
| 8 | B110 | 0.00 | 0.00 | 715.0 | 0.0360 | 0.024 | 24.0 | 0.0 | 0.0 |
| 9 | B113 | 0.00 | 0.00 | 436.0 | 0.0700 | 0.015 | 15.0 | 0.0 | 0.0 |
| 10 | B119 | 0.00 | 0.00 | 1,348.0 | 0.1100 | 0.012 | 24.0 | 0.0 | 0.0 |
| 11 | C103 | 0.00 | 0.00 | 1,350.0 | 0.0260 | 0.011 | 15.0 | 0.0 | 0.0 |
| 12 | 36" Pipe | 635.00 | 571.00 | 935.0 | 0.0684 | 0.015 | 36.0 | 0.0 | 0.0 |
| 13 | 42" Pipe | 587.00 | 535.00 | 575.0 | 0.0904 | 0.012 | 42.0 | 0.0 | 0.0 |
| 14 | 104A | 507.70 | 507.30 | 20.0 | 0.0200 | 0.025 | 12.0 | 0.0 | 0.0 |
| 15 | 105A | 572.90 | 572.00 | 20.0 | 0.0450 | 0.025 | 18.0 | 0.0 | 0.0 |
| 16 | 106A | 716.70 | 686.00 | 133.0 | 0.2308 | 0.025 | 36.0 | 0.0 | 0.0 |
| 17 | 107A | 619.80 | 607.40 | 145.0 | 0.0855 | 0.010 | 24.0 | 0.0 | 0.0 |
| 18 | 108A | 608.80 | 606.90 | 45.0 | 0.0422 | 0.025 | 36.0 | 0.0 | 0.0 |
| 19 | SWM 7A | 802.00 | 801.00 | 41.0 | 0.0244 | 0.015 | 15.0 | 0.0 | 0.0 |
| 20 | SWM17 | 498.00 | 497.00 | 60.0 | 0.0167 | 0.013 | 24.0 | 0.0 | 0.0 |
| 21 | SWM2 | 498.00 | 496.00 | 100.0 | 0.0200 | 0.024 | 8.0 | 0.0 | 0.0 |
| 22 | SWM4 | 510.00 | 505.50 | 250.0 | 0.0180 | 0.020 | 36.0 | 0.0 | 0.0 |
| 23 | SWM5 | 517.00 | 516.00 | 90.0 | 0.0111 | 0.015 | 6.0 | 0.0 | 0.0 |
| 24 | SWM5 | 512.00 | 505.00 | 270.0 | 0.0259 | 0.020 | 30.0 | 0.0 | 0.0 |
| 25 | SWM6 | 500.00 | 498.50 | 135.0 | 0.0111 | 0.012 | 8.0 | 0.0 | 0.0 |
| 26 | SWM6 | 501.50 | 500.00 | 105.0 | 0.0143 | 0.012 | 18.0 | 0.0 | 0.0 |
| 27 | SWM7 | 740.00 | 739.00 | 60.0 | 0.0167 | 0.012 | 30.0 | 0.0 | 0.0 |
| 28 | SWM8 | 650.00 | 648.00 | 90.0 | 0.0222 | 0.010 | 36.0 | 0.0 | 0.0 |
| 29 | WF | 520.00 | 513.00 | 225.0 | 0.0311 | 0.015 | 36.0 | 0.0 | 0.0 |

Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=21.492 ac 4.36% Impervious Runoff Depth=0.00"
Flow Length=1,320' Tc=20.2 min CN=48 Runoff=0.00 cfs 0.000 af

**Subcatchment A102: A102** Runoff Area=4.590 ac 29.85% Impervious Runoff Depth=0.99"
Flow Length=530' Tc=15.8 min CN=81 Runoff=3.76 cfs 0.378 af

**Subcatchment A103: A103** Runoff Area=57.299 ac 21.07% Impervious Runoff Depth=0.09"
Flow Length=2,529' Tc=22.2 min CN=60 Runoff=0.66 cfs 0.409 af

**Subcatchment A104: A104** Runoff Area=29.922 ac 5.68% Impervious Runoff Depth=0.00"
Flow Length=1,871' Tc=21.8 min CN=47 Runoff=0.00 cfs 0.000 af

**Subcatchment A105: A105** Runoff Area=26.625 ac 12.66% Impervious Runoff Depth=0.13"
Flow Length=1,484' Tc=19.3 min CN=62 Runoff=0.49 cfs 0.289 af

**Subcatchment A106: A106** Runoff Area=10.791 ac 11.31% Impervious Runoff Depth=0.74"
Flow Length=1,260' Tc=26.7 min CN=77 Runoff=4.81 cfs 0.666 af

**Subcatchment A107: A107** Runoff Area=79.700 ac 2.24% Impervious Runoff Depth=0.58"
Flow Length=3,685' Tc=61.0 min CN=74 Runoff=15.91 cfs 3.849 af

**Subcatchment A108: A108** Runoff Area=5.527 ac 2.32% Impervious Runoff Depth=0.04"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=0.02 cfs 0.016 af

**Subcatchment A109: A109** Runoff Area=15.712 ac 18.18% Impervious Runoff Depth=0.53"
Flow Length=1,315' Tc=33.2 min CN=73 Runoff=3.80 cfs 0.694 af

**Subcatchment B101: B101** Runoff Area=50.743 ac 17.46% Impervious Runoff Depth=0.16"
Flow Length=3,015' Tc=36.7 min CN=63 Runoff=1.15 cfs 0.659 af

**Subcatchment B102: B102** Runoff Area=40.873 ac 1.28% Impervious Runoff Depth=0.09"
Flow Length=955' Tc=20.3 min CN=60 Runoff=0.47 cfs 0.292 af

**Subcatchment B103: B103** Runoff Area=22.950 ac 10.98% Impervious Runoff Depth=0.92"
Flow Length=2,127' Tc=38.5 min CN=80 Runoff=11.67 cfs 1.766 af

**Subcatchment B104: B104** Runoff Area=24.602 ac 28.02% Impervious Runoff Depth=0.92"
Flow Length=3,620' Tc=24.7 min CN=80 Runoff=15.38 cfs 1.894 af

**Subcatchment B105: B105** Runoff Area=24.733 ac 14.99% Impervious Runoff Depth=0.92"
Flow Length=2,606' Tc=36.4 min CN=80 Runoff=12.95 cfs 1.904 af

**Subcatchment B106: B106** Runoff Area=118.113 ac 1.34% Impervious Runoff Depth=0.69"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=24.33 cfs 6.742 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=0.74"
Flow Length=907' Tc=37.9 min CN=77 Runoff=5.44 cfs 0.885 af

**Subcatchment B108: B108** Runoff Area=40.951 ac 11.09% Impervious Runoff Depth=0.80"
Flow Length=2,038' Tc=32.2 min CN=78 Runoff=18.71 cfs 2.729 af

**Subcatchment B109: B109** Runoff Area=34.256 ac 12.24% Impervious Runoff Depth=0.80"
Flow Length=1,371' Tc=24.9 min CN=78 Runoff=17.50 cfs 2.283 af

**Subcatchment B110: B110** Runoff Area=6.622 ac 45.47% Impervious Runoff Depth=1.28"
Flow Length=936' Tc=11.9 min CN=85 Runoff=8.22 cfs 0.705 af

**Subcatchment B111: B111** Runoff Area=6.254 ac 40.36% Impervious Runoff Depth=0.32"
Flow Length=516' Tc=6.8 min CN=68 Runoff=0.87 cfs 0.165 af

**Subcatchment B112: B112** Runoff Area=39.487 ac 34.78% Impervious Runoff Depth=0.25"
Flow Length=989' Tc=15.8 min CN=66 Runoff=3.04 cfs 0.808 af

**Subcatchment B113: B113** Runoff Area=5.598 ac 30.55% Impervious Runoff Depth=0.07"
Flow Length=836' Tc=14.0 min CN=59 Runoff=0.05 cfs 0.031 af

**Subcatchment B115: B115** Runoff Area=13.072 ac 23.44% Impervious Runoff Depth=0.11"
Flow Length=1,419' Tc=11.1 min CN=61 Runoff=0.19 cfs 0.116 af

**Subcatchment B116: B116** Runoff Area=2.600 ac 30.58% Impervious Runoff Depth=0.04"
Tc=6.0 min CN=57 Runoff=0.01 cfs 0.008 af

**Subcatchment B117: B117** Runoff Area=7.723 ac 36.64% Impervious Runoff Depth=0.11"
Tc=6.0 min CN=61 Runoff=0.11 cfs 0.069 af

**Subcatchment B118: B118** Runoff Area=2.550 ac 54.71% Impervious Runoff Depth=0.44"
Tc=6.0 min CN=71 Runoff=0.70 cfs 0.093 af

**Subcatchment B119: B119** Runoff Area=7.550 ac 56.29% Impervious Runoff Depth=1.36"
Flow Length=1,683' Tc=10.3 min CN=86 Runoff=10.54 cfs 0.853 af

**Subcatchment C101: C101** Runoff Area=12.930 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,500' Tc=31.9 min CN=50 Runoff=0.00 cfs 0.000 af

**Subcatchment C102: C102** Runoff Area=40.074 ac 2.80% Impervious Runoff Depth=0.18"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=1.17 cfs 0.613 af

**Subcatchment C103: C103** Runoff Area=15.350 ac 18.63% Impervious Runoff Depth=0.01"
Flow Length=2,111' Tc=30.4 min CN=54 Runoff=0.02 cfs 0.009 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=0.74"
Flow Length=176' Tc=7.5 min CN=77 Runoff=0.71 cfs 0.062 af

**Reach 36" Pipe: 36" Pipe** Avg. Flow Depth=0.40' Max Vel=10.28 fps Inflow=5.76 cfs 1.045 af
36.0" Round Pipe n=0.015 L=935.0' S=0.0684 '/' Capacity=151.23 cfs Outflow=5.75 cfs 1.045 af

**Reach 42" Pipe: 42" Pipe** Avg. Flow Depth=0.53' Max Vel=17.82 fps Inflow=16.57 cfs 4.558 af
42.0" Round Pipe n=0.012 L=575.0' S=0.0904 '/' Capacity=327.77 cfs Outflow=16.57 cfs 4.558 af

**Reach A105R: Thru A103** Avg. Flow Depth=0.34' Max Vel=2.57 fps Inflow=2.13 cfs 1.318 af
n=0.050 L=1,170.0' S=0.0564 '/' Capacity=150.86 cfs Outflow=2.12 cfs 1.318 af

**Reach B107R: Thru B103** Avg. Flow Depth=0.09' Max Vel=2.96 fps Inflow=1.11 cfs 0.609 af
n=0.050 L=938.0' S=0.4072 '/' Capacity=192.14 cfs Outflow=1.11 cfs 0.609 af

**Reach B112R: Thru B102** Avg. Flow Depth=0.63' Max Vel=2.12 fps Inflow=7.03 cfs 11.131 af
n=0.050 L=600.0' S=0.0167 '/' Capacity=369.68 cfs Outflow=7.03 cfs 11.122 af

**Pond 102C: Pond 102C** Peak Elev=507.20' Storage=26,722 cf Inflow=1.17 cfs 0.613 af
Outflow=0.00 cfs 0.000 af

**Pond 104A: Wetland D** Peak Elev=507.70' Storage=0 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond 105A: Wetland H** Peak Elev=573.57' Storage=15,814 cf Inflow=5.80 cfs 1.334 af
Primary=2.13 cfs 1.318 af Secondary=0.00 cfs 0.000 af Outflow=2.13 cfs 1.318 af

**Pond 106A: 36" Culvert** Peak Elev=717.60' Storage=3 cf Inflow=5.76 cfs 1.045 af
Primary=5.76 cfs 1.045 af Secondary=0.00 cfs 0.000 af Outflow=5.76 cfs 1.045 af

**Pond 106B: Wetland J** Peak Elev=526.37' Storage=15,235 cf Inflow=24.33 cfs 6.742 af
Outflow=24.29 cfs 6.742 af

**Pond 107A: 24" Culvert** Peak Elev=621.56' Storage=89 cf Inflow=16.57 cfs 4.542 af
Primary=16.57 cfs 4.542 af Secondary=0.00 cfs 0.000 af Outflow=16.57 cfs 4.542 af

**Pond 107B: Wetland** Peak Elev=972.65' Storage=17,749 cf Inflow=5.44 cfs 0.885 af
Outflow=1.11 cfs 0.609 af

**Pond 108A: 36" Culvert** Peak Elev=608.86' Storage=1 cf Inflow=0.02 cfs 0.016 af
Primary=0.02 cfs 0.016 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.016 af

**Pond SWM 7A: SWM 7A (Phase 1)** Peak Elev=807.32' Storage=572 cf Inflow=0.71 cfs 0.062 af
Outflow=0.31 cfs 0.062 af

**Pond SWM1: SWM 1** Peak Elev=512.18' Storage=2,033 cf Inflow=1.07 cfs 0.659 af
Outflow=1.05 cfs 0.659 af

**Pond SWM17: SWM17** Peak Elev=498.07' Storage=0.000 af Inflow=0.02 cfs 0.009 af
Outflow=0.02 cfs 0.009 af

**Pond SWM2: SWM2** Peak Elev=500.62' Storage=132,003 cf Inflow=50.50 cfs 8.240 af
Outflow=13.68 cfs 8.100 af

**Pond SWM3try: SWM3** Peak Elev=507.70' Storage=253,882 cf Inflow=34.17 cfs 12.286 af
Outflow=7.03 cfs 11.131 af

**Pond SWM4: SWM4** Peak Elev=515.41' Storage=17,196 cf Inflow=25.56 cfs 9.383 af
Primary=24.71 cfs 9.370 af Secondary=0.00 cfs 0.000 af Outflow=24.71 cfs 9.370 af

**Pond SWM5: SWM5** Peak Elev=519.44' Storage=83,488 cf Inflow=31.19 cfs 4.510 af
Primary=0.80 cfs 2.360 af Secondary=8.98 cfs 2.007 af Tertiary=0.00 cfs 0.000 af Outflow=9.78 cfs 4.367 af

**Pond SWM6: SWM6** Peak Elev=500.53' Storage=43,938 cf Inflow=2.76 cfs 1.727 af
Outflow=0.87 cfs 1.466 af

**Pond SWM7: SWM7** Peak Elev=742.65' Storage=4,923 cf Inflow=3.76 cfs 0.378 af
Outflow=1.03 cfs 0.378 af

**Pond SWM8: SWM8** Peak Elev=651.69' Storage=10,792 cf Inflow=3.80 cfs 0.694 af
Outflow=0.80 cfs 0.692 af

**Pond WF: Water Feature** Peak Elev=526.11' Storage=2,883 cf Inflow=1.15 cfs 0.659 af
Primary=1.07 cfs 0.659 af Secondary=0.00 cfs 0.000 af Outflow=1.07 cfs 0.659 af

**Link A: Amenia Stream** Inflow=16.57 cfs 6.024 af
Primary=16.57 cfs 6.024 af

**Link B: Wetland** Inflow=17.06 cfs 20.267 af
Primary=17.06 cfs 20.267 af

**Link C: Culvert** Inflow=0.02 cfs 0.009 af
Primary=0.02 cfs 0.009 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=0.31 cfs 0.062 af
Primary=0.31 cfs 0.062 af

**Total Runoff Area = 784.019 ac Runoff Volume = 28.990 af Average Runoff Depth = 0.44"**
**87.81% Pervious = 688.462 ac 12.19% Impervious = 95.557 ac**

## Summary for Subcatchment A101: A101

[45] Hint: Runoff=Zero

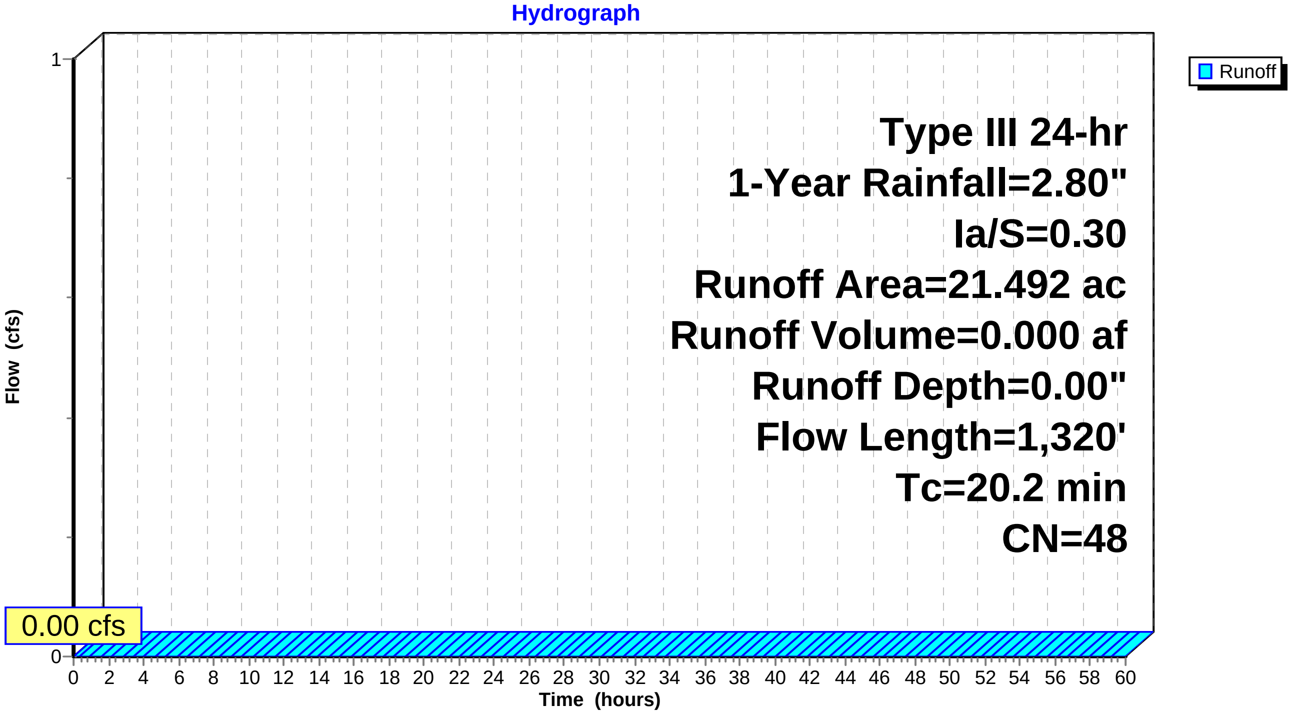
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.015 | 98 | Building roof |
| * | 0.921 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.290 | 39 | >75% Grass cover, Good, HSG A |
| | 6.490 | 61 | >75% Grass cover, Good, HSG B |
| | 0.050 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.270 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.426 | 30 | Sand trap, HSG A |
| * | 0.030 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 21.492 | 48 | Weighted Average |
| | 20.556 | | 95.64% Pervious Area |
| | 0.936 | | 4.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.6 | 100 | 0.1400 | 0.17 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 6.0 | 800 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 420 | 0.0480 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 20.2 | 1,320 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

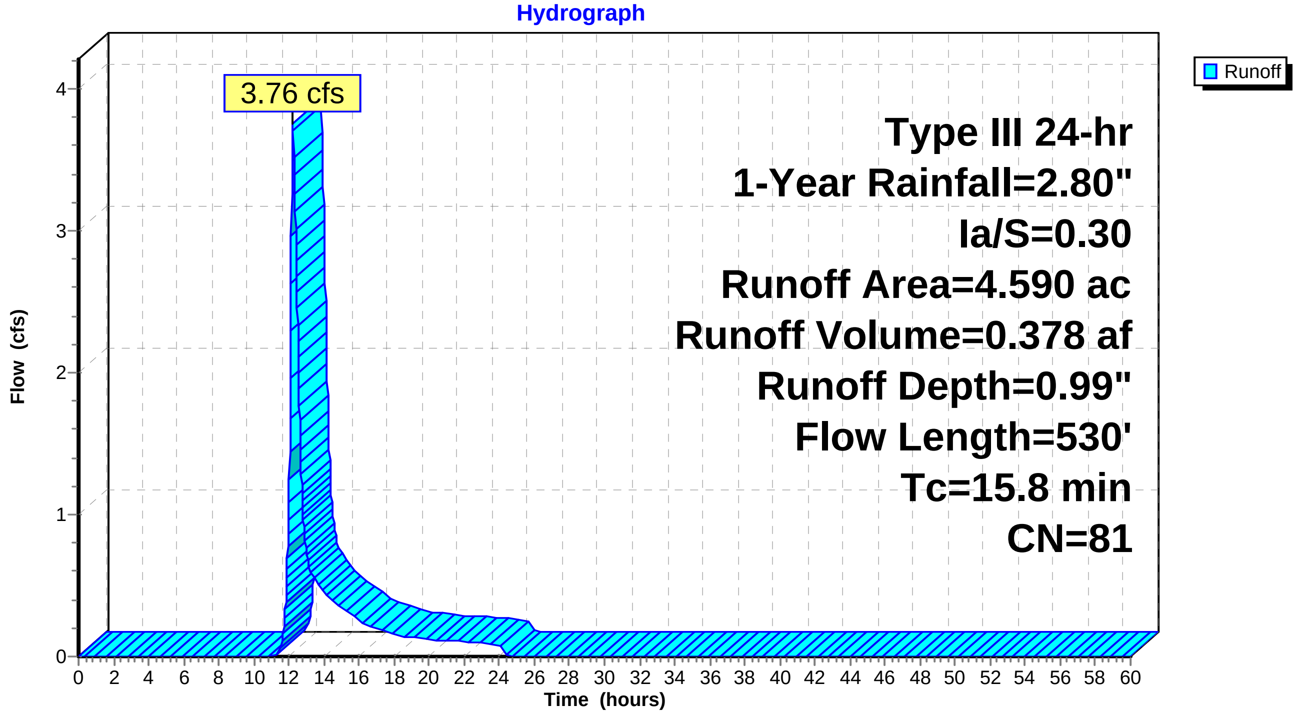
Runoff = 3.76 cfs @ 12.24 hrs, Volume= 0.378 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.200 | 98 | Building roof |
| * | 1.040 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.970 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.250 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 4.590 | 81 | Weighted Average |
| | 3.220 | | 70.15% Pervious Area |
| | 1.370 | | 29.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.1 | 50 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 130 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.7 | 250 | 0.1280 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.8 | 530 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

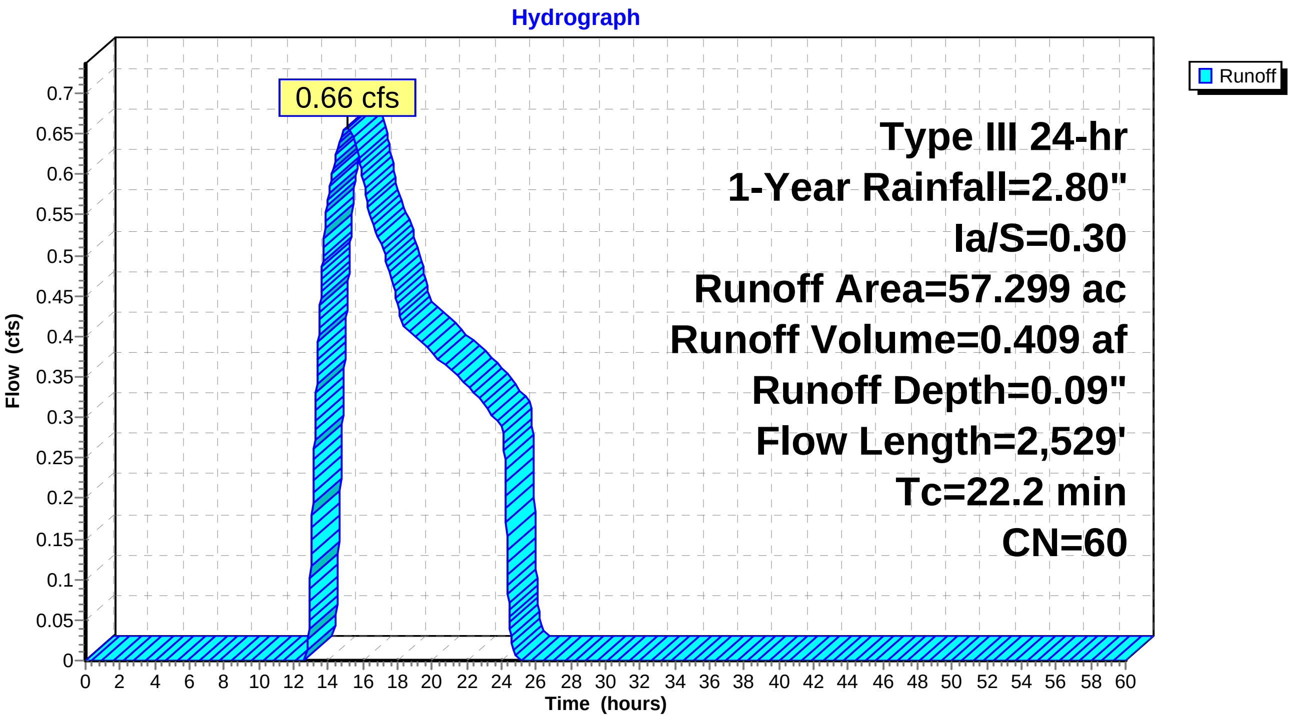
Runoff = 0.66 cfs @ 15.12 hrs, Volume= 0.409 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.320 | 98 | Building roof |
| * | 6.292 | 98 | Paved surface |
| * | 0.438 | 96 | Gravel surface |
| * | 1.461 | 98 | Water Surface |
| | 21.310 | 39 | >75% Grass cover, Good, HSG A |
| | 5.353 | 61 | >75% Grass cover, Good, HSG B |
| | 8.379 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 5.112 | 30 | Woods, Good, HSG A |
| | 1.620 | 55 | Woods, Good, HSG B |
| | 1.505 | 70 | Woods, Good, HSG C |
| | 1.130 | 77 | Woods, Good, HSG D |
| * | 0.220 | 30 | Sand trap, HSG A |
| * | 0.130 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 57.299 | 60 | Weighted Average |
| | 45.226 | | 78.93% Pervious Area |
| | 12.073 | | 21.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.8 | 100 | 0.0300 | 0.09 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 2.2 | 355 | 0.1430 | 2.65 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 554 | 0.0680 | 8.24 | 98.89 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.050 |
| 1.1 | 1,520 | 0.0690 | 23.78 | 116.72 | **Pipe Channel,**<br>30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'<br>n= 0.012 |
| 22.2 | 2,529 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

[45] Hint: Runoff=Zero

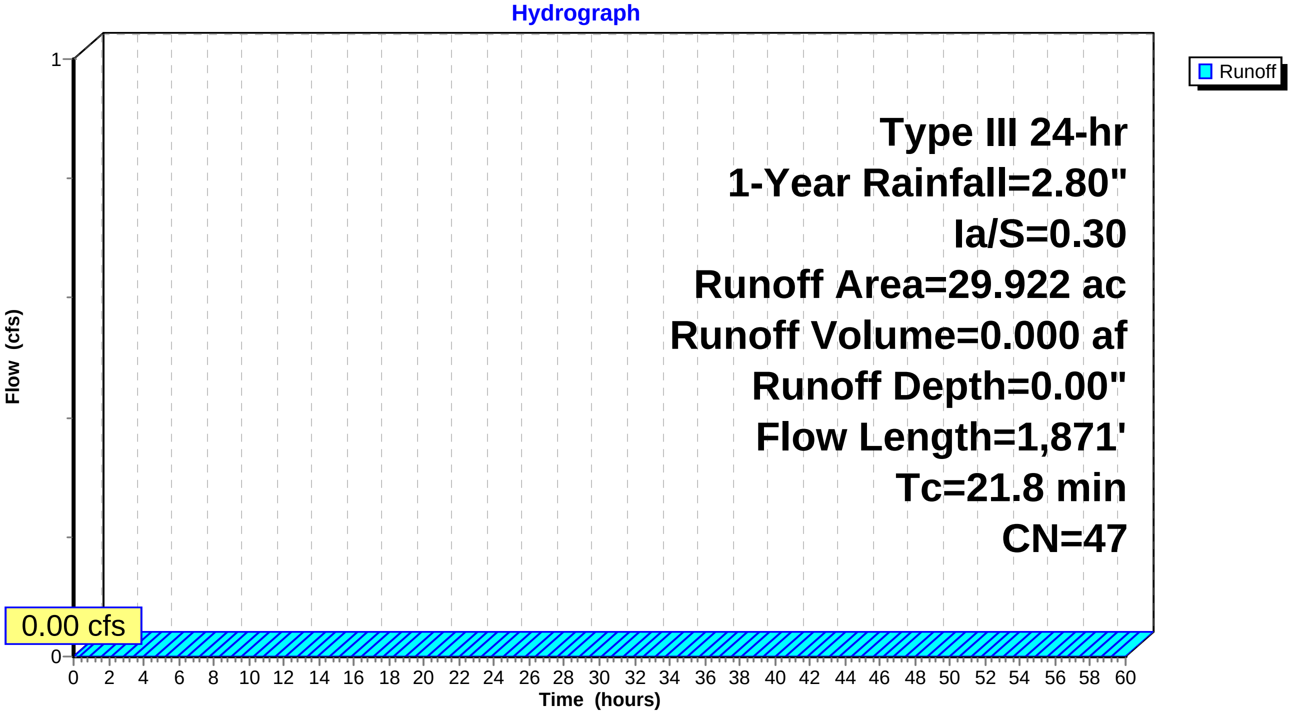
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.270 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.430 | 98 | Water Surface |
| | 23.530 | 39 | >75% Grass cover, Good, HSG A |
| | 0.110 | 61 | >75% Grass cover, Good, HSG B |
| | 3.720 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.028 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.100 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.635 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.082 | 30 | Sand Trap, HSG C |
| | 29.922 | 47 | Weighted Average |
| | 28.222 | | 94.32% Pervious Area |
| | 1.700 | | 5.68% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.8 | 100 | 0.2400 | 0.22 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 9.7 | 1,231 | 0.0920 | 2.12 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 4.3 | 540 | 0.0900 | 2.10 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 21.8 | 1,871 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

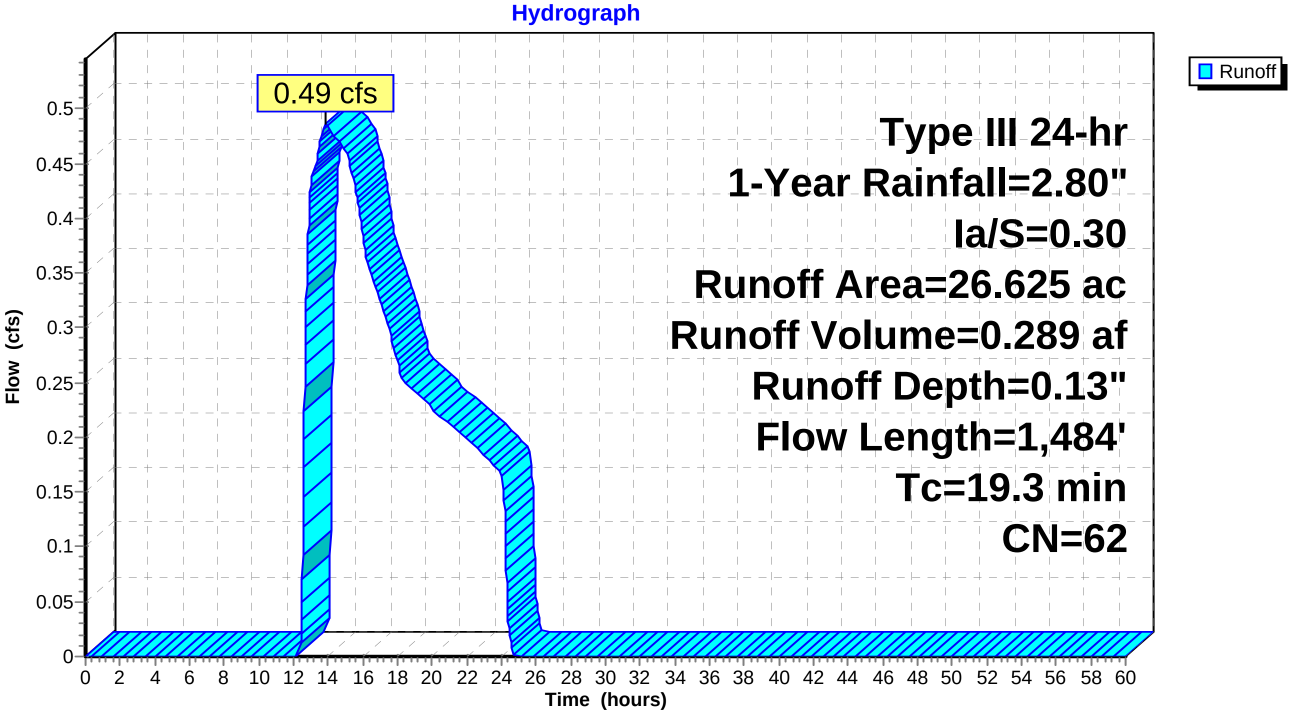
Runoff = 0.49 cfs @ 13.88 hrs, Volume= 0.289 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.390 | 98 | Building roof |
| * | 0.480 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.500 | 98 | Water Surface |
| | 10.650 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 8.795 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.094 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.565 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.145 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.006 | 30 | Sand Trap, HSG C |
| | 26.625 | 62 | Weighted Average |
| | 23.255 | | 87.34% Pervious Area |
| | 3.370 | | 12.66% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 3.0 | 395 | 0.1920 | 2.19 | | **Shallow Concentrated Flow,**<br>Woodland Kv= 5.0 fps |
| 7.1 | 989 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 19.3 | 1,484 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

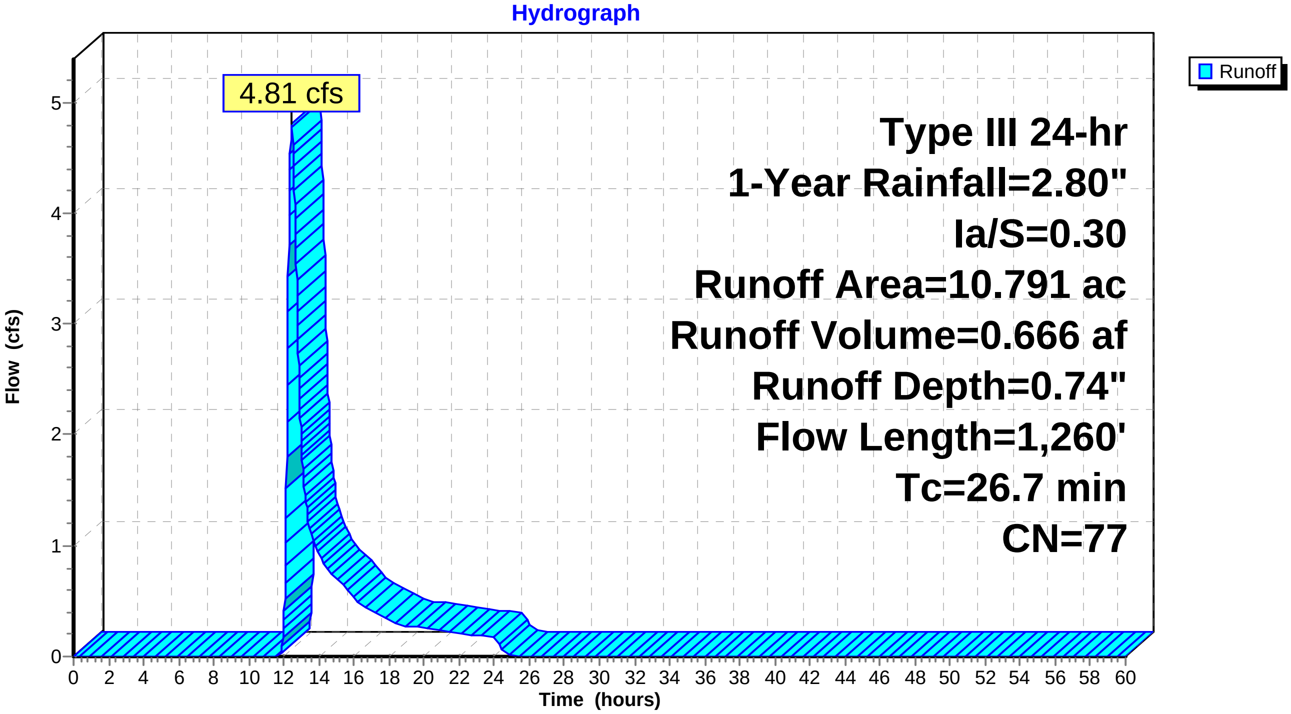
Runoff = 4.81 cfs @ 12.44 hrs, Volume= 0.666 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.220 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.078 | 61 | >75% Grass cover, Good, HSG B |
| | 5.210 | 74 | >75% Grass cover, Good, HSG C |
| | 2.190 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.100 | 55 | Woods, Good, HSG B |
| | 1.390 | 70 | Woods, Good, HSG C |
| | 0.603 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 10.791 | 77 | Weighted Average |
| | 9.571 | | 88.69% Pervious Area |
| | 1.220 | | 11.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00'<br>n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

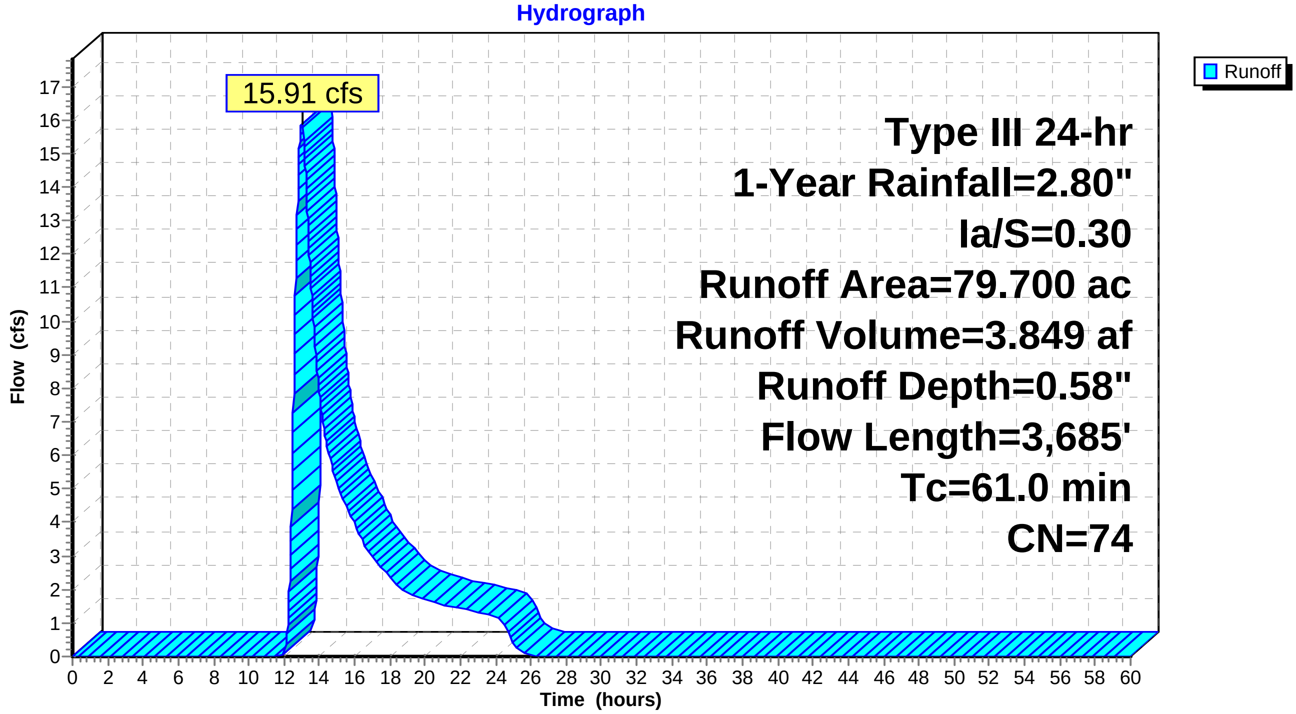
Runoff = 15.91 cfs @ 13.00 hrs, Volume= 3.849 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.340 | 98 | Building roof |
| * | 1.314 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 6.390 | 61 | >75% Grass cover, Good, HSG B |
| | 4.750 | 74 | >75% Grass cover, Good, HSG C |
| | 3.470 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 7.845 | 55 | Woods, Good, HSG B |
| | 3.580 | 70 | Woods, Good, HSG C |
| | 51.810 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 79.700 | 74 | Weighted Average |
| | 77.916 | | 97.76% Pervious Area |
| | 1.784 | | 2.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

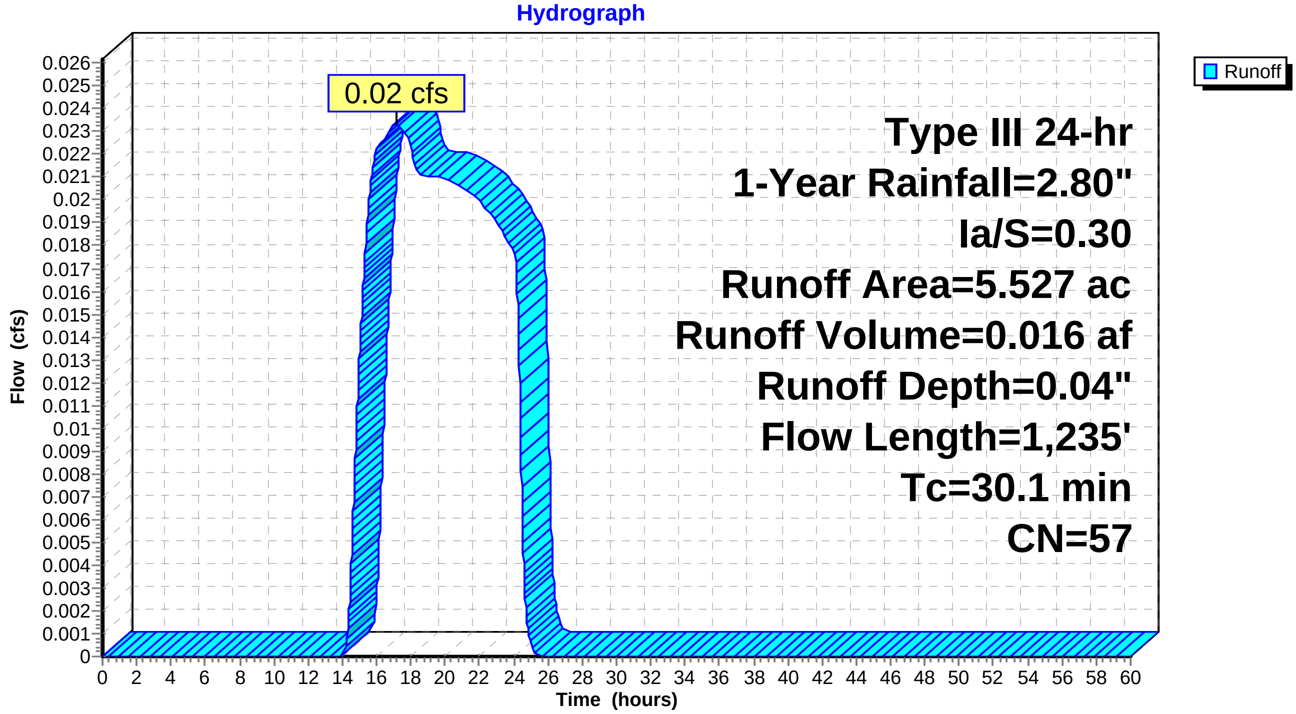
Runoff = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.088 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.630 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.527 | 57 | Weighted Average |
| | 5.399 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment A109: A109

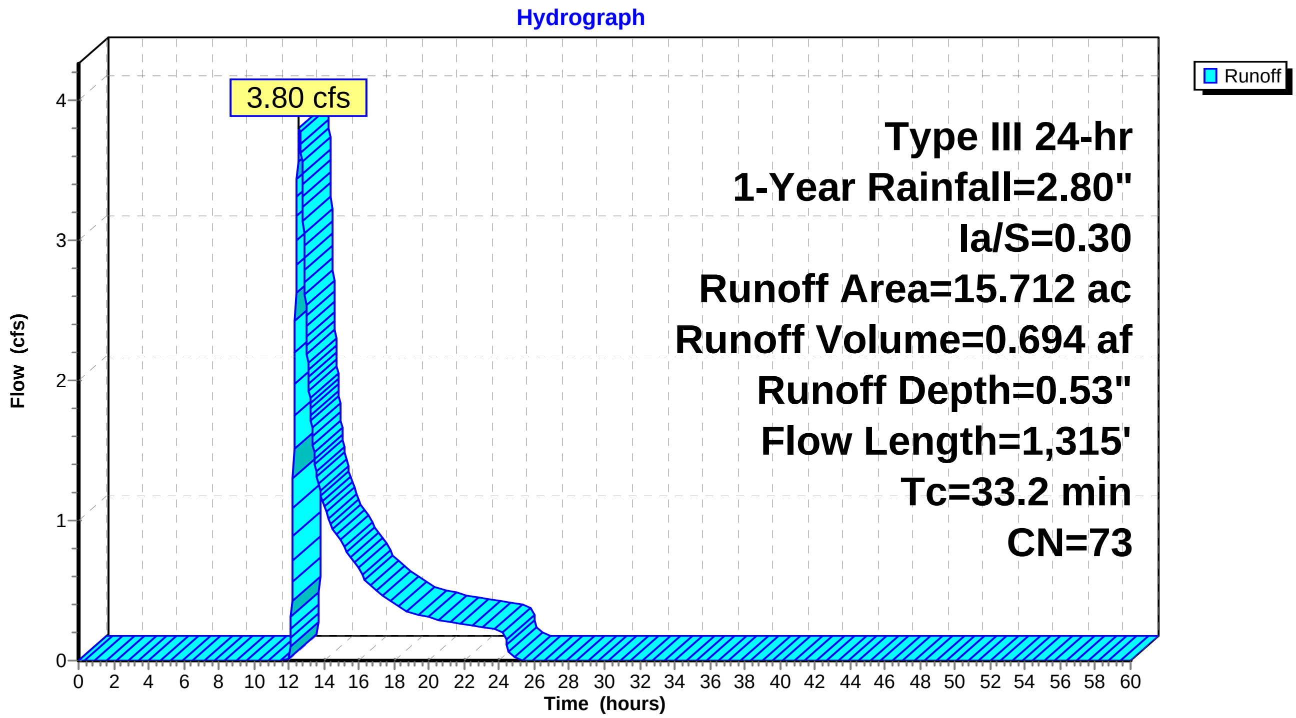
Runoff = 3.80 cfs @ 12.59 hrs, Volume= 0.694 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| Area (ac) | CN | Description |
|---|---|---|
| 0.857 | 98 | Roofs, HSG B |
| 5.730 | 61 | >75% Grass cover, Good, HSG B |
| 4.502 | 74 | >75% Grass cover, Good, HSG C |
| 0.592 | 80 | >75% Grass cover, Good, HSG D |
| 2.000 | 98 | Paved parking, HSG B |
| 0.328 | 55 | Woods, Good, HSG B |
| 0.823 | 70 | Woods, Good, HSG C |
| 0.880 | 77 | Woods, Good, HSG D |
| 15.712 | 73 | Weighted Average |
| 12.855 | | 81.82% Pervious Area |
| 2.857 | | 18.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 22.3 | 100 | 0.0650 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.0 | 388 | 0.2200 | 3.28 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.7 | 427 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.2 | 400 | 0.1850 | 1.08 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 33.2 | 1,315 | Total | | | |

## Subcatchment A109: A109



## Summary for Subcatchment B101: B101

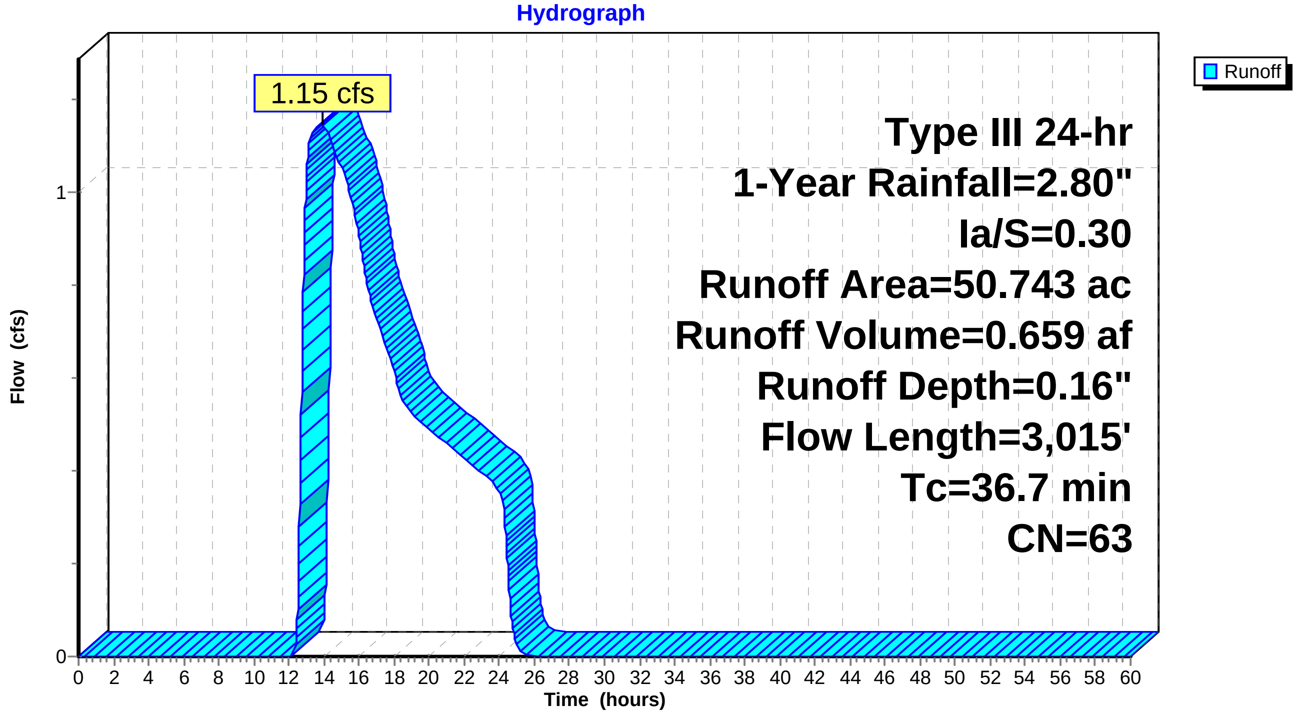
Runoff = 1.15 cfs @ 13.90 hrs, Volume= 0.659 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 5.220 | 98 | Building roof |
| * | 3.230 | 98 | Paved surface |
| * | 0.439 | 96 | Gravel surface |
| * | 0.412 | 98 | Water Surface |
| | 21.653 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 10.300 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.553 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 4.380 | 70 | Woods, Good, HSG C |
| | 4.370 | 77 | Woods, Good, HSG D |
| * | 0.142 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.044 | 30 | Sand Trap, HSG C |
| | 50.743 | 63 | Weighted Average |
| | 41.881 | | 82.54% Pervious Area |
| | 8.862 | | 17.46% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.4 | 1,880 | 0.0830 | 22.47 | 70.61 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 36.7 | 3,015 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

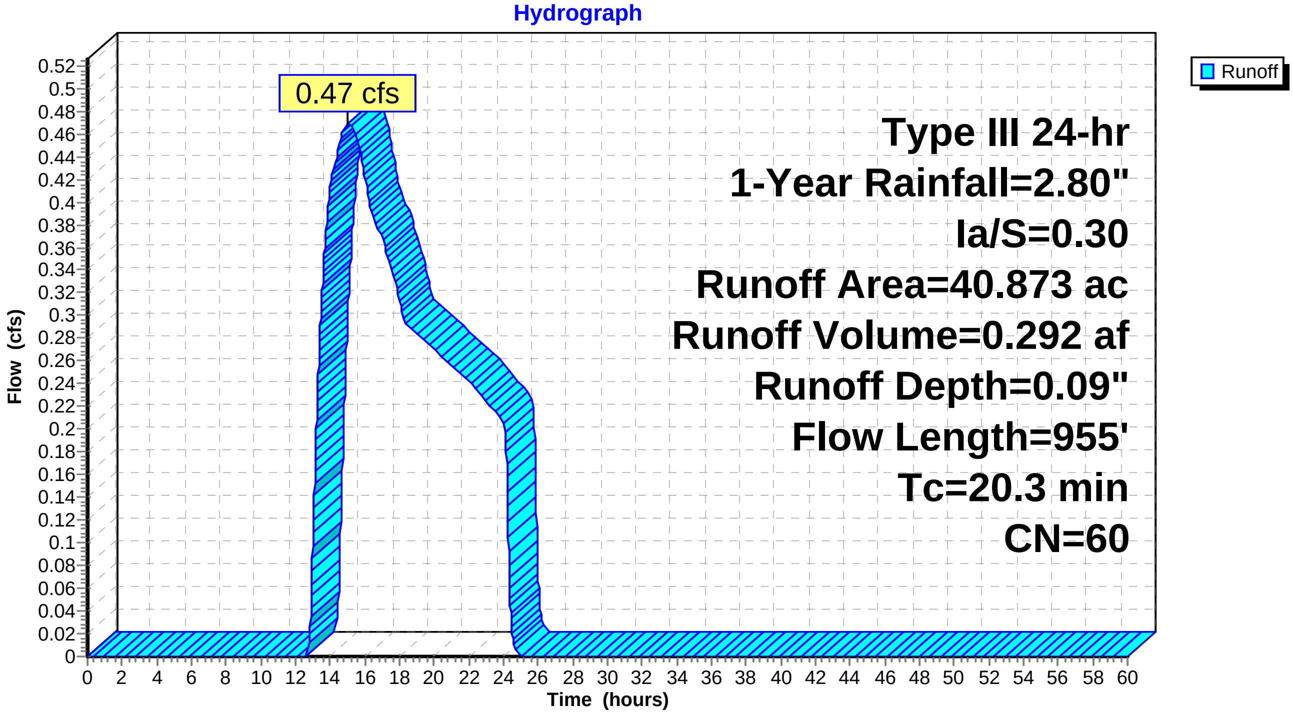
Runoff = 0.47 cfs @ 15.04 hrs, Volume= 0.292 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.516 | 98 | Paved surface |
| * | 0.210 | 96 | Gravel surface |
| * | 0.009 | 98 | Water Surface |
| | 7.476 | 39 | >75% Grass cover, Good, HSG A |
| | 0.464 | 61 | >75% Grass cover, Good, HSG B |
| | 12.033 | 74 | >75% Grass cover, Good, HSG C |
| | 0.764 | 80 | >75% Grass cover, Good, HSG D |
| | 6.808 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 5.496 | 70 | Woods, Good, HSG C |
| | 6.710 | 77 | Woods, Good, HSG D |
| * | 0.060 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.327 | 30 | Sand Trap, HSG C |
| | 40.873 | 60 | Weighted Average |
| | 40.348 | | 98.72% Pervious Area |
| | 0.525 | | 1.28% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 318 | 0.0250 | 7.19 | 287.53 | **Parabolic Channel,**<br>W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.050 |
| 20.3 | 955 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

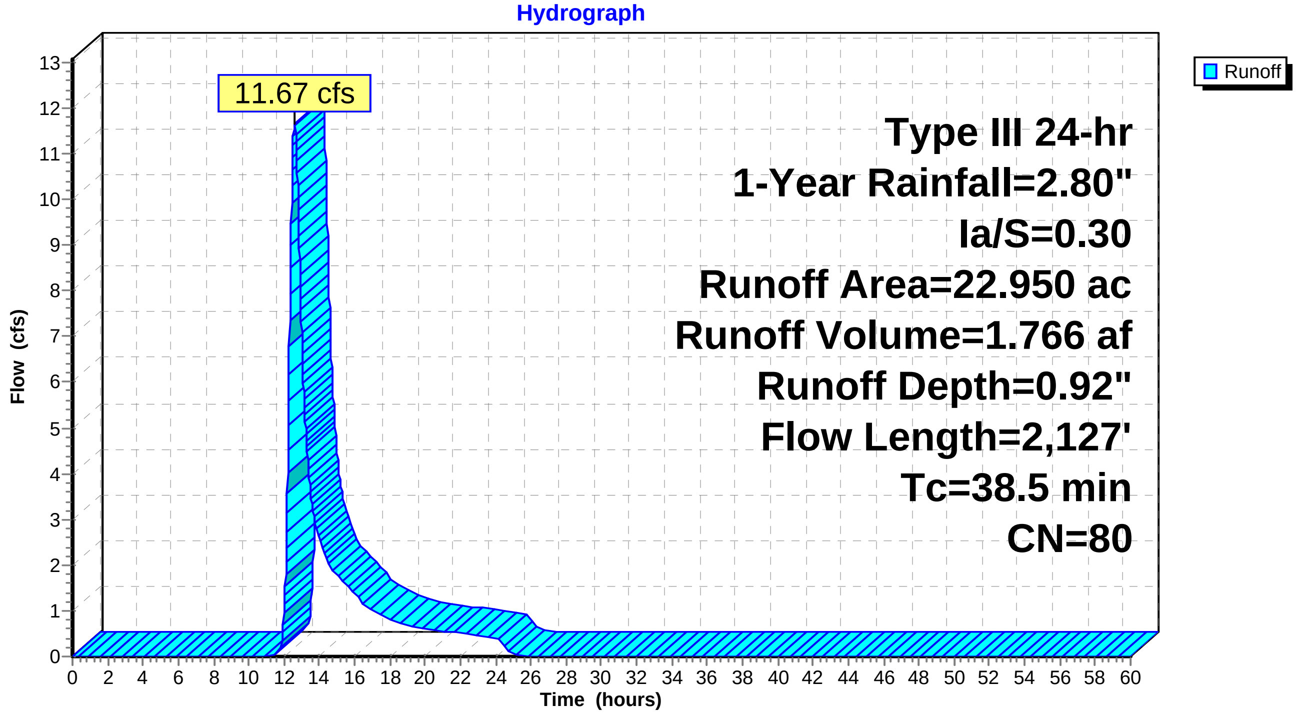
Runoff = 11.67 cfs @ 12.59 hrs, Volume= 1.766 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.520 | 98 | Building roof |
| * | 1.000 | 98 | Paved surface |
| * | 0.123 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.674 | 74 | >75% Grass cover, Good, HSG C |
| | 2.133 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 17.500 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 22.950 | 80 | Weighted Average |
| | 20.430 | | 89.02% Pervious Area |
| | 2.520 | | 10.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.3 | 784 | 0.5100 | 1.79 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 1,243 | 0.0670 | 26.46 | 187.03 | **Pipe Channel,**<br>36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'<br>n= 0.012 |
| 38.5 | 2,127 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

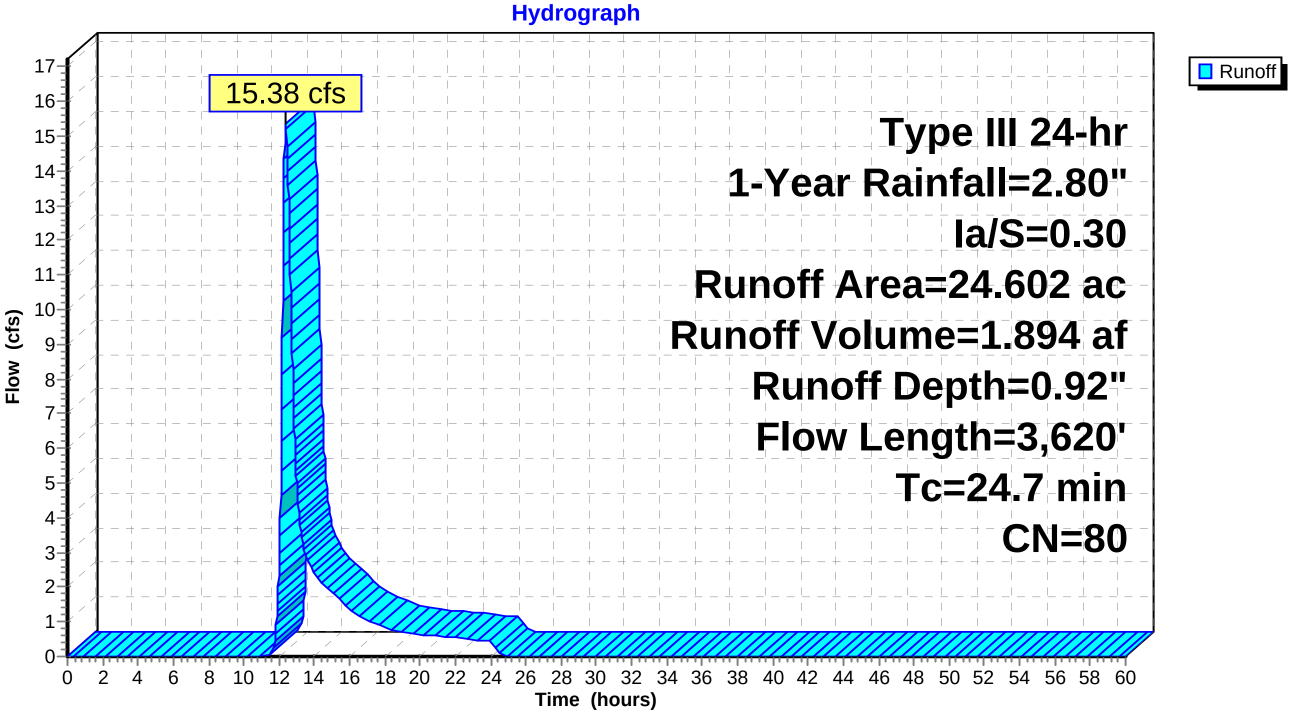
Runoff = 15.38 cfs @ 12.38 hrs, Volume= 1.894 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.579 | 98 | Building roof |
| * | 2.315 | 98 | Paved surface |
| * | 0.016 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.452 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.733 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.315 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.192 | 30 | Sand Trap, HSG C |
| | 24.602 | 80 | Weighted Average |
| | 17.708 | | 71.98% Pervious Area |
| | 6.894 | | 28.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.8 | 100 | 0.1000 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 8.0 | 823 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 452 | 0.1720 | 2.90 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 1,210 | 0.0580 | 8.46 | 101.48 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.045 |
| 0.9 | 1,035 | 0.0350 | 19.12 | 135.18 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 24.7 | 3,620 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

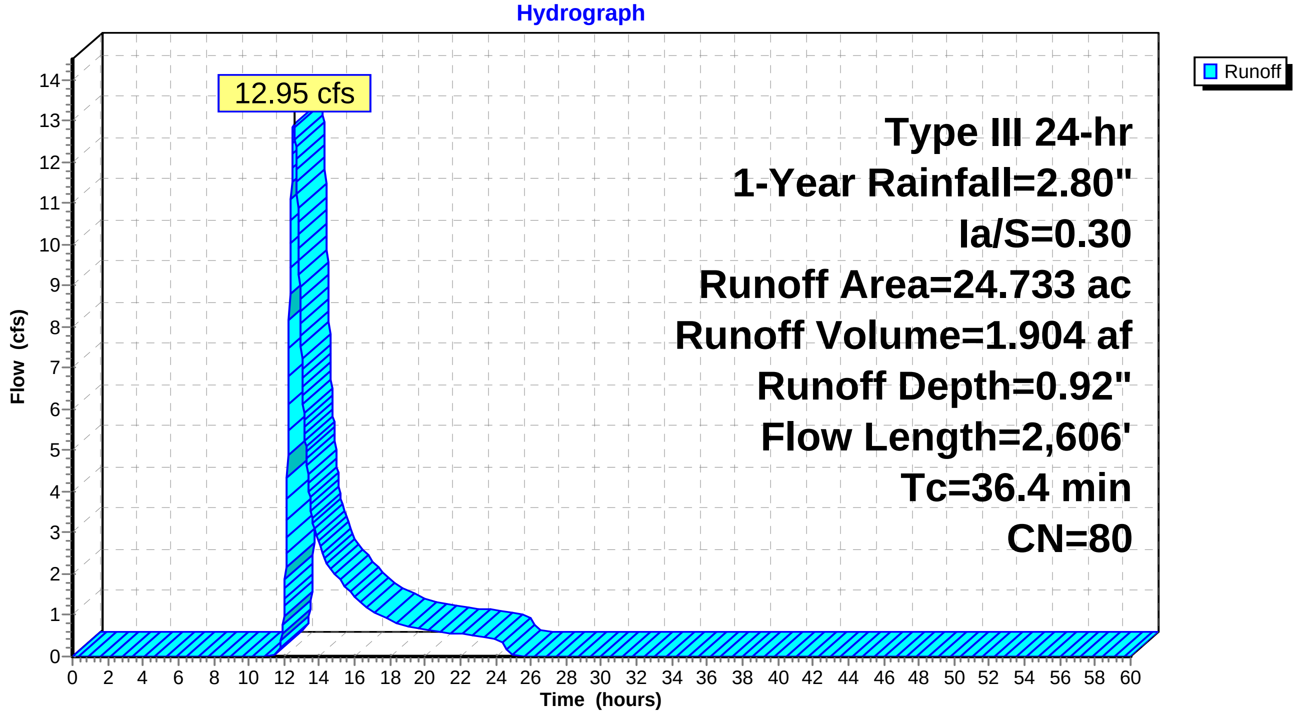
Runoff = 12.95 cfs @ 12.57 hrs, Volume= 1.904 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.944 | 98 | Building roof |
| * | 0.763 | 98 | Paved surface |
| * | 0.287 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.052 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.735 | 74 | >75% Grass cover, Good, HSG C |
| | 0.052 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 18.900 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 24.733 | 80 | Weighted Average |
| | 21.026 | | 85.01% Pervious Area |
| | 3.707 | | 14.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 612 | 0.5680 | 1.88 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 114 | 0.2280 | 3.34 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 880 | 0.0320 | 5.65 | 67.84 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.050 |
| 0.7 | 900 | 0.0400 | 20.44 | 144.51 | **Pipe Channel,**<br>36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'<br>n= 0.012 |
| 36.4 | 2,606 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

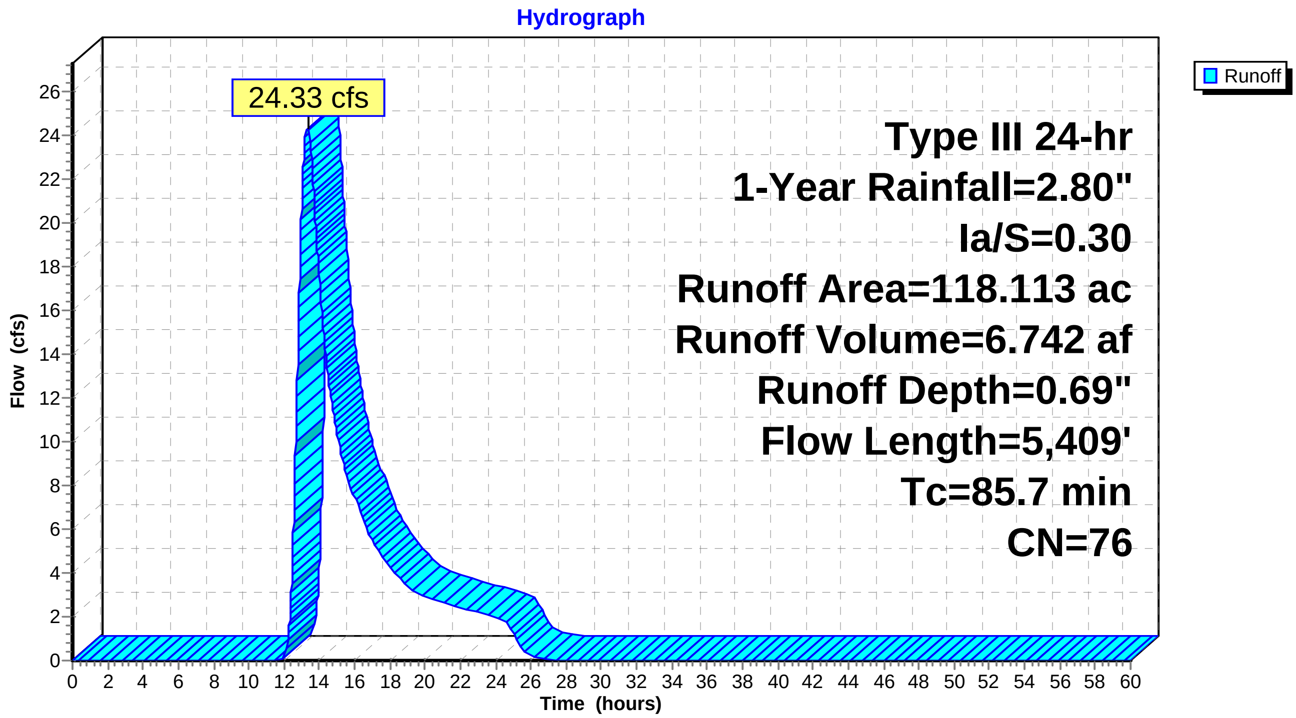
Runoff = 24.33 cfs @ 13.33 hrs, Volume= 6.742 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.587 | 98 | Building roof |
| * | 0.994 | 98 | Paved surface |
| * | 0.746 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.090 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 11.920 | 74 | >75% Grass cover, Good, HSG C |
| | 2.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 10.050 | 70 | Woods, Good, HSG C |
| | 89.064 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 118.113 | 76 | Weighted Average |
| | 116.532 | | 98.66% Pervious Area |
| | 1.581 | | 1.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

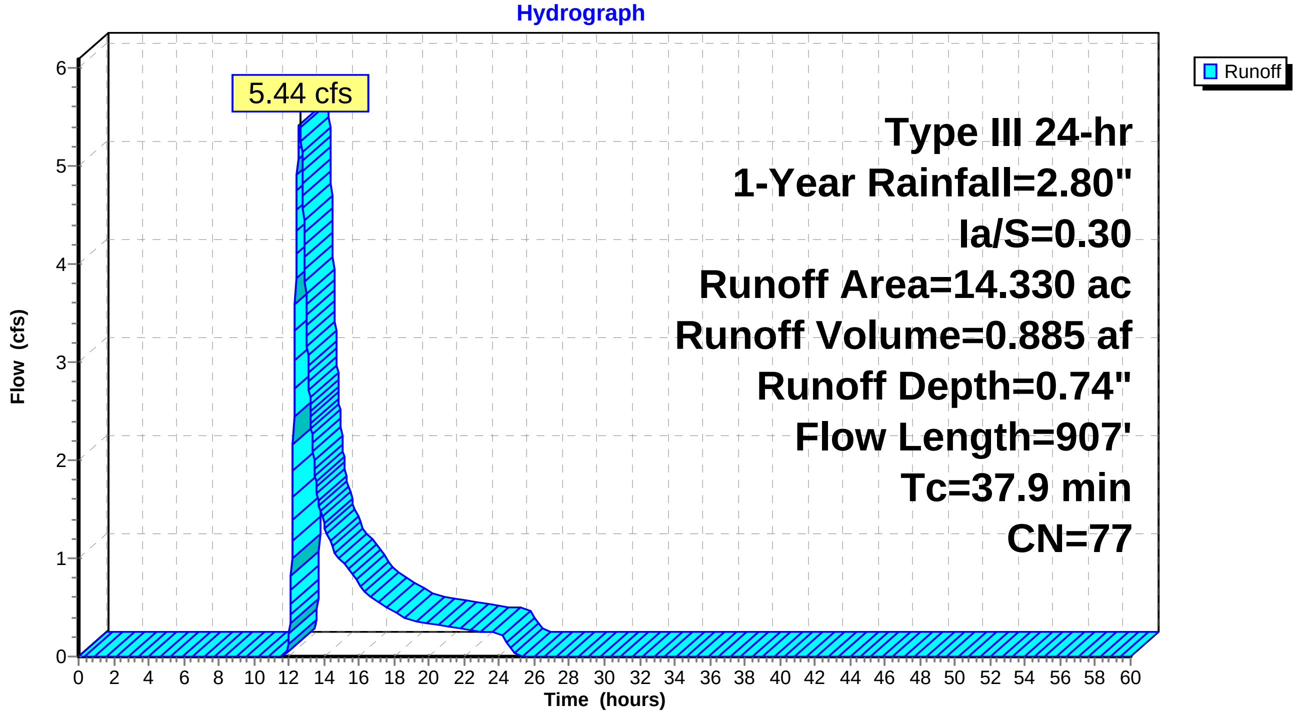
Runoff = 5.44 cfs @ 12.61 hrs, Volume= 0.885 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

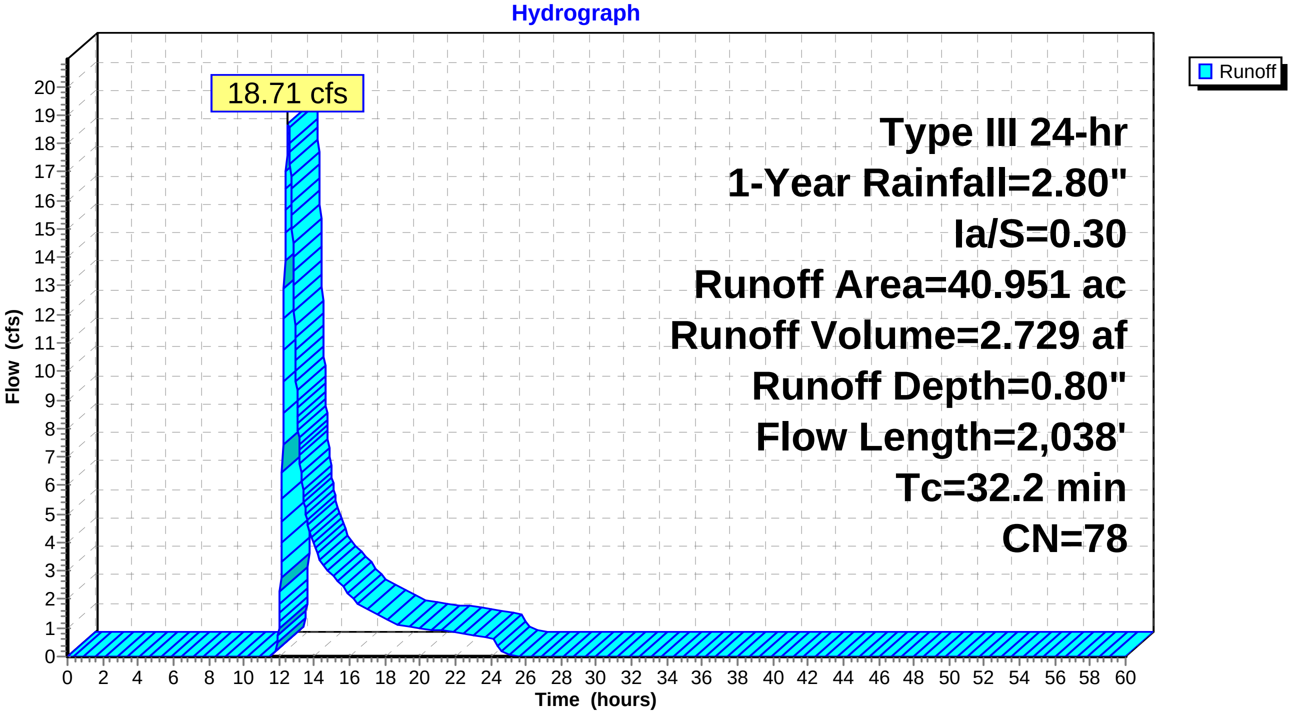
Runoff = 18.71 cfs @ 12.52 hrs, Volume= 2.729 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.640 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.100 | 74 | >75% Grass cover, Good, HSG C |
| | 1.909 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.842 | 70 | Woods, Good, HSG C |
| | 23.560 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.951 | 78 | Weighted Average |
| | 36.411 | | 88.91% Pervious Area |
| | 4.540 | | 11.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 7.8 | 823 | 0.5000 | 1.77 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 725 | 0.1640 | 41.40 | 292.62 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 32.2 | 2,038 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

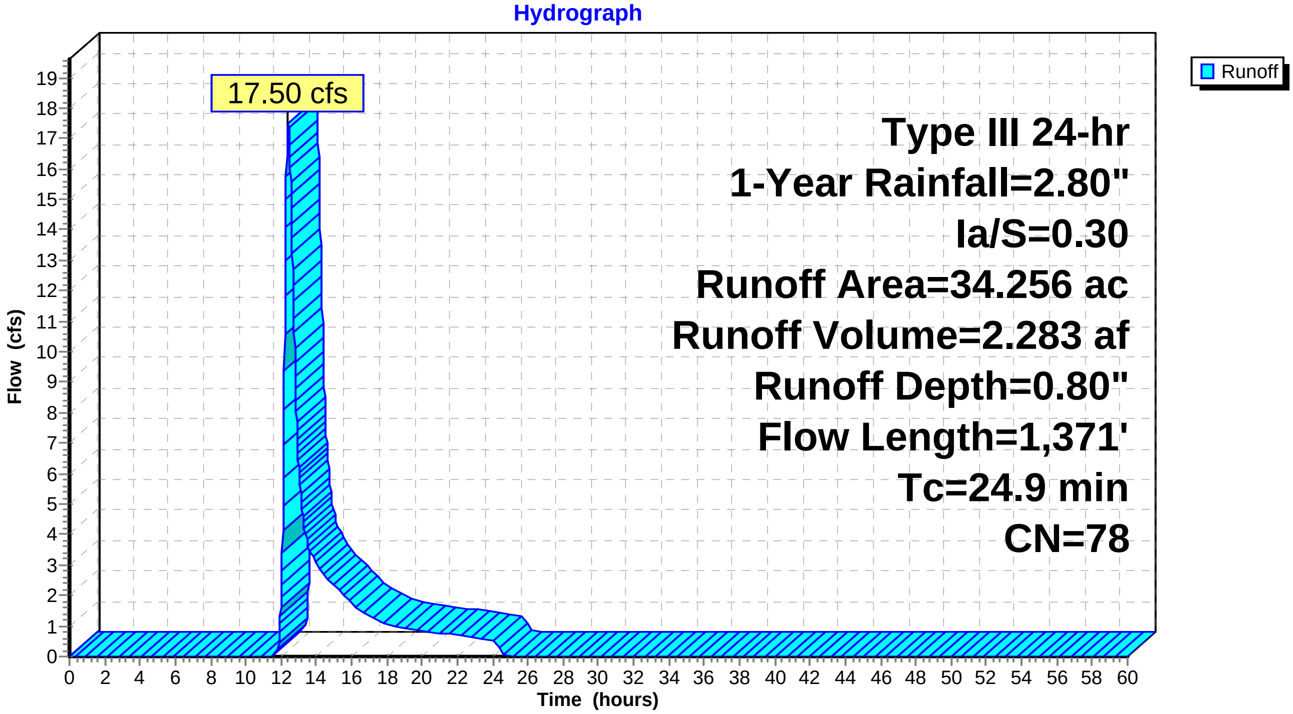
Runoff = 17.50 cfs @ 12.41 hrs, Volume= 2.283 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.000 | 98 | Building roof |
| * | 0.600 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.592 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.332 | 74 | >75% Grass cover, Good, HSG C |
| | 3.160 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.450 | 70 | Woods, Good, HSG C |
| | 9.847 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.275 | 30 | Sand Trap, HSG C |
| | 34.256 | 78 | Weighted Average |
| | 30.064 | | 87.76% Pervious Area |
| | 4.192 | | 12.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4450 | 1.67 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 70 | 0.0280 | 5.29 | 63.46 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.050 |
| 0.0 | 100 | 0.2800 | 54.09 | 382.35 | **Pipe Channel,**<br>36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'<br>n= 0.012 |
| 0.2 | 160 | 0.1600 | 14.62 | 219.28 | **Channel Flow,**<br>Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 0.3 | 281 | 0.1600 | 14.62 | 219.28 | **Channel Flow,**<br>Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 24.9 | 1,371 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment B110: B110

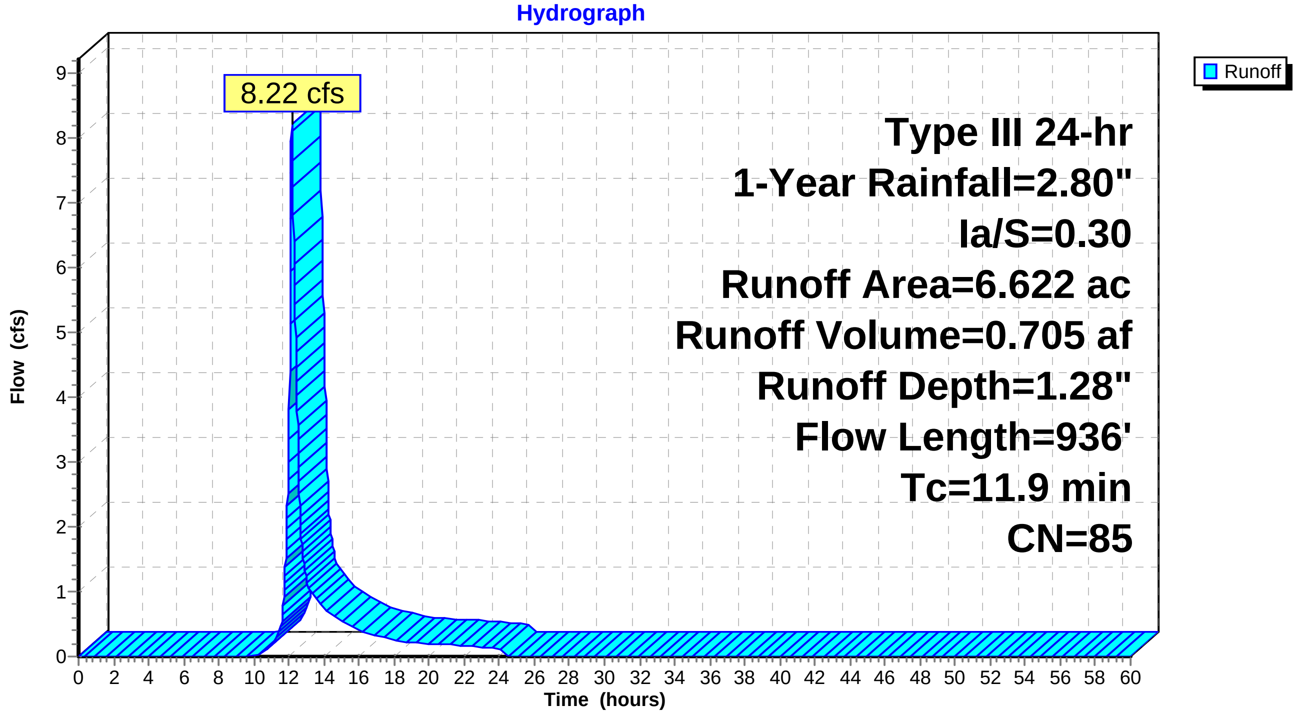
Runoff = 8.22 cfs @ 12.17 hrs, Volume= 0.705 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.381 | 98 | Building roof |
| * | 1.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.550 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.061 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.622 | 85 | Weighted Average |
| | 3.611 | | 54.53% Pervious Area |
| | 3.011 | | 45.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 100 | 0.1300 | 0.17 | | **Sheet Flow,**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 0.6 | 121 | 0.2500 | 3.50 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 715 | 0.0360 | 7.40 | 23.25 | **Pipe Channel,**<br>24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'<br>n= 0.024 |
| 11.9 | 936 | Total | | | |

## Subcatchment B110: B110



## Summary for Subcatchment B111: B111

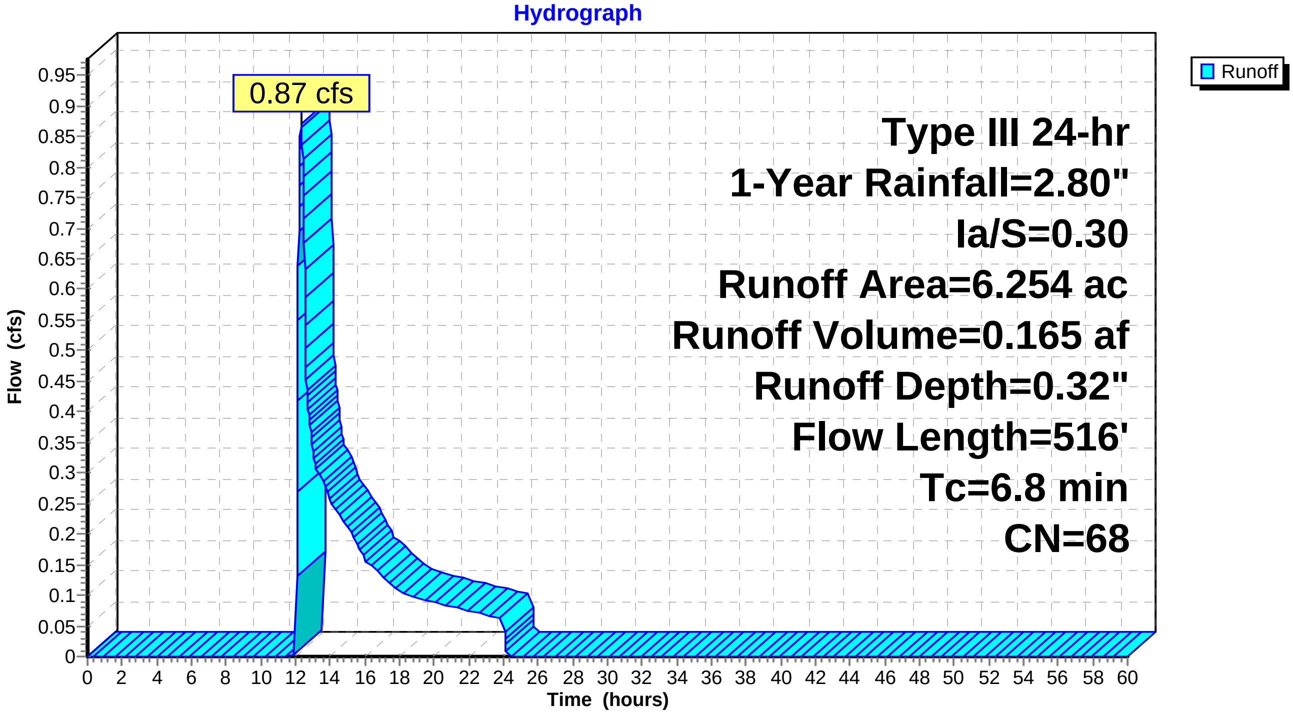
Runoff = 0.87 cfs @ 12.33 hrs, Volume= 0.165 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.504 | 98 | Building roof |
| * | 0.120 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.900 | 98 | Water Surface |
| | 2.730 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.254 | 68 | Weighted Average |
| | 3.730 | | 59.64% Pervious Area |
| | 2.524 | | 40.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.7 | 100 | 0.2000 | 0.45 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 0.6 | 115 | 0.2000 | 3.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 301 | 0.0800 | 1.98 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.8 | 516 | Total | | | |

## Subcatchment B111: B111



## Summary for Subcatchment B112: B112

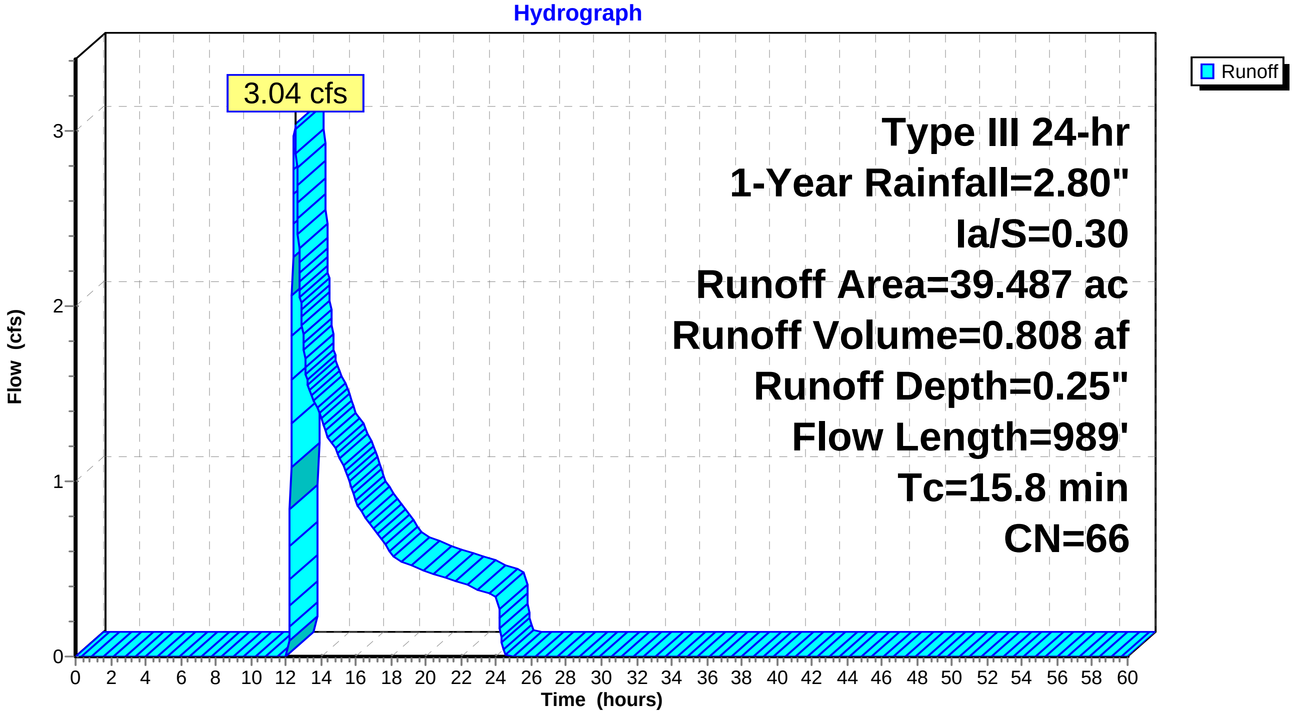
Runoff = 3.04 cfs @ 12.53 hrs, Volume= 0.808 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.550 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 8.285 | 98 | Water Surface |
| | 17.485 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 7.526 | 74 | >75% Grass cover, Good, HSG C |
| | 0.015 | 80 | >75% Grass cover, Good, HSG D |
| | 0.052 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.289 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.385 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 39.487 | 66 | Weighted Average |
| | 25.752 | | 65.22% Pervious Area |
| | 13.735 | | 34.78% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.1 | 100 | 0.0400 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 3.1 | 375 | 0.0850 | 2.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 514 | 0.0470 | 1.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 15.8 | 989 | Total | | | |

## Subcatchment B112: B112



## Summary for Subcatchment B113: B113

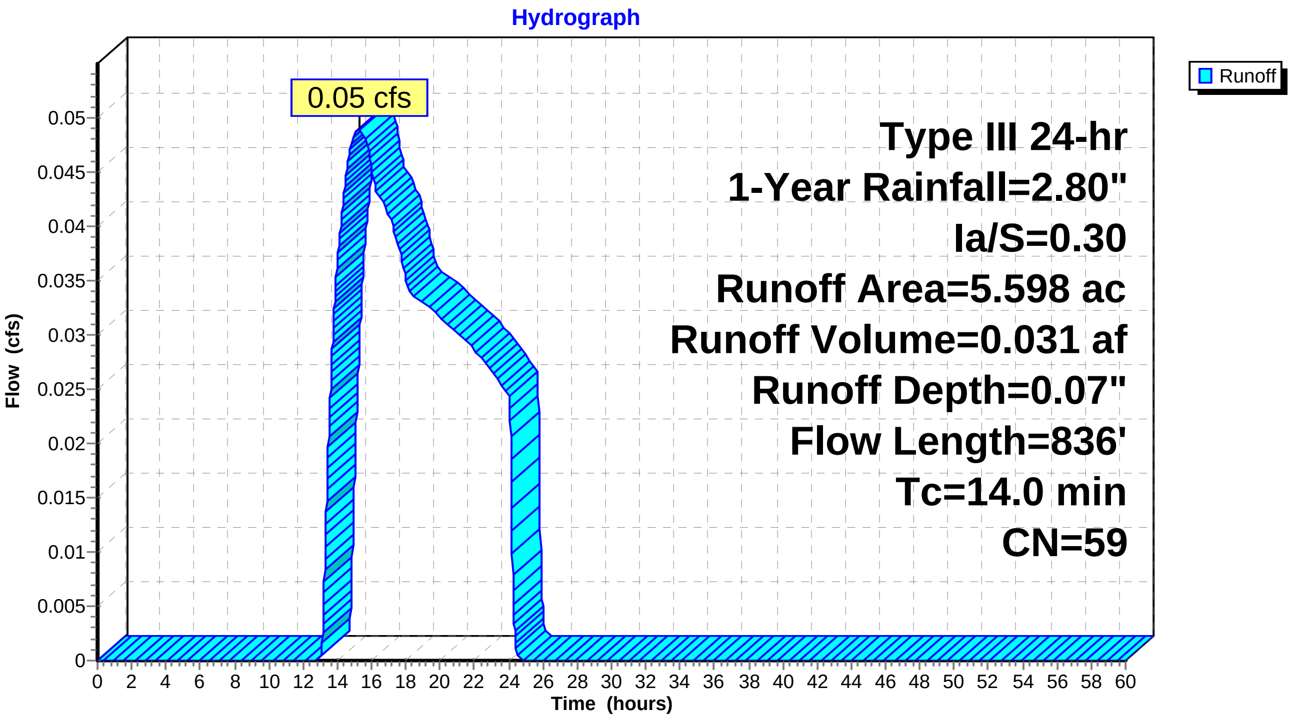
Runoff = 0.05 cfs @ 15.26 hrs, Volume= 0.031 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.060 | 98 | Building roof |
| * | 0.650 | 98 | Paved surface |
| * | 0.009 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.724 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.135 | 80 | >75% Grass cover, Good, HSG D |
| | 0.720 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.300 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.598 | 59 | Weighted Average |
| | 3.888 | | 69.45% Pervious Area |
| | 1.710 | | 30.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.8 | 100 | 0.0800 | 0.14 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.6 | 300 | 0.0360 | 3.05 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 436 | 0.0700 | 12.07 | 14.81 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 |
| 14.0 | 836 | Total | | | |

## Subcatchment B113: B113



## Summary for Subcatchment B115: B115

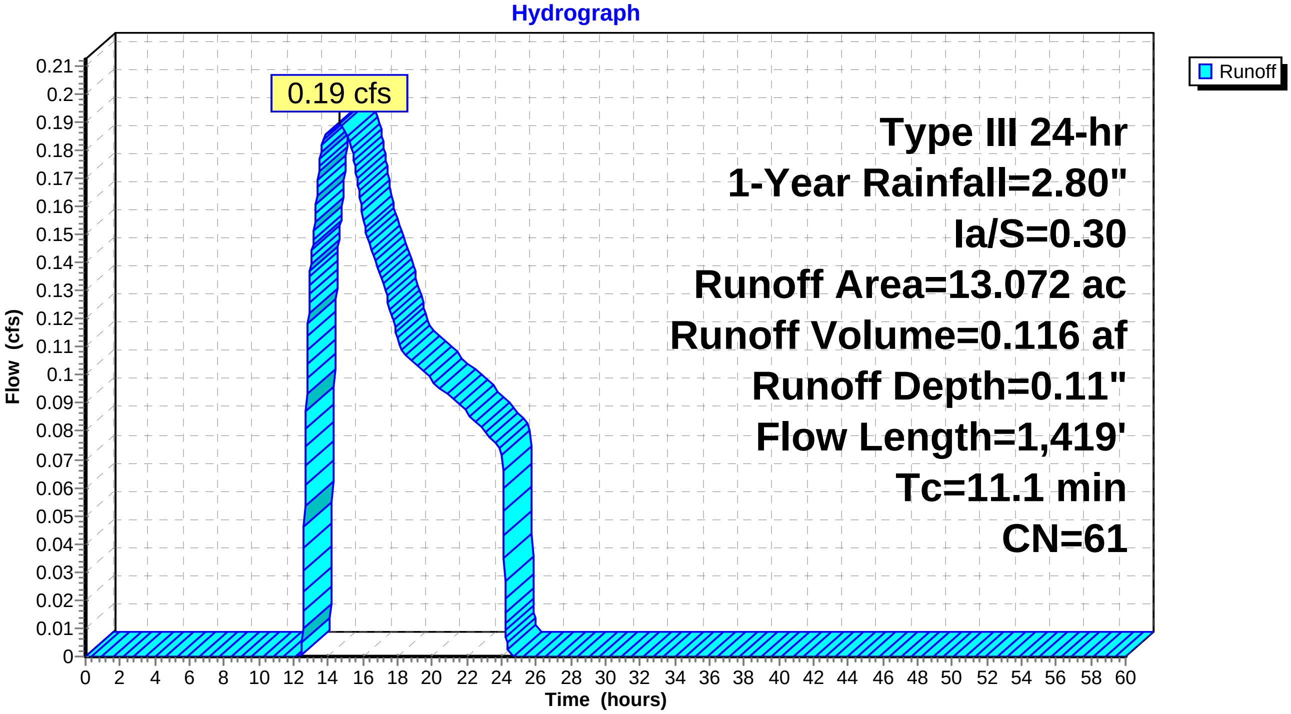
Runoff = 0.19 cfs @ 14.65 hrs, Volume= 0.116 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.615 | 98 | Building roof |
| * | 0.449 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 6.589 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.241 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.030 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.011 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.057 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.080 | 30 | Sand Trap, HSG C |
| | 13.072 | 61 | Weighted Average |
| | 10.008 | | 76.56% Pervious Area |
| | 3.064 | | 23.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 100 | 0.1100 | 0.35 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 4.0 | 340 | 0.0410 | 1.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 979 | 0.0130 | 6.80 | 136.10 | **Channel Flow,** Area= 20.0 sf Perim= 12.0' r= 1.67' n= 0.035 |
| 11.1 | 1,419 | Total | | | |

## Subcatchment B115: B115



## Summary for Subcatchment B116: B116

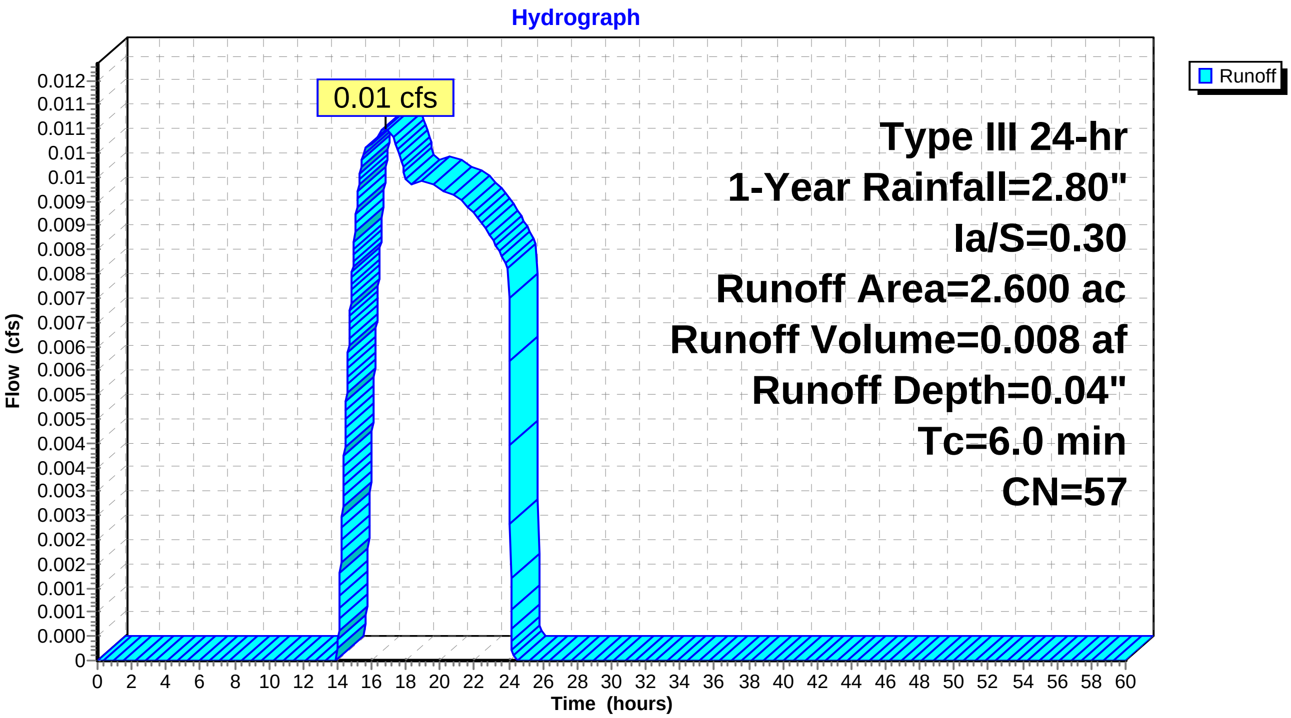
Runoff = 0.01 cfs @ 16.80 hrs, Volume= 0.008 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.174 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.621 | 98 | Water Surface |
| | 1.805 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.600 | 57 | Weighted Average |
| | 1.805 | | 69.42% Pervious Area |
| | 0.795 | | 30.58% Impervious Area |

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

## Subcatchment B116: B116



## Summary for Subcatchment B117: B117

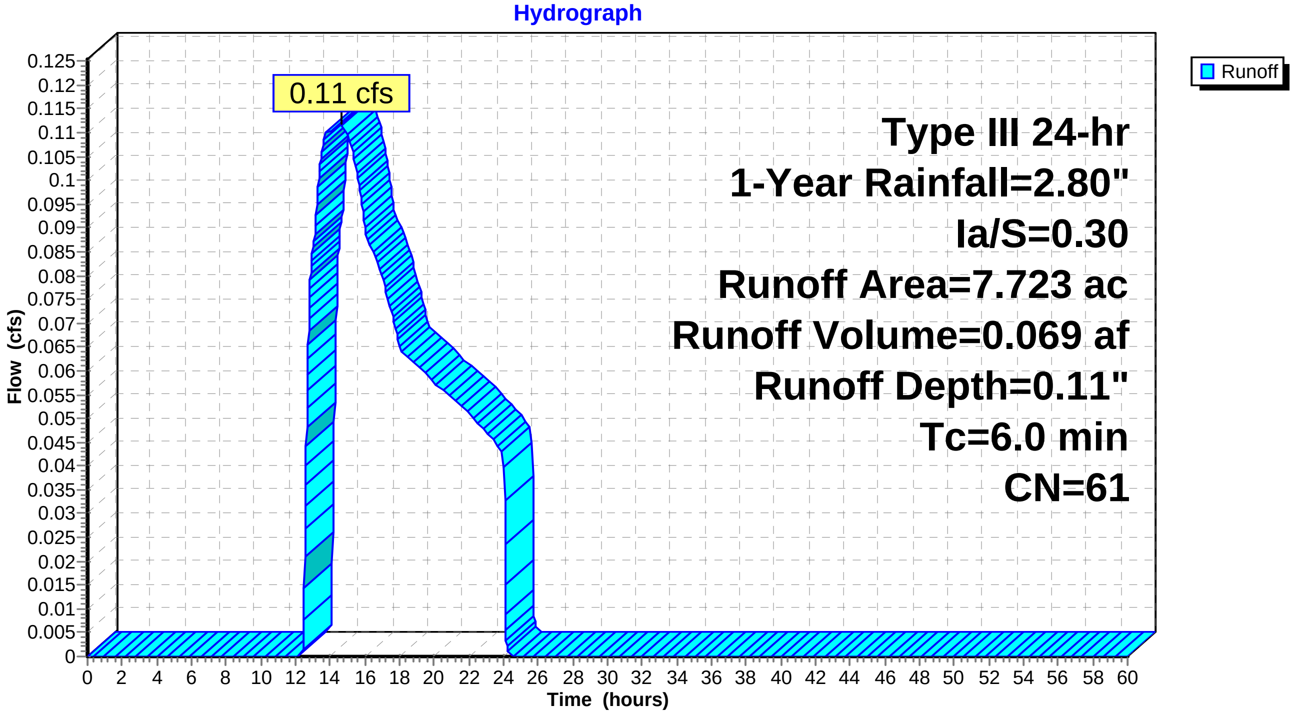
Runoff = 0.11 cfs @ 14.60 hrs, Volume= 0.069 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.200 | 98 | Building roof |
| * | 0.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 4.580 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.018 | 80 | >75% Grass cover, Good, HSG D |
| | 0.268 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.027 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.723 | 61 | Weighted Average |
| | 4.893 | | 63.36% Pervious Area |
| | 2.830 | | 36.64% Impervious Area |

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

## Subcatchment B117: B117



## Summary for Subcatchment B118: B118

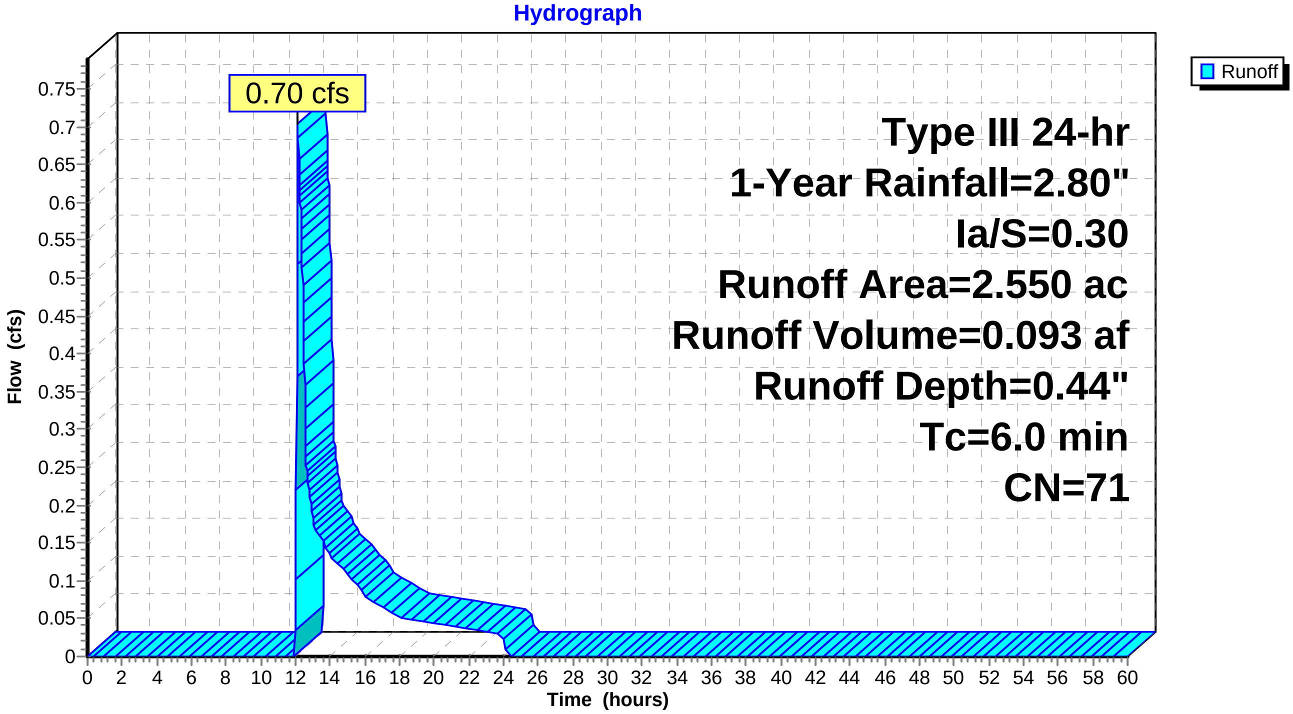
Runoff = 0.70 cfs @ 12.14 hrs, Volume= 0.093 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.295 | 98 | Building roof |
| * | 0.100 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 1.015 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.140 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.550 | 71 | Weighted Average |
| | 1.155 | | 45.29% Pervious Area |
| | 1.395 | | 54.71% Impervious Area |

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

## Subcatchment B118: B118



## Summary for Subcatchment B119: B119

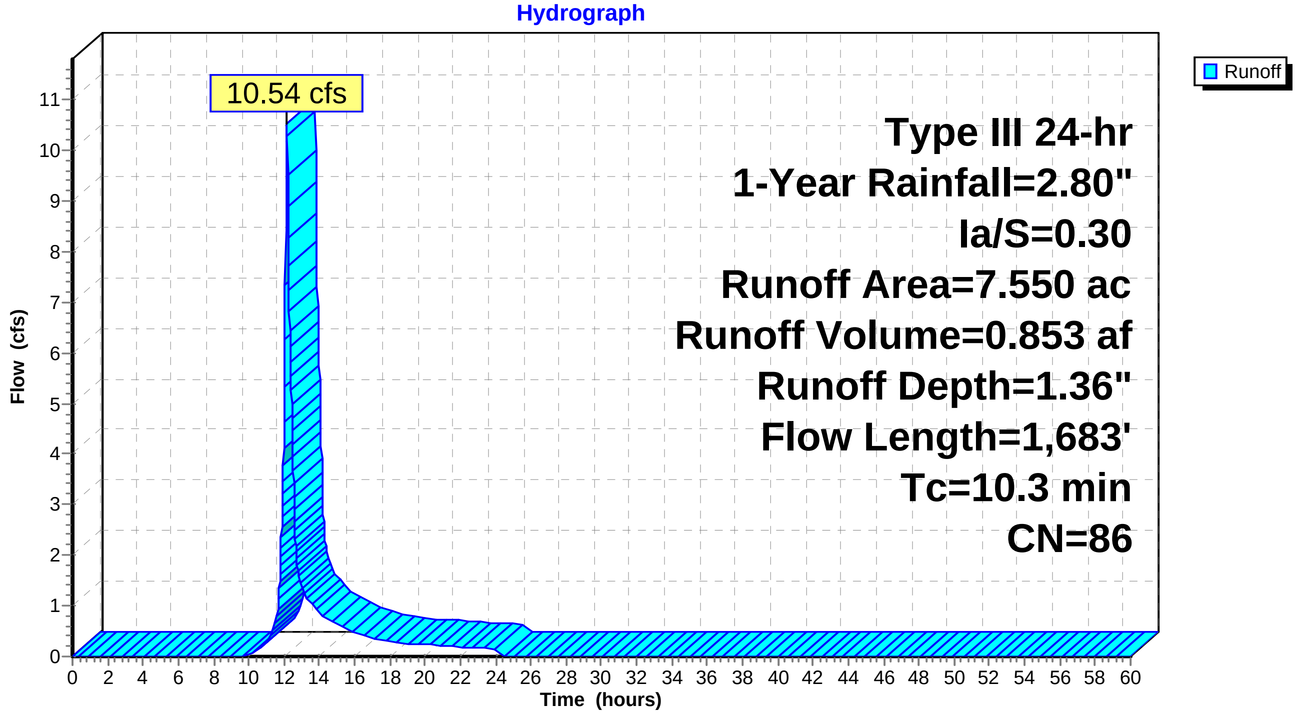
Runoff = 10.54 cfs @ 12.15 hrs, Volume= 0.853 af, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.300 | 98 | Building roof |
| * | 0.950 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.300 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.550 | 86 | Weighted Average |
| | 3.300 | | 43.71% Pervious Area |
| | 4.250 | | 56.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.3000 | 0.24 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 2.3 | 185 | 0.3000 | 1.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.1 | 50 | 0.1100 | 6.73 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.9 | 1,348 | 0.1100 | 25.87 | 81.28 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 10.3 | 1,683 | Total | | | |

## Subcatchment B119: B119



## Summary for Subcatchment C101: C101

[45] Hint: Runoff=Zero

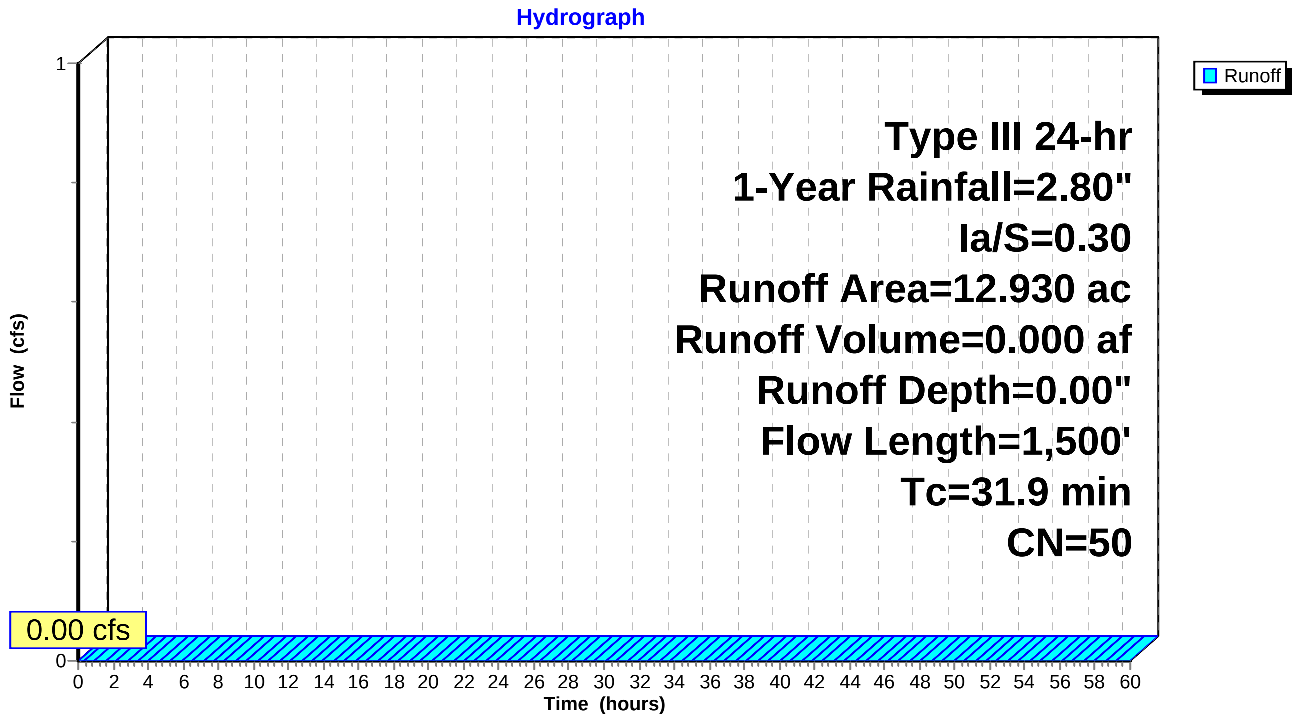
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 4.850 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.370 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.860 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.850 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 12.930 | 50 | Weighted Average |
| | 12.930 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

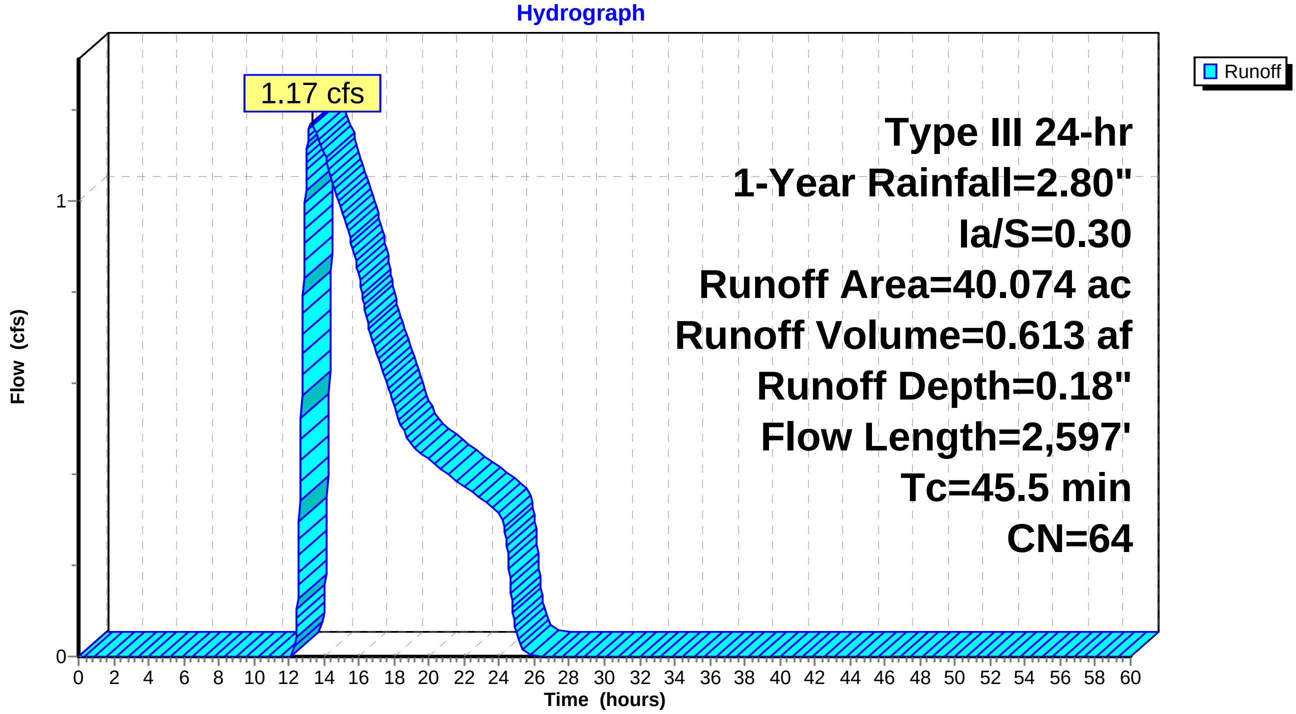
Runoff = 1.17 cfs @ 13.29 hrs, Volume= 0.613 af, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.007 | 98 | Paved surface |
| * | 0.515 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.285 | 98 | Rock Outcrop/Ledge |
| | 13.181 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.190 | 74 | >75% Grass cover, Good, HSG C |
| | 1.269 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.574 | 70 | Woods, Good, HSG C |
| | 15.097 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.074 | 64 | Weighted Average |
| | 38.950 | | 97.20% Pervious Area |
| | 1.124 | | 2.80% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment C103: C103

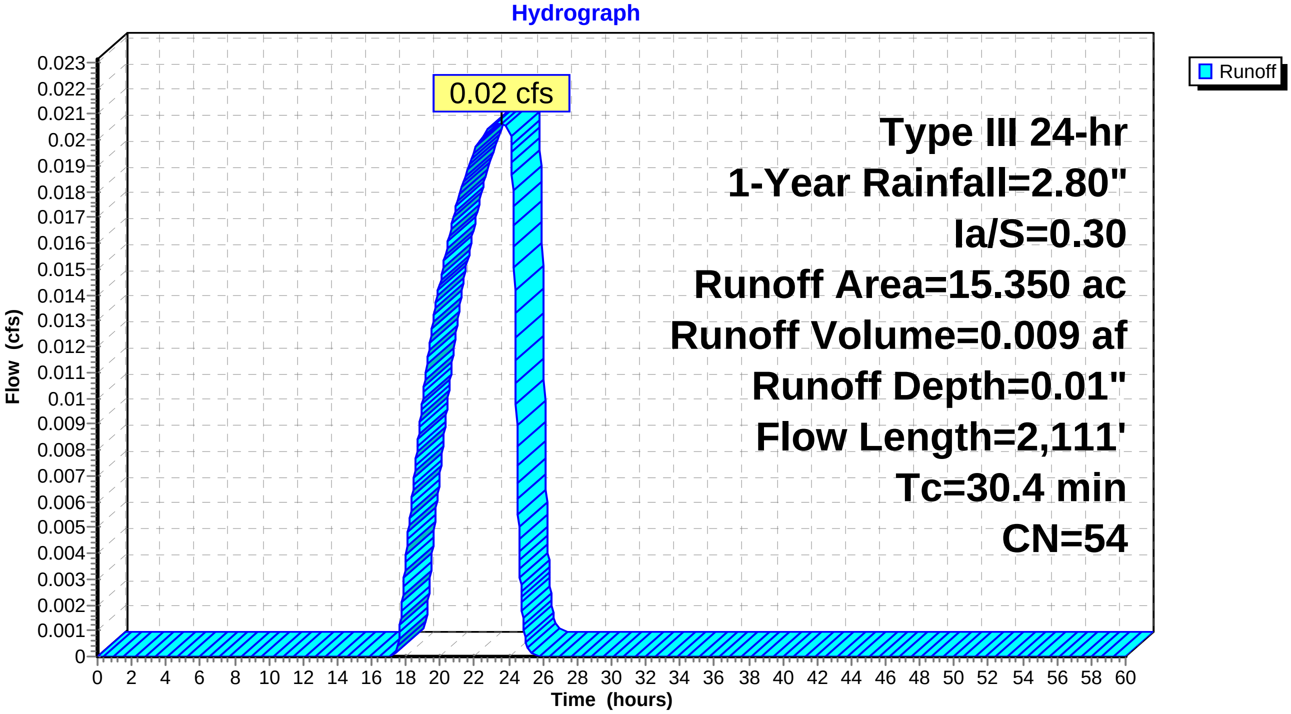
Runoff = 0.02 cfs @ 23.54 hrs, Volume= 0.009 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 2.860 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 9.290 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.240 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.980 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.980 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.350 | 54 | Weighted Average |
| | 12.490 | | 81.37% Pervious Area |
| | 2.860 | | 18.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.9 | 100 | 0.1300 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 185 | 0.1560 | 1.97 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 188 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 288 | 0.0069 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.2 | 1,350 | 0.0260 | 10.03 | 12.31 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 |
| 30.4 | 2,111 | Total | | | |

## Subcatchment C103: C103



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

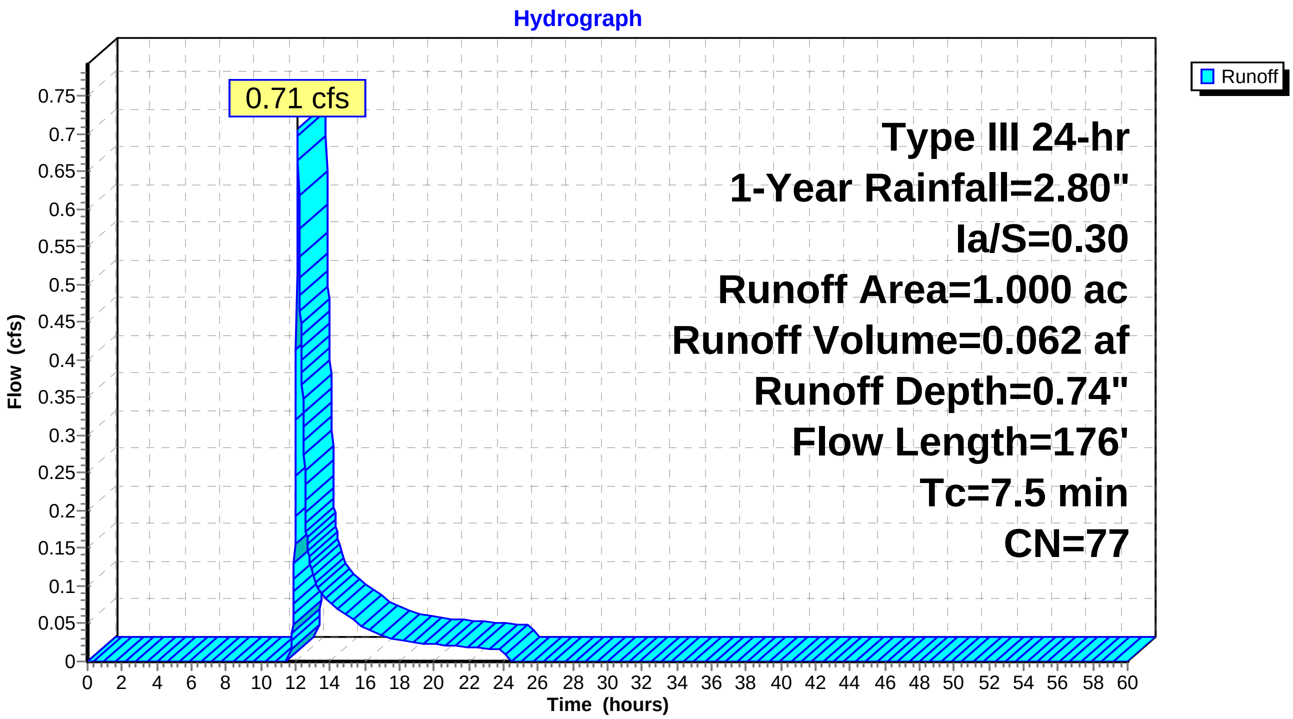
Runoff = 0.71 cfs @ 12.13 hrs, Volume= 0.062 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-Year Rainfall=2.80", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.590 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.260 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 77 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C** Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1100 | 6.73 | | **Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



## Summary for Reach 36" Pipe: 36" Pipe

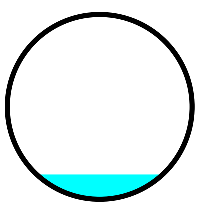
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 0.82" for 1-Year event
Inflow = 5.76 cfs @ 12.45 hrs, Volume= 1.045 af
Outflow = 5.75 cfs @ 12.47 hrs, Volume= 1.045 af, Atten= 0%, Lag= 1.2 min

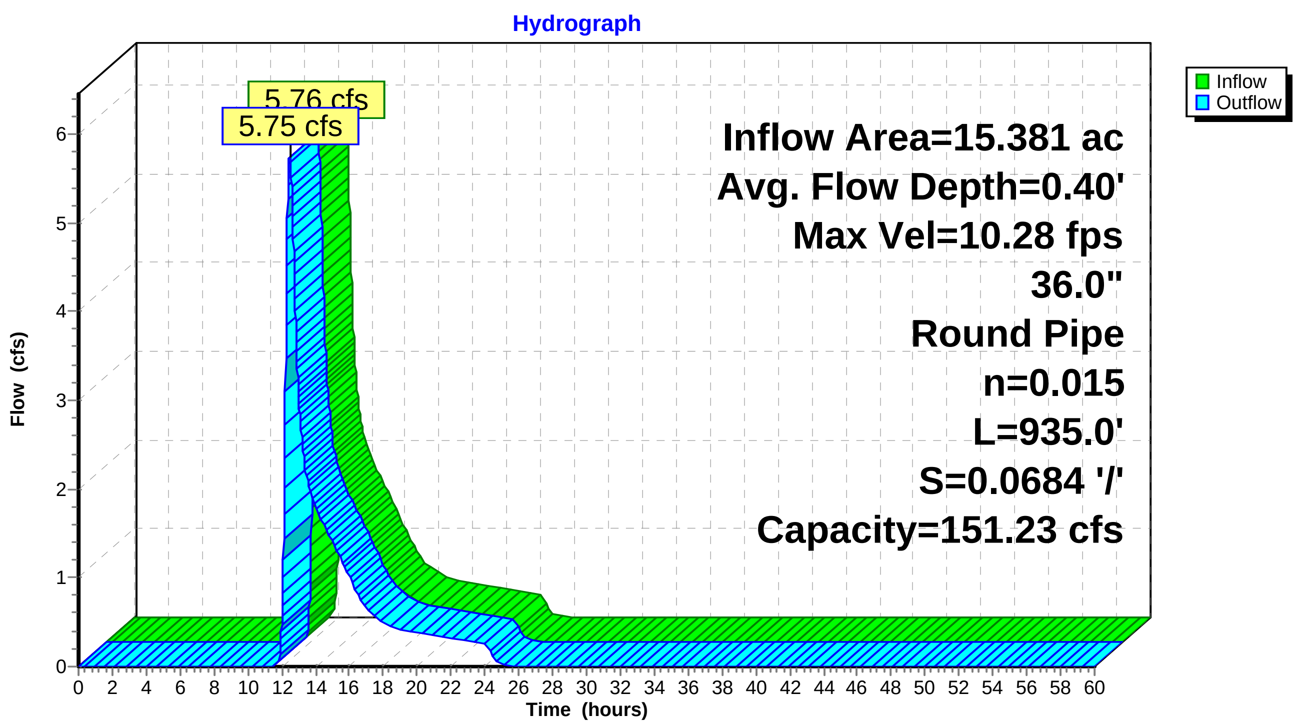
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 10.28 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 3.77 fps, Avg. Travel Time= 4.1 min

Peak Storage= 523 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 151.23 cfs

36.0" Round Pipe
n= 0.015
Length= 935.0' Slope= 0.0684 '/'
Inlet Invert= 635.00', Outlet Invert= 571.00'



**Reach 36" Pipe: 36" Pipe**



## Summary for Reach 42" Pipe: 42" Pipe

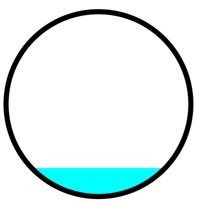
[52] Hint: Inlet/Outlet conditions not evaluated

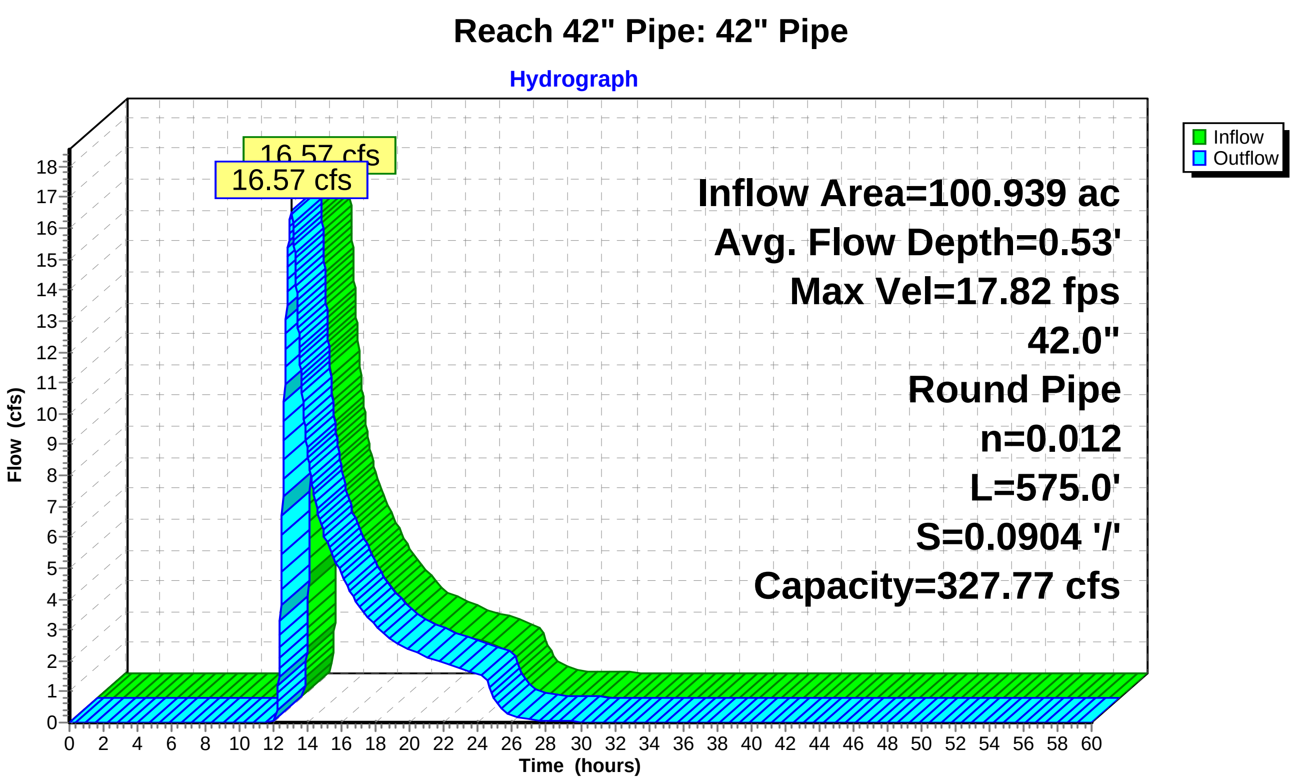
Inflow Area = 100.939 ac, 4.72% Impervious, Inflow Depth = 0.54" for 1-Year event
Inflow = 16.57 cfs @ 13.01 hrs, Volume= 4.558 af
Outflow = 16.57 cfs @ 13.02 hrs, Volume= 4.558 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 17.82 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 5.30 fps, Avg. Travel Time= 1.8 min

Peak Storage= 535 cf @ 13.02 hrs
Average Depth at Peak Storage= 0.53'
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 327.77 cfs

42.0" Round Pipe
n= 0.012
Length= 575.0' Slope= 0.0904 '/'
Inlet Invert= 587.00', Outlet Invert= 535.00'





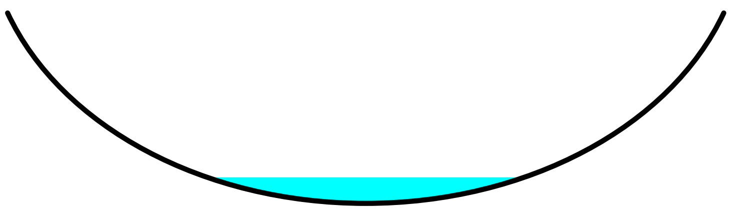
## Summary for Reach A105R: Thru A103

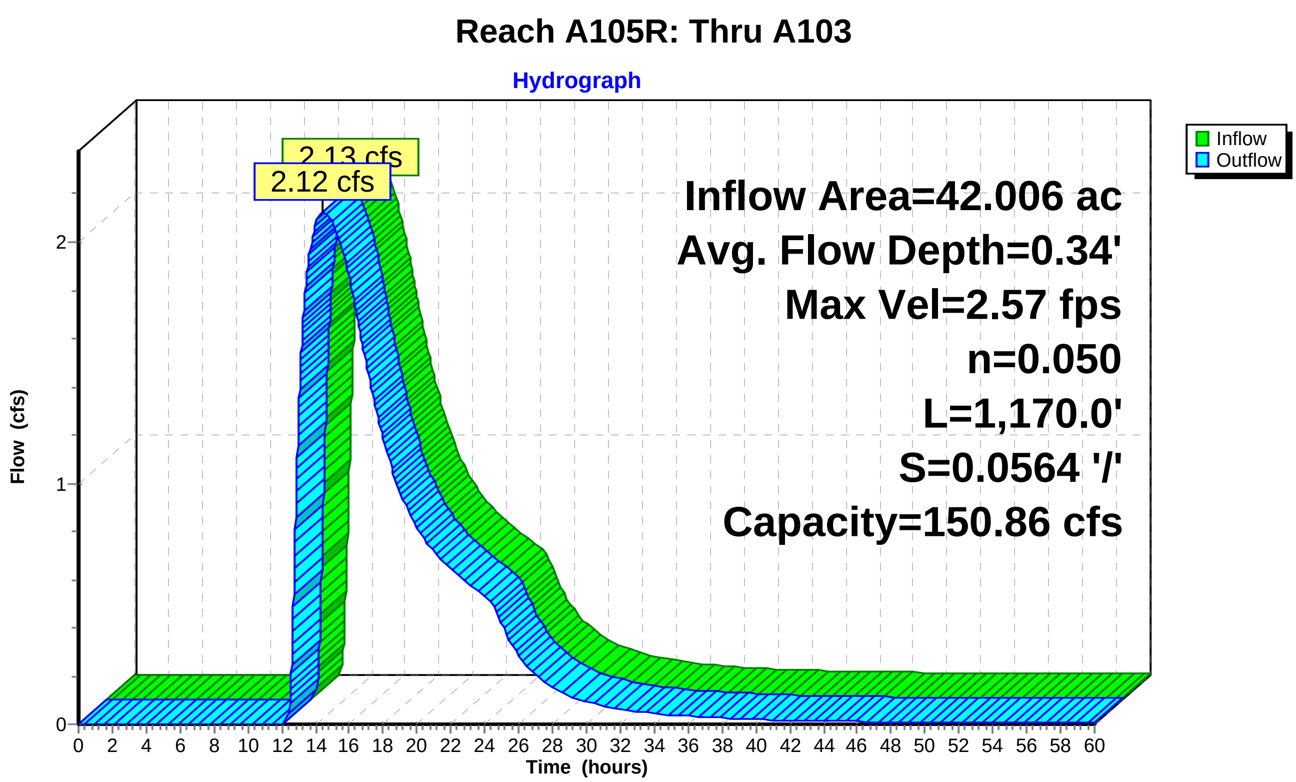
Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth > 0.38" for 1-Year event
Inflow = 2.13 cfs @ 14.36 hrs, Volume= 1.318 af
Outflow = 2.12 cfs @ 14.46 hrs, Volume= 1.318 af, Atten= 0%, Lag= 5.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.57 fps, Min. Travel Time= 7.6 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 18.5 min

Peak Storage= 965 cf @ 14.46 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 150.86 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,170.0' Slope= 0.0564 '/'
Inlet Invert= 566.00', Outlet Invert= 500.00'





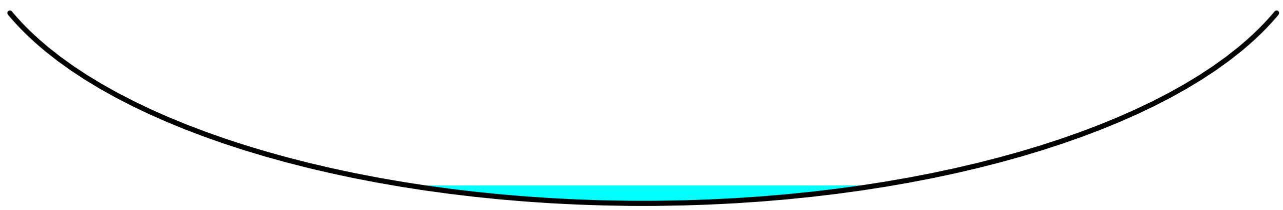
## Summary for Reach B107R: Thru B103

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth > 0.51" for 1-Year event
Inflow = 1.11 cfs @ 14.48 hrs, Volume= 0.609 af
Outflow = 1.11 cfs @ 14.55 hrs, Volume= 0.609 af, Atten= 0%, Lag= 4.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.96 fps, Min. Travel Time= 5.3 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 13.3 min

Peak Storage= 352 cf @ 14.55 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 192.14 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 938.0' Slope= 0.4072 '/'
Inlet Invert= 972.00', Outlet Invert= 590.00'



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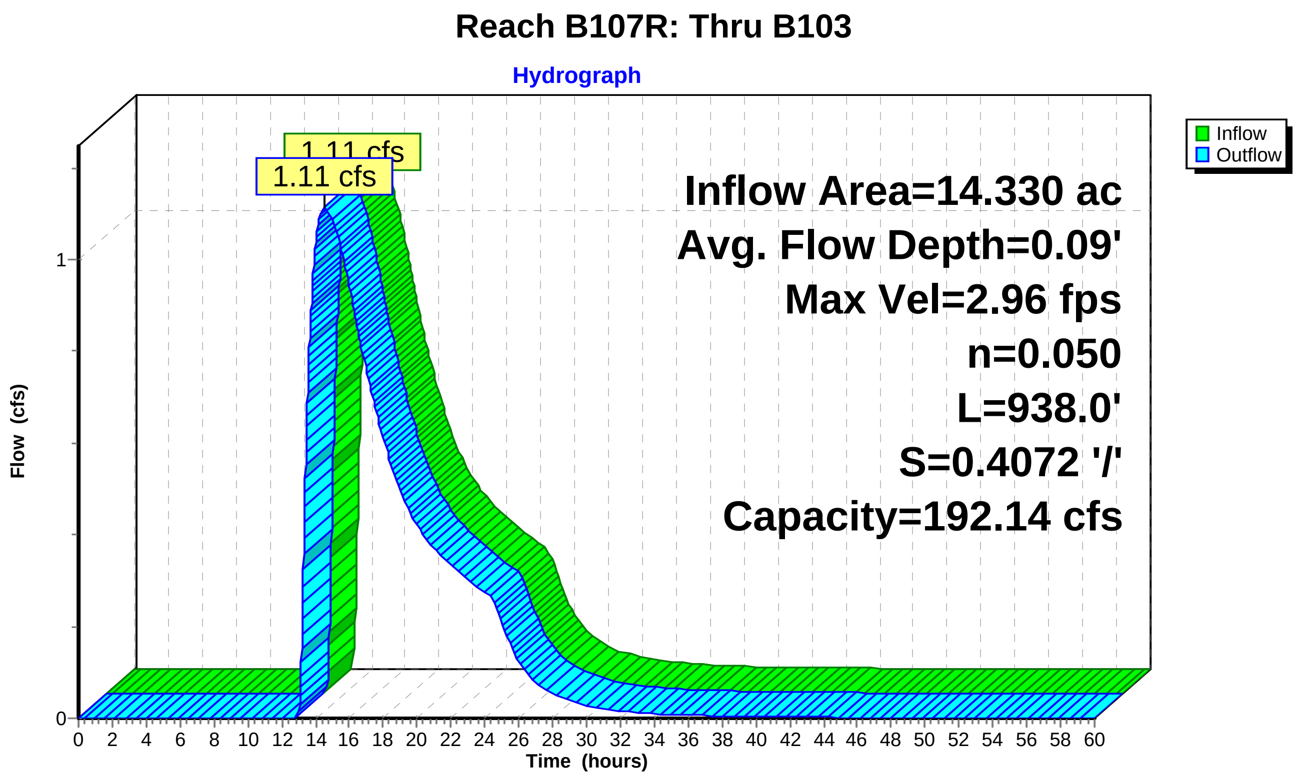


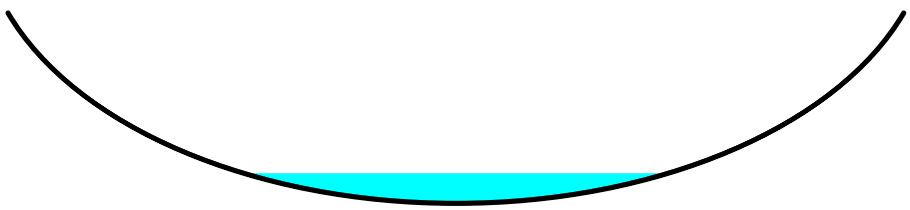
## Summary for Reach B112R: Thru B102

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 0.54" for 1-Year event
Inflow = 7.03 cfs @ 18.48 hrs, Volume= 11.131 af
Outflow = 7.03 cfs @ 18.54 hrs, Volume= 11.122 af, Atten= 0%, Lag= 3.4 min

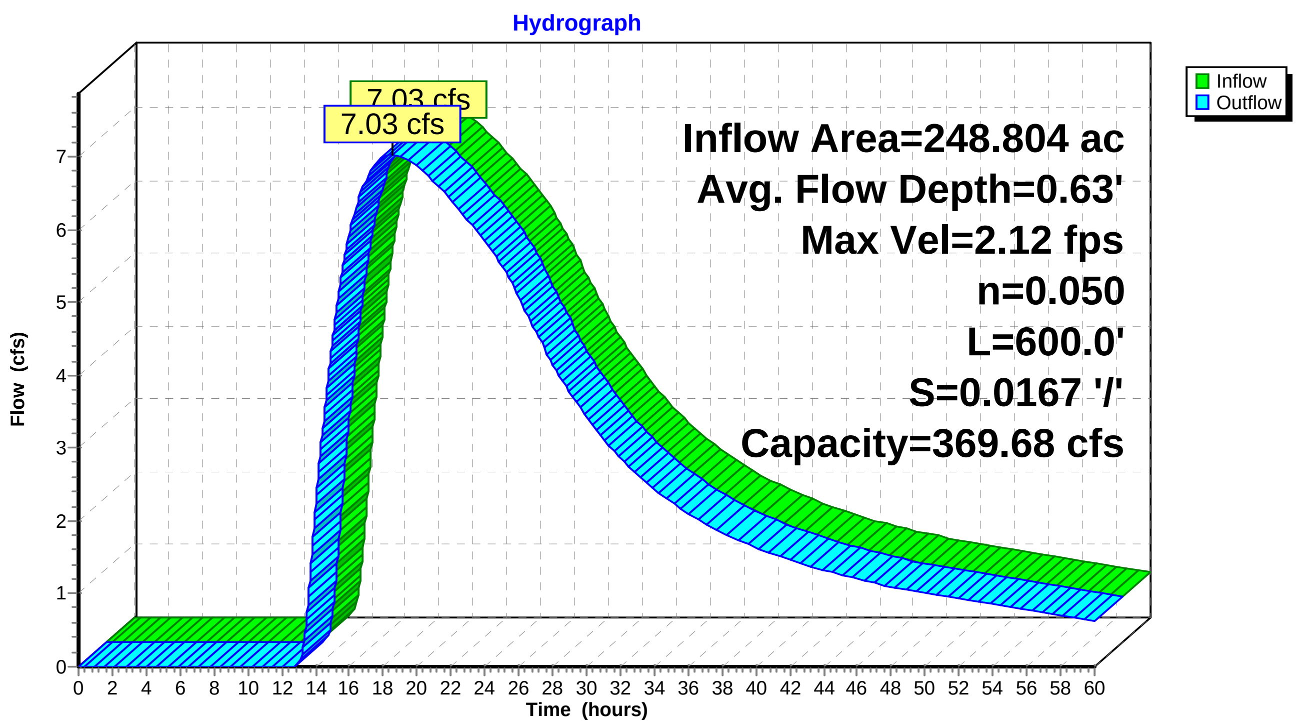
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.12 fps, Min. Travel Time= 4.7 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 6.7 min

Peak Storage= 1,986 cf @ 18.54 hrs
Average Depth at Peak Storage= 0.63'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 369.68 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 600.0' Slope= 0.0167 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'



### Reach B112R: Thru B102



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.074 ac, 2.80% Impervious, Inflow Depth = 0.18" for 1-Year event
Inflow = 1.17 cfs @ 13.29 hrs, Volume= 0.613 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.20' @ 26.62 hrs Surf.Area= 74,235 sf Storage= 26,722 cf

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

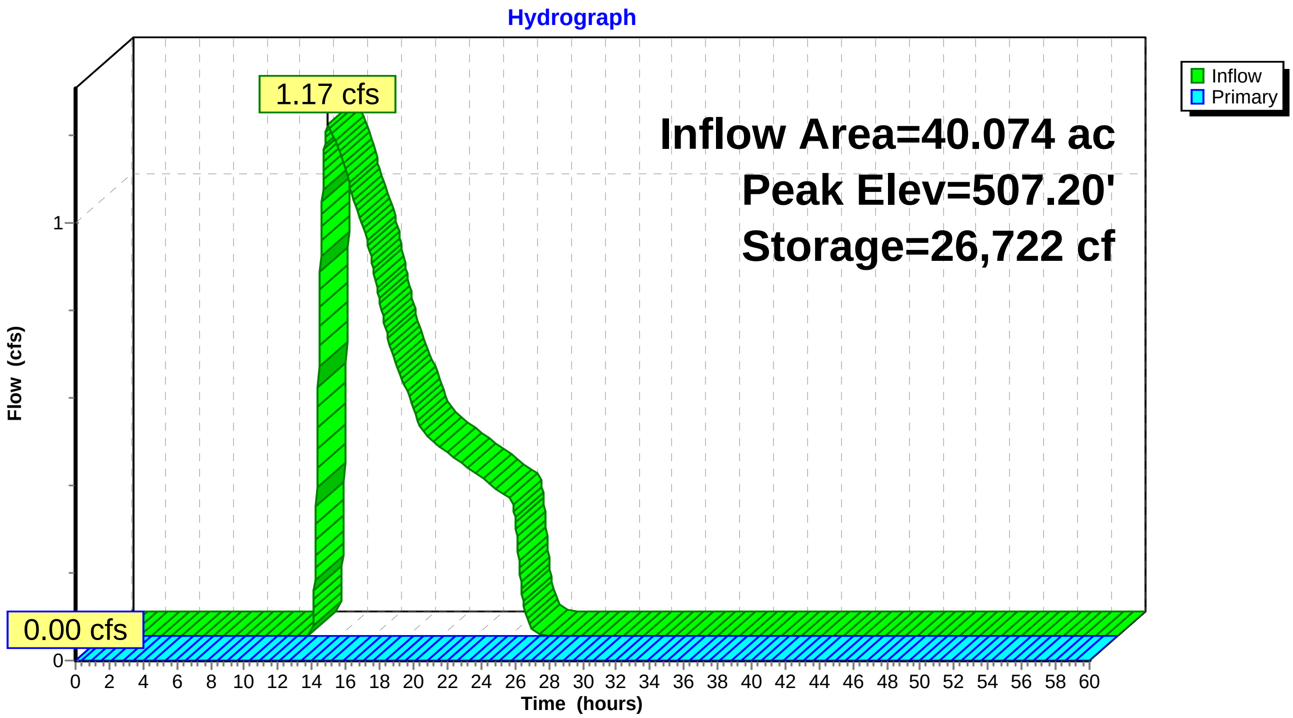
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 104A: Wetland D

Inflow Area = 29.922 ac, 5.68% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.70' @ 0.00 hrs Surf.Area= 18,708 sf Storage= 0 cf

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

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

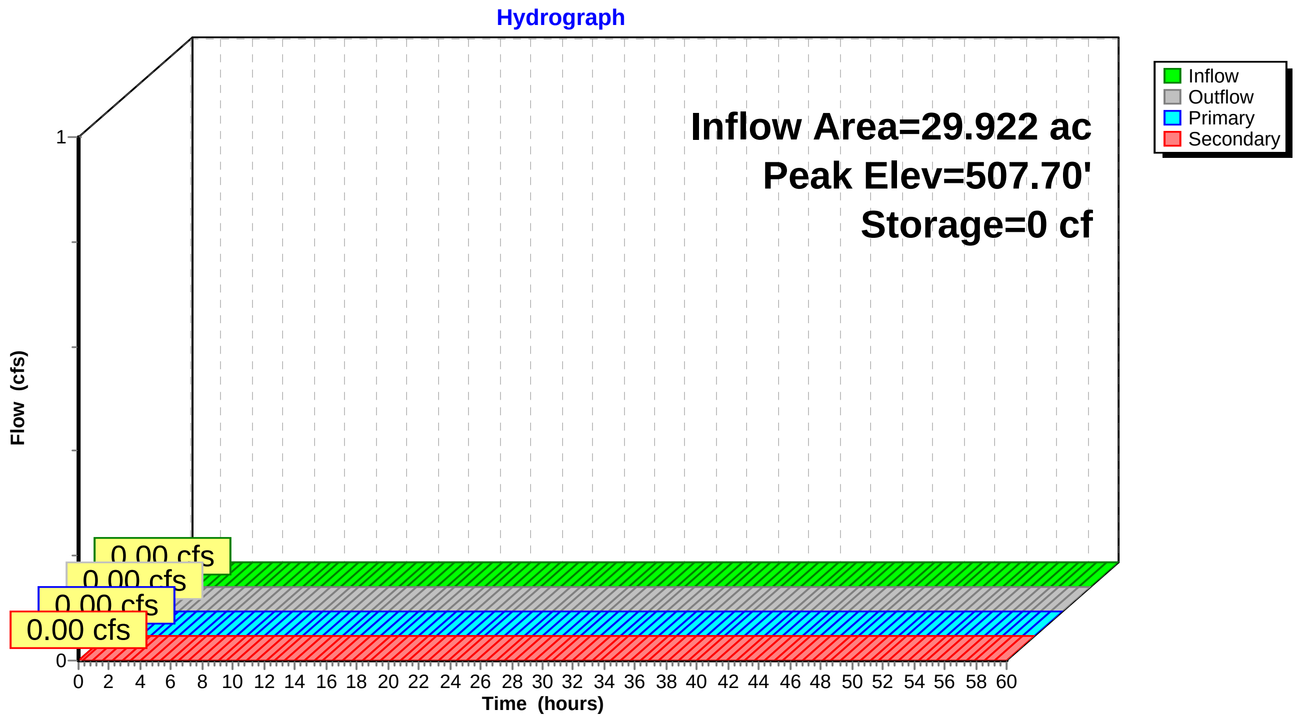
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 104A: Wetland D



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach 36" Pipe OUTLET depth by 2.36' @ 14.96 hrs

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 0.38" for 1-Year event
Inflow = 5.80 cfs @ 12.48 hrs, Volume= 1.334 af
Outflow = 2.13 cfs @ 14.36 hrs, Volume= 1.318 af, Atten= 63%, Lag= 112.9 min
Primary = 2.13 cfs @ 14.36 hrs, Volume= 1.318 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 573.57' @ 14.36 hrs Surf.Area= 25,398 sf Storage= 15,814 cf

Plug-Flow detention time= 178.3 min calculated for 1.318 af (99% of inflow)
Center-of-Mass det. time= 171.8 min ( 1,112.5 - 940.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

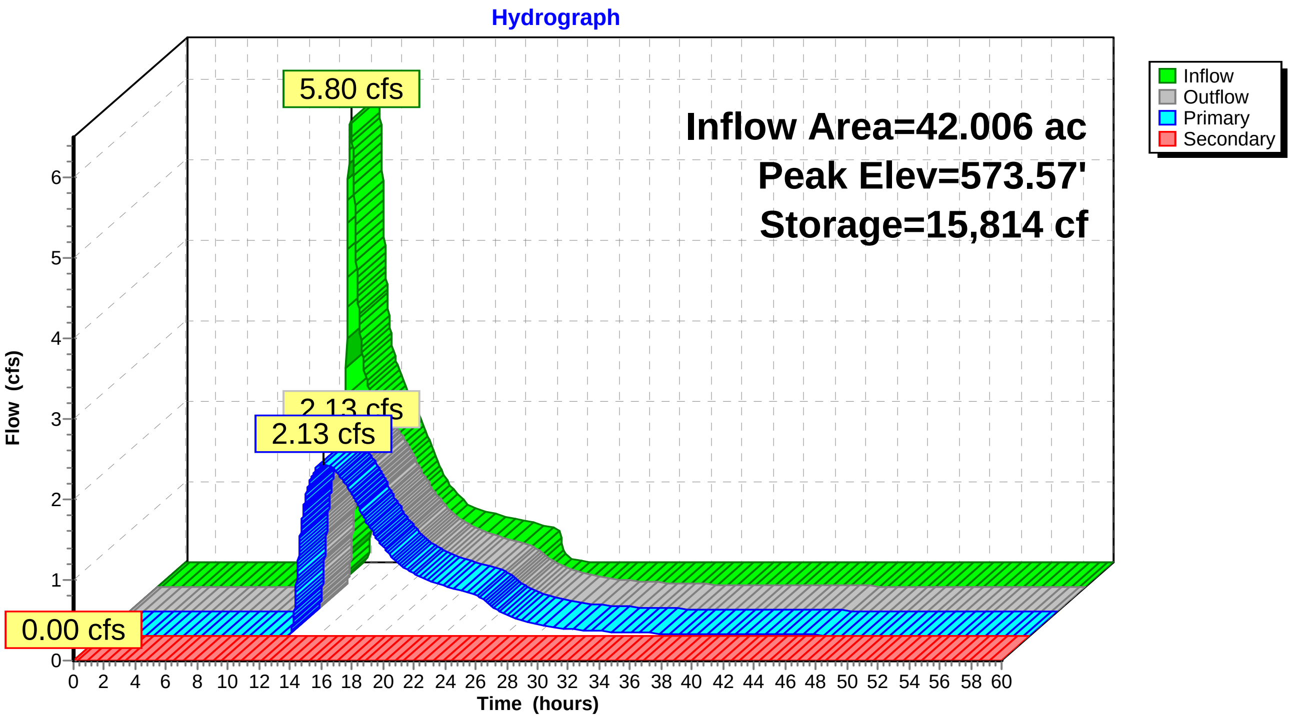
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=2.13 cfs @ 14.36 hrs HW=573.57' TW=566.34' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.13 cfs @ 2.79 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=572.90' TW=566.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 105A: Wetland H



## Summary for Pond 106A: 36" Culvert

```
Inflow Area =      15.381 ac, 16.84% Impervious, Inflow Depth =  0.82"   for 1-Year event
Inflow      =       5.76 cfs @  12.45 hrs, Volume=         1.045 af
Outflow     =       5.76 cfs @  12.45 hrs, Volume=         1.045 af, Atten= 0%, Lag= 0.0 min
Primary     =       5.76 cfs @  12.45 hrs, Volume=         1.045 af
Secondary   =       0.00 cfs @   0.00 hrs, Volume=         0.000 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 717.60' @ 12.45 hrs Surf.Area= 9 sf Storage= 3 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 911.5 - 911.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

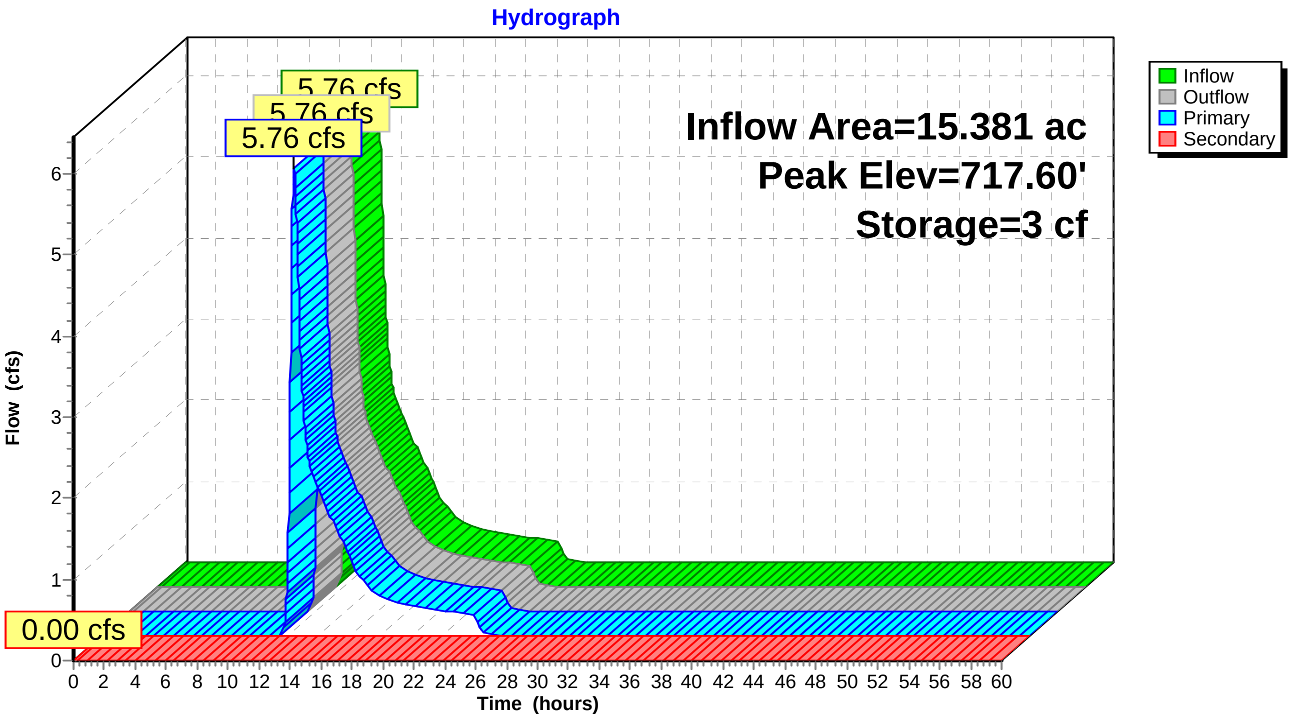
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=5.76 cfs @ 12.45 hrs HW=717.60' TW=635.40' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.76 cfs @ 3.23 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=635.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 118.113 ac, 1.34% Impervious, Inflow Depth = 0.69" for 1-Year event
Inflow = 24.33 cfs @ 13.33 hrs, Volume= 6.742 af
Outflow = 24.29 cfs @ 13.36 hrs, Volume= 6.742 af, Atten= 0%, Lag= 1.5 min
Primary = 24.29 cfs @ 13.36 hrs, Volume= 6.742 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.37' @ 13.36 hrs Surf.Area= 11,372 sf Storage= 15,235 cf

Plug-Flow detention time= 17.6 min calculated for 6.742 af (100% of inflow)
Center-of-Mass det. time= 17.3 min ( 981.0 - 963.7 )

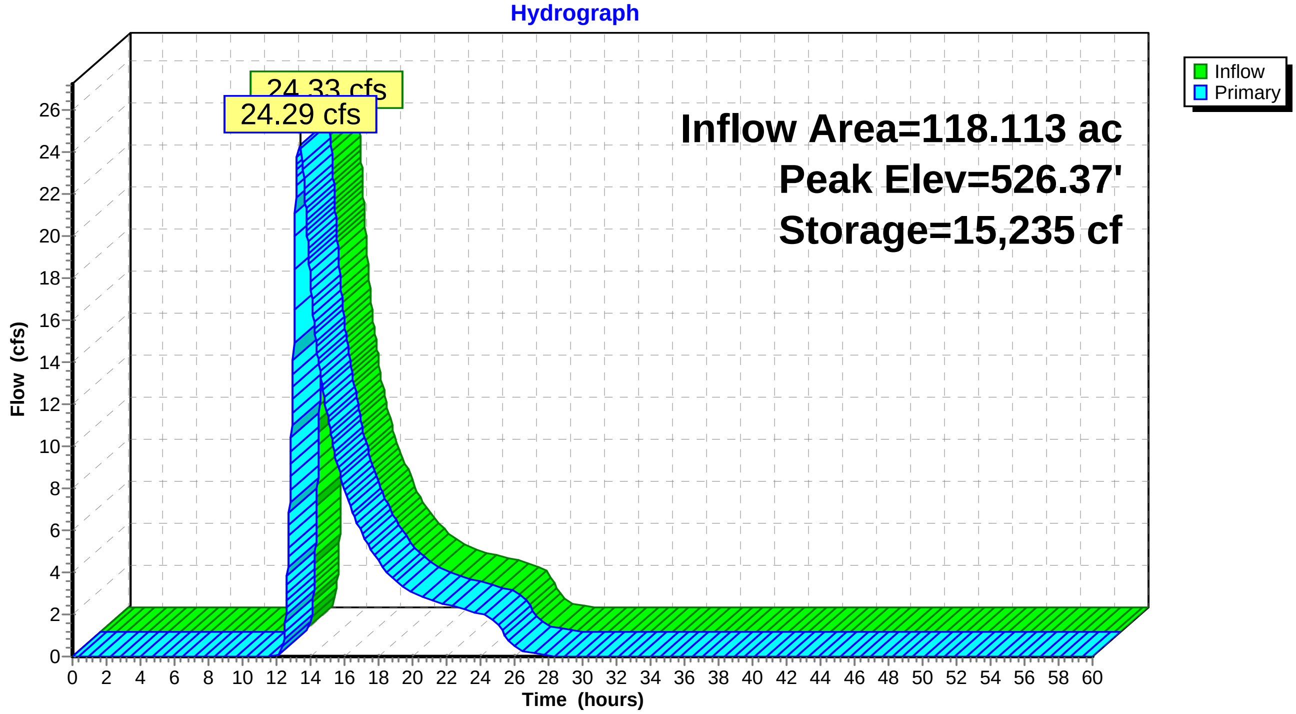
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=24.29 cfs @ 13.36 hrs HW=526.37' TW=515.40' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 24.29 cfs @ 2.27 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 95.412 ac, 4.86% Impervious, Inflow Depth = 0.57" for 1-Year event
Inflow = 16.57 cfs @ 13.01 hrs, Volume= 4.542 af
Outflow = 16.57 cfs @ 13.01 hrs, Volume= 4.542 af, Atten= 0%, Lag= 0.2 min
Primary = 16.57 cfs @ 13.01 hrs, Volume= 4.542 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 621.56' @ 13.01 hrs Surf.Area= 137 sf Storage= 89 cf

Plug-Flow detention time= 0.1 min calculated for 4.542 af (100% of inflow)
Center-of-Mass det. time= 0.1 min ( 979.0 - 978.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

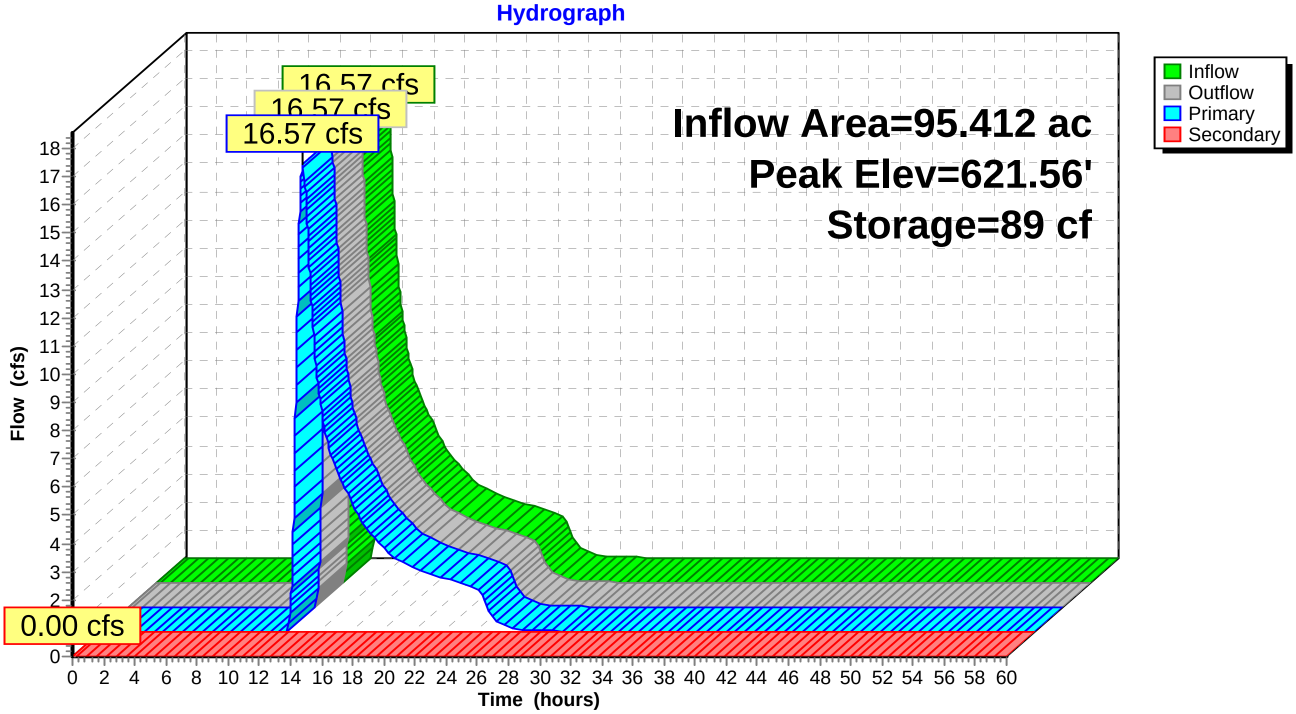
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=16.56 cfs @ 13.01 hrs HW=621.56' TW=587.53' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 16.56 cfs @ 5.65 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=619.60' TW=608.80' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** ( Controls 0.00 cfs)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 5.44 cfs @ 12.61 hrs, Volume= 0.885 af
Outflow = 1.11 cfs @ 14.48 hrs, Volume= 0.609 af, Atten= 80%, Lag= 112.5 min
Primary = 1.11 cfs @ 14.48 hrs, Volume= 0.609 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.65' @ 14.48 hrs Surf.Area= 121,235 sf Storage= 17,749 cf

Plug-Flow detention time= 294.9 min calculated for 0.609 af (69% of inflow)
Center-of-Mass det. time= 184.5 min ( 1,098.3 - 913.8 )

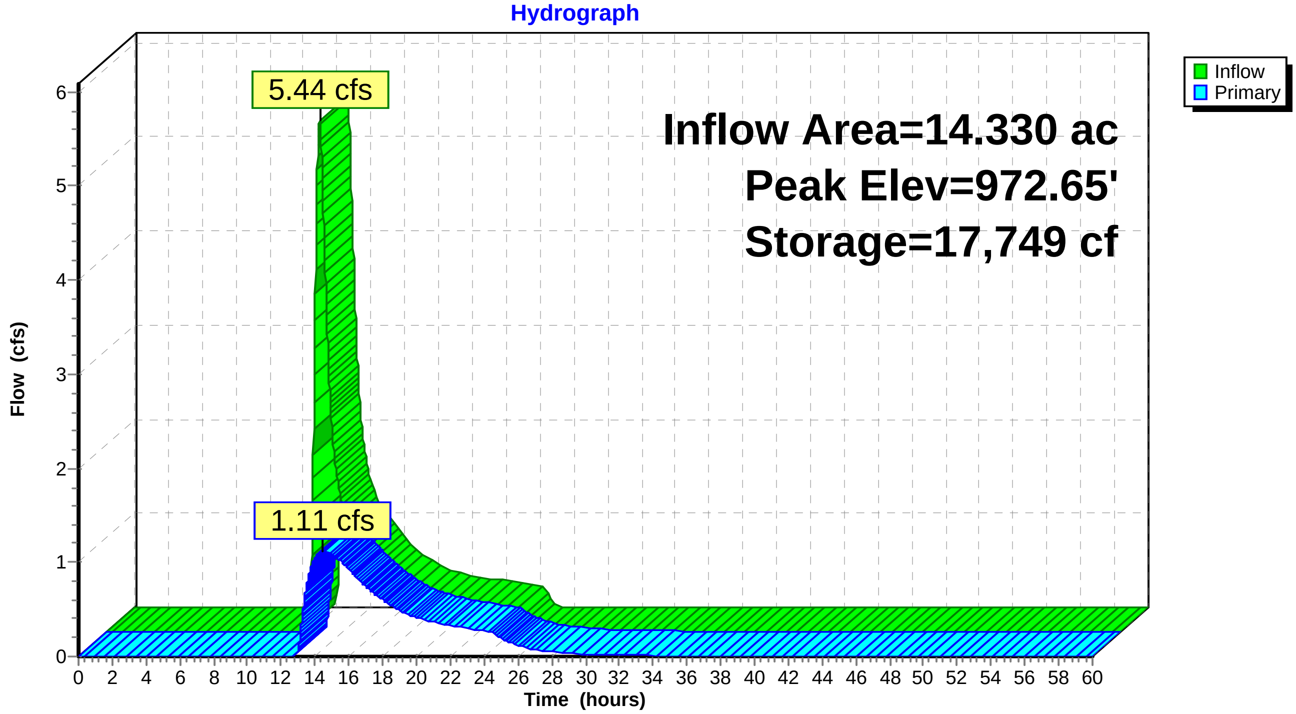
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=1.11 cfs @ 14.48 hrs HW=972.65' TW=972.09' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.11 cfs @ 0.58 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

Inflow Area = 5.527 ac, 2.32% Impervious, Inflow Depth = 0.04" for 1-Year event
Inflow = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af
Outflow = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.2 min
Primary = 0.02 cfs @ 17.16 hrs, Volume= 0.016 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 608.86' @ 17.16 hrs Surf.Area= 13 sf Storage= 1 cf

Plug-Flow detention time= 0.9 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 0.6 min ( 1,170.4 - 1,169.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

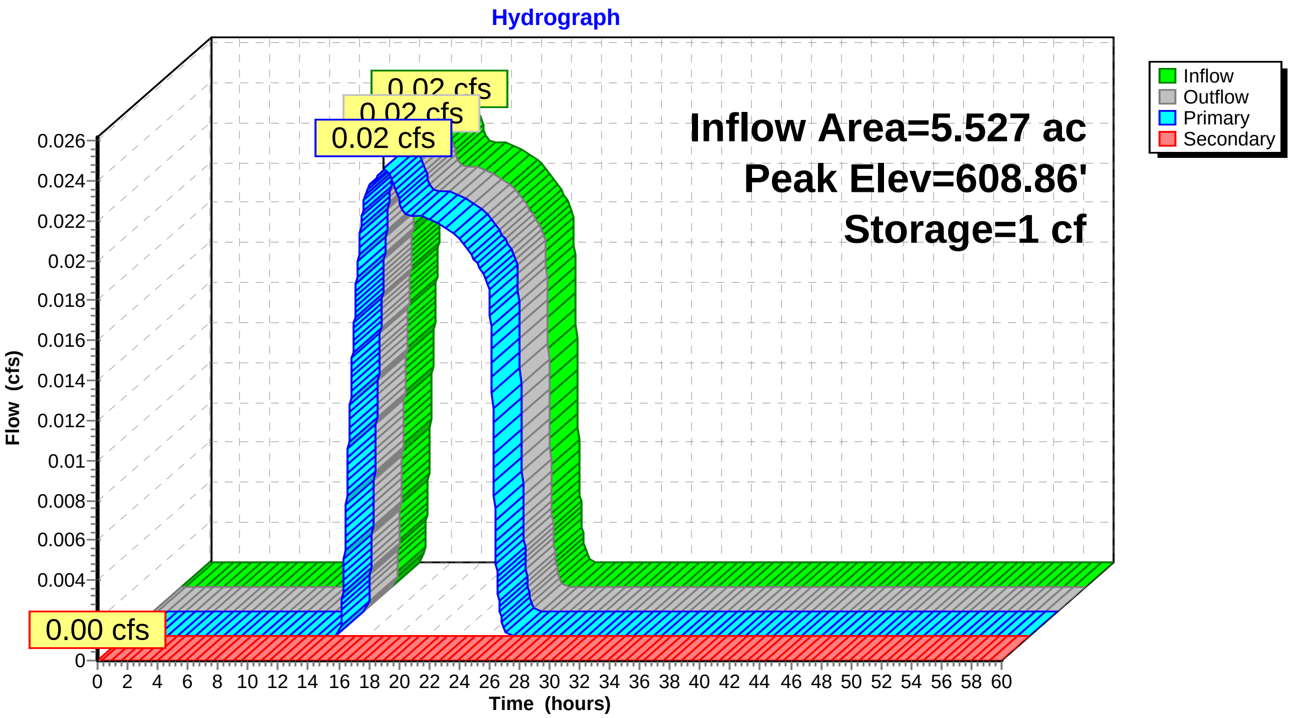
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.02 cfs @ 17.16 hrs HW=608.86' TW=587.26' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.02 cfs @ 1.13 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=608.80' TW=587.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 108A: 36" Culvert



## Summary for Pond SWM 7A: SWM 7A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 0.74" for 1-Year event
Inflow = 0.71 cfs @ 12.13 hrs, Volume= 0.062 af
Outflow = 0.31 cfs @ 12.46 hrs, Volume= 0.062 af, Atten= 56%, Lag= 20.1 min
Primary = 0.31 cfs @ 12.46 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 807.32' @ 12.46 hrs Surf.Area= 1,961 sf Storage= 572 cf

Plug-Flow detention time= 65.6 min calculated for 0.062 af (100% of inflow)
Center-of-Mass det. time= 64.5 min ( 950.1 - 885.6 )

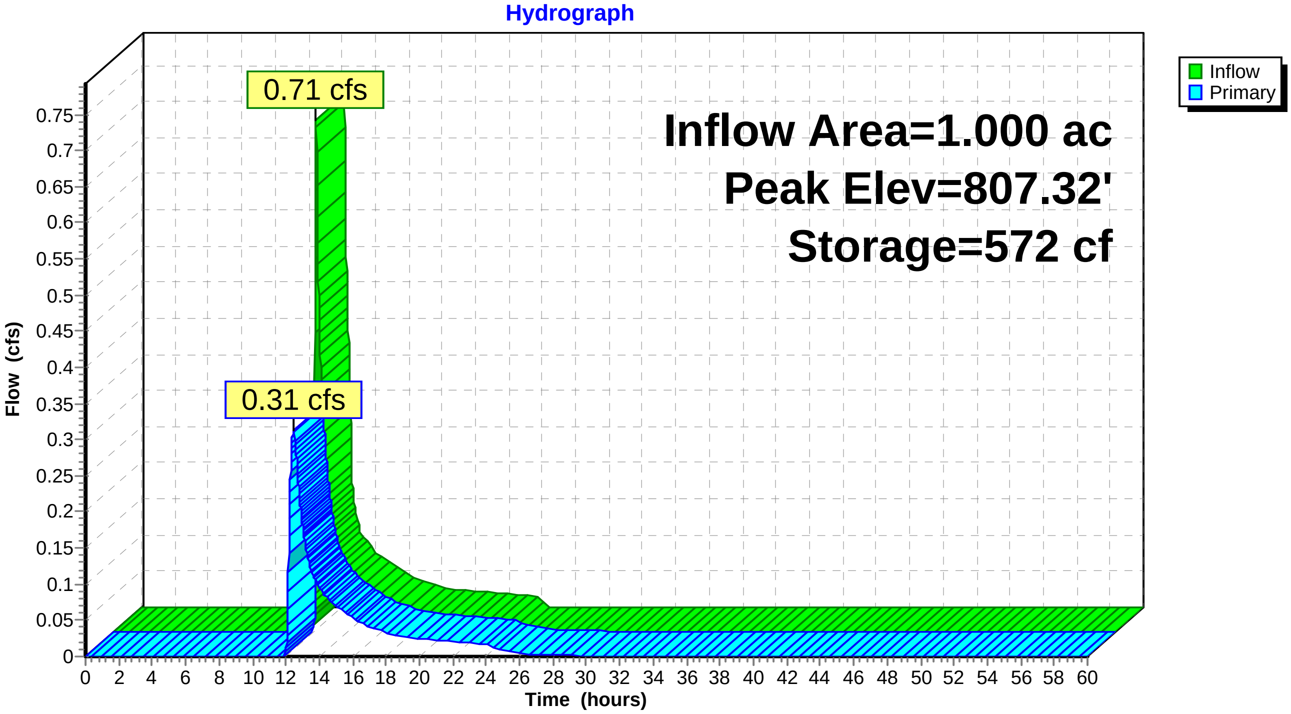
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 807.00' | 5,238 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 807.00 | 1,656 | 0 | 0 |
| 809.00 | 3,582 | 5,238 | 5,238 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 802.00' | **15.0" Round Culvert**<br>L= 41.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 802.00' / 801.00' S= 0.0244 '/' Cc= 0.900<br>n= 0.015, Flow Area= 1.23 sf |
| #2 | Device 1 | 807.00' | **8.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 808.25' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=0.31 cfs @ 12.46 hrs HW=807.32' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Passes 0.31 cfs of 14.10 cfs potential flow)
**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 1.91 fps)
**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM 7A: SWM 7A (Phase 1)



## Summary for Pond SWM1: SWM 1

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 0.16" for 1-Year event
Inflow = 1.07 cfs @ 14.81 hrs, Volume= 0.659 af
Outflow = 1.05 cfs @ 15.39 hrs, Volume= 0.659 af, Atten= 2%, Lag= 34.6 min
Primary = 1.05 cfs @ 15.39 hrs, Volume= 0.659 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 512.18' @ 15.39 hrs Surf.Area= 11,497 sf Storage= 2,033 cf

Plug-Flow detention time= 40.1 min calculated for 0.659 af (100% of inflow)
Center-of-Mass det. time= 39.9 min ( 1,132.8 - 1,092.9 )

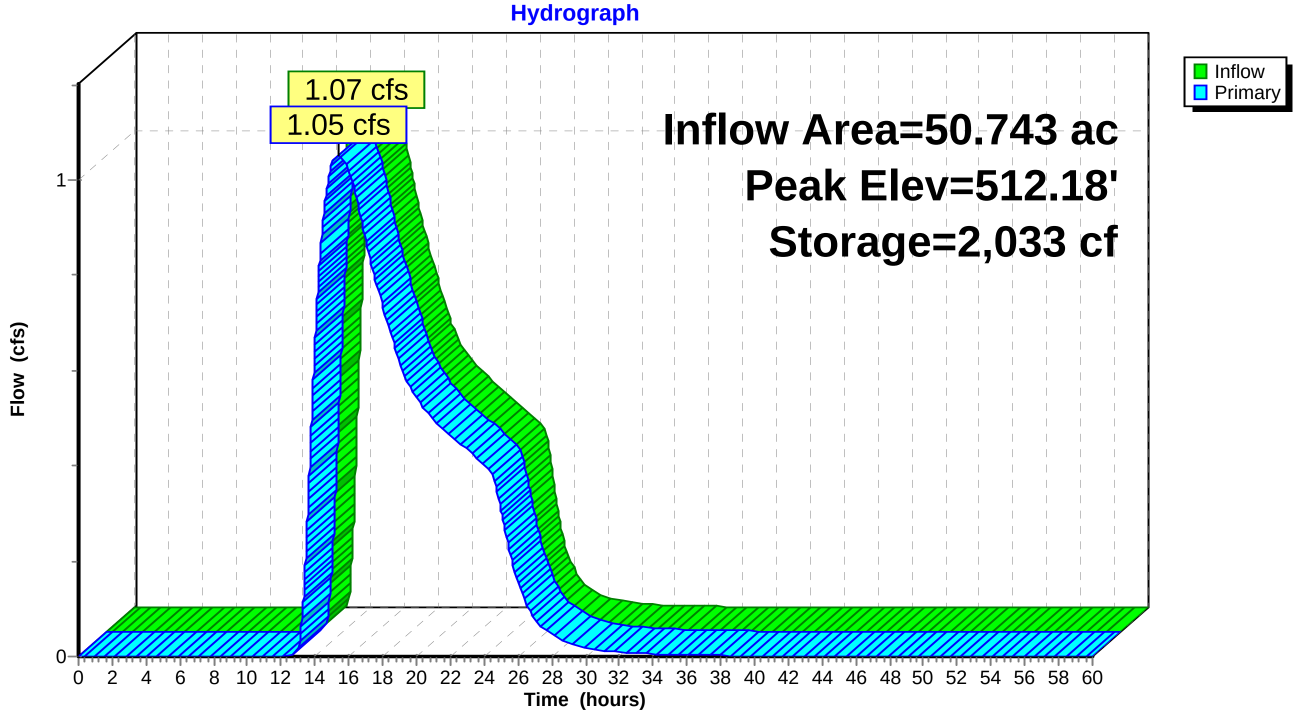
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 512.00' | 77,663 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 512.00 | 10,713 | 0 | 0 |
| 513.00 | 14,994 | 12,854 | 12,854 |
| 514.00 | 19,973 | 17,484 | 30,337 |
| 515.00 | 23,663 | 21,818 | 52,155 |
| 516.00 | 27,353 | 25,508 | 77,663 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 512.00' | **5.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=1.05 cfs @ 15.39 hrs HW=512.18' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.05 cfs @ 1.15 fps)

## Pond SWM1: SWM 1



## Summary for Pond SWM17: SWM17

Inflow Area = 15.350 ac, 18.63% Impervious, Inflow Depth = 0.01" for 1-Year event
Inflow = 0.02 cfs @ 23.54 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 23.63 hrs, Volume= 0.009 af, Atten= 0%, Lag= 5.0 min
Primary = 0.02 cfs @ 23.63 hrs, Volume= 0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.07' @ 23.63 hrs Surf.Area= 0.005 ac Storage= 0.000 af

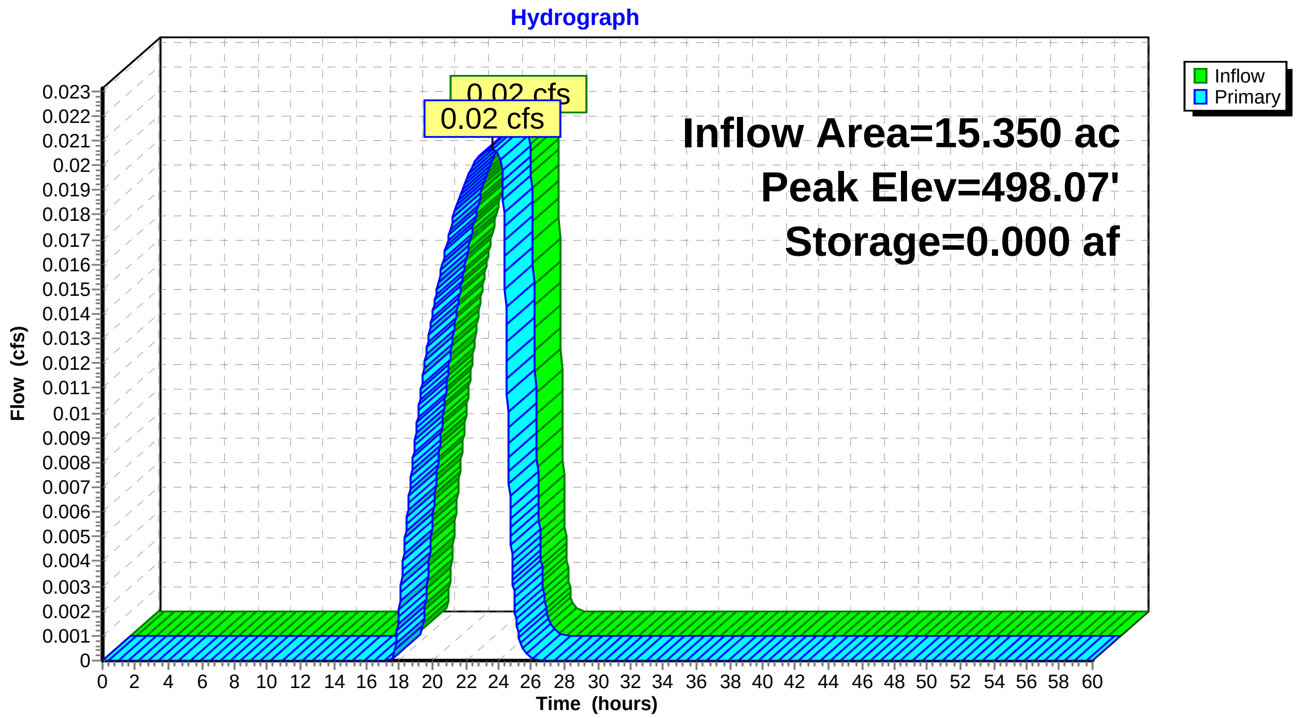
Plug-Flow detention time= 9.8 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 9.9 min ( 1,313.5 - 1,303.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 0.090 af | **60.0" Round Pipe Storage** x 2<br>L= 100.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **24.0" Round Culvert**<br>L= 60.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 497.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 498.00' | **10.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 500.50' | **3.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=0.02 cfs @ 23.63 hrs HW=498.07' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.02 cfs of 0.03 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.91 fps)
  └─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM17: SWM17



## Summary for Pond SWM2: SWM2

Inflow Area = 120.037 ac, 12.91% Impervious, Inflow Depth = 0.82" for 1-Year event
Inflow = 50.50 cfs @ 12.47 hrs, Volume= 8.240 af
Outflow = 13.68 cfs @ 13.54 hrs, Volume= 8.100 af, Atten= 73%, Lag= 64.2 min
Primary = 13.68 cfs @ 13.54 hrs, Volume= 8.100 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 500.62' @ 13.54 hrs Surf.Area= 57,945 sf Storage= 132,003 cf

Plug-Flow detention time= 355.1 min calculated for 8.100 af (98% of inflow)
Center-of-Mass det. time= 344.1 min ( 1,253.5 - 909.4 )

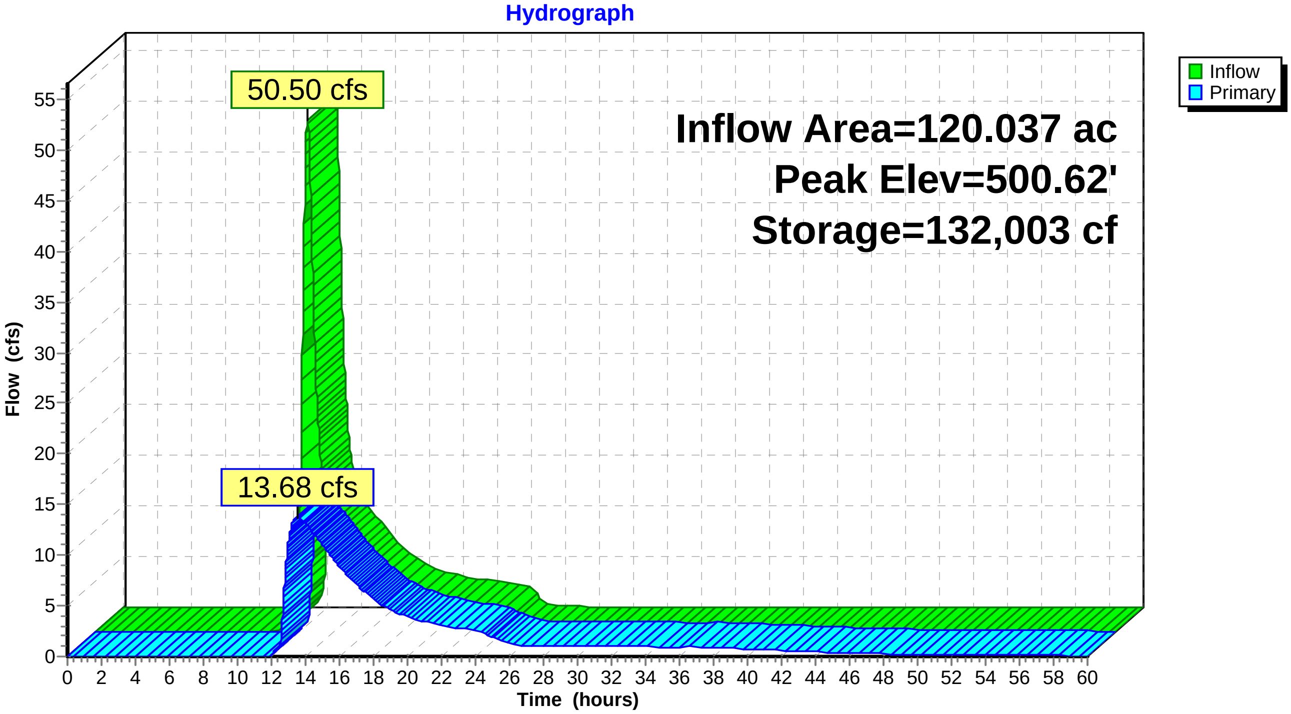
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 598,445 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 498.00 | 33,946 | 0 | 0 |
| 499.00 | 52,156 | 43,051 | 43,051 |
| 500.00 | 55,687 | 53,922 | 96,973 |
| 501.00 | 59,350 | 57,519 | 154,491 |
| 502.00 | 63,077 | 61,214 | 215,705 |
| 503.00 | 66,905 | 64,991 | 280,696 |
| 504.00 | 72,175 | 69,540 | 350,236 |
| 505.00 | 79,111 | 75,643 | 425,879 |
| 506.00 | 88,674 | 83,893 | 509,771 |
| 507.00 | 88,674 | 88,674 | 598,445 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **8.0" Round Culvert**<br>L= 100.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 496.00' S= 0.0200 '/' Cc= 0.900<br>n= 0.024, Flow Area= 0.35 sf |
| #2 | Primary | 499.50' | **4.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #3 | Primary | 503.00' | **15.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=13.68 cfs @ 13.54 hrs HW=500.62' TW=0.00' (Dynamic Tailwater)
├─**1=Culvert** (Barrel Controls 1.24 cfs @ 3.54 fps)
├─**2=Broad-Crested Rectangular Weir** (Weir Controls 12.44 cfs @ 2.79 fps)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM2: SWM2



## Summary for Pond SWM3try: SWM3

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 0.59" for 1-Year event
Inflow = 34.17 cfs @ 13.47 hrs, Volume= 12.286 af
Outflow = 7.03 cfs @ 18.48 hrs, Volume= 11.131 af, Atten= 79%, Lag= 300.9 min
Primary = 7.03 cfs @ 18.48 hrs, Volume= 11.131 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.70' @ 18.48 hrs Surf.Area= 366,867 sf Storage= 253,882 cf

Plug-Flow detention time= 652.3 min calculated for 11.131 af (91% of inflow)
Center-of-Mass det. time= 504.3 min ( 1,673.1 - 1,168.9 )

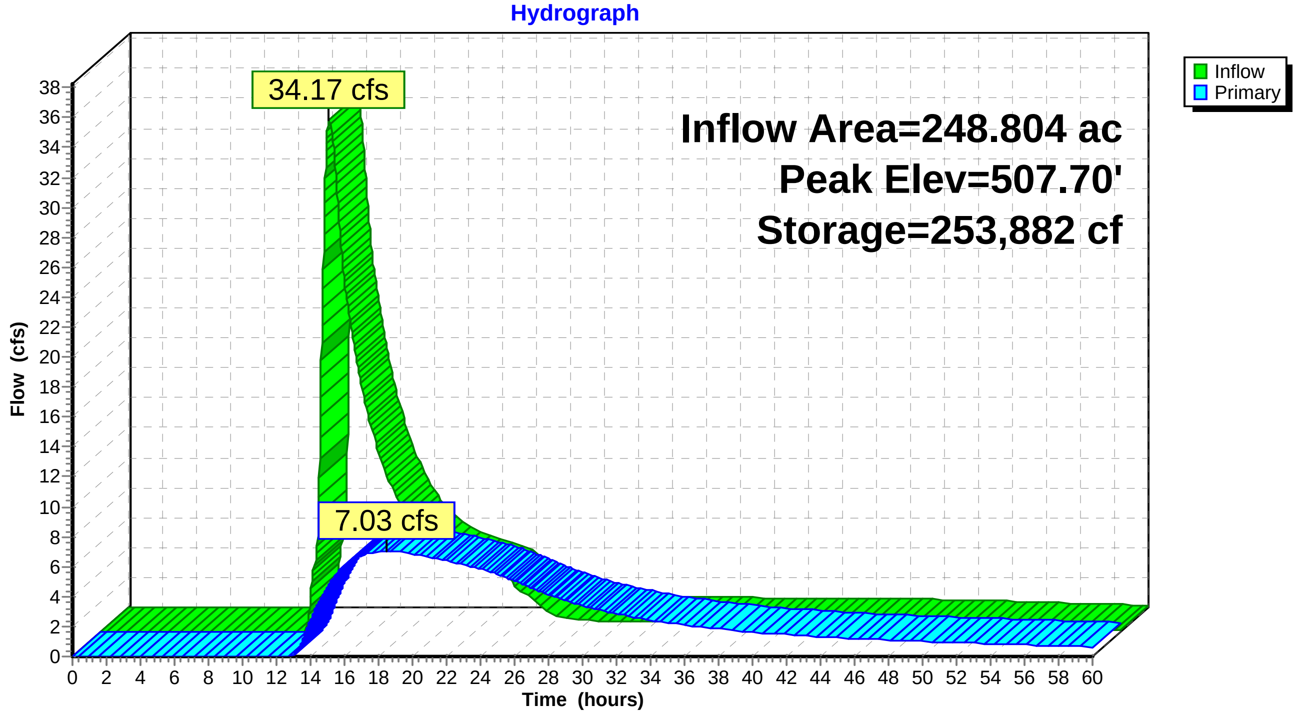
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.00' | 2,034,374 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 507.00 | 359,082 | 0 | 0 |
| 508.00 | 370,212 | 364,647 | 364,647 |
| 510.00 | 413,188 | 783,400 | 1,148,047 |
| 512.00 | 473,139 | 886,327 | 2,034,374 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.00' | **4.5' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #2 | Primary | 508.75' | **15.0' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=7.03 cfs @ 18.48 hrs HW=507.70' TW=502.63' (Dynamic Tailwater)
├─**1=Broad-Crested Rectangular Weir** (Weir Controls 7.03 cfs @ 2.23 fps)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM3try: SWM3



## Summary for Pond SWM4: SWM4

Inflow Area = 195.996 ac, 11.01% Impervious, Inflow Depth > 0.57" for 1-Year event
Inflow = 25.56 cfs @ 13.36 hrs, Volume= 9.383 af
Outflow = 24.71 cfs @ 13.54 hrs, Volume= 9.370 af, Atten= 3%, Lag= 10.9 min
Primary = 24.71 cfs @ 13.54 hrs, Volume= 9.370 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 515.41' @ 13.54 hrs Surf.Area= 42,108 sf Storage= 17,196 cf

Plug-Flow detention time= 20.3 min calculated for 9.367 af (100% of inflow)
Center-of-Mass det. time= 17.1 min ( 1,234.8 - 1,217.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 515.00' | 387,328 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

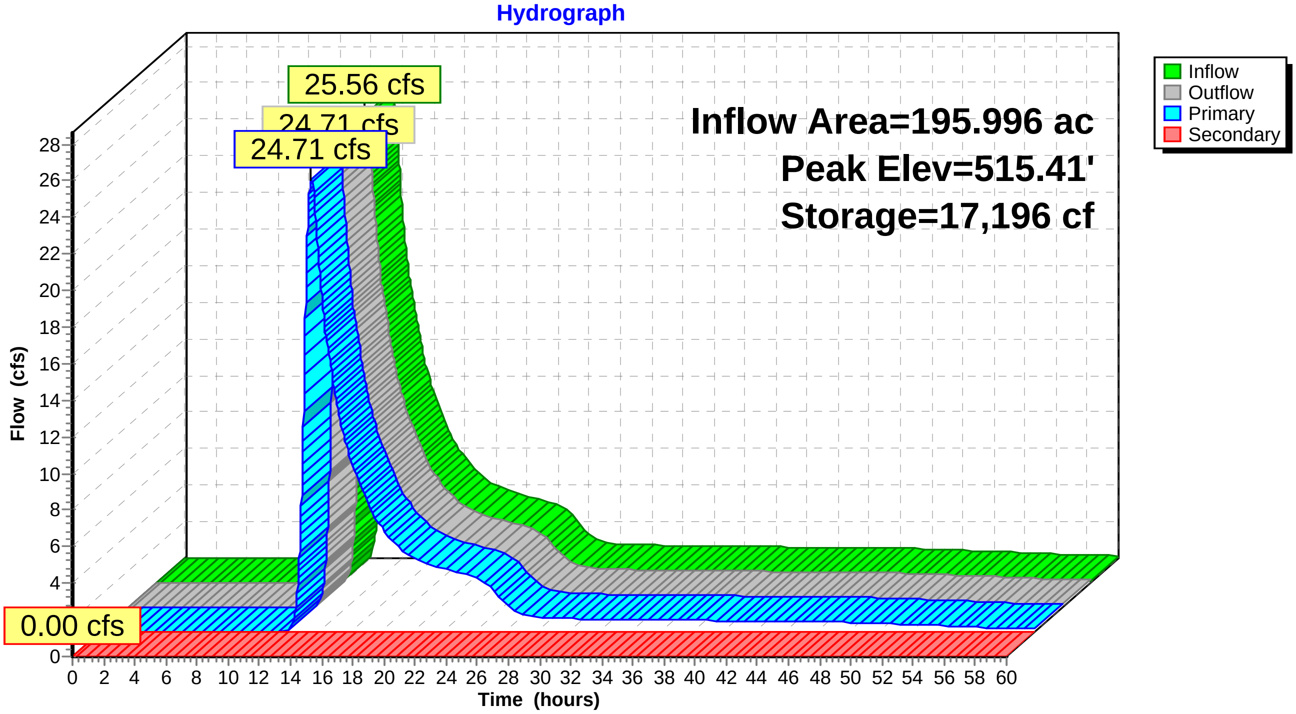
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 515.00 | 40,770 | 0 | 0 |
| 516.00 | 43,995 | 42,383 | 42,383 |
| 518.00 | 52,841 | 96,836 | 139,219 |
| 520.00 | 62,089 | 114,930 | 254,149 |
| 522.00 | 71,090 | 133,179 | 387,328 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 510.00' | **36.0" Round Culvert X 3.00**<br>L= 250.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 510.00' / 505.50' S= 0.0180 '/' Cc= 0.900<br>n= 0.020, Flow Area= 7.07 sf |
| #2 | Device 1 | 515.00' | **36.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 521.50' | **25.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=24.71 cfs @ 13.54 hrs HW=515.41' TW=507.20' (Dynamic Tailwater)
└─**1=Culvert** (Passes 24.71 cfs of 190.89 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 24.71 cfs @ 2.11 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=515.00' TW=507.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM4: SWM4



## Summary for Pond SWM5: SWM5

Inflow Area = 58.557 ac, 24.60% Impervious, Inflow Depth = 0.92" for 1-Year event
Inflow = 31.19 cfs @ 12.42 hrs, Volume= 4.510 af
Outflow = 9.78 cfs @ 13.22 hrs, Volume= 4.367 af, Atten= 69%, Lag= 48.2 min
Primary = 0.80 cfs @ 13.22 hrs, Volume= 2.360 af
Secondary = 8.98 cfs @ 13.22 hrs, Volume= 2.007 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 519.44' @ 13.22 hrs Surf.Area= 40,655 sf Storage= 83,488 cf

Plug-Flow detention time= 602.7 min calculated for 4.365 af (97% of inflow)
Center-of-Mass det. time= 585.8 min ( 1,471.7 - 885.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 517.00' | 251,698 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 517.00 | 22,920 | 0 | 0 |
| 518.00 | 35,091 | 29,006 | 29,006 |
| 520.00 | 42,827 | 77,918 | 106,924 |
| 522.00 | 50,965 | 93,792 | 200,716 |
| 523.00 | 51,000 | 50,983 | 251,698 |

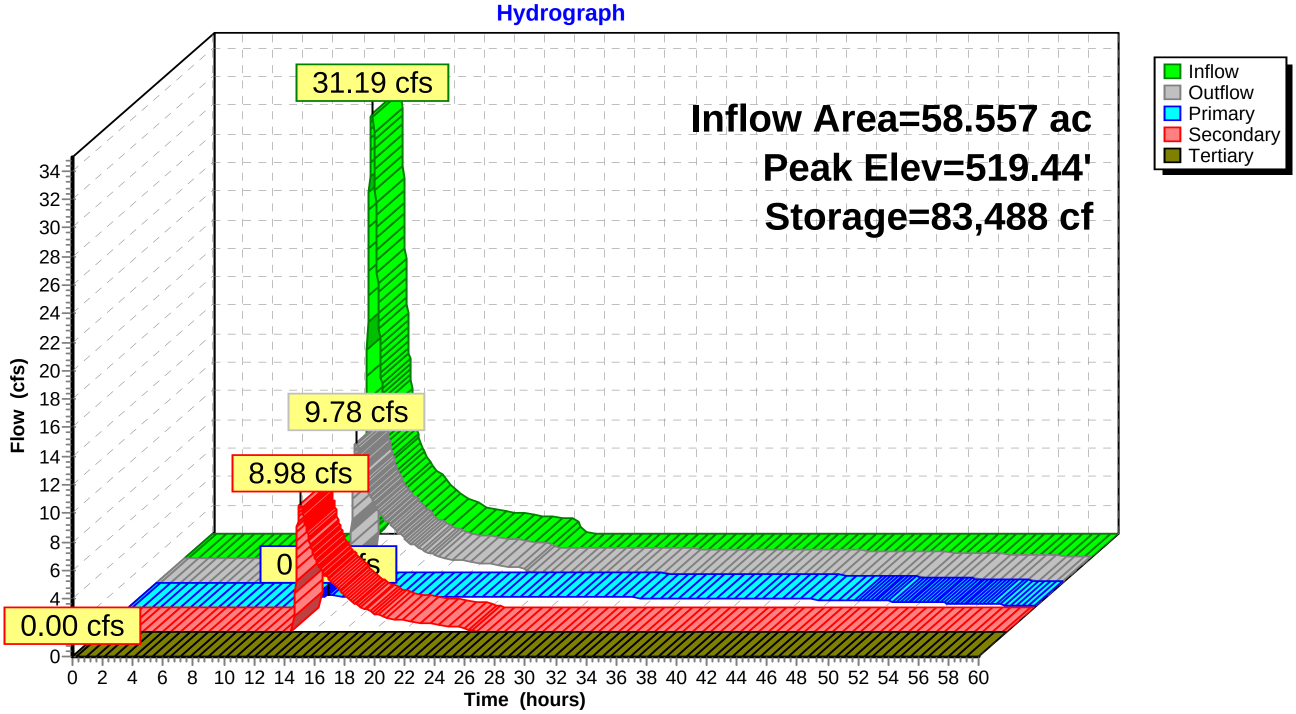
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 517.00' | **6.0" Round Culvert**<br>L= 90.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 517.00' / 516.00' S= 0.0111 '/' Cc= 0.900<br>n= 0.015, Flow Area= 0.20 sf |
| #2 | Secondary | 512.00' | **30.0" Round Culvert X 3.00**<br>L= 270.0' RCP, groove end w/headwall, Ke= 0.200<br>Inlet / Outlet Invert= 512.00' / 505.00' S= 0.0259 '/' Cc= 0.900<br>n= 0.020, Flow Area= 4.91 sf |
| #3 | Device 2 | 519.20' | **30.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Tertiary | 521.00' | **20.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.80 cfs @ 13.22 hrs HW=519.44' TW=515.36' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.80 cfs @ 4.08 fps)

**Secondary OutFlow** Max=8.97 cfs @ 13.22 hrs HW=519.44' TW=507.10' (Dynamic Tailwater)
└─**2=Culvert** (Passes 8.97 cfs of 153.08 cfs potential flow)
  └─**3=Orifice/Grate** (Weir Controls 8.97 cfs @ 1.60 fps)

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=517.00' TW=515.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM5: SWM5



## Summary for Pond SWM6: SWM6

[62] Hint: Exceeded Reach A105R OUTLET depth by 0.37' @ 26.06 hrs

Inflow Area = 99.305 ac, 18.16% Impervious, Inflow Depth > 0.21" for 1-Year event
Inflow = 2.76 cfs @ 14.68 hrs, Volume= 1.727 af
Outflow = 0.87 cfs @ 23.41 hrs, Volume= 1.466 af, Atten= 69%, Lag= 523.6 min
Primary = 0.87 cfs @ 23.41 hrs, Volume= 1.466 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 500.53' @ 23.41 hrs Surf.Area= 88,911 sf Storage= 43,938 cf

Plug-Flow detention time= 751.9 min calculated for 1.466 af (85% of inflow)
Center-of-Mass det. time= 655.1 min ( 1,767.3 - 1,112.2 )

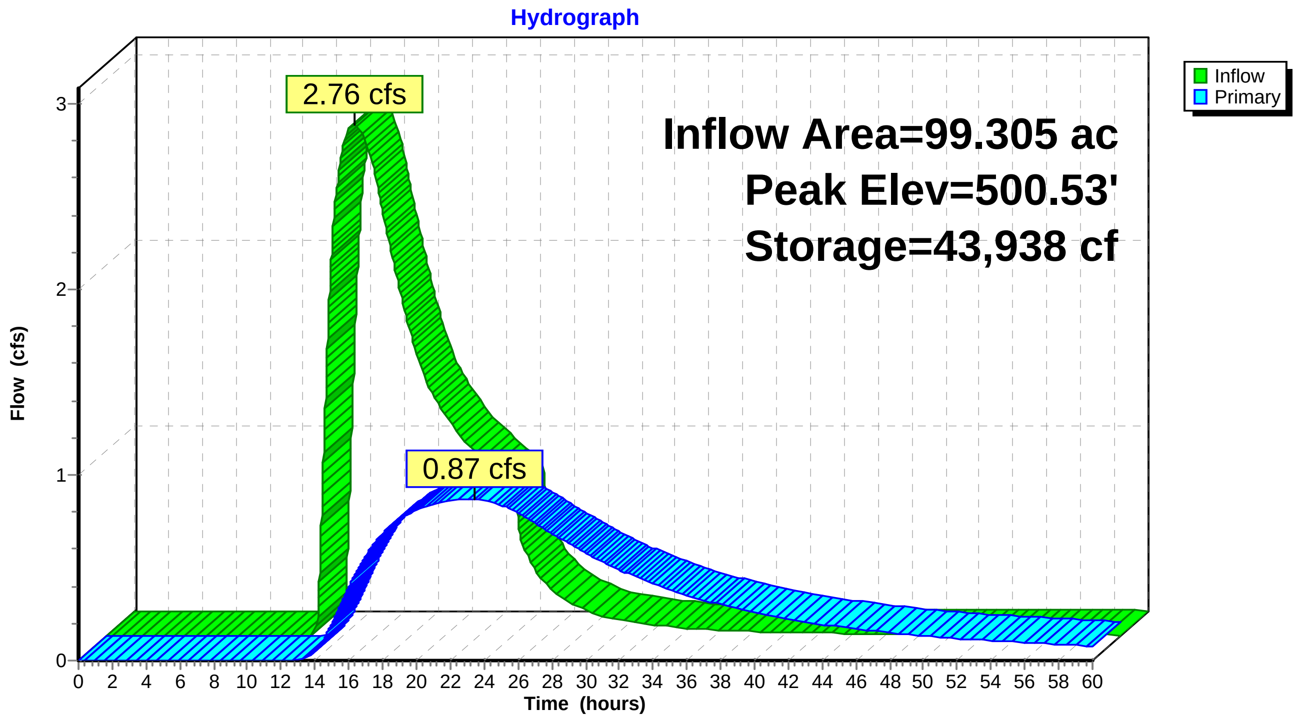
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 883,875 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 500.00 | 76,477 | 0 | 0 |
| 501.00 | 99,879 | 88,178 | 88,178 |
| 502.00 | 122,401 | 111,140 | 199,318 |
| 504.00 | 148,997 | 271,398 | 470,716 |
| 506.00 | 176,108 | 325,105 | 795,821 |
| 506.50 | 176,108 | 88,054 | 883,875 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.00' | **8.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 500.00' / 498.50' S= 0.0111 '/' Cc= 0.900<br>n= 0.012, Flow Area= 0.35 sf |
| #2 | Primary | 501.50' | **18.0" Round Culvert**<br>L= 105.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 501.50' / 500.00' S= 0.0143 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.87 cfs @ 23.41 hrs HW=500.53' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.87 cfs @ 3.99 fps)
└─**2=Culvert** ( Controls 0.00 cfs)

## Pond SWM6: SWM6



## Summary for Pond SWM7: SWM7

Inflow Area = 4.590 ac, 29.85% Impervious, Inflow Depth = 0.99" for 1-Year event
Inflow = 3.76 cfs @ 12.24 hrs, Volume= 0.378 af
Outflow = 1.03 cfs @ 12.79 hrs, Volume= 0.378 af, Atten= 73%, Lag= 33.2 min
Primary = 1.03 cfs @ 12.79 hrs, Volume= 0.378 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 742.65' @ 12.79 hrs Surf.Area= 2,816 sf Storage= 4,923 cf

Plug-Flow detention time= 52.2 min calculated for 0.378 af (100% of inflow)
Center-of-Mass det. time= 52.4 min ( 925.7 - 873.3 )

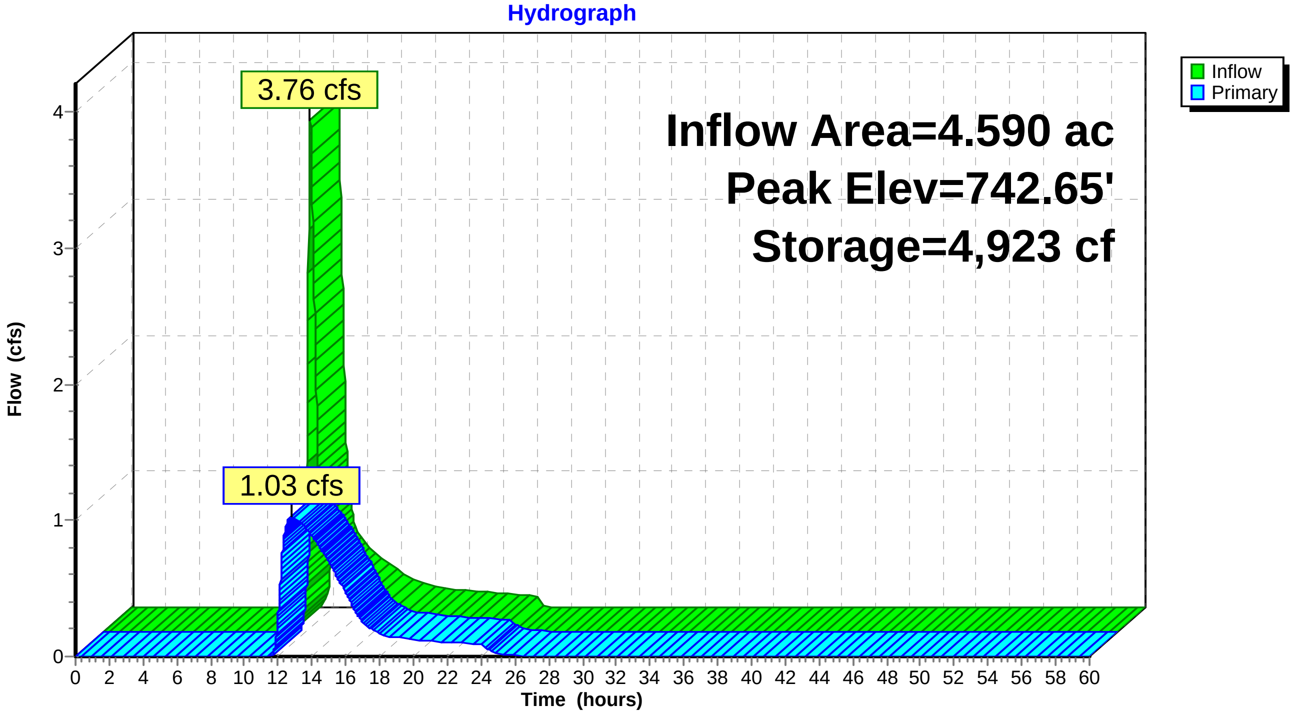
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 740.00' | 33,203 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 740.00 | 1,005 | 0 | 0 |
| 741.00 | 1,611 | 1,308 | 1,308 |
| 742.00 | 2,307 | 1,959 | 3,267 |
| 743.00 | 3,095 | 2,701 | 5,968 |
| 744.00 | 3,949 | 3,522 | 9,490 |
| 745.00 | 4,882 | 4,416 | 13,906 |
| 746.00 | 5,886 | 5,384 | 19,290 |
| 747.00 | 6,942 | 6,414 | 25,704 |
| 748.00 | 8,056 | 7,499 | 33,203 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 740.00' | **30.0" Round Culvert**<br>L= 60.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 740.00' / 739.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |
| #2 | Device 1 | 740.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 743.80' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 744.40' | **10.0" Vert. Orifice/Grate X 2.00** C= 0.600 |
| #5 | Device 1 | 747.10' | **20.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=1.03 cfs @ 12.79 hrs HW=742.65' TW=717.44' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.03 cfs of 34.56 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.03 cfs @ 7.52 fps)
  ├─**3=Orifice/Grate** ( Controls 0.00 cfs)
  ├─**4=Orifice/Grate** ( Controls 0.00 cfs)
  └─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM7: SWM7



## Summary for Pond SWM8: SWM8

Inflow Area = 15.712 ac, 18.18% Impervious, Inflow Depth = 0.53" for 1-Year event
Inflow = 3.80 cfs @ 12.59 hrs, Volume= 0.694 af
Outflow = 0.80 cfs @ 15.22 hrs, Volume= 0.692 af, Atten= 79%, Lag= 157.3 min
Primary = 0.80 cfs @ 15.22 hrs, Volume= 0.692 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 651.69' @ 15.22 hrs Surf.Area= 7,200 sf Storage= 10,792 cf

Plug-Flow detention time= 193.6 min calculated for 0.692 af (100% of inflow)
Center-of-Mass det. time= 192.0 min ( 1,125.3 - 933.3 )

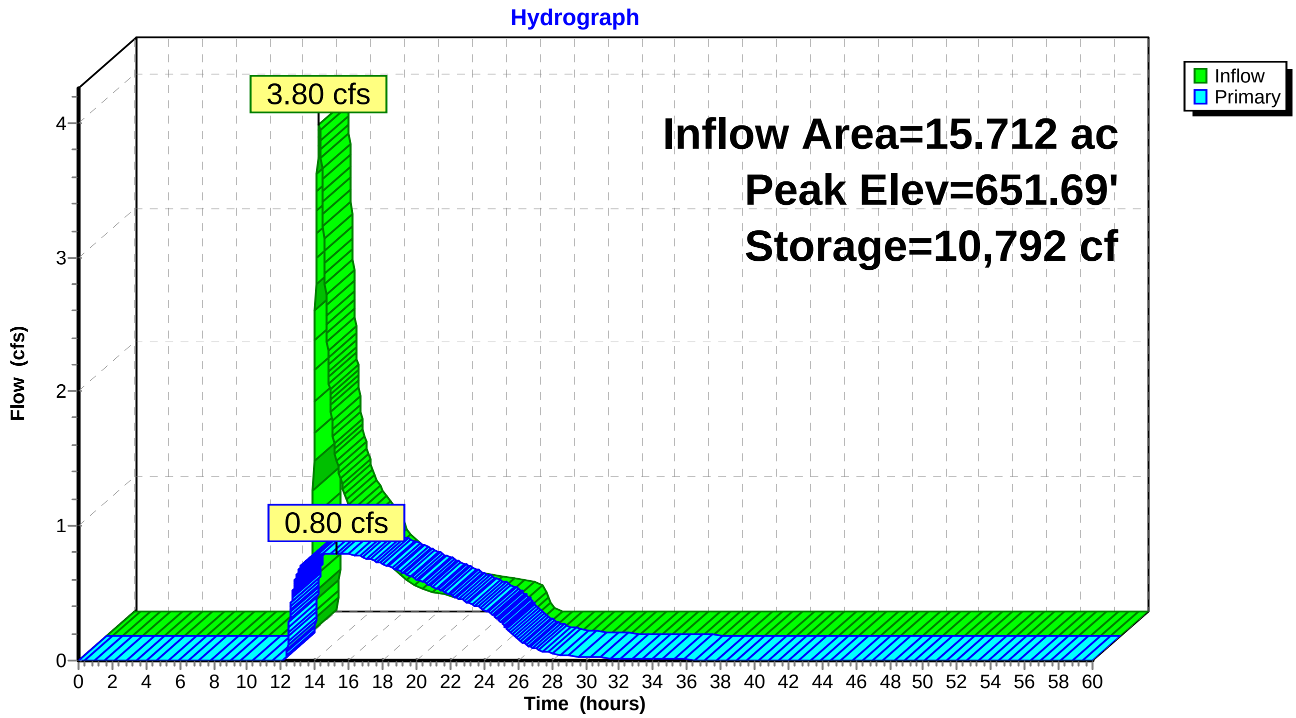
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 79,275 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 650.00 | 5,538 | 0 | 0 |
| 652.00 | 7,499 | 13,037 | 13,037 |
| 654.00 | 9,725 | 17,224 | 30,261 |
| 656.00 | 12,197 | 21,922 | 52,183 |
| 658.00 | 14,895 | 27,092 | 79,275 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **36.0" Round Culvert**<br>L= 90.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 648.00' S= 0.0222 '/' Cc= 0.900<br>n= 0.010, Flow Area= 7.07 sf |
| #2 | Device 1 | 650.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 652.00' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 654.40' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #5 | Device 1 | 656.50' | **1.5' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |
| #6 | Device 1 | 657.50' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=0.80 cfs @ 15.22 hrs HW=651.69' TW=620.71' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.80 cfs of 22.80 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.80 cfs @ 5.87 fps)
  ├─**3=Orifice/Grate** ( Controls 0.00 cfs)
  ├─**4=Orifice/Grate** ( Controls 0.00 cfs)
  ├─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └─**6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM8: SWM8



## Summary for Pond WF: Water Feature

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 0.16" for 1-Year event
Inflow = 1.15 cfs @ 13.90 hrs, Volume= 0.659 af
Outflow = 1.07 cfs @ 14.81 hrs, Volume= 0.659 af, Atten= 7%, Lag= 54.5 min
Primary = 1.07 cfs @ 14.81 hrs, Volume= 0.659 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.11' @ 14.81 hrs Surf.Area= 27,179 sf Storage= 2,883 cf

Plug-Flow detention time= 55.4 min calculated for 0.659 af (100% of inflow)
Center-of-Mass det. time= 55.3 min ( 1,092.9 - 1,037.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 526.00' | 127,058 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

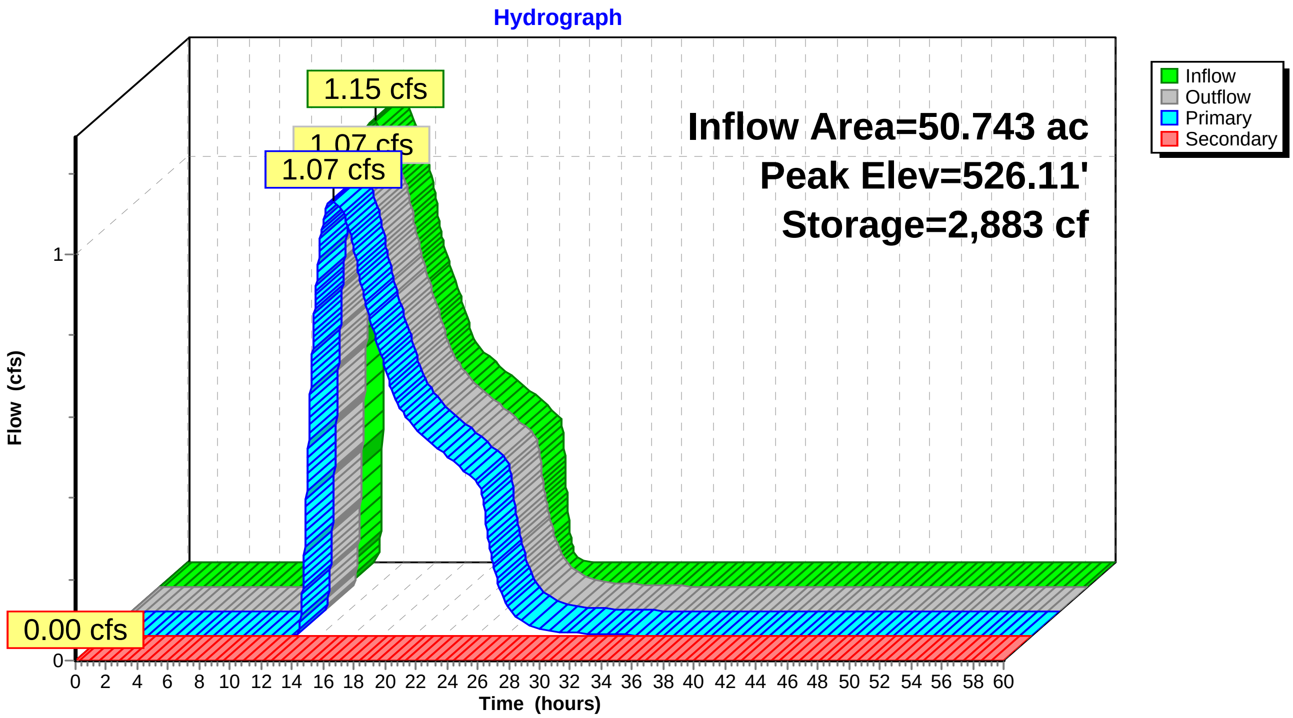
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 526.00 | 26,946 | 0 | 0 |
| 528.00 | 31,311 | 58,257 | 58,257 |
| 530.00 | 37,490 | 68,801 | 127,058 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 520.00' | **36.0" Round Culvert**<br>L= 225.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 520.00' / 513.00' S= 0.0311 '/' Cc= 0.900<br>n= 0.015, Flow Area= 7.07 sf |
| #2 | Device 1 | 526.00' | **36.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 529.00' | **20.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=1.07 cfs @ 14.81 hrs HW=526.11' TW=512.18' (Dynamic Tailwater)
**1=Culvert** (Passes 1.07 cfs of 91.31 cfs potential flow)
**2=Orifice/Grate** (Weir Controls 1.07 cfs @ 1.07 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=526.00' TW=512.00' (Dynamic Tailwater)
**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WF: Water Feature

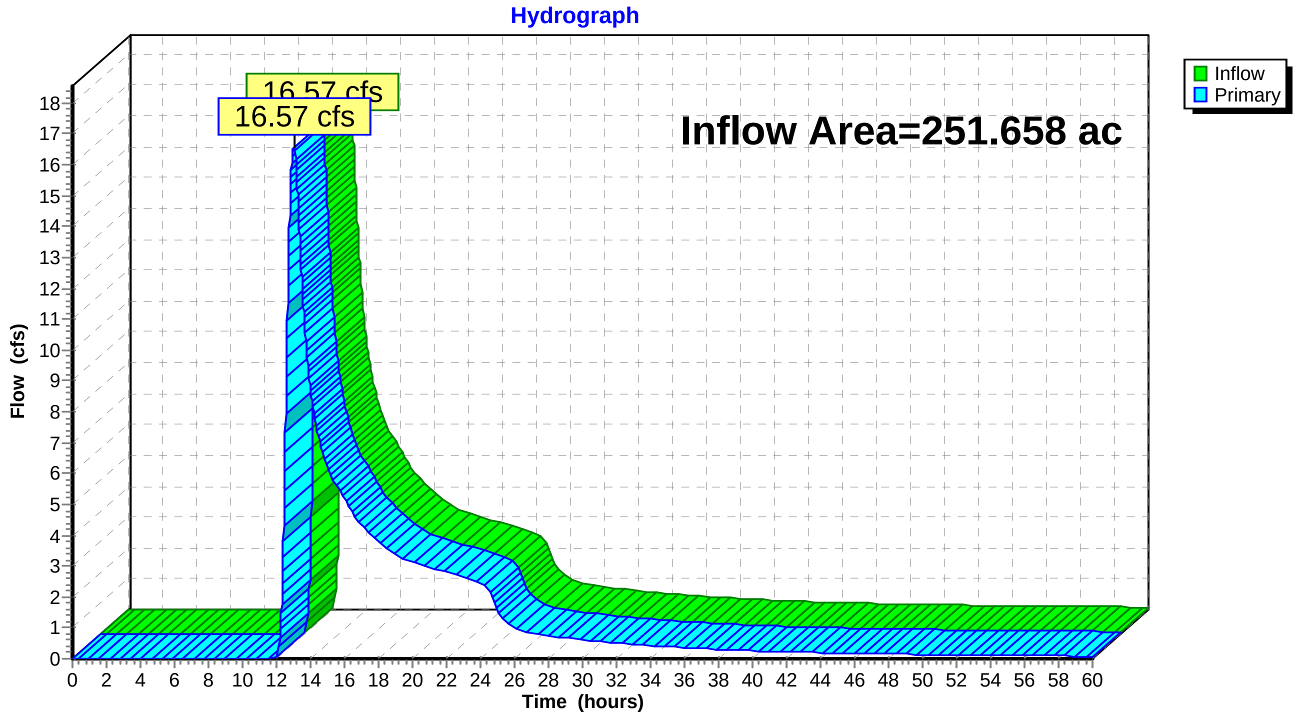


## Summary for Link A: Amenia Stream

Inflow Area = 251.658 ac, 10.11% Impervious, Inflow Depth > 0.29" for 1-Year event
Inflow = 16.57 cfs @ 13.02 hrs, Volume= 6.024 af
Primary = 16.57 cfs @ 13.02 hrs, Volume= 6.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

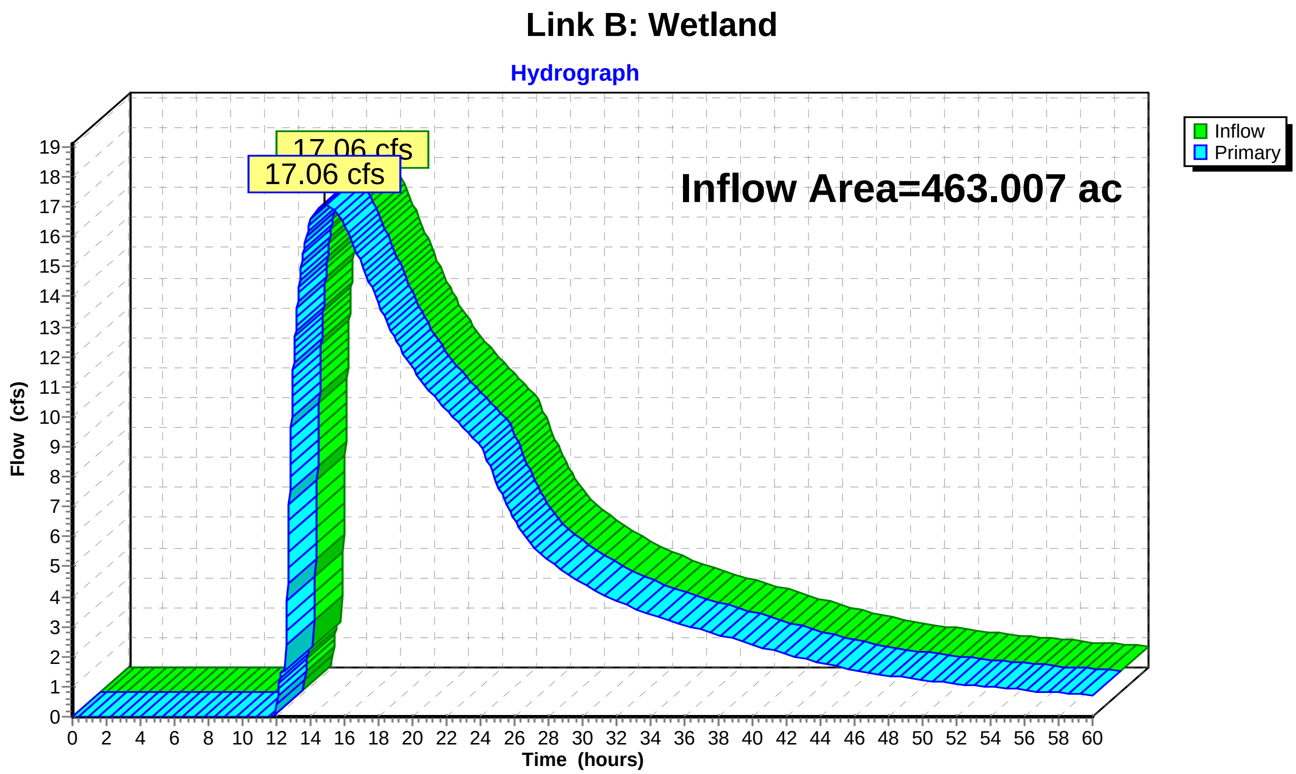
### Link A: Amenia Stream



## Summary for Link B: Wetland

Inflow Area = 463.007 ac, 14.28% Impervious, Inflow Depth > 0.53" for 1-Year event
Inflow = 17.06 cfs @ 14.85 hrs, Volume= 20.267 af
Primary = 17.06 cfs @ 14.85 hrs, Volume= 20.267 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

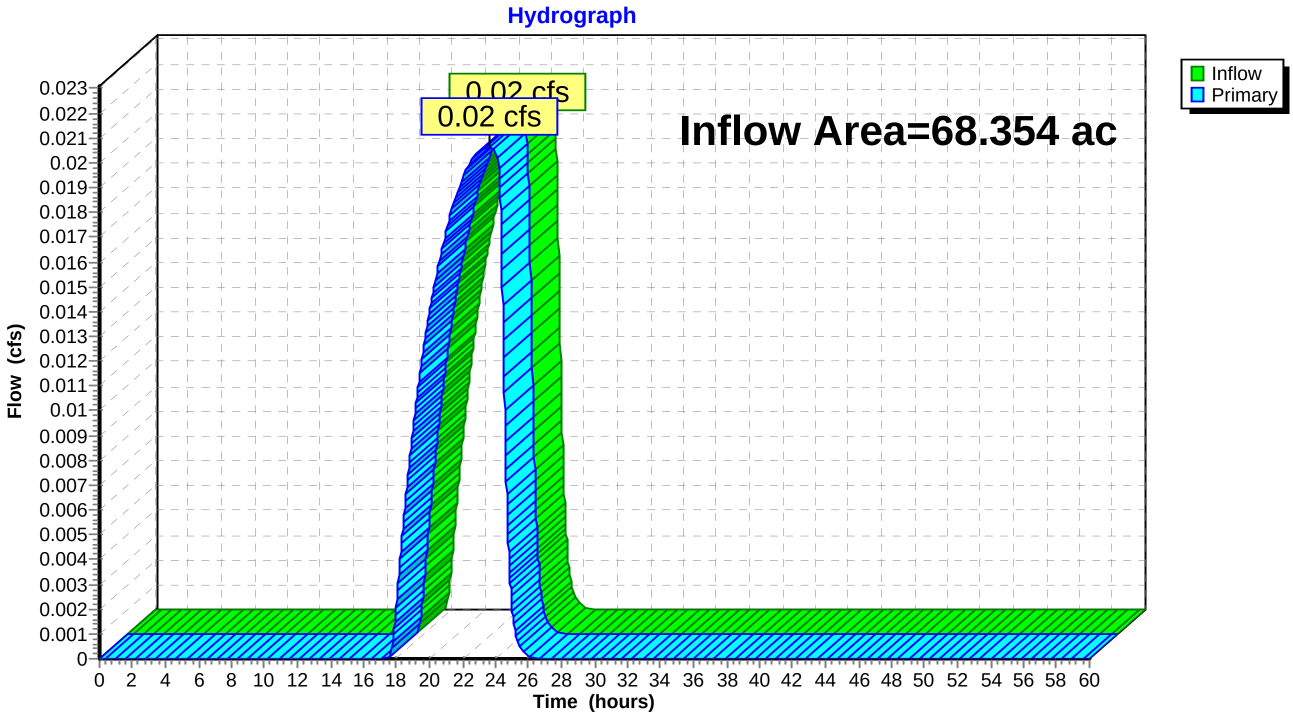


## Summary for Link C: Culvert

Inflow Area = 68.354 ac, 5.83% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.02 cfs @ 23.63 hrs, Volume= 0.009 af
Primary = 0.02 cfs @ 23.63 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

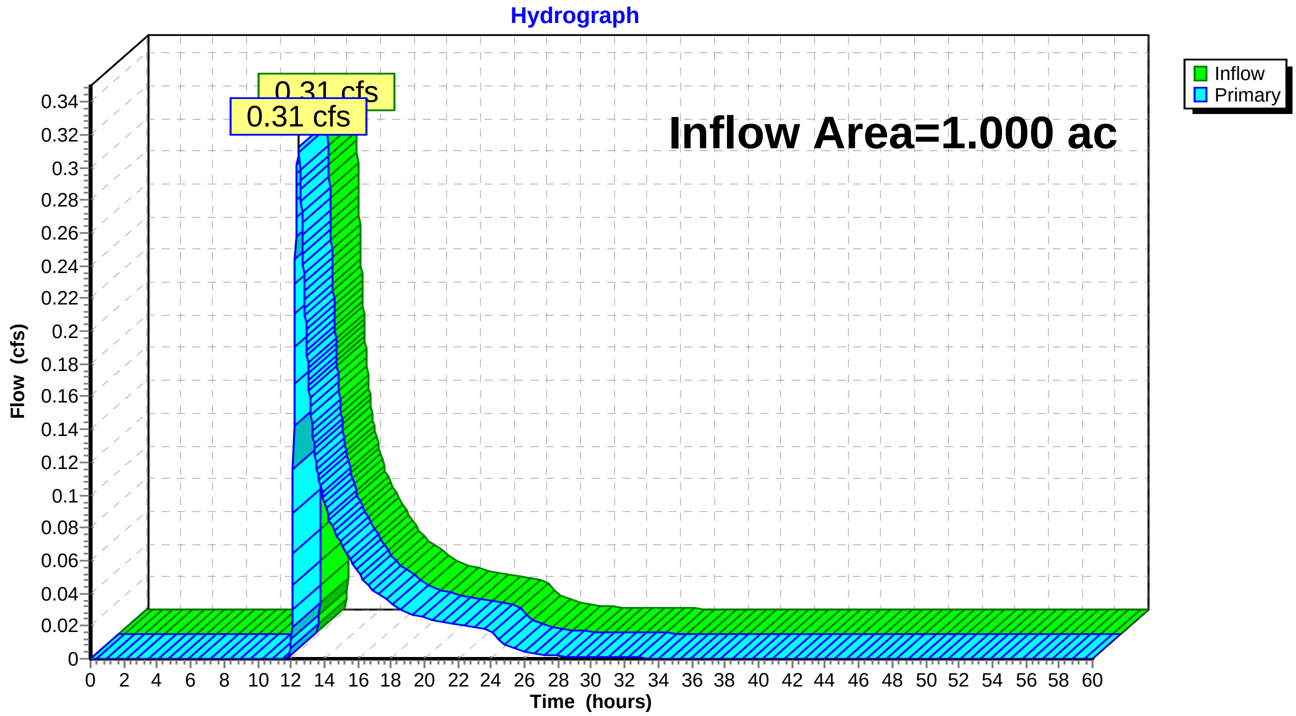


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth > 0.74" for 1-Year event
Inflow = 0.31 cfs @ 12.46 hrs, Volume= 0.062 af
Primary = 0.31 cfs @ 12.46 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

| | |
|---|---|
| **Subcatchment A101: A101** | Runoff Area=21.492 ac 4.36% Impervious Runoff Depth=0.13"<br>Flow Length=1,320' Tc=20.2 min CN=48 Runoff=0.37 cfs 0.232 af |
| **Subcatchment A102: A102** | Runoff Area=4.590 ac 29.85% Impervious Runoff Depth=2.35"<br>Flow Length=530' Tc=15.8 min CN=81 Runoff=9.52 cfs 0.898 af |
| **Subcatchment A103: A103** | Runoff Area=57.299 ac 21.07% Impervious Runoff Depth=0.68"<br>Flow Length=2,529' Tc=22.2 min CN=60 Runoff=17.79 cfs 3.256 af |
| **Subcatchment A104: A104** | Runoff Area=29.922 ac 5.68% Impervious Runoff Depth=0.10"<br>Flow Length=1,871' Tc=21.8 min CN=47 Runoff=0.39 cfs 0.251 af |
| **Subcatchment A105: A105** | Runoff Area=26.625 ac 12.66% Impervious Runoff Depth=0.81"<br>Flow Length=1,484' Tc=19.3 min CN=62 Runoff=11.46 cfs 1.788 af |
| **Subcatchment A106: A106** | Runoff Area=10.791 ac 11.31% Impervious Runoff Depth=1.97"<br>Flow Length=1,260' Tc=26.7 min CN=77 Runoff=14.85 cfs 1.772 af |
| **Subcatchment A107: A107** | Runoff Area=79.700 ac 2.24% Impervious Runoff Depth=1.71"<br>Flow Length=3,685' Tc=61.0 min CN=74 Runoff=59.72 cfs 11.332 af |
| **Subcatchment A108: A108** | Runoff Area=5.527 ac 2.32% Impervious Runoff Depth=0.51"<br>Flow Length=1,235' Tc=30.1 min CN=57 Runoff=0.92 cfs 0.236 af |
| **Subcatchment A109: A109** | Runoff Area=15.712 ac 18.18% Impervious Runoff Depth=1.62"<br>Flow Length=1,315' Tc=33.2 min CN=73 Runoff=15.49 cfs 2.123 af |
| **Subcatchment B101: B101** | Runoff Area=50.743 ac 17.46% Impervious Runoff Depth=0.87"<br>Flow Length=3,015' Tc=36.7 min CN=63 Runoff=19.51 cfs 3.682 af |
| **Subcatchment B102: B102** | Runoff Area=40.873 ac 1.28% Impervious Runoff Depth=0.68"<br>Flow Length=955' Tc=20.3 min CN=60 Runoff=13.01 cfs 2.322 af |
| **Subcatchment B103: B103** | Runoff Area=22.950 ac 10.98% Impervious Runoff Depth=2.25"<br>Flow Length=2,127' Tc=38.5 min CN=80 Runoff=30.84 cfs 4.303 af |
| **Subcatchment B104: B104** | Runoff Area=24.602 ac 28.02% Impervious Runoff Depth=2.25"<br>Flow Length=3,620' Tc=24.7 min CN=80 Runoff=40.55 cfs 4.613 af |
| **Subcatchment B105: B105** | Runoff Area=24.733 ac 14.99% Impervious Runoff Depth=2.25"<br>Flow Length=2,606' Tc=36.4 min CN=80 Runoff=34.16 cfs 4.637 af |
| **Subcatchment B106: B106** | Runoff Area=118.113 ac 1.34% Impervious Runoff Depth=1.88"<br>Flow Length=5,409' Tc=85.7 min CN=76 Runoff=79.90 cfs 18.512 af |
| **Subcatchment B107: B107** | Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=1.97"<br>Flow Length=907' Tc=37.9 min CN=77 Runoff=16.70 cfs 2.353 af |

**Subcatchment B108: B108** Runoff Area=40.951 ac 11.09% Impervious Runoff Depth=2.06"
Flow Length=2,038' Tc=32.2 min CN=78 Runoff=54.45 cfs 7.037 af

**Subcatchment B109: B109** Runoff Area=34.256 ac 12.24% Impervious Runoff Depth=2.06"
Flow Length=1,371' Tc=24.9 min CN=78 Runoff=51.15 cfs 5.887 af

**Subcatchment B110: B110** Runoff Area=6.622 ac 45.47% Impervious Runoff Depth=2.75"
Flow Length=936' Tc=11.9 min CN=85 Runoff=17.91 cfs 1.517 af

**Subcatchment B111: B111** Runoff Area=6.254 ac 40.36% Impervious Runoff Depth=1.22"
Flow Length=516' Tc=6.8 min CN=68 Runoff=7.60 cfs 0.638 af

**Subcatchment B112: B112** Runoff Area=39.487 ac 34.78% Impervious Runoff Depth=1.08"
Flow Length=989' Tc=15.8 min CN=66 Runoff=29.62 cfs 3.544 af

**Subcatchment B113: B113** Runoff Area=5.598 ac 30.55% Impervious Runoff Depth=0.62"
Flow Length=836' Tc=14.0 min CN=59 Runoff=1.66 cfs 0.291 af

**Subcatchment B115: B115** Runoff Area=13.072 ac 23.44% Impervious Runoff Depth=0.74"
Flow Length=1,419' Tc=11.1 min CN=61 Runoff=5.55 cfs 0.809 af

**Subcatchment B116: B116** Runoff Area=2.600 ac 30.58% Impervious Runoff Depth=0.51"
Tc=6.0 min CN=57 Runoff=0.59 cfs 0.111 af

**Subcatchment B117: B117** Runoff Area=7.723 ac 36.64% Impervious Runoff Depth=0.74"
Tc=6.0 min CN=61 Runoff=3.88 cfs 0.478 af

**Subcatchment B118: B118** Runoff Area=2.550 ac 54.71% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=71 Runoff=4.08 cfs 0.310 af

**Subcatchment B119: B119** Runoff Area=7.550 ac 56.29% Impervious Runoff Depth=2.85"
Flow Length=1,683' Tc=10.3 min CN=86 Runoff=22.19 cfs 1.795 af

**Subcatchment C101: C101** Runoff Area=12.930 ac 0.00% Impervious Runoff Depth=0.20"
Flow Length=1,500' Tc=31.9 min CN=50 Runoff=0.35 cfs 0.211 af

**Subcatchment C102: C102** Runoff Area=40.074 ac 2.80% Impervious Runoff Depth=0.94"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=15.46 cfs 3.131 af

**Subcatchment C103: C103** Runoff Area=15.350 ac 18.63% Impervious Runoff Depth=0.36"
Flow Length=2,111' Tc=30.4 min CN=54 Runoff=1.25 cfs 0.462 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=1.97"
Flow Length=176' Tc=7.5 min CN=77 Runoff=2.20 cfs 0.164 af

**Reach 36" Pipe: 36" Pipe** Avg. Flow Depth=0.68' Max Vel=14.15 fps Inflow=16.96 cfs 2.670 af
36.0" Round Pipe n=0.015 L=935.0' S=0.0684 '/' Capacity=151.23 cfs Outflow=16.94 cfs 2.670 af

**Reach 42" Pipe: 42" Pipe** Avg. Flow Depth=1.08' Max Vel=26.84 fps Inflow=67.70 cfs 13.689 af
42.0" Round Pipe n=0.012 L=575.0' S=0.0904 '/' Capacity=327.77 cfs Outflow=67.66 cfs 13.689 af

**Reach A105R: Thru A103** Avg. Flow Depth=0.68' Max Vel=4.04 fps Inflow=9.54 cfs 4.441 af
n=0.050 L=1,170.0' S=0.0564 '/' Capacity=150.86 cfs Outflow=9.53 cfs 4.441 af

**Reach B107R: Thru B103** Avg. Flow Depth=0.23' Max Vel=5.50 fps Inflow=8.35 cfs 2.077 af
n=0.050 L=938.0' S=0.4072 '/' Capacity=192.14 cfs Outflow=8.33 cfs 2.077 af

**Reach B112R: Thru B102** Avg. Flow Depth=1.31' Max Vel=3.43 fps Inflow=34.18 cfs 33.690 af
n=0.050 L=600.0' S=0.0167 '/' Capacity=369.68 cfs Outflow=34.17 cfs 33.681 af

**Pond 102C: Pond 102C** Peak Elev=508.09' Storage=136,377 cf Inflow=15.46 cfs 3.131 af
Outflow=0.00 cfs 0.000 af

**Pond 104A: Wetland D** Peak Elev=507.97' Storage=5,704 cf Inflow=0.39 cfs 0.251 af
Primary=0.21 cfs 0.231 af Secondary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.231 af

**Pond 105A: Wetland H** Peak Elev=574.91' Storage=54,127 cf Inflow=28.21 cfs 4.457 af
Primary=9.54 cfs 4.441 af Secondary=0.00 cfs 0.000 af Outflow=9.54 cfs 4.441 af

**Pond 106A: 36" Culvert** Peak Elev=718.32' Storage=17 cf Inflow=16.96 cfs 2.670 af
Primary=16.96 cfs 2.670 af Secondary=0.00 cfs 0.000 af Outflow=16.96 cfs 2.670 af

**Pond 106B: Wetland J** Peak Elev=526.71' Storage=19,185 cf Inflow=79.90 cfs 18.512 af
Outflow=79.82 cfs 18.512 af

**Pond 107A: 24" Culvert** Peak Elev=625.50' Storage=2,435 cf Inflow=66.90 cfs 13.453 af
Primary=41.01 cfs 12.127 af Secondary=25.88 cfs 1.326 af Outflow=66.89 cfs 13.453 af

**Pond 107B: Wetland** Peak Elev=972.78' Storage=34,203 cf Inflow=16.70 cfs 2.353 af
Outflow=8.35 cfs 2.077 af

**Pond 108A: 36" Culvert** Peak Elev=610.93' Storage=28 cf Inflow=26.65 cfs 1.561 af
Primary=26.68 cfs 1.561 af Secondary=0.00 cfs 0.000 af Outflow=26.68 cfs 1.561 af

**Pond SWM 7A: SWM 7A (Phase 1)** Peak Elev=807.75' Storage=1,522 cf Inflow=2.20 cfs 0.164 af
Outflow=1.09 cfs 0.164 af

**Pond SWM1: SWM 1** Peak Elev=513.02' Storage=13,224 cf Inflow=15.71 cfs 3.681 af
Outflow=13.64 cfs 3.681 af

**Pond SWM17: SWM17** Peak Elev=498.64' Storage=0.007 af Inflow=1.25 cfs 0.462 af
Outflow=1.23 cfs 0.462 af

**Pond SWM2: SWM2** Peak Elev=503.04' Storage=283,617 cf Inflow=141.52 cfs 21.099 af
Outflow=72.11 cfs 20.952 af

**Pond SWM3try: SWM3** Peak Elev=508.92' Storage=713,337 cf Inflow=120.06 cfs 34.989 af
Outflow=34.18 cfs 33.690 af

**Pond SWM4: SWM4** Peak Elev=515.92' Storage=39,046 cf Inflow=83.12 cfs 22.401 af
Primary=82.11 cfs 22.388 af Secondary=0.00 cfs 0.000 af Outflow=82.11 cfs 22.388 af

**Pond SWM5: SWM5** Peak Elev=520.14' Storage=113,066 cf Inflow=81.43 cfs 10.878 af
Primary=0.89 cfs 2.442 af Secondary=68.84 cfs 8.289 af Tertiary=0.00 cfs 0.000 af Outflow=69.73 cfs 10.731 af

**Pond SWM6: SWM6** Peak Elev=502.09' Storage=210,207 cf Inflow=23.75 cfs 7.696 af
Outflow=3.86 cfs 7.037 af

**Pond SWM7: SWM7** Peak Elev=744.88' Storage=13,342 cf Inflow=9.52 cfs 0.898 af
Outflow=3.59 cfs 0.897 af

**Pond SWM8: SWM8** Peak Elev=653.69' Storage=27,283 cf Inflow=15.49 cfs 2.123 af
Outflow=7.32 cfs 2.121 af

**Pond WF: Water Feature** Peak Elev=526.64' Storage=17,639 cf Inflow=19.51 cfs 3.682 af
Primary=15.71 cfs 3.681 af Secondary=0.00 cfs 0.000 af Outflow=15.71 cfs 3.681 af

**Link A: Amenia Stream** Inflow=68.68 cfs 21.188 af
Primary=68.68 cfs 21.188 af

**Link B: Wetland** Inflow=99.31 cfs 60.946 af
Primary=99.31 cfs 60.946 af

**Link C: Culvert** Inflow=1.39 cfs 0.673 af
Primary=1.39 cfs 0.673 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=1.09 cfs 0.164 af
Primary=1.09 cfs 0.164 af

**Total Runoff Area = 784.019 ac Runoff Volume = 88.693 af Average Runoff Depth = 1.36"**
**87.81% Pervious = 688.462 ac 12.19% Impervious = 95.557 ac**

## Summary for Subcatchment A101: A101

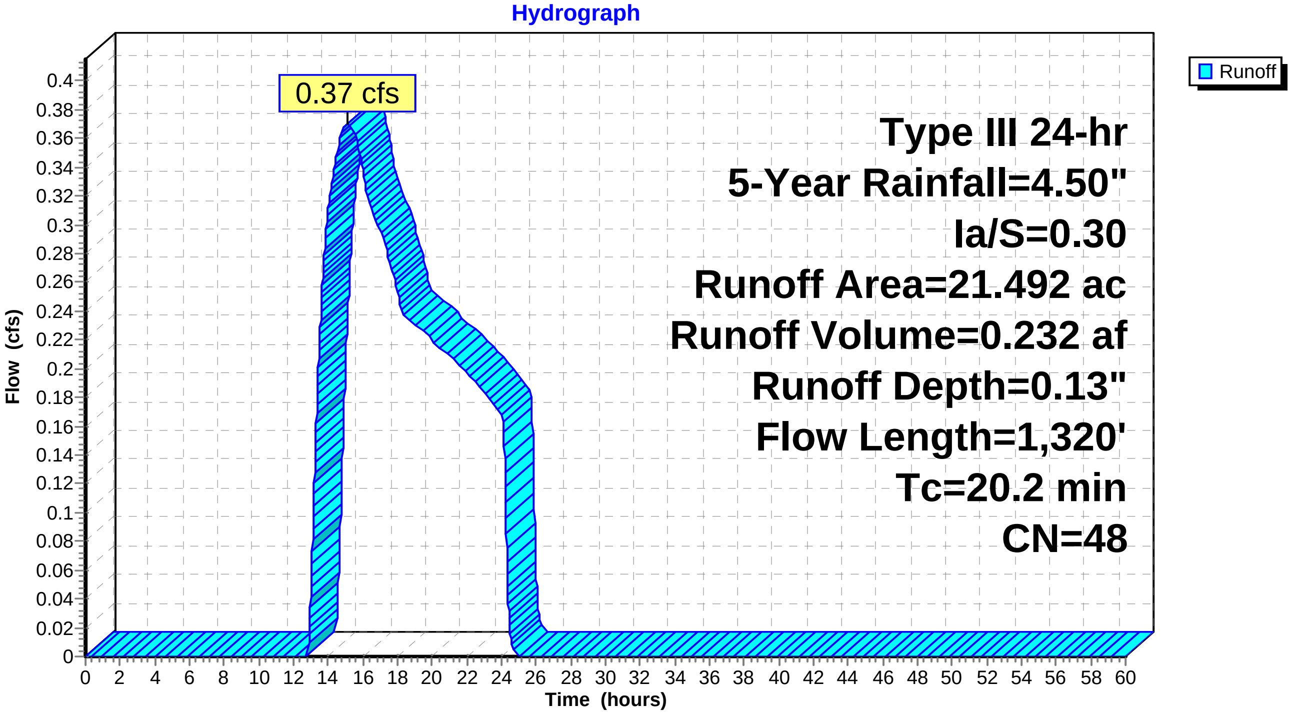
Runoff = 0.37 cfs @ 15.14 hrs, Volume= 0.232 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.015 | 98 | Building roof |
| * | 0.921 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.290 | 39 | >75% Grass cover, Good, HSG A |
| | 6.490 | 61 | >75% Grass cover, Good, HSG B |
| | 0.050 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.270 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.426 | 30 | Sand trap, HSG A |
| * | 0.030 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 21.492 | 48 | Weighted Average |
| | 20.556 | | 95.64% Pervious Area |
| | 0.936 | | 4.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.6 | 100 | 0.1400 | 0.17 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 6.0 | 800 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 420 | 0.0480 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 20.2 | 1,320 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

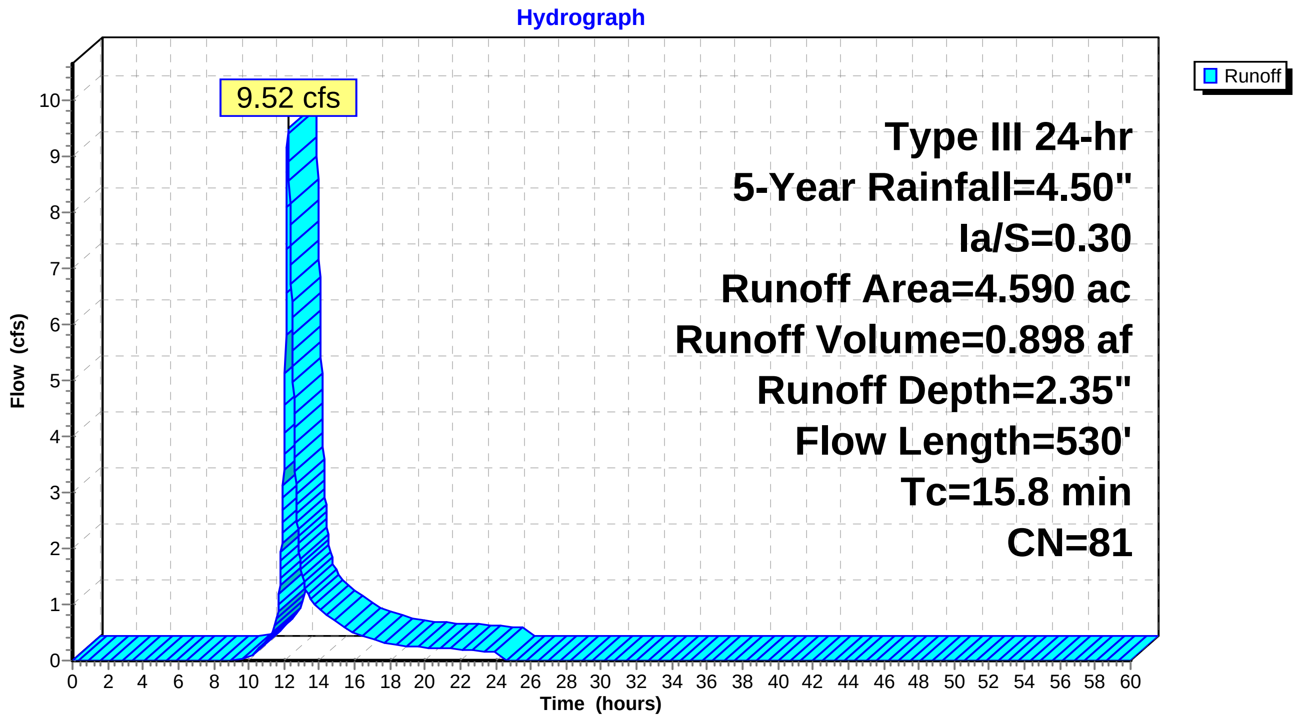
Runoff = 9.52 cfs @ 12.22 hrs, Volume= 0.898 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.200 | 98 | Building roof |
| * | 1.040 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.970 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.250 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 4.590 | 81 | Weighted Average |
| | 3.220 | | 70.15% Pervious Area |
| | 1.370 | | 29.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.1 | 50 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 130 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.7 | 250 | 0.1280 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.8 | 530 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

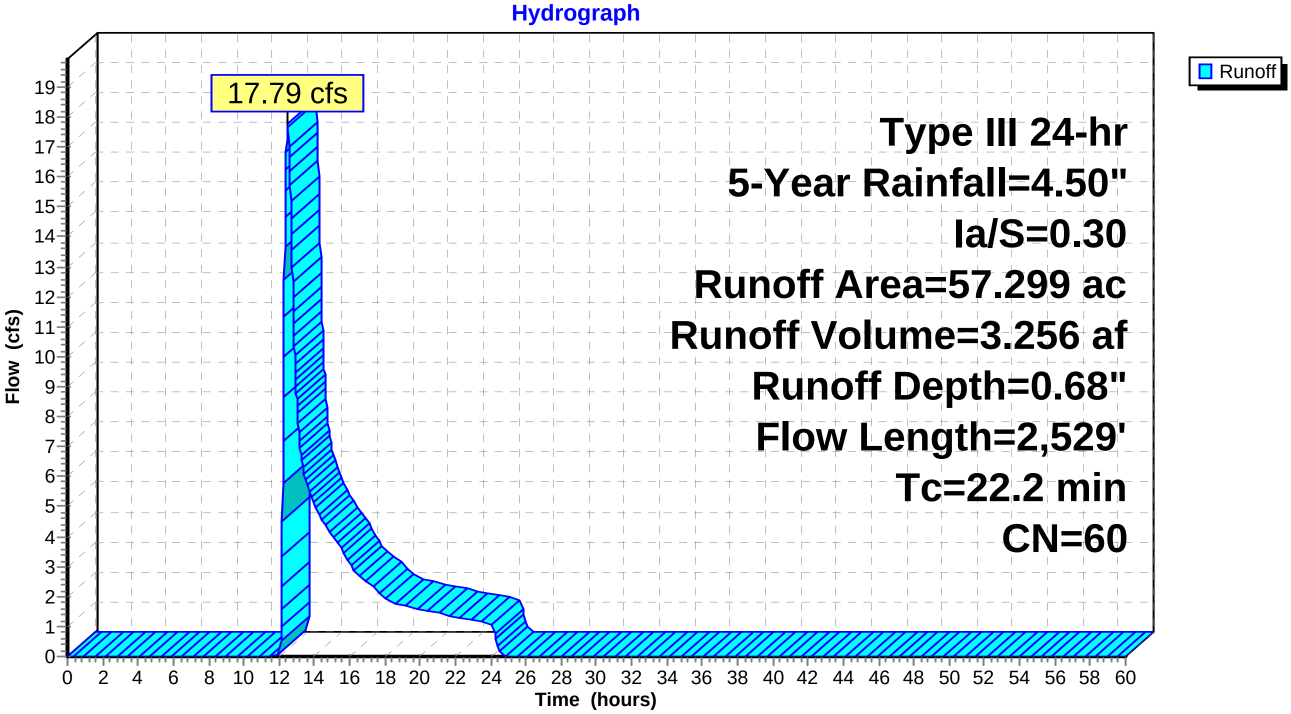
Runoff = 17.79 cfs @ 12.49 hrs, Volume= 3.256 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.320 | 98 | Building roof |
| * | 6.292 | 98 | Paved surface |
| * | 0.438 | 96 | Gravel surface |
| * | 1.461 | 98 | Water Surface |
| | 21.310 | 39 | >75% Grass cover, Good, HSG A |
| | 5.353 | 61 | >75% Grass cover, Good, HSG B |
| | 8.379 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 5.112 | 30 | Woods, Good, HSG A |
| | 1.620 | 55 | Woods, Good, HSG B |
| | 1.505 | 70 | Woods, Good, HSG C |
| | 1.130 | 77 | Woods, Good, HSG D |
| * | 0.220 | 30 | Sand trap, HSG A |
| * | 0.130 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 57.299 | 60 | Weighted Average |
| | 45.226 | | 78.93% Pervious Area |
| | 12.073 | | 21.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.8 | 100 | 0.0300 | 0.09 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 2.2 | 355 | 0.1430 | 2.65 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 554 | 0.0680 | 8.24 | 98.89 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.050 |
| 1.1 | 1,520 | 0.0690 | 23.78 | 116.72 | **Pipe Channel,**<br>30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'<br>n= 0.012 |
| 22.2 | 2,529 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

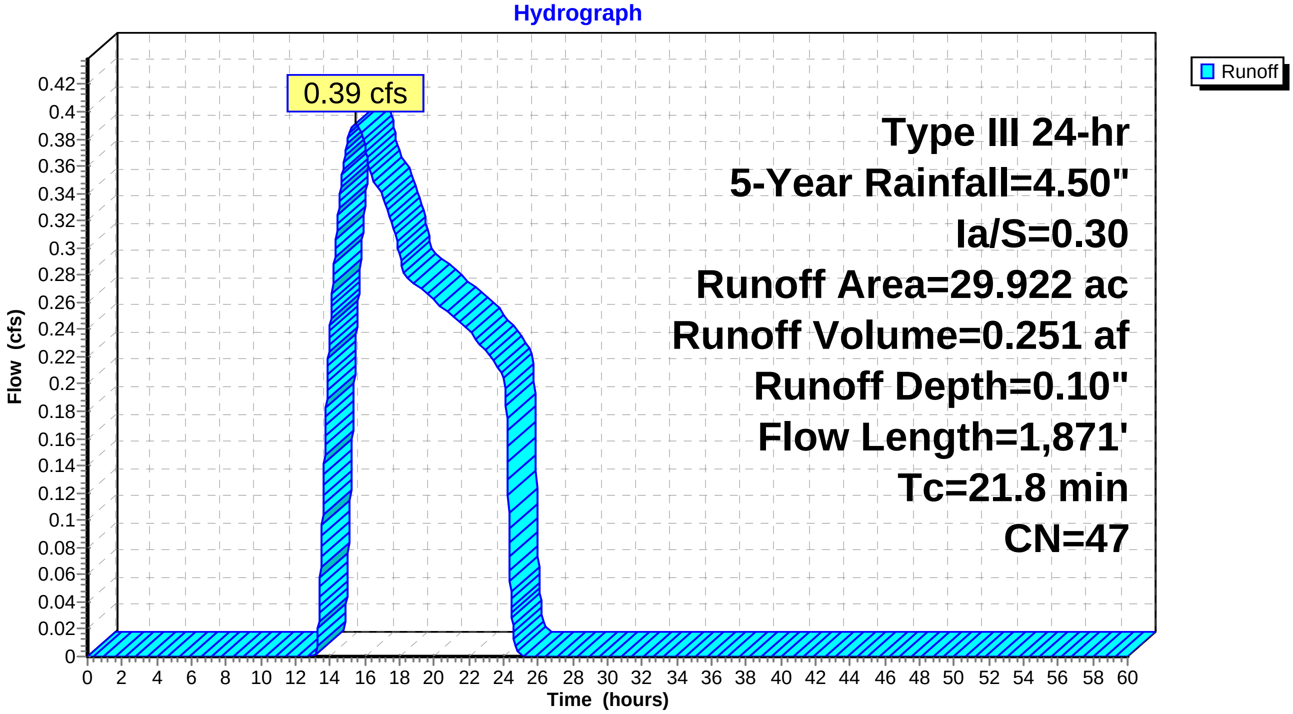
Runoff = 0.39 cfs @ 15.48 hrs, Volume= 0.251 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.270 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.430 | 98 | Water Surface |
| | 23.530 | 39 | >75% Grass cover, Good, HSG A |
| | 0.110 | 61 | >75% Grass cover, Good, HSG B |
| | 3.720 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.028 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.100 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.635 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.082 | 30 | Sand Trap, HSG C |
| | 29.922 | 47 | Weighted Average |
| | 28.222 | | 94.32% Pervious Area |
| | 1.700 | | 5.68% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.8 | 100 | 0.2400 | 0.22 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 9.7 | 1,231 | 0.0920 | 2.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.3 | 540 | 0.0900 | 2.10 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 21.8 | 1,871 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

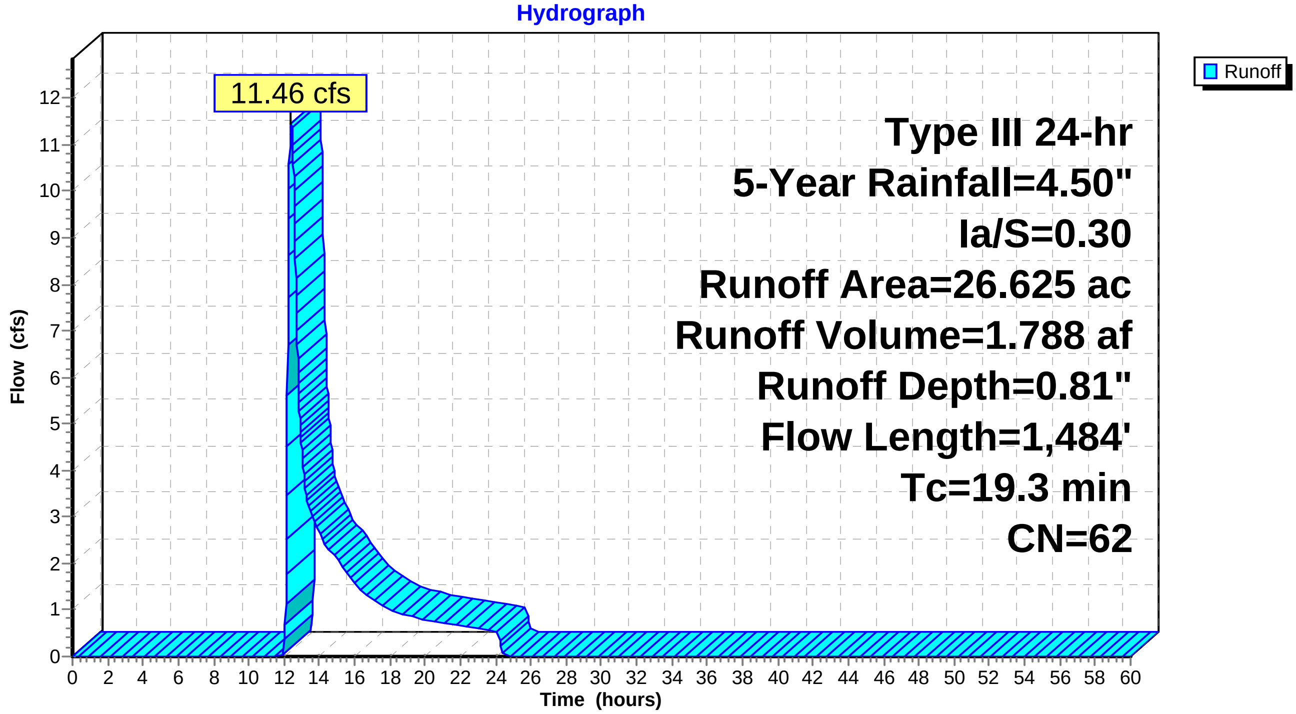
Runoff = 11.46 cfs @ 12.39 hrs, Volume= 1.788 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.390 | 98 | Building roof |
| * | 0.480 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.500 | 98 | Water Surface |
| | 10.650 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 8.795 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.094 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.565 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.145 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.006 | 30 | Sand Trap, HSG C |
| | 26.625 | 62 | Weighted Average |
| | 23.255 | | 87.34% Pervious Area |
| | 3.370 | | 12.66% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 3.0 | 395 | 0.1920 | 2.19 | | **Shallow Concentrated Flow,**<br>Woodland Kv= 5.0 fps |
| 7.1 | 989 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 19.3 | 1,484 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

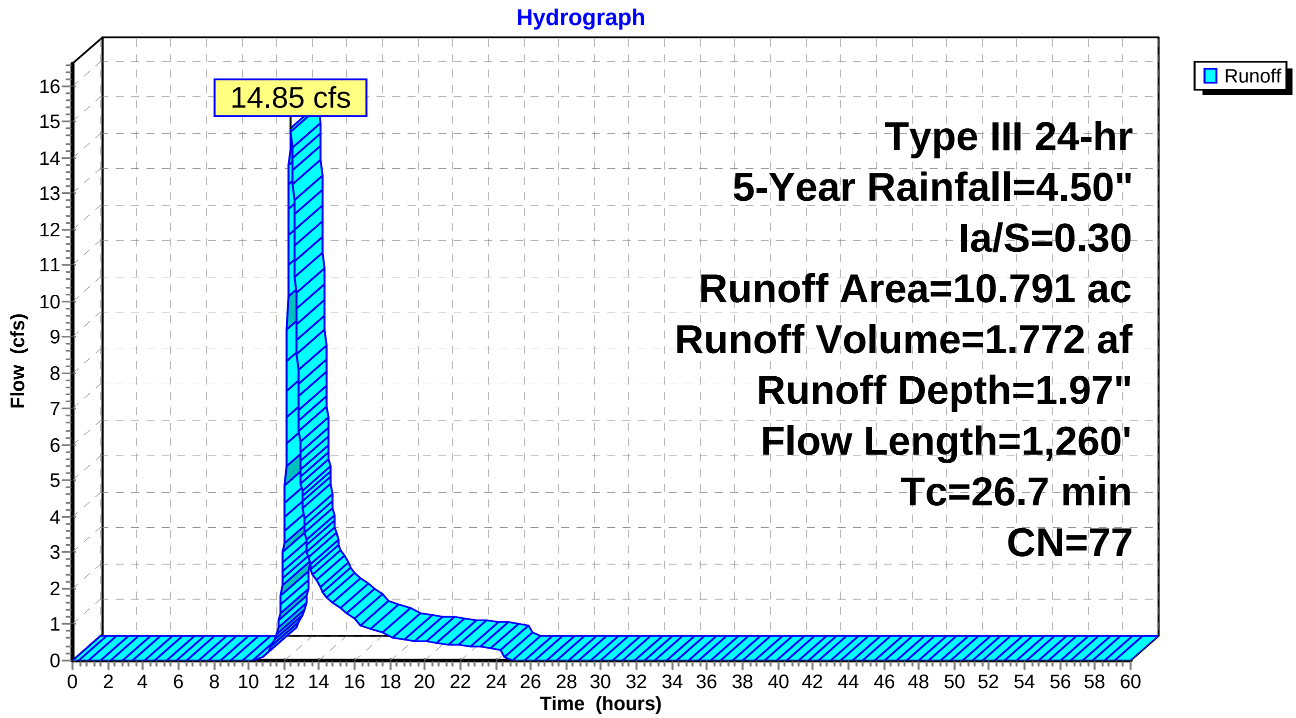
Runoff = 14.85 cfs @ 12.39 hrs, Volume= 1.772 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.220 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.078 | 61 | >75% Grass cover, Good, HSG B |
| | 5.210 | 74 | >75% Grass cover, Good, HSG C |
| | 2.190 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.100 | 55 | Woods, Good, HSG B |
| | 1.390 | 70 | Woods, Good, HSG C |
| | 0.603 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 10.791 | 77 | Weighted Average |
| | 9.571 | | 88.69% Pervious Area |
| | 1.220 | | 11.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

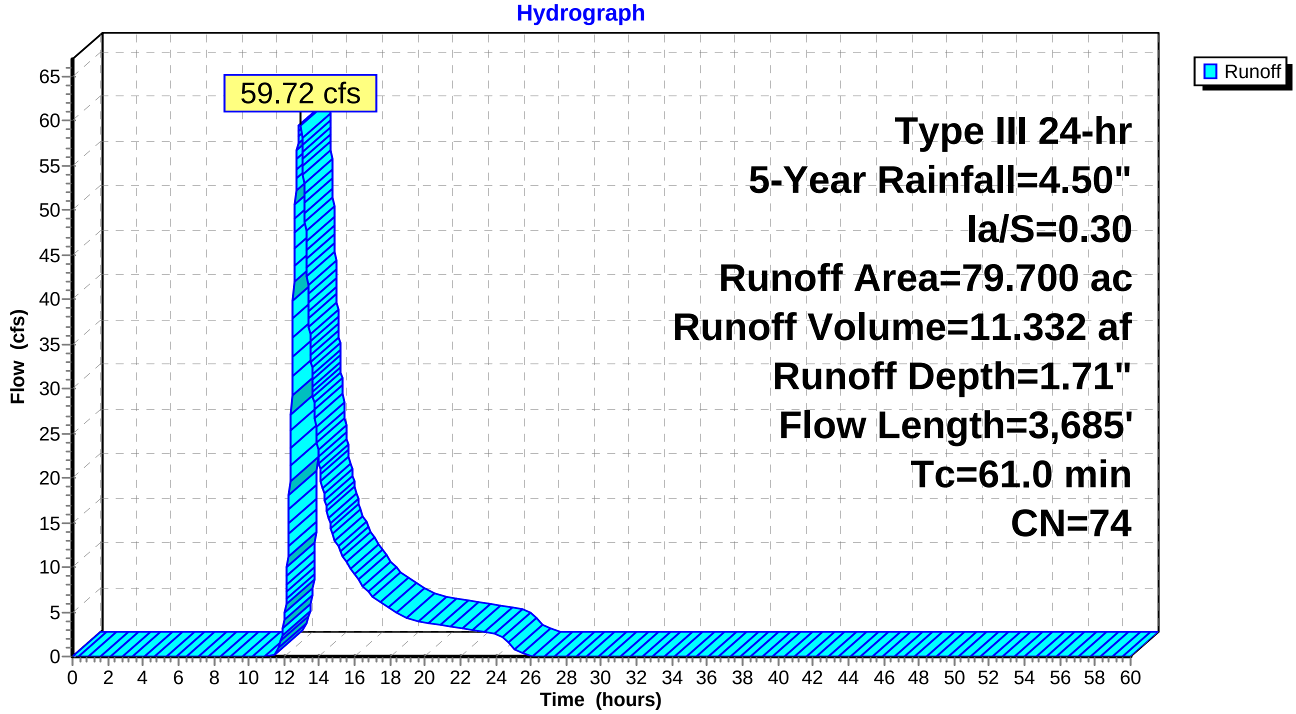
Runoff = 59.72 cfs @ 12.88 hrs, Volume= 11.332 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.340 | 98 | Building roof |
| * | 1.314 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 6.390 | 61 | >75% Grass cover, Good, HSG B |
| | 4.750 | 74 | >75% Grass cover, Good, HSG C |
| | 3.470 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 7.845 | 55 | Woods, Good, HSG B |
| | 3.580 | 70 | Woods, Good, HSG C |
| | 51.810 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 79.700 | 74 | Weighted Average |
| | 77.916 | | 97.76% Pervious Area |
| | 1.784 | | 2.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,**<br>W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,**<br>W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

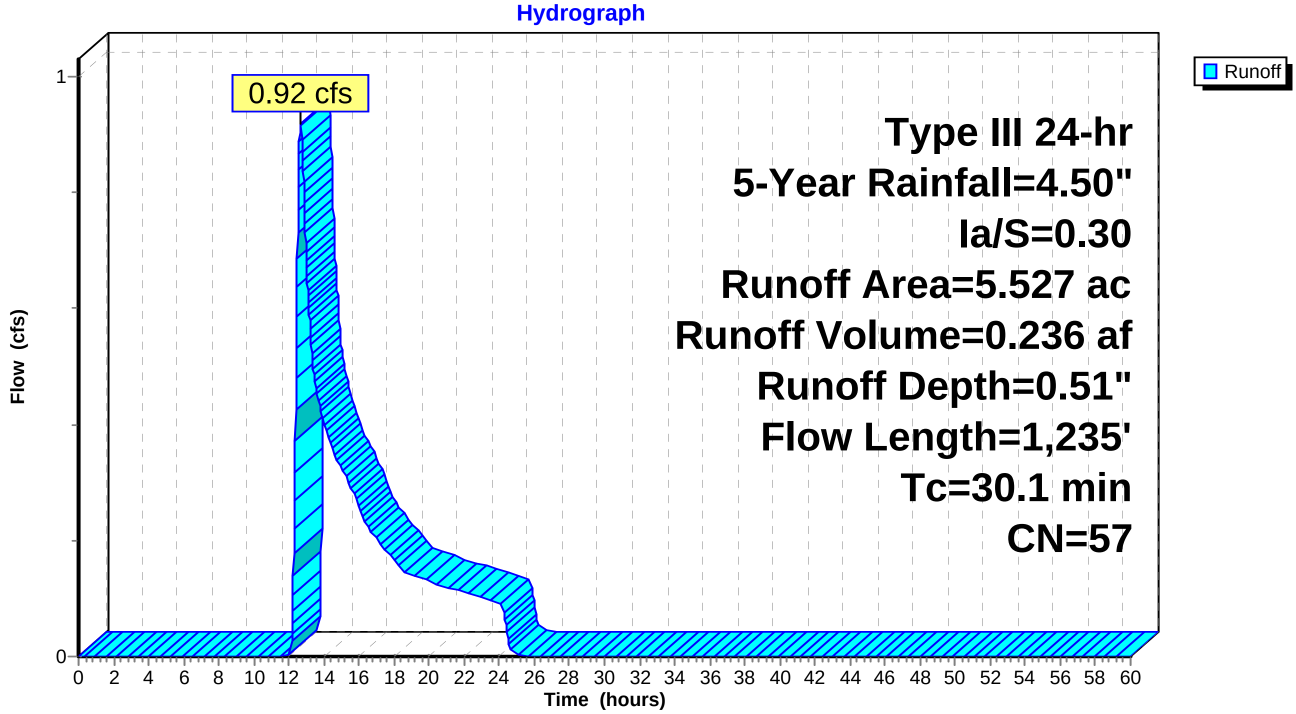
Runoff = 0.92 cfs @ 12.67 hrs, Volume= 0.236 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.088 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.630 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.527 | 57 | Weighted Average |
| | 5.399 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment A109: A109

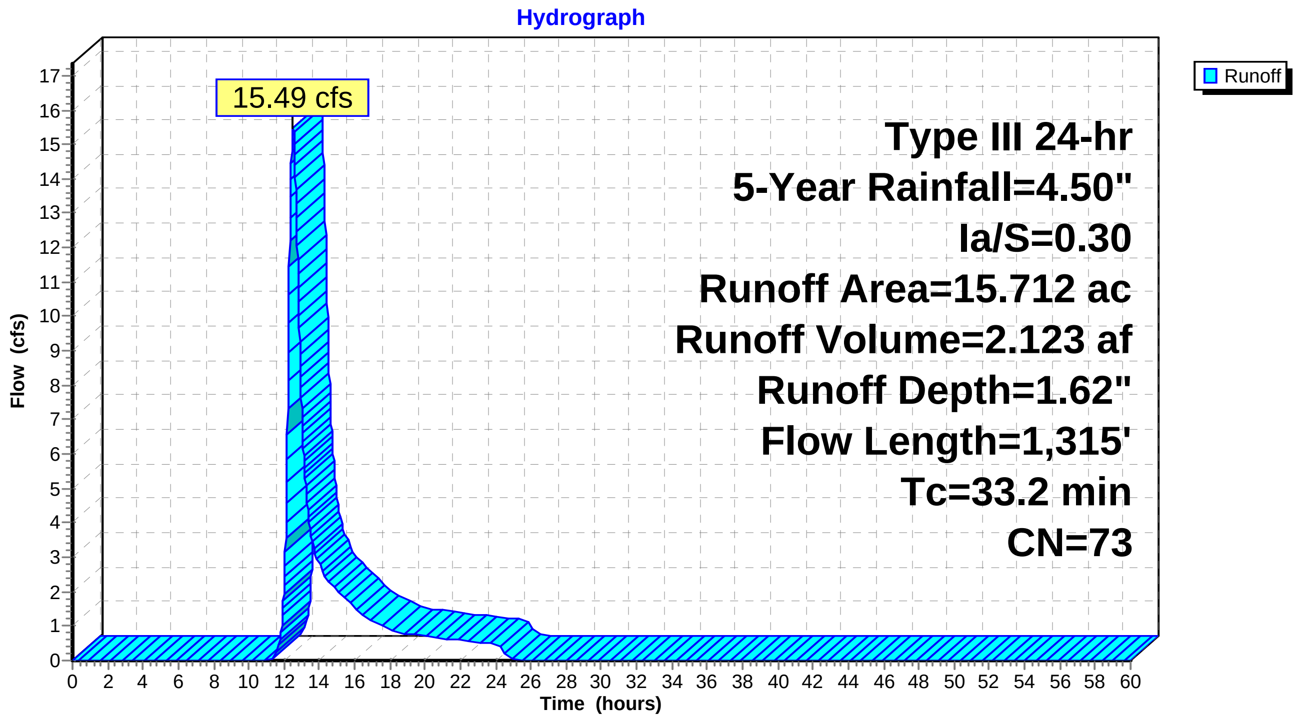
Runoff = 15.49 cfs @ 12.50 hrs, Volume= 2.123 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| Area (ac) | CN | Description |
|---|---|---|
| 0.857 | 98 | Roofs, HSG B |
| 5.730 | 61 | >75% Grass cover, Good, HSG B |
| 4.502 | 74 | >75% Grass cover, Good, HSG C |
| 0.592 | 80 | >75% Grass cover, Good, HSG D |
| 2.000 | 98 | Paved parking, HSG B |
| 0.328 | 55 | Woods, Good, HSG B |
| 0.823 | 70 | Woods, Good, HSG C |
| 0.880 | 77 | Woods, Good, HSG D |
| 15.712 | 73 | Weighted Average |
| 12.855 | | 81.82% Pervious Area |
| 2.857 | | 18.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 22.3 | 100 | 0.0650 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.0 | 388 | 0.2200 | 3.28 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.7 | 427 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.2 | 400 | 0.1850 | 1.08 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 33.2 | 1,315 | Total | | | |

## Subcatchment A109: A109



## Summary for Subcatchment B101: B101

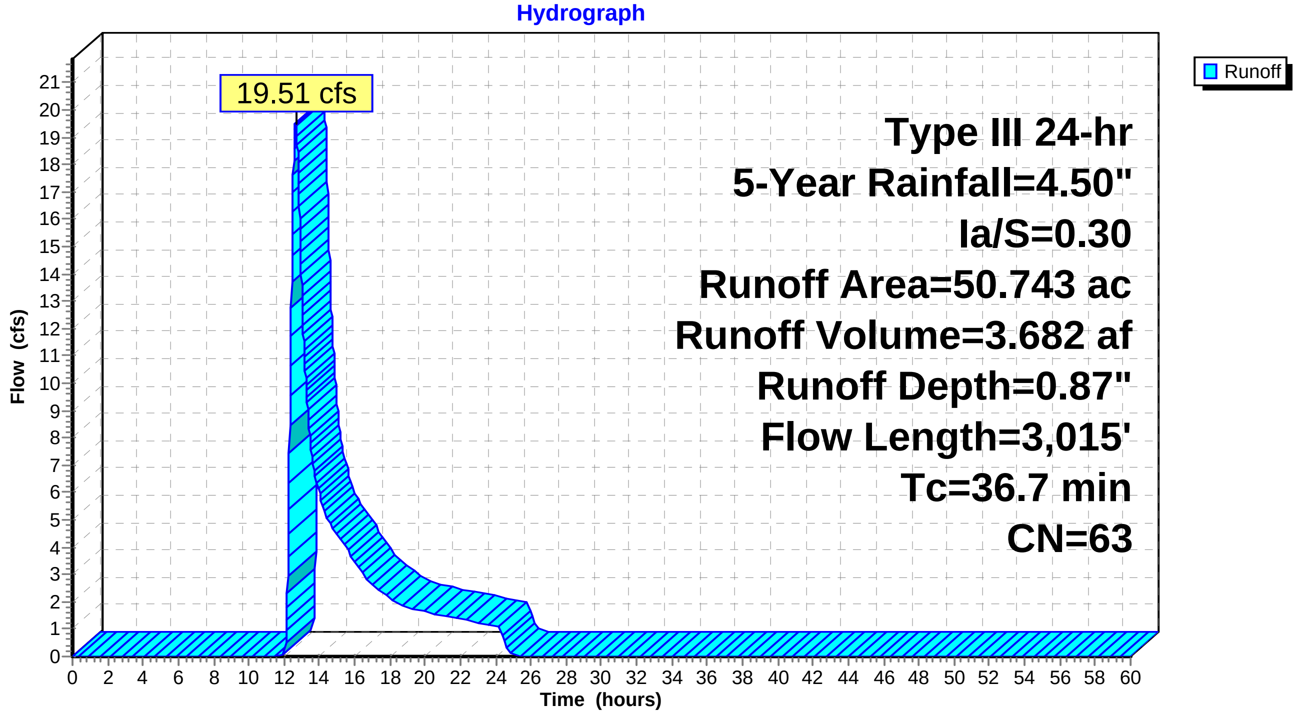
Runoff = 19.51 cfs @ 12.65 hrs, Volume= 3.682 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 5.220 | 98 | Building roof |
| * | 3.230 | 98 | Paved surface |
| * | 0.439 | 96 | Gravel surface |
| * | 0.412 | 98 | Water Surface |
| | 21.653 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 10.300 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.553 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 4.380 | 70 | Woods, Good, HSG C |
| | 4.370 | 77 | Woods, Good, HSG D |
| * | 0.142 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.044 | 30 | Sand Trap, HSG C |
| | 50.743 | 63 | Weighted Average |
| | 41.881 | | 82.54% Pervious Area |
| | 8.862 | | 17.46% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 1.4 | 1,880 | 0.0830 | 22.47 | 70.61 | **Pipe Channel,**<br>24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'<br>n= 0.012 |
| 36.7 | 3,015 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

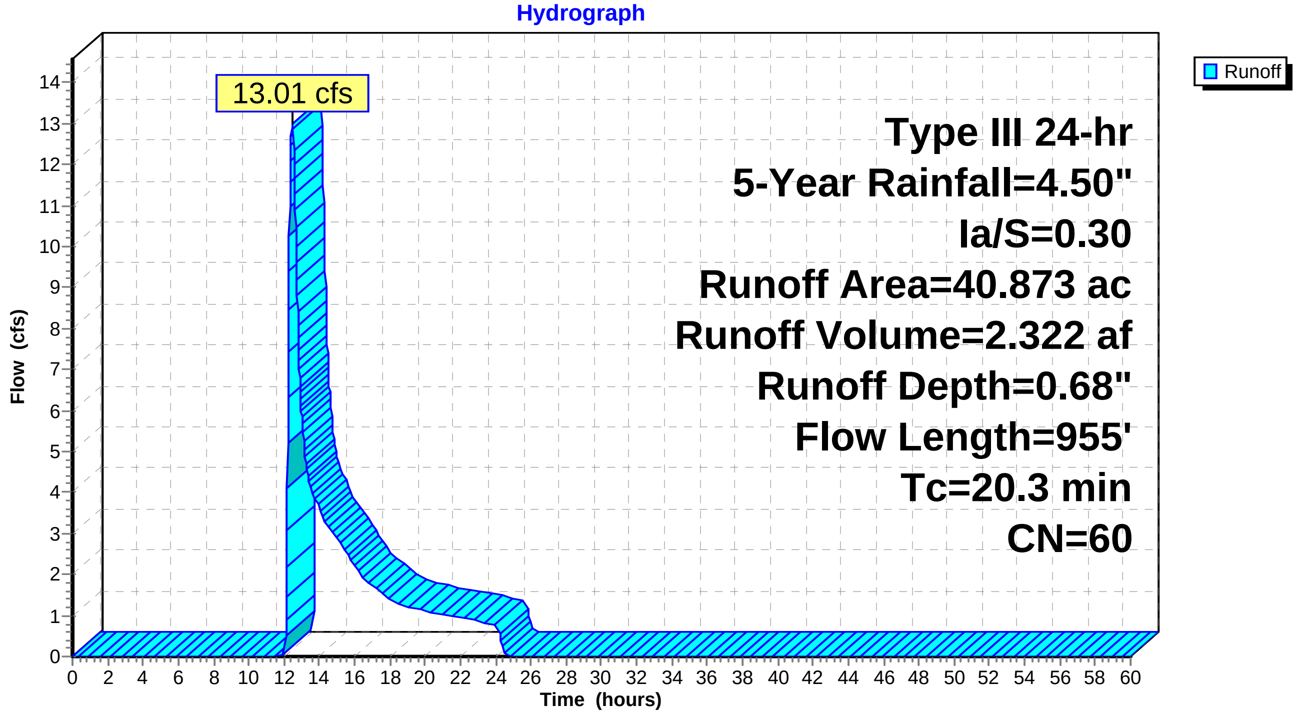
Runoff = 13.01 cfs @ 12.46 hrs, Volume= 2.322 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.516 | 98 | Paved surface |
| * | 0.210 | 96 | Gravel surface |
| * | 0.009 | 98 | Water Surface |
| | 7.476 | 39 | >75% Grass cover, Good, HSG A |
| | 0.464 | 61 | >75% Grass cover, Good, HSG B |
| | 12.033 | 74 | >75% Grass cover, Good, HSG C |
| | 0.764 | 80 | >75% Grass cover, Good, HSG D |
| | 6.808 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 5.496 | 70 | Woods, Good, HSG C |
| | 6.710 | 77 | Woods, Good, HSG D |
| * | 0.060 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.327 | 30 | Sand Trap, HSG C |
| | 40.873 | 60 | Weighted Average |
| | 40.348 | | 98.72% Pervious Area |
| | 0.525 | | 1.28% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 318 | 0.0250 | 7.19 | 287.53 | **Parabolic Channel,** W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.050 |
| 20.3 | 955 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

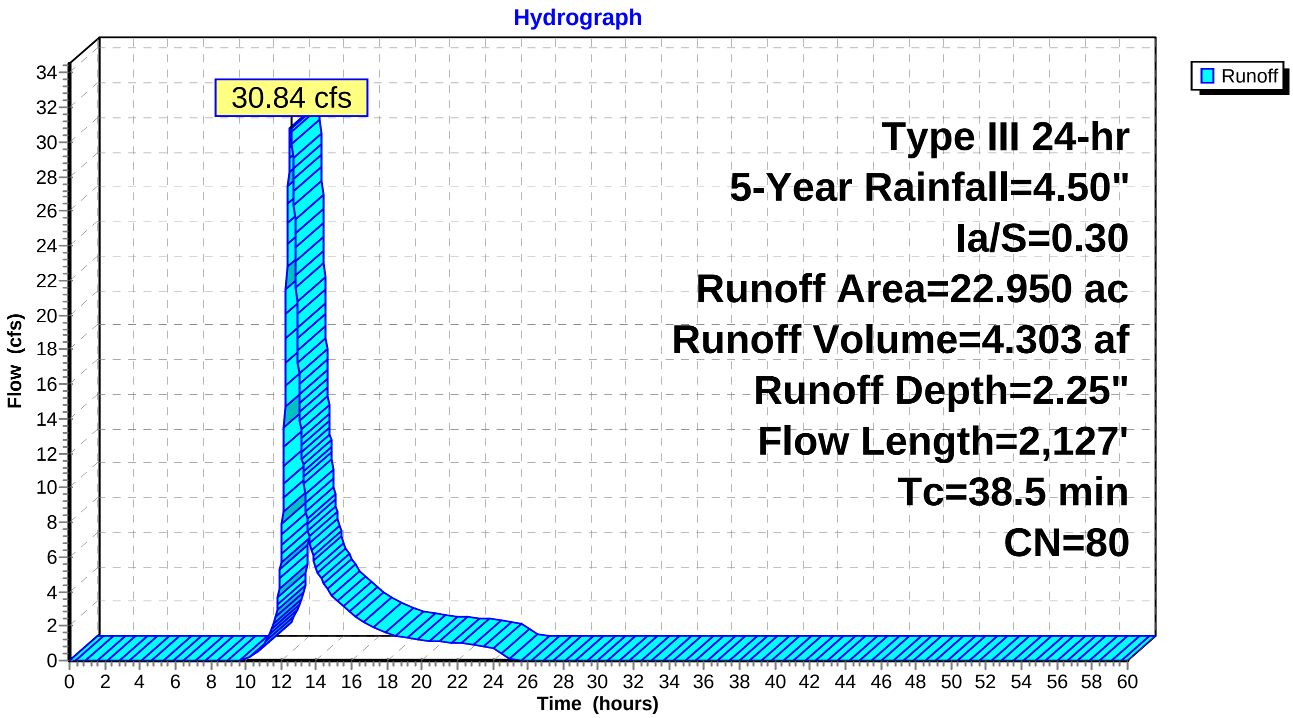
Runoff = 30.84 cfs @ 12.54 hrs, Volume= 4.303 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.520 | 98 | Building roof |
| * | 1.000 | 98 | Paved surface |
| * | 0.123 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.674 | 74 | >75% Grass cover, Good, HSG C |
| | 2.133 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 17.500 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 22.950 | 80 | Weighted Average |
| | 20.430 | | 89.02% Pervious Area |
| | 2.520 | | 10.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.3 | 784 | 0.5100 | 1.79 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 1,243 | 0.0670 | 26.46 | 187.03 | **Pipe Channel,**<br>36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'<br>n= 0.012 |
| 38.5 | 2,127 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

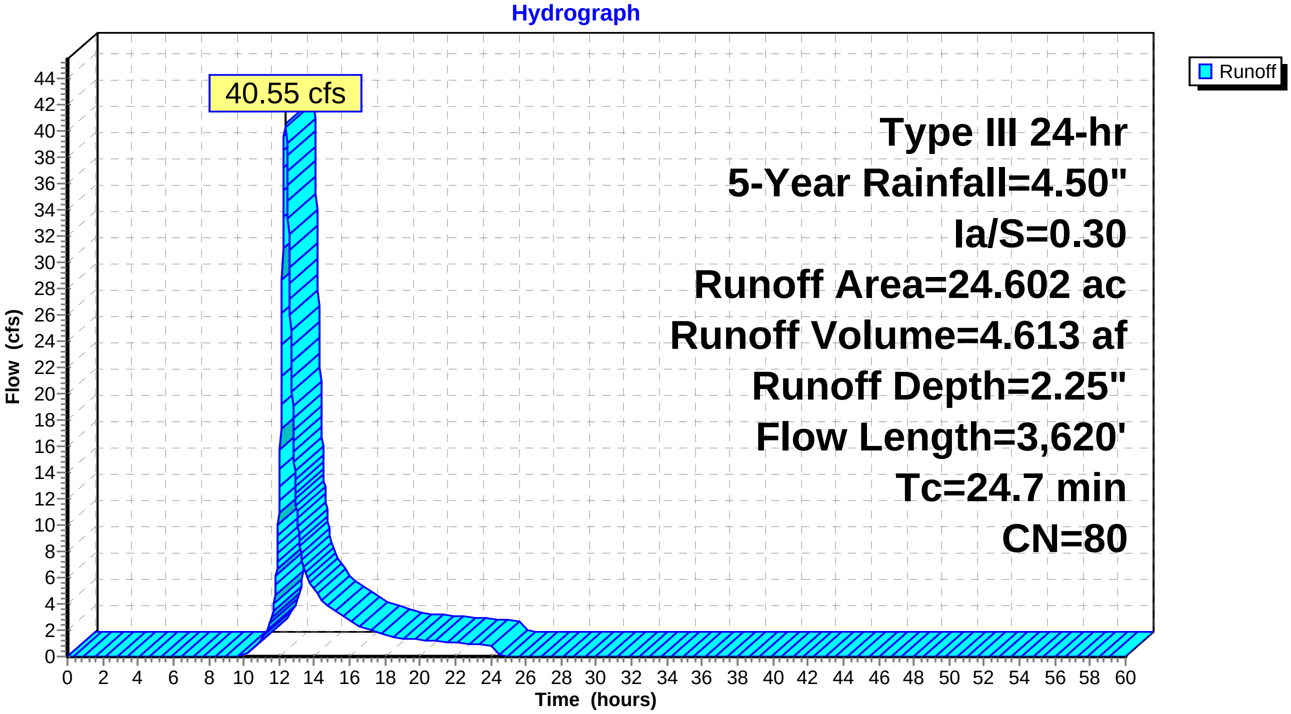
Runoff = 40.55 cfs @ 12.35 hrs, Volume= 4.613 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.579 | 98 | Building roof |
| * | 2.315 | 98 | Paved surface |
| * | 0.016 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.452 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.733 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.315 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.192 | 30 | Sand Trap, HSG C |
| | 24.602 | 80 | Weighted Average |
| | 17.708 | | 71.98% Pervious Area |
| | 6.894 | | 28.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.8 | 100 | 0.1000 | 0.15 | | **Sheet Flow,**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 8.0 | 823 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 452 | 0.1720 | 2.90 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 1,210 | 0.0580 | 8.46 | 101.48 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.045 |
| 0.9 | 1,035 | 0.0350 | 19.12 | 135.18 | **Pipe Channel,**<br>36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'<br>n= 0.012 |
| 24.7 | 3,620 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

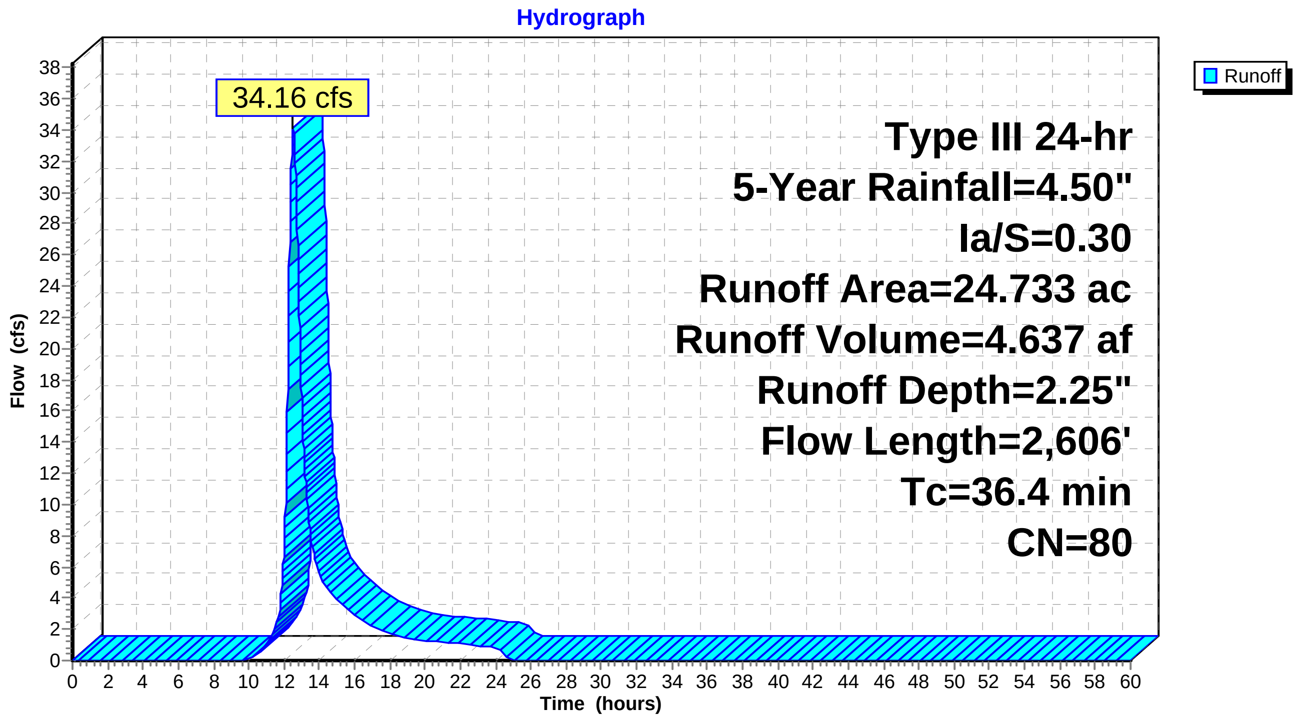
Runoff = 34.16 cfs @ 12.51 hrs, Volume= 4.637 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.944 | 98 | Building roof |
| * | 0.763 | 98 | Paved surface |
| * | 0.287 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.052 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.735 | 74 | >75% Grass cover, Good, HSG C |
| | 0.052 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 18.900 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 24.733 | 80 | Weighted Average |
| | 21.026 | | 85.01% Pervious Area |
| | 3.707 | | 14.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 612 | 0.5680 | 1.88 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 114 | 0.2280 | 3.34 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 880 | 0.0320 | 5.65 | 67.84 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.7 | 900 | 0.0400 | 20.44 | 144.51 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 36.4 | 2,606 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

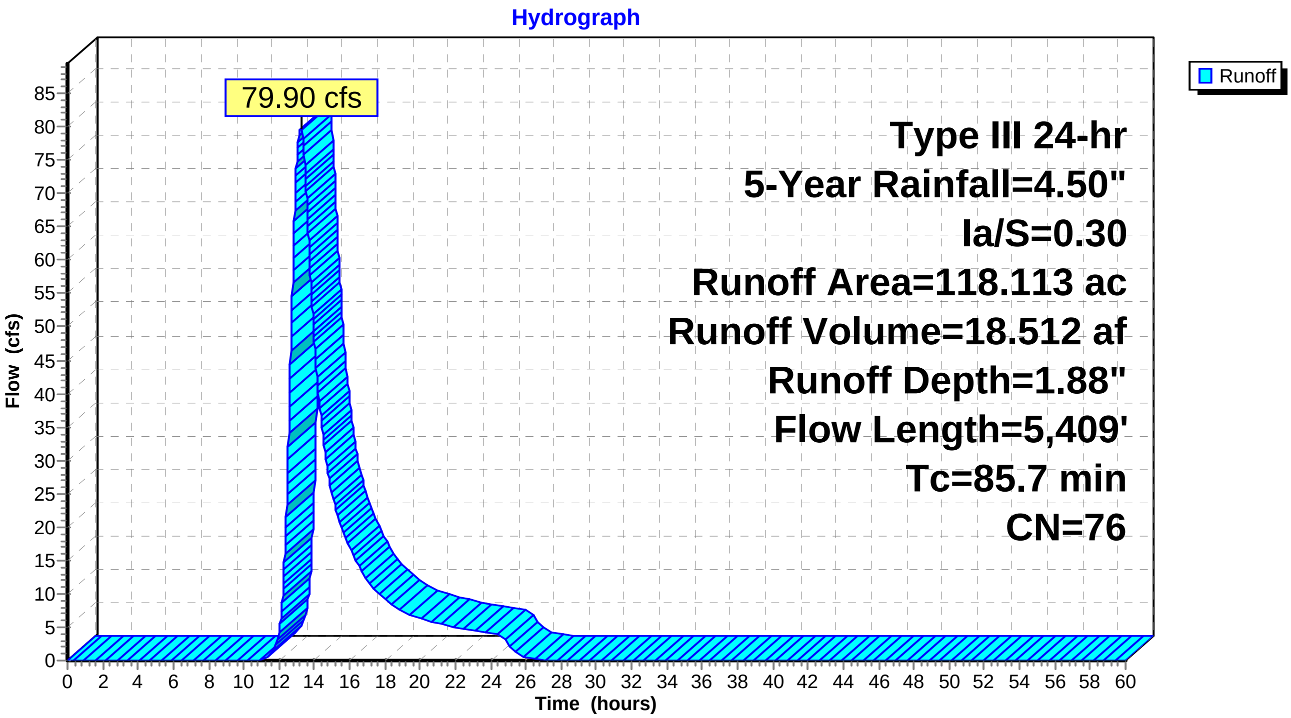
Runoff = 79.90 cfs @ 13.23 hrs, Volume= 18.512 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.587 | 98 | Building roof |
| * | 0.994 | 98 | Paved surface |
| * | 0.746 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.090 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 11.920 | 74 | >75% Grass cover, Good, HSG C |
| | 2.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 10.050 | 70 | Woods, Good, HSG C |
| | 89.064 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 118.113 | 76 | Weighted Average |
| | 116.532 | | 98.66% Pervious Area |
| | 1.581 | | 1.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00'<br>n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

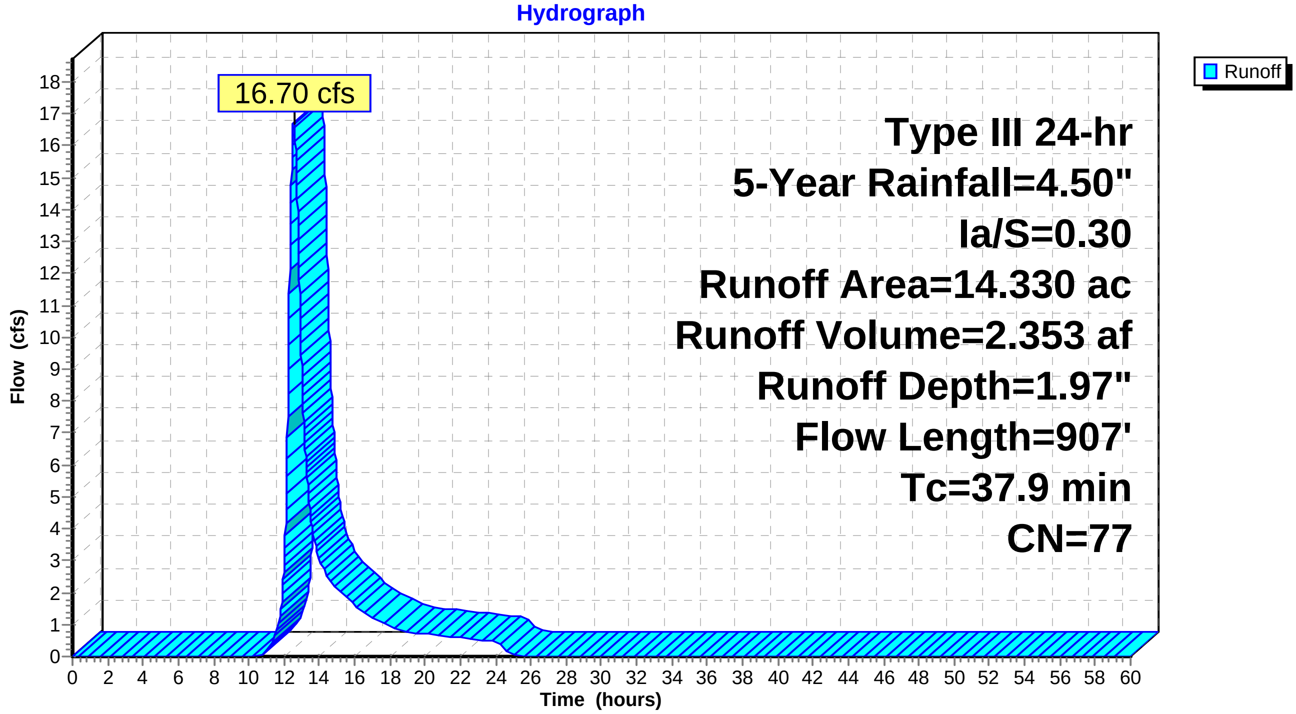
Runoff = 16.70 cfs @ 12.55 hrs, Volume= 2.353 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

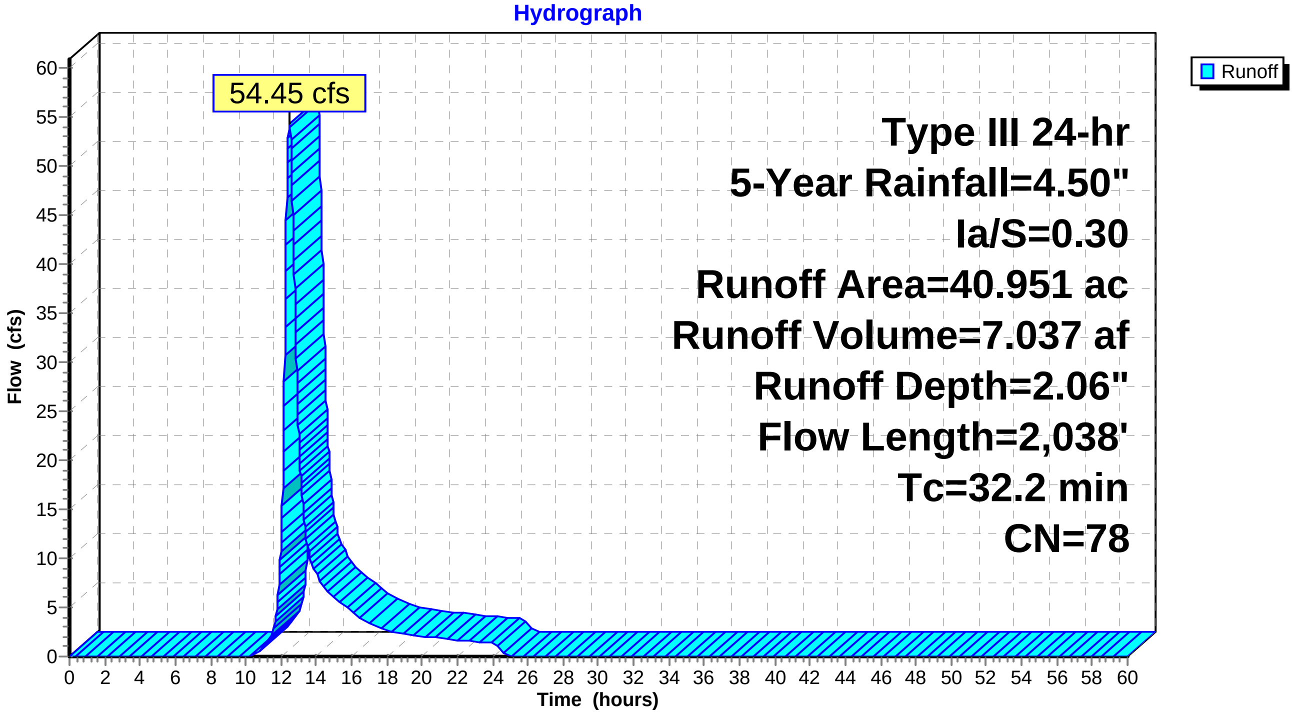
Runoff = 54.45 cfs @ 12.47 hrs, Volume= 7.037 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.640 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.100 | 74 | >75% Grass cover, Good, HSG C |
| | 1.909 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.842 | 70 | Woods, Good, HSG C |
| | 23.560 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.951 | 78 | Weighted Average |
| | 36.411 | | 88.91% Pervious Area |
| | 4.540 | | 11.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 7.8 | 823 | 0.5000 | 1.77 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 725 | 0.1640 | 41.40 | 292.62 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 32.2 | 2,038 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

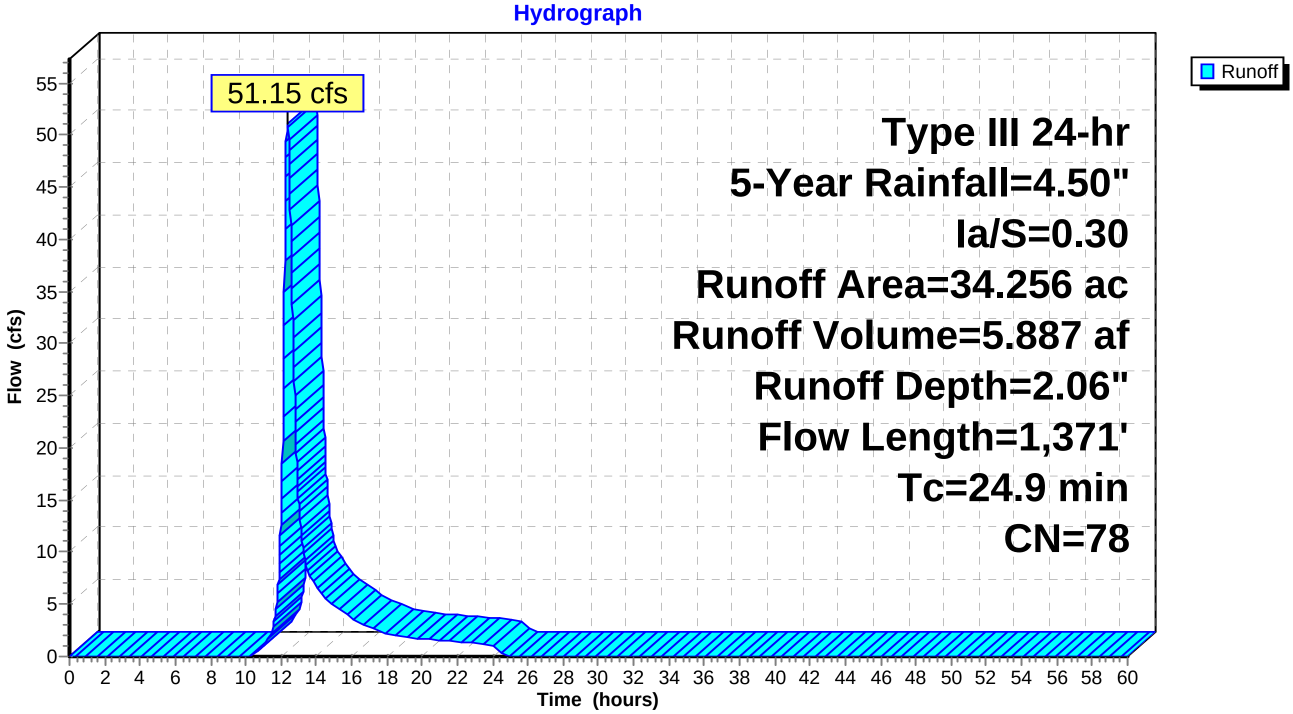
Runoff = 51.15 cfs @ 12.36 hrs, Volume= 5.887 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.000 | 98 | Building roof |
| * | 0.600 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.592 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.332 | 74 | >75% Grass cover, Good, HSG C |
| | 3.160 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.450 | 70 | Woods, Good, HSG C |
| | 9.847 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.275 | 30 | Sand Trap, HSG C |
| | 34.256 | 78 | Weighted Average |
| | 30.064 | | 87.76% Pervious Area |
| | 4.192 | | 12.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4450 | 1.67 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 70 | 0.0280 | 5.29 | 63.46 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.0 | 100 | 0.2800 | 54.09 | 382.35 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 0.2 | 160 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 0.3 | 281 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 24.9 | 1,371 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment B110: B110

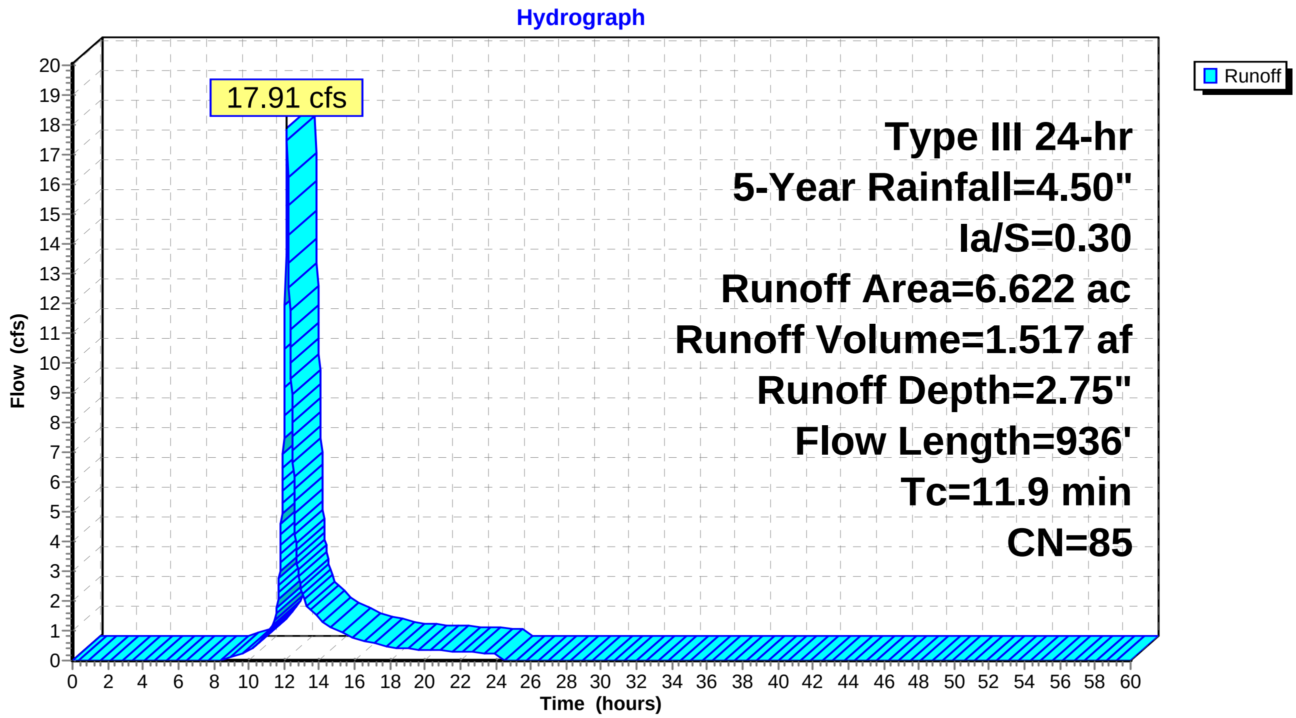
Runoff = 17.91 cfs @ 12.16 hrs, Volume= 1.517 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.381 | 98 | Building roof |
| * | 1.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.550 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.061 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.622 | 85 | Weighted Average |
| | 3.611 | | 54.53% Pervious Area |
| | 3.011 | | 45.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 100 | 0.1300 | 0.17 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 0.6 | 121 | 0.2500 | 3.50 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 715 | 0.0360 | 7.40 | 23.25 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.024 |
| 11.9 | 936 | Total | | | |

## Subcatchment B110: B110



## Summary for Subcatchment B111: B111

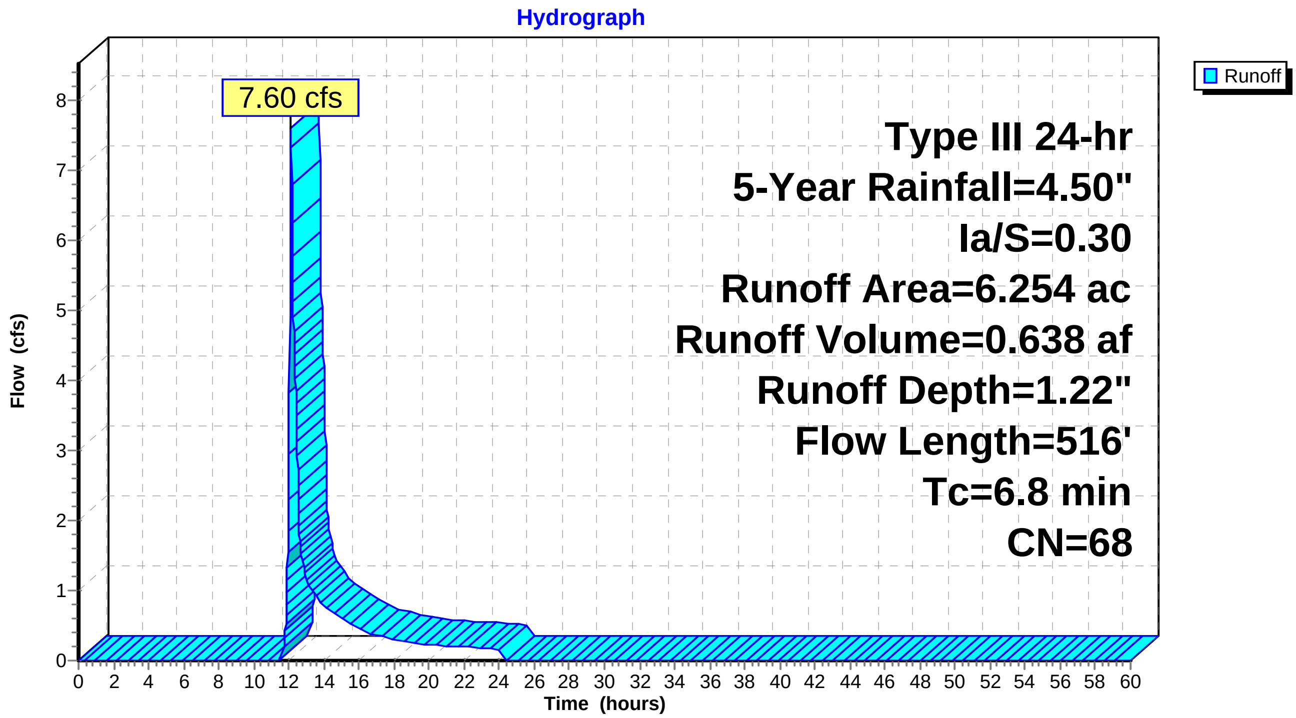
Runoff = 7.60 cfs @ 12.12 hrs, Volume= 0.638 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.504 | 98 | Building roof |
| * | 0.120 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.900 | 98 | Water Surface |
| | 2.730 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.254 | 68 | Weighted Average |
| | 3.730 | | 59.64% Pervious Area |
| | 2.524 | | 40.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.7 | 100 | 0.2000 | 0.45 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 0.6 | 115 | 0.2000 | 3.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 301 | 0.0800 | 1.98 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.8 | 516 | Total | | | |

## Subcatchment B111: B111



## Summary for Subcatchment B112: B112

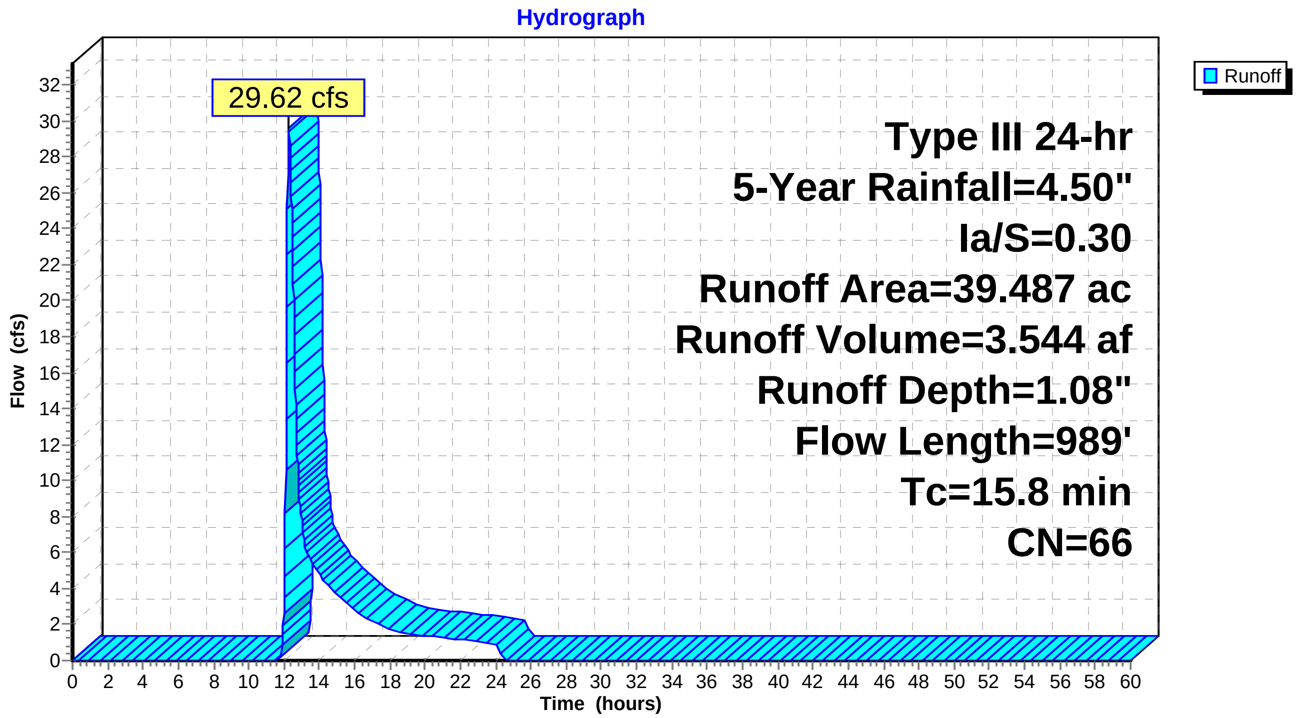
Runoff = 29.62 cfs @ 12.27 hrs, Volume= 3.544 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.550 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 8.285 | 98 | Water Surface |
| | 17.485 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 7.526 | 74 | >75% Grass cover, Good, HSG C |
| | 0.015 | 80 | >75% Grass cover, Good, HSG D |
| | 0.052 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.289 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.385 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 39.487 | 66 | Weighted Average |
| | 25.752 | | 65.22% Pervious Area |
| | 13.735 | | 34.78% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.1 | 100 | 0.0400 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 3.1 | 375 | 0.0850 | 2.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 514 | 0.0470 | 1.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 15.8 | 989 | Total | | | |

## Subcatchment B112: B112



## Summary for Subcatchment B113: B113

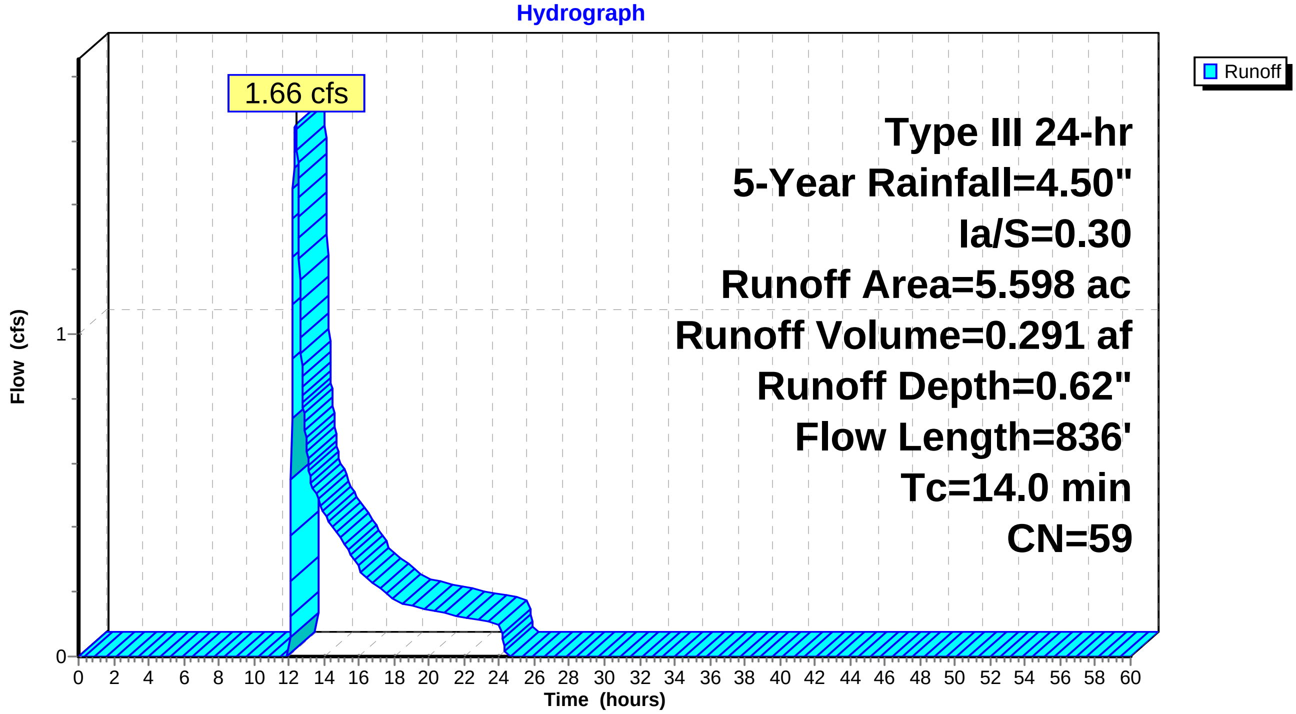
Runoff = 1.66 cfs @ 12.39 hrs, Volume= 0.291 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.060 | 98 | Building roof |
| * | 0.650 | 98 | Paved surface |
| * | 0.009 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.724 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.135 | 80 | >75% Grass cover, Good, HSG D |
| | 0.720 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.300 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.598 | 59 | Weighted Average |
| | 3.888 | | 69.45% Pervious Area |
| | 1.710 | | 30.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.8 | 100 | 0.0800 | 0.14 | | **Sheet Flow,**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.6 | 300 | 0.0360 | 3.05 | | **Shallow Concentrated Flow,**<br>Unpaved Kv= 16.1 fps |
| 0.6 | 436 | 0.0700 | 12.07 | 14.81 | **Pipe Channel,**<br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.015 |
| 14.0 | 836 | Total | | | |

## Subcatchment B113: B113



## Summary for Subcatchment B115: B115

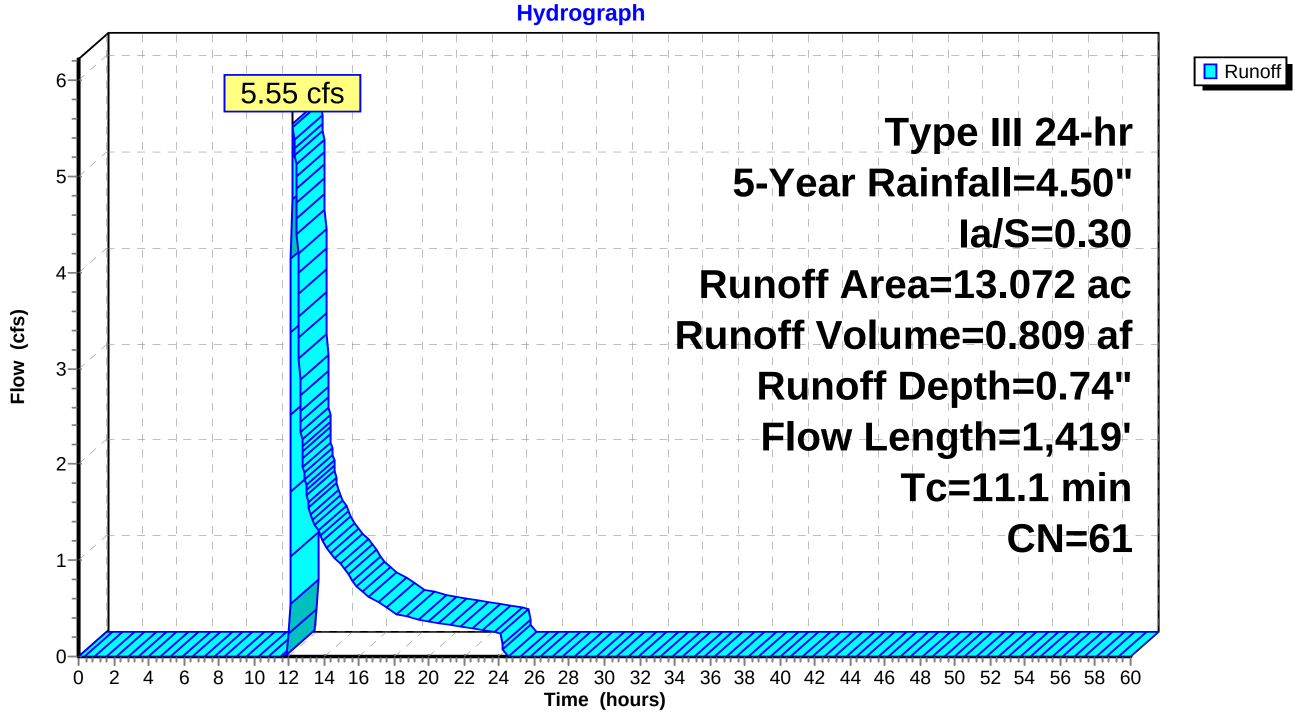
Runoff = 5.55 cfs @ 12.24 hrs, Volume= 0.809 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.615 | 98 | Building roof |
| * | 0.449 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 6.589 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.241 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.030 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.011 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.057 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.080 | 30 | Sand Trap, HSG C |
| | 13.072 | 61 | Weighted Average |
| | 10.008 | | 76.56% Pervious Area |
| | 3.064 | | 23.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 100 | 0.1100 | 0.35 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 4.0 | 340 | 0.0410 | 1.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 979 | 0.0130 | 6.80 | 136.10 | **Channel Flow,** Area= 20.0 sf Perim= 12.0' r= 1.67' n= 0.035 |
| 11.1 | 1,419 | Total | | | |

## Subcatchment B115: B115



## Summary for Subcatchment B116: B116

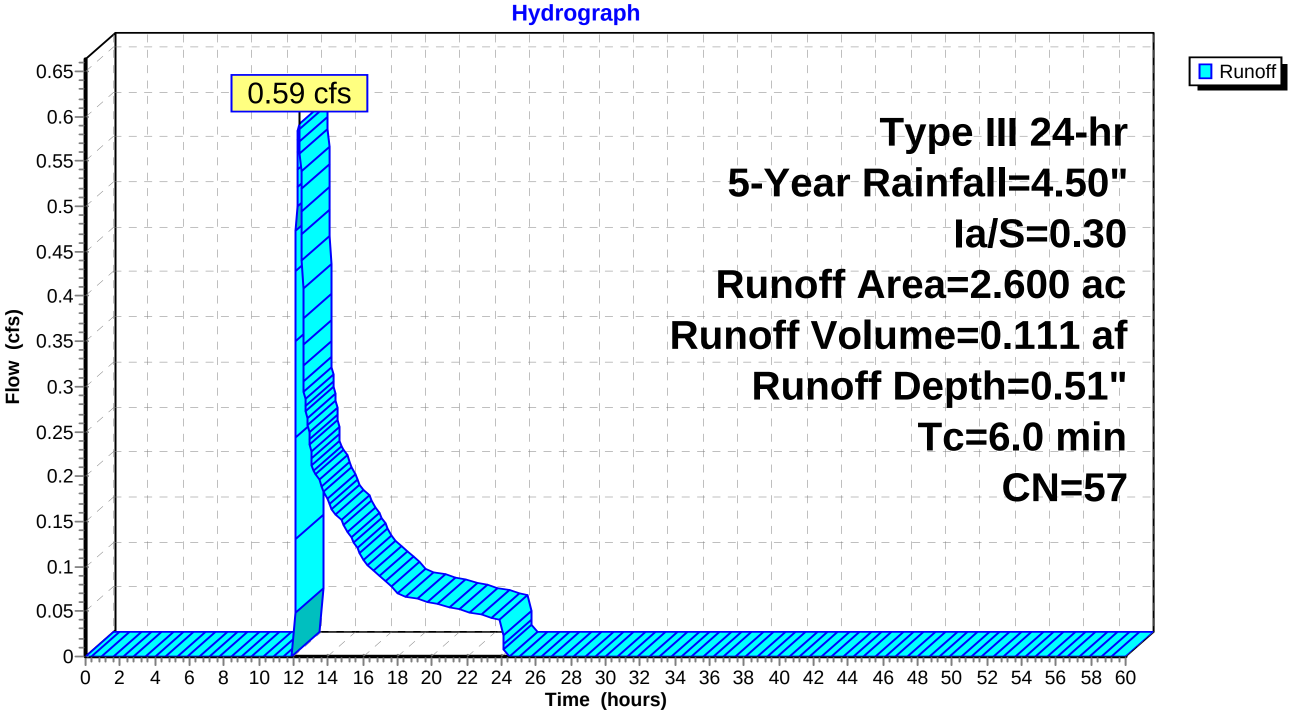
Runoff = 0.59 cfs @ 12.32 hrs, Volume= 0.111 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.174 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.621 | 98 | Water Surface |
| | 1.805 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.600 | 57 | Weighted Average |
| | 1.805 | | 69.42% Pervious Area |
| | 0.795 | | 30.58% Impervious Area |

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

## Subcatchment B116: B116



## Summary for Subcatchment B117: B117

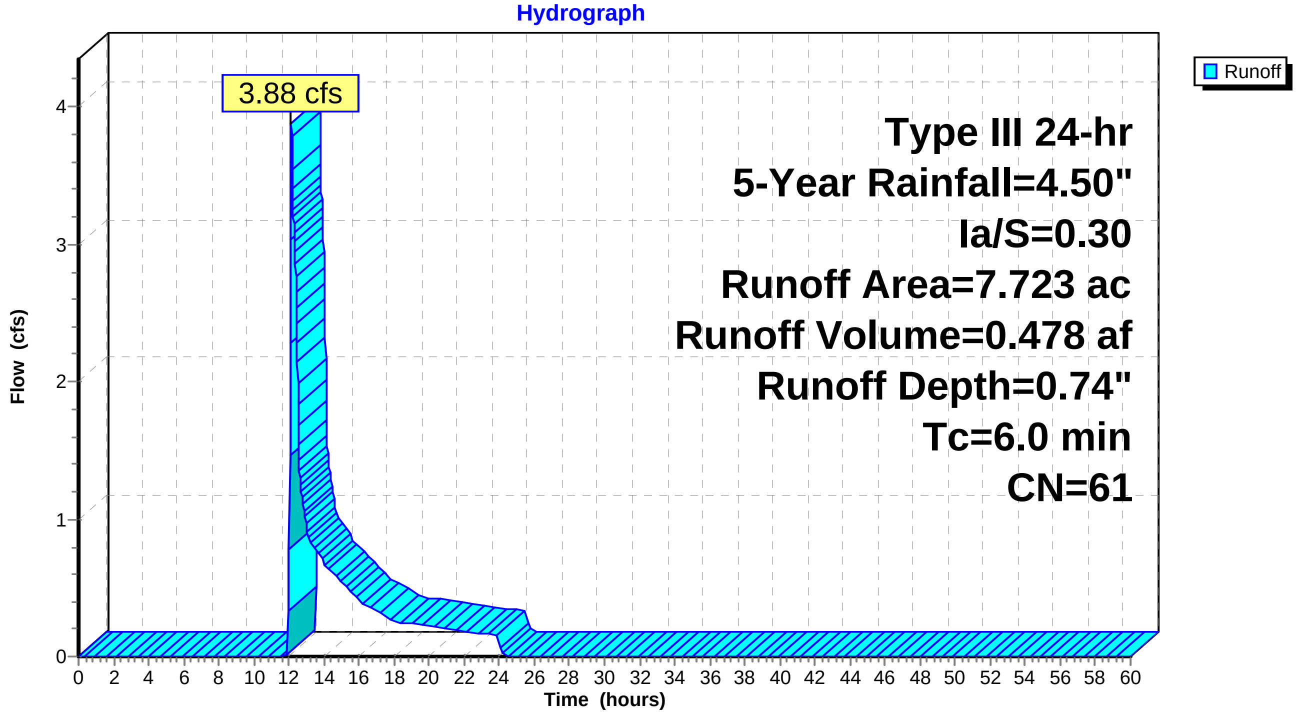
Runoff = 3.88 cfs @ 12.13 hrs, Volume= 0.478 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.200 | 98 | Building roof |
| * | 0.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 4.580 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.018 | 80 | >75% Grass cover, Good, HSG D |
| | 0.268 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.027 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.723 | 61 | Weighted Average |
| | 4.893 | | 63.36% Pervious Area |
| | 2.830 | | 36.64% Impervious Area |

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

## Subcatchment B117: B117



## Summary for Subcatchment B118: B118

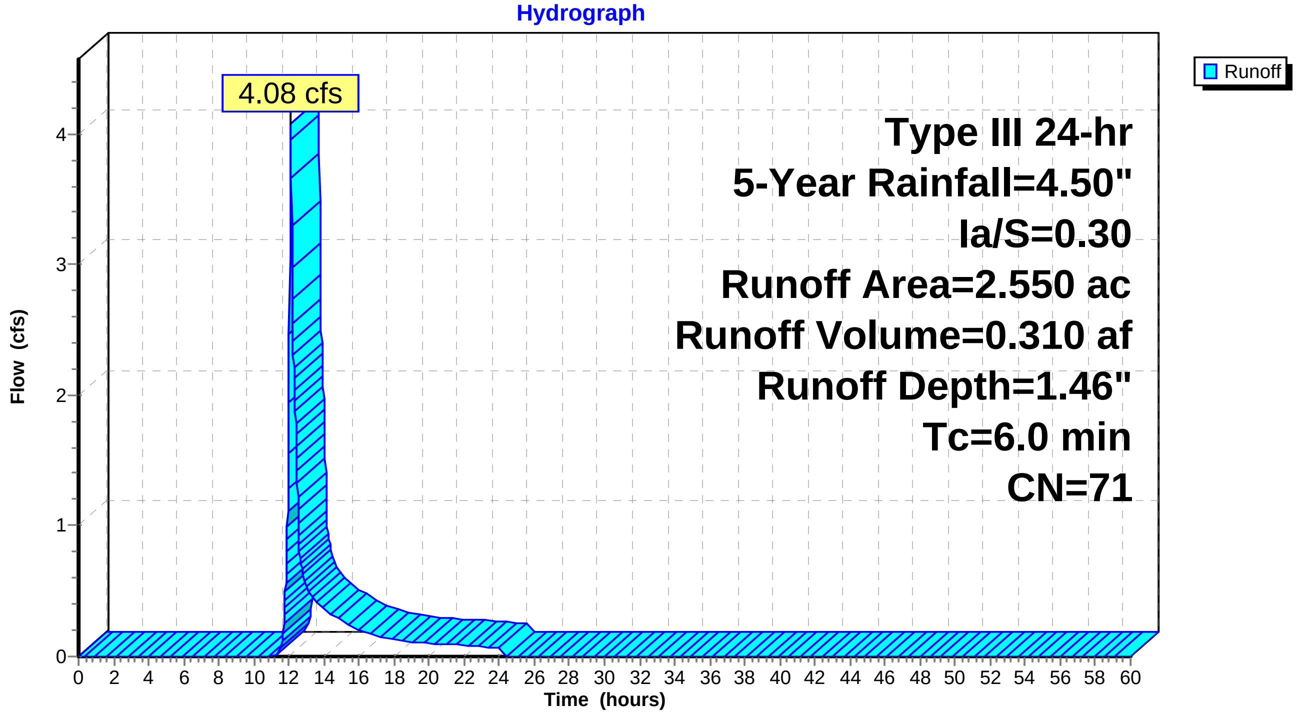
Runoff = 4.08 cfs @ 12.10 hrs, Volume= 0.310 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.295 | 98 | Building roof |
| * | 0.100 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 1.015 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.140 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.550 | 71 | Weighted Average |
| | 1.155 | | 45.29% Pervious Area |
| | 1.395 | | 54.71% Impervious Area |

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

## Subcatchment B118: B118



## Summary for Subcatchment B119: B119

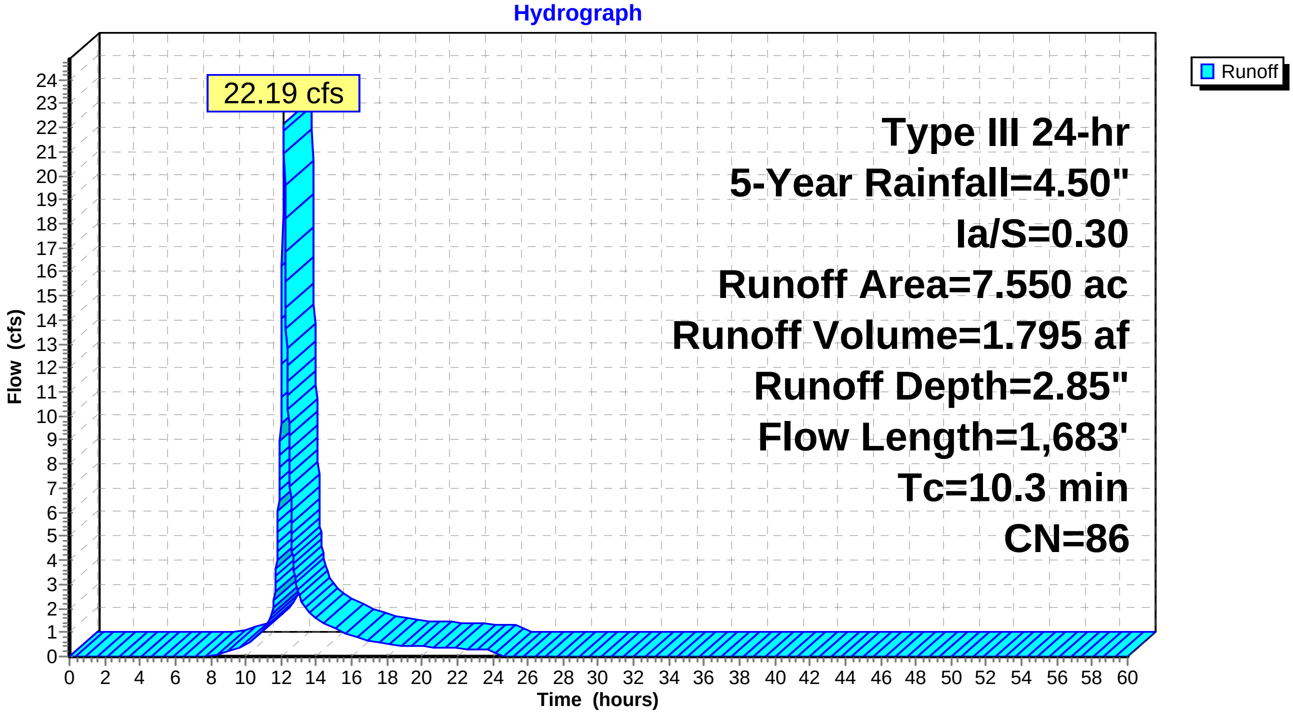
Runoff = 22.19 cfs @ 12.14 hrs, Volume= 1.795 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.300 | 98 | Building roof |
| * | 0.950 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.300 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.550 | 86 | Weighted Average |
| | 3.300 | | 43.71% Pervious Area |
| | 4.250 | | 56.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.3000 | 0.24 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 2.3 | 185 | 0.3000 | 1.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.1 | 50 | 0.1100 | 6.73 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.9 | 1,348 | 0.1100 | 25.87 | 81.28 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 10.3 | 1,683 | Total | | | |

## Subcatchment B119: B119



## Summary for Subcatchment C101: C101

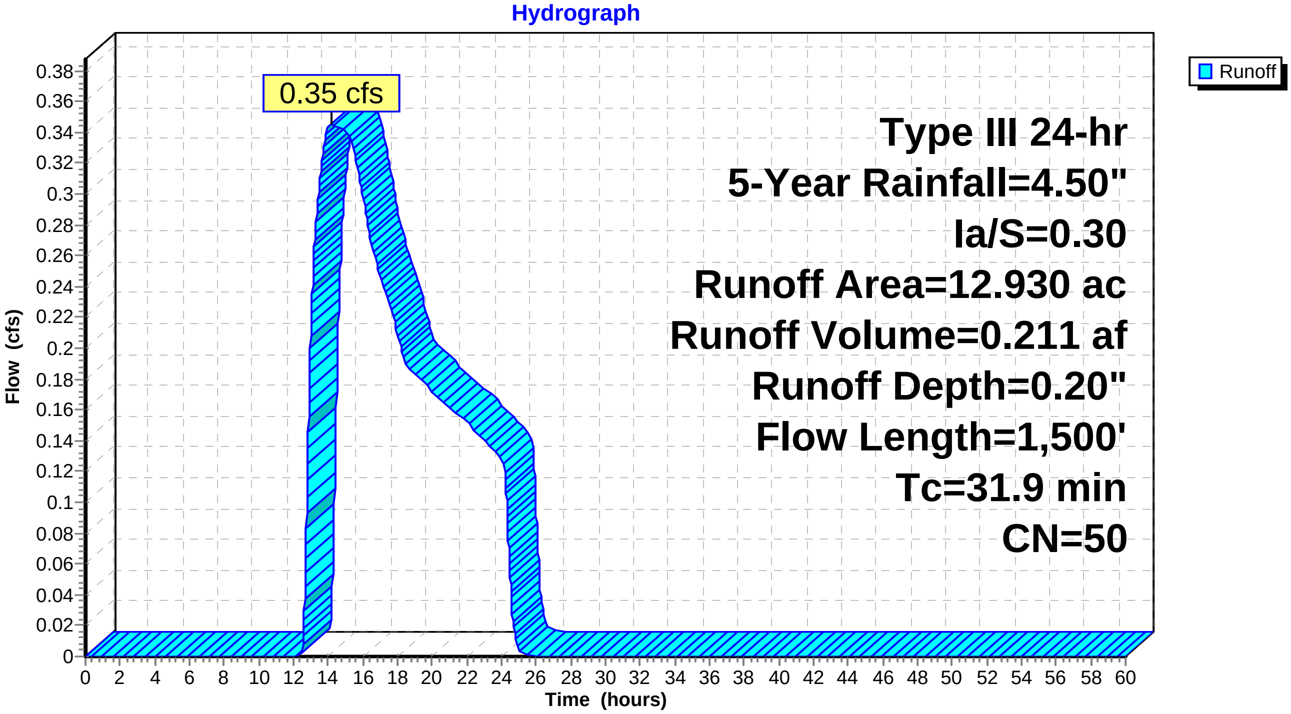
Runoff = 0.35 cfs @ 14.14 hrs, Volume= 0.211 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 4.850 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.370 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.860 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.850 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 12.930 | 50 | Weighted Average |
| | 12.930 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

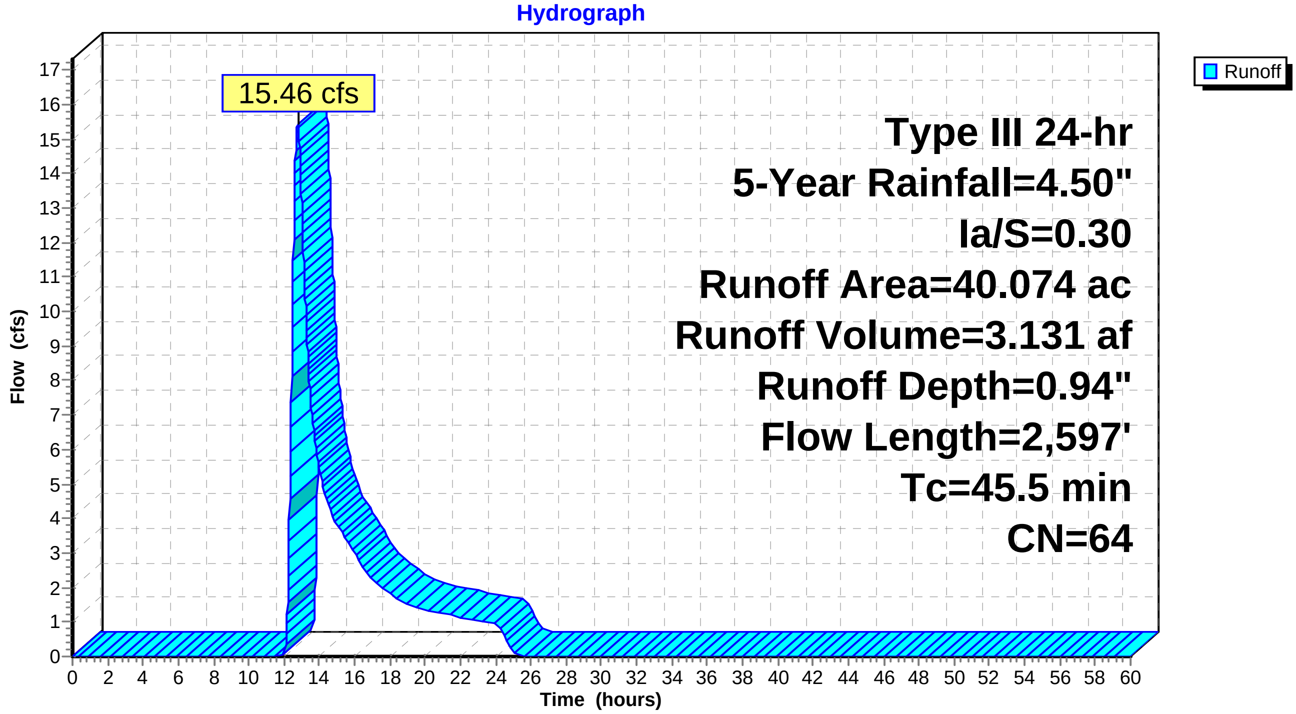
Runoff = 15.46 cfs @ 12.77 hrs, Volume= 3.131 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.007 | 98 | Paved surface |
| * | 0.515 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.285 | 98 | Rock Outcrop/Ledge |
| | 13.181 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.190 | 74 | >75% Grass cover, Good, HSG C |
| | 1.269 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.574 | 70 | Woods, Good, HSG C |
| | 15.097 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.074 | 64 | Weighted Average |
| | 38.950 | | 97.20% Pervious Area |
| | 1.124 | | 2.80% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment C103: C103

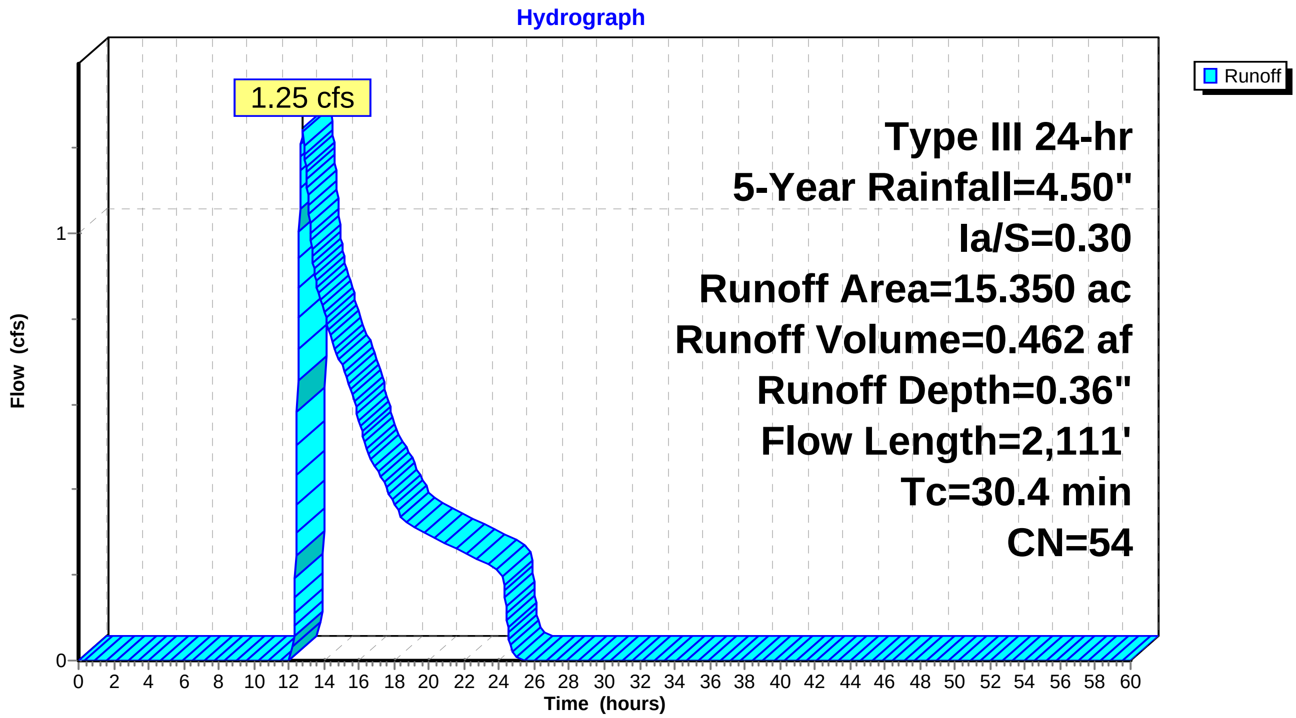
Runoff = 1.25 cfs @ 12.79 hrs, Volume= 0.462 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 2.860 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 9.290 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.240 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.980 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.980 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.350 | 54 | Weighted Average |
| | 12.490 | | 81.37% Pervious Area |
| | 2.860 | | 18.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.9 | 100 | 0.1300 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 185 | 0.1560 | 1.97 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 188 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 288 | 0.0069 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.2 | 1,350 | 0.0260 | 10.03 | 12.31 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 |
| 30.4 | 2,111 | Total | | | |

## Subcatchment C103: C103



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

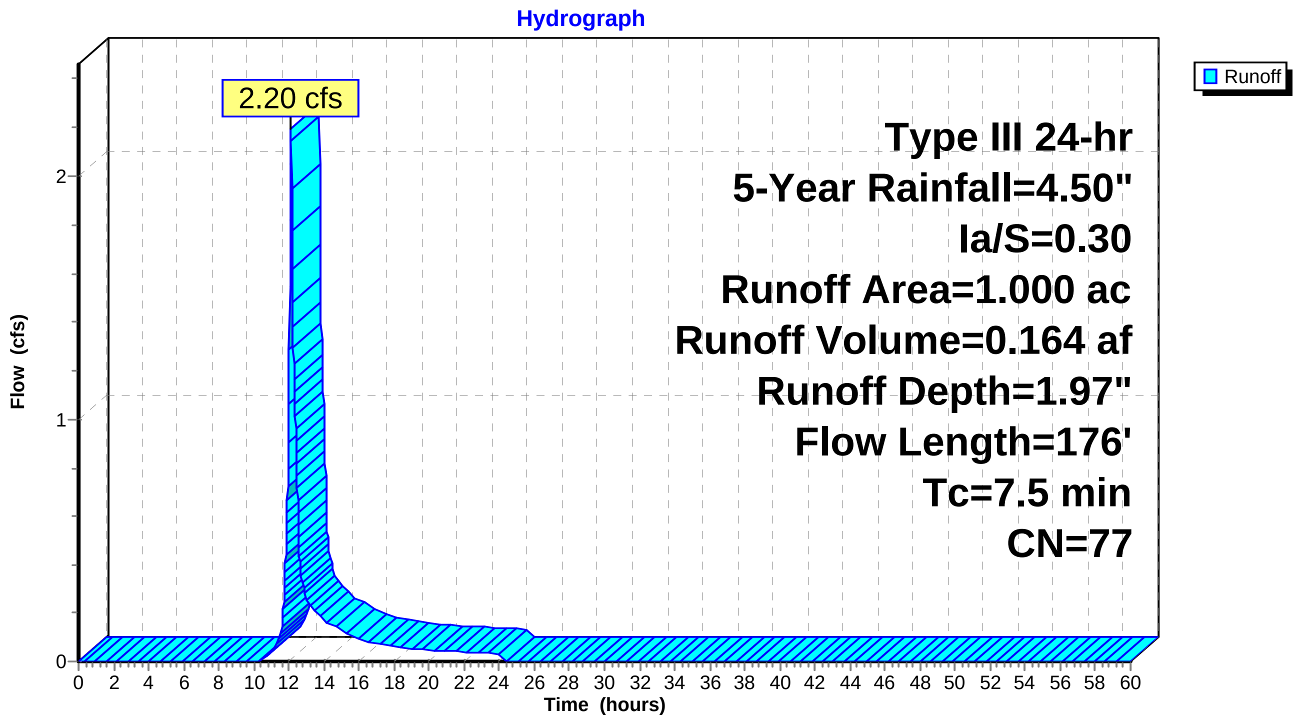
Runoff = 2.20 cfs @ 12.11 hrs, Volume= 0.164 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 5-Year Rainfall=4.50", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.590 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.260 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 77 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C** Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1100 | 6.73 | | **Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



## Summary for Reach 36" Pipe: 36" Pipe

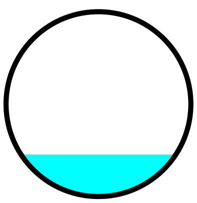
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 2.08" for 5-Year event
Inflow = 16.96 cfs @ 12.45 hrs, Volume= 2.670 af
Outflow = 16.94 cfs @ 12.46 hrs, Volume= 2.670 af, Atten= 0%, Lag= 0.8 min

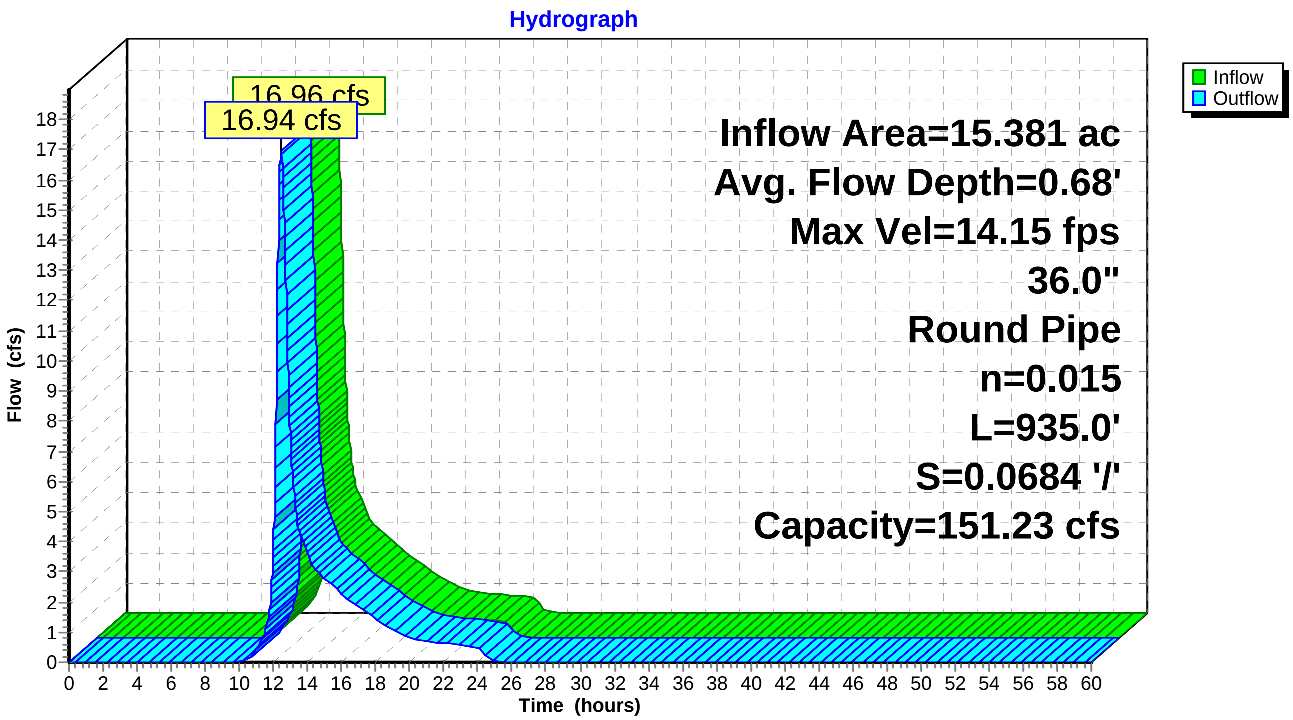
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 14.15 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 4.59 fps, Avg. Travel Time= 3.4 min

Peak Storage= 1,120 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 151.23 cfs

36.0" Round Pipe
n= 0.015
Length= 935.0' Slope= 0.0684 '/'
Inlet Invert= 635.00', Outlet Invert= 571.00'



### Reach 36" Pipe: 36" Pipe



## Summary for Reach 42" Pipe: 42" Pipe

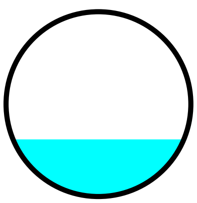
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 100.939 ac, 4.72% Impervious, Inflow Depth = 1.63" for 5-Year event
Inflow = 67.70 cfs @ 12.90 hrs, Volume= 13.689 af
Outflow = 67.66 cfs @ 12.89 hrs, Volume= 13.689 af, Atten= 0%, Lag= 0.0 min

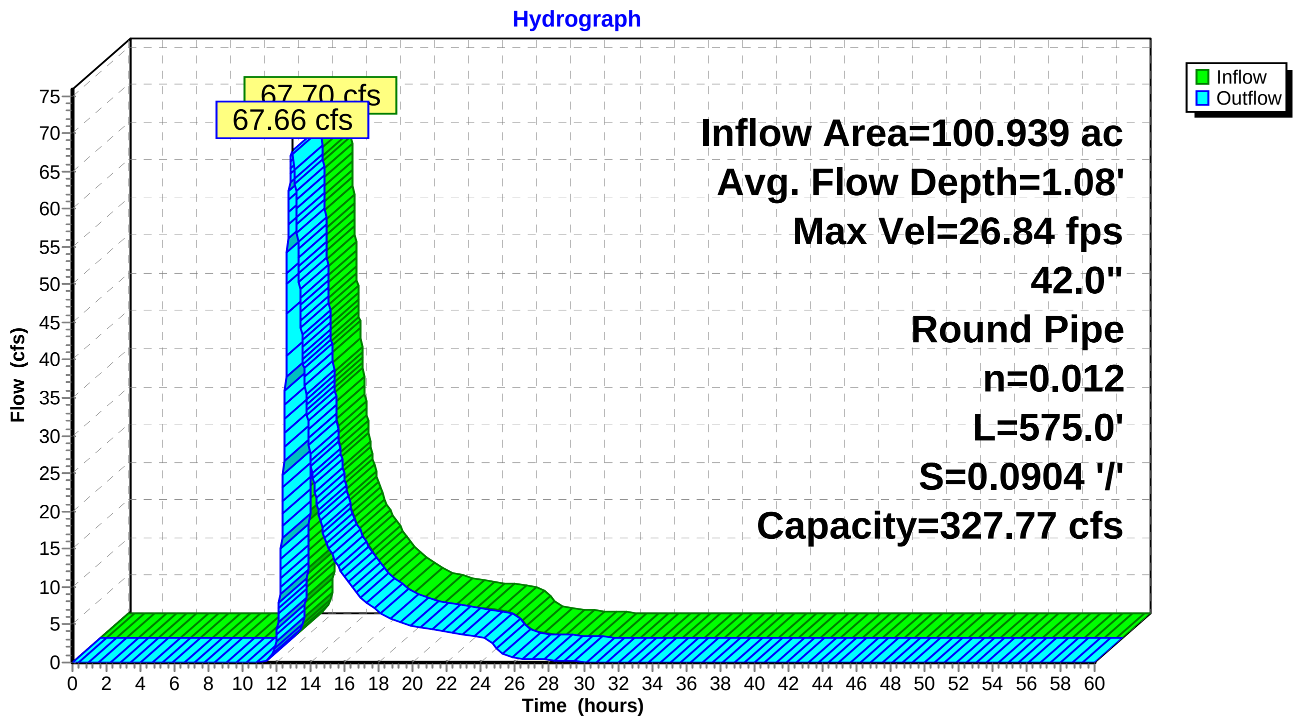
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 26.84 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 6.50 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1,449 cf @ 12.89 hrs
Average Depth at Peak Storage= 1.08'
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 327.77 cfs

42.0" Round Pipe
n= 0.012
Length= 575.0' Slope= 0.0904 '/'
Inlet Invert= 587.00', Outlet Invert= 535.00'



**Reach 42" Pipe: 42" Pipe**



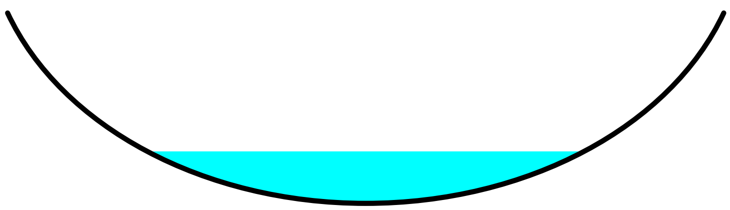
## Summary for Reach A105R: Thru A103

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth > 1.27" for 5-Year event
Inflow = 9.54 cfs @ 13.16 hrs, Volume= 4.441 af
Outflow = 9.53 cfs @ 13.23 hrs, Volume= 4.441 af, Atten= 0%, Lag= 3.7 min

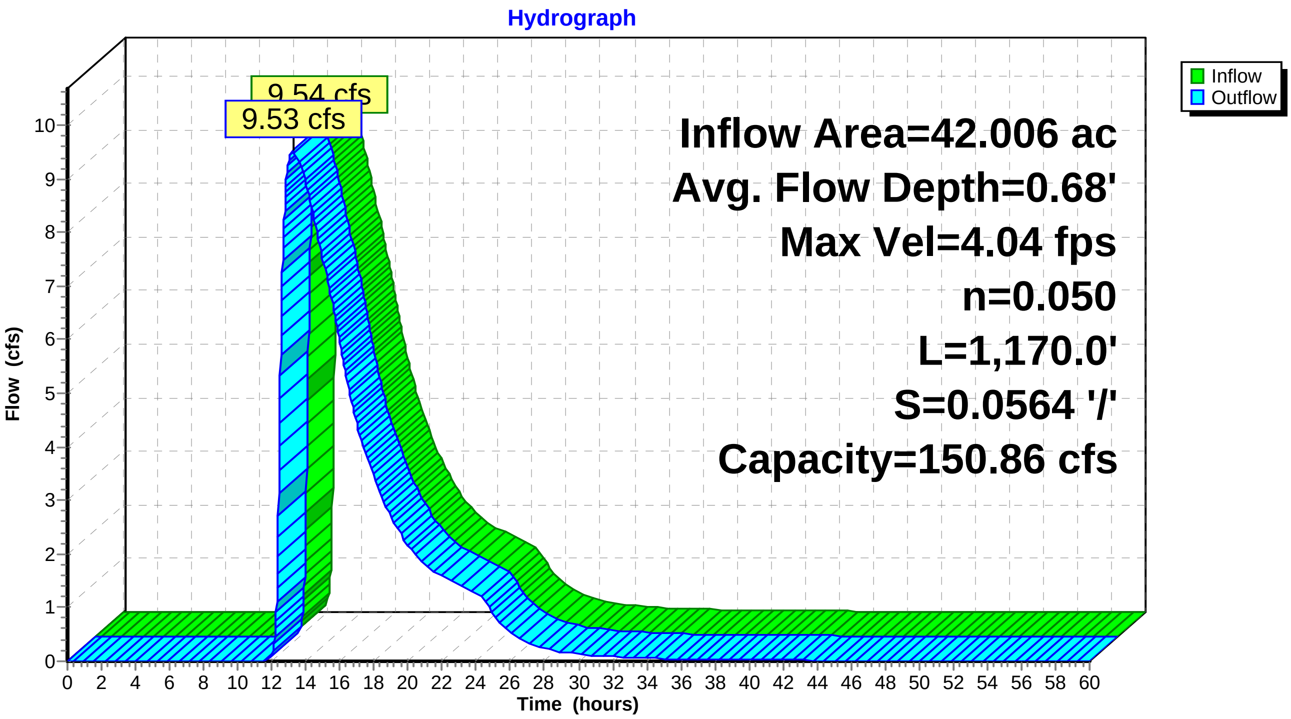
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.04 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 14.8 min

Peak Storage= 2,758 cf @ 13.23 hrs
Average Depth at Peak Storage= 0.68'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 150.86 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,170.0' Slope= 0.0564 '/'
Inlet Invert= 566.00', Outlet Invert= 500.00'



### Reach A105R: Thru A103



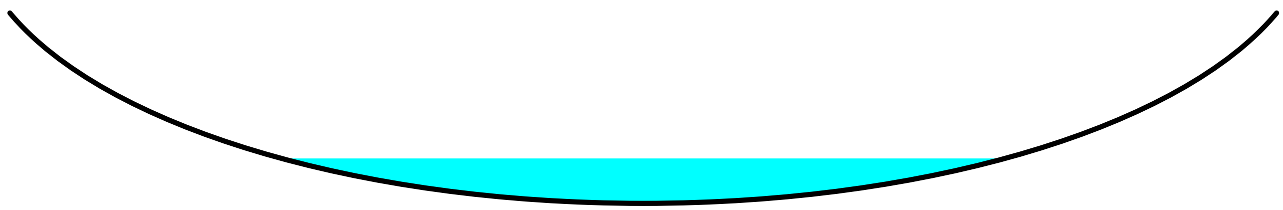
## Summary for Reach B107R: Thru B103

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 1.74" for 5-Year event
Inflow = 8.35 cfs @ 13.05 hrs, Volume= 2.077 af
Outflow = 8.33 cfs @ 13.08 hrs, Volume= 2.077 af, Atten= 0%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.50 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 10.8 min

Peak Storage= 1,420 cf @ 13.08 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 192.14 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 938.0' Slope= 0.4072 '/'
Inlet Invert= 972.00', Outlet Invert= 590.00'



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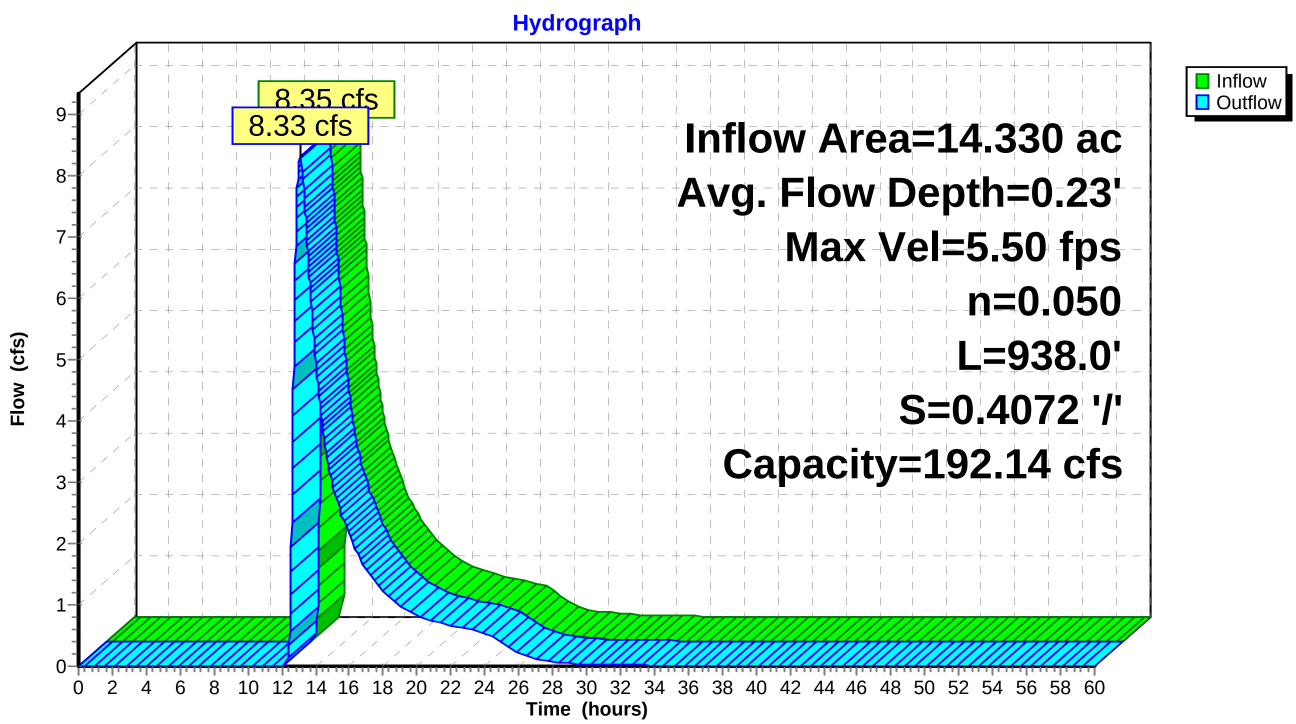
### Reach B107R: Thru B103



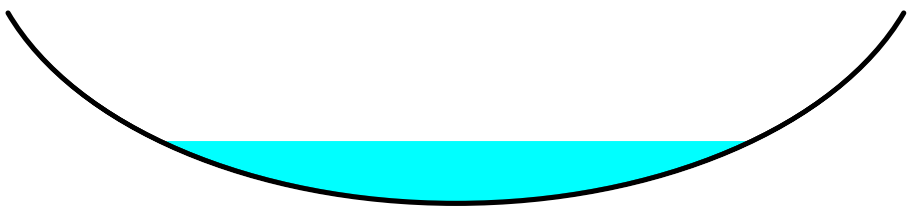
## Summary for Reach B112R: Thru B102

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 1.62" for 5-Year event
Inflow = 34.18 cfs @ 15.59 hrs, Volume= 33.690 af
Outflow = 34.17 cfs @ 15.62 hrs, Volume= 33.681 af, Atten= 0%, Lag= 2.1 min

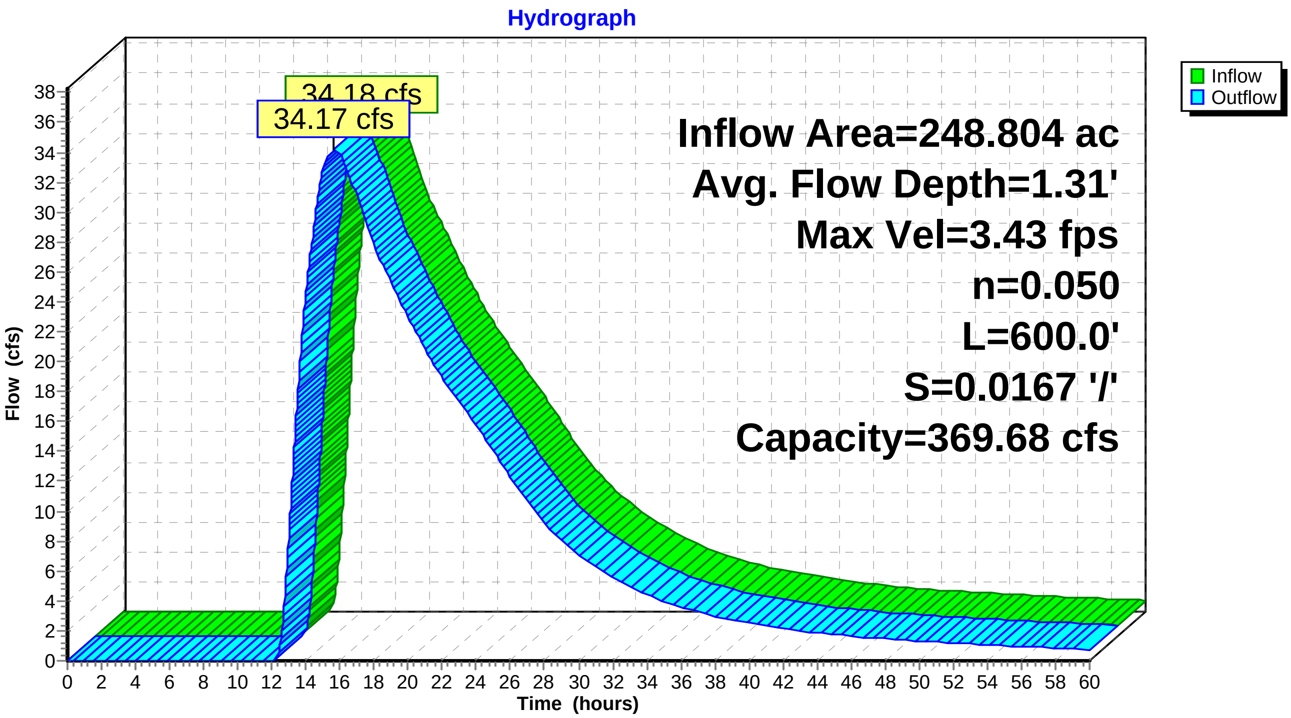
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.43 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 1.93 fps, Avg. Travel Time= 5.2 min

Peak Storage= 5,985 cf @ 15.62 hrs
Average Depth at Peak Storage= 1.31'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 369.68 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 600.0' Slope= 0.0167 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'



### Reach B112R: Thru B102



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.074 ac, 2.80% Impervious, Inflow Depth = 0.94" for 5-Year event
Inflow = 15.46 cfs @ 12.77 hrs, Volume= 3.131 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.09' @ 26.62 hrs Surf.Area= 170,189 sf Storage= 136,377 cf

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

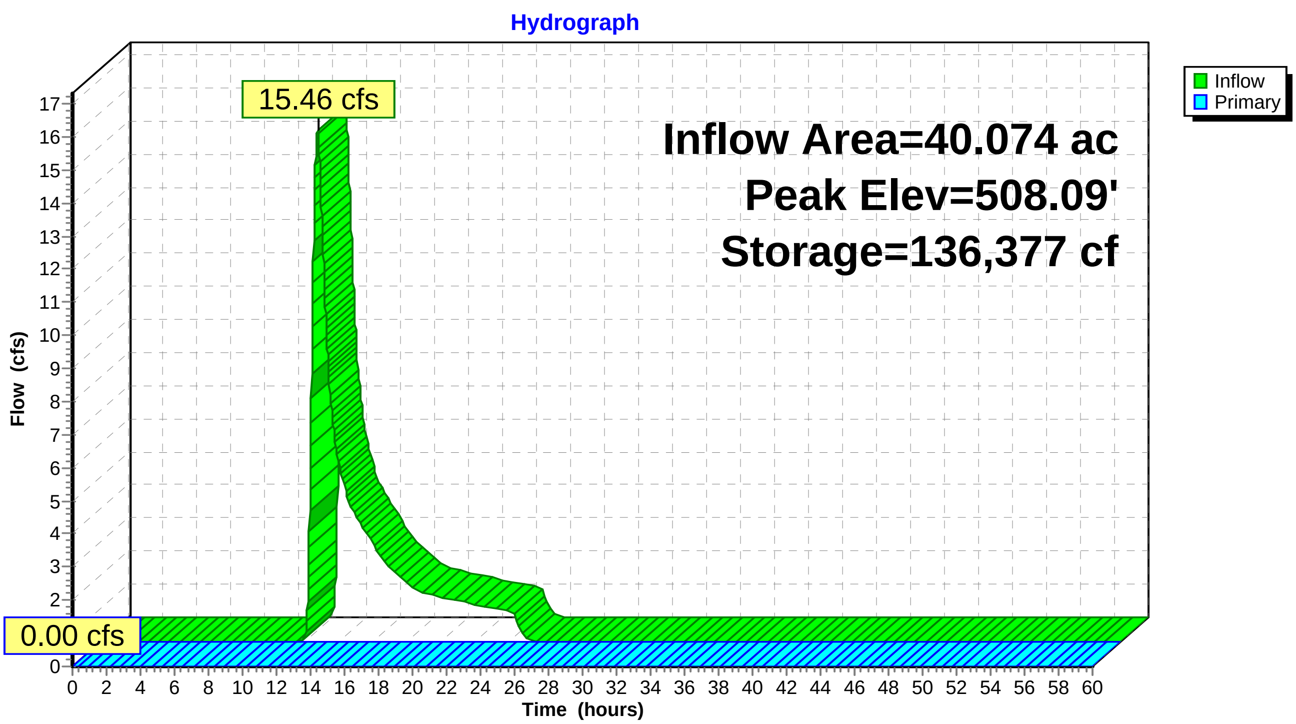
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 104A: Wetland D

Inflow Area = 29.922 ac, 5.68% Impervious, Inflow Depth = 0.10" for 5-Year event
Inflow = 0.39 cfs @ 15.48 hrs, Volume= 0.251 af
Outflow = 0.21 cfs @ 23.56 hrs, Volume= 0.231 af, Atten= 45%, Lag= 484.9 min
Primary = 0.21 cfs @ 23.56 hrs, Volume= 0.231 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 507.97' @ 23.56 hrs Surf.Area= 24,456 sf Storage= 5,704 cf

Plug-Flow detention time= 493.8 min calculated for 0.231 af (92% of inflow)
Center-of-Mass det. time= 465.8 min ( 1,575.5 - 1,109.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

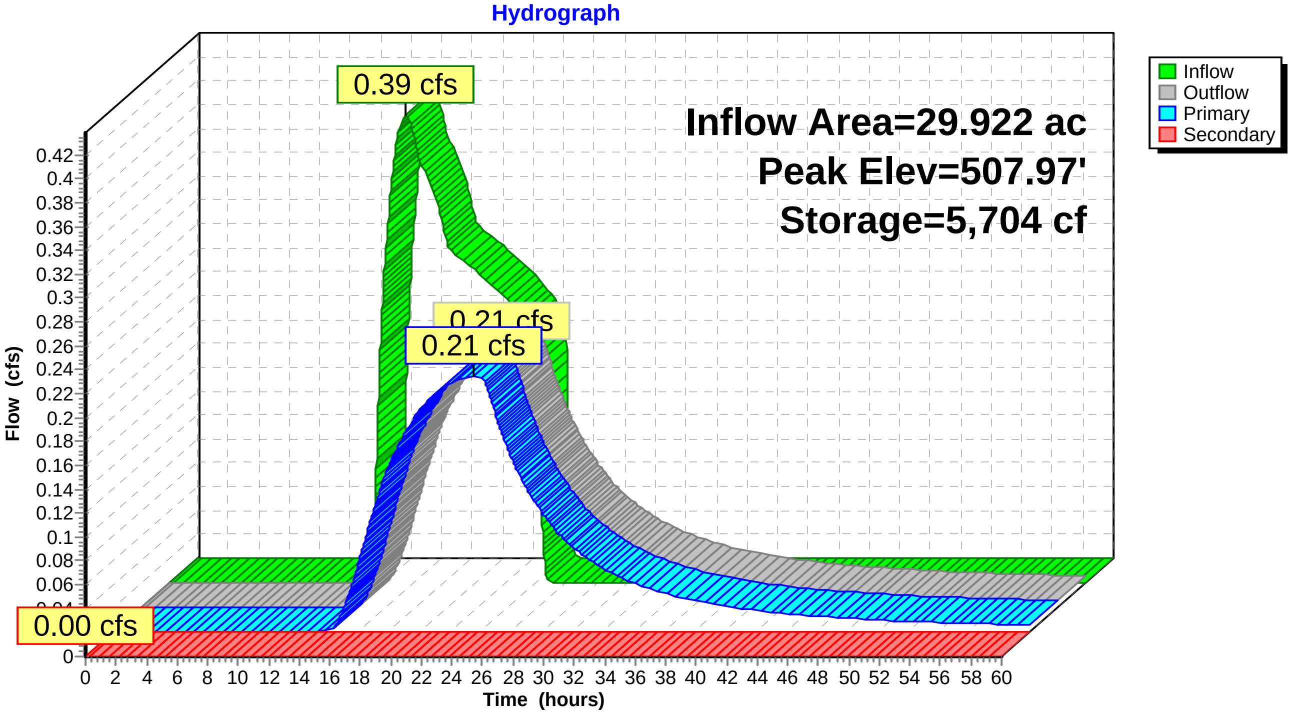
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.21 cfs @ 23.56 hrs HW=507.97' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.21 cfs @ 1.93 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=507.70' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

# Pond 104A: Wetland D



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach 36" Pipe OUTLET depth by 3.52' @ 13.34 hrs

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 1.27" for 5-Year event
Inflow = 28.21 cfs @ 12.43 hrs, Volume= 4.457 af
Outflow = 9.54 cfs @ 13.16 hrs, Volume= 4.441 af, Atten= 66%, Lag= 44.0 min
Primary = 9.54 cfs @ 13.16 hrs, Volume= 4.441 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 574.91' @ 13.16 hrs Surf.Area= 31,469 sf Storage= 54,127 cf

Plug-Flow detention time= 110.6 min calculated for 4.439 af (100% of inflow)
Center-of-Mass det. time= 109.1 min ( 1,011.6 - 902.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

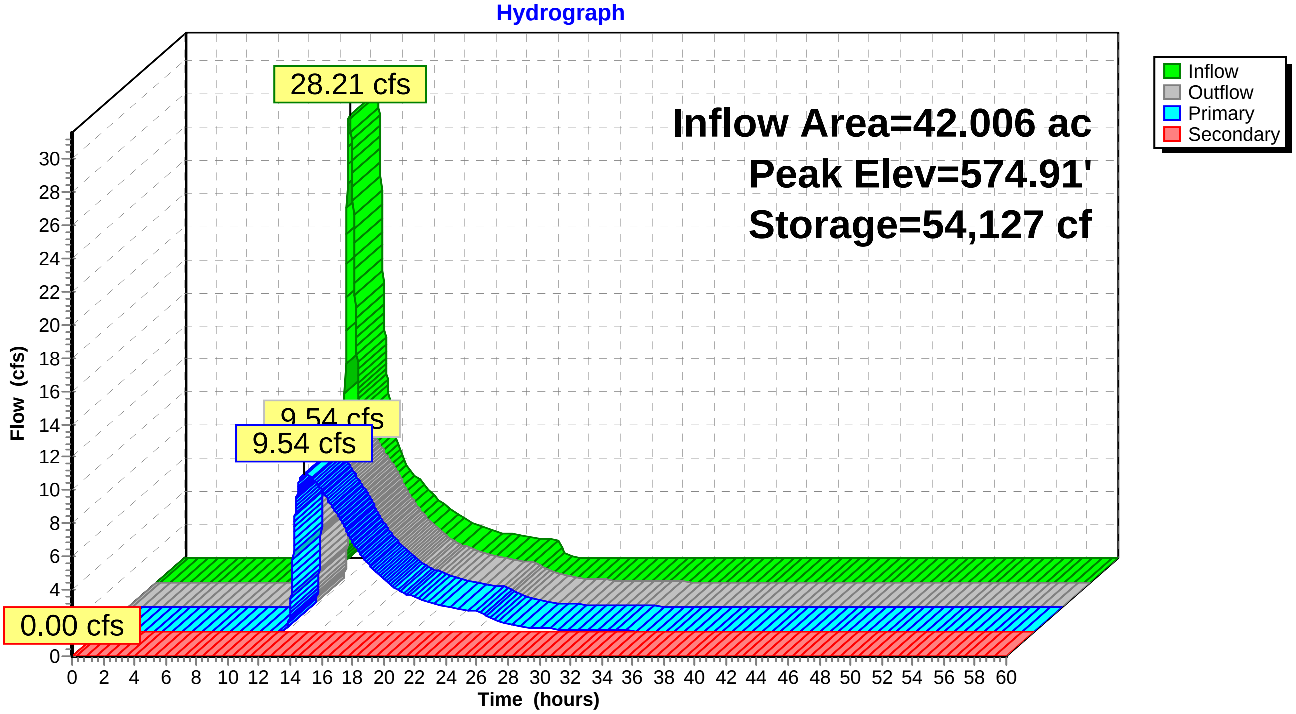
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=9.54 cfs @ 13.16 hrs HW=574.91' TW=566.68' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 9.54 cfs @ 5.40 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=572.90' TW=566.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 105A: Wetland H



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 2.08" for 5-Year event
Inflow = 16.96 cfs @ 12.45 hrs, Volume= 2.670 af
Outflow = 16.96 cfs @ 12.45 hrs, Volume= 2.670 af, Atten= 0%, Lag= 0.0 min
Primary = 16.96 cfs @ 12.45 hrs, Volume= 2.670 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 718.32' @ 12.45 hrs Surf.Area= 31 sf Storage= 17 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 886.1 - 886.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

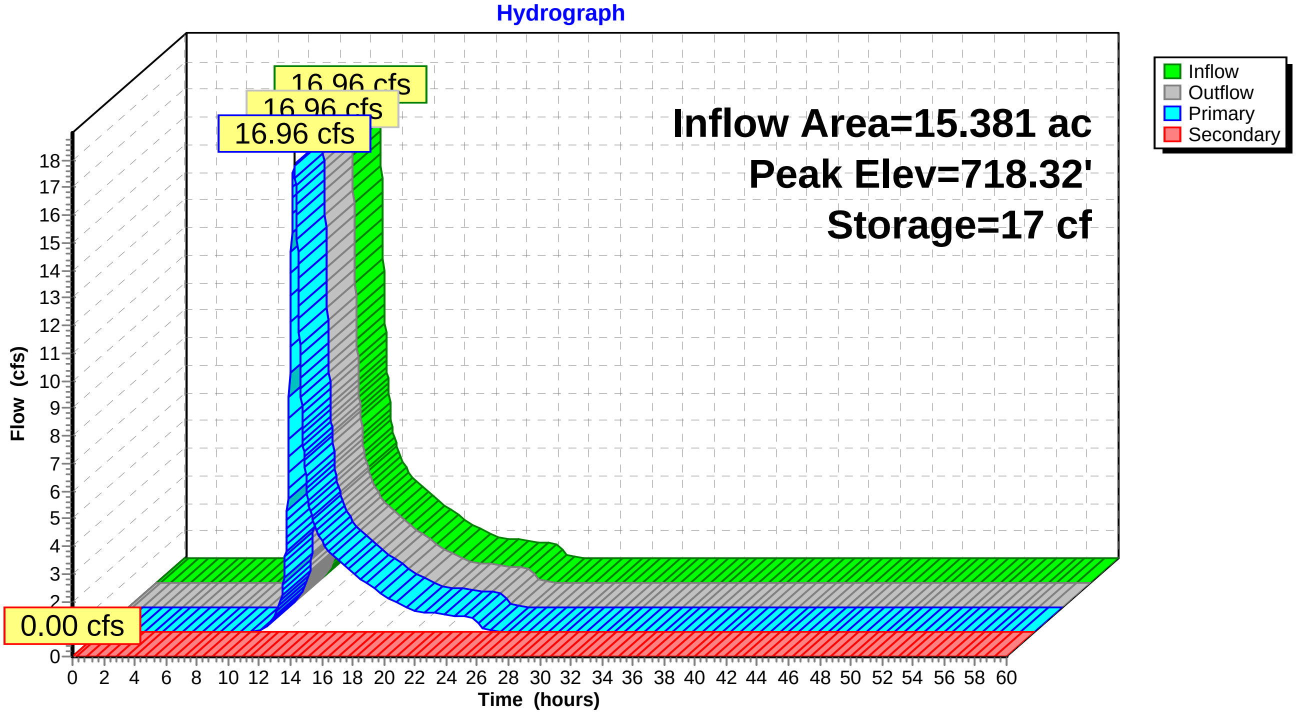
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=16.95 cfs @ 12.45 hrs HW=718.32' TW=635.68' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 16.95 cfs @ 4.34 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=635.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 118.113 ac, 1.34% Impervious, Inflow Depth = 1.88" for 5-Year event
Inflow = 79.90 cfs @ 13.23 hrs, Volume= 18.512 af
Outflow = 79.82 cfs @ 13.24 hrs, Volume= 18.512 af, Atten= 0%, Lag= 0.5 min
Primary = 79.82 cfs @ 13.24 hrs, Volume= 18.512 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.71' @ 13.24 hrs Surf.Area= 12,051 sf Storage= 19,185 cf

Plug-Flow detention time= 10.2 min calculated for 18.506 af (100% of inflow)
Center-of-Mass det. time= 10.3 min ( 936.5 - 926.2 )

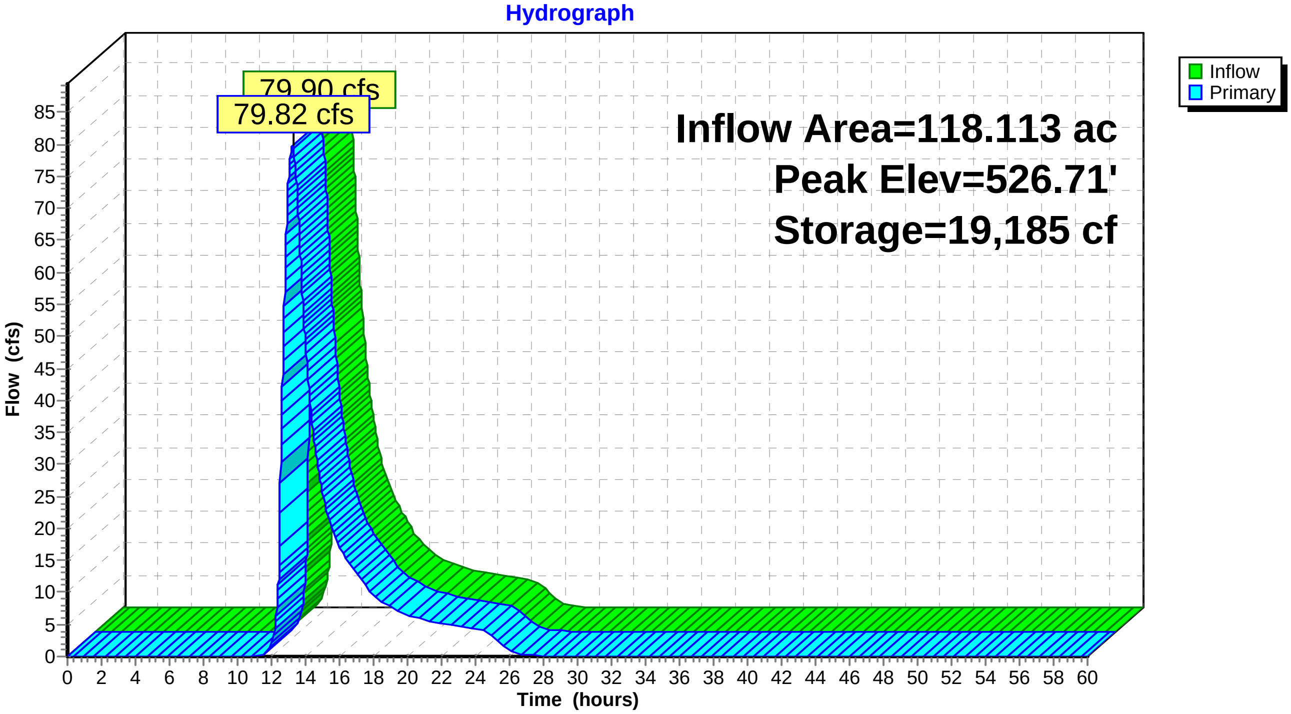
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=79.82 cfs @ 13.24 hrs HW=526.71' TW=515.92' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 79.82 cfs @ 2.58 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

Inflow Area = 95.412 ac, 4.86% Impervious, Inflow Depth = 1.69" for 5-Year event
Inflow = 66.90 cfs @ 12.88 hrs, Volume= 13.453 af
Outflow = 66.89 cfs @ 12.89 hrs, Volume= 13.453 af, Atten= 0%, Lag= 0.3 min
Primary = 41.01 cfs @ 12.89 hrs, Volume= 12.127 af
Secondary = 25.88 cfs @ 12.89 hrs, Volume= 1.326 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 625.50' @ 12.89 hrs Surf.Area= 1,237 sf Storage= 2,435 cf

Plug-Flow detention time= 0.3 min calculated for 13.453 af (100% of inflow)
Center-of-Mass det. time= 0.3 min ( 928.6 - 928.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

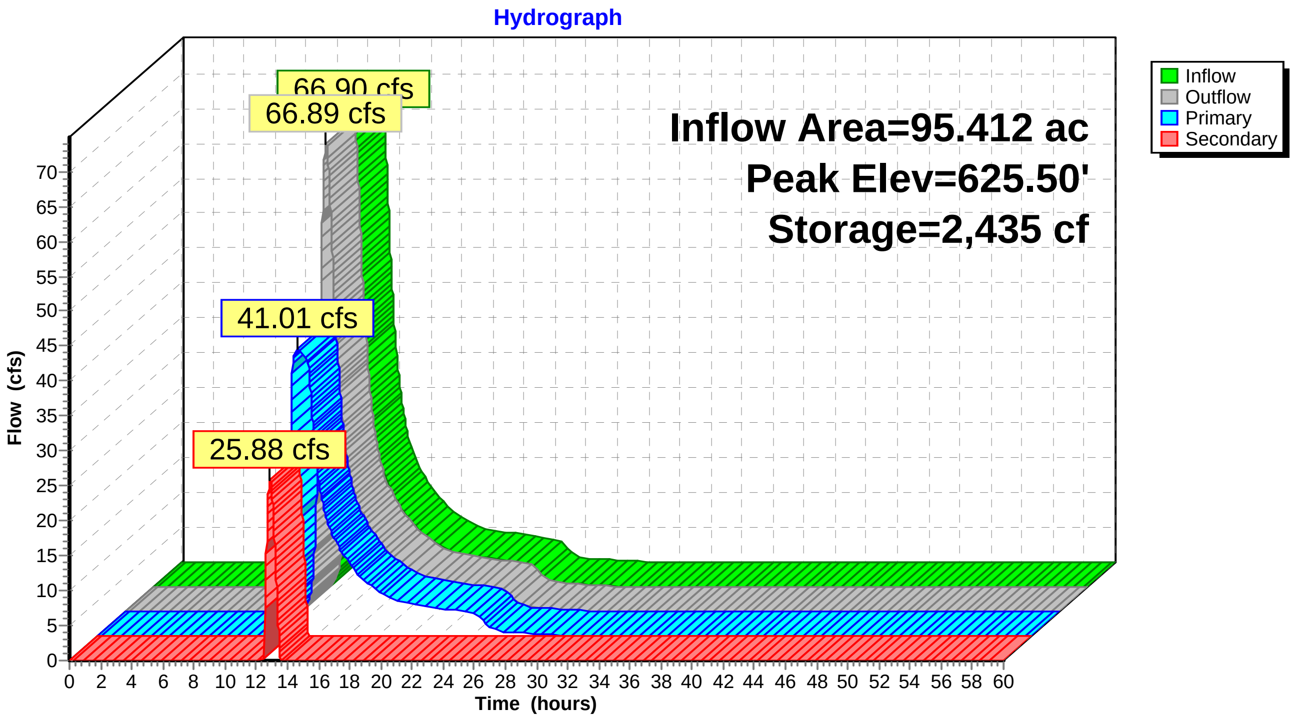
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=41.01 cfs @ 12.89 hrs HW=625.50' TW=588.08' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 41.01 cfs @ 13.05 fps)

**Secondary OutFlow** Max=25.86 cfs @ 12.89 hrs HW=625.50' TW=610.93' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 25.86 cfs @ 2.27 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 1.97" for 5-Year event
Inflow = 16.70 cfs @ 12.55 hrs, Volume= 2.353 af
Outflow = 8.35 cfs @ 13.05 hrs, Volume= 2.077 af, Atten= 50%, Lag= 29.9 min
Primary = 8.35 cfs @ 13.05 hrs, Volume= 2.077 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.78' @ 13.05 hrs Surf.Area= 123,028 sf Storage= 34,203 cf

Plug-Flow detention time= 145.2 min calculated for 2.077 af (88% of inflow)
Center-of-Mass det. time= 90.1 min ( 968.5 - 878.4 )

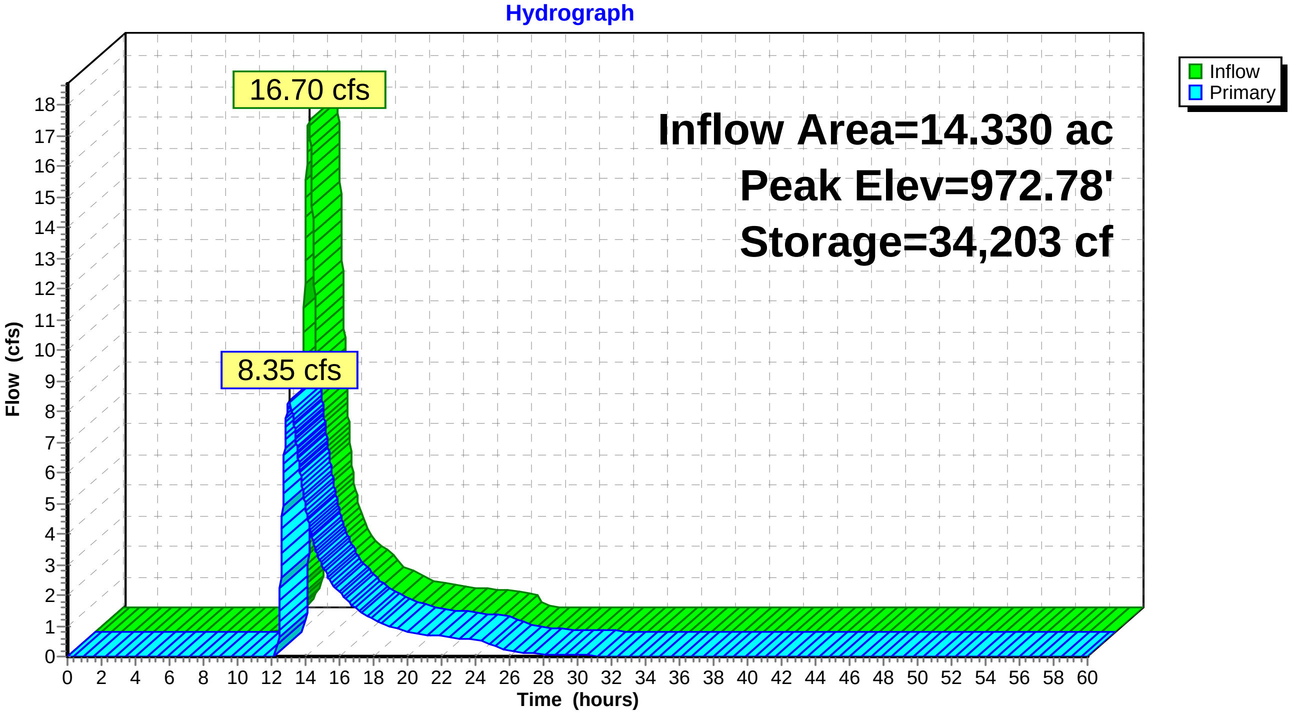
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=8.34 cfs @ 13.05 hrs HW=972.78' TW=972.23' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 8.34 cfs @ 1.14 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 5.527 ac, 2.32% Impervious, Inflow Depth = 3.39" for 5-Year event
Inflow = 26.65 cfs @ 12.89 hrs, Volume= 1.561 af
Outflow = 26.68 cfs @ 12.90 hrs, Volume= 1.561 af, Atten= 0%, Lag= 0.5 min
Primary = 26.68 cfs @ 12.90 hrs, Volume= 1.561 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 610.93' @ 12.90 hrs Surf.Area= 13 sf Storage= 28 cf

Plug-Flow detention time= 0.4 min calculated for 1.561 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 806.6 - 806.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

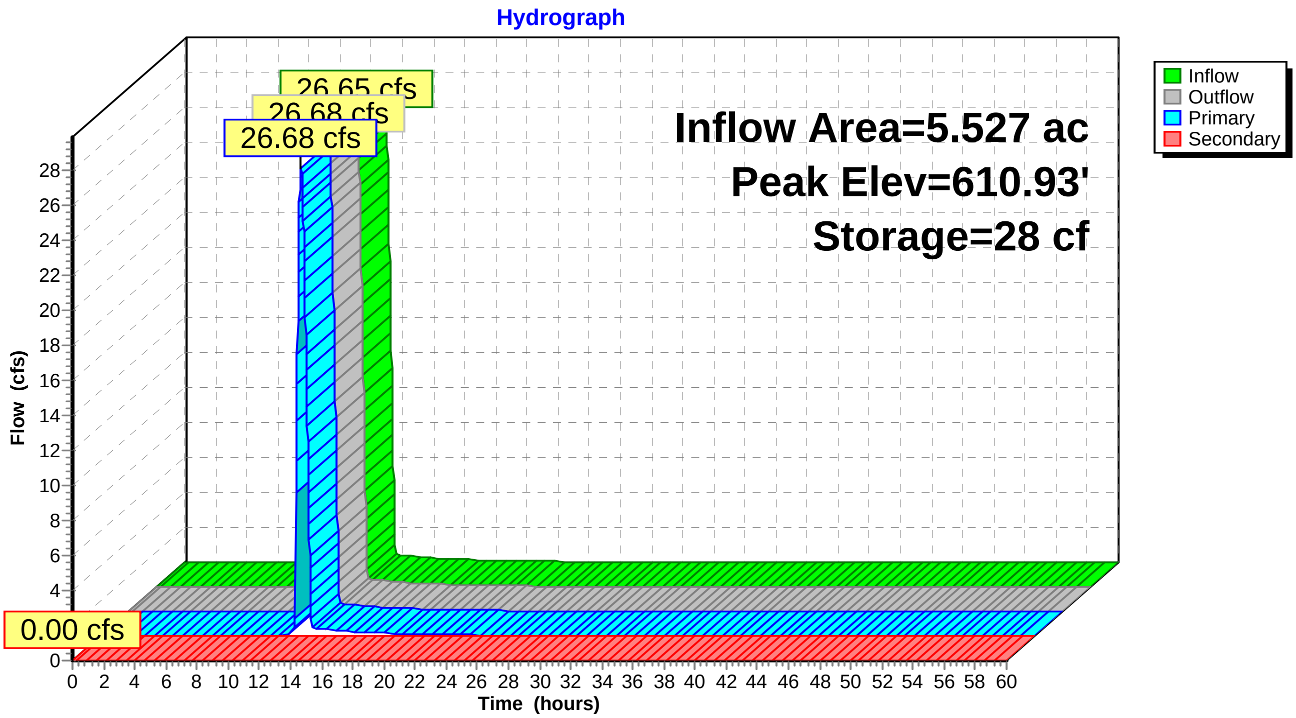
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=26.66 cfs @ 12.90 hrs HW=610.93' TW=588.08' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 26.66 cfs @ 4.97 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=608.80' TW=587.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 108A: 36" Culvert



## Summary for Pond SWM 7A: SWM 7A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 1.97" for 5-Year event
Inflow = 2.20 cfs @ 12.11 hrs, Volume= 0.164 af
Outflow = 1.09 cfs @ 12.33 hrs, Volume= 0.164 af, Atten= 50%, Lag= 12.9 min
Primary = 1.09 cfs @ 12.33 hrs, Volume= 0.164 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 807.75' @ 12.33 hrs Surf.Area= 2,382 sf Storage= 1,522 cf

Plug-Flow detention time= 41.3 min calculated for 0.164 af (100% of inflow)
Center-of-Mass det. time= 40.8 min ( 891.0 - 850.2 )

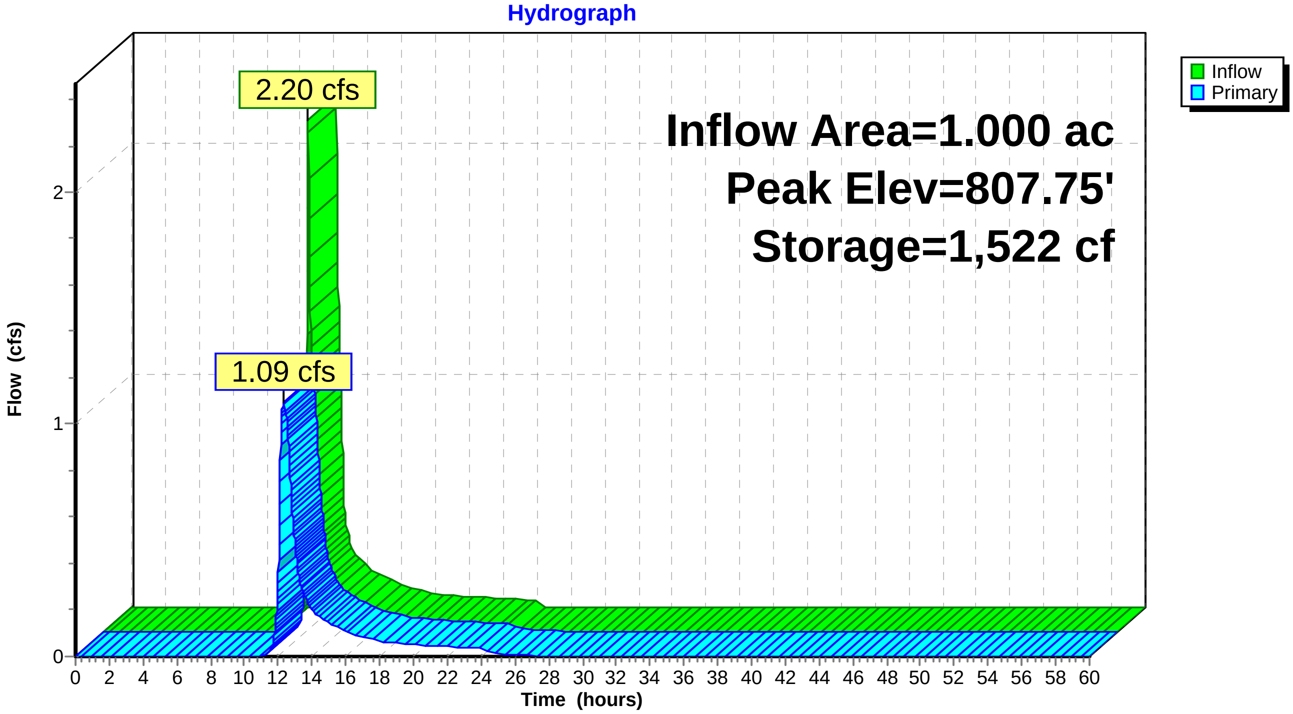
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 807.00' | 5,238 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 807.00 | 1,656 | 0 | 0 |
| 809.00 | 3,582 | 5,238 | 5,238 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 802.00' | **15.0" Round Culvert**<br>L= 41.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 802.00' / 801.00' S= 0.0244 '/' Cc= 0.900<br>n= 0.015, Flow Area= 1.23 sf |
| #2 | Device 1 | 807.00' | **8.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 808.25' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=1.09 cfs @ 12.33 hrs HW=807.75' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.09 cfs of 14.69 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.09 cfs @ 3.12 fps)
  └─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM 7A: SWM 7A (Phase 1)



## Summary for Pond SWM1: SWM 1

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 0.87" for 5-Year event
Inflow = 15.71 cfs @ 12.90 hrs, Volume= 3.681 af
Outflow = 13.64 cfs @ 13.16 hrs, Volume= 3.681 af, Atten= 13%, Lag= 15.5 min
Primary = 13.64 cfs @ 13.16 hrs, Volume= 3.681 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 513.02' @ 13.16 hrs Surf.Area= 15,117 sf Storage= 13,224 cf

Plug-Flow detention time= 22.4 min calculated for 3.681 af (100% of inflow)
Center-of-Mass det. time= 22.3 min ( 986.5 - 964.2 )

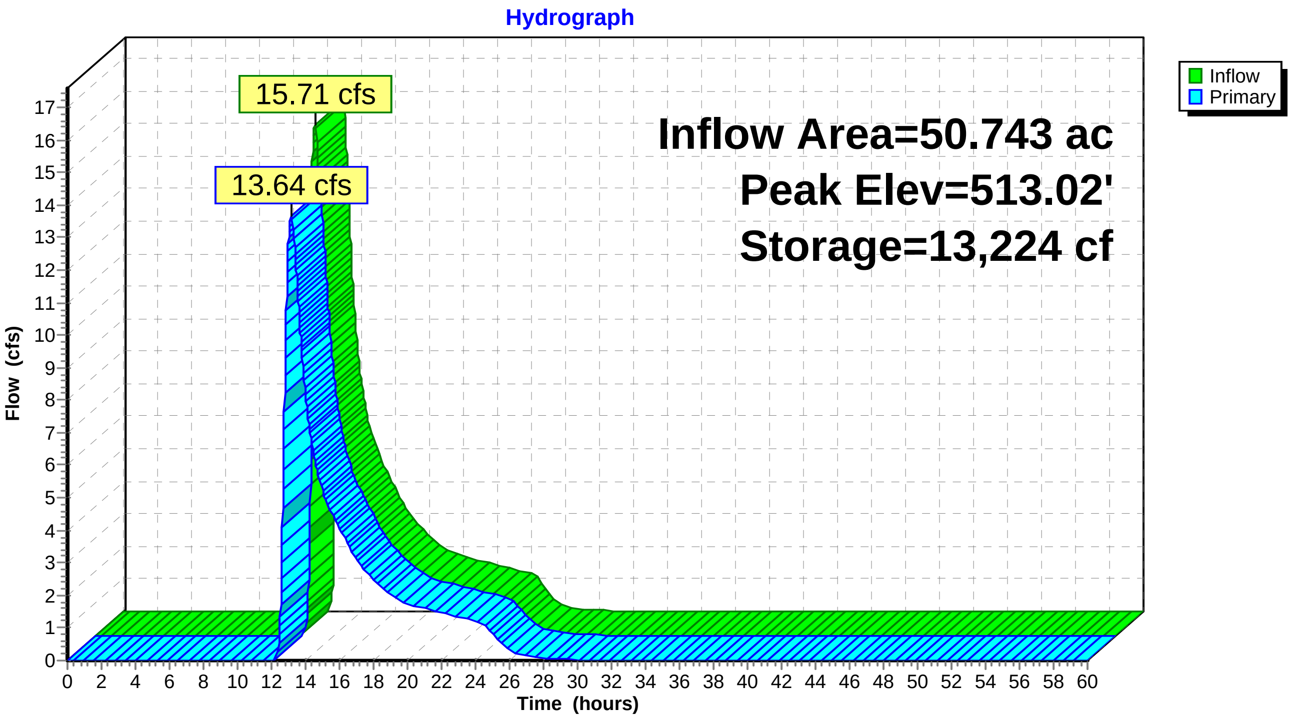
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 512.00' | 77,663 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 512.00 | 10,713 | 0 | 0 |
| 513.00 | 14,994 | 12,854 | 12,854 |
| 514.00 | 19,973 | 17,484 | 30,337 |
| 515.00 | 23,663 | 21,818 | 52,155 |
| 516.00 | 27,353 | 25,508 | 77,663 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 512.00' | **5.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=13.64 cfs @ 13.16 hrs HW=513.02' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 13.64 cfs @ 2.66 fps)

## Pond SWM1: SWM 1



## Summary for Pond SWM17: SWM17

Inflow Area = 15.350 ac, 18.63% Impervious, Inflow Depth = 0.36" for 5-Year event
Inflow = 1.25 cfs @ 12.79 hrs, Volume= 0.462 af
Outflow = 1.23 cfs @ 12.86 hrs, Volume= 0.462 af, Atten= 2%, Lag= 4.3 min
Primary = 1.23 cfs @ 12.86 hrs, Volume= 0.462 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.64' @ 12.86 hrs Surf.Area= 0.015 ac Storage= 0.007 af

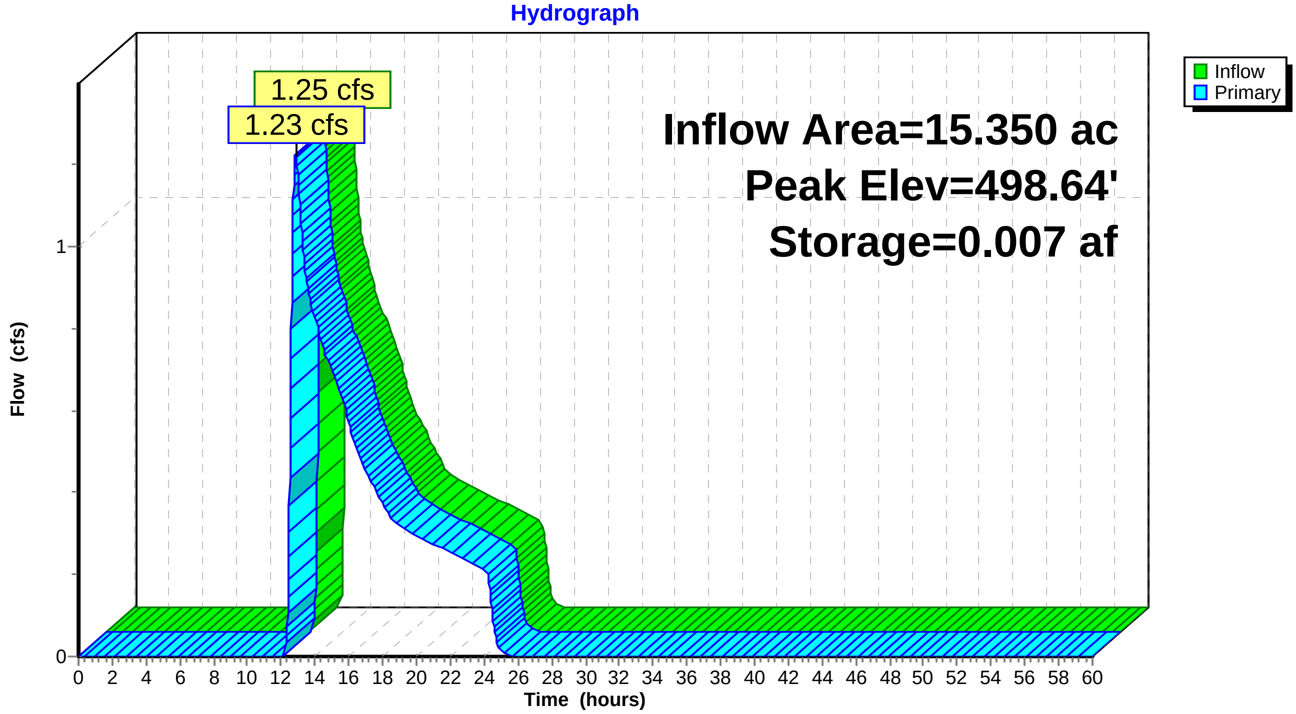
Plug-Flow detention time= 4.5 min calculated for 0.462 af (100% of inflow)
Center-of-Mass det. time= 4.5 min ( 1,003.7 - 999.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 0.090 af | **60.0" Round Pipe Storage** x 2<br>L= 100.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **24.0" Round Culvert**<br>L= 60.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 497.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 498.00' | **10.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 500.50' | **3.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31<br>3.30 3.31 3.32 |

**Primary OutFlow** Max=1.23 cfs @ 12.86 hrs HW=498.64' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.23 cfs of 1.87 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.23 cfs @ 2.73 fps)
  └─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM17: SWM17



## Summary for Pond SWM2: SWM2

Inflow Area = 120.037 ac, 12.91% Impervious, Inflow Depth = 2.11" for 5-Year event
Inflow = 141.52 cfs @ 12.42 hrs, Volume= 21.099 af
Outflow = 72.11 cfs @ 12.93 hrs, Volume= 20.952 af, Atten= 49%, Lag= 30.8 min
Primary = 72.11 cfs @ 12.93 hrs, Volume= 20.952 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 503.04' @ 12.93 hrs Surf.Area= 67,135 sf Storage= 283,617 cf

Plug-Flow detention time= 177.6 min calculated for 20.945 af (99% of inflow)
Center-of-Mass det. time= 173.4 min ( 1,047.1 - 873.7 )

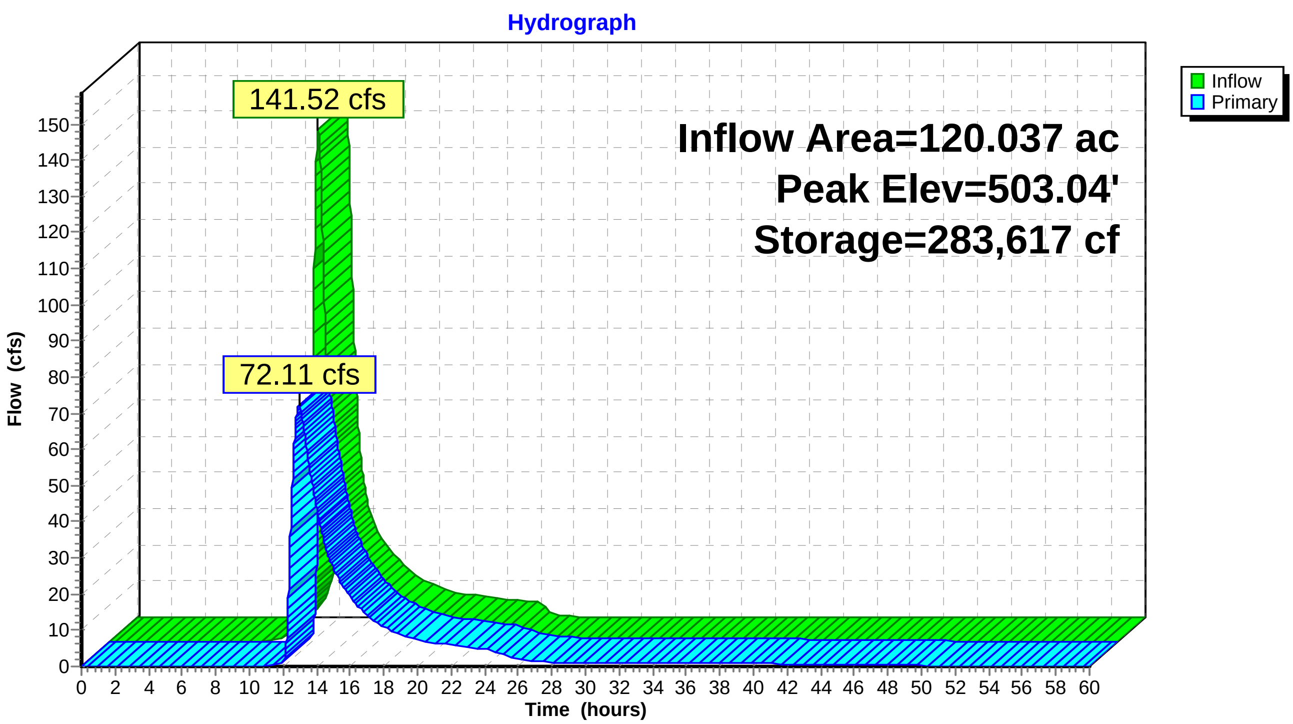
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 598,445 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 498.00 | 33,946 | 0 | 0 |
| 499.00 | 52,156 | 43,051 | 43,051 |
| 500.00 | 55,687 | 53,922 | 96,973 |
| 501.00 | 59,350 | 57,519 | 154,491 |
| 502.00 | 63,077 | 61,214 | 215,705 |
| 503.00 | 66,905 | 64,991 | 280,696 |
| 504.00 | 72,175 | 69,540 | 350,236 |
| 505.00 | 79,111 | 75,643 | 425,879 |
| 506.00 | 88,674 | 83,893 | 509,771 |
| 507.00 | 88,674 | 88,674 | 598,445 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **8.0" Round Culvert**<br>L= 100.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 496.00' S= 0.0200 '/' Cc= 0.900<br>n= 0.024, Flow Area= 0.35 sf |
| #2 | Primary | 499.50' | **4.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #3 | Primary | 503.00' | **15.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=72.10 cfs @ 12.93 hrs HW=503.04' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 1.57 cfs @ 4.50 fps)
**2=Broad-Crested Rectangular Weir** (Weir Controls 70.17 cfs @ 4.95 fps)
**3=Broad-Crested Rectangular Weir** (Weir Controls 0.36 cfs @ 0.56 fps)

## Pond SWM2: SWM2



## Summary for Pond SWM3try: SWM3

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 1.69" for 5-Year event
Inflow = 120.06 cfs @ 12.65 hrs, Volume= 34.989 af
Outflow = 34.18 cfs @ 15.59 hrs, Volume= 33.690 af, Atten= 72%, Lag= 176.0 min
Primary = 34.18 cfs @ 15.59 hrs, Volume= 33.690 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.92' @ 15.59 hrs Surf.Area= 389,926 sf Storage= 713,337 cf

Plug-Flow detention time= 452.9 min calculated for 33.690 af (96% of inflow)
Center-of-Mass det. time= 393.8 min ( 1,386.3 - 992.4 )

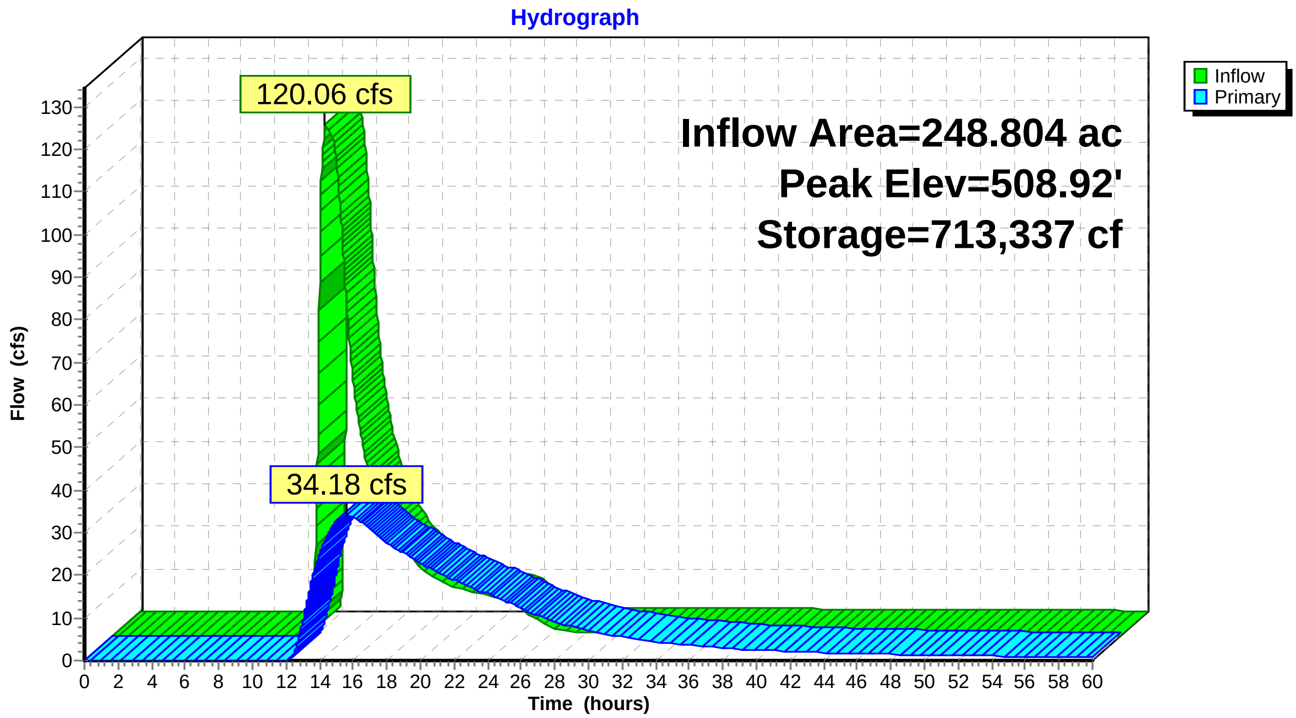
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.00' | 2,034,374 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 507.00 | 359,082 | 0 | 0 |
| 508.00 | 370,212 | 364,647 | 364,647 |
| 510.00 | 413,188 | 783,400 | 1,148,047 |
| 512.00 | 473,139 | 886,327 | 2,034,374 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.00' | **4.5' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #2 | Primary | 508.75' | **15.0' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=34.18 cfs @ 15.59 hrs HW=508.92' TW=503.31' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 31.42 cfs @ 3.64 fps)
**2=Broad-Crested Rectangular Weir** (Weir Controls 2.75 cfs @ 1.10 fps)

## Pond SWM3try: SWM3



## Summary for Pond SWM4: SWM4

Inflow Area = 195.996 ac, 11.01% Impervious, Inflow Depth > 1.37" for 5-Year event
Inflow = 83.12 cfs @ 13.24 hrs, Volume= 22.401 af
Outflow = 82.11 cfs @ 13.31 hrs, Volume= 22.388 af, Atten= 1%, Lag= 4.4 min
Primary = 82.11 cfs @ 13.31 hrs, Volume= 22.388 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 515.92' @ 13.31 hrs Surf.Area= 43,750 sf Storage= 39,046 cf

Plug-Flow detention time= 13.7 min calculated for 22.380 af (100% of inflow)
Center-of-Mass det. time= 12.2 min ( 1,051.4 - 1,039.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 515.00' | 387,328 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

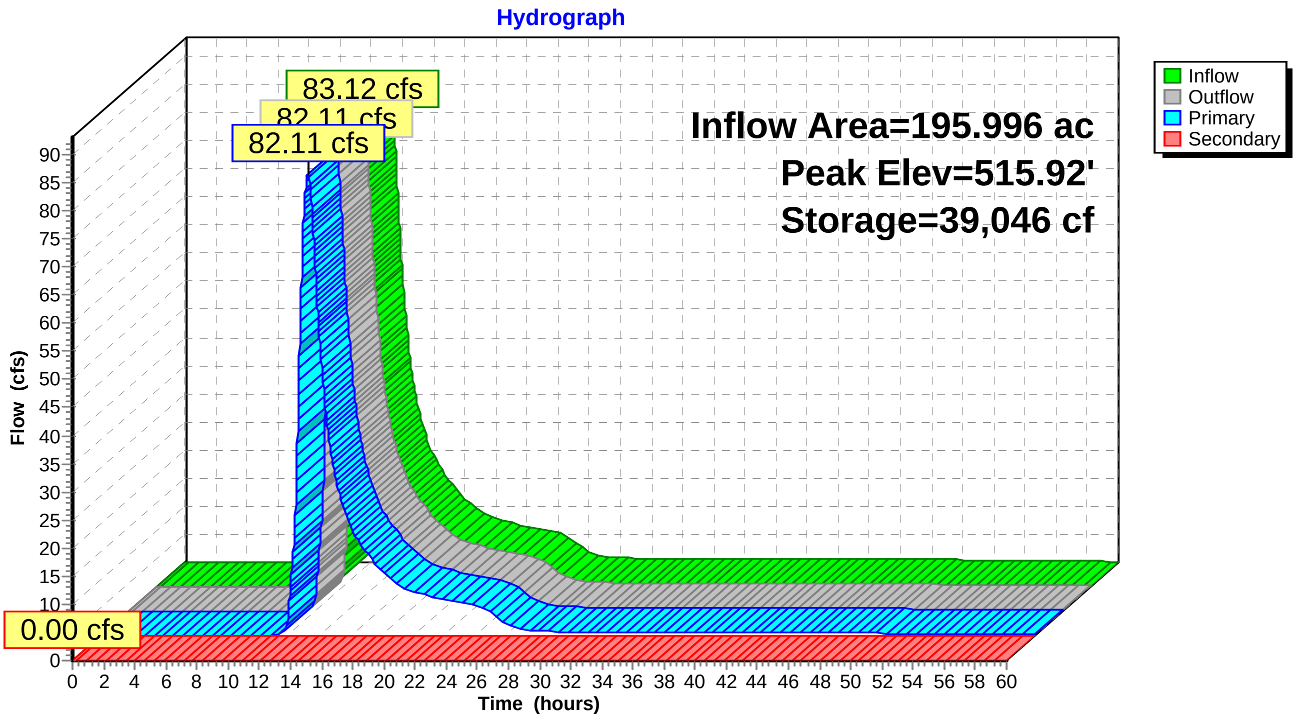
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 515.00 | 40,770 | 0 | 0 |
| 516.00 | 43,995 | 42,383 | 42,383 |
| 518.00 | 52,841 | 96,836 | 139,219 |
| 520.00 | 62,089 | 114,930 | 254,149 |
| 522.00 | 71,090 | 133,179 | 387,328 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 510.00' | **36.0" Round Culvert X 3.00**<br>L= 250.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 510.00' / 505.50' S= 0.0180 '/' Cc= 0.900<br>n= 0.020, Flow Area= 7.07 sf |
| #2 | Device 1 | 515.00' | **36.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 521.50' | **25.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=82.10 cfs @ 13.31 hrs HW=515.92' TW=508.16' (Dynamic Tailwater)
└─**1=Culvert** (Passes 82.10 cfs of 197.79 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 82.10 cfs @ 3.14 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=515.00' TW=507.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM4: SWM4



## Summary for Pond SWM5: SWM5

Inflow Area = 58.557 ac, 24.60% Impervious, Inflow Depth = 2.23" for 5-Year event
Inflow = 81.43 cfs @ 12.38 hrs, Volume= 10.878 af
Outflow = 69.73 cfs @ 12.57 hrs, Volume= 10.731 af, Atten= 14%, Lag= 11.2 min
Primary = 0.89 cfs @ 12.57 hrs, Volume= 2.442 af
Secondary = 68.84 cfs @ 12.57 hrs, Volume= 8.289 af
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 520.14' @ 12.57 hrs Surf.Area= 43,407 sf Storage= 113,066 cf

Plug-Flow detention time= 260.9 min calculated for 10.731 af (99% of inflow)
Center-of-Mass det. time= 252.9 min ( 1,110.4 - 857.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 517.00' | 251,698 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 517.00 | 22,920 | 0 | 0 |
| 518.00 | 35,091 | 29,006 | 29,006 |
| 520.00 | 42,827 | 77,918 | 106,924 |
| 522.00 | 50,965 | 93,792 | 200,716 |
| 523.00 | 51,000 | 50,983 | 251,698 |

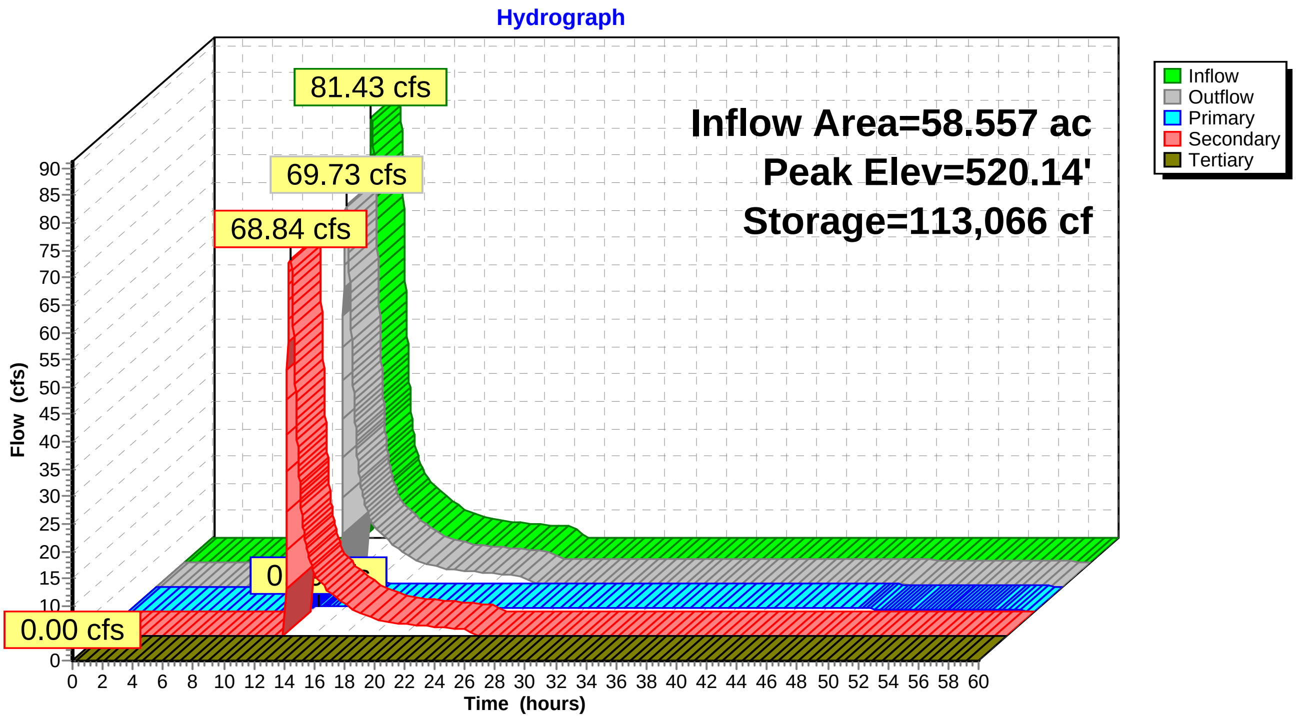
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 517.00' | **6.0" Round Culvert**<br>L= 90.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 517.00' / 516.00' S= 0.0111 '/' Cc= 0.900<br>n= 0.015, Flow Area= 0.20 sf |
| #2 | Secondary | 512.00' | **30.0" Round Culvert X 3.00**<br>L= 270.0' RCP, groove end w/headwall, Ke= 0.200<br>Inlet / Outlet Invert= 512.00' / 505.00' S= 0.0259 '/' Cc= 0.900<br>n= 0.020, Flow Area= 4.91 sf |
| #3 | Device 2 | 519.20' | **30.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Tertiary | 521.00' | **20.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.89 cfs @ 12.57 hrs HW=520.14' TW=515.44' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.89 cfs @ 4.54 fps)

**Secondary OutFlow** Max=68.82 cfs @ 12.57 hrs HW=520.14' TW=507.37' (Dynamic Tailwater)
└─**2=Culvert** (Passes 68.82 cfs of 157.52 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 68.82 cfs @ 4.67 fps)

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=517.00' TW=515.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM5: SWM5



## Summary for Pond SWM6: SWM6

[62] Hint: Exceeded Reach A105R OUTLET depth by 1.77' @ 21.44 hrs

Inflow Area = 99.305 ac, 18.16% Impervious, Inflow Depth > 0.93" for 5-Year event
Inflow = 23.75 cfs @ 12.57 hrs, Volume= 7.696 af
Outflow = 3.86 cfs @ 19.78 hrs, Volume= 7.037 af, Atten= 84%, Lag= 432.5 min
Primary = 3.86 cfs @ 19.78 hrs, Volume= 7.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 502.09' @ 19.78 hrs Surf.Area= 123,578 sf Storage= 210,207 cf

Plug-Flow detention time= 905.1 min calculated for 7.034 af (91% of inflow)
Center-of-Mass det. time= 853.8 min ( 1,838.7 - 984.9 )

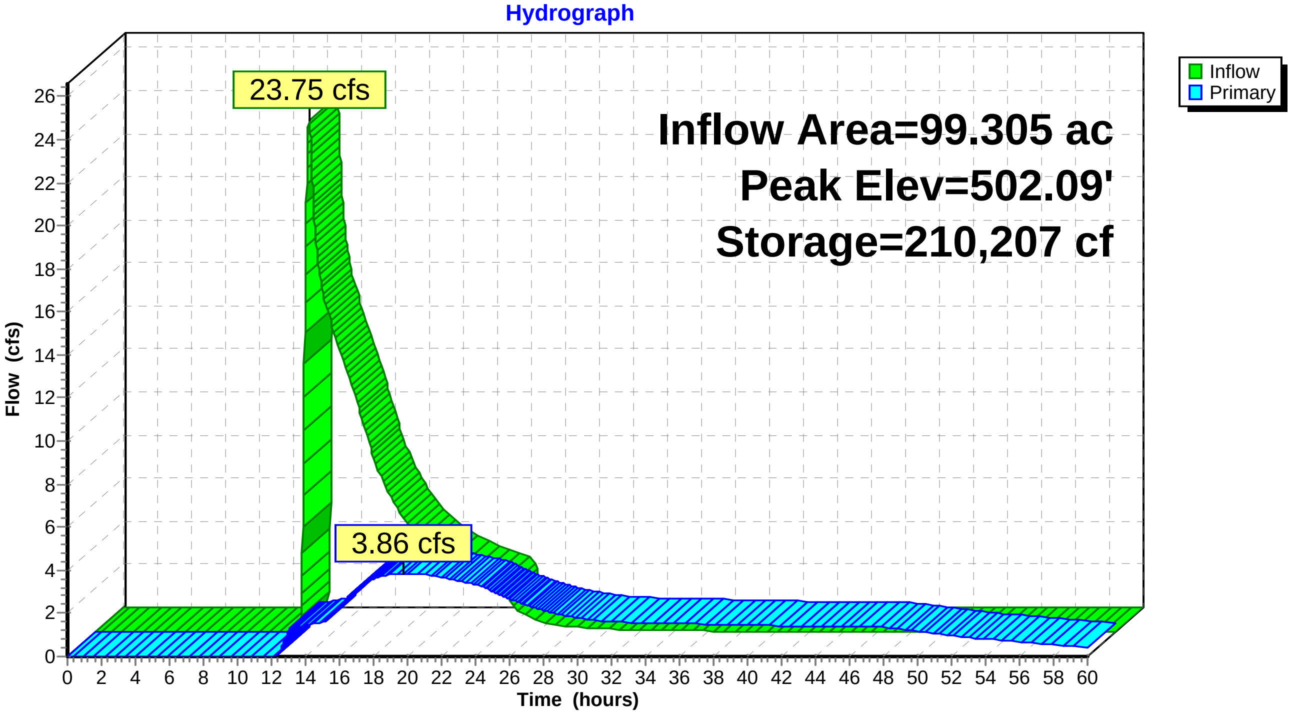
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 883,875 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 500.00 | 76,477 | 0 | 0 |
| 501.00 | 99,879 | 88,178 | 88,178 |
| 502.00 | 122,401 | 111,140 | 199,318 |
| 504.00 | 148,997 | 271,398 | 470,716 |
| 506.00 | 176,108 | 325,105 | 795,821 |
| 506.50 | 176,108 | 88,054 | 883,875 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.00' | **8.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 500.00' / 498.50' S= 0.0111 '/' Cc= 0.900<br>n= 0.012, Flow Area= 0.35 sf |
| #2 | Primary | 501.50' | **18.0" Round Culvert**<br>L= 105.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 501.50' / 500.00' S= 0.0143 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.86 cfs @ 19.78 hrs HW=502.09' TW=0.00' (Dynamic Tailwater)
—**1=Culvert** (Barrel Controls 1.76 cfs @ 5.04 fps)
—**2=Culvert** (Inlet Controls 2.10 cfs @ 3.26 fps)

## Pond SWM6: SWM6



## Summary for Pond SWM7: SWM7

Inflow Area = 4.590 ac, 29.85% Impervious, Inflow Depth = 2.35" for 5-Year event
Inflow = 9.52 cfs @ 12.22 hrs, Volume= 0.898 af
Outflow = 3.59 cfs @ 12.62 hrs, Volume= 0.897 af, Atten= 62%, Lag= 24.3 min
Primary = 3.59 cfs @ 12.62 hrs, Volume= 0.897 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 744.88' @ 12.62 hrs Surf.Area= 4,773 sf Storage= 13,342 cf

Plug-Flow detention time= 77.4 min calculated for 0.897 af (100% of inflow)
Center-of-Mass det. time= 77.2 min ( 921.6 - 844.4 )

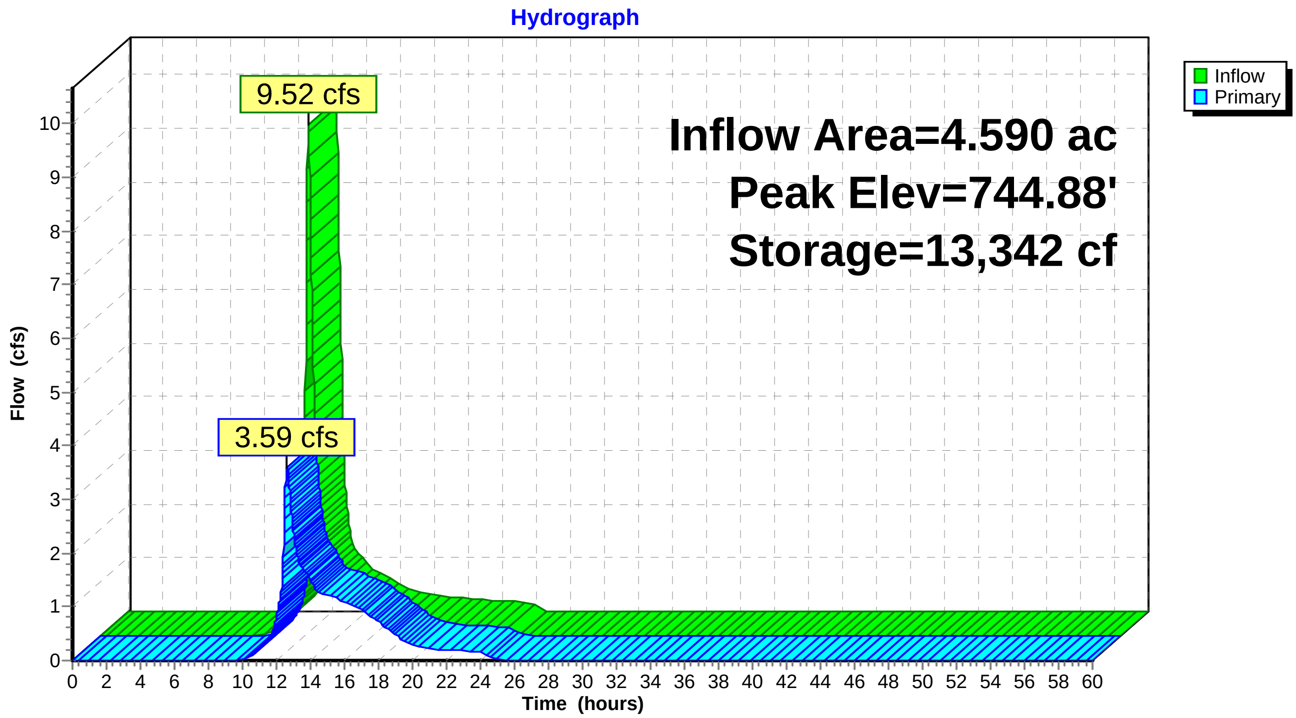
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 740.00' | 33,203 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 740.00 | 1,005 | 0 | 0 |
| 741.00 | 1,611 | 1,308 | 1,308 |
| 742.00 | 2,307 | 1,959 | 3,267 |
| 743.00 | 3,095 | 2,701 | 5,968 |
| 744.00 | 3,949 | 3,522 | 9,490 |
| 745.00 | 4,882 | 4,416 | 13,906 |
| 746.00 | 5,886 | 5,384 | 19,290 |
| 747.00 | 6,942 | 6,414 | 25,704 |
| 748.00 | 8,056 | 7,499 | 33,203 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 740.00' | **30.0" Round Culvert**<br>L= 60.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 740.00' / 739.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |
| #2 | Device 1 | 740.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 743.80' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 744.40' | **10.0" Vert. Orifice/Grate X 2.00** C= 0.600 |
| #5 | Device 1 | 747.10' | **20.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=3.58 cfs @ 12.62 hrs HW=744.88' TW=718.19' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.58 cfs of 56.01 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.42 cfs @ 10.41 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.61 cfs @ 4.50 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 1.55 cfs @ 2.37 fps)
  └─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM7: SWM7



## Summary for Pond SWM8: SWM8

Inflow Area = 15.712 ac, 18.18% Impervious, Inflow Depth = 1.62" for 5-Year event
Inflow = 15.49 cfs @ 12.50 hrs, Volume= 2.123 af
Outflow = 7.32 cfs @ 13.00 hrs, Volume= 2.121 af, Atten= 53%, Lag= 29.9 min
Primary = 7.32 cfs @ 13.00 hrs, Volume= 2.121 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 653.69' @ 13.00 hrs Surf.Area= 9,378 sf Storage= 27,283 cf

Plug-Flow detention time= 137.5 min calculated for 2.121 af (100% of inflow)
Center-of-Mass det. time= 136.9 min ( 1,024.9 - 888.0 )

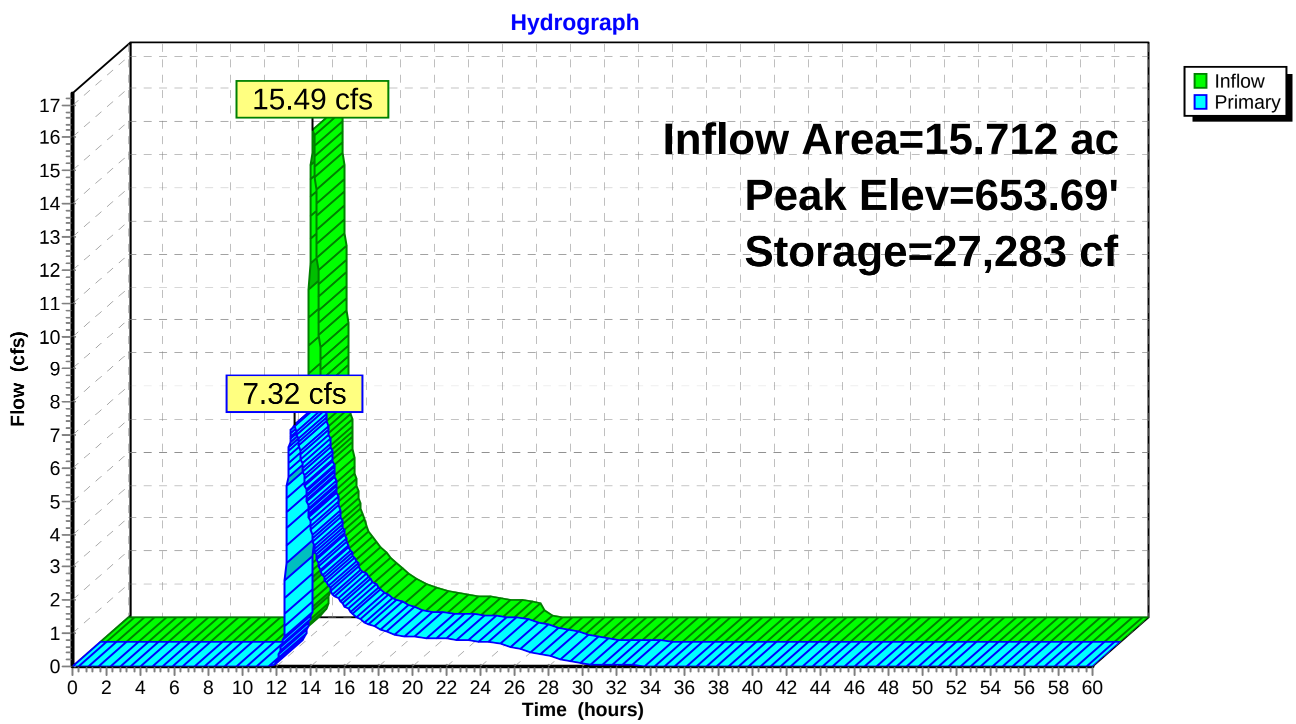
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 79,275 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 650.00 | 5,538 | 0 | 0 |
| 652.00 | 7,499 | 13,037 | 13,037 |
| 654.00 | 9,725 | 17,224 | 30,261 |
| 656.00 | 12,197 | 21,922 | 52,183 |
| 658.00 | 14,895 | 27,092 | 79,275 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **36.0" Round Culvert**<br>L= 90.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 648.00' S= 0.0222 '/' Cc= 0.900<br>n= 0.010, Flow Area= 7.07 sf |
| #2 | Device 1 | 650.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 652.00' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 654.40' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #5 | Device 1 | 656.50' | **1.5' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |
| #6 | Device 1 | 657.50' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=7.32 cfs @ 13.00 hrs HW=653.69' TW=625.49' (Dynamic Tailwater)
└─**1=Culvert** (Passes 7.32 cfs of 62.93 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.22 cfs @ 8.98 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 6.09 cfs @ 4.96 fps)
  ├─**4=Orifice/Grate** ( Controls 0.00 cfs)
  ├─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └─**6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM8: SWM8



## Summary for Pond WF: Water Feature

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 0.87" for 5-Year event
Inflow = 19.51 cfs @ 12.65 hrs, Volume= 3.682 af
Outflow = 15.71 cfs @ 12.90 hrs, Volume= 3.681 af, Atten= 19%, Lag= 14.9 min
Primary = 15.71 cfs @ 12.90 hrs, Volume= 3.681 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.64' @ 12.90 hrs Surf.Area= 28,339 sf Storage= 17,639 cf

Plug-Flow detention time= 29.4 min calculated for 3.681 af (100% of inflow)
Center-of-Mass det. time= 29.2 min ( 964.2 - 935.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 526.00' | 127,058 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

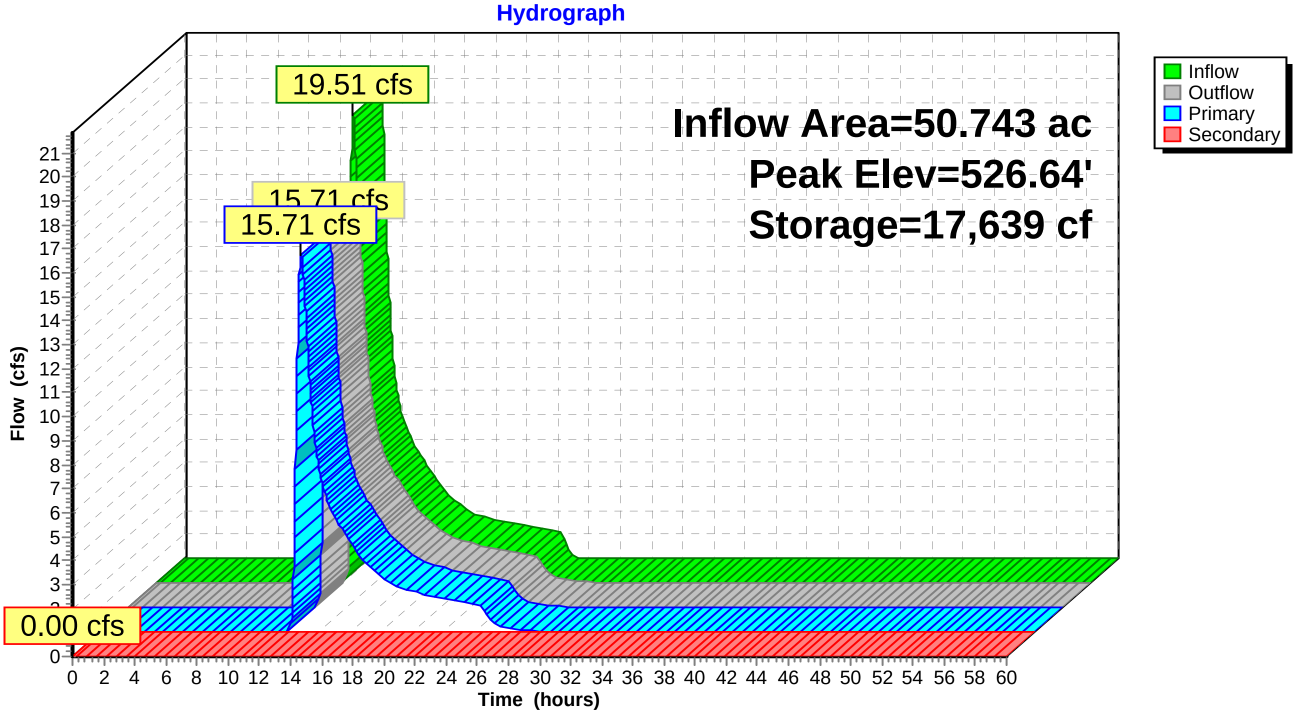
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 526.00 | 26,946 | 0 | 0 |
| 528.00 | 31,311 | 58,257 | 58,257 |
| 530.00 | 37,490 | 68,801 | 127,058 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 520.00' | **36.0" Round Culvert**<br>L= 225.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 520.00' / 513.00' S= 0.0311 '/' Cc= 0.900<br>n= 0.015, Flow Area= 7.07 sf |
| #2 | Device 1 | 526.00' | **36.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 529.00' | **20.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=15.71 cfs @ 12.90 hrs HW=526.64' TW=512.89' (Dynamic Tailwater)
└─**1=Culvert** (Passes 15.71 cfs of 96.44 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 15.71 cfs @ 2.61 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=526.00' TW=512.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WF: Water Feature

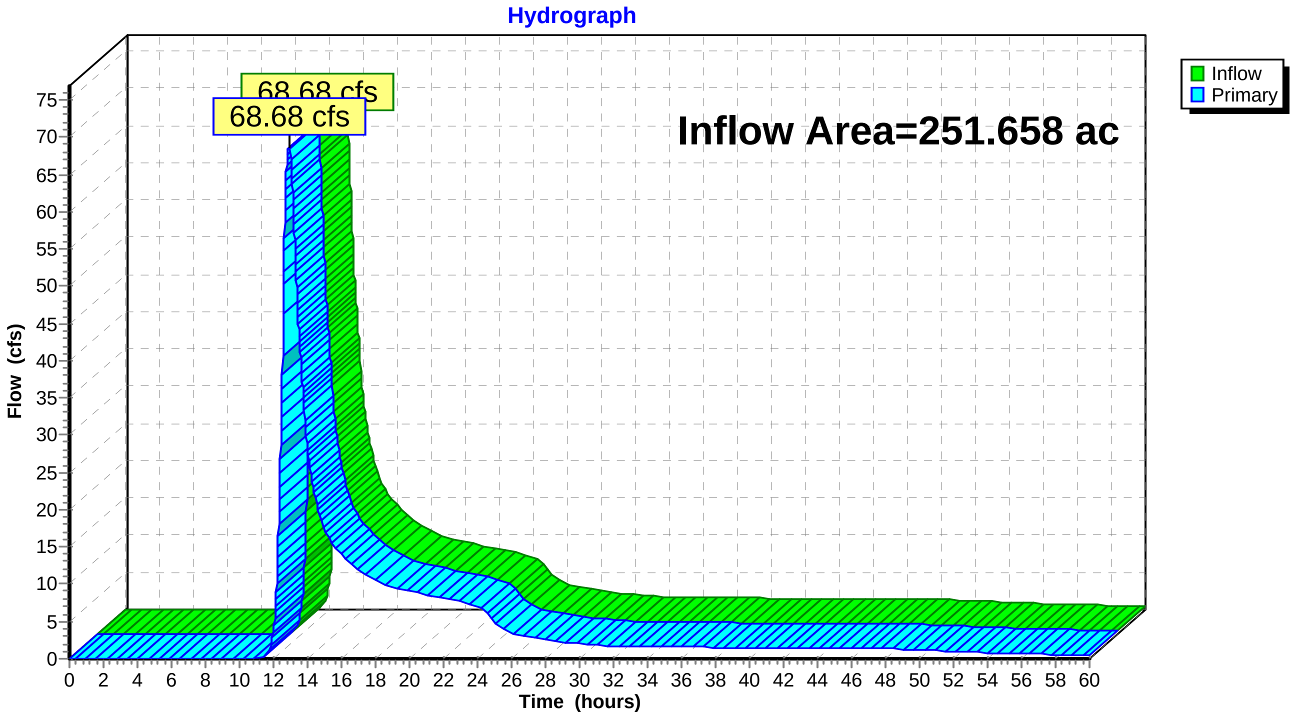


## Summary for Link A: Amenia Stream

Inflow Area = 251.658 ac, 10.11% Impervious, Inflow Depth > 1.01" for 5-Year event
Inflow = 68.68 cfs @ 12.90 hrs, Volume= 21.188 af
Primary = 68.68 cfs @ 12.90 hrs, Volume= 21.188 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link A: Amenia Stream

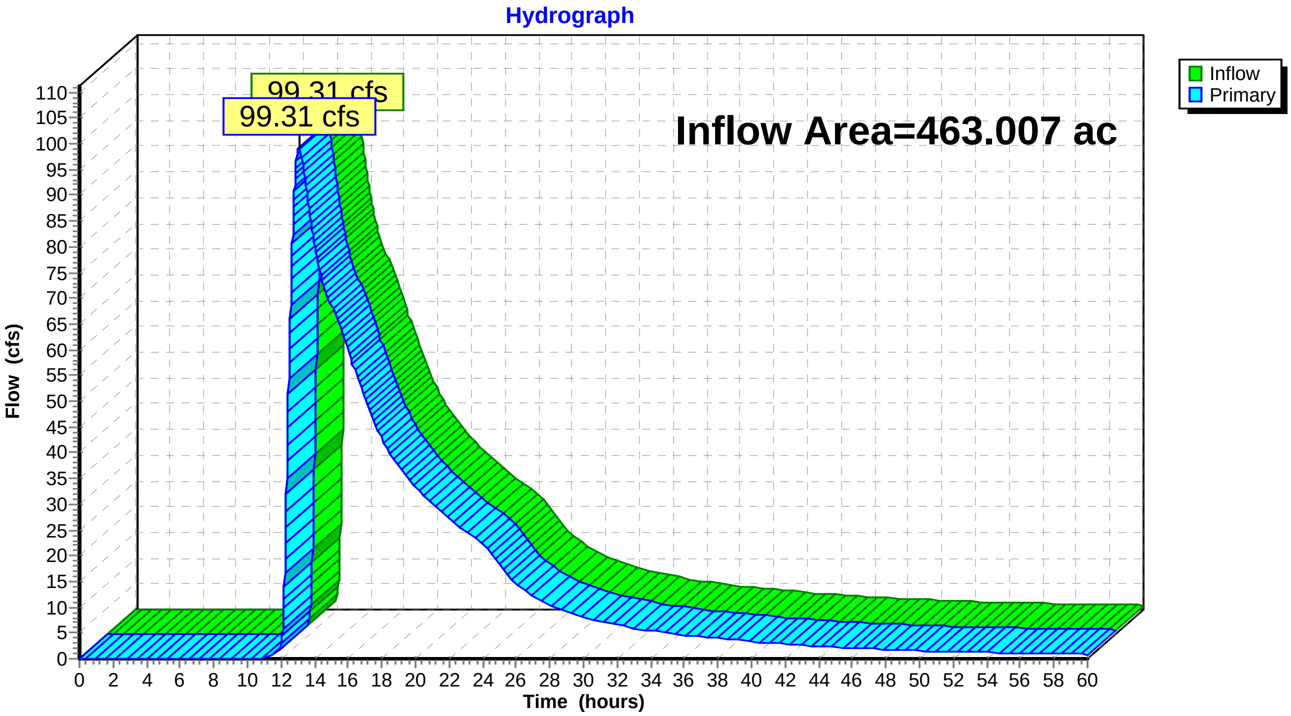


## Summary for Link B: Wetland

| | | | |
|---|---|---|---|
| Inflow Area = | 463.007 ac, 14.28% Impervious, Inflow Depth > 1.58" | for 5-Year event | |
| Inflow = | 99.31 cfs @ 13.04 hrs, Volume= | 60.946 af | |
| Primary = | 99.31 cfs @ 13.04 hrs, Volume= | 60.946 af, Atten= 0%, Lag= 0.0 min | |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link B: Wetland

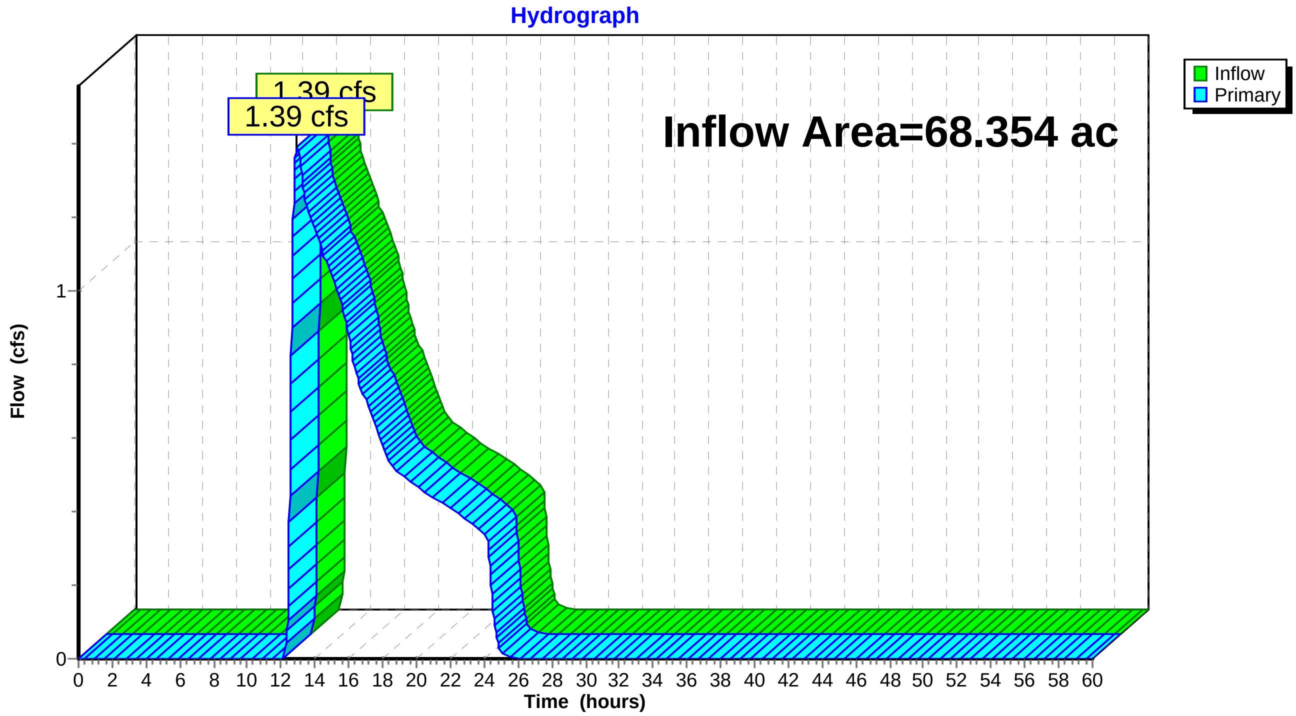


## Summary for Link C: Culvert

Inflow Area = 68.354 ac, 5.83% Impervious, Inflow Depth = 0.12" for 5-Year event
Inflow = 1.39 cfs @ 12.93 hrs, Volume= 0.673 af
Primary = 1.39 cfs @ 12.93 hrs, Volume= 0.673 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

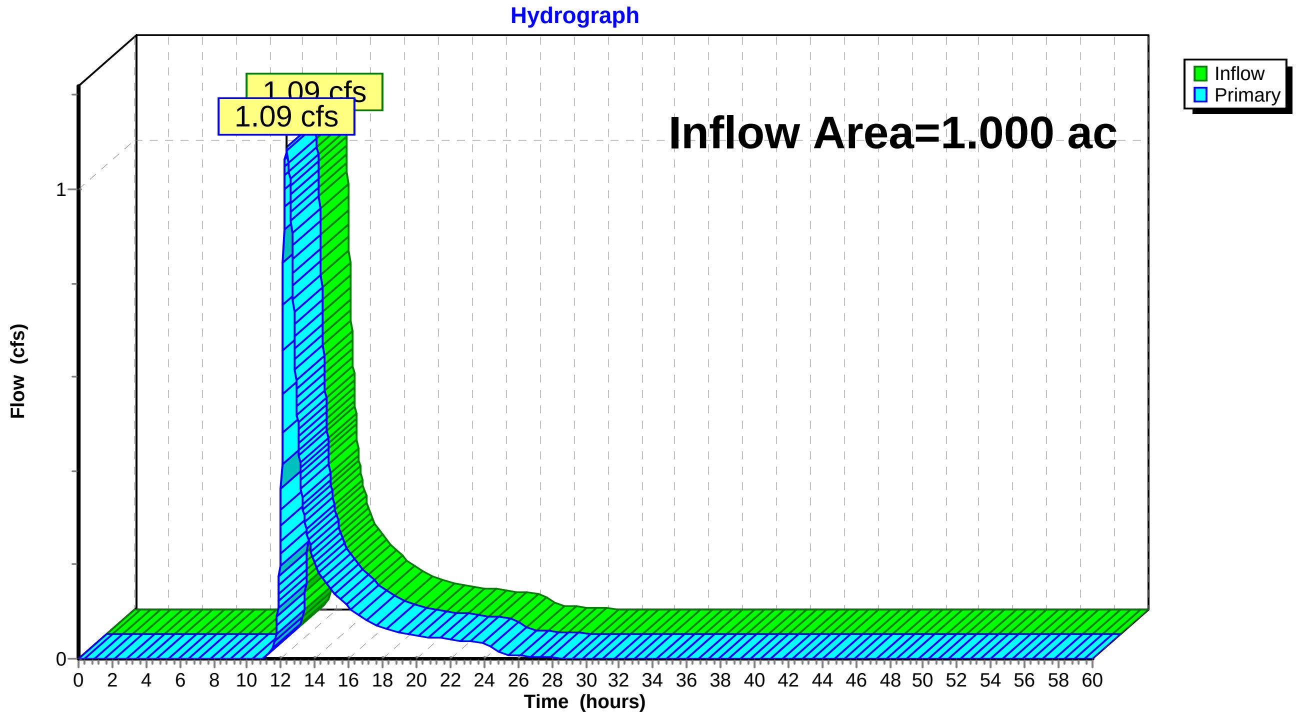


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 1.000 ac, | 0.00% Impervious, Inflow Depth = 1.97" | for 5-Year event | |
| Inflow = | 1.09 cfs @ | 12.33 hrs, Volume= | 0.164 af | |
| Primary = | 1.09 cfs @ | 12.33 hrs, Volume= | 0.164 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=21.492 ac 4.36% Impervious Runoff Depth=0.18"
Flow Length=1,320' Tc=20.2 min CN=48 Runoff=0.53 cfs 0.327 af

**Subcatchment A102: A102** Runoff Area=4.590 ac 29.85% Impervious Runoff Depth=2.56"
Flow Length=530' Tc=15.8 min CN=81 Runoff=10.41 cfs 0.980 af

**Subcatchment A103: A103** Runoff Area=57.299 ac 21.07% Impervious Runoff Depth=0.80"
Flow Length=2,529' Tc=22.2 min CN=60 Runoff=22.67 cfs 3.835 af

**Subcatchment A104: A104** Runoff Area=29.922 ac 5.68% Impervious Runoff Depth=0.15"
Flow Length=1,871' Tc=21.8 min CN=47 Runoff=0.59 cfs 0.369 af

**Subcatchment A105: A105** Runoff Area=26.625 ac 12.66% Impervious Runoff Depth=0.94"
Flow Length=1,484' Tc=19.3 min CN=62 Runoff=14.29 cfs 2.080 af

**Subcatchment A106: A106** Runoff Area=10.791 ac 11.31% Impervious Runoff Depth=2.17"
Flow Length=1,260' Tc=26.7 min CN=77 Runoff=16.46 cfs 1.952 af

**Subcatchment A107: A107** Runoff Area=79.700 ac 2.24% Impervious Runoff Depth=1.89"
Flow Length=3,685' Tc=61.0 min CN=74 Runoff=67.11 cfs 12.584 af

**Subcatchment A108: A108** Runoff Area=5.527 ac 2.32% Impervious Runoff Depth=0.62"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=1.24 cfs 0.284 af

**Subcatchment A109: A109** Runoff Area=15.712 ac 18.18% Impervious Runoff Depth=1.81"
Flow Length=1,315' Tc=33.2 min CN=73 Runoff=17.47 cfs 2.364 af

**Subcatchment B101: B101** Runoff Area=50.743 ac 17.46% Impervious Runoff Depth=1.01"
Flow Length=3,015' Tc=36.7 min CN=63 Runoff=23.82 cfs 4.261 af

**Subcatchment B102: B102** Runoff Area=40.873 ac 1.28% Impervious Runoff Depth=0.80"
Flow Length=955' Tc=20.3 min CN=60 Runoff=16.59 cfs 2.735 af

**Subcatchment B103: B103** Runoff Area=22.950 ac 10.98% Impervious Runoff Depth=2.46"
Flow Length=2,127' Tc=38.5 min CN=80 Runoff=33.83 cfs 4.708 af

**Subcatchment B104: B104** Runoff Area=24.602 ac 28.02% Impervious Runoff Depth=2.46"
Flow Length=3,620' Tc=24.7 min CN=80 Runoff=44.47 cfs 5.047 af

**Subcatchment B105: B105** Runoff Area=24.733 ac 14.99% Impervious Runoff Depth=2.46"
Flow Length=2,606' Tc=36.4 min CN=80 Runoff=37.47 cfs 5.073 af

**Subcatchment B106: B106** Runoff Area=118.113 ac 1.34% Impervious Runoff Depth=2.08"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=88.95 cfs 20.448 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=2.17"
Flow Length=907' Tc=37.9 min CN=77 Runoff=18.51 cfs 2.593 af

**Subcatchment B108: B108** Runoff Area=40.951 ac 11.09% Impervious Runoff Depth=2.27"
Flow Length=2,038' Tc=32.2 min CN=78 Runoff=60.07 cfs 7.734 af

**Subcatchment B109: B109** Runoff Area=34.256 ac 12.24% Impervious Runoff Depth=2.27"
Flow Length=1,371' Tc=24.9 min CN=78 Runoff=56.48 cfs 6.470 af

**Subcatchment B110: B110** Runoff Area=6.622 ac 45.47% Impervious Runoff Depth=2.98"
Flow Length=936' Tc=11.9 min CN=85 Runoff=19.35 cfs 1.642 af

**Subcatchment B111: B111** Runoff Area=6.254 ac 40.36% Impervious Runoff Depth=1.39"
Flow Length=516' Tc=6.8 min CN=68 Runoff=8.88 cfs 0.722 af

**Subcatchment B112: B112** Runoff Area=39.487 ac 34.78% Impervious Runoff Depth=1.23"
Flow Length=989' Tc=15.8 min CN=66 Runoff=35.35 cfs 4.044 af

**Subcatchment B113: B113** Runoff Area=5.598 ac 30.55% Impervious Runoff Depth=0.74"
Flow Length=836' Tc=14.0 min CN=59 Runoff=2.14 cfs 0.345 af

**Subcatchment B115: B115** Runoff Area=13.072 ac 23.44% Impervious Runoff Depth=0.87"
Flow Length=1,419' Tc=11.1 min CN=61 Runoff=7.22 cfs 0.947 af

**Subcatchment B116: B116** Runoff Area=2.600 ac 30.58% Impervious Runoff Depth=0.62"
Tc=6.0 min CN=57 Runoff=0.78 cfs 0.134 af

**Subcatchment B117: B117** Runoff Area=7.723 ac 36.64% Impervious Runoff Depth=0.87"
Tc=6.0 min CN=61 Runoff=5.13 cfs 0.559 af

**Subcatchment B118: B118** Runoff Area=2.550 ac 54.71% Impervious Runoff Depth=1.63"
Tc=6.0 min CN=71 Runoff=4.66 cfs 0.347 af

**Subcatchment B119: B119** Runoff Area=7.550 ac 56.29% Impervious Runoff Depth=3.08"
Flow Length=1,683' Tc=10.3 min CN=86 Runoff=23.92 cfs 1.940 af

**Subcatchment C101: C101** Runoff Area=12.930 ac 0.00% Impervious Runoff Depth=0.26"
Flow Length=1,500' Tc=31.9 min CN=50 Runoff=0.49 cfs 0.281 af

**Subcatchment C102: C102** Runoff Area=40.074 ac 2.80% Impervious Runoff Depth=1.08"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=18.65 cfs 3.605 af

**Subcatchment C103: C103** Runoff Area=15.350 ac 18.63% Impervious Runoff Depth=0.45"
Flow Length=2,111' Tc=30.4 min CN=54 Runoff=1.87 cfs 0.575 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=2.17"
Flow Length=176' Tc=7.5 min CN=77 Runoff=2.44 cfs 0.181 af

**Reach 36" Pipe: 36" Pipe** Avg. Flow Depth=0.73' Max Vel=14.77 fps Inflow=19.71 cfs 2.932 af
36.0" Round Pipe n=0.015 L=935.0' S=0.0684 '/' Capacity=151.23 cfs Outflow=19.68 cfs 2.932 af

**Reach 42" Pipe: 42" Pipe** Avg. Flow Depth=1.15' Max Vel=27.75 fps Inflow=76.27 cfs 15.230 af
42.0" Round Pipe n=0.012 L=575.0' S=0.0904 '/' Capacity=327.77 cfs Outflow=76.20 cfs 15.230 af

**Reach A105R: Thru A103** Avg. Flow Depth=0.86' Max Vel=4.72 fps Inflow=16.75 cfs 4.996 af
n=0.050 L=1,170.0' S=0.0564 '/' Capacity=150.86 cfs Outflow=16.00 cfs 4.996 af

**Reach B107R: Thru B103** Avg. Flow Depth=0.25' Max Vel=5.78 fps Inflow=9.81 cfs 2.317 af
n=0.050 L=938.0' S=0.4072 '/' Capacity=192.14 cfs Outflow=9.79 cfs 2.317 af

**Reach B112R: Thru B102** Avg. Flow Depth=1.45' Max Vel=3.66 fps Inflow=42.65 cfs 37.491 af
n=0.050 L=600.0' S=0.0167 '/' Capacity=369.68 cfs Outflow=42.65 cfs 37.482 af

**Pond 102C: Pond 102C** Peak Elev=508.21' Storage=157,046 cf Inflow=18.65 cfs 3.605 af
Outflow=0.00 cfs 0.000 af

**Pond 104A: Wetland D** Peak Elev=508.00' Storage=6,686 cf Inflow=0.59 cfs 0.369 af
Primary=0.28 cfs 0.325 af Secondary=0.08 cfs 0.022 af Outflow=0.36 cfs 0.348 af

**Pond 105A: Wetland H** Peak Elev=575.06' Storage=59,067 cf Inflow=33.47 cfs 5.012 af
Primary=10.11 cfs 4.835 af Secondary=6.63 cfs 0.160 af Outflow=16.75 cfs 4.996 af

**Pond 106A: 36" Culvert** Peak Elev=718.47' Storage=21 cf Inflow=19.71 cfs 2.932 af
Primary=19.71 cfs 2.932 af Secondary=0.00 cfs 0.000 af Outflow=19.71 cfs 2.932 af

**Pond 106B: Wetland J** Peak Elev=526.75' Storage=19,703 cf Inflow=88.95 cfs 20.448 af
Outflow=88.92 cfs 20.448 af

**Pond 107A: 24" Culvert** Peak Elev=625.60' Storage=2,550 cf Inflow=75.23 cfs 14.946 af
Primary=41.41 cfs 13.018 af Secondary=33.81 cfs 1.928 af Outflow=75.22 cfs 14.946 af

**Pond 107B: Wetland** Peak Elev=972.80' Storage=36,760 cf Inflow=18.51 cfs 2.593 af
Outflow=9.81 cfs 2.317 af

**Pond 108A: 36" Culvert** Peak Elev=611.35' Storage=33 cf Inflow=34.81 cfs 2.212 af
Primary=34.86 cfs 2.212 af Secondary=0.00 cfs 0.000 af Outflow=34.86 cfs 2.212 af

**Pond SWM 7A: SWM 7A (Phase 1)** Peak Elev=807.83' Storage=1,698 cf Inflow=2.44 cfs 0.181 af
Outflow=1.18 cfs 0.181 af

**Pond SWM1: SWM 1** Peak Elev=513.18' Storage=15,698 cf Inflow=19.53 cfs 4.261 af
Outflow=17.00 cfs 4.261 af

**Pond SWM17: SWM17** Peak Elev=498.88' Storage=0.011 af Inflow=1.87 cfs 0.575 af
Outflow=1.79 cfs 0.575 af

**Pond SWM2: SWM2** Peak Elev=503.33' Storage=303,219 cf Inflow=156.14 cfs 23.168 af
Outflow=88.27 cfs 23.021 af

**Pond SWM3try: SWM3** Peak Elev=509.07' Storage=773,695 cf Inflow=139.63 cfs 38.800 af
Outflow=42.65 cfs 37.491 af

**Pond SWM4: SWM4** Peak Elev=515.99' Storage=42,097 cf Inflow=92.56 cfs 24.572 af
Primary=91.56 cfs 24.558 af Secondary=0.00 cfs 0.000 af Outflow=91.56 cfs 24.558 af

**Pond SWM5: SWM5** Peak Elev=520.28' Storage=118,927 cf Inflow=89.29 cfs 11.896 af
Primary=0.91 cfs 2.455 af Secondary=73.57 cfs 9.293 af Tertiary=0.00 cfs 0.000 af Outflow=74.48 cfs 11.748 af

**Pond SWM6: SWM6** Peak Elev=502.26' Storage=231,024 cf Inflow=29.18 cfs 8.830 af
Outflow=5.11 cfs 8.141 af

**Pond SWM7: SWM7** Peak Elev=745.03' Storage=14,031 cf Inflow=10.41 cfs 0.980 af
Outflow=4.47 cfs 0.980 af

**Pond SWM8: SWM8** Peak Elev=654.01' Storage=30,378 cf Inflow=17.47 cfs 2.364 af
Outflow=8.24 cfs 2.362 af

**Pond WF: Water Feature** Peak Elev=526.74' Storage=20,477 cf Inflow=23.82 cfs 4.261 af
Primary=19.53 cfs 4.261 af Secondary=0.00 cfs 0.000 af Outflow=19.53 cfs 4.261 af

**Link A: Amenia Stream** Inflow=77.78 cfs 24.046 af
Primary=77.78 cfs 24.046 af

**Link B: Wetland** Inflow=120.61 cfs 67.845 af
Primary=120.61 cfs 67.845 af

**Link C: Culvert** Inflow=2.19 cfs 0.856 af
Primary=2.19 cfs 0.856 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=1.18 cfs 0.181 af
Primary=1.18 cfs 0.181 af

**Total Runoff Area = 784.019 ac Runoff Volume = 99.165 af Average Runoff Depth = 1.52"**
**87.81% Pervious = 688.462 ac 12.19% Impervious = 95.557 ac**

## Summary for Subcatchment A101: A101

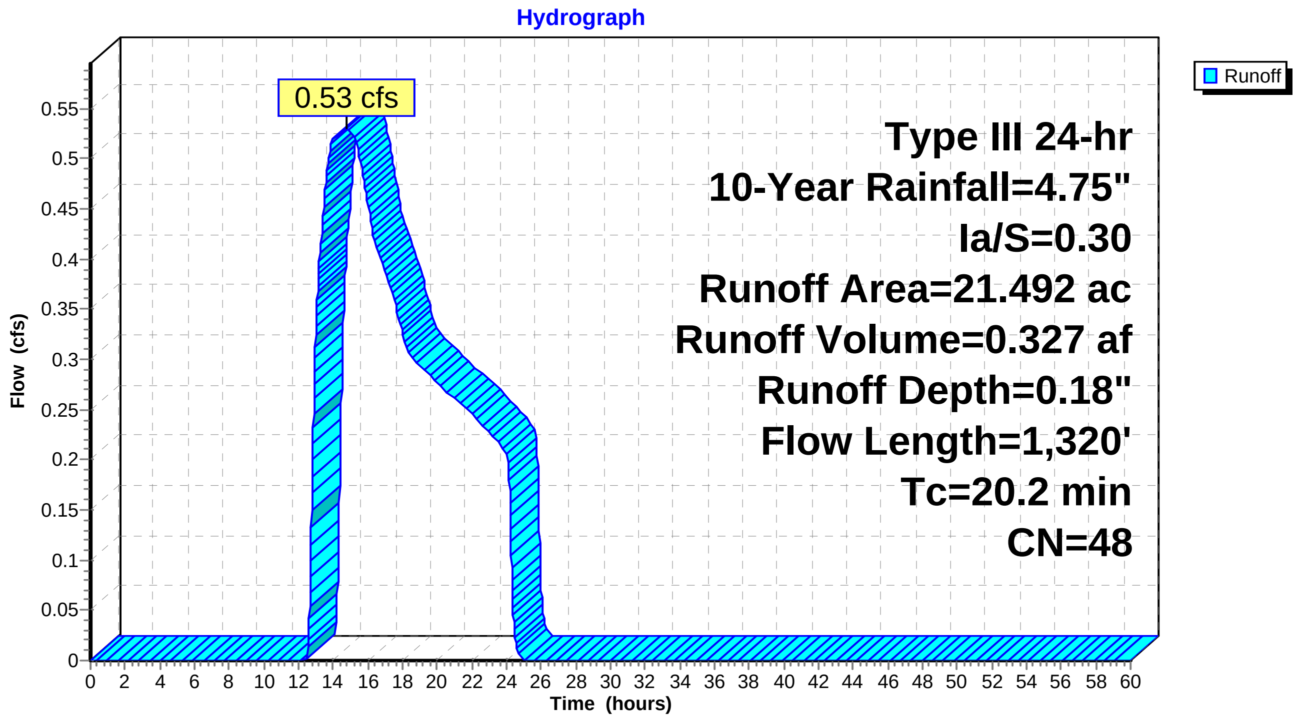
Runoff = 0.53 cfs @ 14.79 hrs, Volume= 0.327 af, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.015 | 98 | Building roof |
| * | 0.921 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.290 | 39 | >75% Grass cover, Good, HSG A |
| | 6.490 | 61 | >75% Grass cover, Good, HSG B |
| | 0.050 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.270 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.426 | 30 | Sand trap, HSG A |
| * | 0.030 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 21.492 | 48 | Weighted Average |
| | 20.556 | | 95.64% Pervious Area |
| | 0.936 | | 4.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.6 | 100 | 0.1400 | 0.17 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 6.0 | 800 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 420 | 0.0480 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 20.2 | 1,320 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

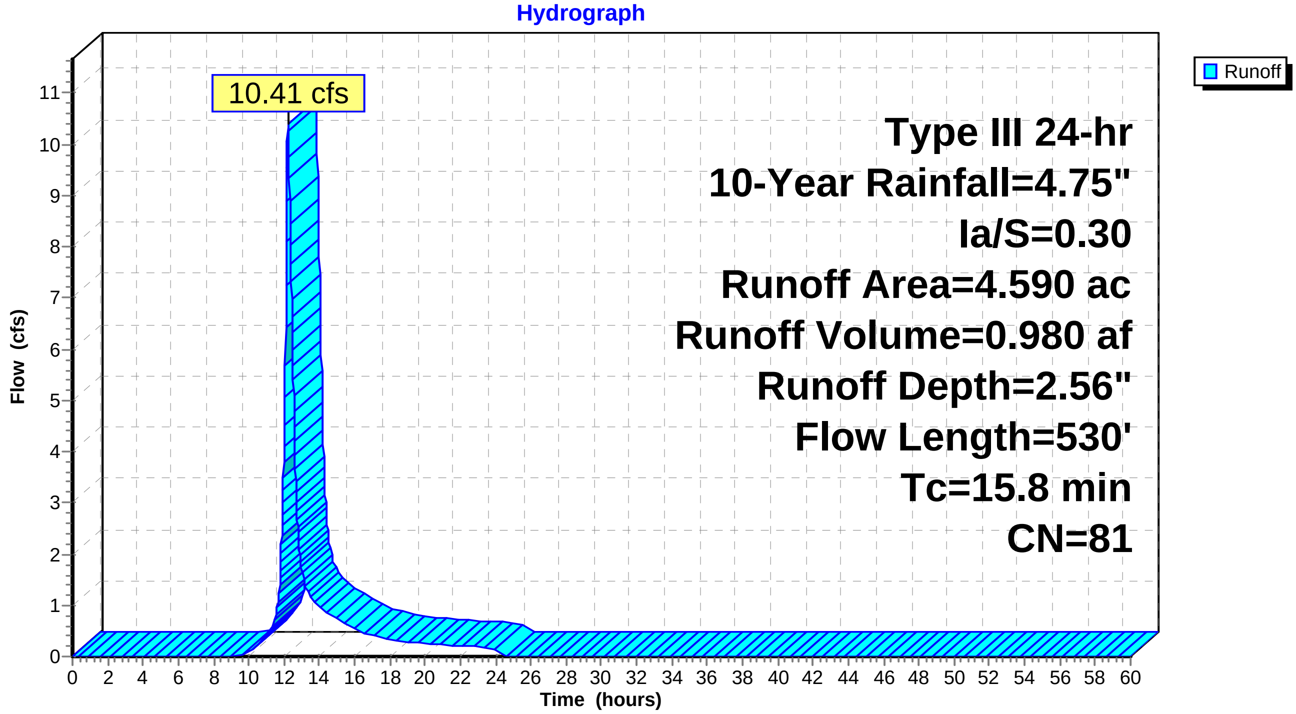
Runoff = 10.41 cfs @ 12.22 hrs, Volume= 0.980 af, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.200 | 98 | Building roof |
| * | 1.040 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.970 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.250 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 4.590 | 81 | Weighted Average |
| | 3.220 | | 70.15% Pervious Area |
| | 1.370 | | 29.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.1 | 50 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 130 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.7 | 250 | 0.1280 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.8 | 530 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

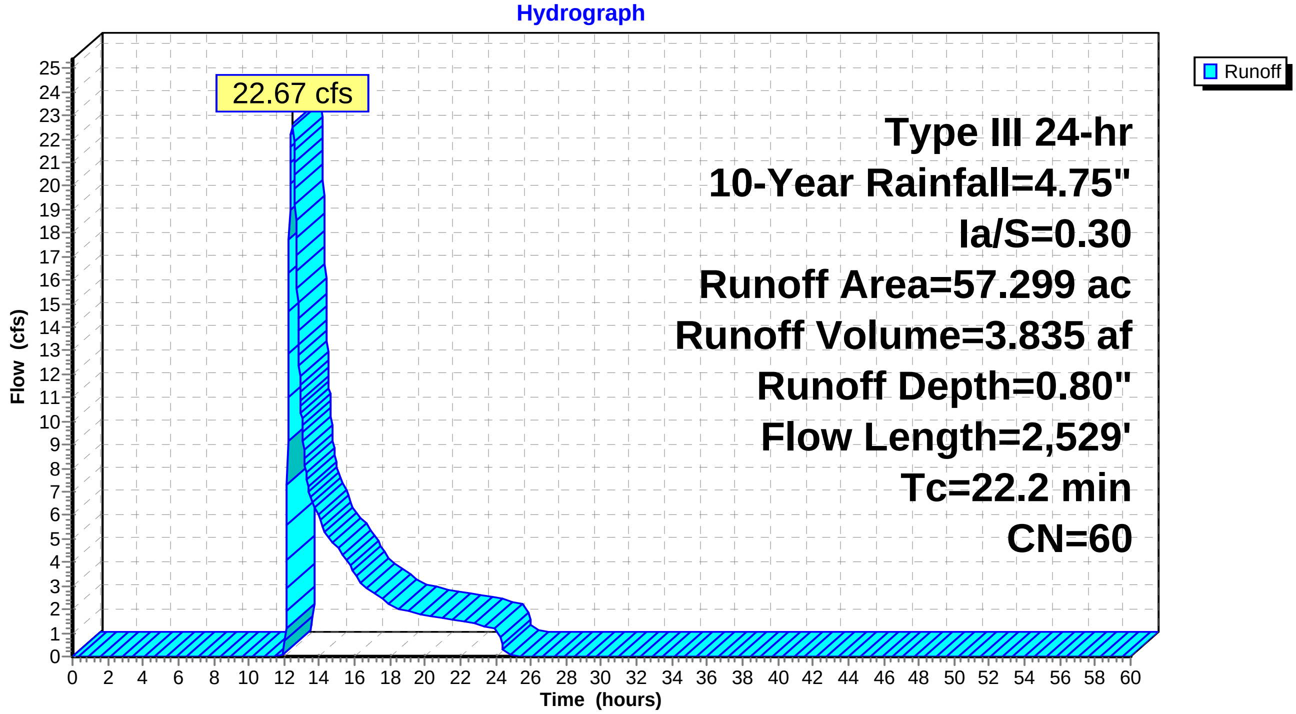
Runoff = 22.67 cfs @ 12.46 hrs, Volume= 3.835 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.320 | 98 | Building roof |
| * | 6.292 | 98 | Paved surface |
| * | 0.438 | 96 | Gravel surface |
| * | 1.461 | 98 | Water Surface |
| | 21.310 | 39 | >75% Grass cover, Good, HSG A |
| | 5.353 | 61 | >75% Grass cover, Good, HSG B |
| | 8.379 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 5.112 | 30 | Woods, Good, HSG A |
| | 1.620 | 55 | Woods, Good, HSG B |
| | 1.505 | 70 | Woods, Good, HSG C |
| | 1.130 | 77 | Woods, Good, HSG D |
| * | 0.220 | 30 | Sand trap, HSG A |
| * | 0.130 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 57.299 | 60 | Weighted Average |
| | 45.226 | | 78.93% Pervious Area |
| | 12.073 | | 21.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.8 | 100 | 0.0300 | 0.09 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 2.2 | 355 | 0.1430 | 2.65 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 554 | 0.0680 | 8.24 | 98.89 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.050 |
| 1.1 | 1,520 | 0.0690 | 23.78 | 116.72 | **Pipe Channel,**<br>30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'<br>n= 0.012 |
| 22.2 | 2,529 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

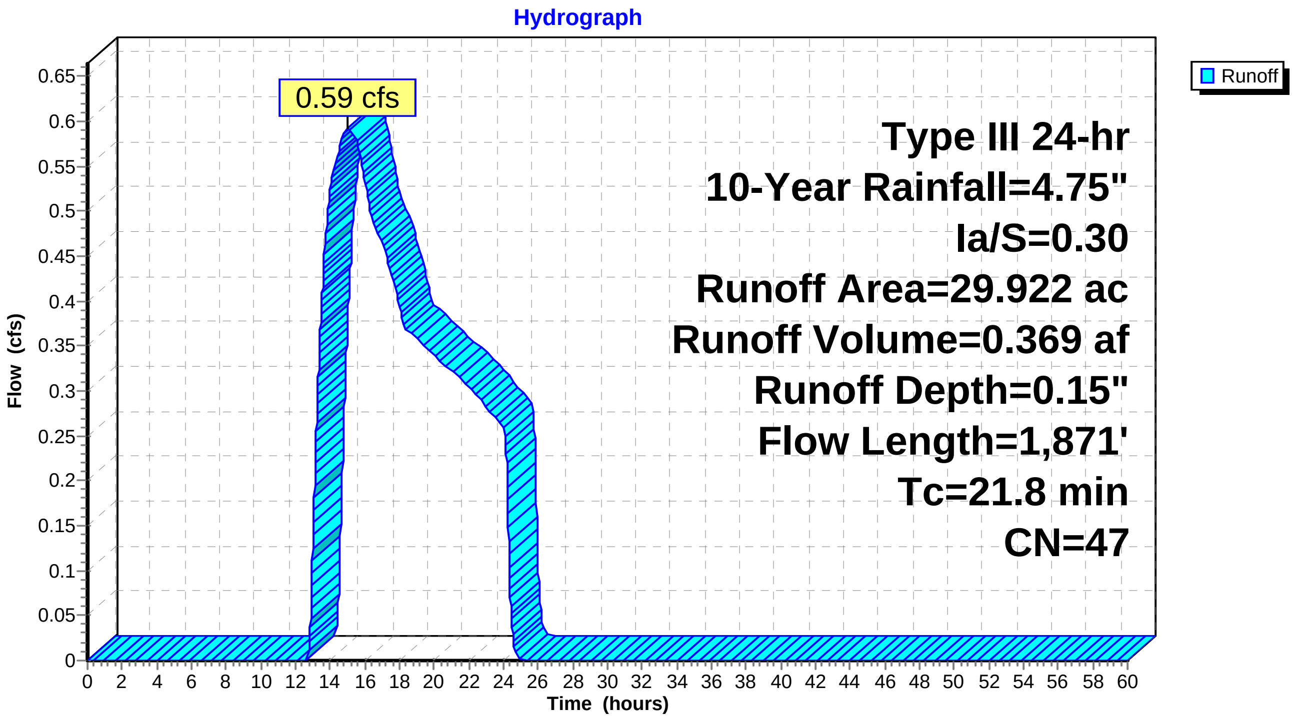
Runoff = 0.59 cfs @ 15.04 hrs, Volume= 0.369 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.270 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.430 | 98 | Water Surface |
| | 23.530 | 39 | >75% Grass cover, Good, HSG A |
| | 0.110 | 61 | >75% Grass cover, Good, HSG B |
| | 3.720 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.028 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.100 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.635 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.082 | 30 | Sand Trap, HSG C |
| | 29.922 | 47 | Weighted Average |
| | 28.222 | | 94.32% Pervious Area |
| | 1.700 | | 5.68% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.8 | 100 | 0.2400 | 0.22 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 9.7 | 1,231 | 0.0920 | 2.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.3 | 540 | 0.0900 | 2.10 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 21.8 | 1,871 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

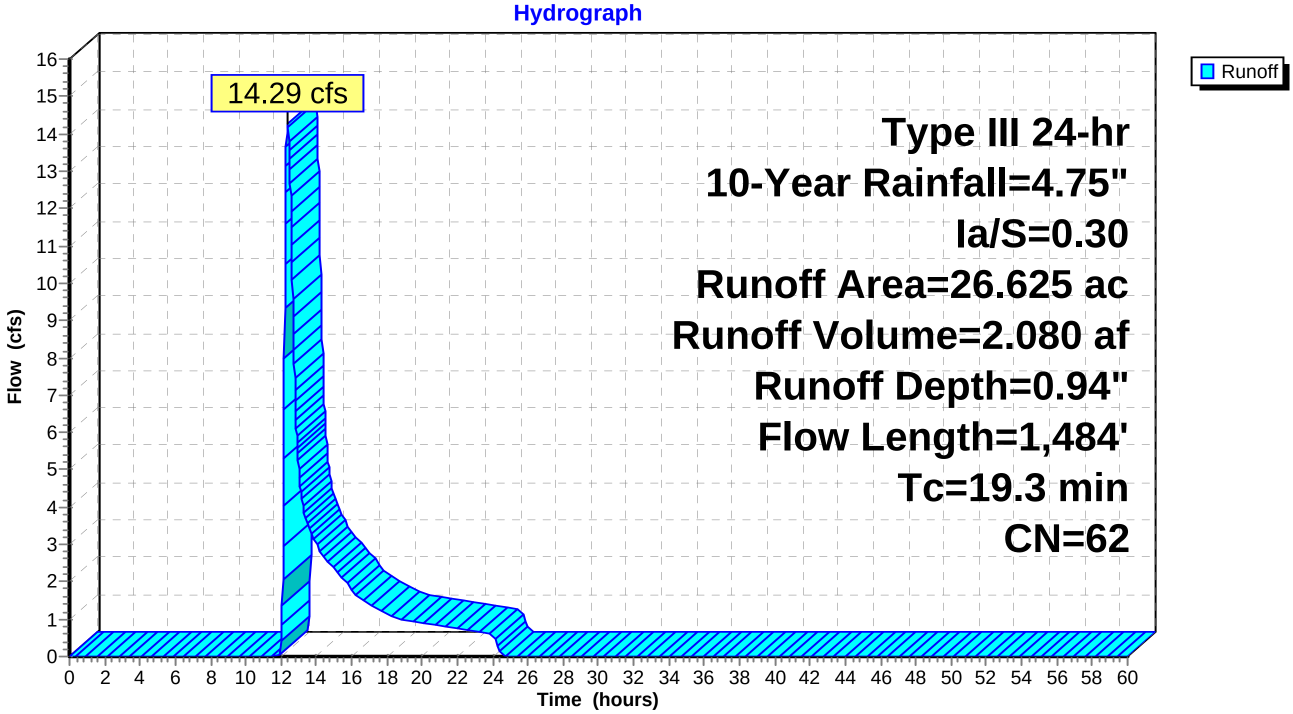
Runoff = 14.29 cfs @ 12.36 hrs, Volume= 2.080 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.390 | 98 | Building roof |
| * | 0.480 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.500 | 98 | Water Surface |
| | 10.650 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 8.795 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.094 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.565 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.145 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.006 | 30 | Sand Trap, HSG C |
| | 26.625 | 62 | Weighted Average |
| | 23.255 | | 87.34% Pervious Area |
| | 3.370 | | 12.66% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 3.0 | 395 | 0.1920 | 2.19 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 7.1 | 989 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 19.3 | 1,484 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

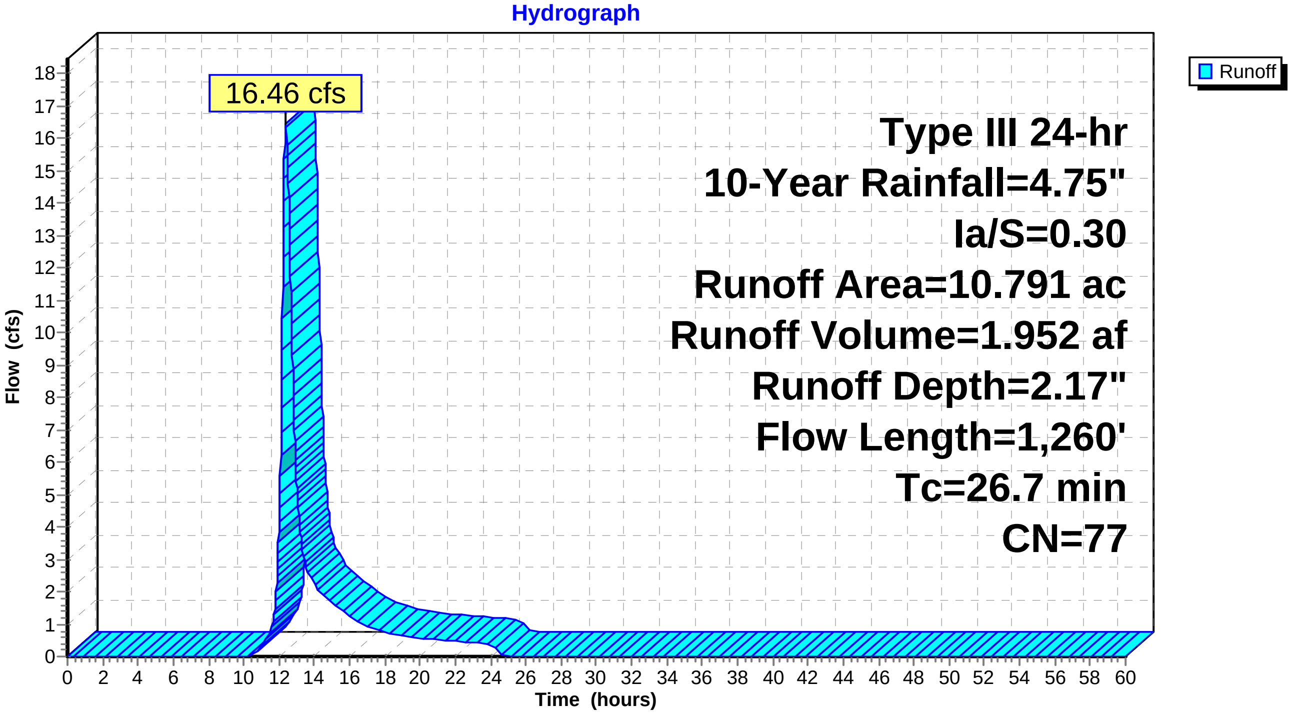
Runoff = 16.46 cfs @ 12.38 hrs, Volume= 1.952 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.220 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.078 | 61 | >75% Grass cover, Good, HSG B |
| | 5.210 | 74 | >75% Grass cover, Good, HSG C |
| | 2.190 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.100 | 55 | Woods, Good, HSG B |
| | 1.390 | 70 | Woods, Good, HSG C |
| | 0.603 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 10.791 | 77 | Weighted Average |
| | 9.571 | | 88.69% Pervious Area |
| | 1.220 | | 11.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

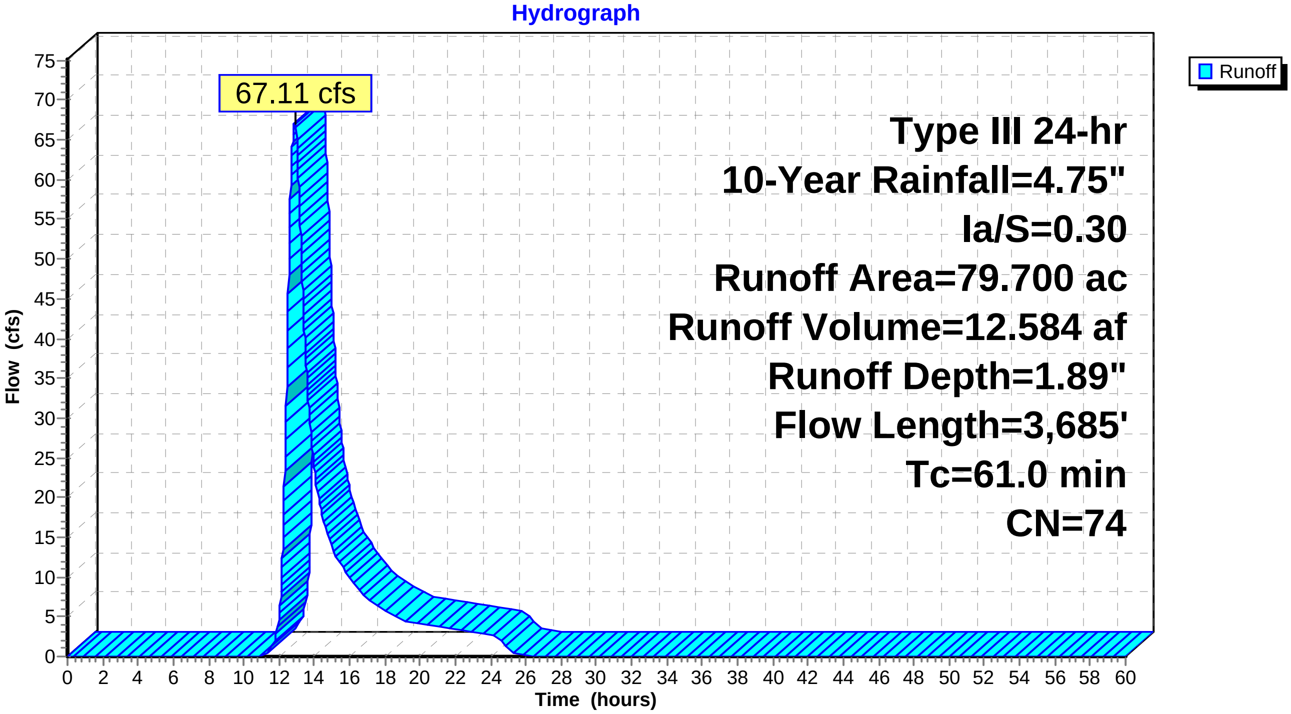
Runoff = 67.11 cfs @ 12.88 hrs, Volume= 12.584 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.340 | 98 | Building roof |
| * | 1.314 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 6.390 | 61 | >75% Grass cover, Good, HSG B |
| | 4.750 | 74 | >75% Grass cover, Good, HSG C |
| | 3.470 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 7.845 | 55 | Woods, Good, HSG B |
| | 3.580 | 70 | Woods, Good, HSG C |
| | 51.810 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 79.700 | 74 | Weighted Average |
| | 77.916 | | 97.76% Pervious Area |
| | 1.784 | | 2.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

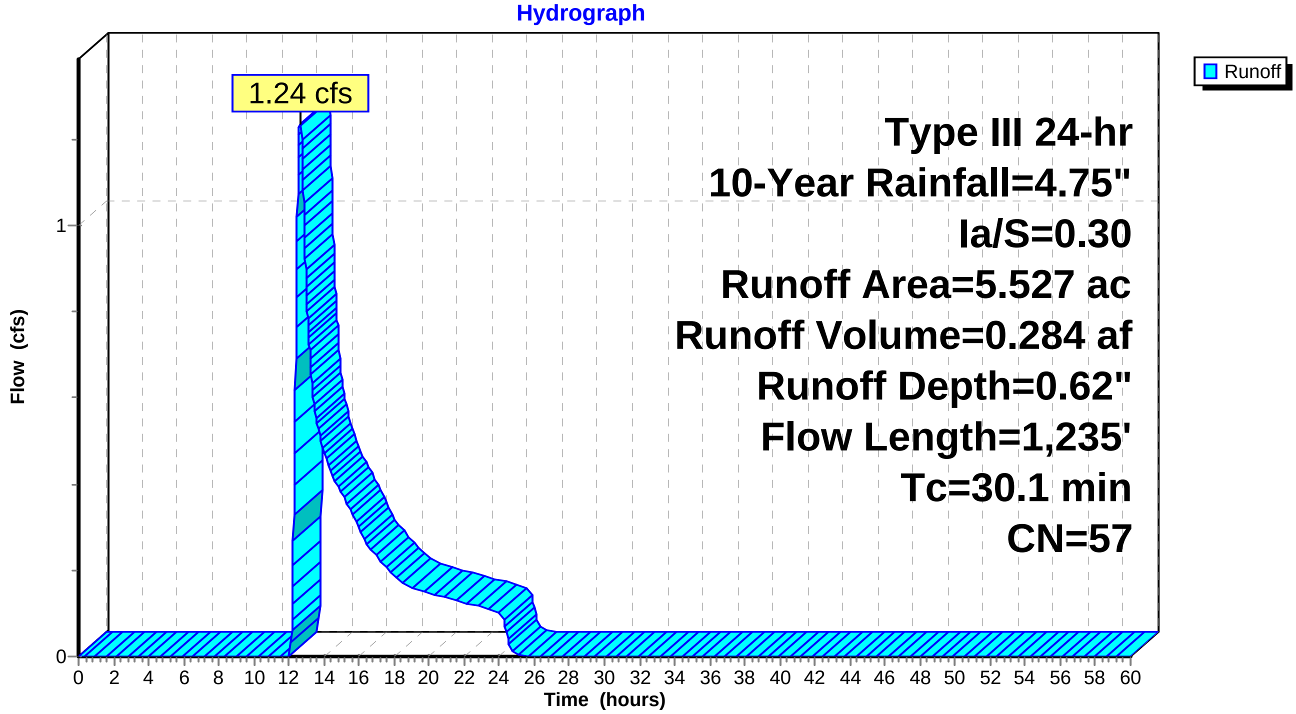
Runoff = 1.24 cfs @ 12.64 hrs, Volume= 0.284 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.088 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.630 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.527 | 57 | Weighted Average |
| | 5.399 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment A109: A109

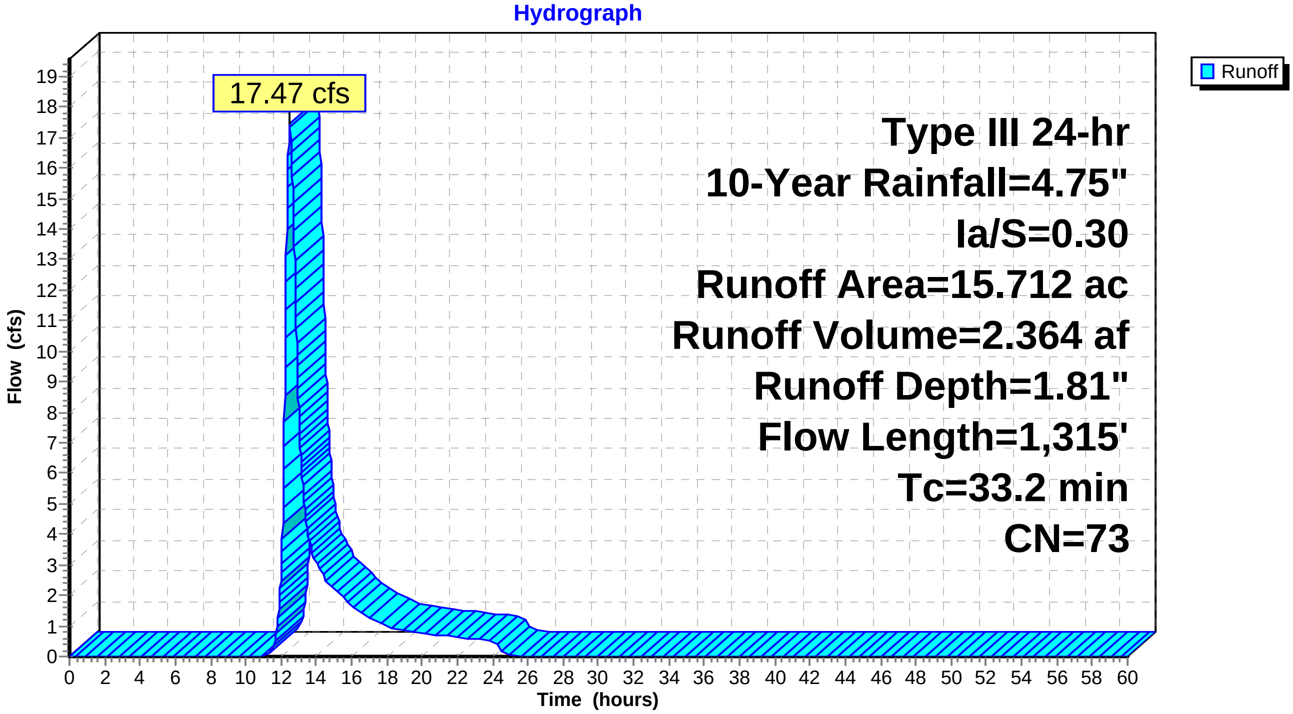
Runoff = 17.47 cfs @ 12.50 hrs, Volume= 2.364 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| Area (ac) | CN | Description |
|---|---|---|
| 0.857 | 98 | Roofs, HSG B |
| 5.730 | 61 | >75% Grass cover, Good, HSG B |
| 4.502 | 74 | >75% Grass cover, Good, HSG C |
| 0.592 | 80 | >75% Grass cover, Good, HSG D |
| 2.000 | 98 | Paved parking, HSG B |
| 0.328 | 55 | Woods, Good, HSG B |
| 0.823 | 70 | Woods, Good, HSG C |
| 0.880 | 77 | Woods, Good, HSG D |
| 15.712 | 73 | Weighted Average |
| 12.855 | | 81.82% Pervious Area |
| 2.857 | | 18.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 22.3 | 100 | 0.0650 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.0 | 388 | 0.2200 | 3.28 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.7 | 427 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.2 | 400 | 0.1850 | 1.08 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 33.2 | 1,315 | Total | | | |

## Subcatchment A109: A109



## Summary for Subcatchment B101: B101

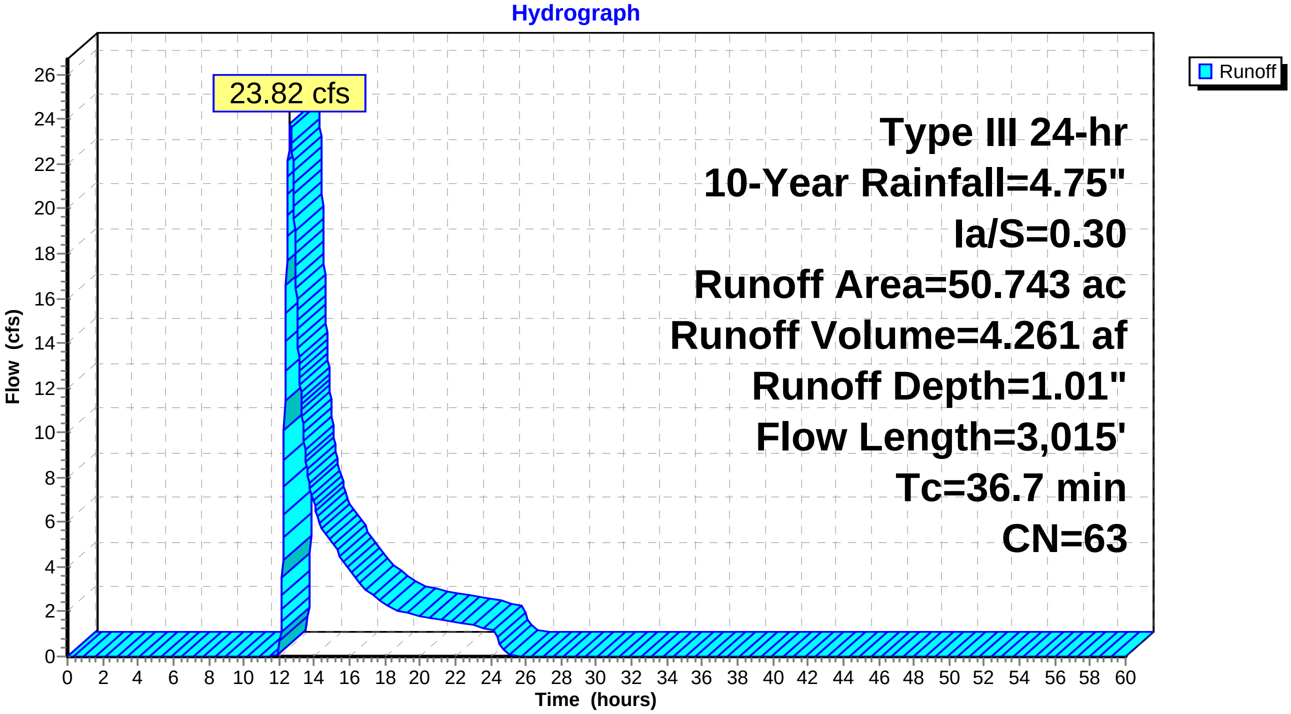
Runoff = 23.82 cfs @ 12.63 hrs, Volume= 4.261 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 5.220 | 98 | Building roof |
| * | 3.230 | 98 | Paved surface |
| * | 0.439 | 96 | Gravel surface |
| * | 0.412 | 98 | Water Surface |
| | 21.653 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 10.300 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.553 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 4.380 | 70 | Woods, Good, HSG C |
| | 4.370 | 77 | Woods, Good, HSG D |
| * | 0.142 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.044 | 30 | Sand Trap, HSG C |
| | 50.743 | 63 | Weighted Average |
| | 41.881 | | 82.54% Pervious Area |
| | 8.862 | | 17.46% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.4 | 1,880 | 0.0830 | 22.47 | 70.61 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 36.7 | 3,015 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

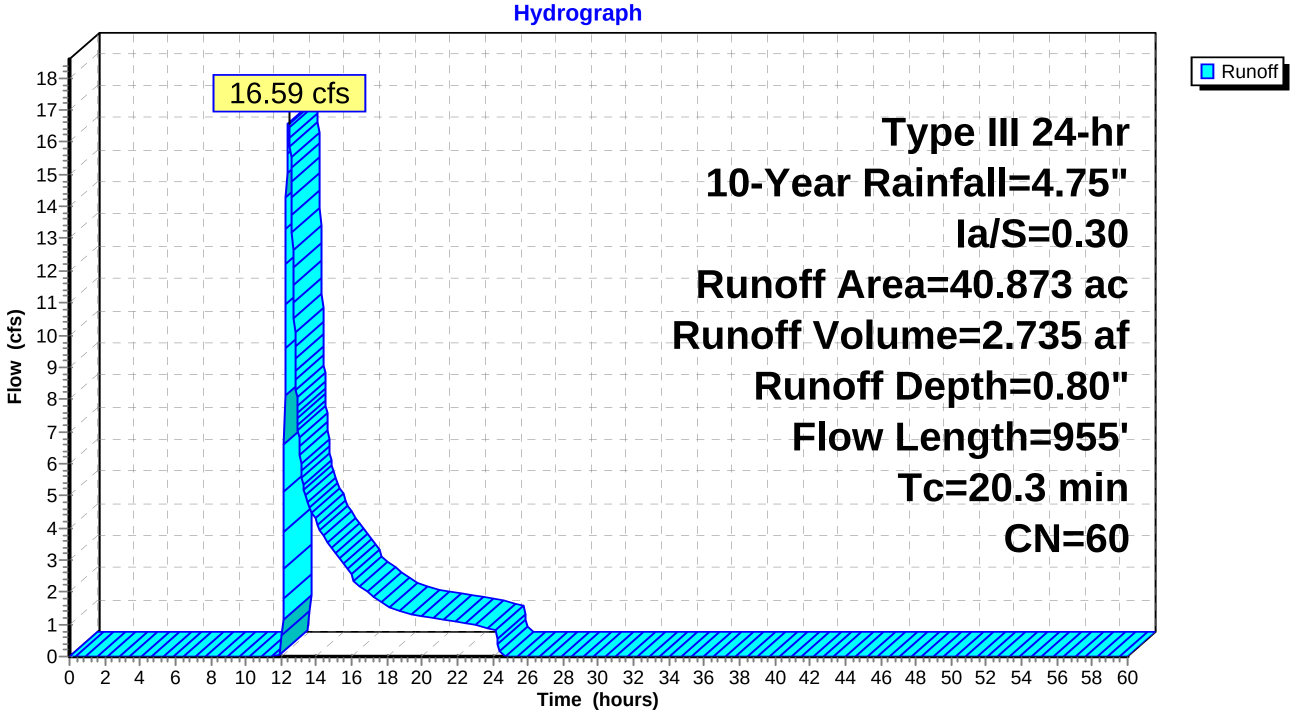
Runoff = 16.59 cfs @ 12.42 hrs, Volume= 2.735 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.516 | 98 | Paved surface |
| * | 0.210 | 96 | Gravel surface |
| * | 0.009 | 98 | Water Surface |
| | 7.476 | 39 | >75% Grass cover, Good, HSG A |
| | 0.464 | 61 | >75% Grass cover, Good, HSG B |
| | 12.033 | 74 | >75% Grass cover, Good, HSG C |
| | 0.764 | 80 | >75% Grass cover, Good, HSG D |
| | 6.808 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 5.496 | 70 | Woods, Good, HSG C |
| | 6.710 | 77 | Woods, Good, HSG D |
| * | 0.060 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.327 | 30 | Sand Trap, HSG C |
| | 40.873 | 60 | Weighted Average |
| | 40.348 | | 98.72% Pervious Area |
| | 0.525 | | 1.28% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 318 | 0.0250 | 7.19 | 287.53 | **Parabolic Channel,** W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.050 |
| 20.3 | 955 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

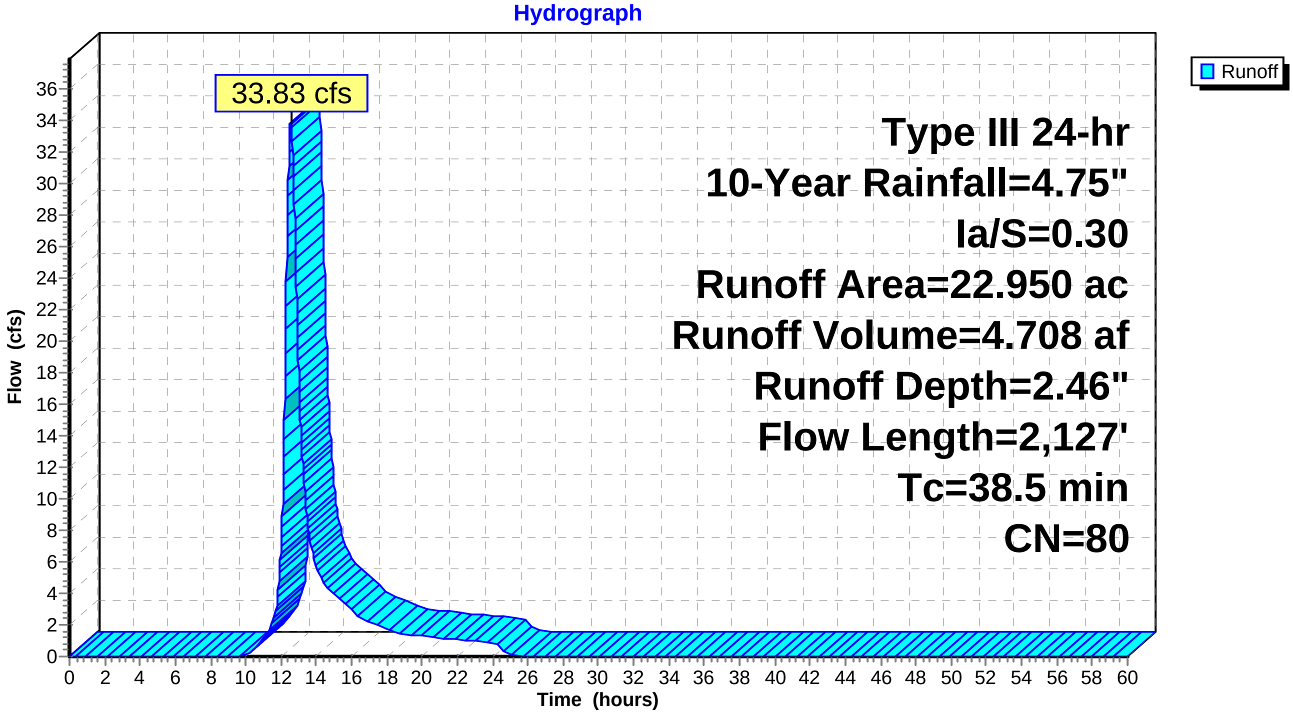
Runoff = 33.83 cfs @ 12.54 hrs, Volume= 4.708 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.520 | 98 | Building roof |
| * | 1.000 | 98 | Paved surface |
| * | 0.123 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.674 | 74 | >75% Grass cover, Good, HSG C |
| | 2.133 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 17.500 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 22.950 | 80 | Weighted Average |
| | 20.430 | | 89.02% Pervious Area |
| | 2.520 | | 10.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.3 | 784 | 0.5100 | 1.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 1,243 | 0.0670 | 26.46 | 187.03 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 38.5 | 2,127 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

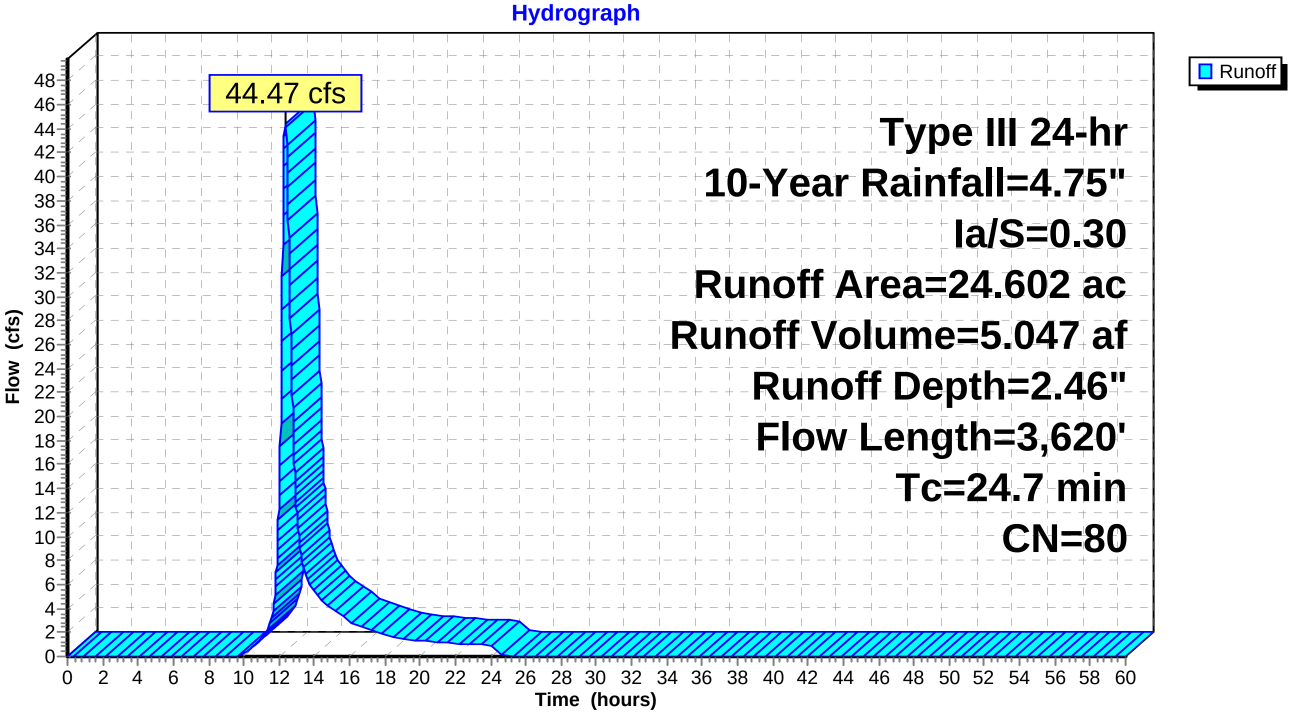
Runoff = 44.47 cfs @ 12.35 hrs, Volume= 5.047 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.579 | 98 | Building roof |
| * | 2.315 | 98 | Paved surface |
| * | 0.016 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.452 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.733 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.315 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.192 | 30 | Sand Trap, HSG C |
| | 24.602 | 80 | Weighted Average |
| | 17.708 | | 71.98% Pervious Area |
| | 6.894 | | 28.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.8 | 100 | 0.1000 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 8.0 | 823 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 452 | 0.1720 | 2.90 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 1,210 | 0.0580 | 8.46 | 101.48 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.045 |
| 0.9 | 1,035 | 0.0350 | 19.12 | 135.18 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 24.7 | 3,620 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

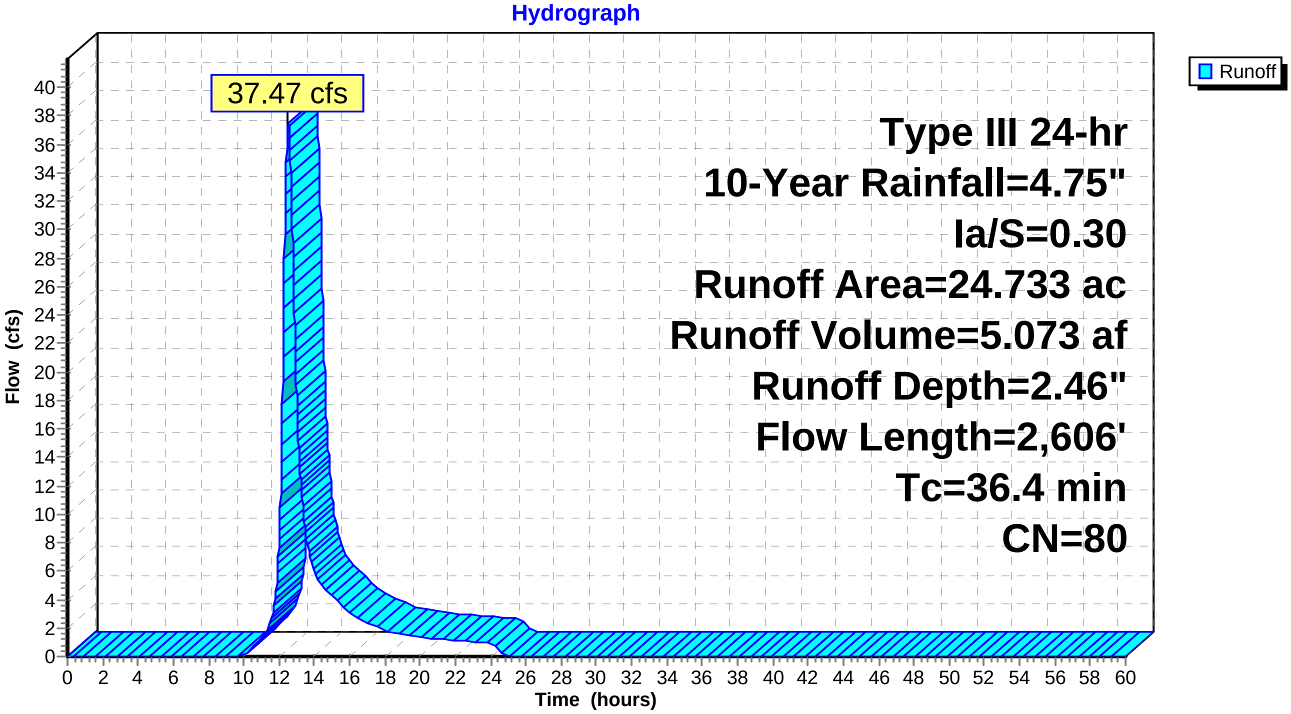
Runoff = 37.47 cfs @ 12.51 hrs, Volume= 5.073 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.944 | 98 | Building roof |
| * | 0.763 | 98 | Paved surface |
| * | 0.287 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.052 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.735 | 74 | >75% Grass cover, Good, HSG C |
| | 0.052 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 18.900 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 24.733 | 80 | Weighted Average |
| | 21.026 | | 85.01% Pervious Area |
| | 3.707 | | 14.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 612 | 0.5680 | 1.88 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 114 | 0.2280 | 3.34 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 880 | 0.0320 | 5.65 | 67.84 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.7 | 900 | 0.0400 | 20.44 | 144.51 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 36.4 | 2,606 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

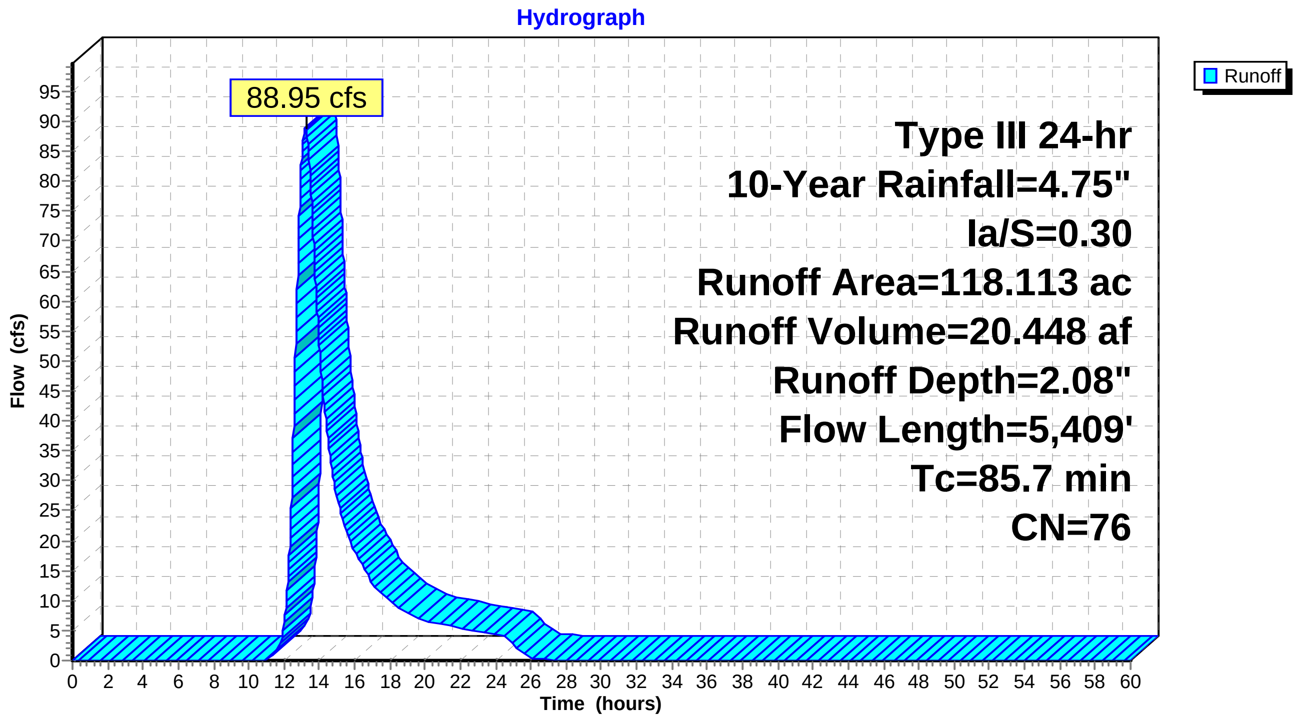
Runoff = 88.95 cfs @ 13.23 hrs, Volume= 20.448 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.587 | 98 | Building roof |
| * | 0.994 | 98 | Paved surface |
| * | 0.746 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.090 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 11.920 | 74 | >75% Grass cover, Good, HSG C |
| | 2.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 10.050 | 70 | Woods, Good, HSG C |
| | 89.064 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 118.113 | 76 | Weighted Average |
| | 116.532 | | 98.66% Pervious Area |
| | 1.581 | | 1.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00'<br>n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

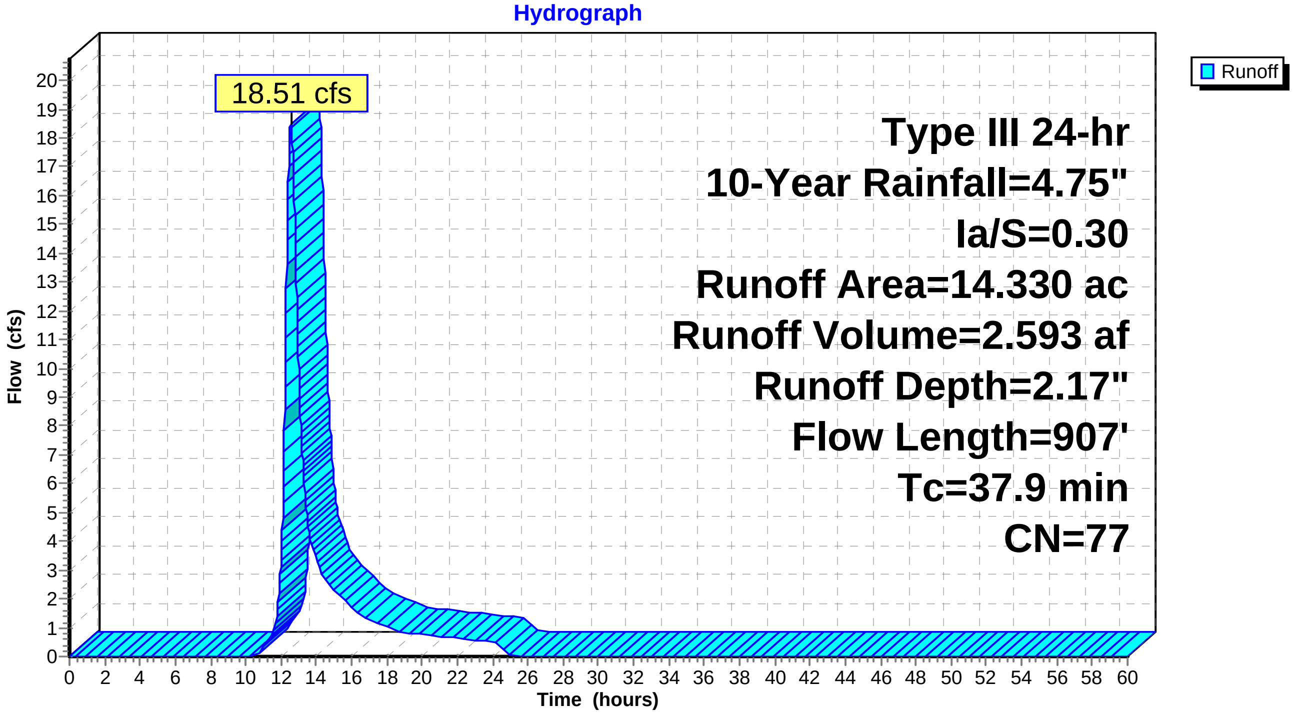
Runoff = 18.51 cfs @ 12.54 hrs, Volume= 2.593 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

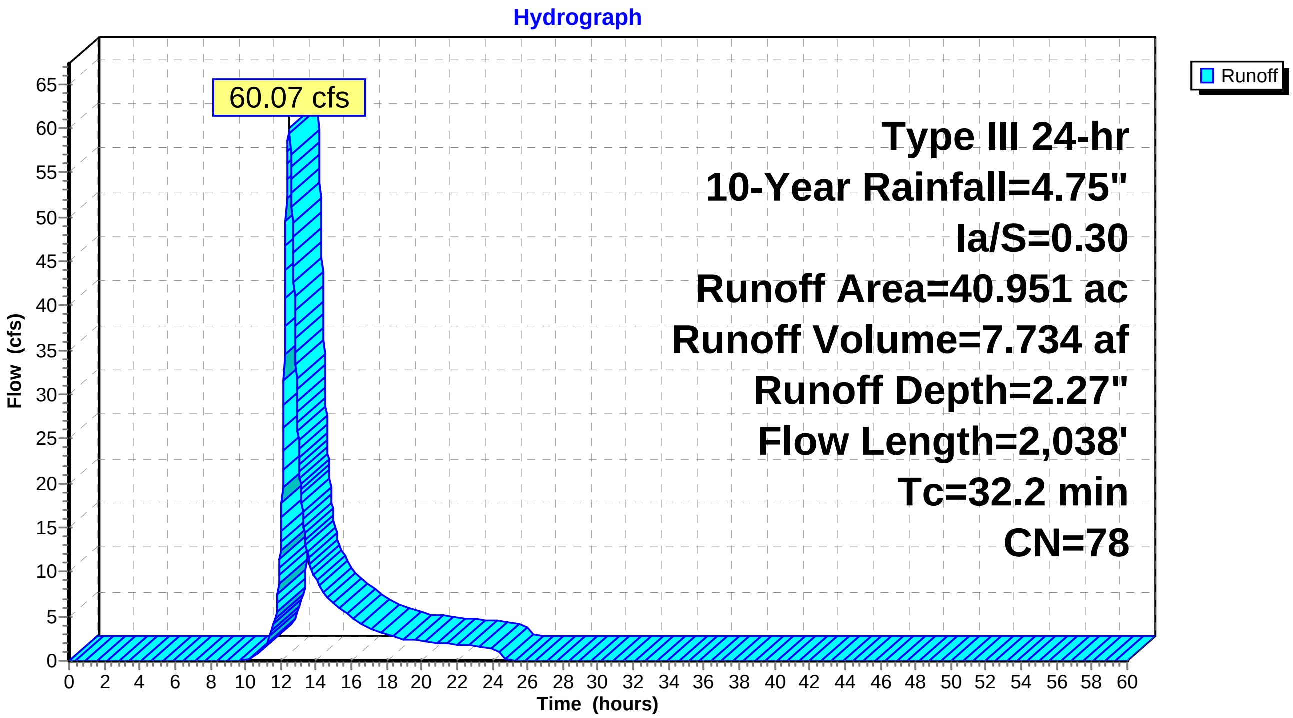
Runoff = 60.07 cfs @ 12.47 hrs, Volume= 7.734 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.640 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.100 | 74 | >75% Grass cover, Good, HSG C |
| | 1.909 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.842 | 70 | Woods, Good, HSG C |
| | 23.560 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.951 | 78 | Weighted Average |
| | 36.411 | | 88.91% Pervious Area |
| | 4.540 | | 11.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 7.8 | 823 | 0.5000 | 1.77 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 725 | 0.1640 | 41.40 | 292.62 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 32.2 | 2,038 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

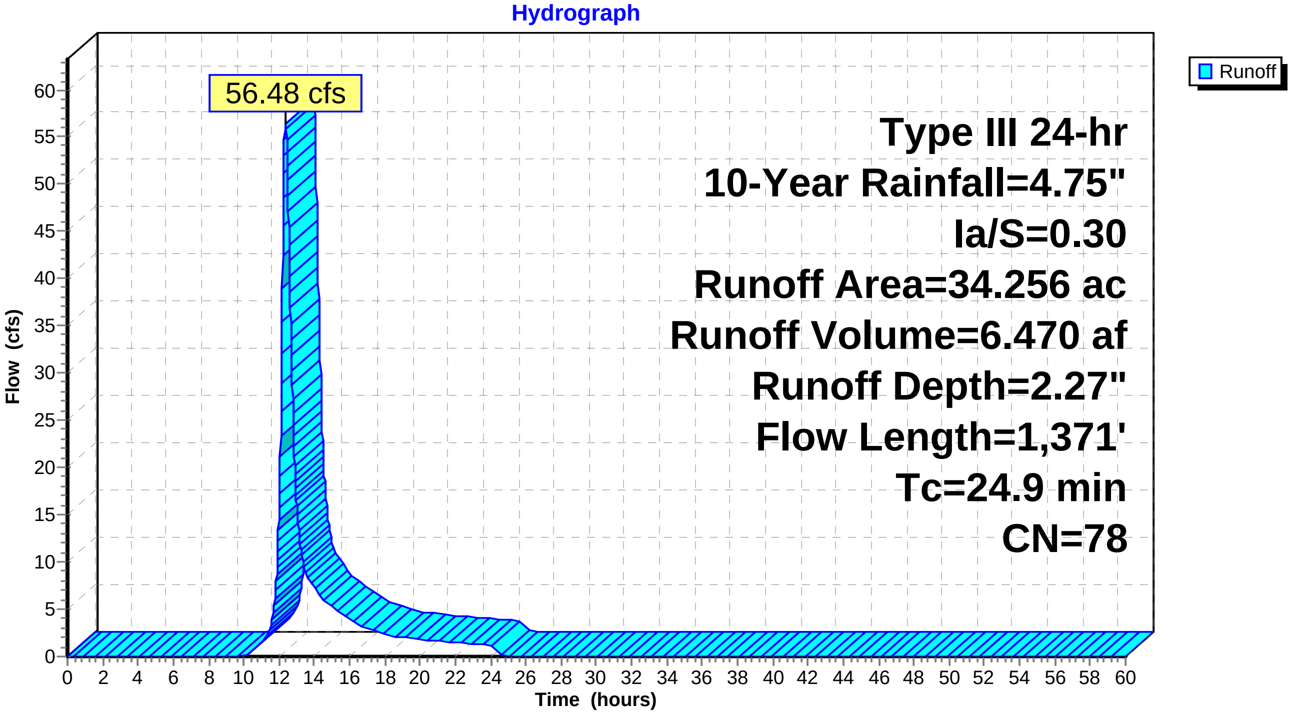
Runoff = 56.48 cfs @ 12.36 hrs, Volume= 6.470 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.000 | 98 | Building roof |
| * | 0.600 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.592 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.332 | 74 | >75% Grass cover, Good, HSG C |
| | 3.160 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.450 | 70 | Woods, Good, HSG C |
| | 9.847 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.275 | 30 | Sand Trap, HSG C |
| | 34.256 | 78 | Weighted Average |
| | 30.064 | | 87.76% Pervious Area |
| | 4.192 | | 12.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4450 | 1.67 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 70 | 0.0280 | 5.29 | 63.46 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.0 | 100 | 0.2800 | 54.09 | 382.35 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 0.2 | 160 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 0.3 | 281 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 24.9 | 1,371 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment B110: B110

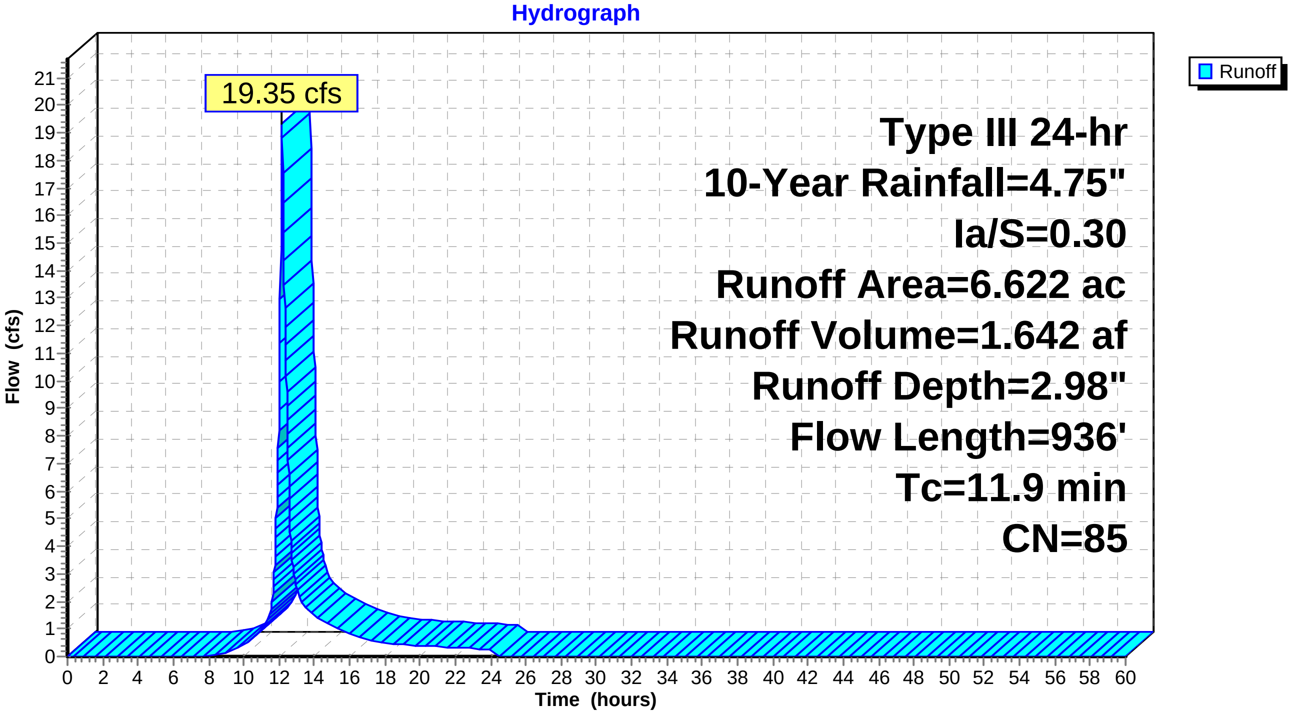
Runoff = 19.35 cfs @ 12.16 hrs, Volume= 1.642 af, Depth= 2.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.381 | 98 | Building roof |
| * | 1.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.550 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.061 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.622 | 85 | Weighted Average |
| | 3.611 | | 54.53% Pervious Area |
| | 3.011 | | 45.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 100 | 0.1300 | 0.17 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 0.6 | 121 | 0.2500 | 3.50 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 715 | 0.0360 | 7.40 | 23.25 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.024 |
| 11.9 | 936 | Total | | | |

## Subcatchment B110: B110



## Summary for Subcatchment B111: B111

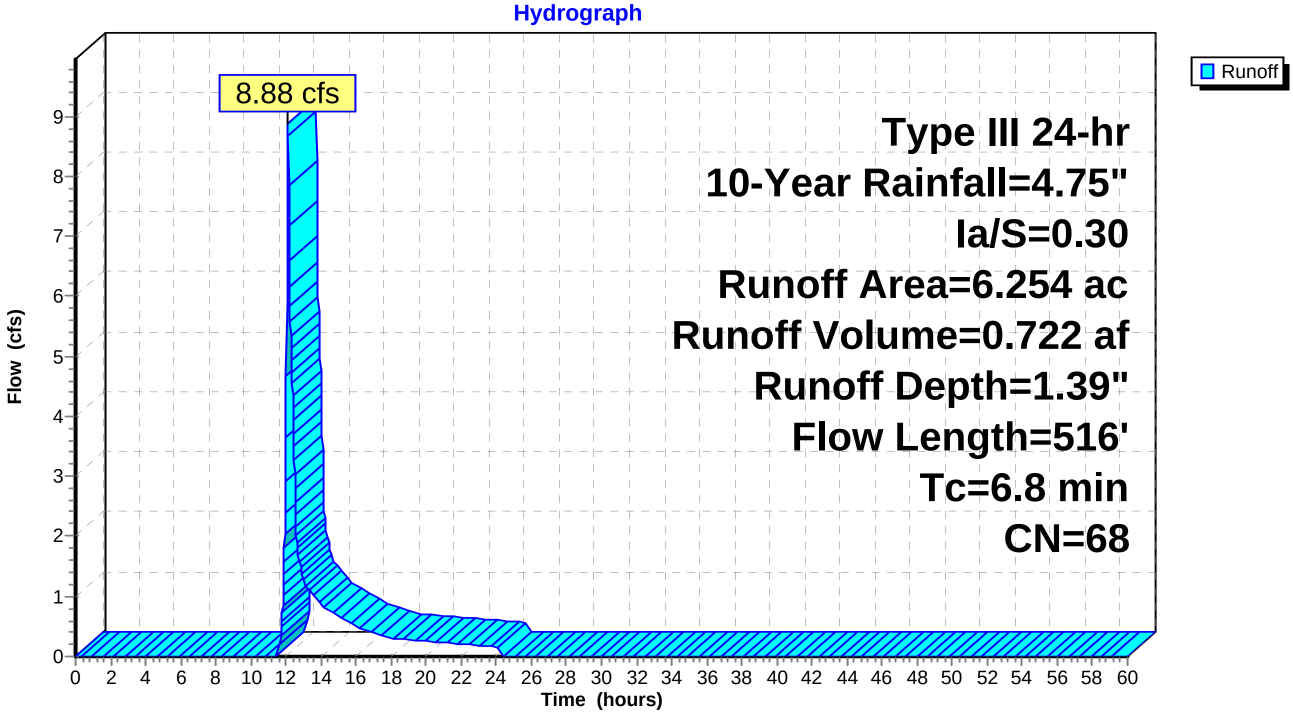
Runoff = 8.88 cfs @ 12.11 hrs, Volume= 0.722 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.504 | 98 | Building roof |
| * | 0.120 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.900 | 98 | Water Surface |
| | 2.730 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.254 | 68 | Weighted Average |
| | 3.730 | | 59.64% Pervious Area |
| | 2.524 | | 40.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.7 | 100 | 0.2000 | 0.45 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 0.6 | 115 | 0.2000 | 3.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 301 | 0.0800 | 1.98 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.8 | 516 | Total | | | |

## Subcatchment B111: B111



## Summary for Subcatchment B112: B112

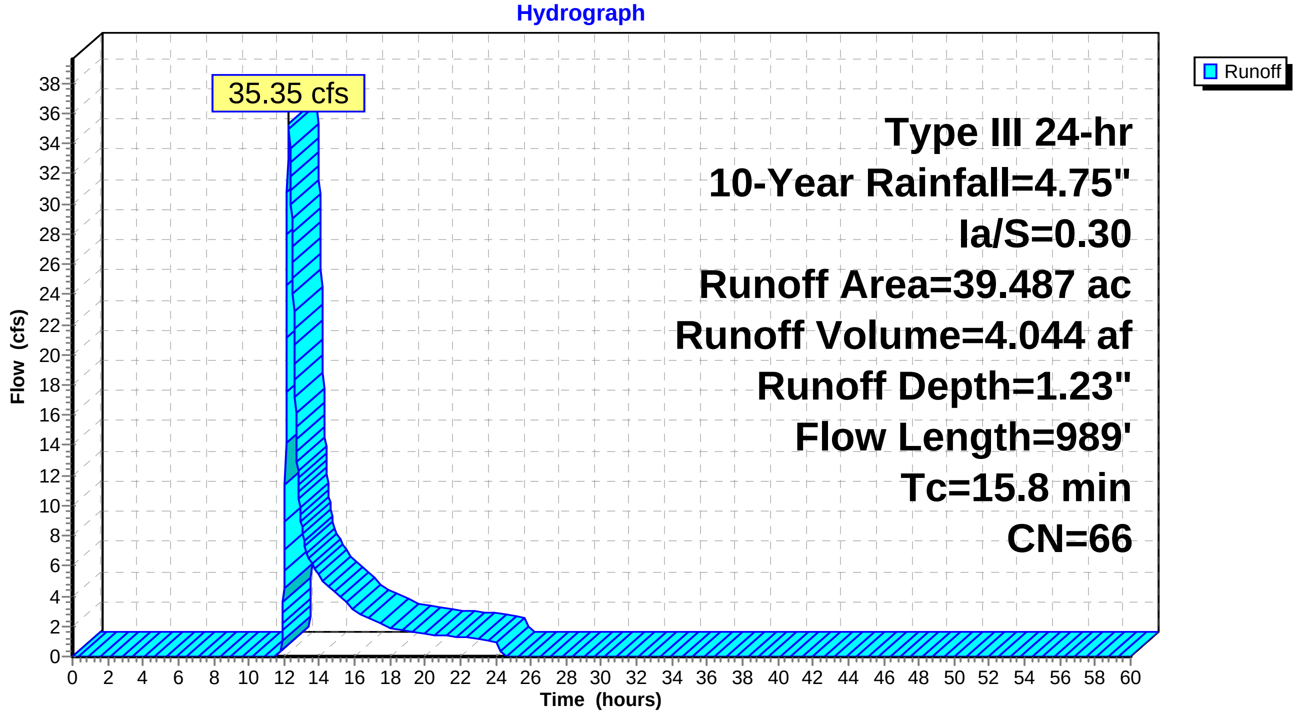
Runoff = 35.35 cfs @ 12.26 hrs, Volume= 4.044 af, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.550 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 8.285 | 98 | Water Surface |
| | 17.485 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 7.526 | 74 | >75% Grass cover, Good, HSG C |
| | 0.015 | 80 | >75% Grass cover, Good, HSG D |
| | 0.052 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.289 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.385 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 39.487 | 66 | Weighted Average |
| | 25.752 | | 65.22% Pervious Area |
| | 13.735 | | 34.78% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.1 | 100 | 0.0400 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 3.1 | 375 | 0.0850 | 2.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 514 | 0.0470 | 1.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 15.8 | 989 | Total | | | |

## Subcatchment B112: B112



## Summary for Subcatchment B113: B113

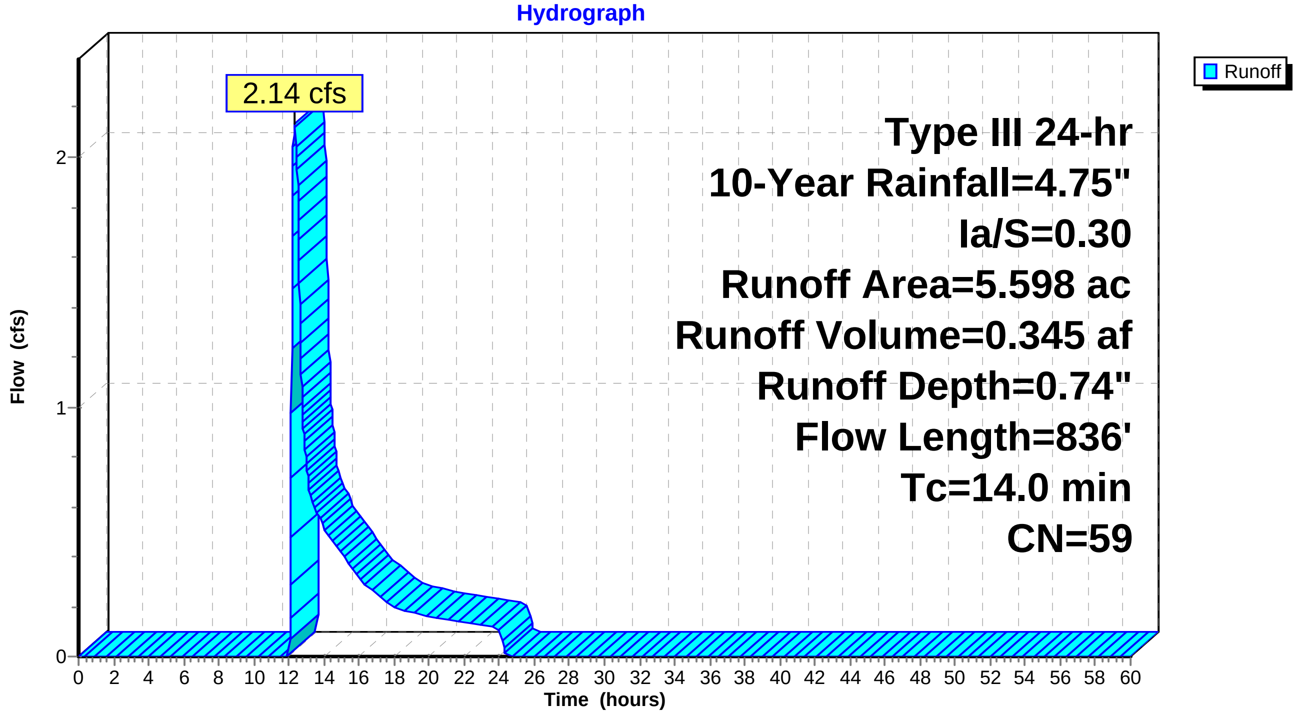
Runoff = 2.14 cfs @ 12.34 hrs, Volume= 0.345 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.060 | 98 | Building roof |
| * | 0.650 | 98 | Paved surface |
| * | 0.009 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.724 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.135 | 80 | >75% Grass cover, Good, HSG D |
| | 0.720 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.300 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.598 | 59 | Weighted Average |
| | 3.888 | | 69.45% Pervious Area |
| | 1.710 | | 30.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.8 | 100 | 0.0800 | 0.14 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.6 | 300 | 0.0360 | 3.05 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 436 | 0.0700 | 12.07 | 14.81 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 |
| 14.0 | 836 | Total | | | |

## Subcatchment B113: B113



## Summary for Subcatchment B115: B115

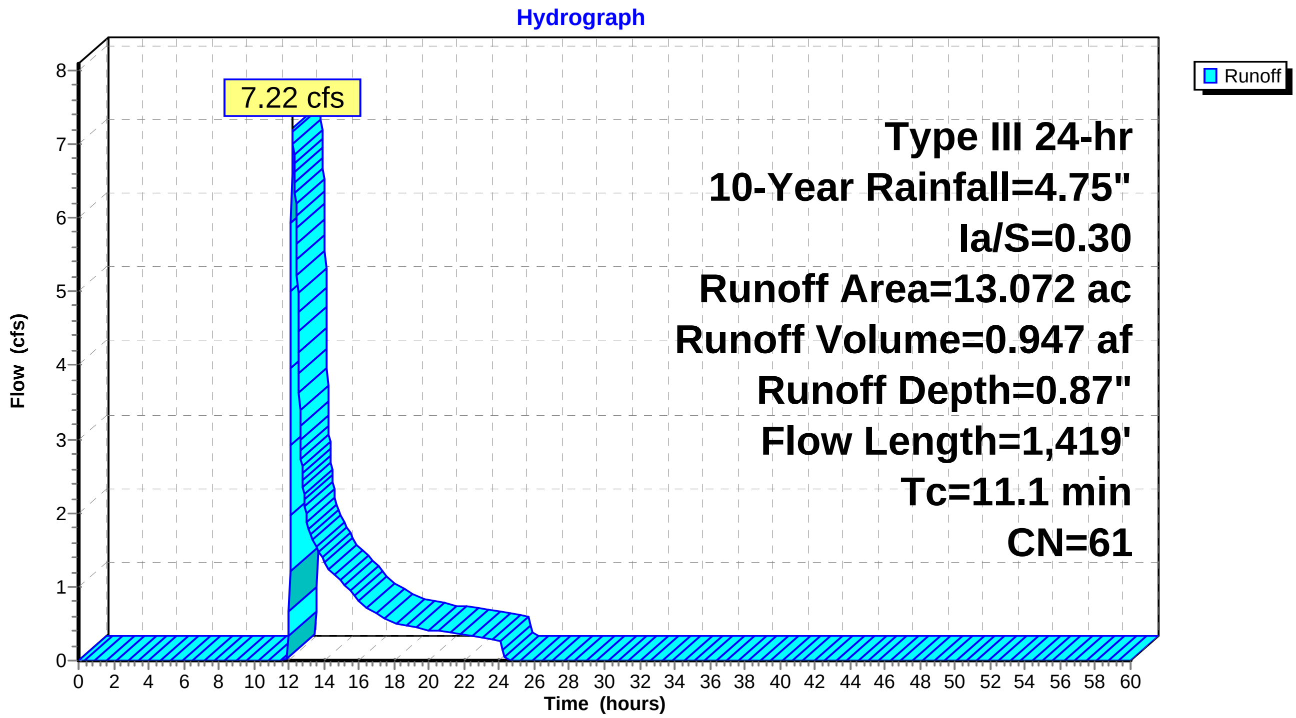
Runoff = 7.22 cfs @ 12.21 hrs, Volume= 0.947 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.615 | 98 | Building roof |
| * | 0.449 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 6.589 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.241 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.030 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.011 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.057 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.080 | 30 | Sand Trap, HSG C |
| | 13.072 | 61 | Weighted Average |
| | 10.008 | | 76.56% Pervious Area |
| | 3.064 | | 23.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 100 | 0.1100 | 0.35 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 4.0 | 340 | 0.0410 | 1.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 979 | 0.0130 | 6.80 | 136.10 | **Channel Flow,** Area= 20.0 sf Perim= 12.0' r= 1.67' n= 0.035 |
| 11.1 | 1,419 | Total | | | |

## Subcatchment B115: B115



## Summary for Subcatchment B116: B116

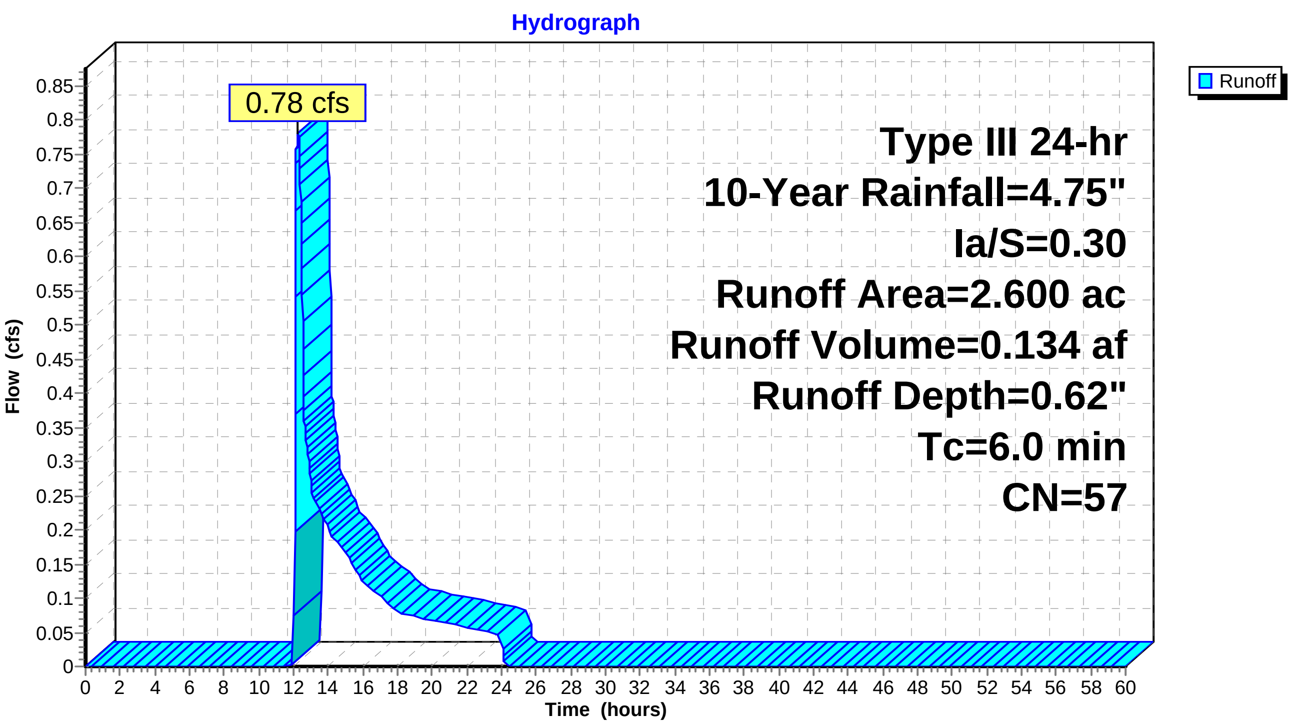
Runoff = 0.78 cfs @ 12.28 hrs, Volume= 0.134 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.174 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.621 | 98 | Water Surface |
| | 1.805 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.600 | 57 | Weighted Average |
| | 1.805 | | 69.42% Pervious Area |
| | 0.795 | | 30.58% Impervious Area |

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

## Subcatchment B116: B116



## Summary for Subcatchment B117: B117

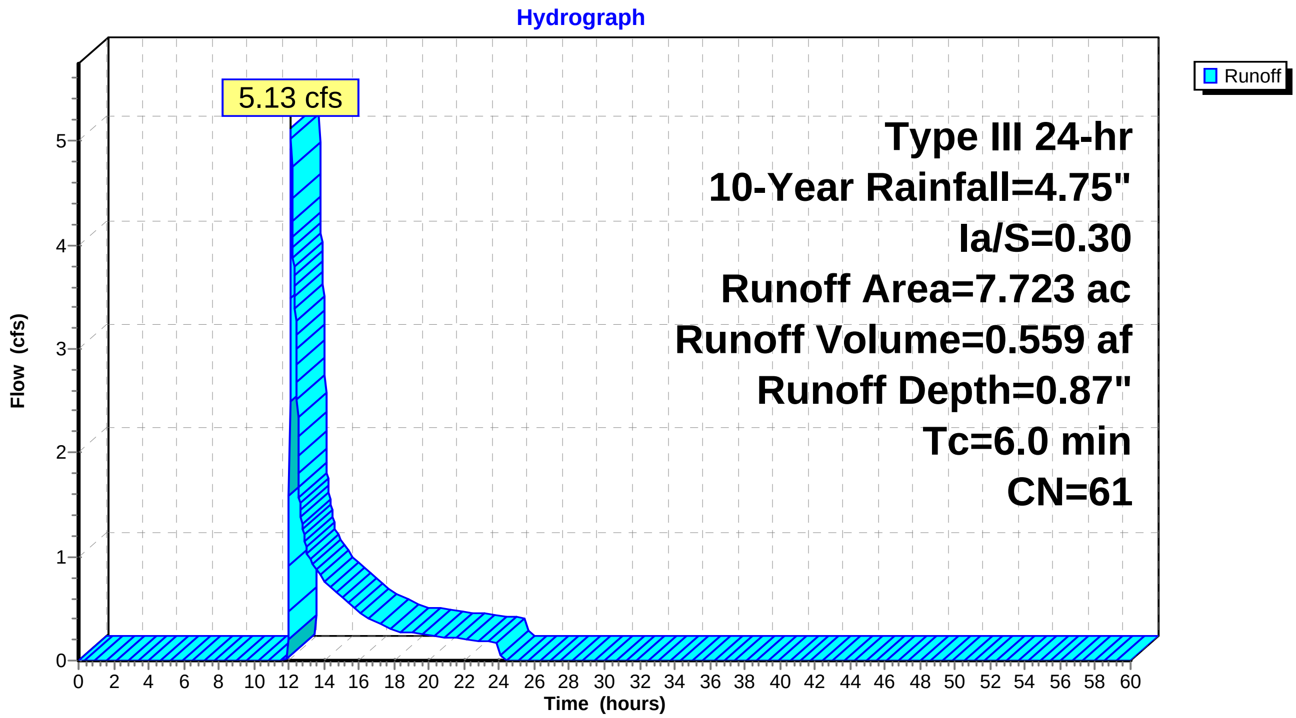
Runoff = 5.13 cfs @ 12.12 hrs, Volume= 0.559 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.200 | 98 | Building roof |
| * | 0.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 4.580 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.018 | 80 | >75% Grass cover, Good, HSG D |
| | 0.268 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.027 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.723 | 61 | Weighted Average |
| | 4.893 | | 63.36% Pervious Area |
| | 2.830 | | 36.64% Impervious Area |

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

## Subcatchment B117: B117



## Summary for Subcatchment B118: B118

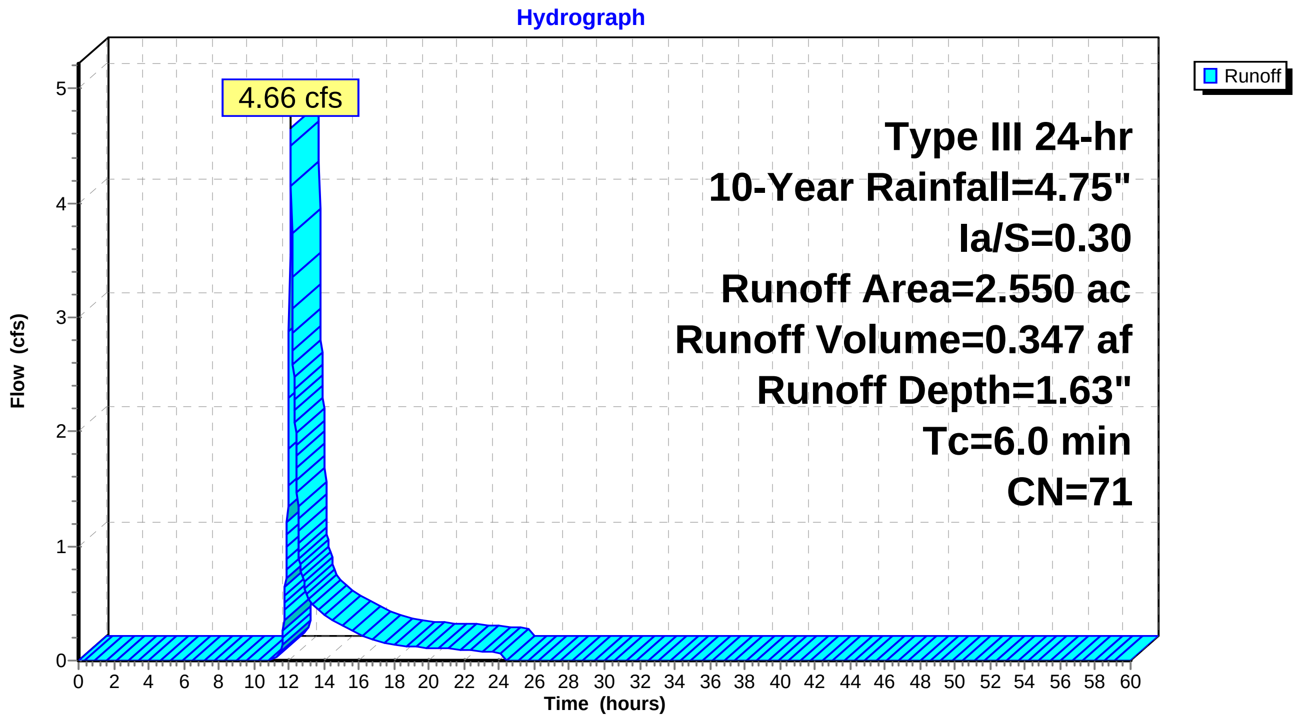
Runoff = 4.66 cfs @ 12.10 hrs, Volume= 0.347 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.295 | 98 | Building roof |
| * | 0.100 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 1.015 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.140 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.550 | 71 | Weighted Average |
| | 1.155 | | 45.29% Pervious Area |
| | 1.395 | | 54.71% Impervious Area |

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

## Subcatchment B118: B118



## Summary for Subcatchment B119: B119

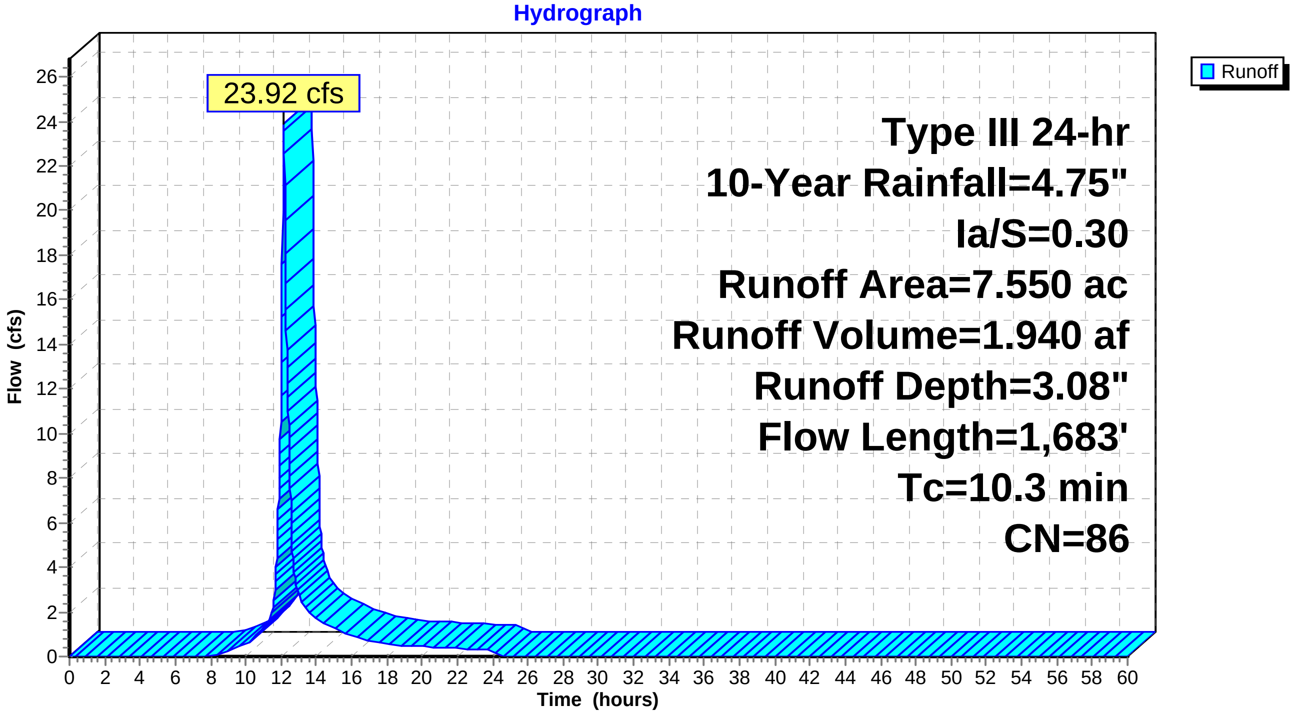
Runoff = 23.92 cfs @ 12.14 hrs, Volume= 1.940 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.300 | 98 | Building roof |
| * | 0.950 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.300 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.550 | 86 | Weighted Average |
| | 3.300 | | 43.71% Pervious Area |
| | 4.250 | | 56.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.3000 | 0.24 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 2.3 | 185 | 0.3000 | 1.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.1 | 50 | 0.1100 | 6.73 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.9 | 1,348 | 0.1100 | 25.87 | 81.28 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 10.3 | 1,683 | Total | | | |

## Subcatchment B119: B119



## Summary for Subcatchment C101: C101

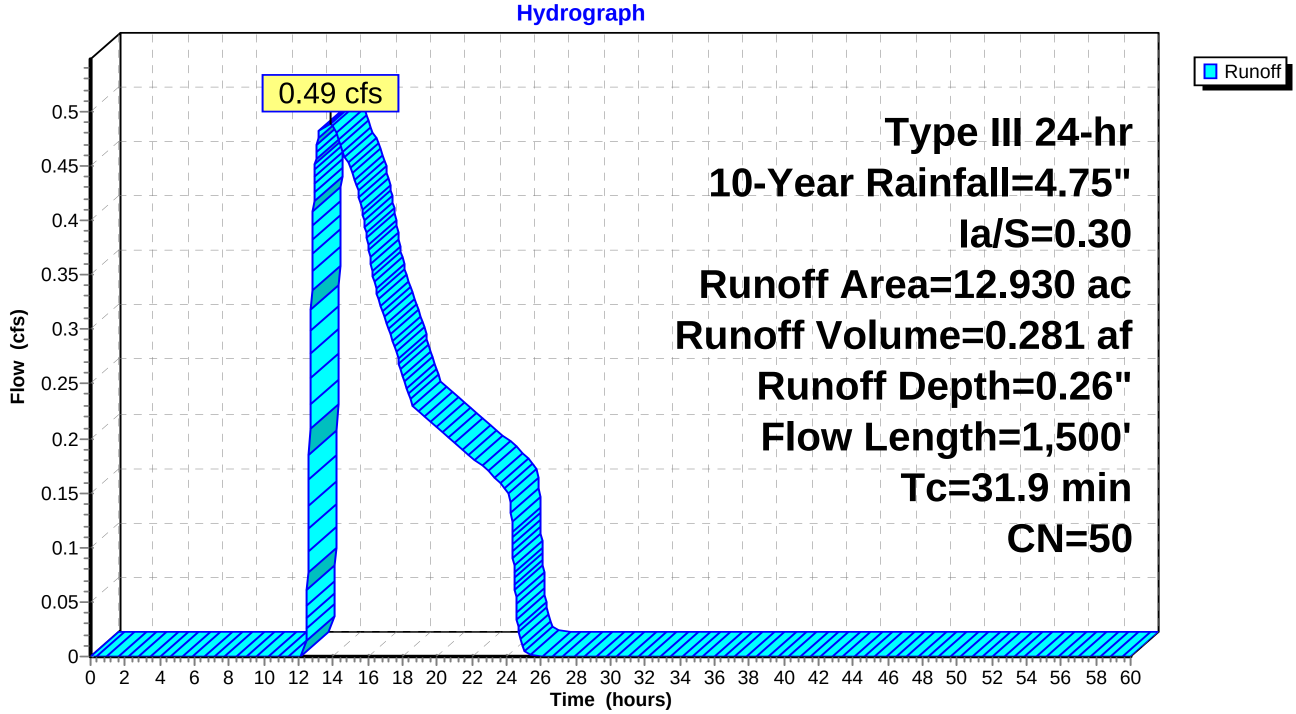
Runoff = 0.49 cfs @ 13.86 hrs, Volume= 0.281 af, Depth= 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 4.850 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.370 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.860 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.850 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 12.930 | 50 | Weighted Average |
| | 12.930 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

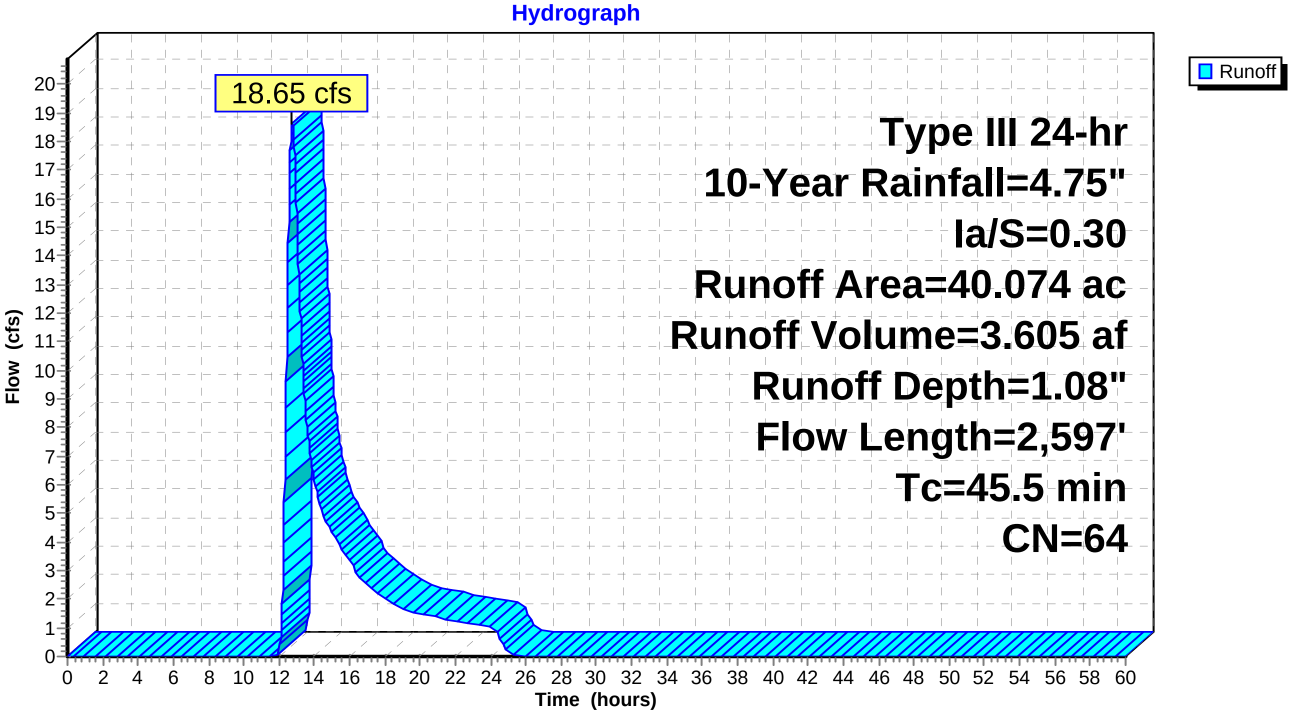
Runoff = 18.65 cfs @ 12.75 hrs, Volume= 3.605 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.007 | 98 | Paved surface |
| * | 0.515 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.285 | 98 | Rock Outcrop/Ledge |
| | 13.181 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.190 | 74 | >75% Grass cover, Good, HSG C |
| | 1.269 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.574 | 70 | Woods, Good, HSG C |
| | 15.097 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.074 | 64 | Weighted Average |
| | 38.950 | | 97.20% Pervious Area |
| | 1.124 | | 2.80% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment C103: C103

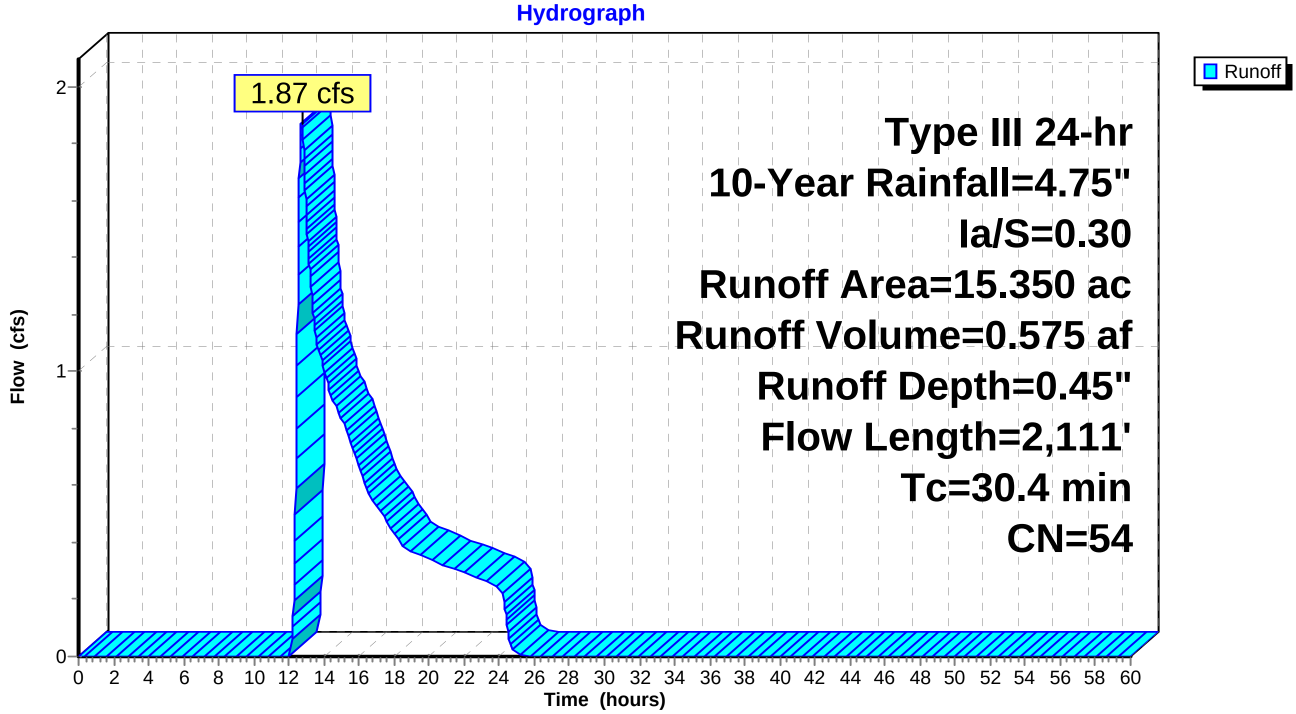
Runoff = 1.87 cfs @ 12.73 hrs, Volume= 0.575 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 2.860 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 9.290 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.240 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.980 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.980 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.350 | 54 | Weighted Average |
| | 12.490 | | 81.37% Pervious Area |
| | 2.860 | | 18.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.9 | 100 | 0.1300 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 185 | 0.1560 | 1.97 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 188 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 288 | 0.0069 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.2 | 1,350 | 0.0260 | 10.03 | 12.31 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 |
| 30.4 | 2,111 | Total | | | |

## Subcatchment C103: C103



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

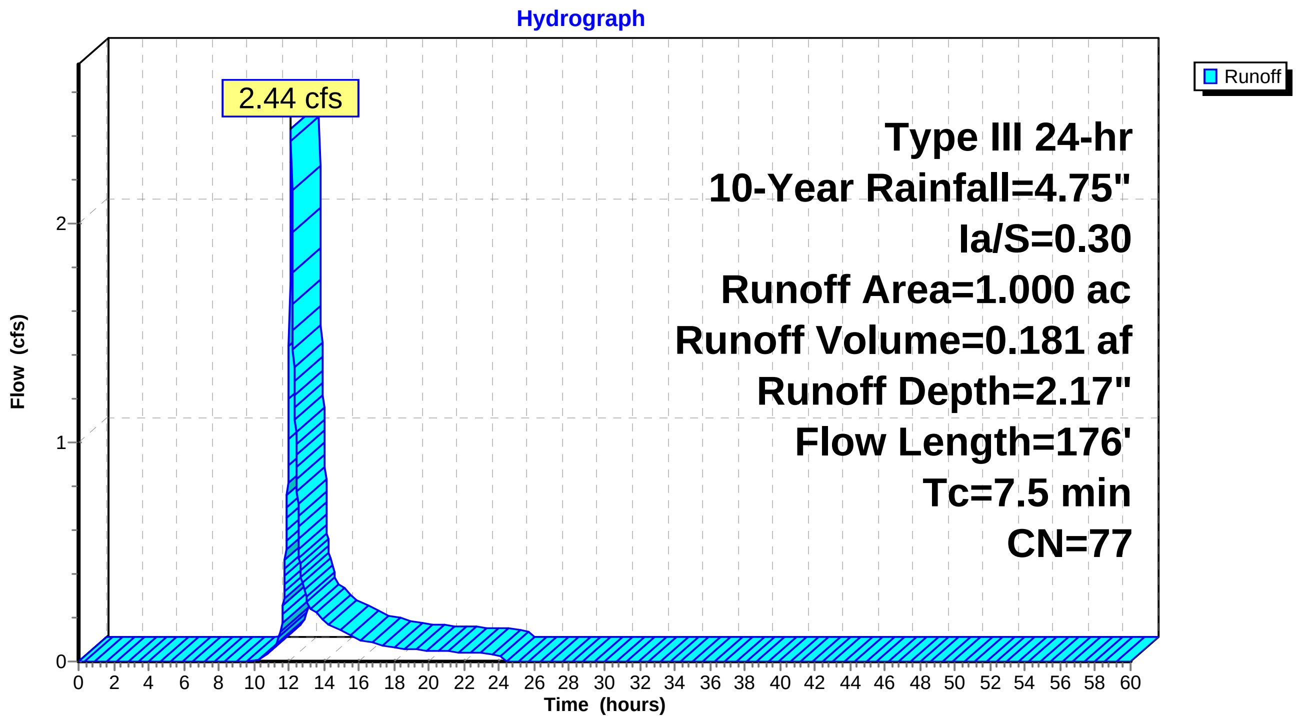
Runoff = 2.44 cfs @ 12.11 hrs, Volume= 0.181 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.75", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.590 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.260 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 77 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C** Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1100 | 6.73 | | **Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps |
| 7.5 | 176 | Total | | | |

### Subcatchment Overlook (P1): Overlook (Phase 1)



## Summary for Reach 36" Pipe: 36" Pipe

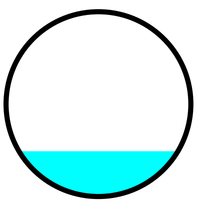
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 2.29" for 10-Year event
Inflow = 19.71 cfs @ 12.44 hrs, Volume= 2.932 af
Outflow = 19.68 cfs @ 12.46 hrs, Volume= 2.932 af, Atten= 0%, Lag= 0.8 min

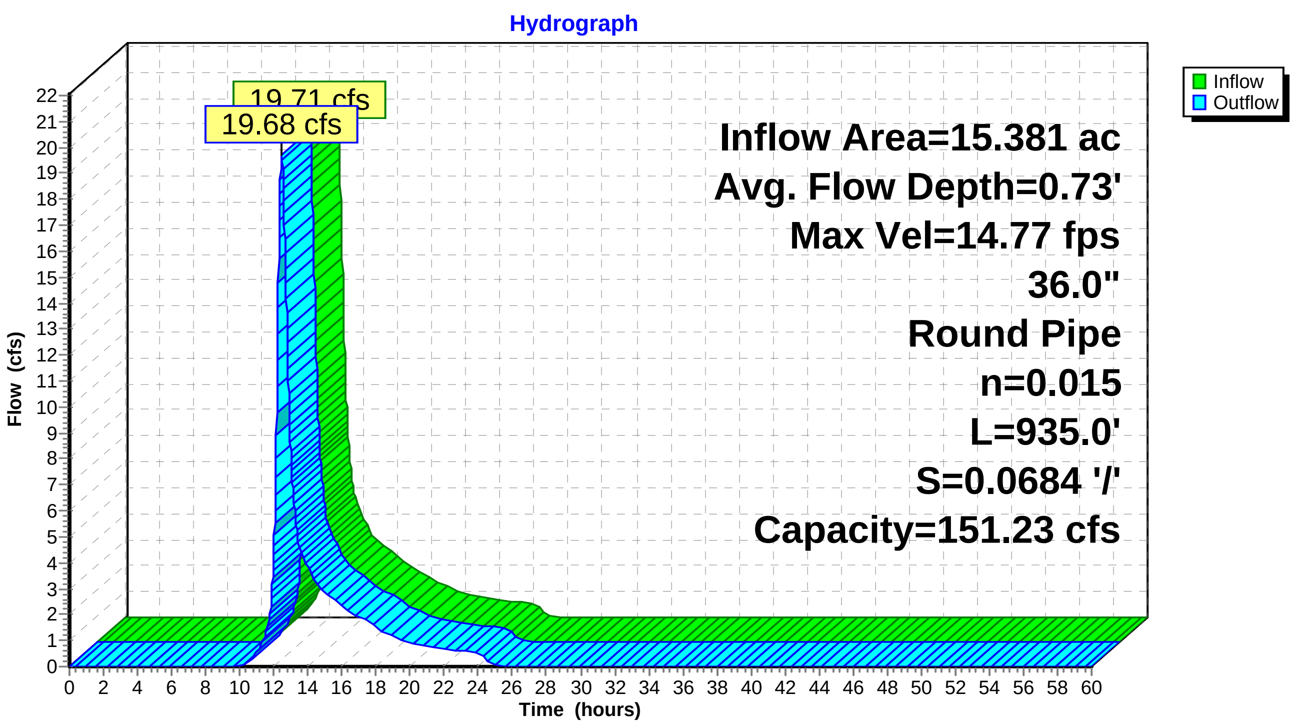
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 14.77 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 4.68 fps, Avg. Travel Time= 3.3 min

Peak Storage= 1,245 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 151.23 cfs

36.0" Round Pipe
n= 0.015
Length= 935.0' Slope= 0.0684 '/'
Inlet Invert= 635.00', Outlet Invert= 571.00'



### Reach 36" Pipe: 36" Pipe



## Summary for Reach 42" Pipe: 42" Pipe

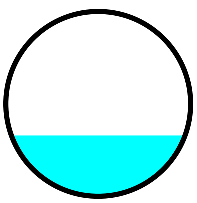
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 100.939 ac, 4.72% Impervious, Inflow Depth = 1.81" for 10-Year event
Inflow = 76.27 cfs @ 12.88 hrs, Volume= 15.230 af
Outflow = 76.20 cfs @ 12.88 hrs, Volume= 15.230 af, Atten= 0%, Lag= 0.3 min

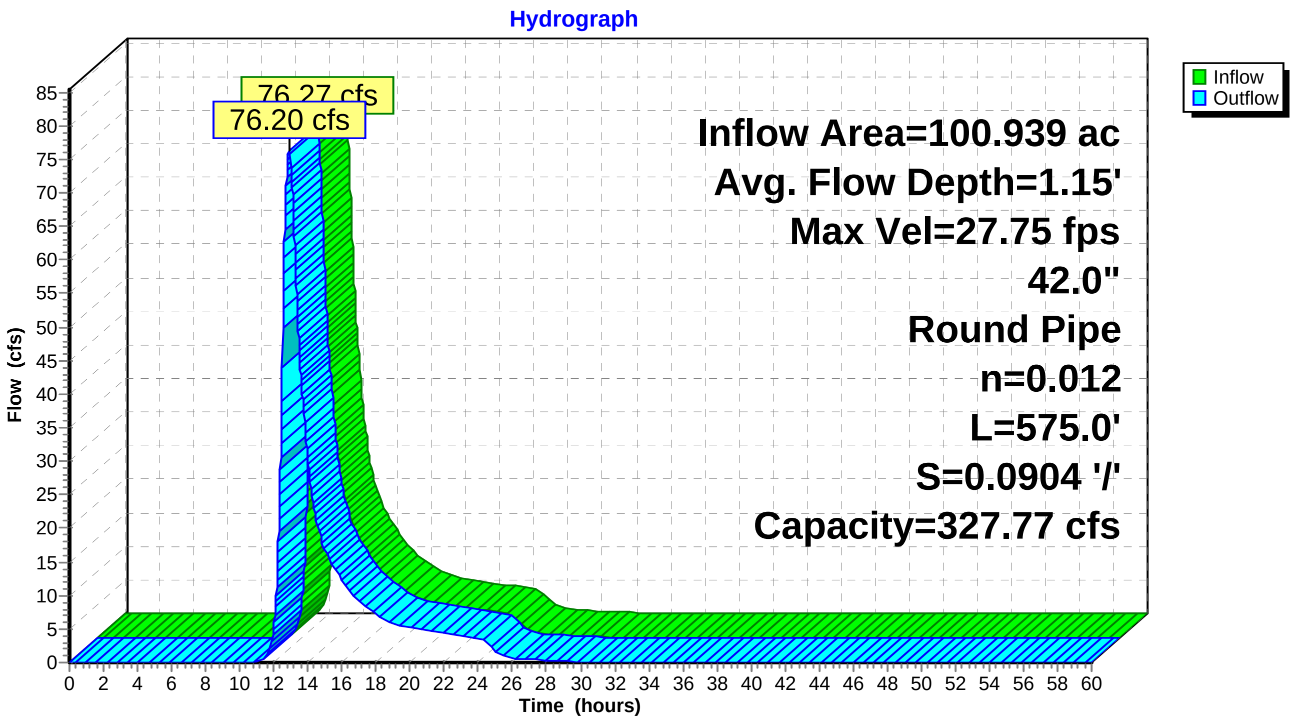
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 27.75 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 6.64 fps, Avg. Travel Time= 1.4 min

Peak Storage= 1,579 cf @ 12.88 hrs
Average Depth at Peak Storage= 1.15'
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 327.77 cfs

42.0" Round Pipe
n= 0.012
Length= 575.0' Slope= 0.0904 '/'
Inlet Invert= 587.00', Outlet Invert= 535.00'



### Reach 42" Pipe: 42" Pipe



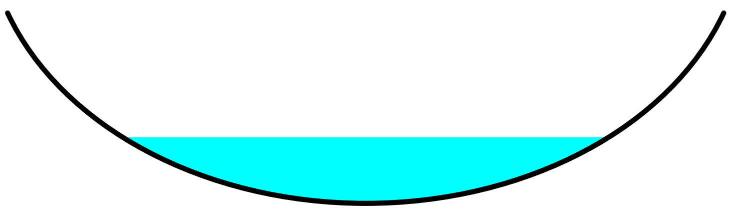
## Summary for Reach A105R: Thru A103

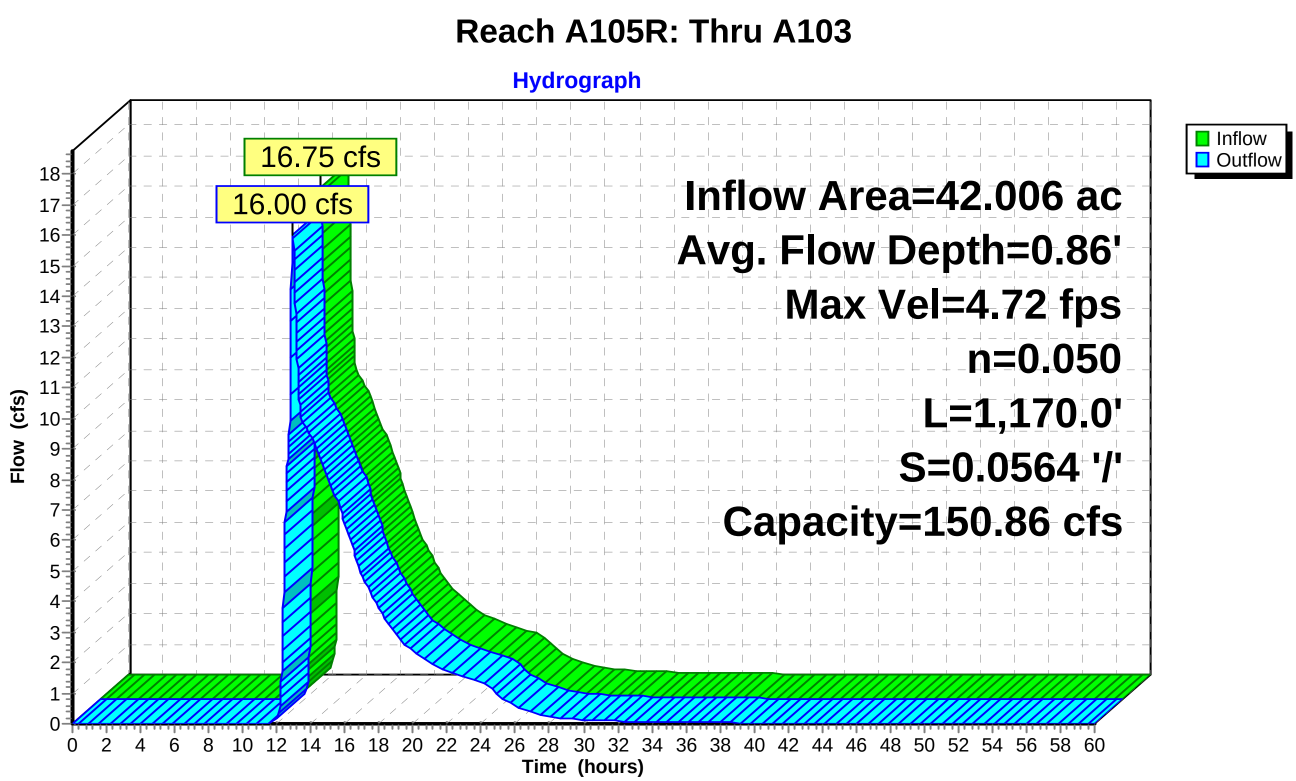
Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth > 1.43" for 10-Year event
Inflow = 16.75 cfs @ 12.86 hrs, Volume= 4.996 af
Outflow = 16.00 cfs @ 12.92 hrs, Volume= 4.996 af, Atten= 4%, Lag= 3.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.72 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 14.5 min

Peak Storage= 3,967 cf @ 12.92 hrs
Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 150.86 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,170.0' Slope= 0.0564 '/'
Inlet Invert= 566.00', Outlet Invert= 500.00'





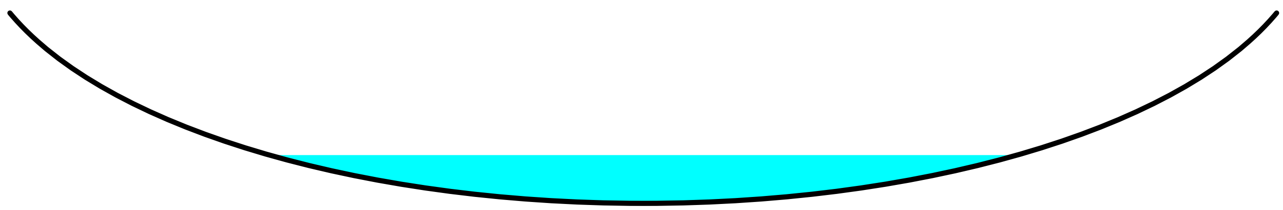
## Summary for Reach B107R: Thru B103

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 1.94" for 10-Year event
Inflow = 9.81 cfs @ 13.01 hrs, Volume= 2.317 af
Outflow = 9.79 cfs @ 13.04 hrs, Volume= 2.317 af, Atten= 0%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.78 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 10.6 min

Peak Storage= 1,589 cf @ 13.04 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 192.14 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 938.0' Slope= 0.4072 '/'
Inlet Invert= 972.00', Outlet Invert= 590.00'



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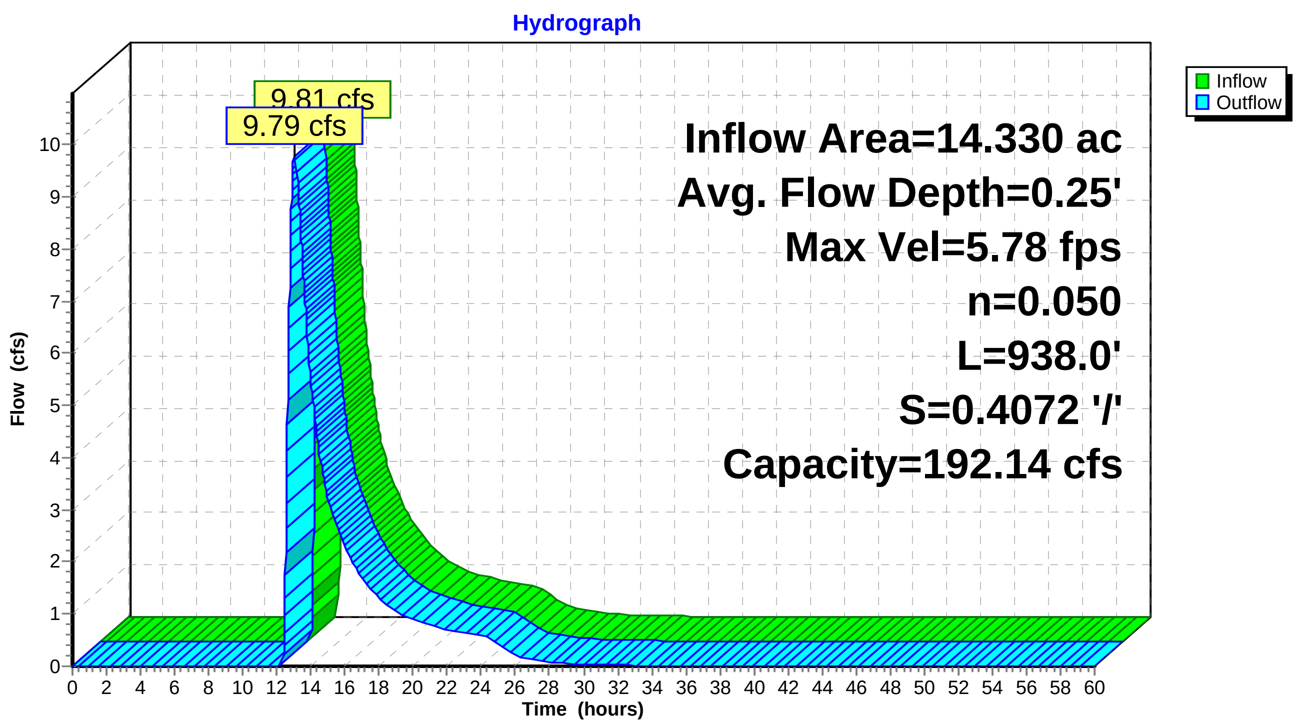
### Reach B107R: Thru B103



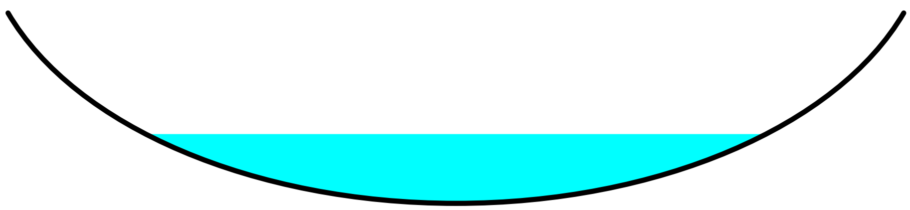
## Summary for Reach B112R: Thru B102

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 1.81" for 10-Year event
Inflow = 42.65 cfs @ 15.22 hrs, Volume= 37.491 af
Outflow = 42.65 cfs @ 15.25 hrs, Volume= 37.482 af, Atten= 0%, Lag= 1.9 min

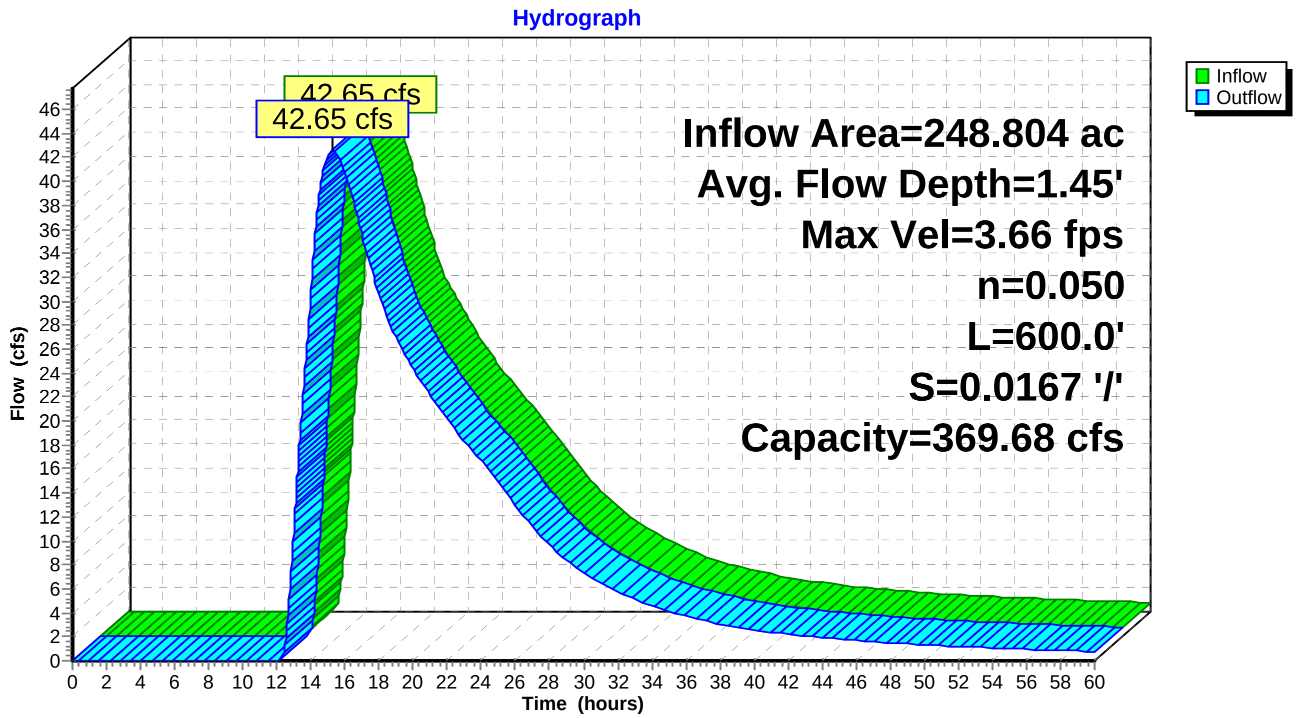
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.66 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 5.1 min

Peak Storage= 6,988 cf @ 15.25 hrs
Average Depth at Peak Storage= 1.45'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 369.68 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 600.0' Slope= 0.0167 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'



### Reach B112R: Thru B102



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.074 ac, 2.80% Impervious, Inflow Depth = 1.08" for 10-Year event
Inflow = 18.65 cfs @ 12.75 hrs, Volume= 3.605 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.21' @ 26.62 hrs Surf.Area= 175,707 sf Storage= 157,046 cf

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

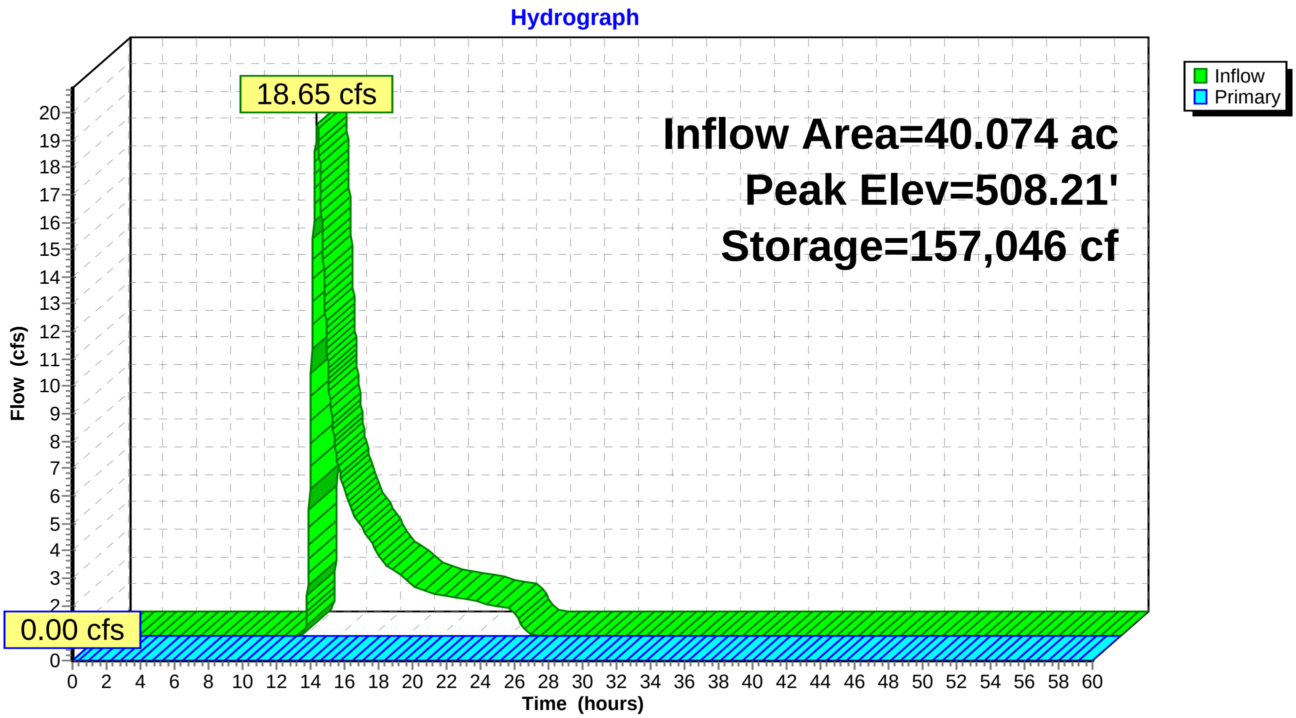
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 104A: Wetland D

Inflow Area = 29.922 ac, 5.68% Impervious, Inflow Depth = 0.15" for 10-Year event
Inflow = 0.59 cfs @ 15.04 hrs, Volume= 0.369 af
Outflow = 0.36 cfs @ 18.83 hrs, Volume= 0.348 af, Atten= 39%, Lag= 227.3 min
Primary = 0.28 cfs @ 18.83 hrs, Volume= 0.325 af
Secondary = 0.08 cfs @ 18.83 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.00' @ 18.83 hrs Surf.Area= 25,291 sf Storage= 6,686 cf

Plug-Flow detention time= 410.7 min calculated for 0.348 af (94% of inflow)
Center-of-Mass det. time= 389.5 min ( 1,467.9 - 1,078.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

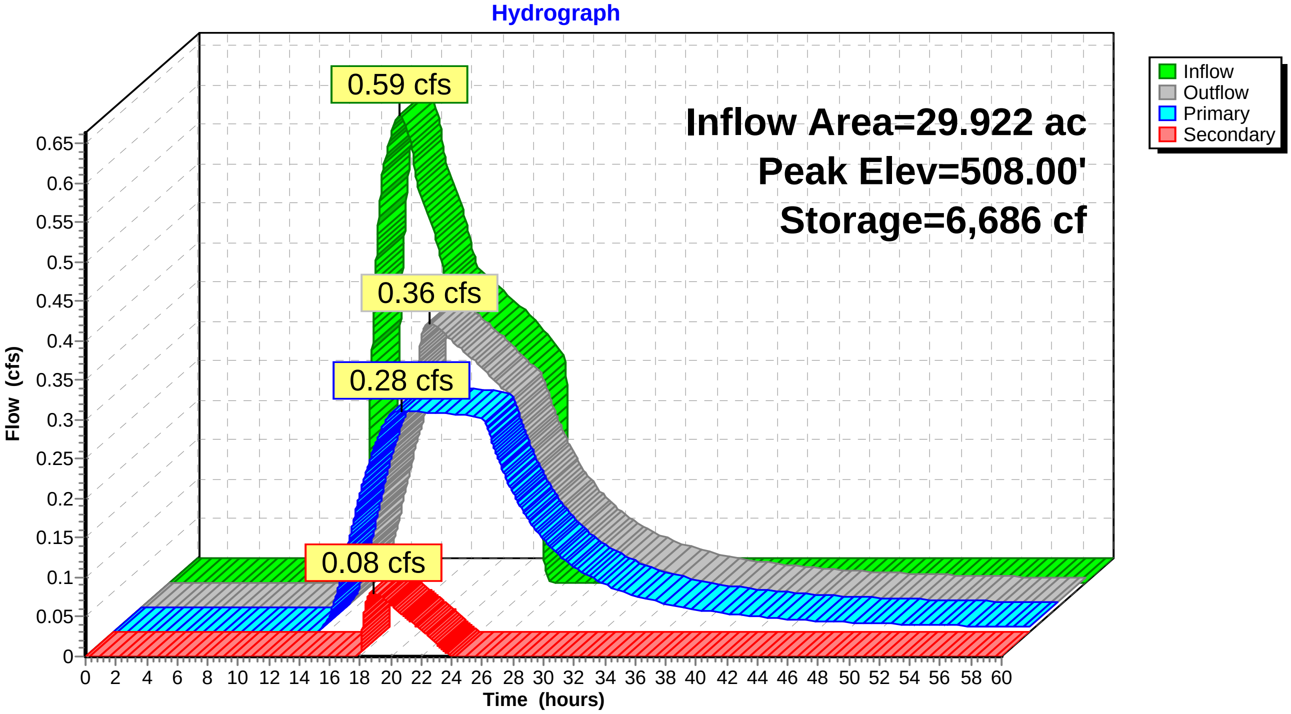
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.28 cfs @ 18.83 hrs HW=508.00' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.28 cfs @ 2.07 fps)

**Secondary OutFlow** Max=0.08 cfs @ 18.83 hrs HW=508.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.08 cfs @ 0.18 fps)

## Pond 104A: Wetland D



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach 36" Pipe OUTLET depth by 3.62' @ 13.40 hrs

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 1.43" for 10-Year event
Inflow = 33.47 cfs @ 12.43 hrs, Volume= 5.012 af
Outflow = 16.75 cfs @ 12.86 hrs, Volume= 4.996 af, Atten= 50%, Lag= 25.9 min
Primary = 10.11 cfs @ 12.86 hrs, Volume= 4.835 af
Secondary = 6.63 cfs @ 12.86 hrs, Volume= 0.160 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.06' @ 12.86 hrs Surf.Area= 31,970 sf Storage= 59,067 cf

Plug-Flow detention time= 106.6 min calculated for 4.996 af (100% of inflow)
Center-of-Mass det. time= 104.6 min ( 1,002.4 - 897.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

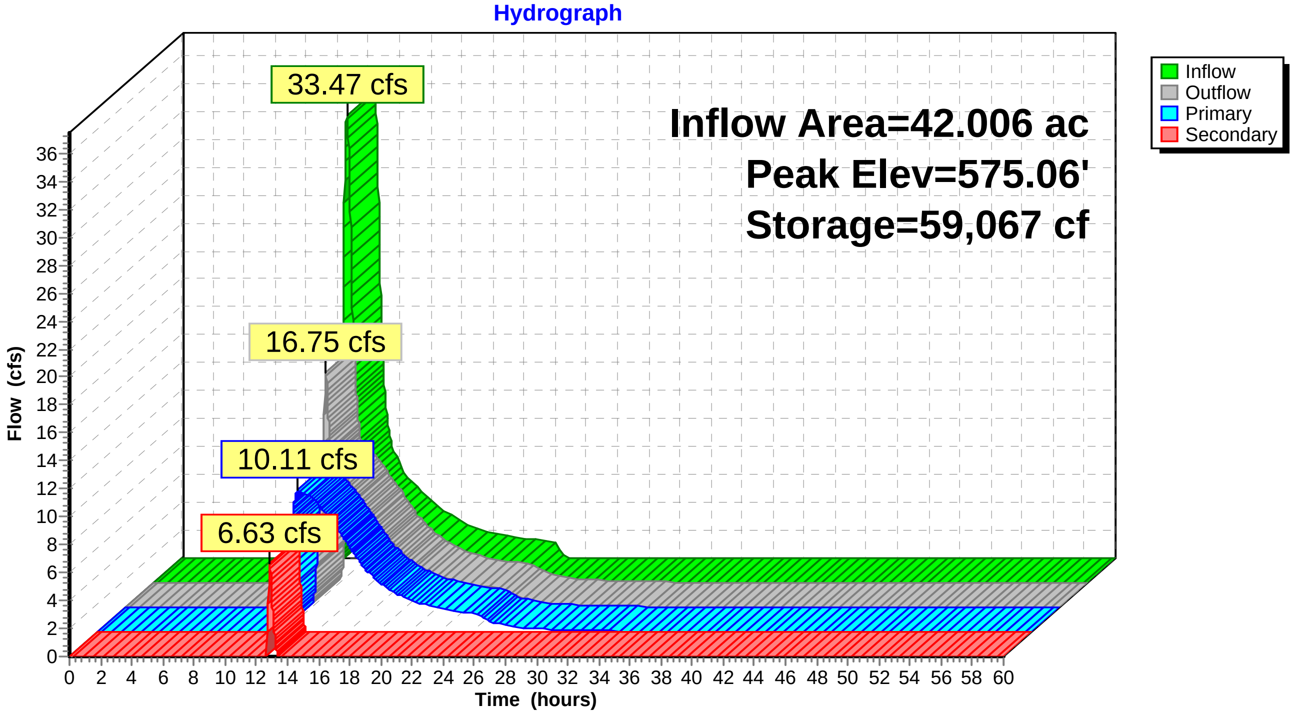
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=10.11 cfs @ 12.86 hrs HW=575.06' TW=566.84' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.11 cfs @ 5.72 fps)

**Secondary OutFlow** Max=6.63 cfs @ 12.86 hrs HW=575.06' TW=566.84' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 6.63 cfs @ 0.59 fps)

## Pond 105A: Wetland H



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 2.29" for 10-Year event
Inflow = 19.71 cfs @ 12.44 hrs, Volume= 2.932 af
Outflow = 19.71 cfs @ 12.44 hrs, Volume= 2.932 af, Atten= 0%, Lag= 0.0 min
Primary = 19.71 cfs @ 12.44 hrs, Volume= 2.932 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 718.47' @ 12.44 hrs Surf.Area= 36 sf Storage= 21 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 882.2 - 882.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

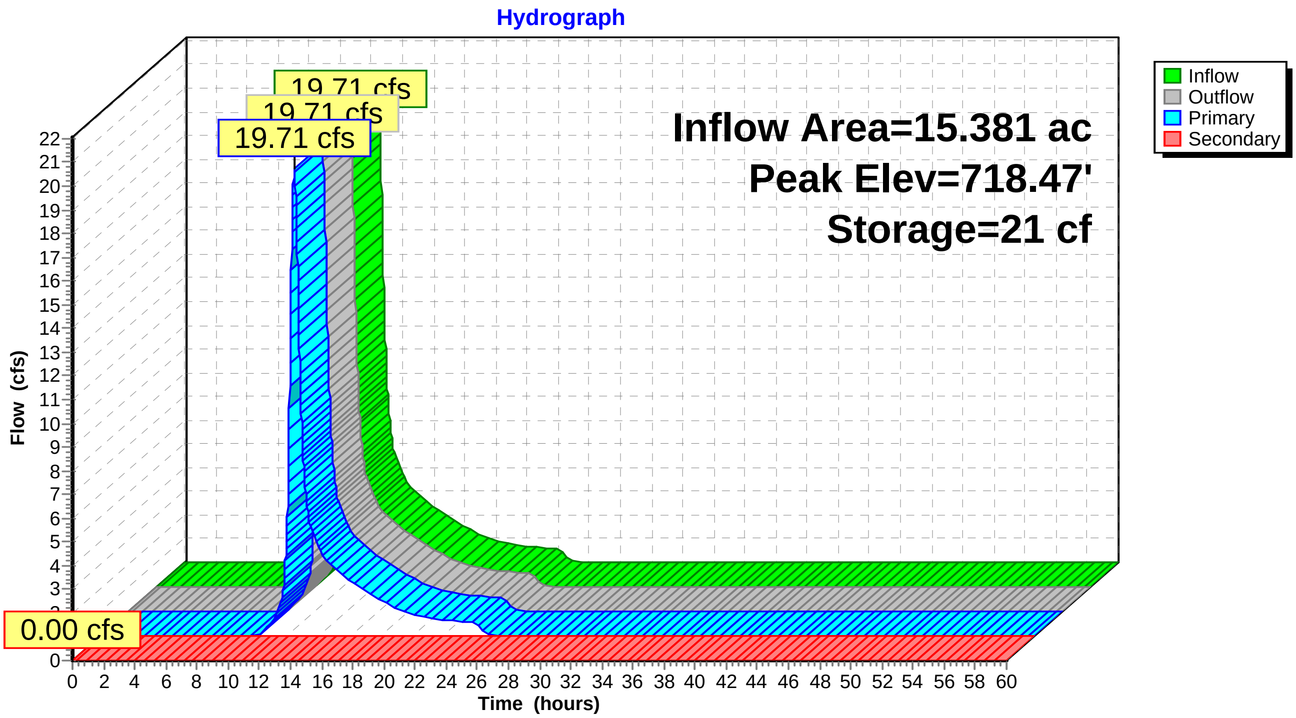
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=19.69 cfs @ 12.44 hrs HW=718.47' TW=635.73' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 19.69 cfs @ 4.53 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=635.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 118.113 ac, 1.34% Impervious, Inflow Depth = 2.08" for 10-Year event
Inflow = 88.95 cfs @ 13.23 hrs, Volume= 20.448 af
Outflow = 88.92 cfs @ 13.24 hrs, Volume= 20.448 af, Atten= 0%, Lag= 0.5 min
Primary = 88.92 cfs @ 13.24 hrs, Volume= 20.448 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.75' @ 13.24 hrs Surf.Area= 12,139 sf Storage= 19,703 cf

Plug-Flow detention time= 10.0 min calculated for 20.448 af (100% of inflow)
Center-of-Mass det. time= 9.8 min ( 932.6 - 922.9 )

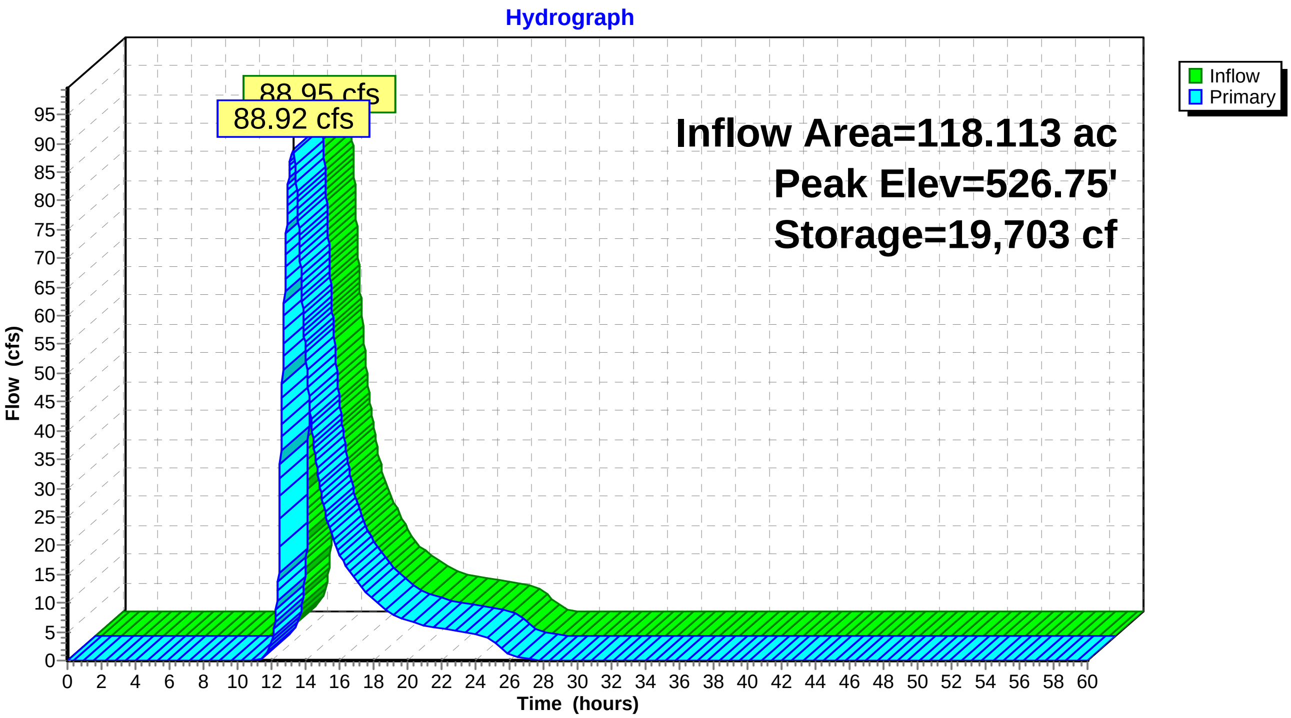
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=88.90 cfs @ 13.24 hrs HW=526.75' TW=515.99' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 88.90 cfs @ 2.65 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

Inflow Area = 95.412 ac, 4.86% Impervious, Inflow Depth = 1.88" for 10-Year event
Inflow = 75.23 cfs @ 12.88 hrs, Volume= 14.946 af
Outflow = 75.22 cfs @ 12.88 hrs, Volume= 14.946 af, Atten= 0%, Lag= 0.2 min
Primary = 41.41 cfs @ 12.88 hrs, Volume= 13.018 af
Secondary = 33.81 cfs @ 12.88 hrs, Volume= 1.928 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 625.60' @ 12.88 hrs Surf.Area= 1,276 sf Storage= 2,550 cf

Plug-Flow detention time= 0.3 min calculated for 14.941 af (100% of inflow)
Center-of-Mass det. time= 0.3 min ( 924.0 - 923.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

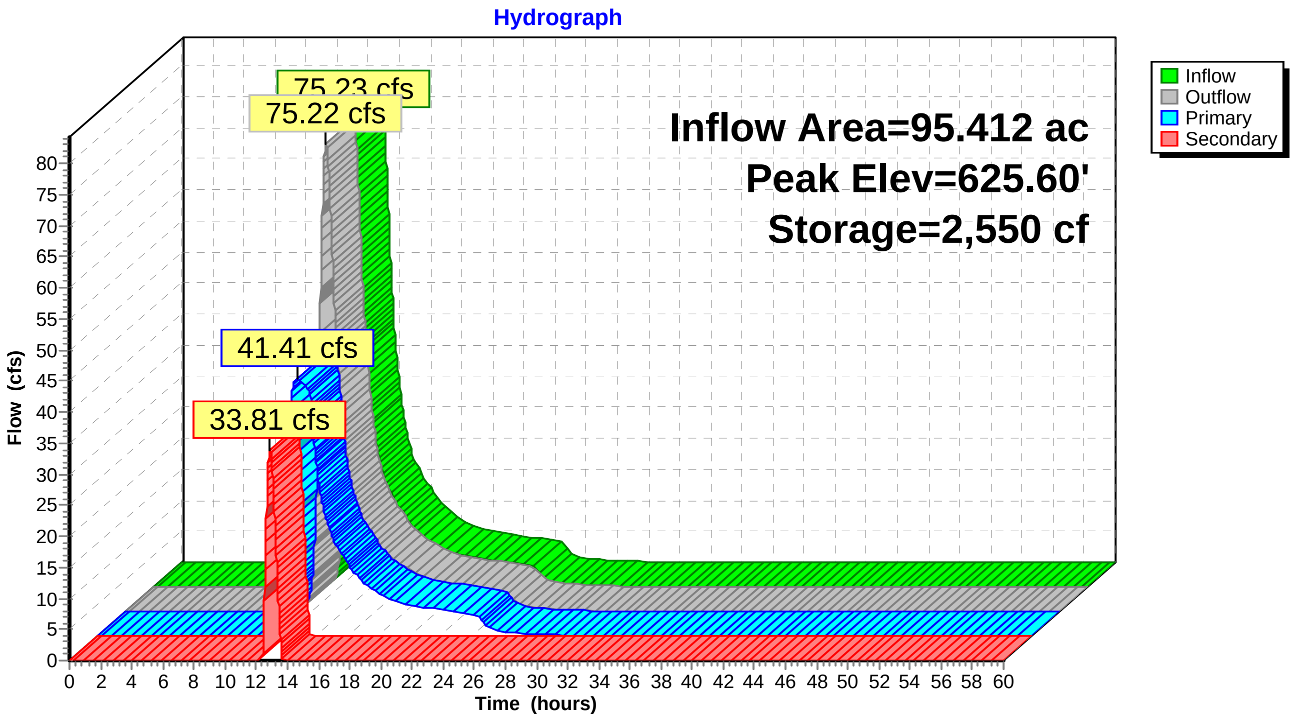
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=41.41 cfs @ 12.88 hrs HW=625.60' TW=588.15' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 41.41 cfs @ 13.18 fps)

**Secondary OutFlow** Max=33.80 cfs @ 12.88 hrs HW=625.60' TW=611.35' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 33.80 cfs @ 2.46 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 2.17" for 10-Year event
Inflow = 18.51 cfs @ 12.54 hrs, Volume= 2.593 af
Outflow = 9.81 cfs @ 13.01 hrs, Volume= 2.317 af, Atten= 47%, Lag= 27.9 min
Primary = 9.81 cfs @ 13.01 hrs, Volume= 2.317 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.80' @ 13.01 hrs Surf.Area= 123,306 sf Storage= 36,760 cf

Plug-Flow detention time= 136.3 min calculated for 2.317 af (89% of inflow)
Center-of-Mass det. time= 85.2 min ( 960.5 - 875.2 )

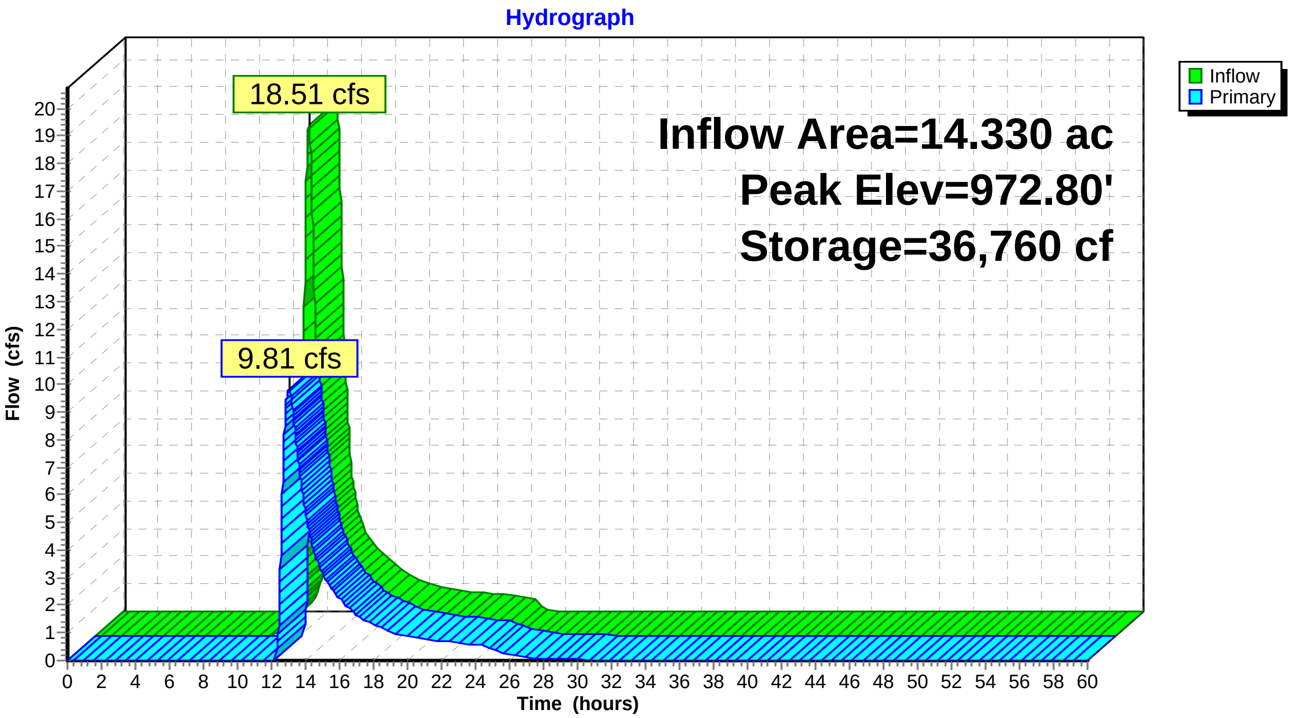
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=9.81 cfs @ 13.01 hrs HW=972.80' TW=972.25' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 9.81 cfs @ 1.21 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 5.527 ac, 2.32% Impervious, Inflow Depth = 4.80" for 10-Year event
Inflow = 34.81 cfs @ 12.88 hrs, Volume= 2.212 af
Outflow = 34.86 cfs @ 12.88 hrs, Volume= 2.212 af, Atten= 0%, Lag= 0.0 min
Primary = 34.86 cfs @ 12.88 hrs, Volume= 2.212 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 611.35' @ 12.88 hrs Surf.Area= 13 sf Storage= 33 cf

Plug-Flow detention time= 0.0 min calculated for 2.211 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 801.2 - 801.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

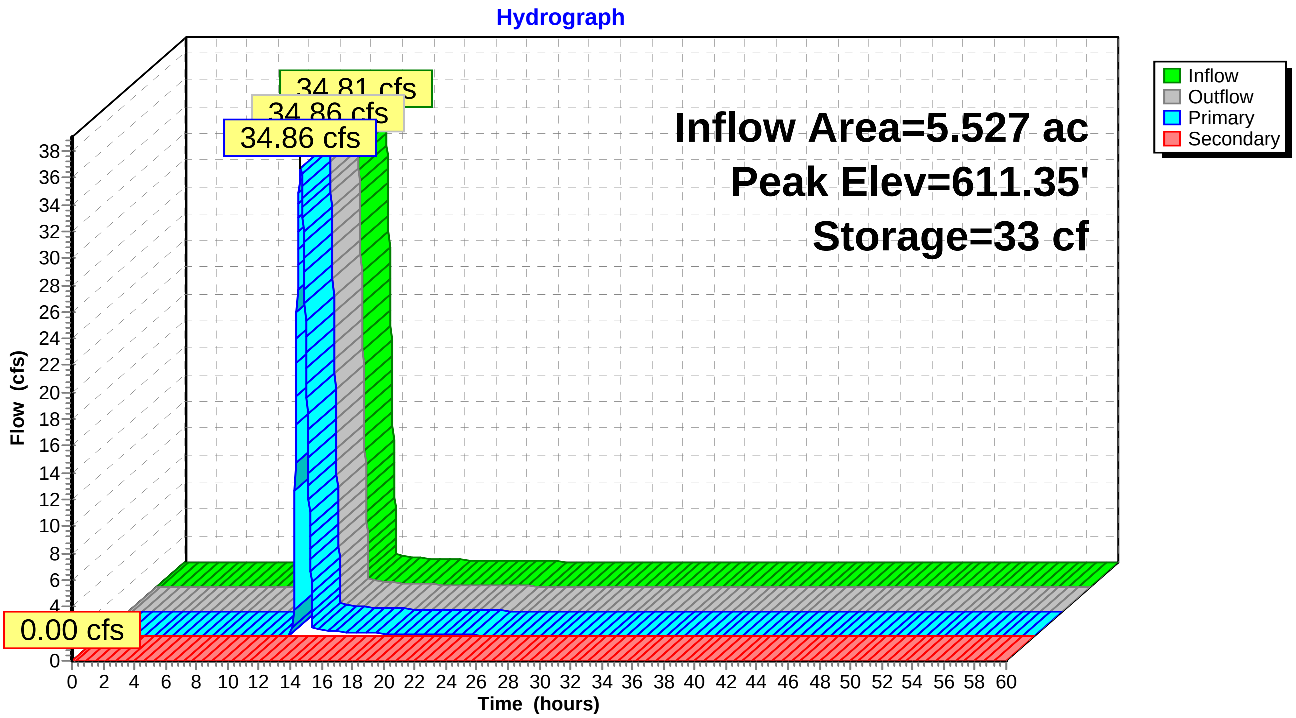
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=34.85 cfs @ 12.88 hrs HW=611.35' TW=588.15' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 34.85 cfs @ 5.44 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=608.80' TW=587.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 108A: 36" Culvert



## Summary for Pond SWM 7A: SWM 7A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 2.17" for 10-Year event
Inflow = 2.44 cfs @ 12.11 hrs, Volume= 0.181 af
Outflow = 1.18 cfs @ 12.33 hrs, Volume= 0.181 af, Atten= 52%, Lag= 13.2 min
Primary = 1.18 cfs @ 12.33 hrs, Volume= 0.181 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 807.83' @ 12.33 hrs Surf.Area= 2,452 sf Storage= 1,698 cf

Plug-Flow detention time= 40.0 min calculated for 0.181 af (100% of inflow)
Center-of-Mass det. time= 39.5 min ( 886.6 - 847.0 )

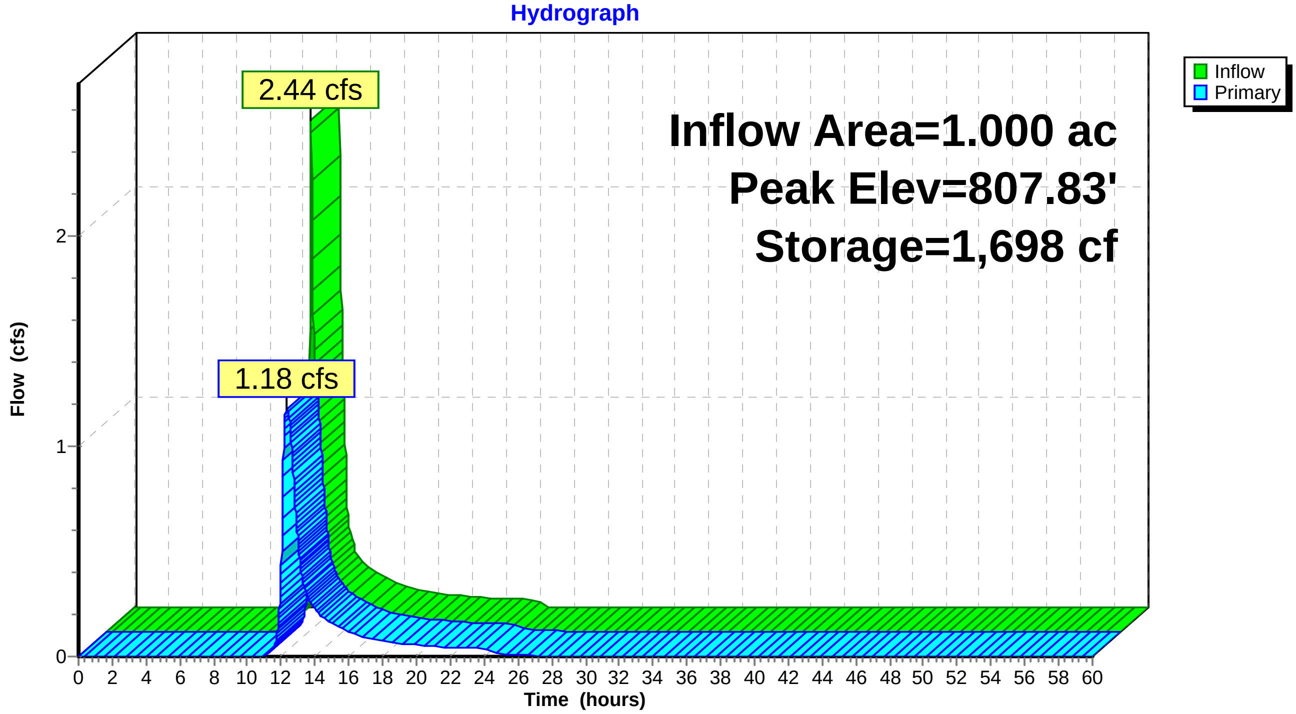
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 807.00' | 5,238 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 807.00 | 1,656 | 0 | 0 |
| 809.00 | 3,582 | 5,238 | 5,238 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 802.00' | **15.0" Round Culvert**<br>L= 41.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 802.00' / 801.00' S= 0.0244 '/' Cc= 0.900<br>n= 0.015, Flow Area= 1.23 sf |
| #2 | Device 1 | 807.00' | **8.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 808.25' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31<br>3.30 3.31 3.32 |

**Primary OutFlow** Max=1.18 cfs @ 12.33 hrs HW=807.83' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.18 cfs of 14.79 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.18 cfs @ 3.38 fps)
  └─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM 7A: SWM 7A (Phase 1)



## Summary for Pond SWM1: SWM 1

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 1.01" for 10-Year event
Inflow = 19.53 cfs @ 12.86 hrs, Volume= 4.261 af
Outflow = 17.00 cfs @ 13.10 hrs, Volume= 4.261 af, Atten= 13%, Lag= 14.6 min
Primary = 17.00 cfs @ 13.10 hrs, Volume= 4.261 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 513.18' @ 13.10 hrs Surf.Area= 15,911 sf Storage= 15,698 cf

Plug-Flow detention time= 21.3 min calculated for 4.259 af (100% of inflow)
Center-of-Mass det. time= 21.3 min ( 977.3 - 955.9 )

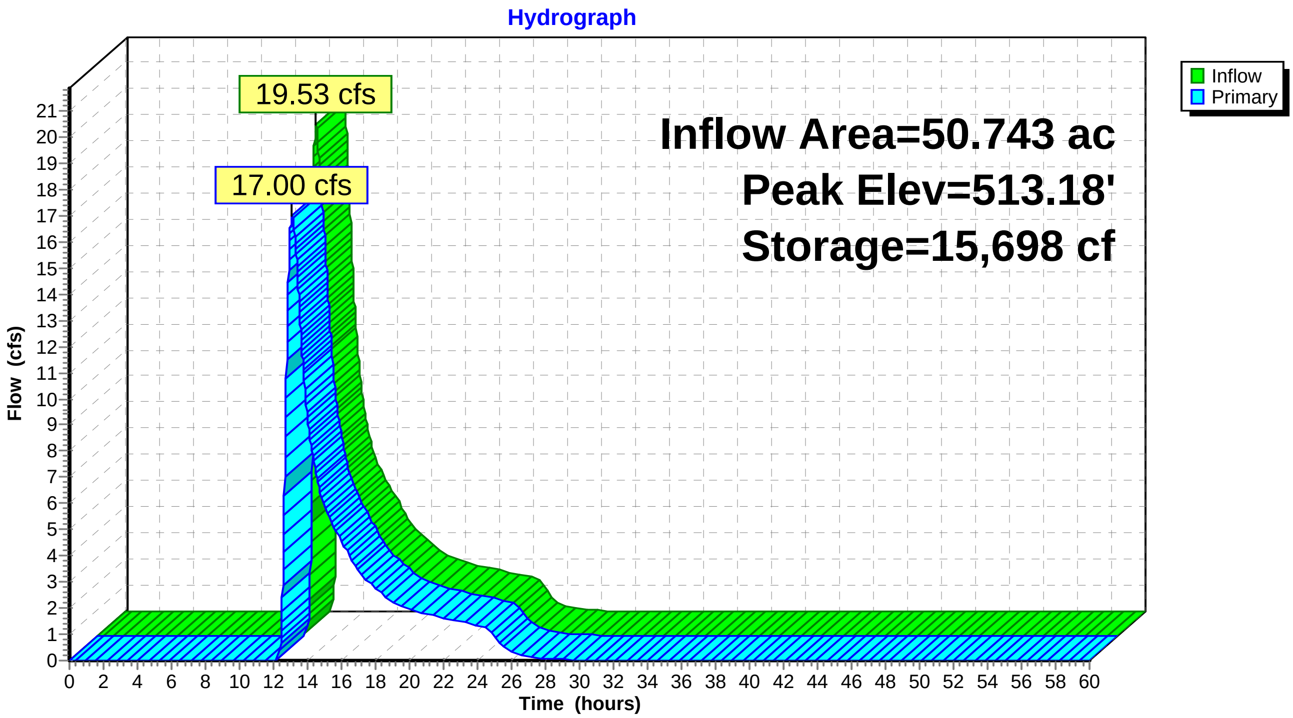
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 512.00' | 77,663 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 512.00 | 10,713 | 0 | 0 |
| 513.00 | 14,994 | 12,854 | 12,854 |
| 514.00 | 19,973 | 17,484 | 30,337 |
| 515.00 | 23,663 | 21,818 | 52,155 |
| 516.00 | 27,353 | 25,508 | 77,663 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 512.00' | **5.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=17.00 cfs @ 13.10 hrs HW=513.18' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 17.00 cfs @ 2.87 fps)

## Pond SWM1: SWM 1



## Summary for Pond SWM17: SWM17

Inflow Area = 15.350 ac, 18.63% Impervious, Inflow Depth = 0.45" for 10-Year event
Inflow = 1.87 cfs @ 12.73 hrs, Volume= 0.575 af
Outflow = 1.79 cfs @ 12.83 hrs, Volume= 0.575 af, Atten= 4%, Lag= 6.0 min
Primary = 1.79 cfs @ 12.83 hrs, Volume= 0.575 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 498.88' @ 12.83 hrs Surf.Area= 0.017 ac Storage= 0.011 af

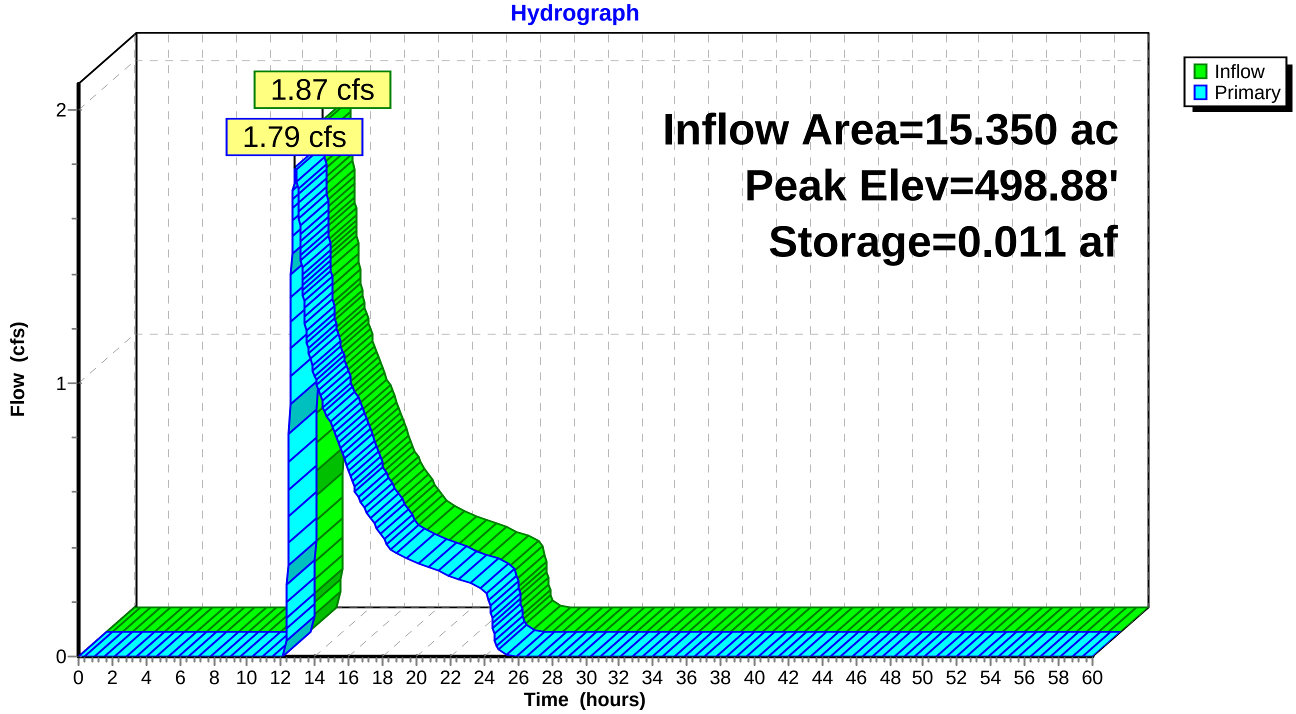
Plug-Flow detention time= 4.4 min calculated for 0.575 af (100% of inflow)
Center-of-Mass det. time= 4.4 min ( 989.6 - 985.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 0.090 af | **60.0" Round Pipe Storage** x 2<br>L= 100.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **24.0" Round Culvert**<br>L= 60.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 497.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 498.00' | **10.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 500.50' | **3.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31<br>3.30 3.31 3.32 |

**Primary OutFlow** Max=1.79 cfs @ 12.83 hrs HW=498.88' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.79 cfs of 3.36 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.79 cfs @ 3.28 fps)
  └─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM17: SWM17



## Summary for Pond SWM2: SWM2

Inflow Area = 120.037 ac, 12.91% Impervious, Inflow Depth = 2.32" for 10-Year event
Inflow = 156.14 cfs @ 12.42 hrs, Volume= 23.168 af
Outflow = 88.27 cfs @ 12.87 hrs, Volume= 23.021 af, Atten= 43%, Lag= 27.1 min
Primary = 88.27 cfs @ 12.87 hrs, Volume= 23.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 503.33' @ 12.87 hrs Surf.Area= 68,656 sf Storage= 303,219 cf

Plug-Flow detention time= 167.0 min calculated for 23.021 af (99% of inflow)
Center-of-Mass det. time= 162.5 min ( 1,032.9 - 870.5 )

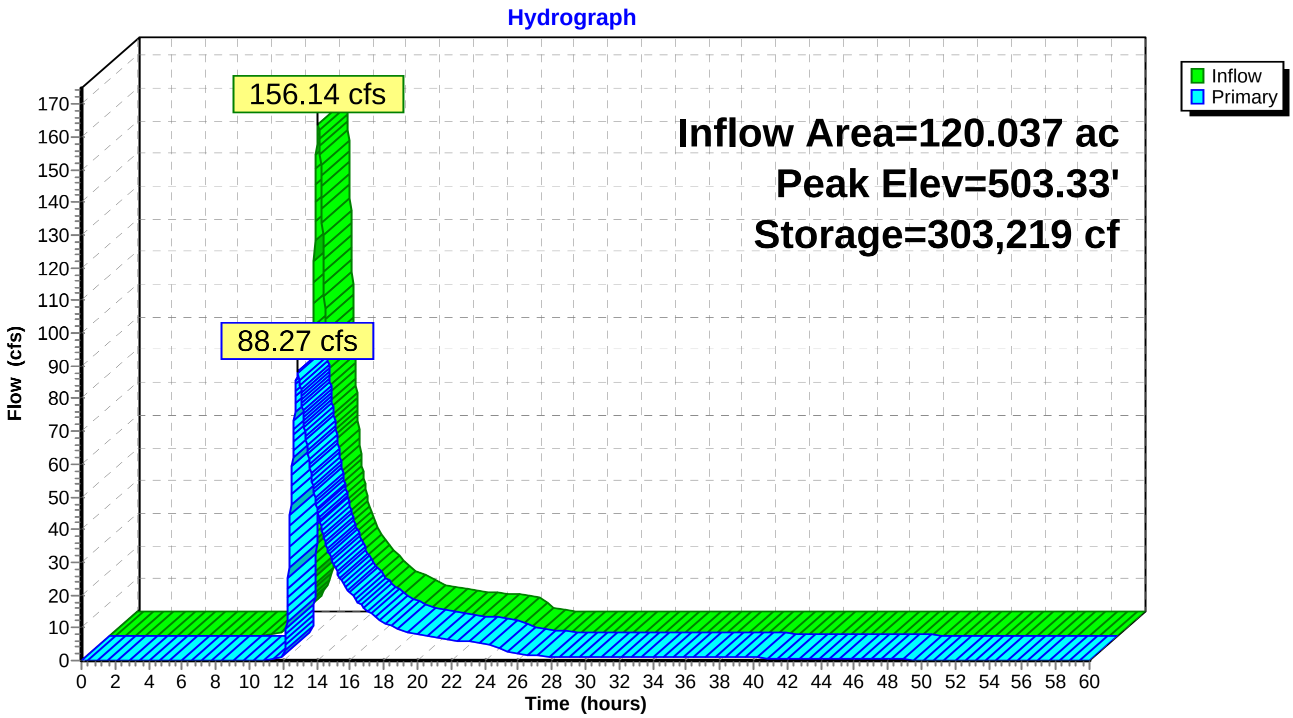
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 598,445 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 498.00 | 33,946 | 0 | 0 |
| 499.00 | 52,156 | 43,051 | 43,051 |
| 500.00 | 55,687 | 53,922 | 96,973 |
| 501.00 | 59,350 | 57,519 | 154,491 |
| 502.00 | 63,077 | 61,214 | 215,705 |
| 503.00 | 66,905 | 64,991 | 280,696 |
| 504.00 | 72,175 | 69,540 | 350,236 |
| 505.00 | 79,111 | 75,643 | 425,879 |
| 506.00 | 88,674 | 83,893 | 509,771 |
| 507.00 | 88,674 | 88,674 | 598,445 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **8.0" Round Culvert**<br>L= 100.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 496.00' S= 0.0200 '/' Cc= 0.900<br>n= 0.024, Flow Area= 0.35 sf |
| #2 | Primary | 499.50' | **4.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #3 | Primary | 503.00' | **15.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=88.24 cfs @ 12.87 hrs HW=503.33' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 1.61 cfs @ 4.60 fps)
**2=Broad-Crested Rectangular Weir** (Weir Controls 78.91 cfs @ 5.15 fps)
**3=Broad-Crested Rectangular Weir** (Weir Controls 7.73 cfs @ 1.55 fps)

## Pond SWM2: SWM2



## Summary for Pond SWM3try: SWM3

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 1.87" for 10-Year event
Inflow = 139.63 cfs @ 12.78 hrs, Volume= 38.800 af
Outflow = 42.65 cfs @ 15.22 hrs, Volume= 37.491 af, Atten= 69%, Lag= 146.4 min
Primary = 42.65 cfs @ 15.22 hrs, Volume= 37.491 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 509.07' @ 15.22 hrs Surf.Area= 393,238 sf Storage= 773,695 cf

Plug-Flow detention time= 428.7 min calculated for 37.491 af (97% of inflow)
Center-of-Mass det. time= 374.9 min ( 1,356.3 - 981.3 )

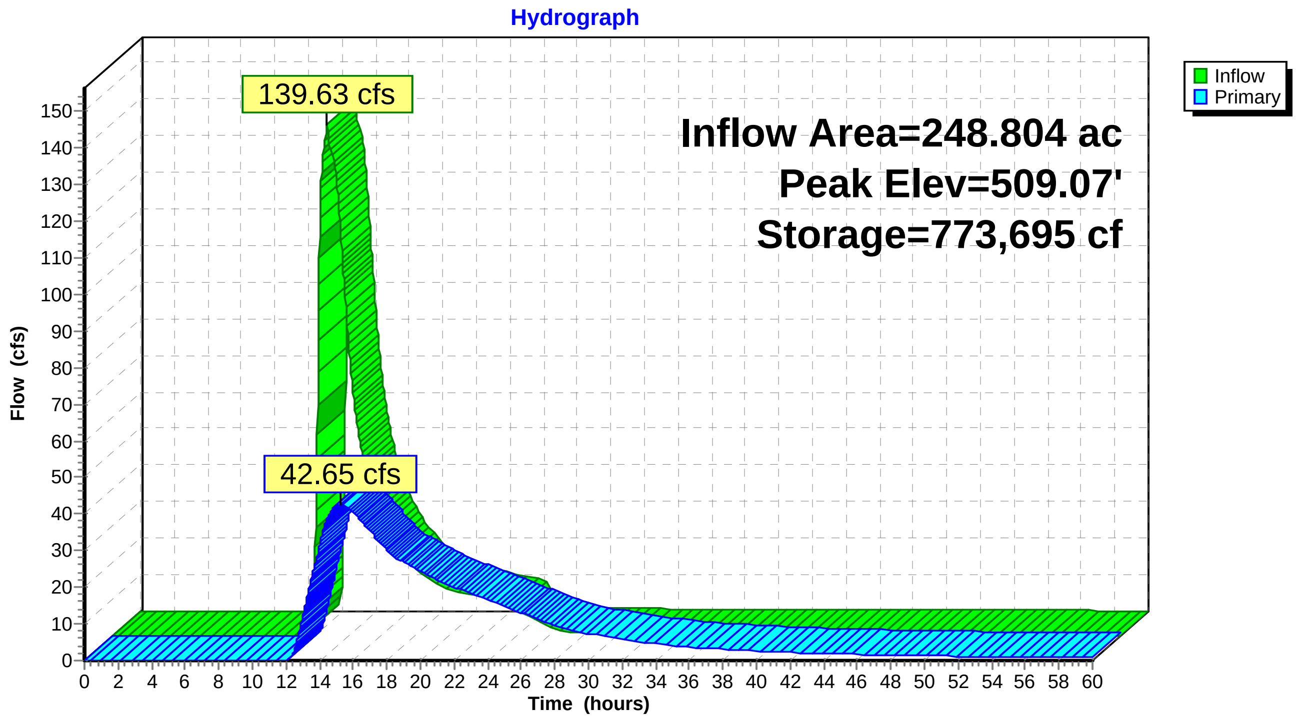
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.00' | 2,034,374 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 507.00 | 359,082 | 0 | 0 |
| 508.00 | 370,212 | 364,647 | 364,647 |
| 510.00 | 413,188 | 783,400 | 1,148,047 |
| 512.00 | 473,139 | 886,327 | 2,034,374 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.00' | **4.5' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #2 | Primary | 508.75' | **15.0' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=42.65 cfs @ 15.22 hrs HW=509.07' TW=503.45' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 35.29 cfs @ 3.79 fps)
**2=Broad-Crested Rectangular Weir** (Weir Controls 7.36 cfs @ 1.53 fps)

## Pond SWM3try: SWM3



## Summary for Pond SWM4: SWM4

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 195.996 ac, 11.01% Impervious, Inflow Depth > 1.50" | for 10-Year event | | |
| Inflow = | 92.56 cfs @ | 13.23 hrs, Volume= | 24.572 af | |
| Outflow = | 91.56 cfs @ | 13.30 hrs, Volume= | 24.558 af, | Atten= 1%, Lag= 4.0 min |
| Primary = | 91.56 cfs @ | 13.30 hrs, Volume= | 24.558 af | |
| Secondary = | 0.00 cfs @ | 0.00 hrs, Volume= | 0.000 af | |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 515.99' @ 13.30 hrs Surf.Area= 43,974 sf Storage= 42,097 cf

Plug-Flow detention time= 13.2 min calculated for 24.550 af (100% of inflow)
Center-of-Mass det. time= 11.8 min ( 1,038.0 - 1,026.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 515.00' | 387,328 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

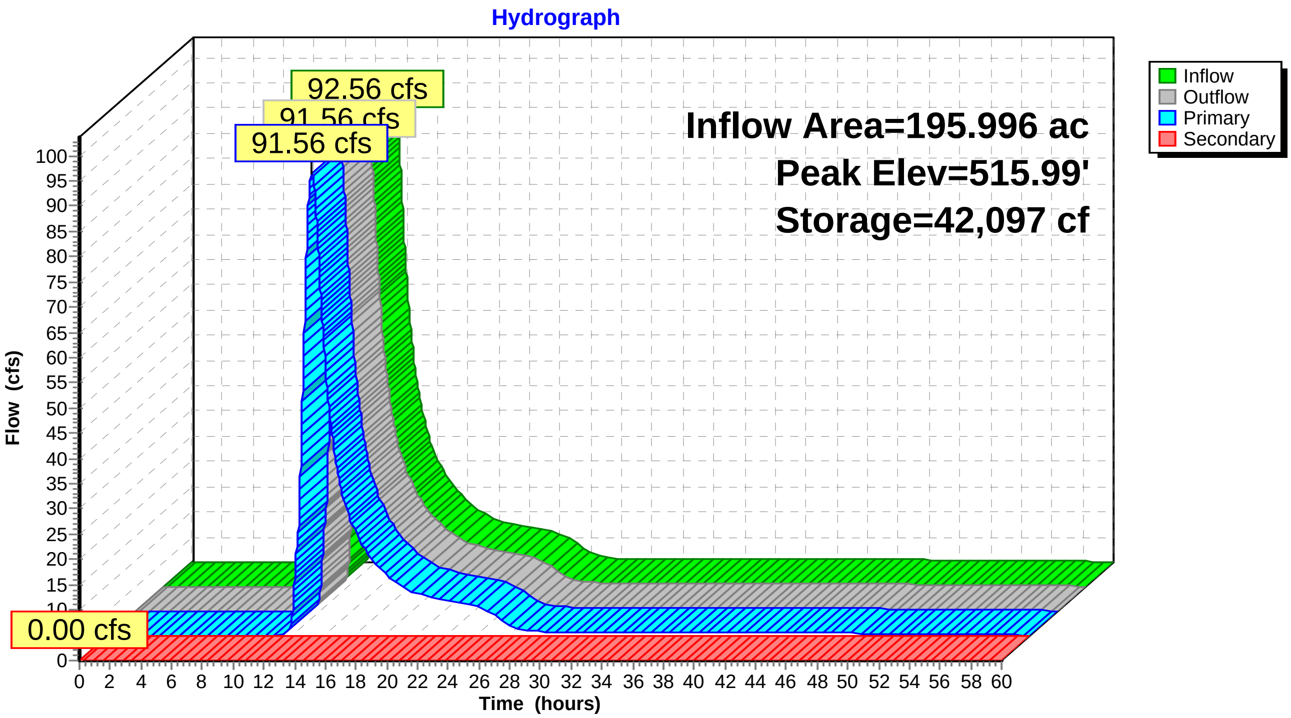
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 515.00 | 40,770 | 0 | 0 |
| 516.00 | 43,995 | 42,383 | 42,383 |
| 518.00 | 52,841 | 96,836 | 139,219 |
| 520.00 | 62,089 | 114,930 | 254,149 |
| 522.00 | 71,090 | 133,179 | 387,328 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 510.00' | **36.0" Round Culvert X 3.00**<br>L= 250.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 510.00' / 505.50' S= 0.0180 '/' Cc= 0.900<br>n= 0.020, Flow Area= 7.07 sf |
| #2 | Device 1 | 515.00' | **36.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 521.50' | **25.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=91.56 cfs @ 13.30 hrs HW=515.99' TW=508.34' (Dynamic Tailwater)
└─**1=Culvert** (Passes 91.56 cfs of 198.72 cfs potential flow)
  └─**2=Orifice/Grate** (Weir Controls 91.56 cfs @ 3.26 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=515.00' TW=507.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM4: SWM4



## Summary for Pond SWM5: SWM5

```
Inflow Area =      58.557 ac, 24.60% Impervious, Inflow Depth =  2.44"   for 10-Year event
Inflow      =     89.29 cfs @  12.38 hrs, Volume=        11.896 af
Outflow     =     74.48 cfs @  12.59 hrs, Volume=        11.748 af, Atten= 17%, Lag= 12.2 min
Primary     =      0.91 cfs @  12.59 hrs, Volume=         2.455 af
Secondary   =     73.57 cfs @  12.59 hrs, Volume=         9.293 af
Tertiary    =      0.00 cfs @   0.00 hrs, Volume=         0.000 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 520.28' @ 12.59 hrs Surf.Area= 43,953 sf Storage= 118,927 cf

Plug-Flow detention time= 239.7 min calculated for 11.744 af (99% of inflow)
Center-of-Mass det. time= 232.9 min ( 1,087.7 - 854.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 517.00' | 251,698 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 517.00 | 22,920 | 0 | 0 |
| 518.00 | 35,091 | 29,006 | 29,006 |
| 520.00 | 42,827 | 77,918 | 106,924 |
| 522.00 | 50,965 | 93,792 | 200,716 |
| 523.00 | 51,000 | 50,983 | 251,698 |

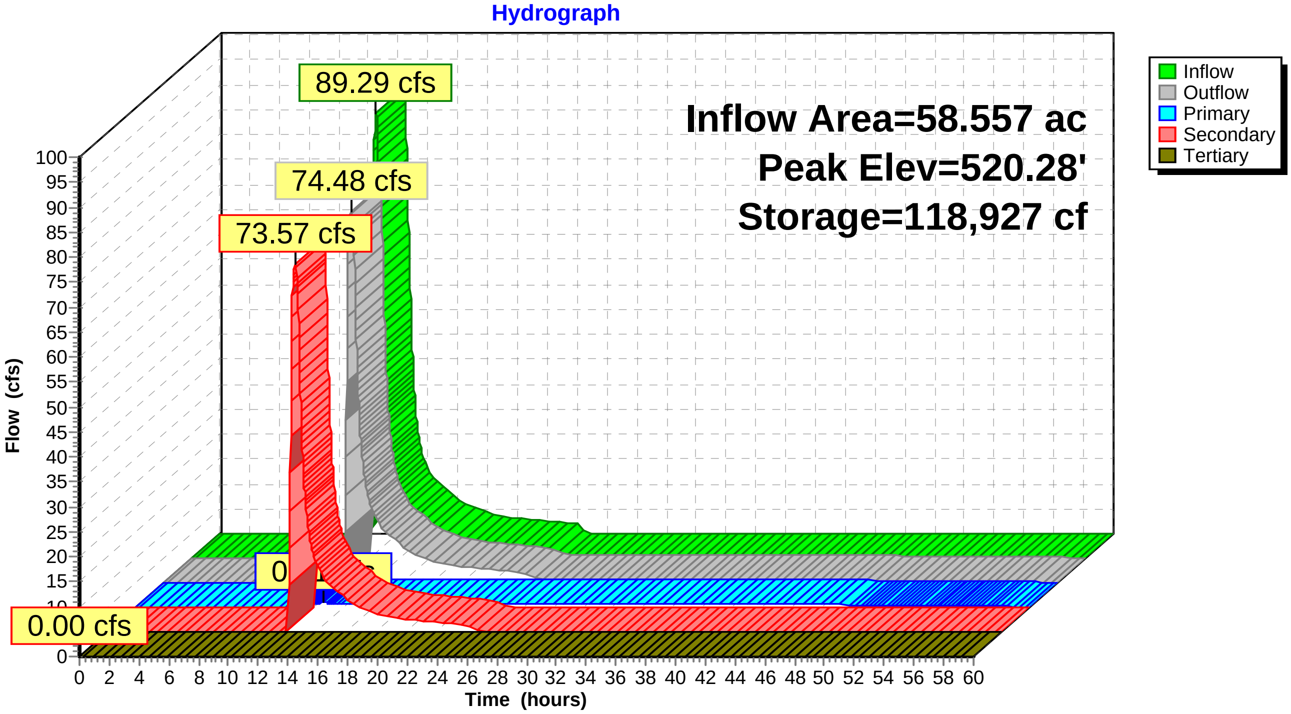
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 517.00' | **6.0" Round Culvert**<br>L= 90.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 517.00' / 516.00' S= 0.0111 '/' Cc= 0.900<br>n= 0.015, Flow Area= 0.20 sf |
| #2 | Secondary | 512.00' | **30.0" Round Culvert X 3.00**<br>L= 270.0' RCP, groove end w/headwall, Ke= 0.200<br>Inlet / Outlet Invert= 512.00' / 505.00' S= 0.0259 '/' Cc= 0.900<br>n= 0.020, Flow Area= 4.91 sf |
| #3 | Device 2 | 519.20' | **30.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Tertiary | 521.00' | **20.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.91 cfs @ 12.59 hrs HW=520.28' TW=515.54' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.91 cfs @ 4.62 fps)

**Secondary OutFlow** Max=73.56 cfs @ 12.59 hrs HW=520.28' TW=507.49' (Dynamic Tailwater)
└─**2=Culvert** (Passes 73.56 cfs of 158.36 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 73.56 cfs @ 5.00 fps)

**Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=517.00' TW=515.00' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM5: SWM5



## Summary for Pond SWM6: SWM6

[62] Hint: Exceeded Reach A105R OUTLET depth by 1.89' @ 20.46 hrs

Inflow Area = 99.305 ac, 18.16% Impervious, Inflow Depth > 1.07" for 10-Year event
Inflow = 29.18 cfs @ 12.54 hrs, Volume= 8.830 af
Outflow = 5.11 cfs @ 18.70 hrs, Volume= 8.141 af, Atten= 82%, Lag= 369.9 min
Primary = 5.11 cfs @ 18.70 hrs, Volume= 8.141 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 502.26' @ 18.70 hrs Surf.Area= 125,798 sf Storage= 231,024 cf

Plug-Flow detention time= 841.8 min calculated for 8.141 af (92% of inflow)
Center-of-Mass det. time= 794.3 min ( 1,769.3 - 975.0 )

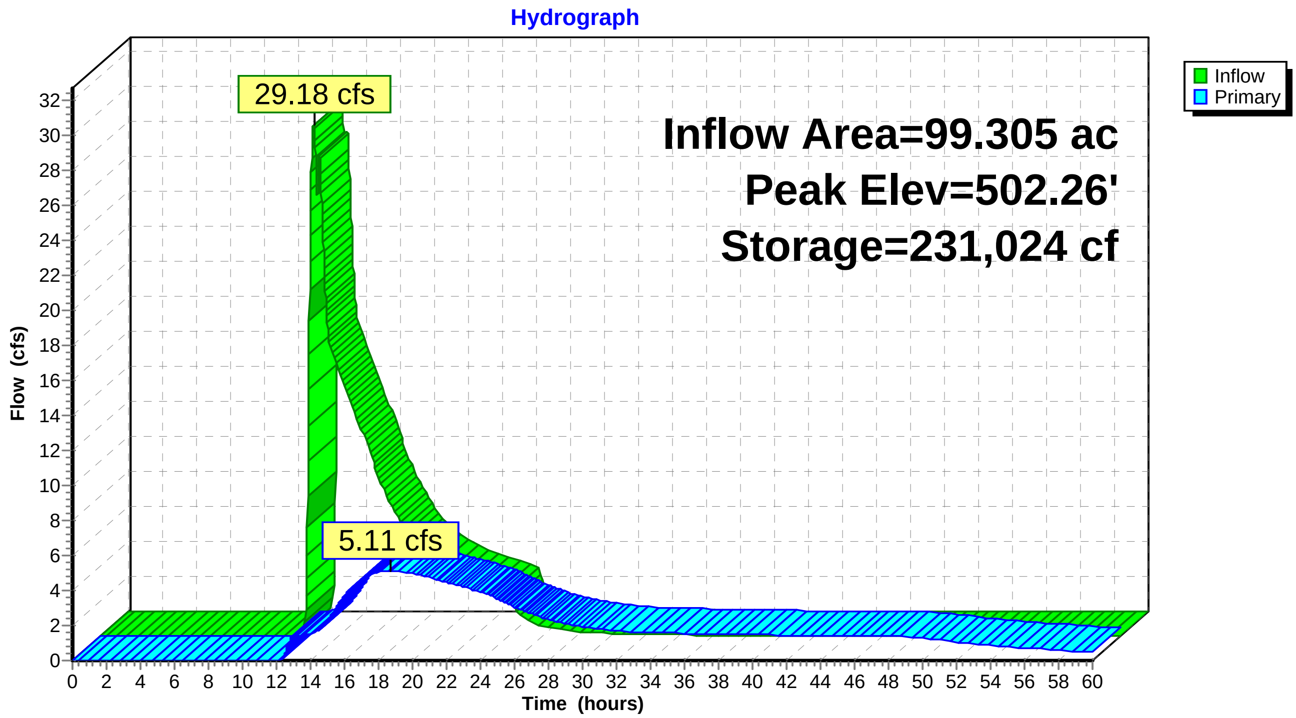
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 883,875 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 500.00 | 76,477 | 0 | 0 |
| 501.00 | 99,879 | 88,178 | 88,178 |
| 502.00 | 122,401 | 111,140 | 199,318 |
| 504.00 | 148,997 | 271,398 | 470,716 |
| 506.00 | 176,108 | 325,105 | 795,821 |
| 506.50 | 176,108 | 88,054 | 883,875 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.00' | **8.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 500.00' / 498.50' S= 0.0111 '/' Cc= 0.900<br>n= 0.012, Flow Area= 0.35 sf |
| #2 | Primary | 501.50' | **18.0" Round Culvert**<br>L= 105.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 501.50' / 500.00' S= 0.0143 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=5.11 cfs @ 18.70 hrs HW=502.26' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 1.81 cfs @ 5.18 fps)
**2=Culvert** (Inlet Controls 3.30 cfs @ 3.70 fps)

## Pond SWM6: SWM6



## Summary for Pond SWM7: SWM7

Inflow Area = 4.590 ac, 29.85% Impervious, Inflow Depth = 2.56" for 10-Year event
Inflow = 10.41 cfs @ 12.22 hrs, Volume= 0.980 af
Outflow = 4.47 cfs @ 12.58 hrs, Volume= 0.980 af, Atten= 57%, Lag= 21.8 min
Primary = 4.47 cfs @ 12.58 hrs, Volume= 0.980 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 745.03' @ 12.58 hrs Surf.Area= 4,908 sf Storage= 14,031 cf

Plug-Flow detention time= 75.2 min calculated for 0.980 af (100% of inflow)
Center-of-Mass det. time= 75.0 min ( 916.6 - 841.6 )

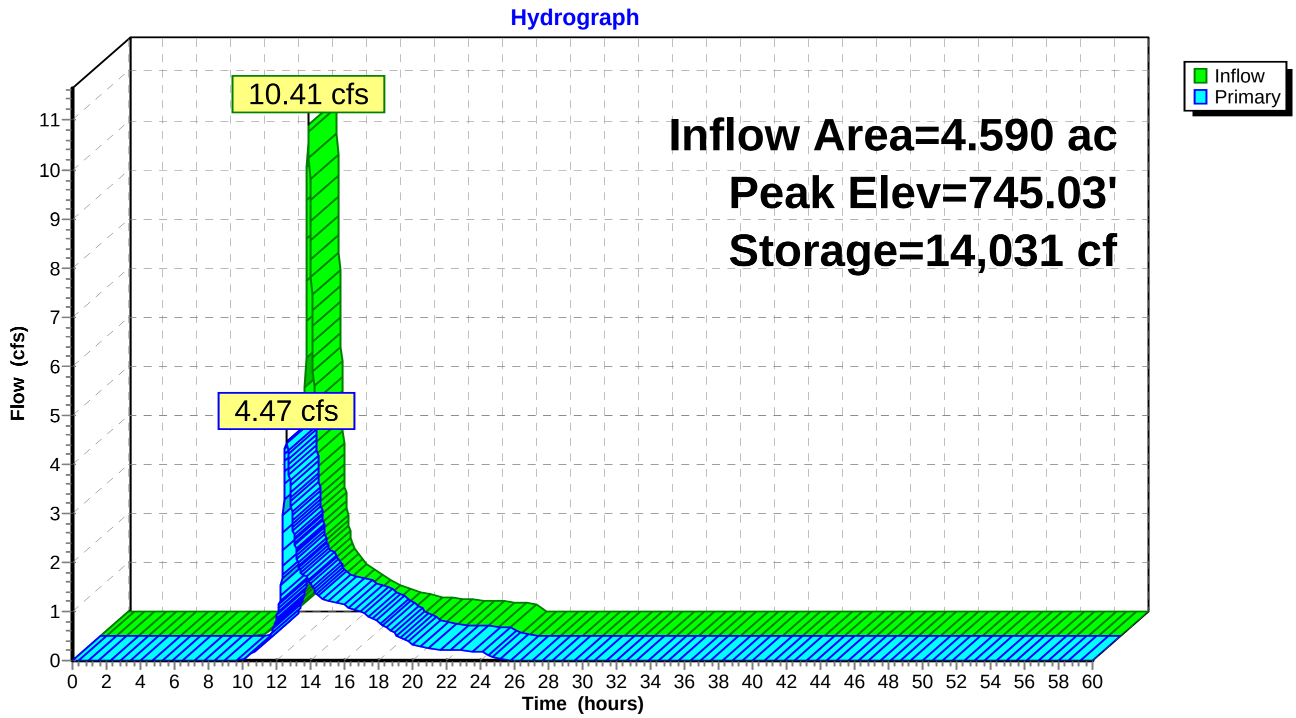
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 740.00' | 33,203 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 740.00 | 1,005 | 0 | 0 |
| 741.00 | 1,611 | 1,308 | 1,308 |
| 742.00 | 2,307 | 1,959 | 3,267 |
| 743.00 | 3,095 | 2,701 | 5,968 |
| 744.00 | 3,949 | 3,522 | 9,490 |
| 745.00 | 4,882 | 4,416 | 13,906 |
| 746.00 | 5,886 | 5,384 | 19,290 |
| 747.00 | 6,942 | 6,414 | 25,704 |
| 748.00 | 8,056 | 7,499 | 33,203 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 740.00' | **30.0" Round Culvert**<br>L= 60.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 740.00' / 739.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |
| #2 | Device 1 | 740.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 743.80' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 744.40' | **10.0" Vert. Orifice/Grate X 2.00** C= 0.600 |
| #5 | Device 1 | 747.10' | **20.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=4.47 cfs @ 12.58 hrs HW=745.03' TW=718.36' (Dynamic Tailwater)
└─**1=Culvert** (Passes 4.47 cfs of 57.18 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.44 cfs @ 10.57 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.66 cfs @ 4.86 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 2.36 cfs @ 2.69 fps)
  └─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM7: SWM7



## Summary for Pond SWM8: SWM8

Inflow Area = 15.712 ac, 18.18% Impervious, Inflow Depth = 1.81" for 10-Year event
Inflow = 17.47 cfs @ 12.50 hrs, Volume= 2.364 af
Outflow = 8.24 cfs @ 12.99 hrs, Volume= 2.362 af, Atten= 53%, Lag= 29.6 min
Primary = 8.24 cfs @ 12.99 hrs, Volume= 2.362 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 654.01' @ 12.99 hrs Surf.Area= 9,740 sf Storage= 30,378 cf

Plug-Flow detention time= 130.6 min calculated for 2.362 af (100% of inflow)
Center-of-Mass det. time= 130.0 min ( 1,014.3 - 884.3 )

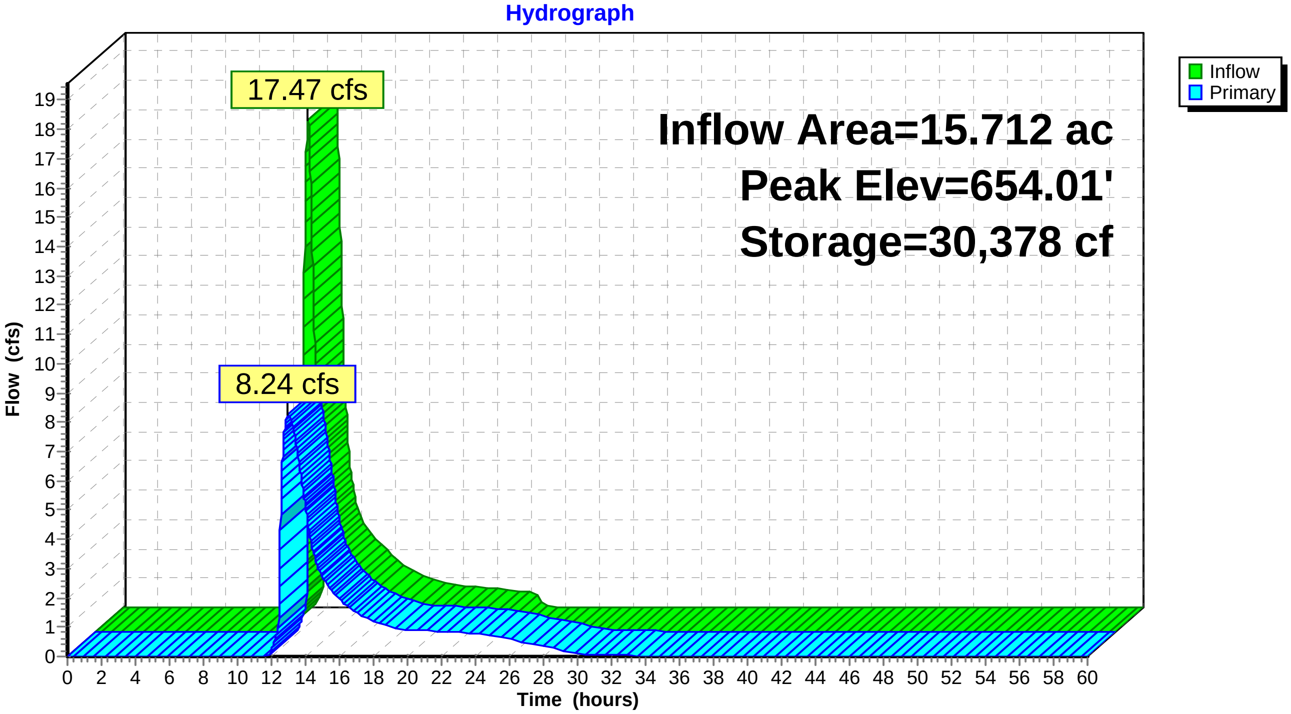
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 79,275 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 650.00 | 5,538 | 0 | 0 |
| 652.00 | 7,499 | 13,037 | 13,037 |
| 654.00 | 9,725 | 17,224 | 30,261 |
| 656.00 | 12,197 | 21,922 | 52,183 |
| 658.00 | 14,895 | 27,092 | 79,275 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **36.0" Round Culvert**<br>L= 90.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 648.00' S= 0.0222 '/' Cc= 0.900<br>n= 0.010, Flow Area= 7.07 sf |
| #2 | Device 1 | 650.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 652.00' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 654.40' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #5 | Device 1 | 656.50' | **1.5' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |
| #6 | Device 1 | 657.50' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=8.24 cfs @ 12.99 hrs HW=654.01' TW=625.58' (Dynamic Tailwater)
└─**1=Culvert** (Passes 8.24 cfs of 67.43 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.28 cfs @ 9.39 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 6.96 cfs @ 5.67 fps)
  ├─**4=Orifice/Grate** ( Controls 0.00 cfs)
  ├─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └─**6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM8: SWM8



## Summary for Pond WF: Water Feature

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 1.01" for 10-Year event
Inflow = 23.82 cfs @ 12.63 hrs, Volume= 4.261 af
Outflow = 19.53 cfs @ 12.86 hrs, Volume= 4.261 af, Atten= 18%, Lag= 13.7 min
Primary = 19.53 cfs @ 12.86 hrs, Volume= 4.261 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.74' @ 12.86 hrs Surf.Area= 28,556 sf Storage= 20,477 cf

Plug-Flow detention time= 27.8 min calculated for 4.261 af (100% of inflow)
Center-of-Mass det. time= 27.6 min ( 955.9 - 928.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 526.00' | 127,058 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

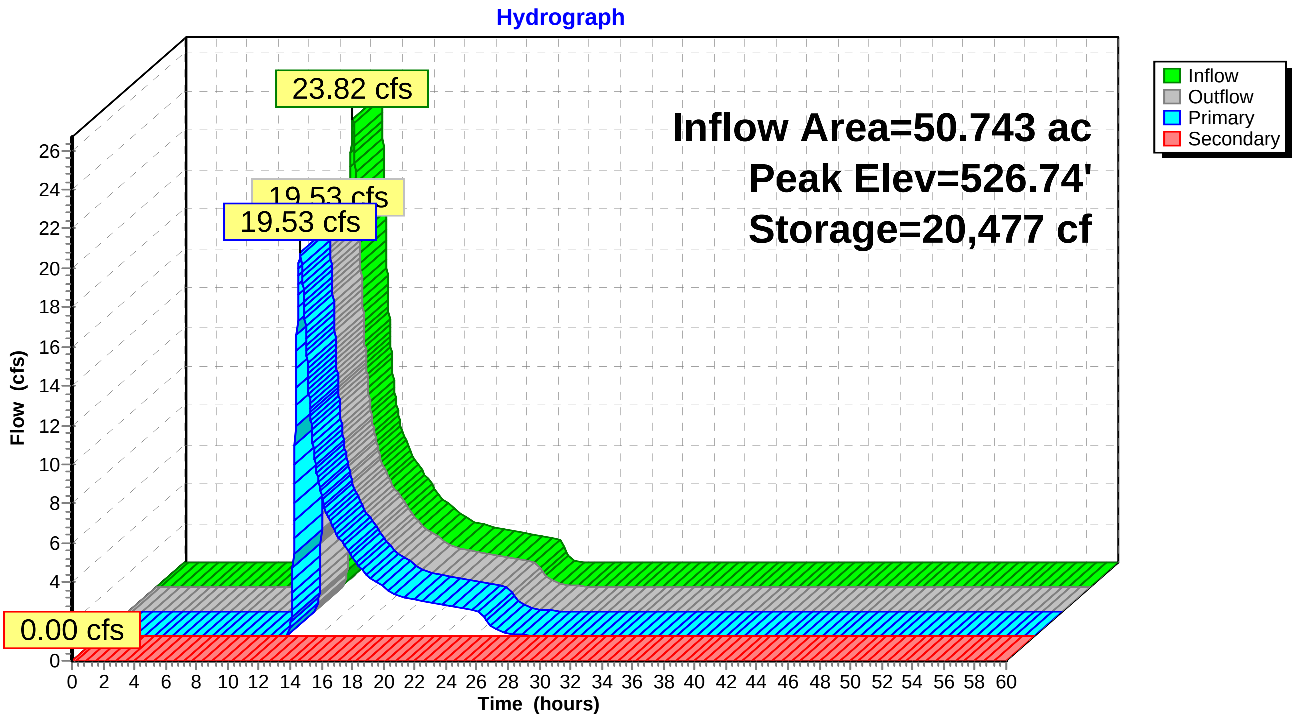
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 526.00 | 26,946 | 0 | 0 |
| 528.00 | 31,311 | 58,257 | 58,257 |
| 530.00 | 37,490 | 68,801 | 127,058 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 520.00' | **36.0" Round Culvert**<br>L= 225.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 520.00' / 513.00' S= 0.0311 '/' Cc= 0.900<br>n= 0.015, Flow Area= 7.07 sf |
| #2 | Device 1 | 526.00' | **36.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 529.00' | **20.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=19.53 cfs @ 12.86 hrs HW=526.74' TW=513.04' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 19.53 cfs of 97.37 cfs potential flow)
  ↑—**2=Orifice/Grate** (Weir Controls 19.53 cfs @ 2.81 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=526.00' TW=512.00' (Dynamic Tailwater)
↑—**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WF: Water Feature

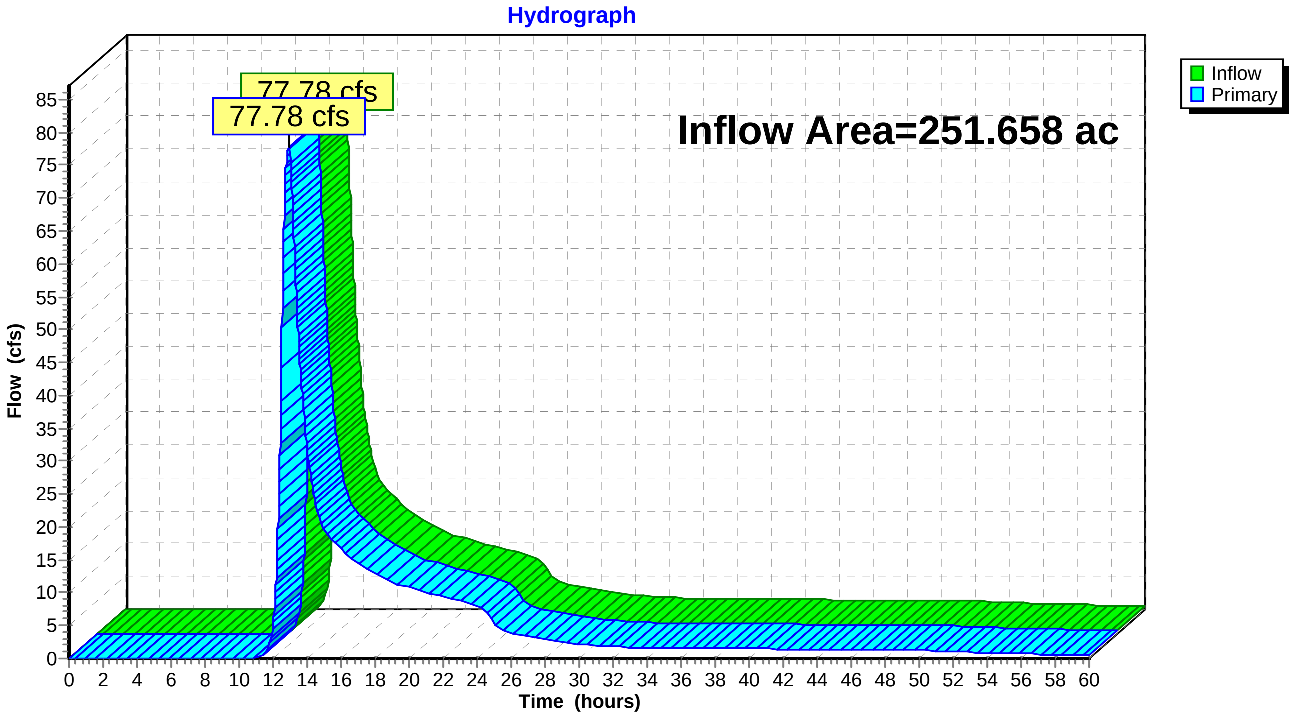


## Summary for Link A: Amenia Stream

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 251.658 ac, | 10.11% Impervious, | Inflow Depth > 1.15" | for 10-Year event |
| Inflow = | 77.78 cfs @ | 12.89 hrs, Volume= | 24.046 af | |
| Primary = | 77.78 cfs @ | 12.89 hrs, Volume= | 24.046 af, Atten= 0%, Lag= 0.0 min | |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

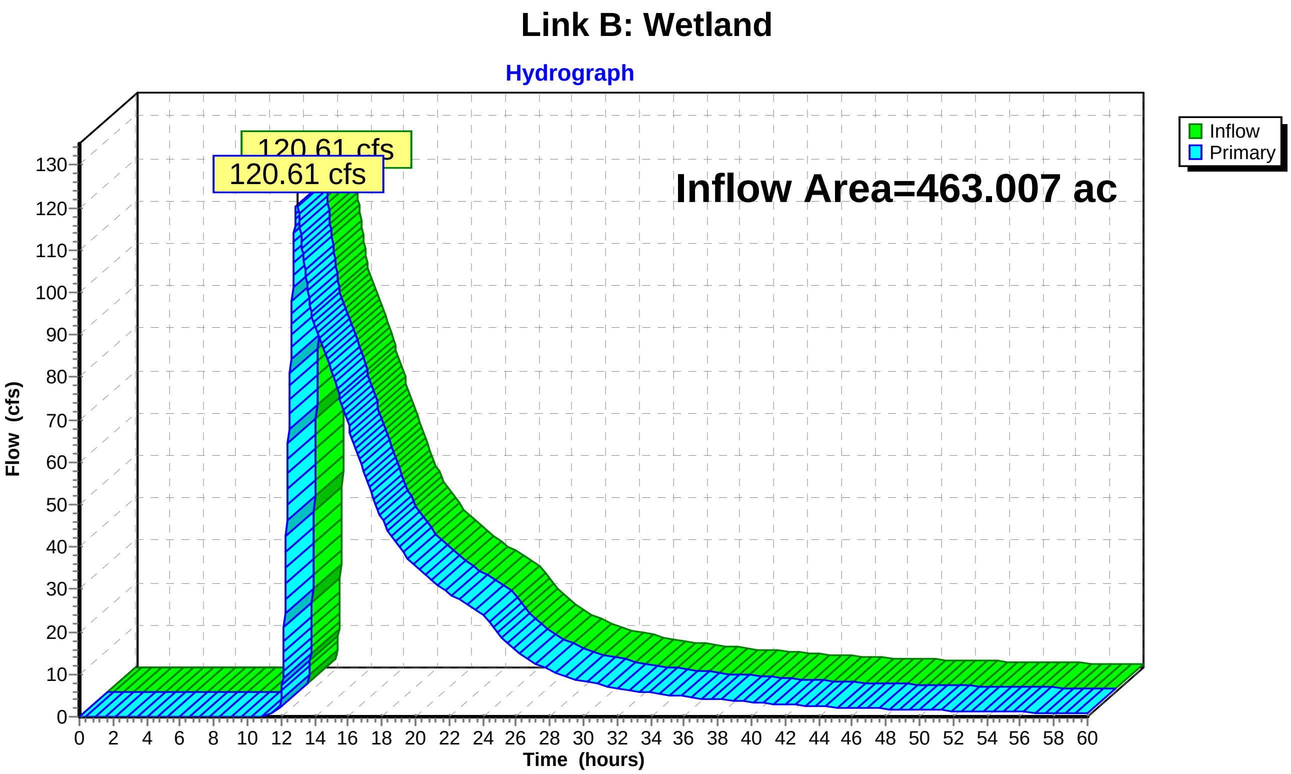
### Link A: Amenia Stream



## Summary for Link B: Wetland

Inflow Area = 463.007 ac, 14.28% Impervious, Inflow Depth > 1.76" for 10-Year event
Inflow = 120.61 cfs @ 12.94 hrs, Volume= 67.845 af
Primary = 120.61 cfs @ 12.94 hrs, Volume= 67.845 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

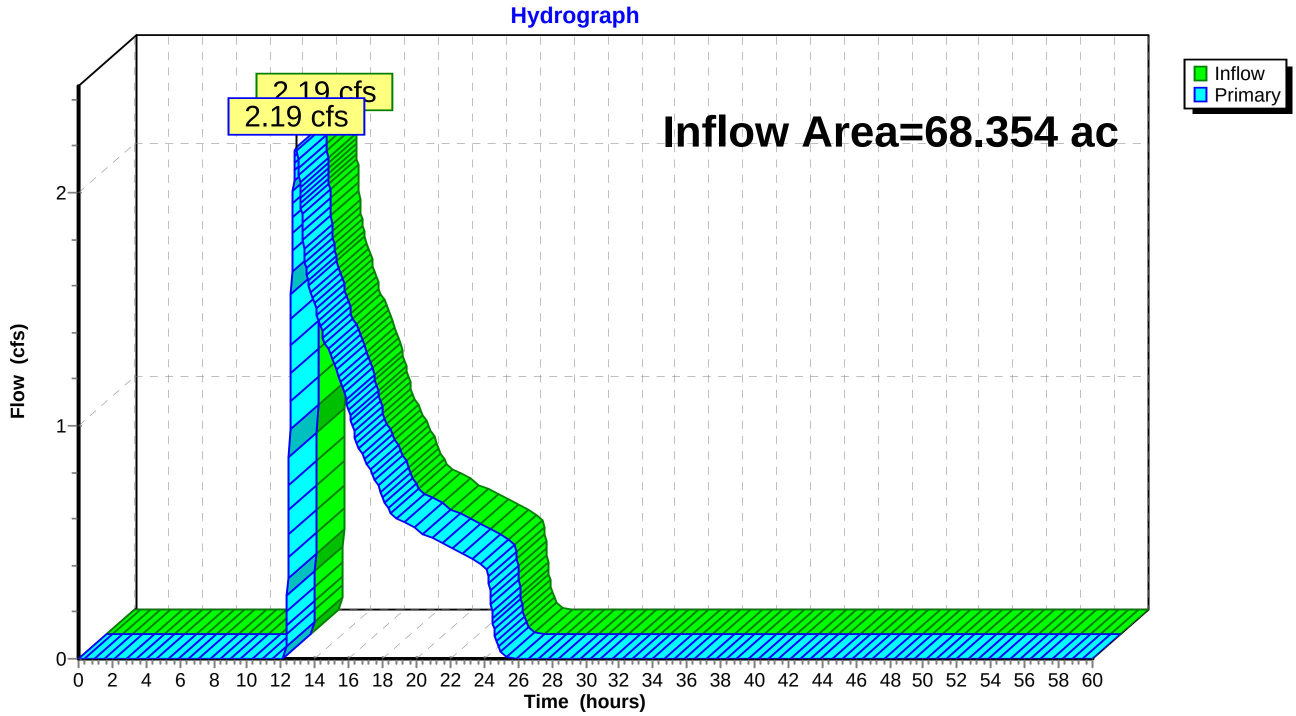


## Summary for Link C: Culvert

Inflow Area = 68.354 ac, 5.83% Impervious, Inflow Depth = 0.15" for 10-Year event
Inflow = 2.19 cfs @ 12.88 hrs, Volume= 0.856 af
Primary = 2.19 cfs @ 12.88 hrs, Volume= 0.856 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

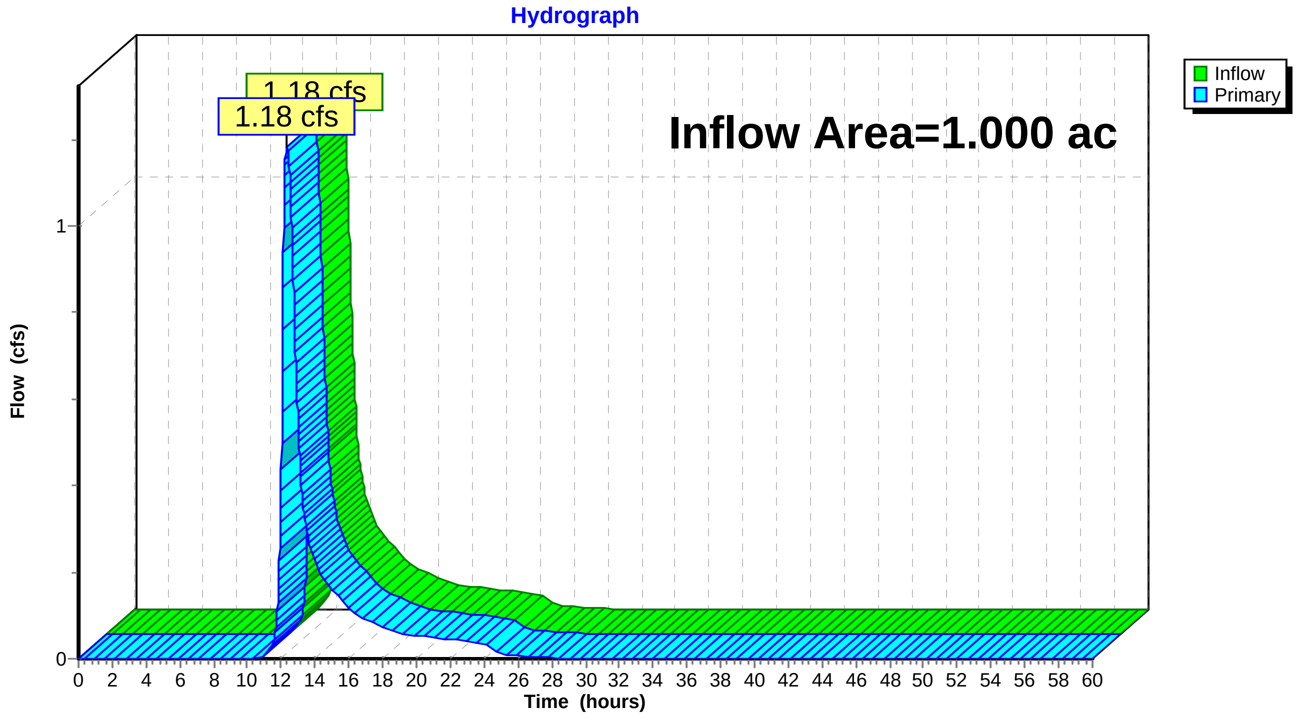


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 1.000 ac, | 0.00% Impervious, Inflow Depth = 2.17" | for 10-Year event | |
| Inflow = | 1.18 cfs @ | 12.33 hrs, Volume= | 0.181 af | |
| Primary = | 1.18 cfs @ | 12.33 hrs, Volume= | 0.181 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=21.492 ac 4.36% Impervious Runoff Depth=0.56"
Flow Length=1,320' Tc=20.2 min CN=48 Runoff=3.71 cfs 0.997 af

**Subcatchment A102: A102** Runoff Area=4.590 ac 29.85% Impervious Runoff Depth=3.67"
Flow Length=530' Tc=15.8 min CN=81 Runoff=14.91 cfs 1.404 af

**Subcatchment A103: A103** Runoff Area=57.299 ac 21.07% Impervious Runoff Depth=1.50"
Flow Length=2,529' Tc=22.2 min CN=60 Runoff=54.10 cfs 7.162 af

**Subcatchment A104: A104** Runoff Area=29.922 ac 5.68% Impervious Runoff Depth=0.49"
Flow Length=1,871' Tc=21.8 min CN=47 Runoff=3.88 cfs 1.229 af

**Subcatchment A105: A105** Runoff Area=26.625 ac 12.66% Impervious Runoff Depth=1.68"
Flow Length=1,484' Tc=19.3 min CN=62 Runoff=31.47 cfs 3.734 af

**Subcatchment A106: A106** Runoff Area=10.791 ac 11.31% Impervious Runoff Depth=3.22"
Flow Length=1,260' Tc=26.7 min CN=77 Runoff=24.74 cfs 2.895 af

**Subcatchment A107: A107** Runoff Area=79.700 ac 2.24% Impervious Runoff Depth=2.89"
Flow Length=3,685' Tc=61.0 min CN=74 Runoff=105.89 cfs 19.206 af

**Subcatchment A108: A108** Runoff Area=5.527 ac 2.32% Impervious Runoff Depth=1.24"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=3.44 cfs 0.570 af

**Subcatchment A109: A109** Runoff Area=15.712 ac 18.18% Impervious Runoff Depth=2.78"
Flow Length=1,315' Tc=33.2 min CN=73 Runoff=27.82 cfs 3.646 af

**Subcatchment B101: B101** Runoff Area=50.743 ac 17.46% Impervious Runoff Depth=1.78"
Flow Length=3,015' Tc=36.7 min CN=63 Runoff=49.05 cfs 7.512 af

**Subcatchment B102: B102** Runoff Area=40.873 ac 1.28% Impervious Runoff Depth=1.50"
Flow Length=955' Tc=20.3 min CN=60 Runoff=39.95 cfs 5.109 af

**Subcatchment B103: B103** Runoff Area=22.950 ac 10.98% Impervious Runoff Depth=3.56"
Flow Length=2,127' Tc=38.5 min CN=80 Runoff=49.01 cfs 6.802 af

**Subcatchment B104: B104** Runoff Area=24.602 ac 28.02% Impervious Runoff Depth=3.56"
Flow Length=3,620' Tc=24.7 min CN=80 Runoff=64.43 cfs 7.291 af

**Subcatchment B105: B105** Runoff Area=24.733 ac 14.99% Impervious Runoff Depth=3.56"
Flow Length=2,606' Tc=36.4 min CN=80 Runoff=54.31 cfs 7.330 af

**Subcatchment B106: B106** Runoff Area=118.113 ac 1.34% Impervious Runoff Depth=3.11"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=136.04 cfs 30.604 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=3.22"
Flow Length=907' Tc=37.9 min CN=77 Runoff=27.84 cfs 3.845 af

**Subcatchment B108: B108** Runoff Area=40.951 ac 11.09% Impervious Runoff Depth=3.33"
Flow Length=2,038' Tc=32.2 min CN=78 Runoff=89.06 cfs 11.367 af

**Subcatchment B109: B109** Runoff Area=34.256 ac 12.24% Impervious Runoff Depth=3.33"
Flow Length=1,371' Tc=24.9 min CN=78 Runoff=83.74 cfs 9.509 af

**Subcatchment B110: B110** Runoff Area=6.622 ac 45.47% Impervious Runoff Depth=4.14"
Flow Length=936' Tc=11.9 min CN=85 Runoff=26.60 cfs 2.283 af

**Subcatchment B111: B111** Runoff Area=6.254 ac 40.36% Impervious Runoff Depth=2.27"
Flow Length=516' Tc=6.8 min CN=68 Runoff=15.79 cfs 1.180 af

**Subcatchment B112: B112** Runoff Area=39.487 ac 34.78% Impervious Runoff Depth=2.07"
Flow Length=989' Tc=15.8 min CN=66 Runoff=67.03 cfs 6.797 af

**Subcatchment B113: B113** Runoff Area=5.598 ac 30.55% Impervious Runoff Depth=1.41"
Flow Length=836' Tc=14.0 min CN=59 Runoff=5.69 cfs 0.658 af

**Subcatchment B115: B115** Runoff Area=13.072 ac 23.44% Impervious Runoff Depth=1.59"
Flow Length=1,419' Tc=11.1 min CN=61 Runoff=17.50 cfs 1.733 af

**Subcatchment B116: B116** Runoff Area=2.600 ac 30.58% Impervious Runoff Depth=1.24"
Tc=6.0 min CN=57 Runoff=2.75 cfs 0.268 af

**Subcatchment B117: B117** Runoff Area=7.723 ac 36.64% Impervious Runoff Depth=1.59"
Tc=6.0 min CN=61 Runoff=12.43 cfs 1.024 af

**Subcatchment B118: B118** Runoff Area=2.550 ac 54.71% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=71 Runoff=7.70 cfs 0.547 af

**Subcatchment B119: B119** Runoff Area=7.550 ac 56.29% Impervious Runoff Depth=4.25"
Flow Length=1,683' Tc=10.3 min CN=86 Runoff=32.57 cfs 2.677 af

**Subcatchment C101: C101** Runoff Area=12.930 ac 0.00% Impervious Runoff Depth=0.69"
Flow Length=1,500' Tc=31.9 min CN=50 Runoff=2.87 cfs 0.746 af

**Subcatchment C102: C102** Runoff Area=40.074 ac 2.80% Impervious Runoff Depth=1.87"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=37.09 cfs 6.250 af

**Subcatchment C103: C103** Runoff Area=15.350 ac 18.63% Impervious Runoff Depth=0.99"
Flow Length=2,111' Tc=30.4 min CN=54 Runoff=6.60 cfs 1.269 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=3.22"
Flow Length=176' Tc=7.5 min CN=77 Runoff=3.66 cfs 0.268 af

**Reach 36" Pipe: 36" Pipe** Avg. Flow Depth=0.93' Max Vel=16.95 fps Inflow=31.85 cfs 4.299 af
36.0" Round Pipe n=0.015 L=935.0' S=0.0684 '/' Capacity=151.23 cfs Outflow=31.83 cfs 4.299 af

**Reach 42" Pipe: 42" Pipe** Avg. Flow Depth=1.49' Max Vel=31.67 fps Inflow=123.64 cfs 23.420 af
42.0" Round Pipe n=0.012 L=575.0' S=0.0904 '/' Capacity=327.77 cfs Outflow=123.53 cfs 23.420 af

**Reach A105R: Thru A103** Avg. Flow Depth=1.55' Max Vel=6.78 fps Inflow=57.48 cfs 8.016 af
n=0.050 L=1,170.0' S=0.0564 '/' Capacity=150.86 cfs Outflow=55.14 cfs 8.016 af

**Reach B107R: Thru B103** Avg. Flow Depth=0.33' Max Vel=6.95 fps Inflow=17.88 cfs 3.569 af
n=0.050 L=938.0' S=0.4072 '/' Capacity=192.14 cfs Outflow=17.85 cfs 3.569 af

**Reach B112R: Thru B102** Avg. Flow Depth=2.14' Max Vel=4.69 fps Inflow=97.80 cfs 57.662 af
n=0.050 L=600.0' S=0.0167 '/' Capacity=369.68 cfs Outflow=97.78 cfs 57.652 af

**Pond 102C: Pond 102C** Peak Elev=508.82' Storage=272,239 cf Inflow=37.09 cfs 6.250 af
Outflow=0.00 cfs 0.000 af

**Pond 104A: Wetland D** Peak Elev=508.04' Storage=7,597 cf Inflow=3.88 cfs 1.229 af
Primary=0.35 cfs 0.431 af Secondary=2.18 cfs 0.777 af Outflow=2.52 cfs 1.208 af

**Pond 105A: Wetland H** Peak Elev=575.23' Storage=64,421 cf Inflow=61.97 cfs 8.033 af
Primary=10.69 cfs 6.154 af Secondary=46.78 cfs 1.863 af Outflow=57.48 cfs 8.016 af

**Pond 106A: 36" Culvert** Peak Elev=719.09' Storage=53 cf Inflow=31.85 cfs 4.299 af
Primary=31.85 cfs 4.299 af Secondary=0.00 cfs 0.000 af Outflow=31.85 cfs 4.299 af

**Pond 106B: Wetland J** Peak Elev=526.95' Storage=22,152 cf Inflow=136.04 cfs 30.604 af
Outflow=136.02 cfs 30.604 af

**Pond 107A: 24" Culvert** Peak Elev=626.00' Storage=3,093 cf Inflow=121.07 cfs 22.849 af
Primary=43.10 cfs 17.090 af Secondary=77.99 cfs 5.760 af Outflow=121.09 cfs 22.849 af

**Pond 107B: Wetland** Peak Elev=972.90' Storage=49,049 cf Inflow=27.84 cfs 3.845 af
Outflow=17.88 cfs 3.569 af

**Pond 108A: 36" Culvert** Peak Elev=613.19' Storage=120 cf Inflow=80.49 cfs 6.330 af
Primary=57.89 cfs 5.586 af Secondary=22.66 cfs 0.744 af Outflow=80.54 cfs 6.330 af

**Pond SWM 7A: SWM 7A (Phase 1)** Peak Elev=808.20' Storage=2,689 cf Inflow=3.66 cfs 0.268 af
Outflow=1.57 cfs 0.268 af

**Pond SWM1: SWM 1** Peak Elev=513.97' Storage=29,679 cf Inflow=39.16 cfs 7.512 af
Outflow=36.28 cfs 7.511 af

**Pond SWM17: SWM17** Peak Elev=500.93' Storage=0.055 af Inflow=6.60 cfs 1.269 af
Outflow=6.49 cfs 1.269 af

**Pond SWM2: SWM2** Peak Elev=504.35' Storage=376,005 cf Inflow=233.89 cfs 33.923 af
Outflow=176.32 cfs 33.773 af

**Pond SWM3try: SWM3** Peak Elev=509.80' Storage=1,065,238 cf Inflow=218.97 cfs 59.006 af
Outflow=97.80 cfs 57.662 af

**Pond SWM4: SWM4** Peak Elev=516.69' Storage=73,991 cf Inflow=141.56 cfs 36.070 af
Primary=132.90 cfs 36.056 af Secondary=0.00 cfs 0.000 af Outflow=132.90 cfs 36.056 af

**Pond SWM5: SWM5** Peak Elev=521.13' Storage=157,794 cf Inflow=129.30 cfs 17.172 af
Primary=1.00 cfs 2.519 af Secondary=98.44 cfs 14.471 af Tertiary=2.44 cfs 0.033 af Outflow=101.88 cfs 17.023 af

**Pond SWM6: SWM6** Peak Elev=503.06' Storage=335,887 cf Inflow=103.27 cfs 15.178 af
Outflow=11.57 cfs 14.394 af

**Pond SWM7: SWM7** Peak Elev=745.78' Storage=17,991 cf Inflow=14.91 cfs 1.404 af
Outflow=7.56 cfs 1.404 af

**Pond SWM8: SWM8** Peak Elev=655.46' Storage=45,816 cf Inflow=27.82 cfs 3.646 af
Outflow=15.37 cfs 3.644 af

**Pond WF: Water Feature** Peak Elev=527.32' Storage=37,578 cf Inflow=49.05 cfs 7.512 af
Primary=39.16 cfs 7.512 af Secondary=0.00 cfs 0.000 af Outflow=39.16 cfs 7.512 af

**Link A: Amenia Stream** Inflow=129.21 cfs 40.019 af
Primary=129.21 cfs 40.019 af

**Link B: Wetland** Inflow=242.50 cfs 104.592 af
Primary=242.50 cfs 104.592 af

**Link C: Culvert** Inflow=9.33 cfs 2.015 af
Primary=9.33 cfs 2.015 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=1.57 cfs 0.268 af
Primary=1.57 cfs 0.268 af

**Total Runoff Area = 784.019 ac Runoff Volume = 155.912 af Average Runoff Depth = 2.39"**
**87.81% Pervious = 688.462 ac 12.19% Impervious = 95.557 ac**

## Summary for Subcatchment A101: A101

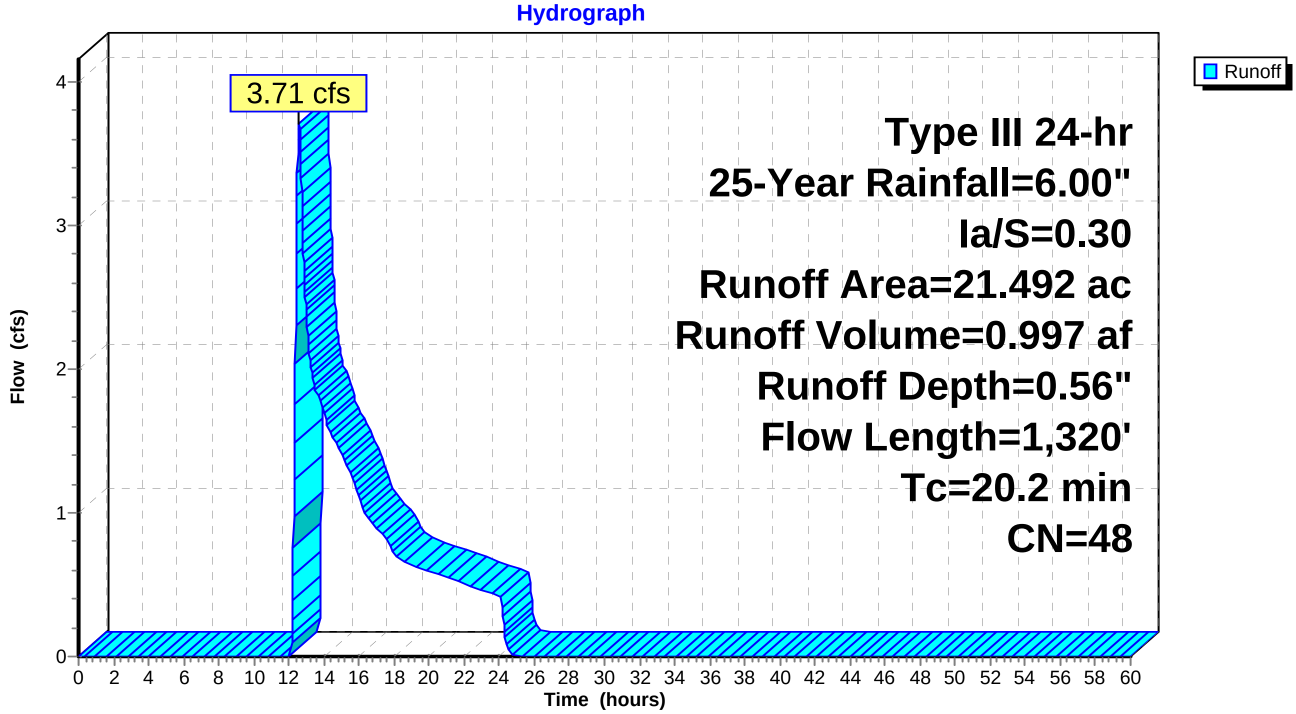
Runoff = 3.71 cfs @ 12.58 hrs, Volume= 0.997 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.015 | 98 | Building roof |
| * | 0.921 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.290 | 39 | >75% Grass cover, Good, HSG A |
| | 6.490 | 61 | >75% Grass cover, Good, HSG B |
| | 0.050 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.270 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.426 | 30 | Sand trap, HSG A |
| * | 0.030 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 21.492 | 48 | Weighted Average |
| | 20.556 | | 95.64% Pervious Area |
| | 0.936 | | 4.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.6 | 100 | 0.1400 | 0.17 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 6.0 | 800 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 420 | 0.0480 | 1.53 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 20.2 | 1,320 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

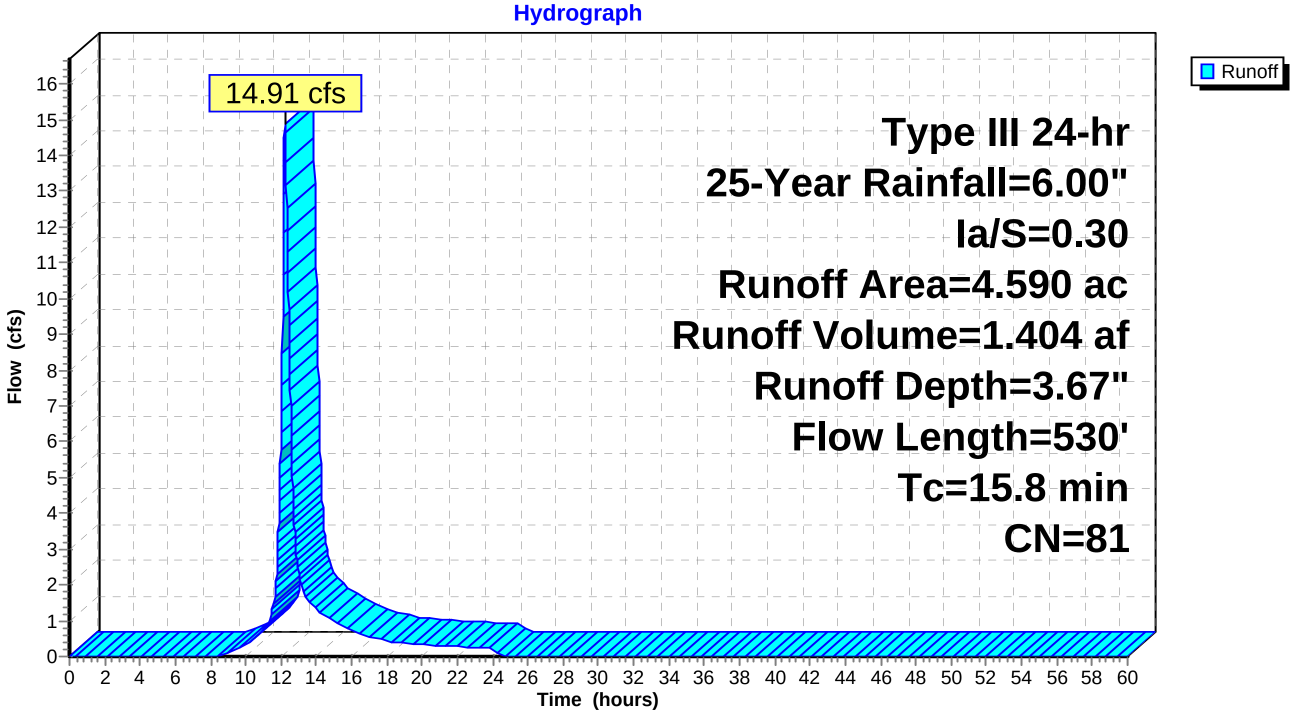
Runoff = 14.91 cfs @ 12.21 hrs, Volume= 1.404 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.200 | 98 | Building roof |
| * | 1.040 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.970 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.250 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 4.590 | 81 | Weighted Average |
| | 3.220 | | 70.15% Pervious Area |
| | 1.370 | | 29.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.1 | 50 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 130 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.7 | 250 | 0.1280 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.8 | 530 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

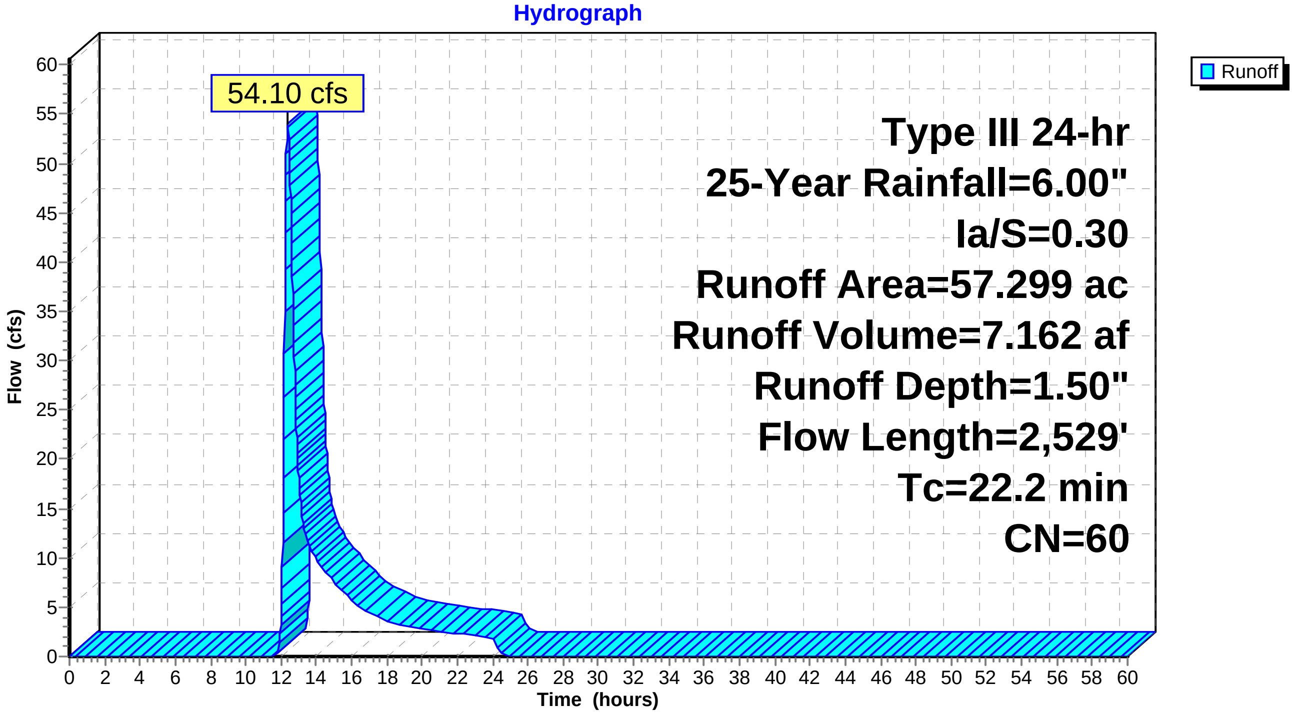
Runoff = 54.10 cfs @ 12.37 hrs, Volume= 7.162 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.320 | 98 | Building roof |
| * | 6.292 | 98 | Paved surface |
| * | 0.438 | 96 | Gravel surface |
| * | 1.461 | 98 | Water Surface |
| | 21.310 | 39 | >75% Grass cover, Good, HSG A |
| | 5.353 | 61 | >75% Grass cover, Good, HSG B |
| | 8.379 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 5.112 | 30 | Woods, Good, HSG A |
| | 1.620 | 55 | Woods, Good, HSG B |
| | 1.505 | 70 | Woods, Good, HSG C |
| | 1.130 | 77 | Woods, Good, HSG D |
| * | 0.220 | 30 | Sand trap, HSG A |
| * | 0.130 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 57.299 | 60 | Weighted Average |
| | 45.226 | | 78.93% Pervious Area |
| | 12.073 | | 21.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.8 | 100 | 0.0300 | 0.09 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 2.2 | 355 | 0.1430 | 2.65 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 554 | 0.0680 | 8.24 | 98.89 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.050 |
| 1.1 | 1,520 | 0.0690 | 23.78 | 116.72 | **Pipe Channel,**<br>30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'<br>n= 0.012 |
| 22.2 | 2,529 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

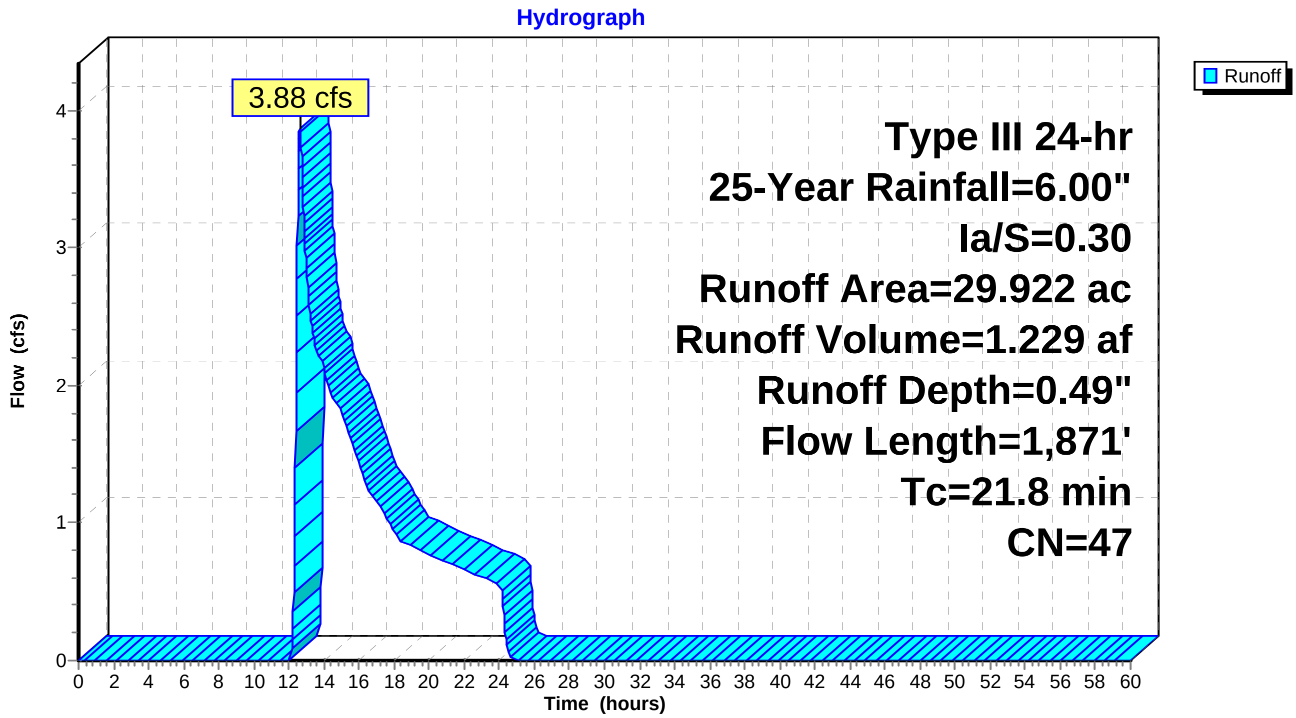
Runoff = 3.88 cfs @ 12.63 hrs, Volume= 1.229 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.270 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.430 | 98 | Water Surface |
| | 23.530 | 39 | >75% Grass cover, Good, HSG A |
| | 0.110 | 61 | >75% Grass cover, Good, HSG B |
| | 3.720 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.028 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.100 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.635 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.082 | 30 | Sand Trap, HSG C |
| | 29.922 | 47 | Weighted Average |
| | 28.222 | | 94.32% Pervious Area |
| | 1.700 | | 5.68% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.8 | 100 | 0.2400 | 0.22 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 9.7 | 1,231 | 0.0920 | 2.12 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 4.3 | 540 | 0.0900 | 2.10 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 21.8 | 1,871 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

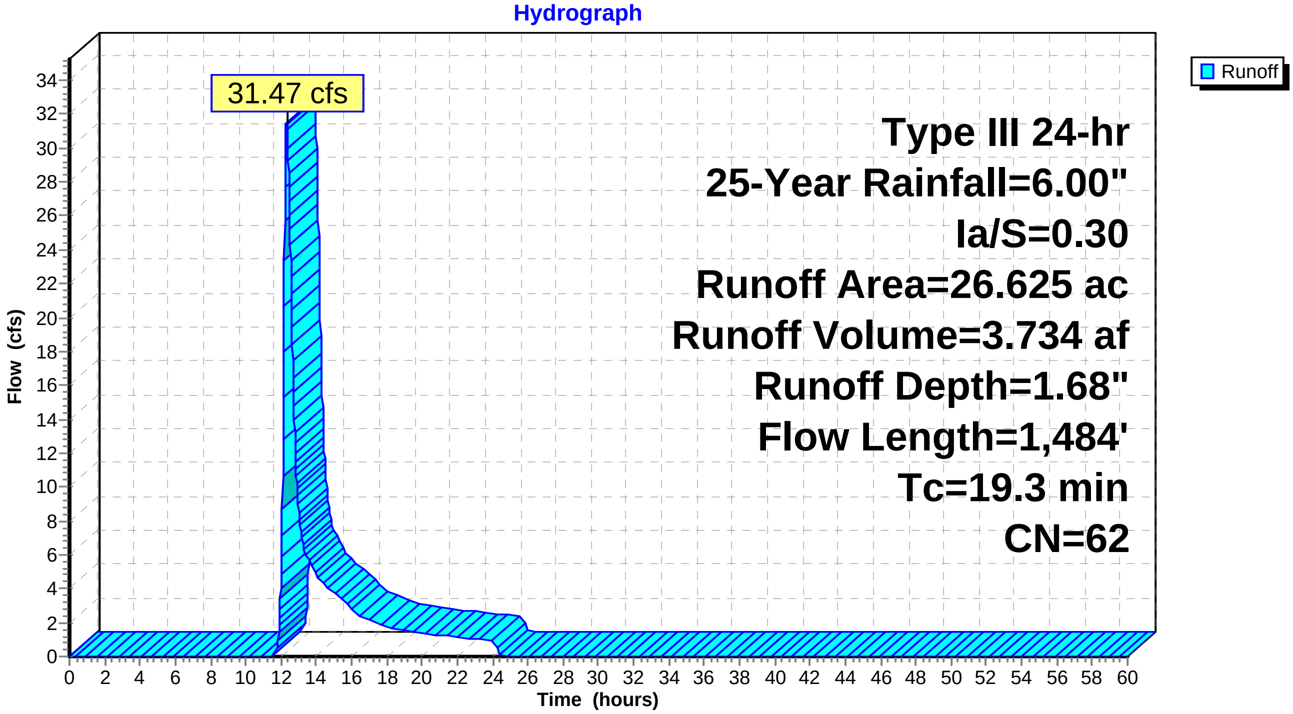
Runoff = 31.47 cfs @ 12.31 hrs, Volume= 3.734 af, Depth= 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.390 | 98 | Building roof |
| * | 0.480 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.500 | 98 | Water Surface |
| | 10.650 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 8.795 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.094 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.565 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.145 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.006 | 30 | Sand Trap, HSG C |
| | 26.625 | 62 | Weighted Average |
| | 23.255 | | 87.34% Pervious Area |
| | 3.370 | | 12.66% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 3.0 | 395 | 0.1920 | 2.19 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 7.1 | 989 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 19.3 | 1,484 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

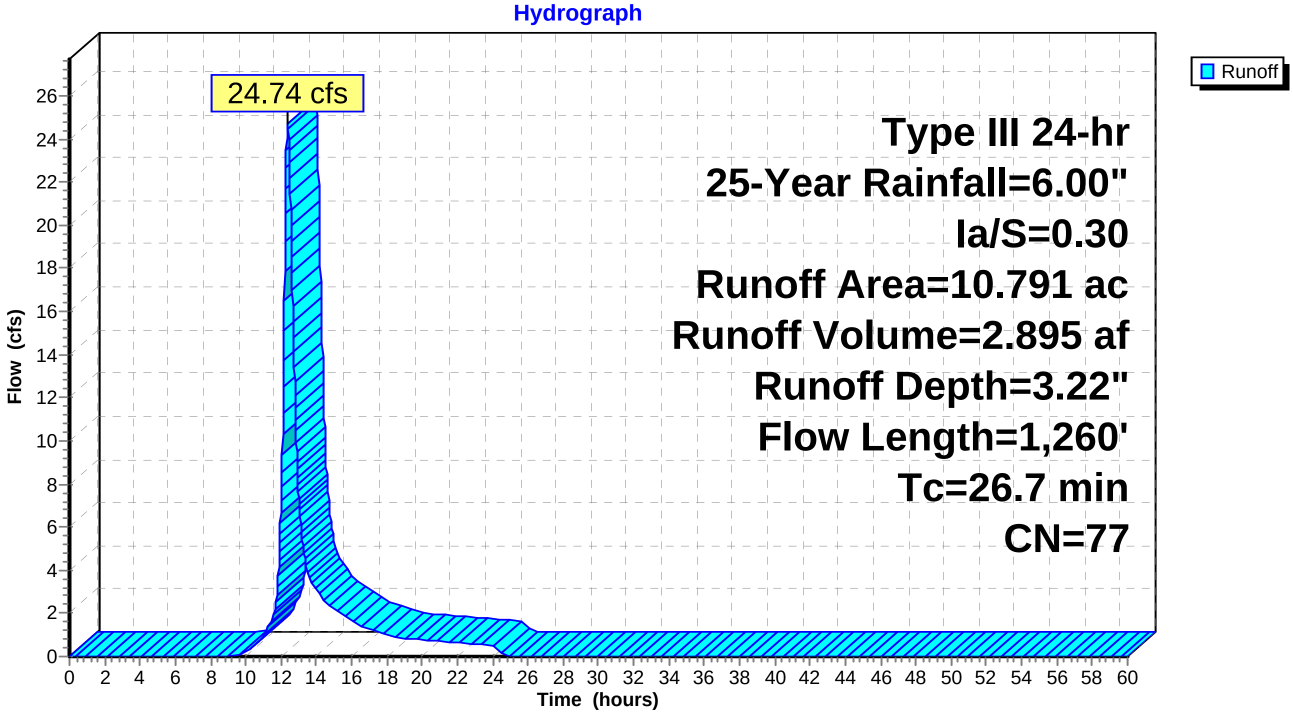
Runoff = 24.74 cfs @ 12.38 hrs, Volume= 2.895 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.220 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.078 | 61 | >75% Grass cover, Good, HSG B |
| | 5.210 | 74 | >75% Grass cover, Good, HSG C |
| | 2.190 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.100 | 55 | Woods, Good, HSG B |
| | 1.390 | 70 | Woods, Good, HSG C |
| | 0.603 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 10.791 | 77 | Weighted Average |
| | 9.571 | | 88.69% Pervious Area |
| | 1.220 | | 11.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

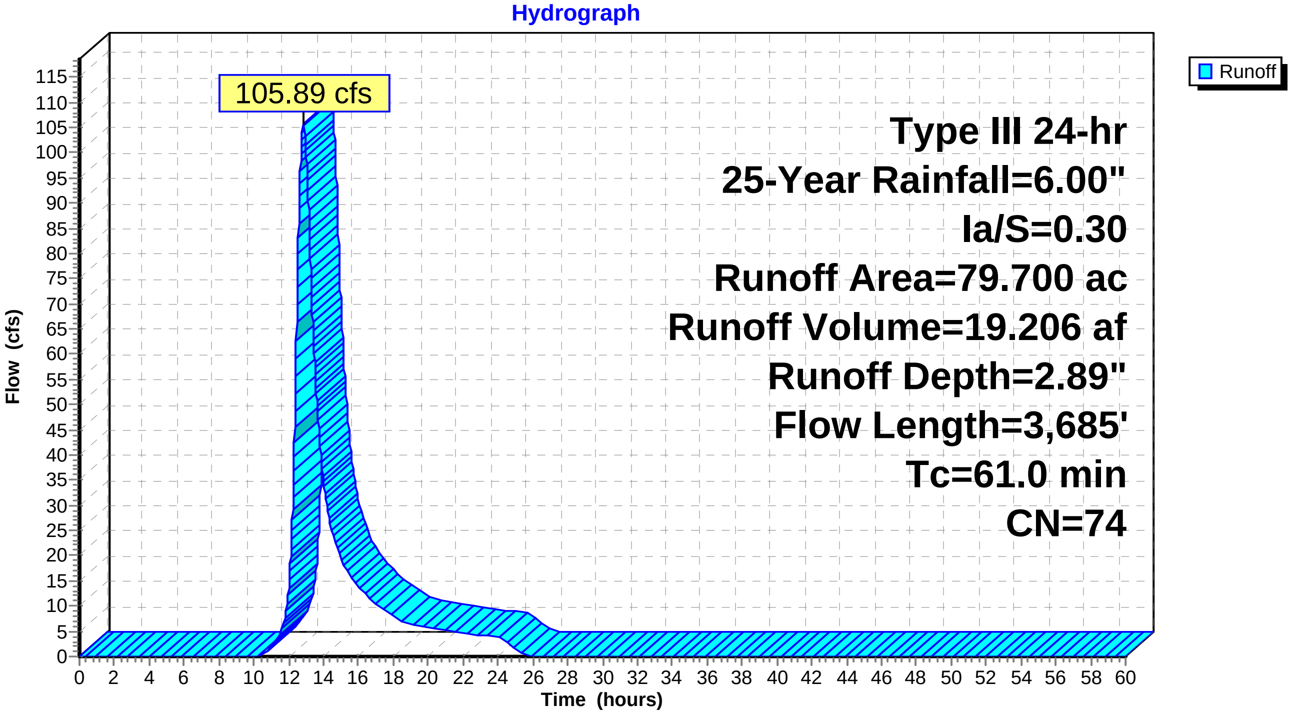
Runoff = 105.89 cfs @ 12.83 hrs, Volume= 19.206 af, Depth= 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.340 | 98 | Building roof |
| * | 1.314 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 6.390 | 61 | >75% Grass cover, Good, HSG B |
| | 4.750 | 74 | >75% Grass cover, Good, HSG C |
| | 3.470 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 7.845 | 55 | Woods, Good, HSG B |
| | 3.580 | 70 | Woods, Good, HSG C |
| | 51.810 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 79.700 | 74 | Weighted Average |
| | 77.916 | | 97.76% Pervious Area |
| | 1.784 | | 2.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

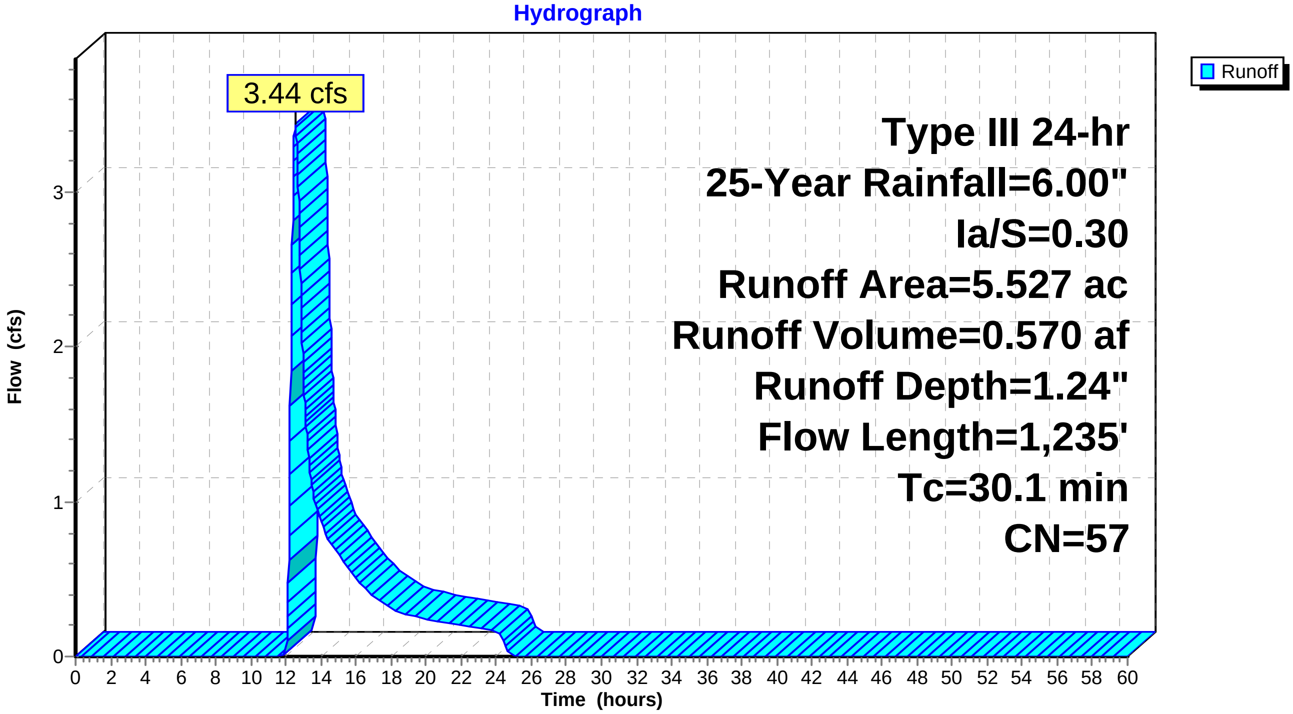
Runoff = 3.44 cfs @ 12.54 hrs, Volume= 0.570 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.088 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.630 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.527 | 57 | Weighted Average |
| | 5.399 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment A109: A109

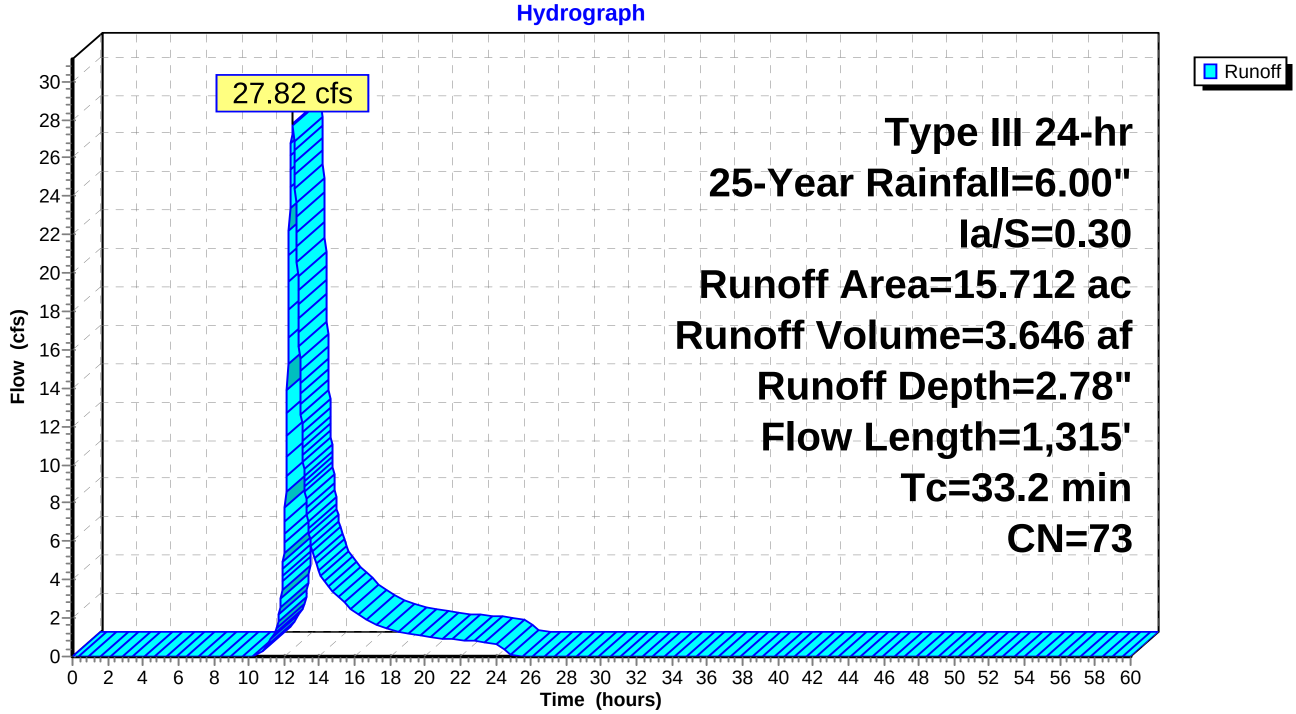
Runoff = 27.82 cfs @ 12.49 hrs, Volume= 3.646 af, Depth= 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| Area (ac) | CN | Description |
|---|---|---|
| 0.857 | 98 | Roofs, HSG B |
| 5.730 | 61 | >75% Grass cover, Good, HSG B |
| 4.502 | 74 | >75% Grass cover, Good, HSG C |
| 0.592 | 80 | >75% Grass cover, Good, HSG D |
| 2.000 | 98 | Paved parking, HSG B |
| 0.328 | 55 | Woods, Good, HSG B |
| 0.823 | 70 | Woods, Good, HSG C |
| 0.880 | 77 | Woods, Good, HSG D |
| 15.712 | 73 | Weighted Average |
| 12.855 | | 81.82% Pervious Area |
| 2.857 | | 18.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 22.3 | 100 | 0.0650 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.0 | 388 | 0.2200 | 3.28 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.7 | 427 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.2 | 400 | 0.1850 | 1.08 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 33.2 | 1,315 | Total | | | |

## Subcatchment A109: A109



## Summary for Subcatchment B101: B101

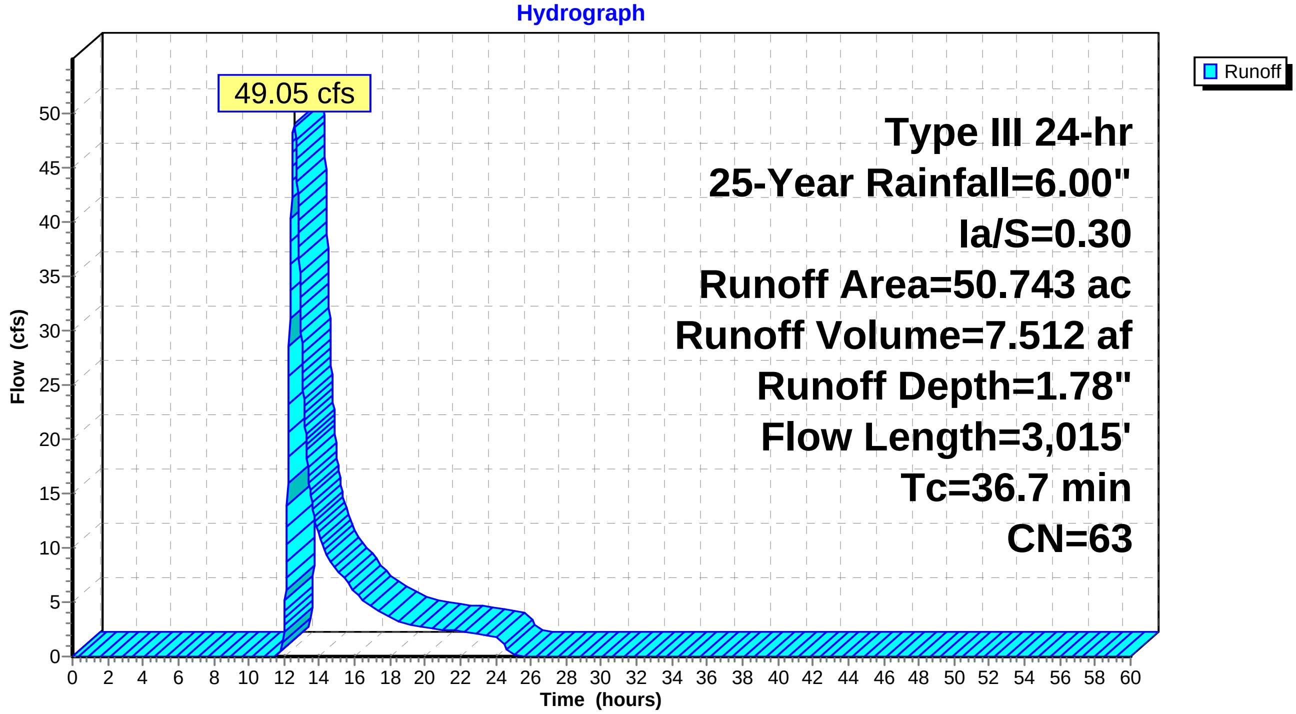
Runoff = 49.05 cfs @ 12.59 hrs, Volume= 7.512 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 5.220 | 98 | Building roof |
| * | 3.230 | 98 | Paved surface |
| * | 0.439 | 96 | Gravel surface |
| * | 0.412 | 98 | Water Surface |
| | 21.653 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 10.300 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.553 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 4.380 | 70 | Woods, Good, HSG C |
| | 4.370 | 77 | Woods, Good, HSG D |
| * | 0.142 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.044 | 30 | Sand Trap, HSG C |
| | 50.743 | 63 | Weighted Average |
| | 41.881 | | 82.54% Pervious Area |
| | 8.862 | | 17.46% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.4 | 1,880 | 0.0830 | 22.47 | 70.61 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 36.7 | 3,015 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

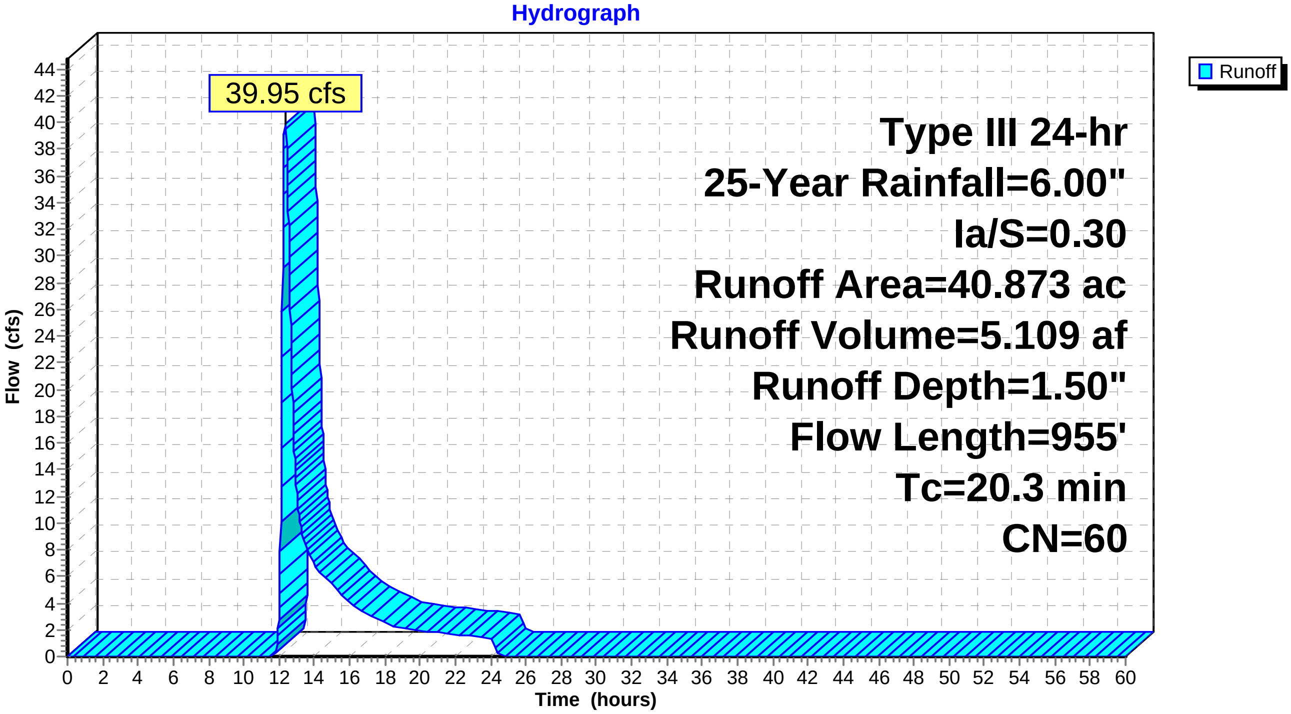
Runoff = 39.95 cfs @ 12.34 hrs, Volume= 5.109 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.516 | 98 | Paved surface |
| * | 0.210 | 96 | Gravel surface |
| * | 0.009 | 98 | Water Surface |
| | 7.476 | 39 | >75% Grass cover, Good, HSG A |
| | 0.464 | 61 | >75% Grass cover, Good, HSG B |
| | 12.033 | 74 | >75% Grass cover, Good, HSG C |
| | 0.764 | 80 | >75% Grass cover, Good, HSG D |
| | 6.808 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 5.496 | 70 | Woods, Good, HSG C |
| | 6.710 | 77 | Woods, Good, HSG D |
| * | 0.060 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.327 | 30 | Sand Trap, HSG C |
| | 40.873 | 60 | Weighted Average |
| | 40.348 | | 98.72% Pervious Area |
| | 0.525 | | 1.28% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 318 | 0.0250 | 7.19 | 287.53 | **Parabolic Channel,** W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.050 |
| 20.3 | 955 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

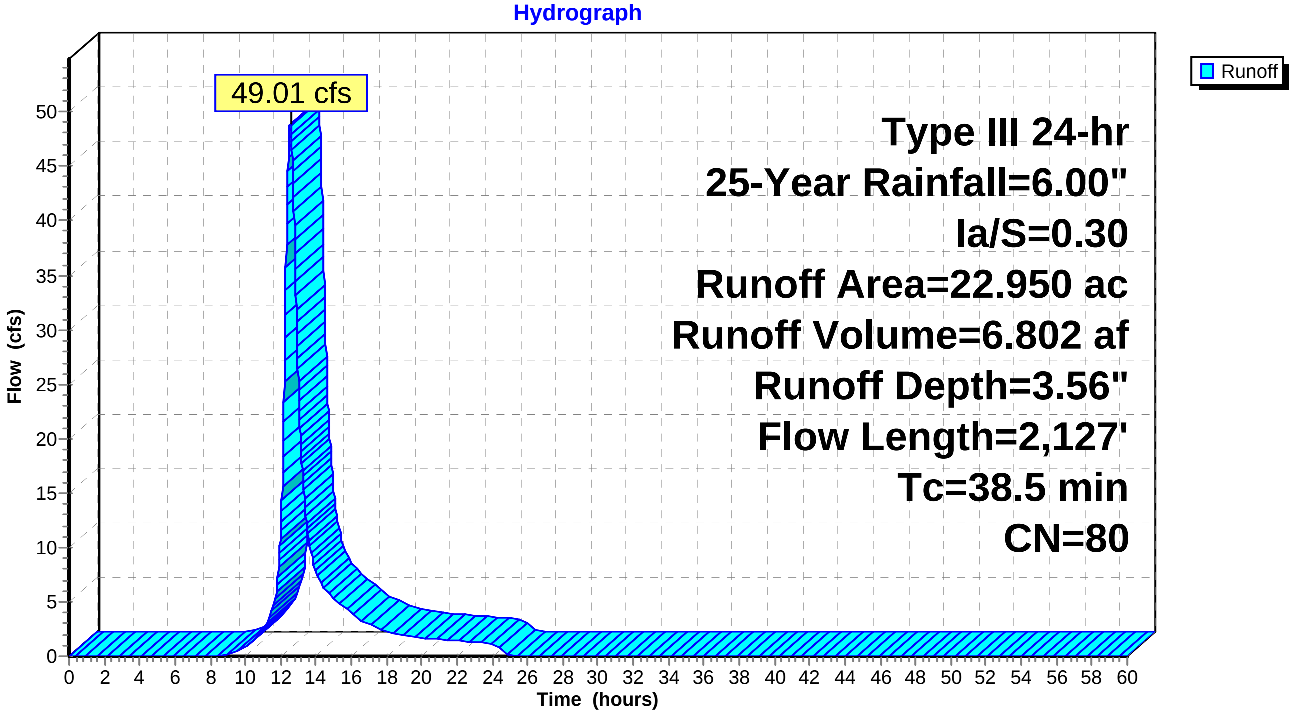
Runoff = 49.01 cfs @ 12.54 hrs, Volume= 6.802 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.520 | 98 | Building roof |
| * | 1.000 | 98 | Paved surface |
| * | 0.123 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.674 | 74 | >75% Grass cover, Good, HSG C |
| | 2.133 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 17.500 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 22.950 | 80 | Weighted Average |
| | 20.430 | | 89.02% Pervious Area |
| | 2.520 | | 10.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.3 | 784 | 0.5100 | 1.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 1,243 | 0.0670 | 26.46 | 187.03 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 38.5 | 2,127 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

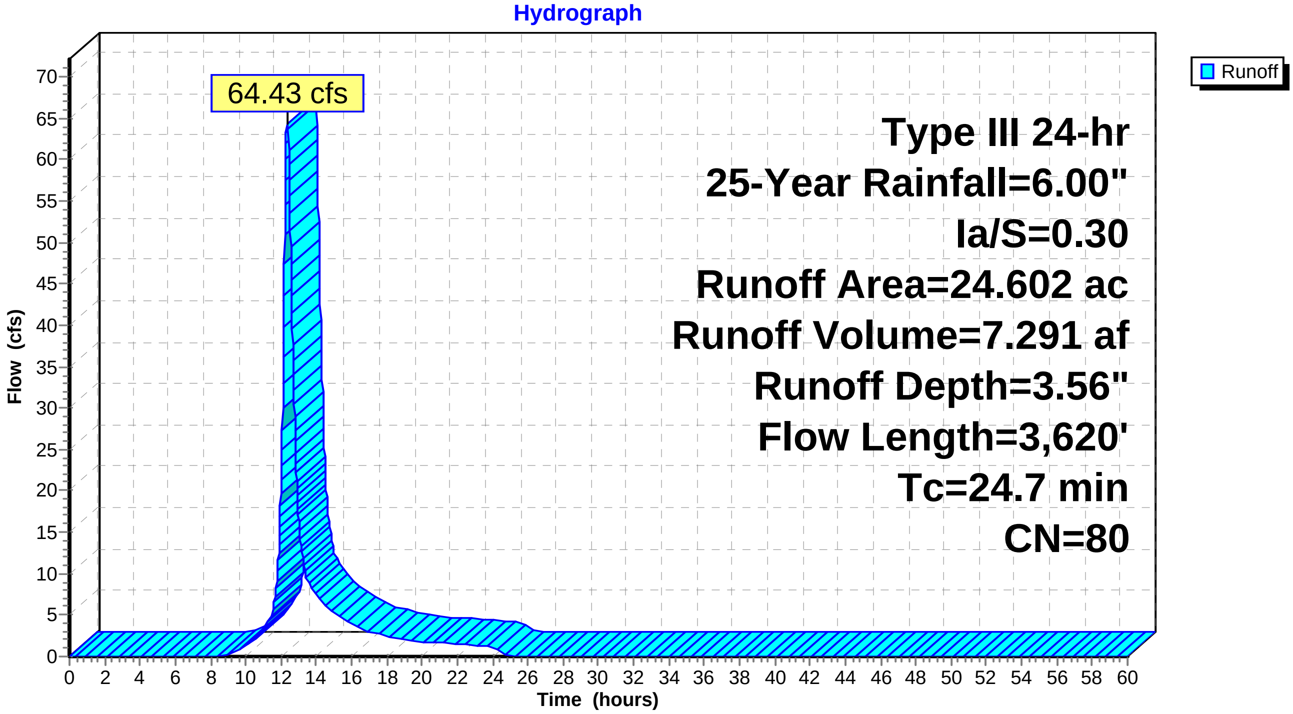
Runoff = 64.43 cfs @ 12.34 hrs, Volume= 7.291 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.579 | 98 | Building roof |
| * | 2.315 | 98 | Paved surface |
| * | 0.016 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.452 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.733 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.315 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.192 | 30 | Sand Trap, HSG C |
| | 24.602 | 80 | Weighted Average |
| | 17.708 | | 71.98% Pervious Area |
| | 6.894 | | 28.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.8 | 100 | 0.1000 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 8.0 | 823 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 452 | 0.1720 | 2.90 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 1,210 | 0.0580 | 8.46 | 101.48 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.045 |
| 0.9 | 1,035 | 0.0350 | 19.12 | 135.18 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 24.7 | 3,620 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

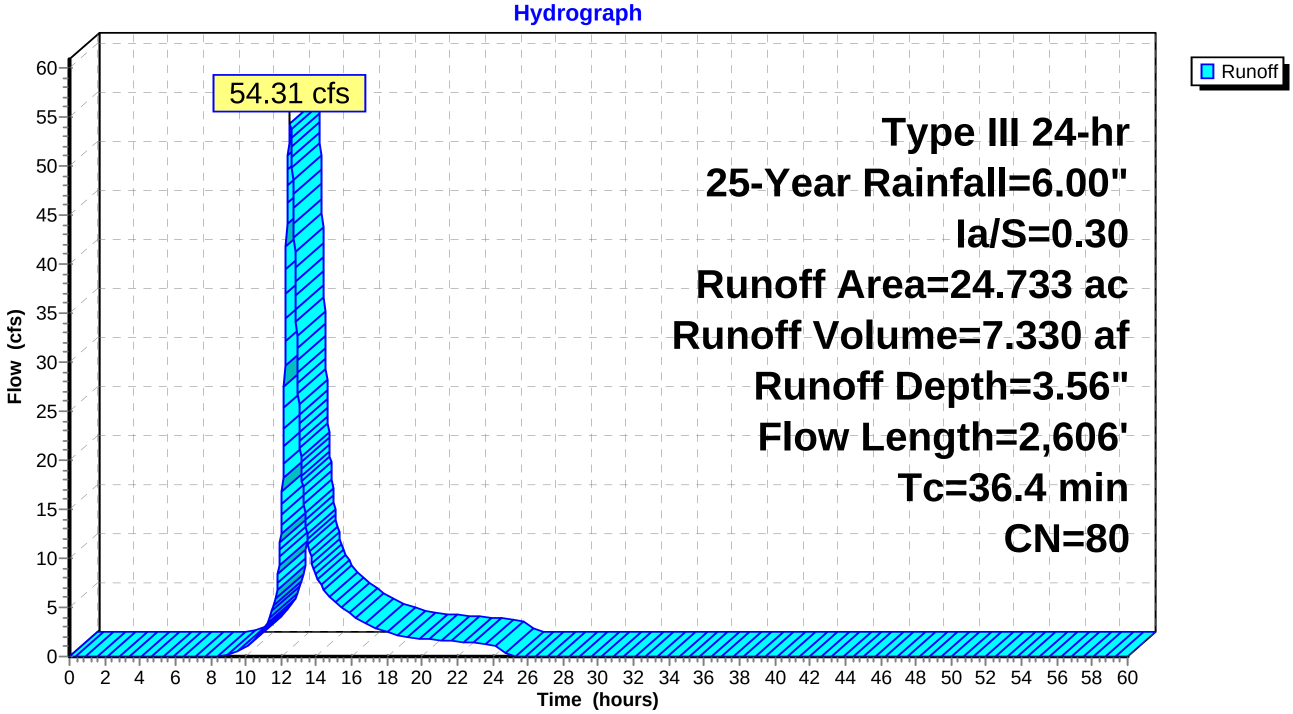
Runoff = 54.31 cfs @ 12.50 hrs, Volume= 7.330 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.944 | 98 | Building roof |
| * | 0.763 | 98 | Paved surface |
| * | 0.287 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.052 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.735 | 74 | >75% Grass cover, Good, HSG C |
| | 0.052 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 18.900 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 24.733 | 80 | Weighted Average |
| | 21.026 | | 85.01% Pervious Area |
| | 3.707 | | 14.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 612 | 0.5680 | 1.88 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 114 | 0.2280 | 3.34 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 880 | 0.0320 | 5.65 | 67.84 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.7 | 900 | 0.0400 | 20.44 | 144.51 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 36.4 | 2,606 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

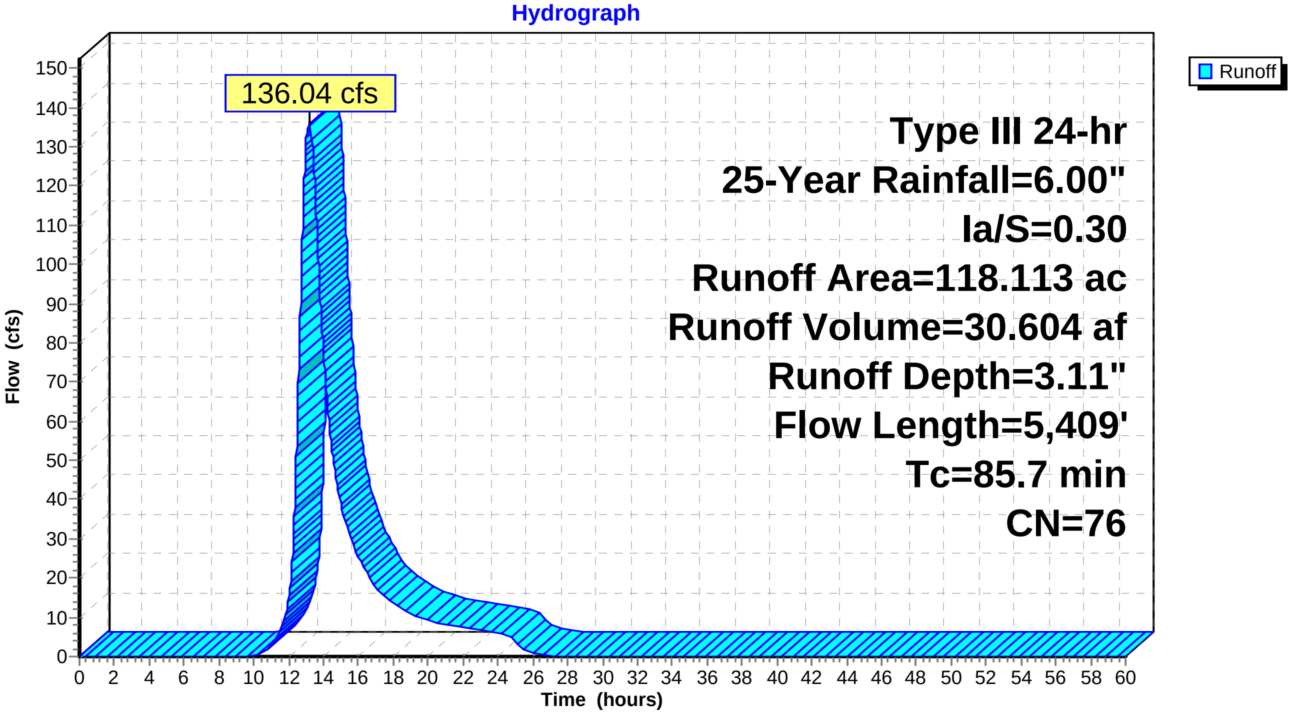
Runoff = 136.04 cfs @ 13.16 hrs, Volume= 30.604 af, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.587 | 98 | Building roof |
| * | 0.994 | 98 | Paved surface |
| * | 0.746 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.090 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 11.920 | 74 | >75% Grass cover, Good, HSG C |
| | 2.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 10.050 | 70 | Woods, Good, HSG C |
| | 89.064 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 118.113 | 76 | Weighted Average |
| | 116.532 | | 98.66% Pervious Area |
| | 1.581 | | 1.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

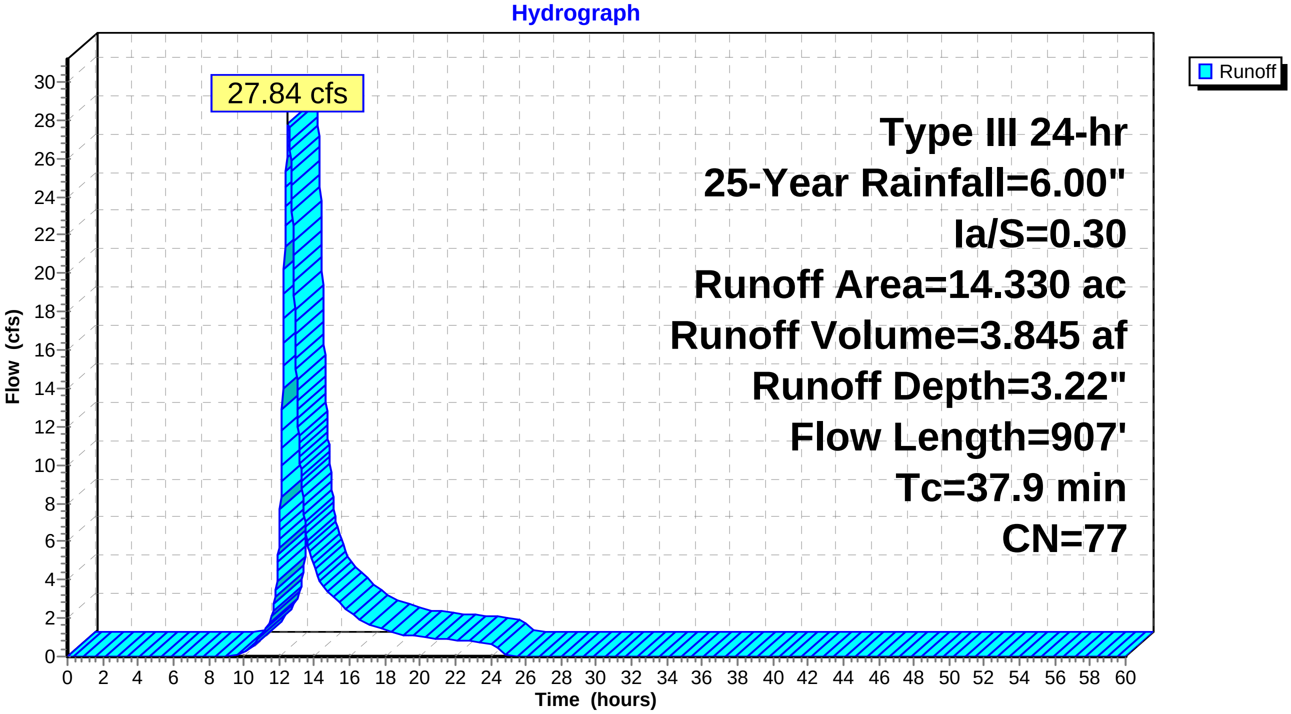
Runoff = 27.84 cfs @ 12.53 hrs, Volume= 3.845 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

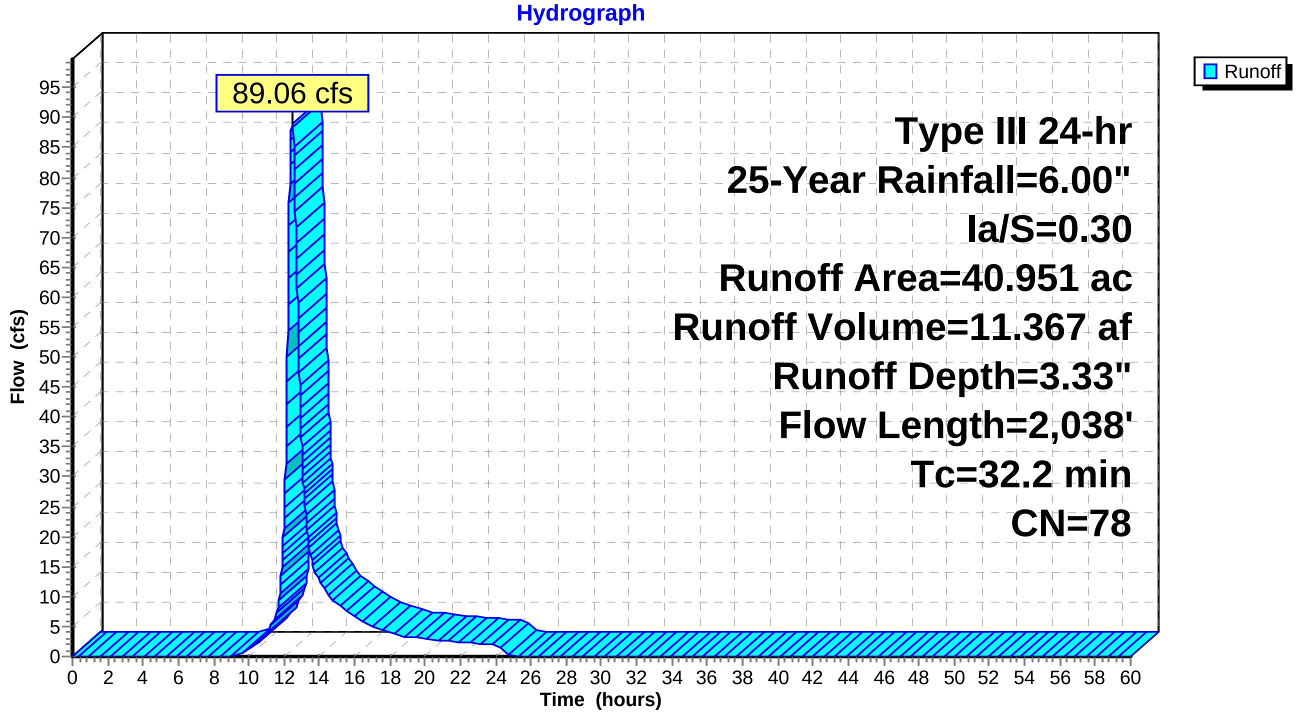
Runoff = 89.06 cfs @ 12.45 hrs, Volume= 11.367 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.640 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.100 | 74 | >75% Grass cover, Good, HSG C |
| | 1.909 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.842 | 70 | Woods, Good, HSG C |
| | 23.560 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.951 | 78 | Weighted Average |
| | 36.411 | | 88.91% Pervious Area |
| | 4.540 | | 11.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 7.8 | 823 | 0.5000 | 1.77 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 725 | 0.1640 | 41.40 | 292.62 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 32.2 | 2,038 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

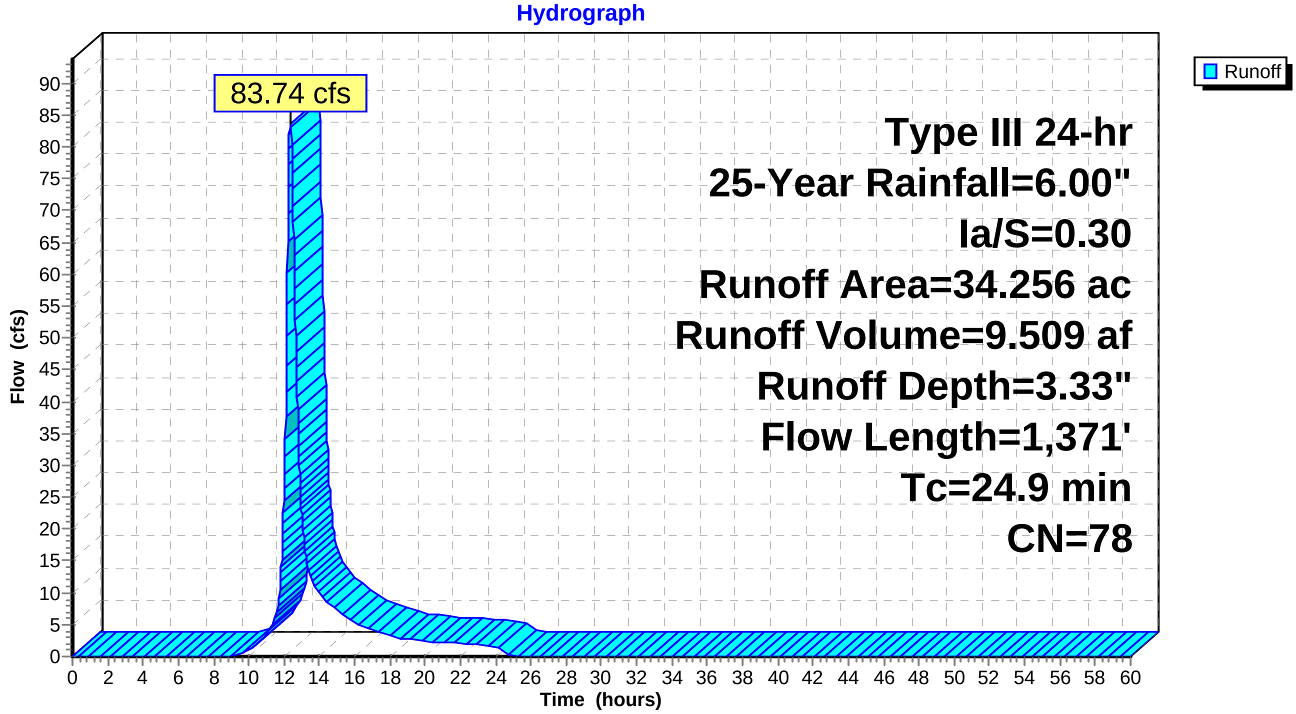
Runoff = 83.74 cfs @ 12.35 hrs, Volume= 9.509 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.000 | 98 | Building roof |
| * | 0.600 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.592 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.332 | 74 | >75% Grass cover, Good, HSG C |
| | 3.160 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.450 | 70 | Woods, Good, HSG C |
| | 9.847 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.275 | 30 | Sand Trap, HSG C |
| | 34.256 | 78 | Weighted Average |
| | 30.064 | | 87.76% Pervious Area |
| | 4.192 | | 12.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4450 | 1.67 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 70 | 0.0280 | 5.29 | 63.46 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.0 | 100 | 0.2800 | 54.09 | 382.35 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 0.2 | 160 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 0.3 | 281 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 24.9 | 1,371 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment B110: B110

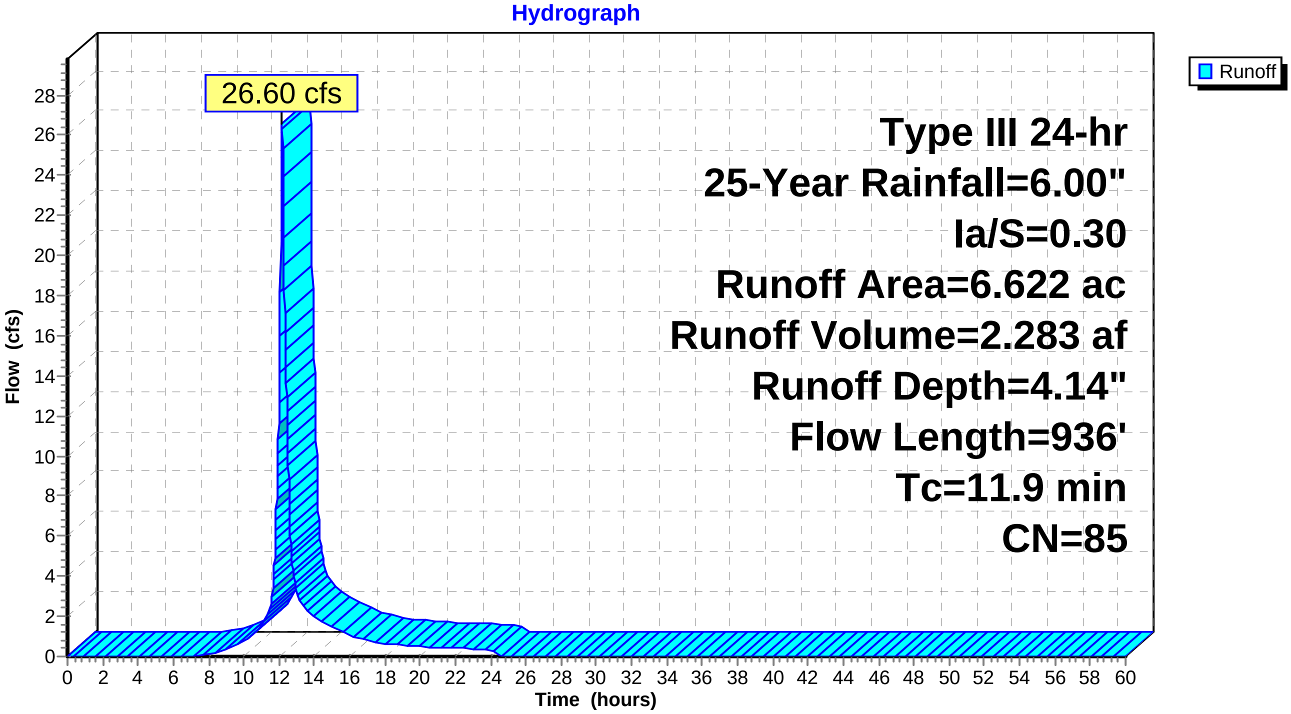
Runoff = 26.60 cfs @ 12.16 hrs, Volume= 2.283 af, Depth= 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.381 | 98 | Building roof |
| * | 1.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.550 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.061 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.622 | 85 | Weighted Average |
| | 3.611 | | 54.53% Pervious Area |
| | 3.011 | | 45.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 100 | 0.1300 | 0.17 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 0.6 | 121 | 0.2500 | 3.50 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 715 | 0.0360 | 7.40 | 23.25 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.024 |
| 11.9 | 936 | Total | | | |

## Subcatchment B110: B110



## Summary for Subcatchment B111: B111

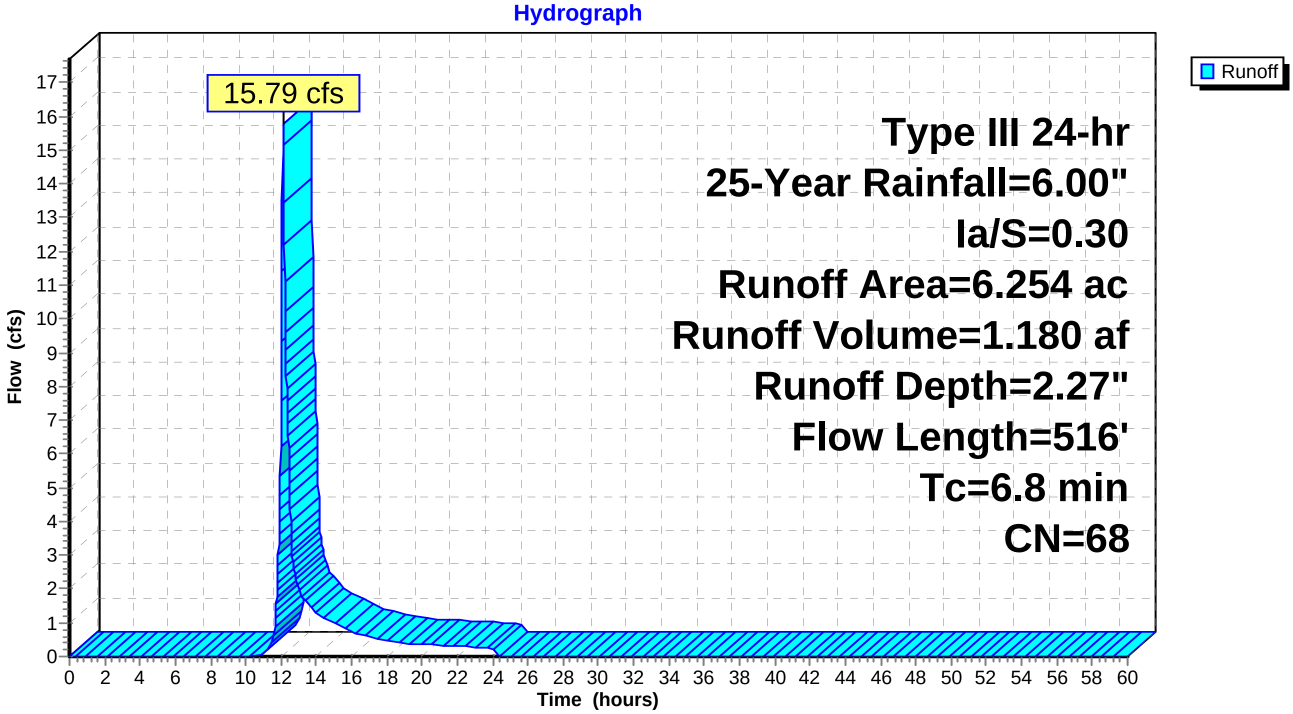
Runoff = 15.79 cfs @ 12.11 hrs, Volume= 1.180 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.504 | 98 | Building roof |
| * | 0.120 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.900 | 98 | Water Surface |
| | 2.730 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.254 | 68 | Weighted Average |
| | 3.730 | | 59.64% Pervious Area |
| | 2.524 | | 40.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.7 | 100 | 0.2000 | 0.45 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 0.6 | 115 | 0.2000 | 3.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 301 | 0.0800 | 1.98 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.8 | 516 | Total | | | |

## Subcatchment B111: B111



## Summary for Subcatchment B112: B112

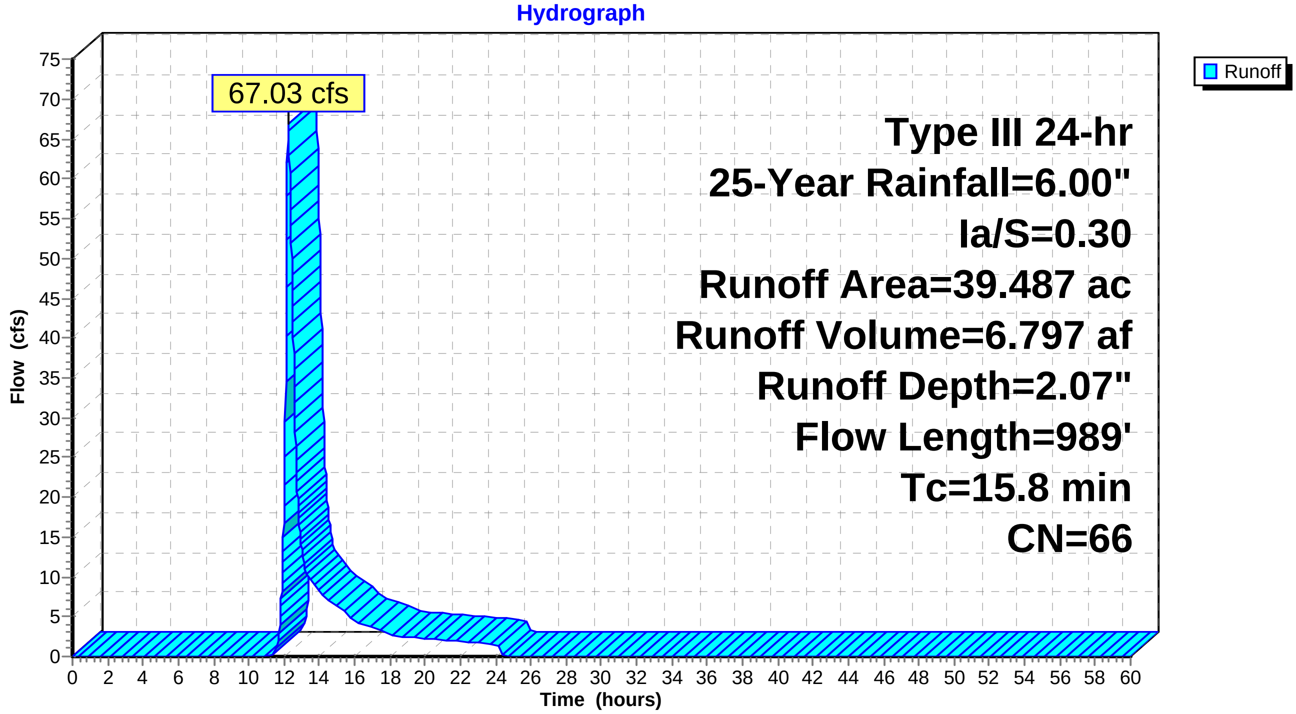
Runoff = 67.03 cfs @ 12.24 hrs, Volume= 6.797 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.550 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 8.285 | 98 | Water Surface |
| | 17.485 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 7.526 | 74 | >75% Grass cover, Good, HSG C |
| | 0.015 | 80 | >75% Grass cover, Good, HSG D |
| | 0.052 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.289 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.385 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 39.487 | 66 | Weighted Average |
| | 25.752 | | 65.22% Pervious Area |
| | 13.735 | | 34.78% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.1 | 100 | 0.0400 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 3.1 | 375 | 0.0850 | 2.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 514 | 0.0470 | 1.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 15.8 | 989 | Total | | | |

## Subcatchment B112: B112



## Summary for Subcatchment B113: B113

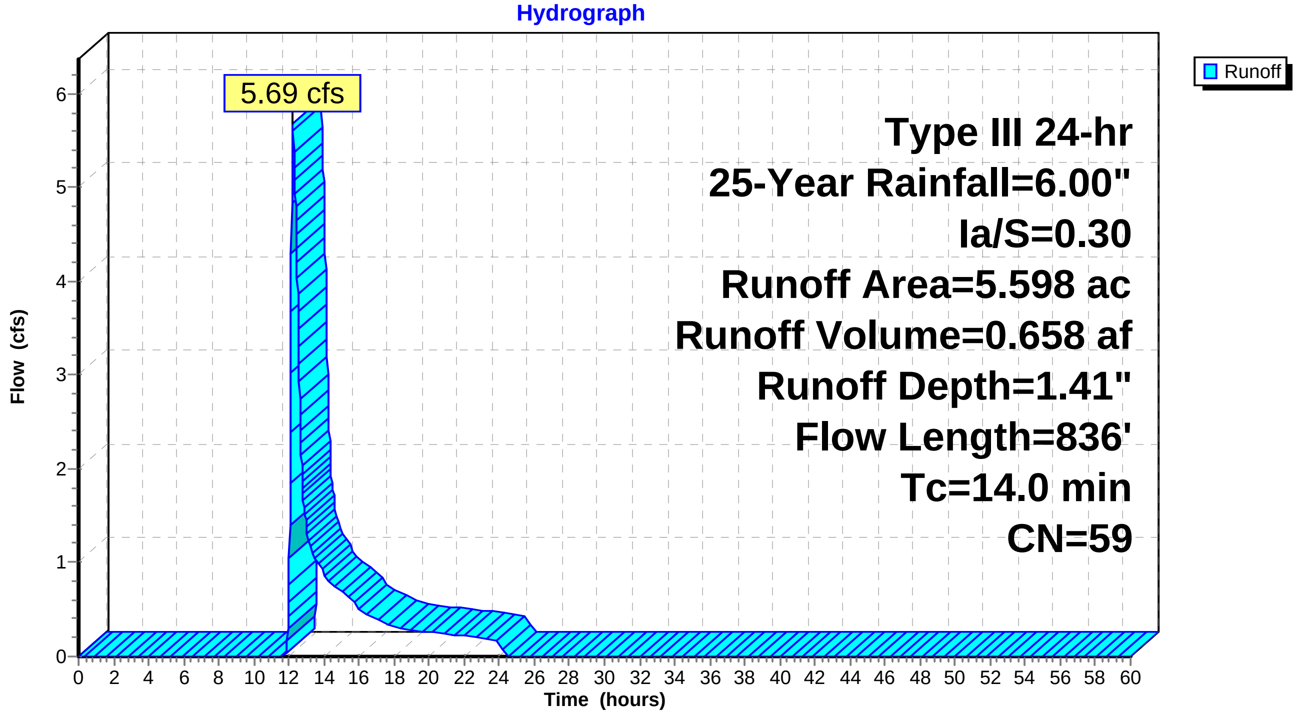
Runoff = 5.69 cfs @ 12.24 hrs, Volume= 0.658 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.060 | 98 | Building roof |
| * | 0.650 | 98 | Paved surface |
| * | 0.009 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.724 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.135 | 80 | >75% Grass cover, Good, HSG D |
| | 0.720 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.300 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.598 | 59 | Weighted Average |
| | 3.888 | | 69.45% Pervious Area |
| | 1.710 | | 30.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.8 | 100 | 0.0800 | 0.14 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.6 | 300 | 0.0360 | 3.05 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 436 | 0.0700 | 12.07 | 14.81 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 |
| 14.0 | 836 | Total | | | |

## Subcatchment B113: B113



## Summary for Subcatchment B115: B115

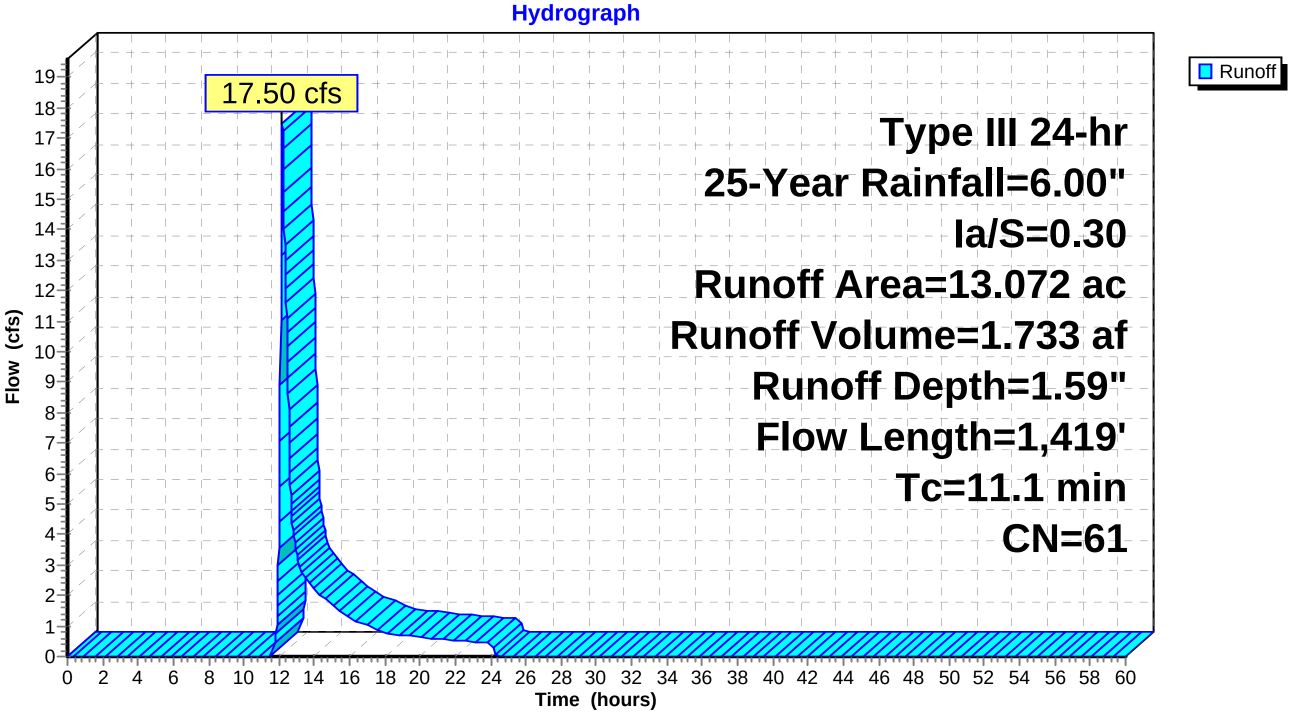
Runoff = 17.50 cfs @ 12.18 hrs, Volume= 1.733 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.615 | 98 | Building roof |
| * | 0.449 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 6.589 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.241 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.030 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.011 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.057 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.080 | 30 | Sand Trap, HSG C |
| | 13.072 | 61 | Weighted Average |
| | 10.008 | | 76.56% Pervious Area |
| | 3.064 | | 23.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 100 | 0.1100 | 0.35 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 4.0 | 340 | 0.0410 | 1.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 979 | 0.0130 | 6.80 | 136.10 | **Channel Flow,** Area= 20.0 sf Perim= 12.0' r= 1.67' n= 0.035 |
| 11.1 | 1,419 | Total | | | |

## Subcatchment B115: B115



## Summary for Subcatchment B116: B116

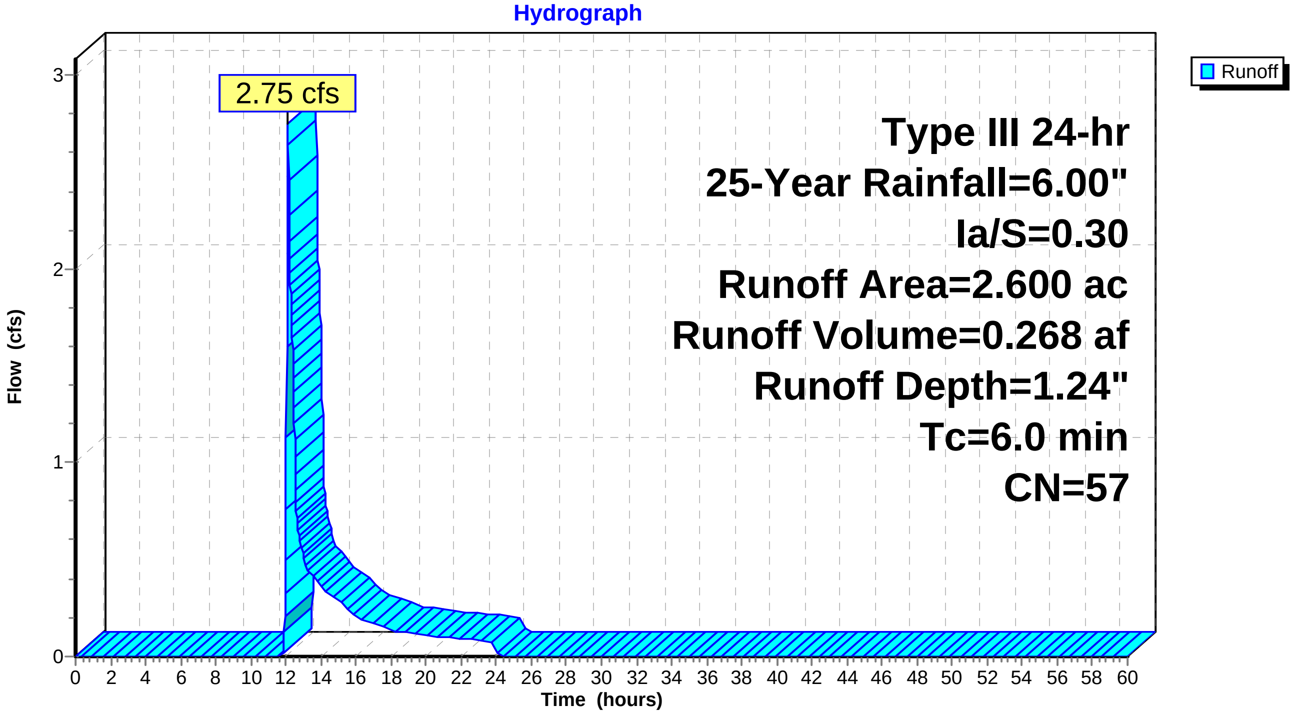
Runoff = 2.75 cfs @ 12.12 hrs, Volume= 0.268 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.174 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.621 | 98 | Water Surface |
| | 1.805 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.600 | 57 | Weighted Average |
| | 1.805 | | 69.42% Pervious Area |
| | 0.795 | | 30.58% Impervious Area |

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

## Subcatchment B116: B116



## Summary for Subcatchment B117: B117

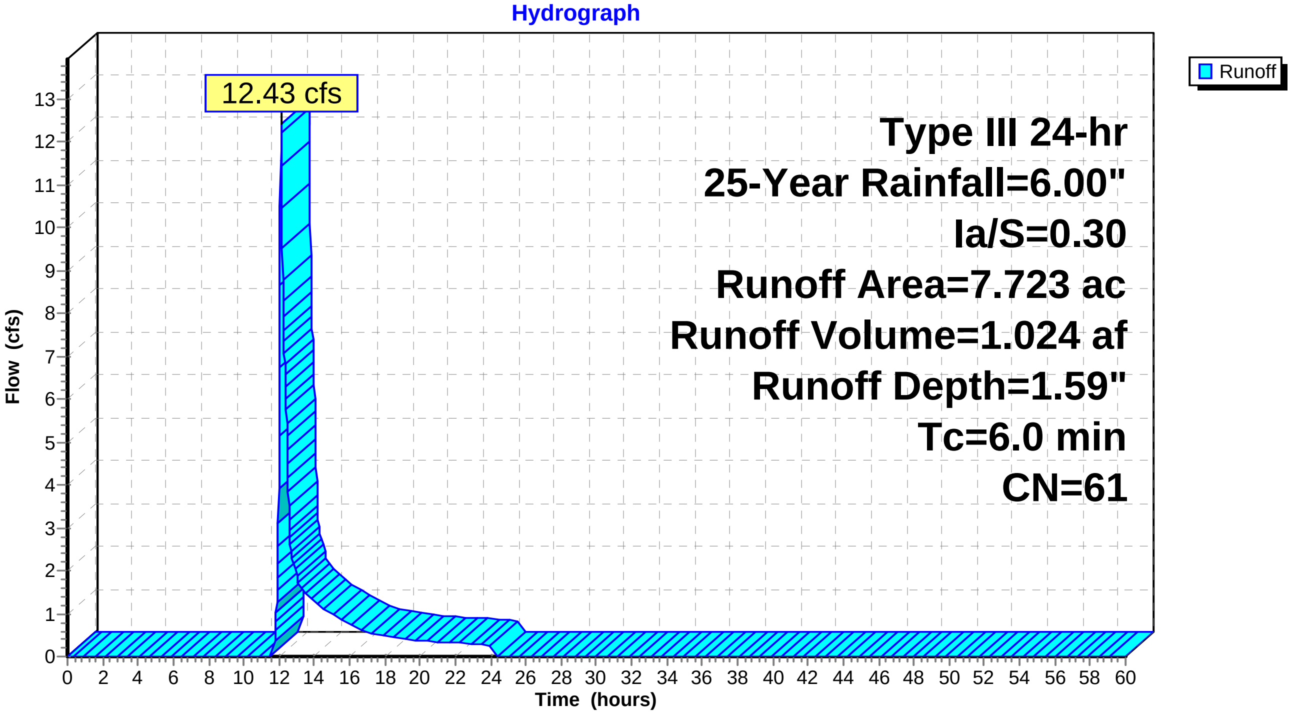
Runoff = 12.43 cfs @ 12.10 hrs, Volume= 1.024 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.200 | 98 | Building roof |
| * | 0.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 4.580 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.018 | 80 | >75% Grass cover, Good, HSG D |
| | 0.268 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.027 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.723 | 61 | Weighted Average |
| | 4.893 | | 63.36% Pervious Area |
| | 2.830 | | 36.64% Impervious Area |

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

## Subcatchment B117: B117



## Summary for Subcatchment B118: B118

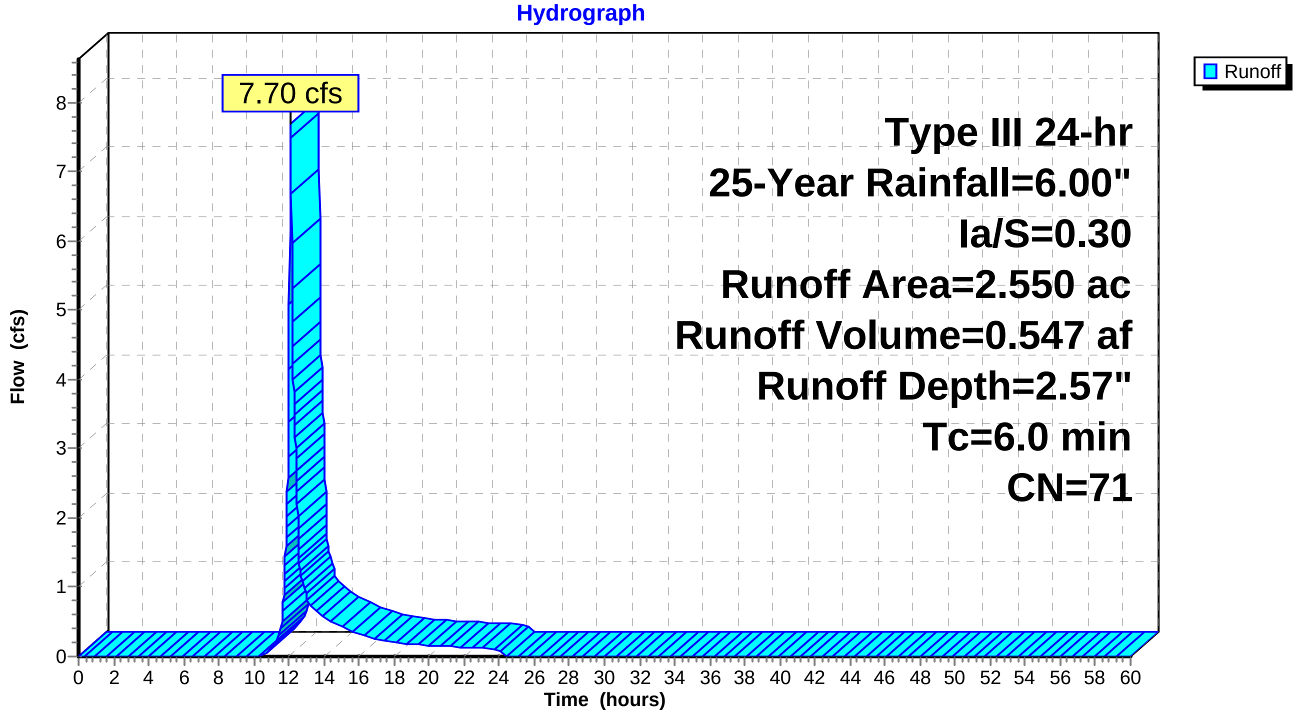
Runoff = 7.70 cfs @ 12.09 hrs, Volume= 0.547 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.295 | 98 | Building roof |
| * | 0.100 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 1.015 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.140 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.550 | 71 | Weighted Average |
| | 1.155 | | 45.29% Pervious Area |
| | 1.395 | | 54.71% Impervious Area |

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

## Subcatchment B118: B118



## Summary for Subcatchment B119: B119

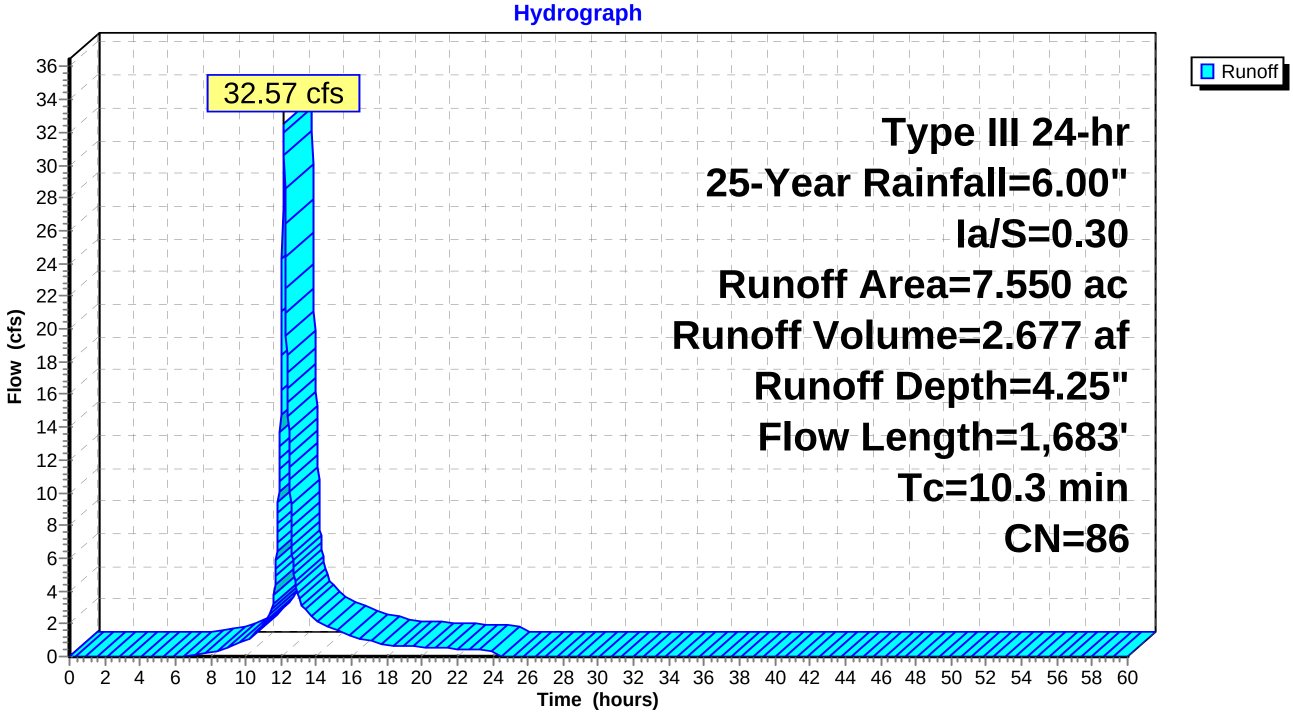
Runoff = 32.57 cfs @ 12.14 hrs, Volume= 2.677 af, Depth= 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.300 | 98 | Building roof |
| * | 0.950 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.300 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.550 | 86 | Weighted Average |
| | 3.300 | | 43.71% Pervious Area |
| | 4.250 | | 56.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.3000 | 0.24 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 2.3 | 185 | 0.3000 | 1.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.1 | 50 | 0.1100 | 6.73 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.9 | 1,348 | 0.1100 | 25.87 | 81.28 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 10.3 | 1,683 | Total | | | |

## Subcatchment B119: B119



## Summary for Subcatchment C101: C101

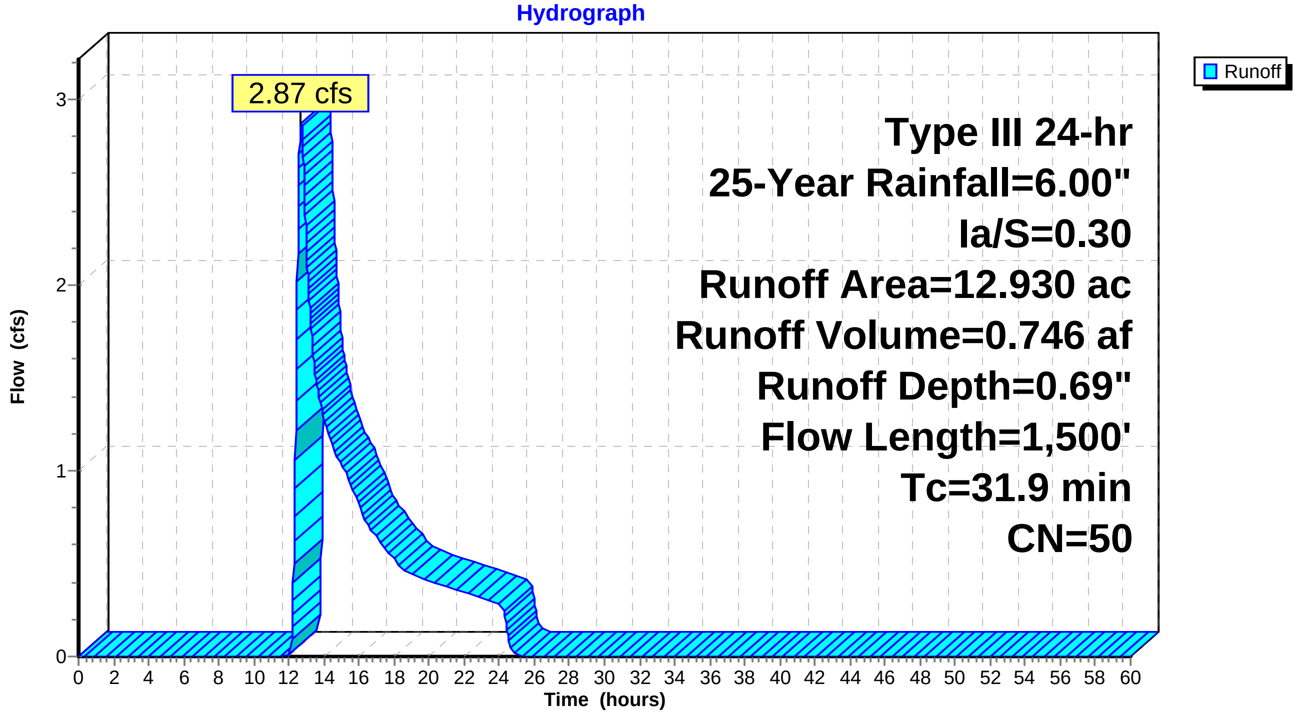
Runoff = 2.87 cfs @ 12.70 hrs, Volume= 0.746 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 4.850 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.370 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.860 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.850 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 12.930 | 50 | Weighted Average |
| | 12.930 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

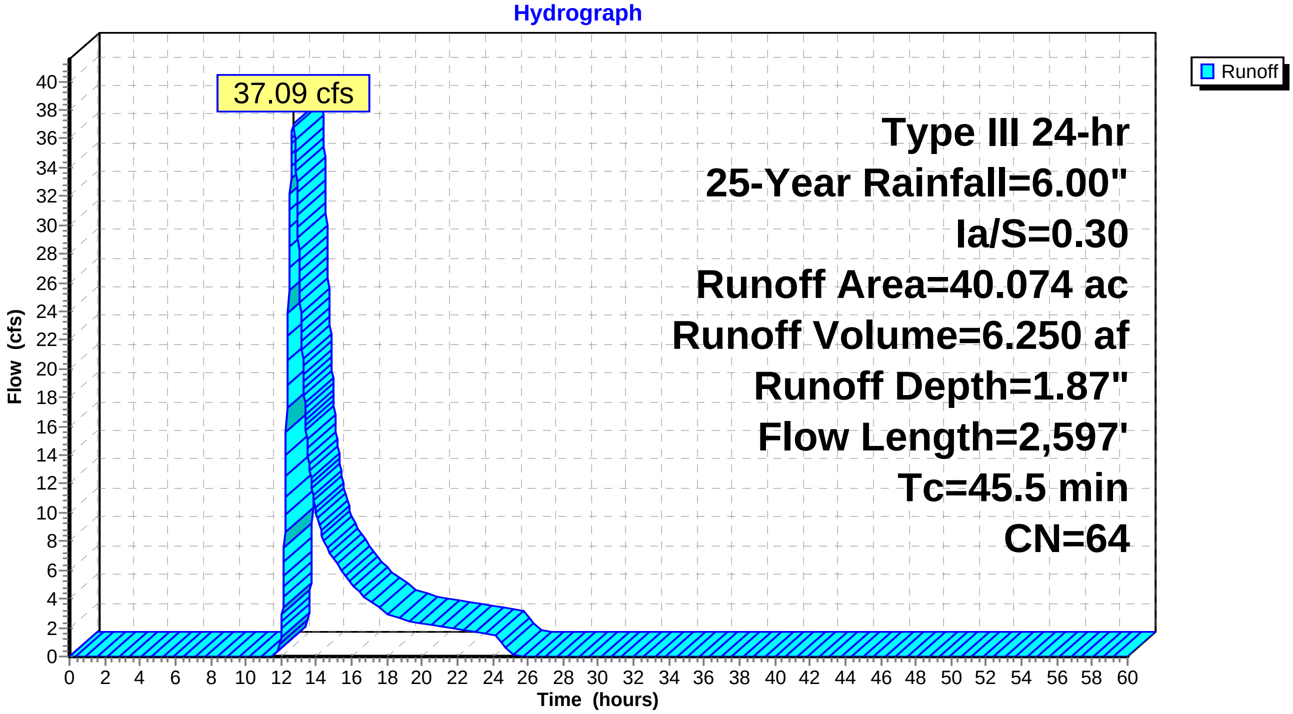
Runoff = 37.09 cfs @ 12.70 hrs, Volume= 6.250 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.007 | 98 | Paved surface |
| * | 0.515 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.285 | 98 | Rock Outcrop/Ledge |
| | 13.181 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.190 | 74 | >75% Grass cover, Good, HSG C |
| | 1.269 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.574 | 70 | Woods, Good, HSG C |
| | 15.097 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.074 | 64 | Weighted Average |
| | 38.950 | | 97.20% Pervious Area |
| | 1.124 | | 2.80% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment C103: C103

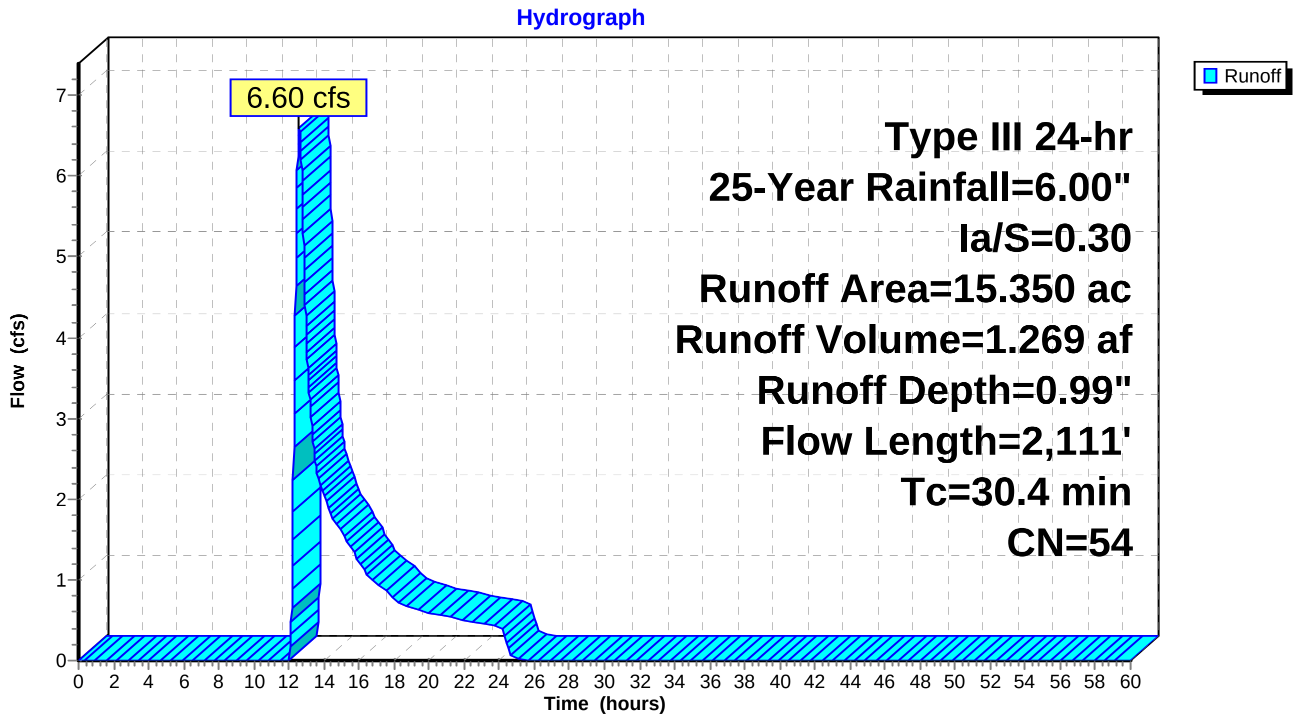
Runoff = 6.60 cfs @ 12.59 hrs, Volume= 1.269 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 2.860 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 9.290 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.240 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.980 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.980 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.350 | 54 | Weighted Average |
| | 12.490 | | 81.37% Pervious Area |
| | 2.860 | | 18.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.9 | 100 | 0.1300 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 185 | 0.1560 | 1.97 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 188 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 288 | 0.0069 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.2 | 1,350 | 0.0260 | 10.03 | 12.31 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 |
| 30.4 | 2,111 | Total | | | |

## Subcatchment C103: C103



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

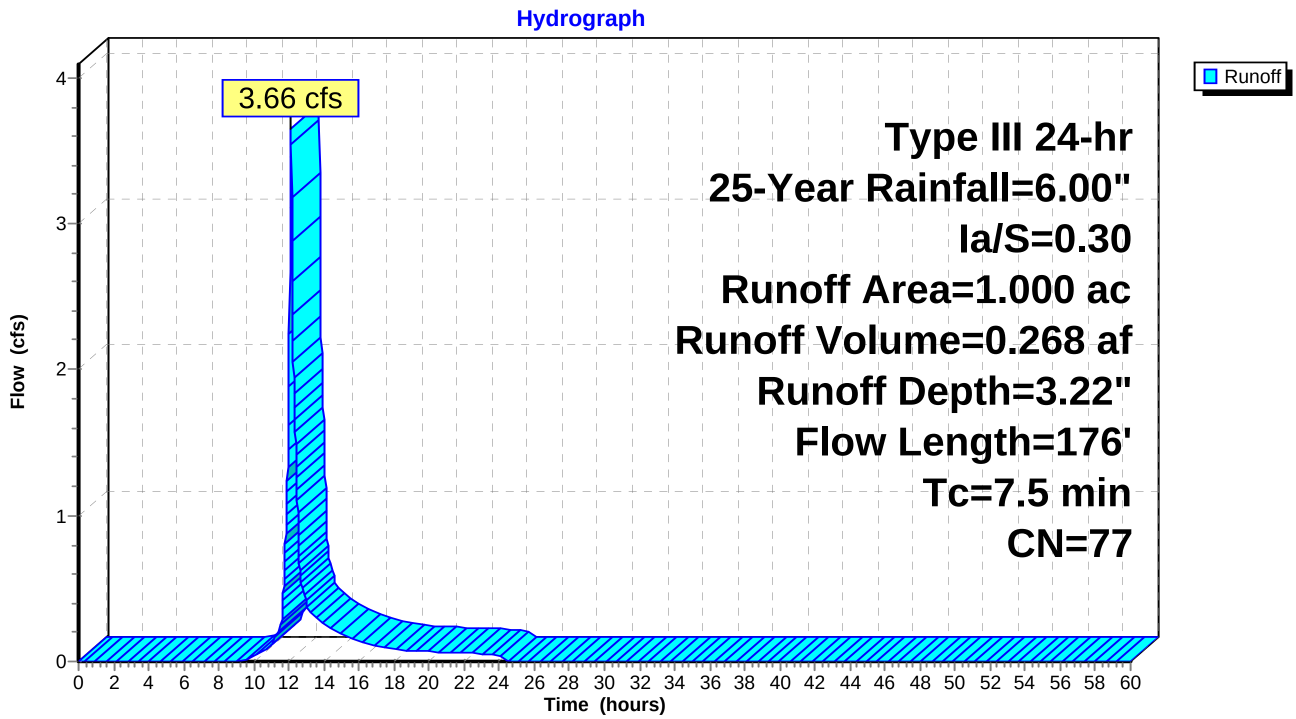
Runoff = 3.66 cfs @ 12.11 hrs, Volume= 0.268 af, Depth= 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 25-Year Rainfall=6.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.590 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.260 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 77 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1100 | 6.73 | | **Shallow Concentrated Flow, C to D**<br>Paved Kv= 20.3 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



## Summary for Reach 36" Pipe: 36" Pipe

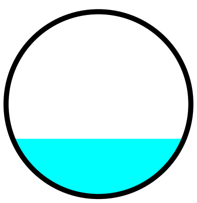
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 3.35" for 25-Year event
Inflow = 31.85 cfs @ 12.39 hrs, Volume= 4.299 af
Outflow = 31.83 cfs @ 12.40 hrs, Volume= 4.299 af, Atten= 0%, Lag= 0.8 min

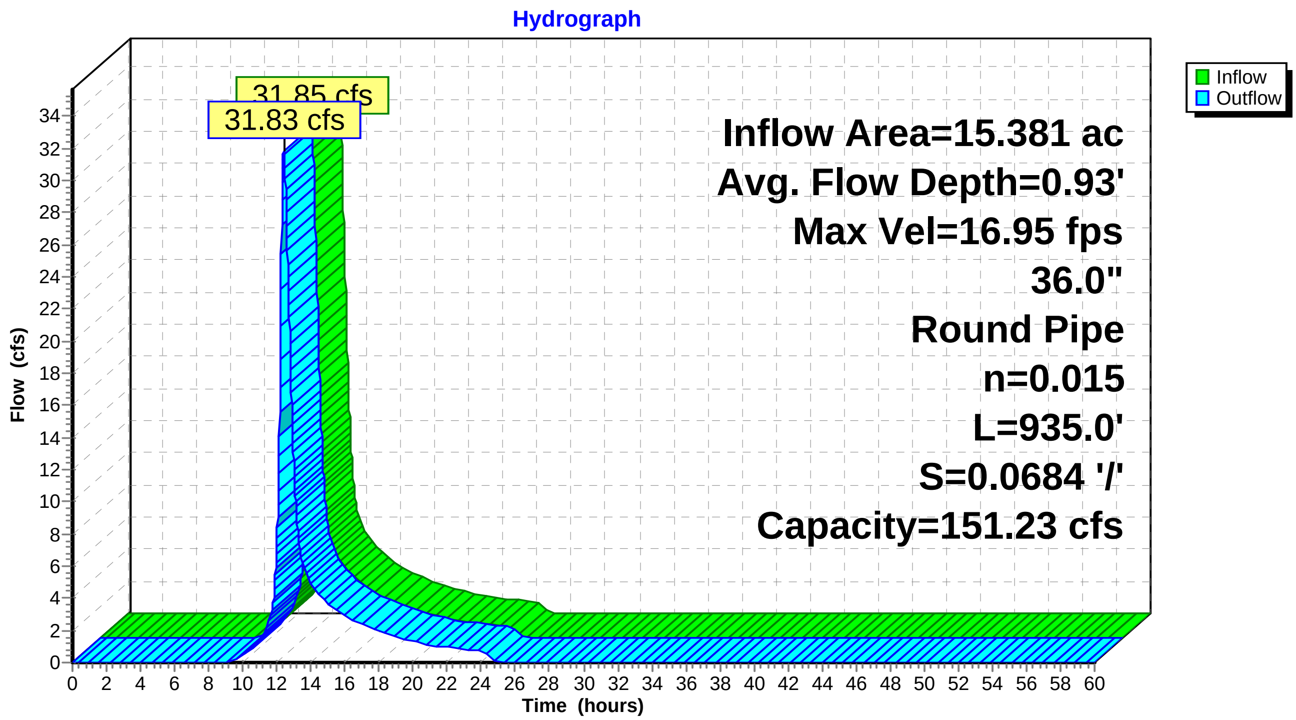
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 16.95 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 5.08 fps, Avg. Travel Time= 3.1 min

Peak Storage= 1,756 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.93'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 151.23 cfs

36.0" Round Pipe
n= 0.015
Length= 935.0' Slope= 0.0684 '/'
Inlet Invert= 635.00', Outlet Invert= 571.00'



### Reach 36" Pipe: 36" Pipe



## Summary for Reach 42" Pipe: 42" Pipe

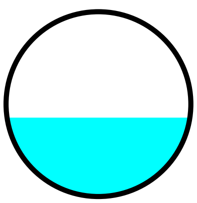
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 100.939 ac, 4.72% Impervious, Inflow Depth = 2.78" for 25-Year event
Inflow = 123.64 cfs @ 12.84 hrs, Volume= 23.420 af
Outflow = 123.53 cfs @ 12.84 hrs, Volume= 23.420 af, Atten= 0%, Lag= 0.0 min

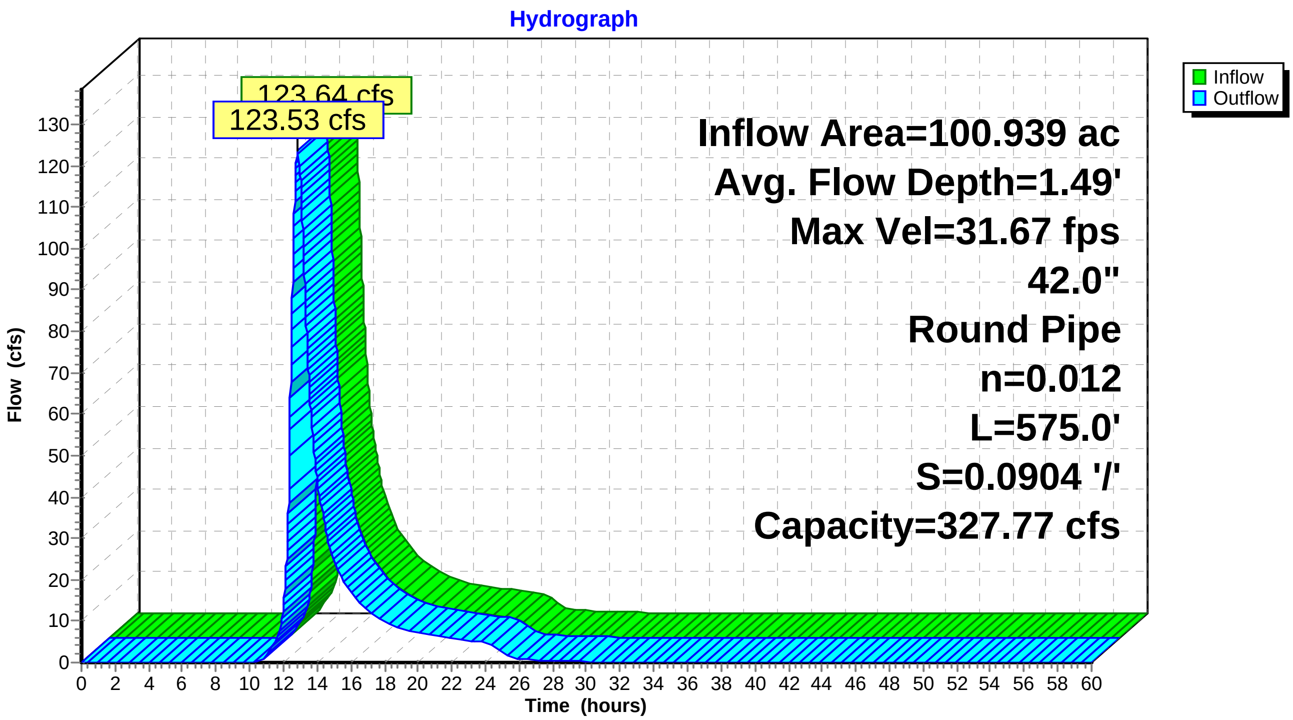
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 31.67 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 7.27 fps, Avg. Travel Time= 1.3 min

Peak Storage= 2,243 cf @ 12.84 hrs
Average Depth at Peak Storage= 1.49'
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 327.77 cfs

42.0" Round Pipe
n= 0.012
Length= 575.0' Slope= 0.0904 '/'
Inlet Invert= 587.00', Outlet Invert= 535.00'



### Reach 42" Pipe: 42" Pipe



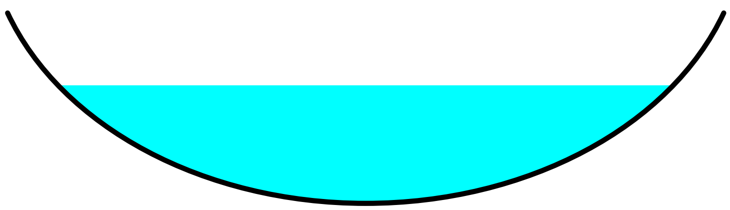
## Summary for Reach A105R: Thru A103

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 2.29" for 25-Year event
Inflow = 57.48 cfs @ 12.47 hrs, Volume= 8.016 af
Outflow = 55.14 cfs @ 12.53 hrs, Volume= 8.016 af, Atten= 4%, Lag= 3.4 min

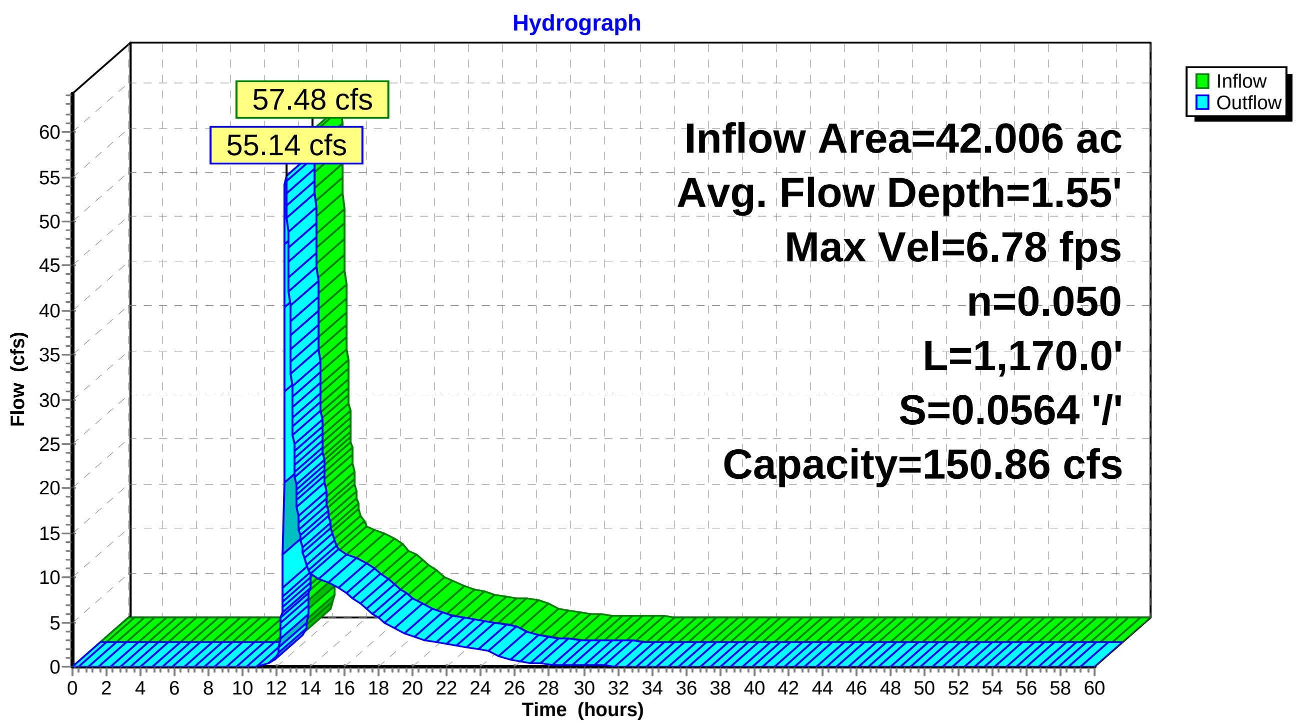
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.78 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 1.47 fps, Avg. Travel Time= 13.3 min

Peak Storage= 9,507 cf @ 12.53 hrs
Average Depth at Peak Storage= 1.55'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 150.86 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,170.0' Slope= 0.0564 '/'
Inlet Invert= 566.00', Outlet Invert= 500.00'



### Reach A105R: Thru A103



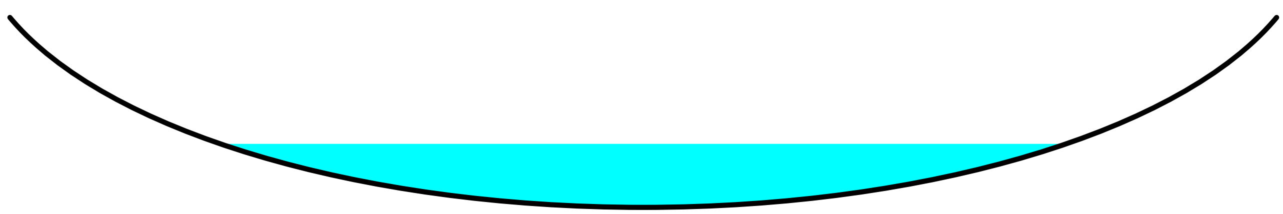
## Summary for Reach B107R: Thru B103

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 2.99" for 25-Year event
Inflow = 17.88 cfs @ 12.89 hrs, Volume= 3.569 af
Outflow = 17.85 cfs @ 12.92 hrs, Volume= 3.569 af, Atten= 0%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.95 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 9.8 min

Peak Storage= 2,408 cf @ 12.92 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 192.14 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 938.0' Slope= 0.4072 '/'
Inlet Invert= 972.00', Outlet Invert= 590.00'



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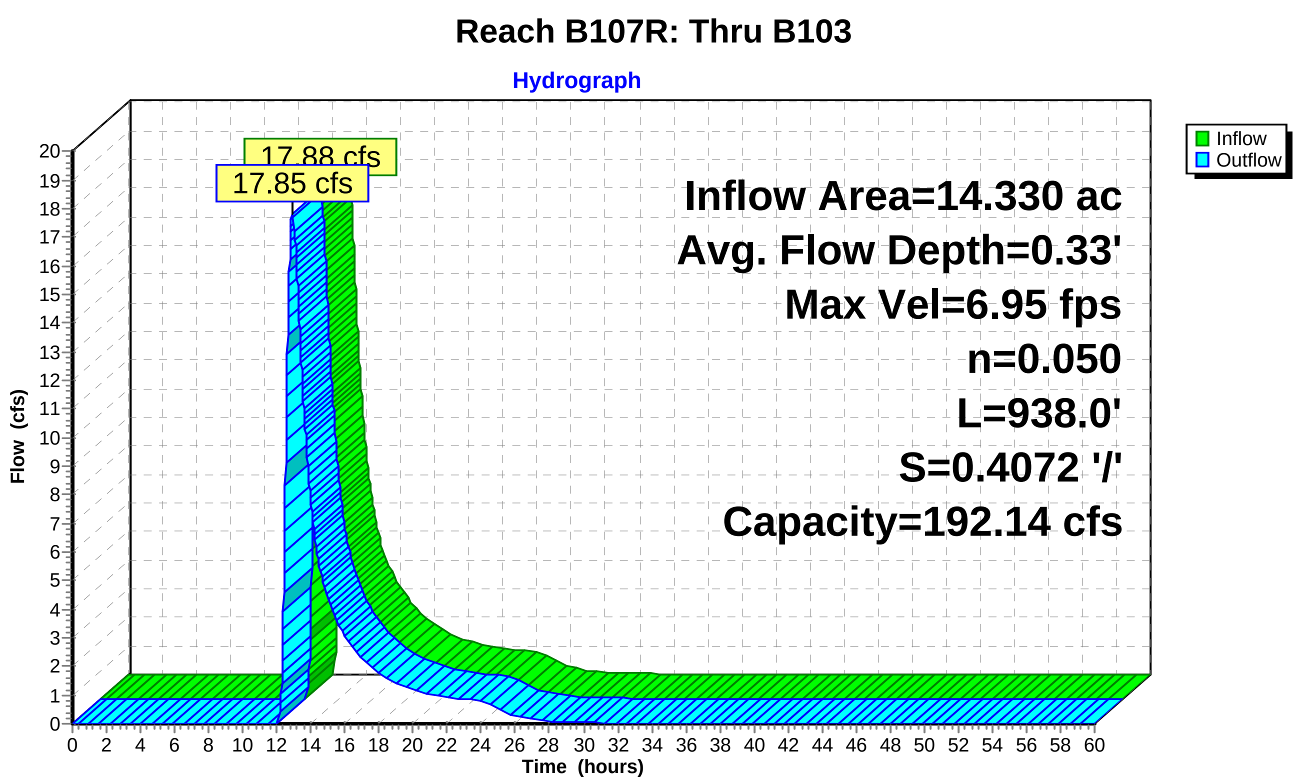


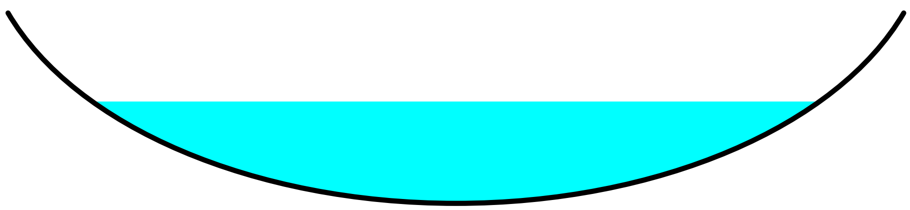
## Summary for Reach B112R: Thru B102

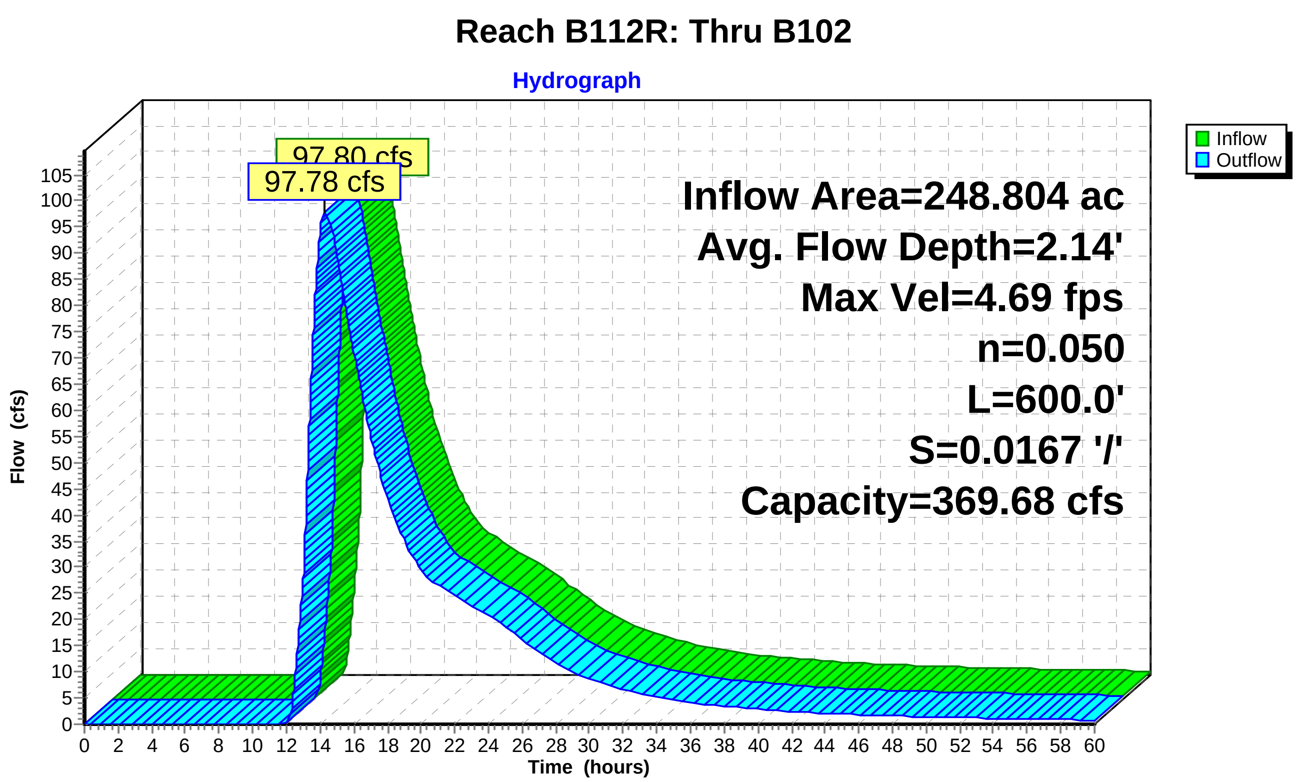
Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 2.78" for 25-Year event
Inflow = 97.80 cfs @ 14.27 hrs, Volume= 57.662 af
Outflow = 97.78 cfs @ 14.30 hrs, Volume= 57.652 af, Atten= 0%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 4.69 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 2.10 fps, Avg. Travel Time= 4.8 min

Peak Storage= 12,506 cf @ 14.30 hrs
Average Depth at Peak Storage= 2.14'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 369.68 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 600.0' Slope= 0.0167 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'





## Summary for Pond 102C: Pond 102C

Inflow Area = 40.074 ac, 2.80% Impervious, Inflow Depth = 1.87" for 25-Year event
Inflow = 37.09 cfs @ 12.70 hrs, Volume= 6.250 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.82' @ 26.62 hrs Surf.Area= 205,030 sf Storage= 272,239 cf

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

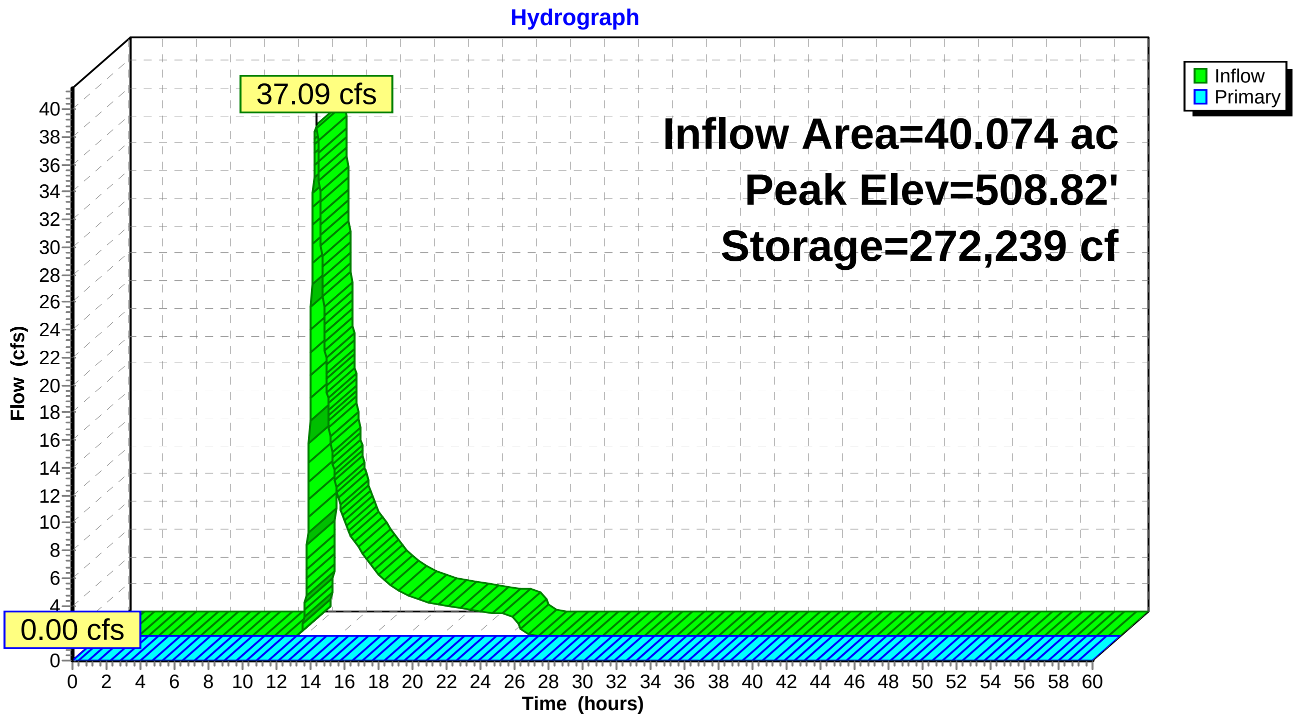
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=506.70' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 102C: Pond 102C



## Summary for Pond 104A: Wetland D

Inflow Area = 29.922 ac, 5.68% Impervious, Inflow Depth = 0.49" for 25-Year event
Inflow = 3.88 cfs @ 12.63 hrs, Volume= 1.229 af
Outflow = 2.52 cfs @ 13.22 hrs, Volume= 1.208 af, Atten= 35%, Lag= 35.4 min
Primary = 0.35 cfs @ 13.22 hrs, Volume= 0.431 af
Secondary = 2.18 cfs @ 13.22 hrs, Volume= 0.777 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.04' @ 13.22 hrs Surf.Area= 25,448 sf Storage= 7,597 cf

Plug-Flow detention time= 144.9 min calculated for 1.208 af (98% of inflow)
Center-of-Mass det. time= 136.9 min ( 1,126.2 - 989.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

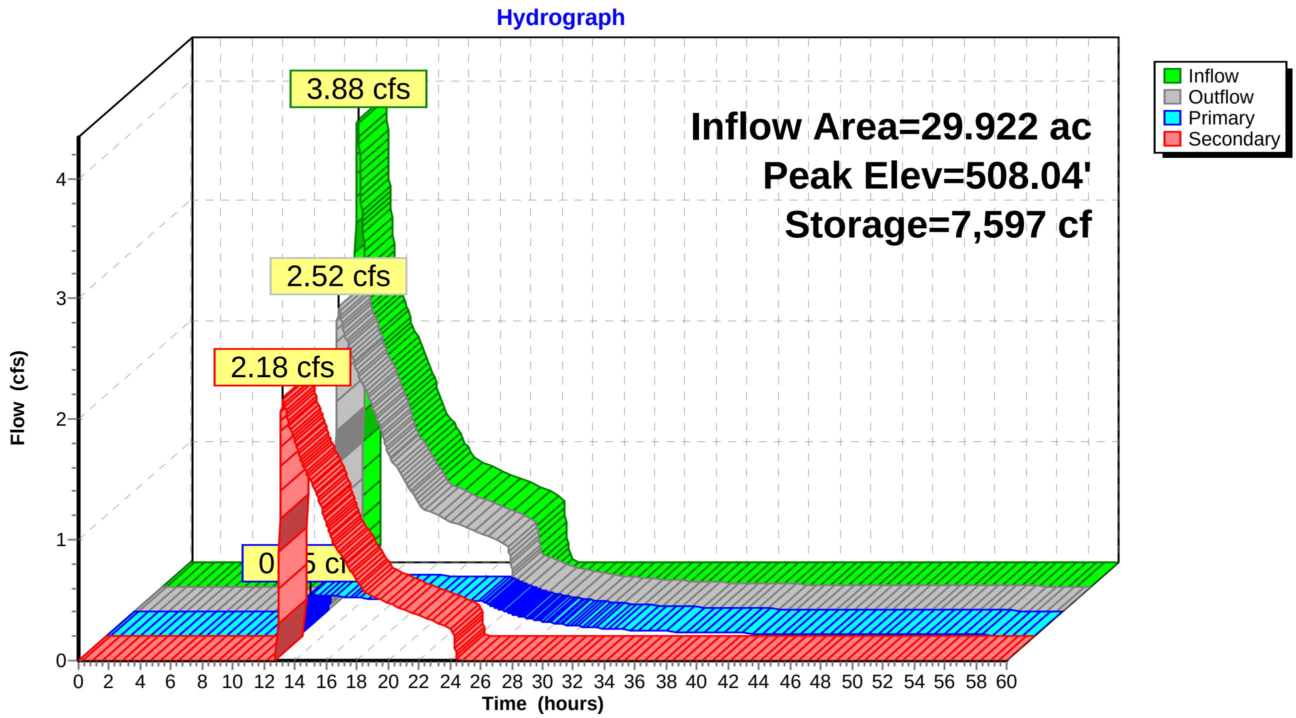
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.35 cfs @ 13.22 hrs HW=508.04' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.35 cfs @ 2.19 fps)

**Secondary OutFlow** Max=2.18 cfs @ 13.22 hrs HW=508.04' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 2.18 cfs @ 0.54 fps)

## Pond 104A: Wetland D



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach 36" Pipe OUTLET depth by 3.64' @ 14.08 hrs

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 2.29" for 25-Year event
Inflow = 61.97 cfs @ 12.35 hrs, Volume= 8.033 af
Outflow = 57.48 cfs @ 12.47 hrs, Volume= 8.016 af, Atten= 7%, Lag= 7.0 min
Primary = 10.69 cfs @ 12.47 hrs, Volume= 6.154 af
Secondary = 46.78 cfs @ 12.47 hrs, Volume= 1.863 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.23' @ 12.47 hrs Surf.Area= 32,268 sf Storage= 64,421 cf

Plug-Flow detention time= 81.6 min calculated for 8.016 af (100% of inflow)
Center-of-Mass det. time= 80.3 min ( 960.0 - 879.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

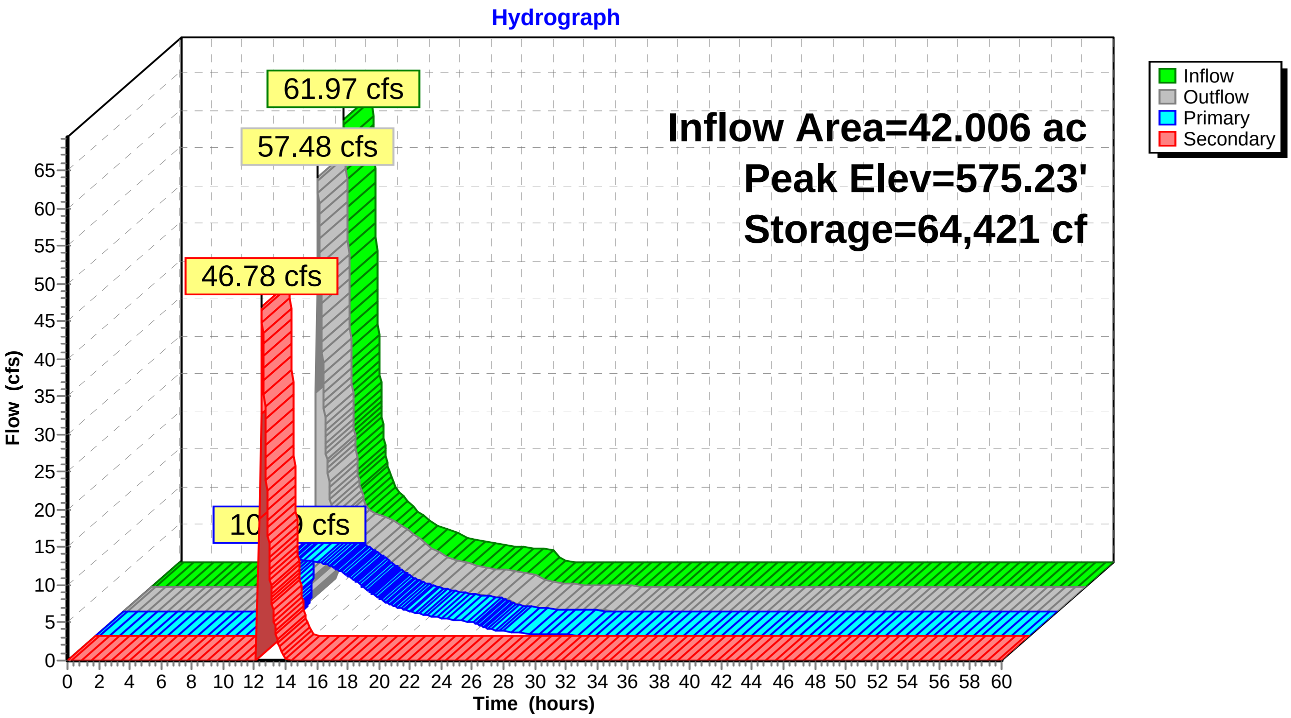
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=10.69 cfs @ 12.47 hrs HW=575.23' TW=567.48' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.69 cfs @ 6.05 fps)

**Secondary OutFlow** Max=46.69 cfs @ 12.47 hrs HW=575.23' TW=567.48' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 46.69 cfs @ 1.13 fps)

## Pond 105A: Wetland H



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 3.35" for 25-Year event
Inflow = 31.85 cfs @ 12.39 hrs, Volume= 4.299 af
Outflow = 31.85 cfs @ 12.39 hrs, Volume= 4.299 af, Atten= 0%, Lag= 0.1 min
Primary = 31.85 cfs @ 12.39 hrs, Volume= 4.299 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 719.09' @ 12.39 hrs Surf.Area= 66 sf Storage= 53 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 867.0 - 867.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

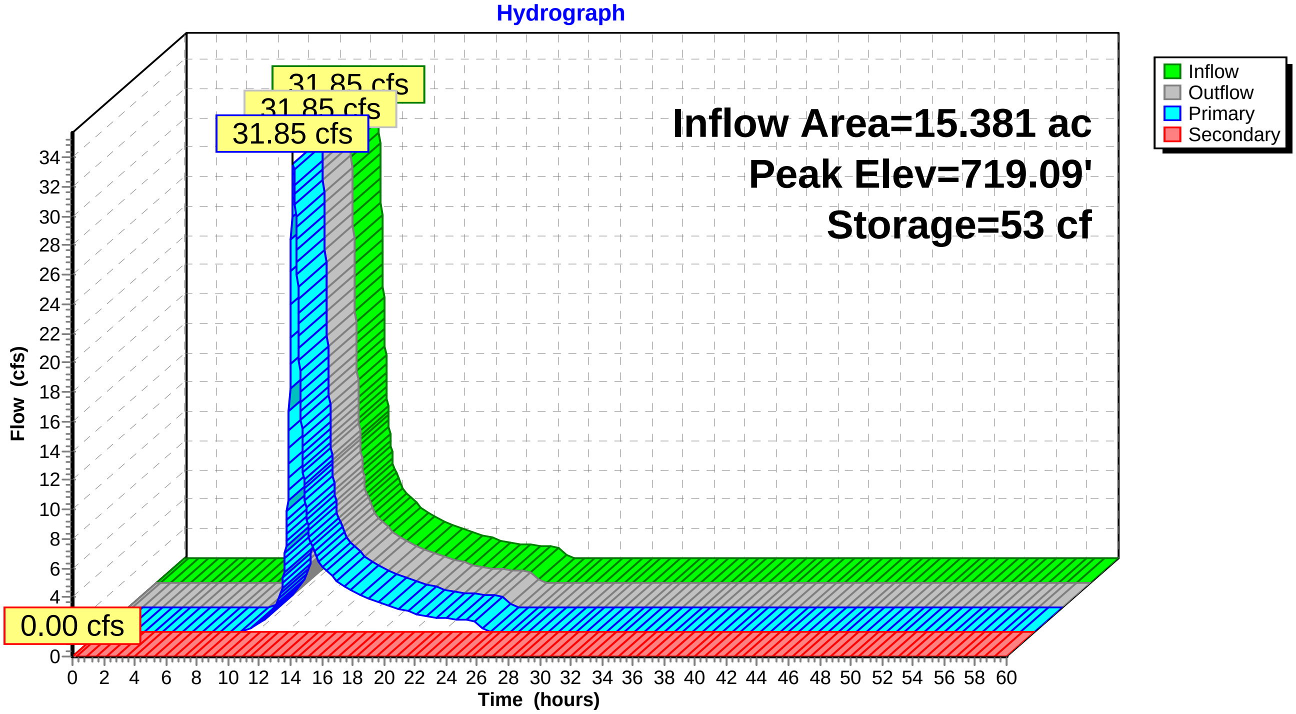
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=31.83 cfs @ 12.39 hrs HW=719.09' TW=635.93' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 31.83 cfs @ 5.27 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=635.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 118.113 ac, 1.34% Impervious, Inflow Depth = 3.11" for 25-Year event
Inflow = 136.04 cfs @ 13.16 hrs, Volume= 30.604 af
Outflow = 136.02 cfs @ 13.18 hrs, Volume= 30.604 af, Atten= 0%, Lag= 1.3 min
Primary = 136.02 cfs @ 13.18 hrs, Volume= 30.604 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 526.95' @ 13.18 hrs Surf.Area= 12,549 sf Storage= 22,152 cf

Plug-Flow detention time= 8.2 min calculated for 30.604 af (100% of inflow)
Center-of-Mass det. time= 7.9 min ( 917.7 - 909.8 )

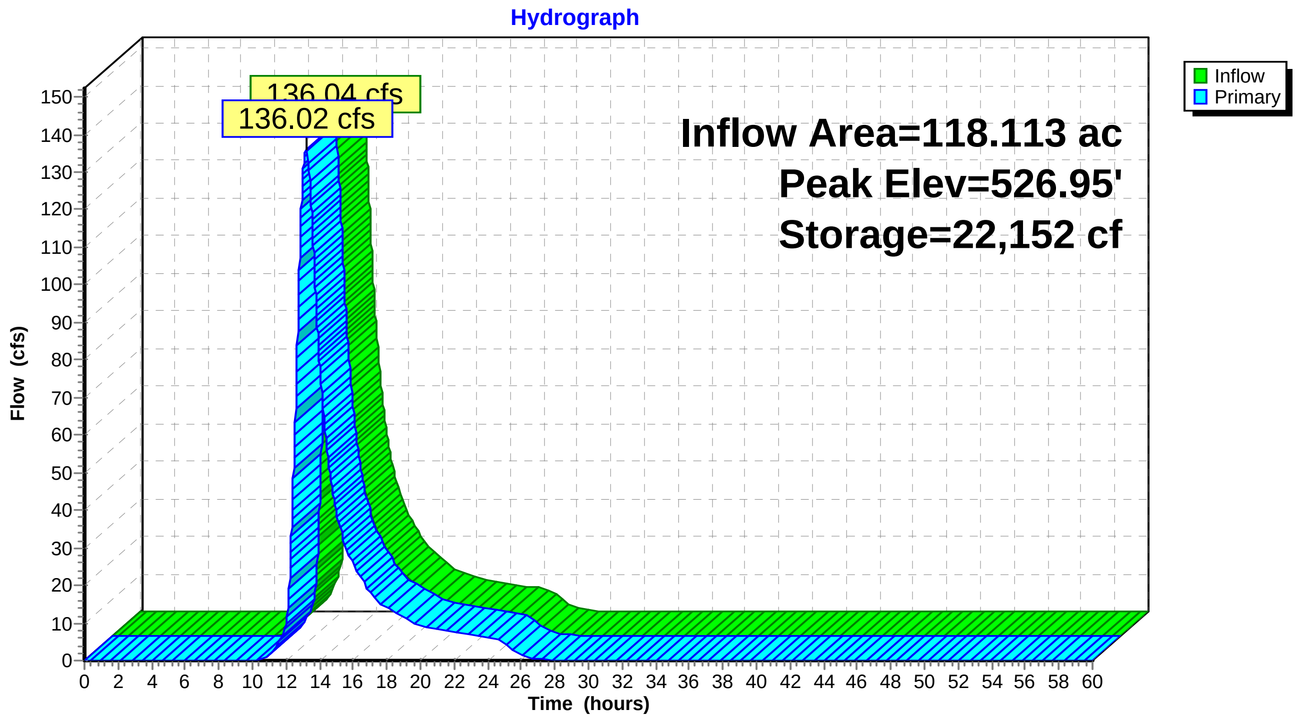
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=136.02 cfs @ 13.18 hrs HW=526.95' TW=516.56' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 136.02 cfs @ 2.97 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 95.412 ac, 4.86% Impervious, Inflow Depth = 2.87" for 25-Year event
Inflow = 121.07 cfs @ 12.82 hrs, Volume= 22.849 af
Outflow = 121.09 cfs @ 12.84 hrs, Volume= 22.849 af, Atten= 0%, Lag= 1.2 min
Primary = 43.10 cfs @ 12.84 hrs, Volume= 17.090 af
Secondary = 77.99 cfs @ 12.84 hrs, Volume= 5.760 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 626.00' @ 12.84 hrs Surf.Area= 1,451 sf Storage= 3,093 cf

Plug-Flow detention time= 0.4 min calculated for 22.842 af (100% of inflow)
Center-of-Mass det. time= 0.4 min ( 906.1 - 905.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

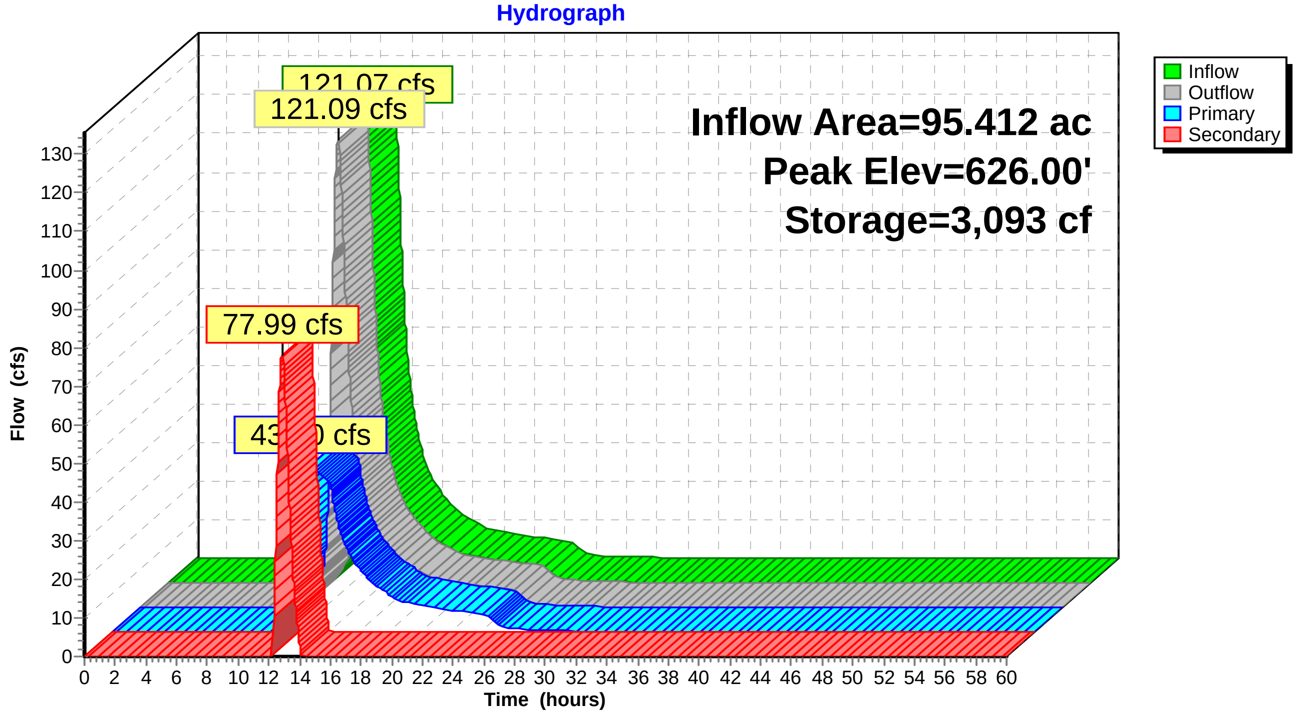
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=43.10 cfs @ 12.84 hrs HW=626.00' TW=588.49' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 43.10 cfs @ 13.72 fps)

**Secondary OutFlow** Max=77.99 cfs @ 12.84 hrs HW=626.00' TW=613.19' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 77.99 cfs @ 3.14 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 3.22" for 25-Year event
Inflow = 27.84 cfs @ 12.53 hrs, Volume= 3.845 af
Outflow = 17.88 cfs @ 12.89 hrs, Volume= 3.569 af, Atten= 36%, Lag= 21.7 min
Primary = 17.88 cfs @ 12.89 hrs, Volume= 3.569 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.90' @ 12.89 hrs Surf.Area= 124,635 sf Storage= 49,049 cf

Plug-Flow detention time= 107.0 min calculated for 3.569 af (93% of inflow)
Center-of-Mass det. time= 69.8 min ( 932.4 - 862.5 )

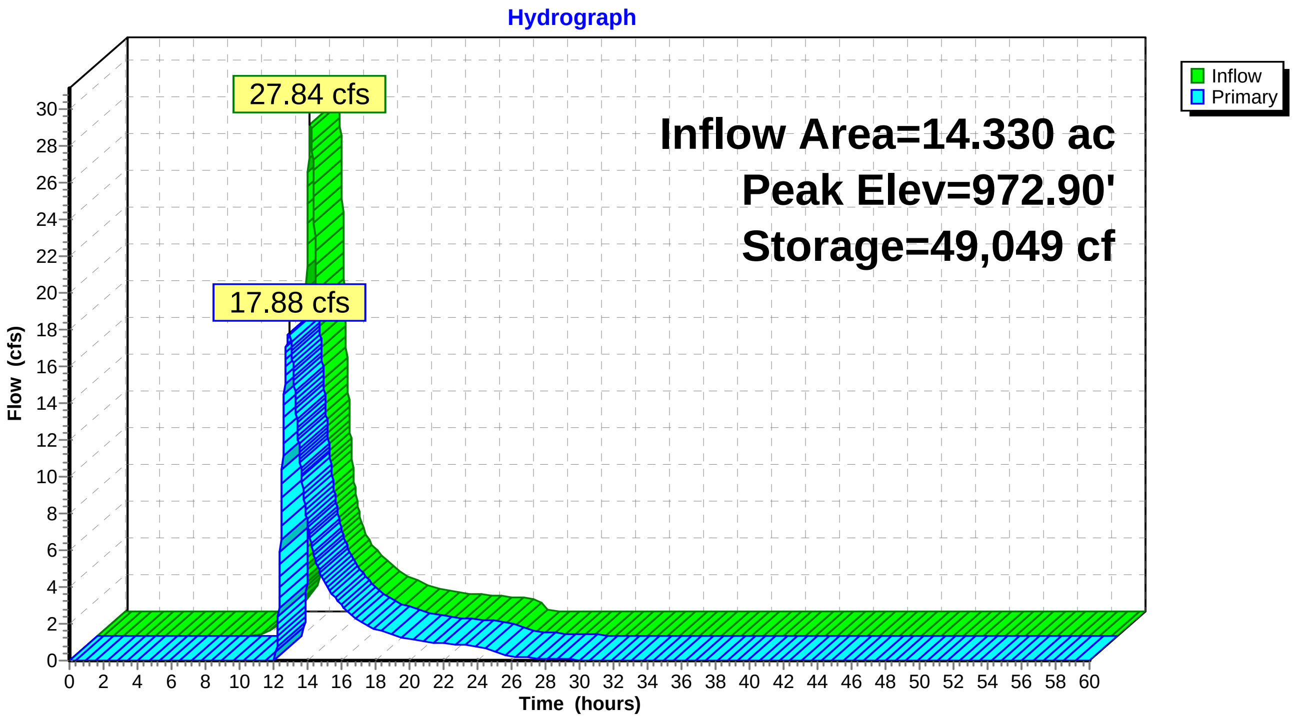
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=17.87 cfs @ 12.89 hrs HW=972.90' TW=972.33' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 17.87 cfs @ 1.48 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

| | | | |
|---|---|---|---|
| Inflow Area = | 5.527 ac, 2.32% Impervious, Inflow Depth = 13.74" for 25-Year event | | |
| Inflow = | 80.49 cfs @ 12.83 hrs, Volume= | 6.330 af | |
| Outflow = | 80.54 cfs @ 12.84 hrs, Volume= | 6.330 af, | Atten= 0%, Lag= 0.5 min |
| Primary = | 57.89 cfs @ 12.84 hrs, Volume= | 5.586 af | |
| Secondary = | 22.66 cfs @ 12.84 hrs, Volume= | 0.744 af | |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 613.19' @ 12.84 hrs Surf.Area= 340 sf Storage= 120 cf

Plug-Flow detention time= 0.4 min calculated for 6.330 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 792.8 - 792.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

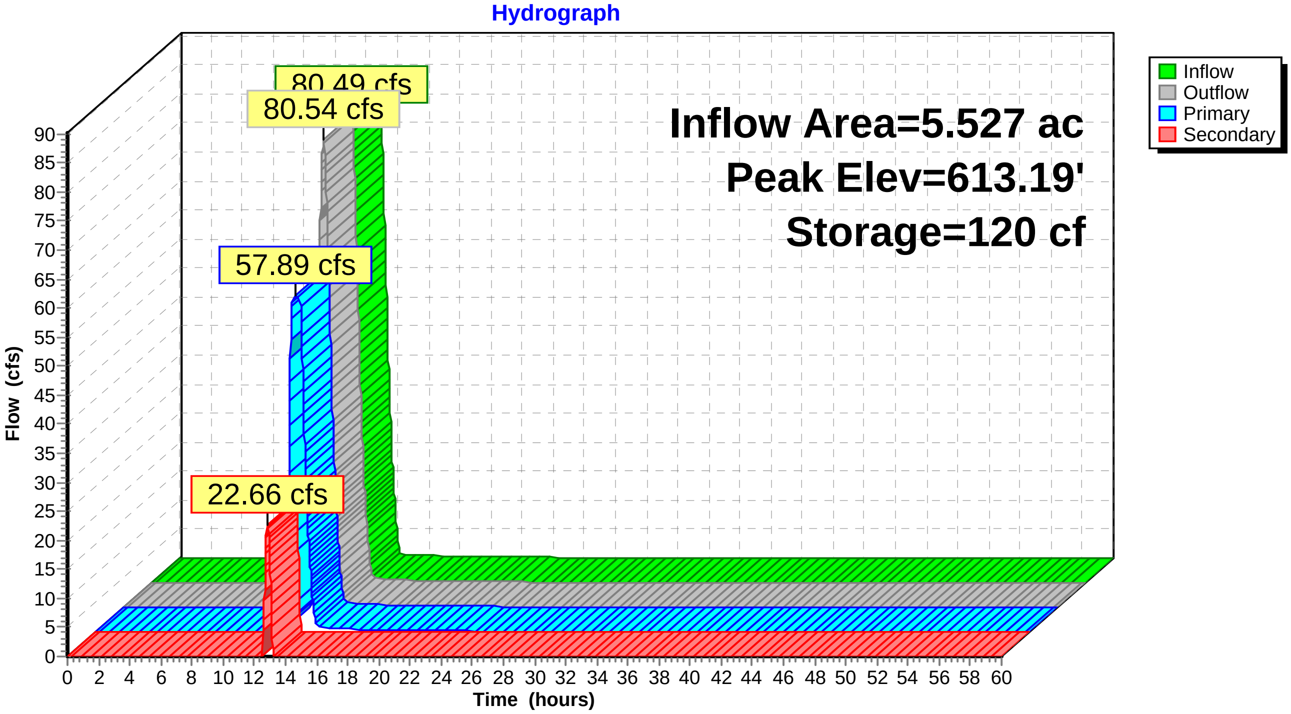
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=57.88 cfs @ 12.84 hrs HW=613.19' TW=588.49' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 57.88 cfs @ 8.19 fps)

**Secondary OutFlow** Max=22.63 cfs @ 12.84 hrs HW=613.19' TW=588.49' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 22.63 cfs @ 1.18 fps)

## Pond 108A: 36" Culvert



## Summary for Pond SWM 7A: SWM 7A (Phase 1)

| | | | |
|---|---|---|---|
| Inflow Area = | 1.000 ac, | 0.00% Impervious, Inflow Depth = 3.22" | for 25-Year event |
| Inflow = | 3.66 cfs @ | 12.11 hrs, Volume= | 0.268 af |
| Outflow = | 1.57 cfs @ | 12.36 hrs, Volume= | 0.268 af, Atten= 57%, Lag= 15.2 min |
| Primary = | 1.57 cfs @ | 12.36 hrs, Volume= | 0.268 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 808.20' @ 12.36 hrs Surf.Area= 2,815 sf Storage= 2,689 cf

Plug-Flow detention time= 36.4 min calculated for 0.268 af (100% of inflow)
Center-of-Mass det. time= 36.1 min ( 870.4 - 834.3 )

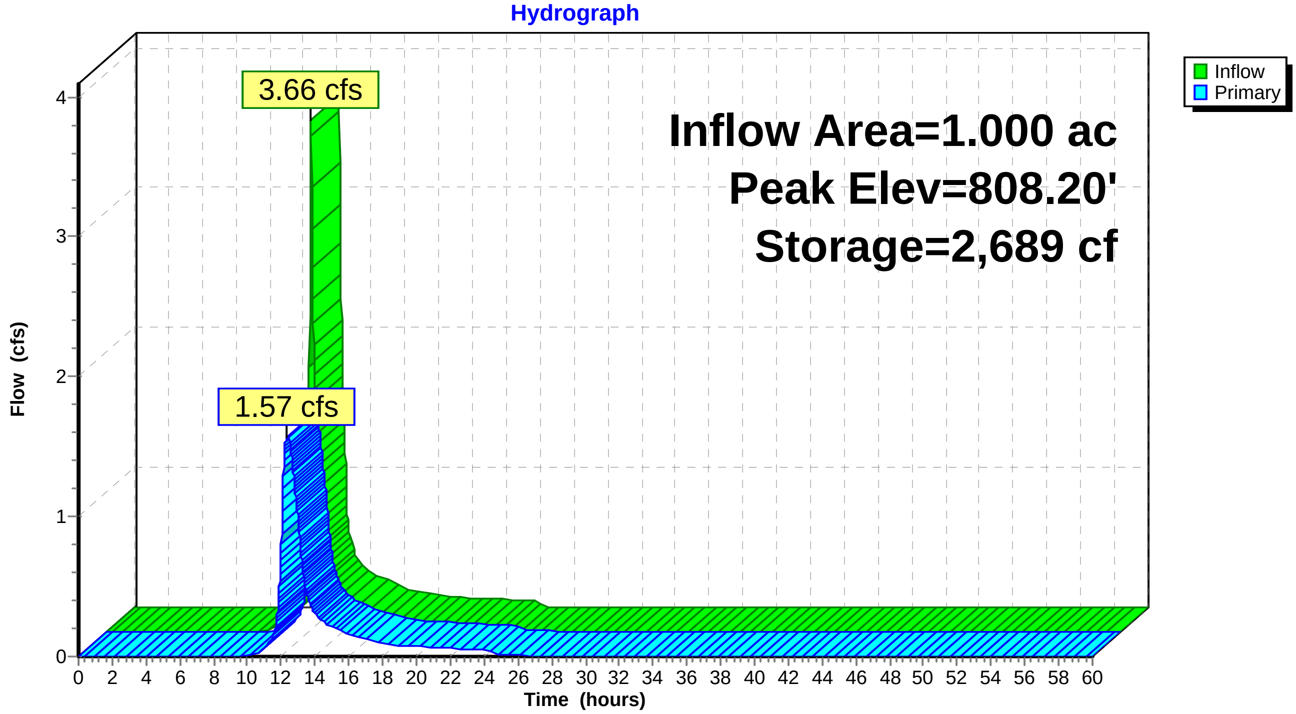
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 807.00' | 5,238 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 807.00 | 1,656 | 0 | 0 |
| 809.00 | 3,582 | 5,238 | 5,238 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 802.00' | **15.0" Round Culvert**<br>L= 41.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 802.00' / 801.00' S= 0.0244 '/' Cc= 0.900<br>n= 0.015, Flow Area= 1.23 sf |
| #2 | Device 1 | 807.00' | **8.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 808.25' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=1.57 cfs @ 12.36 hrs HW=808.20' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.57 cfs of 15.28 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.57 cfs @ 4.49 fps)
  └─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM 7A: SWM 7A (Phase 1)



## Summary for Pond SWM1: SWM 1

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 1.78" for 25-Year event
Inflow = 39.16 cfs @ 12.82 hrs, Volume= 7.512 af
Outflow = 36.28 cfs @ 13.07 hrs, Volume= 7.511 af, Atten= 7%, Lag= 15.2 min
Primary = 36.28 cfs @ 13.07 hrs, Volume= 7.511 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 513.97' @ 13.07 hrs Surf.Area= 19,808 sf Storage= 29,679 cf

Plug-Flow detention time= 18.3 min calculated for 7.511 af (100% of inflow)
Center-of-Mass det. time= 18.2 min ( 945.8 - 927.6 )

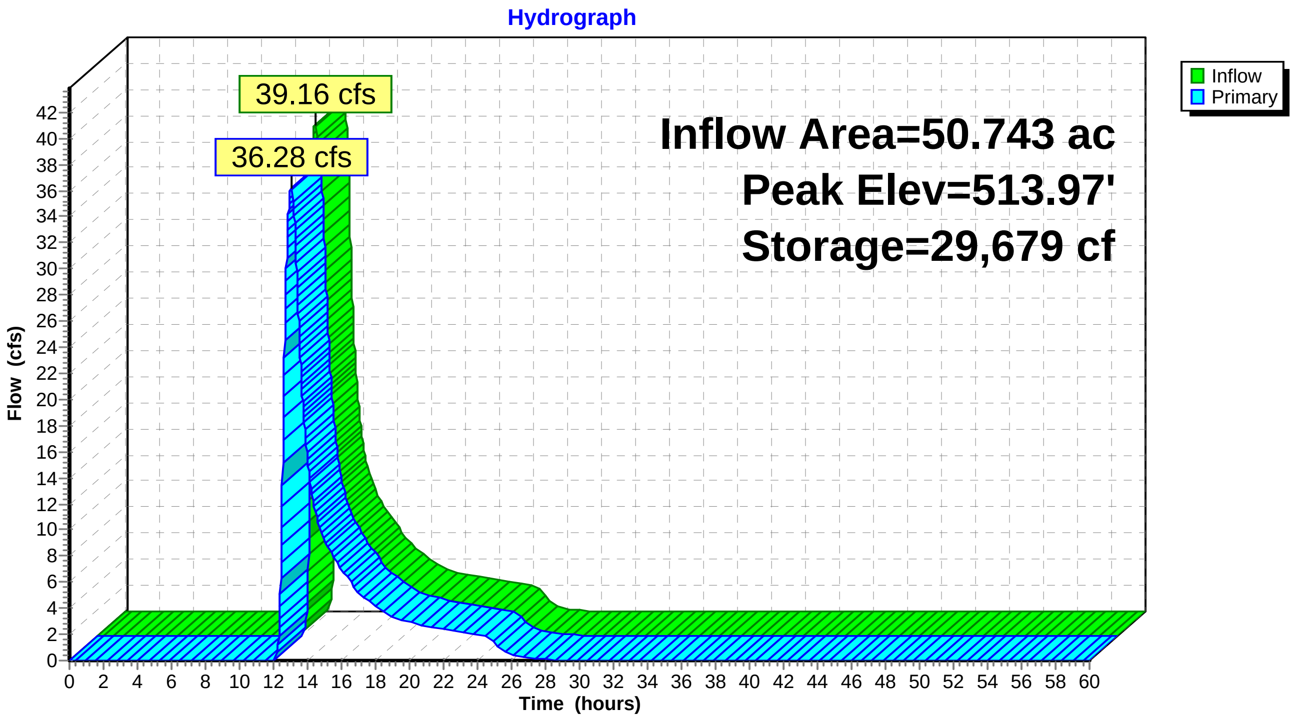
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 512.00' | 77,663 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 512.00 | 10,713 | 0 | 0 |
| 513.00 | 14,994 | 12,854 | 12,854 |
| 514.00 | 19,973 | 17,484 | 30,337 |
| 515.00 | 23,663 | 21,818 | 52,155 |
| 516.00 | 27,353 | 25,508 | 77,663 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 512.00' | **5.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=36.27 cfs @ 13.07 hrs HW=513.97' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 36.27 cfs @ 3.69 fps)

## Pond SWM1: SWM 1



## Summary for Pond SWM17: SWM17

Inflow Area = 15.350 ac, 18.63% Impervious, Inflow Depth = 0.99" for 25-Year event
Inflow = 6.60 cfs @ 12.59 hrs, Volume= 1.269 af
Outflow = 6.49 cfs @ 12.64 hrs, Volume= 1.269 af, Atten= 2%, Lag= 3.0 min
Primary = 6.49 cfs @ 12.64 hrs, Volume= 1.269 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 500.93' @ 12.64 hrs Surf.Area= 0.023 ac Storage= 0.055 af

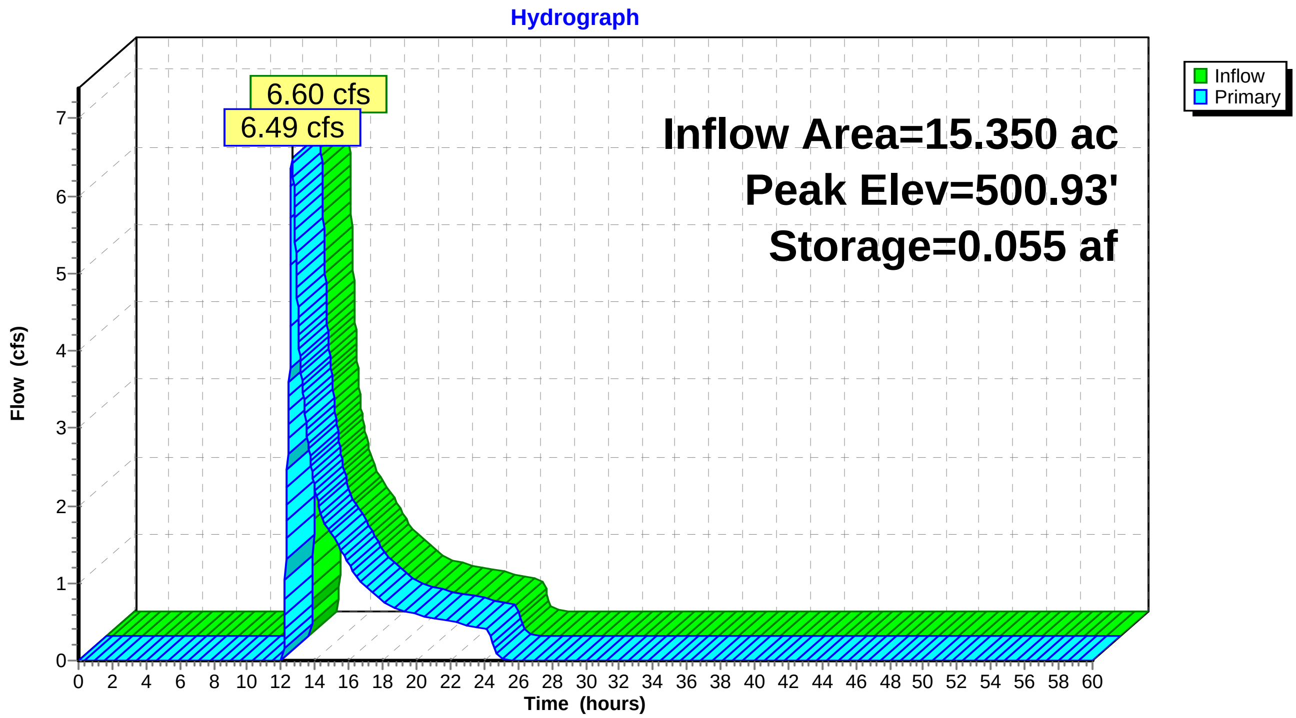
Plug-Flow detention time= 5.4 min calculated for 1.268 af (100% of inflow)
Center-of-Mass det. time= 5.4 min ( 946.1 - 940.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 0.090 af | **60.0" Round Pipe Storage** x 2<br>L= 100.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **24.0" Round Culvert**<br>L= 60.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 497.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 498.00' | **10.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 500.50' | **3.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31<br>3.30 3.31 3.32 |

**Primary OutFlow** Max=6.49 cfs @ 12.64 hrs HW=500.93' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 6.49 cfs of 16.60 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 4.17 cfs @ 7.64 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 2.33 cfs @ 1.79 fps)

## Pond SWM17: SWM17



## Summary for Pond SWM2: SWM2

Inflow Area = 120.037 ac, 12.91% Impervious, Inflow Depth = 3.39" for 25-Year event
Inflow = 233.89 cfs @ 12.42 hrs, Volume= 33.923 af
Outflow = 176.32 cfs @ 12.70 hrs, Volume= 33.773 af, Atten= 25%, Lag= 16.8 min
Primary = 176.32 cfs @ 12.70 hrs, Volume= 33.773 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 504.35' @ 12.70 hrs Surf.Area= 74,610 sf Storage= 376,005 cf

Plug-Flow detention time= 127.2 min calculated for 33.761 af (100% of inflow)
Center-of-Mass det. time= 124.6 min ( 982.1 - 857.5 )

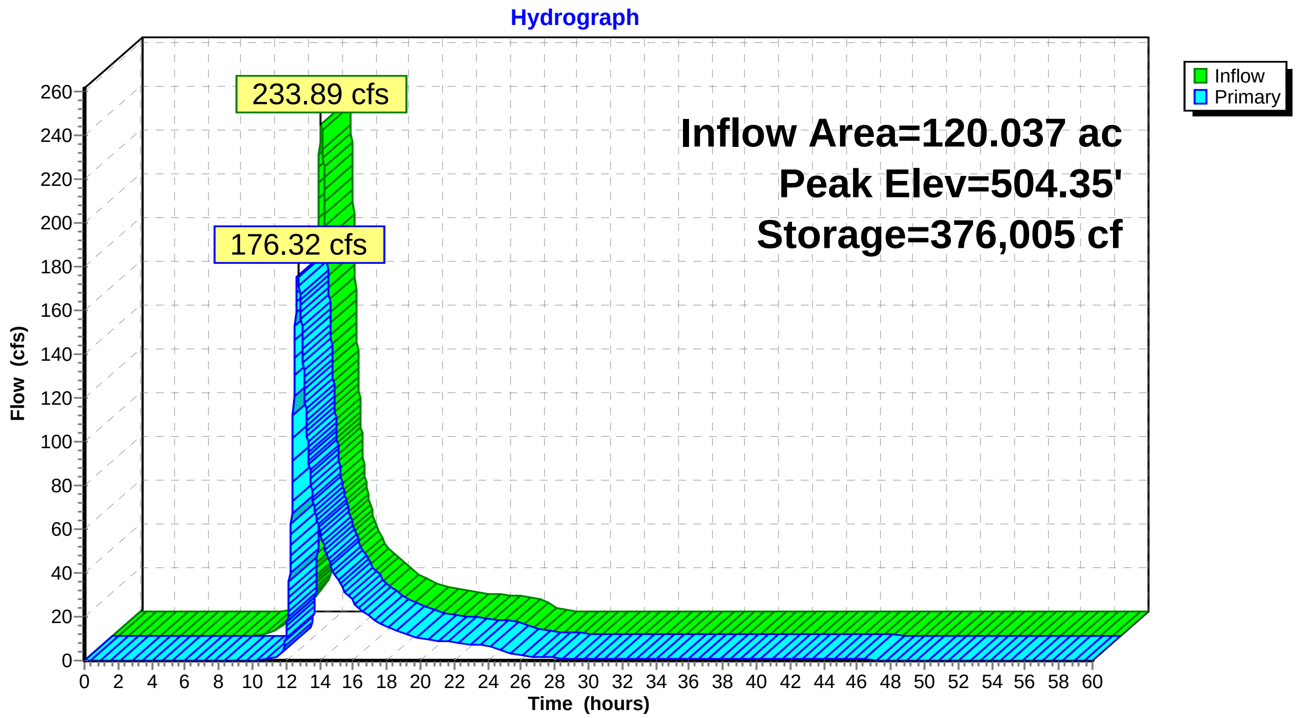
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 598,445 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 498.00 | 33,946 | 0 | 0 |
| 499.00 | 52,156 | 43,051 | 43,051 |
| 500.00 | 55,687 | 53,922 | 96,973 |
| 501.00 | 59,350 | 57,519 | 154,491 |
| 502.00 | 63,077 | 61,214 | 215,705 |
| 503.00 | 66,905 | 64,991 | 280,696 |
| 504.00 | 72,175 | 69,540 | 350,236 |
| 505.00 | 79,111 | 75,643 | 425,879 |
| 506.00 | 88,674 | 83,893 | 509,771 |
| 507.00 | 88,674 | 88,674 | 598,445 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **8.0" Round Culvert**<br>L= 100.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 496.00' S= 0.0200 '/' Cc= 0.900<br>n= 0.024, Flow Area= 0.35 sf |
| #2 | Primary | 499.50' | **4.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #3 | Primary | 503.00' | **15.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=176.31 cfs @ 12.70 hrs HW=504.35' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Barrel Controls 1.72 cfs @ 4.94 fps)
- **2=Broad-Crested Rectangular Weir** (Weir Controls 112.40 cfs @ 5.79 fps)
- **3=Broad-Crested Rectangular Weir** (Weir Controls 62.18 cfs @ 3.07 fps)

## Pond SWM2: SWM2



## Summary for Pond SWM3try: SWM3

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 2.85" for 25-Year event
Inflow = 218.97 cfs @ 12.84 hrs, Volume= 59.006 af
Outflow = 97.80 cfs @ 14.27 hrs, Volume= 57.662 af, Atten= 55%, Lag= 86.1 min
Primary = 97.80 cfs @ 14.27 hrs, Volume= 57.662 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 509.80' @ 14.27 hrs Surf.Area= 408,859 sf Storage= 1,065,238 cf

Plug-Flow detention time= 332.6 min calculated for 57.643 af (98% of inflow)
Center-of-Mass det. time= 296.7 min ( 1,240.6 - 943.9 )

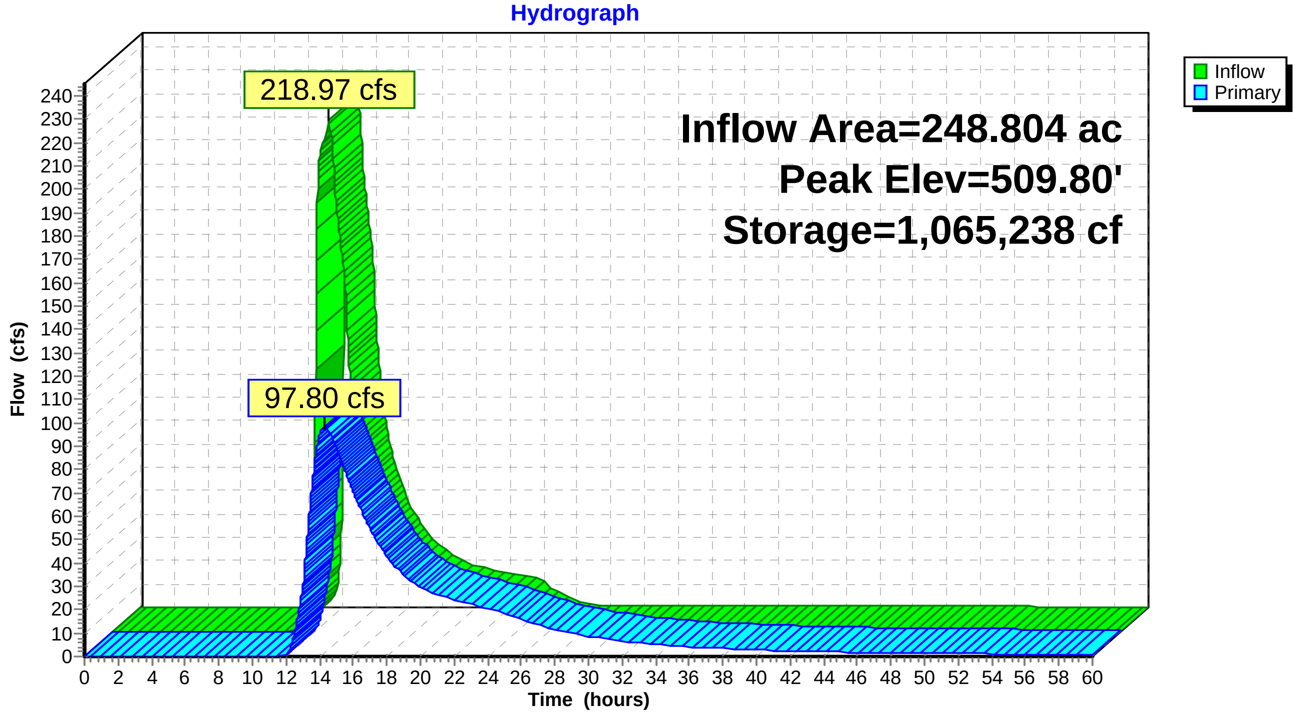
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.00' | 2,034,374 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 507.00 | 359,082 | 0 | 0 |
| 508.00 | 370,212 | 364,647 | 364,647 |
| 510.00 | 413,188 | 783,400 | 1,148,047 |
| 512.00 | 473,139 | 886,327 | 2,034,374 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.00' | **4.5' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #2 | Primary | 508.75' | **15.0' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=97.80 cfs @ 14.27 hrs HW=509.80' TW=504.14' (Dynamic Tailwater)
├─**1=Broad-Crested Rectangular Weir** (Weir Controls 55.41 cfs @ 4.40 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 42.39 cfs @ 2.70 fps)

## Pond SWM3try: SWM3



## Summary for Pond SWM4: SWM4

Inflow Area = 195.996 ac, 11.01% Impervious, Inflow Depth > 2.21" for 25-Year event
Inflow = 141.56 cfs @ 13.17 hrs, Volume= 36.070 af
Outflow = 132.90 cfs @ 13.41 hrs, Volume= 36.056 af, Atten= 6%, Lag= 14.6 min
Primary = 132.90 cfs @ 13.41 hrs, Volume= 36.056 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 516.69' @ 13.41 hrs Surf.Area= 47,066 sf Storage= 73,991 cf

Plug-Flow detention time= 11.8 min calculated for 36.044 af (100% of inflow)
Center-of-Mass det. time= 10.8 min ( 991.4 - 980.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 515.00' | 387,328 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

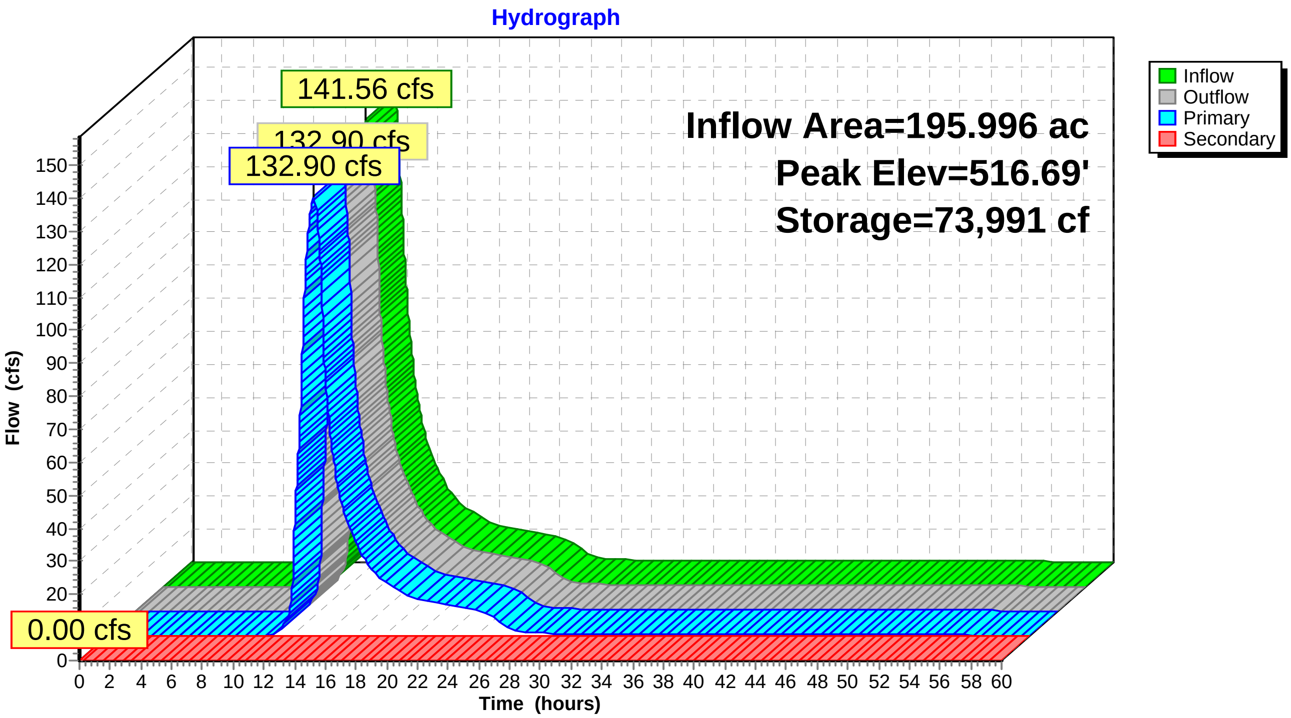
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 515.00 | 40,770 | 0 | 0 |
| 516.00 | 43,995 | 42,383 | 42,383 |
| 518.00 | 52,841 | 96,836 | 139,219 |
| 520.00 | 62,089 | 114,930 | 254,149 |
| 522.00 | 71,090 | 133,179 | 387,328 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 510.00' | **36.0" Round Culvert X 3.00**<br>L= 250.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 510.00' / 505.50' S= 0.0180 '/' Cc= 0.900<br>n= 0.020, Flow Area= 7.07 sf |
| #2 | Device 1 | 515.00' | **36.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 521.50' | **25.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=132.89 cfs @ 13.41 hrs HW=516.69' TW=509.37' (Dynamic Tailwater)
└─**1=Culvert** (Passes 132.89 cfs of 196.41 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 132.89 cfs @ 6.27 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=515.00' TW=507.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM4: SWM4



## Summary for Pond SWM5: SWM5

Inflow Area = 58.557 ac, 24.60% Impervious, Inflow Depth = 3.52" for 25-Year event
Inflow = 129.30 cfs @ 12.37 hrs, Volume= 17.172 af
Outflow = 101.88 cfs @ 12.61 hrs, Volume= 17.023 af, Atten= 21%, Lag= 14.0 min
Primary = 1.00 cfs @ 12.61 hrs, Volume= 2.519 af
Secondary = 98.44 cfs @ 12.61 hrs, Volume= 14.471 af
Tertiary = 2.44 cfs @ 12.61 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 521.13' @ 12.61 hrs Surf.Area= 47,415 sf Storage= 157,794 cf

Plug-Flow detention time= 173.3 min calculated for 17.018 af (99% of inflow)
Center-of-Mass det. time= 168.7 min ( 1,012.2 - 843.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 517.00' | 251,698 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 517.00 | 22,920 | 0 | 0 |
| 518.00 | 35,091 | 29,006 | 29,006 |
| 520.00 | 42,827 | 77,918 | 106,924 |
| 522.00 | 50,965 | 93,792 | 200,716 |
| 523.00 | 51,000 | 50,983 | 251,698 |

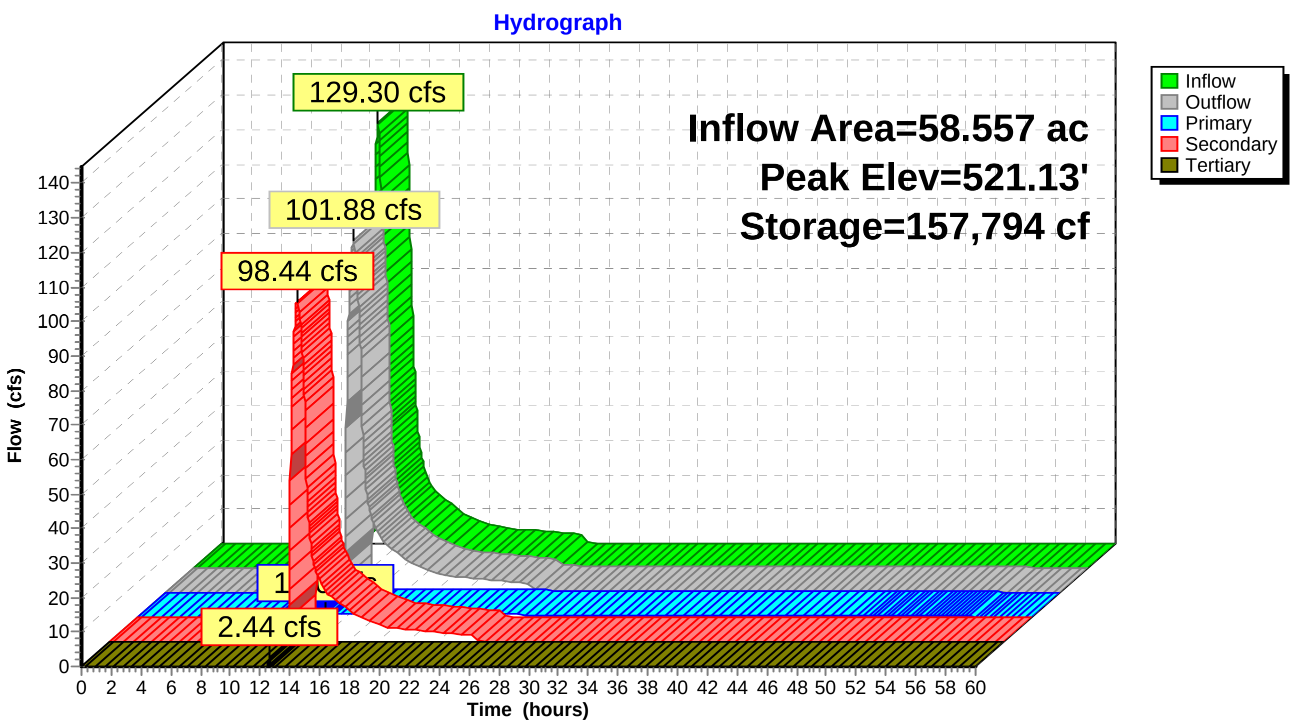
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 517.00' | **6.0" Round Culvert**<br>L= 90.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 517.00' / 516.00' S= 0.0111 '/' Cc= 0.900<br>n= 0.015, Flow Area= 0.20 sf |
| #2 | Secondary | 512.00' | **30.0" Round Culvert X 3.00**<br>L= 270.0' RCP, groove end w/headwall, Ke= 0.200<br>Inlet / Outlet Invert= 512.00' / 505.00' S= 0.0259 '/' Cc= 0.900<br>n= 0.020, Flow Area= 4.91 sf |
| #3 | Device 2 | 519.20' | **30.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Tertiary | 521.00' | **20.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=1.00 cfs @ 12.61 hrs HW=521.13' TW=515.87' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.00 cfs @ 5.12 fps)

**Secondary OutFlow** Max=98.42 cfs @ 12.61 hrs HW=521.13' TW=508.10' (Dynamic Tailwater)
└─**2=Culvert** (Passes 98.42 cfs of 159.92 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 98.42 cfs @ 6.68 fps)

**Tertiary OutFlow** Max=2.42 cfs @ 12.61 hrs HW=521.13' TW=515.87' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 2.42 cfs @ 0.95 fps)

## Pond SWM5: SWM5



## Summary for Pond SWM6: SWM6

[62] Hint: Exceeded Reach A105R OUTLET depth by 2.50' @ 18.00 hrs

Inflow Area = 99.305 ac, 18.16% Impervious, Inflow Depth = 1.83" for 25-Year event
Inflow = 103.27 cfs @ 12.50 hrs, Volume= 15.178 af
Outflow = 11.57 cfs @ 16.91 hrs, Volume= 14.394 af, Atten= 89%, Lag= 264.5 min
Primary = 11.57 cfs @ 16.91 hrs, Volume= 14.394 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 503.06' @ 16.91 hrs Surf.Area= 136,434 sf Storage= 335,887 cf

Plug-Flow detention time= 616.4 min calculated for 14.389 af (95% of inflow)
Center-of-Mass det. time= 583.8 min ( 1,519.7 - 935.9 )

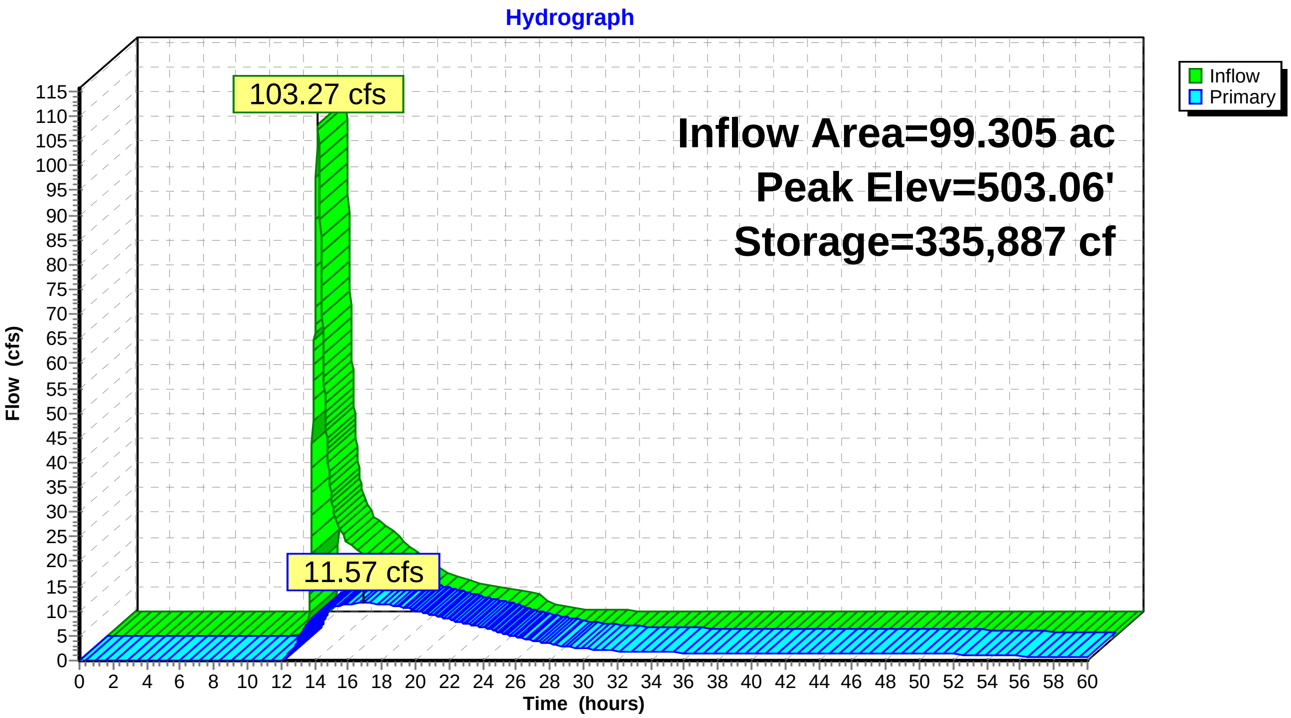
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 883,875 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 500.00 | 76,477 | 0 | 0 |
| 501.00 | 99,879 | 88,178 | 88,178 |
| 502.00 | 122,401 | 111,140 | 199,318 |
| 504.00 | 148,997 | 271,398 | 470,716 |
| 506.00 | 176,108 | 325,105 | 795,821 |
| 506.50 | 176,108 | 88,054 | 883,875 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.00' | **8.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 500.00' / 498.50' S= 0.0111 '/' Cc= 0.900<br>n= 0.012, Flow Area= 0.35 sf |
| #2 | Primary | 501.50' | **18.0" Round Culvert**<br>L= 105.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 501.50' / 500.00' S= 0.0143 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=11.57 cfs @ 16.91 hrs HW=503.06' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 2.03 cfs @ 5.82 fps)
**2=Culvert** (Inlet Controls 9.54 cfs @ 5.40 fps)

## Pond SWM6: SWM6



## Summary for Pond SWM7: SWM7

Inflow Area = 4.590 ac, 29.85% Impervious, Inflow Depth = 3.67" for 25-Year event
Inflow = 14.91 cfs @ 12.21 hrs, Volume= 1.404 af
Outflow = 7.56 cfs @ 12.51 hrs, Volume= 1.404 af, Atten= 49%, Lag= 18.0 min
Primary = 7.56 cfs @ 12.51 hrs, Volume= 1.404 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 745.78' @ 12.51 hrs Surf.Area= 5,660 sf Storage= 17,991 cf

Plug-Flow detention time= 67.5 min calculated for 1.404 af (100% of inflow)
Center-of-Mass det. time= 67.3 min ( 897.6 - 830.3 )

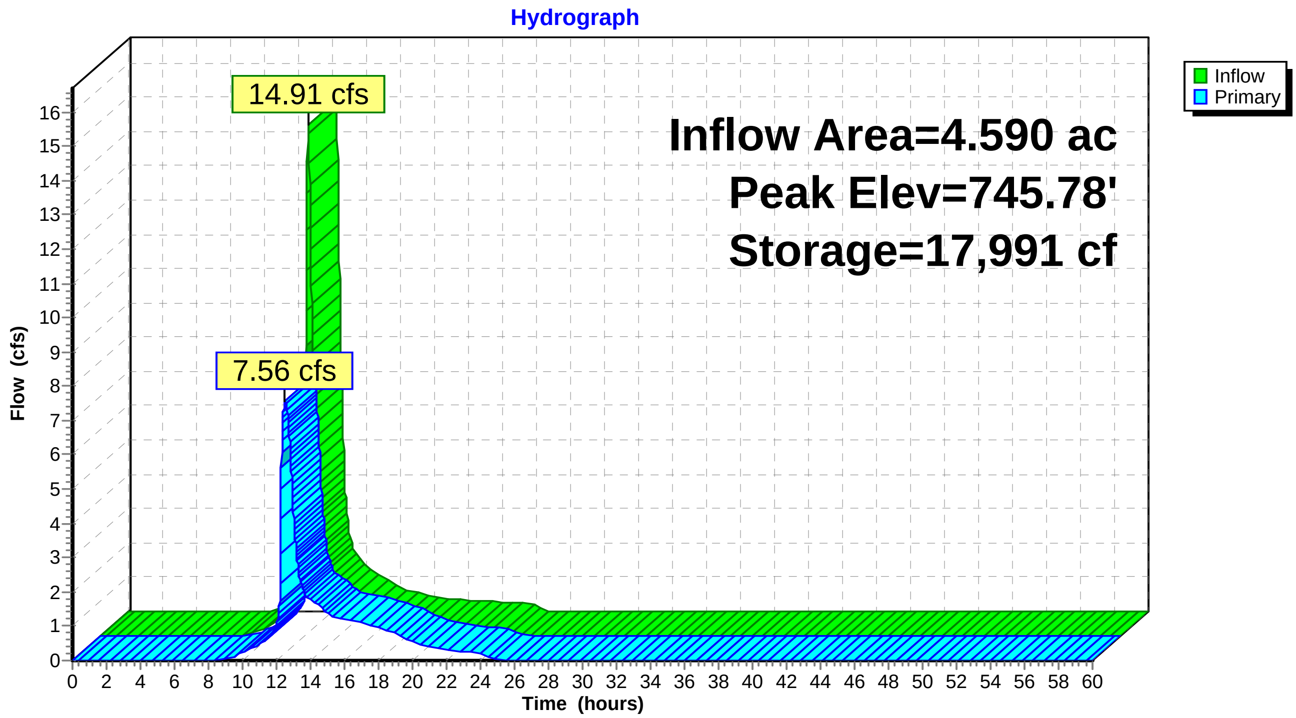
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 740.00' | 33,203 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 740.00 | 1,005 | 0 | 0 |
| 741.00 | 1,611 | 1,308 | 1,308 |
| 742.00 | 2,307 | 1,959 | 3,267 |
| 743.00 | 3,095 | 2,701 | 5,968 |
| 744.00 | 3,949 | 3,522 | 9,490 |
| 745.00 | 4,882 | 4,416 | 13,906 |
| 746.00 | 5,886 | 5,384 | 19,290 |
| 747.00 | 6,942 | 6,414 | 25,704 |
| 748.00 | 8,056 | 7,499 | 33,203 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 740.00' | **30.0" Round Culvert**<br>L= 60.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 740.00' / 739.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |
| #2 | Device 1 | 740.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 743.80' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 744.40' | **10.0" Vert. Orifice/Grate X 2.00** C= 0.600 |
| #5 | Device 1 | 747.10' | **20.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=7.56 cfs @ 12.51 hrs HW=745.77' TW=718.96' (Dynamic Tailwater)
└─**1=Culvert** (Passes 7.56 cfs of 62.84 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.55 cfs @ 11.36 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.87 cfs @ 6.40 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 5.14 cfs @ 4.71 fps)
  └─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM7: SWM7



## Summary for Pond SWM8: SWM8

Inflow Area = 15.712 ac, 18.18% Impervious, Inflow Depth = 2.78" for 25-Year event
Inflow = 27.82 cfs @ 12.49 hrs, Volume= 3.646 af
Outflow = 15.37 cfs @ 12.89 hrs, Volume= 3.644 af, Atten= 45%, Lag= 24.1 min
Primary = 15.37 cfs @ 12.89 hrs, Volume= 3.644 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 655.46' @ 12.89 hrs Surf.Area= 11,534 sf Storage= 45,816 cf

Plug-Flow detention time= 105.9 min calculated for 3.644 af (100% of inflow)
Center-of-Mass det. time= 105.5 min ( 975.2 - 869.7 )

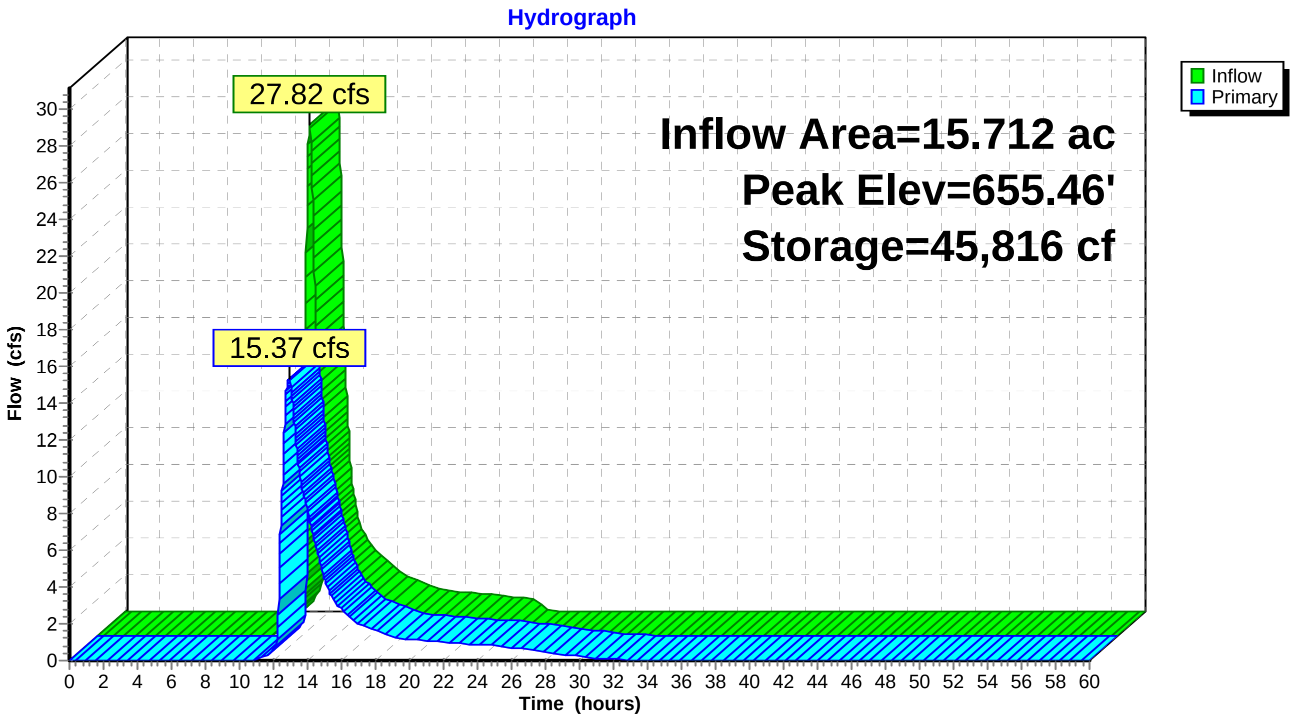
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 79,275 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 650.00 | 5,538 | 0 | 0 |
| 652.00 | 7,499 | 13,037 | 13,037 |
| 654.00 | 9,725 | 17,224 | 30,261 |
| 656.00 | 12,197 | 21,922 | 52,183 |
| 658.00 | 14,895 | 27,092 | 79,275 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **36.0" Round Culvert**<br>L= 90.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 648.00' S= 0.0222 '/' Cc= 0.900<br>n= 0.010, Flow Area= 7.07 sf |
| #2 | Device 1 | 650.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 652.00' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 654.40' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #5 | Device 1 | 656.50' | **1.5' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31<br>3.30 3.31 3.32 |
| #6 | Device 1 | 657.50' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31<br>3.30 3.31 3.32 |

**Primary OutFlow** Max=15.36 cfs @ 12.89 hrs HW=655.46' TW=625.99' (Dynamic Tailwater)
└─**1=Culvert** (Passes 15.36 cfs of 84.69 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.50 cfs @ 11.04 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 9.95 cfs @ 8.11 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 3.90 cfs @ 3.51 fps)
  ├─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └─**6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM8: SWM8



## Summary for Pond WF: Water Feature

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 1.78" for 25-Year event
Inflow = 49.05 cfs @ 12.59 hrs, Volume= 7.512 af
Outflow = 39.16 cfs @ 12.82 hrs, Volume= 7.512 af, Atten= 20%, Lag= 13.7 min
Primary = 39.16 cfs @ 12.82 hrs, Volume= 7.512 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 527.32' @ 12.82 hrs Surf.Area= 29,835 sf Storage= 37,578 cf

Plug-Flow detention time= 22.9 min calculated for 7.512 af (100% of inflow)
Center-of-Mass det. time= 22.7 min ( 927.6 - 904.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 526.00' | 127,058 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

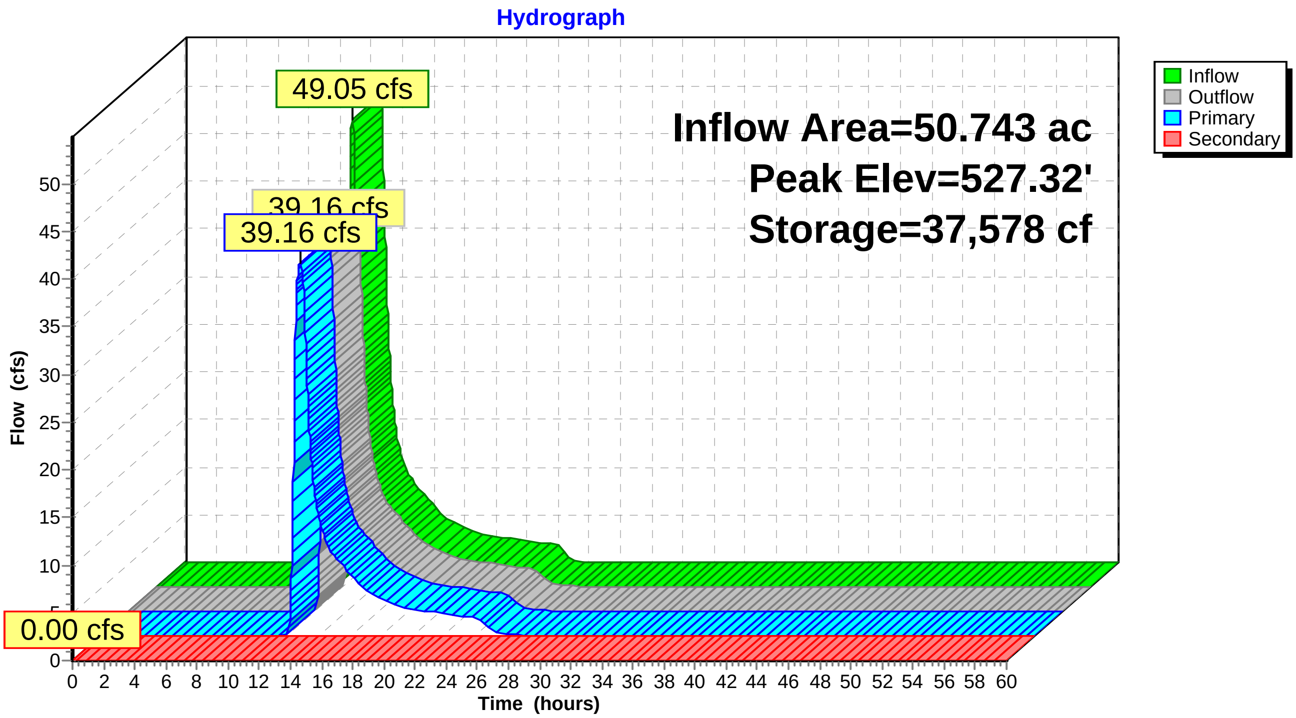
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 526.00 | 26,946 | 0 | 0 |
| 528.00 | 31,311 | 58,257 | 58,257 |
| 530.00 | 37,490 | 68,801 | 127,058 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 520.00' | **36.0" Round Culvert**<br>L= 225.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 520.00' / 513.00' S= 0.0311 '/' Cc= 0.900<br>n= 0.015, Flow Area= 7.07 sf |
| #2 | Device 1 | 526.00' | **36.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 529.00' | **20.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=39.15 cfs @ 12.82 hrs HW=527.32' TW=513.82' (Dynamic Tailwater)
└─**1=Culvert** (Passes 39.15 cfs of 102.67 cfs potential flow)
└─**2=Orifice/Grate** (Orifice Controls 39.15 cfs @ 5.54 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=526.00' TW=512.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WF: Water Feature

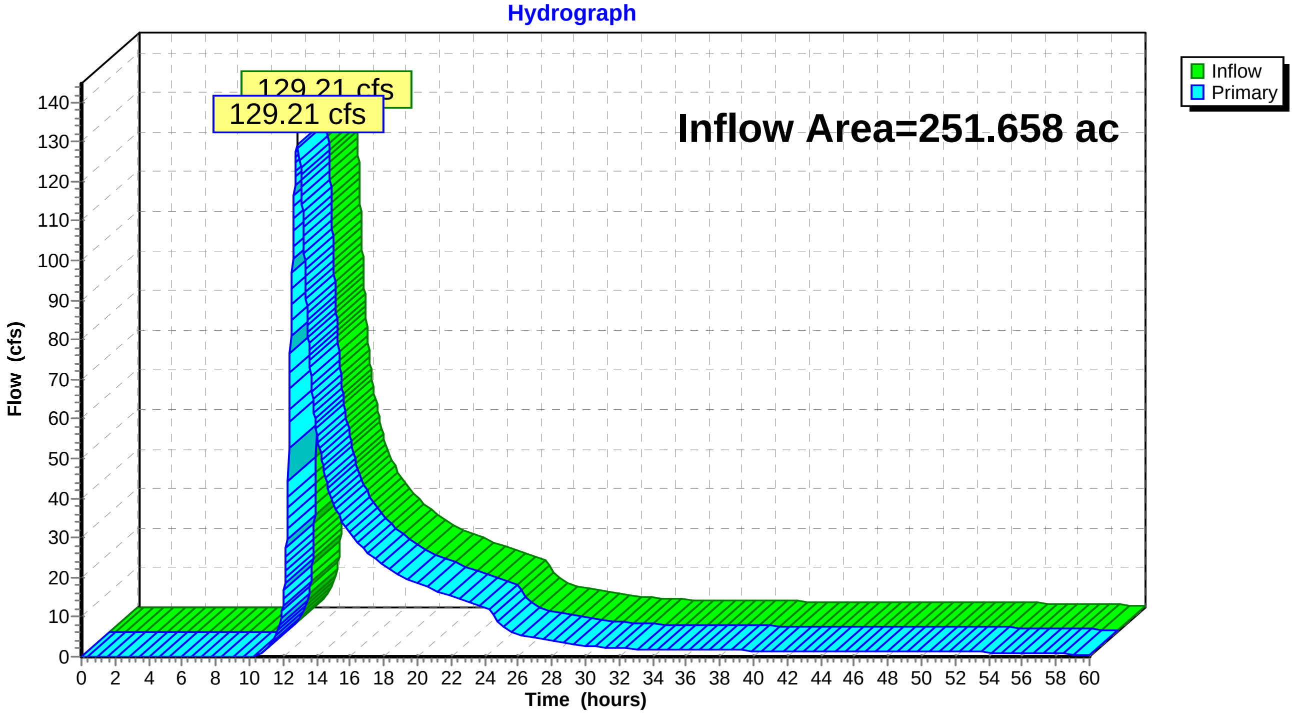


## Summary for Link A: Amenia Stream

| | | | |
|---|---|---|---|
| Inflow Area = | 251.658 ac, 10.11% Impervious, Inflow Depth > 1.91" | for 25-Year event | |
| Inflow = | 129.21 cfs @ 12.85 hrs, Volume= | 40.019 af | |
| Primary = | 129.21 cfs @ 12.85 hrs, Volume= | 40.019 af, Atten= 0%, Lag= 0.0 min | |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link A: Amenia Stream

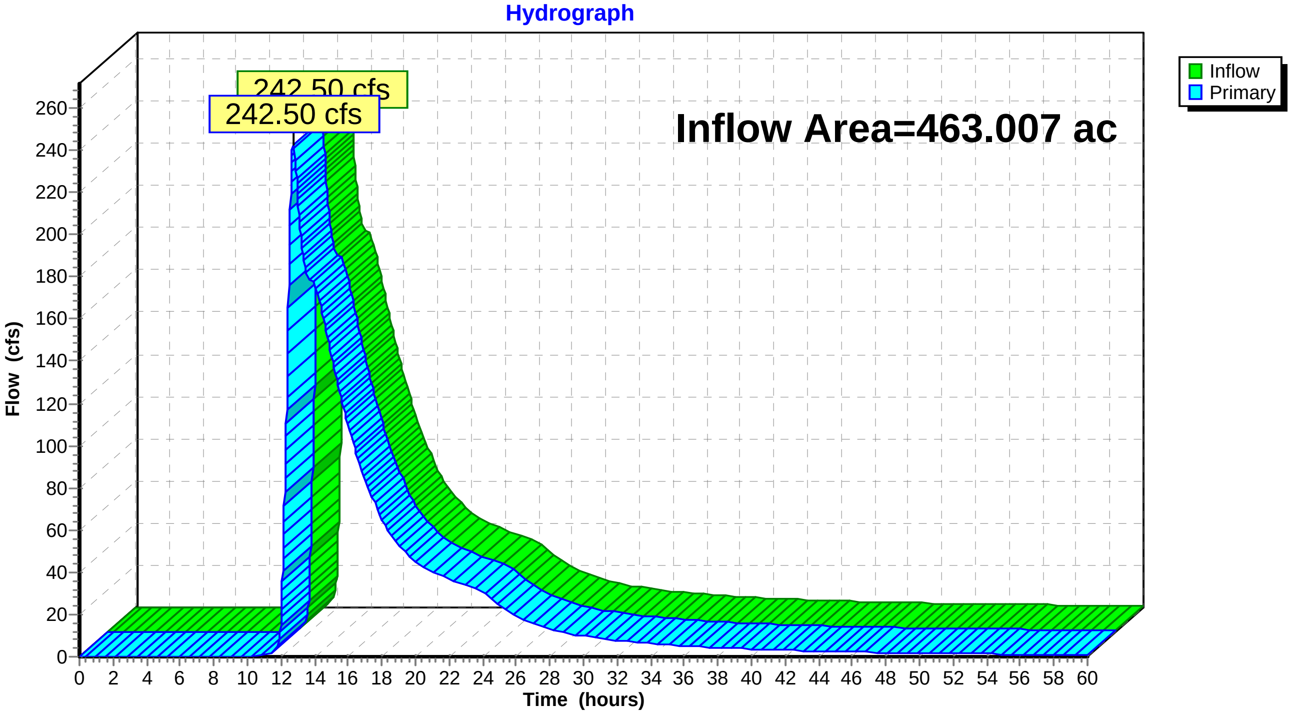


## Summary for Link B: Wetland

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 463.007 ac, | 14.28% Impervious, | Inflow Depth > 2.71" | for 25-Year event |
| Inflow = | 242.50 cfs @ | 12.72 hrs, Volume= | 104.592 af | |
| Primary = | 242.50 cfs @ | 12.72 hrs, Volume= | 104.592 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

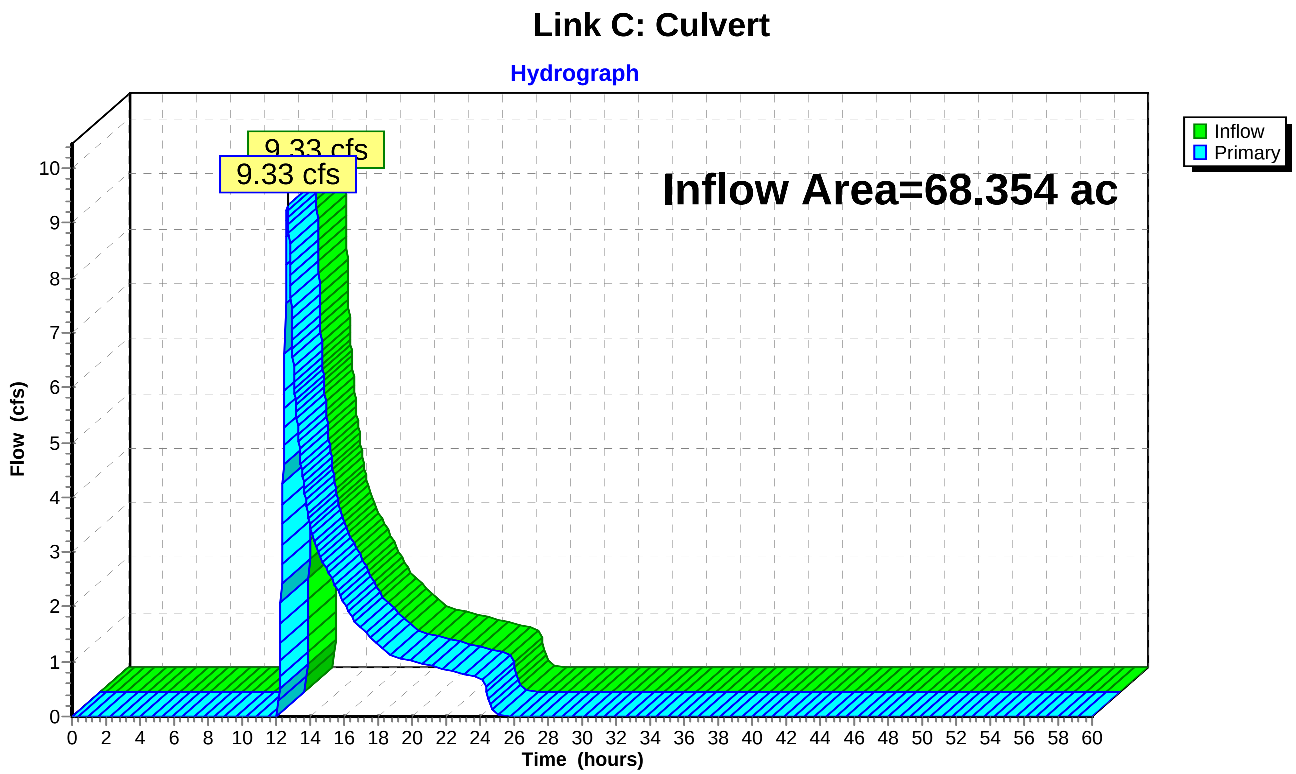
### Link B: Wetland



## Summary for Link C: Culvert

Inflow Area = 68.354 ac, 5.83% Impervious, Inflow Depth = 0.35" for 25-Year event
Inflow = 9.33 cfs @ 12.66 hrs, Volume= 2.015 af
Primary = 9.33 cfs @ 12.66 hrs, Volume= 2.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

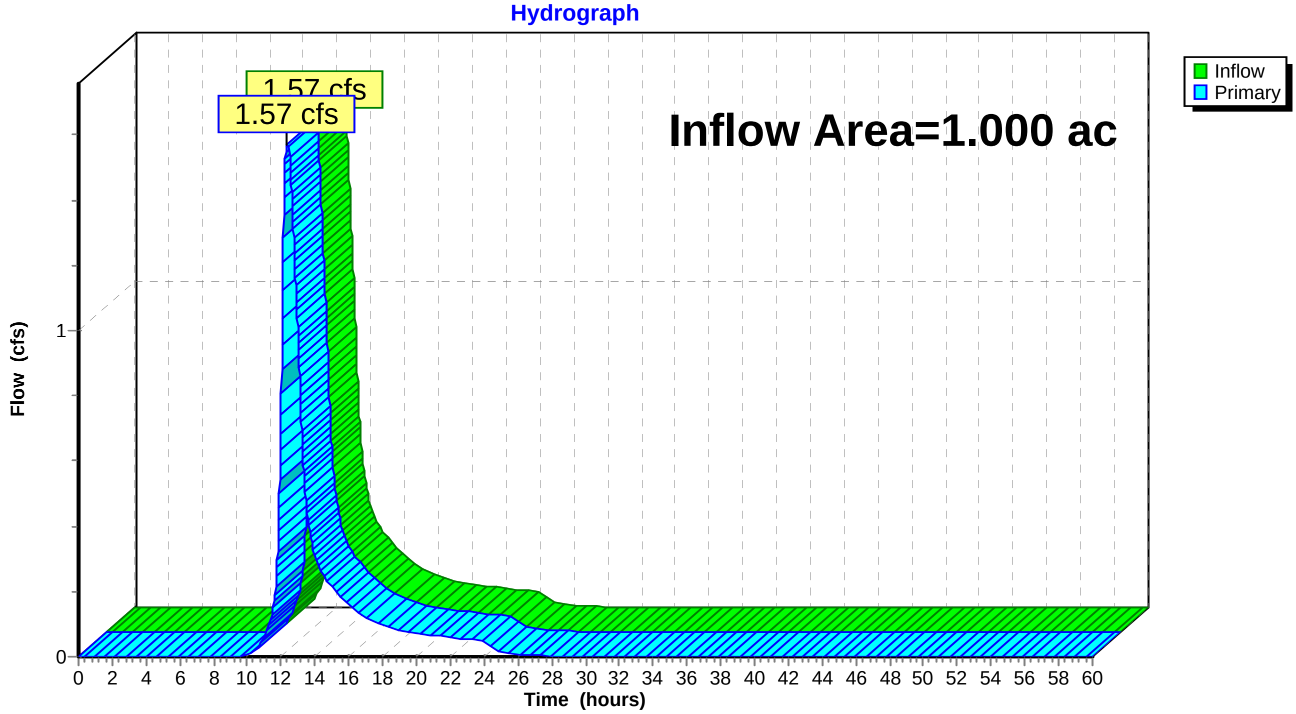


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 1.000 ac, | 0.00% Impervious, Inflow Depth = 3.22" | for 25-Year event | |
| Inflow = | 1.57 cfs @ | 12.36 hrs, Volume= | 0.268 af | |
| Primary = | 1.57 cfs @ | 12.36 hrs, Volume= | 0.268 af, | Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=21.492 ac 4.36% Impervious Runoff Depth=0.96"
Flow Length=1,320' Tc=20.2 min CN=48 Runoff=9.05 cfs 1.727 af

**Subcatchment A102: A102** Runoff Area=4.590 ac 29.85% Impervious Runoff Depth=4.59"
Flow Length=530' Tc=15.8 min CN=81 Runoff=18.53 cfs 1.755 af

**Subcatchment A103: A103** Runoff Area=57.299 ac 21.07% Impervious Runoff Depth=2.14"
Flow Length=2,529' Tc=22.2 min CN=60 Runoff=84.62 cfs 10.232 af

**Subcatchment A104: A104** Runoff Area=29.922 ac 5.68% Impervious Runoff Depth=0.88"
Flow Length=1,871' Tc=21.8 min CN=47 Runoff=10.45 cfs 2.190 af

**Subcatchment A105: A105** Runoff Area=26.625 ac 12.66% Impervious Runoff Depth=2.36"
Flow Length=1,484' Tc=19.3 min CN=62 Runoff=47.34 cfs 5.235 af

**Subcatchment A106: A106** Runoff Area=10.791 ac 11.31% Impervious Runoff Depth=4.10"
Flow Length=1,260' Tc=26.7 min CN=77 Runoff=31.51 cfs 3.685 af

**Subcatchment A107: A107** Runoff Area=79.700 ac 2.24% Impervious Runoff Depth=3.74"
Flow Length=3,685' Tc=61.0 min CN=74 Runoff=138.29 cfs 24.823 af

**Subcatchment A108: A108** Runoff Area=5.527 ac 2.32% Impervious Runoff Depth=1.83"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=5.73 cfs 0.842 af

**Subcatchment A109: A109** Runoff Area=15.712 ac 18.18% Impervious Runoff Depth=3.62"
Flow Length=1,315' Tc=33.2 min CN=73 Runoff=36.49 cfs 4.738 af

**Subcatchment B101: B101** Runoff Area=50.743 ac 17.46% Impervious Runoff Depth=2.47"
Flow Length=3,015' Tc=36.7 min CN=63 Runoff=72.12 cfs 10.442 af

**Subcatchment B102: B102** Runoff Area=40.873 ac 1.28% Impervious Runoff Depth=2.14"
Flow Length=955' Tc=20.3 min CN=60 Runoff=62.52 cfs 7.299 af

**Subcatchment B103: B103** Runoff Area=22.950 ac 10.98% Impervious Runoff Depth=4.46"
Flow Length=2,127' Tc=38.5 min CN=80 Runoff=61.29 cfs 8.538 af

**Subcatchment B104: B104** Runoff Area=24.602 ac 28.02% Impervious Runoff Depth=4.46"
Flow Length=3,620' Tc=24.7 min CN=80 Runoff=80.59 cfs 9.153 af

**Subcatchment B105: B105** Runoff Area=24.733 ac 14.99% Impervious Runoff Depth=4.46"
Flow Length=2,606' Tc=36.4 min CN=80 Runoff=67.93 cfs 9.201 af

**Subcatchment B106: B106** Runoff Area=118.113 ac 1.34% Impervious Runoff Depth=3.98"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=175.26 cfs 39.149 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=4.10"
Flow Length=907' Tc=37.9 min CN=77 Runoff=35.50 cfs 4.894 af

**Subcatchment B108: B108** Runoff Area=40.951 ac 11.09% Impervious Runoff Depth=4.22"
Flow Length=2,038' Tc=32.2 min CN=78 Runoff=112.77 cfs 14.400 af

**Subcatchment B109: B109** Runoff Area=34.256 ac 12.24% Impervious Runoff Depth=4.22"
Flow Length=1,371' Tc=24.9 min CN=78 Runoff=105.94 cfs 12.046 af

**Subcatchment B110: B110** Runoff Area=6.622 ac 45.47% Impervious Runoff Depth=5.08"
Flow Length=936' Tc=11.9 min CN=85 Runoff=32.38 cfs 2.806 af

**Subcatchment B111: B111** Runoff Area=6.254 ac 40.36% Impervious Runoff Depth=3.03"
Flow Length=516' Tc=6.8 min CN=68 Runoff=21.70 cfs 1.581 af

**Subcatchment B112: B112** Runoff Area=39.487 ac 34.78% Impervious Runoff Depth=2.81"
Flow Length=989' Tc=15.8 min CN=66 Runoff=94.64 cfs 9.231 af

**Subcatchment B113: B113** Runoff Area=5.598 ac 30.55% Impervious Runoff Depth=2.04"
Flow Length=836' Tc=14.0 min CN=59 Runoff=9.22 cfs 0.950 af

**Subcatchment B115: B115** Runoff Area=13.072 ac 23.44% Impervious Runoff Depth=2.25"
Flow Length=1,419' Tc=11.1 min CN=61 Runoff=26.98 cfs 2.452 af

**Subcatchment B116: B116** Runoff Area=2.600 ac 30.58% Impervious Runoff Depth=1.83"
Tc=6.0 min CN=57 Runoff=4.77 cfs 0.396 af

**Subcatchment B117: B117** Runoff Area=7.723 ac 36.64% Impervious Runoff Depth=2.25"
Tc=6.0 min CN=61 Runoff=19.06 cfs 1.448 af

**Subcatchment B118: B118** Runoff Area=2.550 ac 54.71% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=71 Runoff=10.26 cfs 0.719 af

**Subcatchment B119: B119** Runoff Area=7.550 ac 56.29% Impervious Runoff Depth=5.21"
Flow Length=1,683' Tc=10.3 min CN=86 Runoff=39.45 cfs 3.278 af

**Subcatchment C101: C101** Runoff Area=12.930 ac 0.00% Impervious Runoff Depth=1.14"
Flow Length=1,500' Tc=31.9 min CN=50 Runoff=6.22 cfs 1.231 af

**Subcatchment C102: C102** Runoff Area=40.074 ac 2.80% Impervious Runoff Depth=2.58"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=53.72 cfs 8.617 af

**Subcatchment C103: C103** Runoff Area=15.350 ac 18.63% Impervious Runoff Depth=1.52"
Flow Length=2,111' Tc=30.4 min CN=54 Runoff=12.06 cfs 1.949 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=4.10"
Flow Length=176' Tc=7.5 min CN=77 Runoff=4.65 cfs 0.342 af

**Reach 36" Pipe: 36" Pipe** Avg. Flow Depth=1.06' Max Vel=18.12 fps Inflow=40.49 cfs 5.440 af
36.0" Round Pipe n=0.015 L=935.0' S=0.0684 '/' Capacity=151.23 cfs Outflow=40.44 cfs 5.440 af

**Reach 42" Pipe: 42" Pipe** Avg. Flow Depth=1.74' Max Vel=33.99 fps Inflow=162.51 cfs 30.400 af
42.0" Round Pipe n=0.012 L=575.0' S=0.0904 '/' Capacity=327.77 cfs Outflow=162.42 cfs 30.400 af

**Reach A105R: Thru A103** Avg. Flow Depth=1.88' Max Vel=7.63 fps Inflow=84.67 cfs 10.658 af
n=0.050 L=1,170.0' S=0.0564 '/' Capacity=150.86 cfs Outflow=82.73 cfs 10.658 af

**Reach B107R: Thru B103** Avg. Flow Depth=0.39' Max Vel=7.68 fps Inflow=24.74 cfs 4.618 af
n=0.050 L=938.0' S=0.4072 '/' Capacity=192.14 cfs Outflow=24.70 cfs 4.618 af

**Reach B112R: Thru B102** Avg. Flow Depth=2.62' Max Vel=5.34 fps Inflow=151.10 cfs 74.838 af
n=0.050 L=600.0' S=0.0167 '/' Capacity=369.68 cfs Outflow=151.07 cfs 74.828 af

**Pond 102C: Pond 102C** Peak Elev=509.05' Storage=321,705 cf Inflow=53.72 cfs 8.617 af
Outflow=2.79 cfs 1.490 af

**Pond 104A: Wetland D** Peak Elev=508.10' Storage=9,226 cf Inflow=10.45 cfs 2.190 af
Primary=0.48 cfs 0.464 af Secondary=9.00 cfs 1.705 af Outflow=9.48 cfs 2.169 af

**Pond 105A: Wetland H** Peak Elev=575.31' Storage=66,881 cf Inflow=85.76 cfs 10.675 af
Primary=10.95 cfs 7.043 af Secondary=73.72 cfs 3.615 af Outflow=84.67 cfs 10.658 af

**Pond 106A: 36" Culvert** Peak Elev=719.59' Storage=94 cf Inflow=40.49 cfs 5.440 af
Primary=40.49 cfs 5.440 af Secondary=0.00 cfs 0.000 af Outflow=40.49 cfs 5.440 af

**Pond 106B: Wetland J** Peak Elev=527.09' Storage=23,974 cf Inflow=175.26 cfs 39.149 af
Outflow=175.17 cfs 39.149 af

**Pond 107A: 24" Culvert** Peak Elev=626.25' Storage=3,478 cf Inflow=158.65 cfs 29.558 af
Primary=44.14 cfs 20.045 af Secondary=114.51 cfs 9.514 af Outflow=158.66 cfs 29.558 af

**Pond 107B: Wetland** Peak Elev=972.97' Storage=58,109 cf Inflow=35.50 cfs 4.894 af
Outflow=24.74 cfs 4.618 af

**Pond 108A: 36" Culvert** Peak Elev=613.36' Storage=195 cf Inflow=118.29 cfs 10.355 af
Primary=59.56 cfs 7.442 af Secondary=58.80 cfs 2.913 af Outflow=118.36 cfs 10.355 af

**Pond SWM 7A: SWM 7A (Phase 1)** Peak Elev=808.34' Storage=3,098 cf Inflow=4.65 cfs 0.342 af
Outflow=2.95 cfs 0.341 af

**Pond SWM1: SWM 1** Peak Elev=514.37' Storage=37,925 cf Inflow=50.43 cfs 10.442 af
Outflow=47.90 cfs 10.442 af

**Pond SWM17: SWM17** Peak Elev=501.40' Storage=0.065 af Inflow=12.06 cfs 1.949 af
Outflow=12.03 cfs 1.949 af

**Pond SWM2: SWM2** Peak Elev=504.97' Storage=423,151 cf Inflow=298.34 cfs 42.880 af
Outflow=244.91 cfs 42.728 af

**Pond SWM3try: SWM3** Peak Elev=510.34' Storage=1,289,239 cf Inflow=280.89 cfs 76.203 af
Outflow=151.10 cfs 74.838 af

**Pond SWM4: SWM4** Peak Elev=517.66' Storage=121,490 cf Inflow=182.17 cfs 46.467 af
Primary=166.52 cfs 46.454 af Secondary=0.00 cfs 0.000 af Outflow=166.52 cfs 46.454 af

**Pond SWM5: SWM5** Peak Elev=521.60' Storage=180,880 cf Inflow=161.74 cfs 21.555 af
Primary=1.06 cfs 2.558 af Secondary=109.95 cfs 18.120 af Tertiary=25.37 cfs 0.728 af Outflow=136.38 cfs 21.405 af

**Pond SWM6: SWM6** Peak Elev=503.92' Storage=458,490 cf Inflow=164.67 cfs 20.890 af
Outflow=15.34 cfs 20.014 af

**Pond SWM7: SWM7** Peak Elev=746.44' Storage=21,984 cf Inflow=18.53 cfs 1.755 af
Outflow=9.36 cfs 1.755 af

**Pond SWM8: SWM8** Peak Elev=656.49' Storage=58,292 cf Inflow=36.49 cfs 4.738 af
Outflow=20.40 cfs 4.735 af

**Pond WF: Water Feature** Peak Elev=528.20' Storage=64,445 cf Inflow=72.12 cfs 10.442 af
Primary=50.43 cfs 10.442 af Secondary=0.00 cfs 0.000 af Outflow=50.43 cfs 10.442 af

**Link A: Amenia Stream** Inflow=185.70 cfs 54.310 af
Primary=185.70 cfs 54.310 af

**Link B: Wetland** Inflow=342.38 cfs 136.014 af
Primary=342.38 cfs 136.014 af

**Link C: Culvert** Inflow=18.16 cfs 4.670 af
Primary=18.16 cfs 4.670 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=2.95 cfs 0.341 af
Primary=2.95 cfs 0.341 af

**Total Runoff Area = 784.019 ac Runoff Volume = 205.347 af Average Runoff Depth = 3.14"**
**87.81% Pervious = 688.462 ac 12.19% Impervious = 95.557 ac**

## Summary for Subcatchment A101: A101

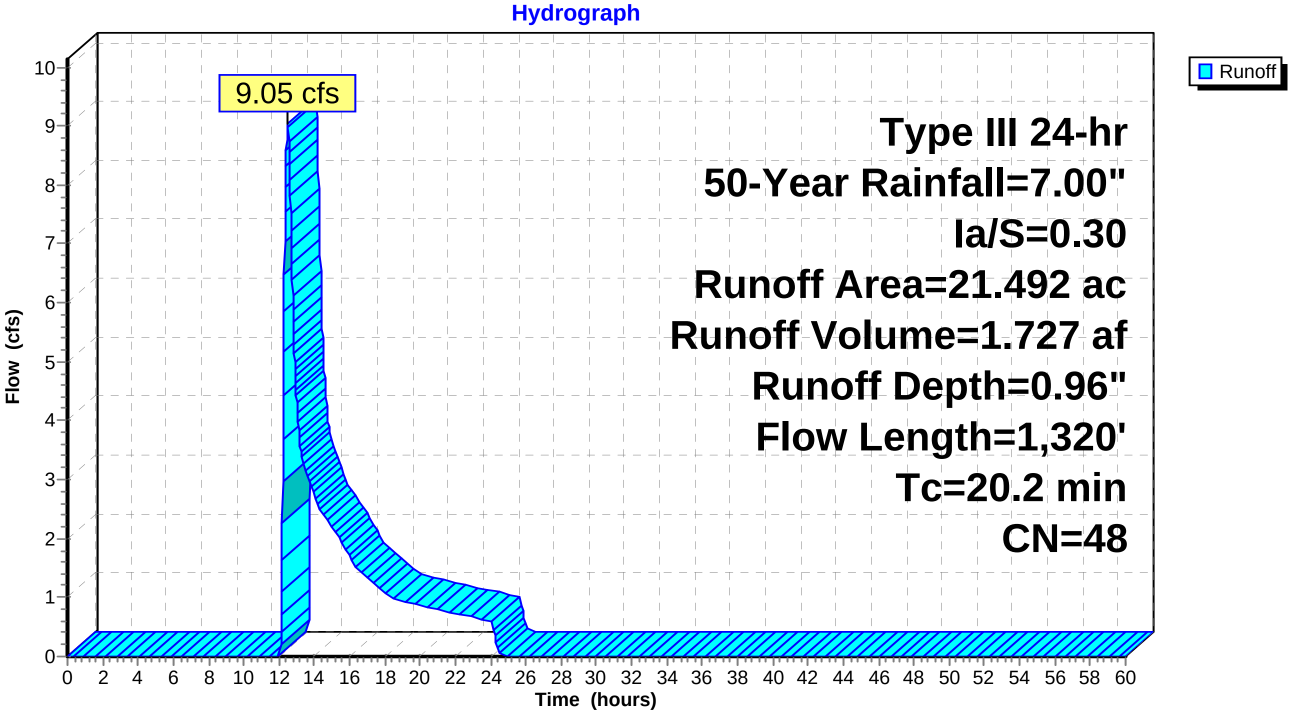
Runoff = 9.05 cfs @ 12.49 hrs, Volume= 1.727 af, Depth= 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.015 | 98 | Building roof |
| * | 0.921 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.290 | 39 | >75% Grass cover, Good, HSG A |
| | 6.490 | 61 | >75% Grass cover, Good, HSG B |
| | 0.050 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.270 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.426 | 30 | Sand trap, HSG A |
| * | 0.030 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 21.492 | 48 | Weighted Average |
| | 20.556 | | 95.64% Pervious Area |
| | 0.936 | | 4.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.6 | 100 | 0.1400 | 0.17 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 6.0 | 800 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 420 | 0.0480 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 20.2 | 1,320 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

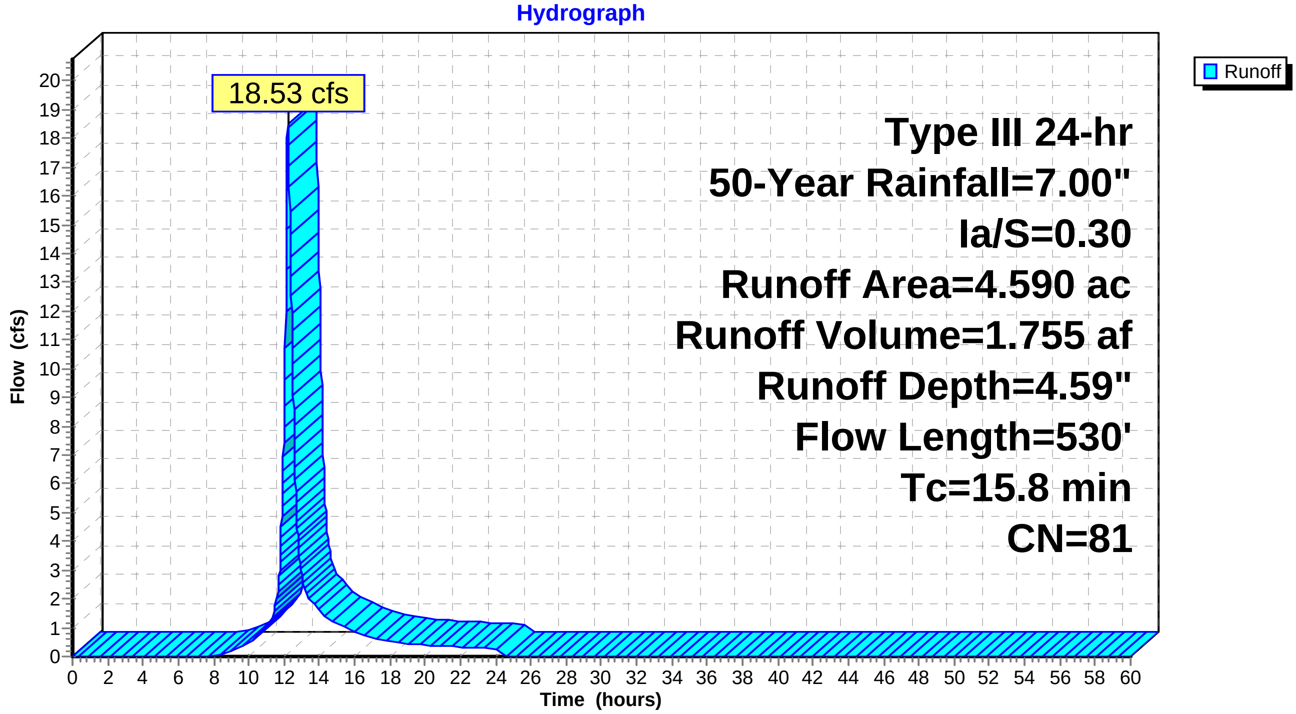
Runoff = 18.53 cfs @ 12.21 hrs, Volume= 1.755 af, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.200 | 98 | Building roof |
| * | 1.040 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.970 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.250 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 4.590 | 81 | Weighted Average |
| | 3.220 | | 70.15% Pervious Area |
| | 1.370 | | 29.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.1 | 50 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 130 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.7 | 250 | 0.1280 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.8 | 530 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

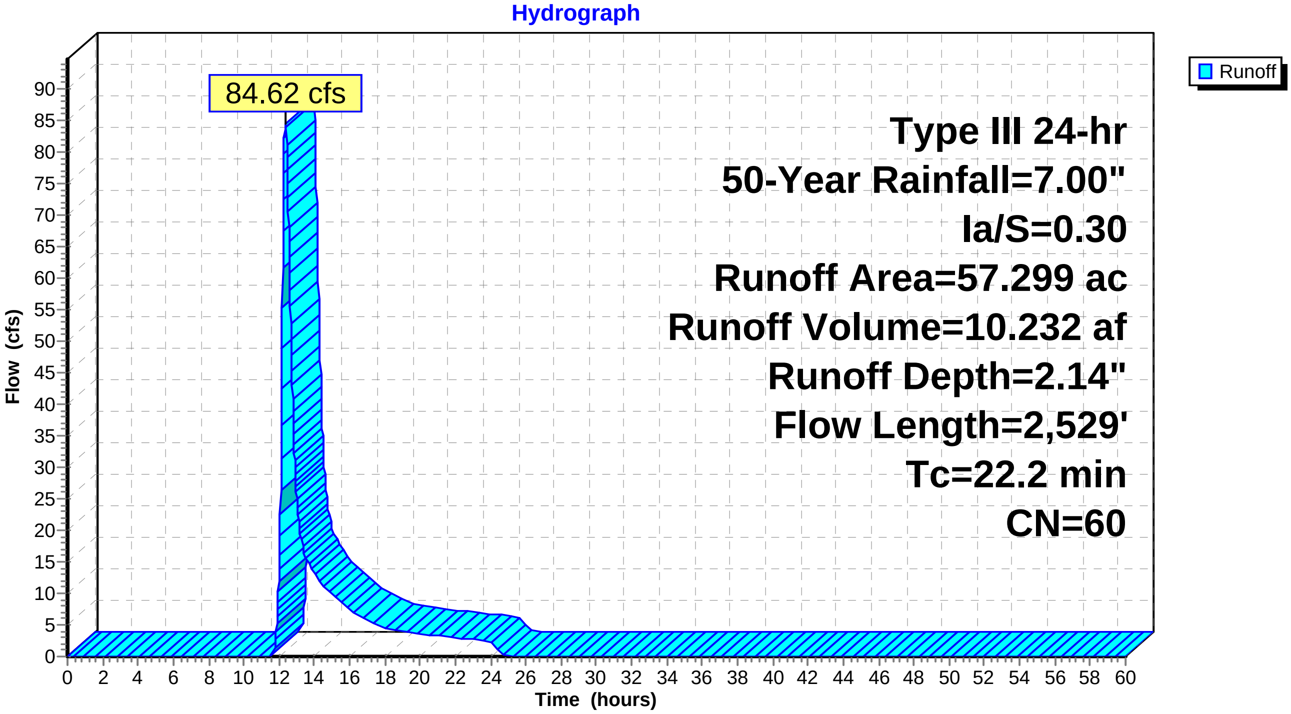
Runoff = 84.62 cfs @ 12.35 hrs, Volume= 10.232 af, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.320 | 98 | Building roof |
| * | 6.292 | 98 | Paved surface |
| * | 0.438 | 96 | Gravel surface |
| * | 1.461 | 98 | Water Surface |
| | 21.310 | 39 | >75% Grass cover, Good, HSG A |
| | 5.353 | 61 | >75% Grass cover, Good, HSG B |
| | 8.379 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 5.112 | 30 | Woods, Good, HSG A |
| | 1.620 | 55 | Woods, Good, HSG B |
| | 1.505 | 70 | Woods, Good, HSG C |
| | 1.130 | 77 | Woods, Good, HSG D |
| * | 0.220 | 30 | Sand trap, HSG A |
| * | 0.130 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 57.299 | 60 | Weighted Average |
| | 45.226 | | 78.93% Pervious Area |
| | 12.073 | | 21.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.8 | 100 | 0.0300 | 0.09 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 2.2 | 355 | 0.1430 | 2.65 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 554 | 0.0680 | 8.24 | 98.89 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.050 |
| 1.1 | 1,520 | 0.0690 | 23.78 | 116.72 | **Pipe Channel,**<br>30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'<br>n= 0.012 |
| 22.2 | 2,529 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

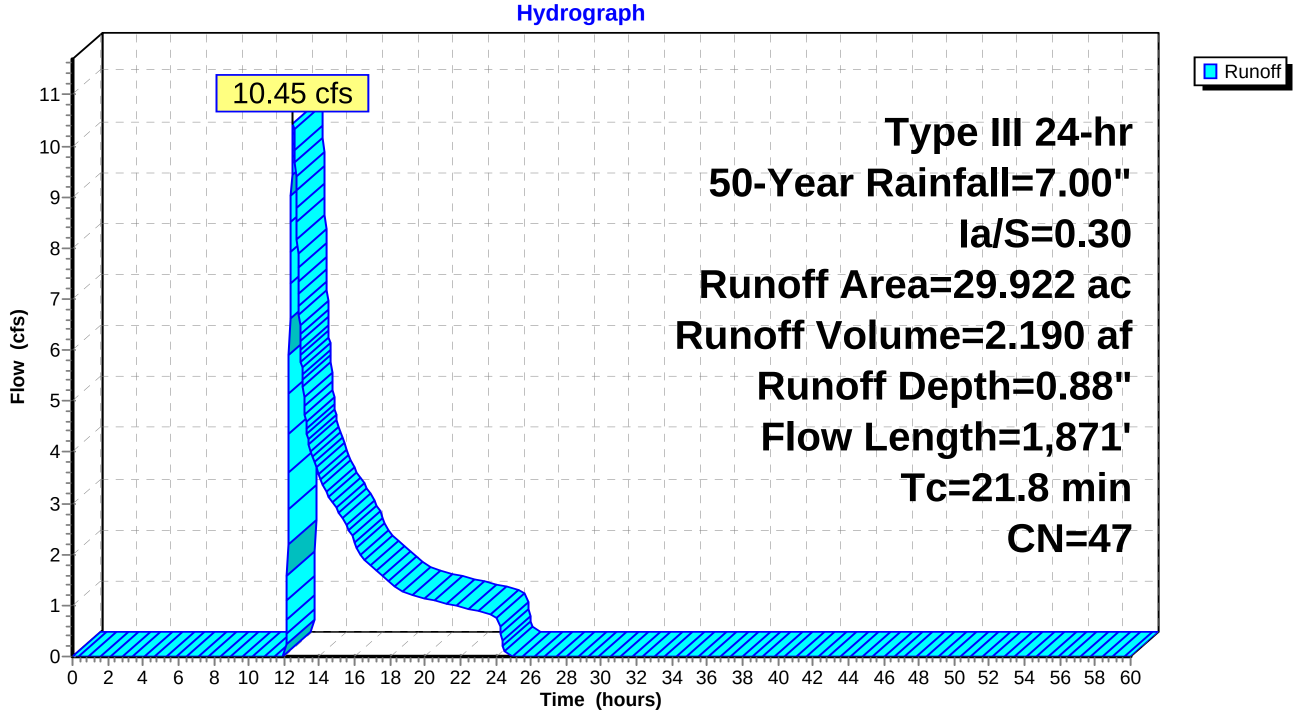
Runoff = 10.45 cfs @ 12.53 hrs, Volume= 2.190 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.270 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.430 | 98 | Water Surface |
| | 23.530 | 39 | >75% Grass cover, Good, HSG A |
| | 0.110 | 61 | >75% Grass cover, Good, HSG B |
| | 3.720 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.028 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.100 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.635 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.082 | 30 | Sand Trap, HSG C |
| | 29.922 | 47 | Weighted Average |
| | 28.222 | | 94.32% Pervious Area |
| | 1.700 | | 5.68% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.8 | 100 | 0.2400 | 0.22 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 9.7 | 1,231 | 0.0920 | 2.12 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 4.3 | 540 | 0.0900 | 2.10 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 21.8 | 1,871 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

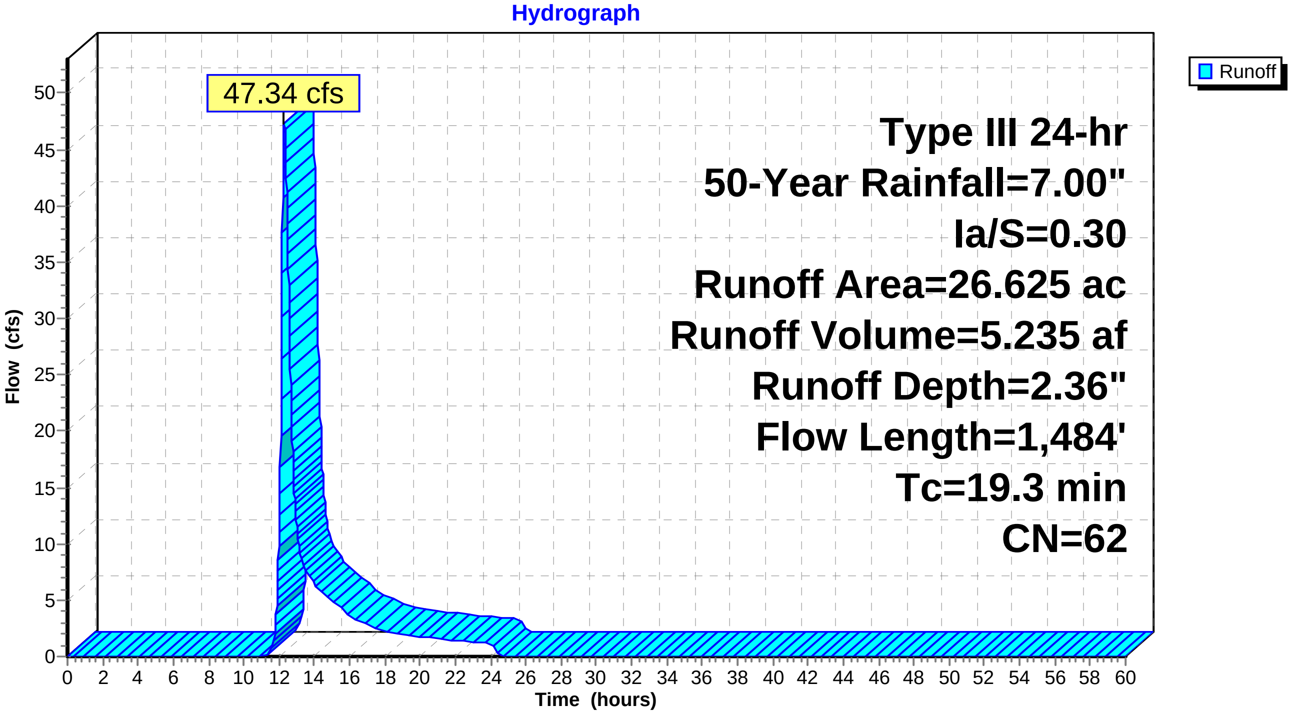
Runoff = 47.34 cfs @ 12.29 hrs, Volume= 5.235 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.390 | 98 | Building roof |
| * | 0.480 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.500 | 98 | Water Surface |
| | 10.650 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 8.795 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.094 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.565 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.145 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.006 | 30 | Sand Trap, HSG C |
| | 26.625 | 62 | Weighted Average |
| | 23.255 | | 87.34% Pervious Area |
| | 3.370 | | 12.66% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 3.0 | 395 | 0.1920 | 2.19 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 7.1 | 989 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 19.3 | 1,484 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

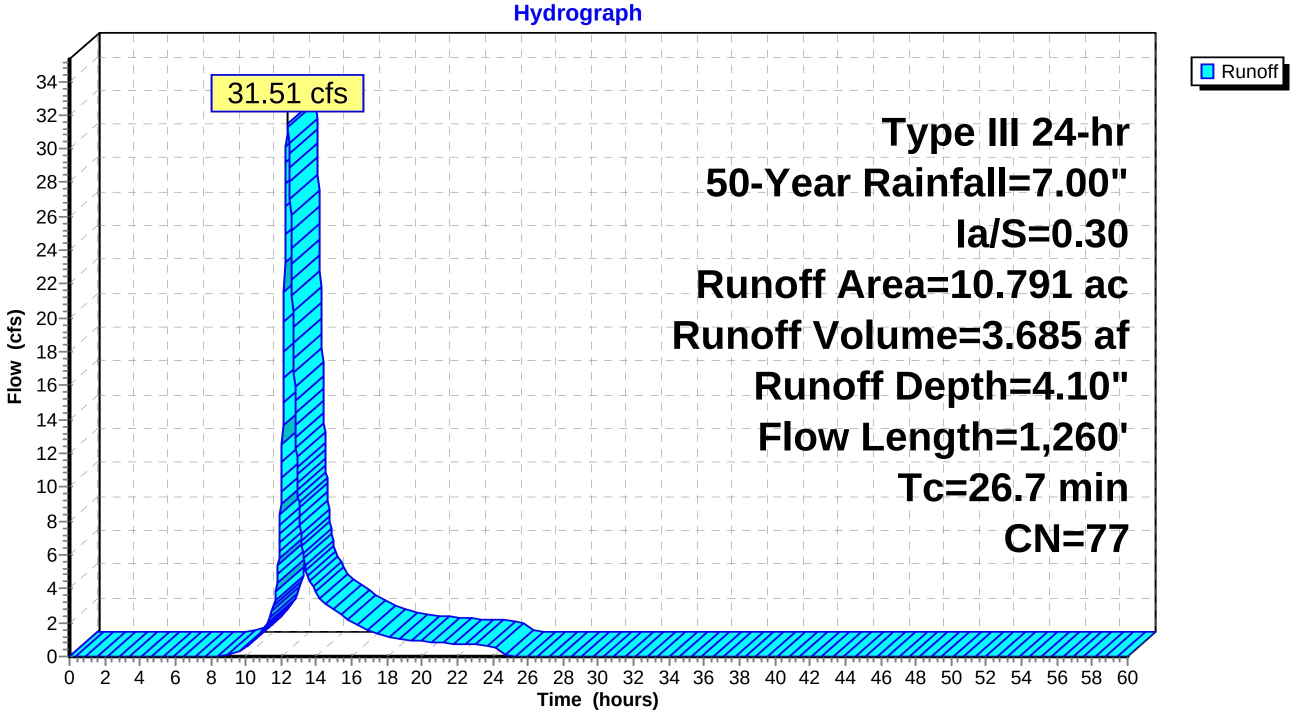
Runoff = 31.51 cfs @ 12.37 hrs, Volume= 3.685 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.220 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.078 | 61 | >75% Grass cover, Good, HSG B |
| | 5.210 | 74 | >75% Grass cover, Good, HSG C |
| | 2.190 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.100 | 55 | Woods, Good, HSG B |
| | 1.390 | 70 | Woods, Good, HSG C |
| | 0.603 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 10.791 | 77 | Weighted Average |
| | 9.571 | | 88.69% Pervious Area |
| | 1.220 | | 11.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

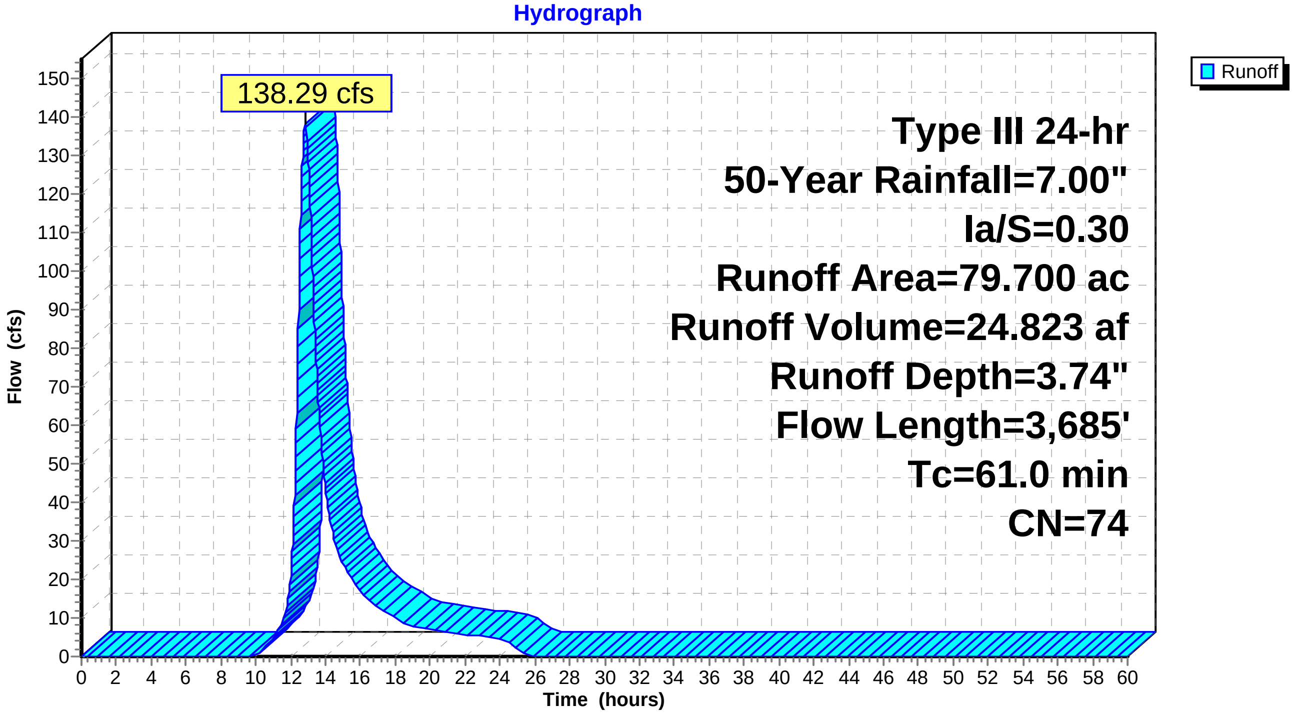
Runoff = 138.29 cfs @ 12.82 hrs, Volume= 24.823 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.340 | 98 | Building roof |
| * | 1.314 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 6.390 | 61 | >75% Grass cover, Good, HSG B |
| | 4.750 | 74 | >75% Grass cover, Good, HSG C |
| | 3.470 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 7.845 | 55 | Woods, Good, HSG B |
| | 3.580 | 70 | Woods, Good, HSG C |
| | 51.810 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 79.700 | 74 | Weighted Average |
| | 77.916 | | 97.76% Pervious Area |
| | 1.784 | | 2.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

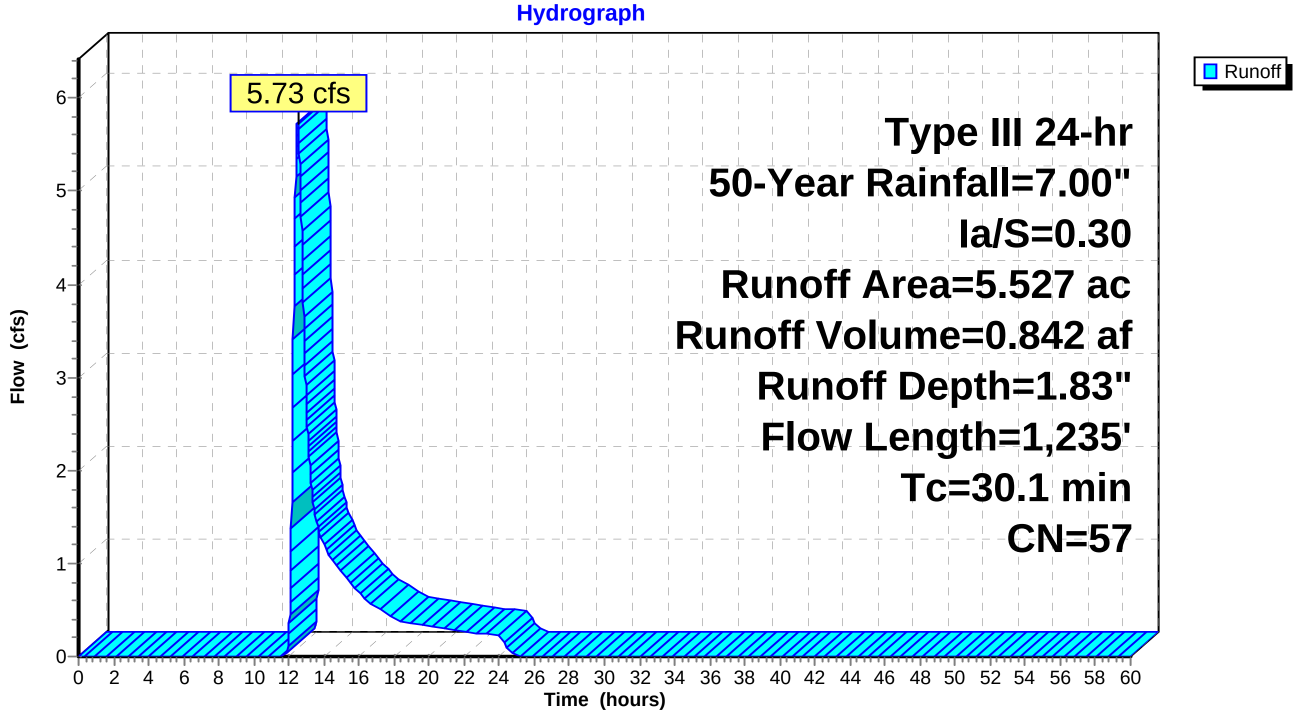
Runoff = 5.73 cfs @ 12.50 hrs, Volume= 0.842 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.088 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.630 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.527 | 57 | Weighted Average |
| | 5.399 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment A109: A109

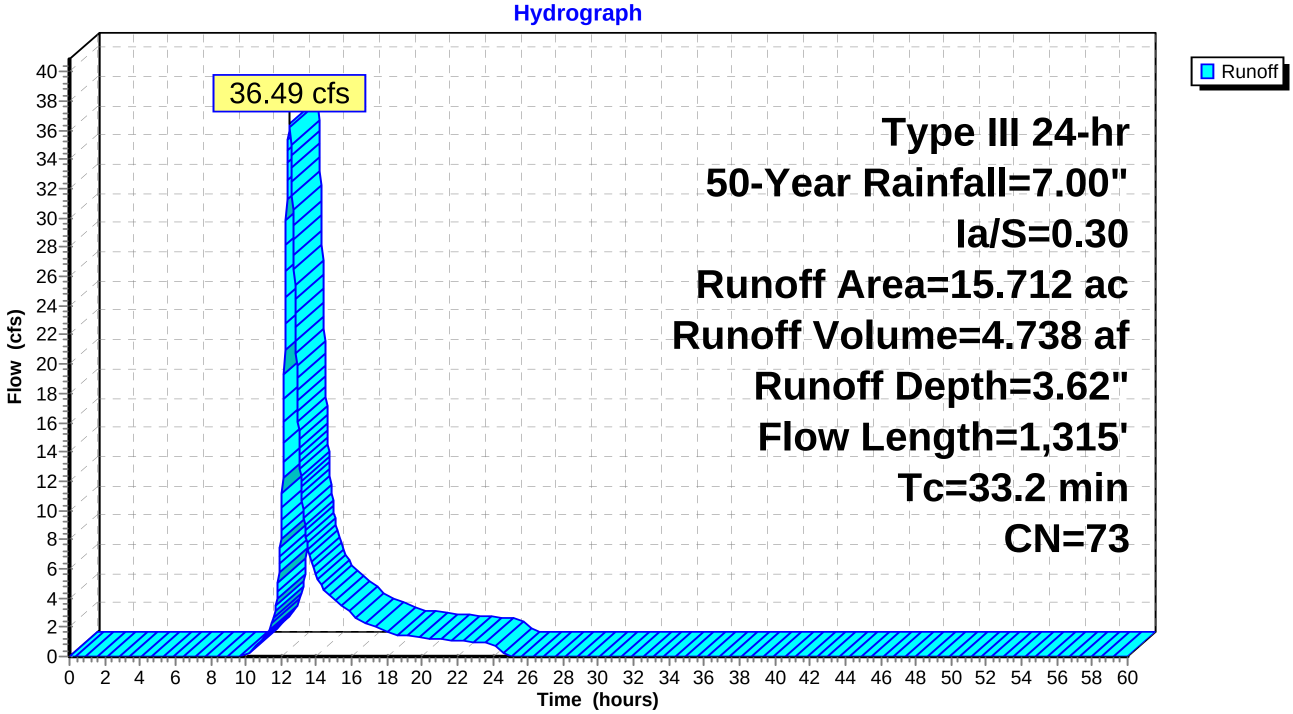
Runoff = 36.49 cfs @ 12.47 hrs, Volume= 4.738 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| Area (ac) | CN | Description |
|---|---|---|
| 0.857 | 98 | Roofs, HSG B |
| 5.730 | 61 | >75% Grass cover, Good, HSG B |
| 4.502 | 74 | >75% Grass cover, Good, HSG C |
| 0.592 | 80 | >75% Grass cover, Good, HSG D |
| 2.000 | 98 | Paved parking, HSG B |
| 0.328 | 55 | Woods, Good, HSG B |
| 0.823 | 70 | Woods, Good, HSG C |
| 0.880 | 77 | Woods, Good, HSG D |
| 15.712 | 73 | Weighted Average |
| 12.855 | | 81.82% Pervious Area |
| 2.857 | | 18.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 22.3 | 100 | 0.0650 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.0 | 388 | 0.2200 | 3.28 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.7 | 427 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.2 | 400 | 0.1850 | 1.08 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 33.2 | 1,315 | Total | | | |

## Subcatchment A109: A109



## Summary for Subcatchment B101: B101

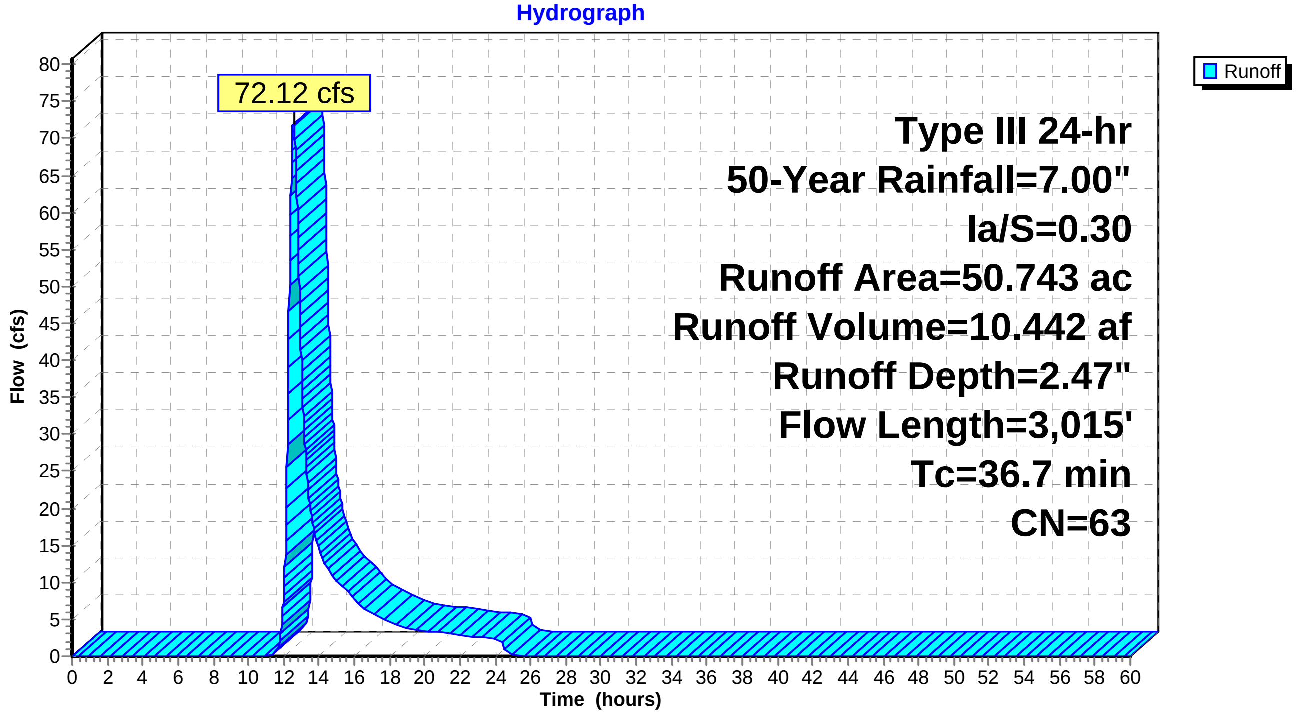
Runoff = 72.12 cfs @ 12.56 hrs, Volume= 10.442 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 5.220 | 98 | Building roof |
| * | 3.230 | 98 | Paved surface |
| * | 0.439 | 96 | Gravel surface |
| * | 0.412 | 98 | Water Surface |
| | 21.653 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 10.300 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.553 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 4.380 | 70 | Woods, Good, HSG C |
| | 4.370 | 77 | Woods, Good, HSG D |
| * | 0.142 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.044 | 30 | Sand Trap, HSG C |
| | 50.743 | 63 | Weighted Average |
| | 41.881 | | 82.54% Pervious Area |
| | 8.862 | | 17.46% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 1.4 | 1,880 | 0.0830 | 22.47 | 70.61 | **Pipe Channel,**<br>24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'<br>n= 0.012 |
| 36.7 | 3,015 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

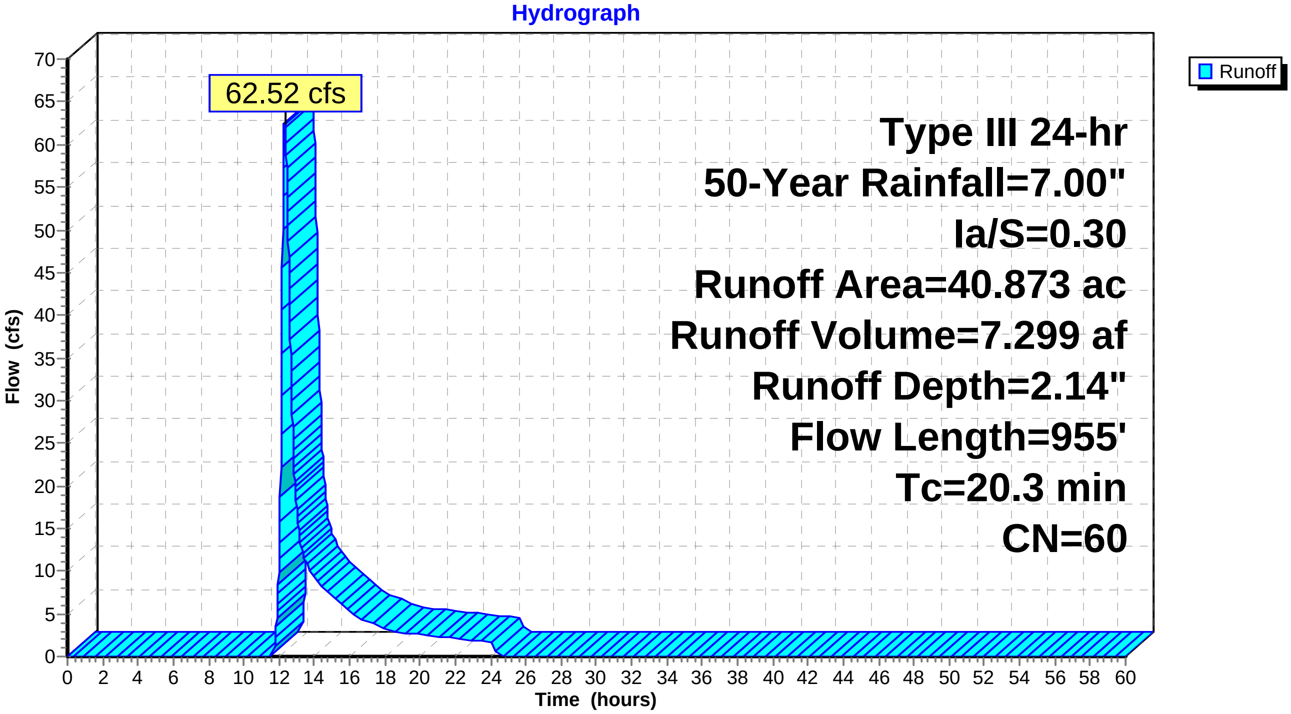
Runoff = 62.52 cfs @ 12.32 hrs, Volume= 7.299 af, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.516 | 98 | Paved surface |
| * | 0.210 | 96 | Gravel surface |
| * | 0.009 | 98 | Water Surface |
| | 7.476 | 39 | >75% Grass cover, Good, HSG A |
| | 0.464 | 61 | >75% Grass cover, Good, HSG B |
| | 12.033 | 74 | >75% Grass cover, Good, HSG C |
| | 0.764 | 80 | >75% Grass cover, Good, HSG D |
| | 6.808 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 5.496 | 70 | Woods, Good, HSG C |
| | 6.710 | 77 | Woods, Good, HSG D |
| * | 0.060 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.327 | 30 | Sand Trap, HSG C |
| | 40.873 | 60 | Weighted Average |
| | 40.348 | | 98.72% Pervious Area |
| | 0.525 | | 1.28% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** |
| | | | | | Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** |
| | | | | | Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** |
| | | | | | Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 318 | 0.0250 | 7.19 | 287.53 | **Parabolic Channel,** |
| | | | | | W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.050 |
| 20.3 | 955 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

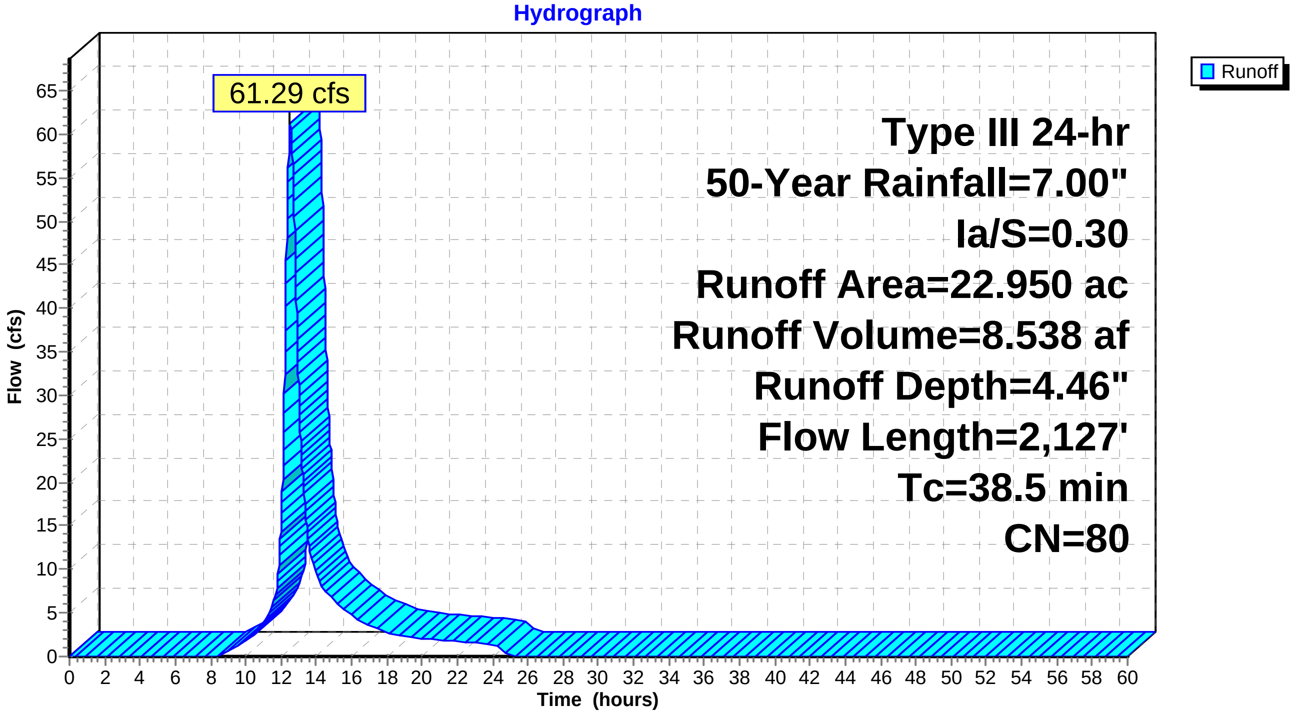
Runoff = 61.29 cfs @ 12.53 hrs, Volume= 8.538 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.520 | 98 | Building roof |
| * | 1.000 | 98 | Paved surface |
| * | 0.123 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.674 | 74 | >75% Grass cover, Good, HSG C |
| | 2.133 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 17.500 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 22.950 | 80 | Weighted Average |
| | 20.430 | | 89.02% Pervious Area |
| | 2.520 | | 10.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.3 | 784 | 0.5100 | 1.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 1,243 | 0.0670 | 26.46 | 187.03 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 38.5 | 2,127 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

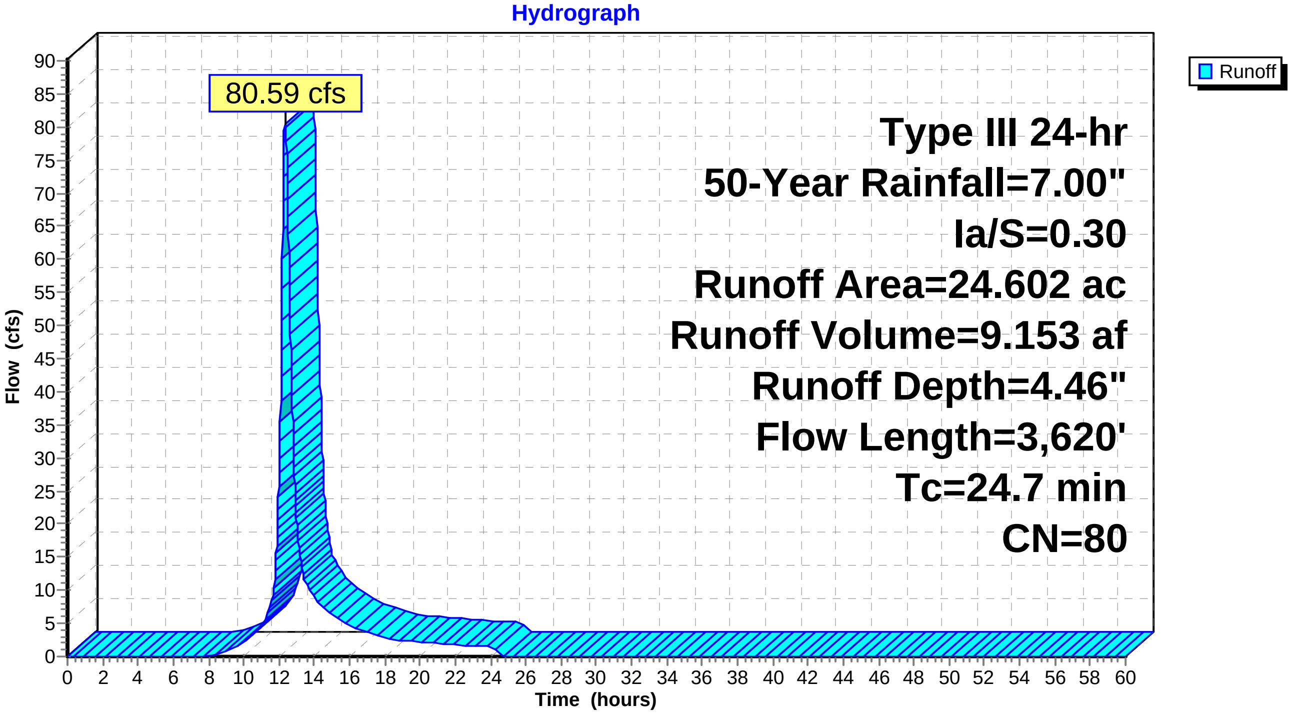
Runoff = 80.59 cfs @ 12.33 hrs, Volume= 9.153 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.579 | 98 | Building roof |
| * | 2.315 | 98 | Paved surface |
| * | 0.016 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.452 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.733 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.315 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.192 | 30 | Sand Trap, HSG C |
| | 24.602 | 80 | Weighted Average |
| | 17.708 | | 71.98% Pervious Area |
| | 6.894 | | 28.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.8 | 100 | 0.1000 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 8.0 | 823 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 452 | 0.1720 | 2.90 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 1,210 | 0.0580 | 8.46 | 101.48 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.045 |
| 0.9 | 1,035 | 0.0350 | 19.12 | 135.18 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 24.7 | 3,620 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

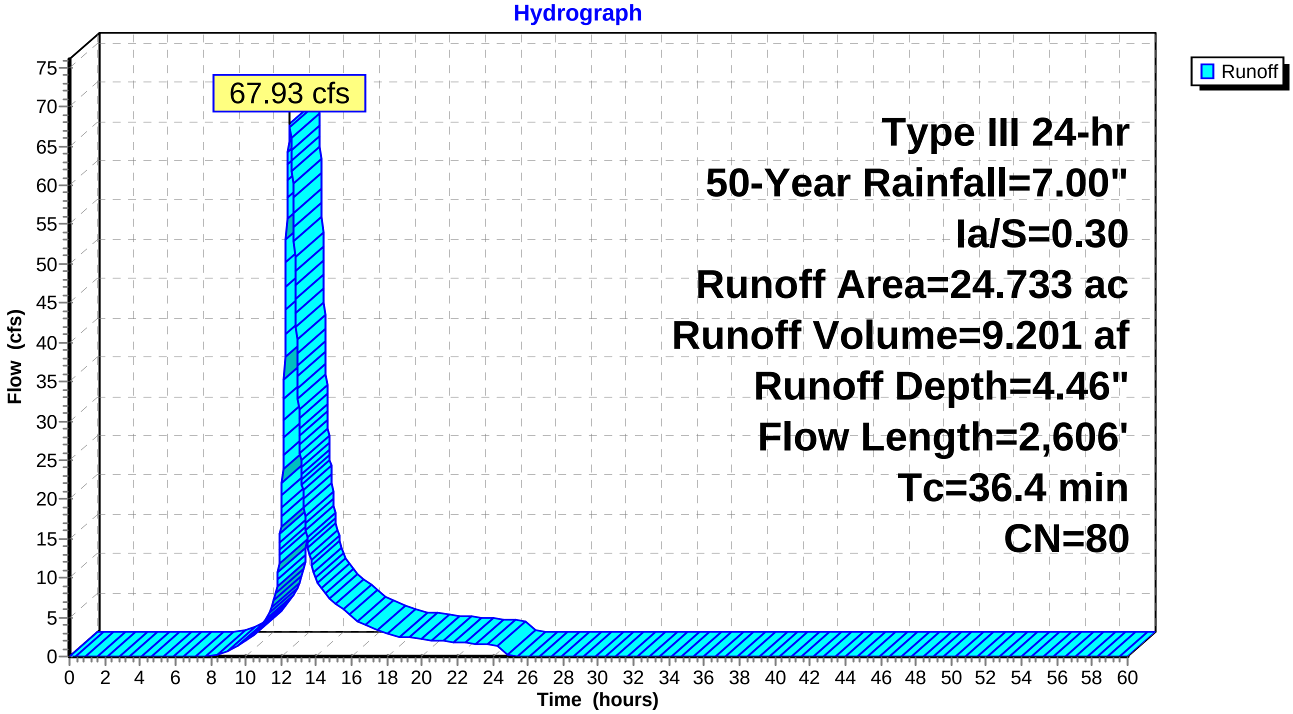
Runoff = 67.93 cfs @ 12.50 hrs, Volume= 9.201 af, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.944 | 98 | Building roof |
| * | 0.763 | 98 | Paved surface |
| * | 0.287 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.052 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.735 | 74 | >75% Grass cover, Good, HSG C |
| | 0.052 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 18.900 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 24.733 | 80 | Weighted Average |
| | 21.026 | | 85.01% Pervious Area |
| | 3.707 | | 14.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 612 | 0.5680 | 1.88 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 114 | 0.2280 | 3.34 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 880 | 0.0320 | 5.65 | 67.84 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.7 | 900 | 0.0400 | 20.44 | 144.51 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 36.4 | 2,606 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

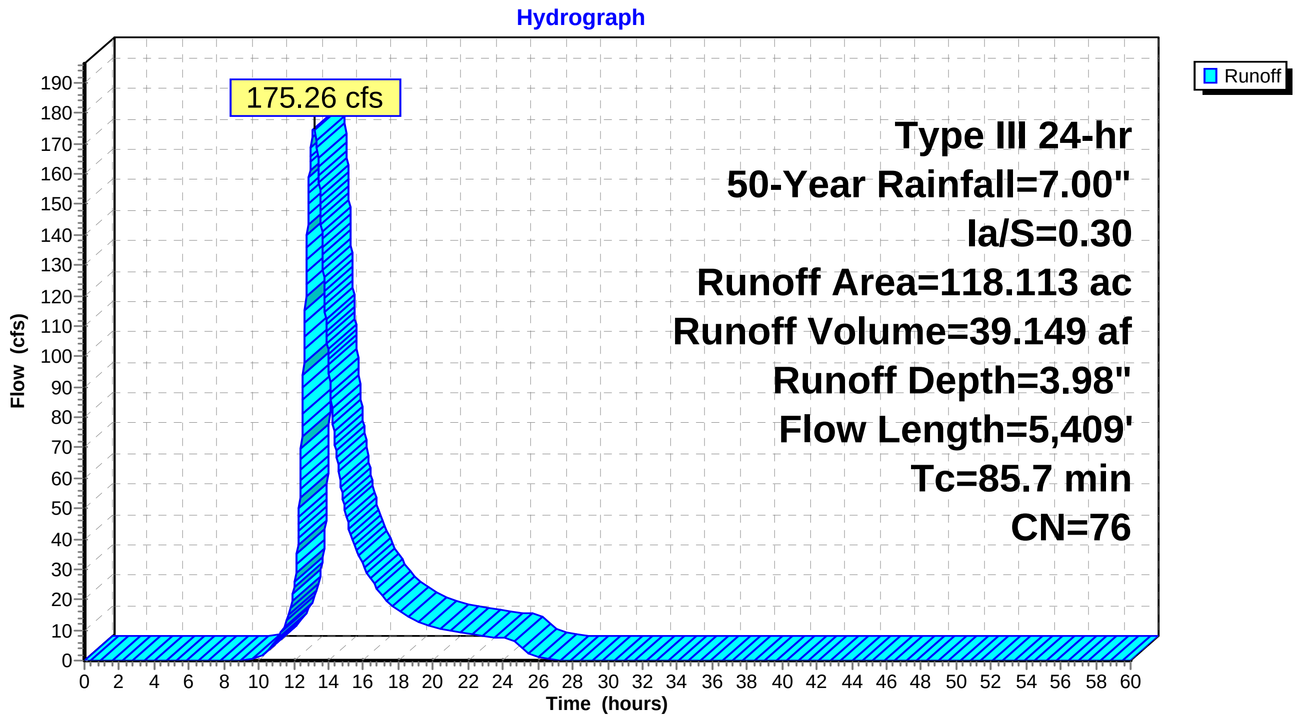
Runoff = 175.26 cfs @ 13.15 hrs, Volume= 39.149 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.587 | 98 | Building roof |
| * | 0.994 | 98 | Paved surface |
| * | 0.746 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.090 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 11.920 | 74 | >75% Grass cover, Good, HSG C |
| | 2.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 10.050 | 70 | Woods, Good, HSG C |
| | 89.064 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 118.113 | 76 | Weighted Average |
| | 116.532 | | 98.66% Pervious Area |
| | 1.581 | | 1.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

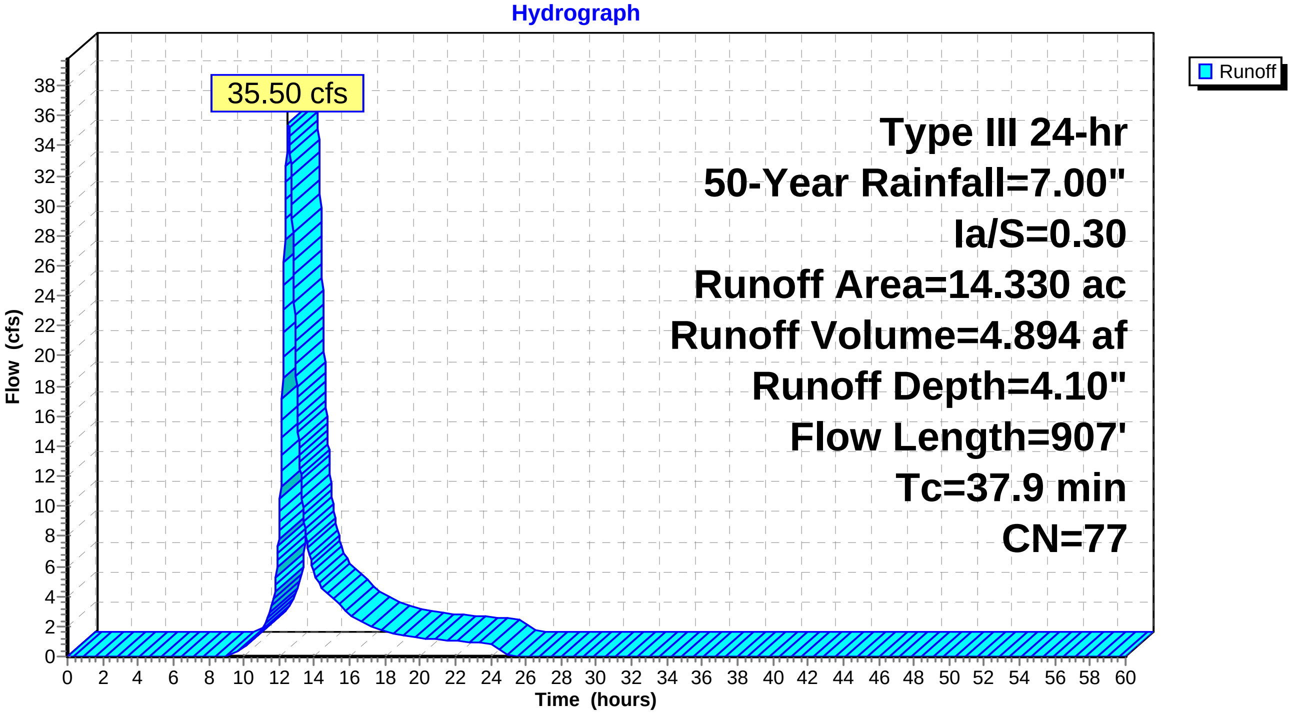
Runoff = 35.50 cfs @ 12.52 hrs, Volume= 4.894 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

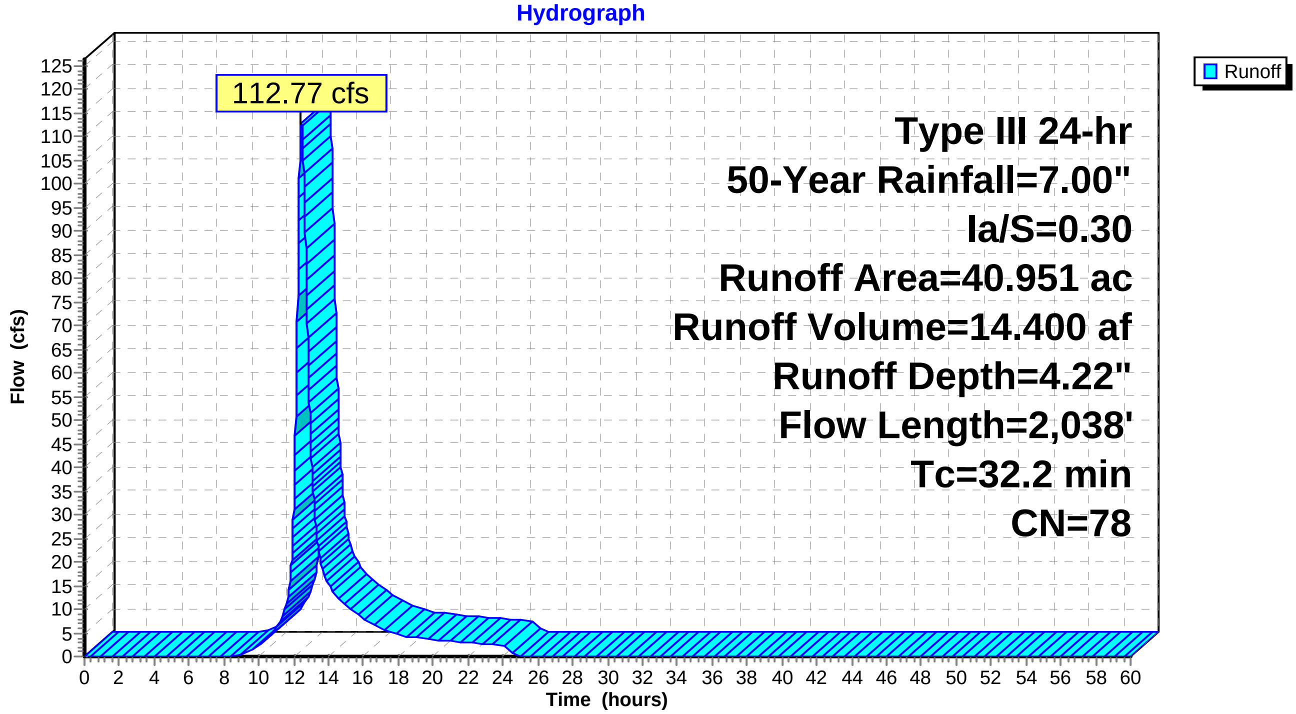
Runoff = 112.77 cfs @ 12.44 hrs, Volume= 14.400 af, Depth= 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.640 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.100 | 74 | >75% Grass cover, Good, HSG C |
| | 1.909 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.842 | 70 | Woods, Good, HSG C |
| | 23.560 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.951 | 78 | Weighted Average |
| | 36.411 | | 88.91% Pervious Area |
| | 4.540 | | 11.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 7.8 | 823 | 0.5000 | 1.77 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 725 | 0.1640 | 41.40 | 292.62 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 32.2 | 2,038 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

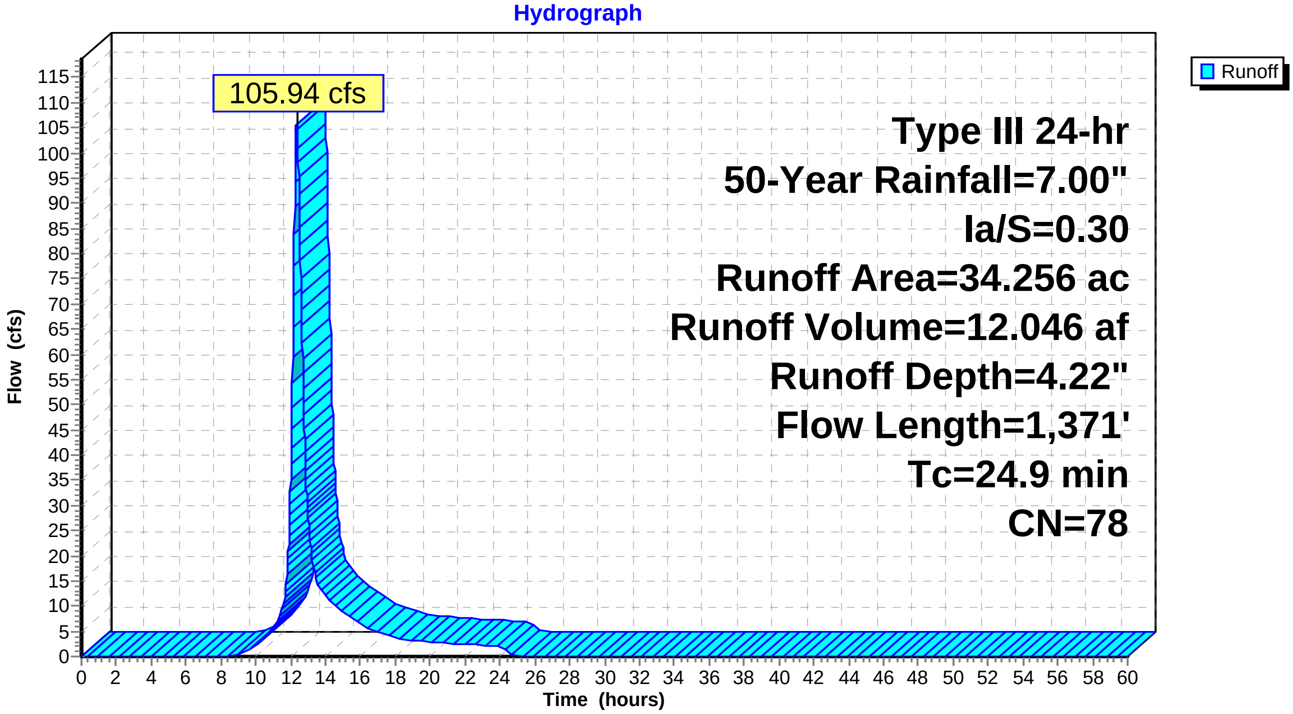
Runoff = 105.94 cfs @ 12.34 hrs, Volume= 12.046 af, Depth= 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.000 | 98 | Building roof |
| * | 0.600 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.592 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.332 | 74 | >75% Grass cover, Good, HSG C |
| | 3.160 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.450 | 70 | Woods, Good, HSG C |
| | 9.847 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.275 | 30 | Sand Trap, HSG C |
| | 34.256 | 78 | Weighted Average |
| | 30.064 | | 87.76% Pervious Area |
| | 4.192 | | 12.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4450 | 1.67 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 70 | 0.0280 | 5.29 | 63.46 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.0 | 100 | 0.2800 | 54.09 | 382.35 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 0.2 | 160 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 0.3 | 281 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 24.9 | 1,371 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment B110: B110

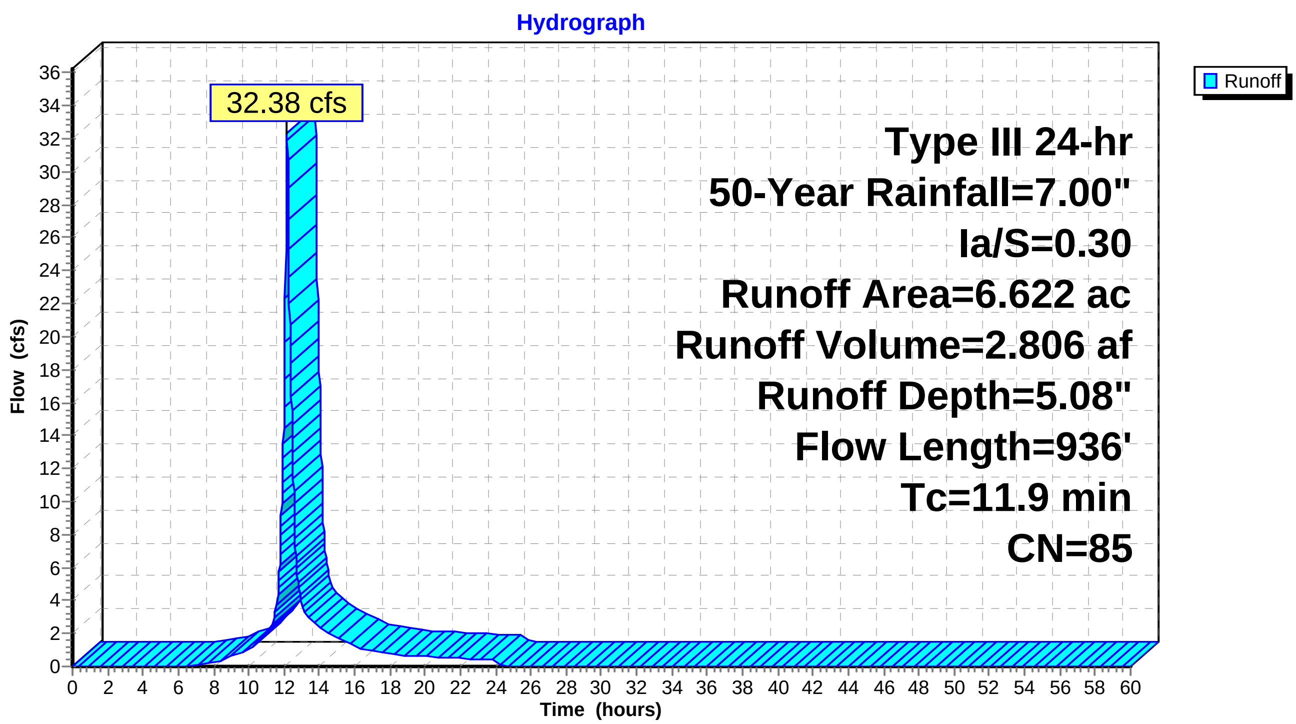
Runoff = 32.38 cfs @ 12.16 hrs, Volume= 2.806 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.381 | 98 | Building roof |
| * | 1.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.550 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.061 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.622 | 85 | Weighted Average |
| | 3.611 | | 54.53% Pervious Area |
| | 3.011 | | 45.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 100 | 0.1300 | 0.17 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 0.6 | 121 | 0.2500 | 3.50 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 715 | 0.0360 | 7.40 | 23.25 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.024 |
| 11.9 | 936 | Total | | | |

## Subcatchment B110: B110



## Summary for Subcatchment B111: B111

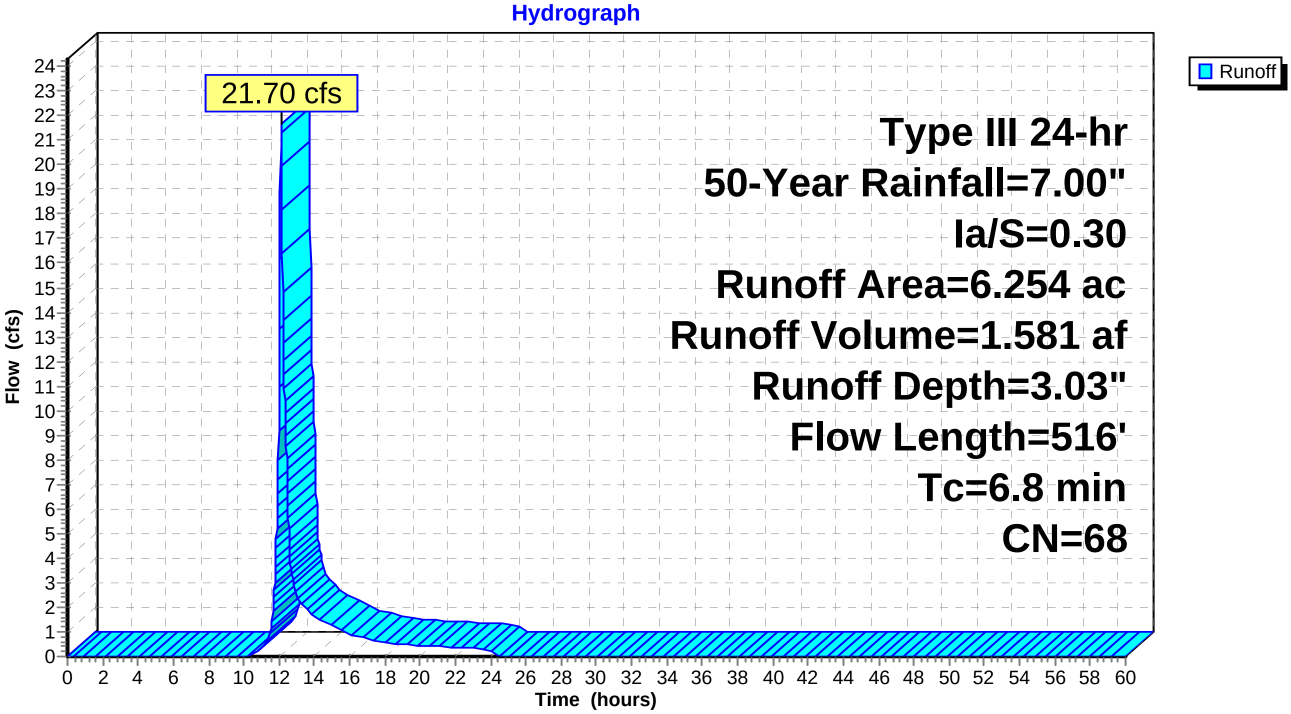
Runoff = 21.70 cfs @ 12.10 hrs, Volume= 1.581 af, Depth= 3.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.504 | 98 | Building roof |
| * | 0.120 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.900 | 98 | Water Surface |
| | 2.730 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.254 | 68 | Weighted Average |
| | 3.730 | | 59.64% Pervious Area |
| | 2.524 | | 40.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.7 | 100 | 0.2000 | 0.45 | | **Sheet Flow,**<br>Grass: Short n= 0.150 P2= 3.50" |
| 0.6 | 115 | 0.2000 | 3.13 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 301 | 0.0800 | 1.98 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 6.8 | 516 | Total | | | |

## Subcatchment B111: B111



## Summary for Subcatchment B112: B112

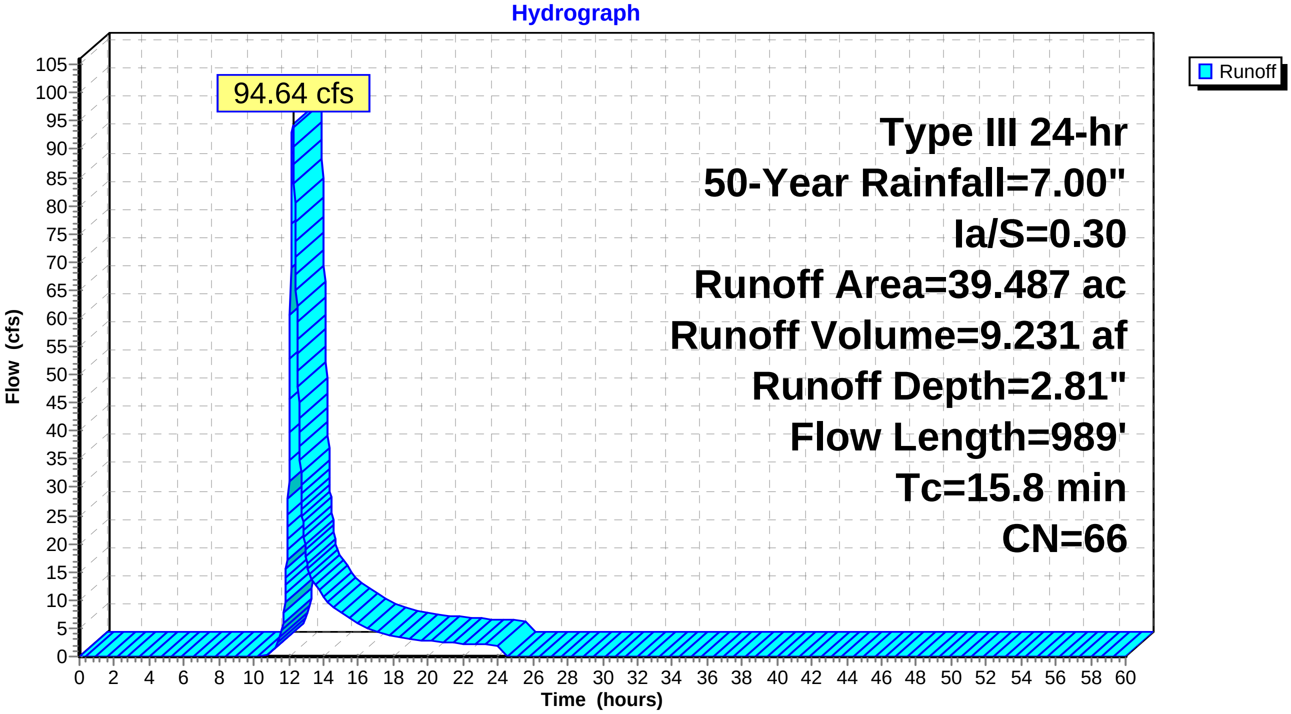
Runoff = 94.64 cfs @ 12.23 hrs, Volume= 9.231 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.550 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 8.285 | 98 | Water Surface |
| | 17.485 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 7.526 | 74 | >75% Grass cover, Good, HSG C |
| | 0.015 | 80 | >75% Grass cover, Good, HSG D |
| | 0.052 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.289 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.385 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 39.487 | 66 | Weighted Average |
| | 25.752 | | 65.22% Pervious Area |
| | 13.735 | | 34.78% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.1 | 100 | 0.0400 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 3.1 | 375 | 0.0850 | 2.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 514 | 0.0470 | 1.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 15.8 | 989 | Total | | | |

## Subcatchment B112: B112



## Summary for Subcatchment B113: B113

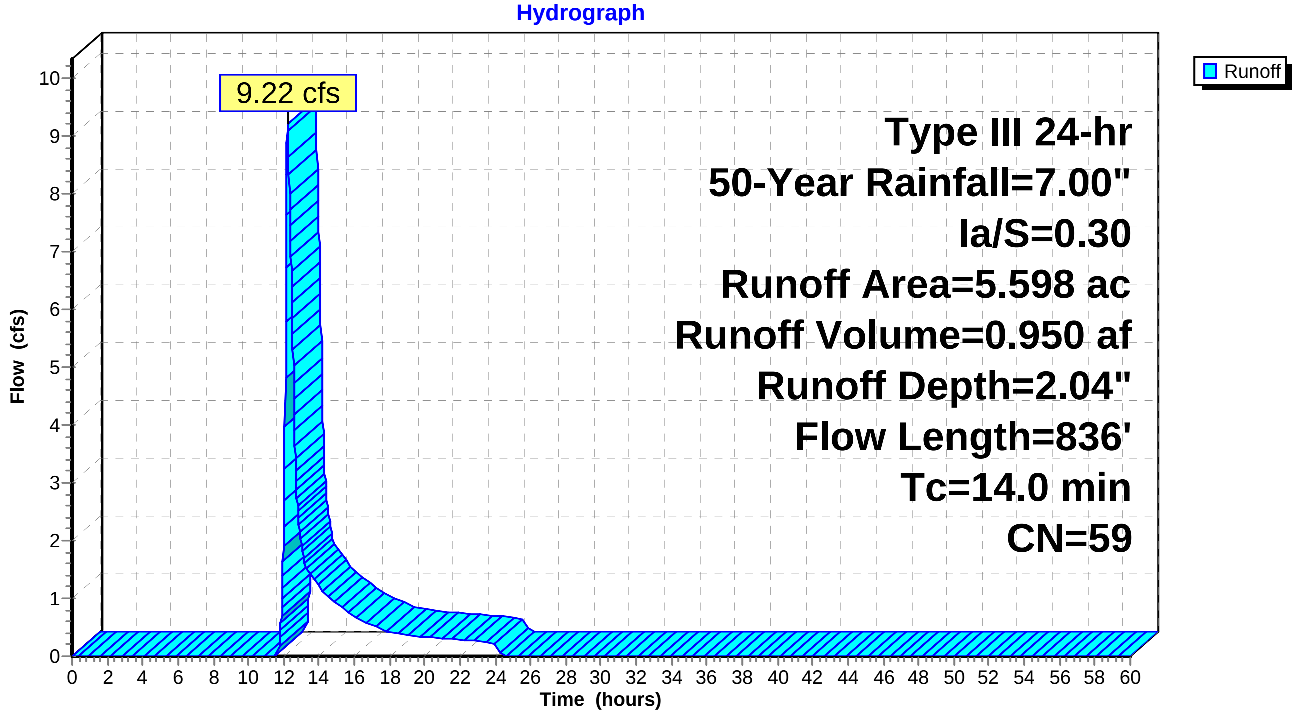
Runoff = 9.22 cfs @ 12.22 hrs, Volume= 0.950 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.060 | 98 | Building roof |
| * | 0.650 | 98 | Paved surface |
| * | 0.009 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.724 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.135 | 80 | >75% Grass cover, Good, HSG D |
| | 0.720 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.300 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.598 | 59 | Weighted Average |
| | 3.888 | | 69.45% Pervious Area |
| | 1.710 | | 30.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.8 | 100 | 0.0800 | 0.14 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.6 | 300 | 0.0360 | 3.05 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 436 | 0.0700 | 12.07 | 14.81 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 |
| 14.0 | 836 | Total | | | |

## Subcatchment B113: B113



## Summary for Subcatchment B115: B115

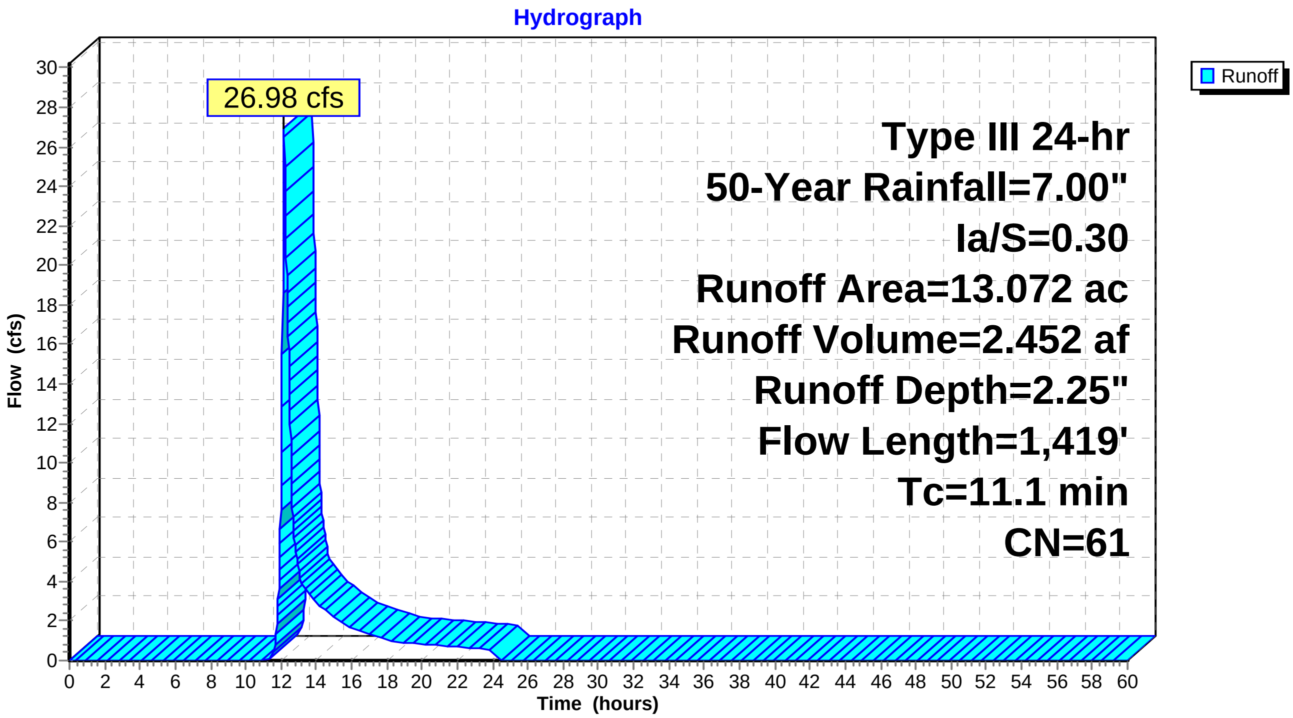
Runoff = 26.98 cfs @ 12.17 hrs, Volume= 2.452 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.615 | 98 | Building roof |
| * | 0.449 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 6.589 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.241 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.030 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.011 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.057 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.080 | 30 | Sand Trap, HSG C |
| | 13.072 | 61 | Weighted Average |
| | 10.008 | | 76.56% Pervious Area |
| | 3.064 | | 23.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 100 | 0.1100 | 0.35 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 4.0 | 340 | 0.0410 | 1.42 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 979 | 0.0130 | 6.80 | 136.10 | **Channel Flow,** Area= 20.0 sf Perim= 12.0' r= 1.67' n= 0.035 |
| 11.1 | 1,419 | Total | | | |

## Subcatchment B115: B115



## Summary for Subcatchment B116: B116

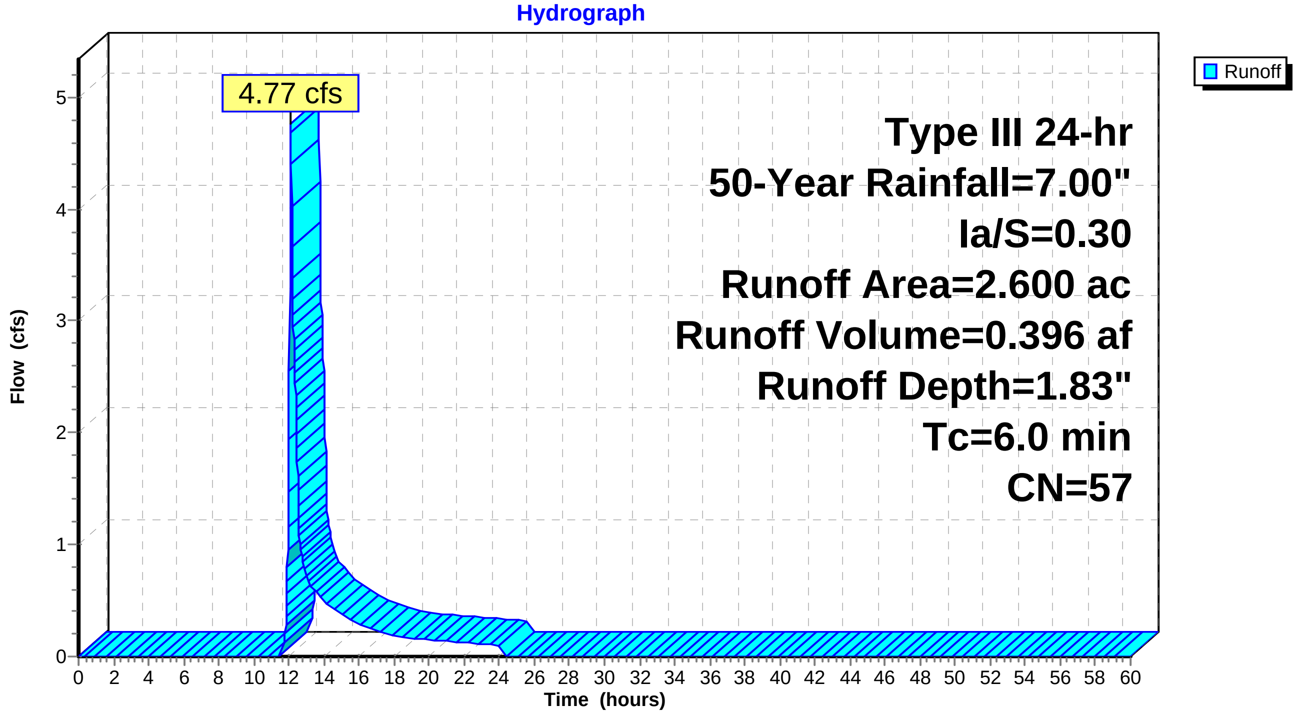
Runoff = 4.77 cfs @ 12.11 hrs, Volume= 0.396 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.174 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.621 | 98 | Water Surface |
| | 1.805 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.600 | 57 | Weighted Average |
| | 1.805 | | 69.42% Pervious Area |
| | 0.795 | | 30.58% Impervious Area |

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

## Subcatchment B116: B116



## Summary for Subcatchment B117: B117

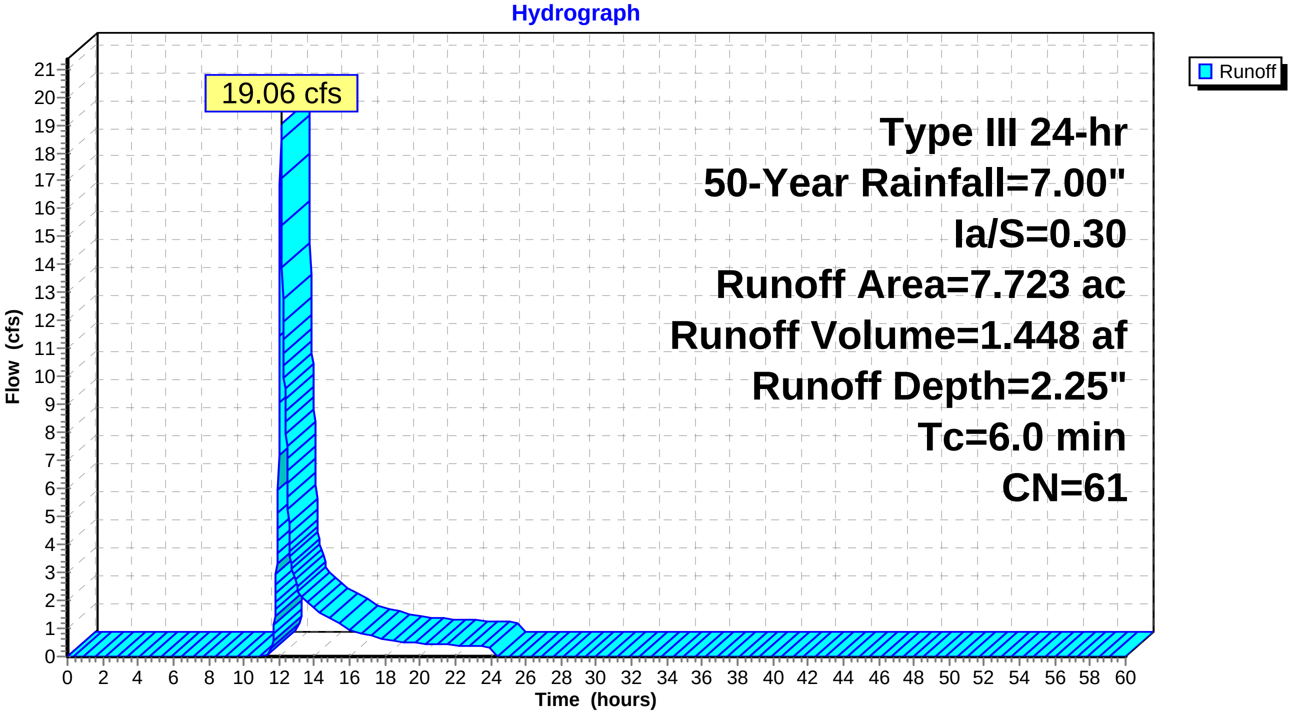
Runoff = 19.06 cfs @ 12.10 hrs, Volume= 1.448 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.200 | 98 | Building roof |
| * | 0.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 4.580 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.018 | 80 | >75% Grass cover, Good, HSG D |
| | 0.268 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.027 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.723 | 61 | Weighted Average |
| | 4.893 | | 63.36% Pervious Area |
| | 2.830 | | 36.64% Impervious Area |

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

## Subcatchment B117: B117



## Summary for Subcatchment B118: B118

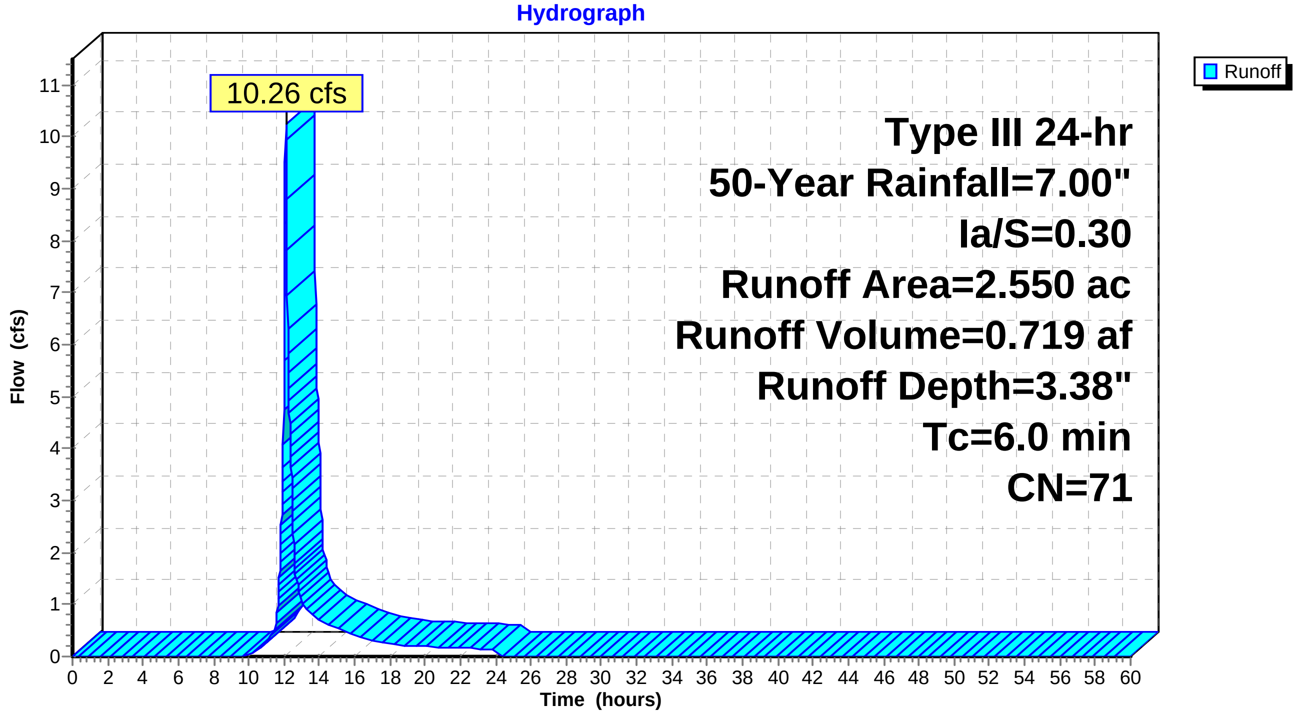
Runoff = 10.26 cfs @ 12.09 hrs, Volume= 0.719 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.295 | 98 | Building roof |
| * | 0.100 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 1.015 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.140 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.550 | 71 | Weighted Average |
| | 1.155 | | 45.29% Pervious Area |
| | 1.395 | | 54.71% Impervious Area |

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

## Subcatchment B118: B118



## Summary for Subcatchment B119: B119

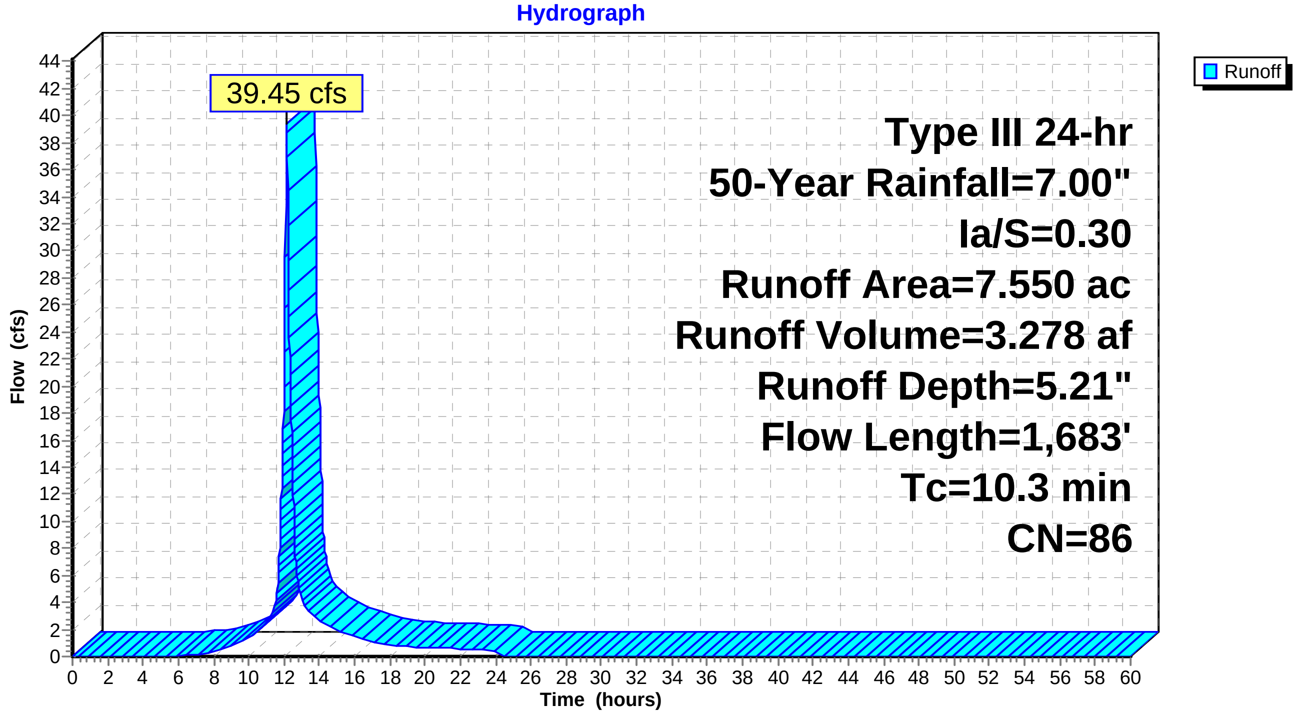
Runoff = 39.45 cfs @ 12.14 hrs, Volume= 3.278 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.300 | 98 | Building roof |
| * | 0.950 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.300 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.550 | 86 | Weighted Average |
| | 3.300 | | 43.71% Pervious Area |
| | 4.250 | | 56.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.3000 | 0.24 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 2.3 | 185 | 0.3000 | 1.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.1 | 50 | 0.1100 | 6.73 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.9 | 1,348 | 0.1100 | 25.87 | 81.28 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 10.3 | 1,683 | Total | | | |

## Subcatchment B119: B119



## Summary for Subcatchment C101: C101

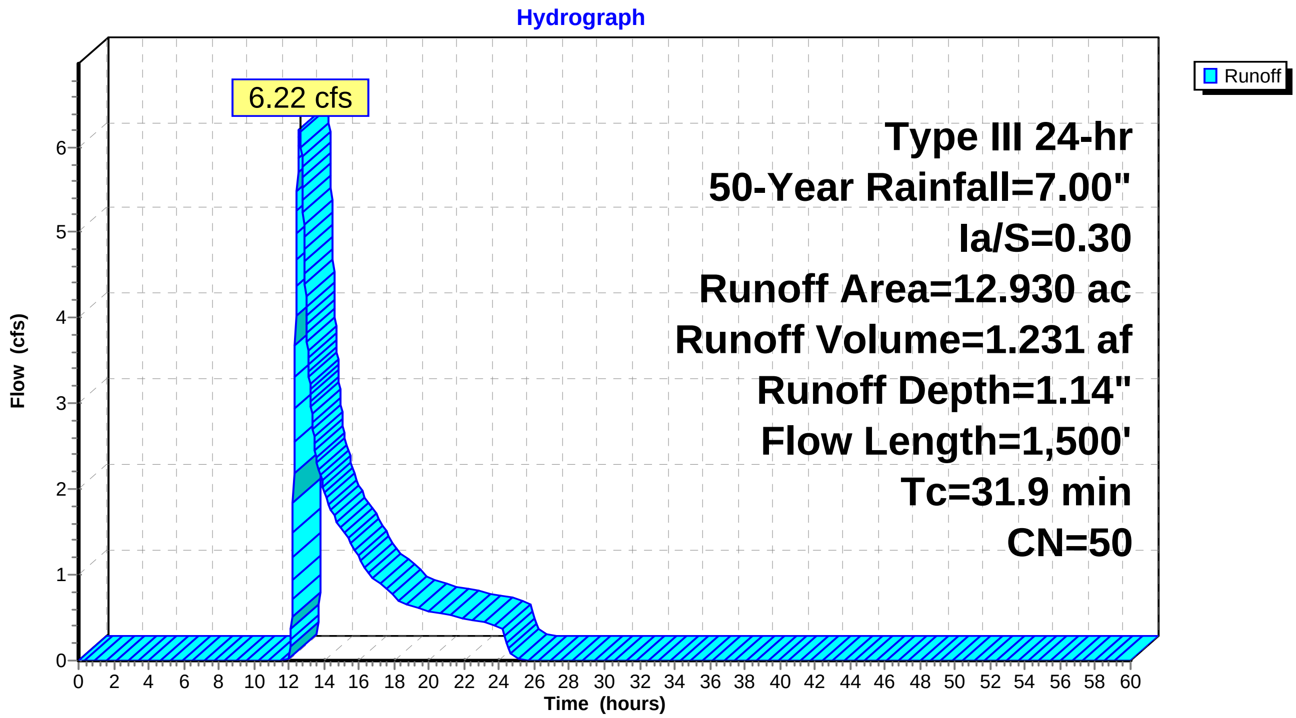
Runoff = 6.22 cfs @ 12.61 hrs, Volume= 1.231 af, Depth= 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 4.850 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.370 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.860 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.850 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 12.930 | 50 | Weighted Average |
| | 12.930 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

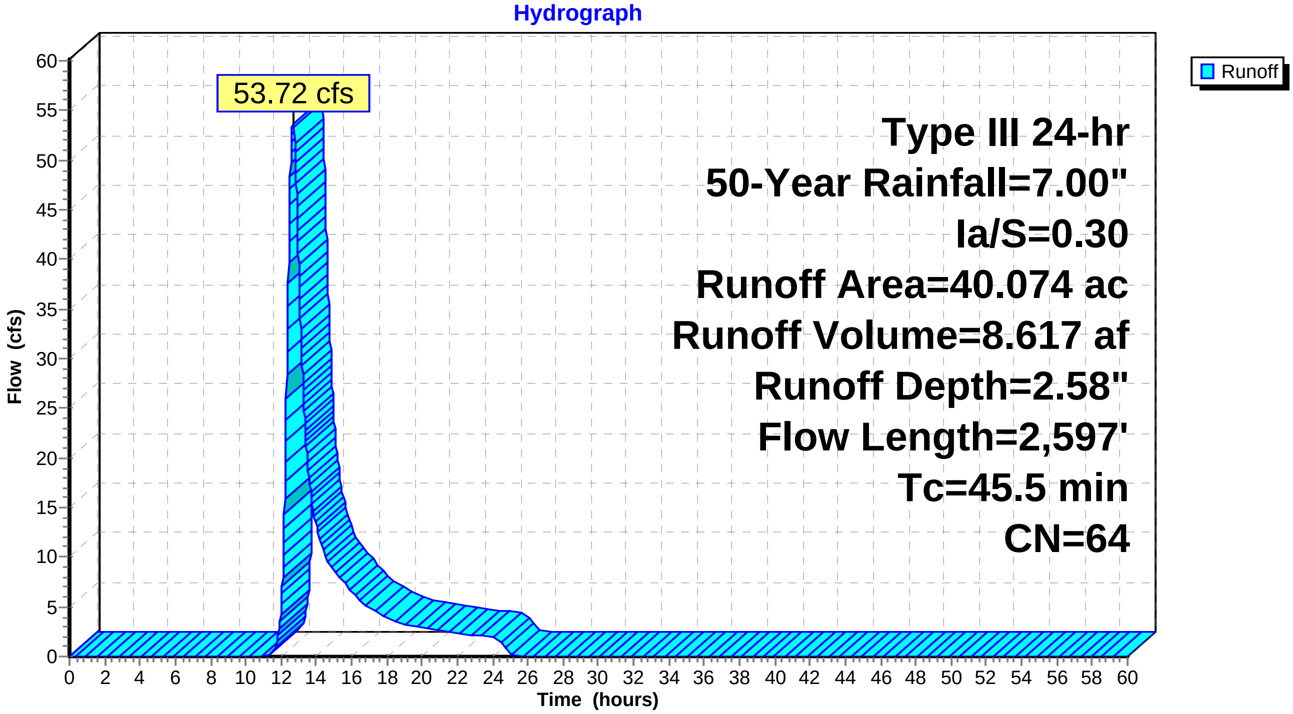
Runoff = 53.72 cfs @ 12.68 hrs, Volume= 8.617 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.007 | 98 | Paved surface |
| * | 0.515 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.285 | 98 | Rock Outcrop/Ledge |
| | 13.181 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.190 | 74 | >75% Grass cover, Good, HSG C |
| | 1.269 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.574 | 70 | Woods, Good, HSG C |
| | 15.097 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.074 | 64 | Weighted Average |
| | 38.950 | | 97.20% Pervious Area |
| | 1.124 | | 2.80% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment C103: C103

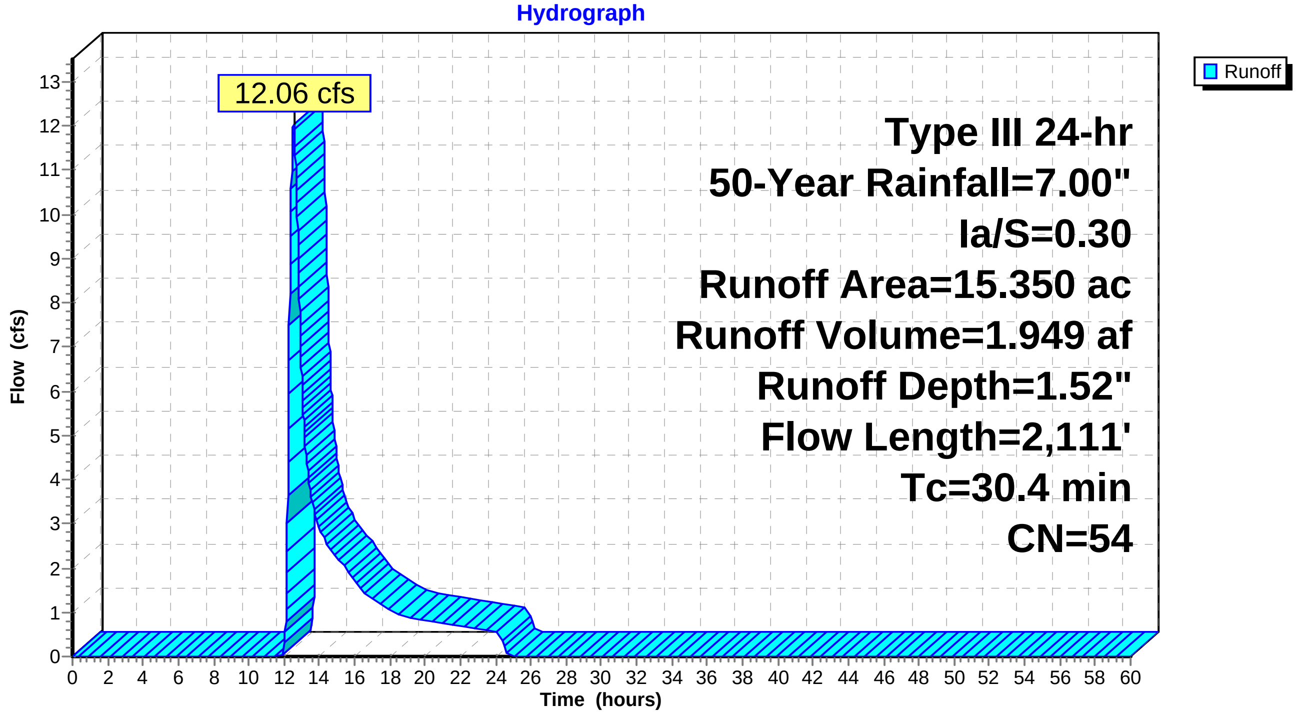
Runoff = 12.06 cfs @ 12.53 hrs, Volume= 1.949 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 2.860 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 9.290 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.240 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.980 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.980 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.350 | 54 | Weighted Average |
| | 12.490 | | 81.37% Pervious Area |
| | 2.860 | | 18.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.9 | 100 | 0.1300 | 0.10 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 185 | 0.1560 | 1.97 | | **Shallow Concentrated Flow,**<br>Woodland Kv= 5.0 fps |
| 1.4 | 188 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 288 | 0.0069 | 0.58 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 2.2 | 1,350 | 0.0260 | 10.03 | 12.31 | **Pipe Channel,**<br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.011 |
| 30.4 | 2,111 | Total | | | |

## Subcatchment C103: C103



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

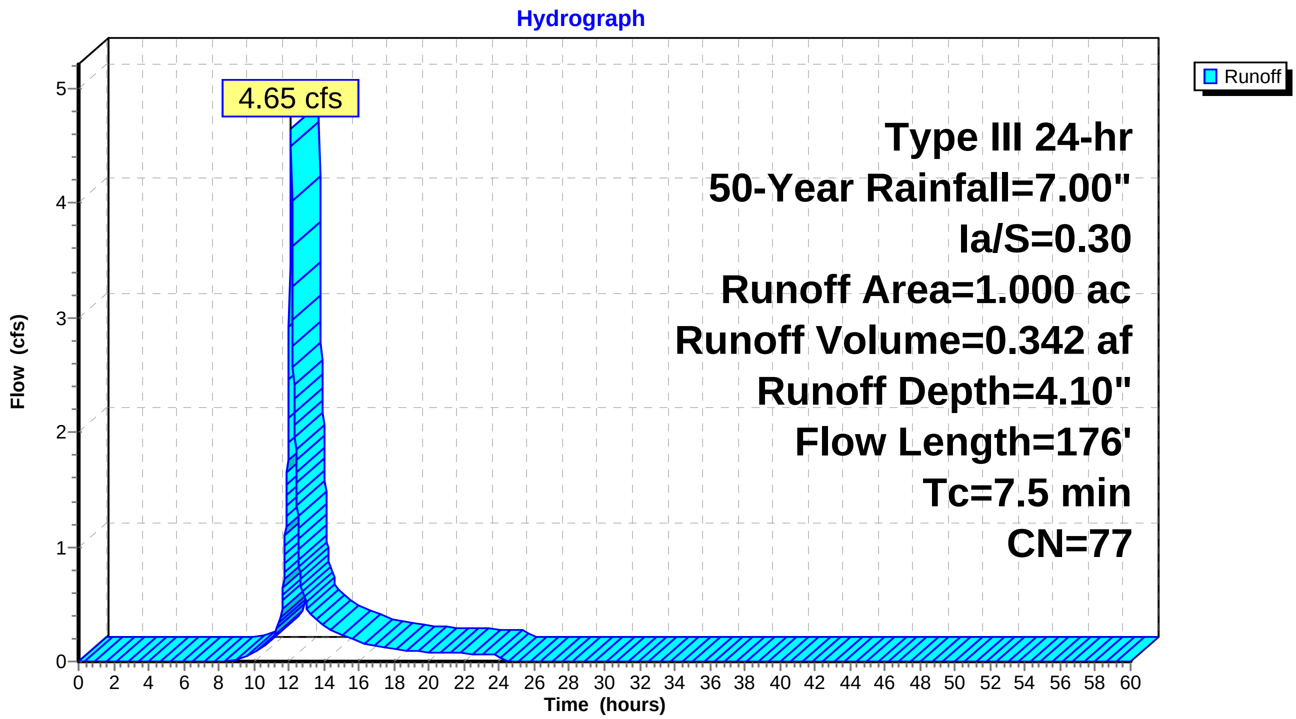
Runoff = 4.65 cfs @ 12.11 hrs, Volume= 0.342 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 50-Year Rainfall=7.00", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.590 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.260 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 77 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1100 | 6.73 | | **Shallow Concentrated Flow, C to D**<br>Paved Kv= 20.3 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



## Summary for Reach 36" Pipe: 36" Pipe

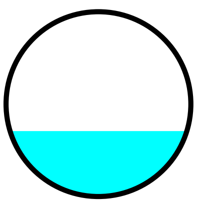
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 4.24" for 50-Year event
Inflow = 40.49 cfs @ 12.38 hrs, Volume= 5.440 af
Outflow = 40.44 cfs @ 12.39 hrs, Volume= 5.440 af, Atten= 0%, Lag= 0.7 min

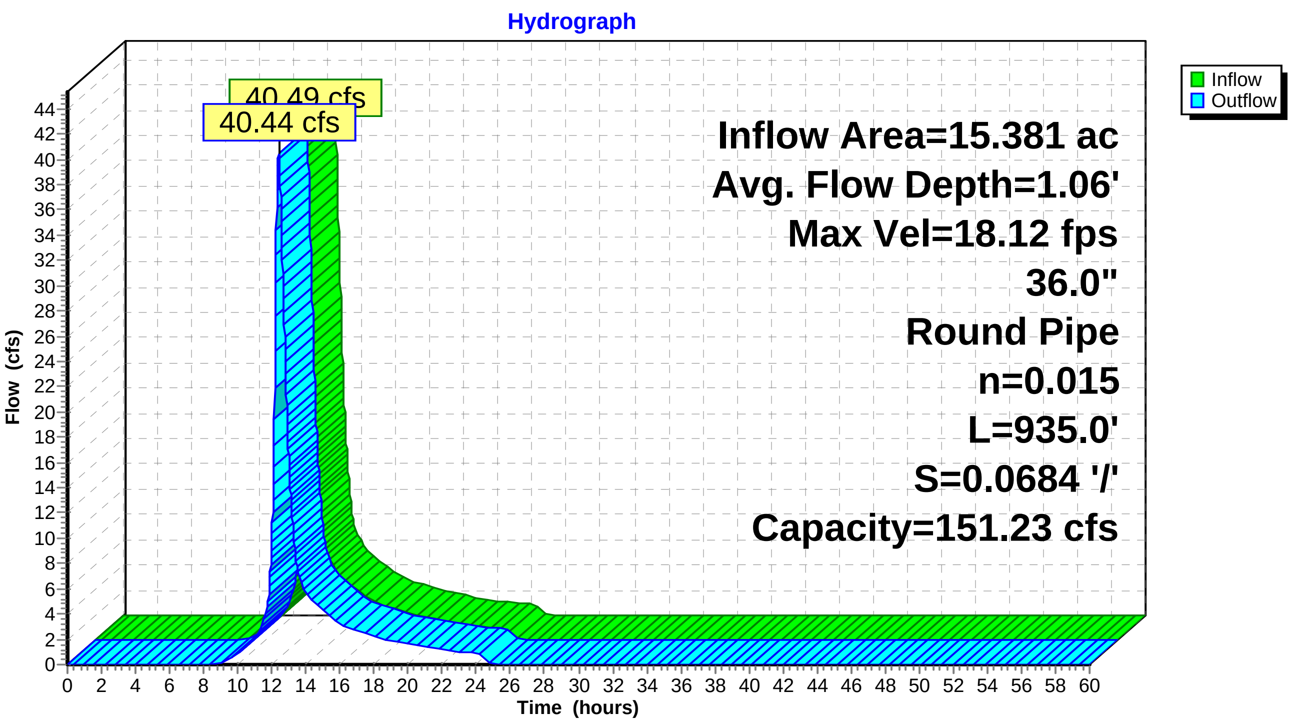
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 18.12 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 5.35 fps, Avg. Travel Time= 2.9 min

Peak Storage= 2,087 cf @ 12.39 hrs
Average Depth at Peak Storage= 1.06'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 151.23 cfs

36.0" Round Pipe
n= 0.015
Length= 935.0' Slope= 0.0684 '/'
Inlet Invert= 635.00', Outlet Invert= 571.00'



### Reach 36" Pipe: 36" Pipe



## Summary for Reach 42" Pipe: 42" Pipe

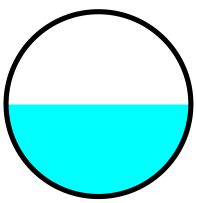
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 100.939 ac, 4.72% Impervious, Inflow Depth = 3.61" for 50-Year event
Inflow = 162.51 cfs @ 12.82 hrs, Volume= 30.400 af
Outflow = 162.42 cfs @ 12.83 hrs, Volume= 30.400 af, Atten= 0%, Lag= 0.2 min

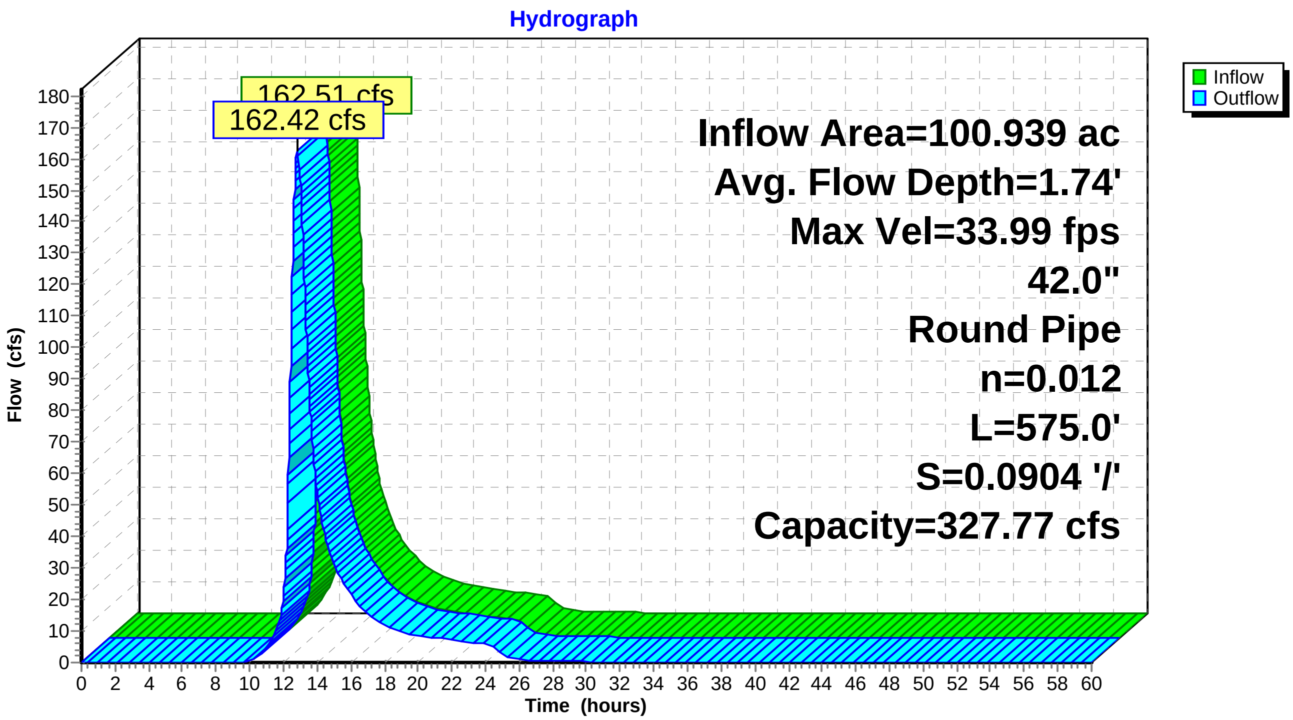
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 33.99 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 7.68 fps, Avg. Travel Time= 1.2 min

Peak Storage= 2,747 cf @ 12.83 hrs
Average Depth at Peak Storage= 1.74'
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 327.77 cfs

42.0" Round Pipe
n= 0.012
Length= 575.0' Slope= 0.0904 '/'
Inlet Invert= 587.00', Outlet Invert= 535.00'



### Reach 42" Pipe: 42" Pipe



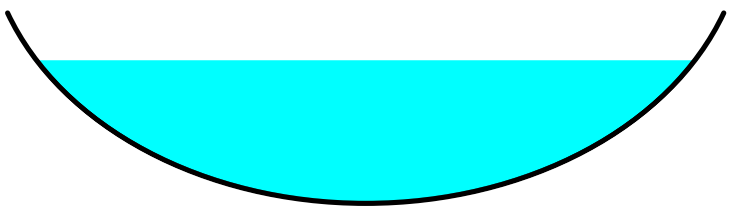
## Summary for Reach A105R: Thru A103

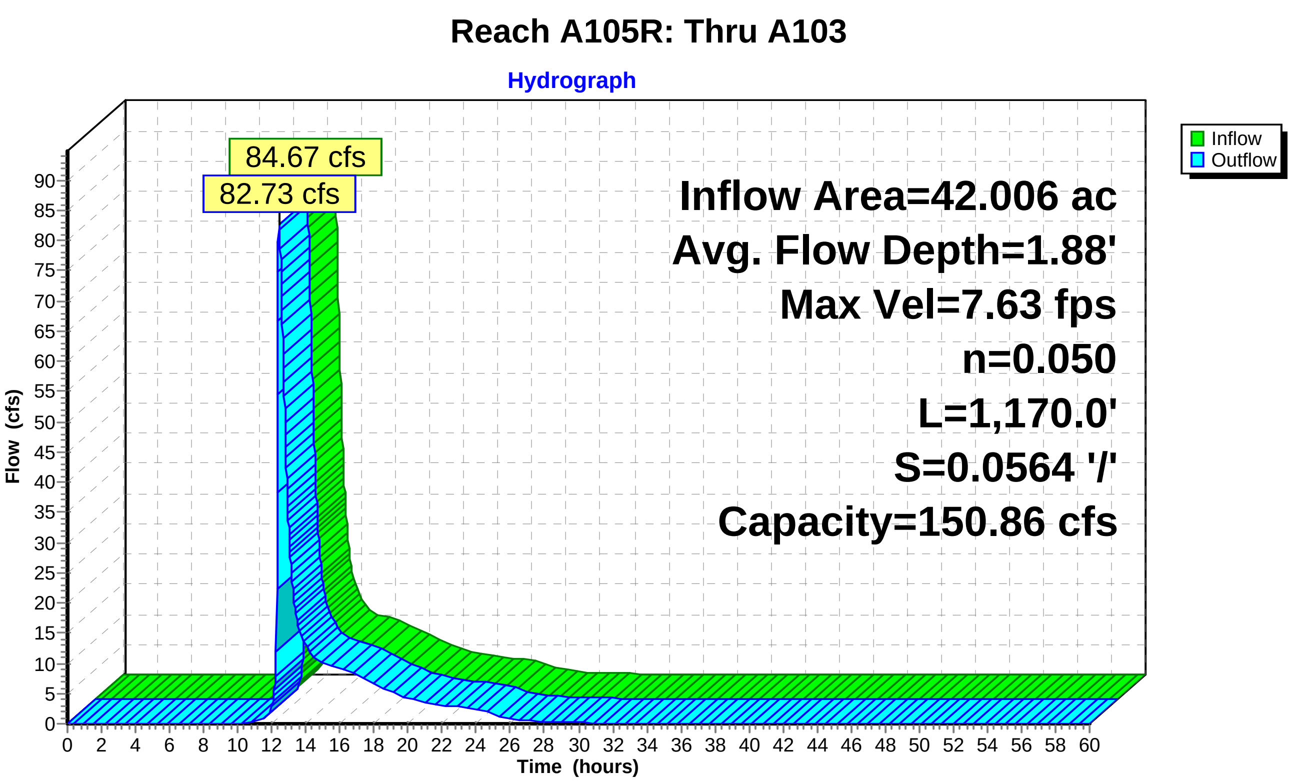
Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 3.04" for 50-Year event
Inflow = 84.67 cfs @ 12.37 hrs, Volume= 10.658 af
Outflow = 82.73 cfs @ 12.43 hrs, Volume= 10.658 af, Atten= 2%, Lag= 3.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 7.63 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.55 fps, Avg. Travel Time= 12.6 min

Peak Storage= 12,688 cf @ 12.43 hrs
Average Depth at Peak Storage= 1.88'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 150.86 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,170.0' Slope= 0.0564 '/'
Inlet Invert= 566.00', Outlet Invert= 500.00'





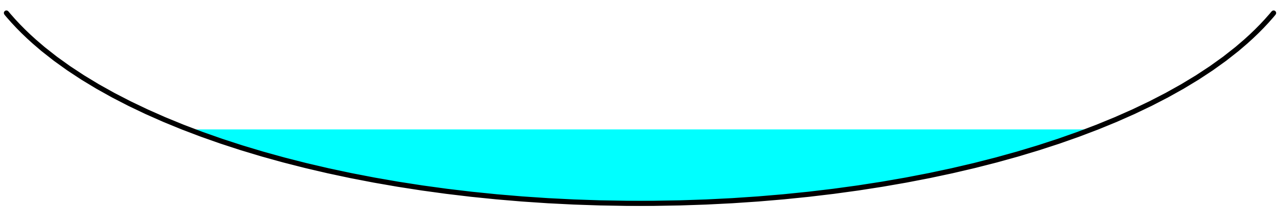
## Summary for Reach B107R: Thru B103

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 3.87" for 50-Year event
Inflow = 24.74 cfs @ 12.83 hrs, Volume= 4.618 af
Outflow = 24.70 cfs @ 12.86 hrs, Volume= 4.618 af, Atten= 0%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 7.68 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 9.3 min

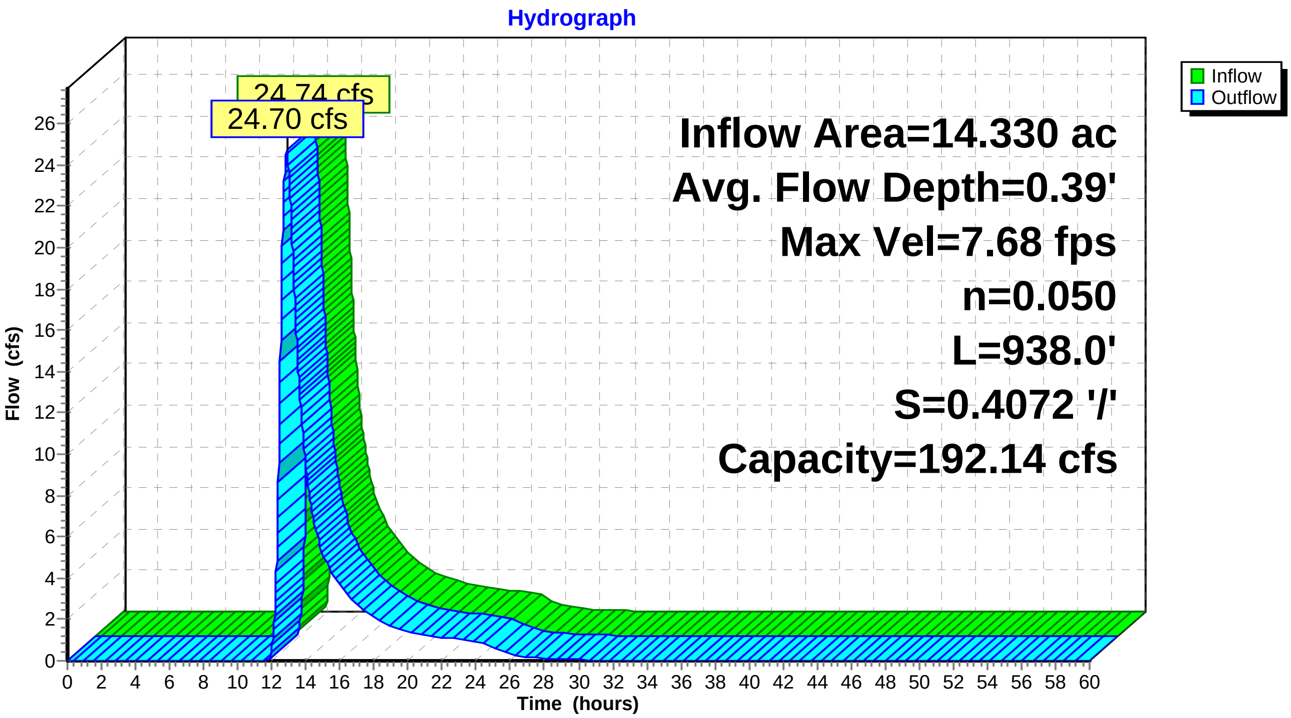
Peak Storage= 3,017 cf @ 12.86 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 192.14 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 938.0' Slope= 0.4072 '/'
Inlet Invert= 972.00', Outlet Invert= 590.00'



‡

### Reach B107R: Thru B103



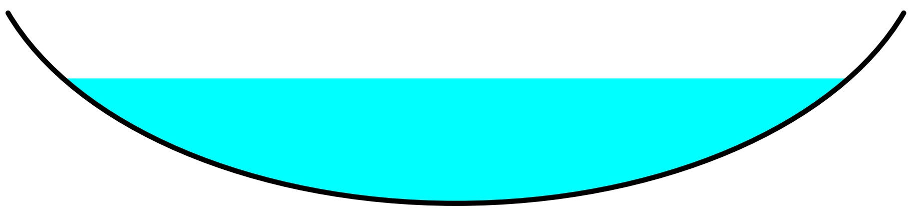
## Summary for Reach B112R: Thru B102

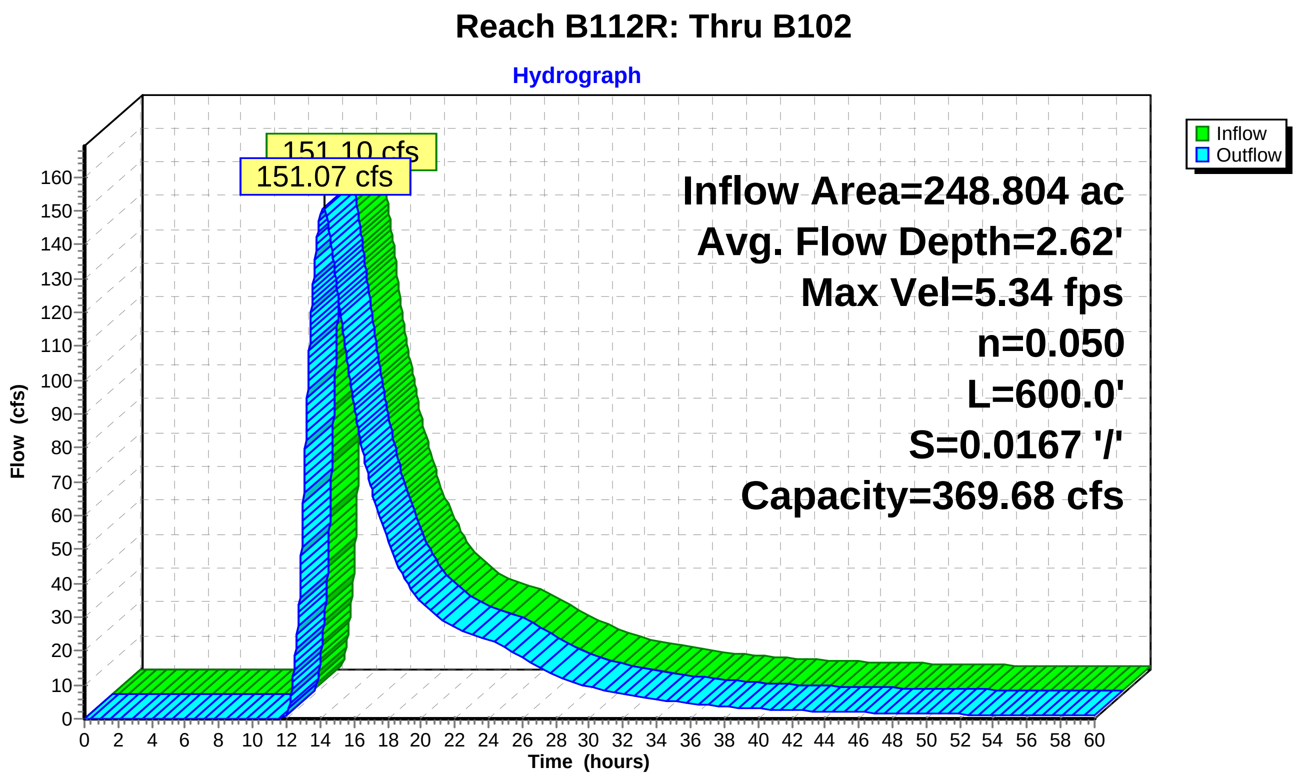
Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 3.61" for 50-Year event
Inflow = 151.10 cfs @ 14.19 hrs, Volume= 74.838 af
Outflow = 151.07 cfs @ 14.21 hrs, Volume= 74.828 af, Atten= 0%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 5.34 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 2.18 fps, Avg. Travel Time= 4.6 min

Peak Storage= 16,987 cf @ 14.21 hrs
Average Depth at Peak Storage= 2.62'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 369.68 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 600.0' Slope= 0.0167 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'





## Summary for Pond 102C: Pond 102C

Inflow Area = 40.074 ac, 2.80% Impervious, Inflow Depth = 2.58" for 50-Year event
Inflow = 53.72 cfs @ 12.68 hrs, Volume= 8.617 af
Outflow = 2.79 cfs @ 20.19 hrs, Volume= 1.490 af, Atten= 95%, Lag= 450.8 min
Primary = 2.79 cfs @ 20.19 hrs, Volume= 1.490 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 509.05' @ 20.19 hrs Surf.Area= 216,987 sf Storage= 321,705 cf

Plug-Flow detention time= 587.4 min calculated for 1.490 af (17% of inflow)
Center-of-Mass det. time= 432.2 min ( 1,330.0 - 897.8 )

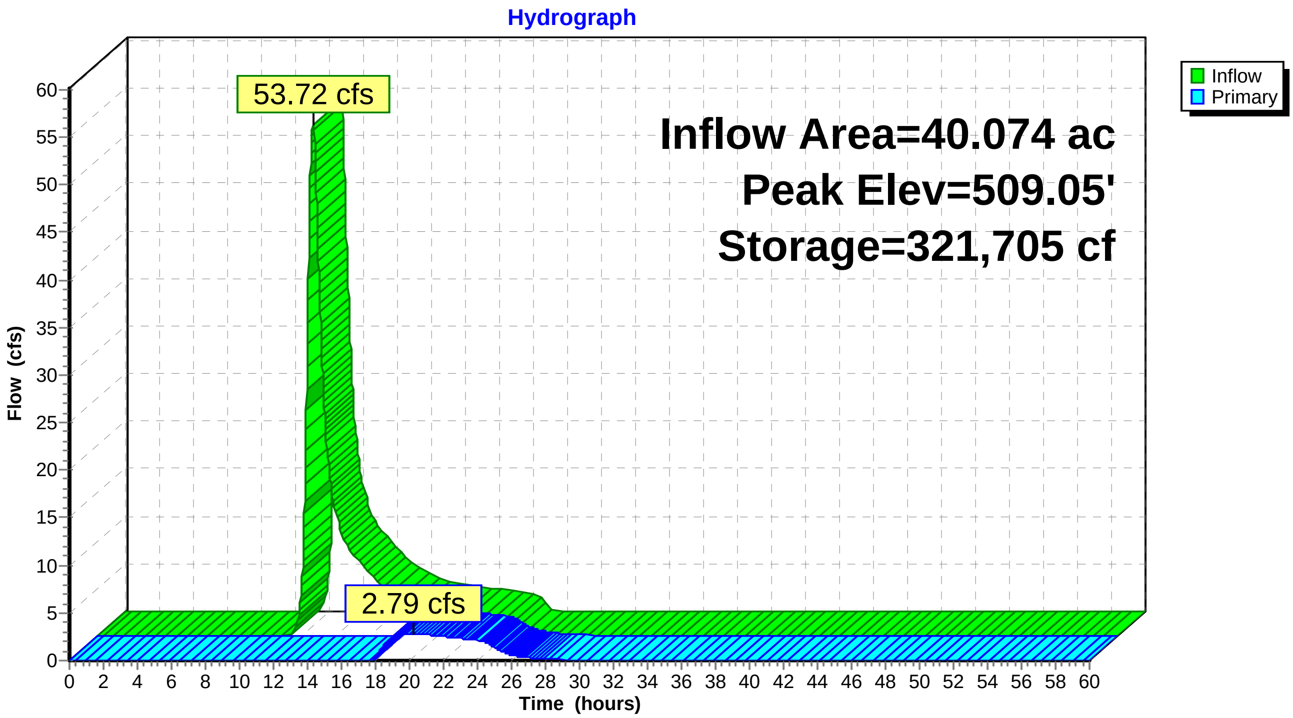
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=2.79 cfs @ 20.19 hrs HW=509.05' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 2.79 cfs @ 0.53 fps)

## Pond 102C: Pond 102C



## Summary for Pond 104A: Wetland D

Inflow Area = 29.922 ac, 5.68% Impervious, Inflow Depth = 0.88" for 50-Year event
Inflow = 10.45 cfs @ 12.53 hrs, Volume= 2.190 af
Outflow = 9.48 cfs @ 12.66 hrs, Volume= 2.169 af, Atten= 9%, Lag= 7.6 min
Primary = 0.48 cfs @ 12.66 hrs, Volume= 0.464 af
Secondary = 9.00 cfs @ 12.66 hrs, Volume= 1.705 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.10' @ 12.66 hrs Surf.Area= 25,728 sf Storage= 9,226 cf

Plug-Flow detention time= 84.0 min calculated for 2.169 af (99% of inflow)
Center-of-Mass det. time= 79.8 min ( 1,033.9 - 954.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

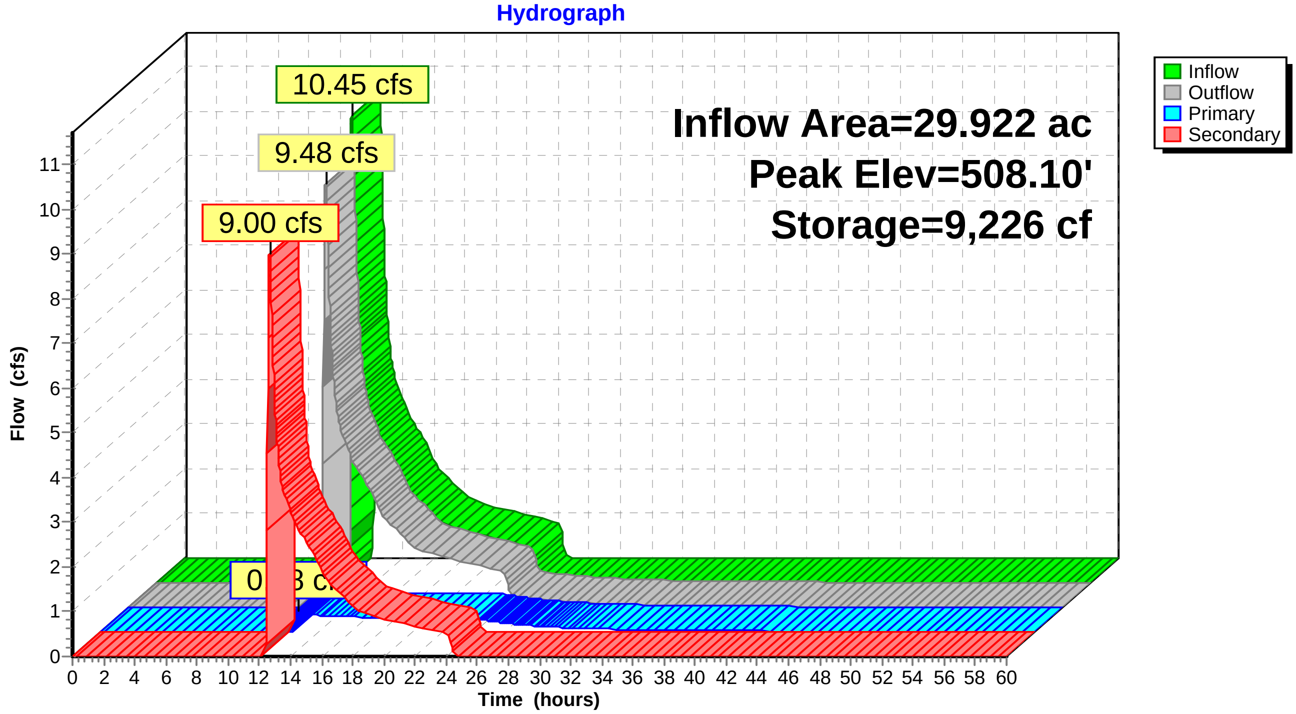
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.48 cfs @ 12.66 hrs HW=508.10' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.48 cfs @ 2.38 fps)

**Secondary OutFlow** Max=8.99 cfs @ 12.66 hrs HW=508.10' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 8.99 cfs @ 0.86 fps)

## Pond 104A: Wetland D



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach 36" Pipe OUTLET depth by 3.65' @ 14.86 hrs

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 3.05" for 50-Year event
Inflow = 85.76 cfs @ 12.33 hrs, Volume= 10.675 af
Outflow = 84.67 cfs @ 12.37 hrs, Volume= 10.658 af, Atten= 1%, Lag= 2.5 min
Primary = 10.95 cfs @ 12.37 hrs, Volume= 7.043 af
Secondary = 73.72 cfs @ 12.37 hrs, Volume= 3.615 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.31' @ 12.37 hrs Surf.Area= 32,405 sf Storage= 66,881 cf

Plug-Flow detention time= 68.5 min calculated for 10.655 af (100% of inflow)
Center-of-Mass det. time= 68.1 min ( 937.8 - 869.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

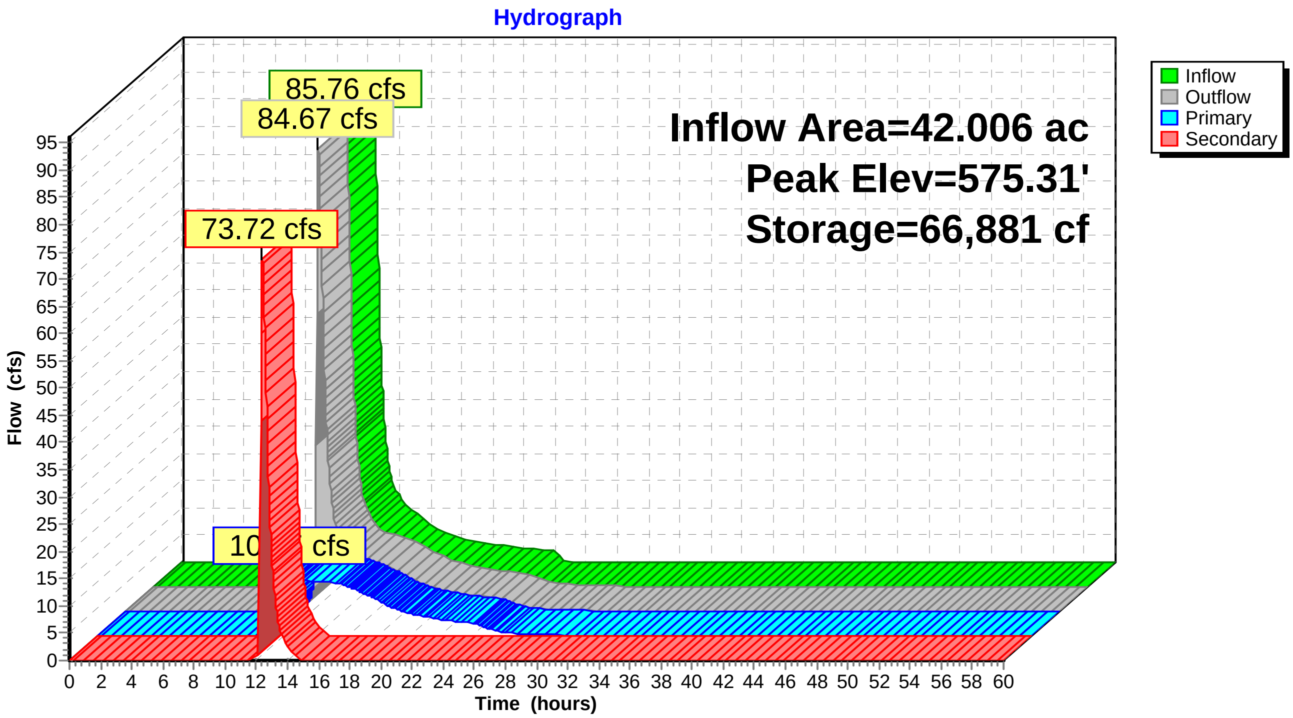
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=10.95 cfs @ 12.37 hrs HW=575.31' TW=567.83' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.95 cfs @ 6.20 fps)

**Secondary OutFlow** Max=73.64 cfs @ 12.37 hrs HW=575.31' TW=567.83' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 73.64 cfs @ 1.34 fps)

## Pond 105A: Wetland H



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 4.24" for 50-Year event
Inflow = 40.49 cfs @ 12.38 hrs, Volume= 5.440 af
Outflow = 40.49 cfs @ 12.38 hrs, Volume= 5.440 af, Atten= 0%, Lag= 0.1 min
Primary = 40.49 cfs @ 12.38 hrs, Volume= 5.440 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 719.59' @ 12.38 hrs Surf.Area= 97 sf Storage= 94 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 858.4 - 858.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

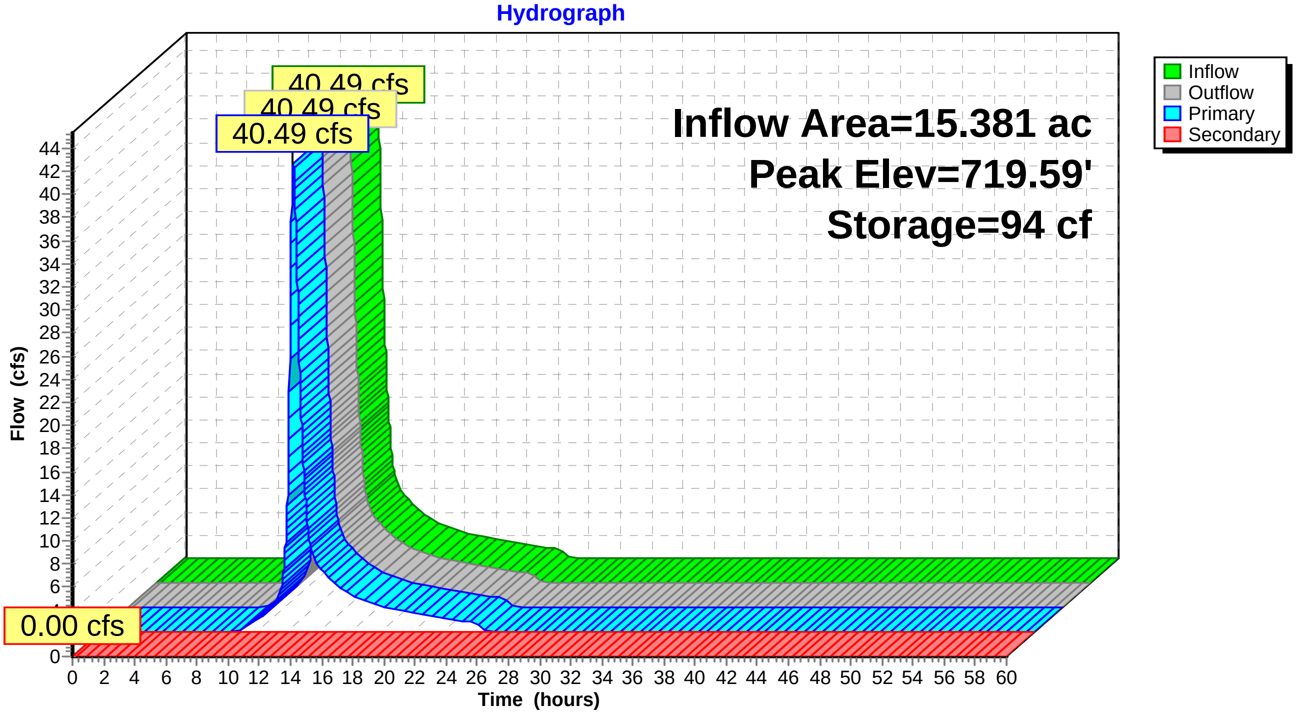
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=40.47 cfs @ 12.38 hrs HW=719.59' TW=636.06' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 40.47 cfs @ 5.79 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=635.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 118.113 ac, 1.34% Impervious, Inflow Depth = 3.98" for 50-Year event
Inflow = 175.26 cfs @ 13.15 hrs, Volume= 39.149 af
Outflow = 175.17 cfs @ 13.16 hrs, Volume= 39.149 af, Atten= 0%, Lag= 1.0 min
Primary = 175.17 cfs @ 13.16 hrs, Volume= 39.149 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 527.09' @ 13.16 hrs Surf.Area= 12,660 sf Storage= 23,974 cf

Plug-Flow detention time= 7.3 min calculated for 39.149 af (100% of inflow)
Center-of-Mass det. time= 7.0 min ( 908.9 - 902.0 )

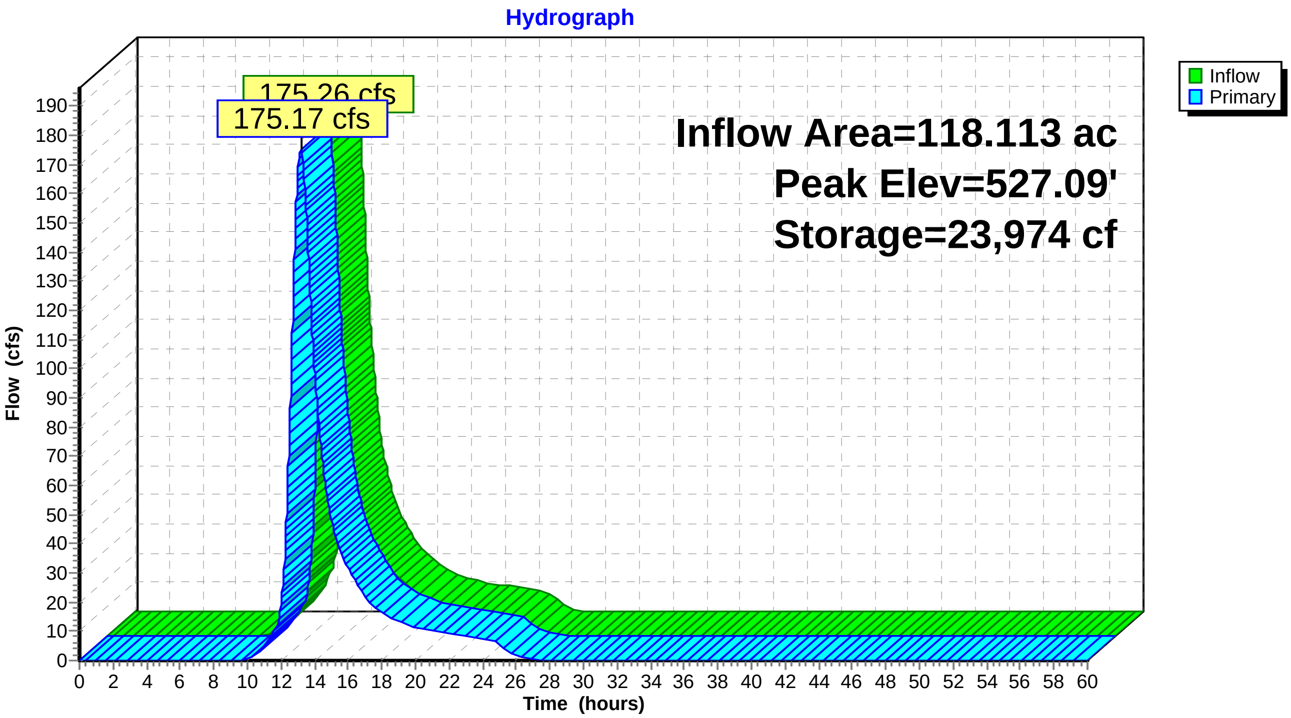
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=175.16 cfs @ 13.16 hrs HW=527.09' TW=517.40' (Dynamic Tailwater)
└─**1=Custom Weir/Orifice** (Weir Controls 175.16 cfs @ 3.19 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

```
Inflow Area =      95.412 ac,   4.86% Impervious,  Inflow Depth =   3.72"    for  50-Year event
Inflow      =     158.65 cfs @  12.82 hrs,  Volume=         29.558 af
Outflow     =     158.66 cfs @  12.83 hrs,  Volume=         29.558 af,  Atten= 0%,  Lag= 0.1 min
Primary     =      44.14 cfs @  12.83 hrs,  Volume=         20.045 af
Secondary =       114.51 cfs @  12.83 hrs,  Volume=          9.514 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 626.25' @ 12.83 hrs Surf.Area= 1,569 sf Storage= 3,478 cf

Plug-Flow detention time= 0.4 min calculated for 29.549 af (100% of inflow)
Center-of-Mass det. time= 0.4 min ( 895.8 - 895.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

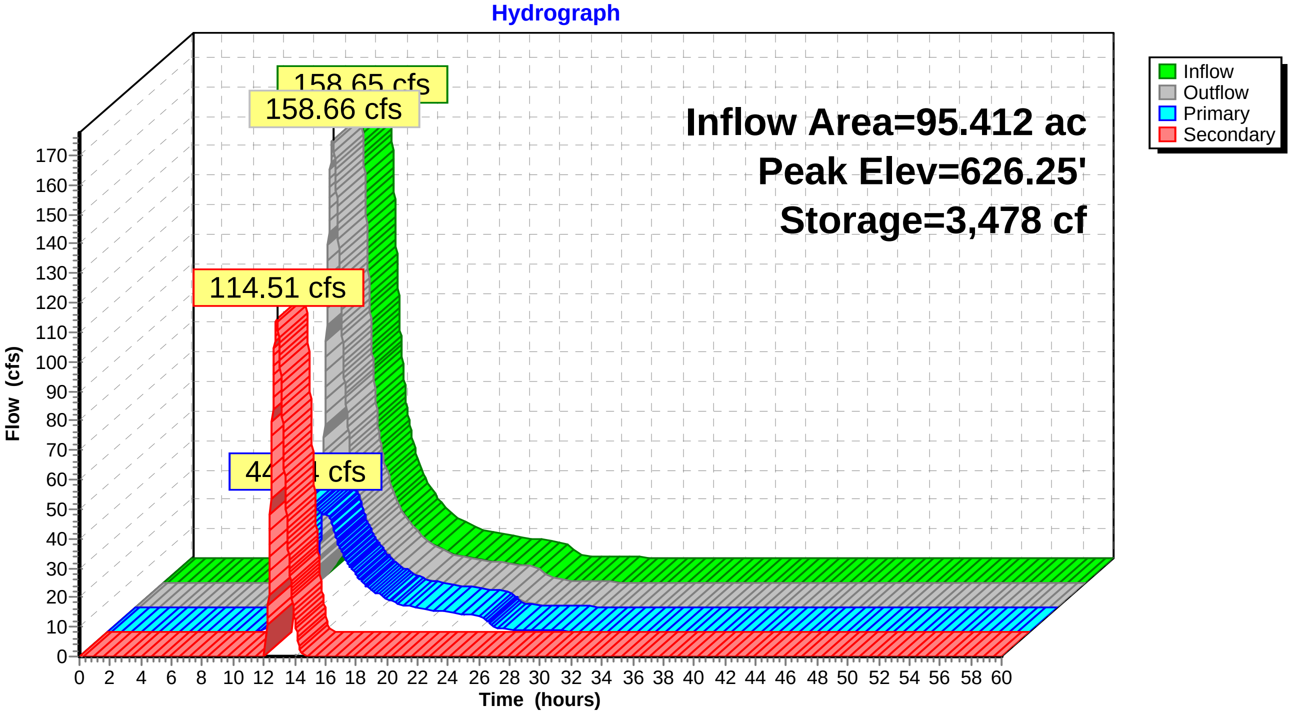
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=44.14 cfs @ 12.83 hrs HW=626.25' TW=588.74' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 44.14 cfs @ 14.05 fps)

**Secondary OutFlow** Max=114.44 cfs @ 12.83 hrs HW=626.25' TW=613.36' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 114.44 cfs @ 3.49 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 4.10" for 50-Year event
Inflow = 35.50 cfs @ 12.52 hrs, Volume= 4.894 af
Outflow = 24.74 cfs @ 12.83 hrs, Volume= 4.618 af, Atten= 30%, Lag= 18.9 min
Primary = 24.74 cfs @ 12.83 hrs, Volume= 4.618 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 972.97' @ 12.83 hrs Surf.Area= 125,610 sf Storage= 58,109 cf

Plug-Flow detention time= 92.8 min calculated for 4.616 af (94% of inflow)
Center-of-Mass det. time= 63.0 min ( 917.9 - 854.9 )

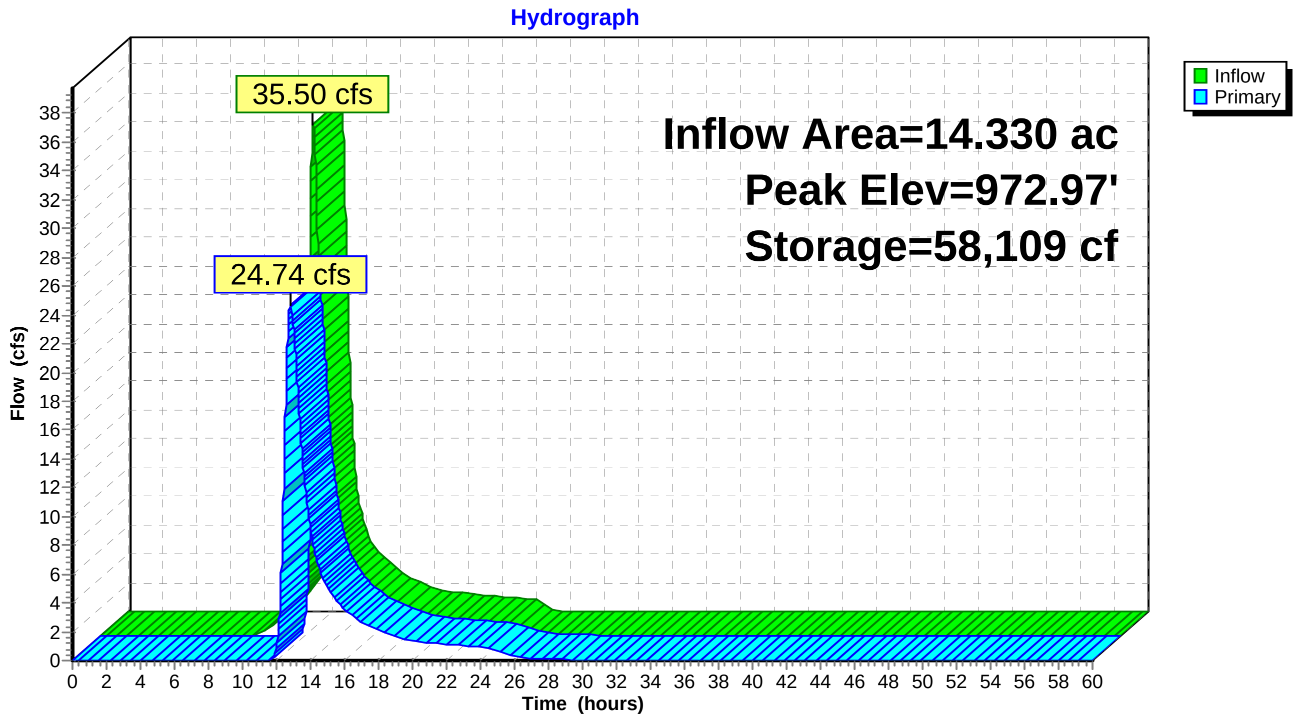
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=24.73 cfs @ 12.83 hrs HW=972.97' TW=972.39' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 24.73 cfs @ 1.65 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

```
Inflow Area =      5.527 ac,   2.32% Impervious,  Inflow Depth = 22.48"   for  50-Year event
Inflow      =    118.29 cfs @  12.82 hrs,  Volume=        10.355 af
Outflow     =    118.36 cfs @  12.82 hrs,  Volume=        10.355 af,  Atten= 0%,  Lag= 0.0 min
Primary     =     59.56 cfs @  12.82 hrs,  Volume=         7.442 af
Secondary =       58.80 cfs @  12.82 hrs,  Volume=         2.913 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 613.36' @ 12.82 hrs Surf.Area= 555 sf Storage= 195 cf

Plug-Flow detention time= 0.4 min calculated for 10.355 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 791.5 - 791.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

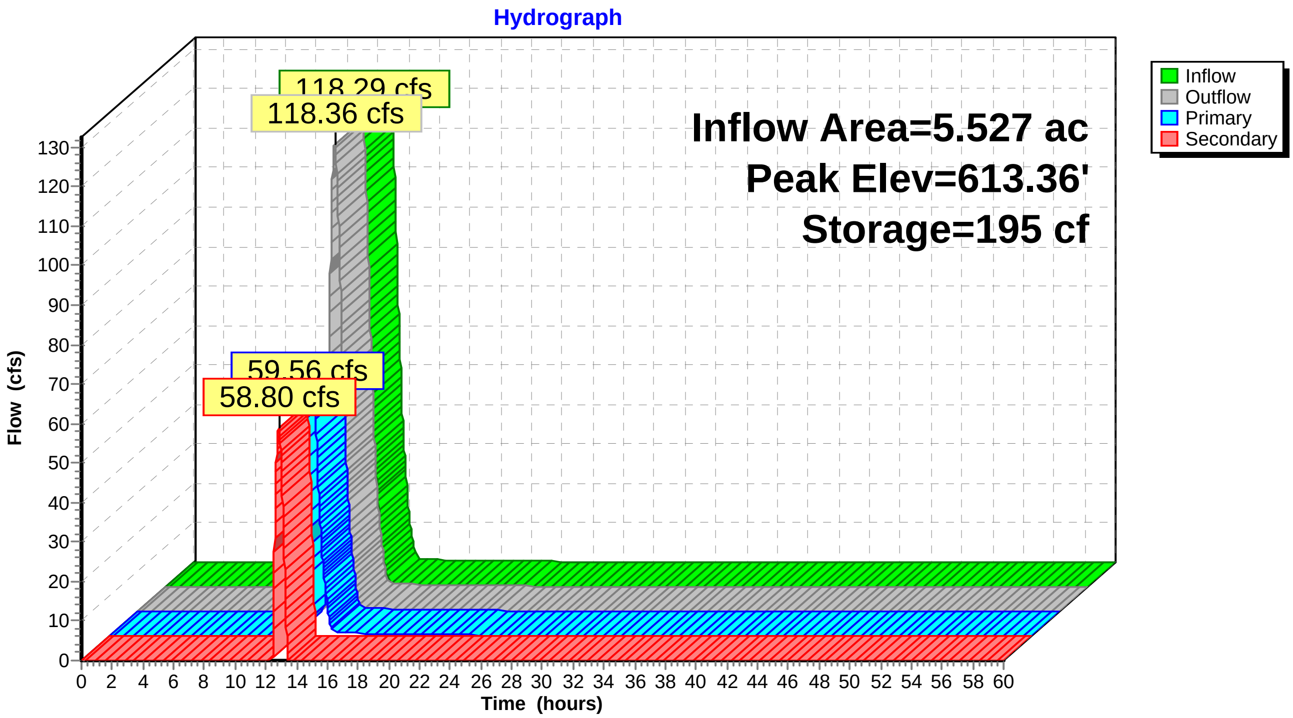
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=59.56 cfs @ 12.82 hrs HW=613.36' TW=588.74' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 59.56 cfs @ 8.43 fps)

**Secondary OutFlow** Max=58.78 cfs @ 12.82 hrs HW=613.36' TW=588.74' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 58.78 cfs @ 1.62 fps)

## Pond 108A: 36" Culvert



## Summary for Pond SWM 7A: SWM 7A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 4.10" for 50-Year event
Inflow = 4.65 cfs @ 12.11 hrs, Volume= 0.342 af
Outflow = 2.95 cfs @ 12.23 hrs, Volume= 0.341 af, Atten= 37%, Lag= 7.1 min
Primary = 2.95 cfs @ 12.23 hrs, Volume= 0.341 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 808.34' @ 12.23 hrs Surf.Area= 2,951 sf Storage= 3,098 cf

Plug-Flow detention time= 32.8 min calculated for 0.341 af (100% of inflow)
Center-of-Mass det. time= 33.0 min ( 859.8 - 826.7 )

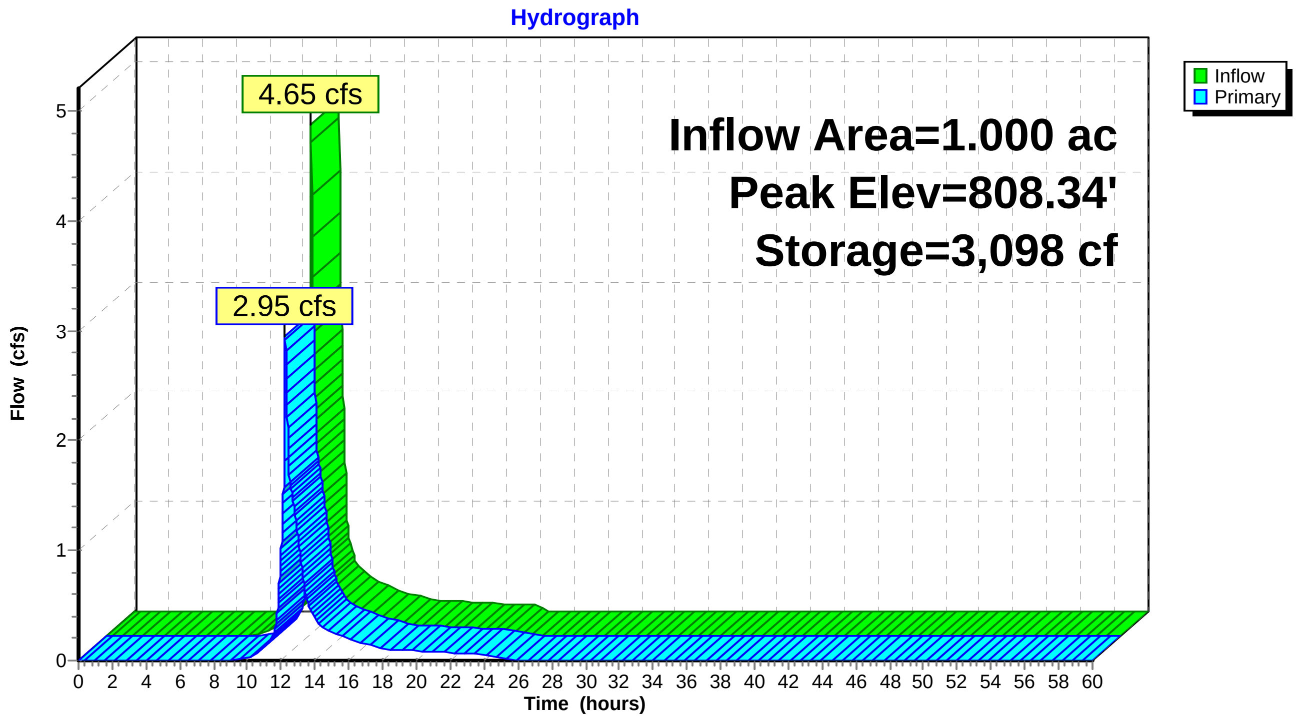
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 807.00' | 5,238 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 807.00 | 1,656 | 0 | 0 |
| 809.00 | 3,582 | 5,238 | 5,238 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 802.00' | **15.0" Round Culvert**<br>L= 41.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 802.00' / 801.00' S= 0.0244 '/' Cc= 0.900<br>n= 0.015, Flow Area= 1.23 sf |
| #2 | Device 1 | 807.00' | **8.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 808.25' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=2.93 cfs @ 12.23 hrs HW=808.34' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.93 cfs of 15.46 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.69 cfs @ 4.84 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 1.24 cfs @ 0.82 fps)

## Pond SWM 7A: SWM 7A (Phase 1)



## Summary for Pond SWM1: SWM 1

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 2.47" for 50-Year event
Inflow = 50.43 cfs @ 12.87 hrs, Volume= 10.442 af
Outflow = 47.90 cfs @ 13.10 hrs, Volume= 10.442 af, Atten= 5%, Lag= 13.8 min
Primary = 47.90 cfs @ 13.10 hrs, Volume= 10.442 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 514.37' @ 13.10 hrs Surf.Area= 21,329 sf Storage= 37,925 cf

Plug-Flow detention time= 16.8 min calculated for 10.438 af (100% of inflow)
Center-of-Mass det. time= 16.8 min ( 931.8 - 915.0 )

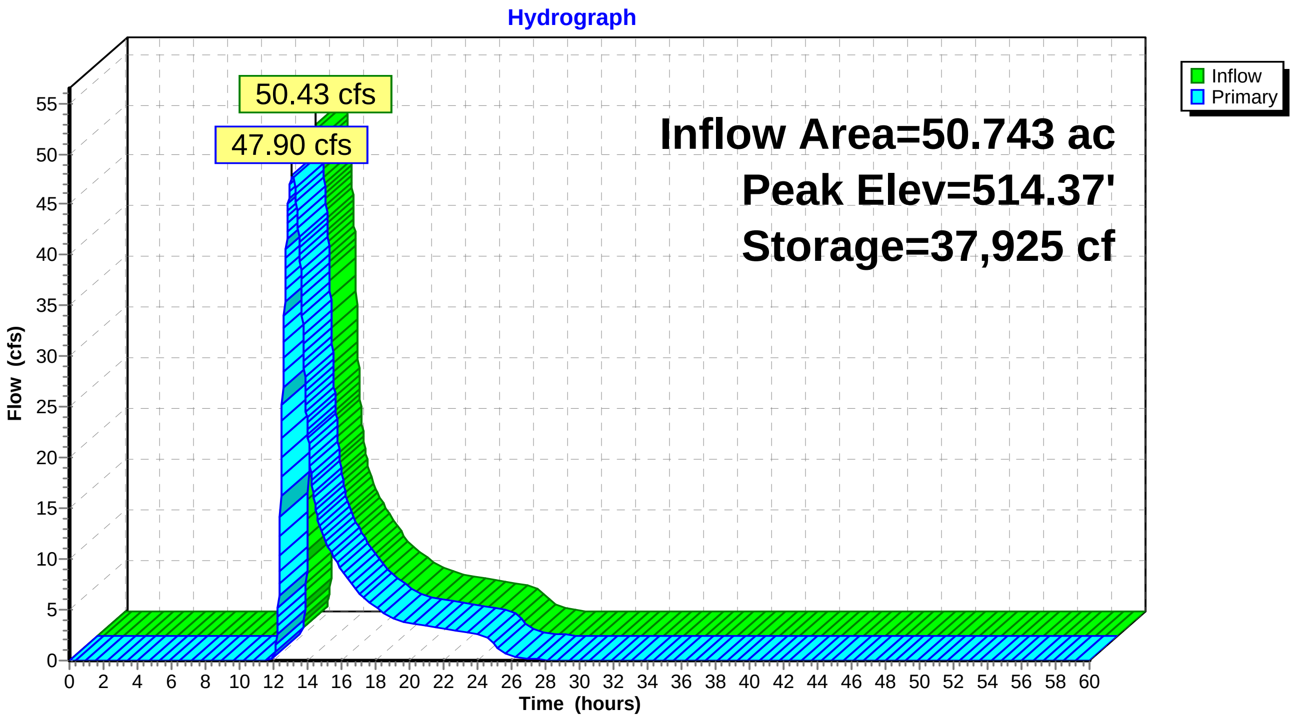
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 512.00' | 77,663 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 512.00 | 10,713 | 0 | 0 |
| 513.00 | 14,994 | 12,854 | 12,854 |
| 514.00 | 19,973 | 17,484 | 30,337 |
| 515.00 | 23,663 | 21,818 | 52,155 |
| 516.00 | 27,353 | 25,508 | 77,663 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 512.00' | **5.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=47.90 cfs @ 13.10 hrs HW=514.37' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 47.90 cfs @ 4.05 fps)

## Pond SWM1: SWM 1



## Summary for Pond SWM17: SWM17

Inflow Area = 15.350 ac, 18.63% Impervious, Inflow Depth = 1.52" for 50-Year event
Inflow = 12.06 cfs @ 12.53 hrs, Volume= 1.949 af
Outflow = 12.03 cfs @ 12.55 hrs, Volume= 1.949 af, Atten= 0%, Lag= 1.0 min
Primary = 12.03 cfs @ 12.55 hrs, Volume= 1.949 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 501.40' @ 12.55 hrs Surf.Area= 0.021 ac Storage= 0.065 af

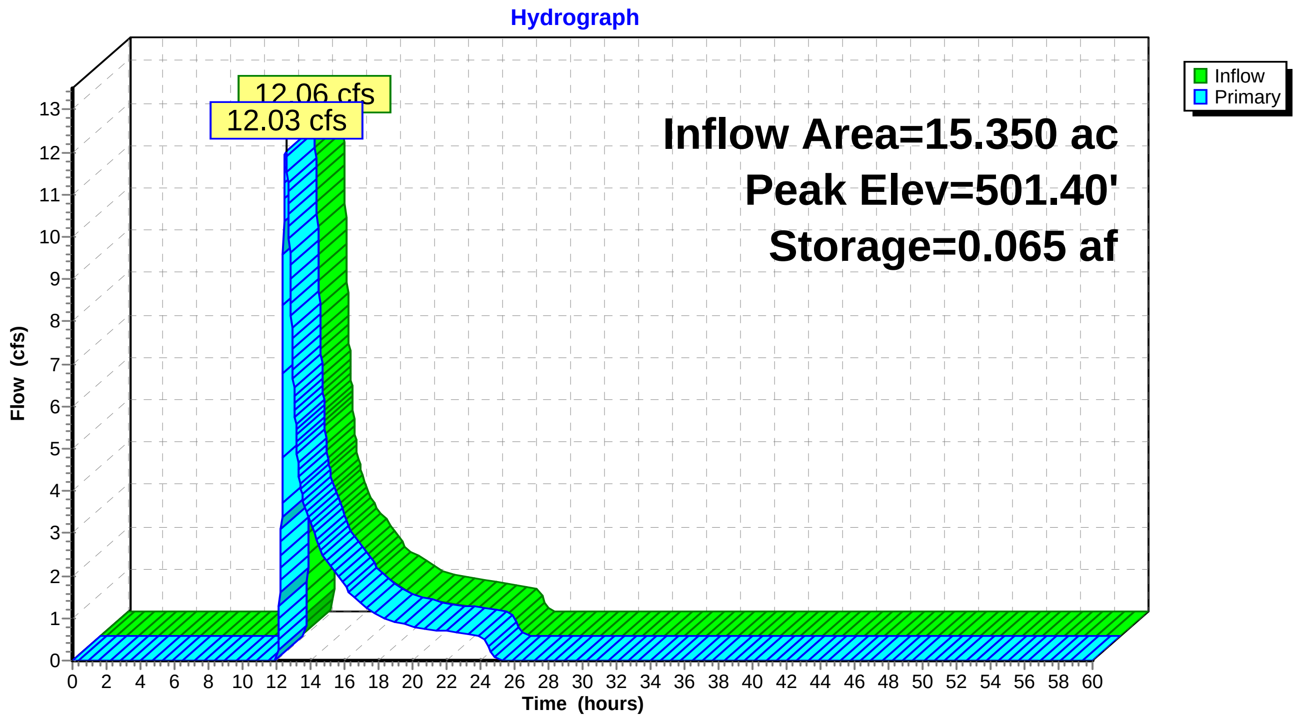
Plug-Flow detention time= 5.2 min calculated for 1.949 af (100% of inflow)
Center-of-Mass det. time= 5.2 min ( 925.8 - 920.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 0.090 af | **60.0" Round Pipe Storage** x 2<br>L= 100.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **24.0" Round Culvert**<br>L= 60.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 497.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 498.00' | **10.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 500.50' | **3.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=12.02 cfs @ 12.55 hrs HW=501.40' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Passes 12.02 cfs of 18.51 cfs potential flow)
**2=Orifice/Grate** (Orifice Controls 4.54 cfs @ 8.32 fps)
**3=Broad-Crested Rectangular Weir** (Weir Controls 7.49 cfs @ 2.77 fps)

## Pond SWM17: SWM17



## Summary for Pond SWM2: SWM2

Inflow Area = 120.037 ac, 12.91% Impervious, Inflow Depth = 4.29" for 50-Year event
Inflow = 298.34 cfs @ 12.42 hrs, Volume= 42.880 af
Outflow = 244.91 cfs @ 12.64 hrs, Volume= 42.728 af, Atten= 18%, Lag= 13.4 min
Primary = 244.91 cfs @ 12.64 hrs, Volume= 42.728 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 504.97' @ 12.64 hrs Surf.Area= 78,871 sf Storage= 423,151 cf

Plug-Flow detention time= 108.6 min calculated for 42.713 af (100% of inflow)
Center-of-Mass det. time= 106.6 min ( 956.4 - 849.8 )

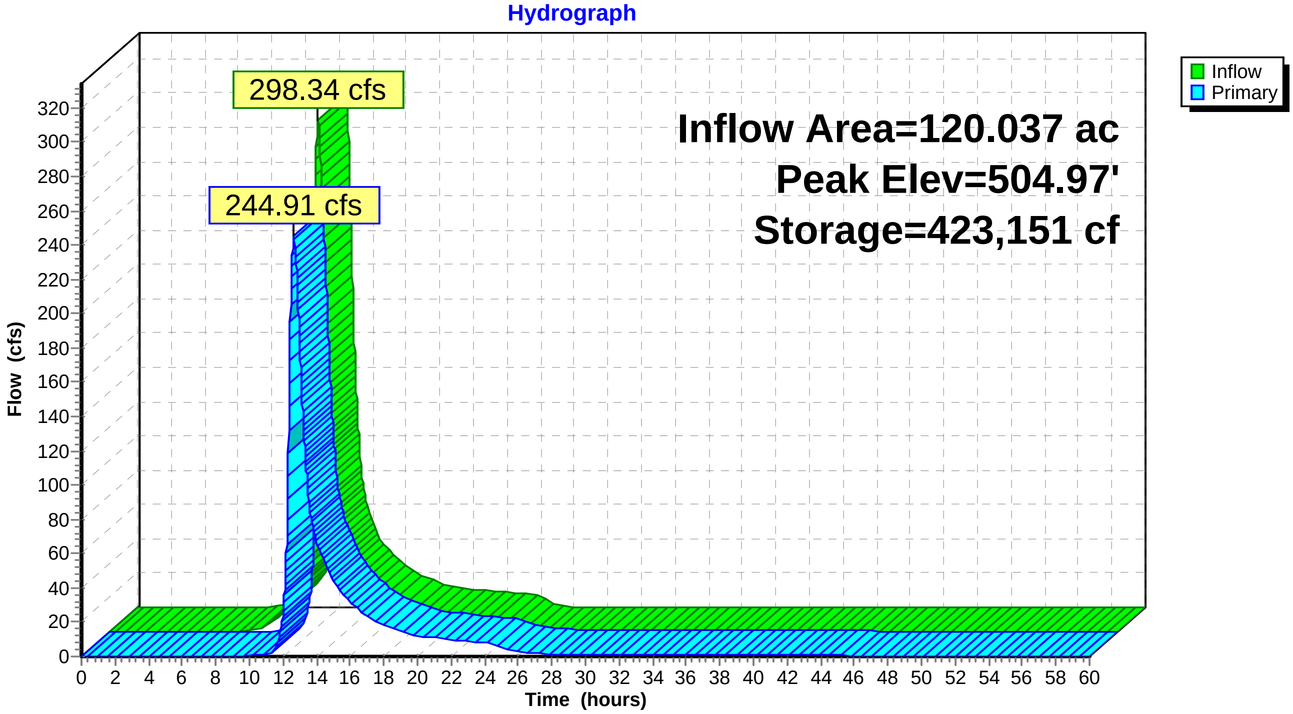
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 598,445 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 498.00 | 33,946 | 0 | 0 |
| 499.00 | 52,156 | 43,051 | 43,051 |
| 500.00 | 55,687 | 53,922 | 96,973 |
| 501.00 | 59,350 | 57,519 | 154,491 |
| 502.00 | 63,077 | 61,214 | 215,705 |
| 503.00 | 66,905 | 64,991 | 280,696 |
| 504.00 | 72,175 | 69,540 | 350,236 |
| 505.00 | 79,111 | 75,643 | 425,879 |
| 506.00 | 88,674 | 83,893 | 509,771 |
| 507.00 | 88,674 | 88,674 | 598,445 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **8.0" Round Culvert**<br>L= 100.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 496.00' S= 0.0200 '/' Cc= 0.900<br>n= 0.024, Flow Area= 0.35 sf |
| #2 | Primary | 499.50' | **4.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #3 | Primary | 503.00' | **15.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=244.90 cfs @ 12.64 hrs HW=504.97' TW=0.00' (Dynamic Tailwater)
├─**1=Culvert** (Barrel Controls 1.79 cfs @ 5.13 fps)
├─**2=Broad-Crested Rectangular Weir** (Weir Controls 134.41 cfs @ 6.15 fps)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 108.70 cfs @ 3.69 fps)

## Pond SWM2: SWM2



## Summary for Pond SWM3try: SWM3

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 3.68" for 50-Year event
Inflow = 280.89 cfs @ 12.52 hrs, Volume= 76.203 af
Outflow = 151.10 cfs @ 14.19 hrs, Volume= 74.838 af, Atten= 46%, Lag= 100.0 min
Primary = 151.10 cfs @ 14.19 hrs, Volume= 74.838 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 510.34' @ 14.19 hrs Surf.Area= 423,307 sf Storage= 1,289,239 cf

Plug-Flow detention time= 284.3 min calculated for 74.838 af (98% of inflow)
Center-of-Mass det. time= 255.6 min ( 1,181.5 - 925.9 )

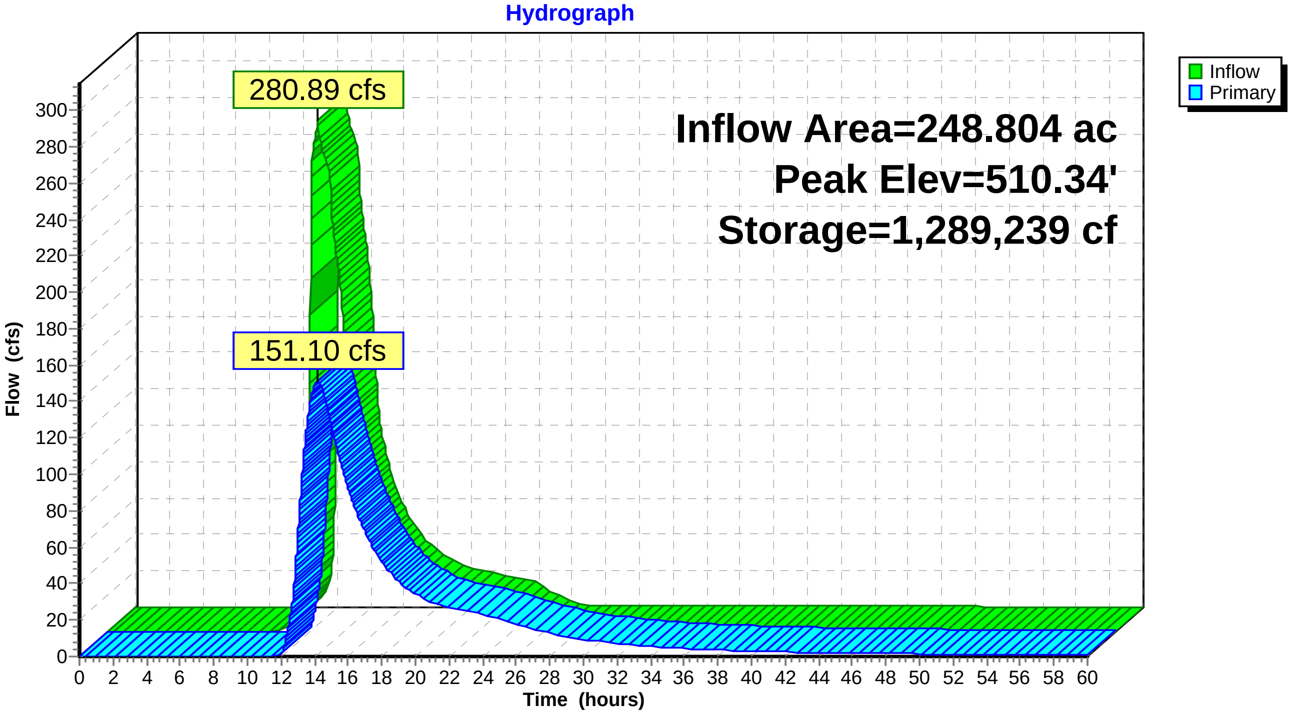
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.00' | 2,034,374 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 507.00 | 359,082 | 0 | 0 |
| 508.00 | 370,212 | 364,647 | 364,647 |
| 510.00 | 413,188 | 783,400 | 1,148,047 |
| 512.00 | 473,139 | 886,327 | 2,034,374 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.00' | **4.5' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #2 | Primary | 508.75' | **15.0' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=151.09 cfs @ 14.19 hrs HW=510.34' TW=504.62' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 72.16 cfs @ 4.80 fps)
**2=Broad-Crested Rectangular Weir** (Weir Controls 78.93 cfs @ 3.31 fps)

## Pond SWM3try: SWM3



## Summary for Pond SWM4: SWM4

Inflow Area = 195.996 ac, 11.01% Impervious, Inflow Depth > 2.84" for 50-Year event
Inflow = 182.17 cfs @ 13.16 hrs, Volume= 46.467 af
Outflow = 166.52 cfs @ 13.44 hrs, Volume= 46.454 af, Atten= 9%, Lag= 17.2 min
Primary = 166.52 cfs @ 13.44 hrs, Volume= 46.454 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 517.66' @ 13.44 hrs Surf.Area= 51,336 sf Storage= 121,490 cf

Plug-Flow detention time= 11.9 min calculated for 46.454 af (100% of inflow)
Center-of-Mass det. time= 11.2 min ( 965.8 - 954.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 515.00' | 387,328 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

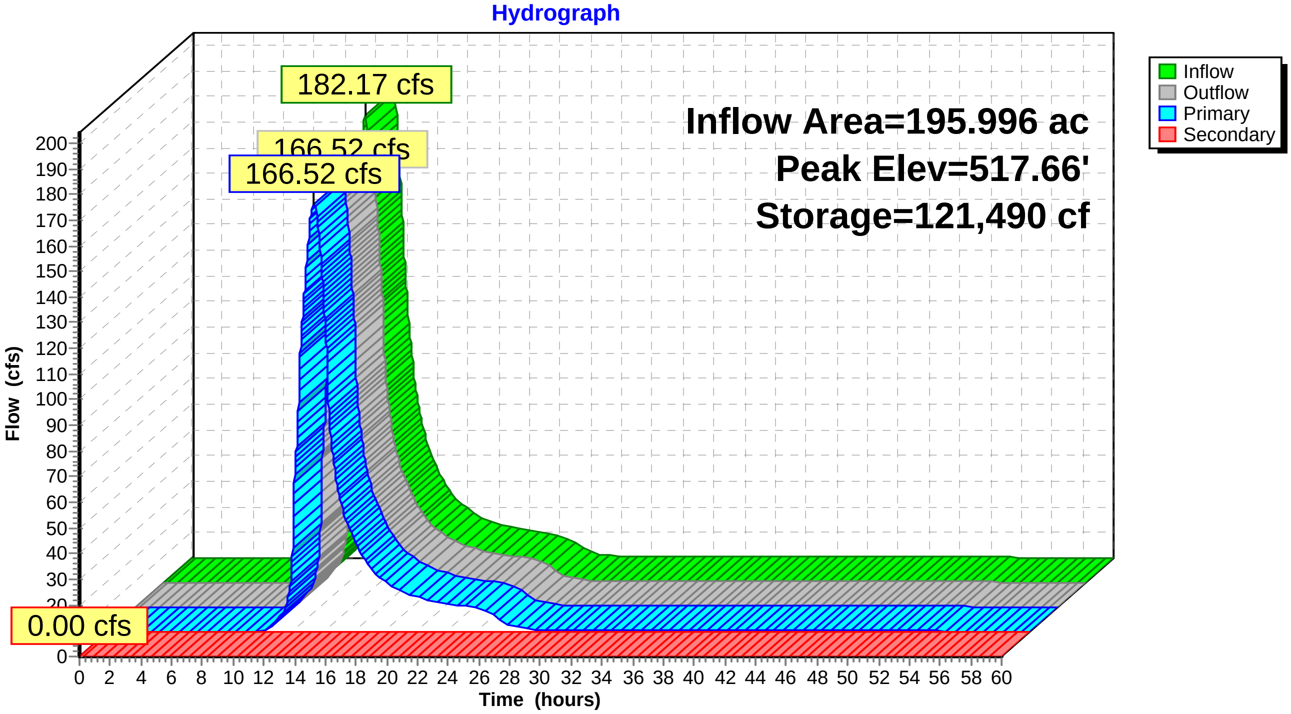
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 515.00 | 40,770 | 0 | 0 |
| 516.00 | 43,995 | 42,383 | 42,383 |
| 518.00 | 52,841 | 96,836 | 139,219 |
| 520.00 | 62,089 | 114,930 | 254,149 |
| 522.00 | 71,090 | 133,179 | 387,328 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 510.00' | **36.0" Round Culvert X 3.00**<br>L= 250.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 510.00' / 505.50' S= 0.0180 '/' Cc= 0.900<br>n= 0.020, Flow Area= 7.07 sf |
| #2 | Device 1 | 515.00' | **36.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 521.50' | **25.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=166.51 cfs @ 13.44 hrs HW=517.66' TW=510.02' (Dynamic Tailwater)
└─**1=Culvert** (Passes 166.51 cfs of 200.61 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 166.51 cfs @ 7.85 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=515.00' TW=507.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM4: SWM4



## Summary for Pond SWM5: SWM5

```
Inflow Area =       58.557 ac, 24.60% Impervious, Inflow Depth =  4.42"   for 50-Year event
Inflow      =     161.74 cfs @  12.37 hrs, Volume=        21.555 af
Outflow     =     136.38 cfs @  12.56 hrs, Volume=        21.405 af,  Atten= 16%,  Lag= 11.3 min
Primary     =       1.06 cfs @  12.56 hrs, Volume=         2.558 af
Secondary   =     109.95 cfs @  12.56 hrs, Volume=        18.120 af
Tertiary    =      25.37 cfs @  12.56 hrs, Volume=         0.728 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 521.60' @ 12.56 hrs Surf.Area= 49,356 sf Storage= 180,880 cf

Plug-Flow detention time= 143.7 min calculated for 21.405 af (99% of inflow)
Center-of-Mass det. time= 139.4 min ( 976.0 - 836.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 517.00' | 251,698 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 517.00 | 22,920 | 0 | 0 |
| 518.00 | 35,091 | 29,006 | 29,006 |
| 520.00 | 42,827 | 77,918 | 106,924 |
| 522.00 | 50,965 | 93,792 | 200,716 |
| 523.00 | 51,000 | 50,983 | 251,698 |

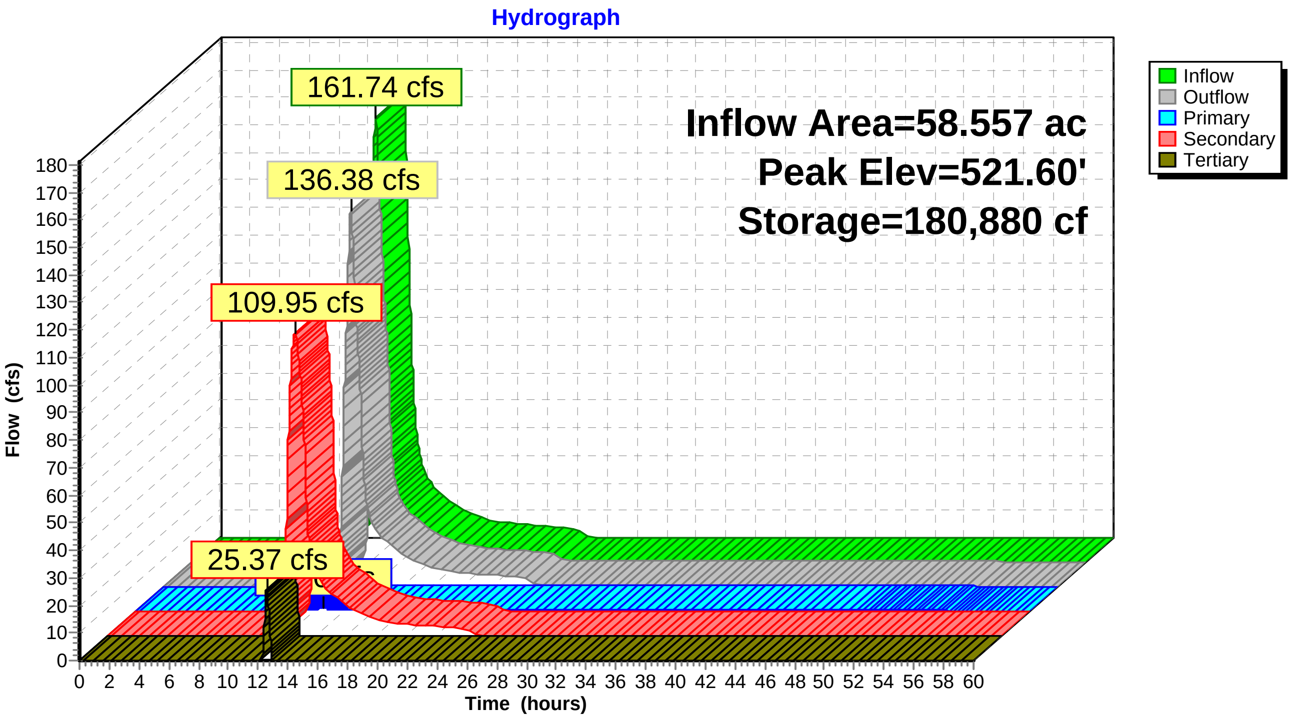
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 517.00' | **6.0" Round Culvert**<br>L= 90.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 517.00' / 516.00' S= 0.0111 '/' Cc= 0.900<br>n= 0.015, Flow Area= 0.20 sf |
| #2 | Secondary | 512.00' | **30.0" Round Culvert X 3.00**<br>L= 270.0' RCP, groove end w/headwall, Ke= 0.200<br>Inlet / Outlet Invert= 512.00' / 505.00' S= 0.0259 '/' Cc= 0.900<br>n= 0.020, Flow Area= 4.91 sf |
| #3 | Device 2 | 519.20' | **30.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Tertiary | 521.00' | **20.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=1.06 cfs @ 12.56 hrs HW=521.60' TW=516.17' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.06 cfs @ 5.38 fps)

**Secondary OutFlow** Max=109.95 cfs @ 12.56 hrs HW=521.60' TW=508.53' (Dynamic Tailwater)
└─**2=Culvert** (Passes 109.95 cfs of 160.22 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 109.95 cfs @ 7.47 fps)

**Tertiary OutFlow** Max=25.37 cfs @ 12.56 hrs HW=521.60' TW=516.17' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 25.37 cfs @ 2.10 fps)

## Pond SWM5: SWM5



## Summary for Pond SWM6: SWM6

[62] Hint: Exceeded Reach A105R OUTLET depth by 3.28' @ 17.26 hrs

Inflow Area = 99.305 ac, 18.16% Impervious, Inflow Depth = 2.52" for 50-Year event
Inflow = 164.67 cfs @ 12.40 hrs, Volume= 20.890 af
Outflow = 15.34 cfs @ 16.42 hrs, Volume= 20.014 af, Atten= 91%, Lag= 240.9 min
Primary = 15.34 cfs @ 16.42 hrs, Volume= 20.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 503.92' @ 16.42 hrs Surf.Area= 147,902 sf Storage= 458,490 cf

Plug-Flow detention time= 553.0 min calculated for 20.007 af (96% of inflow)
Center-of-Mass det. time= 526.1 min ( 1,442.4 - 916.3 )

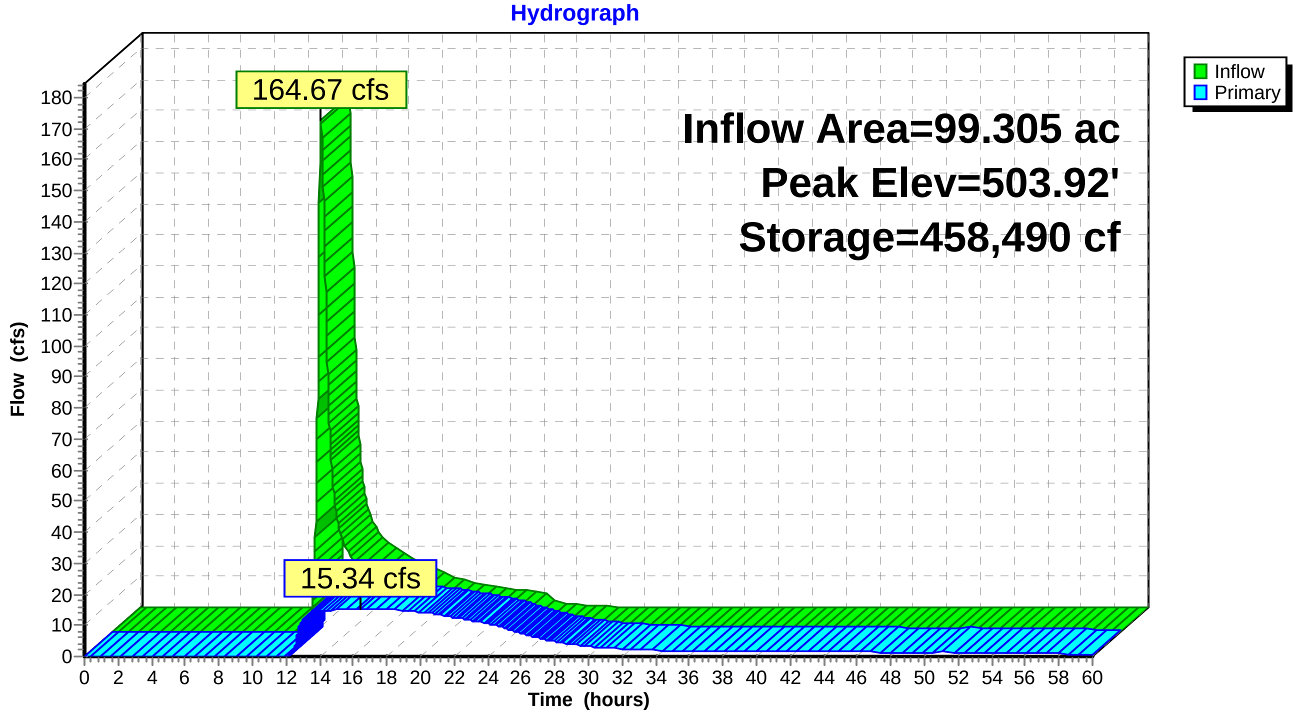
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 883,875 cf | **Custom Stage Data (Prismatic)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 500.00 | 76,477 | 0 | 0 |
| 501.00 | 99,879 | 88,178 | 88,178 |
| 502.00 | 122,401 | 111,140 | 199,318 |
| 504.00 | 148,997 | 271,398 | 470,716 |
| 506.00 | 176,108 | 325,105 | 795,821 |
| 506.50 | 176,108 | 88,054 | 883,875 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.00' | **8.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 500.00' / 498.50' S= 0.0111 '/' Cc= 0.900<br>n= 0.012, Flow Area= 0.35 sf |
| #2 | Primary | 501.50' | **18.0" Round Culvert**<br>L= 105.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 501.50' / 500.00' S= 0.0143 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=15.34 cfs @ 16.42 hrs HW=503.92' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 2.24 cfs @ 6.43 fps)
**2=Culvert** (Barrel Controls 13.09 cfs @ 7.41 fps)

## Pond SWM6: SWM6



## Summary for Pond SWM7: SWM7

Inflow Area = 4.590 ac, 29.85% Impervious, Inflow Depth = 4.59" for 50-Year event
Inflow = 18.53 cfs @ 12.21 hrs, Volume= 1.755 af
Outflow = 9.36 cfs @ 12.51 hrs, Volume= 1.755 af, Atten= 50%, Lag= 17.9 min
Primary = 9.36 cfs @ 12.51 hrs, Volume= 1.755 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 746.44' @ 12.51 hrs Surf.Area= 6,351 sf Storage= 21,984 cf

Plug-Flow detention time= 63.9 min calculated for 1.754 af (100% of inflow)
Center-of-Mass det. time= 64.0 min ( 887.5 - 823.4 )

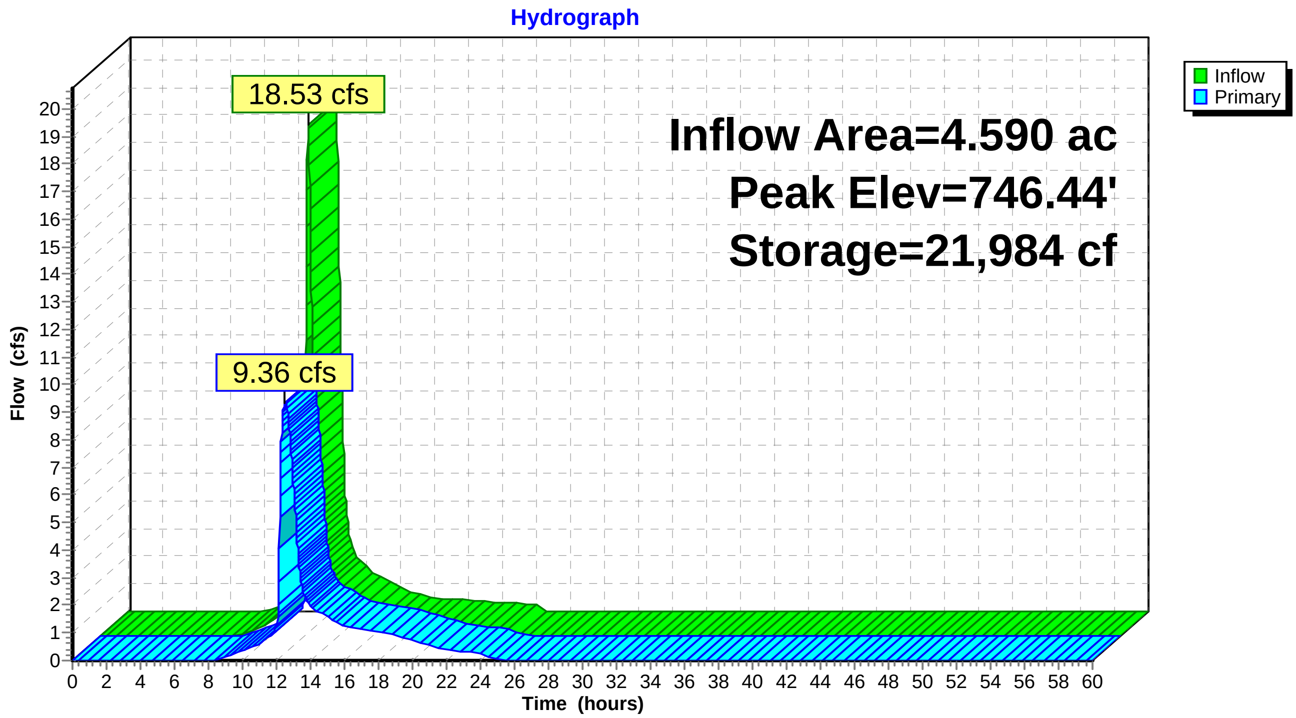
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 740.00' | 33,203 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 740.00 | 1,005 | 0 | 0 |
| 741.00 | 1,611 | 1,308 | 1,308 |
| 742.00 | 2,307 | 1,959 | 3,267 |
| 743.00 | 3,095 | 2,701 | 5,968 |
| 744.00 | 3,949 | 3,522 | 9,490 |
| 745.00 | 4,882 | 4,416 | 13,906 |
| 746.00 | 5,886 | 5,384 | 19,290 |
| 747.00 | 6,942 | 6,414 | 25,704 |
| 748.00 | 8,056 | 7,499 | 33,203 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 740.00' | **30.0" Round Culvert**<br>L= 60.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 740.00' / 739.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |
| #2 | Device 1 | 740.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 743.80' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 744.40' | **10.0" Vert. Orifice/Grate X 2.00** C= 0.600 |
| #5 | Device 1 | 747.10' | **20.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=9.35 cfs @ 12.51 hrs HW=746.44' TW=719.37' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.35 cfs of 67.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.64 cfs @ 12.02 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.02 cfs @ 7.51 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 6.69 cfs @ 6.13 fps)
  └─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM7: SWM7



## Summary for Pond SWM8: SWM8

Inflow Area = 15.712 ac, 18.18% Impervious, Inflow Depth = 3.62" for 50-Year event
Inflow = 36.49 cfs @ 12.47 hrs, Volume= 4.738 af
Outflow = 20.40 cfs @ 12.87 hrs, Volume= 4.735 af, Atten= 44%, Lag= 23.9 min
Primary = 20.40 cfs @ 12.87 hrs, Volume= 4.735 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 656.49' @ 12.87 hrs Surf.Area= 12,855 sf Storage= 58,292 cf

Plug-Flow detention time= 92.6 min calculated for 4.735 af (100% of inflow)
Center-of-Mass det. time= 92.2 min ( 953.5 - 861.3 )

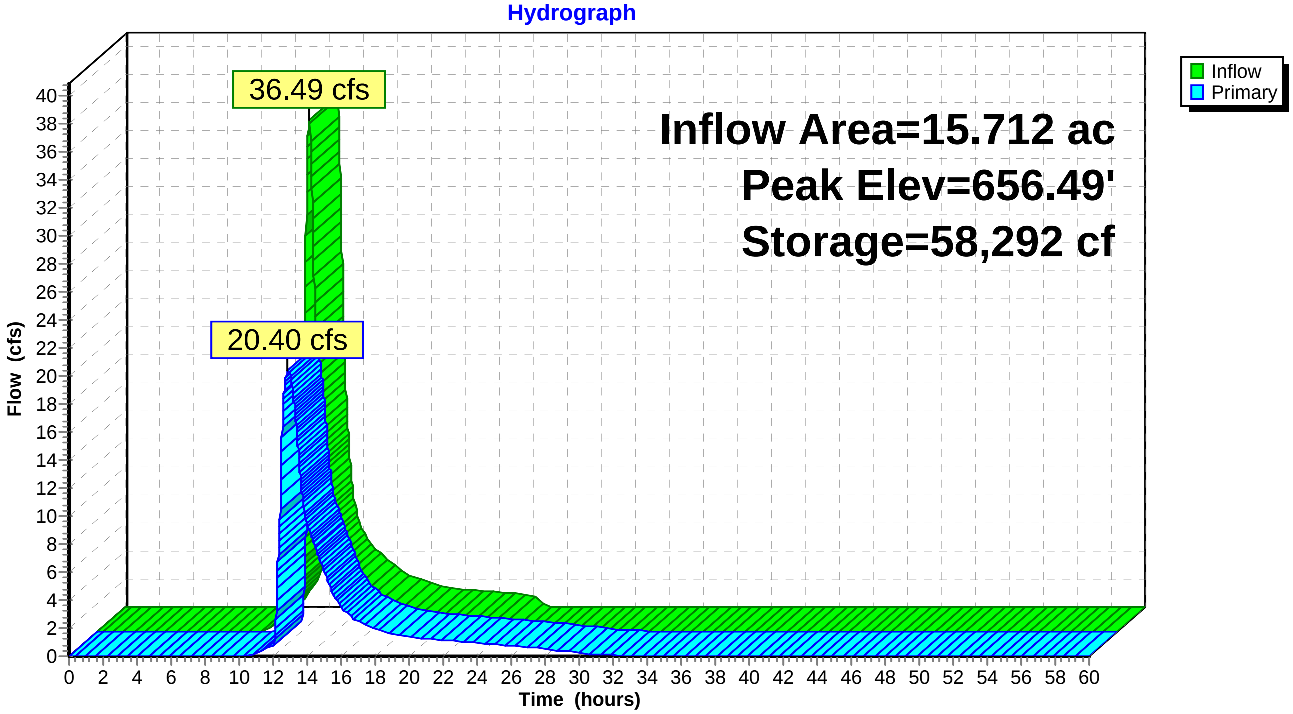
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 79,275 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 650.00 | 5,538 | 0 | 0 |
| 652.00 | 7,499 | 13,037 | 13,037 |
| 654.00 | 9,725 | 17,224 | 30,261 |
| 656.00 | 12,197 | 21,922 | 52,183 |
| 658.00 | 14,895 | 27,092 | 79,275 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **36.0" Round Culvert**<br>L= 90.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 648.00' S= 0.0222 '/' Cc= 0.900<br>n= 0.010, Flow Area= 7.07 sf |
| #2 | Device 1 | 650.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 652.00' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 654.40' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #5 | Device 1 | 656.50' | **1.5' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |
| #6 | Device 1 | 657.50' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=20.40 cfs @ 12.87 hrs HW=656.49' TW=626.25' (Dynamic Tailwater)
└─**1=Culvert** (Passes 20.40 cfs of 95.01 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.65 cfs @ 12.07 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 11.61 cfs @ 9.46 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 7.14 cfs @ 5.82 fps)
  ├─**5=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └─**6=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM8: SWM8



## Summary for Pond WF: Water Feature

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 2.47" for 50-Year event
Inflow = 72.12 cfs @ 12.56 hrs, Volume= 10.442 af
Outflow = 50.43 cfs @ 12.87 hrs, Volume= 10.442 af, Atten= 30%, Lag= 18.7 min
Primary = 50.43 cfs @ 12.87 hrs, Volume= 10.442 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 528.20' @ 12.87 hrs Surf.Area= 31,916 sf Storage= 64,445 cf

Plug-Flow detention time= 22.0 min calculated for 10.438 af (100% of inflow)
Center-of-Mass det. time= 22.2 min ( 915.0 - 892.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 526.00' | 127,058 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

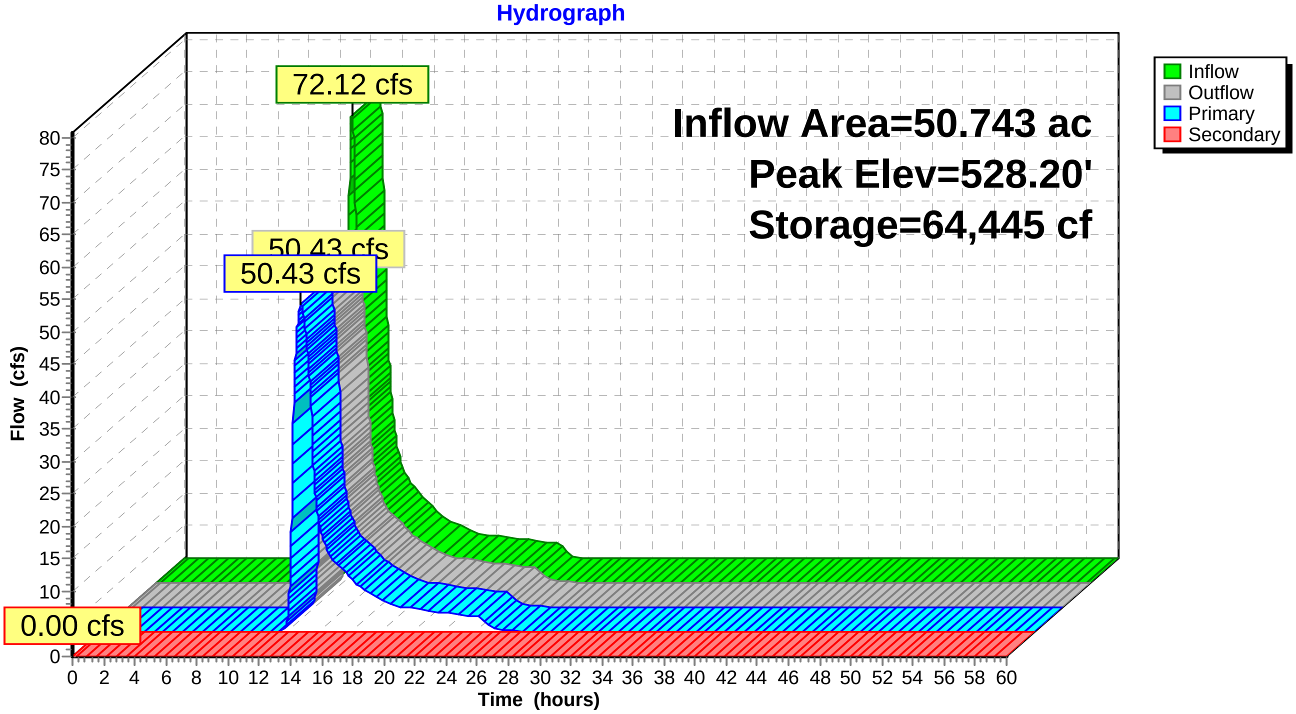
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 526.00 | 26,946 | 0 | 0 |
| 528.00 | 31,311 | 58,257 | 58,257 |
| 530.00 | 37,490 | 68,801 | 127,058 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 520.00' | **36.0" Round Culvert**<br>L= 225.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 520.00' / 513.00' S= 0.0311 '/' Cc= 0.900<br>n= 0.015, Flow Area= 7.07 sf |
| #2 | Device 1 | 526.00' | **36.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 529.00' | **20.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=50.43 cfs @ 12.87 hrs HW=528.20' TW=514.26' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 50.43 cfs of 107.84 cfs potential flow)
  ↑—**2=Orifice/Grate** (Orifice Controls 50.43 cfs @ 7.13 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=526.00' TW=512.00' (Dynamic Tailwater)
↑—**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond WF: Water Feature

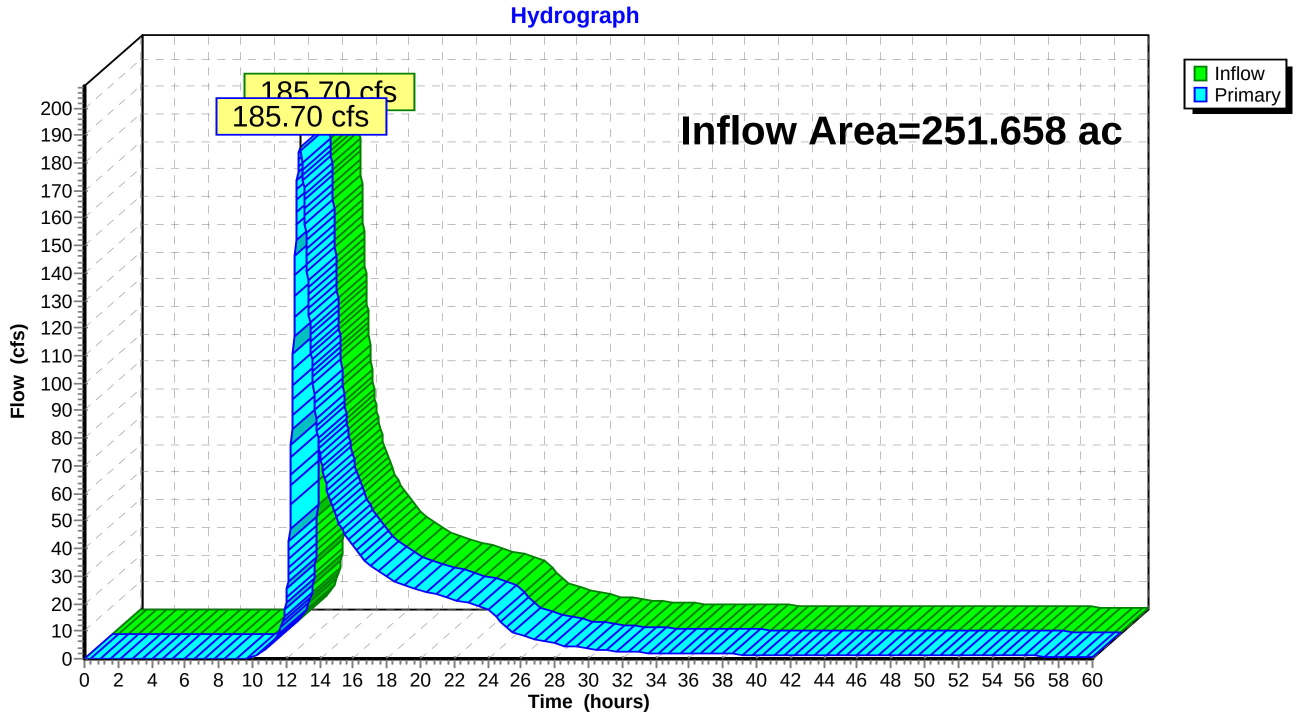


## Summary for Link A: Amenia Stream

| | | | |
|---|---|---|---|
| Inflow Area = | 251.658 ac, 10.11% Impervious, | Inflow Depth > 2.59" | for 50-Year event |
| Inflow = | 185.70 cfs @ 12.82 hrs, | Volume= | 54.310 af |
| Primary = | 185.70 cfs @ 12.82 hrs, | Volume= | 54.310 af, Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link A: Amenia Stream

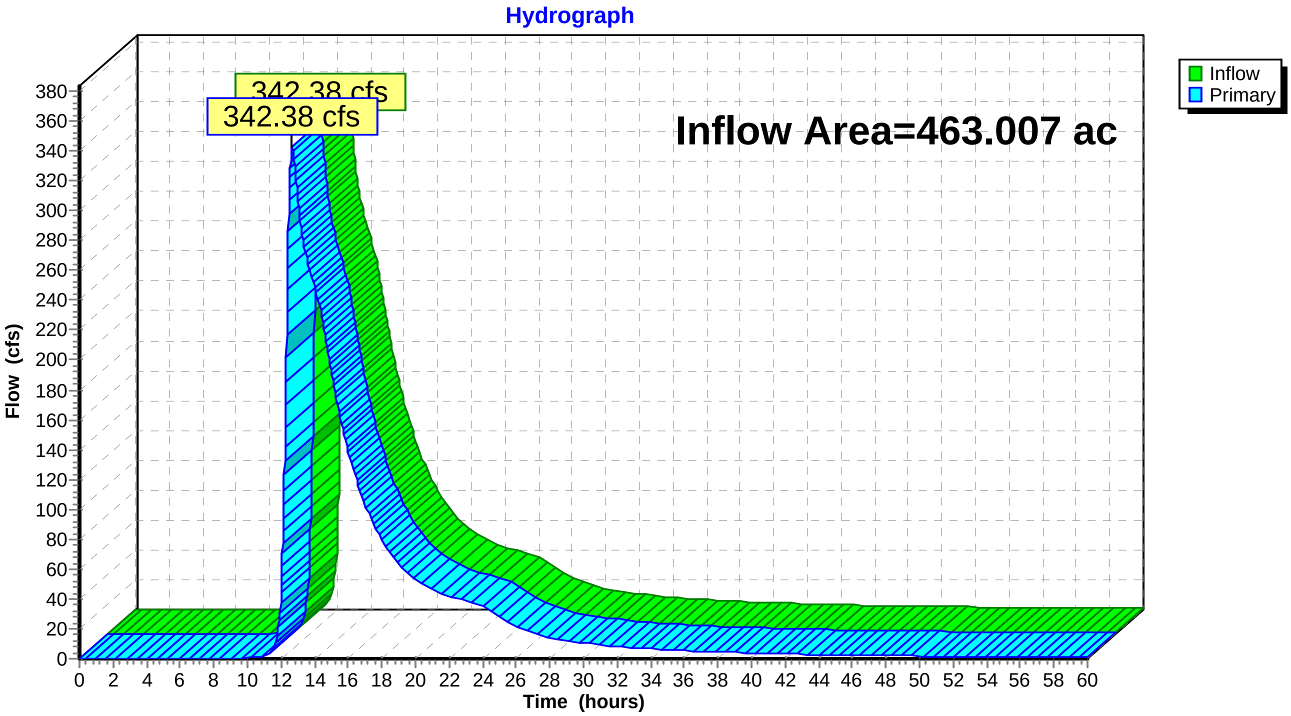


## Summary for Link B: Wetland

Inflow Area = 463.007 ac, 14.28% Impervious, Inflow Depth > 3.53" for 50-Year event
Inflow = 342.38 cfs @ 12.65 hrs, Volume= 136.014 af
Primary = 342.38 cfs @ 12.65 hrs, Volume= 136.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

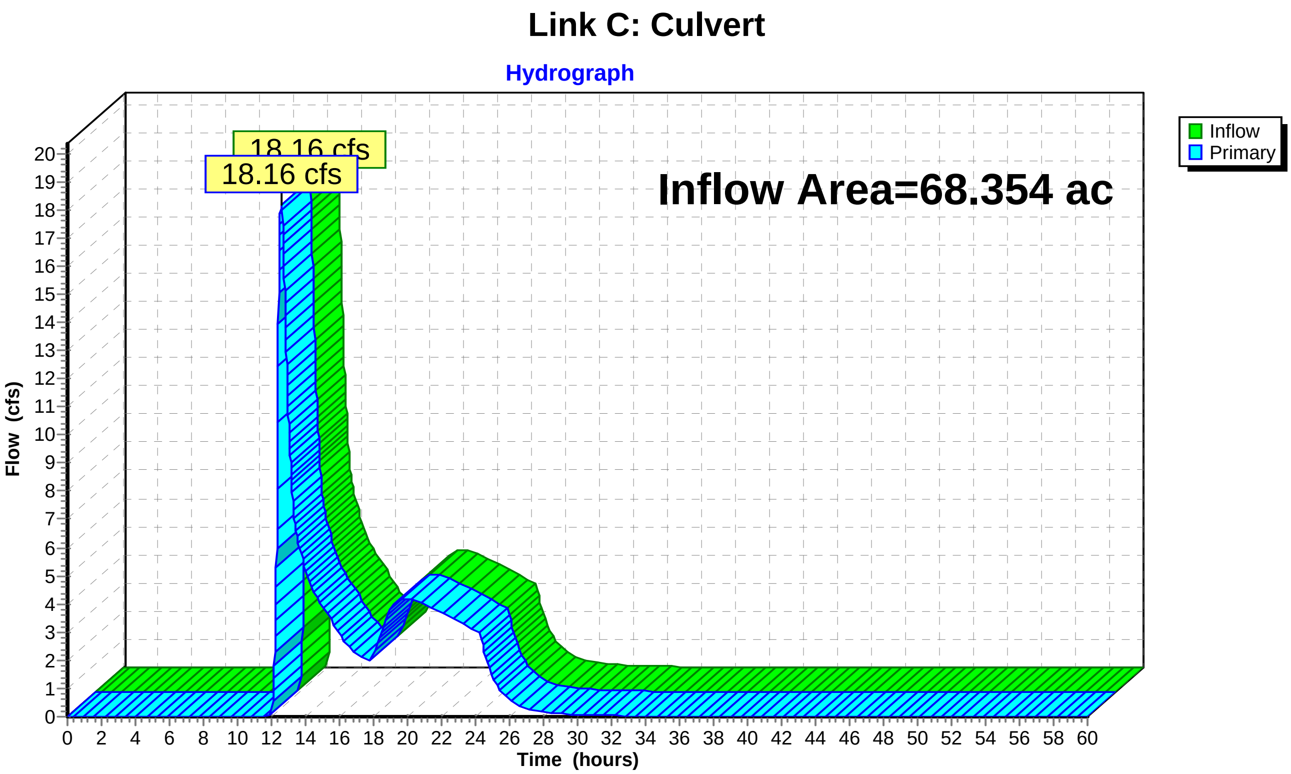
### Link B: Wetland



## Summary for Link C: Culvert

Inflow Area = 68.354 ac, 5.83% Impervious, Inflow Depth = 0.82" for 50-Year event
Inflow = 18.16 cfs @ 12.57 hrs, Volume= 4.670 af
Primary = 18.16 cfs @ 12.57 hrs, Volume= 4.670 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

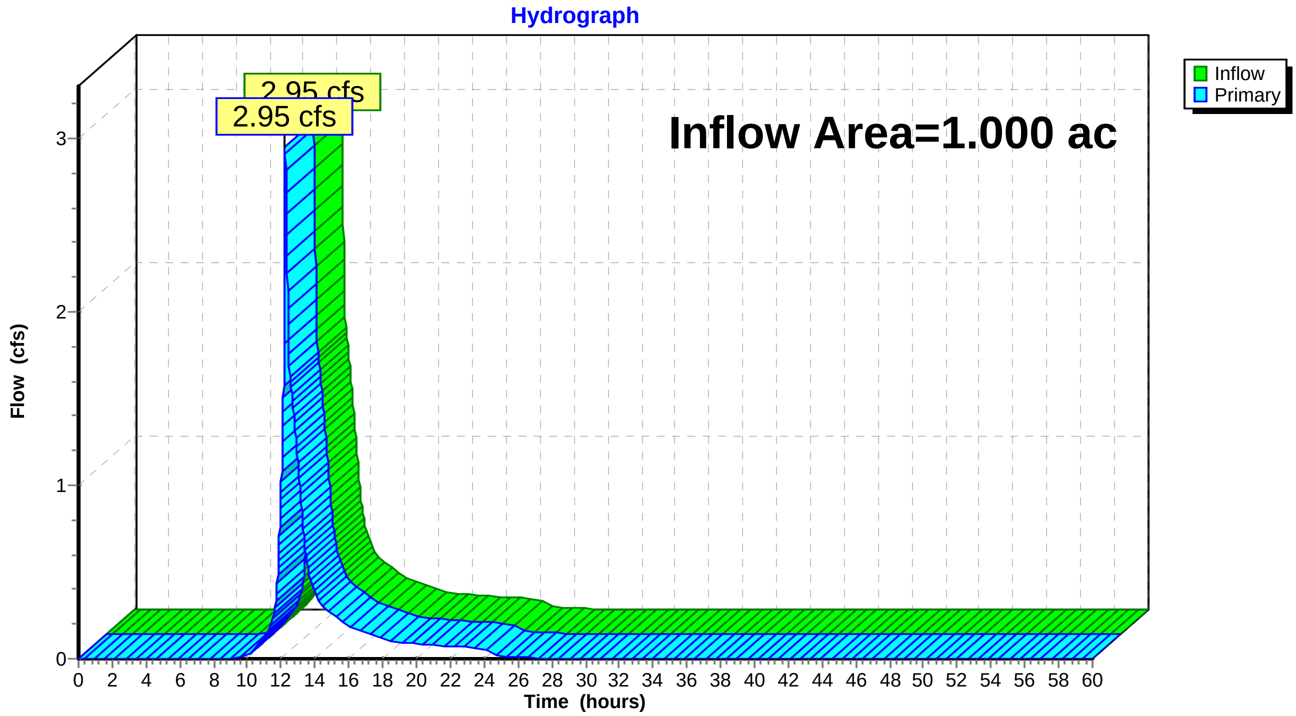


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 4.10" for 50-Year event
Inflow = 2.95 cfs @ 12.23 hrs, Volume= 0.341 af
Primary = 2.95 cfs @ 12.23 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



Time span=0.00-60.00 hrs, dt=0.02 hrs, 3001 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment A101: A101** Runoff Area=21.492 ac 4.36% Impervious Runoff Depth=1.82"
Flow Length=1,320' Tc=20.2 min CN=48 Runoff=23.06 cfs 3.267 af

**Subcatchment A102: A102** Runoff Area=4.590 ac 29.85% Impervious Runoff Depth=6.18"
Flow Length=530' Tc=15.8 min CN=81 Runoff=24.71 cfs 2.365 af

**Subcatchment A103: A103** Runoff Area=57.299 ac 21.07% Impervious Runoff Depth=3.36"
Flow Length=2,529' Tc=22.2 min CN=60 Runoff=142.01 cfs 16.036 af

**Subcatchment A104: A104** Runoff Area=29.922 ac 5.68% Impervious Runoff Depth=1.70"
Flow Length=1,871' Tc=21.8 min CN=47 Runoff=27.94 cfs 4.248 af

**Subcatchment A105: A105** Runoff Area=26.625 ac 12.66% Impervious Runoff Depth=3.62"
Flow Length=1,484' Tc=19.3 min CN=62 Runoff=76.68 cfs 8.041 af

**Subcatchment A106: A106** Runoff Area=10.791 ac 11.31% Impervious Runoff Depth=5.64"
Flow Length=1,260' Tc=26.7 min CN=77 Runoff=43.15 cfs 5.075 af

**Subcatchment A107: A107** Runoff Area=79.700 ac 2.24% Impervious Runoff Depth=5.24"
Flow Length=3,685' Tc=61.0 min CN=74 Runoff=194.58 cfs 34.793 af

**Subcatchment A108: A108** Runoff Area=5.527 ac 2.32% Impervious Runoff Depth=2.96"
Flow Length=1,235' Tc=30.1 min CN=57 Runoff=10.26 cfs 1.365 af

**Subcatchment A109: A109** Runoff Area=15.712 ac 18.18% Impervious Runoff Depth=5.10"
Flow Length=1,315' Tc=33.2 min CN=73 Runoff=51.63 cfs 6.682 af

**Subcatchment B101: B101** Runoff Area=50.743 ac 17.46% Impervious Runoff Depth=3.76"
Flow Length=3,015' Tc=36.7 min CN=63 Runoff=114.67 cfs 15.889 af

**Subcatchment B102: B102** Runoff Area=40.873 ac 1.28% Impervious Runoff Depth=3.36"
Flow Length=955' Tc=20.3 min CN=60 Runoff=105.21 cfs 11.439 af

**Subcatchment B103: B103** Runoff Area=22.950 ac 10.98% Impervious Runoff Depth=6.05"
Flow Length=2,127' Tc=38.5 min CN=80 Runoff=82.19 cfs 11.567 af

**Subcatchment B104: B104** Runoff Area=24.602 ac 28.02% Impervious Runoff Depth=6.05"
Flow Length=3,620' Tc=24.7 min CN=80 Runoff=108.23 cfs 12.400 af

**Subcatchment B105: B105** Runoff Area=24.733 ac 14.99% Impervious Runoff Depth=6.05"
Flow Length=2,606' Tc=36.4 min CN=80 Runoff=91.15 cfs 12.466 af

**Subcatchment B106: B106** Runoff Area=118.113 ac 1.34% Impervious Runoff Depth=5.51"
Flow Length=5,409' Tc=85.7 min CN=76 Runoff=242.96 cfs 54.221 af

**Subcatchment B107: B107** Runoff Area=14.330 ac 0.00% Impervious Runoff Depth=5.64"
Flow Length=907' Tc=37.9 min CN=77 Runoff=48.66 cfs 6.740 af

**Subcatchment B108: B108** Runoff Area=40.951 ac 11.09% Impervious Runoff Depth=5.78"
Flow Length=2,038' Tc=32.2 min CN=78 Runoff=153.58 cfs 19.720 af

**Subcatchment B109: B109** Runoff Area=34.256 ac 12.24% Impervious Runoff Depth=5.78"
Flow Length=1,371' Tc=24.9 min CN=78 Runoff=144.05 cfs 16.496 af

**Subcatchment B110: B110** Runoff Area=6.622 ac 45.47% Impervious Runoff Depth=6.72"
Flow Length=936' Tc=11.9 min CN=85 Runoff=42.13 cfs 3.708 af

**Subcatchment B111: B111** Runoff Area=6.254 ac 40.36% Impervious Runoff Depth=4.43"
Flow Length=516' Tc=6.8 min CN=68 Runoff=32.16 cfs 2.308 af

**Subcatchment B112: B112** Runoff Area=39.487 ac 34.78% Impervious Runoff Depth=4.16"
Flow Length=989' Tc=15.8 min CN=66 Runoff=144.23 cfs 13.687 af

**Subcatchment B113: B113** Runoff Area=5.598 ac 30.55% Impervious Runoff Depth=3.23"
Flow Length=836' Tc=14.0 min CN=59 Runoff=15.88 cfs 1.505 af

**Subcatchment B115: B115** Runoff Area=13.072 ac 23.44% Impervious Runoff Depth=3.49"
Flow Length=1,419' Tc=11.1 min CN=61 Runoff=44.51 cfs 3.803 af

**Subcatchment B116: B116** Runoff Area=2.600 ac 30.58% Impervious Runoff Depth=2.96"
Tc=6.0 min CN=57 Runoff=8.61 cfs 0.642 af

**Subcatchment B117: B117** Runoff Area=7.723 ac 36.64% Impervious Runoff Depth=3.49"
Tc=6.0 min CN=61 Runoff=31.31 cfs 2.247 af

**Subcatchment B118: B118** Runoff Area=2.550 ac 54.71% Impervious Runoff Depth=4.83"
Tc=6.0 min CN=71 Runoff=14.75 cfs 1.027 af

**Subcatchment B119: B119** Runoff Area=7.550 ac 56.29% Impervious Runoff Depth=6.85"
Flow Length=1,683' Tc=10.3 min CN=86 Runoff=51.06 cfs 4.312 af

**Subcatchment C101: C101** Runoff Area=12.930 ac 0.00% Impervious Runoff Depth=2.07"
Flow Length=1,500' Tc=31.9 min CN=50 Runoff=14.16 cfs 2.230 af

**Subcatchment C102: C102** Runoff Area=40.074 ac 2.80% Impervious Runoff Depth=3.89"
Flow Length=2,597' Tc=45.5 min CN=64 Runoff=84.02 cfs 12.995 af

**Subcatchment C103: C103** Runoff Area=15.350 ac 18.63% Impervious Runoff Depth=2.57"
Flow Length=2,111' Tc=30.4 min CN=54 Runoff=23.51 cfs 3.294 af

**Subcatchment Overlook (P1): Overlook** Runoff Area=1.000 ac 0.00% Impervious Runoff Depth=5.64"
Flow Length=176' Tc=7.5 min CN=77 Runoff=6.35 cfs 0.470 af

**Reach 36" Pipe: 36" Pipe** Avg. Flow Depth=1.29' Max Vel=20.00 fps Inflow=58.36 cfs 7.440 af
36.0" Round Pipe n=0.015 L=935.0' S=0.0684 '/' Capacity=151.23 cfs Outflow=58.27 cfs 7.440 af

**Reach 42" Pipe: 42" Pipe** Avg. Flow Depth=2.20' Max Vel=37.10 fps Inflow=236.56 cfs 42.838 af
42.0" Round Pipe n=0.012 L=575.0' S=0.0904 '/' Capacity=327.77 cfs Outflow=236.49 cfs 42.838 af

**Reach A105R: Thru A103** Avg. Flow Depth=2.30' Max Vel=8.62 fps Inflow=127.45 cfs 15.464 af
n=0.050 L=1,170.0' S=0.0564 '/' Capacity=150.86 cfs Outflow=126.85 cfs 15.464 af

**Reach B107R: Thru B103** Avg. Flow Depth=0.46' Max Vel=8.65 fps Inflow=36.37 cfs 6.463 af
n=0.050 L=938.0' S=0.4072 '/' Capacity=192.14 cfs Outflow=36.32 cfs 6.463 af

**Reach B112R: Thru B102** Avg. Flow Depth=3.24' Max Vel=6.09 fps Inflow=236.79 cfs 105.430 af
n=0.050 L=600.0' S=0.0167 '/' Capacity=369.68 cfs Outflow=236.76 cfs 105.420 af

**Pond 102C: Pond 102C** Peak Elev=509.15' Storage=343,057 cf Inflow=84.02 cfs 12.995 af
Outflow=13.53 cfs 5.867 af

**Pond 104A: Wetland D** Peak Elev=508.21' Storage=12,099 cf Inflow=27.94 cfs 4.248 af
Primary=0.74 cfs 0.512 af Secondary=26.68 cfs 3.715 af Outflow=27.42 cfs 4.227 af

**Pond 105A: Wetland H** Peak Elev=575.40' Storage=70,108 cf Inflow=127.68 cfs 15.481 af
Primary=11.27 cfs 8.344 af Secondary=116.18 cfs 7.120 af Outflow=127.45 cfs 15.464 af

**Pond 106A: 36" Culvert** Peak Elev=721.14' Storage=338 cf Inflow=58.37 cfs 7.440 af
Primary=58.36 cfs 7.440 af Secondary=0.00 cfs 0.000 af Outflow=58.36 cfs 7.440 af

**Pond 106B: Wetland J** Peak Elev=527.31' Storage=26,774 cf Inflow=242.96 cfs 54.221 af
Outflow=242.84 cfs 54.221 af

**Pond 107A: 24" Culvert** Peak Elev=626.65' Storage=4,140 cf Inflow=230.10 cfs 41.473 af
Primary=45.73 cfs 24.730 af Secondary=184.34 cfs 16.744 af Outflow=230.06 cfs 41.473 af

**Pond 107B: Wetland** Peak Elev=973.08' Storage=71,937 cf Inflow=48.66 cfs 6.740 af
Outflow=36.37 cfs 6.463 af

**Pond 108A: 36" Culvert** Peak Elev=613.61' Storage=382 cf Inflow=190.83 cfs 18.109 af
Primary=61.93 cfs 10.100 af Secondary=128.90 cfs 8.009 af Outflow=190.83 cfs 18.109 af

**Pond SWM 7A: SWM 7A (Phase 1)** Peak Elev=808.45' Storage=3,409 cf Inflow=6.35 cfs 0.470 af
Outflow=5.58 cfs 0.470 af

**Pond SWM1: SWM 1** Peak Elev=515.25' Storage=58,144 cf Inflow=87.76 cfs 15.889 af
Outflow=76.98 cfs 15.888 af

**Pond SWM17: SWM17** Peak Elev=502.77' Storage=0.089 af Inflow=23.51 cfs 3.294 af
Outflow=23.19 cfs 3.294 af

**Pond SWM2: SWM2** Peak Elev=505.81' Storage=493,380 cf Inflow=408.50 cfs 58.558 af
Outflow=354.91 cfs 58.404 af

**Pond SWM3try: SWM3** Peak Elev=511.07' Storage=1,608,044 cf Inflow=388.46 cfs 106.822 af
Outflow=236.79 cfs 105.430 af

**Pond SWM4: SWM4** Peak Elev=519.91' Storage=248,434 cf Inflow=252.27 cfs 65.591 af
Primary=218.27 cfs 65.577 af Secondary=0.00 cfs 0.000 af Outflow=218.27 cfs 65.577 af

**Pond SWM5: SWM5** Peak Elev=522.20' Storage=210,682 cf Inflow=217.03 cfs 29.215 af
Primary=1.09 cfs 2.577 af Secondary=122.72 cfs 23.806 af Tertiary=69.02 cfs 2.682 af Outflow=192.79 cfs 29.064 af

**Pond SWM6: SWM6** Peak Elev=505.79' Storage=758,778 cf Inflow=267.49 cfs 31.500 af
Outflow=20.09 cfs 30.321 af

**Pond SWM7: SWM7** Peak Elev=747.31' Storage=27,913 cf Inflow=24.71 cfs 2.365 af
Outflow=15.78 cfs 2.365 af

**Pond SWM8: SWM8** Peak Elev=657.76' Storage=75,734 cf Inflow=51.63 cfs 6.682 af
Outflow=37.29 cfs 6.680 af

**Pond WF: Water Feature** Peak Elev=529.58' Storage=111,412 cf Inflow=114.67 cfs 15.889 af
Primary=64.35 cfs 15.217 af Secondary=23.41 cfs 0.672 af Outflow=87.76 cfs 15.889 af

**Link A: Amenia Stream** Inflow=283.15 cfs 80.653 af
Primary=283.15 cfs 80.653 af

**Link B: Wetland** Inflow=538.33 cfs 192.178 af
Primary=538.33 cfs 192.178 af

**Link C: Culvert** Inflow=37.34 cfs 11.390 af
Primary=37.34 cfs 11.390 af

**Link Overlook-A (P1): Overlook A (Phase 1)** Inflow=5.58 cfs 0.470 af
Primary=5.58 cfs 0.470 af

**Total Runoff Area = 784.019 ac Runoff Volume = 295.036 af Average Runoff Depth = 4.52"**
**87.81% Pervious = 688.462 ac 12.19% Impervious = 95.557 ac**

## Summary for Subcatchment A101: A101

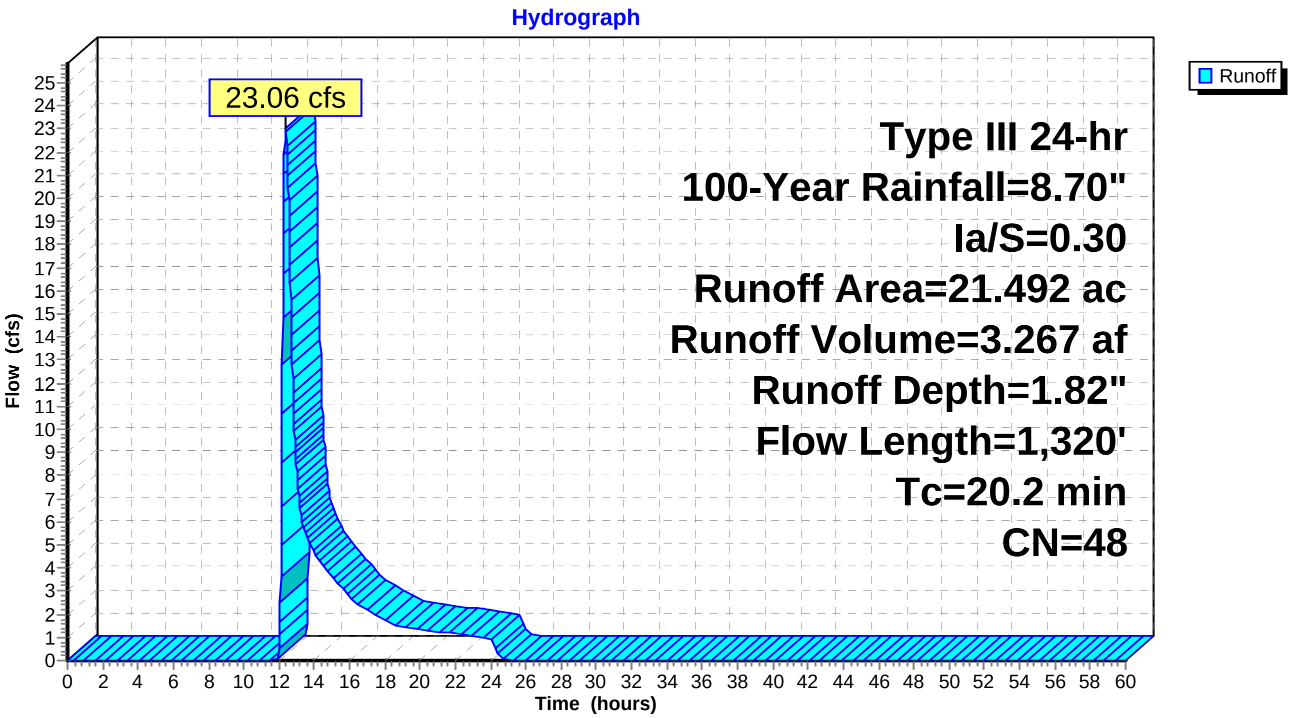
Runoff = 23.06 cfs @ 12.37 hrs, Volume= 3.267 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.015 | 98 | Building roof |
| * | 0.921 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 13.290 | 39 | >75% Grass cover, Good, HSG A |
| | 6.490 | 61 | >75% Grass cover, Good, HSG B |
| | 0.050 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.270 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.426 | 30 | Sand trap, HSG A |
| * | 0.030 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 21.492 | 48 | Weighted Average |
| | 20.556 | | 95.64% Pervious Area |
| | 0.936 | | 4.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.6 | 100 | 0.1400 | 0.17 | | **Sheet Flow,**<br>Grass: Bermuda n= 0.410 P2= 3.50" |
| 6.0 | 800 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 420 | 0.0480 | 1.53 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 20.2 | 1,320 | Total | | | |

## Subcatchment A101: A101



## Summary for Subcatchment A102: A102

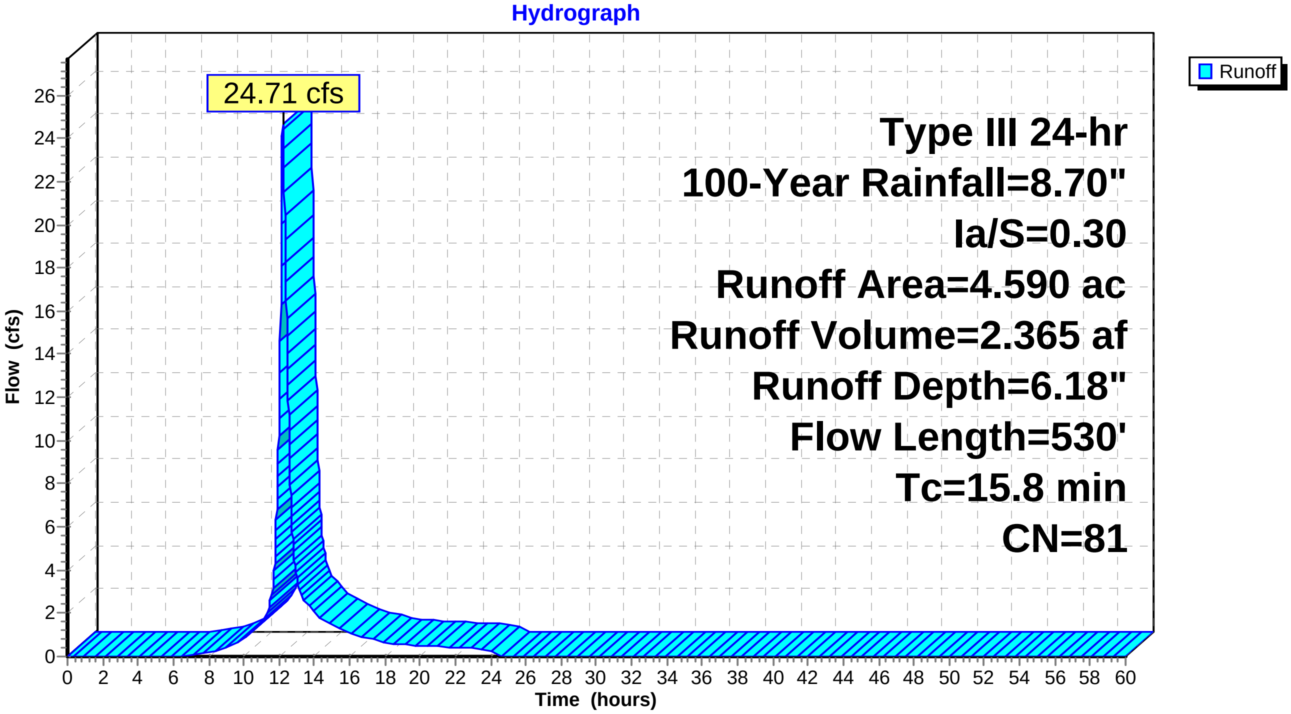
Runoff = 24.71 cfs @ 12.21 hrs, Volume= 2.365 af, Depth= 6.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.200 | 98 | Building roof |
| * | 1.040 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 2.970 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.250 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 4.590 | 81 | Weighted Average |
| | 3.220 | | 70.15% Pervious Area |
| | 1.370 | | 29.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.1 | 50 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 130 | 0.1700 | 2.89 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.7 | 250 | 0.1280 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.8 | 530 | Total | | | |

## Subcatchment A102: A102



## Summary for Subcatchment A103: A103

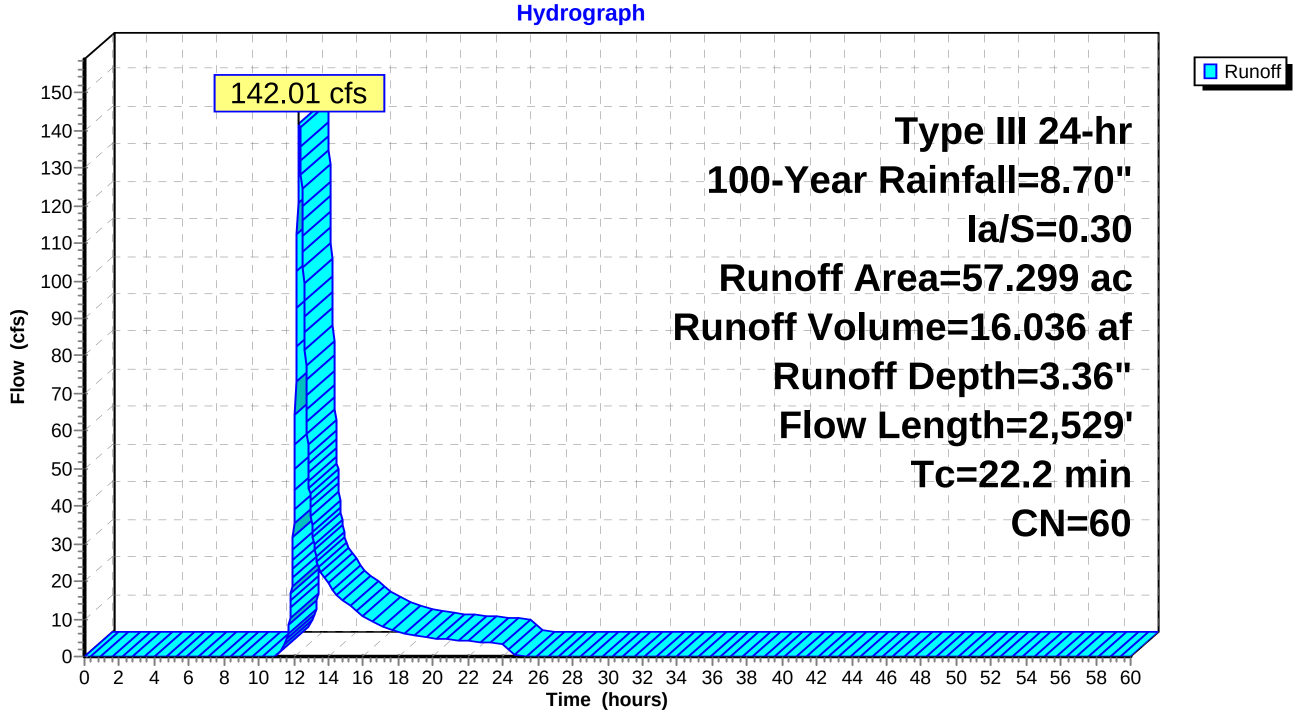
Runoff = 142.01 cfs @ 12.33 hrs, Volume= 16.036 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.320 | 98 | Building roof |
| * | 6.292 | 98 | Paved surface |
| * | 0.438 | 96 | Gravel surface |
| * | 1.461 | 98 | Water Surface |
| | 21.310 | 39 | >75% Grass cover, Good, HSG A |
| | 5.353 | 61 | >75% Grass cover, Good, HSG B |
| | 8.379 | 74 | >75% Grass cover, Good, HSG C |
| | 0.029 | 80 | >75% Grass cover, Good, HSG D |
| | 5.112 | 30 | Woods, Good, HSG A |
| | 1.620 | 55 | Woods, Good, HSG B |
| | 1.505 | 70 | Woods, Good, HSG C |
| | 1.130 | 77 | Woods, Good, HSG D |
| * | 0.220 | 30 | Sand trap, HSG A |
| * | 0.130 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 57.299 | 60 | Weighted Average |
| | 45.226 | | 78.93% Pervious Area |
| | 12.073 | | 21.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.8 | 100 | 0.0300 | 0.09 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 2.2 | 355 | 0.1430 | 2.65 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 554 | 0.0680 | 8.24 | 98.89 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 1.1 | 1,520 | 0.0690 | 23.78 | 116.72 | **Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.012 |
| 22.2 | 2,529 | Total | | | |

## Subcatchment A103: A103



## Summary for Subcatchment A104: A104

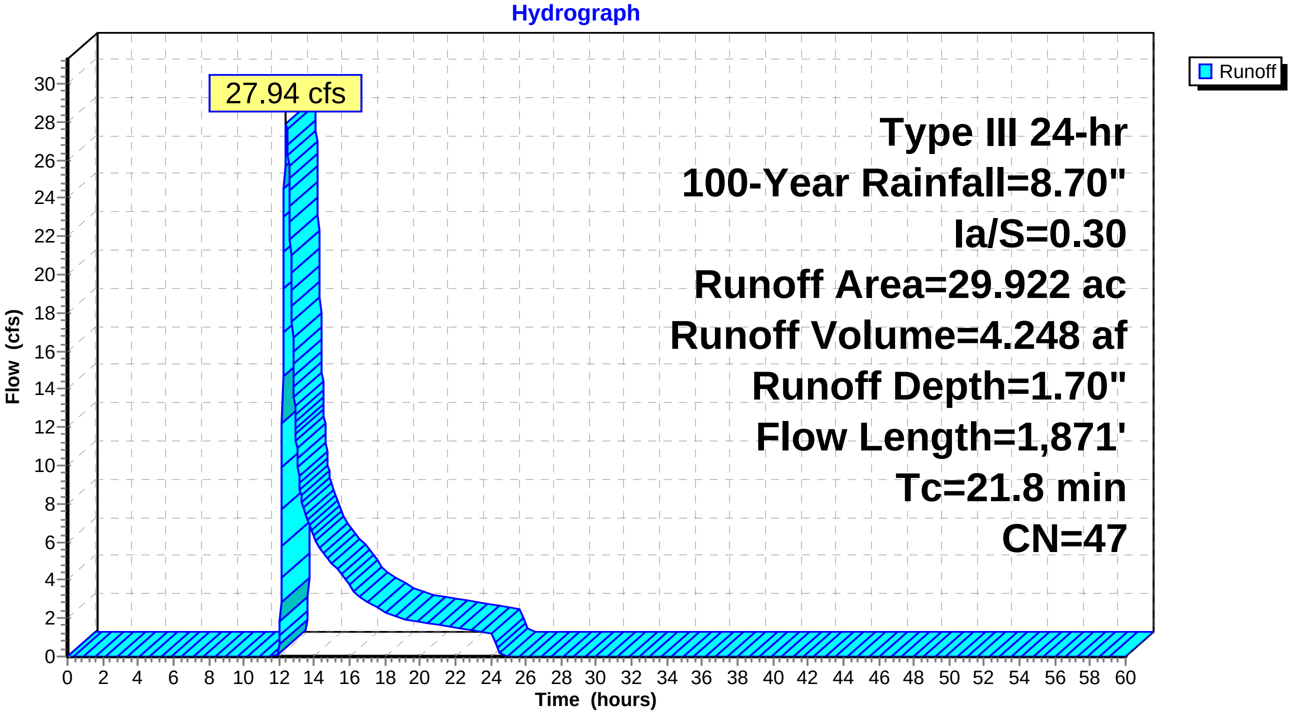
Runoff = 27.94 cfs @ 12.41 hrs, Volume= 4.248 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.270 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.430 | 98 | Water Surface |
| | 23.530 | 39 | >75% Grass cover, Good, HSG A |
| | 0.110 | 61 | >75% Grass cover, Good, HSG B |
| | 3.720 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.028 | 30 | Woods, Good, HSG A |
| | 0.017 | 55 | Woods, Good, HSG B |
| | 0.100 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.635 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.082 | 30 | Sand Trap, HSG C |
| | 29.922 | 47 | Weighted Average |
| | 28.222 | | 94.32% Pervious Area |
| | 1.700 | | 5.68% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.8 | 100 | 0.2400 | 0.22 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 9.7 | 1,231 | 0.0920 | 2.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.3 | 540 | 0.0900 | 2.10 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 21.8 | 1,871 | Total | | | |

## Subcatchment A104: A104



## Summary for Subcatchment A105: A105

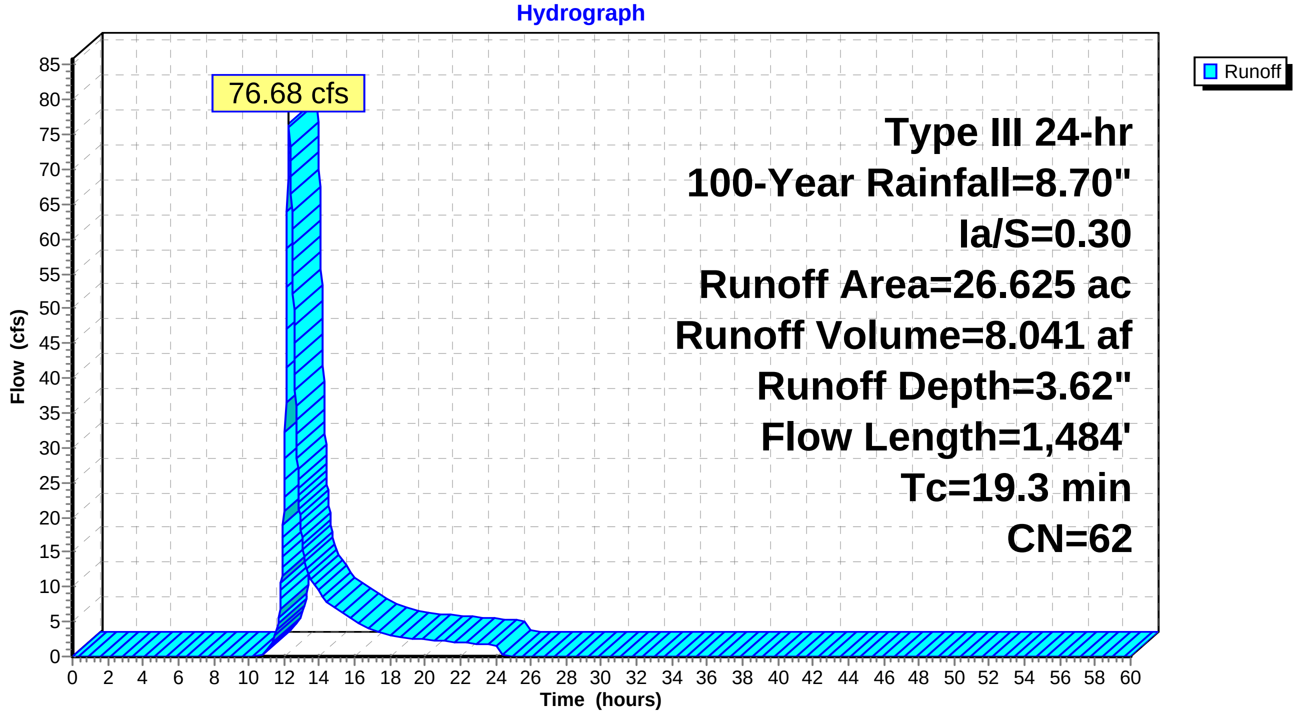
Runoff = 76.68 cfs @ 12.28 hrs, Volume= 8.041 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.390 | 98 | Building roof |
| * | 0.480 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.500 | 98 | Water Surface |
| | 10.650 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 8.795 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.094 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.565 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.145 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.006 | 30 | Sand Trap, HSG C |
| | 26.625 | 62 | Weighted Average |
| | 23.255 | | 87.34% Pervious Area |
| | 3.370 | | 12.66% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.2 | 100 | 0.1500 | 0.18 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 3.0 | 395 | 0.1920 | 2.19 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 7.1 | 989 | 0.1100 | 2.32 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 19.3 | 1,484 | Total | | | |

## Subcatchment A105: A105



## Summary for Subcatchment A106: A106

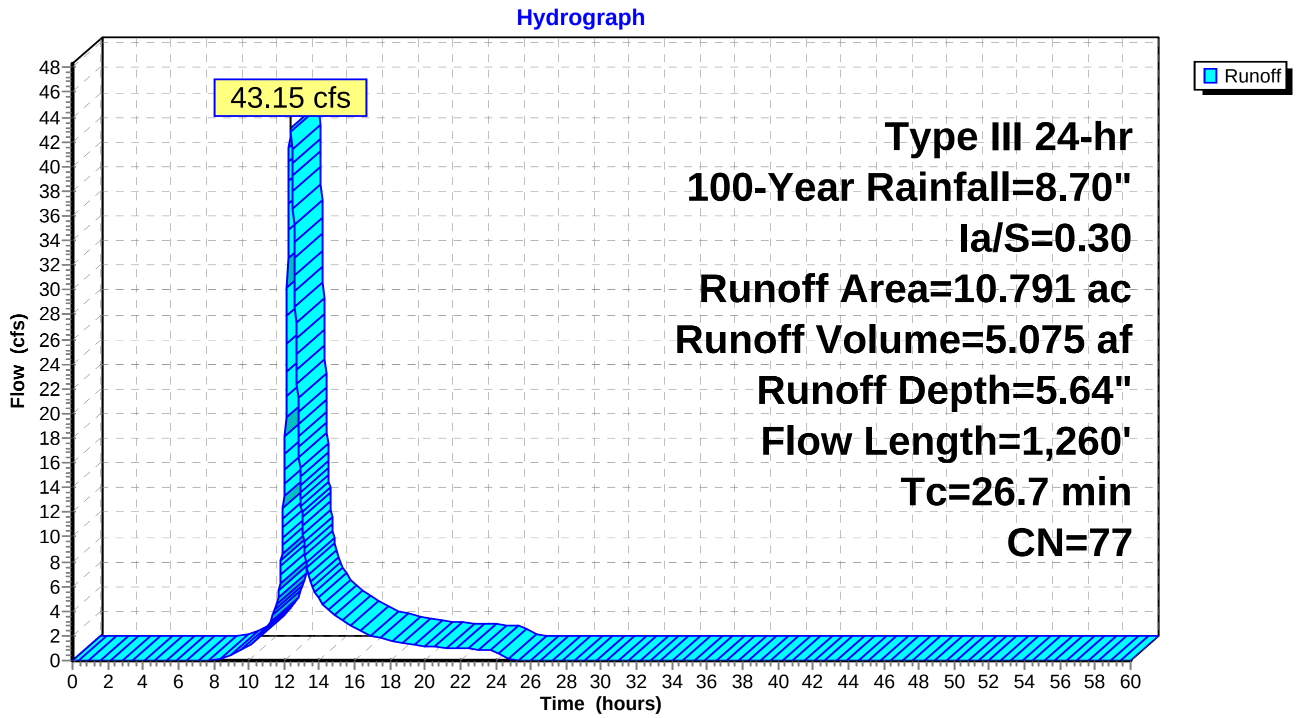
Runoff = 43.15 cfs @ 12.37 hrs, Volume= 5.075 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 1.220 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.078 | 61 | >75% Grass cover, Good, HSG B |
| | 5.210 | 74 | >75% Grass cover, Good, HSG C |
| | 2.190 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.100 | 55 | Woods, Good, HSG B |
| | 1.390 | 70 | Woods, Good, HSG C |
| | 0.603 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 10.791 | 77 | Weighted Average |
| | 9.571 | | 88.69% Pervious Area |
| | 1.220 | | 11.31% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.0 | 100 | 0.1500 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 10.1 | 500 | 0.1100 | 0.83 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 660 | 0.3000 | 17.87 | 321.67 | **Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.050 |
| 26.7 | 1,260 | Total | | | |

## Subcatchment A106: A106



## Summary for Subcatchment A107: A107

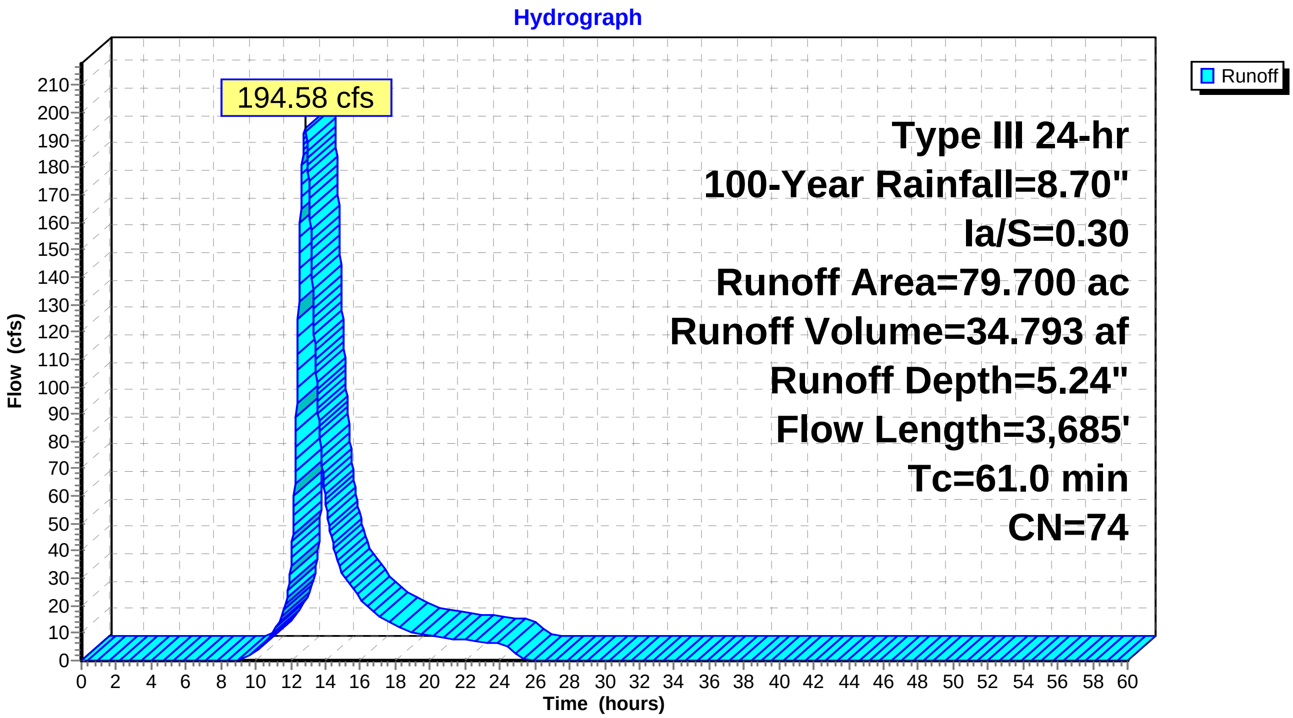
Runoff = 194.58 cfs @ 12.82 hrs, Volume= 34.793 af, Depth= 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.340 | 98 | Building roof |
| * | 1.314 | 98 | Paved surface |
| * | 0.071 | 96 | Gravel surface |
| * | 0.130 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 6.390 | 61 | >75% Grass cover, Good, HSG B |
| | 4.750 | 74 | >75% Grass cover, Good, HSG C |
| | 3.470 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 7.845 | 55 | Woods, Good, HSG B |
| | 3.580 | 70 | Woods, Good, HSG C |
| | 51.810 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 79.700 | 74 | Weighted Average |
| | 77.916 | | 97.76% Pervious Area |
| | 1.784 | | 2.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 20.5 | 100 | 0.0800 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.7 | 230 | 0.1700 | 1.03 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 15.0 | 450 | 0.0400 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 18.0 | 1,210 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.3 | 1,050 | 0.1300 | 7.68 | 25.61 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 1.5 | 645 | 0.1100 | 7.07 | 23.56 | **Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.050 |
| 61.0 | 3,685 | Total | | | |

## Subcatchment A107: A107



## Summary for Subcatchment A108: A108

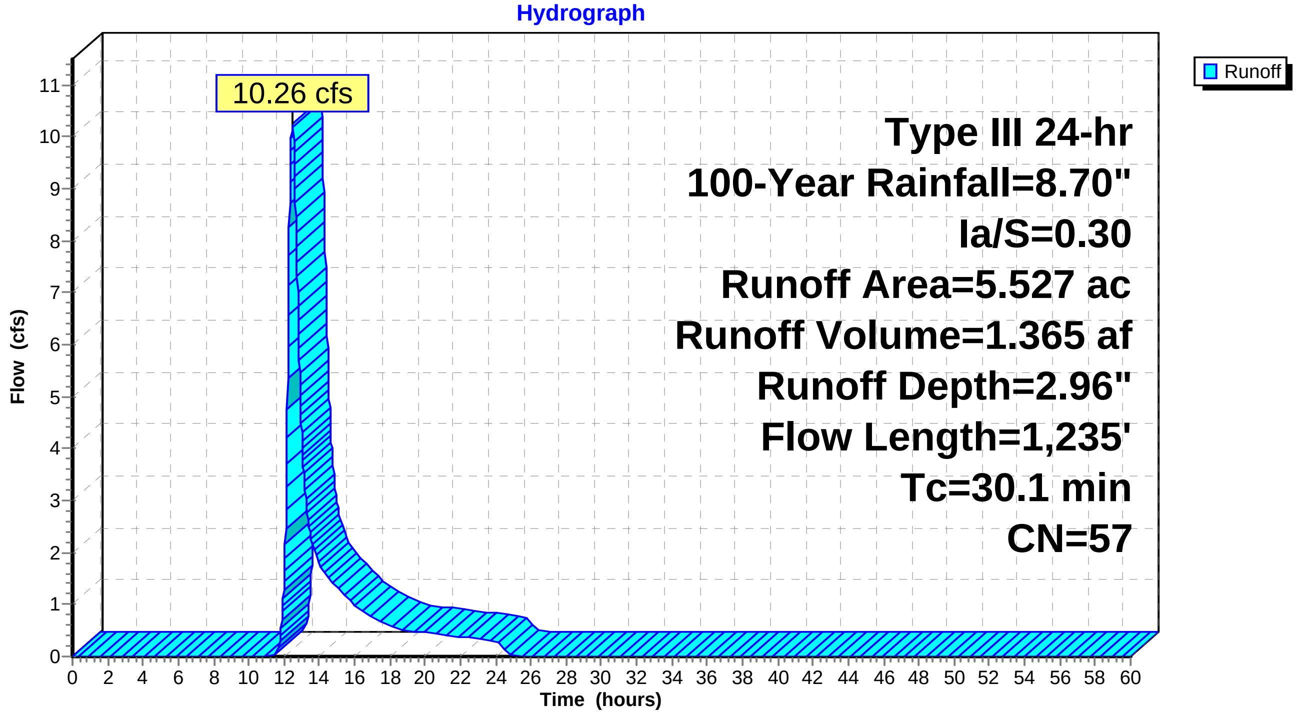
Runoff = 10.26 cfs @ 12.47 hrs, Volume= 1.365 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.040 | 98 | Building roof |
| * | 0.088 | 98 | Paved surface |
| * | 0.049 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.630 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 4.720 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.527 | 57 | Weighted Average |
| | 5.399 | | 97.68% Pervious Area |
| | 0.128 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.2 | 100 | 0.2000 | 0.12 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 12.7 | 950 | 0.2500 | 1.25 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.1 | 85 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.1 | 100 | 0.1000 | 0.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 30.1 | 1,235 | Total | | | |

## Subcatchment A108: A108



## Summary for Subcatchment A109: A109

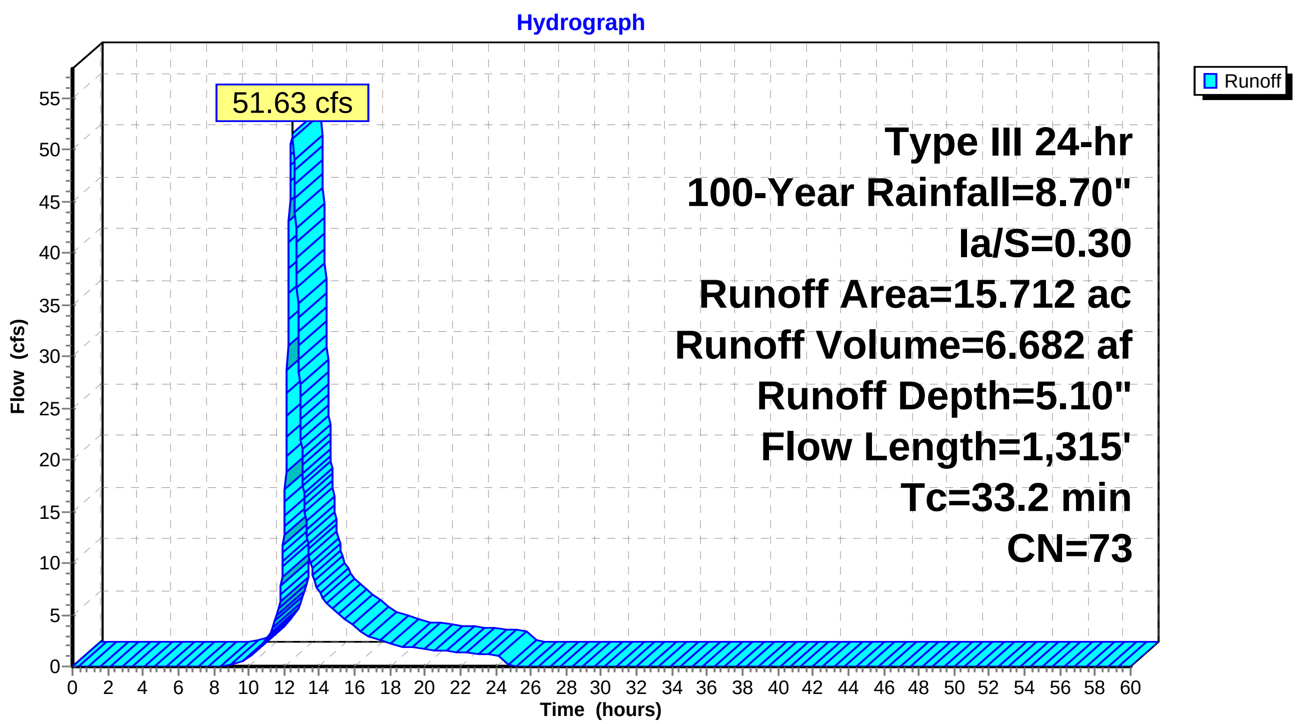
Runoff = 51.63 cfs @ 12.45 hrs, Volume= 6.682 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| Area (ac) | CN | Description |
|---|---|---|
| 0.857 | 98 | Roofs, HSG B |
| 5.730 | 61 | >75% Grass cover, Good, HSG B |
| 4.502 | 74 | >75% Grass cover, Good, HSG C |
| 0.592 | 80 | >75% Grass cover, Good, HSG D |
| 2.000 | 98 | Paved parking, HSG B |
| 0.328 | 55 | Woods, Good, HSG B |
| 0.823 | 70 | Woods, Good, HSG C |
| 0.880 | 77 | Woods, Good, HSG D |
| 15.712 | 73 | Weighted Average |
| 12.855 | | 81.82% Pervious Area |
| 2.857 | | 18.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 22.3 | 100 | 0.0650 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.0 | 388 | 0.2200 | 3.28 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.7 | 427 | 0.1400 | 2.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.2 | 400 | 0.1850 | 1.08 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 33.2 | 1,315 | Total | | | |

## Subcatchment A109: A109



## Summary for Subcatchment B101: B101

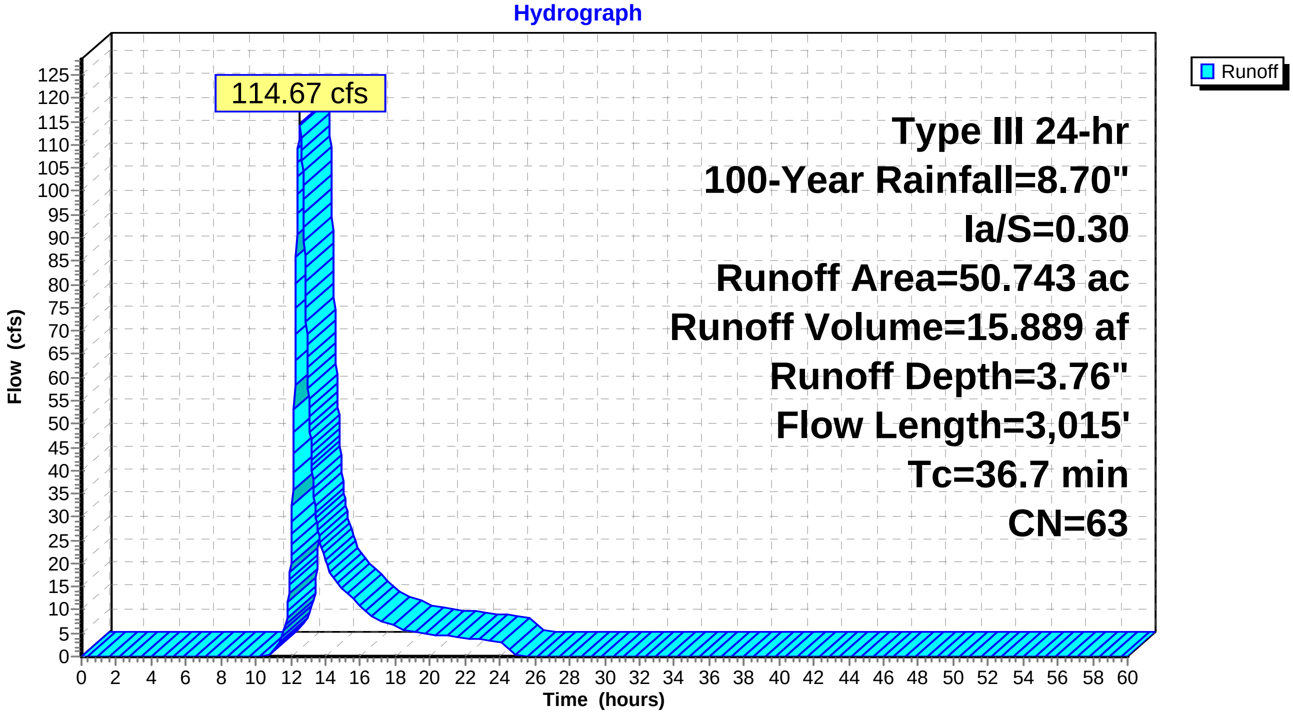
Runoff = 114.67 cfs @ 12.53 hrs, Volume= 15.889 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 5.220 | 98 | Building roof |
| * | 3.230 | 98 | Paved surface |
| * | 0.439 | 96 | Gravel surface |
| * | 0.412 | 98 | Water Surface |
| | 21.653 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 10.300 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.553 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 4.380 | 70 | Woods, Good, HSG C |
| | 4.370 | 77 | Woods, Good, HSG D |
| * | 0.142 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.044 | 30 | Sand Trap, HSG C |
| | 50.743 | 63 | Weighted Average |
| | 41.881 | | 82.54% Pervious Area |
| | 8.862 | | 17.46% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.6 | 50 | 0.0400 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 8.2 | 50 | 0.2000 | 0.10 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 4.6 | 511 | 0.5600 | 1.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.9 | 524 | 0.2600 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.4 | 1,880 | 0.0830 | 22.47 | 70.61 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 36.7 | 3,015 | Total | | | |

## Subcatchment B101: B101



## Summary for Subcatchment B102: B102

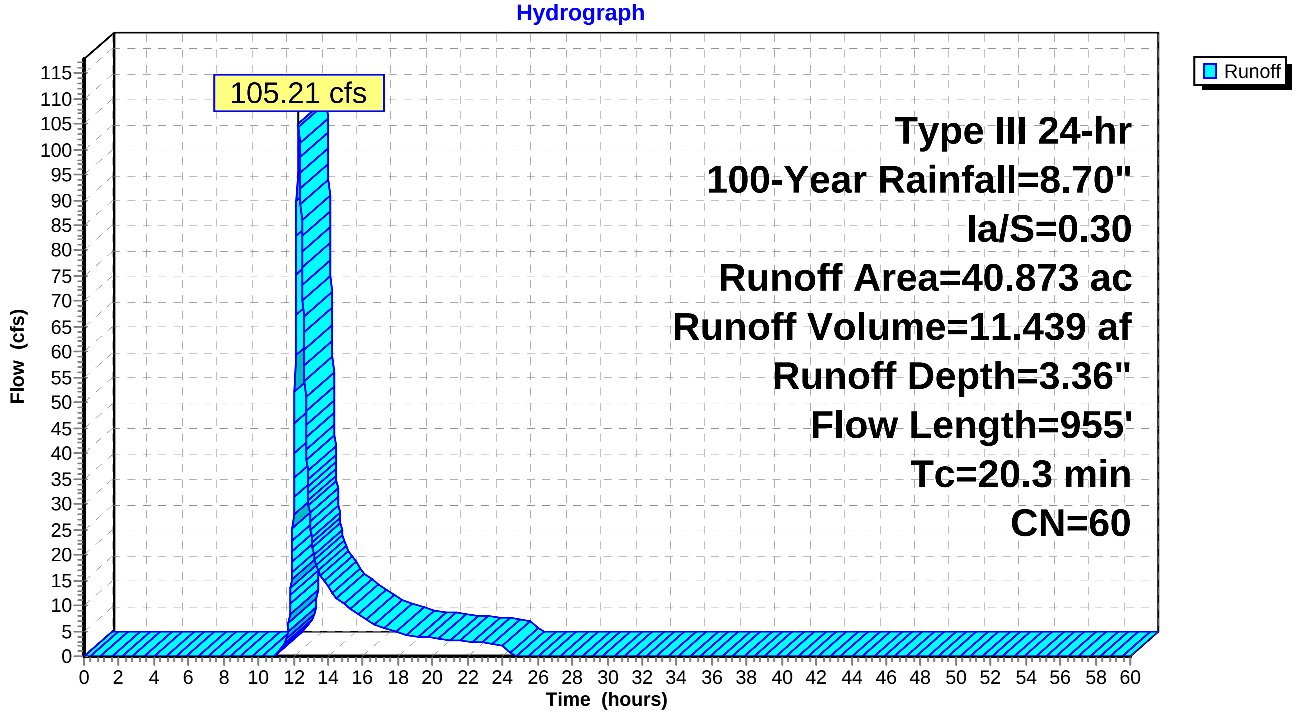
Runoff = 105.21 cfs @ 12.30 hrs, Volume= 11.439 af, Depth= 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.516 | 98 | Paved surface |
| * | 0.210 | 96 | Gravel surface |
| * | 0.009 | 98 | Water Surface |
| | 7.476 | 39 | >75% Grass cover, Good, HSG A |
| | 0.464 | 61 | >75% Grass cover, Good, HSG B |
| | 12.033 | 74 | >75% Grass cover, Good, HSG C |
| | 0.764 | 80 | >75% Grass cover, Good, HSG D |
| | 6.808 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 5.496 | 70 | Woods, Good, HSG C |
| | 6.710 | 77 | Woods, Good, HSG D |
| * | 0.060 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.327 | 30 | Sand Trap, HSG C |
| | 40.873 | 60 | Weighted Average |
| | 40.348 | | 98.72% Pervious Area |
| | 0.525 | | 1.28% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 14.5 | 100 | 0.0500 | 0.11 | | **Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.50" |
| 3.8 | 457 | 0.0830 | 2.02 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.3 | 80 | 0.1750 | 1.05 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.7 | 318 | 0.0250 | 7.19 | 287.53 | **Parabolic Channel,** W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.050 |
| 20.3 | 955 | Total | | | |

## Subcatchment B102: B102



## Summary for Subcatchment B103: B103

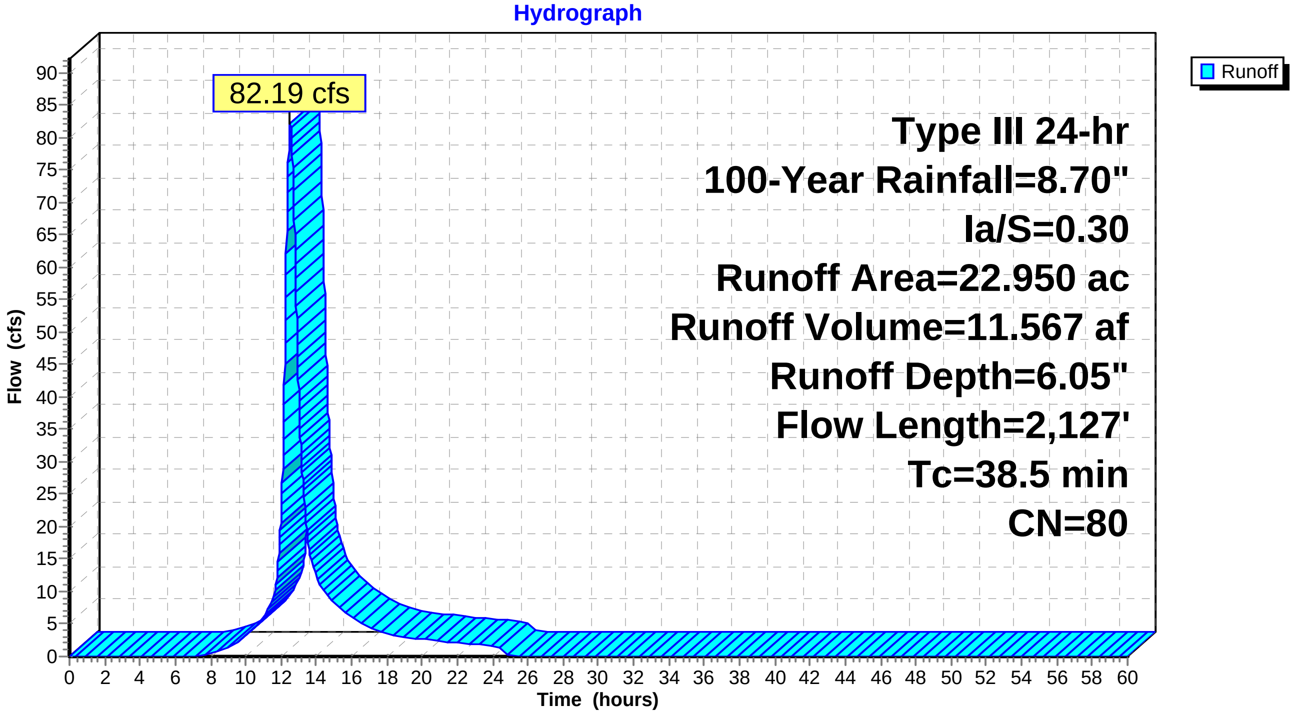
Runoff = 82.19 cfs @ 12.53 hrs, Volume= 11.567 af, Depth= 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.520 | 98 | Building roof |
| * | 1.000 | 98 | Paved surface |
| * | 0.123 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.674 | 74 | >75% Grass cover, Good, HSG C |
| | 2.133 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 17.500 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 22.950 | 80 | Weighted Average |
| | 20.430 | | 89.02% Pervious Area |
| | 2.520 | | 10.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 30.4 | 100 | 0.0300 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.3 | 784 | 0.5100 | 1.79 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.8 | 1,243 | 0.0670 | 26.46 | 187.03 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 38.5 | 2,127 | Total | | | |

## Subcatchment B103: B103



## Summary for Subcatchment B104: B104

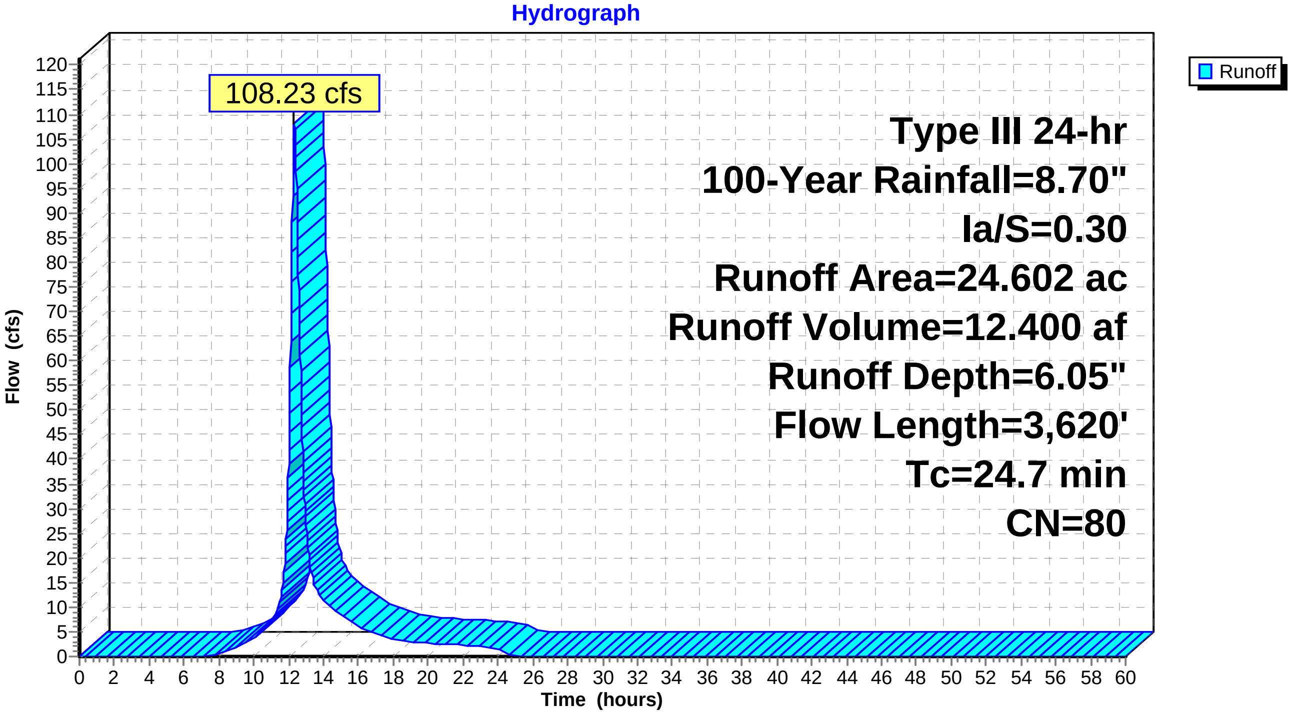
Runoff = 108.23 cfs @ 12.33 hrs, Volume= 12.400 af, Depth= 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.579 | 98 | Building roof |
| * | 2.315 | 98 | Paved surface |
| * | 0.016 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.452 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.733 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.315 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.192 | 30 | Sand Trap, HSG C |
| | 24.602 | 80 | Weighted Average |
| | 17.708 | | 71.98% Pervious Area |
| | 6.894 | | 28.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.8 | 100 | 0.1000 | 0.15 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 8.0 | 823 | 0.0600 | 1.71 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 452 | 0.1720 | 2.90 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 1,210 | 0.0580 | 8.46 | 101.48 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.045 |
| 0.9 | 1,035 | 0.0350 | 19.12 | 135.18 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 24.7 | 3,620 | Total | | | |

## Subcatchment B104: B104



## Summary for Subcatchment B105: B105

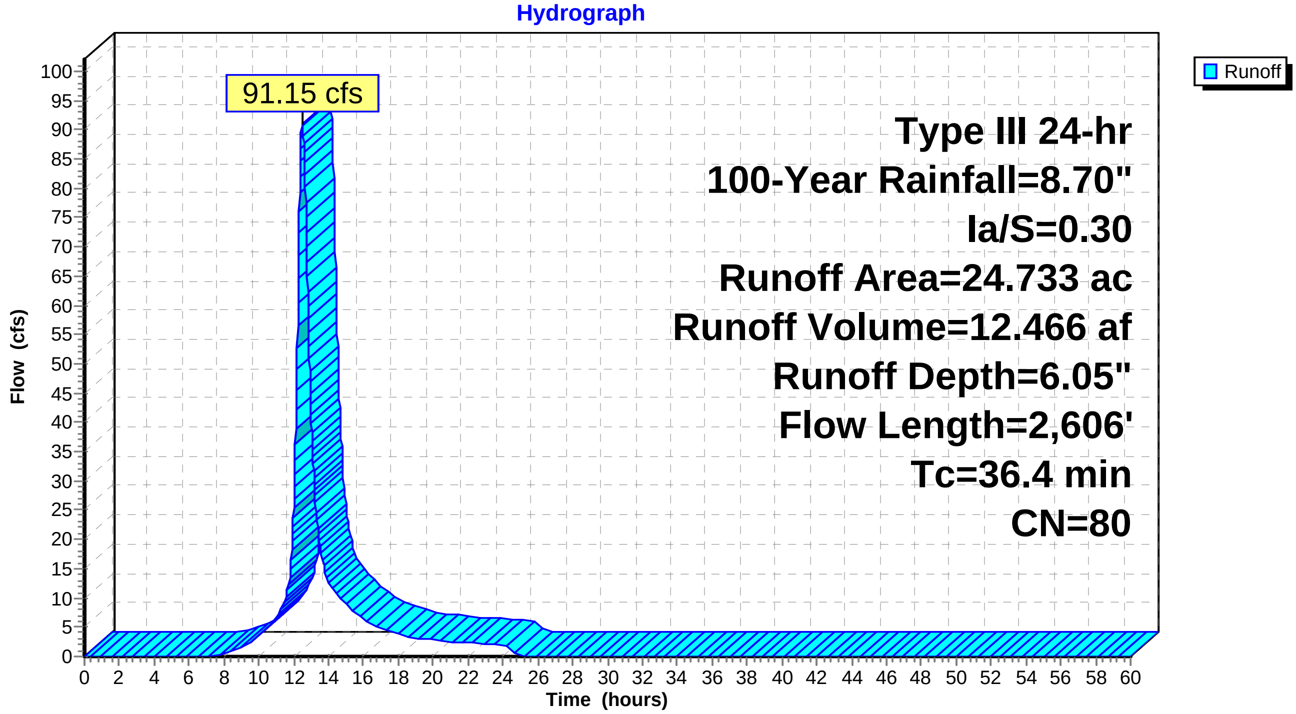
Runoff = 91.15 cfs @ 12.50 hrs, Volume= 12.466 af, Depth= 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.944 | 98 | Building roof |
| * | 0.763 | 98 | Paved surface |
| * | 0.287 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.052 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.735 | 74 | >75% Grass cover, Good, HSG C |
| | 0.052 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 18.900 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 24.733 | 80 | Weighted Average |
| | 21.026 | | 85.01% Pervious Area |
| | 3.707 | | 14.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 612 | 0.5680 | 1.88 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.6 | 114 | 0.2280 | 3.34 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.6 | 880 | 0.0320 | 5.65 | 67.84 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.7 | 900 | 0.0400 | 20.44 | 144.51 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 36.4 | 2,606 | Total | | | |

## Subcatchment B105: B105



## Summary for Subcatchment B106: B106

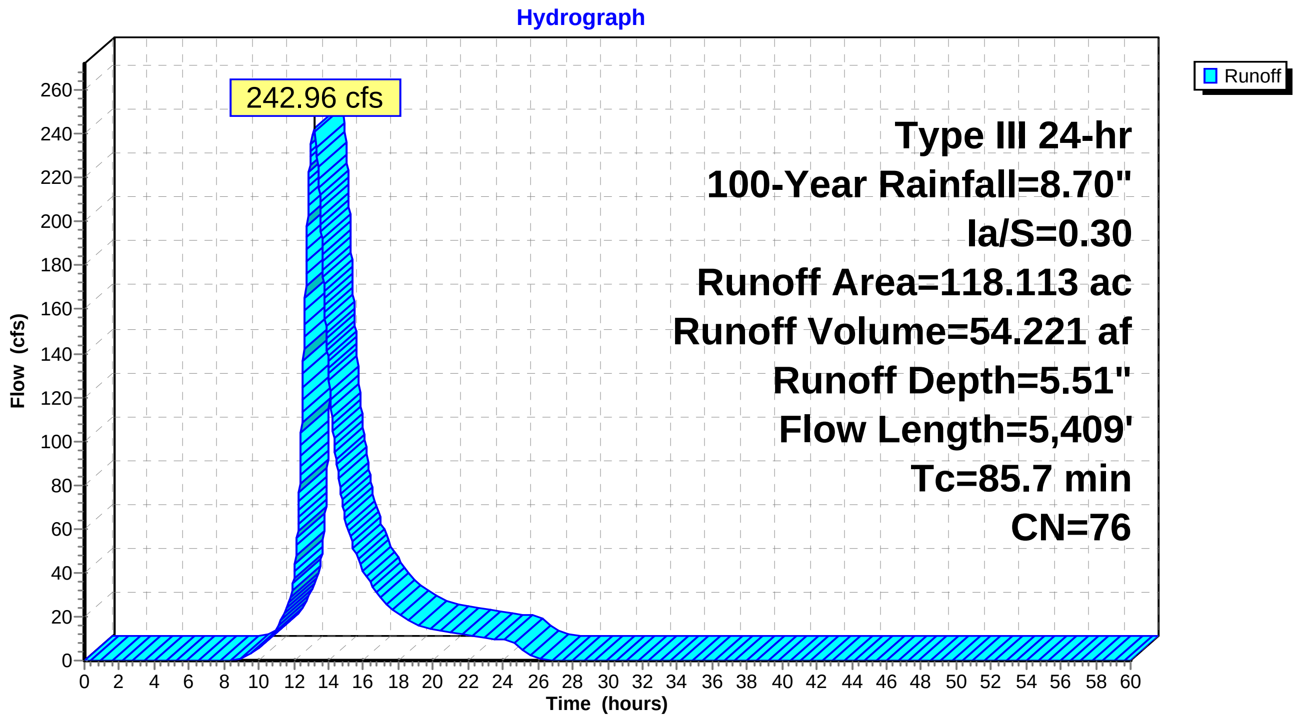
Runoff = 242.96 cfs @ 13.14 hrs, Volume= 54.221 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.587 | 98 | Building roof |
| * | 0.994 | 98 | Paved surface |
| * | 0.746 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.090 | 39 | >75% Grass cover, Good, HSG A |
| | 0.594 | 61 | >75% Grass cover, Good, HSG B |
| | 11.920 | 74 | >75% Grass cover, Good, HSG C |
| | 2.068 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 10.050 | 70 | Woods, Good, HSG C |
| | 89.064 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 118.113 | 76 | Weighted Average |
| | 116.532 | | 98.66% Pervious Area |
| | 1.581 | | 1.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 27.1 | 100 | 0.0400 | 0.06 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 34.3 | 1,838 | 0.1273 | 0.89 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 19.8 | 960 | 0.1040 | 0.81 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 4.5 | 2,511 | 0.0870 | 9.30 | 148.75 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 85.7 | 5,409 | Total | | | |

## Subcatchment B106: B106



## Summary for Subcatchment B107: B107

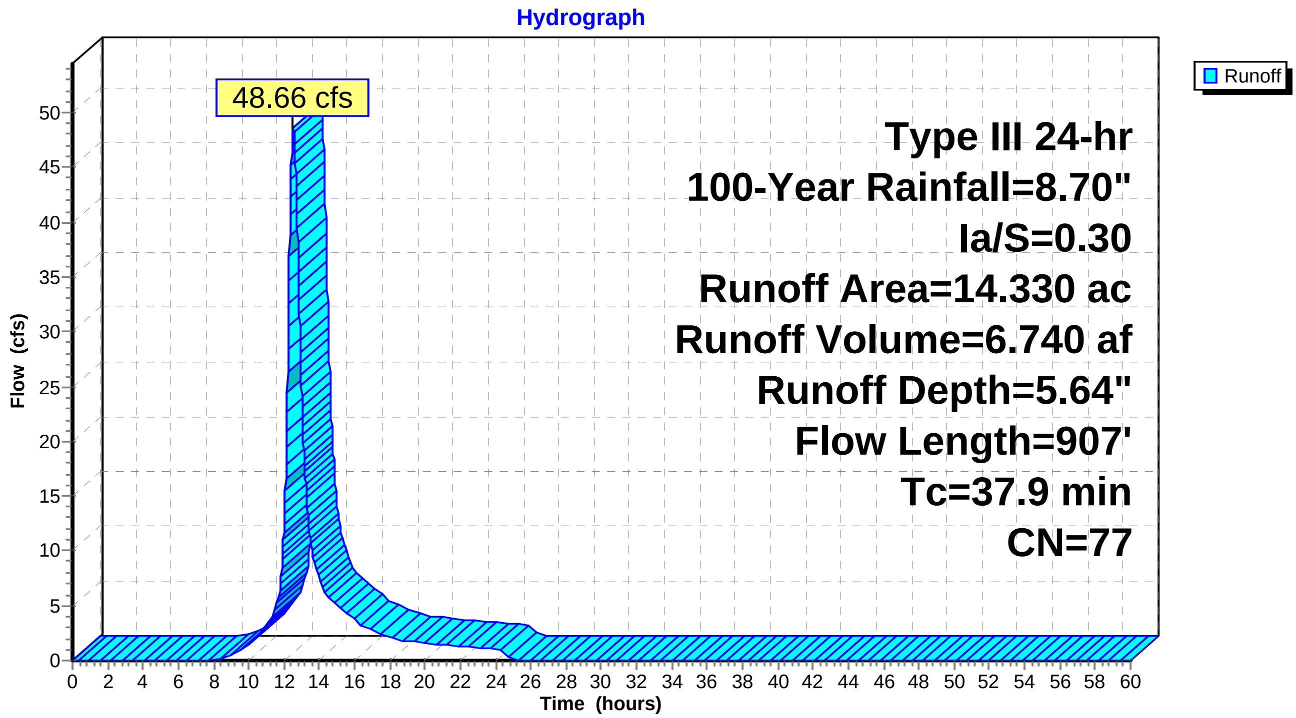
Runoff = 48.66 cfs @ 12.51 hrs, Volume= 6.740 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.106 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.301 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 13.923 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 14.330 | 77 | Weighted Average |
| | 14.330 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.4 | 245 | 0.0900 | 0.75 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.8 | 562 | 0.1200 | 0.87 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 37.9 | 907 | Total | | | |

## Subcatchment B107: B107



## Summary for Subcatchment B108: B108

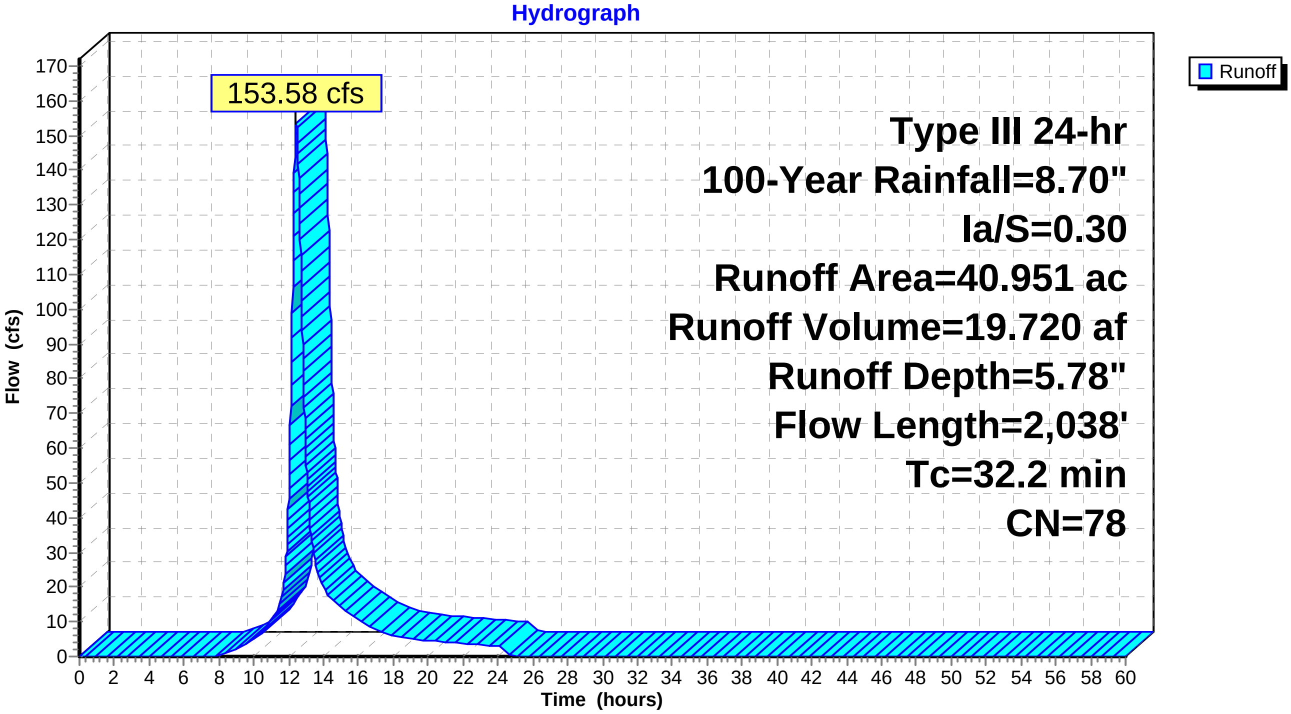
Runoff = 153.58 cfs @ 12.43 hrs, Volume= 19.720 af, Depth= 5.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.640 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 9.100 | 74 | >75% Grass cover, Good, HSG C |
| | 1.909 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 1.842 | 70 | Woods, Good, HSG C |
| | 23.560 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.951 | 78 | Weighted Average |
| | 36.411 | | 88.91% Pervious Area |
| | 4.540 | | 11.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 3.5 | 270 | 0.2590 | 1.27 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 1.8 | 120 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 7.8 | 823 | 0.5000 | 1.77 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 725 | 0.1640 | 41.40 | 292.62 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 32.2 | 2,038 | Total | | | |

## Subcatchment B108: B108



## Summary for Subcatchment B109: B109

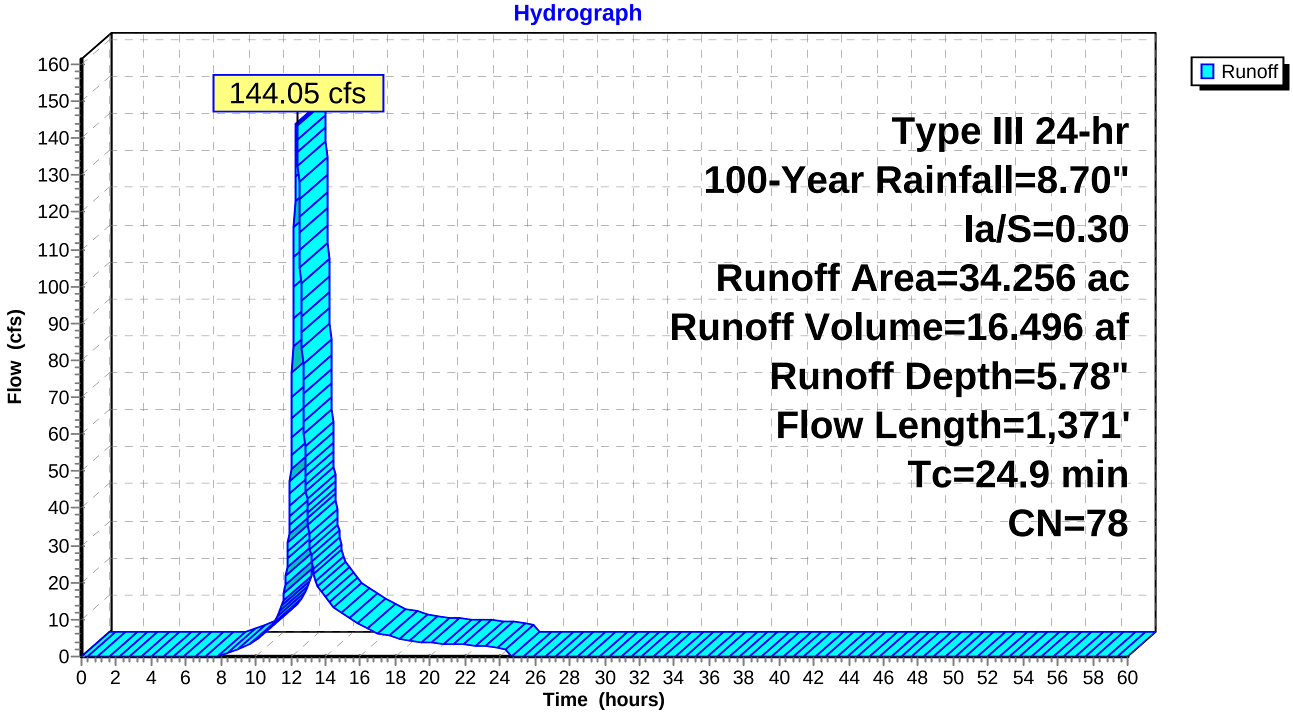
Runoff = 144.05 cfs @ 12.34 hrs, Volume= 16.496 af, Depth= 5.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.000 | 98 | Building roof |
| * | 0.600 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.592 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 16.332 | 74 | >75% Grass cover, Good, HSG C |
| | 3.160 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.450 | 70 | Woods, Good, HSG C |
| | 9.847 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.275 | 30 | Sand Trap, HSG C |
| | 34.256 | 78 | Weighted Average |
| | 30.064 | | 87.76% Pervious Area |
| | 4.192 | | 12.24% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 18.8 | 100 | 0.1000 | 0.09 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 2.8 | 395 | 0.8550 | 2.31 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.6 | 265 | 0.4450 | 1.67 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 70 | 0.0280 | 5.29 | 63.46 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00' n= 0.050 |
| 0.0 | 100 | 0.2800 | 54.09 | 382.35 | **Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 |
| 0.2 | 160 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 0.3 | 281 | 0.1600 | 14.62 | 219.28 | **Channel Flow,** Area= 15.0 sf Perim= 11.0' r= 1.36' n= 0.050 |
| 24.9 | 1,371 | Total | | | |

## Subcatchment B109: B109



## Summary for Subcatchment B110: B110

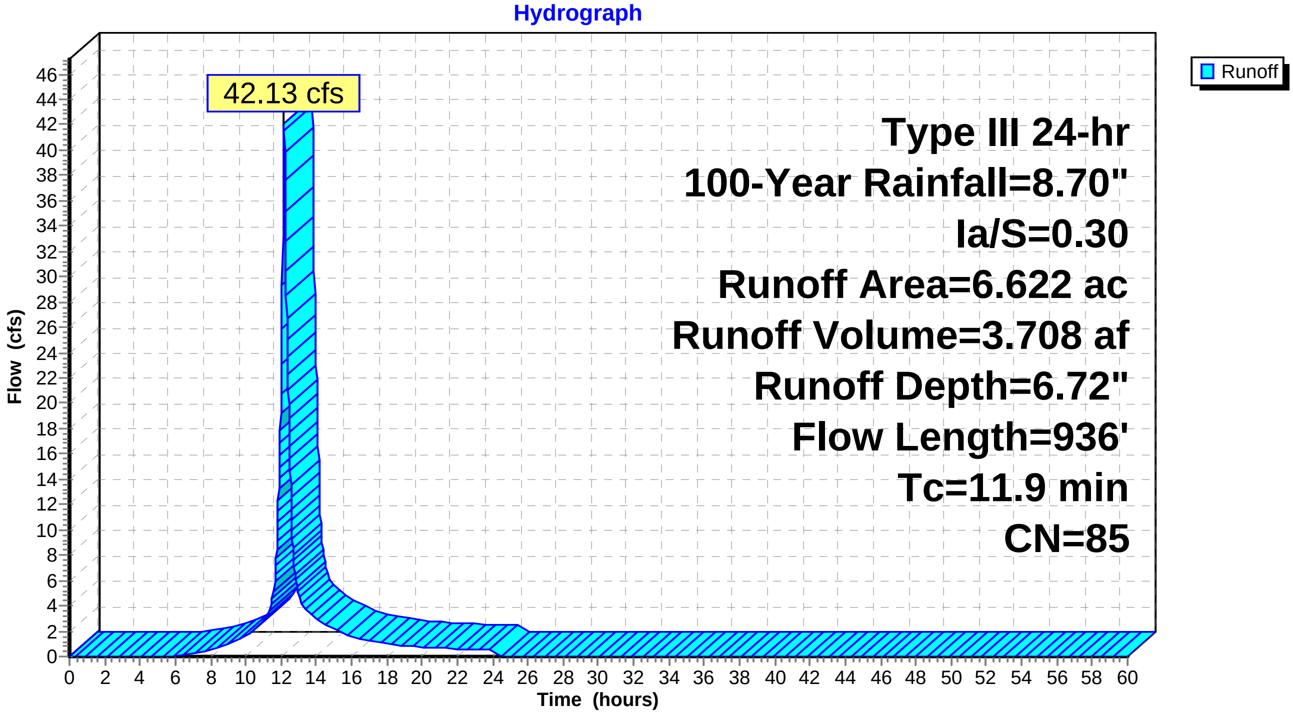
Runoff = 42.13 cfs @ 12.16 hrs, Volume= 3.708 af, Depth= 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.381 | 98 | Building roof |
| * | 1.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.550 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.061 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.622 | 85 | Weighted Average |
| | 3.611 | | 54.53% Pervious Area |
| | 3.011 | | 45.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 100 | 0.1300 | 0.17 | | **Sheet Flow,**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 0.6 | 121 | 0.2500 | 3.50 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 715 | 0.0360 | 7.40 | 23.25 | **Pipe Channel,**<br>24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'<br>n= 0.024 |
| 11.9 | 936 | Total | | | |

## Subcatchment B110: B110



## Summary for Subcatchment B111: B111

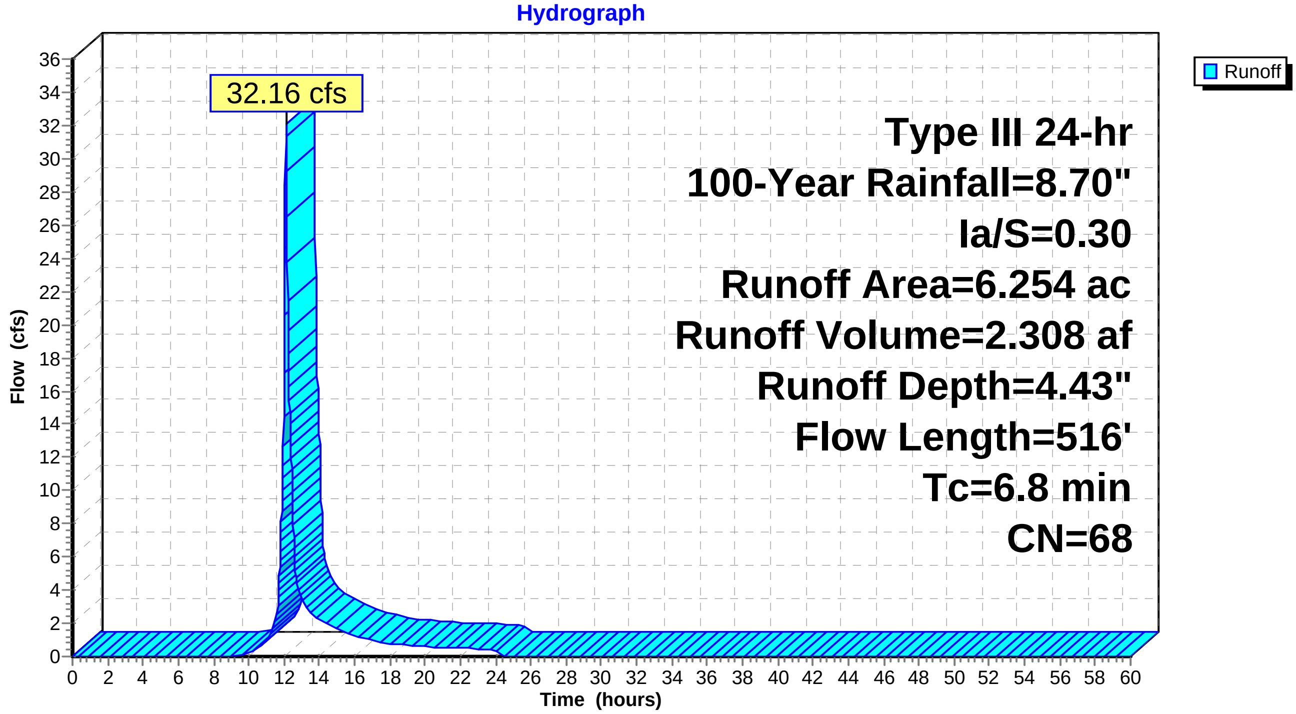
Runoff = 32.16 cfs @ 12.10 hrs, Volume= 2.308 af, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.504 | 98 | Building roof |
| * | 0.120 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.900 | 98 | Water Surface |
| | 2.730 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 6.254 | 68 | Weighted Average |
| | 3.730 | | 59.64% Pervious Area |
| | 2.524 | | 40.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.7 | 100 | 0.2000 | 0.45 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 0.6 | 115 | 0.2000 | 3.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 301 | 0.0800 | 1.98 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.8 | 516 | Total | | | |

## Subcatchment B111: B111



## Summary for Subcatchment B112: B112

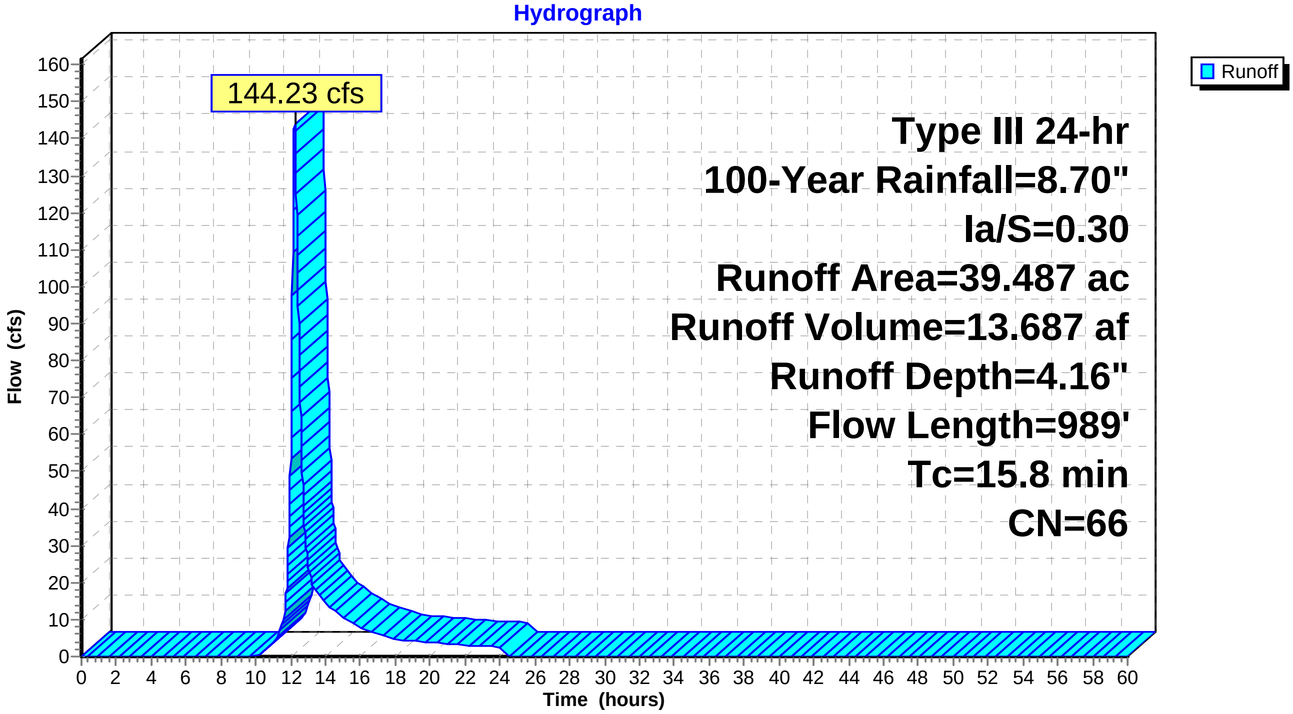
Runoff = 144.23 cfs @ 12.22 hrs, Volume= 13.687 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 4.550 | 98 | Building roof |
| * | 0.900 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 8.285 | 98 | Water Surface |
| | 17.485 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 7.526 | 74 | >75% Grass cover, Good, HSG C |
| | 0.015 | 80 | >75% Grass cover, Good, HSG D |
| | 0.052 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.289 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.385 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 39.487 | 66 | Weighted Average |
| | 25.752 | | 65.22% Pervious Area |
| | 13.735 | | 34.78% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.1 | 100 | 0.0400 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.50" |
| 3.1 | 375 | 0.0850 | 2.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 514 | 0.0470 | 1.52 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 15.8 | 989 | Total | | | |

## Subcatchment B112: B112



## Summary for Subcatchment B113: B113

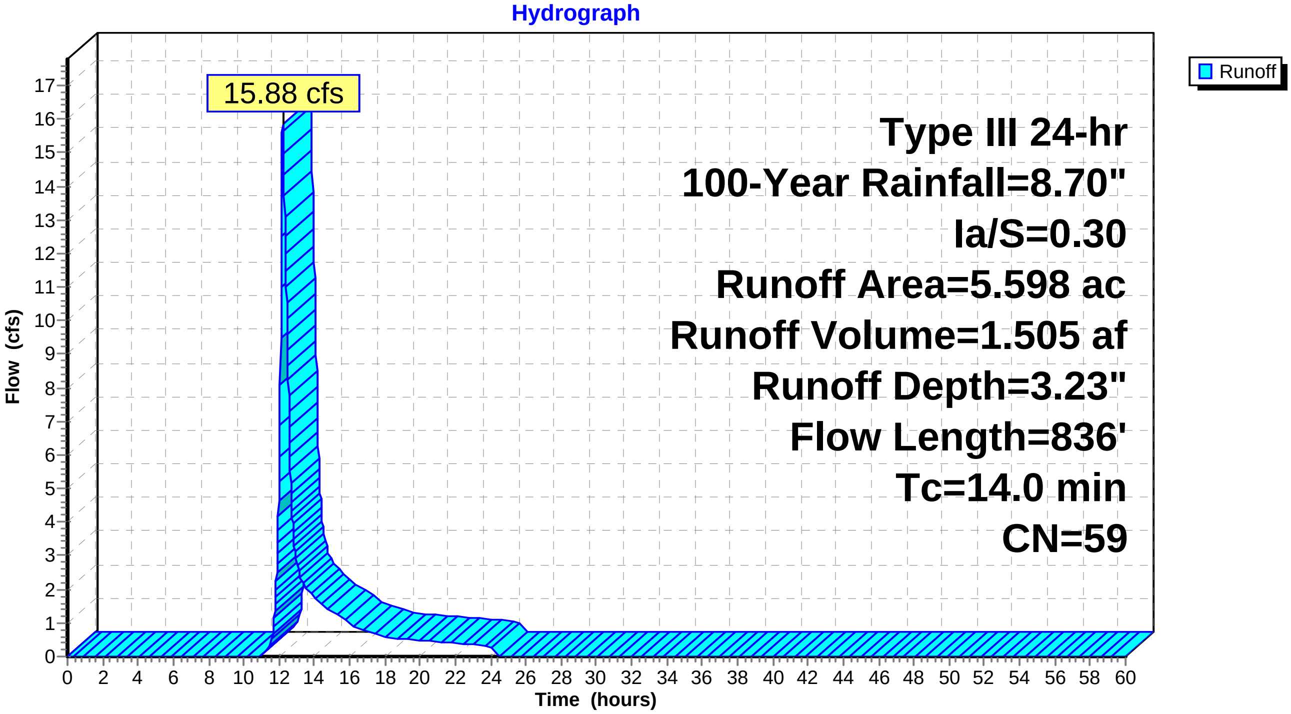
Runoff = 15.88 cfs @ 12.21 hrs, Volume= 1.505 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.060 | 98 | Building roof |
| * | 0.650 | 98 | Paved surface |
| * | 0.009 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 2.724 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.135 | 80 | >75% Grass cover, Good, HSG D |
| | 0.720 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.300 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 5.598 | 59 | Weighted Average |
| | 3.888 | | 69.45% Pervious Area |
| | 1.710 | | 30.55% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 11.8 | 100 | 0.0800 | 0.14 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 1.6 | 300 | 0.0360 | 3.05 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 436 | 0.0700 | 12.07 | 14.81 | **Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 |
| 14.0 | 836 | Total | | | |

## Subcatchment B113: B113



## Summary for Subcatchment B115: B115

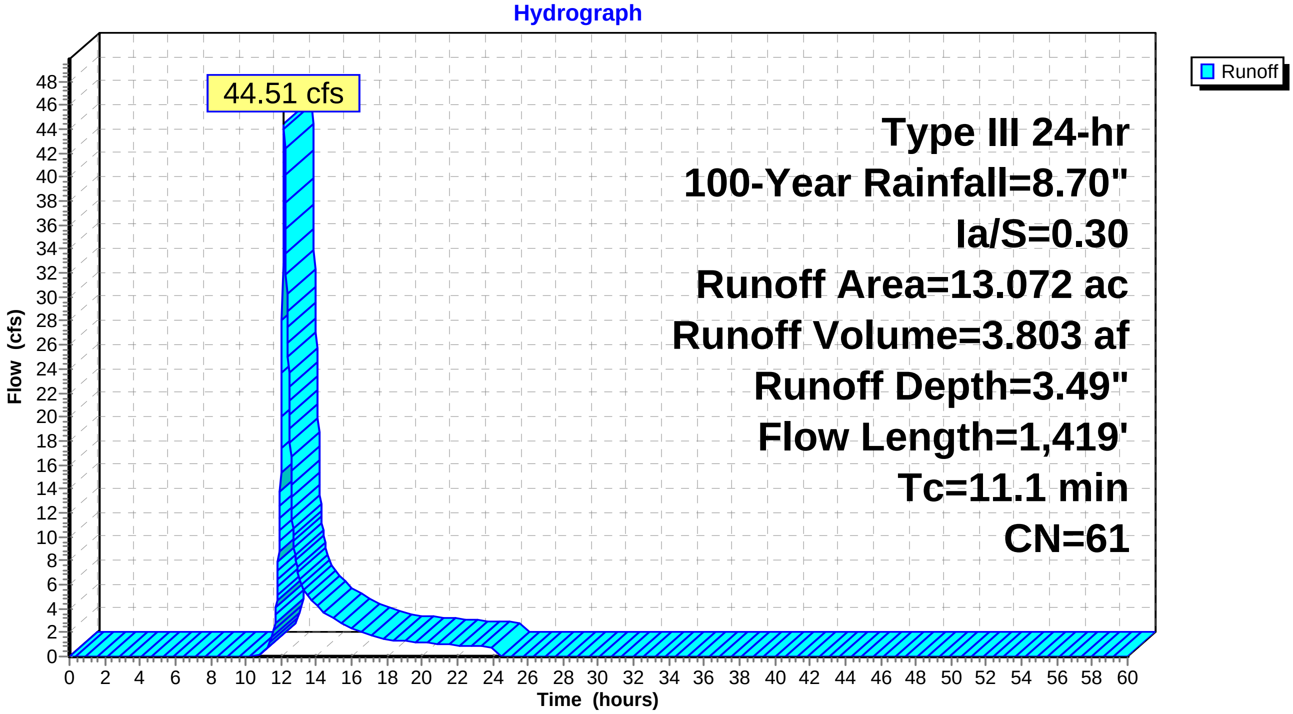
Runoff = 44.51 cfs @ 12.16 hrs, Volume= 3.803 af, Depth= 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.615 | 98 | Building roof |
| * | 0.449 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 6.589 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 3.241 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.030 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.011 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.057 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.080 | 30 | Sand Trap, HSG C |
| | 13.072 | 61 | Weighted Average |
| | 10.008 | | 76.56% Pervious Area |
| | 3.064 | | 23.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.7 | 100 | 0.1100 | 0.35 | | **Sheet Flow,**<br>Grass: Short n= 0.150 P2= 3.50" |
| 4.0 | 340 | 0.0410 | 1.42 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 2.4 | 979 | 0.0130 | 6.80 | 136.10 | **Channel Flow,**<br>Area= 20.0 sf Perim= 12.0' r= 1.67' n= 0.035 |
| 11.1 | 1,419 | Total | | | |

## Subcatchment B115: B115



## Summary for Subcatchment B116: B116

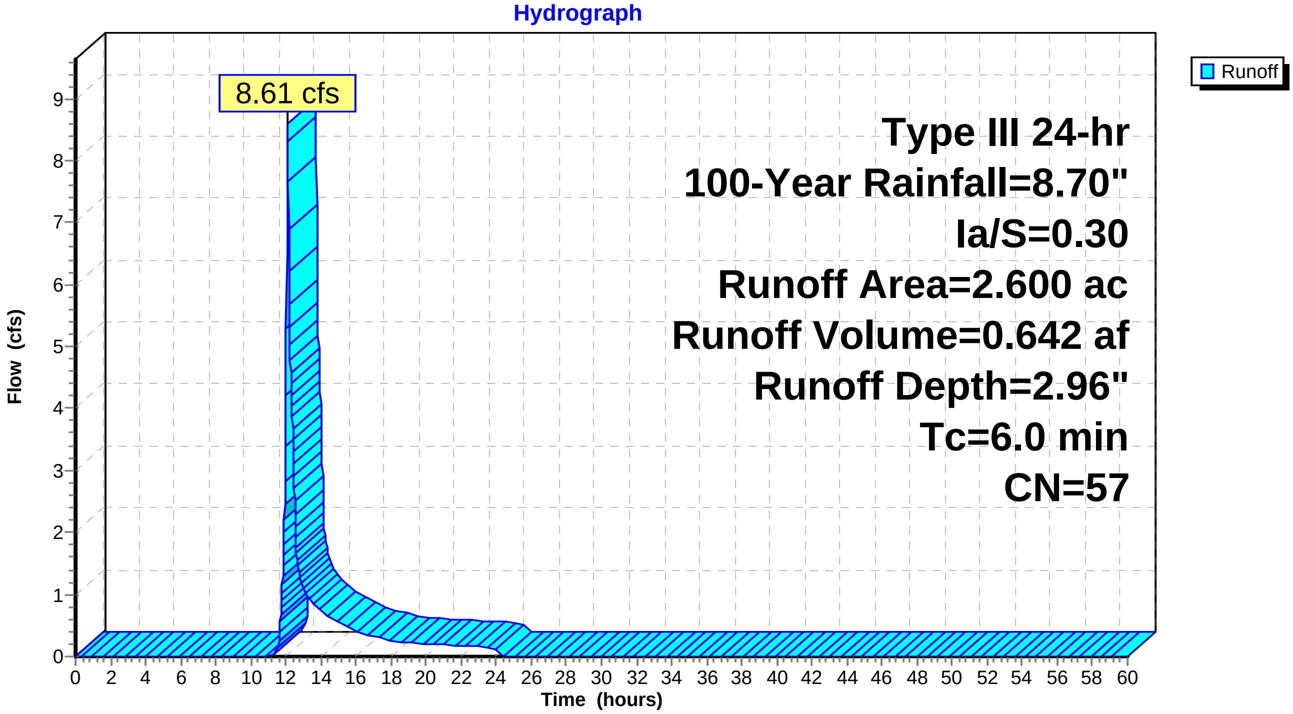
Runoff = 8.61 cfs @ 12.10 hrs, Volume= 0.642 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.174 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.621 | 98 | Water Surface |
| | 1.805 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.600 | 57 | Weighted Average |
| | 1.805 | | 69.42% Pervious Area |
| | 0.795 | | 30.58% Impervious Area |

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

## Subcatchment B116: B116



## Summary for Subcatchment B117: B117

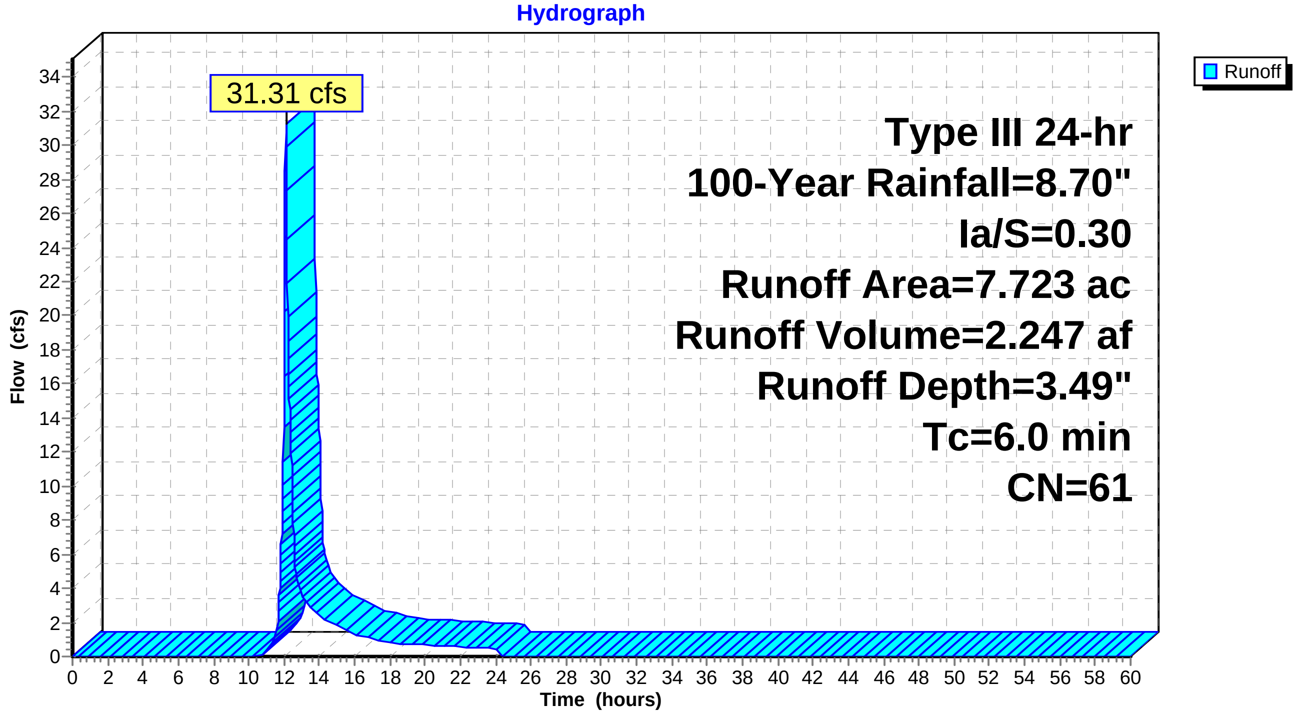
Runoff = 31.31 cfs @ 12.09 hrs, Volume= 2.247 af, Depth= 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 2.200 | 98 | Building roof |
| * | 0.630 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 4.580 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.018 | 80 | >75% Grass cover, Good, HSG D |
| | 0.268 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.027 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.723 | 61 | Weighted Average |
| | 4.893 | | 63.36% Pervious Area |
| | 2.830 | | 36.64% Impervious Area |

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

## Subcatchment B117: B117



## Summary for Subcatchment B118: B118

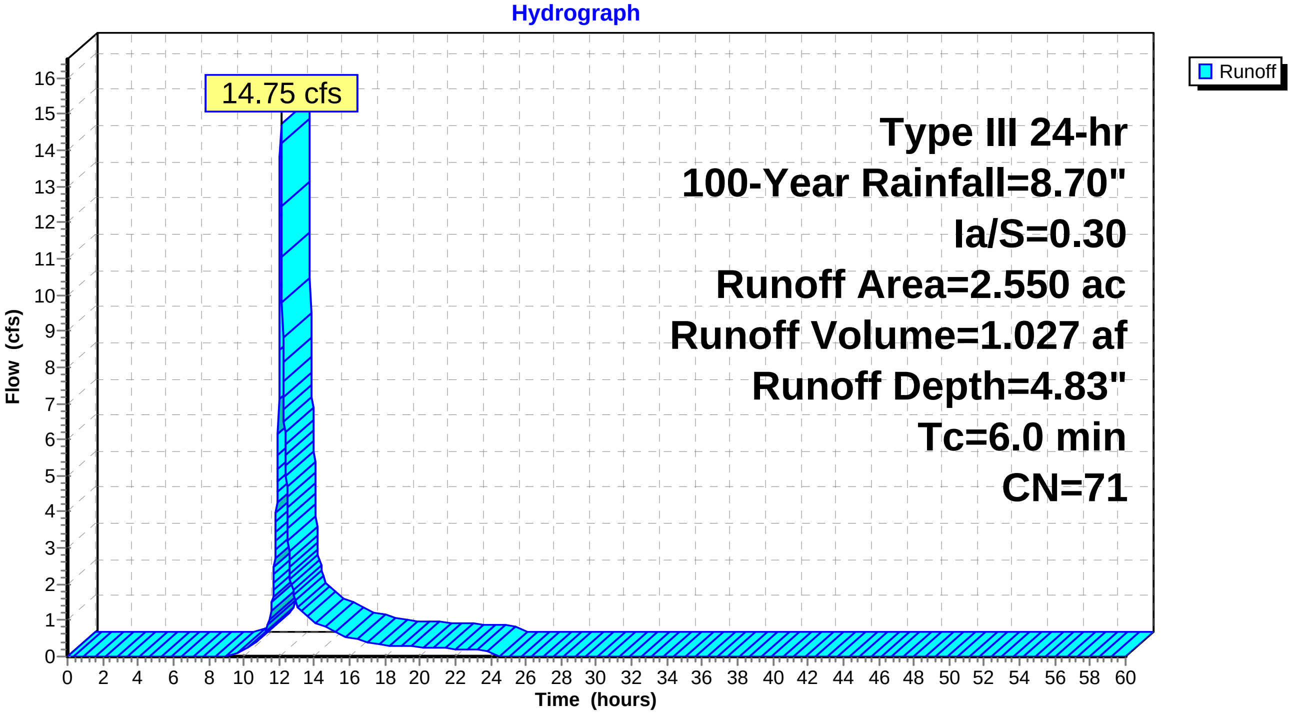
Runoff = 14.75 cfs @ 12.09 hrs, Volume= 1.027 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 1.295 | 98 | Building roof |
| * | 0.100 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 1.015 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.140 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.000 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 2.550 | 71 | Weighted Average |
| | 1.155 | | 45.29% Pervious Area |
| | 1.395 | | 54.71% Impervious Area |

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

## Subcatchment B118: B118



## Summary for Subcatchment B119: B119

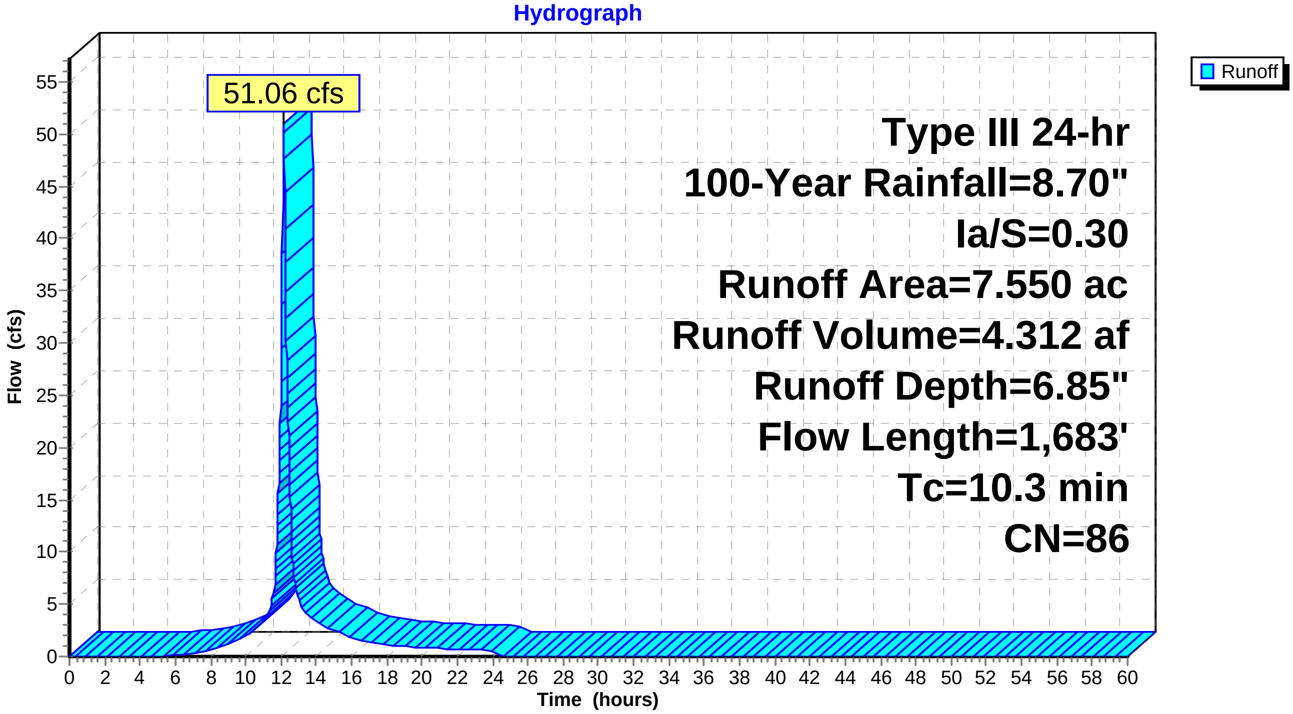
Runoff = 51.06 cfs @ 12.14 hrs, Volume= 4.312 af, Depth= 6.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 3.300 | 98 | Building roof |
| * | 0.950 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| | 0.000 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 0.000 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.000 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.300 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 7.550 | 86 | Weighted Average |
| | 3.300 | | 43.71% Pervious Area |
| | 4.250 | | 56.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.0 | 100 | 0.3000 | 0.24 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50" |
| 2.3 | 185 | 0.3000 | 1.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.1 | 50 | 0.1100 | 6.73 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.9 | 1,348 | 0.1100 | 25.87 | 81.28 | **Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012 |
| 10.3 | 1,683 | Total | | | |

## Subcatchment B119: B119



## Summary for Subcatchment C101: C101

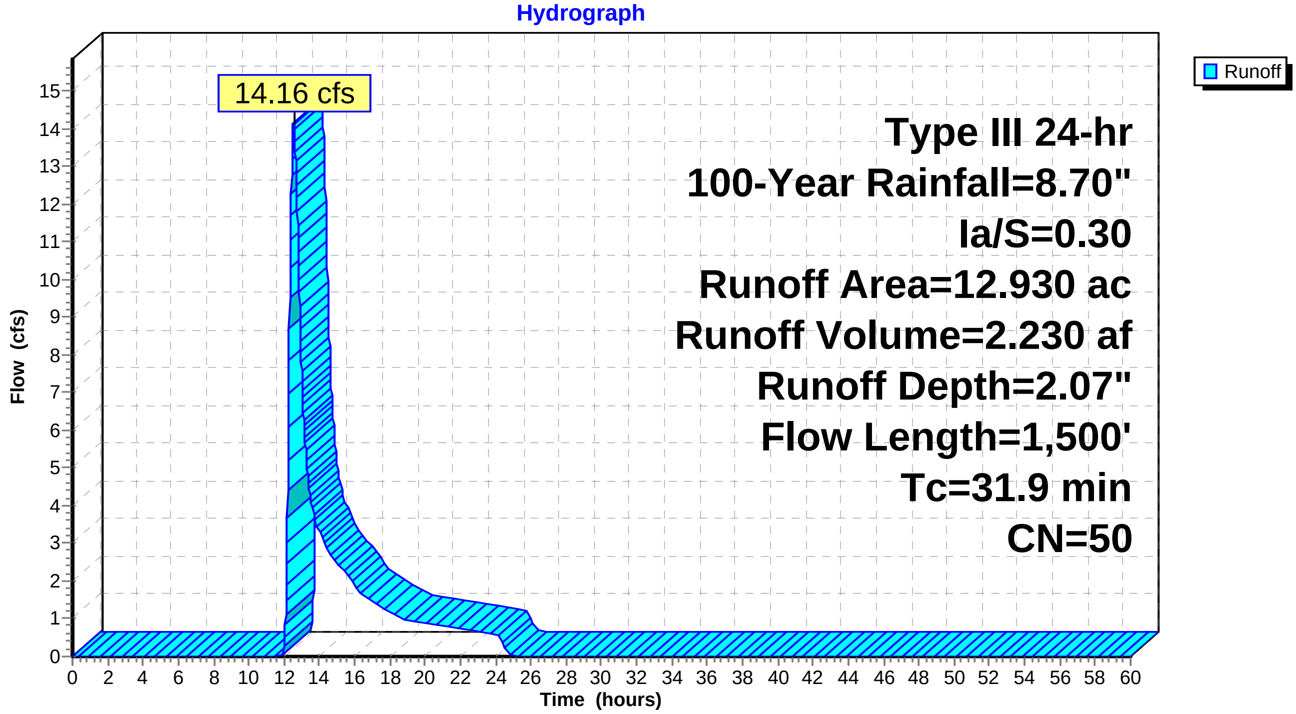
Runoff = 14.16 cfs @ 12.54 hrs, Volume= 2.230 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.000 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 4.850 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.370 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 2.860 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 3.850 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 12.930 | 50 | Weighted Average |
| | 12.930 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 21.7 | 100 | 0.0700 | 0.08 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 5.6 | 385 | 0.2100 | 1.15 | | **Shallow Concentrated Flow,**<br>Forest w/Heavy Litter Kv= 2.5 fps |
| 2.7 | 595 | 0.0300 | 3.66 | 18.32 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00'<br>n= 0.050 |
| 1.9 | 420 | 0.0290 | 3.60 | 18.01 | **Trap/Vee/Rect Channel Flow,**<br>Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00'<br>n= 0.050 |
| 31.9 | 1,500 | Total | | | |

## Subcatchment C101: C101



## Summary for Subcatchment C102: C102

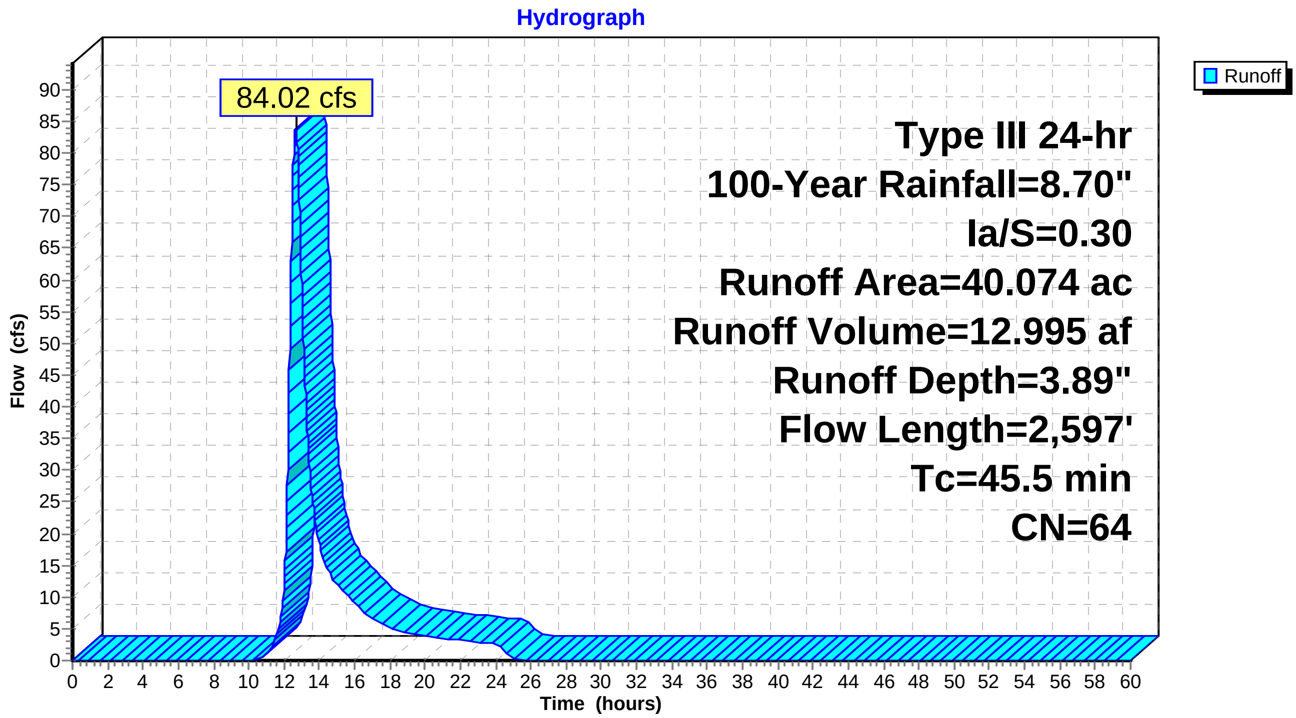
Runoff = 84.02 cfs @ 12.65 hrs, Volume= 12.995 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 0.007 | 98 | Paved surface |
| * | 0.515 | 96 | Gravel surface |
| * | 0.832 | 98 | Water Surface |
| * | 0.285 | 98 | Rock Outcrop/Ledge |
| | 13.181 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.190 | 74 | >75% Grass cover, Good, HSG C |
| | 1.269 | 80 | >75% Grass cover, Good, HSG D |
| | 0.124 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 7.574 | 70 | Woods, Good, HSG C |
| | 15.097 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 40.074 | 64 | Weighted Average |
| | 38.950 | | 97.20% Pervious Area |
| | 1.124 | | 2.80% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.4 | 60 | 0.0330 | 0.05 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 9.0 | 40 | 0.1000 | 0.07 | | **Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 7.2 | 484 | 0.2000 | 1.12 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 6.8 | 700 | 0.4700 | 1.71 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.3 | 304 | 0.2700 | 16.38 | 262.05 | **Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.050 |
| 1.3 | 777 | 0.1100 | 9.86 | 65.70 | **Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.050 |
| 1.5 | 232 | | 2.54 | | **Lake or Reservoir,** Mean Depth= 0.20' |
| 45.5 | 2,597 | Total | | | |

## Subcatchment C102: C102



## Summary for Subcatchment C103: C103

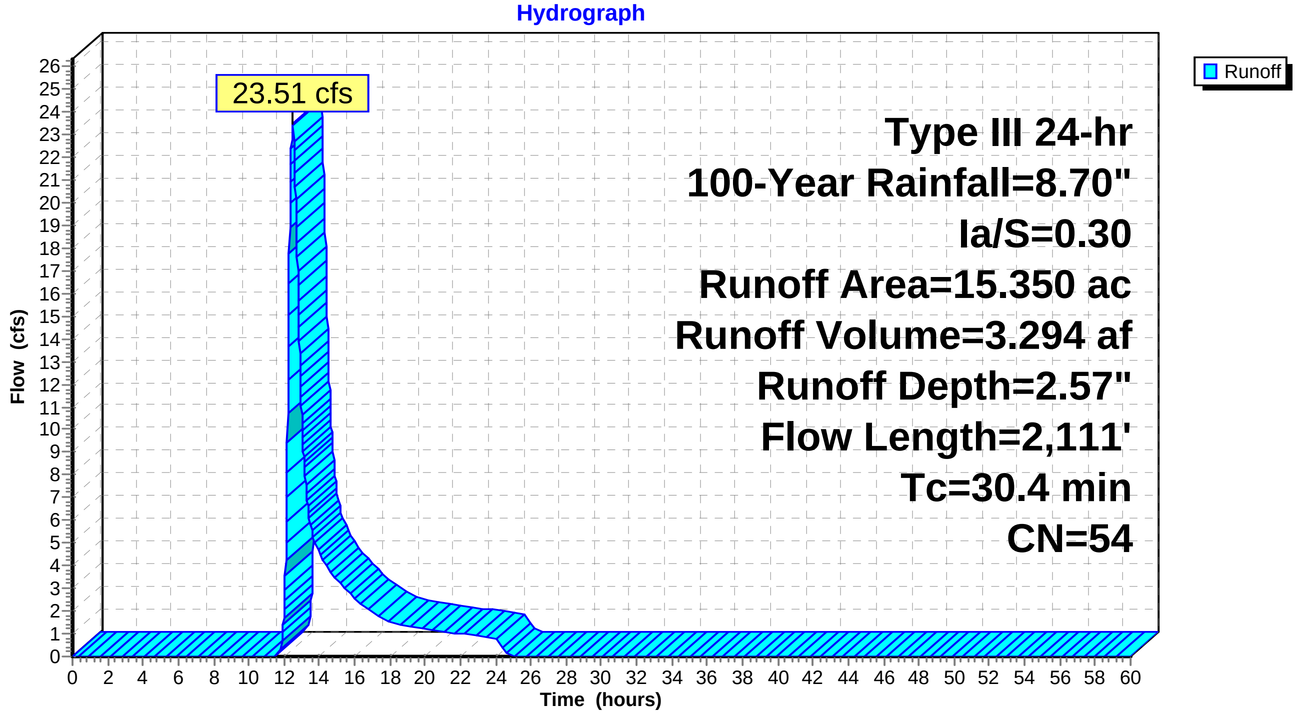
Runoff = 23.51 cfs @ 12.48 hrs, Volume= 3.294 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| * | 0.000 | 98 | Building roof |
| * | 2.860 | 98 | Paved surface |
| * | 0.000 | 96 | Gravel surface |
| * | 0.000 | 98 | Water Surface |
| * | 0.000 | 98 | Rock Outcrop/Ledge |
| | 9.290 | 39 | >75% Grass cover, Good, HSG A |
| | 0.000 | 61 | >75% Grass cover, Good, HSG B |
| | 1.240 | 74 | >75% Grass cover, Good, HSG C |
| | 0.000 | 80 | >75% Grass cover, Good, HSG D |
| | 0.980 | 30 | Woods, Good, HSG A |
| | 0.000 | 55 | Woods, Good, HSG B |
| | 0.980 | 70 | Woods, Good, HSG C |
| | 0.000 | 77 | Woods, Good, HSG D |
| * | 0.000 | 30 | Sand trap, HSG A |
| * | 0.000 | 30 | Sand trap, HSG B |
| * | 0.000 | 30 | Sand Trap, HSG C |
| | 15.350 | 54 | Weighted Average |
| | 12.490 | | 81.37% Pervious Area |
| | 2.860 | | 18.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 16.9 | 100 | 0.1300 | 0.10 | | **Sheet Flow,**<br>Woods: Dense underbrush n= 0.800 P2= 3.50" |
| 1.6 | 185 | 0.1560 | 1.97 | | **Shallow Concentrated Flow,**<br>Woodland Kv= 5.0 fps |
| 1.4 | 188 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 288 | 0.0069 | 0.58 | | **Shallow Concentrated Flow,**<br>Short Grass Pasture Kv= 7.0 fps |
| 2.2 | 1,350 | 0.0260 | 10.03 | 12.31 | **Pipe Channel,**<br>15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'<br>n= 0.011 |
| 30.4 | 2,111 | Total | | | |

## Subcatchment C103: C103



## Summary for Subcatchment Overlook (P1): Overlook (Phase 1)

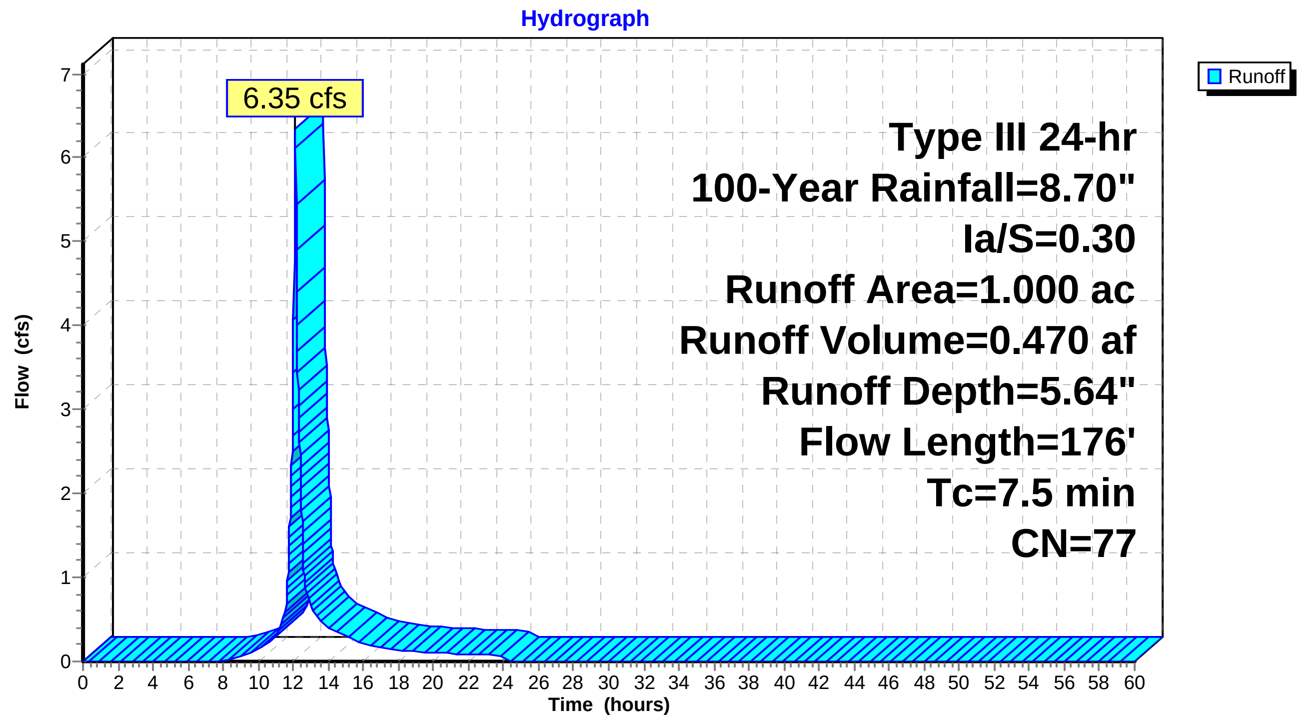
Runoff = 6.35 cfs @ 12.11 hrs, Volume= 0.470 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.70", Ia/S=0.30

| | Area (ac) | CN | Description |
|---|---|---|---|
| | 0.150 | 70 | Woods, Good, HSG C |
| | 0.590 | 74 | >75% Grass cover, Good, HSG C |
| * | 0.260 | 89 | Gravel roads and parking, HSG C |
| | 0.000 | 98 | Paved parking, HSG C |
| | 1.000 | 77 | Weighted Average |
| | 1.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 20 | 0.2000 | 0.15 | | **Sheet Flow, A to B**<br>Woods: Light underbrush n= 0.400 P2= 3.50" |
| 5.0 | 80 | 0.1600 | 0.27 | | **Sheet Flow, B to C**<br>Grass: Dense n= 0.240 P2= 3.50" |
| 0.2 | 76 | 0.1100 | 6.73 | | **Shallow Concentrated Flow, C to D**<br>Paved Kv= 20.3 fps |
| 7.5 | 176 | Total | | | |

## Subcatchment Overlook (P1): Overlook (Phase 1)



## Summary for Reach 36" Pipe: 36" Pipe

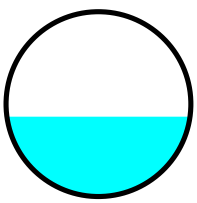
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 5.80" for 100-Year event
Inflow = 58.36 cfs @ 12.40 hrs, Volume= 7.440 af
Outflow = 58.27 cfs @ 12.41 hrs, Volume= 7.440 af, Atten= 0%, Lag= 0.6 min

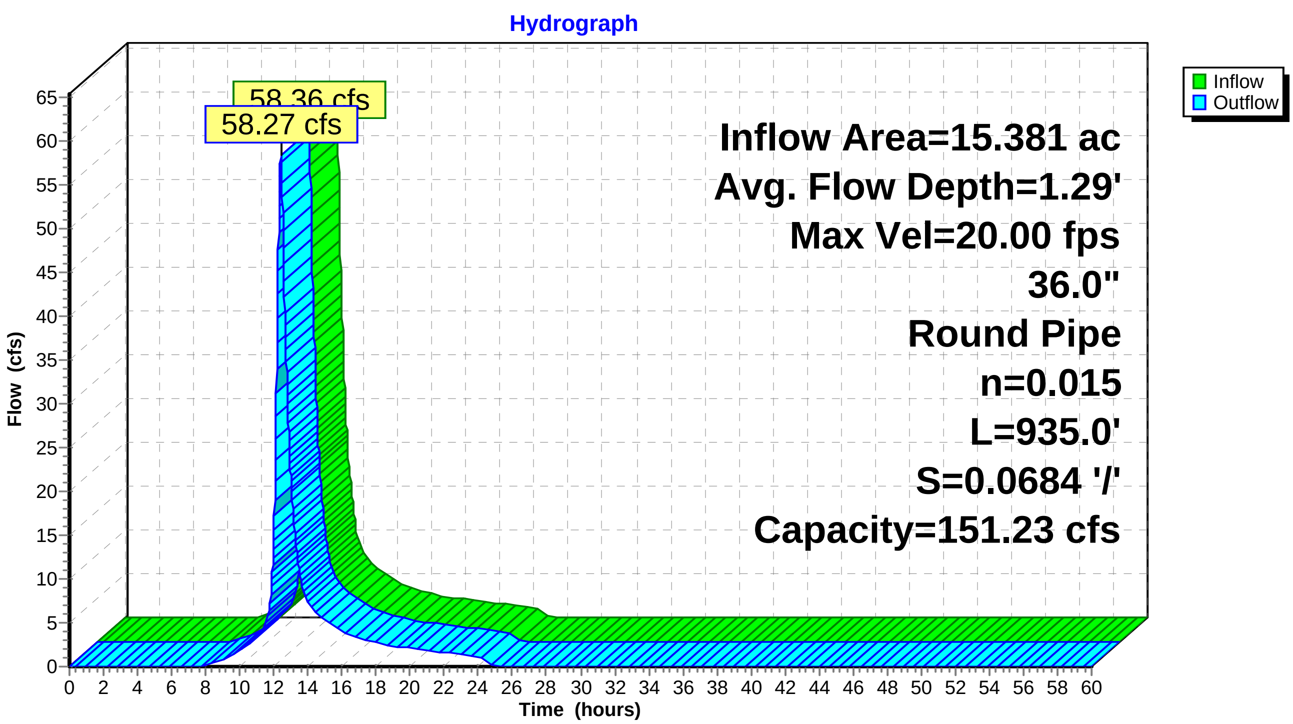
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 20.00 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 5.74 fps, Avg. Travel Time= 2.7 min

Peak Storage= 2,724 cf @ 12.41 hrs
Average Depth at Peak Storage= 1.29'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 151.23 cfs

36.0" Round Pipe
n= 0.015
Length= 935.0' Slope= 0.0684 '/'
Inlet Invert= 635.00', Outlet Invert= 571.00'



### Reach 36" Pipe: 36" Pipe



## Summary for Reach 42" Pipe: 42" Pipe

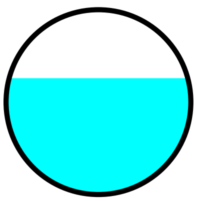
[52] Hint: Inlet/Outlet conditions not evaluated

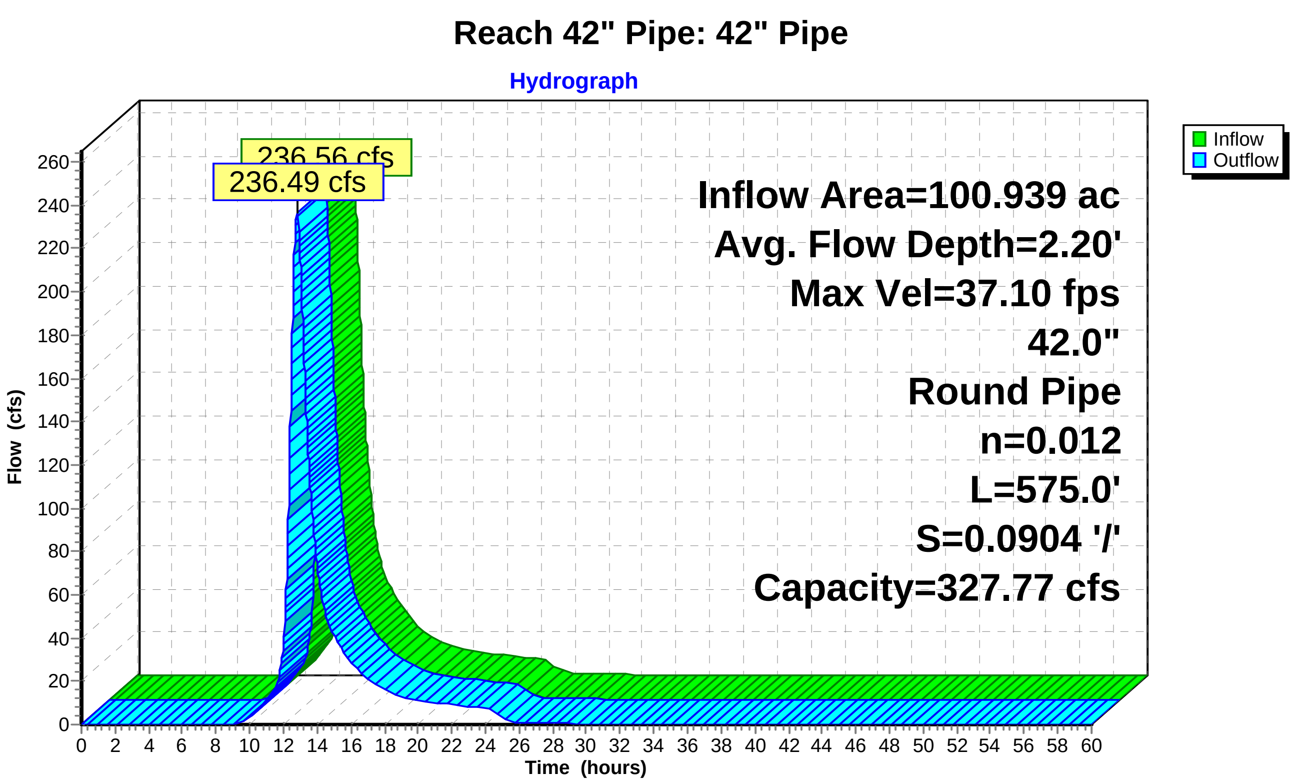
Inflow Area = 100.939 ac, 4.72% Impervious, Inflow Depth = 5.09" for 100-Year event
Inflow = 236.56 cfs @ 12.80 hrs, Volume= 42.838 af
Outflow = 236.49 cfs @ 12.80 hrs, Volume= 42.838 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 37.10 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 8.28 fps, Avg. Travel Time= 1.2 min

Peak Storage= 3,666 cf @ 12.80 hrs
Average Depth at Peak Storage= 2.20'
Bank-Full Depth= 3.50' Flow Area= 9.6 sf, Capacity= 327.77 cfs

42.0" Round Pipe
n= 0.012
Length= 575.0' Slope= 0.0904 '/'
Inlet Invert= 587.00', Outlet Invert= 535.00'





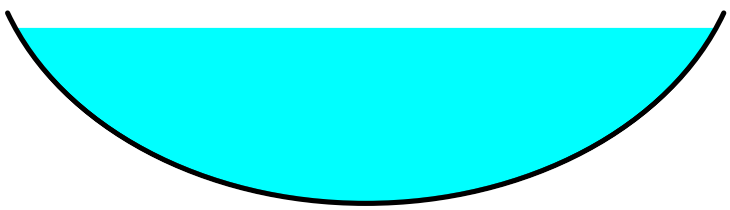
## Summary for Reach A105R: Thru A103

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 4.42" for 100-Year event
Inflow = 127.45 cfs @ 12.35 hrs, Volume= 15.464 af
Outflow = 126.85 cfs @ 12.38 hrs, Volume= 15.464 af, Atten= 0%, Lag= 2.0 min

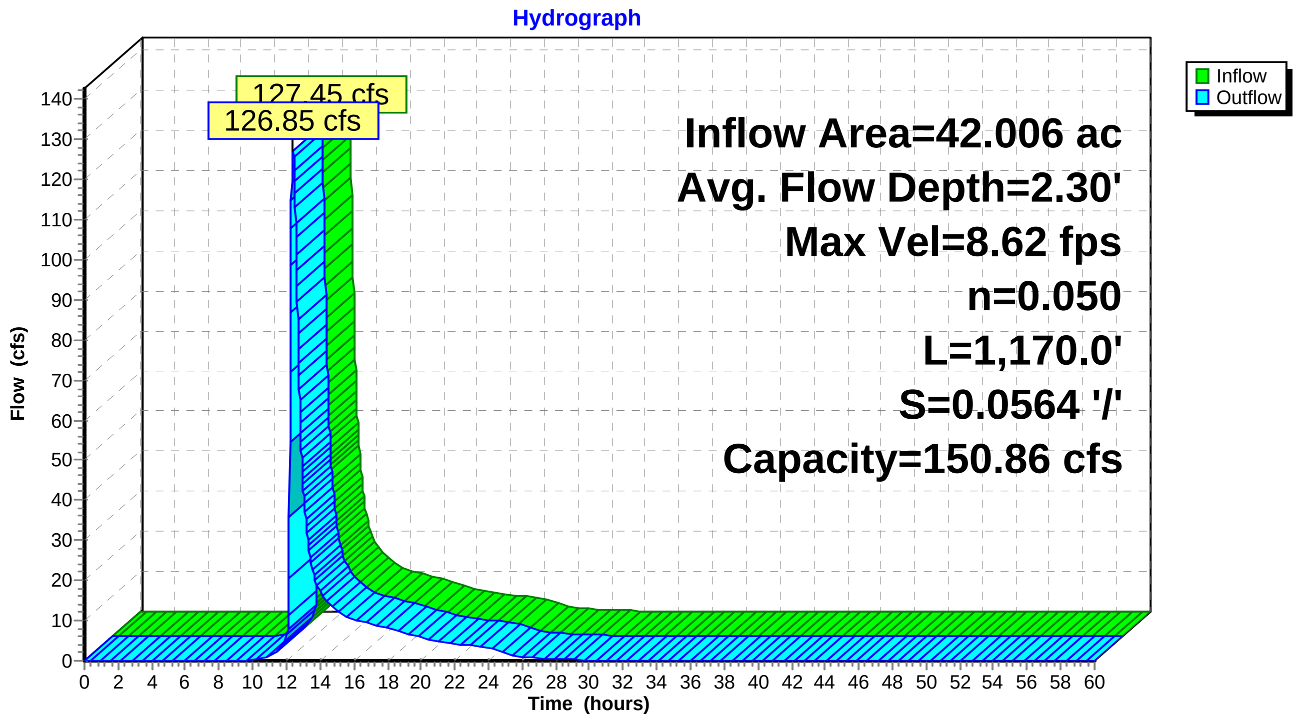
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 8.62 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 11.7 min

Peak Storage= 17,221 cf @ 12.38 hrs
Average Depth at Peak Storage= 2.30'
Bank-Full Depth= 2.50' Flow Area= 16.7 sf, Capacity= 150.86 cfs

10.00' x 2.50' deep Parabolic Channel, n= 0.050
Length= 1,170.0' Slope= 0.0564 '/'
Inlet Invert= 566.00', Outlet Invert= 500.00'



### Reach A105R: Thru A103



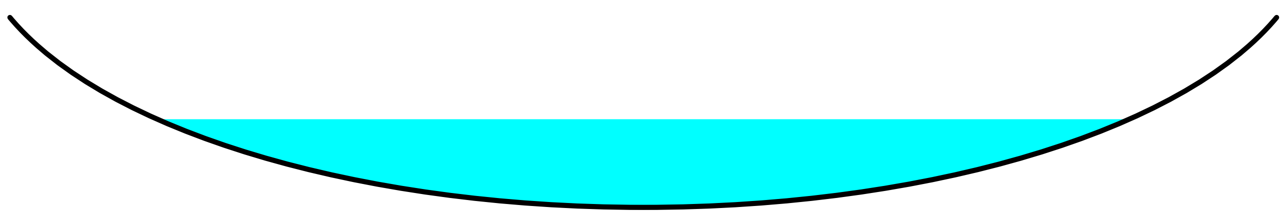
## Summary for Reach B107R: Thru B103

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 5.41" for 100-Year event
Inflow = 36.37 cfs @ 12.79 hrs, Volume= 6.463 af
Outflow = 36.32 cfs @ 12.81 hrs, Volume= 6.463 af, Atten= 0%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 8.65 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.81 fps, Avg. Travel Time= 8.6 min

Peak Storage= 3,941 cf @ 12.81 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 192.14 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.050
Length= 938.0' Slope= 0.4072 '/'
Inlet Invert= 972.00', Outlet Invert= 590.00'



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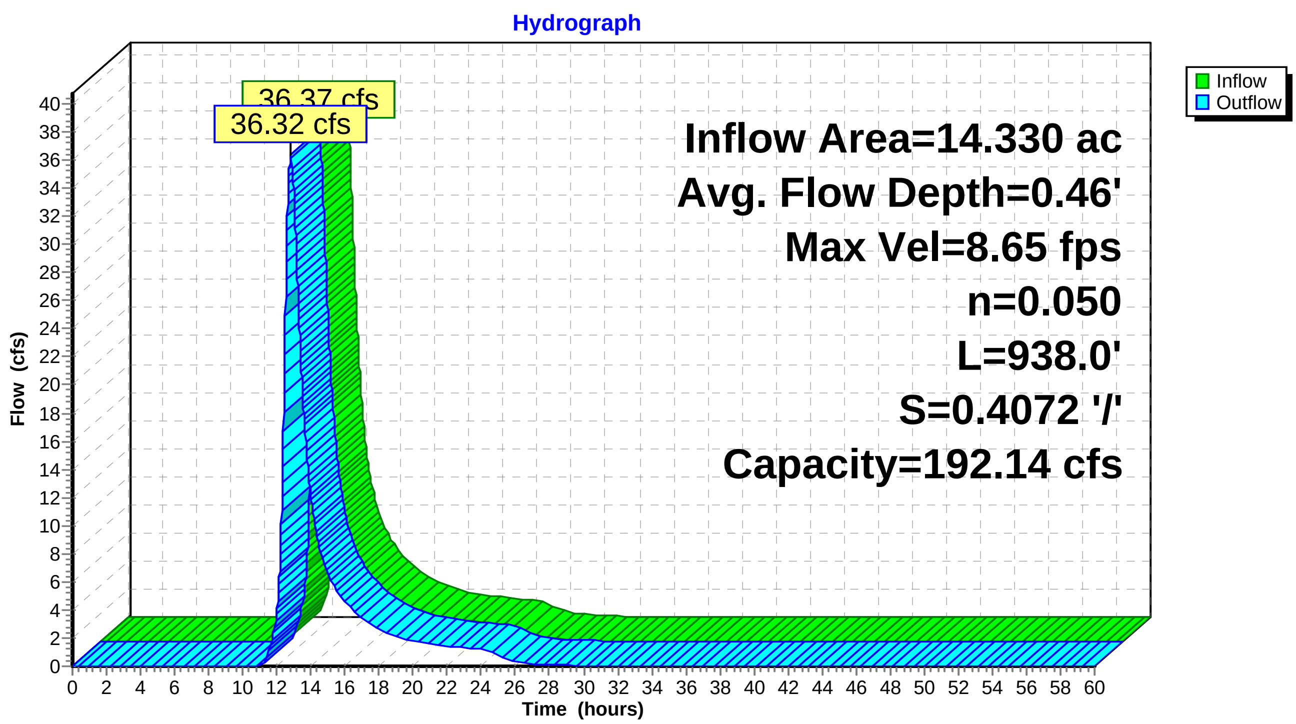
### Reach B107R: Thru B103



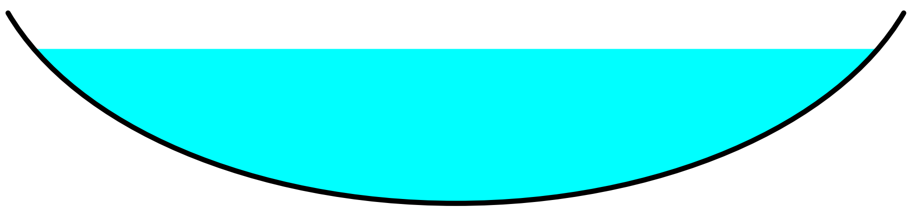
## Summary for Reach B112R: Thru B102

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 5.08" for 100-Year event
Inflow = 236.79 cfs @ 14.09 hrs, Volume= 105.430 af
Outflow = 236.76 cfs @ 14.11 hrs, Volume= 105.420 af, Atten= 0%, Lag= 1.2 min

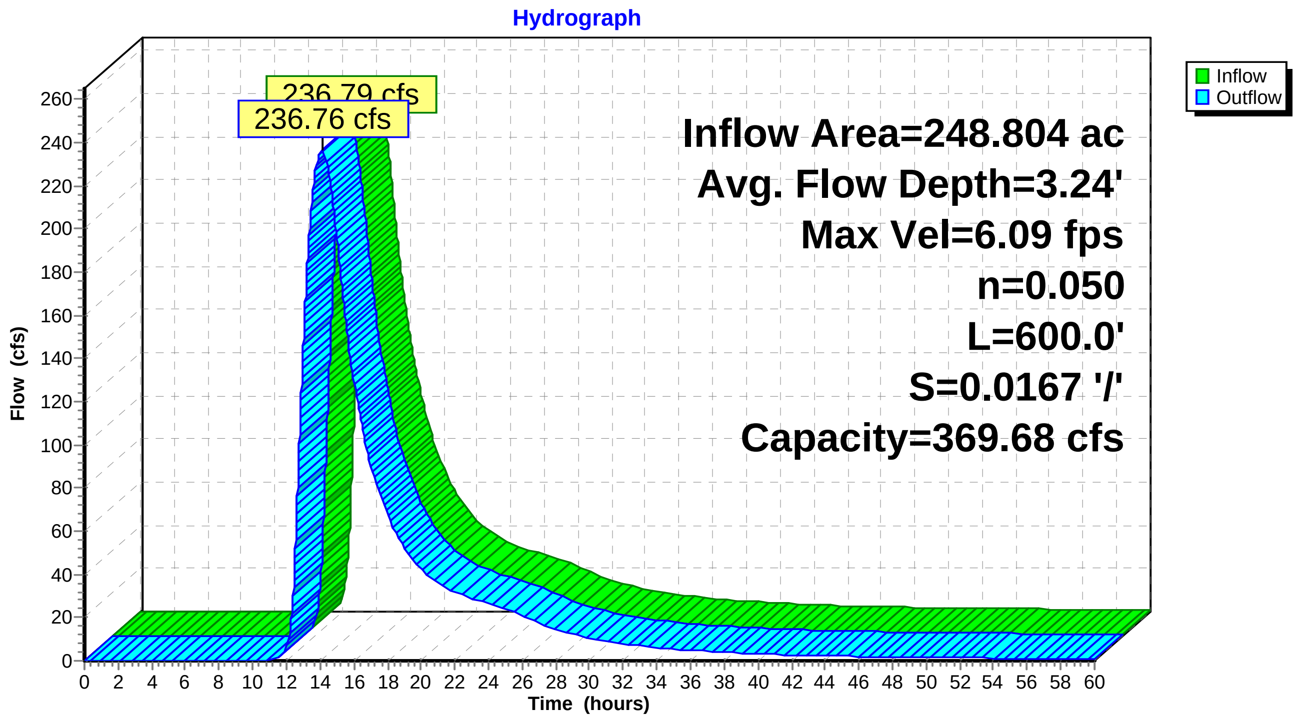
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 6.09 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.30 fps, Avg. Travel Time= 4.3 min

Peak Storage= 23,332 cf @ 14.11 hrs
Average Depth at Peak Storage= 3.24'
Bank-Full Depth= 4.00' Flow Area= 53.3 sf, Capacity= 369.68 cfs

20.00' x 4.00' deep Parabolic Channel, n= 0.050
Length= 600.0' Slope= 0.0167 '/'
Inlet Invert= 502.00', Outlet Invert= 492.00'



### Reach B112R: Thru B102



## Summary for Pond 102C: Pond 102C

Inflow Area = 40.074 ac, 2.80% Impervious, Inflow Depth = 3.89" for 100-Year event
Inflow = 84.02 cfs @ 12.65 hrs, Volume= 12.995 af
Outflow = 13.53 cfs @ 14.64 hrs, Volume= 5.867 af, Atten= 84%, Lag= 119.3 min
Primary = 13.53 cfs @ 14.64 hrs, Volume= 5.867 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 509.15' @ 14.64 hrs Surf.Area= 222,048 sf Storage= 343,057 cf

Plug-Flow detention time= 327.5 min calculated for 5.867 af (45% of inflow)
Center-of-Mass det. time= 199.2 min ( 1,083.1 - 883.9 )

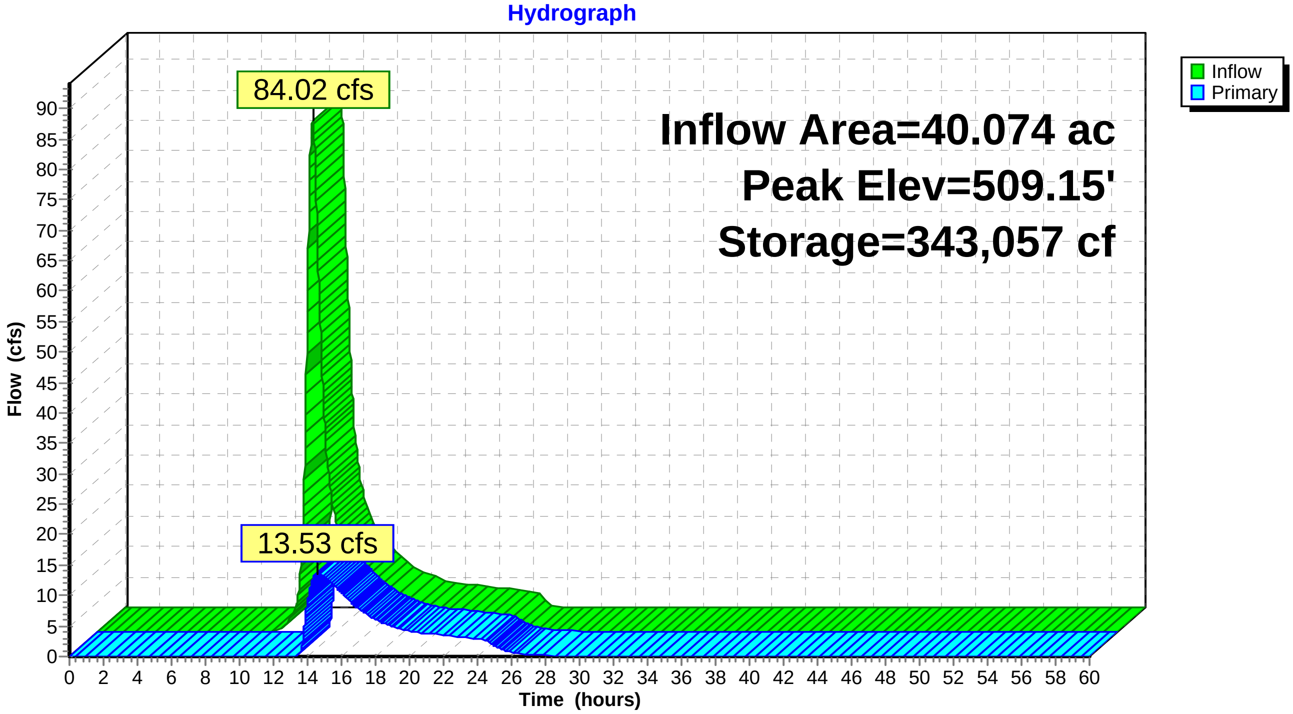
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 506.70' | 551,461 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 506.70 | 35,778 | 1,168.0 | 0 | 0 | 35,778 |
| 508.00 | 165,975 | 1,973.0 | 120,819 | 120,819 | 237,000 |
| 510.00 | 268,777 | 2,083.0 | 430,642 | 551,461 | 272,736 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 509.00' | **100.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=13.53 cfs @ 14.64 hrs HW=509.15' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 13.53 cfs @ 0.90 fps)

## Pond 102C: Pond 102C



## Summary for Pond 104A: Wetland D

Inflow Area = 29.922 ac, 5.68% Impervious, Inflow Depth = 1.70" for 100-Year event
Inflow = 27.94 cfs @ 12.41 hrs, Volume= 4.248 af
Outflow = 27.42 cfs @ 12.47 hrs, Volume= 4.227 af, Atten= 2%, Lag= 3.3 min
Primary = 0.74 cfs @ 12.47 hrs, Volume= 0.512 af
Secondary = 26.68 cfs @ 12.47 hrs, Volume= 3.715 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 508.21' @ 12.47 hrs Surf.Area= 26,219 sf Storage= 12,099 cf

Plug-Flow detention time= 46.0 min calculated for 4.227 af (100% of inflow)
Center-of-Mass det. time= 43.3 min ( 963.6 - 920.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.70' | 19,762 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

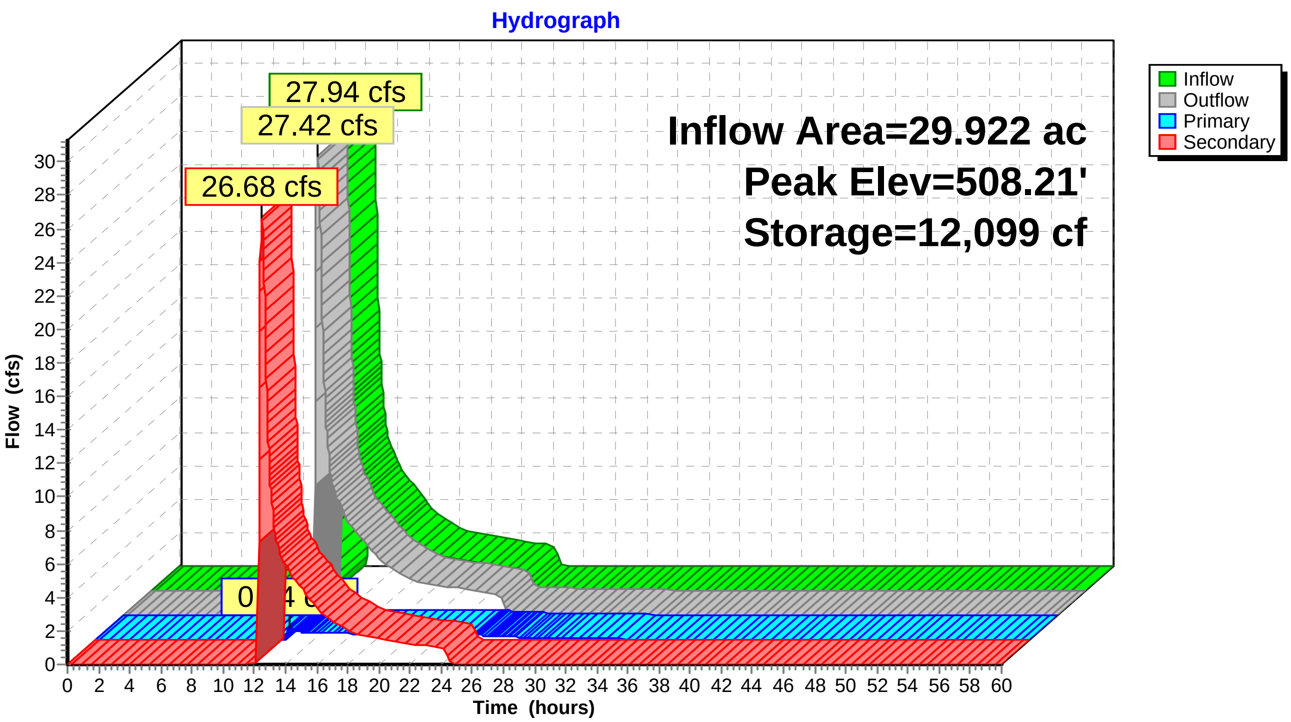
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 507.70 | 18,708 | 688.0 | 0 | 0 | 18,708 |
| 508.00 | 25,271 | 735.0 | 6,572 | 6,572 | 24,034 |
| 508.50 | 27,505 | 755.0 | 13,190 | 19,762 | 26,435 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.70' | **12.0" Round Culvert**<br>L= 20.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 507.70' / 507.30' S= 0.0200 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 0.79 sf |
| #2 | Secondary | 508.00' | **100.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=0.74 cfs @ 12.47 hrs HW=508.21' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 0.74 cfs @ 2.65 fps)

**Secondary OutFlow** Max=26.65 cfs @ 12.47 hrs HW=508.21' TW=0.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 26.65 cfs @ 1.24 fps)

## Pond 104A: Wetland D



## Summary for Pond 105A: Wetland H

[62] Hint: Exceeded Reach 36" Pipe OUTLET depth by 3.66' @ 15.92 hrs

Inflow Area = 42.006 ac, 14.19% Impervious, Inflow Depth = 4.42" for 100-Year event
Inflow = 127.68 cfs @ 12.32 hrs, Volume= 15.481 af
Outflow = 127.45 cfs @ 12.35 hrs, Volume= 15.464 af, Atten= 0%, Lag= 1.6 min
Primary = 11.27 cfs @ 12.35 hrs, Volume= 8.344 af
Secondary = 116.18 cfs @ 12.35 hrs, Volume= 7.120 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 575.40' @ 12.35 hrs Surf.Area= 32,583 sf Storage= 70,108 cf

Plug-Flow detention time= 54.8 min calculated for 15.459 af (100% of inflow)
Center-of-Mass det. time= 54.7 min ( 911.8 - 857.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 572.90' | 73,215 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

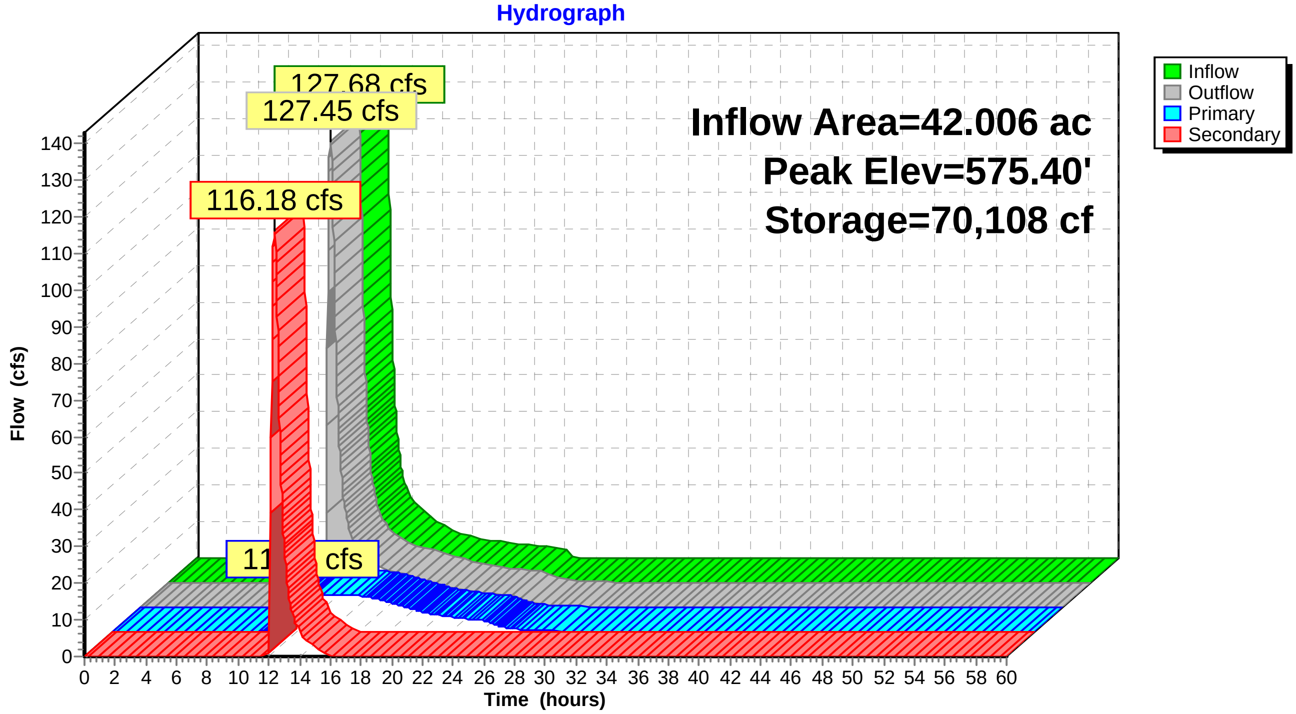
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 572.90 | 21,891 | 815.0 | 0 | 0 | 21,891 |
| 574.00 | 27,791 | 848.0 | 27,261 | 27,261 | 26,353 |
| 575.00 | 31,858 | 892.0 | 29,801 | 57,062 | 32,507 |
| 575.50 | 32,755 | 899.0 | 16,153 | 73,215 | 33,601 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 572.90' | **18.0" Round Culvert**<br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 572.90' / 572.00' S= 0.0450 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 1.77 sf |
| #2 | Secondary | 575.00' | **180.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=11.27 cfs @ 12.35 hrs HW=575.40' TW=568.29' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.27 cfs @ 6.38 fps)

**Secondary OutFlow** Max=116.12 cfs @ 12.35 hrs HW=575.40' TW=568.29' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 116.12 cfs @ 1.59 fps)

## Pond 105A: Wetland H



## Summary for Pond 106A: 36" Culvert

Inflow Area = 15.381 ac, 16.84% Impervious, Inflow Depth = 5.80" for 100-Year event
Inflow = 58.37 cfs @ 12.39 hrs, Volume= 7.440 af
Outflow = 58.36 cfs @ 12.40 hrs, Volume= 7.440 af, Atten= 0%, Lag= 0.4 min
Primary = 58.36 cfs @ 12.40 hrs, Volume= 7.440 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 721.14' @ 12.40 hrs Surf.Area= 228 sf Storage= 338 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 847.4 - 847.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 716.70' | 9,700 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

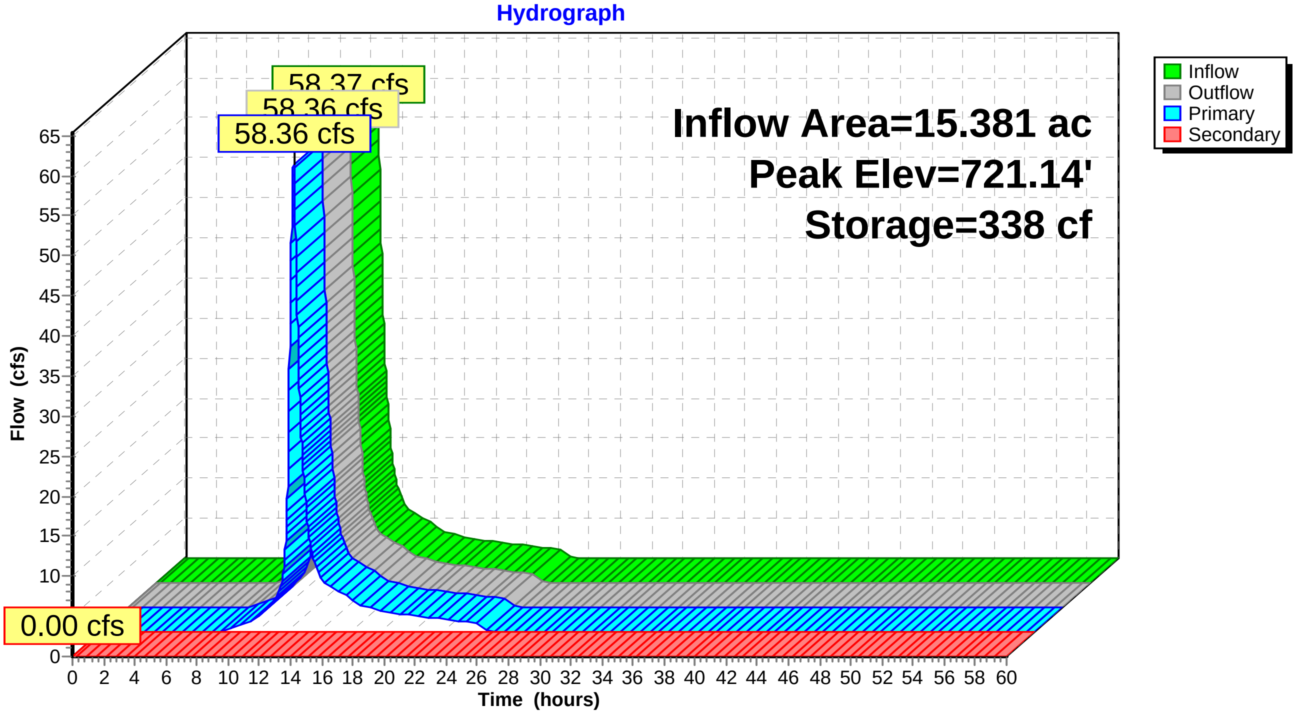
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 716.70 | 0 | 0.0 | 0 | 0 | 0 |
| 728.00 | 1,478 | 185.0 | 5,567 | 5,567 | 2,917 |
| 730.00 | 2,717 | 256.0 | 4,133 | 9,700 | 5,448 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 716.70' | **36.0" Round Culvert**<br>L= 133.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 716.70' / 686.00' S= 0.2308 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 728.00' | **8.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=58.34 cfs @ 12.40 hrs HW=721.14' TW=636.29' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 58.34 cfs @ 8.25 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=716.70' TW=635.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond 106A: 36" Culvert



## Summary for Pond 106B: Wetland J

Inflow Area = 118.113 ac, 1.34% Impervious, Inflow Depth = 5.51" for 100-Year event
Inflow = 242.96 cfs @ 13.14 hrs, Volume= 54.221 af
Outflow = 242.84 cfs @ 13.15 hrs, Volume= 54.221 af, Atten= 0%, Lag= 0.6 min
Primary = 242.84 cfs @ 13.15 hrs, Volume= 54.221 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 527.31' @ 13.15 hrs Surf.Area= 12,660 sf Storage= 26,774 cf

Plug-Flow detention time= 6.2 min calculated for 54.221 af (100% of inflow)
Center-of-Mass det. time= 5.9 min ( 897.7 - 891.8 )

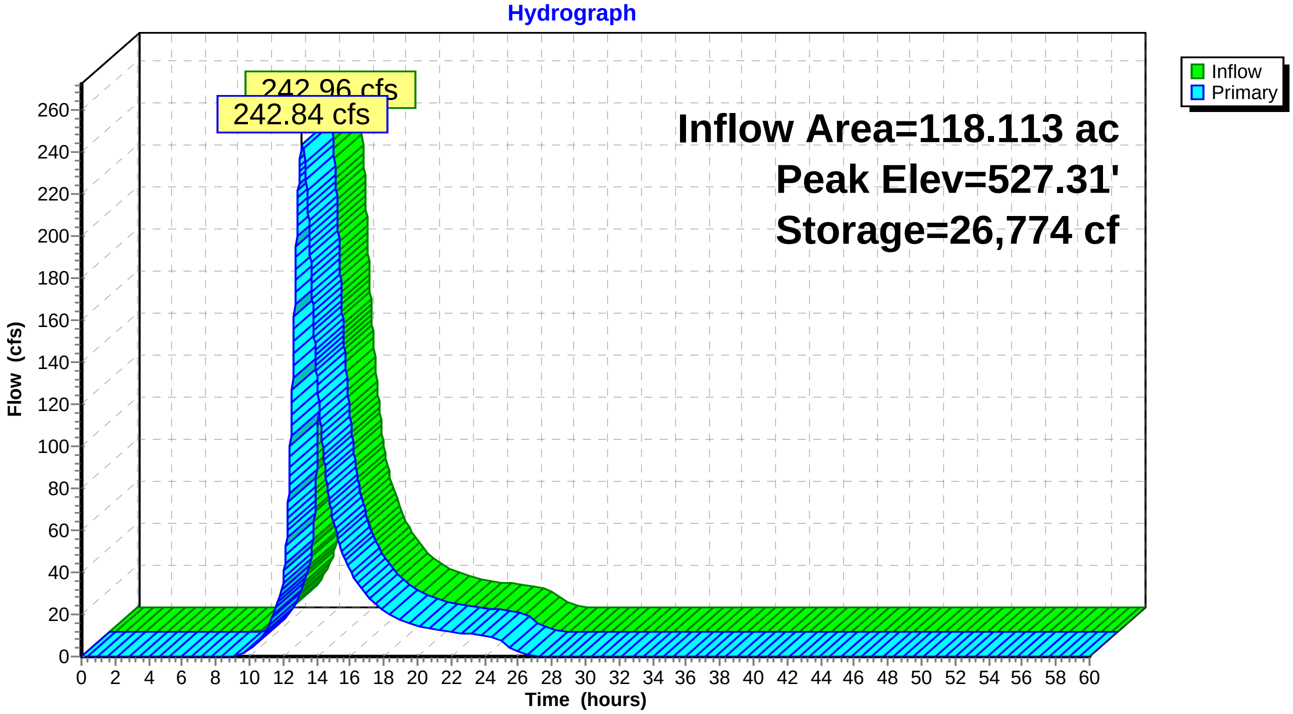
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 524.70' | 35,483 cf | **Custom Stage Data (Irregular)**Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 524.70 | 6,700 | 344.0 | 0 | 0 | 6,700 |
| 526.00 | 10,653 | 430.0 | 11,181 | 11,181 | 12,021 |
| 527.00 | 12,660 | 461.0 | 11,642 | 22,823 | 14,264 |
| 528.00 | 12,660 | 461.0 | 12,660 | 35,483 | 14,725 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 524.70' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 1.50 1.60 2.00 3.00<br>Width (feet) 2.33 2.33 60.00 60.00 70.00 |

**Primary OutFlow** Max=242.79 cfs @ 13.15 hrs HW=527.31' TW=519.44' (Dynamic Tailwater)
**1=Custom Weir/Orifice** (Weir Controls 242.79 cfs @ 3.51 fps)

## Pond 106B: Wetland J



## Summary for Pond 107A: 24" Culvert

Inflow Area = 95.412 ac, 4.86% Impervious, Inflow Depth = 5.22" for 100-Year event
Inflow = 230.10 cfs @ 12.80 hrs, Volume= 41.473 af
Outflow = 230.06 cfs @ 12.80 hrs, Volume= 41.473 af, Atten= 0%, Lag= 0.1 min
Primary = 45.73 cfs @ 12.80 hrs, Volume= 24.730 af
Secondary = 184.34 cfs @ 12.80 hrs, Volume= 16.744 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 626.65' @ 12.80 hrs Surf.Area= 1,762 sf Storage= 4,140 cf

Plug-Flow detention time= 0.3 min calculated for 41.460 af (100% of inflow)
Center-of-Mass det. time= 0.3 min ( 882.8 - 882.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 619.60' | 13,340 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

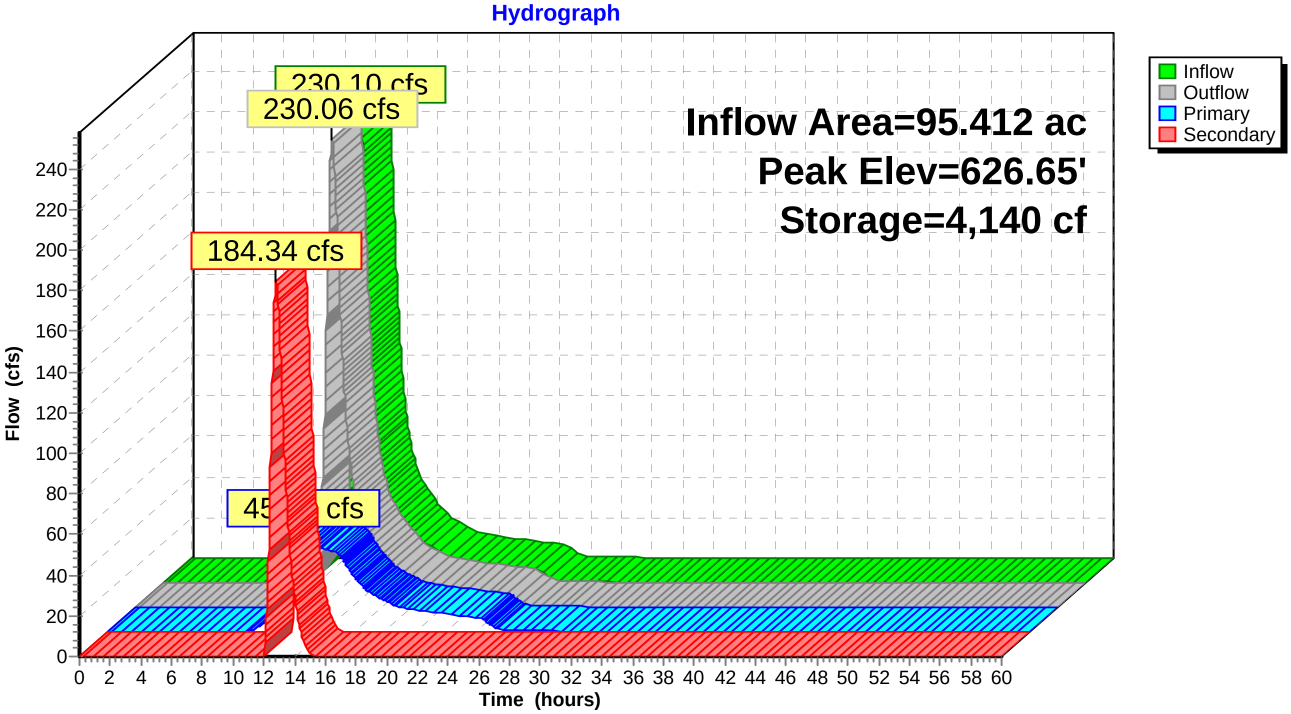
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 619.60 | 0 | 0.0 | 0 | 0 | 0 |
| 626.00 | 1,453 | 185.0 | 3,100 | 3,100 | 2,787 |
| 628.00 | 2,500 | 275.0 | 3,906 | 7,006 | 6,114 |
| 630.00 | 3,885 | 330.0 | 6,334 | 13,340 | 8,830 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 619.80' | **24.0" Round Culvert**<br>L= 145.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 619.80' / 607.40' S= 0.0855 '/' Cc= 0.900<br>n= 0.010, Flow Area= 3.14 sf |
| #2 | Secondary | 625.00' | **25.0' long x 5.0' breadth Broad-Crested Rectangular Weir X 0.00**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |
| #3 | Secondary | 625.00' | **Custom Weir/Orifice, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00<br>Width (feet) 20.00 25.00 30.00 35.00 40.00 45.00 50.00 |

**Primary OutFlow** Max=45.73 cfs @ 12.80 hrs HW=626.65' TW=589.20' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 45.73 cfs @ 14.56 fps)

**Secondary OutFlow** Max=184.31 cfs @ 12.80 hrs HW=626.65' TW=613.61' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
└─**3=Custom Weir/Orifice** (Weir Controls 184.31 cfs @ 3.96 fps)

## Pond 107A: 24" Culvert



## Summary for Pond 107B: Wetland

Inflow Area = 14.330 ac, 0.00% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 48.66 cfs @ 12.51 hrs, Volume= 6.740 af
Outflow = 36.37 cfs @ 12.79 hrs, Volume= 6.463 af, Atten= 25%, Lag= 16.5 min
Primary = 36.37 cfs @ 12.79 hrs, Volume= 6.463 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 973.08' @ 12.79 hrs Surf.Area= 127,092 sf Storage= 71,937 cf

Plug-Flow detention time= 78.5 min calculated for 6.461 af (96% of inflow)
Center-of-Mass det. time= 55.8 min ( 900.9 - 845.0 )

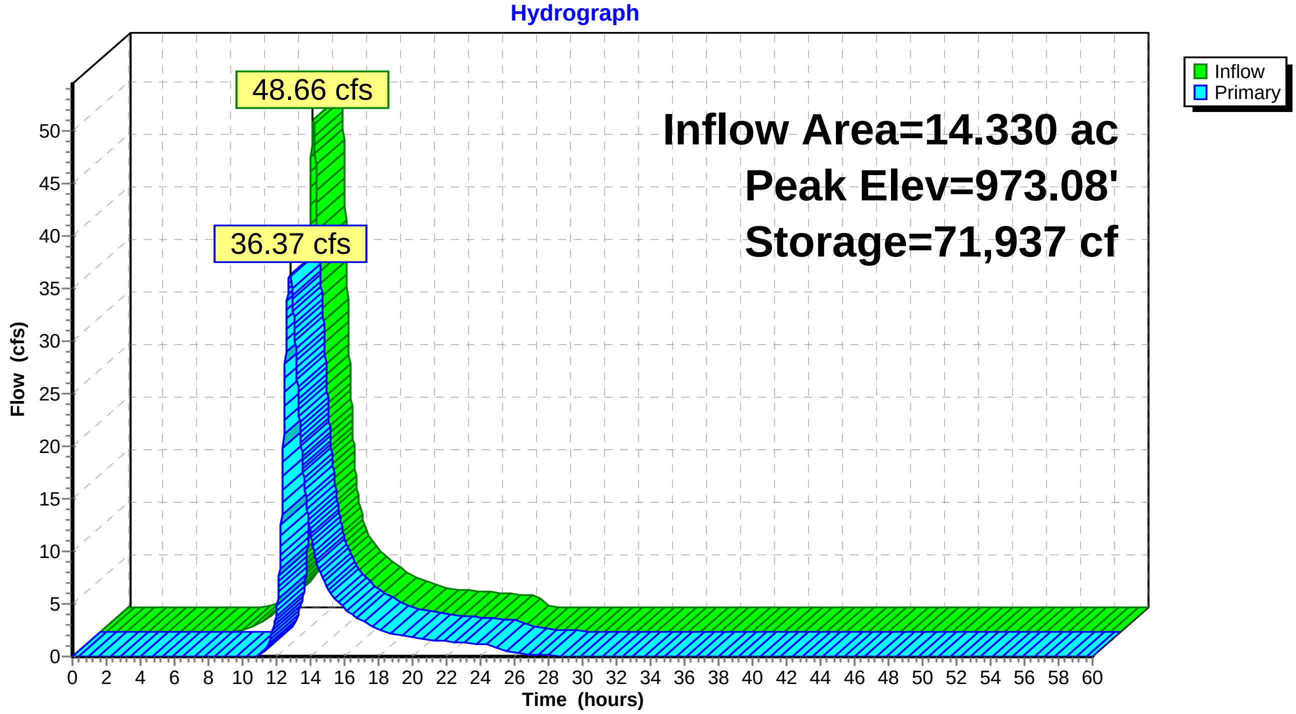
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 972.50' | 194,134 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 972.50 | 119,286 | 2,006.0 | 0 | 0 | 119,286 |
| 974.00 | 139,831 | 2,145.0 | 194,134 | 194,134 | 165,307 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 972.60' | **40.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=36.36 cfs @ 12.79 hrs HW=973.08' TW=972.46' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 36.36 cfs @ 1.88 fps)

## Pond 107B: Wetland



## Summary for Pond 108A: 36" Culvert

Inflow Area = 5.527 ac, 2.32% Impervious, Inflow Depth = 39.32" for 100-Year event
Inflow = 190.83 cfs @ 12.80 hrs, Volume= 18.109 af
Outflow = 190.83 cfs @ 12.80 hrs, Volume= 18.109 af, Atten= 0%, Lag= 0.1 min
Primary = 61.93 cfs @ 12.80 hrs, Volume= 10.100 af
Secondary = 128.90 cfs @ 12.80 hrs, Volume= 8.009 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 613.61' @ 12.80 hrs Surf.Area= 964 sf Storage= 382 cf

Plug-Flow detention time= 0.4 min calculated for 18.109 af (100% of inflow)
Center-of-Mass det. time= 0.0 min ( 791.2 - 791.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 608.80' | 26,148 cf | **Custom Stage Data (Irregular)** Listed below (Recalc) |

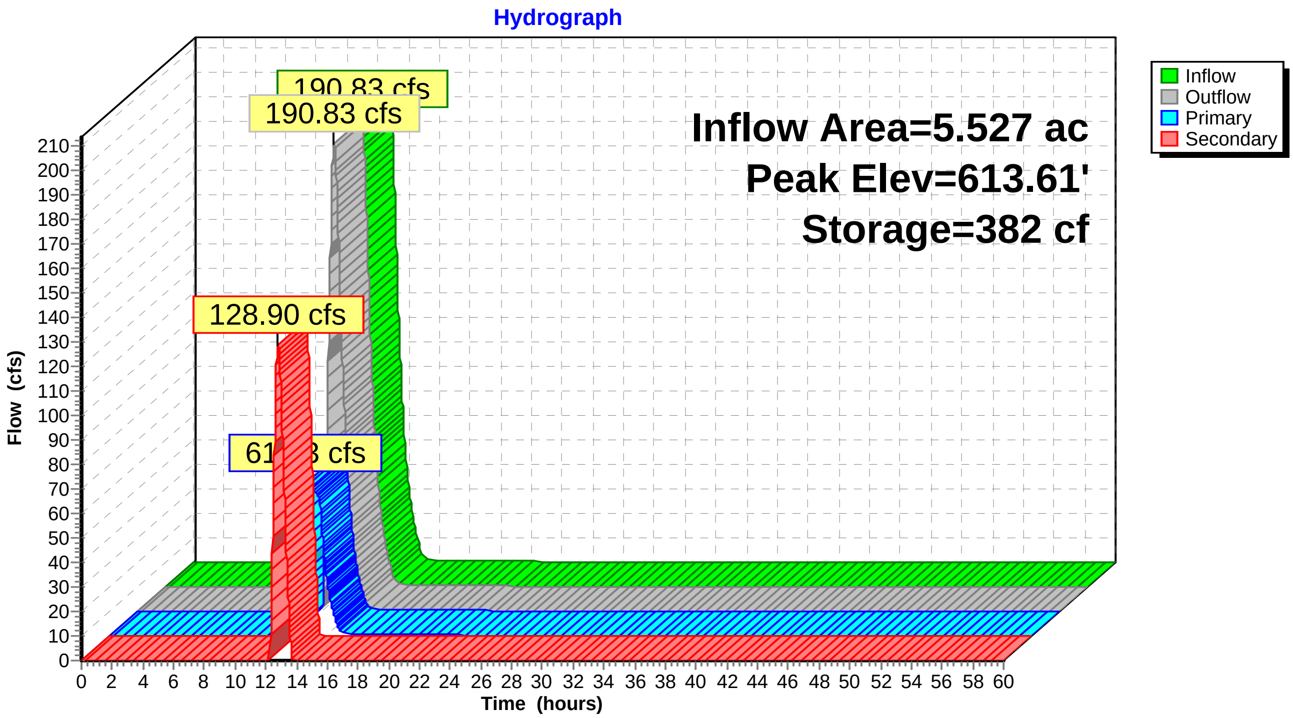
| Elevation (feet) | Surf.Area (sq-ft) | Perim. (feet) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 608.80 | 13 | 13.0 | 0 | 0 | 13 |
| 612.70 | 13 | 13.0 | 51 | 51 | 64 |
| 614.00 | 1,828 | 415.0 | 865 | 915 | 13,758 |
| 616.00 | 7,012 | 545.0 | 8,280 | 9,195 | 23,736 |
| 618.00 | 10,030 | 620.0 | 16,952 | 26,148 | 30,786 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 608.80' | **36.0" Round Culvert**<br>L= 45.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 608.80' / 606.90' S= 0.0422 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 7.07 sf |
| #2 | Secondary | 613.00' | **100.0' long x 24.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=61.93 cfs @ 12.80 hrs HW=613.61' TW=589.20' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 61.93 cfs @ 8.76 fps)

**Secondary OutFlow** Max=128.83 cfs @ 12.80 hrs HW=613.61' TW=589.20' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 128.83 cfs @ 2.11 fps)

## Pond 108A: 36" Culvert



## Summary for Pond SWM 7A: SWM 7A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 6.35 cfs @ 12.11 hrs, Volume= 0.470 af
Outflow = 5.58 cfs @ 12.16 hrs, Volume= 0.470 af, Atten= 12%, Lag= 3.0 min
Primary = 5.58 cfs @ 12.16 hrs, Volume= 0.470 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 808.45' @ 12.16 hrs Surf.Area= 3,051 sf Storage= 3,409 cf

Plug-Flow detention time= 28.4 min calculated for 0.470 af (100% of inflow)
Center-of-Mass det. time= 28.7 min ( 845.5 - 816.8 )

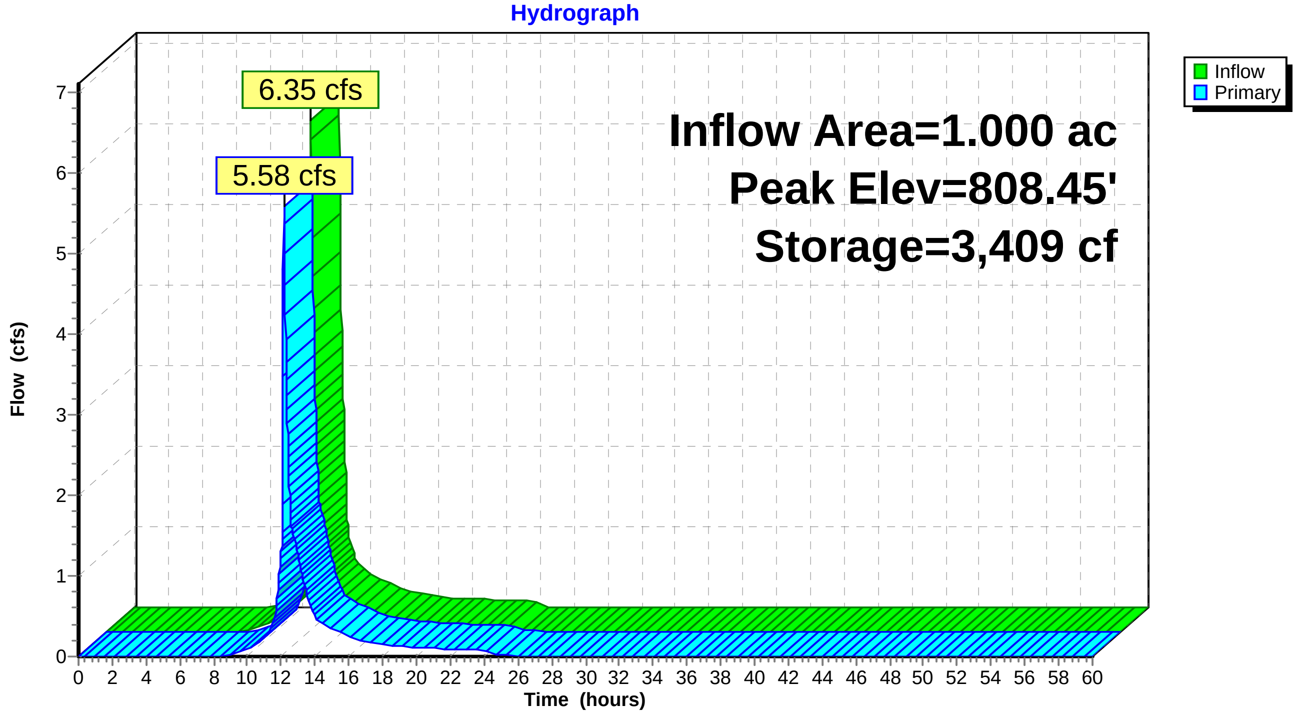
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 807.00' | 5,238 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 807.00 | 1,656 | 0 | 0 |
| 809.00 | 3,582 | 5,238 | 5,238 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 802.00' | **15.0" Round Culvert**<br>L= 41.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 802.00' / 801.00' S= 0.0244 '/' Cc= 0.900<br>n= 0.015, Flow Area= 1.23 sf |
| #2 | Device 1 | 807.00' | **8.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 808.25' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=5.56 cfs @ 12.16 hrs HW=808.45' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Passes 5.56 cfs of 15.59 cfs potential flow)
**2=Orifice/Grate** (Orifice Controls 1.77 cfs @ 5.08 fps)
**3=Broad-Crested Rectangular Weir** (Weir Controls 3.79 cfs @ 1.20 fps)

## Pond SWM 7A: SWM 7A (Phase 1)



## Summary for Pond SWM1: SWM 1

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 3.76" for 100-Year event
Inflow = 87.76 cfs @ 12.79 hrs, Volume= 15.889 af
Outflow = 76.98 cfs @ 12.97 hrs, Volume= 15.888 af, Atten= 12%, Lag= 10.7 min
Primary = 76.98 cfs @ 12.97 hrs, Volume= 15.888 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 515.25' @ 12.97 hrs Surf.Area= 24,579 sf Storage= 58,144 cf

Plug-Flow detention time= 15.6 min calculated for 15.888 af (100% of inflow)
Center-of-Mass det. time= 15.5 min ( 916.4 - 900.9 )

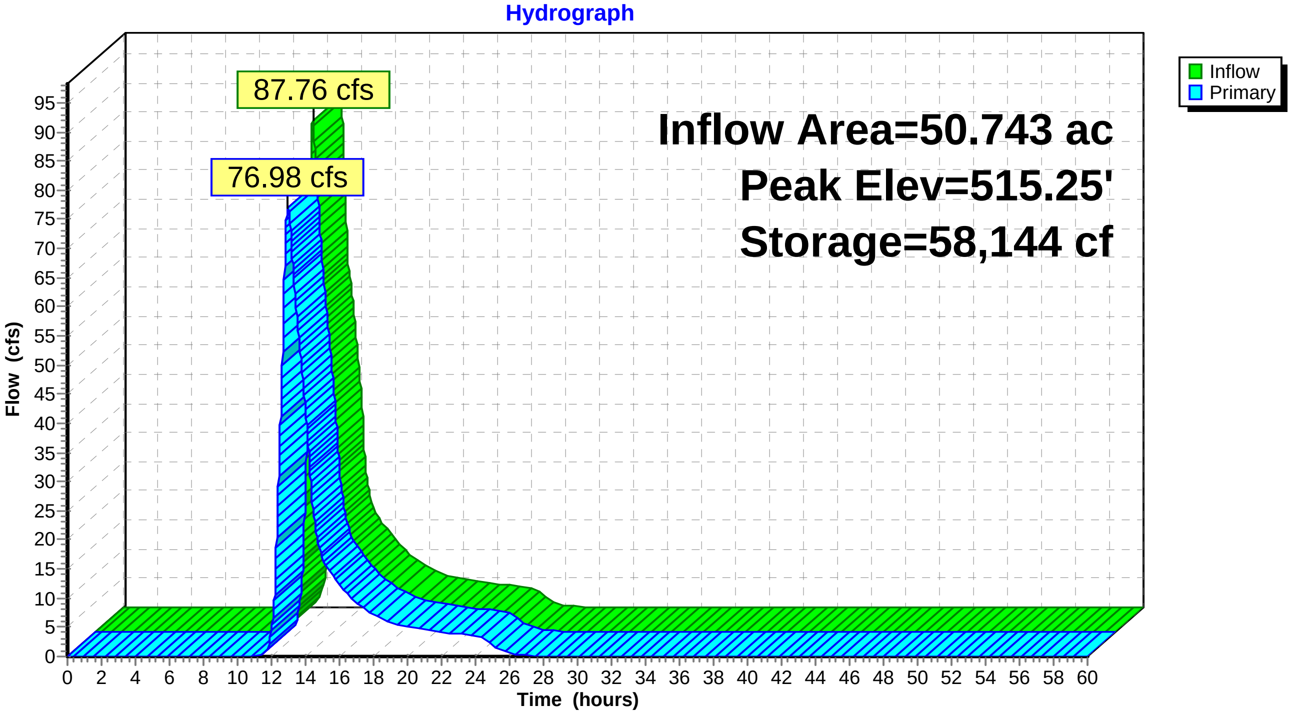
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 512.00' | 77,663 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 512.00 | 10,713 | 0 | 0 |
| 513.00 | 14,994 | 12,854 | 12,854 |
| 514.00 | 19,973 | 17,484 | 30,337 |
| 515.00 | 23,663 | 21,818 | 52,155 |
| 516.00 | 27,353 | 25,508 | 77,663 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 512.00' | **5.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=76.96 cfs @ 12.97 hrs HW=515.25' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 76.96 cfs @ 4.74 fps)

## Pond SWM1: SWM 1



## Summary for Pond SWM17: SWM17

Inflow Area = 15.350 ac, 18.63% Impervious, Inflow Depth = 2.57" for 100-Year event
Inflow = 23.51 cfs @ 12.48 hrs, Volume= 3.294 af
Outflow = 23.19 cfs @ 12.53 hrs, Volume= 3.294 af, Atten= 1%, Lag= 3.0 min
Primary = 23.19 cfs @ 12.53 hrs, Volume= 3.294 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 502.77' @ 12.53 hrs Surf.Area= 0.010 ac Storage= 0.089 af

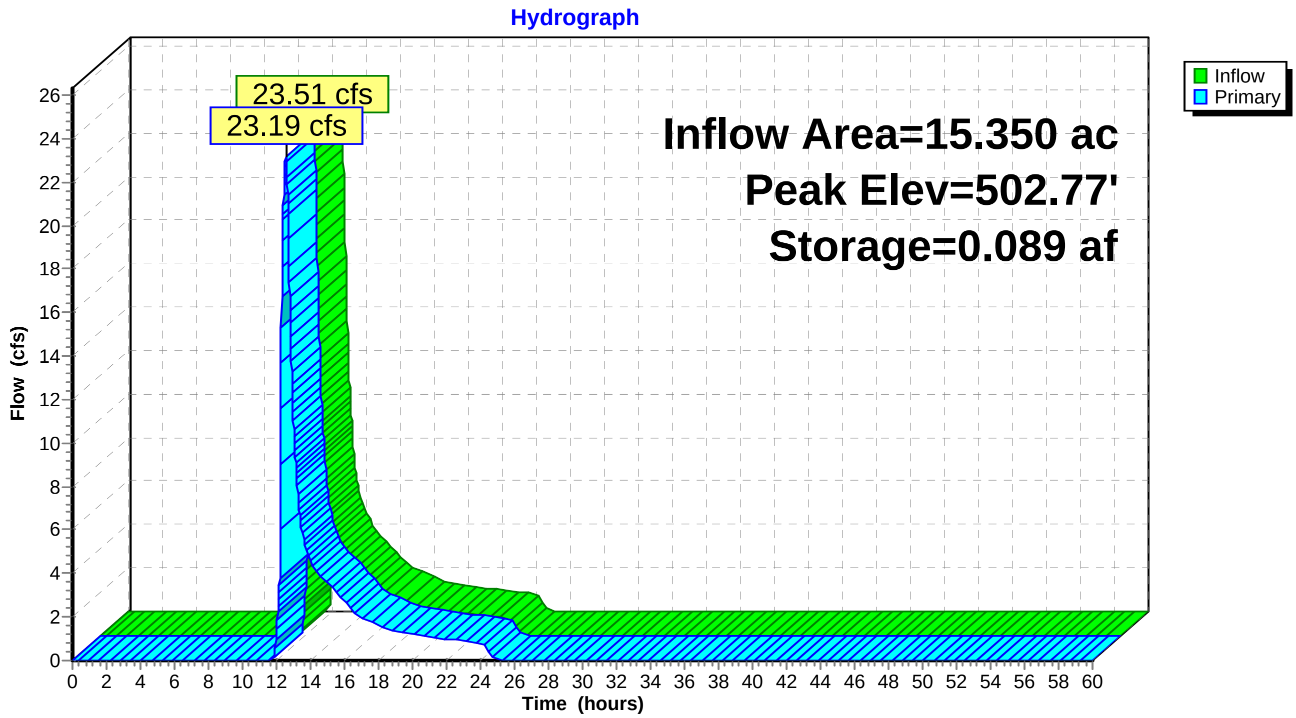
Plug-Flow detention time= 4.8 min calculated for 3.293 af (100% of inflow)
Center-of-Mass det. time= 4.8 min ( 903.9 - 899.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 0.090 af | **60.0" Round Pipe Storage** x 2<br>L= 100.0' |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **24.0" Round Culvert**<br>L= 60.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 497.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 498.00' | **10.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 500.50' | **3.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=23.17 cfs @ 12.53 hrs HW=502.77' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 23.17 cfs @ 7.38 fps)
  ├─**2=Orifice/Grate** (Passes < 5.48 cfs potential flow)
  └─**3=Broad-Crested Rectangular Weir** (Passes < 33.80 cfs potential flow)

## Pond SWM17: SWM17



## Summary for Pond SWM2: SWM2

Inflow Area = 120.037 ac, 12.91% Impervious, Inflow Depth = 5.85" for 100-Year event
Inflow = 408.50 cfs @ 12.41 hrs, Volume= 58.558 af
Outflow = 354.91 cfs @ 12.59 hrs, Volume= 58.404 af, Atten= 13%, Lag= 10.9 min
Primary = 354.91 cfs @ 12.59 hrs, Volume= 58.404 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 505.81' @ 12.59 hrs Surf.Area= 86,888 sf Storage= 493,380 cf

Plug-Flow detention time= 89.5 min calculated for 58.404 af (100% of inflow)
Center-of-Mass det. time= 87.5 min ( 927.2 - 839.7 )

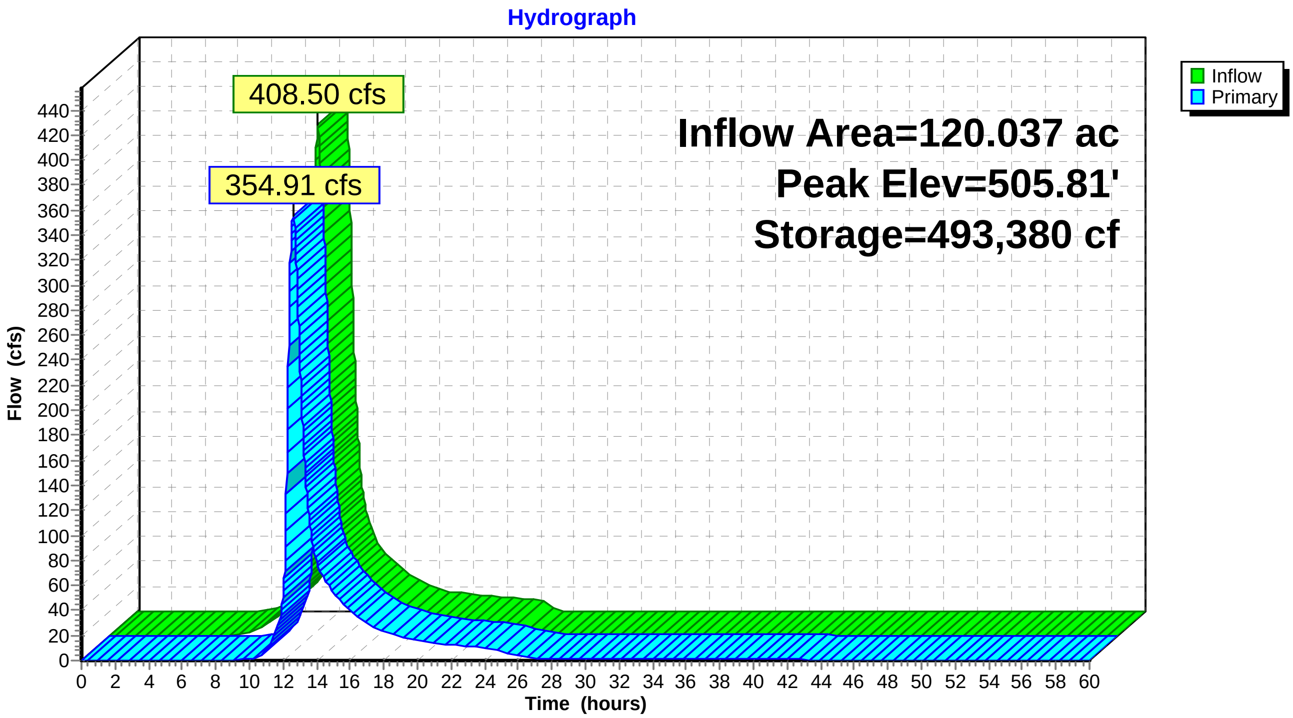
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 498.00' | 598,445 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 498.00 | 33,946 | 0 | 0 |
| 499.00 | 52,156 | 43,051 | 43,051 |
| 500.00 | 55,687 | 53,922 | 96,973 |
| 501.00 | 59,350 | 57,519 | 154,491 |
| 502.00 | 63,077 | 61,214 | 215,705 |
| 503.00 | 66,905 | 64,991 | 280,696 |
| 504.00 | 72,175 | 69,540 | 350,236 |
| 505.00 | 79,111 | 75,643 | 425,879 |
| 506.00 | 88,674 | 83,893 | 509,771 |
| 507.00 | 88,674 | 88,674 | 598,445 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 498.00' | **8.0" Round Culvert**<br>L= 100.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 498.00' / 496.00' S= 0.0200 '/' Cc= 0.900<br>n= 0.024, Flow Area= 0.35 sf |
| #2 | Primary | 499.50' | **4.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #3 | Primary | 503.00' | **15.0' long x 25.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=354.79 cfs @ 12.59 hrs HW=505.81' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 1.88 cfs @ 5.39 fps)
**2=Broad-Crested Rectangular Weir** (Weir Controls 166.84 cfs @ 6.61 fps)
**3=Broad-Crested Rectangular Weir** (Weir Controls 186.06 cfs @ 4.41 fps)

## Pond SWM2: SWM2



## Summary for Pond SWM3try: SWM3

Inflow Area = 248.804 ac, 16.02% Impervious, Inflow Depth > 5.15" for 100-Year event
Inflow = 388.46 cfs @ 12.25 hrs, Volume= 106.822 af
Outflow = 236.79 cfs @ 14.09 hrs, Volume= 105.430 af, Atten= 39%, Lag= 110.6 min
Primary = 236.79 cfs @ 14.09 hrs, Volume= 105.430 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 511.07' @ 14.09 hrs Surf.Area= 445,311 sf Storage= 1,608,044 cf

Plug-Flow detention time= 230.9 min calculated for 105.395 af (99% of inflow)
Center-of-Mass det. time= 210.7 min ( 1,117.2 - 906.5 )

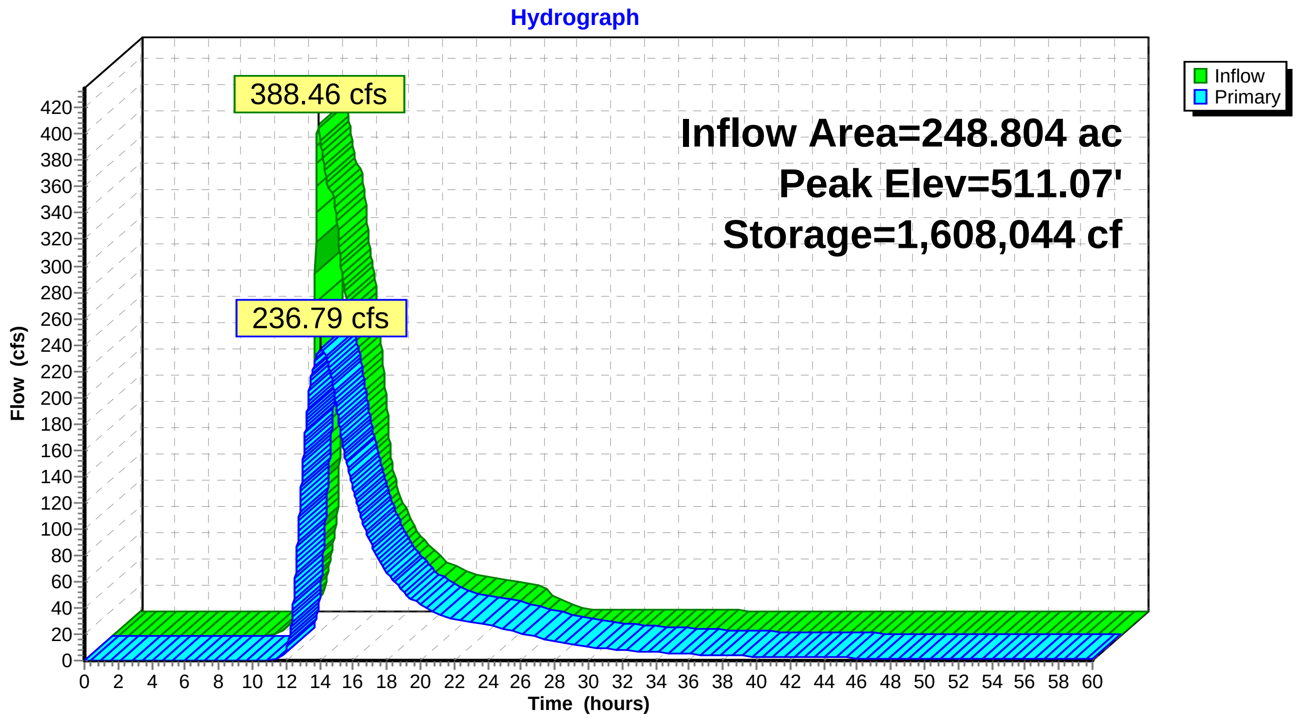
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 507.00' | 2,034,374 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 507.00 | 359,082 | 0 | 0 |
| 508.00 | 370,212 | 364,647 | 364,647 |
| 510.00 | 413,188 | 783,400 | 1,148,047 |
| 512.00 | 473,139 | 886,327 | 2,034,374 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 507.00' | **4.5' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |
| #2 | Primary | 508.75' | **15.0' long x 40.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=236.78 cfs @ 14.09 hrs HW=511.07' TW=505.24' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 97.23 cfs @ 5.31 fps)
**2=Broad-Crested Rectangular Weir** (Weir Controls 139.55 cfs @ 4.01 fps)

## Pond SWM3try: SWM3



## Summary for Pond SWM4: SWM4

Inflow Area = 195.996 ac, 11.01% Impervious, Inflow Depth > 4.02" for 100-Year event
Inflow = 252.27 cfs @ 13.14 hrs, Volume= 65.591 af
Outflow = 218.27 cfs @ 13.40 hrs, Volume= 65.577 af, Atten= 13%, Lag= 15.7 min
Primary = 218.27 cfs @ 13.40 hrs, Volume= 65.577 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 519.91' @ 13.50 hrs Surf.Area= 61,662 sf Storage= 248,434 cf

Plug-Flow detention time= 13.9 min calculated for 65.555 af (100% of inflow)
Center-of-Mass det. time= 13.4 min ( 938.1 - 924.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 515.00' | 387,328 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

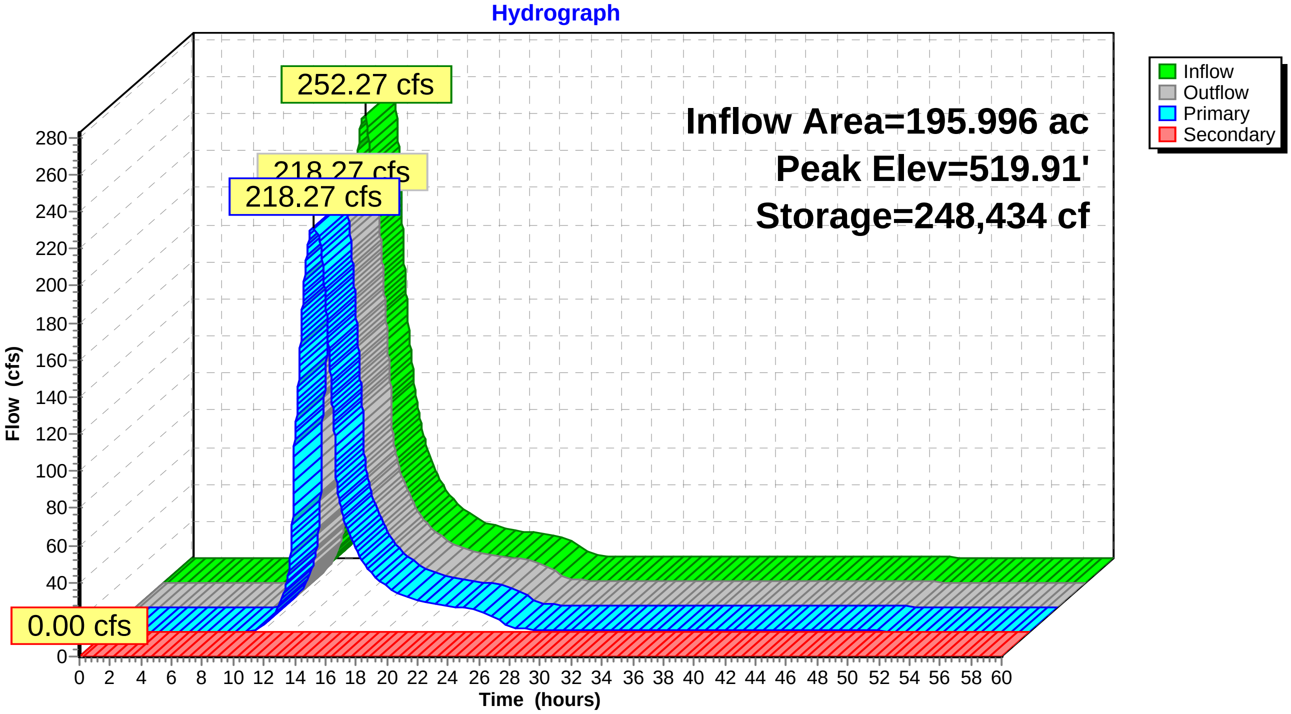
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 515.00 | 40,770 | 0 | 0 |
| 516.00 | 43,995 | 42,383 | 42,383 |
| 518.00 | 52,841 | 96,836 | 139,219 |
| 520.00 | 62,089 | 114,930 | 254,149 |
| 522.00 | 71,090 | 133,179 | 387,328 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 510.00' | **36.0" Round Culvert X 3.00**<br>L= 250.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 510.00' / 505.50' S= 0.0180 '/' Cc= 0.900<br>n= 0.020, Flow Area= 7.07 sf |
| #2 | Device 1 | 515.00' | **36.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 521.50' | **25.0' long x 20.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=218.27 cfs @ 13.40 hrs HW=519.86' TW=510.82' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 218.27 cfs @ 10.29 fps)
  └─**2=Orifice/Grate** (Passes 218.27 cfs of 225.14 cfs potential flow)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=515.00' TW=507.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

## Pond SWM4: SWM4



## Summary for Pond SWM5: SWM5

Inflow Area = 58.557 ac, 24.60% Impervious, Inflow Depth = 5.99" for 100-Year event
Inflow = 217.03 cfs @ 12.36 hrs, Volume= 29.215 af
Outflow = 192.79 cfs @ 12.52 hrs, Volume= 29.064 af, Atten= 11%, Lag= 9.2 min
Primary = 1.09 cfs @ 12.38 hrs, Volume= 2.577 af
Secondary = 122.72 cfs @ 12.52 hrs, Volume= 23.806 af
Tertiary = 69.02 cfs @ 12.52 hrs, Volume= 2.682 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 522.20' @ 12.52 hrs Surf.Area= 50,972 sf Storage= 210,682 cf

Plug-Flow detention time= 111.3 min calculated for 29.055 af (99% of inflow)
Center-of-Mass det. time= 108.7 min ( 936.2 - 827.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 517.00' | 251,698 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 517.00 | 22,920 | 0 | 0 |
| 518.00 | 35,091 | 29,006 | 29,006 |
| 520.00 | 42,827 | 77,918 | 106,924 |
| 522.00 | 50,965 | 93,792 | 200,716 |
| 523.00 | 51,000 | 50,983 | 251,698 |

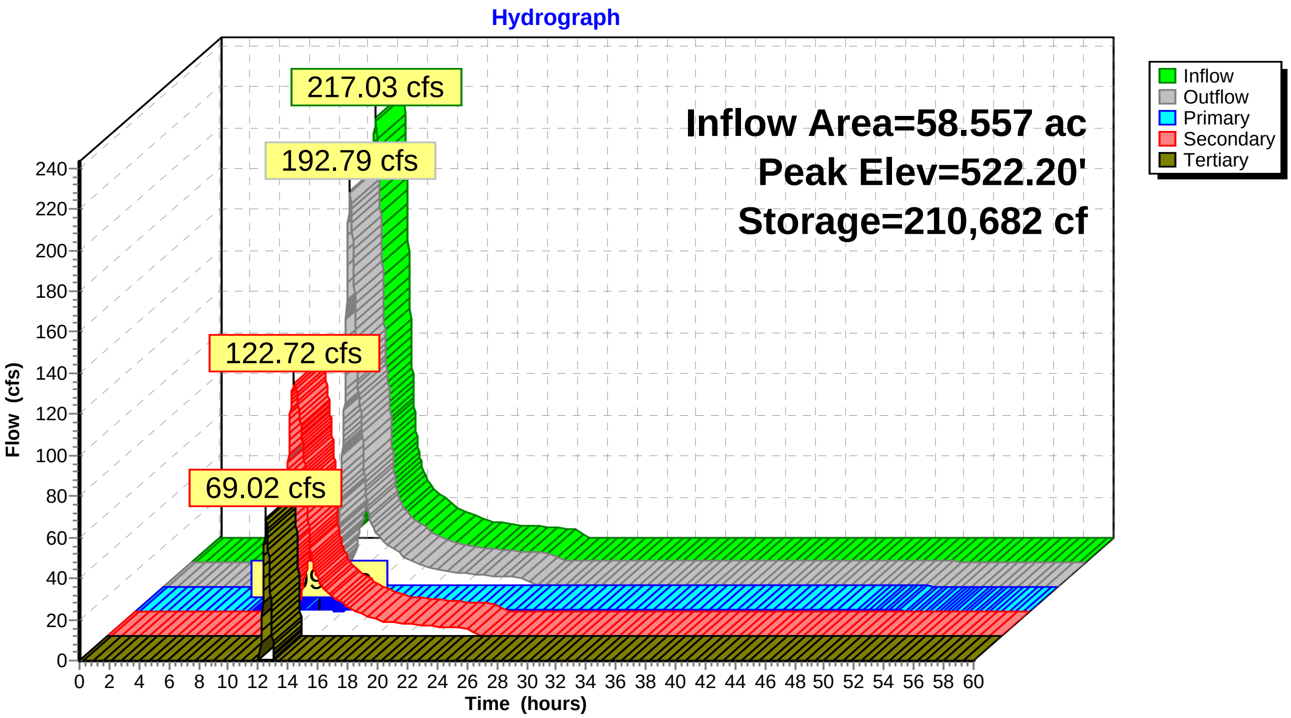
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 517.00' | **6.0" Round Culvert**<br>L= 90.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 517.00' / 516.00' S= 0.0111 '/' Cc= 0.900<br>n= 0.015, Flow Area= 0.20 sf |
| #2 | Secondary | 512.00' | **30.0" Round Culvert X 3.00**<br>L= 270.0' RCP, groove end w/headwall, Ke= 0.200<br>Inlet / Outlet Invert= 512.00' / 505.00' S= 0.0259 '/' Cc= 0.900<br>n= 0.020, Flow Area= 4.91 sf |
| #3 | Device 2 | 519.20' | **30.0" Horiz. Orifice/Grate X 3.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Tertiary | 521.00' | **20.0' long x 30.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 |

**Primary OutFlow** Max=1.09 cfs @ 12.38 hrs HW=522.00' TW=516.53' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.09 cfs @ 5.56 fps)

**Secondary OutFlow** Max=122.71 cfs @ 12.52 hrs HW=522.20' TW=509.30' (Dynamic Tailwater)
└─**2=Culvert** (Passes 122.71 cfs of 159.11 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 122.71 cfs @ 8.33 fps)

**Tertiary OutFlow** Max=68.98 cfs @ 12.52 hrs HW=522.20' TW=517.15' (Dynamic Tailwater)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 68.98 cfs @ 2.89 fps)

## Pond SWM5: SWM5



## Summary for Pond SWM6: SWM6

[62] Hint: Exceeded Reach A105R OUTLET depth by 5.10' @ 16.36 hrs

Inflow Area = 99.305 ac, 18.16% Impervious, Inflow Depth = 3.81" for 100-Year event
Inflow = 267.49 cfs @ 12.35 hrs, Volume= 31.500 af
Outflow = 20.09 cfs @ 16.10 hrs, Volume= 30.321 af, Atten= 92%, Lag= 225.2 min
Primary = 20.09 cfs @ 16.10 hrs, Volume= 30.321 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 505.79' @ 16.10 hrs Surf.Area= 173,233 sf Storage= 758,778 cf

Plug-Flow detention time= 571.9 min calculated for 30.321 af (96% of inflow)
Center-of-Mass det. time= 547.6 min ( 1,441.6 - 894.0 )

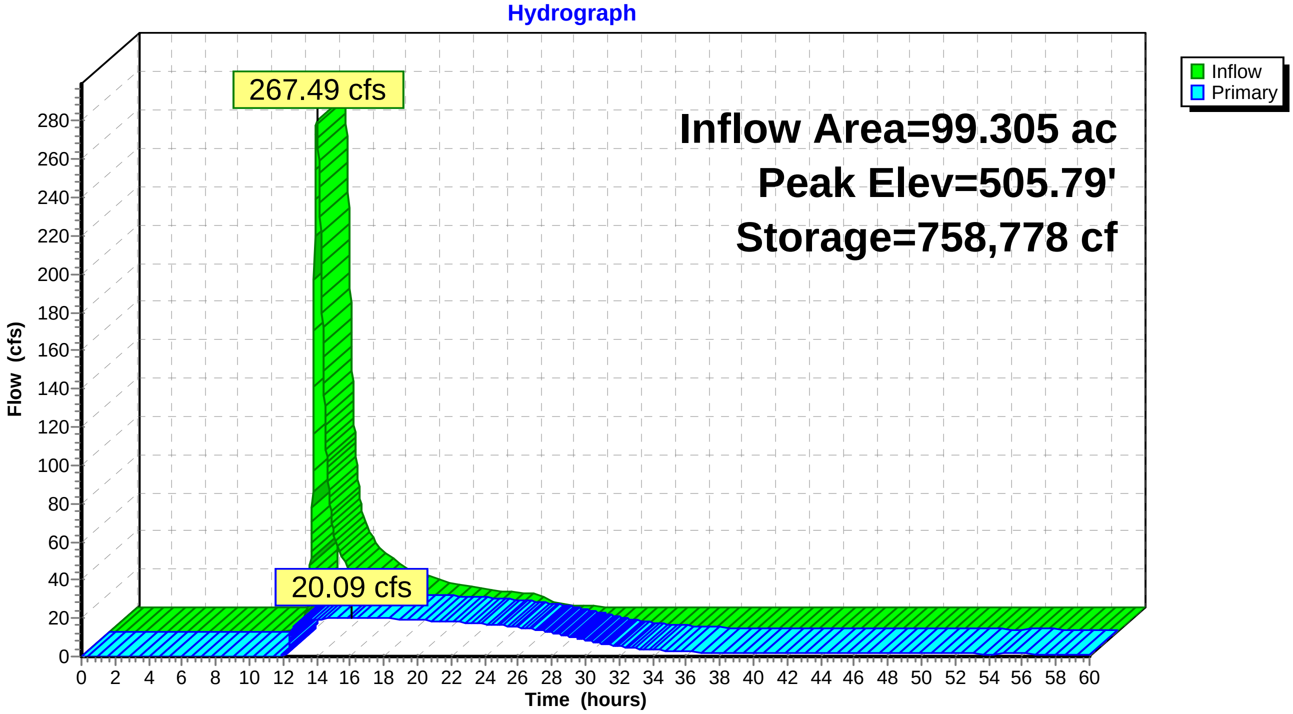
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 500.00' | 883,875 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 500.00 | 76,477 | 0 | 0 |
| 501.00 | 99,879 | 88,178 | 88,178 |
| 502.00 | 122,401 | 111,140 | 199,318 |
| 504.00 | 148,997 | 271,398 | 470,716 |
| 506.00 | 176,108 | 325,105 | 795,821 |
| 506.50 | 176,108 | 88,054 | 883,875 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 500.00' | **8.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 500.00' / 498.50' S= 0.0111 '/' Cc= 0.900<br>n= 0.012, Flow Area= 0.35 sf |
| #2 | Primary | 501.50' | **18.0" Round Culvert**<br>L= 105.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 501.50' / 500.00' S= 0.0143 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=20.09 cfs @ 16.10 hrs HW=505.79' TW=0.00' (Dynamic Tailwater)
**1=Culvert** (Barrel Controls 2.65 cfs @ 7.59 fps)
**2=Culvert** (Barrel Controls 17.44 cfs @ 9.87 fps)

## Pond SWM6: SWM6



## Summary for Pond SWM7: SWM7

Inflow Area = 4.590 ac, 29.85% Impervious, Inflow Depth = 6.18" for 100-Year event
Inflow = 24.71 cfs @ 12.21 hrs, Volume= 2.365 af
Outflow = 15.78 cfs @ 12.42 hrs, Volume= 2.365 af, Atten= 36%, Lag= 12.5 min
Primary = 15.78 cfs @ 12.42 hrs, Volume= 2.365 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 747.31' @ 12.42 hrs Surf.Area= 7,288 sf Storage= 27,913 cf

Plug-Flow detention time= 60.7 min calculated for 2.365 af (100% of inflow)
Center-of-Mass det. time= 60.5 min ( 874.8 - 814.4 )

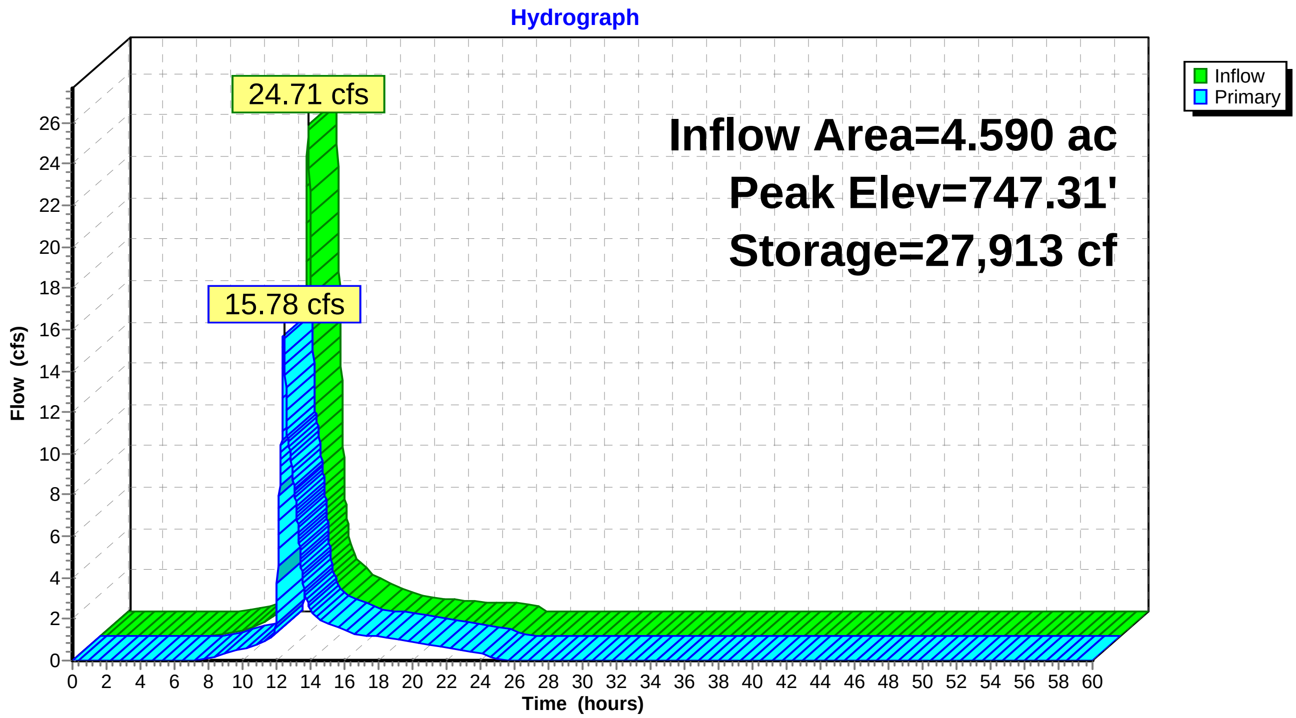
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 740.00' | 33,203 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 740.00 | 1,005 | 0 | 0 |
| 741.00 | 1,611 | 1,308 | 1,308 |
| 742.00 | 2,307 | 1,959 | 3,267 |
| 743.00 | 3,095 | 2,701 | 5,968 |
| 744.00 | 3,949 | 3,522 | 9,490 |
| 745.00 | 4,882 | 4,416 | 13,906 |
| 746.00 | 5,886 | 5,384 | 19,290 |
| 747.00 | 6,942 | 6,414 | 25,704 |
| 748.00 | 8,056 | 7,499 | 33,203 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 740.00' | **30.0" Round Culvert**<br>L= 60.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 740.00' / 739.00' S= 0.0167 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |
| #2 | Device 1 | 740.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 743.80' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 744.40' | **10.0" Vert. Orifice/Grate X 2.00** C= 0.600 |
| #5 | Device 1 | 747.10' | **20.0' long x 5.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65<br>2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

**Primary OutFlow** Max=15.76 cfs @ 12.42 hrs HW=747.31' TW=721.11' (Dynamic Tailwater)
└─**1=Culvert** (Passes 15.76 cfs of 72.73 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.75 cfs @ 12.83 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.19 cfs @ 8.75 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 8.29 cfs @ 7.60 fps)
  └─**5=Broad-Crested Rectangular Weir** (Weir Controls 4.53 cfs @ 1.08 fps)

## Pond SWM7: SWM7



## Summary for Pond SWM8: SWM8

Inflow Area = 15.712 ac, 18.18% Impervious, Inflow Depth = 5.10" for 100-Year event
Inflow = 51.63 cfs @ 12.45 hrs, Volume= 6.682 af
Outflow = 37.29 cfs @ 12.73 hrs, Volume= 6.680 af, Atten= 28%, Lag= 16.6 min
Primary = 37.29 cfs @ 12.73 hrs, Volume= 6.680 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 657.76' @ 12.73 hrs Surf.Area= 14,571 sf Storage= 75,734 cf

Plug-Flow detention time= 77.7 min calculated for 6.680 af (100% of inflow)
Center-of-Mass det. time= 77.4 min ( 927.8 - 850.4 )

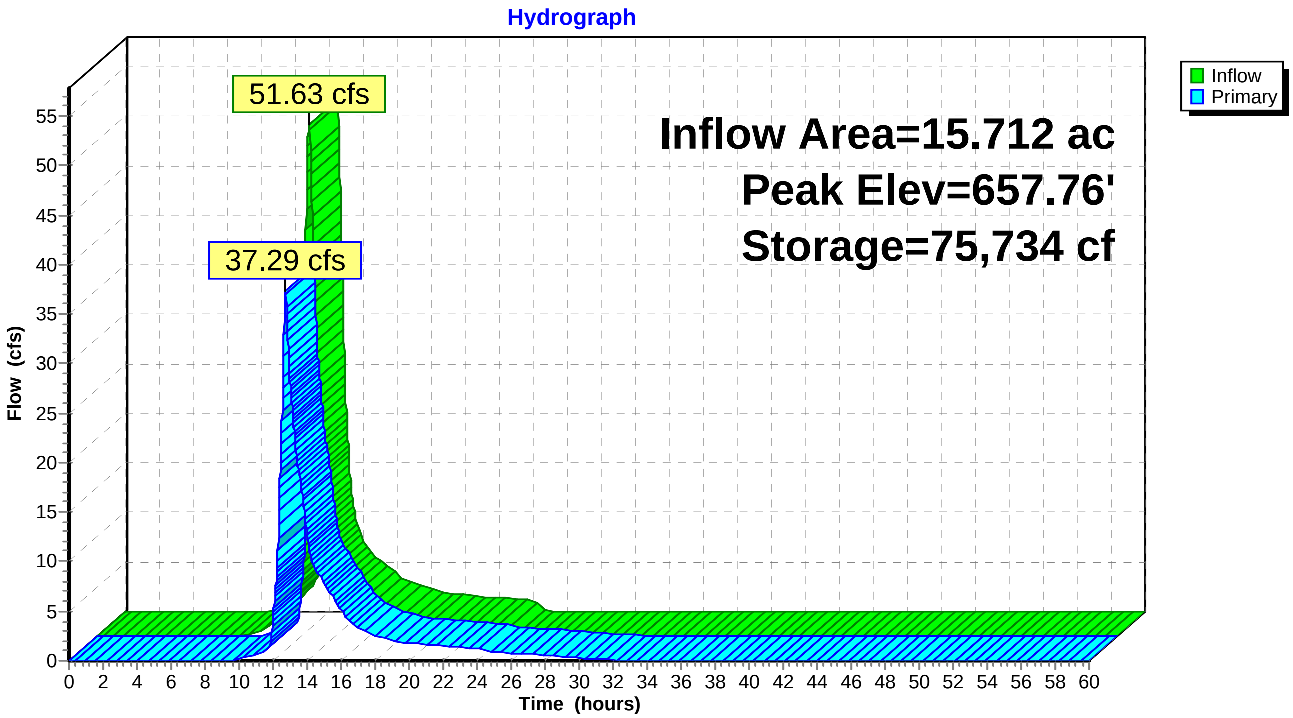
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 79,275 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 650.00 | 5,538 | 0 | 0 |
| 652.00 | 7,499 | 13,037 | 13,037 |
| 654.00 | 9,725 | 17,224 | 30,261 |
| 656.00 | 12,197 | 21,922 | 52,183 |
| 658.00 | 14,895 | 27,092 | 79,275 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **36.0" Round Culvert**<br>L= 90.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 648.00' S= 0.0222 '/' Cc= 0.900<br>n= 0.010, Flow Area= 7.07 sf |
| #2 | Device 1 | 650.00' | **5.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 652.00' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #4 | Device 1 | 654.40' | **15.0" Vert. Orifice/Grate** C= 0.600 |
| #5 | Device 1 | 656.50' | **1.5' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |
| #6 | Device 1 | 657.50' | **16.0' long x 1.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00<br>Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32 |

**Primary OutFlow** Max=37.25 cfs @ 12.73 hrs HW=657.76' TW=626.63' (Dynamic Tailwater)
└─**1=Culvert** (Passes 37.25 cfs of 106.43 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.80 cfs @ 13.23 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 13.39 cfs @ 10.91 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 9.77 cfs @ 7.96 fps)
  ├─**5=Broad-Crested Rectangular Weir** (Weir Controls 6.60 cfs @ 3.50 fps)
  └─**6=Broad-Crested Rectangular Weir** (Weir Controls 5.69 cfs @ 1.37 fps)

## Pond SWM8: SWM8



## Summary for Pond WF: Water Feature

Inflow Area = 50.743 ac, 17.46% Impervious, Inflow Depth = 3.76" for 100-Year event
Inflow = 114.67 cfs @ 12.53 hrs, Volume= 15.889 af
Outflow = 87.76 cfs @ 12.79 hrs, Volume= 15.889 af, Atten= 23%, Lag= 15.8 min
Primary = 64.35 cfs @ 12.79 hrs, Volume= 15.217 af
Secondary = 23.41 cfs @ 12.79 hrs, Volume= 0.672 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 529.58' @ 12.79 hrs Surf.Area= 36,178 sf Storage= 111,412 cf

Plug-Flow detention time= 22.4 min calculated for 15.883 af (100% of inflow)
Center-of-Mass det. time= 22.5 min ( 900.9 - 878.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 526.00' | 127,058 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

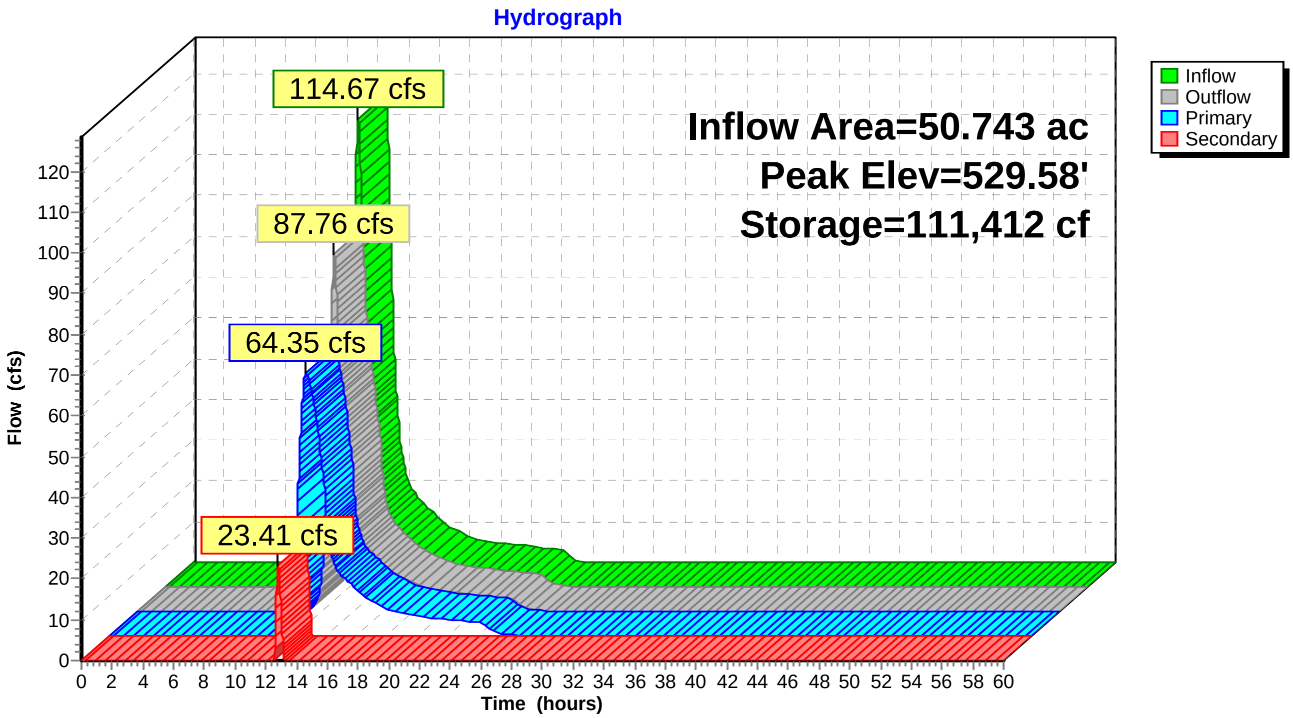
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 526.00 | 26,946 | 0 | 0 |
| 528.00 | 31,311 | 58,257 | 58,257 |
| 530.00 | 37,490 | 68,801 | 127,058 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 520.00' | **36.0" Round Culvert**<br>L= 225.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 520.00' / 513.00' S= 0.0311 '/' Cc= 0.900<br>n= 0.015, Flow Area= 7.07 sf |
| #2 | Device 1 | 526.00' | **36.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 529.00' | **20.0' long x 10.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=64.35 cfs @ 12.79 hrs HW=529.57' TW=514.99' (Dynamic Tailwater)
**1=Culvert** (Passes 64.35 cfs of 113.77 cfs potential flow)
**2=Orifice/Grate** (Orifice Controls 64.35 cfs @ 9.10 fps)

**Secondary OutFlow** Max=23.36 cfs @ 12.79 hrs HW=529.57' TW=514.99' (Dynamic Tailwater)
**3=Broad-Crested Rectangular Weir** (Weir Controls 23.36 cfs @ 2.03 fps)

## Pond WF: Water Feature

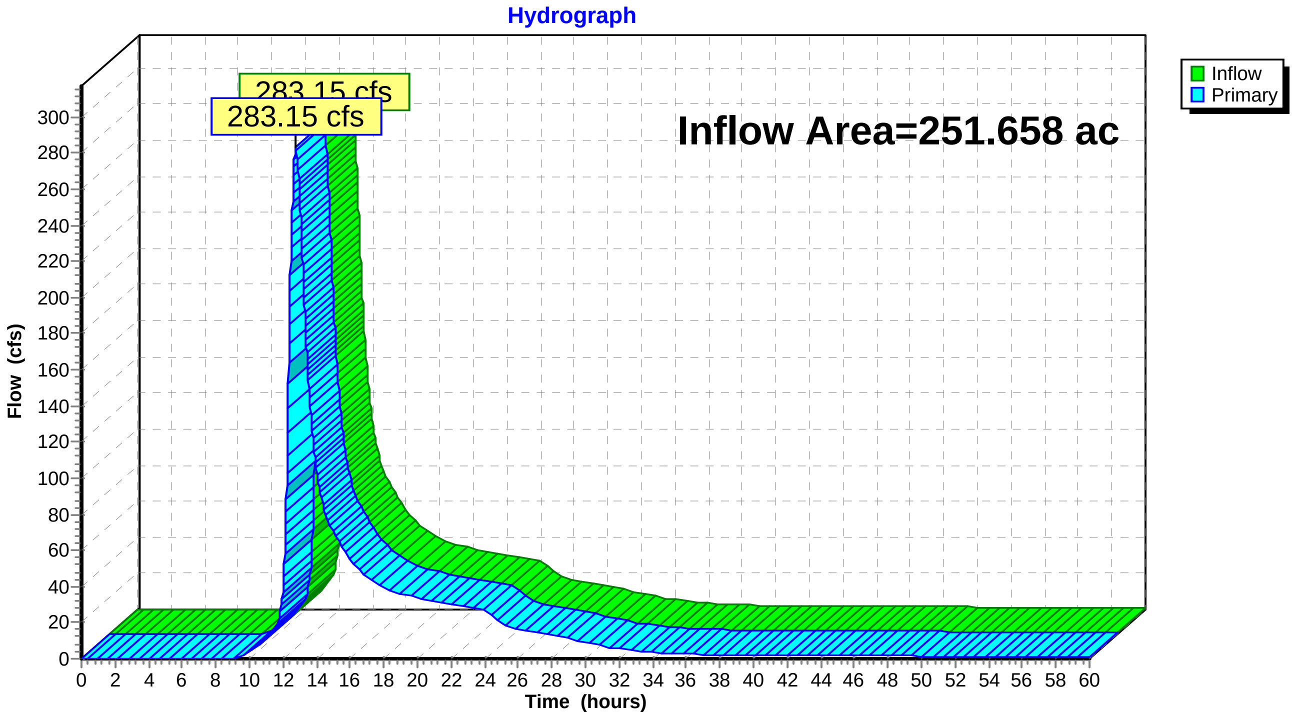


## Summary for Link A: Amenia Stream

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 251.658 ac, | 10.11% Impervious, | Inflow Depth > 3.85" | for 100-Year event |
| Inflow = | 283.15 cfs @ | 12.75 hrs, | Volume= | 80.653 af |
| Primary = | 283.15 cfs @ | 12.75 hrs, | Volume= | 80.653 af, Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

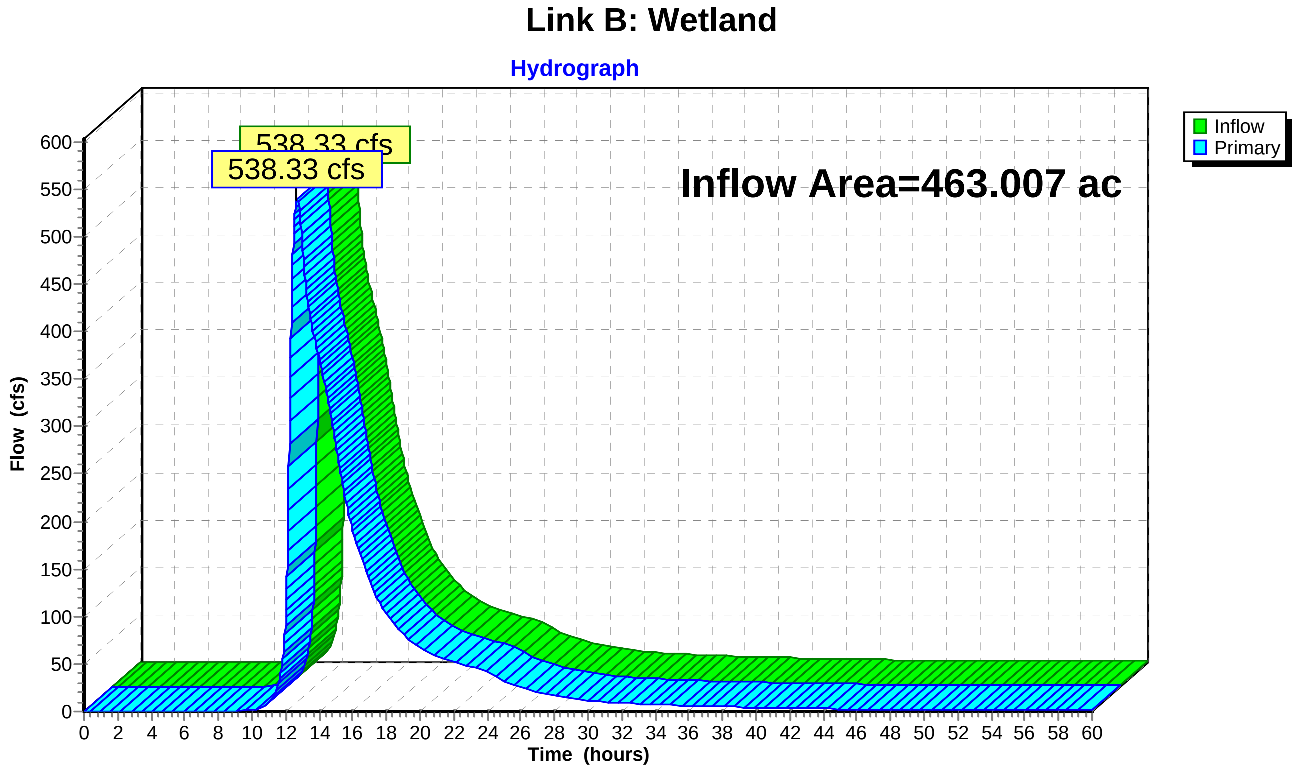
### Link A: Amenia Stream



## Summary for Link B: Wetland

Inflow Area = 463.007 ac, 14.28% Impervious, Inflow Depth > 4.98" for 100-Year event
Inflow = 538.33 cfs @ 12.66 hrs, Volume= 192.178 af
Primary = 538.33 cfs @ 12.66 hrs, Volume= 192.178 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

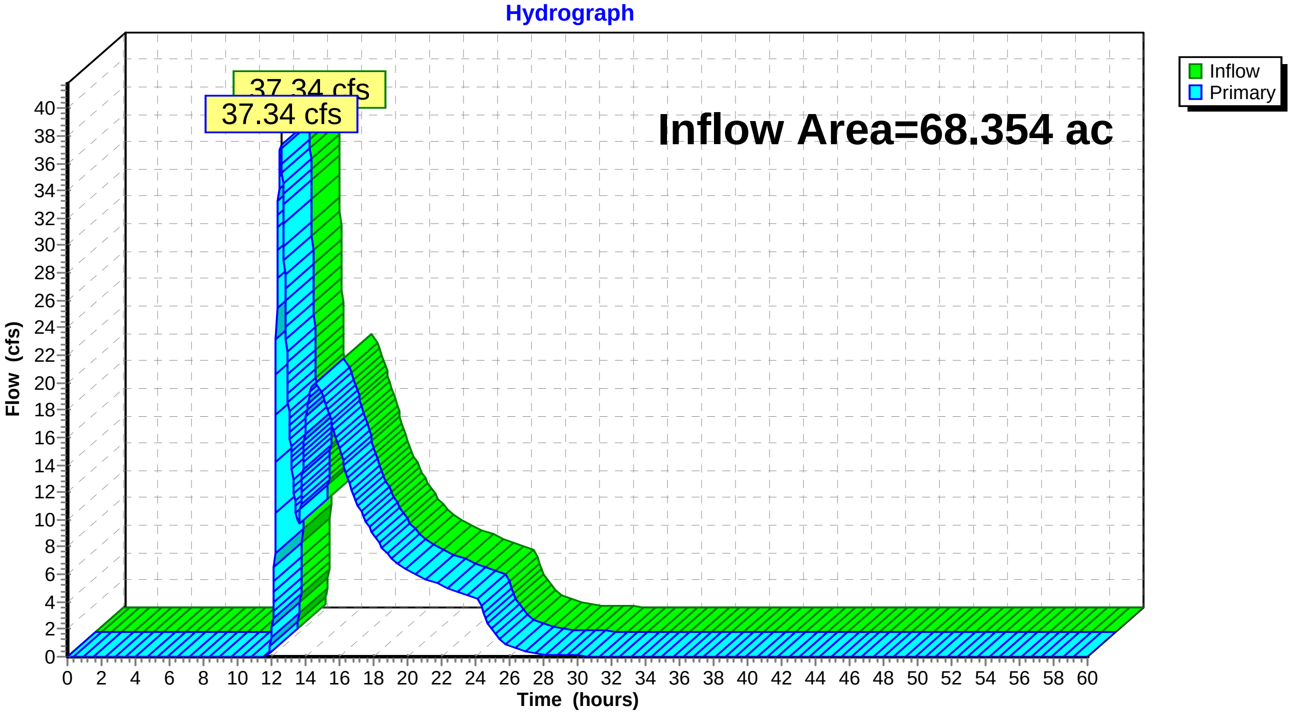


## Summary for Link C: Culvert

| | | | |
|---|---|---|---|
| Inflow Area = | 68.354 ac, | 5.83% Impervious, Inflow Depth = 2.00" | for 100-Year event |
| Inflow = | 37.34 cfs @ | 12.54 hrs, Volume= | 11.390 af |
| Primary = | 37.34 cfs @ | 12.54 hrs, Volume= | 11.390 af, Atten= 0%, Lag= 0.0 min |

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link C: Culvert

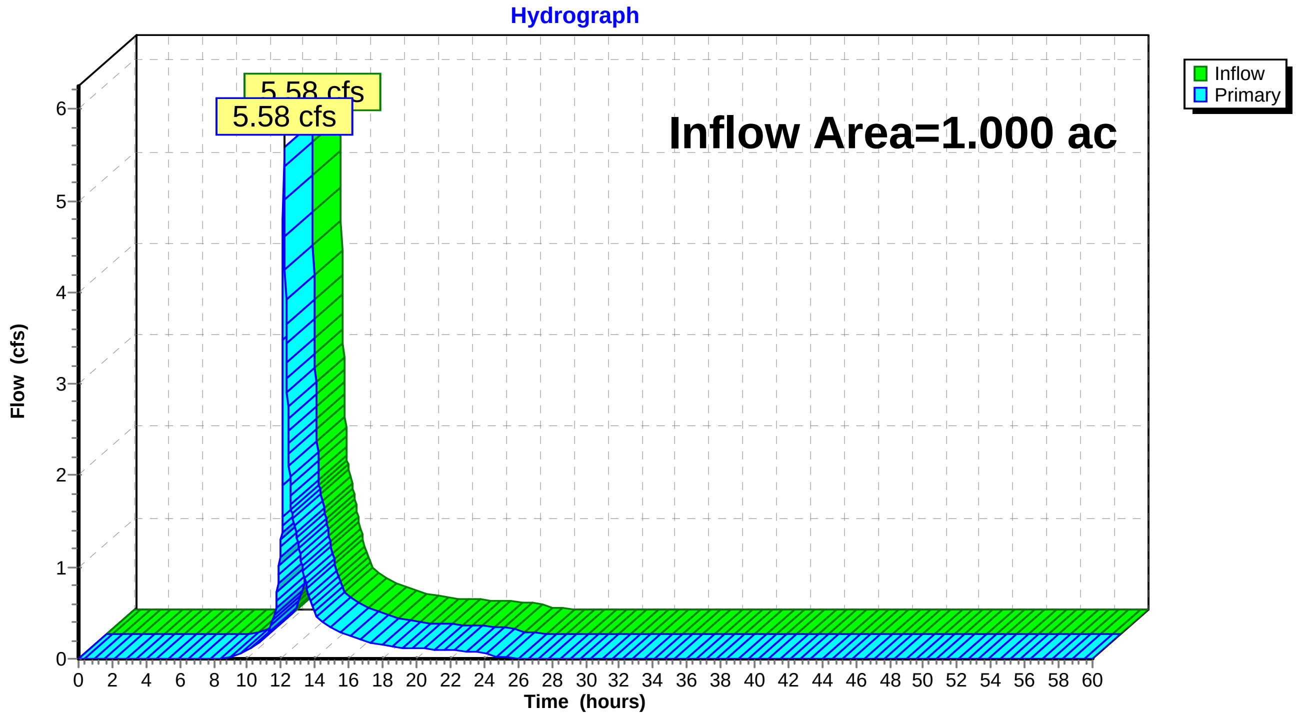


## Summary for Link Overlook-A (P1): Overlook A (Phase 1)

Inflow Area = 1.000 ac, 0.00% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 5.58 cfs @ 12.16 hrs, Volume= 0.470 af
Primary = 5.58 cfs @ 12.16 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.02 hrs

### Link Overlook-A (P1): Overlook A (Phase 1)



# Attachment E3
# Water Quality Calculations

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 1/8/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Wet Extended Detention Pond Design - (SMW #1) (refer to section 8.2 in SMDM)

### Step 1: Compute Preliminary Runoff Control Volumes

### Water Quality Volume Calculations

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 63 | = CN value for developed condition |
| Q: | 0.35 | = 1-year runoff (in.) |
| A: | 32.2 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 5.9

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.35

WQv: **0.945** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.

Qp (peak control volume) and Qf (flood control volume) are not estimated at this step because several design iterations have been performed to archive the peak control volume & rate (step 8) and flood control volume & rate (step 9) using HydroCAD

### Step 2: Appropriateness Stormwater Pond for Site

Drainage Area = 32.2 Ac
Existing ground at proposed pond outlet = 508'
Seasonal high water table is deeper than 500' (no ground water is observed)
(OK)

### Step 2A: Determin Hazardous Class of Dam

Height of pond is less than 40 feet
Storage of pond at normal water surface is less than 1000 ac-ft
Therefore, the pond is classified as small class "A" dam.

### Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

### Step 4: Determin Pretreatment Volume

**Forebay Requirements**

| | | | | |
|---|---|---|---|---|
| Minimum Size: | 10% | of WQv = | *0.0945* | ac-ft |
| | | | 4118.24303 | $ft^3$ |

### Step 5: Determine Permanent Pool Volume and ED Volume

**Permanent Pool Requirements:**

Minimum Size: 50% of WQv = *0.4727* ac-ft

20591.2151 $ft^3$

### Step 6: Determine Pond Geometry, Storage Available for Permanent Pool and WQv-ED

***Forebay Storage Volume:***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Forebay Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 506 | 555 | | 0.0127 | | | | | | |
| | | 943 | | 0.0216 | 2 | 1886 | 0.0433 | 0.0433 | 0.0945 |
| 508 | 1331 | | 0.0306 | | | | | | |
| | | 1855 | | 0.0426 | 2 | 3709 | 0.0851 | 0.1284 | 0.0945 |
| 510 | 2378 | | 0.0546 | | | | | | |
| | | 3039 | | 0.0698 | 2 | 6078 | 0.1395 | 0.2680 | 0.0945 |
| 512 | 3700 | | 0.0849 | | | | | | |

***Permanent Pool Storage Volume (including Forebay Volumes)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Volume Forebay Provided (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Permanent Pool Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 506 | 3326 | | 0.0764 | | | | | | | |
| | | 4080 | | 0.0937 | 2 | 8159 | 0.1873 | 0.0433 | 0.2306 | 0.4727 |
| 508 | 4833 | | 0.1110 | | | | | | | |
| | | 5713 | | 0.1312 | 2 | 11426 | 0.2623 | 0.0851 | 0.5781 | 0.4727 |
| 510 | 6593 | | 0.1514 | | | | | | | |
| | | 7598 | | 0.1744 | 2 | 15196 | 0.3489 | 0.1395 | 1.0664 | 0.4727 |
| 512 | 8603 | | 0.1975 | | | | | | | |

Set Permanent Pool Elevation ($WQ_{PPE}$) = 512.00 ft.

**Required Water Quality Volume above Permanent Pool:**

| | (Total Req'd Volume) | | (Permanent Pool Cumulative Volume) | | | |
|---|---|---|---|---|---|---|
| *Balance of Required Water Quality Volume = above permanent pool | 0.9454 | - | 1.0664 | = | -0.1210 | ac-ft. |

**Note: Permanent Pool Provided more than 100% of WQv therefore extended detention for water quality is not neede**

Water quality volume provided = **1.066** ac-ft

***Basin Volume (above Permanent Pool Elevation)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Cumulative Volume above Permanent Pool (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| 512 | 12303 | | 0.2824 | | | | | |
| | | 13649 | | 0.3133 | 1 | 13649 | 0.3133 | 0.3133 |
| 513 | 14994 | | 0.3442 | | | | | |
| | | 17484 | | 0.4014 | 1 | 17484 | 0.4014 | 0.7147 |
| 514 | 19973 | | 0.4585 | | | | | |
| | | 23663 | | 0.5432 | 2 | 47326 | 1.0865 | 1.8011 |
| 516 | 27353 | | 0.6279 | | | | | |

### Step 7: Determine Channel Protection Volume (CPv)

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.

### Step 8: Calculate $Q_{p10}$ (10-year Storm) Release Rate and Water Surface Elevation

This pond is designed only for water quality purposes. No water quantity is provided because the overall water quantity requirement at study point B already achieved even without any detention from this pond.

### Step 9: Calculate $Qf_{100}$ (100-year Storm) Release Rate and Water Surface Elevation

This pond is designed only for water quality purposes. No water quantity is provided because the overall water quantity requirement at study point B already achieved even without any detention from this pond.

### Step 10: Calculate Safe Passage of $Qf_{100}$ (100-year Storm) and Set Top of Embankment Elevation

Note: Refer to HydroCAD output for these analysis.

Qf100 (100-year Storm) water elevation = 515.25'

Top of Embankment is set at elevation = 516.5'

Freeboard provided = 1.25'

## ***Other Requirements***

*a) Determine Pond Drain to dewater within 24 hours*

Permanent Pool Volume = 1.0664 ac-ft.

Average release rate = 1.0664 x 43560 ft$^2$/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 0.54 cfs

****Size Pond Drain orifice:***

| Qavg = **0.54** cfs |
|---|

Average head (h) = (Permanent Pool Elev - Basin Bottom Elev)/2

Average h = $\frac{512.00 - 510.00}{2}$

| Average h = 1.00 ft. |
|---|

****Use the orifice flow equation to calculate the required cross-sectional area and diameter for the Pond Drain Orifice:***

[Q=ca(sq. rt. (2gh))]

where:

c = 0.61

g = 32.2 sqrt(2gh) = 8.025

Average h = 1.00 a= 0.110 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Resulting diameter of orifice based upon area = D = 0.374 ft. Based upon: [D = sq. rt. (4a/3.142)]

D = 4.488 in.

| For Design, Use a **4** in. diameter hole. |
|---|

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)

Orifice centerline elevation = 508.00 + 0.17

| Orifice centerline elevation = 508.17 ft. |
|---|

Adjustable gate valve shall be provided to pond drain

b) Pond liner is not required since the pond is not located in gravelly sands or fractured bedrock area.
However liner will be provided if during construction verify the need of liner.
c) Inlet pipes are partially submerged as suggested in SMDM and to ensure non-erosive condition.
d) Riprap protection at the oulet has been size to prevent erosion. See Appendix E5
e) Length to width ratio = 170/55 = 3:1 (minimum required is 1.5:1)
f) Surface area to drainage area ratio = 0.17:32.2 = 1:189 (minimum required is 1:100)
This SWM #1 itself does not satisfy the surface area to drainage area ratio eventhough it satisfy the WQv.
However just uphill of this SWM #1 there is one water feature pond that wasn't take into consideration during the WQv calculation. Thus by considering the combined surface area of this water feature pond and SWM #1, the surface area to drainage ratio = 0.79/32.2 = 1/40
g) Safety bench is not required since the design side slope is 4:1.
h) Adequate aquatic bench is provided as shown in the site plan.
i) There is no permanent structure within 25 ft buffer from the maximum water surface elevation of the pond
j) The pond is easily accessible for maintenance via cart path and lot of open spaces

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 1/8/2015
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**Calculated By:** JC
**Checked By:**

# Wet Extended Detention Pond Design -SMW #2 (refer to section 8.2 in SMDM)

## Step 1: Compute Preliminary Runoff Control Volumes

### Water Quality Volume Calculations

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 79 | = CN value for developed condition |
| Q: | 1.04 | = 1-year runoff (in.) |
| A: | 53.3 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 2.7

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 1.04

WQv: **4.639** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.
Qp (peak control volume) and Qf (flood control volume) are not estimated at this step because several design iterations have been performed to archive the peak control volume & rate (step 8) and flood control volume & rate (step 9) using HydroCAD

## Step 2: Appropriateness Stormwater Pond for Site

Drainage Area = 53.3 Ac
Existing ground at proposed pond outlet = 493'
Seasonal high water table is deeper than 493' (no ground water is observed)
(OK)

## Step 2A: Determin Hazardous Class of Dam

Height of pond is less than 40 feet
Storage of pond at normal water surface is less than 1000 ac-ft
Therefore, the pond is classified as small class "A" dam.

## Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

## Step 4: Determine Pretreatment Volume

**Forebay Requirements**

| | | | | |
|---|---|---|---|---|
| Minimum Size: | 10% | of WQv = | *0.4639* | ac-ft |
| | | | 20207.376 | $ft^3$ |

**Step 5: Determine Permanent Pool Volume and ED Volume**

**Permanent Pool Requirements:**

Minimum Size: 50% of WQv = 2.3195 ac-ft

101036.88 $ft^3$

**Step 6: Determine Pond Geometry, Storage Available for Permanent Pool and WQv-ED**

***Forebay Storage Volume:***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Forebay Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 493 | 8227 | | 0.1889 | | | | | | |
| | | 8790 | | 0.2018 | 1 | 8790 | 0.2018 | 0.2018 | 0.4639 |
| 494 | 9352 | | 0.2147 | | | | | | |
| | | 9943 | | 0.2283 | 1 | 9943 | 0.2283 | 0.4300 | 0.4639 |
| 495 | 10534 | | 0.2418 | | | | | | |
| | | 11153 | | 0.2560 | 1 | 11153 | 0.2560 | 0.6861 | 0.4639 |
| 496 | 11772 | | 0.2702 | | | | | | |
| | | 12420 | | 0.2851 | 1 | 12420 | 0.2851 | 0.9712 | 0.4639 |
| 497 | 13067 | | 0.3000 | | | | | | |
| | | 13743 | | 0.3155 | 1 | 13743 | 0.3155 | 1.2867 | 0.4639 |
| 498 | 14418 | | 0.3310 | | | | | | |

***Permanent Pool Storage Volume (including Forebay Volumes)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Volume Forebay Provided (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Permanent Pool Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 493 | 12202 | | 0.2801 | | | | | | | |
| | | 12881 | | 0.2957 | 1 | 12881 | 0.2957 | 0.2018 | 0.4975 | 2.3195 |
| 494 | 13560 | | 0.3113 | | | | | | | |
| | | 14263 | | 0.3274 | 1 | 14263 | 0.3274 | 0.2283 | 1.0532 | 2.3195 |
| 495 | 14965 | | 0.3435 | | | | | | | |
| | | 15700 | | 0.3778 | 1 | 15700 | 0.3604 | 0.2560 | 1.6696 | 2.3195 |
| 496 | 16434 | | 0.3773 | | | | | | | |
| | | 17194 | | 0.4128 | 1 | 17194 | 0.3947 | 0.2851 | 2.3494 | 2.3195 |
| 497 | 17953 | | 0.4121 | | | | | | | |
| | | 18741 | | 0.4302 | 1 | 18741 | 0.4302 | 0.3155 | 3.0951 | 2.3195 |
| 498 | 19528 | | 0.4483 | | | | | | | |

Set Permanent Pool Elevation ($WQ_{PPE}$) = 498.00 ft.

**Required Water Quality Volume above Permanent Pool (WQv-ED):**

| | (Total Req'd Volume) | | (Permanent Pool Cumulative Volume) | | | |
|---|---|---|---|---|---|---|
| *Balance of Required Water Quality Volume = above permanent pool | 4.6390 | - | 3.0951 | = | 1.5438 | ac-ft. |

## *Basin Volume (above Permanent Pool Elevation)*

| Contour Elev. (ft) | Contour Area: Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Cum. Volume above Permanent Pool (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| 498 | 33946 | | 0.7793 | | | | | |
| | | 43051 | | 0.9883 | 1 | 43051 | 0.9883 | 0.9883 |
| 499 | 52156 | | 1.1973 | | | | | |
| | | 53922 | | 1.2379 | 1 | 53922 | 1.2379 | 2.2262 |
| 500 | 55687 | | 1.2784 | | | | | |
| | | 57519 | | 1.3204 | 1 | 57519 | 1.3204 | 3.5466 |
| 501 | 59350 | | 1.3625 | | | | | |
| | | 61214 | | 1.4053 | 1 | 61214 | 1.4053 | 4.9519 |
| 502 | 63077 | | 1.4480 | | | | | |
| | | 64991 | | 1.4920 | 1 | 64991 | 1.4920 | 6.4439 |
| 503 | 66905 | | 1.5359 | | | | | |
| | | 69540 | | 1.5964 | 1 | 69540 | 1.5964 | 8.0403 |
| 504 | 72175 | | 1.6569 | | | | | |
| | | 75643 | | 1.7365 | 1 | 75643 | 1.7365 | 9.7768 |
| 505 | 79111 | | 1.8161 | | | | | |
| | | 83893 | | 1.9259 | 1 | 83893 | 1.9259 | 11.7027 |
| 506 | 88674 | | 2.0357 | | | | | |

## *Determine WQv-Extended Detention Elevation:*

| | | Elev. (ft.) | Cumulative Volume |
|---|---|---|---|
| Required WQv-ED Volume/Elev = | | X | 1.5438 |
| Basin Storage Elevation Range: | High: | 500.00 | 2.2262 |
| (above permanent pool elev) | Low: | 499.00 | 0.9883 |

Required WQv-ED Volume = **1.5438** ac-ft

Required water quality elevation, X = **499.4** ft

| | | |
|---|---|---|
| Set Water Quality Elevation (WQv-ED)= | **499.50** | ft |
| Water quality volume provided = | **4.639** | ac-ft |

## *Determine the required $WQ_V$-ED orifice:*

*(Note: ED means extended detention.)*

Required WQv-ED Volume = 1.5438 ac-ft.

Average ED release rate = 1.5438 x 43560 $ft^2$/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 0.78 cfs

***Size WQv-ED orifice:***

Qavg = **0.78** cfs

Average head (h) = $(WQ_{V\text{-}ED} - WQ_{PPE})/2$

Average h = (499.50 - 498.00) / 2

Average h = 0.75 ft.

***Use the orifice flow equation to calculate the required cross-sectional area and diameter for the WQV-ED orifice:***

[Q=ca(sq. rt. (2gh))]

where:

c = 0.61

g = 32.2 sqrt(2gh) = 6.950

Average h = 0.75 a= 0.184 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Resulting diameter of orifice based upon area = D = 0.483 ft. Based upon: [D = sq. rt. (4a/3.142)]

D = 5.802 in.

| For Design, Use a | **8** | in. diameter hole. |
|---|---|---|

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)

Orifice centerline elevation = 498.00 + 0.33

| Orifice centerline elevation = | 498.33 | ft. |
|---|---|---|

### Step 7: Determine Channel Protection Volume (CPv)

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.

### Step 8: Calculate $Q_{p10}$ (10-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qp10 is less than the existing conditions (Study Point B)

### Step 9: Calculate $Qf_{100}$ (100-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qf100 is less than the existing conditions (Study Point B)

### Step 10: Calculate Safe Passage of $Qf_{100}$ (100-year Storm) and Set Top of Embankment Elevation

Note: Refer to HydroCAD output for these analysis.

Qf100 (100-year Storm) water elevation = 505.8'

Top of Embankment is set at elevation = 506.8'

Freeboard provided = 1 ft

## ***Other Requirements***

*a) Determine Pond Drain to dewater within 24 hours*

Permanent Pool Volume = 3.0951 ac-ft.

Average release rate = 3.0951 x 43560 $ft^2$/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 1.56 cfs

***Size Pond Drain orifice:**

| Qavg = | **1.56** | cfs |
|---|---|---|

Average head (h) = (Permanent Pool Elev - Basin Dewater Elev)/2

$$\text{Average h} = \frac{498.00 - 496.00}{2}$$

| Average h = | 1.00 | ft. |
|---|---|---|

***Use the orifice flow equation to calculate the required cross-sectional area and diameter**

***for the Pond Drain Orifice:***

[Q=ca(sq. rt. (2gh))]
where:
c = 0.61
g = 32.2 sqrt(2gh) = 8.025
Average h = 1.00 a= 0.319 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Resulting diameter of orifice based upon area = D = 0.637 ft. Based upon: [D = sq. rt. (4a/3.142)]
D = 7.645 in.

| For Design, Use a | **8** | in. diameter hole. |
|---|---|---|

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)
Orifice centerline elevation = 496.00 + 0.33

| Orifice centerline elevation = | 496.33 | ft. |
|---|---|---|

Adjustable gate valve shall be provided to pond drain

b) Pond liner is not required since the pond is not located in gravelly sands or fractured bedrock area.
However liner will be provided if during construction verify the need of liner.
c) Inlet pipes are partially submerged as suggested in SMDM and to ensure non-erosive condition.
d) Riprap protection at the oulet has been size to prevent erosion. See Appendix E5
e) Length to width ratio = 280/180 = 1.55:1 (minimum required is 1.5:1)
f) Surface area to drainage area ratio = 0.78:53.3 = 1:68 (minimum required is 1:100)
g) Safety bench is not required since the design side slope is 4:1.
h) Adequate aquatic bench is provided as shown in the site plan.
i) There is no permanent structure within 25 ft buffer from the maximum water surface elevation of the pond
j) The pond is easily accessible for maintenance via cart path and lot of open spaces

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
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**Checked By:**

# Wet Extended Detention Pond Design -SMW #3
# (refer to section 8.2 in SMDM)

### Step 1: Compute Preliminary Runoff Control Volumes

Note: This Pond is designed for water quantity purposes only. No water quality is provided.
Qp (peak control volume) and Qf (flood control volume) are not estimated at this step because several design iterations have been performed to archive the peak control volume & rate (step 8) and flood control volume & rate (step 9) using HydroCAD

### Step 2: Appropriateness Stormwater Pond for Site

Drainage Area = 248 Ac

These are existing pond. Under proposed condition, the ponds will be merged and improved the overall performance

(OK)

### Step 2A: Determin Hazardous Class of Dam

Height of pond is less than 40 feet

Storage of pond at normal water surface is less than 1000 ac-ft

Therefore, the pond is classified as small class "A" dam.

### Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

### Step 4: Determine Pretreatment Volume

This step is not applicable since this pond is not for water quality surposes.

### Step 5: Determine Permanent Pool Volume and ED Volume

This step is not applicable since this pond is not for water quality surposes.

### Step 6: Determine Pond Geometry, Storage Available for Permanent Pool and WQv-ED

WQv-Ed is not applicable for this step. Below are the pond geometry and storage availability for detention

***Basin Volume (above normal surface elevation)***

*Note: Normal surface elevation is set at 507'*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Cumulative Volume above Permanent Pool (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| 507 | 359082 | | 8.2434 | | | | | |
| | | 364647 | | 8.3711 | 1 | 364647 | 8.3711 | 8.3711 |
| 508 | 370212 | | 8.4989 | | | | | |
| | | 391700 | | 8.9922 | 2 | 783400 | 17.9844 | 26.3555 |
| 510 | 413188 | | 9.4855 | | | | | |
| | | 443164 | | 10.1736 | 2 | 886327 | 20.3473 | 46.7028 |
| 512 | 473139 | | 10.8618 | | | | | |

### Step 7: Determine Channel Protection Volume (CPv)

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, overall WQv provided is already accounted for the 1-year storm.

### Step 8: Calculate $Q_{p10}$ (10-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qp10 is less than the existing conditions (Study Point B)

### Step 9: Calculate $Qf_{100}$ (100-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qf100 is less than the existing conditions (Study Point B)

### Step 10: Calculate Safe Passage of $Qf_{100}$ (100-year Storm) and Set Top of Embankment Elevation

Note: Refer to HydroCAD output for these analysis.

Qf100 (100-year Storm) water elevation = 511.1'

Top of Embankment is set at elevation = 512.2'

Freeboard provided = 1.1 ft

## ***Other Requirements***

*a) Determine Pond Drain to dewater within 24 hours*

Permanent Pool Volume = 25.1 ac-ft.

Average release rate = 25.1 x 43560 $ft^2$/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 12.66 cfs

***Size Pond Drain orifice:**

Qavg = **12.66** cfs

Average head (h) = (Permanent Pool Elev - Basin Bottom Elev)/2

Average h = $\frac{507.00 - 504.00}{2}$

Average h = 1.50 ft.

***Use the orifice flow equation to calculate the required cross-sectional area and diameter for the Pond Drain Orifice:**

[Q=ca(sq. rt. (2gh))]

where:

c = 0.61

g = 32.2 sqrt(2gh) = 9.829

Average h = 1.50 a= 2.112 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Resulting diameter of orifice based upon area = D = 1.640 ft. Based upon: [D = sq. rt. (4a/3.142)]

D = 19.677 in.

For Design, Use a **24** in. diameter hole.

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)

Orifice centerline elevation = 504.00 + 1.00

Orifice centerline elevation = 505.00 ft.

Adjustable gate valve shall be provided to pond drain

b) Pond liner is not required since this is an modified existing pond.
However liner will be provided if during construction verify the need of liner.

c) Inlet pipes are partially submerged as suggested in SMDM and to ensure non-erosive condition.

d) Riprap protection at the oulet has been size to prevent erosion. See Appendix E5

e) Length to width ratio = 1400/430 = 3.2:1 (minimum required is 1.5:1)

f) Surface area to drainage area ratio = 8.29:248 = 1:30 (minimum required is 1:100)

g) Safety bench is not required since the design side slope is 4:1.

h) Adequate aquatic  bench is provided as shown in the site plan.
i) There is no permanent structure within 25 ft buffer from the maximum water surface elevation of the pond
j) The pond is easily accessible for maintenance via cart path and lot of open spaces

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 1/8/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Wet Extended Detention Pond Design -SMW #4 (refer to section 8.2 in SMDM)

## Step 1: Compute Preliminary Runoff Control Volumes

Note: This Pond is designed for water quantity purposes only. No water quality is provided.

Qp (peak control volume) and Qf (flood control volume) are not estimated at this step because several design iterations have been performed to archive the peak control volume & rate (step 8) and flood control volume & rate (step 9) using HydroCAD

## Step 2: Appropriateness Stormwater Pond for Site

Drainage Area = 196 Ac

These are existing pond. Under proposed condition, the ponds will be enlarged and improved the overall performance (OK)

## Step 2A: Determin Hazardous Class of Dam

Height of pond is less than 40 feet

Storage of pond at normal water surface is less than 1000 ac-ft

Therefore, the pond is classified as small class "A" dam.

## Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

## Step 4: Determine Pretreatment Volume

This step is not applicable since this pond is not for water quality surposes.

## Step 5: Determine Permanent Pool Volume and ED Volume

This step is not applicable since this pond is not for water quality surposes.

## Step 6: Determine Pond Geometry, Storage Available for Permanent Pool and WQv-ED

WQv-Ed  is not applicable for this step. Below are the pond geometry and storage availability for detention

***Basin Volume (above normal surface elevation)***

*Note: Normal surface elevation is set at 515'*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Cumulative Volume above Permanent Pool (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| 515 | 40770 | | 0.9360 | | | | | |
| | | 42383 | | 0.9730 | 1 | 42383 | 0.9730 | 0.9730 |
| 516 | 43995 | | 1.0100 | | | | | |
| | | 48418 | | 1.1115 | 2 | 96836 | 2.2230 | 3.1960 |
| 518 | 52841 | | 1.2131 | | | | | |
| | | 57465 | | 1.3192 | 2 | 114930 | 2.6384 | 5.8344 |
| 520 | 62089 | | 1.4254 | | | | | |
| | | 66590 | | 1.5287 | 2 | 133179 | 3.0574 | 8.8918 |
| 522 | 71090 | | 1.6320 | | | | | |

## Step 7: Determine Channel Protection Volume (CPv)

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, overall WQv provided is already accounted for the 1-year storm.

## Step 8: Calculate $Q_{p10}$ (10-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qp10 is less than the existing conditions (Study Point B)

### Step 9: Calculate $Qf_{100}$ (100-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qf100 is less than the existing conditions (Study Point B)

### Step 10: Calculate Safe Passage of $Qf_{100}$ (100-year Storm) and Set Top of Embankment Elevation

Note: Refer to HydroCAD output for these analysis.

| | |
|---|---|
| Qf100 (100-year Storm) water elevation = | 519.9' |
| Top of Embankment is set at elevation = | 521.5' |
| Freeboard provided = | 1.6 ft |

## ***Other Requirements***

a) Location of this modified existing pond prohibit pond drain to be provided

b) Pond liner is not required since this is an modified existing pond.
However liner will be provided if during construction verify the need of liner.

c) Inlet pipes are partially submerged as suggested in SMDM and to ensure non-erosive condition.

d) Oulet pipes have been partially submerged at SWM 3 to prevent erosion.

e) Length to width ratio = 470/140 = 3.35:1 (minimum required is 1.5:1)

f) Surface area to drainage area ratio = 1:195 (minimum required is 1:100)
This is an existing pond that was being enlarged. The surface area to drainage area ratio is actually improved.
Furthermore, SWM #3 which is located at downstream of SWM #4 receiving all the drainage area from SMW #4.
Therefore, the satisfaction of surface area to drainage area requirement in SMW #3 will also satisfy the SMW #4.

g) Safety bench is not required since the design side slope is 4:1.

h) Adequate aquatic bench is provided as shown in the site plan.

i) There is no permanent structure within 25 ft buffer from the maximum water surface elevation of the pond

j) The pond is easily accessible for maintenance via cart path and lot of open spaces

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 1/8/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Wet Extended Detention Pond Design -SMW #5 (refer to section 8.2 in SMDM)

### Step 1: Compute Preliminary Runoff Control Volumes

### Water Quality Volume Calculations

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 80 | = CN value for developed condition |
| Q: | 1.10 | = 1-year runoff (in.) |
| A: | 39.65 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 2.5

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 1.10

WQv: **3.641** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.
Qp (peak control volume) and Qf (flood control volume) are not estimated at this step because several design iterations have been performed to archive the peak control volume & rate (step 8) and flood control volume & rate (step 9) using HydroCAD

### Step 2: Appropriateness Stormwater Pond for Site

Drainage Area = 39.7 Ac
Existing ground at proposed pond outlet = 512'
Seasonal high water table is = 509.5'
(OK)

### Step 2A: Determin Hazardous Class of Dam

Height of pond is less than 40 feet
Storage of pond at normal water surface is less than 1000 ac-ft
Therefore, the pond is classified as small class "A" dam.

### Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

### Step 4: Determine Pretreatment Volume

**Forebay Requirements**

Minimum Size: 10% of WQv = *0.3641* ac-ft
15862.2303 $ft^3$

**Step 5: Determine Permanent Pool Volume and ED Volume**

**<u>Permanent Pool Requirements:</u>**

Minimum Size: 50% of WQv = *1.8207* ac-ft

= 79311.1516 $ft^3$

**Step 6: Determine Pond Geometry, Storage Available for Permanent Pool and WQv-ED**

***Forebay Storage Volume:***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Forebay Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 512 | 1799 | | 0.0413 | | | | | | |
| | | 2503 | | 0.0575 | 2 | 5006 | 0.1149 | 0.1149 | 0.3641 |
| 514 | 3207 | | 0.0736 | | | | | | |
| | | 4043 | | 0.0928 | 2 | 8086 | 0.1856 | 0.3006 | 0.3641 |
| 516 | 4879 | | 0.1120 | | | | | | |
| | | 5343 | | 0.1227 | 1 | 5343 | 0.1227 | 0.4232 | 0.3641 |
| 517 | 5807 | | 0.1333 | | | | | | |

***Permanent Pool Storage Volume (including Forebay Volumes)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Volume Forebay Provided (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Permanent Pool Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 512 | 8009 | | 0.1839 | | | | | | | |
| | | 9724 | | 0.2232 | 2 | 19447 | 0.4464 | 0.1149 | 0.5614 | 1.8207 |
| 514 | 11438 | | 0.2626 | | | | | | | |
| | | 13296 | | 0.3052 | 2 | 26591 | 0.6104 | 0.3006 | 1.4724 | 1.8207 |
| 516 | 15153 | | 0.3479 | | | | | | | |
| | | 16133 | | 0.3704 | 1 | 16133 | 0.3704 | 0.4232 | 2.2659 | 1.8207 |
| 517 | 17113 | | 0.3929 | | | | | | | |

Set Permanent Pool Elevation ($WQ_{PPE}$) = 517.00 ft.

**Required Water Quality Volume above Permanent Pool:**

| | (Total Req'd Volume) | | (Permanent Pool Cumulative Volume) | | | |
|---|---|---|---|---|---|---|
| *Balance of Required Water Quality Volume = above permanent pool | 3.6415 | - | 2.2659 | = | <u>1.3755</u> | ac-ft. |

***Basin Volume (above Permanent Pool Elevation)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Cumulative Volume above Permanent Pool (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| 517 | 22920 | | 0.5262 | | | | | |
| | | 29006 | | 0.6659 | 1 | 29006 | 0.6659 | 0.6659 |
| 518 | 35091 | | 0.8056 | | | | | |
| | | 38959 | | 0.8944 | 2 | 77918 | 1.7888 | 2.4546 |
| 520 | 42827 | | 0.9832 | | | | | |
| | | 46896 | | 1.0766 | 2 | 93792 | 2.1532 | 4.6078 |
| 522 | 50965 | | 1.1700 | | | | | |
| | | 50983 | | 1.1704 | 1 | 50983 | 1.1704 | 5.7782 |
| 523 | 51000 | | 1.1708 | | | | | |

## ***Determine WQv-Extended Detention Elevation:***

| | | Elev. (ft.) | Cumulative Volume |
|---|---|---|---|
| Required WQv-ED Volume/Elev = | | X | 1.3755 |
| Basin Storage Elevation Range: | High: | 520.00 | 2.4546 |
| (above permanent pool elev) | Low: | 518.00 | 0.6659 |

Required WQv-ED Volume = **1.3755** ac-ft

Required water quality elevation, X = **518.8** ft

| | | |
|---|---|---|
| Set Water Quality Elevation (WQv-ED)= | **519.25** | ft |
| Water quality volume provided = | **3.641** | ac-ft |

## ***Determine the required $WQ_V$-ED orifice:***

*(Note: ED means extended detention.)*

Balance of required WQv = 1.3755 ac-ft.

Average ED release rate = 1.3755 x 43560 $ft^2$/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 0.69 cfs

****Size WQv-ED orifice:***

Qavg = **0.69** cfs

Average head (h) = $(WQ_{V\text{-}ED} - WQ_{PPE})/2$

$$\text{Average h} = \frac{519.25 - 517.00}{2}$$

Average h = 1.13 ft.

****Use the orifice flow equation to calculate the required cross-sectional area and diameter for the WQV-ED orifice:***

[Q=ca(sq. rt. (2gh))]

where:

c = 0.61

g = 32.2 sqrt(2gh) = 8.512

Average h = 1.13 a= 0.134 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Resulting diameter of orifice based upon area = D = 0.412 ft. Based upon: [D = sq. rt. (4a/3.142)]

D = 4.949 in.

For Design, Use a **6** in. diameter hole.

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)

Orifice centerline elevation = 517.00 + 0.25

Orifice centerline elevation = 517.25 ft.

### Step 7: Determine Channel Protection Volume (CPv)

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.

### Step 8: Calculate $Q_{p10}$ (10-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qp10 is less than the existing conditions (Study Point B)

### Step 9: Calculate $Qf_{100}$ (100-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qf100 is less than the existing conditions (Study Point B)

### Step 10: Calculate Safe Passage of $Qf_{100}$ (100-year Storm) and Set Top of Embankment Elevation

Note: Refer to HydroCAD output for these analysis.

Qf100 (100-year Storm) water elevation = 522.20

Top of Embankment is set at elevation = 523.30

Freeboard provided = 1.1'

## ***Other Requirements***

*a) Determine Pond Drain to dewater within 24 hours*

Permanent Pool Volume = 2.2659 ac-ft.

Average release rate = 2.2659 x 43560 $ft^2$/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 1.14 cfs

****Size Pond Drain orifice:***

Qavg = **1.14** cfs

Average head (h) = (Permanent Pool Elev - Basin Bottom Elev)/2

$$\text{Average h} = \frac{517.00 - 512.00}{2}$$

Average h = 2.50 ft.

****Use the orifice flow equation to calculate the required cross-sectional area and diameter for the Pond Drain Orifice:***

[Q=ca(sq. rt. (2gh))]

where:

c = 0.61

g = 32.2

Average h = 2.50

sqrt(2gh) = 12.689

a= 0.148 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Resulting diameter of orifice based upon area = D = 0.434 ft. Based upon: [D = sq. rt. (4a/3.142)]

D = 5.202 in.

For Design, Use a **6** in. diameter hole.

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)

Orifice centerline elevation = 512.00 + 0.25

Orifice centerline elevation = 512.25 ft.

Adjustable gate valve shall be provided to pond drain

b) Pond liner is not required since the pond is not located in gravelly sands or fractured bedrock area. However liner will be provided if during construction verify the need of liner.

c) Inlet pipes are partially submerged as suggested in SMDM and to ensure non-erosive condition.

d) Oulet pipes have been partially submerged at SWM 3 to prevent erosion.

e) Length to width ratio = 400/70 = 5.7:1  (minimum required is 1.5:1)
f) Surface area to drainage area ratio = 0.53:39.7 = 1:75 (minimum required is 1:100)
g) Safety bench is not required since the design side slope is 4:1.
h) Adequate aquatic  bench is provided as shown in the site plan.
i) There is no permanent structure within 25 ft buffer from the maximum water surface elevation of the pond
j) The pond is easily accessible for maintenance via cart path and lot of open spaces

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 1/8/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Wet Extended Detention Pond Design -SMW #6 (refer to section 8.2 in SMDM)

## Step 1: Compute Preliminary Runoff Control Volumes

### Water Quality Volume Calculations

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 61 | = CN value for developed condition |
| Q: | 0.29 | = 1-year runoff (in.) |
| A: | 84 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 6.4

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.29

WQv: **2.047** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.
Qp (peak control volume) and Qf (flood control volume) are not estimated at this step because several design iterations have been performed to archive the peak control volume & rate (step 8) and flood control volume & rate (step 9) using HydroCAD

## Step 2: Appropriateness Stormwater Pond for Site

Drainage Area = 84 Ac
These are existing pond. Under proposed condition, the ponds will be merged and improved the overall performance

## Step 2A: Determin Hazardous Class of Dam

Height of pond is less than 40 feet
Storage of pond at normal water surface is less than 1000 ac-ft
Therefore, the pond is classified as small class "A" dam.
(OK)

## Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

## Step 4: Determine Pretreatment Volume

**Forebay Requirements**

| | | | | |
|---|---|---|---|---|
| Minimum Size: | 10% | of WQv = | *0.2047* | ac-ft |
| | | | 8916.30194 | $ft^3$ |

## Step 5: Determine Permanent Pool Volume and ED Volume

**Permanent Pool Requirements:**

Minimum Size: 50% of WQv = *1.0235* ac-ft

= 44581.5097 $ft^3$

## Step 6: Determine Pond Geometry, Storage Available for Permanent Pool and WQv-ED

***Forebay Storage Volume:***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Forebay Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 494 | 18614 | | 0.4273 | | | | | | |
| | | 19865 | | 0.4560 | 1 | 19865 | 0.4560 | 0.4560 | 0.2047 |
| 495 | 21116 | | 0.4848 | | | | | | |
| | | 22417 | | 0.5146 | 1 | 22417 | 0.5146 | 0.9707 | 0.2047 |
| 496 | 23718 | | 0.5445 | | | | | | |
| | | 25070 | | 0.5755 | 1 | 25070 | 0.5755 | 1.5462 | 0.2047 |
| 497 | 26421 | | 0.6065 | | | | | | |
| | | 28480 | | 0.6538 | 1 | 28480 | 0.6538 | 2.2000 | 0.2047 |
| 498 | 30539 | | 0.7011 | | | | | | |

***Permanent Pool Storage Volume (including Forebay Volumes)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Volume Forebay Provided (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd Permanent Pool Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 494 | 18873 | | 0.4333 | | | | | | | |
| | | 20139 | | 0.4623 | 1 | 20139 | 0.4623 | 0.4560 | 0.9184 | 1.0235 |
| 495 | 21405 | | 0.4914 | | | | | | | |
| | | 22721 | | 0.5216 | 1 | 22721 | 0.5216 | 0.5146 | 1.9546 | 1.0235 |
| 496 | 24036 | | 0.5518 | | | | | | | |
| | | 25720 | | 0.5904 | 1 | 25720 | 0.5904 | 0.5755 | 3.1205 | 1.0235 |
| 497 | 27403 | | 0.6291 | | | | | | | |
| | | 29279 | | 0.6721 | 1 | 29279 | 0.6721 | 0.6538 | 4.4465 | 1.0235 |
| 498 | 31154 | | 0.7152 | | | | | | | |
| | | 50313 | | 1.1550 | 1 | 50313 | 1.1550 | 0.0000 | 5.6015 | 1.0235 |
| 499 | 69471 | | 1.5948 | | | | | | | |
| | | 72974 | | 1.6753 | 1 | 72974 | 1.6753 | 0.0000 | 7.2768 | 1.0235 |
| 500 | 76477 | | 1.7557 | | | | | | | |

Set Permanent Pool Elevation ($WQ_{PPE}$) = **500.00** ft.

**Required Water Quality Volume above Permanent Pool:**

| | (Total Req'd Volume) | | (Permanent Pool Cumulative Volume) | | | |
|---|---|---|---|---|---|---|
| *Balance of Required Water Quality Volume = above permanent pool | 1.023 | - | 7.2768 | = | -6.2533 | ac-ft. |

**Note: Permanent Pool Provided more than 100% of WQv therefore extended detention for water quality is not needed**

Water quality volume provided = **7.277** ac-ft

***Basin Volume (above Permanent Pool Elevation)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Cumulative Volume above Permanent Pool (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| 500 | 76477 | | 1.7557 | | | | | |
| | | 88178 | | 2.0243 | 1 | 88178 | 2.0243 | 2.0243 |
| 501 | 99879 | | 2.2929 | | | | | |
| | | 111140 | | 2.5514 | 1 | 111140 | 2.5514 | 4.5757 |
| 502 | 122401 | | 2.8099 | | | | | |
| | | 135699 | | 3.1152 | 2 | 271398 | 6.2304 | 10.8062 |
| 504 | 148997 | | 3.4205 | | | | | |
| | | 162553 | | 3.7317 | 2 | 325105 | 7.4634 | 18.2695 |
| 506 | 176108 | | 4.0429 | | | | | |

### Step 7: Determine Channel Protection Volume (CPv)

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.

### Step 8: Calculate $Q_{p10}$ (10-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qp10 is less than the existing conditions (Study Point A)

### Step 9: Calculate $Qf_{100}$ (100-year Storm) Release Rate and Water Surface Elevation

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qf100 is less than the existing conditions (Study Point A)

### Step 10: Calculate Safe Passage of $Qf_{100}$ (100-year Storm) and Set Top of Embankment Elevation

Note: Refer to HydroCAD output for these analysis.
Qf100 (100-year Storm) water elevation = 505.8'
Top of Embankment is set at elevation = 506.8'
Freeboard provided = 1 ft

## ***Other Requirements***

a) Location of this modified existing pond prohibit pond drain to be provided
b) Pond liner is not required since this is an modified existing pond.
However liner will be provided if during construction verify the need of liner.
c) Inlet pipes are partially submerged as suggested in SMDM and to ensure non-erosive condition.
d) Oulet pipes have been partially submerged to prevent erosion.
e) Length to width ratio = 730/140 = 5.2:1 (minimum required is 1.5:1)
f) Surface area to drainage area ratio = 1.7:84 = 1:50 (minimum required is 1:100)
g) Safety bench is not required since the design side slope is 4:1.
h) Adequate aquatic bench is provided as shown in the site plan.
i) There is no permanent structure within 25 ft buffer from the maximum water surface elevation of the pond
j) The pond is easily accessible for maintenance via entrance road and lot of open spaces

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/22/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Pocket Pond Design -Overlook (SWM 7A)

## Step 1: Compute Preliminary Runoff Control Volumes

### Water Quality Volume Calculations

*NYSDEC Required Water Quality Volume (WQv):*

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 77.00 | = CN value for developed condition |
| Q: | 0.93 | = 1-year runoff (in.) |
| A: | 1.1 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 3.0

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.93

WQv: **0.086** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.

Qp (peak control volume) and Qf (flood control volume) are not estimated at this step because several design iterations have been performed to archive the peak control volume & rate (step 8) and flood control volume & rate (step 9) using HydroCAD

## Step 2: Appropriateness Stormwater Pond for Site

Drainage Area = 1 Ac
Existing ground at proposed pond outlet = 808'
Seasonal high water table is = 802' (to be field verify)
(OK)

## Step 2A: Determin Hazardous Class of Dam

Height of pond is less than 40 feet
Storage of pond at normal water surface is less than 1000 ac-ft
Therefore, the pond is classified as small class "A" dam.

## Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

## Step 4: Determine Pretreatment Volume

**Forebay Requirements**

Minimum Size: 10% of WQv = *0.0086* ac-ft
373.280069 $ft^3$

### Step 5: Determine Permanent Pool Volume and ED Volume

**Permanent Pool Requirements:**

Minimum Size: 100% of WQv = *0.0857* ac-ft

= 3732.80069 $ft^3$

ED Volume will remaining of the WQv = WQv - Permanent Pool Volume

### Step 6: Determine Pond Geometry, Storage Available for Permanent Pool and WQv-ED

***Forebay Storage Volume:***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | 1 Cumulative Volume (ac-ft) | 2 Req'd Forebay Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 806 | 37 | | 0.0008 | | | | | | |
| | | 116 | | 0.0027 | 2 | 232 | 0.0053 | 0.0053 | 0.0086 |
| 808 | 195 | | 0.0045 | | | | | | |
| | | 331 | | 0.0076 | 2 | 661 | 0.0152 | 0.0205 | 0.0086 |
| 810 | 466 | | 0.0107 | | | | | | |

***Permanent Pool Storage Volume (including Forebay Volumes)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Volume Forebay Provided (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 Req'd Permanent Pool Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 806 | 192 | | 0.0044 | | | | | | | |
| | | 413 | | 0.0095 | 2 | 826 | 0.0190 | 0.0053 | 0.0243 | 0.0857 |
| 808 | 634 | | 0.0146 | | | | | | | |
| | | 912 | | 0.0209 | 2 | 1824 | 0.0419 | 0.0205 | 0.0867 | 0.0857 |
| 810 | 1190 | | 0.0273 | | | | | | | |

Set Permanent Pool Elevation ($WQ_{PPE}$) = 810.00 ft.

**Required Water Quality Volume above Permanent Pool:**

| | (Total Req'd Volume) | | (Permanent Pool Cumulative Volume) | | | |
|---|---|---|---|---|---|---|
| *Balance of Required Water Quality Volume = above permanent pool | 0.0857 | - | 0.0867 | = | <u>-0.0010</u> | ac-ft. |

NOTE: Forebay and permanent pool provide 100% of water quality volume. No extended detention WQv. Required.

***Basin Volume (above Permanent Pool Elevation)***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Volume ($ft^3$) | Volume (ac-ft) | Cumulative Volume above Permanent Pool (ac-ft) |
|---|---|---|---|---|---|---|---|---|
| 810 | 1656 | | 0.0380 | | | | | |
| | | 2619 | | 0.0601 | 2 | 5238 | 0.1202 | 0.1202 |
| 812 | 3582 | | 0.0822 | | | | | |

### Step 7: Determine Channel Protection Volume (CPv)

Note: CPv is waive because there are no increase in 1-year peak dischage rate compare to existing condition. In addition to that, WQv provided is already accounted for the 1-year storm.

**Step 8: Calculate $Q_{p10}$ (10-year Storm) Release Rate and Water Surface Elevation**

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qp10 is less than the existing conditions (Study Point E)

**Step 9: Calculate $Qf_{100}$ (100-year Storm) Release Rate and Water Surface Elevation**

Note: Refer to HydroCAD output for these analysis. Stage-storage-discharge relationshop for the pond have been established in HydroCAD along with the outlet control. Several design iterations have been performed such that the proposed conditions Qf100 is less than the existing conditions (Study Point E)

**Step 10: Calculate Safe Passage of $Qf_{100}$ (100-year Storm) and Set Top of Embankment Elevation**

Note: Refer to HydroCAD output for these analysis.

Qf100 (100-year Storm) water elevation = 811.5'

Top of Embankment is set at elevation = 812.5'

Freeboard provided = 1 ft

## ***Other Requirements***

*a) Determine Pond Drain to dewater within 24 hours*

Permanent Pool Volume = 0.0867 ac-ft.

Average release rate = 0.0867 x 43560 ft$^2$/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 0.04 cfs

***Size Pond Drain orifice:**

Qavg = **0.04** cfs

Average head (h) = (Permanent Pool Elev - Basin Bottom Elev)/2

$$\text{Average h} = \frac{810.00 - 806.00}{2}$$

Average h = 2.00 ft.

***Use the orifice flow equation to calculate the required cross-sectional area and diameter for the Pond Drain Orifice:**

[Q=ca(sq. rt. (2gh))]

where:

c = 0.61

g = 32.2

Average h = 2.00

sqrt(2gh) = 11.349

a= 0.006 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Resulting diameter of orifice based upon area = D = 0.090 ft. Based upon: [D = sq. rt. (4a/3.142)]

D = 1.076 in.

For Design, Use a **3** in. diameter hole.

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)

Orifice centerline elevation = 806.00 + 0.13

Orifice centerline elevation = 806.13 ft.

Adjustable gate valve shall be provided to pond drain

b) Pond liner is not required since the pond is not located in gravelly sands or fractured bedrock area. However liner will be provided if during construction verify the need of liner.

c) Riprap protection at the oulet has been size to prevent erosion. See attachment E5 in SWPPP

d) Length to width ratio = 90/20 = 4.5:1 (minimum required is 1.5:1)

e) Surface area to drainage area ratio = 0.038:1 = 1:26 (minimum required is 1:100)

f) Safety bench is not required since the design side slope is 4:1.

g) Adequate aquatic bench is provided as shown in the site plan.

h) There is no permanent structure within 25 ft buffer from the maximum water surface elevation of the pond

i) The pond is easily accessible for maintenance since the open spaces area have slope <15%

VHB

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 1/8/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Underground Sand Filter Design -SMW #12 (USF-120) (refer to section 8.3 in SMDM)

## Step 1: Compute Water Quality Volume

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 62.8 | = CN value for developed condition |
| Q: | 0.34 | = 1-year runoff (in.) |
| A: | 9.69 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 5.9

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.34

WQv: **0.279** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

## Step 2: Appropriateness Underground Sand Filter for Site

Filter bottom invert = 494.5
Ground water elevation = 490 ( to be field verify)

## Step 3: Compute Available Head and Peak Discharge (Qwq)

Availabel average depth (hf) is set as = 3.00 ft in step 5 below

***Compute peak discharge ($Q_{wq}$)***

(a) Set high-flow pipe invert at elev.= 503 ft

(b) *Compute peak water quality discharge (Qwq):*

Compute modified CN for 2.8" rainfall

P = 2.8 inch
Qa = WQv / Area
Qa = **0.34** inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$
CN = **62.8**

From TR-55, Table 4-1: **Ia = 1.2** **Ia / P = 0.429**

From TR-55, Exhibit 4-III: **$q_u$ = 260 csm/in**

$Q_{wq} = (q_u)(\text{Site Area, ac/ 640 ac/ sq. mi})(Q_a)$
$Q_{wq}$ = **1.36** cfs

## Step 4: Size the Flow Diversion Structure

*(a)* *Size low-flow orifice to pass Water Quality Storm Flow ($Q_{wq}$)*

Assume Head = 1.5 ft (measured from center line of low-flow orifice to inv of high flow)

h = **1.5**

$Q_{wq}$ = CA*(2gh)^0.5

A = $Q_{wq}$/[C* ((2gh)^0.5)]

A = **0.2302** $ft^2$

A = $\pi$ $d^2/4$

= $3.142*d^2/4$

d = 0.54 ft

d = 6.50 in

Low-flow orifice = **8** inch diameter to pass Water Quality Storm Flow

Low-flow orifice invert at elev.= 501.50 ft

*(b)* *Size high flow pipe to pass larger storm*

| | | |
|---|---|---|
| Pipe Size Selected = | 24" | |
| $Q_{25}$ = | 12 cfs | (from hydroCAD) |
| Pipe Capacity = | 24 | cfs |
| Set high flow pipe invert at | 503.00 | ft |

Pipe selected can bypass the 25-year flow (even though the requirement is only for 10-year flow)

## Step 5: Size Filtration Bed Chamber

$A_f$ = $(WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

1. Data:

$A_f$: = Surface area of filter bed ($ft^2$)

| | | |
|---|---|---|
| 100% $WQ_v$ = | 0.279 | ac-ft |
| 100% $WQ_v$ = | 12131.9 | $ft^3$ |

| | | |
|---|---|---|
| $d_f$: | 1.5 | = Filter bed depth in feet (18" minimum) |
| k: | 3.5 | = Coefficient of permeability of filter media (ft/day) - sand coefficient utilized (see manual) |
| $h_f$: | 3.00 | = Average head on filter (ft) = $h_t/2$ |
| $t_f$: | 1.67 | = Design filter bed drain time (days) (1.67 days is recommended $t_f$ for sand filters) |

$A_f$ = $(WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

$A_f$ = 691.9 $ft^2$

**Filtration Chamber = 25 x 30 or = 750** $ft^2$

## Step 6: Size Sedimentation Chamber

Sedimentation depth = **3.50** ft

Required to store 25% WQv = 3032.97 $ft^3$

Therefore, As = 25%WQv / depth

As = 866.6 $ft^2$

**Sedimentation Chamber = 25 x 36 or = 900** $ft^2$

## Step 7: Compute Minimum Volume, Vmin

$V_{min}$ = 0.75 WQv

$V_{min}$ = 9098.9 $ft^3$

### Step 8: Compute volume within practice

Volume within filter bed, $V_f = A_f(d_f)(n)$ ; n = **0.4** for sand

$V_f$ = 450.0 $ft^3$

Temporary storage above filter bed, $V_{f\text{-temp}} = 2\ (h_f)\ (A_f)$

$V_{f\text{-temp}}$ = 4500.0 $ft^3$

Compute storage in the Sedimentation Chamber, $V_s$

$V_s$ = (invert of high flow event - bottom of sedimentation tank ) (L*W)]

$V_s$ = (2*hf + df + 8" of gravel-Sedimentation depth)* (L*W)

$V_s$ = 4200 $ft^3$

Total volume provided = Vf + Vf-temp + Vs

= **9150.0** $ft^3$ > 9098.9 $ft^3$ OK

### Step 9: Compute Sedimentation Chamber and Filter Bed  Overflow Weir Size

This step is not apply to underground sand filter as the sand filter is burried underground thus no overflow should come out from the sand filter.

However 3ft weir is provided between the sedimentation and filter bed chamber such that the water can flow freely between the chamber.

The high flow pipe at diversion structure will divert the high flow from underground sand filter

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/27/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Underground Sand Filter Design -SMW #13 (USF-984) (refer to section 8.3 in SMDM)

## Step 1: Compute Water Quality Volume

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 81 | = CN value for developed condition |
| Q: | 1.16 | = 1-year runoff (in.) |
| A: | 2.9 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 2.3

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 1.16

WQv: **0.281** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

## Step 2: Appropriateness Underground Sand Filter for Site

Filter bottom invert = 771'
Ground water elevation = 769' ( to be field verify)

## Step 3: Compute Available Head and Peak Discharge (Qwq)

Availabel average depth (hf) is set as = 3.50 ft in step 5 below

***Compute peak discharge ($Q_{wq}$)***

*(a)* Set high-flow pipe invert at elev.= 782.5 ft

*(b)* *Compute peak water quality discharge (Qwq):*

P = 2.8 inch
Qa = WQv / Area
Qa = **1.16** inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)\text{^}0.5]$
CN = **81.0**

From TR-55, Table 4-1: **Ia = 0.469** **Ia / P = 0.168**

From TR-55, Exhibit 4-III: **$q_u$ = 460 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)
$Q_{wq}$ = **2.42** cfs

### Step 4: Size the Flow Diversion Structure

*(a) Size low-flow orifice to pass Water Quality Storm Flow ($Q_{wq}$)*

Assume Head = 1.5 ft (measured from center line of low-flow orifice to inv of high flow)

h = **1.5**

$Q_{wq}$ = CA*(2gh)^0.5

A = $Q_{wq}$/[C* ((2gh)^0.5)]

A = **0.4106** $ft^2$

A = $\pi d^2/4$

= $3.142 \cdot d^2/4$

d = 0.72 ft

d = 8.68 in

Low-flow orifice = **10** inch diameter to pass Water Quality Storm Flow

Low-flow orifice invert at elev.= 781.00 ft

*(b) Size high flow pipe to pass larger storm*

| | | |
|---|---|---|
| Pipe Size Selected = | 18" | |
| $Q_{25}$ = | 14.92 | (from hydroCAD) |
| Pipe Capacity = | 25 | cfs |
| Set high flow pipe invert at | 782.50 | ft |

Pipe selected can bypass the 25-year flow (even though the requirement is only for 10-year flow)

### Step 5: Size Filtration Bed Chamber

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

1. Data:

$A_f$: = Surface area of filter bed ($ft^2$)

| | | |
|---|---|---|
| 100% $WQ_v$ = | 0.281 | ac-ft |
| 100% $WQ_v$ = | 12229.6 | $ft^3$ |

| | | |
|---|---|---|
| $d_f$: | 1.5 | = Filter bed depth in feet (18" minimum) |
| k: | 3.5 | = Coefficient of permeability of filter media (ft/day) - sand coefficient utilized (see manual) |
| $h_f$: | 3.50 | = Average head on filter (ft) = $h_f/2$ |
| $t_f$: | 1.67 | = Design filter bed drain time (days) (1.67 days is recommended f for sand filters) |

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

$A_f$ = 627.7 $ft^2$

**Filtration Chamber = 32 x 21 or = 672** $ft^2$

### Step 6: Size Sedimentation Chamber

Sedimentation depth = **4.00** ft

Required to store 25% WQv = 3057.41 $ft^3$

Therefore, As = 25%WQv / depth

As = 764.4 $ft^2$

**Sedimentation Chamber = 32 x 25 or = 800** $ft^2$

### Step 7: Compute Minimum Volume, Vmin

$V_{min}$ = 0.75 WQv

$V_{min}$ = 9172.2 $ft^3$

### Step 8: Compute volume within practice

Volume within filter bed, $V_f = A_f(d_f)(n)$ ; n = **0.4** for sand

$V_f$ = 403.2 $ft^3$

Temporary storage above filter bed, $V_{f\text{-}temp} = 2\ (h_f)\ (A_f)$

$V_{f\text{-}temp}$ = 4704.0 $ft^3$

Compute storage in the Sedimentation Chamber, $V_s$

$V_s$ = (invert of high flow event - bottom of sedimentation tank ) (L*W)]

$V_s$ = (2*hf + df + 8" of gravel-Sedimentation depth)* (L*W)

$V_s$ = 4133 $ft^3$

Total volume provided = Vf + Vf-temp + Vs

= **9240.5** $ft^3$ > 9172.2 $ft^3$ OK

### Step 9: Compute Sedimentation Chamber and Filter Bed Overflow Weir Size

This step is not apply to underground sand filter as the sand filter is burried underground thus no overflow should come out from the sand filter.
However 3ft weir is provided between the sedimentation and filter bed chamber such that the water can flow freely between the chamber.
The high flow pipe at diversion structure will divert the high flow from underground sand filter

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/27/2014
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**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Underground Sand Filter Design -SMW #14 (USF-991) (refer to section 8.3 in SMDM)

## Step 1: Compute Water Quality Volume

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 73 | = CN value for developed condition |
| Q: | 0.74 | = 1-year runoff (in.) |
| A: | 9.2 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 3.7

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.74

WQv: **0.565** = Req'd Water Quality Volume (in ac-ft)
$= \frac{(Q)(A)}{12}$

## Step 2: Appropriateness Underground Sand Filter for Site

Filter bottom invert = 684'
Ground water elevation = 682' ( to be field verify)

## Step 3: Compute Available Head and Peak Discharge (Qwq)

Availabel average depth (hf) is set as = 4.50 ft in step 5 below

***Compute peak discharge ($Q_{wq}$)***

*(a)* Set high-flow pipe invert at elev.= 695.5 ft

*(b)* *Compute peak water quality discharge (Qwq):*

P = 2.8 inch
Qa = WQv / Area
Qa = **0.74** inch

CN = $1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$
CN = **73.0**

From TR-55, Table 4-1: **Ia = 0.667** **Ia / P = 0.238**

From TR-55, Exhibit 4-III: **$q_u$ = 360 csm/in**

$Q_{wq}$ = $(q_u)$(Site Area, ac/ 640 ac/ sq. mi)$(Q_a)$
$Q_{wq}$ = **3.81** cfs

## Step 4: Size the Flow Diversion Structure

*(a)* *Size low-flow orifice to pass Water Quality Storm Flow ($Q_{wq}$)*

Assume Head = 1.5 ft (measured from center line of low-flow orifice to inv of high flow)

h = **1.5**

$Q_{wq}$ = CA*(2gh)^0.5

A = $Q_{wq}$/[C* ((2gh)^0.5)]

A = **0.6468** $ft^2$

A = $\pi d^2/4$

= $3.142*d^2/4$

d = 0.91 ft

d = 10.89 in

Low-flow orifice = **12** inch diameter to pass Water Quality Storm Flow

Low-flow orifice invert at elev.= 694.00 ft

*(b)* *Size high flow pipe to pass larger storm*

| | | |
|---|---|---|
| Pipe Size Selected = | 24" | |
| $Q_{25}$ = | 27.8 cfs | (from hydroCAD) |
| Pipe Capacity = | 31 | cfs |
| Set high flow pipe invert at | 695.50 | ft |

Pipe selected can bypass the 25-year flow (even though the requirement is only for 10-year flow)

## Step 5: Size Filtration Bed Chamber

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

1. Data:

$A_f$: = Surface area of filter bed ($ft^2$)

| | | |
|---|---|---|
| 100% $WQ_v$ = | 0.565 | ac-ft |
| 100% $WQ_v$ = | 24615.3 | $ft^3$ |

| | | |
|---|---|---|
| $d_f$: | 1.5 | = Filter bed depth in feet (18" minimum) |
| k: | 3.5 | = Coefficient of permeability of filter media (ft/day) - sand coefficient utilized (see manual) |
| $h_f$: | 4.50 | = Average head on filter (ft) = $h_f/2$ |
| $t_f$: | 1.67 | = Design filter bed drain time (days) (1.67 days is recommended f for sand filters) |

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

$A_f$ = 1052.8 $ft^2$

**Filtration Chamber = 36 x 32 or = 1152** $ft^2$

## Step 6: Size Sedimentation Chamber

Sedimentation depth = **5.00** ft

Required to store 25% WQv = 6153.82 $ft^3$

Therefore, As = 25%WQv / depth

As = 1230.8 $ft^2$

**Sedimentation Chamber = 36 x 35 or = 1260** $ft^2$

## Step 7: Compute Minimum Volume, Vmin

$V_{min}$ = 0.75 WQv

$V_{min}$ = 18461.5 $ft^3$

### Step 8: Compute volume within practice

Volume within filter bed, $V_f = A_f(d_f)(n)$ ; n = **0.4** for sand

$V_f$ = 691.2 $ft^3$

Temporary storage above filter bed, $V_{f\text{-}temp} = 2\ (h_f)\ (A_f)$

$V_{f\text{-}temp}$ = 10368.0 $ft^3$

Compute storage in the Sedimentation Chamber, $V_s$

$V_s$ = (invert of high flow event - bottom of sedimentation tank ) (L*W)]

$V_s$ = (2*hf + df + 8" of gravel-Sedimentation depth)* (L*W)

$V_s$ = 7770 $ft^3$

Total volume provided = Vf + Vf-temp + Vs

= **18829.2** $ft^3$ > 18461.5 $ft^3$ OK

### Step 9: Compute Sedimentation Chamber and Filter Bed Overflow Weir Size

This step is not apply to underground sand filter as the sand filter is burried underground thus no overflow should come out from the sand filter.
However 3ft weir is provided between the sedimentation and filter bed chamber such that the water can flow freely between the chamber.
The high flow pipe at diversion structure will divert the high flow from underground sand filter

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 12/16/2014
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**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Underground Sand Filter Design -SMW #15 (USF-656) (refer to section 8.3 in SMDM)

## Step 1: Compute Water Quality Volume

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 71 | = CN value for developed condition |
| Q: | 0.65 | = 1-year runoff (in.) |
| A: | 2.25 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 4.1

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.65

WQv: **0.122** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

## Step 2: Appropriateness Underground Sand Filter for Site

Filter bottom invert = 496.5
Ground water elevation = 492 ( to be field verify)

## Step 3: Compute Available Head and Peak Discharge (Qwq)

Availabel average depth (hf) is set as = 3.50 ft in step 5 below

***Compute peak discharge ($Q_{wq}$)***

*(a)* Set high-flow pipe invert at elev.= 505 ft

*(b)* *Compute peak water quality discharge (Qwq):*

P = 2.8 inch
Qa = WQv / Area
Qa = **0.65** inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$
CN = **71.0**

From TR-55, Table 4-1: **Ia = 0.817** **Ia / P = 0.292**

From TR-55, Exhibit 4-III: **$q_u$ = 600 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)
$Q_{wq}$ = **1.37** cfs

## Step 4: Size the Flow Diversion Structure

*(a)* *Size low-flow orifice to pass Water Quality Storm Flow ($Q_{wq}$)*

Assume Head = 1.5 ft (measured from center line of low-flow orifice to inv of high flow)

h = **1.5**

$Q_{wq}$ = CA*(2gh)^0.5

A = $Q_{wq}$/[C* ((2gh)^0.5)]

A = **0.2318** $ft^2$

A = $\pi d^2/4$

= $3.142*d^2/4$

d = 0.54 ft

d = 6.52 in

Low-flow orifice = **8** inch diameter to pass Water Quality Storm Flow

Low-flow orifice invert at elev.= 503.50 ft

*(b)* *Size high flow pipe to pass larger storm*

| | | |
|---|---|---|
| Pipe Size Selected = | 18" | |
| $Q_{25}$ = | 8 cfs | (from hydroCAD) |
| Pipe Capacity = | 18 | cfs |
| Set high flow pipe invert at | 505.00 | ft |

Pipe selected can bypass the 25-year flow (even though the requirement is only for 10-year flow)

## Step 5: Size Filtration Bed Chamber

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

1. Data:

$A_f$: = Surface area of filter bed ($ft^2$)

| | | |
|---|---|---|
| 100% $WQ_v$ = | 0.122 | ac-ft |
| 100% $WQ_v$ = | 5293.7 | $ft^3$ |

| | | |
|---|---|---|
| $d_f$: | 1.5 | = Filter bed depth in feet (18" minimum) |
| k: | 3.5 | = Coefficient of permeability of filter media (ft/day) - sand coefficient utilized (see manual) |
| $h_f$: | 3.00 | = Average head on filter (ft) = $h_t/2$ |
| $t_f$: | 1.67 | = Design filter bed drain time (days) (1.67 days is recommended f for sand filters) |

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

$A_f$ = 301.9 $ft^2$

**Filtration Chamber = 25 x 12 or = 300** $ft^2$

## Step 6: Size Sedimentation Chamber

Sedimentation depth = **3.20** ft

Required to store 25% WQv = 1323.43 $ft^3$

Therefore, As = 25%WQv / depth

As = 413.6 $ft^2$

**Sedimentation Chamber = 25x17 or = 425** $ft^2$

## Step 7: Compute Minimum Volume, Vmin

$V_{min}$ = 0.75 WQv

$V_{min}$ = 3970.3 $ft^3$

### Step 8: Compute volume within practice

Volume within filter bed, $V_f = A_f(d_f)(n)$ ; n = **0.4** for sand

$V_f$ = 180.0 $ft^3$

Temporary storage above filter bed, $V_{f\text{-temp}} = 2\ (h_f)\ (A_f)$

$V_{f\text{-temp}}$ = 1800.0 $ft^3$

Compute storage in the Sedimentation Chamber, $V_s$

$V_s$ = (invert of high flow event - bottom of sedimentation tank ) (L*W)]

$V_s$ = (2*hf + df + 8" of gravel-Sedimentation depth)* (L*W)

$V_s$ = 2111 $ft^3$

Total volume provided = Vf + Vf-temp + Vs

= **4090.8** $ft^3$ > 3970.3 $ft^3$ OK

### Step 9: Compute Sedimentation Chamber and Filter Bed Overflow Weir Size

This step is not apply to underground sand filter as the sand filter is burried underground thus no overflow should come out from the sand filter.

However 3ft weir is provided between the sedimentation and filter bed chamber such that the water can flow freely between the chamber.

The high flow pipe at diversion structure will divert the high flow from underground sand filter

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VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 12/16/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Underground Sand Filter Design -SMW #16 (USF-611) (refer to section 8.3 in SMDM)

### Step 1: Compute Water Quality Volume

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 61 | = CN value for developed condition |
| Q: | 0.29 | = 1-year runoff (in.) |
| A: | 5.8 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 6.4

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.29

WQv: **0.141** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

### Step 2: Appropriateness Underground Sand Filter for Site

Filter bottom invert = 509'
Ground water elevation = 492 ( to be field verify)

### Step 3: Compute Available Head and Peak Discharge (Qwq)

Availabel average depth (hf) is set as = 3.00 ft in step 5 below

***Compute peak discharge ($Q_{wq}$)***

*(a)* Set high-flow pipe invert at elev.= 517 ft

*(b)* *Compute peak water quality discharge (Qwq):*

P = 2.8 inch
Qa = WQv / Area
Qa = **0.29** inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$
CN = **61.0**

From TR-55, Table 4-1: **Ia = 1.279** **Ia / P = 0.457**

From TR-55, Exhibit 4-III: **$q_u$ = 370 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)
$Q_{wq}$ = **0.98** cfs

## Step 4: Size the Flow Diversion Structure

(a) *Size low-flow orifice to pass Water Quality Storm Flow ($Q_{wq}$)*

Assume Head = 1.0 ft (measured from center line of low-flow orifice to inv of high flow)

h = **1**

$Q_{wq}$ = CA*(2gh)^0.5

A = $Q_{wq}$/[C* ((2gh)^0.5)]

A = **0.2036** $ft^2$

A = $\pi d^2/4$

= $3.142 \cdot d^2/4$

d = 0.51 ft

d = 6.11 in

Low-flow orifice = **6** inch diameter to pass Water Quality Storm Flow

Low-flow orifice invert at elev.= 516.00 ft

(b) *Size high flow pipe to pass larger storm*

| | | |
|---|---|---|
| Pipe Size Selected = | 18" | |
| $Q_{25}$ = | 13 cfs | (from hydroCAD) |
| Pipe Capacity = | 20 | cfs |
| Set high flow pipe invert at | 517.00 | ft |

Pipe selected can bypass the 25-year flow (even though the requirement is only for 10-year flow)

## Step 5: Size Filtration Bed Chamber

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

1. Data:

$A_f$: = Surface area of filter bed ($ft^2$)

100% $WQ_v$ = 0.141 ac-ft

100% $WQ_v$ = 6156.5 $ft^3$

| | | |
|---|---|---|
| $d_f$: | 1.5 | = Filter bed depth in feet (18" minimum) |
| k: | 3.5 | = Coefficient of permeability of filter media (ft/day) - sand coefficient utilized (see manual) |
| $h_f$: | 3.00 | = Average head on filter (ft) = $h_t/2$ |
| $t_f$: | 1.67 | = Design filter bed drain time (days) (1.67 days is recommended $t_f$ for sand filters) |

$A_f = (WQ_v)(d_f)/[(k)(h_f+d_f)(t_f)]$

$A_f$ = 351.1 $ft^2$

**Filtration Chamber = 25x 16 or = 400** $ft^2$

## Step 6: Size Sedimentation Chamber

Sedimentation depth = **3.50** ft

Required to store 25% WQv = 1539.12 $ft^3$

Therefore, As = 25%WQv / depth

As = 439.7 $ft^2$

**Sedimentation Chamber = 25 x 18 or = 450** $ft^2$

## Step 7: Compute Minimum Volume, Vmin

$V_{min}$ = 0.75 WQv

$V_{min}$ = 4617.4 $ft^3$

## Step 8: Compute volume within practice

Volume within filter bed, $V_f = A_f(d_f)(n)$ ; n = **0.4** for sand

$V_f$ = 240.0 $ft^3$

Temporary storage above filter bed, $V_{f\text{-temp}} = 2\ (h_f)\ (A_f)$

$V_{f\text{-temp}}$ = 2400.0 $ft^3$

Compute storage in the Sedimentation Chamber, $V_s$

$V_s$ = (invert of high flow event - bottom of sedimentation tank ) (L*W)]

$V_s$ = (2*hf + df + 8" of gravel-Sedimentation depth)* (L*W)

$V_s$ = 2100 $ft^3$

Total volume provided = Vf + Vf-temp + Vs

= **4740.0** $ft^3$ > 4617.4 $ft^3$ OK

## Step 9: Compute Sedimentation Chamber and Filter Bed Overflow Weir Size

This step is not apply to underground sand filter as the sand filter is burried underground thus no overflow should come out from the sand filter.
However 3ft weir is provided between the sedimentation and filter bed chamber such that the water can flow freely between the chamber.
The high flow pipe at diversion structure will divert the high flow from underground sand filter

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/15/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Infiltration Basin Design -IB #B

## Step 1: Compute Water Quality Volumes

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 1.08 | = 90% Rainfall Event Number from Figure #1 |
| Rv: | 0.1310 | = 0.05 + 0.009(I) (Min. Rv =0.2) Use Rv = 0.2000 |
| I: | 9 | = Impervious coverage percentage |
| A: | 3.1 | = Site Area to Basin (in acres) |
| WQv: | **0.056** | = Req'd Water Quality Volume (in ac-ft) |

$$= \frac{(P)(Rv)(A)}{12}$$

## Step 2: Appropriateness Infiltration Basin for Site

Soil underneath the infiltration basin will be replaced with permeasible soil with at least 0.5 in/hour infiltration rate
Also underdrain pipe will be provided to enhance the infiltration as suggested in SMDM
Infiltration basin is not located on area with slope greater than 15%
Infiltration basin is not located in fill soil
Bottom of infiltration basin is at lease 3 ft from ground water table (to be field verify)
Infiltration basin is at least 100 ft from water supply well
Infiltration basin is at least 25 ft from any structure

## Step 3: Confirm local design criteria and applicability

Not applicable

## Step 4: Calculate Pretreatment Volume

**Pretreatment Requirements**

Minimum Size: 25% of WQv = *0.0140* ac-ft
607.662 $ft^3$

## *Storage of Plunge Pool*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 506 | 320 | | 0.0073 | | | | | | |
| | | 419 | | 0.0096 | 1 | 419 | 0.0096 | 0.0096 | 0.0140 |
| 507 | 519 | | 0.0119 | | | | | | |
| | | 618 | | 0.0142 | 1 | 618 | 0.0142 | 0.0238 | 0.0140 |
| 508 | 717 | | 0.0165 | | | | | | |

## Step 5: Overflow Weir Sizing

*(a)* *Compute peak water quality discharge (Qwq):*

Compute modified CN for 1" rainfall

P = 1 inch

Qa = WQv / Area

Qa = **0.22** inch

CN = 1000 / [10 + 5P + 10$Q_a$ - 10($Q_a^2$ + 1.25*$Q_a$*P)^0.5]

CN = **86.7**

From TR-55, Table 4-1: **Ia = 0.3** **Ia / P = 0.300**

From TR-55, Exhibit 4-III: **$q_u$ = 350 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)

$Q_{wq}$ = **0.37** cfs

*(b)* *Water quality weir design:*

Width of weir = 3 ft.

$Q_{wq} = CLH^{3/2}$

0.37 = 3.1*L*(Hp^1.5)

Hp = **0.12** ft

Set weir elevation (infiltration basin) = 507.5

*(c)* *10-Year flow weir design:*

$Q_{10}$ = 4.7 cfs

Design flow, $Q_{10d}$ = $Q_{10} - Q_{wq}$

= 4.65 - 0.37

= 4.28 cfs

Width of weir = 8 ft.

$Q_{10d} = CLH^{3/2}$

4.28 = 3.1*L*(Hp^1.5)

Hp = **0.31** ft

Overflow Velocity (ft/s) = Q10d / (weir width * depth)

= **1.73** ft/s ok

Set weir elevation = 507.6

Design High Water Elevation = Weir Elevation + Hp

= 507.62 + 0.31

= 507.93

Top of Plunge Pool Elevation = 508.5 ( 6" freeboard)

**Step 6: Determine Infiltration Basin Size**

**WQv Requirements:**

| | | | | |
|---|---|---|---|---|
| 100% | WQv | = | *0.0558* | ac-ft |
| | | = | 2430.648 | $ft^3$ |
| | Side Slope = | | 2 on 1 | |

## *Storage of Infiltration Basin*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 506 | 936 | | 0.0215 | | | | | | |
| | | 1177 | | 0.0270 | 1 | 1177 | 0.0270 | 0.0270 | 0.0558 |
| 507 | 1419 | | 0.0326 | | | | | | |
| | | 1660 | | 0.0381 | 1 | 1660 | 0.0381 | 0.0651 | 0.0558 |
| 508 | 1901 | | 0.0436 | | | | | | |

## *Determine Required WQv Elevation:*

| | | Elev. (ft) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Required Water Quality Volume (WQv) = | | X | 0.0558 |
| Water Quality Storage Elevation Range: | High: | 508.00 | 0.0651 |
| | Low: | 507.00 | 0.0270 |

| | | |
|---|---|---|
| Required water quality elevation, X = | **507.8** | ft |
| Required Water quality volume at elevation X = | **0.0558** | ac-ft |
| Provided water quality elevation = | **508.0** | ft |
| Provided water quality volume = | **0.0651** | ac-ft |
| Depth of WQ elevation = | **24.0** | in |

**Provide 4" PVC underdrain pipe at inv. 504**

## *Other Requirements*

*a) Determine Infiltration basin to dewater within 48 hours*

Infiltration rate = 0.5 in/hr

Time of infiltration = Depth of ponding / infiltration rate

$$= \frac{24.0}{0.500}$$

= 48 hr ok

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/15/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Infiltration Basin Design -IB #B1

## Step 1: Compute Water Quality Volumes

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 1.08 | = 90% Rainfall Event Number from Figure #1 |
| Rv: | 0.1310 | = 0.05 + 0.009(I) (Min. Rv =0.2) Use Rv = 0.2000 |
| I: | 9 | = Impervious coverage percentage |
| A: | 0.76 | = Site Area to Basin (in acres) |

WQv: **0.014** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

## Step 2: Appropriateness Infiltration Basin for Site

Soil underneath the infiltration basin will be replaced with permeasible soil with at least 0.5 in/hour infiltration rate
Also underdrain pipe will be provided to enhance the infiltration as suggested in SMDM
Infiltration basin is not located on area with slope greater than 15%
Infiltration basin is not located in fill soil
Bottom of infiltration basin is at lease 3 ft from ground water table (to be field verify)
Infiltration basin is at least 100 ft from water supply well
Infiltration basin is at least 25 ft from any structure

## Step 3: Confirm local design criteria and applicability

Not applicable

## Step 4: Calculate Pretreatment Volume

**Pretreatment Requirements**

Minimum Size: 25% of WQv = *0.0034* ac-ft
148.9752 $ft^3$

## *Storage of Plunge Pool*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 533 | 121 | | 0.0028 | | | | | | |
| | | 198 | | 0.0045 | 1 | 198 | 0.0045 | 0.0045 | 0.0034 |
| 534 | 274 | | 0.0063 | | | | | | |

## Step 5: Overflow Weir Sizing

(a) *Compute peak water quality discharge (Qwq):*

Compute modified CN for 1" rainfall

P = 1 inch

Qa = WQv / Area

Qa = **0.22** inch

CN = $1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$

CN = **86.7**

From TR-55, Table 4-1: **Ia = 0.3** **Ia / P = 0.300**

From TR-55, Exhibit 4-III: **$q_u$ = 350 csm/in**

$Q_{wq}$ = $(q_u)$(Site Area, ac/ 640 ac/ sq. mi)$(Q_a)$

$Q_{wq}$ = **0.09** cfs

(b) *Water quality weir design:*

Width of weir = 3 ft.

$Q_{wq} = CLH^{3/2}$

0.09 = 3.1*L*(Hp^1.5)

Hp = **0.05** ft

Set weir elevation (infiltration basin) = 533.8

(c) *10-Year flow weir design:*

$Q_{10}$ = 1.14 cfs

Design flow, $Q_{10d}$ = $Q_{10} - Q_{wq}$

= 1.14 - 0.09

= 1.05 cfs

Width of weir = 5 ft.

$Q_{10d} = CLH^{3/2}$

1.05 = 3.1*L*(Hp^1.5)

Hp = **0.17** ft

Overflow Velocity (ft/s) = Q10d / (weir width * depth)

= **1.26** ft/s ok

Set weir elevation = 533.85

Design High Water Elevation = Weir Elevation + Hp

= 533.85 + 0.17

= 534.01

Top of Plunge Pool Elevation = 534.5 ( 6" freeboard)

## Step 6: Determine Infiltration Basin Size

**WQv Requirements:**

100% WQv = *0.0137* ac-ft

= 595.9008 $ft^3$

Side Slope = 2 on 1

## ***Storage of Infiltration Basin***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 532 | 329 | | 0.0076 | | | | | | |
| | | 422 | | 0.0097 | 1 | 422 | 0.0097 | 0.0097 | 0.0137 |
| 533 | 514 | | 0.0118 | | | | | | |
| | | 607 | | 0.0139 | 1 | 607 | 0.0139 | 0.0236 | 0.0137 |
| 534 | 699 | | 0.0160 | | | | | | |

## ***Determine Required WQv Elevation:***

| | | Elev. (ft) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Required Water Quality Volume (WQv) = | | X | 0.0137 |
| Water Quality Storage Elevation Range: | High: | 534.00 | 0.0236 |
| | Low: | 533.00 | 0.0097 |

Required water quality elevation, X = **533.3** ft
Required Water quality volume at elevation X = **0.0137** ac-ft

Provided water quality elevation = **534.0** ft
Provided water quality volume = **0.0236** ac-ft
Depth of WQ elevation = **24.0** in

**Provide 4" PVC underdrain pipe at inv. 529**

## ***Other Requirements***

*a) Determine Infiltration basin to dewater within 48 hours*

Infiltration rate = 0.5 in/hr

Time of infiltration = Depth of ponding / infiltration rate

$$= \frac{24.0}{0.500}$$

= 48 hr ok

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/15/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Infiltration Basin Design -IB #B2

### Step 1: Compute Water Quality Volumes

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | | |
|---|---|---|---|
| P: | 1.08 | = 90% Rainfall Event Number from Figure #1 | |
| Rv: | 0.1310 | = 0.05 + 0.009(I) (Min. Rv =0.2) | Use Rv = 0.2000 |
| I: | 9 | = Impervious coverage percentage | |
| A: | 1.33 | = Site Area to Basin (in acres) | |

WQv: **0.024** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

### Step 2: Appropriateness Infiltration Basin for Site

Soil underneath the infiltration basin will be replaced with permeasible soil with at least 0.5 in/hour infiltration rate
Also underdrain pipe will be provided to enhance the infiltration as suggested in SMDM
Infiltration basin is not located on area with slope greater than 15%
Infiltration basin is not located in fill soil
Bottom of infiltration basin is at lease 3 ft from ground water table (to be field verify)
Infiltration basin is at least 100 ft from water supply well
Infiltration basin is at least 25 ft from any structure

### Step 3: Confirm local design criteria and applicability

Not applicable

### Step 4: Calculate Pretreatment Volume

**Pretreatment Requirements**

Minimum Size: 25% of WQv = *0.0060* ac-ft
260.7066 $ft^3$

## *Storage of Plunge Pool*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 512 | 122 | 238 | 0.0028 | 0.0055 | 2 | 475 | 0.0109 | 0.0109 | 0.0060 |
| 514 | 353 | | 0.0081 | | | | | | |

## Step 5: Overflow Weir Sizing

(a) *Compute peak water quality discharge (Qwq):*

Compute modified CN for 1" rainfall

P = 1 inch

Qa = WQv / Area

Qa = **0.22** inch

CN = 1000 / [10 + 5P + 10$Q_a$ - 10($Q_a^2$ + 1.25*$Q_a$*P)^0.5]

CN = **86.7**

From TR-55, Table 4-1: **Ia = 0.3** **Ia / P = 0.300**

From TR-55, Exhibit 4-III: **$q_u$ = 350 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)

$Q_{wq}$ = **0.16** cfs

(b) *Water quality weir design:*

Width of weir = 3 ft.

$Q_{wq}$ = $CLH^{3/2}$

0.16 = 3.1*L*(Hp^1.5)

Hp = **0.07** ft

Set weir elevation (infiltration basin) = 513.7

(c) *10-Year flow weir design:*

$Q_{10}$ = 2.0 cfs

Design flow, $Q_{10d}$ = $Q_{10}$ - $Q_{wq}$

= 2.00 - 0.16

= 1.84 cfs

Width of weir = 6 ft.

$Q_{10d}$ = $CLH^{3/2}$

1.84 = 3.1*L*(Hp^1.5)

Hp = **0.21** ft

Overflow Velocity (ft/s) = Q10d / (weir width * depth)

= **1.43** ft/s ok

Set weir elevation = 513.77

Design High Water Elevation = Weir Elevation + Hp

= 513.77 + 0.21

= 513.98

Top of Plunge Pool Elevation = 514.5 ( 6" freeboard)

## Step 6: Determine Infiltration Basin Size

**WQv Requirements:**

100% WQv = *0.0239* ac-ft

= 1042.8264 $ft^3$

Side Slope = 2 on 1

## *Storage of Infiltration Basin*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 512 | 545 | | 0.0125 | | | | | | |
| | | 652 | | 0.0150 | 1 | 652 | 0.0150 | 0.0150 | 0.0239 |
| 513 | 759 | | 0.0174 | | | | | | |
| | | 865 | | 0.0199 | 1 | 865 | 0.0199 | 0.0348 | 0.0239 |
| 514 | 972 | | 0.0223 | | | | | | |

## *Determine Required WQv Elevation:*

| | | Elev. (ft) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Required Water Quality Volume (WQv) = | | X | 0.0239 |
| Water Quality Storage Elevation Range: | High: | 514.00 | 0.0348 |
| | Low: | 513.00 | 0.0150 |

Required water quality elevation, X = **513.5** ft

Required Water quality volume at elevation X = **0.0239** ac-ft

Provided water quality elevation = **514.0** ft

Provided water quality volume = **0.0348** ac-ft

Depth of WQ elevation = **24.0** in

**Provide 4" PVC underdrain pipe at inv. 509**

## *Other Requirements*

*a) Determine Infiltration basin to dewater within 48 hours*

Infiltration rate = 0.5 in/hr

Time of infiltration = Depth of ponding / infiltration rate

$$= \frac{24.0}{0.500}$$

= 48 hr ok

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/15/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Infiltration Basin Design -IB #C

## Step 1: Compute Water Quality Volumes

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 1.08 | = 90% Rainfall Event Number from Figure #1 |
| Rv: | 0.1310 | = 0.05 + 0.009(I) (Min. Rv =0.2) Use Rv = 0.2000 |
| I: | 9 | = Impervious coverage percentage |
| A: | 2.39 | = Site Area to Basin (in acres) |

WQv: **0.043** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

## Step 2: Appropriateness Infiltration Basin for Site

Soil underneath the infiltration basin will be replaced with permeasible soil with at least 0.5 in/hour infiltration rate
Also underdrain pipe will be provided to enhance the infiltration as suggested in SMDM
Infiltration basin is not located on area with slope greater than 15%
Infiltration basin is not located in fill soil
Bottom of infiltration basin is at lease 3 ft from ground water table (to be field verify)
Infiltration basin is at least 100 ft from water supply well
Infiltration basin is at least 25 ft from any structure

## Step 3: Confirm local design criteria and applicability

Not applicable

## Step 4: Calculate Pretreatment Volume

**Pretreatment Requirements**

Minimum Size: 25% of WQv = *0.0108* ac-ft
468.4878 $ft^3$

## *Storage of Plunge Pool*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 546 | 448 | | 0.0103 | | | | | | |
| | | 541 | | 0.0124 | 1 | 541 | 0.0124 | 0.0124 | 0.0108 |
| 547 | 634 | | 0.0146 | | | | | | |
| | | 727 | | 0.0167 | 1 | 727 | 0.0167 | 0.0291 | 0.0108 |
| 548 | 820 | | 0.0188 | | | | | | |

## Step 5: Overflow Weir Sizing

(a) *Compute peak water quality discharge (Qwq):*

Compute modified CN for 1" rainfall

P = 1 inch

Qa = WQv / Area

Qa = **0.22** inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$

CN = **86.7**

From TR-55, Table 4-1: **Ia = 0.3** **Ia / P = 0.300**

From TR-55, Exhibit 4-III: **$q_u$ = 350 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)

$Q_{wq}$ = **0.28** cfs

(b) *Water quality weir design:*

Width of weir = 2 ft.

$Q_{wq} = CLH^{3/2}$

0.28 = 3.1*L*(Hp^1.5)

Hp = **0.13** ft

Set weir elevation (infiltration basin) = 547.5

(c) *10-Year flow weir design:*

$Q_{10}$ = 3.6 cfs

Design flow, $Q_{10d}$ = $Q_{10} - Q_{wq}$

= 3.60 - 0.28

= 3.32 cfs

Width of weir = 10 ft.

$Q_{10d} = CLH^{3/2}$

3.32 = 3.1*L*(Hp^1.5)

Hp = **0.23** ft

Overflow Velocity (ft/s) = Q10d / (weir width * depth)

= **1.47** ft/s ok

Set weir elevation = 547.63

Design High Water Elevation = Weir Elevation + Hp

= 547.63 + 0.23

= 547.85

Top of Plunge Pool Elevation = 548.4 ( 6" freeboard)

## Step 6: Determine Infiltration Basin Size

**WQv Requirements:**

100% WQv = *0.0430* ac-ft

= 1873.9512 $ft^3$

Side Slope = 2 on 1

## ***Storage of Infiltration Basin***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 546 | 717 | | 0.0165 | | | | | | |
| | | 890 | | 0.0204 | 1 | 890 | 0.0204 | 0.0204 | 0.0430 |
| 547 | 1062 | | 0.0244 | | | | | | |
| | | 1235 | | 0.0283 | 1 | 1235 | 0.0283 | 0.0488 | 0.0430 |
| 548 | 1407 | | 0.0323 | | | | | | |

## ***Determine Required WQv Elevation:***

| | | Elev. (ft) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Required Water Quality Volume (WQv) = | | X | 0.0430 |
| Water Quality Storage Elevation Range: | High: | 548.00 | 0.0488 |
| | Low: | 547.00 | 0.0204 |

Required water quality elevation, X = **547.8** ft
Required Water quality volume at elevation X = **0.0430** ac-ft

Provided water quality elevation = **548.0** ft
Provided water quality volume = **0.0488** ac-ft
Depth of WQ elevation = **24.0** in

**Provide 4" PVC underdrain pipe at inv. 543**

## ***Other Requirements***

*a) Determine Infiltration basin to dewater within 48 hours*

Infiltration rate = 0.5 in/hr

Time of infiltration = Depth of ponding / infiltration rate

$$= \frac{24.0}{0.500}$$

= 48 hr ok

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/15/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Infiltration Basin Design -IB #D

## Step 1: Compute Water Quality Volumes

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | | |
|---|---|---|---|
| P: | 1.08 | = 90% Rainfall Event Number from Figure #1 | |
| Rv: | 0.1310 | = 0.05 + 0.009(I) (Min. Rv =0.2) | Use Rv = 0.2000 |
| I: | 9 | = Impervious coverage percentage | |
| A: | 2.02 | = Site Area to Basin (in acres) | |

WQv: **0.036** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

## Step 2: Appropriateness Infiltration Basin for Site

Soil underneath the infiltration basin will be replaced with permeasible soil with at least 0.5 in/hour infiltration rate
Also underdrain pipe will be provided to enhance the infiltration as suggested in SMDM
Infiltration basin is not located on area with slope greater than 15%
Infiltration basin is not located in fill soil
Bottom of infiltration basin is at lease 3 ft from ground water table (to be field verify)
Infiltration basin is at least 100 ft from water supply well
Infiltration basin is at least 25 ft from any structure

## Step 3: Confirm local design criteria and applicability

Not applicable

## Step 4: Calculate Pretreatment Volume

**Pretreatment Requirements**

Minimum Size: 25% of WQv = *0.0091* ac-ft
395.9604 $ft^3$

## *Storage of Plunge Pool*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 520 | 117 | | 0.0027 | | | | | | |
| | | 190 | | 0.0044 | 1 | 190 | 0.0044 | 0.0044 | 0.0091 |
| 521 | 262 | | 0.0060 | | | | | | |
| | | 335 | | 0.0077 | 1 | 335 | 0.0077 | 0.0120 | 0.0091 |
| 522 | 407 | | 0.0093 | | | | | | |

## Step 5: Overflow Weir Sizing

(a) *Compute peak water quality discharge (Qwq):*

Compute modified CN for 1" rainfall

P = 1 inch

Qa = WQv / Area

Qa = **0.22** inch

CN = $1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$

CN = **86.7**

From TR-55, Table 4-1: **Ia = 0.3** **Ia / P = 0.300**

From TR-55, Exhibit 4-III: **$q_u$ = 350 csm/in**

$Q_{wq}$ = $(q_u)$(Site Area, ac/ 640 ac/ sq. mi)$(Q_a)$

$Q_{wq}$ = **0.24** cfs

(b) *Water quality weir design:*

Width of weir = 4 ft.

$Q_{wq} = CLH^{3/2}$

0.24 = 3.1*L*(Hp^1.5)

Hp = **0.07** ft

Set weir elevation (infiltration basin) = 521.8

(c) *10-Year flow weir design:*

$Q_{10}$ = 6.3 cfs (from hydroCAD)

Design flow, $Q_{10d}$ = $Q_{10} - Q_{wq}$

= 6.30 - 0.24

= 6.06 cfs

Width of weir = 10 ft.

$Q_{10d} = CLH^{3/2}$

6.06 = 3.1*L*(Hp^1.5)

Hp = **0.34** ft

Overflow Velocity (ft/s) = Q10d / (weir width * depth)

= **1.80** ft/s ok

Set weir elevation = 521.87

Design High Water Elevation = Weir Elevation + Hp

= 521.87 + 0.34

= 522.21

Top of Plunge Pool Elevation = 522.8 ( 6" freeboard)

## Step 6: Determine Infiltration Basin Size

**WQv Requirements:**

100% WQv = *0.0364* ac-ft

= 1583.8416 $ft^3$

Side Slope = 2 on 1

## ***Storage of Infiltration Basin***

| Contour Elev. (ft) | Contour Area: Proposed ($ft^2$) | Contour Area: Average ($ft^2$) | Contour Area: Proposed (ac) | Contour Area: Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1<br>Volume Provided (ac-ft) | 2<br>Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 520 | 1051 | | 0.0241 | | | | | | |
| | | 1219 | | 0.0280 | 1 | 1219 | 0.0280 | 0.0280 | 0.0364 |
| 521 | 1387 | | 0.0318 | | | | | | |
| | | 1555 | | 0.0357 | 1 | 1555 | 0.0357 | 0.0637 | 0.0364 |
| 522 | 1723 | | 0.0396 | | | | | | |

## ***Determine Required WQv Elevation:***

| | | Elev. (ft) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Required Water Quality Volume (WQv) = | | X | 0.0364 |
| Water Quality Storage Elevation Range: | High: | 522.00 | 0.0637 |
| | Low: | 521.00 | 0.0280 |

Required water quality elevation, X = **521.2** ft

Required Water quality volume at elevation X = **0.0364** ac-ft

Provided water quality elevation = **522.0** ft

Provided water quality volume = **0.0637** ac-ft

Depth of WQ elevation = **24.0** in

**Provide 4" PVC underdrain pipe at inv. 517**

## ***Other Requirements***

*a) Determine Infiltration basin to dewater within 48 hours*

Infiltration rate = 0.5 in/hr

Time of infiltration = Depth of ponding / infiltration rate

$$= \frac{24.0}{0.500}$$

= 48 hr ok

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/15/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Infiltration Basin Design -IB #E3

## Step 1: Compute Water Quality Volumes

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | | |
|---|---|---|---|
| P: | 1.08 | = 90% Rainfall Event Number from Figure #1 | |
| Rv: | 0.1310 | = 0.05 + 0.009(I) (Min. Rv =0.2) | Use Rv = 0.2000 |
| I: | 9 | = Impervious coverage percentage | |
| A: | 2.43 | = Site Area to Basin (in acres) | |

WQv: **0.044** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

## Step 2: Appropriateness Infiltration Basin for Site

Soil underneath the infiltration basin will be replaced with permeasible soil with at least 0.5 in/hour infiltration rate
Also underdrain pipe will be provided to enhance the infiltration as suggested in SMDM
Infiltration basin is not located on area with slope greater than 15%
Infiltration basin is not located in fill soil
Bottom of infiltration basin is at lease 3 ft from ground water table (to be field verify)
Infiltration basin is at least 100 ft from water supply well
Infiltration basin is at least 25 ft from any structure

## Step 3: Confirm local design criteria and applicability

Not applicable

## Step 4: Calculate Pretreatment Volume

**Pretreatment Requirements**

Minimum Size: 25% of WQv = *0.0109* ac-ft
476.3286 $ft^3$

## *Storage of Plunge Pool*

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 508 | 260 | 418 | 0.0060 | 0.0096 | 2 | 836 | 0.0192 | 0.0192 | 0.0109 |
| 510 | 576 | | 0.0132 | | | | | | |

## Step 5: Overflow Weir Sizing

*(a)* *Compute peak water quality discharge (Qwq):*

Compute modified CN for 1" rainfall

P = 1 inch

Qa = WQv / Area

Qa = **0.22** inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$

CN = **86.7**

From TR-55, Table 4-1: **Ia = 0.3** **Ia / P = 0.300**

From TR-55, Exhibit 4-III: **$q_u$ = 350 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)

$Q_{wq}$ = **0.29** cfs

*(b)* *Water quality weir design:*

Width of weir = 3 ft.

$Q_{wq} = CLH^{3/2}$

0.29 = 3.1*L*(Hp^1.5)

Hp = **0.10** ft

Set weir elevation (infiltration basin) = 509.4

*(c)* *10-Year flow weir design:*

$Q_{10}$ = 3.7 cfs

Design flow, $Q_{10d}$ = $Q_{10} - Q_{wq}$

= 3.65 - 0.29

= 3.36 cfs

Width of weir = 10 ft.

$Q_{10d} = CLH^{3/2}$

3.36 = 3.1*L*(Hp^1.5)

Hp = **0.23** ft

Overflow Velocity (ft/s) = Q10d / (weir width * depth)

= **1.48** ft/s ok

Set weir elevation = 509.50

Design High Water Elevation = Weir Elevation + Hp

= 509.50 + 0.23

= 509.73

Top of Plunge Pool Elevation = 510.3 ( 6" freeboard)

**Step 6: Determine Infiltration Basin Size**

**WQv Requirements:**

| | | | | |
|---|---|---|---|---|
| 100% | WQv | = | *0.0437* | ac-ft |
| | | = | 1905.3144 | $ft^3$ |
| | Side Slope = | | 2 on 1 | |

## ***Storage of Infiltration Basin***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 509 | 3978 | 4262 | 0.0913 | 0.0978 | 1 | 4262 | 0.0978 | 0.0978 | 0.0437 |
| 510 | 4546 | | 0.1044 | | | | | | |

## ***Determine Required WQv Elevation:***

| | | Elev. (ft) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Required Water Quality Volume (WQv) = | | X | 0.0437 |
| Water Quality Storage Elevation Range: | High: | 510.00 | 0.0978 |
| | Low: | 509.00 | 0.0000 |

Required water quality elevation, X = **509.4** ft

Required Water quality volume at elevation X = **0.0437** ac-ft

Provided water quality elevation = **510.0** ft

Provided water quality volume = **0.0978** ac-ft

Depth of WQ elevation = **12.0** in

**Provide 4" PVC underdrain pipe at inv. 507.5**

## ***Other Requirements***

*a) Determine Infiltration basin to dewater within 48 hours*

Infiltration rate = 0.5 in/hr

Time of infiltration = Depth of ponding / infiltration rate

$$= \frac{12.0}{0.500}$$

= 24 hr ok

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 5/27/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Infiltration Basin Design -SWM 11

## Step 1: Compute Water Quality Volumes

Note: This infiltration basin (which is constructed during the golf phase) is designed to satisfy the East of Hudson standard because it received part of the runoff from the full built conditions. WQv from SWM 11 (constructed during golf phase) is not being considered in full built WQv & RRv analysis to be conservative.

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| East of Hudson Standard | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 56 | = CN value for developed condition |
| Q: | 0.17 | = 1-year runoff (in.) |
| A: | 16.24 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 7.9

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.17

WQv: **0.2248** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

| 90% Rainfall Event Standard | | | |
|---|---|---|---|
| P: | 1.08 | = 90% Rainfall Event Number from Figure #1 | |
| Rv: | 0.1310 | = 0.05 + 0.009(I) (Min. Rv =0.2) | Use Rv = 0.2000 |
| I: | 9 | = Impervious coverage percentage | |
| A: | 7.9 | = Site Area to Basin (in acres) | |

WQv: **0.142** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(P)(Rv)(A)}{12}$$

**USE WQv = 0.2248 ac-ft for design purposes**

## Step 2: Appropriateness Infiltration Basin for Site

Soil underneath the infiltration basin will be replaced with permeasible soil with at least 0.5 in/hour infiltration rate
Also underdrain pipe will be provided to enhance the infiltration as suggested in SMDM
Infiltration basin is not located on area with slope greater than 15%
Infiltration basin is not located in fill soil

Bottom of infiltration basin is at lease 3 ft from ground water table (to be field verify)
Infiltration basin is at least 100 ft from water supply well
Infiltration basin is at least 25 ft from any structure

### Step 3: Confirm local design criteria and applicability

The town required the design to be done to East of Hudson standard.

### Step 4: Calculate Pretreatment Volume

**Pretreatment Requirements**

Minimum Size: 25% of WQv = *0.0562* ac-ft
2448.35509 $ft^3$

## ***Storage of Plunge Pool***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 509 | 944 | | 0.0217 | | | | | | |
| | | 1434 | | 0.0329 | 2 | 2867 | 0.0658 | 0.0658 | 0.0562 |
| 511 | 1923 | | 0.0441 | | | | | | |

### Step 5: Overflow Weir Sizing

*(a)* *Compute peak water quality discharge (Qwq):*

Compute modified CN for 2.8" rainfall

P = 2.8 inch

Qa = WQv / Area

Qa = **0.17** inch

$CN = 1000 / [10 + 5P + 10Q_a - 10(Q_a^2 + 1.25*Q_a*P)^{0.5}]$

CN = **56.0**

From TR-55, Table 4-1: **Ia = 1.448** **Ia / P = 0.517**

From TR-55, Exhibit 4-III: **$q_u$ = 180 csm/in**

$Q_{wq}$ = ($q_u$)(Site Area, ac/ 640 ac/ sq. mi)($Q_a$)

$Q_{wq}$ = **0.76** cfs

*(b)* *Water quality weir design:*

Width of weir = 10 ft.

$Q_{wq} = CLH^{3/2}$

0.76 = 3.1*L*(Hp^1.5)

Hp = **0.08** ft

Set weir elevation (infiltration basin) = 510.8

*(c) 10-Year flow weir design:*

$Q_{10}$ = 15.6 cfs (from hydroCAD)

Design flow, $Q_{10d}$ = $Q_{10} - Q_{wq}$

= 15.59 - 0.76

= 14.83 cfs

Width of weir = 15 ft.

$Q_{10d} = CLH^{3/2}$

14.83 = 3.1*L*(Hp^1.5)

Hp = **0.47** ft

Overflow Velocity (ft/s) = Q10d / (weir width * depth)

= **2.12** ft/s ok

Set weir elevation

(diverted from infiltration basin)= 510.88

Design High Water Elevation = Weir Elevation + Hp

= 510.88 + 0.47

= 511.35

Top of Plunge Pool Elevation = 511.9 ( 6" freeboard)

### Step 6: Determine Infiltration Basin Size

**WQv Requirements:**

100% WQv = 0.2248 ac-ft

= 9793.42038 $ft^3$

Side Slope = 2 on 1

## ***Storage of Infiltration Basin***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Volume Provided (ac-ft) | 2 Req'd WQ Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| 509 | 4898 | | 0.1124 | | | | | | |
| | | 5206 | | 0.1195 | 1 | 5206 | 0.1195 | 0.1195 | 0.2248 |
| 510 | 5515 | | 0.1266 | | | | | | |
| | | 5823 | | 0.1337 | 1 | 5823 | 0.1337 | 0.2532 | 0.2248 |
| 511 | 6131 | | 0.1407 | | | | | | |

## ***Determine Required WQv Elevation:***

| | | Elev. (ft) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Required Water Quality Volume (WQv) = | | X | 0.2248 |
| Water Quality Storage Elevation Range: | High: | 511.00 | 0.2532 |
| | Low: | 510.00 | 0.1195 |

| | | |
|---|---|---|
| Required Water quality elevation, X = | **510.8** | ft |
| Required Water quality volume at elevation X = | **0.2248** | ac-ft |
| | | |
| Provided water quality elevation = | **511.0** | ft |
| Provided water quality volume = | **0.2532** | ac-ft |
| Depth of required WQ elevation = | **24.0** | in |

**Provide 4" PVC underdrain pipe at inv. 507.2**

## ***Other Requirements***

*a) Determine Infiltration basin to dewater within 48 hours*

Infiltration rate = 0.5 in/hr

Time of infiltration = Depth of ponding / infiltration rate

$$= \frac{24.0}{0.500}$$

= 48 hr ok

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Rev Date:** 1/8/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Water Quality Volume & Runoff Reduction Volume Analysis

## 1) Required Water Quality Volume Calculations (#28 in NOI)

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 68.6 | = CN value for developed condition |
| Q: | 0.55 | = 1-year runoff (in.) |
| A: | 782.775 | = Contributing Drainage Area (in acres) |

S= 1000/cn -10
S= 4.6

$$Q= \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.55

WQv: **35.726** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

**Required WQv = 35.726 Ac-ft**

## 2) Runoff Reduction Volume- Conservation area (#30 in NOI)

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 70.2 | = CN value for Conservation Area |
| Q: | 0.61 | = 1-year runoff (in.) |
| A: | 453.5 | = Contributing Drainage Area (in acres) |

S= 1000/cn -10
S= 4.3

$$Q= \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.61

WQv: **23.150** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

## 2A) Runoff Reduction Volume- Buffer / Filter Strip Area (#30 in NOI)

*NYSDEC Required Water Quality Volume (WQv):*

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 74 | = CN value for Buffer/ Filter Strip Area |
| Q: | 0.78 | = 1-year runoff (in.) |
| A: | 5.6 | = Contributing Drainage Area (in acres) |

S= 1000/cn -10
S= 3.5

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.78

WQv: **0.366** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

## 2B) Runoff Reduction Volume- Infiltration Basin (SWM11) (#30 in NOI)

(As suggested by Town Engineer to take credit for RRv)

Data:

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 56 | = CN value for developed condition |
| Q: | 0.17 | = 1-year runoff (in.) |
| A: | 16.24 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 7.9

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 0.17

WQv: **0.2248** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

## 3) Total Runoff Reduction Volume Provided (#30 in NOI)

| | | |
|---|---|---|
| **Total RRv Provided =** | **Step 2 + Step 2A + Step 2B =** | **23.741 Ac-ft** |

## 4) Minimum Required Runoff Reduction Volume Based on HSG (#32 in NOI)

RRv (min) = (P * 0.95 * Ai) / 12
Where Ai = S * Aic
Aic = Total area of new Impervious
Aic = 70.0 Ac
S = 0.55 (to be conservative assume all soil A)

RRv (min) = (P * 0.95 * Ai) / 12
= (2.8 x 0.95 x 0.55 x 70)/12
= 8.53 Ac-ft

**RRv (min) = 8.53 Ac-ft**

## 5) Water Quality Volume Provided by Standard Stormwater Management Practise During Full-Built Condition
**(#33a in NOI)**

| Stormwater Management Practise | Water Quality Volume Provided (ac-ft) |
|---|---|
| Wet Extended Pond | 16.503 |
| Infiltration Basin (SWM 11) | 0.225 |
| Underground Sand Filter | 1.387 |
| Total WQv Provided | 18.115 |

## 6) Total Runoff Reduction Volume and Water Quality Volume Provided (#34 in NOI)

Total RRv & WQv Provided = 23.741 + 18.115

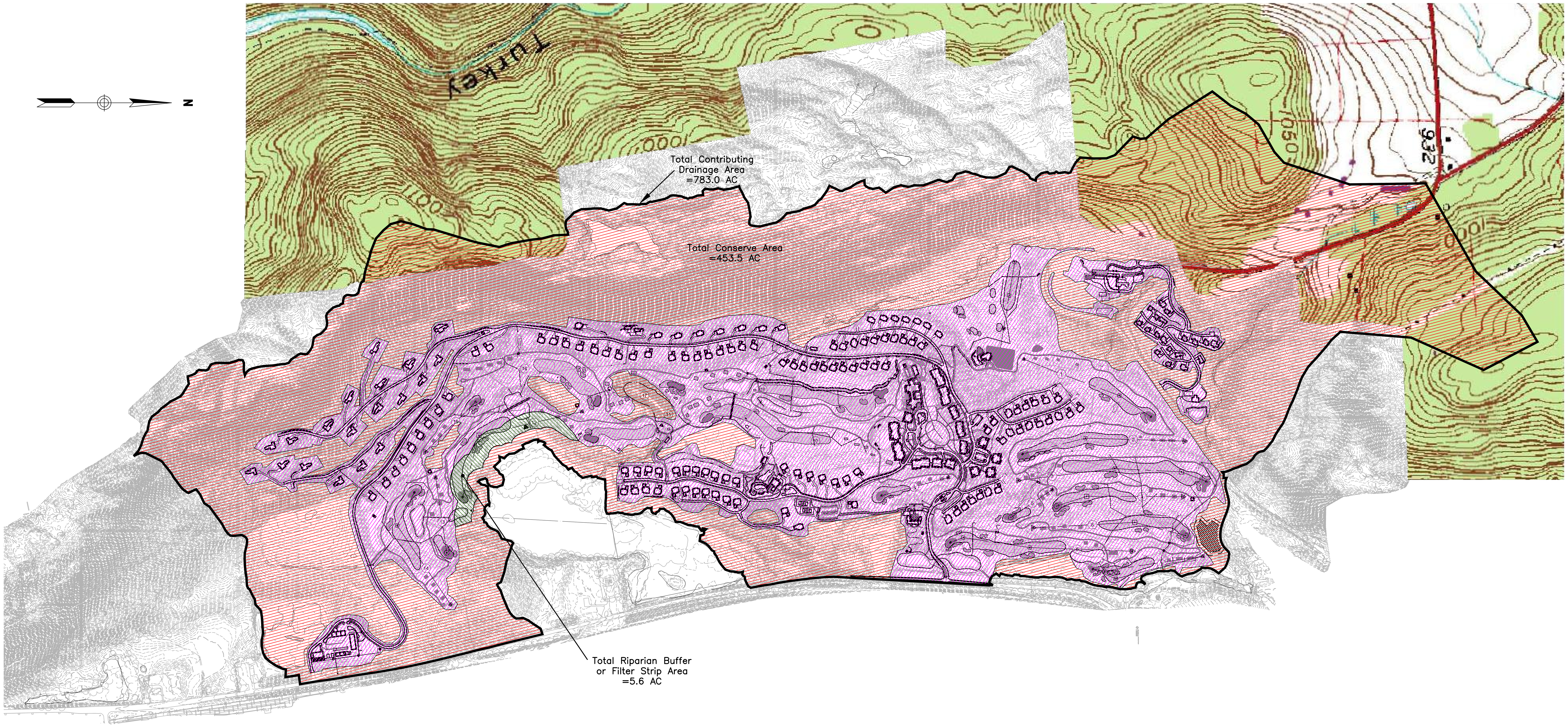
**Total RRv & WQv Provided = 41.855 Ac-ft**

## 7) Total RRv & WQv Provided Vs. Required WQv (#35 in NOI)

Total RRv & WQv Provided = 41.855 Ac-ft
Required WQv = 35.726 Ac-ft

**Total RRv & WQv Provided > Required WQv** ok

VHB
*Engineering, Surveying & Landscape Architecture, P.C.*
Planning
Transportation
Land Development
Environmental Services
50 Main Street - Suite 360
White Plains, NY 10606
914.761.3582 • FAX 914.761.3582




400 0 400 800
SCALE IN FEET

| No. | Revision | Date | Appvd |
|---|---|---|---|
| 1 | PER TOWN COMMENTS | 1/8/15 | ACD |

Designed by | Drawn by | Checked by
CAD checked by | Approved by
Scale 1"=400' | Date June 19, 2014

Project Title
Silo Ridge Resort Community

4651 Route 22
Amenia, New York

Issued for
Permitting

Not Approved for Construction

Drawing Title
Proposed Conditions Water Quality Map

Drawing Number
Fig. E3

Sheet 1 of 1

Project Number
29011.00

# Attachment E4
# Temporary Sediment Basin Calculations

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 2/5/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ______

**TEMPORARY SEDIMENT BASIN DESIGN FOR OVERLOOK AREA (SB #1)**

Drainage Area = 1 acres
Riser Crest Elevation = 806

Peak discharge for construction condition (Rational Method) :

$Q_{p(10)}$ = CIA
= 0.9 * 5 in * 1 ac
= 4.5 cfs

$\boxed{Q_{p(10)} = 4.50 \text{ cfs}}$

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 134 cu.yds.
= 0.083 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 134
= 67 cu.yds.
= 0.042 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| | | | | | | | | 1 | 2 | 1-2=3 |
|---|---|---|---|---|---|---|---|---|---|---|
| Contour | Contour Area | | | | | Total | Total | Cumulative | *Req'd Sediment | Net |
| Elev. | Proposed | Average | Proposed | Average | Depth | Volume | Volume | Total Volume | Storage Volume | Volume |
| (ft) | ($ft^2$) | ($ft^2$) | (ac) | (ac) | (ft) | ($ft^3$) | (ac-ft) | (ac-ft) | (ac-ft) | (ac-ft) |
| 803 | 984 | | 0.0226 | | | | | | | |
| | | 1367 | | 0.0314 | 2 | 2733 | 0.0627 | 0.0627 | 0.0831 | -0.0203 |
| 805 | 1749 | | 0.0402 | | | | | | | |
| | | 2182 | | 0.0501 | 2 | 4364 | 0.1002 | 0.1629 | 0.0831 | 0.0799 |
| 807 | 2615 | | 0.0600 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.042 |
| Elevation Range: | High: | 807.00 | 0.1629 |
| | Low: | 805.00 | 0.0627 |

Interpolated Elevation for scheduled time to clean out = **804.6**

Elevation corresponding to scheduled time to clean out = 805.00 ft.

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 806.0 - 805.00
h = 1 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$
As = 0.01 x 4.50
As = 0.045 ac

or As = 0.015 x DA
As = 0.015 x 1
As = 0.015 ac

Use As = 0.045 ac which is greater than As = 0.015 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 803.0

***Runoff:***

4) $Q_{p(10)}$ = 4.50 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 0.20 cfs

6) H = 806.0 - 802.0
= 4.0 ft.

Barrel Length, L 50 ft.

7) Barrel Diameter, Dp = 15 inches
Q = 6.96 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 1.14 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 7.93 cfs

8) Riser Diameter = 15 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 806.0 - 803.0
= 3.0 ft.

Required, h = 0.6 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

9) Trash Rack Diameter = 21" (Fig. 5A.29 (2))

H = 7" (Fig. 5A.29(2))

Design High Water Elevation = Riser Crest Elevation + h
= 806.0 + 1.00
= 807.0
Top of Dam Elevation = 808.0 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 807.0

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 3.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.020 | | 2.00% |
| Length of pipe in saturated zone, $L_s$ = | 20 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 3.0 | ft. | | |
| Outlet pipe size = | 1.25 | ft. | | |
| Projection = | 0.9 | ft. | | |
| Collar spacing is between = | 4.5 | ft. to | 12.3 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{A_s \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.045 ac

h = 1 ft.

$$\frac{3.14\, d_0^2}{4} = 0.023 \text{ ft}^2$$

$$d_0 = 0.170 \text{ ft.}$$

$$= 2.04 \text{ inches}$$

| | |
|---|---|
| Provide 3-inch diameter hole at elevation for dewatering orifice | 805.00 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 12/29/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA C103 (SB #2)**

Drainage Area = 8.35 acres
Riser Crest Elevation = 500

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 10.40 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 1118.9 cu.yds.
= 0.694 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 1118.9
= 559.45 cu.yds.
= 0.347 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area: Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1<br>Cumulative Total Volume (ac-ft) | 2<br>*Req'd Sediment Storage Volume (ac-ft) | 1-2=3<br>Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 496 | 4392 | | 0.1008 | | | | | | | |
| | | 5016 | | 0.1152 | 2 | 10032 | 0.2303 | 0.2303 | 0.6935 | -0.4632 |
| 498 | 5640 | | 0.1295 | | | | | | | |
| | | 6314 | | 0.1449 | 2 | 12628 | 0.2899 | 0.5202 | 0.6935 | -0.1733 |
| 500 | 6988 | | 0.1604 | | | | | | | |
| | | 7713 | | 0.1771 | 2 | 15425 | 0.3541 | 0.8743 | 0.6935 | 0.1808 |
| 502 | 8437 | | 0.1937 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.347 |
| Elevation Range: | High: | 500.00 | 0.5202 |
| | Low: | 498.00 | 0.2303 |

Interpolated Elevation for scheduled time to clean out = **498.8**

| Elevation corresponding to scheduled time to clean out = 499.00 ft. |
|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 500.00 - 499.00

h = 1 ft.

3) Minimum Basin Surface Area,

$As = 0.01 \times Q_{p(10)}$ or $0.015 \times DA$

$As = 0.01 \times Q_{p(10)}$

As = 0.01 x 10.40

As = 0.104 ac

or

As = 0.015 x DA

As = 0.015 x 8.35

As = 0.125 ac

Use As = 0.125 ac which is greater than As = 0.104 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 496.0

***Runoff:***

4) $Q_{p(10)}$ = 10.40 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 1.67 cfs

6) H = 500.0 - 494.0
= 6.0 ft.

Barrel Length, L 60 ft.

| | | | | |
|---|---|---|---|---|
| 7) Barrel Diameter, Dp | = | 18 | inches | |
| Q | = | 13.40 | cfs | (Fig. 5A.26- Pipe flow chart ; "n"=0.025) |
| Correction Factor | = | 1.05 | | (Fig. 5A.26 - Pipe flow chart ; "n"=0.025) |

Qps = Q x Correction Factor
= 14.07 cfs

8) Riser Diameter = 24 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 500.0 - 496.0
= 4.0 ft.

Required, h = 0.7 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

9) Trash Rack Diameter = 36" (Fig. 5A.29 (2))

H = 13" (Fig. 5A.29(2))

Design High Water Elevation = Riser Crest Elevation + h
= 500.0 + 1.00
= 501.0
Top of Dam Elevation = 502.0

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 501.0

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.033 | | 3.0% |
| Length of pipe in saturated zone, $L_s$ = | 28 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) |
| Anti-Seep collar size = | 3.75 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 1.1 | ft. | | |
| Collar spacing is between = | 5.5 | ft. to | 15.8 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$Ao = \frac{As \times (2 \times h)^{0.5}}{122,568}$$

As = 0.125 ac
h = 1 ft.

$$\frac{3.14\, d_0^2}{4} = 0.063 \text{ ft}^2$$

$$d_0 = 0.283 \text{ ft.}$$

$$= 3.40 \text{ inches}$$

| | |
|---|---|
| Provide 4-inch diameter hole at elevation for dewatering orifice | 499.00 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 2/5/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ______

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA A101 (SB #3)**

Drainage Area = 12.36 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 529.00 - 1
= 528.00

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 18.54 cfs |
|---|---|

**A. BASIN SIZE DESIGN REQUIREMENTS**

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 1656.2 cu.yds.
= 1.027 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 1656.2
= 828.12 cu.yds.
= 0.513 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1<br>Cumulative Total Volume (ac-ft) | 2<br>*Req'd Sediment Storage Volume (ac-ft) | 1-2=3<br>Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 524 | 6111 | | 0.1403 | | | | | | | |
| | | 6745 | | 0.1548 | 2 | 13490 | 0.3097 | 0.3097 | 1.0266 | -0.7169 |
| 526 | 7379 | | 0.1694 | | | | | | | |
| | | 8063 | | 0.1851 | 2 | 16126 | 0.3702 | 0.6799 | 1.0266 | -0.3467 |
| 528 | 8747 | | 0.2008 | | | | | | | |
| | | 9482 | | 0.2177 | 2 | 18963 | 0.4353 | 1.1152 | 1.0266 | 0.0886 |
| 530 | 10216 | | 0.2345 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.513 |
| Elevation Range: | High: | 528.00 | 0.6799 |
| | Low: | 526.00 | 0.3097 |

Interpolated Elevation for scheduled time to clean out = **527.1**

Elevation corresponding to scheduled time to clean out = 527.10 ft.

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 528.00 - 527.10

h = 0.9 ft.

3) Minimum Basin Surface Area,

$As = 0.01 \times Q_{p(10)}$ or $0.015 \times DA$

$As = 0.01 \times Q_{p(10)}$

As = 0.01 x 18.54

As = 0.185 ac

or

As = 0.015 x DA

As = 0.015 x 12.36

As = 0.185 ac

Use As = 0.185 ac which is greater than As = 0.185 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 524.0

***Runoff:***

4) $Q_{p(10)}$ = 18.54 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 2.47 cfs

6) H = 529.0 - 522.0
= 7.0 ft.

Barrel Length, L 60 ft.

7) Barrel Diameter, Dp = 18 inches
Q = 14.50 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 1.05 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 15.23 cfs

8) Riser Diameter = 24 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 528.0 - 524.0
= 4 ft.

Required, h = 0.7 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 529.0 - 1.0
= 528.0 ft.

9) Trash Rack Diameter = 36" (Fig. 5A.29 (2))

H = 13" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 18.54 - 15.23
= 3.31 cfs

11) Width of spillway = 10 ft.
$Q_{es} = CLH^{3/2}$
3.31 = 3.1*L*(Hp^1.5)
Hp = **0.23** ft
Spillway Elevation = 529.0
Design High Water Elevation = Spillway Elevation + Hp
= 529.0 + 0.23
= 529.2
Top of Dam Elevation = 530.3 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 529.2

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.020 | | 2.0% |
| Length of pipe in saturated zone, $L_s$ = | 26 | ft. | |

(Fig. 5A.31 - Anti-Seep Collar Design Charts)

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | | |
| Anti-Seep collar size = | 3.25 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 0.9 | ft. | | |
| Collar spacing is between = | 4.5 | ft. to | 12.3 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{As \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.185 ac
h = 0.9 ft.

$$\frac{3.14\, d_0^2}{4} = 0.088 \text{ ft}^2$$

$$d_0 = 0.336 \text{ ft.}$$
$$= 4.03 \text{ inches}$$

| |
|---|
| Provide 4-inch diameter hole at elevation 527.10<br>for dewatering orifice |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 1/14/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ____________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA A104 (SB #4)**

Drainage Area = 11.58 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 583.50 - 1
= 582.50

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 17.40 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 1551.7 cu.yds.
= 0.962 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 1551.7
= 775.86 cu.yds.
= 0.481 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1<br>Cumulative Total Volume (ac-ft) | 2<br>*Req'd Sediment Storage Volume (ac-ft) | 1-2=3<br>Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 578 | 6111 | | 0.1403 | | | | | | | |
| | | 6745 | | 0.1548 | 2 | 13490 | 0.3097 | 0.3097 | 0.9618 | -0.6521 |
| 580 | 7379 | | 0.1694 | | | | | | | |
| | | 8063 | | 0.1851 | 2 | 16126 | 0.3702 | 0.6799 | 0.9618 | -0.2819 |
| 582 | 8747 | | 0.2008 | | | | | | | |
| | | 9482 | | 0.2177 | 2 | 18963 | 0.4353 | 1.1152 | 0.9618 | 0.1534 |
| 584 | 10216 | | 0.2345 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.481 |
| Elevation Range: | High: | 582.00 | 0.6799 |
| | Low: | 580.00 | 0.3097 |

Interpolated Elevation for scheduled time to clean out = **580.9**

| Elevation corresponding to scheduled time to clean out = | 581.00 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 582.50 - 581.00

h = 1.5 ft.

3) Minimum Basin Surface Area,

As = $0.01 \times Q_{p(10)}$ or $0.015 \times DA$

As = $0.01 \times Q_{p(10)}$

As = 0.01 x 17.40

As = 0.174 ac

or

As = 0.015 x DA

As = 0.015 x 11.58

As = 0.174 ac

Use As = 0.174 ac which is greater than As = 0.174 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 578.0

***Runoff:***

4) $Q_{p(10)}$ = 17.40 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 2.32 cfs

6) H = 583.5 - 576.0
= 7.5 ft.

Barrel Length, L 90 ft.

7) Barrel Diameter, Dp = 18 inches
Q = 15.00 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 0.91 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 13.65 cfs

8) Riser Diameter = 24 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 582.5 - 578.0
= 4.5 ft.

Required, h = 0.8 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 583.5 - 1.0
= 582.5 ft.

9) Trash Rack Diameter = 36" (Fig. 5A.29 (2))

H = 13" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 17.40 - 13.65
= 3.75 cfs

11) Width of spillway = 25 ft.

$Q_{es} = CLH^{3/2}$

3.75 = 3.1*L*(Hp^1.5)

Hp = **0.13** ft

Spillway Elevation = 583.5

Design High Water Elevation = Spillway Elevation + Hp
= 583.5 + 0.13
= 583.6

Top of Dam Elevation = 584.6 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 583.6

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.5 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.022 | | 2.2% |
| Length of pipe in saturated zone, $L_s$ = | 30 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) |
| Anti-Seep collar size = | 3.75 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 1.1 | ft. | | |
| Collar spacing is between = | 5.5 | ft. to | 15.8 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{A_s \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.174 ac
h = 1.5 ft.

$$\frac{3.14\, d_0^2}{4} = 0.107 \text{ ft}^2$$

$$d_0 = 0.369 \text{ ft.}$$
$$= 4.43 \text{ inches}$$

Provide 4-inch diameter hole at elevation 581.00
for dewatering orifice

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 1/16/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ______

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA A104 - LOWER PART (SB #5)**

Drainage Area = 9.25 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 513.00 - 1
= 512.00

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 13.90 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 1239.5 cu.yds.
= 0.768 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 1239.5
= 619.75 cu.yds.
= 0.384 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 508 | 6111 | | 0.1403 | | | | | | | |
| | | 6745 | | 0.1548 | 2 | 13490 | 0.3097 | 0.3097 | 0.7683 | -0.4586 |
| 510 | 7379 | | 0.1694 | | | | | | | |
| | | 8063 | | 0.1851 | 2 | 16126 | 0.3702 | 0.6799 | 0.7683 | -0.0884 |
| 512 | 8747 | | 0.2008 | | | | | | | |
| | | 9482 | | 0.2177 | 2 | 18963 | 0.4353 | 1.1152 | 0.7683 | 0.3469 |
| 514 | 10216 | | 0.2345 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.384 |
| Elevation Range: | High: | 512.00 | 0.6799 |
| | Low: | 510.00 | 0.3097 |

Interpolated Elevation for scheduled time to clean out = **510.4**

Elevation corresponding to scheduled time to clean out = 510.50 ft.

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 512.00 - 510.50
h = 1.5 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$
As = 0.01 x 13.90
As = 0.139 ac

or

As = 0.015 x DA
As = 0.015 x 9.25
As = 0.139 ac

Use As = 0.139 ac which is greater than As = 0.139 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 508.0

***Runoff:***

4) $Q_{p(10)}$ = 13.90 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 1.85 cfs

6) H = 513.0 - 507.0
= 6.0 ft.

Barrel Length, L 120 ft.

7) Barrel Diameter, Dp = 18 inches
Q = 13.40 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 0.82 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 10.99 cfs

8) Riser Diameter = 24 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 512.0 - 508.0
= 4 ft.

Required, h = 0.7 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 513.0 - 1.0
= 512.0 ft.

9) Trash Rack Diameter = 36" (Fig. 5A.29 (2))

H = 13" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 13.90 - 10.99
= 2.91 cfs

11) Width of spillway = 10 ft.

$Q_{es} = CLH^{3/2}$

2.91 = 3.1*L*(Hp^1.5)

Hp = **0.21** ft

Spillway Elevation = 513.0

Design High Water Elevation = Spillway Elevation + Hp
= 513.0 + 0.21
= 513.2

Top of Dam Elevation = 514.2 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 513.2

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.013 | | 1.3% |
| Length of pipe in saturated zone, $L_s$ = | 25 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 3.25 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 0.9 | ft. | | |
| Collar spacing is between = | 4.5 | ft. to | 12.3 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $A_o = \dfrac{As \times (2 \times h)^{0.5}}{122{,}568}$  As = 0.139 ac, h = 1.5 ft.

$\dfrac{3.14\, d_0^2}{4} = 0.086$ ft$^2$

$d_0 = 0.330$ ft.

$= 3.96$ inches

| | |
|---|---|
| Provide 4-inch diameter hole at elevation for dewatering orifice | 510.50 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 2/5/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA A105 (SB #6)**

Drainage Area = 13.8 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 593.00 - 1
= 592.00

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 15.40 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 1849.2 cu.yds.
= 1.146 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 1849.2
= 924.6 cu.yds.
= 0.573 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 588 | 7009 | | 0.1609 | | | | | | | |
| | | 7688 | | 0.1765 | 2 | 15375 | 0.3530 | 0.3530 | 1.1462 | -0.7932 |
| 590 | 8366 | | 0.1921 | | | | | | | |
| | | 9095 | | 0.2088 | 2 | 18190 | 0.4176 | 0.7705 | 1.1462 | -0.3757 |
| 592 | 9824 | | 0.2255 | | | | | | | |
| | | 10603 | | 0.2434 | 2 | 21206 | 0.4868 | 1.2574 | 1.1462 | 0.1112 |
| 594 | 11382 | | 0.2613 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.573 |
| Elevation Range: | High: | 592.00 | 0.7705 |
| | Low: | 590.00 | 0.3530 |

Interpolated Elevation for scheduled time to clean out = **591.1**

| Elevation corresponding to scheduled time to clean out = | 591.10 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 593.00 - 591.10
h = 1.9 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$
As = 0.01 x 15.40
As = 0.154 ac

or As = 0.015 x DA
As = 0.015 x 13.8
As = 0.207 ac

Use As = 0.207 ac which is greater than As = 0.154 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 588.0

***Runoff:***

4) $Q_{p(10)}$ = 15.40 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 2.76 cfs

6) H = 593.0 - 586.5
= 6.5 ft.

Barrel Length, L 85 ft.

7) Barrel Diameter, Dp = 18 inches
Q = 13.95 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 0.93 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 12.97 cfs

8) Riser Diameter = 24 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 592.0 - 588.0
= 4 ft.

Required, h = 0.8 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 593.0 - 1.0
= 592.0 ft.

9) Trash Rack Diameter = 36" (Fig. 5A.29 (2))

H = 13" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 15.40 - 12.97
= 2.43 cfs

11) Width of spillway = 5 ft.

$Q_{es} = CLH^{3/2}$

2.43 = 3.1*L*(Hp^1.5)

Hp = **0.29** ft

Spillway Elevation = 593.0

Design High Water Elevation = Spillway Elevation + Hp
= 593.0 + 0.29
= 593.3

Top of Dam Elevation = 594.3 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 593.3

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.017 | | 1.7% |
| Length of pipe in saturated zone, $L_s$ = | 26 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 3.25 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 0.9 | ft. | | |
| Collar spacing is between = | 4.5 | ft. to | 12.3 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $Ao = \frac{As \times (2 \times h)^{0.5}}{122{,}568}$ As = 0.207 ac; h = 1.9 ft.

$$\frac{3.14\, d_0^2}{4} = 0.143 \text{ ft}^2$$

$$d_0 = 0.427 \text{ ft.}$$

$$= 5.13 \text{ inches}$$

| | |
|---|---|
| Provide 5-inch diameter hole at elevation | 591.10 |
| for dewatering orifice | |

VHB

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 1/20/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA A103 (SB #7)**

Drainage Area = 57.5 acres
Riser Crest Elevation = 503

Peak discharge for construction condition (from HydroCAD analysis) :

$Q_{p(10)}$: 24.75 cfs

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 7705 cu.yds.
= 4.776 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 7705
= 3852.5 cu.yds.
= 2.388 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1<br>Cumulative Total Volume (ac-ft) | 2<br>*Req'd Sediment Storage Volume (ac-ft) | 1-2=3<br>Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 496 | 29906 | | 0.6865 | | | | | | | |
| | | 31322 | | 0.7191 | 2 | 62644 | 1.4381 | 1.4381 | 4.7758 | -3.3377 |
| 498 | 32738 | | 0.7516 | | | | | | | |
| | | 34204 | | 0.7852 | 2 | 68408 | 1.5704 | 3.0085 | 4.7758 | -1.7673 |
| 500 | 35670 | | 0.8189 | | | | | | | |
| | | 37187 | | 0.8537 | 2 | 74373 | 1.7074 | 4.7159 | 4.7758 | -0.0599 |
| 502 | 38703 | | 0.8885 | | | | | | | |
| | | 40270 | | 0.9245 | 2 | 80539 | 1.8489 | 6.5648 | 4.7758 | 1.7890 |
| 504 | 41836 | | 0.9604 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 2.388 |
| Elevation Range: | High: | 500.00 | 3.0085 |
| | Low: | 498.00 | 1.4381 |

Interpolated Elevation for scheduled time to clean out = **499.2**

| Elevation corresponding to scheduled time to clean out = | 500.00 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 503.00 - 500.00

h = 3 ft.

3) Minimum Basin Surface Area,

$As = 0.01 \times Q_{p(10)}$ or $0.015 \times DA$

$As = 0.01 \times Q_{p(10)}$

As = 0.01 x 24.75

As = 0.248 ac

or

As = 0.015 x DA

As = 0.015 x 57.5

As = 0.863 ac

Use As = 0.863 ac which is greater than As = 0.248 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 496.0

***Runoff:***

4) $Q_{p(10)}$ = 24.75 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 11.50 cfs

6) H = 503.0 - 499.0
= 4.0 ft.

Barrel Length, L 140 ft.

7) Barrel Diameter, Dp = 30 inches
Q = 32.60 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 0.81 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 26.41 cfs

8) Riser Diameter = 36 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 503.0 - 500.0
= 3.0 ft.

Required, h = 0.9 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

9) Trash Rack Diameter = 54" (Fig. 5A.29 (2))

H = 17" (Fig. 5A.29(2))

Design High Water Elevation = Riser Crest Elevation + h
= 503.0 + 1.00
= 504.0
Top of Dam Elevation = 505.0 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 504.0

| | | | | |
|---|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 3.0 | ft. | | |
| Slope upstream embankment, Z = | 2 | :1 | | |
| pipe slope = | 0.007 | | 0.7% | |
| Length of pipe in saturated zone, $L_s$ = | 19 | ft. | | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 3 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 3.50 | ft. | | |
| Outlet pipe size = | 2.5 | ft. | | |
| Projection = | 0.5 | ft. | | |
| Collar spacing is between = | 2.5 | ft. to | 7.0 | ft. |
| Provided collar spacing = | 7.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{A_s \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.863 ac

h = 3 ft.

$$\frac{3.14\, d_0^2}{4} = 0.751 \text{ ft}^2$$

$d_0$ = 0.978 ft.

= 11.74 inches

| |
|---|
| Provide 12-inch diameter hole at elevation 500.00 for dewatering orifice |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 1/24/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B102 & B103 (SB #8)**

Drainage Area = 16.15 acres
Riser Crest Elevation = 516

Peak discharge for construction condition (from HydroCAD analysis) :

$Q_{p(10)}$: 14.35 cfs

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 2164.1 cu.yds.
= 1.341 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 2164.1
= 1082.1 cu.yds.
= 0.671 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed (ft$^2$) | Average (ft$^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume (ft$^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 512 | 8601 | | 0.1975 | | | | | | | |
| | | 9480 | | 0.2176 | 2 | 18959 | 0.4352 | 0.4352 | 1.3414 | -0.9061 |
| 514 | 10358 | | 0.2378 | | | | | | | |
| | | 11287 | | 0.2591 | 2 | 22573 | 0.5182 | 0.9534 | 1.3414 | -0.3879 |
| 516 | 12215 | | 0.2804 | | | | | | | |
| | | 13194 | | 0.3029 | 2 | 26388 | 0.6058 | 1.5592 | 1.3414 | 0.2178 |
| 518 | 14173 | | 0.3254 | | | | | | | |

| | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | X | 0.671 |
| Elevation Range: High: | 516.00 | 0.9534 |
| Low: | 514.00 | 0.4352 |

Interpolated Elevation for scheduled time to clean out = **514.9**

Elevation corresponding to scheduled time to clean out = 515.00 ft.

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 516.00 - 515.00
h = 1 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ <u>or</u> 0.015 x DA

As = 0.01 x $Q_{p(10)}$
As = 0.01 x 14.35
As = 0.144 ac

<u>or</u> As = 0.015 x DA
As = 0.015 x 16.15
As = 0.242 ac

Use As = <u>0.242</u> ac which is greater than As = 0.144 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 512.0

***Runoff:***

4) $Q_{p(10)}$ = 14.35 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 3.23 cfs

6) H = 516.0 - 508.5
= 7.5 ft.

Barrel Length, L 60 ft.

| | | | | |
|---|---|---|---|---|
| 7) Barrel Diameter, Dp | = | 18 | inches | |
| Q | = | 13.95 | cfs | (Fig. 5A.26- Pipe flow chart ; "n"=0.025) |
| Correction Factor | = | 1.05 | | (Fig. 5A.26 - Pipe flow chart ; "n"=0.025) |
| Qps | = | Q x Correction Factor | | |
| | = | 14.65 | cfs | |
| 8) Riser Diameter | = | 24 | inches | |
| Length of Riser | = | Riser Crest Elevation - Bottom of Basin | | |
| | = | 516.0 - 512.0 | | |
| | = | 4.0 | ft. | |
| Required, h | = | 0.9 | ft. | (Fig. 5A.25 - Riser Inflow Chart) |
| Provided, h | = | 1.0 | ft. | |
| 9) Trash Rack Diameter | = | 36" | (Fig. 5A.29 (2)) | |
| H | = | 13" | (Fig. 5A.29(2)) | |

Design High Water Elevation = Riser Crest Elevation + h
= 516.0 + 1.00
= 517.0
Top of Dam Elevation = 518.0 (1 ft freeboard)

### C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 517.0

| | | | | |
|---|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.0 | ft. | | |
| Slope upstream embankment, Z = | 2 | :1 | | |
| pipe slope = | 0.058 | | 5.8% | |
| Length of pipe in saturated zone, $L_s$ = | 31 | ft. | | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 3.75 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 1.1 | ft. | | |
| Collar spacing is between = | 5.5 | ft. to | 15.8 | ft. |
| Provided collar spacing = | 8.0 | ft. | | |

### D. DEWATERING ORIFICE SIZING

13) $$Ao = \frac{As \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.242 ac

h = 1 ft.

$$\frac{3.14\, d_0^2}{4} = 0.122 \text{ ft}^2$$

$$d_0 = 0.394 \text{ ft.}$$

$$= 4.73 \text{ inches}$$

| | |
|---|---|
| Provide 5-inch diameter hole at elevation for dewatering orifice | 515.00 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 1/24/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B117 (SB #8A)**

Drainage Area = 7.2 acres
Riser Crest Elevation = 514

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 3.68 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 964.8 cu.yds.
= 0.598 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 964.8
= 482.4 cu.yds.
= 0.299 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 510 | 3344 | | 0.0768 | | | | | | | |
| | | 3826 | | 0.0878 | 2 | 7652 | 0.1757 | 0.1757 | 0.5980 | -0.4224 |
| 512 | 4308 | | 0.0989 | | | | | | | |
| | | 4841 | | 0.1111 | 2 | 9681 | 0.2222 | 0.3979 | 0.5980 | -0.2001 |
| 514 | 5373 | | 0.1233 | | | | | | | |
| | | 5956 | | 0.1367 | 2 | 11911 | 0.2734 | 0.6713 | 0.5980 | 0.0733 |
| 516 | 6538 | | 0.1501 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.299 |
| Elevation Range: | High: | 514.00 | 0.3979 |
| | Low: | 512.00 | 0.1757 |

Interpolated Elevation for scheduled time to clean out = **513.1**

Elevation corresponding to scheduled time to clean out = 513.10 ft.

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 514.00 - 513.10

h = 0.9 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$

As = 0.01 x 3.68

As = 0.037 ac

or

As = 0.015 x DA

As = 0.015 x 7.2

As = 0.108 ac

Use As = 0.108 ac which is greater than As = 0.037 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 510.0

***Runoff:***

4) $Q_{p(10)}$ = 3.68 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 1.44 cfs

6) H = 514.0 - 508.0
= 6.0 ft.

Barrel Length, L 60 ft.

| | | | | |
|---|---|---|---|---|
| 7) Barrel Diameter, Dp | = | 15 | inches | |
| Q | = | 8.50 | cfs | (Fig. 5A.26- Pipe flow chart ; "n"=0.025) |
| Correction Factor | = | 1 | | (Fig. 5A.26 - Pipe flow chart ; "n"=0.025) |
| Qps | = | Q x Correction Factor | | |
| | = | 8.50 | cfs | |
| 8) Riser Diameter | = | 18 | inches | |
| Length of Riser | = | Riser Crest Elevation - Bottom of Basin | | |
| | = | 514.0 - 510.0 | | |
| | = | 4.0 | ft. | |
| Required, h | = | 0.8 | ft. | (Fig. 5A.25 - Riser Inflow Chart) |
| Provided, h | = | 1.0 | ft. | |
| 9) Trash Rack Diameter | = | 27" | (Fig. 5A.29 (2)) | |
| H | = | 8" | (Fig. 5A.29(2)) | |

Design High Water Elevation = Riser Crest Elevation + h
= 514.0 + 1.00
= 515.0
Top of Dam Elevation = 516.0

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 515.0

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.033 | | 3.3% |
| Length of pipe in saturated zone, $L_s$ = | 28 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) |
| Anti-Seep collar size = | 3.50 | ft. | | |
| Outlet pipe size = | 1.25 | ft. | | |
| Projection = | 1.1 | ft. | | |
| Collar spacing is between = | 5.5 | ft. to | 15.8 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$Ao = \frac{As \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.108 ac
h = 0.9 ft.

$$\frac{3.14\, d_0^2}{4} = 0.051 \text{ ft}^2$$

$$d_0 = 0.256 \text{ ft.}$$
$$= 3.07 \text{ inches}$$

| | |
|---|---|
| Provide 3-inch diameter hole at elevation for dewatering orifice | 513.10 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 12/29/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B118 (SB #8B)**

Drainage Area = 3 acres
Riser Crest Elevation = 502.6

Peak discharge for construction condition (from HydroCAD analysis) :

$Q_{p(10)}$: 2.60 cfs

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 402 cu.yds.
= 0.249 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 402
= 201 cu.yds.
= 0.125 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 498 | 768 | | 0.0176 | | | | | | | |
| | | 1158 | | 0.0266 | 2 | 2315 | 0.0531 | 0.0531 | 0.2492 | -0.1960 |
| 500 | 1547 | | 0.0355 | | | | | | | |
| | | 1987 | | 0.0456 | 2 | 3973 | 0.0912 | 0.1444 | 0.2492 | -0.1048 |
| 502 | 2426 | | 0.0557 | | | | | | | |
| | | 2916 | | 0.0669 | 2 | 5832 | 0.1339 | 0.2782 | 0.2492 | 0.0291 |
| 504 | 3406 | | 0.0782 | | | | | | | |

| | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | X | 0.125 |
| Elevation Range: High: | 502.00 | 0.1444 |
| Low: | 500.00 | 0.0531 |

Interpolated Elevation for scheduled time to clean out = **501.6**

| Elevation corresponding to scheduled time to clean out = | 501.60 | ft. |
|---|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 502.60 - 501.60
h = 1 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$
As = 0.01 x 2.60
As = 0.026 ac

or As = 0.015 x DA
As = 0.015 x 3
As = 0.045 ac

Use As = 0.045 ac which is greater than As = 0.026 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 498.0

***Runoff:***

4) $Q_{p(10)}$ = 2.60 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 0.60 cfs

6) H = 502.6 - 496.0
= 6.6 ft.

Barrel Length, L 60 ft.

| | | | | |
|---|---|---|---|---|
| 7) Barrel Diameter, Dp | = | 15 | inches | |
| Q | = | 8.50 | cfs | (Fig. 5A.26- Pipe flow chart ; "n"=0.025) |
| Correction Factor | = | 1 | | (Fig. 5A.26 - Pipe flow chart ; "n"=0.025) |
| Qps | = | Q x Correction Factor | | |
| | = | 8.50 | cfs | |
| 8) Riser Diameter | = | 18 | inches | |
| Length of Riser | = | Riser Crest Elevation - Bottom of Basin | | |
| | = | 502.6 - 498.0 | | |
| | = | 4.6 | ft. | |
| Required, h | = | 0.5 | ft. | (Fig. 5A.25 - Riser Inflow Chart) |
| Provided, h | = | 0.5 | ft. | |
| 9) Trash Rack Diameter | = | 27" | (Fig. 5A.29 (2)) | |
| H | = | 8" | (Fig. 5A.29(2)) | |

Design High Water Elevation = Riser Crest Elevation + h
= 502.6 + 0.50
= 503.1

Top of Dam Elevation = 504.0

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 503.1

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.6 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.033 | | 3.3% |
| Length of pipe in saturated zone, $L_s$ = | 32 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 3.75 | ft. | | |
| Outlet pipe size = | 1.25 | ft. | | |
| Projection = | 1.3 | ft. | | |
| Collar spacing is between = | 6.5 | ft. to | 17.5 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{A_s \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.045 ac

h = 1 ft.

$$\frac{3.14\, d_0^2}{4} = 0.023 \text{ ft}^2$$

$$d_0 = 0.170 \text{ ft.}$$

$$= 2.04 \text{ inches}$$

| | |
|---|---|
| Provide 3-inch diameter hole at elevation<br>for dewatering orifice | 501.60 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 2/6/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ____________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B104, B110 & B115 (SB #9)**

Drainage Area = 26.1 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 527.30 - 1.3
= 526.00

Peak discharge for construction condition (from HydroCAD analysis) :

| | |
|---|---|
| $Q_{p(10)}$: | 59.50 cfs |

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 3497.4 cu.yds.
= 2.168 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 3497.4
= 1748.7 cu.yds.
= 1.084 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 520 | 8939 | | 0.2052 | | | | | | | |
| | | 9841 | | 0.2259 | 2 | 19681 | 0.4518 | 0.4518 | 2.1678 | -1.7160 |
| 522 | 10742 | | 0.2466 | | | | | | | |
| | | 11694 | | 0.2685 | 2 | 23388 | 0.5369 | 0.9887 | 2.1678 | -1.1791 |
| 524 | 12646 | | 0.2903 | | | | | | | |
| | | 13648 | | 0.3133 | 2 | 27296 | 0.6266 | 1.6154 | 2.1678 | -0.5525 |
| 526 | 14650 | | 0.3363 | | | | | | | |
| | | 15703 | | 0.3605 | 2 | 31405 | 0.7210 | 2.3363 | 2.1678 | 0.1685 |
| 528 | 16755 | | 0.3846 | | | | | | | |

| | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | X | 1.084 |
| Elevation Range: High: | 526.00 | 1.6154 |
| Low: | 524.00 | 0.9887 |

Interpolated Elevation for scheduled time to clean out = **524.3**

Elevation corresponding to scheduled time to clean out = 524.30 ft.

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 526.00 - 524.30
h = 1.7 ft.

3) Minimum Basin Surface Area,

As = $0.01 \times Q_{p(10)}$ or 0.015 x DA

As = $0.01 \times Q_{p(10)}$
As = 0.01 x 59.50
As = 0.595 ac

or As = 0.015 x DA
As = 0.015 x 26.1
As = 0.392 ac

Use As = 0.595 ac which is greater than As = 0.392 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 520.0

***Runoff:***

4) $Q_{p(10)}$ = 59.50 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 5.22 cfs

6) H = 527.3 - 519.0
= 8.3 ft.

Barrel Length, L 90 ft.

7) Barrel Diameter, Dp = 30 inches
Q = 53.20 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 0.93 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 49.48 cfs

8) Riser Diameter = 42 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 526.0 - 520.0
= 6 ft.

Required, h = 1.3 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.3 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 527.3 - 1.3
= 526.0 ft.

9) Trash Rack Diameter = 60" (Fig. 5A.29 (2))

H = 19" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 59.50 - 49.48
= 10.02 cfs

11) Width of spillway = 20 ft.

$Q_{es} = CLH^{3/2}$

10.02 = 3.1*L*(Hp^1.5)

Hp = **0.30** ft

Spillway Elevation = 527.3

Design High Water Elevation = Spillway Elevation + Hp
= 527.3 + 0.30
= 527.6

Top of Dam Elevation = 528.6 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 527.6

| | | | | |
|---|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 6.0 | ft. | | |
| Slope upstream embankment, Z = | 2 | :1 | | |
| pipe slope = | 0.011 | | 1.1% | |
| Length of pipe in saturated zone, $L_s$ = | 38 | ft. | | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 3 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 4.50 | ft. | | |
| Outlet pipe size = | 2.5 | ft. | | |
| Projection = | 1.0 | ft. | | |
| Collar spacing is between = | 5.0 | ft. to | 14.0 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{A_s \times (2 \times h)^{0.5}}{122{,}568}$$ As = 0.595 ac, h = 1.7 ft.

$$\frac{3.14\, d_0^2}{4} = 0.390 \ \text{ft}^2$$

$$d_0 = 0.705 \ \text{ft.}$$

$$= 8.46 \ \text{inches}$$

| |
|---|
| Provide 8-inch diameter hole at elevation 524.30<br>for dewatering orifice |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 2/6/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B105 & B111 (SB #10)**

Drainage Area = 12.6 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 531.20 - 1
= 530.20

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 40.00 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 1688.4 cu.yds.
= 1.047 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 1688.4
= 844.2 cu.yds.
= 0.523 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| | | | | | | | | 1 | 2 | 1-2=3 |
|---|---|---|---|---|---|---|---|---|---|---|
| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | Cumulative Total Volume (ac-ft) | *Req'd Sediment Storage Volume (ac-ft) | Net Volume (ac-ft) |
| 526 | 6140 | | 0.1410 | | | | | | | |
| | | 6779 | | 0.1556 | 2 | 13557 | 0.3112 | 0.3112 | 1.0465 | -0.7353 |
| 528 | 7417 | | 0.1703 | | | | | | | |
| | | 8106 | | 0.1861 | 2 | 16211 | 0.3722 | 0.6834 | 1.0465 | -0.3631 |
| 530 | 8794 | | 0.2019 | | | | | | | |
| | | 9533 | | 0.2188 | 2 | 19066 | 0.4377 | 1.1211 | 1.0465 | 0.0745 |
| 532 | 10272 | | 0.2358 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.523 |
| Elevation Range: | High: | 530.00 | 0.6834 |
| | Low: | 528.00 | 0.3112 |

Interpolated Elevation for scheduled time to clean out = **529.1**

| Elevation corresponding to scheduled time to clean out = | 529.10 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 530.20 - 529.10

h = 1.1 ft.

3) Minimum Basin Surface Area,

$As = 0.01 \times Q_{p(10)}$ or $0.015 \times DA$

$As = 0.01 \times Q_{p(10)}$

As = 0.01 x 40.00

As = 0.400 ac

or

As = 0.015 x DA

As = 0.015 x 12.6

As = 0.189 ac

Use As = 0.400 ac which is greater than As = 0.189 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 526.0

***Runoff:***

4) $Q_{p(10)}$ = 40.00 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 2.52 cfs

6) H = 531.2 - 524.0
= 7.2 ft.

Barrel Length, L 65 ft.

7) Barrel Diameter, Dp = 24 inches
Q = 29.20 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 1 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 29.20 cfs

8) Riser Diameter = 36 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 530.2 - 526.0
= 4.2 ft.

Required, h = 1 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 531.2 - 1.0
= 530.2 ft.

9) Trash Rack Diameter = 54" (Fig. 5A.29 (2))

H = 17" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p - Q_{ps}$
= 40.00 - 29.20
= 10.80 cfs

11) Width of spillway = 12 ft.

$Q_{es} = CLH^{3/2}$

10.80 = 3.1*L*(Hp^1.5)

Hp = **0.44** ft

Spillway Elevation = 531.2

Design High Water Elevation = Spillway Elevation + Hp
= 531.2 + 0.44
= 531.6

Top of Dam Elevation = 532.6 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 531.6

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.2 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.030 | | 3.0% |
| Length of pipe in saturated zone, $L_s$ = | 29 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) |
| Anti-Seep collar size = | 4.25 | ft. | | |
| Outlet pipe size = | 2 | ft. | | |
| Projection = | 1.1 | ft. | | |
| Collar spacing is between = | 5.5 | ft. to | 15.8 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$Ao = \frac{As \times (2 \times h)^{0.5}}{122,568}$$

As = 0.400 ac

h = 1.1 ft.

$$\frac{3.14\, d_0^2}{4} = 0.211 \text{ ft}^2$$

$$d_0 = 0.518 \text{ ft.}$$

$$= 6.22 \text{ inches}$$

| | |
|---|---|
| Provide 6-inch diameter hole at elevation for dewatering orifice | 529.10 |

VHB

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 2/6/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ______

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B103 (SB #11)**

Drainage Area = 7 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 543.20 - 1
= 542.20

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 24.00 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 938 cu.yds.
= 0.581 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 938
= 469 cu.yds.
= 0.291 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Contour Area Average ($ft^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 538 | 3464 | | 0.0795 | | | | | | | |
| | | 4089 | | 0.0939 | 2 | 8177 | 0.1877 | 0.1877 | 0.5814 | -0.3937 |
| 540 | 4713 | | 0.1082 | | | | | | | |
| | | 5388 | | 0.1237 | 2 | 10776 | 0.2474 | 0.4351 | 0.5814 | -0.1463 |
| 542 | 6063 | | 0.1392 | | | | | | | |
| | | 6788 | | 0.1558 | 2 | 13576 | 0.3117 | 0.7468 | 0.5814 | 0.1654 |
| 544 | 7513 | | 0.1725 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.291 |
| Elevation Range: | High: | 542.00 | 0.4351 |
| | Low: | 540.00 | 0.1877 |

Interpolated Elevation for scheduled time to clean out = **540.8**

| Elevation corresponding to scheduled time to clean out = | 541.00 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 542.20 - 541.00

h = 1.2 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$

As = 0.01 x 24.00

As = 0.240 ac

or

As = 0.015 x DA

As = 0.015 x 7

As = 0.105 ac

Use As = 0.240 ac which is greater than As = 0.105 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 538.0

***Runoff:***

4) $Q_{p(10)}$ = 24.00 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 1.40 cfs

6) H = 543.2 - 536.0
= 7.2 ft.

Barrel Length, L 65 ft.

7) Barrel Diameter, Dp = 18 inches
Q = 14.70 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 1 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 14.70 cfs

8) Riser Diameter = 24 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 542.2 - 538.0
= 4.2 ft.

Required, h = 0.9 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 543.2 - 1.0
= 542.2 ft.

9) Trash Rack Diameter = 36" (Fig. 5A.29 (2))

H = 13" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 24.00 - 14.70
= 9.30 cfs

11) Width of spillway = 15 ft.
$Q_{es} = CLH^{3/2}$
9.30 = 3.1*L*(Hp^1.5)
Hp = **0.34** ft
Spillway Elevation = 543.2
Design High Water Elevation = Spillway Elevation + Hp
= 543.2 + 0.34
= 543.5
Top of Dam Elevation = 544.5 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 543.5

| | | | | |
|---|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.2 | ft. | | |
| Slope upstream embankment, Z = | 2 | :1 | | |
| pipe slope = | 0.040 | | 4.0% | |
| Length of pipe in saturated zone, $L_s$ = | 30 | ft. | | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) |
| Anti-Seep collar size = | 4.25 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 1.4 | ft. | | |
| Collar spacing is between = | 7.0 | ft. to | 19.3 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$Ao = \frac{As \times (2 \times h)^{0.5}}{122{,}568}$$ As = 0.240 ac; h = 1.2 ft.

$$\frac{3.14\, d_0^2}{4} = 0.132 \text{ ft}^2$$

$$d_0 = 0.410 \text{ ft.}$$

$$= 4.92 \text{ inches}$$

| | |
|---|---|
| Provide 5-inch diameter hole at elevation for dewatering orifice | 541.00 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 2/7/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B103 (SB #11A)**

Drainage Area = 7 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 559.20 - 1
= 558.20

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 24.00 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 938 cu.yds.
= 0.581 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 938
= 469 cu.yds.
= 0.291 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area: Proposed ($ft^2$) | Contour Area: Average ($ft^2$) | Contour Area: Proposed (ac) | Contour Area: Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1<br>Cumulative Total Volume (ac-ft) | 2<br>*Req'd Sediment Storage Volume (ac-ft) | 1-2=3<br>Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 554 | 3466 | | 0.0796 | | | | | | | |
| | | 4000 | | 0.0918 | 2 | 8000 | 0.1837 | 0.1837 | 0.5814 | -0.3978 |
| 556 | 4534 | | 0.1041 | | | | | | | |
| | | 5124 | | 0.1176 | 2 | 10248 | 0.2353 | 0.4189 | 0.5814 | -0.1625 |
| 558 | 5714 | | 0.1312 | | | | | | | |
| | | 6352 | | 0.1458 | 2 | 12704 | 0.2916 | 0.7106 | 0.5814 | 0.1292 |
| 560 | 6990 | | 0.1605 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.291 |
| Elevation Range: | High: | 558.00 | 0.4189 |
| | Low: | 556.00 | 0.1837 |

Interpolated Elevation for scheduled time to clean out = **556.9**

| Elevation corresponding to scheduled time to clean out = | 557.00 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 558.20 - 557.00
h = 1.2 ft.

3) Minimum Basin Surface Area,

$As = 0.01 \times Q_{p(10)}$ or $0.015 \times DA$

$As = 0.01 \times Q_{p(10)}$
As = 0.01 x 24.00
As = 0.240 ac

or

As = 0.015 x DA
As = 0.015 x 7
As = 0.105 ac

Use As = 0.240 ac which is greater than As = 0.105 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 554.0

***Runoff:***

4) $Q_{p(10)}$ = 24.00 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 1.40 cfs

6) H = 559.2 - 552.0
= 7.2 ft.

Barrel Length, L 50 ft.

7) Barrel Diameter, Dp = 18 inches
Q = 14.70 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 1.11 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 16.32 cfs

8) Riser Diameter = 24 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 558.2 - 554.0
= 4.2 ft.

Required, h = 0.9 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 559.2 - 1.0
= 558.2 ft.

9) Trash Rack Diameter = 36" (Fig. 5A.29 (2))

H = 13" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 24.00 - 16.32
= 7.68 cfs

11) Width of spillway = 15 ft.
$Q_{es} = CLH^{3/2}$
7.68 = 3.1*L*(Hp^1.5)
Hp = **0.30** ft
Spillway Elevation = 559.2
Design High Water Elevation = Spillway Elevation + Hp
= 559.2 + 0.30
= 559.5
Top of Dam Elevation = 560.5 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 559.5

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.2 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.040 | | 4.0% |
| Length of pipe in saturated zone, $L_s$ = | 30 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 4.25 | ft. | | |
| Outlet pipe size = | 1.5 | ft. | | |
| Projection = | 1.4 | ft. | | |
| Collar spacing is between = | 7.0 | ft. to | 19.3 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{A_s \times (2 \times h)^{0.5}}{122{,}568}$$

As = 0.240 ac
h = 1.2 ft.

$$\frac{3.14\, d_0^2}{4} = 0.132 \text{ ft}^2$$

$$d_0 = 0.410 \text{ ft.}$$
$$= 4.92 \text{ inches}$$

| | |
|---|---|
| Provide 5-inch diameter hole at elevation<br>for dewatering orifice | 557.00 |

VHB

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 12/30/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ___________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B101 (SB #13)**

Drainage Area = 20 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 513.00 - 1
= 512.00

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 30.00 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 2680 cu.yds.
= 1.661 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 2680
= 1340 cu.yds.
= 0.831 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| | Contour Area | | | | | | | 1 | 2 | 1-2=3 |
|---|---|---|---|---|---|---|---|---|---|---|
| Contour Elev. (ft) | Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | Cumulative Total Volume (ac-ft) | *Req'd Sediment Storage Volume (ac-ft) | Net Volume (ac-ft) |
| 506 | 13378 | | 0.3071 | | | | | | | |
| | | 14374 | | 0.3300 | 2 | 28747 | 0.6599 | 0.6599 | 1.6612 | -1.0012 |
| 508 | 15369 | | 0.3528 | | | | | | | |
| | | 16415 | | 0.3768 | 2 | 32830 | 0.7537 | 1.4136 | 1.6612 | -0.2475 |
| 510 | 17461 | | 0.4008 | | | | | | | |
| | | 18557 | | 0.4260 | 2 | 37114 | 0.8520 | 2.2656 | 1.6612 | 0.6045 |
| 512 | 19653 | | 0.4512 | | | | | | | |
| | | 20800 | | 0.4775 | 2 | 41599 | 0.9550 | 3.2206 | 1.6612 | 1.5595 |
| 514 | 21946 | | 0.5038 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.831 |
| Elevation Range: | High: | 512.00 | 2.2656 |
| | Low: | 510.00 | 1.4136 |

Interpolated Elevation for scheduled time to clean out = **508.6**

| Elevation corresponding to scheduled time to clean out = | 509.00 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume

h = 512.00 - 509.00

h = 3 ft.

3) Minimum Basin Surface Area,

$As = 0.01 \times Q_{p(10)}$ or $0.015 \times DA$

$As = 0.01 \times Q_{p(10)}$

As = 0.01 x 30.00

As = 0.300 ac

or

As = 0.015 x DA

As = 0.015 x 20

As = 0.300 ac

Use As = 0.300 ac which is greater than As = 0.300 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 506.0

***Runoff:***

4) $Q_{p(10)}$ = 30.00 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 4.00 cfs

6) H = 512.0 - 505.0
= 7.0 ft.

Barrel Length, L 70 ft.

7) Barrel Diameter, Dp = 24 inches
Q = 25.20 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 1 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 25.20 cfs

8) Riser Diameter = 36 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 512.0 - 506.0
= 6.0 ft.

Required, h = 1 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

9) Trash Rack Diameter = 54" (Fig. 5A.29 (2))

H = 17" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p$ - $Q_{ps}$
= 30.00 - 25.20
= 4.80 cfs

11) Width of spillway = 10 ft.
$Q_{es} = CLH^{3/2}$
4.80 = 3.1*L*(Hp^1.5)
Hp = **0.29** ft
Spillway Elevation = 513.0
Design High Water Elevation = Spillway Elevation + Hp
= 513.0 + 0.29
= 513.3
Top of Dam Elevation = 514.5 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 513.3

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 6.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.014 | | 1.4% |
| Length of pipe in saturated zone, $L_s$ = | 38 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 3 | | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) |
| Anti-Seep collar size = | 4.00 | ft. | | |
| Outlet pipe size = | 2 | ft. | | |
| Projection = | 1.0 | ft. | | |
| Collar spacing is between = | 5.0 | ft. to | 14.0 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $Ao = \frac{As \times (2 \times h)^{0.5}}{122{,}568}$  As = 0.300 ac, h = 3 ft.

$$\frac{3.14\, d_0^2}{4} = 0.261 \text{ ft}^2$$

$$d_0 = 0.577 \text{ ft.}$$

$$= 6.92 \text{ inches}$$

| | |
|---|---|
| Provide 9-inch diameter hole at elevation for dewatering orifice | 509.00 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 1/20/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ____________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B101 (SB #14)**

Drainage Area = 4.6 acres
Riser Crest Elevation = 502.5

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 6.90 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 616.4 cu.yds.
= 0.382 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 616.4
= 308.2 cu.yds.
= 0.191 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed ($ft^2$) | Average ($ft^2$) | Proposed (ac) | Average (ac) | Depth (ft) | Total Volume ($ft^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 498 | 2065 | | 0.0474 | | | | | | | |
| | | 2448 | | 0.0562 | 2 | 4896 | 0.1124 | 0.1124 | 0.3821 | -0.2697 |
| 500 | 2831 | | 0.0650 | | | | | | | |
| | | 3265 | | 0.0749 | 2 | 6529 | 0.1499 | 0.2623 | 0.3821 | -0.1198 |
| 502 | 3698 | | 0.0849 | | | | | | | |
| | | 4182 | | 0.0960 | 2 | 8363 | 0.1920 | 0.4543 | 0.3821 | 0.0722 |
| 504 | 4665 | | 0.1071 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 0.191 |
| Elevation Range: | High: | 502.00 | 0.2623 |
| | Low: | 500.00 | 0.1124 |

Interpolated Elevation for scheduled time to clean out = **501.0**

| Elevation corresponding to scheduled time to clean out = | 501.00 ft. |
|---|---|

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 502.50 - 501.00
h = 1.5 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$
As = 0.01 x 6.90
As = 0.069 ac

or

As = 0.015 x DA
As = 0.015 x 4.6
As = 0.069 ac

Use As = 0.069 ac which is greater than As = 0.069 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 498.0

***Runoff:***

4) $Q_{p(10)}$ = 6.90 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 0.92 cfs

6) H = 502.5 - 496.0
= 6.5 ft.

Barrel Length, L 50 ft.

7) Barrel Diameter, Dp = 15 inches
Q = 8.70 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 1.1 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 9.57 cfs

8) Riser Diameter = 18 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 502.5 - 498.0
= 4.5 ft.

Required, h = 0.6 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.0 ft.

9) Trash Rack Diameter = 27" (Fig. 5A.29 (2))

H = 8" (Fig. 5A.29(2))

Design High Water Elevation = Riser Crest Elevation + h
= 502.5 + 1.00
= 503.5
Top of Dam Elevation = 504.5

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 503.5

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 4.5 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.040 | | 4.0% |
| Length of pipe in saturated zone, $L_s$ = | 32 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 3.50 | ft. | | |
| Outlet pipe size = | 1.25 | ft. | | |
| Projection = | 1.1 | ft. | | |
| Collar spacing is between = | 5.5 | ft. to | 15.8 | ft. |
| Provided collar spacing = | 10.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$Ao = \frac{As \times (2 \times h)^{0.5}}{122,568}$$ As = 0.069 ac, h = 1.5 ft.

$$\frac{3.14\, d_0^2}{4} = 0.042 \text{ ft}^2$$

$$d_0 = 0.233 \text{ ft.}$$

$$= 2.79 \text{ inches}$$

| | |
|---|---|
| Provide 3-inch diameter hole at elevation for dewatering orifice | 501.00 |

VHB Engineering, Surveying
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York

**Date:** 12/29/2014
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:** ____________

**TEMPORARY SEDIMENT BASIN DESIGN FOR DRAINAGE AREA B108, B109, B103, B119 (SB #15)**

Drainage Area = 112.8 acres
Riser Crest Elevation = Emergency Spillway Elevation - Req'd 1-foot of freeboard
= 504.50 - 1.5
= 503.00

Peak discharge for construction condition (from HydroCAD analysis) :

| $Q_{p(10)}$: | 169.00 cfs |
|---|---|

## A. BASIN SIZE DESIGN REQUIREMENTS

1) Minimum Required Sediment Storage Volume (134 cu.yd./acre)

= 134 cu.yds/ac x Drainage Area (acres)
= 15115 cu.yds.
= 9.369 ac-ft

2) Determine storage volume and elevation to be cleaned out when sediment has achieved 50% of basin storage volume.

a. Sediment basin shall be cleaned out when sediment has achieved 50% of basin storage volume.

= 50% of 15115
= 7557.6 cu.yds.
= 4.684 ac-ft

b. Elevation corresponding to scheduled time to clean out when sediment has achieved 50% of basin storage volume.

***Chart : Sediment Basin Design Elevation VS Volume***

| Contour Elev. (ft) | Contour Area Proposed (ft$^2$) | Contour Area Average (ft$^2$) | Contour Area Proposed (ac) | Contour Area Average (ac) | Depth (ft) | Total Volume (ft$^3$) | Total Volume (ac-ft) | 1 Cumulative Total Volume (ac-ft) | 2 *Req'd Sediment Storage Volume (ac-ft) | 1-2=3 Net Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 496 | 32548 | | 0.7472 | | | | | | | |
| | | 35424 | | 0.8132 | 2 | 70847 | 1.6264 | 1.6264 | 9.3689 | -7.7425 |
| 498 | 38299 | | 0.8792 | | | | | | | |
| | | 46993 | | 1.0788 | 2 | 93986 | 2.1576 | 3.7840 | 9.3689 | -5.5849 |
| 500 | 55687 | | 1.2784 | | | | | | | |
| | | 59382 | | 1.3632 | 2 | 118764 | 2.7264 | 6.5105 | 9.3689 | -2.8584 |
| 502 | 63077 | | 1.4480 | | | | | | | |
| | | 67626 | | 1.5525 | 2 | 135252 | 3.1050 | 9.6154 | 9.3689 | 0.2465 |
| 504 | 72175 | | 1.6569 | | | | | | | |
| | | 78840 | | 1.8099 | 2 | 157679 | 3.6198 | 13.2353 | 9.3689 | 3.8663 |
| 506 | 85504 | | 1.9629 | | | | | | | |

| | | Elev. (ft.) | Cumulative Volume (ac-ft) |
|---|---|---|---|
| Volume/elevation corresponding to scheduled time to clean out = | | X | 4.684 |
| Elevation Range: | High: | 502.00 | 6.5105 |
| | Low: | 500.00 | 3.7840 |

Interpolated Elevation for scheduled time to clean out = **500.7**

Elevation corresponding to scheduled time to clean out = 501.00 ft.

c. Distance below top of riser, h

h = Riser Crest Elevation - Elevation at 50% of basin storage volume
h = 503.00 - 501.00
h = 2 ft.

3) Minimum Basin Surface Area,

As = 0.01 x $Q_{p(10)}$ or 0.015 x DA

As = 0.01 x $Q_{p(10)}$
As = 0.01 x 169.00
As = 1.690 ac

or As = 0.015 x DA
As = 0.015 x 112.8
As = 1.692 ac

Use As = 1.692 ac which is greater than As = 1.690 ac

## B. DESIGN OF SPILLWAY AND ELEVATIONS

Bottom of Basin = 496.0

***Runoff:***

4) $Q_{p(10)}$ = 169.00 cfs

***Pipe Spillway ($Q_{ps}$)***

5) Minimum Pipe Spillway Capacity, Qps = 0.2 x DA
= 22.56 cfs

6) H = 504.5 - 495.0
= 9.5 ft.

Barrel Length, L 120 ft.

7) Barrel Diameter, Dp = 36 inches
Q = 88.90 cfs (Fig. 5A.26- Pipe flow chart ; "n"=0.025)
Correction Factor = 0.86 (Fig. 5A.26 - Pipe flow chart ; "n"=0.025)

Qps = Q x Correction Factor
= 76.45 cfs

8) Riser Diameter = 54 inches
Length of Riser = Riser Crest Elevation - Bottom of Basin
= 503.0 - 496.0
= 7 ft.

Required, h = 1.4 ft. (Fig. 5A.25 - Riser Inflow Chart)
Provided, h = 1.5 ft.

Riser Crest Elevation = Emergency Spillway Elevation - h
= 504.5 - 1.5
= 503.0 ft.

9) Trash Rack Diameter = 78" (Fig. 5A.29 (2))

H = 25" (Fig. 5A.29(2))

***Emergency Spillway Design***

10) Emergency Spillway Flow, $Q_{es}$ = $Q_p - Q_{ps}$
= 169.00 - 76.45
= 92.55 cfs

11) Width of spillway = 26 ft.

$Q_{es} = CLH^{3/2}$

92.55 = 3.1*L*(Hp^1.5)

Hp = **1.10** ft

Spillway Elevation = 504.5

Design High Water Elevation = Spillway Elevation + Hp
= 504.5 + 1.10
= 505.6

Top of Dam Elevation = 506.6 (1 ft freeboard)

## C. ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

(Note: the length of pipe within saturated zone is determined graphically from Sediment basin cross section.)

12) Expected highest water elevation 505.6

| | | | |
|---|---|---|---|
| Distance from upstream invert to highest water level, y = | 7.0 | ft. | |
| Slope upstream embankment, Z = | 2 | :1 | |
| pipe slope = | 0.010 | | 1.0% |
| Length of pipe in saturated zone, $L_s$ = | 44 | ft. | |

| | | | | |
|---|---|---|---|---|
| Required collar number = | 2 | | (Fig. 5A.31 - Anti-Seep Collar Design Charts) | |
| Anti-Seep collar size = | 6.25 | ft. | | |
| Outlet pipe size = | 3 | ft. | | |
| Projection = | 1.6 | ft. | | |
| Collar spacing is between = | 8.0 | ft. to | 22.8 | ft. |
| Provided collar spacing = | 15.0 | ft. | | |

## D. DEWATERING ORIFICE SIZING

13) $$A_o = \frac{A_s \times (2 \times h)^{0.5}}{122{,}568}$$

As = 1.692 ac
h = 2 ft.

$$\frac{3.14\, d_0^2}{4} = 1.203 \text{ ft}^2$$

$$d_0 = 1.238 \text{ ft.}$$
$$= 14.85 \text{ inches}$$

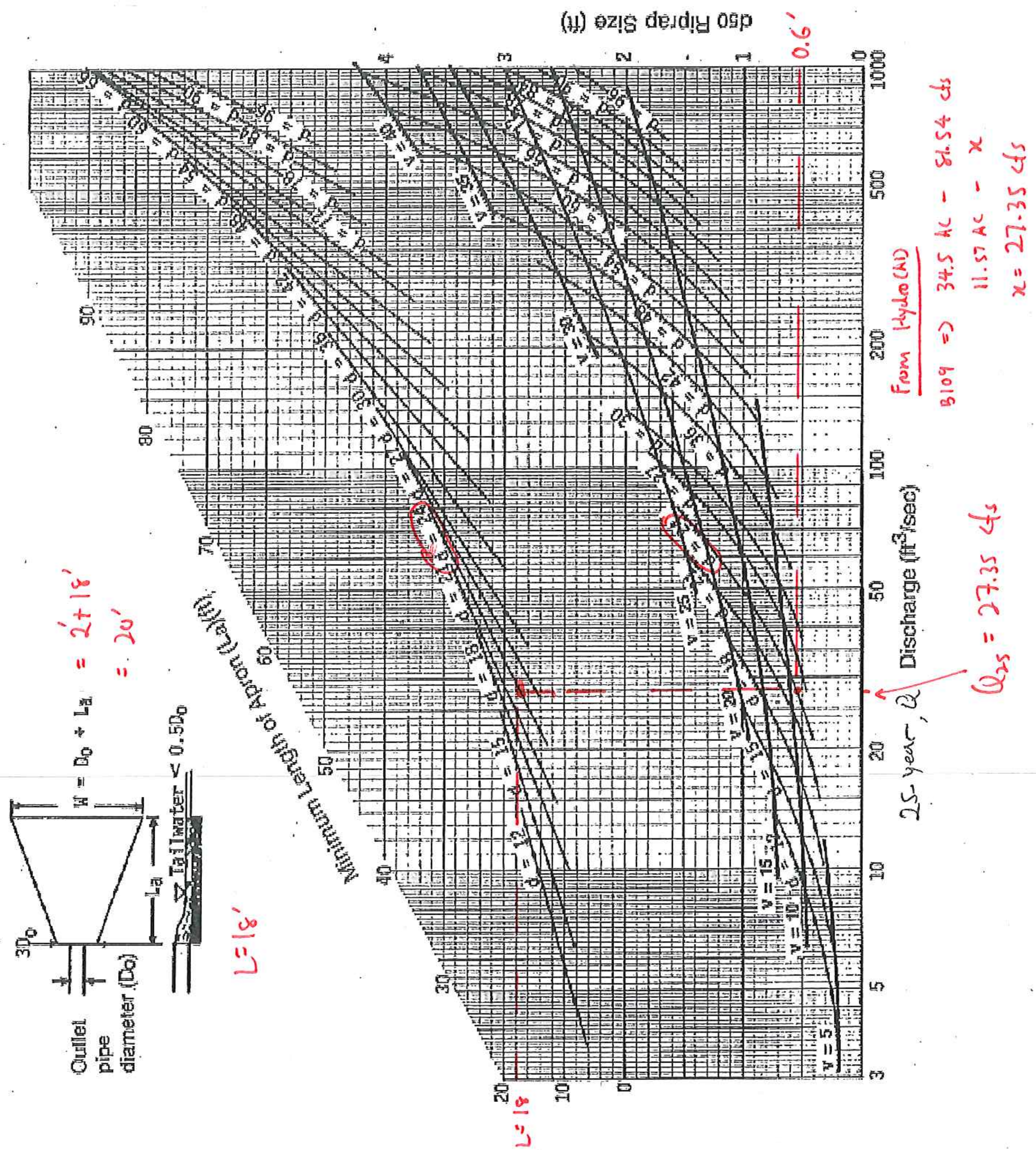
| |
|---|
| Provide 15-inch diameter hole at elevation 501.00 for dewatering orifice |

# Attachment E5
# Riprap Calculations

F.E.S # 852 (Phase I)

# Figure 5B.12

## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

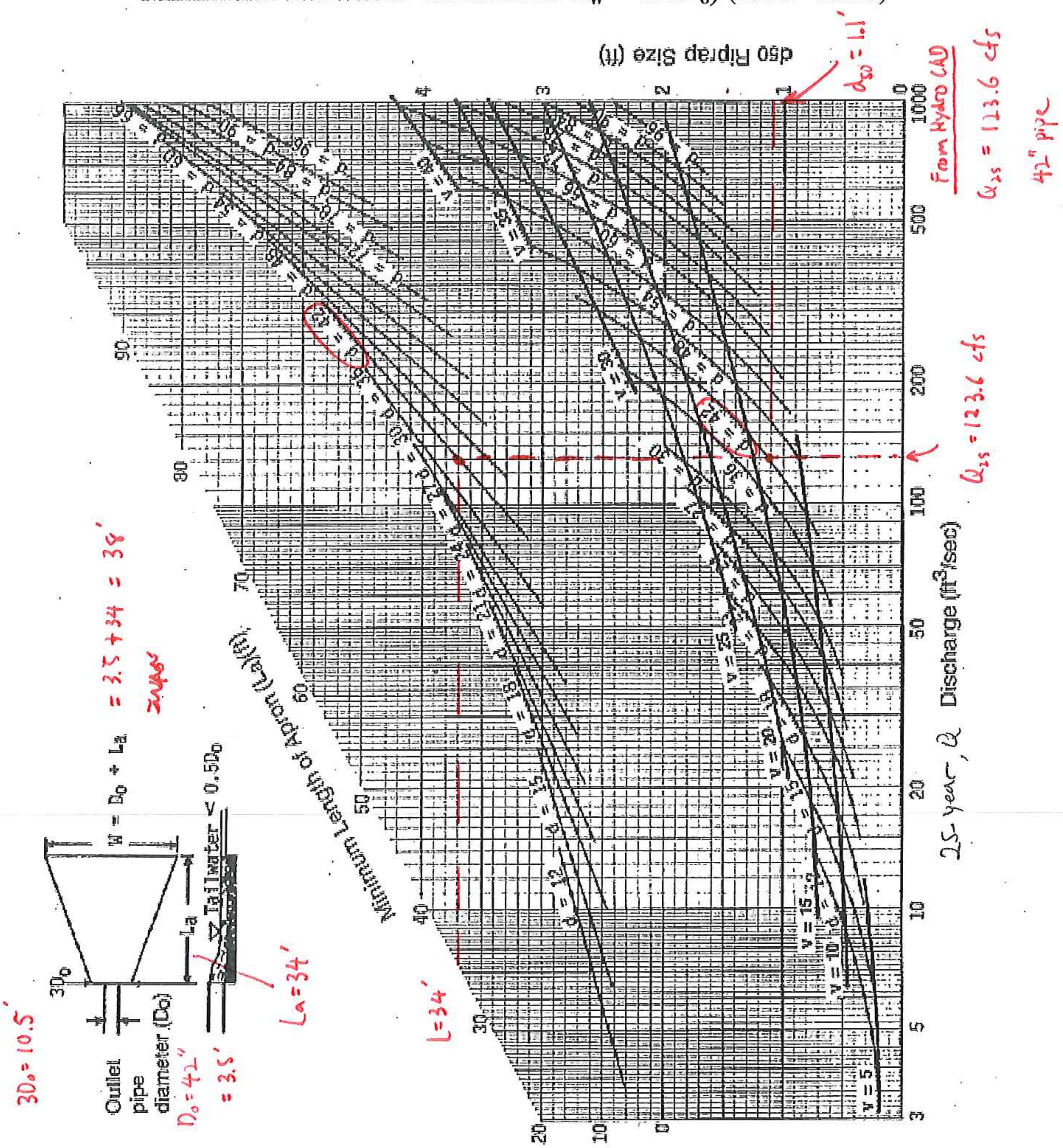



$3D_o = 6'$

$D_o = 24''$

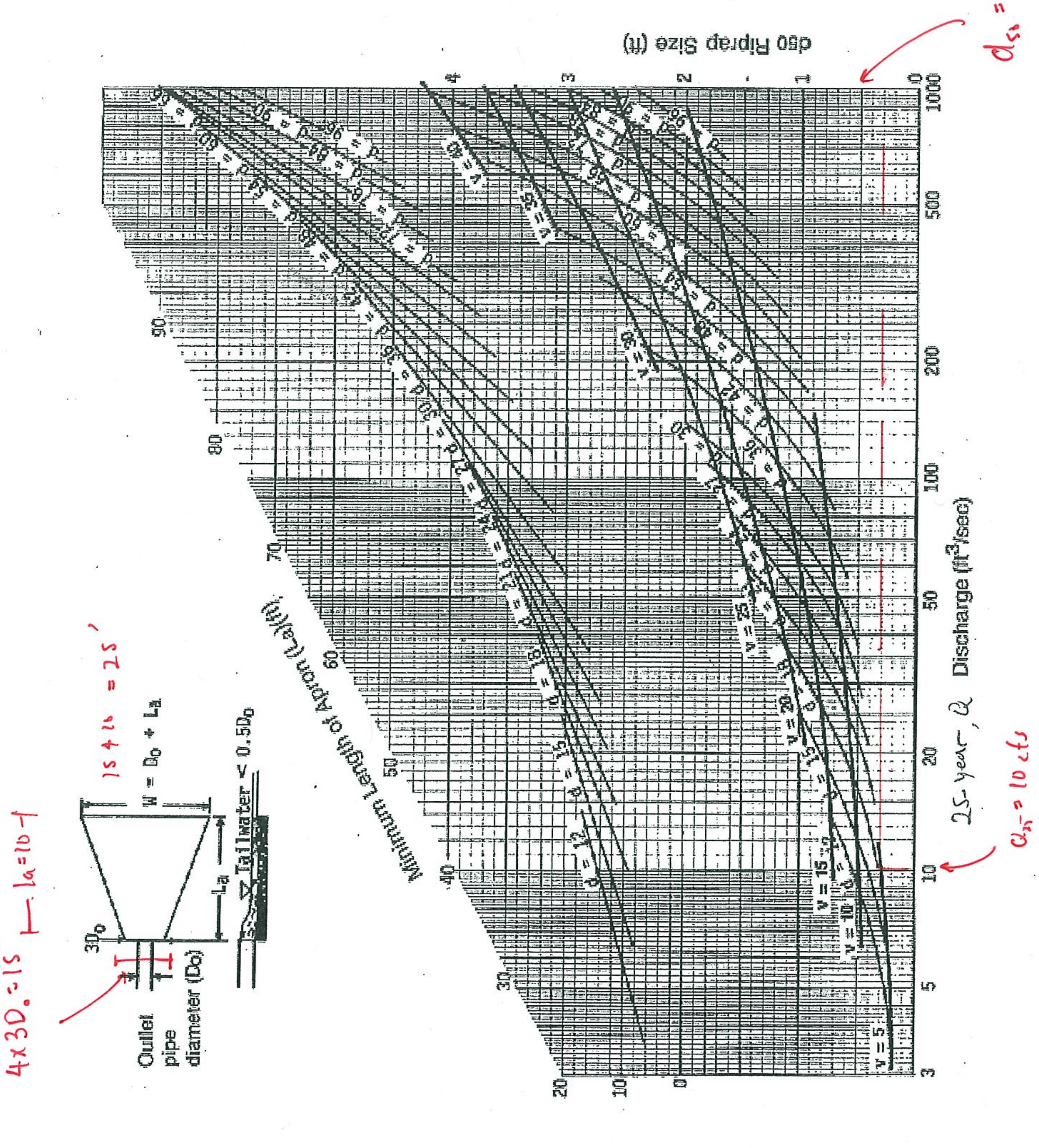
F.E.S # 206 (Phase I)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



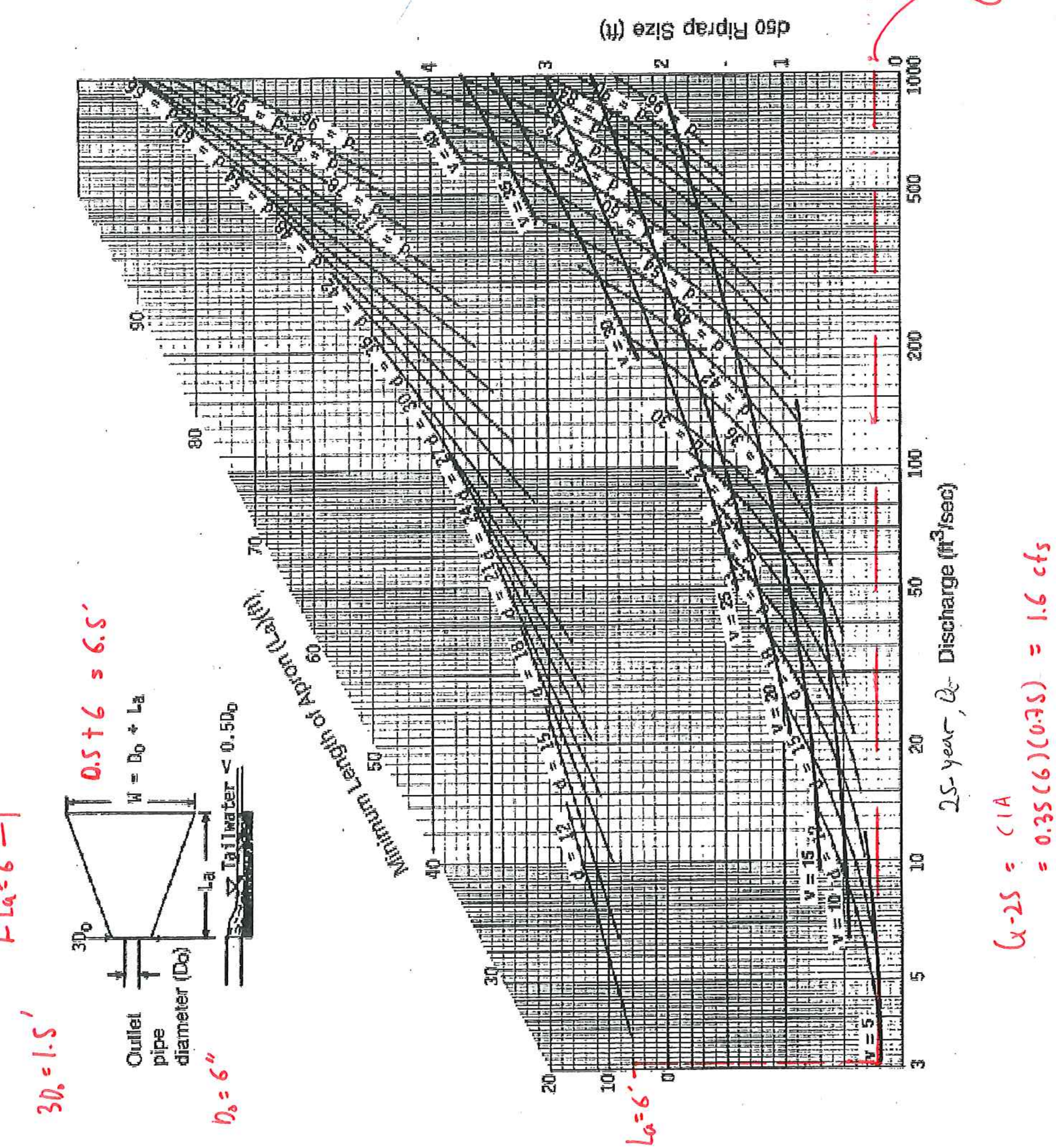
Riprap Protection for FES-957C (Phase I)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



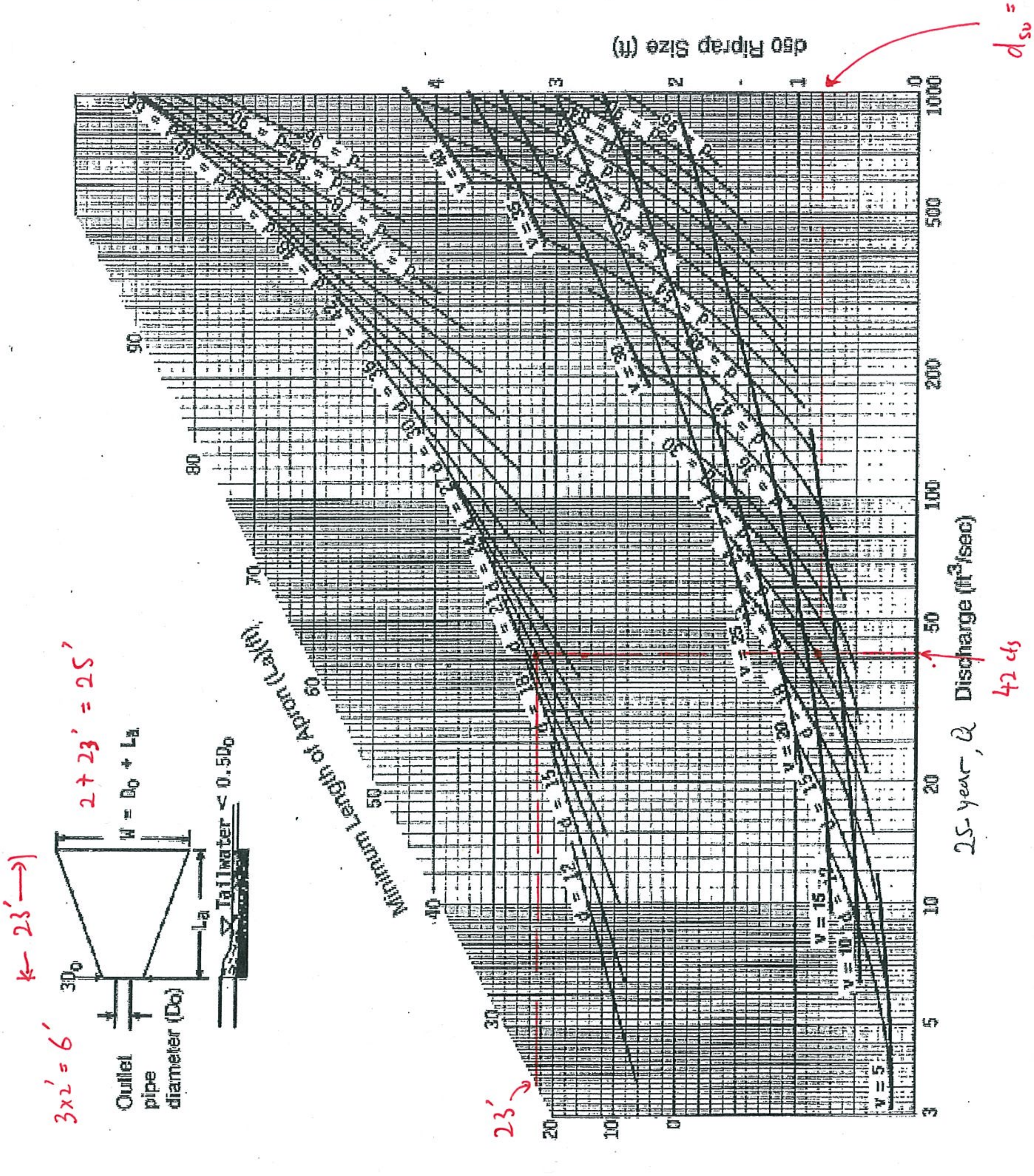
Riprap for FES 1026 A (Phase I)

## Figure 5B.12
### Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



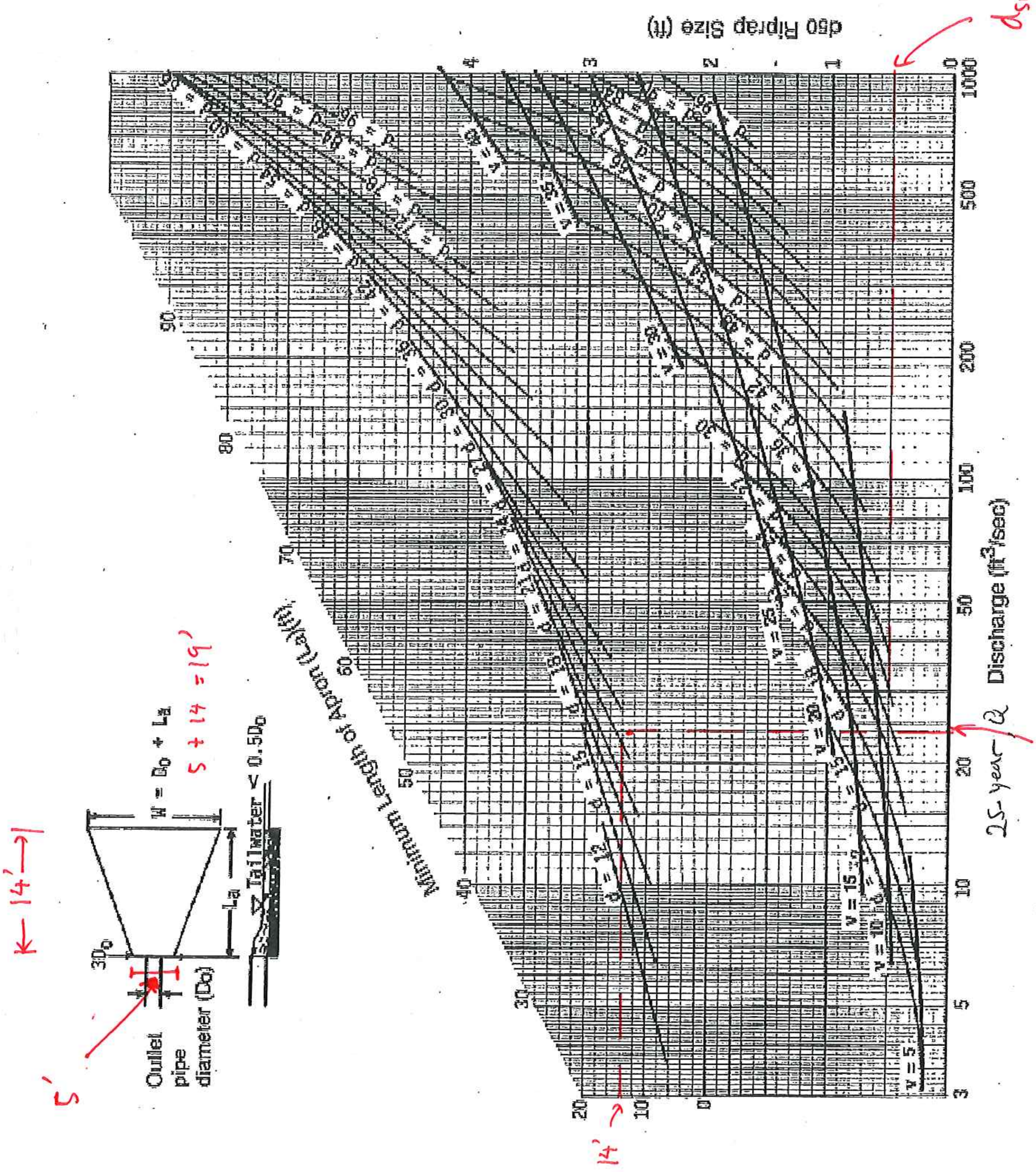
FES - 874C3

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



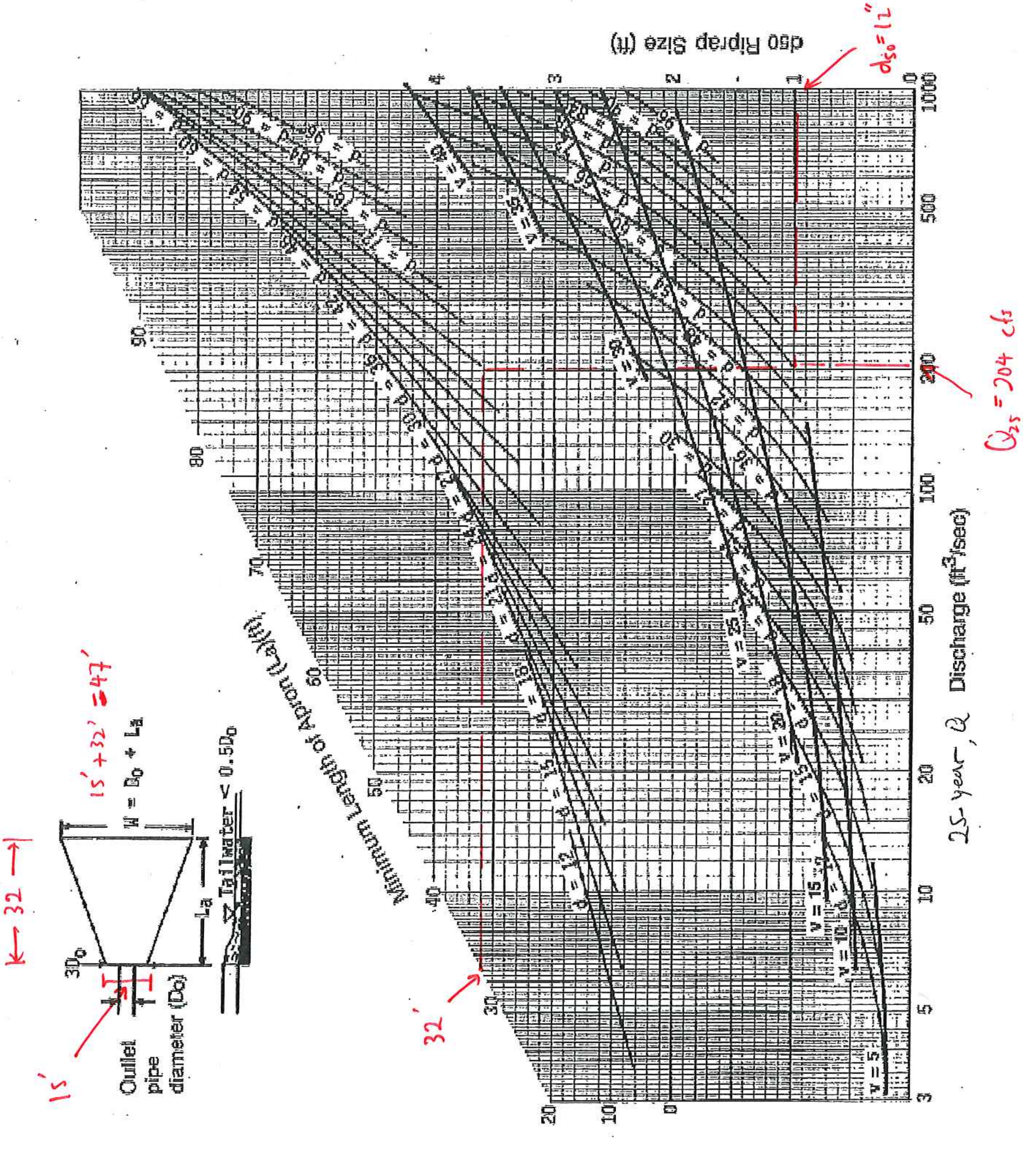
Riprap for SWM # 1 Outlet Rev

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Riprap for SWM #2 Outlet Rev

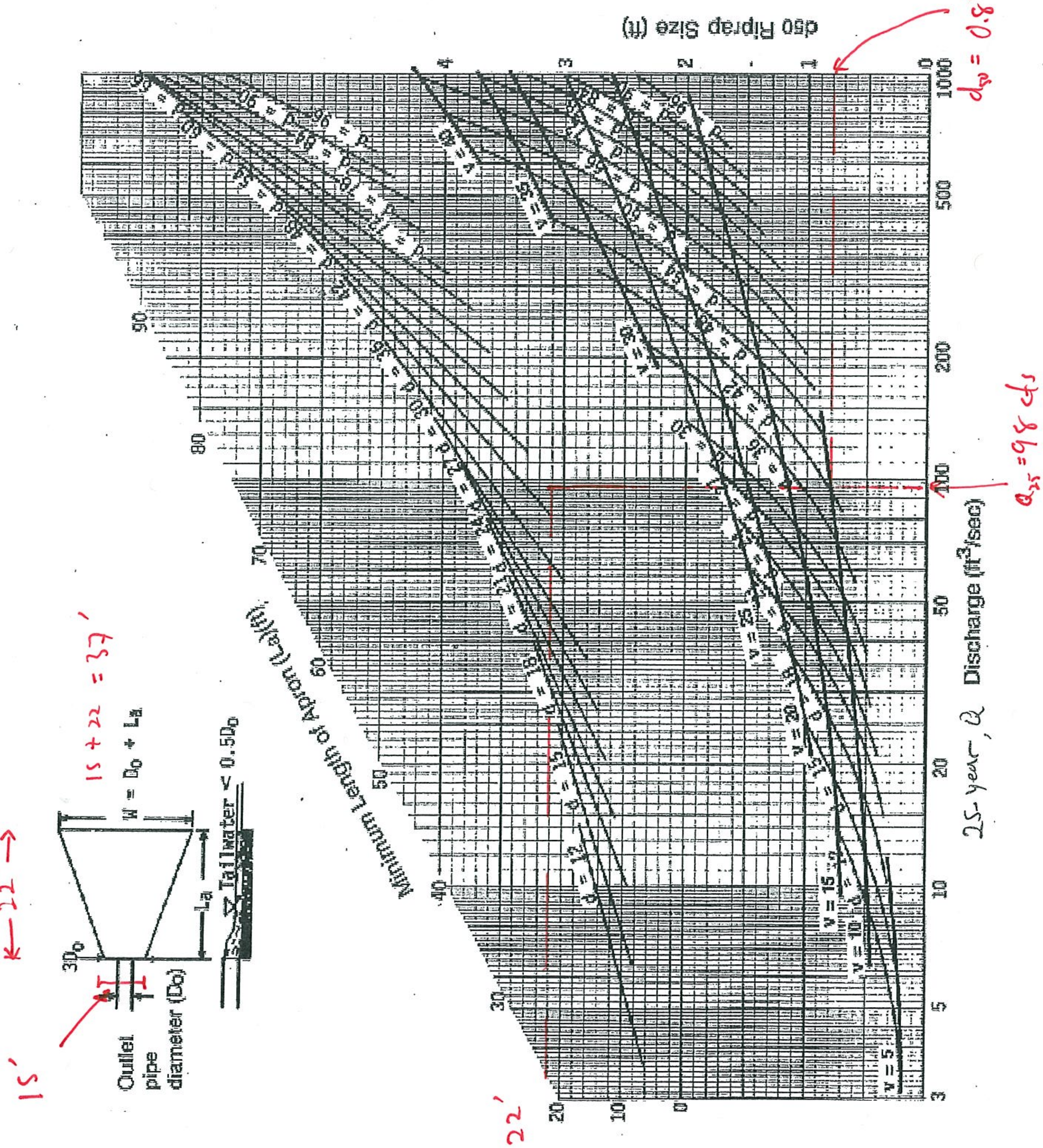
# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Riprap for SWM # 3 outlet

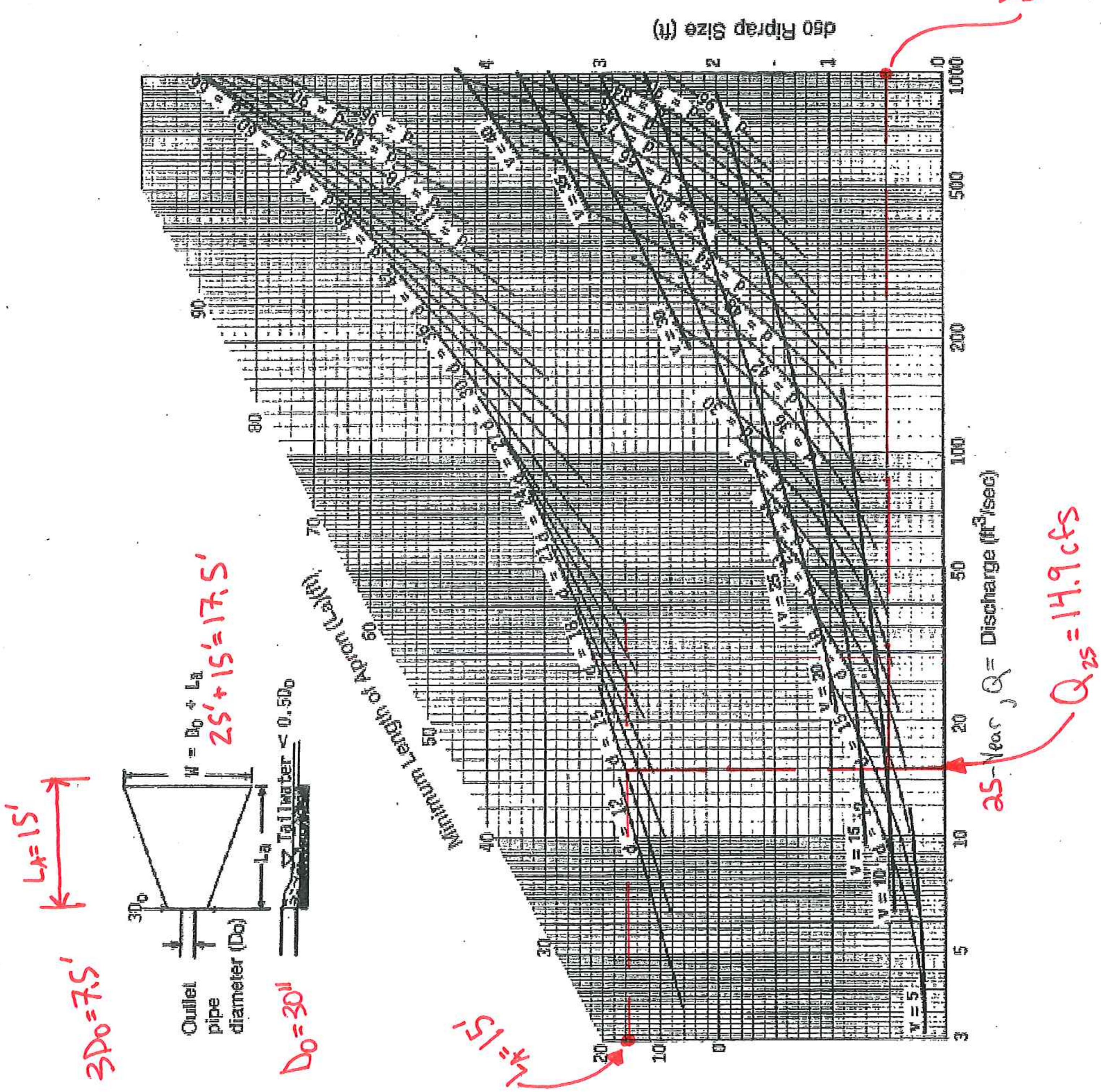
# Figure 5B.12

## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



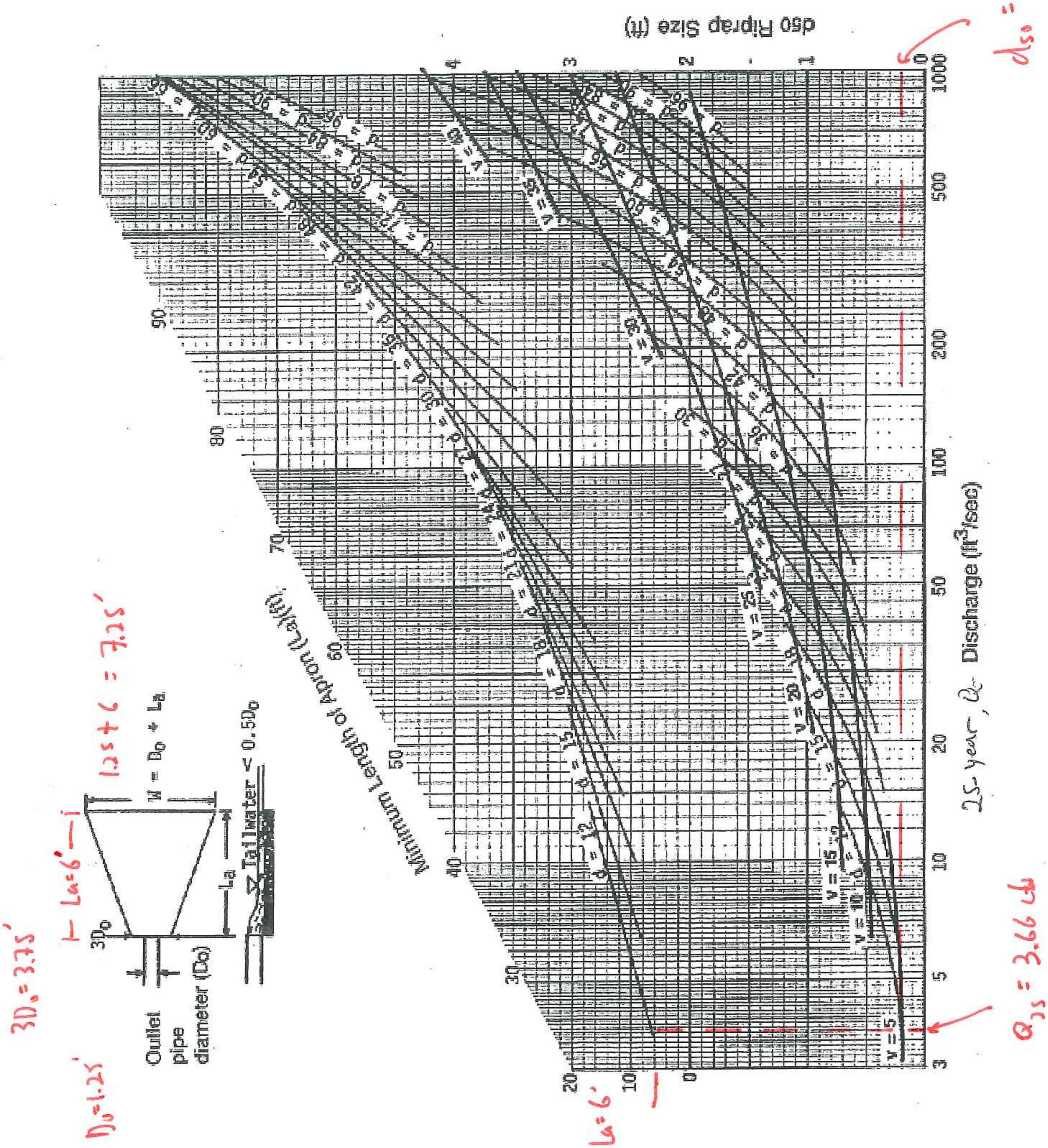
Riprap for SWM#7 outlet

## Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



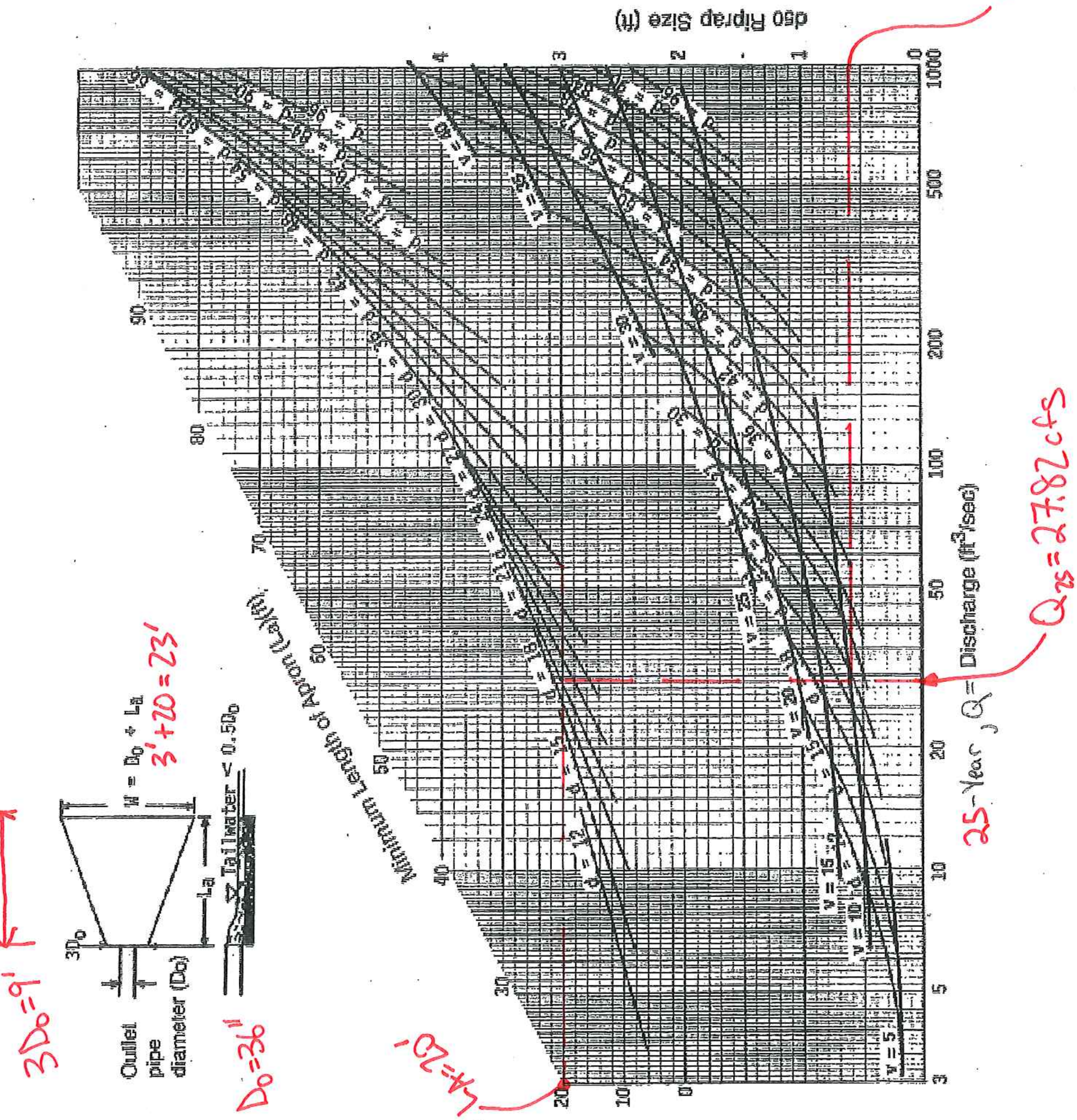
Riprap for SWM 7A (Overlook) / FES 966

**Figure 5B.12**
**Outlet Protection Design—Minimum Tailwater Condition**
**(Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$)** (USDA - NRCS)



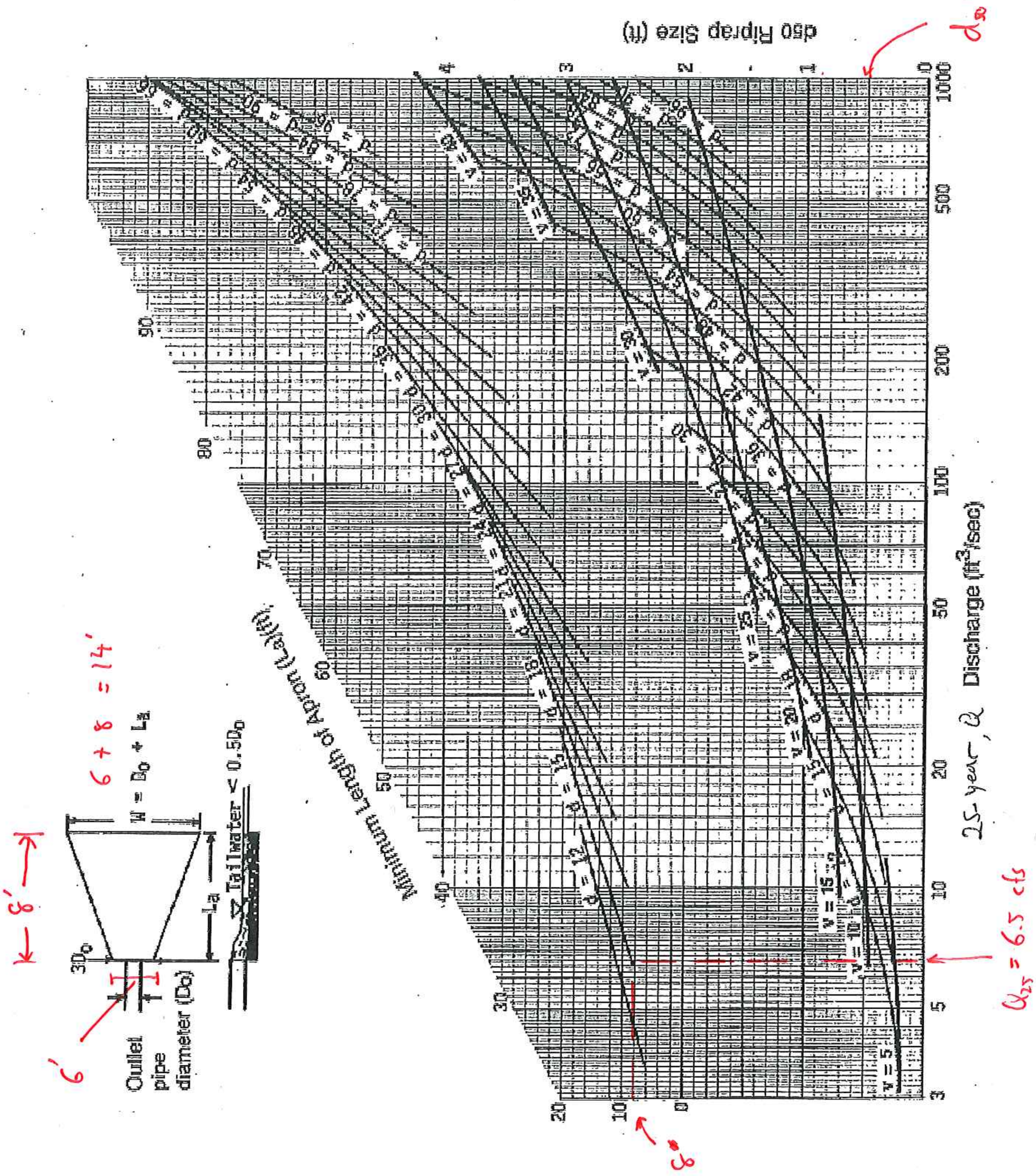
Riprap for SWM #8 Outlet

## Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



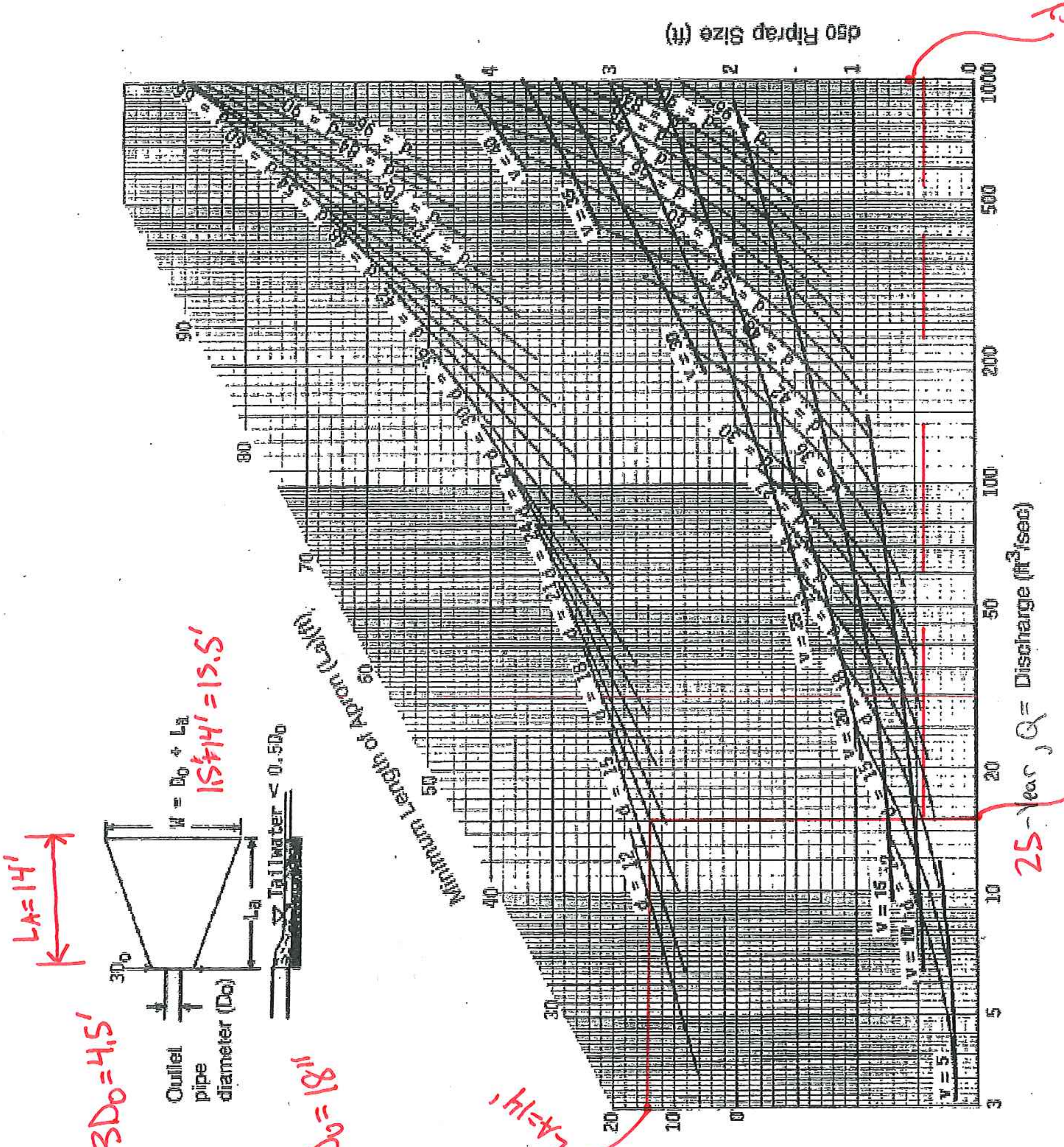
Rip rap for SWM #12 & SWM #17 Outlet Rev

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



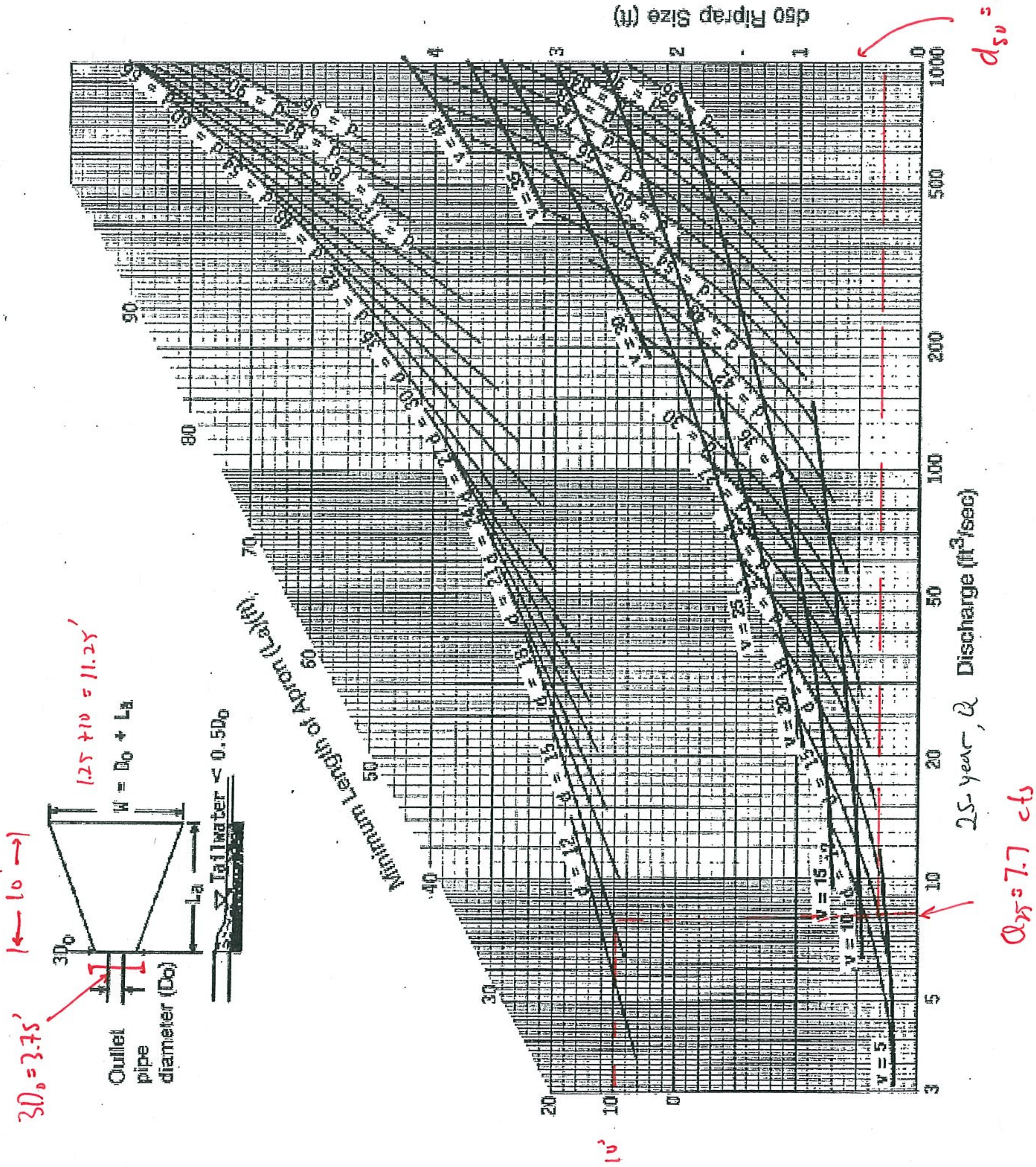
Riprap for SWM #13 Outlet

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



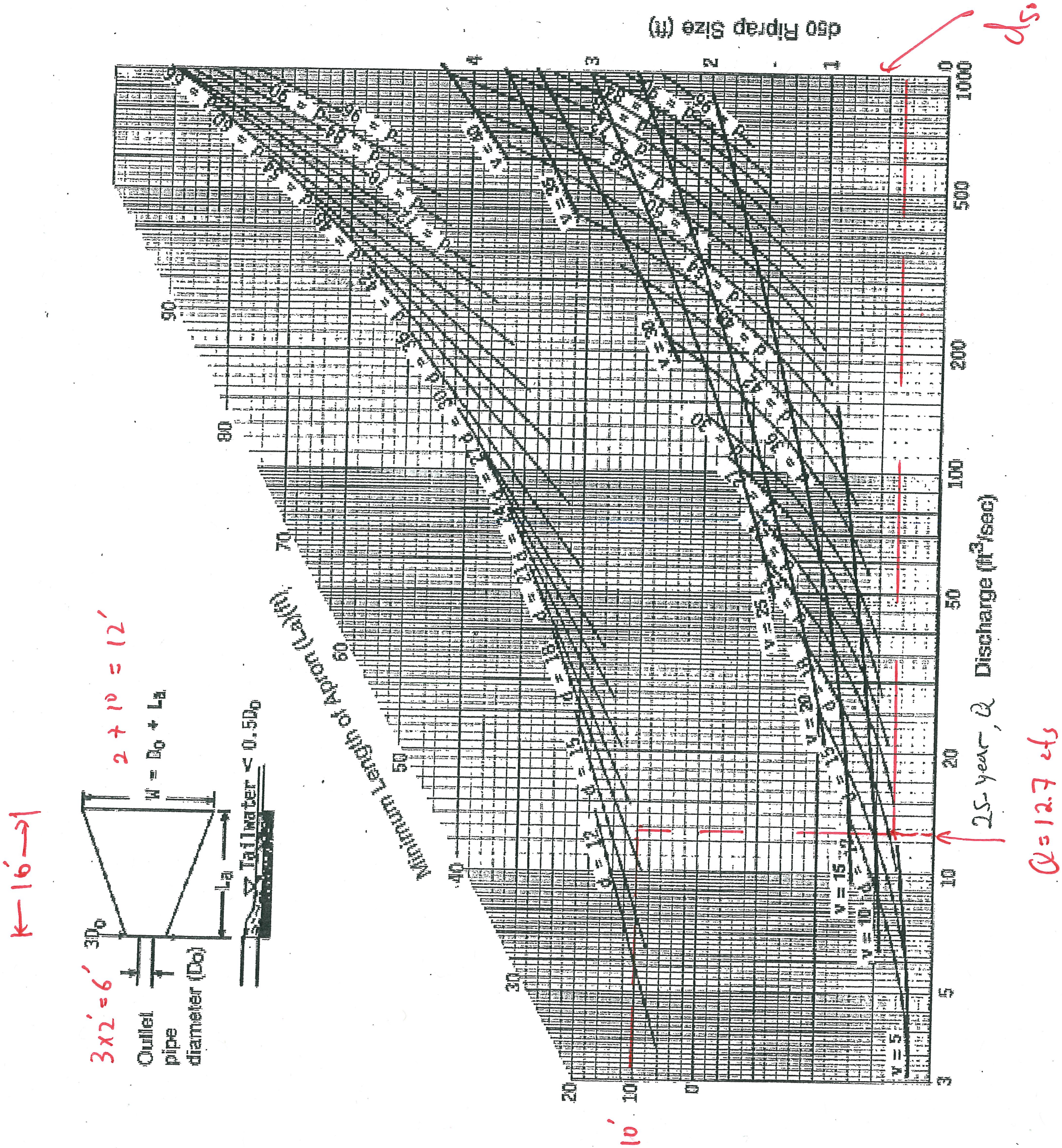
Riprap for SWM # 15 outlet

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_W < 0.5D_o$) (USDA - NRCS)



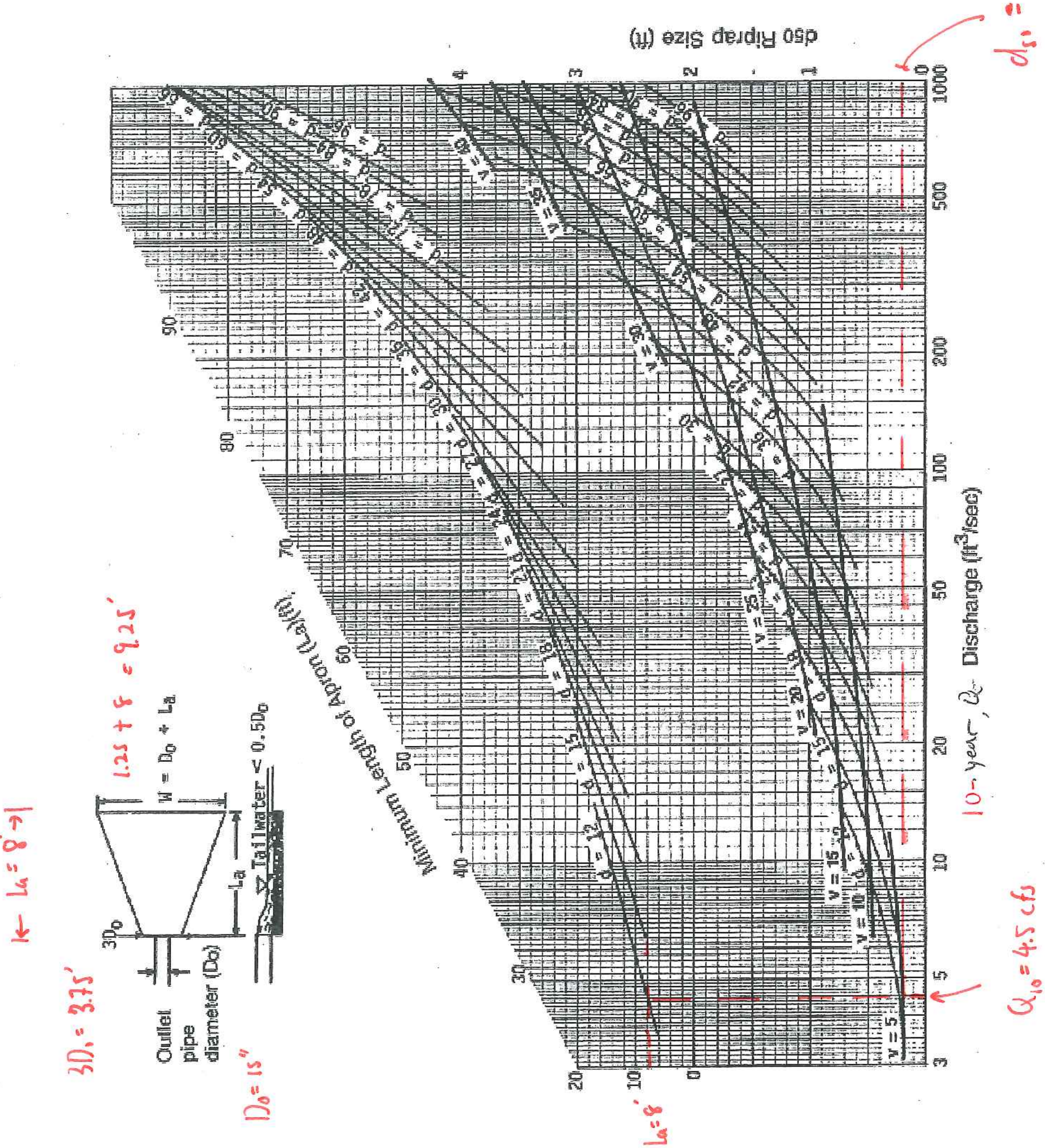
Pond Drain for SWM 3 (C-105)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



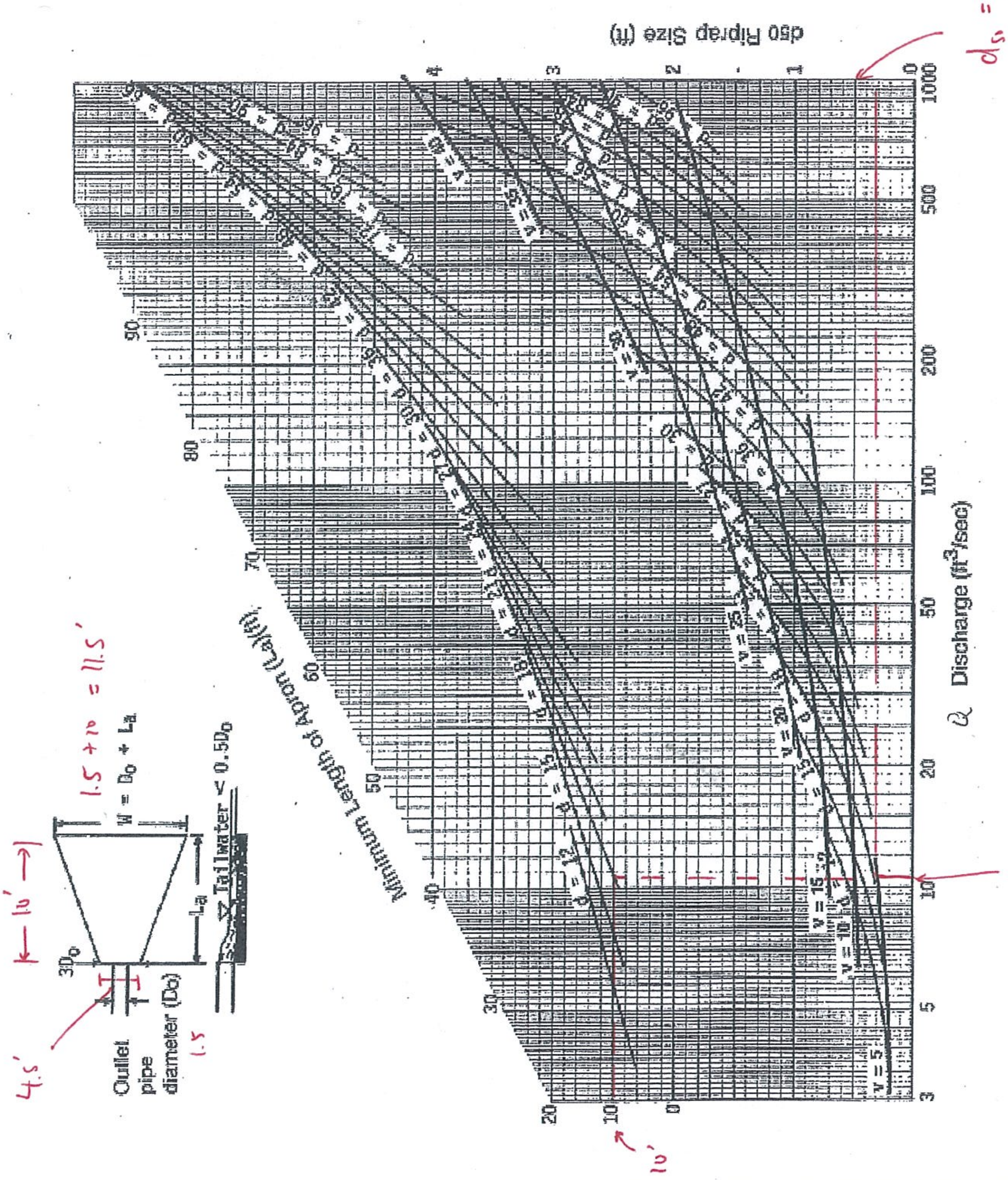
Riprap for Temporary Sediment Basin (SB #1) - Overlook

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



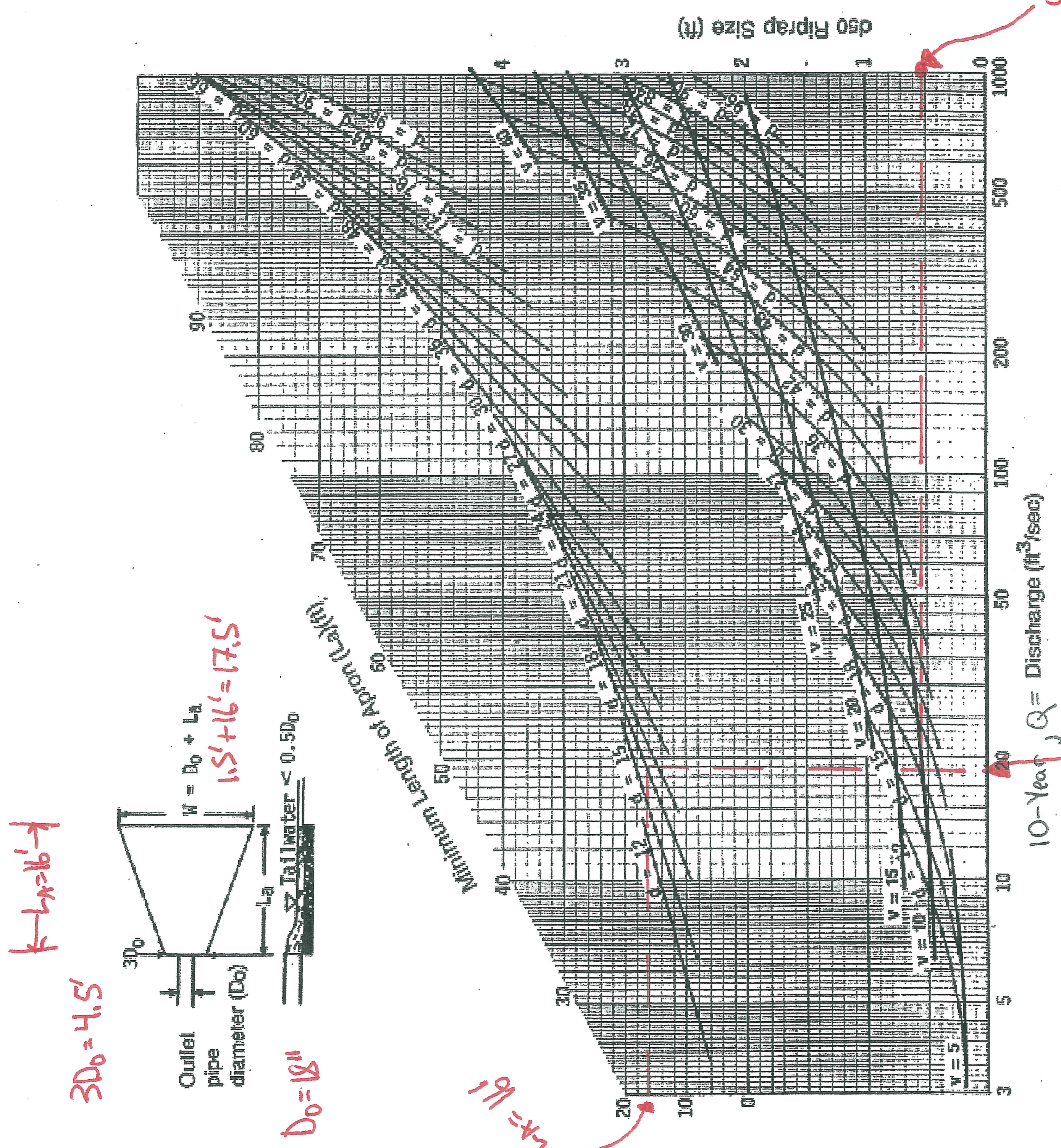
Temporary Sediment Basin (SB # 2)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



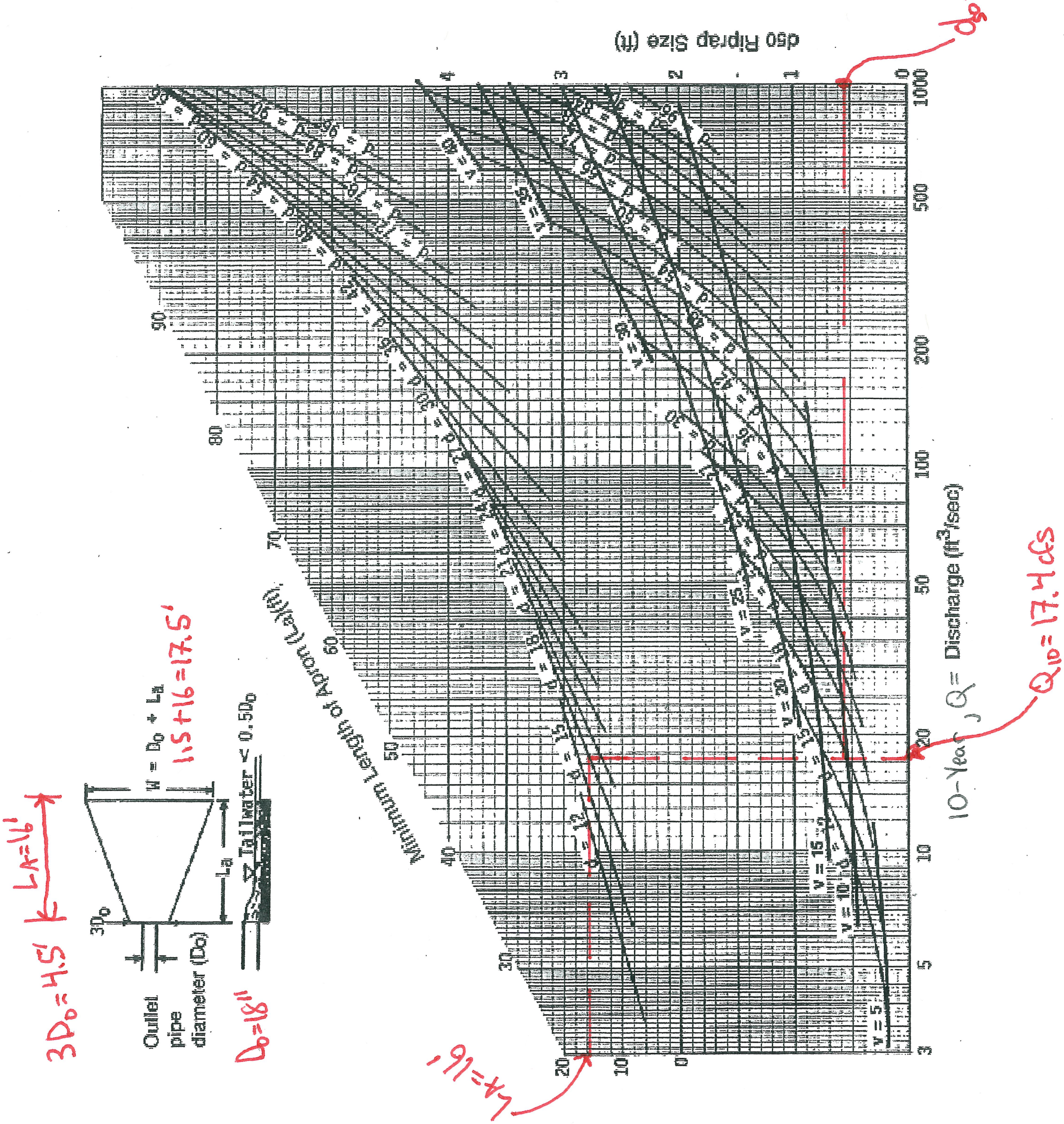
Temporary Sediment Basin (SB #3)

## Figure 5B.12
**Outlet Protection Design—Minimum Tailwater Condition**
**(Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$)** (USDA - NRCS)



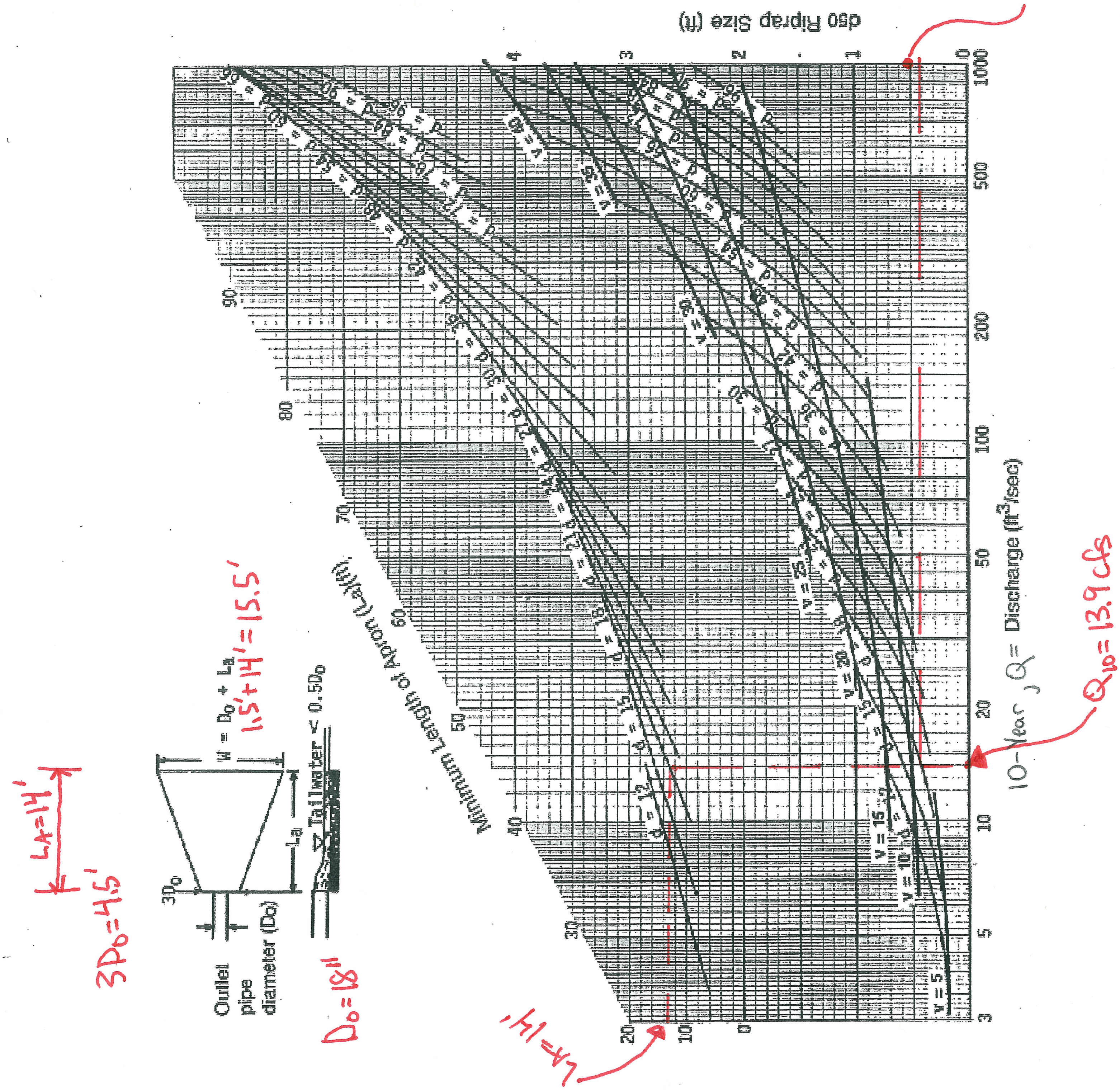
Temporary Sediment Basin (SB#4)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Temporary Sediment Basin (SB #5)

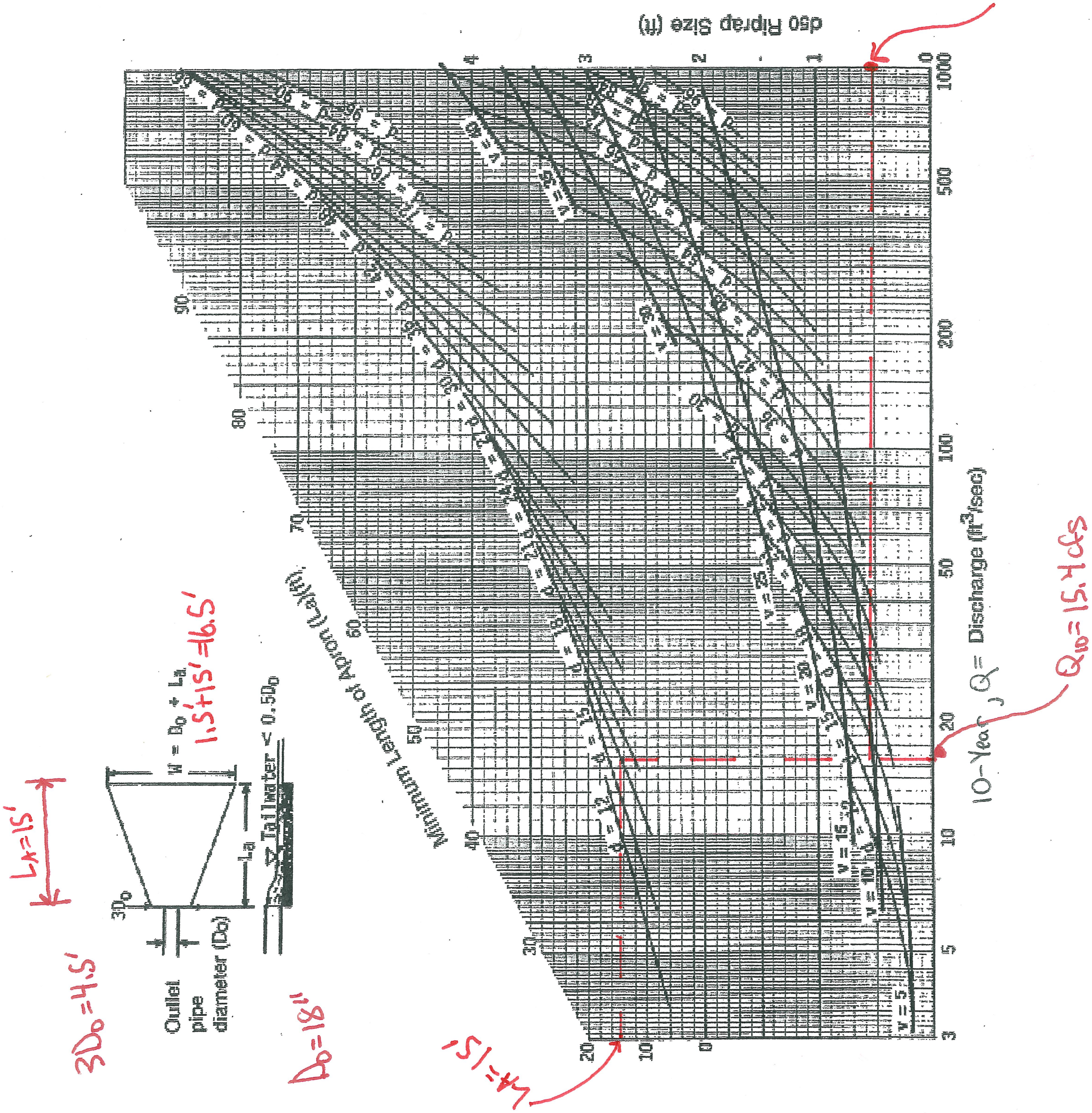
**Figure 5B.12**
**Outlet Protection Design—Minimum Tailwater Condition**
**(Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_W < 0.5D_o$)** (USDA - NRCS)



Temporary Sediment Basin (SB #6)

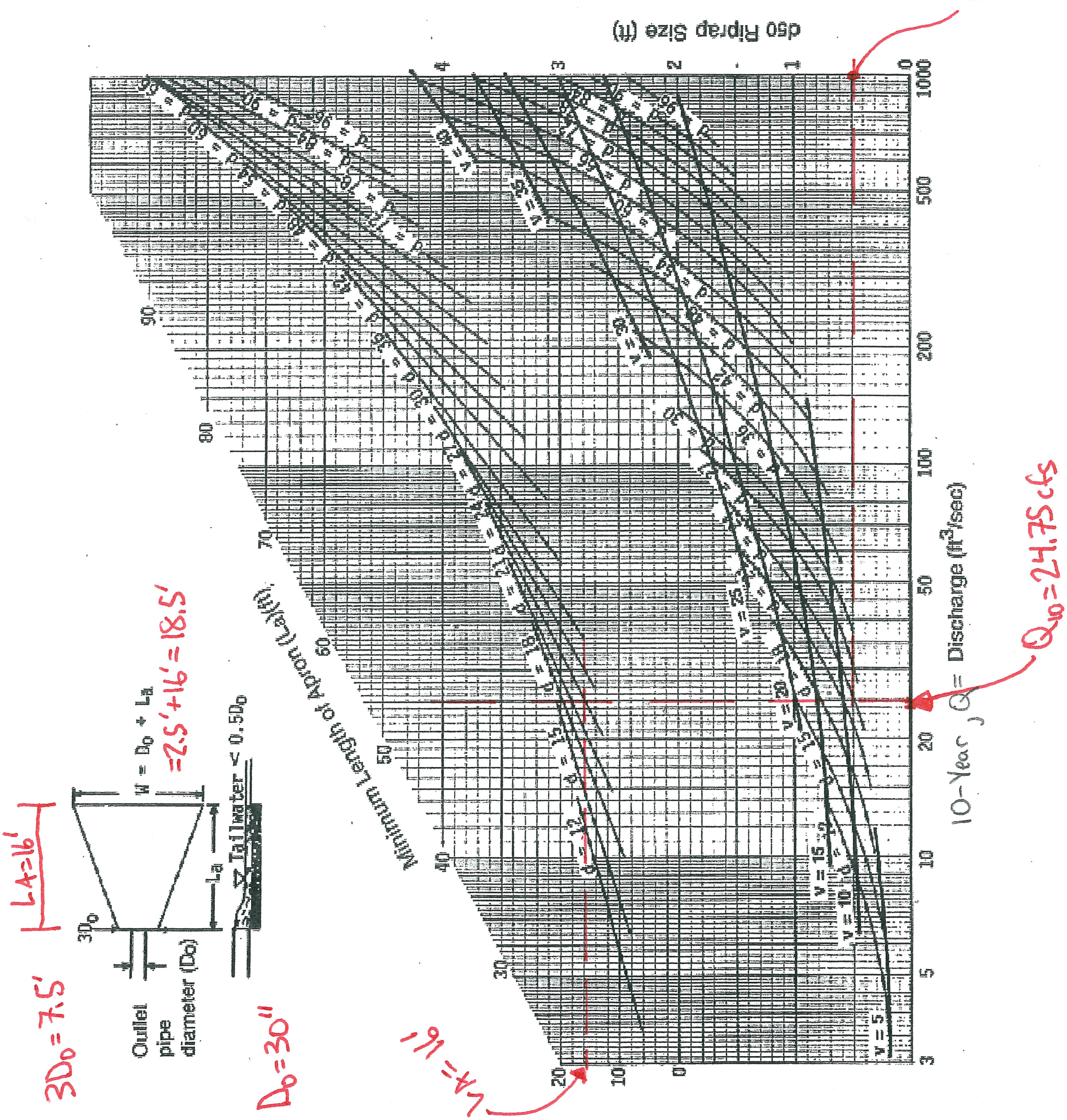
# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

$d_{50} = 0.6 = 8''$



Temporary Sediment Basin (SB#7)

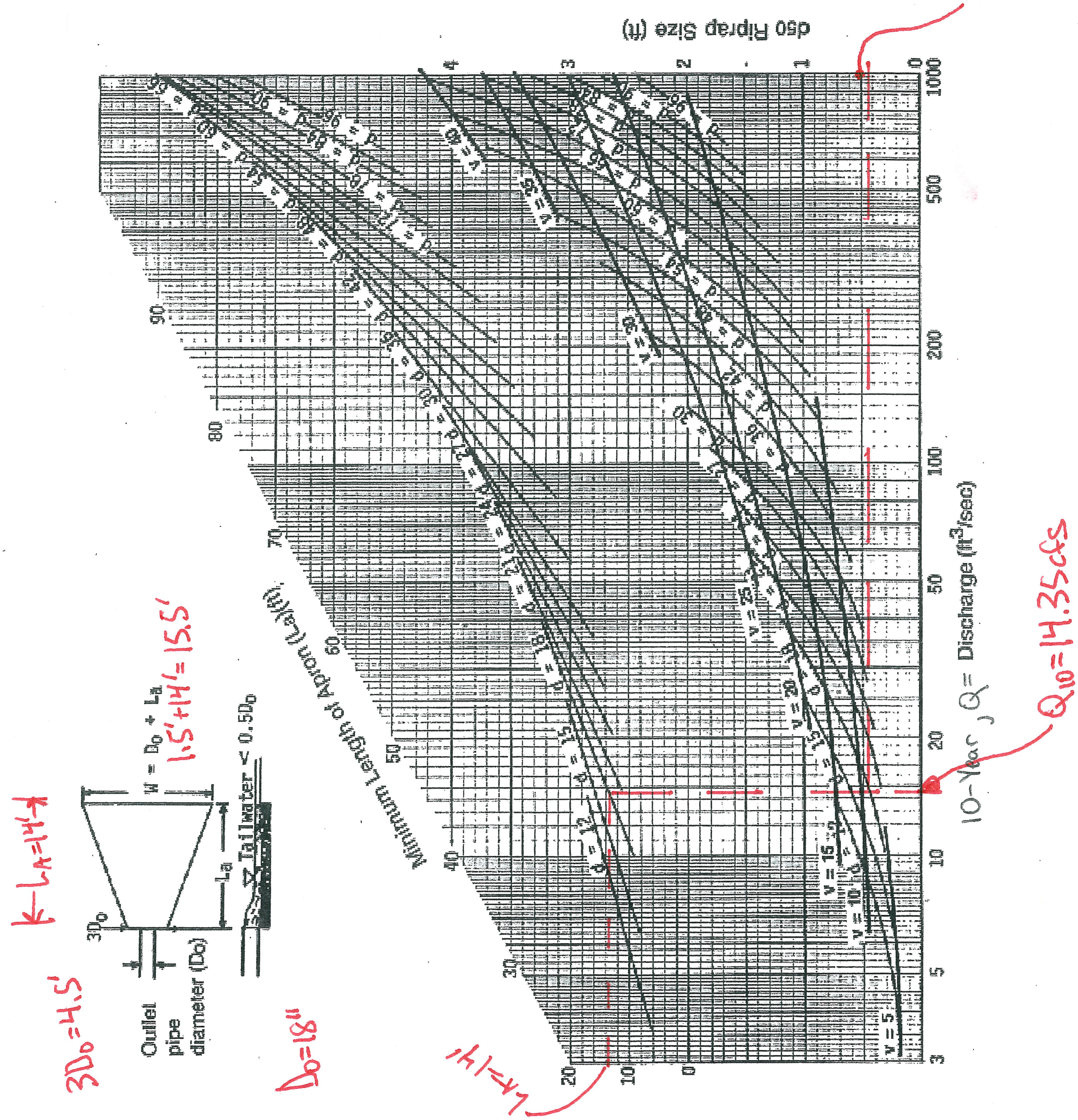
# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Temporary Sediment Basin (SB #8)

# Figure 5B.12

## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



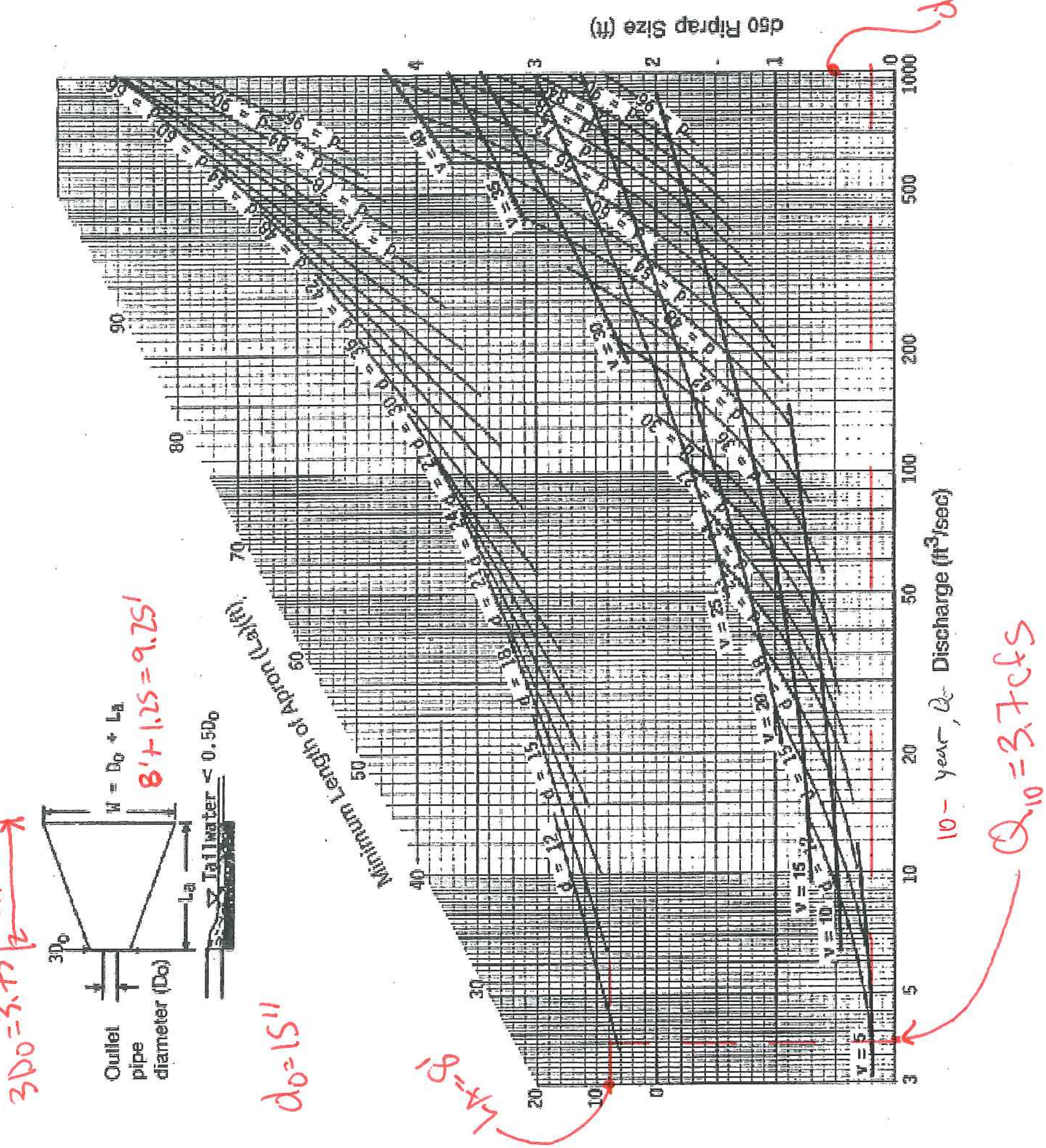
Temporary Sediment Basin (SB #8A)

**Figure 5B.12**

**Outlet Protection Design—Minimum Tailwater Condition**

**(Design of Outlet Protection from a Round Pipe Flowing Full,**

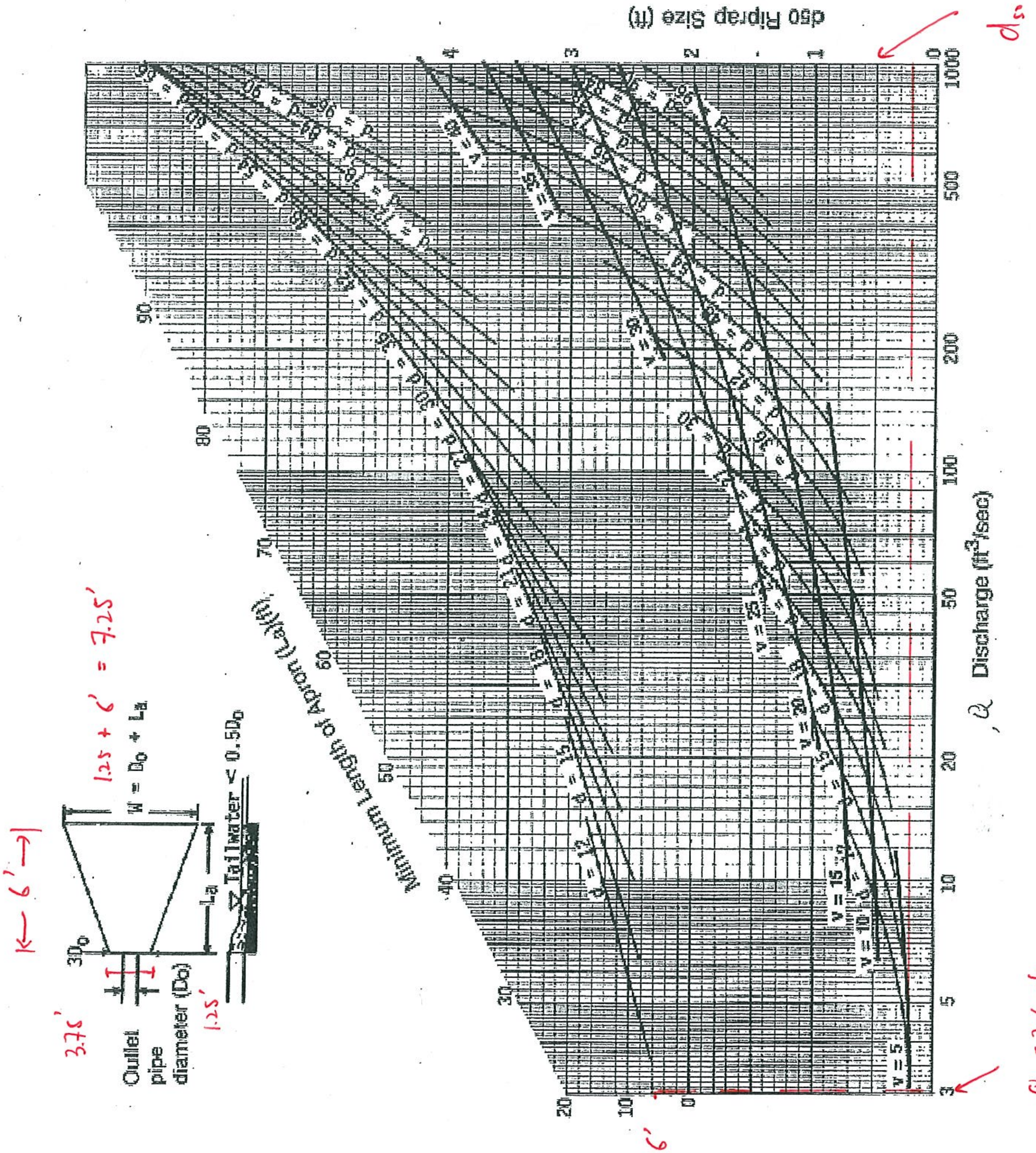
**Minimum Tailwater Condition: $T_w < 0.5D_o$)** (USDA - NRCS)



Temporary Sediment Basin (SB #8B)

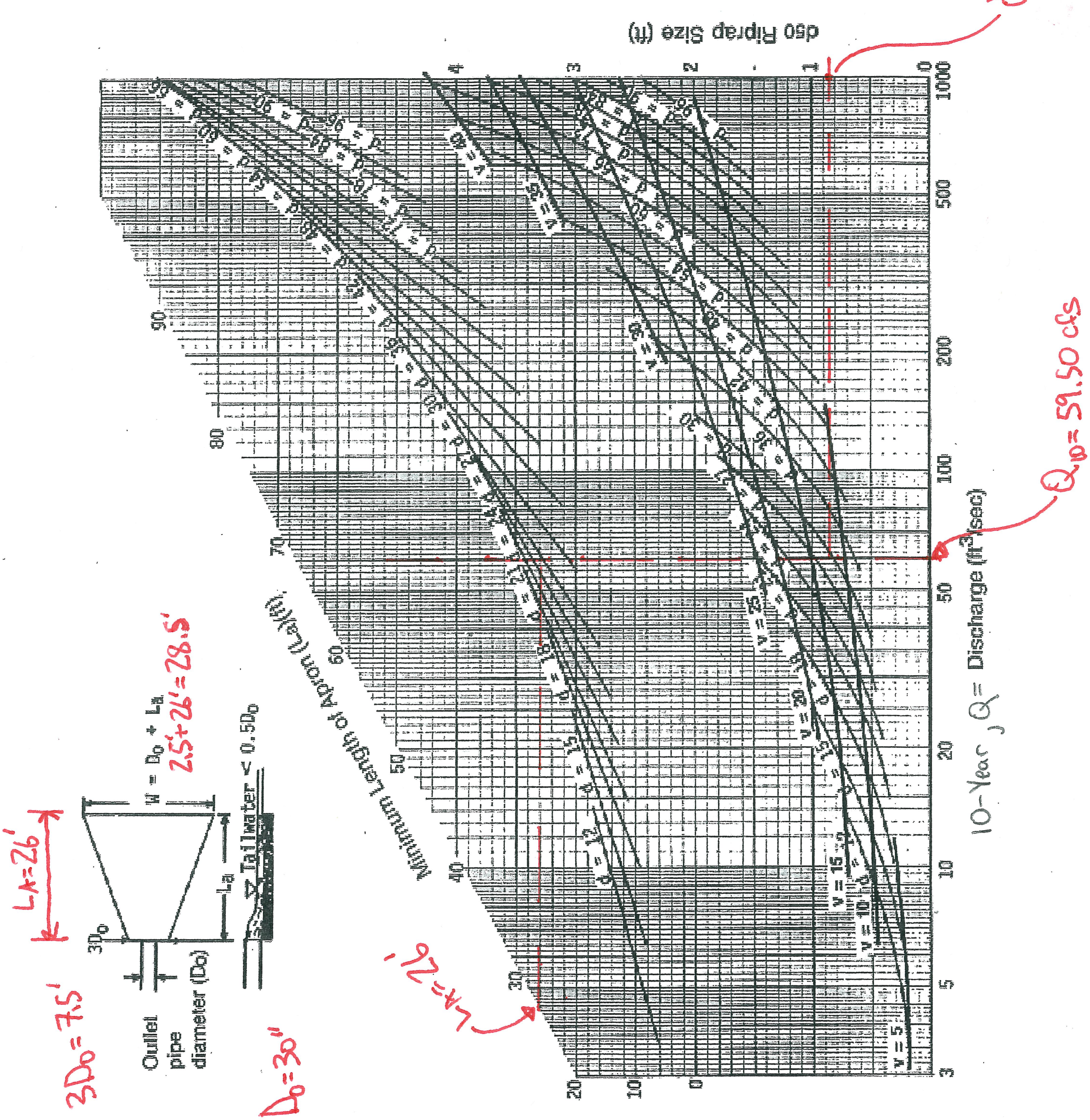
# Figure 5B.12

## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



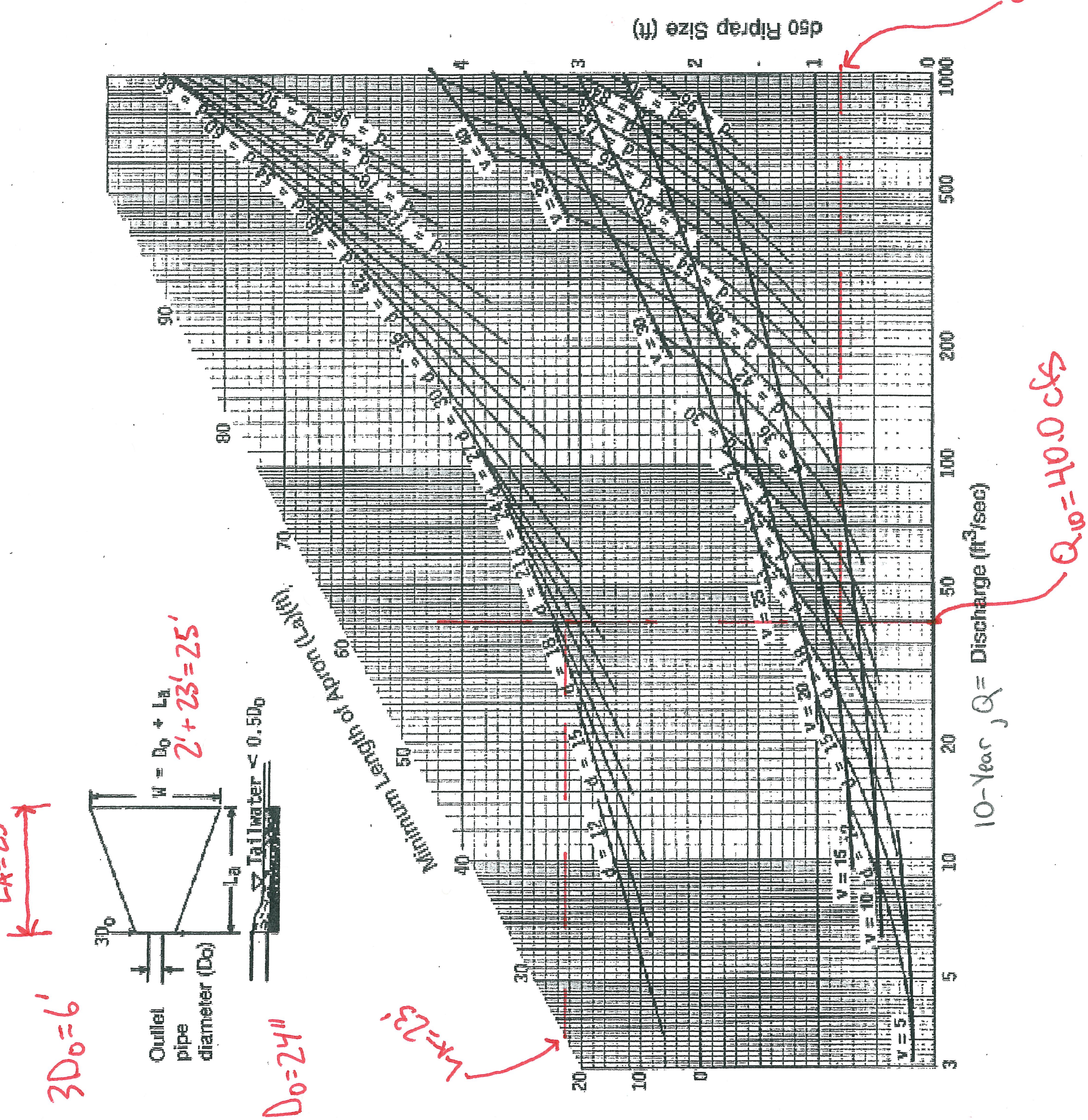
Temporary Sediment Basin (SB #9)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Temporary Sediment Basin (SB #10)

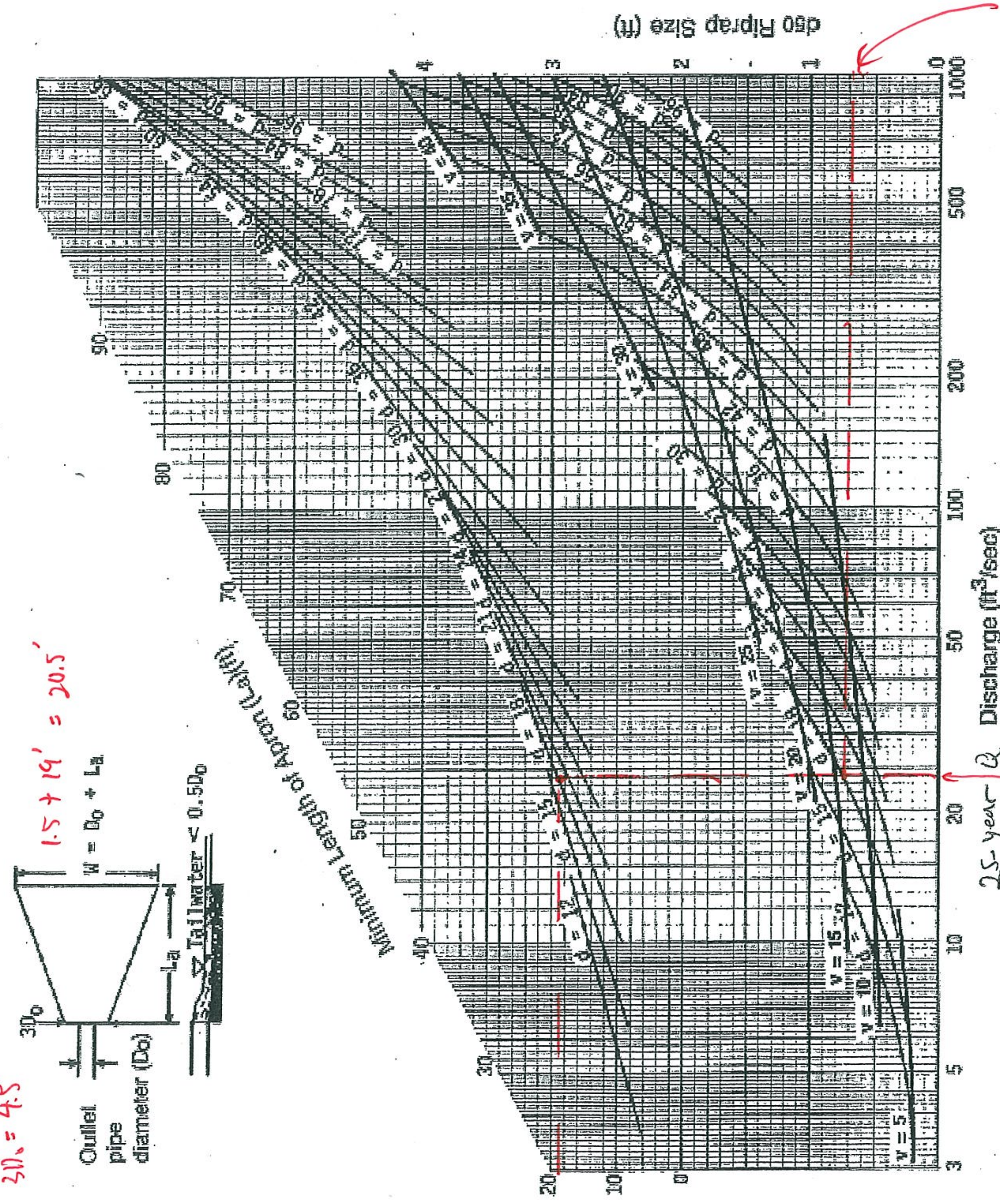
# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Temporary Sediment Basin (SB # 11)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

$d_{50} = 0.7' = 8.4"$




25-year Q

$Q_{10} = 24$ cfs

19'

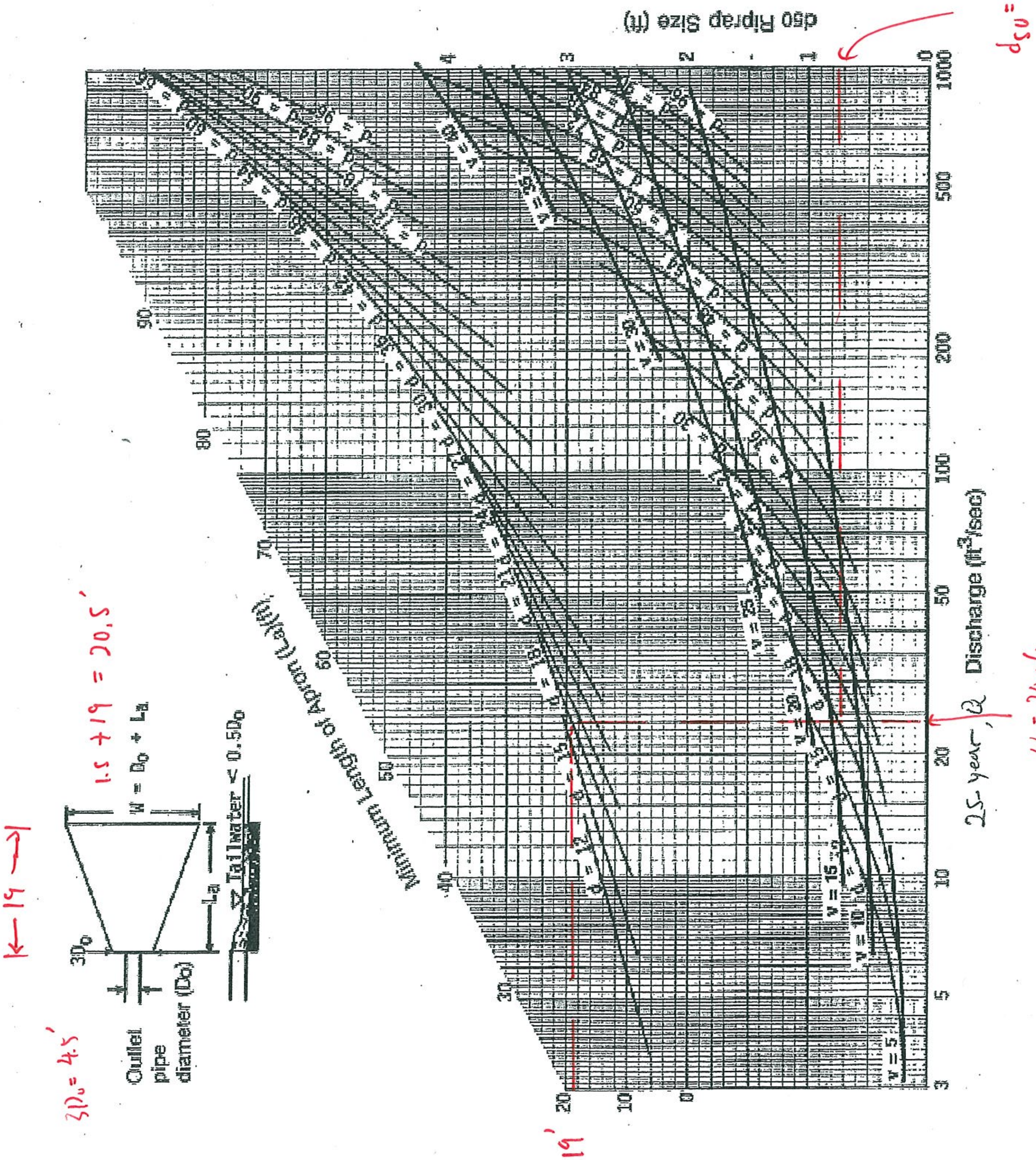
1.5 + 19' = 20.5'

← 19' →

$3D_o = 4.5'$

Temporary Sediment Basin (SB #11 A)

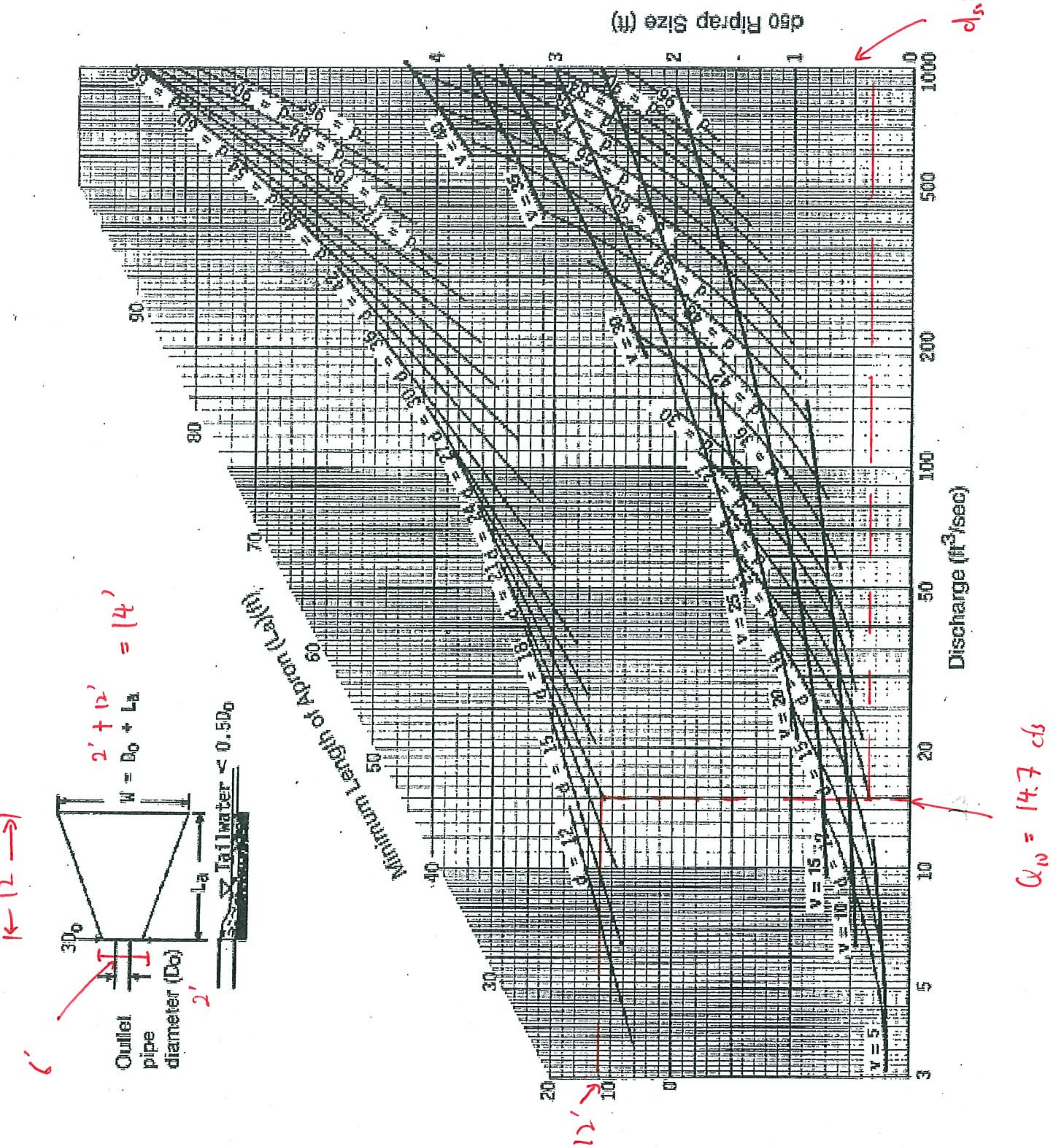
## Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Temporary Sediment Basin (SB # 13)

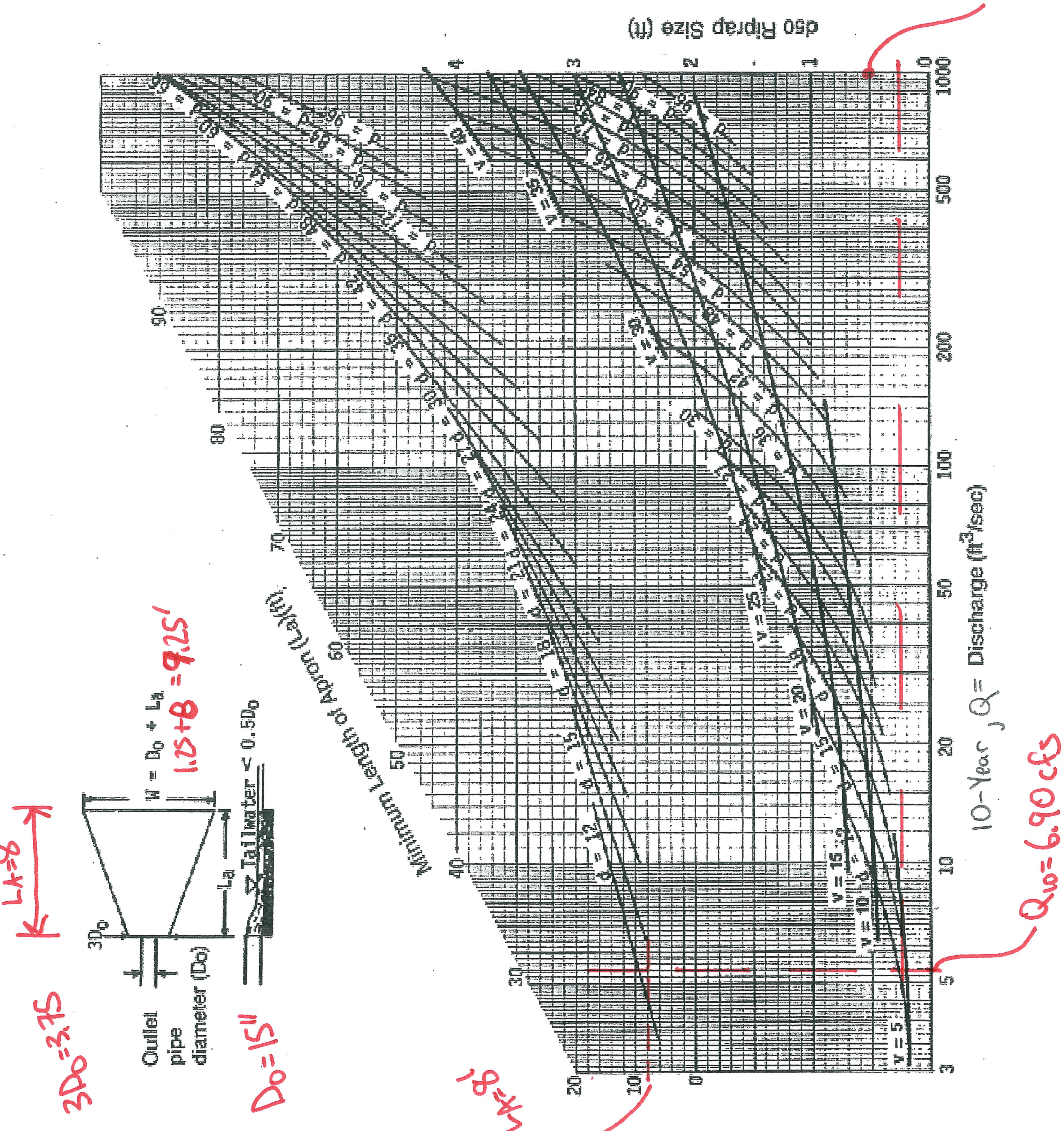
# Figure 5B.12

## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



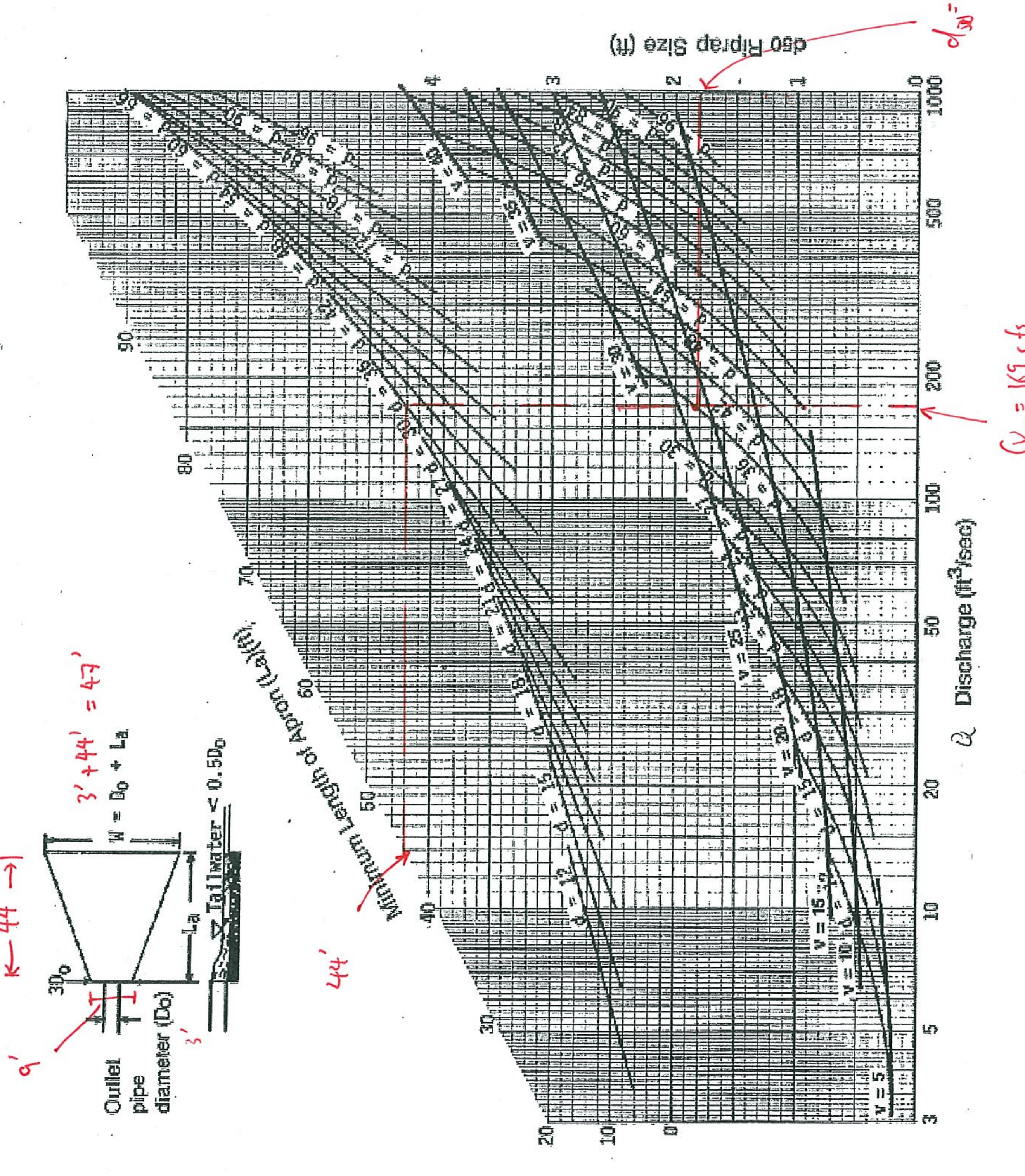
Temporary Sediment Basin (SB#14)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition
## (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



Temporary Sediment Basin (SB # 15)

# Figure 5B.12
## Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)



# Attachment F
# Hydraulic Grade Line Calculations - StormCAD output

# Closed Drainge System:
# Closed Drainge System (Maintenance Facility - 100 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-117A | | | 0.060 | 0.05 | 0.05 | | | | | | | | | 507.0 | 505.5 | 505.5 | | |
| 117A | FI-117A | FI-117 | | | | 6.42 | 15 | 95 | 0.012 | 0.008 | 0.04 | 503.80 | 503.00 | | 505.5 | 505.5 | 1.95 | 2.75 |
| FI-114A | | | 0.440 | 0.35 | 0.35 | | | | | | | | | 506.0 | 506.0 | 506.0 | | |
| 114A | FI-114A | FI-114 | | | | 1.84 | 12 | 44 | 0.012 | 0.002 | 0.45 | 503.90 | 503.80 | | 506.4 | 506.4 | 1.10 | 2.20 |
| FI-111 | | | 0.130 | 0.10 | 0.10 | | | | | | | | | 511.2 | 507.1 | 507.1 | | |
| 111 | FI-111 | FI-112 | | | | 11.35 | 15 | 76 | 0.012 | 0.026 | 2.86 | 507.00 | 505.00 | | 507.1 | 506.5 | 2.95 | 2.85 |
| FI-112 | | | 1.230 | 0.98 | 1.08 | | | | | | | | | 509.1 | 506.5 | 506.5 | | |
| 112 | FI-112 | FI-113 | | | | 6.19 | 15 | 64 | 0.012 | 0.008 | 0.88 | 505.00 | 504.50 | | 506.5 | 506.4 | 2.85 | 2.05 |
| FI-113 | | | 0.120 | 0.10 | 1.18 | | | | | | | | | 507.8 | 506.4 | 506.4 | | |
| 113 | FI-113 | FI-114 | | | | 5.44 | 15 | 116 | 0.012 | 0.006 | 0.96 | 504.50 | 503.80 | | 506.4 | 506.4 | 2.05 | 1.95 |
| FI-107 | | | 0.080 | 0.06 | 0.06 | | | | | | | | | 511.5 | 509.0 | 509.0 | | |
| 107 | FI-107 | FI-106 | | | | 8.47 | 15 | 82 | 0.012 | 0.015 | 0.05 | 507.50 | 506.30 | | 509.0 | 509.0 | 2.75 | 4.75 |
| FI-100 | | | 0.600 | 0.48 | 0.48 | | | | | | | | | 543.3 | 538.3 | 538.3 | | |
| 100 | FI-100 | FI-101 | | | | 15.09 | 15 | 215 | 0.012 | 0.047 | 5.61 | 538.00 | 528.00 | | 538.3 | 528.4 | 4.05 | 4.15 |
| FI-101 | | | 0.280 | 0.22 | 0.70 | | | | | | | | | 533.4 | 528.4 | 528.3 | | |
| 101 | FI-101 | FI-102 | | | | 22.24 | 15 | 99 | 0.012 | 0.101 | 8.24 | 528.00 | 518.00 | | 528.3 | 519.2 | 4.15 | 4.15 |
| FI-102 | | | 5.730 | 4.58 | 5.28 | | | | | | | | | 523.4 | 519.2 | 518.9 | | |
| 102 | FI-102 | FI-102A | | | | 13.30 | 15 | 83 | 0.012 | 0.036 | 10.21 | 518.00 | 515.00 | | 518.9 | 516.2 | 4.15 | 3.55 |
| FI-102A | | | 0.370 | 0.30 | 5.58 | | | | | | | | | 519.8 | 516.2 | 516.0 | | |
| 102A | FI-102A | FI-103 | | | | 8.75 | 15 | 64 | 0.012 | 0.016 | 7.56 | 515.00 | 514.00 | | 516.0 | 515.5 | 3.55 | 3.75 |
| FI-103 | | | 1.040 | 0.83 | 6.41 | | | | | | | | | 519.0 | 515.5 | 515.2 | | |
| 103 | FI-103 | FI-104 | | | | 6.96 | 15 | 101 | 0.012 | 0.01 | 6.44 | 514.00 | 513.00 | | 515.2 | 514.4 | 3.75 | 4.75 |
| FI-104 | | | 0.180 | 0.14 | 6.55 | | | | | | | | | 519.0 | 514.4 | 514.0 | | |
| 104 | FI-104 | FI-105 | | | | 12.78 | 15 | 165 | 0.012 | 0.033 | 10.48 | 513.00 | 507.50 | | 514.0 | 509.7 | 4.75 | 3.85 |
| FI-105 | | | 2.220 | 1.78 | 8.33 | | | | | | | | | 512.6 | 509.7 | 509.5 | | |
| 105 | FI-105 | FI-106 | | | | 12.93 | 18 | 93 | 0.012 | 0.013 | 4.71 | 507.50 | 506.30 | | 509.5 | 509.0 | 3.60 | 4.50 |

# Closed Drainge System:
# Closed Drainge System (Maintenance Facility - 100 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-106 | | | 0.070 | 0.06 | 8.45 | | | | | | | | | 512.3 | 509.0 | 508.8 | | |
| 106 | FI-106 | FI-109 | | | | 9.69 | 18 | 69 | 0.012 | 0.007 | 4.78 | 506.30 | 505.80 | | 508.8 | 508.4 | 4.50 | 2.20 |
| FI-109 | | | 0.350 | 0.28 | 8.73 | | | | | | | | | 509.5 | 508.4 | 508.2 | | |
| 109 | FI-109 | FI-110 | | | | 9.53 | 18 | 114 | 0.012 | 0.007 | 4.94 | 505.80 | 505.00 | | 508.2 | 507.5 | 2.20 | 2.80 |
| FI-110 | | | 0.130 | 0.10 | 8.83 | | | | | | | | | 509.3 | 507.5 | 507.3 | | |
| 110 | FI-110 | FI-114 | | | | 10.50 | 18 | 141 | 0.012 | 0.009 | 5.00 | 505.00 | 503.80 | | 507.3 | 506.4 | 2.80 | 1.70 |
| FI-114 | | | 0.140 | 0.11 | 10.47 | | | | | | | | | 507.0 | 506.4 | 505.9 | | |
| 114 | FI-114 | FI-117 | | | | 14.69 | 18 | 48 | 0.012 | 0.017 | 5.92 | 503.80 | 503.00 | | 505.9 | 505.5 | 1.70 | 2.50 |
| FI-117 | | | 0.400 | 0.32 | 10.84 | | | | | | | | | 507.0 | 505.5 | 504.2 | | |
| 117 | FI-117 | DET-118A | | | | 12.78 | 15 | 90 | 0.012 | 0.033 | 11.68 | 503.00 | 500.00 | | 504.2 | 500.9 | 2.75 | 7.15 |
| DET-118A | | | | | 10.84 | | | | | | | | | 508.4 | 499.6 | 499.5 | | |
| 118A | DET-118A | DET-118D | | | | 0.00 | 60 | 17 | 0.012 | 0 | 0.55 | 498.00 | 498.00 | | 499.5 | 499.5 | 5.40 | 5.50 |
| DET-118D | | | | | 10.84 | | | | | | | | | 508.5 | 499.5 | 499.4 | | |
| 118B | DET-118D | OCS-119 | | | | 0.00 | 60 | 10 | 0.012 | 0 | 0.55 | 498.00 | 498.00 | | 499.4 | 499.4 | 5.50 | 5.30 |
| OCS-119 | | | | | 10.84 | | | | | | | | | 508.3 | 499.4 | 499.2 | | |
| 119 | OCS-119 | DMH-121 | | | | 46.31 | 24 | 14 | 0.012 | 0.036 | 12.03 | 498.00 | 497.50 | | 499.2 | 498.3 | 8.30 | 8.50 |
| DMH-121 | | | | | 10.84 | | | | | | | | | 508.0 | 496.0 | 495.6 | | |
| 121 | DMH-121 | FES-122 | | | | 20.55 | 24 | 199 | 0.012 | 0.007 | 6.63 | 494.40 | 493.00 | | 495.6 | 494.0 | 11.60 | 0.20 |
| FES-122 | | | | | | | | | | | | | | 495.2 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 1 - 950, 1300, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YI-1300 | | | 0.290 | 0.41 | 0.41 | | | | | | | | | 537.5 | 533.3 | 533.3 | | |
| 1300 | YI-1300 | YI-1301 | | | | 1.17 | 6 | 130 | 0.012 | 0.037 | 5.43 | 533.00 | 528.20 | | 533.3 | 528.8 | 4.00 | 4.00 |
| YI-1301 | | | 0.190 | 0.27 | 0.68 | | | | | | | | | 532.7 | 528.8 | 528.6 | | |
| 1301 | YI-1301 | FI-958A | | | | 0.84 | 6 | 166 | 0.012 | 0.019 | 4.78 | 528.20 | 525.00 | | 528.6 | 525.5 | 4.00 | 4.10 |
| FI-957B | | | 11.820 | 16.80 | 16.80 | | | | | | | | | 571.2 | 567.5 | 567.5 | | |
| 957B | FI-957B | DMH-957A | | | | 81.28 | 24 | 100 | 0.012 | 0.11 | 20.39 | 566.00 | 555.00 | | 567.5 | 555.6 | 3.20 | 2.70 |
| DMH-957A | | | | | 16.80 | | | | | | | | | 559.7 | 549.8 | 549.5 | | |
| 957A | DMH-957A | FI-957 | | | | 79.58 | 24 | 183 | 0.012 | 0.105 | 20.08 | 548.00 | 528.70 | | 549.5 | 532.9 | 9.70 | 5.30 |
| FI-2205C | | | 1.300 | 1.85 | 1.85 | | | | | | | | | 577.0 | 572.7 | 572.5 | | |
| 2205C | FI-2205C | FI-2205B | | | | 9.75 | 15 | 103 | 0.012 | 0.019 | 6.11 | 572.00 | 570.00 | | 572.5 | 570.4 | 3.75 | 4.35 |
| CI-2200 | | | 2.760 | 3.92 | 3.92 | | | | | | | | | 693.3 | 686.5 | 686.5 | | |
| 2200 | CI-2200 | CI-2201 | | | | 36.66 | 18 | 132 | 0.012 | 0.104 | 13.53 | 685.70 | 672.00 | | 686.5 | 672.3 | 6.10 | 3.50 |
| CI-2201 | | | 3.630 | 5.16 | 9.08 | | | | | | | | | 677.0 | 669.3 | 669.0 | | |
| 2201 | CI-2201 | CI-2202 | | | | 35.62 | 18 | 151 | 0.012 | 0.098 | 16.85 | 667.80 | 653.00 | | 669.0 | 654.6 | 7.70 | 3.70 |
| CI-2202 | | | 1.060 | 1.51 | 10.59 | | | | | | | | | 658.2 | 654.6 | 654.3 | | |
| 2202 | CI-2202 | FI-2203 | | | | 36.73 | 18 | 24 | 0.012 | 0.104 | 17.97 | 653.00 | 650.50 | | 654.3 | 651.2 | 3.70 | 3.80 |
| FI-2203 | | | 0.670 | 0.95 | 11.54 | | | | | | | | | 655.8 | 651.7 | 651.3 | | |
| 2203 | FI-2203 | CI-2204 | | | | 30.28 | 18 | 24 | 0.012 | 0.071 | 15.98 | 650.00 | 648.30 | | 651.3 | 650.0 | 4.30 | 4.00 |
| CI-2204 | | | 0.420 | 0.60 | 12.14 | | | | | | | | | 653.8 | 650.0 | 649.6 | | |
| 2204 | CI-2204 | CI-2205 | | | | 20.67 | 18 | 100 | 0.012 | 0.033 | 12.17 | 648.30 | 645.00 | | 649.6 | 645.8 | 4.00 | 3.40 |
| CI-2207 | | | 0.690 | 0.98 | 0.98 | | | | | | | | | 666.5 | 661.5 | 661.4 | | |
| 2207 | CI-2207 | CI-2206 | | | | 18.75 | 15 | 195 | 0.012 | 0.072 | 8.07 | 661.00 | 647.00 | | 661.4 | 647.9 | 4.25 | 4.75 |
| CI-2206 | | | 1.430 | 2.03 | 3.01 | | | | | | | | | 653.0 | 647.9 | 647.7 | | |
| 2206 | CI-2206 | CI-2205 | | | | 9.66 | 15 | 105 | 0.012 | 0.019 | 6.95 | 647.00 | 645.00 | | 647.7 | 645.5 | 4.75 | 3.65 |
| CI-2205 | | | 1.090 | 1.55 | 16.70 | | | | | | | | | 649.9 | 643.0 | 642.5 | | |
| 2205 | CI-2205 | DMH-2205A | | | | 115.69 | 24 | 175 | 0.012 | 0.223 | 26.19 | 641.00 | 602.00 | | 642.5 | 602.5 | 6.90 | 4.00 |

# Closed Drainge System:
# Closed Drainge System (SWM 1 - 950, 1300, and 2000 Series)



| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DMH-2205A | | | | | 16.70 | | | | | | | | | 608.0 | 599.8 | 599.5 | | |
| 2205A | DMH-2205A | FI-2205B | | | | 129.67 | 24 | 100 | 0.012 | 0.28 | 28.41 | 598.00 | 570.00 | | 599.5 | 570.5 | 8.00 | 3.60 |
| FI-2205B | | | 2.480 | 3.52 | 22.07 | | | | | | | | | 575.6 | 570.4 | 569.7 | | |
| 2205D | FI-2205B | FI-955E | | | | 32.55 | 24 | 85 | 0.012 | 0.018 | 11.13 | 568.00 | 566.50 | | 569.7 | 568.9 | 5.60 | 9.20 |
| CI-955I | | | 0.370 | 0.53 | 0.53 | | | | | | | | | 604.7 | 599.3 | 599.3 | | |
| 955I | CI-955I | CI-955H | | | | 17.40 | 15 | 89 | 0.012 | 0.062 | 6.36 | 599.00 | 593.50 | | 599.3 | 594.0 | 4.45 | 4.35 |
| CI-955H | | | 0.360 | 0.51 | 1.04 | | | | | | | | | 599.1 | 594.0 | 593.9 | | |
| 955H | CI-955H | CI-955G | | | | 18.22 | 15 | 90 | 0.012 | 0.068 | 8.05 | 593.50 | 587.40 | | 593.9 | 588.0 | 4.35 | 4.25 |
| CI-955G | | | 0.460 | 0.65 | 1.69 | | | | | | | | | 592.9 | 588.0 | 587.9 | | |
| 955G | CI-955G | CI-955F | | | | 18.29 | 15 | 101 | 0.012 | 0.068 | 9.31 | 587.40 | 580.50 | | 587.9 | 581.3 | 4.25 | 4.25 |
| CI-955F | | | 0.630 | 0.90 | 2.59 | | | | | | | | | 586.0 | 581.3 | 581.2 | | |
| 955F | CI-955F | FI-955E | | | | 19.19 | 15 | 111 | 0.012 | 0.075 | 10.91 | 580.50 | 572.15 | | 581.2 | 572.5 | 4.25 | 4.30 |
| FI-955E | | | 0.650 | 0.92 | 25.58 | | | | | | | | | 577.7 | 568.9 | 568.2 | | |
| 955E | FI-955E | DMH-955B | | | | 114.73 | 30 | 60 | 0.012 | 0.067 | 18.82 | 566.50 | 562.50 | | 568.2 | 563.4 | 8.70 | 3.00 |
| DMH-955B | | | | | 25.58 | | | | | | | | | 568.0 | 561.7 | 561.7 | | |
| 955B | DMH-955B | DMH-955 | | | | 132.47 | 30 | 180 | 0.012 | 0.089 | 20.86 | 560.00 | 544.00 | | 561.7 | 544.7 | 5.50 | 7.50 |
| DMH-955 | | | | | 25.58 | | | | | | | | | 554.0 | 545.7 | 545.2 | | |
| 955 | DMH-955 | DMH-956 | | | | 51.65 | 30 | 185 | 0.012 | 0.014 | 10.50 | 543.50 | 541.00 | | 545.2 | 543.2 | 8.00 | 7.00 |
| DMH-956 | | | | | 25.58 | | | | | | | | | 550.5 | 543.2 | 542.7 | | |
| 956 | DMH-956 | FI-957 | | | | 110.78 | 30 | 185 | 0.012 | 0.062 | 18.35 | 541.00 | 529.50 | | 542.7 | 532.9 | 7.00 | 4.00 |
| FI-957 | | | 2.540 | 3.61 | 45.99 | | | | | | | | | 536.0 | 532.9 | 531.8 | | |
| 957 | FI-957 | DMH-958 | | | | 46.74 | 30 | 244 | 0.012 | 0.011 | 9.37 | 528.70 | 526.00 | | 531.8 | 529.2 | 4.80 | 4.80 |
| DMH-958 | | | | | 45.99 | | | | | | | | | 533.3 | 529.2 | 528.2 | | |
| 958 | DMH-958 | FI-958A | | | | 66.98 | 30 | 110 | 0.012 | 0.023 | 14.70 | 526.00 | 523.50 | | 528.2 | 525.1 | 4.80 | 3.60 |
| FI-958A | | | 0.250 | 0.36 | 47.03 | | | | | | | | | 529.6 | 525.5 | 524.3 | | |
| 958A | FI-958A | DMH-958B | | | | 116.91 | 30 | 130 | 0.012 | 0.069 | 22.52 | 522.00 | 513.00 | | 524.3 | 515.7 | 5.10 | 3.60 |

# Closed Drainge System:
# Closed Drainge System (SWM 1 - 950, 1300, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DMH-958B | | | | | 47.03 | | | | | | | | | 519.1 | 515.7 | 514.9 | | |
| 958B | DMH-958B | SWM #1 | | | | 55.38 | 30 | 103 | 0.012 | 0.016 | 12.66 | 512.60 | 511.00 | | 514.9 | 512.8 | 4.00 | -1.50 |
| SWM #1 | | | | | | | | | | | | | | 512.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 2 - 800 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CI-800 | | | 1.720 | 4.59 | 4.59 | | | | | | | | | 611.0 | 605.8 | 605.8 | | |
| 800 | CI-800 | CI-800A | | | | 49.64 | 24 | 145 | 0.012 | 0.041 | 9.87 | 605.00 | 599.05 | | 605.8 | 601.4 | 4.00 | 4.35 |
| CI-800A | | | 2.330 | 6.22 | 10.81 | | | | | | | | | 605.4 | 601.4 | 601.4 | | |
| 800A | CI-800A | CI-801 | | | | 27.15 | 24 | 167 | 0.012 | 0.012 | 3.44 | 599.05 | 597.00 | | 601.4 | 601.0 | 4.35 | 4.40 |
| CI-801 | | | 4.850 | 12.95 | 23.76 | | | | | | | | | 603.4 | 601.0 | 600.6 | | |
| 801 | CI-801 | CI-802 | | | | 28.17 | 24 | 227 | 0.012 | 0.013 | 7.56 | 597.00 | 594.00 | | 600.6 | 598.5 | 4.40 | 8.00 |
| CI-802 | | | 2.590 | 6.92 | 30.68 | | | | | | | | | 604.0 | 598.5 | 598.1 | | |
| 802 | CI-802 | FI-802A | | | | 46.32 | 30 | 69 | 0.012 | 0.011 | 6.25 | 594.00 | 593.25 | | 598.1 | 597.8 | 7.50 | 7.55 |
| FI-802A | | | 3.430 | 9.16 | 39.84 | | | | | | | | | 603.3 | 597.8 | 597.3 | | |
| 802A- | FI-802A | FI-803 | | | | 46.37 | 30 | 101 | 0.012 | 0.011 | 8.12 | 593.25 | 592.15 | | 597.3 | 596.5 | 7.55 | 7.75 |
| FI-803 | | | 0.970 | 2.59 | 42.43 | | | | | | | | | 602.4 | 596.5 | 595.9 | | |
| 803 | FI-803 | FI-804 | | | | 47.97 | 30 | 163 | 0.012 | 0.012 | 8.64 | 592.15 | 590.25 | | 595.9 | 594.4 | 7.75 | 9.25 |
| FI-804 | | | 1.290 | 3.45 | 45.88 | | | | | | | | | 602.0 | 594.4 | 593.7 | | |
| 804 | FI-804 | FI-804A | | | | 48.48 | 30 | 42 | 0.012 | 0.012 | 9.35 | 590.25 | 589.75 | | 593.7 | 593.3 | 9.25 | 10.15 |
| FI-804B | | | 1.300 | 3.47 | 3.47 | | | | | | | | | 603.2 | 598.8 | 598.8 | | |
| 804B | FI-804B | FI-804A | | | | 29.74 | 24 | 146 | 0.012 | 0.015 | 6.33 | 598.10 | 595.95 | | 598.8 | 596.4 | 3.10 | 4.45 |
| FI-804A | | | 2.060 | 5.50 | 54.85 | | | | | | | | | 602.4 | 593.3 | 592.2 | | |
| 804A | FI-804A | DMH-805 | | | | 132.80 | 36 | 37 | 0.012 | 0.034 | 17.89 | 589.75 | 588.50 | | 592.2 | 591.7 | 9.65 | 13.20 |
| DMH-805 | | | | | 54.85 | | | | | | | | | 604.7 | 591.7 | 590.9 | | |
| 805 | DMH-805 | DMH-805A2 | | | | 129.40 | 36 | 53 | 0.012 | 0.032 | 17.55 | 588.50 | 586.80 | | 590.9 | 588.4 | 13.20 | 9.70 |
| DMH-805A2 | | | | | 54.85 | | | | | | | | | 599.5 | 588.0 | 587.4 | | |
| 805A2 | DMH-805A2 | DMH-805A1 | | | | 140.36 | 36 | 53 | 0.012 | 0.038 | 18.64 | 585.00 | 583.00 | | 587.4 | 584.6 | 11.50 | 5.00 |
| DMH-805A1 | | | | | 54.85 | | | | | | | | | 591.0 | 578.5 | 577.9 | | |
| 805A1 | DMH-805A1 | DMH-805A | | | | 152.66 | 36 | 56 | 0.012 | 0.045 | 19.82 | 575.50 | 573.00 | | 577.9 | 574.5 | 12.50 | 2.70 |
| DMH-805A | | | | | 54.85 | | | | | | | | | 578.7 | 573.9 | 572.9 | | |
| 805A | DMH-805A | DMH-806 | | | | 131.91 | 36 | 15 | 0.012 | 0.033 | 17.80 | 570.50 | 570.00 | | 572.9 | 571.9 | 5.20 | 4.90 |

# Closed Drainge System:
# Closed Drainge System (SWM 2 - 800 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DMH-806 | | | | | 54.85 | | | | | | | | | 577.9 | 566.6 | 566.0 | | |
| 806 | DMH-806 | DMH-807 | | | | 139.92 | 36 | 112 | 0.012 | 0.038 | 18.59 | 563.60 | 559.40 | | 566.0 | 562.4 | 11.30 | 10.90 |
| DMH-807 | | | | | 54.85 | | | | | | | | | 573.3 | 562.4 | 561.8 | | |
| 807 | DMH-807 | DMH-808 | | | | 145.63 | 36 | 288 | 0.012 | 0.041 | 19.15 | 559.40 | 547.70 | | 561.8 | 550.3 | 10.90 | 3.30 |
| DMH-808 | | | | | 54.85 | | | | | | | | | 554.0 | 550.3 | 549.7 | | |
| 808 | DMH-808 | DMH-809 | | | | 129.27 | 36 | 353 | 0.012 | 0.032 | 17.54 | 547.30 | 536.00 | | 549.7 | 538.9 | 3.70 | 7.50 |
| DMH-809 | | | | | 54.85 | | | | | | | | | 546.5 | 538.9 | 538.3 | | |
| 809 | DMH-809 | DMH-810 | | | | 258.94 | 36 | 109 | 0.012 | 0.128 | 29.07 | 535.90 | 521.90 | | 538.3 | 522.9 | 7.60 | 4.60 |
| DMH-810 | | | | | 54.85 | | | | | | | | | 529.5 | 519.2 | 518.4 | | |
| 810 | DMH-810 | DMH-811 | | | | 253.66 | 36 | 86 | 0.012 | 0.123 | 28.64 | 516.00 | 505.40 | | 518.4 | 506.5 | 10.50 | 9.20 |
| DMH-811 | | | | | 54.85 | | | | | | | | | 517.6 | 503.9 | 503.3 | | |
| 811 | DMH-811 | SWM #2 | | | | 143.01 | 36 | 97 | 0.012 | 0.039 | 18.89 | 500.90 | 497.10 | | 503.3 | 498.5 | 13.70 | 6.90 |
| SWM #2 | | | | | | | | | | | | | | 507.0 | | | | |

Rainfall:  50 Year Storm

# Closed Drainge System:
# Closed Drainge System (SWM 2 - 870 and 2100 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DMH-874-1 | | | | 71.00 | 71.00 | | | | | | | | | 579.3 | 578.0 | 576.8 | | |
| 874 | DMH-874-1 | DMH-875 | | | | 311.61 | 36 | 200 | 0.012 | 0.186 | 35.71 | 574.10 | 536.90 | | 576.8 | 540.5 | 2.20 | 2.60 |
| DMH-875 | | | | | 71.00 | | | | | | | | | 542.5 | 540.5 | 539.6 | | |
| 875 | DMH-875 | DMH-876 | | | | 312.86 | 36 | 168 | 0.012 | 0.188 | 35.81 | 536.90 | 505.40 | | 539.6 | 506.4 | 2.60 | 2.30 |
| DMH-876 | | | | | 71.00 | | | | | | | | | 510.7 | 504.5 | 503.5 | | |
| 876 | DMH-876 | SWM #2 | | | | 199.44 | 36 | 63 | 0.012 | 0.076 | 25.83 | 500.80 | 496.00 | | 503.5 | 497.5 | 6.90 | 8.00 |
| SWM #2 | | | | | | | | | | | | | | 507.0 | | | | |
| CI-2100 | | | 0.700 | 1.93 | 1.93 | | | | | | | | | 800.1 | 796.5 | 796.5 | | |
| 2100 | CI-2100 | CI-2101 | | | | 17.27 | 24 | 151 | 0.012 | 0.005 | 3.63 | 796.00 | 795.25 | | 796.5 | 796.0 | 2.10 | 5.25 |
| CI-2101 | | | 0.310 | 0.85 | 2.78 | | | | | | | | | 802.5 | 796.0 | 795.8 | | |
| 2101 | CI-2101 | CI-2102 | | | | 43.96 | 24 | 101 | 0.012 | 0.032 | 7.82 | 795.25 | 792.00 | | 795.8 | 793.0 | 5.25 | 3.00 |
| CI-2102 | | | 1.000 | 2.75 | 5.53 | | | | | | | | | 797.0 | 793.0 | 792.8 | | |
| 2102 | CI-2102 | CI-2103 | | | | 79.25 | 24 | 153 | 0.012 | 0.105 | 14.51 | 792.00 | 776.00 | | 792.8 | 777.3 | 3.00 | 3.50 |
| CI-2103 | | | 1.200 | 3.30 | 8.83 | | | | | | | | | 781.5 | 777.3 | 777.1 | | |
| 2103 | CI-2103 | CI-2104 | | | | 79.81 | 24 | 99 | 0.012 | 0.106 | 16.73 | 776.00 | 765.50 | | 777.1 | 766.9 | 3.50 | 3.50 |
| CI-2104 | | | 0.590 | 1.62 | 10.45 | | | | | | | | | 771.0 | 766.9 | 766.7 | | |
| 2104 | CI-2104 | CI-2105 | | | | 53.99 | 24 | 103 | 0.012 | 0.049 | 13.29 | 765.50 | 760.50 | | 766.7 | 762.0 | 3.50 | 3.50 |
| CI-2105 | | | 0.530 | 1.46 | 11.91 | | | | | | | | | 766.0 | 762.0 | 761.7 | | |
| 2105 | CI-2105 | CI-2106 | | | | 46.77 | 24 | 151 | 0.012 | 0.036 | 12.44 | 760.50 | 755.00 | | 761.7 | 756.7 | 3.50 | 3.50 |
| CI-2106 | | | 1.280 | 3.52 | 15.43 | | | | | | | | | 760.5 | 756.7 | 756.4 | | |
| 2106 | CI-2106 | CI-2107 | | | | 72.56 | 24 | 154 | 0.012 | 0.088 | 18.35 | 755.00 | 741.50 | | 756.4 | 742.1 | 3.50 | 3.50 |
| CI-2107 | | | 3.140 | 8.65 | 24.08 | | | | | | | | | 747.0 | 740.3 | 739.7 | | |
| 2107 | CI-2107 | CI-2108 | | | | 75.94 | 24 | 151 | 0.012 | 0.096 | 21.45 | 738.00 | 723.50 | | 739.7 | 724.3 | 7.00 | 3.50 |
| CI-2108 | | | 3.290 | 9.06 | 33.14 | | | | | | | | | 729.0 | 723.3 | 722.4 | | |
| 2108 | CI-2108 | CI-2109 | | | | 75.16 | 24 | 101 | 0.012 | 0.094 | 23.18 | 720.50 | 711.00 | | 722.4 | 712.0 | 6.50 | 4.00 |
| CI-2109 | | | 1.680 | 4.63 | 37.77 | | | | | | | | | 717.0 | 711.1 | 709.9 | | |

# Closed Drainge System:
# Closed Drainge System (SWM 2 - 870 and 2100 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2109 | CI-2109 | CI-2110 | | | | 74.13 | 24 | 153 | 0.012 | 0.092 | 23.71 | 708.00 | 694.00 | | 709.9 | 695.0 | 7.00 | 3.00 |
| CI-2110 | | | 2.210 | 6.09 | 43.86 | | | | | | | | | 699.0 | 692.9 | 692.2 | | |
| 2110 | CI-2110 | CI-2111 | | | | 125.67 | 30 | 150 | 0.012 | 0.08 | 23.32 | 690.00 | 678.00 | | 692.2 | 680.9 | 6.50 | 3.00 |
| CI-2111 | | | 4.150 | 11.43 | 55.29 | | | | | | | | | 683.5 | 680.9 | 679.8 | | |
| 2111 | CI-2111 | CI-2112 | | | | 90.70 | 30 | 72 | 0.012 | 0.042 | 11.26 | 677.00 | 674.00 | | 679.8 | 678.6 | 4.00 | 4.10 |
| CI-2112 | | | 2.990 | 8.23 | 63.52 | | | | | | | | | 680.6 | 678.6 | 678.0 | | |
| 2112 | CI-2112 | CI-2113 | | | | 88.49 | 36 | 100 | 0.012 | 0.015 | 8.99 | 674.00 | 672.50 | | 678.0 | 677.2 | 3.60 | 6.50 |
| CI-2113 | | | 4.160 | 11.46 | 74.98 | | | | | | | | | 682.0 | 677.2 | 676.2 | | |
| 2113 | CI-2113 | CI-2114 | | | | 88.05 | 36 | 101 | 0.012 | 0.015 | 10.61 | 672.50 | 671.00 | | 676.2 | 675.1 | 6.50 | 9.00 |
| CI-2114 | | | 2.360 | 6.50 | 81.48 | | | | | | | | | 683.0 | 675.1 | 673.8 | | |
| 2114 | CI-2114 | CI-2115 | | | | 86.36 | 36 | 105 | 0.012 | 0.014 | 13.90 | 671.00 | 669.50 | | 673.8 | 671.9 | 9.00 | 6.00 |
| CI-2115 | | | 5.240 | 14.43 | 95.91 | | | | | | | | | 678.5 | 671.1 | 669.4 | | |
| 2115 | CI-2115 | CI-2116 | | | | 189.28 | 36 | 153 | 0.012 | 0.069 | 26.86 | 666.50 | 656.00 | | 669.4 | 657.6 | 9.00 | 3.00 |
| CI-2116 | | | 3.180 | 8.76 | 104.67 | | | | | | | | | 662.0 | 656.7 | 654.9 | | |
| 2116 | CI-2116 | CI-2117 | | | | 210.78 | 36 | 94 | 0.012 | 0.085 | 29.77 | 652.00 | 644.00 | | 654.9 | 645.8 | 7.00 | 4.00 |
| CI-2117 | | | 2.100 | 5.78 | 110.45 | | | | | | | | | 651.0 | 642.7 | 640.4 | | |
| 2117 | CI-2117 | DMH-2117A | | | | 215.90 | 36 | 56 | 0.012 | 0.089 | 30.71 | 637.50 | 632.50 | | 640.4 | 637.6 | 10.50 | 5.10 |
| DMH-2117A | | | | | 110.45 | | | | | | | | | 640.6 | 637.6 | 634.6 | | |
| 2117A | DMH-2117A | CI-2118 | | | | 124.58 | 36 | 37 | 0.012 | 0.03 | 15.63 | 630.10 | 629.00 | | 634.6 | 633.7 | 7.50 | 4.30 |
| CI-2118 | | | 0.000 | 0.00 | 110.45 | | | | | | | | | 636.3 | 633.7 | 631.4 | | |
| 2118 | CI-2118 | CI-2119 | | | | 139.57 | 36 | 134 | 0.012 | 0.037 | 21.89 | 628.50 | 623.50 | | 631.4 | 626.5 | 4.80 | 5.00 |
| CI-2119 | | | 0.240 | 0.66 | 111.11 | | | | | | | | | 631.5 | 626.5 | 624.2 | | |
| 2119 | CI-2119 | CI-874C | | | | 121.27 | 36 | 142 | 0.012 | 0.028 | 15.72 | 621.00 | 617.00 | | 624.2 | 620.8 | 7.50 | 4.50 |
| CI-874C | | | 0.600 | 1.65 | 112.76 | | | | | | | | | 624.5 | 620.8 | 618.4 | | |
| 874C | CI-874C | DMH-874B | | | | 143.08 | 36 | 51 | 0.012 | 0.039 | 22.43 | 615.50 | 613.50 | | 618.4 | 615.9 | 6.00 | 6.10 |
| DMH-874B | | | | 0.00 | 112.76 | | | | | | | | | 622.6 | 614.1 | 610.9 | | |

# Closed Drainge System:
# Closed Drainge System (SWM 2 - 870 and 2100 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 874B | DMH-874B | DMH-874B1 | | | | 131.91 | 36 | 30 | 0.012 | 0.033 | 20.97 | 608.00 | 607.00 | | 610.9 | 609.6 | 11.60 | 8.00 |
| DMH-874B1 | | | | | 112.76 | | | | | | | | | 618.0 | 606.3 | 604.3 | | |
| 874B1 | DMH-874B1 | DMH-874B2 | | | | 136.10 | 36 | 31 | 0.012 | 0.035 | 21.52 | 601.40 | 600.30 | | 604.3 | 602.9 | 13.60 | 4.70 |
| DMH-874B2 | | | | | 112.76 | | | | | | | | | 608.0 | 596.4 | 594.4 | | |
| 874-B2 | DMH-874B2 | DMH-874B3 | | | | 136.54 | 36 | 28 | 0.012 | 0.036 | 21.58 | 591.50 | 590.50 | | 594.4 | 593.1 | 13.50 | 3.50 |
| DMH-874B3 | | | | | 112.76 | | | | | | | | | 597.0 | 588.4 | 586.4 | | |
| 874B3 | DMH-874B3 | DMH-874B4 | | | | 129.77 | 36 | 31 | 0.012 | 0.032 | 20.68 | 583.50 | 582.50 | | 586.4 | 585.1 | 10.50 | 2.50 |
| DMH-874B4 | | | | | 112.76 | | | | | | | | | 588.0 | 582.4 | 580.4 | | |
| 874B4 | DMH-874B4 | DMH-874 | | | | 123.66 | 36 | 99 | 0.012 | 0.029 | 15.95 | 577.00 | 574.10 | | 580.4 | 578.0 | 8.00 | 2.20 |
| DMH-874 | | | | | | | | | | | | | | 579.3 | | | | |
| DMH-874-2 | | | | 42.00 | 42.00 | | | | | | | | | 579.3 | 578.0 | 576.1 | | |
| 874B2 | DMH-874-2 | DMH-874C1 | | | | 64.53 | 24 | 225 | 0.012 | 0.069 | 21.87 | 574.10 | 558.50 | | 576.1 | 559.7 | 3.20 | 3.50 |
| DMH-874C1 | | | | | 42.00 | | | | | | | | | 564.0 | 554.6 | 553.0 | | |
| 874B1 | DMH-874C1 | DMH-874C2 | | | | 66.02 | 24 | 62 | 0.012 | 0.073 | 22.26 | 551.00 | 546.50 | | 553.0 | 547.8 | 11.00 | 3.50 |
| DMH-874C2 | | | | | 42.00 | | | | | | | | | 552.0 | 542.6 | 541.0 | | |
| 874C2 | DMH-874C2 | FES-874C3 | | | | 51.66 | 24 | 90 | 0.012 | 0.044 | 18.32 | 539.00 | 535.00 | | 541.0 | 536.5 | 11.00 | 0.00 |
| FES-874C3 | | | | | | | | | | | | | | 537.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 2 - 890 and 2200 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CI-892E | | | 0.930 | 4.90 | 4.90 | | | | | | | | | 604.7 | 601.5 | 601.5 | | |
| 892E | CI-892E | FI-892D | | | | 5.19 | 15 | 182 | 0.012 | 0.005 | 4.81 | 600.50 | 599.50 | | 601.5 | 600.4 | 2.95 | 9.25 |
| CI-890 | | | 0.790 | 2.25 | 2.25 | | | | | | | | | 616.5 | 611.0 | 611.0 | | |
| 890 | CI-890 | CI-890A | | | | 36.13 | 24 | 161 | 0.012 | 0.022 | 6.40 | 610.50 | 607.00 | | 611.0 | 609.0 | 4.00 | 3.20 |
| CI-890A | | | 0.900 | 4.74 | 6.99 | | | | | | | | | 612.2 | 609.0 | 609.0 | | |
| 890A | CI-890A | DMH-891 | | | | 23.47 | 24 | 109 | 0.012 | 0.009 | 6.52 | 607.00 | 606.00 | | 609.0 | 608.9 | 3.20 | 5.40 |
| CI-2208 | | | 0.480 | 2.53 | 2.53 | | | | | | | | | 668.2 | 663.7 | 663.6 | | |
| 2208 | CI-2208 | CI-2209 | | | | 35.26 | 18 | 125 | 0.012 | 0.096 | 11.57 | 663.00 | 651.00 | | 663.6 | 652.3 | 3.70 | 3.90 |
| CI-2209 | | | 0.770 | 4.06 | 6.59 | | | | | | | | | 656.4 | 652.3 | 652.0 | | |
| 2209 | CI-2209 | CI-2210 | | | | 37.74 | 18 | 100 | 0.012 | 0.11 | 16.05 | 651.00 | 640.00 | | 652.0 | 641.4 | 3.90 | 4.20 |
| CI-2210 | | | 0.630 | 3.32 | 9.91 | | | | | | | | | 645.7 | 641.4 | 641.1 | | |
| 2210 | CI-2210 | CI-2211 | | | | 77.74 | 24 | 159 | 0.012 | 0.101 | 16.98 | 640.00 | 624.00 | | 641.1 | 624.5 | 3.70 | 3.00 |
| CI-2211 | | | 1.030 | 5.42 | 15.33 | | | | | | | | | 629.0 | 624.7 | 624.4 | | |
| 2211 | CI-2211 | CI-2212 | | | | 76.08 | 24 | 83 | 0.012 | 0.096 | 18.95 | 623.00 | 615.00 | | 624.4 | 615.6 | 4.00 | 3.50 |
| CI-2212 | | | 0.670 | 3.53 | 18.86 | | | | | | | | | 620.5 | 614.0 | 613.6 | | |
| 2212 | CI-2212 | CI-2213 | | | | 52.94 | 24 | 75 | 0.012 | 0.047 | 15.43 | 612.00 | 608.50 | | 613.6 | 611.0 | 6.50 | 3.40 |
| CI-2213 | | | 0.650 | 3.42 | 22.28 | | | | | | | | | 613.9 | 611.0 | 610.2 | | |
| 2213 | CI-2213 | DMH-891 | | | | 42.78 | 24 | 21 | 0.012 | 0.03 | 13.76 | 608.50 | 607.86 | | 610.2 | 609.1 | 3.40 | 3.54 |
| DMH-891 | | | | | 29.27 | | | | | | | | | 613.4 | 608.9 | 607.9 | | |
| 891 | DMH-891 | FI-892D | | | | 41.62 | 24 | 104 | 0.012 | 0.029 | 14.35 | 606.00 | 603.00 | | 607.9 | 604.3 | 5.40 | 5.00 |
| FI-892D | | | 0.670 | 3.53 | 37.70 | | | | | | | | | 610.0 | 597.9 | 597.1 | | |
| 892D | FI-892D | DMH-892A3 | | | | 120.98 | 30 | 58 | 0.012 | 0.074 | 21.77 | 595.00 | 590.70 | | 597.1 | 591.8 | 12.50 | 4.80 |
| DMH-892A3 | | | | | 37.70 | | | | | | | | | 598.0 | 584.9 | 584.3 | | |
| 892A3 | DMH-892A3 | DMH-892A2 | | | | 85.63 | 30 | 35 | 0.012 | 0.037 | 16.89 | 582.20 | 580.90 | | 584.3 | 582.3 | 13.30 | 3.60 |
| DMH-892A2 | | | | | 37.70 | | | | | | | | | 587.0 | 575.2 | 574.6 | | |
| 892A2 | DMH-892A2 | DMH-892A1 | | | | 81.12 | 30 | 39 | 0.012 | 0.033 | 16.22 | 572.50 | 571.20 | | 574.6 | 572.6 | 12.00 | 3.30 |

Rainfall: 50 Year Storm

# Closed Drainge System:
# Closed Drainge System (SWM 2 - 890 and 2200 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DMH-892A1 | | | | | 37.70 | | | | | | | | | 577.0 | 564.7 | 564.1 | | |
| 892A1 | DMH-892A1 | DMH-892A | | | | 94.42 | 30 | 31 | 0.012 | 0.045 | 18.16 | 562.00 | 560.60 | | 564.1 | 562.0 | 12.50 | 3.20 |
| DMH-892A | | | | | 37.70 | | | | | | | | | 566.3 | 560.0 | 559.1 | | |
| 892A | DMH-892A | DMH-893 | | | | 96.63 | 30 | 148 | 0.012 | 0.047 | 18.47 | 557.00 | 550.00 | | 559.1 | 551.1 | 6.80 | 6.60 |
| DMH-893 | | | | | 37.70 | | | | | | | | | 559.1 | 546.8 | 546.1 | | |
| 893 | DMH-893 | YI-893A | | | | 94.20 | 30 | 89 | 0.012 | 0.045 | 18.12 | 544.00 | 540.00 | | 546.1 | 541.2 | 12.60 | 4.10 |
| YI-893A | | | 0.450 | 2.37 | 40.07 | | | | | | | | | 546.6 | 533.8 | 533.1 | | |
| 893A | YI-893A | DMH-894 | | | | 122.56 | 30 | 92 | 0.012 | 0.076 | 22.34 | 531.00 | 524.00 | | 533.1 | 525.1 | 13.10 | 3.50 |
| DMH-894 | | | | | 40.07 | | | | | | | | | 530.0 | 524.4 | 523.6 | | |
| 894 | DMH-894 | DMH-894A | | | | 97.74 | 30 | 155 | 0.012 | 0.048 | 18.92 | 521.50 | 514.00 | | 523.6 | 515.2 | 6.00 | 6.50 |
| DMH-894A | | | | | 40.07 | | | | | | | | | 523.0 | 508.8 | 508.1 | | |
| 894A | DMH-894A | DMH-895 | | | | 85.08 | 30 | 90 | 0.012 | 0.037 | 17.07 | 506.00 | 502.70 | | 508.1 | 504.0 | 14.50 | 2.90 |
| DMH-895 | | | | | 40.07 | | | | | | | | | 508.1 | 503.1 | 502.2 | | |
| 895 | DMH-895 | SWM #2 | | | | 74.25 | 30 | 111 | 0.012 | 0.028 | 15.42 | 500.10 | 497.00 | | 502.2 | 498.4 | 5.50 | 7.50 |
| SWM #2 | | | | | | | | | | | | | | 507.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 3 - 580 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-581B | | | 0.130 | 0.21 | 0.21 | | | | | | | | | 545.8 | 540.7 | 540.7 | | |
| 581B | FI-581B | DMH-581A | | | | 9.46 | 15 | 82 | 0.012 | 0.018 | 3.15 | 540.50 | 539.00 | | 540.7 | 540.7 | 4.05 | 6.45 |
| FI-580C | | | 0.030 | 0.05 | 0.05 | | | | | | | | | 568.4 | 563.1 | 563.1 | | |
| 580C | FI-580C | FI-580B1 | | | | 12.45 | 15 | 79 | 0.012 | 0.032 | 2.47 | 563.00 | 560.50 | | 563.1 | 560.7 | 4.15 | 5.15 |
| FI-580B1 | | | | 0.11 | 0.16 | | | | | | | | | 566.9 | 560.7 | 560.7 | | |
| 580B1 | FI-580B1 | FI-580B | | | | 12.45 | 15 | 79 | 0.012 | 0.032 | 3.51 | 560.50 | 558.00 | | 560.7 | 558.2 | 5.15 | 3.75 |
| FI-580B | | | 0.130 | 0.10 | 0.26 | | | | | | | | | 563.0 | 558.2 | 558.2 | | |
| 580B | FI-580B | FI-580 | | | | 20.12 | 15 | 127 | 0.012 | 0.083 | 5.68 | 558.00 | 547.50 | | 558.2 | 547.9 | 3.75 | 5.55 |
| FI-580 | | | 0.210 | 0.35 | 0.61 | | | | | | | | | 554.3 | 547.9 | 547.8 | | |
| 580 | FI-580 | FI-580A | | | | 11.96 | 15 | 125 | 0.012 | 0.029 | 5.11 | 547.50 | 543.85 | | 547.8 | 544.4 | 5.55 | 2.90 |
| FI-580A | | | 0.400 | 0.66 | 1.27 | | | | | | | | | 548.0 | 544.4 | 544.3 | | |
| 580A | FI-580A | CI-581 | | | | 12.21 | 15 | 110 | 0.012 | 0.03 | 6.44 | 543.85 | 540.50 | | 544.3 | 542.4 | 2.90 | 2.75 |
| CI-581 | | | 4.350 | 7.16 | 8.43 | | | | | | | | | 544.5 | 542.4 | 541.8 | | |
| 581 | CI-581 | DMH-581A | | | | 9.77 | 15 | 77 | 0.012 | 0.019 | 6.87 | 540.50 | 539.00 | | 541.8 | 540.7 | 2.75 | 6.45 |
| DMH-581A | | | | | 8.64 | | | | | | | | | 546.7 | 540.7 | 540.1 | | |
| 581A | DMH-581A | FI-582 | | | | 9.46 | 15 | 82 | 0.012 | 0.018 | 8.74 | 539.00 | 537.50 | | 540.1 | 538.7 | 6.45 | 4.75 |
| FI-582 | | | 0.020 | 0.03 | 8.67 | | | | | | | | | 543.5 | 538.7 | 538.1 | | |
| 582 | FI-582 | DMH-582A | | | | 9.52 | 15 | 81 | 0.012 | 0.019 | 8.79 | 537.00 | 535.50 | | 538.1 | 536.4 | 5.25 | 6.35 |
| DMH-582A | | | | | 8.67 | | | | | | | | | 543.1 | 535.2 | 534.6 | | |
| 582A | DMH-582A | FI-583 | | | | 27.63 | 15 | 93 | 0.012 | 0.156 | 19.91 | 533.50 | 519.00 | | 534.6 | 519.5 | 8.35 | 4.75 |
| FI-583 | | | 0.020 | 0.03 | 8.70 | | | | | | | | | 525.0 | 519.6 | 519.1 | | |
| 583 | FI-583 | FI-584 | | | | 25.14 | 15 | 62 | 0.012 | 0.129 | 18.61 | 518.00 | 510.00 | | 519.1 | 511.7 | 5.75 | 4.35 |
| FI-584 | | | 0.360 | 0.59 | 9.29 | | | | | | | | | 515.6 | 511.7 | 511.2 | | |
| 584 | FI-584 | SWM #3 | | | | 9.52 | 15 | 54 | 0.012 | 0.019 | 8.84 | 510.00 | 509.00 | | 511.2 | 510.0 | 4.35 | 1.75 |
| SWM #3 | | | | | | | | | | | | | | 512.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 3 - 600 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CI-600 | | | 0.370 | 0.91 | 0.91 | | | | | | | | | 546.2 | 540.9 | 540.9 | | |
| 600 | CI-600 | FI-601 | | | | 19.33 | 15 | 59 | 0.012 | 0.076 | 8.06 | 540.50 | 536.00 | | 540.9 | 536.9 | 4.45 | 4.75 |
| FI-601 | | | 1.060 | 2.62 | 3.53 | | | | | | | | | 542.0 | 536.9 | 536.8 | | |
| 601 | FI-601 | DMH-602 | | | | 14.59 | 15 | 92 | 0.012 | 0.043 | 9.79 | 536.00 | 532.00 | | 536.8 | 533.0 | 4.75 | 2.75 |
| DMH-602 | | | | | 3.53 | | | | | | | | | 536.0 | 533.0 | 532.8 | | |
| 602 | DMH-602 | FI-603 | | | | 18.82 | 15 | 76 | 0.012 | 0.072 | 11.76 | 532.00 | 526.50 | | 532.8 | 527.3 | 2.75 | 4.15 |
| FI-603 | | | 1.050 | 2.59 | 6.12 | | | | | | | | | 531.9 | 527.3 | 527.0 | | |
| 603 | FI-603 | FI-604 | | | | 8.95 | 15 | 330 | 0.012 | 0.016 | 7.85 | 526.00 | 520.60 | | 527.0 | 523.1 | 4.65 | 3.65 |
| FI-604 | | | 2.360 | 5.82 | 11.94 | | | | | | | | | 525.5 | 523.1 | 522.7 | | |
| 604 | FI-604 | DMH-605 | | | | 13.25 | 18 | 59 | 0.012 | 0.014 | 6.76 | 520.60 | 519.80 | | 522.7 | 522.1 | 3.40 | 3.30 |
| DMH-605 | | | | | 11.94 | | | | | | | | | 524.6 | 522.1 | 521.6 | | |
| 605 | DMH-605 | FI-608 | | | | 13.17 | 18 | 56 | 0.012 | 0.013 | 6.76 | 519.80 | 519.05 | | 521.6 | 521.0 | 3.30 | 3.15 |
| FI-606 | | | 0.530 | 1.31 | 1.31 | | | | | | | | | 527.8 | 522.0 | 522.0 | | |
| 606 | FI-606 | DMH-607 | | | | 8.63 | 15 | 23 | 0.012 | 0.015 | 5.08 | 521.50 | 521.15 | | 522.0 | 521.7 | 5.05 | 12.10 |
| DMH-607 | | | | | 1.31 | | | | | | | | | 534.5 | 521.7 | 521.6 | | |
| 607 | DMH-607 | FI-608 | | | | 8.60 | 15 | 139 | 0.012 | 0.015 | 5.06 | 521.15 | 519.05 | | 521.6 | 521.0 | 12.10 | 3.40 |
| FI-608 | | | 1.390 | 3.43 | 16.68 | | | | | | | | | 523.7 | 521.0 | 520.5 | | |
| 608 | FI-608 | FI-610 | | | | 33.01 | 24 | 113 | 0.012 | 0.018 | 10.54 | 519.05 | 517.00 | | 520.5 | 519.2 | 2.65 | 1.00 |
| FI-610 | | | 0.990 | 2.44 | 19.12 | | | | | | | | | 520.0 | 519.2 | 518.6 | | |
| 610 | FI-610 | DMH-612 | | | | 42.88 | 24 | 49 | 0.012 | 0.031 | 13.26 | 517.00 | 515.50 | | 518.6 | 516.5 | 1.00 | 2.50 |
| DMH-612 | | | | | 19.12 | | | | | | | | | 520.0 | 517.0 | 516.6 | | |
| 612 | DMH-612 | DMH-613 | | | | 48.06 | 24 | 52 | 0.012 | 0.038 | 14.43 | 515.00 | 513.00 | | 516.6 | 514.0 | 3.00 | 3.20 |
| DMH-613 | | | | | 19.12 | | | | | | | | | 518.2 | 509.5 | 509.1 | | |
| 613 | DMH-613 | SWM #3 | | | | 22.46 | 24 | 119 | 0.012 | 0.008 | 8.03 | 507.50 | 506.50 | | 509.1 | 507.9 | 8.70 | 3.50 |
| SWM #3 | | | | | | | | | | | | | | 512.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 5 - 700 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DMH-740A2 | | | | 56.00 | 56.00 | | | | | | | | | 533.8 | 533.8 | 532.2 | | |
| 740A2 | DMH-740A2 | DMH-740B | | | | 74.05 | 30 | 9 | 0.012 | 0.028 | 11.41 | 527.10 | 526.85 | | 532.2 | 532.0 | 4.20 | 3.95 |
| DMH-740B | | | | | 56.00 | | | | | | | | | 533.3 | 532.0 | 530.4 | | |
| 740A2 | DMH-740B | DMH-740C | | | | 81.93 | 30 | 25 | 0.012 | 0.034 | 11.41 | 526.85 | 526.00 | | 530.4 | 530.0 | 3.95 | 4.60 |
| DMH-740C | | | | | 56.00 | | | | | | | | | 533.1 | 530.0 | 528.8 | | |
| 740C | DMH-740C | DMH-740D | | | | 90.99 | 30 | 62 | 0.012 | 0.042 | 11.41 | 525.60 | 523.00 | | 528.8 | 527.8 | 5.00 | 4.60 |
| DMH-740D | | | | | 56.00 | | | | | | | | | 530.1 | 527.8 | 526.8 | | |
| 740D | DMH-740D | DMH-740E | | | | 61.96 | 30 | 216 | 0.012 | 0.019 | 11.41 | 523.00 | 518.80 | | 526.8 | 523.4 | 4.60 | 12.70 |
| DMH-740E | | | | | 56.00 | | | | | | | | | 534.0 | 523.4 | 521.7 | | |
| 740E | DMH-740E | SWM #5 | | | | 56.39 | 30 | 298 | 0.012 | 0.016 | 11.41 | 518.80 | 514.00 | | 521.7 | 517.0 | 12.70 | 5.50 |
| DMH-740A1 | | | | 92.00 | 92.00 | | | | | | | | | 533.8 | 533.7 | 531.6 | | |
| 740A1 | DMH-740A1 | DMH-741 | | | | 94.87 | 36 | 29 | 0.012 | 0.017 | 13.02 | 527.10 | 526.60 | | 531.6 | 531.1 | 3.70 | 4.10 |
| DMH-741 | | | | | 92.00 | | | | | | | | | 533.7 | 531.1 | 529.5 | | |
| 741 | DMH-741 | DMH-742 | | | | 206.24 | 36 | 54 | 0.012 | 0.081 | 28.35 | 526.60 | 522.20 | | 529.5 | 527.8 | 4.10 | 5.50 |
| DMH-742 | | | | | 92.00 | | | | | | | | | 530.7 | 527.8 | 527.8 | | |
| 742 | DMH-742 | DMH-743 | | | | 92.43 | 36 | 220 | 0.012 | 0.016 | 13.02 | 522.20 | 518.60 | | 527.8 | 524.2 | 5.50 | 15.50 |
| DMH-743 | | | | | 92.00 | | | | | | | | | 537.1 | 524.2 | 522.1 | | |
| 743 | DMH-743 | SWM #5 | | | | 107.28 | 36 | 313 | 0.012 | 0.022 | 13.02 | 518.60 | 511.70 | | 522.1 | 517.0 | 15.50 | 7.30 |
| SWM #5 | | | | | | | | | | | | | | 522.0 | | | | |
| FI-780A | | | 1.320 | 3.46 | 3.46 | | | | | | | | | 594.1 | 587.7 | 587.7 | | |
| 780A | FI-780A | FI-780 | | | | 54.80 | 24 | 199 | 0.012 | 0.05 | 9.75 | 587.05 | 577.10 | | 587.7 | 578.9 | 5.05 | 3.30 |
| FI-780 | | | 4.460 | 11.68 | 15.14 | | | | | | | | | 582.4 | 578.9 | 578.5 | | |
| 780 | FI-780 | FI-781 | | | | 33.50 | 24 | 182 | 0.012 | 0.019 | 10.39 | 577.10 | 573.70 | | 578.5 | 576.8 | 3.30 | 3.10 |
| FI-781 | | | 4.780 | 12.52 | 27.66 | | | | | | | | | 578.8 | 576.8 | 576.2 | | |
| 781 | FI-781 | FI-781A | | | | 32.09 | 24 | 35 | 0.012 | 0.017 | 8.80 | 573.70 | 573.10 | | 576.2 | 575.8 | 3.10 | 4.00 |
| FI-781A | | | 4.020 | 10.53 | 38.19 | | | | | | | | | 579.1 | 575.8 | 575.2 | | |

# Closed Drainge System:
# Closed Drainge System (SWM 5 - 700 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 781A | FI-781A | FI-782 | | | | 54.47 | 30 | 163 | 0.012 | 0.015 | 12.01 | 573.10 | 570.65 | | 575.2 | 573.0 | 3.50 | 7.25 |
| FI-782 | | | 0.070 | 0.18 | 38.37 | | | | | | | | | 580.4 | 573.0 | 572.2 | | |
| 782 | FI-782 | FI-783 | | | | 82.17 | 30 | 174 | 0.012 | 0.034 | 16.45 | 570.15 | 564.20 | | 572.2 | 567.7 | 7.75 | 5.30 |
| FI-783 | | | 5.620 | 14.72 | 53.09 | | | | | | | | | 572.0 | 567.7 | 566.5 | | |
| 783 | FI-783 | FI-784 | | | | 93.47 | 30 | 174 | 0.012 | 0.044 | 19.65 | 564.20 | 556.50 | | 566.5 | 559.0 | 5.30 | 2.30 |
| FI-784 | | | 3.010 | 7.89 | 60.98 | | | | | | | | | 561.3 | 559.0 | 557.8 | | |
| 784 | FI-784 | FI-785 | | | | 85.38 | 30 | 65 | 0.012 | 0.037 | 18.90 | 555.40 | 553.00 | | 557.8 | 554.8 | 3.40 | 3.50 |
| FI-785 | | | 2.640 | 6.92 | 67.90 | | | | | | | | | 559.0 | 552.9 | 550.4 | | |
| 785 | FI-785 | DMH-786A | | | | 89.22 | 30 | 62 | 0.012 | 0.04 | 20.00 | 548.00 | 545.50 | | 550.4 | 547.4 | 8.50 | 4.00 |
| DMH-786A | | | | | 67.90 | | | | | | | | | 552.0 | 542.9 | 541.4 | | |
| 786A | DMH-786A | DMH-786 | | | | 88.28 | 30 | 38 | 0.012 | 0.039 | 19.83 | 539.00 | 537.50 | | 541.4 | 540.5 | 10.50 | 3.00 |
| DMH-786 | | | | | 67.90 | | | | | | | | | 543.0 | 540.5 | 539.3 | | |
| 786 | DMH-786 | DMH-740 | | | | 75.64 | 36 | 73 | 0.012 | 0.011 | 9.61 | 530.30 | 529.50 | | 539.3 | 538.7 | 9.70 | 8.20 |
| FI-700A | | | 0.730 | 2.39 | 2.39 | | | | | | | | | 637.6 | 632.8 | 632.6 | | |
| 700A | FI-700A | FI-700 | | | | 12.12 | 15 | 100 | 0.012 | 0.03 | 7.68 | 632.00 | 629.00 | | 632.6 | 630.0 | 4.35 | 2.75 |
| FI-700 | | | 0.420 | 1.38 | 3.77 | | | | | | | | | 633.0 | 630.0 | 629.8 | | |
| 700 | FI-700 | FI-701 | | | | 15.54 | 15 | 152 | 0.012 | 0.049 | 10.44 | 629.00 | 621.50 | | 629.8 | 622.8 | 2.75 | 3.25 |
| FI-701 | | | 0.590 | 1.93 | 5.70 | | | | | | | | | 626.0 | 622.8 | 622.5 | | |
| 701 | FI-701 | FI-702 | | | | 17.49 | 15 | 192 | 0.012 | 0.063 | 12.74 | 621.50 | 609.50 | | 622.5 | 610.5 | 3.25 | 4.95 |
| FI-702 | | | 0.650 | 2.13 | 7.83 | | | | | | | | | 615.7 | 610.5 | 610.1 | | |
| 702 | FI-702 | FI-703 | | | | 20.69 | 15 | 191 | 0.012 | 0.087 | 15.70 | 609.00 | 592.30 | | 610.1 | 592.8 | 5.45 | 3.75 |
| FI-703 | | | 0.320 | 1.05 | 8.88 | | | | | | | | | 597.3 | 592.5 | 592.0 | | |
| 703 | FI-703 | FI-704 | | | | 27.51 | 15 | 99 | 0.012 | 0.155 | 19.99 | 590.80 | 575.50 | | 592.0 | 576.0 | 5.25 | 3.45 |
| FI-704 | | | 0.100 | 0.33 | 9.21 | | | | | | | | | 580.2 | 576.2 | 575.7 | | |
| 704 | FI-704 | DMH-705 | | | | 23.18 | 15 | 123 | 0.012 | 0.11 | 17.80 | 574.50 | 561.00 | | 575.7 | 561.6 | 4.45 | 3.35 |
| DMH-705 | | | | | 9.21 | | | | | | | | | 565.6 | 561.7 | 561.2 | | |

# Closed Drainge System:
# Closed Drainge System (SWM 5 - 700 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 705 | DMH-705 | DMH-705A | | | | 24.35 | 15 | 71 | 0.012 | 0.121 | 18.47 | 560.00 | 551.40 | | 561.2 | 553.0 | 4.35 | 7.45 |
| DMH-705A | | | | | 9.21 | | | | | | | | | 560.1 | 553.0 | 552.6 | | |
| 705A | DMH-705A | FI-738A | | | | 12.56 | 15 | 90 | 0.012 | 0.032 | 11.18 | 551.40 | 548.50 | | 552.6 | 549.3 | 7.45 | 6.25 |
| FI-732C | | | 0.220 | 0.72 | 0.72 | | | | | | | | | 622.2 | 616.6 | 616.6 | | |
| 732C | FI-732C | CI-732B | | | | 44.74 | 24 | 33 | 0.012 | 0.033 | 5.29 | 616.30 | 615.20 | | 616.6 | 616.1 | 3.90 | 3.90 |
| CI-732B | | | 1.730 | 5.67 | 6.39 | | | | | | | | | 621.1 | 616.1 | 616.1 | | |
| 732B | CI-732B | CI-732A | | | | 54.80 | 24 | 102 | 0.012 | 0.05 | 11.66 | 615.20 | 610.10 | | 616.1 | 611.5 | 3.90 | 6.30 |
| CI-732A | | | 1.370 | 4.49 | 10.88 | | | | | | | | | 618.4 | 611.5 | 611.3 | | |
| 732A | CI-732A | CI-732 | | | | 49.87 | 24 | 99 | 0.012 | 0.041 | 12.70 | 610.10 | 606.00 | | 611.3 | 606.6 | 6.30 | 4.30 |
| FI-730A | | | 0.860 | 2.82 | 2.82 | | | | | | | | | 640.4 | 634.7 | 634.7 | | |
| 730A | FI-730A | FI-730 | | | | 16.16 | 15 | 150 | 0.012 | 0.053 | 9.89 | 634.00 | 626.00 | | 634.7 | 626.4 | 5.15 | 3.75 |
| FE-731E | | | 9.300 | 30.47 | 30.47 | | | | | | | | | 685.1 | 672.6 | 671.9 | | |
| 731E | FE-731E | DMH-731D | | | | 60.84 | 24 | 73 | 0.012 | 0.062 | 19.37 | 670.00 | 665.50 | | 671.9 | 666.6 | 13.10 | 4.70 |
| DMH-731D | | | | | 30.47 | | | | | | | | | 672.2 | 662.6 | 661.4 | | |
| 731D | DMH-731D | DMH-731C | | | | 63.42 | 24 | 112 | 0.012 | 0.067 | 19.98 | 659.50 | 652.00 | | 661.4 | 653.0 | 10.70 | 3.30 |
| DMH-731C | | | | | 30.47 | | | | | | | | | 657.3 | 645.8 | 644.9 | | |
| 731C | DMH-731C | DMH-731B | | | | 59.69 | 24 | 118 | 0.012 | 0.059 | 19.10 | 643.00 | 636.00 | | 644.9 | 637.1 | 12.30 | 2.00 |
| DMH-731B | | | | | 30.47 | | | | | | | | | 640.0 | 631.8 | 630.9 | | |
| 731B | DMH-731B | FI-730 | | | | 55.26 | 24 | 59 | 0.012 | 0.051 | 18.02 | 629.00 | 626.00 | | 630.9 | 627.2 | 9.00 | 3.00 |
| FI-730 | | | 1.380 | 4.52 | 37.81 | | | | | | | | | 631.0 | 624.3 | 622.9 | | |
| 730 | FI-730 | FI-731 | | | | 55.01 | 24 | 127 | 0.012 | 0.05 | 18.87 | 621.00 | 614.60 | | 622.9 | 615.9 | 8.00 | 3.60 |
| FI-731A | | | 0.520 | 1.70 | 1.70 | | | | | | | | | 620.6 | 615.9 | 615.9 | | |
| 731A | FI-731A | FI-731 | | | | 47.83 | 24 | 21 | 0.012 | 0.038 | 7.17 | 615.40 | 614.60 | | 615.9 | 614.9 | 3.20 | 3.60 |
| FI-731 | | | 0.410 | 1.34 | 40.85 | | | | | | | | | 620.2 | 613.6 | 611.5 | | |
| 731 | FI-731 | CI-732 | | | | 57.76 | 24 | 63 | 0.012 | 0.056 | 19.94 | 609.50 | 606.00 | | 611.5 | 607.4 | 8.70 | 4.30 |
| CI-732 | | | 0.250 | 0.82 | 52.55 | | | | | | | | | 612.3 | 603.5 | 602.3 | | |

# Closed Drainge System:
# Closed Drainge System (SWM 5 - 700 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 732 | CI-732 | CI-733 | | | | 112.33 | 30 | 133 | 0.012 | 0.064 | 22.50 | 600.00 | 591.50 | | 602.3 | 594.3 | 9.80 | 4.00 |
| CI-733 | | | 0.430 | 1.41 | 53.96 | | | | | | | | | 598.0 | 594.3 | 593.3 | | |
| 733 | CI-733 | CI-734 | | | | 100.17 | 30 | 61 | 0.012 | 0.051 | 20.79 | 591.00 | 587.90 | | 593.3 | 591.3 | 4.50 | 4.30 |
| CI-734 | | | 0.590 | 1.93 | 55.89 | | | | | | | | | 594.7 | 591.3 | 590.3 | | |
| 734 | CI-734 | CI-735 | | | | 99.35 | 30 | 60 | 0.012 | 0.05 | 20.84 | 587.90 | 584.90 | | 590.3 | 588.8 | 4.30 | 5.80 |
| CI-735 | | | 1.770 | 5.80 | 61.69 | | | | | | | | | 593.2 | 588.8 | 587.5 | | |
| 735 | CI-735 | CI-735A | | | | 72.84 | 30 | 147 | 0.012 | 0.027 | 12.57 | 584.90 | 580.95 | | 587.5 | 584.7 | 5.80 | 6.85 |
| CI-735A | | | 0.520 | 1.70 | 63.39 | | | | | | | | | 590.3 | 584.7 | 583.4 | | |
| 735A | CI-735A | CI-736 | | | | 72.84 | 30 | 147 | 0.012 | 0.027 | 16.72 | 580.95 | 577.00 | | 583.4 | 578.9 | 6.85 | 4.10 |
| CI-736 | | | 0.420 | 1.38 | 64.77 | | | | | | | | | 583.6 | 578.7 | 577.3 | | |
| 736 | CI-736 | CI-736A | | | | 101.96 | 30 | 226 | 0.012 | 0.053 | 22.00 | 574.90 | 563.00 | | 577.3 | 566.9 | 6.20 | 4.50 |
| CI-736A | | | 0.520 | 1.70 | 66.47 | | | | | | | | | 570.0 | 566.9 | 565.4 | | |
| 736A | CI-736A | CI-737 | | | | 102.16 | 30 | 227 | 0.012 | 0.053 | 22.16 | 563.00 | 551.00 | | 565.4 | 552.5 | 4.50 | 5.30 |
| CI-737 | | | 0.580 | 1.90 | 68.37 | | | | | | | | | 558.8 | 552.9 | 552.2 | | |
| 737 | CI-737 | FI-738 | | | | 79.64 | 36 | 107 | 0.012 | 0.012 | 9.67 | 548.30 | 547.00 | | 552.2 | 551.3 | 7.50 | 5.30 |
| FI-738 | | | 0.500 | 1.64 | 70.01 | | | | | | | | | 555.3 | 551.3 | 550.5 | | |
| 738 | FI-738 | FI-738A | | | | 104.84 | 36 | 95 | 0.012 | 0.021 | 9.90 | 547.00 | 545.00 | | 550.5 | 549.6 | 5.30 | 8.00 |
| FI-738A | | | 0.090 | 0.29 | 79.51 | | | | | | | | | 556.0 | 549.6 | 548.2 | | |
| 738A | FI-738A | FI-738B | | | | 102.87 | 36 | 74 | 0.012 | 0.02 | 11.25 | 545.00 | 543.50 | | 548.2 | 547.3 | 8.00 | 10.10 |
| FI-738B | | | 0.060 | 0.20 | 79.71 | | | | | | | | | 556.6 | 547.3 | 546.3 | | |
| 738B | FI-738B | DMH-739A | | | | 128.30 | 36 | 111 | 0.012 | 0.032 | 19.12 | 543.50 | 540.00 | | 546.3 | 541.9 | 10.10 | 3.00 |
| DMH-739A | | | | | 79.71 | | | | | | | | | 546.0 | 540.3 | 539.3 | | |
| 739A | DMH-739A | DMH-740 | | | | 125.15 | 36 | 50 | 0.012 | 0.03 | 11.28 | 535.50 | 534.00 | | 539.3 | 538.7 | 7.50 | 3.70 |
| DMH-740 | | | | | 147.61 | | | | | | | | | 540.7 | 538.7 | 536.1 | | |
| 740A | DMH-740 | DMH-740A | | | | 150.42 | 42 | 126 | 0.012 | 0.019 | 15.34 | 529.50 | 527.10 | | 536.1 | 533.8 | 7.70 | 4.20 |
| DMH-740A | | | | | | | | | | | | | | 534.8 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 5 - 750 Series)

Rainfall: 50 Year Storm

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-750 | | | 1.130 | 5.53 | 5.53 | | | | | | | | | 569.8 | 561.1 | 561.1 | | |
| 750 | FI-750 | FI-751 | | | | 98.80 | 30 | 178 | 0.012 | 0.049 | 10.84 | 560.30 | 551.50 | | 561.1 | 553.3 | 7.00 | 9.50 |
| FI-751 | | | 2.400 | 11.74 | 17.27 | | | | | | | | | 563.5 | 553.3 | 552.9 | | |
| 751 | FI-751 | FI-752 | | | | 67.21 | 30 | 118 | 0.012 | 0.023 | 11.47 | 551.50 | 548.80 | | 552.9 | 550.3 | 9.50 | 2.70 |
| FI-752 | | | 1.190 | 5.82 | 23.09 | | | | | | | | | 554.0 | 550.3 | 550.3 | | |
| 752 | FI-752 | DMH-753 | | | | 96.15 | 30 | 284 | 0.012 | 0.047 | 16.10 | 548.70 | 535.40 | | 550.3 | 537.4 | 2.80 | 4.80 |
| DMH-753 | | | | | 23.09 | | | | | | | | | 542.7 | 537.4 | 537.0 | | |
| 753 | DMH-753 | DMH-754 | | | | 85.78 | 30 | 330 | 0.012 | 0.037 | 14.83 | 535.40 | 523.10 | | 537.0 | 524.0 | 4.80 | 3.70 |
| DMH-754 | | | | | 23.09 | | | | | | | | | 529.3 | 524.7 | 524.7 | | |
| 754 | DMH-754 | SWM #5 | | | | 137.16 | 30 | 85 | 0.012 | 0.095 | 20.77 | 523.10 | 515.00 | | 524.7 | 517.0 | 3.70 | 4.50 |
| SWM #5 | | | | | | | | | | | | | | 522.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 215 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HW-215 | | | 6.180 | 93.80 | 93.80 | | | | | | | | | 514.0 | 512.9 | 512.9 | | |
| 215 | HW-215 | DMH-216 | | | | 303.52 | 36 | 17 | 0.012 | 0.176 | 37.84 | 510.00 | 507.00 | | 512.9 | 508.9 | 1.00 | 3.10 |
| DMH-216 | | | | | 93.80 | | | | | | | | | 513.1 | 508.6 | 506.9 | | |
| 216 | DMH-216 | FI-217 | | | | 107.60 | 36 | 257 | 0.012 | 0.022 | 17.15 | 504.00 | 498.30 | | 506.9 | 502.0 | 6.10 | 0.70 |
| FI-217 | | | | | 93.80 | | | | | | | | | 502.0 | 502.9 | 501.2 | | |
| 217 | FI-217 | SWM #6 | | | | 106.24 | 36 | 37 | 0.012 | 0.022 | 16.97 | 498.30 | 497.50 | | 501.2 | 500.0 | 0.70 | 5.50 |
| SWM #6 | | | | | | | | | | | | | | 506.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 300, 400, 500, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-553A | | | | 0.56 | 0.56 | | | | | | | | | 528.4 | 526.0 | 526.0 | | |
| 553A | FI-553A | FI-553 | | | | 7.04 | 15 | 74 | 0.012 | 0.01 | 3.43 | 525.75 | 525.00 | | 526.0 | 526.1 | 1.40 | 3.15 |
| FI-550 | | | 0.260 | 0.38 | 0.38 | | | | | | | | | 553.3 | 550.7 | 550.7 | | |
| 550 | FI-550 | FI-551 | | | | 7.07 | 15 | 245 | 0.012 | 0.01 | 3.07 | 550.50 | 548.00 | | 550.7 | 548.3 | 1.55 | 2.45 |
| FI-551 | | | 0.060 | 0.09 | 0.47 | | | | | | | | | 551.7 | 548.3 | 548.3 | | |
| 551 | FI-551 | FI-552 | | | | 21.49 | 15 | 228 | 0.012 | 0.094 | 7.12 | 548.00 | 526.50 | | 548.3 | 527.4 | 2.45 | 3.45 |
| FI-552 | | | 2.380 | 2.95 | 3.42 | | | | | | | | | 531.2 | 527.4 | 527.3 | | |
| 552 | FI-552 | FI-553 | | | | 9.96 | 15 | 74 | 0.012 | 0.02 | 7.36 | 526.50 | 525.00 | | 527.3 | 526.1 | 3.45 | 3.15 |
| FI-553 | | | 0.340 | 0.50 | 4.48 | | | | | | | | | 529.4 | 526.1 | 525.9 | | |
| 553 | FI-553 | FI-554 | | | | 11.21 | 15 | 117 | 0.012 | 0.026 | 8.62 | 525.00 | 522.00 | | 525.9 | 523.2 | 3.15 | 4.15 |
| FI-554 | | | 0.450 | 0.66 | 5.14 | | | | | | | | | 527.4 | 523.2 | 522.9 | | |
| 554 | FI-554 | FI-312 | | | | 19.37 | 15 | 62 | 0.012 | 0.077 | 13.34 | 522.00 | 517.25 | | 522.9 | 517.7 | 4.15 | 3.30 |
| FI-309A | | | 0.500 | 0.74 | 0.74 | | | | | | | | | 545.4 | 541.0 | 541.0 | | |
| 309A | FI-309A | FI-309 | | | | 11.06 | 15 | 60 | 0.012 | 0.025 | 5.12 | 540.50 | 539.00 | | 541.0 | 541.0 | 3.65 | 4.25 |
| CI-307A | | | 0.170 | 0.25 | 0.25 | | | | | | | | | 580.4 | 576.2 | 576.2 | | |
| 307A | CI-307A | CI-307 | | | | 17.18 | 15 | 83 | 0.012 | 0.06 | 5.05 | 576.00 | 571.00 | | 576.2 | 571.1 | 3.15 | 2.75 |
| CI-420I | | | | 1.96 | 1.96 | | | | | | | | | 646.4 | 642.4 | 642.3 | | |
| 420I | CI-420I | DMH-420H | | | | 9.92 | 15 | 87 | 0.012 | 0.02 | 6.29 | 641.75 | 640.00 | | 642.3 | 640.4 | 3.40 | 12.05 |
| DMH-420H | | | | | 1.96 | | | | | | | | | 653.3 | 638.7 | 638.6 | | |
| 420H | DMH-420H | DMH-420F | | | | 21.73 | 15 | 83 | 0.012 | 0.096 | 10.98 | 638.00 | 630.00 | | 638.6 | 630.3 | 14.05 | 3.35 |
| DMH-420F | | | | | 1.96 | | | | | | | | | 634.6 | 623.7 | 623.6 | | |
| 420F | DMH-420F | DMH-420D | | | | 20.83 | 15 | 79 | 0.012 | 0.089 | 10.66 | 623.00 | 616.00 | | 623.6 | 616.3 | 10.35 | 3.35 |
| DMH-420D | | | | | 1.96 | | | | | | | | | 620.6 | 614.0 | 613.9 | | |
| 420D | DMH-420D | FI-420C | | | | 9.80 | 15 | 107 | 0.012 | 0.02 | 6.24 | 613.30 | 611.20 | | 613.9 | 612.0 | 6.05 | 2.65 |
| FI-420C | | | 1.310 | 1.93 | 3.89 | | | | | | | | | 615.1 | 612.0 | 612.0 | | |
| 420C | FI-420C | FI-420B | | | | 7.56 | 15 | 60 | 0.012 | 0.012 | 6.20 | 611.20 | 610.50 | | 612.0 | 611.7 | 2.65 | 2.85 |

Rainfall: 50 Year Storm

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 300, 400, 500, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-420B | | | 2.430 | 1.62 | 5.51 | | | | | | | | | 614.6 | 611.7 | 611.5 | | |
| 420B | FI-420B | FI-420A | | | | 7.30 | 15 | 322 | 0.012 | 0.011 | 6.53 | 610.50 | 607.00 | | 611.5 | 608.2 | 2.85 | 4.75 |
| FI-420A | | | 0.610 | 0.90 | 6.41 | | | | | | | | | 613.0 | 608.2 | 608.1 | | |
| 420A | FI-420A | FI-420 | | | | 13.94 | 18 | 100 | 0.012 | 0.015 | 7.72 | 607.00 | 605.50 | | 608.1 | 607.9 | 4.50 | 3.10 |
| FI-420 | | | 0.560 | 0.83 | 13.65 | | | | | | | | | 610.1 | 607.9 | 607.3 | | |
| 420 | FI-420 | FI-421 | | | | 15.38 | 18 | 93 | 0.012 | 0.018 | 7.72 | 605.50 | 603.80 | | 607.3 | 606.0 | 3.10 | 8.20 |
| FI-421 | | | 0.140 | 0.21 | 13.86 | | | | | | | | | 613.5 | 606.0 | 605.2 | | |
| 421 | FI-421 | FI-422 | | | | 35.50 | 18 | 188 | 0.012 | 0.097 | 18.84 | 603.80 | 585.50 | | 605.2 | 586.9 | 8.20 | 3.20 |
| FI-422 | | | 0.240 | 0.35 | 14.21 | | | | | | | | | 590.2 | 586.9 | 586.4 | | |
| 422 | FI-422 | FI-423 | | | | 35.24 | 18 | 73 | 0.012 | 0.096 | 18.87 | 585.00 | 578.00 | | 586.4 | 582.7 | 3.70 | 3.50 |
| FI-423 | | | 0.380 | 0.56 | 14.77 | | | | | | | | | 583.0 | 582.7 | 582.0 | | |
| 423 | FI-423 | FI-424 | | | | 14.99 | 18 | 144 | 0.012 | 0.017 | 8.36 | 578.00 | 575.50 | | 582.0 | 579.6 | 3.50 | 3.80 |
| FI-424 | | | 0.750 | 1.11 | 15.88 | | | | | | | | | 580.8 | 579.6 | 578.8 | | |
| 424 | FI-424 | FI-425 | | | | 16.17 | 18 | 109 | 0.012 | 0.02 | 8.99 | 575.50 | 573.30 | | 578.8 | 576.7 | 3.80 | 3.40 |
| FI-425 | | | 0.240 | 0.35 | 16.23 | | | | | | | | | 578.2 | 576.7 | 575.9 | | |
| 425 | FI-425 | CI-306 | | | | 18.73 | 18 | 48 | 0.012 | 0.027 | 9.18 | 573.30 | 572.00 | | 575.9 | 574.9 | 3.40 | 3.10 |
| CI-401 | | | 2.320 | 3.43 | 3.43 | | | | | | | | | 648.0 | 644.8 | 644.8 | | |
| 401 | CI-401 | CI-402 | | | | 23.38 | 15 | 215 | 0.012 | 0.112 | 13.62 | 644.00 | 620.00 | | 644.8 | 621.2 | 2.75 | 2.75 |
| CI-402 | | | 1.510 | 2.23 | 5.66 | | | | | | | | | 624.0 | 621.2 | 621.0 | | |
| 402 | CI-402 | CI-403 | | | | 17.49 | 15 | 136 | 0.012 | 0.063 | 12.72 | 620.00 | 611.50 | | 621.0 | 612.8 | 2.75 | 2.25 |
| CI-403 | | | 0.540 | 0.80 | 6.46 | | | | | | | | | 615.0 | 612.8 | 612.5 | | |
| 403 | CI-403 | CI-403A | | | | 11.81 | 15 | 65 | 0.012 | 0.028 | 9.84 | 611.50 | 609.65 | | 612.5 | 611.0 | 2.25 | 2.90 |
| CI-403A | | | | 0.49 | 6.95 | | | | | | | | | 613.8 | 611.0 | 610.7 | | |
| 403A | CI-403A | CI-404 | | | | 11.70 | 15 | 59 | 0.012 | 0.028 | 9.94 | 609.65 | 608.00 | | 610.7 | 609.6 | 2.90 | 3.65 |
| CI-404 | | | | 0.53 | 7.48 | | | | | | | | | 612.9 | 609.6 | 609.1 | | |
| 404 | CI-404 | FI-405 | | | | 21.60 | 15 | 42 | 0.012 | 0.095 | 15.99 | 608.00 | 604.00 | | 609.1 | 605.7 | 3.65 | 2.05 |

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 300, 400, 500, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-405 | | | 0.120 | 0.18 | 7.66 | | | | | | | | | 607.3 | 605.7 | 605.1 | | |
| 405 | FI-405 | FI-303 | | | | 8.28 | 15 | 50 | 0.012 | 0.014 | 7.66 | 604.00 | 603.30 | | 605.1 | 604.6 | 2.05 | 3.15 |
| FI-302A | | | 0.280 | 0.41 | 0.41 | | | | | | | | | 614.9 | 610.4 | 610.4 | | |
| 302A | FI-302A | CI-302 | | | | 9.97 | 15 | 32 | 0.012 | 0.02 | 4.00 | 610.15 | 609.50 | | 610.4 | 610.1 | 3.50 | 3.35 |
| CI-301A | | | 0.110 | 0.16 | 0.16 | | | | | | | | | 621.2 | 616.6 | 616.6 | | |
| 301A | CI-301A | CI-301 | | | | 12.12 | 15 | 80 | 0.012 | 0.03 | 3.44 | 616.40 | 614.00 | | 616.6 | 614.3 | 3.55 | 3.25 |
| CI-301 | | | 0.220 | 0.32 | 0.48 | | | | | | | | | 618.5 | 614.3 | 614.3 | | |
| 301 | CI-301 | CI-302 | | | | 13.96 | 15 | 113 | 0.012 | 0.04 | 5.31 | 614.00 | 609.50 | | 614.3 | 610.1 | 3.25 | 3.35 |
| CI-302 | | | 0.240 | 0.35 | 1.24 | | | | | | | | | 614.1 | 610.1 | 609.9 | | |
| 302 | CI-302 | FI-303 | | | | 18.17 | 15 | 92 | 0.012 | 0.067 | 8.46 | 609.50 | 603.30 | | 609.9 | 604.6 | 3.35 | 3.15 |
| FI-303 | | | 0.240 | 0.35 | 9.25 | | | | | | | | | 607.7 | 604.6 | 604.2 | | |
| 303 | FI-303 | CI-304 | | | | 32.95 | 18 | 167 | 0.012 | 0.084 | 16.00 | 603.00 | 589.00 | | 604.2 | 590.6 | 3.20 | 3.20 |
| CI-304 | | | 0.630 | 0.93 | 10.18 | | | | | | | | | 593.7 | 590.6 | 590.2 | | |
| 304 | CI-304 | CI-305 | | | | 41.01 | 18 | 77 | 0.012 | 0.13 | 19.25 | 589.00 | 579.00 | | 590.2 | 580.7 | 3.20 | 3.50 |
| CI-305 | | | 0.130 | 0.19 | 10.37 | | | | | | | | | 584.0 | 580.7 | 580.2 | | |
| 305 | CI-305 | CI-306 | | | | 32.33 | 18 | 83 | 0.012 | 0.081 | 16.29 | 579.00 | 572.30 | | 580.2 | 574.9 | 3.50 | 2.80 |
| CI-306 | | | 0.120 | 0.18 | 26.78 | | | | | | | | | 576.6 | 574.9 | 573.8 | | |
| 306 | CI-306 | CI-307 | | | | 36.13 | 24 | 92 | 0.012 | 0.022 | 12.59 | 572.00 | 570.00 | | 573.8 | 571.3 | 2.60 | 3.00 |
| CI-307 | | | 0.380 | 0.56 | 27.59 | | | | | | | | | 575.0 | 569.0 | 567.8 | | |
| 307 | CI-307 | FI-308A | | | | 63.81 | 24 | 59 | 0.012 | 0.068 | 19.57 | 566.00 | 562.00 | | 567.8 | 563.0 | 7.00 | 2.50 |
| FI-308A | | | | | 27.59 | | | | | | | | | 566.5 | 557.0 | 556.3 | | |
| 308A | FI-308A | FI-308 | | | | 63.27 | 24 | 60 | 0.012 | 0.067 | 19.45 | 554.50 | 550.50 | | 556.3 | 551.5 | 10.00 | 4.80 |
| FI-308 | | | 0.590 | 0.87 | 28.46 | | | | | | | | | 557.3 | 548.7 | 547.8 | | |
| 308 | FI-308 | FI-309 | | | | 63.89 | 24 | 103 | 0.012 | 0.068 | 19.75 | 546.00 | 539.00 | | 547.8 | 541.0 | 9.30 | 3.50 |
| FI-309 | | | 0.160 | 0.24 | 29.44 | | | | | | | | | 544.5 | 541.0 | 539.9 | | |
| 309 | FI-309 | FI-310 | | | | 63.27 | 24 | 165 | 0.012 | 0.067 | 19.78 | 538.00 | 527.00 | | 539.9 | 529.9 | 4.50 | 3.50 |

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 300, 400, 500, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-310 | | | 1.500 | 2.22 | 31.66 | | | | | | | | | 532.5 | 529.9 | 528.9 | | |
| 310 | FI-310 | FI-311 | | | | 50.73 | 24 | 105 | 0.012 | 0.043 | 17.03 | 527.00 | 522.50 | | 528.9 | 523.7 | 3.50 | 3.00 |
| FI-506C | | | | 0.27 | 0.27 | | | | | | | | | 563.0 | 557.2 | 557.2 | | |
| 506C | FI-506C | FI-506B | | | | 8.17 | 15 | 165 | 0.012 | 0.014 | 3.07 | 557.00 | 554.75 | | 557.2 | 554.9 | 4.75 | 3.10 |
| FI-506B | | | 0.080 | 0.28 | 0.55 | | | | | | | | | 559.1 | 554.6 | 554.5 | | |
| 506B | FI-506B | FI-506A | | | | 9.97 | 15 | 32 | 0.012 | 0.02 | 4.36 | 554.25 | 553.60 | | 554.5 | 554.2 | 3.60 | 4.35 |
| FI-506A | | | 0.370 | 0.12 | 0.67 | | | | | | | | | 559.2 | 554.2 | 554.2 | | |
| 506A | FI-506A | FI-506 | | | | 10.07 | 15 | 58 | 0.012 | 0.021 | 4.65 | 553.60 | 552.40 | | 554.2 | 554.2 | 4.35 | 6.45 |
| YI-2004 | | | 0.990 | 1.46 | 1.46 | | | | | | | | | 583.5 | 580.2 | 580.2 | | |
| 2004 | YI-2004 | YI-2003 | | | | 7.12 | 15 | 82 | 0.012 | 0.01 | 4.56 | 579.75 | 578.90 | | 580.2 | 580.2 | 2.50 | 3.35 |
| YI-2003 | | | 0.310 | 0.46 | 1.92 | | | | | | | | | 583.5 | 580.2 | 580.1 | | |
| 2003 | YI-2003 | YI-2002 | | | | 7.18 | 15 | 57 | 0.012 | 0.011 | 4.96 | 579.50 | 578.90 | | 580.1 | 579.6 | 2.75 | 4.45 |
| YI-2002 | | | 0.310 | 0.46 | 2.38 | | | | | | | | | 584.6 | 579.6 | 579.5 | | |
| 2002 | YI-2002 | YI-2001 | | | | 7.17 | 15 | 62 | 0.012 | 0.01 | 5.25 | 578.90 | 578.25 | | 579.5 | 579.1 | 4.45 | 5.10 |
| YI-2001 | | | 0.290 | 0.43 | 2.81 | | | | | | | | | 584.6 | 579.1 | 578.9 | | |
| 2001 | YI-2001 | FI-502 | | | | 8.58 | 15 | 133 | 0.012 | 0.015 | 6.26 | 578.25 | 576.25 | | 578.9 | 576.7 | 5.10 | 1.00 |
| FI-501 | | | 1.930 | 2.85 | 2.85 | | | | | | | | | 578.5 | 576.2 | 576.2 | | |
| 501 | FI-501 | FI-502 | | | | 5.86 | 15 | 107 | 0.012 | 0.007 | 4.74 | 575.25 | 574.50 | | 576.2 | 576.0 | 2.00 | 2.75 |
| FI-502 | | | 0.790 | 1.17 | 6.83 | | | | | | | | | 578.5 | 576.0 | 575.6 | | |
| 502 | FI-502 | FI-503 | | | | 7.68 | 15 | 141 | 0.012 | 0.012 | 7.07 | 574.50 | 572.80 | | 575.6 | 574.2 | 2.75 | 8.45 |
| FI-503 | | | 0.040 | 0.06 | 6.89 | | | | | | | | | 582.5 | 574.2 | 573.9 | | |
| 503 | FI-503 | FI-504 | | | | 7.80 | 15 | 145 | 0.012 | 0.012 | 7.17 | 572.80 | 571.00 | | 573.9 | 572.4 | 8.45 | 7.75 |
| FI-504C | | | | 0.16 | 0.16 | | | | | | | | | 581.4 | 576.9 | 576.9 | | |
| 504C | FI-504C | FI-504B | | | | 9.90 | 15 | 50 | 0.012 | 0.02 | 3.00 | 576.75 | 575.75 | | 576.9 | 576.0 | 3.40 | 4.20 |
| FI-504B | | | | 0.21 | 0.37 | | | | | | | | | 581.2 | 576.0 | 576.0 | | |
| 504B | FI-504B | FI-504A | | | | 9.96 | 15 | 79 | 0.012 | 0.02 | 3.87 | 575.75 | 574.15 | | 576.0 | 574.5 | 4.20 | 4.10 |

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 300, 400, 500, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-504A | | | | 0.22 | 0.59 | | | | | | | | | 579.5 | 574.5 | 574.5 | | |
| 504A | FI-504A | FI-504 | | | | 10.00 | 15 | 49 | 0.012 | 0.02 | 4.46 | 574.15 | 573.15 | | 574.5 | 573.4 | 4.10 | 5.60 |
| FI-504 | | | 0.610 | 0.90 | 8.38 | | | | | | | | | 580.0 | 572.4 | 572.1 | | |
| 504 | FI-504 | FI-505 | | | | 25.08 | 18 | 175 | 0.012 | 0.049 | 12.77 | 571.00 | 562.50 | | 572.1 | 564.0 | 7.50 | 3.00 |
| FI-505 | | | 0.690 | 0.41 | 8.79 | | | | | | | | | 567.0 | 564.0 | 563.7 | | |
| 505 | FI-505 | FI-506 | | | | 27.98 | 18 | 167 | 0.012 | 0.06 | 14.01 | 562.50 | 552.40 | | 563.7 | 554.2 | 3.00 | 6.20 |
| FI-506 | | | 0.170 | 0.25 | 9.71 | | | | | | | | | 560.1 | 554.2 | 553.6 | | |
| 506 | FI-506 | FI-507 | | | | 41.33 | 18 | 72 | 0.012 | 0.132 | 19.11 | 552.40 | 542.90 | | 553.6 | 545.4 | 6.20 | 4.30 |
| FI-507 | | | 0.210 | 0.31 | 10.02 | | | | | | | | | 548.7 | 545.4 | 545.1 | | |
| 507 | FI-507 | FI-508 | | | | 10.15 | 18 | 239 | 0.012 | 0.008 | 5.67 | 542.90 | 541.00 | | 545.1 | 543.2 | 4.30 | 5.40 |
| FI-508 | | | 2.650 | 3.91 | 13.93 | | | | | | | | | 547.9 | 543.2 | 542.7 | | |
| 508 | FI-508 | DMH-509 | | | | 14.90 | 18 | 70 | 0.012 | 0.017 | 7.88 | 541.00 | 539.80 | | 542.7 | 541.6 | 5.40 | 9.90 |
| DMH-509 | | | | | 13.93 | | | | | | | | | 551.2 | 541.6 | 541.0 | | |
| 509 | DMH-509 | DMH-509A | | | | 24.56 | 18 | 73 | 0.012 | 0.047 | 14.33 | 539.60 | 536.20 | | 541.0 | 537.1 | 10.10 | 2.30 |
| DMH-509A | | | | | 13.93 | | | | | | | | | 540.0 | 533.0 | 532.4 | | |
| 509A | DMH-509A | FI-311 | | | | 37.70 | 18 | 82 | 0.012 | 0.11 | 19.73 | 531.00 | 522.00 | | 532.4 | 524.0 | 7.50 | 4.00 |
| FI-450 | | | 1.280 | 1.89 | 1.89 | | | | | | | | | 558.0 | 554.6 | 554.6 | | |
| 450 | FI-450 | FI-451 | | | | 8.30 | 15 | 71 | 0.012 | 0.014 | 5.48 | 554.00 | 553.00 | | 554.6 | 553.7 | 2.75 | 2.75 |
| FI-451 | | | 0.220 | 0.32 | 2.21 | | | | | | | | | 557.0 | 553.7 | 553.6 | | |
| 451 | FI-451 | FI-452 | | | | 15.98 | 15 | 211 | 0.012 | 0.052 | 9.15 | 553.00 | 542.00 | | 553.6 | 542.9 | 2.75 | 3.95 |
| FI-452 | | | 0.700 | 1.03 | 3.24 | | | | | | | | | 547.2 | 542.9 | 542.7 | | |
| 452 | FI-452 | FI-453 | | | | 16.45 | 15 | 143 | 0.012 | 0.055 | 10.42 | 542.00 | 534.10 | | 542.7 | 535.0 | 3.95 | 6.15 |
| FI-453 | | | 0.160 | 0.24 | 3.48 | | | | | | | | | 541.5 | 535.0 | 534.9 | | |
| 453 | FI-453 | FI-454 | | | | 18.51 | 15 | 130 | 0.012 | 0.07 | 11.57 | 534.10 | 525.00 | | 534.9 | 526.1 | 6.15 | 3.05 |
| FI-454 | | | 0.250 | 0.37 | 3.85 | | | | | | | | | 529.3 | 526.1 | 525.8 | | |
| 454 | FI-454 | FI-311 | | | | 10.23 | 15 | 117 | 0.012 | 0.021 | 7.75 | 525.00 | 522.50 | | 525.8 | 524.0 | 3.05 | 3.75 |

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 300, 400, 500, and 2000 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-311 | | | 0.410 | 0.61 | 50.05 | | | | | | | | | 527.5 | 524.0 | 522.3 | | |
| 311 | FI-311 | FI-312 | | | | 85.91 | 30 | 107 | 0.012 | 0.037 | 18.17 | 520.00 | 516.00 | | 522.3 | 517.5 | 5.00 | 3.30 |
| FI-312 | | | 0.660 | 0.97 | 56.16 | | | | | | | | | 521.8 | 518.1 | 516.4 | | |
| 312 | FI-312 | FI-313 | | | | 90.81 | 30 | 158 | 0.012 | 0.042 | 19.47 | 514.00 | 507.40 | | 516.4 | 510.9 | 5.30 | 3.10 |
| FI-313 | | | 0.450 | 0.66 | 56.82 | | | | | | | | | 513.0 | 510.9 | 509.8 | | |
| 313 | FI-313 | FI-314 | | | | 77.67 | 30 | 144 | 0.012 | 0.031 | 17.28 | 507.40 | 503.00 | | 509.8 | 504.7 | 3.10 | 3.00 |
| FI-314 | | | 0.810 | 1.20 | 58.02 | | | | | | | | | 508.5 | 503.2 | 501.9 | | |
| 314 | FI-314 | SWM #6 | | | | 72.08 | 30 | 57 | 0.012 | 0.026 | 16.33 | 499.50 | 498.00 | | 501.9 | 499.9 | 6.50 | 5.50 |
| SWM #6 | | | | | | | | | | | | | | 506.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (SWM 6 - 320 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow ($ft^3/s$) | System Flow ($ft^3/s$) | Capacity (Full Flow) ($ft^3/s$) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-320 | | | 0.570 | 0.84 | 0.84 | | | | | | | | | 506.8 | 503.4 | 503.4 | | |
| 320 | FI-320 | FI-321 | | | | 6.28 | 15 | 62 | 0.012 | 0.008 | 3.56 | 503.00 | 502.50 | | 503.4 | 503.2 | 2.55 | 2.95 |
| FI-321 | | | 0.680 | 1.00 | 1.84 | | | | | | | | | 506.7 | 503.2 | 503.0 | | |
| 321 | FI-321 | FI-322 | | | | 7.13 | 15 | 53 | 0.012 | 0.01 | 4.87 | 502.50 | 501.95 | | 503.0 | 502.6 | 2.95 | 4.90 |
| FI-322 | | | 0.010 | 0.01 | 1.85 | | | | | | | | | 508.1 | 502.6 | 502.5 | | |
| 322 | FI-322 | SWM #6 | | | | 9.97 | 15 | 96 | 0.012 | 0.02 | 6.21 | 501.95 | 500.00 | | 502.5 | 500.4 | 4.90 | 4.75 |
| SWM #6 | | | | | | | | | | | | | | 506.0 | | | | |

# Closed Drainge System:
# Closed Drainge System (Wetland E-2 - 200 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-203 | | | 1.520 | 0.64 | 0.64 | | | | | | | | | 589.1 | 585.4 | 585.4 | | |
| 203 | FI-203 | DMH-205B1 | | | | 2.69 | 8 | 190 | 0.012 | 0.042 | 6.32 | 585.00 | 577.00 | | 585.4 | 577.2 | 3.43 | 5.83 |
| EX-205E | | | 5.530 | 118.36 | 118.36 | | | | | | | | | 612.7 | 612.3 | 612.3 | | |
| 205E | EX-205E | DMH-205D | | | | 166.86 | 36 | 45 | 0.012 | 0.053 | 25.61 | 609.30 | 606.90 | | 612.3 | 609.2 | 0.40 | 1.00 |
| DMH-205D | | | | | 118.36 | | | | | | | | | 610.9 | 606.6 | 604.0 | | |
| 205D | DMH-205D | DMH-205C1 | | | | 165.04 | 36 | 115 | 0.012 | 0.052 | 25.39 | 601.00 | 595.00 | | 604.0 | 597.1 | 6.90 | 3.00 |
| FI-200 | | | 0.410 | 0.17 | 0.17 | | | | | | | | | 613.8 | 608.2 | 608.2 | | |
| 200 | FI-200 | DMH-201 | | | | 12.99 | 15 | 87 | 0.012 | 0.034 | 3.68 | 608.00 | 605.00 | | 608.2 | 605.1 | 4.55 | 4.55 |
| C-121 | | | 95.410 | 44.14 | 44.14 | | | | | | | | | 625.0 | 624.2 | 621.8 | | |
| 201A | C-121 | DMH-201 | | | | 70.70 | 24 | 149 | 0.012 | 0.083 | 23.74 | 619.80 | 607.40 | | 621.8 | 608.6 | 3.20 | 1.40 |
| DMH-201 | | | | | 44.31 | | | | | | | | | 610.8 | 604.5 | 602.0 | | |
| 201 | DMH-201 | DMH-205C1 | | | | 47.26 | 24 | 242 | 0.012 | 0.037 | 17.10 | 600.00 | 591.00 | | 602.0 | 592.6 | 8.80 | 8.00 |
| DMH-205C1 | | | | | 162.67 | | | | | | | | | 601.0 | 592.7 | 590.4 | | |
| 205C1 | DMH-205C1 | DMH-205C | | | | 227.26 | 42 | 115 | 0.012 | 0.043 | 25.68 | 587.00 | 582.00 | | 590.4 | 584.5 | 10.50 | 8.40 |
| DMH-205C | | | | | 162.67 | | | | | | | | | 593.9 | 585.1 | 582.4 | | |
| 205C | DMH-205C | DMH-205B1 | | | | 259.79 | 42 | 88 | 0.012 | 0.057 | 28.50 | 579.00 | 574.00 | | 582.4 | 576.4 | 11.40 | 6.00 |
| DMH-205B1 | | | | | 163.31 | | | | | | | | | 583.5 | 572.1 | 569.4 | | |
| 205B1 | DMH-205B1 | DMH-205B | | | | 249.31 | 42 | 86 | 0.012 | 0.052 | 27.63 | 566.00 | 561.50 | | 569.4 | 564.0 | 14.00 | 2.30 |
| DMH-205B | | | | | 163.31 | | | | | | | | | 567.3 | 558.7 | 556.4 | | |
| 205B | DMH-205B | DMH-205A | | | | 231.41 | 42 | 122 | 0.012 | 0.045 | 26.07 | 553.00 | 547.50 | | 556.4 | 550.0 | 10.80 | 2.00 |
| DMH-205A | | | | | 163.31 | | | | | | | | | 553.0 | 544.7 | 542.4 | | |
| 205A | DMH-205A | FES-206 | | | | 172.87 | 42 | 159 | 0.012 | 0.025 | 20.44 | 539.00 | 535.00 | | 542.4 | 537.9 | 10.50 | 0.30 |
| FES-206 | | | | | | | | | | | | | | 538.8 | | | | |

Rainfall: 50 Year Storm

# Closed Drainge System:
# Closed Drainge System (Wetland L-LL - 650 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-650 | | | 0.040 | 0.16 | 0.16 | | | | | | | | | 516.3 | 510.8 | 510.8 | | |
| 650 | FI-650 | FI-651 | | | | 8.72 | 15 | 74 | 0.012 | 0.016 | 2.73 | 510.65 | 509.50 | | 510.8 | 509.8 | 4.40 | 2.95 |
| FI-651 | | | 0.060 | 0.24 | 0.40 | | | | | | | | | 513.7 | 509.8 | 509.8 | | |
| 651 | FI-651 | FI-652 | | | | 8.71 | 15 | 42 | 0.012 | 0.015 | 3.60 | 509.50 | 508.85 | | 509.8 | 509.2 | 2.95 | 2.70 |
| FI-652 | | | 0.030 | 0.12 | 0.52 | | | | | | | | | 512.8 | 509.2 | 509.1 | | |
| 652 | FI-652 | FI-653 | | | | 8.51 | 15 | 71 | 0.012 | 0.015 | 3.84 | 508.85 | 507.80 | | 509.1 | 508.2 | 2.70 | 2.35 |
| FI-653 | | | 0.070 | 0.28 | 0.80 | | | | | | | | | 511.4 | 508.2 | 508.2 | | |
| 653 | FI-653 | FI-654 | | | | 9.90 | 15 | 115 | 0.012 | 0.02 | 4.84 | 507.80 | 505.50 | | 508.2 | 506.0 | 2.35 | 2.55 |
| FI-654 | | | 0.090 | 0.36 | 1.16 | | | | | | | | | 509.3 | 506.0 | 505.9 | | |
| 654 | FI-654 | DMH-655 | | | | 8.03 | 15 | 38 | 0.012 | 0.013 | 4.65 | 505.50 | 505.00 | | 505.9 | 505.3 | 2.55 | 1.15 |
| DMH-655 | | | | | 1.16 | | | | | | | | | 507.4 | 504.0 | 503.9 | | |
| 655 | DMH-655 | FES-657 | | | | 25.67 | 15 | 26 | 0.012 | 0.135 | 10.58 | 503.50 | 500.00 | | 503.9 | 500.2 | 2.65 | 0.15 |
| FES-657 | | | | | | | | | | | | | | 501.4 | | | | |

# Closed Drainge System:
# Closed Drainge System (Wetland P - 850 Series)

| Label | Start Node | Stop Node | Inlet Drainage Area (acres) | Inlet Flow (ft³/s) | System Flow (ft³/s) | Capacity (Full Flow) (ft³/s) | Diameter (in) | Length (Unified) (ft) | Manning's n | Slope (ft/ft) | Velocity (Average) (ft/s) | Invert (Upstream) (ft) | Invert (Downstream) (ft) | Elevation (Rim) (ft) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Cover (Start) (ft) | Cover (Stop) (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FI-850 | | | 4.880 | 15.10 | 15.10 | | | | | | | | | 630.1 | 626.7 | 626.4 | | |
| 850 | FI-850 | FI-850A | | | | 60.64 | 24 | 98 | 0.012 | 0.061 | 16.03 | 625.00 | 619.00 | | 626.4 | 621.2 | 3.10 | 3.60 |
| FI-850A | | | 2.320 | 7.18 | 22.28 | | | | | | | | | 624.6 | 621.2 | 620.7 | | |
| 850A | FI-850A | CI-850B | | | | 63.89 | 24 | 103 | 0.012 | 0.068 | 18.52 | 619.00 | 612.00 | | 620.7 | 614.3 | 3.60 | 5.00 |
| CI-850B | | | 3.410 | 10.55 | 32.83 | | | | | | | | | 619.0 | 614.3 | 612.9 | | |
| 805B | CI-850B | FI-851 | | | | 52.25 | 24 | 22 | 0.012 | 0.045 | 17.57 | 611.00 | 610.00 | | 612.9 | 611.5 | 6.00 | 7.10 |
| FI-851 | | | | 0.00 | 32.83 | | | | | | | | | 619.1 | 605.9 | 605.9 | | |
| 851 | FI-851 | FES-852 | | | | 57.76 | 24 | 36 | 0.012 | 0.056 | 18.98 | 604.00 | 602.00 | | 605.9 | 603.3 | 13.10 | 0.20 |
| FES-852 | | | | | | | | | | | | | | 604.2 | | | | |

# Attachment G
# Permeable Paver Calculations

VHB Engineering, Surveying and
Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

**Date:** 1/12/2015
**Project:** Silo Ridge
**Project No:** 29011

**Calculated By:** JC
**Checked By:**

# Permeable Paver Design -Proposed Parking Lot by Tennis Court

## Step 1: Compute Preliminary Runoff Control Volumes

### Water Quality Volume Calculations

*NYSDEC Required Water Quality Volume (WQv):*

| | | |
|---|---|---|
| P: | 2.8 | = 1-year Rainfall Precipitation (in.) |
| CN: | 98.00 | = CN value for developed condition |
| Q: | 2.57 | = 1-year runoff (in.) |
| A: | 0.53 | = Site Area to Basin (in acres) |

S= 1000/cn -10
S= 0.2

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q= 2.57

WQv: **0.113** = Req'd Water Quality Volume (in ac-ft)

$$= \frac{(Q)(A)}{12}$$

**4942.802 cu. Ft.**

## Step 2: Calculate the available storage volume in the storage reserviour

Storage Volume = A * n * dt
where:
n = porosity = 0.4
dt= gravel bed/reservior depth = 1.25 ft
Storage Volume = 0.265 ac-ft

**Storage Volume = 11543.4 cu ft** **>** **4943** **(ok)**

## Step 3: Determine Storage Available for Treatment of Additional Impervious Area or Higher Storm

Available Storage = Reservior Storage Volume - WQv
Available Storage = 11543 - 4943
**Available Storage = 6601 cu. ft.**

## Step 4: Determine Height WQv Would Reach Within the Storage Chamber

d = WQv / A /0.4

$$\frac{0.113}{0.53 \times 0.4}$$

d = 0.5 ft
**d = 6.4 inches**

# Attachment H
# Construction Sequence Plans

## Construction Sequence Volume Analysis

| Golf Phase | Cut ($yd^3$) | Fill ($yd^3$) | Net Difference |
|---|---|---|---|
| G1 | 61568 | 170875 | -109307 |
| G2 | 167945 | 36164 | 131780 |
| G3 | 85481 | 73282 | 12199 |
| G4 | 87402 | 57246 | 30157 |
| G5 | 7377 | 6997 | 380 |
| G6 | 115940 | 100878 | 15063 |
| **Golf Total** | **525712.66** | **445441.921** | **80270.739** |

## Construction Sequence Volume Analysis

| Development Phase | Cut ($yd^3$) | Fill ($yd^3$) | Net Difference |
|---|---|---|---|
| D1 | 28053 | 11629 | 16425 |
| D2 | 72514 | 53783 | 18732 |
| D3 | 9730 | 38826 | -29096 |
| D4 | 9028 | 12980 | -3953 |
| D5 | 1621 | 324 | 1297 |
| D6 | 334 | 823 | -490 |
| D7 | 6584 | 205 | 6380 |
| D8 | 2234 | 337 | 1897 |
| D9 | 4076 | 1014 | 3062 |
| D10 | 2653 | 689 | 1965 |
| D11 | 121 | 25932 | -25811 |
| D12 | 12621 | 8857 | 3763 |
| D13 | 7157 | 41622 | -34465 |
| D14 | 9519 | 6980 | 2539 |
| D15 | 6370 | 3558 | 2812 |
| D16 | 60483 | 18639 | 41844 |
| D17 | 2112 | 55814 | -53703 |
| D18 | 4587 | 134449 | -129862 |
| D19 | 34244 | 3568 | 30676 |
| D20 | 33010 | 11464 | 21546 |
| D21 | 14250 | 7222 | 7028 |
| D22 | 4133 | 14302 | -10169 |
| D23 | 24706 | 8897 | 15809 |
| D24 | 3125 | 3483 | -358 |
| D25 | 66661 | 63880 | 2781 |
| D26 | 486 | 8846 | -8360 |
| D27 | 1187 | 0 | 1187 |
| **Development Total** | **421602** | **538124** | **-116523** |
| | | | |
| **Total Project** | **947314** | **983566** | **-36252** |

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# Note

1. REFER TO THE "SILO RIDGE GOLF COURSE GOLF IMPROVEMENTS PLANS" AND SWPPP FOR ALL GOLF COURSE WORK COVERED UNDER THE SPDES PERMIT IDENTIFICATION NUMBER NYR 10X567.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Completed Golf Phase Plan

## Phasing Summary

| Phase | Area (AC) |
|---|---|
| 1A | 20.0 |
| 1B | 18.4 |
| 1C | 17.1 |

## Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


N

400 0 400 800

SCALE IN FEET

**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Golf Phase 1 Plan
Total Disturbance = 62.9 AC

## Phasing Summary

| Phase | Area (AC) |
|---|---|
| 2A | 15.1 |
| 2B | 11.1 |
| 2C | 10.1 |

## Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.

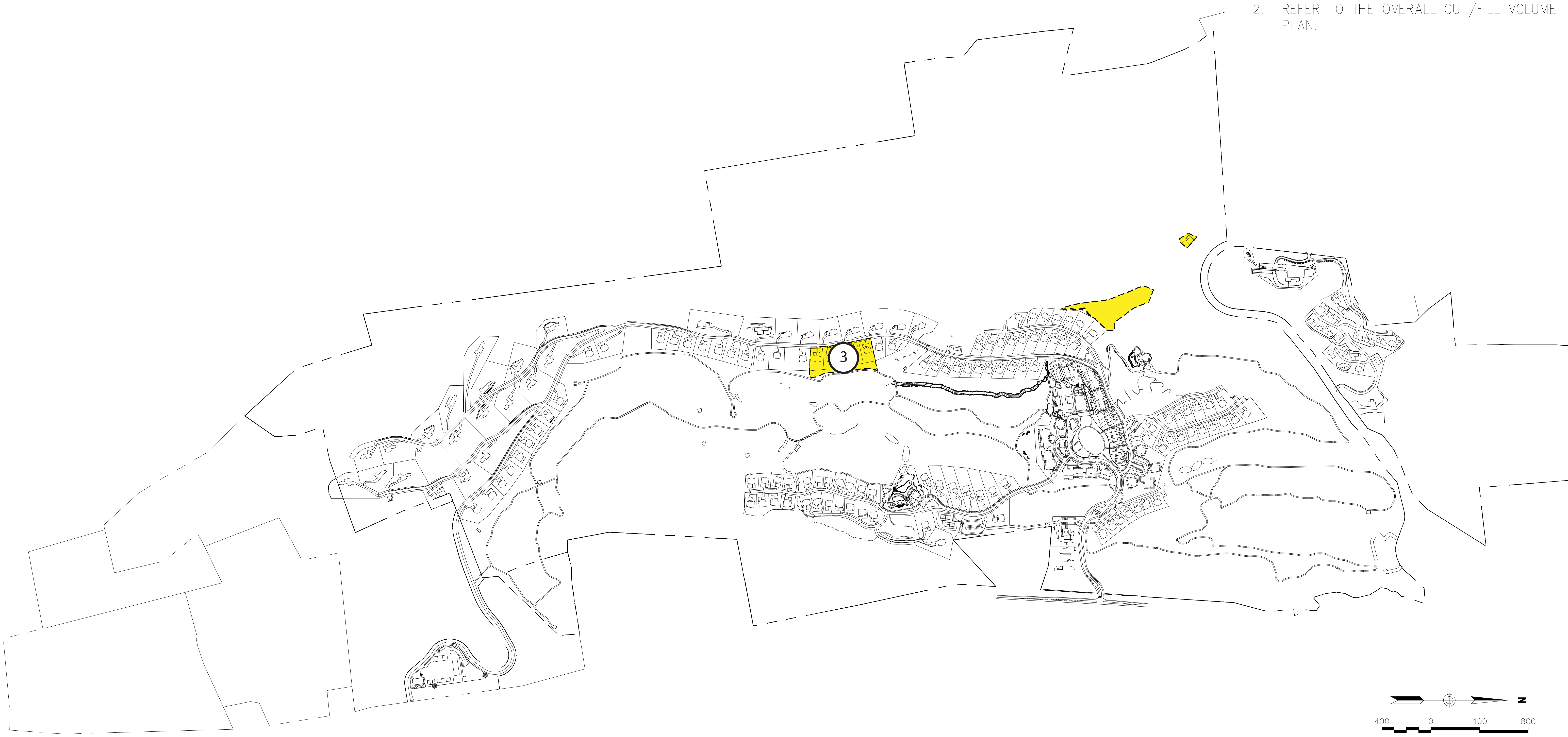

**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Golf Phase 2 Plan
Total Disturbance = 57.2 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.



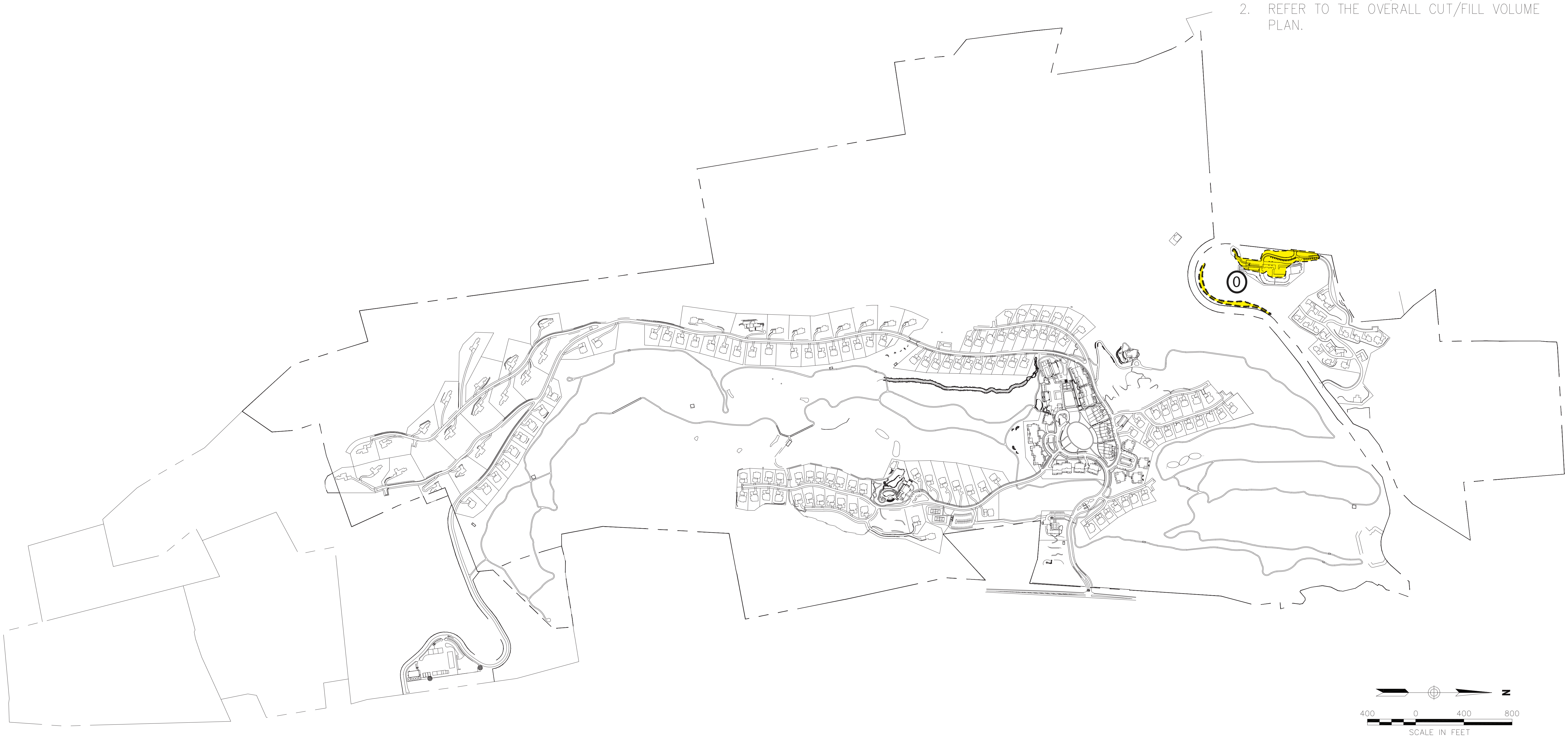

**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Golf Phase 3 Plan
Total Disturbance = 6.0 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.




**Vanasse Hangen Brustlin, Inc.**

March 2015

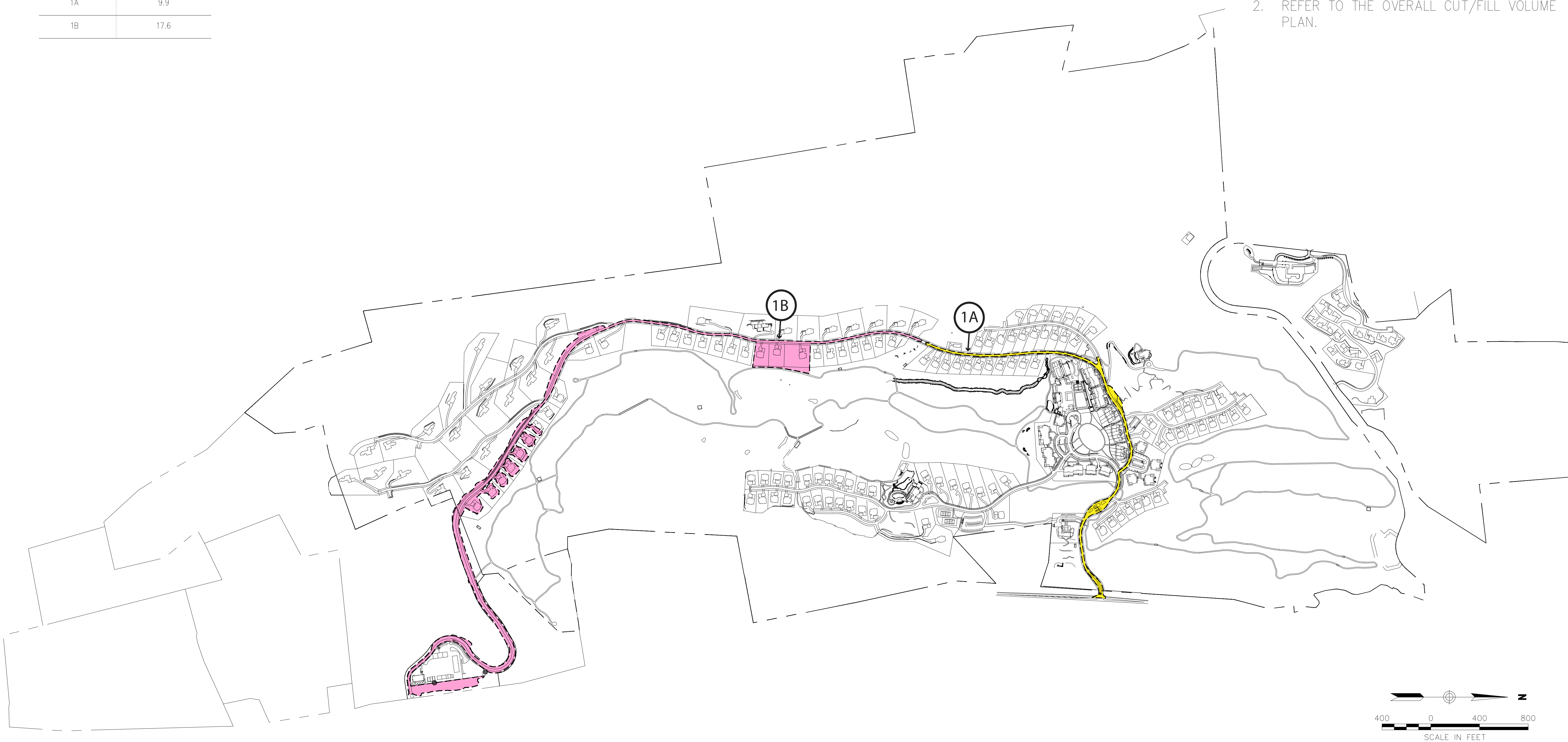
Construction Sequence
Development Phase 0 Plan
Total Disturbance = 2.42 AC

## Phasing Summary

| Phase | Area (AC) |
|---|---|
| 1A | 9.9 |
| 1B | 17.6 |

## Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.




**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 1 Plan
Total Disturbance = 27.5 AC

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# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


N

400 0 400 800

SCALE IN FEET

**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 2 Plan
Total Disturbance = 20.9 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 3 Plan
Total Disturbance = 13.3 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 4 Plan
Total Disturbance = 17.7 AC

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# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 5 Plan
Total Disturbance = 10.9 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 6 Plan
Total Disturbance = 10.3 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 7 Plan
Total Disturbance = 13.3 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


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SCALE IN FEET

**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 8 Plan
Total Disturbance = 4.8 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 9 Plan
Total Disturbance = 18.9 AC

# Note

1. REFER TO CONSTRUCTION SEQUENCE VOLUME ANALYSIS FOR CUT/FILL VOLUMES.
2. REFER TO THE OVERALL CUT/FILL VOLUME PLAN.


**Vanasse Hangen Brustlin, Inc.**

March 2015

Construction Sequence
Development Phase 10 Plan
Total Disturbance = 16.7 AC