Stormwater Pollution Prevention Plan

Village View
Cluster Subdivision
Reduced Scale Alternative

Village and Town of Warwick
Orange County, NY

September 2019
Revised October, 2019

Kirk Rother, PE, PLLC
5 Saint Stephens Lane
Warwick, NY 10990

Summary

This Storm Water Pollution Prevention Plan (SWPPP) is prepared for a project known as *Village View Cluster Subdivision - Reduced Scale Alternative*. The project proposes a 33-lot cluster subdivision of approximately 21 acres of land situated on the west side of Locust Street and north side of Woodside Drive within the Village of Warwick. The subject property is identified as Section 201, Block 1, Lots 1.1, 1.2, 1.3, and 2 on current Village of Warwick Tax Maps and lies entirely within the Village of Warwick "R" Zoning District. Also included in the proposal is a through road connection and stormwater management features on adjacent land lying in the Town of Warwick on Tax parcels Section 31, Block 2, Lots 84.1, 84.2, 85.2. The objective of the SWPPP is to minimize potential impacts to the water shed from the development. A full storm water analysis has been performed in accordance with New York State SPDES Permit GP-0-15-002 requirements. Erosion and sediment control, storm water quantity management, run-off reduction features and storm water quality control measures will be implemented in conformance with the *NYS Stormwater Design Manual, (Jan. 2015 ed.)*, the *NYS Standards for Erosion and Sediment Control, (Nov. 2016 ed.)*, and SPDES permit criteria. A pre and post developed hydrologic analysis has been completed. This SWPPP narrative and associated Appendices, together with the drainage system design and erosion control drawings, constitute the contract documents necessary for coverage under the SPDES Permit. With proper implementation and maintenance, the best management practices to be implemented for the Village View project will satisfy all SPDES Permit criteria and mitigate potential impacts due to storm water runoff.

Property and Contact Information

Property Address:

Corner of Woodside Drive and Locust Street
Village View
Warwick, NY 10990

Coordinates:

Latitude: 41.272
Longitude:-74.360

Owner:

Village View Estates LLC.
C/o Robert Silber
4 Fosse Court
Airmont, NY, 10952

Developer:

Village View Estates LLC.
C/o Robert Silber
4 Fosse Court
Airmont, NY, 10952
845-222-1812
silberconstruction@gmail.com

Engineer:

Kirk Rother, PE, Consulting Engineer, PLLC
Kirk Rother, PE
5 Saint Stephens Lane
Warwick, NY 10990
845-988-0620
krother@kirkrother.com

NYS DEC Region:

Region 3

NYS DEC Spill Hotline:

800-457-7362 or
631-444-0320 (Region 3 spill office)

Underground Utilities:

Dig Safely NY
Dial 811

Table of Contents

List of Appendices

List of Tables

Village View Cluster Subdivision
Village of Warwick
Orange County, New York

Contractor's Certification Statement

To be signed by all Contractors and Sub-Contractors performing any site work that involves ground disturbance.

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 storm water 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 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.

_____

Contractor's Name

_____

Contractor's Address

_____

Responsible Agent's Name (Print)

_____

Responsible Agent's Title

_____ _____

Responsible Agent's Signature Date

_____

List SWPPP Components Contractor is responsible for.

Provide additional Contractor Certification Sheets if more than one contractor will be involved in ground disturbance.

Section 1 – Introduction and Document Requirements

This Storm Water Pollution Prevention Plan is prepared for a project known as the Village View Cluster Subdivision: Reduced Scale Alternative. The project proposes a residential cluster development situated on approximately 21 acres of land lying within the "R" zoning district in the Village of Warwick, Orange County, New York. Also included in the proposal is a through road connection and the placement of storm water management facilities on adjacent land lying in the Town of Warwick. The project lies on the west side of Woodside Drive and the south side of Locust Street, which turns into Sleepy Valley Road, and is identified as Section 201, Block 1, Lots 1.1, 1.2, 1.3 and 2 on Village of Warwick tax Maps with the improvements in the Town lying within Section 31, Block 2, Lots 84.1, 84.2, 85.2 and Section 43, Block 1, Lot 3 on current Town of Warwick tax maps. The project's purpose is to serve the demand for residential housing in Warwick and surrounding area. The proposed improvements have been designed utilizing the Village of Warwick Cluster Subdivision provisions as set forth in the Zoning section of the Village of Warwick Code.

This SWPPP will help to minimize potential impacts to the water shed from the development. Potential impacts include soil erosion during site construction and the introduction of pollutants such as garbage, construction debris, chemicals and sediments from roof tops, roadways, construction equipment and people. The storm water management plan also addresses potential downstream impacts, such as flooding and channel erosion, caused by the conversion of natural, vegetated areas to impervious surfaces.

Stormwater quantity management, run-off reduction, storm water quality control measures and erosion control measures will be implemented in conformance with the NYS Stormwater Design Manual, (Jan. 2015 ed.), the NYS Standards for Erosion and Sediment Control, (Nov. 2016 ed.), and SPDES permit GP-0-15-002 criteria. A copy of the SPDES Permit and associated Permit Forms can be found in Appendix A of this report.

Planned improvements include the construction of 42 dwelling units in a mix of 32 single family homes and five two-family structures with associated access roads, driveways and sidewalks. Also included will be improvements to the Village's water and sewer infrastructure as needed to extend those services into the site. A through road connection to Sleepy Valley Road and a system of storm water management features will also be constructed. A more detailed project description can be found in Section 2 of this report.

The 21 acre site lies entirely within the Wawayanda Creek watershed which is ultimately tributary to the Lower Hudson River Basin. The site is currently vacant land and the property is almost entirely wooded. An existing unnamed Class C(T) tributary to Wawayanda Creek originates on the site with areas of federally regulated wetlands flanking the watercourse. There are no flood plains or impaired waters present on the site. A more detailed description of existing site hydrology can be found in Section 3 of this report with associated regulatory mapping and supporting information located in Appendix B.

Stormwater Management is to be accomplished via an open and closed storm drain infrastructure. The conveyance mechanisms will convey storm water runoff towards multiple run-off reduction water quality practices. Attenuation of peak run off rates to 10% below the existing peak run-off rates for the development portion lying within the Village of Warwick, as required by Village of Warwick Zoning, will be accomplished by means of multiple dry type detention ponds. Upon treatment for water quality and detention of peak flow rates, storm water run-off will continue its existing course of drainage toward Wawayanda Creek. Additional description of run-off reduction measures and water quality volume can be found in Section 4 of this report with supporting maps and worksheets included in Appendix C. A more detailed description of storm water quantity control, including a pre and post developed hydrologic analysis, can be found in Section 5 of this report with supporting HydroCAD model based on TR-20 methodology located in Appendix D.

Erosion control will be accomplished via means of temporary and permanent erosion control measures. Erosion control features will be implemented prior to the start of construction activities. Construction shall be performed in phases with no more than five acres of the site disturbed at any one time. The design and placement of the erosion control practices can be found on the Erosion Control Plan sheets of the Village View drawings with associated construction details being found on in the Erosion Control Details sheets. A more detailed discussion of erosion and sediment control can be found in Section 6 of this report with Erosion Control Checklists and a sample Construction Site Logbook located in Appendix E. Maintenance of erosion control measures will be the responsibility of the project sponsor. Included in the erosion control plan is a general Sequence of Construction which will be followed by the Developer. This general Sequence of Construction can also be found in Section 7 of this SWPPP report.

An electronic Notice of Intent Form (NOI) will be completed and filed with the New York State Department of Environmental Conservation to obtain coverage under the SPDES Permit. The Village of Warwick is not an MS4 Community and therefore does not require the filing of an MS4 Acceptance Form. The Town of Warwick is an MS4 community and will therefore require the filing of an MS4 Acceptance Form for the improvements located in the Town. The NOI will be submitted to the NYS DEC at least five days prior to commencing construction.

All contractors and subcontractors involved in activities which will result in site disturbance, or effect storm water runoff, shall familiarize themselves with both this written SWPPP and the water quality, quantity and erosion control measures shown on the approved Site Plan. Said parties shall attest to their familiarity with the storm water documents by signing of the written certification found at the beginning of this report.

A copy of the approved Subdivision Plan, this written Storm Water Pollution Prevention Plan report, signed Contractor Certification Statement, completed Notice of Intent and Department of Environmental Conservation acknowledgement letter with Permit number shall be kept at the construction site. All Maintenance Inspection Checklists and a Construction Site Log Book, samples of which can be found in Appendix E of this report, shall also be kept at the construction site and made available for review by regulatory agencies. Upon completion of construction activities, and vegetative stabilization of the fully built site, a Notice of Termination Form will be filed with the New York State Department of Environmental Conservation to terminate the SPDES Permit.

By implementing the above best management practices, storm water quality and quantity objectives will meet or exceed those required by the New York State SPDES Permit for general construction activities. Reducing the peak rate of run-off to 10% below existing conditions will also satisfy the storm water run-off objectives set forth by the Village of Warwick.

Section 2 – Project Description

The Village View Cluster Subdivision lies on approximately 21 acres of land situated on the west side of Locust Street at the intersection with Woodside Drive. The project will consist of 32 single family residential Lots and five two-family structures with associated

improvements. Access to the site will be by means of a looped access roadway which will provide two points of access: one from Woodside Drive and the other through adjacent land in the Town of Warwick to Sleepy Valley Road. The Village portion of the roadway is proposed to be constructed to Village of Warwick standards and have a pavement width of 26 feet with a 6" curb and four-foot-wide sidewalk on one or both sides of the street depending on the placement of the lots. The total length of roadway in the Village is found to is found to be approximately 2,650 linear feet. An additional approximately 1,400 linear feet will be constructed in the Town to Town road standards of 24-foot-wide pavement without curbs. Off street parking will be provided on each of the single-family lots with the lots designed to accommodate driveways with garages in the rear of the house. The townhouse two-family units will have off street parking in the driveway serving the unit with front facing garages. On street parking will also be permitted on one side of the street. The total new impervious area within the Village is computed to be approximately 4.75 acres. The through road connection through the Town adds an additional approximately 1.2 acres of impervious area.

Sanitary sewer will be accomplished by means of connection to the municipal sewer system which fronts the property in Woodside Drive. Drinking water will be accomplished by means of connection to the municipal water system which is also present at the site.

Section 3 – Site Hydrology

Village View lies entirely within the Wawayanda Creek watershed which is part of the Wallkill River Sub Basin and ultimately tributary to the Lower Hudson River drainage basin. The site and lands upstream of it are the headwaters of an unnamed Class C(t) tributary, identified as Index #H139-13-61-9-21-1. The headwaters of the stream lie to the east of Sleepy Valley Road and drain into the site via an existing 15" culvert under Sleepy Valley Road at the approximate Town - Village municipal boundary. The outlet of this culvert is the point at which the stream originates on publicly available mapping such as the NYS DEC Environmental Resource Mapper. The stream then flows to the south through the Village View property, picking up additional run-off from Village View and adjacent land to the north, after which the stream discharges to the south under Woodside Drive via an eight-foot-wide by four-foot-high reinforced concrete box culvert. For the purposes of storm water quantity, this box culvert was taken as the point of analysis and is identified as "AP" on the HydroCAD model and the pre and post developed drainage basin maps which can be found in Appendix

D and F respectively. The stream then continues its course to the south and east to eventually be piped under NYS Route 17A before discharging into Wawayanda Creek. The total drainage area tributary culver under Sleepy Valley Road is computed to be approximately 49.75 acres with the total area tributary to the box culvert under Woodside Drive found to be approximately 137.7 acres. Some of this acreage includes run-off from existing properties on Woodside drive that flow along the northerly edge of Woodside Drive, onto the Village View site and into the box culvert.

The Village portion of the Village View site is currently vacant land save for the remains of some old foundations. The land in the Town is also vacant with the exception of a power transmission line. Both the Town and Village properties are entirely brush and woodland with the exception of the stream and associated wetlands which lie parallel to the stream edge. The Federal Jurisdictional wetlands and stream sit in the eastern portions of the property, adjacent to Locust Street. The wetlands have been delineated by Robert Torgersen, LA and a jurisdictional determination has been received from the US Army Corps of Engineers. Vegetation on the property is taken to be in good hydrologic condition.

The highest elevations of the Village portion of the site lie at approximate elevation 820 feet in the western extremities with the lowest extremities being at approximately 630 feet where the stream discharges under Woodside Drive. The site can be generally described as moderately sloping with the majority of the terrain being sloped at 10% to 15%. A few pockets of steeper slopes are spread throughout the site with steep slopes also being found adjacent to Locust Ave.

The project is not tributary to a Total Maximum Daily Load (TMDL) watershed or 303d impaired water body. There are no flood areas or floodplains on the property based on a review of FEMA mapping. Soils on the site were found to be predominantly Mardin type soil of Hydrologic Soil Group D. Copies of the State and Federal Wetland Inventory maps, together with FEMA and USDA soil mapping, can be found in Appendix B.

A review of the CRIS Portal through the NYS Office of Parks, Recreation and Historic Preservation indicates the site is in an archeologically sensitive area. A Phase 1A/1B Archeological assessment, and a Phase II assessment, has been conducted as a part of a prior subdivision proposal and a letter of No Impact issued from the NYS Office of Parks, Recreation and Historic Preservation.

Section 4 – Run-off Reduction and Storm Water Quality

Water quality objectives for Village View are based on the 90% rule as set forth in Chapter 4 - Unified Sizing Criteria in the *NYS Stormwater Design Manual.* The goal is to capture and treat run-off from 90% of the 24-hour rainfall events that can be expected to occur at the site. The volume of water to be treated is directly proportional to the area that is tributary to the practice and the amount of impervious cover within that tributary area. The 90th Percentile – 24 hour Rainfall value for the Village View Development is found to be 1.42 inches. The resultant water quality volume, or WQv, as computed using the Unified Sizing Criteria is found to be 34,010 cubic feet. The WQv worksheet can be found in Appendix C.

Runoff Reduction is a component of the water quality objectives set forth by the NYS SPDES Permit. Reducing run-off encourages the recharge of groundwater and reduces the volume of run-off leaving the post-developed site. Run-off reduction is primarily accomplished by infiltrating runoff where soil conditions allow and by minimizing concentrated flows from the site. Minimizing concentrated flows is accomplished by preserving naturally vegetated areas and providing treatment in a distributed manner utilizing multiple, interspersed practices near the impervious source of the run-off thereby capturing and treatment the runoff before it reaches the drainage collection system.

The Runoff Reduction objective set forth by the Design Manual is to reduce 100% of the computed water quality volume. If site constraints, such as poor soils, steep slopes, high groundwater or shallow depth to bedrock prelude the use of infiltration practices, a minimum Runoff Reduction volume, or RRv, must still be met. Multiple methods of meeting the RRv value are available.

The soils found on the Village View site, being comprised entirely of hydrologic soil D, have low infiltration rates. The presence of mottling in test pits performed at the site also reveals the presence of seasonal high groundwater. These conditions are supported by the USDA soil descriptions that can be found in Appendix B. The poor infiltrative capacity of the soils at precludes reduction of 100% of the water quality volume for the Village View development due to the inability to infiltrate. The minimum RRv will be met by using storm water management practices with runoff reduction capacity, namely bio-retention and disconnection of impervious areas by directing run off through vegetated areas. The minimum RRv value for the Village View Reduced Scale Alternative is computed to be 6,141 cubic feet.

Computations associated with water quality volume, run-off reduction volume and bio-retention sizing can be found in Appendix C. The net result is that Village View project will exceed the minimum water quality volume objectives set forth by the Unified Sizing Criteria.

Section 5 – Detention and Storm Water Quantity

An integral part of the storm water pollution prevention plan calls for the attenuation of peak runoff flow rates to pre-developed levels. Doing so mitigates against the adverse impacts caused by the conversion of natural areas to impervious surfaces and the increased speed at which rain water sheds these areas. Attenuation of peak flow rates is accomplished by detaining storm water run-off in a pond or reservoir to be released slowly over an extended period of time. As a baseline for comparison of post developed runoff to pre-developed levels, the project is modeled in the pre-developed condition.

Detention is proposed for Village View that will limit peak post-developed flow rates to 10% below pre-developed levels. A TR-20 Hydrologic Analysis has been performed for the 1-, 10-, and 100-year storm events and attenuation of the peak discharge rates for the aforementioned storms will satisfy SPDES permit requirements for Channel Protection (Cpv), Over bank Flood Control (Qp) and Extreme Flood Control (Qf).

The hydrologic analysis was performed utilizing HydroCAD storm water modeling software. The Software methodology is based on the National Resources Conservation Service (NRCS - formerly SCS) TR-20 watershed analysis model. To compute the analysis the amount of rainfall that can be expected for a given storm event, together with the distribution of that rainfall over a given time interval, must be determined. The Northeast Regional Climate Center (NRCC), in collaboration with Cornell University and the National Resource Conservation Service, publishes an interactive Web Tool for extreme precipitation analysis. The Web Tool provides site specific rainfall data based on a projects geographic location. The NYS Department of Environmental Conservation encourages the use of NRCC data in the design of stormwater management systems.

The rainfall values for the Village View site as taken from the NRCC Web Tool are summarized in the following table:

Table 1 - 24 Hour Rainfall Values	
Storm Frequency	Rainfall (in.)
1 year	2.64
10 year	4.80
25 year	6.04
100 year	8.57

Utilizing the above rainfall values and the pre-developed drainage catchment data depicted on the Pre-developed Drainage Basin Map found in Appendix F, a pre-developed hydrologic model was prepared. Resulting pre-developed peak flow rates for the 1-, 10-, and 100-year storm events are summarized as follows:

Table 2 - Pre-Developed Runoff Calculations						
Basin # Analysis Point #	Area (Ac.)	CN	TC (min.)	Q peak 1 Yr. (cfs)	Q peak 10 Yr.(cfs)	Q peak 100 Yr. (cfs)
Basin 1 - AP1	71.7	78	23.0	44.4	135	313

With the above data in place, the post developed site condition was subsequently modeled. Due to the addition of the proposed site improvements, and the corresponding drainage collection system, the post developed sub area is segregated into multiple sub-catchments, as compared to the catchments that make up the pre developed area. The total acreage of the sub catchments remains the same as in the predeveloped model. A map of the post developed sub catchment areas can be found in Appendix F. A table summarizing the Post Developed catchments follows:

Table 3 - Post-Developed Runoff Calculations						
Basin # Analysis Point #	Area (Ac.)	CN	TC (min.)	Q peak 1 Yr. (cfs)	Q peak 10 Yr.(cfs)	Q peak 100 Yr. (cfs)
Basin 2A	12.9	81	12.8	12	34	74
Basin 2B	1.1	77	6.7	0.9	2.8	6.6

Table 3 - Post-Developed Runoff Calculations						
Basin # Analysis Point #	Area (Ac.)	CN	TC (min.)	Q peak 1 Yr. (cfs)	Q peak 10 Yr.(cfs)	Q peak 100 Yr. (cfs)
Basin 2C	3.9	85	11.0	5.0	12	25
Basin 3A	4.7	87	6.7	7.6	18	35
Basin 3B	7.4	83	12.0	8.1	21	45
Basin 3C	7.2	79	11.9	6.2	18	41
Basin 3D	22.2	80	15.9	18	52	162
Basin 4	6.3	78	15.8	4.5	14	32
Basin 5	5.1	82	15.3	4.8	13	28

To accurately analyze the impacts of the development, a comparison of the pre and post developed peak flow rates at the analysis point must be made. A table summarizing of the pre-and post-developed peak flow rates at the culvert discharging under Woodside Drive follows:

Table 4 - Comparison of Pre- & Post-Developed Peak Flow Rates			
Storm Event	1 Year (cfs)	10 Year (cfs)	100 Year (cfs)
Analysis Point #1			
Pre-Developed	45	142	334
Post-Developed	18	114	298
Difference	-27	- 28	- 36

As can be seen, post developed peak flow rates at the culvert under Woodside Drive from the tributary area encompassing the Village View development are more than 10% below the pre-developed levels for all storms analyzed.

The Pre- and Post- Developed analysis includes the potential impervious area from possible future development in the Town of Warwick as depicted on the Concept Cluster Subdivision Plans as shown on the Post Developed Maps. It is noted that Sub catchment #1 as shown

on the Drainage Maps and included in the HydroCAD model is comprised of offsite properties that are tributary to the culvert under Woodside Drive but do not flow through the Village View site. Sub catchment 6 is comprised on off site, upstream areas that lie in the Town of Warwick and are the headwaters of the stream that flows through Village View. Attenuation of flow from this area is beyond the scope of the Village View project.

Attenuation of the peak discharge rates for the aforementioned storms will satisfy SPDES permit requirements for Channel Protection (Cpv), Over bank Flood Control (Qp) and Extreme Flood Control (Qf) as well as the Village of Warwick drainage requirements. Channel protection volume calculations can be found in Appendix C of this report. The pre and post developed HydroCAD model for the 1-, 10- and 100- year storm events can be found in Appendix D.

Section 6 – Erosion and Sediment Control

Proposed erosion control measures will be in accordance with a publication entitled *New York State Standards and Specifications for Erosion and Sediment Control (Nov. 2016 ed.)*. Erosion control will accomplished by means of temporary and permanent measures with the timing of the installation of said measures to be in accordance with the construction sequence found on the Erosion Control Plan sheet of the approved drawings.

Temporary erosion control measures will include a stabilized construction entrance, silt fence, temporary sediment trap, temporary diversion swales, stone check dams, inlet protection, mulching, land grading and temporary topsoil stockpiling, seeding and haying. Areas to be disturbed shall have the area of disturbance delineated. Areas to remain un-disturbed shall be protected with a perimeter construction fence, or snow fence. Activities resulting in site disturbance will be phased so as to keep the area disturbed at any one time under five acres.

Upon completion of clearing and grubbing activities, topsoil shall be stripped and temporary topsoil stockpiles created in locations out of the way of construction and any run off water course. Stockpiles shall be surrounded with silt fence and immediately stabilized with seed and hay per the temporary seeding schedule shown on the Erosion Control Plan. Temporary seeding shall be placed in all areas that have been disturbed but that are not expected to be disturbed again for a period of 14 days. Dust control by means of spraying water shall be

incorporated as necessary. The locations of the specific erosion control practices to be implemented, with associated construction details, are depicted on the Erosion Control Plan.

Chemicals, grease, oils and other potentially hazardous materials shall be kept in a designated, locked containment vessel on site. The contractor shall maintain an employee trained in spill response. The NYS DEC spill response phone number, located at the front of this report, shall be kept handy. Waste concrete from concrete trucks shall be washed out in the designated concrete wash out area.

Permanent erosion control measures include grass lined waterways, permanent seeding and landscaping, land grading, mulching, and slope stabilization. Slope stabilization will be accomplished utilizing rolled erosion control matting in all areas of slopes of two horizontal to one vertical or steeper.

Erosion control measures shall be routinely inspected daily by a "*Trained Contractor"* to be employed by the excavation company. A thorough review and report by a "*Qualified Inspector"* must be performed at least once every seven days. The definition of a Trained Contractor and Qualified Inspector can be found in the SPDES Permit located in Appendix A. Inspection logs identifying the site conditions, impacts to adjacent properties or water bodies, and any defects in erosion control measures, together with photographs of the site, shall be prepared by the Qualified Inspector. Defects identified shall be reported to the project owner in a timely manner of one day or less. Corrections shall be made immediately.

This SWPPP narrative and all weekly inspection logs shall be kept at the project site in a mailbox clearly labeled with the letters "DEC" and made available for review by the Regulatory Agency having jurisdiction. Maintenance of erosion control measures will be the responsibility of the project sponsor. Included in the erosion control plan is a general sequence of construction as follows.

Section 7 – General Construction Sequence

1. Obtain necessary approvals and permits from Municipal and Regulatory agencies.
2. Pre-construction meeting with applicable Regulatory agencies. Submittal of Notice of Intent.

3. Contractors shall sign “Contractor’s Certification Statement”. Install on site mailbox for SPDES related documents and label with the letters “DEC”.
4. Delineation of limits of clearing and disturbance. Trees to be saved shall be protected with perimeter fence.
5. Install stabilized construction entrances at beginning of proposed access road.
6. Install silt fence down-gradient of work area.
7. Excavate temporary sediment trap. Install temporary diversion swales, culverts and rip rap outlets as shown on the Erosion Control Plan.
8. Perform clearing and grubbing activities. Site disturbance shall not exceed beyond the disturbance limit line. No more than five acres of ground shall be disturbed at any one time. Disturbed areas that are not expected to be disturbed again for a period of 14 days or more shall be stabilized with rye grass in accordance with the Temporary Seeding Schedule shown on the Erosion Control Plan.
9. Strip and stockpile topsoil, stabilize with rye grass seed and perimeter silt fence.
10. Perform mass earth work. Complete rough-grading of roads and parking lots and building pads. Fine grade and stabilize all embankments upon completion of rough grading.
11. Begin installation of drainage infrastructure. Install utilities within roadway. Disturbed areas that will not be disturbed again for a period of more than 14 days shall be seeded with temporary seed.
12. Install roadway sub-base. Pave roadway with base course if feasible.
13. Restore compacted soils as needed by deep ripping. Complete fine-grading of disturbed areas and embankments, amend soils as required. Seed and stabilize with mulch, jute netting or hydro seed.
14. Review final storm water infrastructure improvement checklists. Construct storm water management appurtenances to permanent size and geometry. Remove any trapped sediment and fines and discard off-site.
15. Complete surfacing of roadways.
16. Upon final grading, stabilization of drainage channels and establishment of permanent vegetation, remove erosion control measures beginning at the most upstream points and then work downstream.
17. Perform any fine-grading and seeding as required. Maintain and repair vegetative cover as required. Maintain and repair wash-outs as required and after each storm event until all erosion control and water quality treatment measures are fully established.

18. Build out individual lots. No more than five acres shall be disturbed at any one time.
19. Repair and reshape storm water management areas to final design.
20. Complete final inspection and submit Notice of Termination (NOT) Form.

Section 8 – Operation and Maintenance

The storm water management infrastructure within the Village of Warwick will be maintained by the Village of Warwick Department of Public Works. Annual maintenance shall include repair of vegetation and soil in areas of wash-outs, cleaning of sediment and debris from catch basins and detention ponds and annual re-mulching, re-plantings as necessary and removal of litter and debris from bio-retention areas. Easements to the benefit of the Village of Warwick will be created to facilitate maintenance.

Stormwater management infrastructure located in the Town of Warwick will be maintained either by the property owner on which the feature is located or a Homeowner's Associated. A back-up Drainage District will typically be formed allowing the Town to perform the required maintenance in the event the homeowner or Association fails to do so. The cost of the Town performed maintenance will be passed on the properties located within the District. Easements to the benefit of the Town will be created to facilitate the maintenance if needed.

References

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Appendix A

Notice of Intent Form; Notice of Termination Form;

SPDES Permit GP 0-15-002

0644089821

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-0-15-002

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)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State ☐☐ Zip ☐☐☐☐☐ - ☐☐☐☐

Phone (Owner/Operator) ☐☐☐ - ☐☐☐ - ☐☐☐☐

Fax (Owner/Operator) ☐☐☐ - ☐☐☐ - ☐☐☐☐

Email (Owner/Operator)

FED TAX ID ☐☐ - ☐☐☐☐☐☐☐ (not required for individuals)

Project Site Information

Project/Site Name

Street Address (NOT P.O. BOX)

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

City/Town/Village (THAT ISSUES BUILDING PERMIT)

State N Y Zip - County DEC Region

Name of Nearest Cross Street

Distance to Nearest Cross Street (Feet)

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

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

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) 4

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in impervious area**

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

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
- ○ 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 Within Disturbed Area**
.	.	.	.

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**
%	%	%	%

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

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

Start Date / / - **End Date** / /

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

Name

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-0-15-002? ○ **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ○ **No**

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

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? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

.

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?

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)? ○ **Yes** ○ **No**
If No, skip questions 23 and 27-39.

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

Contact Name (Last, Space, First)

Mailing Address

City

State Zip -

Phone - -

Fax - -

Email

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-0-15-002. 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 **MI**

Last Name

Signature

Date / /

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

			.			
			.			**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)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)	___.___	and/or	___.___
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	___.___	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)			___.___
○ 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)			___.___
○ Multiple Pond System (P-4)			___.___
○ Pocket Pond (P-5)			___.___
○ Surface Sand Filter (F-1)			___.___
○ Underground Sand Filter (F-2)			___.___
○ 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

. **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

. **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.
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.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

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

☐☐☐.☐☐☐ **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). ☐☐☐.☐☐☐

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, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

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

CPv Required

☐☐☐.☐☐☐ **acre-feet**

CPv Provided

☐☐☐.☐☐☐ **acre-feet**

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

☐☐☐.☐☐☐ **CFS**

Post-development

☐☐☐.☐☐☐ **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

☐☐☐.☐☐☐ **CFS**

Post-development

☐☐☐.☐☐☐ **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

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.

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 [N][Y][R][ ][ ][ ][ ][ ][ ]
- ○ Other [ ]
- ○ None

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

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. [N][Y][R][ ][ ][ ][ ][ ][ ]

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 **MI**

Print Last Name

Owner/Operator Signature

Date / /

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:

4b. 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, a mechanism is 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.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; 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:

(NYS DEC Notice of Termination - January 2015)

Full Text of SPDES Permit will be added to final document.

To reduce paper consumption the text of the SPDES Permit can be found at https://www.dec.ny.gov/docs/water_pdf/gp015002.pdf

Appendix B

NRCS Soils Information; FEMA Map; NWI Map; NYS DEC Environmental Resource Map

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 Orange County, New York

Village View

September 23, 2019

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://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

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 Web Soil Survey, the site for official soil survey information.

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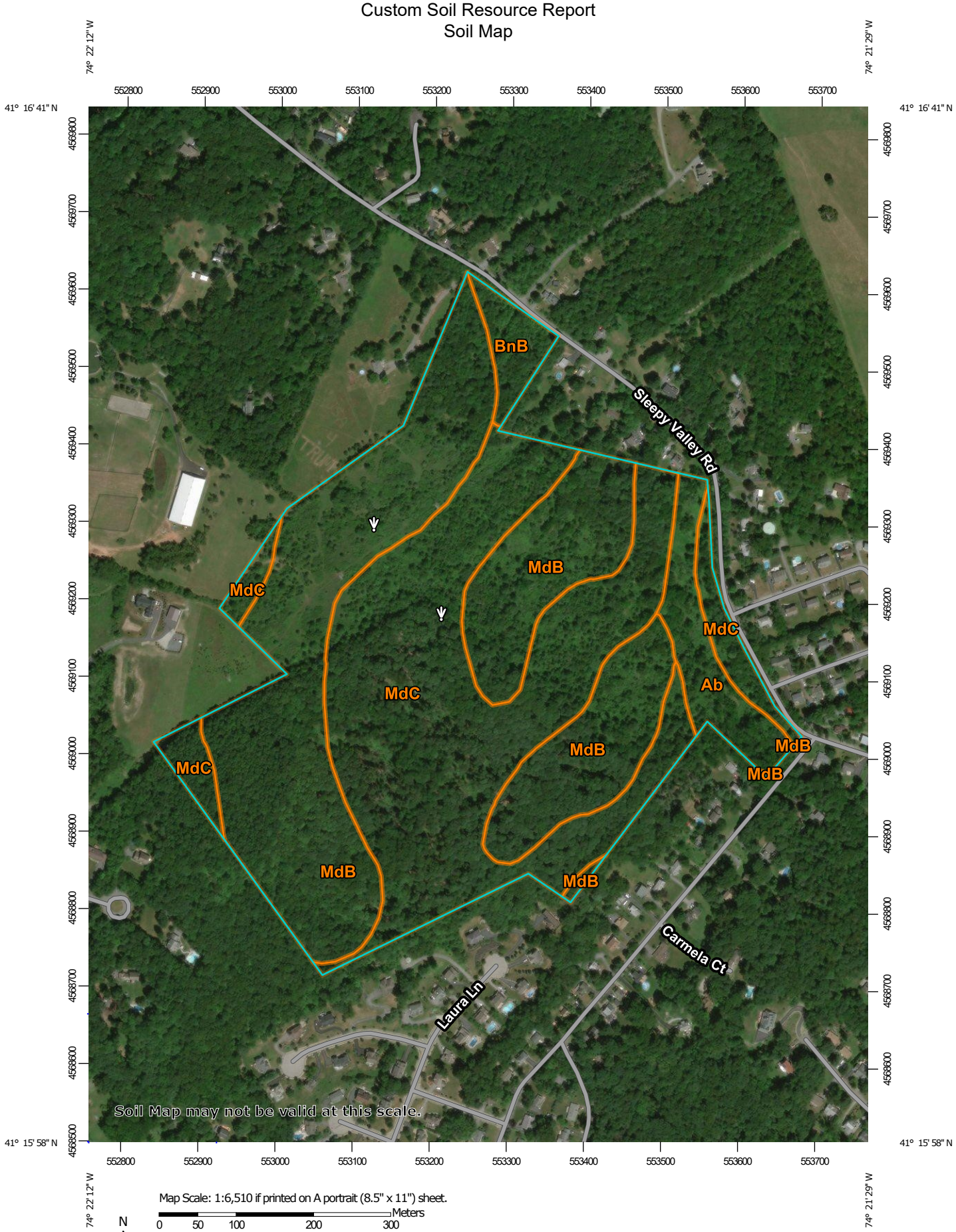
Contents

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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:6,510 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 300 600 1200 1800

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 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Orange County, New York
Survey Area Data: Version 19, Sep 3, 2018

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ab	Alden silt loam	5.0	5.3%
BnB	Bath-Nassau channery silt loams, 3 to 8 percent slopes	2.3	2.4%
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	44.6	47.3%
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	42.4	45.0%
Totals for Area of Interest		**94.4**	**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.

Orange County, New York

Ab—Alden silt loam

Map Unit Setting

National map unit symbol: 9vtc
Elevation: 300 to 1,500 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Alden and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alden

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: A silty mantle of local deposition overlying loamy till

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 36 inches: silt loam
H3 - 36 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very 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 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Canandaigua

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Erie

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: No

Wayland

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Carlisle

Percent of map unit: 5 percent
Landform: Swamps, marshes
Hydric soil rating: Yes

BnB—Bath-Nassau channery silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9vtn
Elevation: 600 to 1,800 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bath and similar soils: 50 percent
Nassau and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bath

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: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 29 inches: channery silt loam
H3 - 29 to 53 inches: very channery silt loam
H4 - 53 to 57 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 22 to 38 inches to fragipan; 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 24 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Nassau

Setting

Landform: Benches, ridges, till plains
Landform position (two-dimensional): Summit
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

Typical profile

H1 - 0 to 10 inches: channery silt loam
H2 - 10 to 19 inches: very channery silt loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively 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
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lordstown

Percent of map unit: 9 percent
Hydric soil rating: No

Erie

Percent of map unit: 5 percent
Hydric soil rating: No

Mardin
Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop
Percent of map unit: 1 percent
Hydric soil rating: Unranked

MdB—Mardin gravelly silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2v30j
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Mardin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mardin

Setting
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till

Typical profile
Ap - 0 to 8 inches: gravelly silt loam
Bw - 8 to 15 inches: gravelly silt loam
E - 15 to 20 inches: gravelly silt loam
Bx - 20 to 72 inches: gravelly silt loam

Properties and qualities
Slope: 3 to 8 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Volusia

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Mountaintop, interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

MdC—Mardin gravelly silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2v30l
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Mardin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mardin

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: gravelly silt loam
Bw - 8 to 15 inches: gravelly silt loam
E - 15 to 20 inches: gravelly silt loam
Bx - 20 to 72 inches: gravelly silt loam

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Volusia

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent
Landform: Hills, mountains

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope, nose slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

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National Flood Hazard Layer FIRMette

FEMA

41°16'33.53"N

74°21'55.74"W

74°21'18.28"W

41°16'6.49"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth
- Regulatory Floodway *Zone AE, AO, AH, VE, AR*

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The base map shown complies with FEMA's base map accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/1/2018 at 12:36:11 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: base map imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

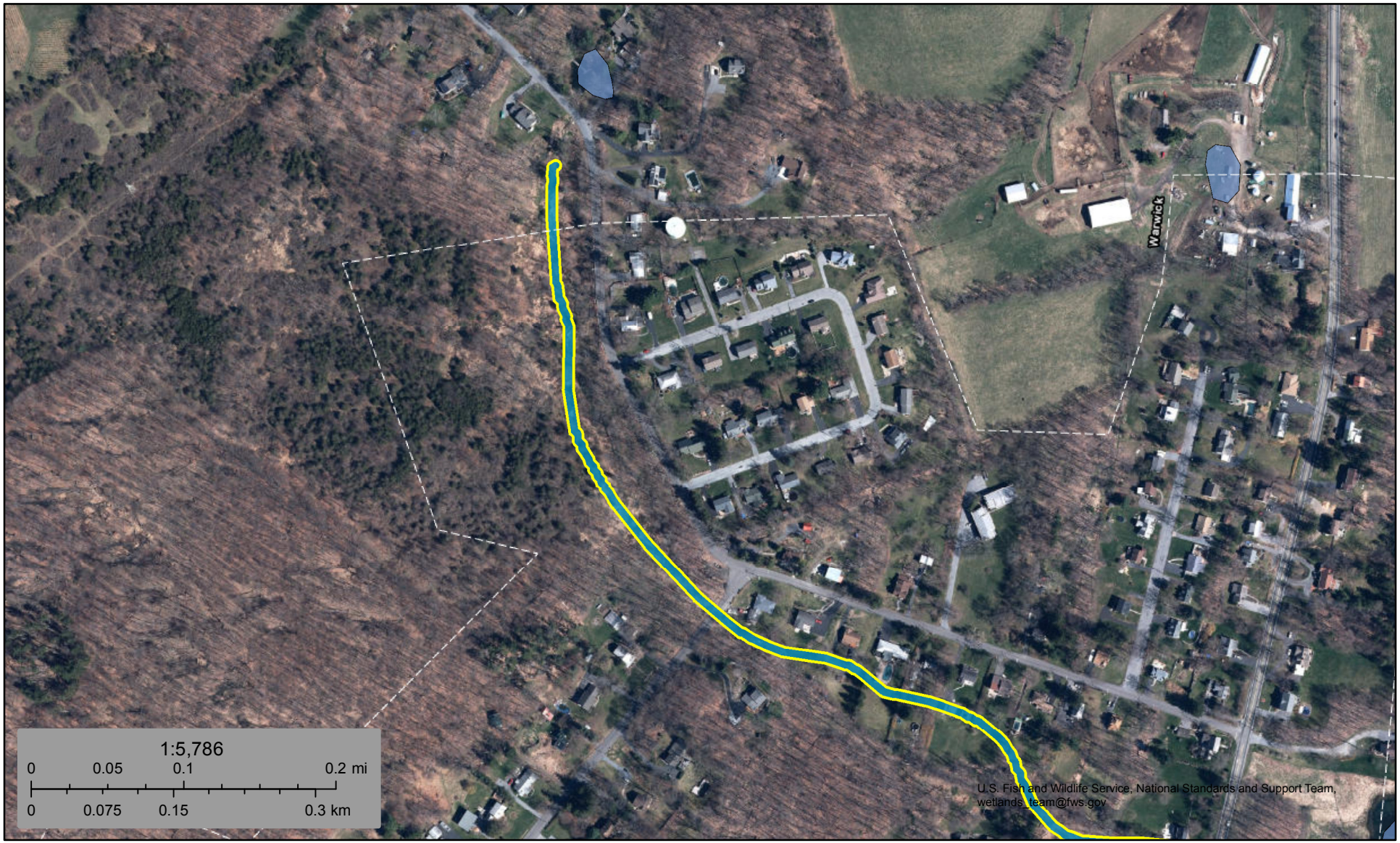
Environmental Resource Mapper

Base Map: Topographical Using this map

- Search
- Tools
- **Layers and Legend**
  - All Layers
  - Unique Geological Features
  - Waterbody Classifications for Rivers/Streams
  - Waterbody Classifications for Lakes
  - State Regulated Freshwater Wetlands
  - State Regulated Wetland Checkzone
  - Significant Natural Communities
- Other Wetland Layers
- Reference Layers
- Tell Me More...
- Need A Permit?
- Contacts

U.S. Fish and Wildlife Service
National Wetlands Inventory

Village View NWI map



April 4, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Appendix C

Water Quality and Run off Reduction Calculation Spreadsheets; Bio-Retention Worksheets; Channel Protection Volume Calculations; Swale Sizing Calculations

Version 1.8 Total Water Quality Volume Calculation
Last Updated: 11/09/2015 WQv(acre-feet) = [(P)(Rv)(A)] /12

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	No

Design Point:	Village View	
P=	1.42	*inch*

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	4.10	1.20	29%	0.31	6,624	Area 1
2	5.30	1.90	36%	0.37	10,180	Area 2
3	5.20	1.65	32%	0.34	8,995	Area 3
4	4.00	1.20	30%	0.32	6,598	Area 4
5	0.50	0.32	64%	0.63	1,613	Area 5
6						
7						
8						
9						
10						
Subtotal (1-30)	19.10	6.27	33%	0.35	**34,010**	**Subtotal 1**
Total	19.10	6.27	33%	0.35	**34,010**	**Initial WQv**

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**0.00**	**0.00**	

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*
"<<Initial WQv"	19.10	6.27	33%	0.35	34,010
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	**19.10**	**6.27**	33%	0.35	34,010
Disconnection of Rooftops		0.37			
Adjusted WQv after Area Reduction and Rooftop Disconnect	19.10	5.90	31%	0.33	**32,294**
WQv reduced by Area Reduction techniques					1,716

Total Water Quality Volume Calculation

WQv(acre-feet) = [(P)(Rv)(A)] /12

All Subcatchments						
Catchment	**Total Area** *(Acres)*	**Impervious Cover** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient** *Rv*	**WQv** *(ft^3)*	**Description**
1	4.10	1.20	0.29	0.31	6623.66	Area 1
2	5.30	1.90	0.36	0.37	10,180	Area 2
3	5.20	1.65	0.32	0.34	8994.78	Area 3
4	4.00	1.20	0.30	0.32	6597.89	Area 4
5	0.50	0.32	0.64	0.63	1613.39	Area 5
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**cf**	**cf**
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.37		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4				
	Bioretention & Infiltration Bioretention	F-5	18.60	5.58	14719	15961
	Dry swale	O-1	0.50	0.32	602	1011
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction →			0.00	0.37	1716	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			19.10	5.90	15321	16972
Totals by Standard SMP →			0.00	0.00		0
Totals (Area + Volume + all SMPs) →			19.10	6.27	17,038	16,972
	Impervious Cover √	okay				

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A		55%
B		40%
C		30%
D	**14.80**	20%
Total Area	14.8	
Calculate the Minimum RRv		
S =	**0.20**	
Impervious =	6.27	*acre*
Precipitation	1.42	*in*
Rv	0.95	
Minimum RRv	**6,141**	***ft3***
	0.14	af

NOI QUESTIONS

#	NOI Question	Reported Value	
		cf	af
28	Total Water Quality Volume (WQv) Required	34010	*0.781*
30	Total RRV Provided	17038	*0.391*
31	Is RRv Provided ≥WQv Required?	No	
32	Minimum RRv	6141	*0.141*
32a	Is RRv Provided ≥ Minimum RRv Required?	Yes	
33a	Total WQv Treated	16972	*0.390*
34	Sum of Volume Reduced & Treated	34010	*0.781*
34	Sum of Volume Reduced and Treated	34010	*0.781*
35	Is Sum RRv Provided and WQv Provided ≥WQv Required?	Yes	

Apply Peak Flow Attenuation			
36	Channel Protection	*Cpv*	
37	Overbank	*Qp*	
37	Extreme Flood Control	*Qf*	
	Are Quantity Control requirements met?		

Planning

Practice	Description	Application
Preservation of Undisturbed Areas	Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	Considered & Applied
Preservation of Buffers	Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	Considered & Applied
Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	Considered & Applied
Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.	Considered & Applied
Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	Considered & Applied
Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of post construction practices.	Considered & Applied
Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area	Considered & Applied
Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area	Considered & Applied
Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area	Considered & Not Applied
Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	Considered & Not Applied
Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	N/A
Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	N/A

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k — The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point:	**Village View**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	4.10	1.20	0.29	0.31	6623.66	1.42	Area 1
Enter Impervious Area Reduced by Disconnection of Rooftops		0.30	22%	0.25	5,232	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	ft^3	

Soil Information			
Soil Group	D		
Soil Infiltration Rate	0.00	*in/hour*	*Okay*
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area				
		Value	Units	Notes
WQv		5,232	ft^3	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.5	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**4360**	ft^2	

Determine Actual Bio-Retention Area			
Filter Width	42	*ft*	
Filter Length	186	*ft*	
Filter Area	7812	ft^2	
Actual Volume Provided	9374	ft^3	

Determine Runoff Reduction				
Is the Bioretention contributing flow to another practice?		No	Select Practice	
RRv	3,750			
RRv applied	**3,750**	ft^3	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	1,482	ft^3	*This is the portion of the WQv that is not reduced in the practice.*	
Volume Directed	0	ft^3	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k — The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor & Schueler, 1996)

Design Point:	**Village View**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	5.30	1.90	0.36	0.37	10180.34	1.42	Area 2
Enter Impervious Area Reduced by Disconnection of Rooftops		0.07	35%	0.36	9,856	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	ft^3	

Soil Information			
Soil Group	D		
Soil Infiltration Rate	0.00	*in/hour*	*Okay*
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area				
		Value	Units	Notes
WQv		9,856	ft^3	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.5	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**8213**	ft^2	

Determine Actual Bio-Retention Area			
Filter Width	70	*ft*	
Filter Length	125	*ft*	
Filter Area	8750	ft^2	
Actual Volume Provided	10500	ft^3	

Determine Runoff Reduction				
Is the Bioretention contributing flow to another practice?		No	Select Practice	
RRv	4,200			
RRv applied	**4,200**	ft^3	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	5,656	ft^3	*This is the portion of the WQv that is not reduced in the practice.*	
Volume Directed	0	ft^3	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k — The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point:	**Village View**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
3	5.20	1.65	0.32	0.34	8994.78	1.42	Area 3
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	32%	0.34	8,995	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						*ft^3*	

Soil Information			
Soil Group	D		
Soil Infiltration Rate	0.00	*in/hour*	*Okay*
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area				
		Value	Units	Notes
WQv		8,995	*ft^3*	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.5	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**7496**	***ft^2***	

Determine Actual Bio-Retention Area			
Filter Width	75	*ft*	
Filter Length	106.7	*ft*	
Filter Area	8002.5	*ft^2*	
Actual Volume Provided	9603	*ft^3*	

Determine Runoff Reduction				
Is the Bioretention contributing flow to another practice?			Select Practice	
RRv	3,841			
RRv applied	**3,841**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	5,154	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*	
Volume Directed	0	*ft^3*	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

Af	Required Surface Area (ft2)
WQv	Water Quality Volume (ft3)
df	Depth of the Soil Medium (feet)
hf	Average height of water above the planter bed
tf	Volume Through the Filter Media (days)

k — The hydraulic conductivity [ft/day], can be varied depending on the properties of the soil media. Some reported conductivity values are: ***Sand*** - 3.5 ft/day (City of Austin 1988); ***Peat*** - 2.0 ft/day (Galli 1990); ***Leaf Compost*** - 8.7 ft/day (Claytor and Schueler, 1996); ***Bioretention Soil*** (0.5 ft/day (Claytor &

Design Point:	**Village View**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
4	4.00	1.20	0.30	0.32	6597.89	1.42	Area 4
Enter Impervious Area Reduced by Disconnection of Rooftops			30%	0.32	6,598	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						*ft^3*	

Soil Information			
Soil Group	D		
Soil Infiltration Rate	0.00	*in/hour*	*Okay*
Using Underdrains?	Yes	*Okay*	

Calculate the Minimum Filter Area				
		Value	Units	Notes
WQv		6,598	*ft^3*	
Enter Depth of Soil Media	*df*	2.5	*ft*	*2.5-4 ft*
Enter Hydraulic Conductivity	*k*	0.5	*ft/day*	
Enter Average Height of Ponding	*hf*	0.5	*ft*	*6 inches max.*
Enter Filter Time	*tf*	2	*days*	
Required Filter Area	***Af***	**5498**	***ft^2***	

Determine Actual Bio-Retention Area			
Filter Width	50	*ft*	
Filter Length	122	*ft*	
Filter Area	6100	*ft^2*	
Actual Volume Provided	7320	*ft^3*	

Determine Runoff Reduction				
Is the Bioretention contributing flow to another practice?			Select Practice	
RRv	2,928			
RRv applied	**2,928**	***ft^3***	***This is 40% of the storage provided or WQv whichever is less.***	
Volume Treated	3,670	*ft^3*	*This is the portion of the WQv that is not reduced in the practice.*	
Volume Directed	0	*ft^3*	This volume is directed another practice	
Sizing √	OK		*Check to be sure Area provided ≥ Af*	

Bioretention Worksheet

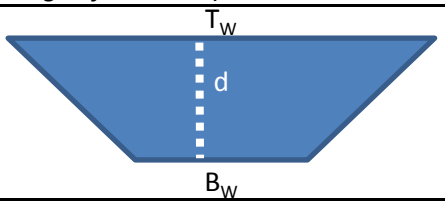
Total RRv Applied	14,718.96
Total Area	18.60
Total Impervious Area	5.58
Total Volume Treated	15,961.22
Rooftop Disconnect Impervious Area Total	0.37

Dry Swale Worksheet

Design Point:	Village View

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
5	0.50	0.32	0.64	0.63	1613.39	1.42	Area 5
Enter Impervious Area Reduced by Disconnection of Rooftops			64%	0.63	1,613	<<WQv after adjusting for Disconnected Rooftops	

Pretreatment Provided			Pretreatment Technique
Pretreatment (10% of WQv)	161	ft^3	

Calculate Available Storage Capacity			
Bottom Width	3	*ft*	Design with a bottom width no greater than eight feet to avoid potential gullying and channel braiding, but no less than two feet
Side Slope (X:1)	0:00	*Okay*	Channels shall be designed with moderate side slopes (flatter than 3:1) for most conditions. 2:1 is the absolute maximum side slope
Longitudinal Slope	1%	*Okay*	*Maximum longitudinal slope shall be 4%*
Flow Depth	1	*ft*	*Maximum ponding depth of one foot at the mid-point of the channel, and a maximum depth of 18" at the end point of the channel (for storage of the WQv)*
Top Width	7	*ft*	
Area	5.00	*sf*	
Minimum Length	290	*ft*	
Actual Length	570	*ft*	
End Point Depth check	1.00	*Okay*	*A maximum depth of 18" at the end point of the channel (for storage of the WQv)*
Storage Capacity	3,011	ft^3	
Soil Group (HSG)		D	

Runoff Reduction				
Is the Dry Swale contributing flow to another practice?		No	Select Practice	Other/Standard SMP
RRv	**602**	***ft^3***	**Runnoff Reduction equals 40% in HSG A and B and 20% in HSG C and D up to the WQv**	
Volume Treated	1,011	ft^3	This is the difference between the WQv calculated and the runoff reduction achieved in the swale	
Volume Directed	0	ft^3	This volume is directed another practice	
Volume √	*Okay*		Check to be sure that channel is long enough to store WQv	

Dry Swale Worksheet

Total RRV	602.27
Total Area	0.50
Total Impervious Area	0.32
Total Volume Treated	1,011.12
Rooftop Disconnect Impervious Area Total	0.00

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Pond 3C
Channel Protection Volume Calculation

Curve Number for Drainage Basin tributary to SMP = 80

Initial Abstraction (Ia) = [(200/CN)-2]
Ia = [(200/80)-2] = [2.50-2] = **0.50**

1 Year Rainfall in inches (**P**) = **2.9** inches for Orange County
Ia/P = 0.50/2.9 = **0.17**

Time of Concentration (**Tc**) = **0.27** hours

Using the above Data and Exhibit 4-III from TR-55
Unit peak discharge (qu) for SCS Type III rainfall distribution
Unit Peak Discharge = (**qu**) = **470 csm/in**
Using a (qu) of 470 csm/in the Ratio of Outflow to Inflow (qo/qi) = **0.040**
qo/qi = 0.040

Channel Protection Storage Volume (Vs) / Volume of Runoff in Inches (Vr) =
$Vs / Vr = 0.683 - 1.43(qo/qi) + 1.64(qo/qi)^2 - 0.804(qo/qi)^3 =$
$Vs / Vr = 0.683 - 1.43(0.04) + 1.64(0.04)^2 - 0.804(0.04)^3 =$
$Vs / Vr = 0.683 - 1.43(0.04) + 1.64(0.0016) - 0.804(0.00064) =$
$Vs / Vr = 0.683 - 0.0572 + 0.00262 – 0.0005 =$
Vs / Vr = **0.628**

Vs = (Vs/Vr) (Post Developed Runoff in inches) (1/12) (Total Drainage Area in Acres)
Vs = (0.628) (0.99”) (1/12) (22.21 ac.)
Vs = **1.15 a.f.** = **50,124 c.f.**

Channel Protection Volume Required = 50,124 c.f.
Channel Protection Volume Provided = 50,980 c.f.

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Pond 2A
Channel Protection Volume Calculation

Curve Number for Drainage Basin tributary to SMP = 81

Initial Abstraction (Ia) = [(200/CN)-2]
Ia = [(200/81)-2] = [2.47-2] = **0.47**

1 Year Rainfall in inches (**P**) = **2.9** inches for Orange County
Ia/P = 0.47/2.9 = **0.16**

Time of Concentration (**Tc**) = **0.21** hours

Using the above Data and Exhibit 4-III from TR-55
Unit peak discharge (qu) for SCS Type III rainfall distribution
Unit Peak Discharge = (**qu**) = **520 csm/in**
Using a (qu) of 520 csm/in the Ratio of Outflow to Inflow (qo/qi) = **0.040**
qo/qi = 0.040

Channel Protection Storage Volume (Vs) / Volume of Runoff in Inches (Vr) =
$Vs / Vr = 0.683 - 1.43(qo/qi) + 1.64(qo/qi)^2 - 0.804(qo/qi)^3 =$
$Vs / Vr = 0.683 - 1.43(0.04) + 1.64(0.04)^2 - 0.804(0.04)^3 =$
$Vs / Vr = 0.683 - 1.43(0.04) + 1.64(0.0016) - 0.804(0.00064) =$
$Vs / Vr = 0.683 - 0.0572 + 0.00262 – 0.0005 =$
Vs / Vr = **0.628**

Vs = (Vs/Vr) (Post Developed Runoff in inches) (1/12) (Total Drainage Area in Acres)
Vs = (0.628) (1.04”) (1/12) (12.91 ac.)
Vs = **0.7431 a.f.** = **32,247 c.f.**

Channel Protection Volume Required = 30,607 c.f.
Channel Protection Volume Provided = 31,980 c.f.

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Pond 3AB
Channel Protection Volume Calculation

Curve Number for Drainage Basin tributary to SMP = 85

Initial Abstraction (Ia) = [(200/CN)-2]
Ia = [(200/85)-2] = [2.35-2] = **0.35**

1 Year Rainfall in inches (**P**) = **2.9** inches for Orange County
Ia/P = 0.35/2.9 = **0.12**

Time of Concentration (**Tc**) = **0.2** hours

Using the above Data and Exhibit 4-III from TR-55
Unit peak discharge (qu) for SCS Type III rainfall distribution
Unit Peak Discharge = (**qu**) = **570 csm/in**
Using a (qu) of 570 csm/in the Ratio of Outflow to Inflow (qo/qi) = **0.035**
qo/qi = 0.035

Channel Protection Storage Volume (Vs) / Volume of Runoff in Inches (Vr) =
$Vs / Vr = 0.683 - 1.43(qo/qi) + 1.64(qo/qi)^2 - 0.804(qo/qi)^3 =$
$Vs / Vr = 0.683 - 1.43(0.035) + 1.64(0.035)^2 - 0.804(0.035)^3 =$
$Vs / Vr = 0.683 - 1.43(0.035) + 1.64(0.00123) - 0.804(0.000043) =$
$Vs / Vr = 0.683 - 0.05 + 0.002 – 0.0003 =$
Vs / Vr = **0.6347**

Vs = (Vs/Vr) (Post Developed Runoff in inches) (1/12) (Total Drainage Area in Acres)
Vs = (0.6347) (1.3”) (1/12) (12.11 ac.)
Vs = **0.7431 a.f.** = **32,247 c.f.**

Channel Protection Volume Required = 36,271 c.f.
Channel Protection Volume Provided = 38,148 c.f.

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Swale Calculations

DIVERSION SWALE B

Channel Calculator
50 Year Storm

Given Input Data:

Shape ..... Trapezoidal
Solving for ..... ***Depth of Flow***
Flowrate ..... 10.0000 cfs
Slope ..... 0.1200 ft/ft
Manning's n 0.0300
Height ..... **2.0000 ft**
Bottom width ..... 1.0000 ft
Left slope ..... 0.5000 ft/ft (V/H)
Right slope ..... 0.5000 ft/ft (V/H)

Computed Results:

Depth ..... ***0.5627 ft***
Velocity ..... 8.3607 fps
Full Flowrate ..... 172.2290 cfs
Flow area 1.1961 ft2
Flow perimeter ..... 3.5166 ft
Hydraulic radius ..... 0.3401 ft
Top width ..... 3.2509 ft
Area 10.0000 ft2
Perimeter ..... 9.9443 ft
Percent full ..... **28.1367 %**

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Swale Calculations

DIVERSION SWALE A

Channel Calculator
50 Year Storm

Given Input Data:

Shape ..... Trapezoidal
Solving for ..... ***Depth of Flow***
Flowrate ..... 50.0000 cfs
Slope ..... 0.1200 ft/ft
Manning's n 0.0300
Height ..... **2.0000 ft**
Bottom width ..... 2.0000 ft
Left slope ..... 0.5000 ft/ft (V/H)
Right slope ..... 0.5000 ft/ft (V/H)

Computed Results:

Depth ..... ***1.0020 ft***
Velocity ..... 12.4631 fps
Full Flowrate ..... 218.9436 cfs
Flow area 4.0119 ft2
Flow perimeter ..... 6.4810 ft
Hydraulic radius ..... 0.6190 ft
Top width ..... 6.0079 ft
Area 12.0000 ft2
Perimeter ..... 10.9443 ft
Percent full ..... **50.0987 %**

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Culvert Calculations

30” HDPE CULVERT

Manning Pipe Calculator
100 Year Storm

Given Input Data:

Shape ..... Circular
Solving for ..... ***Depth of Flow***
Diameter ..... 2.5000 ft
Flowrate ..... **55.3000 cfs**
Slope ..... 0.0200 ft/ft
Manning's n 0.0120

Computed Results:

Depth ..... ***1.8201 ft***
Area 4.9087 ft2
Wetted Area 3.8284 ft2
Wetted Perimeter ..... 5.1108 ft
Perimeter ..... 7.8540 ft
Velocity ..... 14.4446 fps
Hydraulic Radius ..... 0.7491 ft
Percent Full ..... **72.8020 %**
Full flow Flowrate ..... 62.8409 cfs
Full flow velocity ..... 12.8018 fps

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Culvert Calculations

18” HDPE CULVERT
TO BIORETENTION AREA 1

Manning Pipe Calculator
2 Year Storm

Given Input Data:

Shape ..... Circular
Solving for ..... ***Depth of Flow***
Diameter ..... 1.5000 ft
Flowrate ..... **7.0000 cfs**
Slope ..... 0.0200 ft/ft
Manning's n 0.0120

Computed Results:

Depth ..... ***0.6918 ft***
Area 1.7671 ft2
Wetted Area 0.7964 ft2
Wetted Perimeter ..... 2.2397 ft
Perimeter ..... 4.7124 ft
Velocity ..... 8.7897 fps
Hydraulic Radius ..... 0.3556 ft
Percent Full ..... 46.1212 %
Full flow Flowrate ..... 16.0933 cfs
Full flow velocity ..... 9.1070 fps

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Culvert Calculations

18” HDPE CULVERT
TO BIORETENTION AREA 2

Manning Pipe Calculator
2 Year Storm

Given Input Data:

Shape ..... Circular
Solving for ..... ***Depth of Flow***
Diameter ..... 1.5000 ft
Flowrate ..... **9.5000 cfs**
Slope ..... 0.0200 ft/ft
Manning's n 0.0120

Computed Results:

Depth ..... ***0.8290 ft***
Area 1.7671 ft2
Wetted Area 1.0018 ft2
Wetted Perimeter ..... 2.5145 ft
Perimeter ..... 4.7124 ft
Velocity ..... 9.4825 fps
Hydraulic Radius ..... 0.3984 ft
Percent Full ..... 55.2664 %
Full flow Flowrate ..... 16.0933 cfs
Full flow velocity ..... 9.1070 fps

VILLAGE VIEW
Reduced Scale Alternative Cluster Subdivision

Culvert Calculations

18” HDPE CULVERT
TO BIORETENTION AREA 3

Manning Pipe Calculator
2 Year Storm

Given Input Data:

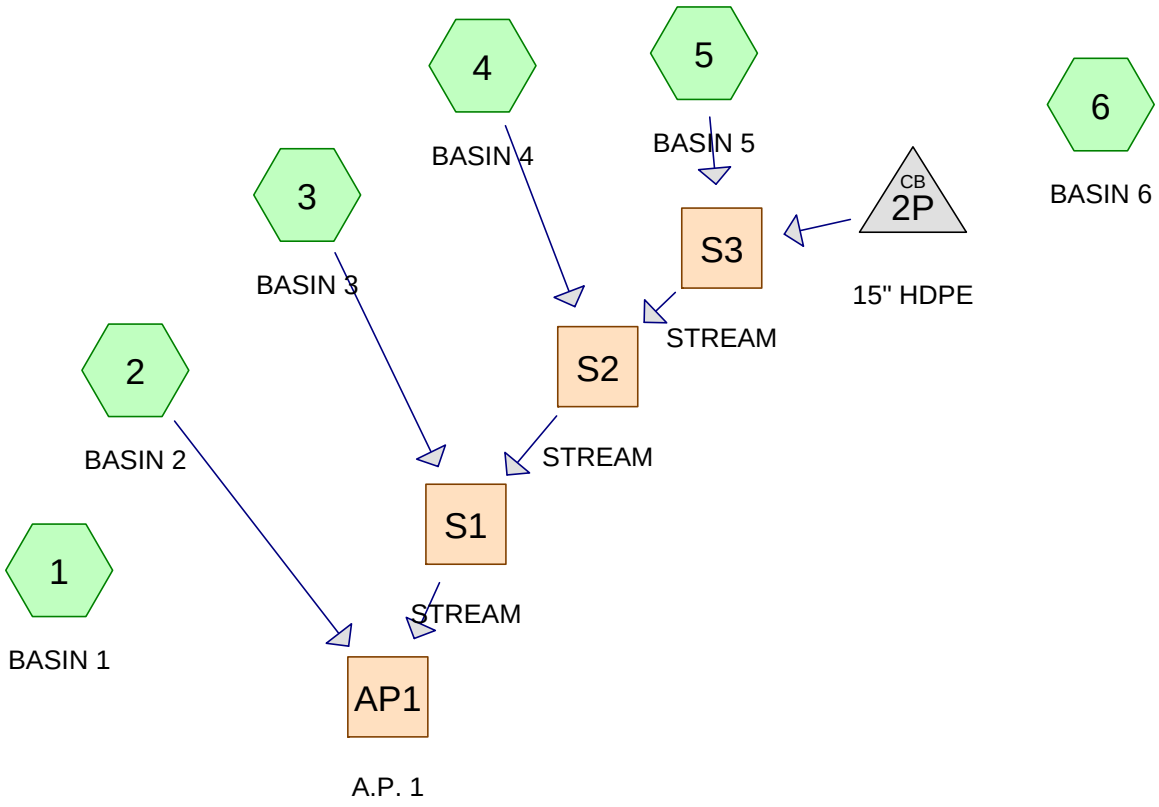
Shape ..... Circular
Solving for ..... ***Depth of Flow***
Diameter ..... **1.5000 ft**
Flowrate ..... 8.0000 cfs
Slope ..... 0.0200 ft/ft
Manning's n 0.0120

Computed Results:

Depth ..... ***0.7474 ft***
Area 1.7671 ft2
Wetted Area 0.8797 ft2
Wetted Perimeter ..... 2.3511 ft
Perimeter ..... 4.7124 ft
Velocity ..... 9.0937 fps
Hydraulic Radius ..... 0.3742 ft
Percent Full ..... 49.8291 %
Full flow Flowrate ..... 16.0933 cfs
Full flow velocity ..... 9.1070 fps

Appendix D

TR-20 HydroCAD Model



Subcat Reach Pond Link

Routing Diagram for SILBER3 2019 PRE4
Prepared by Kirk Rother, PE, PLLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.500	80	>75% Grass cover, Good, HSG D (1, 4, 5, 6)
2.260	98	Impervious Surfaces (1, 2, 4, 5)
0.140	98	Impervious surfaces (3)
1.150	98	Imperviuos Surfaces (6)
3.700	78	Meadow, non-grazed, HSG D (3, 4)
11.900	80	Pasture/grassland/range, Good, HSG D (6)
109.050	77	Woods, Good, HSG D (1, 2, 3, 4, 5, 6)
137.700	**78**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
134.150	HSG D	1, 2, 3, 4, 5, 6
3.550	Other	1, 2, 3, 4, 5, 6
137.700		**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
0.000	0.000	0.000	9.500	0.000	9.500	>75% Grass cover, Good	1, 4, 5, 6
0.000	0.000	0.000	0.000	2.260	2.260	Impervious Surfaces	1, 2, 4, 5
0.000	0.000	0.000	0.000	0.140	0.140	Impervious surfaces	3
0.000	0.000	0.000	0.000	1.150	1.150	Imperviuos Surfaces	6
0.000	0.000	0.000	3.700	0.000	3.700	Meadow, non-grazed	3, 4
0.000	0.000	0.000	11.900	0.000	11.900	Pasture/grassland/range, Good	6
0.000	0.000	0.000	109.050	0.000	109.050	Woods, Good	1, 2, 3, 4, 5, 6
0.000	**0.000**	**0.000**	**134.150**	**3.550**	**137.700**	**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	1	0.00	0.00	850.0	0.0200	0.012	18.0	0.0	0.0
2	2P	720.00	716.00	35.0	0.1143	0.012	15.0	0.0	0.0

Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: BASIN 1 Runoff Area=17.370 ac 6.85% Impervious Runoff Depth=0.93"
Flow Length=2,535' Tc=21.8 min CN=79 Runoff=11.80 cfs 1.350 af

Subcatchment 2: BASIN 2 Runoff Area=23.400 ac 0.73% Impervious Runoff Depth=0.83"
Flow Length=2,080' Tc=19.0 min CN=77 Runoff=14.57 cfs 1.618 af

Subcatchment 3: BASIN 3 Runoff Area=28.910 ac 0.48% Impervious Runoff Depth=0.83"
Flow Length=2,080' Tc=18.5 min CN=77 Runoff=18.18 cfs 1.998 af

Subcatchment 4: BASIN 4 Runoff Area=12.760 ac 0.78% Impervious Runoff Depth=0.83"
Flow Length=1,805' Tc=16.0 min CN=77 Runoff=8.50 cfs 0.882 af

Subcatchment 5: BASIN 5 Runoff Area=5.510 ac 14.52% Impervious Runoff Depth=1.04"
Flow Length=1,020' Tc=15.3 min CN=81 Runoff=4.91 cfs 0.479 af

Subcatchment 6: BASIN 6 Runoff Area=49.750 ac 2.31% Impervious Runoff Depth=0.88"
Flow Length=2,650' Tc=25.1 min CN=78 Runoff=29.73 cfs 3.649 af

Reach AP1: A.P. 1 Inflow=45.45 cfs 4.977 af
Outflow=45.45 cfs 4.977 af

Reach S1: STREAM Avg. Flow Depth=0.62' Max Vel=7.57 fps Inflow=31.30 cfs 3.360 af
n=0.030 L=610.0' S=0.0541 '/' Capacity=227.67 cfs Outflow=31.02 cfs 3.360 af

Reach S2: STREAM Avg. Flow Depth=0.51' Max Vel=7.46 fps Inflow=13.35 cfs 1.361 af
n=0.030 L=590.0' S=0.0763 '/' Capacity=150.60 cfs Outflow=13.12 cfs 1.361 af

Reach S3: STREAM Avg. Flow Depth=0.45' Max Vel=5.56 fps Inflow=4.91 cfs 0.479 af
n=0.030 L=170.0' S=0.0588 '/' Capacity=20.83 cfs Outflow=4.85 cfs 0.479 af

Pond 2P: 15" HDPE Peak Elev=0.00'
15.0" Round Culvert n=0.012 L=35.0' S=0.1143 '/' Primary=0.00 cfs 0.000 af

Total Runoff Area = 137.700 ac Runoff Volume = 9.976 af Average Runoff Depth = 0.87"
97.42% Pervious = 134.150 ac 2.58% Impervious = 3.550 ac

Summary for Subcatchment 1: BASIN 1

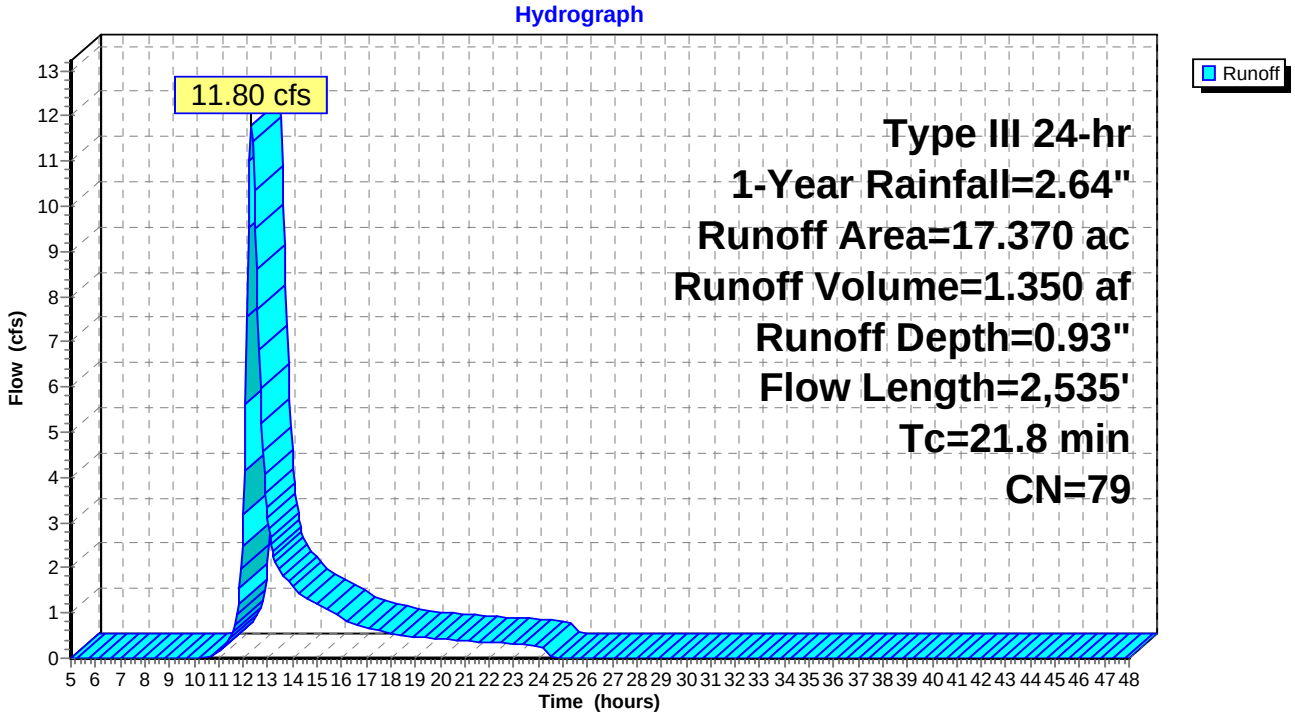
Runoff = 11.80 cfs @ 12.32 hrs, Volume= 1.350 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	3.500	80	>75% Grass cover, Good, HSG D
*	1.190	98	Impervious Surfaces
	12.680	77	Woods, Good, HSG D
	17.370	79	Weighted Average
	16.180		93.15% Pervious Area
	1.190		6.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.8	1,415	0.1500	6.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.6	850	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	170	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.8	2,535	Total			

Subcatchment 1: BASIN 1



Summary for Subcatchment 2: BASIN 2

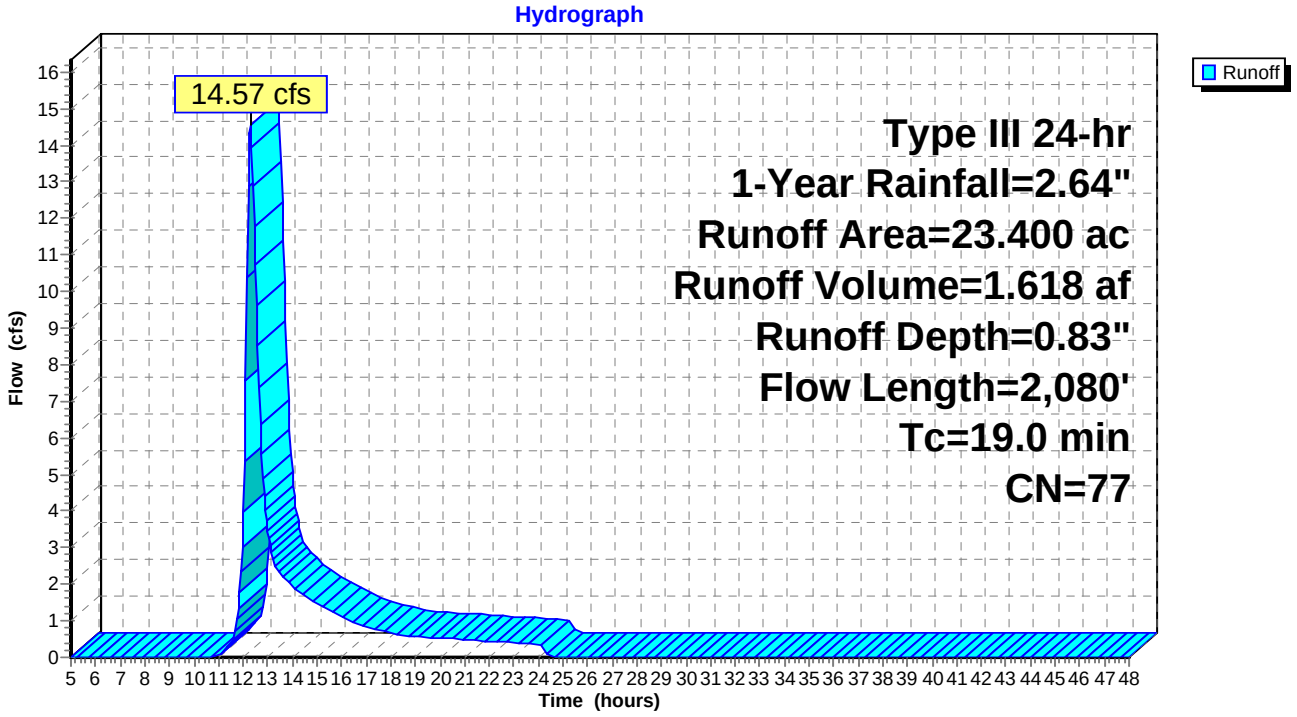
Runoff = 14.57 cfs @ 12.29 hrs, Volume= 1.618 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
*	0.170	98	Impervious Surfaces
	23.230	77	Woods, Good, HSG D
	23.400	77	Weighted Average
	23.230		99.27% Pervious Area
	0.170		0.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0450	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.3	815	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	840	0.1300	17.86	119.04	**Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.030
1.1	325	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
19.0	2,080	Total			

Subcatchment 2: BASIN 2



Summary for Subcatchment 3: BASIN 3

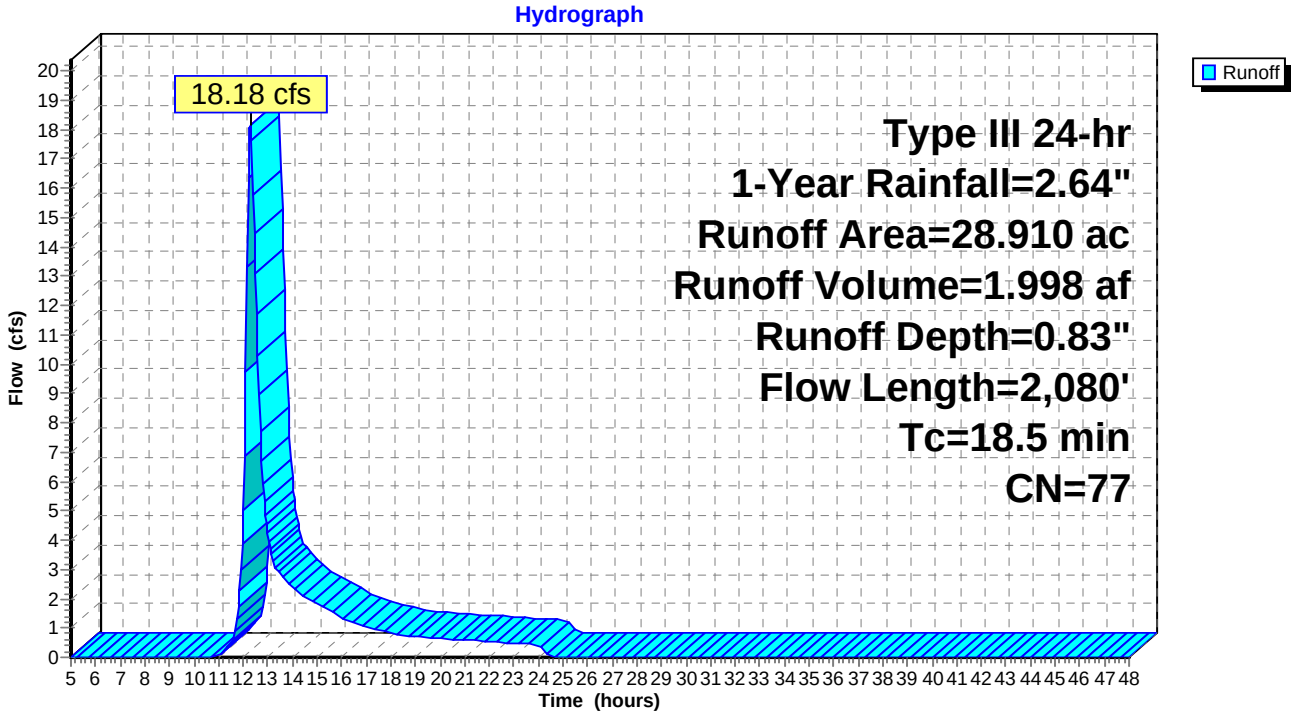
Runoff = 18.18 cfs @ 12.28 hrs, Volume= 1.998 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	25.570	77	Woods, Good, HSG D
*	0.140	98	Impervious surfaces
	3.200	78	Meadow, non-grazed, HSG D
	28.910	77	Weighted Average
	28.770		99.52% Pervious Area
	0.140		0.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
4.3	1,430	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	550	0.0760	15.03	150.34	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 1.0 '/' Top.W=7.00' n= 0.030
18.5	2,080	Total			

Subcatchment 3: BASIN 3



Summary for Subcatchment 4: BASIN 4

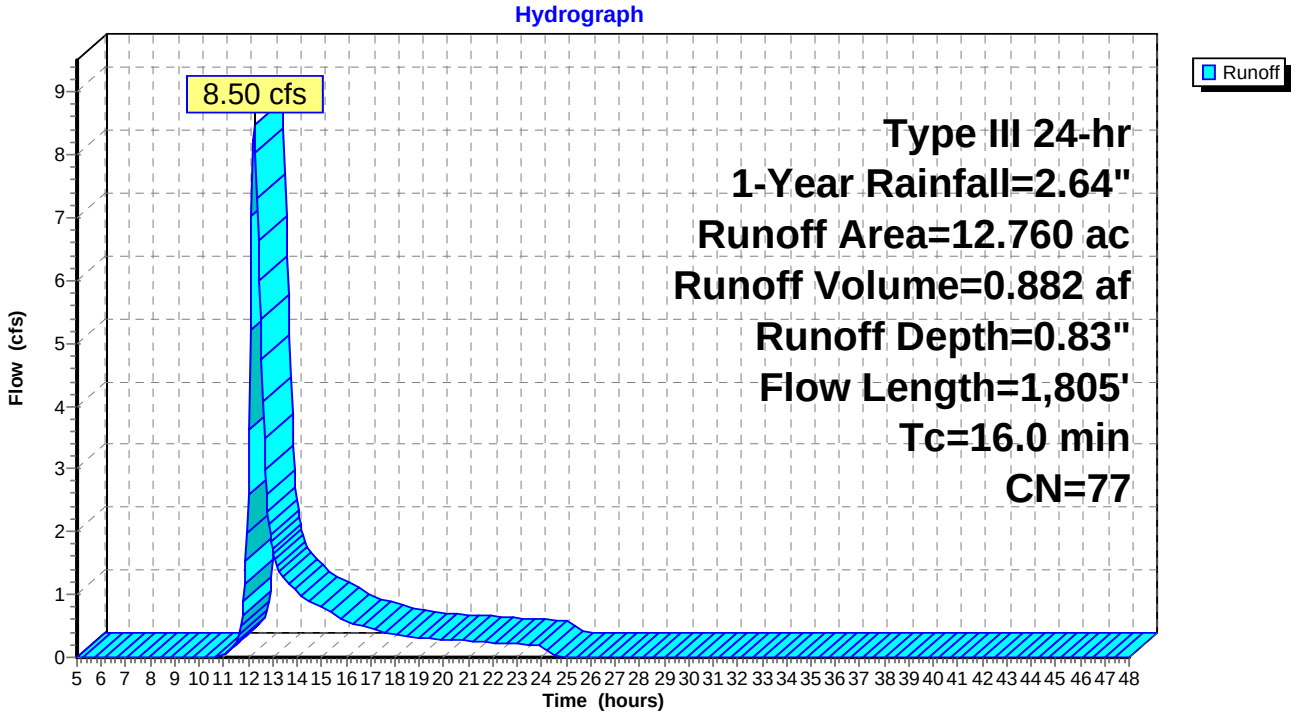
Runoff = 8.50 cfs @ 12.24 hrs, Volume= 0.882 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	0.500	78	Meadow, non-grazed, HSG D
	0.700	80	>75% Grass cover, Good, HSG D
*	0.100	98	Impervious Surfaces
	11.460	77	Woods, Good, HSG D
	12.760	77	Weighted Average
	12.660		99.22% Pervious Area
	0.100		0.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
3.2	890	0.0850	4.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.2	815	0.1000	11.23	37.43	**Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.030
16.0	1,805	Total			

Subcatchment 4: BASIN 4



Summary for Subcatchment 5: BASIN 5

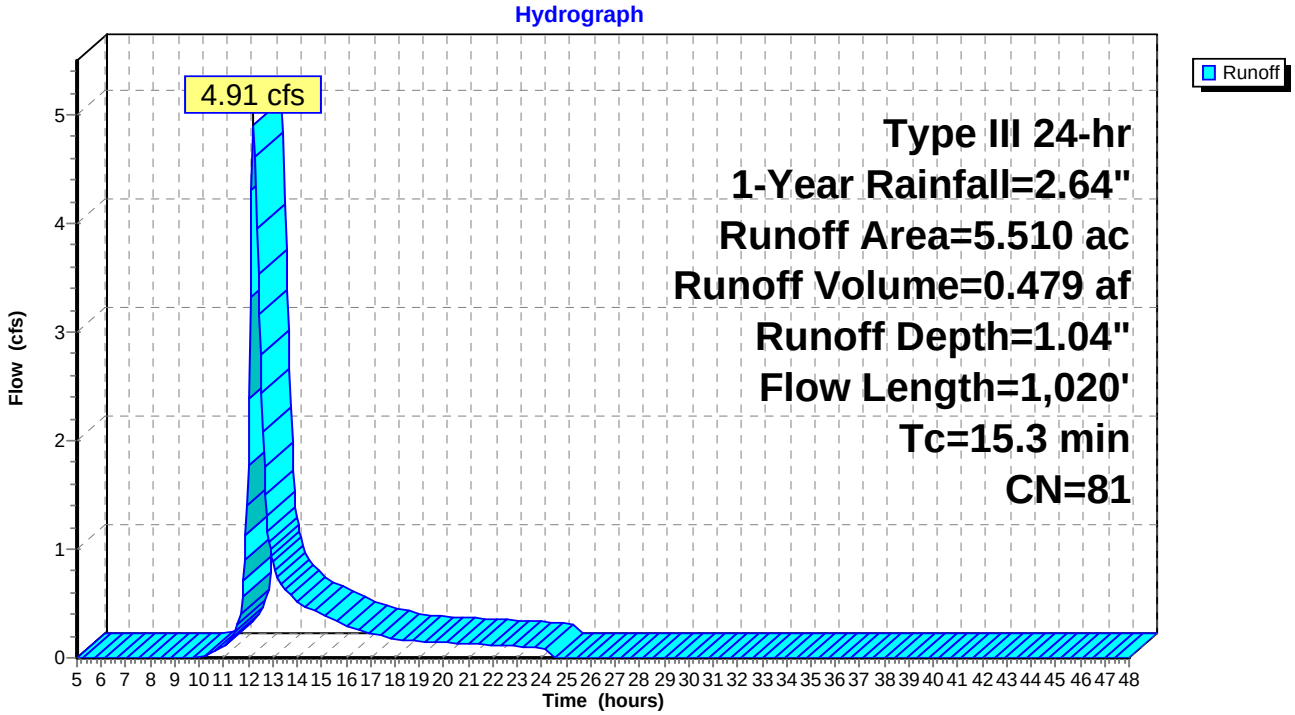
Runoff = 4.91 cfs @ 12.22 hrs, Volume= 0.479 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
*	0.800	98	Impervious Surfaces
	2.200	80	>75% Grass cover, Good, HSG D
	2.510	77	Woods, Good, HSG D
	5.510	81	Weighted Average
	4.710		85.48% Pervious Area
	0.800		14.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0700	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.9	920	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
15.3	1,020	Total			

Subcatchment 5: BASIN 5



Summary for Subcatchment 6: BASIN 6

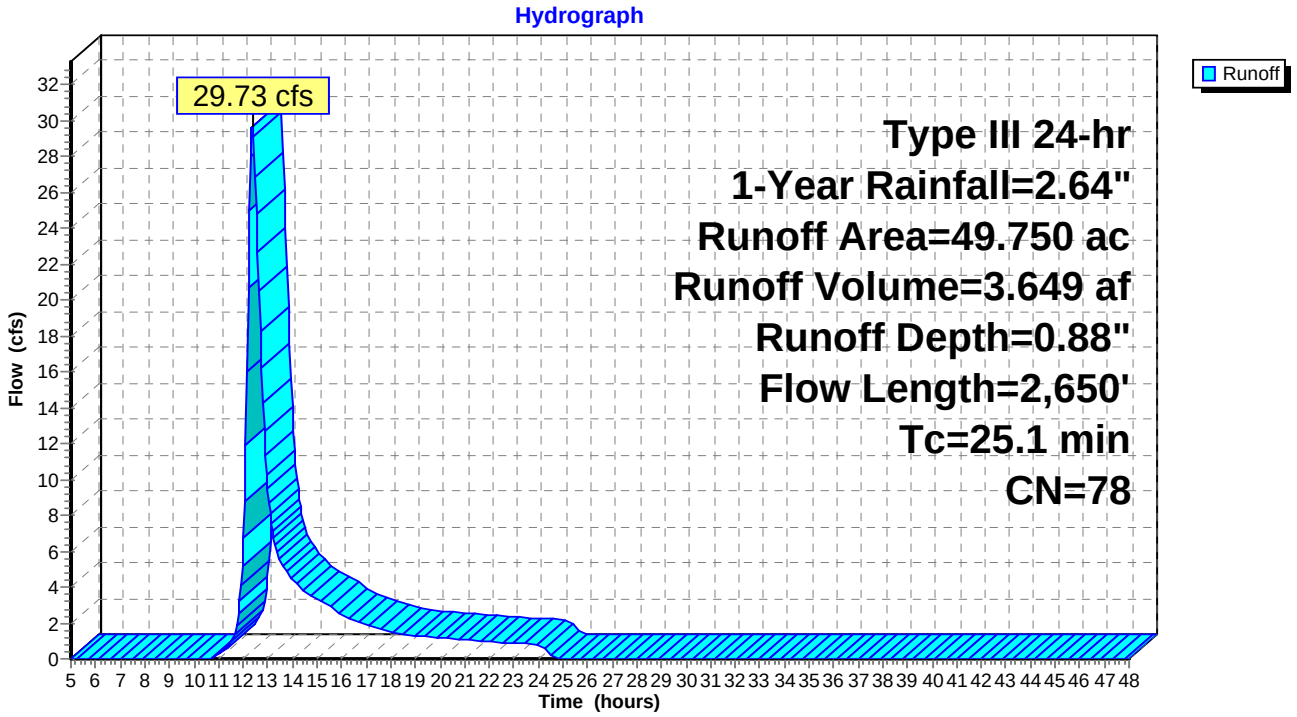
Runoff = 29.73 cfs @ 12.38 hrs, Volume= 3.649 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	3.100	80	>75% Grass cover, Good, HSG D
*	1.150	98	Imperviuos Surfaces
	11.900	80	Pasture/grassland/range, Good, HSG D
	33.600	77	Woods, Good, HSG D
	49.750	78	Weighted Average
	48.600		97.69% Pervious Area
	1.150		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	2,550	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.1	2,650	Total			

Subcatchment 6: BASIN 6

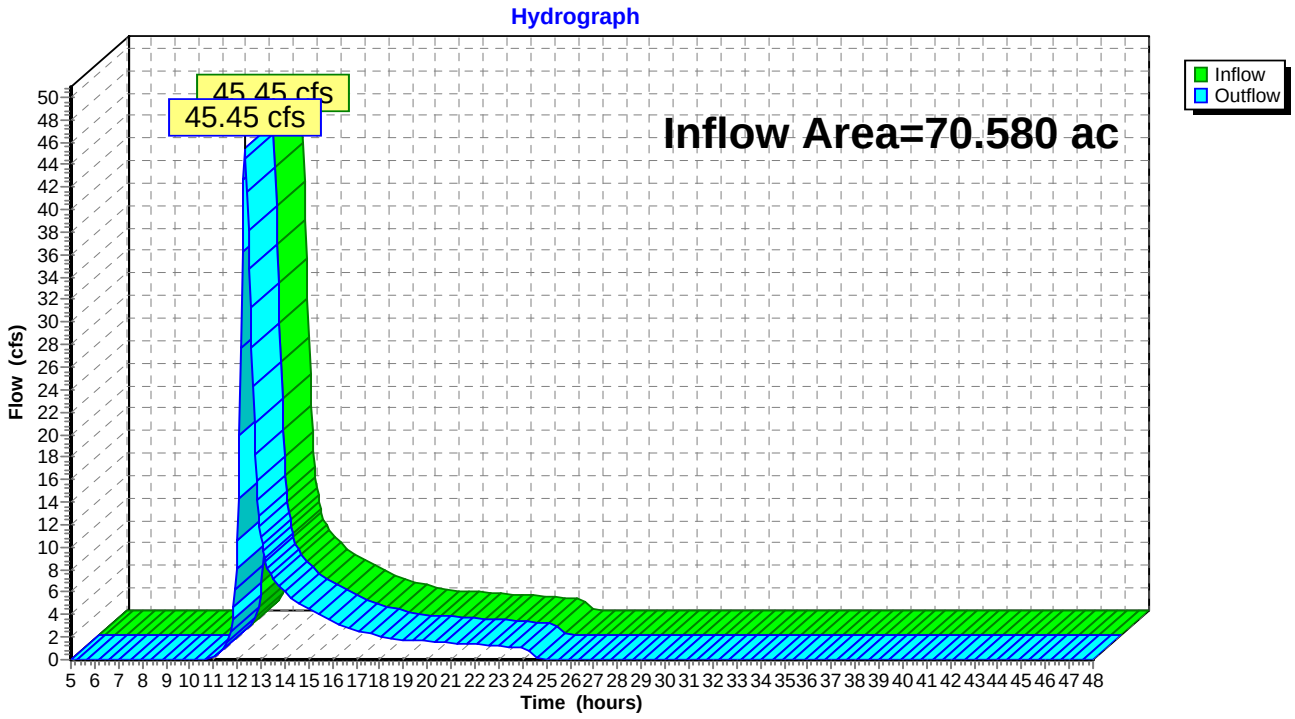


Summary for Reach AP1: A.P. 1

Inflow Area = 70.580 ac, 1.71% Impervious, Inflow Depth = 0.85" for 1-Year event
Inflow = 45.45 cfs @ 12.31 hrs, Volume= 4.977 af
Outflow = 45.45 cfs @ 12.31 hrs, Volume= 4.977 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach AP1: A.P. 1



Summary for Reach S1: STREAM

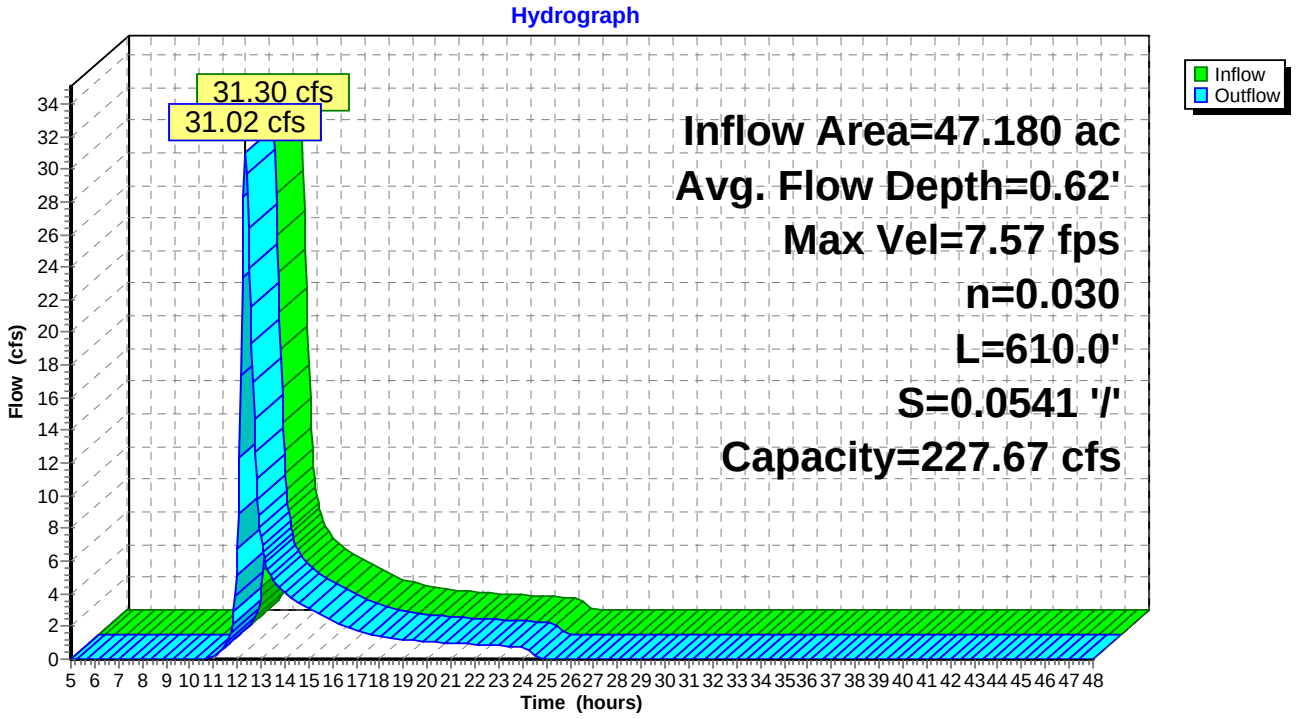
Inflow Area = 47.180 ac, 2.20% Impervious, Inflow Depth = 0.85" for 1-Year event
Inflow = 31.30 cfs @ 12.28 hrs, Volume= 3.360 af
Outflow = 31.02 cfs @ 12.32 hrs, Volume= 3.360 af, Atten= 1%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.57 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.43 fps, Avg. Travel Time= 4.2 min

Peak Storage= 2,521 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 227.67 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 610.0' Slope= 0.0541 '/'
Inlet Invert= 665.00', Outlet Invert= 632.00'

Reach S1: STREAM



Summary for Reach S2: STREAM

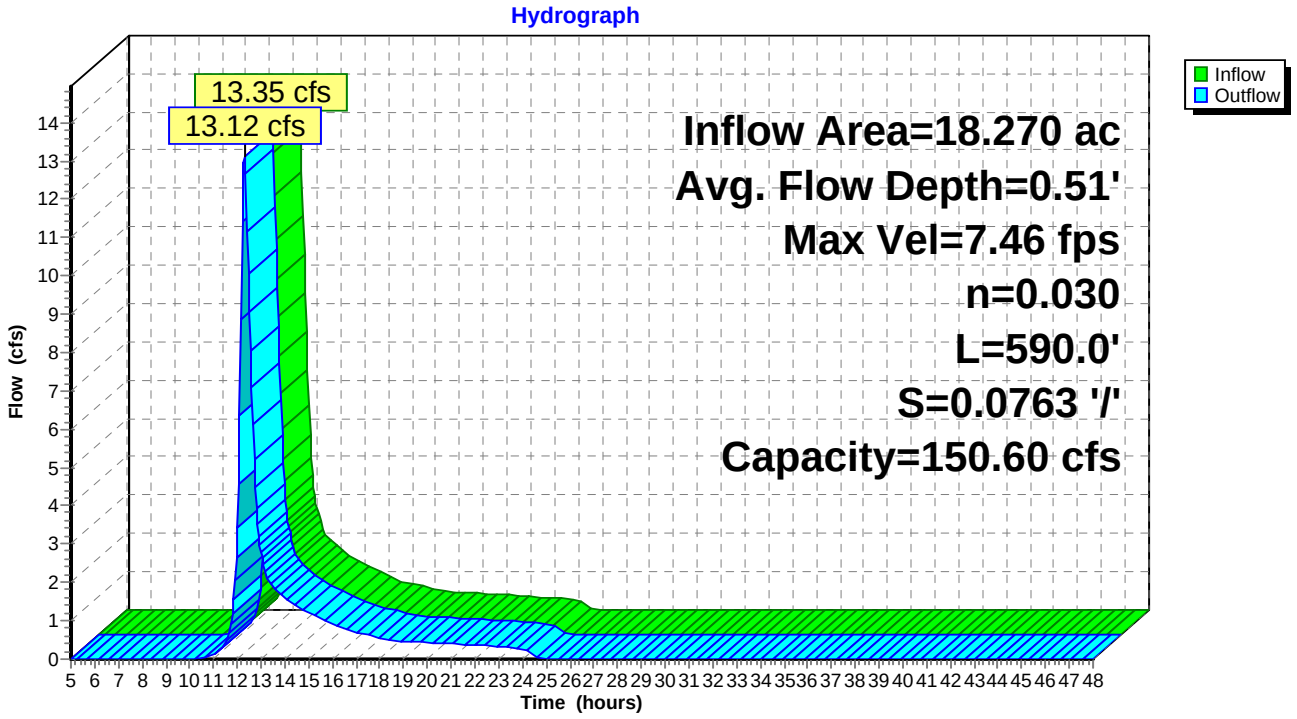
Inflow Area = 18.270 ac, 4.93% Impervious, Inflow Depth = 0.89" for 1-Year event
Inflow = 13.35 cfs @ 12.24 hrs, Volume= 1.361 af
Outflow = 13.12 cfs @ 12.28 hrs, Volume= 1.361 af, Atten= 2%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.46 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.52 fps, Avg. Travel Time= 3.9 min

Peak Storage= 1,055 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 150.60 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 590.0' Slope= 0.0763 '/'
Inlet Invert= 710.00', Outlet Invert= 665.00'

Reach S2: STREAM



Summary for Reach S3: STREAM

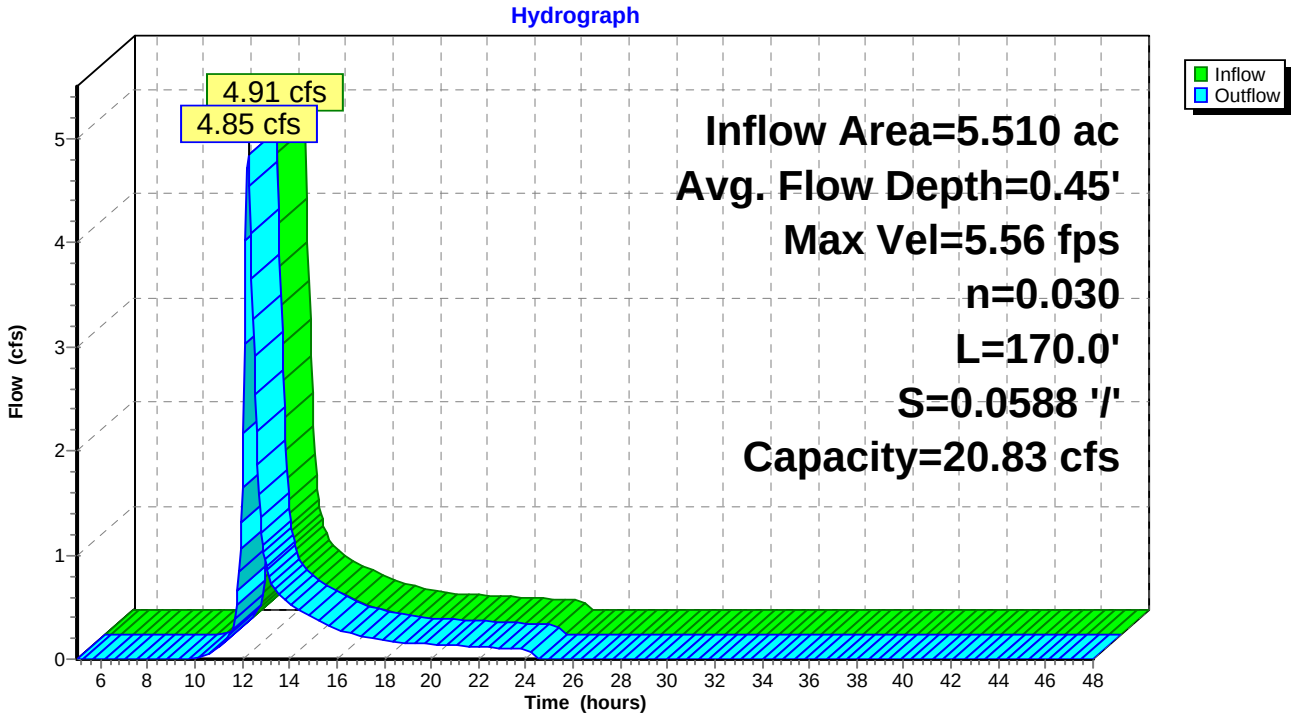
Inflow Area = 5.510 ac, 14.52% Impervious, Inflow Depth = 1.04" for 1-Year event
Inflow = 4.91 cfs @ 12.22 hrs, Volume= 0.479 af
Outflow = 4.85 cfs @ 12.24 hrs, Volume= 0.479 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.56 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.99 fps, Avg. Travel Time= 1.4 min

Peak Storage= 149 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.00' Flow Area= 2.5 sf, Capacity= 20.83 cfs

1.50' x 1.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 3.50'
Length= 170.0' Slope= 0.0588 '/'
Inlet Invert= 710.00', Outlet Invert= 700.00'

Reach S3: STREAM

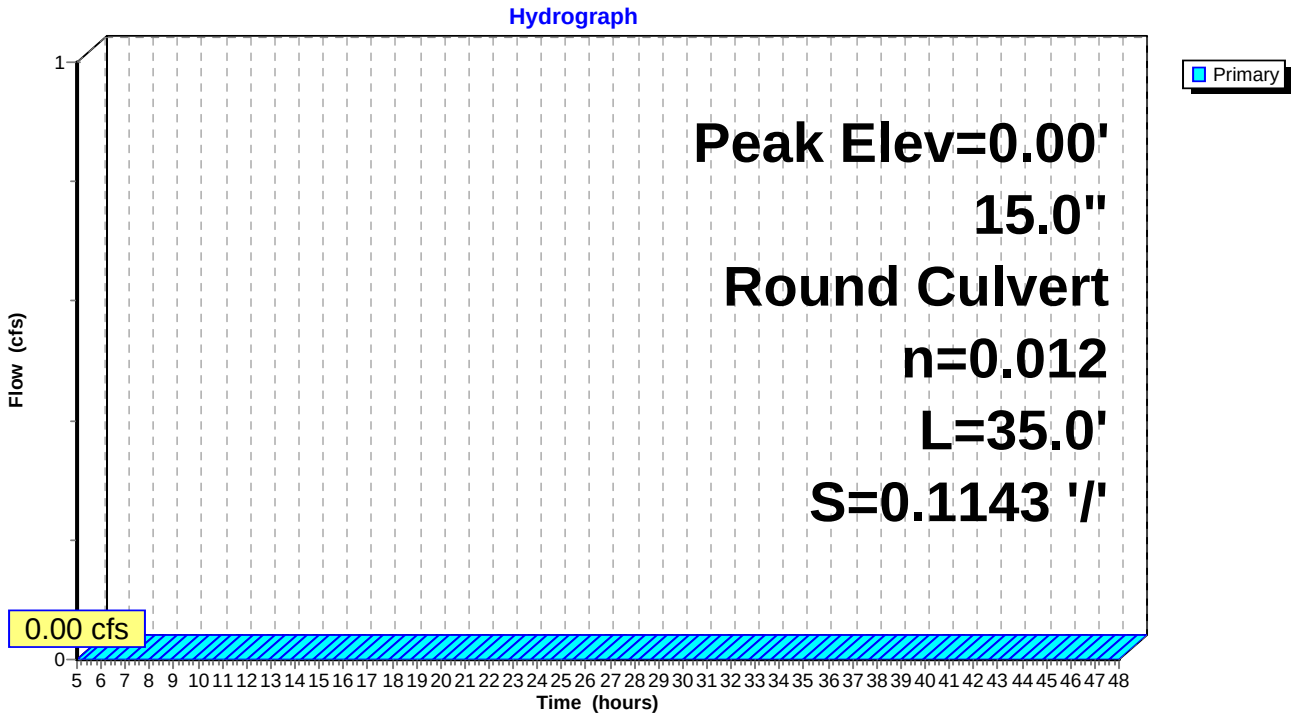


Summary for Pond 2P: 15" HDPE

Device	Routing	Invert	Outlet Devices
#1	Primary	720.00'	**15.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 720.00' / 716.00' S= 0.1143 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond 2P: 15" HDPE



Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: BASIN 1 Runoff Area=17.370 ac 6.85% Impervious Runoff Depth=2.63"
Flow Length=2,535' Tc=21.8 min CN=79 Runoff=34.74 cfs 3.807 af

Subcatchment 2: BASIN 2 Runoff Area=23.400 ac 0.73% Impervious Runoff Depth=2.46"
Flow Length=2,080' Tc=19.0 min CN=77 Runoff=46.20 cfs 4.790 af

Subcatchment 3: BASIN 3 Runoff Area=28.910 ac 0.48% Impervious Runoff Depth=2.46"
Flow Length=2,080' Tc=18.5 min CN=77 Runoff=57.68 cfs 5.918 af

Subcatchment 4: BASIN 4 Runoff Area=12.760 ac 0.78% Impervious Runoff Depth=2.46"
Flow Length=1,805' Tc=16.0 min CN=77 Runoff=26.97 cfs 2.612 af

Subcatchment 5: BASIN 5 Runoff Area=5.510 ac 14.52% Impervious Runoff Depth=2.81"
Flow Length=1,020' Tc=15.3 min CN=81 Runoff=13.58 cfs 1.290 af

Subcatchment 6: BASIN 6 Runoff Area=49.750 ac 2.31% Impervious Runoff Depth=2.54"
Flow Length=2,650' Tc=25.1 min CN=78 Runoff=90.53 cfs 10.542 af

Reach AP1: A.P. 1 Inflow=142.08 cfs 14.611 af
Outflow=142.08 cfs 14.611 af

Reach S1: STREAM Avg. Flow Depth=1.22' Max Vel=10.99 fps Inflow=97.53 cfs 9.820 af
n=0.030 L=610.0' S=0.0541 '/' Capacity=227.67 cfs Outflow=96.22 cfs 9.820 af

Reach S2: STREAM Avg. Flow Depth=0.97' Max Vel=10.46 fps Inflow=40.45 cfs 3.902 af
n=0.030 L=590.0' S=0.0763 '/' Capacity=150.60 cfs Outflow=39.86 cfs 3.902 af

Reach S3: STREAM Avg. Flow Depth=0.80' Max Vel=7.42 fps Inflow=13.58 cfs 1.290 af
n=0.030 L=170.0' S=0.0588 '/' Capacity=20.83 cfs Outflow=13.48 cfs 1.290 af

Pond 2P: 15" HDPE Peak Elev=0.00'
15.0" Round Culvert n=0.012 L=35.0' S=0.1143 '/' Primary=0.00 cfs 0.000 af

Total Runoff Area = 137.700 ac Runoff Volume = 28.960 af Average Runoff Depth = 2.52"
97.42% Pervious = 134.150 ac 2.58% Impervious = 3.550 ac

Summary for Subcatchment 1: BASIN 1

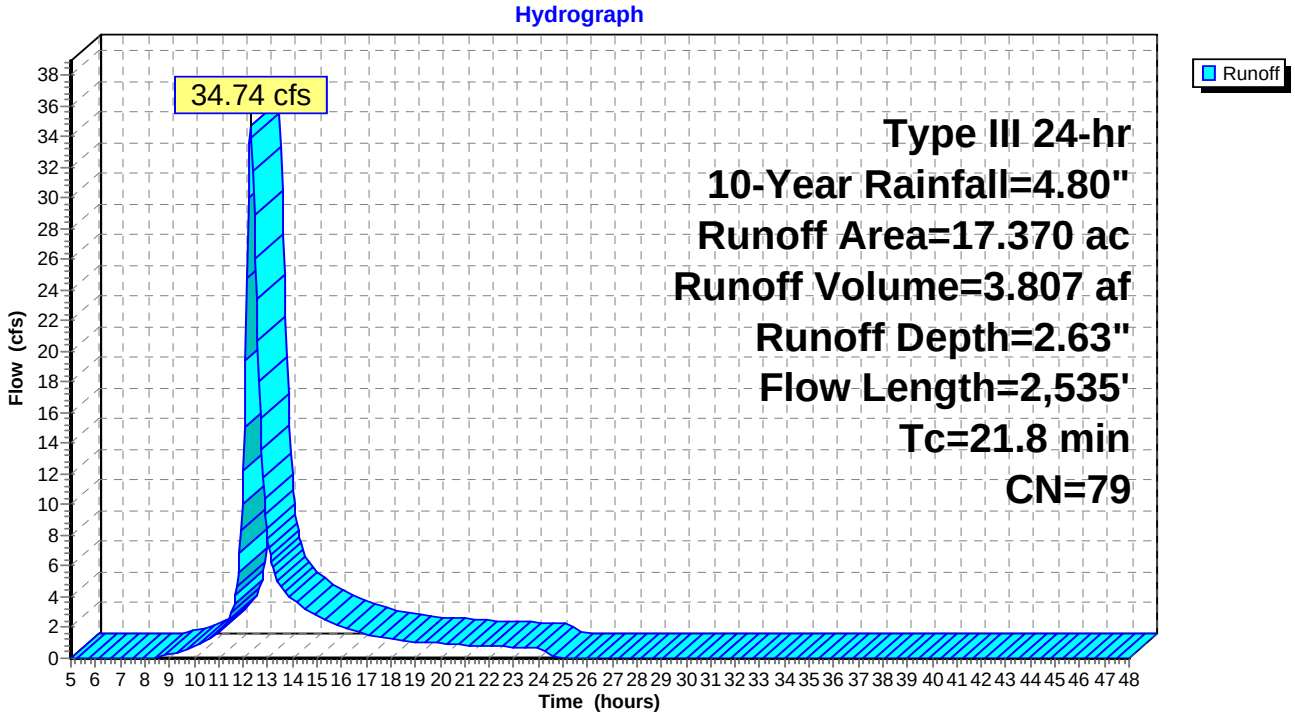
Runoff = 34.74 cfs @ 12.30 hrs, Volume= 3.807 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	3.500	80	>75% Grass cover, Good, HSG D
*	1.190	98	Impervious Surfaces
	12.680	77	Woods, Good, HSG D
	17.370	79	Weighted Average
	16.180		93.15% Pervious Area
	1.190		6.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.8	1,415	0.1500	6.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.6	850	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	170	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.8	2,535	Total			

Subcatchment 1: BASIN 1



Summary for Subcatchment 2: BASIN 2

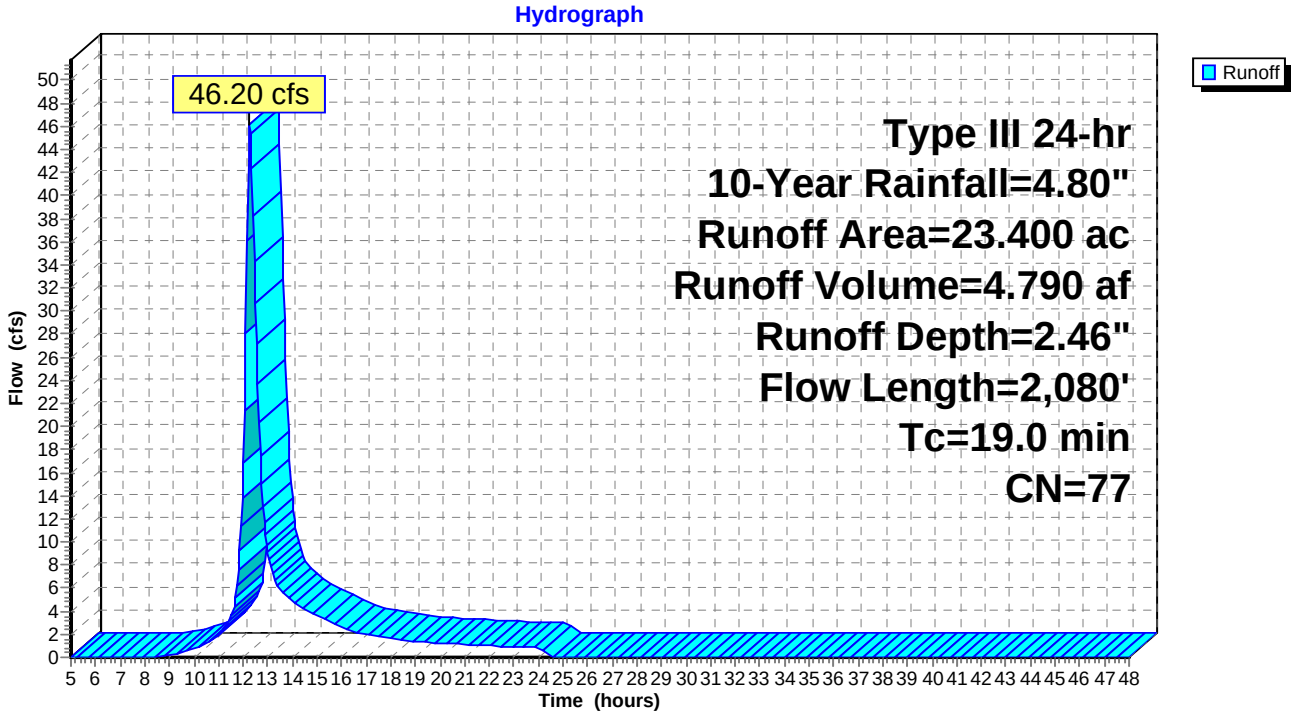
Runoff = 46.20 cfs @ 12.27 hrs, Volume= 4.790 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
*	0.170	98	Impervious Surfaces
	23.230	77	Woods, Good, HSG D
	23.400	77	Weighted Average
	23.230		99.27% Pervious Area
	0.170		0.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0450	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.3	815	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	840	0.1300	17.86	119.04	**Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.030
1.1	325	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
19.0	2,080	Total			

Subcatchment 2: BASIN 2



Summary for Subcatchment 3: BASIN 3

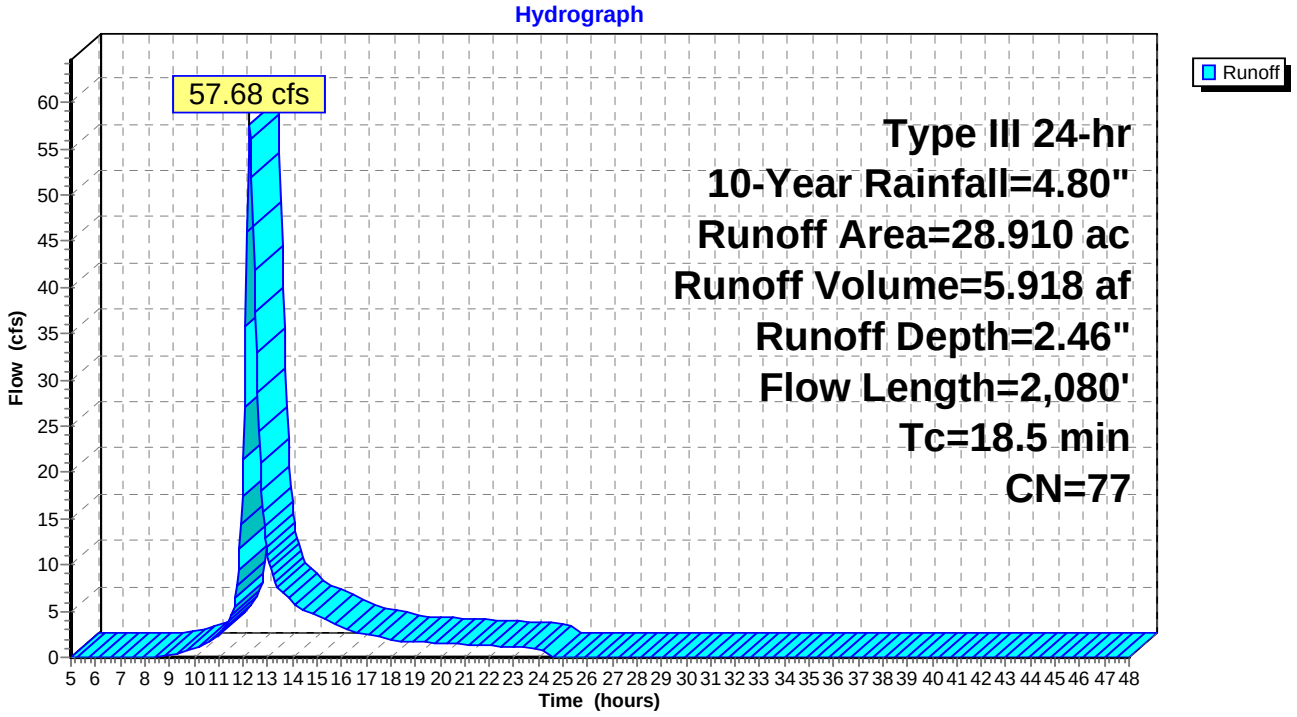
Runoff = 57.68 cfs @ 12.26 hrs, Volume= 5.918 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	25.570	77	Woods, Good, HSG D
*	0.140	98	Impervious surfaces
	3.200	78	Meadow, non-grazed, HSG D
	28.910	77	Weighted Average
	28.770		99.52% Pervious Area
	0.140		0.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
4.3	1,430	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	550	0.0760	15.03	150.34	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 1.0 '/' Top.W=7.00' n= 0.030
18.5	2,080	Total			

Subcatchment 3: BASIN 3



Summary for Subcatchment 4: BASIN 4

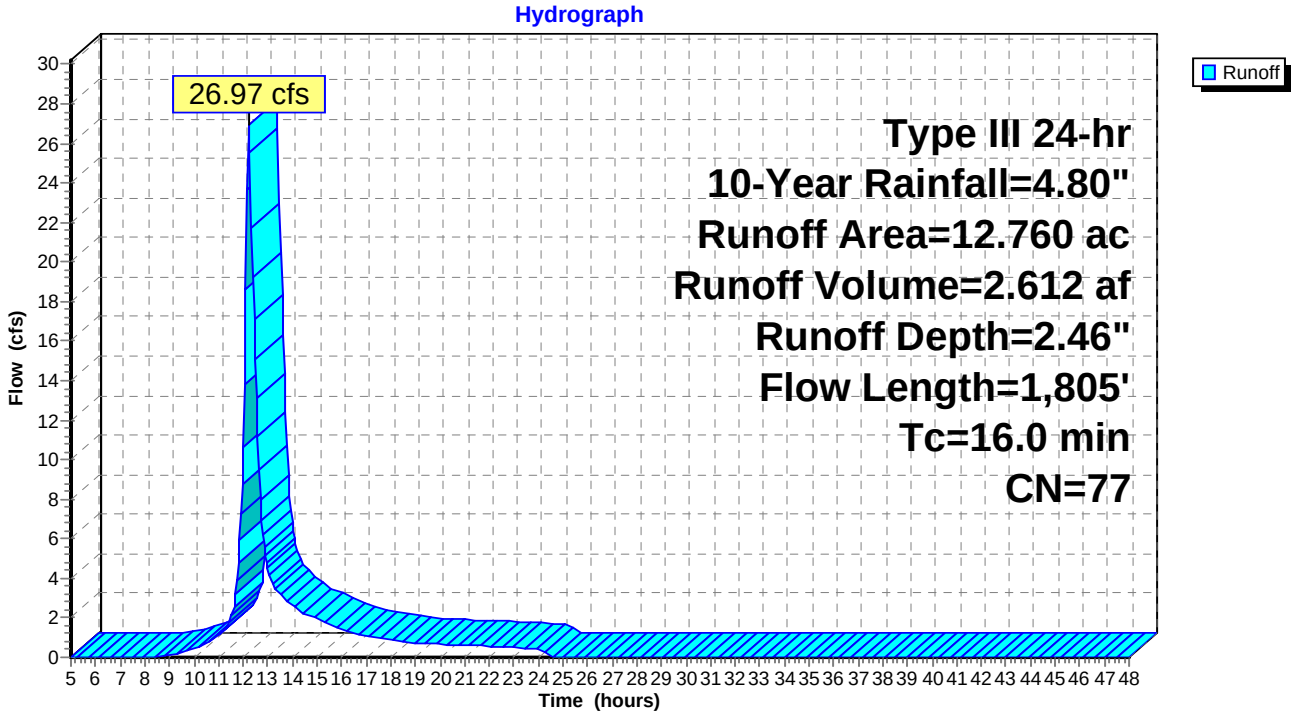
Runoff = 26.97 cfs @ 12.22 hrs, Volume= 2.612 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	0.500	78	Meadow, non-grazed, HSG D
	0.700	80	>75% Grass cover, Good, HSG D
*	0.100	98	Impervious Surfaces
	11.460	77	Woods, Good, HSG D
	12.760	77	Weighted Average
	12.660		99.22% Pervious Area
	0.100		0.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
3.2	890	0.0850	4.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.2	815	0.1000	11.23	37.43	**Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.030
16.0	1,805	Total			

Subcatchment 4: BASIN 4



Summary for Subcatchment 5: BASIN 5

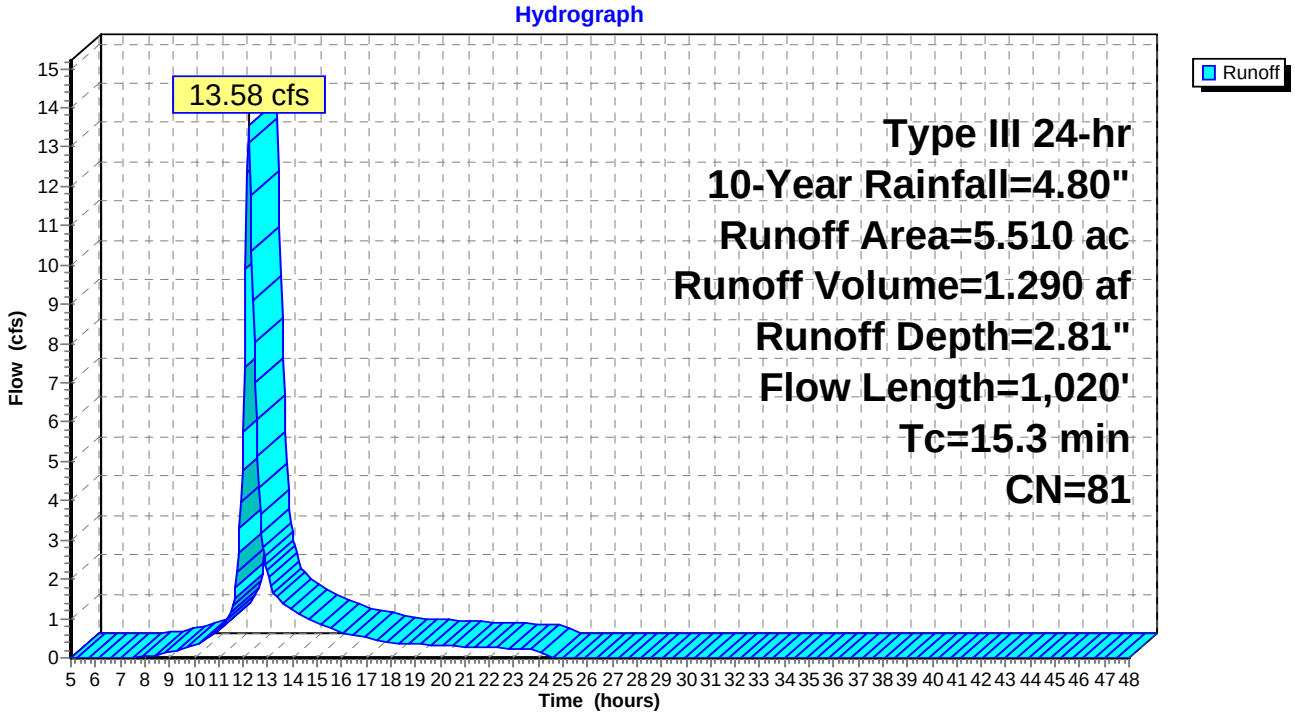
Runoff = 13.58 cfs @ 12.21 hrs, Volume= 1.290 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
*	0.800	98	Impervious Surfaces
	2.200	80	>75% Grass cover, Good, HSG D
	2.510	77	Woods, Good, HSG D
	5.510	81	Weighted Average
	4.710		85.48% Pervious Area
	0.800		14.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0700	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.9	920	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
15.3	1,020	Total			

Subcatchment 5: BASIN 5



Summary for Subcatchment 6: BASIN 6

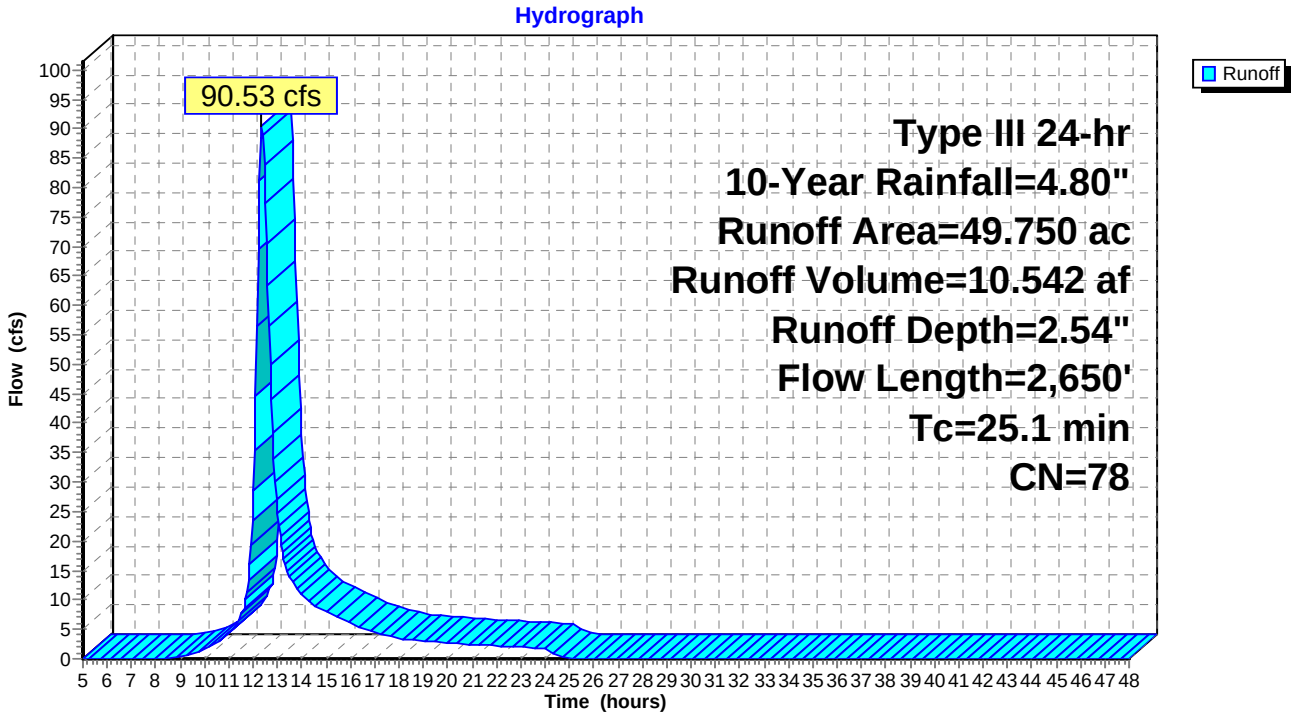
Runoff = 90.53 cfs @ 12.35 hrs, Volume= 10.542 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	3.100	80	>75% Grass cover, Good, HSG D
*	1.150	98	Imperviuos Surfaces
	11.900	80	Pasture/grassland/range, Good, HSG D
	33.600	77	Woods, Good, HSG D
	49.750	78	Weighted Average
	48.600		97.69% Pervious Area
	1.150		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	2,550	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.1	2,650	Total			

Subcatchment 6: BASIN 6

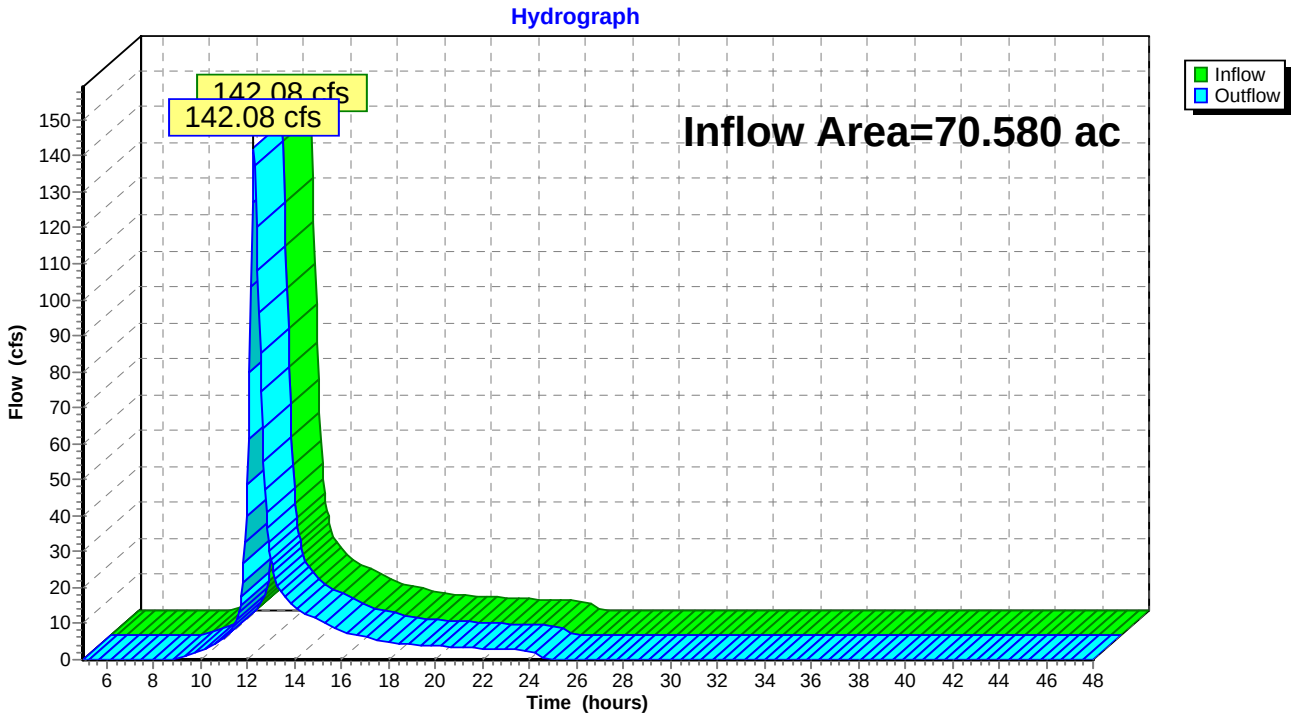


Summary for Reach AP1: A.P. 1

Inflow Area = 70.580 ac, 1.71% Impervious, Inflow Depth = 2.48" for 10-Year event
Inflow = 142.08 cfs @ 12.28 hrs, Volume= 14.611 af
Outflow = 142.08 cfs @ 12.28 hrs, Volume= 14.611 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach AP1: A.P. 1



Summary for Reach S1: STREAM

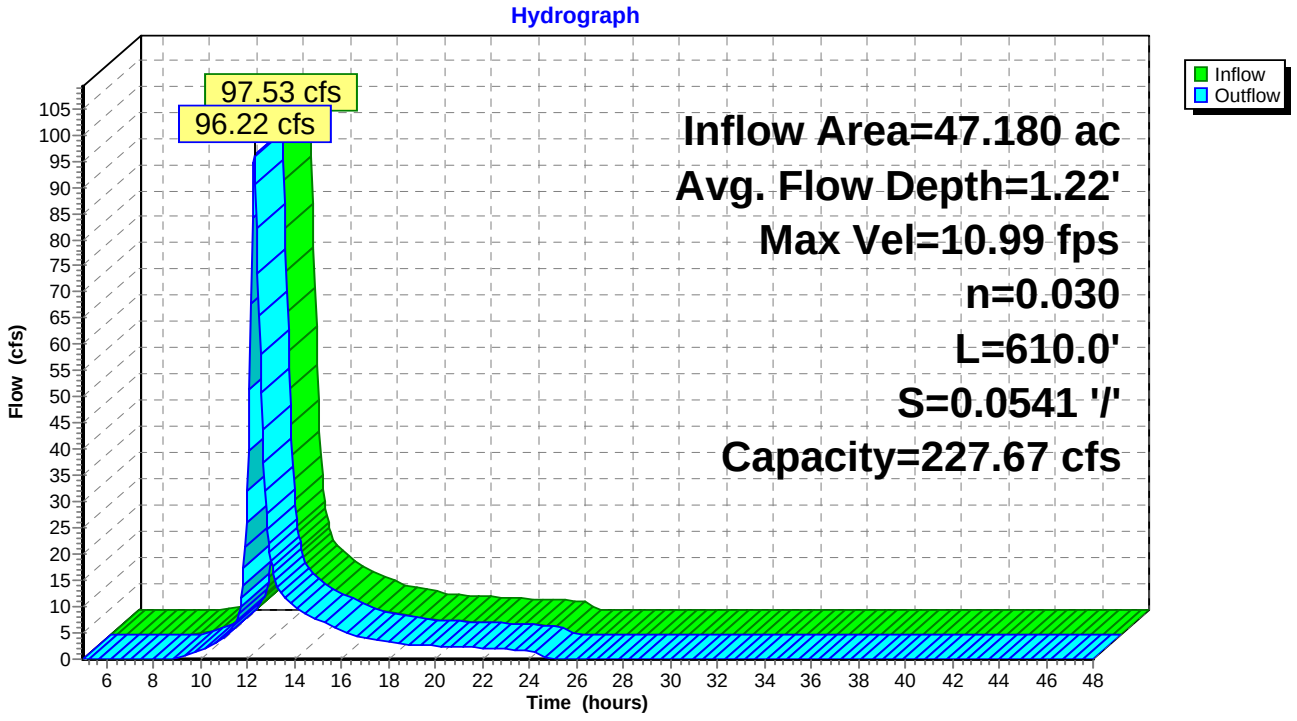
Inflow Area = 47.180 ac, 2.20% Impervious, Inflow Depth = 2.50" for 10-Year event
Inflow = 97.53 cfs @ 12.26 hrs, Volume= 9.820 af
Outflow = 96.22 cfs @ 12.29 hrs, Volume= 9.820 af, Atten= 1%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.99 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 3.30 fps, Avg. Travel Time= 3.1 min

Peak Storage= 5,397 cf @ 12.27 hrs
Average Depth at Peak Storage= 1.22'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 227.67 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 610.0' Slope= 0.0541 '/'
Inlet Invert= 665.00', Outlet Invert= 632.00'

Reach S1: STREAM



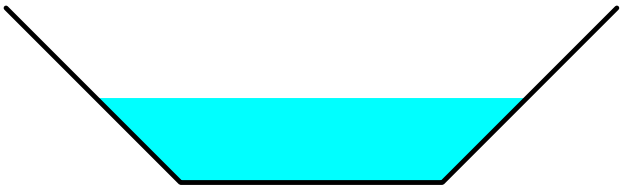
Summary for Reach S2: STREAM

Inflow Area = 18.270 ac, 4.93% Impervious, Inflow Depth = 2.56" for 10-Year event
Inflow = 40.45 cfs @ 12.22 hrs, Volume= 3.902 af
Outflow = 39.86 cfs @ 12.25 hrs, Volume= 3.902 af, Atten= 1%, Lag= 1.9 min

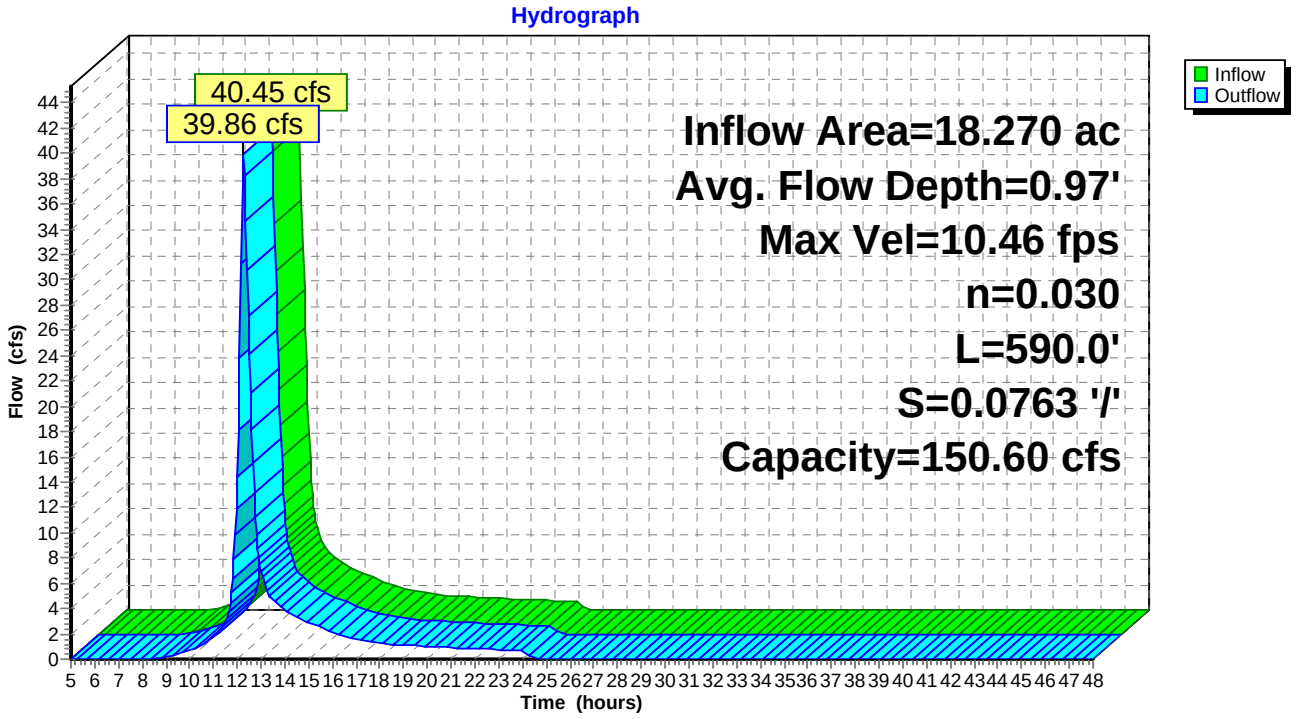
Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.46 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 3.36 fps, Avg. Travel Time= 2.9 min

Peak Storage= 2,267 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.97'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 150.60 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 590.0' Slope= 0.0763 '/'
Inlet Invert= 710.00', Outlet Invert= 665.00'



Reach S2: STREAM



Summary for Reach S3: STREAM

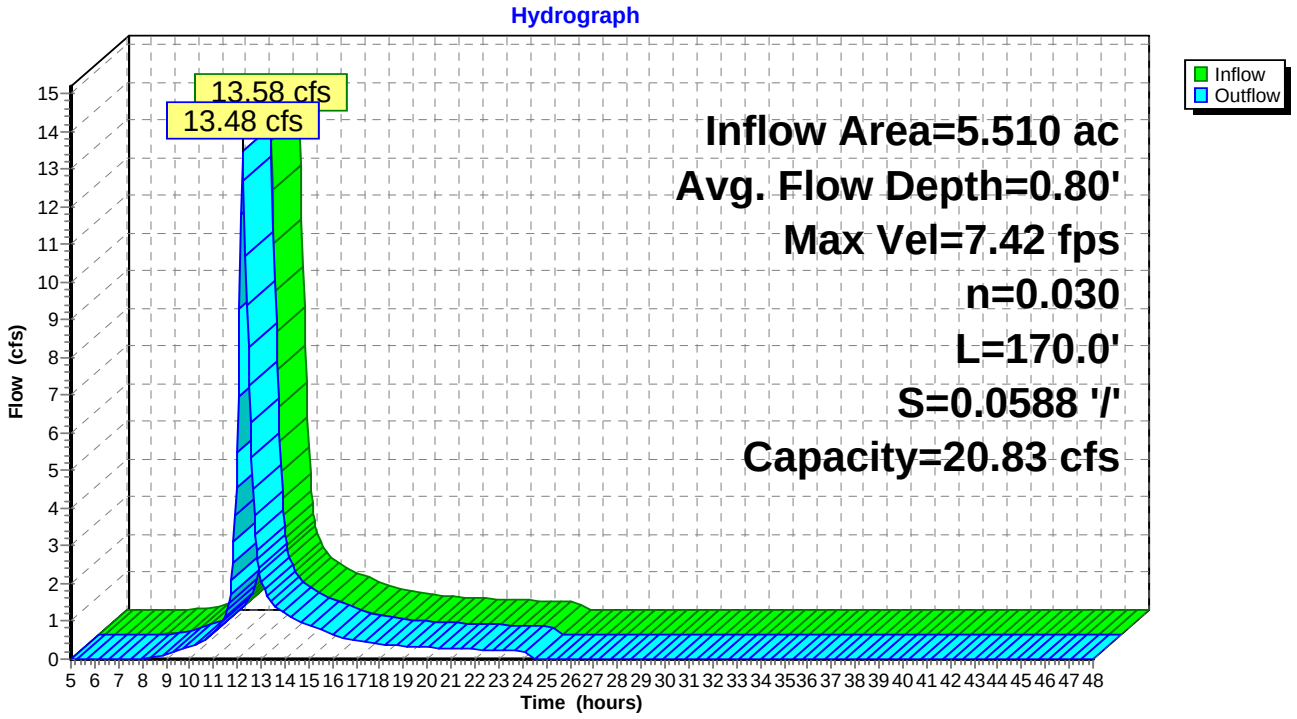
Inflow Area = 5.510 ac, 14.52% Impervious, Inflow Depth = 2.81" for 10-Year event
Inflow = 13.58 cfs @ 12.21 hrs, Volume= 1.290 af
Outflow = 13.48 cfs @ 12.22 hrs, Volume= 1.290 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.42 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.59 fps, Avg. Travel Time= 1.1 min

Peak Storage= 310 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.80'
Bank-Full Depth= 1.00' Flow Area= 2.5 sf, Capacity= 20.83 cfs

1.50' x 1.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 3.50'
Length= 170.0' Slope= 0.0588 '/'
Inlet Invert= 710.00', Outlet Invert= 700.00'

Reach S3: STREAM

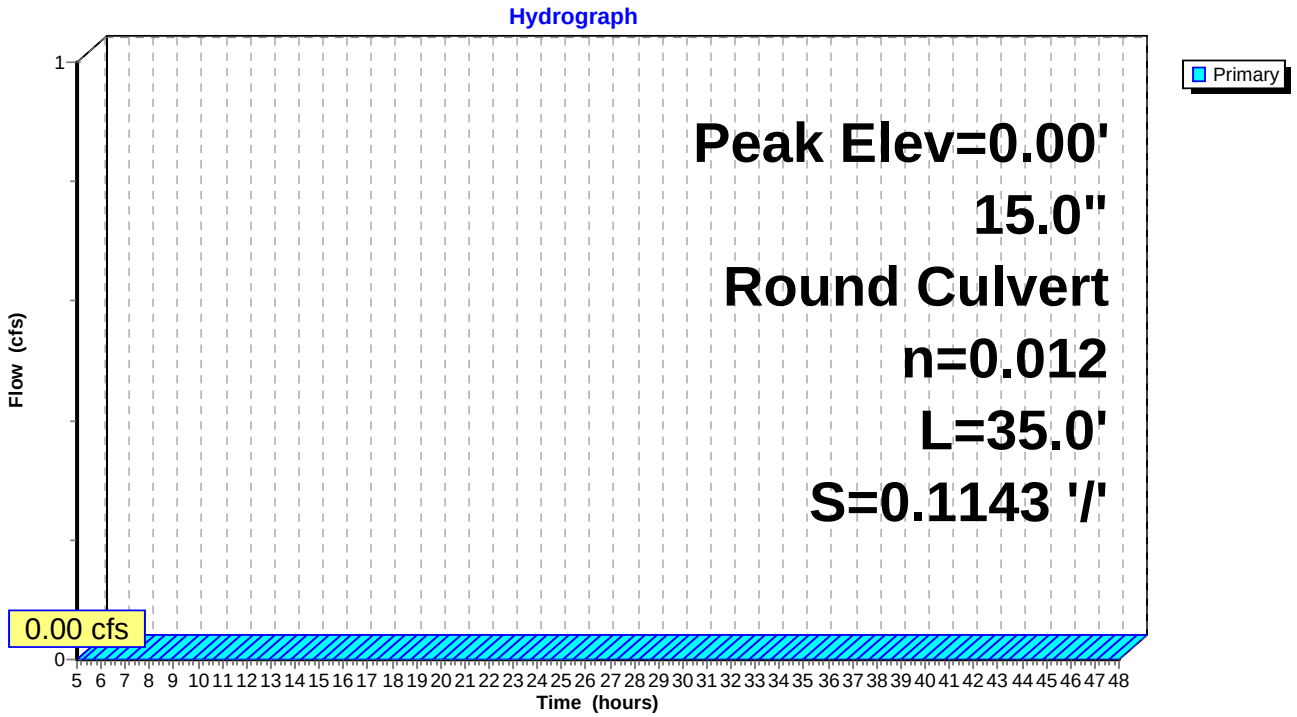


Summary for Pond 2P: 15" HDPE

Device	Routing	Invert	Outlet Devices
#1	Primary	720.00'	**15.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 720.00' / 716.00' S= 0.1143 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond 2P: 15" HDPE



Time span=5.00-48.00 hrs, dt=0.05 hrs, 861 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: BASIN 1 Runoff Area=17.370 ac 6.85% Impervious Runoff Depth=6.04"
Flow Length=2,535' Tc=21.8 min CN=79 Runoff=78.84 cfs 8.744 af

Subcatchment 2: BASIN 2 Runoff Area=23.400 ac 0.73% Impervious Runoff Depth=5.80"
Flow Length=2,080' Tc=19.0 min CN=77 Runoff=108.52 cfs 11.309 af

Subcatchment 3: BASIN 3 Runoff Area=28.910 ac 0.48% Impervious Runoff Depth=5.80"
Flow Length=2,080' Tc=18.5 min CN=77 Runoff=135.47 cfs 13.972 af

Subcatchment 4: BASIN 4 Runoff Area=12.760 ac 0.78% Impervious Runoff Depth=5.80"
Flow Length=1,805' Tc=16.0 min CN=77 Runoff=63.35 cfs 6.167 af

Subcatchment 5: BASIN 5 Runoff Area=5.510 ac 14.52% Impervious Runoff Depth>6.28"
Flow Length=1,020' Tc=15.3 min CN=81 Runoff=29.79 cfs 2.884 af

Subcatchment 6: BASIN 6 Runoff Area=49.750 ac 2.31% Impervious Runoff Depth=5.92"
Flow Length=2,650' Tc=25.1 min CN=78 Runoff=208.96 cfs 24.544 af

Reach AP1: A.P. 1 Inflow=333.51 cfs 34.333 af
Outflow=333.51 cfs 34.333 af

Reach S1: STREAM Avg. Flow Depth=2.00' Max Vel=14.21 fps Inflow=227.00 cfs 23.024 af
n=0.030 L=610.0' S=0.0541 '/' Capacity=227.67 cfs Outflow=225.10 cfs 23.024 af

Reach S2: STREAM Avg. Flow Depth=1.54' Max Vel=13.19 fps Inflow=92.97 cfs 9.051 af
n=0.030 L=590.0' S=0.0763 '/' Capacity=150.60 cfs Outflow=91.64 cfs 9.051 af

Reach S3: STREAM Avg. Flow Depth=1.23' Max Vel=9.04 fps Inflow=29.79 cfs 2.884 af
n=0.030 L=170.0' S=0.0588 '/' Capacity=20.83 cfs Outflow=29.62 cfs 2.884 af

Pond 2P: 15" HDPE Peak Elev=0.00'
15.0" Round Culvert n=0.012 L=35.0' S=0.1143 '/' Primary=0.00 cfs 0.000 af

Total Runoff Area = 137.700 ac Runoff Volume = 67.621 af Average Runoff Depth = 5.89"
97.42% Pervious = 134.150 ac 2.58% Impervious = 3.550 ac

Summary for Subcatchment 1: BASIN 1

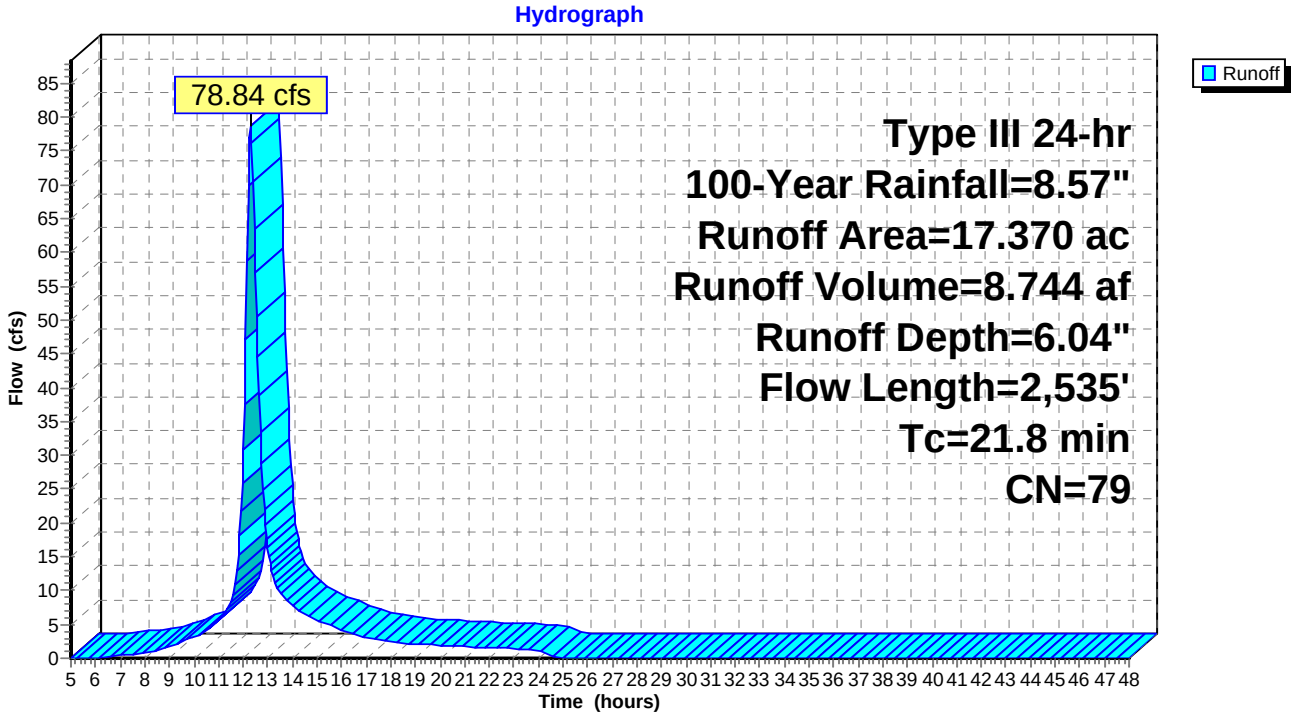
Runoff = 78.84 cfs @ 12.30 hrs, Volume= 8.744 af, Depth= 6.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	3.500	80	>75% Grass cover, Good, HSG D
*	1.190	98	Impervious Surfaces
	12.680	77	Woods, Good, HSG D
	17.370	79	Weighted Average
	16.180		93.15% Pervious Area
	1.190		6.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.8	1,415	0.1500	6.24		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.6	850	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	170	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.8	2,535	Total			

Subcatchment 1: BASIN 1



Summary for Subcatchment 2: BASIN 2

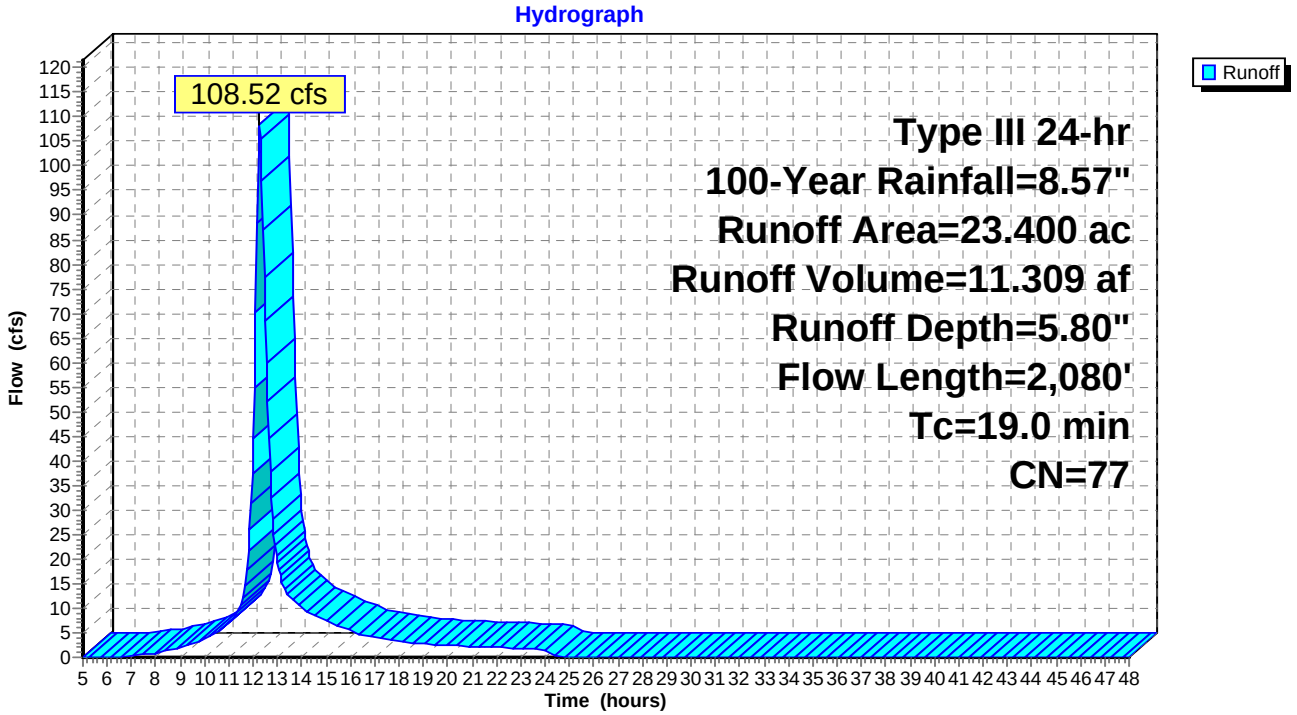
Runoff = 108.52 cfs @ 12.26 hrs, Volume= 11.309 af, Depth= 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
*	0.170	98	Impervious Surfaces
	23.230	77	Woods, Good, HSG D
	23.400	77	Weighted Average
	23.230		99.27% Pervious Area
	0.170		0.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0450	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.3	815	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	840	0.1300	17.86	119.04	**Parabolic Channel,** W=5.00' D=2.00' Area=6.7 sf Perim=6.7' n= 0.030
1.1	325	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
19.0	2,080	Total			

Subcatchment 2: BASIN 2



Summary for Subcatchment 3: BASIN 3

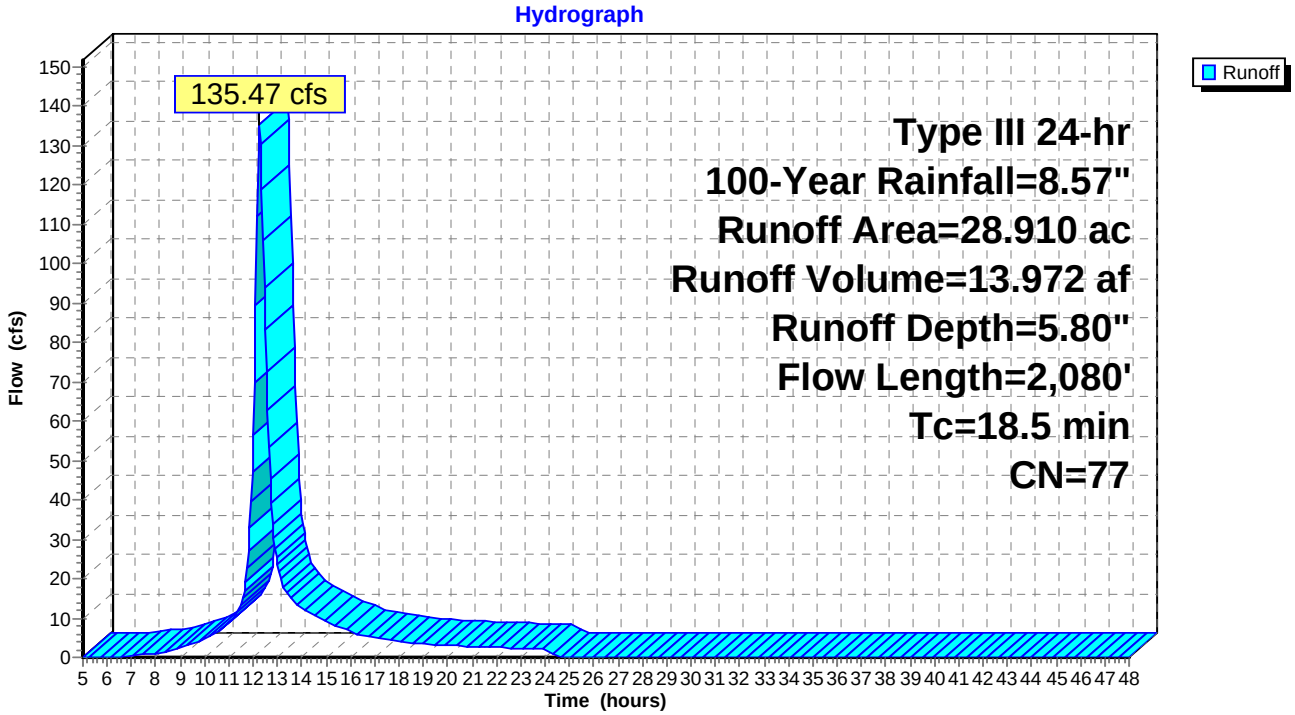
Runoff = 135.47 cfs @ 12.25 hrs, Volume= 13.972 af, Depth= 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	25.570	77	Woods, Good, HSG D
*	0.140	98	Impervious surfaces
	3.200	78	Meadow, non-grazed, HSG D
	28.910	77	Weighted Average
	28.770		99.52% Pervious Area
	0.140		0.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
4.3	1,430	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	550	0.0760	15.03	150.34	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 1.0 '/' Top.W=7.00' n= 0.030
18.5	2,080	Total			

Subcatchment 3: BASIN 3



Summary for Subcatchment 4: BASIN 4

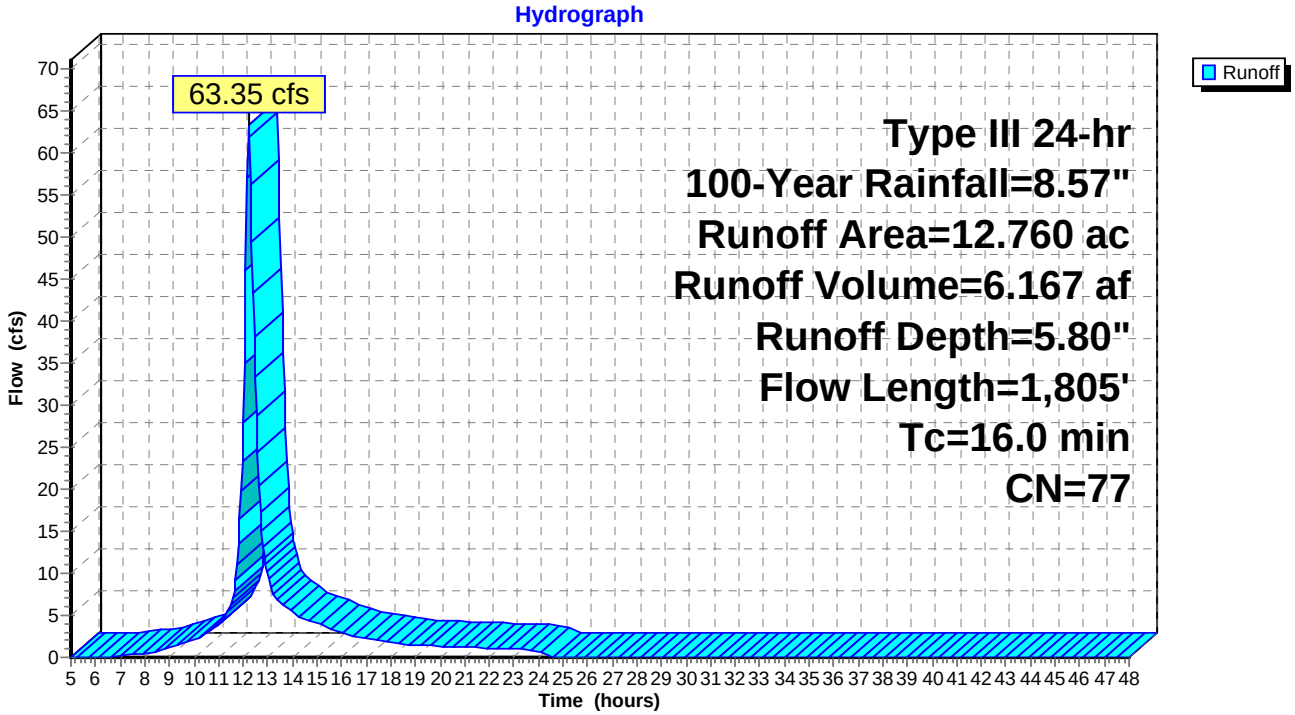
Runoff = 63.35 cfs @ 12.22 hrs, Volume= 6.167 af, Depth= 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	0.500	78	Meadow, non-grazed, HSG D
	0.700	80	>75% Grass cover, Good, HSG D
*	0.100	98	Impervious Surfaces
	11.460	77	Woods, Good, HSG D
	12.760	77	Weighted Average
	12.660		99.22% Pervious Area
	0.100		0.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0300	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
3.2	890	0.0850	4.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.2	815	0.1000	11.23	37.43	**Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.030
16.0	1,805	Total			

Subcatchment 4: BASIN 4



Summary for Subcatchment 5: BASIN 5

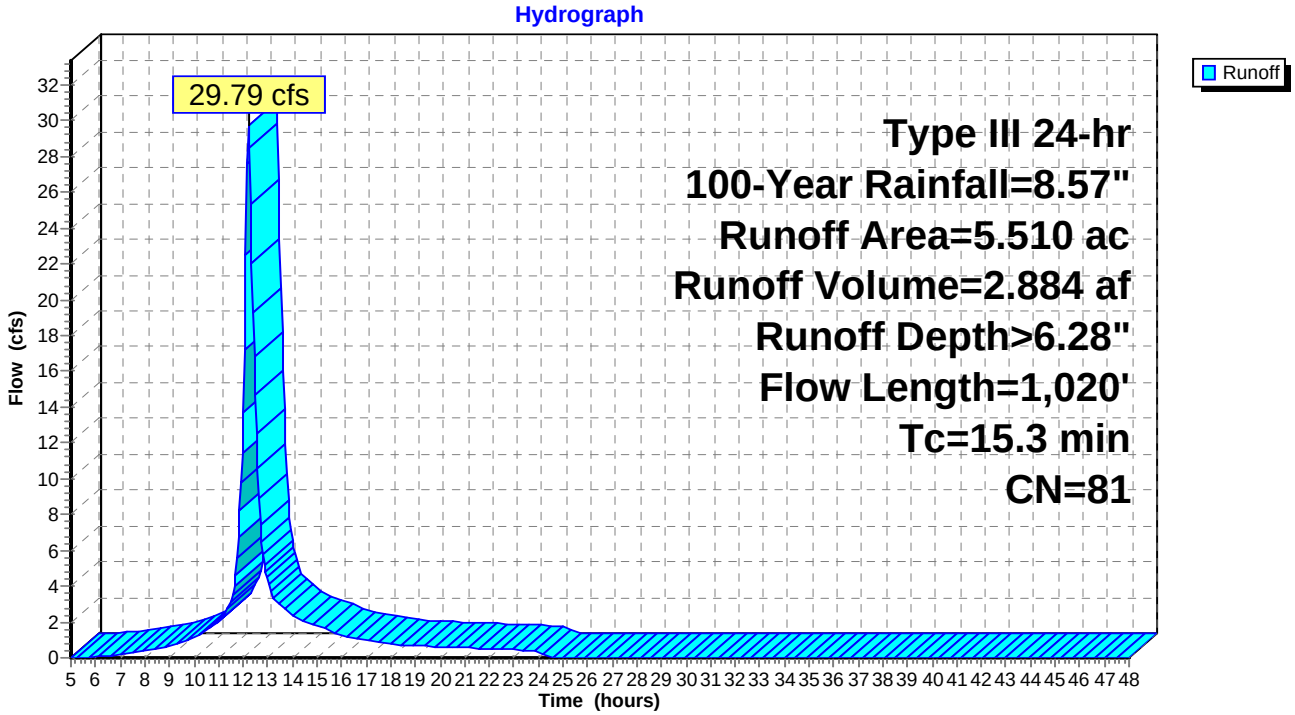
Runoff = 29.79 cfs @ 12.21 hrs, Volume= 2.884 af, Depth> 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
*	0.800	98	Impervious Surfaces
	2.200	80	>75% Grass cover, Good, HSG D
	2.510	77	Woods, Good, HSG D
	5.510	81	Weighted Average
	4.710		85.48% Pervious Area
	0.800		14.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0700	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.9	920	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
15.3	1,020	Total			

Subcatchment 5: BASIN 5



Summary for Subcatchment 6: BASIN 6

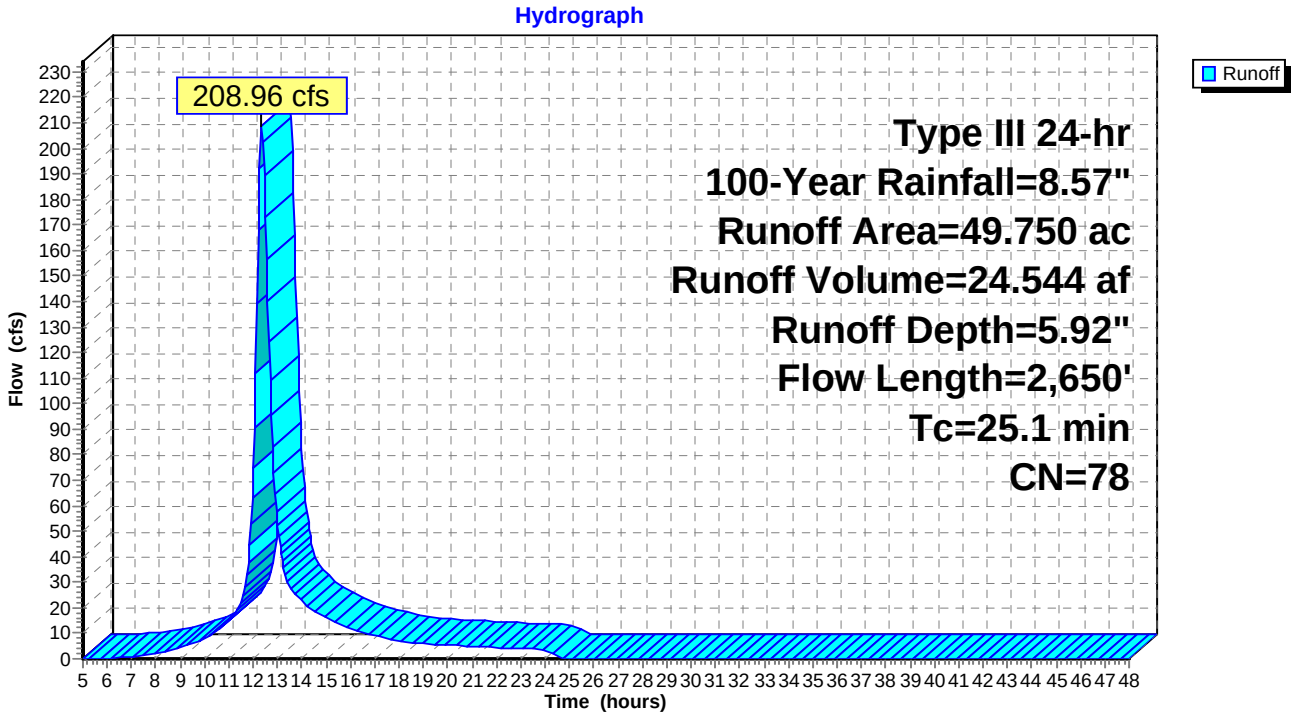
Runoff = 208.96 cfs @ 12.34 hrs, Volume= 24.544 af, Depth= 5.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	3.100	80	>75% Grass cover, Good, HSG D
*	1.150	98	Imperviuos Surfaces
	11.900	80	Pasture/grassland/range, Good, HSG D
	33.600	77	Woods, Good, HSG D
	49.750	78	Weighted Average
	48.600		97.69% Pervious Area
	1.150		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	2,550	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.1	2,650	Total			

Subcatchment 6: BASIN 6

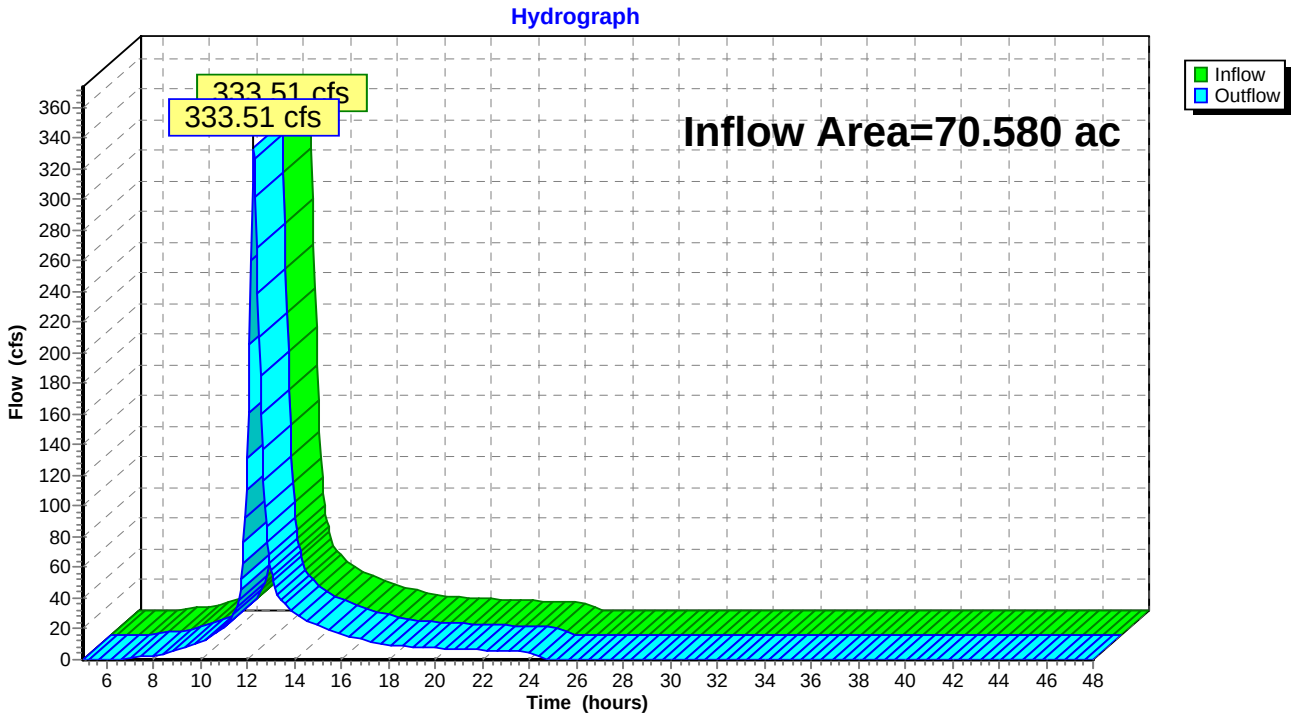


Summary for Reach AP1: A.P. 1

Inflow Area = 70.580 ac, 1.71% Impervious, Inflow Depth = 5.84" for 100-Year event
Inflow = 333.51 cfs @ 12.26 hrs, Volume= 34.333 af
Outflow = 333.51 cfs @ 12.26 hrs, Volume= 34.333 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs

Reach AP1: A.P. 1



Summary for Reach S1: STREAM

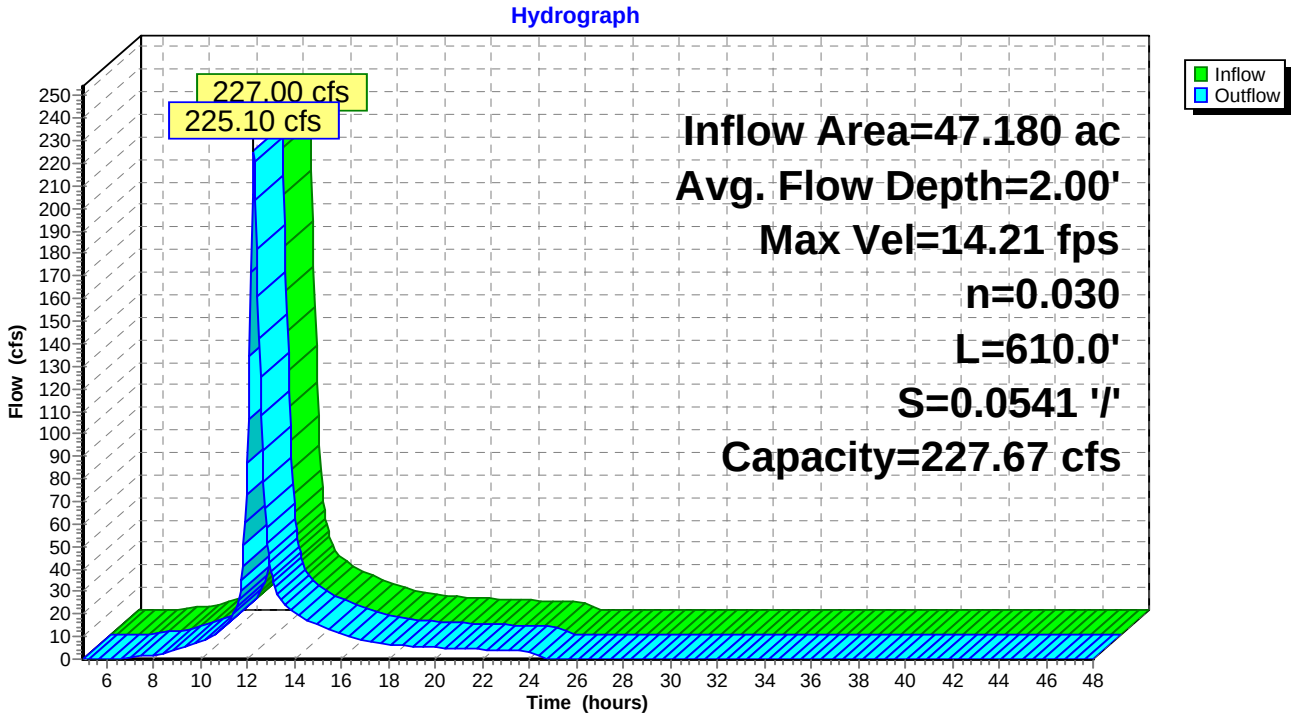
Inflow Area = 47.180 ac, 2.20% Impervious, Inflow Depth = 5.86" for 100-Year event
Inflow = 227.00 cfs @ 12.25 hrs, Volume= 23.024 af
Outflow = 225.10 cfs @ 12.27 hrs, Volume= 23.024 af, Atten= 1%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.21 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 4.21 fps, Avg. Travel Time= 2.4 min

Peak Storage= 9,739 cf @ 12.26 hrs
Average Depth at Peak Storage= 2.00'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 227.67 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 610.0' Slope= 0.0541 '/'
Inlet Invert= 665.00', Outlet Invert= 632.00'

Reach S1: STREAM



Summary for Reach S2: STREAM

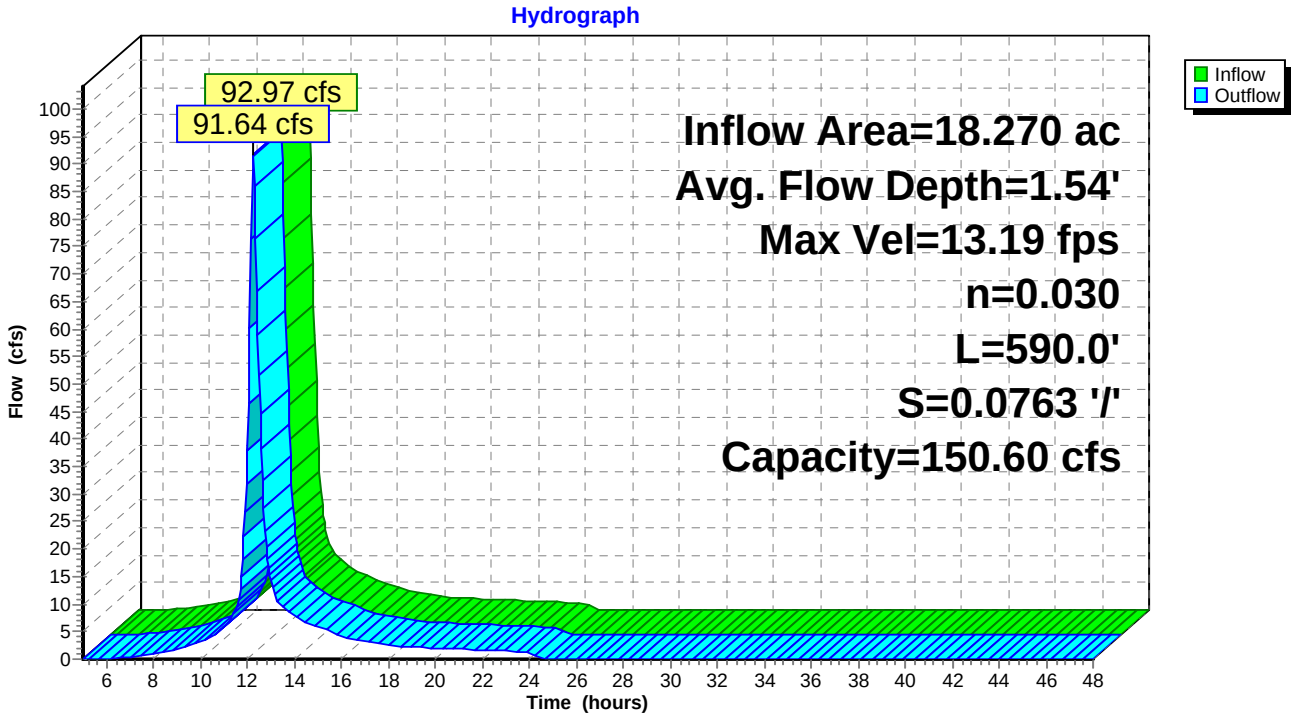
Inflow Area = 18.270 ac, 4.93% Impervious, Inflow Depth = 5.95" for 100-Year event
Inflow = 92.97 cfs @ 12.22 hrs, Volume= 9.051 af
Outflow = 91.64 cfs @ 12.24 hrs, Volume= 9.051 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.19 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 4.22 fps, Avg. Travel Time= 2.3 min

Peak Storage= 4,125 cf @ 12.23 hrs
Average Depth at Peak Storage= 1.54'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 150.60 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 590.0' Slope= 0.0763 '/'
Inlet Invert= 710.00', Outlet Invert= 665.00'

Reach S2: STREAM



Summary for Reach S3: STREAM

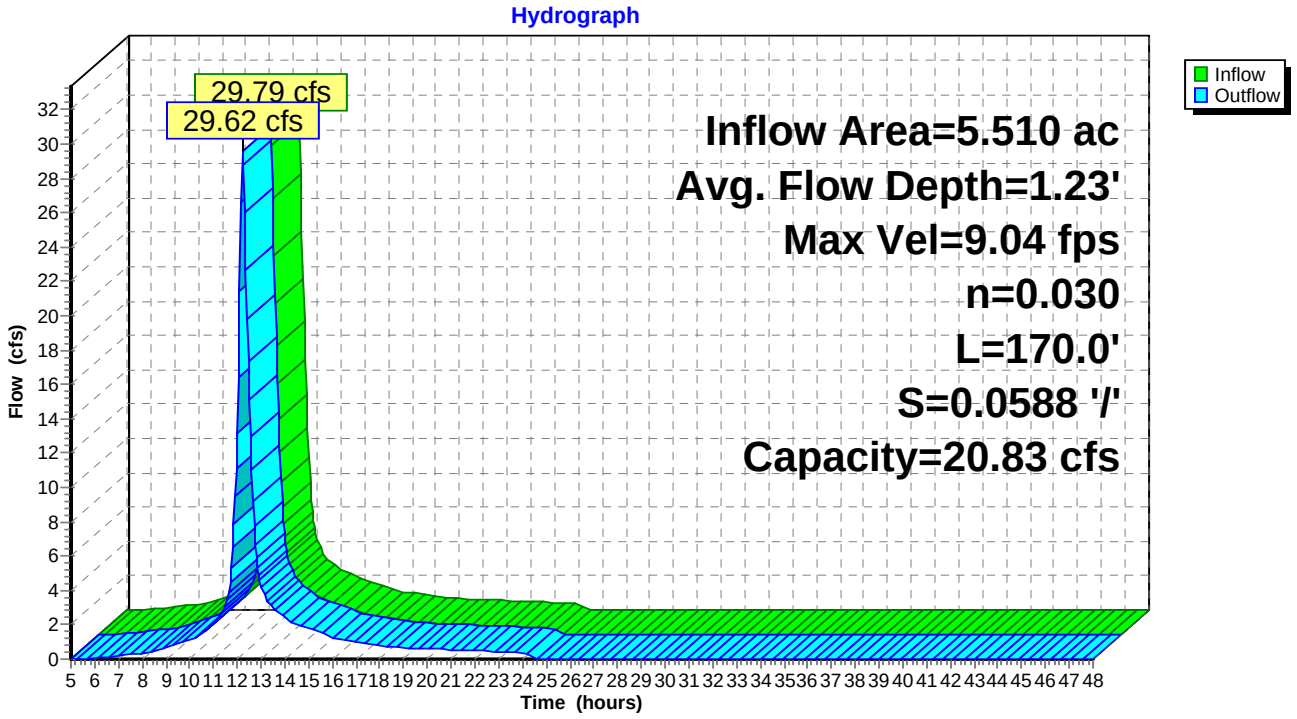
Inflow Area = 5.510 ac, 14.52% Impervious, Inflow Depth > 6.28" for 100-Year event
Inflow = 29.79 cfs @ 12.21 hrs, Volume= 2.884 af
Outflow = 29.62 cfs @ 12.22 hrs, Volume= 2.884 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.04 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.20 fps, Avg. Travel Time= 0.9 min

Peak Storage= 560 cf @ 12.21 hrs
Average Depth at Peak Storage= 1.23'
Bank-Full Depth= 1.00' Flow Area= 2.5 sf, Capacity= 20.83 cfs

1.50' x 1.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 3.50'
Length= 170.0' Slope= 0.0588 '/'
Inlet Invert= 710.00', Outlet Invert= 700.00'

Reach S3: STREAM

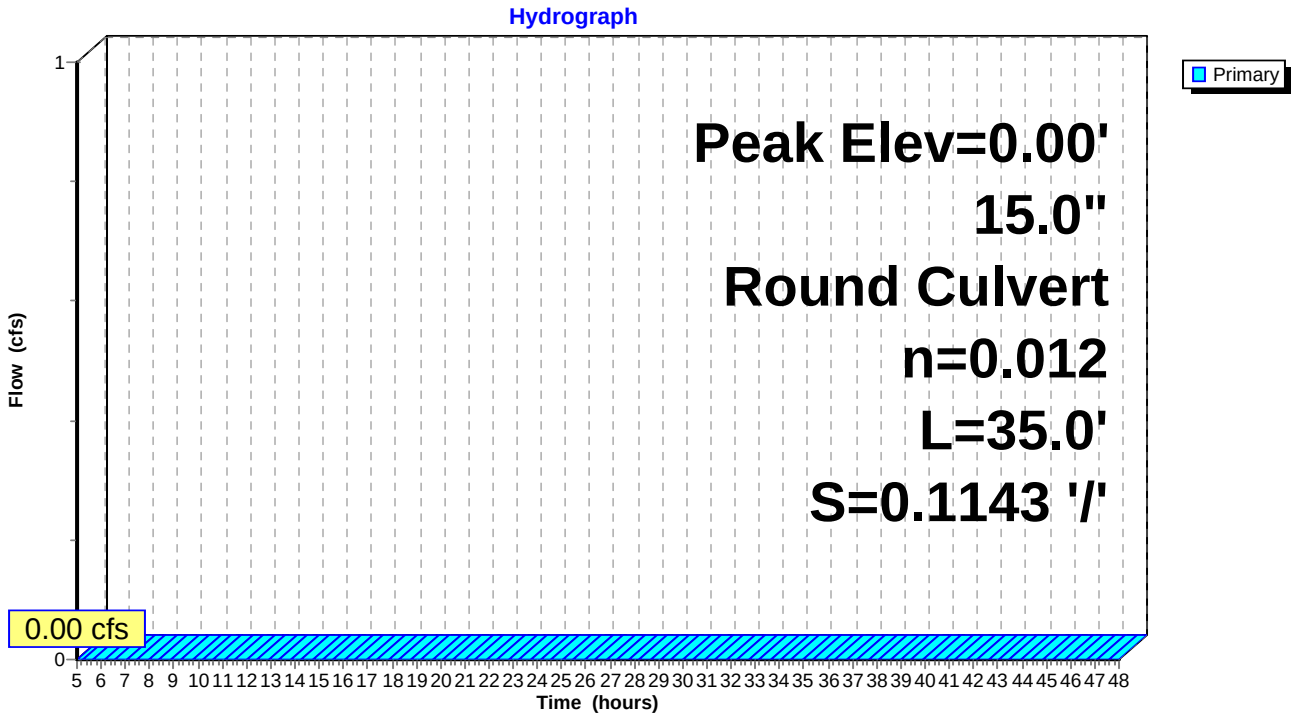


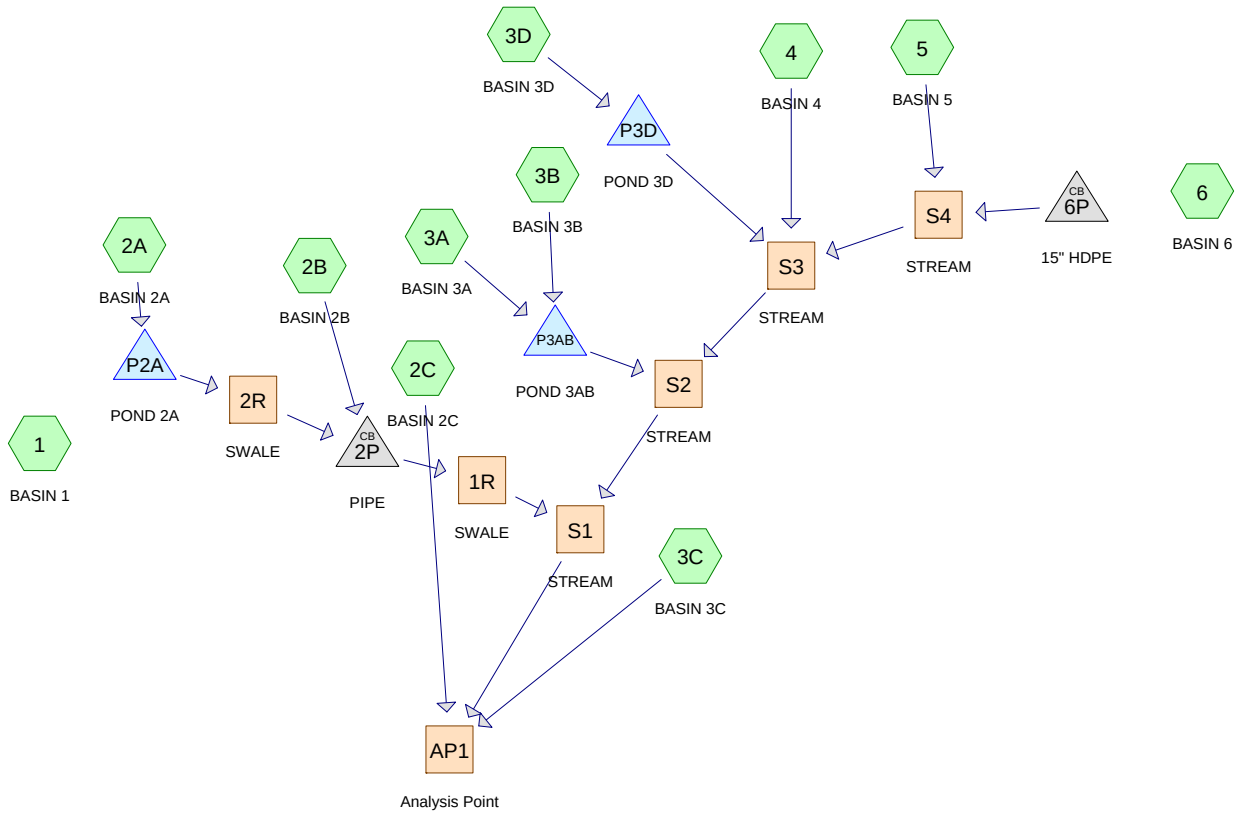
Summary for Pond 2P: 15" HDPE

Device	Routing	Invert	Outlet Devices
#1	Primary	720.00'	**15.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 720.00' / 716.00' S= 0.1143 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Pond 2P: 15" HDPE





Subcat Reach Pond Link

Routing Diagram for SILBER3 POST5 2019
Prepared by Kirk Rother, PE, PLLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.000	98	(3A, 4)
36.640	80	>75% Grass cover, Good, HSG D (1, 2A, 2B, 2C, 3A, 3B, 3D, 4, 5, 6)
0.700	98	Driveways (2A, 3D)
0.300	98	Existing Impervious (3C)
1.190	98	Existing Impervious Surfaces (1)
0.370	96	Gravel Road (2A, 3D)
0.800	98	Houses (2A, 3D)
0.820	98	Impervious Surfaces (5)
1.150	98	Imperviuos Surfaces (6)
0.600	78	Meadow, non-grazed, HSG D (3D)
11.900	80	Pasture/grassland/range, Good, HSG D (6)
1.650	98	Proposed Impervious (3B)
1.420	98	Proposed Impervious Surfaces (1, 2C)
0.400	98	Road (2A)
1.360	98	Roads (3D)
0.300	98	Stream (3C)
3.160	77	Woods, D, Good (2A)
73.210	77	Woods, Good, HSG D (1, 2B, 2C, 3A, 3B, 3C, 3D, 4, 5, 6)
137.970	**80**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
122.350	HSG D	1, 2A, 2B, 2C, 3A, 3B, 3C, 3D, 4, 5, 6
15.620	Other	1, 2A, 2C, 3A, 3B, 3C, 3D, 4, 5, 6
137.970		**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
0.000	0.000	0.000	0.000	2.000	2.000		3A, 4
0.000	0.000	0.000	36.640	0.000	36.640	>75% Grass cover, Good	1, 2A, 2B, 2C, 3A, 3B, 3D, 4, 5, 6
0.000	0.000	0.000	0.000	0.700	0.700	Driveways	2A, 3D
0.000	0.000	0.000	0.000	0.300	0.300	Existing Impervious	3C
0.000	0.000	0.000	0.000	1.190	1.190	Existing Impervious Surfaces	1
0.000	0.000	0.000	0.000	0.370	0.370	Gravel Road	2A, 3D
0.000	0.000	0.000	0.000	0.800	0.800	Houses	2A, 3D
0.000	0.000	0.000	0.000	0.820	0.820	Impervious Surfaces	5
0.000	0.000	0.000	0.000	1.150	1.150	Imperviuos Surfaces	6
0.000	0.000	0.000	0.600	0.000	0.600	Meadow, non-grazed	3D
0.000	0.000	0.000	11.900	0.000	11.900	Pasture/grassland/range, Good	6
0.000	0.000	0.000	0.000	1.650	1.650	Proposed Impervious	3B
0.000	0.000	0.000	0.000	1.420	1.420	Proposed Impervious Surfaces	1, 2C
0.000	0.000	0.000	0.000	0.400	0.400	Road	2A
0.000	0.000	0.000	0.000	1.360	1.360	Roads	3D
0.000	0.000	0.000	0.000	0.300	0.300	Stream	3C
0.000	0.000	0.000	0.000	3.160	3.160	Woods, D, Good	2A
0.000	0.000	0.000	73.210	0.000	73.210	Woods, Good	1, 2B, 2C, 3A, 3B, 3C, 3D, 4, 5, 6
0.000	**0.000**	**0.000**	**122.350**	**15.620**	**137.970**	**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	1	0.00	0.00	530.0	0.0200	0.012	18.0	0.0	0.0
2	1	0.00	0.00	60.0	0.0100	0.012	24.0	0.0	0.0
3	2C	0.00	0.00	113.0	0.0350	0.012	18.0	0.0	0.0
4	2C	0.00	0.00	24.0	0.0300	0.012	18.0	0.0	0.0
5	2C	0.00	0.00	112.0	0.0488	0.012	18.0	0.0	0.0
6	2C	0.00	0.00	54.0	0.0300	0.012	18.0	0.0	0.0
7	3A	0.00	0.00	1,200.0	0.0900	0.012	18.0	0.0	0.0
8	3B	0.00	0.00	376.0	0.0900	0.012	18.0	0.0	0.0
9	3D	0.00	0.00	125.0	0.0700	0.012	18.0	0.0	0.0
10	2P	646.30	645.00	65.0	0.0200	0.012	30.0	0.0	0.0
11	6P	720.00	716.00	35.0	0.1143	0.012	15.0	0.0	0.0
12	P2A	725.00	723.72	32.0	0.0400	0.012	30.0	0.0	0.0
13	P3AB	674.00	673.20	80.0	0.0100	0.012	30.0	0.0	0.0
14	P3D	747.00	726.00	221.0	0.0950	0.012	36.0	0.0	0.0

Time span=5.00-60.00 hrs, dt=0.05 hrs, 1101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: BASIN 1 Runoff Area=17.460 ac 8.08% Impervious Runoff Depth=0.93"
Flow Length=1,980' Tc=15.0 min CN=79 Runoff=13.77 cfs 1.357 af

Subcatchment 2A: BASIN 2A Runoff Area=12.910 ac 8.91% Impervious Runoff Depth=1.04"
Flow Length=775' Tc=12.8 min CN=81 Runoff=12.23 cfs 1.123 af

Subcatchment 2B: BASIN 2B Runoff Area=1.020 ac 0.00% Impervious Runoff Depth=0.83"
Flow Length=540' Slope=0.1400 '/' Tc=6.7 min CN=77 Runoff=0.90 cfs 0.071 af

Subcatchment 2C: BASIN 2C Runoff Area=3.930 ac 30.53% Impervious Runoff Depth=1.29"
Flow Length=828' Tc=11.0 min CN=85 Runoff=4.98 cfs 0.423 af

Subcatchment 3A: BASIN 3A Runoff Area=4.720 ac 40.25% Impervious Runoff Depth=1.43"
Flow Length=1,560' Tc=6.7 min CN=87 Runoff=7.61 cfs 0.562 af

Subcatchment 3B: BASIN 3B Runoff Area=7.390 ac 22.33% Impervious Runoff Depth=1.16"
Flow Length=806' Tc=12.0 min CN=83 Runoff=8.12 cfs 0.716 af

Subcatchment 3C: BASIN 3C Runoff Area=7.230 ac 8.30% Impervious Runoff Depth=0.93"
Flow Length=1,395' Tc=11.9 min CN=79 Runoff=6.15 cfs 0.562 af

Subcatchment 3D: BASIN 3D Runoff Area=22.210 ac 9.50% Impervious Runoff Depth=0.99"
Flow Length=1,225' Tc=15.9 min CN=80 Runoff=18.22 cfs 1.827 af

Subcatchment 4: BASIN 4 Runoff Area=6.260 ac 1.60% Impervious Runoff Depth=0.88"
Flow Length=1,210' Tc=15.8 min CN=78 Runoff=4.50 cfs 0.459 af

Subcatchment 5: BASIN 5 Runoff Area=5.090 ac 16.11% Impervious Runoff Depth=1.10"
Flow Length=1,020' Tc=15.3 min CN=82 Runoff=4.83 cfs 0.467 af

Subcatchment 6: BASIN 6 Runoff Area=49.750 ac 2.31% Impervious Runoff Depth=0.88"
Flow Length=2,650' Tc=25.1 min CN=78 Runoff=29.73 cfs 3.649 af

Reach 1R: SWALE Avg. Flow Depth=0.15' Max Vel=2.21 fps Inflow=1.07 cfs 1.169 af
n=0.030 L=110.0' S=0.0273 '/' Capacity=68.49 cfs Outflow=1.03 cfs 1.169 af

Reach 2R: SWALE Avg. Flow Depth=0.08' Max Vel=2.96 fps Inflow=0.72 cfs 1.099 af
n=0.030 L=360.0' S=0.1111 '/' Capacity=181.78 cfs Outflow=0.72 cfs 1.099 af

Reach AP1: Analysis Point Inflow=18.13 cfs 6.023 af
Outflow=18.13 cfs 6.023 af

Reach S1: STREAM Avg. Flow Depth=0.33' Max Vel=4.89 fps Inflow=10.35 cfs 5.040 af
n=0.030 L=210.0' S=0.0476 '/' Capacity=213.60 cfs Outflow=10.30 cfs 5.039 af

Reach S2: STREAM Avg. Flow Depth=0.30' Max Vel=5.10 fps Inflow=9.75 cfs 3.873 af
n=0.030 L=480.0' S=0.0583 '/' Capacity=236.41 cfs Outflow=9.61 cfs 3.871 af

Reach S3: STREAM Avg. Flow Depth=0.45' Max Vel=6.08 fps Inflow=9.55 cfs 2.606 af
n=0.030 L=520.0' S=0.0577 '/' Capacity=130.98 cfs Outflow=9.38 cfs 2.604 af

Reach S4: STREAM Avg. Flow Depth=0.44' Max Vel=5.53 fps Inflow=4.83 cfs 0.467 af
n=0.030 L=170.0' S=0.0588 '/' Capacity=20.83 cfs Outflow=4.76 cfs 0.467 af

Pond 2P: PIPE Peak Elev=646.70' Inflow=1.07 cfs 1.169 af
30.0" Round Culvert n=0.012 L=65.0' S=0.0200 '/' Outflow=1.07 cfs 1.169 af

Pond 6P: 15" HDPE Peak Elev=0.00'
15.0" Round Culvert n=0.012 L=35.0' S=0.1143 '/' Primary=0.00 cfs 0.000 af

Pond P2A: POND 2A Peak Elev=729.06' Storage=31,980 cf Inflow=12.23 cfs 1.123 af
Outflow=0.72 cfs 1.099 af

Pond P3AB: POND 3AB Peak Elev=677.46' Storage=29,773 cf Inflow=14.67 cfs 1.278 af
Outflow=1.71 cfs 1.269 af

Pond P3D: POND 3D Peak Elev=751.94' Storage=50,980 cf Inflow=18.22 cfs 1.827 af
Outflow=1.41 cfs 1.680 af

Total Runoff Area = 137.970 ac Runoff Volume = 11.215 af Average Runoff Depth = 0.98"
91.24% Pervious = 125.880 ac 8.76% Impervious = 12.090 ac

Summary for Subcatchment 1: BASIN 1

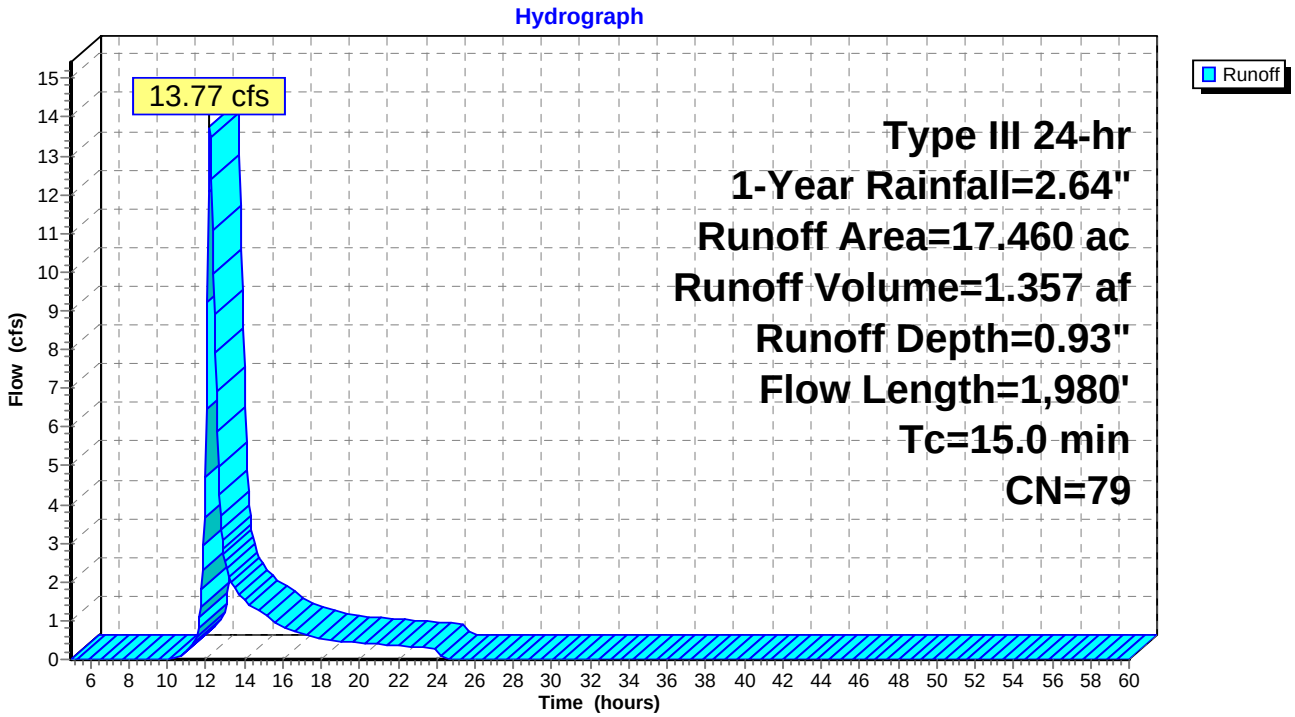
Runoff = 13.77 cfs @ 12.22 hrs, Volume= 1.357 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	4.300	80	>75% Grass cover, Good, HSG D
*	1.190	98	Existing Impervious Surfaces
	11.750	77	Woods, Good, HSG D
*	0.220	98	Proposed Impervious Surfaces
	17.460	79	Weighted Average
	16.050		91.92% Pervious Area
	1.410		8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	1,120	0.1400	6.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	530	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	170	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	60	0.0100	7.80	24.51	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
15.0	1,980	Total			

Subcatchment 1: BASIN 1



Summary for Subcatchment 2A: BASIN 2A

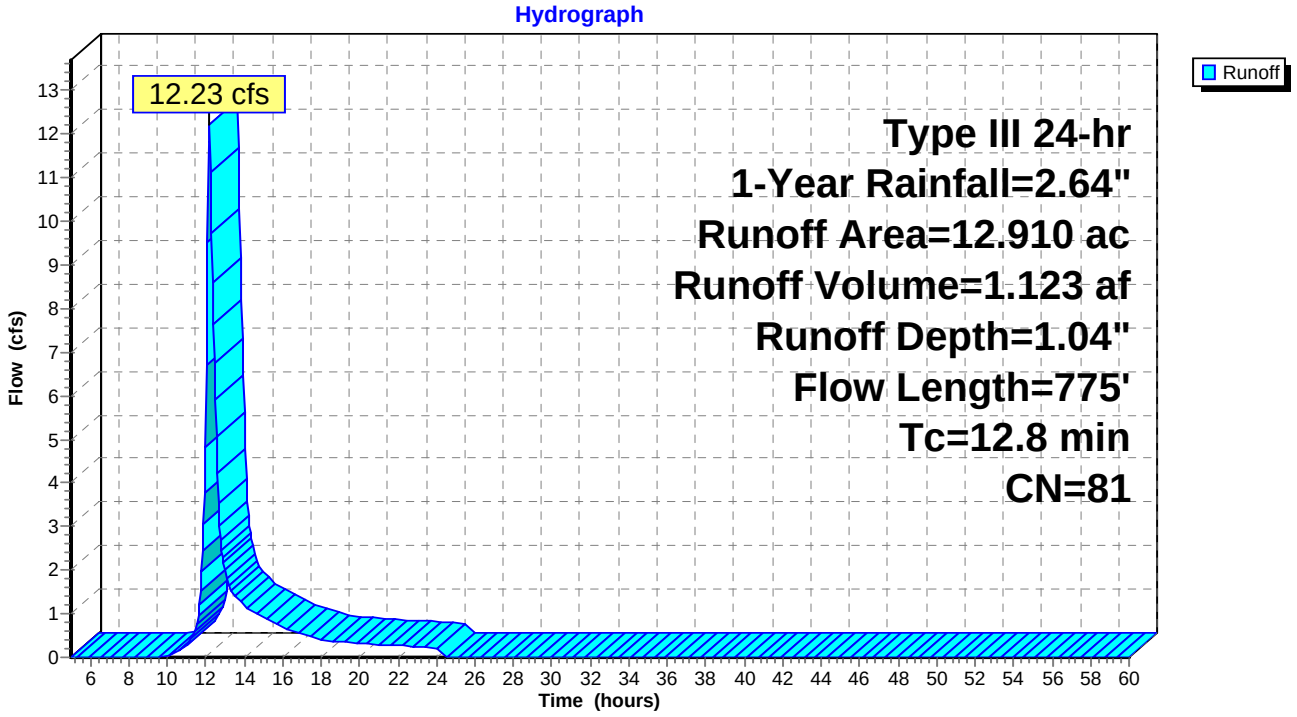
Runoff = 12.23 cfs @ 12.19 hrs, Volume= 1.123 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
*	3.160	77	Woods, D, Good
	8.350	80	>75% Grass cover, Good, HSG D
*	0.450	98	Houses
*	0.400	98	Road
*	0.300	98	Driveways
*	0.250	96	Gravel Road
	12.910	81	Weighted Average
	11.760		91.09% Pervious Area
	1.150		8.91% 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"
2.0	675	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.8	775	Total			

Subcatchment 2A: BASIN 2A



Summary for Subcatchment 2B: BASIN 2B

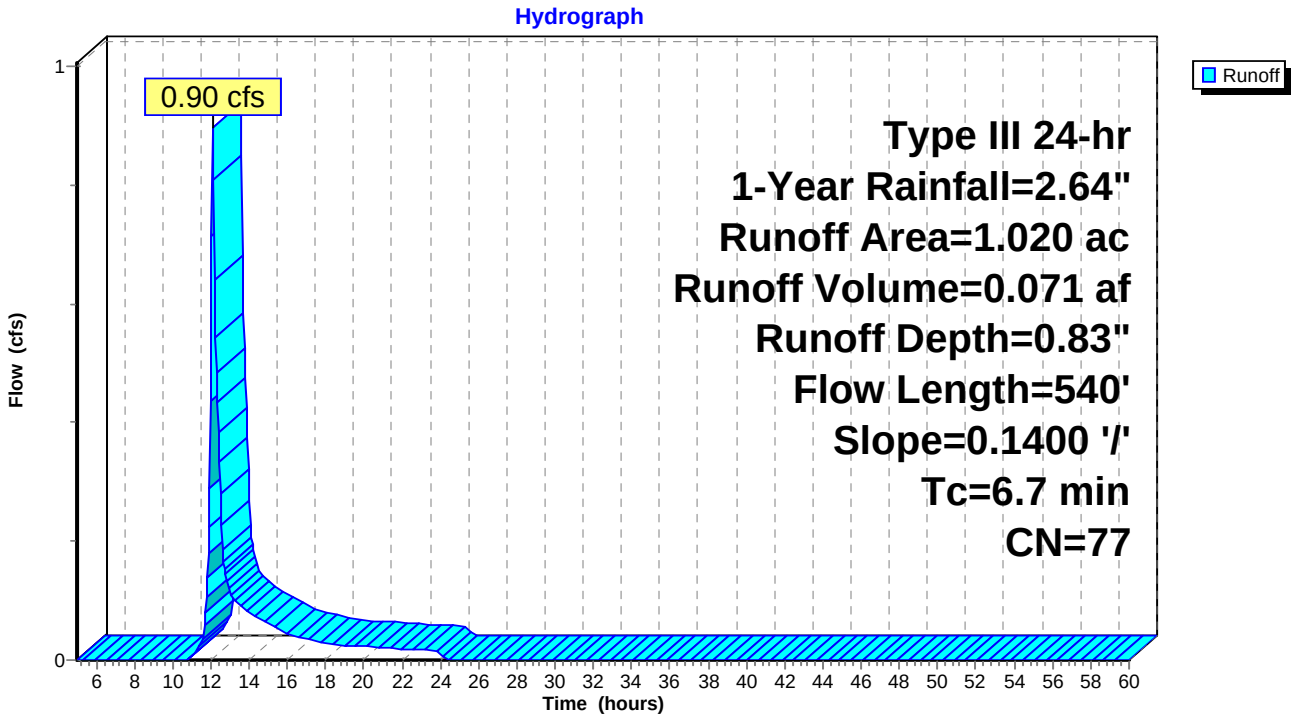
Runoff = 0.90 cfs @ 12.11 hrs, Volume= 0.071 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.870	77	Woods, Good, HSG D
0.150	80	>75% Grass cover, Good, HSG D
1.020	77	Weighted Average
1.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1400	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
0.4	440	0.1400	17.62	105.73	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 0.5 '/' Top.W=4.00' n= 0.030
6.7	540	Total			

Subcatchment 2B: BASIN 2B



Summary for Subcatchment 2C: BASIN 2C

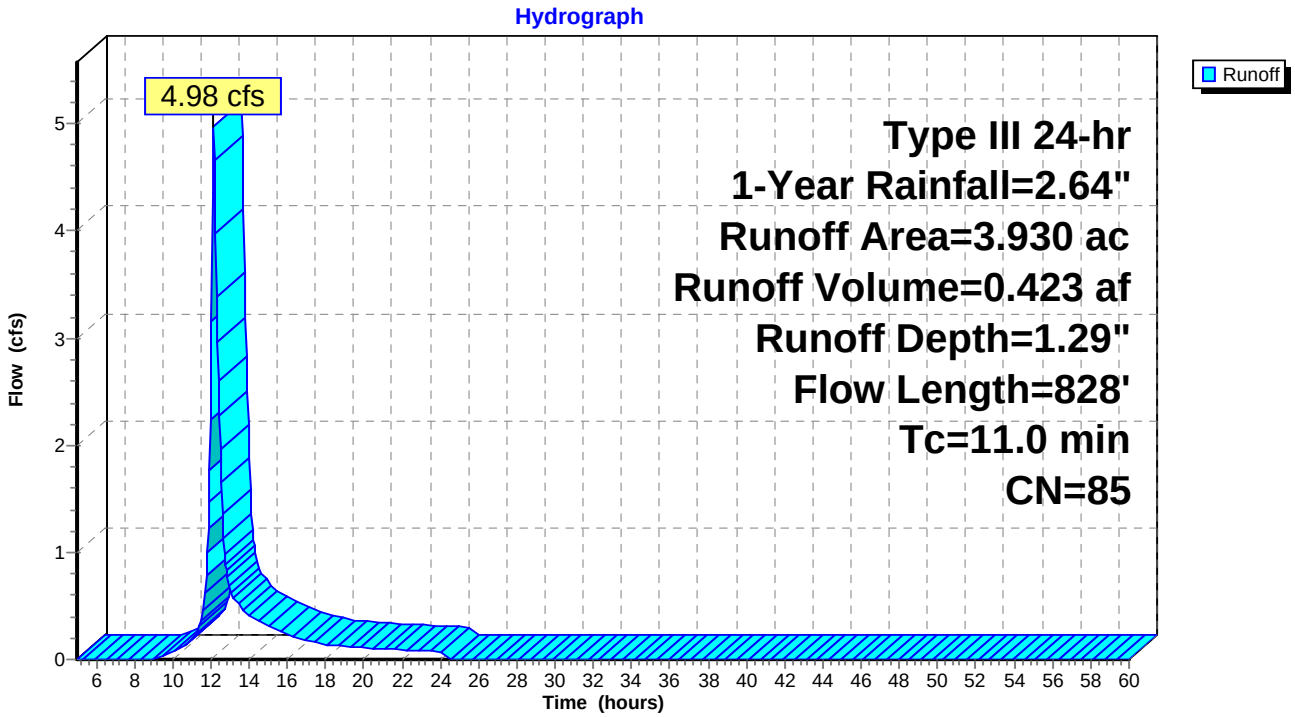
Runoff = 4.98 cfs @ 12.16 hrs, Volume= 0.423 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
*	1.200	98	Proposed Impervious Surfaces
	0.650	77	Woods, Good, HSG D
	2.080	80	>75% Grass cover, Good, HSG D
	3.930	85	Weighted Average
	2.730		69.47% Pervious Area
	1.200		30.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	425	0.1400	6.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	113	0.0350	12.05	21.29	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.0	24	0.0300	11.15	19.71	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	112	0.0488	14.23	25.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	54	0.0300	11.15	19.71	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
11.0	828	Total			

Subcatchment 2C: BASIN 2C



Summary for Subcatchment 3A: BASIN 3A

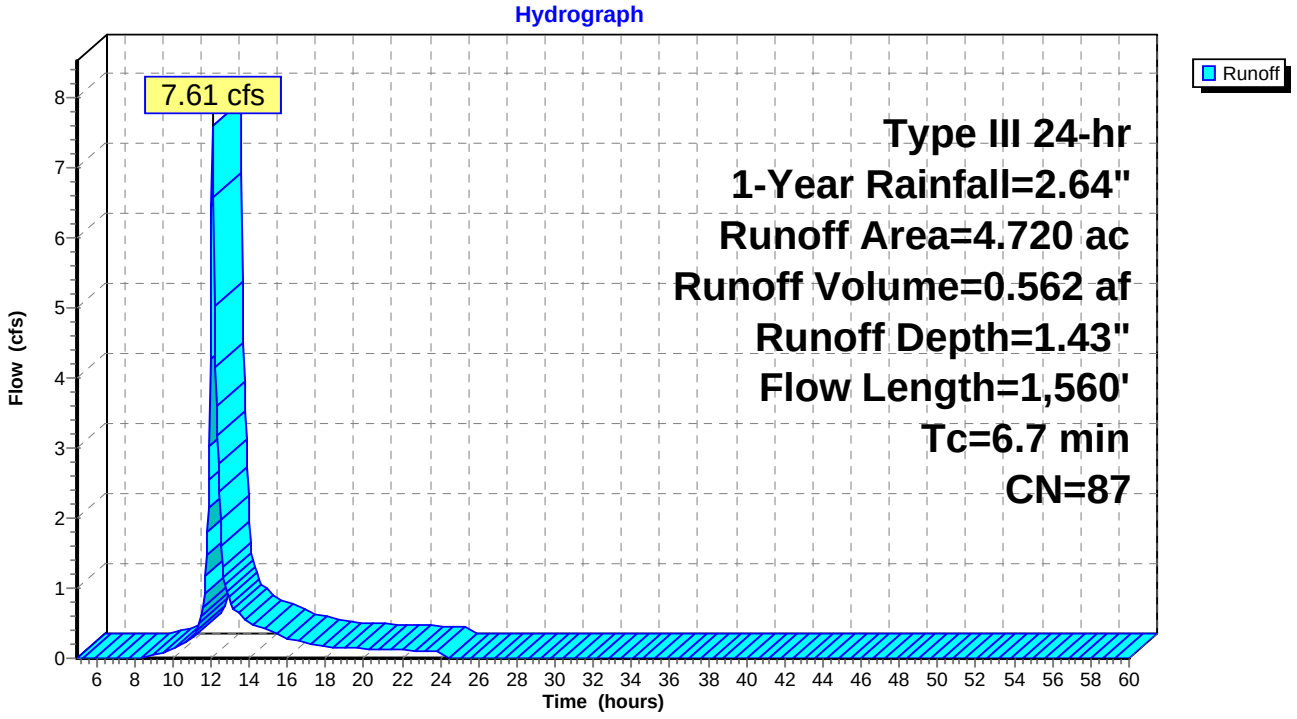
Runoff = 7.61 cfs @ 12.10 hrs, Volume= 0.562 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
*	1.900	98	
	0.100	77	Woods, Good, HSG D
	2.720	80	>75% Grass cover, Good, HSG D
	4.720	87	Weighted Average
	2.820		59.75% Pervious Area
	1.900		40.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	100	0.1000	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	145	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	115	0.0850	5.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	1,200	0.0900	19.32	34.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
6.7	1,560	Total			

Subcatchment 3A: BASIN 3A



Summary for Subcatchment 3B: BASIN 3B

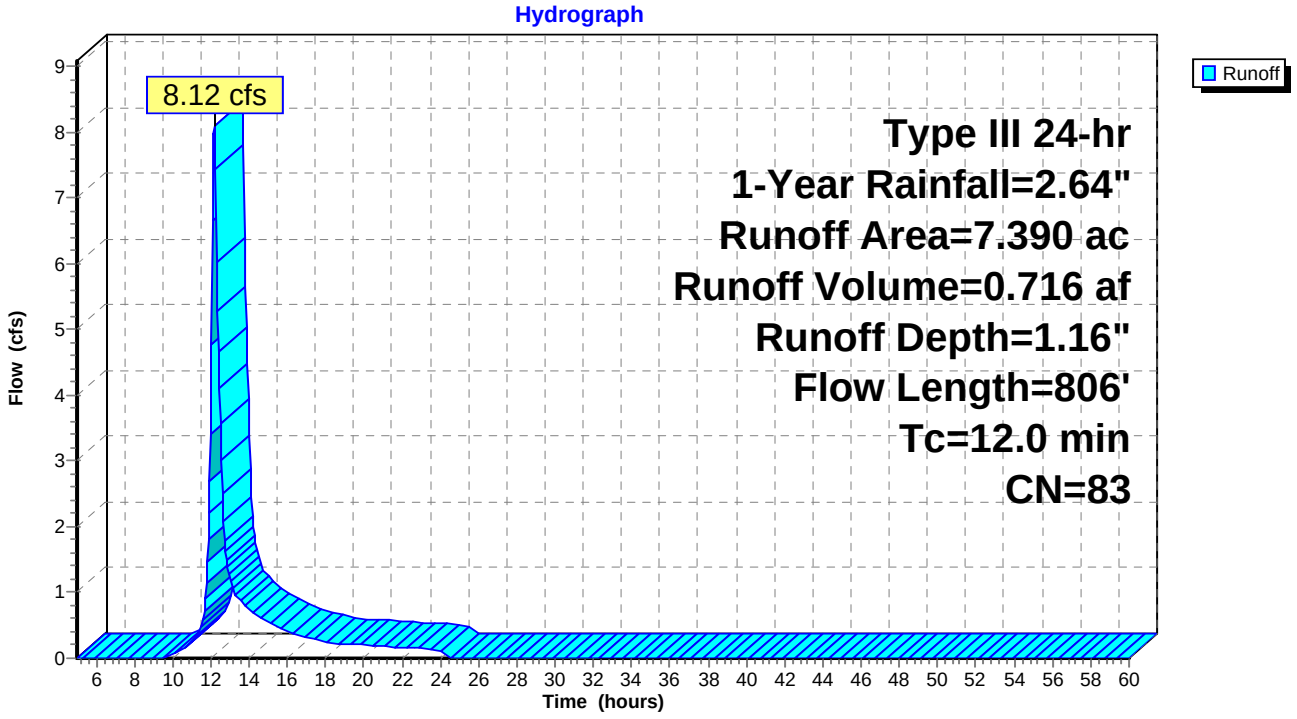
Runoff = 8.12 cfs @ 12.17 hrs, Volume= 0.716 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
*	1.650	98	Proposed Impervious
	1.700	77	Woods, Good, HSG D
	4.040	80	>75% Grass cover, Good, HSG D
	7.390	83	Weighted Average
	5.740		77.67% Pervious Area
	1.650		22.33% 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"
0.4	150	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	376	0.0900	19.32	34.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.5	180	0.1700	6.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.0	806	Total			

Subcatchment 3B: BASIN 3B



Summary for Subcatchment 3C: BASIN 3C

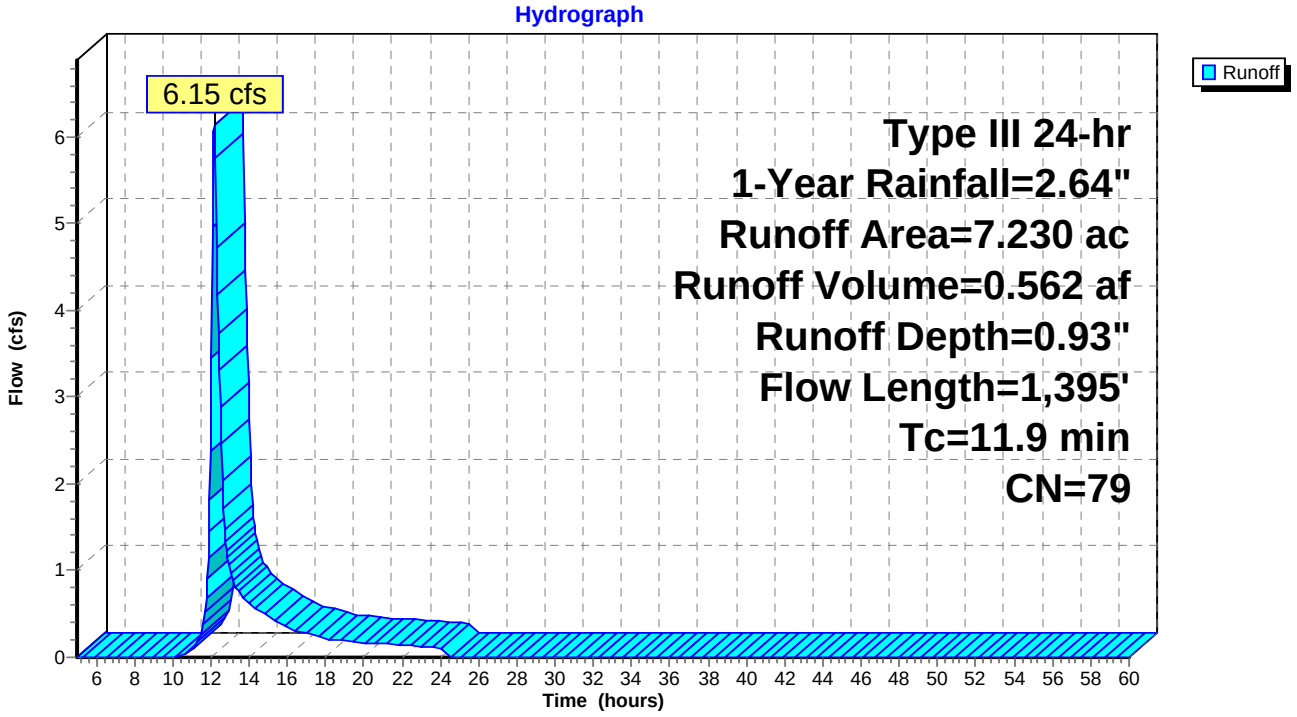
Runoff = 6.15 cfs @ 12.18 hrs, Volume= 0.562 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	6.630	77	Woods, Good, HSG D
*	0.300	98	Stream
*	0.300	98	Existing Impervious
	7.230	79	Weighted Average
	6.630		91.70% Pervious Area
	0.600		8.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	270	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.1	1,025	0.0600	14.99	239.76	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=2.00' Z= 1.0 '/' Top.W=10.00' n= 0.030
11.9	1,395	Total			

Subcatchment 3C: BASIN 3C



Summary for Subcatchment 3D: BASIN 3D

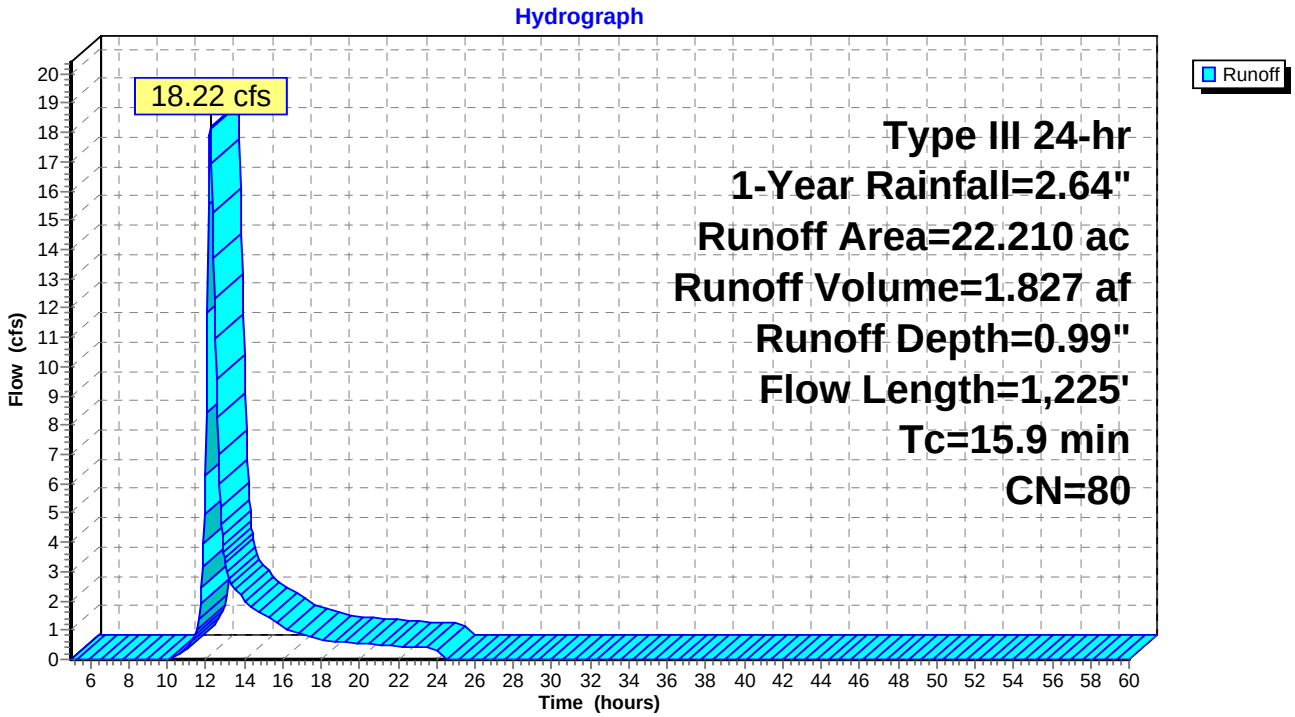
Runoff = 18.22 cfs @ 12.23 hrs, Volume= 1.827 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	9.000	80	>75% Grass cover, Good, HSG D
	10.380	77	Woods, Good, HSG D
*	1.360	98	Roads
*	0.400	98	Driveways
*	0.350	98	Houses
*	0.120	96	Gravel Road
	0.600	78	Meadow, non-grazed, HSG D
	22.210	80	Weighted Average
	20.100		90.50% Pervious Area
	2.110		9.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
1.3	450	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	265	0.0400	7.86	20.62	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.50' Z= 0.5 '/' Top.W=2.50' n= 0.027
0.1	125	0.0700	17.04	30.11	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	285	0.0900	14.13	84.77	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 0.5 '/' Top.W=4.00' n= 0.030
15.9	1,225	Total			

Subcatchment 3D: BASIN 3D



Summary for Subcatchment 4: BASIN 4

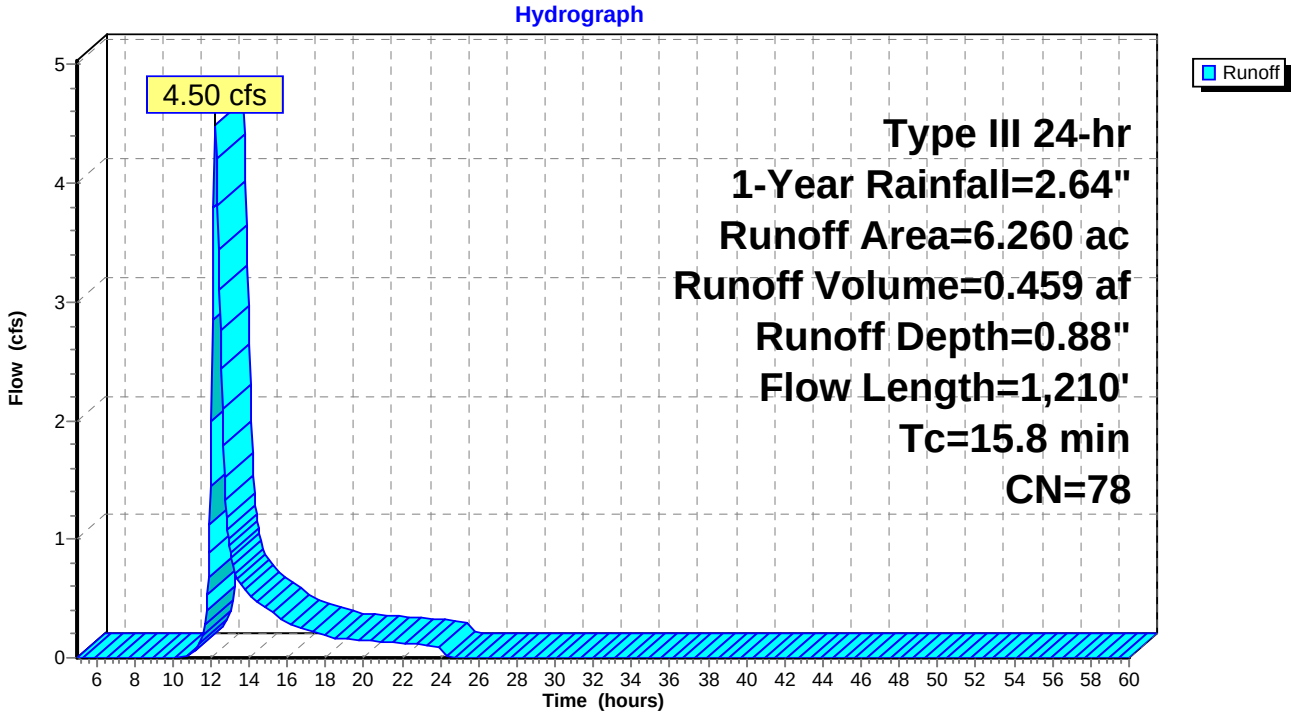
Runoff = 4.50 cfs @ 12.24 hrs, Volume= 0.459 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	5.460	77	Woods, Good, HSG D
	0.700	80	>75% Grass cover, Good, HSG D
*	0.100	98	
	6.260	78	Weighted Average
	6.160		98.40% Pervious Area
	0.100		1.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.6	1,110	0.1000	11.23	37.43	**Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.030
15.8	1,210	Total			

Subcatchment 4: BASIN 4



Summary for Subcatchment 5: BASIN 5

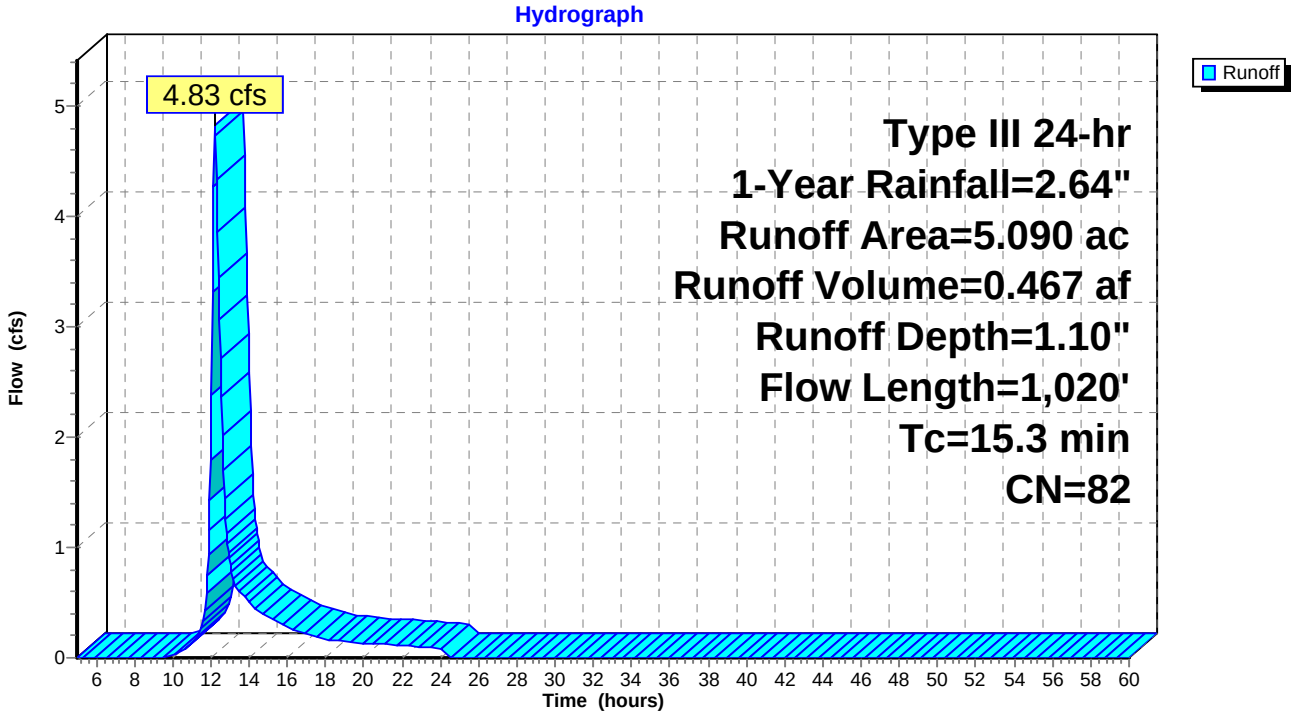
Runoff = 4.83 cfs @ 12.22 hrs, Volume= 0.467 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
*	0.820	98	Impervious Surfaces
	2.200	80	>75% Grass cover, Good, HSG D
	2.070	77	Woods, Good, HSG D
	5.090	82	Weighted Average
	4.270		83.89% Pervious Area
	0.820		16.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0700	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.9	920	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
15.3	1,020	Total			

Subcatchment 5: BASIN 5



Summary for Subcatchment 6: BASIN 6

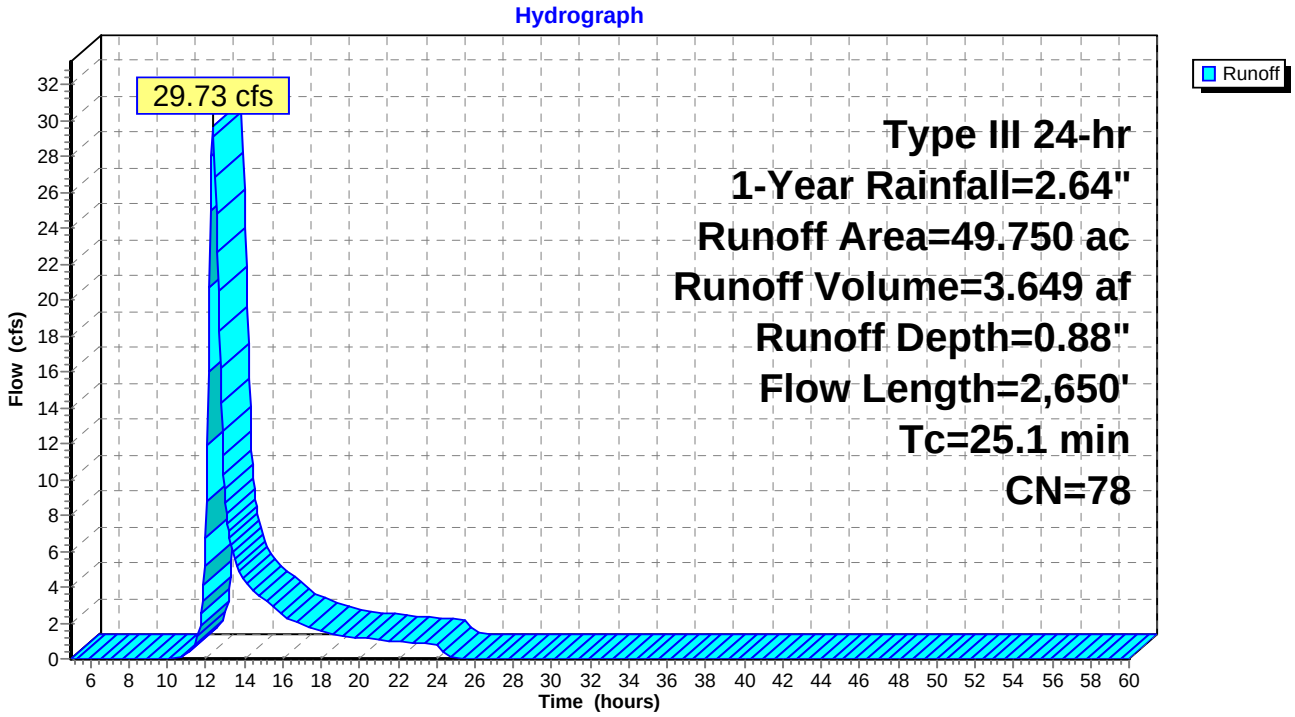
Runoff = 29.73 cfs @ 12.38 hrs, Volume= 3.649 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.64"

	Area (ac)	CN	Description
	3.100	80	>75% Grass cover, Good, HSG D
*	1.150	98	Imperviuos Surfaces
	11.900	80	Pasture/grassland/range, Good, HSG D
	33.600	77	Woods, Good, HSG D
	49.750	78	Weighted Average
	48.600		97.69% Pervious Area
	1.150		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	2,550	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.1	2,650	Total			

Subcatchment 6: BASIN 6



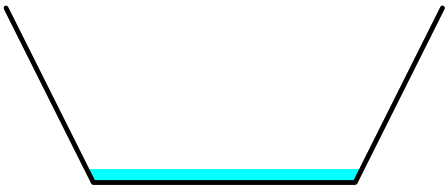
Summary for Reach 1R: SWALE

Inflow Area = 13.930 ac, 8.26% Impervious, Inflow Depth > 1.01" for 1-Year event
Inflow = 1.07 cfs @ 12.11 hrs, Volume= 1.169 af
Outflow = 1.03 cfs @ 12.14 hrs, Volume= 1.169 af, Atten= 4%, Lag= 1.8 min

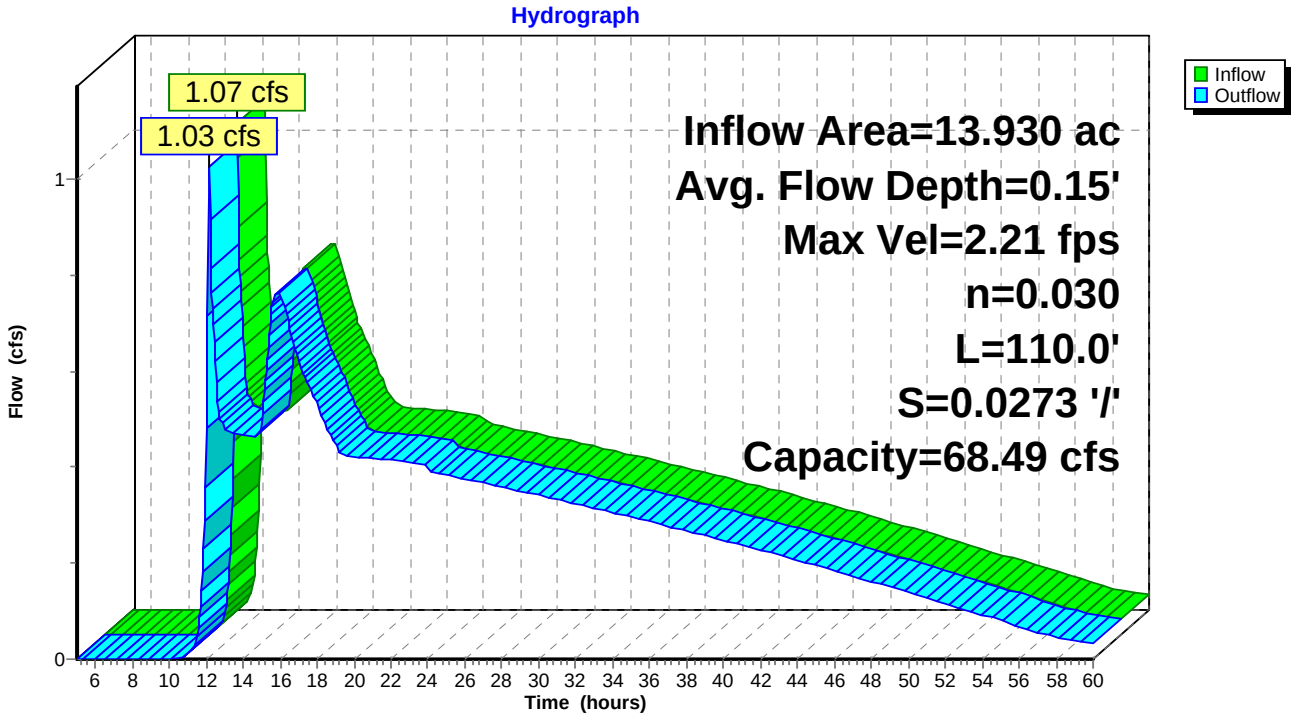
Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.21 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 1.4 min

Peak Storage= 52 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 68.49 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 0.5 '/' Top Width= 5.00'
Length= 110.0' Slope= 0.0273 '/'
Inlet Invert= 645.00', Outlet Invert= 642.00'



Reach 1R: SWALE



Summary for Reach 2R: SWALE

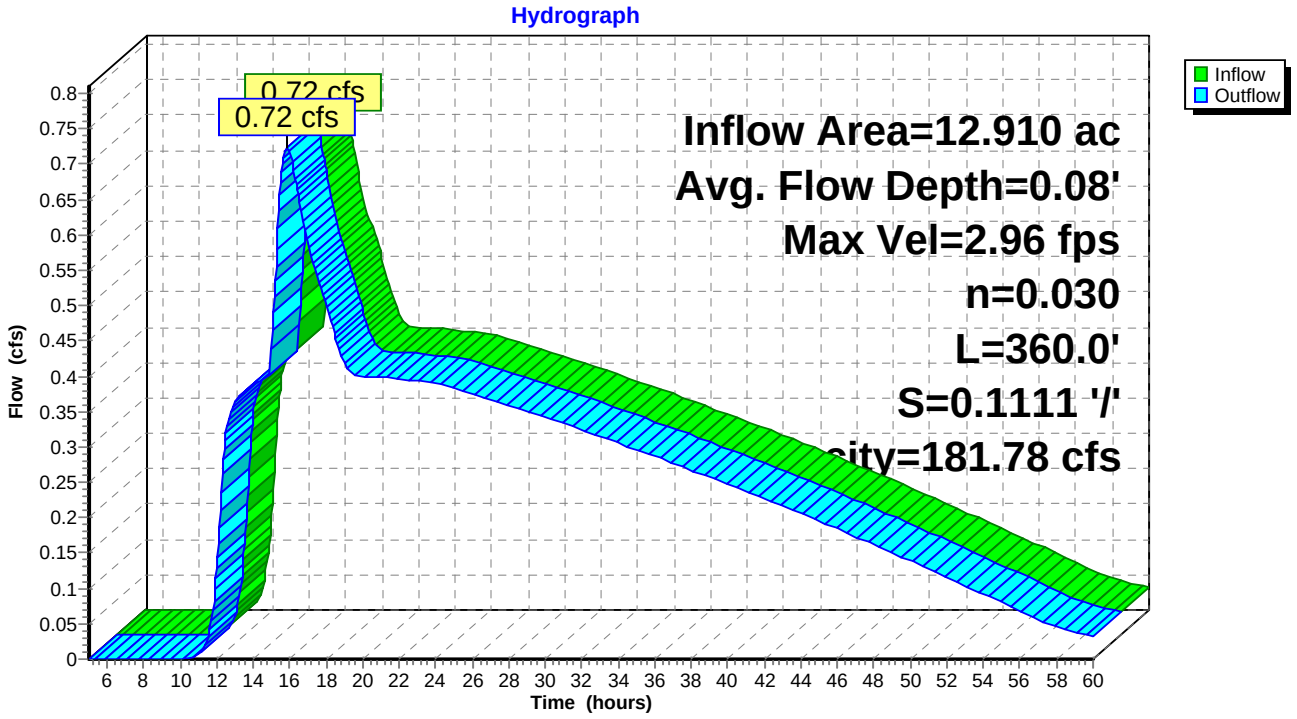
Inflow Area = 12.910 ac, 8.91% Impervious, Inflow Depth > 1.02" for 1-Year event
Inflow = 0.72 cfs @ 15.79 hrs, Volume= 1.099 af
Outflow = 0.72 cfs @ 15.85 hrs, Volume= 1.099 af, Atten= 0%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.96 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 3.1 min

Peak Storage= 88 cf @ 15.81 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 181.78 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 360.0' Slope= 0.1111 '/'
Inlet Invert= 720.00', Outlet Invert= 680.00'

Reach 2R: SWALE

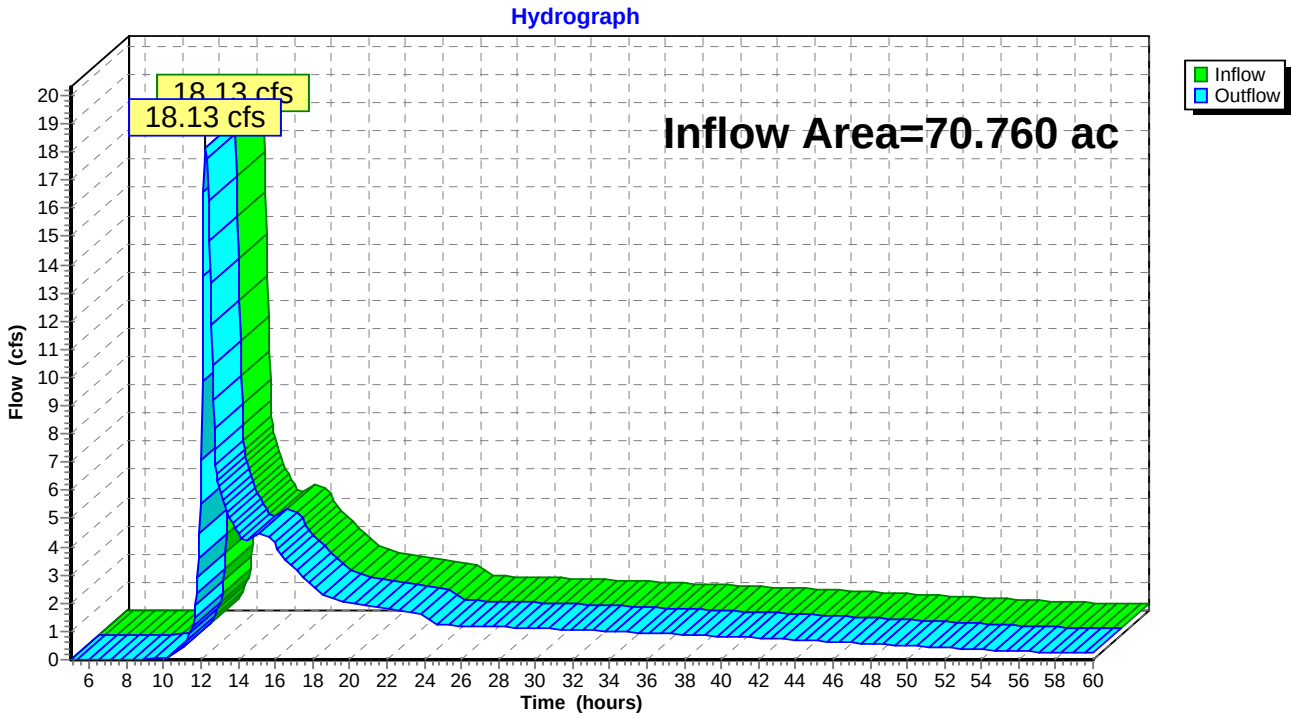


Summary for Reach AP1: Analysis Point

Inflow Area = 70.760 ac, 13.47% Impervious, Inflow Depth > 1.02" for 1-Year event
Inflow = 18.13 cfs @ 12.26 hrs, Volume= 6.023 af
Outflow = 18.13 cfs @ 12.26 hrs, Volume= 6.023 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs

Reach AP1: Analysis Point



Summary for Reach S1: STREAM

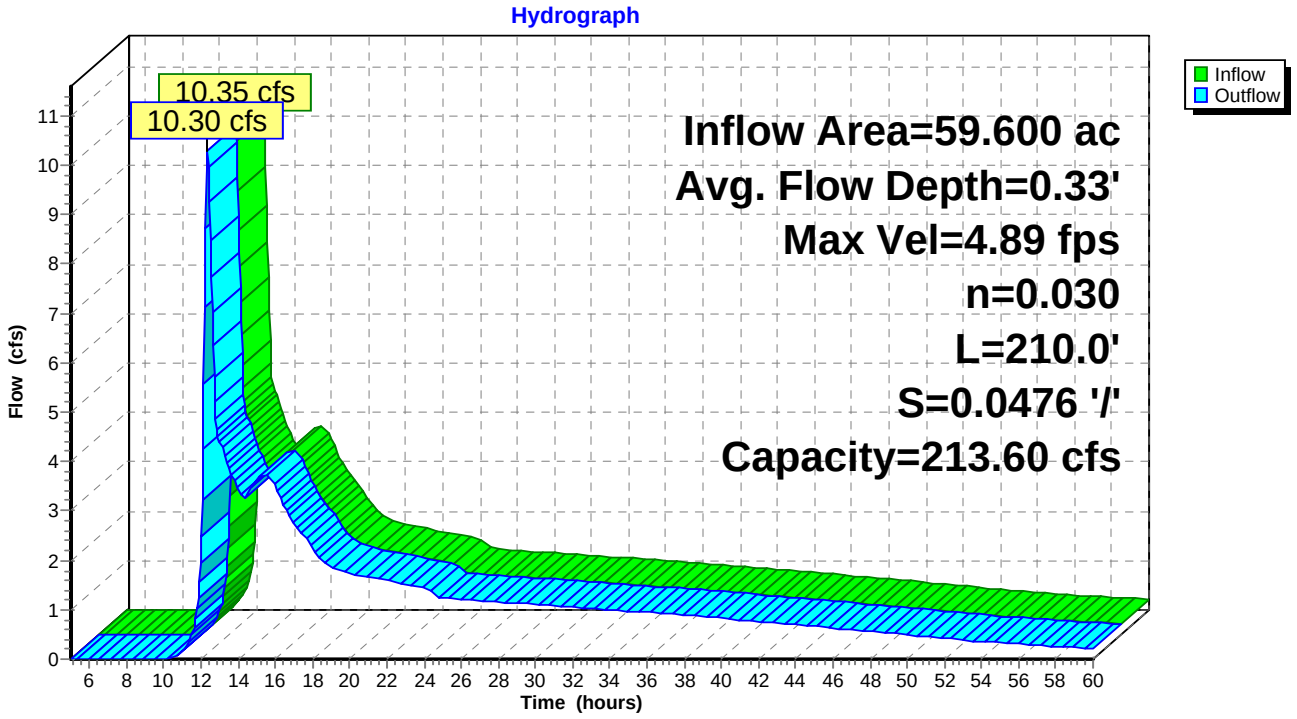
Inflow Area = 59.600 ac, 12.97% Impervious, Inflow Depth > 1.01" for 1-Year event
Inflow = 10.35 cfs @ 12.33 hrs, Volume= 5.040 af
Outflow = 10.30 cfs @ 12.35 hrs, Volume= 5.039 af, Atten= 1%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.89 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 1.8 min

Peak Storage= 444 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 213.60 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 210.0' Slope= 0.0476 '/'
Inlet Invert= 642.00', Outlet Invert= 632.00'

Reach S1: STREAM



Summary for Reach S2: STREAM

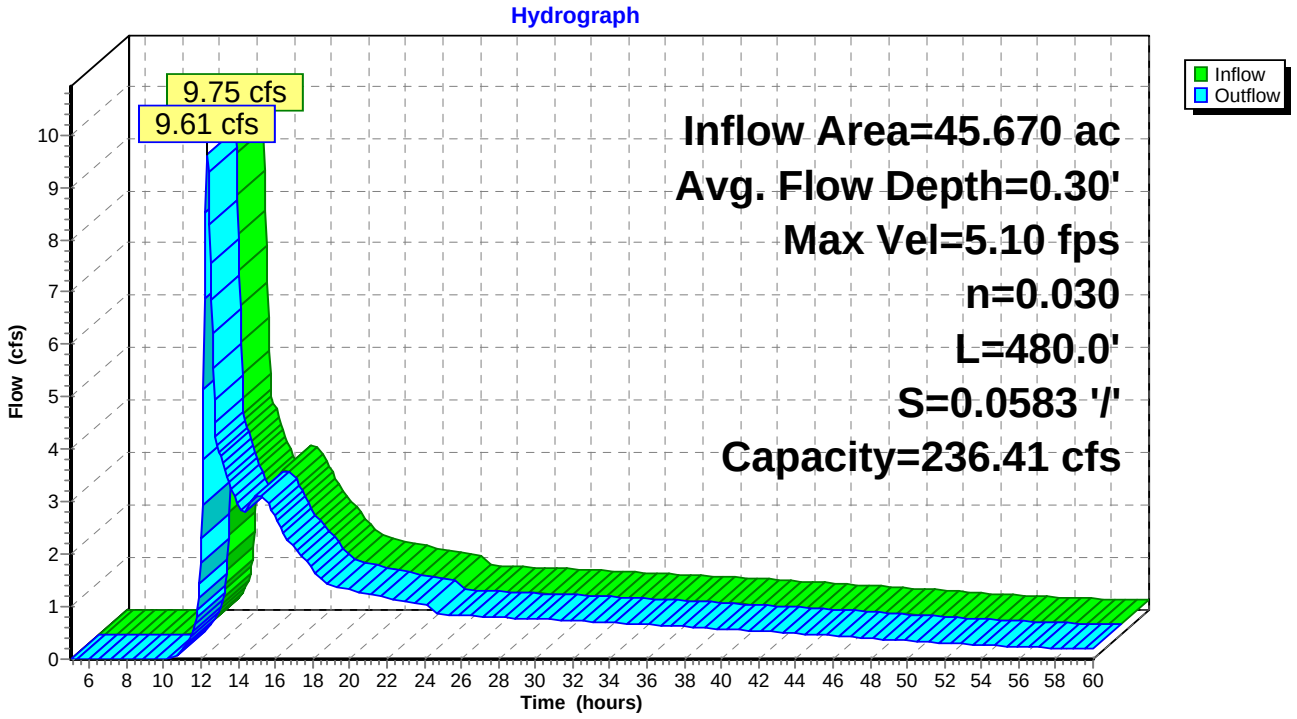
Inflow Area = 45.670 ac, 14.41% Impervious, Inflow Depth > 1.02" for 1-Year event
Inflow = 9.75 cfs @ 12.28 hrs, Volume= 3.873 af
Outflow = 9.61 cfs @ 12.33 hrs, Volume= 3.871 af, Atten= 1%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.10 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 4.3 min

Peak Storage= 916 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 236.41 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 480.0' Slope= 0.0583 '/'
Inlet Invert= 670.00', Outlet Invert= 642.00'

Reach S2: STREAM



Summary for Reach S3: STREAM

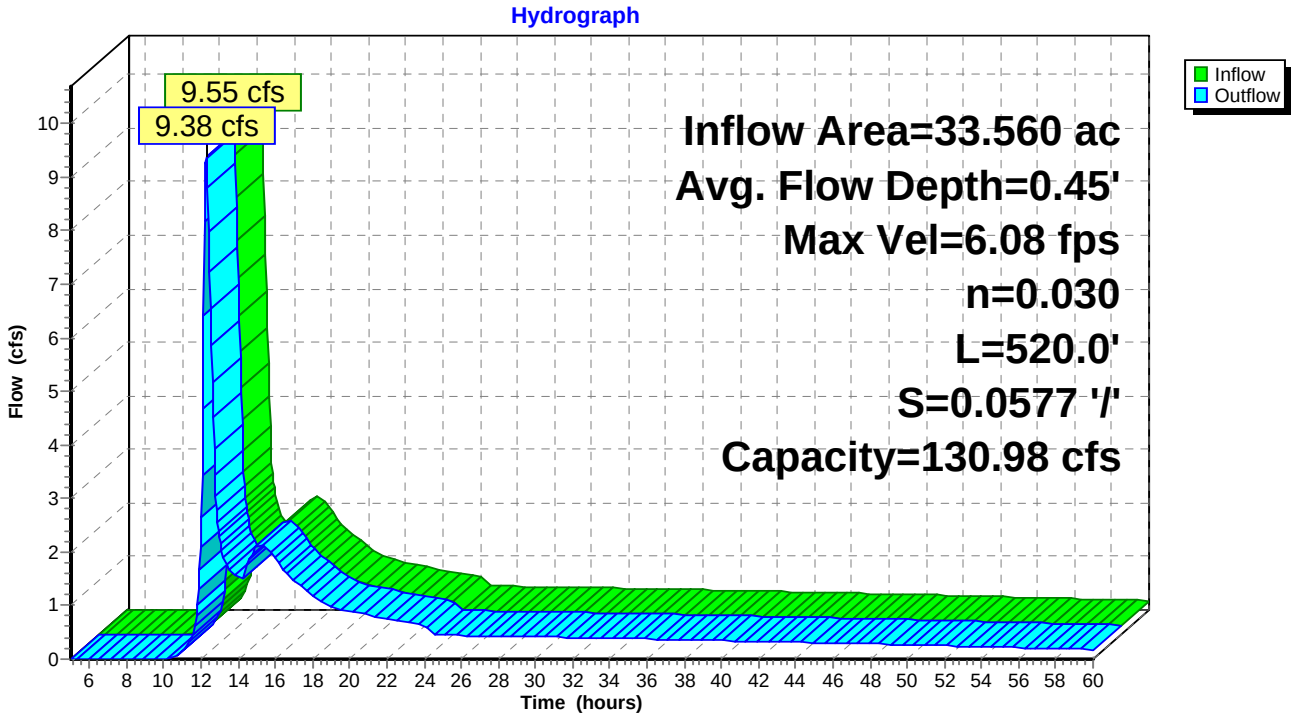
Inflow Area = 33.560 ac, 9.03% Impervious, Inflow Depth > 0.93" for 1-Year event
Inflow = 9.55 cfs @ 12.24 hrs, Volume= 2.606 af
Outflow = 9.38 cfs @ 12.28 hrs, Volume= 2.604 af, Atten= 2%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.08 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.07 fps, Avg. Travel Time= 4.2 min

Peak Storage= 815 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 130.98 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 520.0' Slope= 0.0577 '/'
Inlet Invert= 700.00', Outlet Invert= 670.00'

Reach S3: STREAM



Summary for Reach S4: STREAM

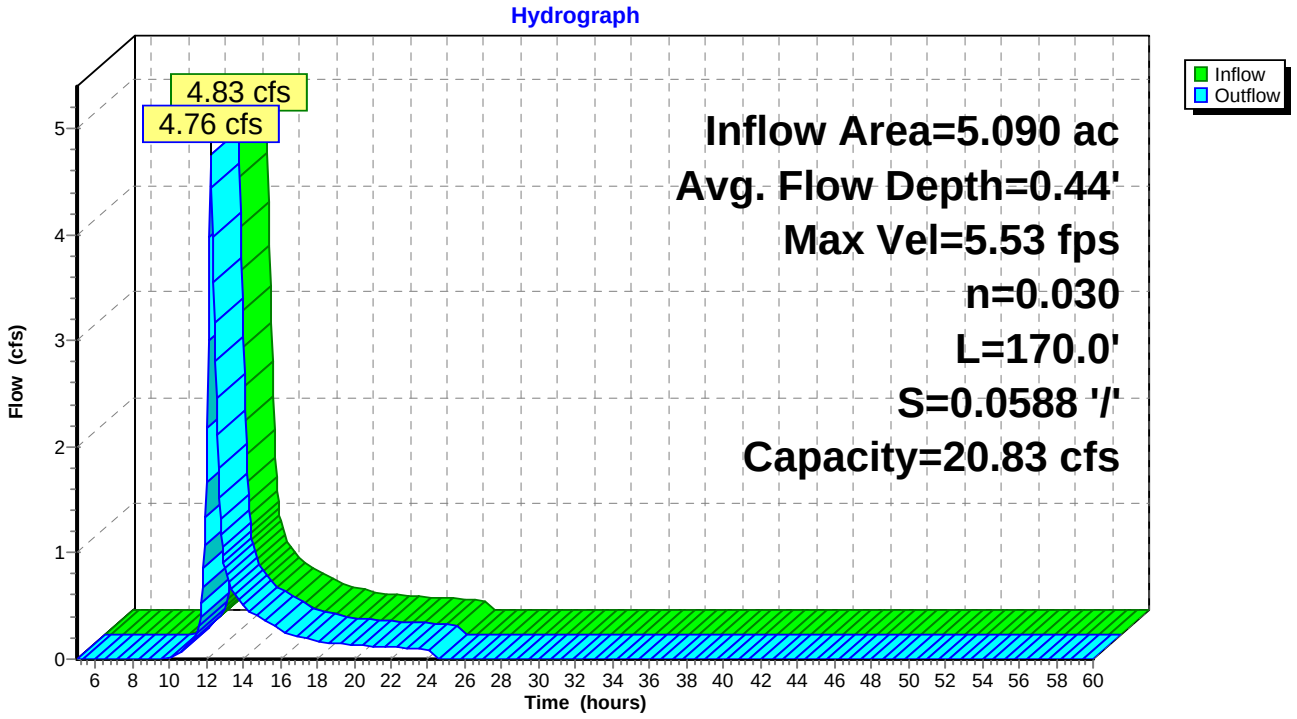
Inflow Area = 5.090 ac, 16.11% Impervious, Inflow Depth = 1.10" for 1-Year event
Inflow = 4.83 cfs @ 12.22 hrs, Volume= 0.467 af
Outflow = 4.76 cfs @ 12.24 hrs, Volume= 0.467 af, Atten= 1%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.53 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 1.5 min

Peak Storage= 147 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.00' Flow Area= 2.5 sf, Capacity= 20.83 cfs

1.50' x 1.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 3.50'
Length= 170.0' Slope= 0.0588 '/'
Inlet Invert= 710.00', Outlet Invert= 700.00'

Reach S4: STREAM



Summary for Pond 2P: PIPE

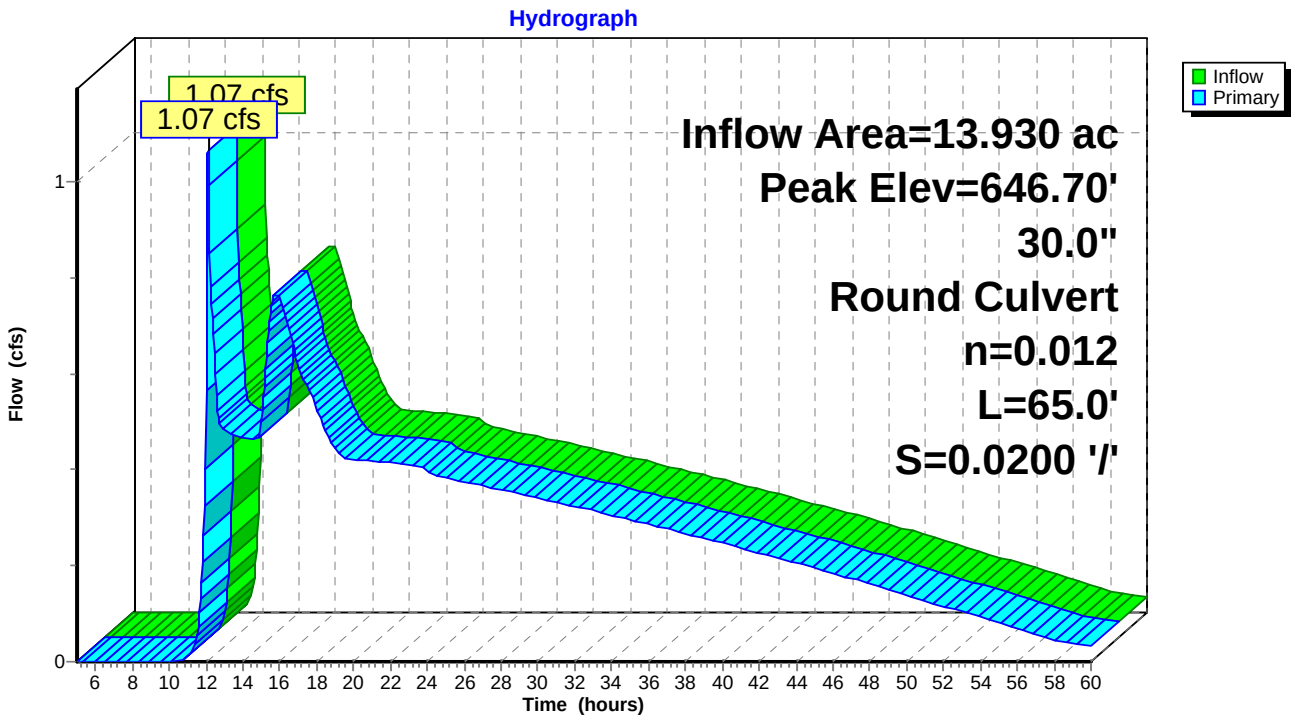
Inflow Area = 13.930 ac, 8.26% Impervious, Inflow Depth > 1.01" for 1-Year event
Inflow = 1.07 cfs @ 12.11 hrs, Volume= 1.169 af
Outflow = 1.07 cfs @ 12.11 hrs, Volume= 1.169 af, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 12.11 hrs, Volume= 1.169 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 646.70' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	646.30'	**30.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 646.30' / 645.00' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf

Primary OutFlow Max=1.04 cfs @ 12.11 hrs HW=646.69' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.04 cfs @ 2.13 fps)

Pond 2P: PIPE

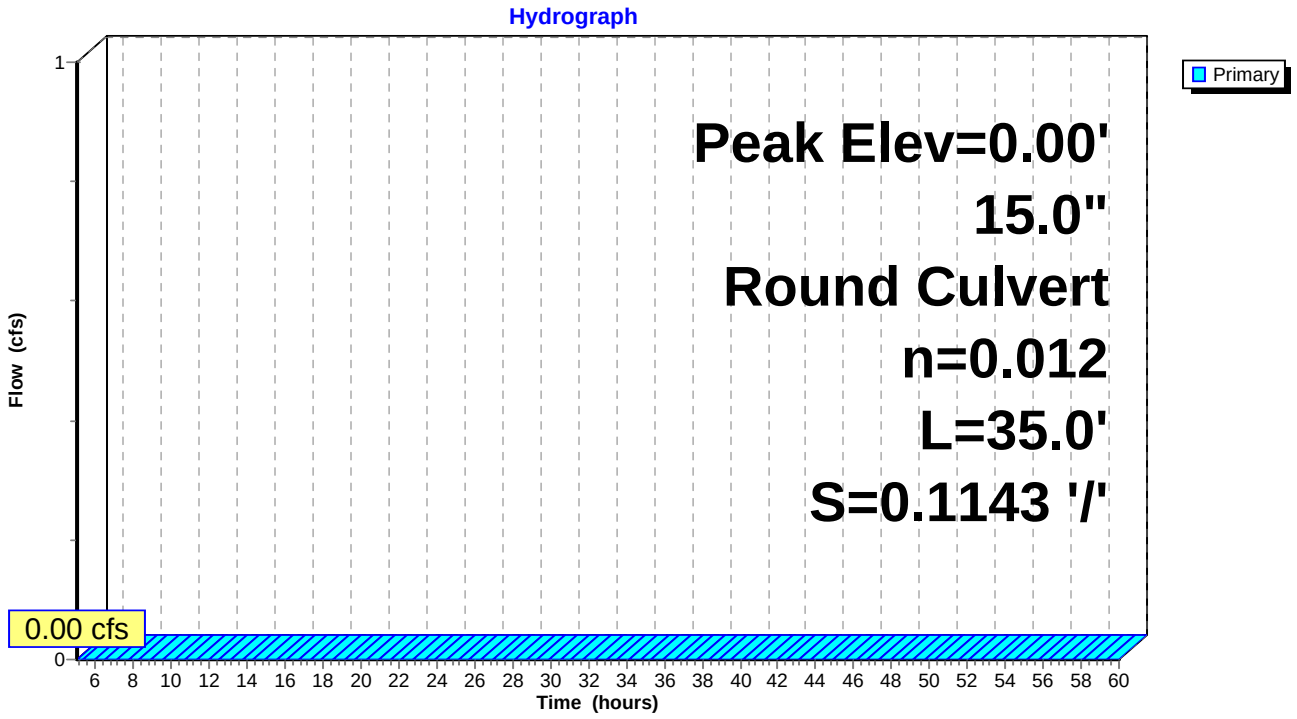


Summary for Pond 6P: 15" HDPE

Device	Routing	Invert	Outlet Devices
#1	Primary	720.00'	**15.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 720.00' / 716.00' S= 0.1143 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 6P: 15" HDPE



Summary for Pond P2A: POND 2A

Inflow Area = 12.910 ac, 8.91% Impervious, Inflow Depth = 1.04" for 1-Year event
Inflow = 12.23 cfs @ 12.19 hrs, Volume= 1.123 af
Outflow = 0.72 cfs @ 15.79 hrs, Volume= 1.099 af, Atten= 94%, Lag= 216.2 min
Primary = 0.72 cfs @ 15.79 hrs, Volume= 1.099 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 729.06' @ 15.79 hrs Surf.Area= 13,082 sf Storage= 31,980 cf

Plug-Flow detention time= 904.4 min calculated for 1.098 af (98% of inflow)
Center-of-Mass det. time= 893.7 min (1,749.6 - 855.9)

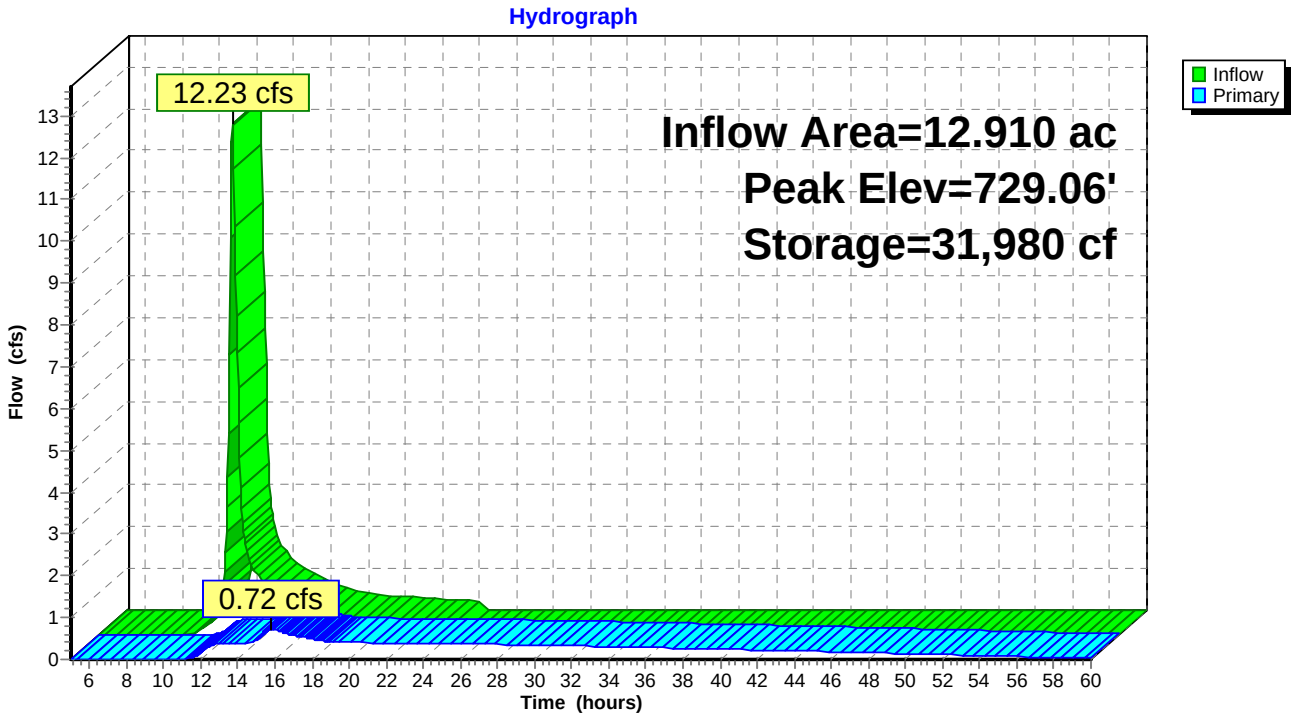
Volume	Invert	Avail.Storage	Storage Description
#1	726.00'	78,700 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
726.00	8,000	0	0
728.00	11,150	19,150	19,150
730.00	14,800	25,950	45,100
732.00	18,800	33,600	78,700

Device	Routing	Invert	Outlet Devices
#1	Primary	725.00'	**30.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.00' / 723.72' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	726.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	729.00'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	731.00'	**36.0" W x 36.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.69 cfs @ 15.79 hrs HW=729.06' (Free Discharge)
└─**1=Culvert** (Passes 0.69 cfs of 39.61 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.40 cfs @ 8.25 fps)
  ├─**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.28 cfs @ 0.80 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond P2A: POND 2A



Summary for Pond P3AB: POND 3AB

Inflow Area = 12.110 ac, 29.31% Impervious, Inflow Depth = 1.27" for 1-Year event
Inflow = 14.67 cfs @ 12.13 hrs, Volume= 1.278 af
Outflow = 1.71 cfs @ 13.18 hrs, Volume= 1.269 af, Atten= 88%, Lag= 62.9 min
Primary = 1.71 cfs @ 13.18 hrs, Volume= 1.269 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 677.46' @ 13.18 hrs Surf.Area= 11,273 sf Storage= 29,773 cf

Plug-Flow detention time= 674.5 min calculated for 1.269 af (99% of inflow)
Center-of-Mass det. time= 670.1 min (1,509.3 - 839.1)

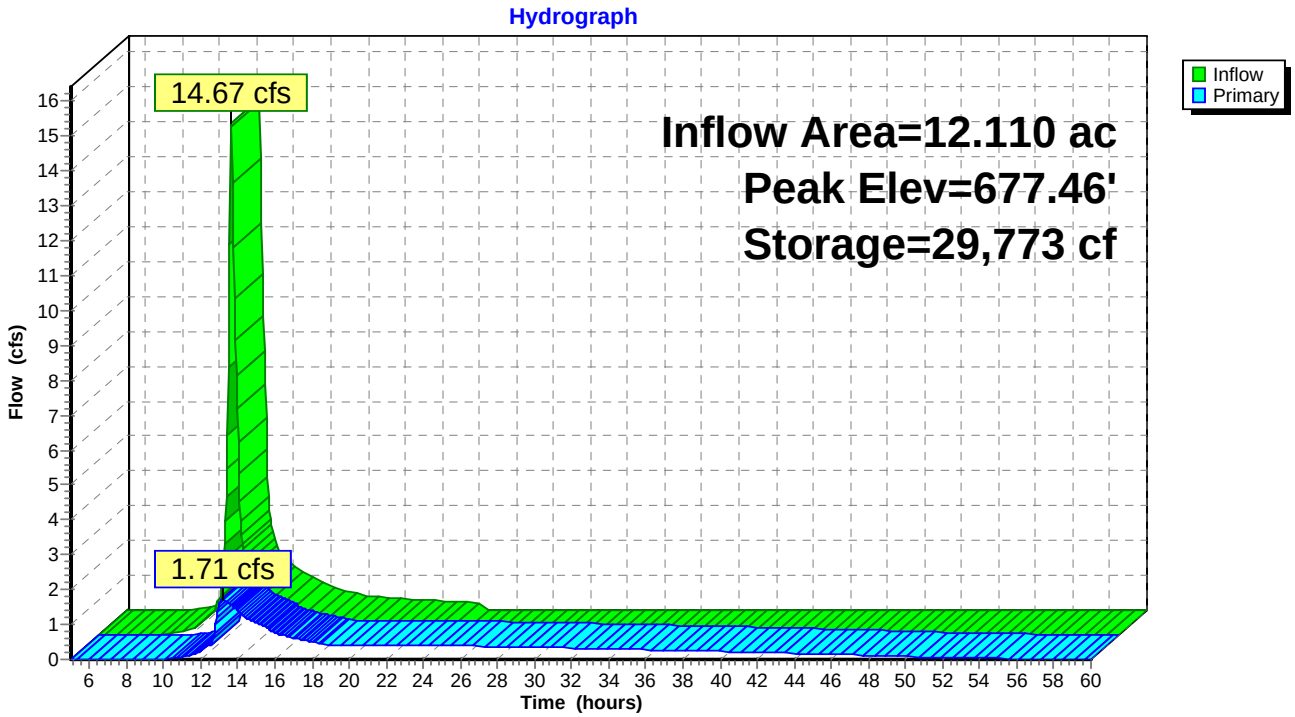
Volume	Invert	Avail.Storage	Storage Description
#1	674.00'	64,180 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
674.00	6,140	0	0
676.00	8,920	15,060	15,060
678.00	12,150	21,070	36,130
680.00	15,900	28,050	64,180

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**30.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 674.00' / 673.20' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	674.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	677.30'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	679.00'	**54.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.69 cfs @ 13.18 hrs HW=677.46' (Free Discharge)
└**1=Culvert** (Passes 1.69 cfs of 35.11 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.43 cfs @ 8.79 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.26 cfs @ 1.35 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond P3AB: POND 3AB



Summary for Pond P3D: POND 3D

Inflow Area = 22.210 ac, 9.50% Impervious, Inflow Depth = 0.99" for 1-Year event
Inflow = 18.22 cfs @ 12.23 hrs, Volume= 1.827 af
Outflow = 1.41 cfs @ 15.35 hrs, Volume= 1.680 af, Atten= 92%, Lag= 186.9 min
Primary = 1.41 cfs @ 15.35 hrs, Volume= 1.680 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 751.94' @ 15.35 hrs Surf.Area= 17,159 sf Storage= 50,980 cf

Plug-Flow detention time= 990.5 min calculated for 1.678 af (92% of inflow)
Center-of-Mass det. time= 951.0 min (1,813.4 - 862.4)

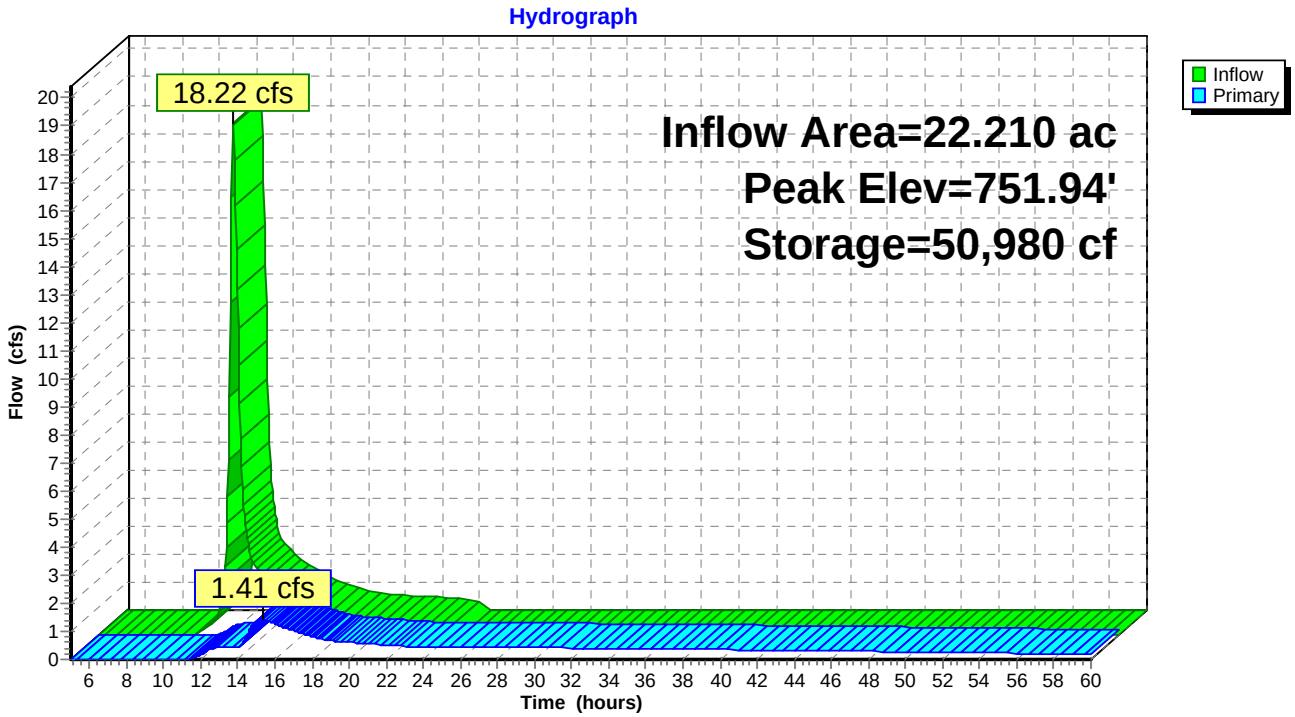
Volume	Invert	Avail.Storage	Storage Description
#1	748.00'	114,646 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
748.00	8,890	0	0
750.00	12,880	21,770	21,770
752.00	17,280	30,160	51,930
754.00	22,080	39,360	91,290
755.00	24,631	23,356	114,646

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**36.0" Round Culvert** L= 221.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 726.00' S= 0.0950 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	748.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	753.00'	**54.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	751.80'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=1.39 cfs @ 15.35 hrs HW=751.94' (Free Discharge)
└**1=Culvert** (Passes 1.39 cfs of 63.17 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 9.41 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Weir Controls 0.93 cfs @ 1.29 fps)

Pond P3D: POND 3D



Time span=5.00-60.00 hrs, dt=0.05 hrs, 1101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: BASIN 1 Runoff Area=17.460 ac 8.08% Impervious Runoff Depth=2.63"
Flow Length=1,980' Tc=15.0 min CN=79 Runoff=40.58 cfs 3.827 af

Subcatchment 2A: BASIN 2A Runoff Area=12.910 ac 8.91% Impervious Runoff Depth=2.81"
Flow Length=775' Tc=12.8 min CN=81 Runoff=33.75 cfs 3.022 af

Subcatchment 2B: BASIN 2B Runoff Area=1.020 ac 0.00% Impervious Runoff Depth=2.46"
Flow Length=540' Slope=0.1400 '/' Tc=6.7 min CN=77 Runoff=2.82 cfs 0.209 af

Subcatchment 2C: BASIN 2C Runoff Area=3.930 ac 30.53% Impervious Runoff Depth=3.18"
Flow Length=828' Tc=11.0 min CN=85 Runoff=12.24 cfs 1.043 af

Subcatchment 3A: BASIN 3A Runoff Area=4.720 ac 40.25% Impervious Runoff Depth=3.38"
Flow Length=1,560' Tc=6.7 min CN=87 Runoff=17.69 cfs 1.329 af

Subcatchment 3B: BASIN 3B Runoff Area=7.390 ac 22.33% Impervious Runoff Depth=2.99"
Flow Length=806' Tc=12.0 min CN=83 Runoff=21.13 cfs 1.844 af

Subcatchment 3C: BASIN 3C Runoff Area=7.230 ac 8.30% Impervious Runoff Depth=2.63"
Flow Length=1,395' Tc=11.9 min CN=79 Runoff=18.26 cfs 1.585 af

Subcatchment 3D: BASIN 3D Runoff Area=22.210 ac 9.50% Impervious Runoff Depth=2.72"
Flow Length=1,225' Tc=15.9 min CN=80 Runoff=52.22 cfs 5.033 af

Subcatchment 4: BASIN 4 Runoff Area=6.260 ac 1.60% Impervious Runoff Depth=2.54"
Flow Length=1,210' Tc=15.8 min CN=78 Runoff=13.78 cfs 1.326 af

Subcatchment 5: BASIN 5 Runoff Area=5.090 ac 16.11% Impervious Runoff Depth=2.90"
Flow Length=1,020' Tc=15.3 min CN=82 Runoff=12.94 cfs 1.230 af

Subcatchment 6: BASIN 6 Runoff Area=49.750 ac 2.31% Impervious Runoff Depth=2.54"
Flow Length=2,650' Tc=25.1 min CN=78 Runoff=90.53 cfs 10.542 af

Reach 1R: SWALE Avg. Flow Depth=1.03' Max Vel=6.33 fps Inflow=23.09 cfs 3.202 af
n=0.030 L=110.0' S=0.0273 '/' Capacity=68.49 cfs Outflow=22.90 cfs 3.202 af

Reach 2R: SWALE Avg. Flow Depth=0.61' Max Vel=9.95 fps Inflow=22.05 cfs 2.994 af
n=0.030 L=360.0' S=0.1111 '/' Capacity=181.78 cfs Outflow=21.83 cfs 2.994 af

Reach AP1: Analysis Point Inflow=114.83 cfs 16.417 af
Outflow=114.83 cfs 16.417 af

Reach S1: STREAM Avg. Flow Depth=1.28' Max Vel=10.58 fps Inflow=98.48 cfs 13.791 af
n=0.030 L=210.0' S=0.0476 '/' Capacity=213.60 cfs Outflow=98.28 cfs 13.790 af

Reach S2: STREAM Avg. Flow Depth=1.03' Max Vel=10.42 fps Inflow=75.91 cfs 10.591 af
n=0.030 L=480.0' S=0.0583 '/' Capacity=236.41 cfs Outflow=75.59 cfs 10.589 af

Reach S3: STREAM Avg. Flow Depth=1.24' Max Vel=10.30 fps Inflow=53.92 cfs 7.431 af
n=0.030 L=520.0' S=0.0577 '/' Capacity=130.98 cfs Outflow=53.55 cfs 7.429 af

Reach S4: STREAM Avg. Flow Depth=0.78' Max Vel=7.33 fps Inflow=12.94 cfs 1.230 af
n=0.030 L=170.0' S=0.0588 '/' Capacity=20.83 cfs Outflow=12.85 cfs 1.230 af

Pond 2P: PIPE Peak Elev=648.50' Inflow=23.09 cfs 3.202 af
30.0" Round Culvert n=0.012 L=65.0' S=0.0200 '/' Outflow=23.09 cfs 3.202 af

Pond 6P: 15" HDPE Peak Elev=0.00'
15.0" Round Culvert n=0.012 L=35.0' S=0.1143 '/' Primary=0.00 cfs 0.000 af

Pond P2A: POND 2A Peak Elev=729.95' Storage=44,317 cf Inflow=33.75 cfs 3.022 af
Outflow=22.05 cfs 2.994 af

Pond P3AB: POND 3AB Peak Elev=678.41' Storage=41,269 cf Inflow=36.39 cfs 3.173 af
Outflow=28.60 cfs 3.162 af

Pond P3D: POND 3D Peak Elev=753.15' Storage=73,312 cf Inflow=52.22 cfs 5.033 af
Outflow=35.45 cfs 4.874 af

Total Runoff Area = 137.970 ac Runoff Volume = 30.990 af Average Runoff Depth = 2.70"
91.24% Pervious = 125.880 ac 8.76% Impervious = 12.090 ac

Summary for Subcatchment 1: BASIN 1

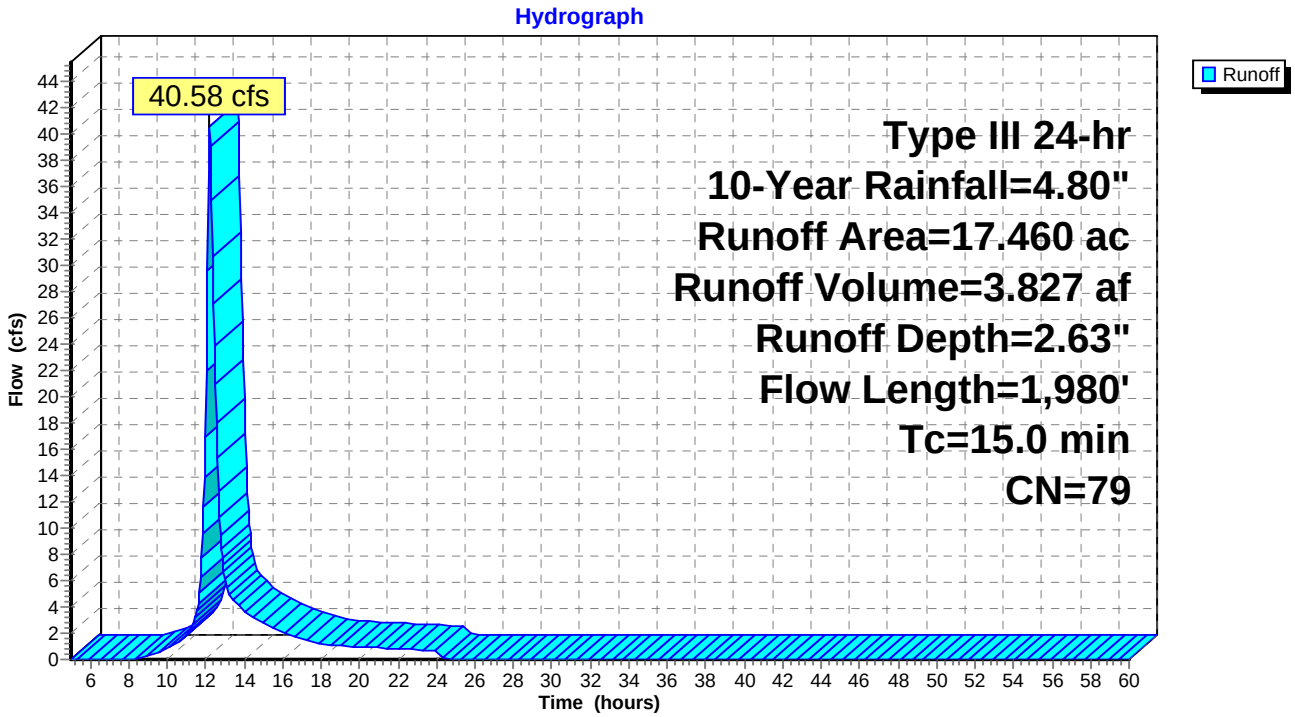
Runoff = 40.58 cfs @ 12.21 hrs, Volume= 3.827 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	4.300	80	>75% Grass cover, Good, HSG D
*	1.190	98	Existing Impervious Surfaces
	11.750	77	Woods, Good, HSG D
*	0.220	98	Proposed Impervious Surfaces
	17.460	79	Weighted Average
	16.050		91.92% Pervious Area
	1.410		8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	1,120	0.1400	6.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	530	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	170	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	60	0.0100	7.80	24.51	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
15.0	1,980	Total			

Subcatchment 1: BASIN 1



Summary for Subcatchment 2A: BASIN 2A

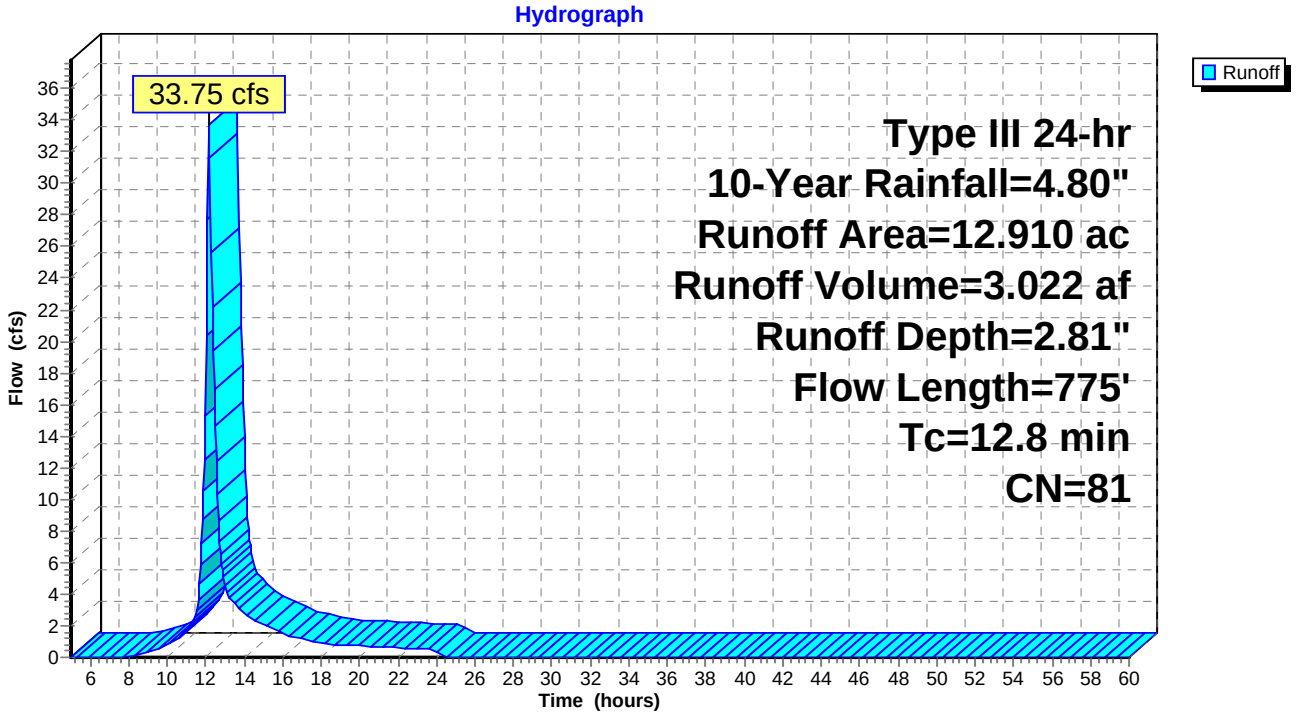
Runoff = 33.75 cfs @ 12.18 hrs, Volume= 3.022 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
*	3.160	77	Woods, D, Good
	8.350	80	>75% Grass cover, Good, HSG D
*	0.450	98	Houses
*	0.400	98	Road
*	0.300	98	Driveways
*	0.250	96	Gravel Road
	12.910	81	Weighted Average
	11.760		91.09% Pervious Area
	1.150		8.91% 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"
2.0	675	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.8	775	Total			

Subcatchment 2A: BASIN 2A



Summary for Subcatchment 2B: BASIN 2B

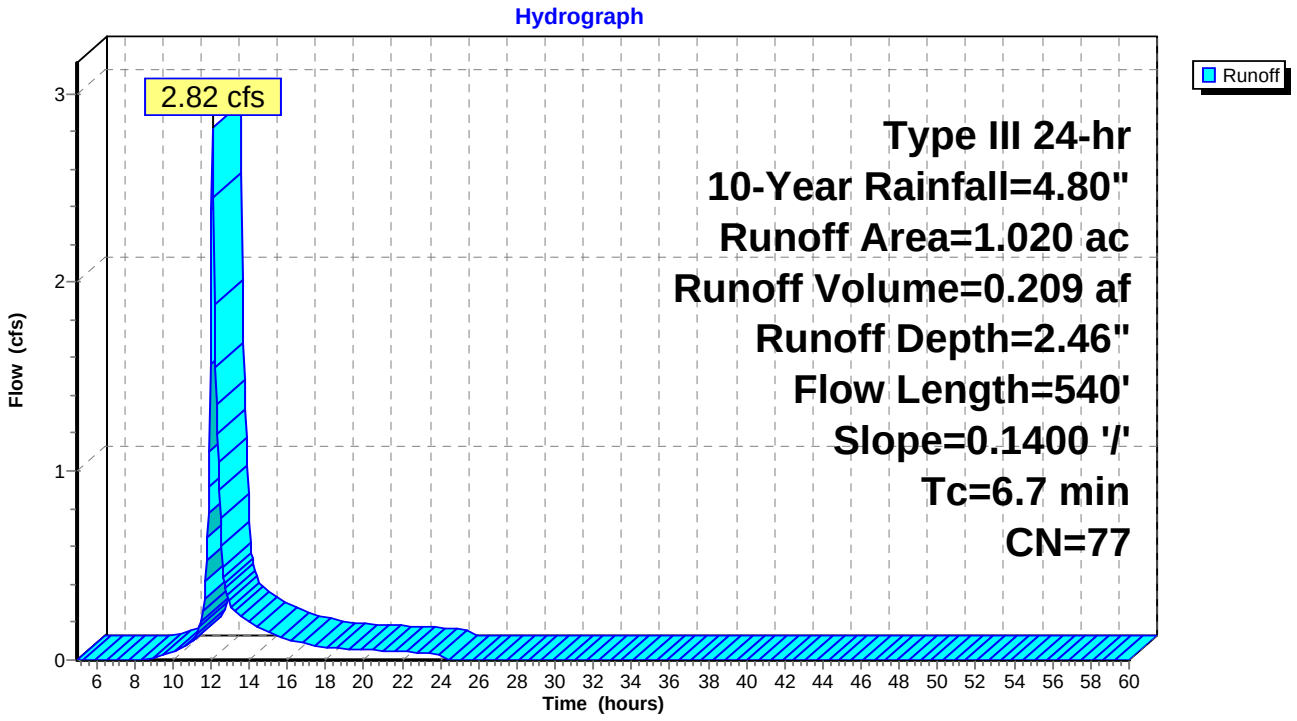
Runoff = 2.82 cfs @ 12.10 hrs, Volume= 0.209 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (ac)	CN	Description
0.870	77	Woods, Good, HSG D
0.150	80	>75% Grass cover, Good, HSG D
1.020	77	Weighted Average
1.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1400	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
0.4	440	0.1400	17.62	105.73	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 0.5 '/' Top.W=4.00' n= 0.030
6.7	540	Total			

Subcatchment 2B: BASIN 2B



Summary for Subcatchment 2C: BASIN 2C

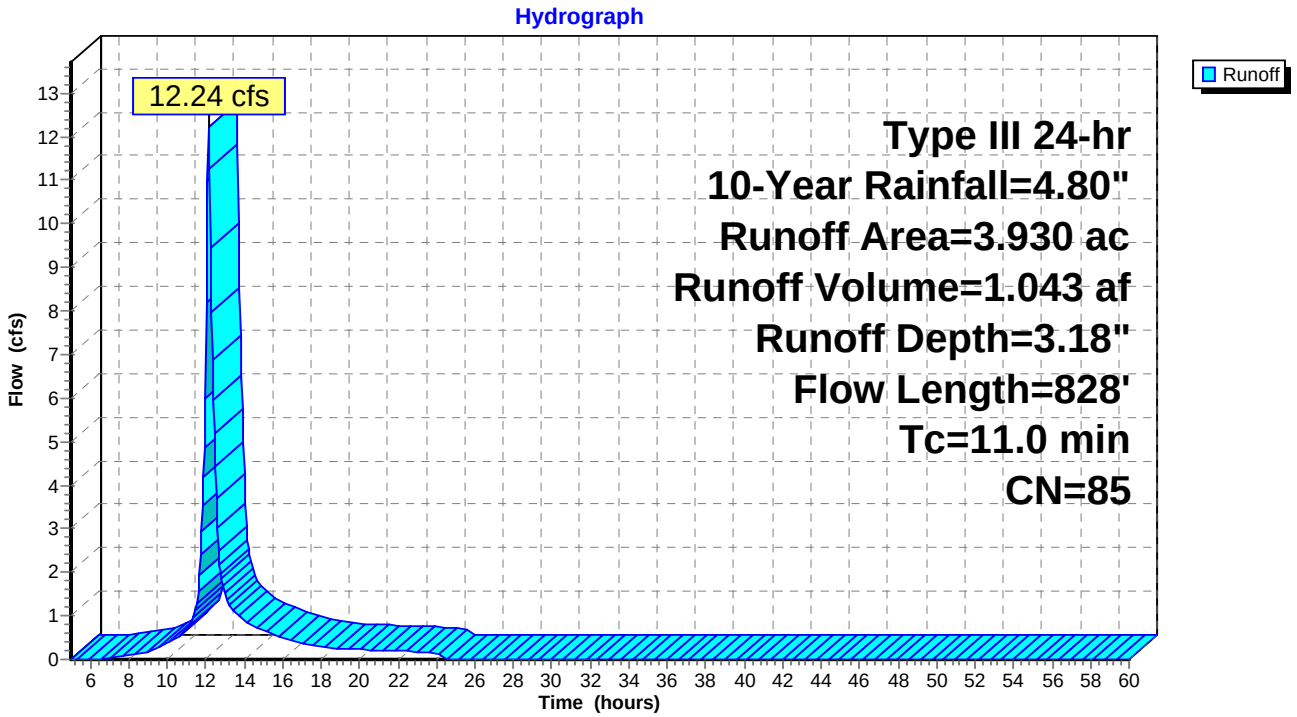
Runoff = 12.24 cfs @ 12.15 hrs, Volume= 1.043 af, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
*	1.200	98	Proposed Impervious Surfaces
	0.650	77	Woods, Good, HSG D
	2.080	80	>75% Grass cover, Good, HSG D
	3.930	85	Weighted Average
	2.730		69.47% Pervious Area
	1.200		30.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	425	0.1400	6.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	113	0.0350	12.05	21.29	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.0	24	0.0300	11.15	19.71	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	112	0.0488	14.23	25.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	54	0.0300	11.15	19.71	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
11.0	828	Total			

Subcatchment 2C: BASIN 2C



Summary for Subcatchment 3A: BASIN 3A

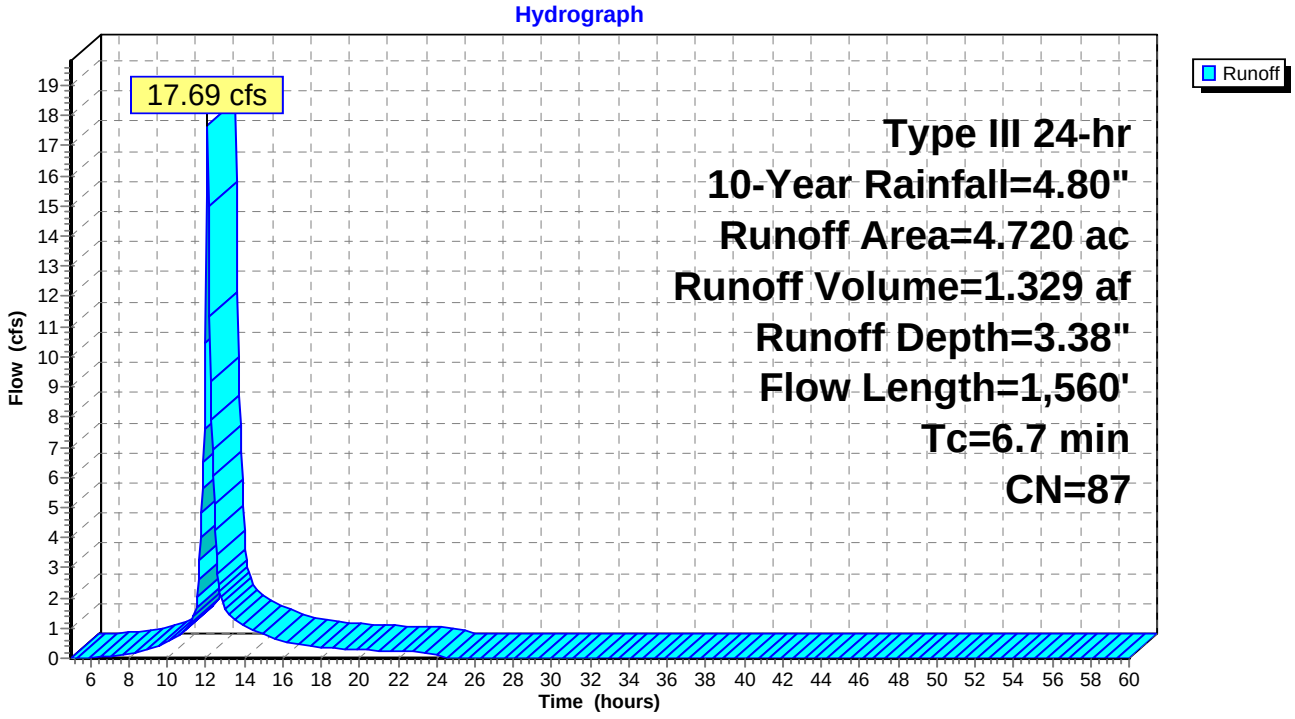
Runoff = 17.69 cfs @ 12.10 hrs, Volume= 1.329 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
*	1.900	98	
	0.100	77	Woods, Good, HSG D
	2.720	80	>75% Grass cover, Good, HSG D
	4.720	87	Weighted Average
	2.820		59.75% Pervious Area
	1.900		40.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	100	0.1000	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	145	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	115	0.0850	5.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	1,200	0.0900	19.32	34.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
6.7	1,560	Total			

Subcatchment 3A: BASIN 3A



Summary for Subcatchment 3B: BASIN 3B

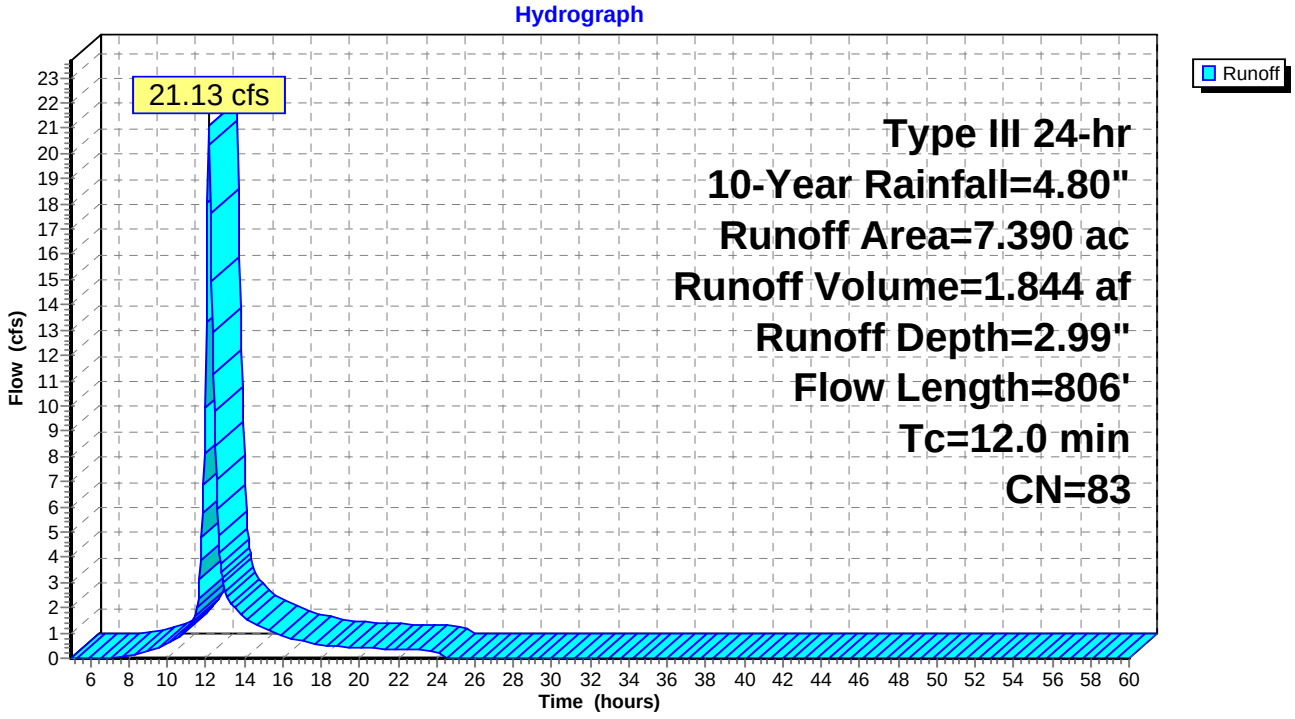
Runoff = 21.13 cfs @ 12.17 hrs, Volume= 1.844 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
*	1.650	98	Proposed Impervious
	1.700	77	Woods, Good, HSG D
	4.040	80	>75% Grass cover, Good, HSG D
	7.390	83	Weighted Average
	5.740		77.67% Pervious Area
	1.650		22.33% 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"
0.4	150	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	376	0.0900	19.32	34.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.5	180	0.1700	6.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.0	806	Total			

Subcatchment 3B: BASIN 3B



Summary for Subcatchment 3C: BASIN 3C

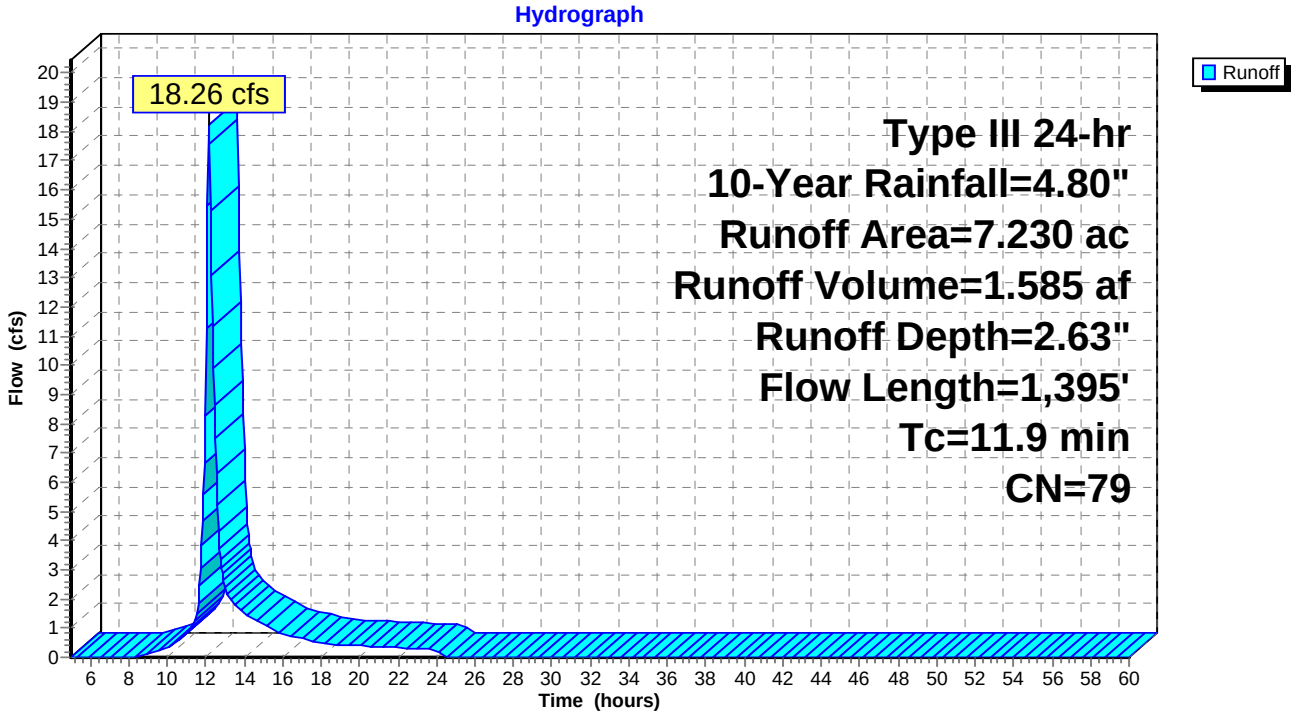
Runoff = 18.26 cfs @ 12.17 hrs, Volume= 1.585 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	6.630	77	Woods, Good, HSG D
*	0.300	98	Stream
*	0.300	98	Existing Impervious
	7.230	79	Weighted Average
	6.630		91.70% Pervious Area
	0.600		8.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	270	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.1	1,025	0.0600	14.99	239.76	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=2.00' Z= 1.0 '/' Top.W=10.00' n= 0.030
11.9	1,395	Total			

Subcatchment 3C: BASIN 3C



Summary for Subcatchment 3D: BASIN 3D

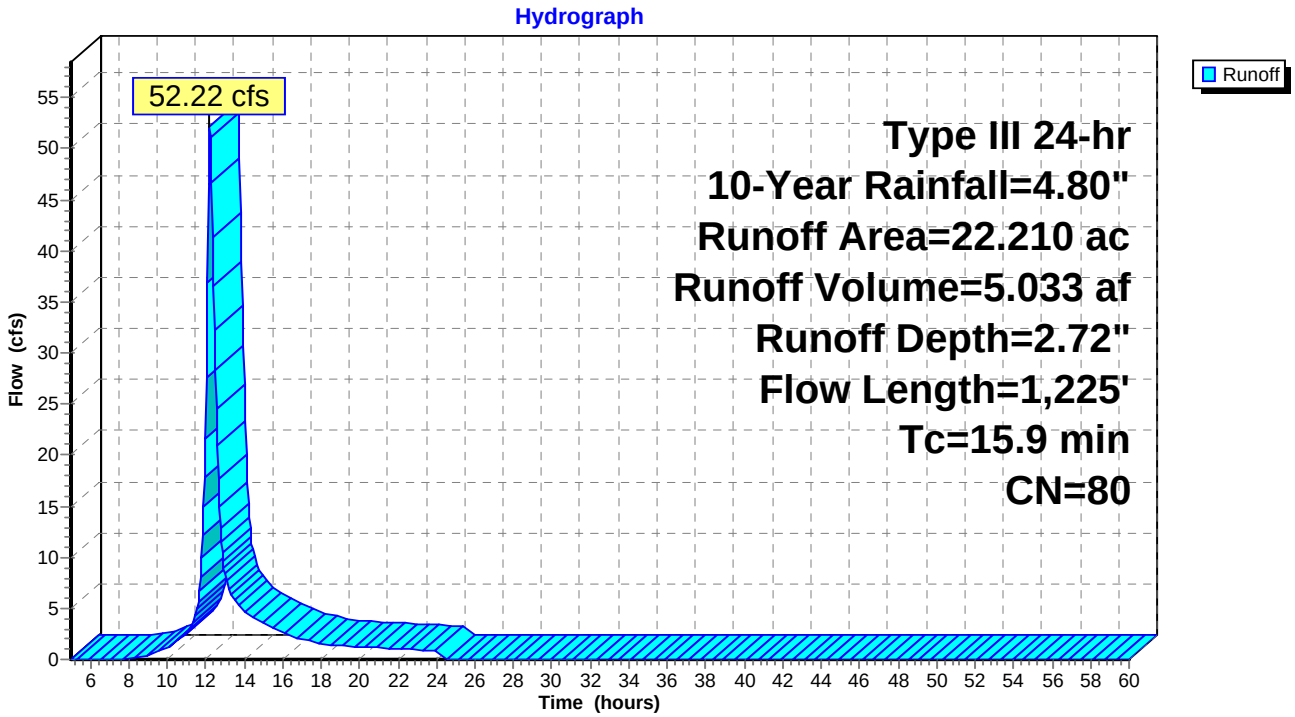
Runoff = 52.22 cfs @ 12.22 hrs, Volume= 5.033 af, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	9.000	80	>75% Grass cover, Good, HSG D
	10.380	77	Woods, Good, HSG D
*	1.360	98	Roads
*	0.400	98	Driveways
*	0.350	98	Houses
*	0.120	96	Gravel Road
	0.600	78	Meadow, non-grazed, HSG D
	22.210	80	Weighted Average
	20.100		90.50% Pervious Area
	2.110		9.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
1.3	450	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	265	0.0400	7.86	20.62	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.50' Z= 0.5 '/' Top.W=2.50' n= 0.027
0.1	125	0.0700	17.04	30.11	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	285	0.0900	14.13	84.77	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 0.5 '/' Top.W=4.00' n= 0.030
15.9	1,225	Total			

Subcatchment 3D: BASIN 3D



Summary for Subcatchment 4: BASIN 4

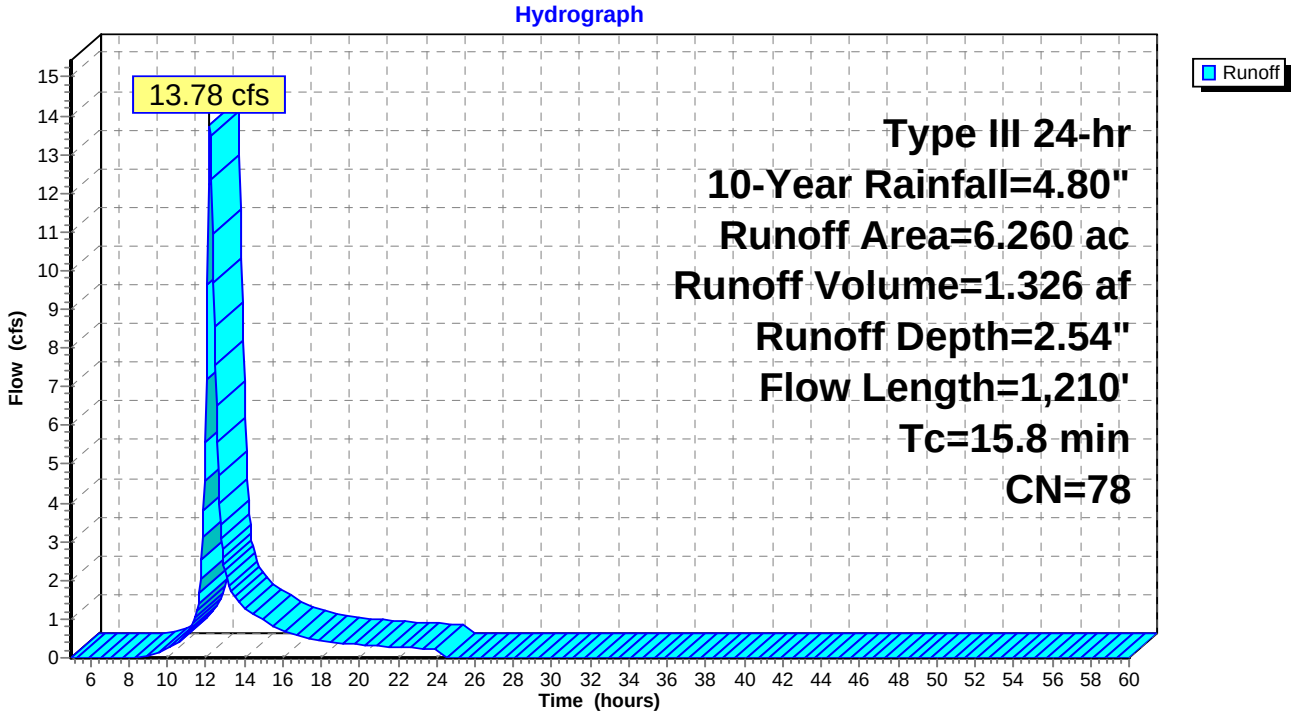
Runoff = 13.78 cfs @ 12.22 hrs, Volume= 1.326 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	5.460	77	Woods, Good, HSG D
	0.700	80	>75% Grass cover, Good, HSG D
*	0.100	98	
	6.260	78	Weighted Average
	6.160		98.40% Pervious Area
	0.100		1.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.6	1,110	0.1000	11.23	37.43	**Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.030
15.8	1,210	Total			

Subcatchment 4: BASIN 4



Summary for Subcatchment 5: BASIN 5

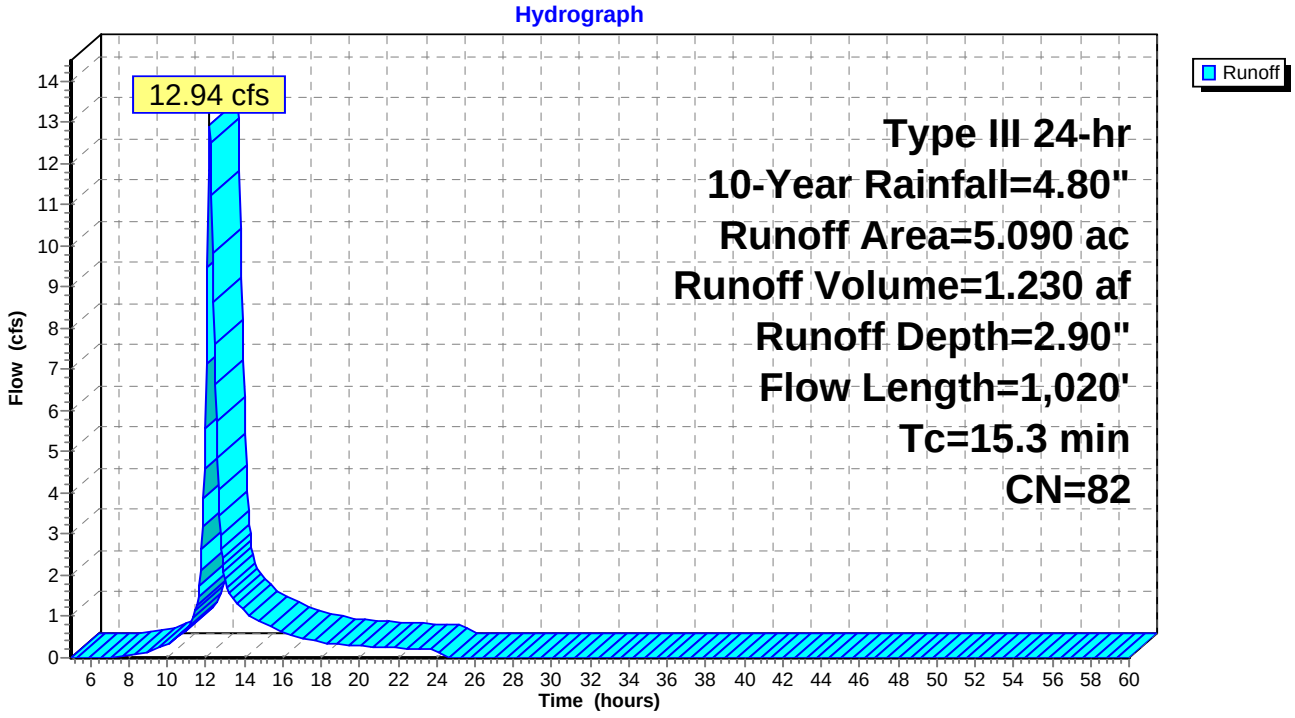
Runoff = 12.94 cfs @ 12.21 hrs, Volume= 1.230 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
*	0.820	98	Impervious Surfaces
	2.200	80	>75% Grass cover, Good, HSG D
	2.070	77	Woods, Good, HSG D
	5.090	82	Weighted Average
	4.270		83.89% Pervious Area
	0.820		16.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0700	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.9	920	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
15.3	1,020	Total			

Subcatchment 5: BASIN 5



Summary for Subcatchment 6: BASIN 6

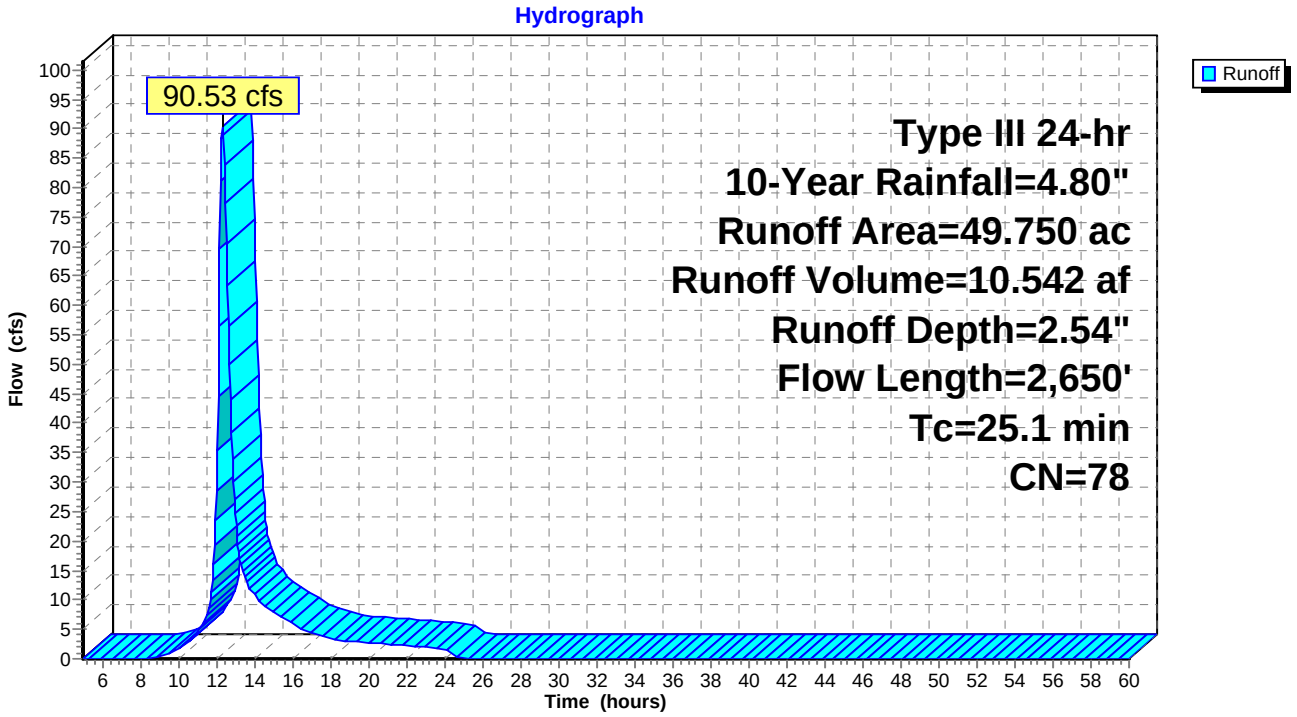
Runoff = 90.53 cfs @ 12.35 hrs, Volume= 10.542 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (ac)	CN	Description
	3.100	80	>75% Grass cover, Good, HSG D
*	1.150	98	Imperviuos Surfaces
	11.900	80	Pasture/grassland/range, Good, HSG D
	33.600	77	Woods, Good, HSG D
	49.750	78	Weighted Average
	48.600		97.69% Pervious Area
	1.150		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	2,550	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.1	2,650	Total			

Subcatchment 6: BASIN 6



Summary for Reach 1R: SWALE

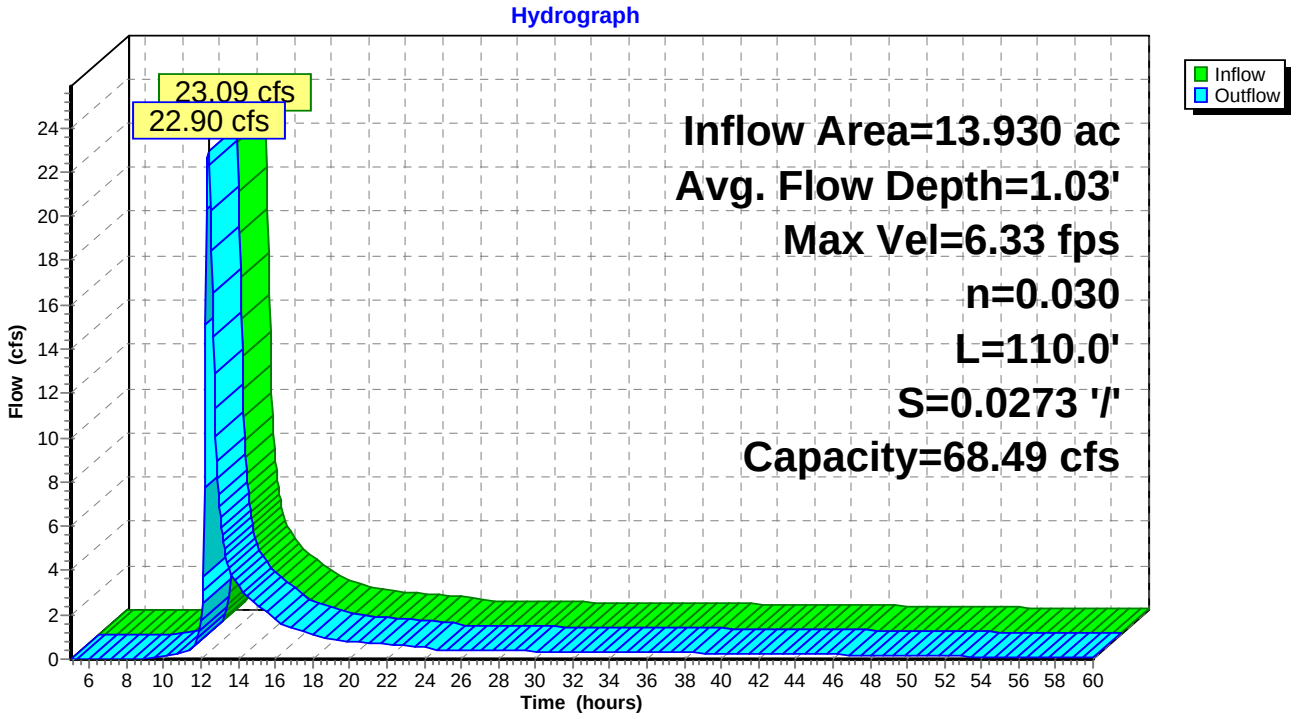
Inflow Area = 13.930 ac, 8.26% Impervious, Inflow Depth > 2.76" for 10-Year event
Inflow = 23.09 cfs @ 12.37 hrs, Volume= 3.202 af
Outflow = 22.90 cfs @ 12.38 hrs, Volume= 3.202 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.33 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 1.2 min

Peak Storage= 398 cf @ 12.38 hrs
Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 68.49 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 0.5 '/' Top Width= 5.00'
Length= 110.0' Slope= 0.0273 '/'
Inlet Invert= 645.00', Outlet Invert= 642.00'

Reach 1R: SWALE



Summary for Reach 2R: SWALE

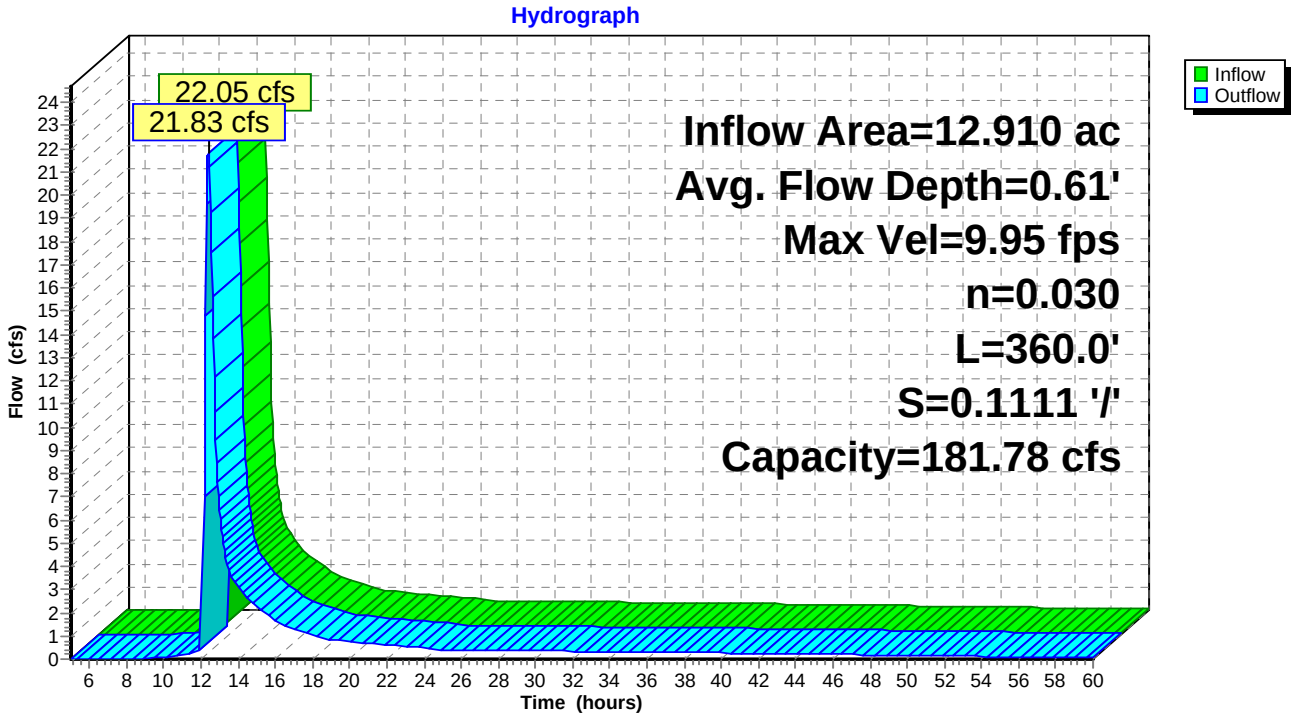
Inflow Area = 12.910 ac, 8.91% Impervious, Inflow Depth > 2.78" for 10-Year event
Inflow = 22.05 cfs @ 12.36 hrs, Volume= 2.994 af
Outflow = 21.83 cfs @ 12.38 hrs, Volume= 2.994 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.95 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.33 fps, Avg. Travel Time= 2.6 min

Peak Storage= 799 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 181.78 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 360.0' Slope= 0.1111 '/'
Inlet Invert= 720.00', Outlet Invert= 680.00'

Reach 2R: SWALE

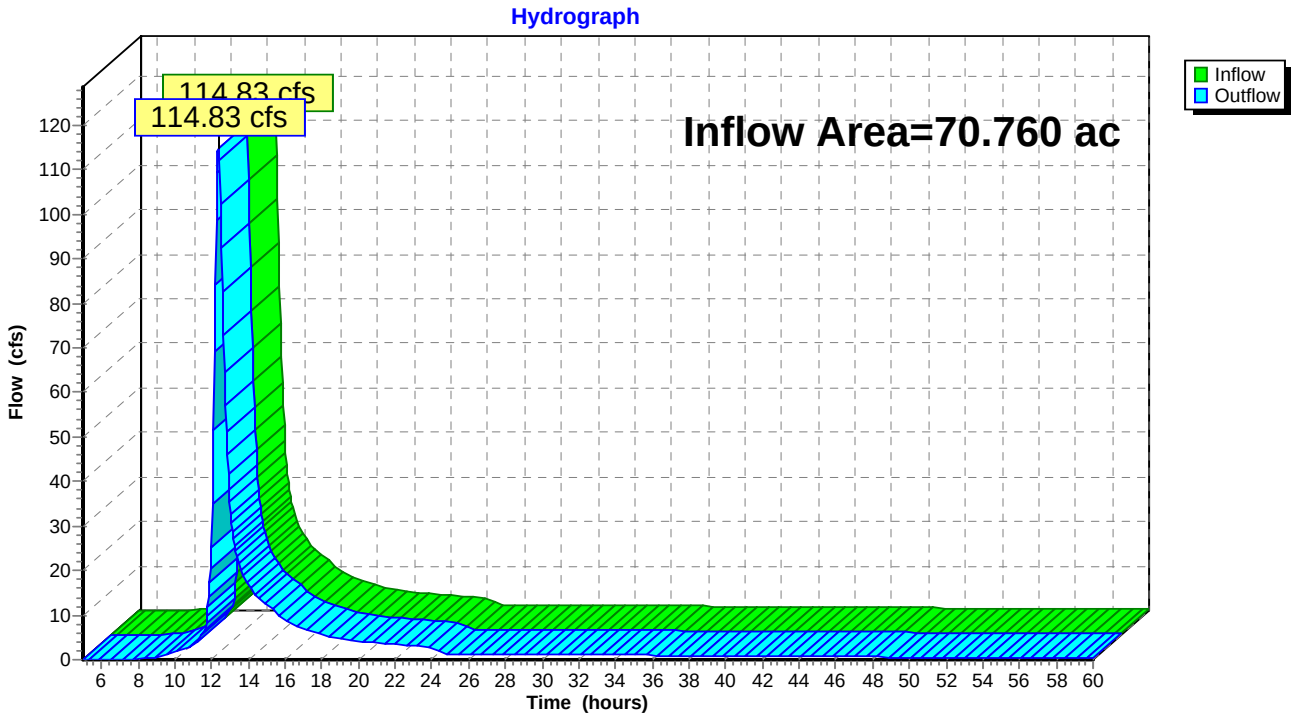


Summary for Reach AP1: Analysis Point

Inflow Area = 70.760 ac, 13.47% Impervious, Inflow Depth > 2.78" for 10-Year event
Inflow = 114.83 cfs @ 12.37 hrs, Volume= 16.417 af
Outflow = 114.83 cfs @ 12.37 hrs, Volume= 16.417 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs

Reach AP1: Analysis Point



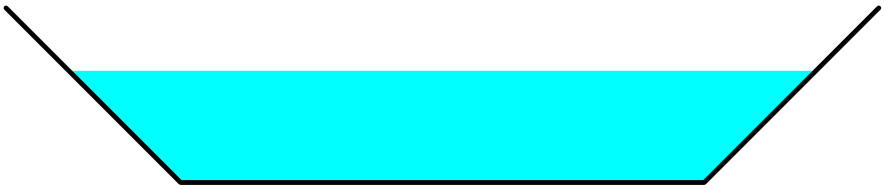
Summary for Reach S1: STREAM

Inflow Area = 59.600 ac, 12.97% Impervious, Inflow Depth > 2.78" for 10-Year event
Inflow = 98.48 cfs @ 12.39 hrs, Volume= 13.791 af
Outflow = 98.28 cfs @ 12.40 hrs, Volume= 13.790 af, Atten= 0%, Lag= 0.6 min

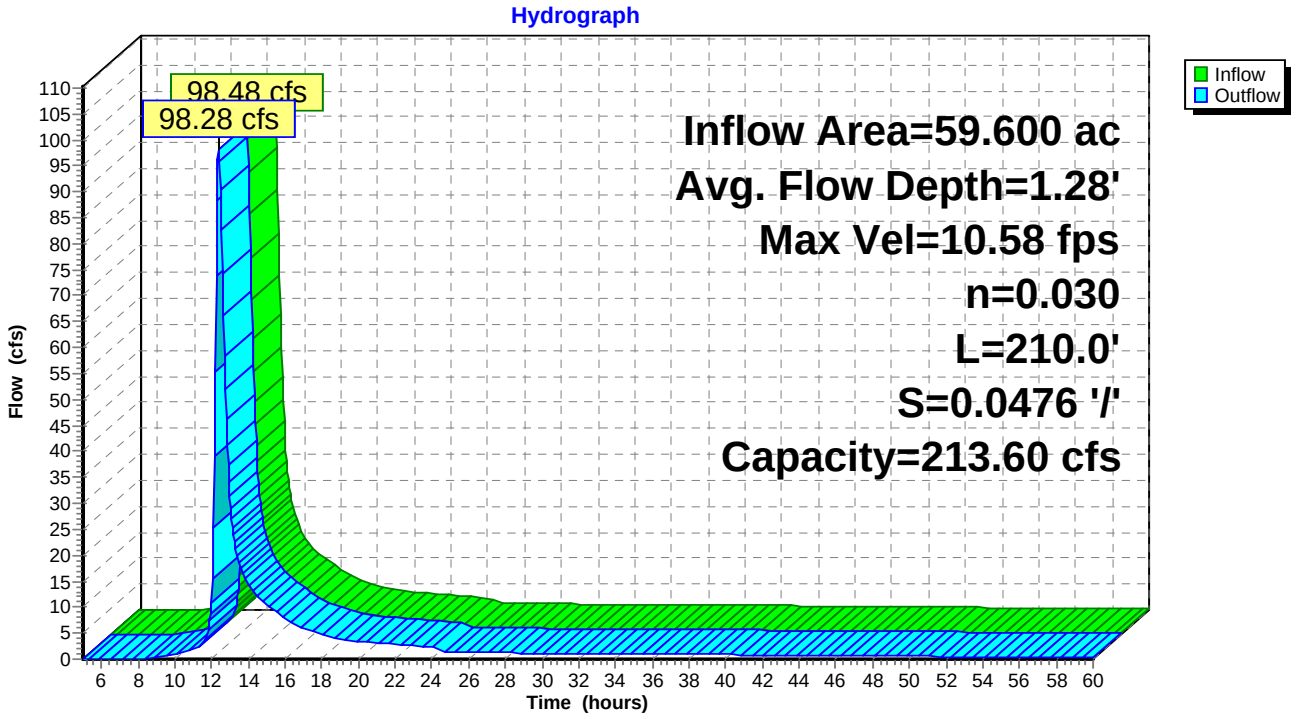
Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.58 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.33 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1,955 cf @ 12.39 hrs
Average Depth at Peak Storage= 1.28'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 213.60 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 210.0' Slope= 0.0476 '/'
Inlet Invert= 642.00', Outlet Invert= 632.00'



Reach S1: STREAM



Summary for Reach S2: STREAM

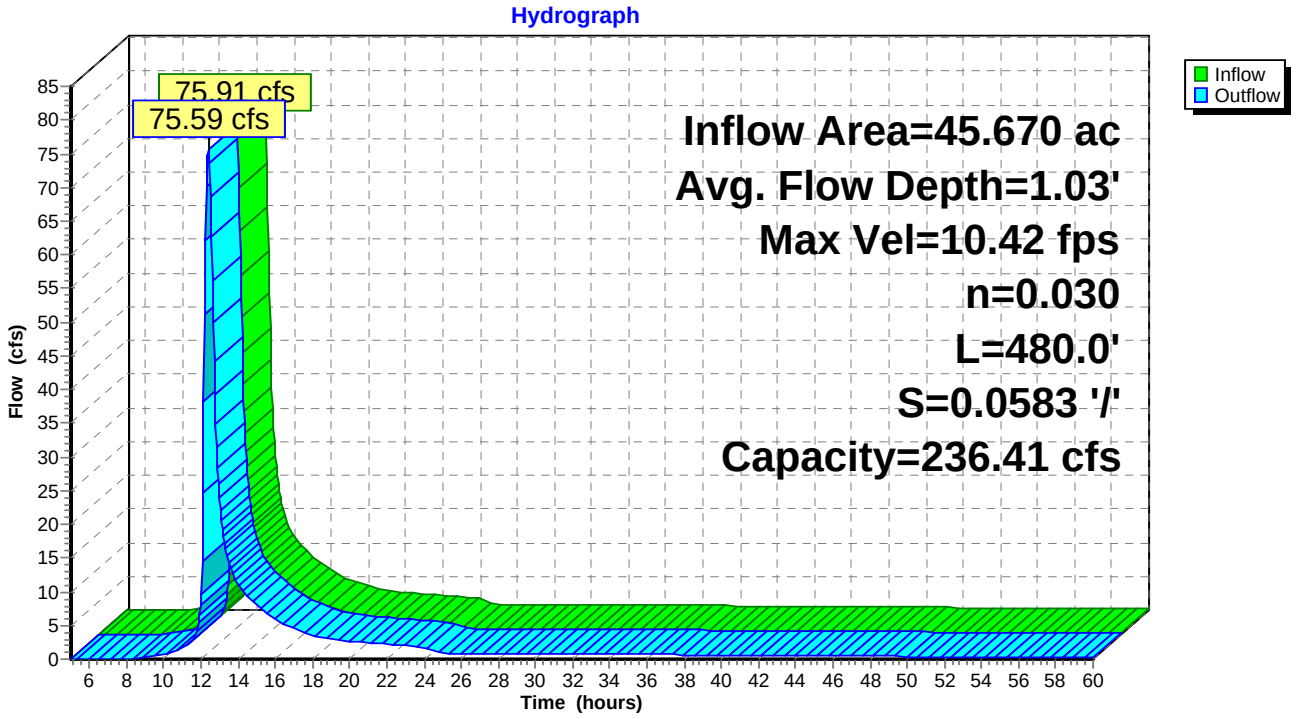
Inflow Area = 45.670 ac, 14.41% Impervious, Inflow Depth > 2.78" for 10-Year event
Inflow = 75.91 cfs @ 12.37 hrs, Volume= 10.591 af
Outflow = 75.59 cfs @ 12.39 hrs, Volume= 10.589 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.42 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.23 fps, Avg. Travel Time= 3.6 min

Peak Storage= 3,490 cf @ 12.38 hrs
Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 236.41 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 480.0' Slope= 0.0583 '/'
Inlet Invert= 670.00', Outlet Invert= 642.00'

Reach S2: STREAM



Summary for Reach S3: STREAM

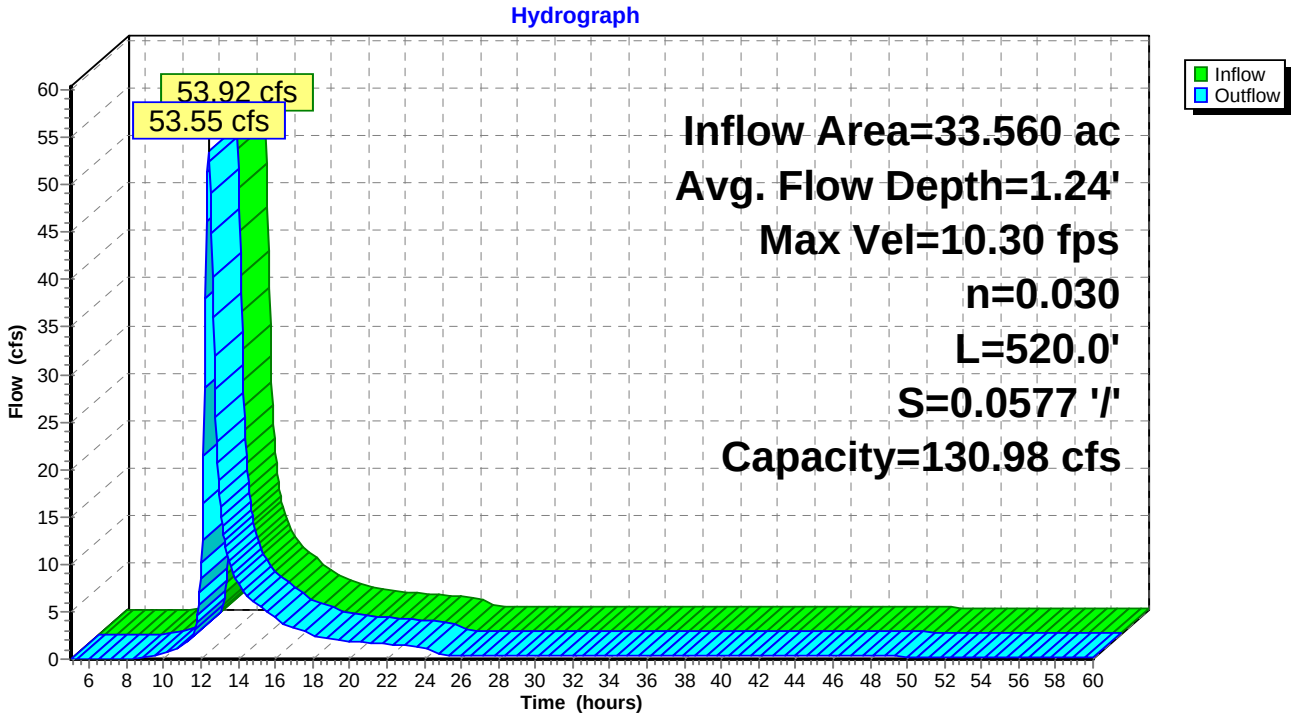
Inflow Area = 33.560 ac, 9.03% Impervious, Inflow Depth > 2.66" for 10-Year event
Inflow = 53.92 cfs @ 12.38 hrs, Volume= 7.431 af
Outflow = 53.55 cfs @ 12.41 hrs, Volume= 7.429 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.30 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 3.5 min

Peak Storage= 2,721 cf @ 12.40 hrs
Average Depth at Peak Storage= 1.24'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 130.98 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 520.0' Slope= 0.0577 '/'
Inlet Invert= 700.00', Outlet Invert= 670.00'

Reach S3: STREAM



Summary for Reach S4: STREAM

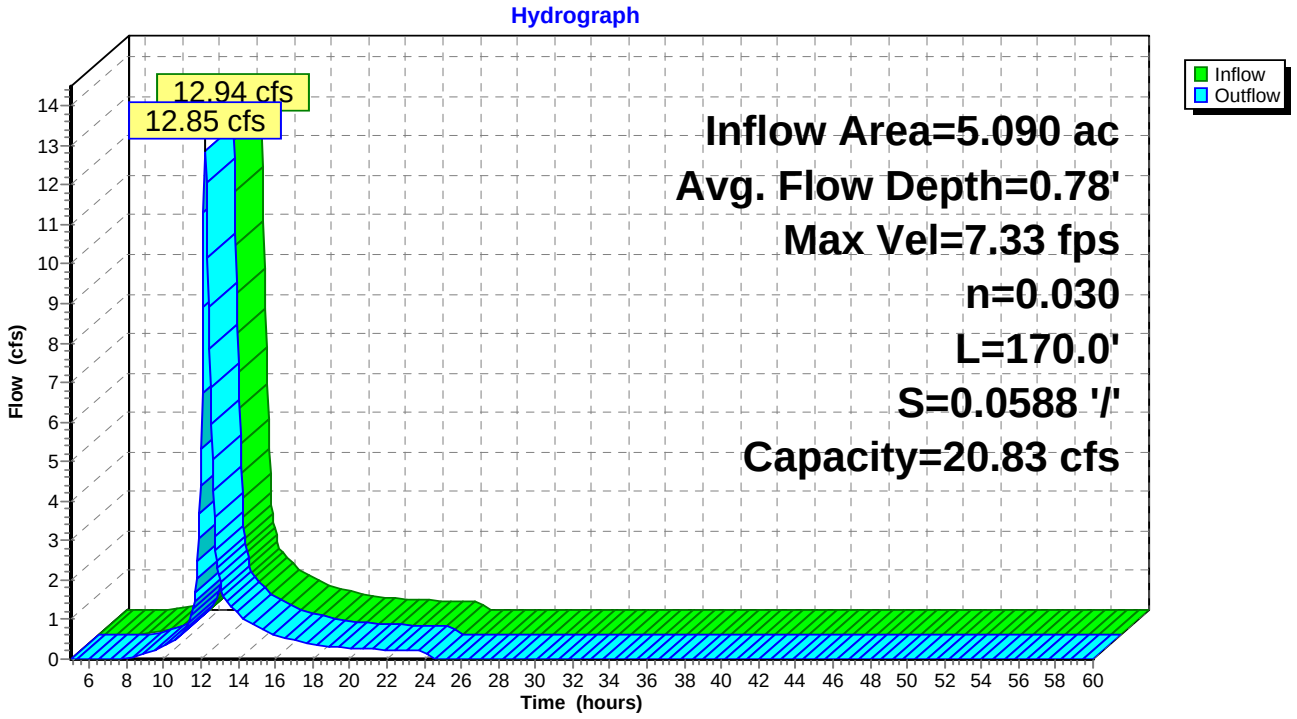
Inflow Area = 5.090 ac, 16.11% Impervious, Inflow Depth = 2.90" for 10-Year event
Inflow = 12.94 cfs @ 12.21 hrs, Volume= 1.230 af
Outflow = 12.85 cfs @ 12.22 hrs, Volume= 1.230 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.33 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.53 fps, Avg. Travel Time= 1.1 min

Peak Storage= 300 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.78'
Bank-Full Depth= 1.00' Flow Area= 2.5 sf, Capacity= 20.83 cfs

1.50' x 1.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 3.50'
Length= 170.0' Slope= 0.0588 '/'
Inlet Invert= 710.00', Outlet Invert= 700.00'

Reach S4: STREAM



Summary for Pond 2P: PIPE

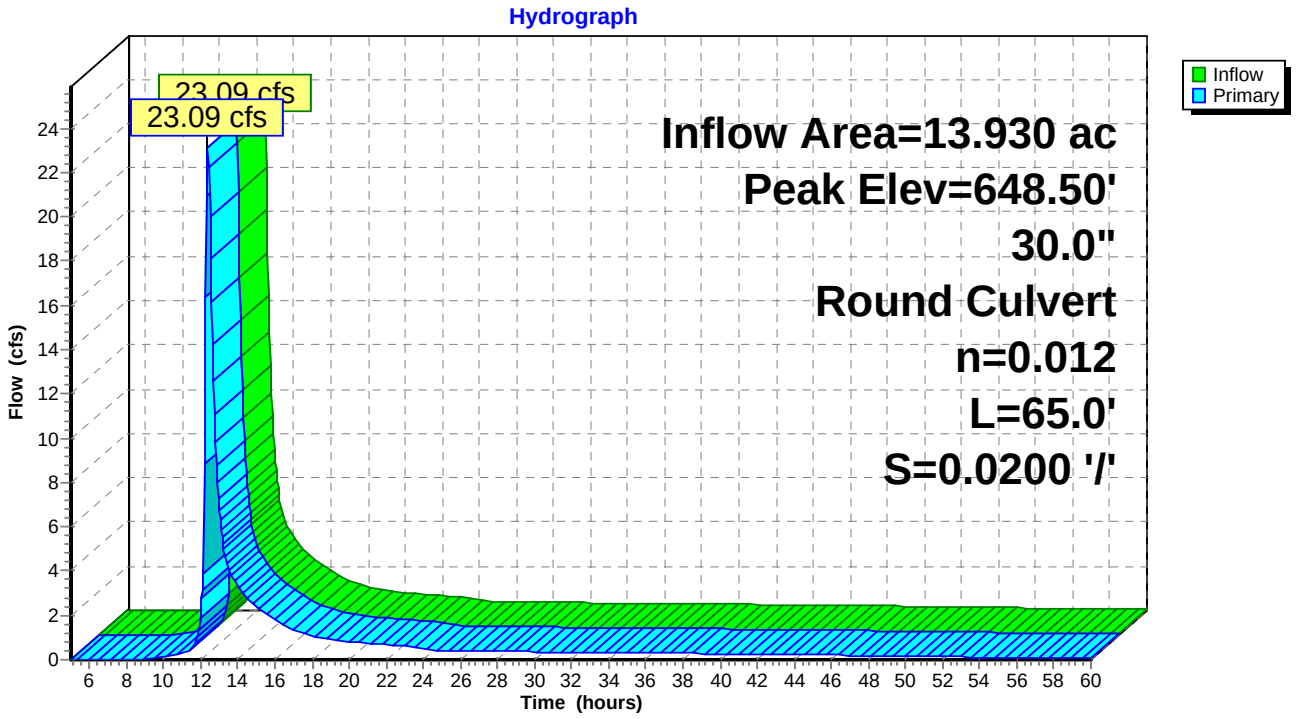
Inflow Area = 13.930 ac, 8.26% Impervious, Inflow Depth > 2.76" for 10-Year event
Inflow = 23.09 cfs @ 12.37 hrs, Volume= 3.202 af
Outflow = 23.09 cfs @ 12.37 hrs, Volume= 3.202 af, Atten= 0%, Lag= 0.0 min
Primary = 23.09 cfs @ 12.37 hrs, Volume= 3.202 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 648.50' @ 12.37 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	646.30'	**30.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 646.30' / 645.00' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf

Primary OutFlow Max=22.84 cfs @ 12.37 hrs HW=648.48' (Free Discharge)
└**1=Culvert** (Inlet Controls 22.84 cfs @ 5.03 fps)

Pond 2P: PIPE

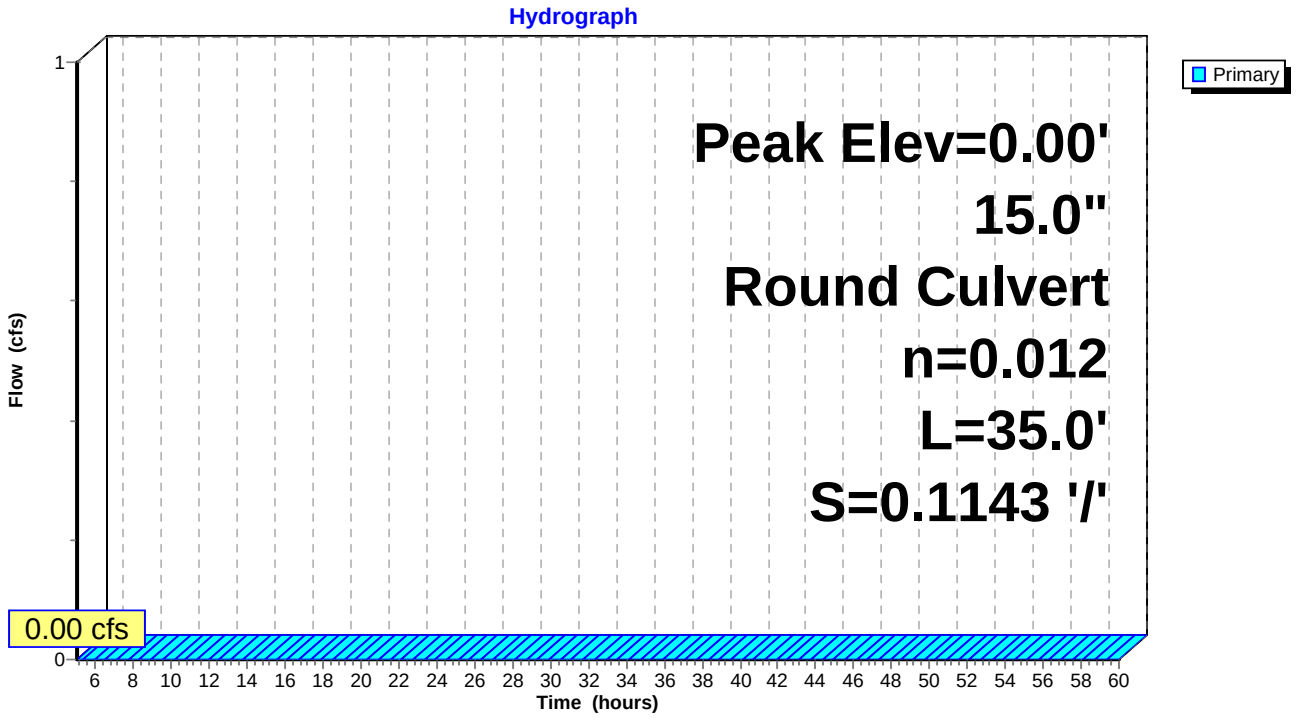


Summary for Pond 6P: 15" HDPE

Device	Routing	Invert	Outlet Devices
#1	Primary	720.00'	**15.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 720.00' / 716.00' S= 0.1143 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 6P: 15" HDPE



Summary for Pond P2A: POND 2A

Inflow Area = 12.910 ac, 8.91% Impervious, Inflow Depth = 2.81" for 10-Year event
Inflow = 33.75 cfs @ 12.18 hrs, Volume= 3.022 af
Outflow = 22.05 cfs @ 12.36 hrs, Volume= 2.994 af, Atten= 35%, Lag= 10.9 min
Primary = 22.05 cfs @ 12.36 hrs, Volume= 2.994 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 729.95' @ 12.36 hrs Surf.Area= 14,703 sf Storage= 44,317 cf

Plug-Flow detention time= 377.3 min calculated for 2.991 af (99% of inflow)
Center-of-Mass det. time= 373.2 min (1,200.3 - 827.1)

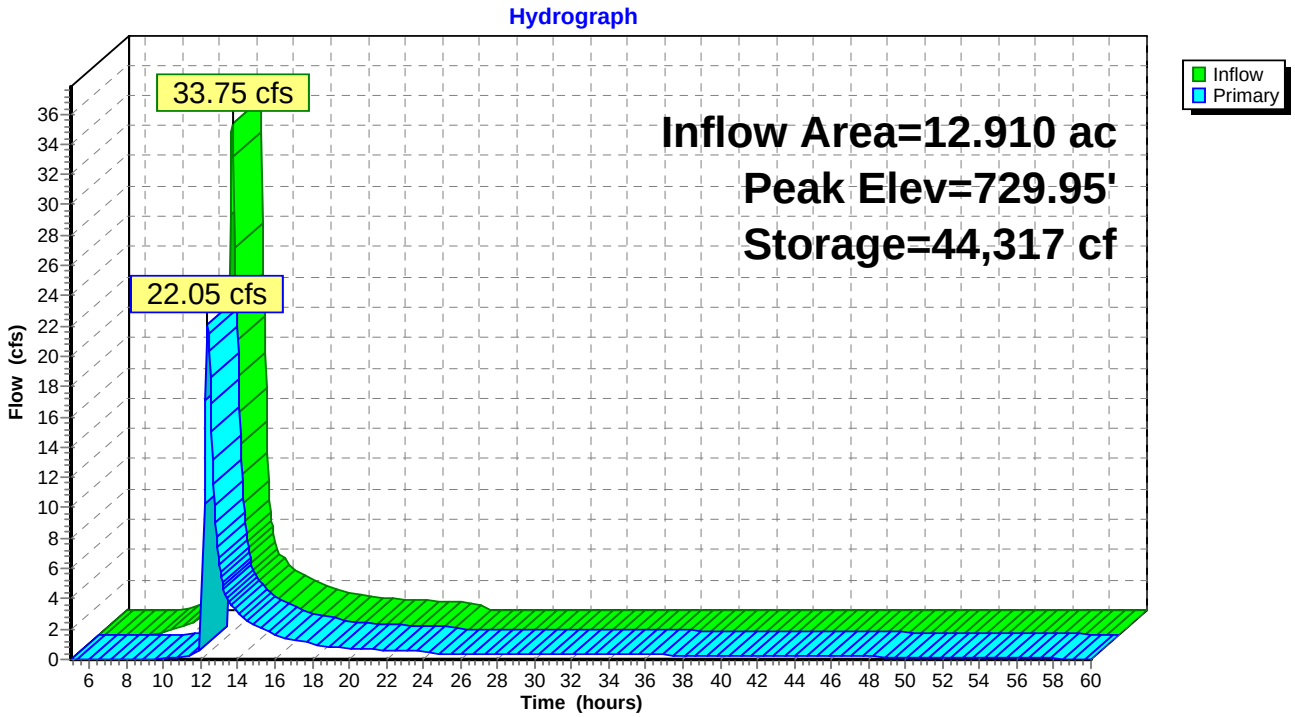
Volume	Invert	Avail.Storage	Storage Description
#1	726.00'	78,700 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
726.00	8,000	0	0
728.00	11,150	19,150	19,150
730.00	14,800	25,950	45,100
732.00	18,800	33,600	78,700

Device	Routing	Invert	Outlet Devices
#1	Primary	725.00'	**30.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.00' / 723.72' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	726.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	729.00'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	731.00'	**36.0" W x 36.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=21.90 cfs @ 12.36 hrs HW=729.94' (Free Discharge)
└─**1=Culvert** (Passes 21.90 cfs of 45.42 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 9.41 fps)
  ├─**3=Sharp-Crested Rectangular Weir** (Weir Controls 21.44 cfs @ 3.91 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond P2A: POND 2A



Summary for Pond P3AB: POND 3AB

Inflow Area = 12.110 ac, 29.31% Impervious, Inflow Depth = 3.14" for 10-Year event
Inflow = 36.39 cfs @ 12.13 hrs, Volume= 3.173 af
Outflow = 28.60 cfs @ 12.24 hrs, Volume= 3.162 af, Atten= 21%, Lag= 6.6 min
Primary = 28.60 cfs @ 12.24 hrs, Volume= 3.162 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 678.41' @ 12.24 hrs Surf.Area= 12,919 sf Storage= 41,269 cf

Plug-Flow detention time= 309.8 min calculated for 3.162 af (100% of inflow)
Center-of-Mass det. time= 307.6 min (1,121.1 - 813.4)

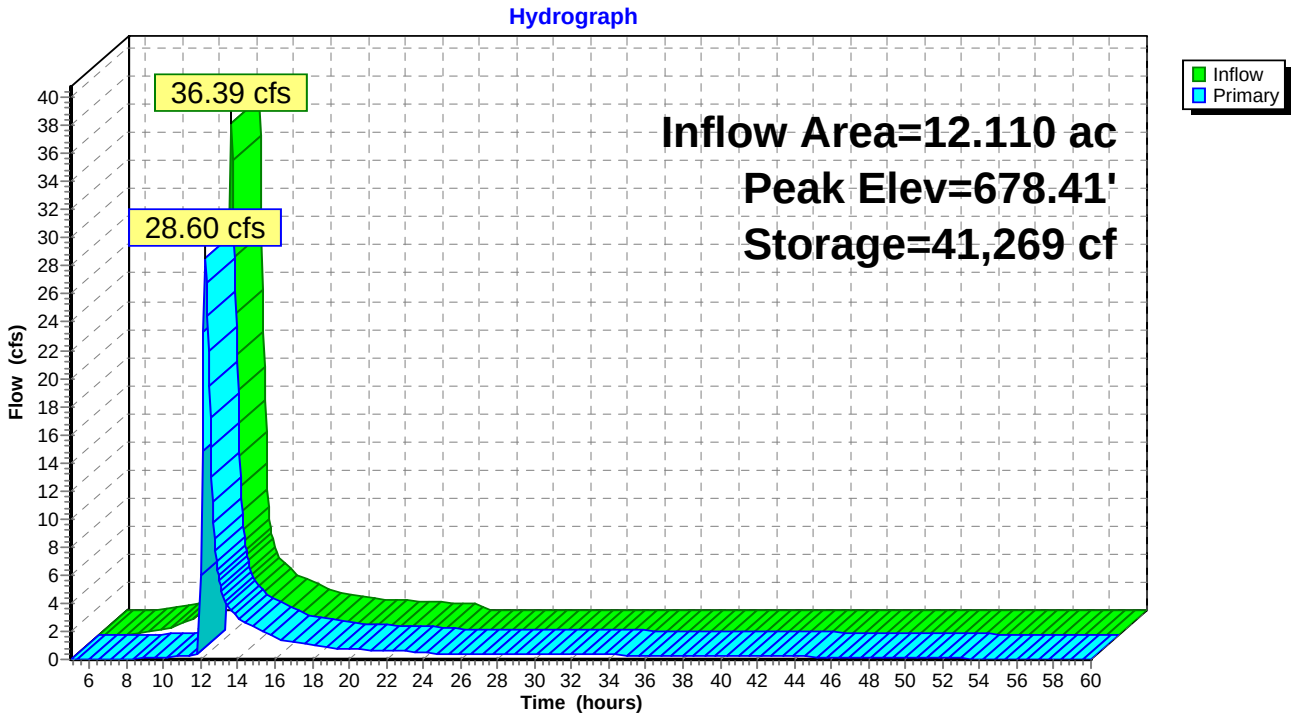
Volume	Invert	Avail.Storage	Storage Description
#1	674.00'	64,180 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
674.00	6,140	0	0
676.00	8,920	15,060	15,060
678.00	12,150	21,070	36,130
680.00	15,900	28,050	64,180

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**30.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 674.00' / 673.20' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	674.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	677.30'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	679.00'	**54.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=28.38 cfs @ 12.24 hrs HW=678.41' (Free Discharge)
└**1=Culvert** (Passes 28.38 cfs of 41.98 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.49 cfs @ 9.96 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 27.89 cfs @ 4.37 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond P3AB: POND 3AB



Summary for Pond P3D: POND 3D

Inflow Area = 22.210 ac, 9.50% Impervious, Inflow Depth = 2.72" for 10-Year event
Inflow = 52.22 cfs @ 12.22 hrs, Volume= 5.033 af
Outflow = 35.45 cfs @ 12.42 hrs, Volume= 4.874 af, Atten= 32%, Lag= 12.0 min
Primary = 35.45 cfs @ 12.42 hrs, Volume= 4.874 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 753.15' @ 12.42 hrs Surf.Area= 20,031 sf Storage= 73,312 cf

Plug-Flow detention time= 372.5 min calculated for 4.870 af (97% of inflow)
Center-of-Mass det. time= 356.1 min (1,188.9 - 832.7)

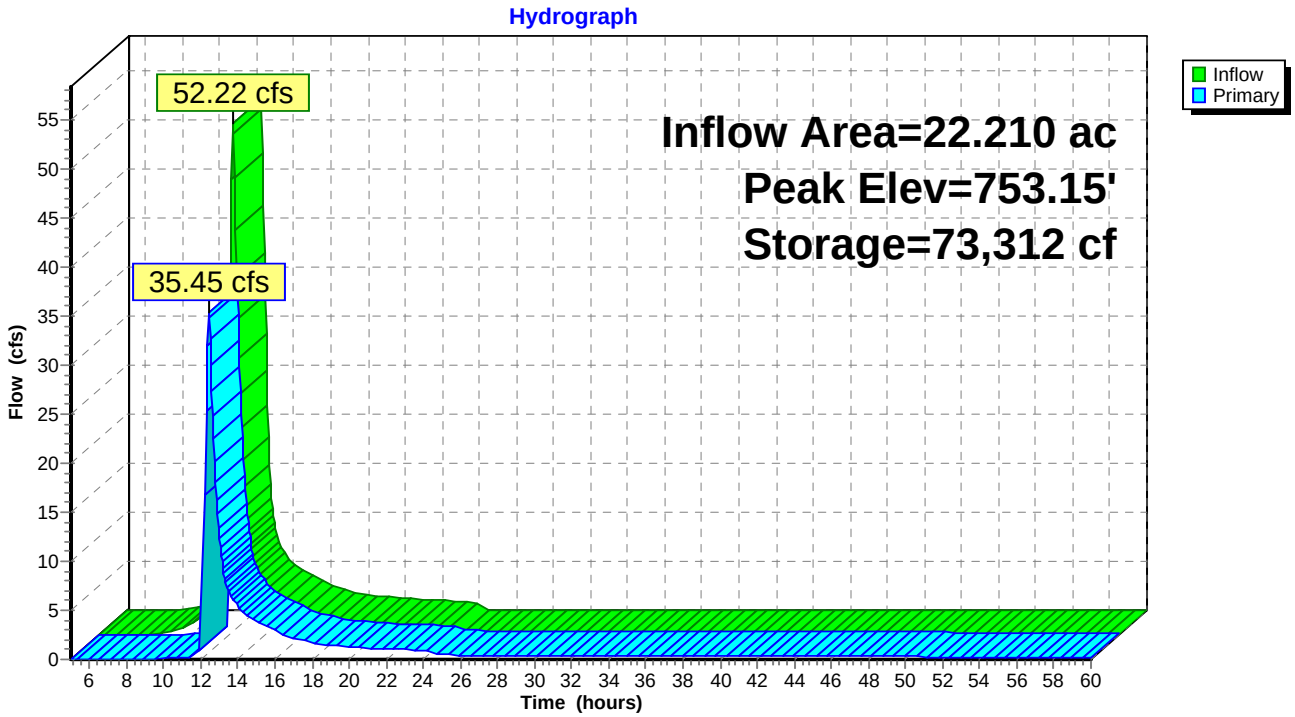
Volume	Invert	Avail.Storage	Storage Description
#1	748.00'	114,646 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
748.00	8,890	0	0
750.00	12,880	21,770	21,770
752.00	17,280	30,160	51,930
754.00	22,080	39,360	91,290
755.00	24,631	23,356	114,646

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**36.0" Round Culvert** L= 221.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 726.00' S= 0.0950 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	748.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	753.00'	**54.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	751.80'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=34.96 cfs @ 12.42 hrs HW=753.14' (Free Discharge)
- **1=Culvert** (Passes 34.96 cfs of 73.31 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.53 cfs @ 10.78 fps)
  - **3=Orifice/Grate** (Weir Controls 2.57 cfs @ 1.22 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 31.87 cfs @ 5.03 fps)

Pond P3D: POND 3D



Time span=5.00-60.00 hrs, dt=0.05 hrs, 1101 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: BASIN 1 Runoff Area=17.460 ac 8.08% Impervious Runoff Depth=6.04"
Flow Length=1,980' Tc=15.0 min CN=79 Runoff=92.00 cfs 8.789 af

Subcatchment 2A: BASIN 2A Runoff Area=12.910 ac 8.91% Impervious Runoff Depth>6.28"
Flow Length=775' Tc=12.8 min CN=81 Runoff=74.39 cfs 6.758 af

Subcatchment 2B: BASIN 2B Runoff Area=1.020 ac 0.00% Impervious Runoff Depth=5.80"
Flow Length=540' Slope=0.1400 '/' Tc=6.7 min CN=77 Runoff=6.60 cfs 0.493 af

Subcatchment 2C: BASIN 2C Runoff Area=3.930 ac 30.53% Impervious Runoff Depth>6.76"
Flow Length=828' Tc=11.0 min CN=85 Runoff=25.22 cfs 2.213 af

Subcatchment 3A: BASIN 3A Runoff Area=4.720 ac 40.25% Impervious Runoff Depth>6.99"
Flow Length=1,560' Tc=6.7 min CN=87 Runoff=35.37 cfs 2.749 af

Subcatchment 3B: BASIN 3B Runoff Area=7.390 ac 22.33% Impervious Runoff Depth>6.52"
Flow Length=806' Tc=12.0 min CN=83 Runoff=44.89 cfs 4.016 af

Subcatchment 3C: BASIN 3C Runoff Area=7.230 ac 8.30% Impervious Runoff Depth=6.04"
Flow Length=1,395' Tc=11.9 min CN=79 Runoff=41.36 cfs 3.640 af

Subcatchment 3D: BASIN 3D Runoff Area=22.210 ac 9.50% Impervious Runoff Depth=6.16"
Flow Length=1,225' Tc=15.9 min CN=80 Runoff=116.49 cfs 11.404 af

Subcatchment 4: BASIN 4 Runoff Area=6.260 ac 1.60% Impervious Runoff Depth=5.92"
Flow Length=1,210' Tc=15.8 min CN=78 Runoff=31.79 cfs 3.088 af

Subcatchment 5: BASIN 5 Runoff Area=5.090 ac 16.11% Impervious Runoff Depth>6.40"
Flow Length=1,020' Tc=15.3 min CN=82 Runoff=27.95 cfs 2.716 af

Subcatchment 6: BASIN 6 Runoff Area=49.750 ac 2.31% Impervious Runoff Depth=5.92"
Flow Length=2,650' Tc=25.1 min CN=78 Runoff=208.96 cfs 24.544 af

Reach 1R: SWALE Avg. Flow Depth=1.76' Max Vel=8.10 fps Inflow=55.30 cfs 7.221 af
n=0.030 L=110.0' S=0.0273 '/' Capacity=68.49 cfs Outflow=55.29 cfs 7.221 af

Reach 2R: SWALE Avg. Flow Depth=1.01' Max Vel=12.92 fps Inflow=52.37 cfs 6.729 af
n=0.030 L=360.0' S=0.1111 '/' Capacity=181.78 cfs Outflow=52.38 cfs 6.728 af

Reach AP1: Analysis Point Inflow=298.12 cfs 36.866 af
Outflow=298.12 cfs 36.866 af

Reach S1: STREAM Avg. Flow Depth=2.16' Max Vel=13.83 fps Inflow=244.05 cfs 31.014 af
n=0.030 L=210.0' S=0.0476 '/' Capacity=213.60 cfs Outflow=243.48 cfs 31.013 af

Reach S2: STREAM Avg. Flow Depth=1.76' Max Vel=13.84 fps Inflow=189.21 cfs 23.795 af
n=0.030 L=480.0' S=0.0583 '/' Capacity=236.41 cfs Outflow=188.95 cfs 23.793 af

Reach S3: STREAM Avg. Flow Depth=2.07' Max Vel=13.30 fps Inflow=139.77 cfs 17.043 af
n=0.030 L=520.0' S=0.0577 '/' Capacity=130.98 cfs Outflow=139.18 cfs 17.042 af

Reach S4: STREAM Avg. Flow Depth=1.18' Max Vel=8.92 fps Inflow=27.95 cfs 2.716 af
n=0.030 L=170.0' S=0.0588 '/' Capacity=20.83 cfs Outflow=27.78 cfs 2.716 af

Pond 2P: PIPE Peak Elev=653.02' Inflow=55.30 cfs 7.221 af
30.0" Round Culvert n=0.012 L=65.0' S=0.0200 '/' Outflow=55.30 cfs 7.221 af

Pond 6P: 15" HDPE Peak Elev=0.00'
15.0" Round Culvert n=0.012 L=35.0' S=0.1143 '/' Primary=0.00 cfs 0.000 af

Pond P2A: POND 2A Peak Elev=731.16' Storage=63,594 cf Inflow=74.39 cfs 6.758 af
Outflow=52.37 cfs 6.729 af

Pond P3AB: POND 3AB Peak Elev=679.74' Storage=60,080 cf Inflow=76.05 cfs 6.765 af
Outflow=50.07 cfs 6.754 af

Pond P3D: POND 3D Peak Elev=754.54' Storage=103,699 cf Inflow=116.49 cfs 11.404 af
Outflow=83.68 cfs 11.239 af

Total Runoff Area = 137.970 ac Runoff Volume = 70.410 af Average Runoff Depth = 6.12"
91.24% Pervious = 125.880 ac 8.76% Impervious = 12.090 ac

Summary for Subcatchment 1: BASIN 1

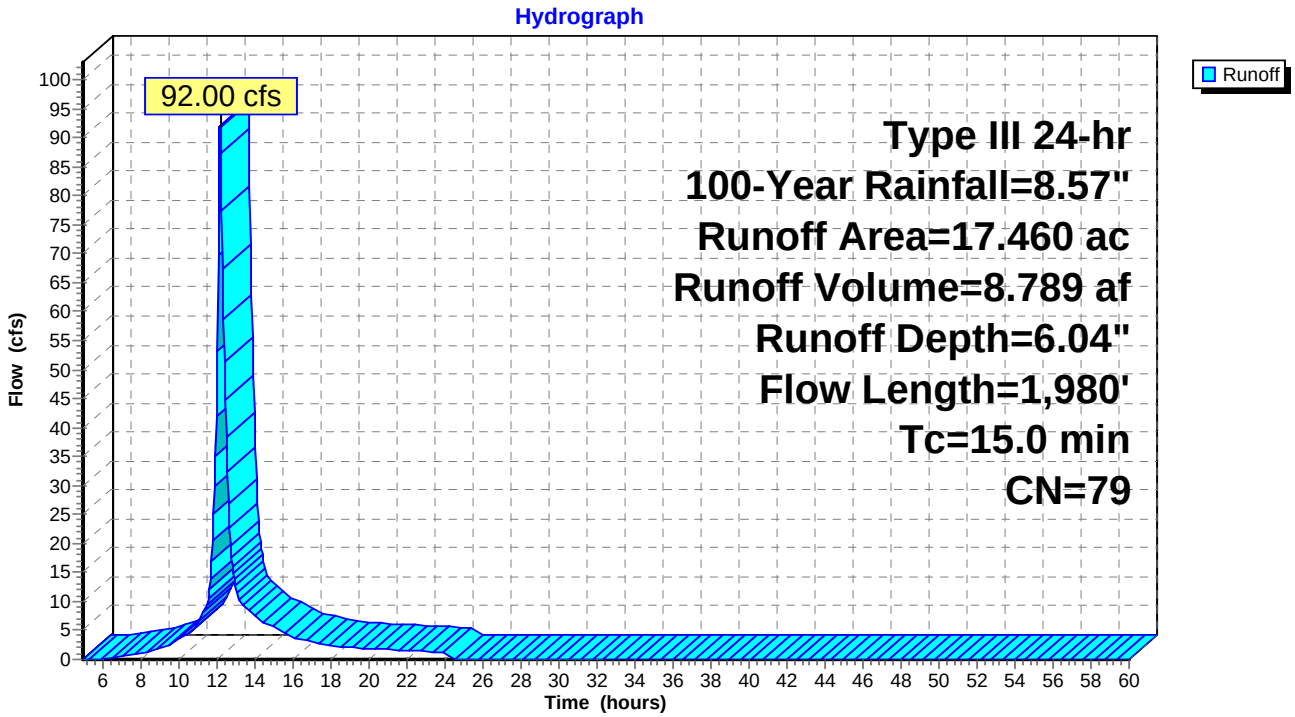
Runoff = 92.00 cfs @ 12.20 hrs, Volume= 8.789 af, Depth= 6.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	4.300	80	>75% Grass cover, Good, HSG D
*	1.190	98	Existing Impervious Surfaces
	11.750	77	Woods, Good, HSG D
*	0.220	98	Proposed Impervious Surfaces
	17.460	79	Weighted Average
	16.050		91.92% Pervious Area
	1.410		8.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
3.1	1,120	0.1400	6.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	530	0.0200	9.11	16.09	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	170	0.0500	3.60		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.1	60	0.0100	7.80	24.51	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
15.0	1,980	Total			

Subcatchment 1: BASIN 1



Summary for Subcatchment 2A: BASIN 2A

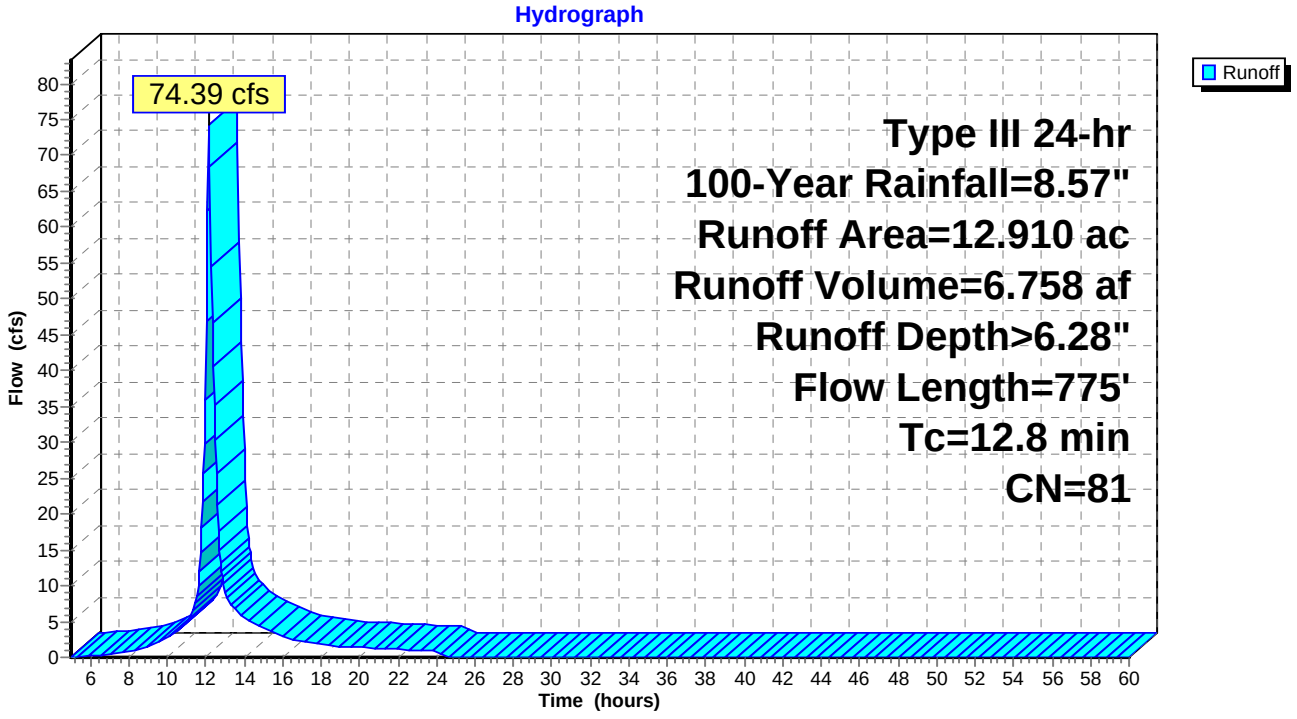
Runoff = 74.39 cfs @ 12.17 hrs, Volume= 6.758 af, Depth> 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
*	3.160	77	Woods, D, Good
	8.350	80	>75% Grass cover, Good, HSG D
*	0.450	98	Houses
*	0.400	98	Road
*	0.300	98	Driveways
*	0.250	96	Gravel Road
	12.910	81	Weighted Average
	11.760		91.09% Pervious Area
	1.150		8.91% 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"
2.0	675	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.8	775	Total			

Subcatchment 2A: BASIN 2A



Summary for Subcatchment 2B: BASIN 2B

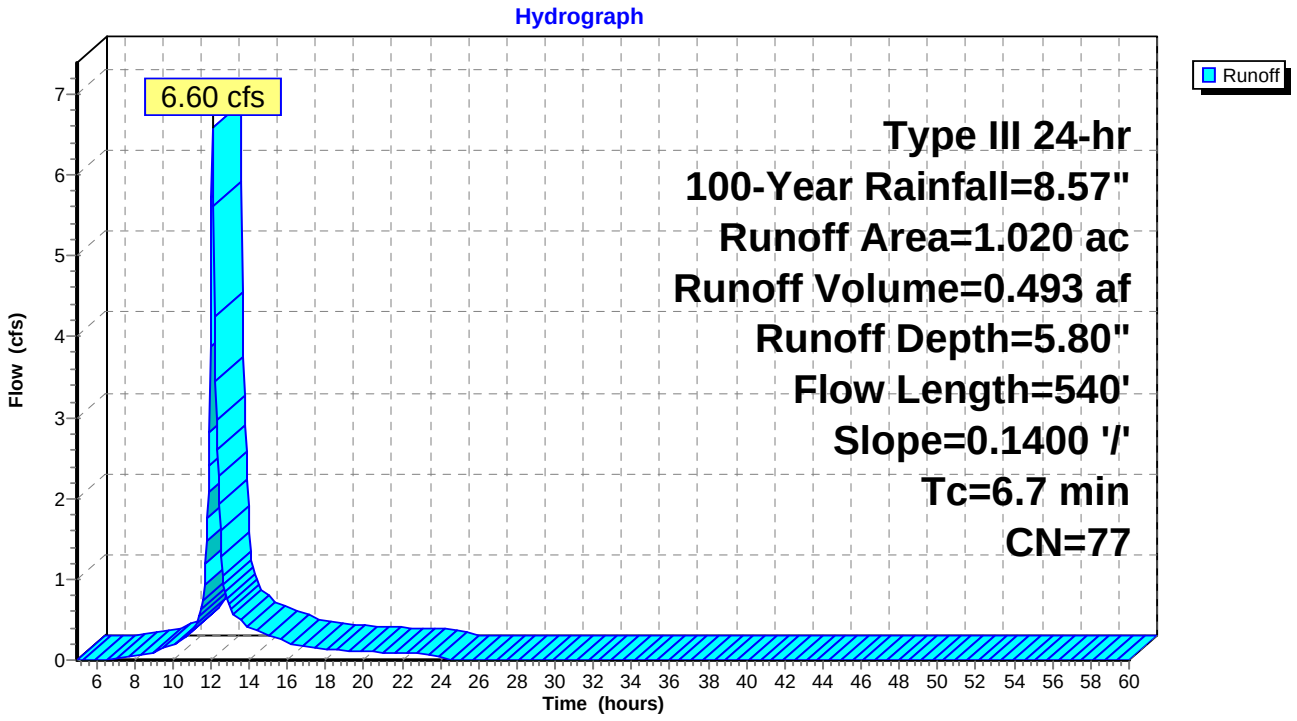
Runoff = 6.60 cfs @ 12.10 hrs, Volume= 0.493 af, Depth= 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

Area (ac)	CN	Description
0.870	77	Woods, Good, HSG D
0.150	80	>75% Grass cover, Good, HSG D
1.020	77	Weighted Average
1.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	100	0.1400	0.27		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
0.4	440	0.1400	17.62	105.73	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 0.5 '/' Top.W=4.00' n= 0.030
6.7	540	Total			

Subcatchment 2B: BASIN 2B



Summary for Subcatchment 2C: BASIN 2C

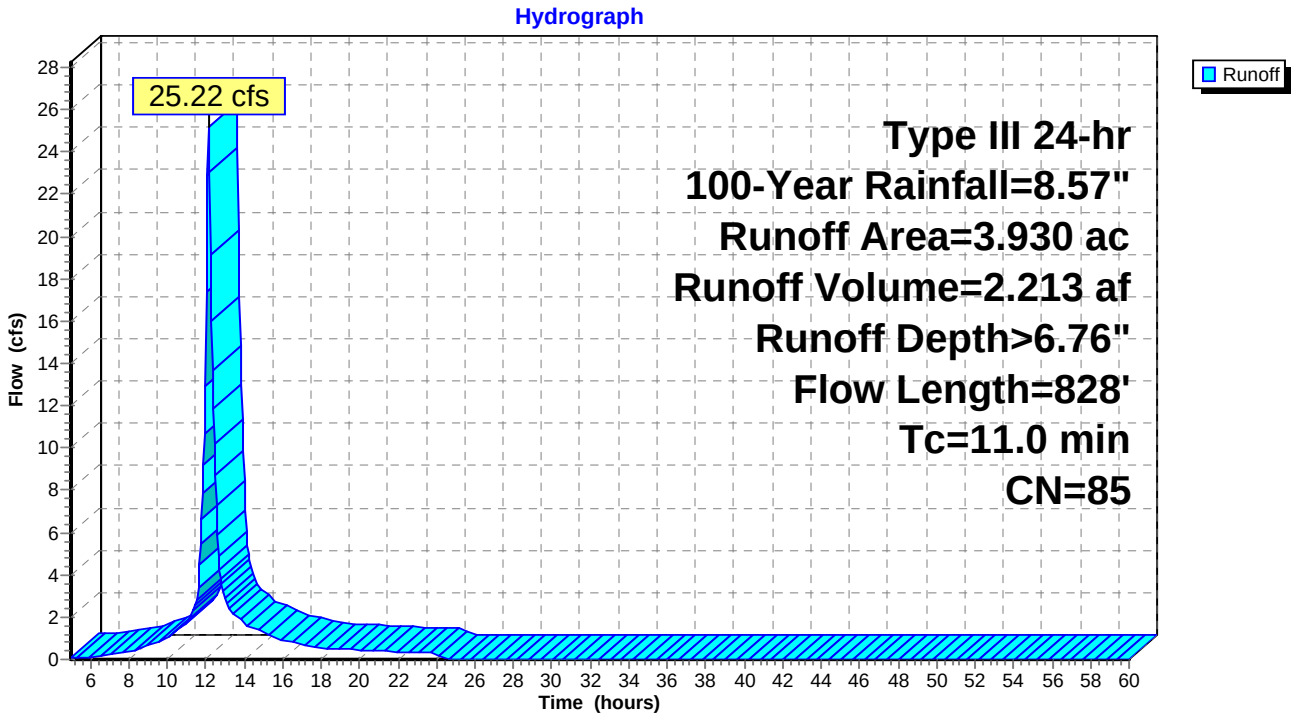
Runoff = 25.22 cfs @ 12.15 hrs, Volume= 2.213 af, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
*	1.200	98	Proposed Impervious Surfaces
	0.650	77	Woods, Good, HSG D
	2.080	80	>75% Grass cover, Good, HSG D
	3.930	85	Weighted Average
	2.730		69.47% Pervious Area
	1.200		30.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.4	100	0.1400	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.2	425	0.1400	6.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.2	113	0.0350	12.05	21.29	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.0	24	0.0300	11.15	19.71	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	112	0.0488	14.23	25.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.1	54	0.0300	11.15	19.71	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
11.0	828	Total			

Subcatchment 2C: BASIN 2C



Summary for Subcatchment 3A: BASIN 3A

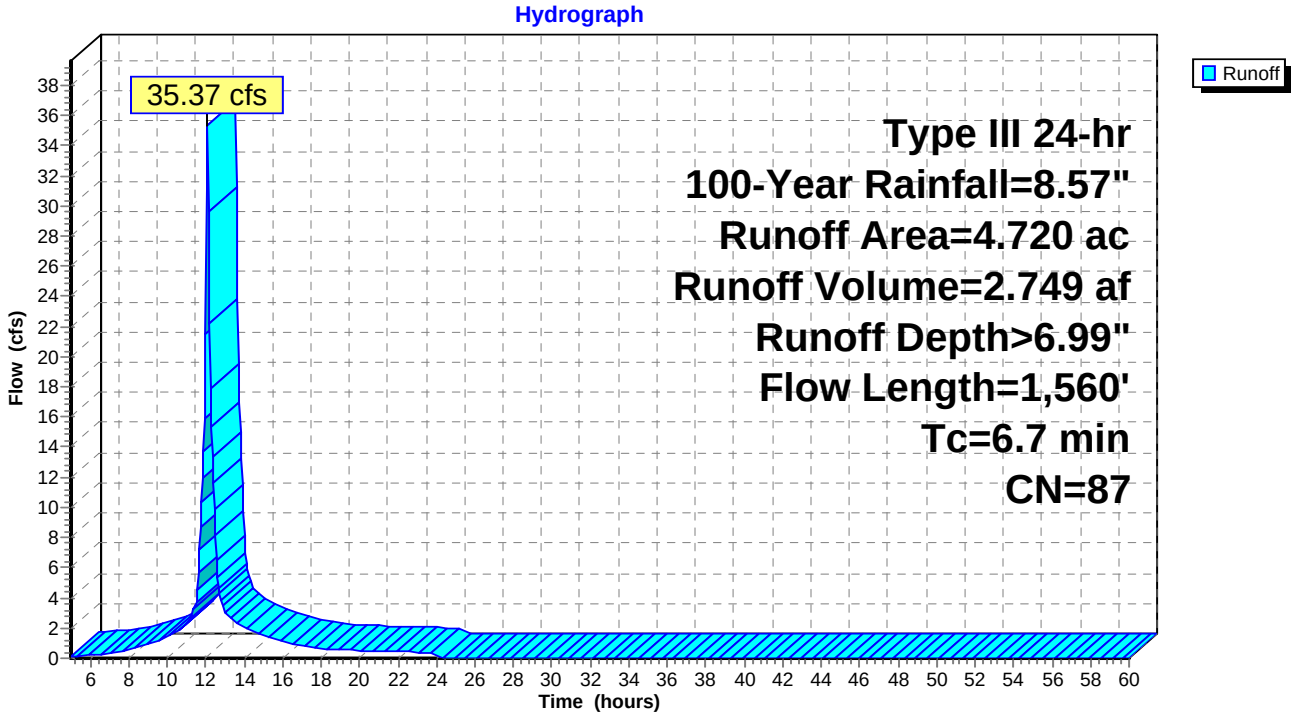
Runoff = 35.37 cfs @ 12.10 hrs, Volume= 2.749 af, Depth> 6.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
*	1.900	98	
	0.100	77	Woods, Good, HSG D
	2.720	80	>75% Grass cover, Good, HSG D
	4.720	87	Weighted Average
	2.820		59.75% Pervious Area
	1.900		40.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	100	0.1000	0.34		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.50"
0.5	145	0.0900	4.83		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	115	0.0850	5.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.0	1,200	0.0900	19.32	34.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
6.7	1,560	Total			

Subcatchment 3A: BASIN 3A



Summary for Subcatchment 3B: BASIN 3B

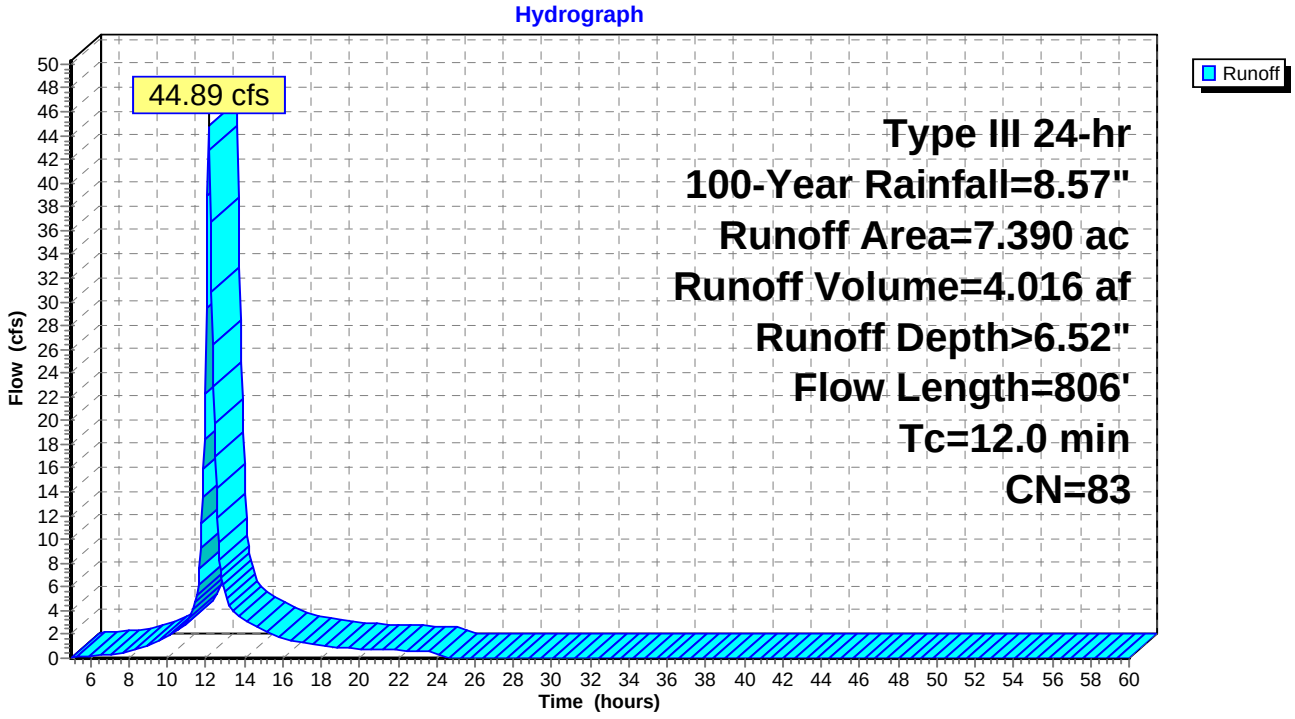
Runoff = 44.89 cfs @ 12.16 hrs, Volume= 4.016 af, Depth> 6.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
*	1.650	98	Proposed Impervious
	1.700	77	Woods, Good, HSG D
	4.040	80	>75% Grass cover, Good, HSG D
	7.390	83	Weighted Average
	5.740		77.67% Pervious Area
	1.650		22.33% 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"
0.4	150	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	376	0.0900	19.32	34.14	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.5	180	0.1700	6.64		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.0	806	Total			

Subcatchment 3B: BASIN 3B



Summary for Subcatchment 3C: BASIN 3C

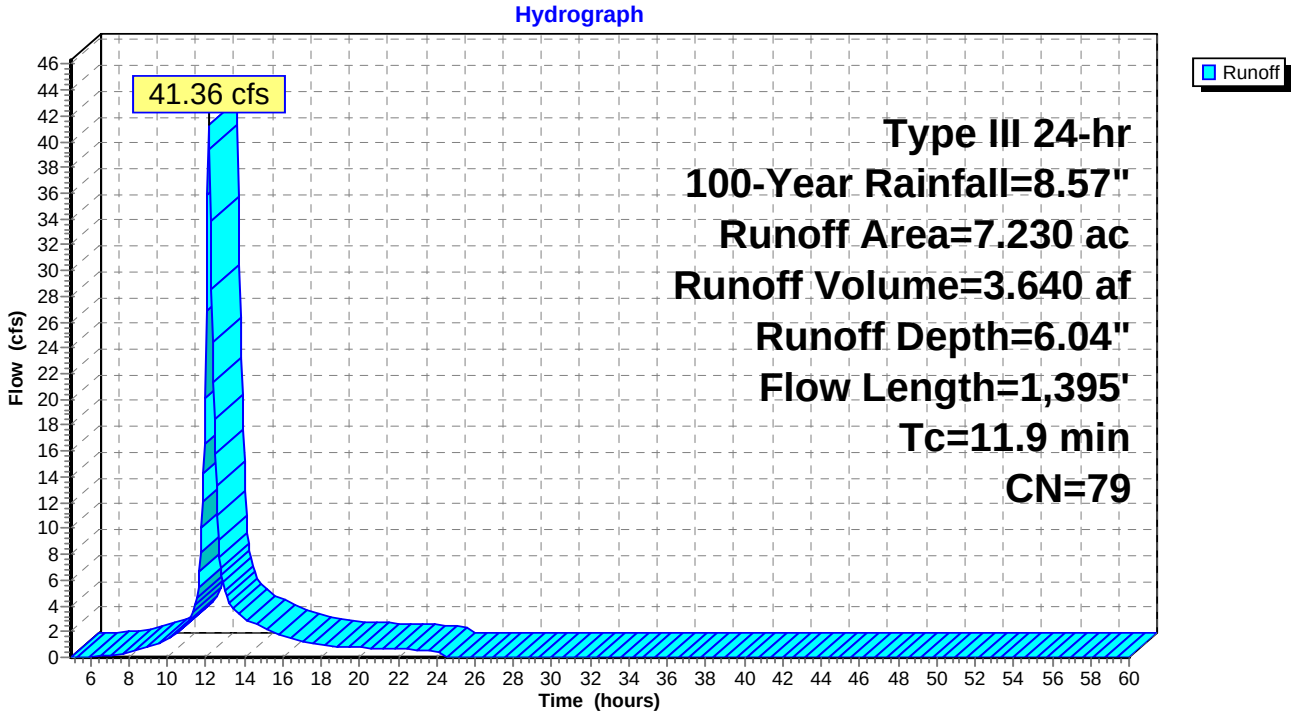
Runoff = 41.36 cfs @ 12.16 hrs, Volume= 3.640 af, Depth= 6.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	6.630	77	Woods, Good, HSG D
*	0.300	98	Stream
*	0.300	98	Existing Impervious
	7.230	79	Weighted Average
	6.630		91.70% Pervious Area
	0.600		8.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1200	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
0.8	270	0.1300	5.80		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.1	1,025	0.0600	14.99	239.76	**Trap/Vee/Rect Channel Flow,** Bot.W=6.00' D=2.00' Z= 1.0 '/' Top.W=10.00' n= 0.030
11.9	1,395	Total			

Subcatchment 3C: BASIN 3C



Summary for Subcatchment 3D: BASIN 3D

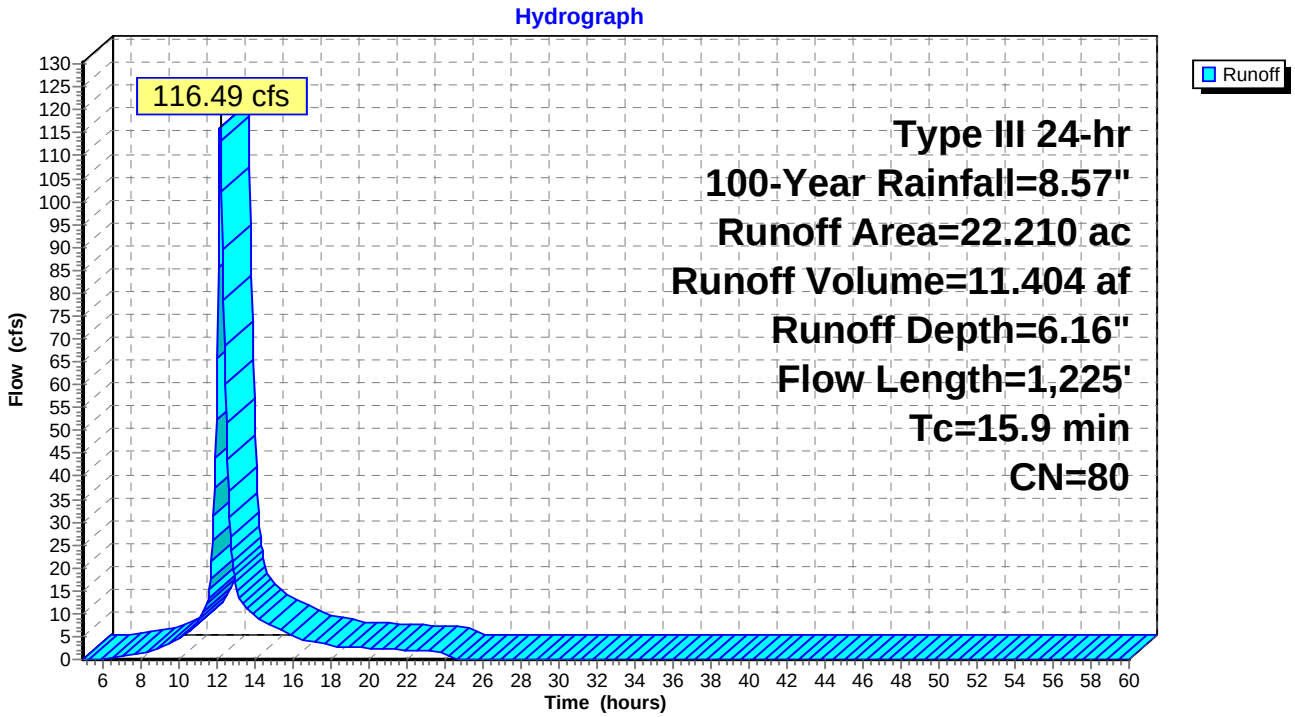
Runoff = 116.49 cfs @ 12.21 hrs, Volume= 11.404 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	9.000	80	>75% Grass cover, Good, HSG D
	10.380	77	Woods, Good, HSG D
*	1.360	98	Roads
*	0.400	98	Driveways
*	0.350	98	Houses
*	0.120	96	Gravel Road
	0.600	78	Meadow, non-grazed, HSG D
	22.210	80	Weighted Average
	20.100		90.50% Pervious Area
	2.110		9.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.6	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
1.3	450	0.1200	5.58		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	265	0.0400	7.86	20.62	**Trap/Vee/Rect Channel Flow,** Bot.W=1.00' D=1.50' Z= 0.5 '/' Top.W=2.50' n= 0.027
0.1	125	0.0700	17.04	30.11	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	285	0.0900	14.13	84.77	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=2.00' Z= 0.5 '/' Top.W=4.00' n= 0.030
15.9	1,225	Total			

Subcatchment 3D: BASIN 3D



Summary for Subcatchment 4: BASIN 4

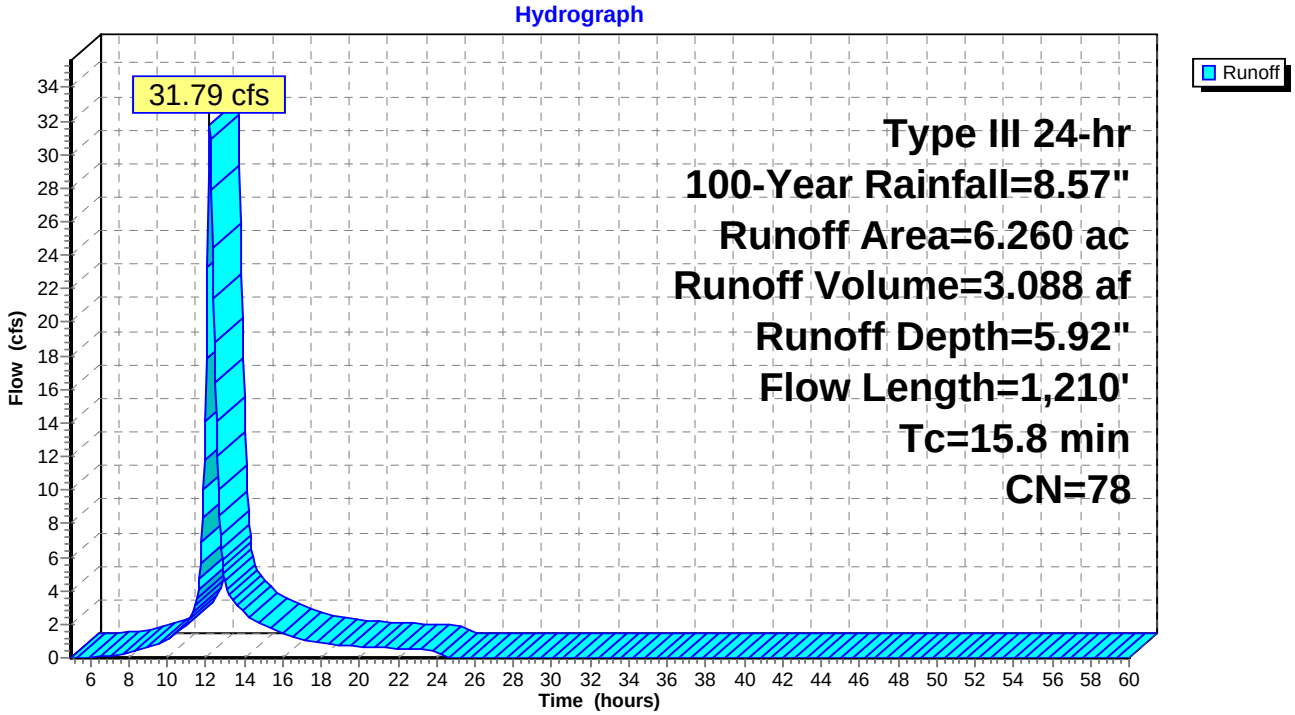
Runoff = 31.79 cfs @ 12.21 hrs, Volume= 3.088 af, Depth= 5.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	5.460	77	Woods, Good, HSG D
	0.700	80	>75% Grass cover, Good, HSG D
*	0.100	98	
	6.260	78	Weighted Average
	6.160		98.40% Pervious Area
	0.100		1.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0500	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
1.6	1,110	0.1000	11.23	37.43	**Parabolic Channel,** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.030
15.8	1,210	Total			

Subcatchment 4: BASIN 4



Summary for Subcatchment 5: BASIN 5

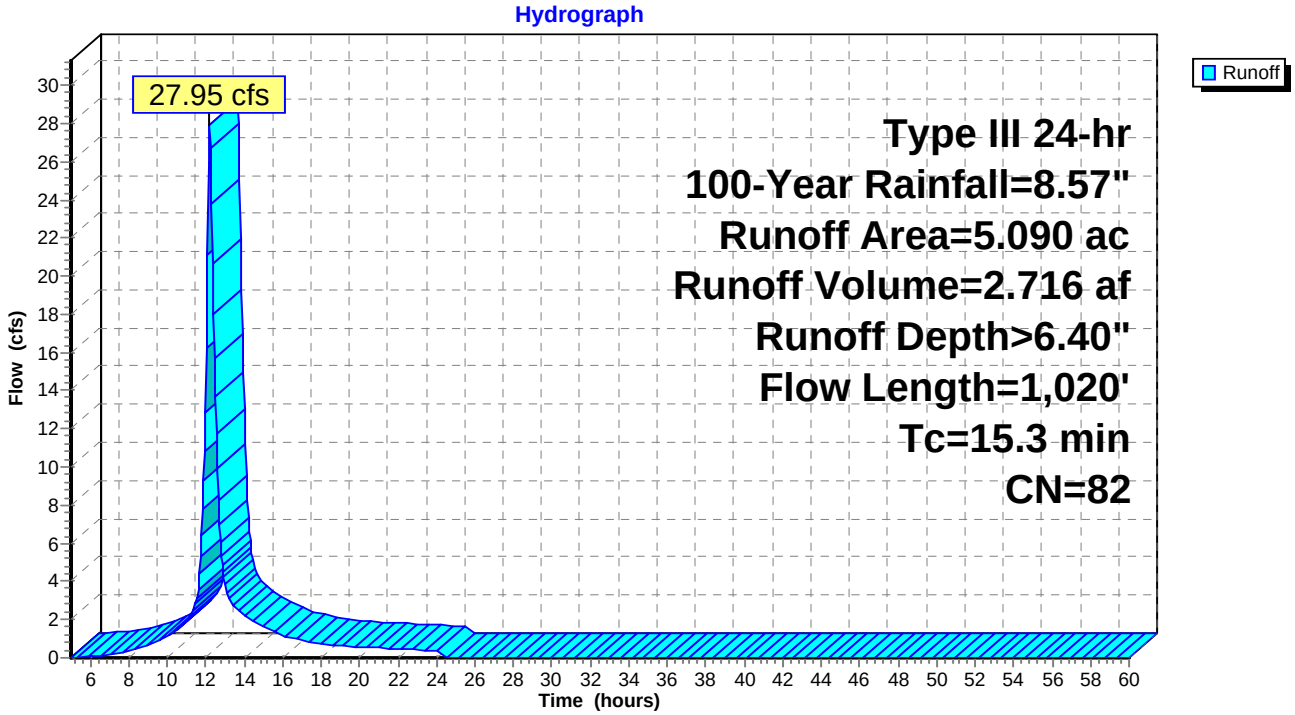
Runoff = 27.95 cfs @ 12.21 hrs, Volume= 2.716 af, Depth> 6.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
*	0.820	98	Impervious Surfaces
	2.200	80	>75% Grass cover, Good, HSG D
	2.070	77	Woods, Good, HSG D
	5.090	82	Weighted Average
	4.270		83.89% Pervious Area
	0.820		16.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.0700	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
2.9	920	0.1100	5.34		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
15.3	1,020	Total			

Subcatchment 5: BASIN 5



Summary for Subcatchment 6: BASIN 6

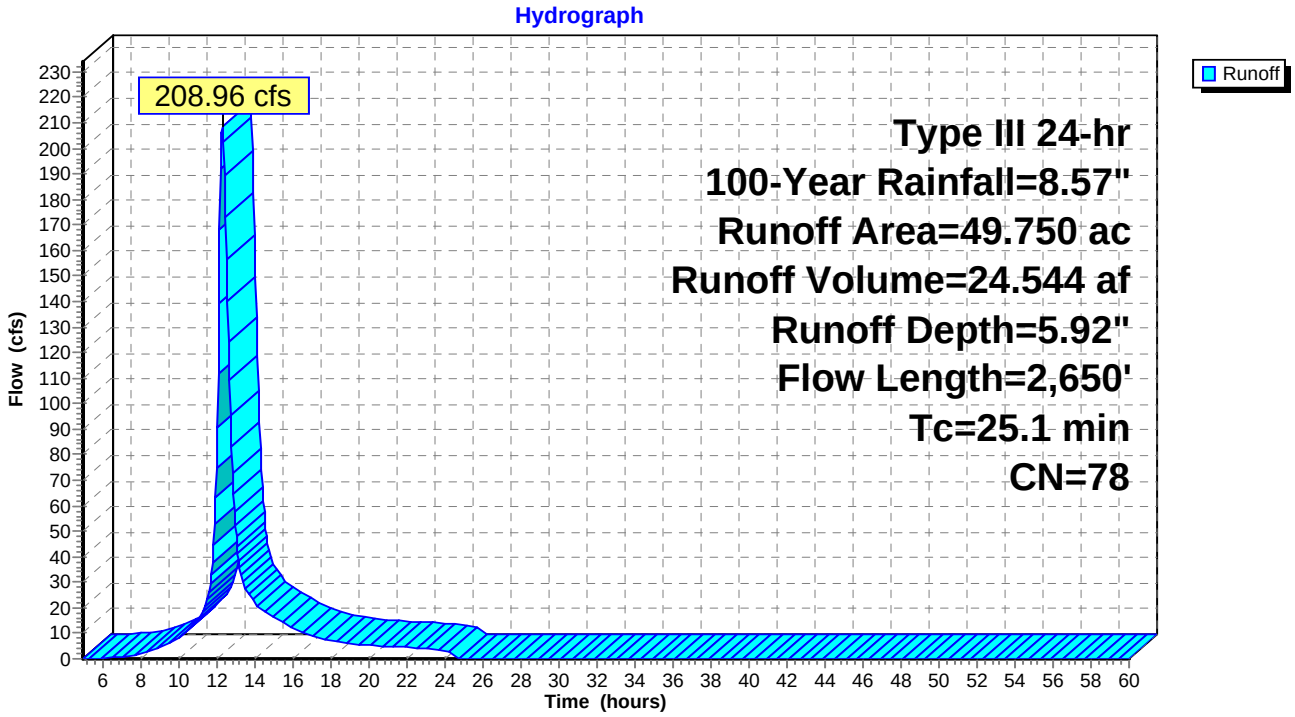
Runoff = 208.96 cfs @ 12.34 hrs, Volume= 24.544 af, Depth= 5.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.57"

	Area (ac)	CN	Description
	3.100	80	>75% Grass cover, Good, HSG D
*	1.150	98	Imperviuos Surfaces
	11.900	80	Pasture/grassland/range, Good, HSG D
	33.600	77	Woods, Good, HSG D
	49.750	78	Weighted Average
	48.600		97.69% Pervious Area
	1.150		2.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	2,550	0.0780	4.50		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
25.1	2,650	Total			

Subcatchment 6: BASIN 6



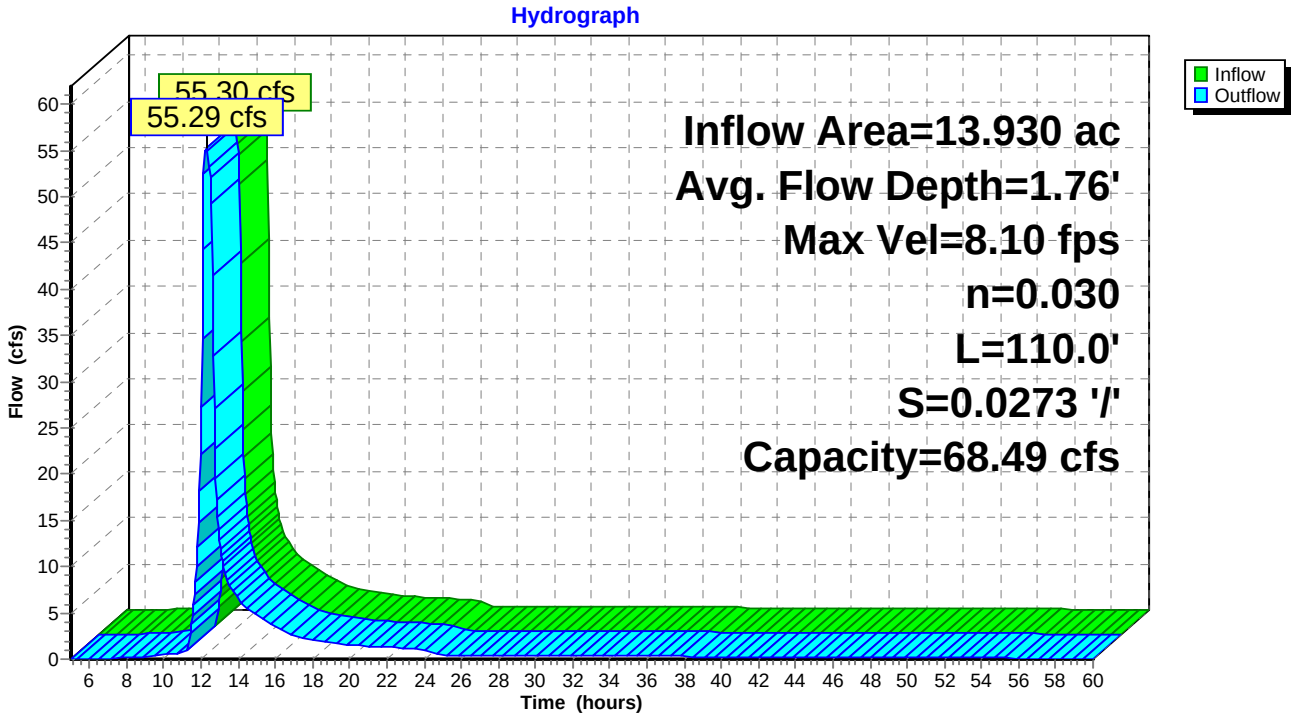
Summary for Reach 1R: SWALE

Inflow Area = 13.930 ac, 8.26% Impervious, Inflow Depth > 6.22" for 100-Year event
Inflow = 55.30 cfs @ 12.29 hrs, Volume= 7.221 af
Outflow = 55.29 cfs @ 12.30 hrs, Volume= 7.221 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.10 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.74 fps, Avg. Travel Time= 1.1 min

Peak Storage= 751 cf @ 12.30 hrs
Average Depth at Peak Storage= 1.76'
Bank-Full Depth= 2.00' Flow Area= 8.0 sf, Capacity= 68.49 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 0.5 '/' Top Width= 5.00'
Length= 110.0' Slope= 0.0273 '/'
Inlet Invert= 645.00', Outlet Invert= 642.00'



Summary for Reach 2R: SWALE

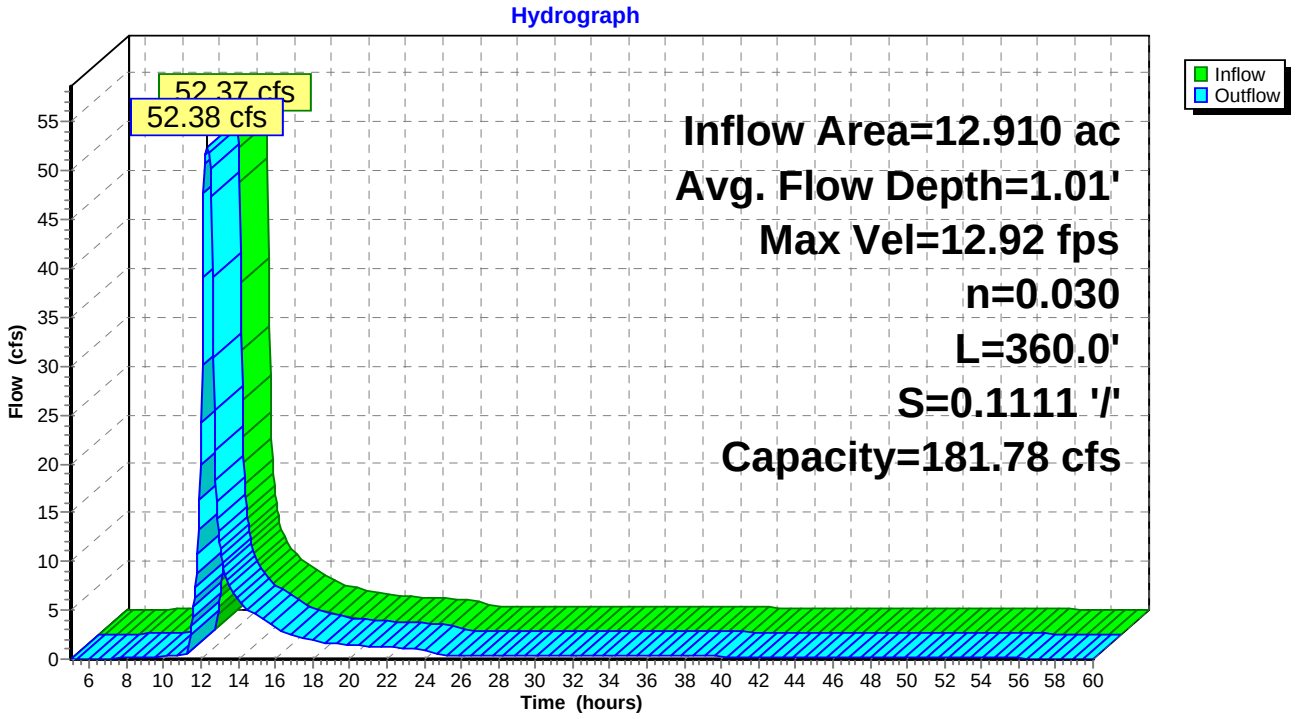
Inflow Area = 12.910 ac, 8.91% Impervious, Inflow Depth > 6.25" for 100-Year event
Inflow = 52.37 cfs @ 12.32 hrs, Volume= 6.729 af
Outflow = 52.38 cfs @ 12.32 hrs, Volume= 6.728 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 12.92 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.65 fps, Avg. Travel Time= 2.3 min

Peak Storage= 1,461 cf @ 12.31 hrs
Average Depth at Peak Storage= 1.01'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 181.78 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 360.0' Slope= 0.1111 '/'
Inlet Invert= 720.00', Outlet Invert= 680.00'

Reach 2R: SWALE

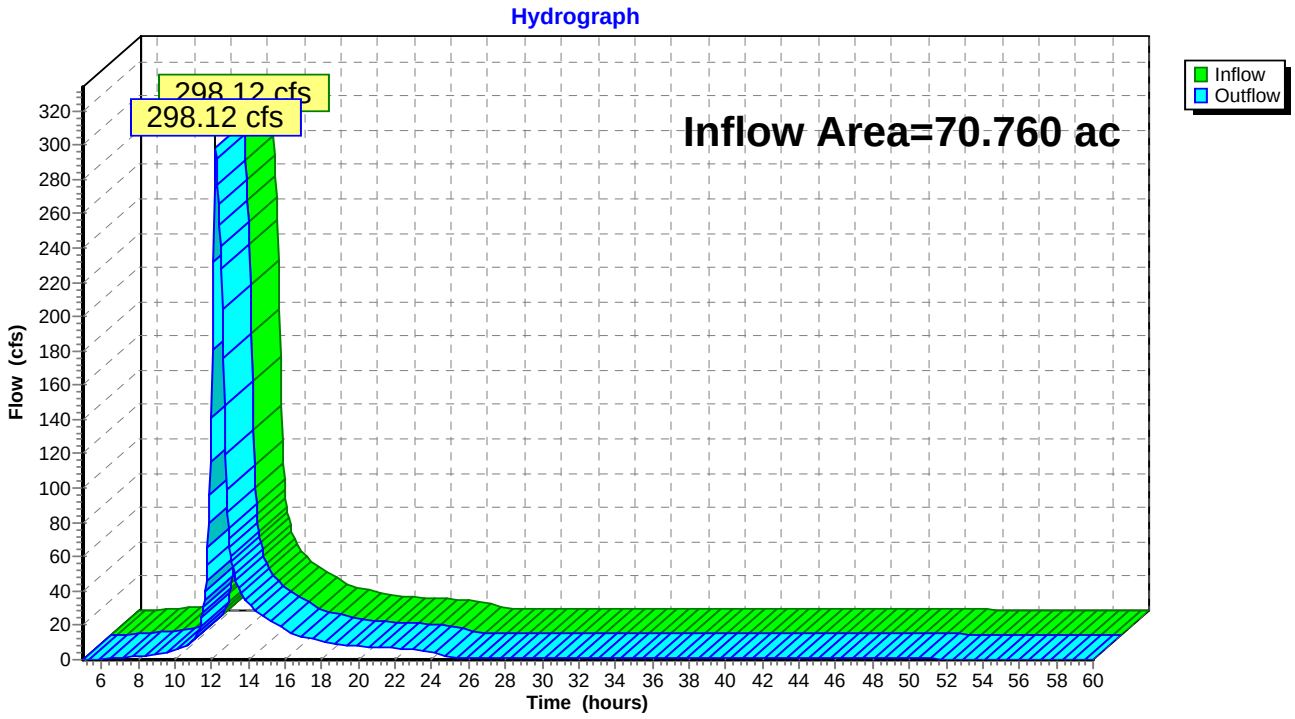


Summary for Reach AP1: Analysis Point

Inflow Area = 70.760 ac, 13.47% Impervious, Inflow Depth > 6.25" for 100-Year event
Inflow = 298.12 cfs @ 12.22 hrs, Volume= 36.866 af
Outflow = 298.12 cfs @ 12.22 hrs, Volume= 36.866 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs

Reach AP1: Analysis Point



Summary for Reach S1: STREAM

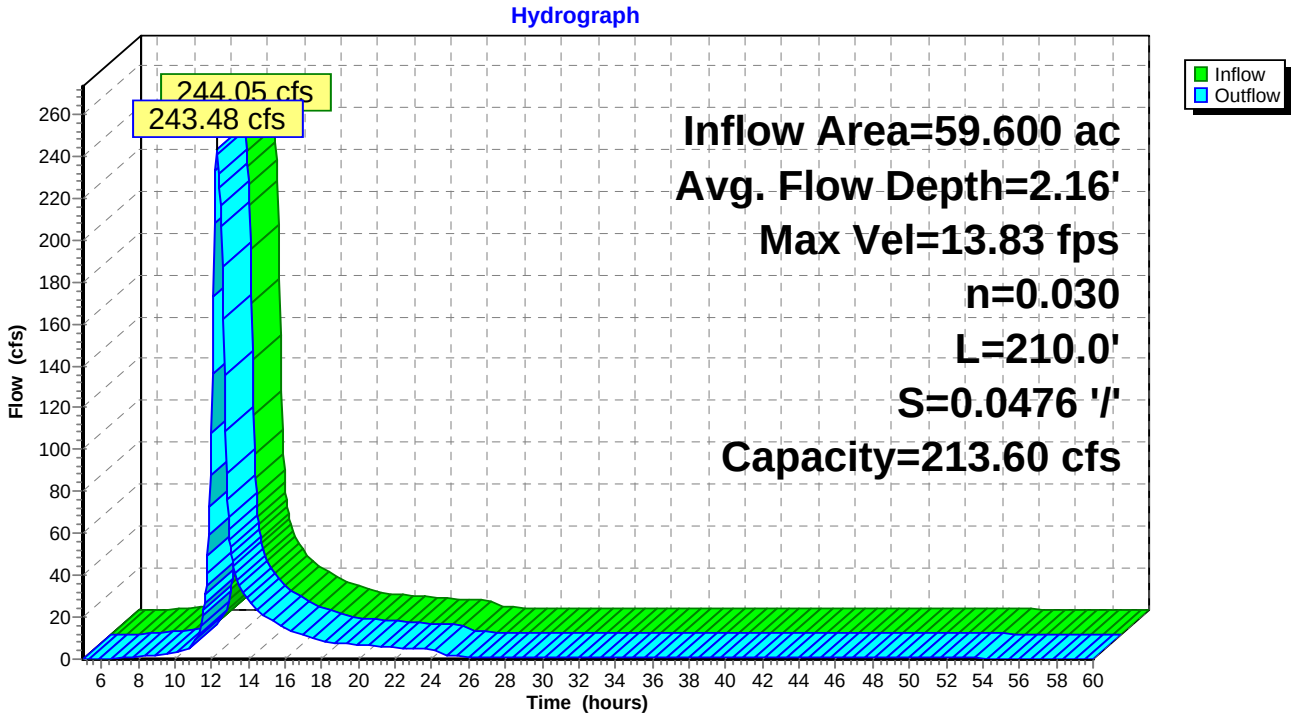
Inflow Area = 59.600 ac, 12.97% Impervious, Inflow Depth > 6.24" for 100-Year event
Inflow = 244.05 cfs @ 12.27 hrs, Volume= 31.014 af
Outflow = 243.48 cfs @ 12.28 hrs, Volume= 31.013 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.83 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.76 fps, Avg. Travel Time= 1.3 min

Peak Storage= 3,697 cf @ 12.28 hrs
Average Depth at Peak Storage= 2.16'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 213.60 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 210.0' Slope= 0.0476 '/'
Inlet Invert= 642.00', Outlet Invert= 632.00'

Reach S1: STREAM



Summary for Reach S2: STREAM

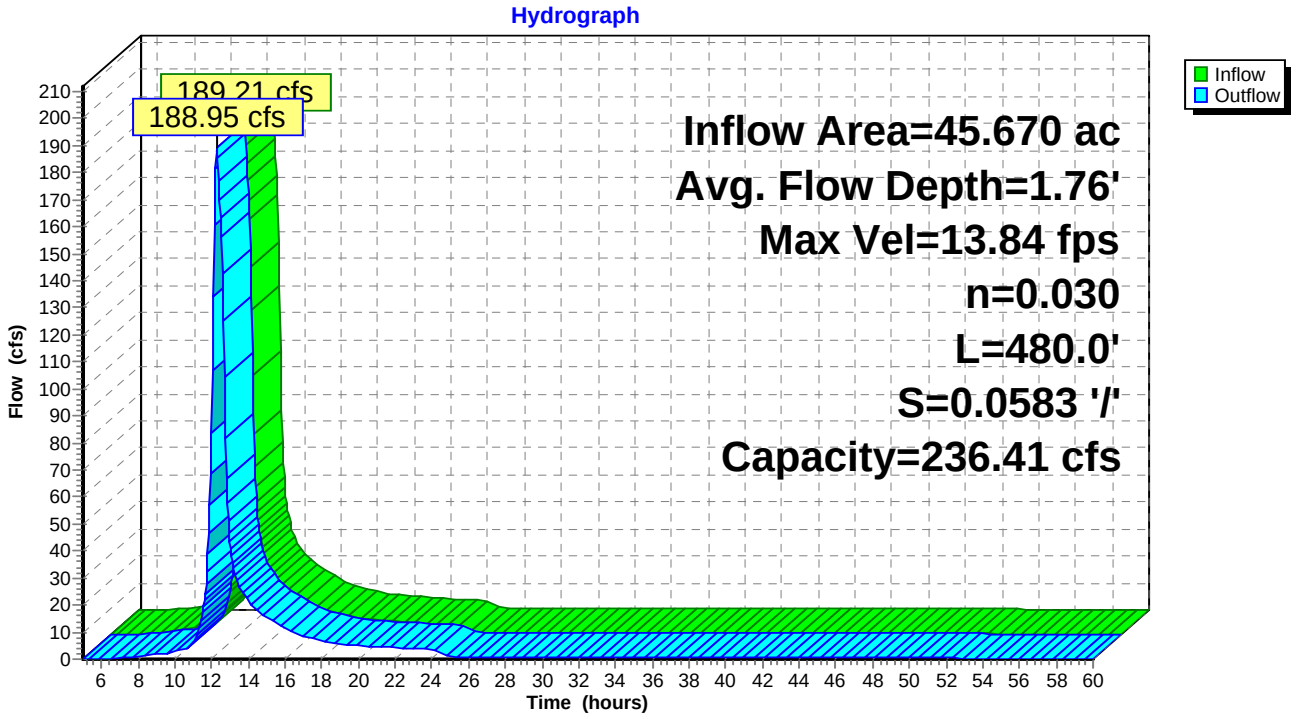
Inflow Area = 45.670 ac, 14.41% Impervious, Inflow Depth > 6.25" for 100-Year event
Inflow = 189.21 cfs @ 12.26 hrs, Volume= 23.795 af
Outflow = 188.95 cfs @ 12.27 hrs, Volume= 23.793 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.84 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.64 fps, Avg. Travel Time= 3.0 min

Peak Storage= 6,561 cf @ 12.26 hrs
Average Depth at Peak Storage= 1.76'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 236.41 cfs

6.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 10.00'
Length= 480.0' Slope= 0.0583 '/'
Inlet Invert= 670.00', Outlet Invert= 642.00'

Reach S2: STREAM



Summary for Reach S3: STREAM

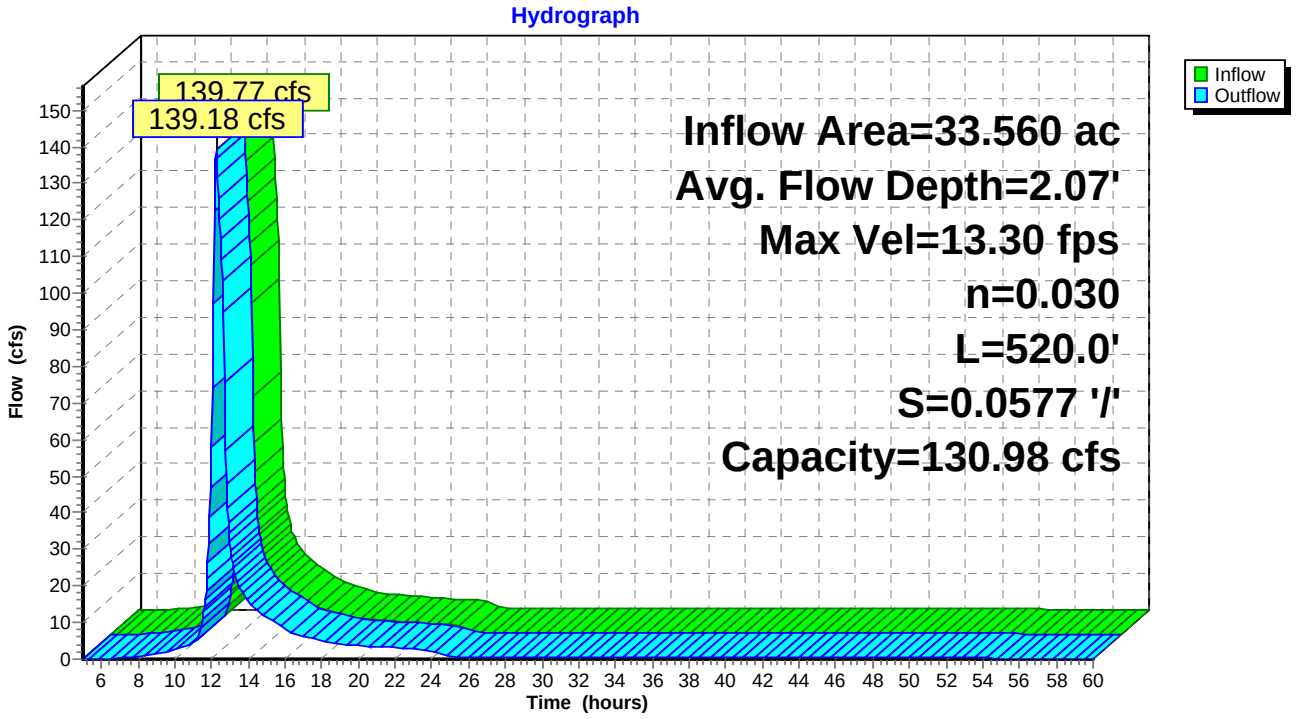
Inflow Area = 33.560 ac, 9.03% Impervious, Inflow Depth > 6.09" for 100-Year event
Inflow = 139.77 cfs @ 12.23 hrs, Volume= 17.043 af
Outflow = 139.18 cfs @ 12.25 hrs, Volume= 17.042 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.30 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.84 fps, Avg. Travel Time= 3.1 min

Peak Storage= 5,450 cf @ 12.23 hrs
Average Depth at Peak Storage= 2.07'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 130.98 cfs

3.00' x 2.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 7.00'
Length= 520.0' Slope= 0.0577 '/'
Inlet Invert= 700.00', Outlet Invert= 670.00'

Reach S3: STREAM



Summary for Reach S4: STREAM

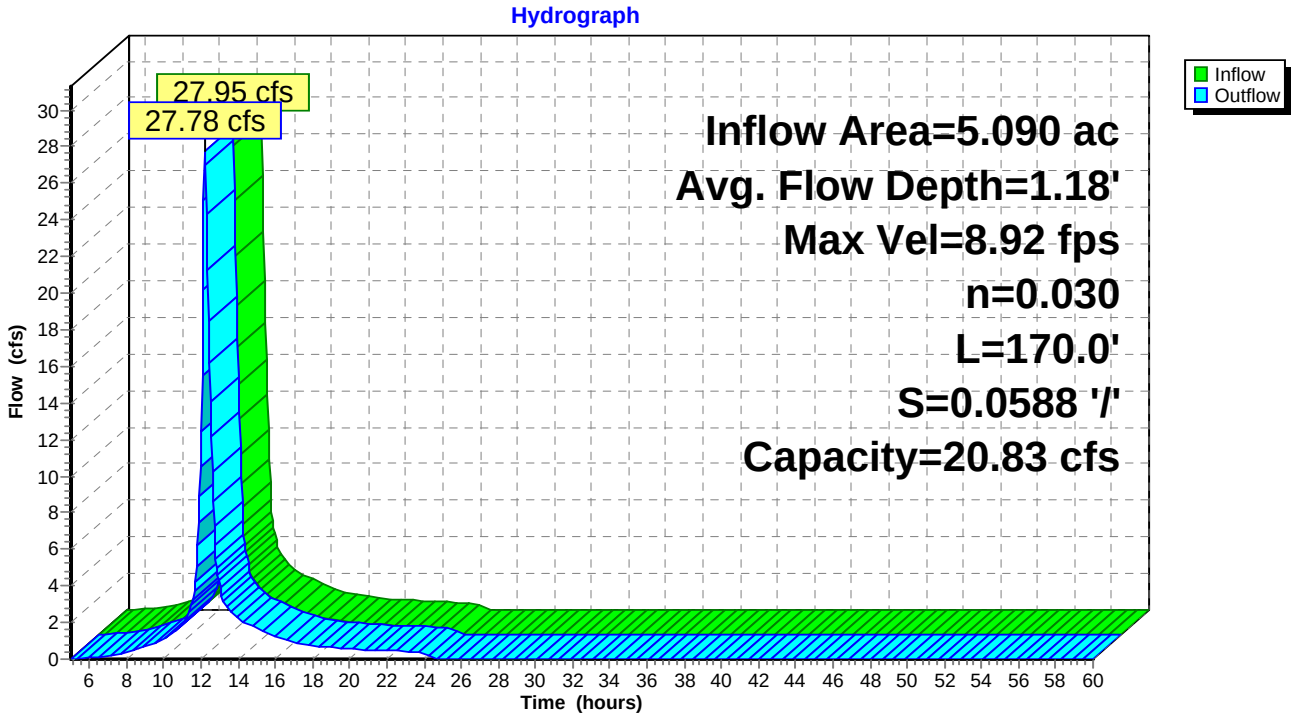
Inflow Area = 5.090 ac, 16.11% Impervious, Inflow Depth > 6.40" for 100-Year event
Inflow = 27.95 cfs @ 12.21 hrs, Volume= 2.716 af
Outflow = 27.78 cfs @ 12.22 hrs, Volume= 2.716 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.92 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.15 fps, Avg. Travel Time= 0.9 min

Peak Storage= 532 cf @ 12.21 hrs
Average Depth at Peak Storage= 1.18'
Bank-Full Depth= 1.00' Flow Area= 2.5 sf, Capacity= 20.83 cfs

1.50' x 1.00' deep channel, n= 0.030
Side Slope Z-value= 1.0 '/' Top Width= 3.50'
Length= 170.0' Slope= 0.0588 '/'
Inlet Invert= 710.00', Outlet Invert= 700.00'

Reach S4: STREAM



Summary for Pond 2P: PIPE

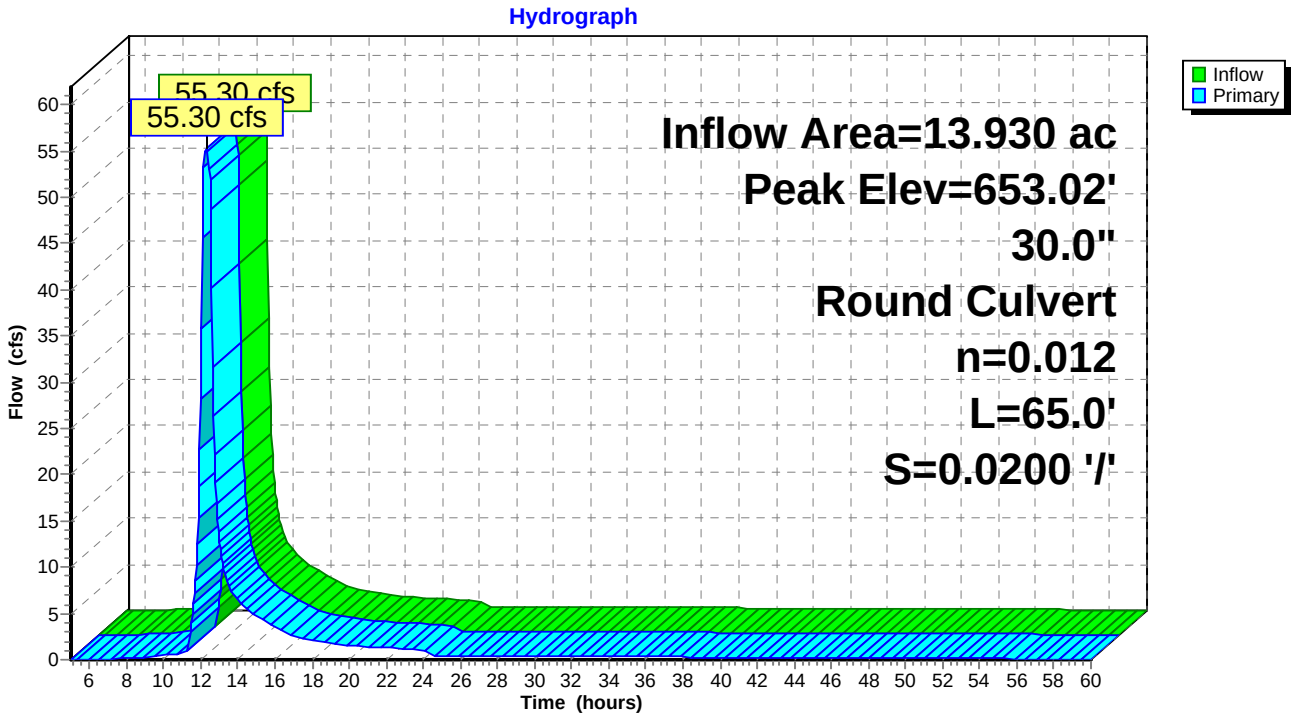
Inflow Area = 13.930 ac, 8.26% Impervious, Inflow Depth > 6.22" for 100-Year event
Inflow = 55.30 cfs @ 12.29 hrs, Volume= 7.221 af
Outflow = 55.30 cfs @ 12.29 hrs, Volume= 7.221 af, Atten= 0%, Lag= 0.0 min
Primary = 55.30 cfs @ 12.29 hrs, Volume= 7.221 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 653.02' @ 12.29 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	646.30'	**30.0" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 646.30' / 645.00' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf

Primary OutFlow Max=55.26 cfs @ 12.29 hrs HW=653.02' (Free Discharge)
1=Culvert (Inlet Controls 55.26 cfs @ 11.26 fps)

Pond 2P: PIPE

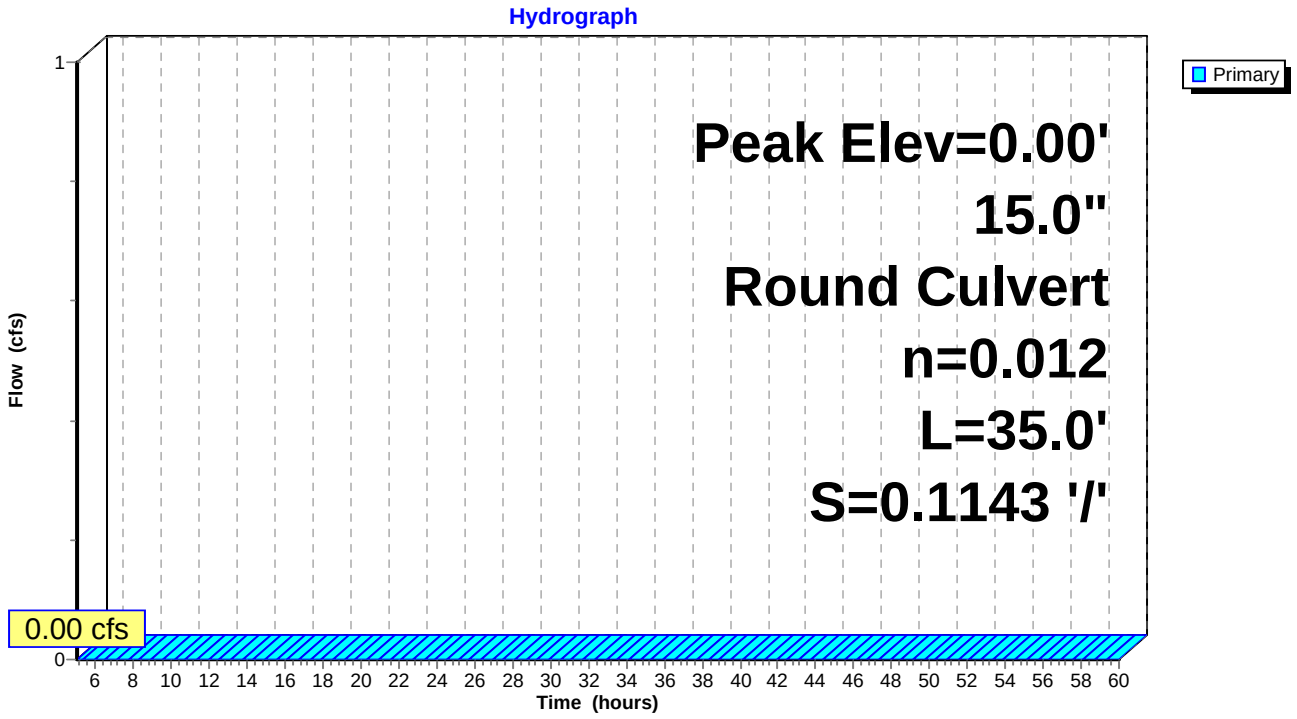


Summary for Pond 6P: 15" HDPE

Device	Routing	Invert	Outlet Devices
#1	Primary	720.00'	**15.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 720.00' / 716.00' S= 0.1143 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Pond 6P: 15" HDPE



Summary for Pond P2A: POND 2A

Inflow Area = 12.910 ac, 8.91% Impervious, Inflow Depth > 6.28" for 100-Year event
Inflow = 74.39 cfs @ 12.17 hrs, Volume= 6.758 af
Outflow = 52.37 cfs @ 12.32 hrs, Volume= 6.729 af, Atten= 30%, Lag= 8.6 min
Primary = 52.37 cfs @ 12.32 hrs, Volume= 6.729 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 731.16' @ 12.32 hrs Surf.Area= 17,118 sf Storage= 63,594 cf

Plug-Flow detention time= 185.3 min calculated for 6.723 af (99% of inflow)
Center-of-Mass det. time= 184.3 min (988.6 - 804.3)

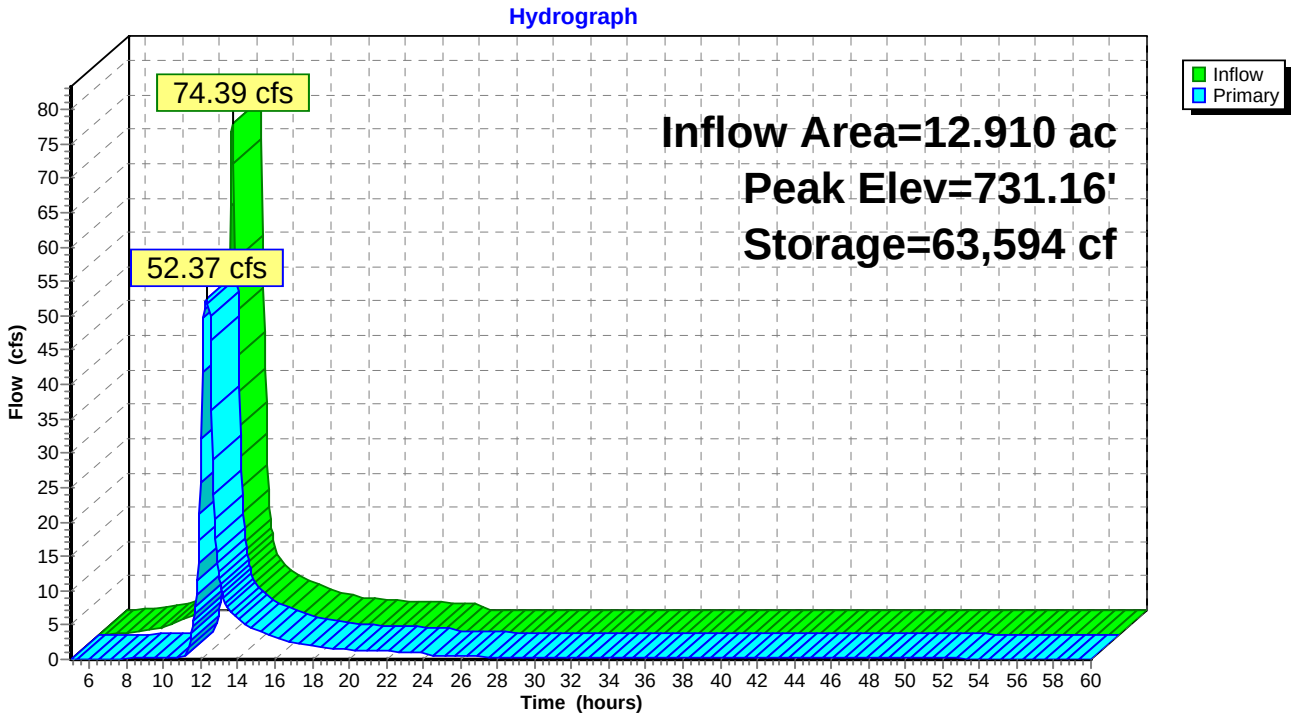
Volume	Invert	Avail.Storage	Storage Description
#1	726.00'	78,700 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
726.00	8,000	0	0
728.00	11,150	19,150	19,150
730.00	14,800	25,950	45,100
732.00	18,800	33,600	78,700

Device	Routing	Invert	Outlet Devices
#1	Primary	725.00'	**30.0" Round Culvert** L= 32.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.00' / 723.72' S= 0.0400 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	726.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	729.00'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	731.00'	**36.0" W x 36.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=52.31 cfs @ 12.32 hrs HW=731.15' (Free Discharge)
└─**1=Culvert** (Inlet Controls 52.31 cfs @ 10.66 fps)
  ├─**2=Orifice/Grate** (Passes < 0.53 cfs potential flow)
  ├─**3=Sharp-Crested Rectangular Weir** (Passes < 87.54 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 0.55 cfs potential flow)

Pond P2A: POND 2A



Summary for Pond P3AB: POND 3AB

Inflow Area = 12.110 ac, 29.31% Impervious, Inflow Depth > 6.70" for 100-Year event
Inflow = 76.05 cfs @ 12.12 hrs, Volume= 6.765 af
Outflow = 50.07 cfs @ 12.28 hrs, Volume= 6.754 af, Atten= 34%, Lag= 9.2 min
Primary = 50.07 cfs @ 12.28 hrs, Volume= 6.754 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 679.74' @ 12.28 hrs Surf.Area= 15,409 sf Storage= 60,080 cf

Plug-Flow detention time= 161.4 min calculated for 6.747 af (100% of inflow)
Center-of-Mass det. time= 162.0 min (955.1 - 793.1)

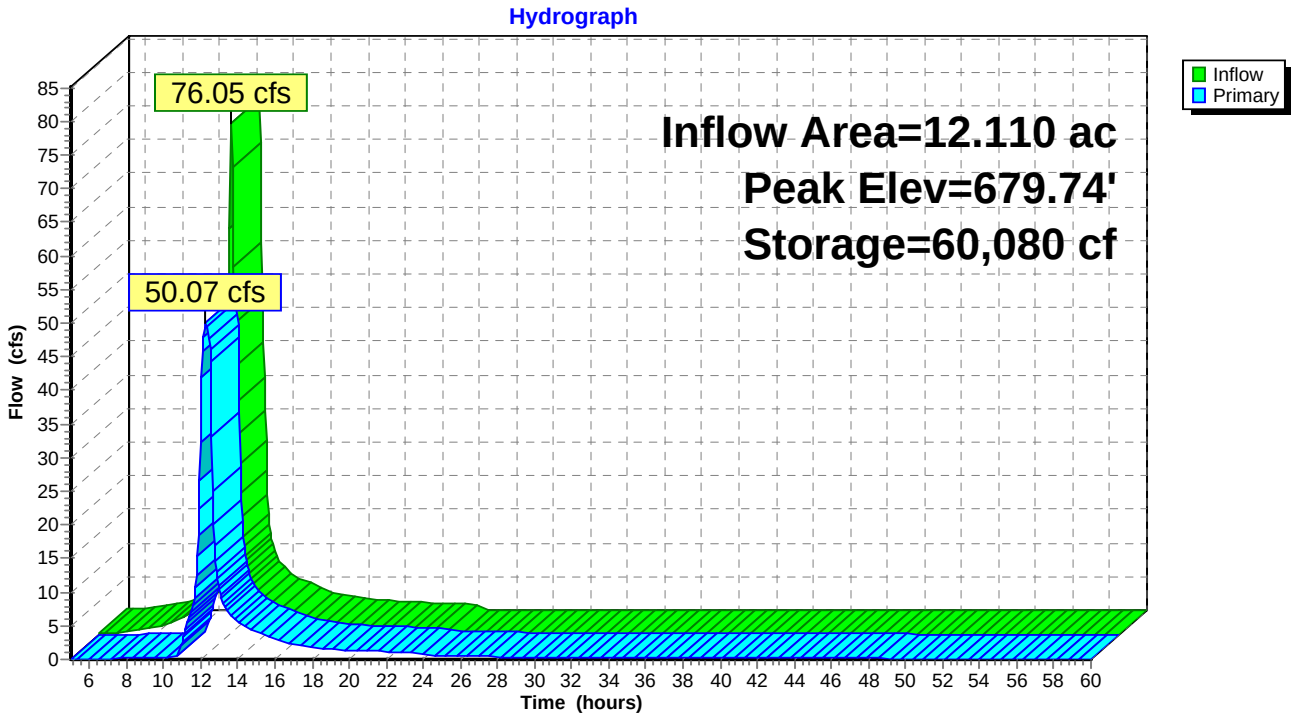
Volume	Invert	Avail.Storage	Storage Description
#1	674.00'	64,180 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
674.00	6,140	0	0
676.00	8,920	15,060	15,060
678.00	12,150	21,070	36,130
680.00	15,900	28,050	64,180

Device	Routing	Invert	Outlet Devices
#1	Primary	674.00'	**30.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 674.00' / 673.20' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 4.91 sf
#2	Device 1	674.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	677.30'	**6.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	679.00'	**54.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=50.01 cfs @ 12.28 hrs HW=679.73' (Free Discharge)
└**1=Culvert** (Inlet Controls 50.01 cfs @ 10.19 fps)
  ├**2=Orifice/Grate** (Passes < 0.56 cfs potential flow)
  ├**3=Sharp-Crested Rectangular Weir** (Passes < 108.72 cfs potential flow)
  └**4=Orifice/Grate** (Passes < 34.51 cfs potential flow)

Pond P3AB: POND 3AB



Summary for Pond P3D: POND 3D

Inflow Area = 22.210 ac, 9.50% Impervious, Inflow Depth = 6.16" for 100-Year event
Inflow = 116.49 cfs @ 12.21 hrs, Volume= 11.404 af
Outflow = 83.68 cfs @ 12.38 hrs, Volume= 11.239 af, Atten= 28%, Lag= 9.7 min
Primary = 83.68 cfs @ 12.38 hrs, Volume= 11.239 af

Routing by Stor-Ind method, Time Span= 5.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 754.54' @ 12.38 hrs Surf.Area= 23,470 sf Storage= 103,699 cf

Plug-Flow detention time= 180.7 min calculated for 11.239 af (99% of inflow)
Center-of-Mass det. time= 171.8 min (981.3 - 809.5)

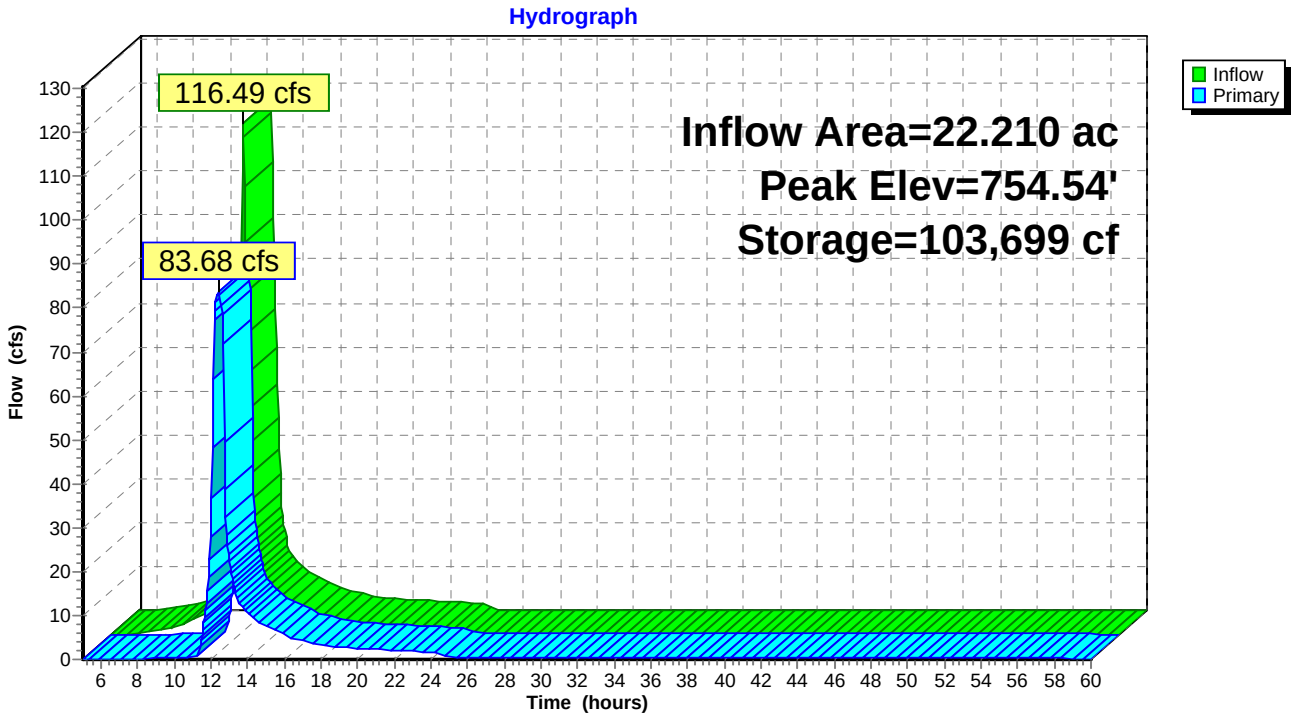
Volume	Invert	Avail.Storage	Storage Description
#1	748.00'	114,646 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
748.00	8,890	0	0
750.00	12,880	21,770	21,770
752.00	17,280	30,160	51,930
754.00	22,080	39,360	91,290
755.00	24,631	23,356	114,646

Device	Routing	Invert	Outlet Devices
#1	Primary	747.00'	**36.0" Round Culvert** L= 221.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 747.00' / 726.00' S= 0.0950 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf
#2	Device 1	748.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	753.00'	**54.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	751.80'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Primary OutFlow Max=83.61 cfs @ 12.38 hrs HW=754.54' (Free Discharge)
└**1=Culvert** (Inlet Controls 83.61 cfs @ 11.83 fps)
  ├**2=Orifice/Grate** (Passes < 0.60 cfs potential flow)
  ├**3=Orifice/Grate** (Passes < 80.54 cfs potential flow)
  └**4=Sharp-Crested Rectangular Weir** (Passes < 109.94 cfs potential flow)

Pond P3D: POND 3D



Appendix E

Construction and Maintenance Inspection Checklists; Sample Construction Site Inspection and Maintenance Log Book

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 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 (April-June planting window)		
Wetland buffer area preserved to maximum extent possible		

Comments:

Actions to be Taken:

Bioretention 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		
If designed as exfilter, soil testing for permeability		
Facility location staked out		
2. Excavation		
Size and location		
Lateral slopes completely level		
If designed as exfilter, ensure that excavation does not compact susoils.		
Longitudinal slopes within design range		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
3. Structural Components		
Stone diaphragm installed correctly		
Outlets installed correctly		
Underdrain		
Pretreatment devices installed		
Soil bed composition and texture		
4. Vegetation		
Complies with planting specs		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
5. Final Inspection		
Dimensions		
Proper stone diaphragm		
Proper outlet		
Soil/ filter bed permeability testing		
Effective stand of vegetation and stabilization		
Construction generated sediments removed		
Contributing watershed stabilized before flow is diverted to the practice		

Comments:

Actions to be Taken:

Open Channel 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 location staked out		
2. Excavation		
Size and location		
Side slope stable		
Soil permeability		
Groundwater / bedrock		
Lateral slopes completely level		
Longitudinal slopes within design range		
Excavation does not compact subsoils		
3. Check dams		
Dimensions		
Spacing		
Materials		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
4. Structural Components		
Underdrain installed correctly		
Inflow installed correctly		
Pretreatment devices installed		
5. Vegetation		
Complies with planting specifications		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
6. Final inspection		
Dimensions		
Check dams		
Proper outlet		
Effective stand of vegetation and stabilization		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

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 _____ Corrugated pipe _____ Masonry _____ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels 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 a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve 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 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 Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species 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:

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Open Channel 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		
2. Check Dams or Energy Dissipators (Annual, After Major Storms)		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
3. Vegetation (Monthly)		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
4. Dewatering (Monthly)		
Dewaters between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Sediment deposition (Annual)		
Clean of sediment		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion		

Comments:

Actions to be Taken:

CONSTRUCTION SITE INSPECTION AND MAINTENANCE LOG BOOK

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

SAMPLE CONSTRUCTION SITE LOG BOOK

Table of Contents

I. **PRE-CONSTRUCTION MEETING DOCUMENTS**

Project Name _____

Permit No. _____ **Date of Authorization** _____

Name of Operator _____

Prime Contractor _____

a. **Preamble to Site Assessment and Inspections**

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified inspector[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization[3] 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. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 Refer to "Qualified Inspector" inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_____
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Access

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page _____
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

II. **CONSTRUCTION DURATION INSPECTIONS**

a. **Directions:**

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)	**Date of Inspection**
Qualified Inspector (print name)	**Qualified Inspector Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions at the outfalls?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease at the outfalls?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA
[ ] [ ] [ ] Is construction site litter, debris and spoils appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

3. Stabilized Construction Access

Yes No NA
[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

Runoff Control Practices (continued)

2. Flow Spreader

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Silt Fence and Linear Barriers

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

2. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated; Filter Sock or Manufactured practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Manufactured insert fabric is free of tears and punctures.
[ ] [ ] [ ] Filter Sock is not torn or flattened and fill material is contained within the mesh sock.

Sediment accumulation ___% of design capacity.

3. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
[ ] [ ] [ ] Sediment trap slopes and disturbed areas are stabilized.

Sediment accumulation is ___% of design capacity.

4. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
[ ] [ ] [ ] Sediment basin dewatering pool is dewatering at appropriate rate.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. All practices shall be maintained in accordance with their respective standards.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

Appendix F

WQv Areas Maps; Pre and Post Developed
Drainage Basin Map

WATER QUALITY TABLE

WATER QUALITY AREA #	AREA COLOR	TOTAL TRIBUTARY AREA (AC.)	PROPOSED IMPERVIOUS AREA (AC.)	PROPOSED WATER QUALITY PRACTICE
1		4.1	1.2	BIORETENTION / STREET TREES
2		5.3	1.9	BIORETENTION / STREET TREES
3		5.2	1.65	BIORETENTION / STREET TREES
4		4	1.2	BIORETENTION / STREET TREES
5		0.5	0.32	DRY SWALE

LEGEND

- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- MINIMUM SETBACK LINE
- EXISTNG WETLANDS LINE
- EXISTING STONEWALL
- EXISTING WIRE FENCE
- EXISTING OVER HEAD UTILITIES
- USDA SOILS BOUNDARY
- EXISTING TREELINE
- EXISTING EDGE OF PAVEMENT
- PROPOSED SILT FENCE
- PROPOSED SWALE

VILLAGE VIEW CLUSTER SUBDIVISION

VILLAGE OF WARWICK,
ORANGE COUNTY, NEW YORK

PROJECT TITLE

WATER QUALITY VOLUME AREAS

DRAWING TITLE

KIRK ROTHER, P.E.
CONSULTING ENGINEER, PLLC
5 St. Stephens Lane, Warwick, NY 10990
(845) 988-0620

DATE	REVISIONS
09-13-19	REVISED DESIGN
03-01-18	INITIAL PREPARATION

KIRK ROTHER, P.E. N.Y.S. LIC. NO. 079053 DATE

D.O.T. SHEET #	D.E.C.. SHEET #	O.C.H.D. SHEET #	SHEET #
N.A.	N.A.	N.A.	1 OF 1
CAD # 04170 CLUS 1-17	PROJECT # 04170.0	SCALE AS SHOWN	

PRE DEVELOPED
DRAINAGE ANALYSIS

SCALE: 1" = 150'

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

LEGEND

EXISTING PROPERTY LINE
PROPOSED PROPERTY LINE
10' CONTOUR LINE
2' CONTOUR LINE
DRAINAGE TRIBUTARY AREA

VILLAGE VIEW
CLUSTER SUBDIVISION

VILLAGE OF WARWICK,
ORANGE COUNTY, NEW YORK

PROJECT TITLE

PRE DEVELOPED
DRAINAGE ANALYSIS
MAP

DRAWING TITLE

KIRK ROTHER, P.E.
CONSULTING ENGINEER, PLLC
5 St. Stephens Lane, Warwick, NY 10990
(845) 988-0620

05-29-18	GENERAL REVISIONS
02-27-18	INITIAL PREPARATION
DATE	REVISIONS

KIRK ROTHER, P.E. N.Y.S. LIC. NO. 079053 DATE

D.O.T. SHEET #	D.E.C.. SHEET #	O.C.H.D. SHEET #	SHEET #
N.A.	N.A.	N.A.	1 OF 1
CAD # 04170 CLUS 18	PROJECT # 04170.0	SCALE AS SHOWN	

NORTH

BASIN 1A
12.91 AC.

BASIN 1
19.46 AC.

BASIN 2A
12.91 AC.

BASIN 2B
2.97 AC.

BASIN 2C
2.97 AC.

BASIN 3A
4.70 AC.

BASIN 3B
7.41 AC.

BASIN 3C
7.24 AC.

BASIN 3D
22.31 AC.

BASIN 4
6.26 AC.

BASIN 5
5.09 AC.

BASIN 6
49.75 AC.

POND 1A

POND 2A

POND 3A

POND 3D

DIVERSION SWALE

BIORETENTION AREA

TC PATH

REACH S1

REACH S2

REACH S3

REACH S4

REACH 1E

REACH 2E

REACH 3E

APPROX. 15" HDPE

ANALYSIS POINT

LEGEND

- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- 10' CONTOUR LINE (700)
- 2' CONTOUR LINE
- PROPOSED CONTOUR LINE (700)
- DRAINAGE TRIBUTARY AREA

POST DEVELOPED DRAINAGE ANALYSIS

SCALE: 1" = 150'

GRAPHIC SCALE

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

VILLAGE VIEW CLUSTER SUBDIVISION

VILLAGE OF WARWICK,
ORANGE COUNTY, NEW YORK

PROJECT TITLE

POST DEVELOPED DRAINAGE ANALYSIS MAP

DRAWING TITLE

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N.A.	N.A.	N.A.	1 OF 1
CAD # 04170 CLUS 18	PROJECT # 04170.0	SCALE AS SHOWN	