



Stormwater Analysis & Report

For

**Age Qualified Village
Pembroke Country Club
Dwelley St., Hazelwood Dr., West Elm St.
Pembroke, MA**

**August 8, 2023
Revised: December 12, 2023**

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1.1 EXECUTIVE SUMMARY

In accordance with the provisions of the Town of Pembroke Zoning Bylaws, the Applicant, Weathervane at Pembroke Country Club, LLC (Weathervane) proposes to develop an Age Qualified Village Cluster Development for individuals 55 years of age or older, on the subject property with frontage on Dwelley Street, Hazelwood Drive and West Elm Street in Pembroke, MA.

The property consists of 244 acres of which the majority is an existing 18-hole golf course. In addition to the golf course, The Applicant, has acquired surrounding residential properties, which have since been combined into one parcel through an ANR dated November 8, 2021. The site is surrounded by residential properties, bound to the north by Dwelley Street, West Elm Street to the east, residential properties to the south, and Hazelwood Drive and The Town of Hanson, to the west. The site topography varies across the site as it is an existing golf course, elevations vary across the site from a high at Dwelley Street of 132+/- and to a low elevation of 34+/- at West Elm Street. The property's existing main entrance to the golf course is located on West Elm Street which the project proposes to maintain, there is also a maintenance access off Dwelley Street which is proposed to become an entrance for residents only. In addition, two residential entrances are proposed off of Dwelley Street and Hazelwood Drive.

The site is currently utilized as an active 18-hole golf course with two clubhouse/function rooms, a pro shop, and maintenance building located off of Dwelley Street. Gravel cart paths are maintained throughout the property. The site consists of 244 acres in total, all of which are located within the Residential District- A (RA). The proposed project is utilizing the Age Qualified Cluster Developments bylaw which is allowed under Section V-13 of the Pembroke Zoning Bylaws.

1.2 APPROVALS BEING SOUGHT

The Stormwater Report is being filed with the Pembroke Planning Board as part of the Site Plan and Special Permit application as well as with the Pembroke Conservation Commission (PCC) and the Massachusetts Department of Environmental Protection (MA DEP) as part of the Notice of Intent Application and Groundwater Discharge permit. The Applicant requests that the permit approvals encompass the entirety of the scope listed below, as shown in the accompanying plan set:

- One-hundred sixty-two (162), single-family residential units, an eight (8) unit multifamily and two (2) existing residential homes.
- A reconfigured 18-hole golf course with gravel cart paths.
- The project proposes several amenities to the golf course including a clubhouse, a restaurant/tavern, function space, pro shop, guest suites, offices and golf cart storage as well as a driving range.

- Supporting site infrastructure includes a stormwater management system, utilities, pavement, and landscaping.

1.3 FEMA – FLOODPLAIN SUMMARY

The entire property is shown on FEMA Flood Insurance Rate Map Panel 25023C0204K dated 7/6/2021. The site is located within Zone X, which is defined as areas determined to be outside the 500-year floodplain and determined to be outside the 1% and 0.2% annual chance floodplain.

1.4 ON-SITE SOIL INFORMATION

The Natural Resource Conservation Service (NRCS) maps the on-site soil as many different types of soil textures and Hydrologic Soil Groups. Please refer to Section 6 of the Stormwater Report for the complete NRCS Soil Report.

Significant and thorough soil explorations have been performed on the site. Test pits were performed by Crocker Design Group in January of 2020, October 2021, April 2022, January 2023, and July 2023. The test pits indicated that the subsurface soil conditions vary throughout the site but consist of mostly loamy sands and sands. Recharge BMP's have been sized and designed based on the soil testing done at each specific location. In locations where test pits have not been dug the NRCS map was used a conservative infiltration rate was utilized. All test pit information is compiled in Section 6, and on the test pit plan included in the Site Plans dated 8/7/23.

1.5 WETLANDS AND ENVIRONMENTAL RESOURCE AREAS ANALYSIS

There were several resource areas delineated within the vicinity of the project including Bordering Vegetated Wetlands (BVW), Isolated Vegetated Wetlands (IVW) and Inland Bank. The project is also located within and/or close to several critical areas including Outstanding Resource Waters (Public Supply Watershed, Zone A, Zone II and a Scenic/Protected River) and as a result, the proposed project is designed to treat 1.0 inches of runoff, where applicable. The site does not contain any areas designated as estimated or priority endangered species habitat, certified vernal pools, or Areas of Critical Environmental Concern. The site does not contain areas classified as Estimated Habitats of Rare Wildlife by the Natural Heritage and Endangered Species Program of the Division of Fisheries and Wildlife.

The following is a summary of the buffer and protection zones that portions of the project are proposed within:

1) 100' Bordering Vegetated Wetland (BVW) Buffer (310 CMR 10.55)

There are several wetland series located throughout the site consisting of mainly BVW's, one IVW and a section of inland bank, all of which can be seen on the ORAD approved on October 12, 2021.

Portions of the proposed improvements are located within the 100' BVW buffer which will be addressed further during the NOI process.

2) 25' Wetland Buffer

There is approximately 9,797+/- SF of disturbance within the 25' buffer located at the entrance of Hazelwood Wetland Series R and H. The disturbance in the buffer is due to the grading of the roadway.

1.6 OBJECTIVE OF CALCULATIONS

The purpose of this stormwater analysis is to examine the stormwater runoff from the proposed site based upon the Massachusetts Department of Environmental Protection Stormwater Management Policy and the applicable provisions of the Town of Pembroke Bylaws and regulations.

The goal of the stormwater management system design on this project is to provide improved water quality, reduce post-development peak runoff rates below pre-development peak flow rates, maximize the opportunities for recharge and infiltration, and protect the surrounding area from any potential flooding and/or environmental impacts associated with the unmitigated condition. The following stormwater hydrology calculations were performed using the 2-year, 10-year, 25-year, and 100-year frequency, Type III, 24-hour SCS design storms and were compared for both pre-development and post-development conditions. The 2, 10, and 100 were evaluated to demonstrate the proposed peak rates of discharge do not exceed pre-development peak rates. The 10-year storm was also utilized as the design criteria for the stormwater collection system to verify that the hydraulic grade line remains within the pipes during a 10-year storm and that the 100-year storm analysis does not exceed the grate elevations at catch basins and manholes.

1.7 METHODOLOGY

We utilized the latest version of Hydro CAD for the overall stormwater hydrology/routing analysis to assess and compare peak rates of runoff at the various discharge points from the subject property. We then utilized the Hydraflow Storm Sewers Extension Pack through AutoCAD Civil 3D to analyze the pipe design and to select appropriate pipe sizing.

Refer to Section 1.3 – Hydrocad Model, which includes the detailed print-out of the HydroCAD Model Reports for the 2, 10, 25, and 100-year storms as well as Section 7 – Hydraulic Pipe Analysis / Sizing, which includes the Hydraflow reports for the 10 and 100-year storms for pipe capacity analysis and sizing.

1.8 SITE HYDROLOGY

Existing Conditions

Please refer to the attached Existing Conditions Watershed Analysis Plan. The property has been divided into numerous subcatchment areas based on the existing site topography and flow paths. These subcatchments then combine where appropriate from an analysis standpoint where they discharge toward wetland resource areas, adjacent rights-of-way and abutting residential and commercial properties. Each subcatchment area has been analyzed and assigned an appropriate Curve Number to represent the existing vegetative cover and underlying soils conditions. Times of concentration have been computed and the extent of pervious vs. impervious cover computed. This data was then input into HydroCAD to determine peak rates of runoff at the various design points (identified as “Points of Analysis”) which provide the locations for which to compare existing versus proposed conditions to document compliance that the peak rates have been reduced in the regulatory storm events as required. A Summary table is provided in the Hydrology Model Results and Conclusions Section below.

Proposed Conditions

Please refer to the attached Proposed Conditions Watershed Analysis Plan. The proposed project has been divided into numerous subcatchment areas and the various stormwater detention and infiltration BMPs have been modeled. Appropriate Times of Concentration and Curve Numbers have been assigned for each catchment area. A Summary table is provided in the Hydrology Model Results and Conclusions Section below.

For the purposes of the design shown the following assumptions were made. In the denser portion of the development which includes homes and drives on the main roadway of Weathervane Drive, it was assumed in HydroCAD that the development would be 38% impervious within the specific watersheds. This was taken as a conservative approach to calculating CNs for the potential of different building footprint during development, patios, and other associated impervious areas to residential areas that could not be anticipated at this time. Typical Weathervane homes vary between 16,00SF and 2,400 SF in size. For the peripheral developments (Fairway Landing and Mulligan Drive) the CN numbers were calculated in more detail due to the smaller size of these proposed developments, it was assumed that the largest building footprint would be chosen (2,500 SF) and a conservative average for the driveway lengths to conservatively calculate impervious areas.

Hydrology Model Results and Conclusions

The goal of the stormwater design for the project is to fully comply with the Massachusetts Stormwater Policy and the Town of Pembroke Regulations. This analysis confirms that the stormwater system is receiving proper treatment and peak rates of runoff have been reduced to below pre-development rates using stormwater Best Management Practices including deep sump hooded catch basins, grass swales, rain garden, CDS Water Quality Units, Infiltration Basins, Detention Basins, and Underground Infiltration Systems. The discharge points from the site have been engineered to employ properly designed rip-rap splash pads to further reduce discharge velocities and to spread out the discharge to prevent future point discharge erosion situation. Water quality units have been properly sized in accordance with MADEP guidance for water quality flows.

The results of the pre- and post-development hydrology calculations provided in Section 3 are summarized in the following table:

PEAK RATE OF DISCHARGE COMPARISON												
Point of Analysis	2-Year Storm (cfs)			10-Year Storm (cfs)			25-Year Storm (cfs)			100-Year Storm (cfs)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
1	2.29	1.79	-0.50	11.44	6.28	-5.16	18.95	13.60	-5.35	31.96	31.78	-0.18
2	11.26	11.18	-0.08	36.88	32.00	-4.88	56.33	48.51	-7.82	89.51	79.50	-10.01
3	10.21	10.02	-0.19	27.55	25.74	-1.81	40.08	36.99	-3.09	60.93	55.59	-5.34
4	0.01	0.01	0.00	0.40	0.24	-0.16	1.14	0.51	-0.63	2.57	1.01	-1.56
5	2.23	2.22	-0.01	9.94	6.28	-3.66	16.41	9.44	-6.97	27.72	14.97	-12.75
6	5.89	5.85	-0.04	16.46	14.60	-1.86	24.16	20.91	-3.25	37.02	31.18	-5.84
7	2.11	2.00	-0.11	10.30	9.77	-0.53	17.07	16.19	-0.88	28.94	27.44	-1.50
8	0.82	0.82	0.00	3.49	3.39	-0.10	6.35	6.05	-0.30	10.24	10.06	-0.18
WEST ELM ST.	0.68	0.50	-0.18	6.14	5.74	-0.40	11.18	10.40	-0.78	20.88	15.24	-5.64
11	0.03	0.00	-0.03	0.61	0.04	-0.57	2.10	0.17	-1.93	5.88	0.86	-5.02
12	0.33	0.03	-0.30	4.66	0.87	-3.79	10.53	2.45	-8.08	22.22	5.56	-16.66
13	0.04	0.04	0.00	0.66	0.66	0.00	1.35	1.35	0.00	2.62	2.62	0.00
14	6.12	5.99	-0.13	24.92	24.38	-0.54	39.79	38.94	-0.85	65.47	64.06	-1.41
15	0.22	0.21	-0.01	2.46	2.03	-0.43	4.67	3.38	-1.29	8.66	5.71	-2.95

Table 1.8.1

As can be seen based on the above tables, the peak stormwater runoff generated by the development are the same or less in post development conditions versus the existing conditions in all cases. Refer to Section 3 for copies of the HydroCAD Analysis that document the above results as well as the Existing Conditions Watershed Plan attached.

1.9 STORMWATER MANAGEMENT

The following section describes each of the ten (10) Massachusetts Stormwater Management Standards and describes how the project complies with each.

Standard 1: No New Untreated Discharges – No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The project has been designed so that the large majority of proposed impervious areas (including the building roof and paved parking/driveway areas) shall be collected and passed through the proposed drainage system for treatment prior to discharge. There is a small amount of roof runoff that is not directed to a drainage system due to restrictions imposed by site topography.

Standard 2: Peak Rate Attenuation – Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

As outlined in Table 1.8.1, the development of the site and the proposed stormwater management system, have been designed so that the post-development peak rates of runoff are equal to or below pre-development conditions for the 2-, 10-, 25-, and 100- year storm events.

Standard 3: Recharge – Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The stormwater system has been designed to comply with the recharge requirements for the MA Stormwater Management Regulations. Refer to Section 4 for a summary of the stormwater recharge calculations.

Standard 4: Water Quality – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

The project utilizes deep sump hooded catch basins, CDS Water Quality Units, grass swales, subsurface infiltration systems, sediment forebays, rain gardens,

detention basins and infiltration basins. Please refer to Section 4 of this report for calculations documenting required and provided water quality volumes.

Standard 5: Land Uses with Higher Potential Pollutant Loads – For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

This project is not considered a LUHPPL. This standard does not apply.

Standard 6: Critical Areas – Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

A portion of the site is located within the Water Resource and Groundwater Protection District and Outstanding Resource Waters which is considered a critical area, and as a result, the proposed project is designed to treat 1.0 inches of runoff.

Standard 7: Redevelopment and Other Projects Subject to the Standards only to the maximum extent practicable – A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

This standard is not applicable.

Standard 8: Construction Period Pollution Prevention Plan and Erosion and Sedimentation Control – A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

An Erosion and Sedimentation Controls Plan has been incorporated into the Site Plans.

Standard 9: Operation and Maintenance Plan – A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

A long-term Operation and Maintenance Plan has been incorporated herein. See Section 5.

Standard 10: Prohibition of Illicit Discharges – All illicit discharges to the stormwater management system are prohibited.

An Illicit Discharge Compliance Statement is included as required.

1.10 BEST MANAGEMENT PRACTICES (BMP'S)

A system of deep sump hooded catch basins, subsurface infiltration systems and infiltration basins will be used to treat stormwater runoff on the site. See Section 4.5: Total Suspended Solids (TSS) Calculations.

1.11 PIPE SIZING

Refer to Section 7 for the output results from the Hydraflow Sewer Storm Sewers Extension for AutoCAD Civil 3D. Hydraflow utilized the Rational Method. The tributary area for each inlet/subcatchment area has been computed along with pipe length, slope and friction coefficient. The Rational Method is then utilized to determine the hydraulic grade line. For design purposes, this approach was used to size the pipes such that the 10-year storm event is contained within the pipe. The 100-year storm was then checked to confirm the hydraulic grade line for the pipe network does not exceed the rim elevations of the drainage structures. In addition, pipe velocities were checked to be within the range of 2fps to 10 fps flowing 1/3 full. Those calculations are included in Section 4.7 herein.

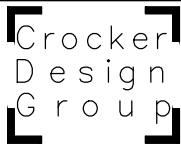
1.12 CONCLUSION

In conclusion, the project has been designed in accordance with the requirements of the MA Stormwater Management Regulations.

1.13 FIGURES

The following pages contain the following accompanying figures:

- FIG 1 SITE LOCUS ORTHOGRAPHIC MAP
- FIG 2 FEMA FLOODPLAIN MAP
- FIG 5 MASSDEP WETLANDS MAP
- FIG 4 SITE LOCUS USGS MAP
- FIG 5 NHESP HABITAT MAP



2 SHARP STREET, UNIT A
HINGHAM, MA 02043

Project
**PEMBROKE
COUNTRY CLUB**

94 WEST ELM ST.
PEMBROKE, MA

Prepared for
**WEATHERVANE AT
PEMBROKE COUNTRY
CLUB LLC**

190 OLD DERBY
STREET

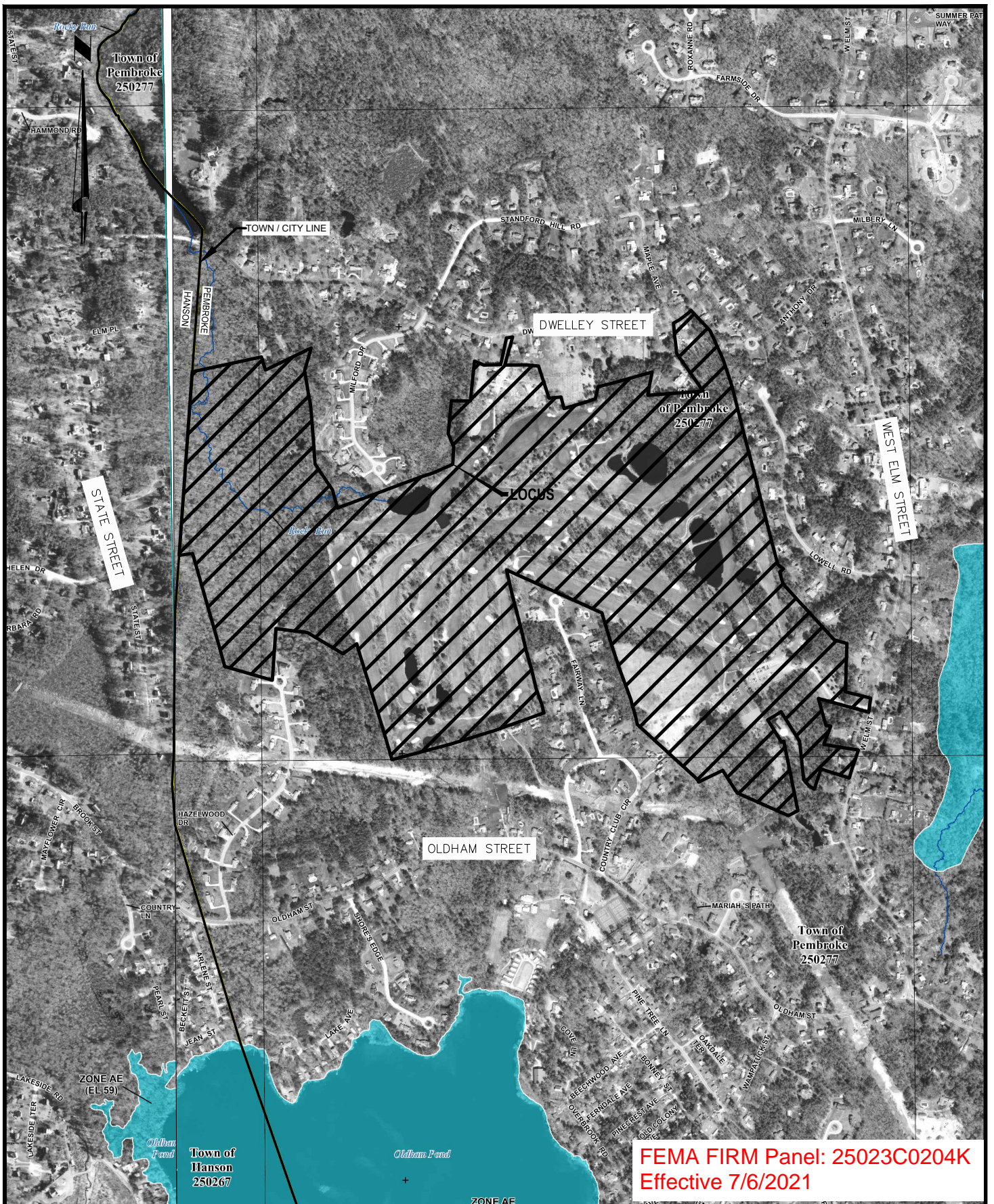
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STREET

Drawing Title
FEMA FLOOD EXHIBIT

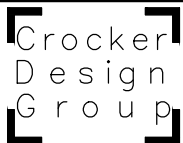
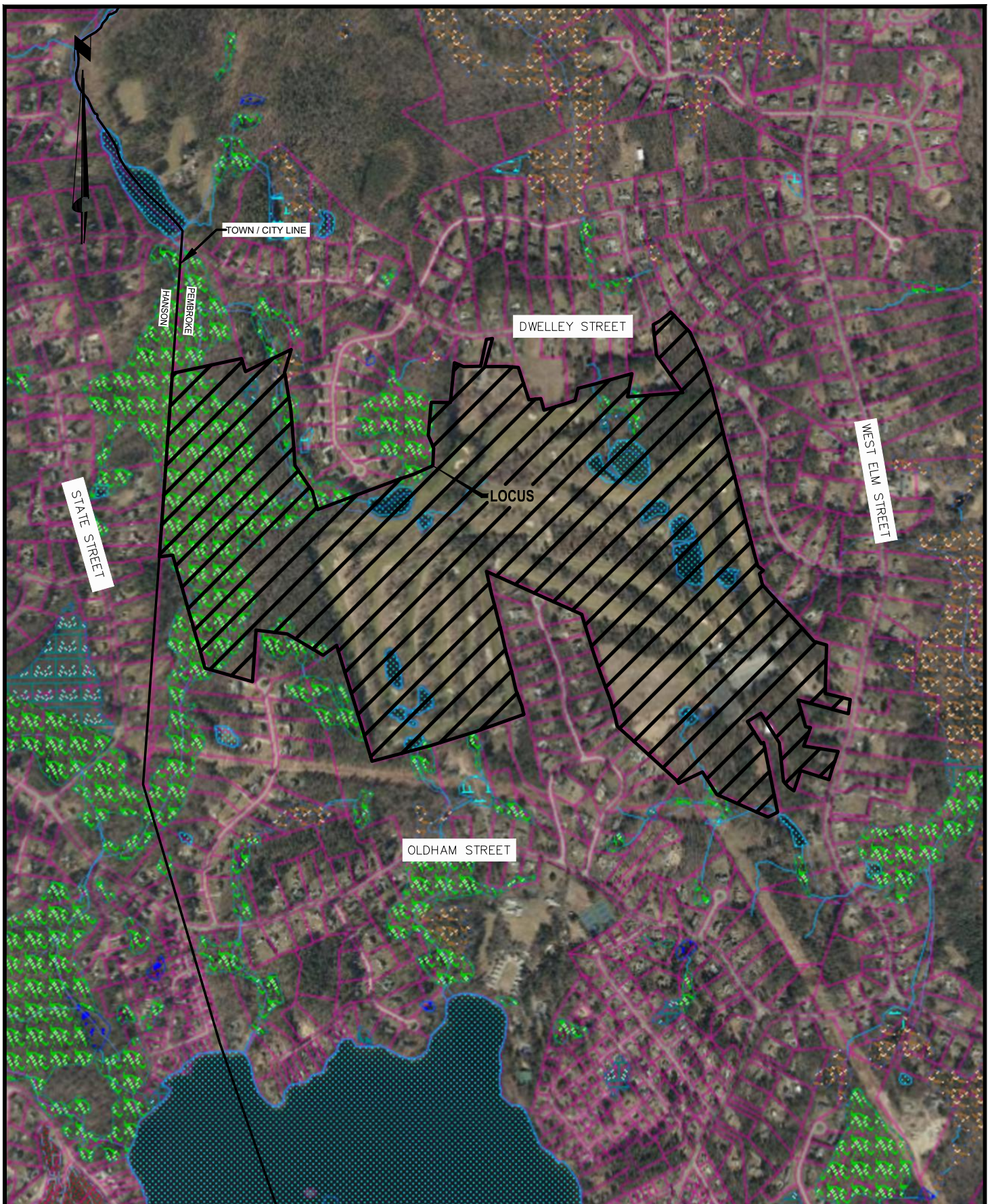
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**WEATHERVANE AT
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CLUB LLC**

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Drawing Title

WETLANDS EXHIBIT

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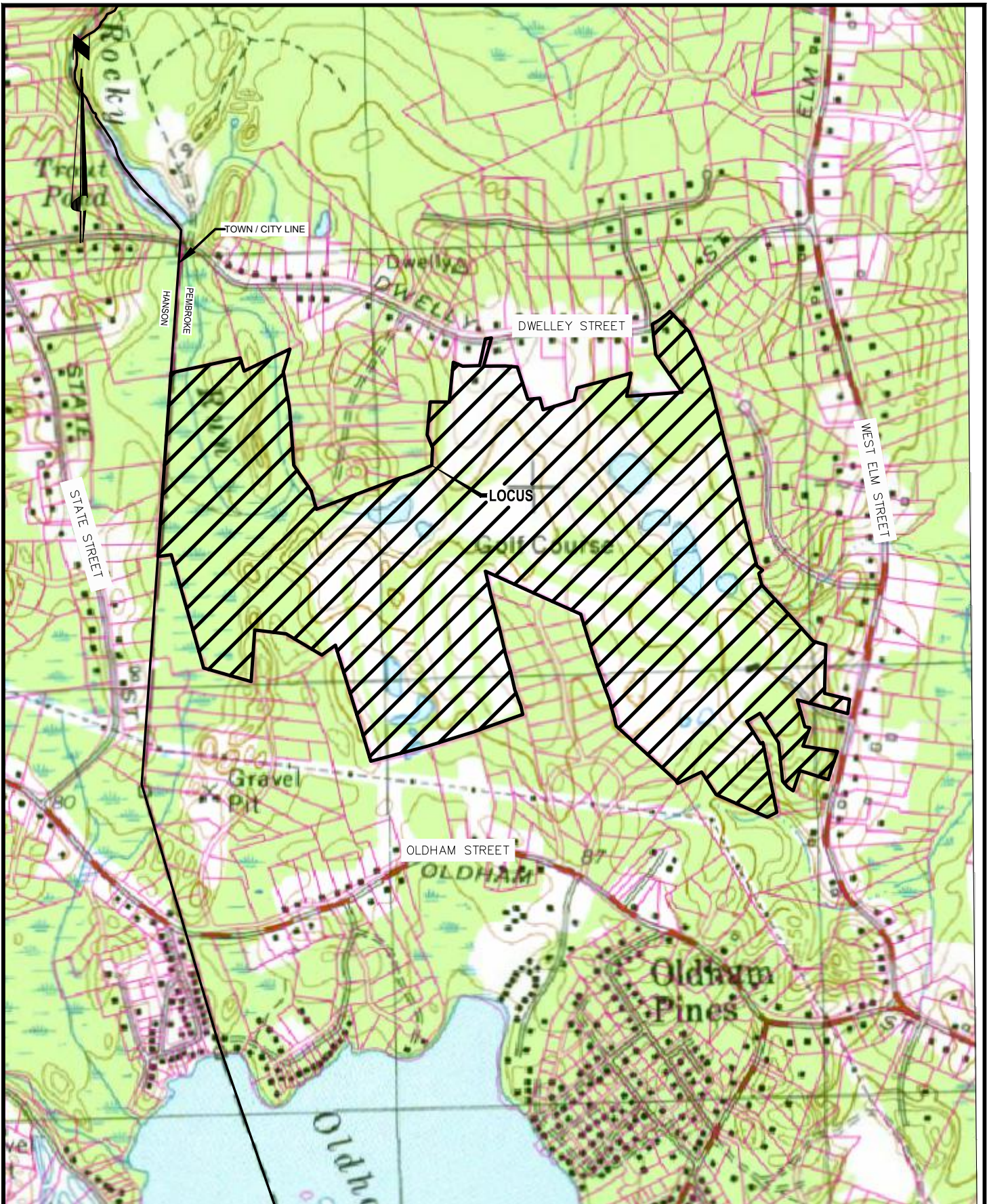
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Drawing Title

USGS EXHIBIT

DATE: 09.21.2022

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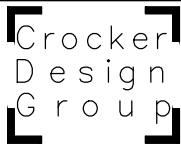
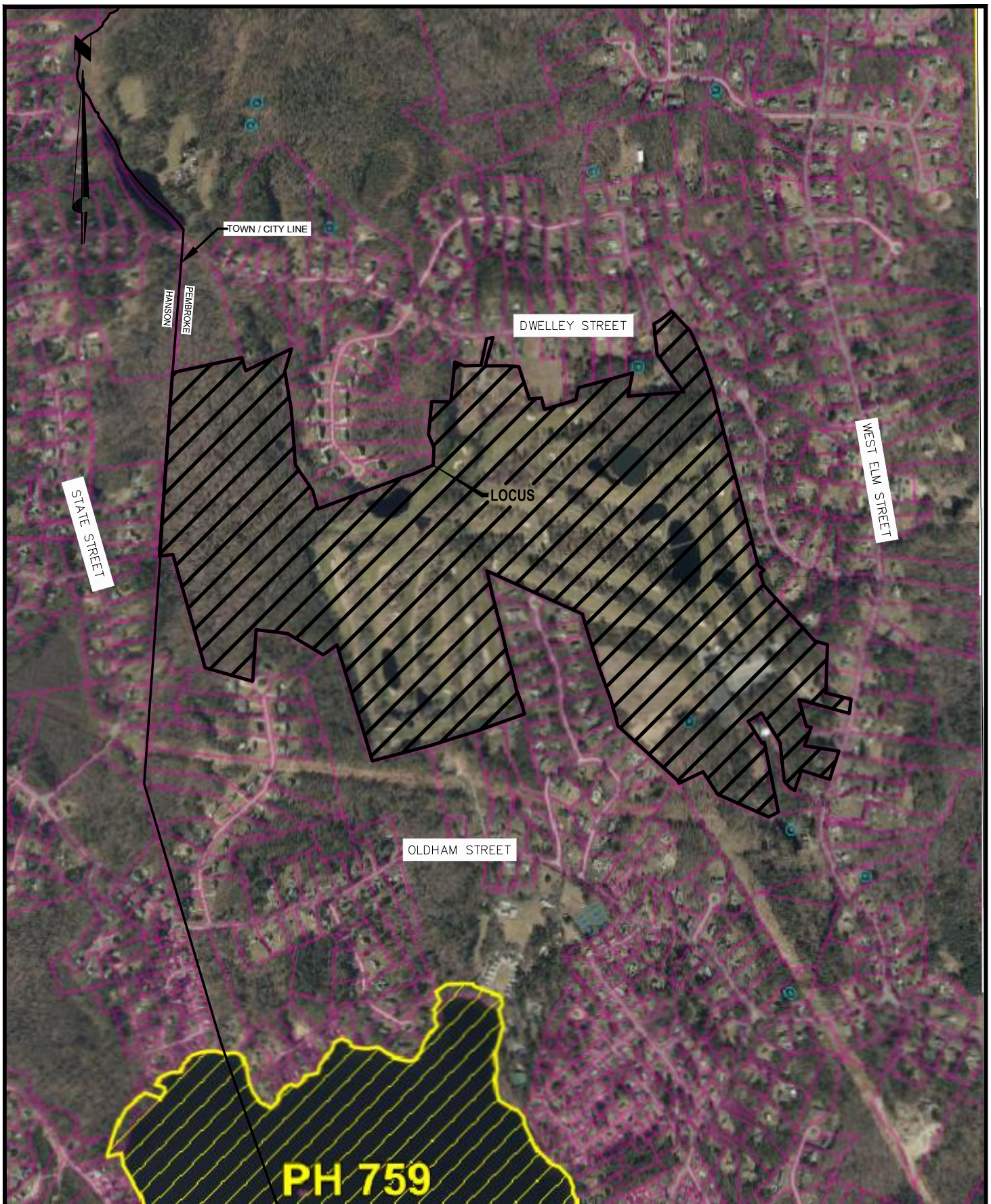
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STREET

Drawing Title
NHESP EXHIBIT

DATE: 09.21.2022 DRAWN: CC

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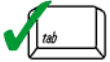
SECTION 2 – STORMWATER CHECKLIST



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

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



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

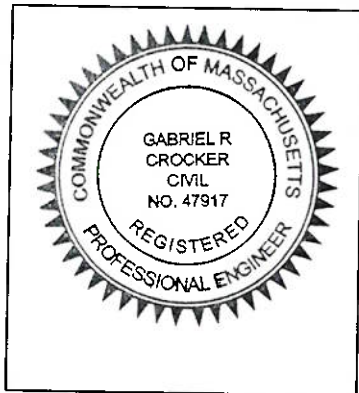
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



[Handwritten Signature]
Signature and Date

12/11/2023

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- ☐ New development
- ☐ Redevelopment
- ☒ Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- ☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - ☐ Static
 - ☒ Simple Dynamic
 - ☐ Dynamic Field¹
- ☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
- ☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- ☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- ☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
 - ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
 - ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- ☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- ☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- ☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- ☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- ☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - ☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - ☐ is within the Zone II or Interim Wellhead Protection Area
 - ☒ is near or to other critical areas
 - ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - ☐ involves runoff from land uses with higher potential pollutant loads.
 - ☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - ☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- ☐ The NPDES Multi-Sector General Permit does **not** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☒ Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- ☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - ☐ Limited Project
 - ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - ☐ Bike Path and/or Foot Path
 - ☐ Redevelopment Project
 - ☒ Redevelopment portion of mix of new and redevelopment.
- ☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- ☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- ☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- ☐ The project is **not** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
 - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
 - ☒ Description and delineation of public safety features;
 - ☒ Estimated operation and maintenance budget; and
 - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

ILLCIT DISCHARGE COMPLIANCE STATEMENT

Standard 10: Massachusetts Stormwater Standards Handbook

Illicit discharges are defined as discharges into waters of the State or municipal separate stormwater system (MS4) that are not entirely comprised of stormwater. Exclusions for non-stormwater discharges into drainage systems include activities or facilities for firefighting, water line flushing, landscape irrigation, uncontaminated groundwater discharge, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, water used to clean residential buildings without detergents, water used for street washing, and flows from riparian habitats/wetlands. These exclusions are subject to change and are under the discretion of the local governing authority.

To the best of our knowledge and professional belief no illicit discharges to the stormwater system, surface waters, or wetland resource areas will remain on the site after construction. We will agree to implement a pollution prevention plan to prevent illicit discharges into the stormwater management system. The design of the site based on the plans entitled "SITE PLANS: AGE QUALIFIED VILLAGE PEMBROKE COUNTRY CLUB FOR WEATHERVANE AT PEMBROKE COUNTRY CLUB, LLC" prepared by Crocker Design Group, 2 Sharp Street, Unit A, Hingham, Massachusetts, show a separation and no direct connection between the stormwater management systems and the wastewater and/ or groundwater on the site. To the maximum extent practicable, the design prevents entry of illicit discharges into the stormwater management system.

Engineer's Name:
(please print)

Crocker R. Crocker

Engineer's Signature:

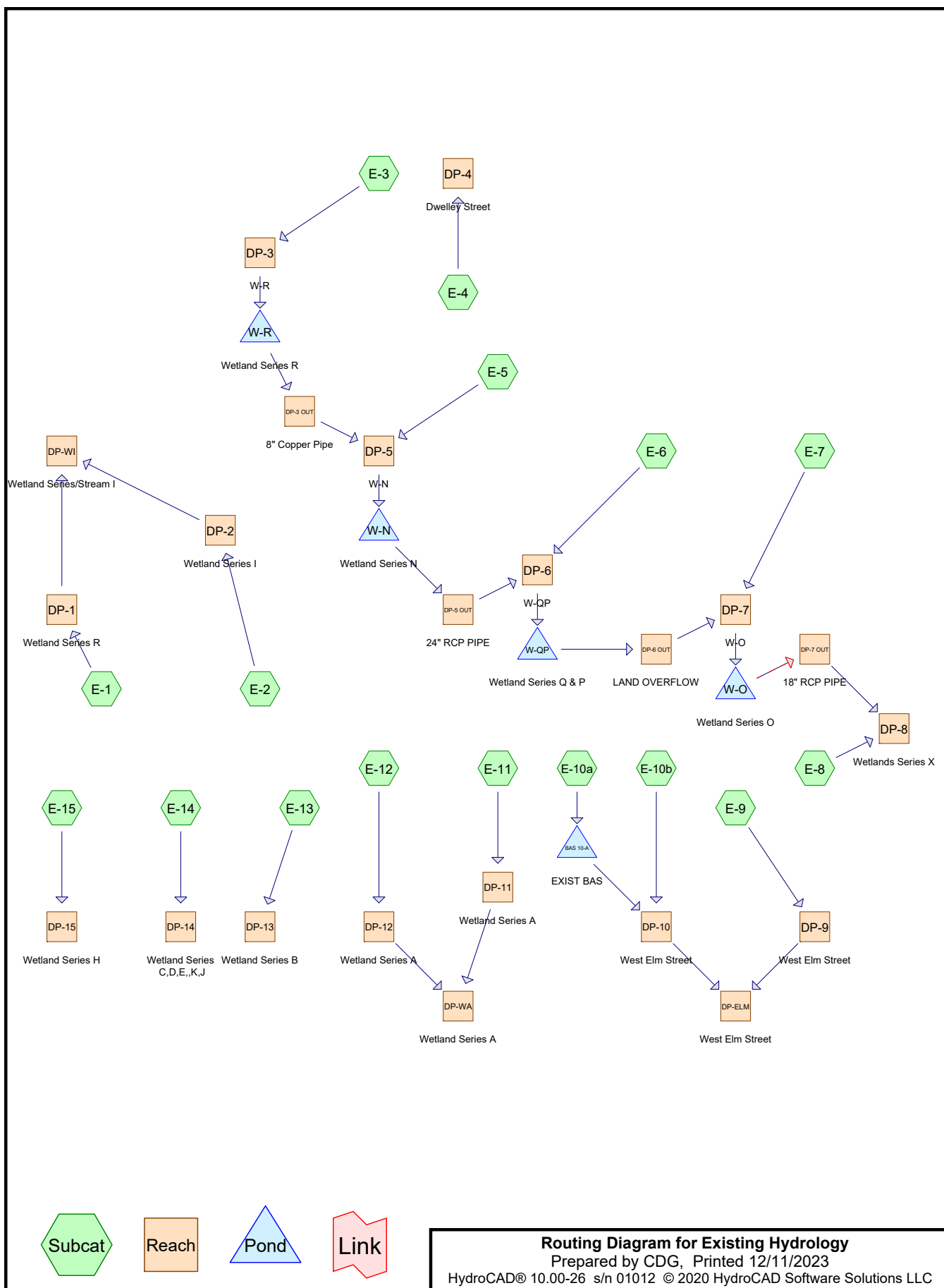


Date:

12/11/2023

Company: Crocker Design Group, LLC.

SECTION 3 – STORMWATER HYDROLOGY MODEL



Existing Hydrology

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.242	39	>75% Grass cover, Good, HSG A (E-10b, E-11, E-3, E-4, E-5, E-8, E-9)
12.602	61	>75% Grass cover, Good, HSG B (E-1, E-15, E-3, E-5, E-8)
7.229	80	>75% Grass cover, Good, HSG D (E-3, E-5, E-6, E-7)
3.620	98	Paved parking, HSG A (E-11, E-9)
2.000	98	Paved parking, HSG B (E-12, E-7, E-8)
0.401	98	Paved parking, HSG D (E-2)
0.114	98	ROOF AND Paved parking, HSG A (E-10b)
0.363	98	Roof and Pavement (E-3)
2.447	98	WETLAND, 0% imp, HSG D (E-5, E-6)
0.540	98	Water Surface, 0% imp, HSG A (E-7, E-8)
1.223	98	Wetland, HSG D (E-2)
17.227	30	Woods, Good, HSG A (E-10a, E-10b, E-11, E-15, E-3, E-4, E-5, E-8, E-9)
19.438	55	Woods, Good, HSG B (E-1, E-11, E-15, E-3, E-4, E-5, E-8)
2.652	77	Woods, Good, HSG D (E-15, E-3)
30.009	32	Woods/grass comb., Good, HSG A (E-12, E-13, E-14, E-2, E-6, E-7)
48.375	58	Woods/grass comb., Good, HSG B (E-12, E-14, E-2, E-6, E-7)
20.896	72	Woods/grass comb., Good, HSG C (E-13, E-14, E-2)
14.532	79	Woods/grass comb., Good, HSG D (E-12, E-2)
0.091	98	roof and pavement (E-4)
3.891	98	wetland, HSG D (E-3)
194.893	58	TOTAL AREA

Existing Hydrology

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Page 3

Summary for Subcatchment E-1:

Runoff = 2.29 cfs @ 12.27 hrs, Volume= 0.381 af, Depth= 0.38"

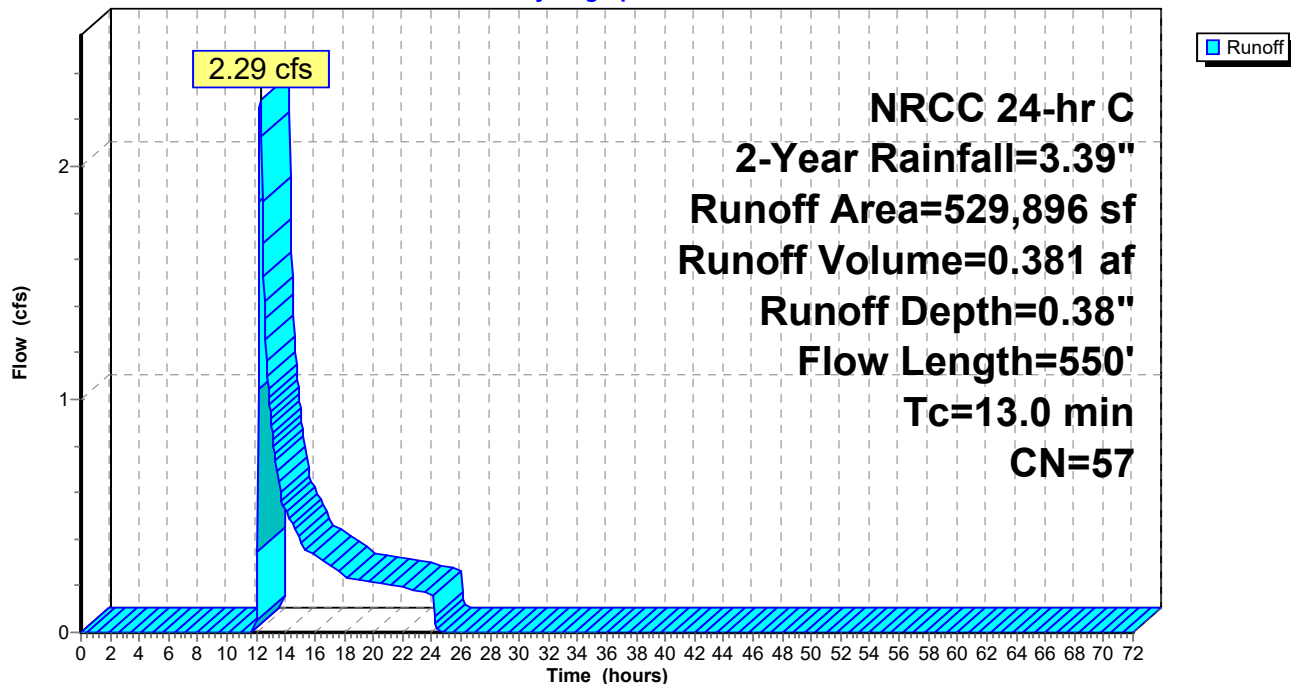
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
156,466	61	>75% Grass cover, Good, HSG B
373,430	55	Woods, Good, HSG B
529,896	57	Weighted Average
529,896		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
7.5	500	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	550	Total			

Subcatchment E-1:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-10a:

[45] Hint: Runoff=Zero

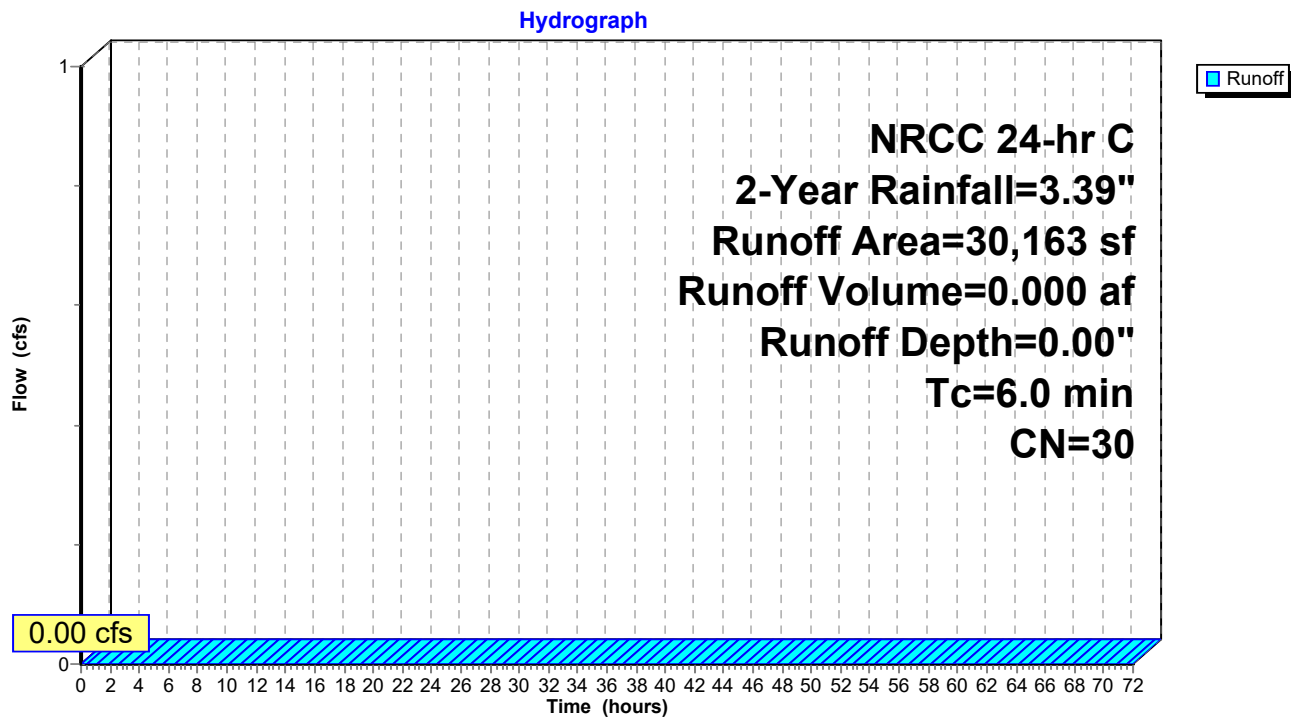
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
30,163	30	Woods, Good, HSG A
30,163		100.00% Pervious Area

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

Subcatchment E-10a:



Existing Hydrology

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Summary for Subcatchment E-10b:

[45] Hint: Runoff=Zero

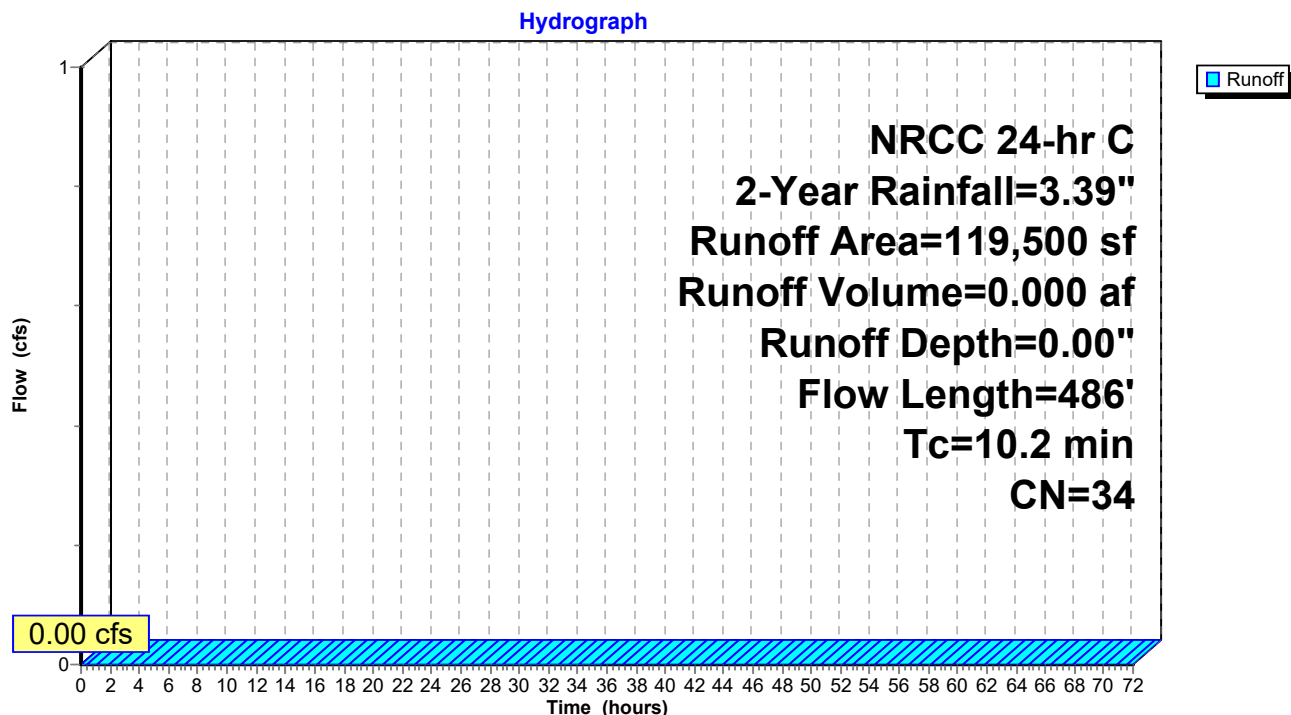
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	4,986	98	ROOF AND Paved parking, HSG A
	104,514	30	Woods, Good, HSG A
	10,000	39	>75% Grass cover, Good, HSG A
	119,500	34	Weighted Average
	114,514		95.83% Pervious Area
	4,986		4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
2.7	286	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
10.2	486	Total			

Subcatchment E-10b:



Existing Hydrology

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Summary for Subcatchment E-11:

Runoff = 0.03 cfs @ 21.03 hrs, Volume= 0.021 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
17,473	98	Paved parking, HSG A
88,168	55	Woods, Good, HSG B
139,460	30	Woods, Good, HSG A
31,226	39	>75% Grass cover, Good, HSG A
276,327	43	Weighted Average
258,854		93.68% Pervious Area
17,473		6.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.5	142	0.1046	1.62		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
3.4	316	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
0.5	28	0.0423	1.03		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
17.0	536	Total			

Existing Hydrology

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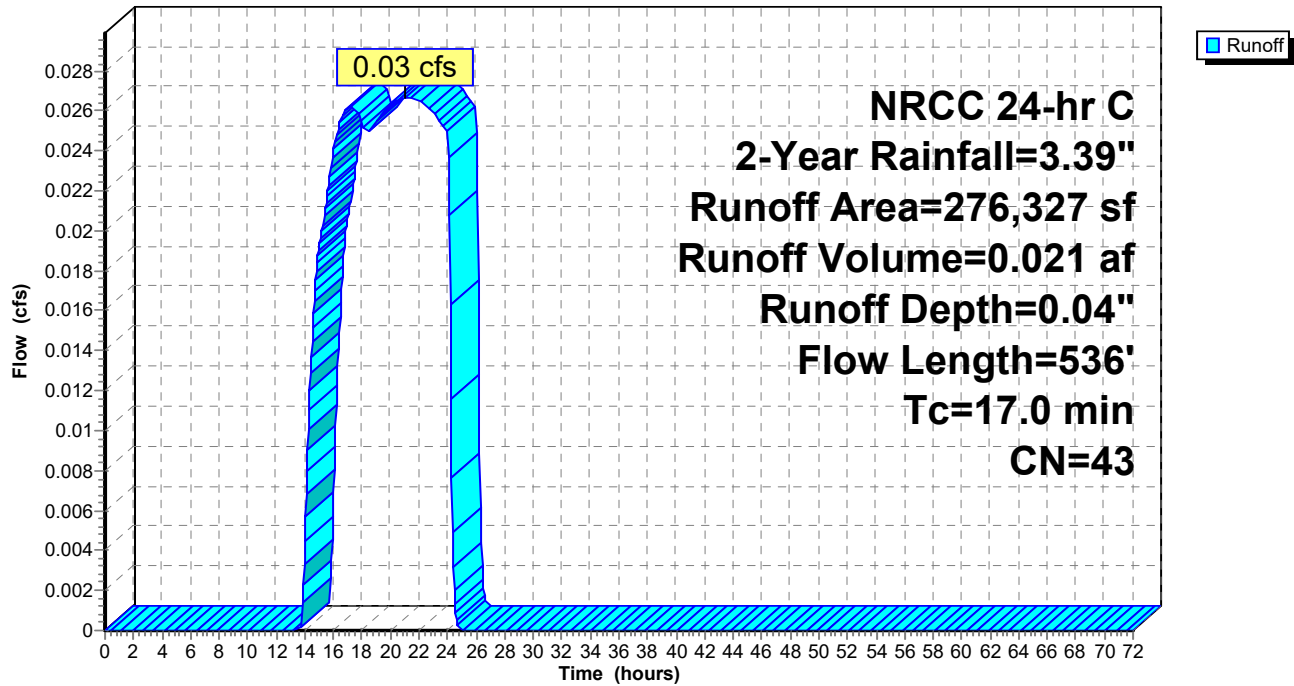
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment E-11:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-12:

Runoff = 0.33 cfs @ 13.35 hrs, Volume= 0.192 af, Depth= 0.12"

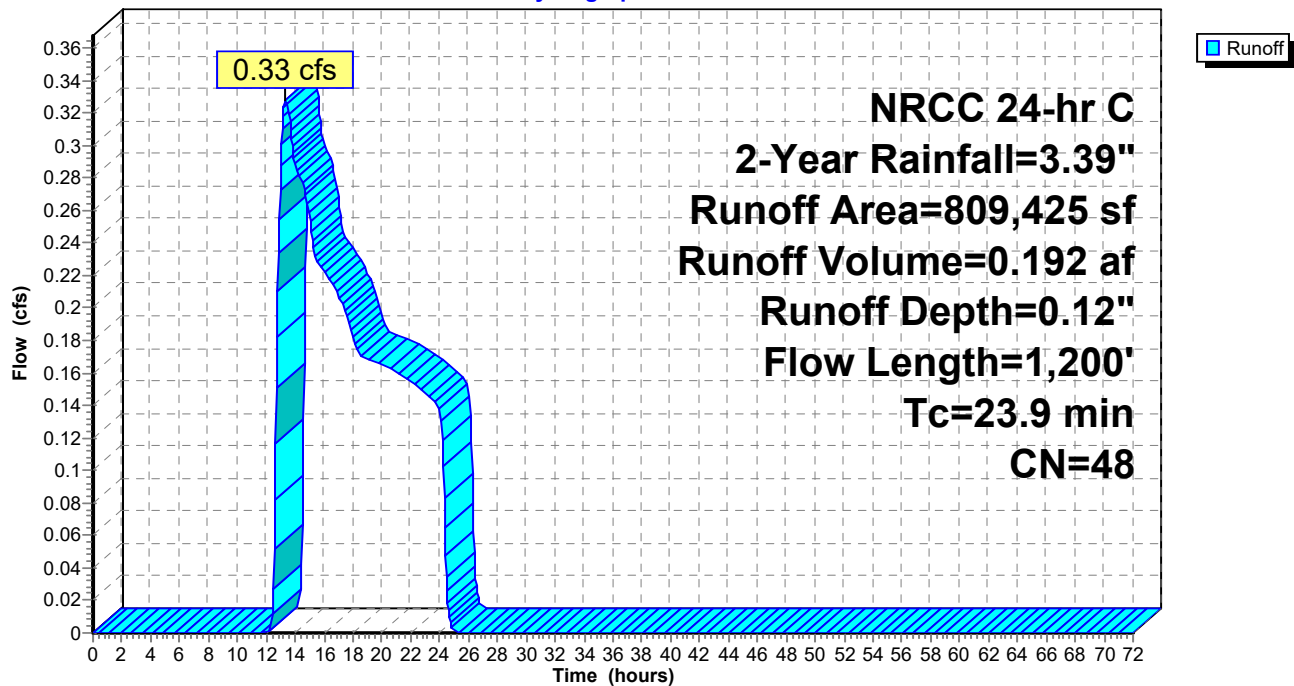
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
46,376	98	Paved parking, HSG B
382,602	32	Woods/grass comb., Good, HSG A
379,547	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
809,425	48	Weighted Average
763,049		94.27% Pervious Area
46,376		5.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
18.5	1,100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,200	Total			

Subcatchment E-12:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-13:

Runoff = 0.04 cfs @ 12.60 hrs, Volume= 0.018 af, Depth= 0.17"

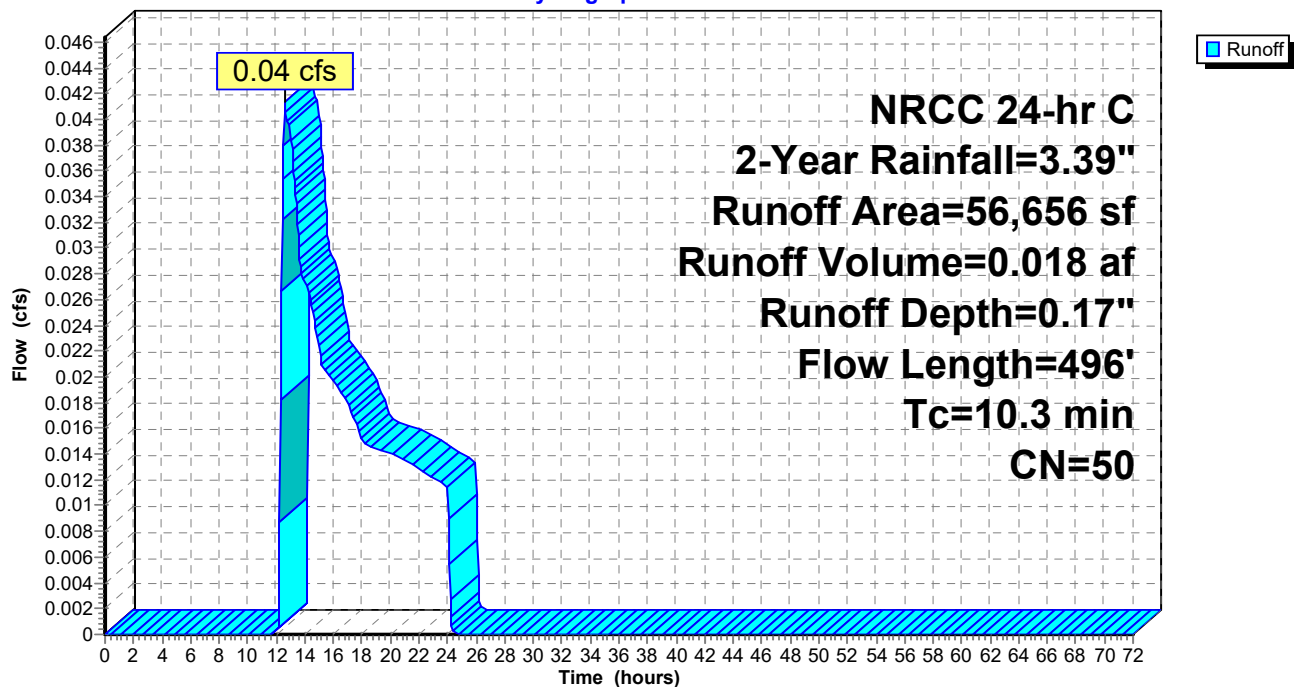
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-14:

Runoff = 6.12 cfs @ 12.39 hrs, Volume= 1.067 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
356,270	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,248,024	59	Weighted Average
1,248,024		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

Existing Hydrology

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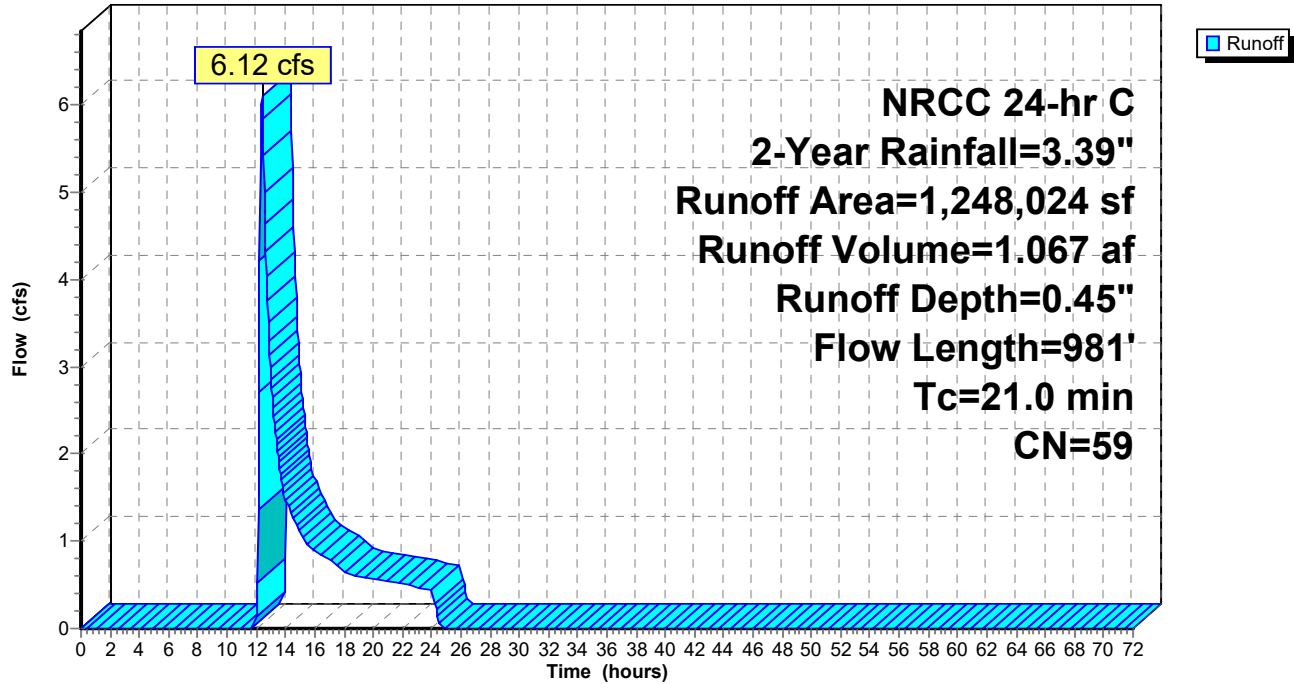
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment E-14:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-15:

Runoff = 0.22 cfs @ 12.45 hrs, Volume= 0.076 af, Depth= 0.22"

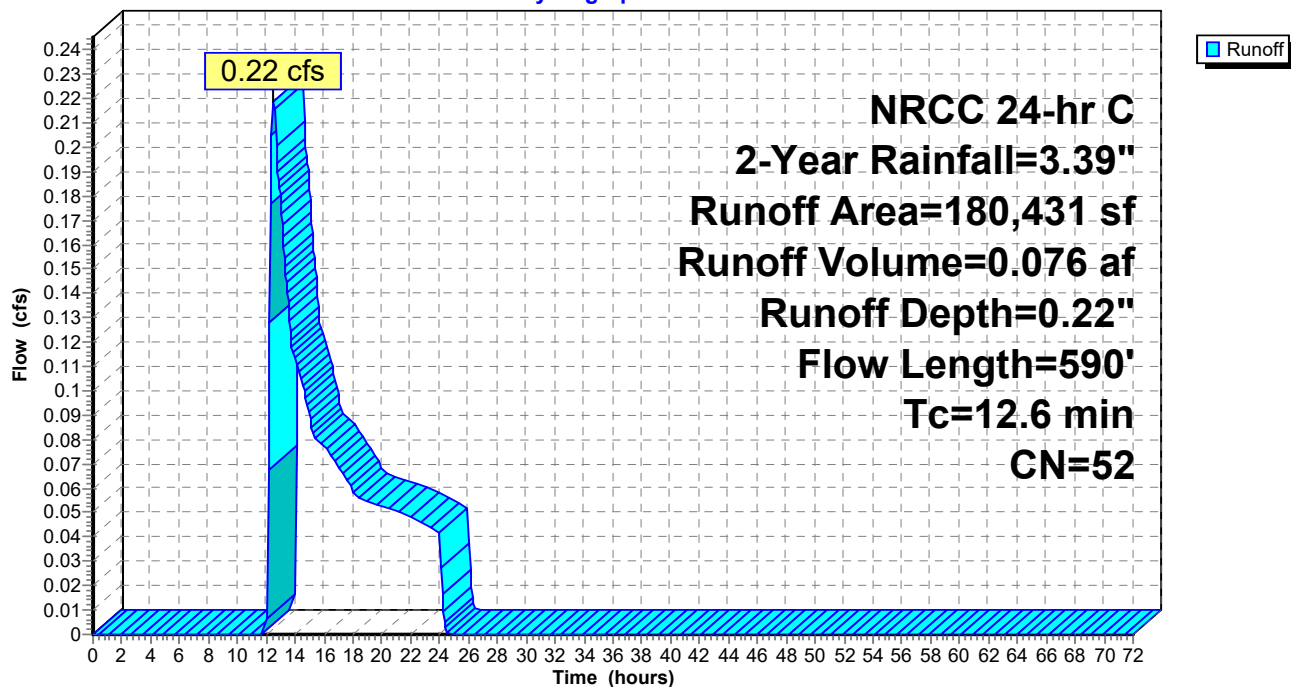
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
77,431	55	Woods, Good, HSG B
60,000	61	>75% Grass cover, Good, HSG B
37,500	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
180,431	52	Weighted Average
180,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1600	0.16		Sheet Flow, Grass Grass: Bermuda n= 0.410 P2= 3.37"
7.3	540	0.0310	1.23		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
12.6	590	Total			

Subcatchment E-15:

Hydrograph



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Summary for Subcatchment E-2:

Runoff = 11.26 cfs @ 12.62 hrs, Volume= 2.228 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
461,097	32	Woods/grass comb., Good, HSG A
636,415	58	Woods/grass comb., Good, HSG B
261,419	72	Woods/grass comb., Good, HSG C
632,109	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
* 17,483	98	Paved parking, HSG D
2,061,814	62	Weighted Average
1,991,040		96.57% Pervious Area
70,774		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Existing Hydrology

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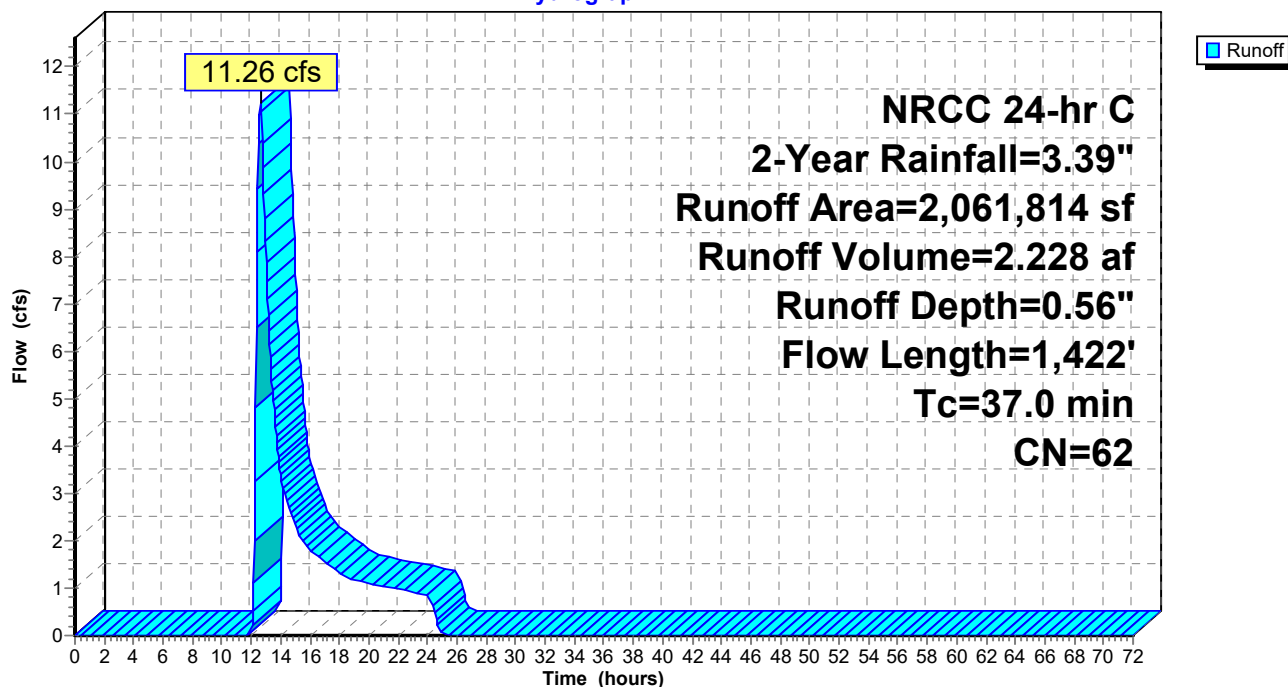
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment E-2:

Hydrograph



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Summary for Subcatchment E-3:

Runoff = 10.21 cfs @ 12.31 hrs, Volume= 1.228 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	126,000	30	Woods, Good, HSG A
	70,460	39	>75% Grass cover, Good, HSG A
	160,000	61	>75% Grass cover, Good, HSG B
	109,000	55	Woods, Good, HSG B
*	15,800	98	Roof and Pavement
	110,000	77	Woods, Good, HSG D
	105,000	80	>75% Grass cover, Good, HSG D
	865,760	66	Weighted Average
	680,460		78.60% Pervious Area
	185,300		21.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

Existing Hydrology

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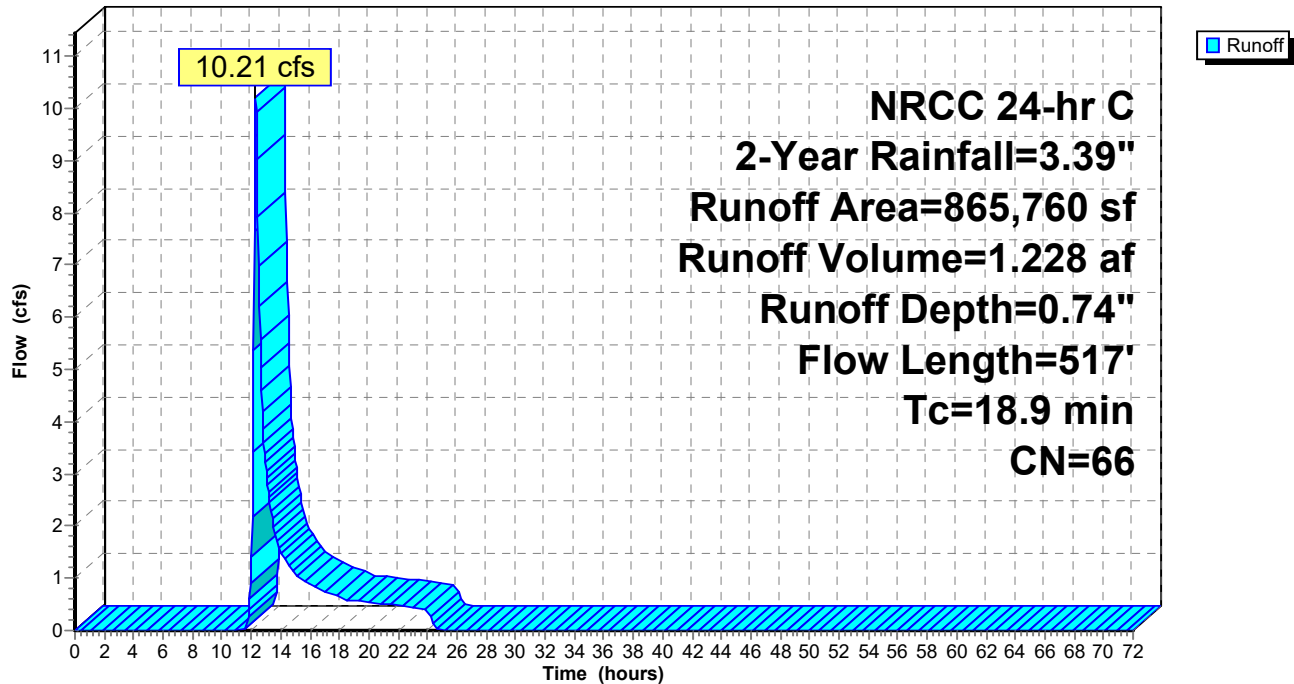
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment E-3:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-4:

Runoff = 0.01 cfs @ 14.34 hrs, Volume= 0.010 af, Depth= 0.08"

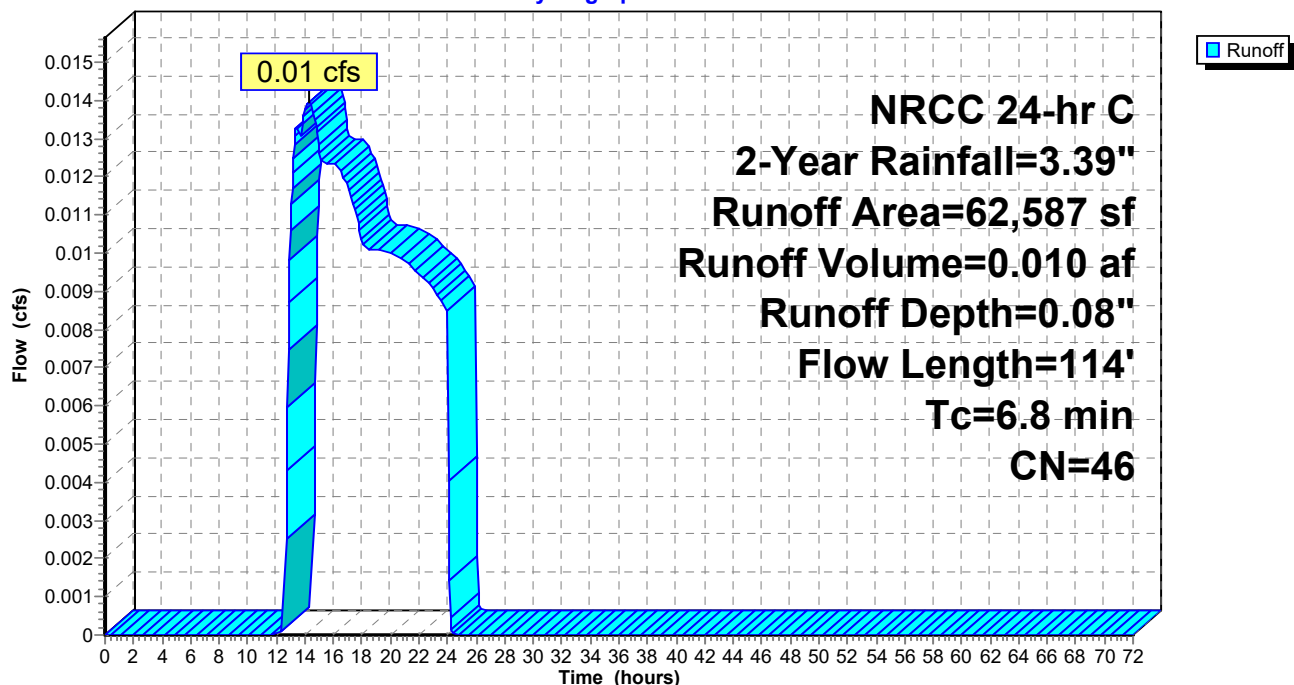
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
17,800	55	Woods, Good, HSG B
6,800	30	Woods, Good, HSG A
34,006	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
62,587	46	Weighted Average
58,606		93.64% Pervious Area
3,981		6.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0173	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.2	18	0.0449	1.48		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.8	46	0.0362	0.95		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
6.8	114	Total			

Subcatchment E-4:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-5:

Runoff = 2.23 cfs @ 12.45 hrs, Volume= 0.444 af, Depth= 0.41"

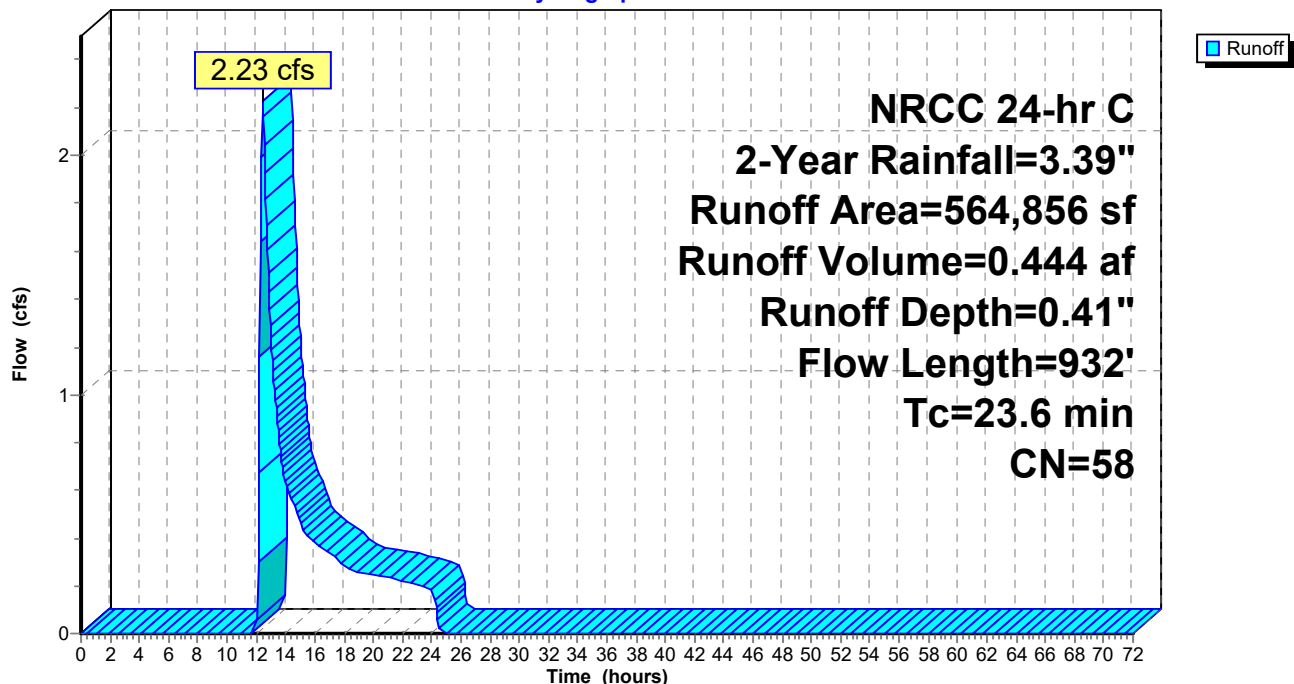
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
97,200	39	>75% Grass cover, Good, HSG A
60,000	30	Woods, Good, HSG A
148,500	55	Woods, Good, HSG B
128,700	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
106,356	80	>75% Grass cover, Good, HSG D
564,856	58	Weighted Average
564,856		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0296	0.08		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
5.8	355	0.0215	1.03		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.5	527	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.6	932	Total			

Subcatchment E-5:

Hydrograph



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Summary for Subcatchment E-6:

Runoff = 5.89 cfs @ 12.27 hrs, Volume= 0.660 af, Depth= 0.70"

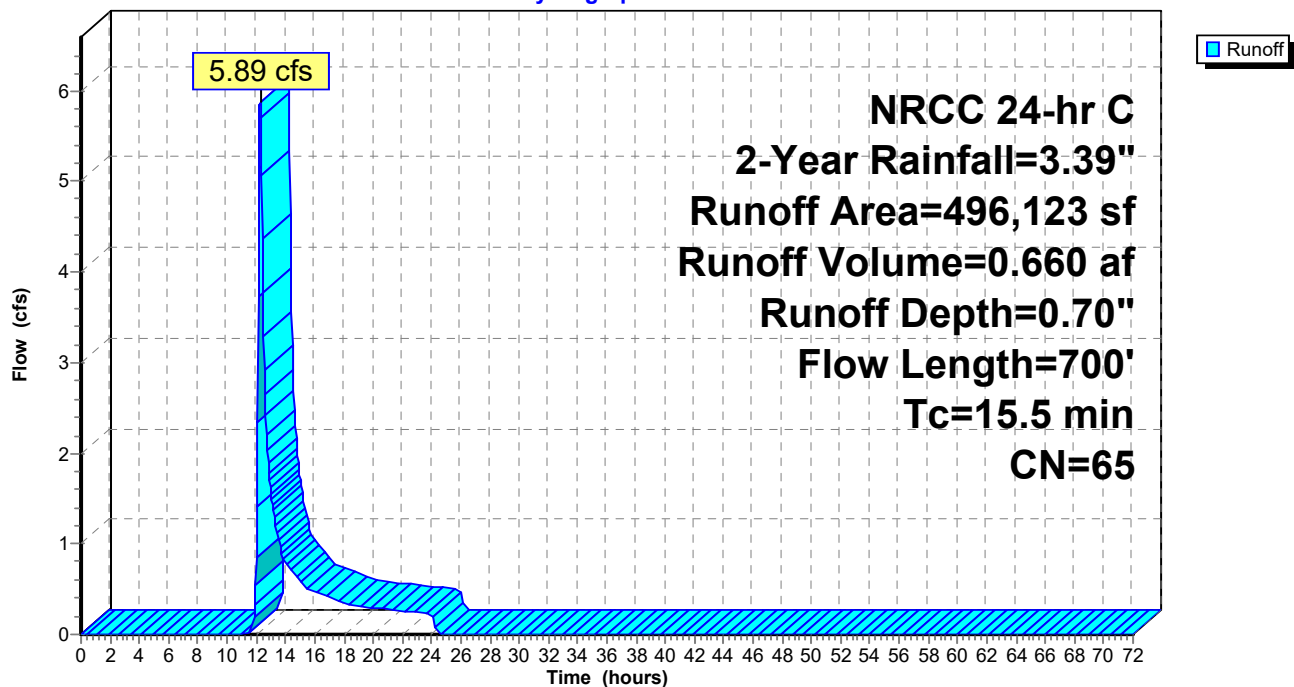
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
298,100	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
496,123	65	Weighted Average
496,123		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
7.3	600	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.5	700	Total			

Subcatchment E-6:

Hydrograph



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Summary for Subcatchment E-7:

Runoff = 2.11 cfs @ 12.47 hrs, Volume= 0.459 af, Depth= 0.38"

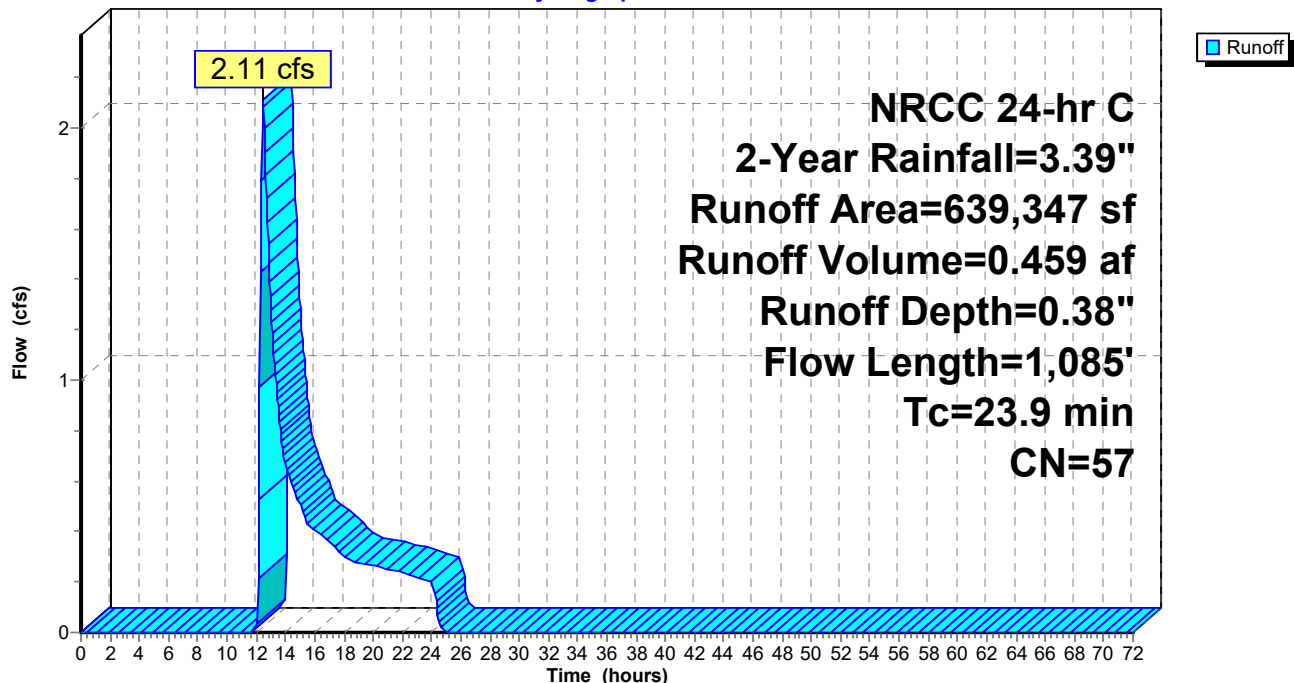
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
436,868	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
639,347	57	Weighted Average
606,609		94.88% Pervious Area
32,738		5.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment E-7:

Hydrograph



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Summary for Subcatchment E-8:

Runoff = 0.82 cfs @ 12.18 hrs, Volume= 0.093 af, Depth= 0.45"

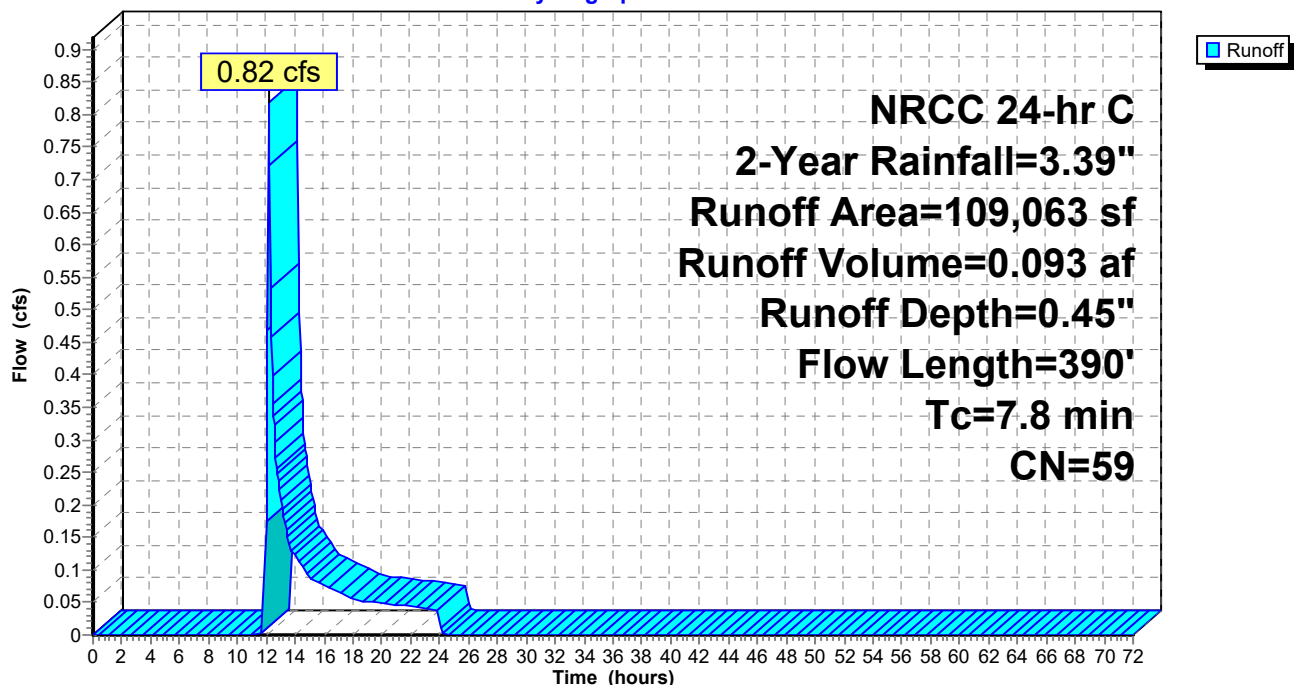
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
7,994	98	Paved parking, HSG B
5,726	98	Water Surface, 0% imp, HSG A
12,549	39	>75% Grass cover, Good, HSG A
43,794	61	>75% Grass cover, Good, HSG B
6,600	30	Woods, Good, HSG A
32,400	55	Woods, Good, HSG B
109,063	59	Weighted Average
101,069		92.67% Pervious Area
7,994		7.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment E-8:

Hydrograph



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Summary for Subcatchment E-9:

Runoff = 0.68 cfs @ 12.44 hrs, Volume= 0.210 af, Depth= 0.25"

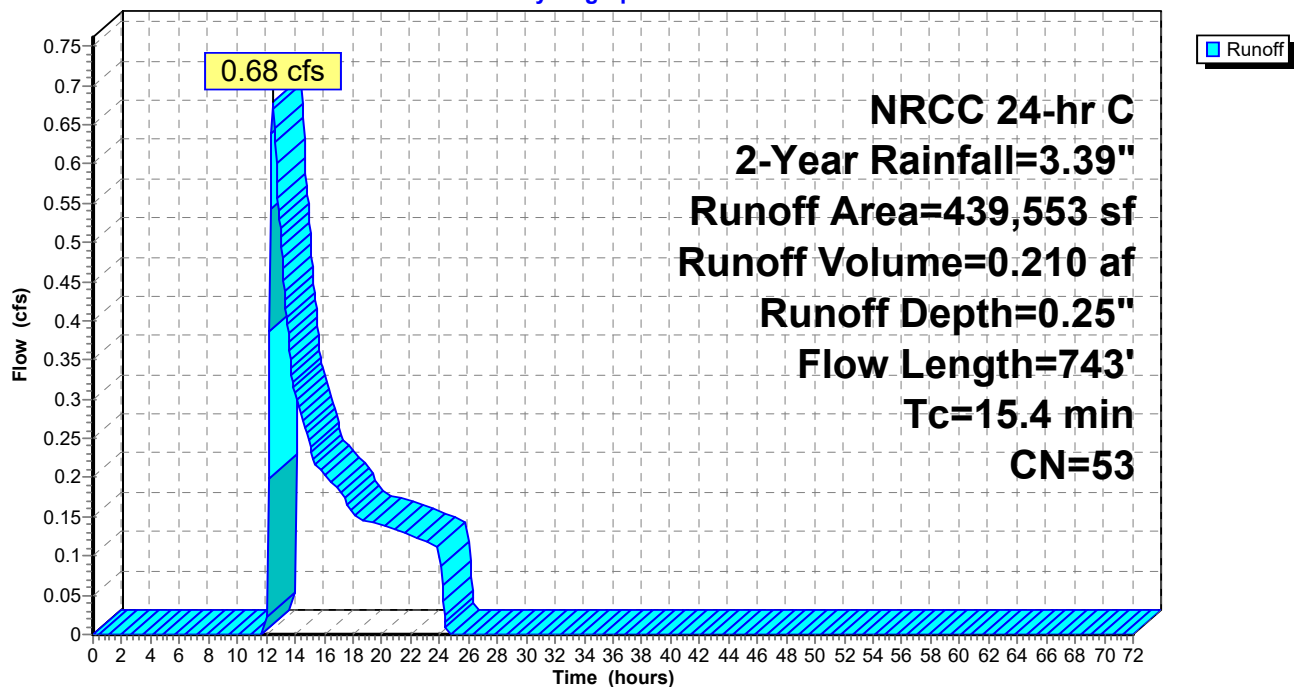
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
239,355	30	Woods, Good, HSG A
140,198	98	Paved parking, HSG A
60,000	39	>75% Grass cover, Good, HSG A
439,553	53	Weighted Average
299,355		68.10% Pervious Area
140,198		31.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0600	0.12		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.37"
1.1	318	0.1114	5.01		Shallow Concentrated Flow, HR-A Grassed Waterway Kv= 15.0 fps
0.8	325	0.1139	6.85		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
15.4	743	Total			

Subcatchment E-9:

Hydrograph



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Summary for Reach DP-1: Wetland Series R

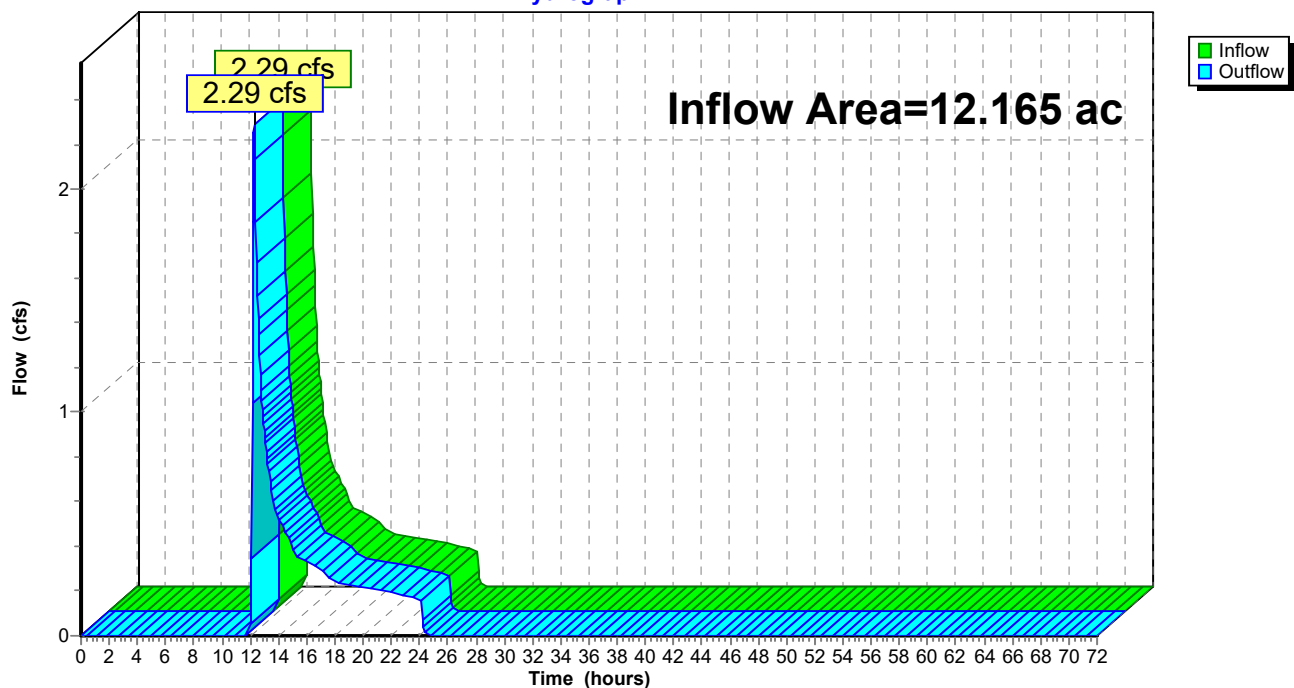
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.165 ac, 0.00% Impervious, Inflow Depth = 0.38" for 2-Year event
Inflow = 2.29 cfs @ 12.27 hrs, Volume= 0.381 af
Outflow = 2.29 cfs @ 12.27 hrs, Volume= 0.381 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R

Hydrograph



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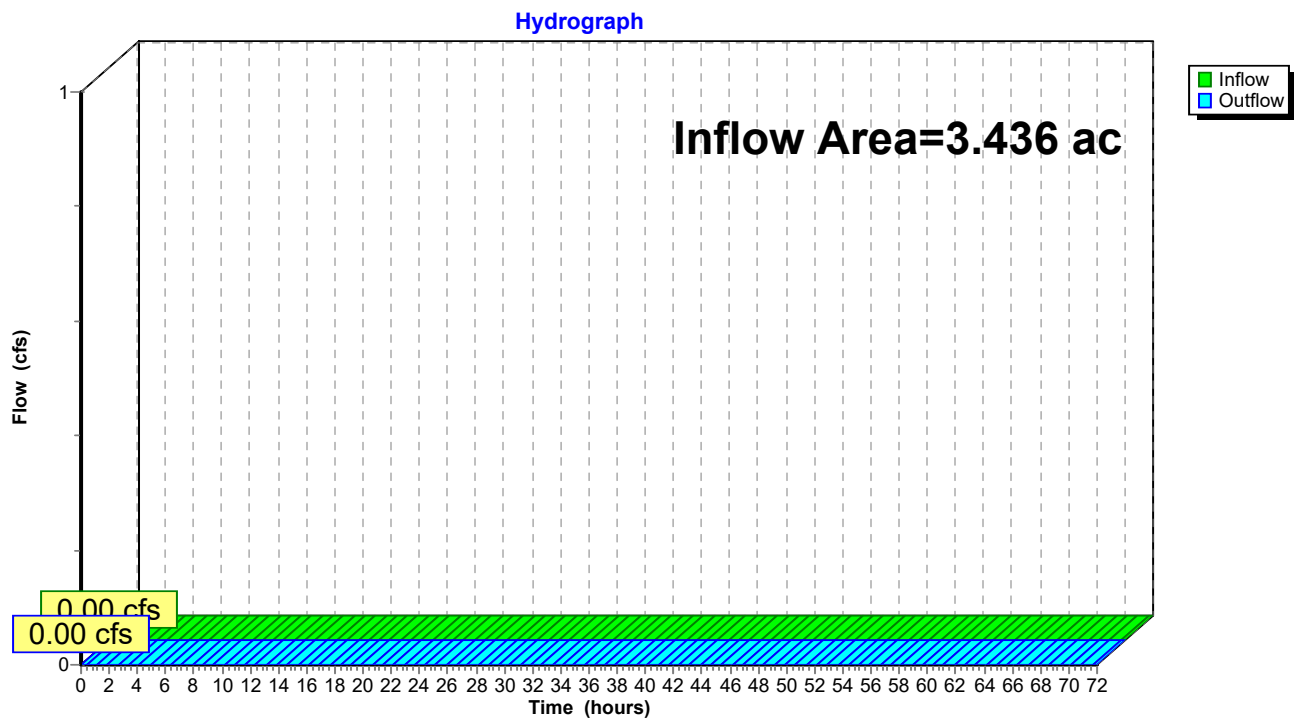
Summary for Reach DP-10: West Elm Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.436 ac, 3.33% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street



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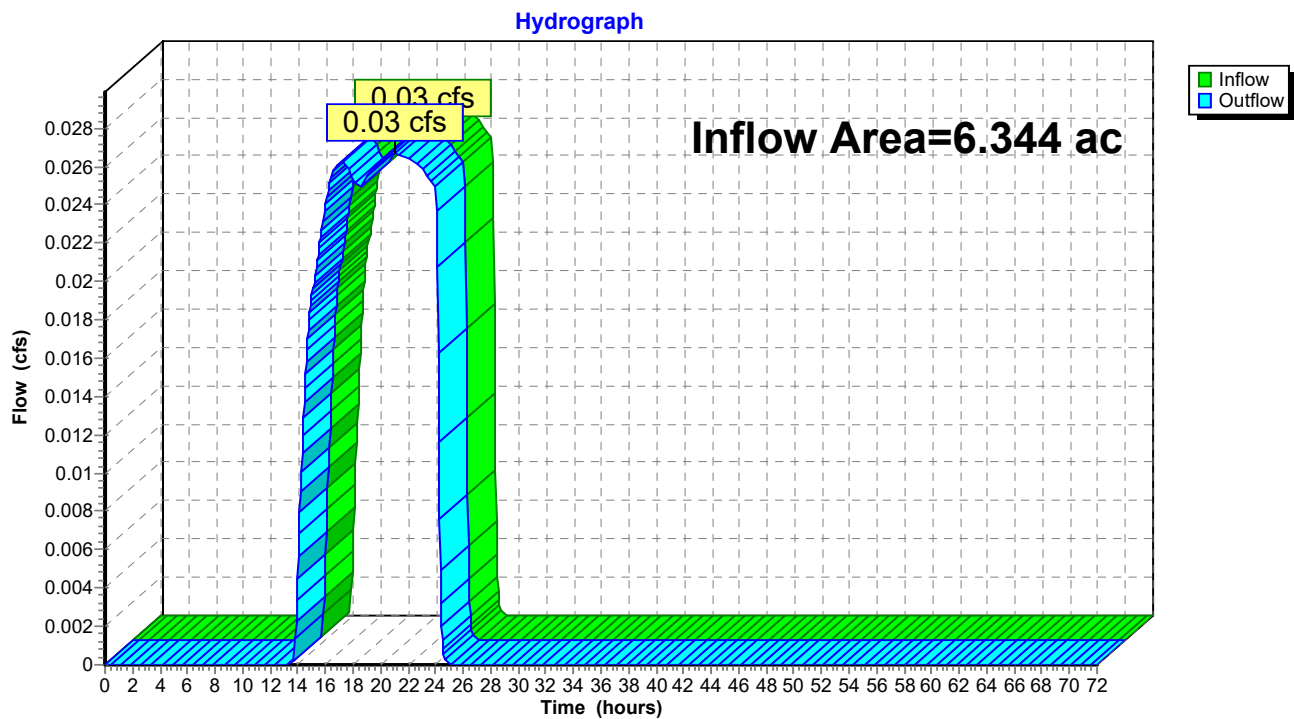
Summary for Reach DP-11: Wetland Series A

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.344 ac, 6.32% Impervious, Inflow Depth = 0.04" for 2-Year event
Inflow = 0.03 cfs @ 21.03 hrs, Volume= 0.021 af
Outflow = 0.03 cfs @ 21.03 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A



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Summary for Reach DP-12: Wetland Series A

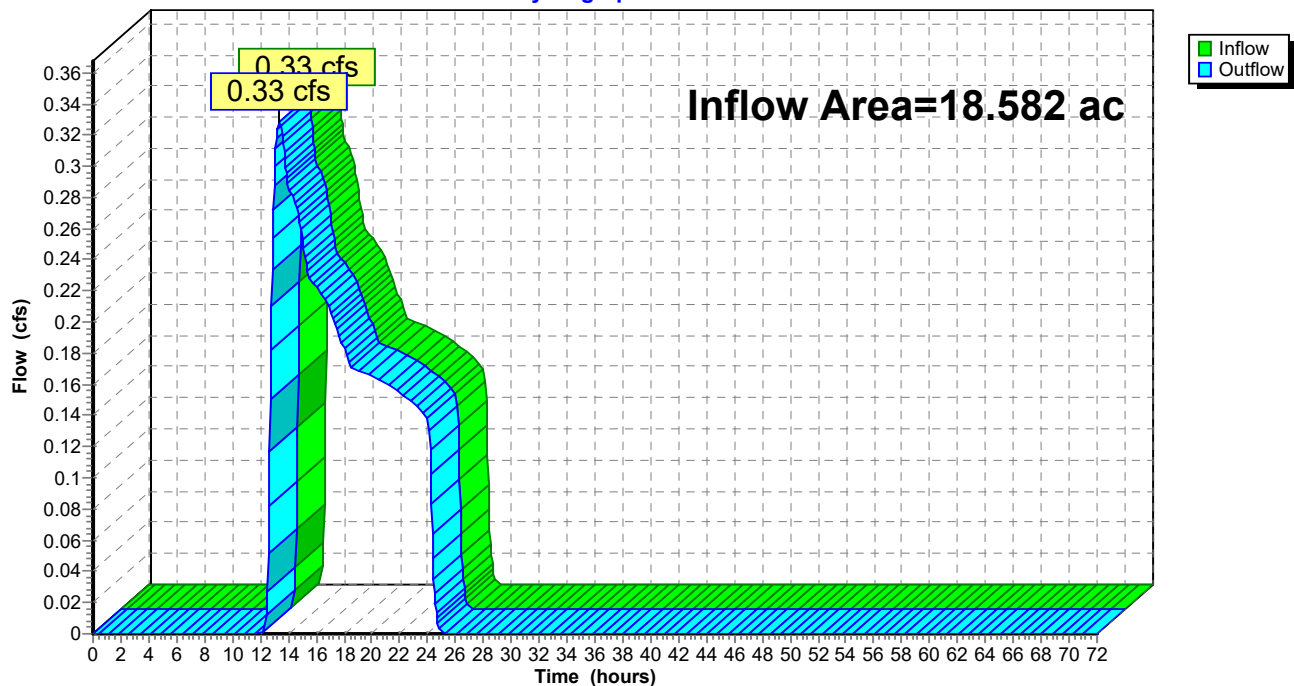
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.582 ac, 5.73% Impervious, Inflow Depth = 0.12" for 2-Year event
Inflow = 0.33 cfs @ 13.35 hrs, Volume= 0.192 af
Outflow = 0.33 cfs @ 13.35 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A

Hydrograph



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Summary for Reach DP-13: Wetland Series B

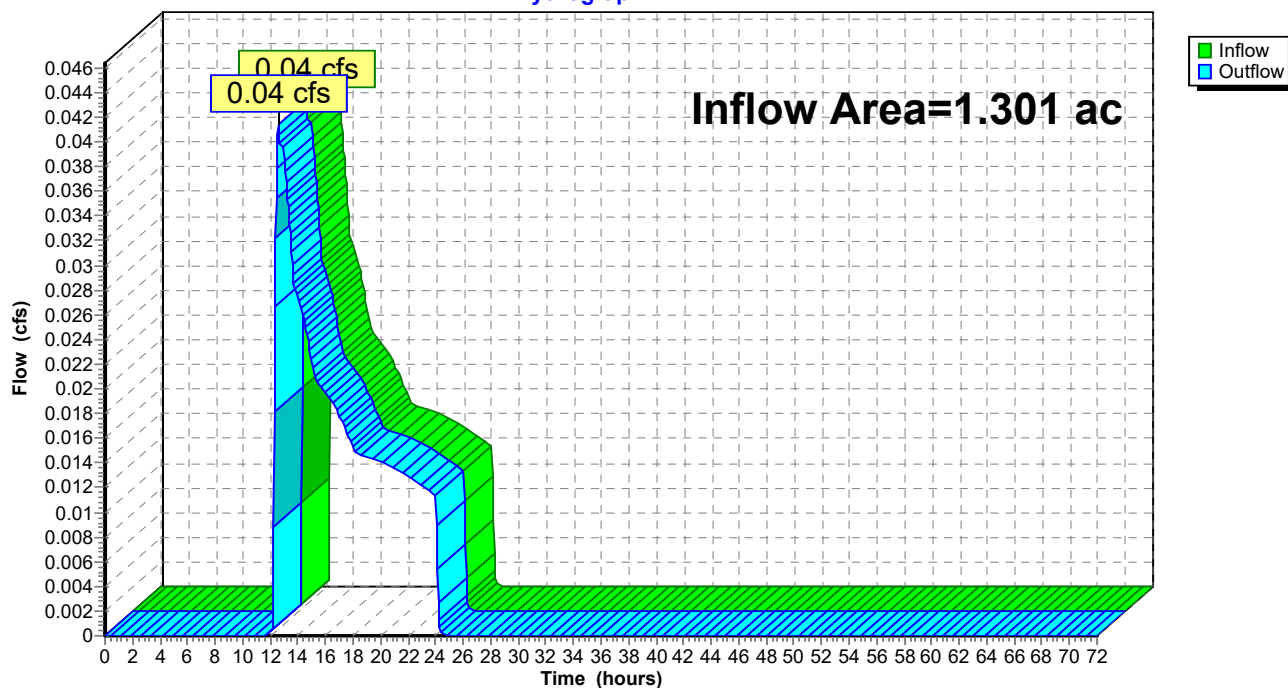
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 0.17" for 2-Year event
Inflow = 0.04 cfs @ 12.60 hrs, Volume= 0.018 af
Outflow = 0.04 cfs @ 12.60 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B

Hydrograph



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Summary for Reach DP-14: Wetland Series C,D,E,,K,J

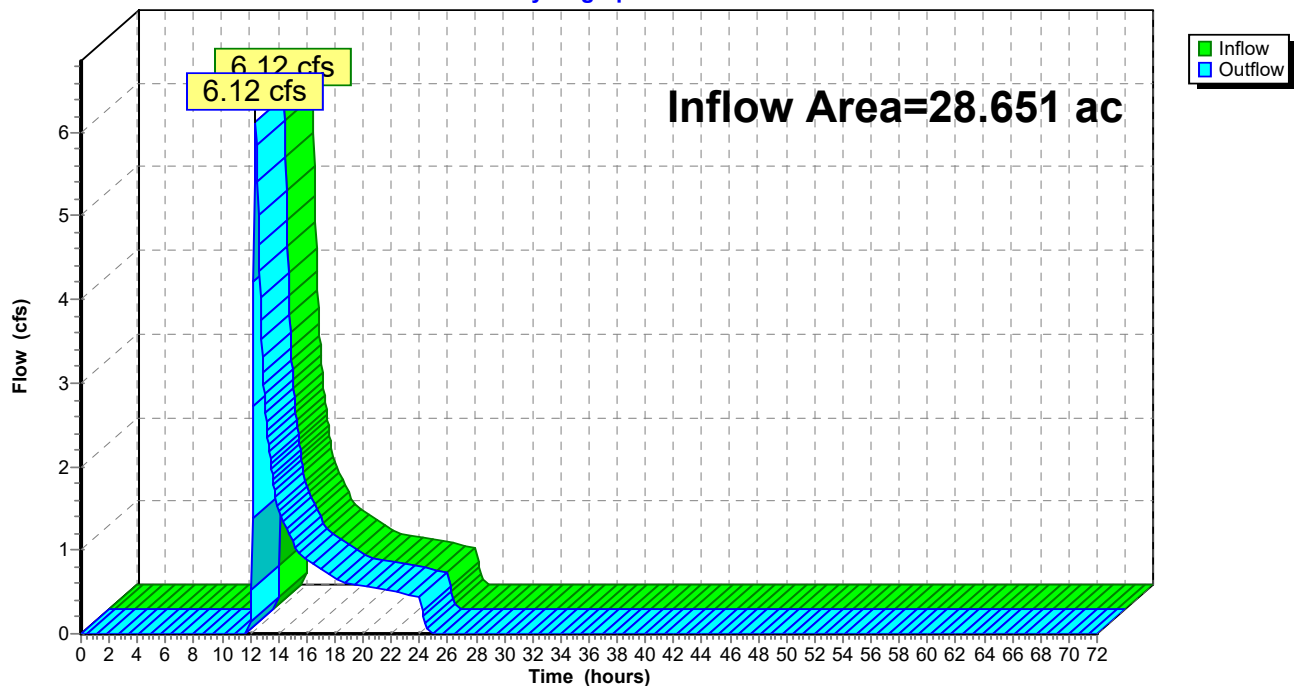
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.651 ac, 0.00% Impervious, Inflow Depth = 0.45" for 2-Year event
Inflow = 6.12 cfs @ 12.39 hrs, Volume= 1.067 af
Outflow = 6.12 cfs @ 12.39 hrs, Volume= 1.067 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J

Hydrograph



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Summary for Reach DP-15: Wetland Series H

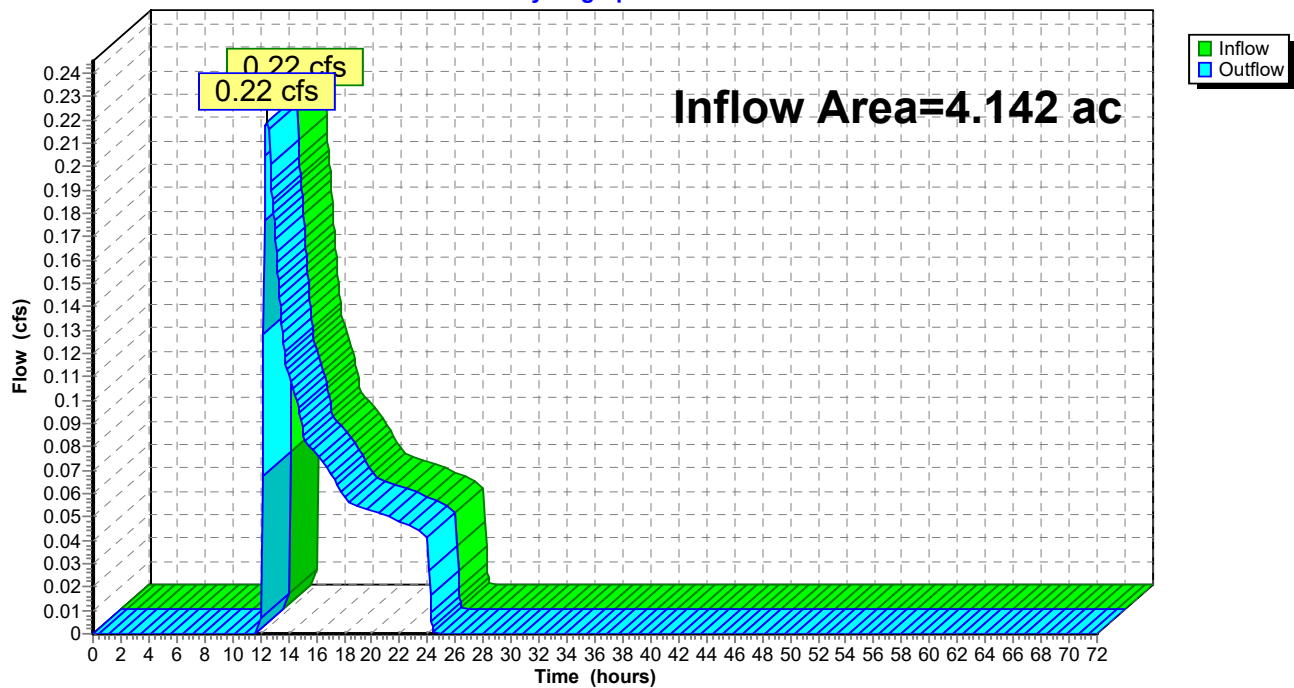
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.142 ac, 0.00% Impervious, Inflow Depth = 0.22" for 2-Year event
Inflow = 0.22 cfs @ 12.45 hrs, Volume= 0.076 af
Outflow = 0.22 cfs @ 12.45 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H

Hydrograph



Existing Hydrology

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Summary for Reach DP-2: Wetland Series I

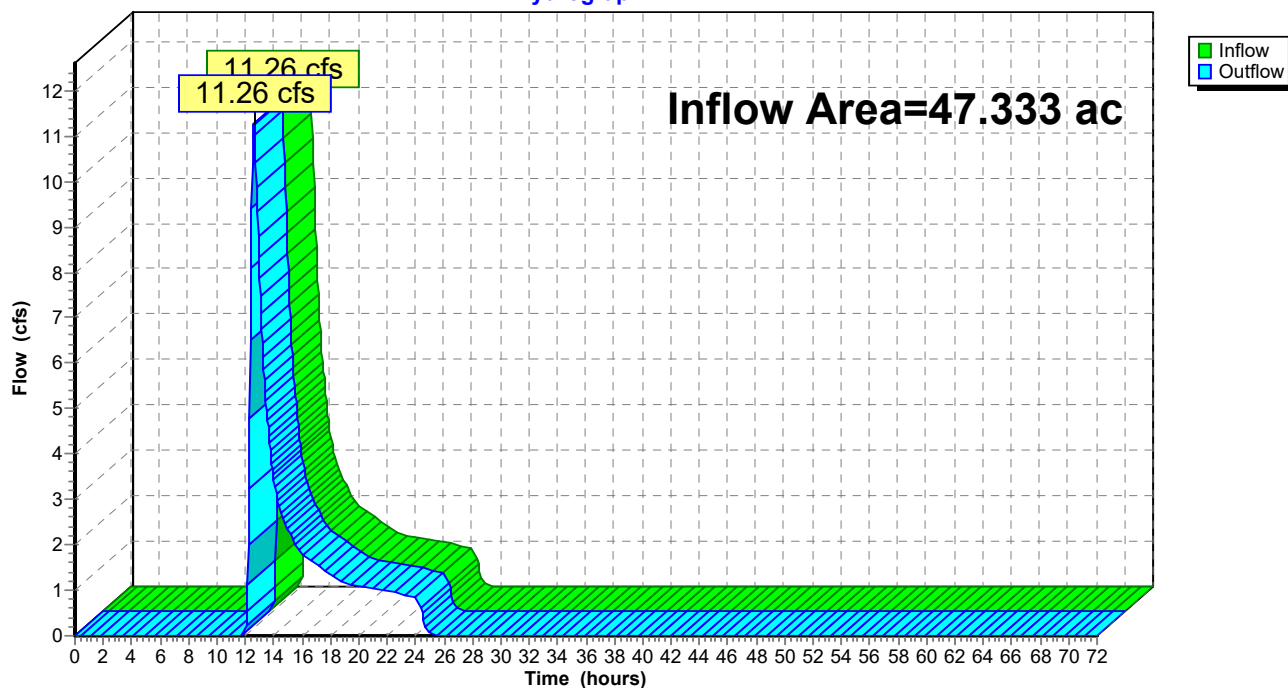
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.333 ac, 3.43% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 11.26 cfs @ 12.62 hrs, Volume= 2.228 af
Outflow = 11.26 cfs @ 12.62 hrs, Volume= 2.228 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I

Hydrograph



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Summary for Reach DP-3: W-R

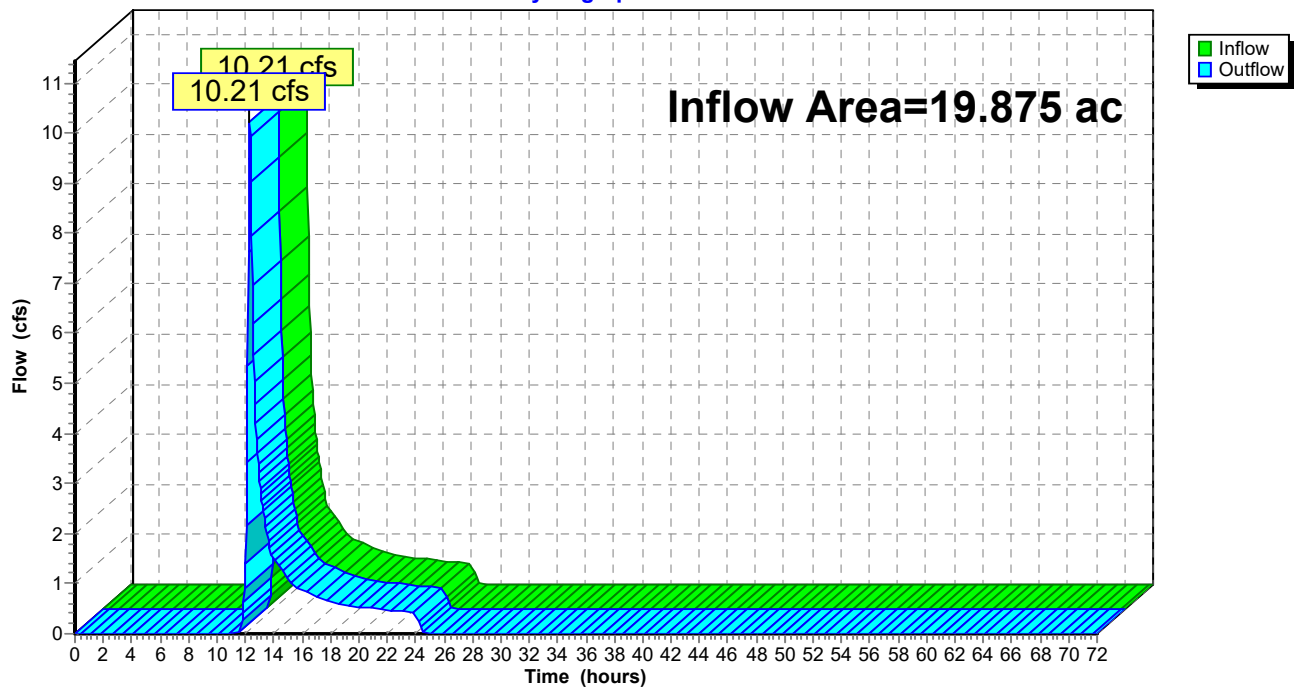
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 0.74" for 2-Year event
Inflow = 10.21 cfs @ 12.31 hrs, Volume= 1.228 af
Outflow = 10.21 cfs @ 12.31 hrs, Volume= 1.228 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: W-R

Hydrograph



Existing Hydrology

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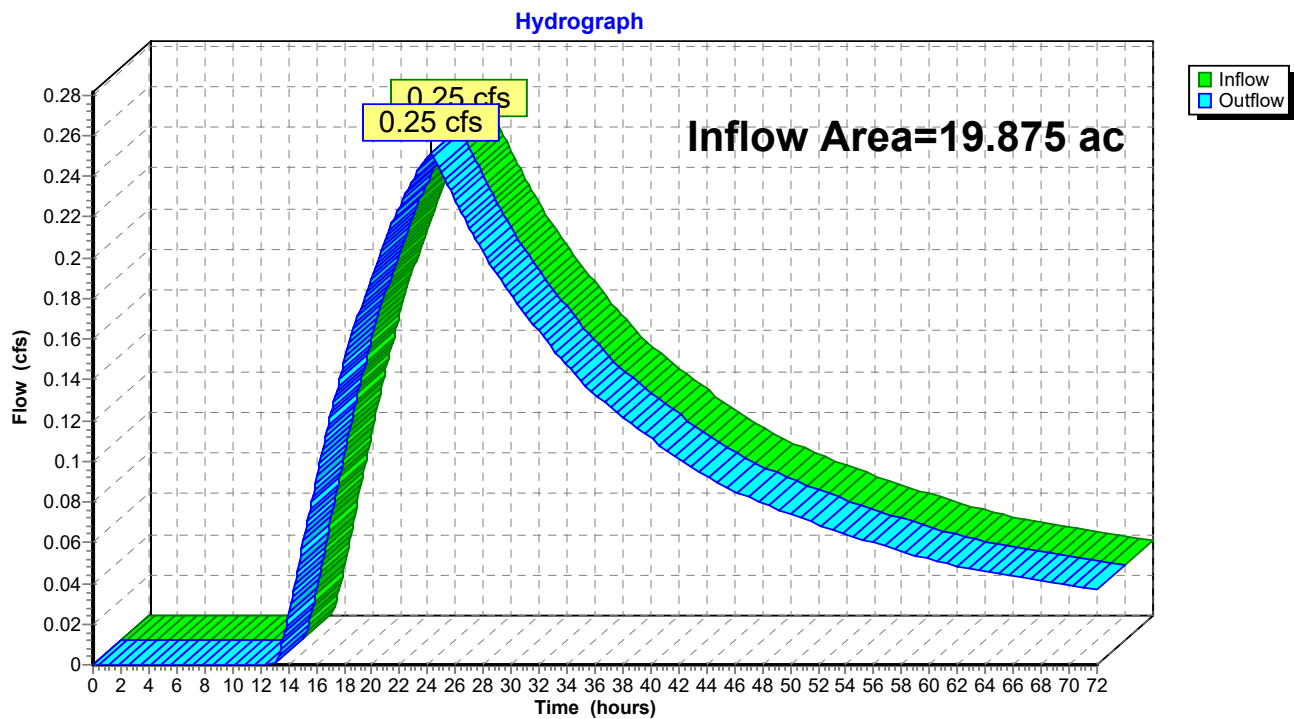
Summary for Reach DP-3 OUT: 8" Copper Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth > 0.32" for 2-Year event
Inflow = 0.25 cfs @ 24.23 hrs, Volume= 0.527 af
Outflow = 0.25 cfs @ 24.23 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe



Existing Hydrology

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Summary for Reach DP-4: Dwelley Street

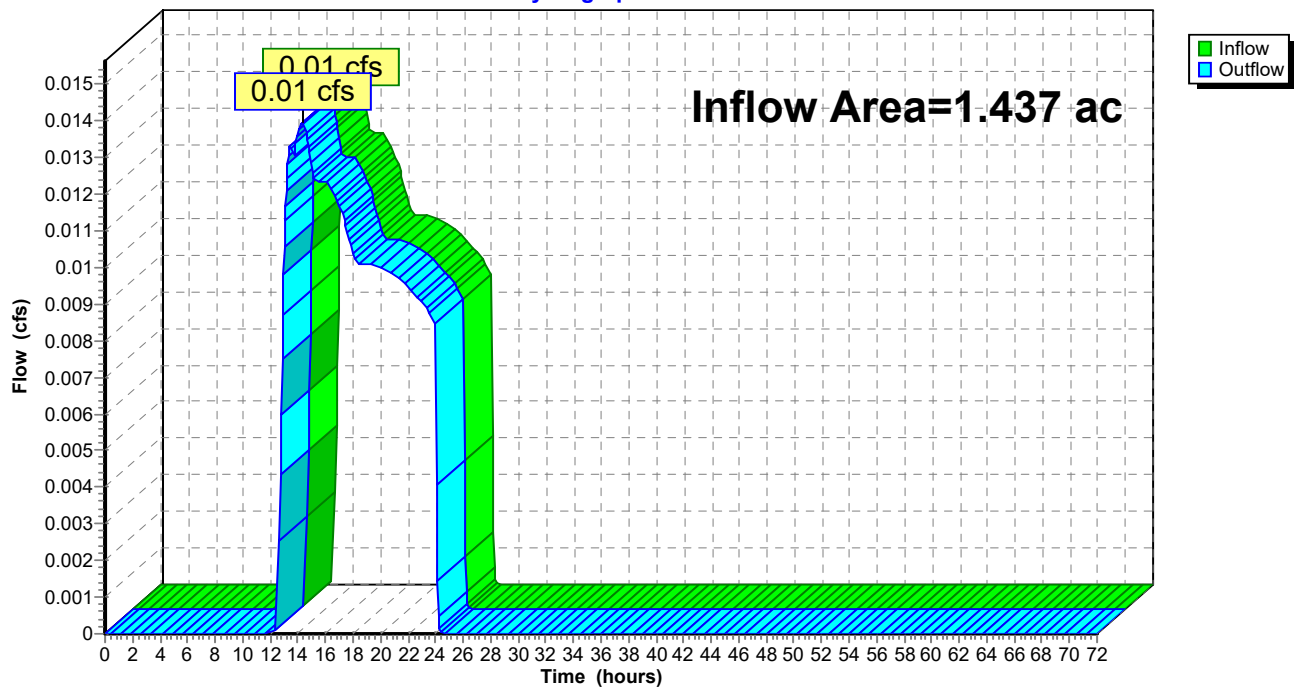
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.437 ac, 6.36% Impervious, Inflow Depth = 0.08" for 2-Year event
Inflow = 0.01 cfs @ 14.34 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 14.34 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-5: W-N

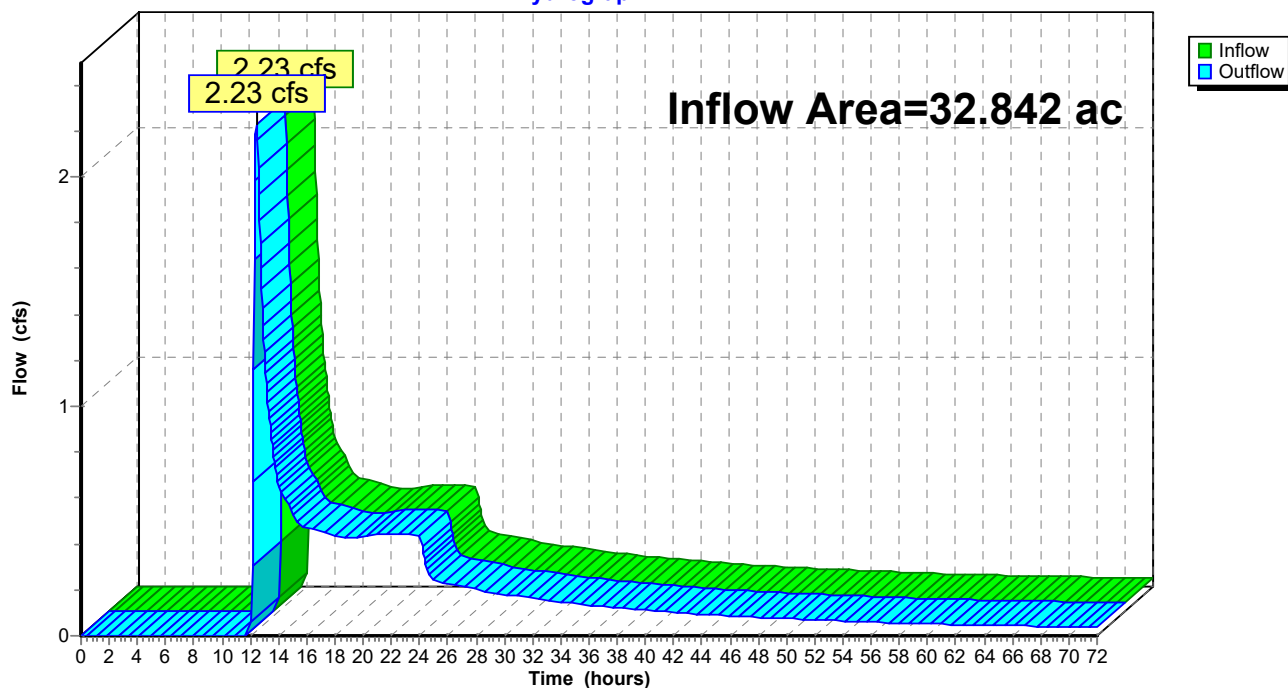
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 0.35" for 2-Year event
Inflow = 2.23 cfs @ 12.45 hrs, Volume= 0.970 af
Outflow = 2.23 cfs @ 12.45 hrs, Volume= 0.970 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-5: W-N

Hydrograph



Existing Hydrology

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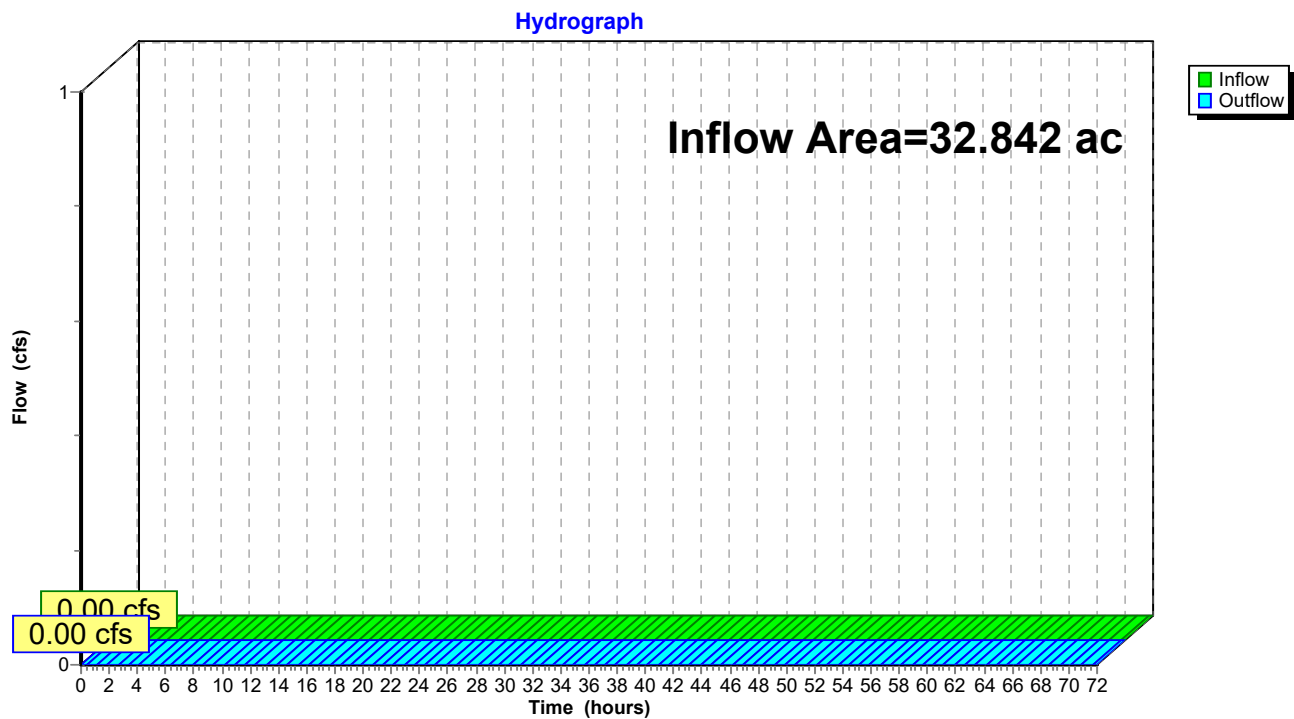
Summary for Reach DP-5 OUT: 24" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE



Existing Hydrology

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Summary for Reach DP-6: W-QP

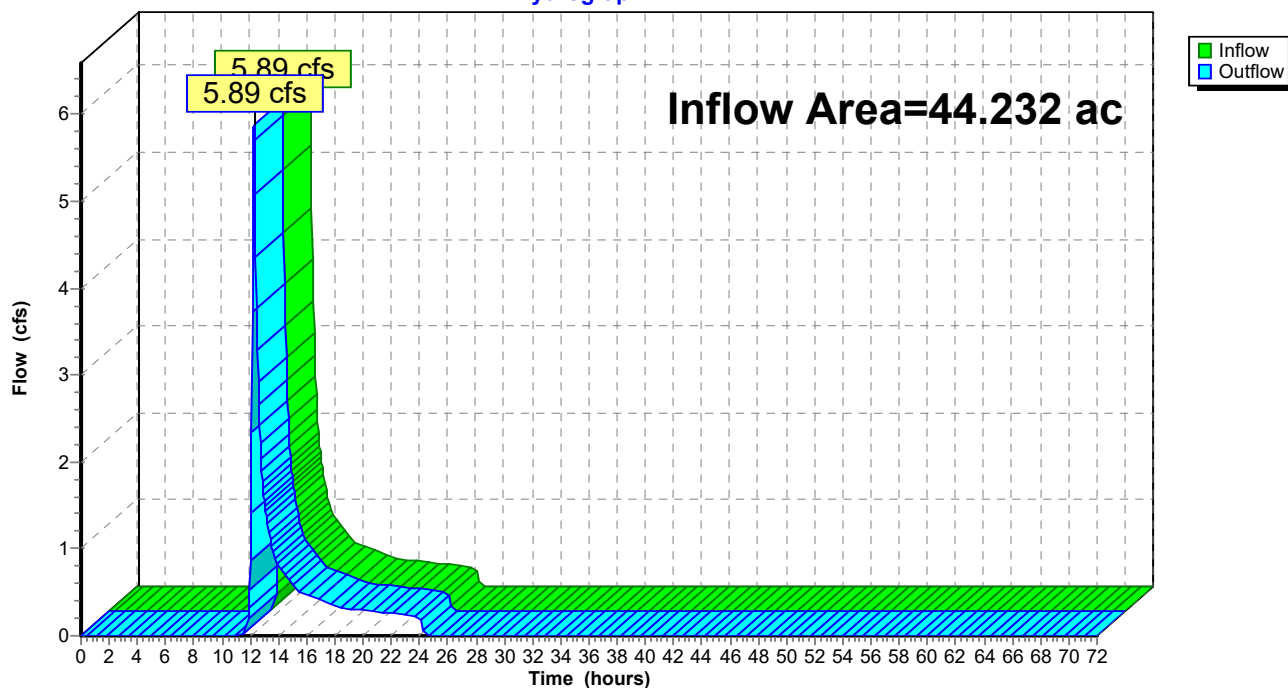
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth = 0.18" for 2-Year event
Inflow = 5.89 cfs @ 12.27 hrs, Volume= 0.660 af
Outflow = 5.89 cfs @ 12.27 hrs, Volume= 0.660 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



Existing Hydrology

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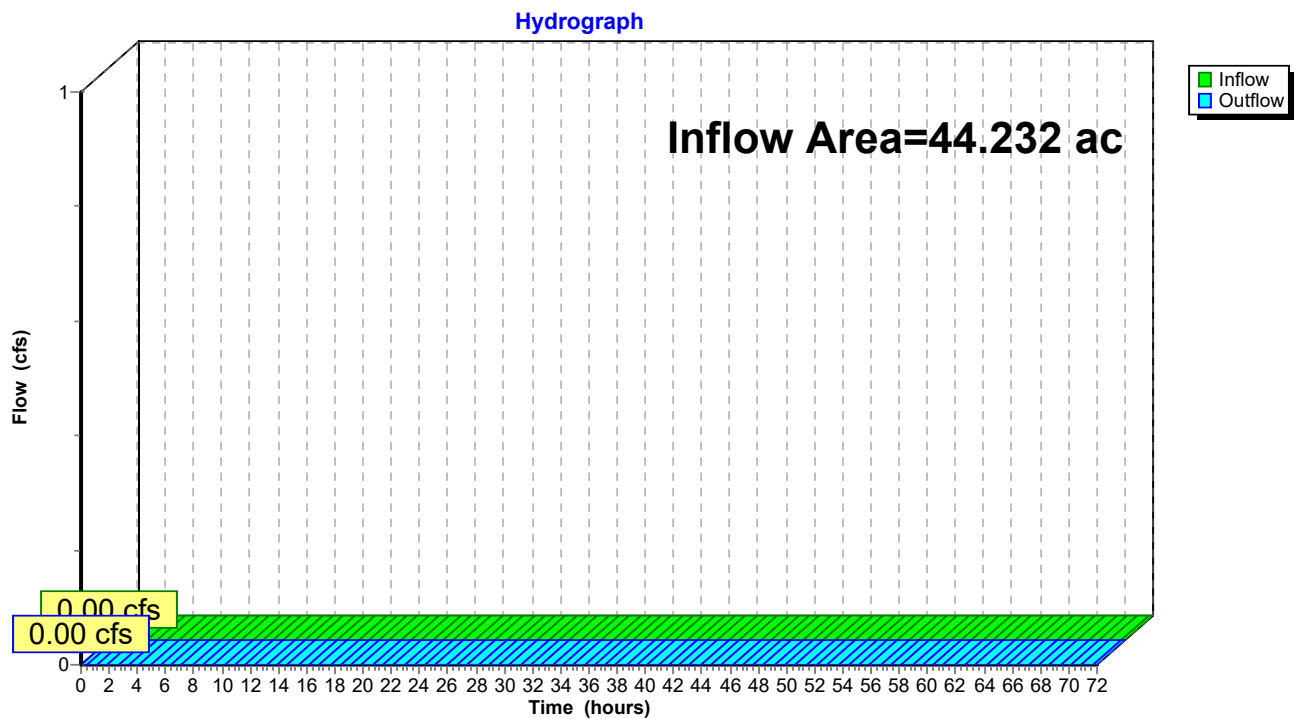
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



Existing Hydrology

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Summary for Reach DP-7: W-O

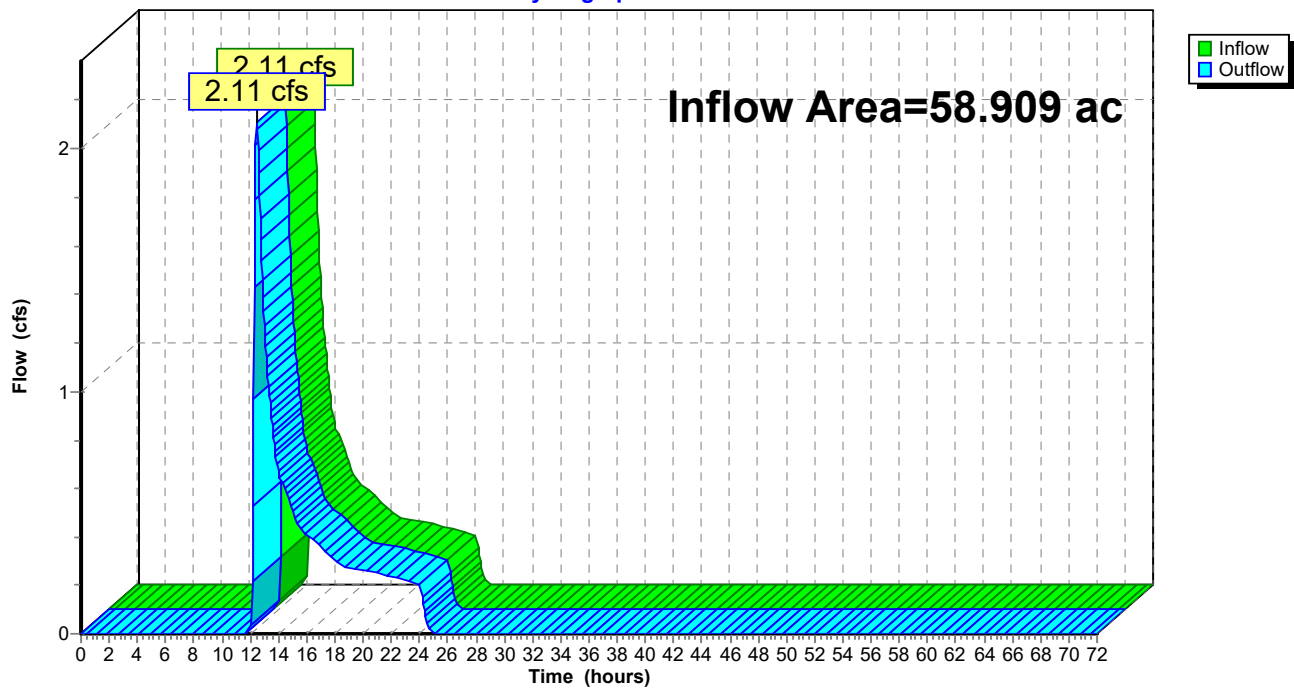
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.09" for 2-Year event
Inflow = 2.11 cfs @ 12.47 hrs, Volume= 0.459 af
Outflow = 2.11 cfs @ 12.47 hrs, Volume= 0.459 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7: W-O

Hydrograph



Existing Hydrology

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Summary for Reach DP-7 OUT: 18" RCP PIPE

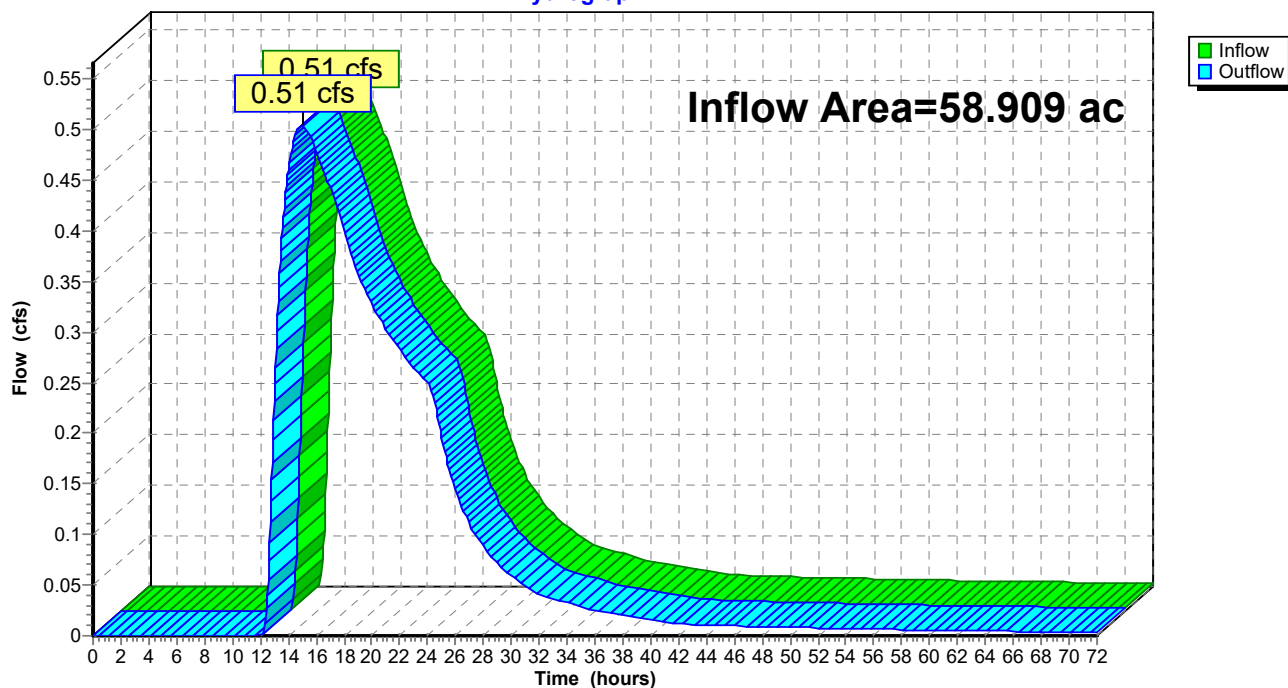
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 0.09" for 2-Year event
Inflow = 0.51 cfs @ 15.00 hrs, Volume= 0.452 af
Outflow = 0.51 cfs @ 15.00 hrs, Volume= 0.452 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 18" RCP PIPE

Hydrograph



Existing Hydrology

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Summary for Reach DP-8: Wetlands Series X

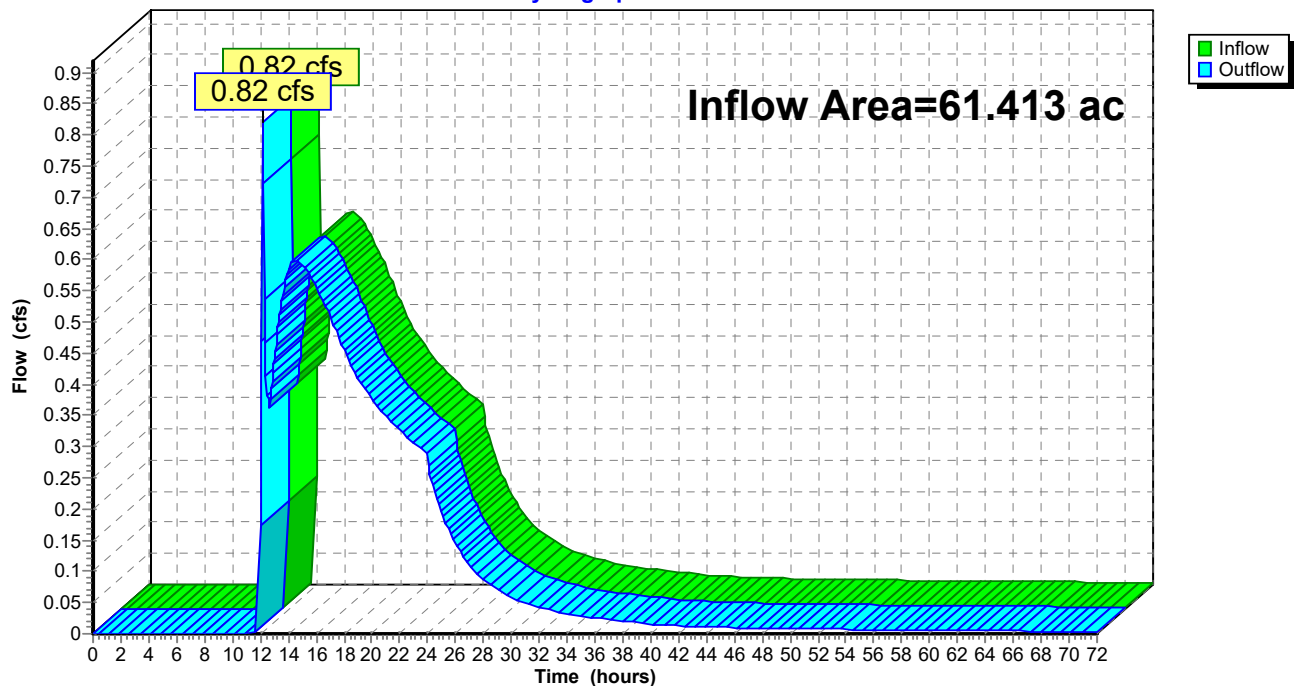
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 0.11" for 2-Year event
Inflow = 0.82 cfs @ 12.18 hrs, Volume= 0.546 af
Outflow = 0.82 cfs @ 12.18 hrs, Volume= 0.546 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X

Hydrograph



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Summary for Reach DP-9: West Elm Street

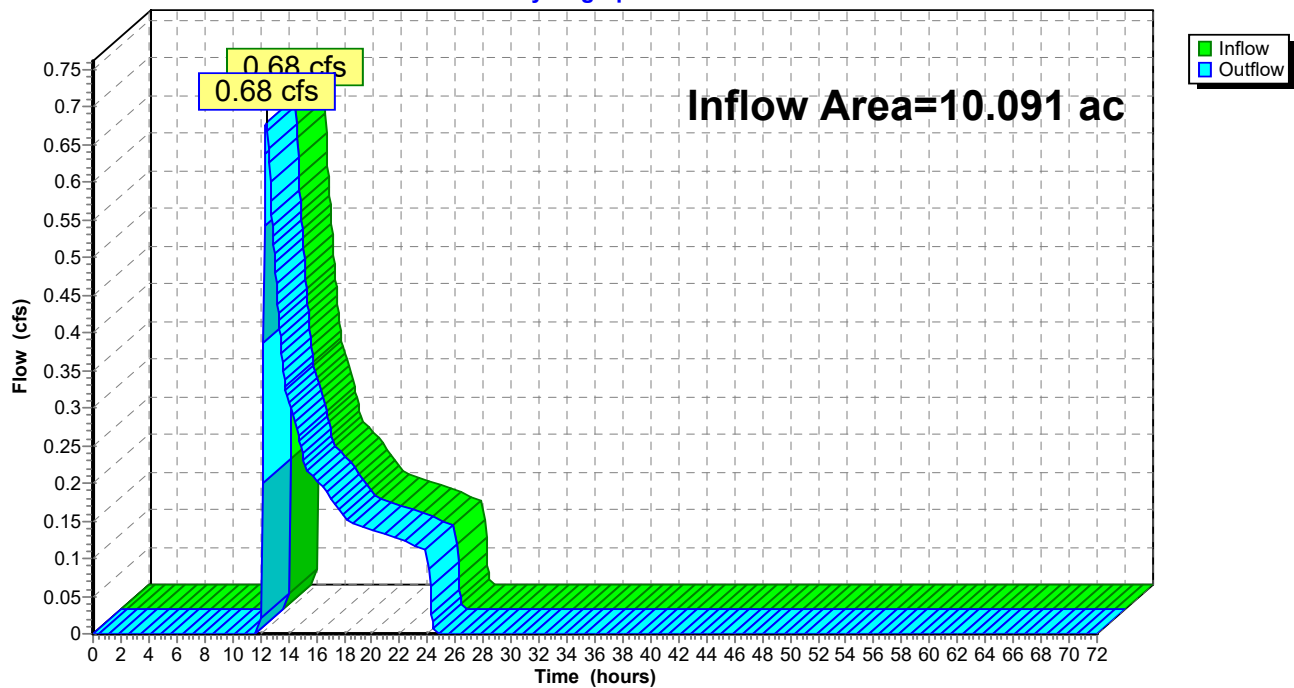
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.091 ac, 31.90% Impervious, Inflow Depth = 0.25" for 2-Year event
Inflow = 0.68 cfs @ 12.44 hrs, Volume= 0.210 af
Outflow = 0.68 cfs @ 12.44 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-ELM: West Elm Street

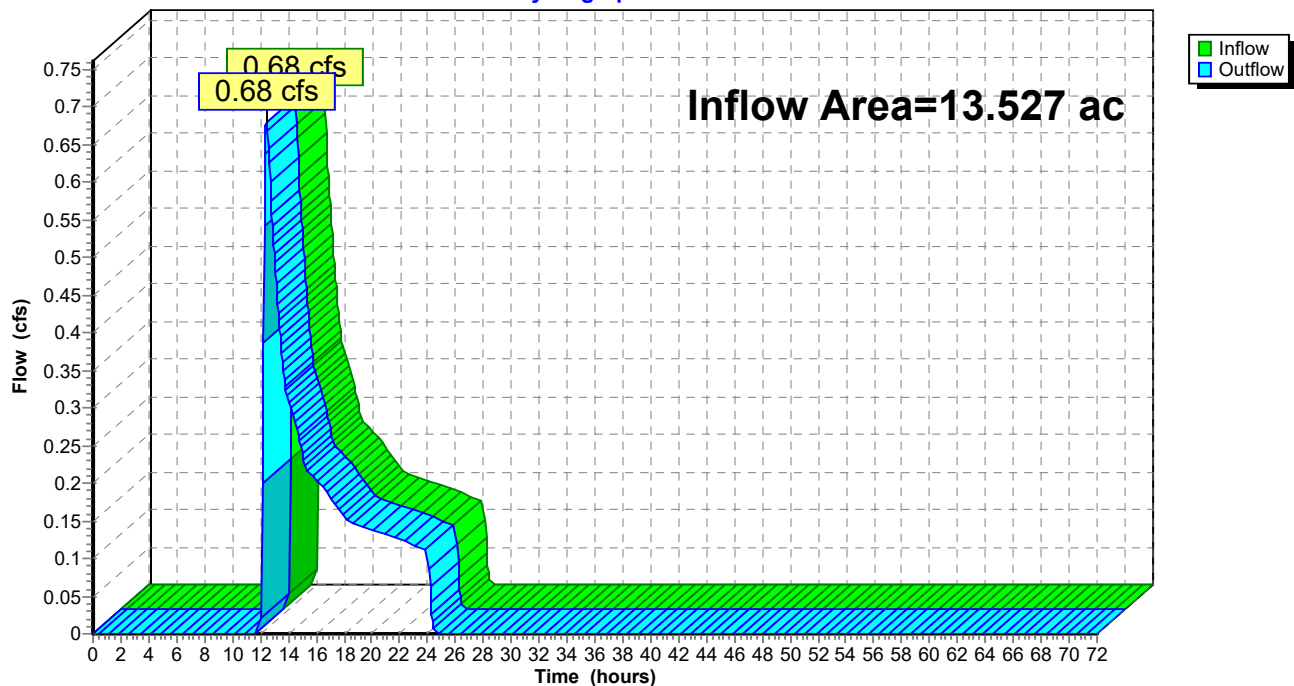
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.527 ac, 24.64% Impervious, Inflow Depth = 0.19" for 2-Year event
Inflow = 0.68 cfs @ 12.44 hrs, Volume= 0.210 af
Outflow = 0.68 cfs @ 12.44 hrs, Volume= 0.210 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-WA: Wetland Series A

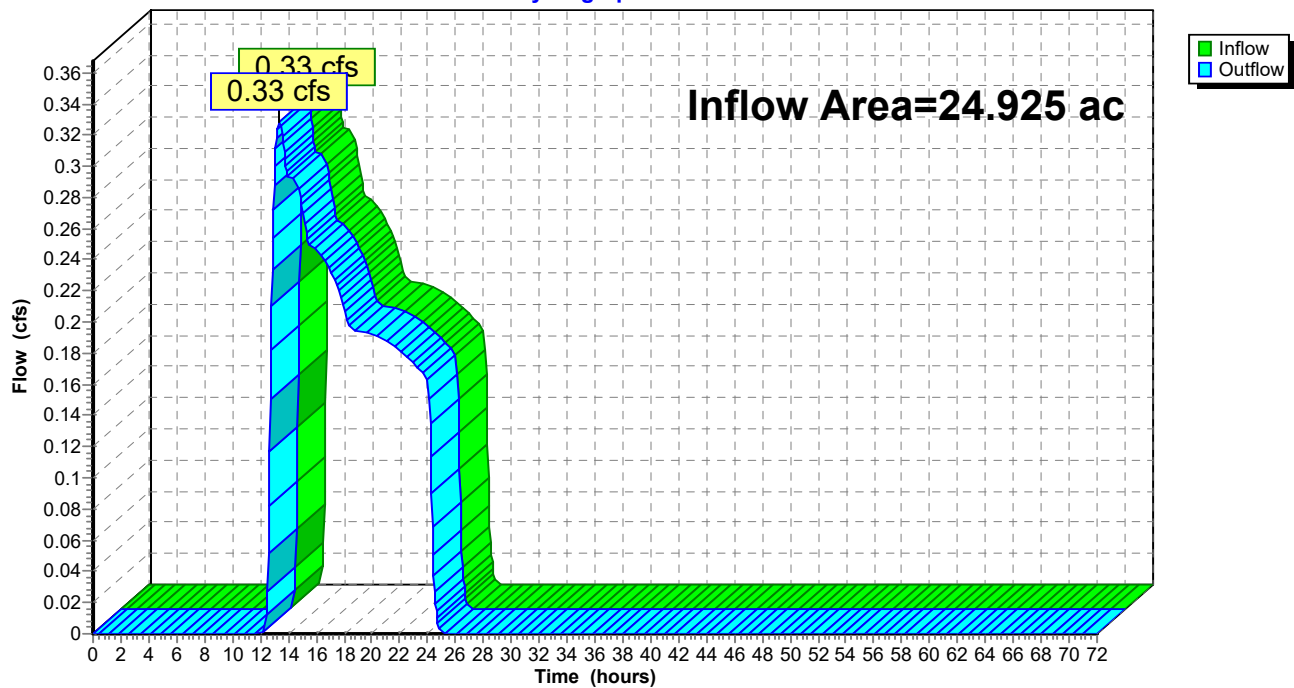
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 24.925 ac, 5.88% Impervious, Inflow Depth = 0.10" for 2-Year event
Inflow = 0.33 cfs @ 13.35 hrs, Volume= 0.213 af
Outflow = 0.33 cfs @ 13.35 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A

Hydrograph



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Summary for Reach DP-WI: Wetland Series/Stream I

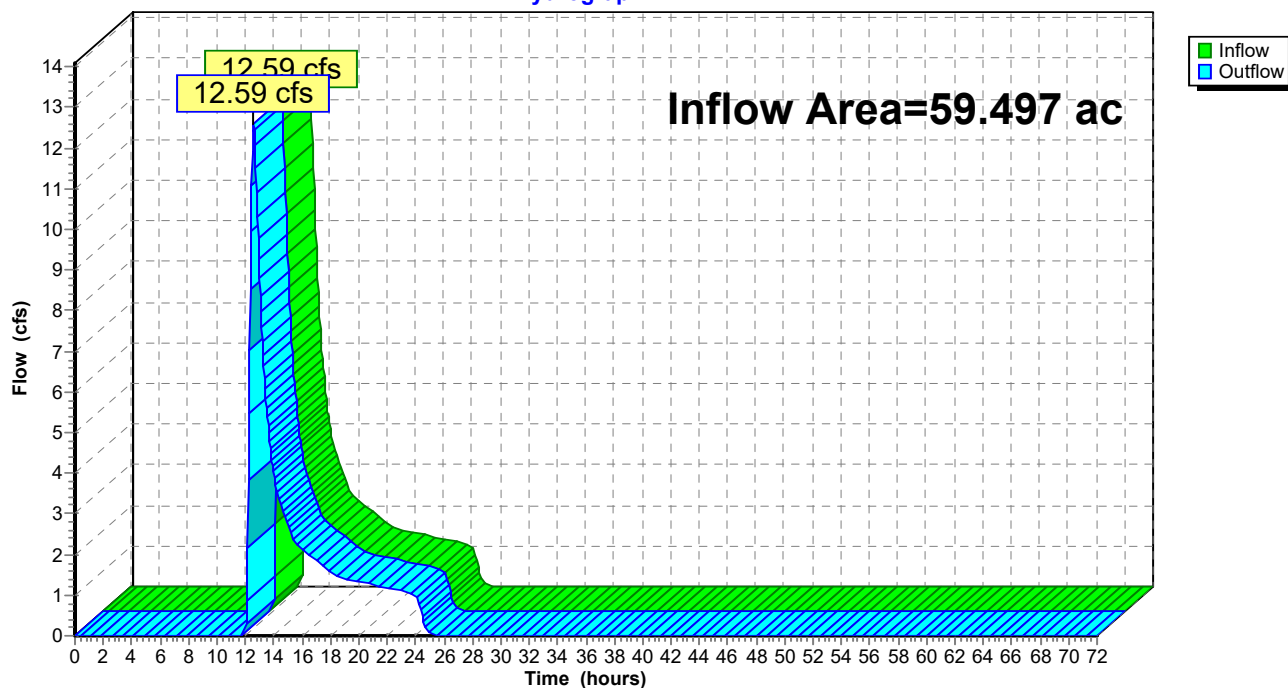
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 59.497 ac, 2.73% Impervious, Inflow Depth = 0.53" for 2-Year event
Inflow = 12.59 cfs @ 12.60 hrs, Volume= 2.608 af
Outflow = 12.59 cfs @ 12.60 hrs, Volume= 2.608 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I

Hydrograph



Existing Hydrology

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Summary for Pond BAS 10-A: EXIST BAS

Inflow Area = 0.692 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 54.00' @ 0.00 hrs Surf.Area= 220 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)↑**1=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Existing Hydrology

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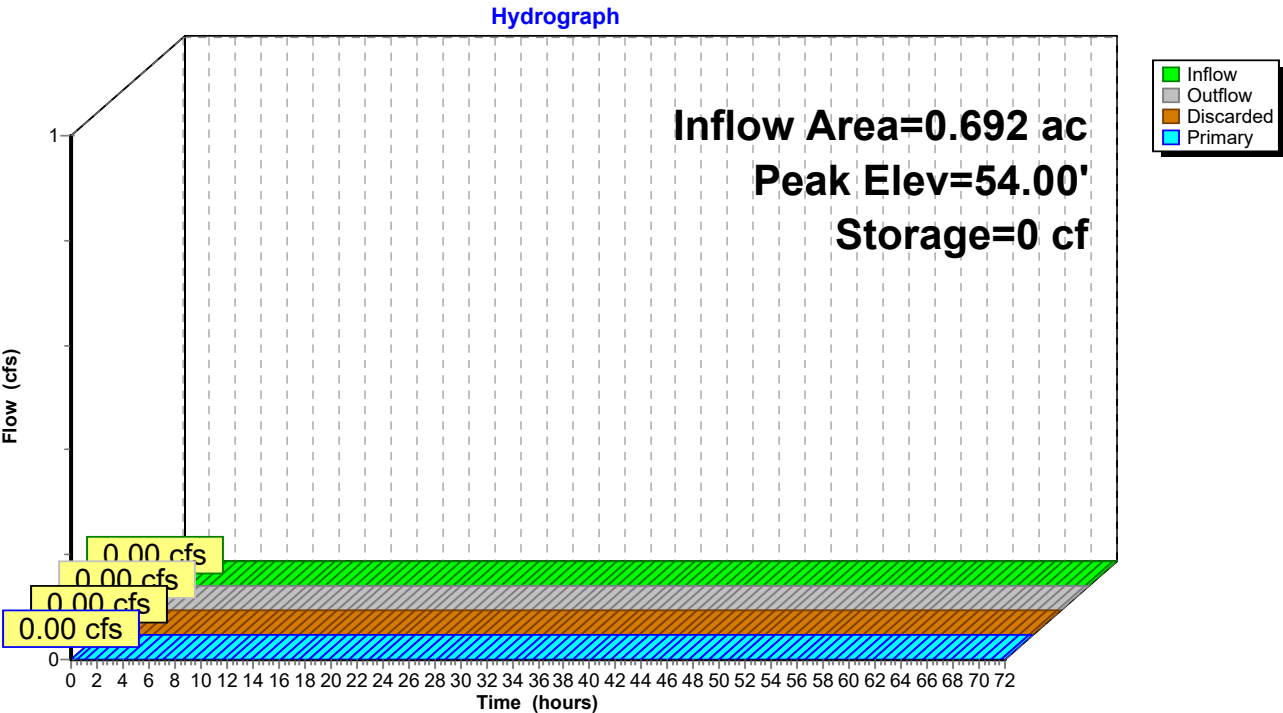
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Pond BAS 10-A: EXIST BAS



Existing Hydrology

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Summary for Pond W-N: Wetland Series N

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 0.35" for 2-Year event
 Inflow = 2.23 cfs @ 12.45 hrs, Volume= 0.970 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 87.08' @ 72.00 hrs Surf.Area= 29,385 sf Storage= 42,257 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)

↑1=RCP_Round 24" (Controls 0.00 cfs)

Existing Hydrology

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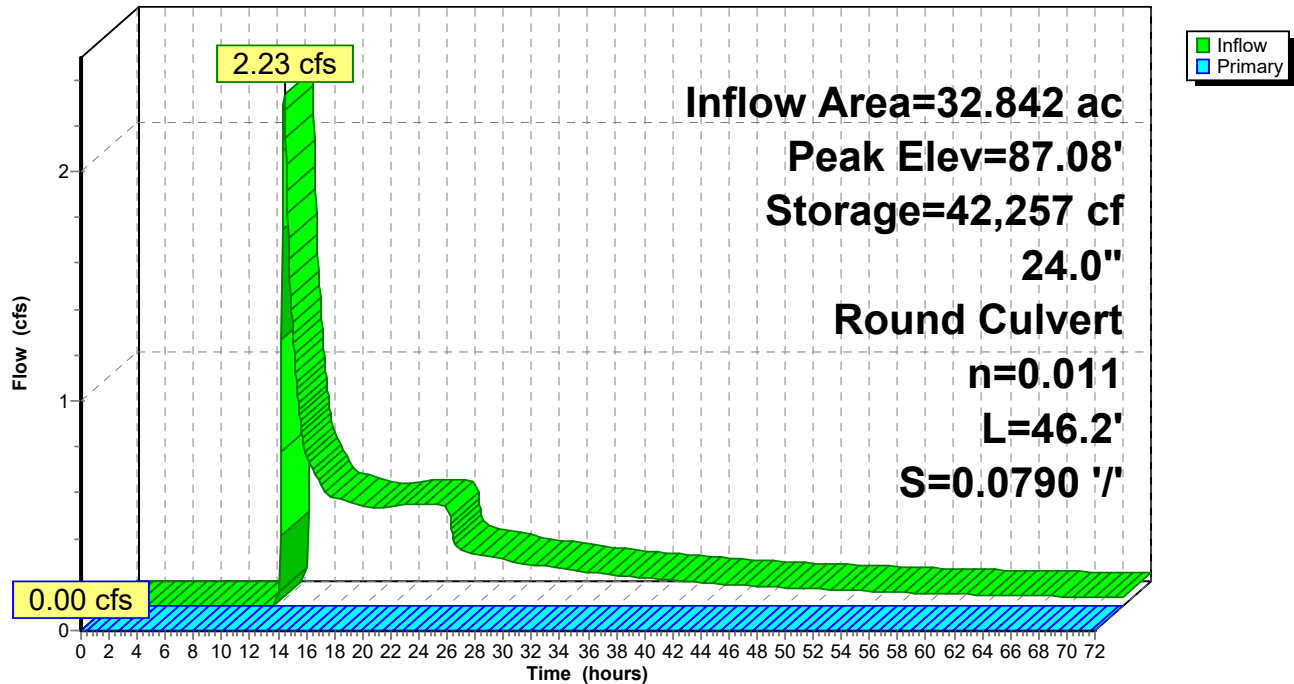
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-N: Wetland Series N

Hydrograph



Existing Hydrology

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Summary for Pond W-O: Wetland Series O

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.09" for 2-Year event
 Inflow = 2.11 cfs @ 12.47 hrs, Volume= 0.459 af
 Outflow = 0.51 cfs @ 15.00 hrs, Volume= 0.452 af, Atten= 76%, Lag= 151.9 min
 Primary = 0.51 cfs @ 15.00 hrs, Volume= 0.452 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 77.29' @ 15.00 hrs Surf.Area= 19,475 sf Storage= 6,833 cf

Plug-Flow detention time= 323.0 min calculated for 0.452 af (99% of inflow)
 Center-of-Mass det. time= 315.7 min (1,281.4 - 965.6)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S= 0.0114 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.50 cfs @ 15.00 hrs HW=77.29' (Free Discharge)

1=Culvert (Inlet Controls 0.50 cfs @ 1.60 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

Prepared by CDG

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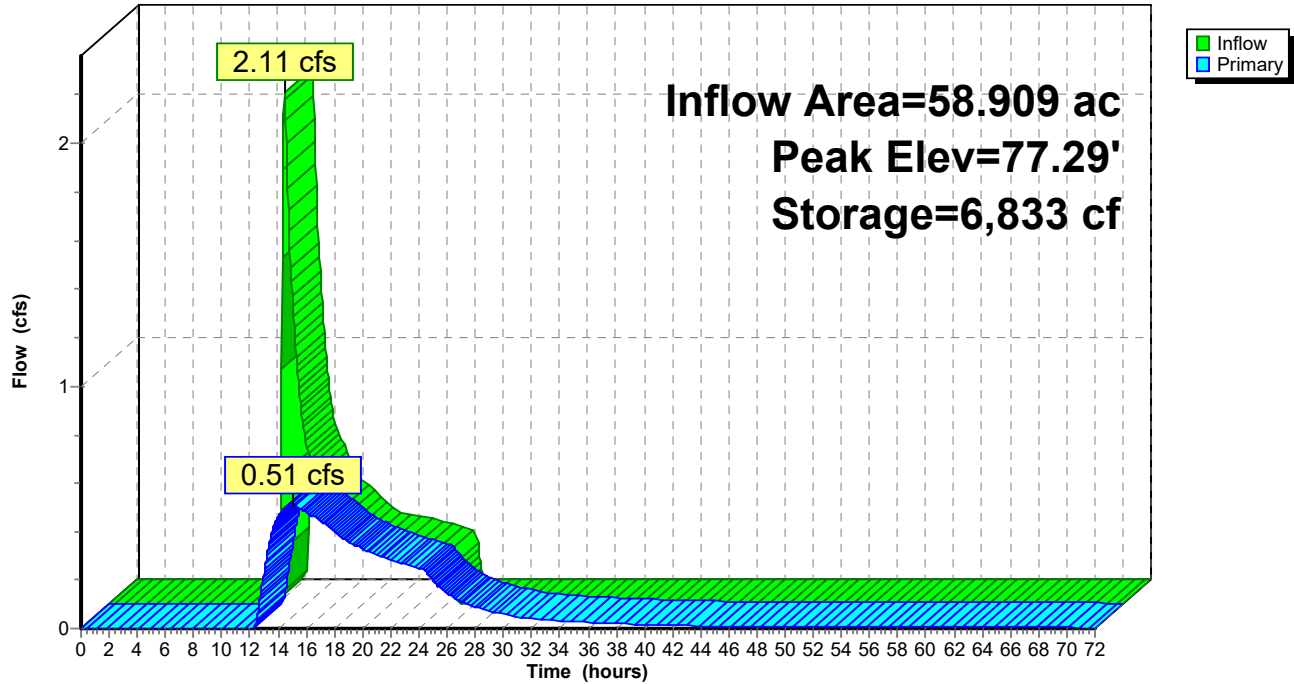
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-O: Wetland Series O

Hydrograph



Existing Hydrology

Prepared by CDG

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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth = 0.18" for 2-Year event
 Inflow = 5.89 cfs @ 12.27 hrs, Volume= 0.660 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 77.25' @ 24.90 hrs Surf.Area= 58,200 sf Storage= 28,736 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices									
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Existing Hydrology

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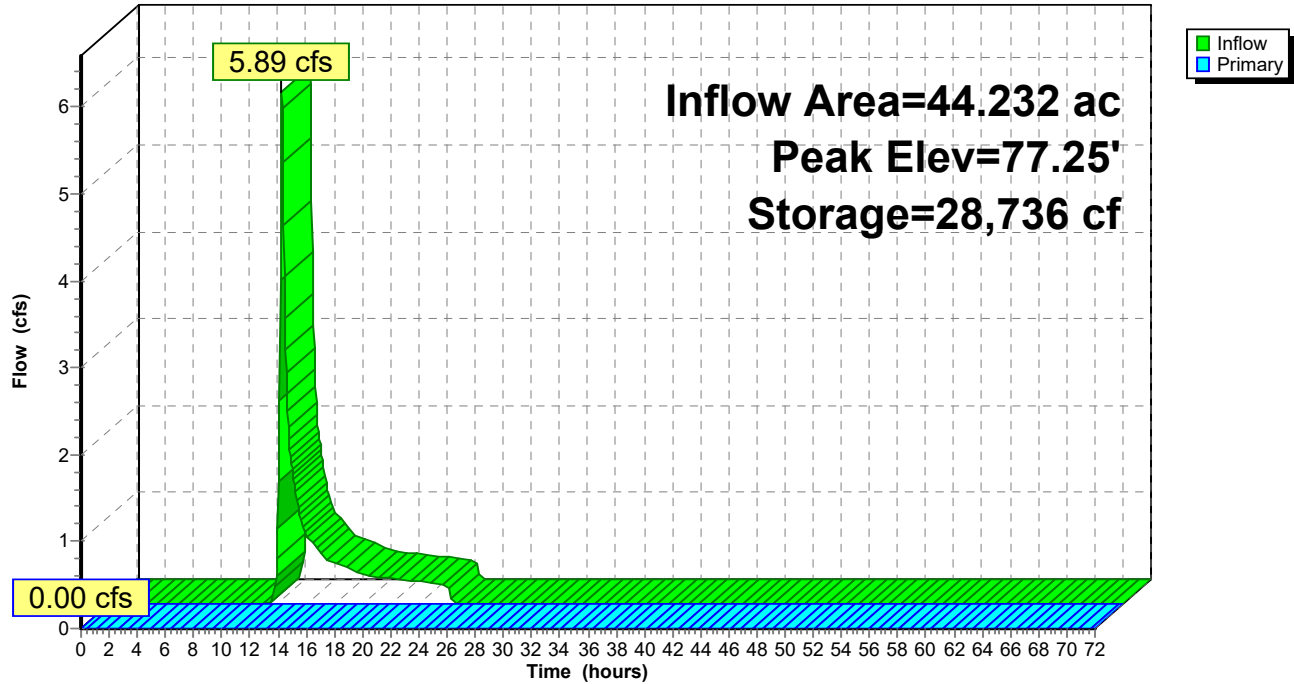
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-QP: Wetland Series Q & P

Hydrograph



Existing Hydrology

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Summary for Pond W-R: Wetland Series R

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 0.74" for 2-Year event
 Inflow = 10.21 cfs @ 12.31 hrs, Volume= 1.228 af
 Outflow = 0.25 cfs @ 24.23 hrs, Volume= 0.527 af, Atten= 98%, Lag= 715.2 min
 Primary = 0.25 cfs @ 24.23 hrs, Volume= 0.527 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 87.59' @ 24.23 hrs Surf.Area= 81,661 sf Storage= 47,379 cf

Plug-Flow detention time= 1,368.6 min calculated for 0.526 af (43% of inflow)
 Center-of-Mass det. time= 1,206.9 min (2,119.9 - 913.0)

Volume	Invert	Avail.Storage	Storage Description
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.25 cfs @ 24.23 hrs HW=87.59' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.25 cfs @ 2.12 fps)

Existing Hydrology

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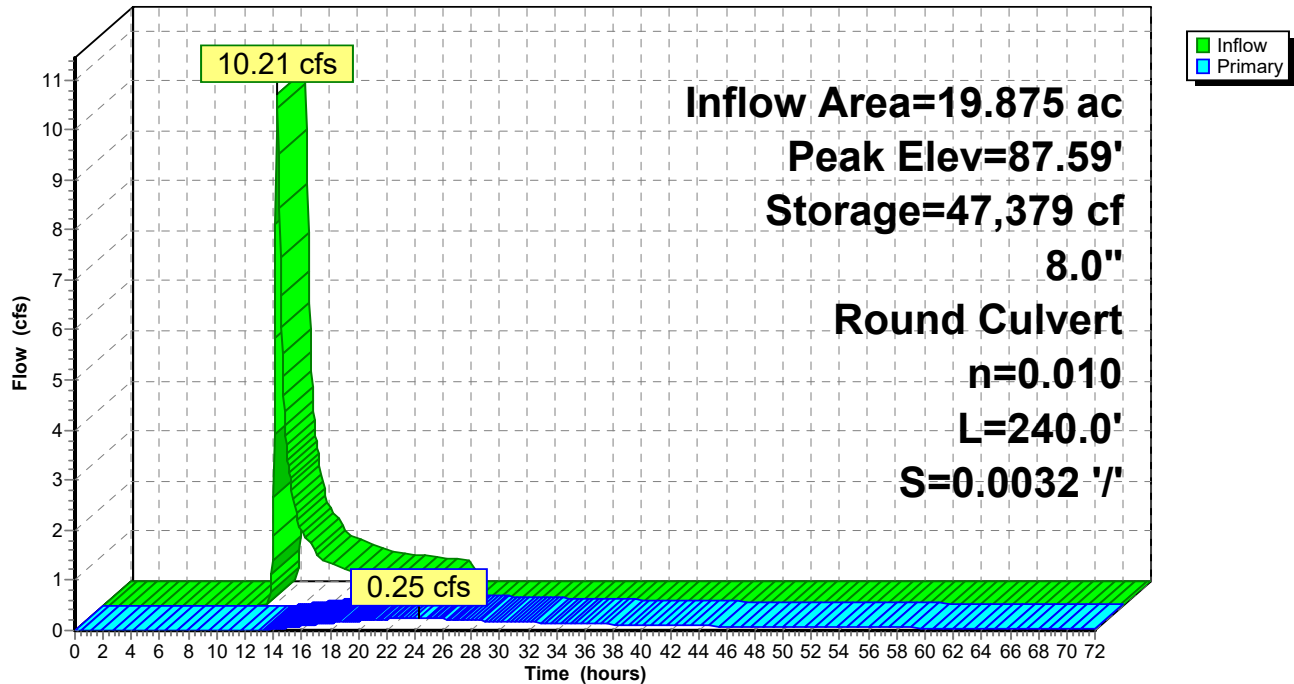
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-R: Wetland Series R

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-1:

Runoff = 11.44 cfs @ 12.23 hrs, Volume= 1.147 af, Depth= 1.13"

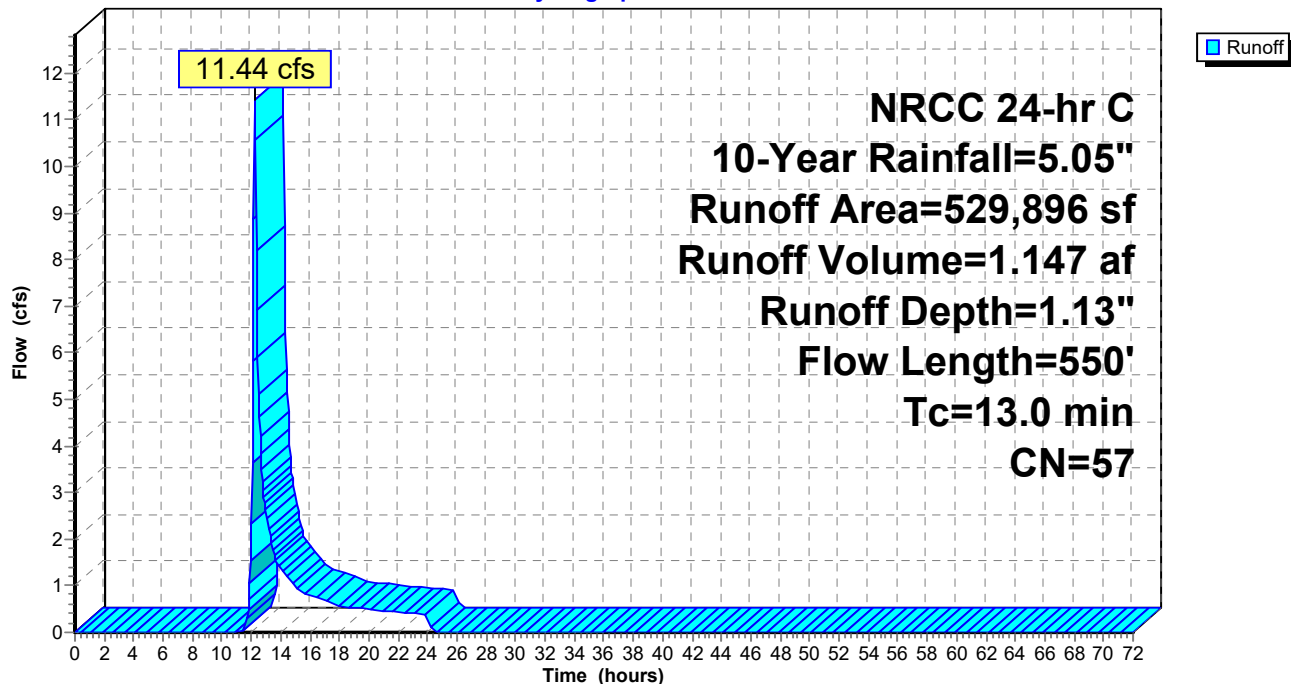
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
156,466	61	>75% Grass cover, Good, HSG B
373,430	55	Woods, Good, HSG B
529,896	57	Weighted Average
529,896		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
7.5	500	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.0	550	Total			

Subcatchment E-1:

Hydrograph



Existing Hydrology

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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment E-10a:

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth= 0.01"

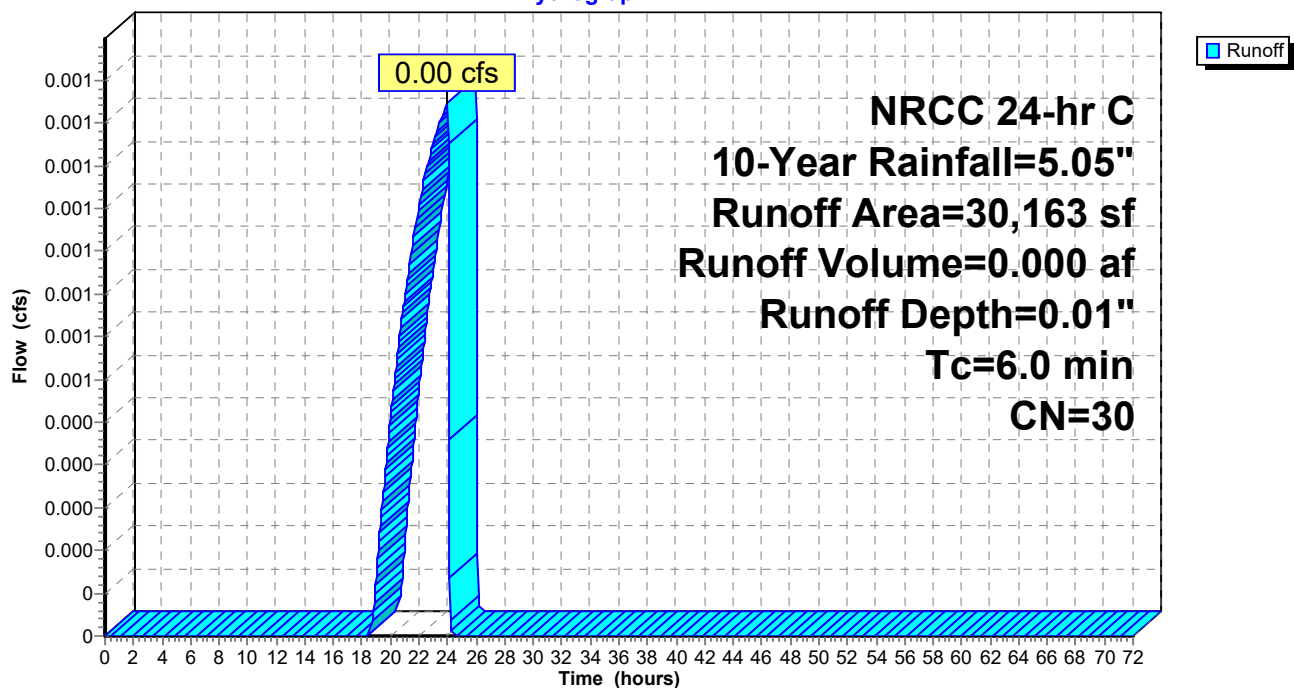
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
30,163	30	Woods, Good, HSG A
30,163		100.00% Pervious Area

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

Subcatchment E-10a:

Hydrograph



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Summary for Subcatchment E-10b:

Runoff = 0.02 cfs @ 16.87 hrs, Volume= 0.015 af, Depth= 0.07"

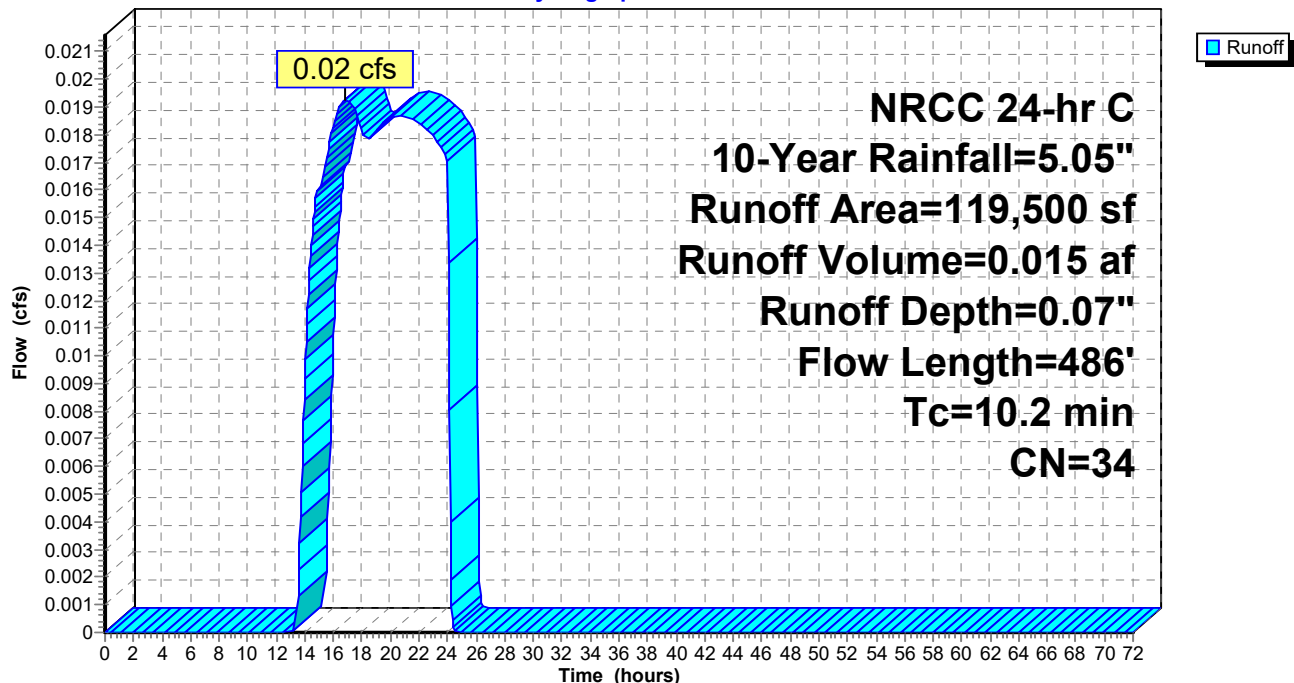
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	4,986	98	ROOF AND Paved parking, HSG A
	104,514	30	Woods, Good, HSG A
	10,000	39	>75% Grass cover, Good, HSG A
	119,500	34	Weighted Average
	114,514		95.83% Pervious Area
	4,986		4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
2.7	286	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
10.2	486	Total			

Subcatchment E-10b:

Hydrograph



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Summary for Subcatchment E-11:

Runoff = 0.61 cfs @ 12.48 hrs, Volume= 0.194 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
17,473	98	Paved parking, HSG A
88,168	55	Woods, Good, HSG B
139,460	30	Woods, Good, HSG A
31,226	39	>75% Grass cover, Good, HSG A
276,327	43	Weighted Average
258,854		93.68% Pervious Area
17,473		6.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.5	142	0.1046	1.62		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
3.4	316	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
0.5	28	0.0423	1.03		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
17.0	536	Total			

Existing Hydrology

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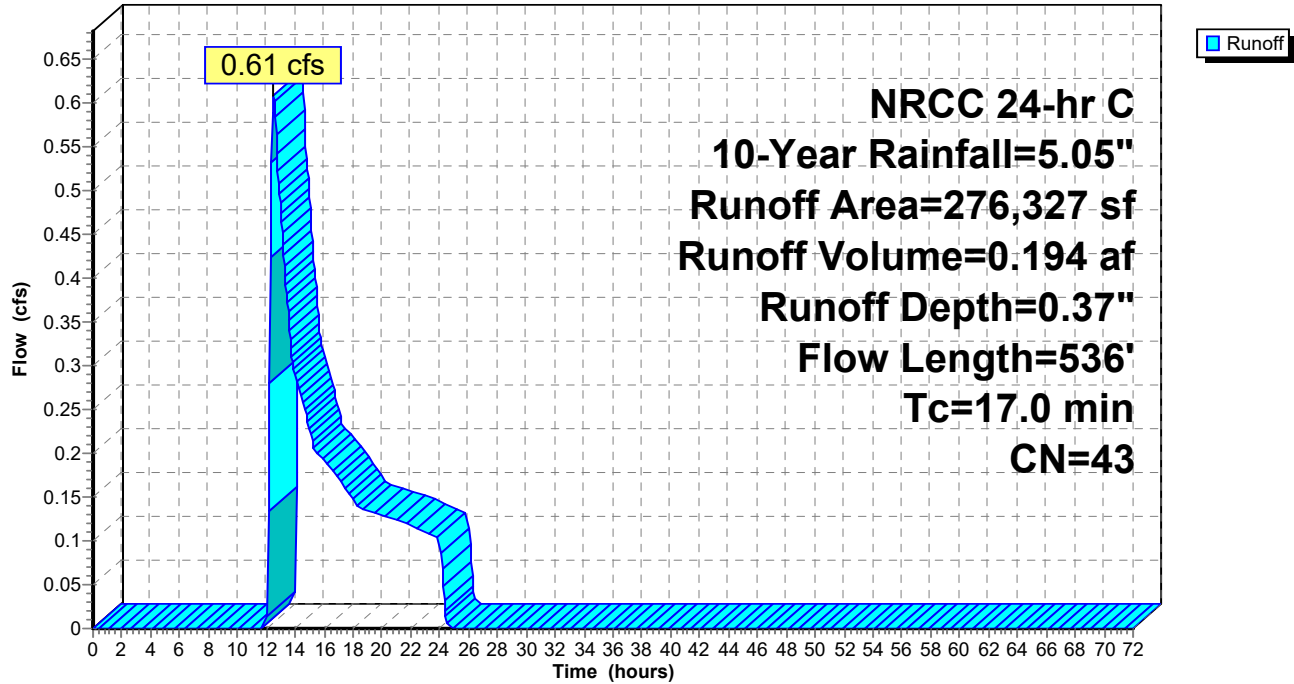
NRCC 24-hr C 10-Year Rainfall=5.05"

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Subcatchment E-11:

Hydrograph



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Summary for Subcatchment E-12:

Runoff = 4.66 cfs @ 12.45 hrs, Volume= 0.939 af, Depth= 0.61"

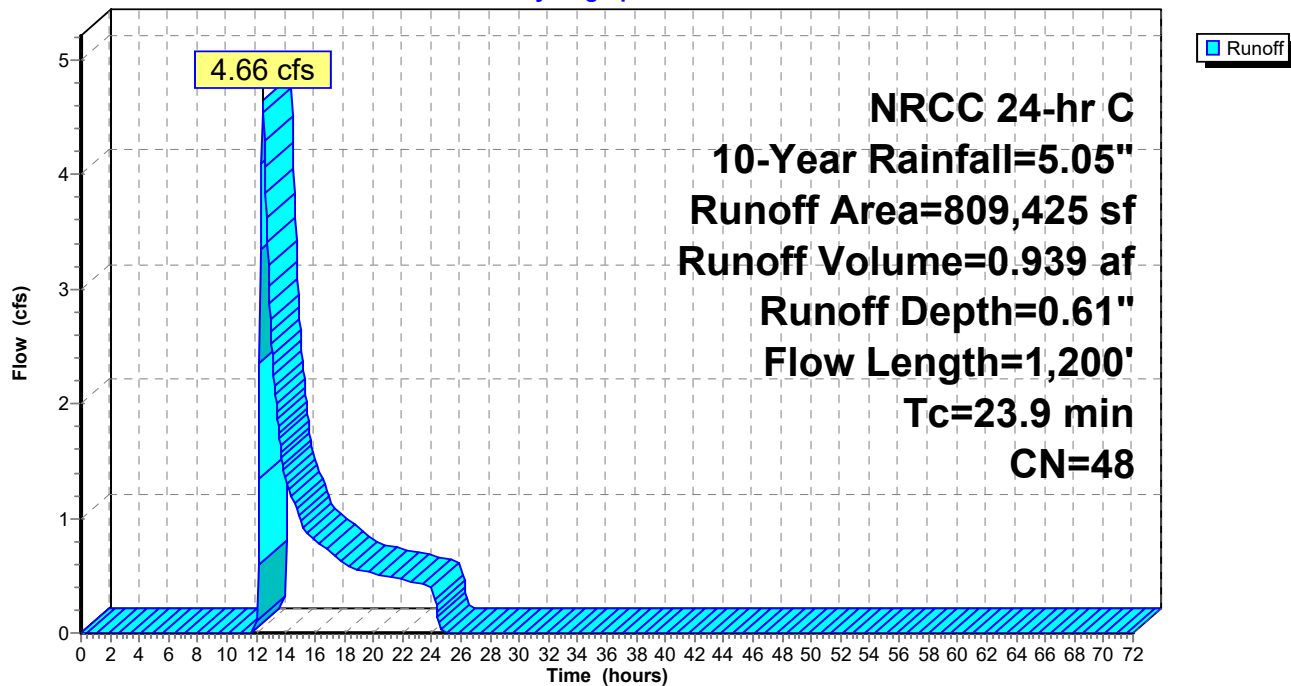
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
46,376	98	Paved parking, HSG B
382,602	32	Woods/grass comb., Good, HSG A
379,547	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
809,425	48	Weighted Average
763,049		94.27% Pervious Area
46,376		5.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
18.5	1,100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,200	Total			

Subcatchment E-12:

Hydrograph



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Summary for Subcatchment E-13:

Runoff = 0.66 cfs @ 12.21 hrs, Volume= 0.077 af, Depth= 0.71"

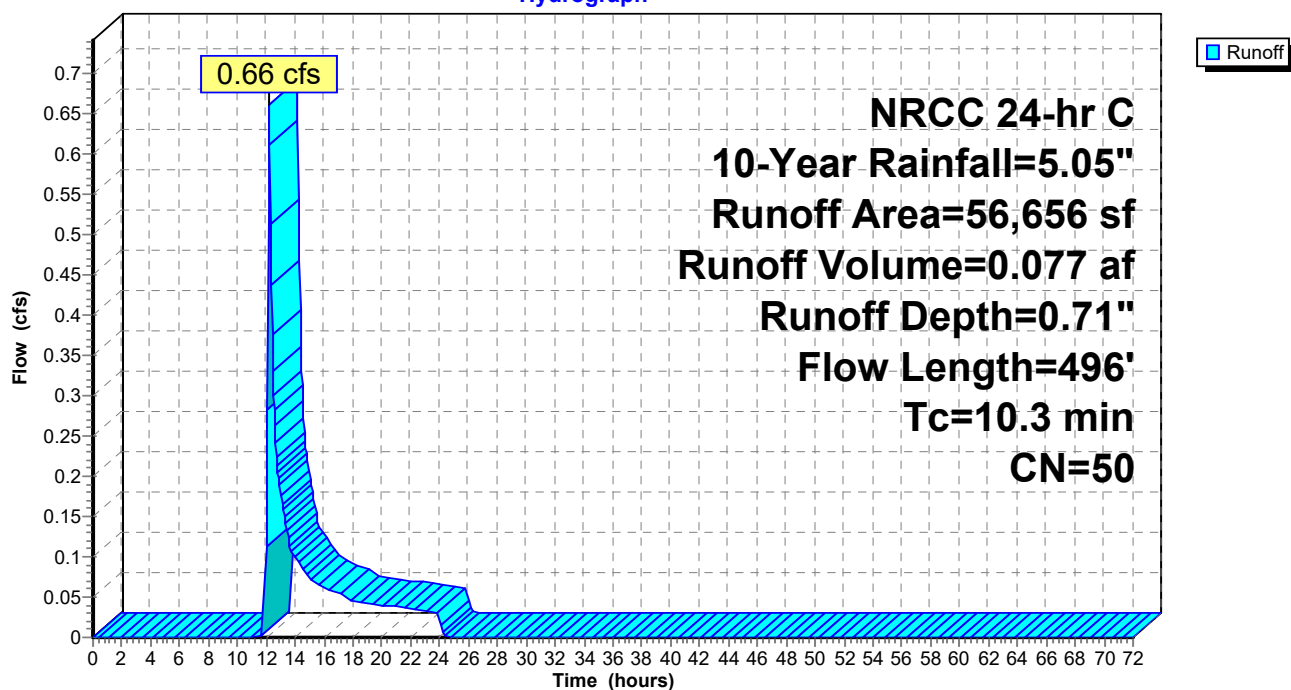
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



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Summary for Subcatchment E-14:

Runoff = 24.92 cfs @ 12.33 hrs, Volume= 3.015 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
356,270	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,248,024	59	Weighted Average
1,248,024		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

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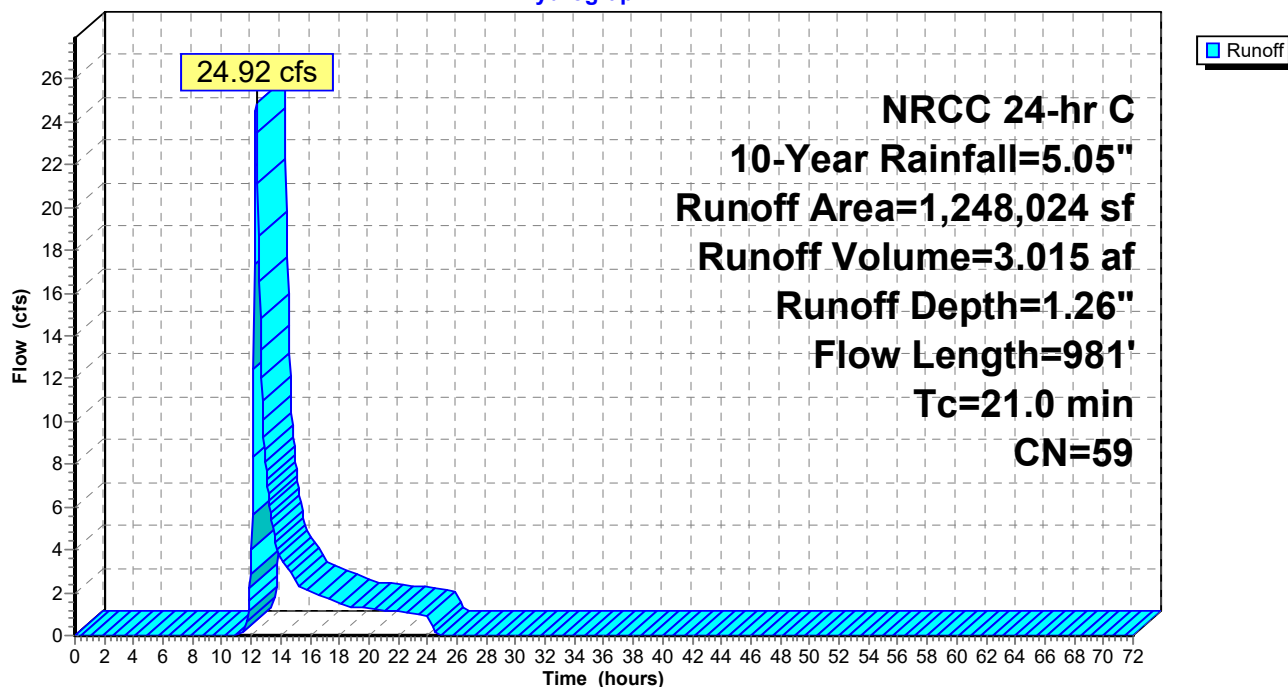
NRCC 24-hr C 10-Year Rainfall=5.05"

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Subcatchment E-14:

Hydrograph



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Summary for Subcatchment E-15:

Runoff = 2.46 cfs @ 12.24 hrs, Volume= 0.285 af, Depth= 0.83"

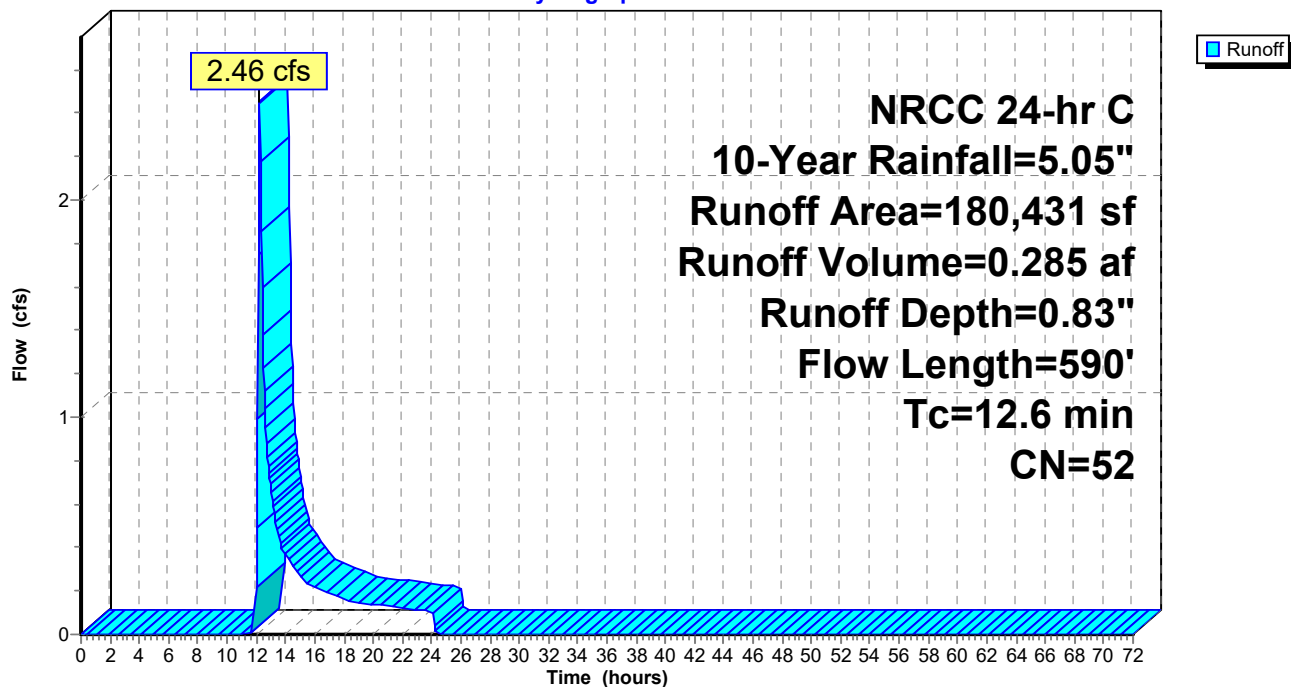
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
77,431	55	Woods, Good, HSG B
60,000	61	>75% Grass cover, Good, HSG B
37,500	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
180,431	52	Weighted Average
180,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1600	0.16		Sheet Flow, Grass Grass: Bermuda n= 0.410 P2= 3.37"
7.3	540	0.0310	1.23		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
12.6	590	Total			

Subcatchment E-15:

Hydrograph



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Summary for Subcatchment E-2:

Runoff = 36.88 cfs @ 12.55 hrs, Volume= 5.796 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
461,097	32	Woods/grass comb., Good, HSG A
636,415	58	Woods/grass comb., Good, HSG B
261,419	72	Woods/grass comb., Good, HSG C
632,109	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
* 17,483	98	Paved parking, HSG D
2,061,814	62	Weighted Average
1,991,040		96.57% Pervious Area
70,774		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Existing Hydrology

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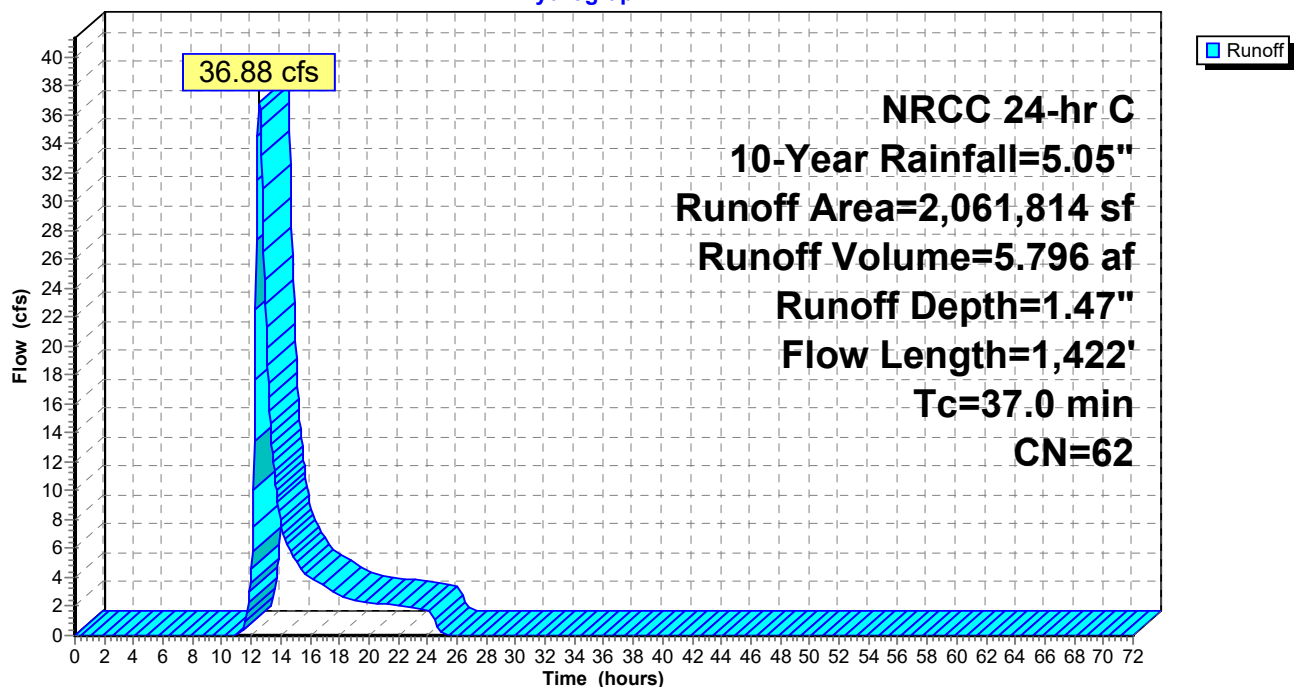
NRCC 24-hr C 10-Year Rainfall=5.05"

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Subcatchment E-2:

Hydrograph



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Summary for Subcatchment E-3:

Runoff = 27.55 cfs @ 12.29 hrs, Volume= 2.918 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	126,000	30	Woods, Good, HSG A
	70,460	39	>75% Grass cover, Good, HSG A
	160,000	61	>75% Grass cover, Good, HSG B
	109,000	55	Woods, Good, HSG B
*	15,800	98	Roof and Pavement
	110,000	77	Woods, Good, HSG D
	105,000	80	>75% Grass cover, Good, HSG D
	865,760	66	Weighted Average
	680,460		78.60% Pervious Area
	185,300		21.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

Existing Hydrology

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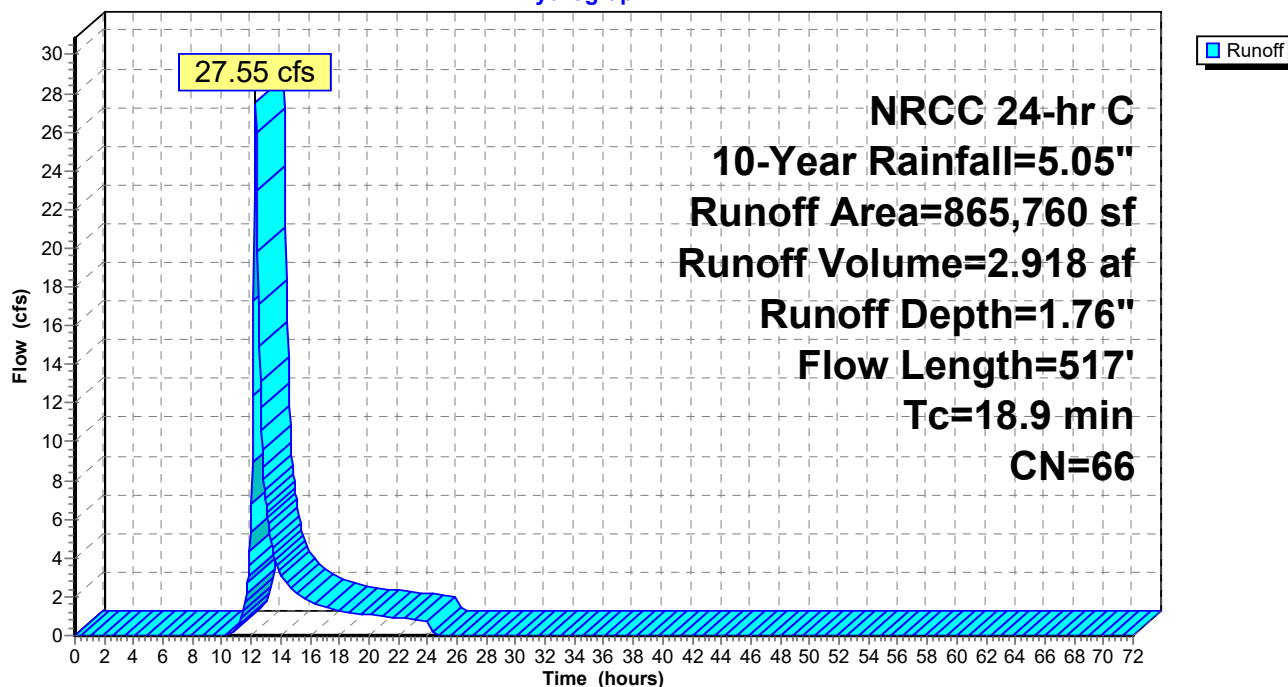
NRCC 24-hr C 10-Year Rainfall=5.05"

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Subcatchment E-3:

Hydrograph



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Summary for Subcatchment E-4:

Runoff = 0.40 cfs @ 12.18 hrs, Volume= 0.061 af, Depth= 0.51"

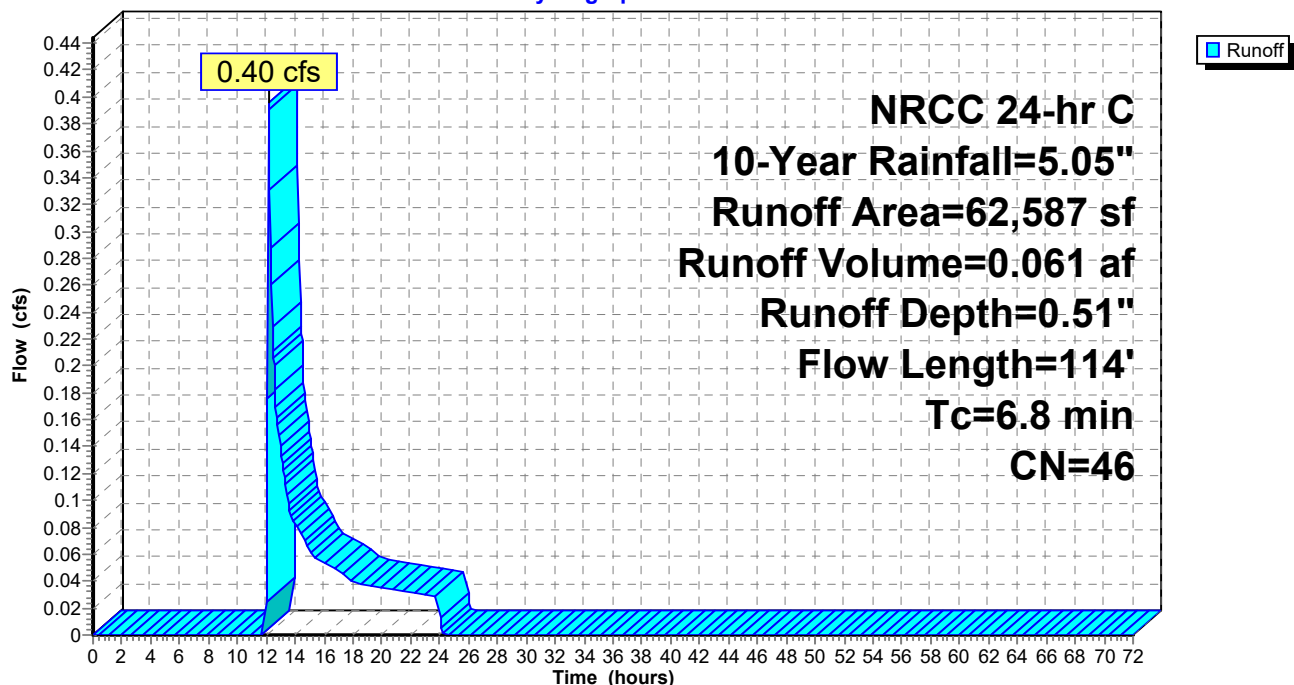
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
17,800	55	Woods, Good, HSG B
6,800	30	Woods, Good, HSG A
34,006	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
62,587	46	Weighted Average
58,606		93.64% Pervious Area
3,981		6.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0173	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.2	18	0.0449	1.48		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.8	46	0.0362	0.95		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
6.8	114	Total			

Subcatchment E-4:

Hydrograph



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Summary for Subcatchment E-5:

Runoff = 9.91 cfs @ 12.37 hrs, Volume= 1.293 af, Depth= 1.20"

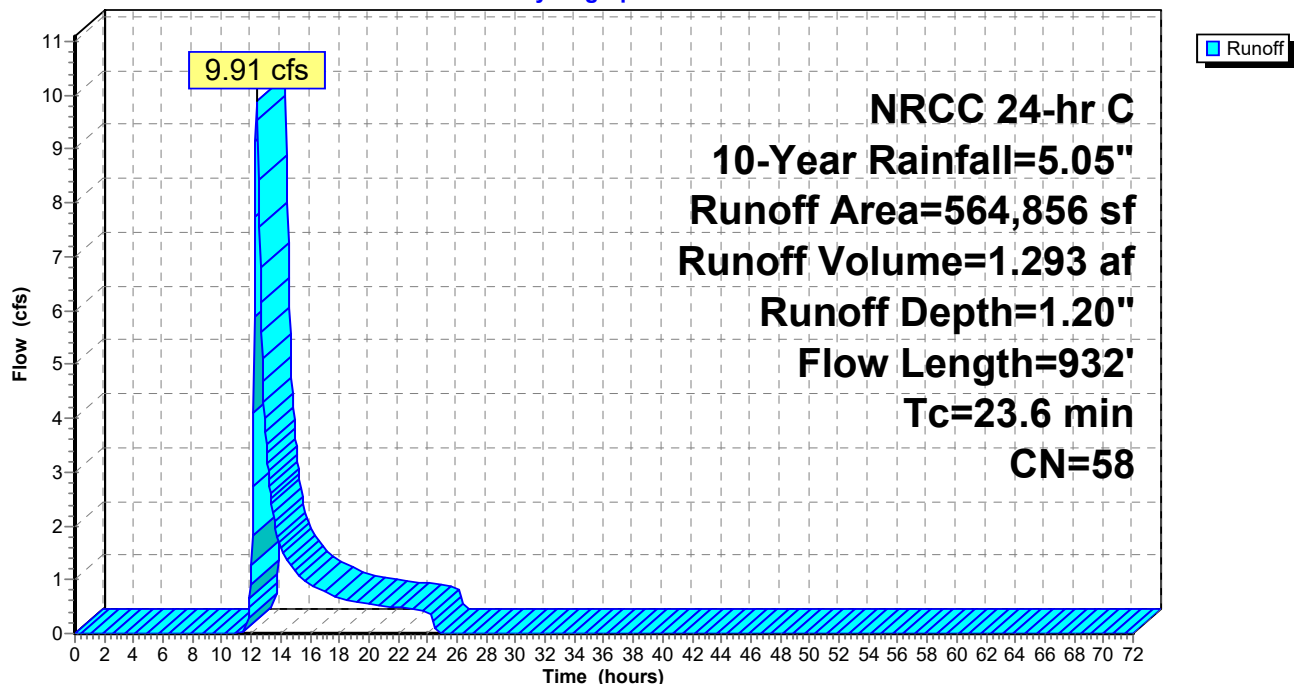
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
97,200	39	>75% Grass cover, Good, HSG A
60,000	30	Woods, Good, HSG A
148,500	55	Woods, Good, HSG B
128,700	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
106,356	80	>75% Grass cover, Good, HSG D
564,856	58	Weighted Average
564,856		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0296	0.08		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
5.8	355	0.0215	1.03		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.5	527	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.6	932	Total			

Subcatchment E-5:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-6:

Runoff = 16.46 cfs @ 12.25 hrs, Volume= 1.601 af, Depth= 1.69"

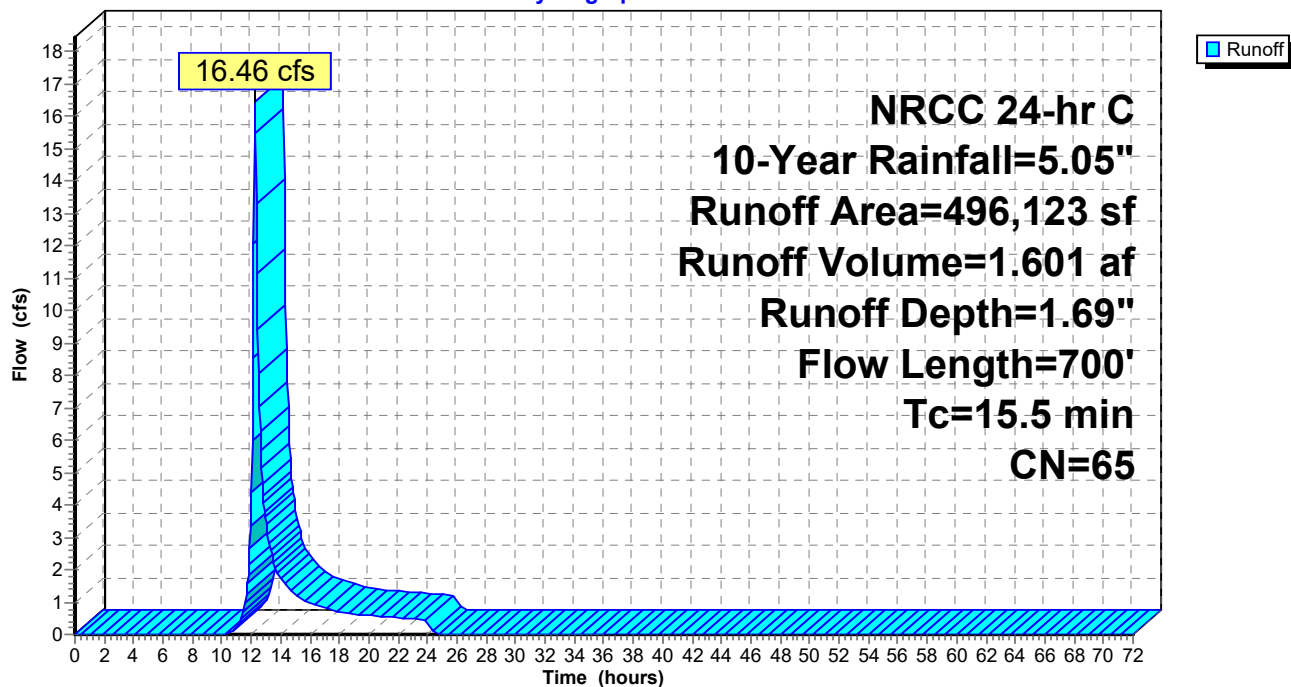
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
298,100	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
496,123	65	Weighted Average
496,123		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
7.3	600	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.5	700	Total			

Subcatchment E-6:

Hydrograph



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Summary for Subcatchment E-7:

Runoff = 10.30 cfs @ 12.38 hrs, Volume= 1.384 af, Depth= 1.13"

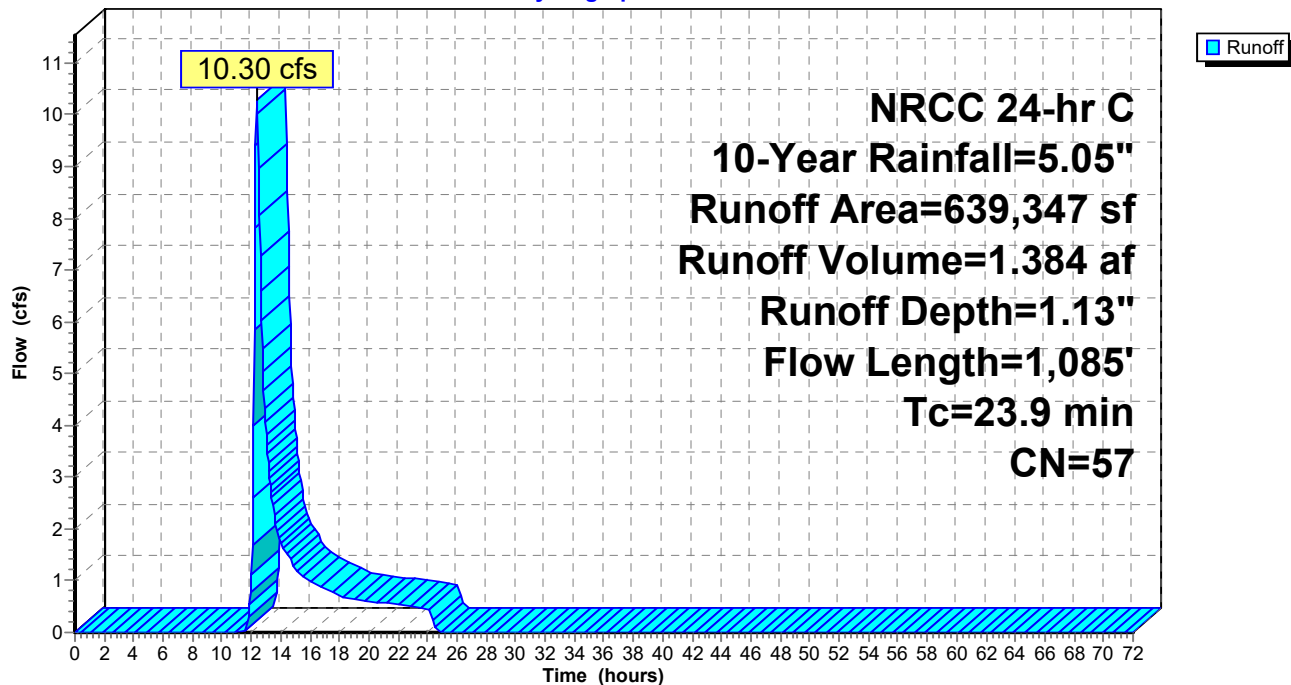
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
436,868	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
639,347	57	Weighted Average
606,609		94.88% Pervious Area
32,738		5.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment E-7:

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment E-8:

Runoff = 3.37 cfs @ 12.16 hrs, Volume= 0.263 af, Depth= 1.26"

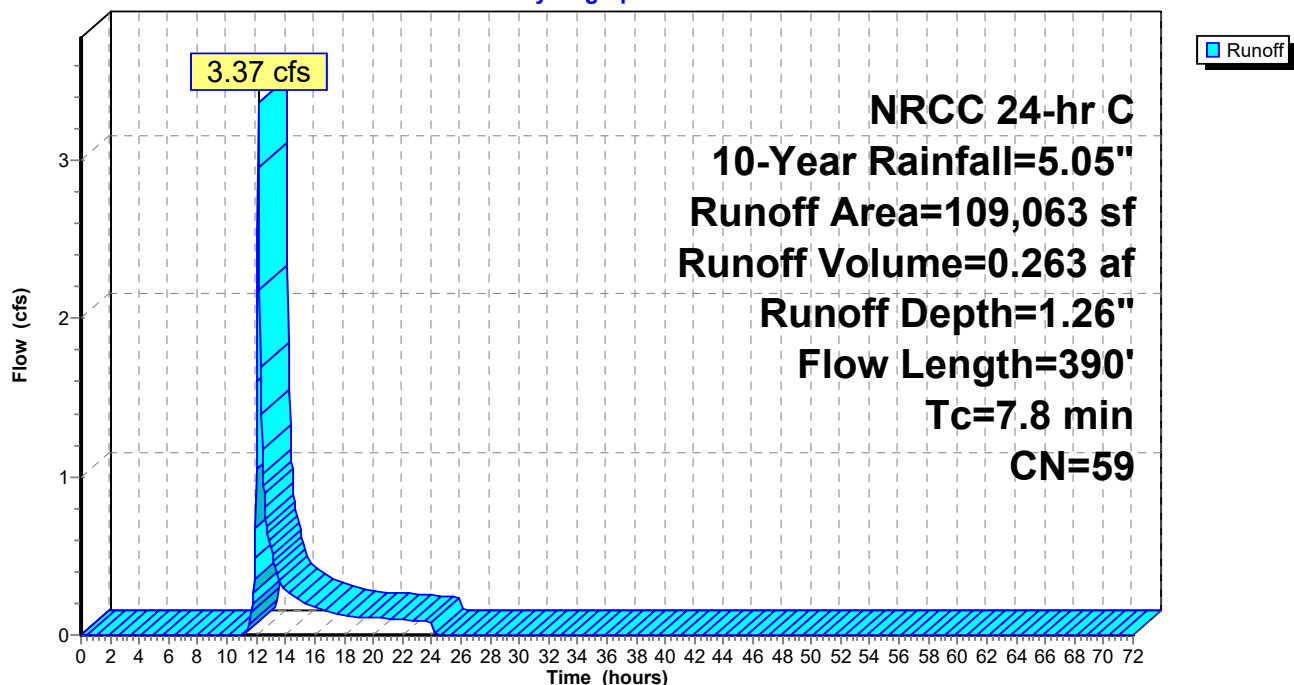
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
7,994	98	Paved parking, HSG B
5,726	98	Water Surface, 0% imp, HSG A
12,549	39	>75% Grass cover, Good, HSG A
43,794	61	>75% Grass cover, Good, HSG B
6,600	30	Woods, Good, HSG A
32,400	55	Woods, Good, HSG B
109,063	59	Weighted Average
101,069		92.67% Pervious Area
7,994		7.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment E-8:

Hydrograph



Existing Hydrology

Prepared by CDG

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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment E-9:

Runoff = 6.14 cfs @ 12.27 hrs, Volume= 0.743 af, Depth= 0.88"

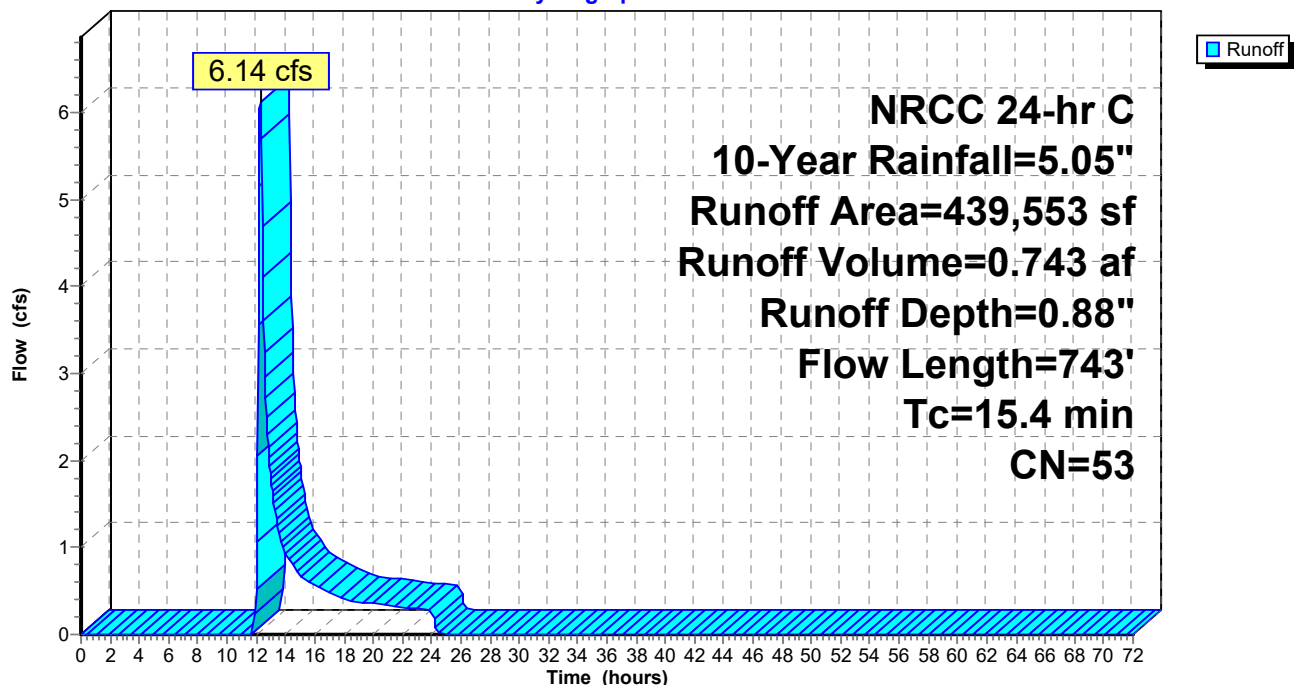
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
239,355	30	Woods, Good, HSG A
140,198	98	Paved parking, HSG A
60,000	39	>75% Grass cover, Good, HSG A
439,553	53	Weighted Average
299,355		68.10% Pervious Area
140,198		31.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0600	0.12		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.37"
1.1	318	0.1114	5.01		Shallow Concentrated Flow, HR-A Grassed Waterway Kv= 15.0 fps
0.8	325	0.1139	6.85		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
15.4	743	Total			

Subcatchment E-9:

Hydrograph



Existing Hydrology

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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Reach DP-1: Wetland Series R

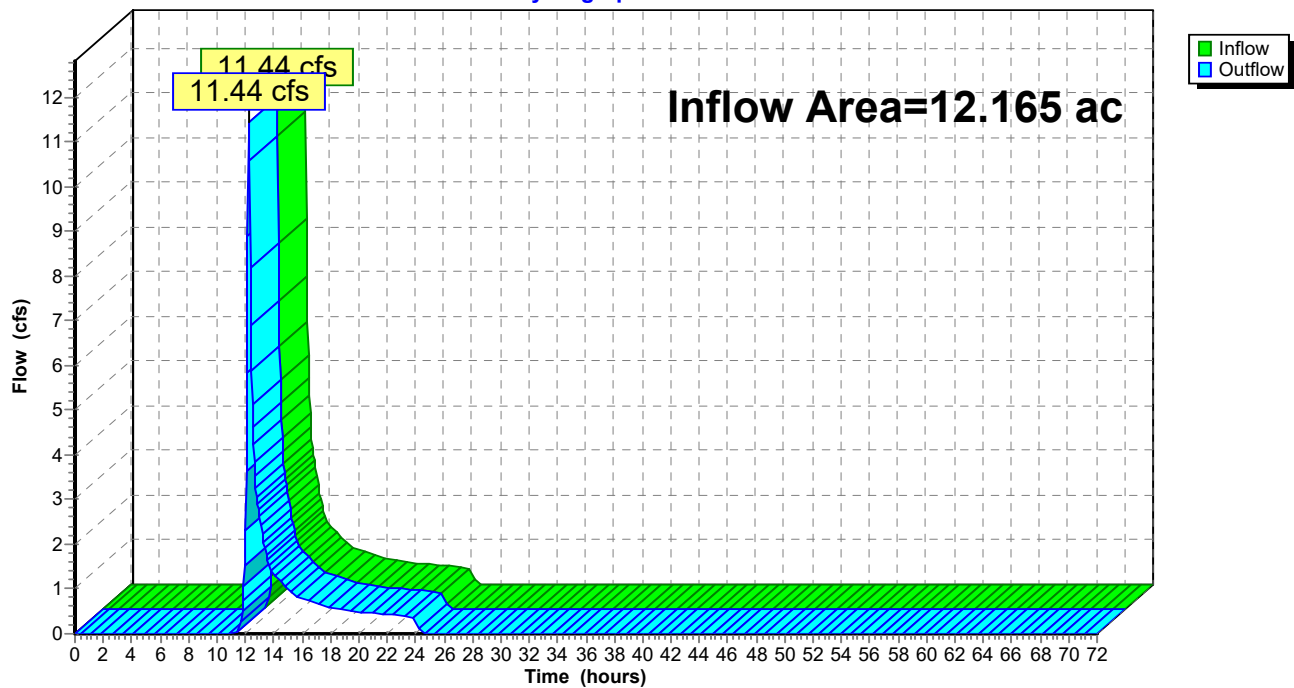
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.165 ac, 0.00% Impervious, Inflow Depth = 1.13" for 10-Year event
Inflow = 11.44 cfs @ 12.23 hrs, Volume= 1.147 af
Outflow = 11.44 cfs @ 12.23 hrs, Volume= 1.147 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R

Hydrograph



Existing Hydrology

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Summary for Reach DP-10: West Elm Street

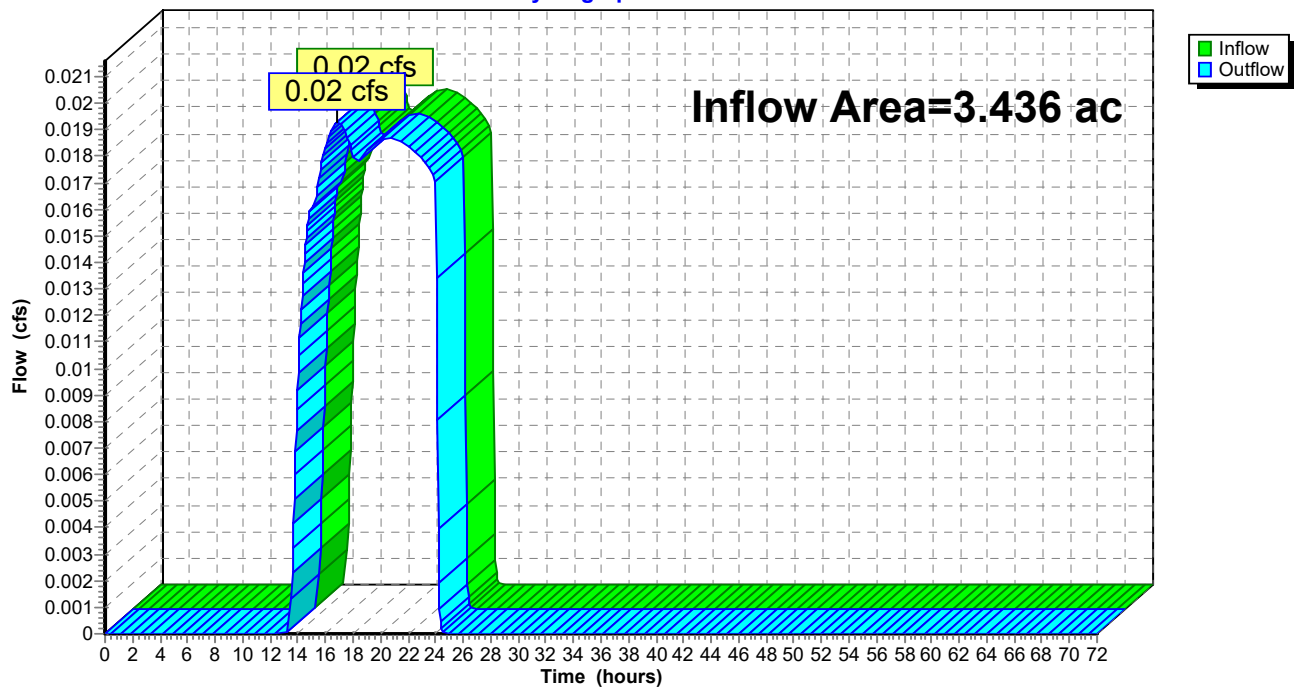
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.436 ac, 3.33% Impervious, Inflow Depth = 0.05" for 10-Year event
Inflow = 0.02 cfs @ 16.87 hrs, Volume= 0.015 af
Outflow = 0.02 cfs @ 16.87 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-11: Wetland Series A

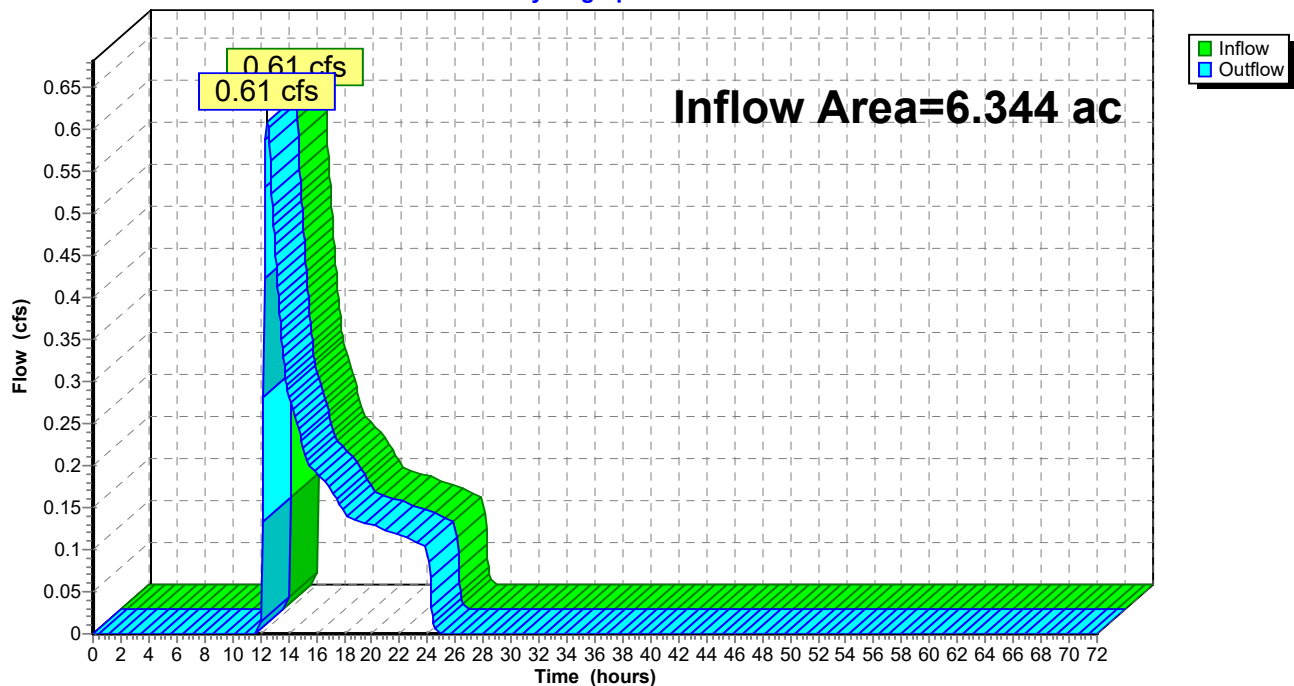
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.344 ac, 6.32% Impervious, Inflow Depth = 0.37" for 10-Year event
Inflow = 0.61 cfs @ 12.48 hrs, Volume= 0.194 af
Outflow = 0.61 cfs @ 12.48 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A

Hydrograph



Existing Hydrology

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Summary for Reach DP-12: Wetland Series A

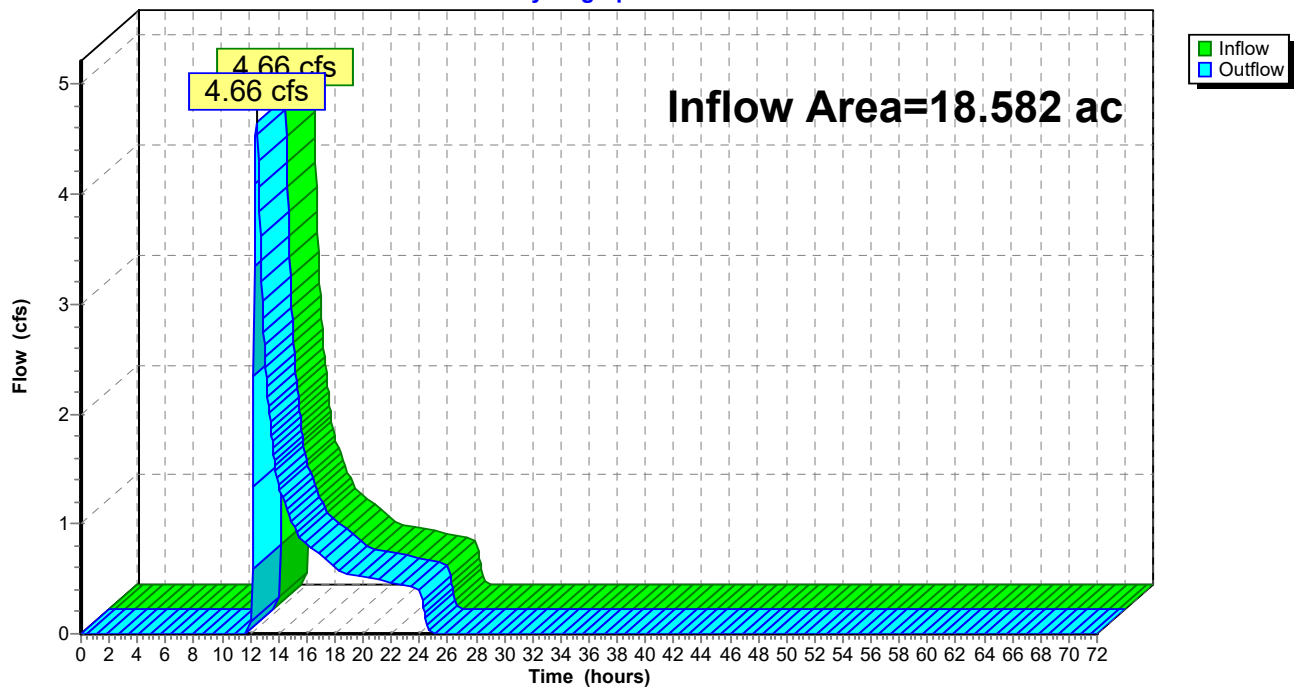
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.582 ac, 5.73% Impervious, Inflow Depth = 0.61" for 10-Year event
Inflow = 4.66 cfs @ 12.45 hrs, Volume= 0.939 af
Outflow = 4.66 cfs @ 12.45 hrs, Volume= 0.939 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A

Hydrograph



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Summary for Reach DP-13: Wetland Series B

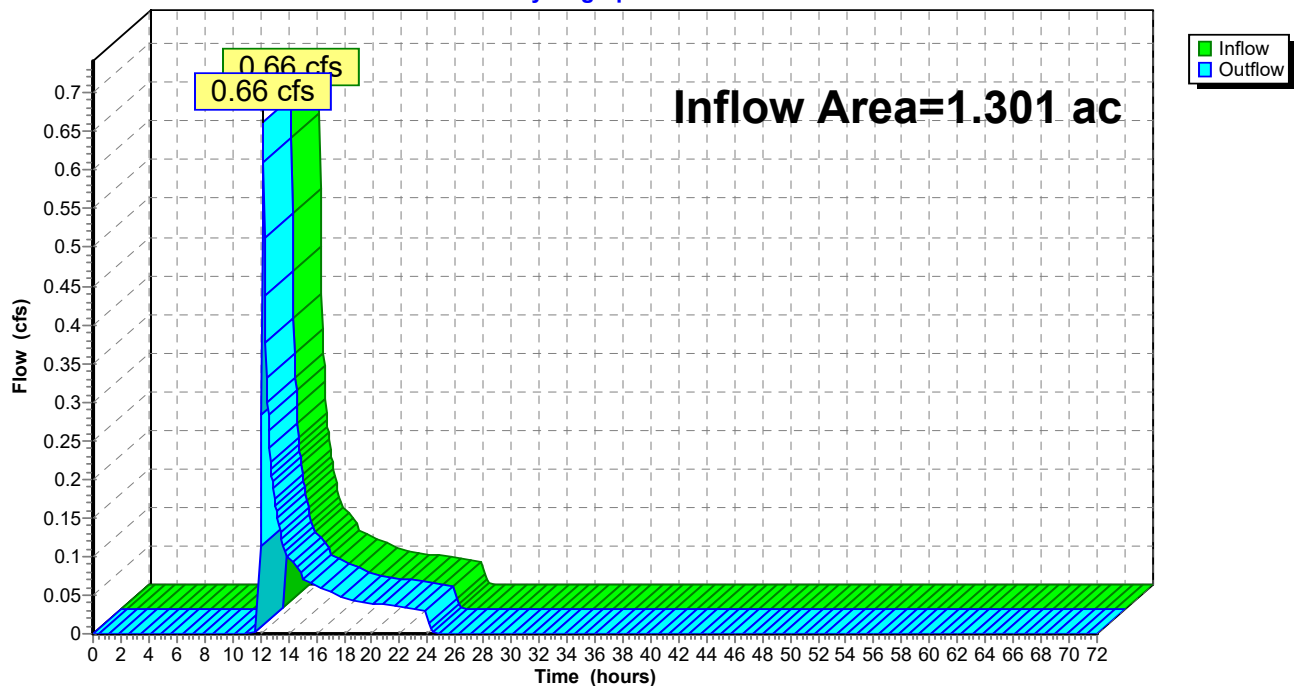
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 0.71" for 10-Year event
Inflow = 0.66 cfs @ 12.21 hrs, Volume= 0.077 af
Outflow = 0.66 cfs @ 12.21 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B

Hydrograph



Existing Hydrology

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Summary for Reach DP-14: Wetland Series C,D,E,,K,J

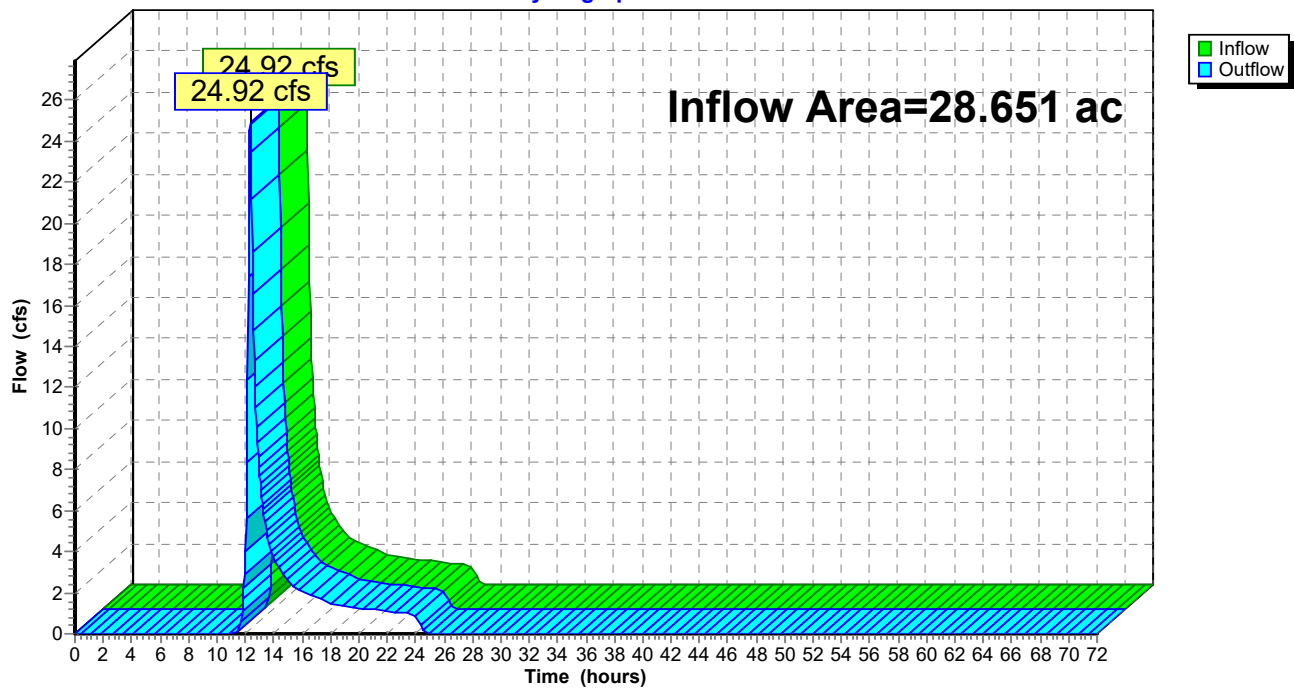
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.651 ac, 0.00% Impervious, Inflow Depth = 1.26" for 10-Year event
Inflow = 24.92 cfs @ 12.33 hrs, Volume= 3.015 af
Outflow = 24.92 cfs @ 12.33 hrs, Volume= 3.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J

Hydrograph



Existing Hydrology

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Summary for Reach DP-15: Wetland Series H

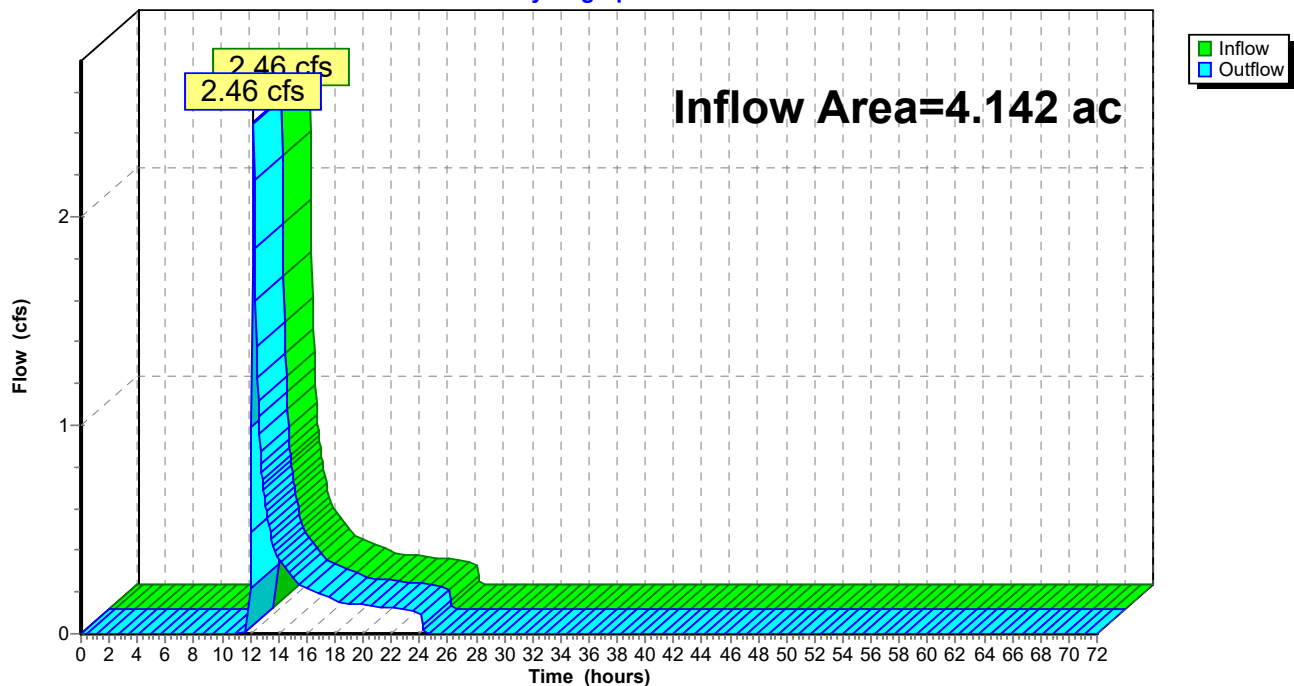
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.142 ac, 0.00% Impervious, Inflow Depth = 0.83" for 10-Year event
Inflow = 2.46 cfs @ 12.24 hrs, Volume= 0.285 af
Outflow = 2.46 cfs @ 12.24 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H

Hydrograph



Existing Hydrology

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Summary for Reach DP-2: Wetland Series I

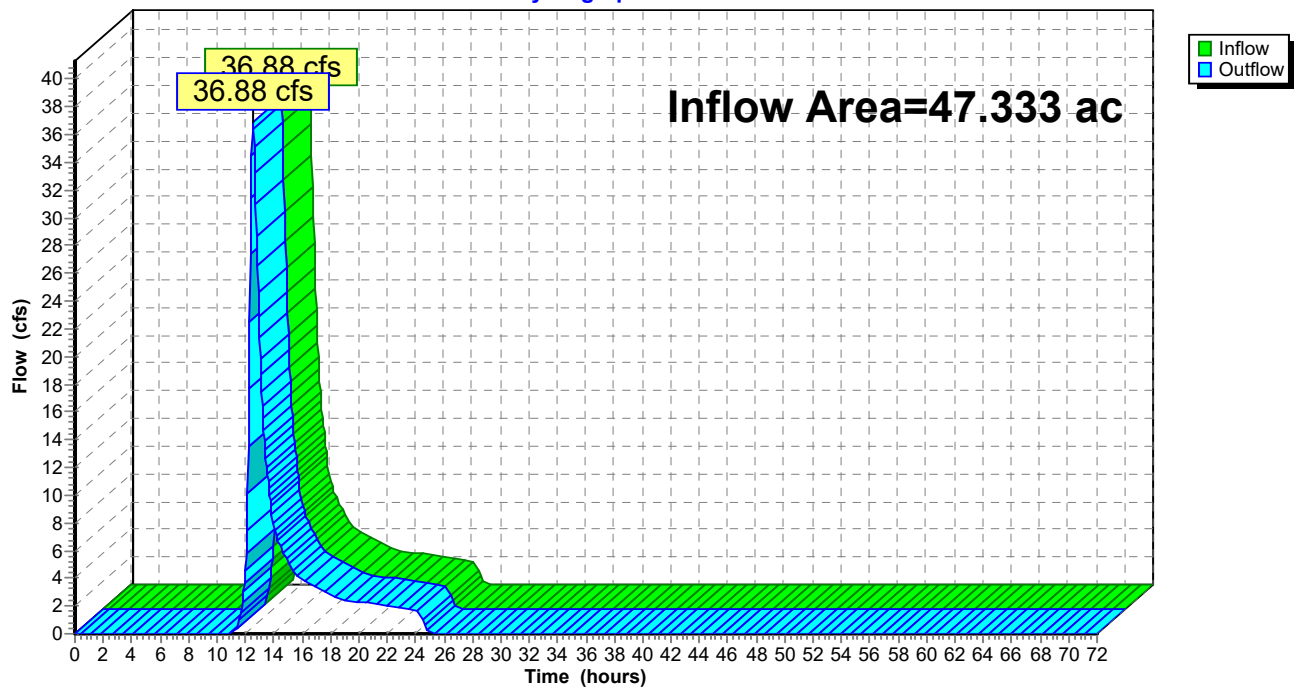
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.333 ac, 3.43% Impervious, Inflow Depth = 1.47" for 10-Year event
Inflow = 36.88 cfs @ 12.55 hrs, Volume= 5.796 af
Outflow = 36.88 cfs @ 12.55 hrs, Volume= 5.796 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I

Hydrograph



Existing Hydrology

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Summary for Reach DP-3: W-R

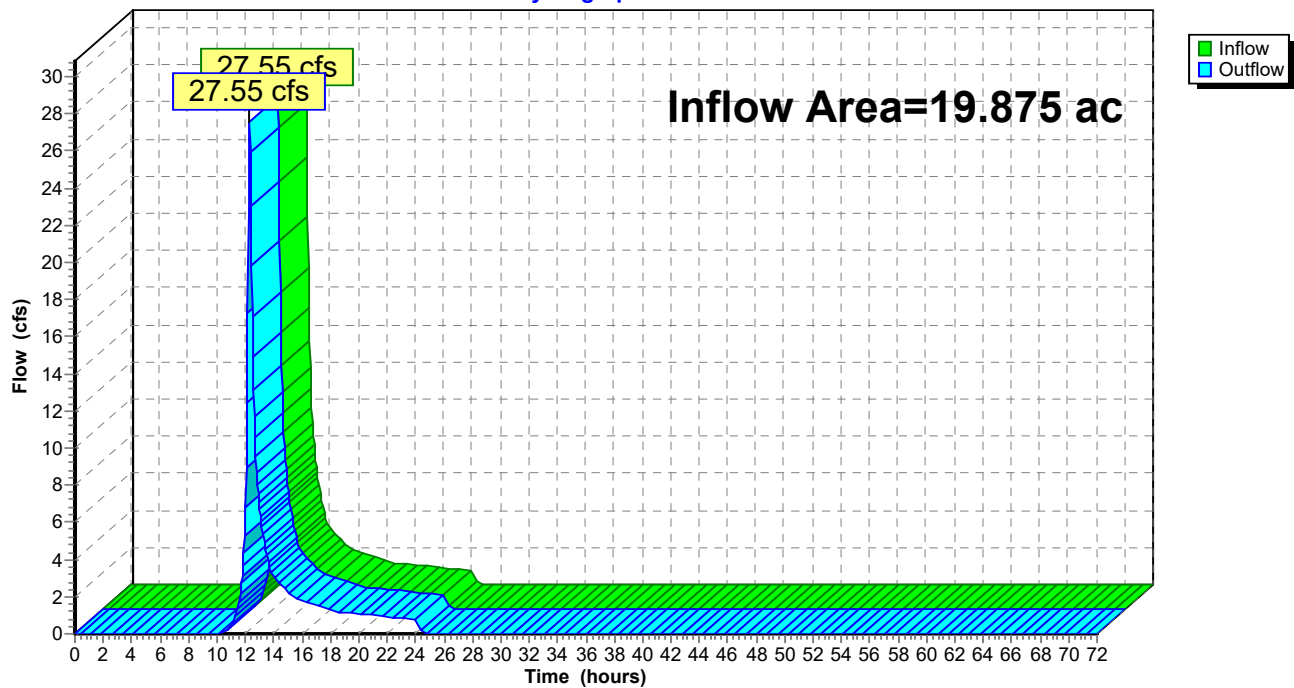
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 1.76" for 10-Year event
Inflow = 27.55 cfs @ 12.29 hrs, Volume= 2.918 af
Outflow = 27.55 cfs @ 12.29 hrs, Volume= 2.918 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: W-R

Hydrograph



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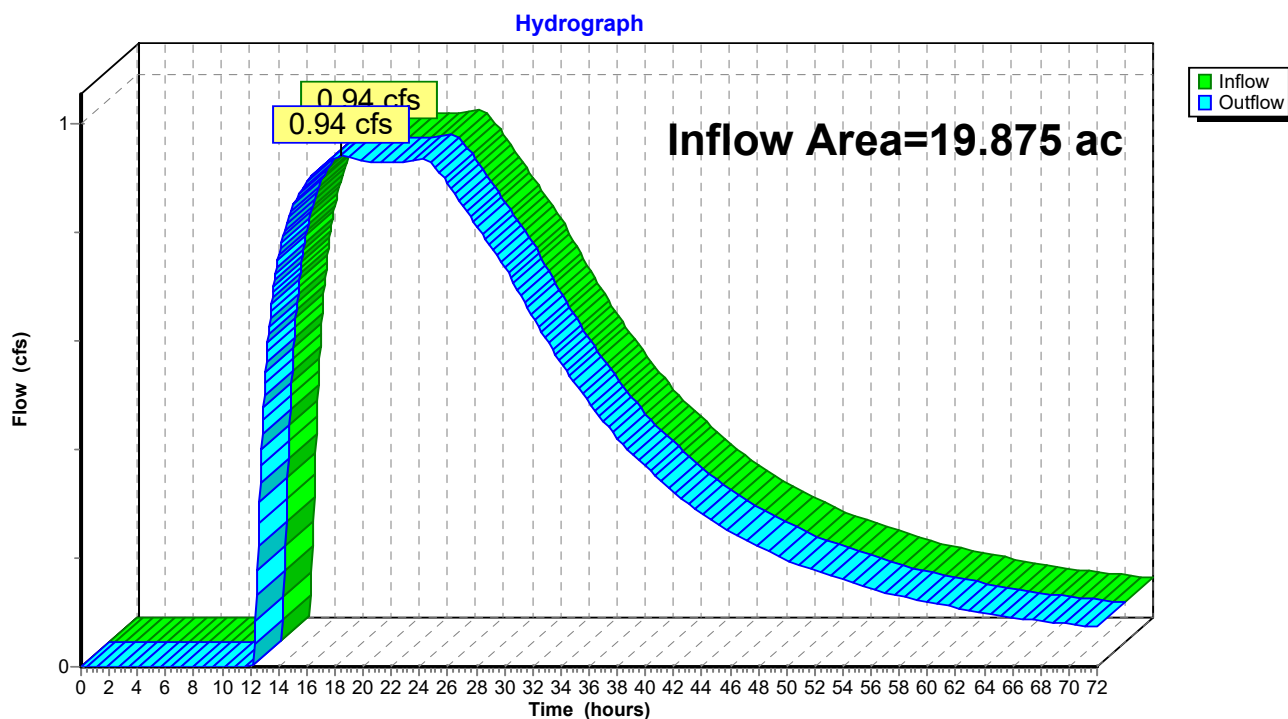
Summary for Reach DP-3 OUT: 8" Copper Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth > 1.28" for 10-Year event
Inflow = 0.94 cfs @ 18.44 hrs, Volume= 2.125 af
Outflow = 0.94 cfs @ 18.44 hrs, Volume= 2.125 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe



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Summary for Reach DP-4: Dwelley Street

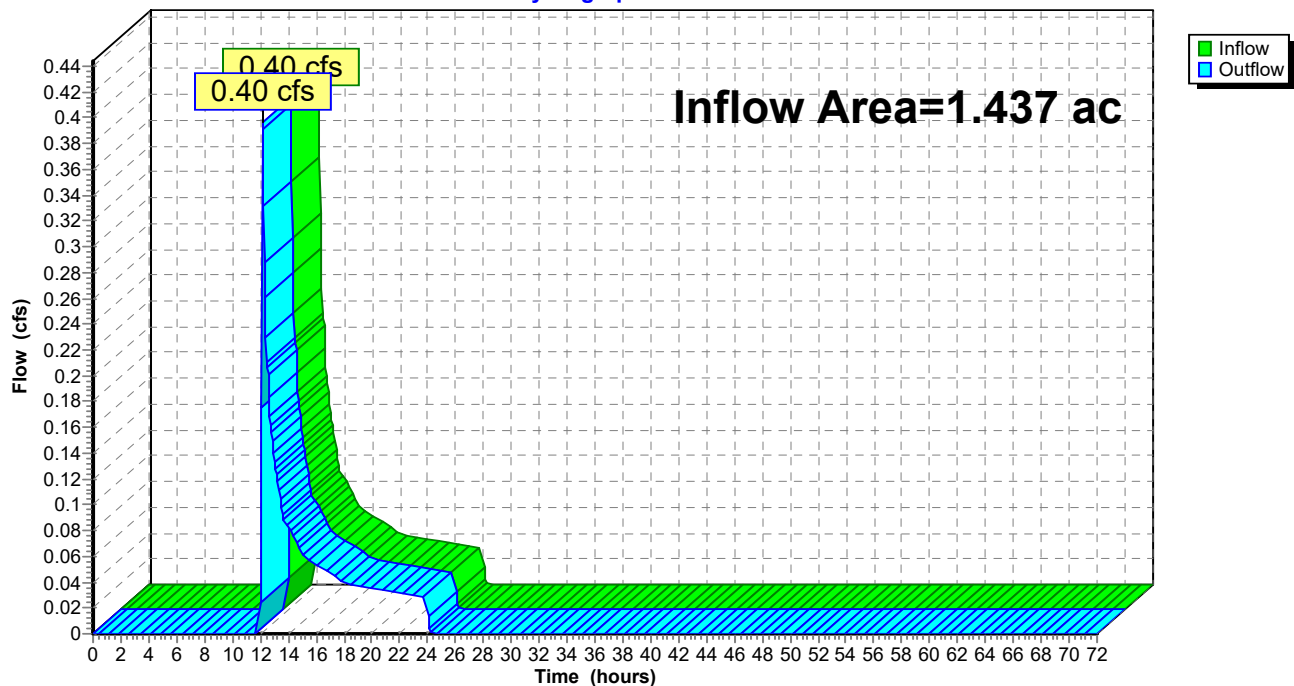
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.437 ac, 6.36% Impervious, Inflow Depth = 0.51" for 10-Year event
Inflow = 0.40 cfs @ 12.18 hrs, Volume= 0.061 af
Outflow = 0.40 cfs @ 12.18 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street

Hydrograph



Existing Hydrology

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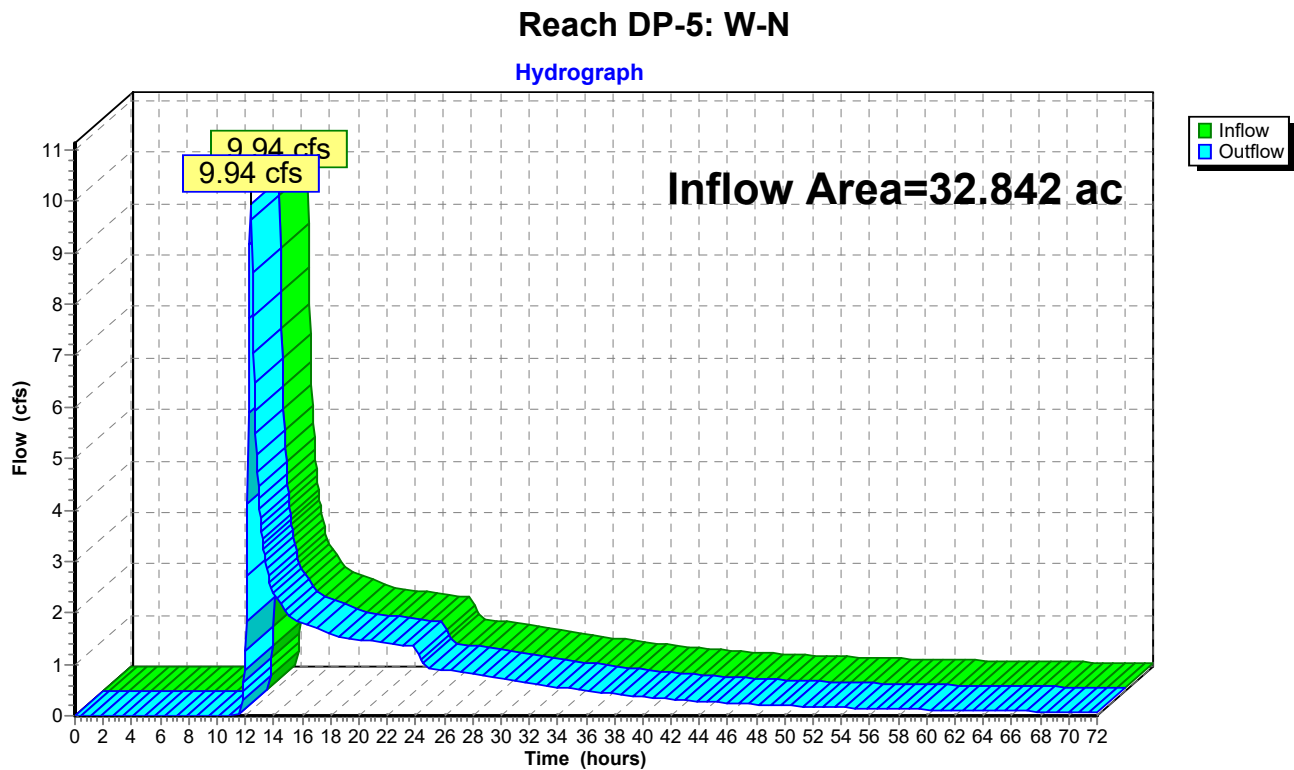
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Summary for Reach DP-5: W-N

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 1.25" for 10-Year event
Inflow = 9.94 cfs @ 12.38 hrs, Volume= 3.418 af
Outflow = 9.94 cfs @ 12.38 hrs, Volume= 3.418 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs



Existing Hydrology

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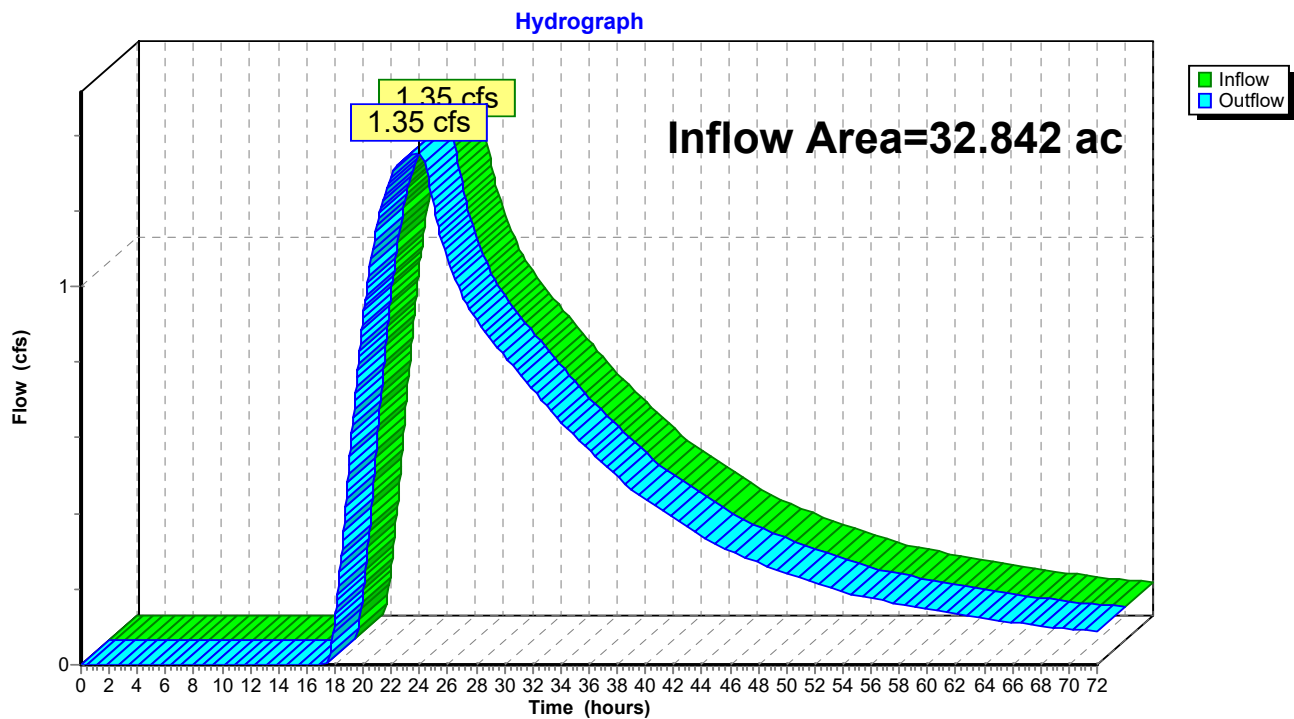
Summary for Reach DP-5 OUT: 24" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 0.75" for 10-Year event
Inflow = 1.35 cfs @ 23.92 hrs, Volume= 2.048 af
Outflow = 1.35 cfs @ 23.92 hrs, Volume= 2.048 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE



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Summary for Reach DP-6: W-QP

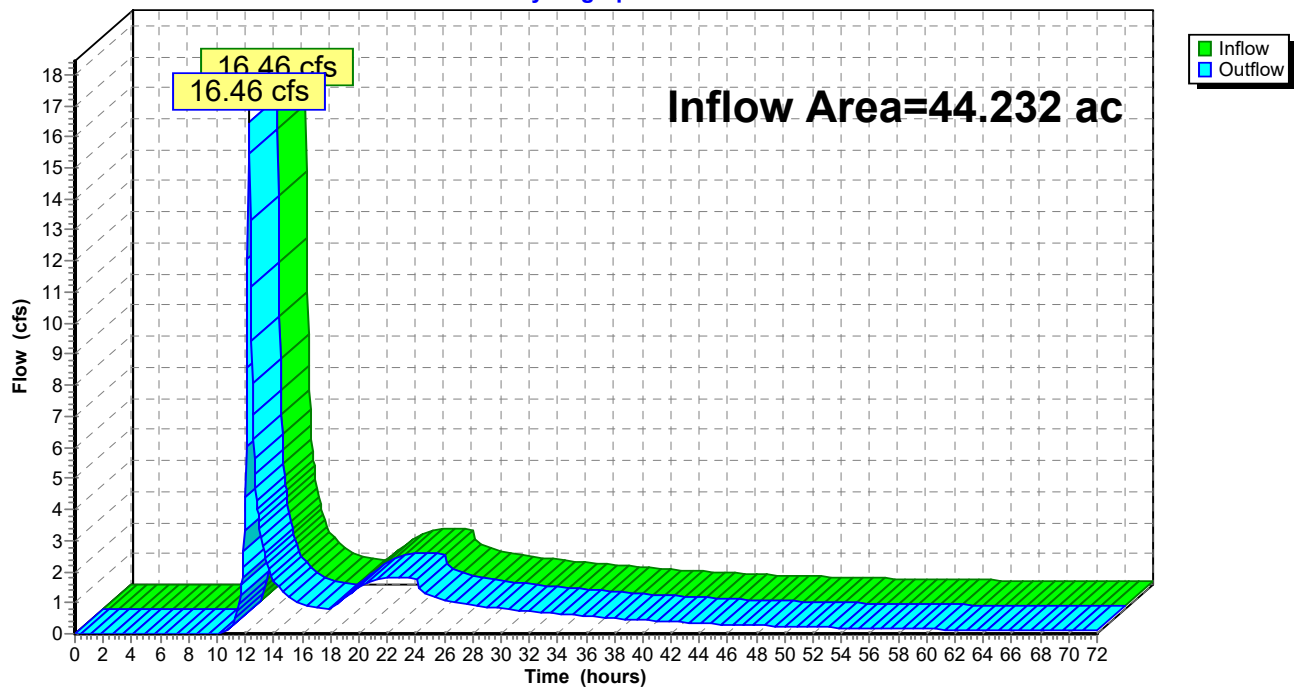
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 0.99" for 10-Year event
Inflow = 16.46 cfs @ 12.25 hrs, Volume= 3.649 af
Outflow = 16.46 cfs @ 12.25 hrs, Volume= 3.649 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



Existing Hydrology

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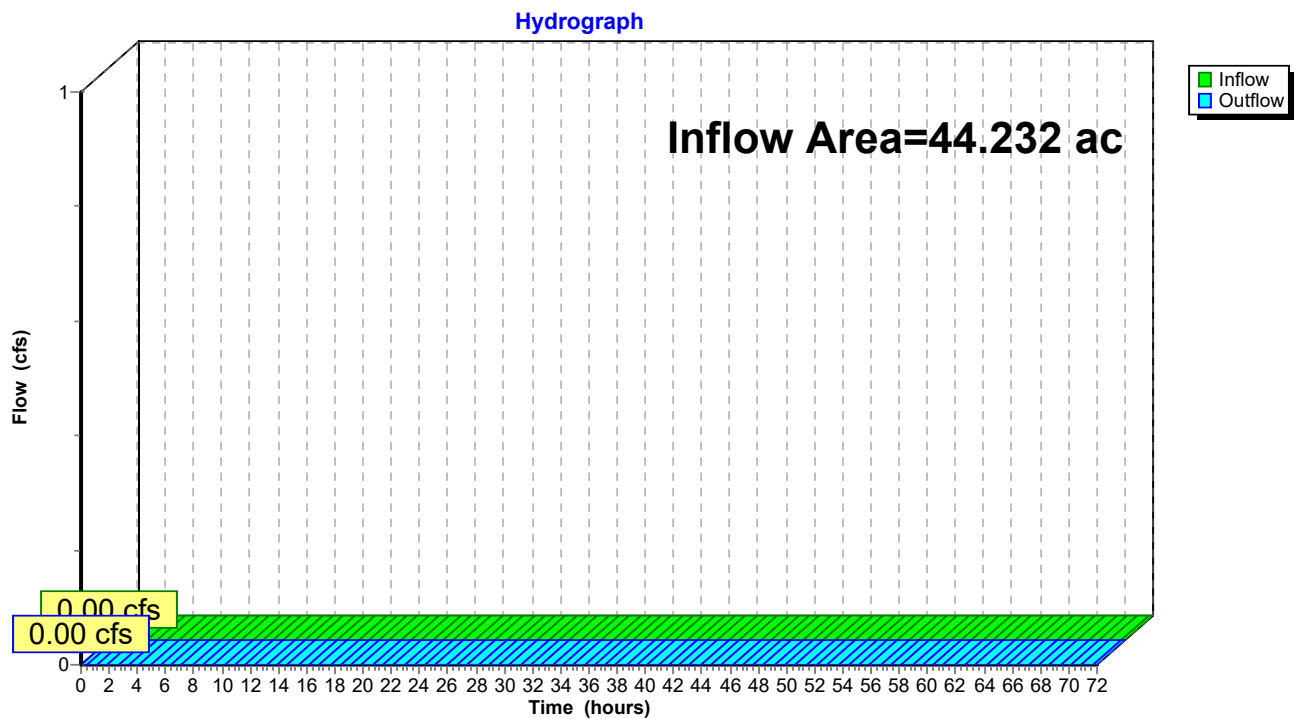
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



Existing Hydrology

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Summary for Reach DP-7: W-O

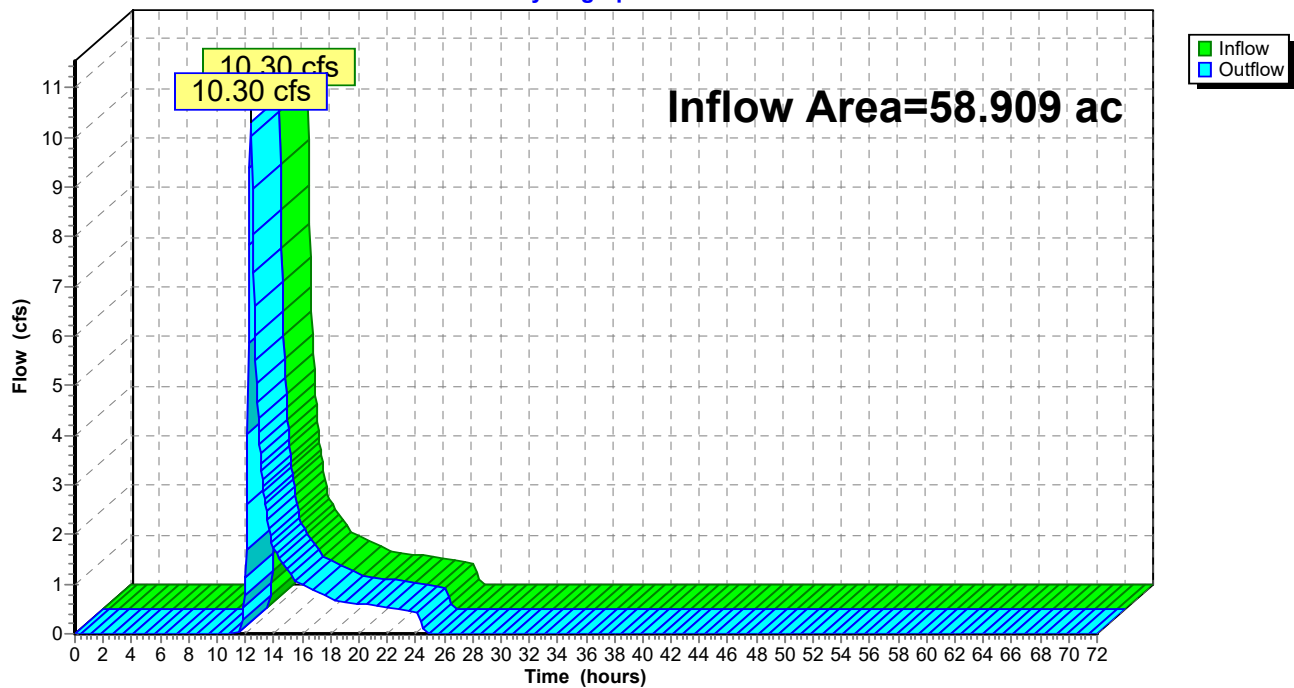
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.28" for 10-Year event
Inflow = 10.30 cfs @ 12.38 hrs, Volume= 1.384 af
Outflow = 10.30 cfs @ 12.38 hrs, Volume= 1.384 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7: W-O

Hydrograph



Existing Hydrology

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Summary for Reach DP-7 OUT: 18" RCP PIPE

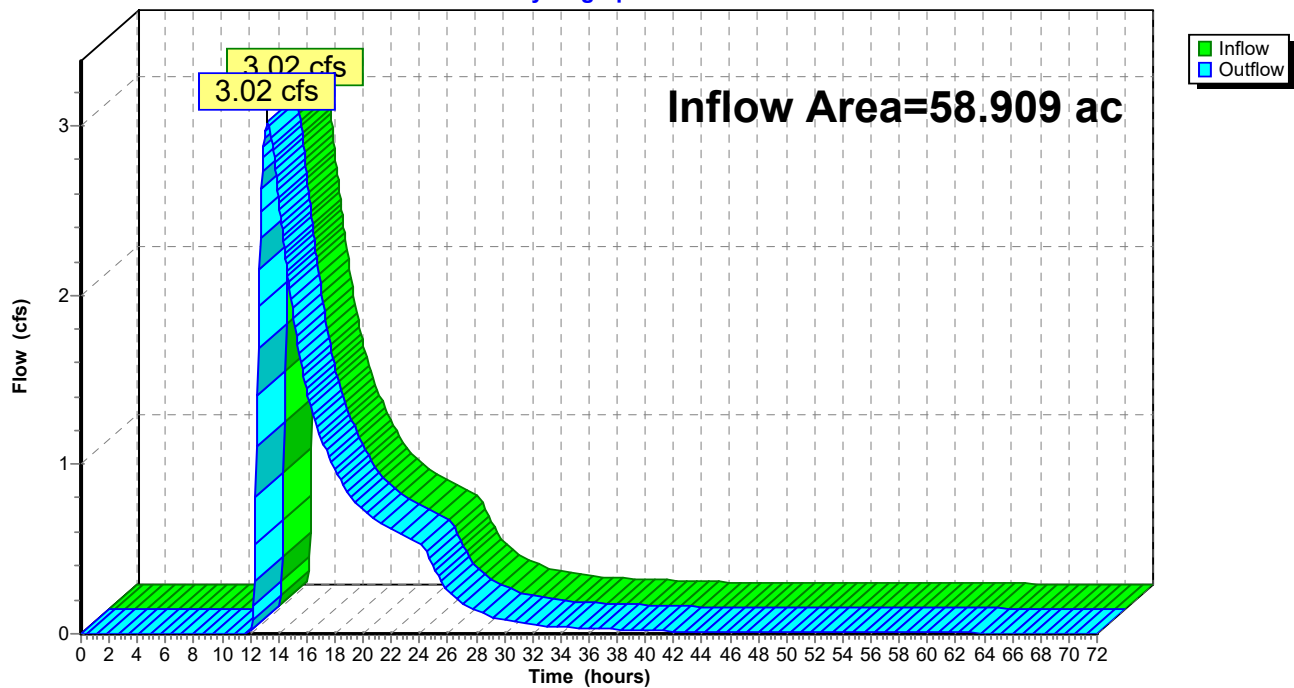
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 0.28" for 10-Year event
Inflow = 3.02 cfs @ 13.24 hrs, Volume= 1.376 af
Outflow = 3.02 cfs @ 13.24 hrs, Volume= 1.376 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 18" RCP PIPE

Hydrograph



Existing Hydrology

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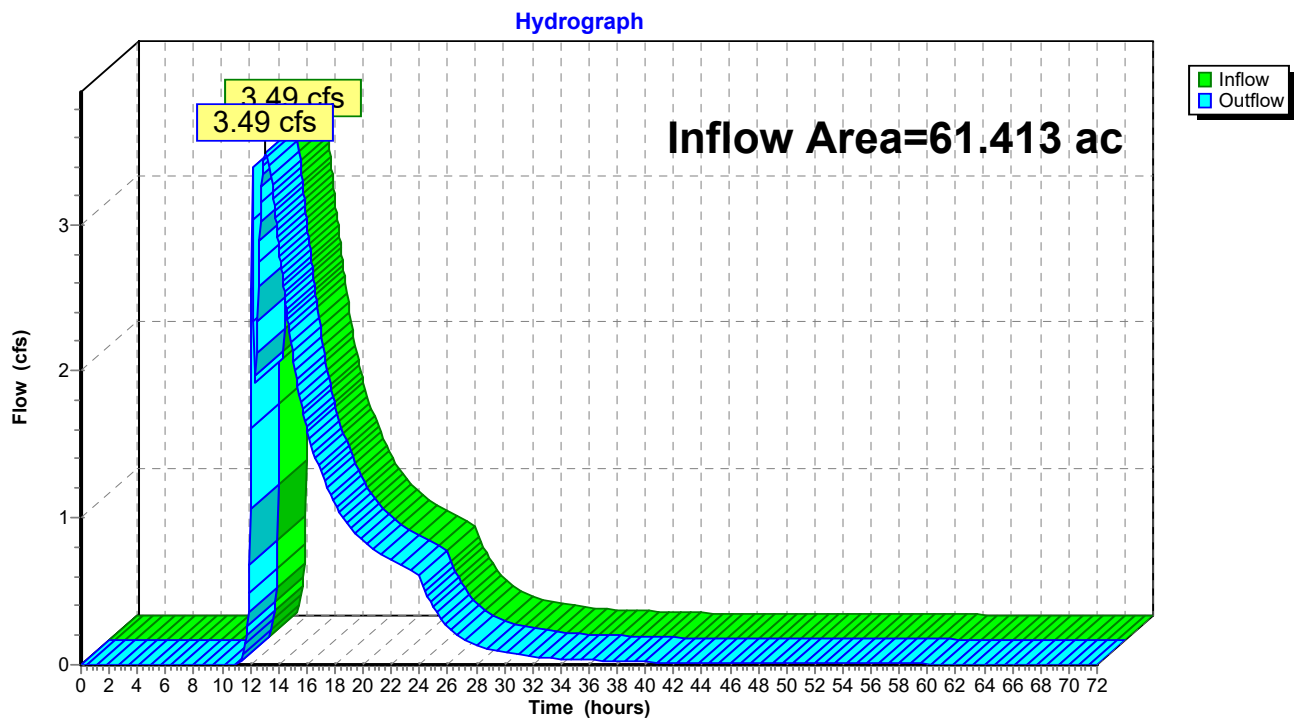
Summary for Reach DP-8: Wetlands Series X

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 0.32" for 10-Year event
Inflow = 3.49 cfs @ 13.09 hrs, Volume= 1.640 af
Outflow = 3.49 cfs @ 13.09 hrs, Volume= 1.640 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X



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Summary for Reach DP-9: West Elm Street

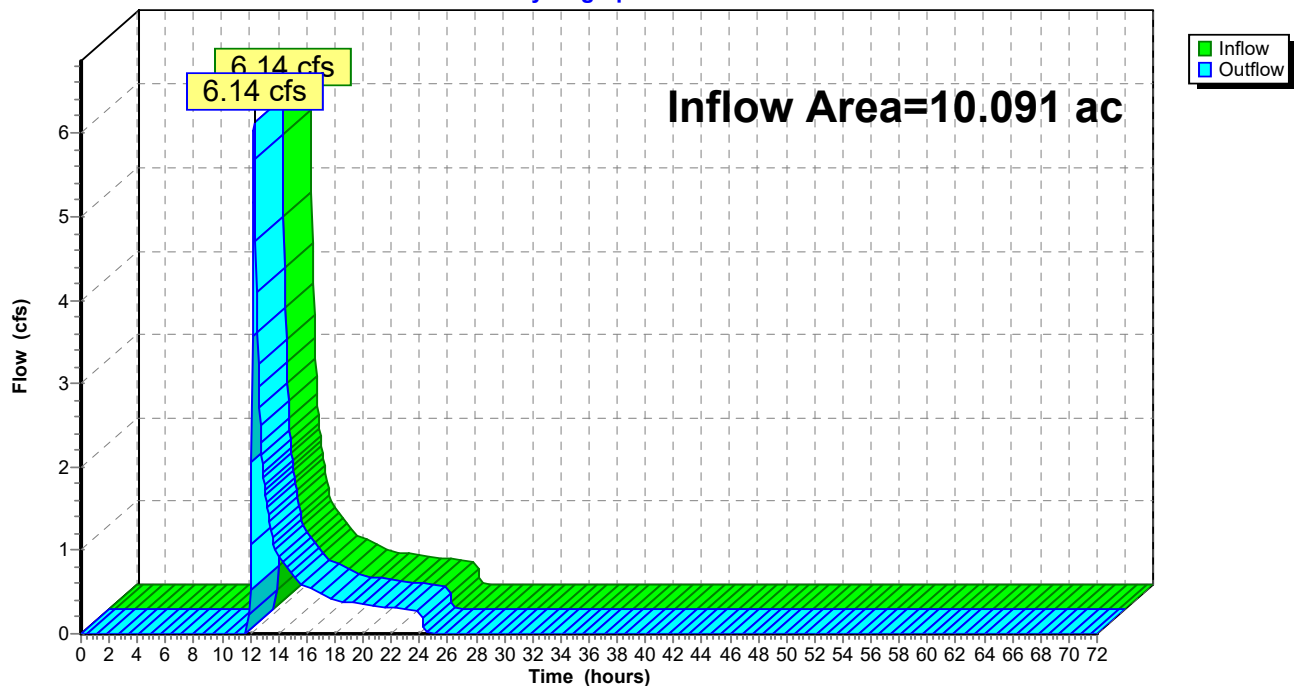
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.091 ac, 31.90% Impervious, Inflow Depth = 0.88" for 10-Year event
Inflow = 6.14 cfs @ 12.27 hrs, Volume= 0.743 af
Outflow = 6.14 cfs @ 12.27 hrs, Volume= 0.743 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-ELM: West Elm Street

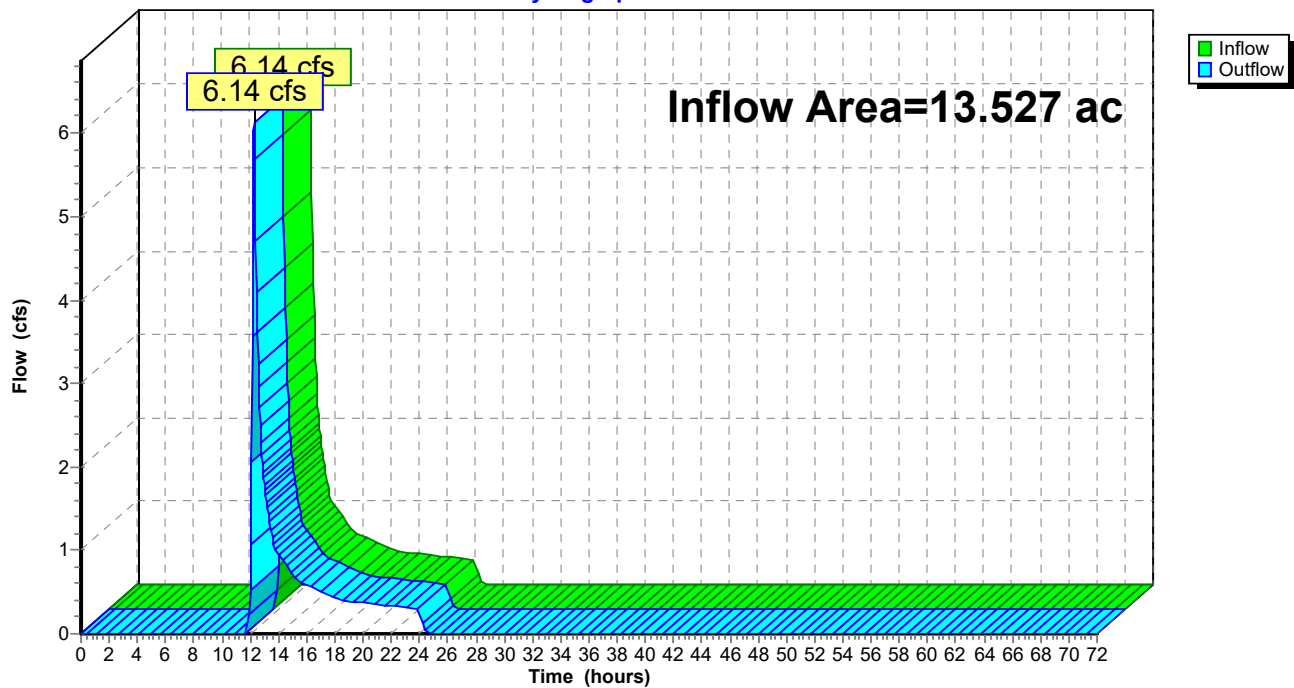
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.527 ac, 24.64% Impervious, Inflow Depth = 0.67" for 10-Year event
Inflow = 6.14 cfs @ 12.27 hrs, Volume= 0.758 af
Outflow = 6.14 cfs @ 12.27 hrs, Volume= 0.758 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-WA: Wetland Series A

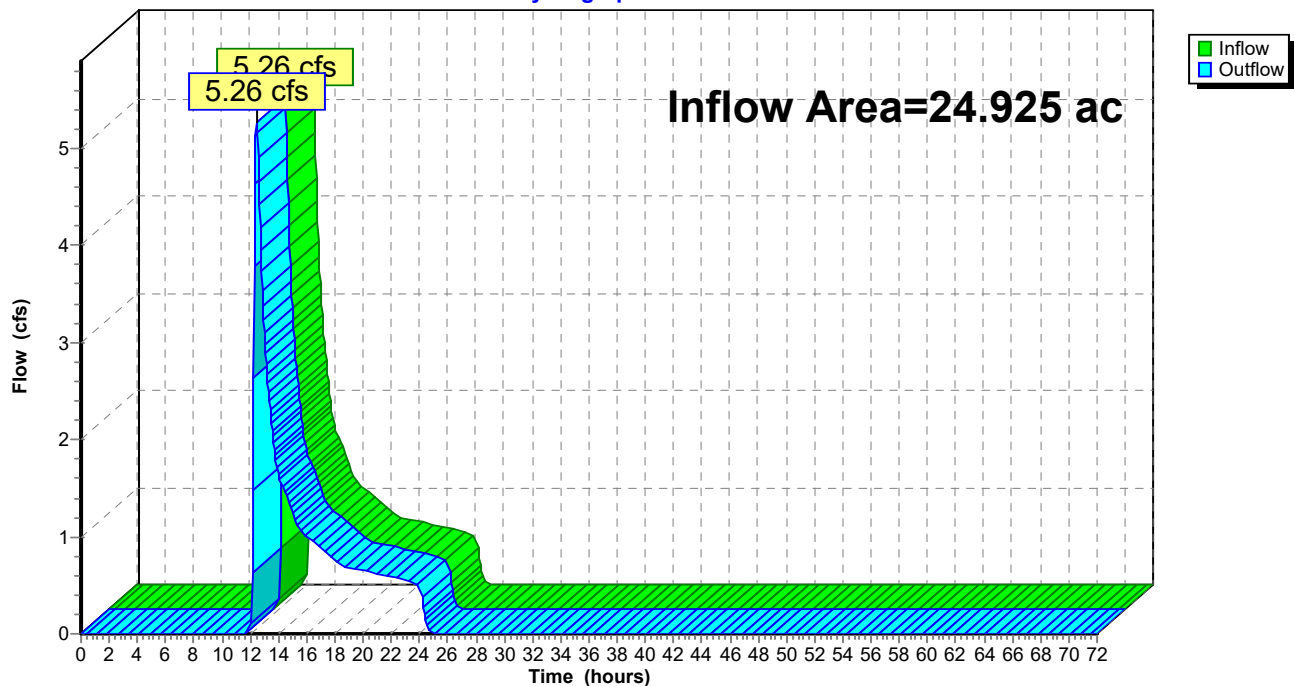
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 24.925 ac, 5.88% Impervious, Inflow Depth = 0.55" for 10-Year event
Inflow = 5.26 cfs @ 12.45 hrs, Volume= 1.133 af
Outflow = 5.26 cfs @ 12.45 hrs, Volume= 1.133 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A

Hydrograph



Existing Hydrology

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Summary for Reach DP-WI: Wetland Series/Stream I

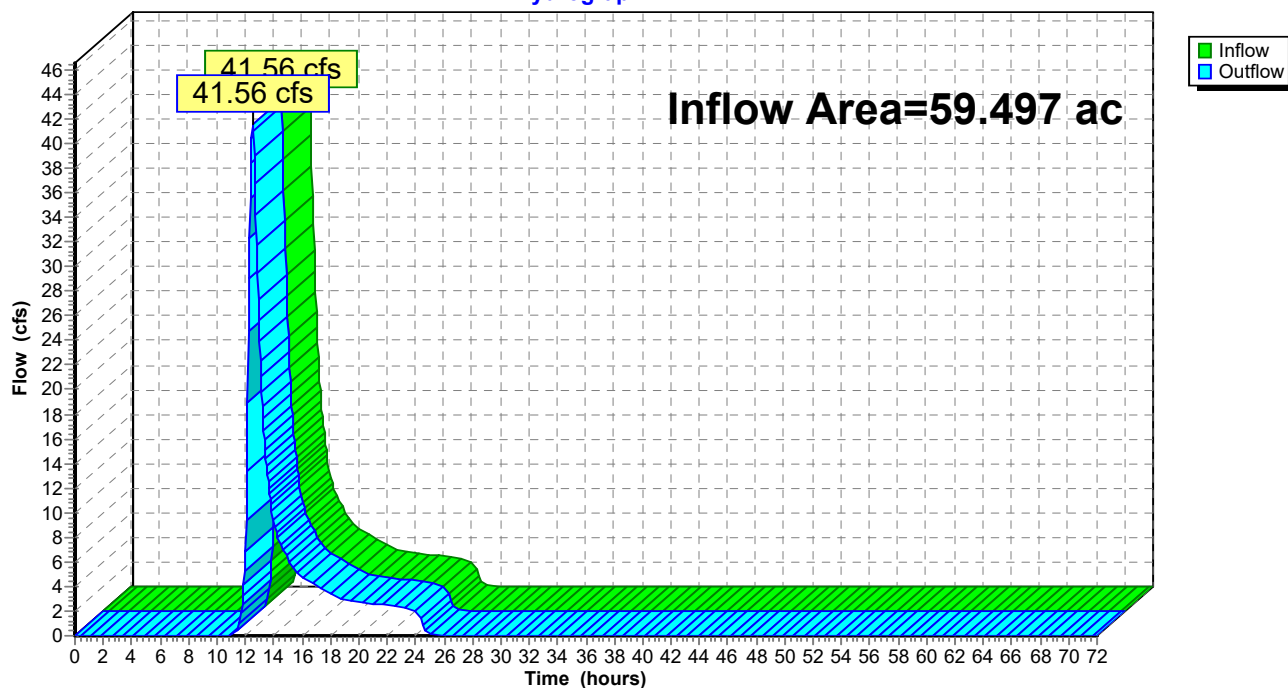
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 59.497 ac, 2.73% Impervious, Inflow Depth = 1.40" for 10-Year event
Inflow = 41.56 cfs @ 12.53 hrs, Volume= 6.942 af
Outflow = 41.56 cfs @ 12.53 hrs, Volume= 6.942 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I

Hydrograph



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Summary for Pond BAS 10-A: EXIST BAS

Inflow Area = 0.692 ac, 0.00% Impervious, Inflow Depth = 0.01" for 10-Year event
 Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Atten= 14%, Lag= 2.1 min
 Discarded = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 54.02' @ 24.04 hrs Surf.Area= 233 sf Storage= 5 cf

Plug-Flow detention time= 77.7 min calculated for 0.000 af (100% of inflow)
 Center-of-Mass det. time= 78.0 min (1,402.7 - 1,324.7)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.00 cfs @ 24.04 hrs HW=54.02' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)

↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Existing Hydrology

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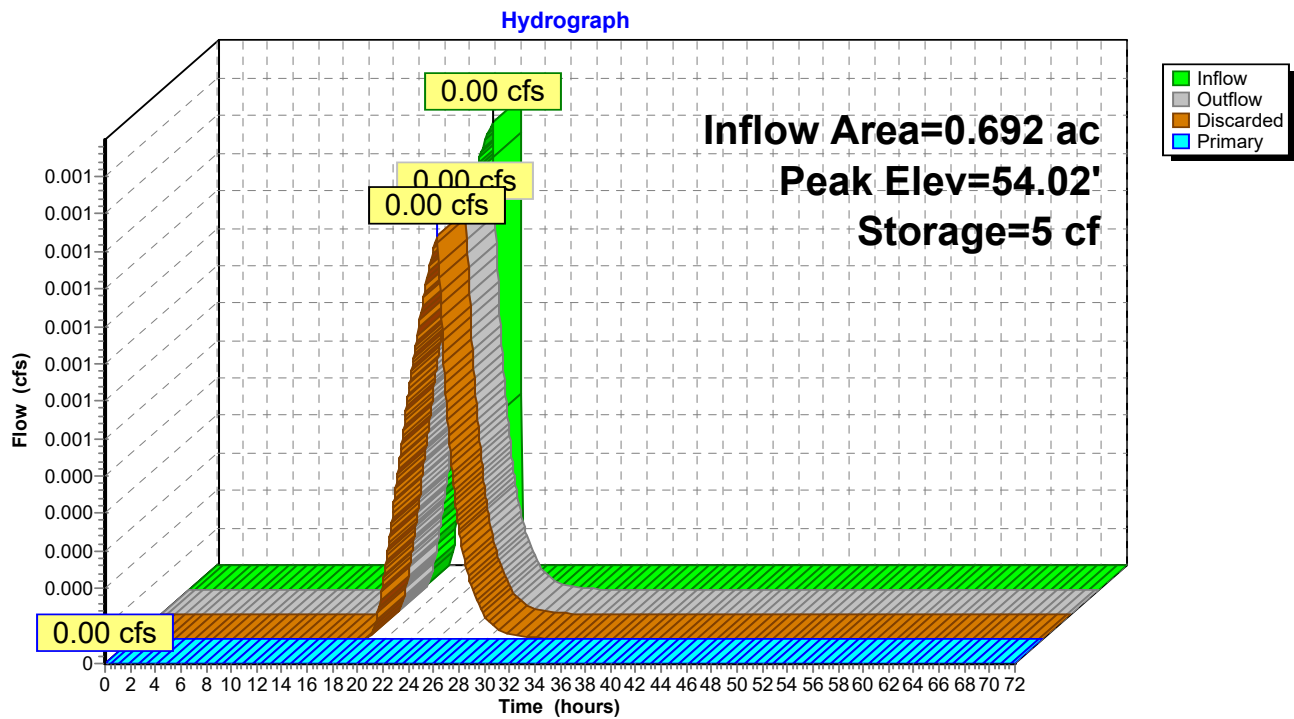
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Pond BAS 10-A: EXIST BAS



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Summary for Pond W-N: Wetland Series N

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 1.25" for 10-Year event
 Inflow = 9.94 cfs @ 12.38 hrs, Volume= 3.418 af
 Outflow = 1.35 cfs @ 23.92 hrs, Volume= 2.048 af, Atten= 86%, Lag= 692.8 min
 Primary = 1.35 cfs @ 23.92 hrs, Volume= 2.048 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 87.97' @ 23.92 hrs Surf.Area= 32,596 sf Storage= 69,879 cf

Plug-Flow detention time= 1,061.4 min calculated for 2.046 af (60% of inflow)
 Center-of-Mass det. time= 560.0 min (2,039.8 - 1,479.8)

Volume	Invert	Avail.Storage	Storage Description	
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=1.35 cfs @ 23.92 hrs HW=87.97' (Free Discharge)

↑1=RCP_Round 24" (Inlet Controls 1.35 cfs @ 2.77 fps)

Existing Hydrology

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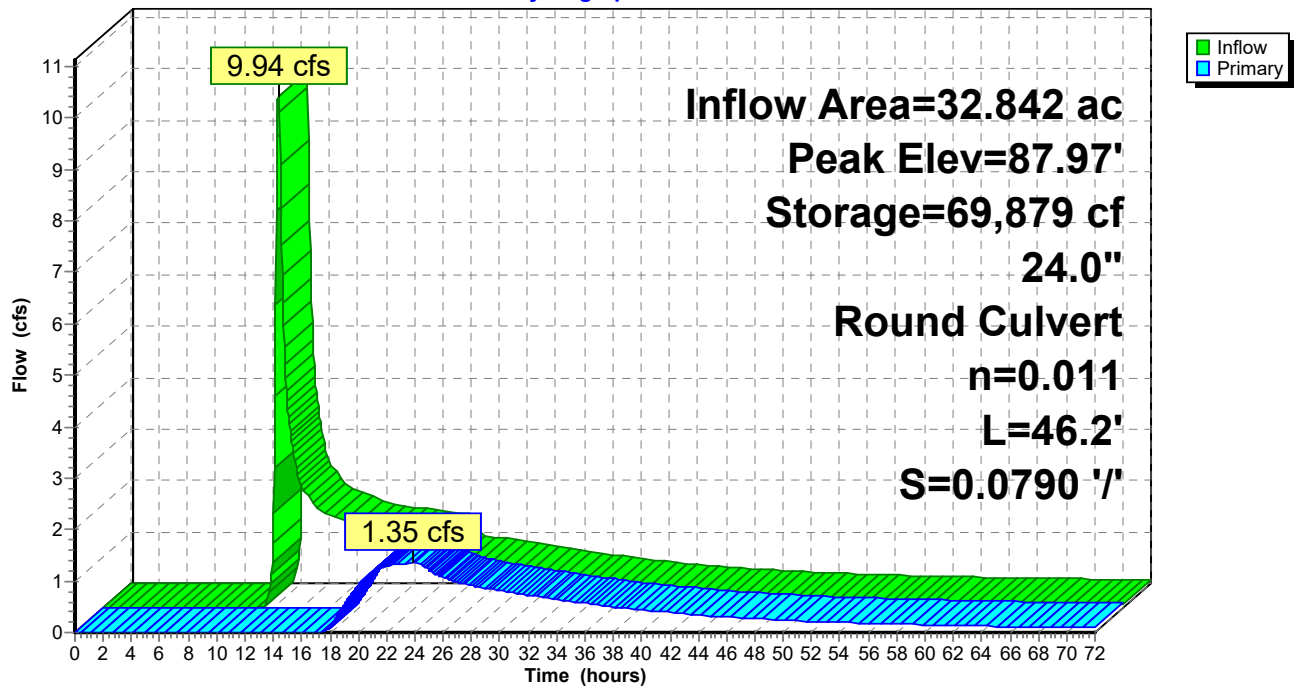
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Pond W-N: Wetland Series N

Hydrograph



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Summary for Pond W-O: Wetland Series O

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.28" for 10-Year event
 Inflow = 10.30 cfs @ 12.38 hrs, Volume= 1.384 af
 Outflow = 3.02 cfs @ 13.24 hrs, Volume= 1.376 af, Atten= 71%, Lag= 51.3 min
 Primary = 3.02 cfs @ 13.24 hrs, Volume= 1.376 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 77.88' @ 13.24 hrs Surf.Area= 19,766 sf Storage= 18,292 cf

Plug-Flow detention time= 175.8 min calculated for 1.376 af (99% of inflow)
 Center-of-Mass det. time= 172.9 min (1,089.0 - 916.1)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S= 0.0114 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=3.02 cfs @ 13.24 hrs HW=77.88' (Free Discharge)

1=Culvert (Inlet Controls 3.02 cfs @ 2.60 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

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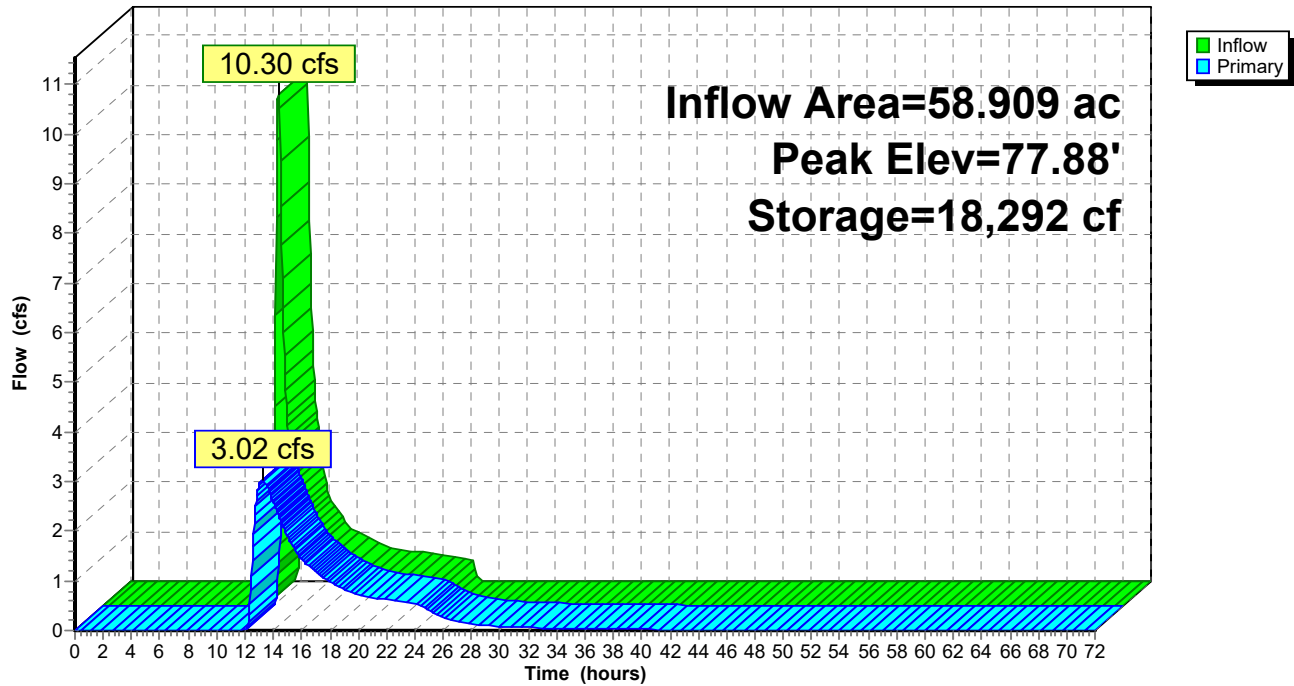
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Pond W-O: Wetland Series O

Hydrograph



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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 0.99" for 10-Year event
 Inflow = 16.46 cfs @ 12.25 hrs, Volume= 3.649 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.25' @ 72.00 hrs Surf.Area= 85,877 sf Storage= 158,940 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices									
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Existing Hydrology

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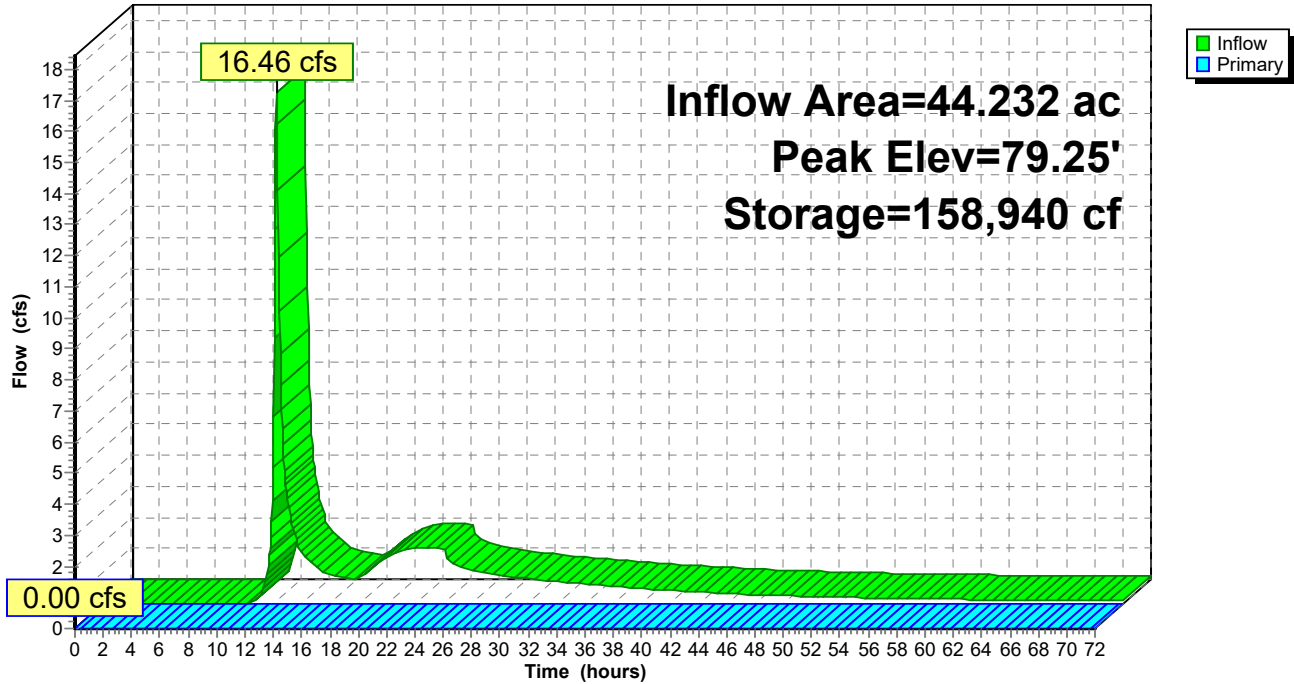
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Pond W-QP: Wetland Series Q & P

Hydrograph



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Summary for Pond W-R: Wetland Series R

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 1.76" for 10-Year event
 Inflow = 27.55 cfs @ 12.29 hrs, Volume= 2.918 af
 Outflow = 0.94 cfs @ 18.44 hrs, Volume= 2.125 af, Atten= 97%, Lag= 369.0 min
 Primary = 0.94 cfs @ 18.44 hrs, Volume= 2.125 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 88.12' @ 21.96 hrs Surf.Area= 84,157 sf Storage= 91,012 cf

Plug-Flow detention time= 1,049.5 min calculated for 2.125 af (73% of inflow)
 Center-of-Mass det. time= 943.1 min (1,825.2 - 882.1)

Volume	Invert	Avail.Storage	Storage Description	
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.94 cfs @ 18.44 hrs HW=88.10' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.94 cfs @ 2.75 fps)

Existing Hydrology

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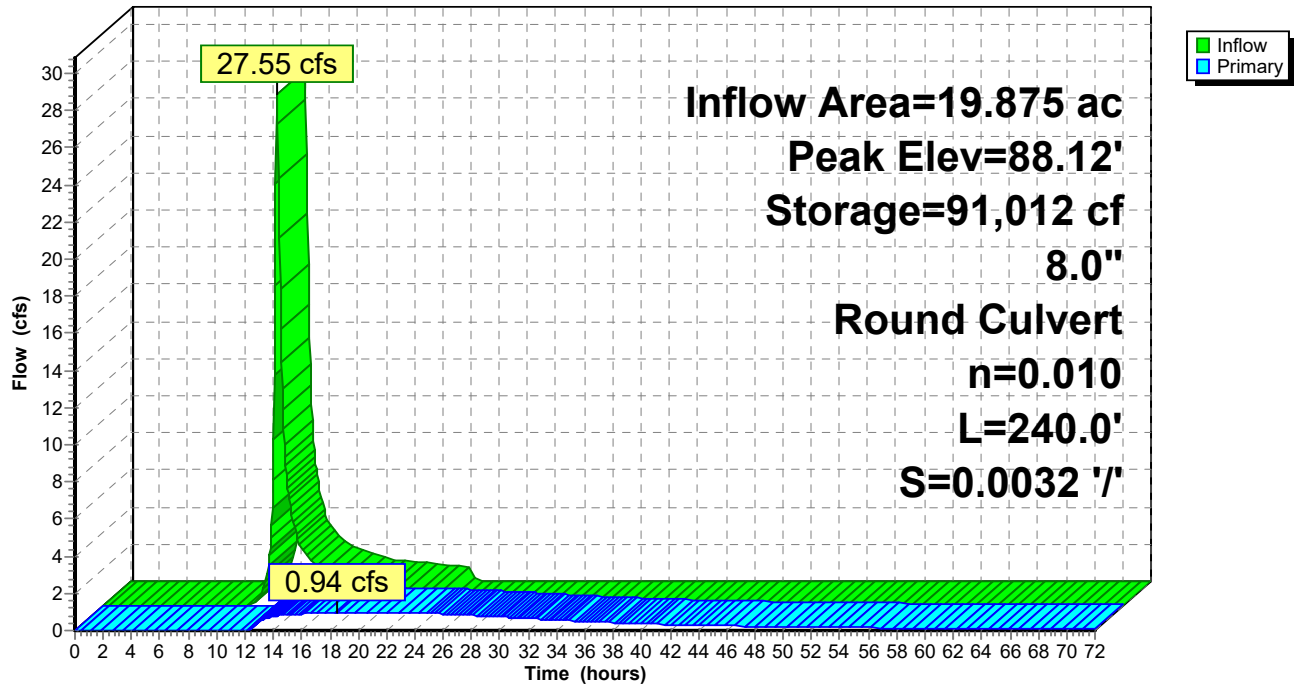
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Pond W-R: Wetland Series R

Hydrograph



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Summary for Subcatchment E-1:

Runoff = 18.95 cfs @ 12.22 hrs, Volume= 1.755 af, Depth= 1.73"

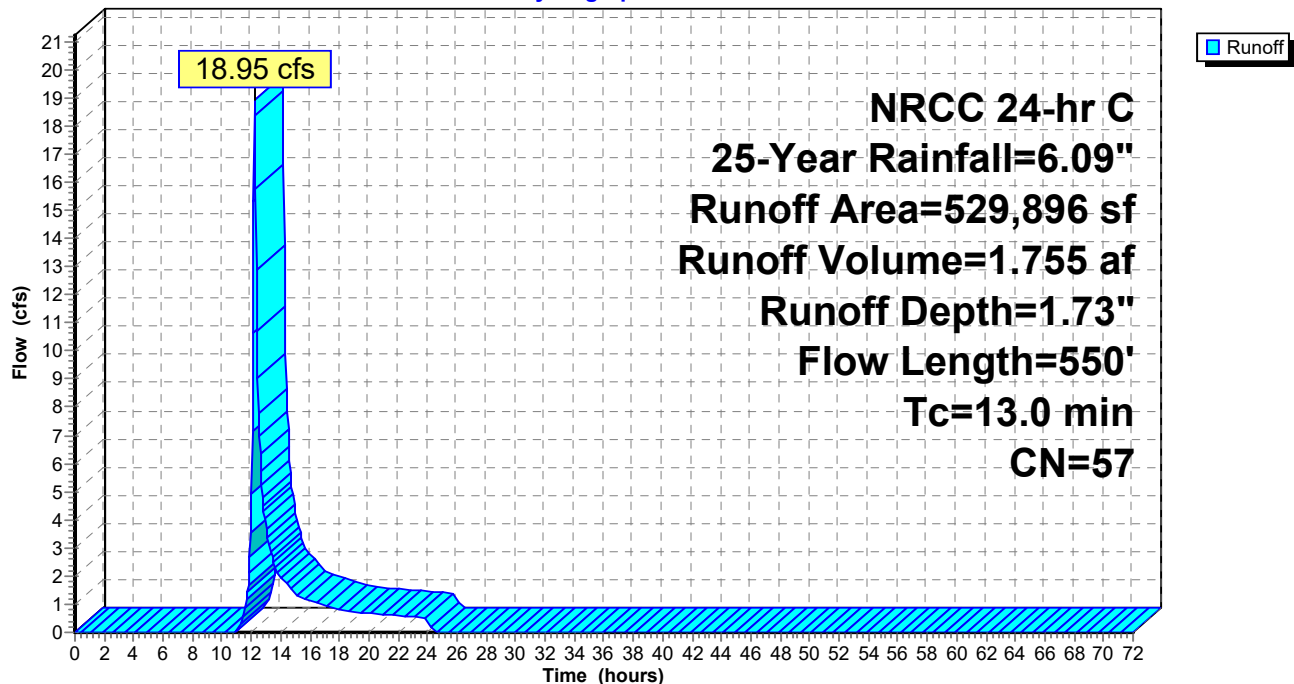
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
156,466	61	>75% Grass cover, Good, HSG B
373,430	55	Woods, Good, HSG B
529,896	57	Weighted Average
529,896		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded
					Woods: Light underbrush n= 0.400 P2= 3.37"
7.5	500	0.0500	1.12		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.0	550	Total			

Subcatchment E-1:

Hydrograph



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Summary for Subcatchment E-10a:

Runoff = 0.01 cfs @ 16.84 hrs, Volume= 0.005 af, Depth= 0.08"

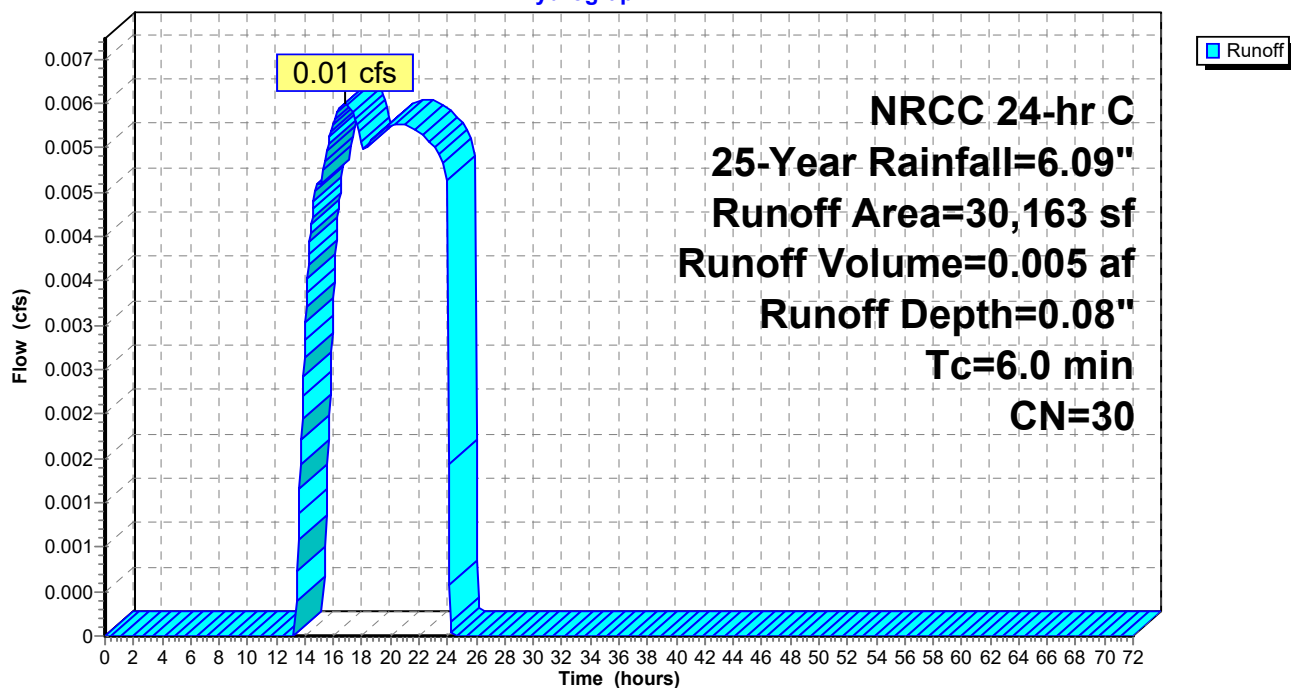
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
30,163	30	Woods, Good, HSG A
30,163		100.00% Pervious Area

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

Subcatchment E-10a:

Hydrograph



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Summary for Subcatchment E-10b:

Runoff = 0.09 cfs @ 13.04 hrs, Volume= 0.052 af, Depth= 0.23"

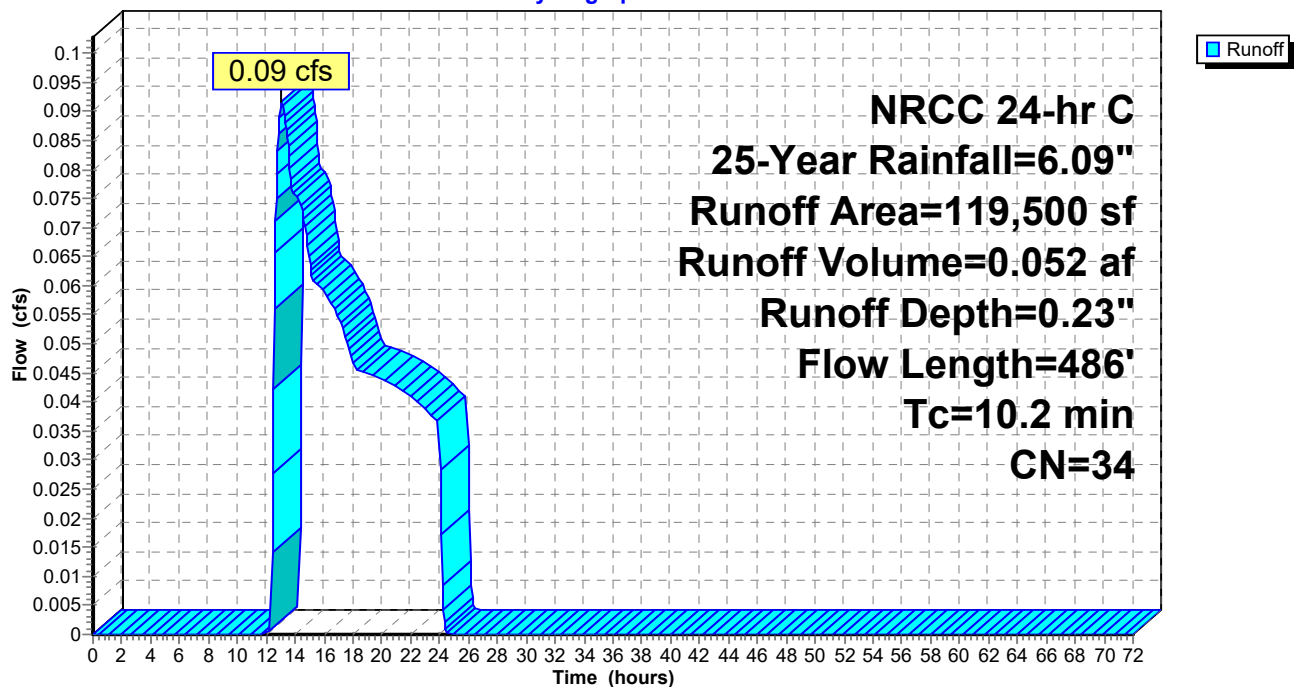
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	4,986	98	ROOF AND Paved parking, HSG A
	104,514	30	Woods, Good, HSG A
	10,000	39	>75% Grass cover, Good, HSG A
	119,500	34	Weighted Average
	114,514		95.83% Pervious Area
	4,986		4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
2.7	286	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
10.2	486	Total			

Subcatchment E-10b:

Hydrograph



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Summary for Subcatchment E-11:

Runoff = 2.10 cfs @ 12.34 hrs, Volume= 0.374 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
17,473	98	Paved parking, HSG A
88,168	55	Woods, Good, HSG B
139,460	30	Woods, Good, HSG A
31,226	39	>75% Grass cover, Good, HSG A
276,327	43	Weighted Average
258,854		93.68% Pervious Area
17,473		6.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.5	142	0.1046	1.62		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
3.4	316	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
0.5	28	0.0423	1.03		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
17.0	536	Total			

Existing Hydrology

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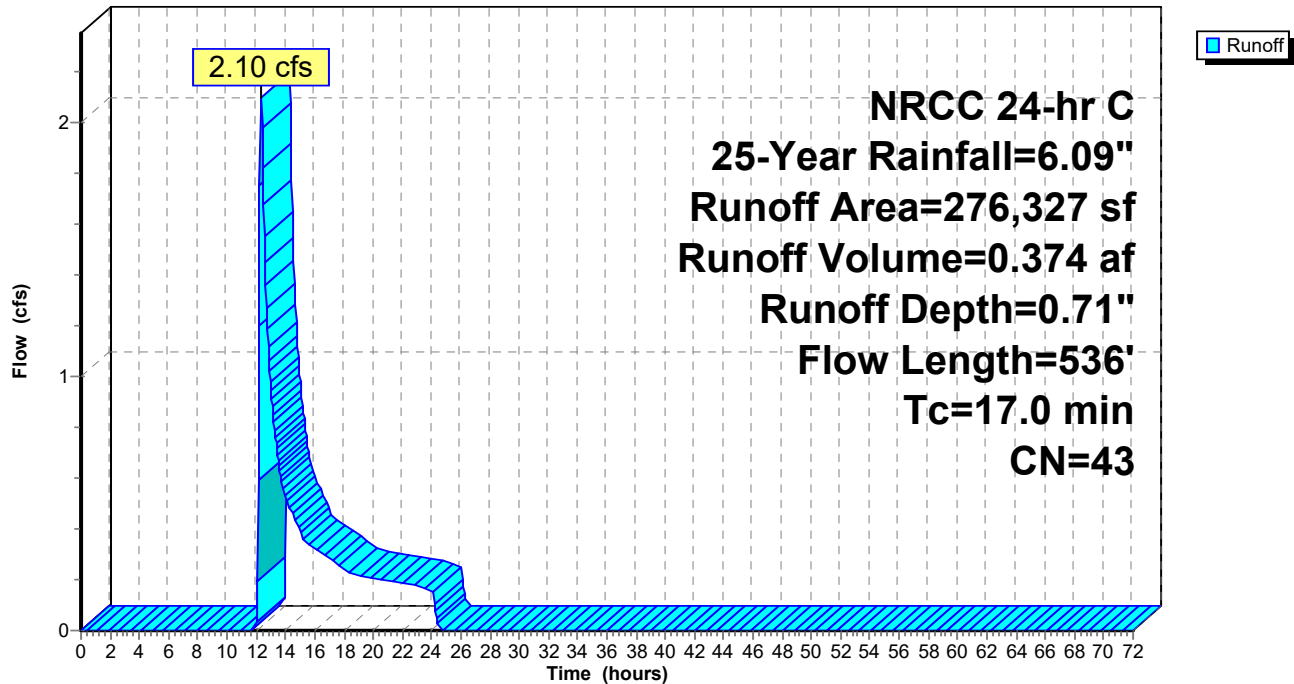
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Subcatchment E-11:

Hydrograph



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Summary for Subcatchment E-12:

Runoff = 10.53 cfs @ 12.40 hrs, Volume= 1.615 af, Depth= 1.04"

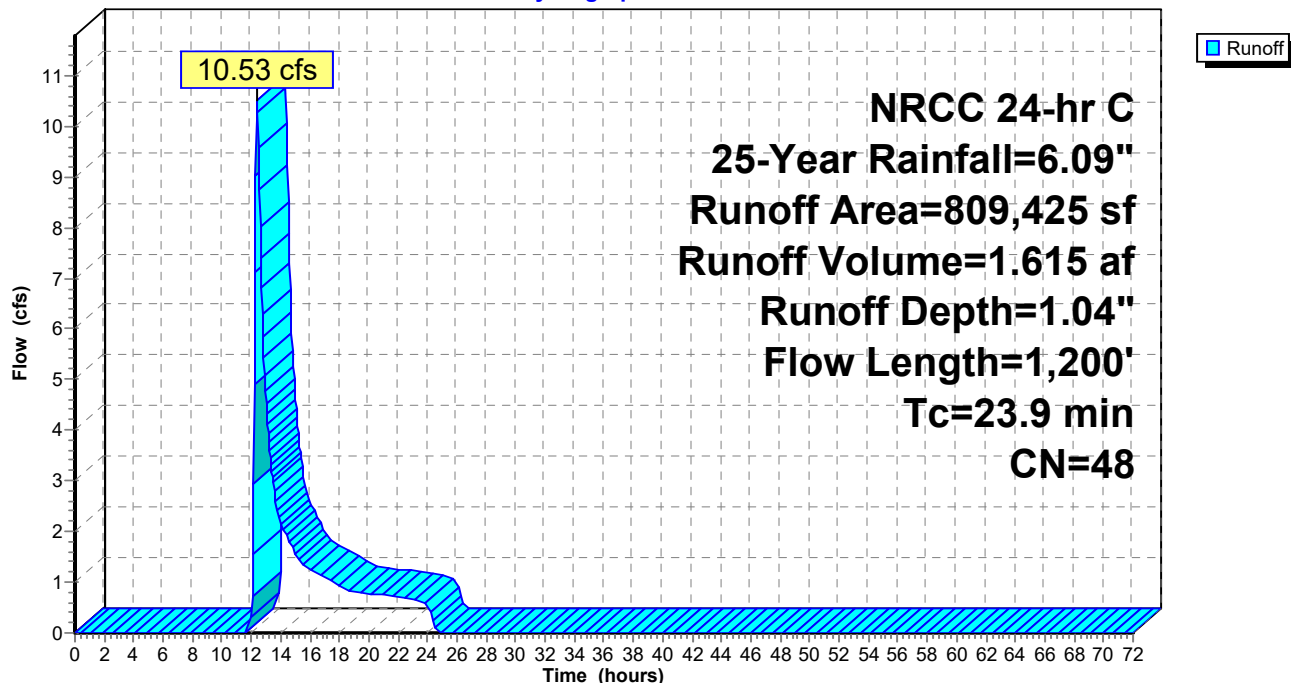
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
46,376	98	Paved parking, HSG B
382,602	32	Woods/grass comb., Good, HSG A
379,547	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
809,425	48	Weighted Average
763,049		94.27% Pervious Area
46,376		5.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
18.5	1,100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,200	Total			

Subcatchment E-12:

Hydrograph



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Summary for Subcatchment E-13:

Runoff = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af, Depth= 1.19"

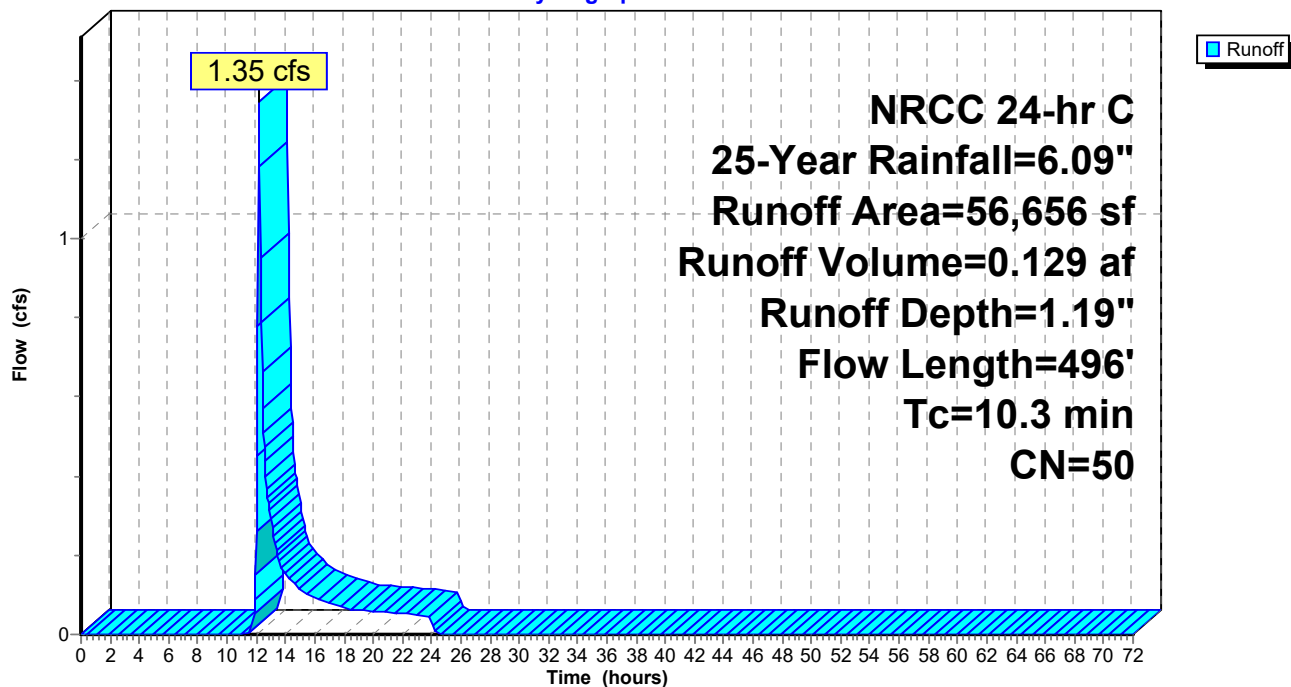
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-14:

Runoff = 39.79 cfs @ 12.32 hrs, Volume= 4.528 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
356,270	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,248,024	59	Weighted Average
1,248,024		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

Existing Hydrology

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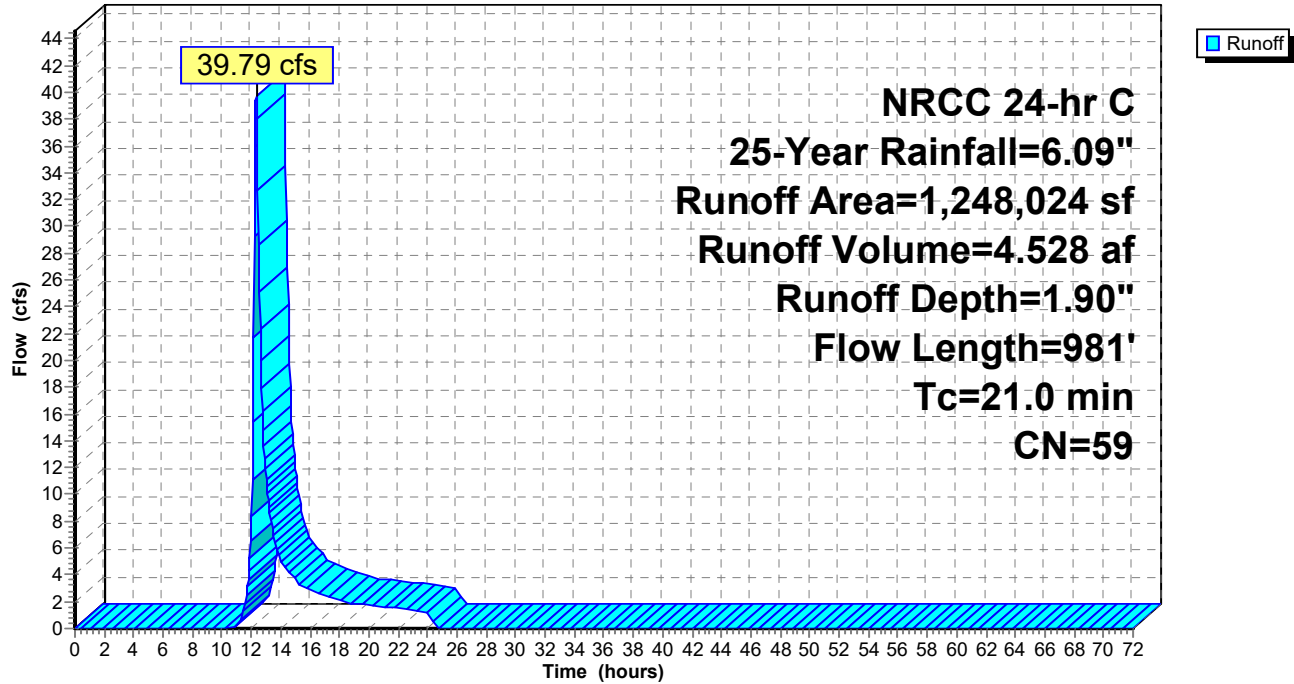
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Subcatchment E-14:

Hydrograph



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Summary for Subcatchment E-15:

Runoff = 4.67 cfs @ 12.22 hrs, Volume= 0.461 af, Depth= 1.34"

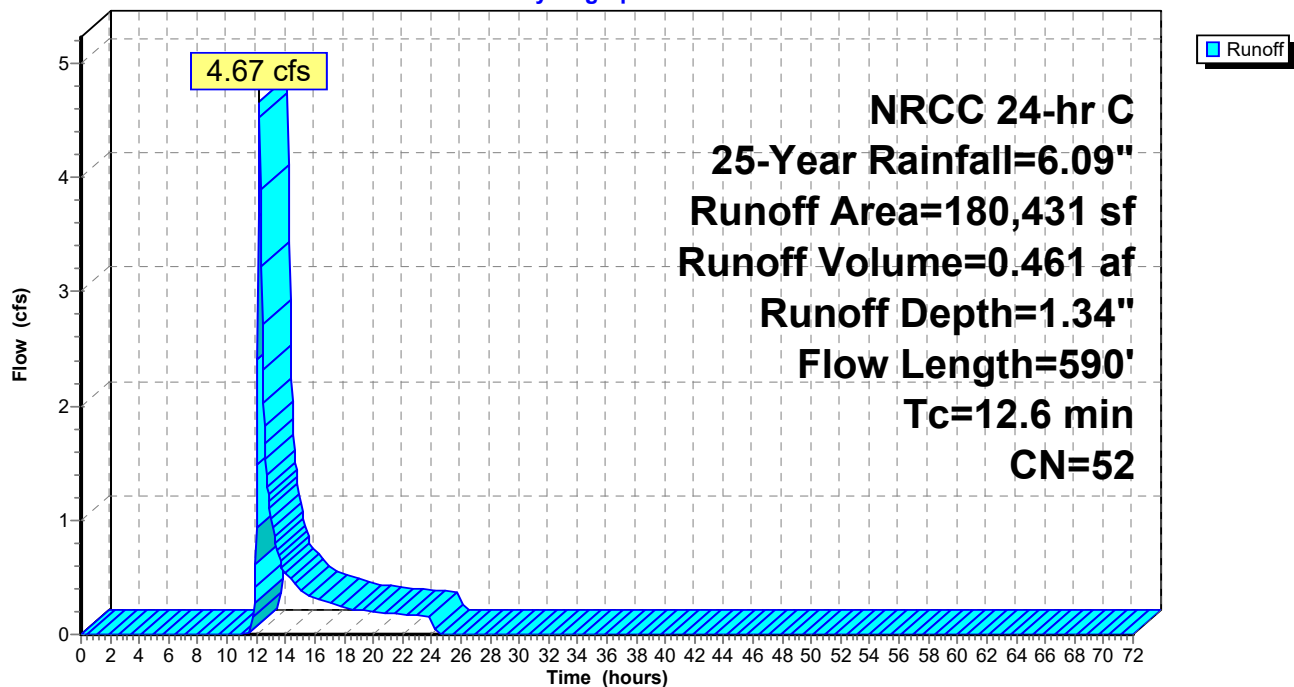
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
77,431	55	Woods, Good, HSG B
60,000	61	>75% Grass cover, Good, HSG B
37,500	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
180,431	52	Weighted Average
180,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1600	0.16		Sheet Flow, Grass Grass: Bermuda n= 0.410 P2= 3.37"
7.3	540	0.0310	1.23		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
12.6	590	Total			

Subcatchment E-15:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-2:

Runoff = 56.33 cfs @ 12.54 hrs, Volume= 8.489 af, Depth= 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
461,097	32	Woods/grass comb., Good, HSG A
636,415	58	Woods/grass comb., Good, HSG B
261,419	72	Woods/grass comb., Good, HSG C
632,109	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
* 17,483	98	Paved parking, HSG D
2,061,814	62	Weighted Average
1,991,040		96.57% Pervious Area
70,774		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Existing Hydrology

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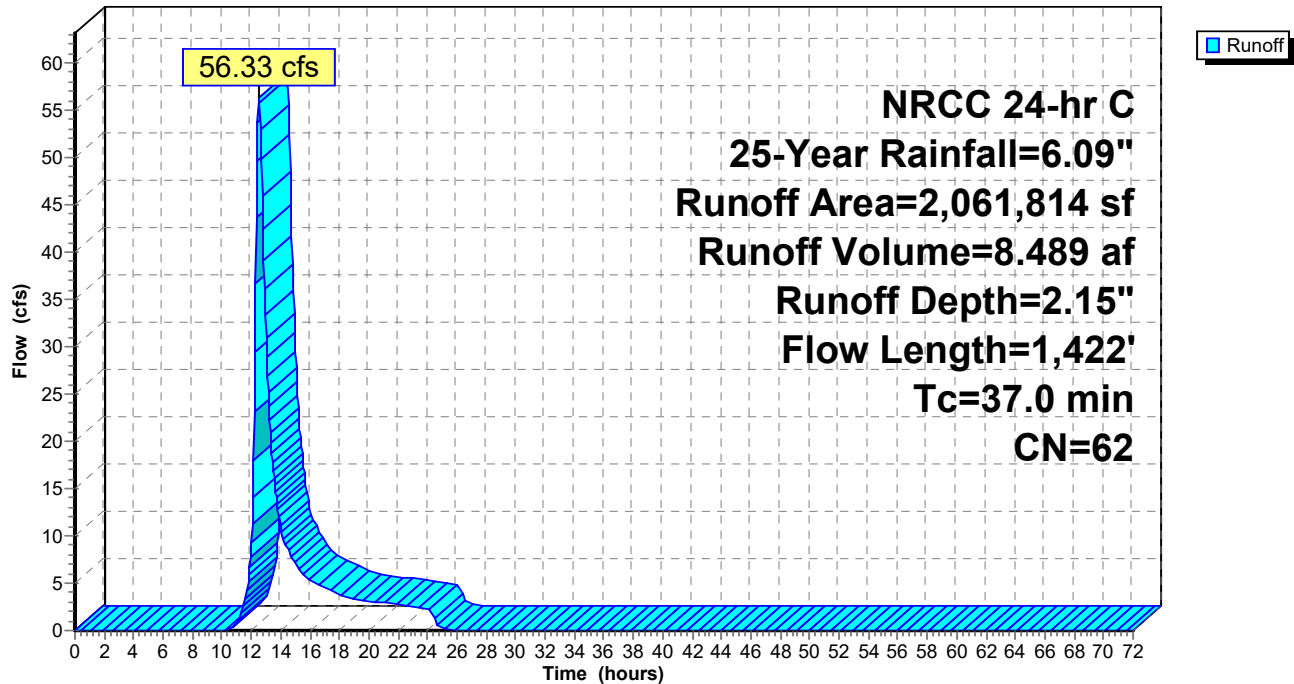
NRCC 24-hr C 25-Year Rainfall=6.09"

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Subcatchment E-2:

Hydrograph



Existing Hydrology

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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Subcatchment E-3:

Runoff = 40.08 cfs @ 12.29 hrs, Volume= 4.152 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	126,000	30	Woods, Good, HSG A
	70,460	39	>75% Grass cover, Good, HSG A
	160,000	61	>75% Grass cover, Good, HSG B
	109,000	55	Woods, Good, HSG B
*	15,800	98	Roof and Pavement
	110,000	77	Woods, Good, HSG D
	105,000	80	>75% Grass cover, Good, HSG D
	865,760	66	Weighted Average
	680,460		78.60% Pervious Area
	185,300		21.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

Existing Hydrology

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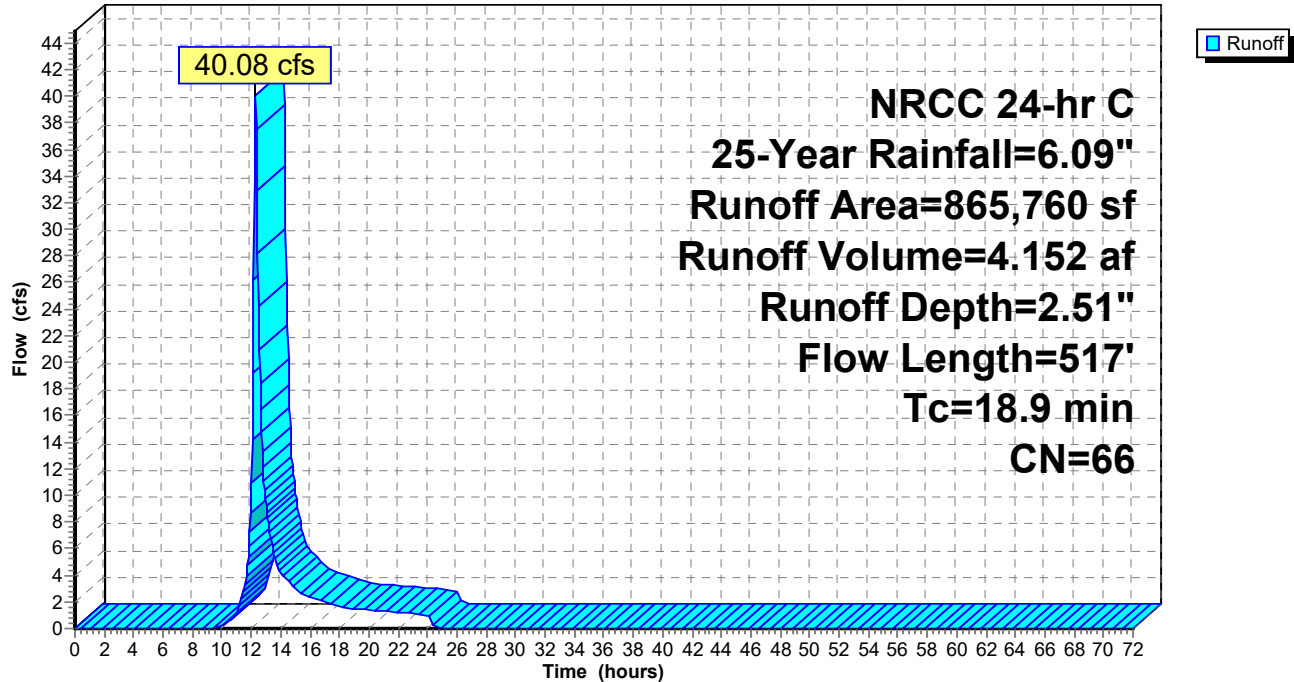
NRCC 24-hr C 25-Year Rainfall=6.09"

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Subcatchment E-3:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-4:

Runoff = 1.14 cfs @ 12.16 hrs, Volume= 0.108 af, Depth= 0.90"

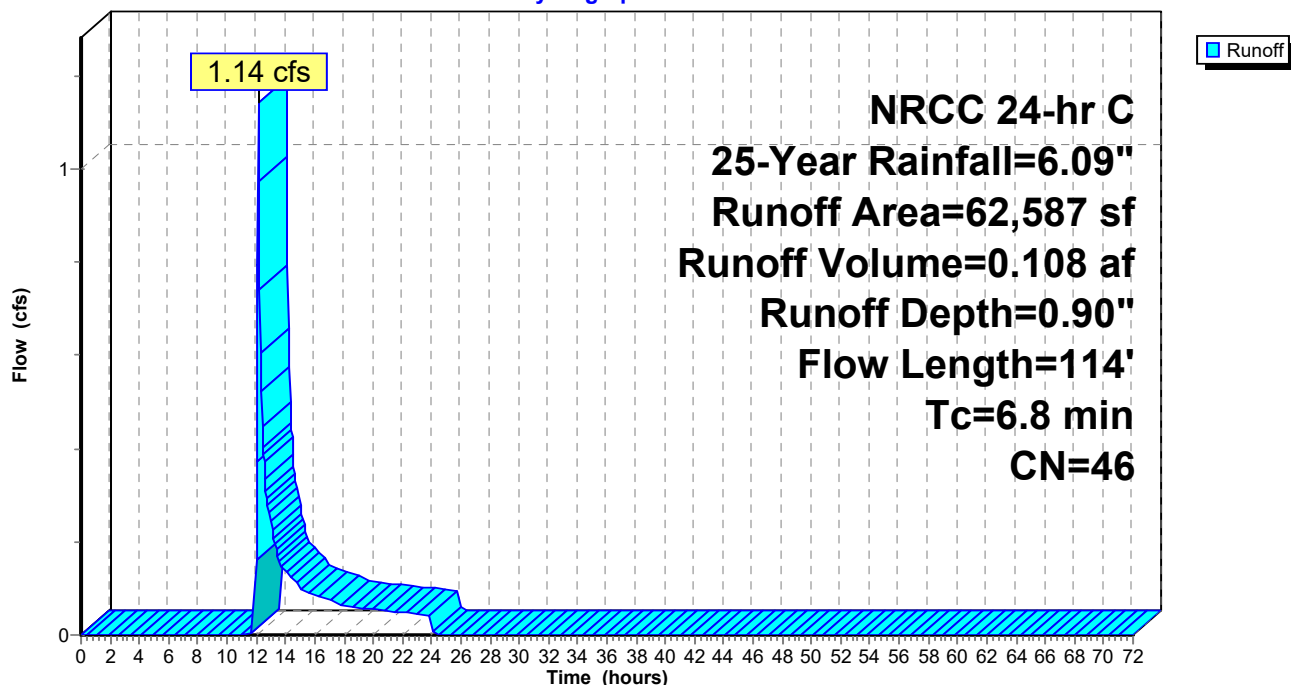
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
17,800	55	Woods, Good, HSG B
6,800	30	Woods, Good, HSG A
34,006	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
62,587	46	Weighted Average
58,606		93.64% Pervious Area
3,981		6.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0173	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.2	18	0.0449	1.48		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.8	46	0.0362	0.95		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
6.8	114	Total			

Subcatchment E-4:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-5:

Runoff = 16.06 cfs @ 12.36 hrs, Volume= 1.959 af, Depth= 1.81"

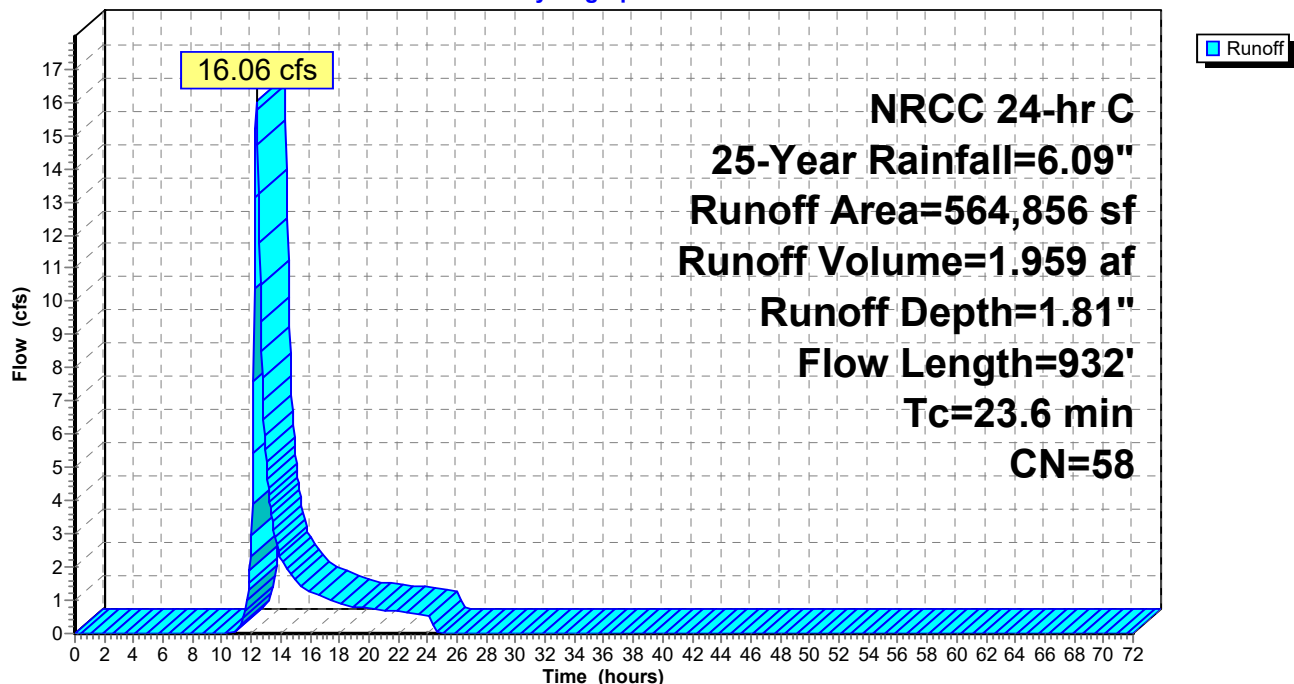
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
97,200	39	>75% Grass cover, Good, HSG A
60,000	30	Woods, Good, HSG A
148,500	55	Woods, Good, HSG B
128,700	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
106,356	80	>75% Grass cover, Good, HSG D
564,856	58	Weighted Average
564,856		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0296	0.08		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
5.8	355	0.0215	1.03		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.5	527	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.6	932	Total			

Subcatchment E-5:

Hydrograph



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Summary for Subcatchment E-6:

Runoff = 24.16 cfs @ 12.25 hrs, Volume= 2.294 af, Depth= 2.42"

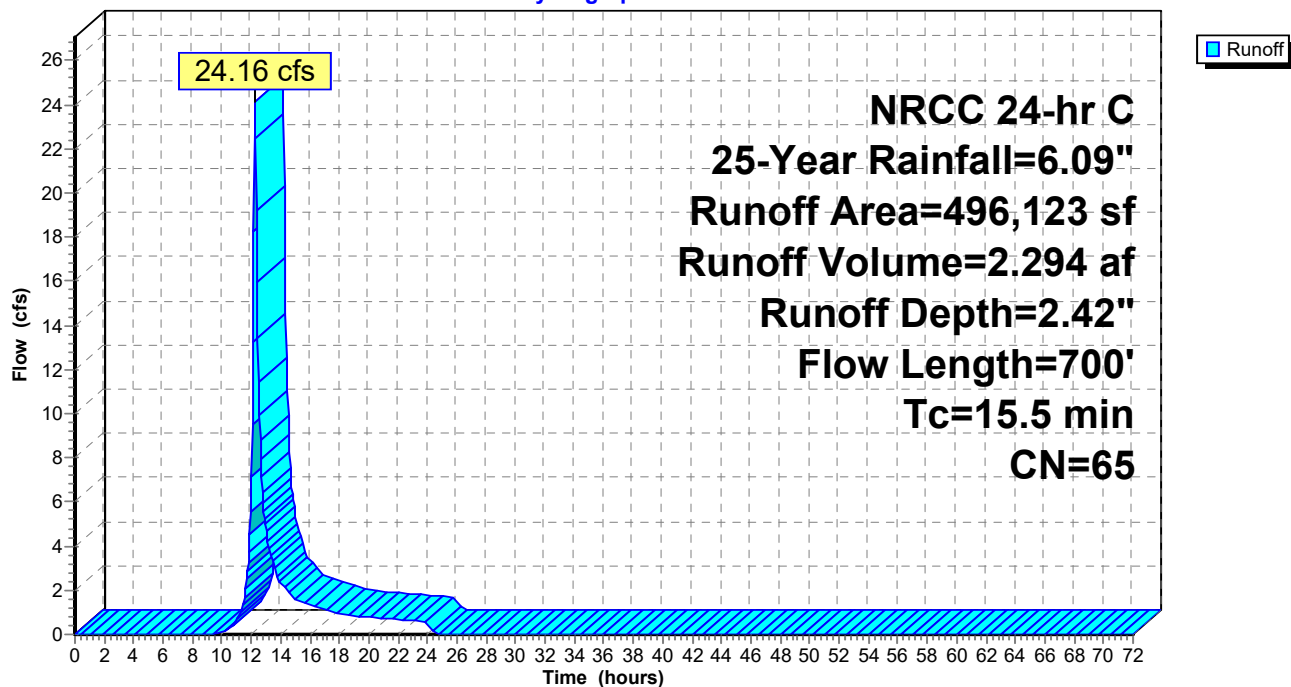
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
298,100	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
496,123	65	Weighted Average
496,123		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
7.3	600	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.5	700	Total			

Subcatchment E-6:

Hydrograph



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Summary for Subcatchment E-7:

Runoff = 17.07 cfs @ 12.37 hrs, Volume= 2.117 af, Depth= 1.73"

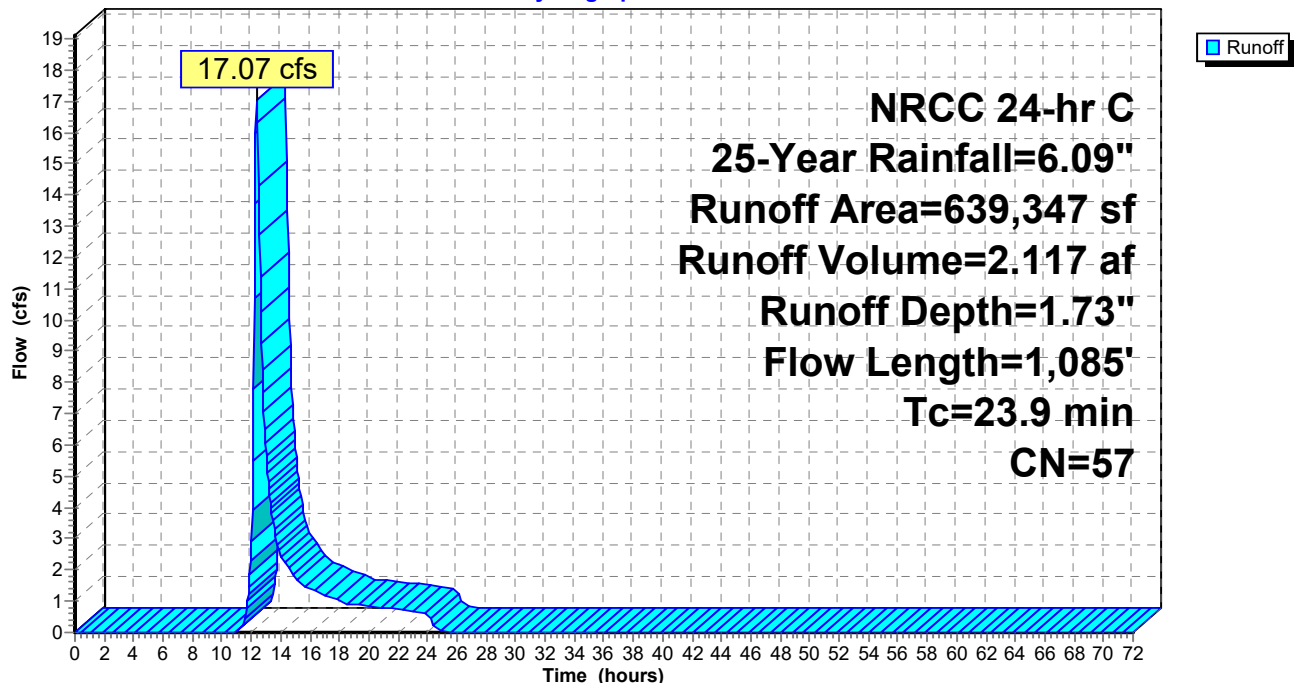
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
436,868	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
639,347	57	Weighted Average
606,609		94.88% Pervious Area
32,738		5.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment E-7:

Hydrograph



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Summary for Subcatchment E-8:

Runoff = 5.30 cfs @ 12.16 hrs, Volume= 0.396 af, Depth= 1.90"

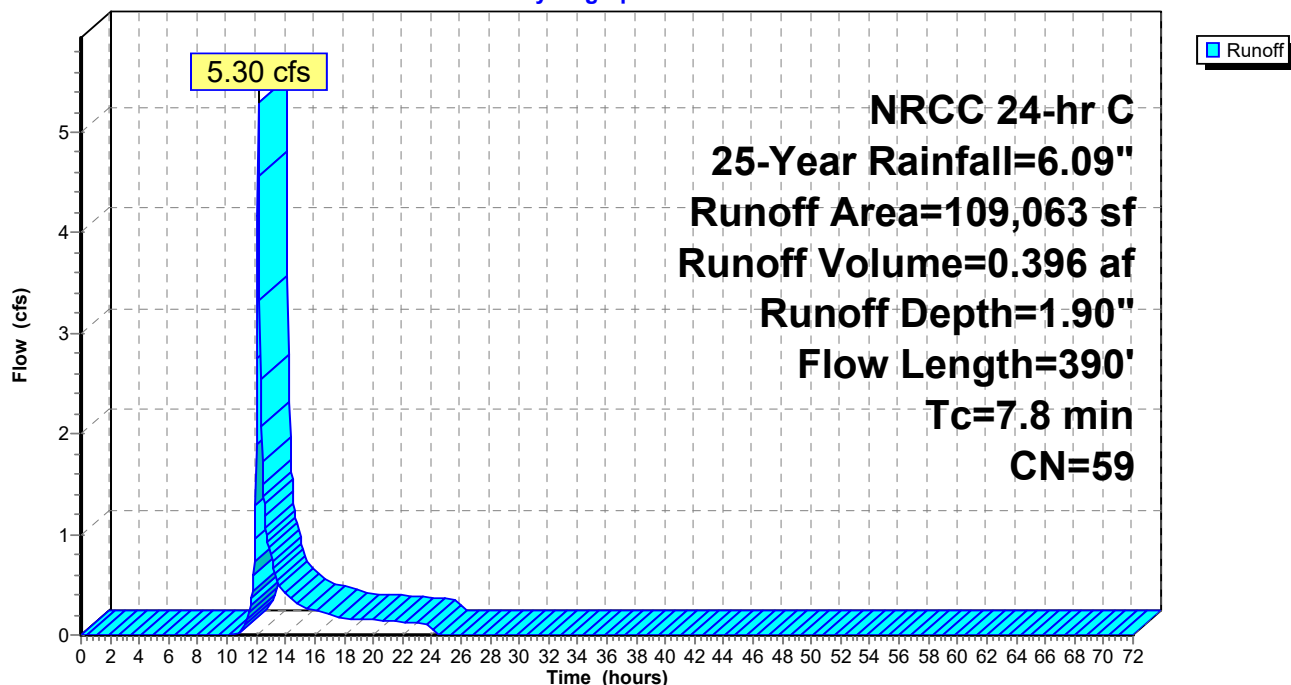
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
7,994	98	Paved parking, HSG B
5,726	98	Water Surface, 0% imp, HSG A
12,549	39	>75% Grass cover, Good, HSG A
43,794	61	>75% Grass cover, Good, HSG B
6,600	30	Woods, Good, HSG A
32,400	55	Woods, Good, HSG B
109,063	59	Weighted Average
101,069		92.67% Pervious Area
7,994		7.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment E-8:

Hydrograph



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Summary for Subcatchment E-9:

Runoff = 11.18 cfs @ 12.26 hrs, Volume= 1.188 af, Depth= 1.41"

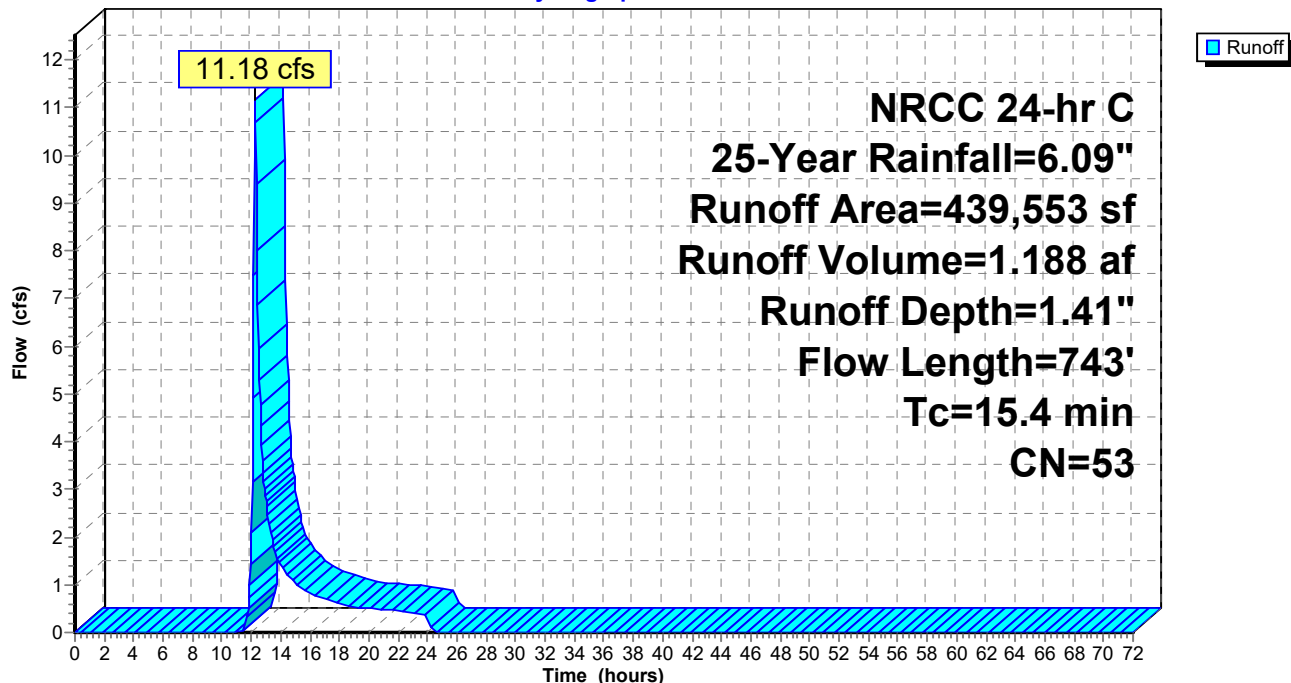
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
239,355	30	Woods, Good, HSG A
140,198	98	Paved parking, HSG A
60,000	39	>75% Grass cover, Good, HSG A
439,553	53	Weighted Average
299,355		68.10% Pervious Area
140,198		31.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0600	0.12		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.37"
1.1	318	0.1114	5.01		Shallow Concentrated Flow, HR-A Grassed Waterway Kv= 15.0 fps
0.8	325	0.1139	6.85		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
15.4	743	Total			

Subcatchment E-9:

Hydrograph



Existing Hydrology

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Summary for Reach DP-1: Wetland Series R

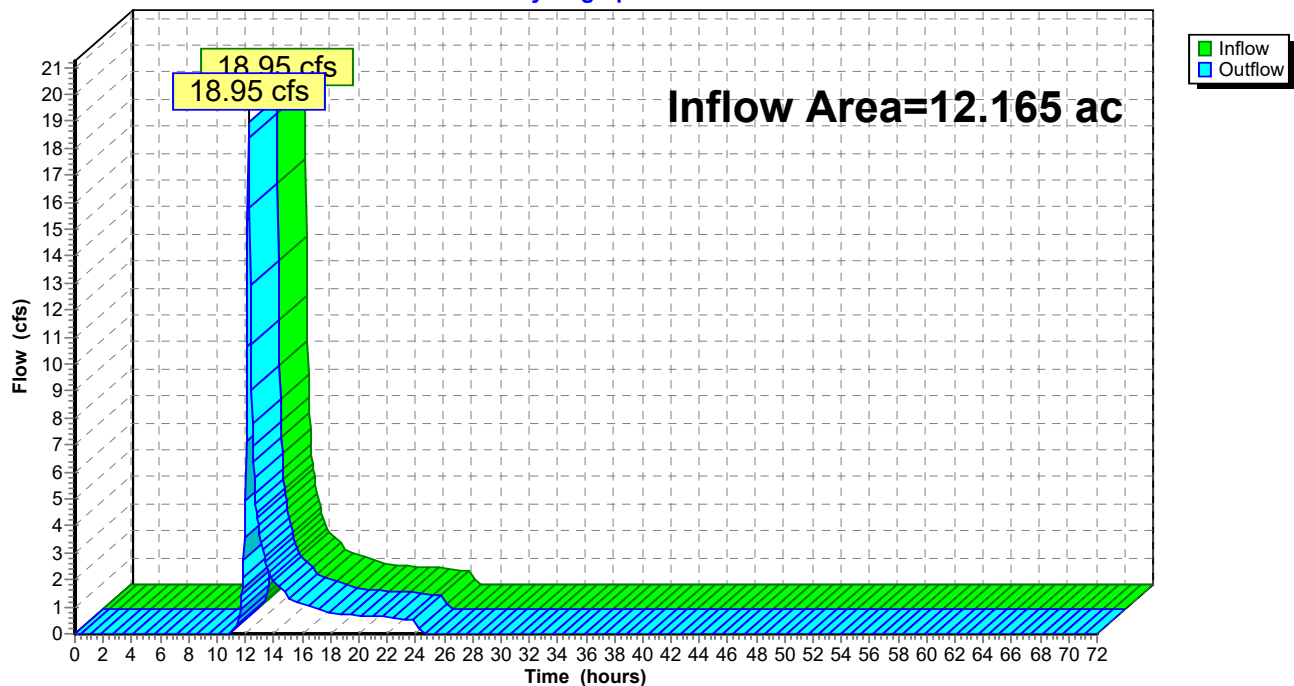
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.165 ac, 0.00% Impervious, Inflow Depth = 1.73" for 25-Year event
Inflow = 18.95 cfs @ 12.22 hrs, Volume= 1.755 af
Outflow = 18.95 cfs @ 12.22 hrs, Volume= 1.755 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R

Hydrograph



Existing Hydrology

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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Reach DP-10: West Elm Street

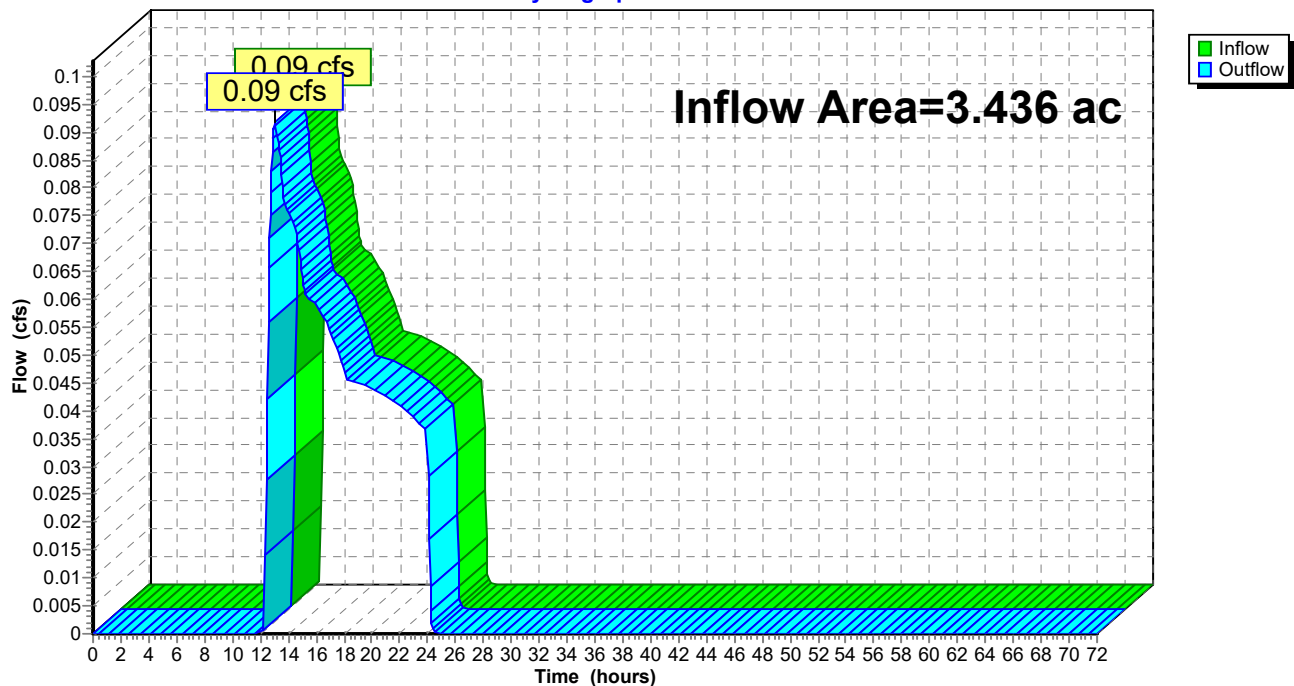
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.436 ac, 3.33% Impervious, Inflow Depth = 0.18" for 25-Year event
Inflow = 0.09 cfs @ 13.04 hrs, Volume= 0.052 af
Outflow = 0.09 cfs @ 13.04 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street

Hydrograph



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Summary for Reach DP-11: Wetland Series A

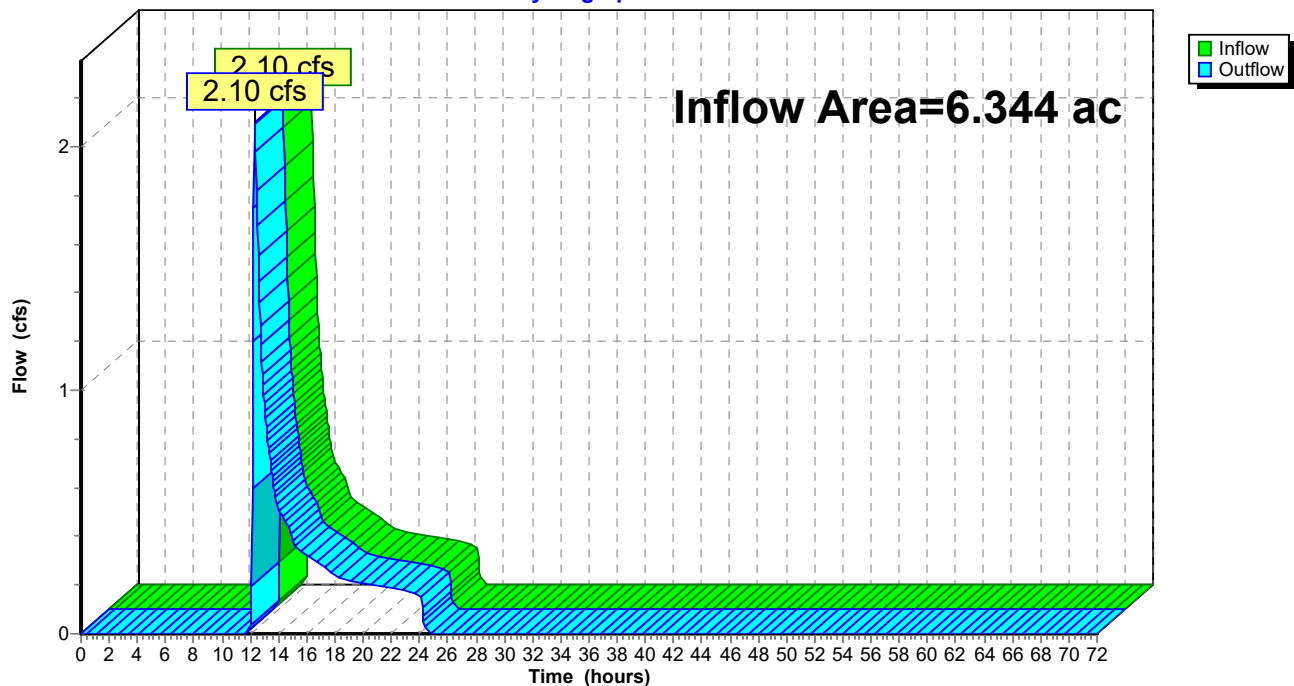
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.344 ac, 6.32% Impervious, Inflow Depth = 0.71" for 25-Year event
Inflow = 2.10 cfs @ 12.34 hrs, Volume= 0.374 af
Outflow = 2.10 cfs @ 12.34 hrs, Volume= 0.374 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A

Hydrograph



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Summary for Reach DP-12: Wetland Series A

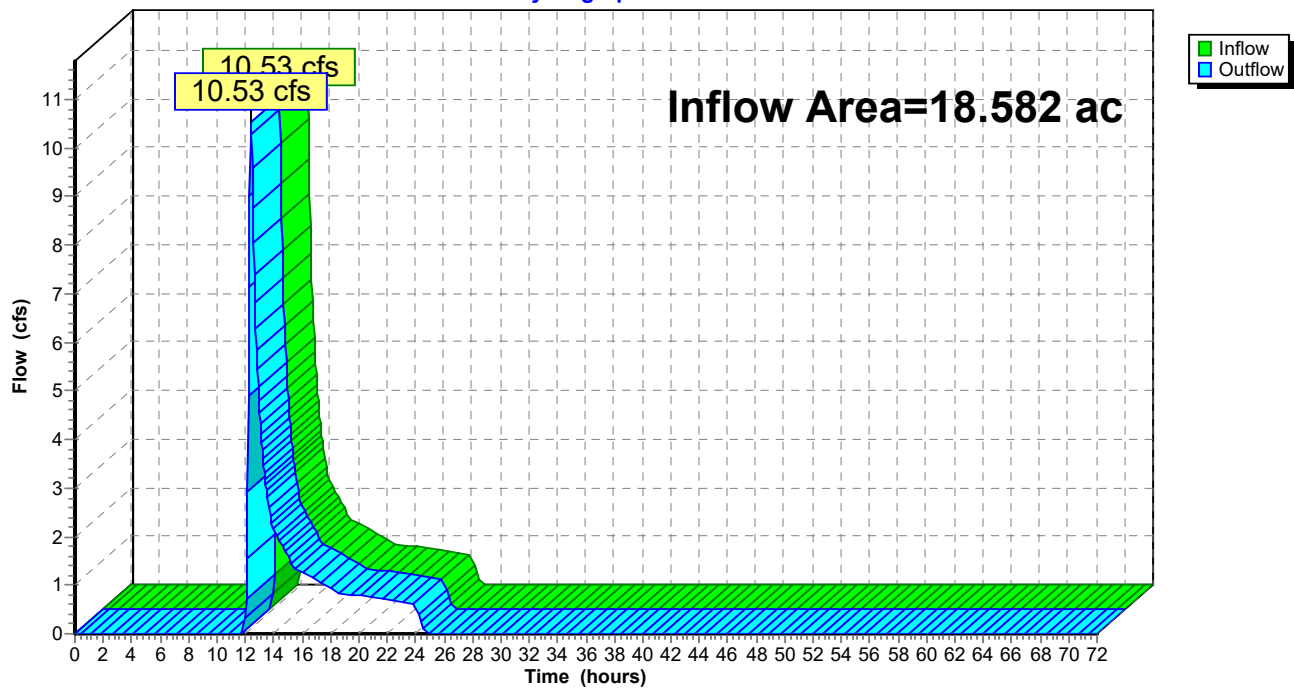
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.582 ac, 5.73% Impervious, Inflow Depth = 1.04" for 25-Year event
Inflow = 10.53 cfs @ 12.40 hrs, Volume= 1.615 af
Outflow = 10.53 cfs @ 12.40 hrs, Volume= 1.615 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A

Hydrograph



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Summary for Reach DP-13: Wetland Series B

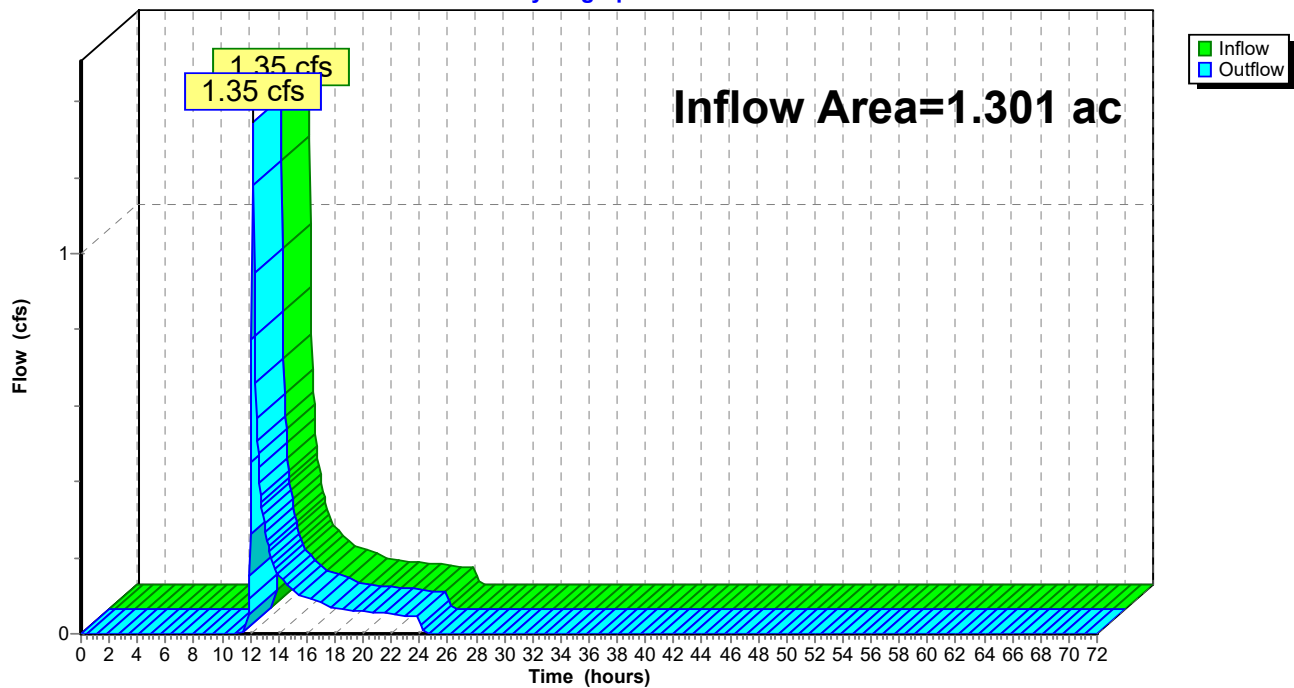
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 1.19" for 25-Year event
Inflow = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af
Outflow = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B

Hydrograph



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Summary for Reach DP-14: Wetland Series C,D,E,,K,J

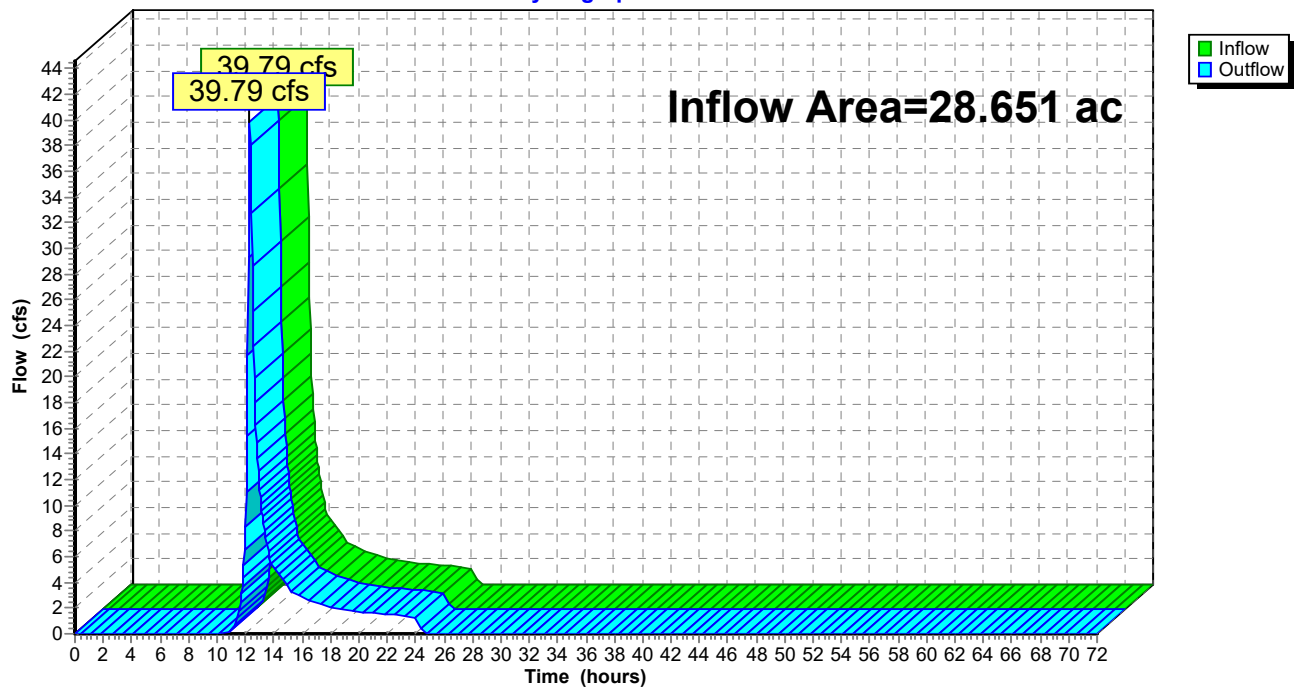
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.651 ac, 0.00% Impervious, Inflow Depth = 1.90" for 25-Year event
Inflow = 39.79 cfs @ 12.32 hrs, Volume= 4.528 af
Outflow = 39.79 cfs @ 12.32 hrs, Volume= 4.528 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J

Hydrograph



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Summary for Reach DP-15: Wetland Series H

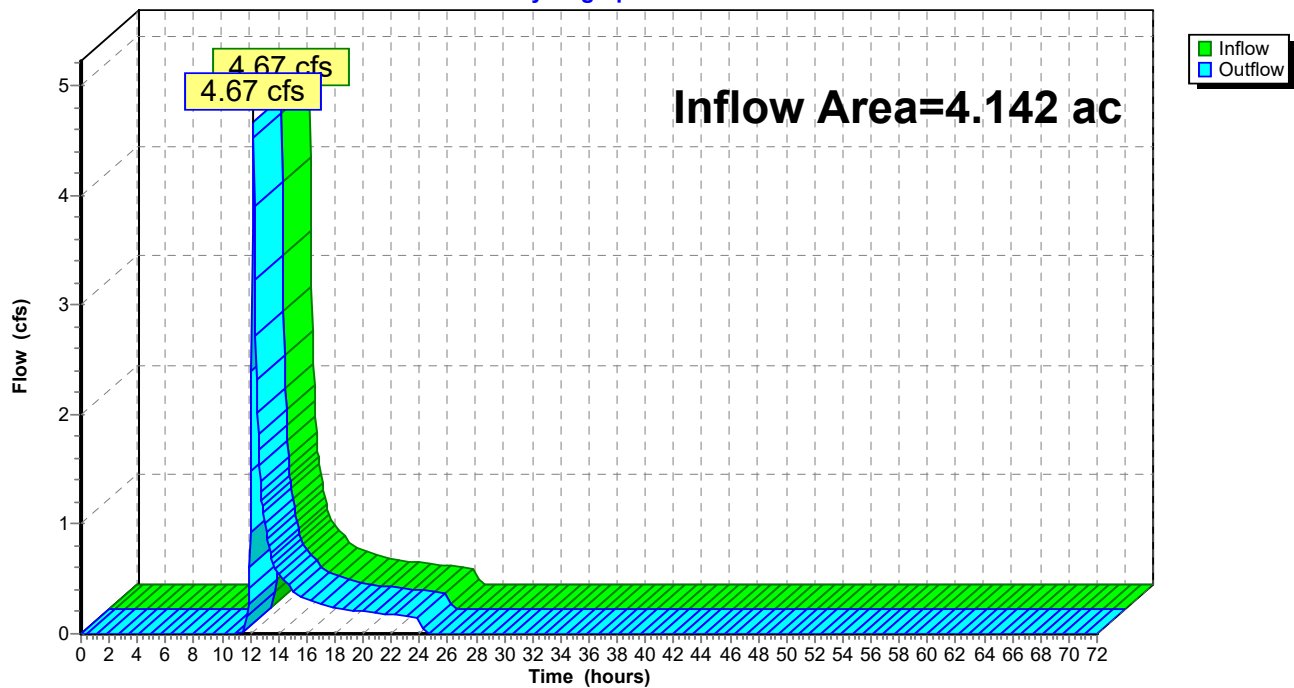
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.142 ac, 0.00% Impervious, Inflow Depth = 1.34" for 25-Year event
Inflow = 4.67 cfs @ 12.22 hrs, Volume= 0.461 af
Outflow = 4.67 cfs @ 12.22 hrs, Volume= 0.461 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H

Hydrograph



Existing Hydrology

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Summary for Reach DP-2: Wetland Series I

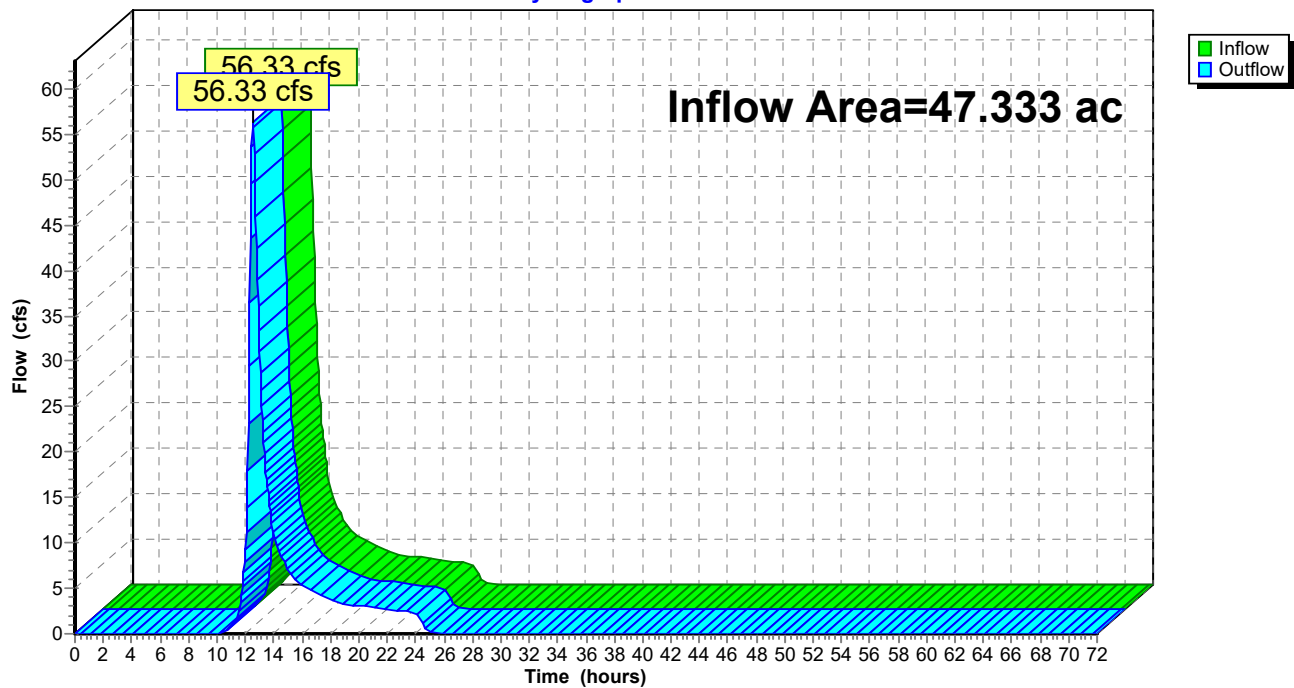
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.333 ac, 3.43% Impervious, Inflow Depth = 2.15" for 25-Year event
Inflow = 56.33 cfs @ 12.54 hrs, Volume= 8.489 af
Outflow = 56.33 cfs @ 12.54 hrs, Volume= 8.489 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I

Hydrograph



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Summary for Reach DP-3: W-R

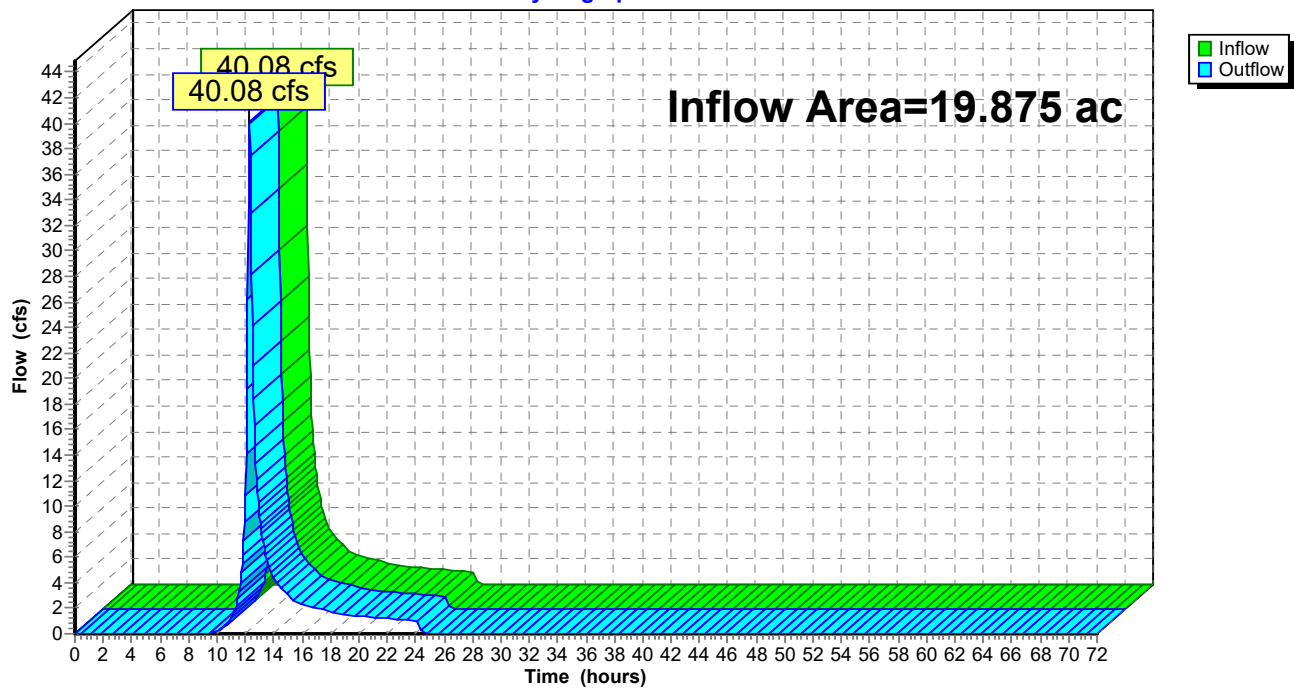
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 2.51" for 25-Year event
Inflow = 40.08 cfs @ 12.29 hrs, Volume= 4.152 af
Outflow = 40.08 cfs @ 12.29 hrs, Volume= 4.152 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: W-R

Hydrograph



Existing Hydrology

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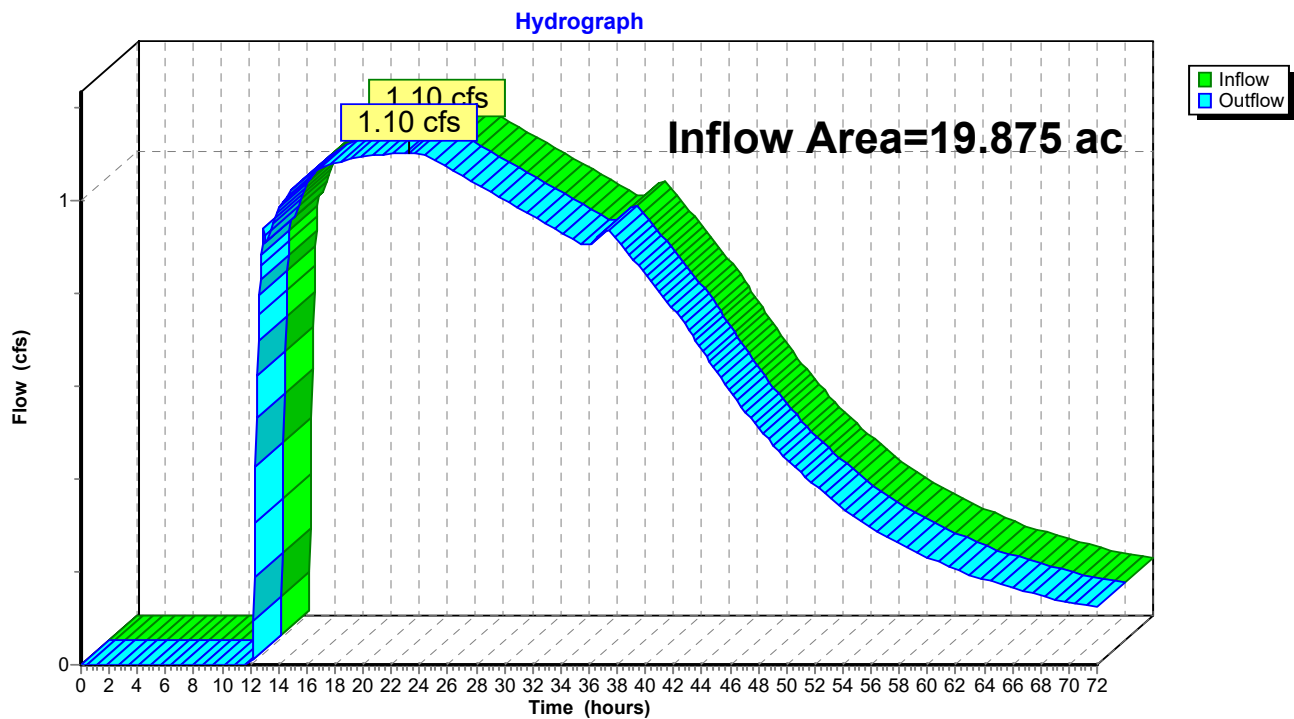
Summary for Reach DP-3 OUT: 8" Copper Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth > 1.97" for 25-Year event
Inflow = 1.10 cfs @ 23.27 hrs, Volume= 3.260 af
Outflow = 1.10 cfs @ 23.27 hrs, Volume= 3.260 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe



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Summary for Reach DP-4: Dwelley Street

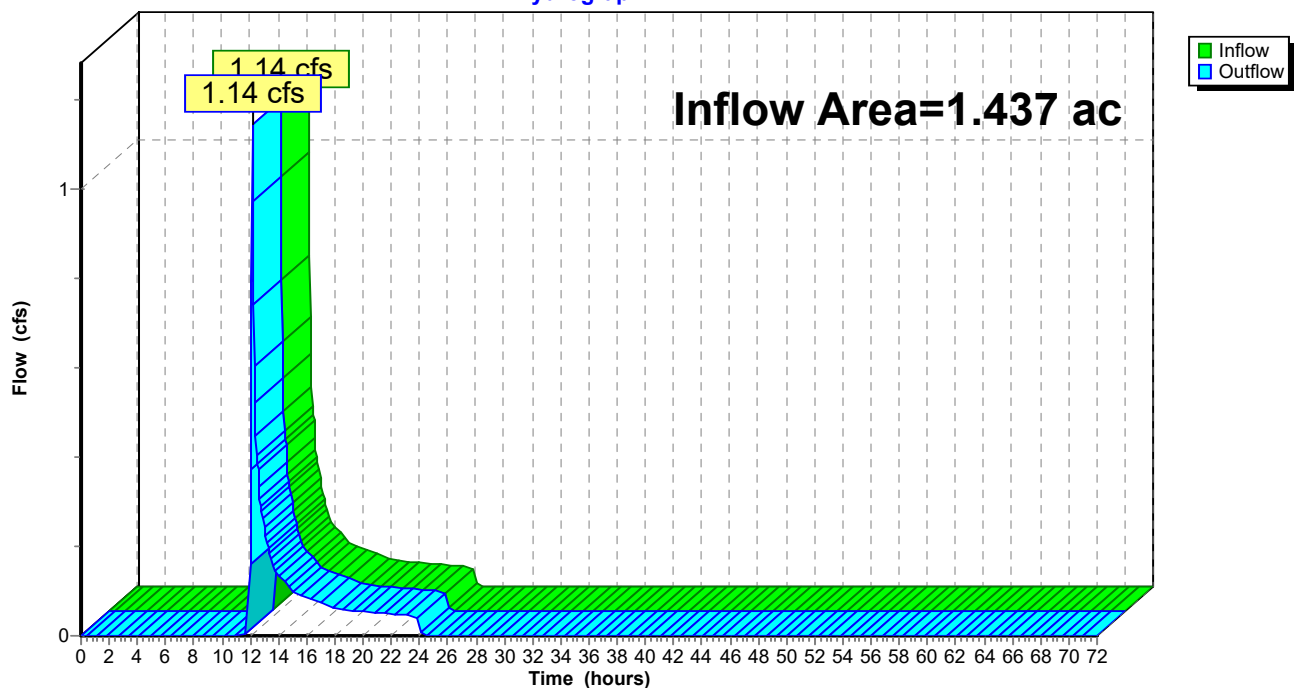
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.437 ac, 6.36% Impervious, Inflow Depth = 0.90" for 25-Year event
Inflow = 1.14 cfs @ 12.16 hrs, Volume= 0.108 af
Outflow = 1.14 cfs @ 12.16 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-5: W-N

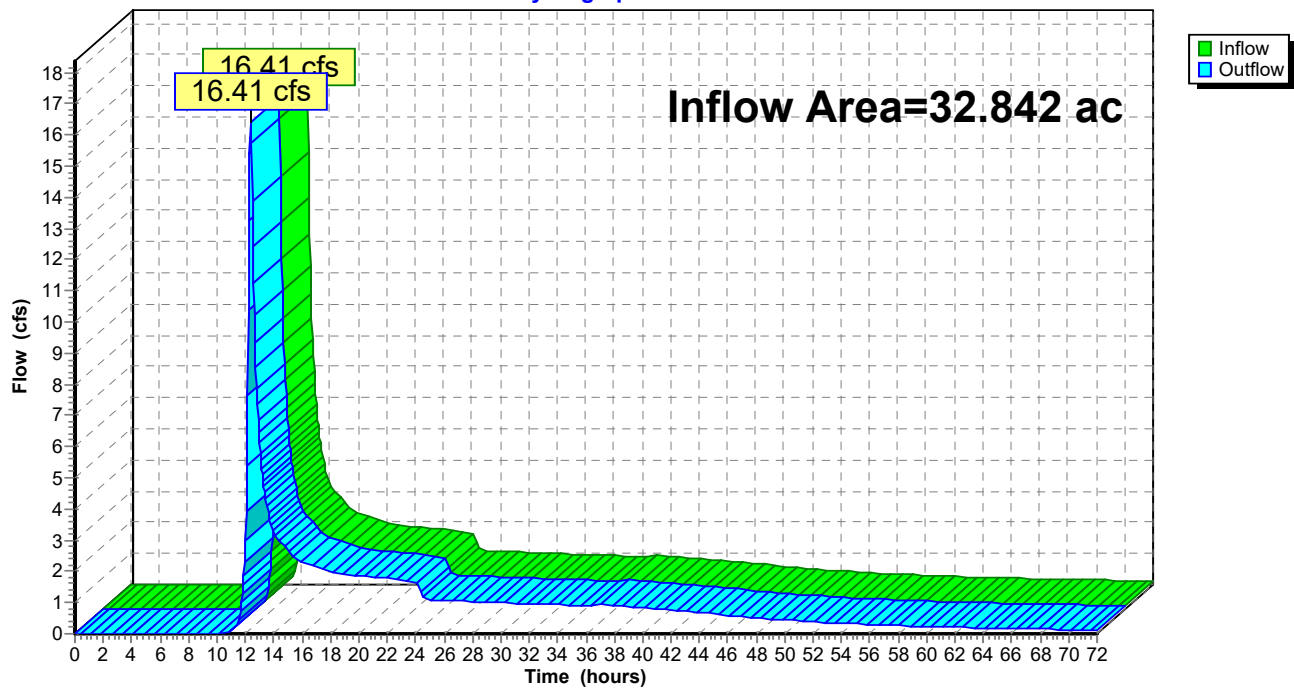
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 1.91" for 25-Year event
Inflow = 16.41 cfs @ 12.37 hrs, Volume= 5.219 af
Outflow = 16.41 cfs @ 12.37 hrs, Volume= 5.219 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-5: W-N

Hydrograph



Existing Hydrology

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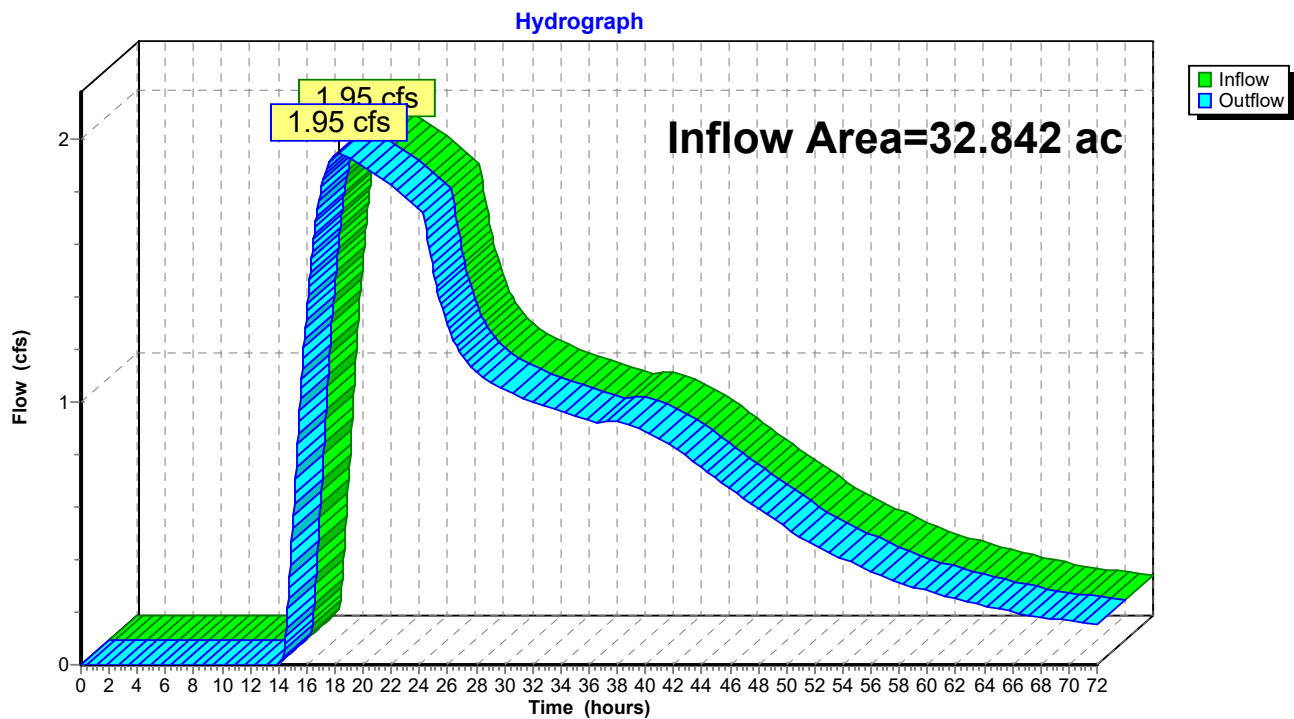
Summary for Reach DP-5 OUT: 24" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 1.40" for 25-Year event
Inflow = 1.95 cfs @ 18.23 hrs, Volume= 3.827 af
Outflow = 1.95 cfs @ 18.23 hrs, Volume= 3.827 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE



Existing Hydrology

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Summary for Reach DP-6: W-QP

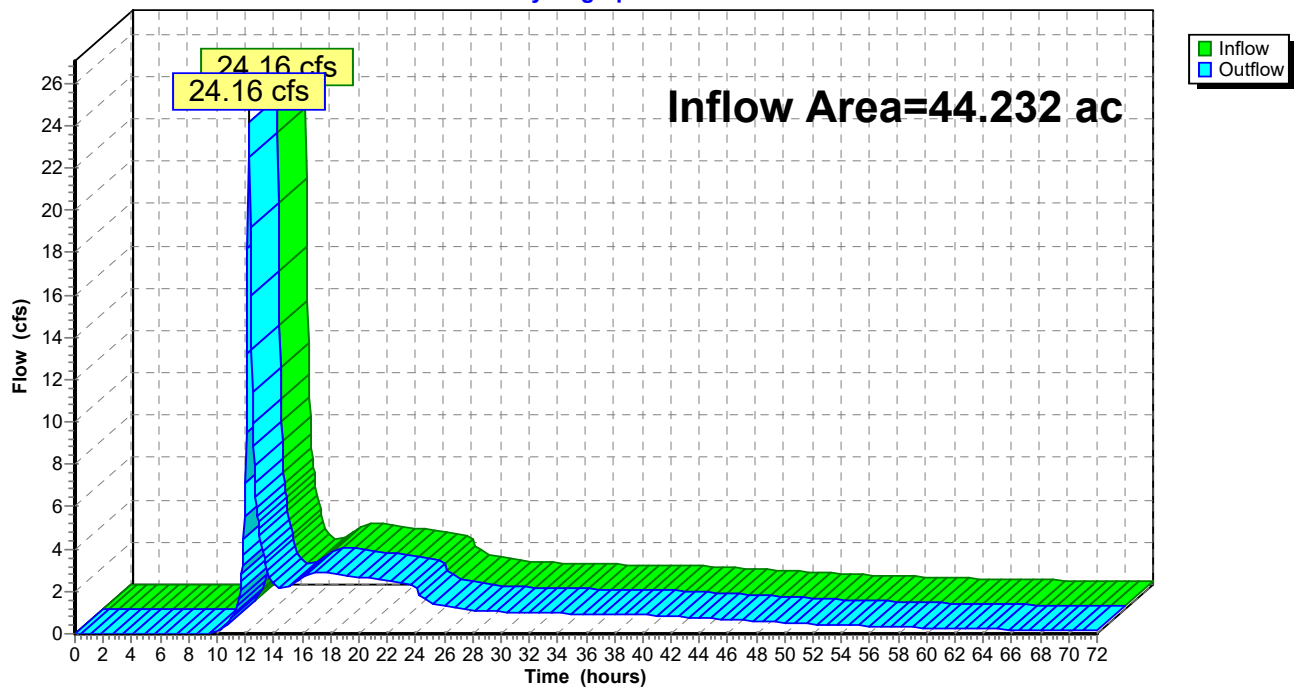
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 1.66" for 25-Year event
Inflow = 24.16 cfs @ 12.25 hrs, Volume= 6.121 af
Outflow = 24.16 cfs @ 12.25 hrs, Volume= 6.121 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



Existing Hydrology

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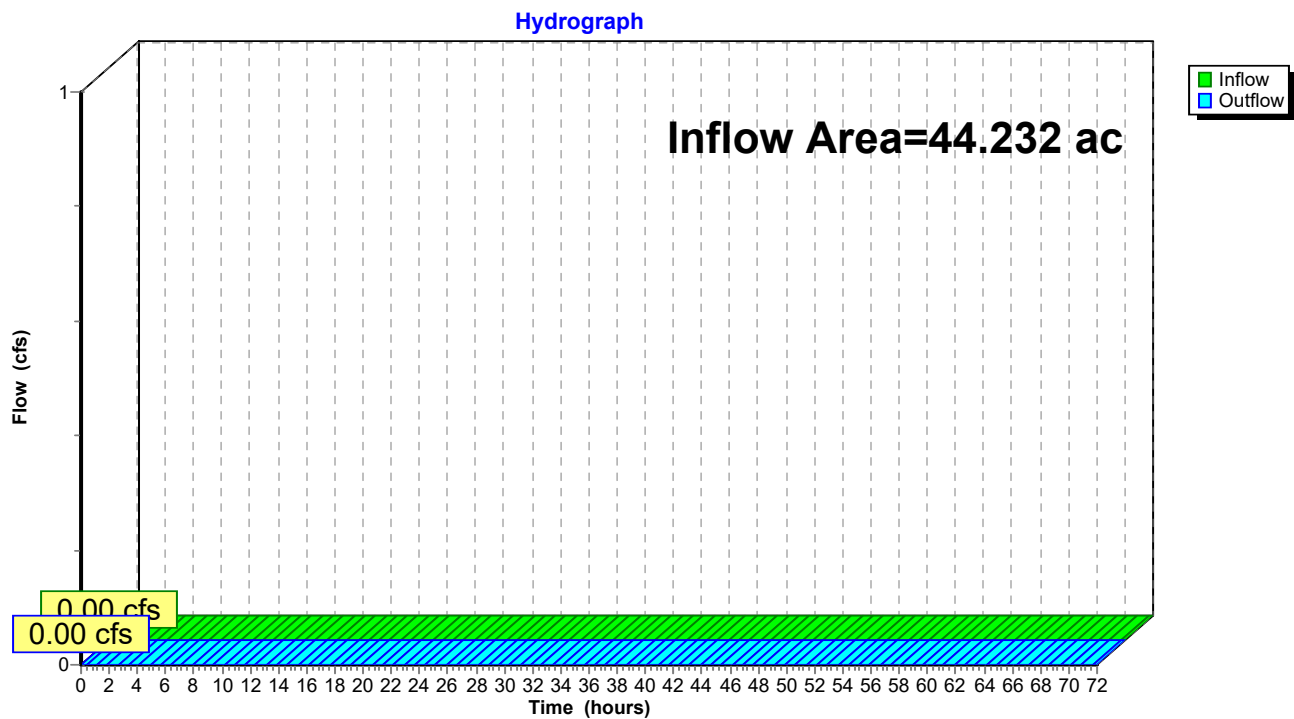
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



Existing Hydrology

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Summary for Reach DP-7: W-O

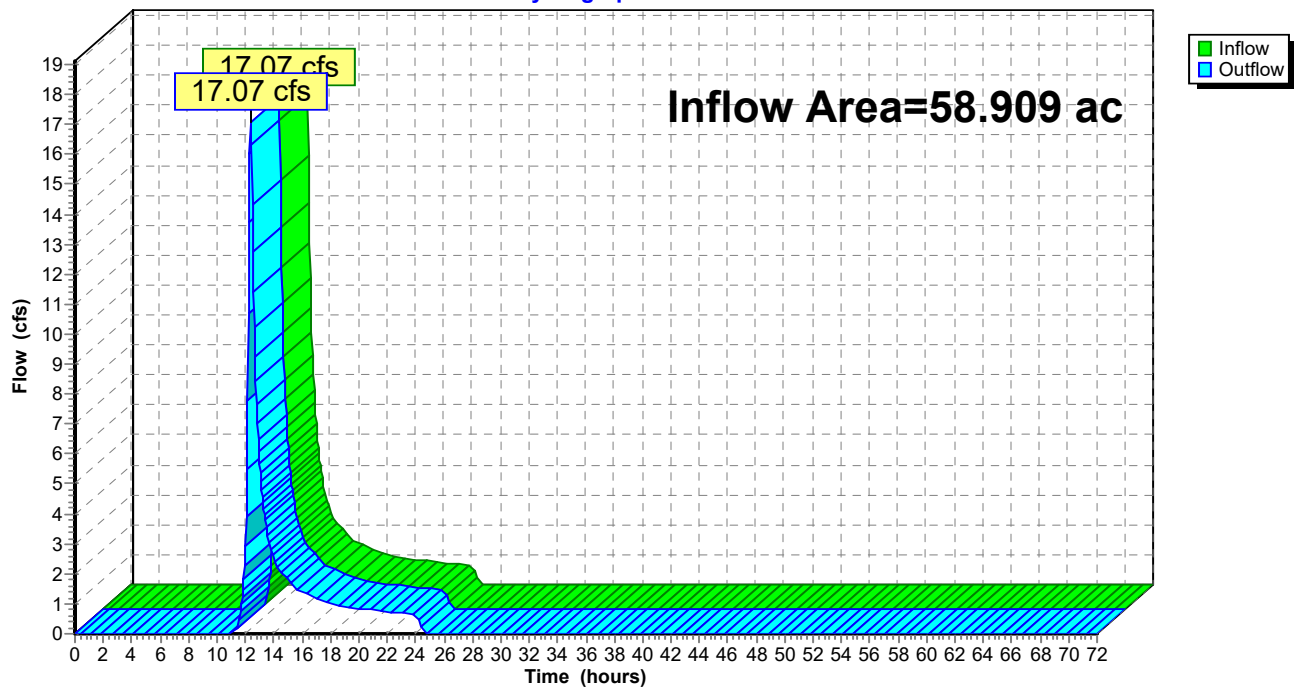
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.43" for 25-Year event
Inflow = 17.07 cfs @ 12.37 hrs, Volume= 2.117 af
Outflow = 17.07 cfs @ 12.37 hrs, Volume= 2.117 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7: W-O

Hydrograph



Existing Hydrology

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Summary for Reach DP-7 OUT: 18" RCP PIPE

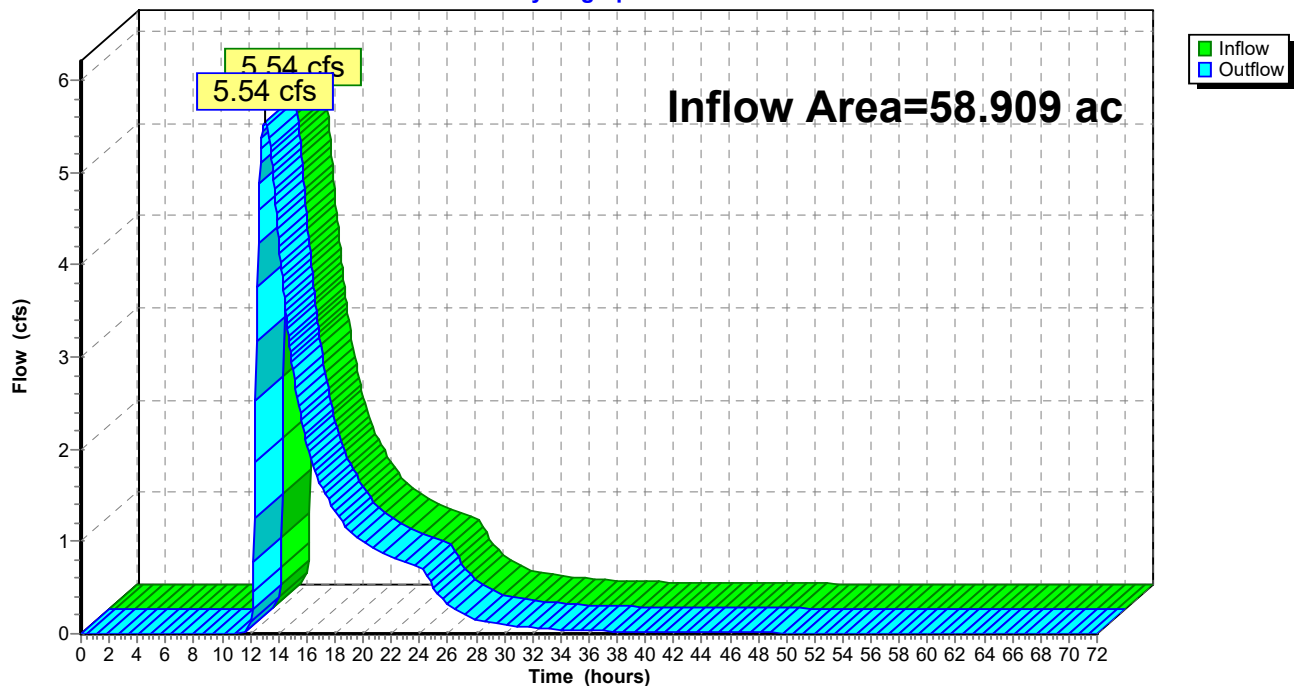
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 0.43" for 25-Year event
Inflow = 5.54 cfs @ 13.02 hrs, Volume= 2.110 af
Outflow = 5.54 cfs @ 13.02 hrs, Volume= 2.110 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 18" RCP PIPE

Hydrograph



Existing Hydrology

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Summary for Reach DP-8: Wetlands Series X

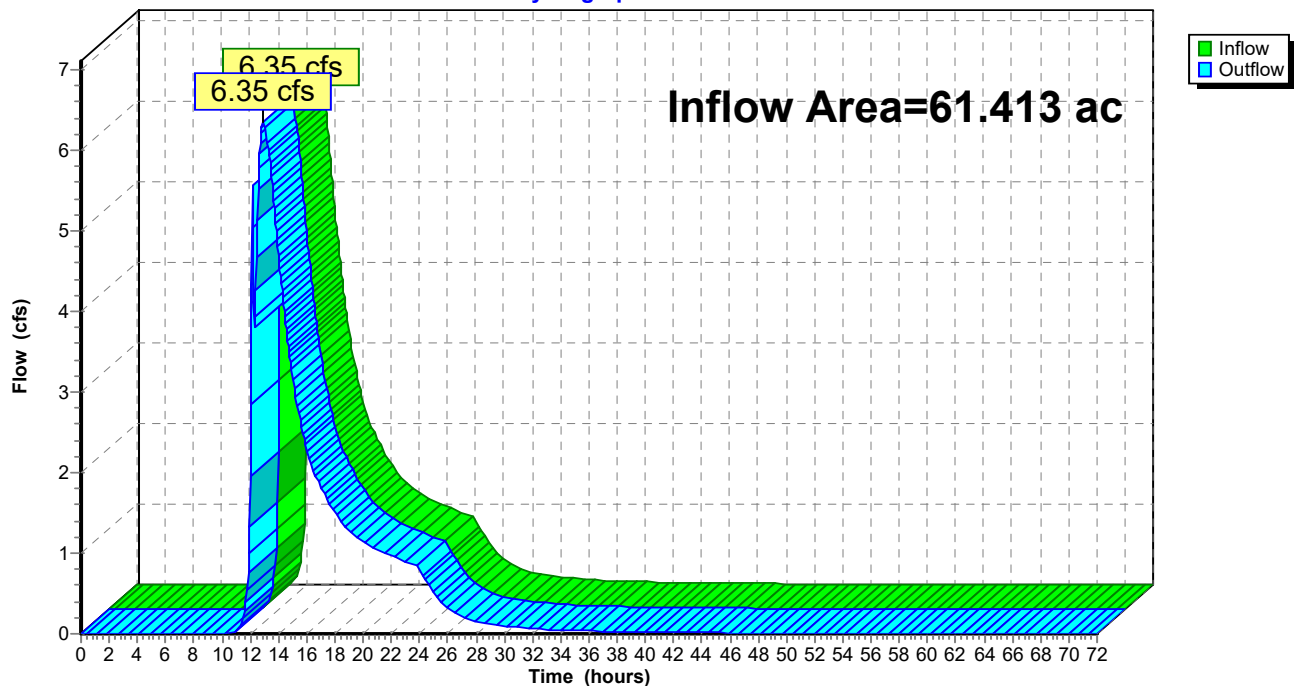
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 0.49" for 25-Year event
Inflow = 6.35 cfs @ 12.92 hrs, Volume= 2.505 af
Outflow = 6.35 cfs @ 12.92 hrs, Volume= 2.505 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X

Hydrograph



Existing Hydrology

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Summary for Reach DP-9: West Elm Street

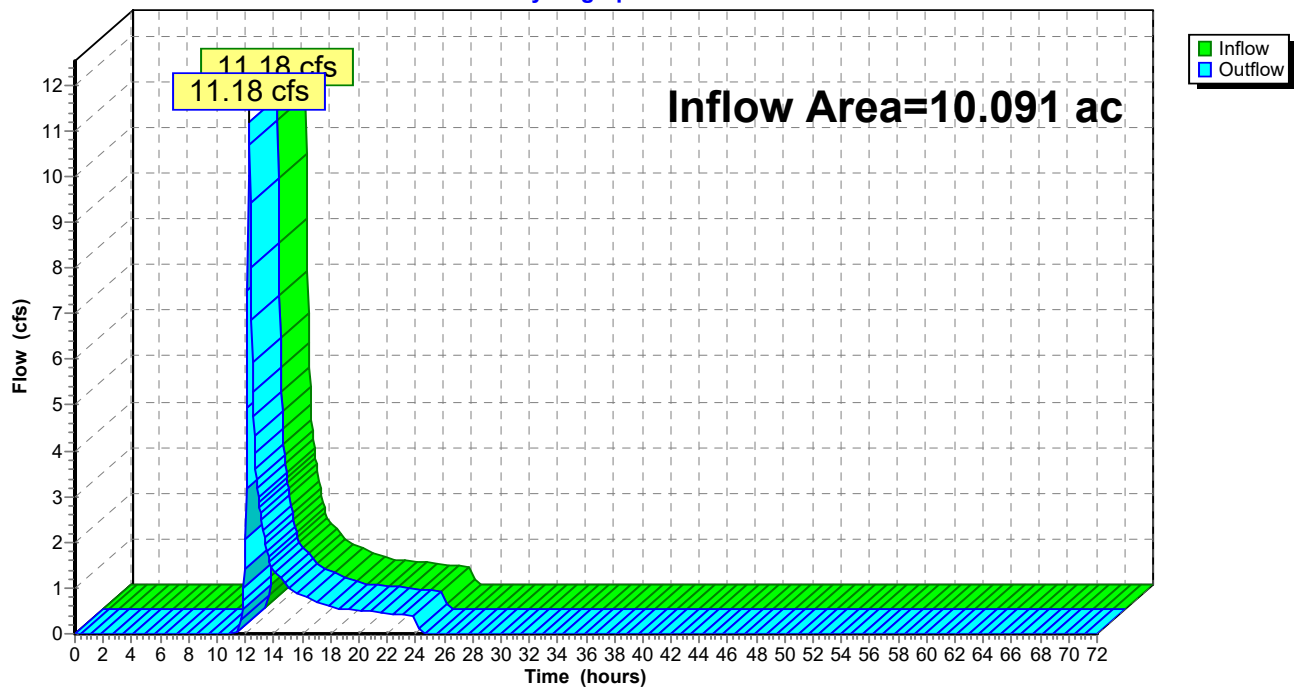
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.091 ac, 31.90% Impervious, Inflow Depth = 1.41" for 25-Year event
Inflow = 11.18 cfs @ 12.26 hrs, Volume= 1.188 af
Outflow = 11.18 cfs @ 12.26 hrs, Volume= 1.188 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-ELM: West Elm Street

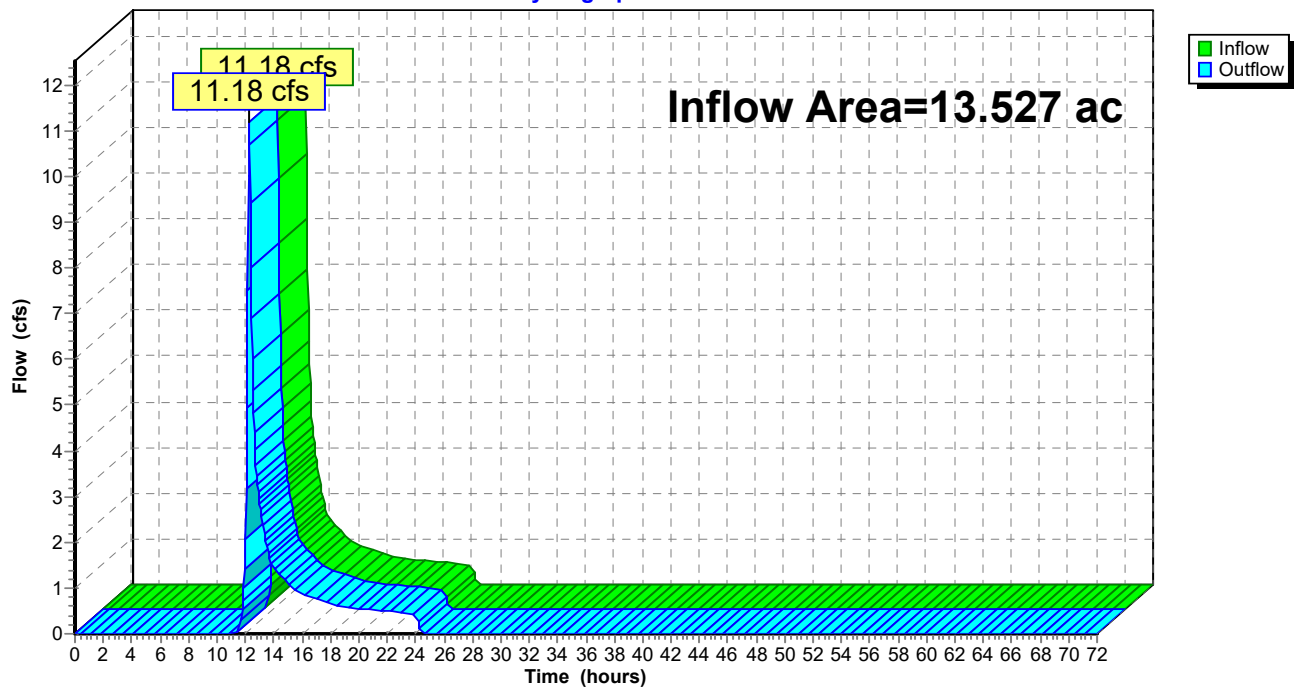
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.527 ac, 24.64% Impervious, Inflow Depth = 1.10" for 25-Year event
Inflow = 11.18 cfs @ 12.26 hrs, Volume= 1.240 af
Outflow = 11.18 cfs @ 12.26 hrs, Volume= 1.240 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-WA: Wetland Series A

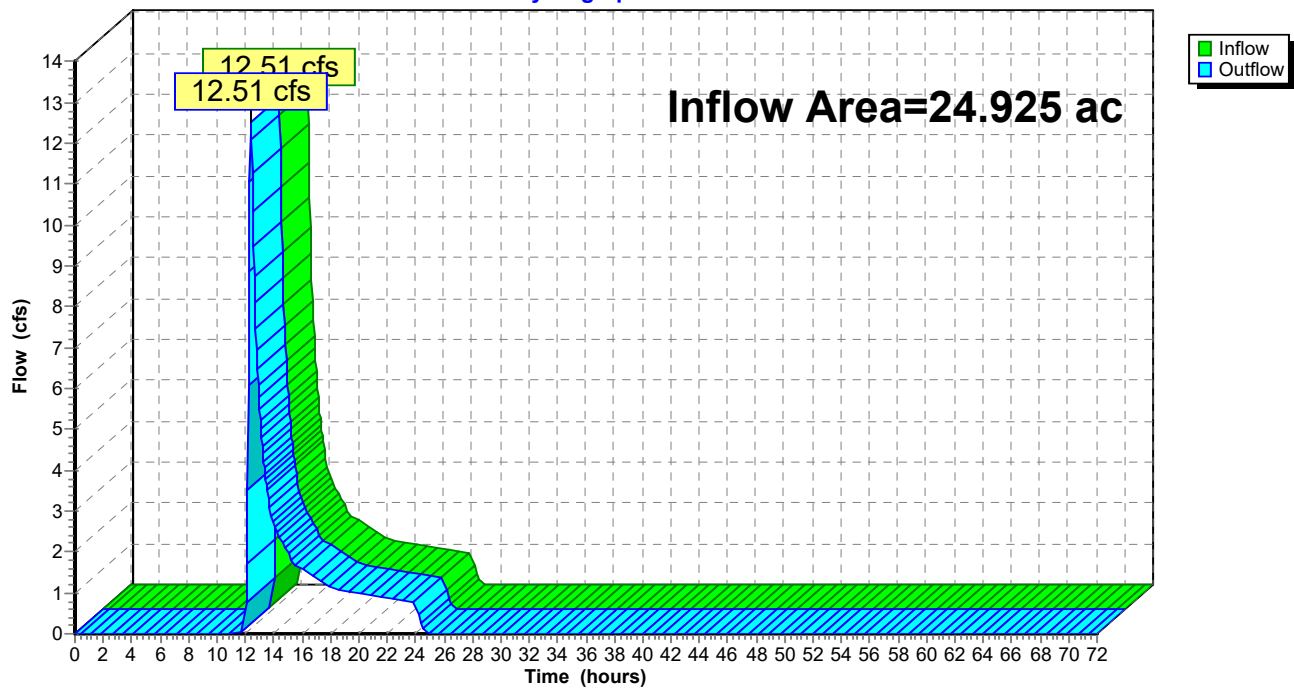
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 24.925 ac, 5.88% Impervious, Inflow Depth = 0.96" for 25-Year event
Inflow = 12.51 cfs @ 12.39 hrs, Volume= 1.990 af
Outflow = 12.51 cfs @ 12.39 hrs, Volume= 1.990 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A

Hydrograph



Existing Hydrology

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Summary for Reach DP-WI: Wetland Series/Stream I

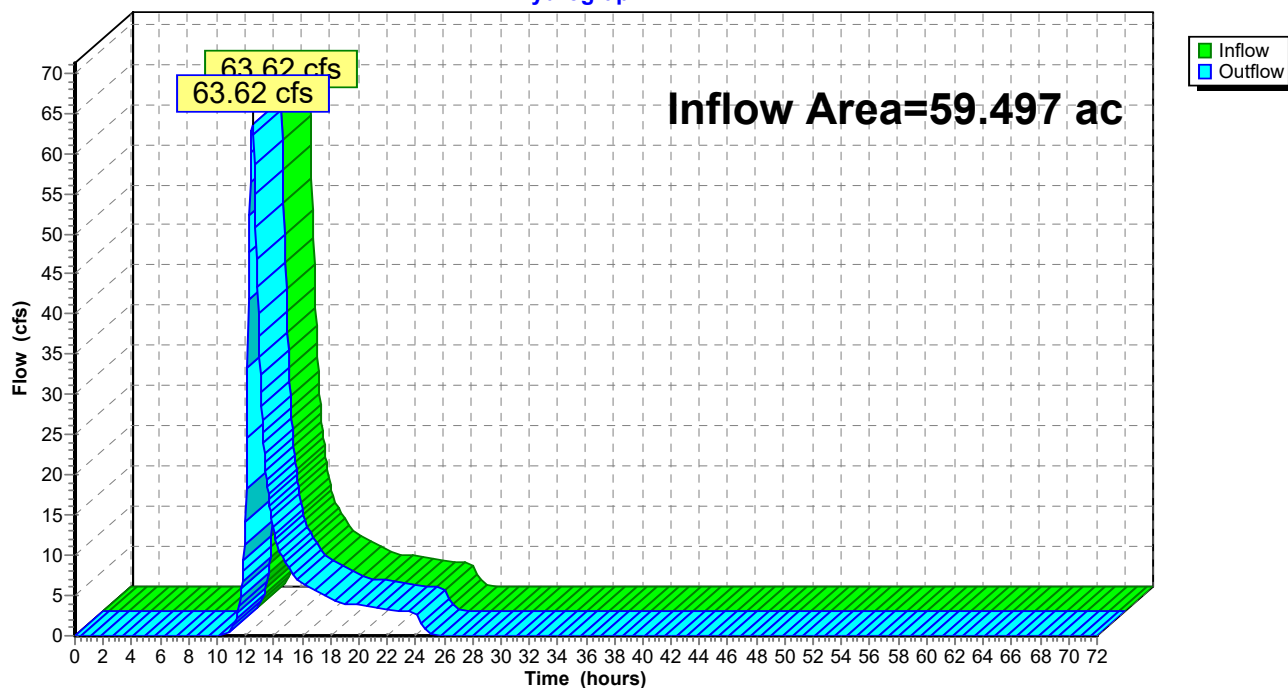
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 59.497 ac, 2.73% Impervious, Inflow Depth = 2.07" for 25-Year event
Inflow = 63.62 cfs @ 12.51 hrs, Volume= 10.244 af
Outflow = 63.62 cfs @ 12.51 hrs, Volume= 10.244 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I

Hydrograph



Existing Hydrology

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Summary for Pond BAS 10-A: EXIST BAS

Inflow Area = 0.692 ac, 0.00% Impervious, Inflow Depth = 0.08" for 25-Year event
 Inflow = 0.01 cfs @ 16.84 hrs, Volume= 0.005 af
 Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.005 af, Atten= 24%, Lag= 431.9 min
 Discarded = 0.00 cfs @ 24.03 hrs, Volume= 0.005 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 54.23' @ 24.03 hrs Surf.Area= 381 sf Storage= 68 cf

Plug-Flow detention time= 174.0 min calculated for 0.005 af (100% of inflow)
 Center-of-Mass det. time= 173.3 min (1,314.1 - 1,140.8)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.00 cfs @ 24.03 hrs HW=54.23' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)
 ↑2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

Prepared by CDG

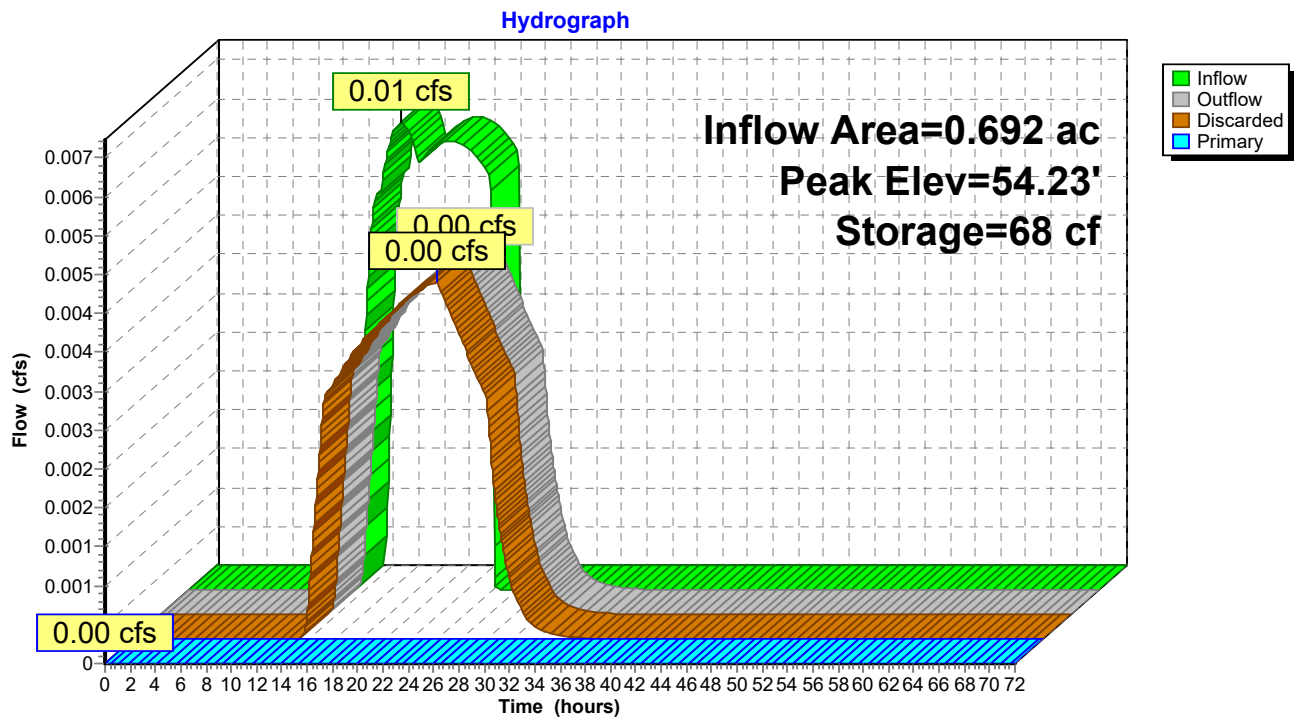
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Pond BAS 10-A: EXIST BAS



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Summary for Pond W-N: Wetland Series N

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 1.91" for 25-Year event
 Inflow = 16.41 cfs @ 12.37 hrs, Volume= 5.219 af
 Outflow = 1.95 cfs @ 18.23 hrs, Volume= 3.827 af, Atten= 88%, Lag= 351.6 min
 Primary = 1.95 cfs @ 18.23 hrs, Volume= 3.827 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 88.06' @ 18.23 hrs Surf.Area= 33,123 sf Storage= 72,810 cf

Plug-Flow detention time= 848.0 min calculated for 3.827 af (73% of inflow)
 Center-of-Mass det. time= 406.0 min (1,987.9 - 1,581.9)

Volume	Invert	Avail.Storage	Storage Description	
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=1.95 cfs @ 18.23 hrs HW=88.06' (Free Discharge)

↑1=RCP_Round 24" (Inlet Controls 1.95 cfs @ 3.05 fps)

Existing Hydrology

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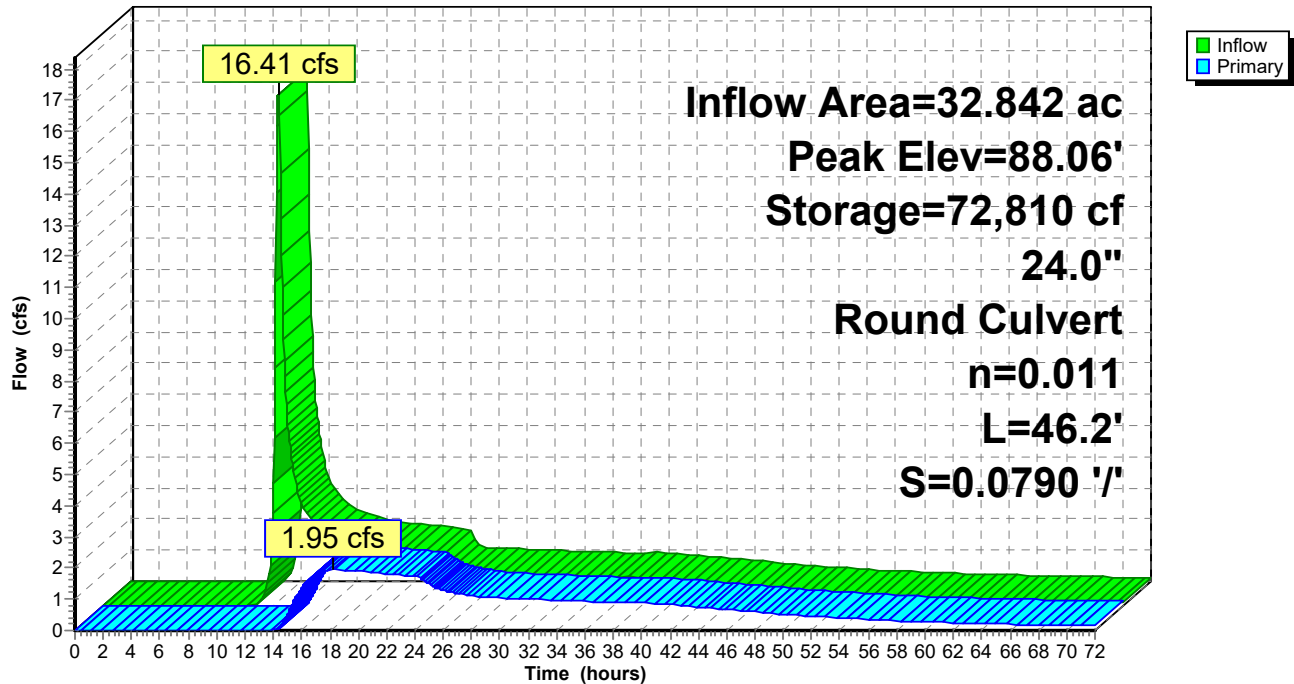
NRCC 24-hr C 25-Year Rainfall=6.09"

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Pond W-N: Wetland Series N

Hydrograph



Existing Hydrology

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Summary for Pond W-O: Wetland Series O

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.43" for 25-Year event
 Inflow = 17.07 cfs @ 12.37 hrs, Volume= 2.117 af
 Outflow = 5.54 cfs @ 13.02 hrs, Volume= 2.110 af, Atten= 68%, Lag= 39.3 min
 Primary = 5.54 cfs @ 13.02 hrs, Volume= 2.110 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 78.36' @ 13.02 hrs Surf.Area= 20,009 sf Storage= 27,913 cf

Plug-Flow detention time= 141.5 min calculated for 2.110 af (100% of inflow)
 Center-of-Mass det. time= 139.5 min (1,039.9 - 900.4)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S= 0.0114 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=5.54 cfs @ 13.02 hrs HW=78.36' (Free Discharge)

1=Culvert (Inlet Controls 5.54 cfs @ 3.20 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

Prepared by CDG

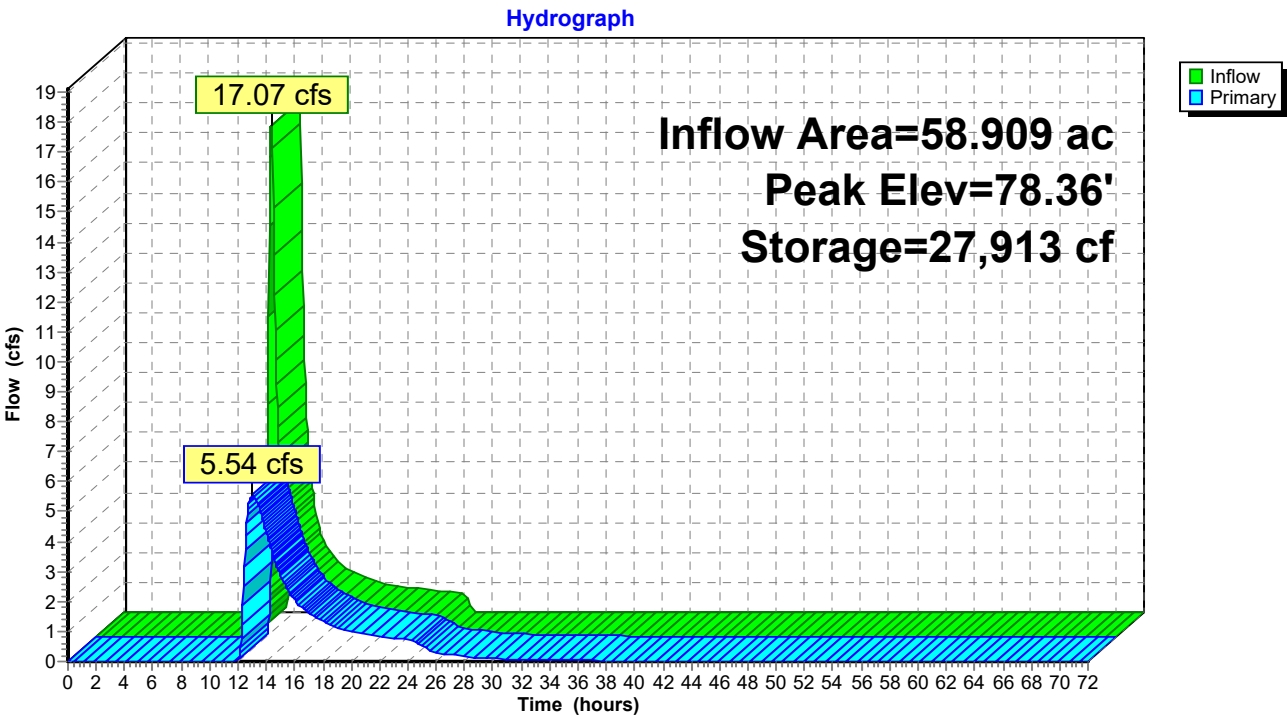
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NRCC 24-hr C 25-Year Rainfall=6.09"

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Pond W-O: Wetland Series O



Existing Hydrology

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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 1.66" for 25-Year event
 Inflow = 24.16 cfs @ 12.25 hrs, Volume= 6.121 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 80.47' @ 72.00 hrs Surf.Area= 91,852 sf Storage= 266,601 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices									
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Existing Hydrology

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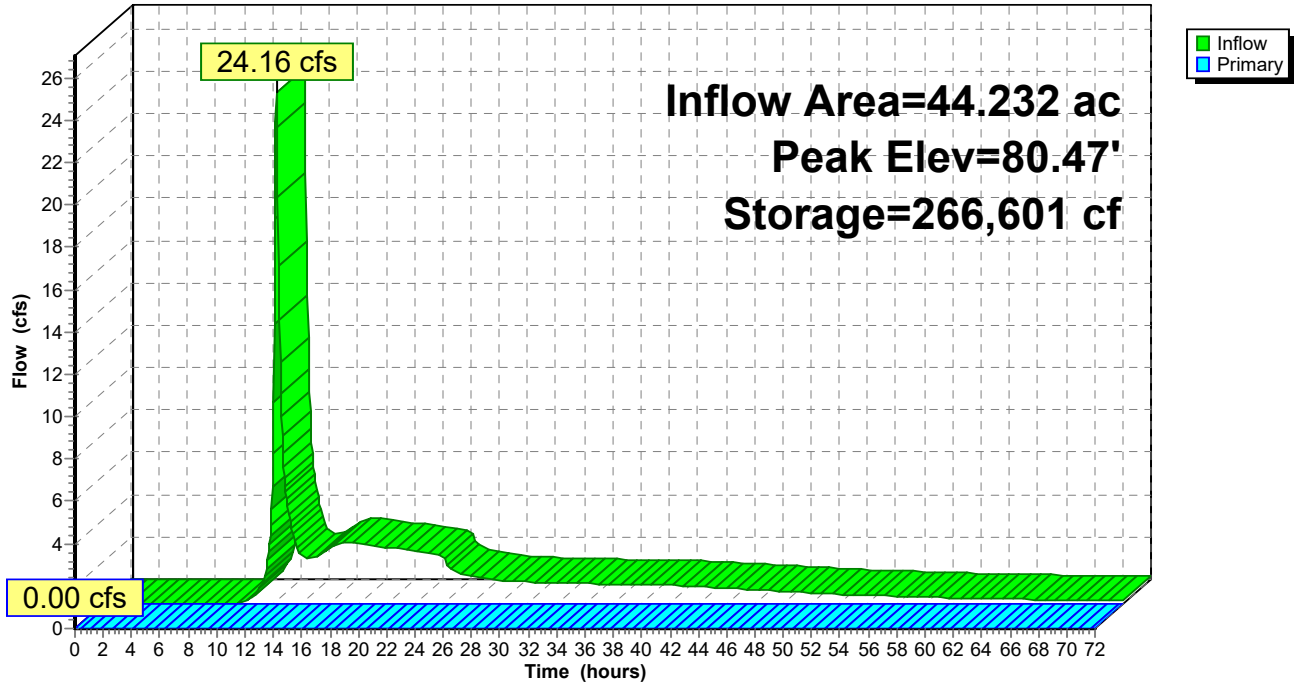
NRCC 24-hr C 25-Year Rainfall=6.09"

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Pond W-QP: Wetland Series Q & P

Hydrograph



Existing Hydrology

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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Pond W-R: Wetland Series R

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 2.51" for 25-Year event
 Inflow = 40.08 cfs @ 12.29 hrs, Volume= 4.152 af
 Outflow = 1.10 cfs @ 23.27 hrs, Volume= 3.260 af, Atten= 97%, Lag= 658.7 min
 Primary = 1.10 cfs @ 23.27 hrs, Volume= 3.260 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 88.64' @ 23.27 hrs Surf.Area= 86,691 sf Storage= 135,959 cf

Plug-Flow detention time= 1,213.4 min calculated for 3.260 af (79% of inflow)
 Center-of-Mass det. time= 1,123.0 min (1,993.5 - 870.5)

Volume	Invert	Avail.Storage	Storage Description	
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.10 cfs @ 23.27 hrs HW=88.64' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.10 cfs @ 3.15 fps)

Existing Hydrology

Prepared by CDG

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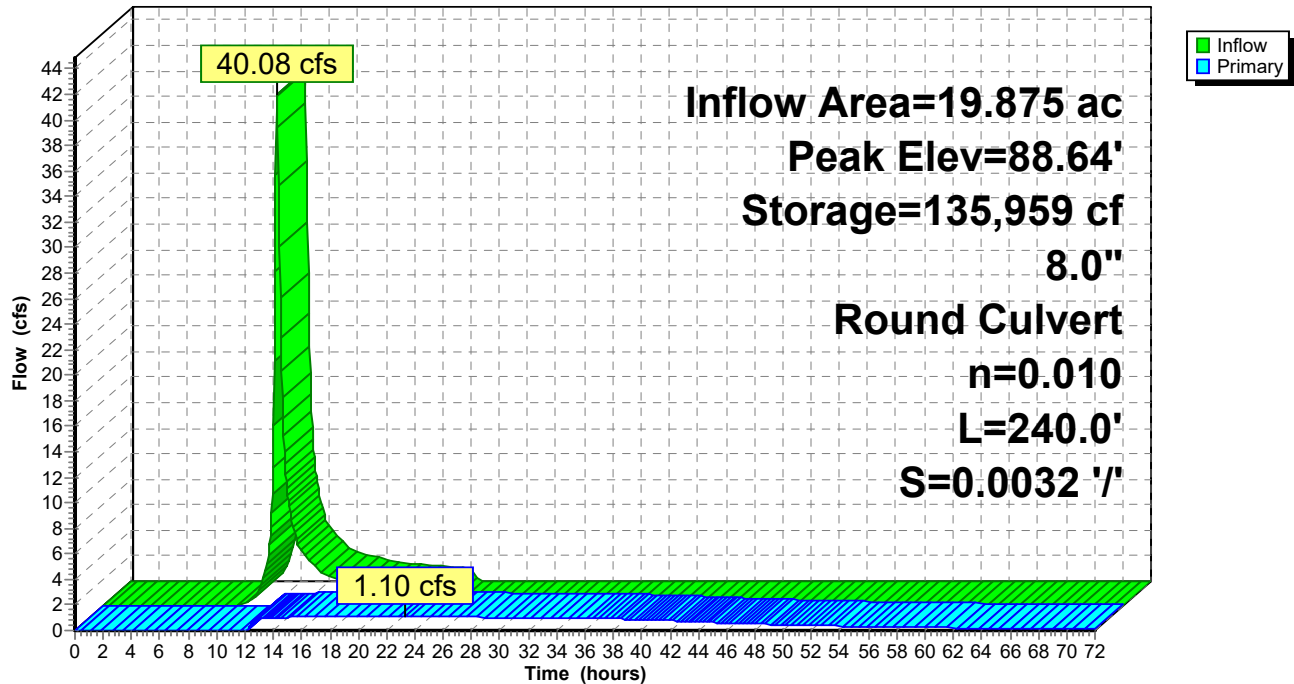
NRCC 24-hr C 25-Year Rainfall=6.09"

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Pond W-R: Wetland Series R

Hydrograph



Existing Hydrology

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Subcatchment E-1:

Runoff = 31.96 cfs @ 12.22 hrs, Volume= 2.829 af, Depth= 2.79"

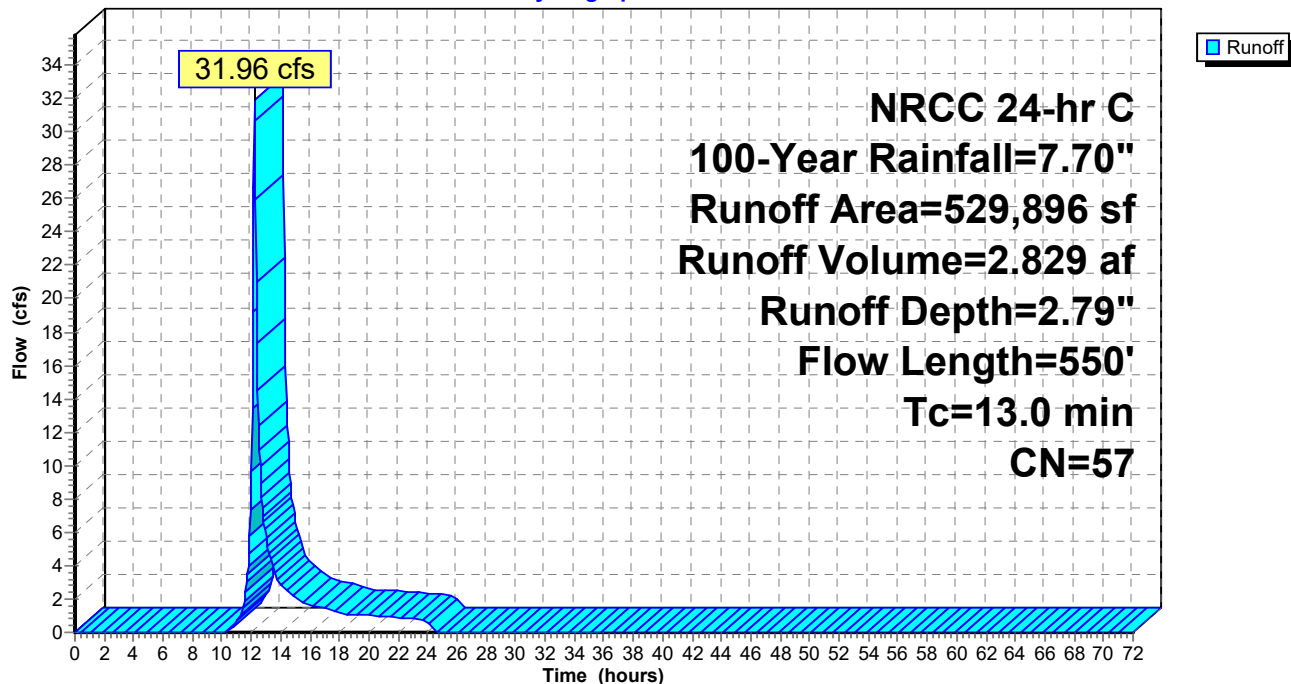
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
156,466	61	>75% Grass cover, Good, HSG B
373,430	55	Woods, Good, HSG B
529,896	57	Weighted Average
529,896		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded
					Woods: Light underbrush n= 0.400 P2= 3.37"
7.5	500	0.0500	1.12		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
13.0	550	Total			

Subcatchment E-1:

Hydrograph



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Summary for Subcatchment E-10a:

Runoff = 0.04 cfs @ 12.55 hrs, Volume= 0.020 af, Depth= 0.35"

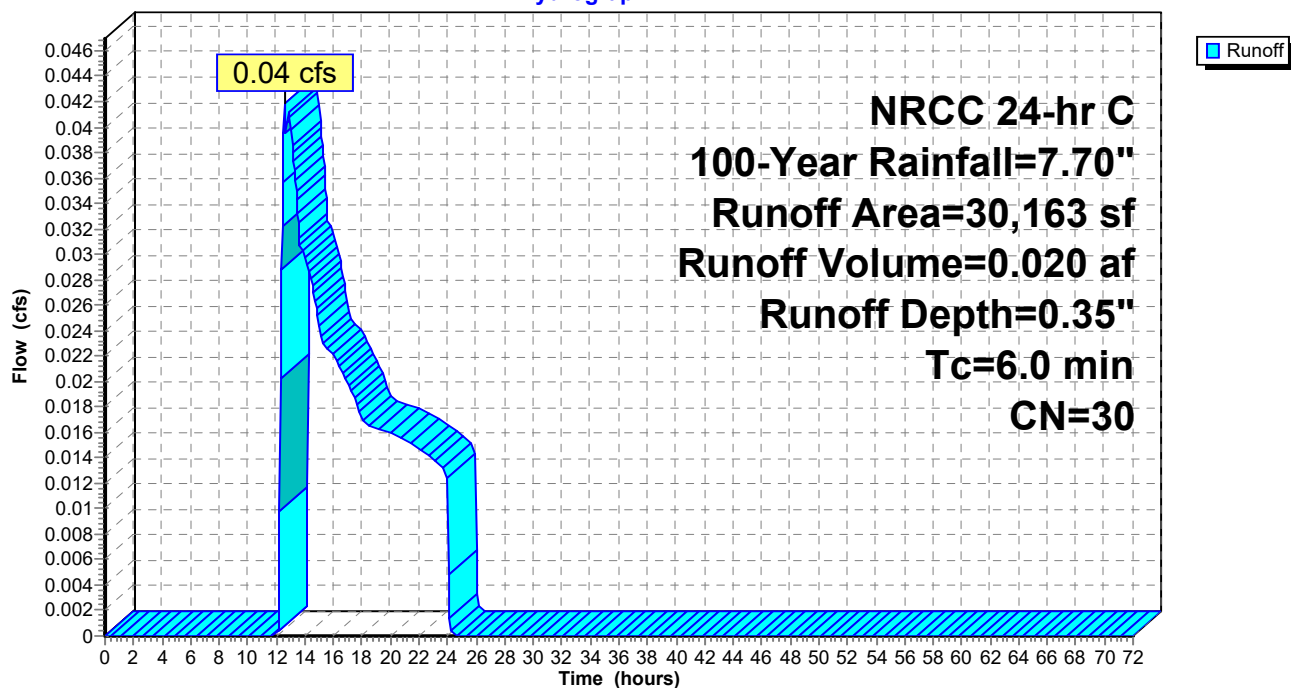
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
30,163	30	Woods, Good, HSG A
30,163		100.00% Pervious Area

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

Subcatchment E-10a:

Hydrograph



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Summary for Subcatchment E-10b:

Runoff = 0.59 cfs @ 12.28 hrs, Volume= 0.143 af, Depth= 0.63"

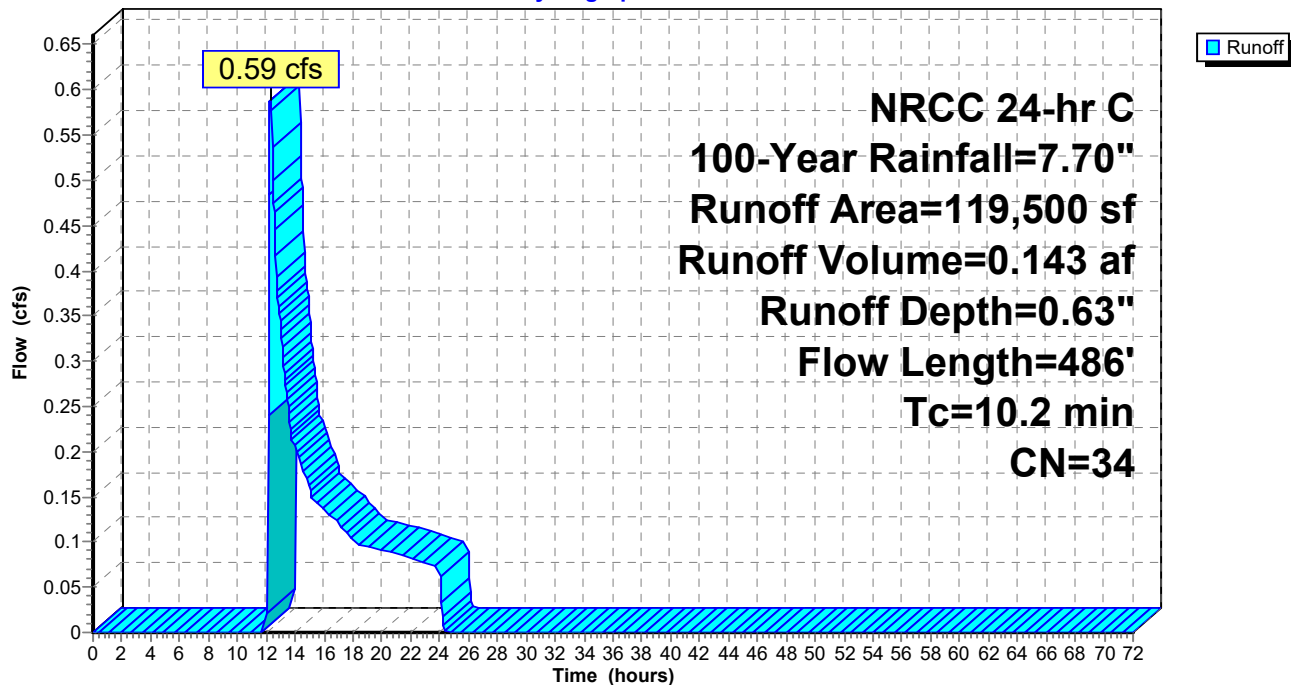
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	4,986	98	ROOF AND Paved parking, HSG A
	104,514	30	Woods, Good, HSG A
	10,000	39	>75% Grass cover, Good, HSG A
	119,500	34	Weighted Average
	114,514		95.83% Pervious Area
	4,986		4.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
2.7	286	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
10.2	486	Total			

Subcatchment E-10b:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-11:

Runoff = 5.88 cfs @ 12.30 hrs, Volume= 0.736 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
17,473	98	Paved parking, HSG A
88,168	55	Woods, Good, HSG B
139,460	30	Woods, Good, HSG A
31,226	39	>75% Grass cover, Good, HSG A
276,327	43	Weighted Average
258,854		93.68% Pervious Area
17,473		6.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.5	142	0.1046	1.62		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
3.4	316	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
0.5	28	0.0423	1.03		Shallow Concentrated Flow, HR-A Woodland Kv= 5.0 fps
17.0	536	Total			

Existing Hydrology

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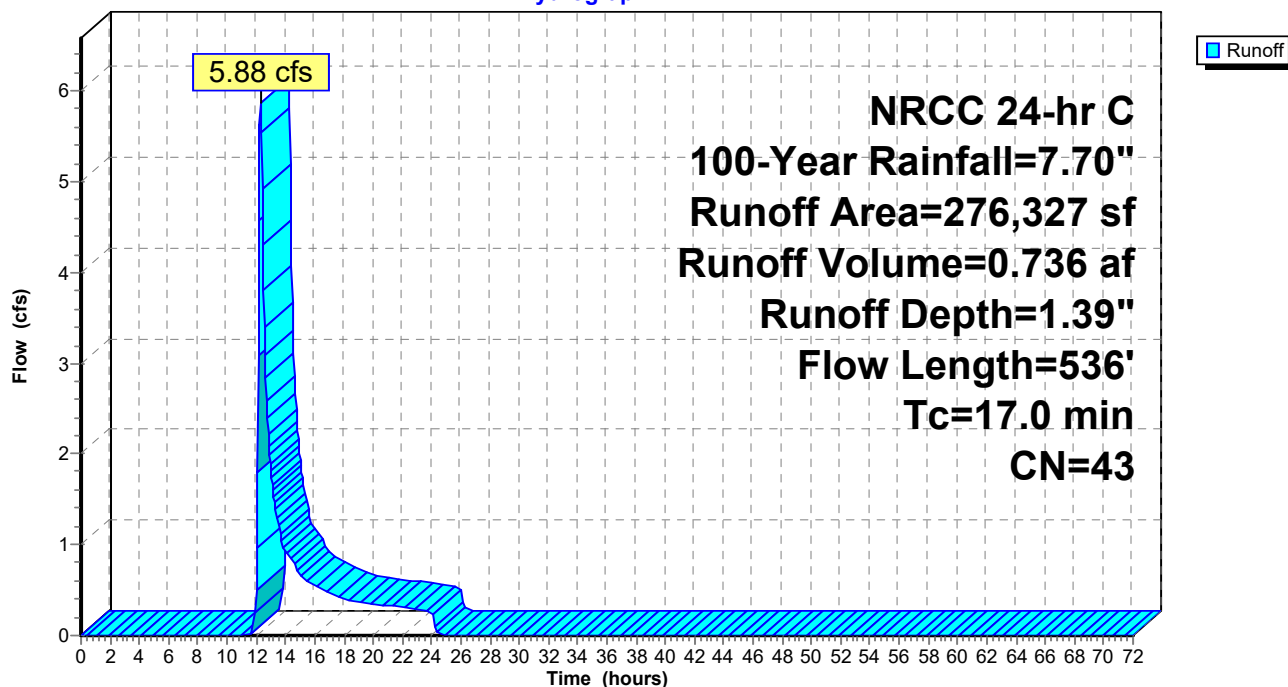
NRCC 24-hr C 100-Year Rainfall=7.70"

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Subcatchment E-11:

Hydrograph



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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Subcatchment E-12:

Runoff = 22.22 cfs @ 12.38 hrs, Volume= 2.897 af, Depth= 1.87"

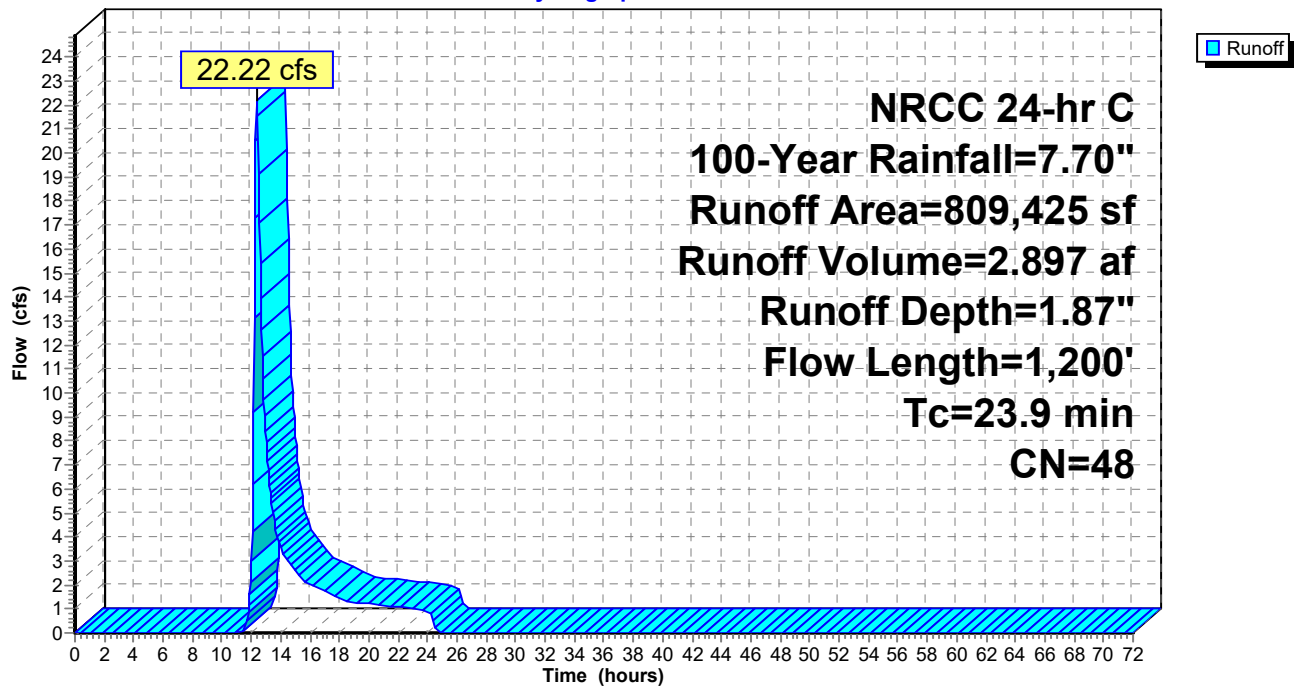
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
46,376	98	Paved parking, HSG B
382,602	32	Woods/grass comb., Good, HSG A
379,547	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
809,425	48	Weighted Average
763,049		94.27% Pervious Area
46,376		5.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
18.5	1,100	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,200	Total			

Subcatchment E-12:

Hydrograph



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Summary for Subcatchment E-13:

Runoff = 2.62 cfs @ 12.19 hrs, Volume= 0.224 af, Depth= 2.07"

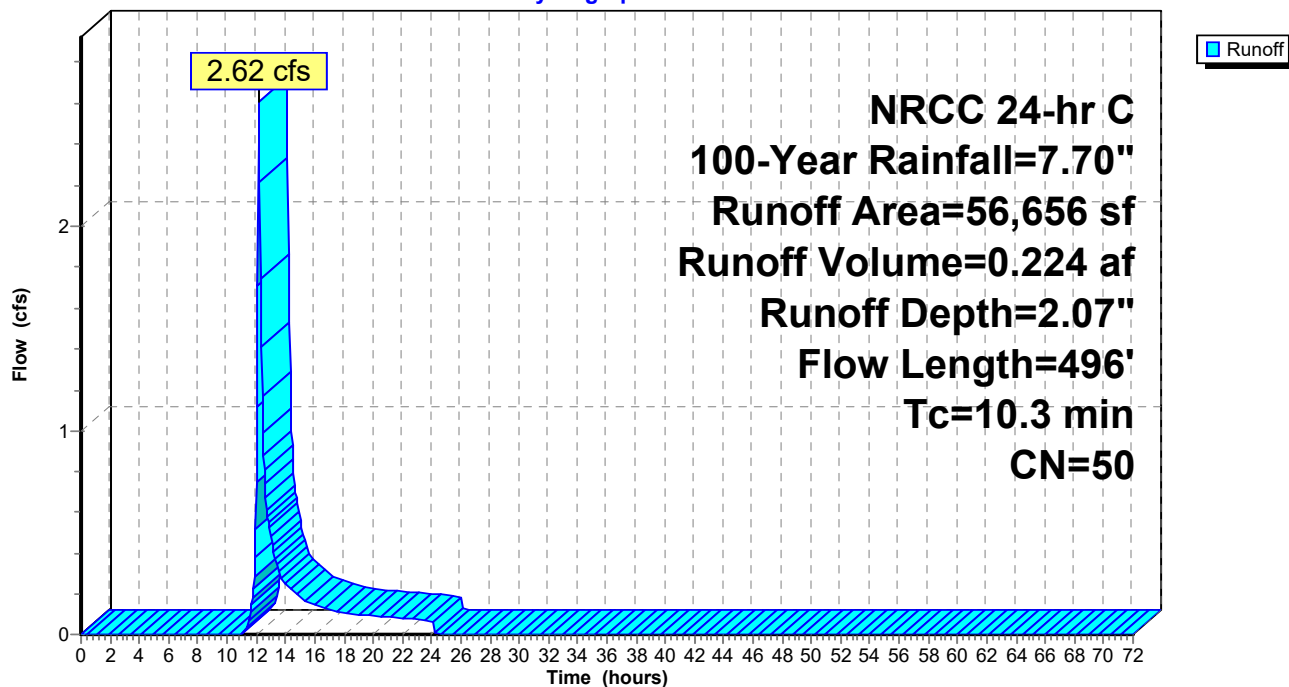
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



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Summary for Subcatchment E-14:

Runoff = 65.47 cfs @ 12.32 hrs, Volume= 7.170 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
356,270	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,248,024	59	Weighted Average
1,248,024		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

Existing Hydrology

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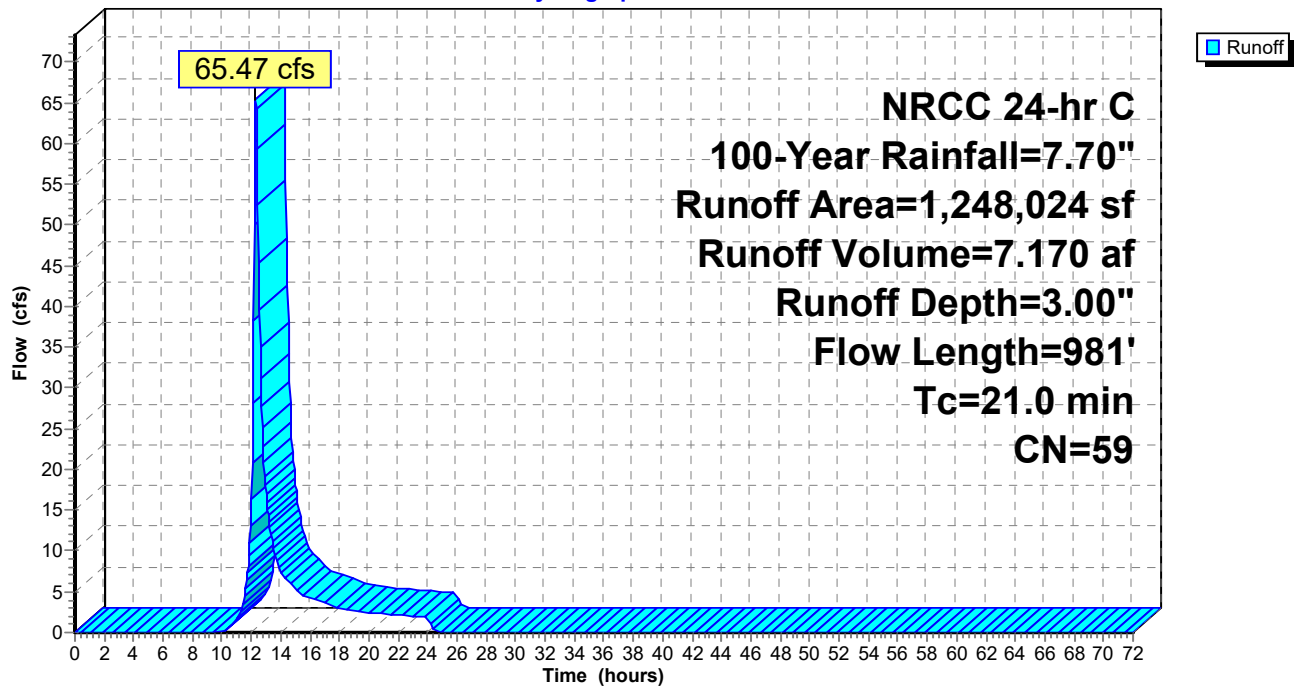
NRCC 24-hr C 100-Year Rainfall=7.70"

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Subcatchment E-14:

Hydrograph



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Summary for Subcatchment E-15:

Runoff = 8.66 cfs @ 12.22 hrs, Volume= 0.784 af, Depth= 2.27"

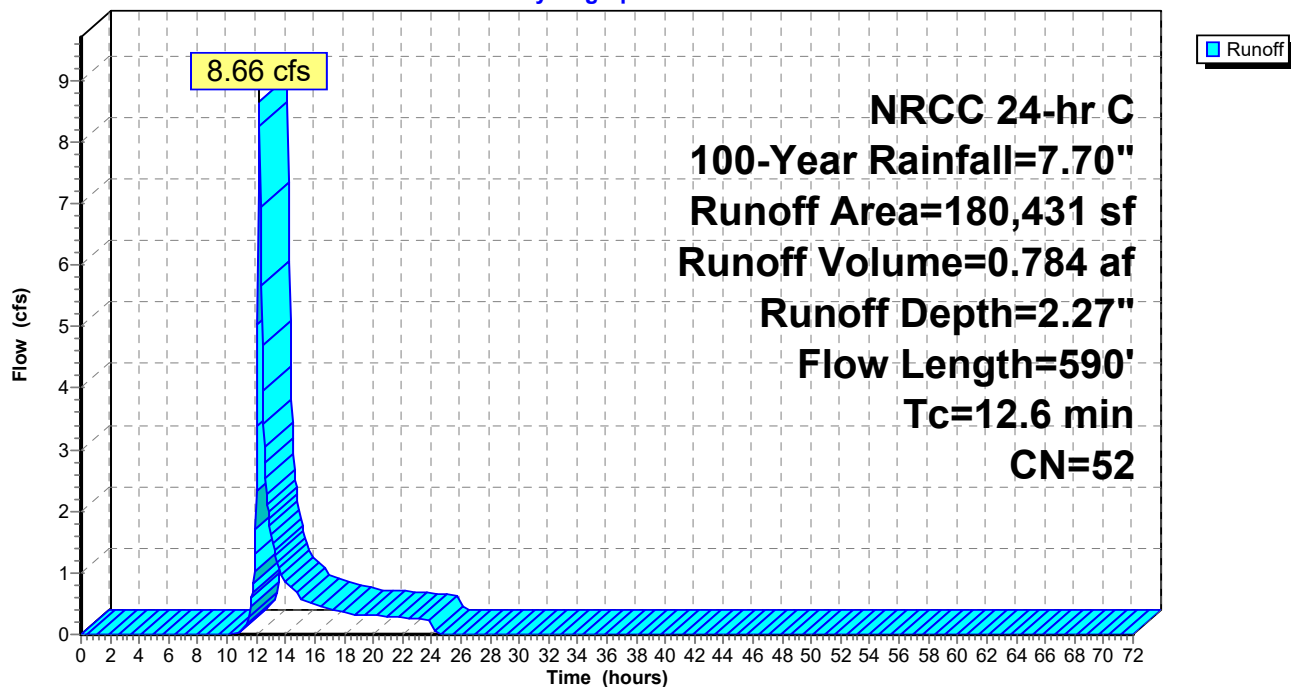
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
77,431	55	Woods, Good, HSG B
60,000	61	>75% Grass cover, Good, HSG B
37,500	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
180,431	52	Weighted Average
180,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	50	0.1600	0.16		Sheet Flow, Grass Grass: Bermuda n= 0.410 P2= 3.37"
7.3	540	0.0310	1.23		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
12.6	590	Total			

Subcatchment E-15:

Hydrograph



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Summary for Subcatchment E-2:

Runoff = 89.51 cfs @ 12.53 hrs, Volume= 13.118 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
461,097	32	Woods/grass comb., Good, HSG A
636,415	58	Woods/grass comb., Good, HSG B
261,419	72	Woods/grass comb., Good, HSG C
632,109	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
* 17,483	98	Paved parking, HSG D
2,061,814	62	Weighted Average
1,991,040		96.57% Pervious Area
70,774		3.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Existing Hydrology

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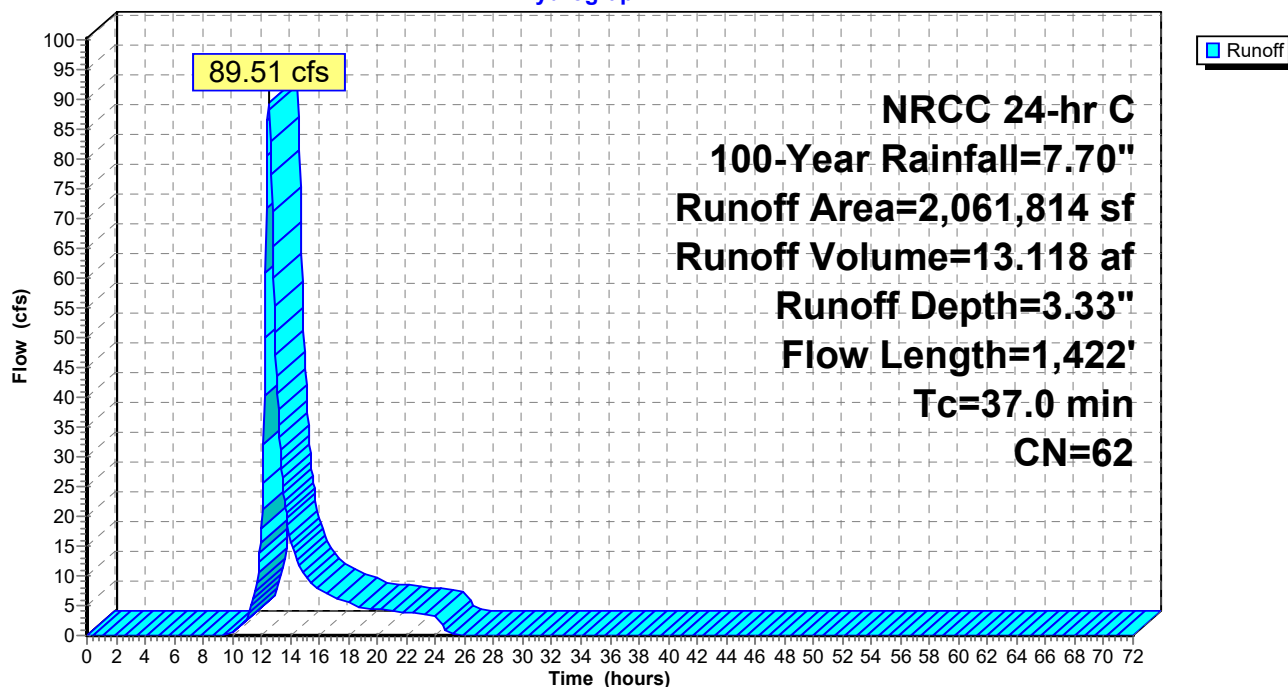
NRCC 24-hr C 100-Year Rainfall=7.70"

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Subcatchment E-2:

Hydrograph



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Summary for Subcatchment E-3:

Runoff = 60.93 cfs @ 12.28 hrs, Volume= 6.233 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	126,000	30	Woods, Good, HSG A
	70,460	39	>75% Grass cover, Good, HSG A
	160,000	61	>75% Grass cover, Good, HSG B
	109,000	55	Woods, Good, HSG B
*	15,800	98	Roof and Pavement
	110,000	77	Woods, Good, HSG D
	105,000	80	>75% Grass cover, Good, HSG D
	865,760	66	Weighted Average
	680,460		78.60% Pervious Area
	185,300		21.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

Existing Hydrology

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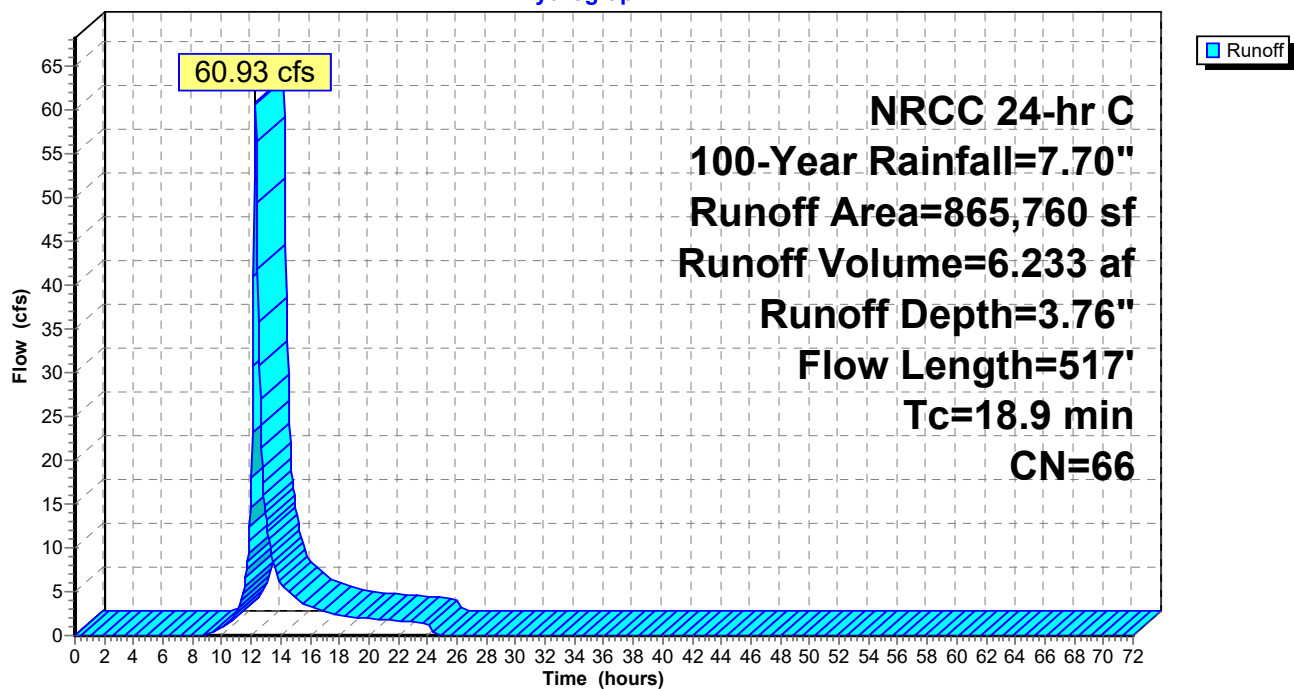
NRCC 24-hr C 100-Year Rainfall=7.70"

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Subcatchment E-3:

Hydrograph



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Summary for Subcatchment E-4:

Runoff = 2.57 cfs @ 12.15 hrs, Volume= 0.201 af, Depth= 1.68"

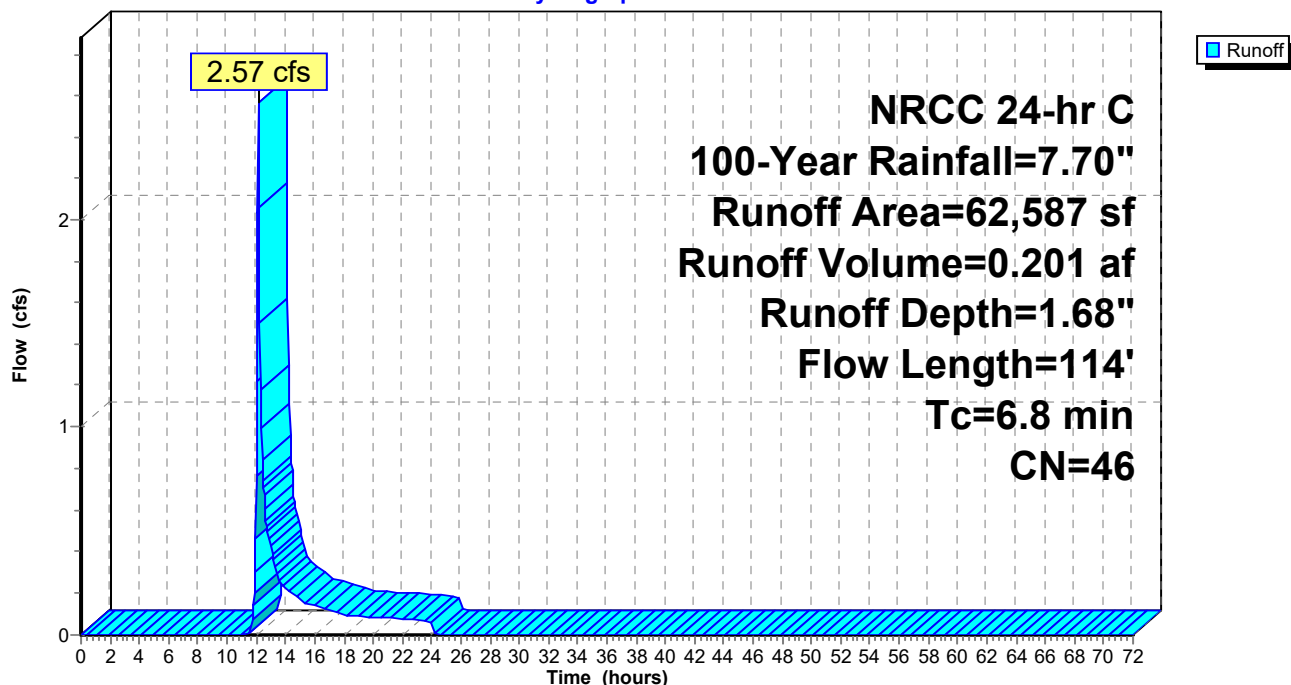
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
17,800	55	Woods, Good, HSG B
6,800	30	Woods, Good, HSG A
34,006	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
62,587	46	Weighted Average
58,606		93.64% Pervious Area
3,981		6.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0173	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.2	18	0.0449	1.48		Shallow Concentrated Flow, Grass Short Grass Pasture Kv= 7.0 fps
0.8	46	0.0362	0.95		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
6.8	114	Total			

Subcatchment E-4:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-5:

Runoff = 26.81 cfs @ 12.35 hrs, Volume= 3.130 af, Depth= 2.90"

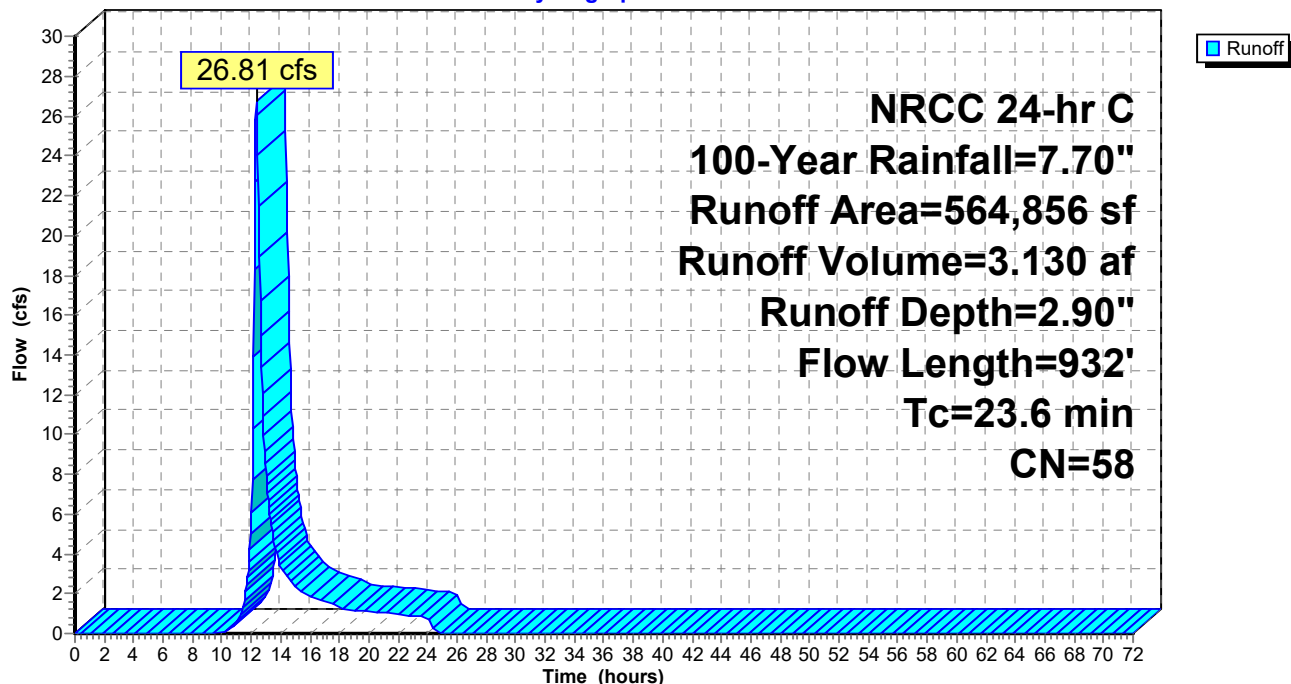
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
97,200	39	>75% Grass cover, Good, HSG A
60,000	30	Woods, Good, HSG A
148,500	55	Woods, Good, HSG B
128,700	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
106,356	80	>75% Grass cover, Good, HSG D
564,856	58	Weighted Average
564,856		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	50	0.0296	0.08		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
5.8	355	0.0215	1.03		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.5	527	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.6	932	Total			

Subcatchment E-5:

Hydrograph



Existing Hydrology

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Summary for Subcatchment E-6:

Runoff = 37.02 cfs @ 12.24 hrs, Volume= 3.467 af, Depth= 3.65"

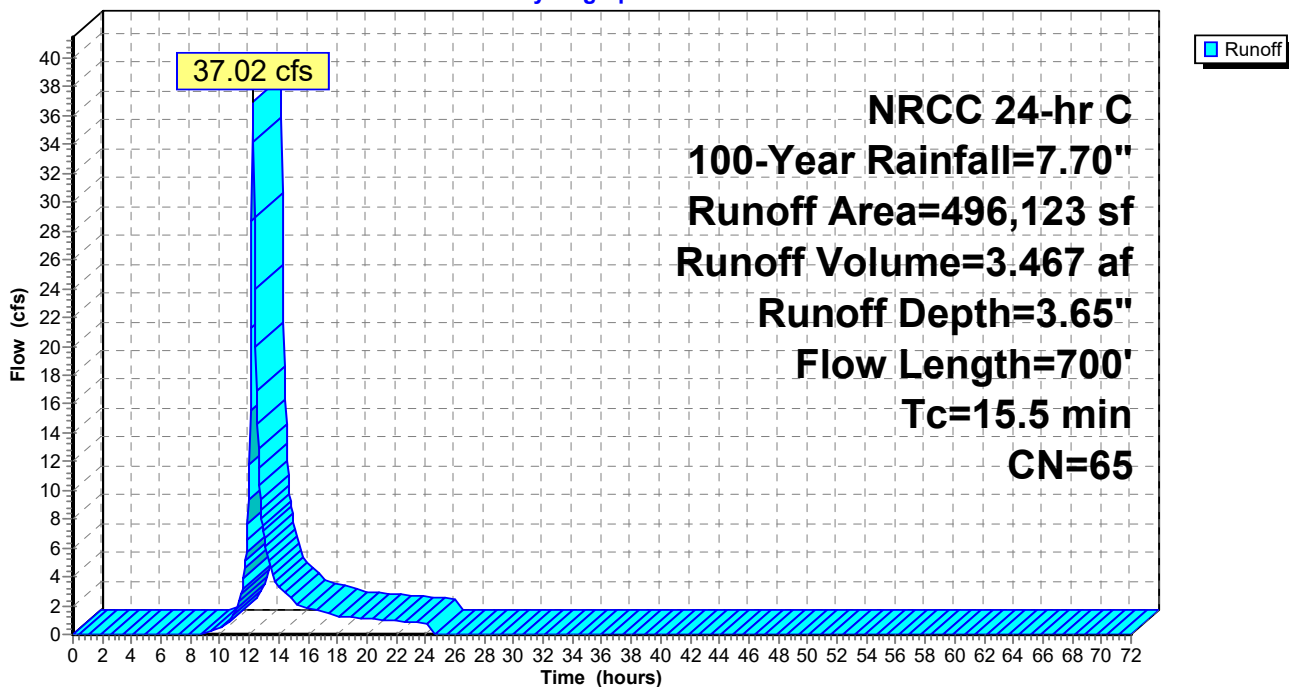
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
298,100	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
496,123	65	Weighted Average
496,123		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
7.3	600	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.5	700	Total			

Subcatchment E-6:

Hydrograph



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Summary for Subcatchment E-7:

Runoff = 28.94 cfs @ 12.36 hrs, Volume= 3.413 af, Depth= 2.79"

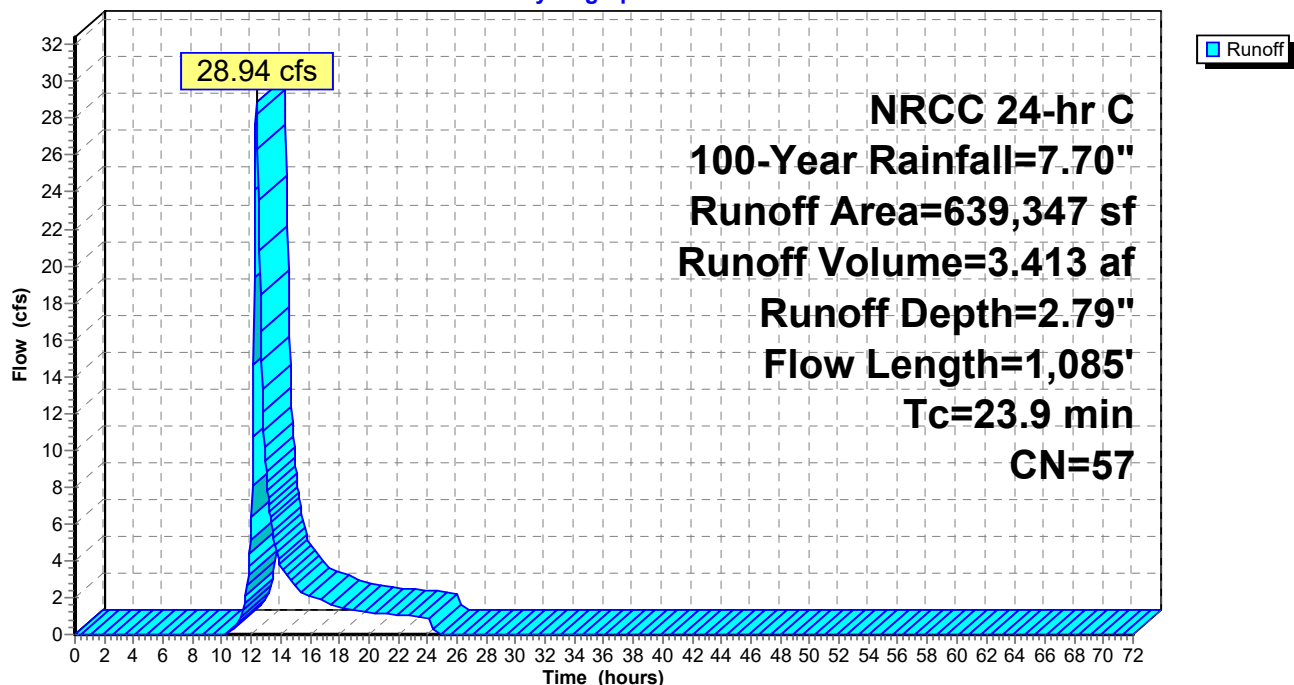
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
436,868	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
639,347	57	Weighted Average
606,609		94.88% Pervious Area
32,738		5.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment E-7:

Hydrograph



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Summary for Subcatchment E-8:

Runoff = 8.64 cfs @ 12.15 hrs, Volume= 0.627 af, Depth= 3.00"

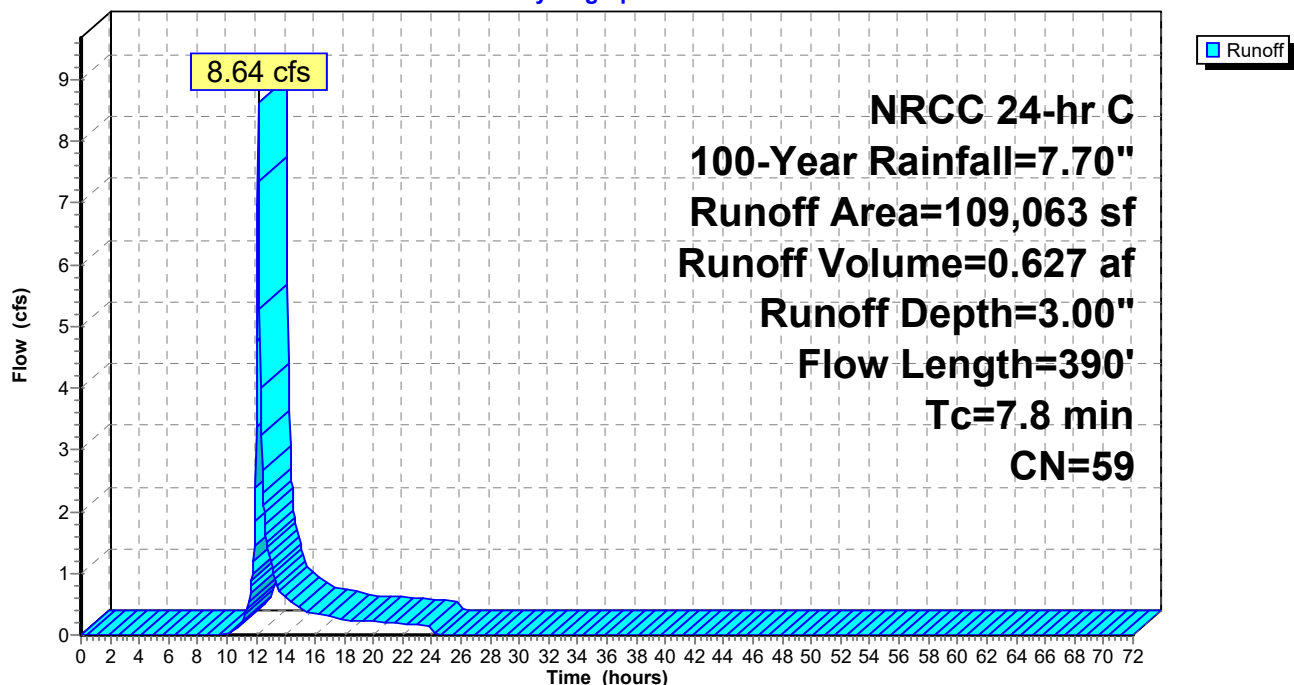
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
7,994	98	Paved parking, HSG B
5,726	98	Water Surface, 0% imp, HSG A
12,549	39	>75% Grass cover, Good, HSG A
43,794	61	>75% Grass cover, Good, HSG B
6,600	30	Woods, Good, HSG A
32,400	55	Woods, Good, HSG B
109,063	59	Weighted Average
101,069		92.67% Pervious Area
7,994		7.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment E-8:

Hydrograph



Existing Hydrology

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Subcatchment E-9:

Runoff = 20.29 cfs @ 12.25 hrs, Volume= 1.996 af, Depth= 2.37"

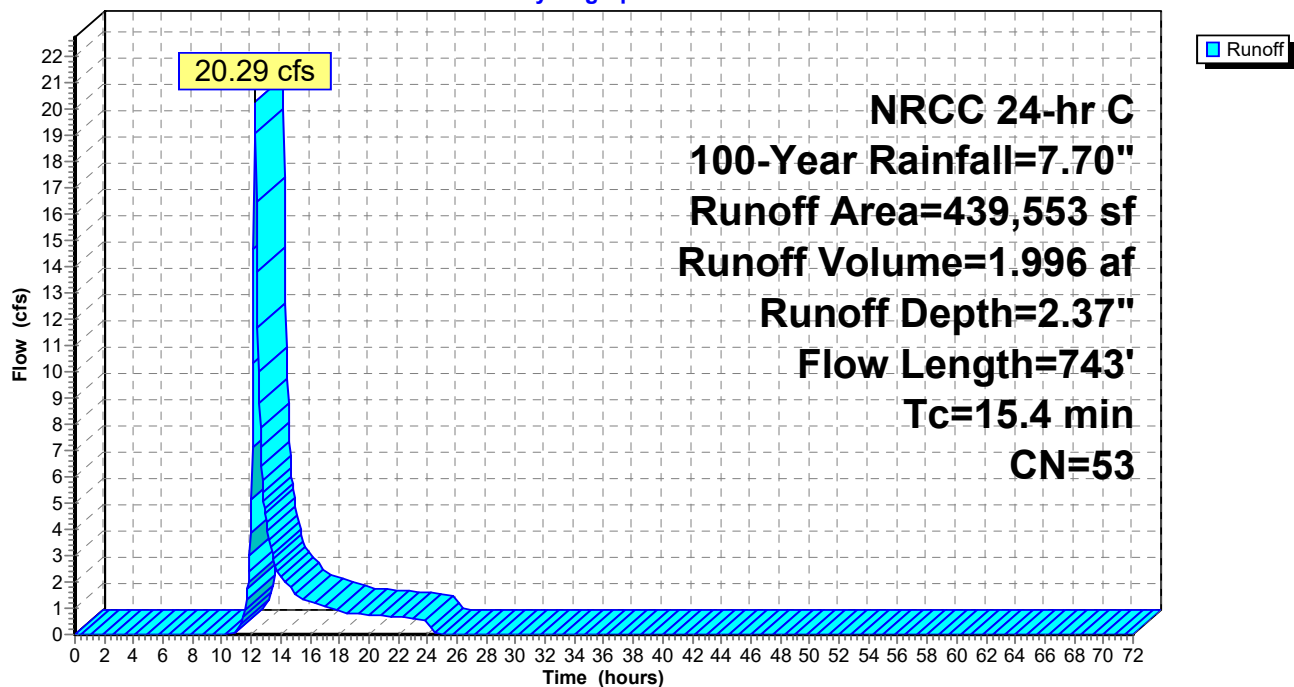
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
239,355	30	Woods, Good, HSG A
140,198	98	Paved parking, HSG A
60,000	39	>75% Grass cover, Good, HSG A
439,553	53	Weighted Average
299,355		68.10% Pervious Area
140,198		31.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0600	0.12		Sheet Flow, Woods Woods: Light underbrush n= 0.400 P2= 3.37"
1.1	318	0.1114	5.01		Shallow Concentrated Flow, HR-A Grassed Waterway Kv= 15.0 fps
0.8	325	0.1139	6.85		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
15.4	743	Total			

Subcatchment E-9:

Hydrograph



Existing Hydrology

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Summary for Reach DP-1: Wetland Series R

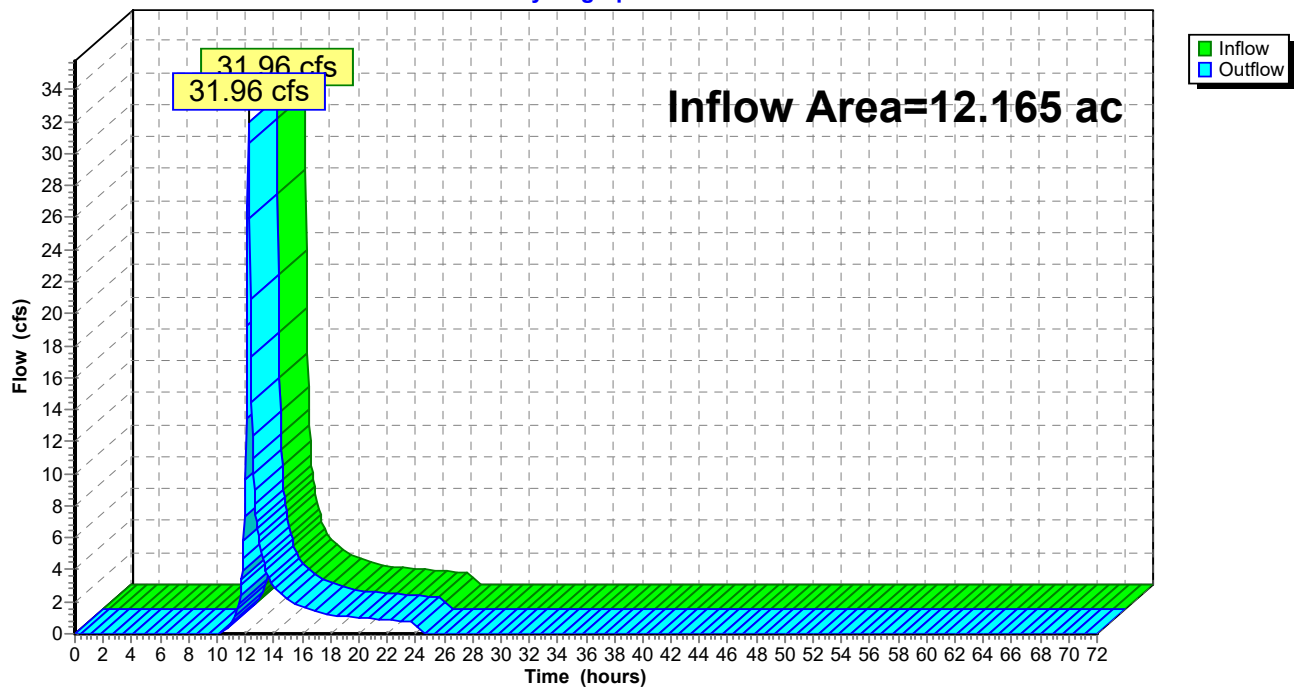
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 12.165 ac, 0.00% Impervious, Inflow Depth = 2.79" for 100-Year event
Inflow = 31.96 cfs @ 12.22 hrs, Volume= 2.829 af
Outflow = 31.96 cfs @ 12.22 hrs, Volume= 2.829 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R

Hydrograph



Existing Hydrology

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Summary for Reach DP-10: West Elm Street

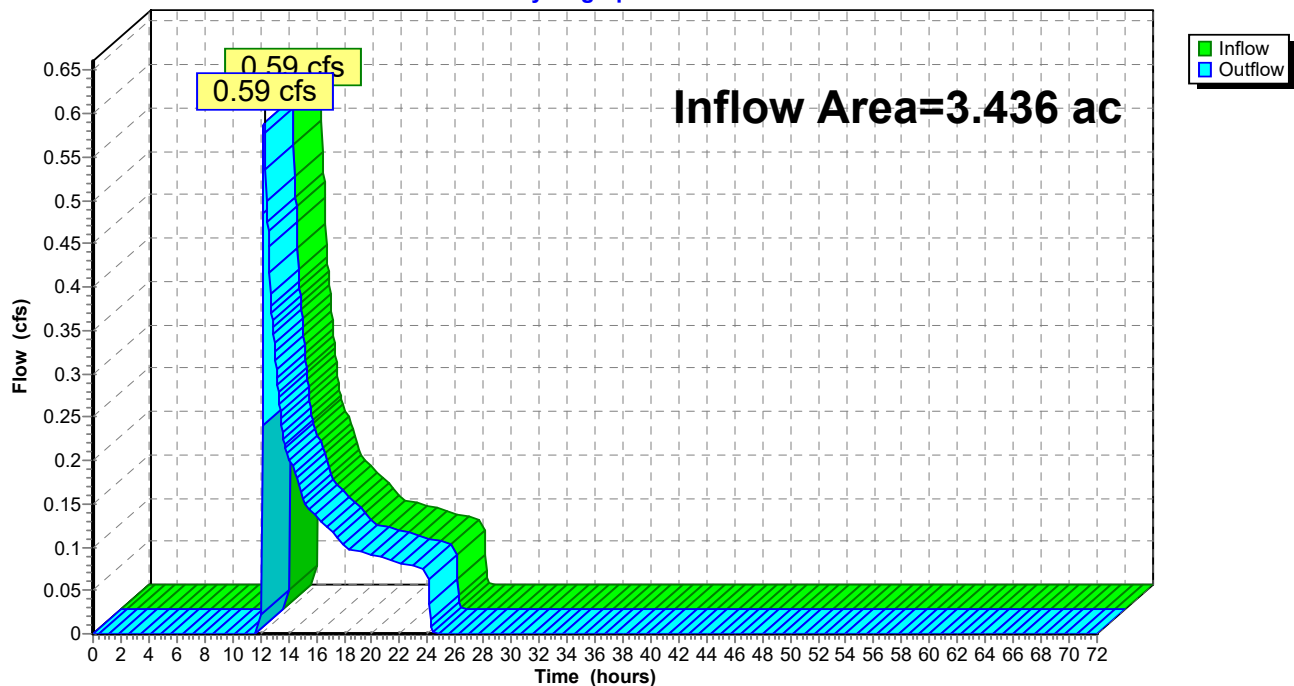
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.436 ac, 3.33% Impervious, Inflow Depth = 0.50" for 100-Year event
Inflow = 0.59 cfs @ 12.28 hrs, Volume= 0.143 af
Outflow = 0.59 cfs @ 12.28 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street

Hydrograph



Existing Hydrology

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Reach DP-11: Wetland Series A

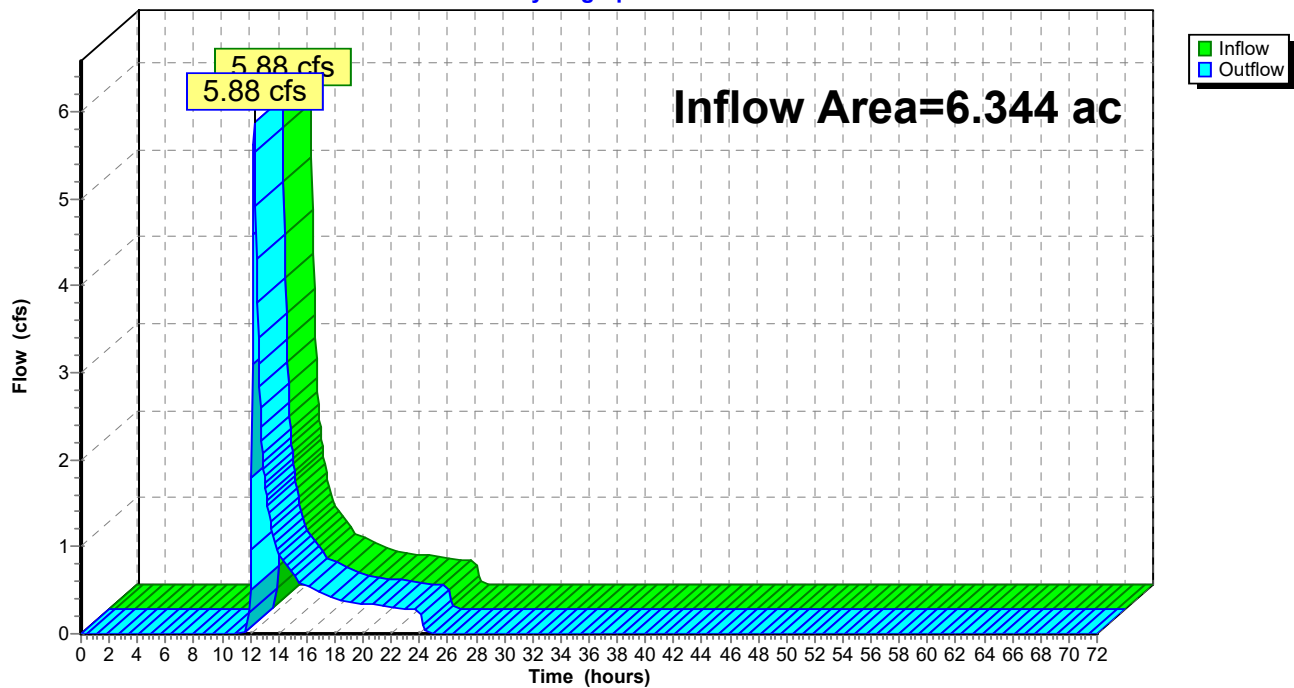
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.344 ac, 6.32% Impervious, Inflow Depth = 1.39" for 100-Year event
Inflow = 5.88 cfs @ 12.30 hrs, Volume= 0.736 af
Outflow = 5.88 cfs @ 12.30 hrs, Volume= 0.736 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A

Hydrograph



Existing Hydrology

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Summary for Reach DP-12: Wetland Series A

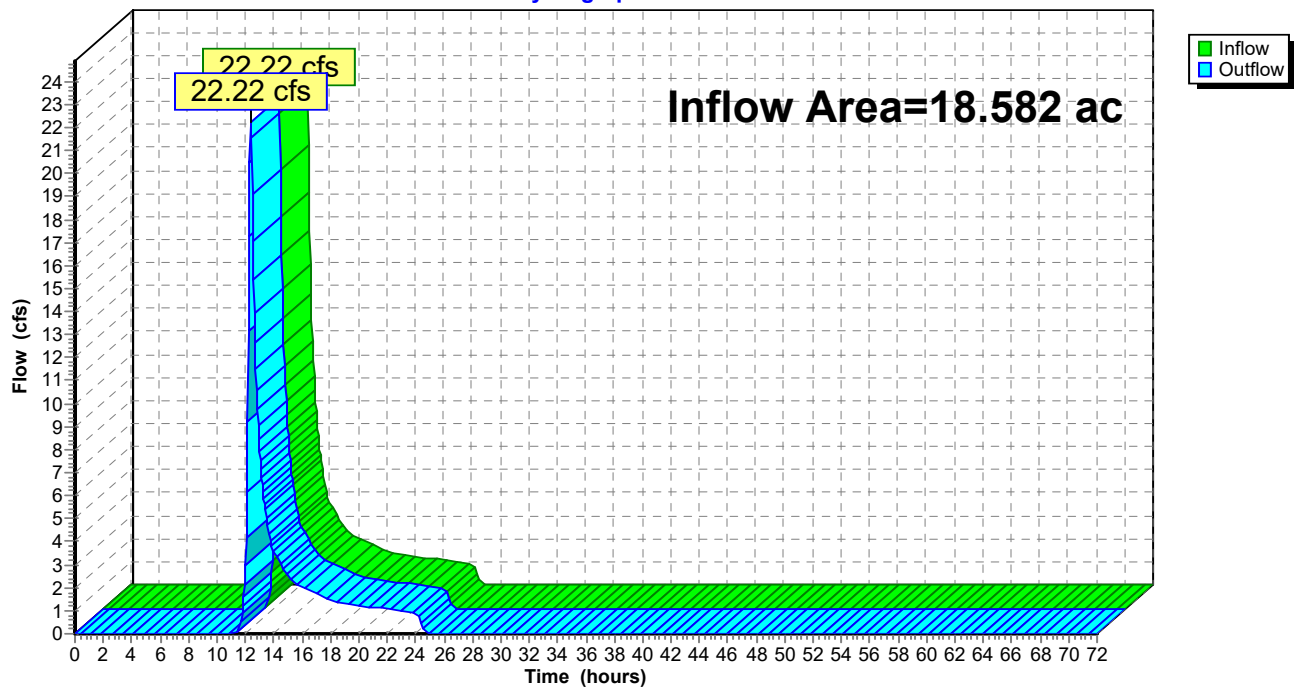
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.582 ac, 5.73% Impervious, Inflow Depth = 1.87" for 100-Year event
Inflow = 22.22 cfs @ 12.38 hrs, Volume= 2.897 af
Outflow = 22.22 cfs @ 12.38 hrs, Volume= 2.897 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A

Hydrograph



Existing Hydrology

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Summary for Reach DP-13: Wetland Series B

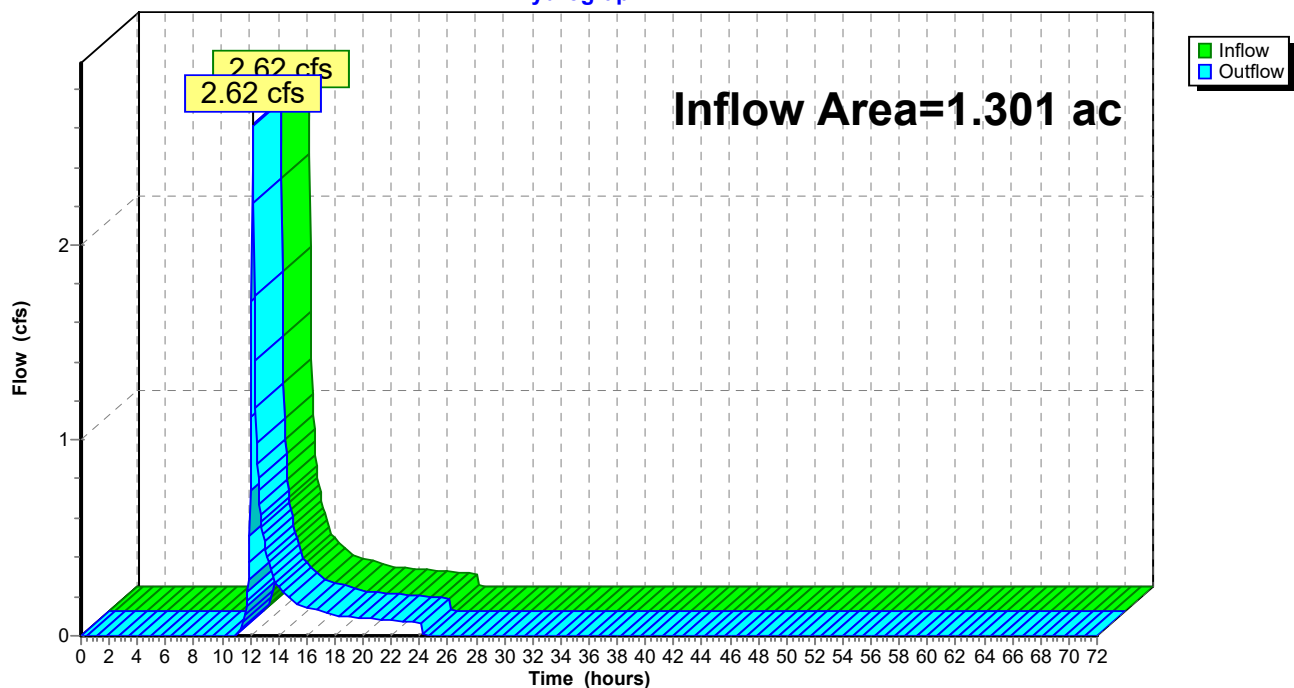
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 2.07" for 100-Year event
Inflow = 2.62 cfs @ 12.19 hrs, Volume= 0.224 af
Outflow = 2.62 cfs @ 12.19 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B

Hydrograph



Existing Hydrology

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Reach DP-14: Wetland Series C,D,E,,K,J

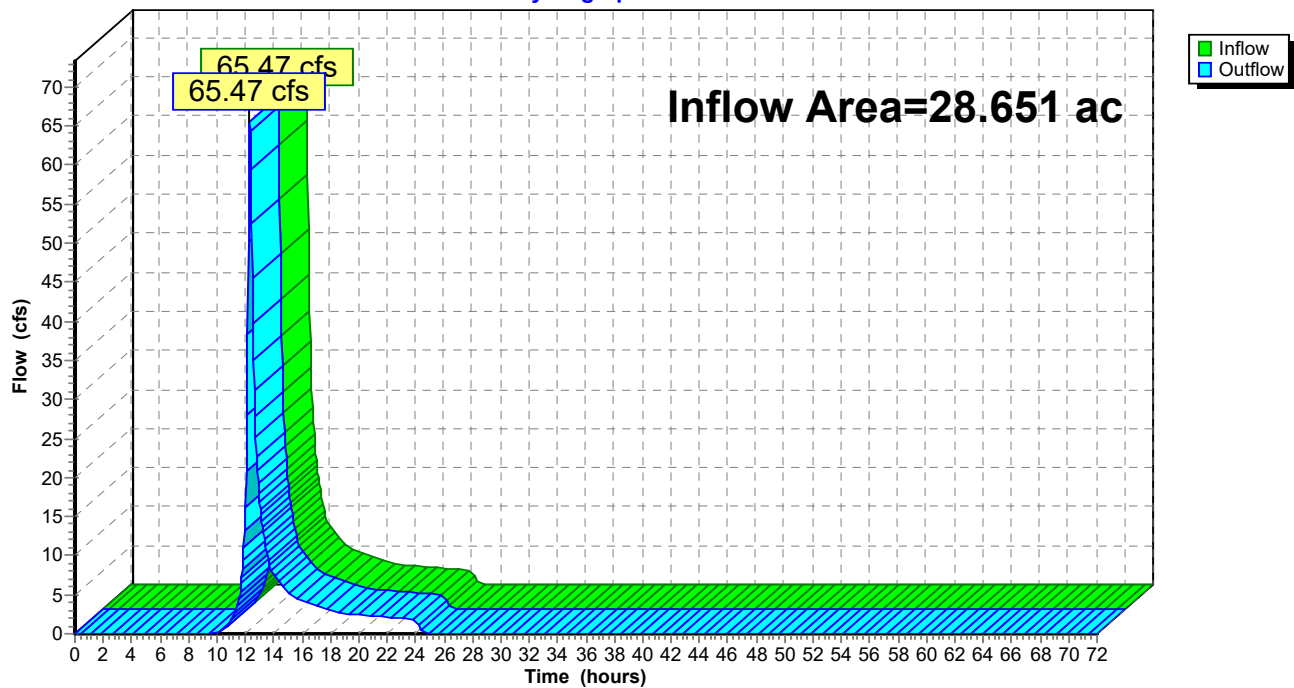
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.651 ac, 0.00% Impervious, Inflow Depth = 3.00" for 100-Year event
Inflow = 65.47 cfs @ 12.32 hrs, Volume= 7.170 af
Outflow = 65.47 cfs @ 12.32 hrs, Volume= 7.170 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J

Hydrograph



Existing Hydrology

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Summary for Reach DP-15: Wetland Series H

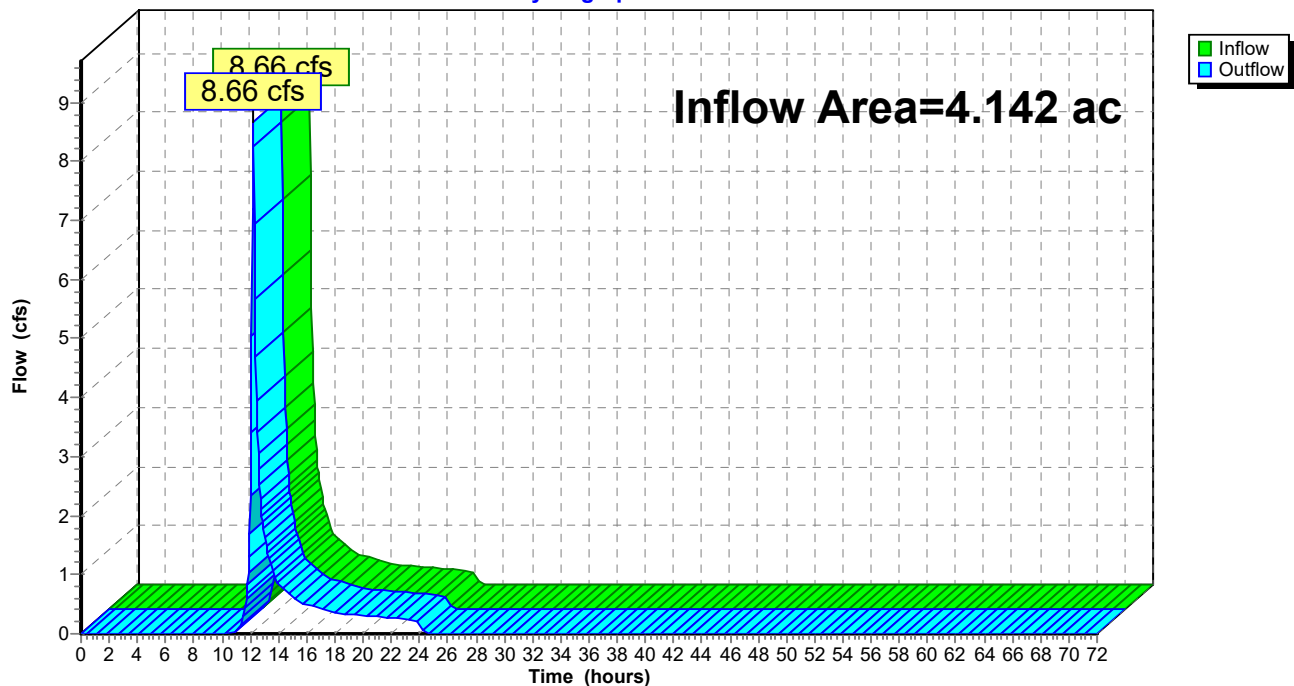
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.142 ac, 0.00% Impervious, Inflow Depth = 2.27" for 100-Year event
Inflow = 8.66 cfs @ 12.22 hrs, Volume= 0.784 af
Outflow = 8.66 cfs @ 12.22 hrs, Volume= 0.784 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H

Hydrograph



Existing Hydrology

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Summary for Reach DP-2: Wetland Series I

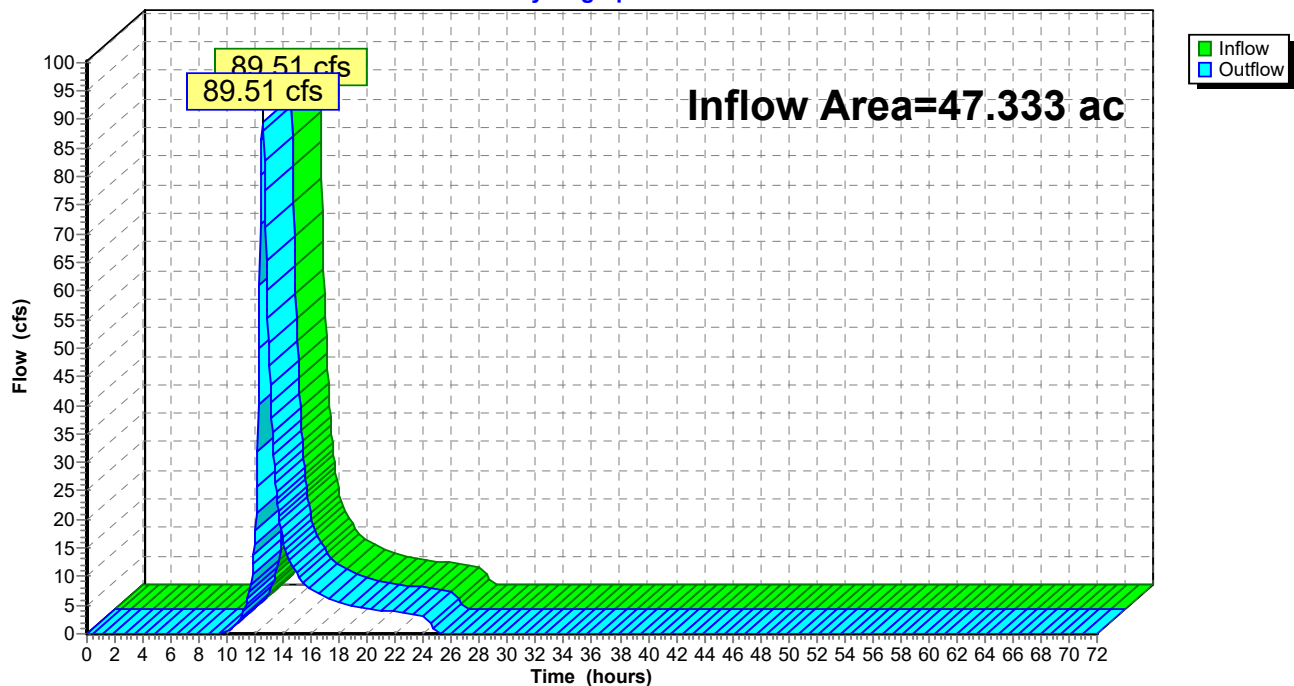
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.333 ac, 3.43% Impervious, Inflow Depth = 3.33" for 100-Year event
Inflow = 89.51 cfs @ 12.53 hrs, Volume= 13.118 af
Outflow = 89.51 cfs @ 12.53 hrs, Volume= 13.118 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I

Hydrograph



Existing Hydrology

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Summary for Reach DP-3: W-R

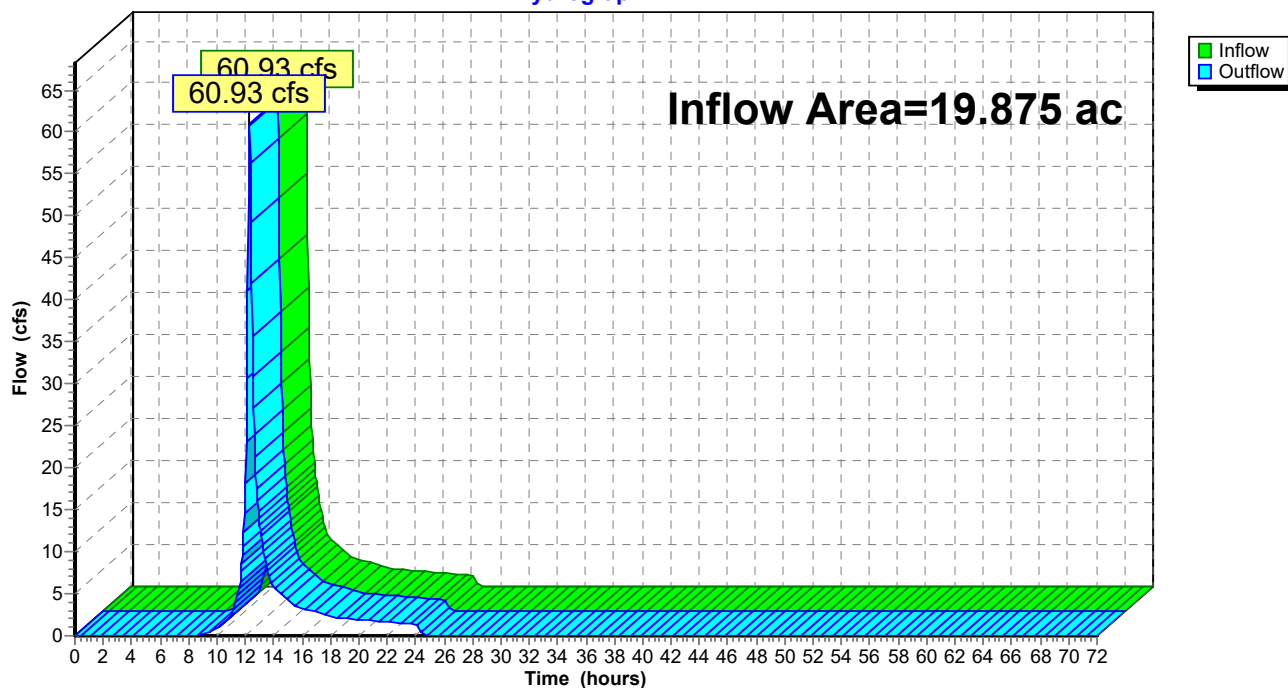
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 3.76" for 100-Year event
Inflow = 60.93 cfs @ 12.28 hrs, Volume= 6.233 af
Outflow = 60.93 cfs @ 12.28 hrs, Volume= 6.233 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3: W-R

Hydrograph



Existing Hydrology

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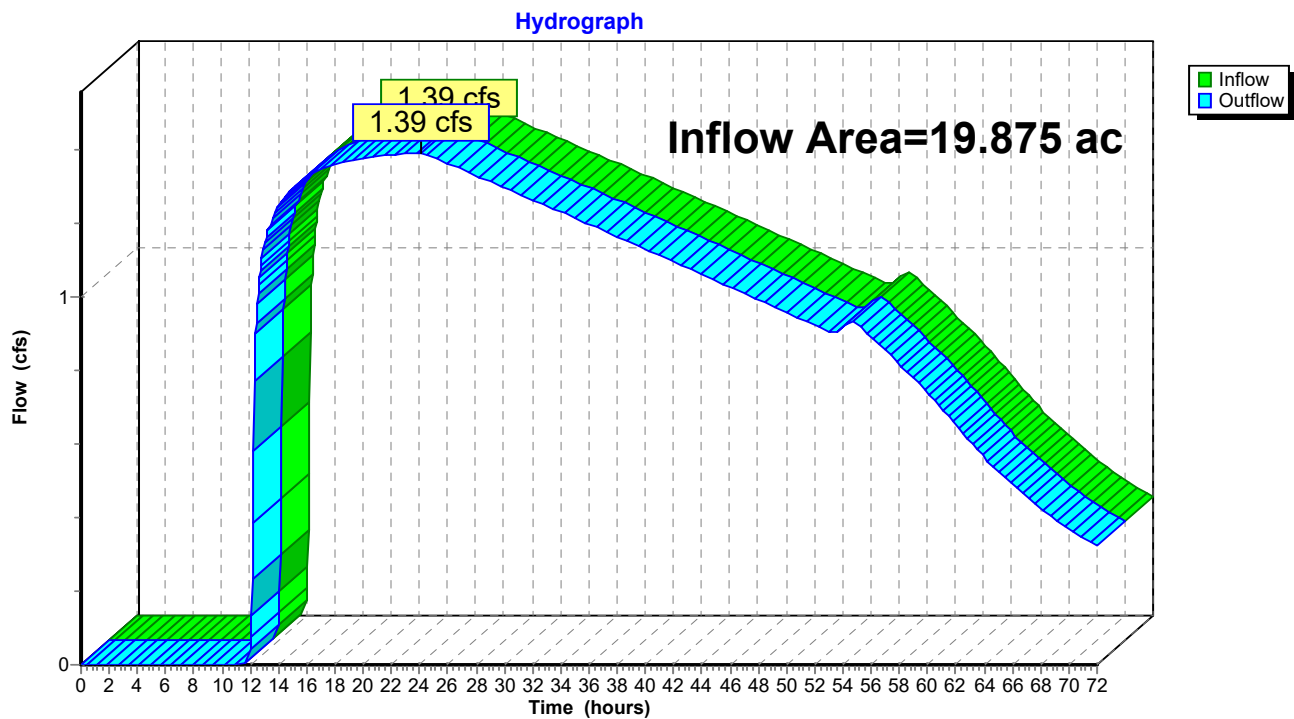
Summary for Reach DP-3 OUT: 8" Copper Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth > 3.05" for 100-Year event
Inflow = 1.39 cfs @ 24.06 hrs, Volume= 5.050 af
Outflow = 1.39 cfs @ 24.06 hrs, Volume= 5.050 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe



Existing Hydrology

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Summary for Reach DP-4: Dwelley Street

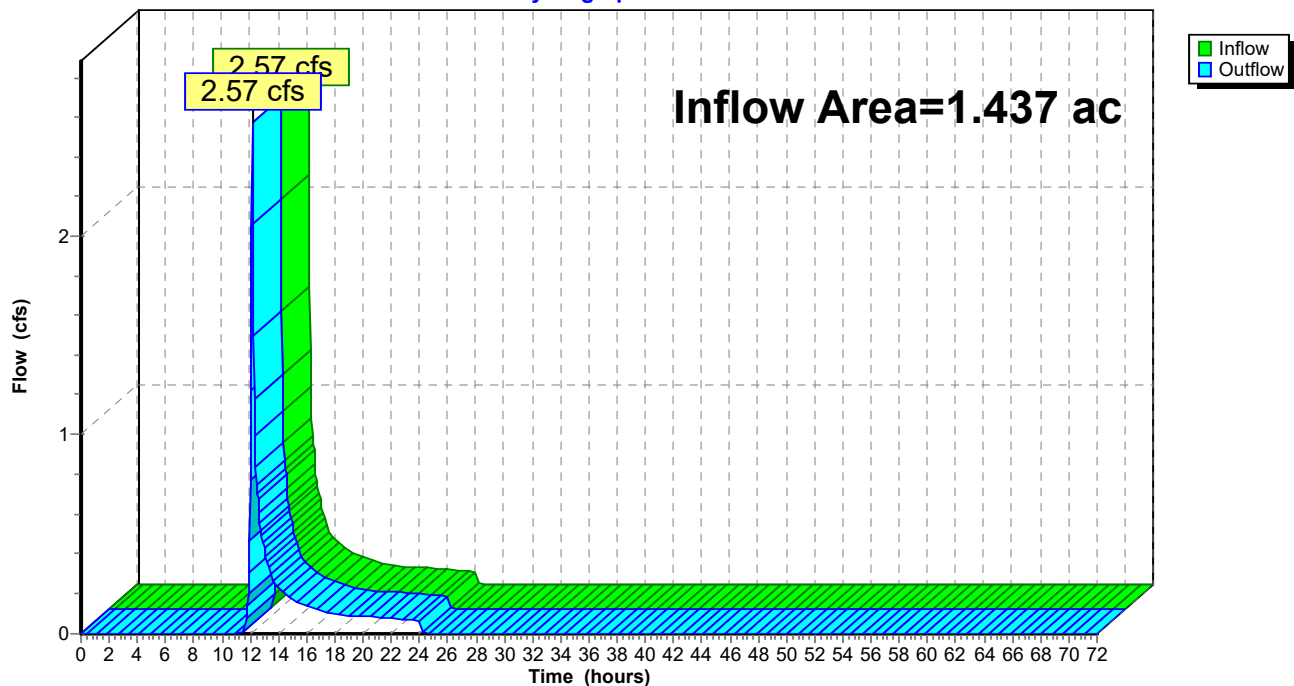
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.437 ac, 6.36% Impervious, Inflow Depth = 1.68" for 100-Year event
Inflow = 2.57 cfs @ 12.15 hrs, Volume= 0.201 af
Outflow = 2.57 cfs @ 12.15 hrs, Volume= 0.201 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-5: W-N

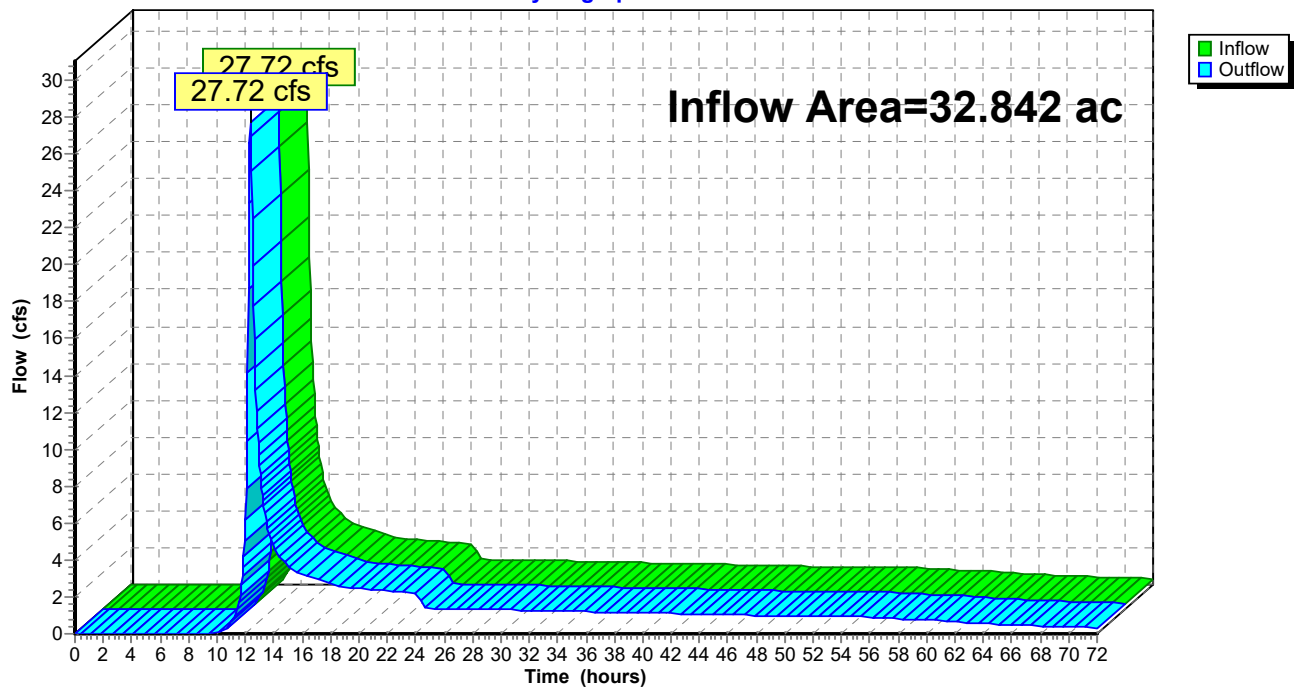
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 2.99" for 100-Year event
Inflow = 27.72 cfs @ 12.36 hrs, Volume= 8.180 af
Outflow = 27.72 cfs @ 12.36 hrs, Volume= 8.180 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-5: W-N

Hydrograph



Existing Hydrology

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Summary for Reach DP-5 OUT: 24" RCP PIPE

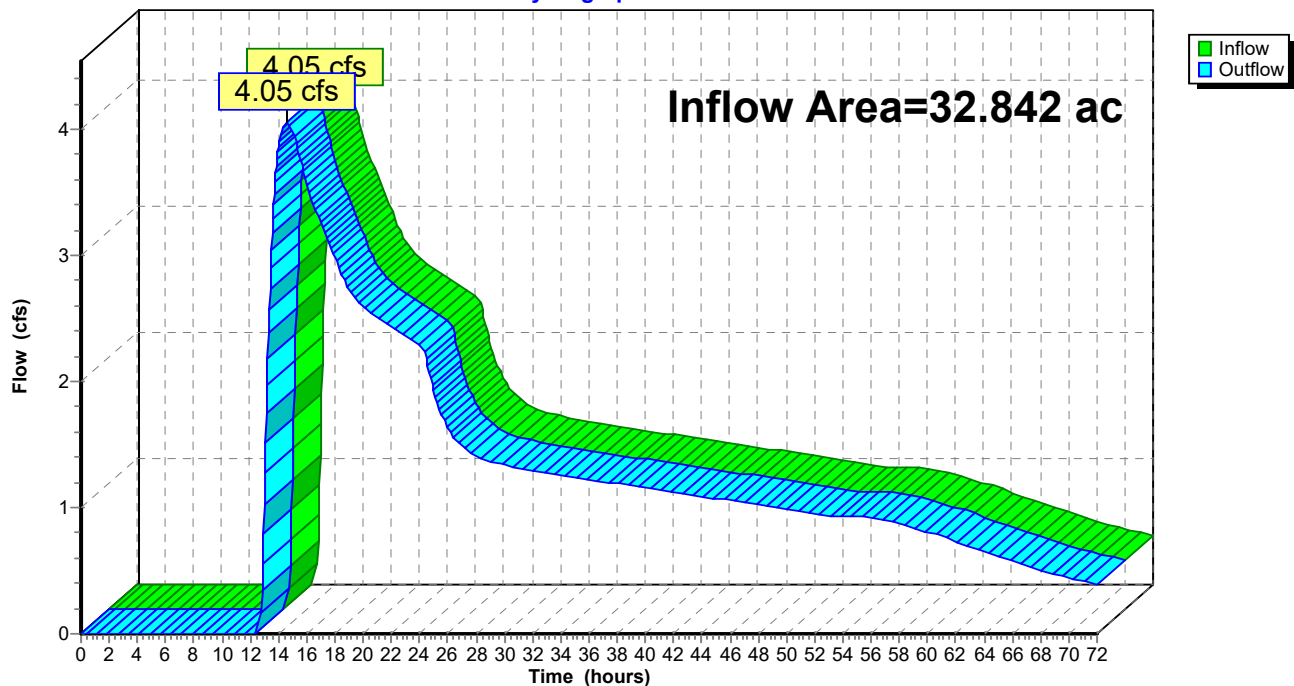
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 2.46" for 100-Year event
Inflow = 4.05 cfs @ 14.59 hrs, Volume= 6.725 af
Outflow = 4.05 cfs @ 14.59 hrs, Volume= 6.725 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE

Hydrograph



Existing Hydrology

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Summary for Reach DP-6: W-QP

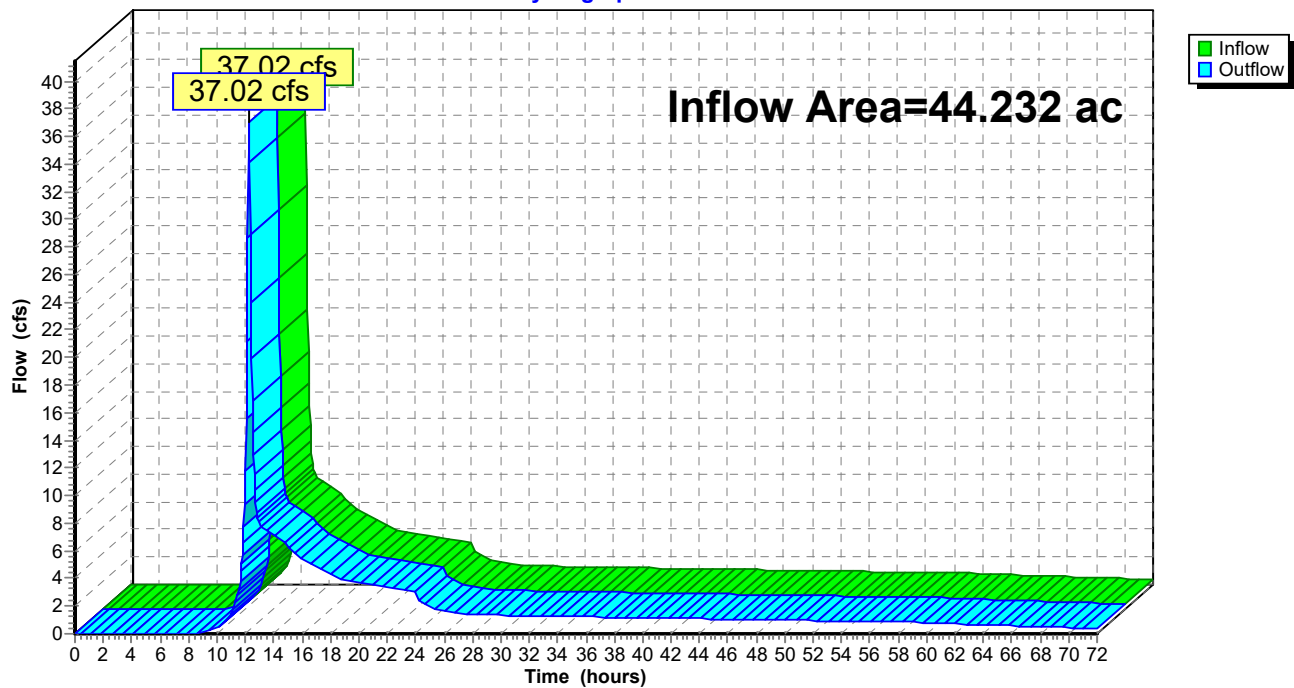
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 2.77" for 100-Year event
Inflow = 37.02 cfs @ 12.24 hrs, Volume= 10.193 af
Outflow = 37.02 cfs @ 12.24 hrs, Volume= 10.193 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



Existing Hydrology

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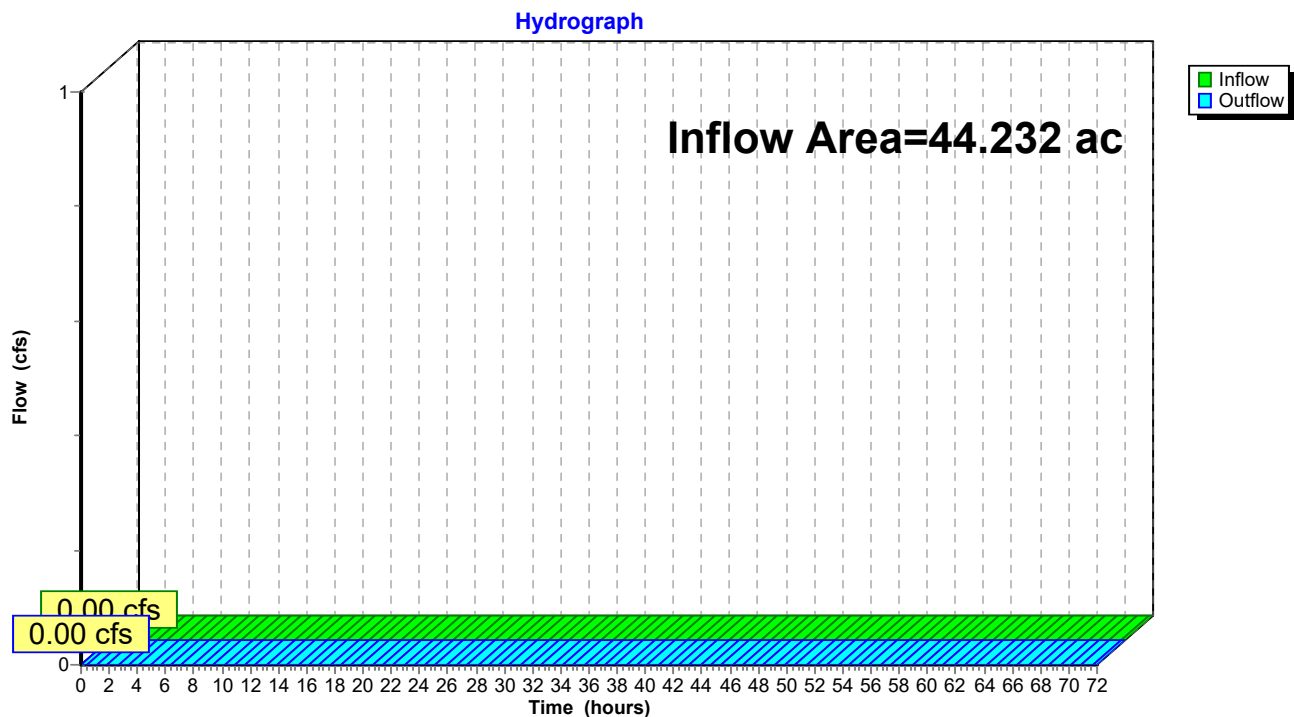
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth = 0.00" for 100-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



Existing Hydrology

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Summary for Reach DP-7: W-O

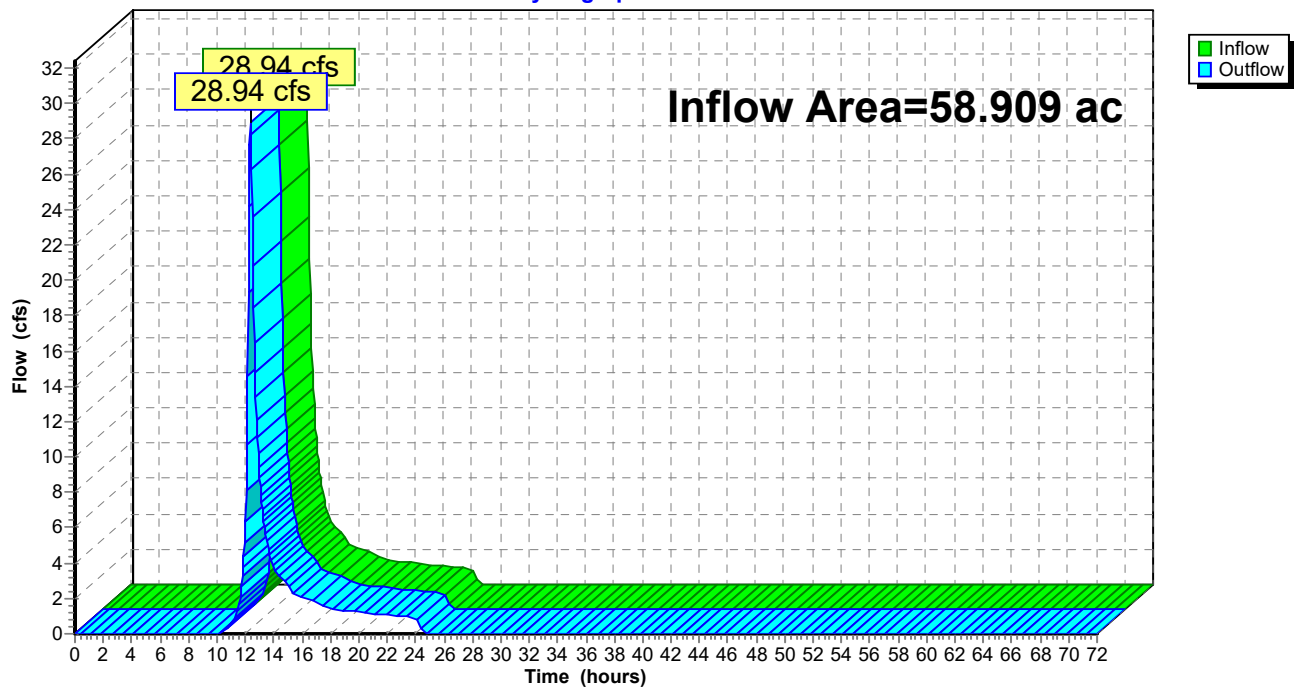
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.70" for 100-Year event
Inflow = 28.94 cfs @ 12.36 hrs, Volume= 3.413 af
Outflow = 28.94 cfs @ 12.36 hrs, Volume= 3.413 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7: W-O

Hydrograph



Existing Hydrology

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Summary for Reach DP-7 OUT: 18" RCP PIPE

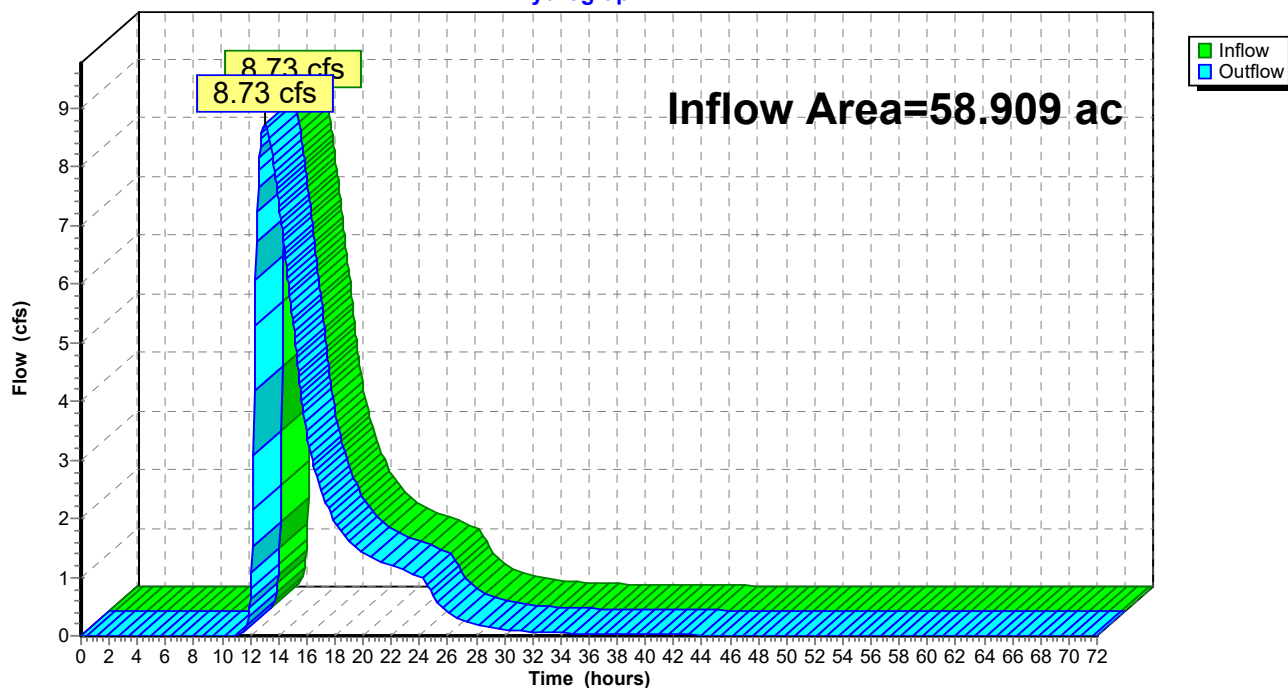
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 0.69" for 100-Year event
Inflow = 8.73 cfs @ 13.01 hrs, Volume= 3.406 af
Outflow = 8.73 cfs @ 13.01 hrs, Volume= 3.406 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 18" RCP PIPE

Hydrograph



Existing Hydrology

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NRCC 24-hr C 100-Year Rainfall=7.70"

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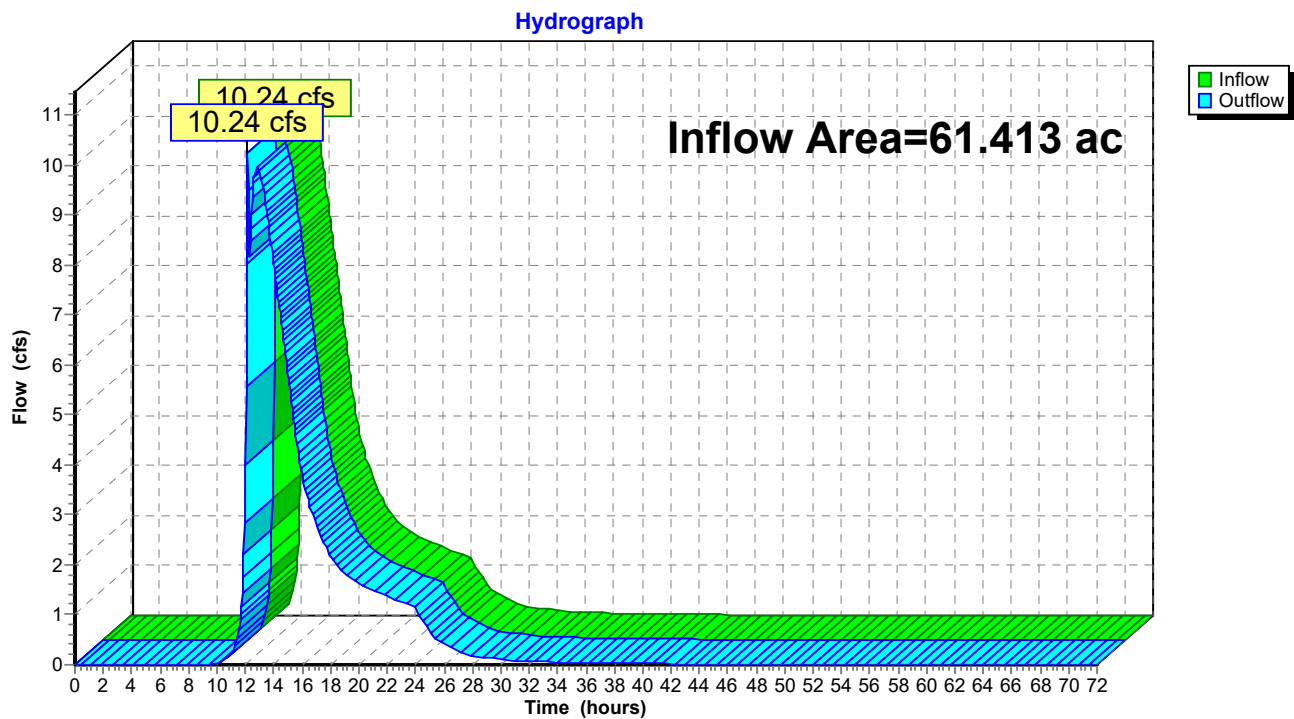
Summary for Reach DP-8: Wetlands Series X

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 0.79" for 100-Year event
Inflow = 10.24 cfs @ 12.16 hrs, Volume= 4.032 af
Outflow = 10.24 cfs @ 12.16 hrs, Volume= 4.032 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X



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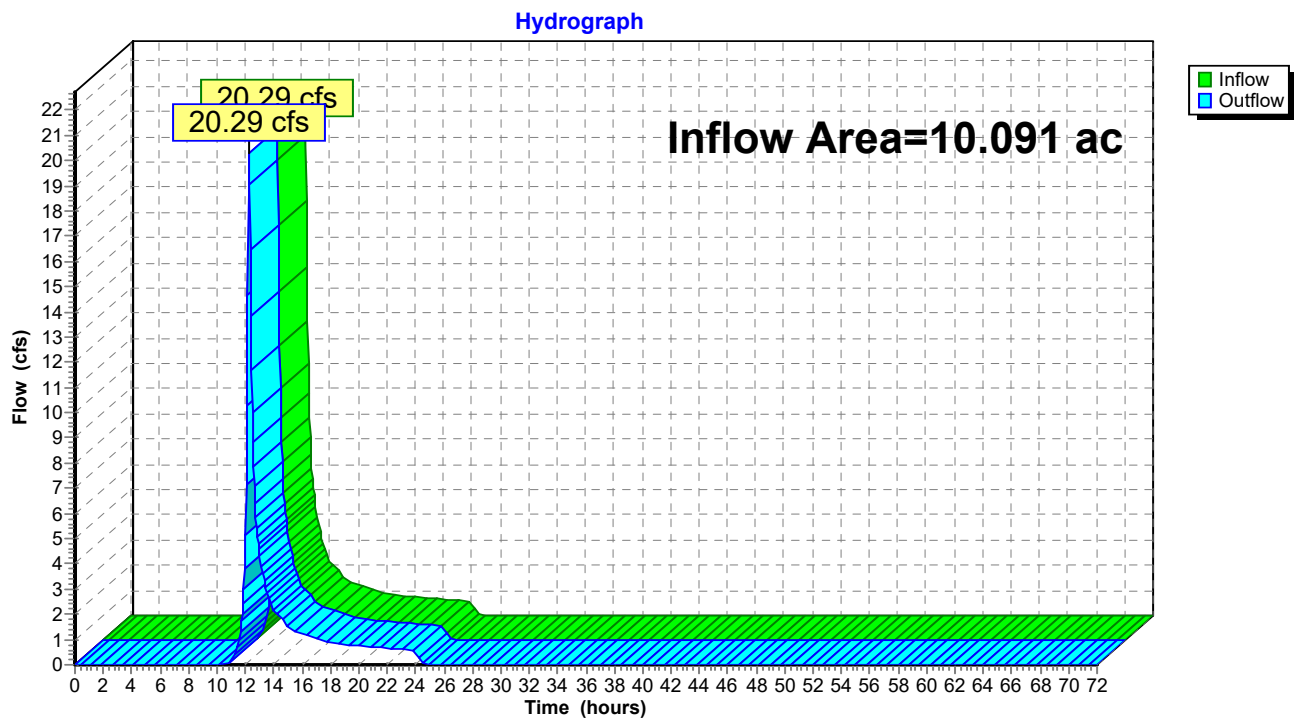
Summary for Reach DP-9: West Elm Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.091 ac, 31.90% Impervious, Inflow Depth = 2.37" for 100-Year event
Inflow = 20.29 cfs @ 12.25 hrs, Volume= 1.996 af
Outflow = 20.29 cfs @ 12.25 hrs, Volume= 1.996 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street



Existing Hydrology

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Summary for Reach DP-ELM: West Elm Street

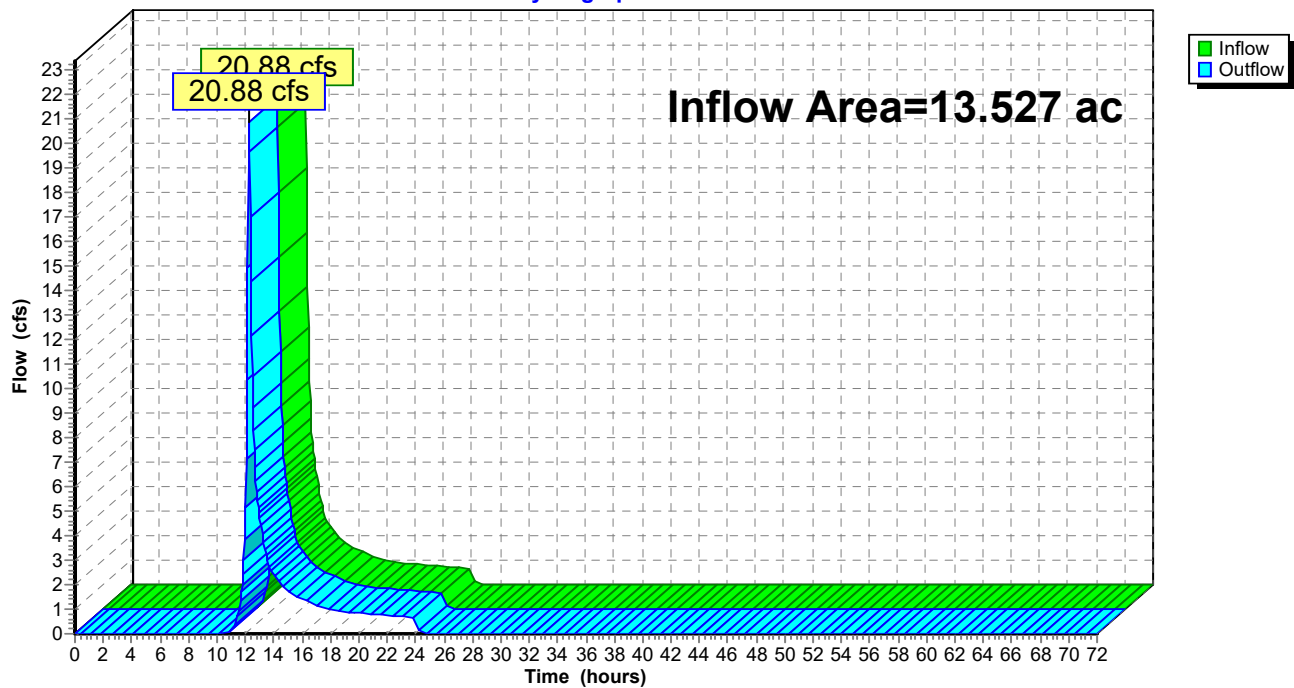
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.527 ac, 24.64% Impervious, Inflow Depth = 1.90" for 100-Year event
Inflow = 20.88 cfs @ 12.25 hrs, Volume= 2.140 af
Outflow = 20.88 cfs @ 12.25 hrs, Volume= 2.140 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street

Hydrograph



Existing Hydrology

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Summary for Reach DP-WA: Wetland Series A

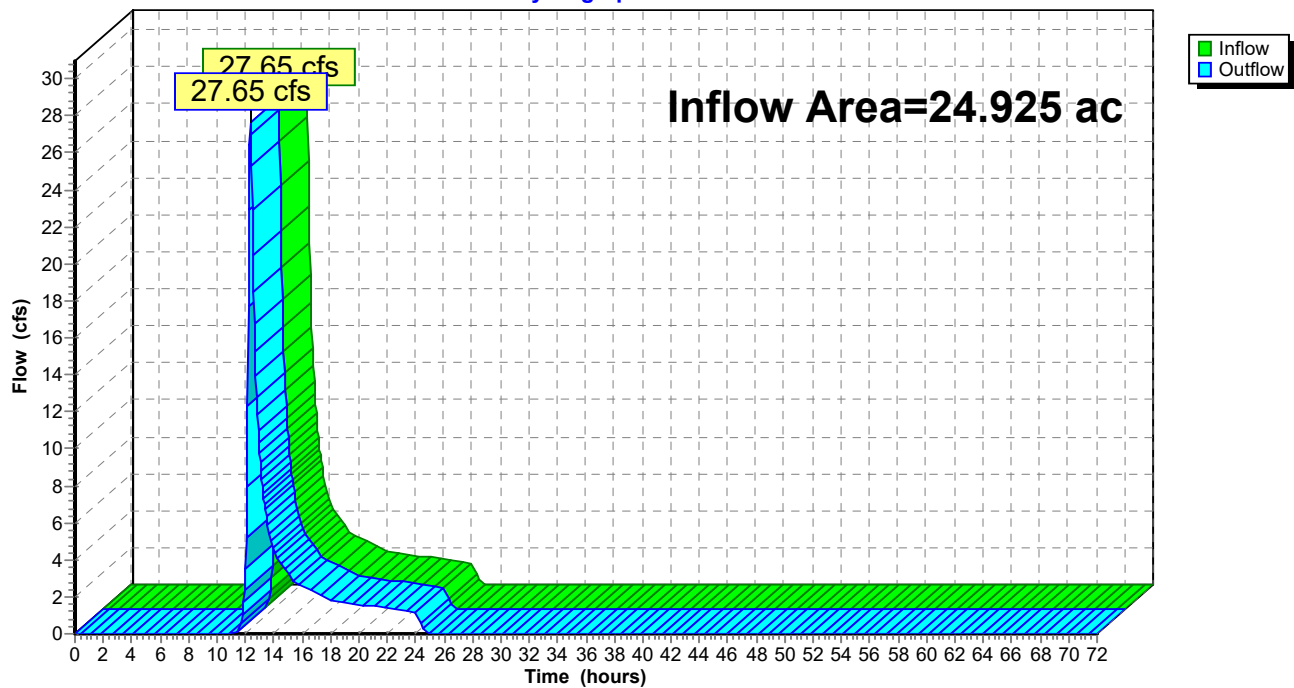
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 24.925 ac, 5.88% Impervious, Inflow Depth = 1.75" for 100-Year event
Inflow = 27.65 cfs @ 12.36 hrs, Volume= 3.633 af
Outflow = 27.65 cfs @ 12.36 hrs, Volume= 3.633 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A

Hydrograph



Existing Hydrology

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Summary for Reach DP-WI: Wetland Series/Stream I

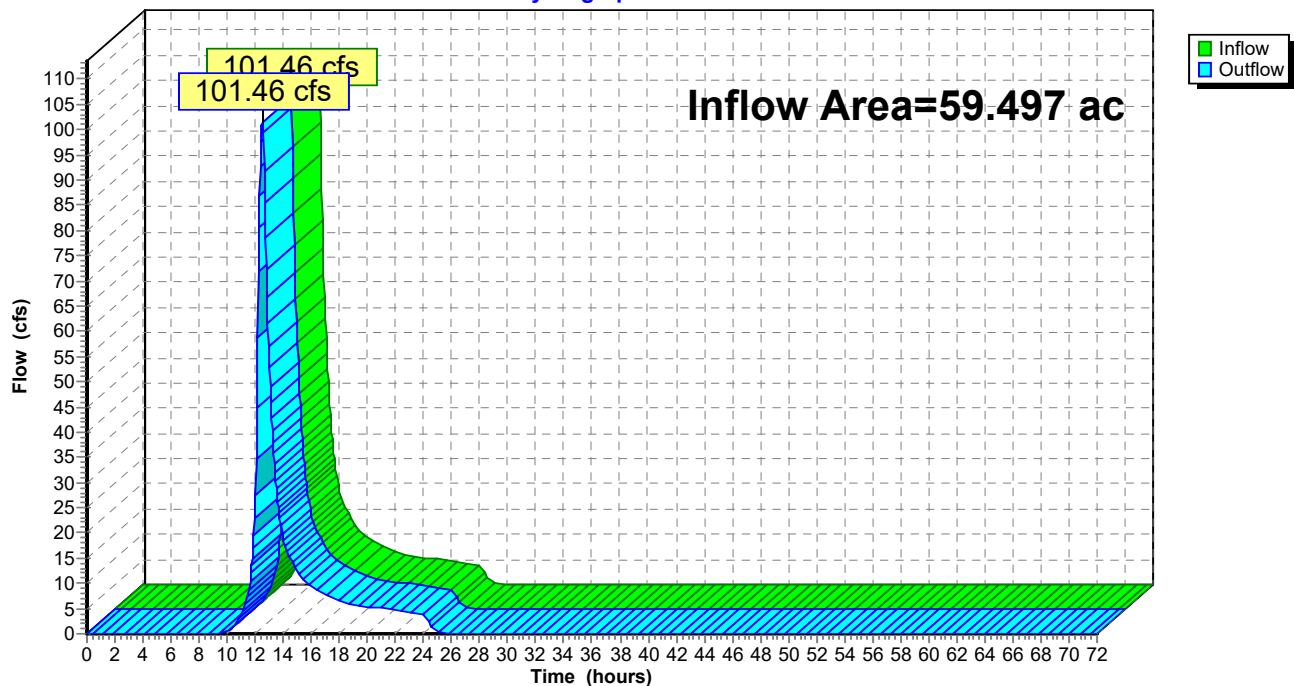
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 59.497 ac, 2.73% Impervious, Inflow Depth = 3.22" for 100-Year event
Inflow = 101.46 cfs @ 12.49 hrs, Volume= 15.947 af
Outflow = 101.46 cfs @ 12.49 hrs, Volume= 15.947 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I

Hydrograph



Existing Hydrology

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Pond BAS 10-A: EXIST BAS

Inflow Area = 0.692 ac, 0.00% Impervious, Inflow Depth = 0.35" for 100-Year event
 Inflow = 0.04 cfs @ 12.55 hrs, Volume= 0.020 af
 Outflow = 0.01 cfs @ 24.03 hrs, Volume= 0.020 af, Atten= 71%, Lag= 688.3 min
 Discarded = 0.01 cfs @ 24.03 hrs, Volume= 0.020 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 54.81' @ 24.03 hrs Surf.Area= 994 sf Storage= 456 cf

Plug-Flow detention time= 497.5 min calculated for 0.020 af (100% of inflow)
 Center-of-Mass det. time= 498.1 min (1,522.3 - 1,024.2)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 24.03 hrs HW=54.81' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)

↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Existing Hydrology

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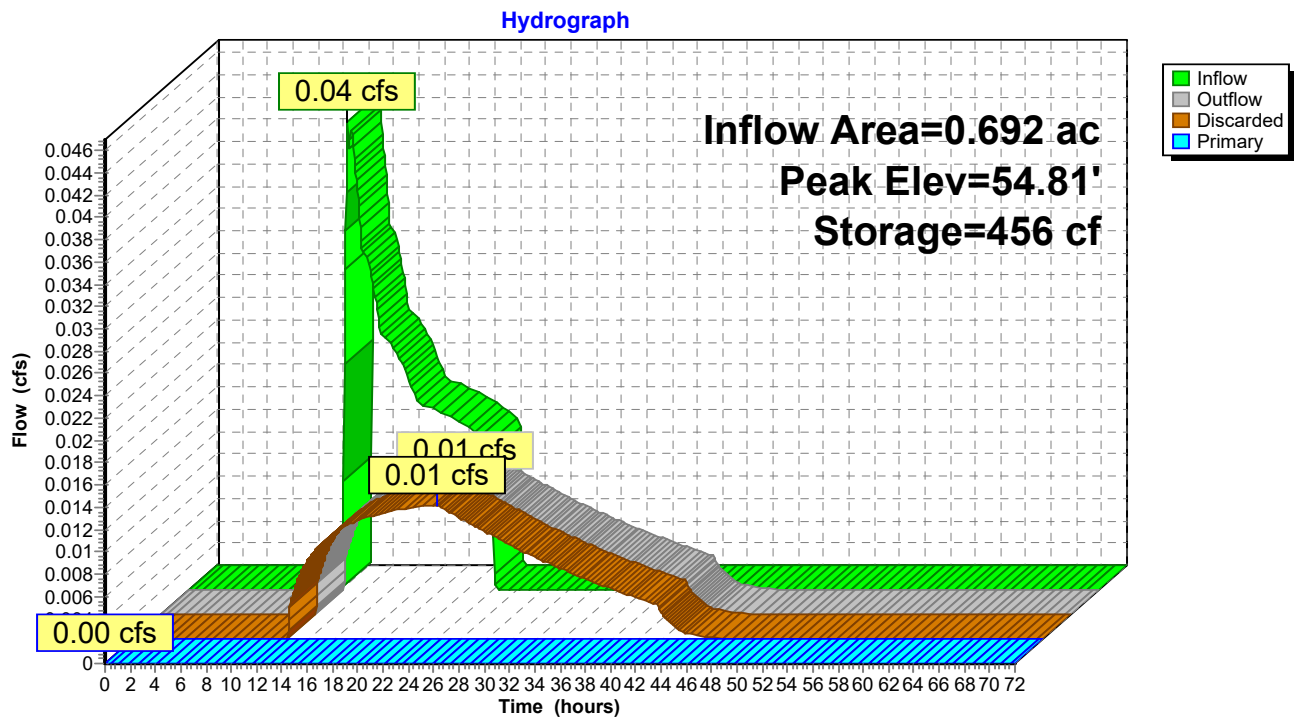
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Pond BAS 10-A: EXIST BAS



Existing Hydrology

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Summary for Pond W-N: Wetland Series N

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 2.99" for 100-Year event
 Inflow = 27.72 cfs @ 12.36 hrs, Volume= 8.180 af
 Outflow = 4.05 cfs @ 14.59 hrs, Volume= 6.725 af, Atten= 85%, Lag= 134.3 min
 Primary = 4.05 cfs @ 14.59 hrs, Volume= 6.725 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 88.31' @ 14.59 hrs Surf.Area= 34,809 sf Storage= 81,119 cf

Plug-Flow detention time= 659.3 min calculated for 6.721 af (82% of inflow)
 Center-of-Mass det. time= 285.4 min (2,000.7 - 1,715.3)

Volume	Invert	Avail.Storage	Storage Description	
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=4.05 cfs @ 14.59 hrs HW=88.31' (Free Discharge)

↑1=RCP_Round 24" (Inlet Controls 4.05 cfs @ 3.71 fps)

Existing Hydrology

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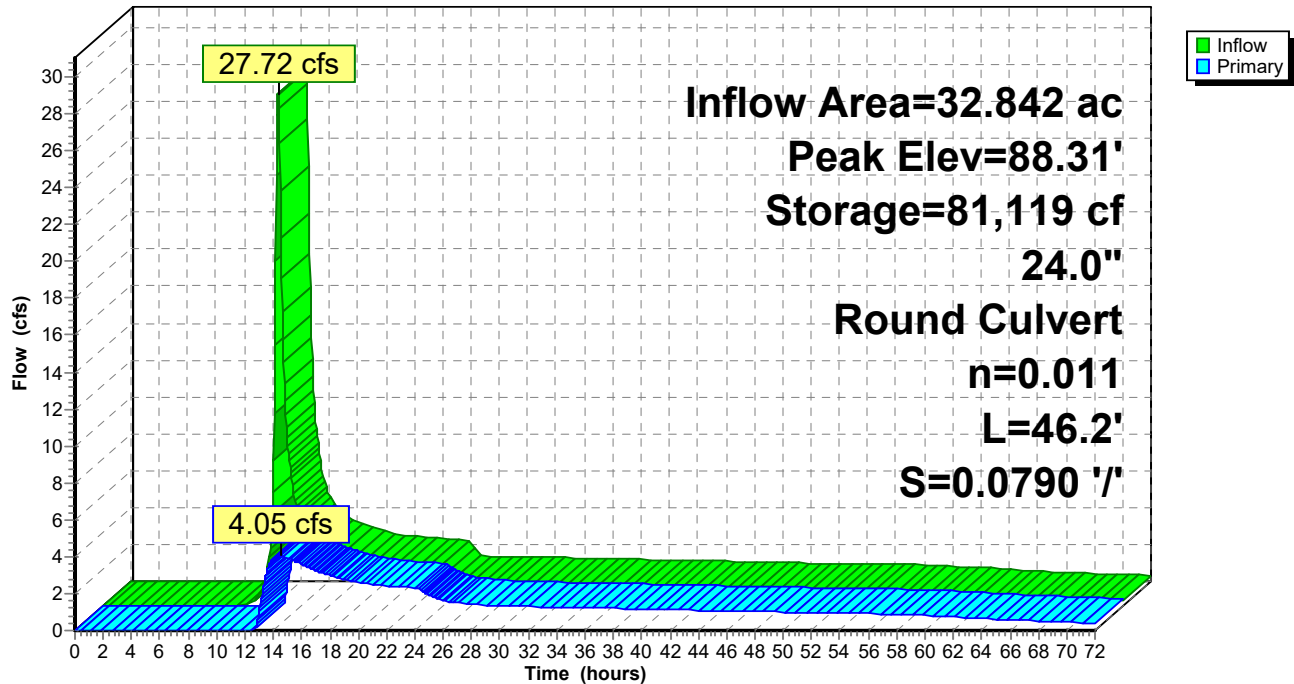
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Pond W-N: Wetland Series N

Hydrograph



Existing Hydrology

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Summary for Pond W-O: Wetland Series O

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth = 0.70" for 100-Year event
 Inflow = 28.94 cfs @ 12.36 hrs, Volume= 3.413 af
 Outflow = 8.73 cfs @ 13.01 hrs, Volume= 3.406 af, Atten= 70%, Lag= 39.1 min
 Primary = 8.73 cfs @ 13.01 hrs, Volume= 3.406 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.38' @ 13.01 hrs Surf.Area= 20,525 sf Storage= 48,544 cf

Plug-Flow detention time= 118.6 min calculated for 3.403 af (100% of inflow)
 Center-of-Mass det. time= 119.0 min (1,003.1 - 884.1)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S= 0.0114 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=8.73 cfs @ 13.01 hrs HW=79.38' (Free Discharge)

1=Culvert (Inlet Controls 8.73 cfs @ 4.94 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

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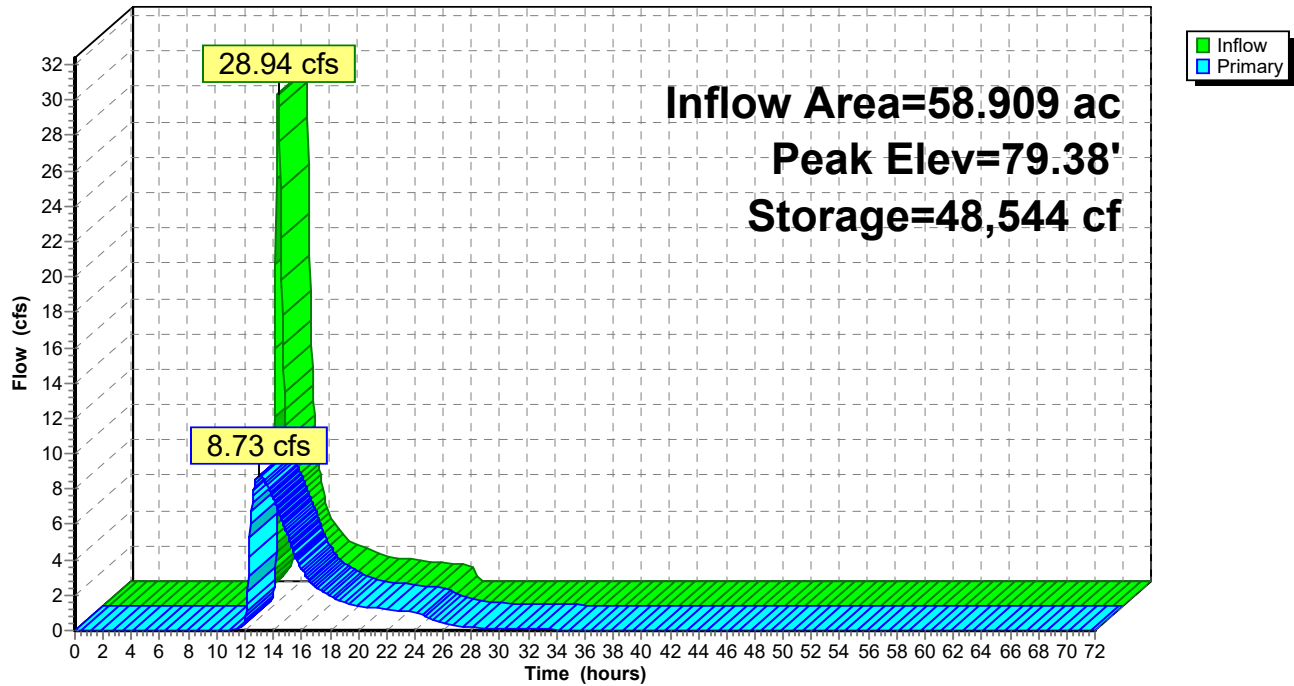
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Pond W-O: Wetland Series O

Hydrograph



Existing Hydrology

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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 2.77" for 100-Year event
 Inflow = 37.02 cfs @ 12.24 hrs, Volume= 10.193 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 82.30' @ 72.00 hrs Surf.Area= 101,295 sf Storage= 443,955 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices							
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir							
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40 1.60
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Existing Hydrology

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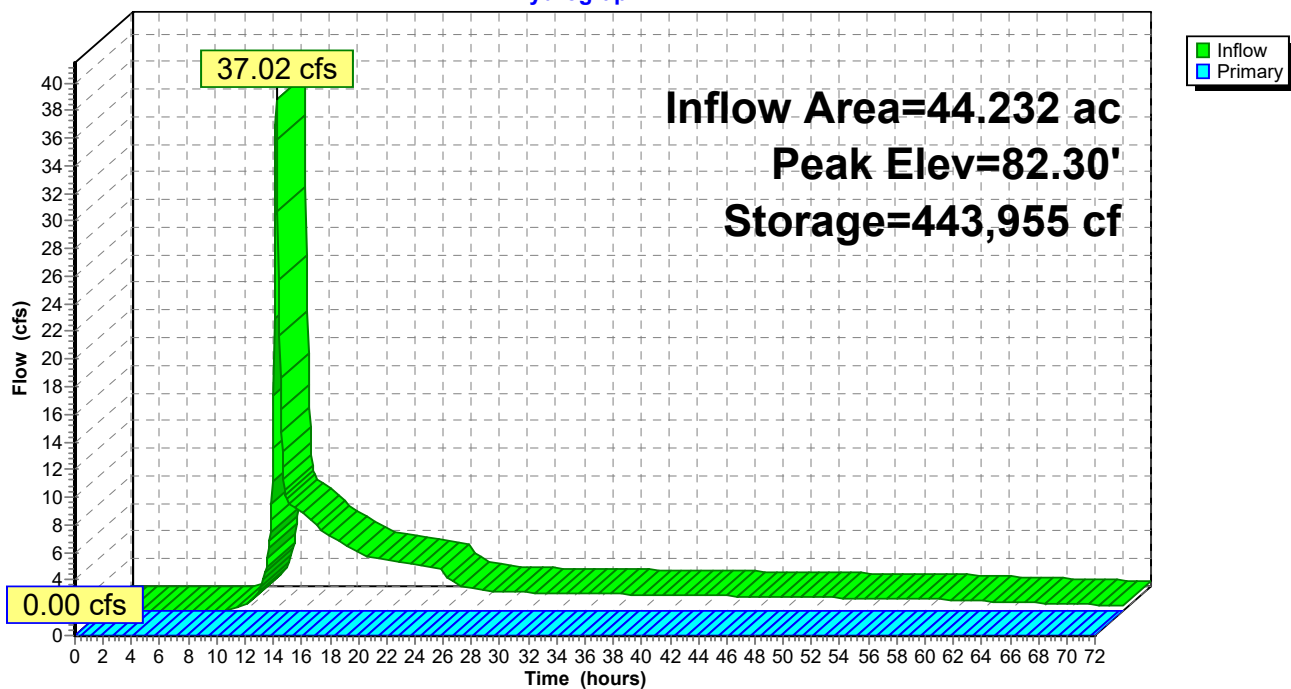
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Pond W-QP: Wetland Series Q & P

Hydrograph



Existing Hydrology

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Summary for Pond W-R: Wetland Series R

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth = 3.76" for 100-Year event
 Inflow = 60.93 cfs @ 12.28 hrs, Volume= 6.233 af
 Outflow = 1.39 cfs @ 24.06 hrs, Volume= 5.050 af, Atten= 98%, Lag= 706.6 min
 Primary = 1.39 cfs @ 24.06 hrs, Volume= 5.050 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 89.52' @ 24.06 hrs Surf.Area= 91,002 sf Storage= 213,960 cf

Plug-Flow detention time= 1,455.8 min calculated for 5.047 af (81% of inflow)
 Center-of-Mass det. time= 1,374.8 min (2,232.2 - 857.4)

Volume	Invert	Avail.Storage	Storage Description	
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.39 cfs @ 24.06 hrs HW=89.52' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.39 cfs @ 3.98 fps)

Existing Hydrology

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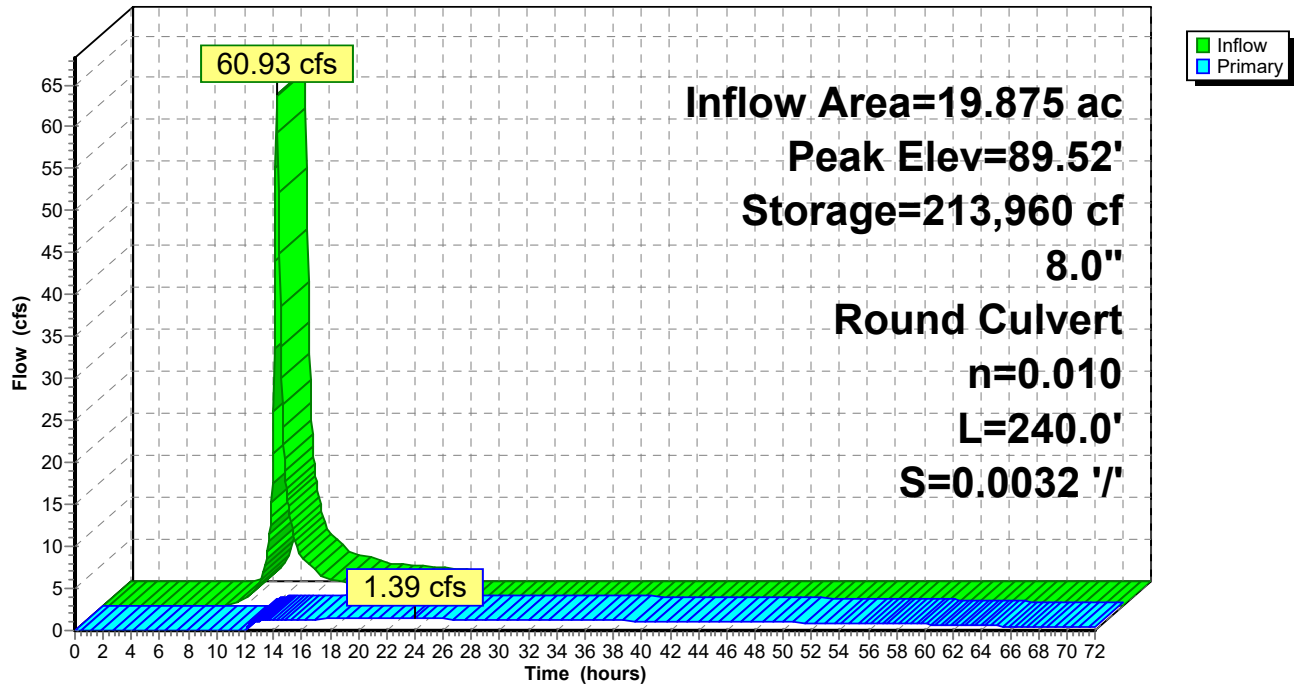
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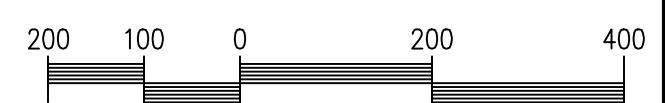
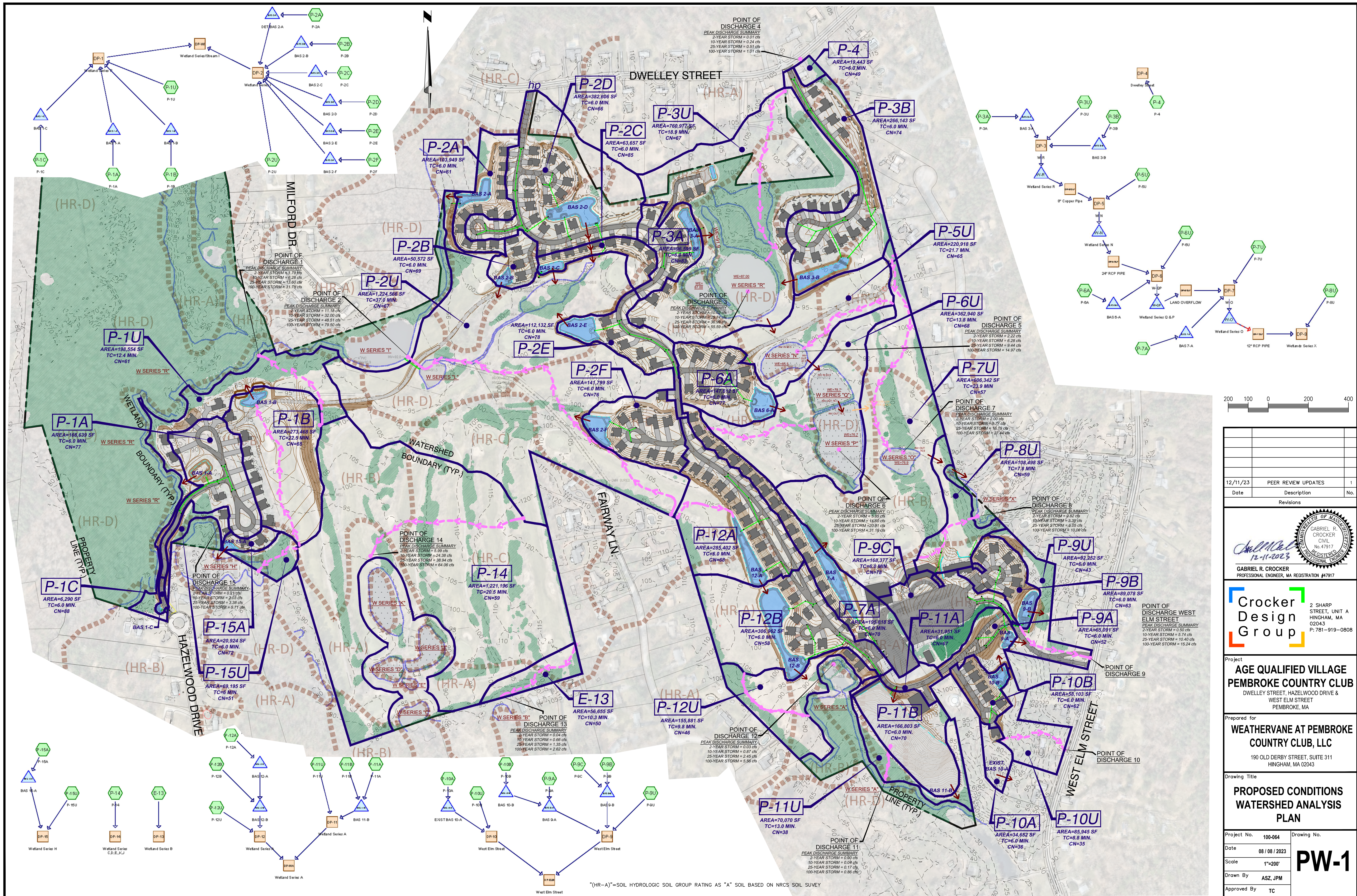
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Pond W-R: Wetland Series R

Hydrograph





Date	Description	No.
12/11/23	PEER REVIEW UPDATES	1

GABRIEL R. CROCKER
PROFESSIONAL ENGINEER, MA REGISTRATION #47917

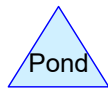
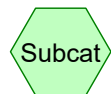
Crocker Design Group
2 SHARP STREET, UNIT A
HINGHAM, MA 02043
P: 781-919-0808

Project
**AGE QUALIFIED VILLAGE
PEMBROKE COUNTRY CLUB**
DWELLEY STREET, HAZELWOOD DRIVE &
WEST ELM STREET
PEMBROKE, MA

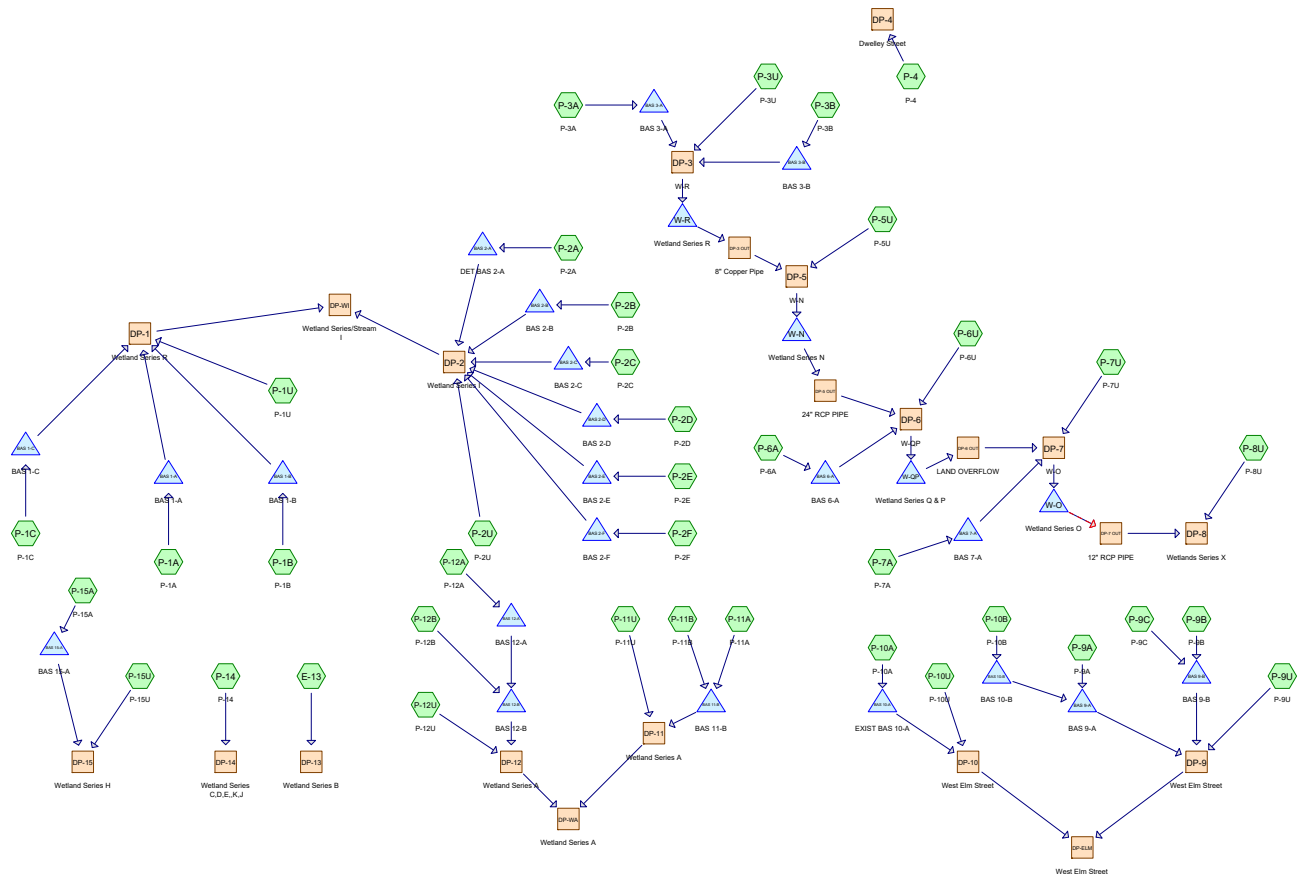
Prepared for
**WEATHERVANE AT PEMBROKE
COUNTRY CLUB, LLC**
190 OLD DERBY STREET, SUITE 311
HINGHAM, MA 02043

Drawing Title
**PROPOSED CONDITIONS
WATERSHED ANALYSIS
PLAN**

Project No.	100-064	Drawing No.	PW-1
Date	08 / 06 / 2023		
Scale	1"=200'		
Drawn By	ASZ, JPM		
Approved By	TC		



Routing Diagram for Proposed Hydrology
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Proposed Hydrology

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.057	98	1 unit (P-1A)
10.921	61	1/4 acre lots, 38% imp, HSG A (P-10B, P-12A, P-2A, P-2B, P-2D, P-9B)
20.906	75	1/4 acre lots, 38% imp, HSG B (P-12A, P-12B, P-2C, P-2E, P-2F, P-3A, P-3B, P-6A)
4.800	87	1/4 acre lots, 38% imp, HSG D (P-2B, P-2C, P-2D, P-3A)
0.746	98	13 UNITS (P-3U)
0.086	98	156 LF OF ROAD (P-1C)
0.018	98	156 LF OF SIDEWALK (P-1C)
0.893	98	1620 lf of road (P-1A)
0.976	98	17 HOUSE UNITS (P-7A)
0.537	98	17 units driveway (P-1A)
0.041	98	2 UNITS DRIVEWAY (P-3U)
0.115	98	2 units roof (P-12U)
0.133	98	2.5 UNITS (P-15A)
0.258	98	4.5 UNITS (P-1U)
0.147	98	400 LF OF ROAD (P-3U)
0.184	85	500 LF GRAVEL ROAD B SOILS (P-1B)
0.072	98	630 lf of sidewalk (P-1A)
0.430	98	7.5 UNITS (P-1B)
15.954	39	>75% Grass cover, Good, HSG A (P-10A, P-10U, P-11A, P-11B, P-12A, P-12B, P-15U, P-2D, P-3U, P-4, P-5U, P-7A, P-8U, P-9A, P-9C, P-9U)
17.900	61	>75% Grass cover, Good, HSG B (P-11B, P-12A, P-12U, P-15A, P-15U, P-1A, P-1B, P-1C, P-1U, P-3U, P-5U, P-8U)
0.298	74	>75% Grass cover, Good, HSG C (P-2D)
6.161	80	>75% Grass cover, Good, HSG D (P-2D, P-3U, P-5U, P-6U, P-7U)
0.542	98	BASIN (P-15A, P-1B, P-1C, P-3A, P-3B, P-9A, P-9B)
0.133	98	BUILD roof (P-7A)
0.363	98	EXIST Roof and Pavement (P-3U)
0.294	98	PARKING LOT (P-11A, P-12B)
2.777	98	Paved parking, HSG A (P-10U, P-9C, P-9U)
0.752	98	Paved parking, HSG B (P-7U)
0.344	98	ROADS (P-9A)
0.218	98	ROOF (P-9C)
2.447	98	WETLAND, 0% imp, HSG D (P-5U, P-6U)
0.540	98	Water Surface, 0% imp, HSG A (P-7U, P-8U)
1.223	98	Wetland, HSG D (P-2U)
9.125	30	Woods, Good, HSG A (P-10A, P-10U, P-11U, P-15U, P-2D, P-3B, P-3U, P-4, P-8U, P-9A, P-9C, P-9U)
5.328	55	Woods, Good, HSG B (P-11U, P-15U, P-1A, P-1U, P-3U, P-8U)
1.669	77	Woods, Good, HSG D (P-15U, P-2D, P-3U)
15.377	32	Woods/grass comb., Good, HSG A (E-13, P-12U, P-14, P-2U, P-6U, P-7U)
31.030	58	Woods/grass comb., Good, HSG B (P-12U, P-14, P-2U, P-6U, P-7U)
20.227	72	Woods/grass comb., Good, HSG C (E-13, P-14, P-2U)

Proposed Hydrology

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Area Listing (all nodes) (continued)

Area (acres)	CN	Description (subcatchment-numbers)
9.628	79	Woods/grass comb., Good, HSG D (P-12U, P-2U)
2.259	98	basin (P-10B, P-12A, P-12B, P-1A, P-2D, P-2E, P-2F, P-6A, P-7A)
0.399	98	exist impervious (P-2D)
0.987	98	pavement parking (P-7A)
0.273	98	road with sidewalk (P-11A)
0.436	98	roof (P-10A, P-11B, P-8U)
0.091	98	roof and pavement (P-4)
2.916	75	stone field (P-11B)
3.891	98	wetland, HSG D (P-3U)
194.905	64	TOTAL AREA

Proposed Hydrology

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Summary for Subcatchment E-13:

Runoff = 0.04 cfs @ 12.60 hrs, Volume= 0.018 af, Depth= 0.17"

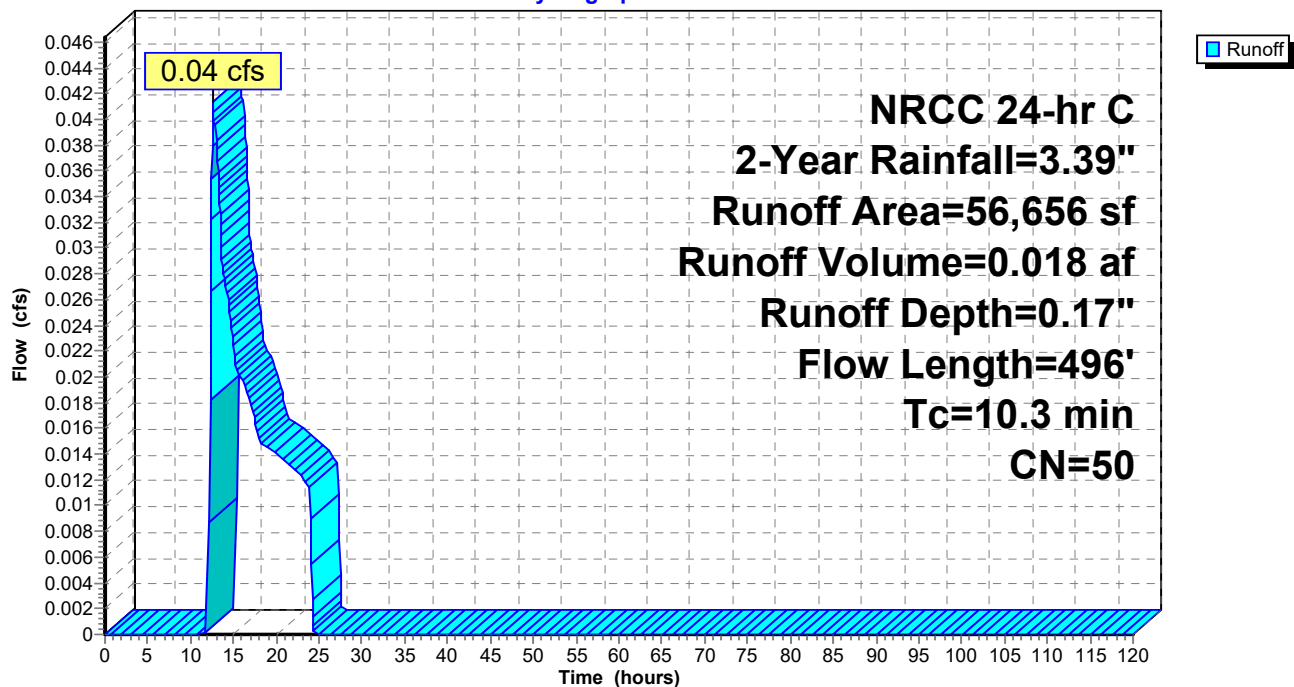
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



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Summary for Subcatchment P-10A: P-10A

[45] Hint: Runoff=Zero

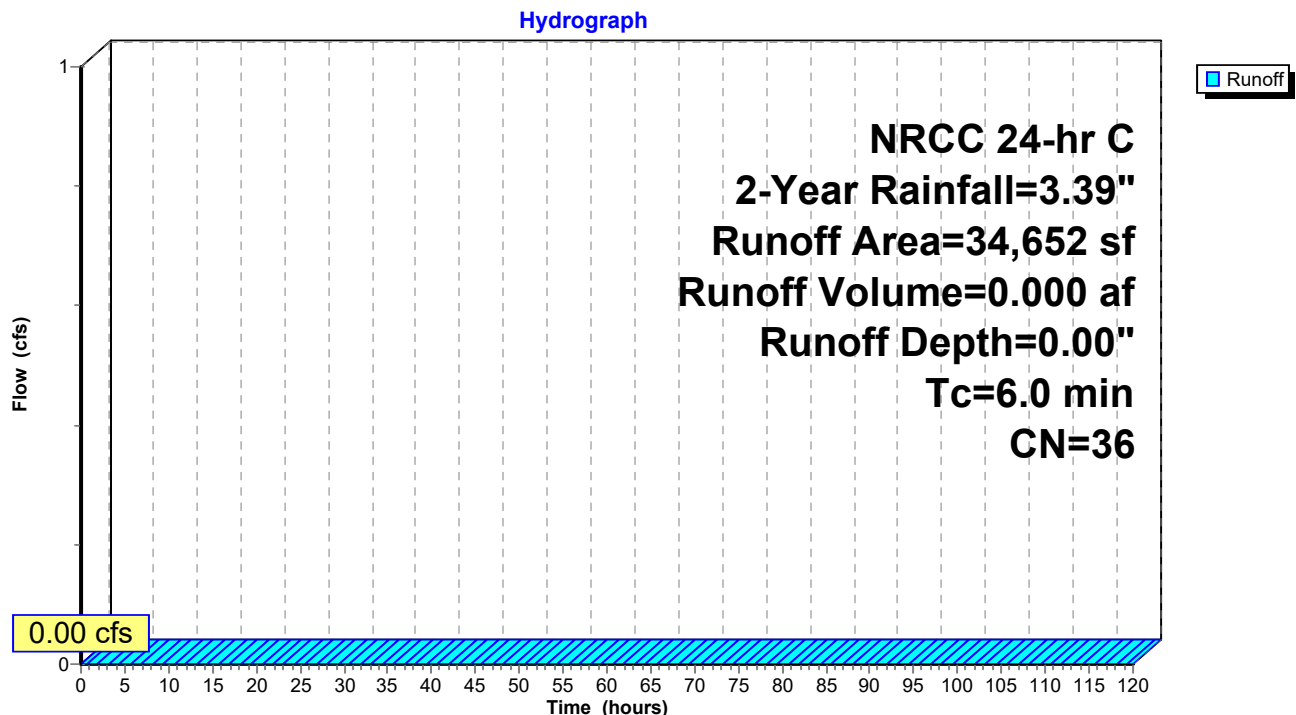
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	2,500	98	roof
	2,500	39	>75% Grass cover, Good, HSG A
	29,652	30	Woods, Good, HSG A
	34,652	36	Weighted Average
	32,152		92.79% Pervious Area
	2,500		7.21% Impervious Area

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

Subcatchment P-10A: P-10A



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NRCC 24-hr C 2-Year Rainfall=3.39"

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Summary for Subcatchment P-10B: P-10B

Runoff = 0.74 cfs @ 12.15 hrs, Volume= 0.063 af, Depth= 0.56"

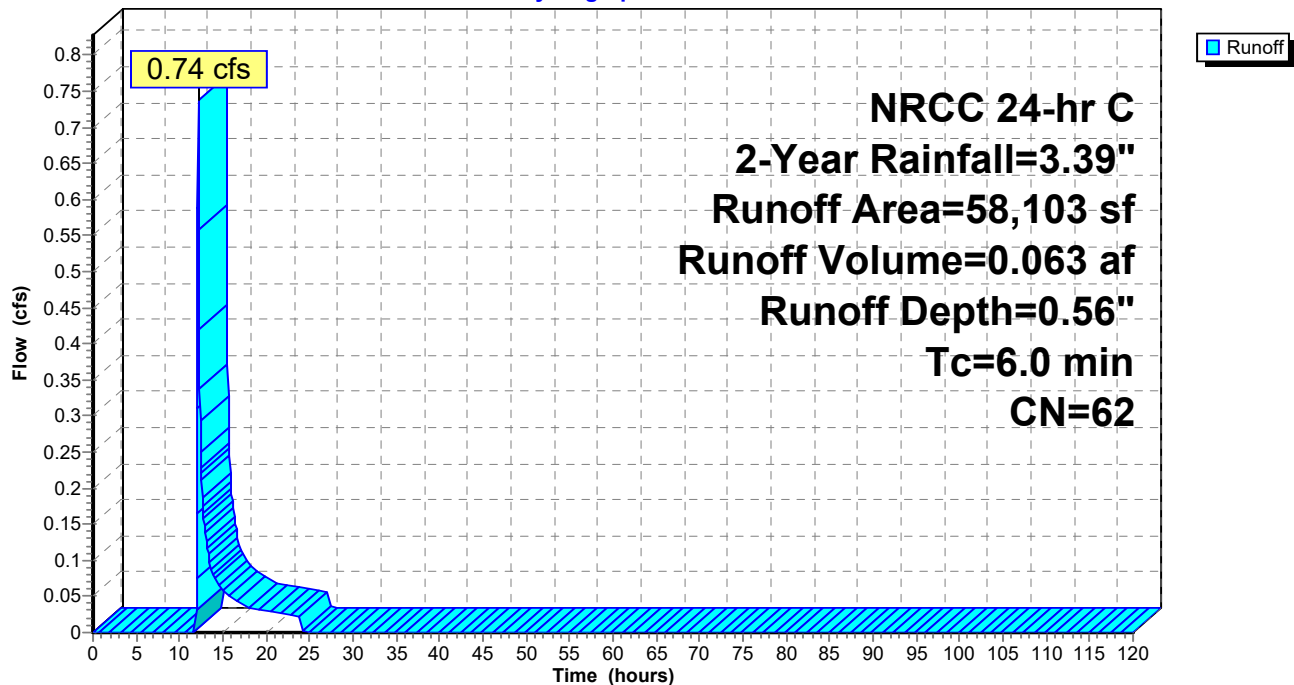
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	2,050	98	basin
	56,053	61	1/4 acre lots, 38% imp, HSG A
	58,103	62	Weighted Average
	34,753		59.81% Pervious Area
	23,350		40.19% Impervious Area

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

Subcatchment P-10B: P-10B

Hydrograph



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NRCC 24-hr C 2-Year Rainfall=3.39"

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Summary for Subcatchment P-10U: P-10U

[45] Hint: Runoff=Zero

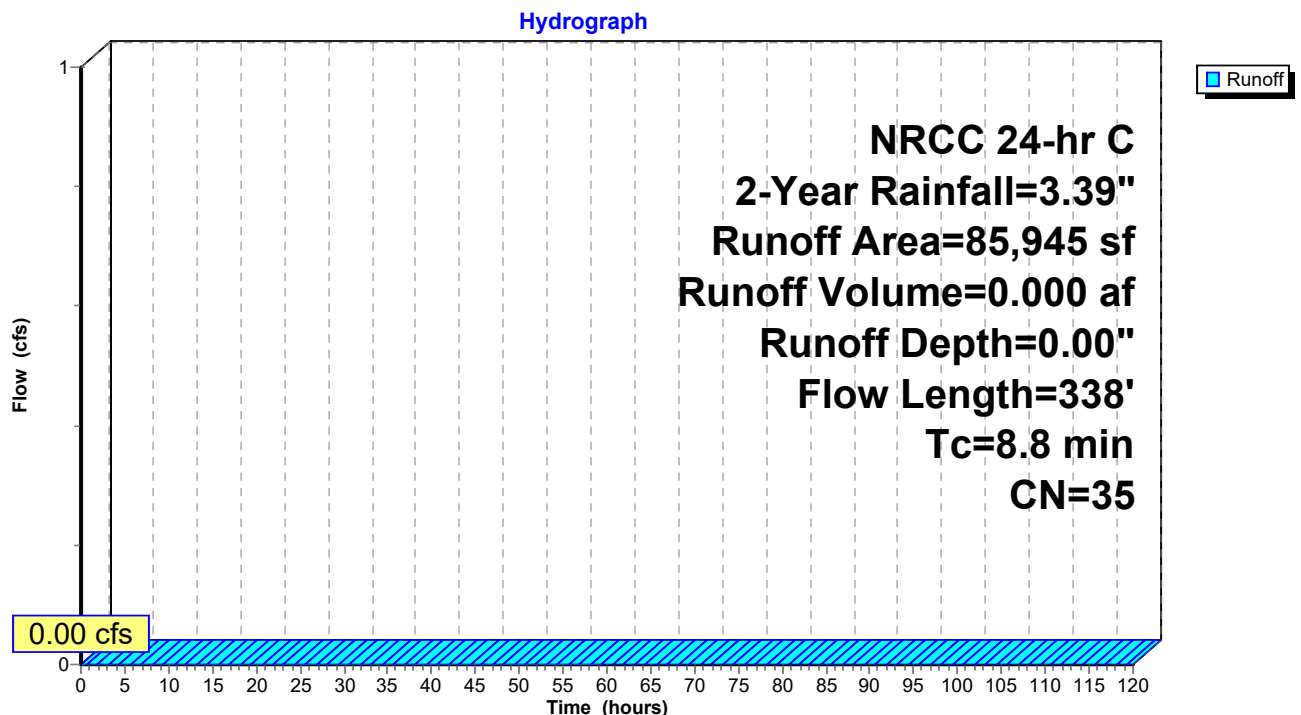
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
4,986	98	Paved parking, HSG A
68,659	30	Woods, Good, HSG A
12,300	39	>75% Grass cover, Good, HSG A
85,945	35	Weighted Average
80,959		94.20% Pervious Area
4,986		5.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
1.3	138	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
8.8	338	Total			

Subcatchment P-10U: P-10U



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NRCC 24-hr C 2-Year Rainfall=3.39"

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Summary for Subcatchment P-11A: P-11A

Runoff = 0.65 cfs @ 12.14 hrs, Volume= 0.048 af, Depth= 0.79"

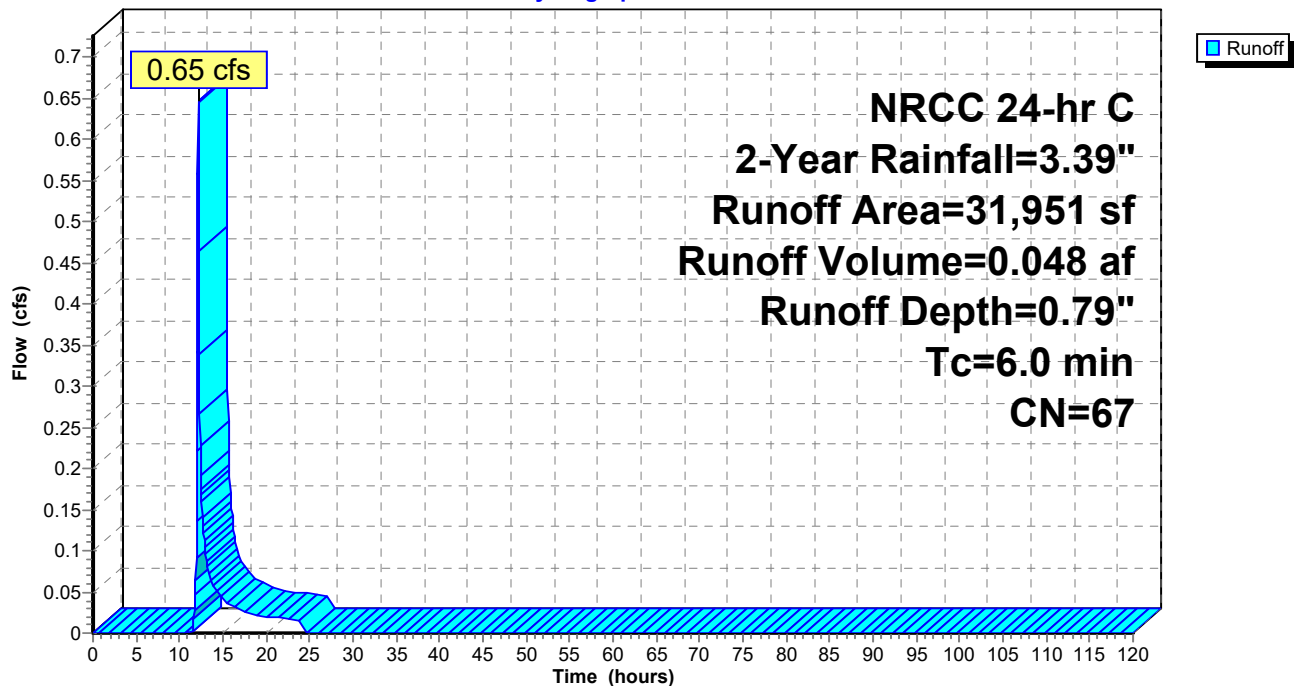
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
	16,752	39	>75% Grass cover, Good, HSG A
*	11,889	98	road with sidewalk
*	3,310	98	PARKING LOT
	31,951	67	Weighted Average
	16,752		52.43% Pervious Area
	15,199		47.57% Impervious Area

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

Subcatchment P-11A: P-11A

Hydrograph



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Summary for Subcatchment P-11B: P-11B

Runoff = 4.21 cfs @ 12.14 hrs, Volume= 0.300 af, Depth= 0.94"

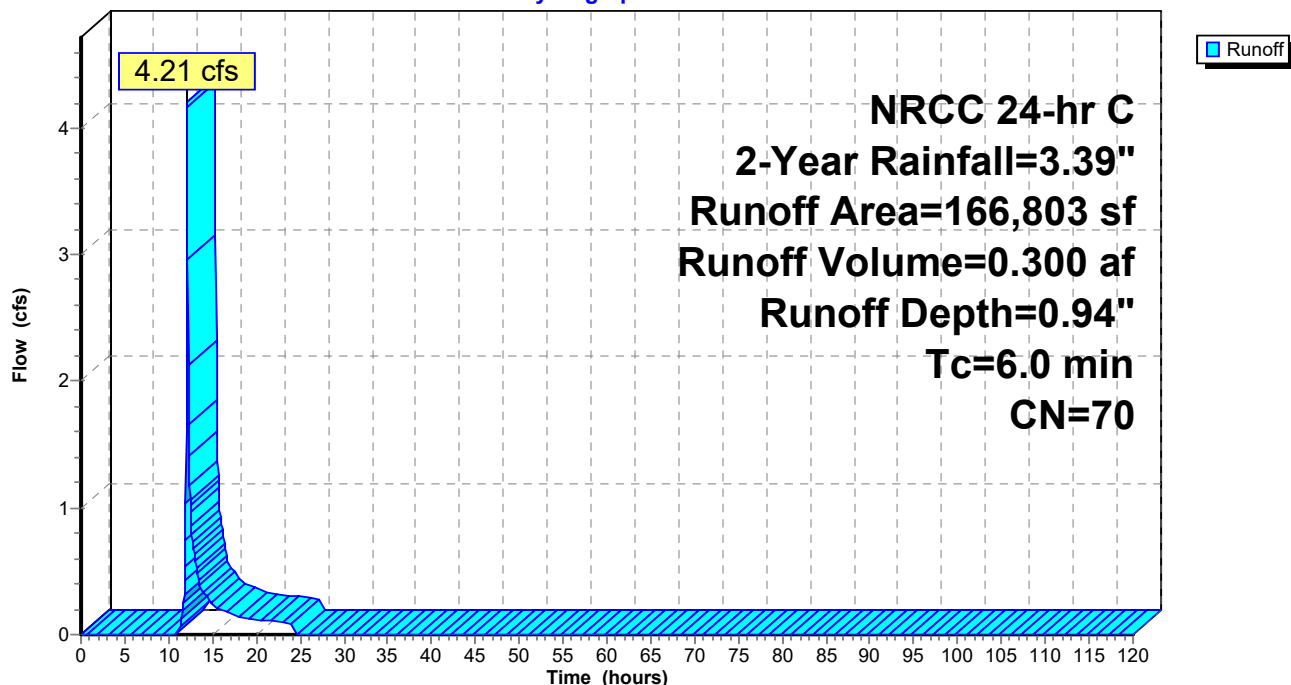
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	9,500	98	roof
	28,000	39	>75% Grass cover, Good, HSG A
	2,303	61	>75% Grass cover, Good, HSG B
*	127,000	75	stone field
	166,803	70	Weighted Average
	157,303		94.30% Pervious Area
	9,500		5.70% Impervious Area

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

Subcatchment P-11B: P-11B

Hydrograph



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Summary for Subcatchment P-11U: P-11U

Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

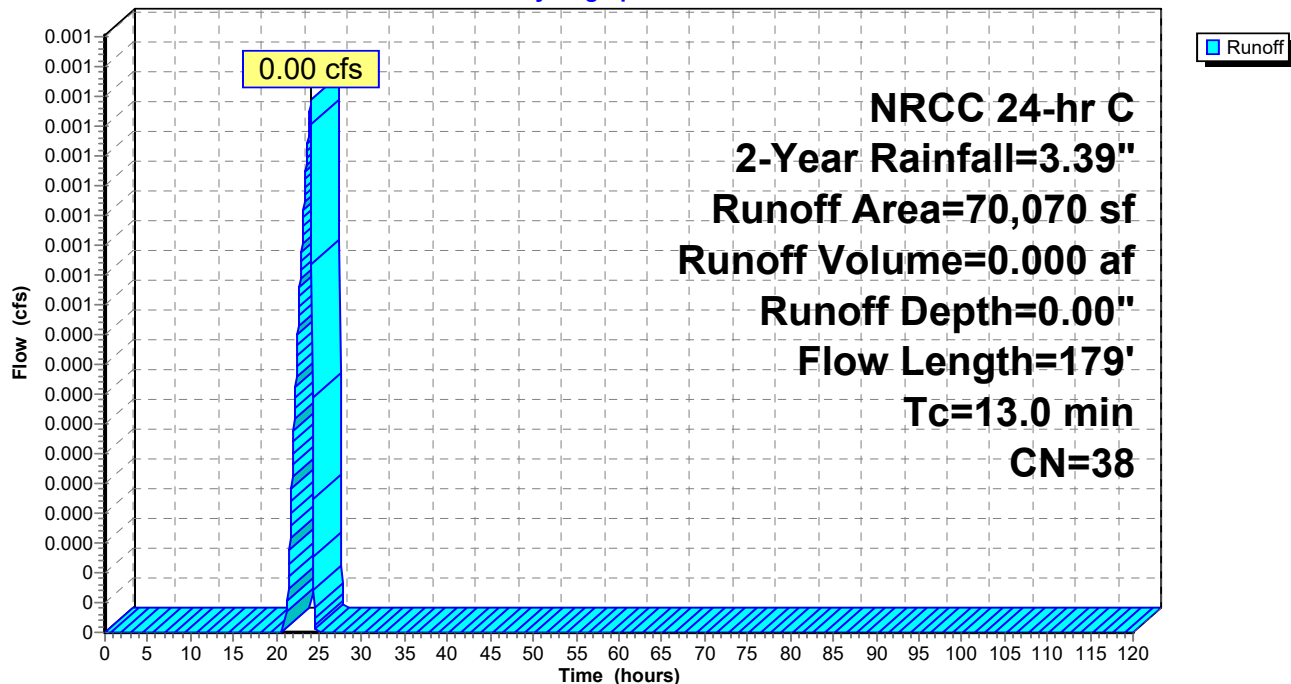
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
23,000	55	Woods, Good, HSG B
47,070	30	Woods, Good, HSG A
70,070	38	Weighted Average
70,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.4	129	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
13.0	179	Total			

Subcatchment P-11U: P-11U

Hydrograph



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Summary for Subcatchment P-12A: P-12A

Runoff = 6.25 cfs @ 12.14 hrs, Volume= 0.458 af, Depth= 0.84"

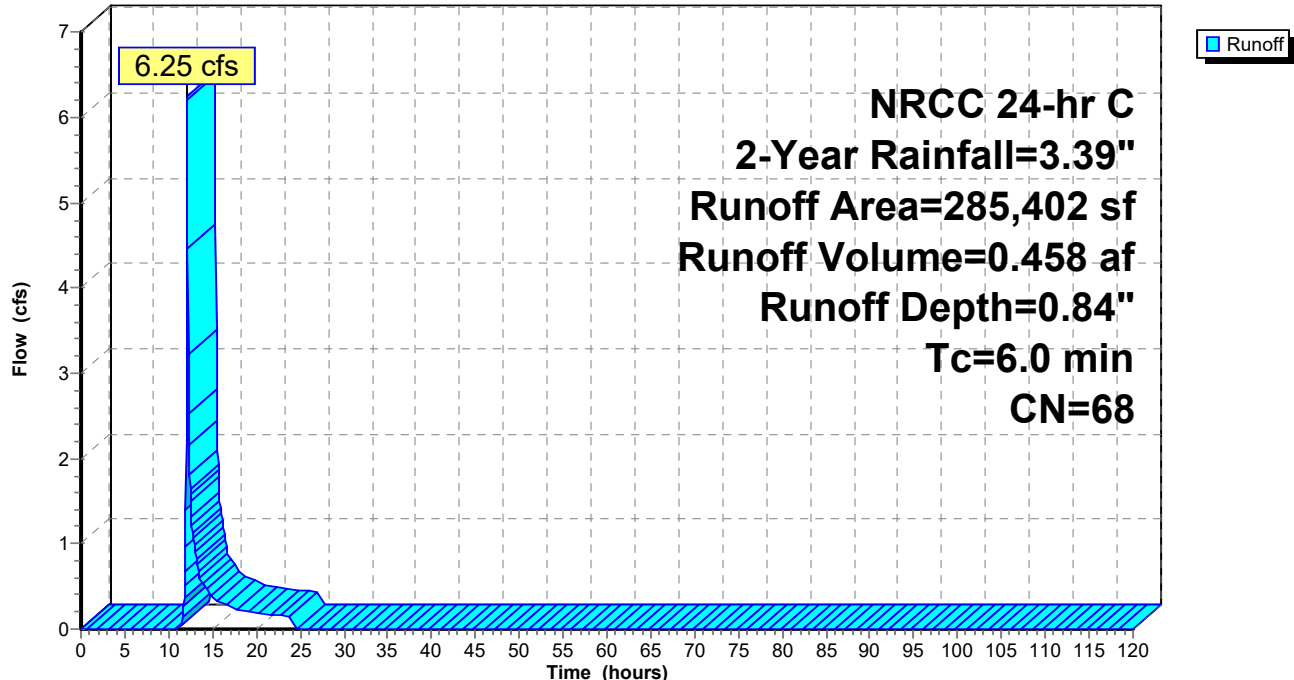
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	9,500	98	basin
	138,400	75	1/4 acre lots, 38% imp, HSG B
	33,000	61	1/4 acre lots, 38% imp, HSG A
	87,300	61	>75% Grass cover, Good, HSG B
	17,202	39	>75% Grass cover, Good, HSG A
	285,402	68	Weighted Average
	210,770		73.85% Pervious Area
	74,632		26.15% Impervious Area

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

Subcatchment P-12A: P-12A

Hydrograph



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Summary for Subcatchment P-12B: P-12B

Runoff = 2.23 cfs @ 12.16 hrs, Volume= 0.241 af, Depth= 0.41"

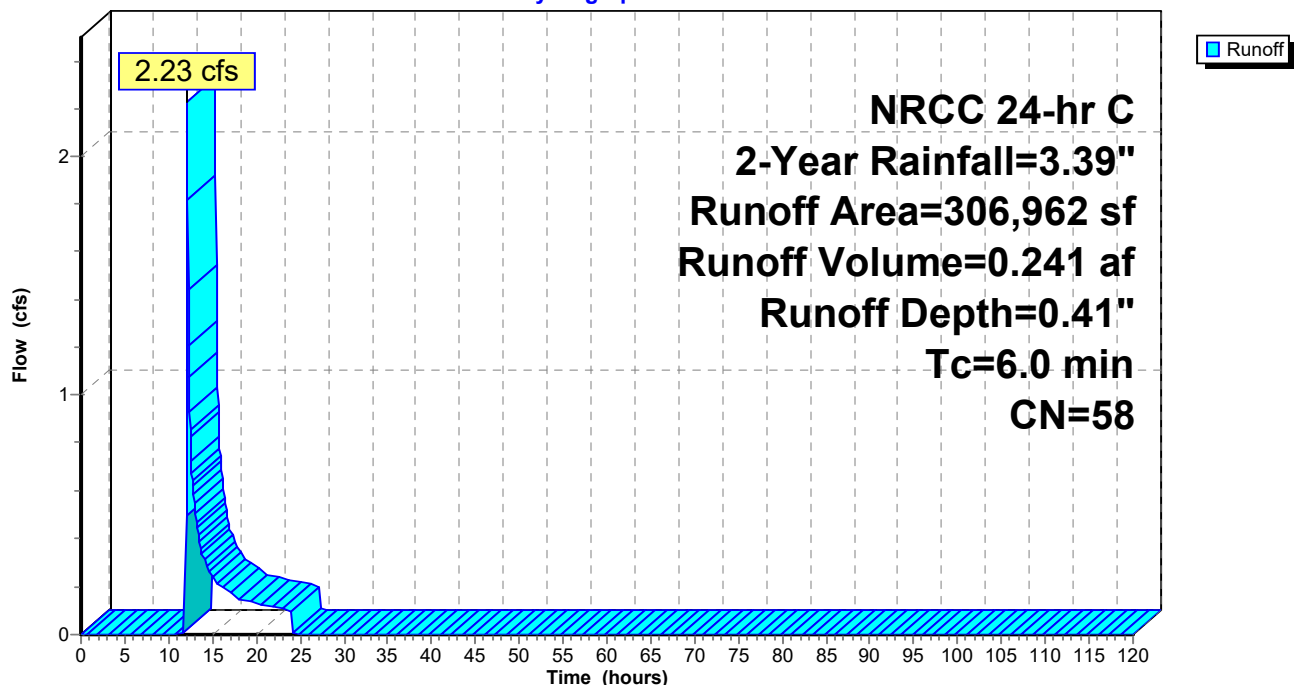
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	22,500	98	basin
	110,800	75	1/4 acre lots, 38% imp, HSG B
	164,162	39	>75% Grass cover, Good, HSG A
*	9,500	98	PARKING LOT
	306,962	58	Weighted Average
	232,858		75.86% Pervious Area
	74,104		24.14% Impervious Area

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

Subcatchment P-12B: P-12B

Hydrograph



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Summary for Subcatchment P-12U: P-12U

Runoff = 0.03 cfs @ 14.36 hrs, Volume= 0.025 af, Depth= 0.08"

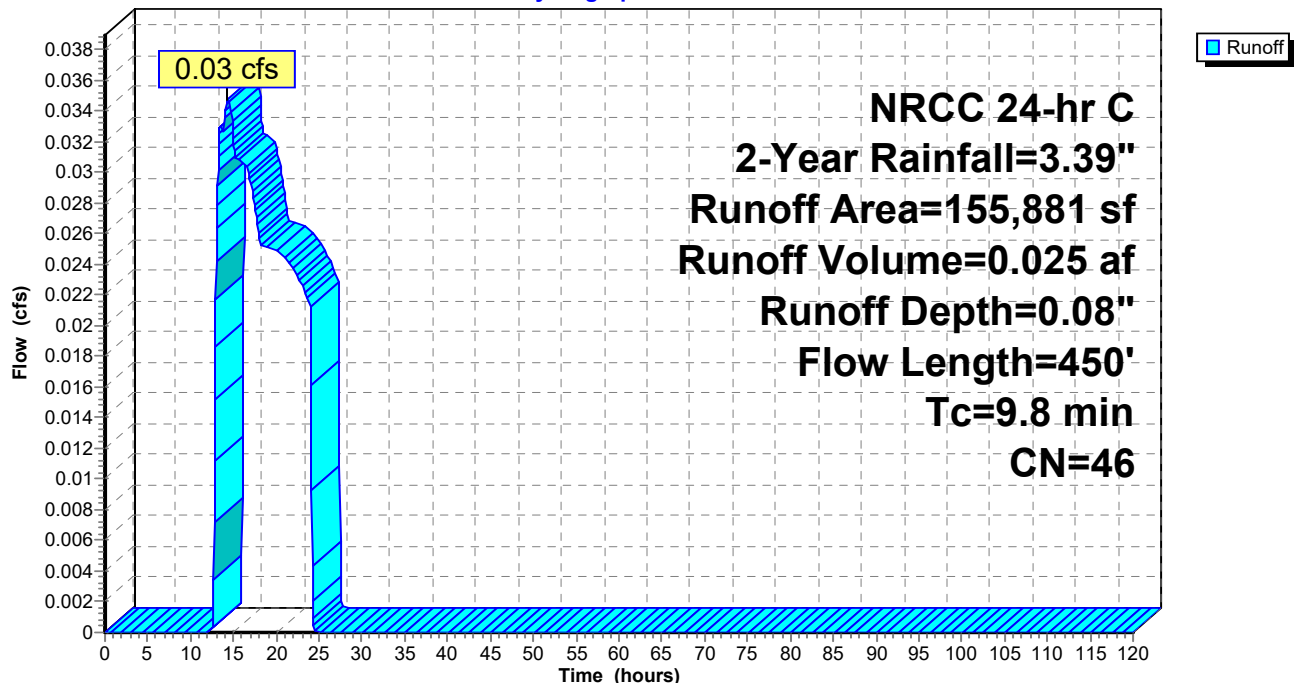
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
80,000	32	Woods/grass comb., Good, HSG A
59,250	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
* 5,000	98	2 units roof
10,731	61	>75% Grass cover, Good, HSG B
155,881	46	Weighted Average
150,881		96.79% Pervious Area
5,000		3.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
3.9	400	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.8	450	Total			

Subcatchment P-12U: P-12U

Hydrograph



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Summary for Subcatchment P-14: P-14

Runoff = 5.99 cfs @ 12.39 hrs, Volume= 1.044 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
329,442	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,221,196	59	Weighted Average
1,221,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

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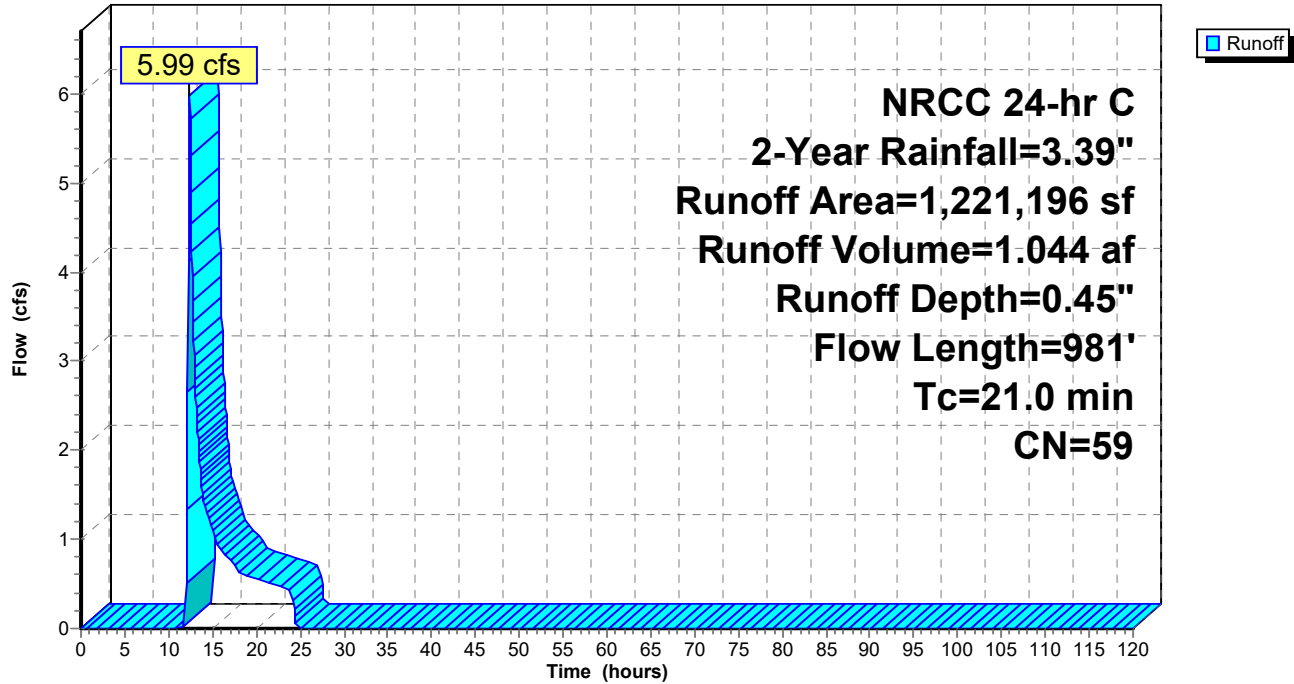
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment P-14: P-14

Hydrograph



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Summary for Subcatchment P-15A: P-15A

Runoff = 0.60 cfs @ 12.14 hrs, Volume= 0.042 af, Depth= 1.05"

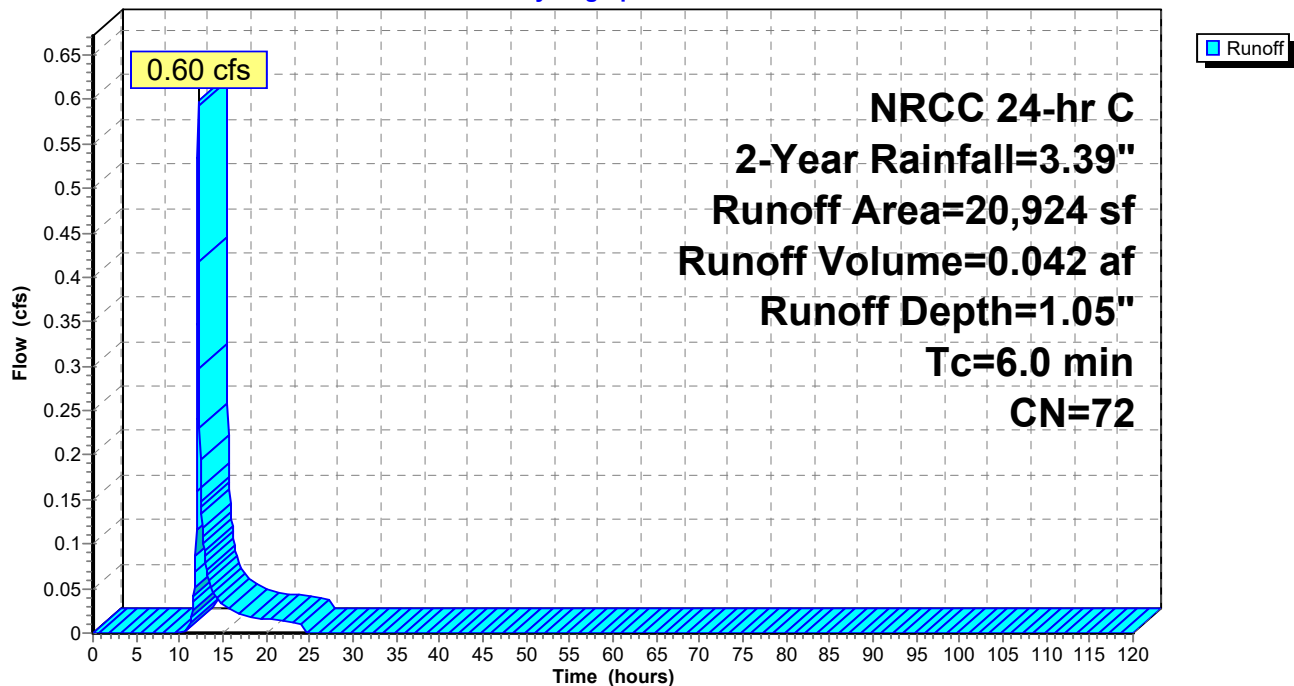
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	300	98	BASIN
*	5,800	98	2.5 UNITS
	14,824	61	>75% Grass cover, Good, HSG B
	20,924	72	Weighted Average
	14,824		70.85% Pervious Area
	6,100		29.15% Impervious Area

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

Subcatchment P-15A: P-15A

Hydrograph



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Summary for Subcatchment P-15U: P-15U

Runoff = 0.07 cfs @ 12.57 hrs, Volume= 0.026 af, Depth= 0.19"

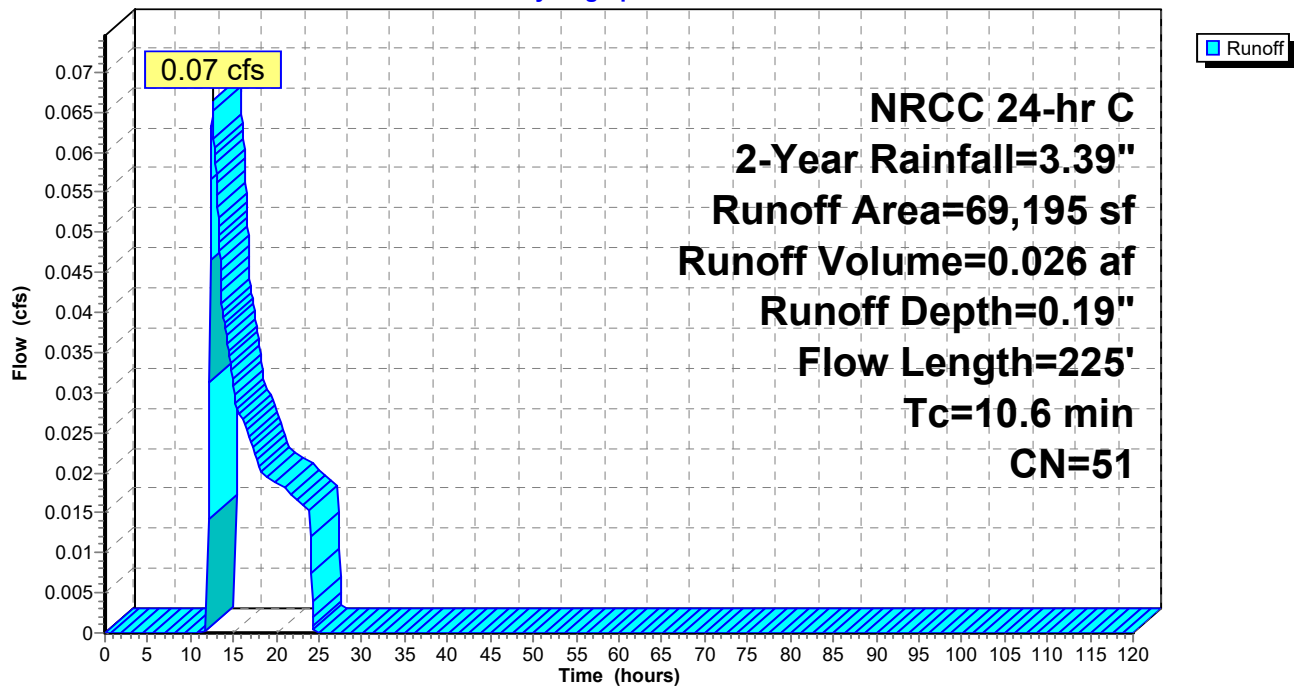
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
13,300	55	Woods, Good, HSG B
26,658	61	>75% Grass cover, Good, HSG B
22,600	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
1,137	39	>75% Grass cover, Good, HSG A
69,195	51	Weighted Average
69,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
2.3	175	0.0650	1.27		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.6	225	Total			

Subcatchment P-15U: P-15U

Hydrograph



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Summary for Subcatchment P-1A: P-1A

Runoff = 6.38 cfs @ 12.13 hrs, Volume= 0.435 af, Depth= 1.35"

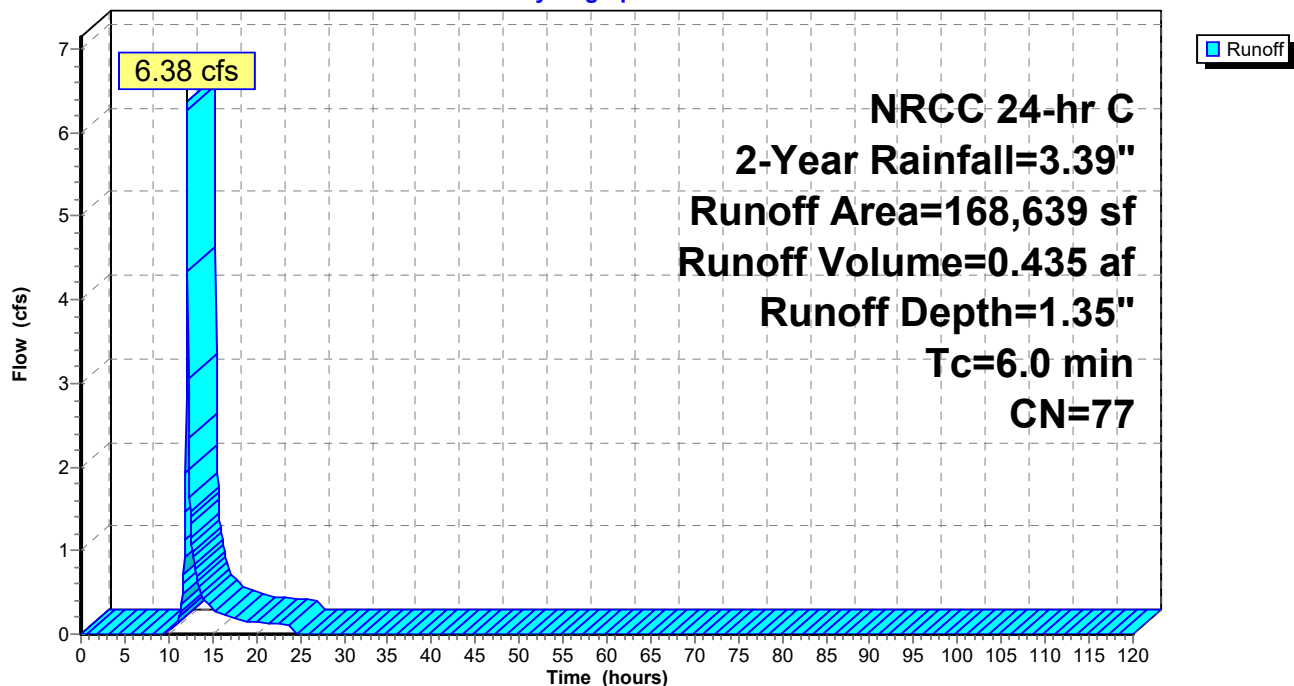
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	5,750	98	basin
*	38,880	98	1620 lf of road
*	3,150	98	630 lf of sidewalk
*	2,500	98	1 unit
*	23,400	98	17 units driveway
	7,380	55	Woods, Good, HSG B
	87,579	61	>75% Grass cover, Good, HSG B
	168,639	77	Weighted Average
	94,959		56.31% Pervious Area
	73,680		43.69% Impervious Area

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

Subcatchment P-1A: P-1A

Hydrograph



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Summary for Subcatchment P-1B: P-1B

Runoff = 2.70 cfs @ 12.37 hrs, Volume= 0.364 af, Depth= 0.70"

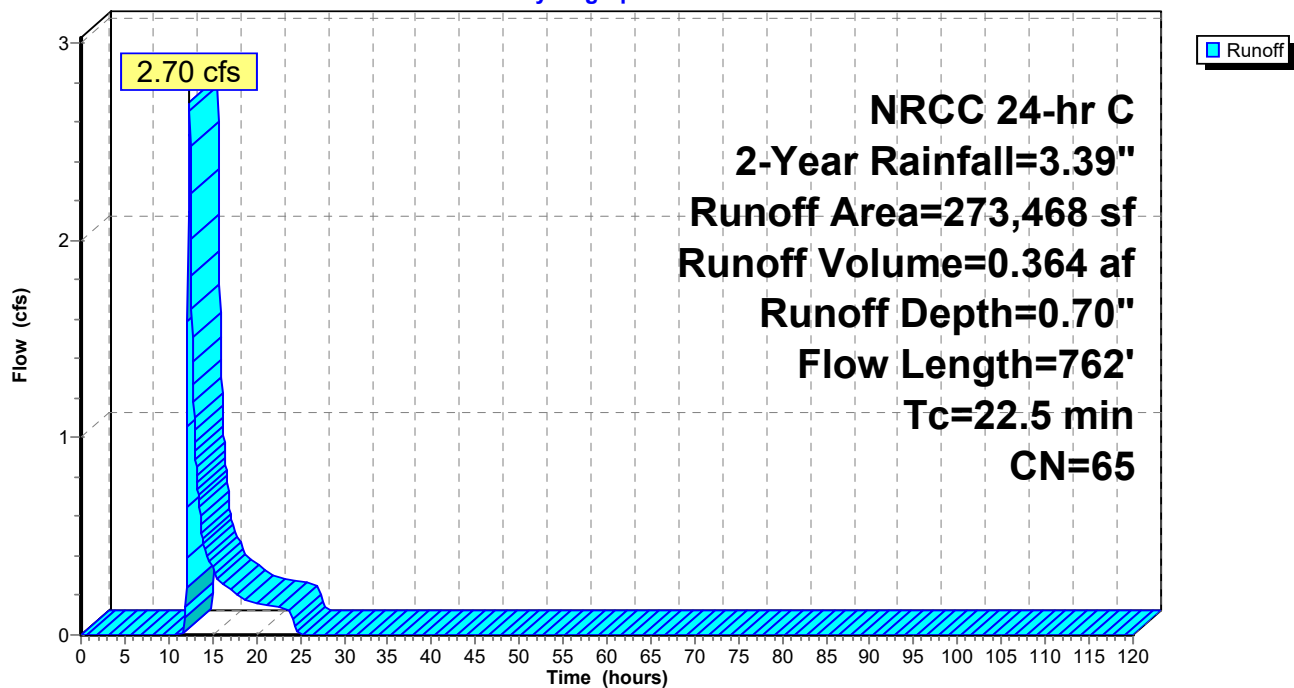
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	3,150	98	BASIN
*	8,000	85	500 LF GRAVEL ROAD B SOILS
*	18,750	98	7.5 UNITS
	243,568	61	>75% Grass cover, Good, HSG B
	273,468	65	Weighted Average
	251,568		91.99% Pervious Area
	21,900		8.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
17.0	712	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.5	762	Total			

Subcatchment P-1B: P-1B

Hydrograph



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Summary for Subcatchment P-1C: P-1C

Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af, Depth= 2.17"

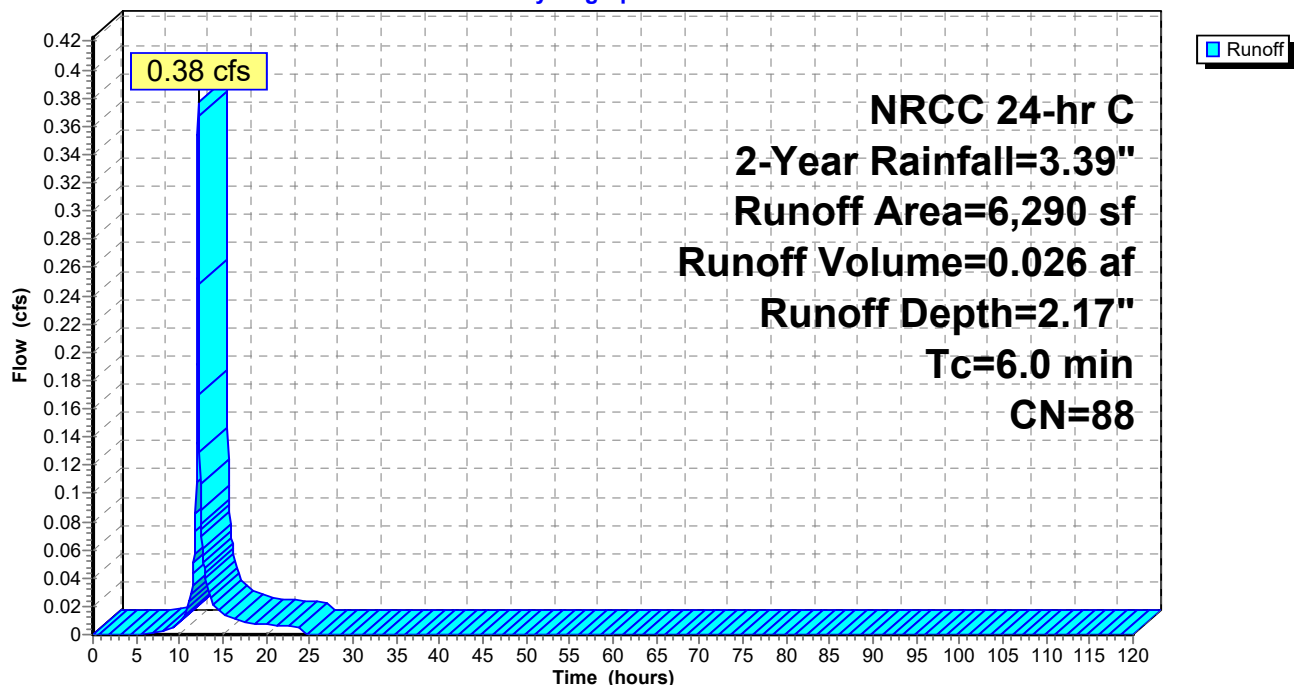
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	70	98	BASIN
*	3,744	98	156 LF OF ROAD
*	780	98	156 LF OF SIDEWALK
	1,696	61	>75% Grass cover, Good, HSG B
	6,290	88	Weighted Average
	1,696		26.96% Pervious Area
	4,594		73.04% Impervious Area

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

Subcatchment P-1C: P-1C

Hydrograph



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Summary for Subcatchment P-1U: P-1U

Runoff = 1.66 cfs @ 12.24 hrs, Volume= 0.199 af, Depth= 0.52"

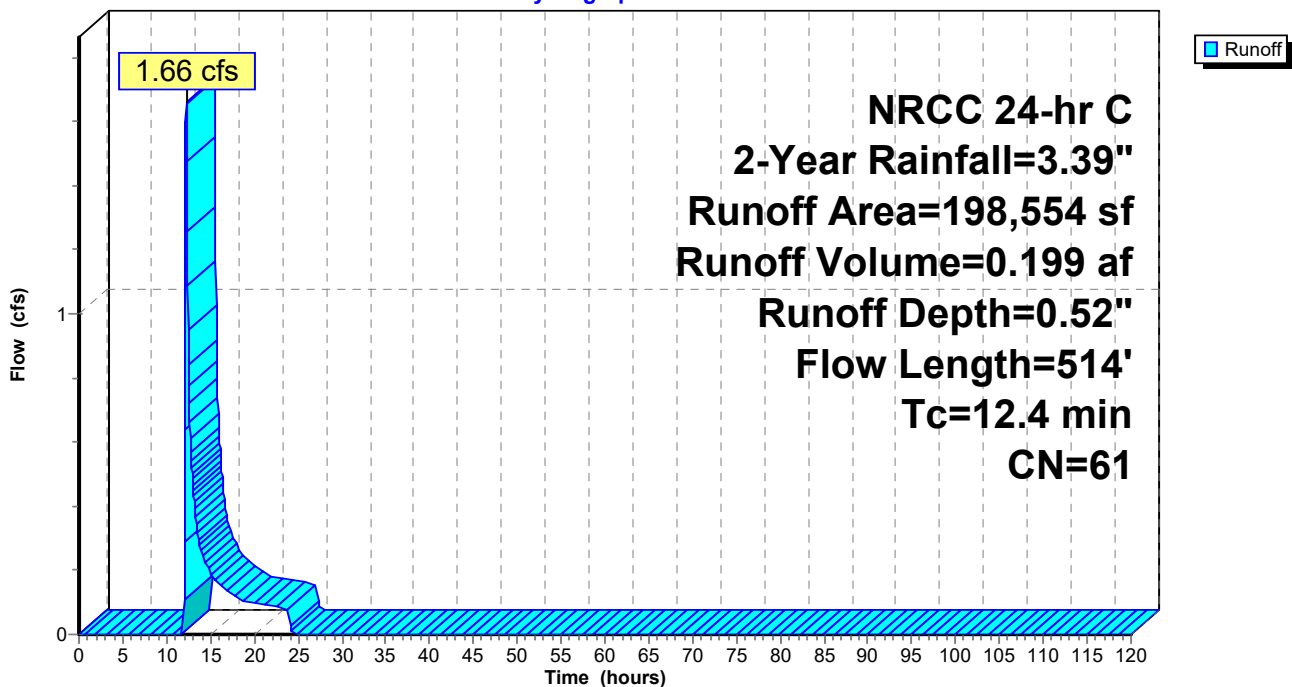
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
107,304	61	>75% Grass cover, Good, HSG B
80,000	55	Woods, Good, HSG B
* 11,250	98	4.5 UNITS
198,554	61	Weighted Average
187,304		94.33% Pervious Area
11,250		5.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
6.9	464	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.4	514	Total			

Subcatchment P-1U: P-1U

Hydrograph



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Summary for Subcatchment P-2A: P-2A

Runoff = 1.17 cfs @ 12.15 hrs, Volume= 0.104 af, Depth= 0.52"

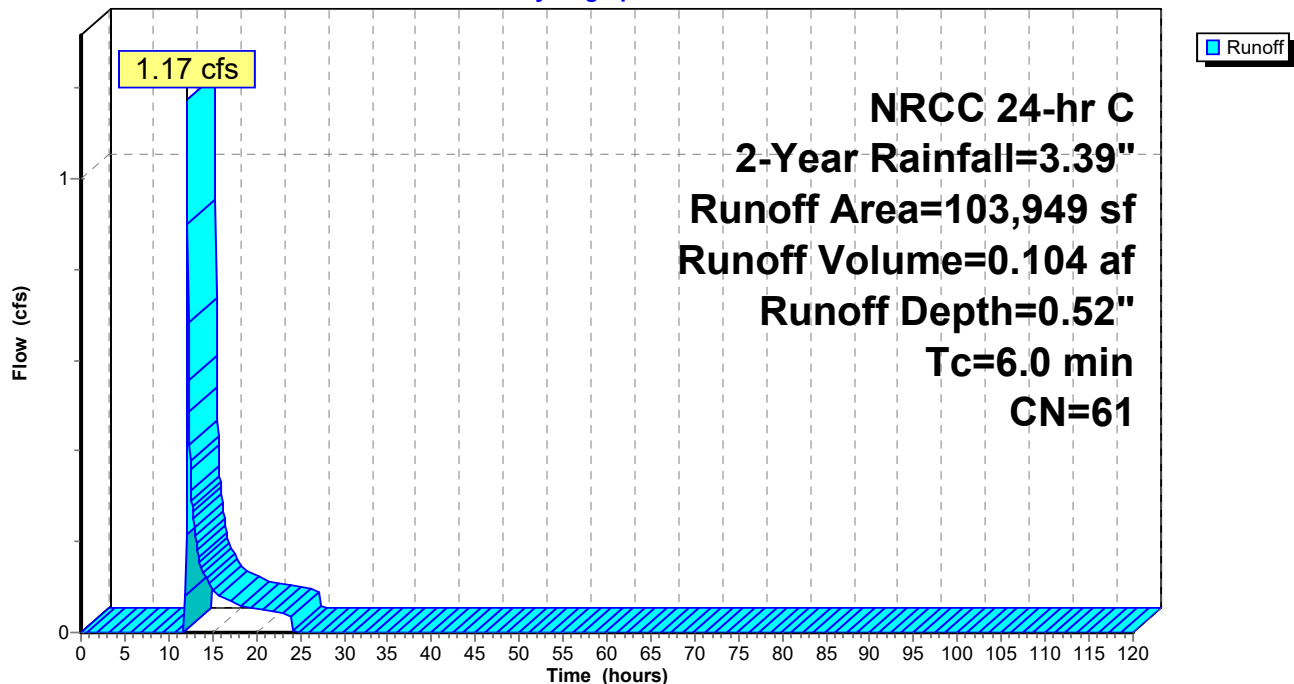
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
103,949	61	1/4 acre lots, 38% imp, HSG A
64,448		62.00% Pervious Area
39,501		38.00% Impervious Area

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

Subcatchment P-2A: P-2A

Hydrograph



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Summary for Subcatchment P-2B: P-2B

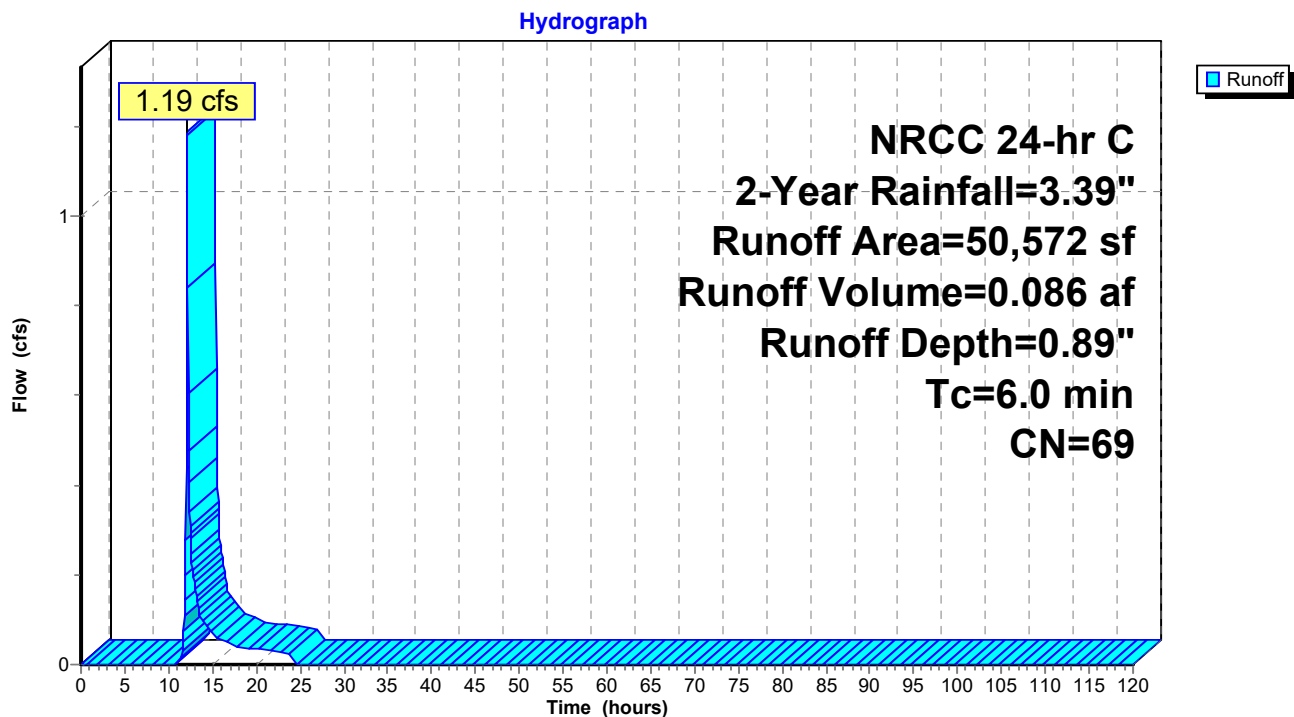
Runoff = 1.19 cfs @ 12.14 hrs, Volume= 0.086 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
34,300	61	1/4 acre lots, 38% imp, HSG A
16,272	87	1/4 acre lots, 38% imp, HSG D
50,572	69	Weighted Average
31,355		62.00% Pervious Area
19,217		38.00% Impervious Area

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

Subcatchment P-2B: P-2B



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Summary for Subcatchment P-2C: P-2C

Runoff = 3.43 cfs @ 12.13 hrs, Volume= 0.234 af, Depth= 1.92"

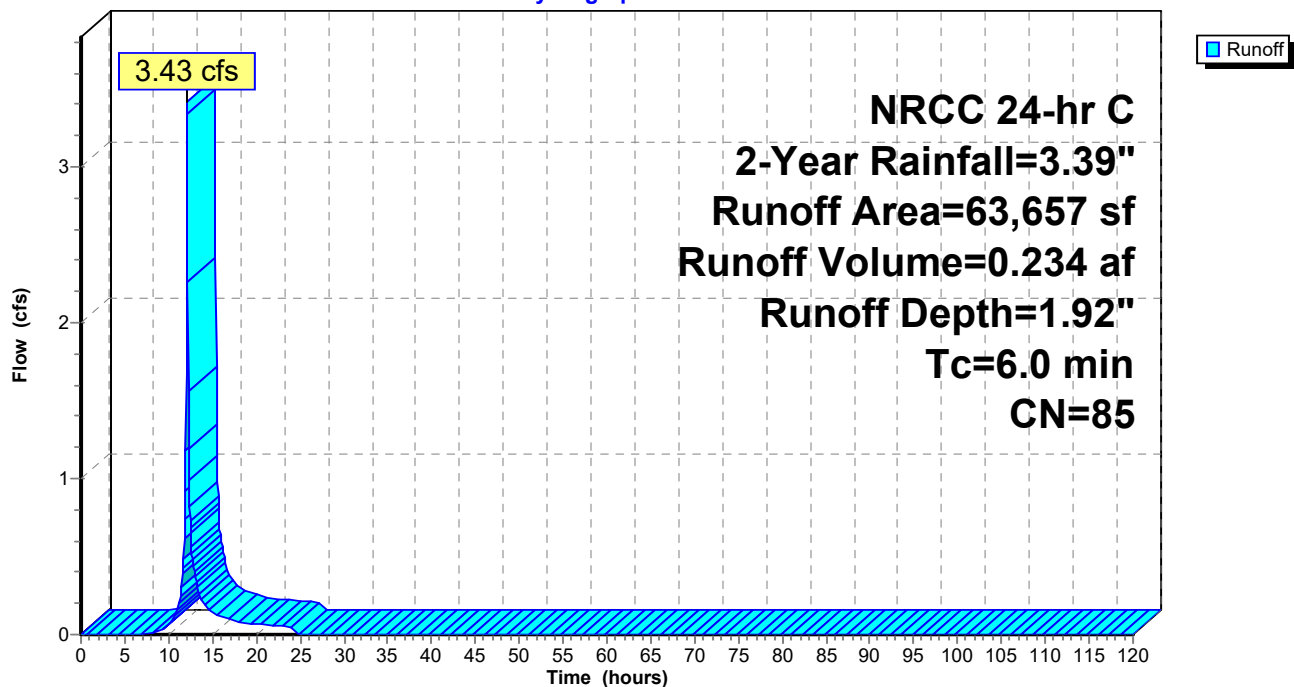
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
54,284	87	1/4 acre lots, 38% imp, HSG D
9,373	75	1/4 acre lots, 38% imp, HSG B
63,657	85	Weighted Average
39,467		62.00% Pervious Area
24,190		38.00% Impervious Area

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

Subcatchment P-2C: P-2C

Hydrograph



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Summary for Subcatchment P-2D: P-2D

Runoff = 7.16 cfs @ 12.14 hrs, Volume= 0.543 af, Depth= 0.74"

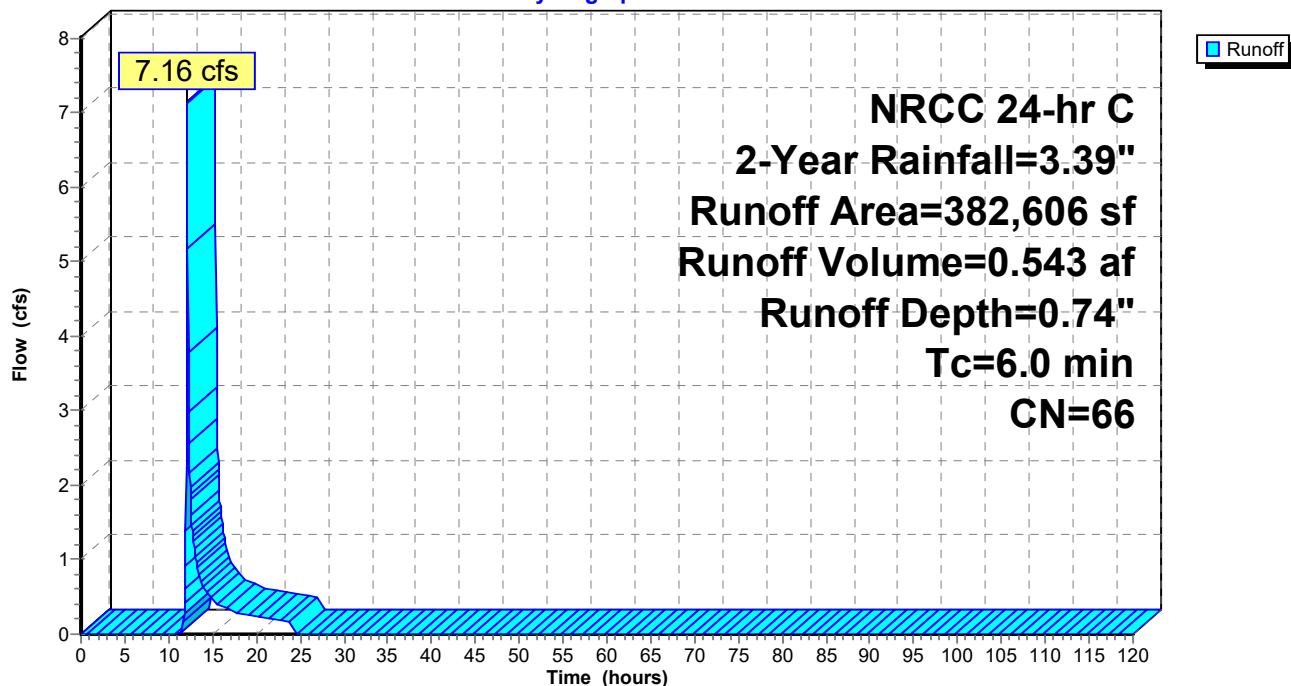
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
163,640	61	1/4 acre lots, 38% imp, HSG A
82,633	87	1/4 acre lots, 38% imp, HSG D
* 15,400	98	basin
30,500	30	Woods, Good, HSG A
9,200	77	Woods, Good, HSG D
* 17,400	98	exist impervious
13,000	74	>75% Grass cover, Good, HSG C
10,000	80	>75% Grass cover, Good, HSG D
40,833	39	>75% Grass cover, Good, HSG A
382,606	66	Weighted Average
256,222		66.97% Pervious Area
126,384		33.03% Impervious Area

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

Subcatchment P-2D: P-2D

Hydrograph



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Summary for Subcatchment P-2E: P-2E

Runoff = 4.46 cfs @ 12.13 hrs, Volume= 0.303 af, Depth= 1.41"

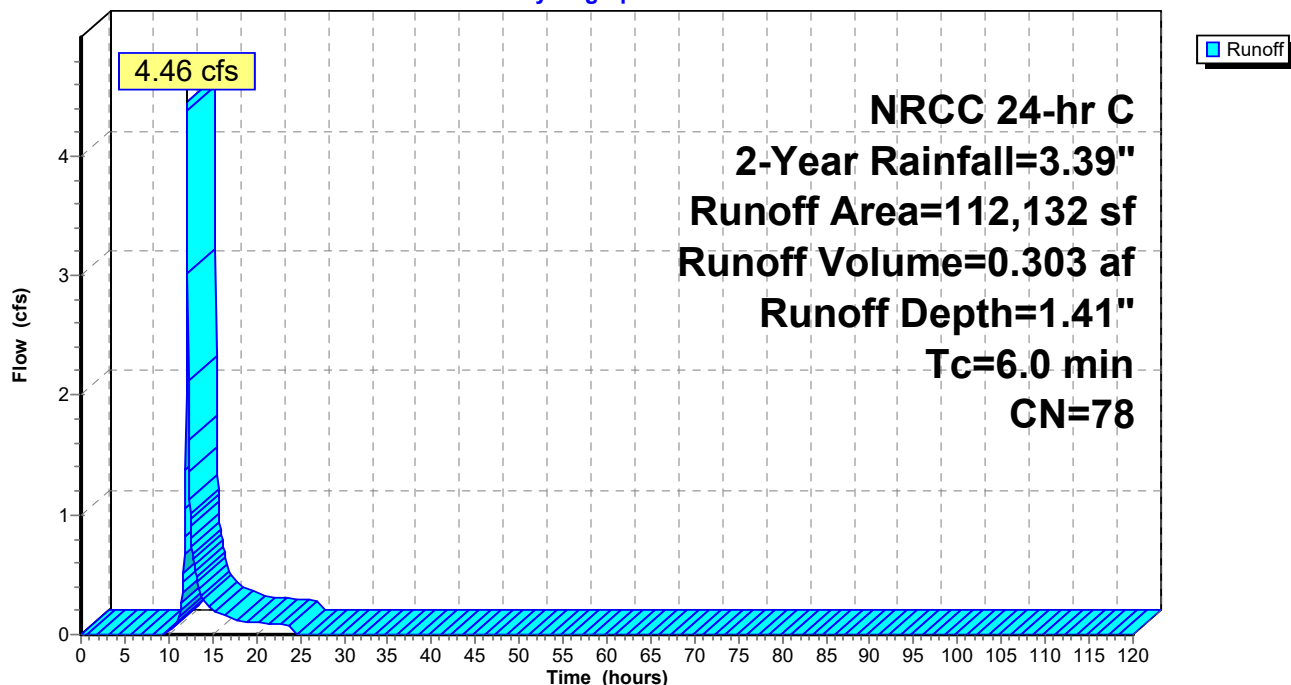
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	12,500	98	basin
	99,632	75	1/4 acre lots, 38% imp, HSG B
	112,132	78	Weighted Average
	61,772		55.09% Pervious Area
	50,360		44.91% Impervious Area

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

Subcatchment P-2E: P-2E

Hydrograph



Proposed Hydrology

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NRCC 24-hr C 2-Year Rainfall=3.39"

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Summary for Subcatchment P-2F: P-2F

Runoff = 5.09 cfs @ 12.14 hrs, Volume= 0.349 af, Depth= 1.29"

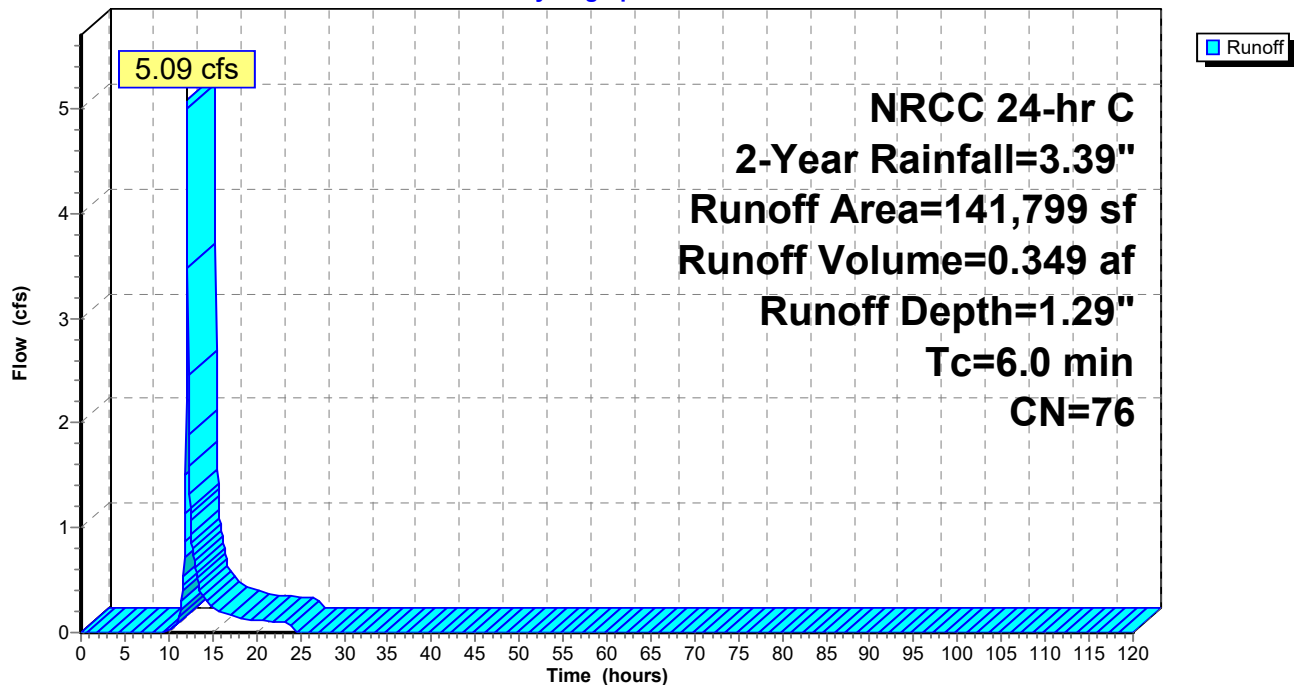
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
134,299	75	1/4 acre lots, 38% imp, HSG B
* 7,500	98	basin
141,799	76	Weighted Average
83,265		58.72% Pervious Area
58,534		41.28% Impervious Area

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

Subcatchment P-2F: P-2F

Hydrograph



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Summary for Subcatchment P-2U: P-2U

Runoff = 10.97 cfs @ 12.57 hrs, Volume= 1.848 af, Depth= 0.79"

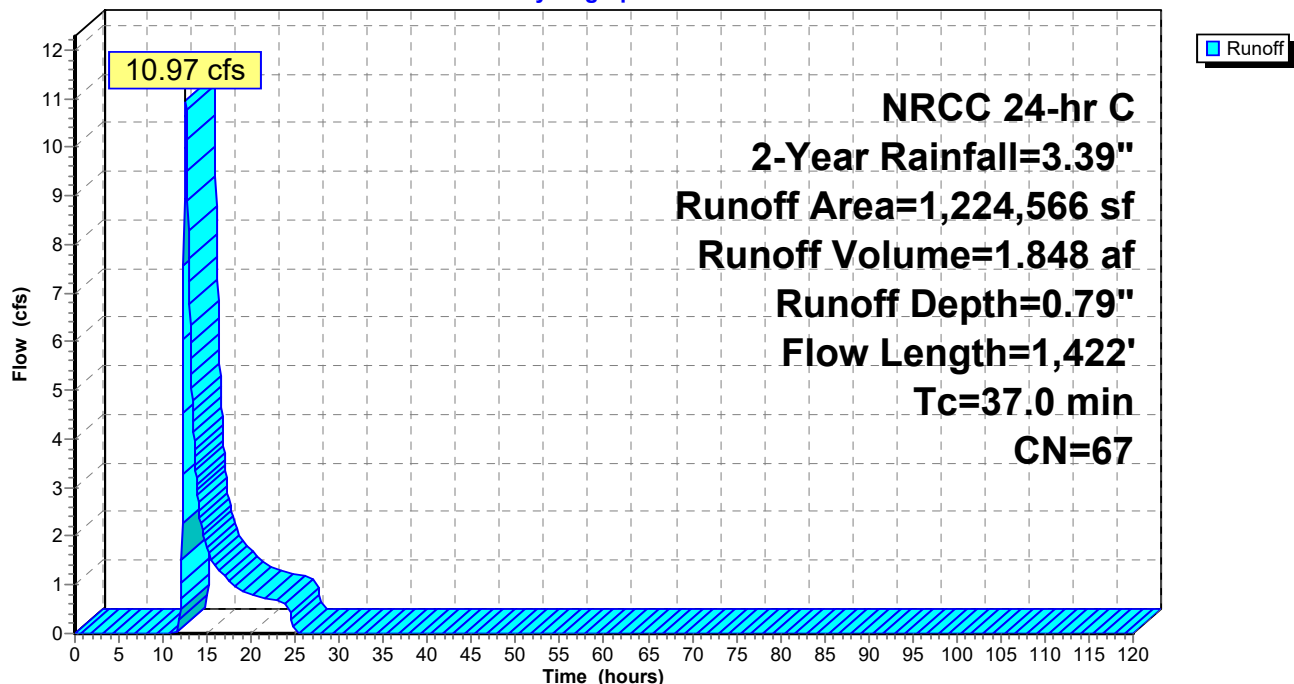
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
126,300	32	Woods/grass comb., Good, HSG A
394,200	58	Woods/grass comb., Good, HSG B
232,300	72	Woods/grass comb., Good, HSG C
418,475	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
1,224,566	67	Weighted Average
1,171,275		95.65% Pervious Area
53,291		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Subcatchment P-2U: P-2U

Hydrograph



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Summary for Subcatchment P-3A: P-3A

Runoff = 4.80 cfs @ 12.13 hrs, Volume= 0.326 af, Depth= 1.77"

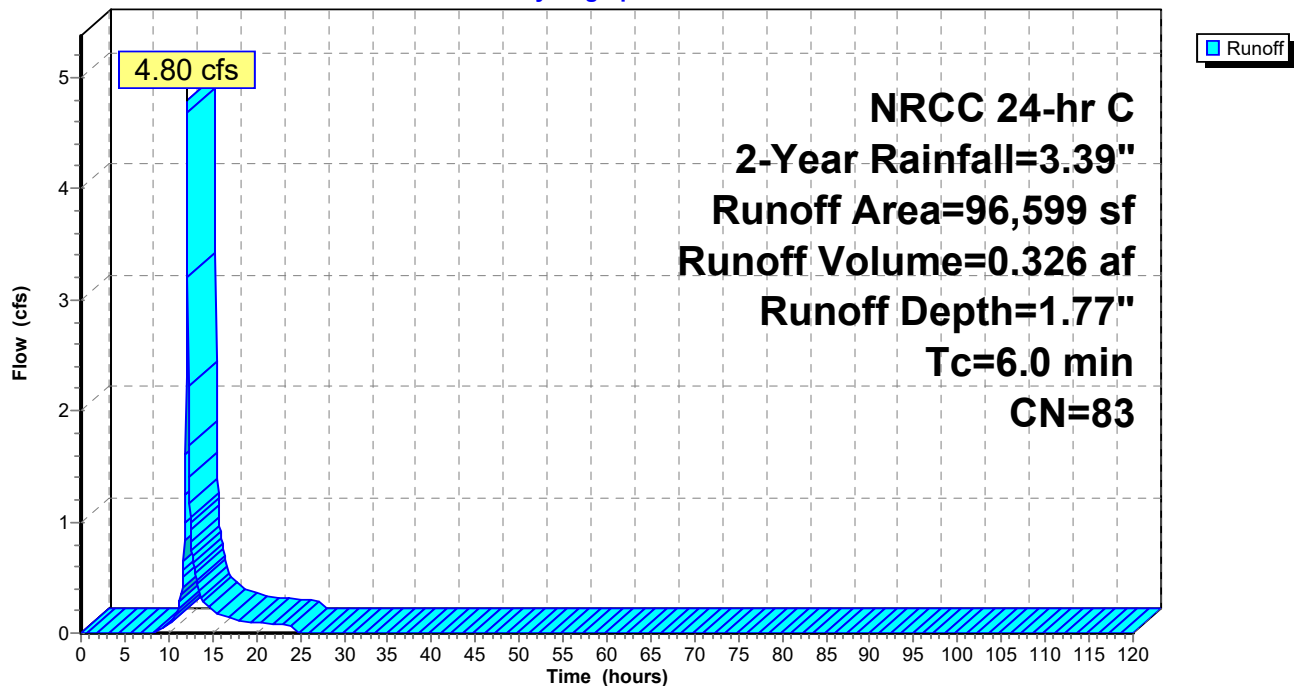
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	4,600	98	BASIN
	36,100	75	1/4 acre lots, 38% imp, HSG B
	55,899	87	1/4 acre lots, 38% imp, HSG D
	96,599	83	Weighted Average
	57,039		59.05% Pervious Area
	39,560		40.95% Impervious Area

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

Subcatchment P-3A: P-3A

Hydrograph



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Summary for Subcatchment P-3B: P-3B

Runoff = 8.58 cfs @ 12.14 hrs, Volume= 0.593 af, Depth= 1.16"

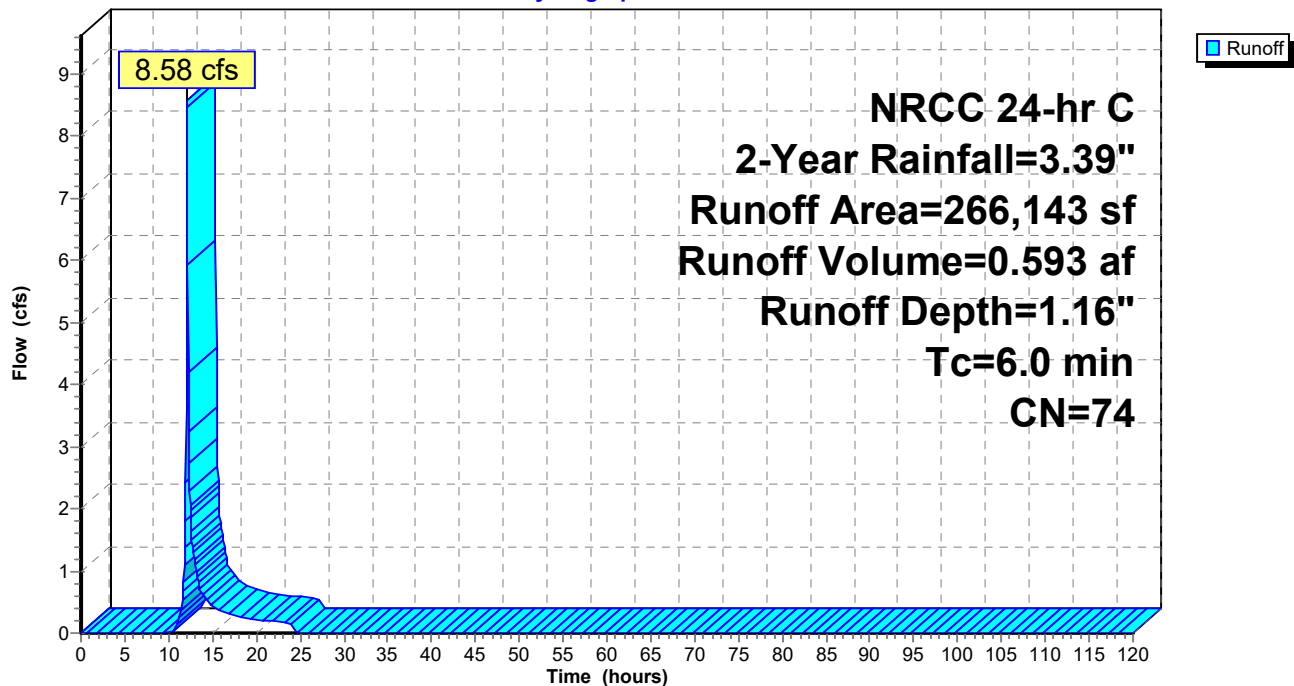
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	9,500	98	BASIN
	9,200	30	Woods, Good, HSG A
	247,443	75	1/4 acre lots, 38% imp, HSG B
	266,143	74	Weighted Average
	162,615		61.10% Pervious Area
	103,528		38.90% Impervious Area

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

Subcatchment P-3B: P-3B

Hydrograph



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Summary for Subcatchment P-3U: P-3U

Runoff = 9.79 cfs @ 12.31 hrs, Volume= 1.149 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	108,000	30	Woods, Good, HSG A
	98,000	39	>75% Grass cover, Good, HSG A
	136,977	61	>75% Grass cover, Good, HSG B
	76,000	55	Woods, Good, HSG B
*	15,800	98	EXIST Roof and Pavement
	58,000	77	Woods, Good, HSG D
	58,000	80	>75% Grass cover, Good, HSG D
*	32,500	98	13 UNITS
*	6,400	98	400 LF OF ROAD
*	1,800	98	2 UNITS DRIVEWAY
	760,977	67	Weighted Average
	534,977		70.30% Pervious Area
	226,000		29.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

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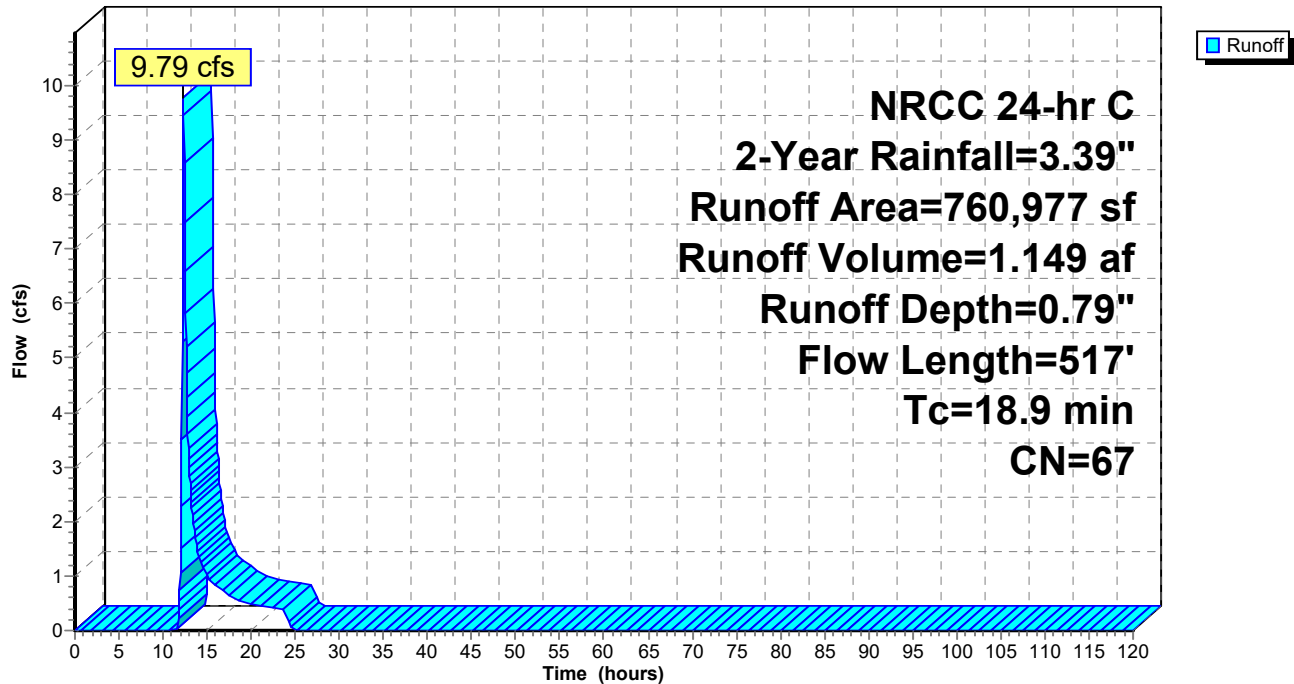
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment P-3U: P-3U

Hydrograph



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Summary for Subcatchment P-4: P-4

Runoff = 0.01 cfs @ 12.87 hrs, Volume= 0.005 af, Depth= 0.15"

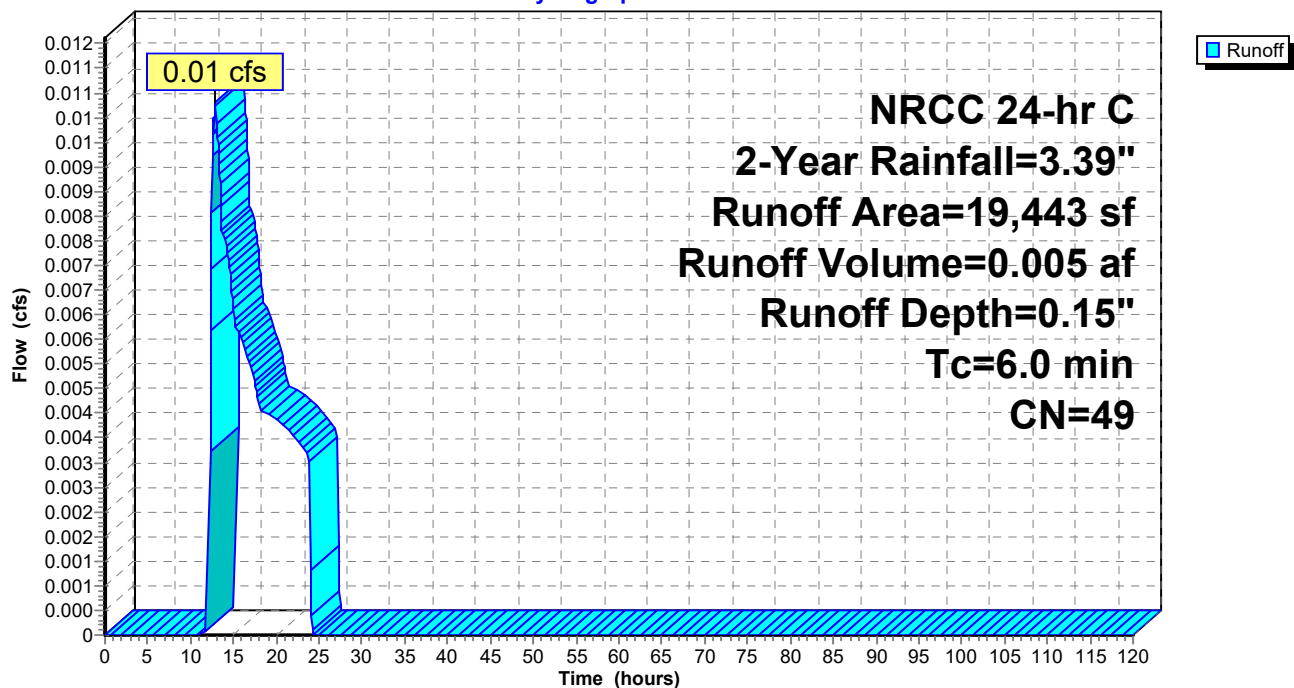
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
5,200	30	Woods, Good, HSG A
10,262	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
19,443	49	Weighted Average
15,462		79.52% Pervious Area
3,981		20.48% Impervious Area

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

Subcatchment P-4: P-4

Hydrograph



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NRCC 24-hr C 2-Year Rainfall=3.39"

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Summary for Subcatchment P-5U: P-5U

Runoff = 2.22 cfs @ 12.36 hrs, Volume= 0.294 af, Depth= 0.70"

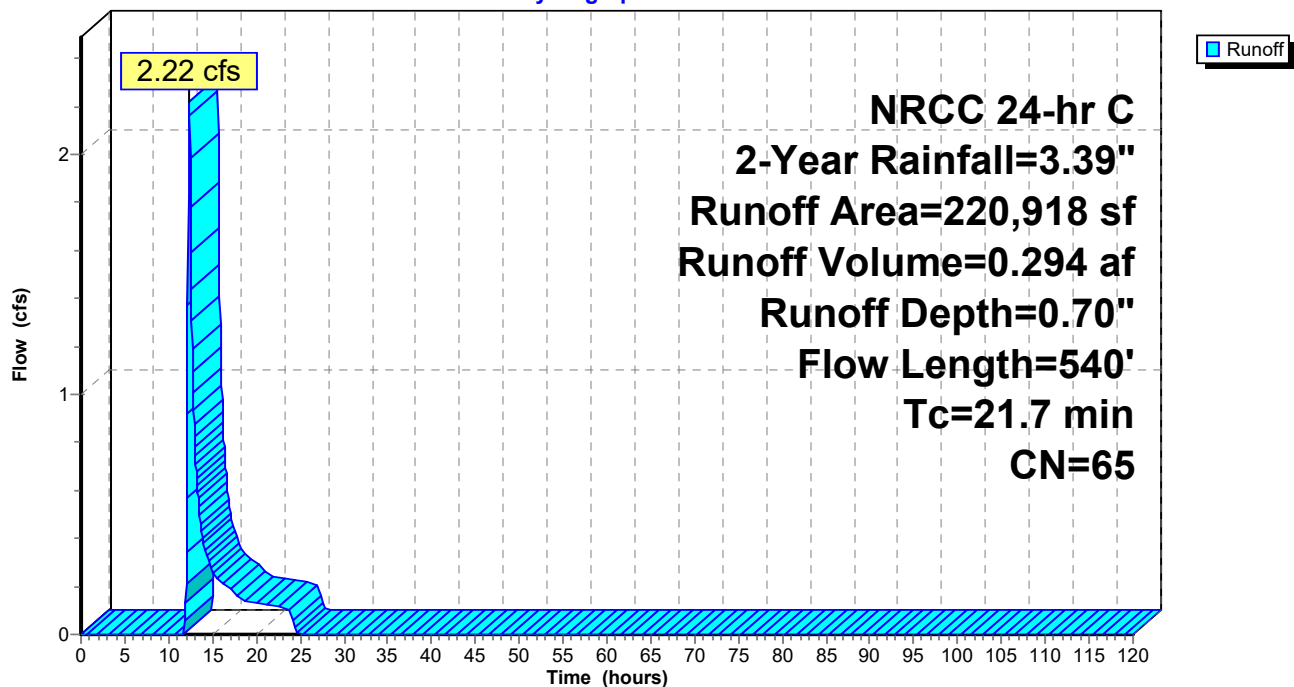
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
83,000	39	>75% Grass cover, Good, HSG A
17,000	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
96,818	80	>75% Grass cover, Good, HSG D
220,918	65	Weighted Average
220,918		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
11.5	490	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.7	540	Total			

Subcatchment P-5U: P-5U

Hydrograph



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Summary for Subcatchment P-6A: P-6A

Runoff = 5.58 cfs @ 12.13 hrs, Volume= 0.381 af, Depth= 1.35"

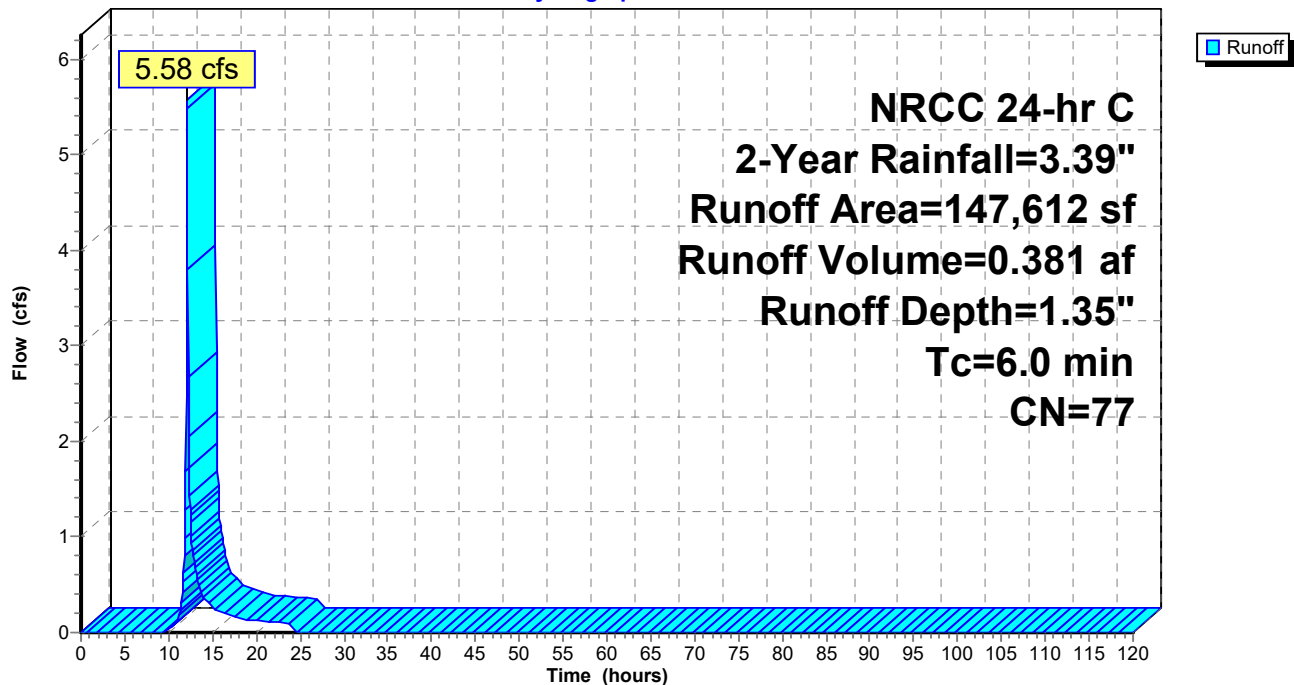
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
134,612	75	1/4 acre lots, 38% imp, HSG B
* 13,000	98	basin
147,612	77	Weighted Average
83,459		56.54% Pervious Area
64,153		43.46% Impervious Area

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

Subcatchment P-6A: P-6A

Hydrograph



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Summary for Subcatchment P-6U: P-6U

Runoff = 5.85 cfs @ 12.24 hrs, Volume= 0.582 af, Depth= 0.84"

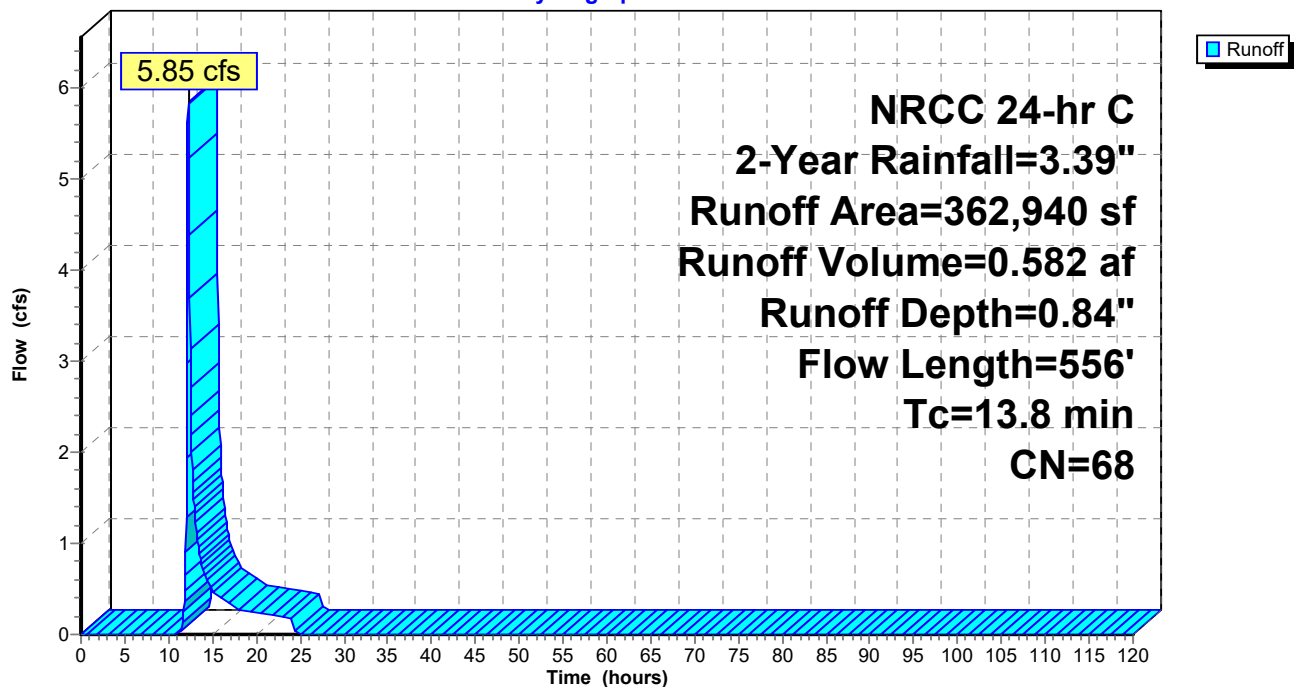
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
164,917	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
362,940	68	Weighted Average
362,940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
5.6	456	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.8	556	Total			

Subcatchment P-6U: P-6U

Hydrograph



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Summary for Subcatchment P-7A: P-7A

Runoff = 4.94 cfs @ 12.14 hrs, Volume= 0.352 af, Depth= 0.94"

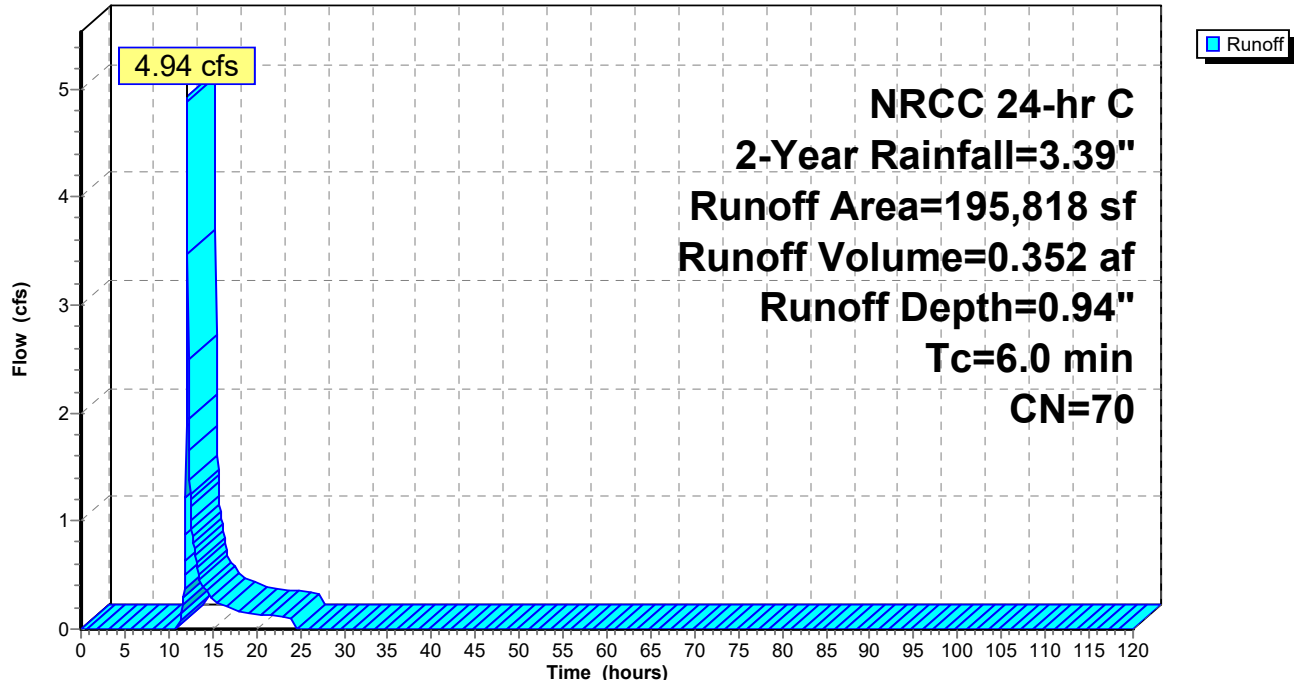
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	43,000	98	pavement parking
*	5,800	98	BUILD roof
*	10,200	98	basin
	94,318	39	>75% Grass cover, Good, HSG A
*	42,500	98	17 HOUSE UNITS
	195,818	70	Weighted Average
	94,318		48.17% Pervious Area
	101,500		51.83% Impervious Area

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

Subcatchment P-7A: P-7A

Hydrograph



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Summary for Subcatchment P-7U: P-7U

Runoff = 2.00 cfs @ 12.47 hrs, Volume= 0.436 af, Depth= 0.38"

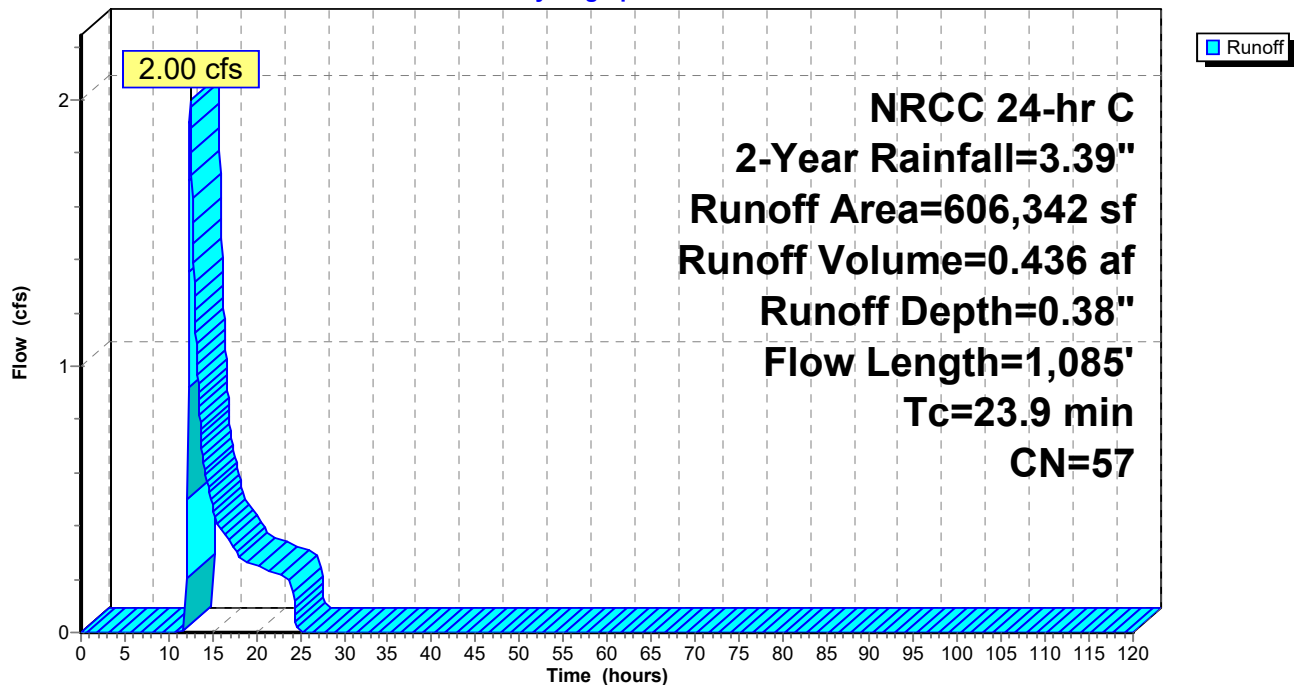
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
403,863	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
606,342	57	Weighted Average
573,604		94.60% Pervious Area
32,738		5.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment P-7U: P-7U

Hydrograph



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Summary for Subcatchment P-8U: P-8U

Runoff = 0.82 cfs @ 12.18 hrs, Volume= 0.093 af, Depth= 0.45"

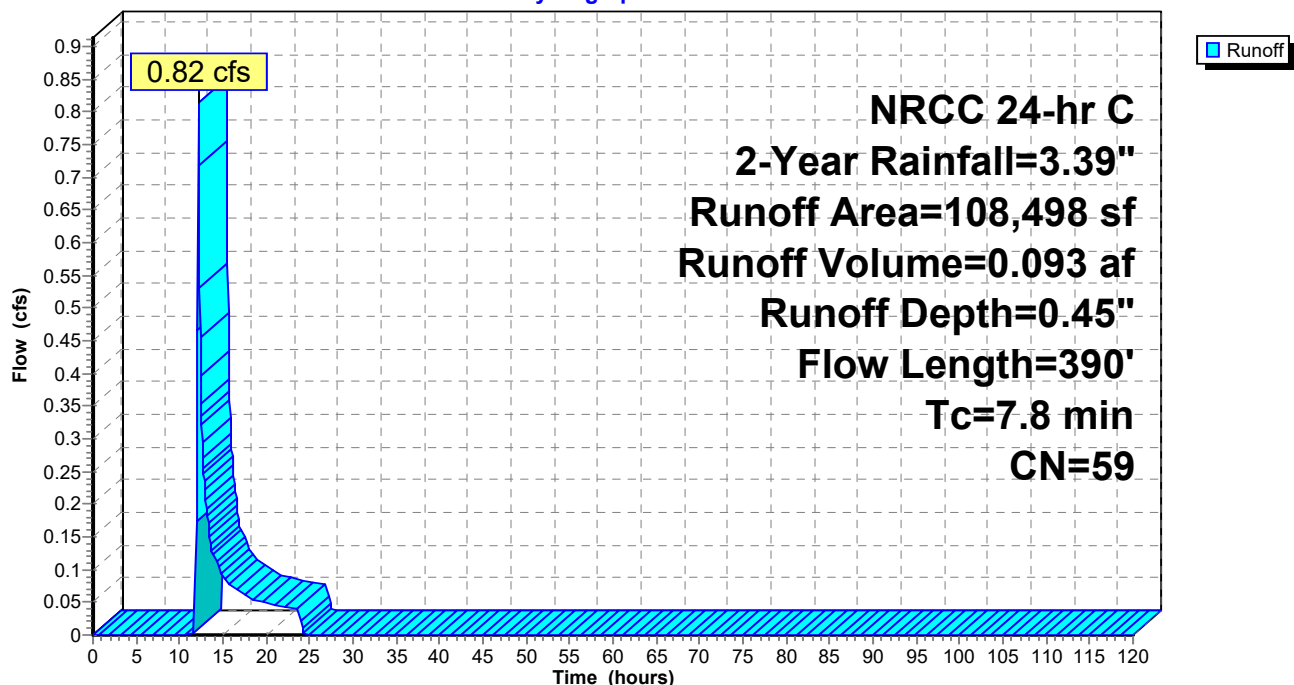
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
* 7,000	98	roof
5,726	98	Water Surface, 0% imp, HSG A
12,978	39	>75% Grass cover, Good, HSG A
43,794	61	>75% Grass cover, Good, HSG B
6,600	30	Woods, Good, HSG A
32,400	55	Woods, Good, HSG B
108,498	59	Weighted Average
101,498		93.55% Pervious Area
7,000		6.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment P-8U: P-8U

Hydrograph



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Summary for Subcatchment P-9A: P-9A

Runoff = 0.09 cfs @ 12.33 hrs, Volume= 0.028 af, Depth= 0.22"

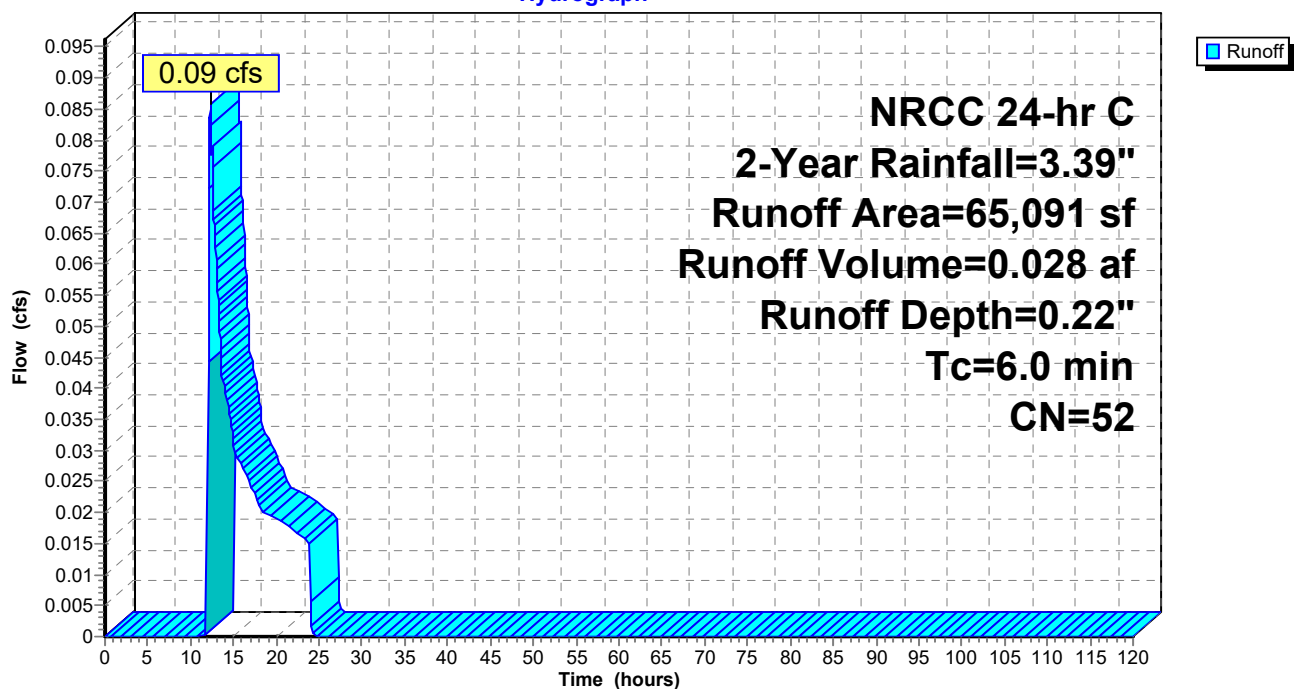
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
	13,200	30	Woods, Good, HSG A
*	15,000	98	ROADS
*	1,700	98	BASIN
	35,191	39	>75% Grass cover, Good, HSG A
	65,091	52	Weighted Average
	48,391		74.34% Pervious Area
	16,700		25.66% Impervious Area

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

Subcatchment P-9A: P-9A

Hydrograph



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Summary for Subcatchment P-9B: P-9B

Runoff = 1.26 cfs @ 12.15 hrs, Volume= 0.103 af, Depth= 0.61"

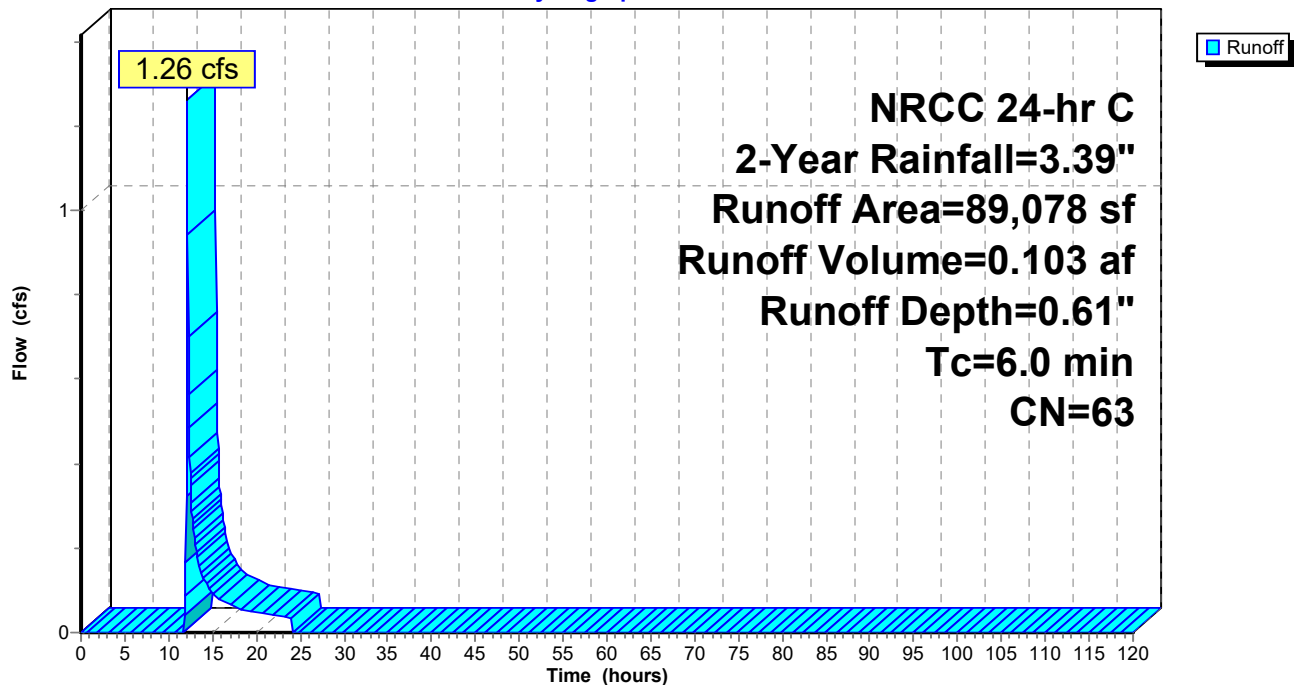
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

	Area (sf)	CN	Description
*	4,300	98	BASIN
	84,778	61	1/4 acre lots, 38% imp, HSG A
	89,078	63	Weighted Average
	52,562		59.01% Pervious Area
	36,516		40.99% Impervious Area

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

Subcatchment P-9B: P-9B

Hydrograph



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Summary for Subcatchment P-9C: P-9C

Runoff = 6.69 cfs @ 12.13 hrs, Volume= 0.456 af, Depth= 1.41"

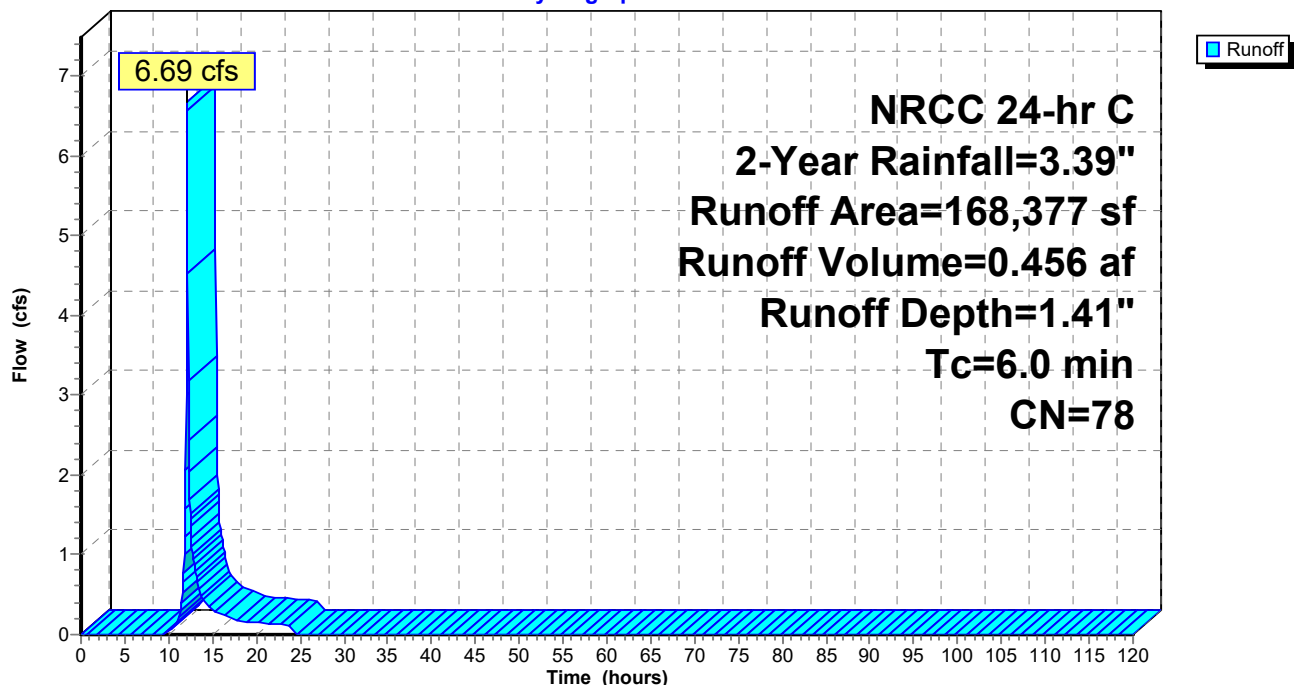
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
20,800	30	Woods, Good, HSG A
104,000	98	Paved parking, HSG A
34,077	39	>75% Grass cover, Good, HSG A
* 9,500	98	ROOF
168,377	78	Weighted Average
54,877		32.59% Pervious Area
113,500		67.41% Impervious Area

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

Subcatchment P-9C: P-9C

Hydrograph



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Summary for Subcatchment P-9U: P-9U

Runoff = 0.01 cfs @ 21.14 hrs, Volume= 0.007 af, Depth= 0.04"

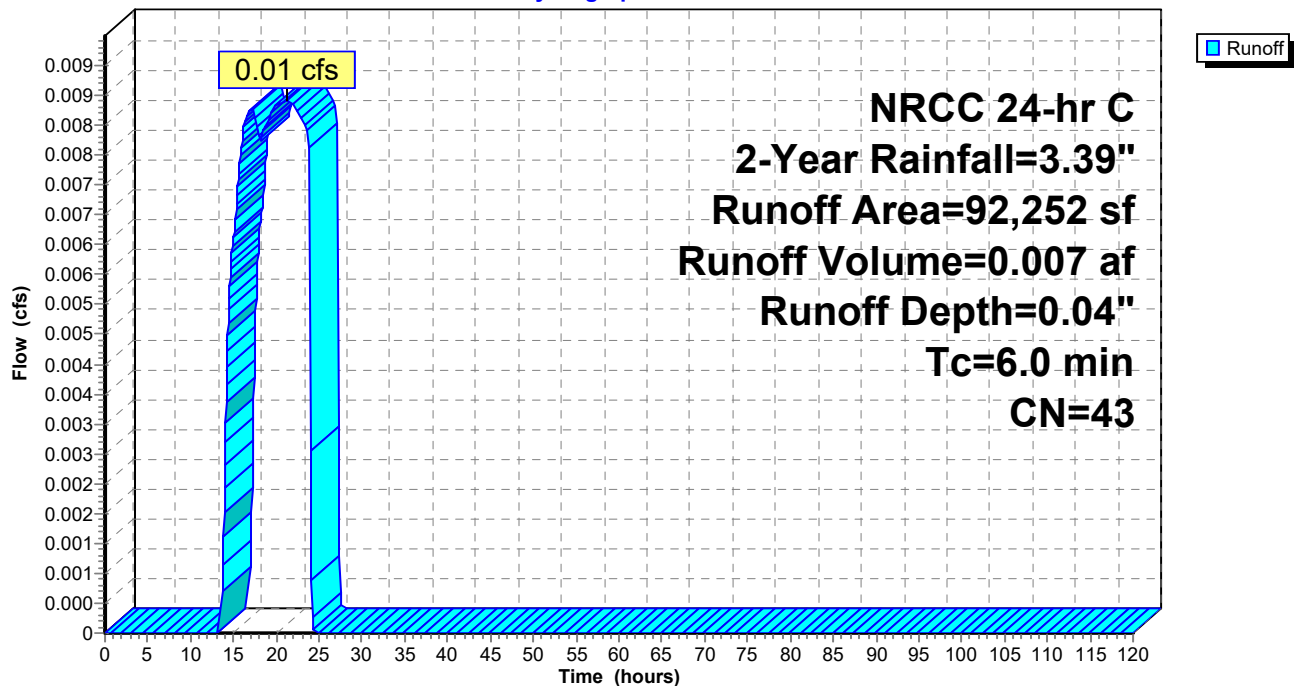
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

Area (sf)	CN	Description
36,000	30	Woods, Good, HSG A
12,000	98	Paved parking, HSG A
44,252	39	>75% Grass cover, Good, HSG A
92,252	43	Weighted Average
80,252		86.99% Pervious Area
12,000		13.01% Impervious Area

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

Subcatchment P-9U: P-9U

Hydrograph



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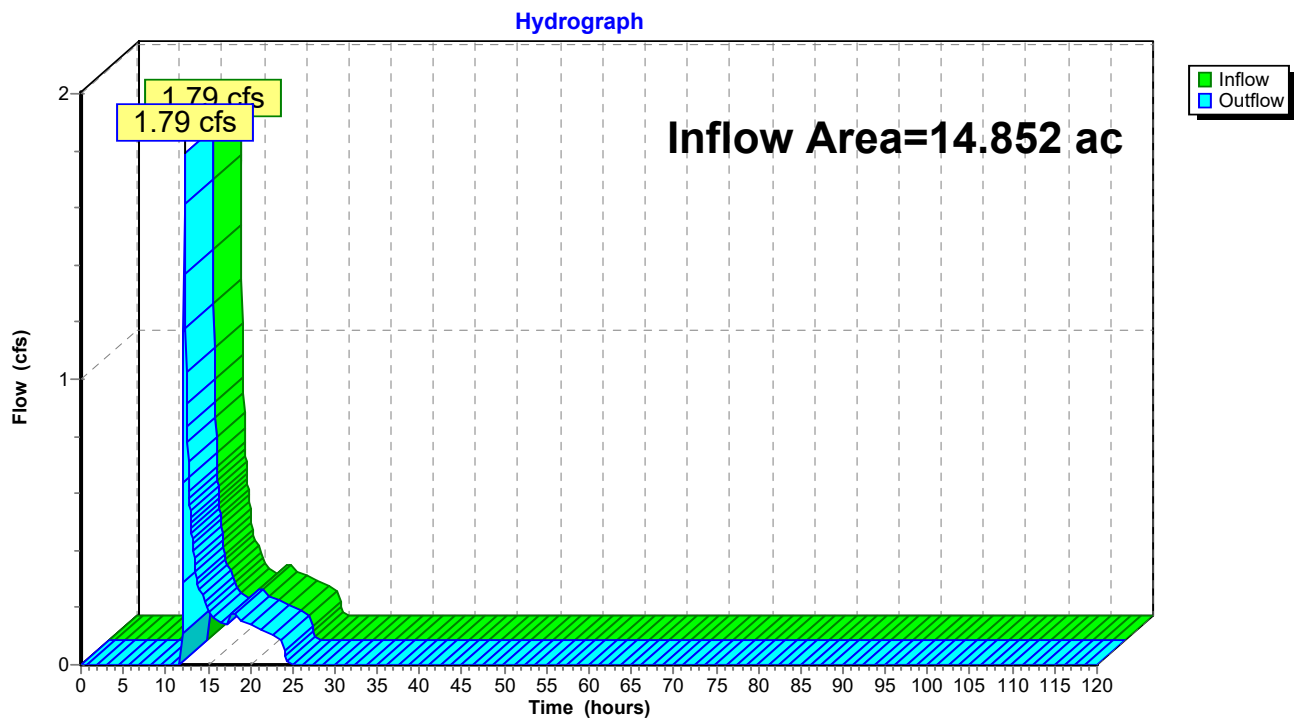
Summary for Reach DP-1: Wetland Series R

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.852 ac, 17.22% Impervious, Inflow Depth = 0.18" for 2-Year event
Inflow = 1.79 cfs @ 12.25 hrs, Volume= 0.225 af
Outflow = 1.79 cfs @ 12.25 hrs, Volume= 0.225 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R



Proposed Hydrology

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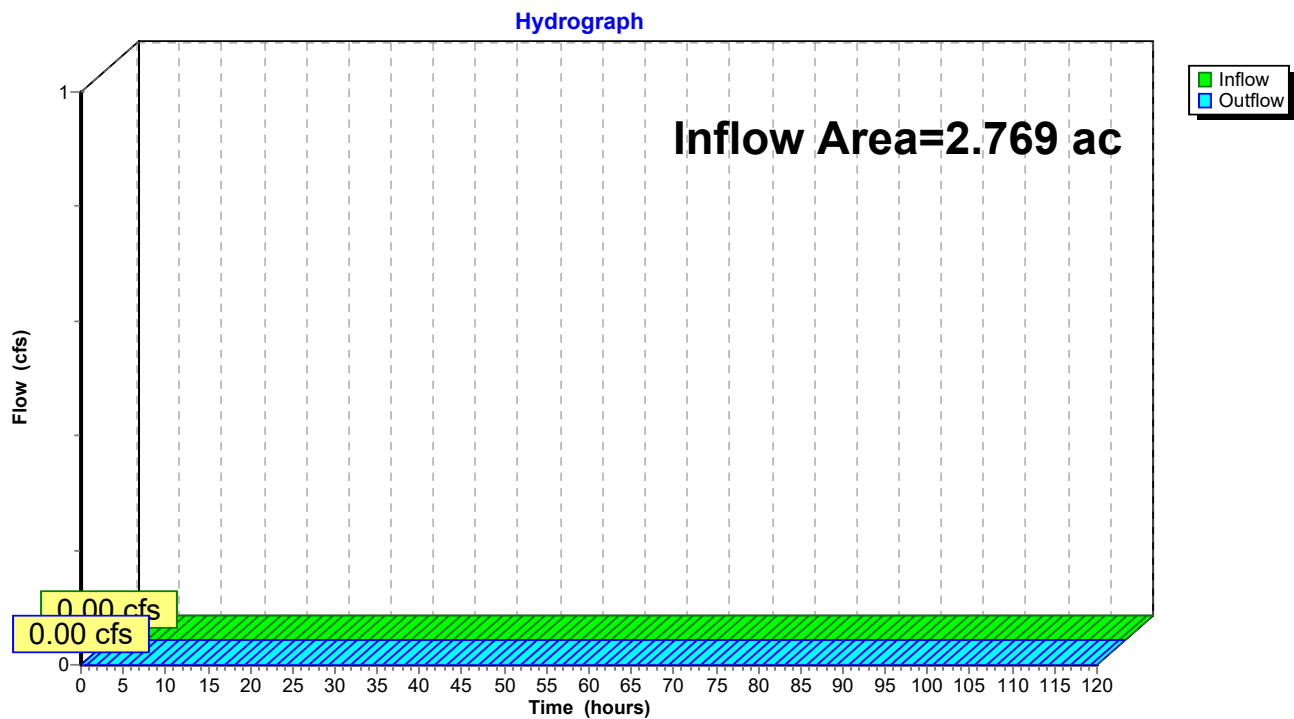
Summary for Reach DP-10: West Elm Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.769 ac, 6.21% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street



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Summary for Reach DP-11: Wetland Series A

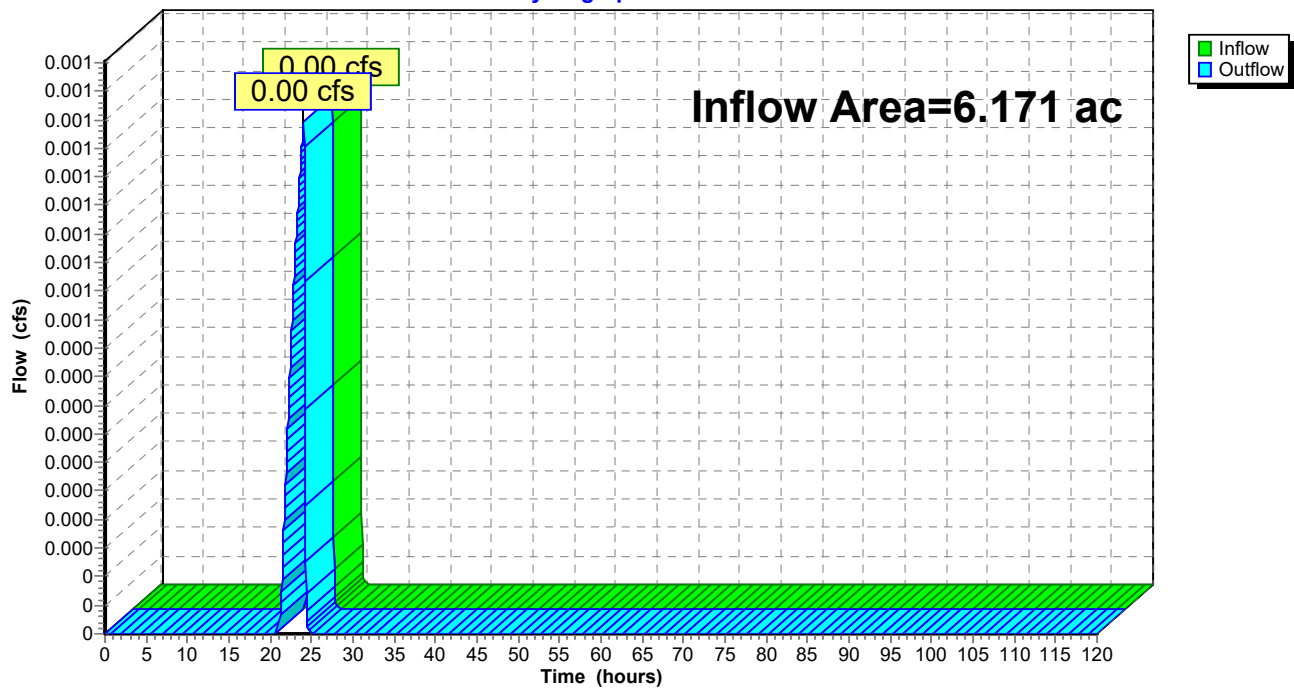
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.171 ac, 9.19% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A

Hydrograph



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Summary for Reach DP-12: Wetland Series A

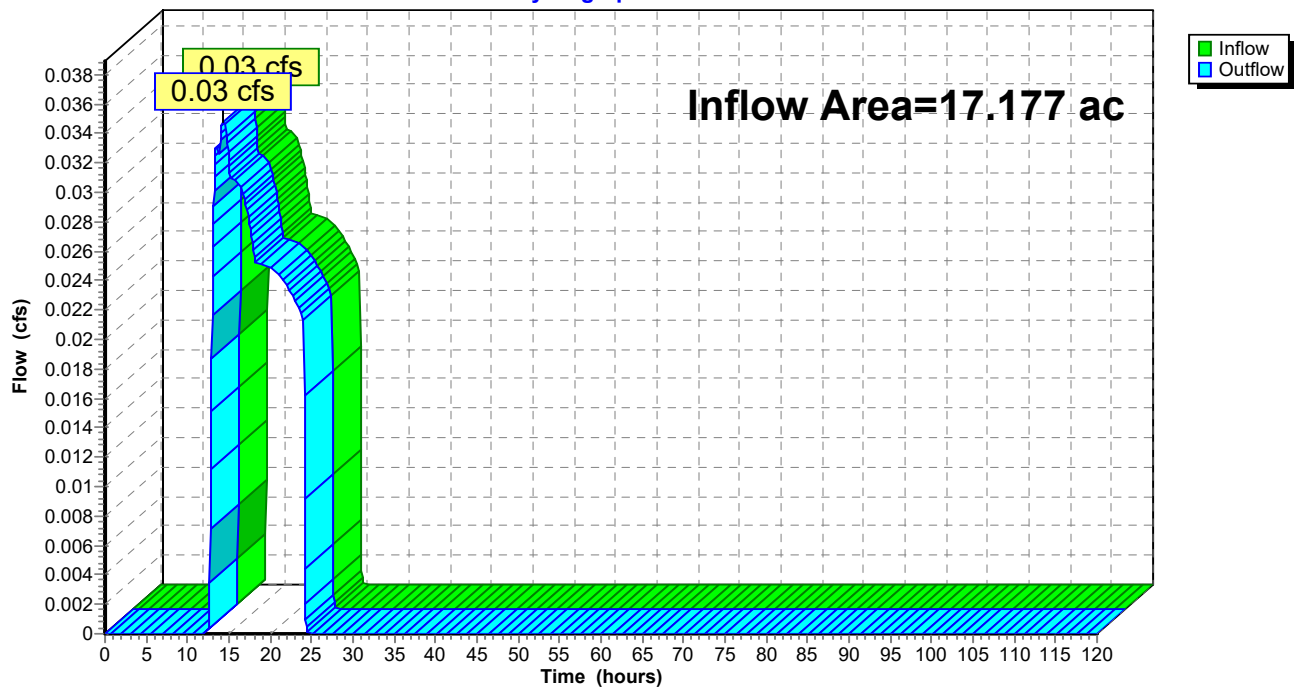
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17.177 ac, 20.55% Impervious, Inflow Depth = 0.02" for 2-Year event
Inflow = 0.03 cfs @ 14.36 hrs, Volume= 0.025 af
Outflow = 0.03 cfs @ 14.36 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A

Hydrograph



Proposed Hydrology

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Summary for Reach DP-13: Wetland Series B

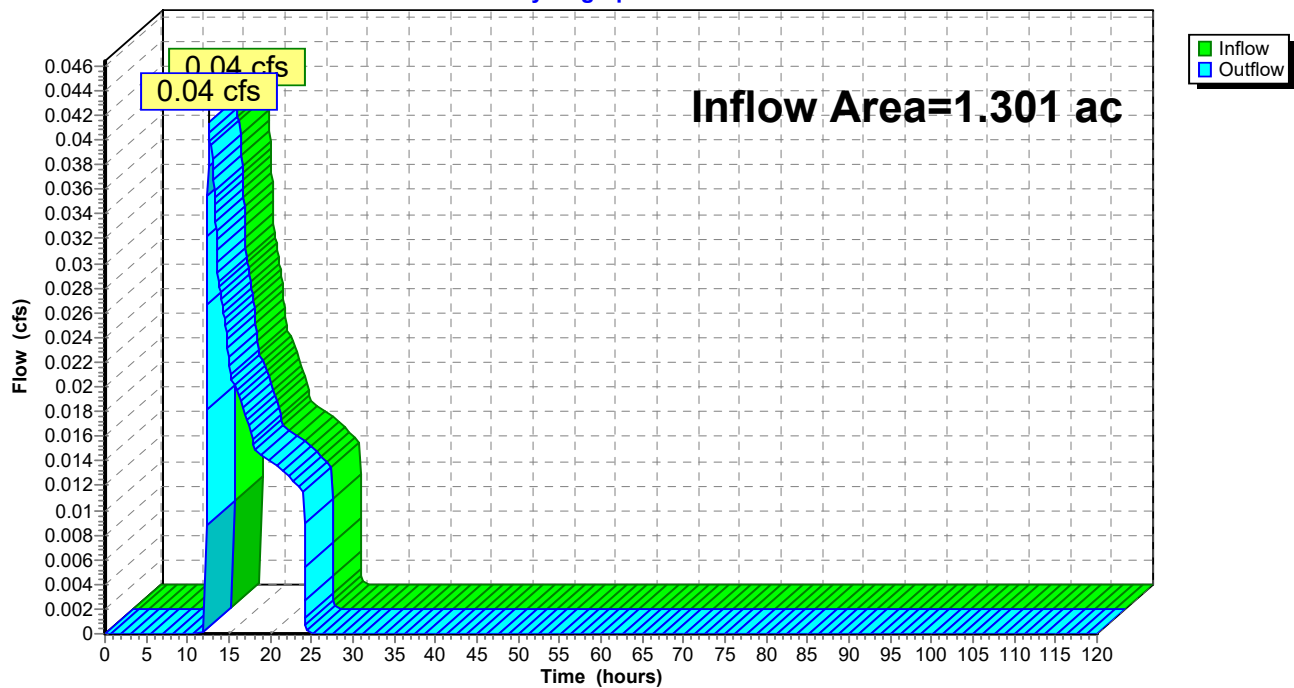
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 0.17" for 2-Year event
Inflow = 0.04 cfs @ 12.60 hrs, Volume= 0.018 af
Outflow = 0.04 cfs @ 12.60 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B

Hydrograph



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Summary for Reach DP-14: Wetland Series C,D,E,,K,J

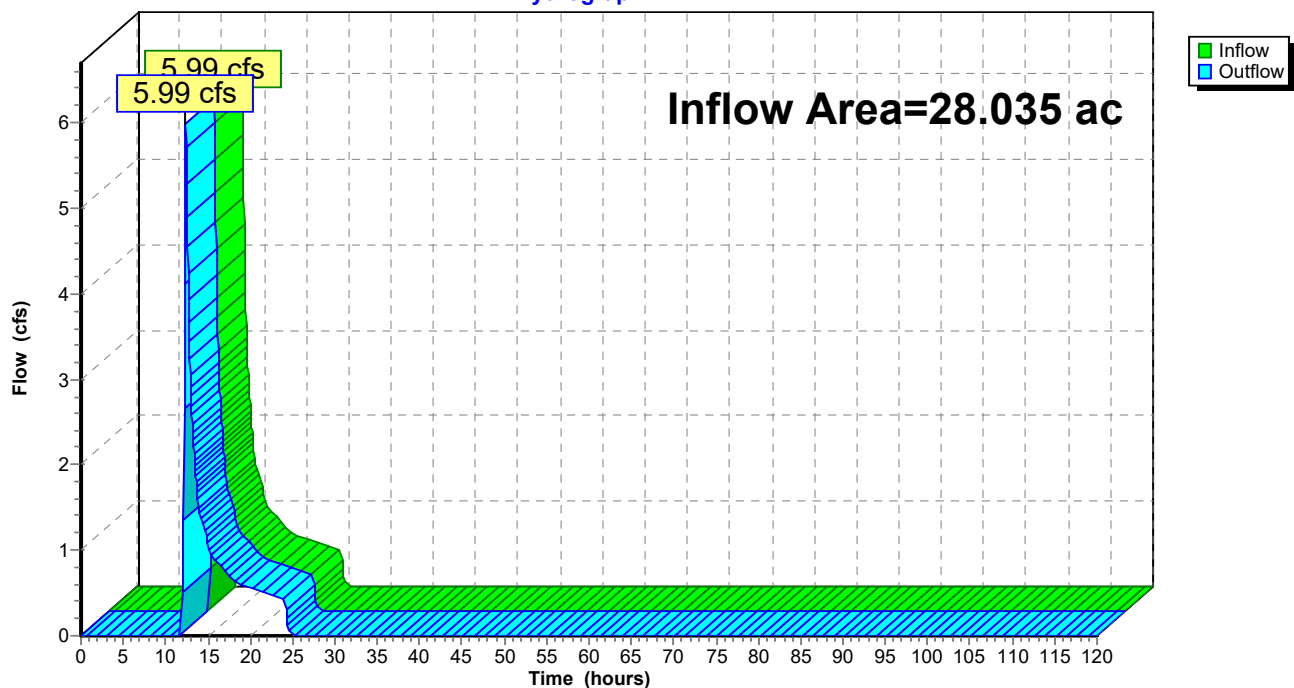
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.035 ac, 0.00% Impervious, Inflow Depth = 0.45" for 2-Year event
Inflow = 5.99 cfs @ 12.39 hrs, Volume= 1.044 af
Outflow = 5.99 cfs @ 12.39 hrs, Volume= 1.044 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J

Hydrograph



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Summary for Reach DP-15: Wetland Series H

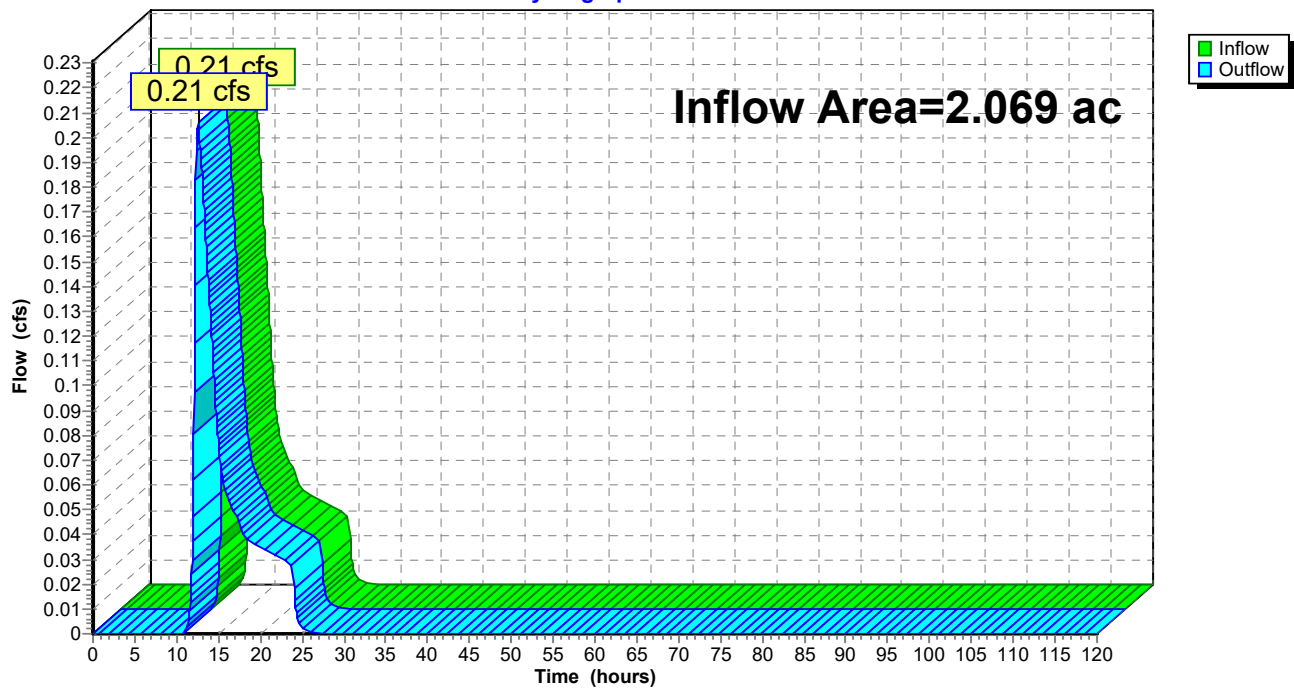
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.069 ac, 6.77% Impervious, Inflow Depth = 0.39" for 2-Year event
Inflow = 0.21 cfs @ 12.57 hrs, Volume= 0.068 af
Outflow = 0.21 cfs @ 12.57 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H

Hydrograph



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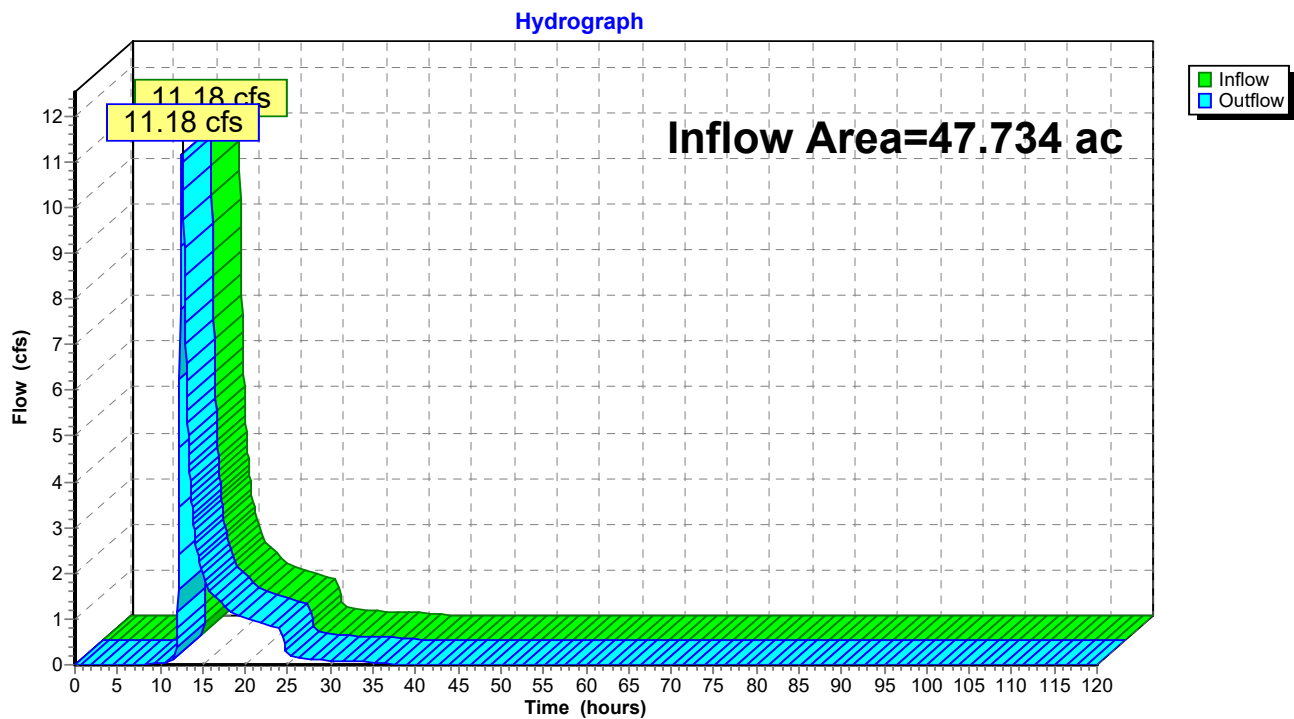
Summary for Reach DP-2: Wetland Series I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.734 ac, 17.87% Impervious, Inflow Depth = 0.55" for 2-Year event
Inflow = 11.18 cfs @ 12.57 hrs, Volume= 2.187 af
Outflow = 11.18 cfs @ 12.57 hrs, Volume= 2.187 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I



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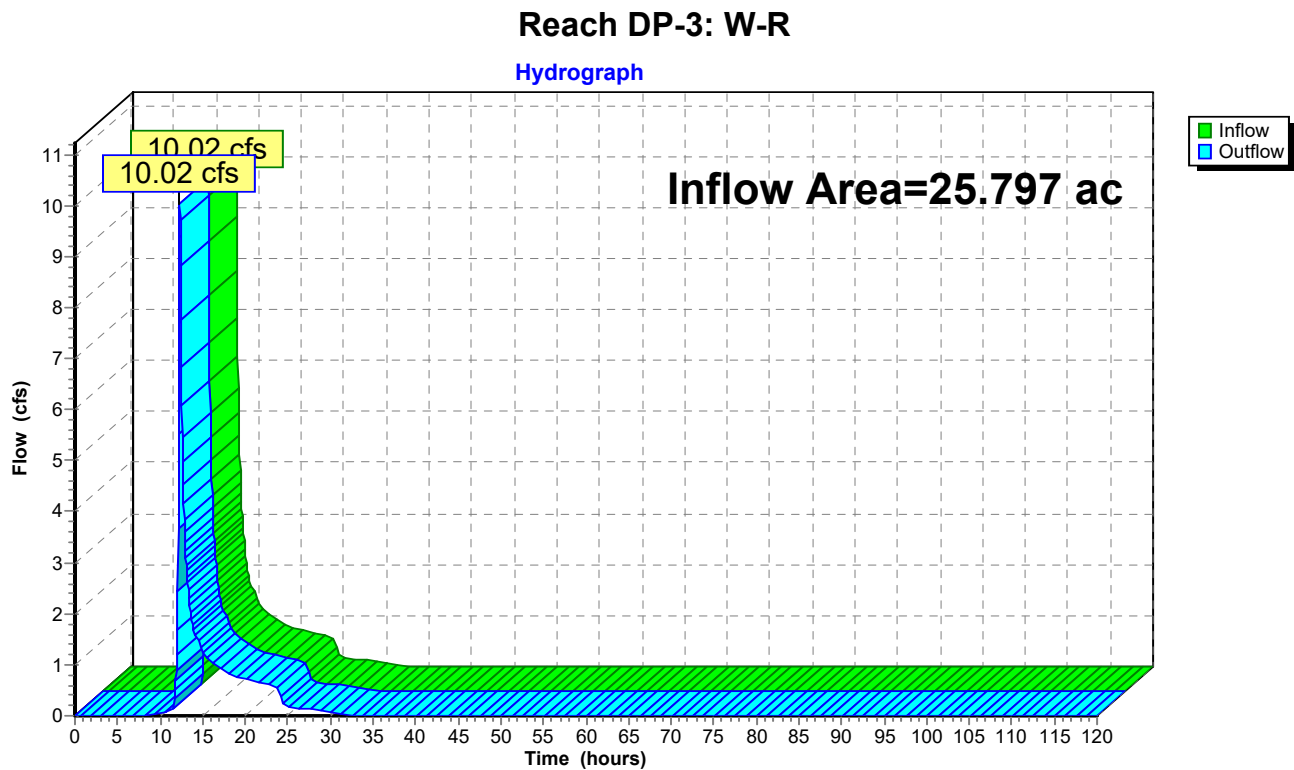
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Summary for Reach DP-3: W-R

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 0.69" for 2-Year event
Inflow = 10.02 cfs @ 12.31 hrs, Volume= 1.475 af
Outflow = 10.02 cfs @ 12.31 hrs, Volume= 1.475 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



Proposed Hydrology

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Summary for Reach DP-3 OUT: 8" Copper Pipe

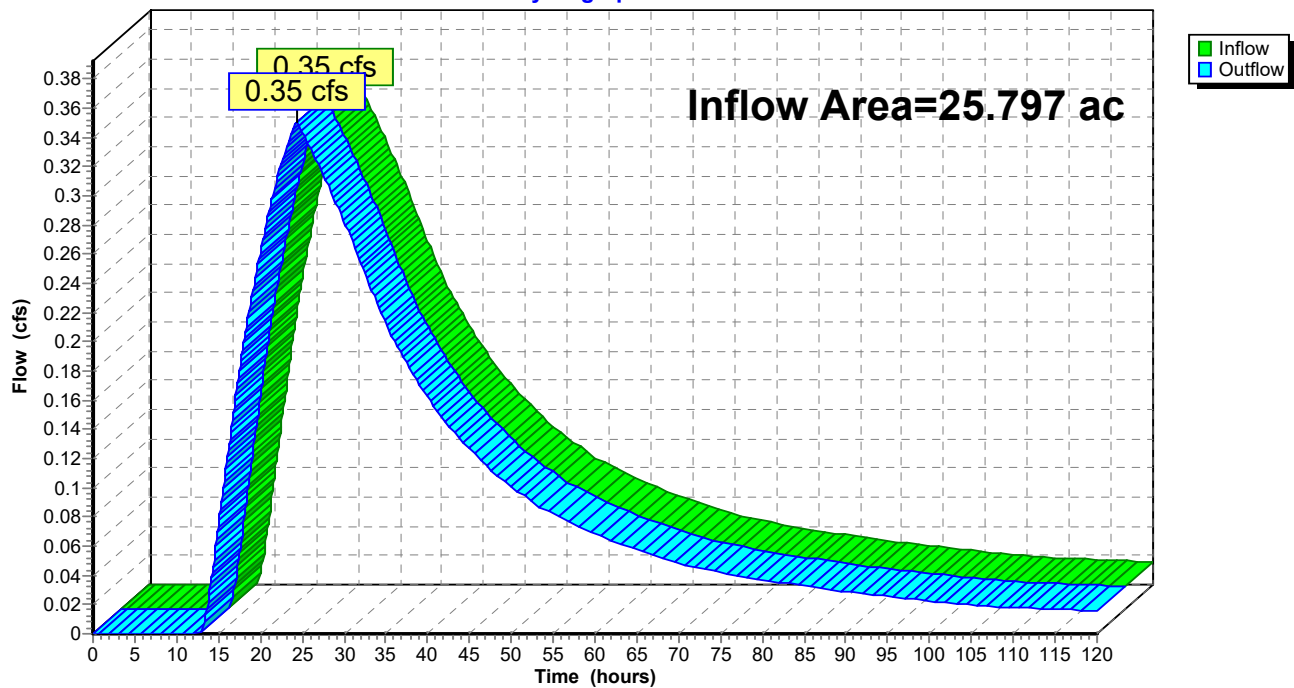
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth > 0.40" for 2-Year event
Inflow = 0.35 cfs @ 24.29 hrs, Volume= 0.853 af
Outflow = 0.35 cfs @ 24.29 hrs, Volume= 0.853 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe

Hydrograph



Proposed Hydrology

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Summary for Reach DP-4: Dwelley Street

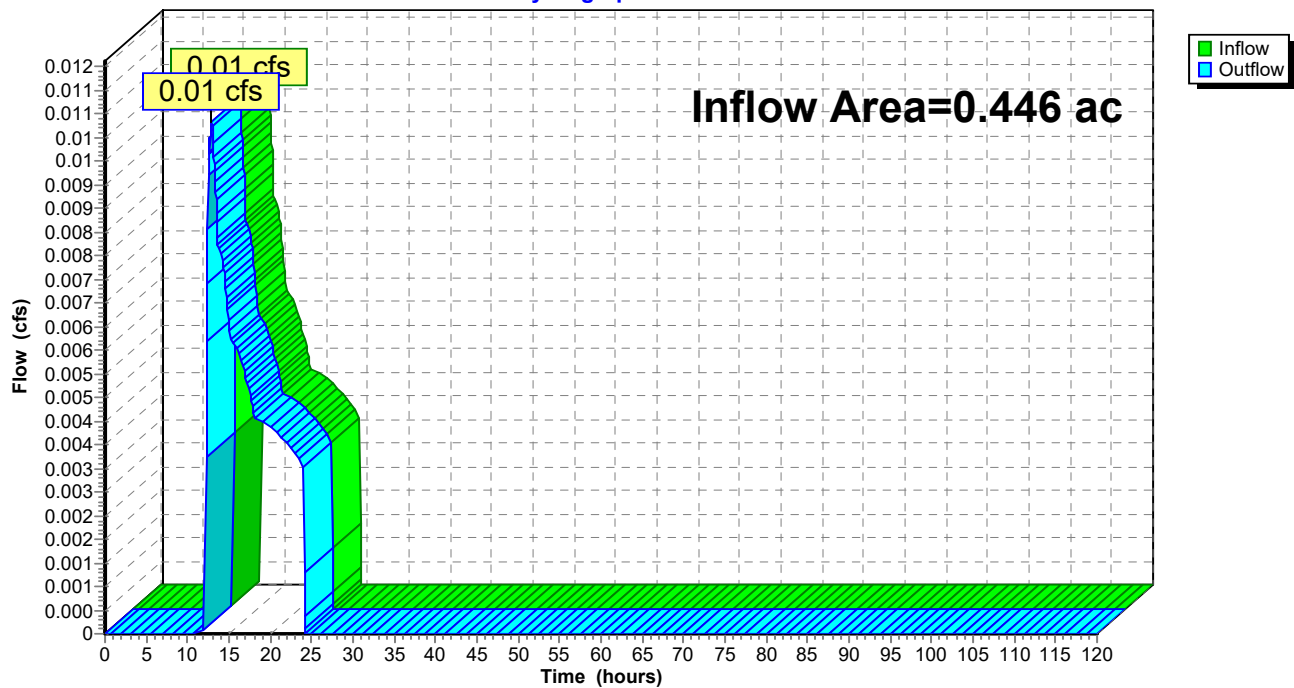
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.446 ac, 20.48% Impervious, Inflow Depth = 0.15" for 2-Year event
Inflow = 0.01 cfs @ 12.87 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 12.87 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street

Hydrograph



Proposed Hydrology

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Summary for Reach DP-5: W-N

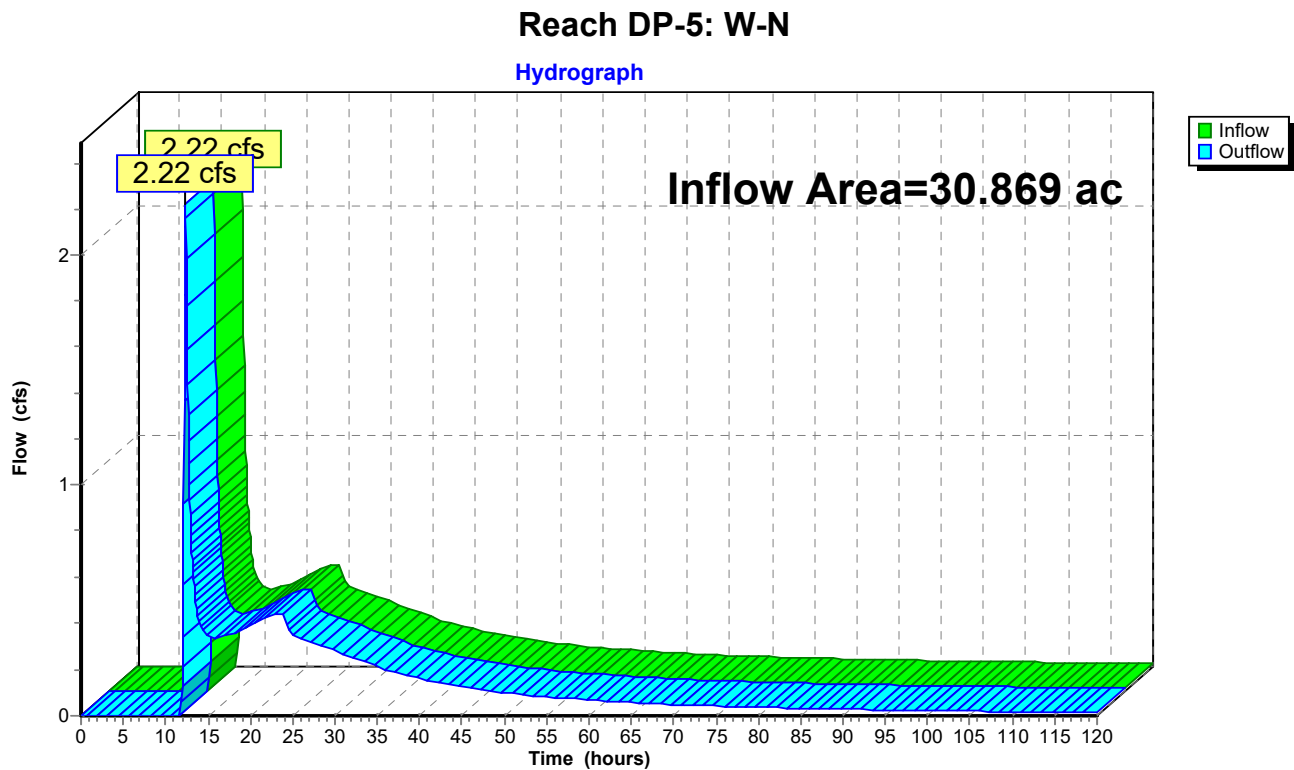
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 0.45" for 2-Year event

Inflow = 2.22 cfs @ 12.36 hrs, Volume= 1.147 af

Outflow = 2.22 cfs @ 12.36 hrs, Volume= 1.147 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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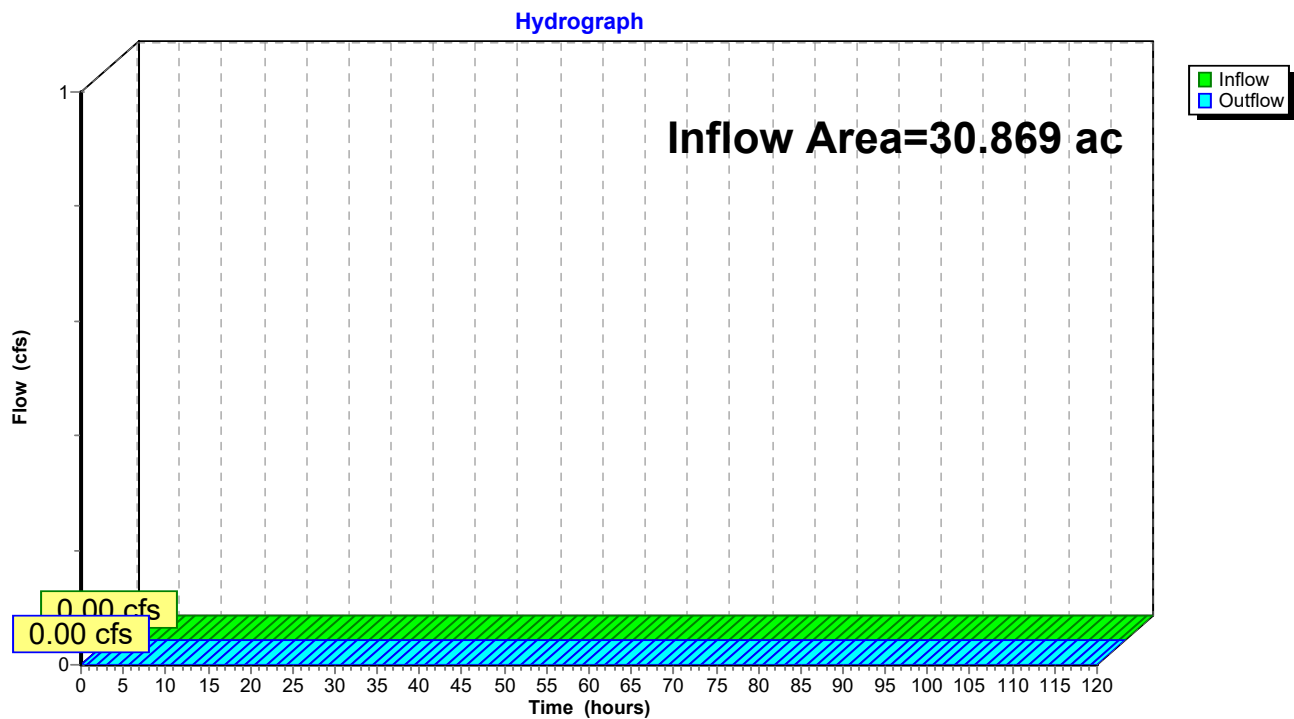
Summary for Reach DP-5 OUT: 24" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE



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Summary for Reach DP-6: W-QP

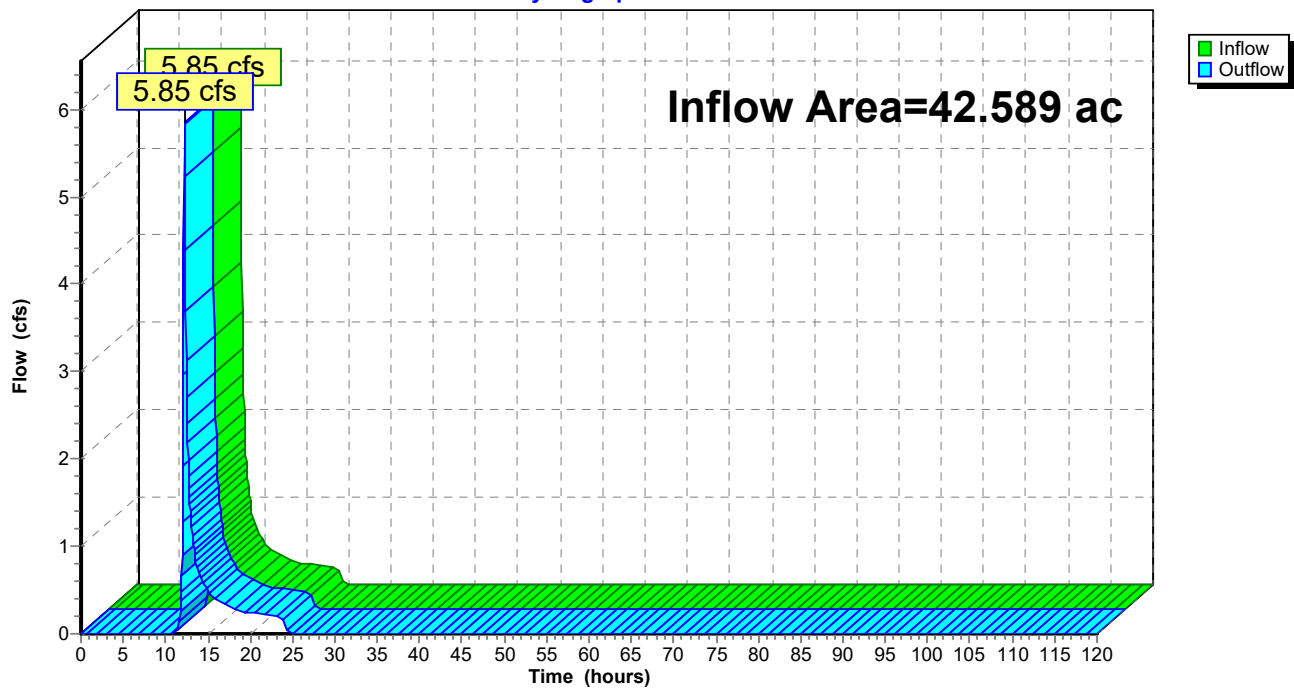
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth = 0.16" for 2-Year event
Inflow = 5.85 cfs @ 12.24 hrs, Volume= 0.582 af
Outflow = 5.85 cfs @ 12.24 hrs, Volume= 0.582 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



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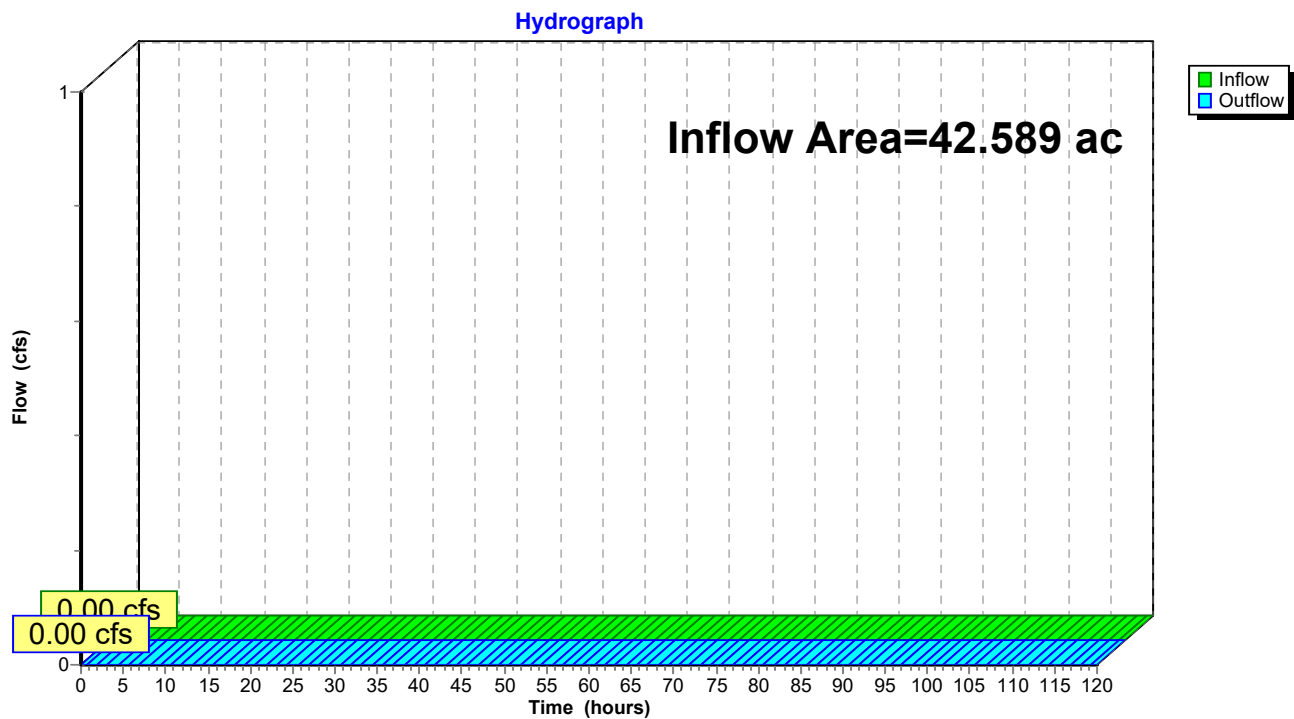
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



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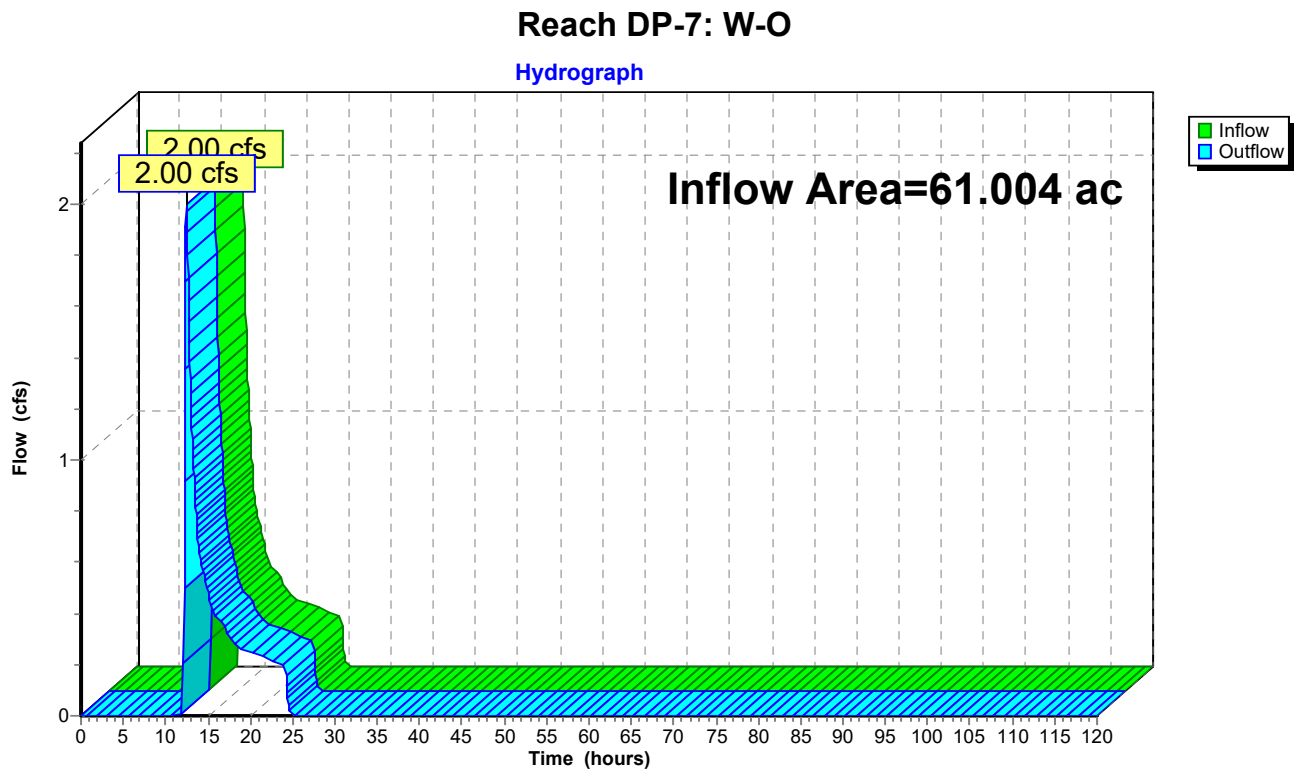
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Summary for Reach DP-7: W-O

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.09" for 2-Year event
Inflow = 2.00 cfs @ 12.47 hrs, Volume= 0.436 af
Outflow = 2.00 cfs @ 12.47 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



Proposed Hydrology

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Summary for Reach DP-7 OUT: 12" RCP PIPE

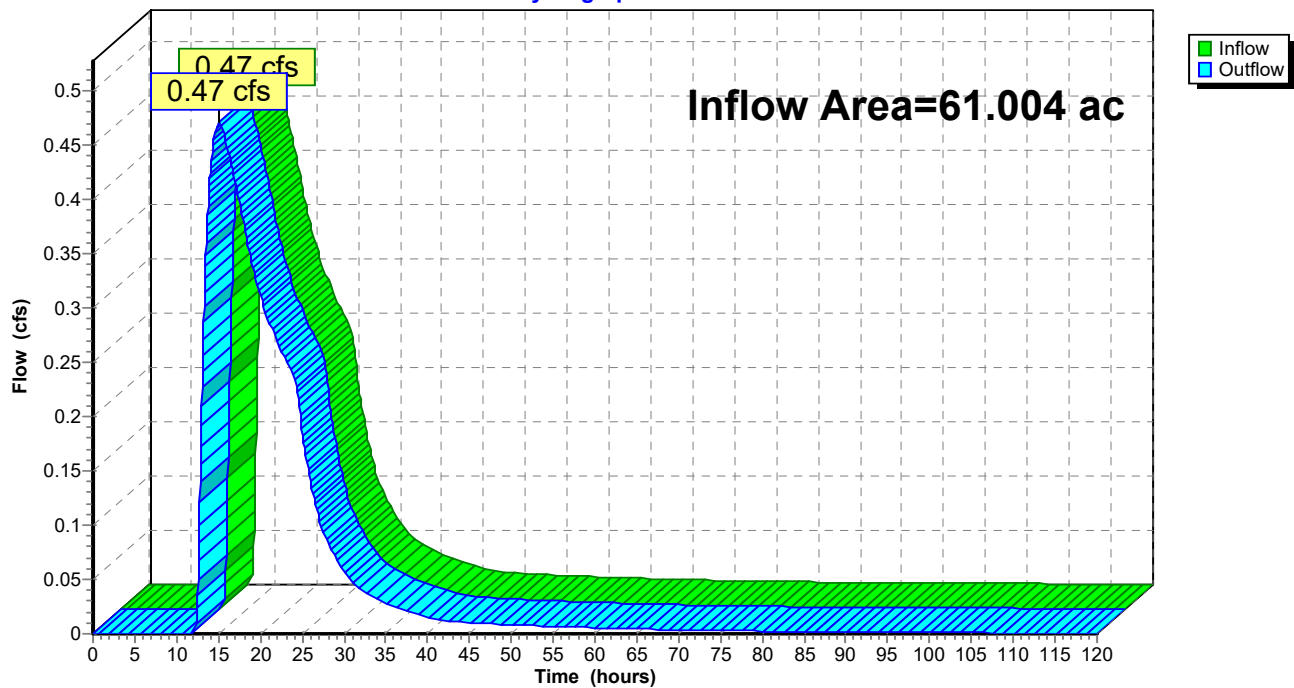
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth > 0.09" for 2-Year event
Inflow = 0.47 cfs @ 15.05 hrs, Volume= 0.435 af
Outflow = 0.47 cfs @ 15.05 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 12" RCP PIPE

Hydrograph



Proposed Hydrology

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Summary for Reach DP-8: Wetlands Series X

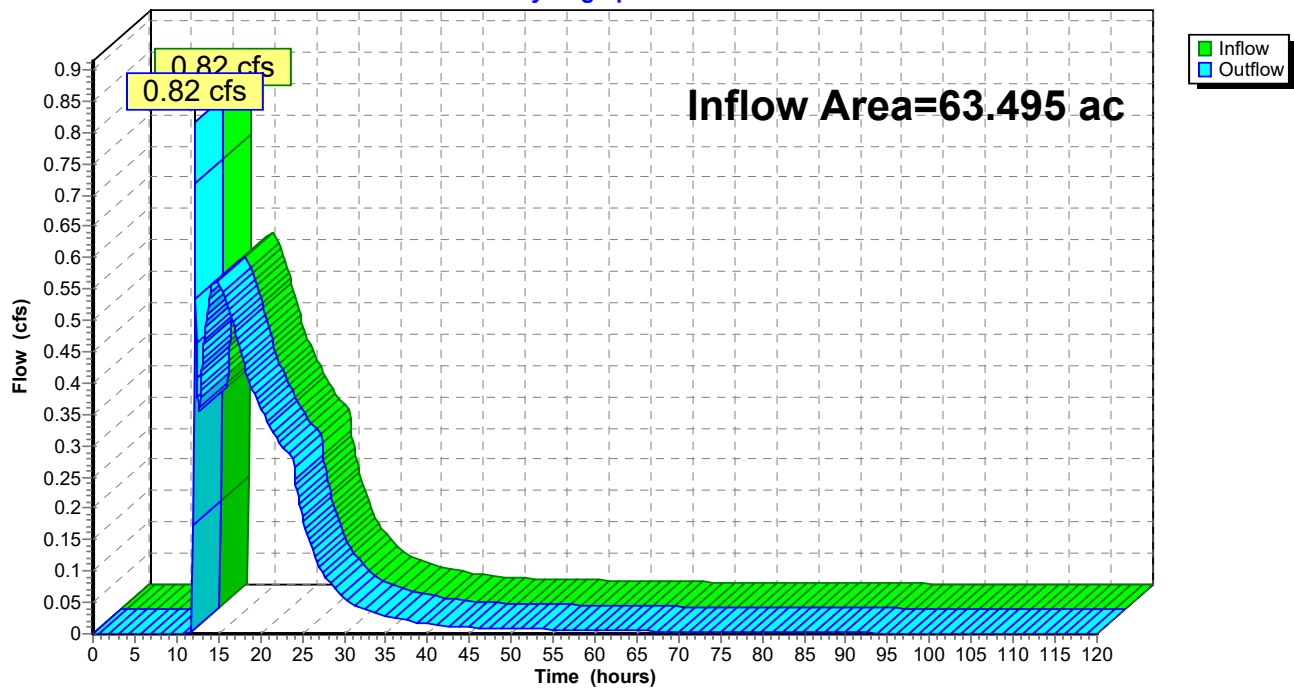
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 63.495 ac, 20.77% Impervious, Inflow Depth > 0.10" for 2-Year event
Inflow = 0.82 cfs @ 12.18 hrs, Volume= 0.527 af
Outflow = 0.82 cfs @ 12.18 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X

Hydrograph



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Summary for Reach DP-9: West Elm Street

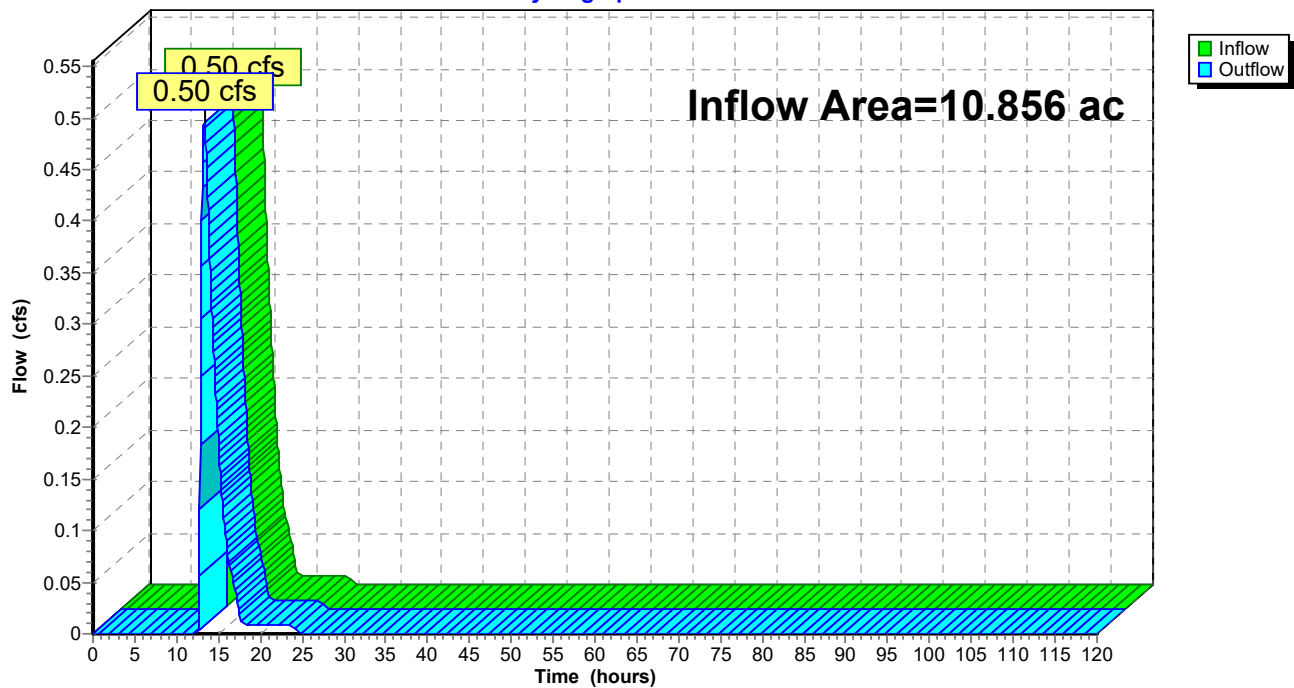
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.856 ac, 42.73% Impervious, Inflow Depth = 0.10" for 2-Year event
Inflow = 0.50 cfs @ 13.32 hrs, Volume= 0.086 af
Outflow = 0.50 cfs @ 13.32 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street

Hydrograph



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Summary for Reach DP-ELM: West Elm Street

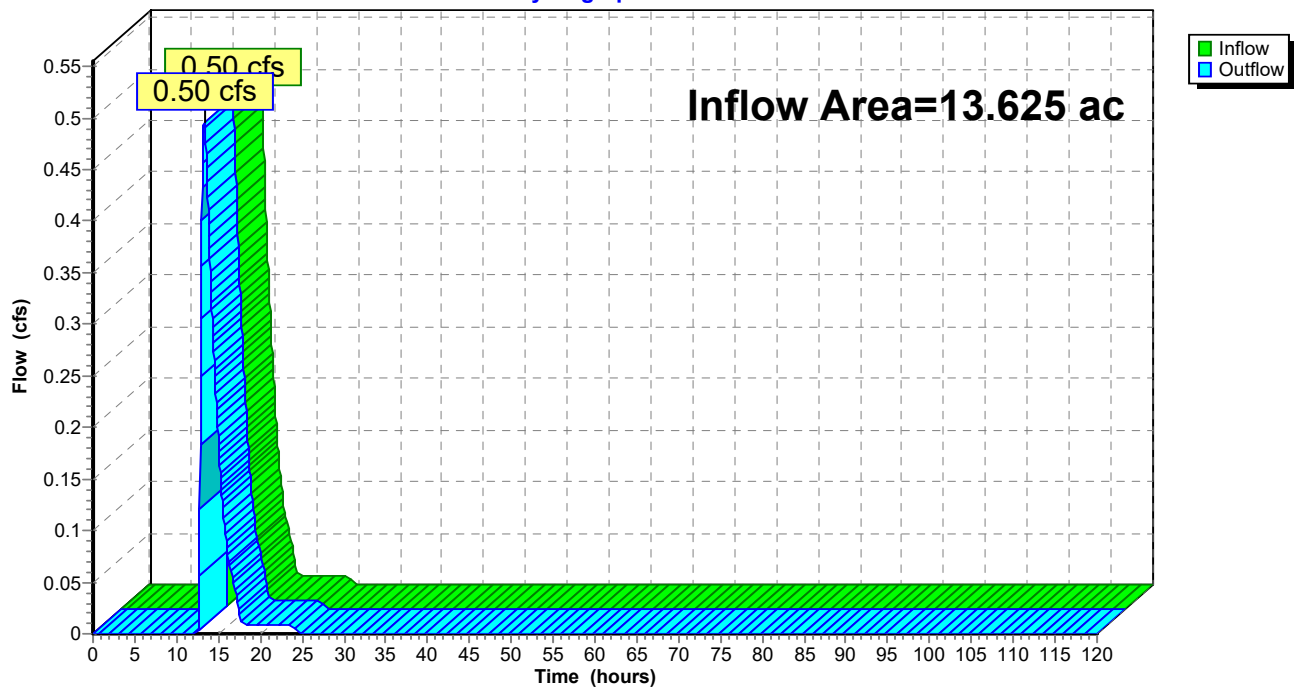
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.625 ac, 35.31% Impervious, Inflow Depth = 0.08" for 2-Year event
Inflow = 0.50 cfs @ 13.32 hrs, Volume= 0.086 af
Outflow = 0.50 cfs @ 13.32 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street

Hydrograph



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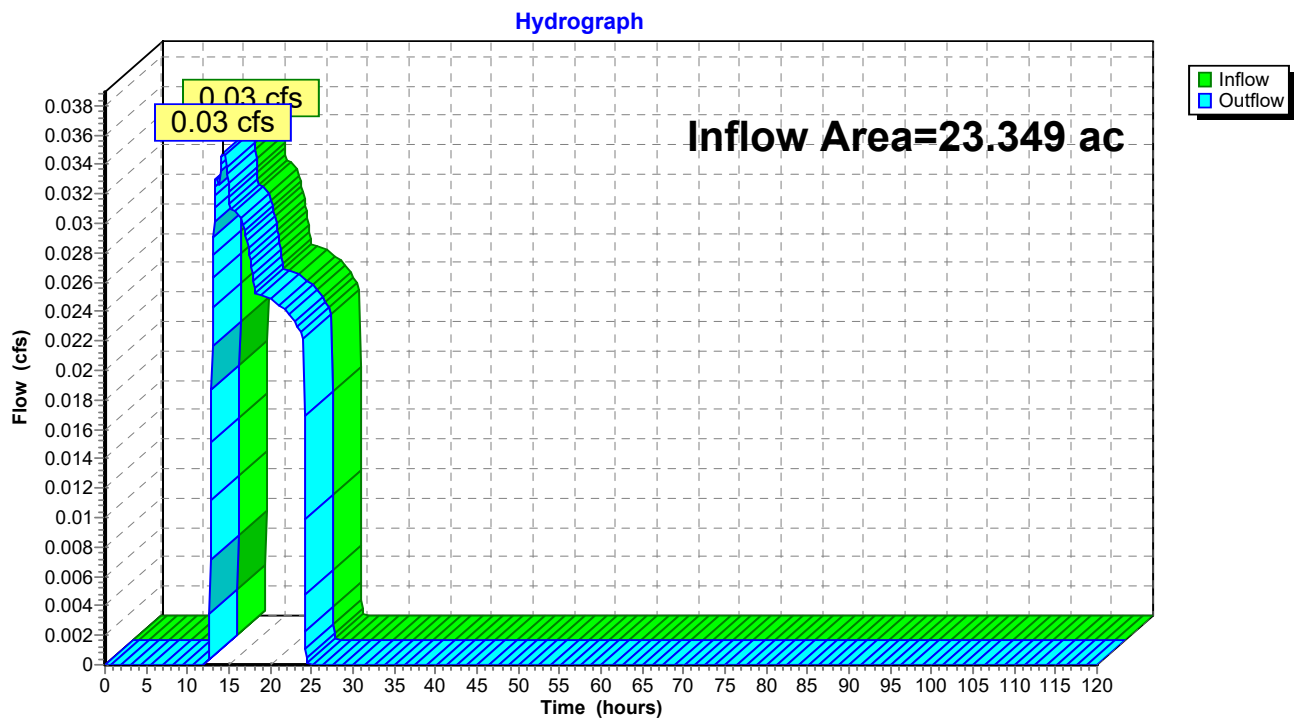
Summary for Reach DP-WA: Wetland Series A

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 23.349 ac, 17.54% Impervious, Inflow Depth = 0.01" for 2-Year event
Inflow = 0.03 cfs @ 14.36 hrs, Volume= 0.025 af
Outflow = 0.03 cfs @ 14.36 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A



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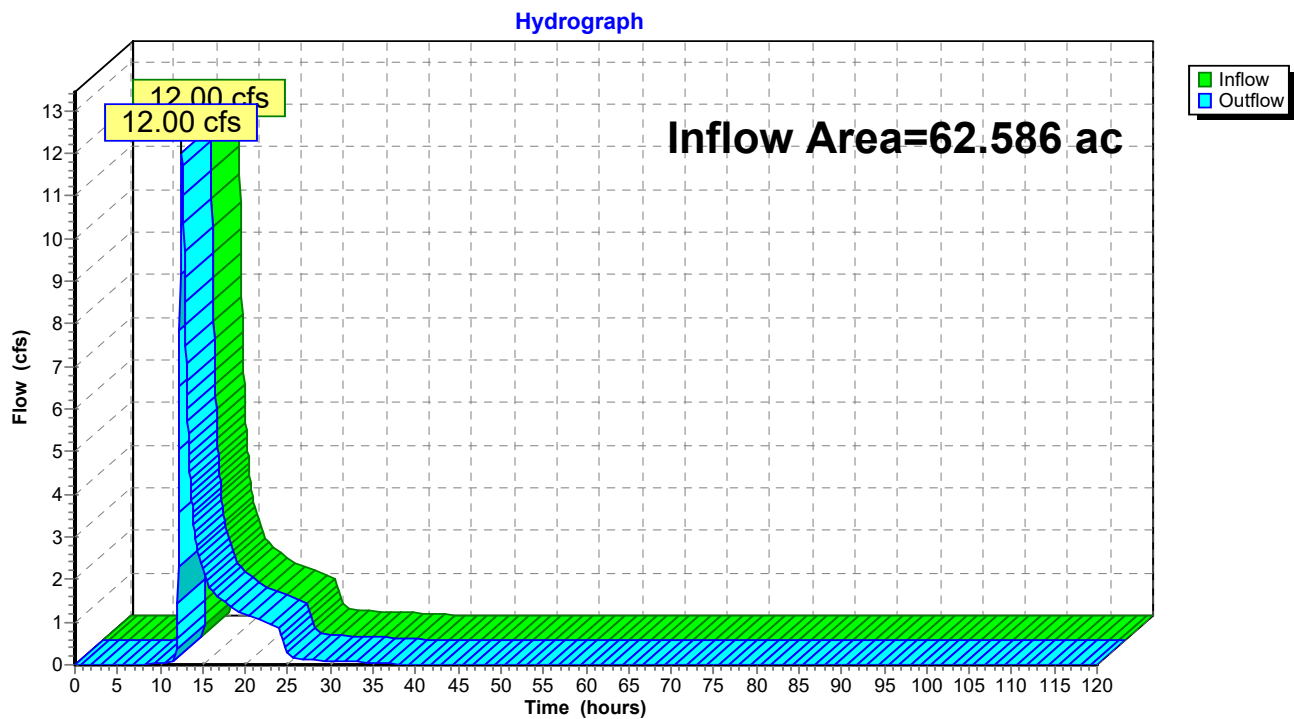
Summary for Reach DP-WI: Wetland Series/Stream I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62.586 ac, 17.71% Impervious, Inflow Depth = 0.46" for 2-Year event
Inflow = 12.00 cfs @ 12.56 hrs, Volume= 2.411 af
Outflow = 12.00 cfs @ 12.56 hrs, Volume= 2.411 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I



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Summary for Pond BAS 1-A: BAS 1-A

Inflow Area = 3.871 ac, 43.69% Impervious, Inflow Depth = 1.35" for 2-Year event
Inflow = 6.38 cfs @ 12.13 hrs, Volume= 0.435 af
Outflow = 0.75 cfs @ 13.05 hrs, Volume= 0.435 af, Atten= 88%, Lag= 54.7 min
Discarded = 0.75 cfs @ 13.05 hrs, Volume= 0.435 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 79.99' @ 13.05 hrs Surf.Area= 3,873 sf Storage= 6,281 cf

Plug-Flow detention time= 75.0 min calculated for 0.435 af (100% of inflow)
Center-of-Mass det. time= 74.9 min (935.9 - 860.9)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	31,322 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	2,480	0	0	2,480
79.00	3,150	2,808	2,808	3,176
80.00	3,880	3,509	6,317	3,935
80.95	4,660	4,051	10,368	4,746
81.00	5,284	248	10,616	5,370
82.00	6,379	5,823	16,439	6,498
83.00	7,434	6,900	23,339	7,593
84.00	8,545	7,983	31,322	8,748

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	8.270 in/hr Exfiltration over Wetted area
#2	Primary	82.75'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.75 cfs @ 13.05 hrs HW=79.99' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.75 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=78.00' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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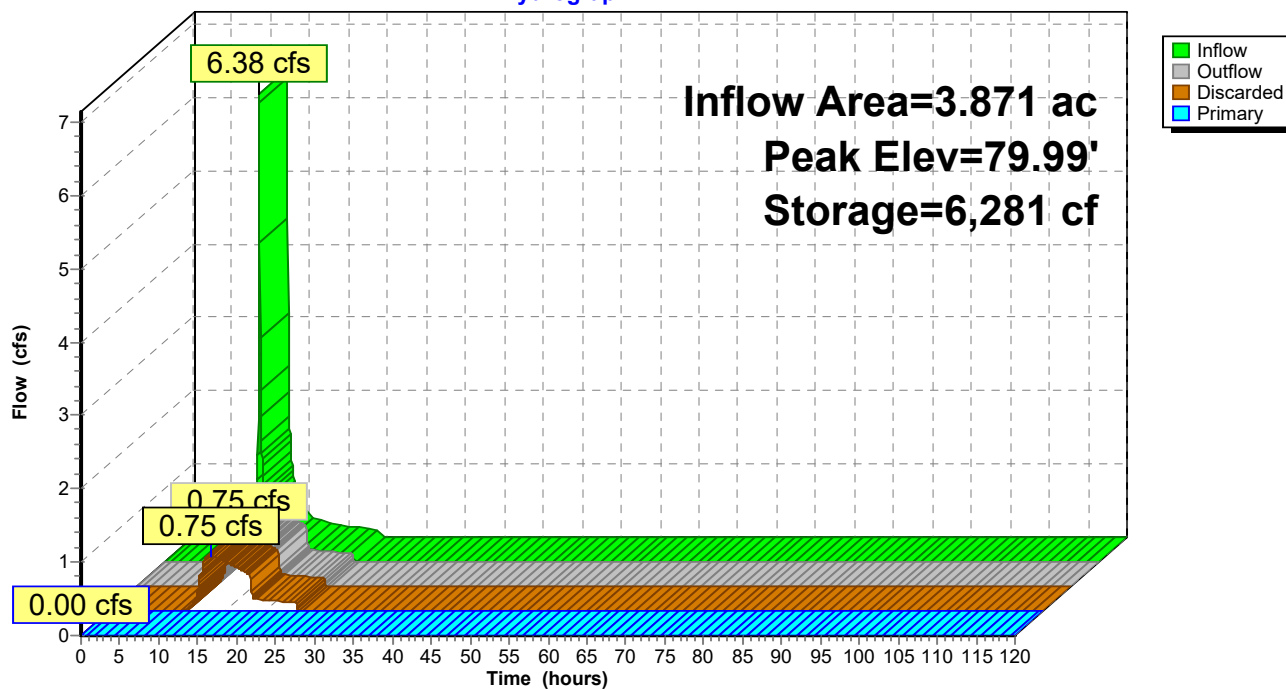
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond BAS 1-A: BAS 1-A

Hydrograph



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Summary for Pond BAS 1-B: BAS 1-B

Inflow Area = 6.278 ac, 8.01% Impervious, Inflow Depth = 0.70" for 2-Year event
Inflow = 2.70 cfs @ 12.37 hrs, Volume= 0.364 af
Outflow = 0.20 cfs @ 17.96 hrs, Volume= 0.364 af, Atten= 93%, Lag= 335.6 min
Discarded = 0.13 cfs @ 17.96 hrs, Volume= 0.345 af
Primary = 0.07 cfs @ 17.96 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.29' @ 17.96 hrs Surf.Area= 5,327 sf Storage= 9,716 cf

Plug-Flow detention time= 849.9 min calculated for 0.363 af (100% of inflow)
Center-of-Mass det. time= 850.2 min (1,770.9 - 920.7)

Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	13,755 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
80.00	3,170	0	0
83.00	6,000	13,755	13,755

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.27'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.13 cfs @ 17.96 hrs HW=82.29' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.06 cfs @ 17.96 hrs HW=82.29' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.06 cfs @ 0.35 fps)

Proposed Hydrology

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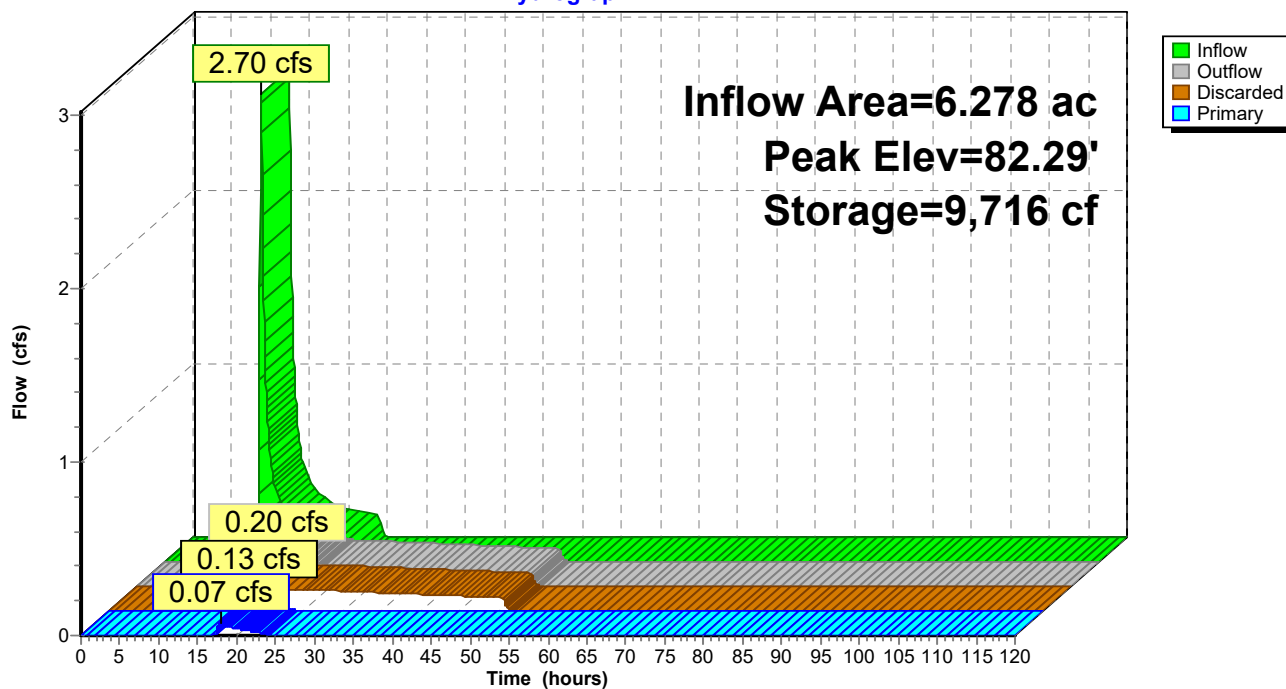
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Pond BAS 1-B: BAS 1-B

Hydrograph



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Summary for Pond BAS 1-C: BAS 1-C

Inflow Area = 0.144 ac, 73.04% Impervious, Inflow Depth = 2.17" for 2-Year event
Inflow = 0.38 cfs @ 12.13 hrs, Volume= 0.026 af
Outflow = 0.15 cfs @ 12.28 hrs, Volume= 0.026 af, Atten= 60%, Lag= 8.9 min
Discarded = 0.01 cfs @ 12.28 hrs, Volume= 0.019 af
Primary = 0.14 cfs @ 12.28 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.85' @ 12.28 hrs Surf.Area= 426 sf Storage= 458 cf

Plug-Flow detention time= 419.2 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 419.5 min (1,240.3 - 820.8)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	525 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	70	0	0
83.00	455	525	525

Device	Routing	Invert	Outlet Devices
#1	Discarded	81.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.80'	5.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 12.28 hrs HW=82.85' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.14 cfs @ 12.28 hrs HW=82.85' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.14 cfs @ 0.58 fps)

Proposed Hydrology

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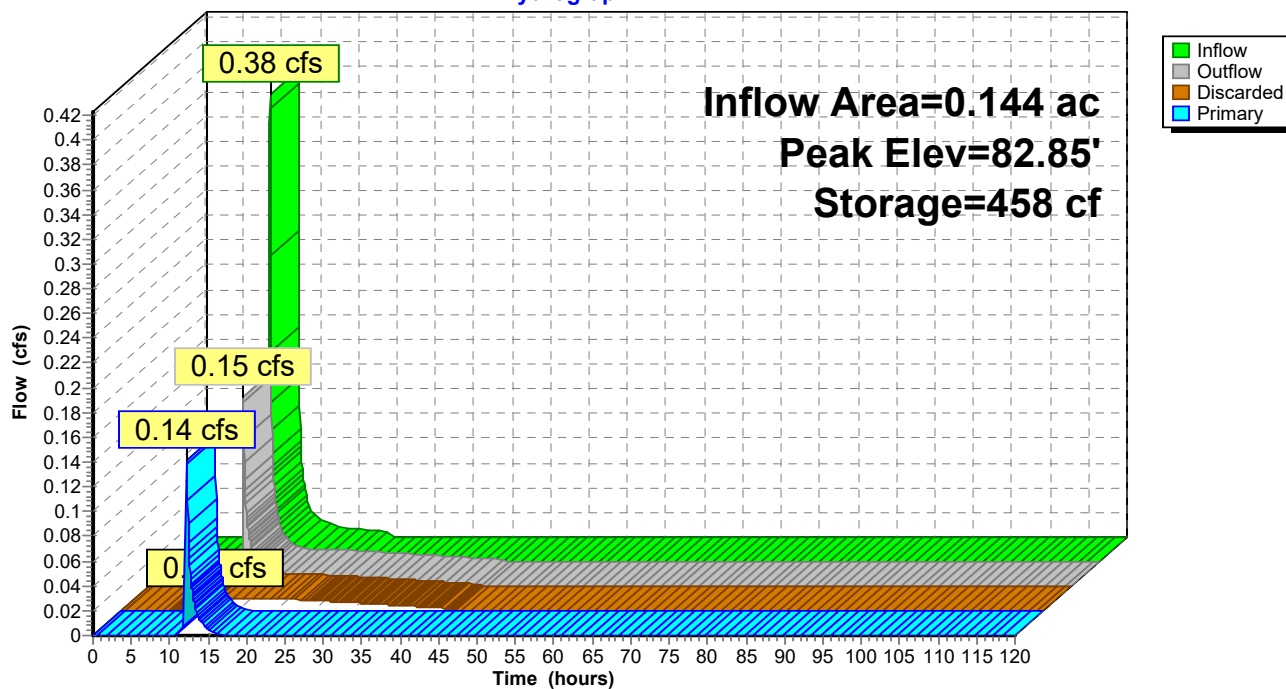
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Pond BAS 1-C: BAS 1-C

Hydrograph



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Summary for Pond BAS 10-A: EXIST BAS 10-A

Inflow Area = 0.796 ac, 7.21% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 54.00' @ 0.00 hrs Surf.Area= 220 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)

↑**1=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)

↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Hydrology

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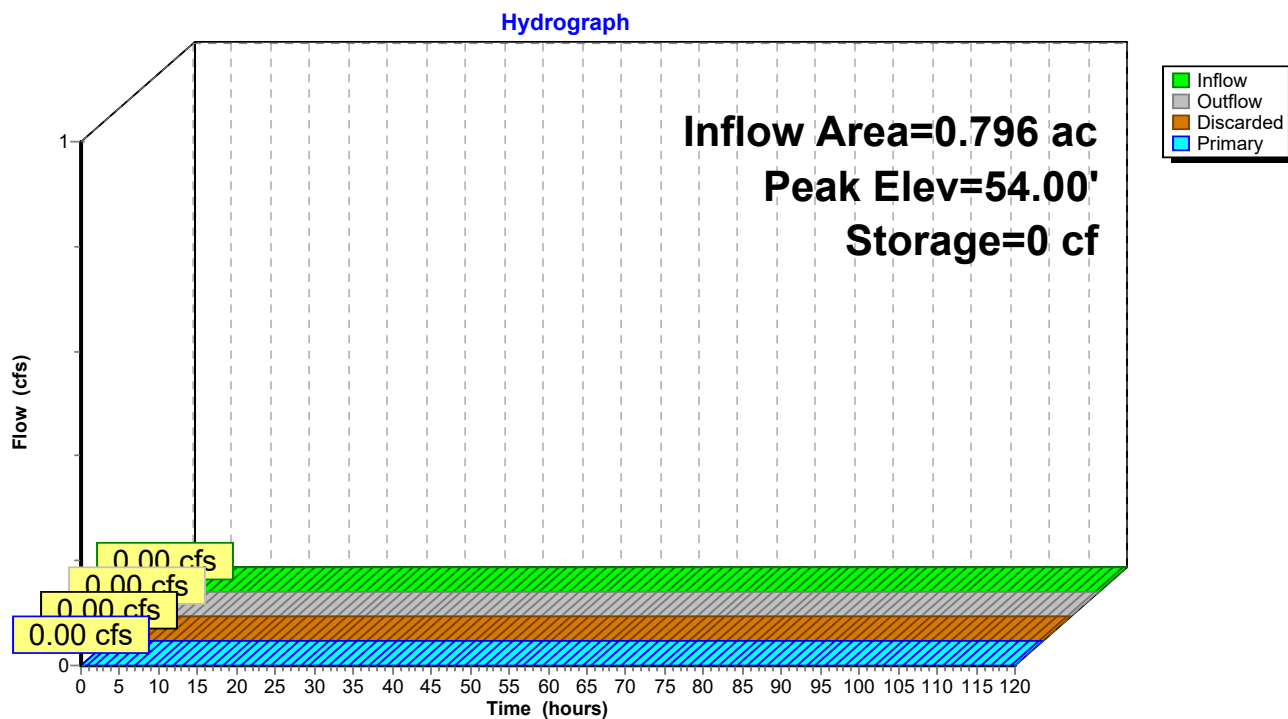
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Pond BAS 10-A: EXIST BAS 10-A



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Summary for Pond BAS 10-B: BAS 10-B

Inflow Area = 1.334 ac, 40.19% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 0.74 cfs @ 12.15 hrs, Volume= 0.063 af
Outflow = 0.11 cfs @ 13.22 hrs, Volume= 0.063 af, Atten= 85%, Lag= 64.1 min
Discarded = 0.11 cfs @ 13.22 hrs, Volume= 0.063 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 77.33' @ 13.22 hrs Surf.Area= 2,040 sf Storage= 645 cf

Plug-Flow detention time= 46.7 min calculated for 0.063 af (100% of inflow)
Center-of-Mass det. time= 46.7 min (966.2 - 919.5)

Volume	Invert	Avail.Storage	Storage Description	
#1	77.00'	9,015 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
77.00	1,850	0	0	1,850
78.00	2,450	2,143	2,143	2,472
79.00	3,520	2,969	5,112	3,559
80.00	4,300	3,904	9,015	4,370

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.00'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.11 cfs @ 13.22 hrs HW=77.33' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Proposed Hydrology

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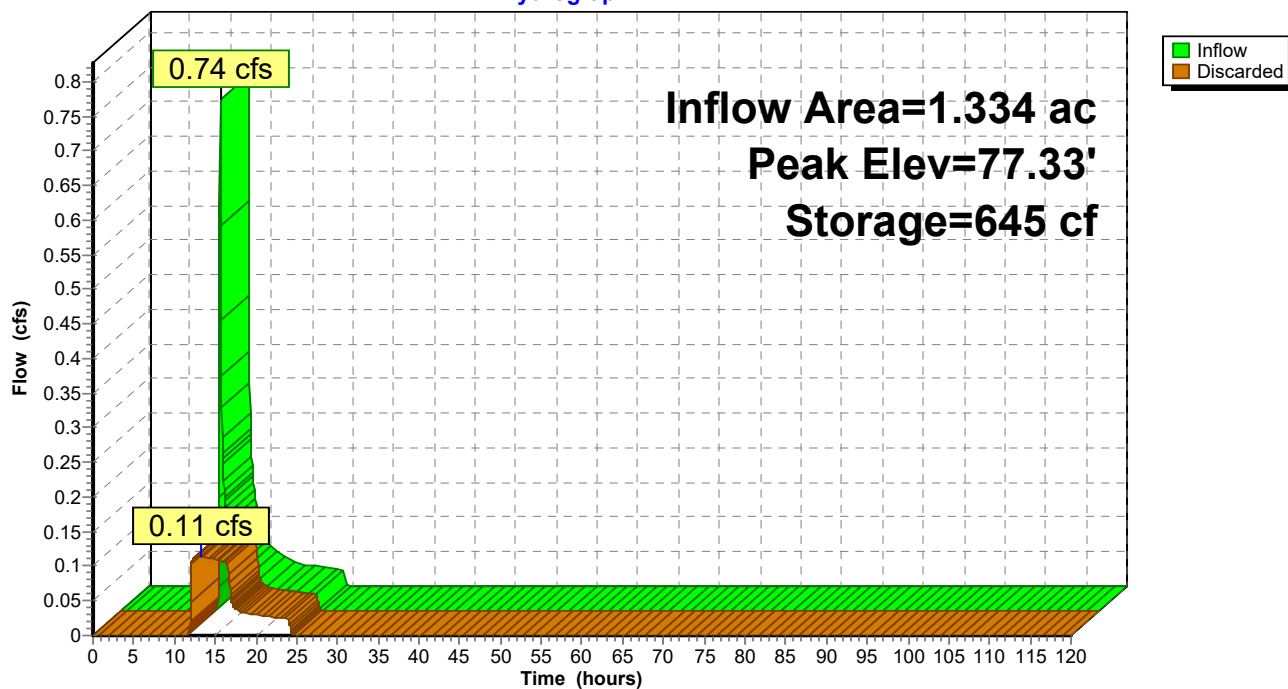
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Pond BAS 10-B: BAS 10-B

Hydrograph



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Summary for Pond BAS 11-B: BAS 11-B

Inflow Area = 4.563 ac, 12.43% Impervious, Inflow Depth = 0.92" for 2-Year event
Inflow = 4.86 cfs @ 12.14 hrs, Volume= 0.348 af
Outflow = 3.00 cfs @ 12.22 hrs, Volume= 0.348 af, Atten= 38%, Lag= 5.0 min
Discarded = 3.00 cfs @ 12.22 hrs, Volume= 0.348 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 44.52' @ 12.22 hrs Surf.Area= 127,000 sf Storage= 843 cf

Plug-Flow detention time= 1.8 min calculated for 0.348 af (100% of inflow)
Center-of-Mass det. time= 1.8 min (888.8 - 887.0)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	25,400 cf	Custom Stage Data (Conic) Listed below (Recalc) 63,500 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.50	127,000	0	0	127,000
45.00	127,000	63,500	63,500	127,632

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.50'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=3.00 cfs @ 12.22 hrs HW=44.52' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 3.00 cfs)

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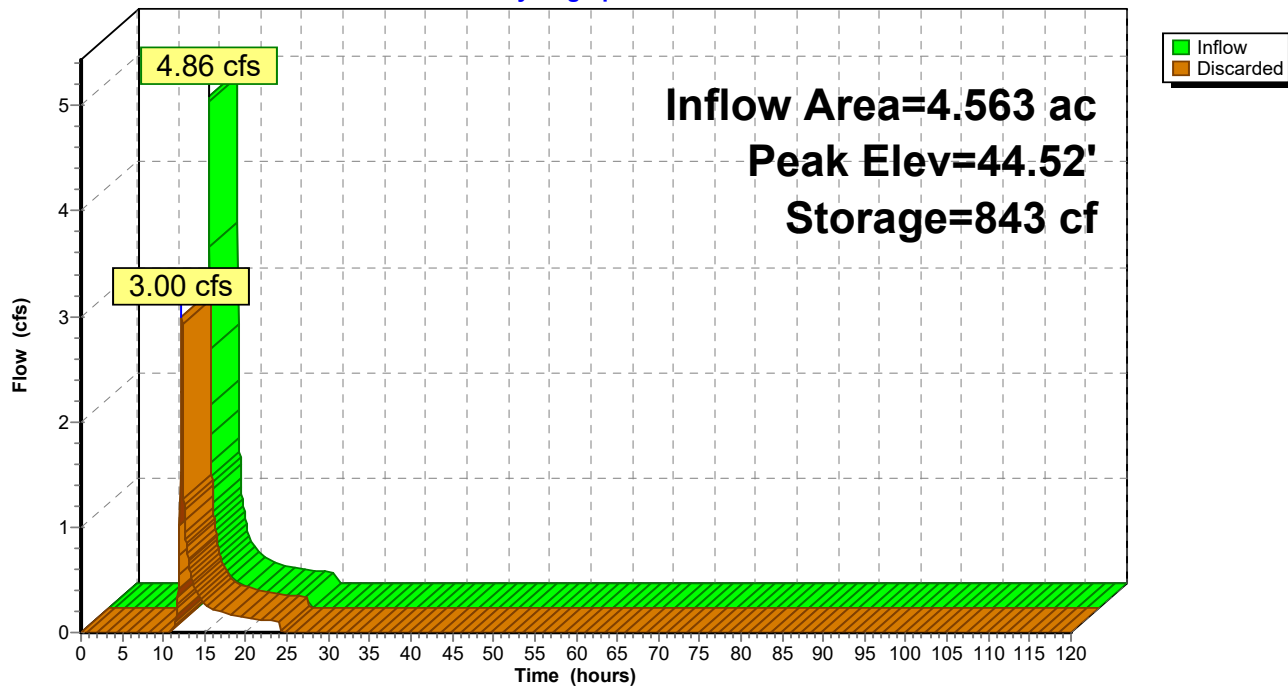
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Pond BAS 11-B: BAS 11-B

Hydrograph



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Summary for Pond BAS 12-A: BAS 12-A

Inflow Area = 6.552 ac, 26.15% Impervious, Inflow Depth = 0.84" for 2-Year event
Inflow = 6.25 cfs @ 12.14 hrs, Volume= 0.458 af
Outflow = 0.54 cfs @ 13.75 hrs, Volume= 0.458 af, Atten= 91%, Lag= 96.9 min
Discarded = 0.54 cfs @ 13.75 hrs, Volume= 0.458 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.81' @ 13.75 hrs Surf.Area= 9,626 sf Storage= 7,207 cf

Plug-Flow detention time= 134.9 min calculated for 0.457 af (100% of inflow)
Center-of-Mass det. time= 134.9 min (1,027.8 - 893.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	32,859 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.00	8,250	0	0	8,250
96.00	13,900	32,859	32,859	14,008

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	95.45'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.54 cfs @ 13.75 hrs HW=93.81' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.54 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Hydrology

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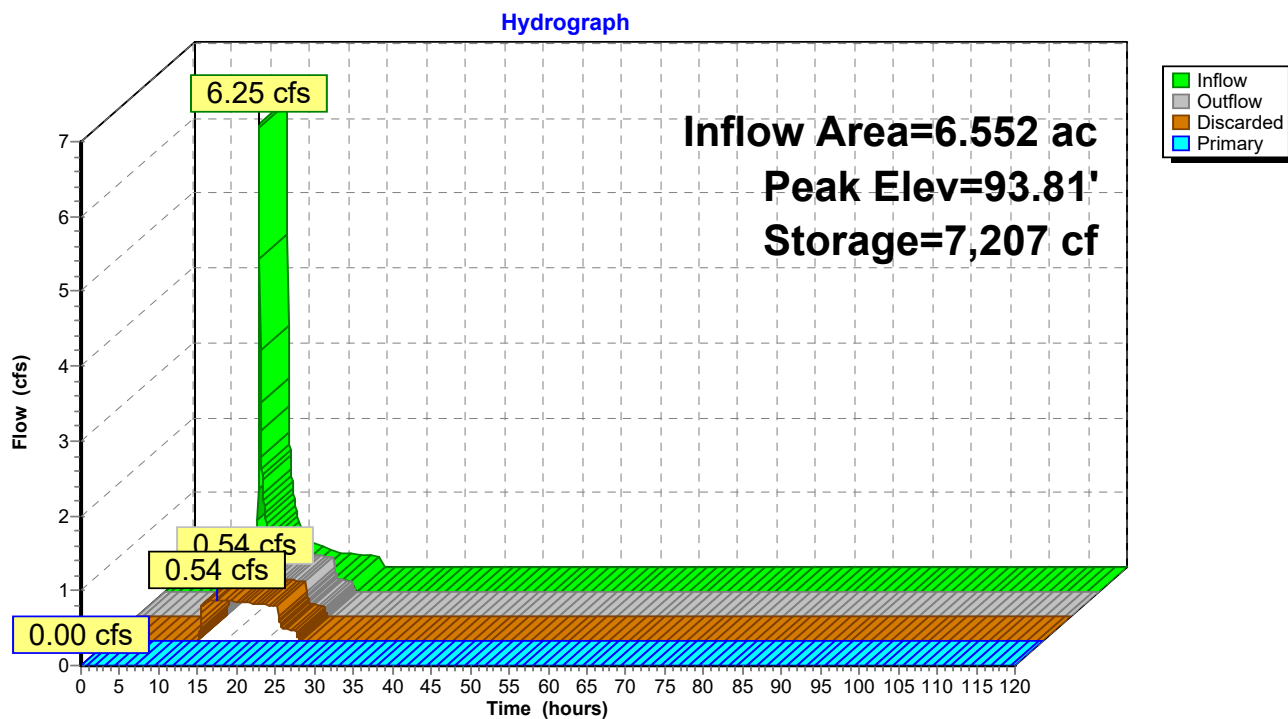
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Pond BAS 12-A: BAS 12-A



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Summary for Pond BAS 12-B: BAS 12-B

Inflow Area = 13.599 ac, 25.11% Impervious, Inflow Depth = 0.21" for 2-Year event
Inflow = 2.23 cfs @ 12.16 hrs, Volume= 0.241 af
Outflow = 0.54 cfs @ 12.99 hrs, Volume= 0.241 af, Atten= 76%, Lag= 50.2 min
Discarded = 0.54 cfs @ 12.99 hrs, Volume= 0.241 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 91.07' @ 12.99 hrs Surf.Area= 22,911 sf Storage= 1,618 cf

Plug-Flow detention time= 29.3 min calculated for 0.241 af (100% of inflow)
Center-of-Mass det. time= 29.3 min (971.6 - 942.3)

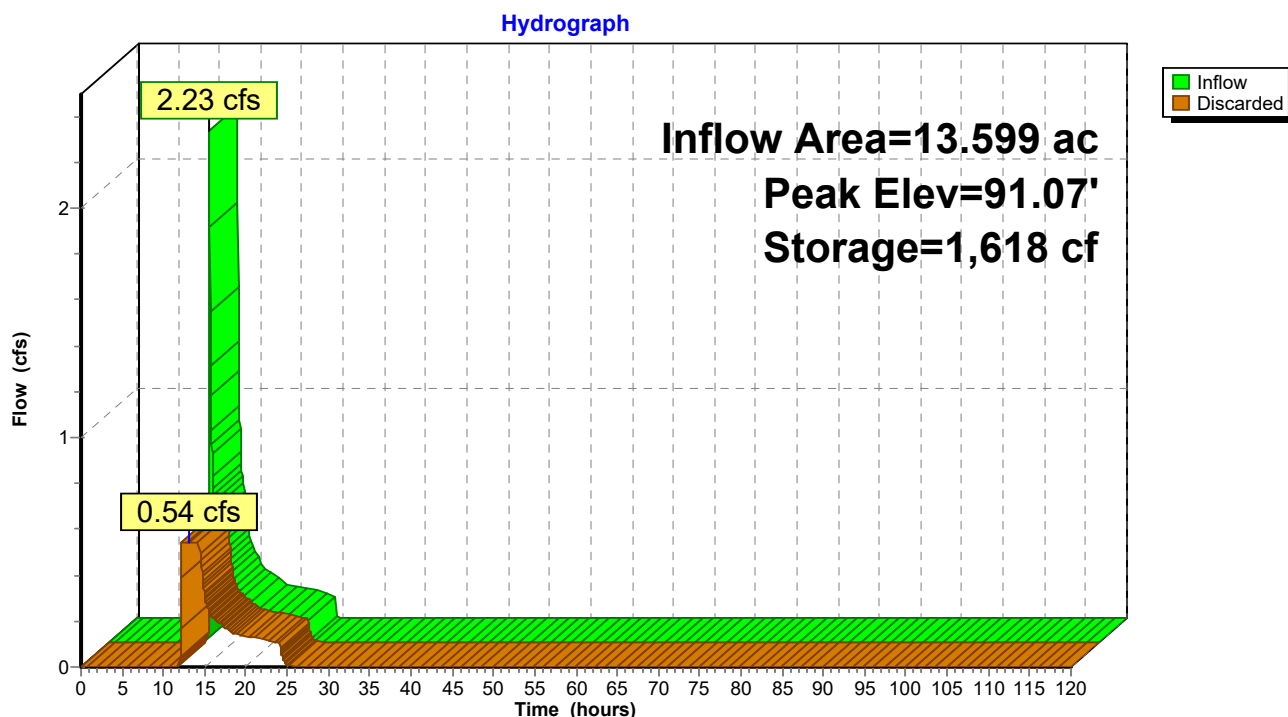
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	82,362 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	22,700	0	0	22,700
94.00	32,500	82,362	82,362	32,657

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.54 cfs @ 12.99 hrs HW=91.07' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.54 cfs)

Pond BAS 12-B: BAS 12-B



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Summary for Pond BAS 15-A: BAS 15-A

Inflow Area = 0.480 ac, 29.15% Impervious, Inflow Depth = 1.05" for 2-Year event
Inflow = 0.60 cfs @ 12.14 hrs, Volume= 0.042 af
Outflow = 0.14 cfs @ 12.51 hrs, Volume= 0.042 af, Atten= 77%, Lag= 22.3 min
Primary = 0.14 cfs @ 12.51 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.82' @ 12.51 hrs Surf.Area= 1,412 sf Storage= 461 cf

Plug-Flow detention time= 42.7 min calculated for 0.042 af (100% of inflow)
Center-of-Mass det. time= 43.1 min (921.2 - 878.1)

Volume	Invert	Avail.Storage	Storage Description
#1	82.35'	716 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.35	300	0	0
82.70	1,350	289	289
83.00	1,500	427	716

Device	Routing	Invert	Outlet Devices
#1	Primary	82.35'	3.0" Vert. Orifice/Grate C= 0.600
#2	Primary	82.83'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.14 cfs @ 12.51 hrs HW=82.82' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.14 cfs @ 2.85 fps)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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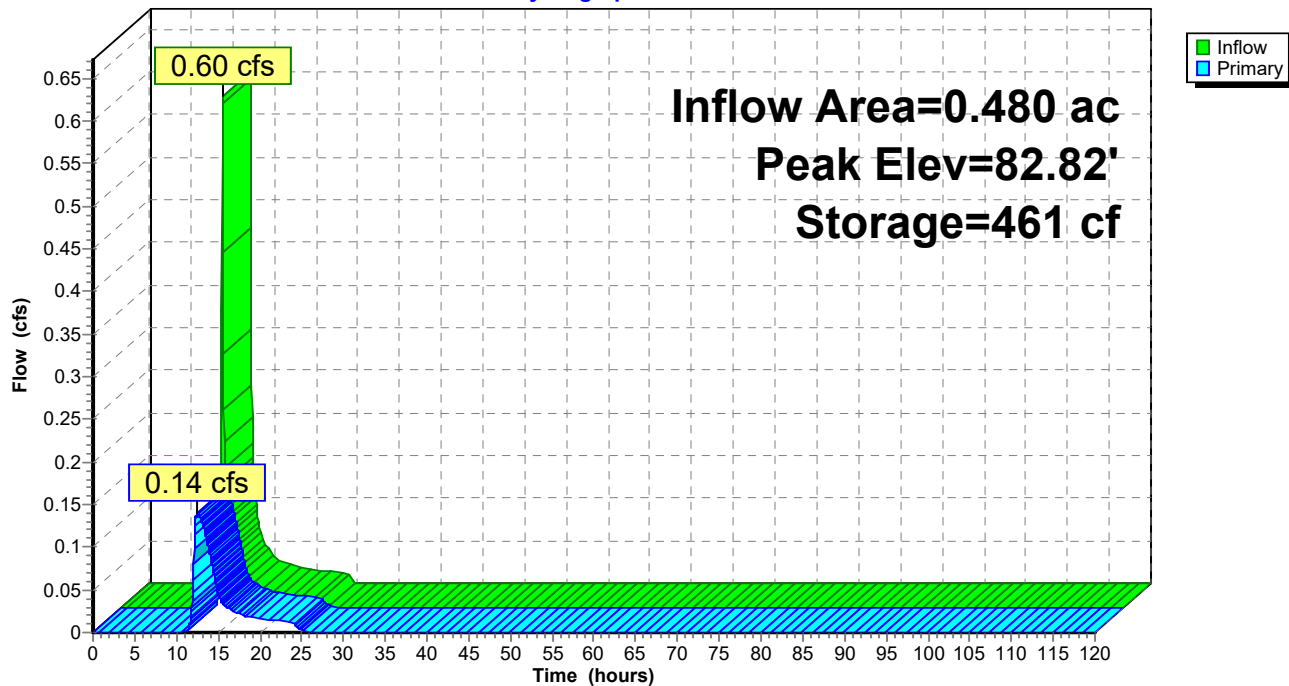
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Pond BAS 15-A: BAS 15-A

Hydrograph



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Summary for Pond BAS 2-A: DET BAS 2-A

Inflow Area = 2.386 ac, 38.00% Impervious, Inflow Depth = 0.52" for 2-Year event
Inflow = 1.17 cfs @ 12.15 hrs, Volume= 0.104 af
Outflow = 0.10 cfs @ 14.84 hrs, Volume= 0.104 af, Atten= 91%, Lag= 161.6 min
Primary = 0.10 cfs @ 14.84 hrs, Volume= 0.104 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 103.28' @ 14.84 hrs Surf.Area= 4,802 sf Storage= 1,693 cf

Plug-Flow detention time= 226.3 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 225.7 min (1,150.5 - 924.7)

Volume	Invert	Avail.Storage	Storage Description
#1	102.80'	20,037 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.80	300	0	0	300
103.00	4,450	394	394	4,450
106.00	8,900	19,643	20,037	8,982

Device	Routing	Invert	Outlet Devices
#1	Primary	102.80'	2.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.10 cfs @ 14.84 hrs HW=103.28' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.10 cfs @ 2.96 fps)

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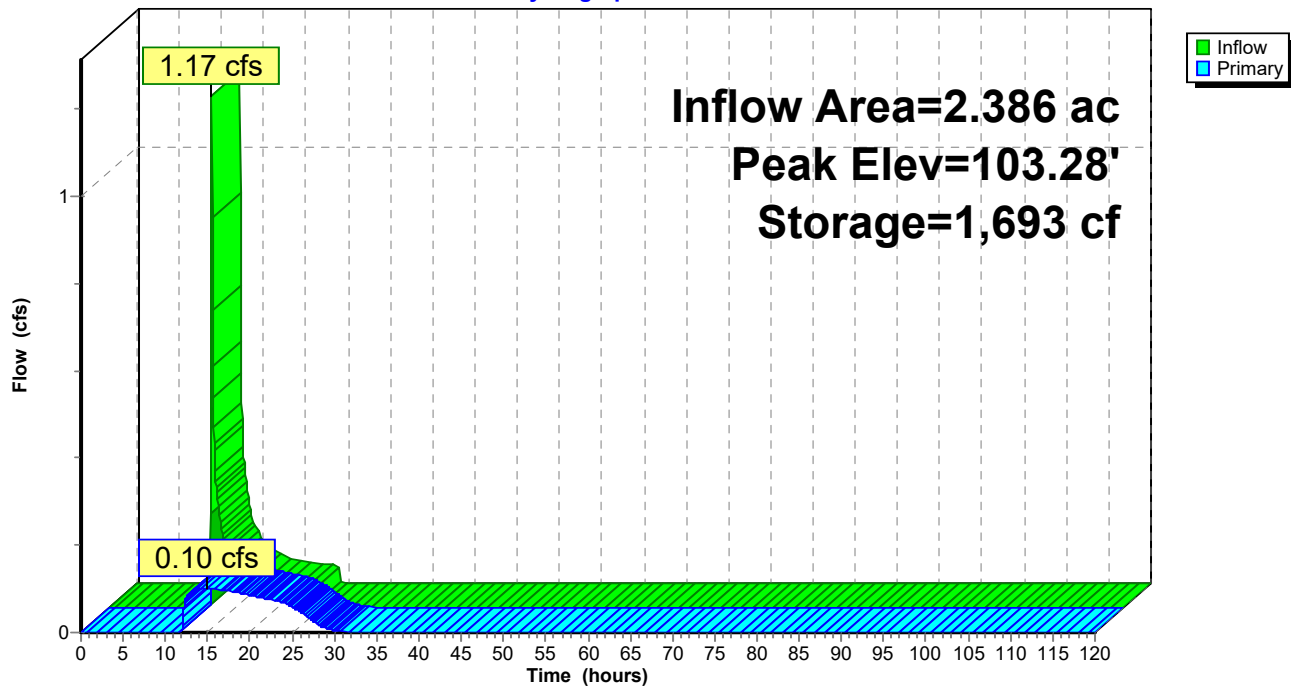
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Pond BAS 2-A: DET BAS 2-A

Hydrograph



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Summary for Pond BAS 2-B: BAS 2-B

Inflow Area = 1.161 ac, 38.00% Impervious, Inflow Depth = 0.89" for 2-Year event
Inflow = 1.19 cfs @ 12.14 hrs, Volume= 0.086 af
Outflow = 0.07 cfs @ 14.76 hrs, Volume= 0.086 af, Atten= 94%, Lag= 157.0 min
Discarded = 0.07 cfs @ 14.76 hrs, Volume= 0.086 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 99.55' @ 14.76 hrs Surf.Area= 3,103 sf Storage= 1,603 cf

Plug-Flow detention time= 244.5 min calculated for 0.086 af (100% of inflow)
Center-of-Mass det. time= 244.5 min (1,133.6 - 889.1)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	3,067 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
99.00	2,700	0	0	2,700
100.00	3,450	3,067	3,067	3,475

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	99.73'	15.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.07 cfs @ 14.76 hrs HW=99.55' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=99.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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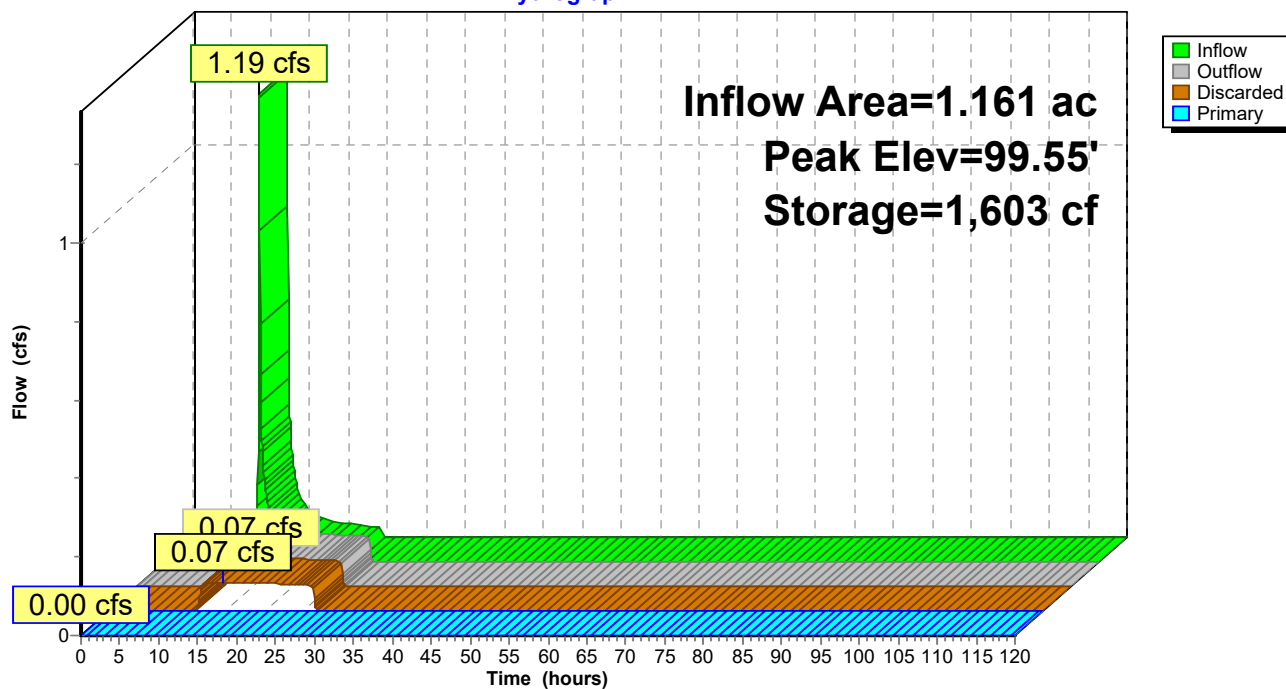
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Pond BAS 2-B: BAS 2-B

Hydrograph



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Summary for Pond BAS 2-C: BAS 2-C

Inflow Area = 1.461 ac, 38.00% Impervious, Inflow Depth = 1.92" for 2-Year event
Inflow = 3.43 cfs @ 12.13 hrs, Volume= 0.234 af
Outflow = 0.16 cfs @ 14.65 hrs, Volume= 0.234 af, Atten= 95%, Lag= 151.2 min
Primary = 0.16 cfs @ 14.65 hrs, Volume= 0.234 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.50' @ 14.65 hrs Surf.Area= 3,925 sf Storage= 5,725 cf

Plug-Flow detention time= 481.1 min calculated for 0.234 af (100% of inflow)
Center-of-Mass det. time= 481.3 min (1,314.1 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	7,748 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.60	100	0	0	100
101.00	3,050	494	494	3,050
103.00	4,237	7,255	7,748	4,312

Device	Routing	Invert	Outlet Devices
#1	Device 3	102.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Device 3	100.60'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	100.60'	12.0" Round RCP_Round 12" X 2.00 L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.60' / 100.30' S= 0.0111 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.15 cfs @ 14.65 hrs HW=102.50' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 0.15 cfs of 10.29 cfs potential flow)

↑ **1=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.21 fps)

↑ **2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.50 fps)

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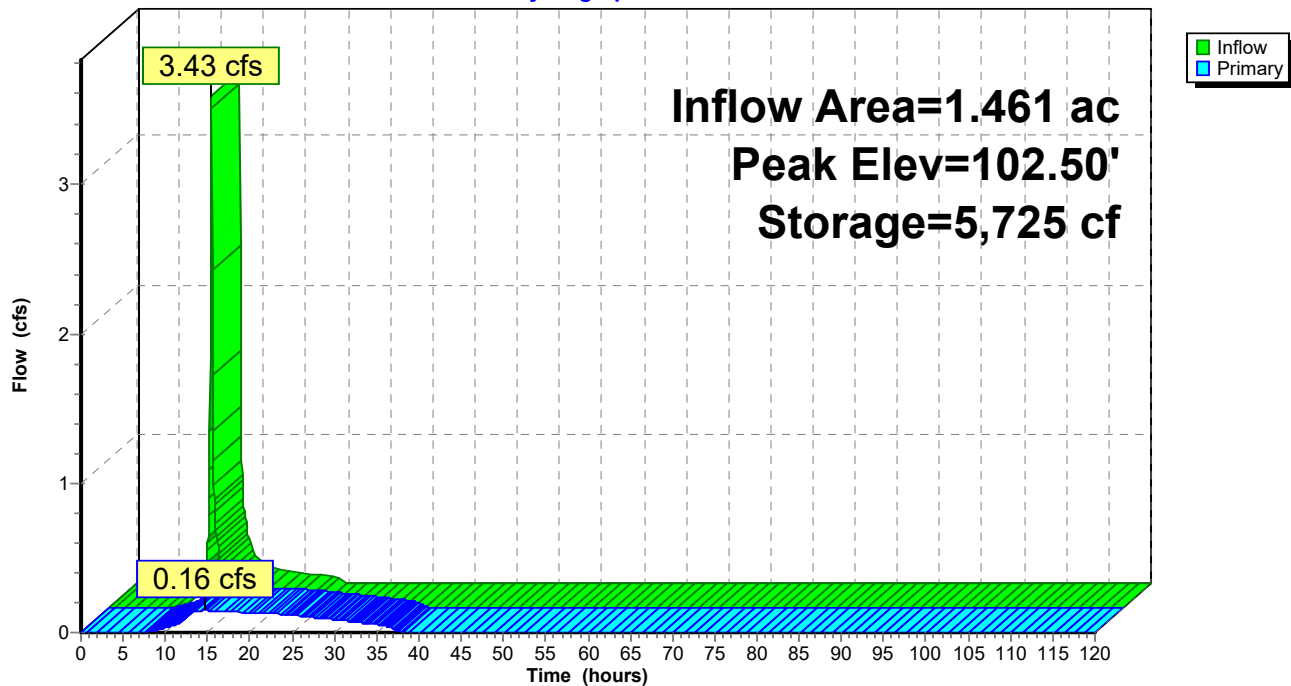
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Pond BAS 2-C: BAS 2-C

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Summary for Pond BAS 2-D: BAS 2-D

Inflow Area = 8.783 ac, 33.03% Impervious, Inflow Depth = 0.74" for 2-Year event
Inflow = 7.16 cfs @ 12.14 hrs, Volume= 0.543 af
Outflow = 0.37 cfs @ 16.12 hrs, Volume= 0.543 af, Atten= 95%, Lag= 238.9 min
Discarded = 0.37 cfs @ 16.12 hrs, Volume= 0.543 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 106.74' @ 16.12 hrs Surf.Area= 15,659 sf Storage= 11,031 cf

Plug-Flow detention time= 351.3 min calculated for 0.542 af (100% of inflow)
Center-of-Mass det. time= 351.4 min (1,252.4 - 901.1)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	53,997 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	14,000	0	0	14,000
107.00	16,250	15,111	15,111	16,292
108.00	19,800	17,996	33,107	19,873
109.00	22,000	20,890	53,997	22,132

Device	Routing	Invert	Outlet Devices
#1	Device 3	108.60'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	106.00'	1.020 in/hr Exfiltration over Wetted area
#3	Primary	106.00'	18.0" Round Culvert L= 185.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 106.00' / 102.00' S= 0.0216 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Discarded OutFlow Max=0.37 cfs @ 16.12 hrs HW=106.74' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' (Free Discharge)

↑ **3=Culvert** (Controls 0.00 cfs)

↑ **1=Orifice/Grate** (Controls 0.00 cfs)

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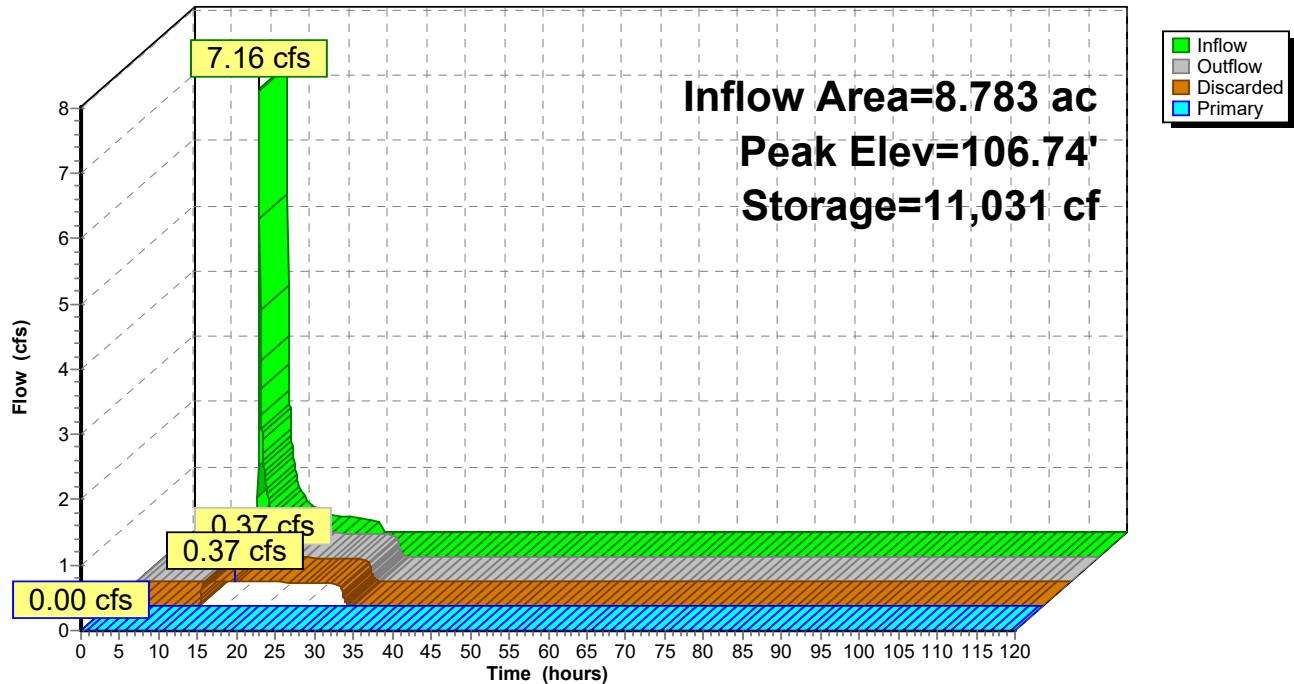
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Pond BAS 2-D: BAS 2-D

Hydrograph



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Summary for Pond BAS 2-E: BAS 2-E

Inflow Area = 2.574 ac, 44.91% Impervious, Inflow Depth = 1.41" for 2-Year event
Inflow = 4.46 cfs @ 12.13 hrs, Volume= 0.303 af
Outflow = 0.30 cfs @ 13.83 hrs, Volume= 0.303 af, Atten= 93%, Lag= 101.5 min
Discarded = 0.30 cfs @ 13.83 hrs, Volume= 0.303 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 100.45' @ 13.83 hrs Surf.Area= 12,701 sf Storage= 5,505 cf

Plug-Flow detention time= 177.9 min calculated for 0.303 af (100% of inflow)
Center-of-Mass det. time= 177.9 min (1,035.4 - 857.5)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	14,162 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	12,000	0	0	12,000
101.00	13,600	12,792	12,792	13,649
101.10	13,800	1,370	14,162	13,854

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.70'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.30 cfs @ 13.83 hrs HW=100.45' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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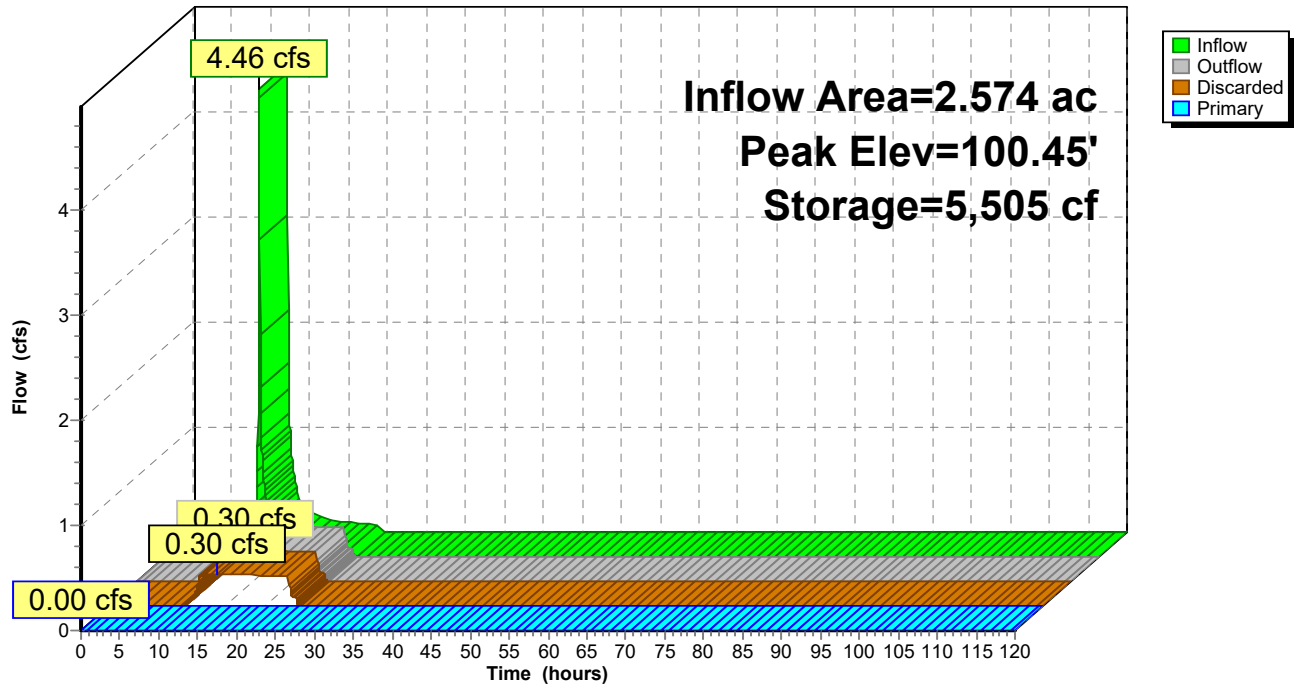
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Pond BAS 2-E: BAS 2-E

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Summary for Pond BAS 2-F: BAS 2-F

Inflow Area = 3.255 ac, 41.28% Impervious, Inflow Depth = 1.29" for 2-Year event
Inflow = 5.09 cfs @ 12.14 hrs, Volume= 0.349 af
Outflow = 0.50 cfs @ 13.30 hrs, Volume= 0.349 af, Atten= 90%, Lag= 69.8 min
Discarded = 0.50 cfs @ 13.30 hrs, Volume= 0.349 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 101.62' @ 13.30 hrs Surf.Area= 8,897 sf Storage= 5,295 cf

Plug-Flow detention time= 92.1 min calculated for 0.349 af (100% of inflow)
Center-of-Mass det. time= 92.1 min (956.4 - 864.3)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	19,860 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
101.00	8,130	0	0	8,130
102.00	9,380	8,748	8,748	9,423
103.00	10,700	10,033	18,780	10,790
103.10	10,900	1,080	19,860	10,993

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	102.50'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.50 cfs @ 13.30 hrs HW=101.62' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.50 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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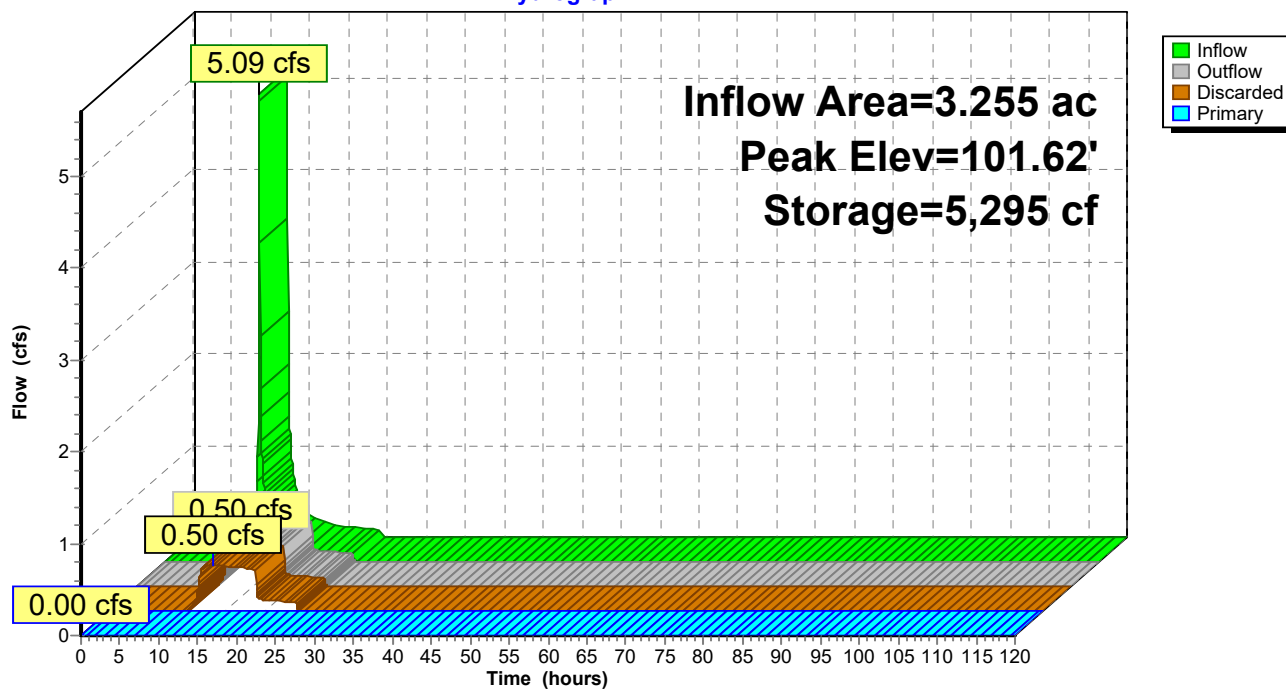
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Pond BAS 2-F: BAS 2-F

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Summary for Pond BAS 3-A: BAS 3-A

Inflow Area = 2.218 ac, 40.95% Impervious, Inflow Depth = 1.77" for 2-Year event
Inflow = 4.80 cfs @ 12.13 hrs, Volume= 0.326 af
Outflow = 0.27 cfs @ 14.17 hrs, Volume= 0.326 af, Atten= 94%, Lag= 122.5 min
Primary = 0.27 cfs @ 14.17 hrs, Volume= 0.326 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.11' @ 14.17 hrs Surf.Area= 6,878 sf Storage= 7,305 cf

Plug-Flow detention time= 331.7 min calculated for 0.326 af (100% of inflow)
Center-of-Mass det. time= 331.9 min (1,172.1 - 840.2)

Volume	Invert	Avail.Storage	Storage Description
#1	100.70'	23,581 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.70	300	0	0	300
101.00	5,100	664	664	5,100
104.00	10,500	22,918	23,581	10,579

Device	Routing	Invert	Outlet Devices
#1	Device 3	100.70'	3.0" Vert. Orifice/Grate C= 0.600
#2	Device 3	103.85'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	100.70'	12.0" Round RCP_Round 12" L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.70' / 99.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 14.17 hrs HW=102.11' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 0.27 cfs of 4.52 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.46 fps)

↑ **2=Orifice/Grate** (Controls 0.00 cfs)

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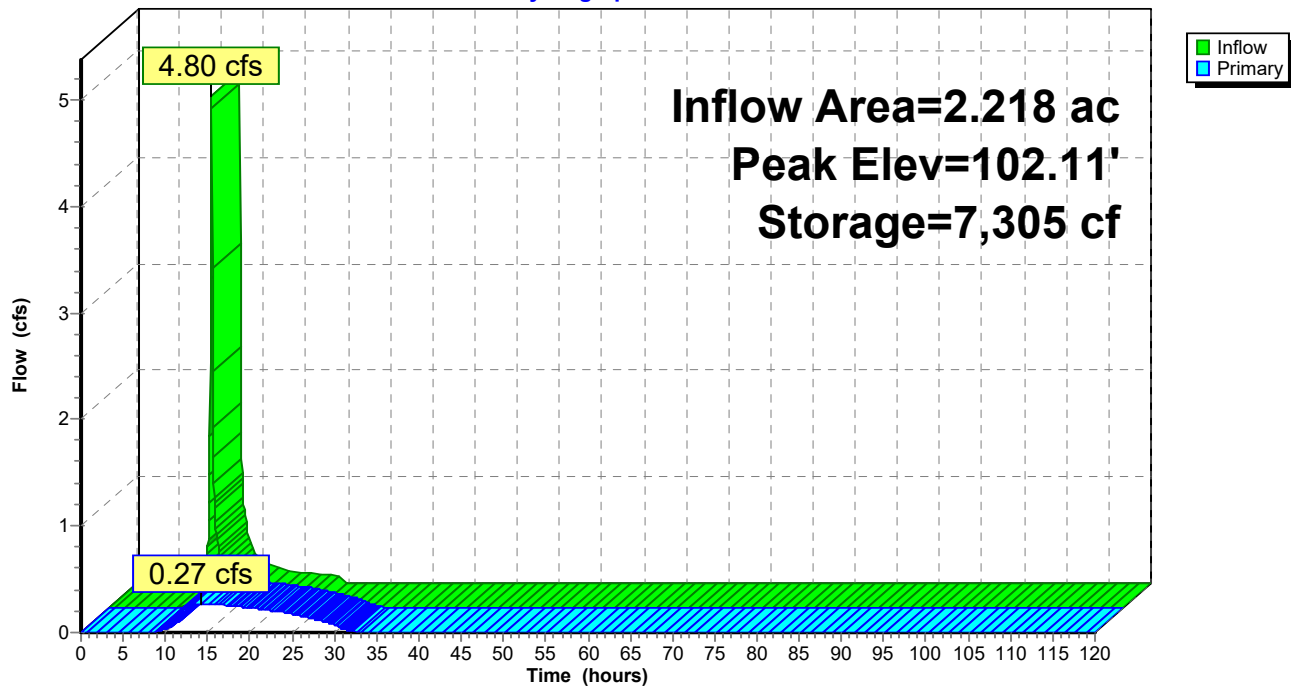
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Pond BAS 3-A: BAS 3-A

Hydrograph



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Summary for Pond BAS 3-B: BAS 3-B

Inflow Area = 6.110 ac, 38.90% Impervious, Inflow Depth = 1.16" for 2-Year event
Inflow = 8.58 cfs @ 12.14 hrs, Volume= 0.593 af
Outflow = 0.33 cfs @ 16.51 hrs, Volume= 0.593 af, Atten= 96%, Lag= 262.2 min
Discarded = 0.33 cfs @ 16.51 hrs, Volume= 0.593 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 98.12' @ 16.51 hrs Surf.Area= 13,746 sf Storage= 14,046 cf

Plug-Flow detention time= 493.5 min calculated for 0.593 af (100% of inflow)
Center-of-Mass det. time= 493.4 min (1,364.5 - 871.1)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	63,788 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
97.00	11,300	0	0	11,300
101.00	21,100	63,788	63,788	21,261

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.60'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.33 cfs @ 16.51 hrs HW=98.12' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.33 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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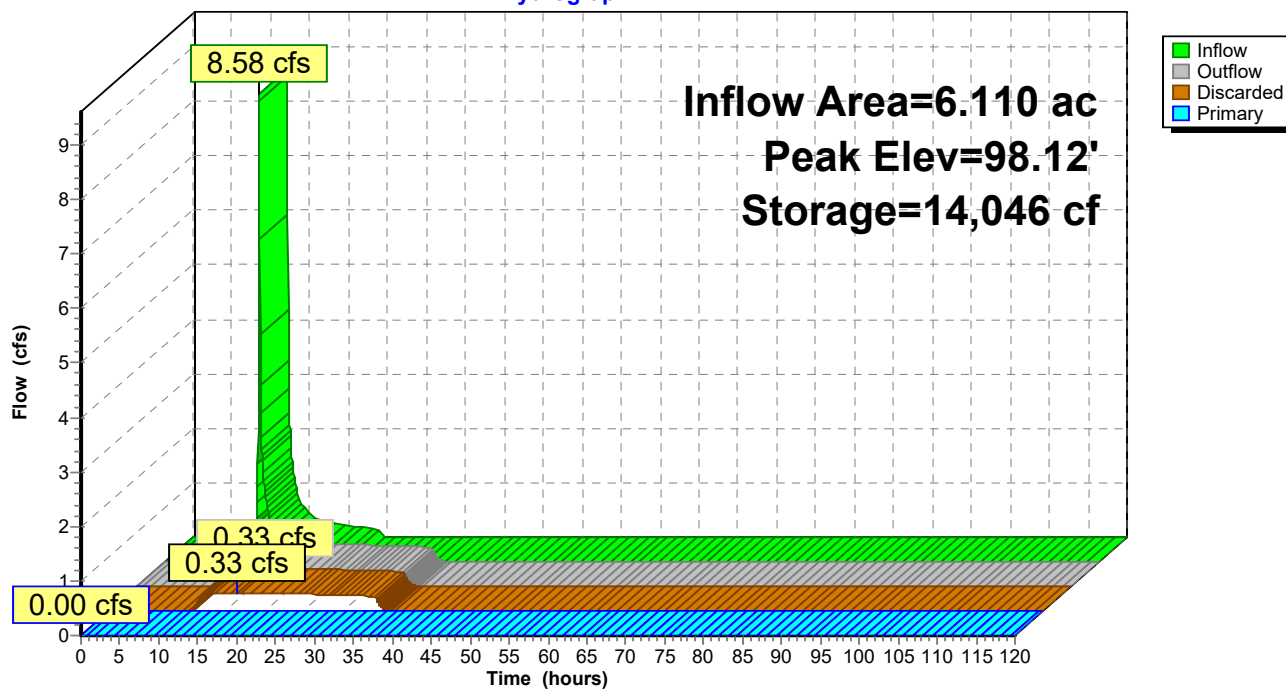
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Pond BAS 3-B: BAS 3-B

Hydrograph



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Summary for Pond BAS 6-A: BAS 6-A

Inflow Area = 3.389 ac, 43.46% Impervious, Inflow Depth = 1.35" for 2-Year event
Inflow = 5.58 cfs @ 12.13 hrs, Volume= 0.381 af
Outflow = 0.24 cfs @ 15.23 hrs, Volume= 0.381 af, Atten= 96%, Lag= 185.7 min
Discarded = 0.24 cfs @ 15.23 hrs, Volume= 0.381 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 89.21' @ 15.23 hrs Surf.Area= 9,986 sf Storage= 8,561 cf

Plug-Flow detention time= 399.2 min calculated for 0.381 af (100% of inflow)
Center-of-Mass det. time= 399.3 min (1,260.2 - 860.9)

Volume	Invert	Avail.Storage	Storage Description
#1	88.30'	28,567 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
88.30	8,860	0	0	8,860
91.00	12,400	28,567	28,567	12,534

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.30'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	90.78'	14.0' long x 21.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.24 cfs @ 15.23 hrs HW=89.21' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.30' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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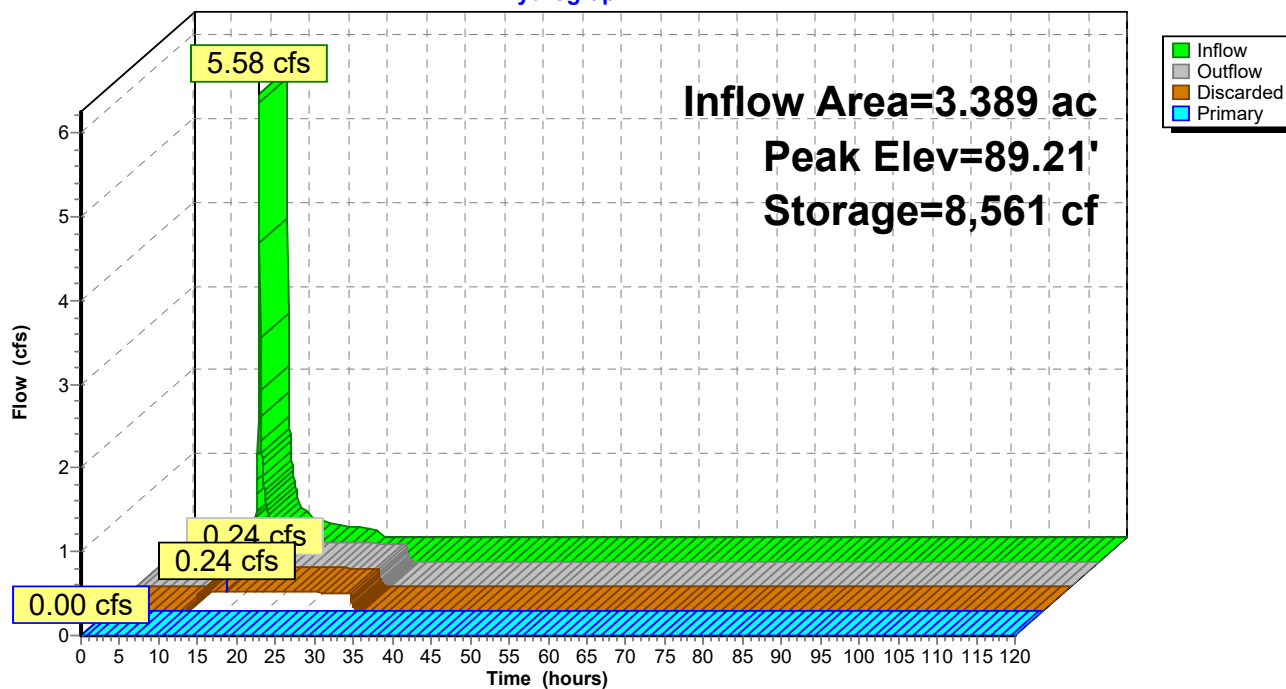
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Pond BAS 6-A: BAS 6-A

Hydrograph



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Summary for Pond BAS 7-A: BAS 7-A

Inflow Area = 4.495 ac, 51.83% Impervious, Inflow Depth = 0.94" for 2-Year event
Inflow = 4.94 cfs @ 12.14 hrs, Volume= 0.352 af
Outflow = 0.28 cfs @ 14.93 hrs, Volume= 0.352 af, Atten= 94%, Lag= 167.4 min
Discarded = 0.28 cfs @ 14.93 hrs, Volume= 0.352 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 91.64' @ 14.93 hrs Surf.Area= 11,698 sf Storage= 7,006 cf

Plug-Flow detention time= 289.5 min calculated for 0.352 af (100% of inflow)
Center-of-Mass det. time= 289.5 min (1,174.8 - 885.4)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	42,338 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	10,100	0	0	10,100
94.00	18,550	42,338	42,338	18,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	93.87'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.28 cfs @ 14.93 hrs HW=91.64' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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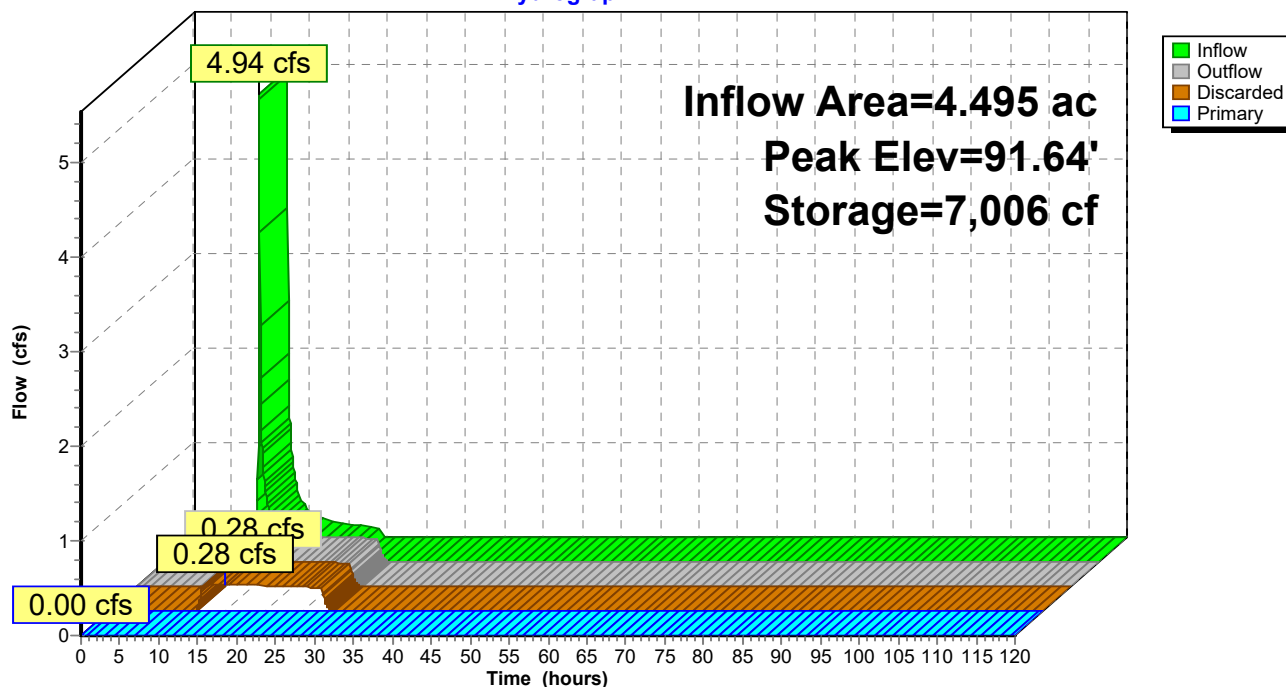
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Pond BAS 7-A: BAS 7-A

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Summary for Pond BAS 9-A: BAS 9-A

Inflow Area = 2.828 ac, 32.51% Impervious, Inflow Depth = 0.12" for 2-Year event
Inflow = 0.09 cfs @ 12.33 hrs, Volume= 0.028 af
Outflow = 0.06 cfs @ 12.96 hrs, Volume= 0.028 af, Atten= 28%, Lag= 37.8 min
Discarded = 0.06 cfs @ 12.96 hrs, Volume= 0.028 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 61.05' @ 12.96 hrs Surf.Area= 1,116 sf Storage= 53 cf

Plug-Flow detention time= 9.7 min calculated for 0.028 af (100% of inflow)
Center-of-Mass det. time= 9.7 min (1,001.5 - 991.8)

Volume	Invert	Avail.Storage	Storage Description
#1	61.00'	5,320 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	1,100	0	0	1,100
63.00	1,850	2,918	2,918	1,897
64.00	3,000	2,402	5,320	3,060

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	63.90'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.06 cfs @ 12.96 hrs HW=61.05' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=61.00' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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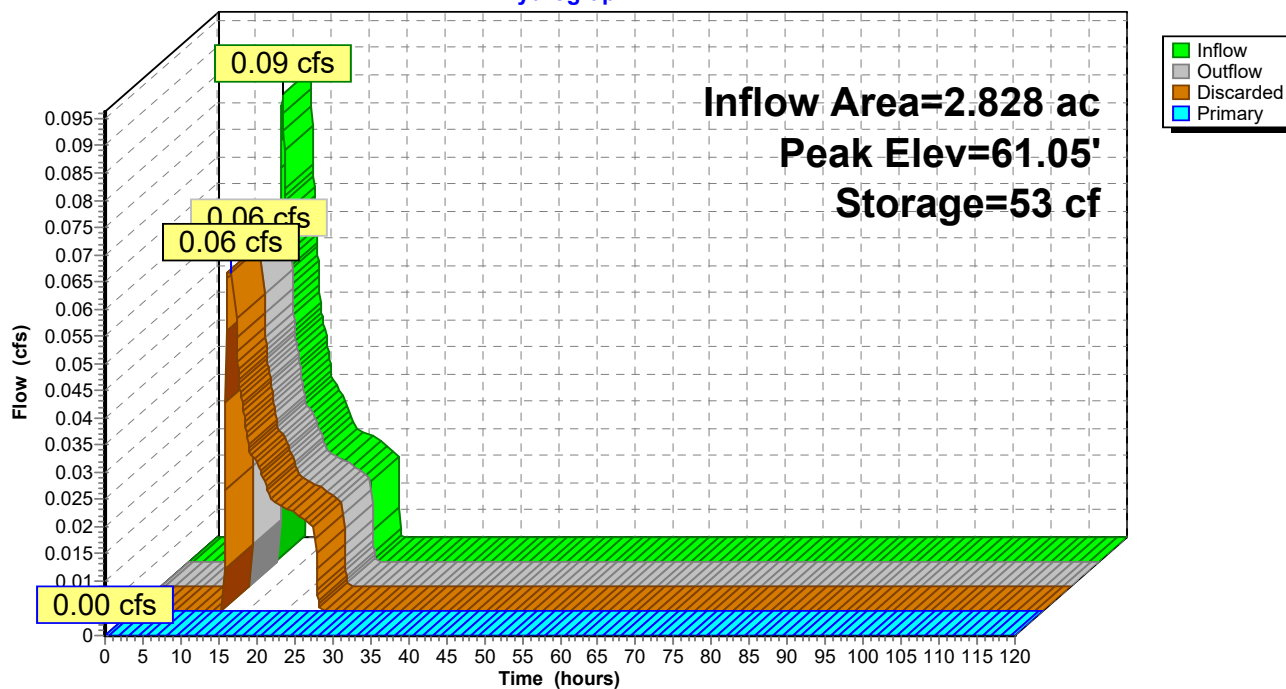
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Pond BAS 9-A: BAS 9-A

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Summary for Pond BAS 9-B: BAS 9-B

Inflow Area = 5.910 ac, 58.27% Impervious, Inflow Depth = 1.13" for 2-Year event
Inflow = 7.94 cfs @ 12.14 hrs, Volume= 0.559 af
Outflow = 0.80 cfs @ 13.32 hrs, Volume= 0.559 af, Atten= 90%, Lag= 70.8 min
Discarded = 0.30 cfs @ 13.32 hrs, Volume= 0.479 af
Primary = 0.50 cfs @ 13.32 hrs, Volume= 0.079 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 62.60' @ 13.32 hrs Surf.Area= 5,362 sf Storage= 10,743 cf

Plug-Flow detention time= 359.8 min calculated for 0.559 af (100% of inflow)
Center-of-Mass det. time= 359.7 min (1,227.8 - 868.1)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	28,387 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	3,000	0	0	3,000
61.00	3,800	3,392	3,392	3,826
62.00	4,800	4,290	7,682	4,853
63.00	5,750	5,268	12,950	5,837
64.00	8,000	6,844	19,794	8,106
65.00	9,200	8,593	28,387	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	60.00'	2.410 in/hr Exfiltration over Wetted area
#2	Device 3	62.40'	1.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Primary	62.00'	18.0" Round CMP_Round 18" L= 90.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 62.00' / 61.42' S= 0.0064 ' / S= 0.0064 ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.30 cfs @ 13.32 hrs HW=62.60' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.49 cfs @ 13.32 hrs HW=62.60' (Free Discharge)

↑ **3=CMP_Round 18"** (Passes 0.49 cfs of 1.75 cfs potential flow)

↑ **2=Sharp-Crested Rectangular Weir** (Weir Controls 0.49 cfs @ 1.47 fps)

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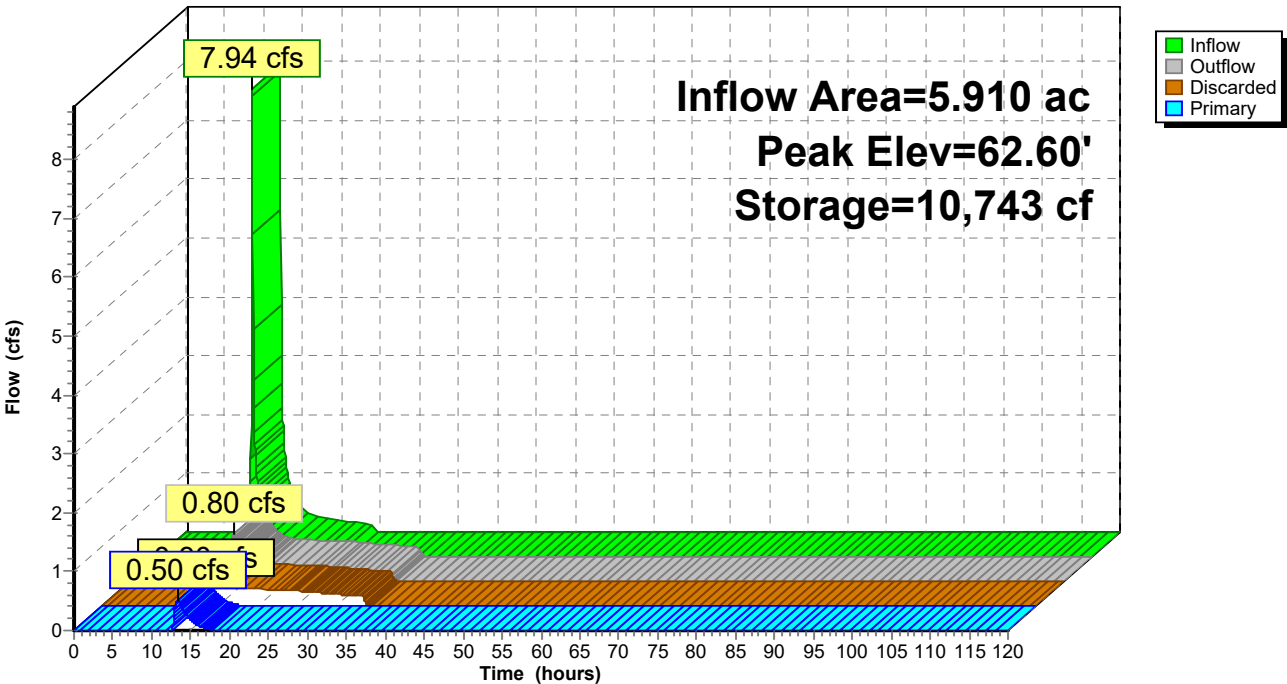
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond BAS 9-B: BAS 9-B

Hydrograph



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Summary for Pond W-N: Wetland Series N

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 0.45" for 2-Year event
Inflow = 2.22 cfs @ 12.36 hrs, Volume= 1.147 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 87.34' @ 120.00 hrs Surf.Area= 30,296 sf Storage= 49,948 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=85.50' (Free Discharge)

↑1=RCP_Round 24" (Controls 0.00 cfs)

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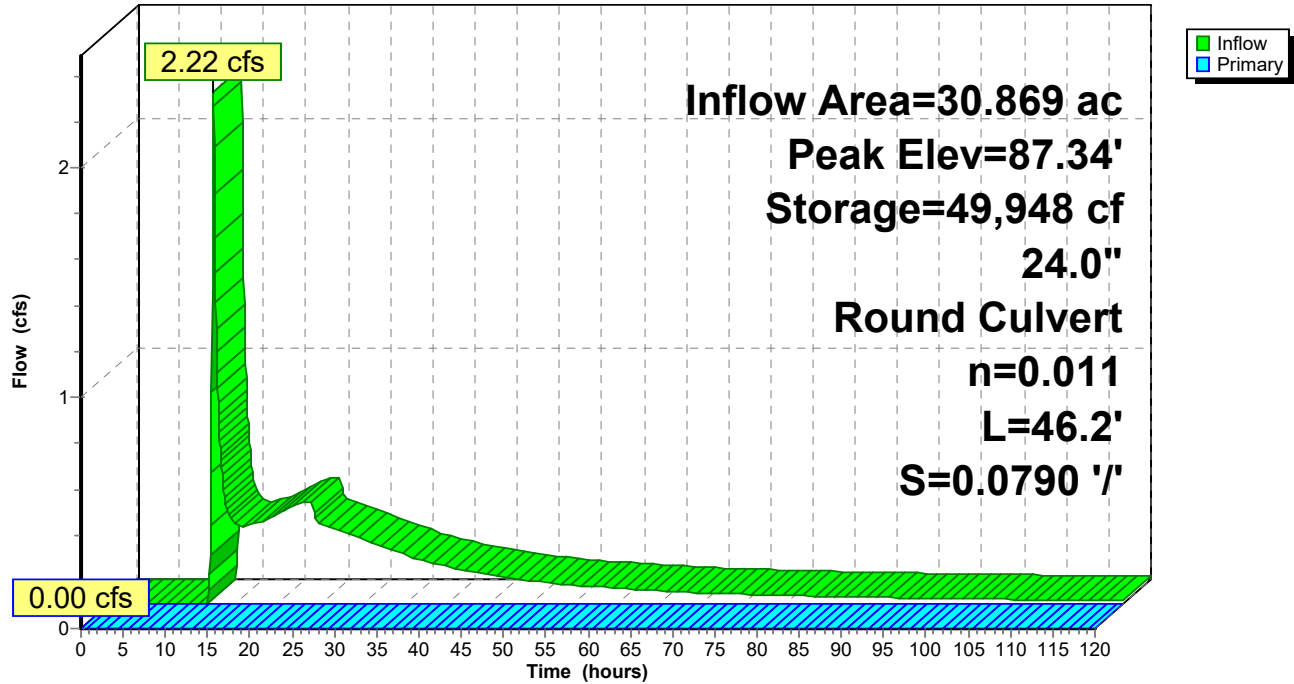
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-N: Wetland Series N

Hydrograph



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Summary for Pond W-O: Wetland Series O

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.09" for 2-Year event
Inflow = 2.00 cfs @ 12.47 hrs, Volume= 0.436 af
Outflow = 0.47 cfs @ 15.05 hrs, Volume= 0.435 af, Atten= 76%, Lag= 154.9 min
Primary = 0.47 cfs @ 15.05 hrs, Volume= 0.435 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 77.28' @ 15.05 hrs Surf.Area= 19,468 sf Storage= 6,575 cf

Plug-Flow detention time= 379.6 min calculated for 0.435 af (100% of inflow)
Center-of-Mass det. time= 378.5 min (1,344.1 - 965.6)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S= 0.0114 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.47 cfs @ 15.05 hrs HW=77.28' (Free Discharge)

1=Culvert (Inlet Controls 0.47 cfs @ 1.57 fps)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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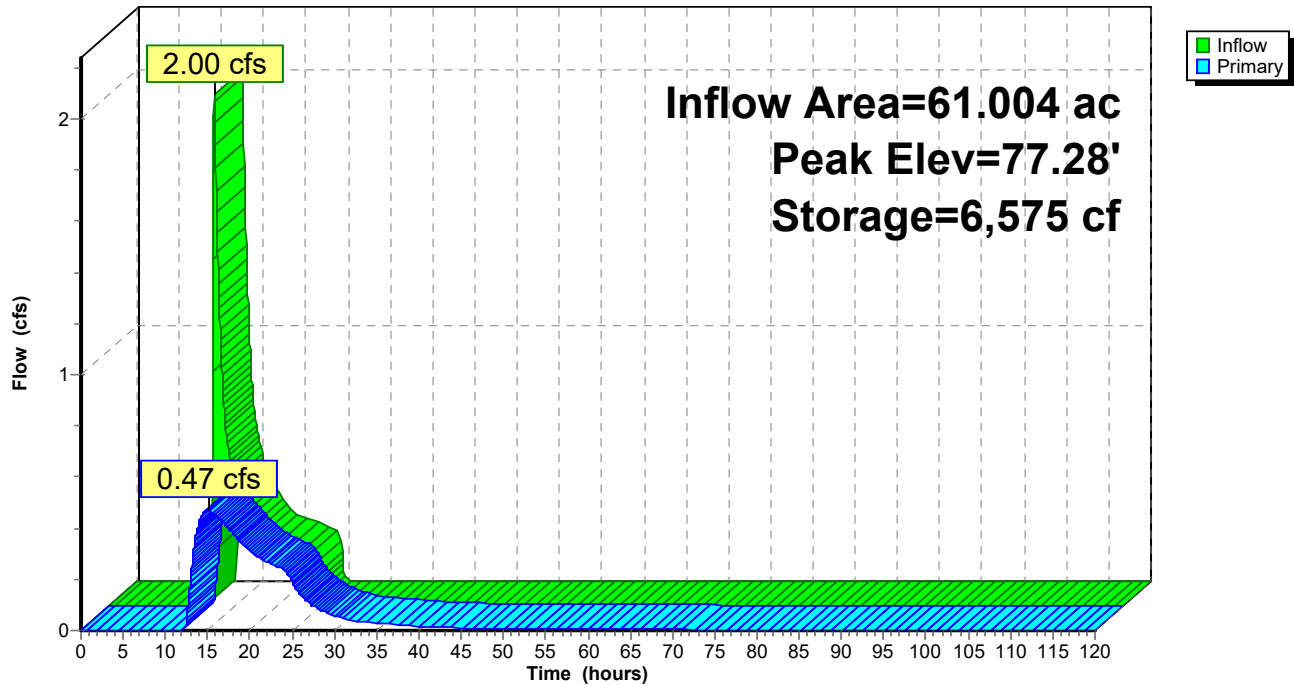
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-O: Wetland Series O

Hydrograph



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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth = 0.16" for 2-Year event
Inflow = 5.85 cfs @ 12.24 hrs, Volume= 0.582 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 77.20' @ 24.85 hrs Surf.Area= 58,200 sf Storage= 25,350 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices									
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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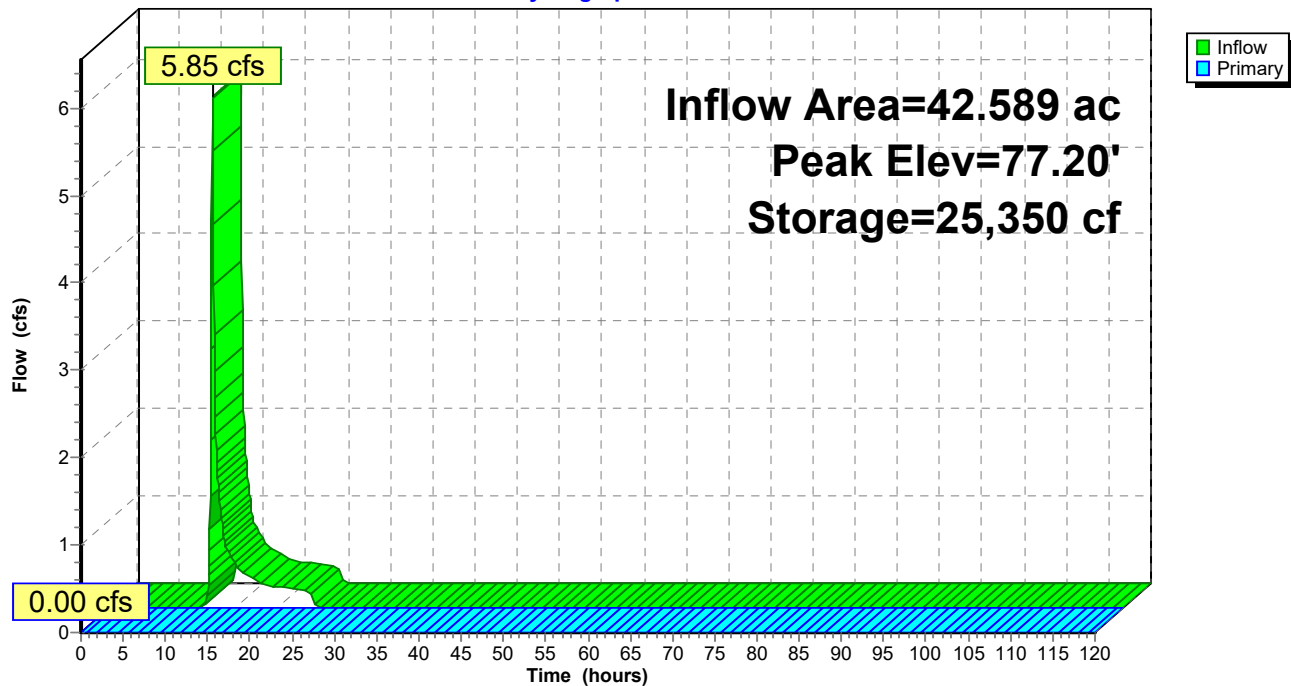
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-QP: Wetland Series Q & P

Hydrograph



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Summary for Pond W-R: Wetland Series R

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 0.69" for 2-Year event
 Inflow = 10.02 cfs @ 12.31 hrs, Volume= 1.475 af
 Outflow = 0.35 cfs @ 24.29 hrs, Volume= 0.853 af, Atten= 97%, Lag= 718.6 min
 Primary = 0.35 cfs @ 24.29 hrs, Volume= 0.853 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 87.66' @ 24.29 hrs Surf.Area= 81,980 sf Storage= 52,918 cf

Plug-Flow detention time= 1,738.7 min calculated for 0.853 af (58% of inflow)
 Center-of-Mass det. time= 1,556.4 min (2,523.5 - 967.2)

Volume	Invert	Avail.Storage	Storage Description	
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.35 cfs @ 24.29 hrs HW=87.66' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.35 cfs @ 2.31 fps)

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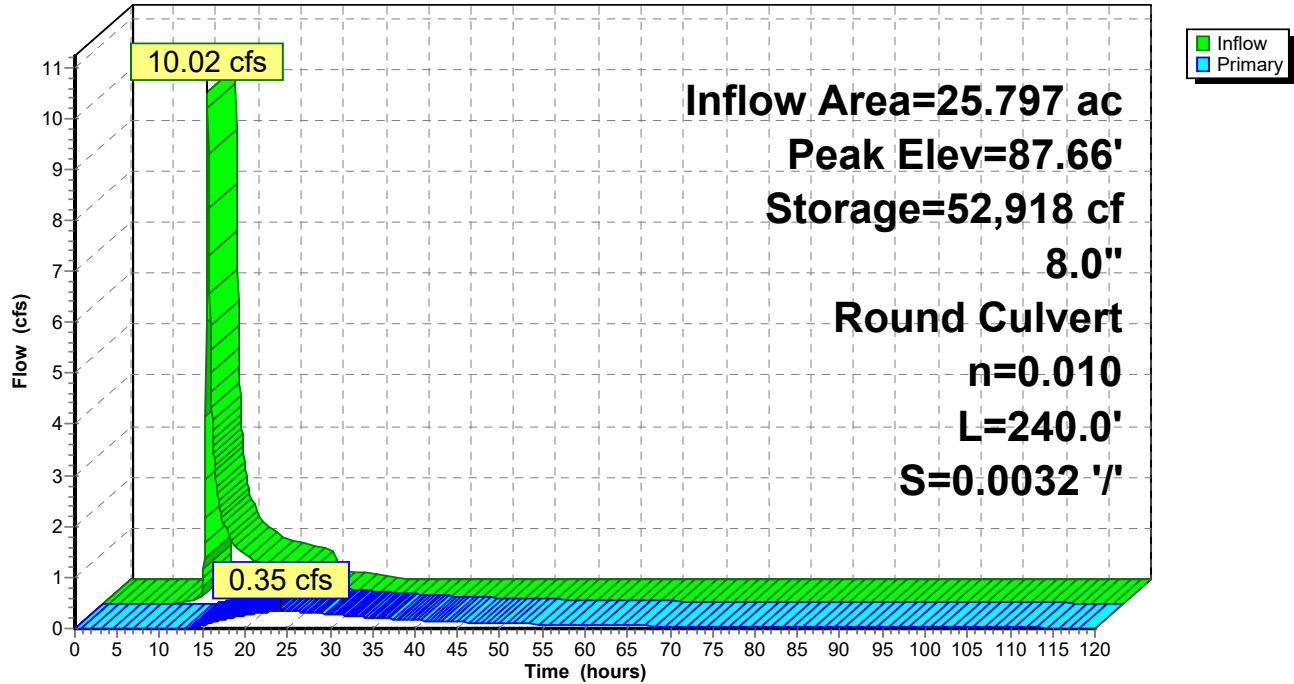
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-R: Wetland Series R

Hydrograph



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Summary for Subcatchment E-13:

Runoff = 0.66 cfs @ 12.21 hrs, Volume= 0.077 af, Depth= 0.71"

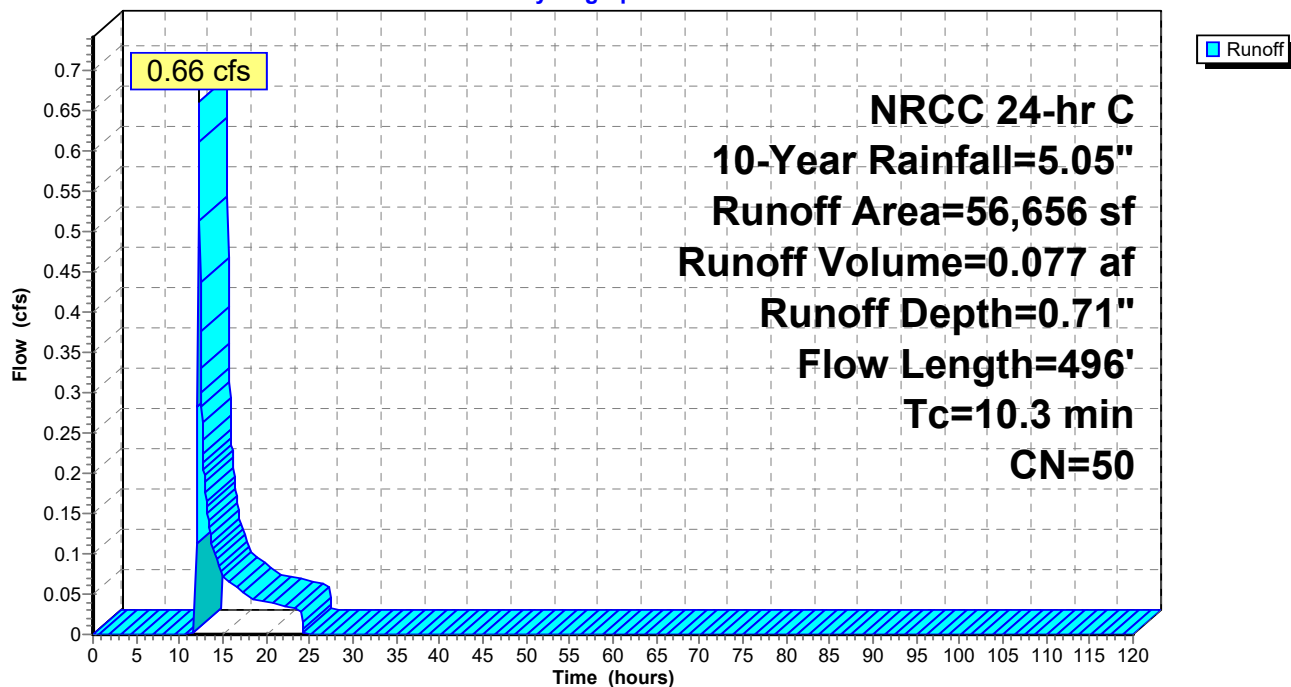
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



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Summary for Subcatchment P-10A: P-10A

Runoff = 0.01 cfs @ 14.35 hrs, Volume= 0.008 af, Depth= 0.12"

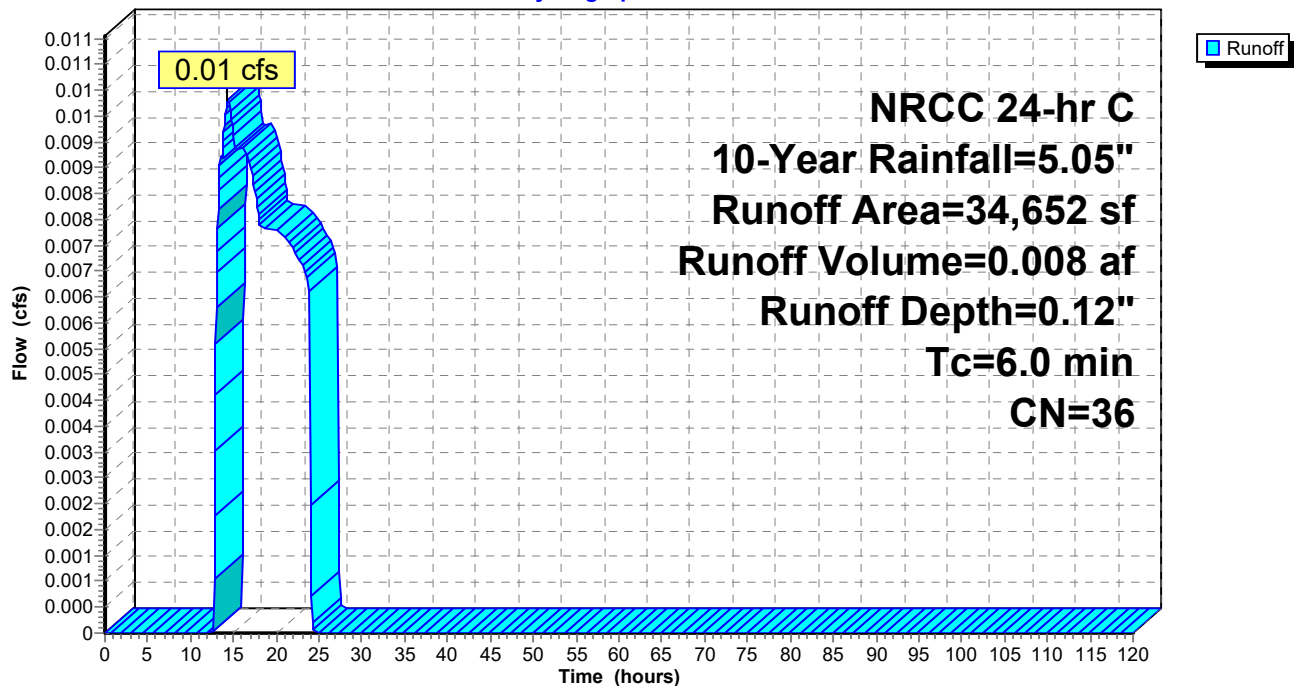
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	2,500	98	roof
	2,500	39	>75% Grass cover, Good, HSG A
	29,652	30	Woods, Good, HSG A
	34,652	36	Weighted Average
	32,152		92.79% Pervious Area
	2,500		7.21% Impervious Area

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

Subcatchment P-10A: P-10A

Hydrograph



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Summary for Subcatchment P-10B: P-10B

Runoff = 2.31 cfs @ 12.14 hrs, Volume= 0.163 af, Depth= 1.47"

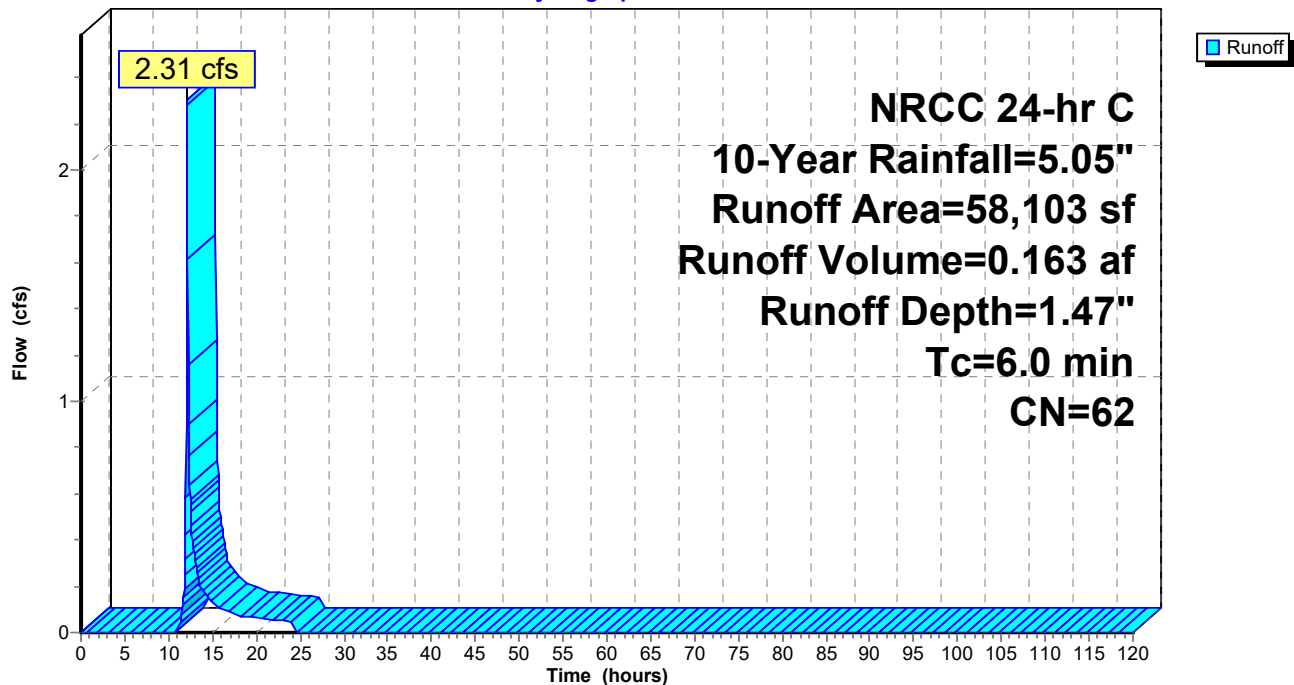
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	2,050	98	basin
	56,053	61	1/4 acre lots, 38% imp, HSG A
	58,103	62	Weighted Average
	34,753		59.81% Pervious Area
	23,350		40.19% Impervious Area

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

Subcatchment P-10B: P-10B

Hydrograph



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Summary for Subcatchment P-10U: P-10U

Runoff = 0.02 cfs @ 16.28 hrs, Volume= 0.015 af, Depth= 0.09"

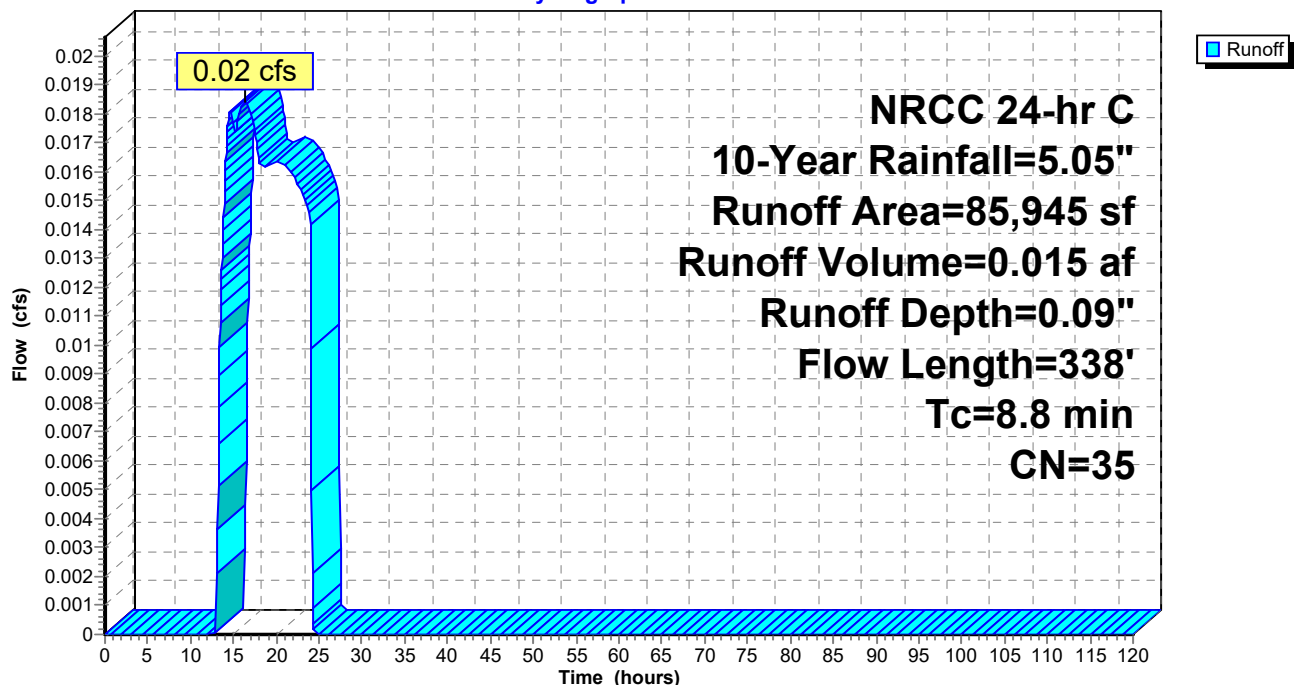
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
4,986	98	Paved parking, HSG A
68,659	30	Woods, Good, HSG A
12,300	39	>75% Grass cover, Good, HSG A
85,945	35	Weighted Average
80,959		94.20% Pervious Area
4,986		5.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
1.3	138	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
8.8	338	Total			

Subcatchment P-10U: P-10U

Hydrograph



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Summary for Subcatchment P-11A: P-11A

Runoff = 1.63 cfs @ 12.14 hrs, Volume= 0.112 af, Depth= 1.84"

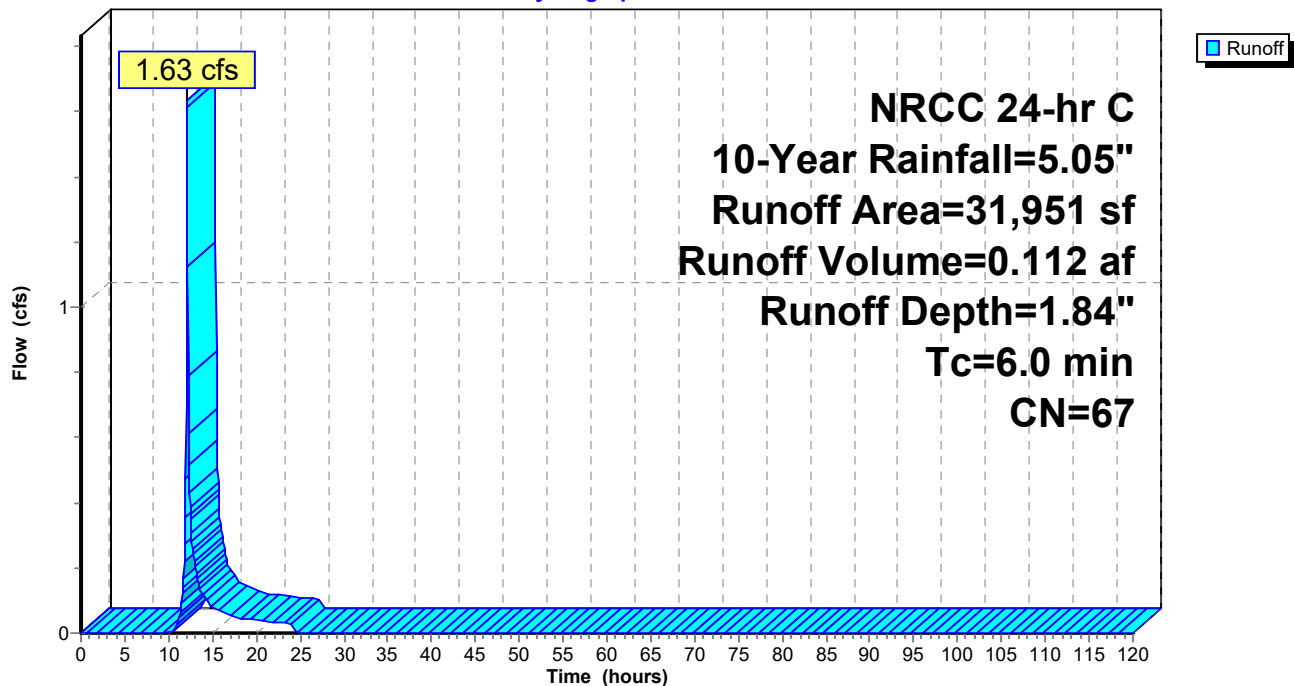
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
	16,752	39	>75% Grass cover, Good, HSG A
*	11,889	98	road with sidewalk
*	3,310	98	PARKING LOT
	31,951	67	Weighted Average
	16,752		52.43% Pervious Area
	15,199		47.57% Impervious Area

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

Subcatchment P-11A: P-11A

Hydrograph



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Summary for Subcatchment P-11B: P-11B

Runoff = 9.71 cfs @ 12.13 hrs, Volume= 0.662 af, Depth= 2.07"

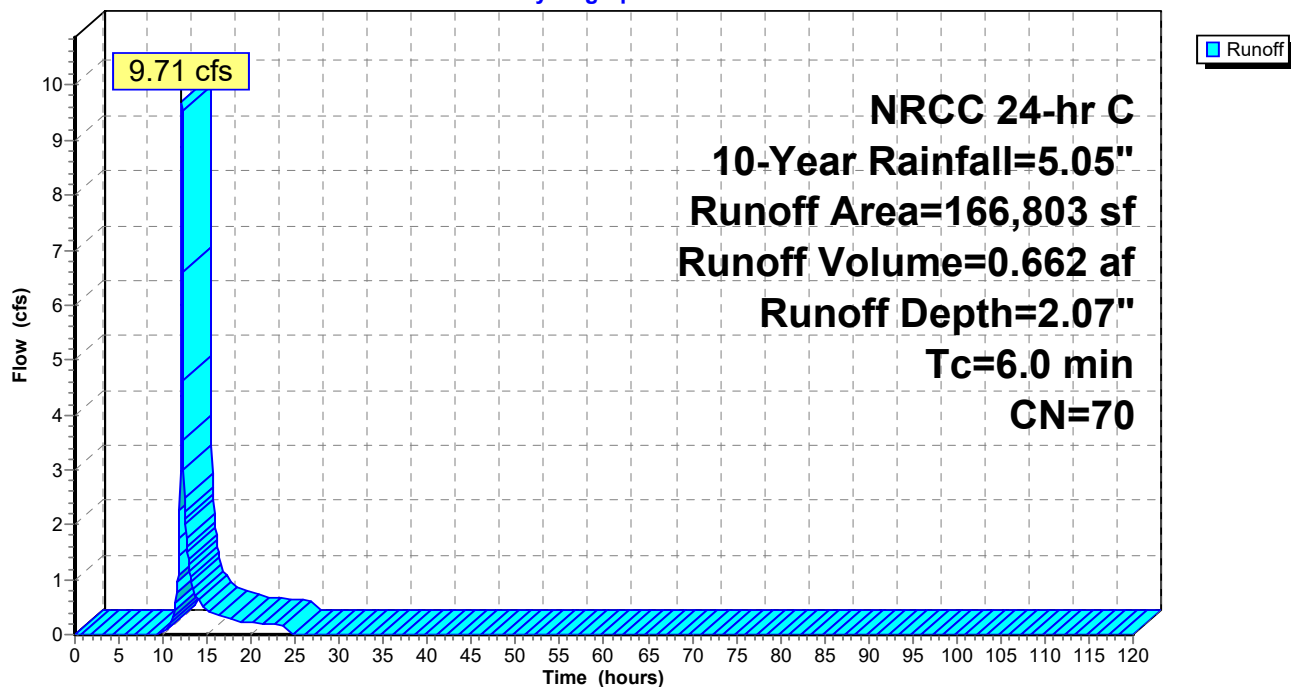
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	9,500	98	roof
	28,000	39	>75% Grass cover, Good, HSG A
	2,303	61	>75% Grass cover, Good, HSG B
*	127,000	75	stone field
	166,803	70	Weighted Average
	157,303		94.30% Pervious Area
	9,500		5.70% Impervious Area

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

Subcatchment P-11B: P-11B

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-11U: P-11U

Runoff = 0.04 cfs @ 13.12 hrs, Volume= 0.024 af, Depth= 0.18"

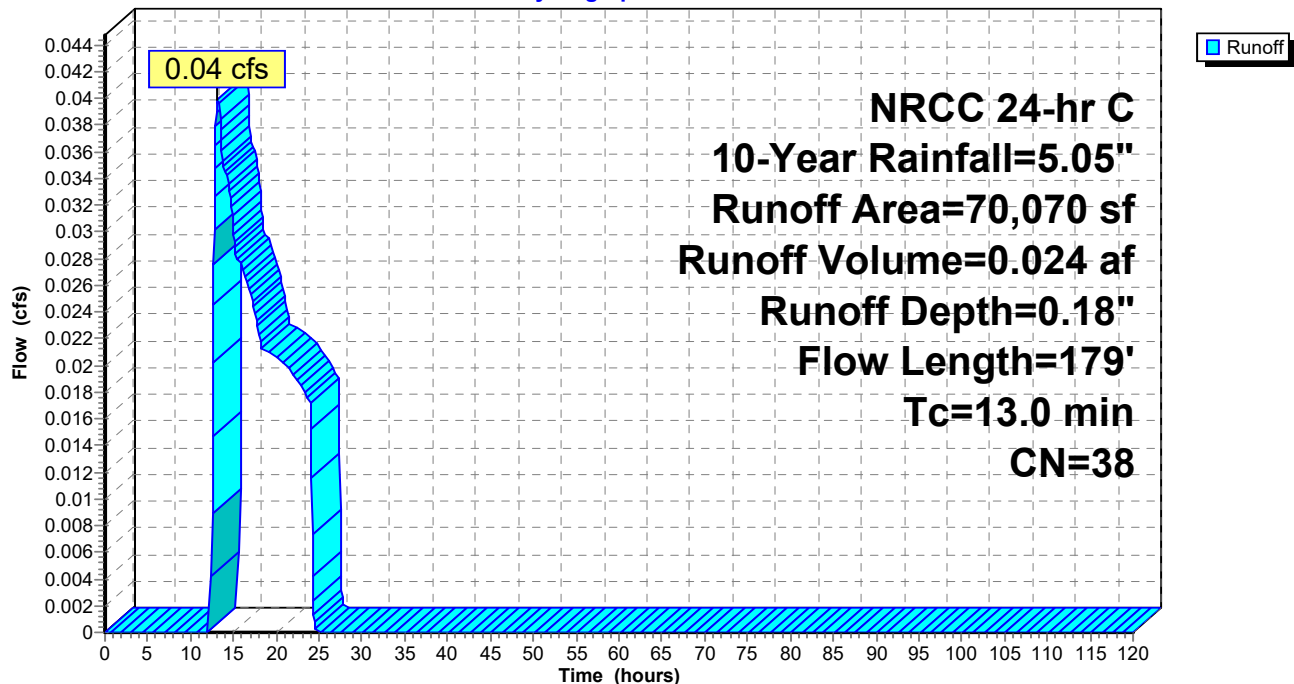
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
23,000	55	Woods, Good, HSG B
47,070	30	Woods, Good, HSG A
70,070	38	Weighted Average
70,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.4	129	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
13.0	179	Total			

Subcatchment P-11U: P-11U

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Summary for Subcatchment P-12A: P-12A

Runoff = 15.27 cfs @ 12.14 hrs, Volume= 1.046 af, Depth= 1.92"

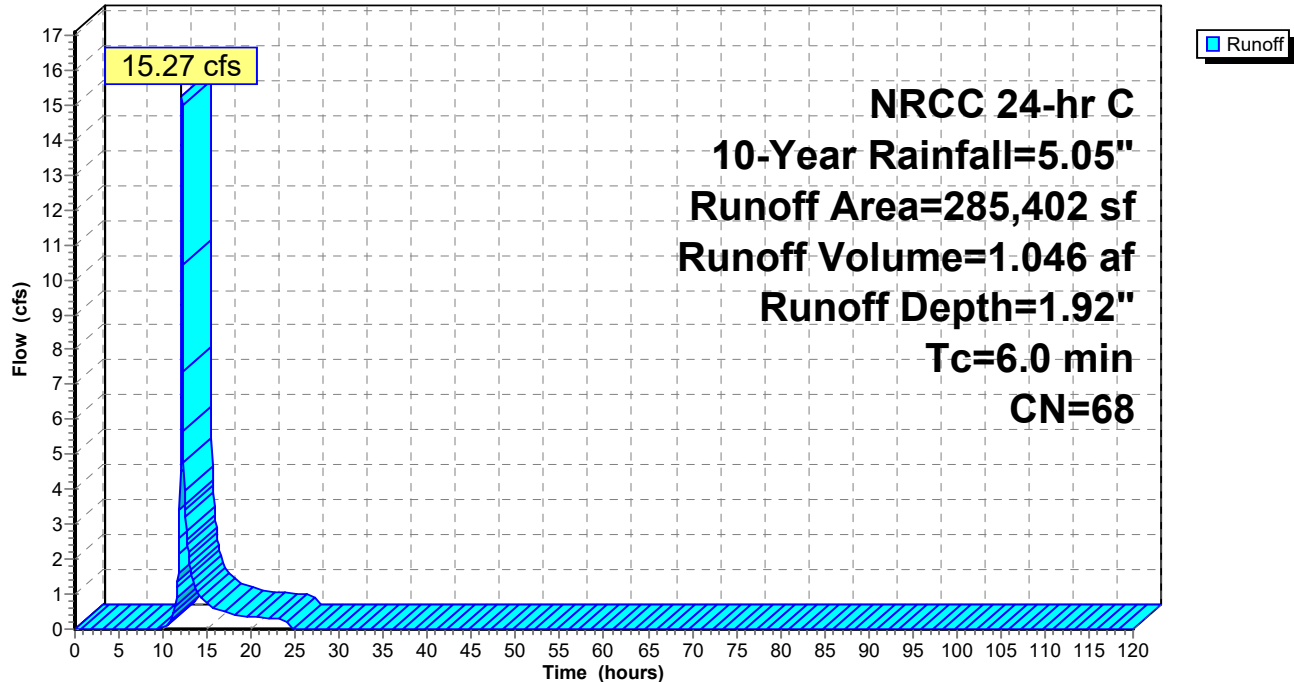
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	9,500	98	basin
	138,400	75	1/4 acre lots, 38% imp, HSG B
	33,000	61	1/4 acre lots, 38% imp, HSG A
	87,300	61	>75% Grass cover, Good, HSG B
	17,202	39	>75% Grass cover, Good, HSG A
	285,402	68	Weighted Average
	210,770		73.85% Pervious Area
	74,632		26.15% Impervious Area

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

Subcatchment P-12A: P-12A

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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-12B: P-12B

Runoff = 9.49 cfs @ 12.14 hrs, Volume= 0.703 af, Depth= 1.20"

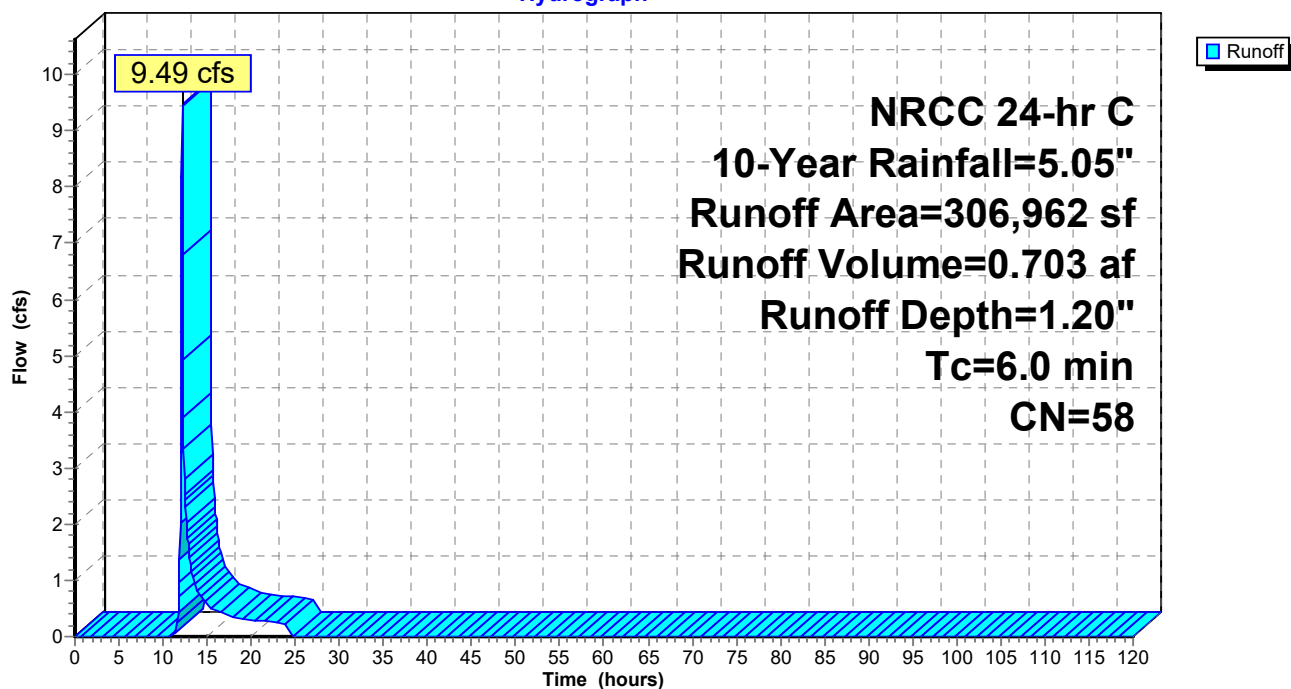
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	22,500	98	basin
	110,800	75	1/4 acre lots, 38% imp, HSG B
	164,162	39	>75% Grass cover, Good, HSG A
*	9,500	98	PARKING LOT
	306,962	58	Weighted Average
	232,858		75.86% Pervious Area
	74,104		24.14% Impervious Area

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

Subcatchment P-12B: P-12B

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-12U: P-12U

Runoff = 0.87 cfs @ 12.23 hrs, Volume= 0.151 af, Depth= 0.51"

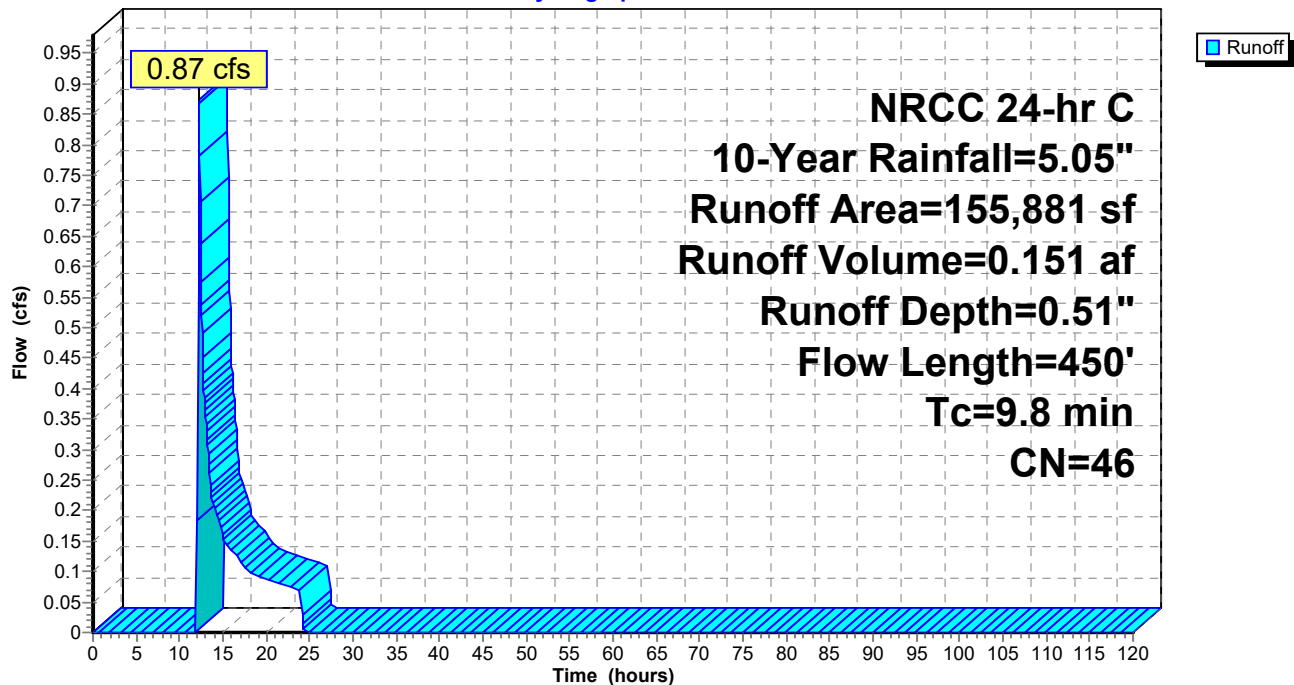
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
80,000	32	Woods/grass comb., Good, HSG A
59,250	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
* 5,000	98	2 units roof
10,731	61	>75% Grass cover, Good, HSG B
155,881	46	Weighted Average
150,881		96.79% Pervious Area
5,000		3.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
3.9	400	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.8	450	Total			

Subcatchment P-12U: P-12U

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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-14: P-14

Runoff = 24.38 cfs @ 12.33 hrs, Volume= 2.950 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
329,442	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,221,196	59	Weighted Average
1,221,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

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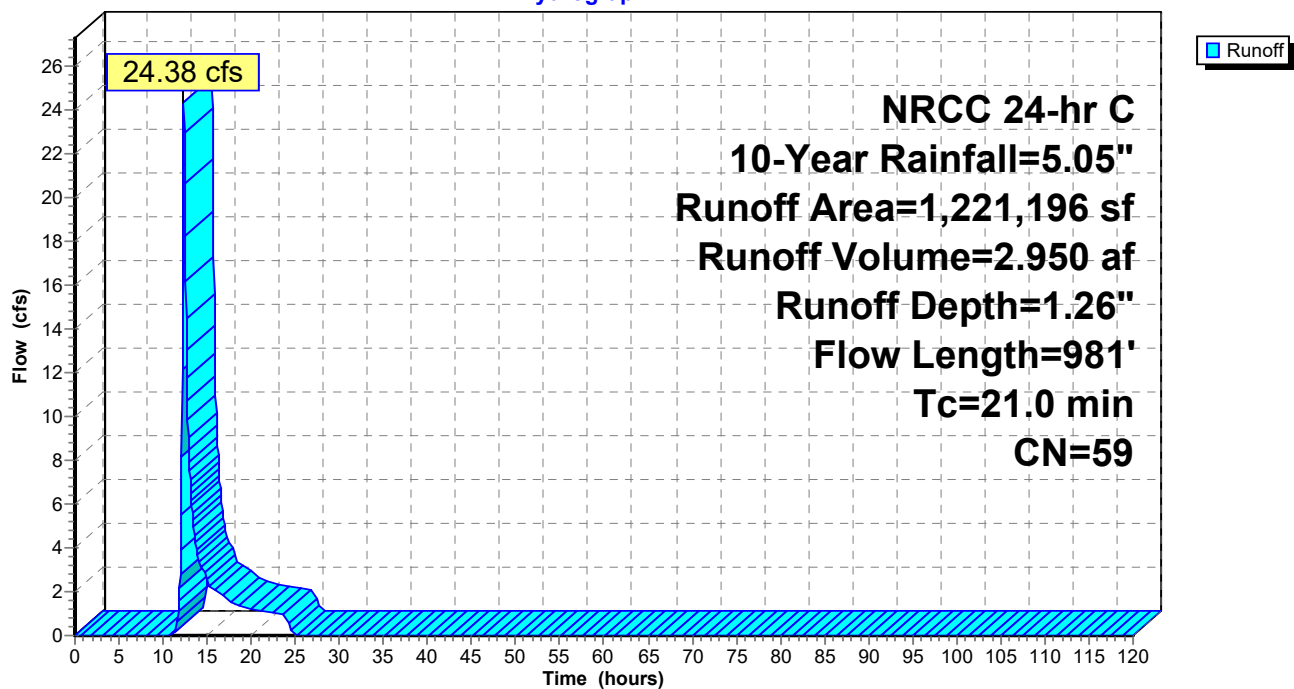
NRCC 24-hr C 10-Year Rainfall=5.05"

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Subcatchment P-14: P-14

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-15A: P-15A

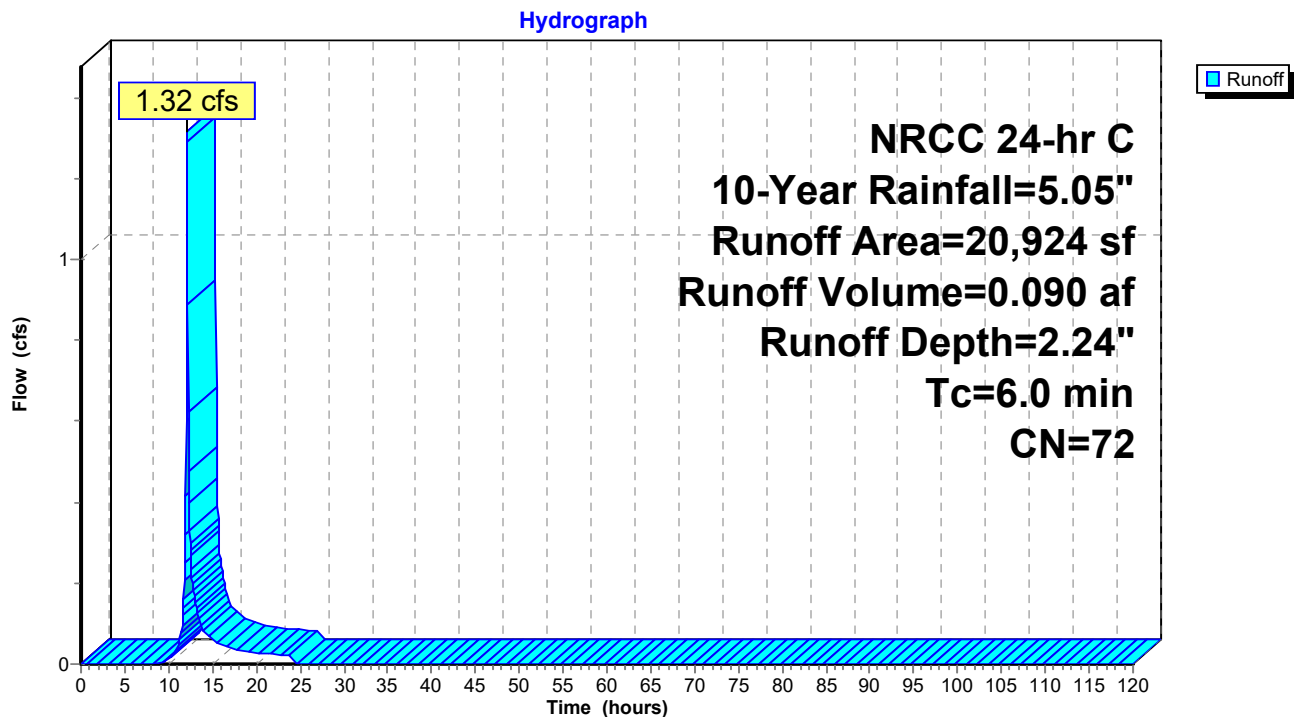
Runoff = 1.32 cfs @ 12.13 hrs, Volume= 0.090 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	300	98	BASIN
*	5,800	98	2.5 UNITS
	14,824	61	>75% Grass cover, Good, HSG B
	20,924	72	Weighted Average
	14,824		70.85% Pervious Area
	6,100		29.15% Impervious Area

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

Subcatchment P-15A: P-15A



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Summary for Subcatchment P-15U: P-15U

Runoff = 0.91 cfs @ 12.21 hrs, Volume= 0.102 af, Depth= 0.77"

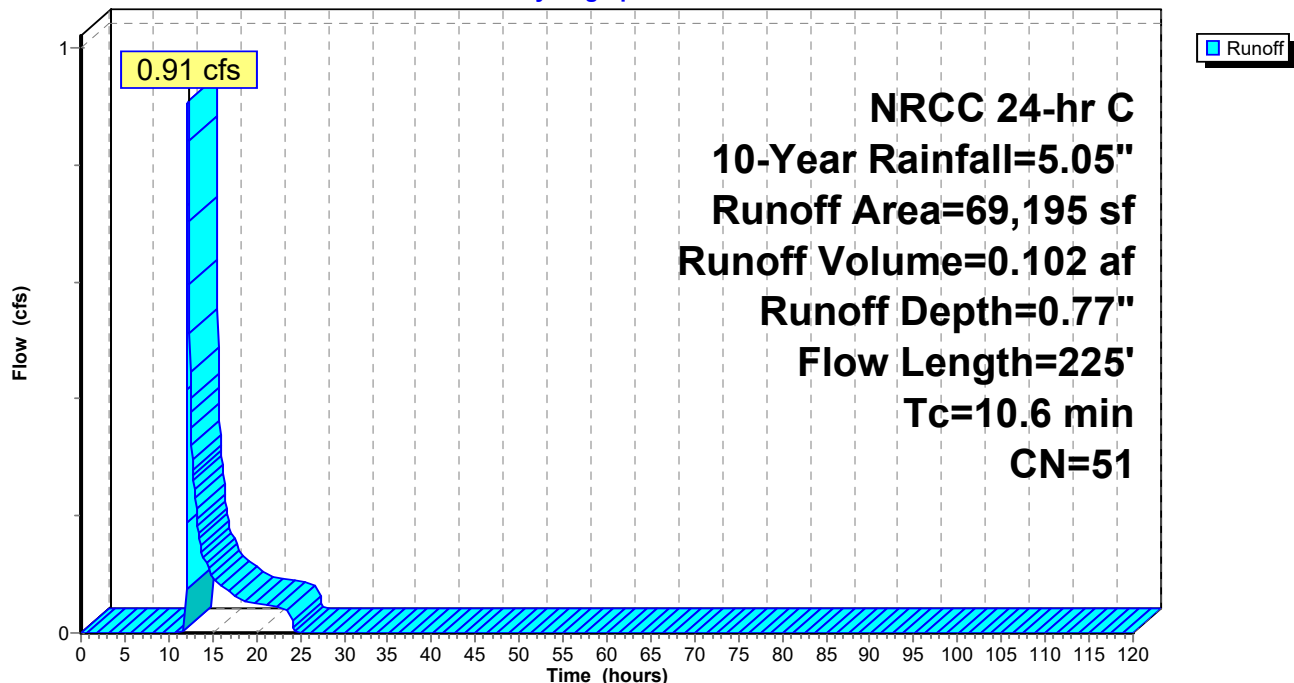
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
13,300	55	Woods, Good, HSG B
26,658	61	>75% Grass cover, Good, HSG B
22,600	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
1,137	39	>75% Grass cover, Good, HSG A
69,195	51	Weighted Average
69,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
2.3	175	0.0650	1.27		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.6	225	Total			

Subcatchment P-15U: P-15U

Hydrograph



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Summary for Subcatchment P-1A: P-1A

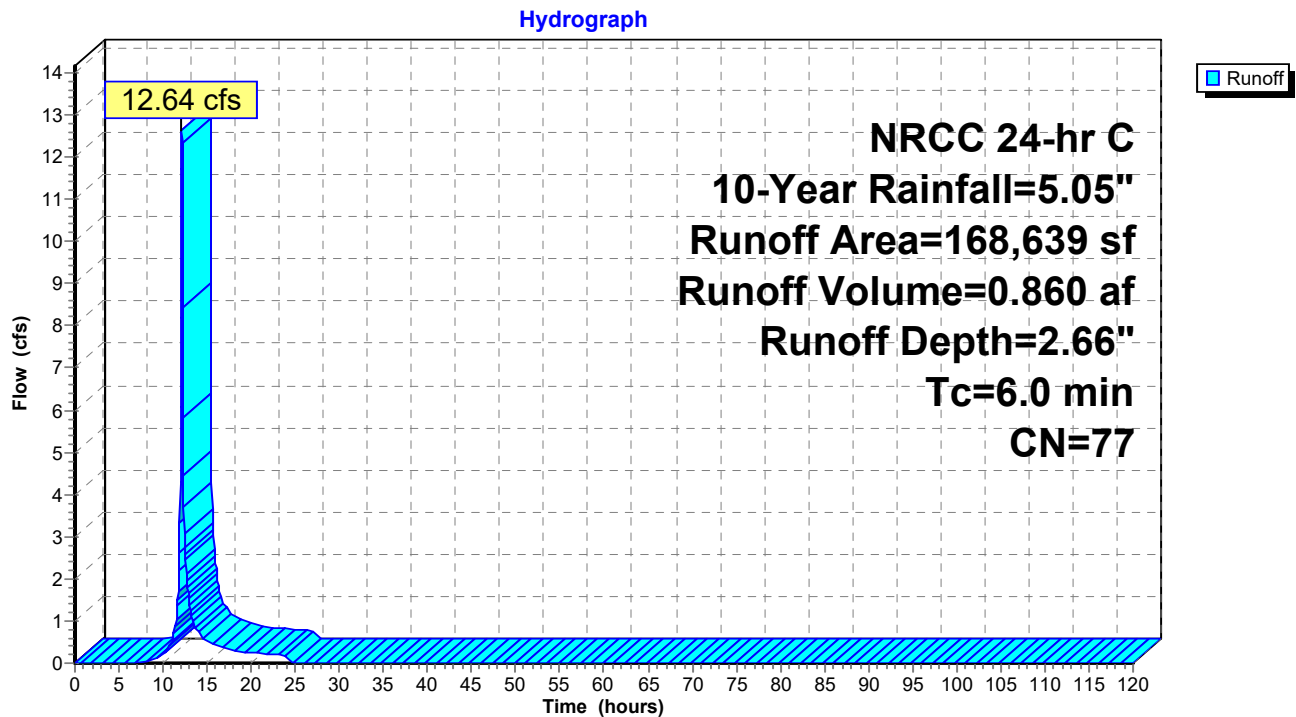
Runoff = 12.64 cfs @ 12.13 hrs, Volume= 0.860 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	5,750	98	basin
*	38,880	98	1620 lf of road
*	3,150	98	630 lf of sidewalk
*	2,500	98	1 unit
*	23,400	98	17 units driveway
	7,380	55	Woods, Good, HSG B
	87,579	61	>75% Grass cover, Good, HSG B
	168,639	77	Weighted Average
	94,959		56.31% Pervious Area
	73,680		43.69% Impervious Area

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

Subcatchment P-1A: P-1A



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Summary for Subcatchment P-1B: P-1B

Runoff = 7.62 cfs @ 12.34 hrs, Volume= 0.883 af, Depth= 1.69"

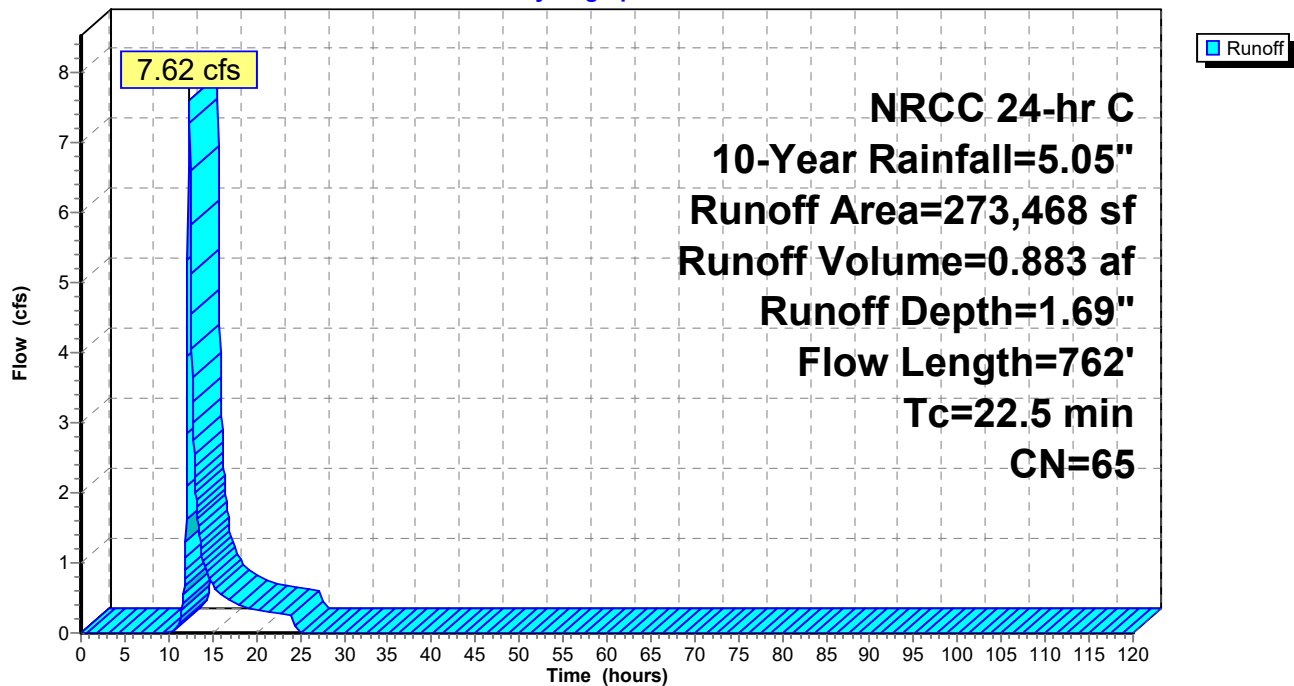
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
* 3,150	98	BASIN
* 8,000	85	500 LF GRAVEL ROAD B SOILS
* 18,750	98	7.5 UNITS
243,568	61	>75% Grass cover, Good, HSG B
273,468	65	Weighted Average
251,568		91.99% Pervious Area
21,900		8.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
17.0	712	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.5	762	Total			

Subcatchment P-1B: P-1B

Hydrograph



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Summary for Subcatchment P-1C: P-1C

Runoff = 0.63 cfs @ 12.13 hrs, Volume= 0.045 af, Depth= 3.72"

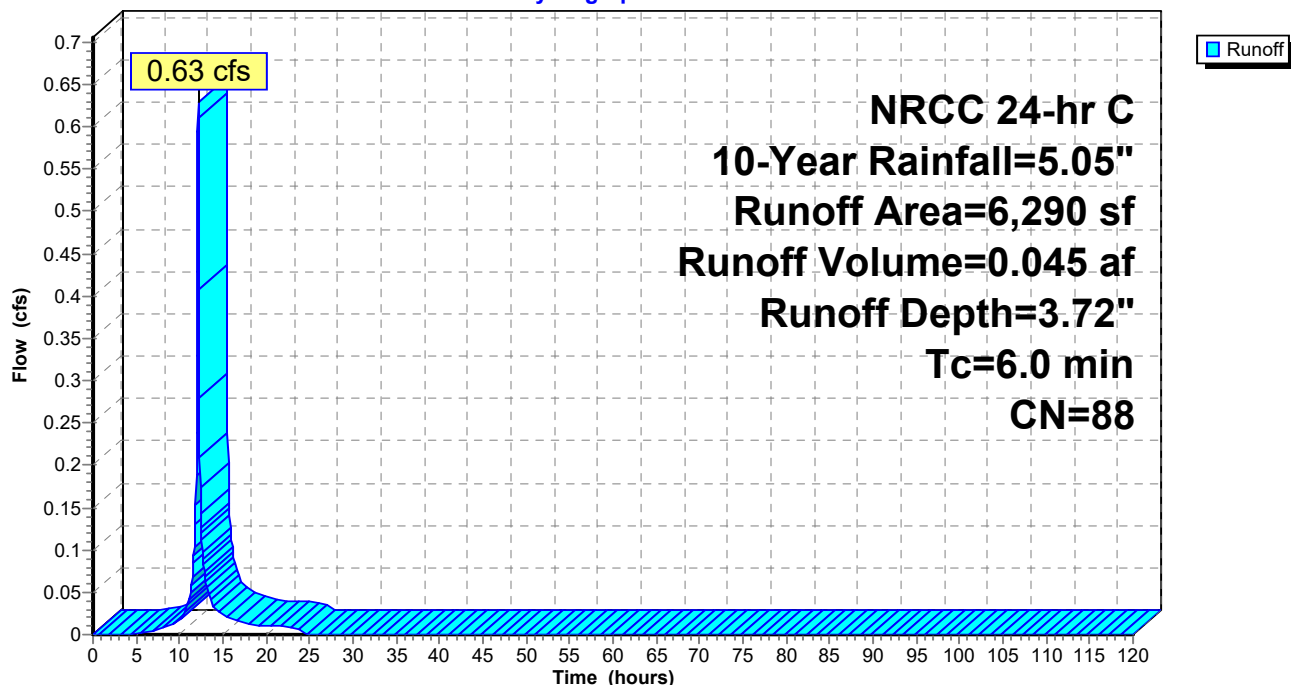
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	70	98	BASIN
*	3,744	98	156 LF OF ROAD
*	780	98	156 LF OF SIDEWALK
	1,696	61	>75% Grass cover, Good, HSG B
	6,290	88	Weighted Average
	1,696		26.96% Pervious Area
	4,594		73.04% Impervious Area

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

Subcatchment P-1C: P-1C

Hydrograph



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Summary for Subcatchment P-1U: P-1U

Runoff = 5.83 cfs @ 12.21 hrs, Volume= 0.531 af, Depth= 1.40"

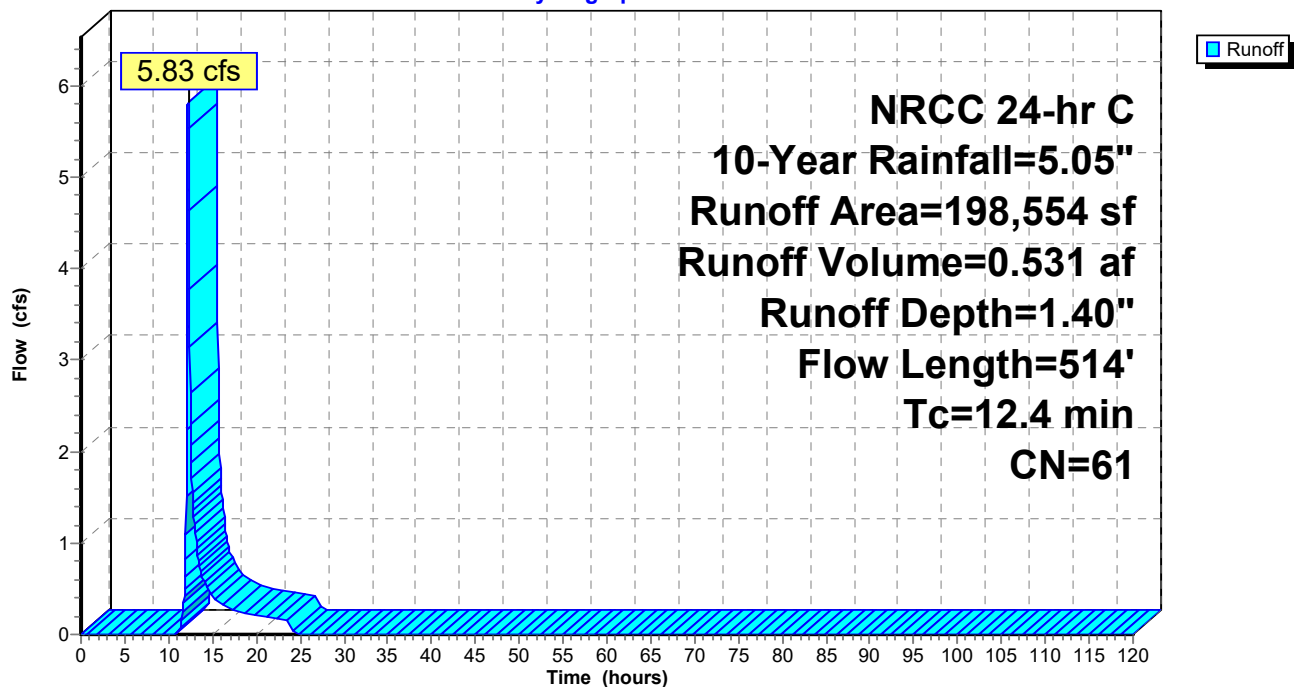
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
107,304	61	>75% Grass cover, Good, HSG B
80,000	55	Woods, Good, HSG B
* 11,250	98	4.5 UNITS
198,554	61	Weighted Average
187,304		94.33% Pervious Area
11,250		5.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
6.9	464	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.4	514	Total			

Subcatchment P-1U: P-1U

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Summary for Subcatchment P-2A: P-2A

Runoff = 3.90 cfs @ 12.14 hrs, Volume= 0.278 af, Depth= 1.40"

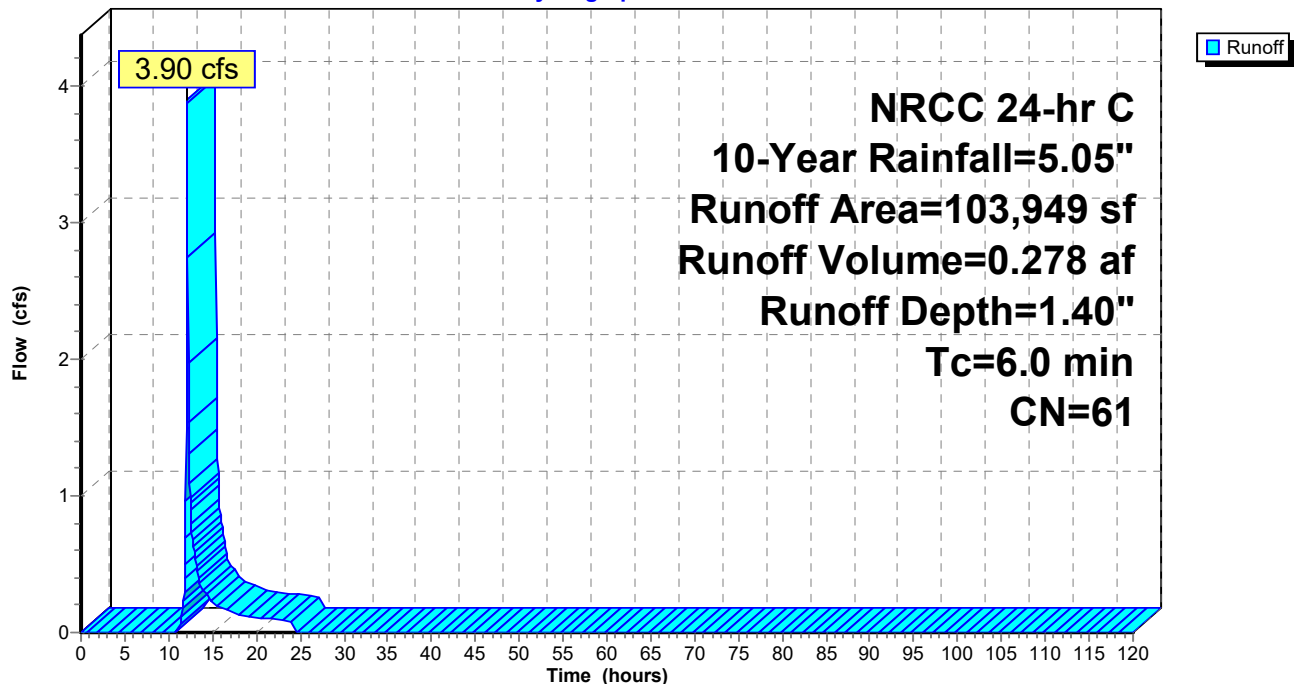
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
103,949	61	1/4 acre lots, 38% imp, HSG A
64,448		62.00% Pervious Area
39,501		38.00% Impervious Area

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

Subcatchment P-2A: P-2A

Hydrograph



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Summary for Subcatchment P-2B: P-2B

Runoff = 2.82 cfs @ 12.13 hrs, Volume= 0.193 af, Depth= 1.99"

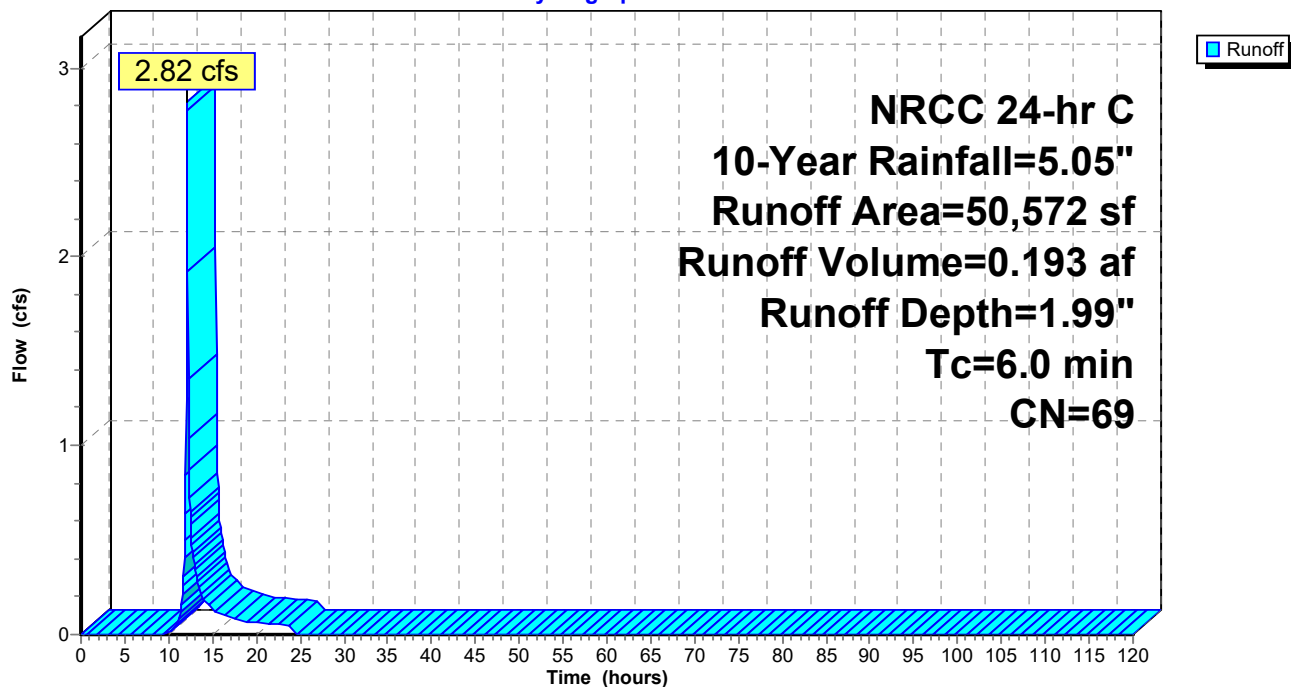
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
34,300	61	1/4 acre lots, 38% imp, HSG A
16,272	87	1/4 acre lots, 38% imp, HSG D
50,572	69	Weighted Average
31,355		62.00% Pervious Area
19,217		38.00% Impervious Area

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

Subcatchment P-2B: P-2B

Hydrograph



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Summary for Subcatchment P-2C: P-2C

Runoff = 5.97 cfs @ 12.13 hrs, Volume= 0.416 af, Depth= 3.41"

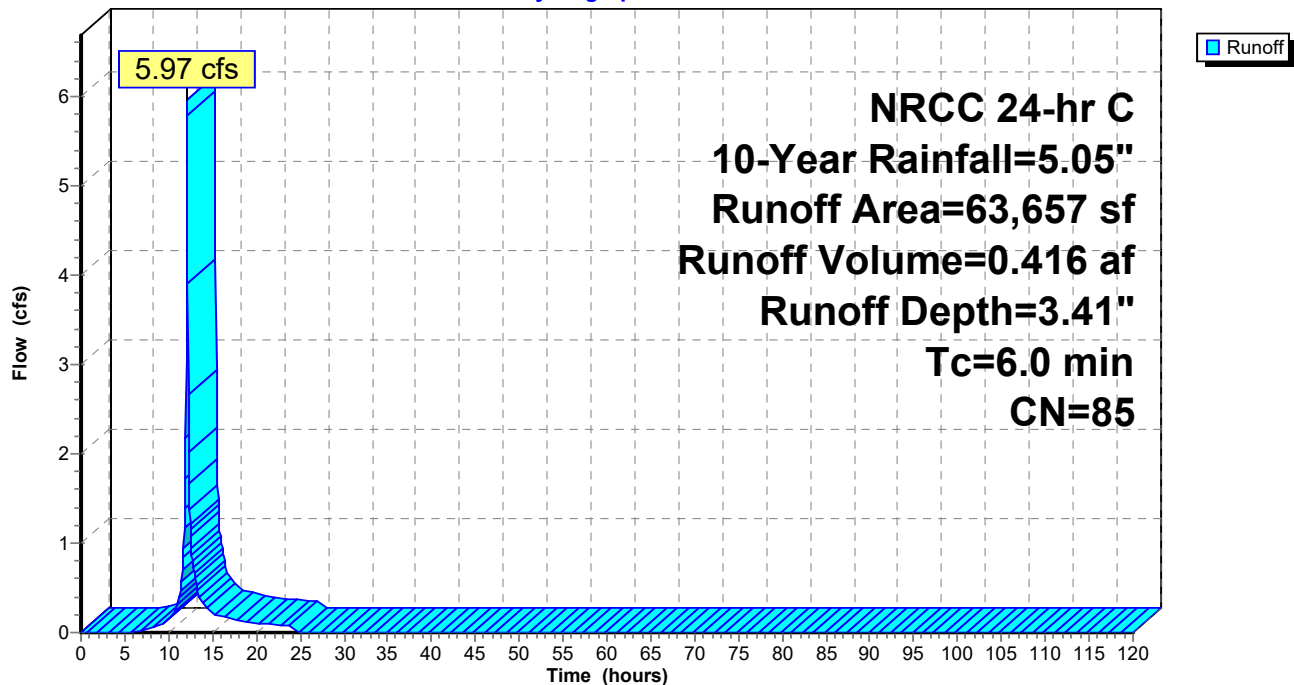
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
54,284	87	1/4 acre lots, 38% imp, HSG D
9,373	75	1/4 acre lots, 38% imp, HSG B
63,657	85	Weighted Average
39,467		62.00% Pervious Area
24,190		38.00% Impervious Area

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

Subcatchment P-2C: P-2C

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-2D: P-2D

Runoff = 18.69 cfs @ 12.14 hrs, Volume= 1.290 af, Depth= 1.76"

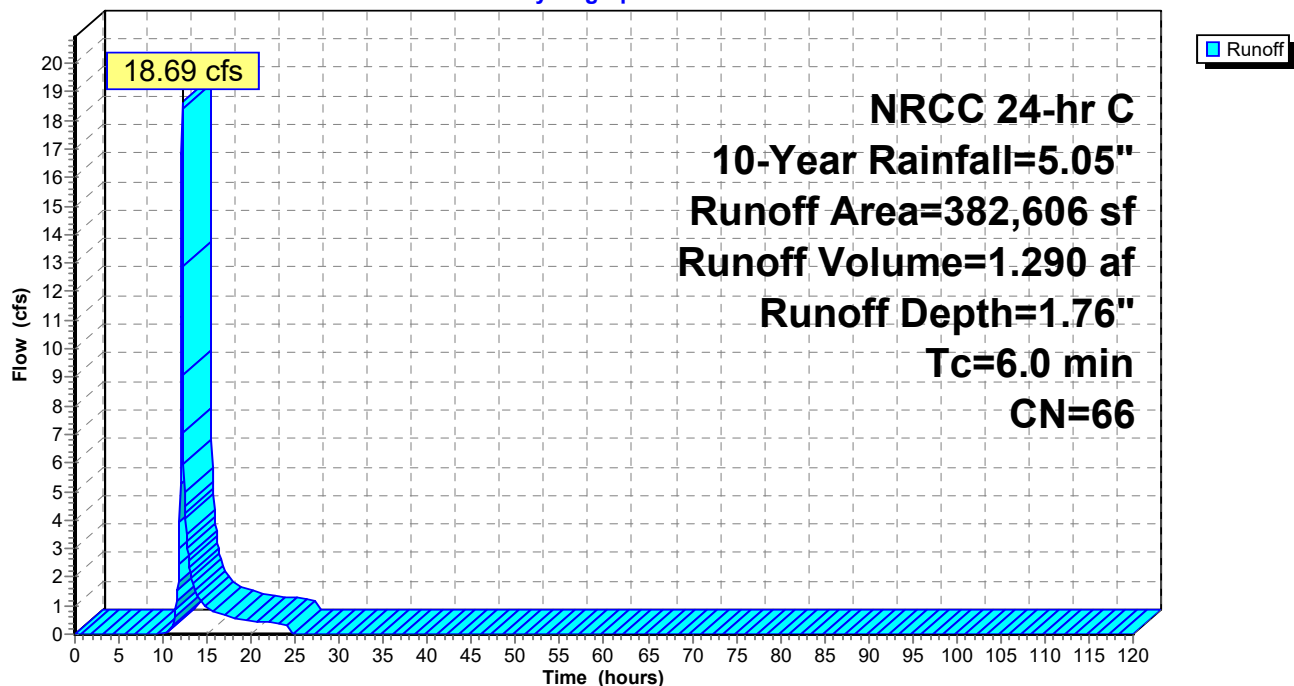
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
163,640	61	1/4 acre lots, 38% imp, HSG A
82,633	87	1/4 acre lots, 38% imp, HSG D
* 15,400	98	basin
30,500	30	Woods, Good, HSG A
9,200	77	Woods, Good, HSG D
* 17,400	98	exist impervious
13,000	74	>75% Grass cover, Good, HSG C
10,000	80	>75% Grass cover, Good, HSG D
40,833	39	>75% Grass cover, Good, HSG A
382,606	66	Weighted Average
256,222		66.97% Pervious Area
126,384		33.03% Impervious Area

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

Subcatchment P-2D: P-2D

Hydrograph



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Summary for Subcatchment P-2E: P-2E

Runoff = 8.68 cfs @ 12.13 hrs, Volume= 0.591 af, Depth= 2.75"

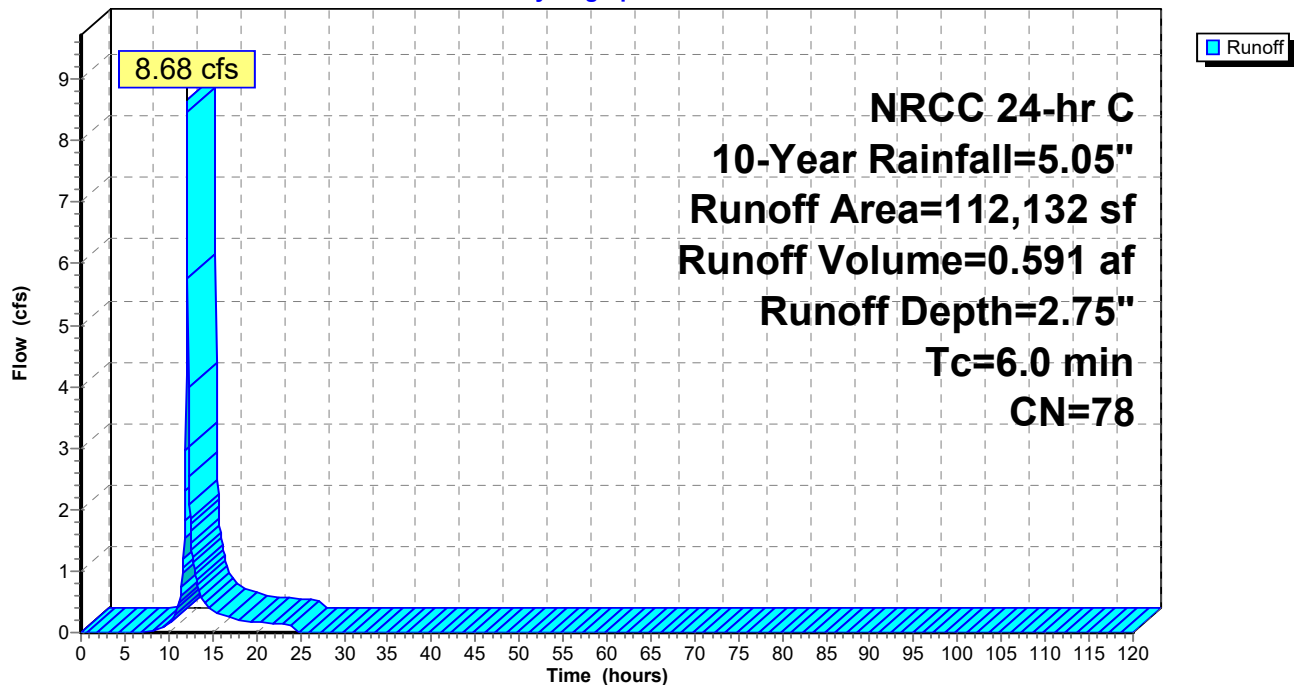
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	12,500	98	basin
	99,632	75	1/4 acre lots, 38% imp, HSG B
	112,132	78	Weighted Average
	61,772		55.09% Pervious Area
	50,360		44.91% Impervious Area

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

Subcatchment P-2E: P-2E

Hydrograph



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Summary for Subcatchment P-2F: P-2F

Runoff = 10.29 cfs @ 12.13 hrs, Volume= 0.699 af, Depth= 2.58"

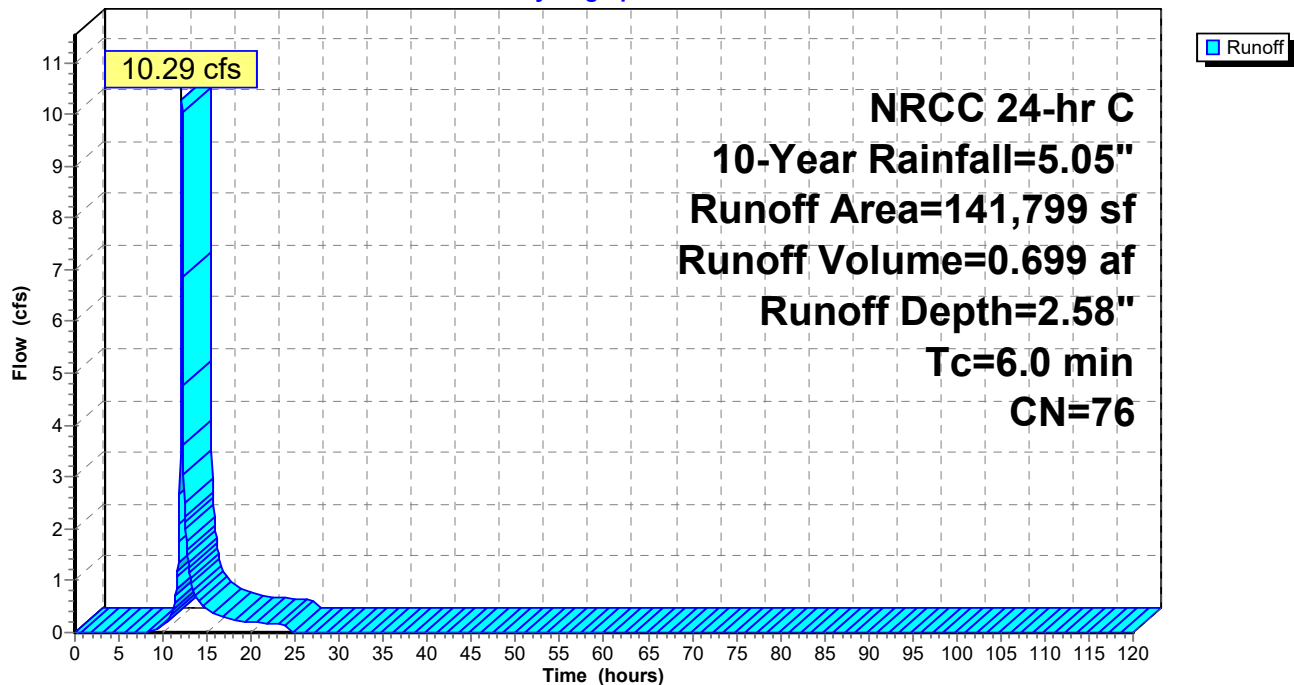
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
134,299	75	1/4 acre lots, 38% imp, HSG B
* 7,500	98	basin
141,799	76	Weighted Average
83,265		58.72% Pervious Area
58,534		41.28% Impervious Area

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

Subcatchment P-2F: P-2F

Hydrograph



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Summary for Subcatchment P-2U: P-2U

Runoff = 28.71 cfs @ 12.54 hrs, Volume= 4.306 af, Depth= 1.84"

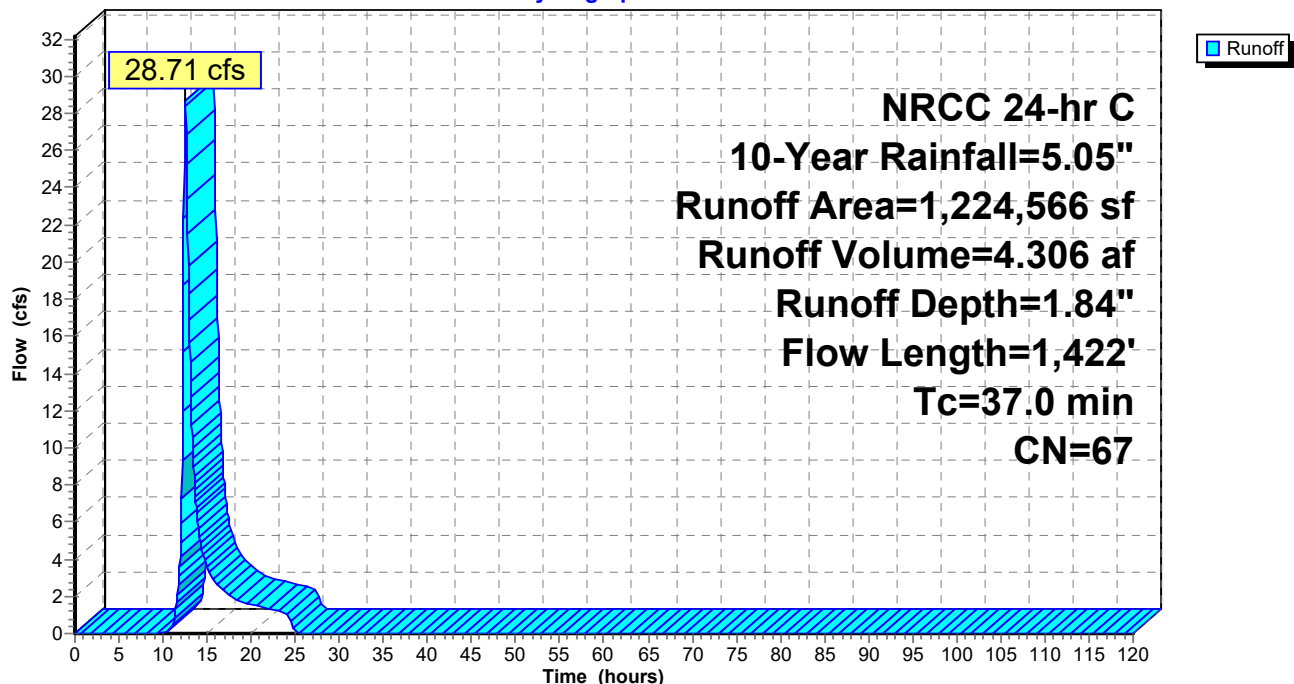
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
126,300	32	Woods/grass comb., Good, HSG A
394,200	58	Woods/grass comb., Good, HSG B
232,300	72	Woods/grass comb., Good, HSG C
418,475	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
1,224,566	67	Weighted Average
1,171,275		95.65% Pervious Area
53,291		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Subcatchment P-2U: P-2U

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-3A: P-3A

Runoff = 8.61 cfs @ 12.13 hrs, Volume= 0.595 af, Depth= 3.22"

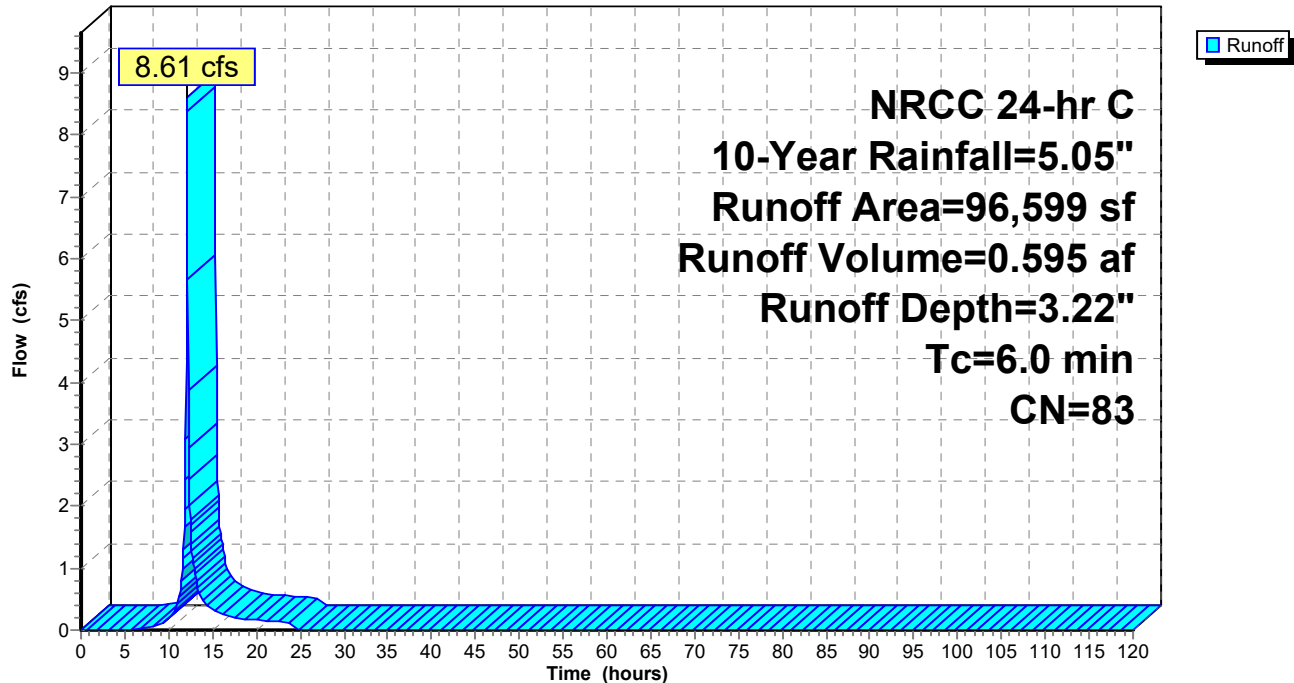
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	4,600	98	BASIN
	36,100	75	1/4 acre lots, 38% imp, HSG B
	55,899	87	1/4 acre lots, 38% imp, HSG D
	96,599	83	Weighted Average
	57,039		59.05% Pervious Area
	39,560		40.95% Impervious Area

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

Subcatchment P-3A: P-3A

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Summary for Subcatchment P-3B: P-3B

Runoff = 18.03 cfs @ 12.13 hrs, Volume= 1.224 af, Depth= 2.40"

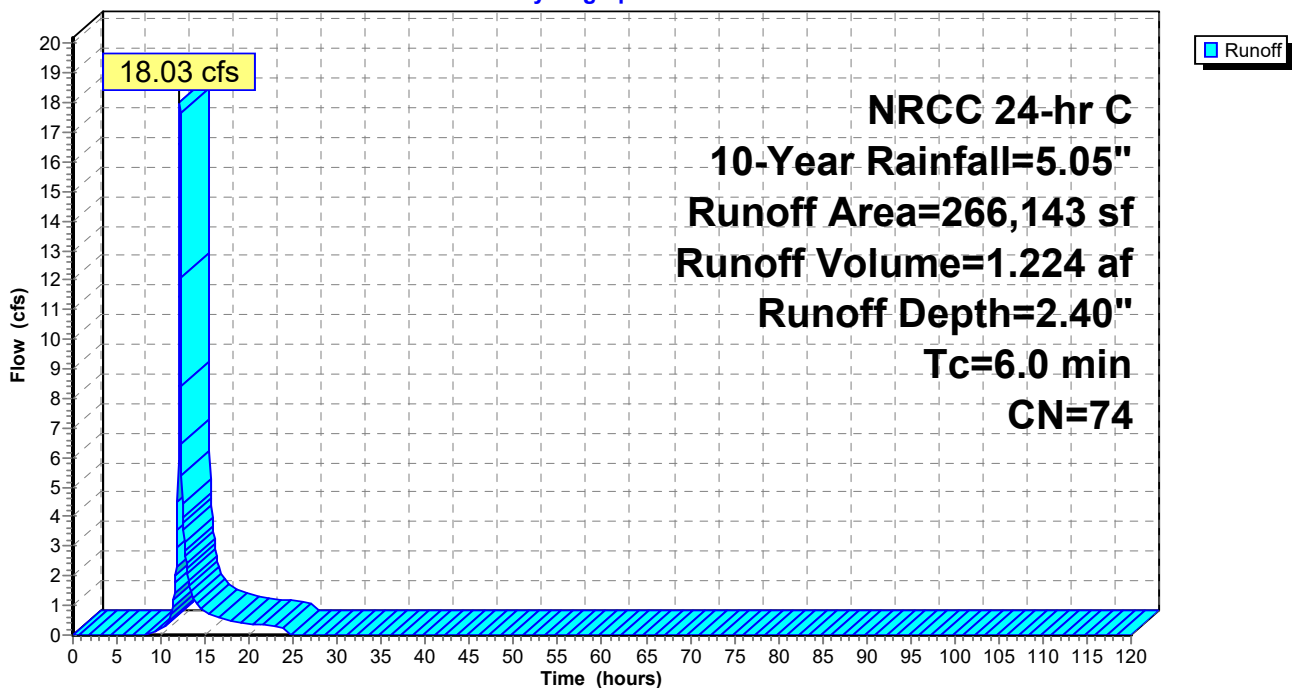
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	9,500	98	BASIN
	9,200	30	Woods, Good, HSG A
	247,443	75	1/4 acre lots, 38% imp, HSG B
	266,143	74	Weighted Average
	162,615		61.10% Pervious Area
	103,528		38.90% Impervious Area

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

Subcatchment P-3B: P-3B

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Subcatchment P-3U: P-3U

Runoff = 25.43 cfs @ 12.29 hrs, Volume= 2.676 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	108,000	30	Woods, Good, HSG A
	98,000	39	>75% Grass cover, Good, HSG A
	136,977	61	>75% Grass cover, Good, HSG B
	76,000	55	Woods, Good, HSG B
*	15,800	98	EXIST Roof and Pavement
	58,000	77	Woods, Good, HSG D
	58,000	80	>75% Grass cover, Good, HSG D
*	32,500	98	13 UNITS
*	6,400	98	400 LF OF ROAD
*	1,800	98	2 UNITS DRIVEWAY
	760,977	67	Weighted Average
	534,977		70.30% Pervious Area
	226,000		29.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

Proposed Hydrology

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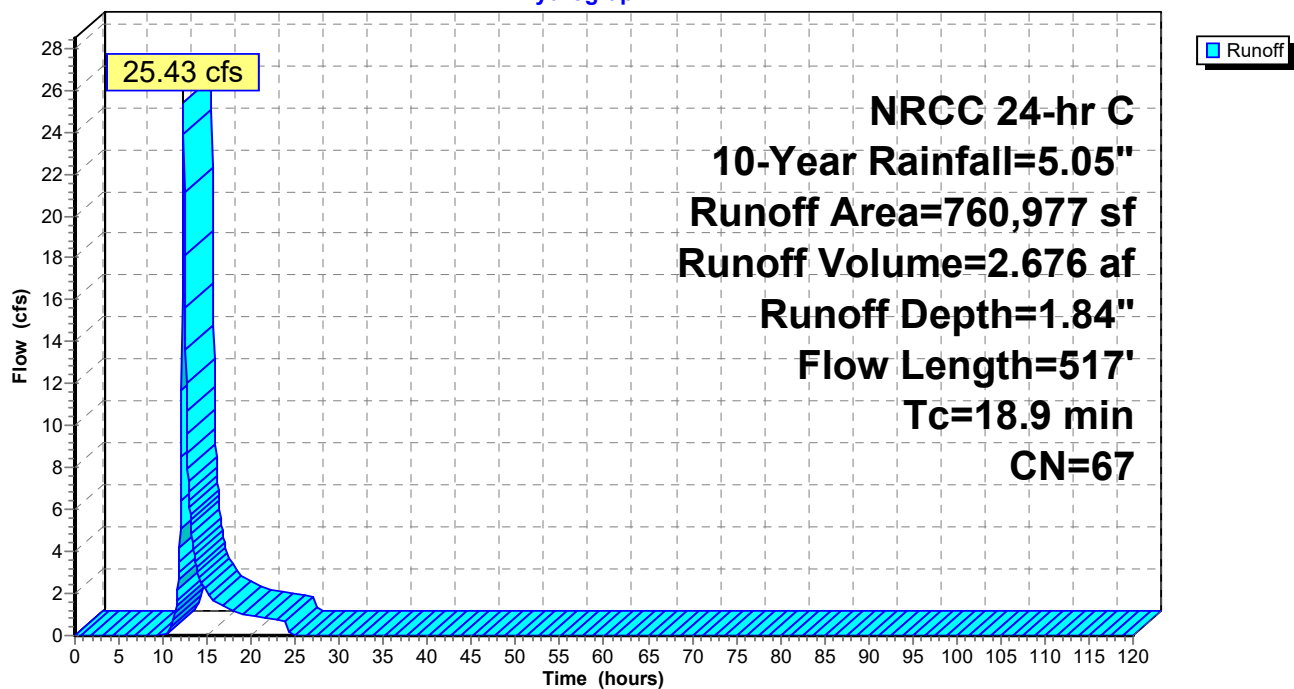
NRCC 24-hr C 10-Year Rainfall=5.05"

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Subcatchment P-3U: P-3U

Hydrograph



Proposed Hydrology

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Summary for Subcatchment P-4: P-4

Runoff = 0.24 cfs @ 12.15 hrs, Volume= 0.025 af, Depth= 0.66"

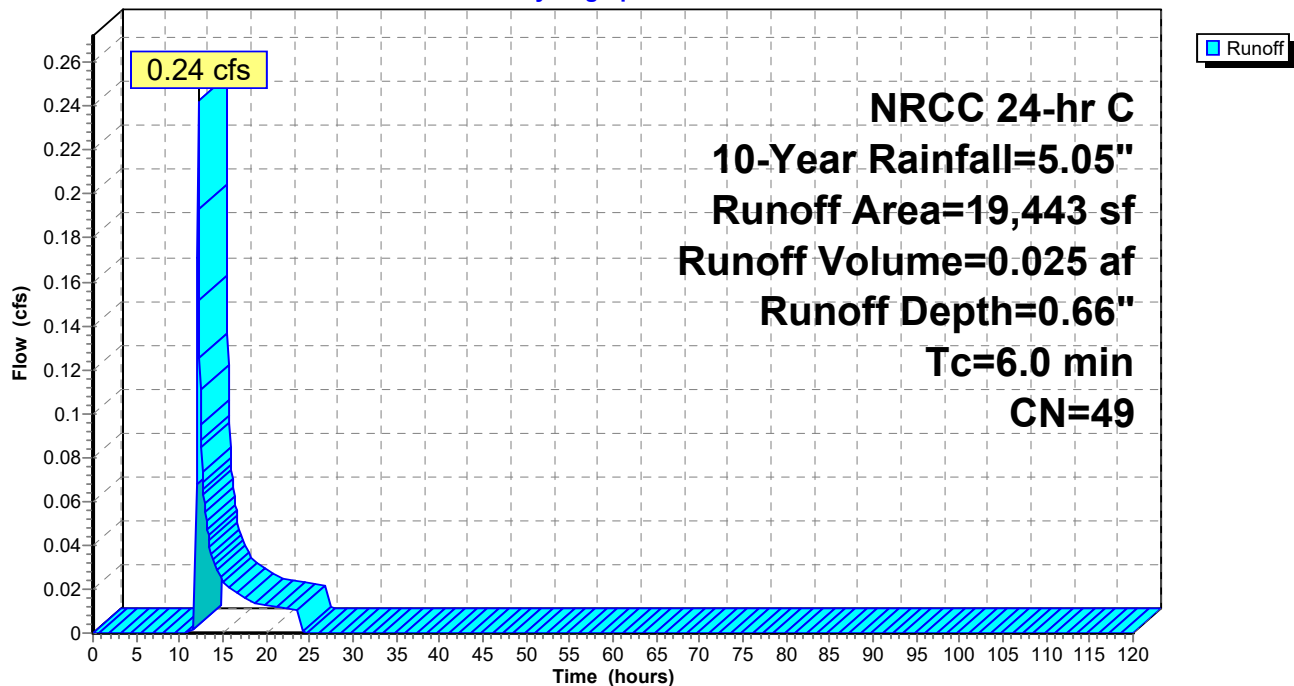
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
5,200	30	Woods, Good, HSG A
10,262	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
19,443	49	Weighted Average
15,462		79.52% Pervious Area
3,981		20.48% Impervious Area

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

Subcatchment P-4: P-4

Hydrograph



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Summary for Subcatchment P-5U: P-5U

Runoff = 6.25 cfs @ 12.33 hrs, Volume= 0.713 af, Depth= 1.69"

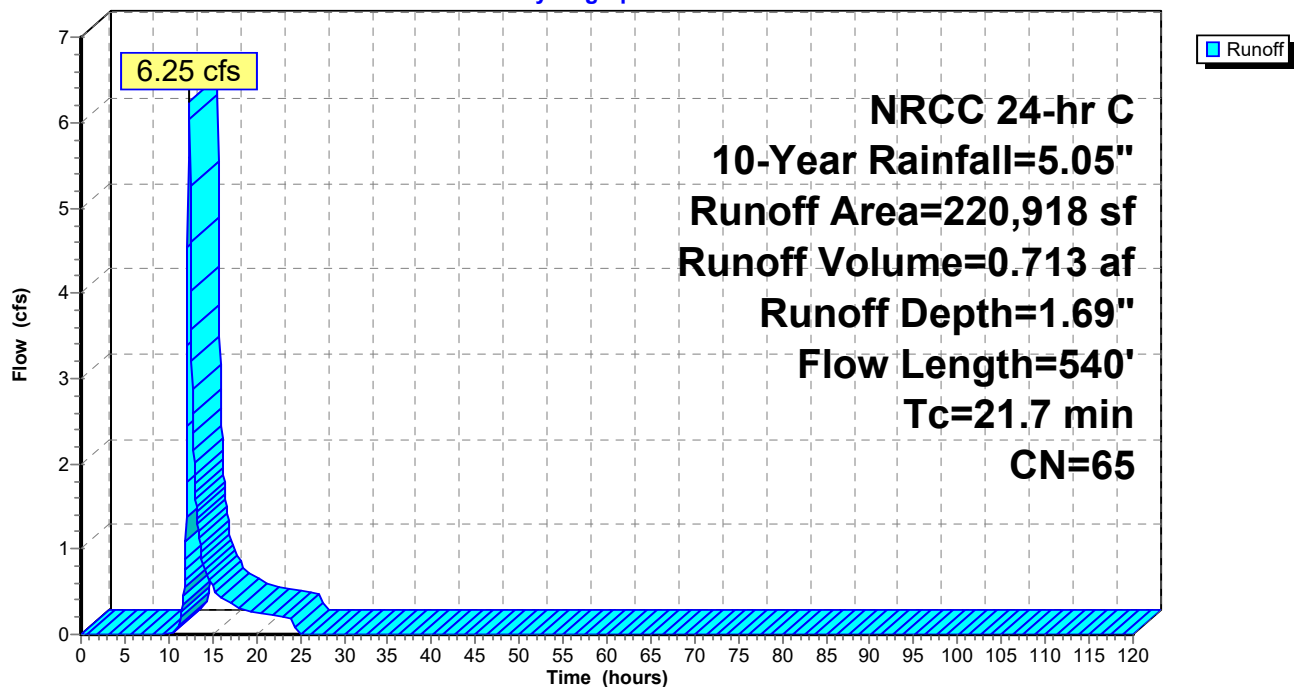
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
83,000	39	>75% Grass cover, Good, HSG A
17,000	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
96,818	80	>75% Grass cover, Good, HSG D
220,918	65	Weighted Average
220,918		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
11.5	490	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.7	540	Total			

Subcatchment P-5U: P-5U

Hydrograph



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Summary for Subcatchment P-6A: P-6A

Runoff = 11.07 cfs @ 12.13 hrs, Volume= 0.753 af, Depth= 2.66"

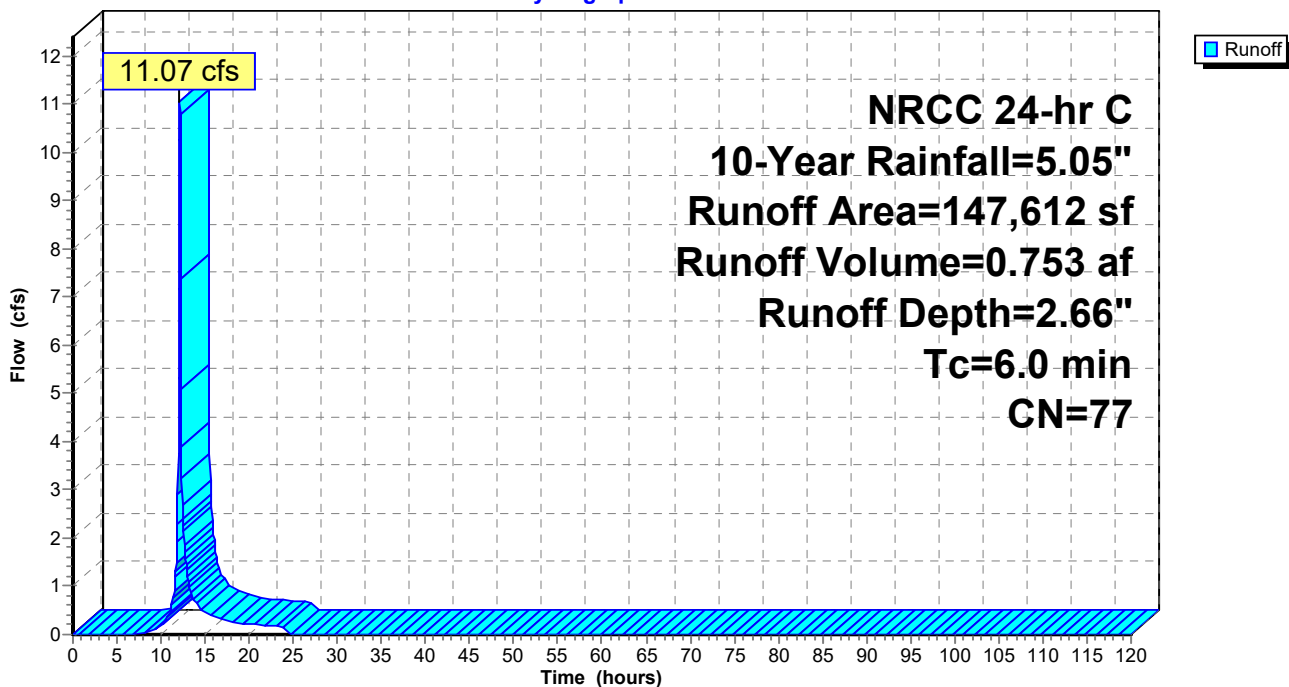
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
134,612	75	1/4 acre lots, 38% imp, HSG B
* 13,000	98	basin
147,612	77	Weighted Average
83,459		56.54% Pervious Area
64,153		43.46% Impervious Area

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

Subcatchment P-6A: P-6A

Hydrograph



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Summary for Subcatchment P-6U: P-6U

Runoff = 14.60 cfs @ 12.23 hrs, Volume= 1.330 af, Depth= 1.92"

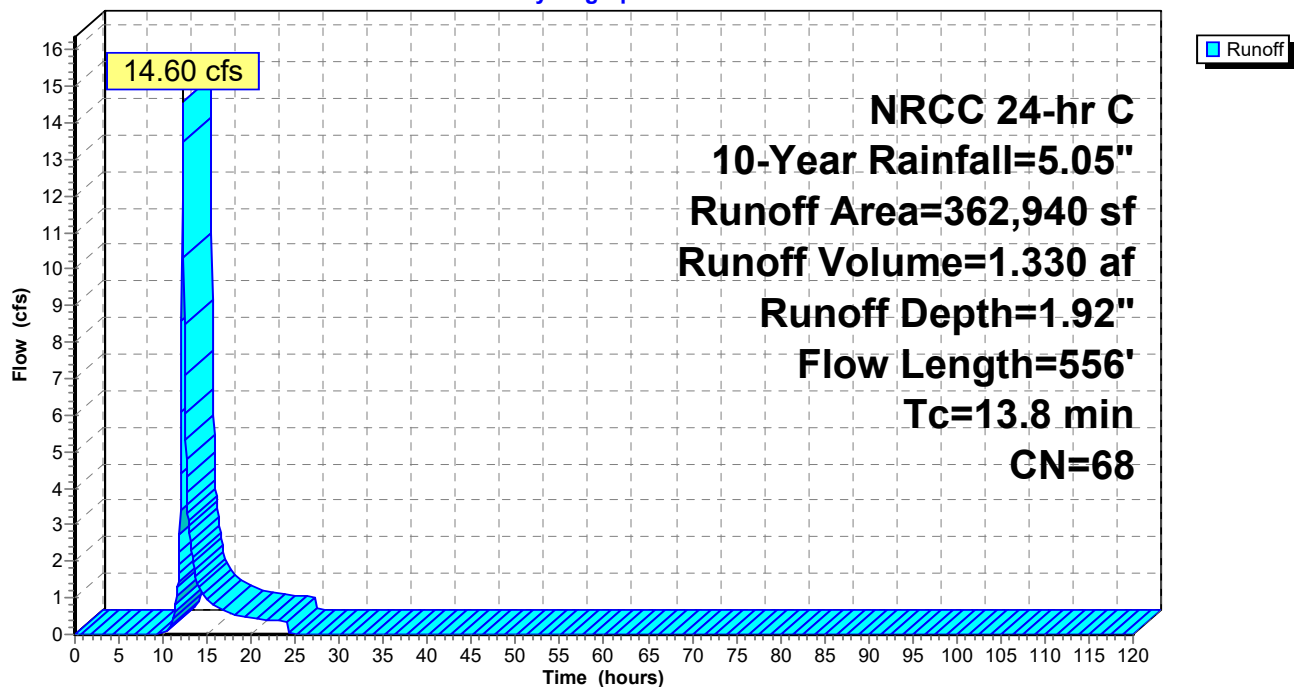
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
164,917	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
362,940	68	Weighted Average
362,940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
5.6	456	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.8	556	Total			

Subcatchment P-6U: P-6U

Hydrograph



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Summary for Subcatchment P-7A: P-7A

Runoff = 11.40 cfs @ 12.13 hrs, Volume= 0.777 af, Depth= 2.07"

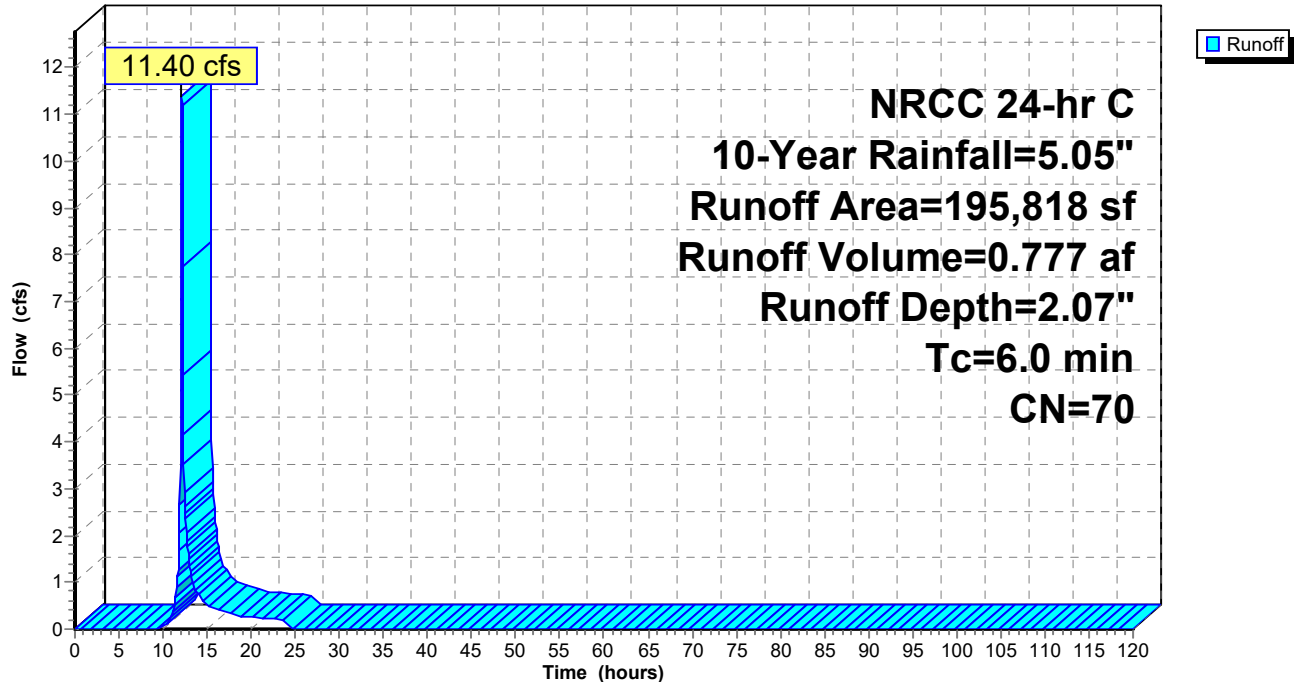
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	43,000	98	pavement parking
*	5,800	98	BUILD roof
*	10,200	98	basin
	94,318	39	>75% Grass cover, Good, HSG A
*	42,500	98	17 HOUSE UNITS
	195,818	70	Weighted Average
	94,318		48.17% Pervious Area
	101,500		51.83% Impervious Area

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

Subcatchment P-7A: P-7A

Hydrograph



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Summary for Subcatchment P-7U: P-7U

Runoff = 9.77 cfs @ 12.38 hrs, Volume= 1.312 af, Depth= 1.13"

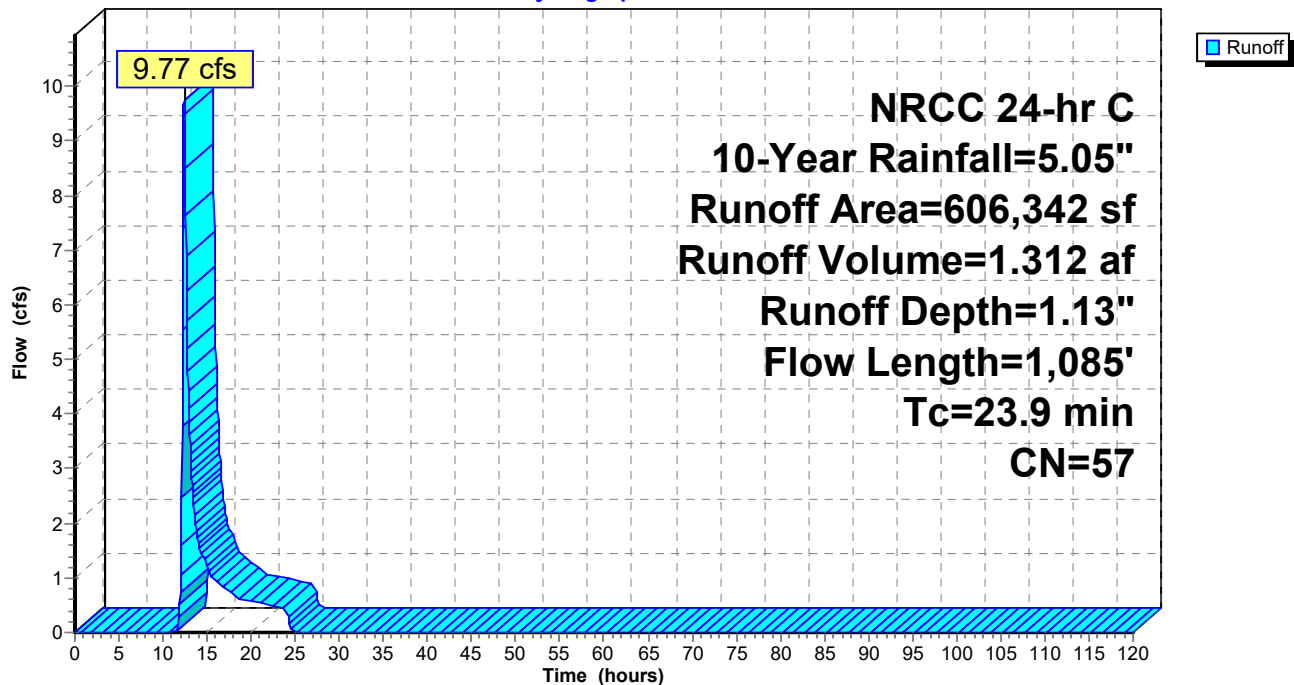
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
403,863	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
606,342	57	Weighted Average
573,604		94.60% Pervious Area
32,738		5.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment P-7U: P-7U

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Summary for Subcatchment P-8U: P-8U

Runoff = 3.35 cfs @ 12.16 hrs, Volume= 0.262 af, Depth= 1.26"

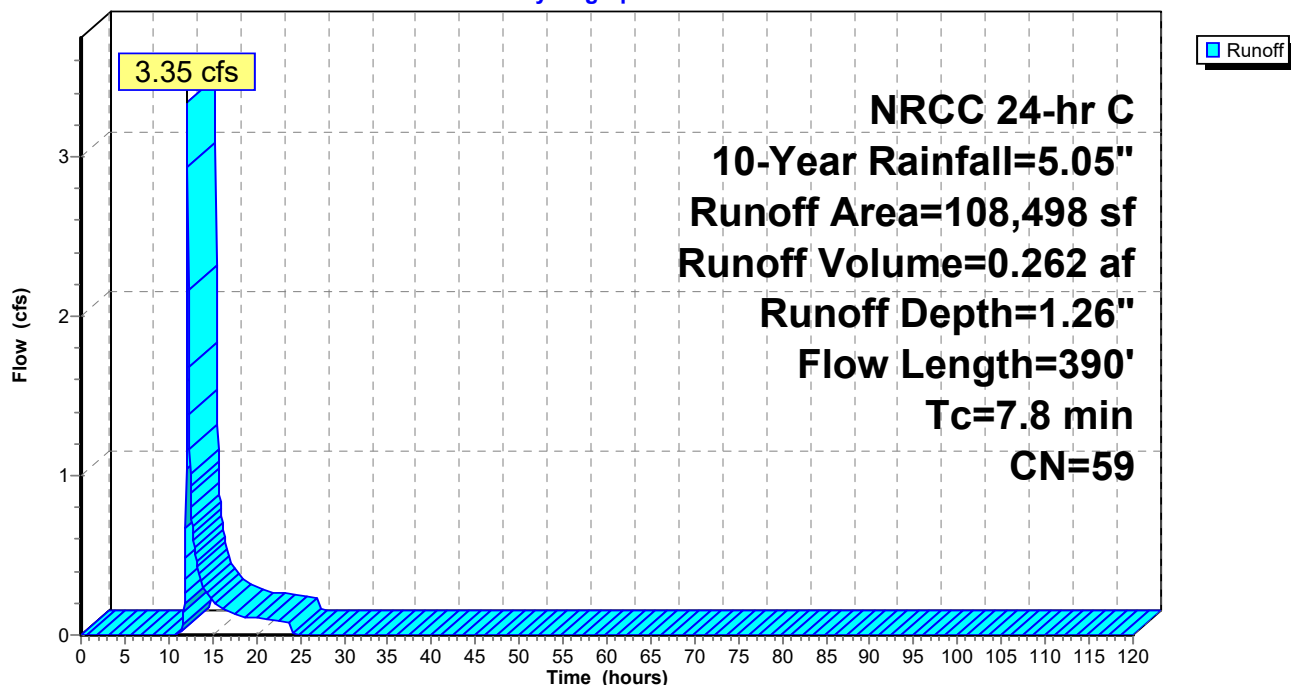
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	7,000	98	roof
	5,726	98	Water Surface, 0% imp, HSG A
	12,978	39	>75% Grass cover, Good, HSG A
	43,794	61	>75% Grass cover, Good, HSG B
	6,600	30	Woods, Good, HSG A
	32,400	55	Woods, Good, HSG B
	108,498	59	Weighted Average
	101,498		93.55% Pervious Area
	7,000		6.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment P-8U: P-8U

Hydrograph



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Summary for Subcatchment P-9A: P-9A

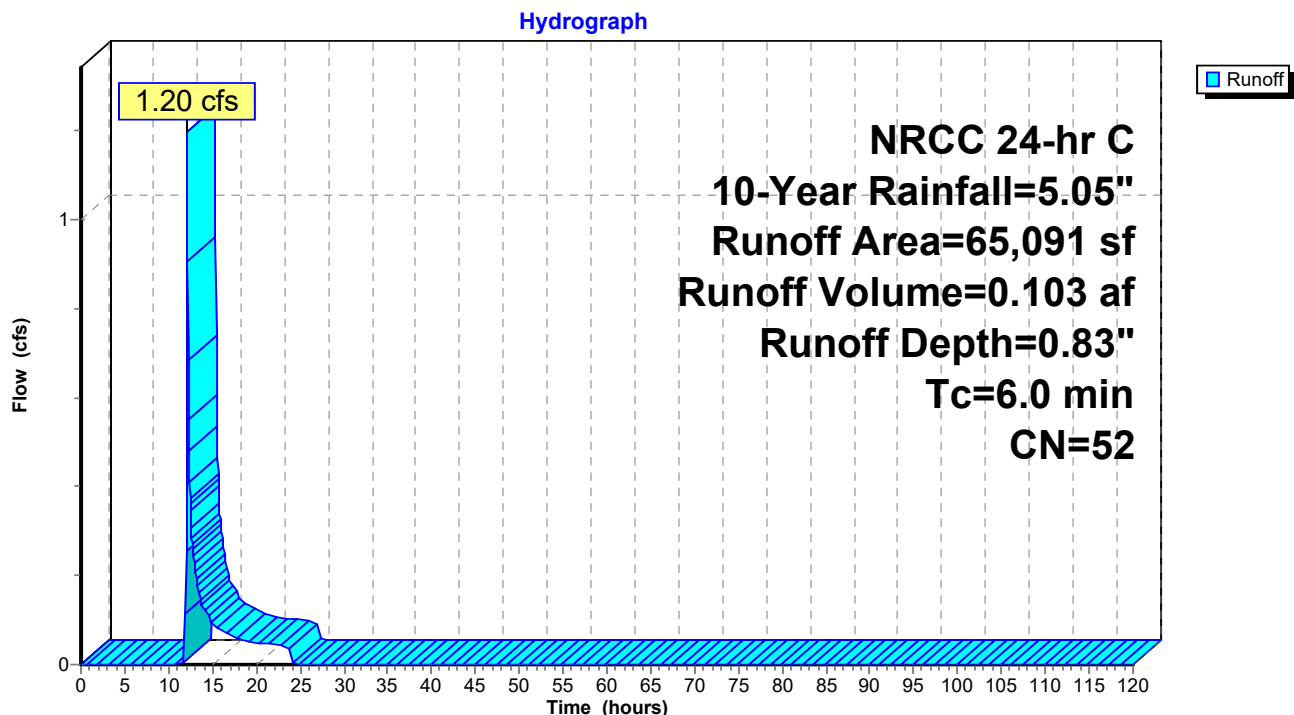
Runoff = 1.20 cfs @ 12.15 hrs, Volume= 0.103 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
	13,200	30	Woods, Good, HSG A
*	15,000	98	ROADS
*	1,700	98	BASIN
	35,191	39	>75% Grass cover, Good, HSG A
	65,091	52	Weighted Average
	48,391		74.34% Pervious Area
	16,700		25.66% Impervious Area

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

Subcatchment P-9A: P-9A



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Summary for Subcatchment P-9B: P-9B

Runoff = 3.74 cfs @ 12.14 hrs, Volume= 0.263 af, Depth= 1.54"

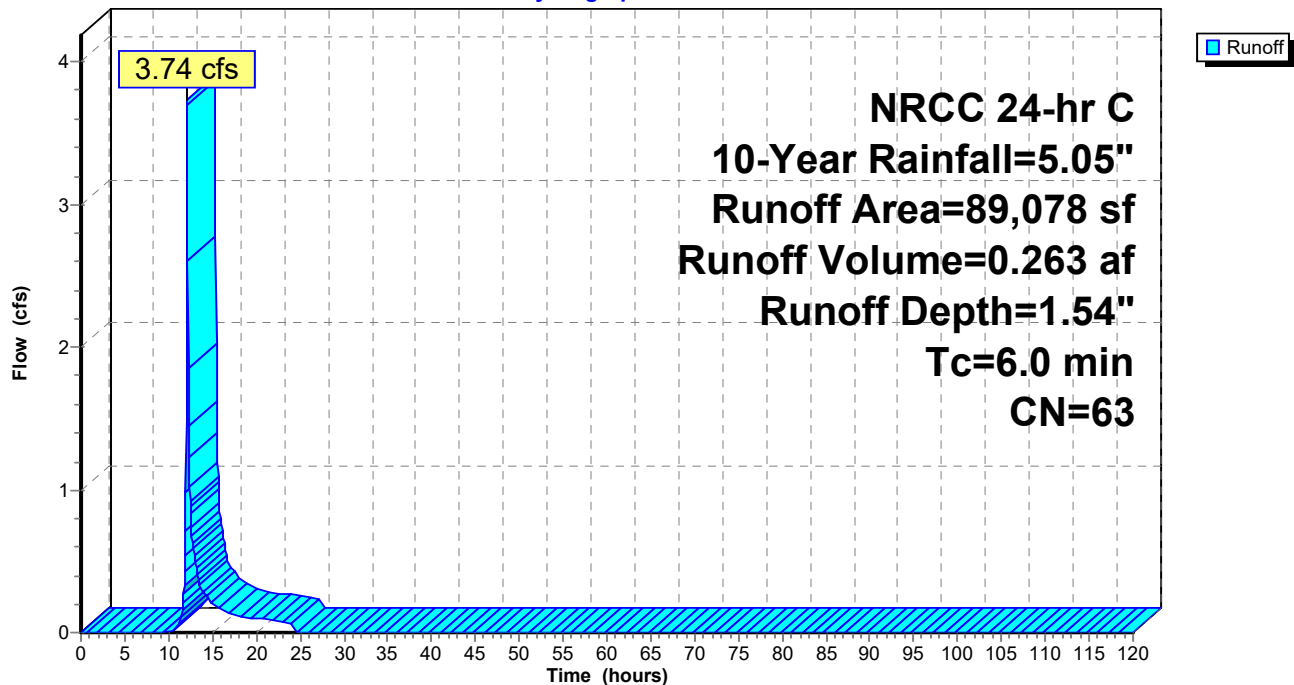
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	4,300	98	BASIN
	84,778	61	1/4 acre lots, 38% imp, HSG A
	89,078	63	Weighted Average
	52,562		59.01% Pervious Area
	36,516		40.99% Impervious Area

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

Subcatchment P-9B: P-9B

Hydrograph



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Summary for Subcatchment P-9C: P-9C

Runoff = 13.03 cfs @ 12.13 hrs, Volume= 0.887 af, Depth= 2.75"

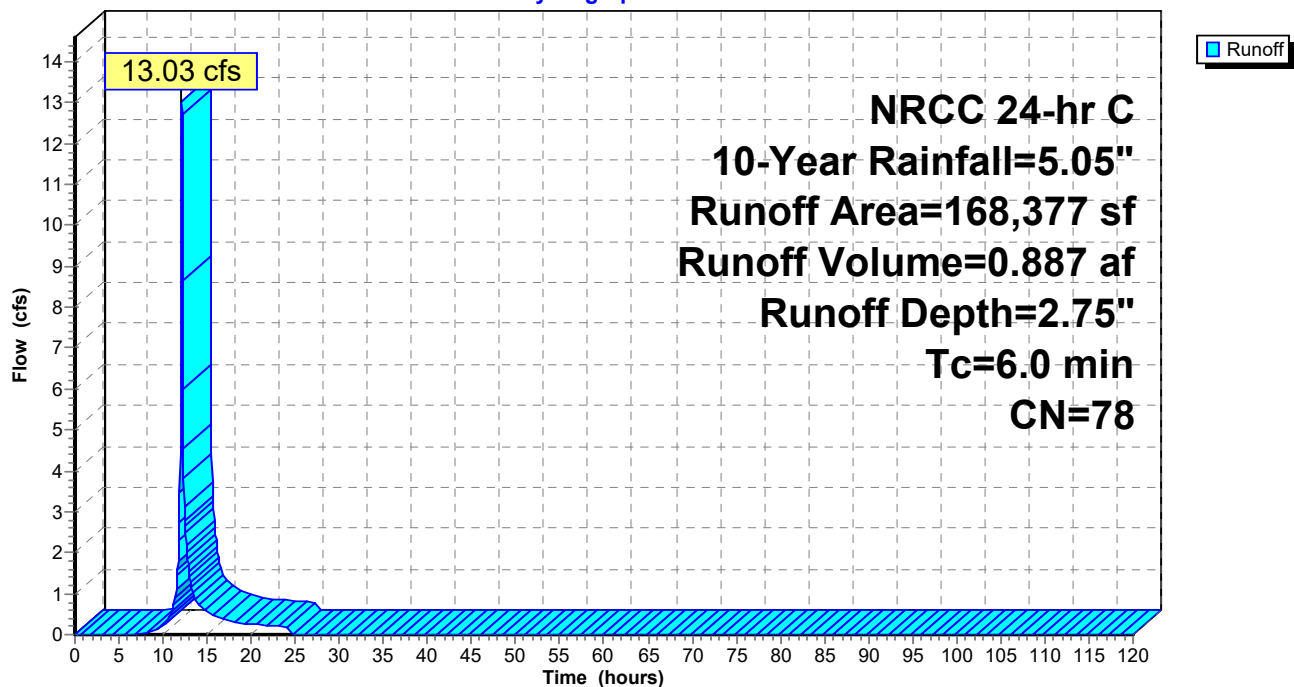
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
20,800	30	Woods, Good, HSG A
104,000	98	Paved parking, HSG A
34,077	39	>75% Grass cover, Good, HSG A
* 9,500	98	ROOF
168,377	78	Weighted Average
54,877		32.59% Pervious Area
113,500		67.41% Impervious Area

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

Subcatchment P-9C: P-9C

Hydrograph



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Summary for Subcatchment P-9U: P-9U

Runoff = 0.24 cfs @ 12.24 hrs, Volume= 0.065 af, Depth= 0.37"

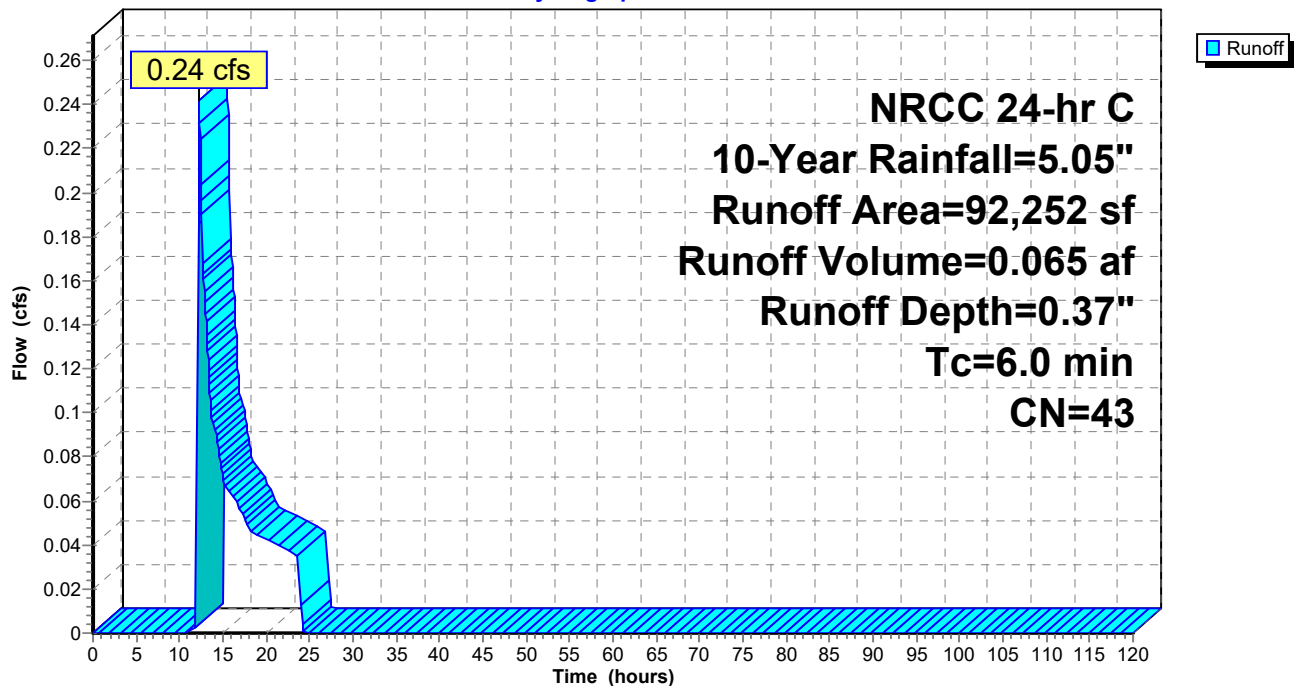
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

Area (sf)	CN	Description
36,000	30	Woods, Good, HSG A
12,000	98	Paved parking, HSG A
44,252	39	>75% Grass cover, Good, HSG A
92,252	43	Weighted Average
80,252		86.99% Pervious Area
12,000		13.01% Impervious Area

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

Subcatchment P-9U: P-9U

Hydrograph



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Summary for Reach DP-1: Wetland Series R

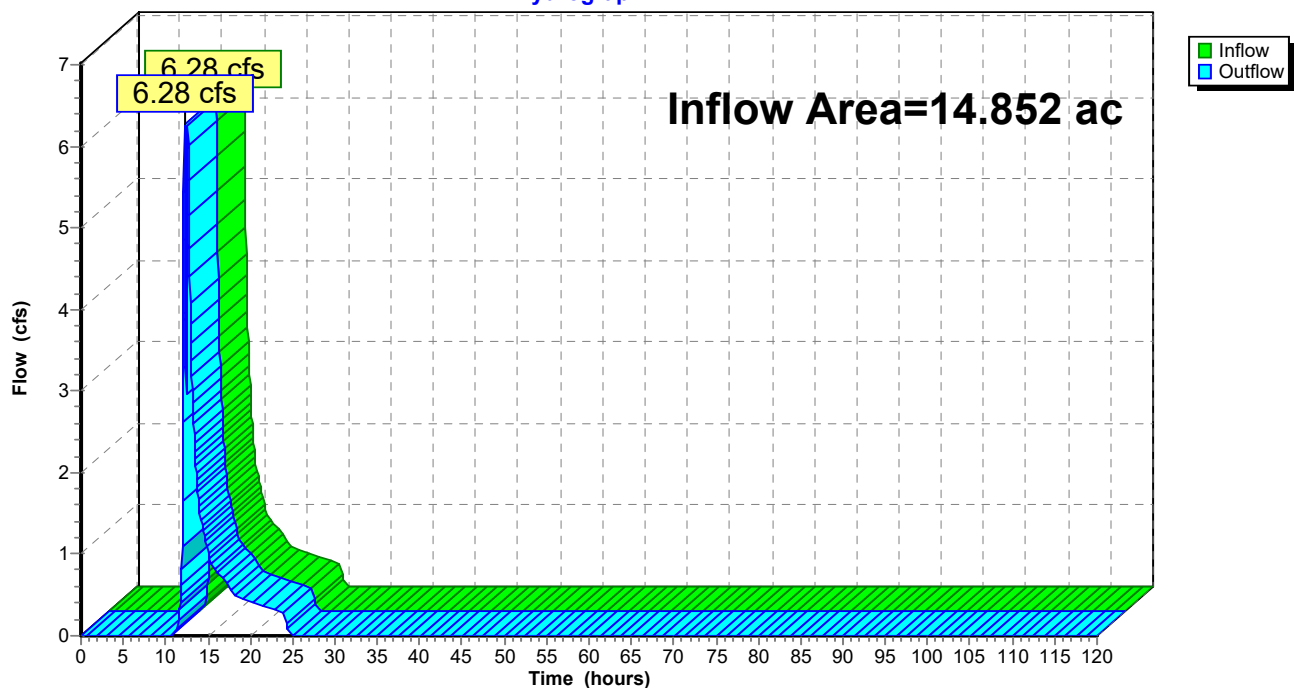
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.852 ac, 17.22% Impervious, Inflow Depth = 0.87" for 10-Year event
Inflow = 6.28 cfs @ 12.21 hrs, Volume= 1.078 af
Outflow = 6.28 cfs @ 12.21 hrs, Volume= 1.078 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R

Hydrograph



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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Reach DP-10: West Elm Street

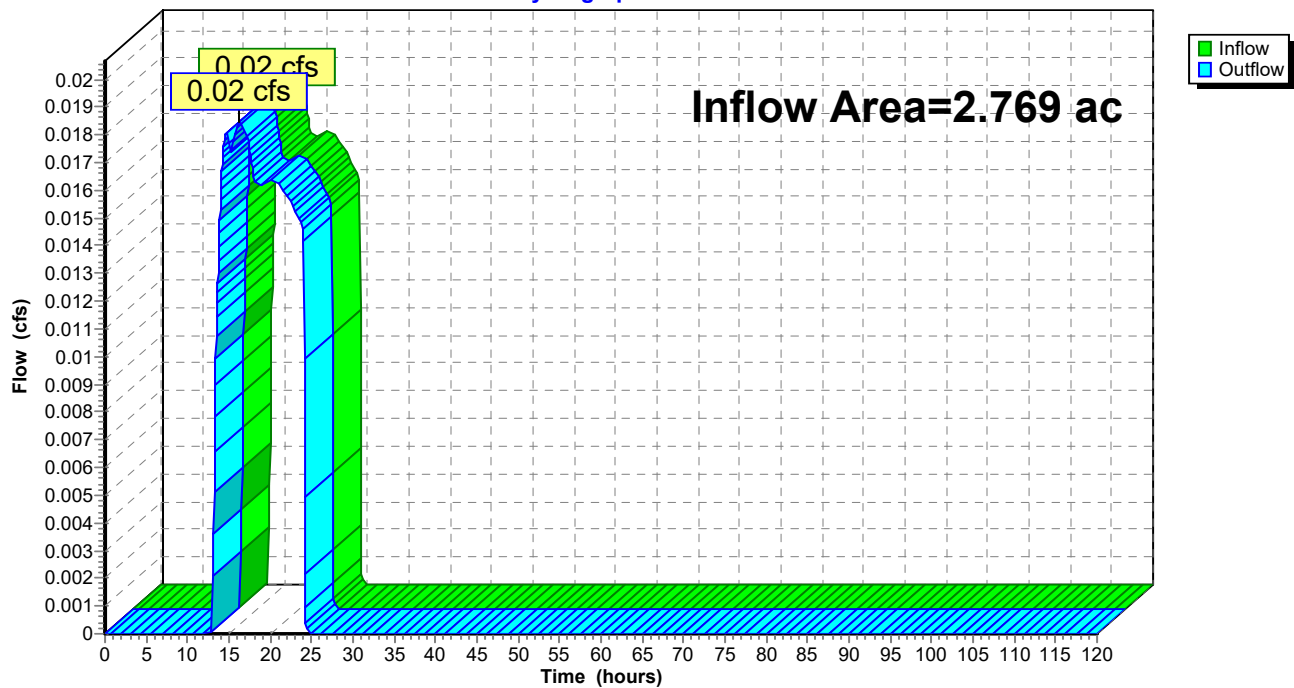
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.769 ac, 6.21% Impervious, Inflow Depth = 0.06" for 10-Year event
Inflow = 0.02 cfs @ 16.28 hrs, Volume= 0.015 af
Outflow = 0.02 cfs @ 16.28 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street

Hydrograph



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Summary for Reach DP-11: Wetland Series A

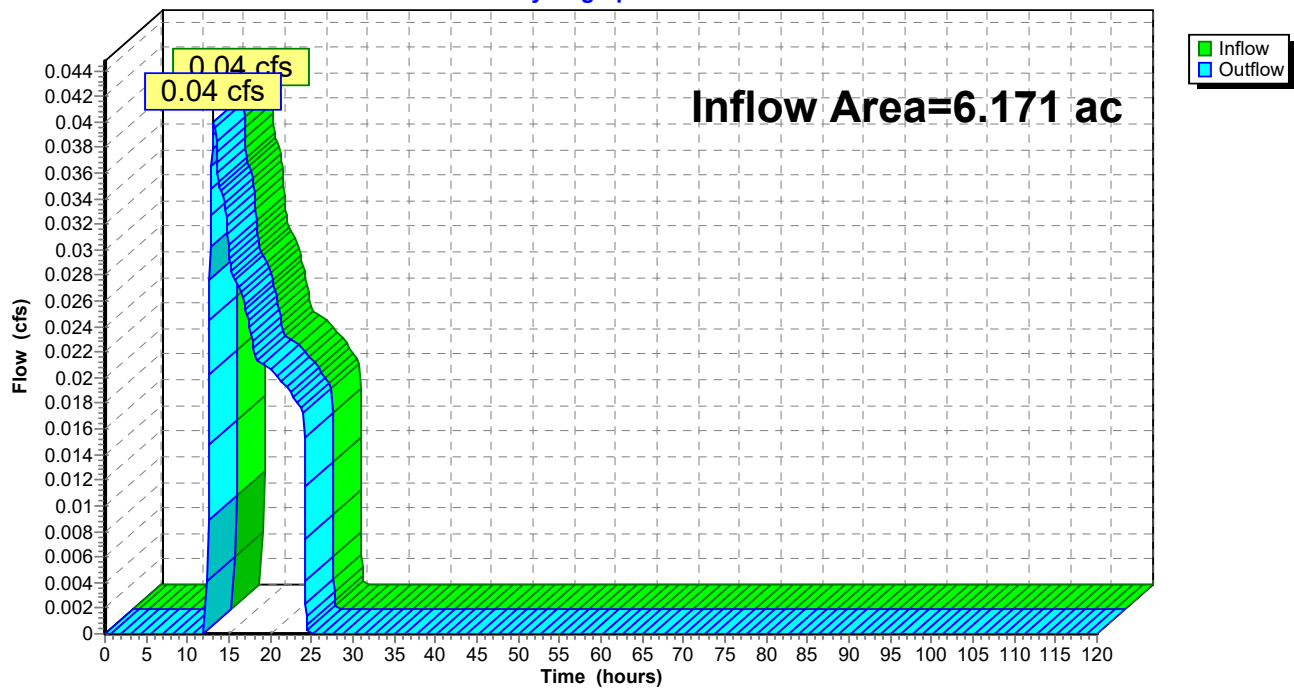
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.171 ac, 9.19% Impervious, Inflow Depth = 0.05" for 10-Year event
Inflow = 0.04 cfs @ 13.12 hrs, Volume= 0.024 af
Outflow = 0.04 cfs @ 13.12 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A

Hydrograph



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Summary for Reach DP-12: Wetland Series A

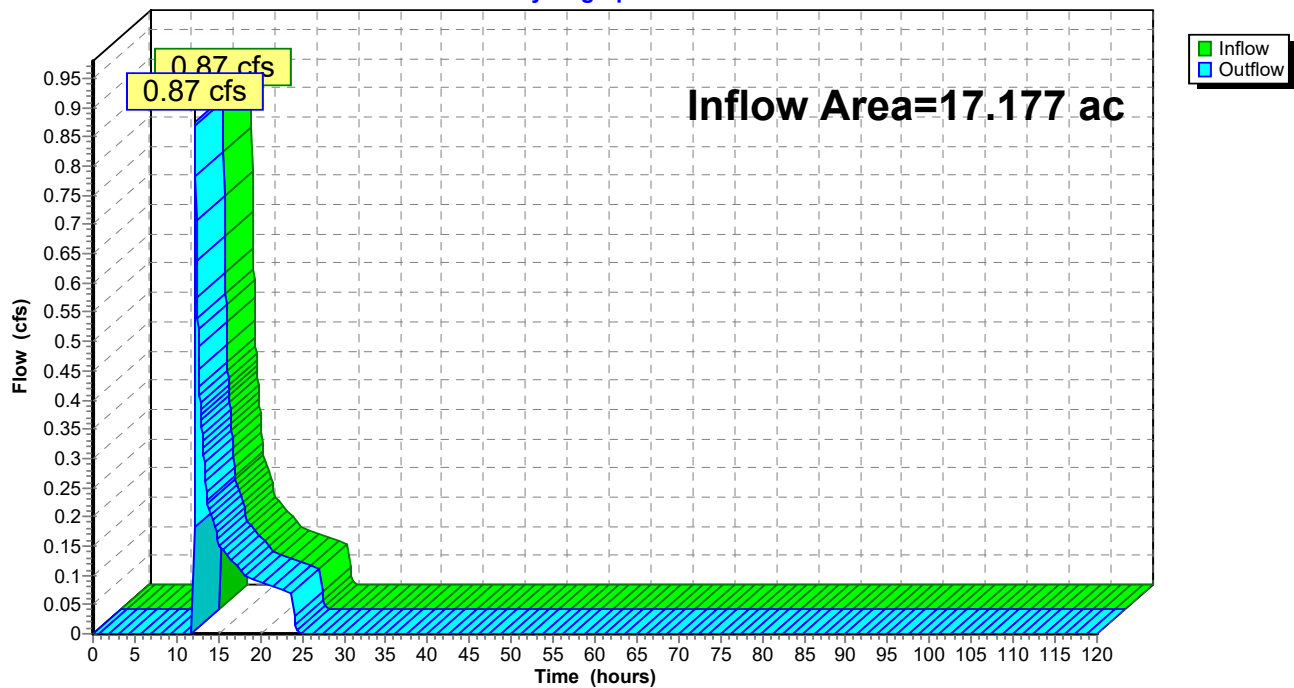
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17.177 ac, 20.55% Impervious, Inflow Depth = 0.11" for 10-Year event
Inflow = 0.87 cfs @ 12.23 hrs, Volume= 0.151 af
Outflow = 0.87 cfs @ 12.23 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A

Hydrograph



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Summary for Reach DP-13: Wetland Series B

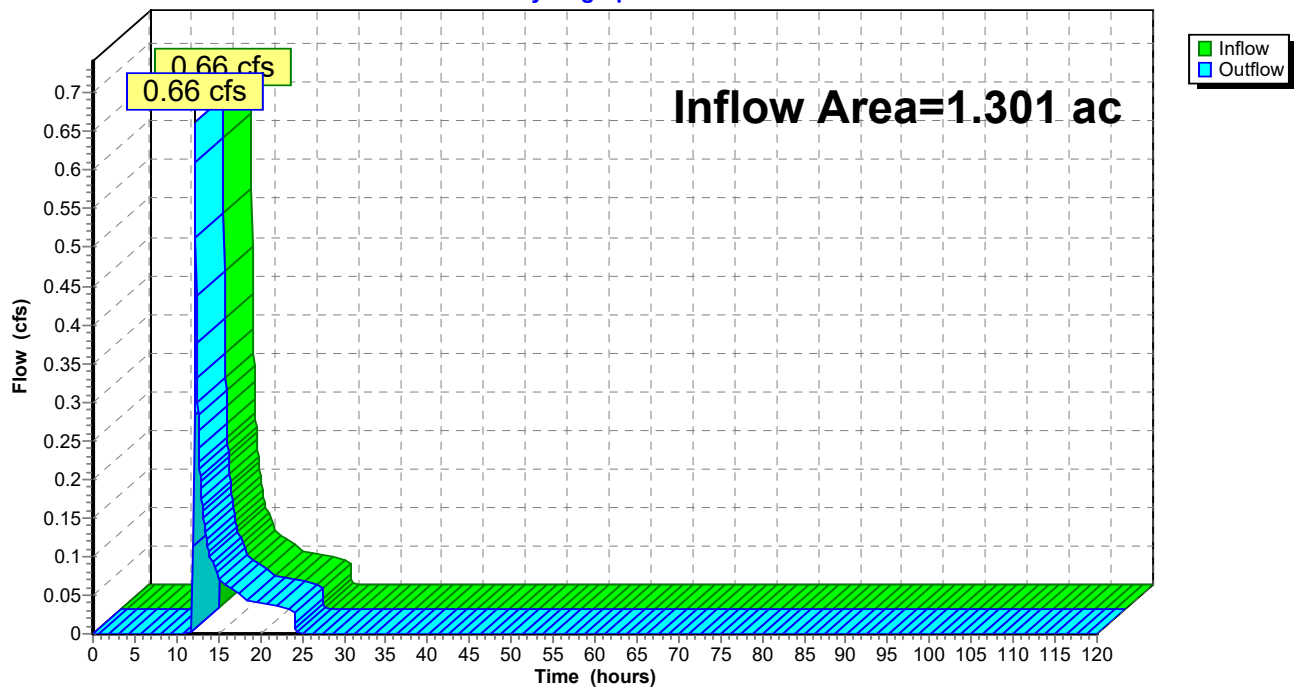
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 0.71" for 10-Year event
Inflow = 0.66 cfs @ 12.21 hrs, Volume= 0.077 af
Outflow = 0.66 cfs @ 12.21 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B

Hydrograph



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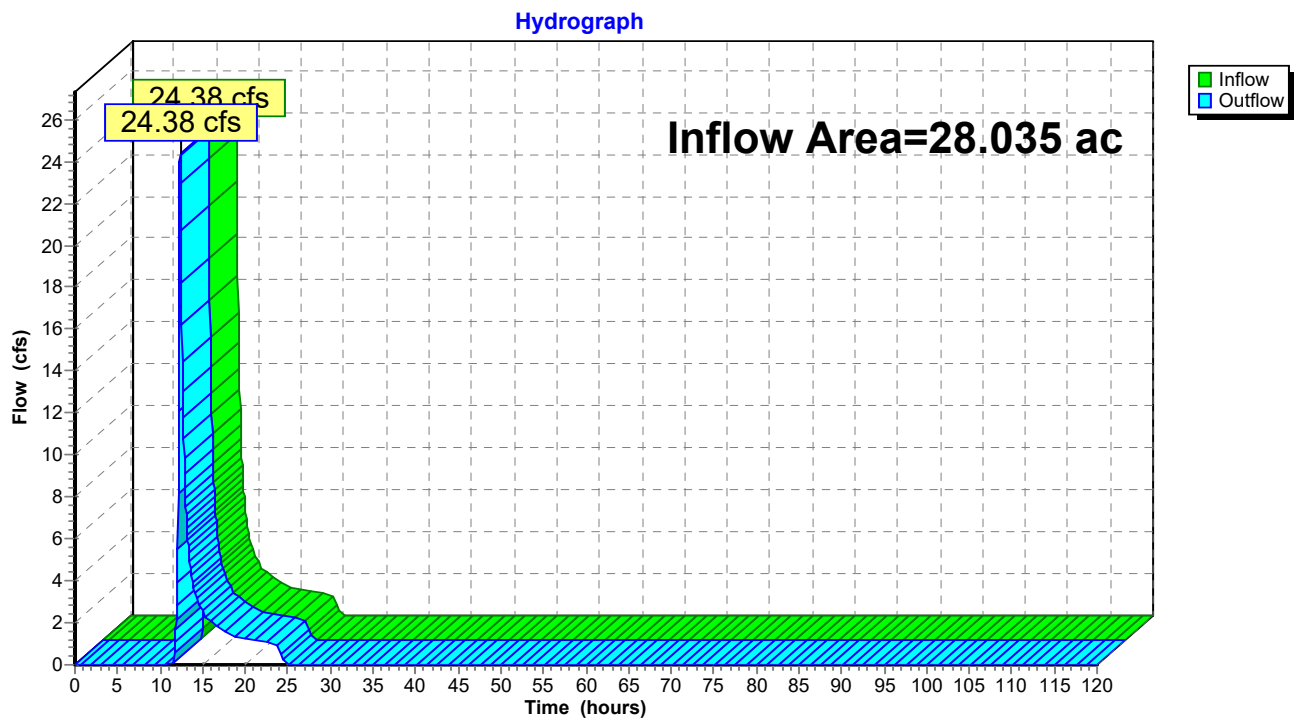
Summary for Reach DP-14: Wetland Series C,D,E,,K,J

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.035 ac, 0.00% Impervious, Inflow Depth = 1.26" for 10-Year event
Inflow = 24.38 cfs @ 12.33 hrs, Volume= 2.950 af
Outflow = 24.38 cfs @ 12.33 hrs, Volume= 2.950 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J



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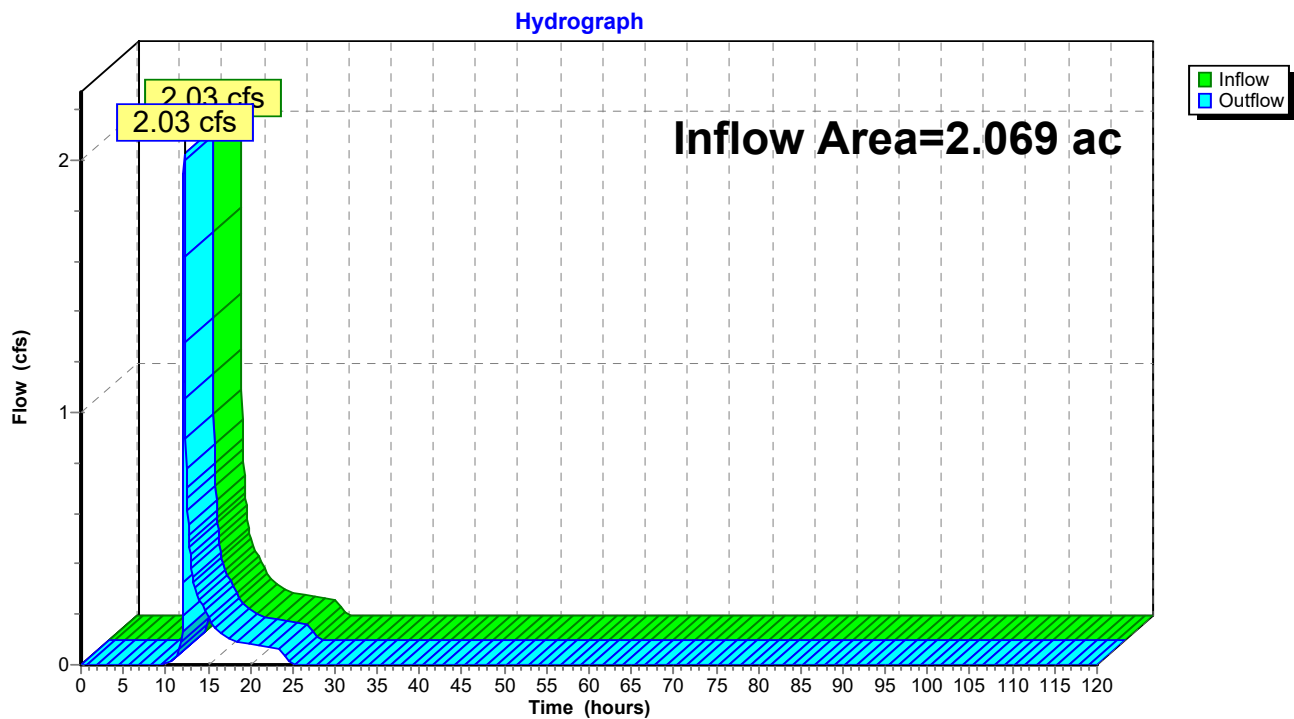
Summary for Reach DP-15: Wetland Series H

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.069 ac, 6.77% Impervious, Inflow Depth = 1.11" for 10-Year event
Inflow = 2.03 cfs @ 12.18 hrs, Volume= 0.191 af
Outflow = 2.03 cfs @ 12.18 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H



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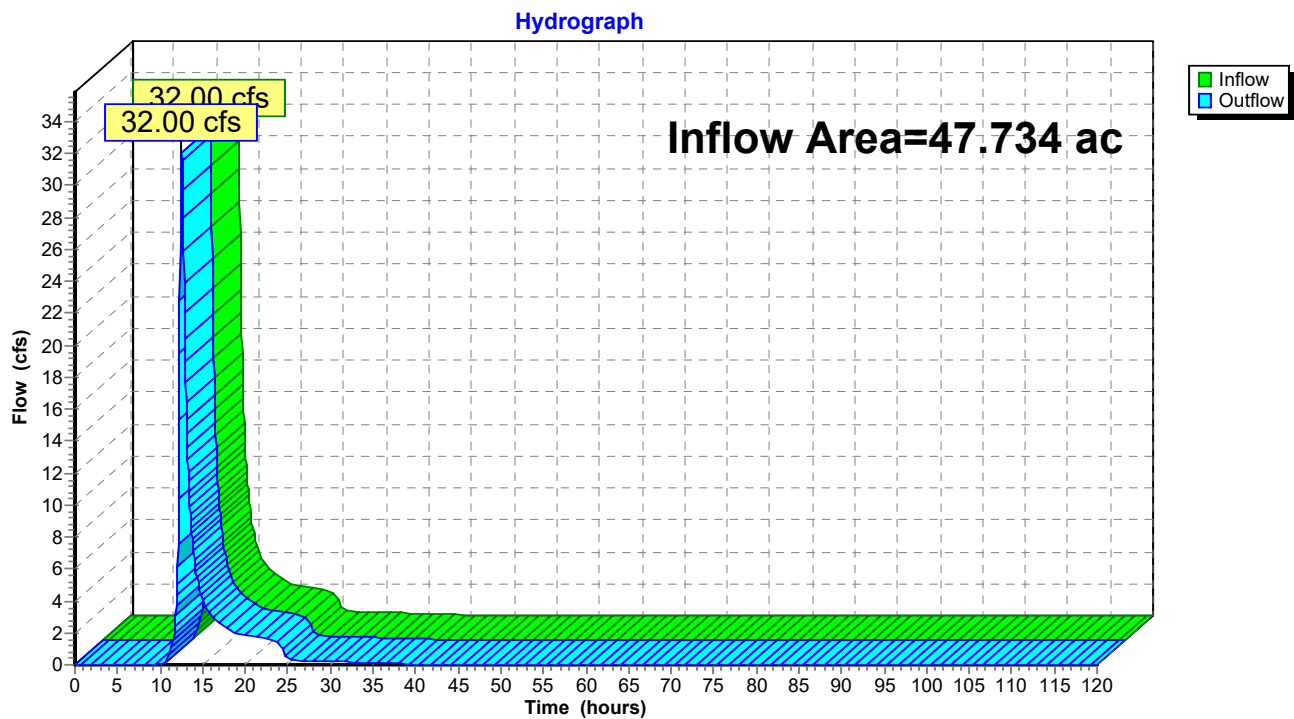
Summary for Reach DP-2: Wetland Series I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.734 ac, 17.87% Impervious, Inflow Depth = 1.31" for 10-Year event
Inflow = 32.00 cfs @ 12.53 hrs, Volume= 5.192 af
Outflow = 32.00 cfs @ 12.53 hrs, Volume= 5.192 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I



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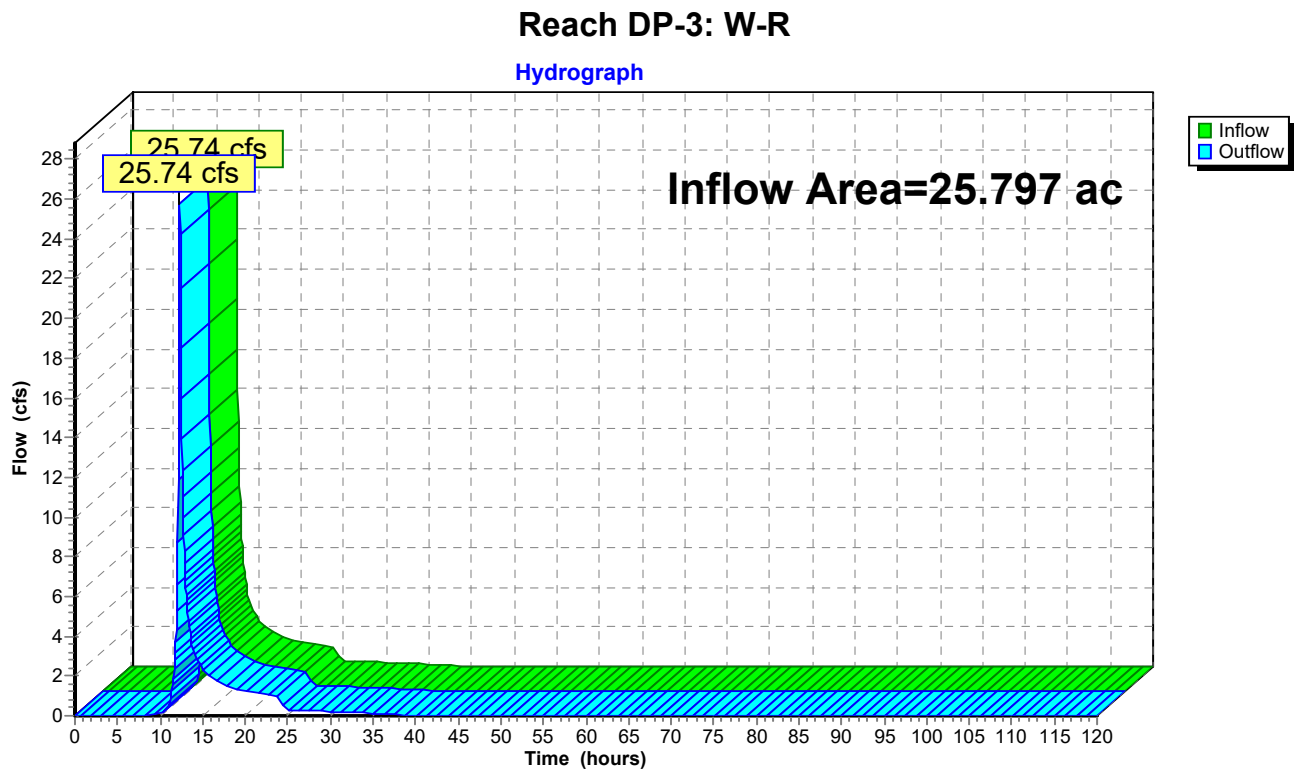
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Summary for Reach DP-3: W-R

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 1.52" for 10-Year event
Inflow = 25.74 cfs @ 12.29 hrs, Volume= 3.271 af
Outflow = 25.74 cfs @ 12.29 hrs, Volume= 3.271 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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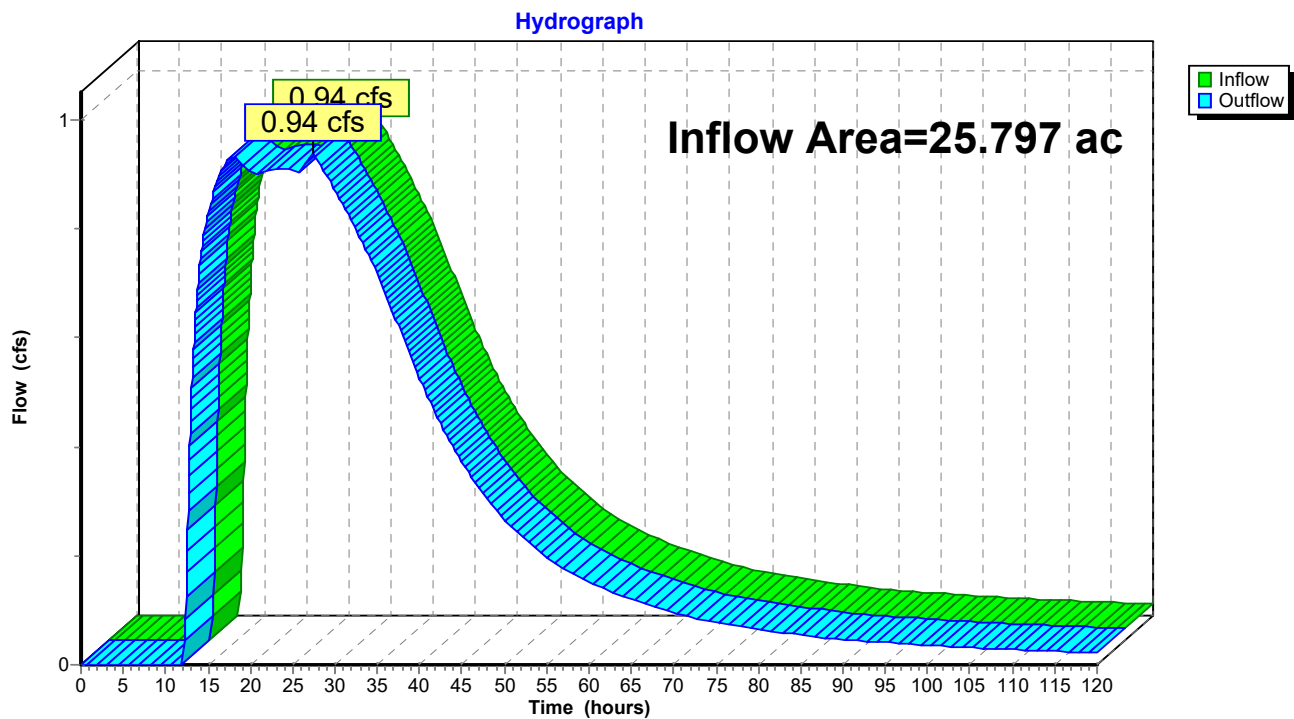
Summary for Reach DP-3 OUT: 8" Copper Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth > 1.22" for 10-Year event
Inflow = 0.94 cfs @ 27.41 hrs, Volume= 2.620 af
Outflow = 0.94 cfs @ 27.41 hrs, Volume= 2.620 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe



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Summary for Reach DP-4: Dwelley Street

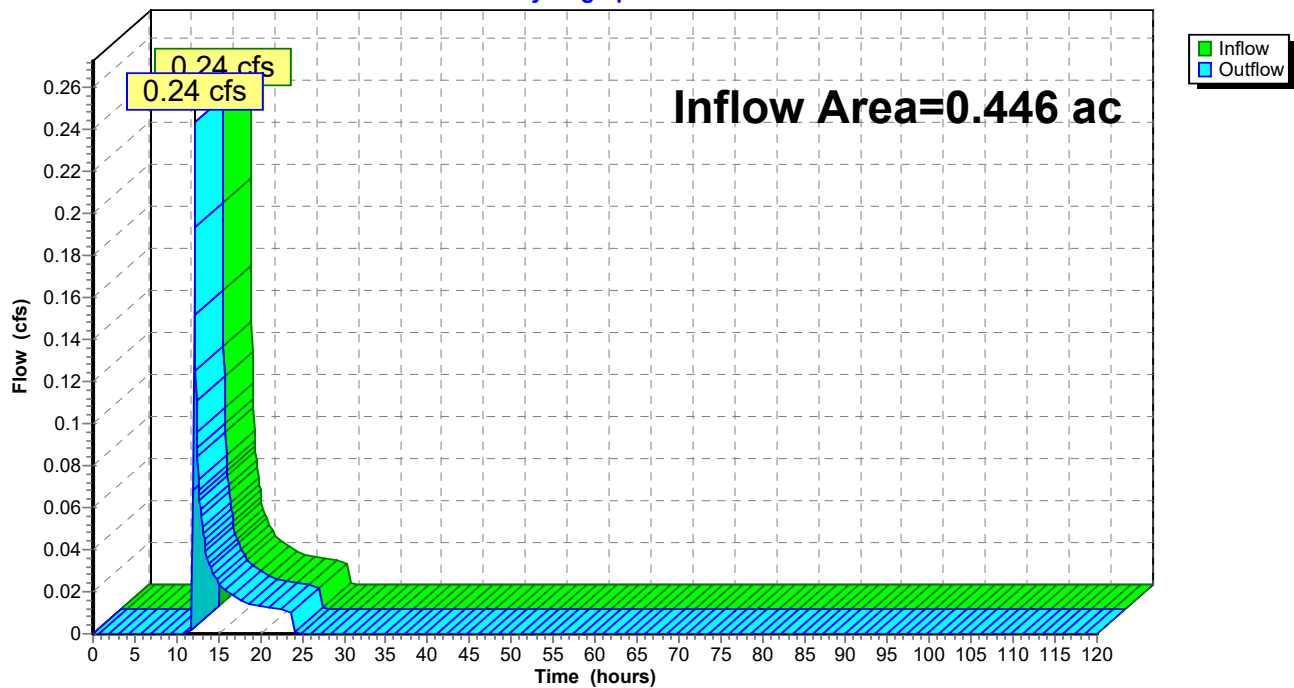
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.446 ac, 20.48% Impervious, Inflow Depth = 0.66" for 10-Year event
Inflow = 0.24 cfs @ 12.15 hrs, Volume= 0.025 af
Outflow = 0.24 cfs @ 12.15 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street

Hydrograph



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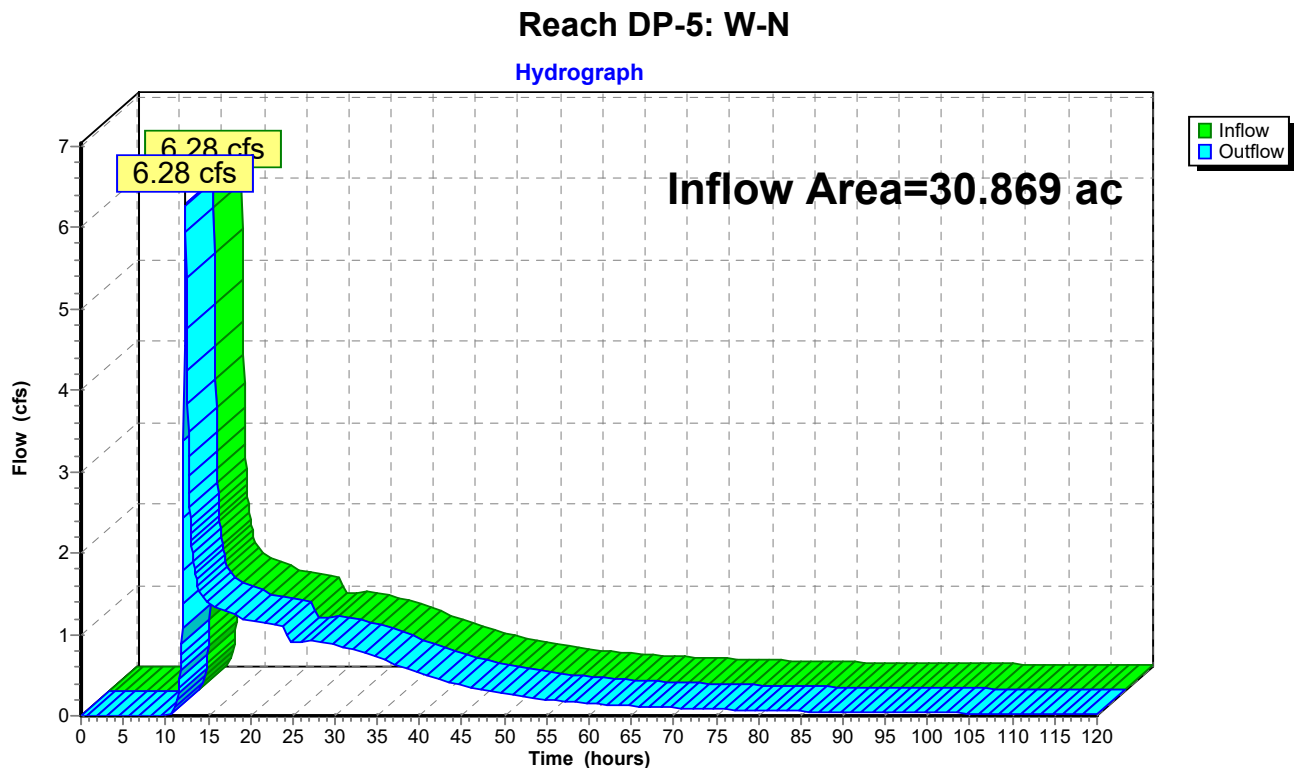
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Summary for Reach DP-5: W-N

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 1.30" for 10-Year event
Inflow = 6.28 cfs @ 12.33 hrs, Volume= 3.333 af
Outflow = 6.28 cfs @ 12.33 hrs, Volume= 3.333 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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Summary for Reach DP-5 OUT: 24" RCP PIPE

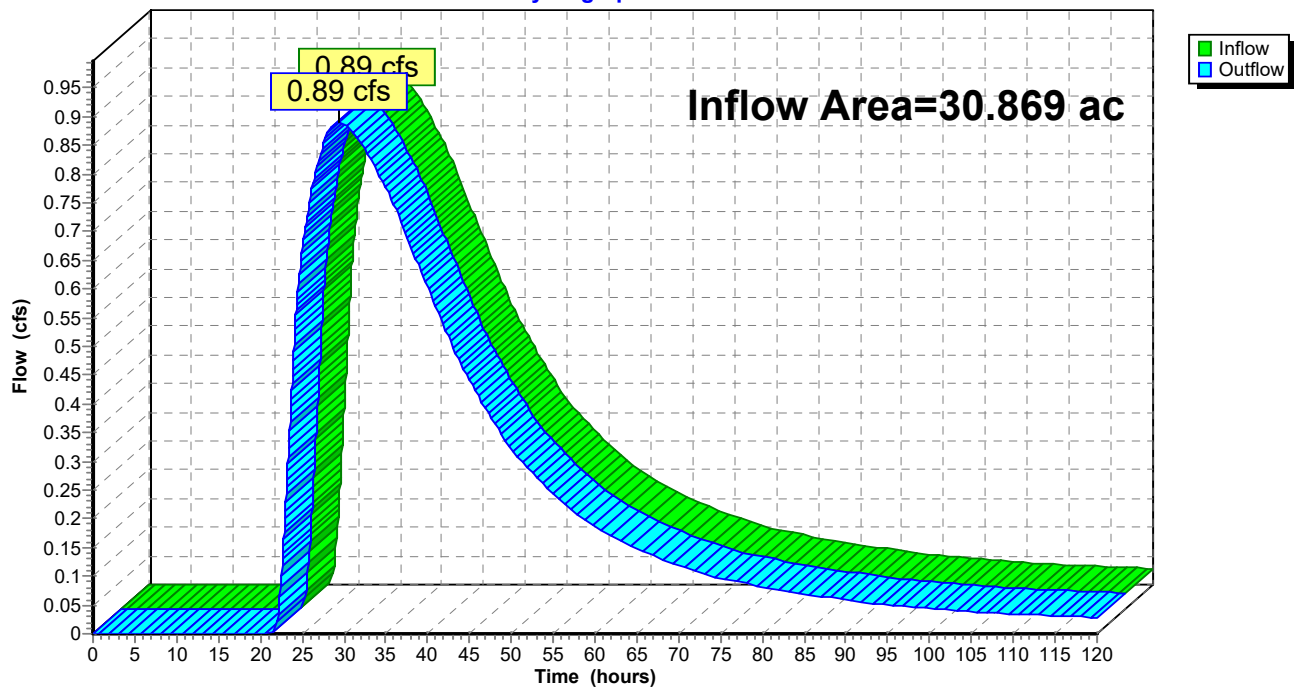
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 0.78" for 10-Year event
Inflow = 0.89 cfs @ 29.36 hrs, Volume= 1.998 af
Outflow = 0.89 cfs @ 29.36 hrs, Volume= 1.998 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE

Hydrograph



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Summary for Reach DP-6: W-QP

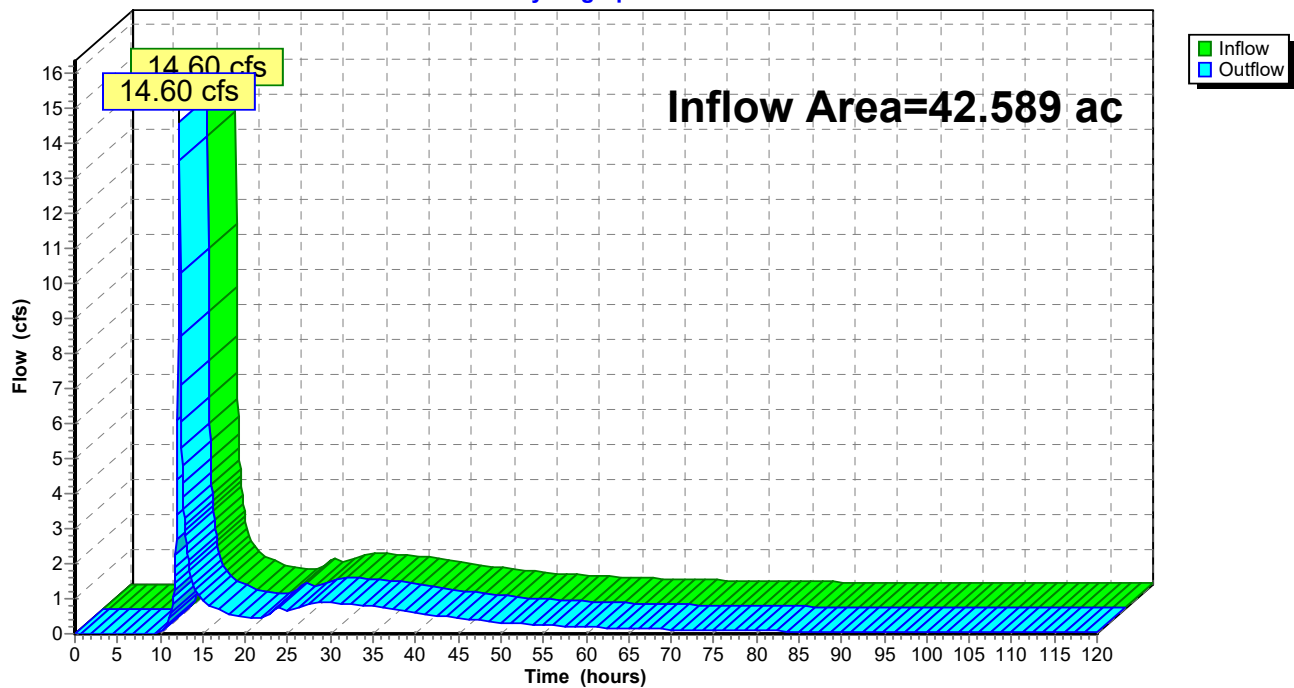
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth > 0.94" for 10-Year event
Inflow = 14.60 cfs @ 12.23 hrs, Volume= 3.328 af
Outflow = 14.60 cfs @ 12.23 hrs, Volume= 3.328 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



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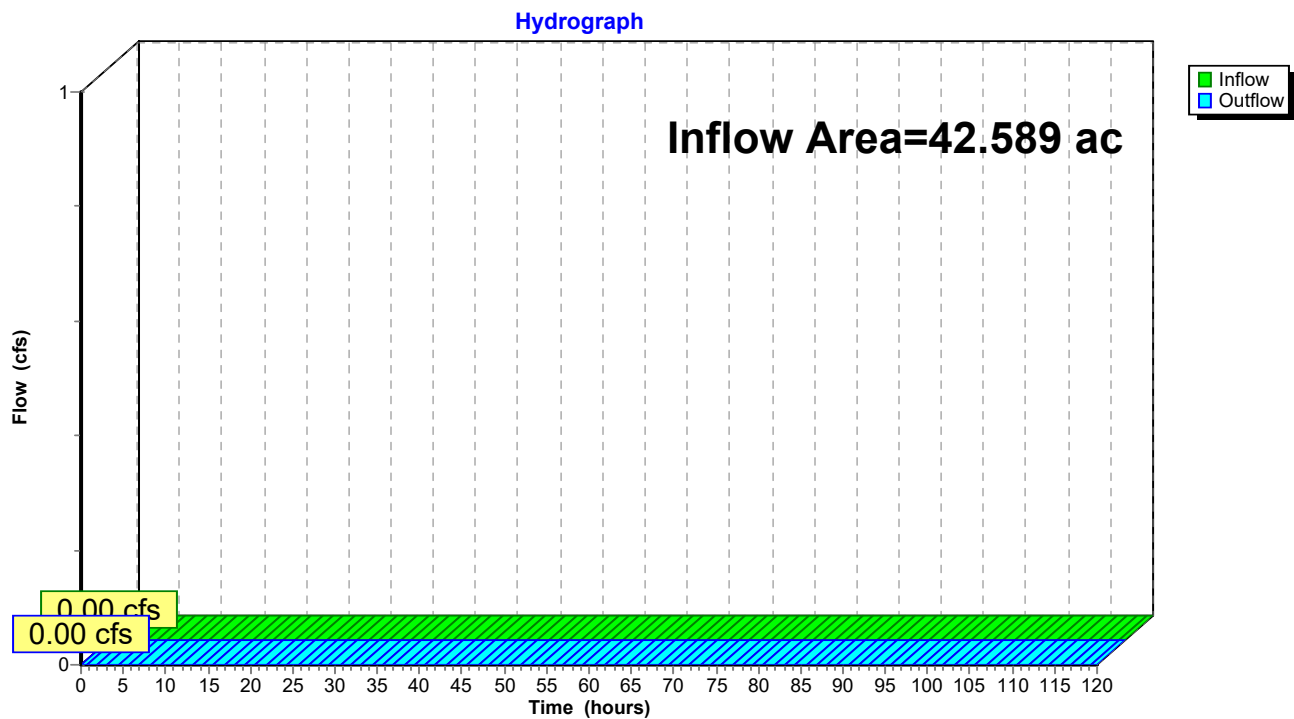
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth = 0.00" for 10-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



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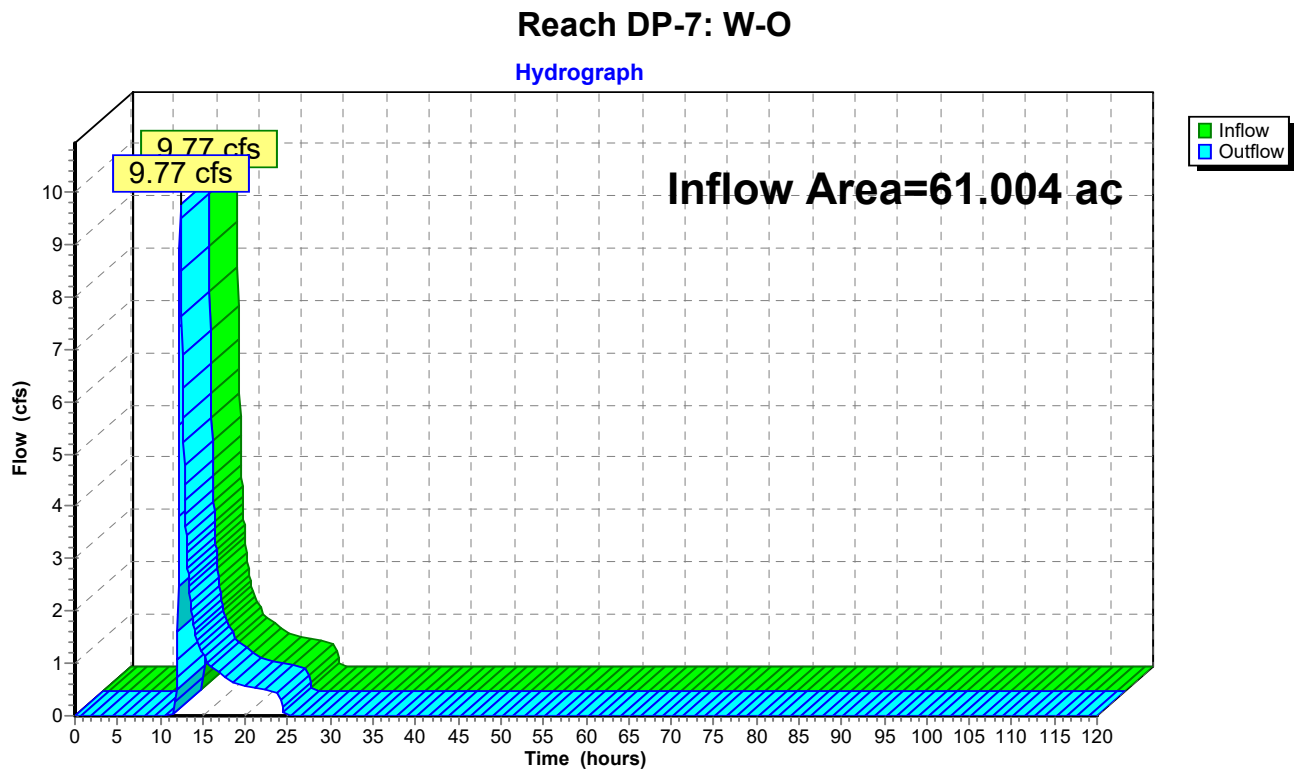
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Summary for Reach DP-7: W-O

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.26" for 10-Year event
Inflow = 9.77 cfs @ 12.38 hrs, Volume= 1.312 af
Outflow = 9.77 cfs @ 12.38 hrs, Volume= 1.312 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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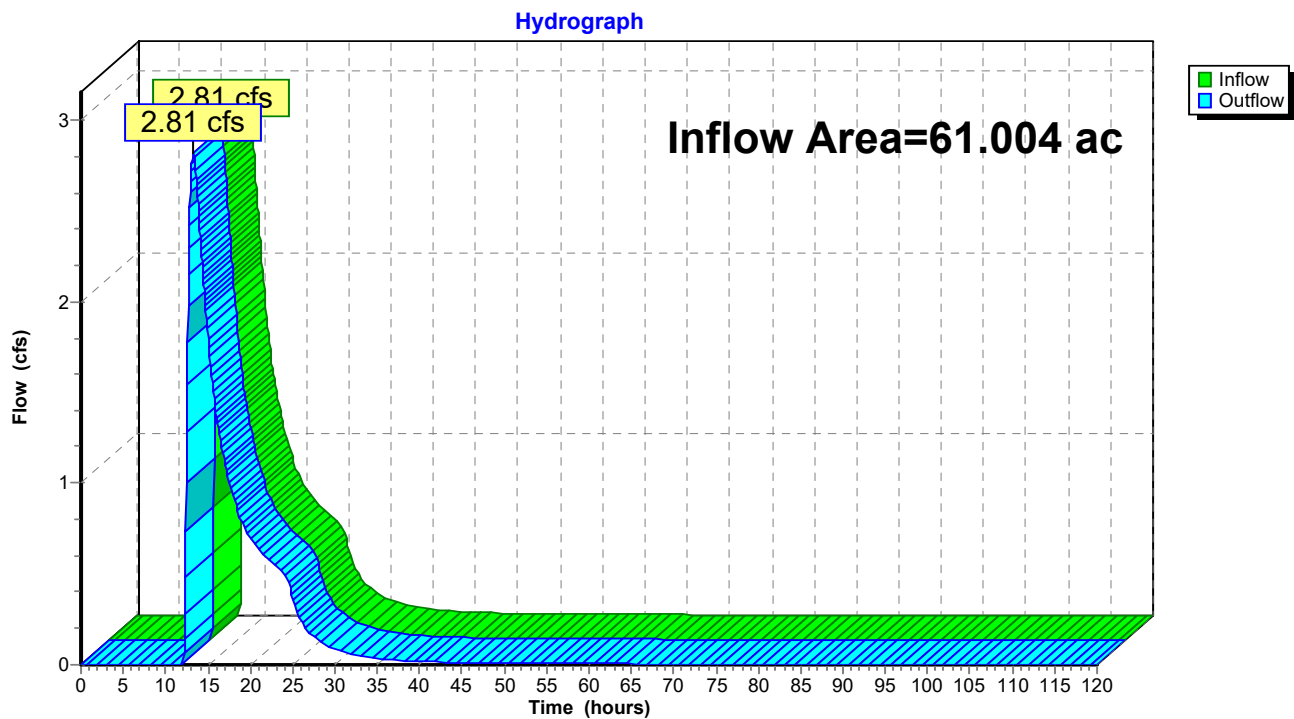
Summary for Reach DP-7 OUT: 12" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth > 0.26" for 10-Year event
Inflow = 2.81 cfs @ 13.25 hrs, Volume= 1.311 af
Outflow = 2.81 cfs @ 13.25 hrs, Volume= 1.311 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 12" RCP PIPE



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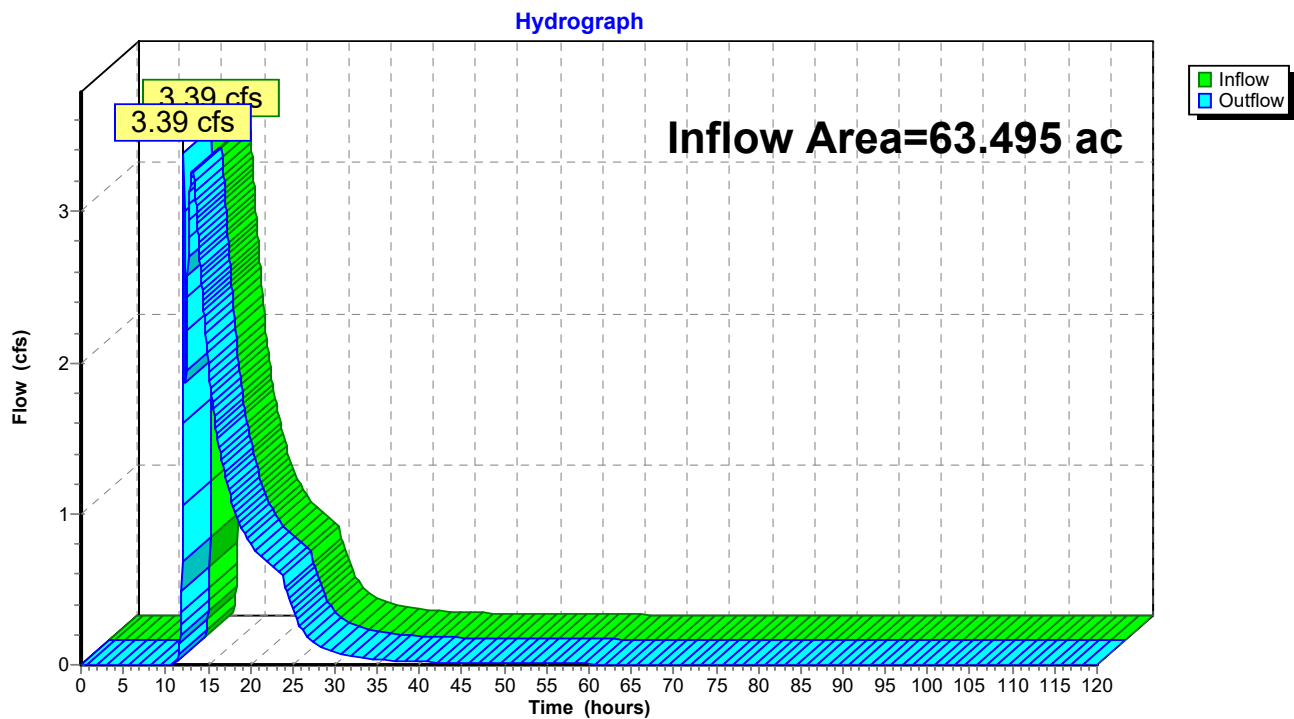
Summary for Reach DP-8: Wetlands Series X

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 63.495 ac, 20.77% Impervious, Inflow Depth > 0.30" for 10-Year event
Inflow = 3.39 cfs @ 12.16 hrs, Volume= 1.573 af
Outflow = 3.39 cfs @ 12.16 hrs, Volume= 1.573 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X



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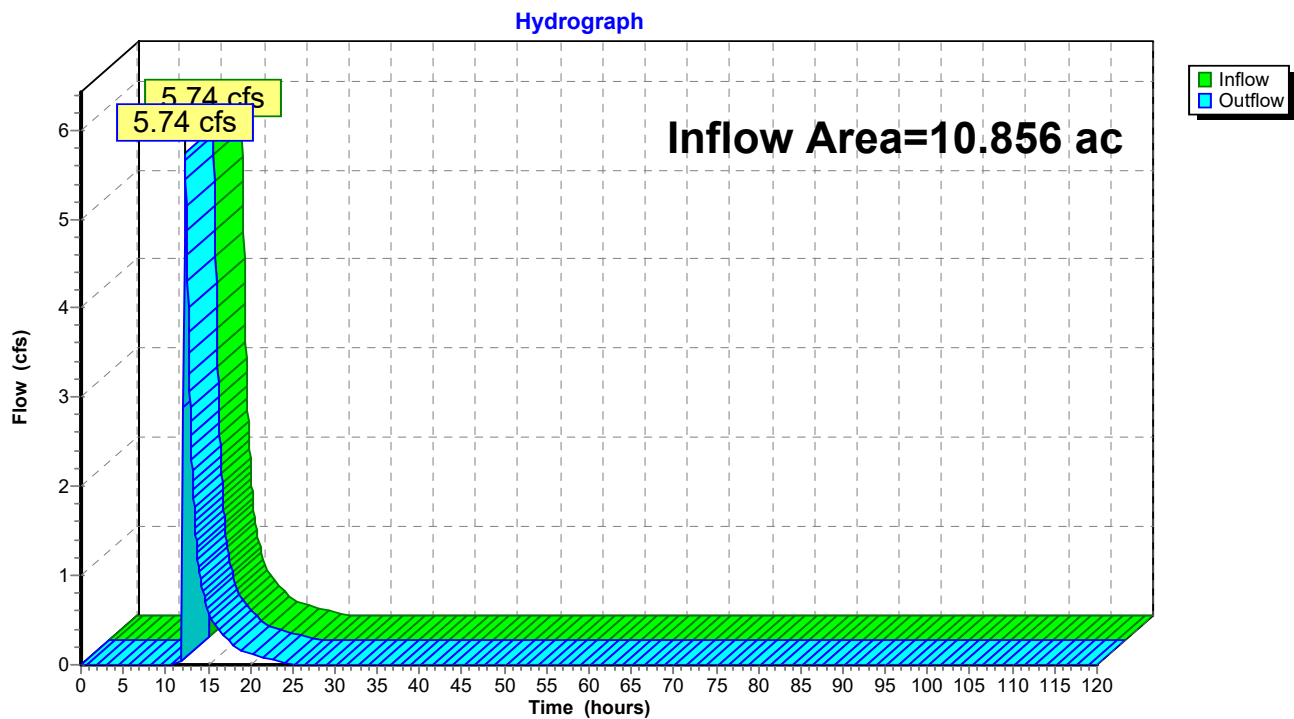
Summary for Reach DP-9: West Elm Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.856 ac, 42.73% Impervious, Inflow Depth = 0.71" for 10-Year event
Inflow = 5.74 cfs @ 12.31 hrs, Volume= 0.646 af
Outflow = 5.74 cfs @ 12.31 hrs, Volume= 0.646 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street



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Summary for Reach DP-ELM: West Elm Street

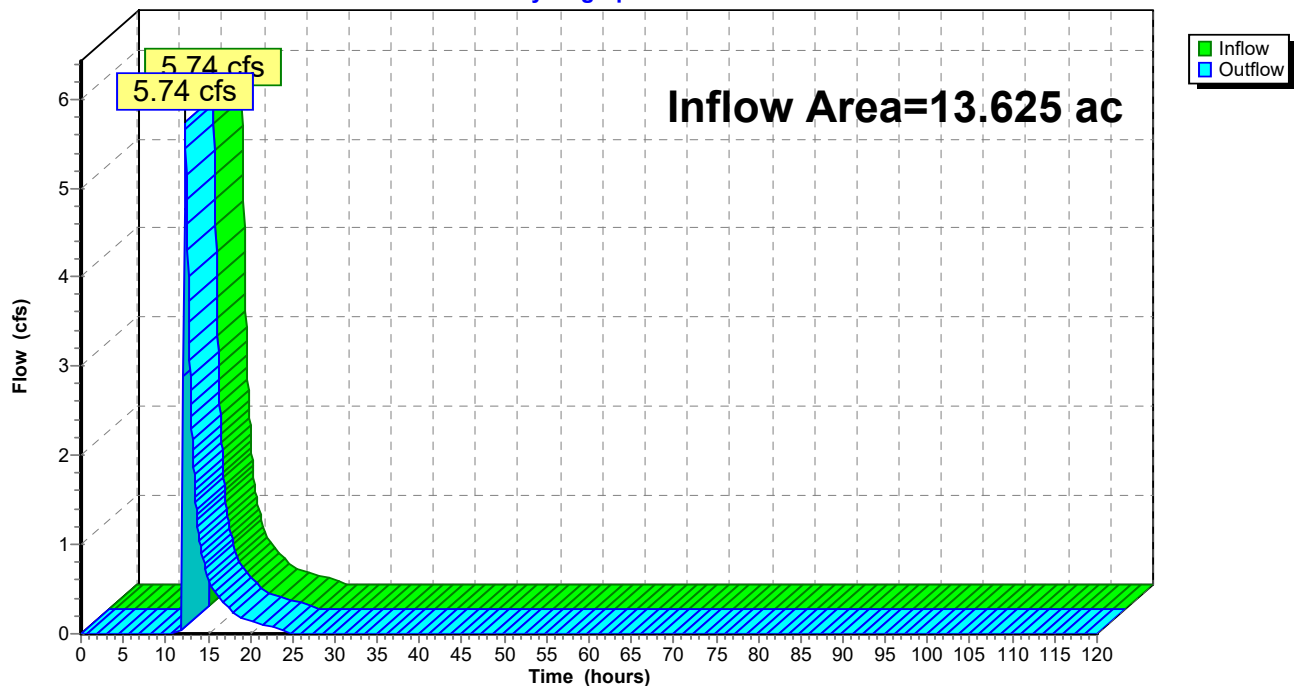
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.625 ac, 35.31% Impervious, Inflow Depth = 0.58" for 10-Year event
Inflow = 5.74 cfs @ 12.31 hrs, Volume= 0.661 af
Outflow = 5.74 cfs @ 12.31 hrs, Volume= 0.661 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street

Hydrograph



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Summary for Reach DP-WA: Wetland Series A

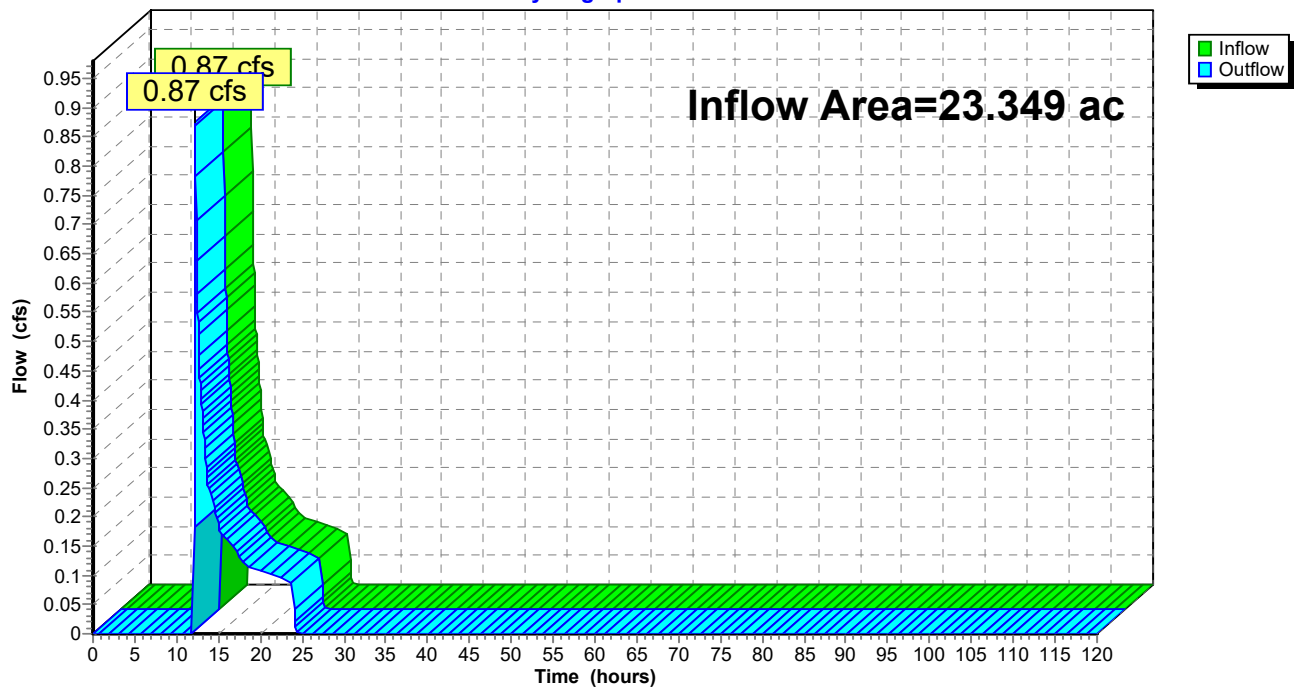
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 23.349 ac, 17.54% Impervious, Inflow Depth = 0.09" for 10-Year event
Inflow = 0.87 cfs @ 12.23 hrs, Volume= 0.174 af
Outflow = 0.87 cfs @ 12.23 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A

Hydrograph



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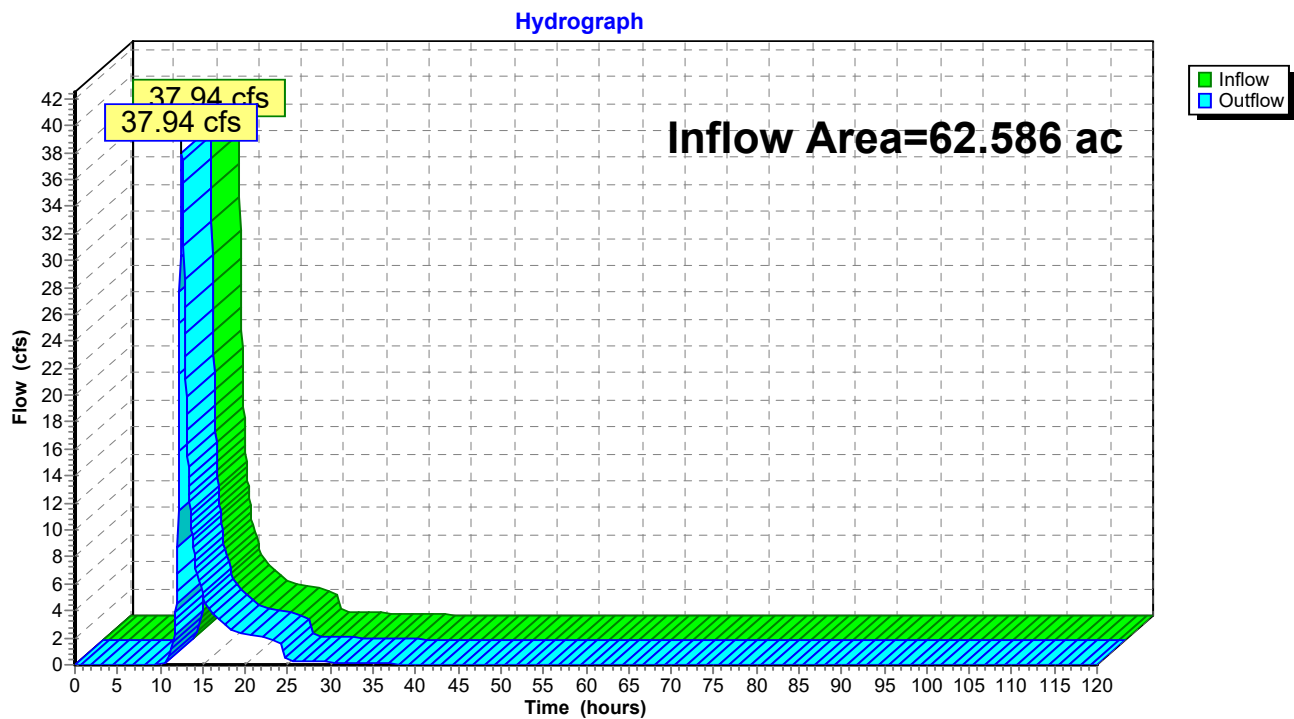
Summary for Reach DP-WI: Wetland Series/Stream I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62.586 ac, 17.71% Impervious, Inflow Depth = 1.20" for 10-Year event
Inflow = 37.94 cfs @ 12.56 hrs, Volume= 6.270 af
Outflow = 37.94 cfs @ 12.56 hrs, Volume= 6.270 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I



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Summary for Pond BAS 1-A: BAS 1-A

Inflow Area = 3.871 ac, 43.69% Impervious, Inflow Depth = 2.66" for 10-Year event
Inflow = 12.64 cfs @ 12.13 hrs, Volume= 0.860 af
Outflow = 1.19 cfs @ 13.19 hrs, Volume= 0.860 af, Atten= 91%, Lag= 63.4 min
Discarded = 1.19 cfs @ 13.19 hrs, Volume= 0.860 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 81.78' @ 13.19 hrs Surf.Area= 6,125 sf Storage= 15,038 cf

Plug-Flow detention time= 137.8 min calculated for 0.859 af (100% of inflow)
Center-of-Mass det. time= 137.8 min (976.9 - 839.1)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	31,322 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	2,480	0	0	2,480
79.00	3,150	2,808	2,808	3,176
80.00	3,880	3,509	6,317	3,935
80.95	4,660	4,051	10,368	4,746
81.00	5,284	248	10,616	5,370
82.00	6,379	5,823	16,439	6,498
83.00	7,434	6,900	23,339	7,593
84.00	8,545	7,983	31,322	8,748

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	8.270 in/hr Exfiltration over Wetted area
#2	Primary	82.75'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.19 cfs @ 13.19 hrs HW=81.78' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=78.00' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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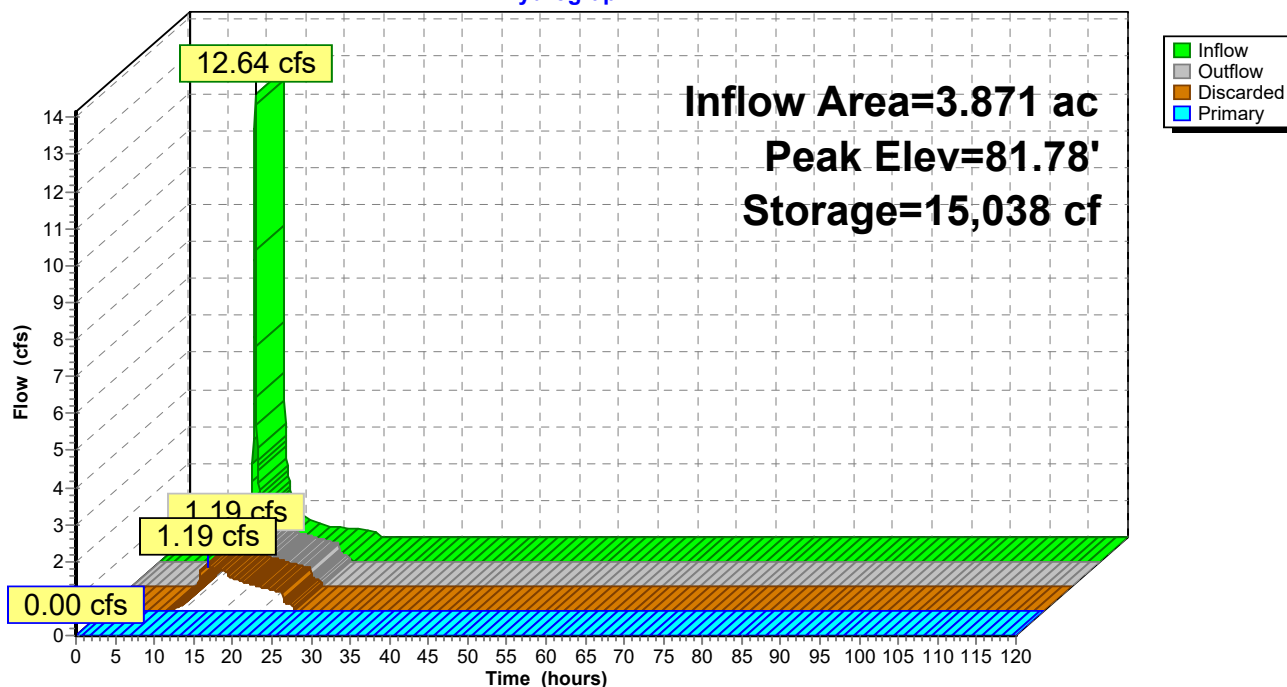
NRCC 24-hr C 10-Year Rainfall=5.05"

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Pond BAS 1-A: BAS 1-A

Hydrograph



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Summary for Pond BAS 1-B: BAS 1-B

Inflow Area = 6.278 ac, 8.01% Impervious, Inflow Depth = 1.69" for 10-Year event
Inflow = 7.62 cfs @ 12.34 hrs, Volume= 0.883 af
Outflow = 4.44 cfs @ 12.62 hrs, Volume= 0.883 af, Atten= 42%, Lag= 16.7 min
Discarded = 0.13 cfs @ 12.62 hrs, Volume= 0.359 af
Primary = 4.31 cfs @ 12.62 hrs, Volume= 0.524 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.56' @ 12.62 hrs Surf.Area= 5,589 sf Storage= 11,233 cf

Plug-Flow detention time= 376.4 min calculated for 0.882 af (100% of inflow)
Center-of-Mass det. time= 376.9 min (1,265.2 - 888.3)

Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	13,755 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
80.00	3,170	0	0
83.00	6,000	13,755	13,755

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.27'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.13 cfs @ 12.62 hrs HW=82.56' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=4.24 cfs @ 12.62 hrs HW=82.56' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 4.24 cfs @ 1.45 fps)

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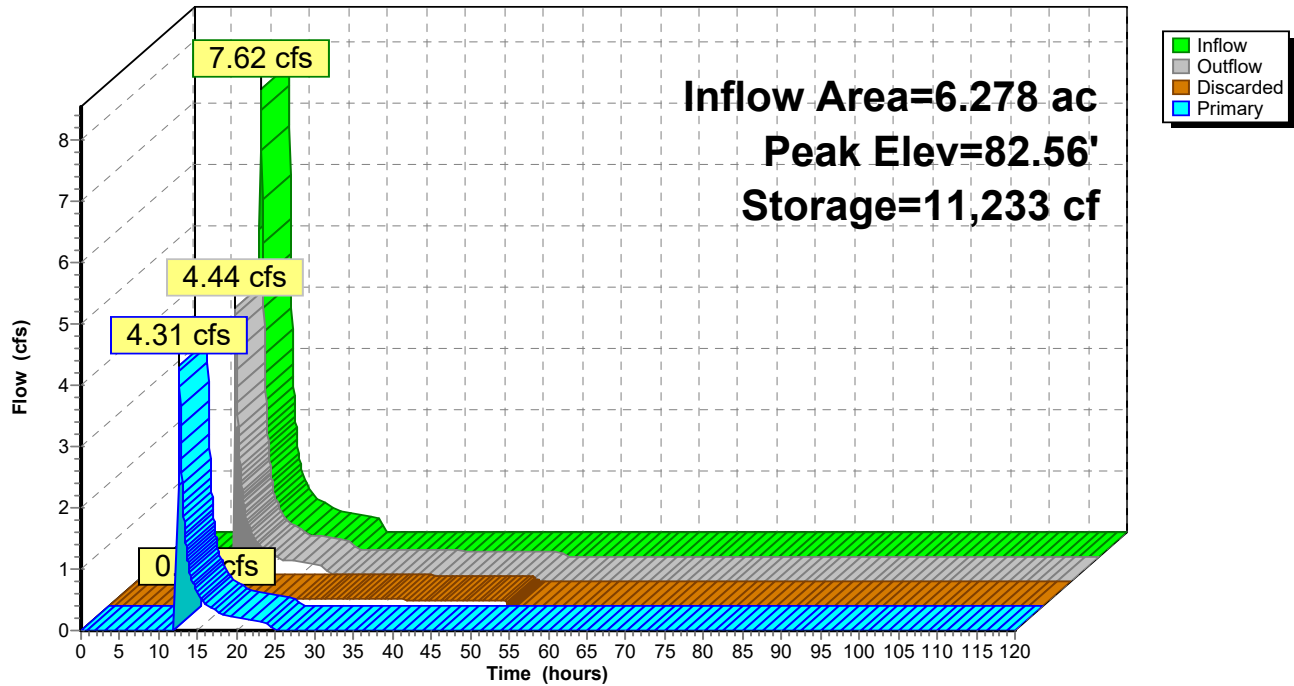
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Pond BAS 1-B: BAS 1-B

Hydrograph



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Summary for Pond BAS 1-C: BAS 1-C

Inflow Area = 0.144 ac, 73.04% Impervious, Inflow Depth = 3.72" for 10-Year event
Inflow = 0.63 cfs @ 12.13 hrs, Volume= 0.045 af
Outflow = 0.62 cfs @ 12.15 hrs, Volume= 0.045 af, Atten= 2%, Lag= 1.0 min
Discarded = 0.01 cfs @ 12.15 hrs, Volume= 0.022 af
Primary = 0.61 cfs @ 12.15 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.93' @ 12.15 hrs Surf.Area= 441 sf Storage= 492 cf

Plug-Flow detention time= 283.2 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 283.6 min (1,087.5 - 803.9)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	525 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	70	0	0
83.00	455	525	525

Device	Routing	Invert	Outlet Devices
#1	Discarded	81.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.80'	5.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=82.93' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.60 cfs @ 12.15 hrs HW=82.93' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.60 cfs @ 0.95 fps)

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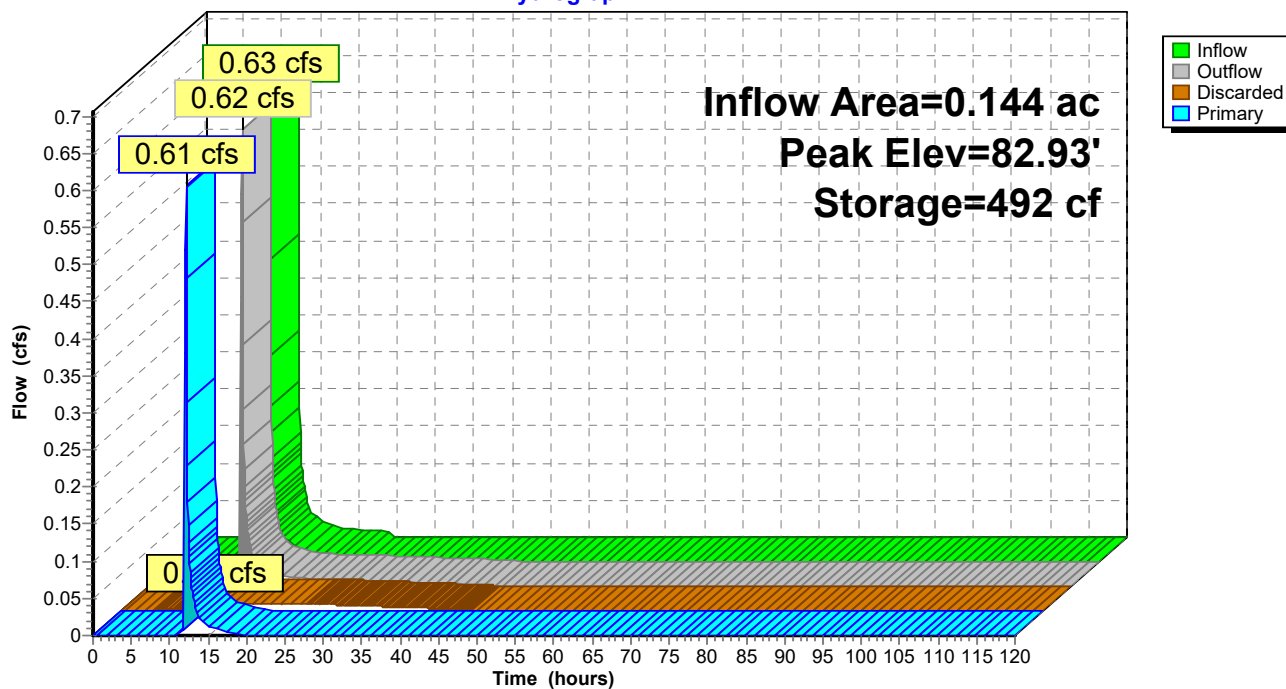
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Pond BAS 1-C: BAS 1-C

Hydrograph



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Summary for Pond BAS 10-A: EXIST BAS 10-A

Inflow Area = 0.796 ac, 7.21% Impervious, Inflow Depth = 0.12" for 10-Year event
Inflow = 0.01 cfs @ 14.35 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 24.03 hrs, Volume= 0.008 af, Atten= 41%, Lag= 580.6 min
Discarded = 0.01 cfs @ 24.03 hrs, Volume= 0.008 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Peak Elev= 54.38' @ 24.03 hrs Surf.Area= 508 sf Storage= 133 cf

Plug-Flow detention time= 269.7 min calculated for 0.008 af (100% of inflow)

Center-of-Mass det. time= 269.2 min (1,358.1 - 1,088.8)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 24.03 hrs HW=54.37' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)

↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Hydrology

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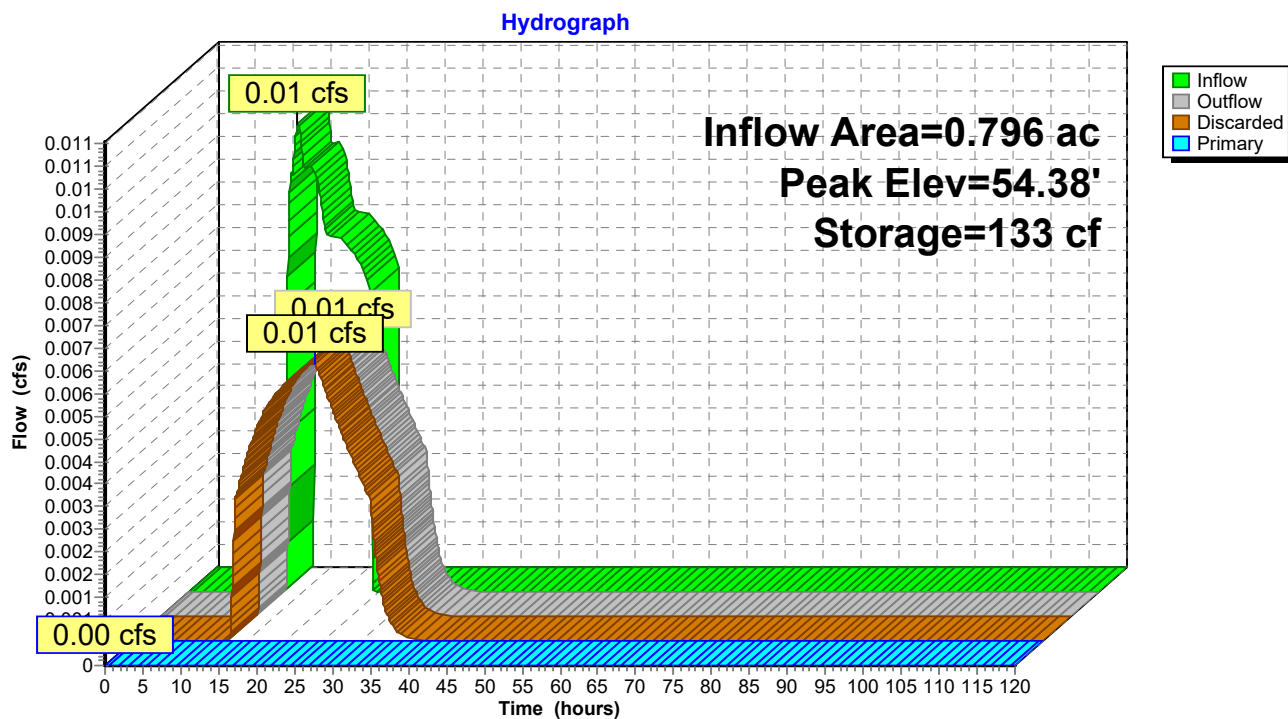
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Pond BAS 10-A: EXIST BAS 10-A



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Summary for Pond BAS 10-B: BAS 10-B

Inflow Area = 1.334 ac, 40.19% Impervious, Inflow Depth = 1.47" for 10-Year event
 Inflow = 2.31 cfs @ 12.14 hrs, Volume= 0.163 af
 Outflow = 0.16 cfs @ 14.33 hrs, Volume= 0.163 af, Atten= 93%, Lag= 131.5 min
 Discarded = 0.16 cfs @ 14.33 hrs, Volume= 0.163 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 78.33' @ 14.33 hrs Surf.Area= 2,784 sf Storage= 3,011 cf

Plug-Flow detention time= 225.4 min calculated for 0.163 af (100% of inflow)
 Center-of-Mass det. time= 225.4 min (1,107.6 - 882.2)

Volume	Invert	Avail.Storage	Storage Description	
#1	77.00'	9,015 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
77.00	1,850	0	0	1,850
78.00	2,450	2,143	2,143	2,472
79.00	3,520	2,969	5,112	3,559
80.00	4,300	3,904	9,015	4,370

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.00'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.16 cfs @ 14.33 hrs HW=78.33' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Proposed Hydrology

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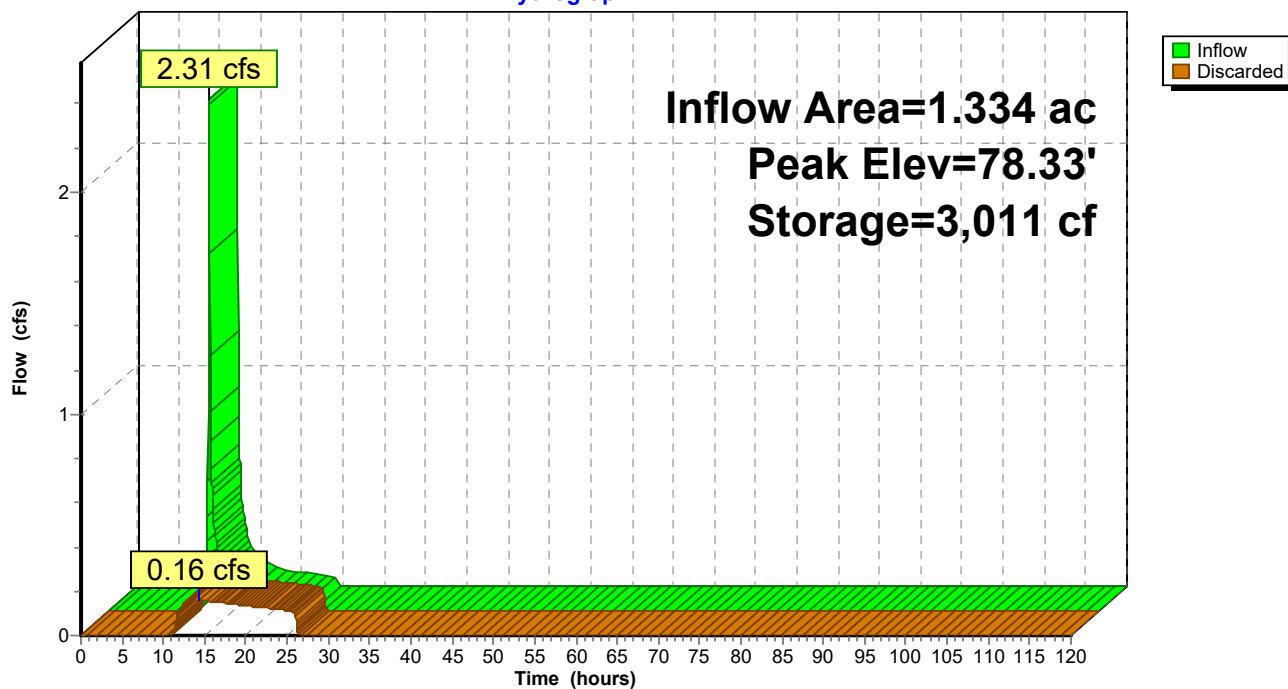
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Pond BAS 10-B: BAS 10-B

Hydrograph



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Summary for Pond BAS 11-B: BAS 11-B

Inflow Area = 4.563 ac, 12.43% Impervious, Inflow Depth = 2.04" for 10-Year event
Inflow = 11.34 cfs @ 12.13 hrs, Volume= 0.774 af
Outflow = 3.00 cfs @ 12.40 hrs, Volume= 0.774 af, Atten= 74%, Lag= 15.8 min
Discarded = 3.00 cfs @ 12.40 hrs, Volume= 0.774 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 44.61' @ 12.40 hrs Surf.Area= 127,000 sf Storage= 5,742 cf

Plug-Flow detention time= 10.3 min calculated for 0.774 af (100% of inflow)
Center-of-Mass det. time= 10.3 min (870.2 - 859.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	25,400 cf	Custom Stage Data (Conic) Listed below (Recalc) 63,500 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.50	127,000	0	0	127,000
45.00	127,000	63,500	63,500	127,632

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.50'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=3.00 cfs @ 12.40 hrs HW=44.61' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 3.00 cfs)

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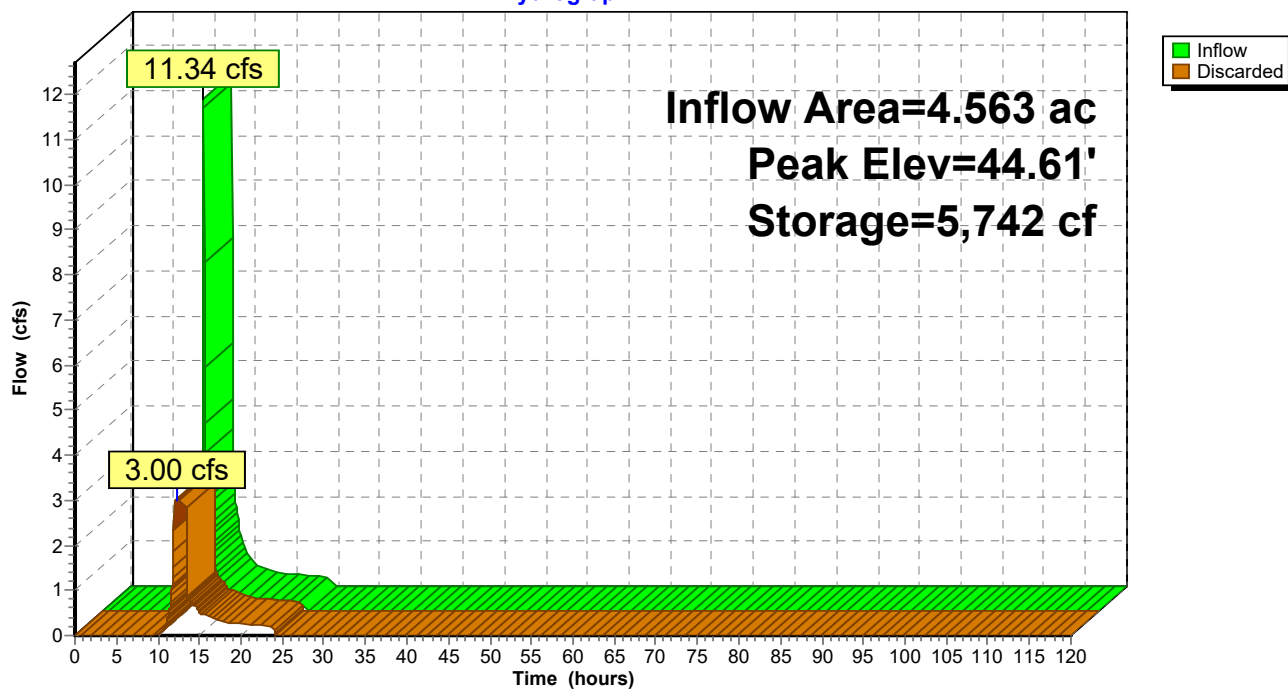
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Pond BAS 11-B: BAS 11-B

Hydrograph



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Summary for Pond BAS 12-A: BAS 12-A

Inflow Area = 6.552 ac, 26.15% Impervious, Inflow Depth = 1.92" for 10-Year event
Inflow = 15.27 cfs @ 12.14 hrs, Volume= 1.046 af
Outflow = 0.69 cfs @ 15.06 hrs, Volume= 1.046 af, Atten= 95%, Lag= 175.5 min
Discarded = 0.69 cfs @ 15.06 hrs, Volume= 1.046 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 95.26' @ 15.06 hrs Surf.Area= 12,370 sf Storage= 23,146 cf

Plug-Flow detention time= 387.4 min calculated for 1.045 af (100% of inflow)
Center-of-Mass det. time= 387.5 min (1,251.8 - 864.3)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	32,859 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.00	8,250	0	0	8,250
96.00	13,900	32,859	32,859	14,008

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	95.45'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.69 cfs @ 15.06 hrs HW=95.26' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.69 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=93.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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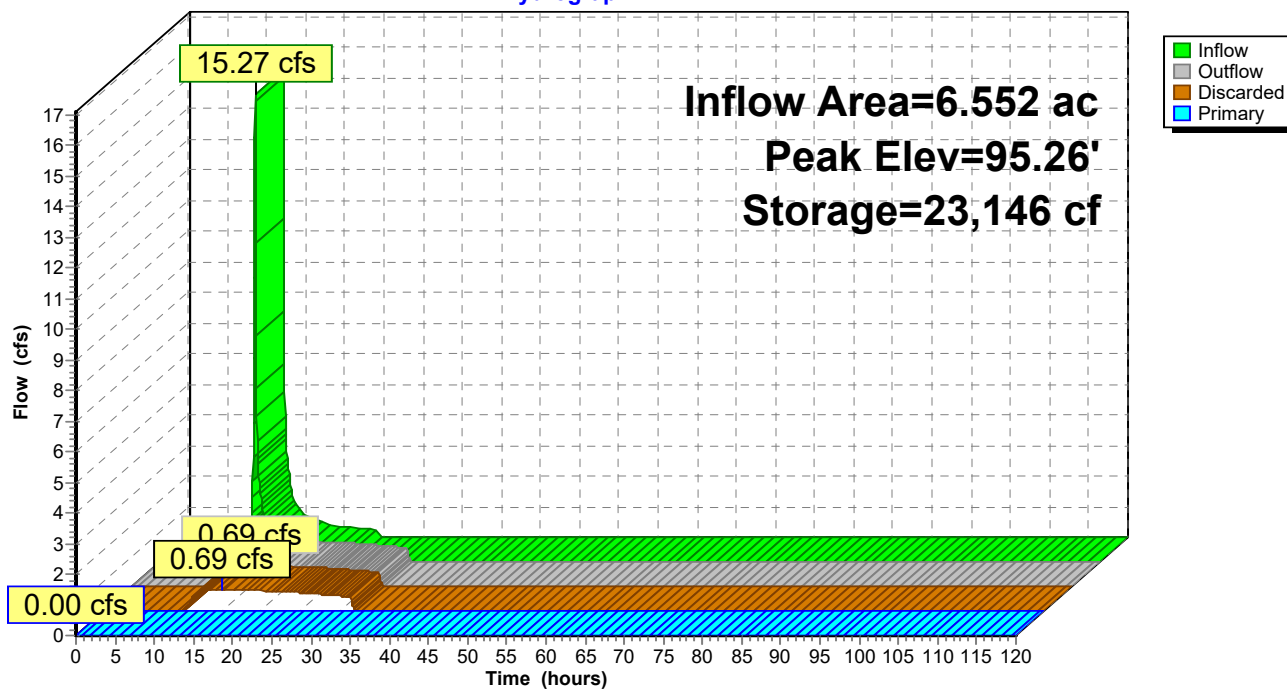
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Pond BAS 12-A: BAS 12-A

Hydrograph



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Summary for Pond BAS 12-B: BAS 12-B

Inflow Area = 13.599 ac, 25.11% Impervious, Inflow Depth = 0.62" for 10-Year event
Inflow = 9.49 cfs @ 12.14 hrs, Volume= 0.703 af
Outflow = 0.58 cfs @ 14.94 hrs, Volume= 0.703 af, Atten= 94%, Lag= 168.0 min
Discarded = 0.58 cfs @ 14.94 hrs, Volume= 0.703 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 91.56' @ 14.94 hrs Surf.Area= 24,404 sf Storage= 13,247 cf

Plug-Flow detention time= 261.0 min calculated for 0.702 af (100% of inflow)
Center-of-Mass det. time= 261.0 min (1,156.8 - 895.8)

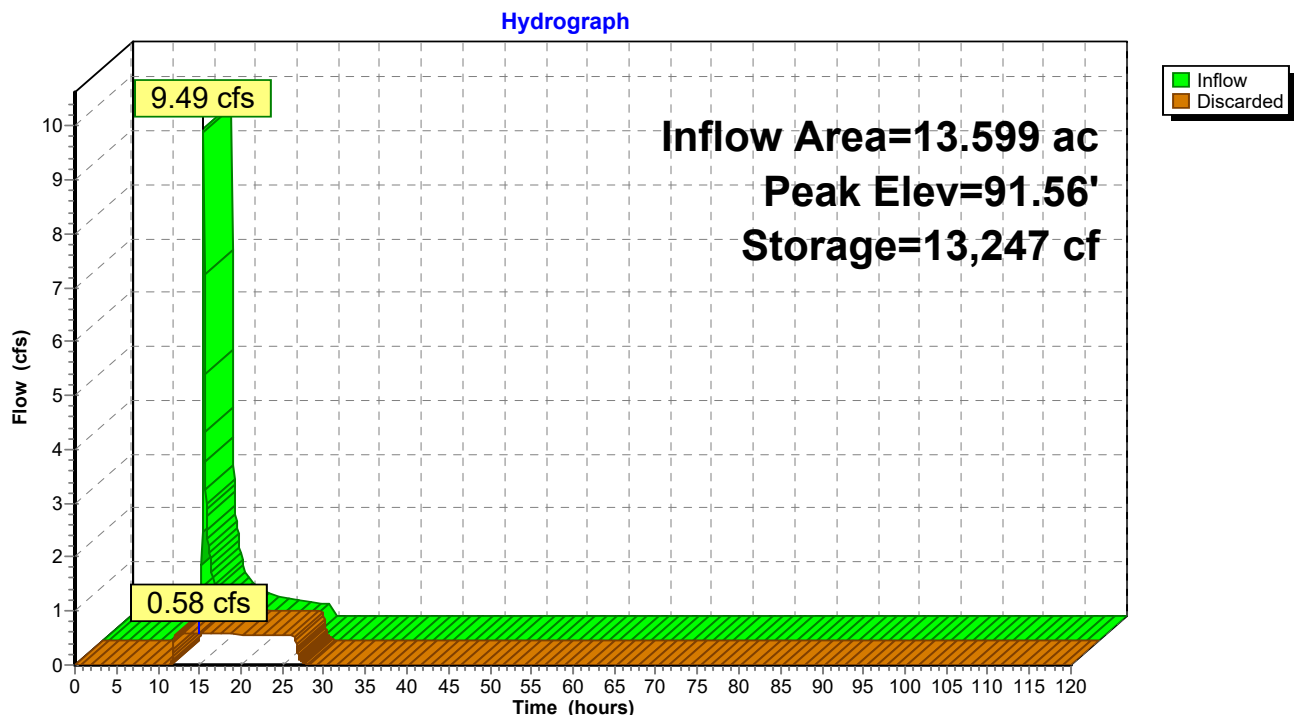
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	82,362 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	22,700	0	0	22,700
94.00	32,500	82,362	82,362	32,657

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.58 cfs @ 14.94 hrs HW=91.56' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.58 cfs)

Pond BAS 12-B: BAS 12-B



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Summary for Pond BAS 15-A: BAS 15-A

Inflow Area = 0.480 ac, 29.15% Impervious, Inflow Depth = 2.24" for 10-Year event
Inflow = 1.32 cfs @ 12.13 hrs, Volume= 0.090 af
Outflow = 1.25 cfs @ 12.17 hrs, Volume= 0.090 af, Atten= 5%, Lag= 1.9 min
Primary = 1.25 cfs @ 12.17 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.93' @ 12.17 hrs Surf.Area= 1,467 sf Storage= 618 cf

Plug-Flow detention time= 34.2 min calculated for 0.090 af (100% of inflow)
Center-of-Mass det. time= 33.2 min (886.4 - 853.1)

Volume	Invert	Avail.Storage	Storage Description
#1	82.35'	716 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.35	300	0	0
82.70	1,350	289	289
83.00	1,500	427	716

Device	Routing	Invert	Outlet Devices
#1	Primary	82.35'	3.0" Vert. Orifice/Grate C= 0.600
#2	Primary	82.83'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.18 cfs @ 12.17 hrs HW=82.93' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.16 cfs @ 3.24 fps)

2=Sharp-Crested Rectangular Weir (Weir Controls 1.02 cfs @ 1.03 fps)

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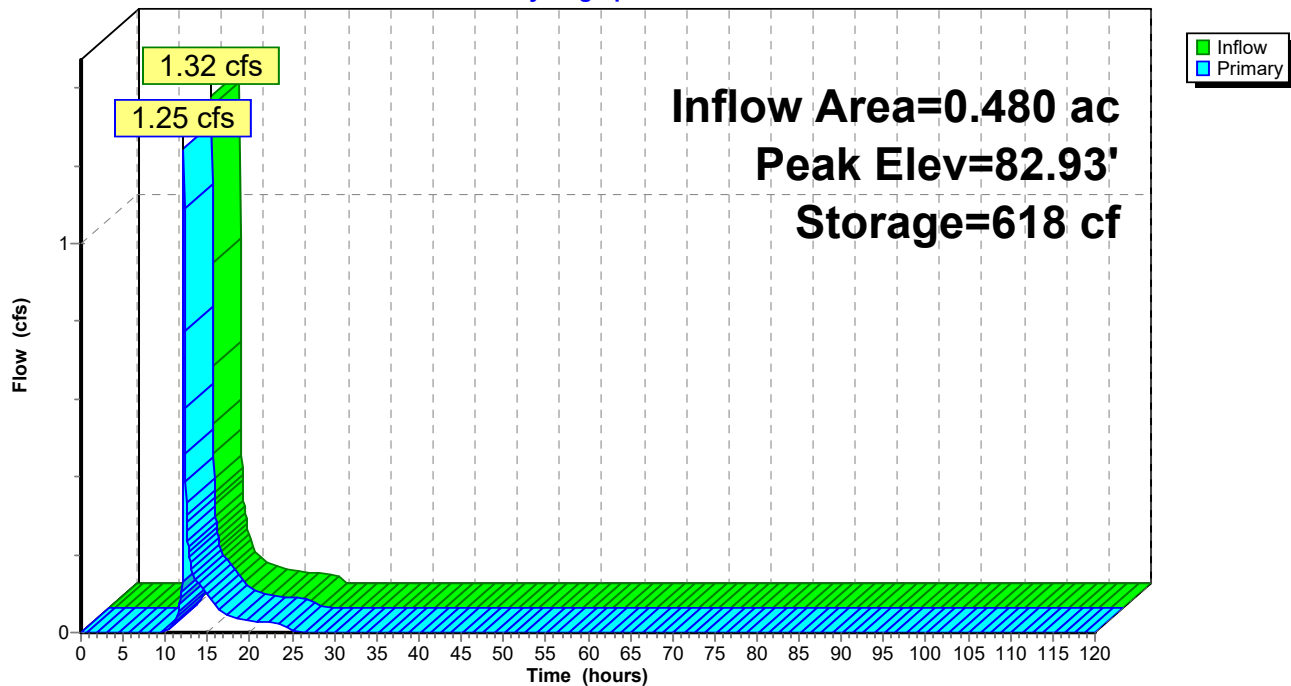
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Pond BAS 15-A: BAS 15-A

Hydrograph



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Summary for Pond BAS 2-A: DET BAS 2-A

Inflow Area = 2.386 ac, 38.00% Impervious, Inflow Depth = 1.40" for 10-Year event
 Inflow = 3.90 cfs @ 12.14 hrs, Volume= 0.278 af
 Outflow = 0.18 cfs @ 15.85 hrs, Volume= 0.278 af, Atten= 95%, Lag= 222.7 min
 Primary = 0.18 cfs @ 15.85 hrs, Volume= 0.278 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.13' @ 15.85 hrs Surf.Area= 5,950 sf Storage= 6,262 cf

Plug-Flow detention time= 450.3 min calculated for 0.278 af (100% of inflow)
 Center-of-Mass det. time= 449.7 min (1,335.2 - 885.5)

Volume	Invert	Avail.Storage	Storage Description
#1	102.80'	20,037 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.80	300	0	0	300
103.00	4,450	394	394	4,450
106.00	8,900	19,643	20,037	8,982

Device	Routing	Invert	Outlet Devices
#1	Primary	102.80'	2.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.18 cfs @ 15.85 hrs HW=104.13' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.34 fps)

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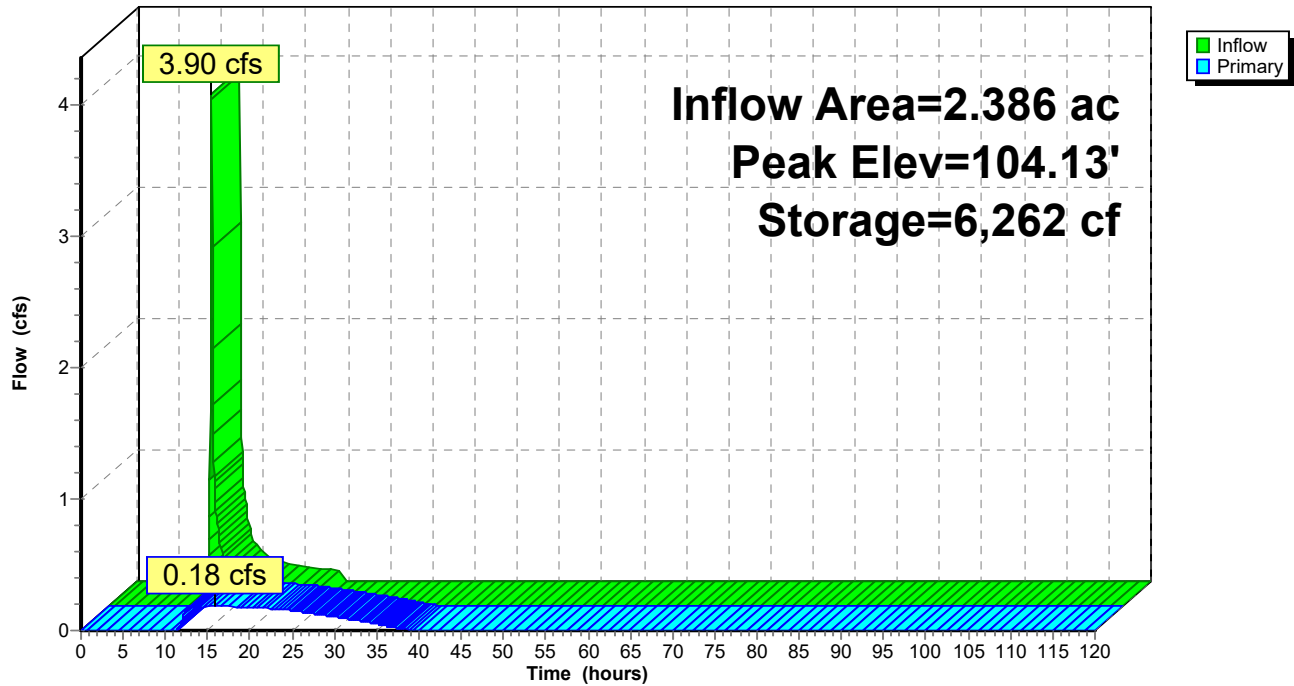
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Pond BAS 2-A: DET BAS 2-A

Hydrograph



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Summary for Pond BAS 2-B: BAS 2-B

Inflow Area = 1.161 ac, 38.00% Impervious, Inflow Depth = 1.99" for 10-Year event
Inflow = 2.82 cfs @ 12.13 hrs, Volume= 0.193 af
Outflow = 1.15 cfs @ 12.29 hrs, Volume= 0.193 af, Atten= 59%, Lag= 9.6 min
Discarded = 0.08 cfs @ 12.29 hrs, Volume= 0.126 af
Primary = 1.08 cfs @ 12.29 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 99.82' @ 12.29 hrs Surf.Area= 3,308 sf Storage= 2,457 cf

Plug-Flow detention time= 231.0 min calculated for 0.193 af (100% of inflow)
Center-of-Mass det. time= 230.9 min (1,092.5 - 861.5)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	3,067 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
99.00	2,700	0	0	2,700
100.00	3,450	3,067	3,067	3,475

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	99.73'	15.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.08 cfs @ 12.29 hrs HW=99.82' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=1.06 cfs @ 12.29 hrs HW=99.82' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.06 cfs @ 0.80 fps)

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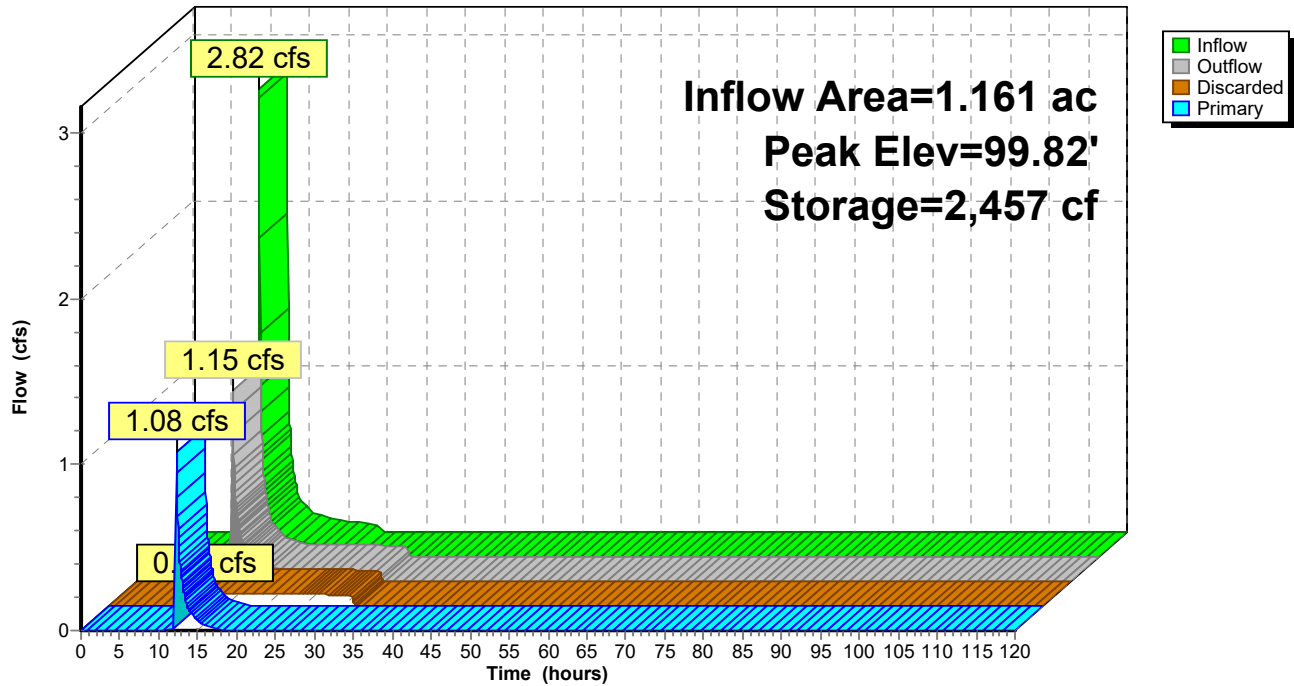
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Pond BAS 2-B: BAS 2-B

Hydrograph



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Summary for Pond BAS 2-C: BAS 2-C

Inflow Area = 1.461 ac, 38.00% Impervious, Inflow Depth = 3.41" for 10-Year event
Inflow = 5.97 cfs @ 12.13 hrs, Volume= 0.416 af
Outflow = 3.17 cfs @ 12.24 hrs, Volume= 0.416 af, Atten= 47%, Lag= 6.6 min
Primary = 3.17 cfs @ 12.24 hrs, Volume= 0.416 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.74' @ 12.24 hrs Surf.Area= 4,070 sf Storage= 6,655 cf

Plug-Flow detention time= 333.3 min calculated for 0.416 af (100% of inflow)
Center-of-Mass det. time= 333.6 min (1,148.2 - 814.6)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	7,748 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.60	100	0	0	100
101.00	3,050	494	494	3,050
103.00	4,237	7,255	7,748	4,312

Device	Routing	Invert	Outlet Devices
#1	Device 3	102.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Device 3	100.60'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	100.60'	12.0" Round RCP_Round 12" X 2.00 L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.60' / 100.30' S= 0.0111 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.11 cfs @ 12.24 hrs HW=102.73' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 3.11 cfs of 11.23 cfs potential flow)

↑ **1=Orifice/Grate** (Weir Controls 2.96 cfs @ 1.58 fps)

↑ **2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.89 fps)

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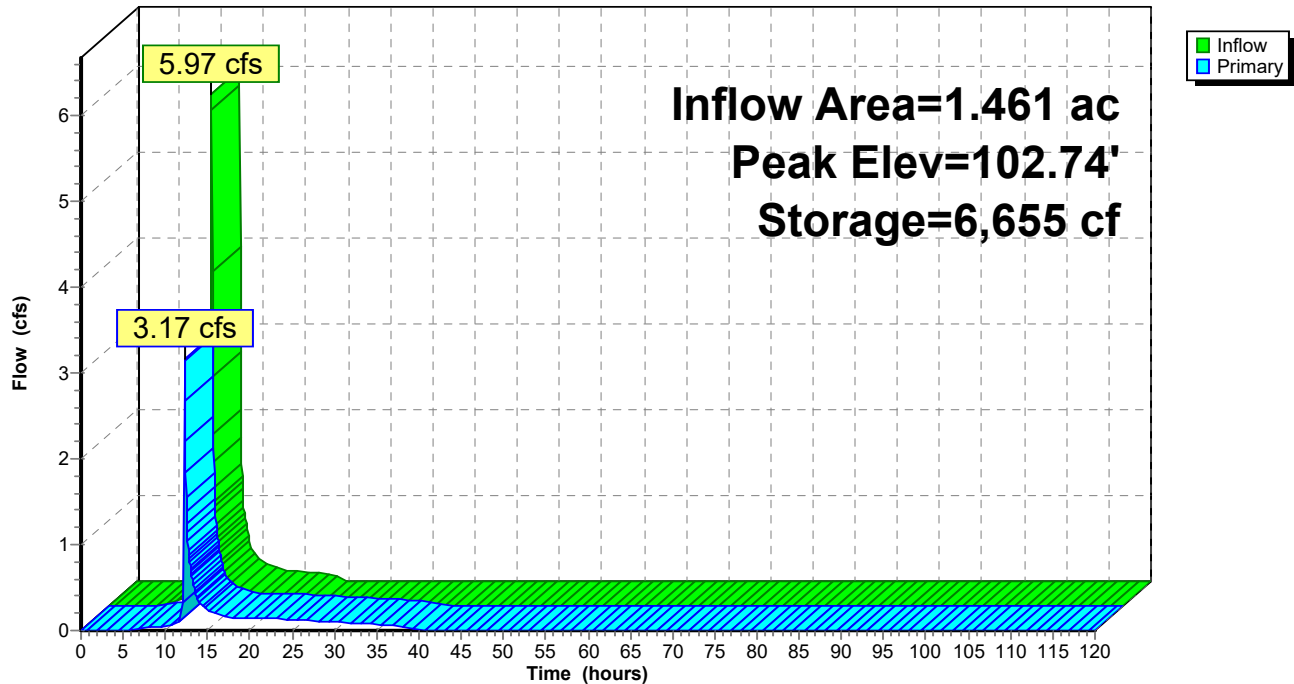
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Pond BAS 2-C: BAS 2-C

Hydrograph



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Summary for Pond BAS 2-D: BAS 2-D

Inflow Area = 8.783 ac, 33.03% Impervious, Inflow Depth = 1.76" for 10-Year event
Inflow = 18.69 cfs @ 12.14 hrs, Volume= 1.290 af
Outflow = 0.48 cfs @ 19.39 hrs, Volume= 1.290 af, Atten= 97%, Lag= 435.4 min
Discarded = 0.48 cfs @ 19.39 hrs, Volume= 1.290 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 108.13' @ 19.39 hrs Surf.Area= 20,085 sf Storage= 35,750 cf

Plug-Flow detention time= 852.8 min calculated for 1.289 af (100% of inflow)
Center-of-Mass det. time= 853.0 min (1,723.1 - 870.1)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	53,997 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	14,000	0	0	14,000
107.00	16,250	15,111	15,111	16,292
108.00	19,800	17,996	33,107	19,873
109.00	22,000	20,890	53,997	22,132

Device	Routing	Invert	Outlet Devices
#1	Device 3	108.60'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	106.00'	1.020 in/hr Exfiltration over Wetted area
#3	Primary	106.00'	18.0" Round Culvert L= 185.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 106.00' / 102.00' S= 0.0216 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Discarded OutFlow Max=0.48 cfs @ 19.39 hrs HW=108.13' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.48 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' (Free Discharge)

↑ **3=Culvert** (Controls 0.00 cfs)

↑ **1=Orifice/Grate** (Controls 0.00 cfs)

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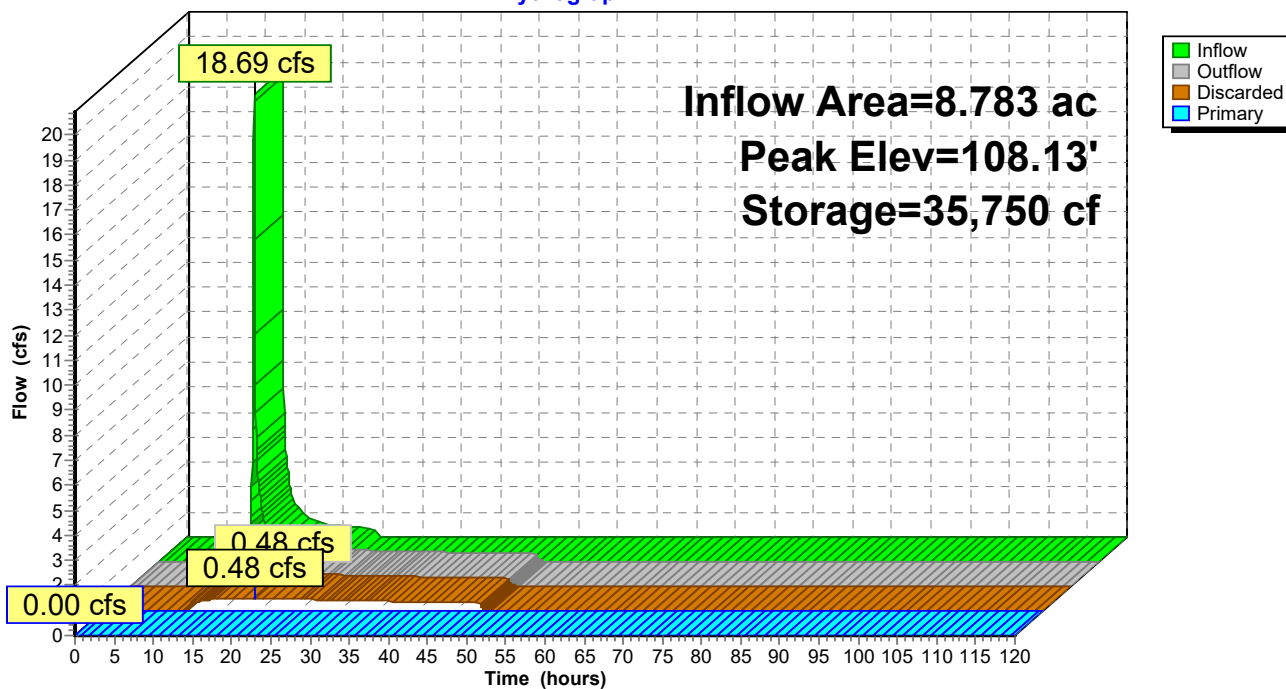
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Pond BAS 2-D: BAS 2-D

Hydrograph



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Summary for Pond BAS 2-E: BAS 2-E

Inflow Area = 2.574 ac, 44.91% Impervious, Inflow Depth = 2.75" for 10-Year event
Inflow = 8.68 cfs @ 12.13 hrs, Volume= 0.591 af
Outflow = 1.59 cfs @ 12.57 hrs, Volume= 0.591 af, Atten= 82%, Lag= 26.2 min
Discarded = 0.31 cfs @ 12.57 hrs, Volume= 0.475 af
Primary = 1.27 cfs @ 12.57 hrs, Volume= 0.116 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 100.78' @ 12.57 hrs Surf.Area= 13,244 sf Storage= 9,874 cf

Plug-Flow detention time= 252.7 min calculated for 0.591 af (100% of inflow)
Center-of-Mass det. time= 252.7 min (1,088.9 - 836.3)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	14,162 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	12,000	0	0	12,000
101.00	13,600	12,792	12,792	13,649
101.10	13,800	1,370	14,162	13,854

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.70'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.31 cfs @ 12.57 hrs HW=100.78' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=1.27 cfs @ 12.57 hrs HW=100.78' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.27 cfs @ 0.77 fps)

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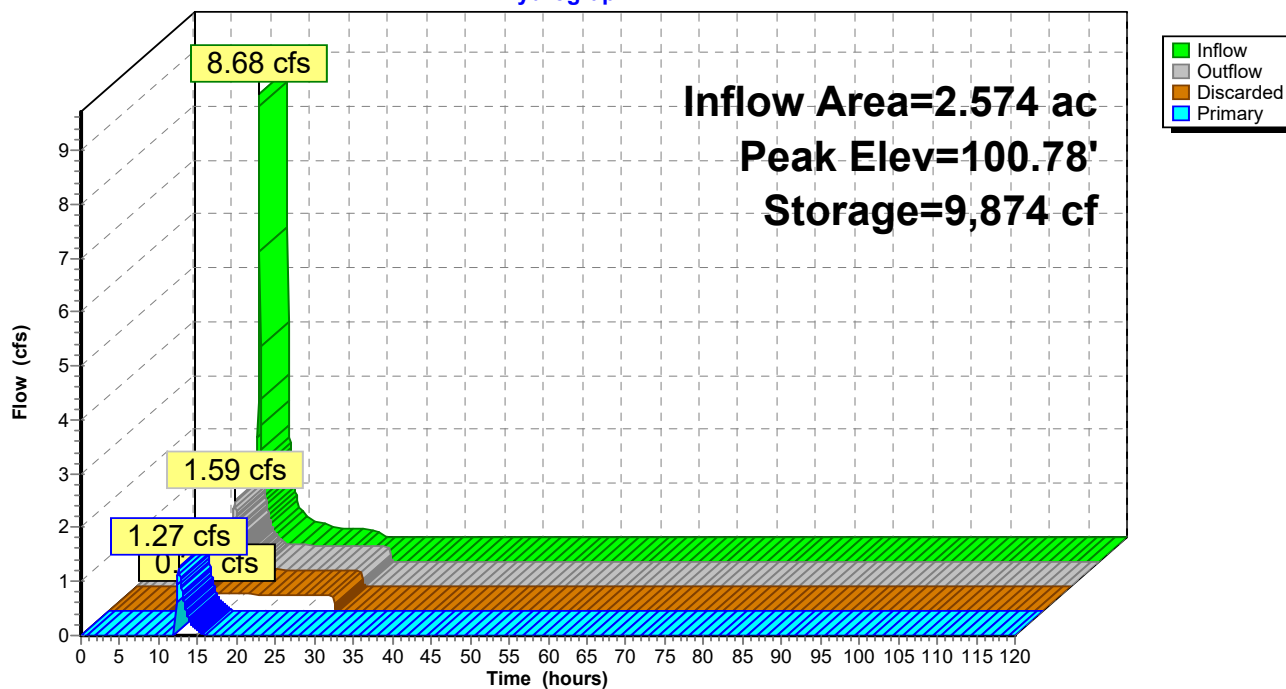
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Pond BAS 2-E: BAS 2-E

Hydrograph



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Summary for Pond BAS 2-F: BAS 2-F

Inflow Area = 3.255 ac, 41.28% Impervious, Inflow Depth = 2.58" for 10-Year event
Inflow = 10.29 cfs @ 12.13 hrs, Volume= 0.699 af
Outflow = 0.68 cfs @ 13.66 hrs, Volume= 0.699 af, Atten= 93%, Lag= 91.7 min
Discarded = 0.57 cfs @ 13.66 hrs, Volume= 0.690 af
Primary = 0.11 cfs @ 13.66 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.53' @ 13.66 hrs Surf.Area= 10,069 sf Storage= 13,898 cf

Plug-Flow detention time= 250.2 min calculated for 0.699 af (100% of inflow)
Center-of-Mass det. time= 250.2 min (1,092.2 - 842.0)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	19,860 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
101.00	8,130	0	0	8,130
102.00	9,380	8,748	8,748	9,423
103.00	10,700	10,033	18,780	10,790
103.10	10,900	1,080	19,860	10,993

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	102.50'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.57 cfs @ 13.66 hrs HW=102.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.57 cfs)

Primary OutFlow Max=0.11 cfs @ 13.66 hrs HW=102.53' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.11 cfs @ 0.46 fps)

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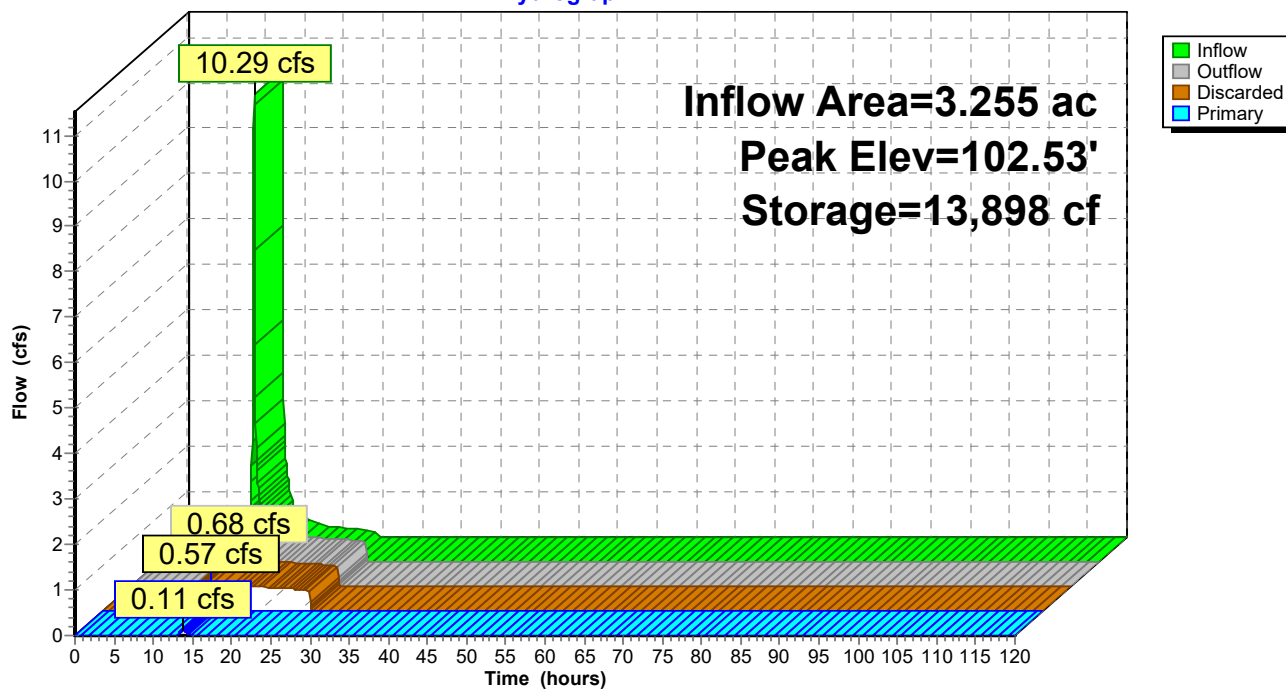
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Pond BAS 2-F: BAS 2-F

Hydrograph



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Summary for Pond BAS 3-A: BAS 3-A

Inflow Area = 2.218 ac, 40.95% Impervious, Inflow Depth = 3.22" for 10-Year event
Inflow = 8.61 cfs @ 12.13 hrs, Volume= 0.595 af
Outflow = 0.36 cfs @ 14.79 hrs, Volume= 0.595 af, Atten= 96%, Lag= 159.5 min
Primary = 0.36 cfs @ 14.79 hrs, Volume= 0.595 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 103.10' @ 14.79 hrs Surf.Area= 8,669 sf Storage= 14,925 cf

Plug-Flow detention time= 500.6 min calculated for 0.595 af (100% of inflow)
Center-of-Mass det. time= 500.1 min (1,321.3 - 821.2)

Volume	Invert	Avail.Storage	Storage Description
#1	100.70'	23,581 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.70	300	0	0	300
101.00	5,100	664	664	5,100
104.00	10,500	22,918	23,581	10,579

Device	Routing	Invert	Outlet Devices
#1	Device 3	100.70'	3.0" Vert. Orifice/Grate C= 0.600
#2	Device 3	103.85'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	100.70'	12.0" Round RCP_Round 12" L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.70' / 99.70' S= 0.0200 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 14.79 hrs HW=103.10' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 0.36 cfs of 6.12 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.36 cfs @ 7.26 fps)

↑ **2=Orifice/Grate** (Controls 0.00 cfs)

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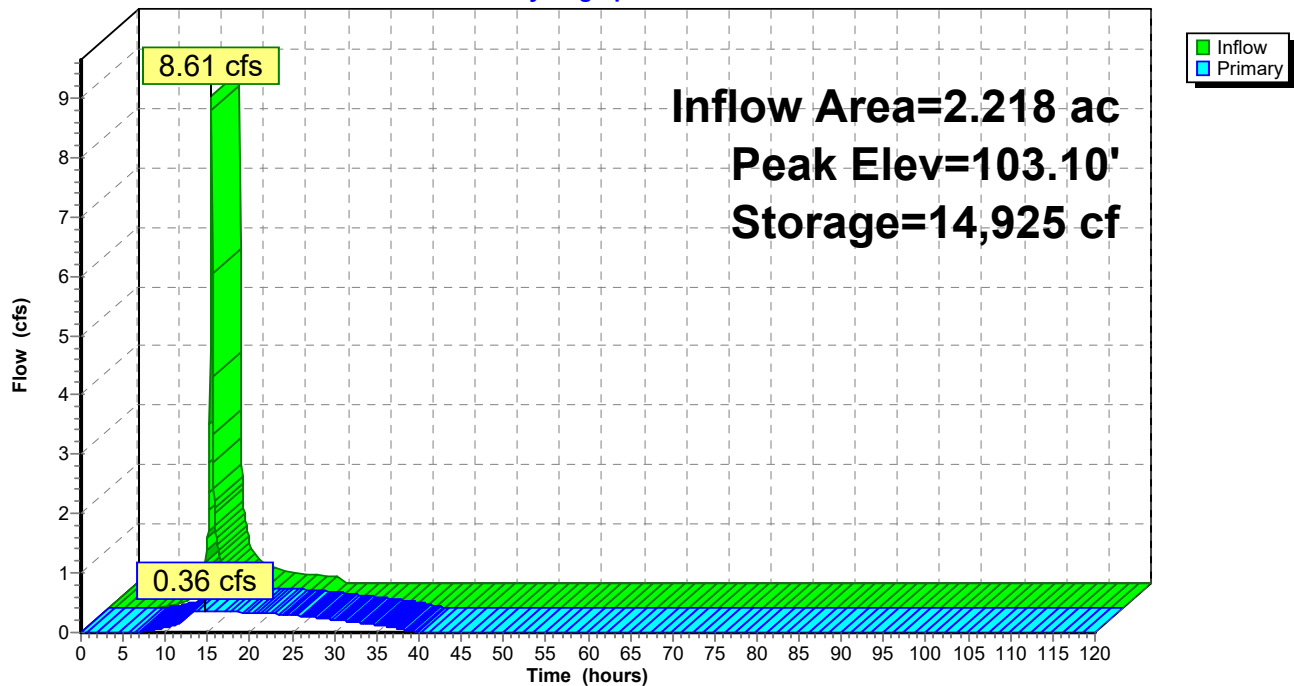
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Pond BAS 3-A: BAS 3-A

Hydrograph



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Summary for Pond BAS 3-B: BAS 3-B

Inflow Area = 6.110 ac, 38.90% Impervious, Inflow Depth = 2.40" for 10-Year event
Inflow = 18.03 cfs @ 12.13 hrs, Volume= 1.224 af
Outflow = 0.41 cfs @ 18.89 hrs, Volume= 1.224 af, Atten= 98%, Lag= 405.6 min
Discarded = 0.41 cfs @ 18.89 hrs, Volume= 1.224 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 99.50' @ 18.89 hrs Surf.Area= 17,069 sf Storage= 35,214 cf

Plug-Flow detention time= 961.9 min calculated for 1.224 af (100% of inflow)
Center-of-Mass det. time= 961.7 min (1,809.3 - 847.6)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	63,788 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
97.00	11,300	0	0	11,300
101.00	21,100	63,788	63,788	21,261

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.60'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.41 cfs @ 18.89 hrs HW=99.50' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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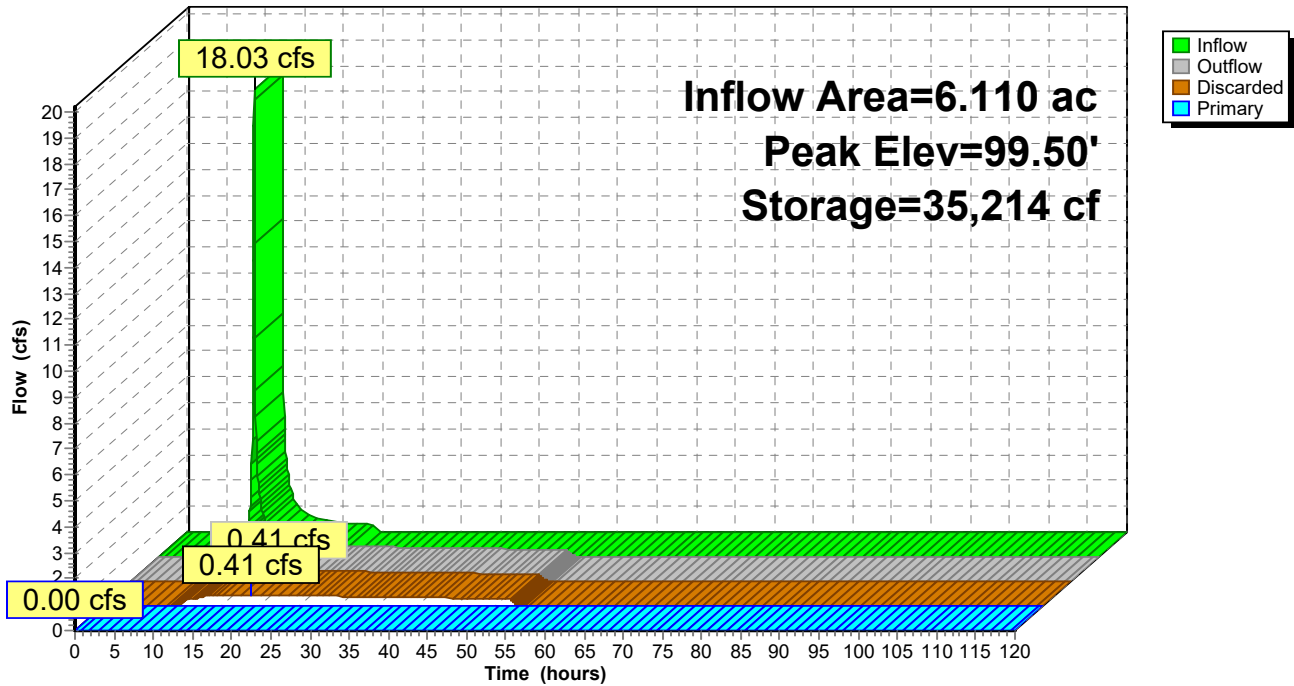
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Pond BAS 3-B: BAS 3-B

Hydrograph



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Summary for Pond BAS 6-A: BAS 6-A

Inflow Area = 3.389 ac, 43.46% Impervious, Inflow Depth = 2.66" for 10-Year event
Inflow = 11.07 cfs @ 12.13 hrs, Volume= 0.753 af
Outflow = 0.27 cfs @ 17.70 hrs, Volume= 0.753 af, Atten= 98%, Lag= 334.2 min
Discarded = 0.27 cfs @ 17.70 hrs, Volume= 0.753 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 90.34' @ 17.70 hrs Surf.Area= 11,481 sf Storage= 20,697 cf

Plug-Flow detention time= 810.4 min calculated for 0.752 af (100% of inflow)
Center-of-Mass det. time= 810.7 min (1,649.8 - 839.1)

Volume	Invert	Avail.Storage	Storage Description
#1	88.30'	28,567 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
88.30	8,860	0	0	8,860
91.00	12,400	28,567	28,567	12,534

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.30'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	90.78'	14.0' long x 21.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.27 cfs @ 17.70 hrs HW=90.34' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.30' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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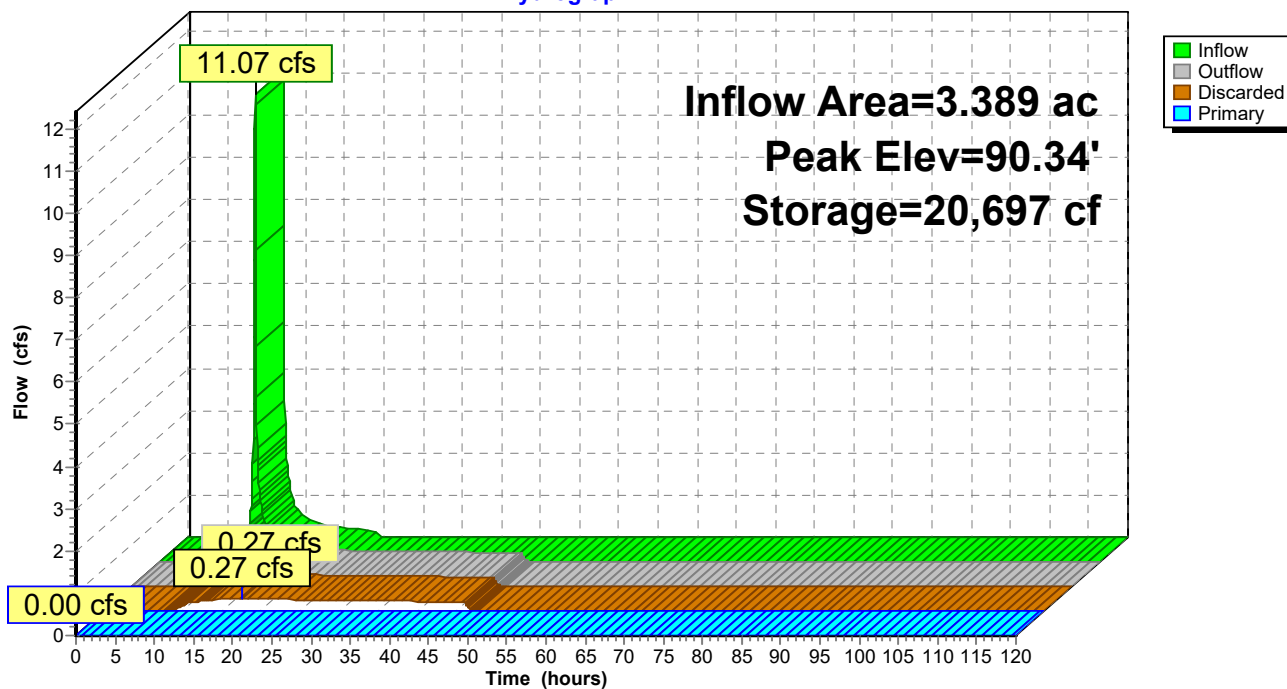
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Pond BAS 6-A: BAS 6-A

Hydrograph



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Summary for Pond BAS 7-A: BAS 7-A

Inflow Area = 4.495 ac, 51.83% Impervious, Inflow Depth = 2.07" for 10-Year event
Inflow = 11.40 cfs @ 12.13 hrs, Volume= 0.777 af
Outflow = 0.34 cfs @ 17.33 hrs, Volume= 0.777 af, Atten= 97%, Lag= 312.0 min
Discarded = 0.34 cfs @ 17.33 hrs, Volume= 0.777 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 92.66' @ 17.33 hrs Surf.Area= 14,453 sf Storage= 20,236 cf

Plug-Flow detention time= 671.1 min calculated for 0.777 af (100% of inflow)
Center-of-Mass det. time= 671.0 min (1,529.7 - 858.7)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	42,338 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	10,100	0	0	10,100
94.00	18,550	42,338	42,338	18,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	93.87'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.34 cfs @ 17.33 hrs HW=92.66' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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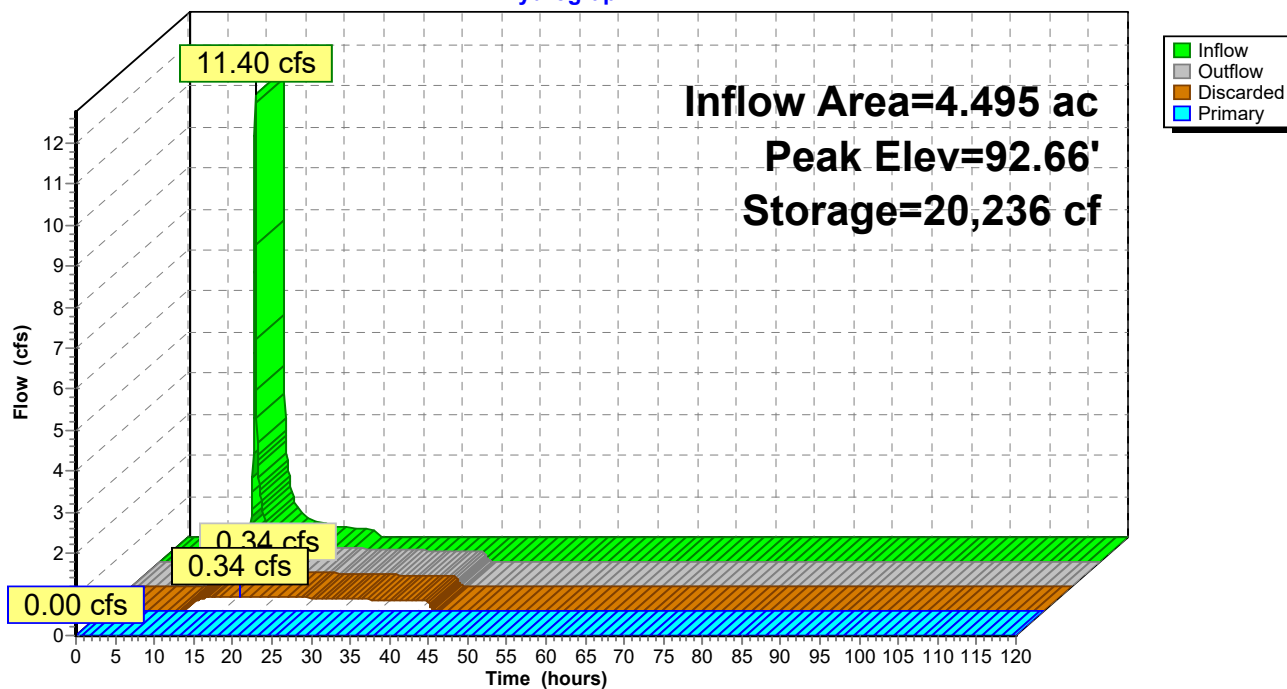
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Pond BAS 7-A: BAS 7-A

Hydrograph



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Summary for Pond BAS 9-A: BAS 9-A

Inflow Area = 2.828 ac, 32.51% Impervious, Inflow Depth = 0.44" for 10-Year event
Inflow = 1.20 cfs @ 12.15 hrs, Volume= 0.103 af
Outflow = 0.09 cfs @ 15.07 hrs, Volume= 0.103 af, Atten= 93%, Lag= 175.1 min
Discarded = 0.09 cfs @ 15.07 hrs, Volume= 0.103 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 62.31' @ 15.07 hrs Surf.Area= 1,570 sf Storage= 1,742 cf

Plug-Flow detention time= 240.8 min calculated for 0.103 af (100% of inflow)
Center-of-Mass det. time= 240.8 min (1,161.6 - 920.8)

Volume	Invert	Avail.Storage	Storage Description
#1	61.00'	5,320 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	1,100	0	0	1,100
63.00	1,850	2,918	2,918	1,897
64.00	3,000	2,402	5,320	3,060

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	63.90'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.09 cfs @ 15.07 hrs HW=62.31' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=61.00' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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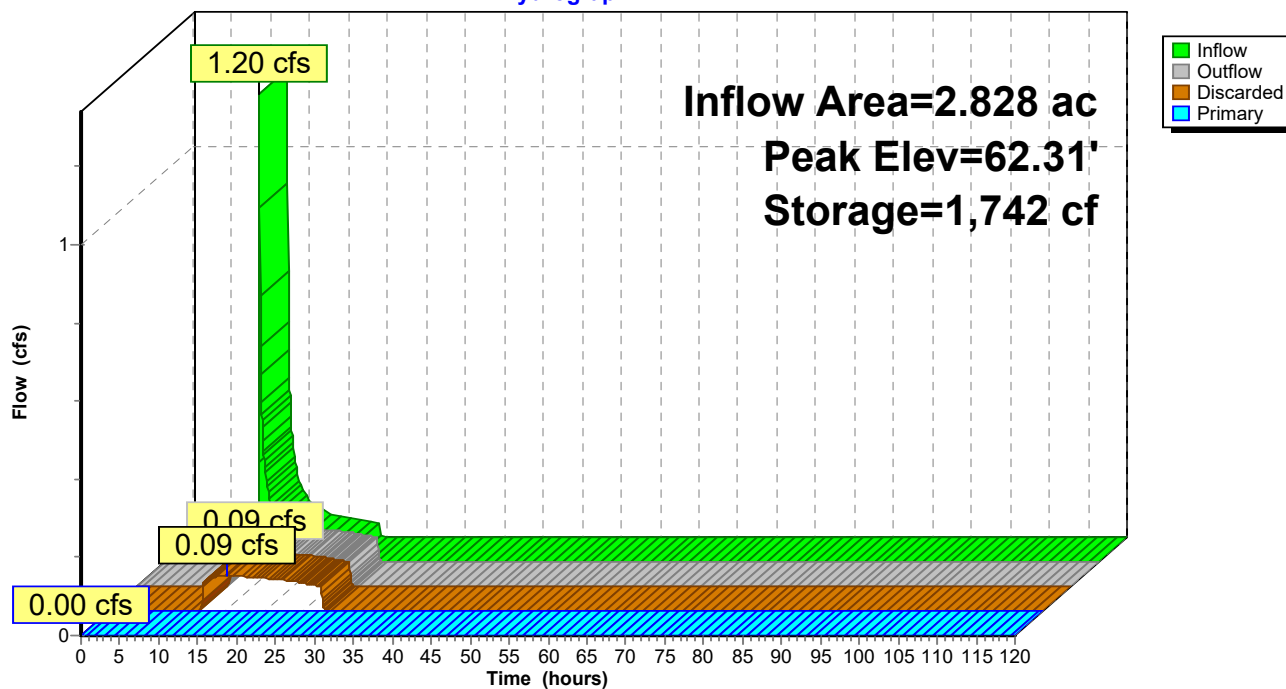
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Pond BAS 9-A: BAS 9-A

Hydrograph



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Summary for Pond BAS 9-B: BAS 9-B

Inflow Area = 5.910 ac, 58.27% Impervious, Inflow Depth = 2.33" for 10-Year event
Inflow = 16.76 cfs @ 12.13 hrs, Volume= 1.150 af
Outflow = 5.89 cfs @ 12.31 hrs, Volume= 1.150 af, Atten= 65%, Lag= 10.8 min
Discarded = 0.38 cfs @ 12.31 hrs, Volume= 0.568 af
Primary = 5.51 cfs @ 12.31 hrs, Volume= 0.581 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 63.49' @ 12.31 hrs Surf.Area= 6,804 sf Storage= 16,016 cf

Plug-Flow detention time= 219.6 min calculated for 1.150 af (100% of inflow)
Center-of-Mass det. time= 219.5 min (1,065.6 - 846.0)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	28,387 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	3,000	0	0	3,000
61.00	3,800	3,392	3,392	3,826
62.00	4,800	4,290	7,682	4,853
63.00	5,750	5,268	12,950	5,837
64.00	8,000	6,844	19,794	8,106
65.00	9,200	8,593	28,387	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	60.00'	2.410 in/hr Exfiltration over Wetted area
#2	Device 3	62.40'	1.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Primary	62.00'	18.0" Round CMP_Round 18" L= 90.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 62.00' / 61.42' S= 0.0064 ' / S= 0.0064 ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.38 cfs @ 12.31 hrs HW=63.49' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.38 cfs)

Primary OutFlow Max=5.48 cfs @ 12.31 hrs HW=63.49' (Free Discharge)

↑ **3=CMP_Round 18"** (Passes 5.48 cfs of 7.32 cfs potential flow)

↑ **2=Sharp-Crested Rectangular Weir** (Weir Controls 5.48 cfs @ 3.41 fps)

Proposed Hydrology

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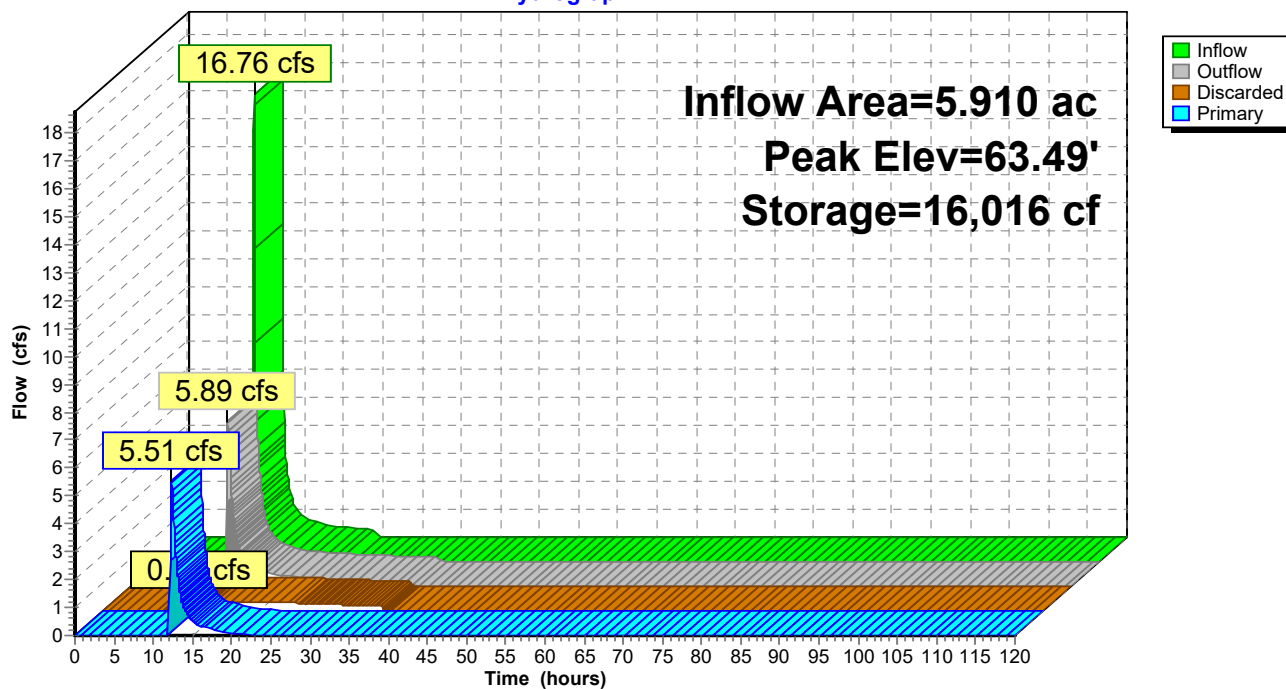
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Pond BAS 9-B: BAS 9-B

Hydrograph



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Summary for Pond W-N: Wetland Series N

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 1.30" for 10-Year event
Inflow = 6.28 cfs @ 12.33 hrs, Volume= 3.333 af
Outflow = 0.89 cfs @ 29.36 hrs, Volume= 1.998 af, Atten= 86%, Lag= 1,021.4 min
Primary = 0.89 cfs @ 29.36 hrs, Volume= 1.998 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 87.89' @ 29.36 hrs Surf.Area= 32,291 sf Storage= 67,196 cf

Plug-Flow detention time= 1,552.8 min calculated for 1.998 af (60% of inflow)
Center-of-Mass det. time= 824.6 min (2,710.8 - 1,886.1)

Volume	Invert	Avail.Storage	Storage Description	
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=0.89 cfs @ 29.36 hrs HW=87.89' (Free Discharge)

↑**1=RCP_Round 24"** (Inlet Controls 0.89 cfs @ 2.49 fps)

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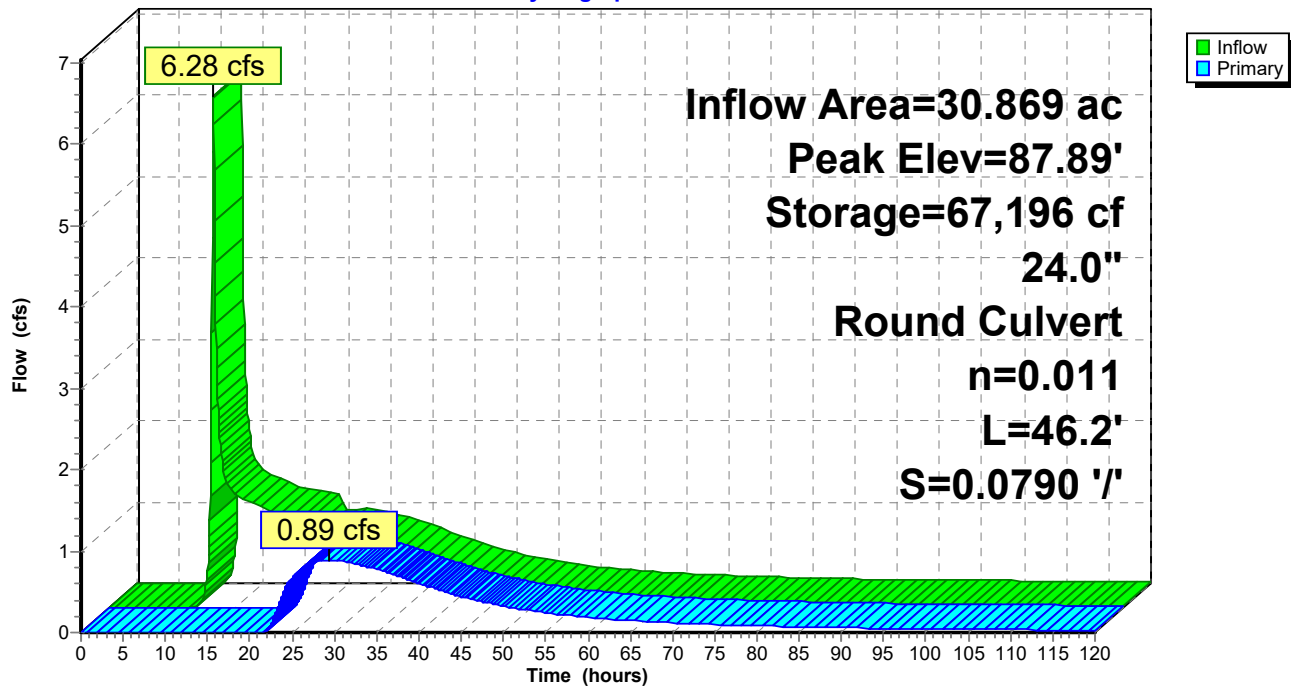
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Pond W-N: Wetland Series N

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Summary for Pond W-O: Wetland Series O

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.26" for 10-Year event
 Inflow = 9.77 cfs @ 12.38 hrs, Volume= 1.312 af
 Outflow = 2.81 cfs @ 13.25 hrs, Volume= 1.311 af, Atten= 71%, Lag= 52.4 min
 Primary = 2.81 cfs @ 13.25 hrs, Volume= 1.311 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 77.84' @ 13.25 hrs Surf.Area= 19,747 sf Storage= 17,537 cf

Plug-Flow detention time= 198.3 min calculated for 1.311 af (100% of inflow)
 Center-of-Mass det. time= 197.8 min (1,113.9 - 916.1)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.81 cfs @ 13.25 hrs HW=77.84' (Free Discharge)

1=Culvert (Inlet Controls 2.81 cfs @ 2.55 fps)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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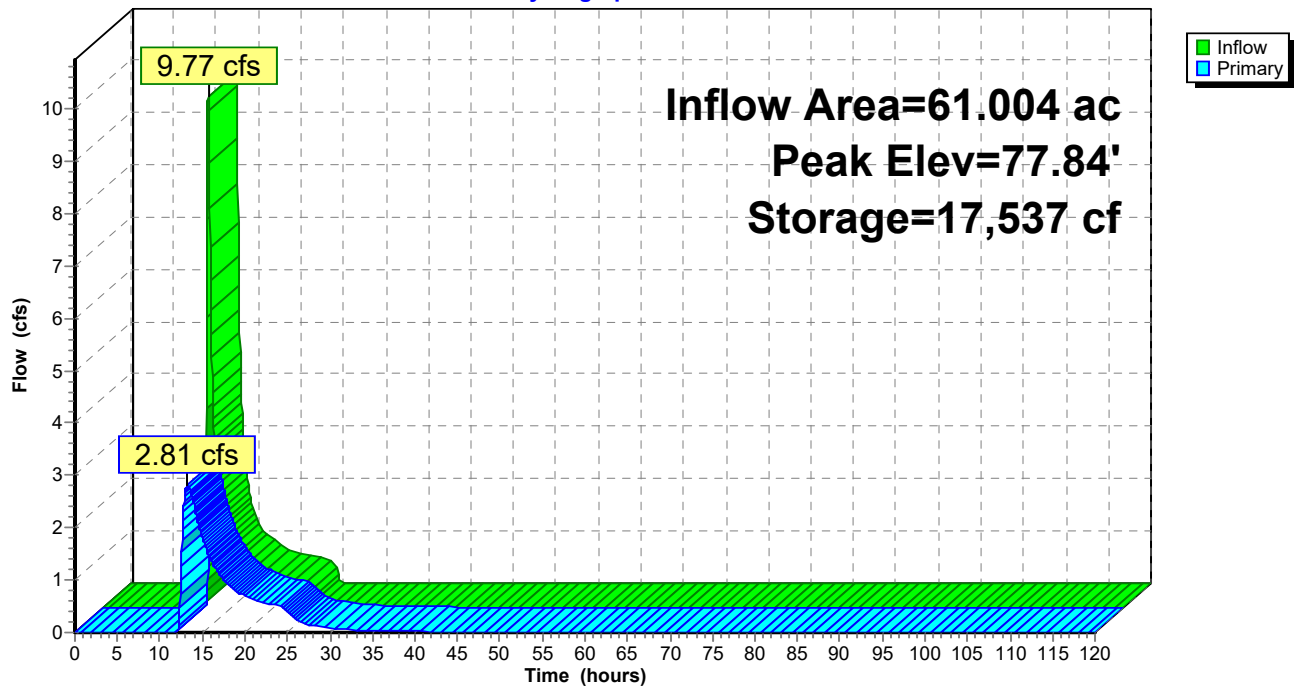
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Pond W-O: Wetland Series O

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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth > 0.94" for 10-Year event
 Inflow = 14.60 cfs @ 12.23 hrs, Volume= 3.328 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.09' @ 120.00 hrs Surf.Area= 85,085 sf Storage= 144,946 cf

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

Volume	Invert	Avail.Storage	Storage Description	
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices									
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Hydrology

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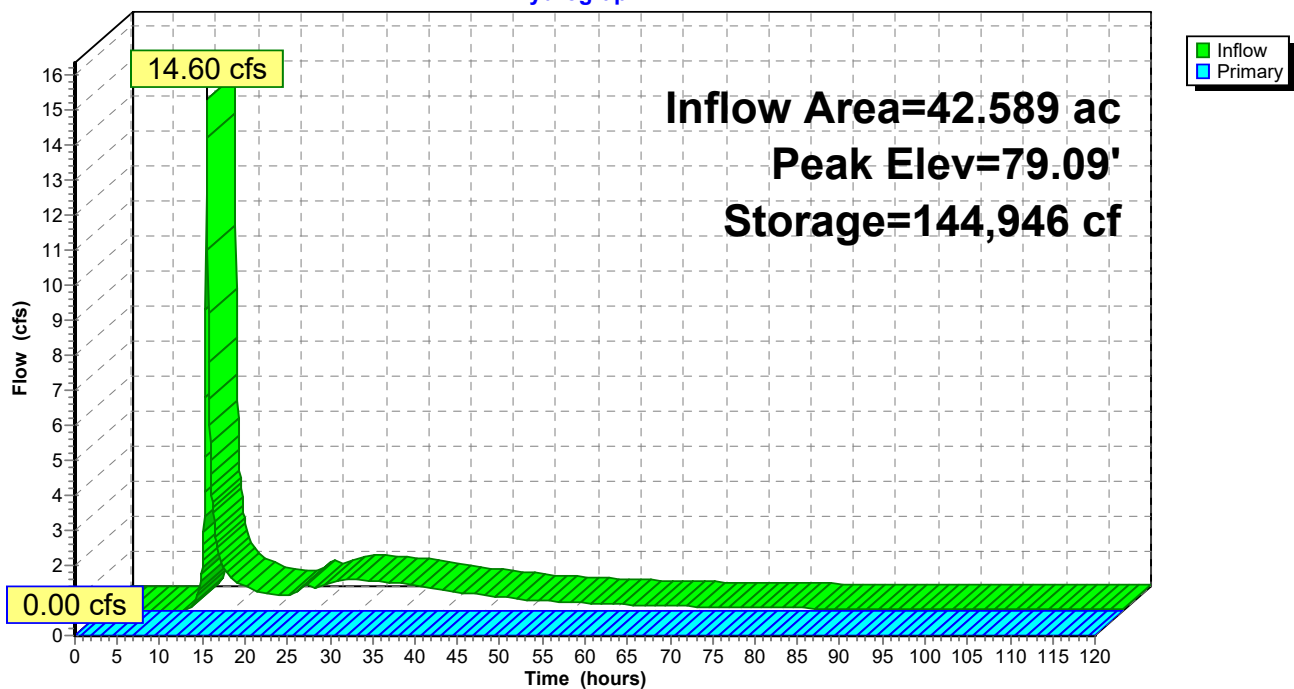
NRCC 24-hr C 10-Year Rainfall=5.05"

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Pond W-QP: Wetland Series Q & P

Hydrograph



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Summary for Pond W-R: Wetland Series R

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 1.52" for 10-Year event
 Inflow = 25.74 cfs @ 12.29 hrs, Volume= 3.271 af
 Outflow = 0.94 cfs @ 27.41 hrs, Volume= 2.620 af, Atten= 96%, Lag= 906.8 min
 Primary = 0.94 cfs @ 27.41 hrs, Volume= 2.620 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 88.18' @ 24.15 hrs Surf.Area= 84,480 sf Storage= 96,703 cf

Plug-Flow detention time= 1,327.0 min calculated for 2.620 af (80% of inflow)
 Center-of-Mass det. time= 1,198.2 min (2,157.8 - 959.6)

Volume	Invert	Avail.Storage	Storage Description
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.94 cfs @ 27.41 hrs HW=88.10' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.94 cfs @ 2.75 fps)

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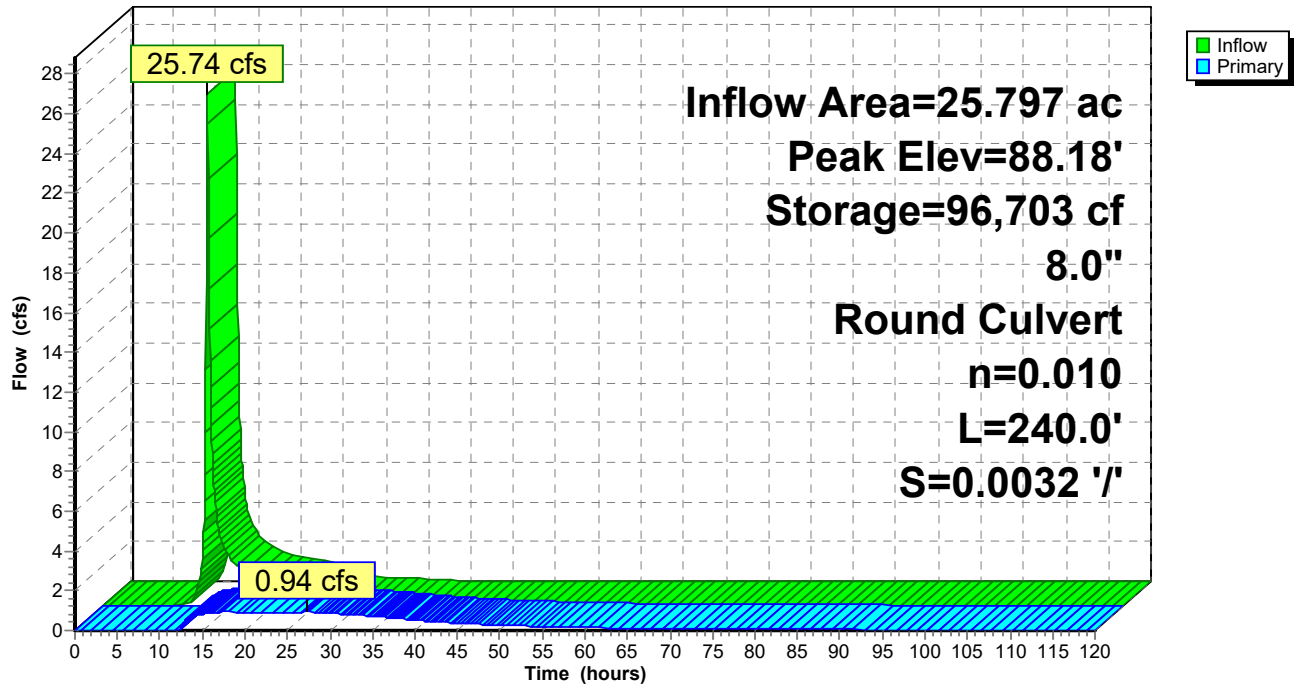
NRCC 24-hr C 10-Year Rainfall=5.05"

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Pond W-R: Wetland Series R

Hydrograph



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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Subcatchment E-13:

Runoff = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af, Depth= 1.19"

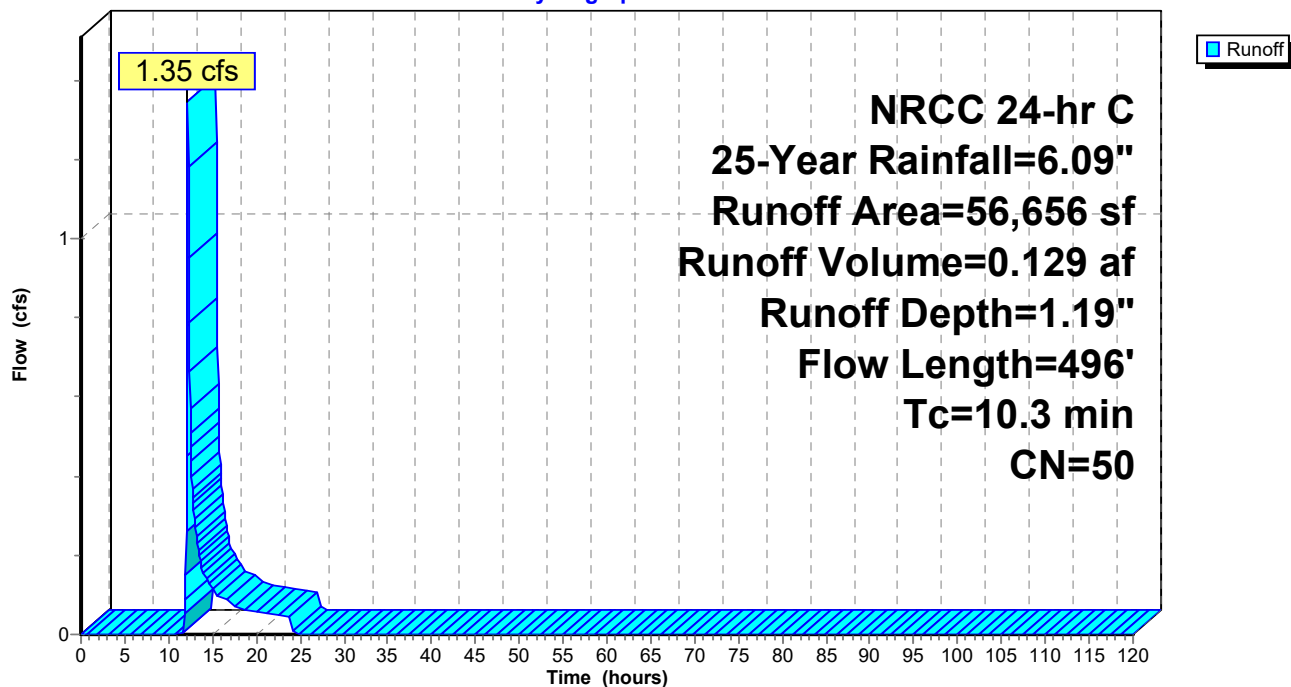
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



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Summary for Subcatchment P-10A: P-10A

Runoff = 0.05 cfs @ 12.54 hrs, Volume= 0.021 af, Depth= 0.32"

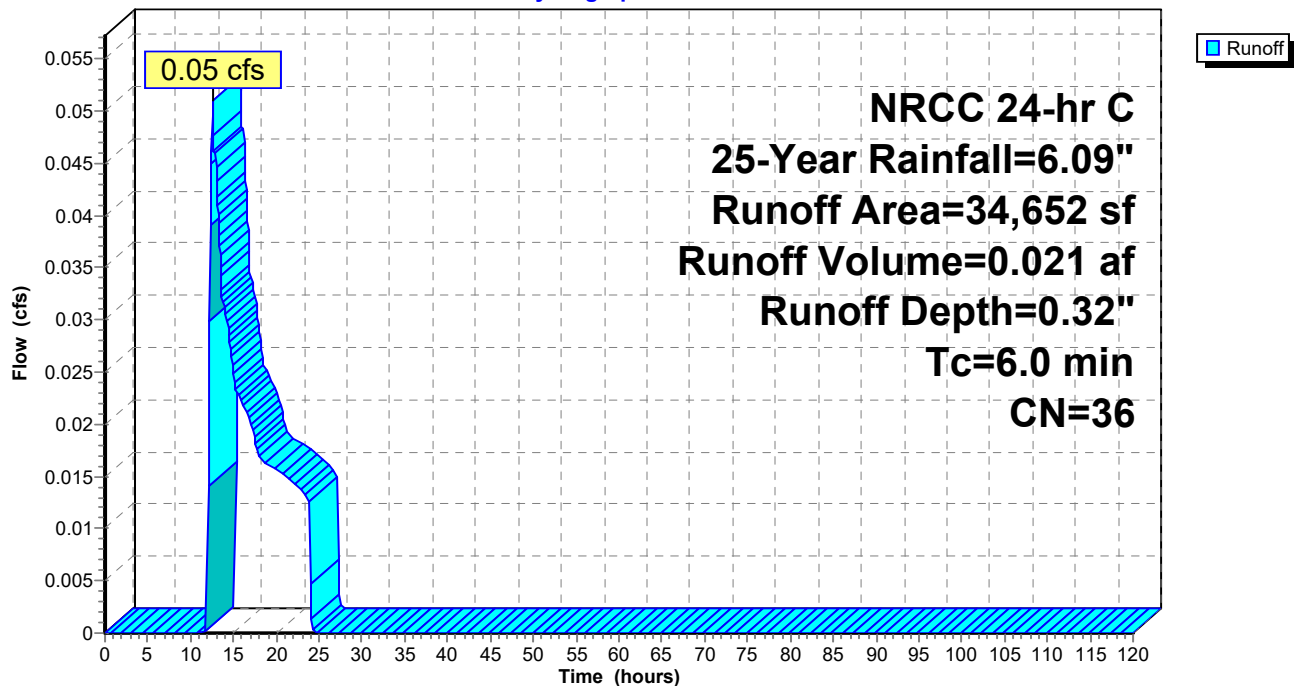
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	2,500	98	roof
	2,500	39	>75% Grass cover, Good, HSG A
	29,652	30	Woods, Good, HSG A
	34,652	36	Weighted Average
	32,152		92.79% Pervious Area
	2,500		7.21% Impervious Area

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

Subcatchment P-10A: P-10A

Hydrograph



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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Subcatchment P-10B: P-10B

Runoff = 3.47 cfs @ 12.14 hrs, Volume= 0.239 af, Depth= 2.15"

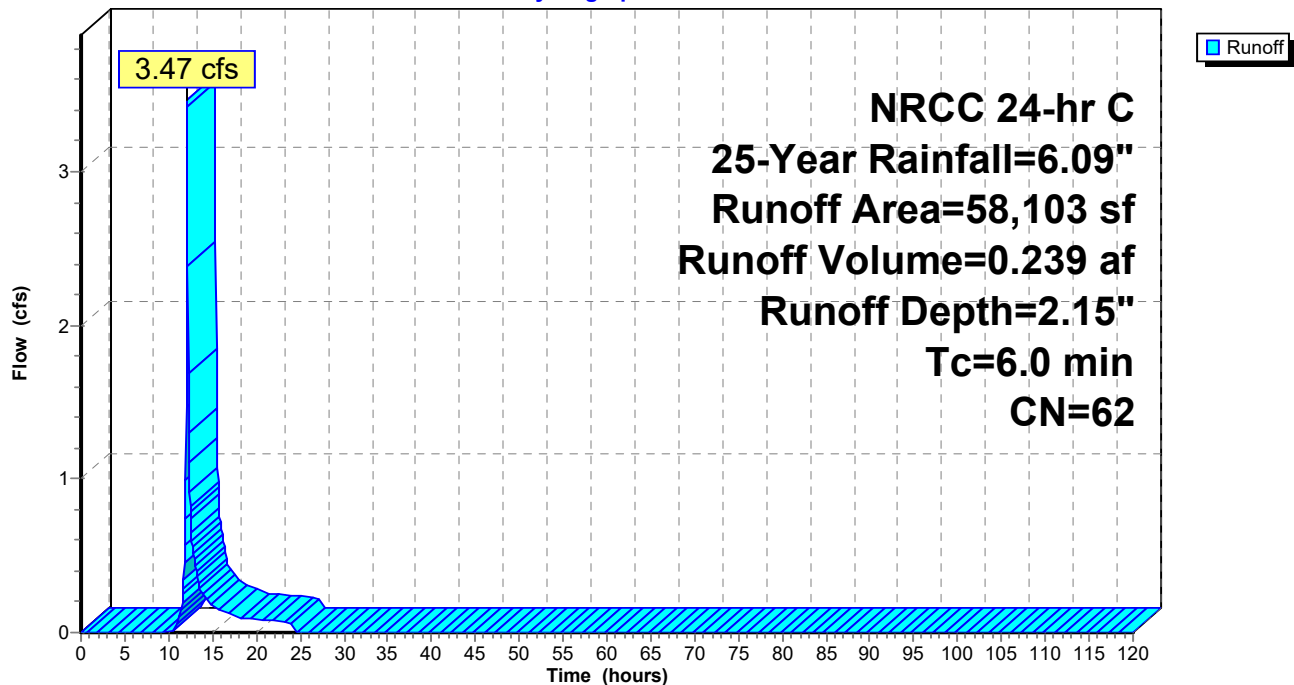
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	2,050	98	basin
	56,053	61	1/4 acre lots, 38% imp, HSG A
	58,103	62	Weighted Average
	34,753		59.81% Pervious Area
	23,350		40.19% Impervious Area

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

Subcatchment P-10B: P-10B

Hydrograph



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Summary for Subcatchment P-10U: P-10U

Runoff = 0.09 cfs @ 12.93 hrs, Volume= 0.044 af, Depth= 0.27"

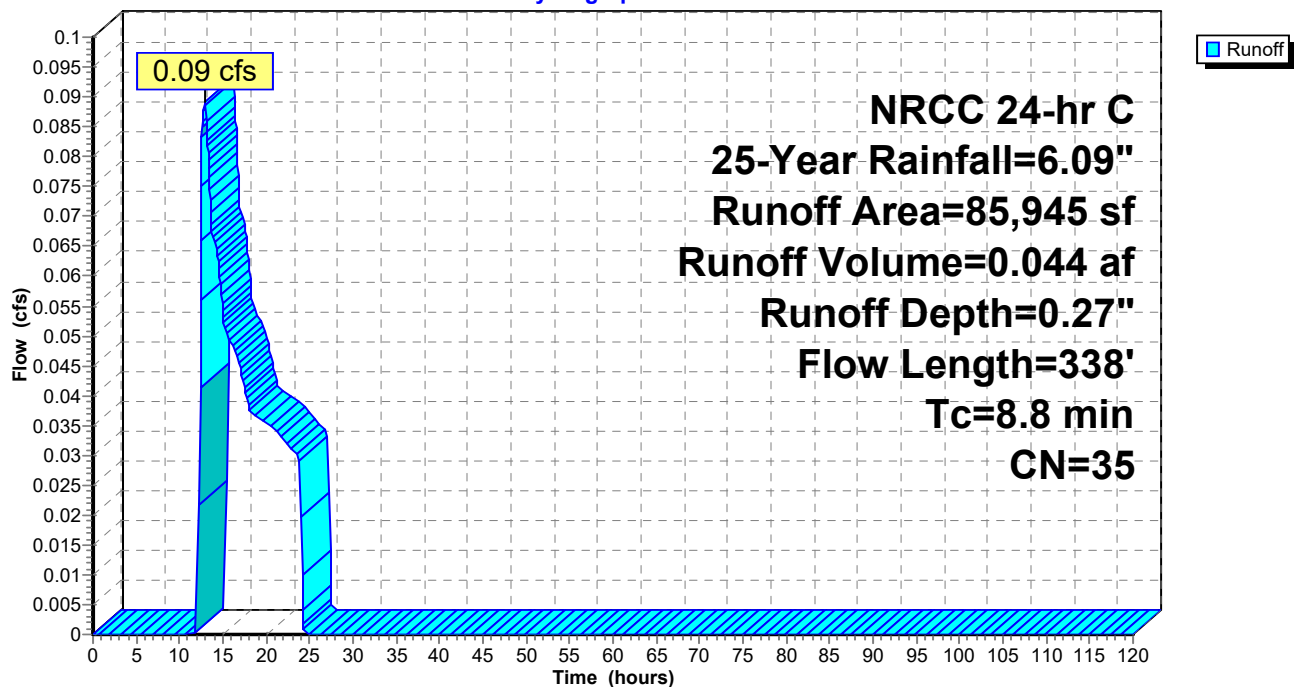
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
4,986	98	Paved parking, HSG A
68,659	30	Woods, Good, HSG A
12,300	39	>75% Grass cover, Good, HSG A
85,945	35	Weighted Average
80,959		94.20% Pervious Area
4,986		5.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
1.3	138	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
8.8	338	Total			

Subcatchment P-10U: P-10U

Hydrograph



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Summary for Subcatchment P-11A: P-11A

Runoff = 2.33 cfs @ 12.13 hrs, Volume= 0.159 af, Depth= 2.60"

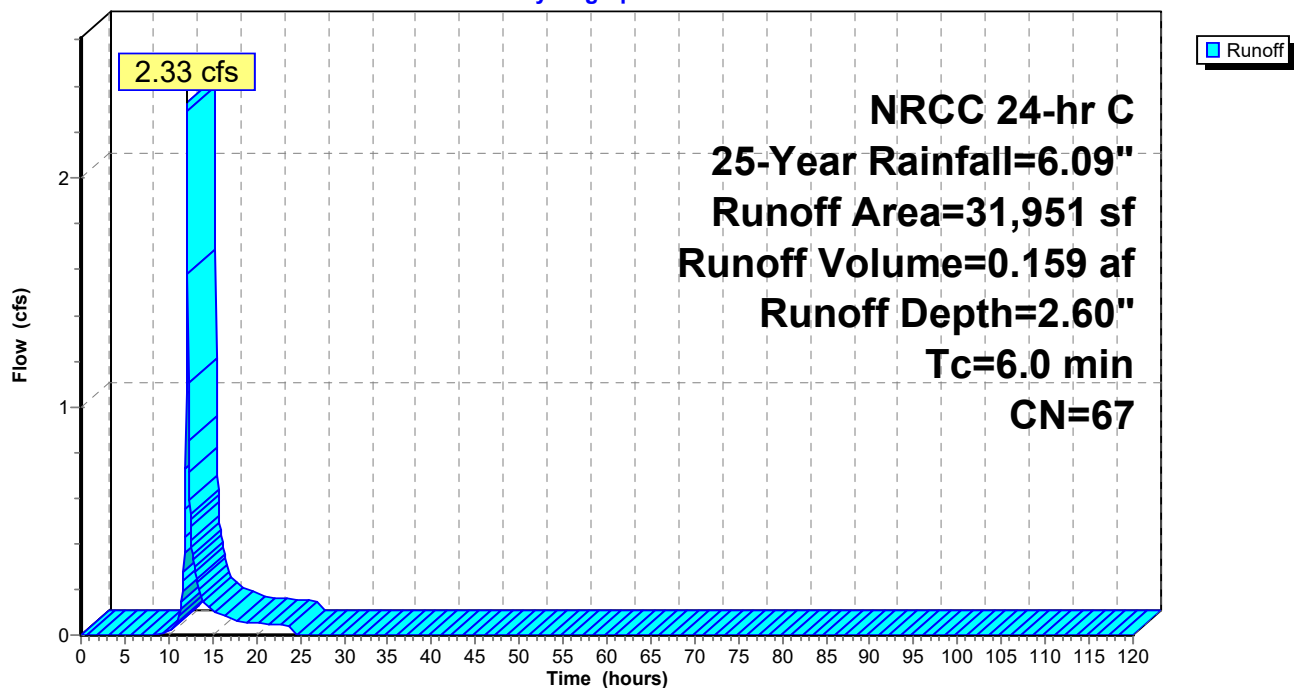
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
	16,752	39	>75% Grass cover, Good, HSG A
*	11,889	98	road with sidewalk
*	3,310	98	PARKING LOT
	31,951	67	Weighted Average
	16,752		52.43% Pervious Area
	15,199		47.57% Impervious Area

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

Subcatchment P-11A: P-11A

Hydrograph



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Summary for Subcatchment P-11B: P-11B

Runoff = 13.52 cfs @ 12.13 hrs, Volume= 0.918 af, Depth= 2.88"

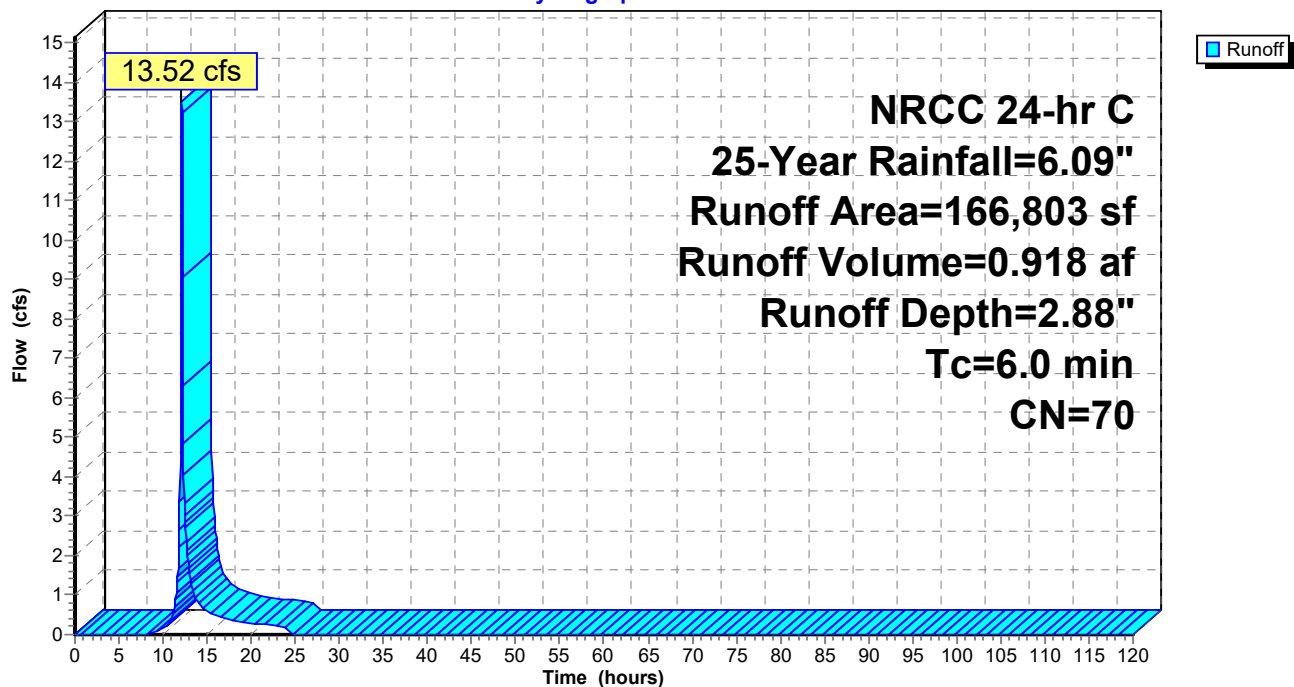
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	9,500	98	roof
	28,000	39	>75% Grass cover, Good, HSG A
	2,303	61	>75% Grass cover, Good, HSG B
*	127,000	75	stone field
	166,803	70	Weighted Average
	157,303		94.30% Pervious Area
	9,500		5.70% Impervious Area

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

Subcatchment P-11B: P-11B

Hydrograph



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Summary for Subcatchment P-11U: P-11U

Runoff = 0.17 cfs @ 12.42 hrs, Volume= 0.056 af, Depth= 0.42"

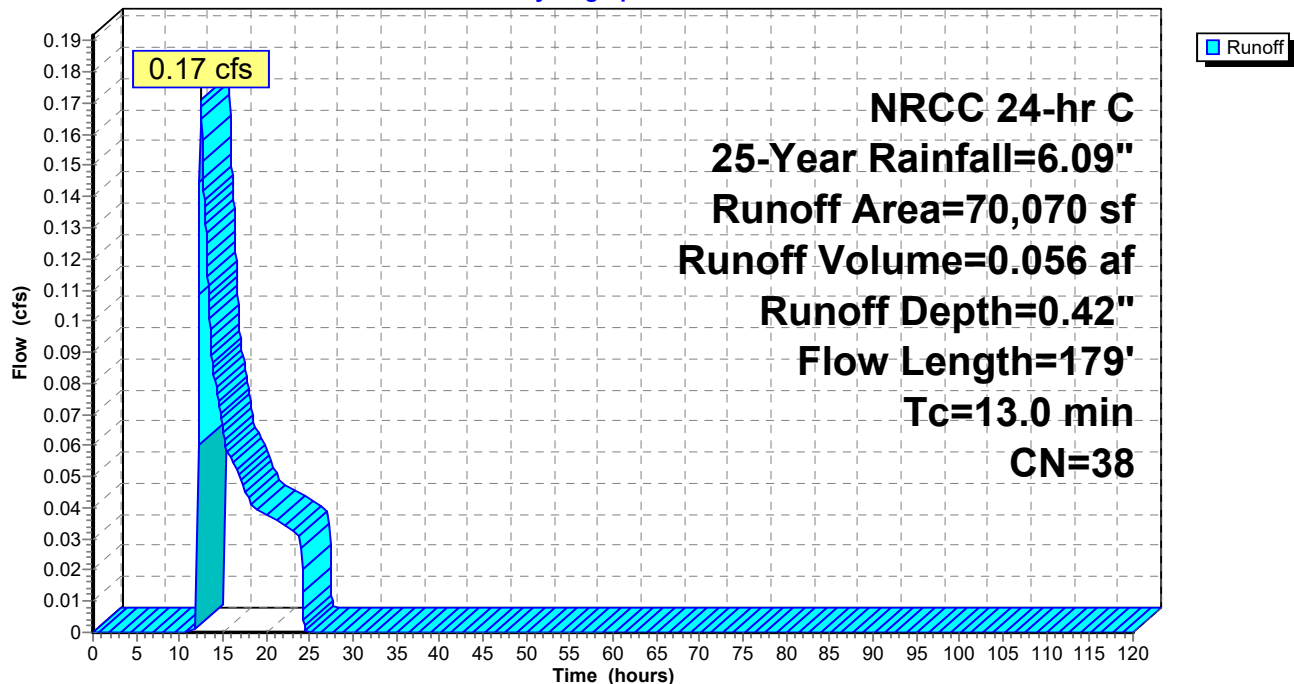
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
23,000	55	Woods, Good, HSG B
47,070	30	Woods, Good, HSG A
70,070	38	Weighted Average
70,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.4	129	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
13.0	179	Total			

Subcatchment P-11U: P-11U

Hydrograph



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Summary for Subcatchment P-12A: P-12A

Runoff = 21.62 cfs @ 12.13 hrs, Volume= 1.469 af, Depth= 2.69"

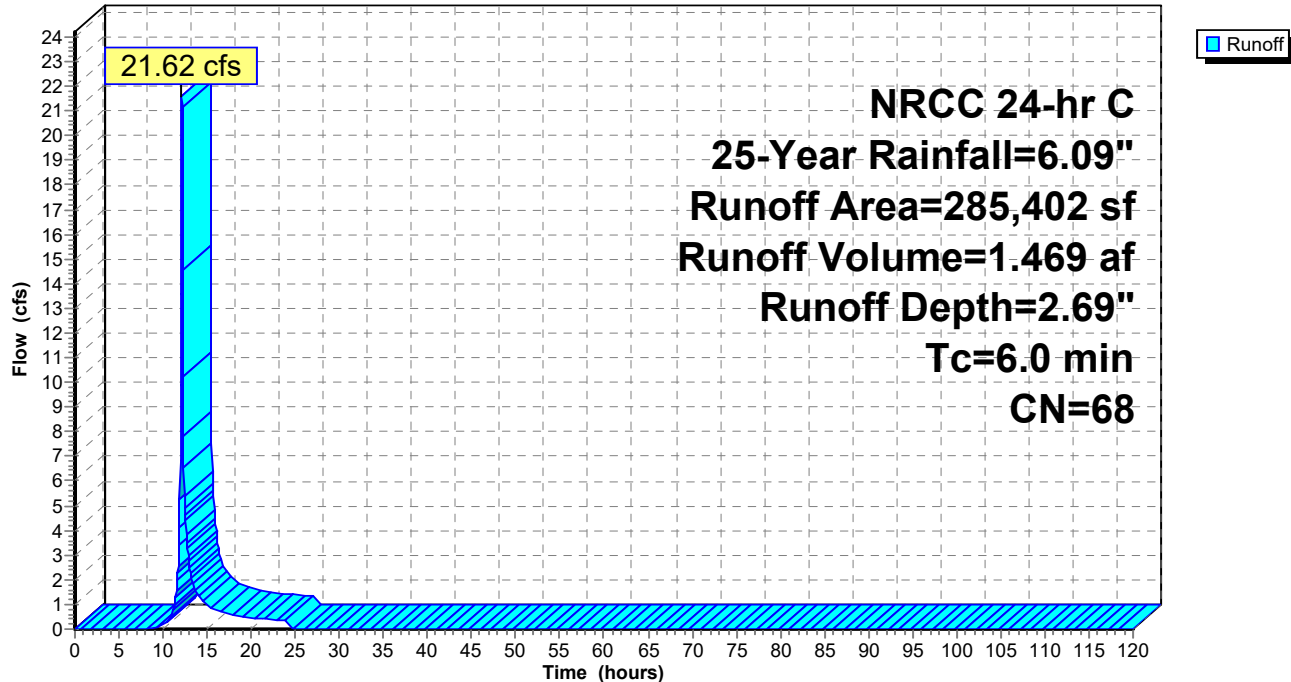
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	9,500	98	basin
	138,400	75	1/4 acre lots, 38% imp, HSG B
	33,000	61	1/4 acre lots, 38% imp, HSG A
	87,300	61	>75% Grass cover, Good, HSG B
	17,202	39	>75% Grass cover, Good, HSG A
	285,402	68	Weighted Average
	210,770		73.85% Pervious Area
	74,632		26.15% Impervious Area

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

Subcatchment P-12A: P-12A

Hydrograph



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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Subcatchment P-12B: P-12B

Runoff = 15.11 cfs @ 12.14 hrs, Volume= 1.065 af, Depth= 1.81"

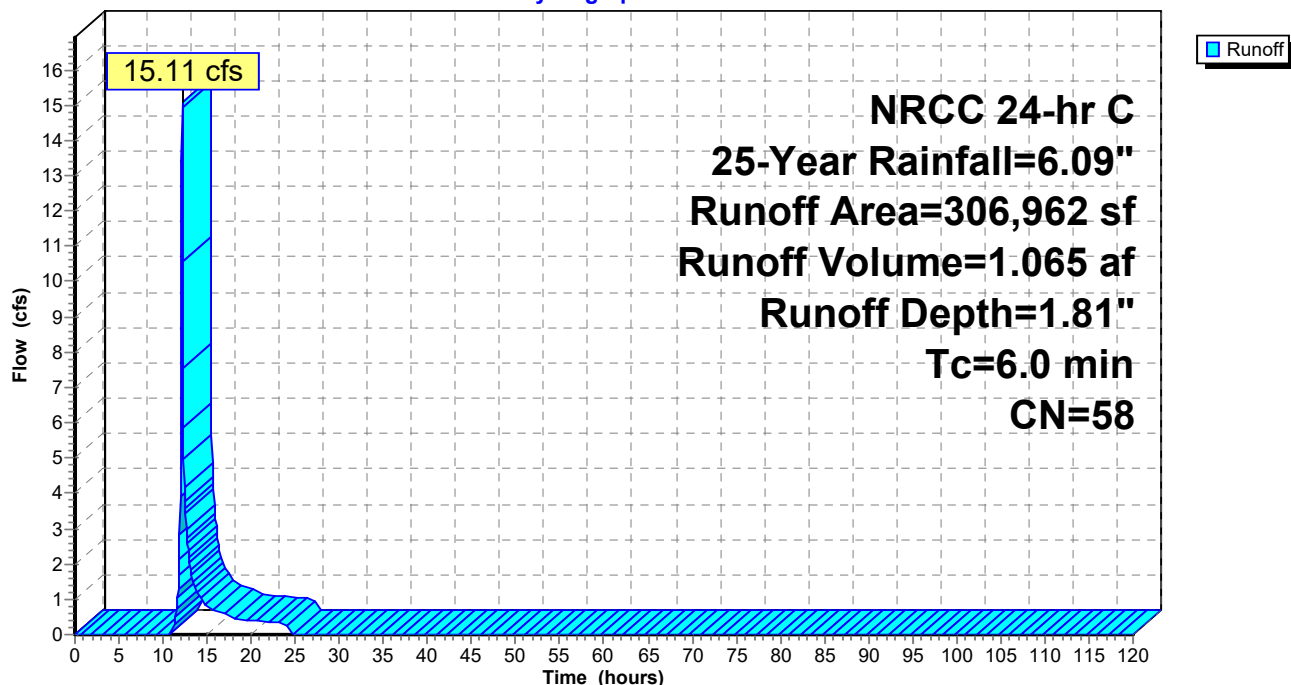
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	22,500	98	basin
	110,800	75	1/4 acre lots, 38% imp, HSG B
	164,162	39	>75% Grass cover, Good, HSG A
*	9,500	98	PARKING LOT
	306,962	58	Weighted Average
	232,858		75.86% Pervious Area
	74,104		24.14% Impervious Area

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

Subcatchment P-12B: P-12B

Hydrograph



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Summary for Subcatchment P-12U: P-12U

Runoff = 2.45 cfs @ 12.20 hrs, Volume= 0.270 af, Depth= 0.90"

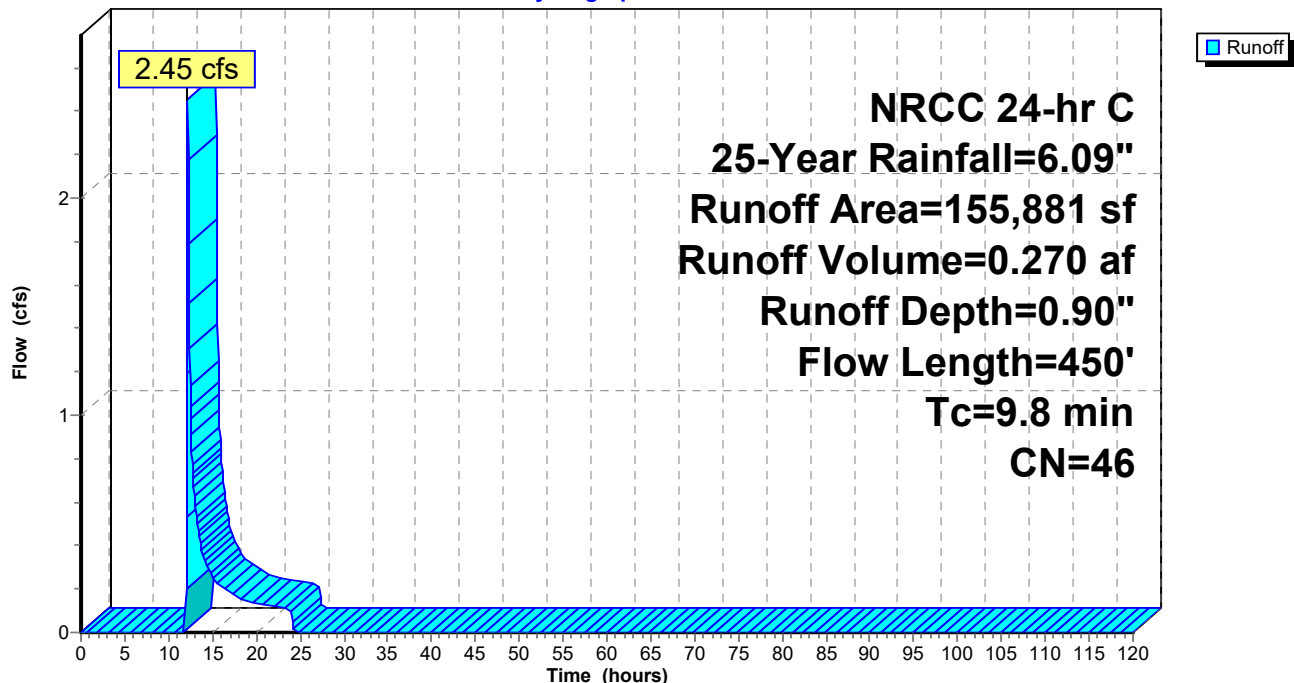
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
80,000	32	Woods/grass comb., Good, HSG A
59,250	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
* 5,000	98	2 units roof
10,731	61	>75% Grass cover, Good, HSG B
155,881	46	Weighted Average
150,881		96.79% Pervious Area
5,000		3.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
3.9	400	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.8	450	Total			

Subcatchment P-12U: P-12U

Hydrograph



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Summary for Subcatchment P-14: P-14

Runoff = 38.94 cfs @ 12.32 hrs, Volume= 4.430 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
329,442	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,221,196	59	Weighted Average
1,221,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

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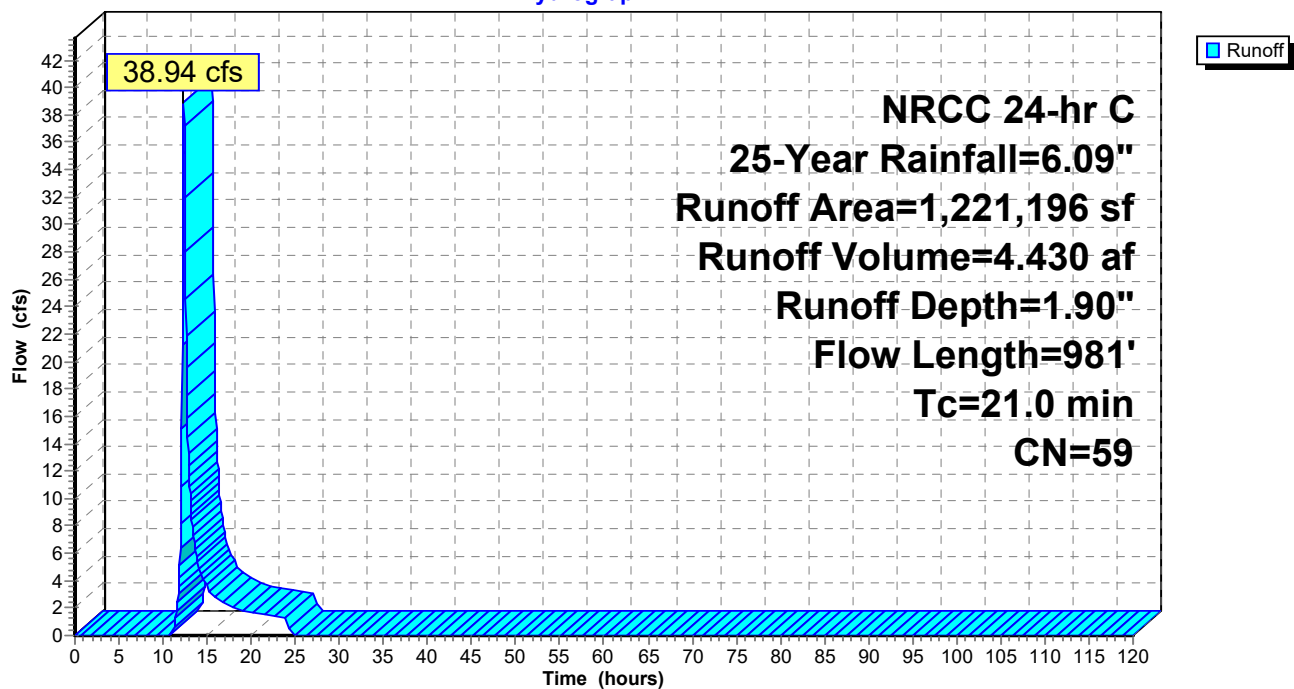
NRCC 24-hr C 25-Year Rainfall=6.09"

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Subcatchment P-14: P-14

Hydrograph



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Summary for Subcatchment P-15A: P-15A

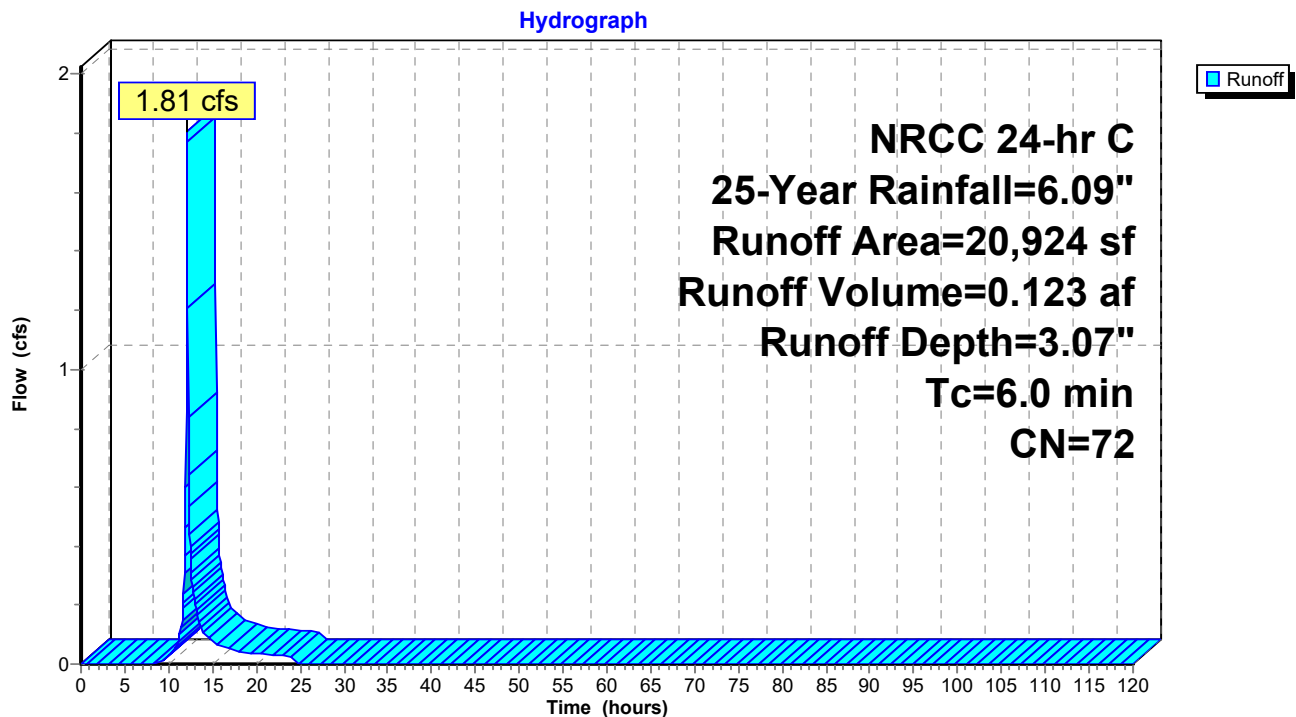
Runoff = 1.81 cfs @ 12.13 hrs, Volume= 0.123 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	300	98	BASIN
*	5,800	98	2.5 UNITS
	14,824	61	>75% Grass cover, Good, HSG B
	20,924	72	Weighted Average
	14,824		70.85% Pervious Area
	6,100		29.15% Impervious Area

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

Subcatchment P-15A: P-15A



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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Subcatchment P-15U: P-15U

Runoff = 1.78 cfs @ 12.20 hrs, Volume= 0.167 af, Depth= 1.26"

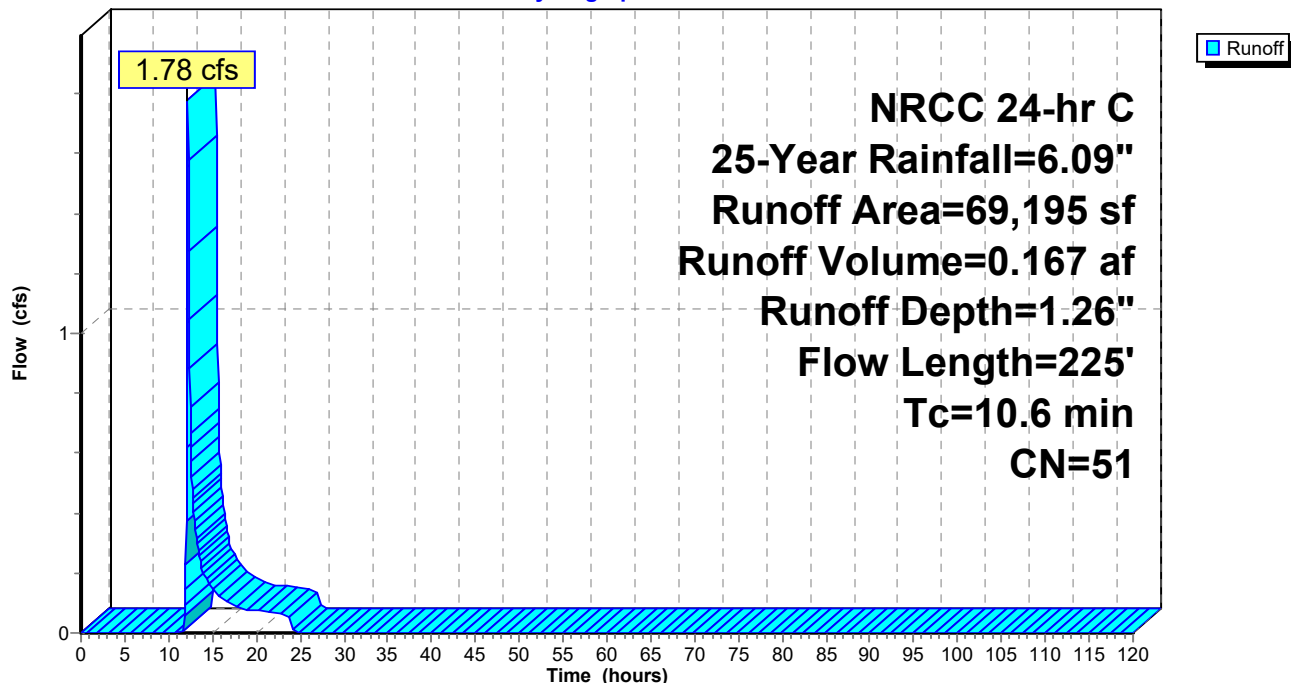
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
13,300	55	Woods, Good, HSG B
26,658	61	>75% Grass cover, Good, HSG B
22,600	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
1,137	39	>75% Grass cover, Good, HSG A
69,195	51	Weighted Average
69,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
2.3	175	0.0650	1.27		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.6	225	Total			

Subcatchment P-15U: P-15U

Hydrograph



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Summary for Subcatchment P-1A: P-1A

Runoff = 16.78 cfs @ 12.13 hrs, Volume= 1.148 af, Depth= 3.56"

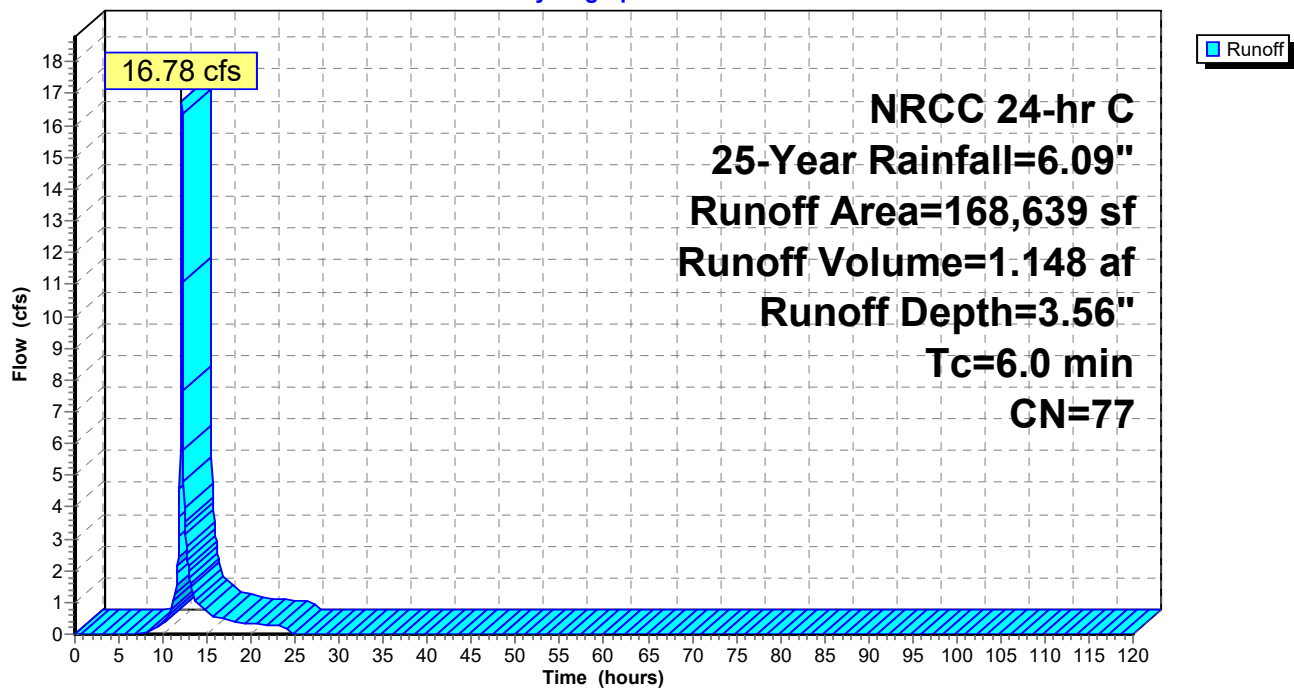
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	5,750	98	basin
*	38,880	98	1620 lf of road
*	3,150	98	630 lf of sidewalk
*	2,500	98	1 unit
*	23,400	98	17 units driveway
	7,380	55	Woods, Good, HSG B
	87,579	61	>75% Grass cover, Good, HSG B
	168,639	77	Weighted Average
	94,959		56.31% Pervious Area
	73,680		43.69% Impervious Area

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

Subcatchment P-1A: P-1A

Hydrograph



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Summary for Subcatchment P-1B: P-1B

Runoff = 11.22 cfs @ 12.33 hrs, Volume= 1.264 af, Depth= 2.42"

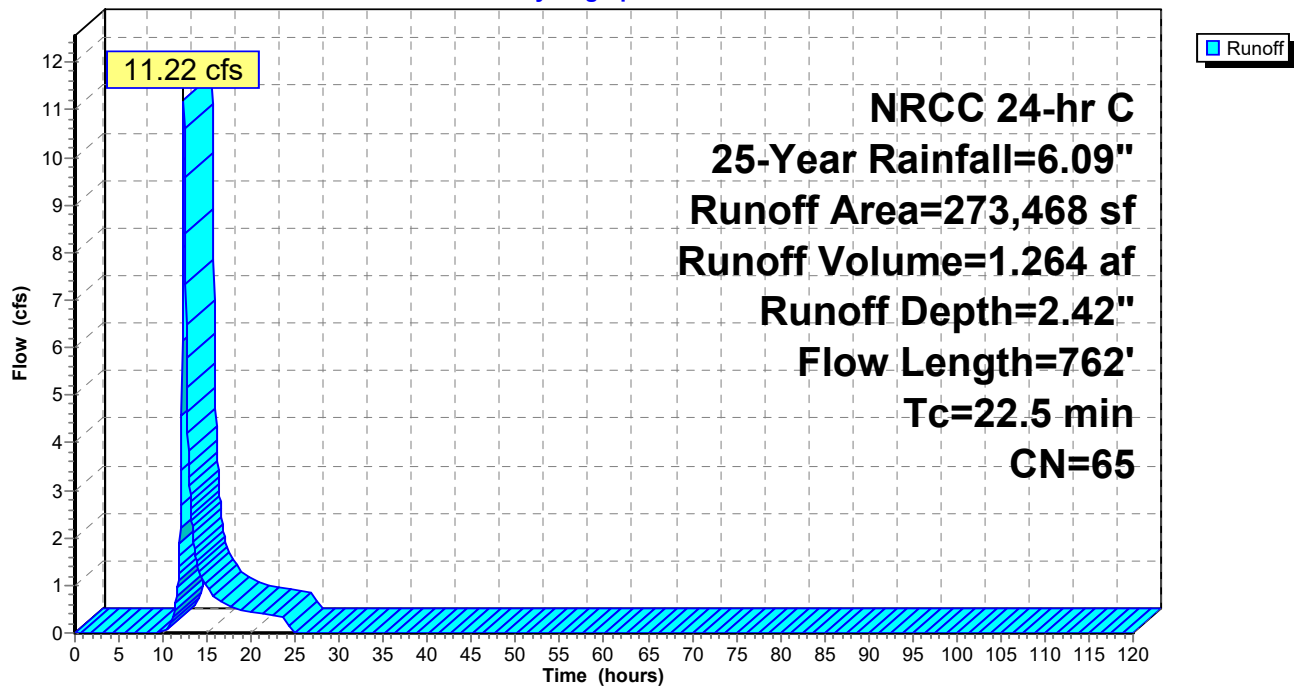
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
* 3,150	98	BASIN
* 8,000	85	500 LF GRAVEL ROAD B SOILS
* 18,750	98	7.5 UNITS
243,568	61	>75% Grass cover, Good, HSG B
273,468	65	Weighted Average
251,568		91.99% Pervious Area
21,900		8.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
17.0	712	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.5	762	Total			

Subcatchment P-1B: P-1B

Hydrograph



Proposed Hydrology

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Summary for Subcatchment P-1C: P-1C

Runoff = 0.79 cfs @ 12.13 hrs, Volume= 0.057 af, Depth= 4.71"

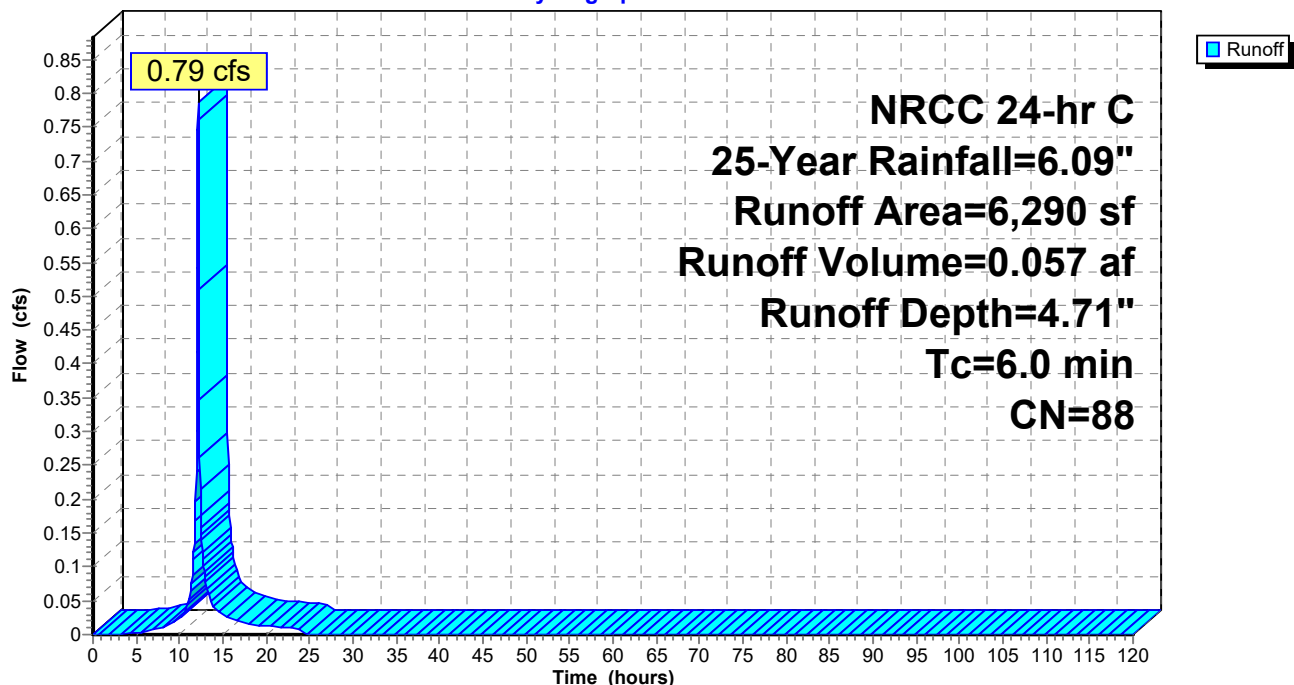
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	70	98	BASIN
*	3,744	98	156 LF OF ROAD
*	780	98	156 LF OF SIDEWALK
	1,696	61	>75% Grass cover, Good, HSG B
	6,290	88	Weighted Average
	1,696		26.96% Pervious Area
	4,594		73.04% Impervious Area

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

Subcatchment P-1C: P-1C

Hydrograph



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Summary for Subcatchment P-1U: P-1U

Runoff = 8.96 cfs @ 12.21 hrs, Volume= 0.785 af, Depth= 2.07"

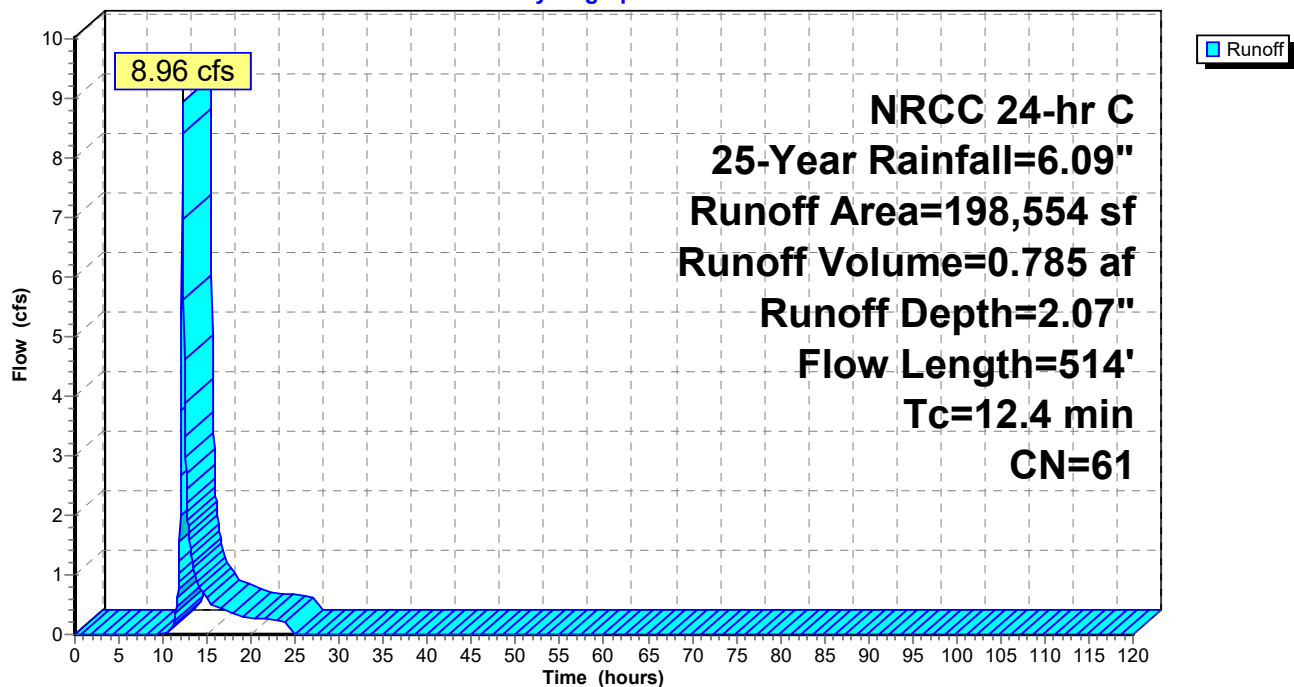
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
107,304	61	>75% Grass cover, Good, HSG B
80,000	55	Woods, Good, HSG B
* 11,250	98	4.5 UNITS
198,554	61	Weighted Average
187,304		94.33% Pervious Area
11,250		5.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
6.9	464	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.4	514	Total			

Subcatchment P-1U: P-1U

Hydrograph



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Summary for Subcatchment P-2A: P-2A

Runoff = 5.94 cfs @ 12.14 hrs, Volume= 0.411 af, Depth= 2.07"

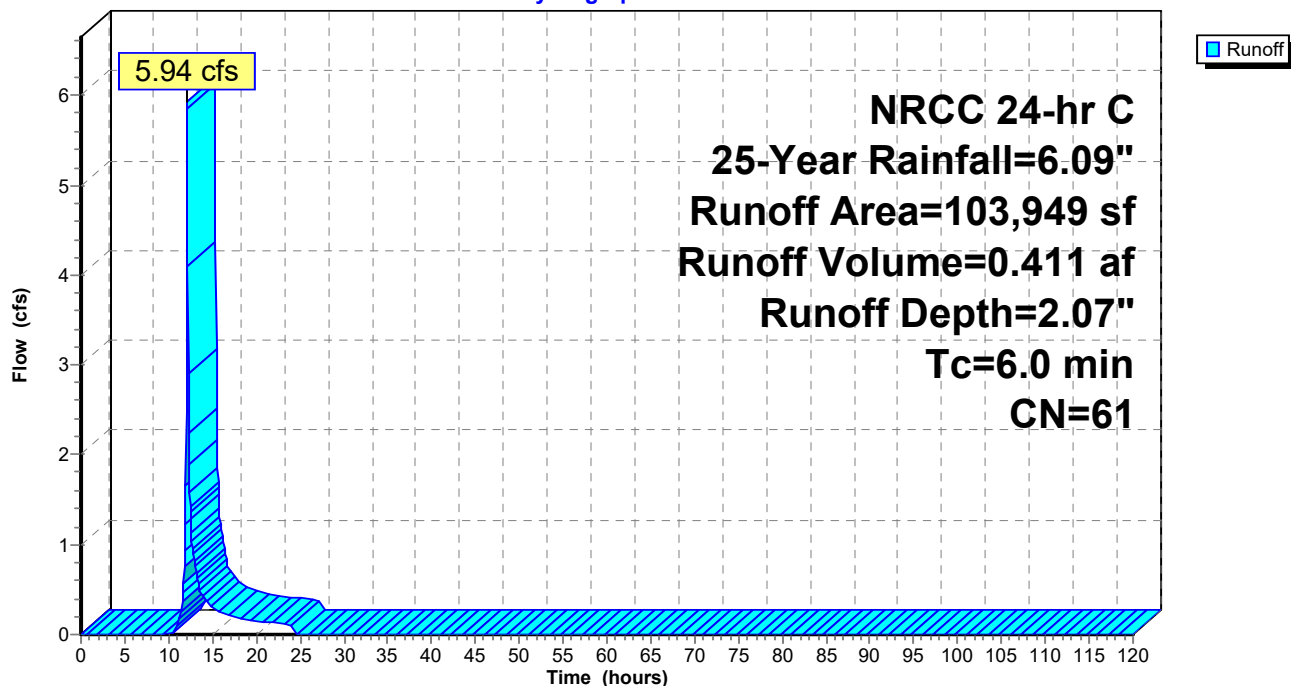
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
103,949	61	1/4 acre lots, 38% imp, HSG A
64,448		62.00% Pervious Area
39,501		38.00% Impervious Area

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

Subcatchment P-2A: P-2A

Hydrograph



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Summary for Subcatchment P-2B: P-2B

Runoff = 3.97 cfs @ 12.13 hrs, Volume= 0.269 af, Depth= 2.78"

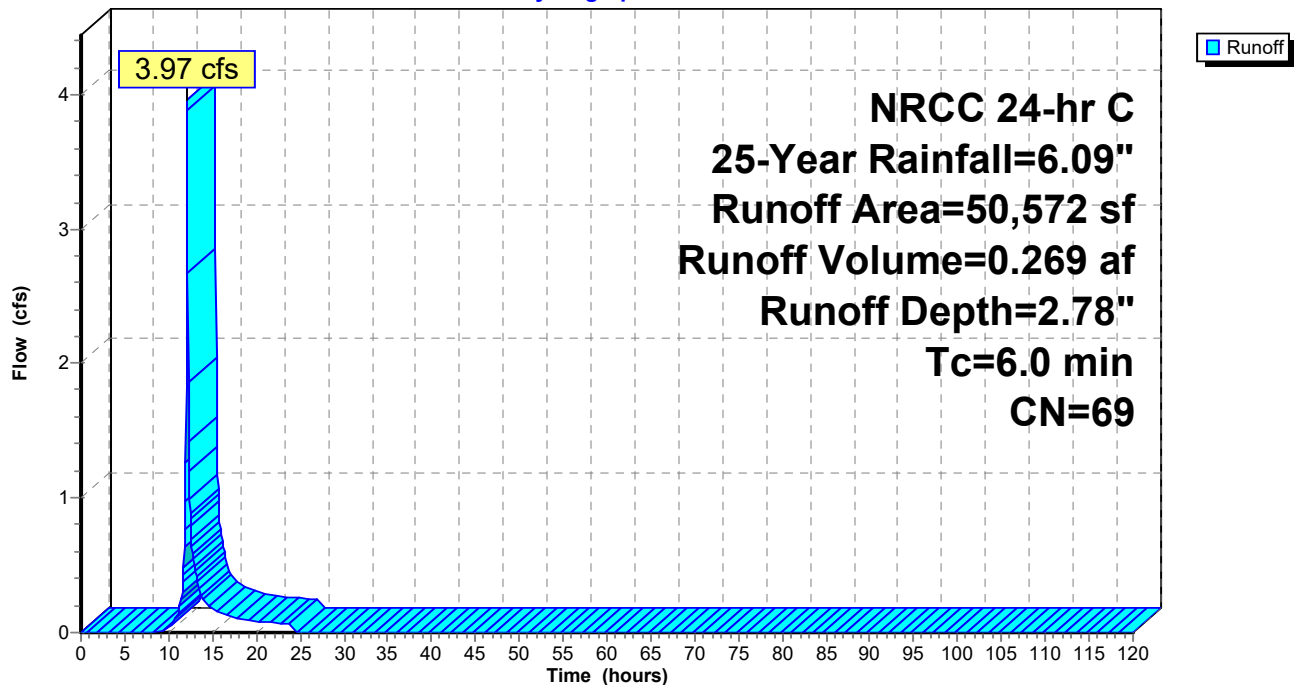
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
34,300	61	1/4 acre lots, 38% imp, HSG A
16,272	87	1/4 acre lots, 38% imp, HSG D
50,572	69	Weighted Average
31,355		62.00% Pervious Area
19,217		38.00% Impervious Area

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

Subcatchment P-2B: P-2B

Hydrograph



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Summary for Subcatchment P-2C: P-2C

Runoff = 7.57 cfs @ 12.13 hrs, Volume= 0.534 af, Depth= 4.39"

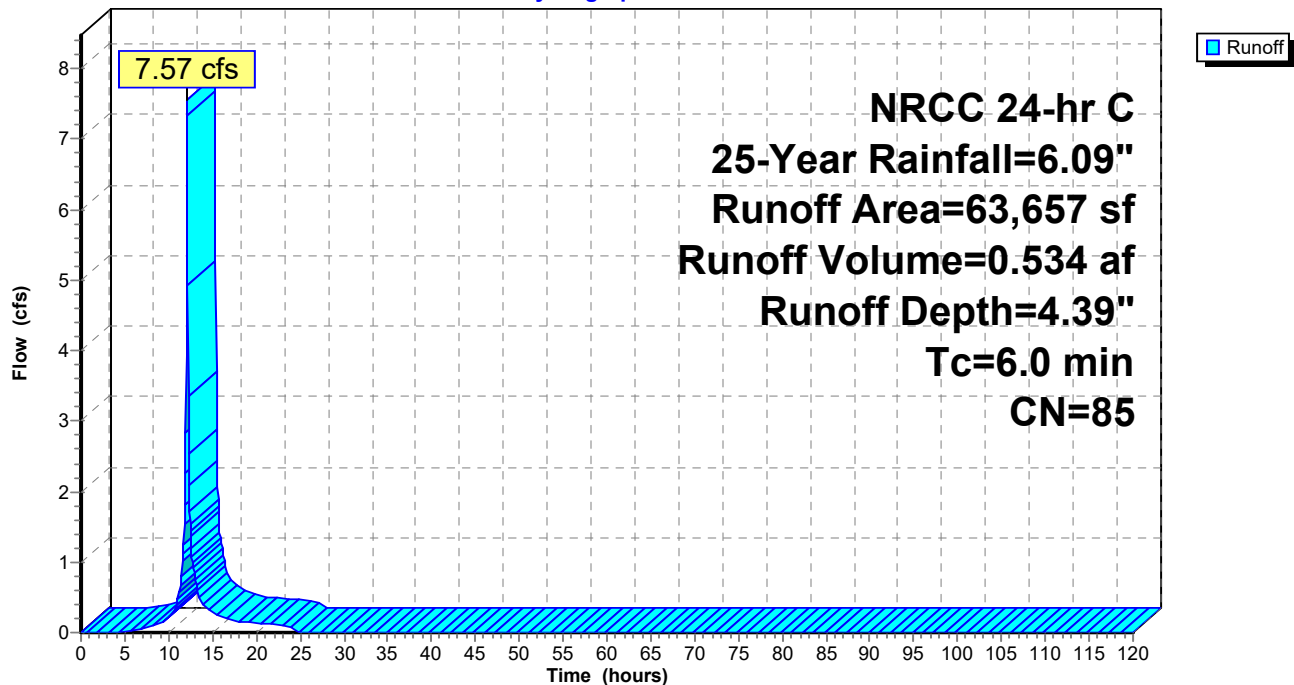
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
54,284	87	1/4 acre lots, 38% imp, HSG D
9,373	75	1/4 acre lots, 38% imp, HSG B
63,657	85	Weighted Average
39,467		62.00% Pervious Area
24,190		38.00% Impervious Area

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

Subcatchment P-2C: P-2C

Hydrograph



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Summary for Subcatchment P-2D: P-2D

Runoff = 26.93 cfs @ 12.13 hrs, Volume= 1.835 af, Depth= 2.51"

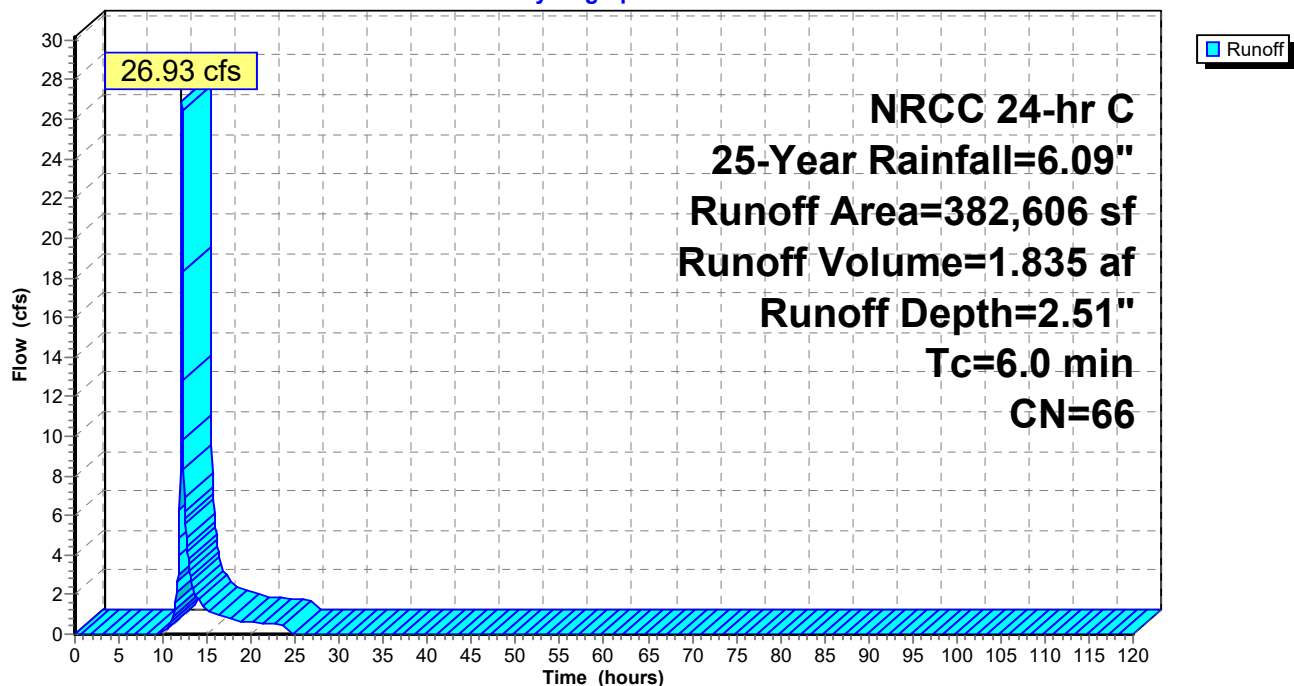
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
163,640	61	1/4 acre lots, 38% imp, HSG A
82,633	87	1/4 acre lots, 38% imp, HSG D
* 15,400	98	basin
30,500	30	Woods, Good, HSG A
9,200	77	Woods, Good, HSG D
* 17,400	98	exist impervious
13,000	74	>75% Grass cover, Good, HSG C
10,000	80	>75% Grass cover, Good, HSG D
40,833	39	>75% Grass cover, Good, HSG A
382,606	66	Weighted Average
256,222		66.97% Pervious Area
126,384		33.03% Impervious Area

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

Subcatchment P-2D: P-2D

Hydrograph



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Summary for Subcatchment P-2E: P-2E

Runoff = 11.44 cfs @ 12.13 hrs, Volume= 0.785 af, Depth= 3.66"

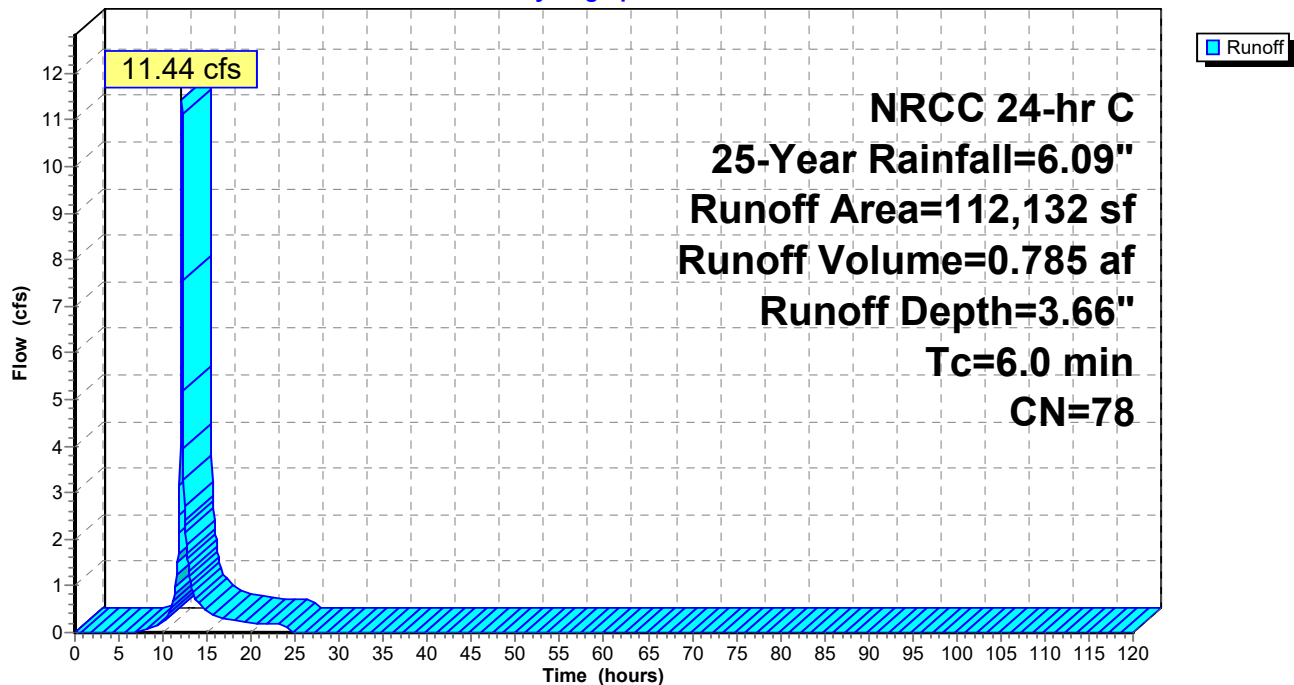
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	12,500	98	basin
	99,632	75	1/4 acre lots, 38% imp, HSG B
	112,132	78	Weighted Average
	61,772		55.09% Pervious Area
	50,360		44.91% Impervious Area

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

Subcatchment P-2E: P-2E

Hydrograph



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Summary for Subcatchment P-2F: P-2F

Runoff = 13.74 cfs @ 12.13 hrs, Volume= 0.938 af, Depth= 3.46"

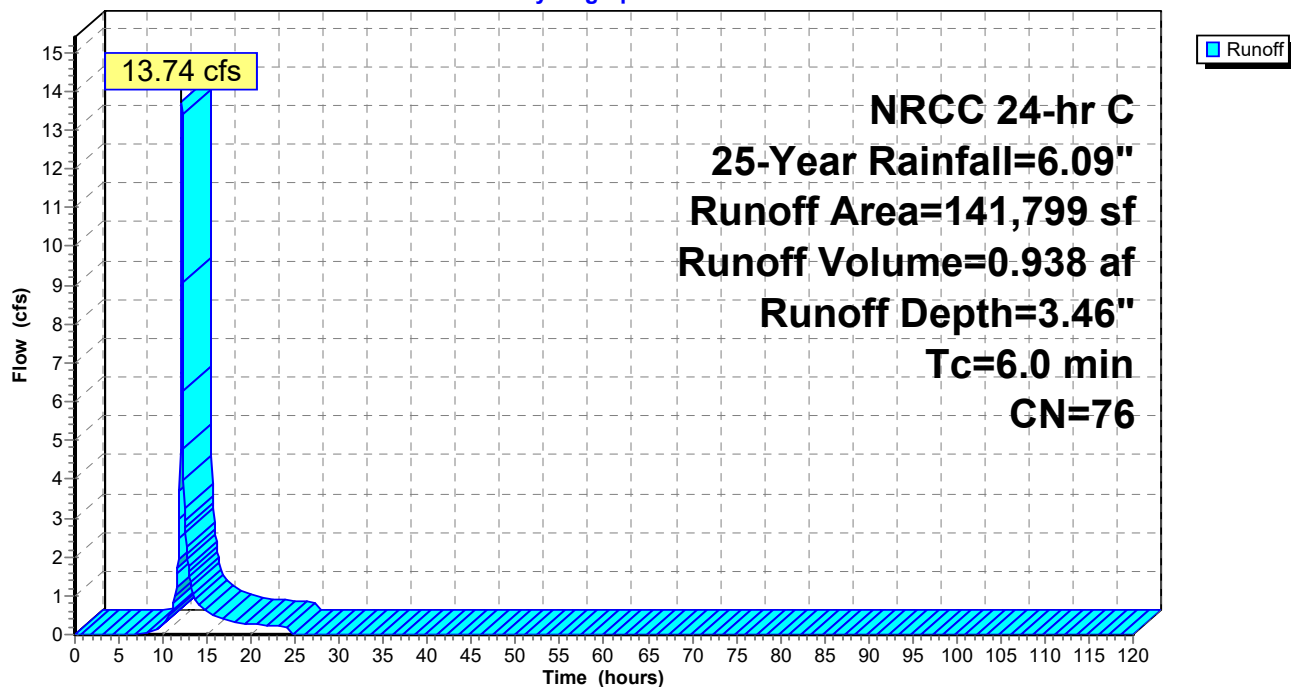
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
134,299	75	1/4 acre lots, 38% imp, HSG B
* 7,500	98	basin
141,799	76	Weighted Average
83,265		58.72% Pervious Area
58,534		41.28% Impervious Area

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

Subcatchment P-2F: P-2F

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Summary for Subcatchment P-2U: P-2U

Runoff = 41.48 cfs @ 12.53 hrs, Volume= 6.087 af, Depth= 2.60"

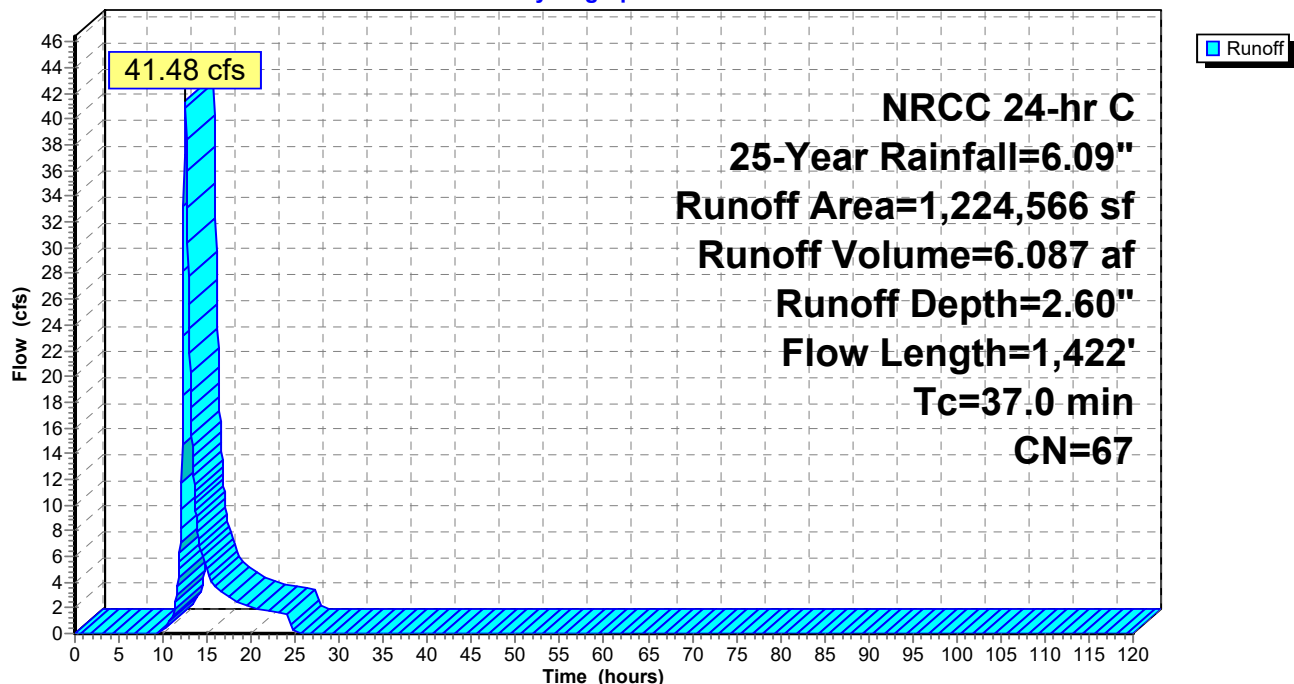
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
126,300	32	Woods/grass comb., Good, HSG A
394,200	58	Woods/grass comb., Good, HSG B
232,300	72	Woods/grass comb., Good, HSG C
418,475	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
1,224,566	67	Weighted Average
1,171,275		95.65% Pervious Area
53,291		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Subcatchment P-2U: P-2U

Hydrograph



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Summary for Subcatchment P-3A: P-3A

Runoff = 11.04 cfs @ 12.13 hrs, Volume= 0.772 af, Depth= 4.17"

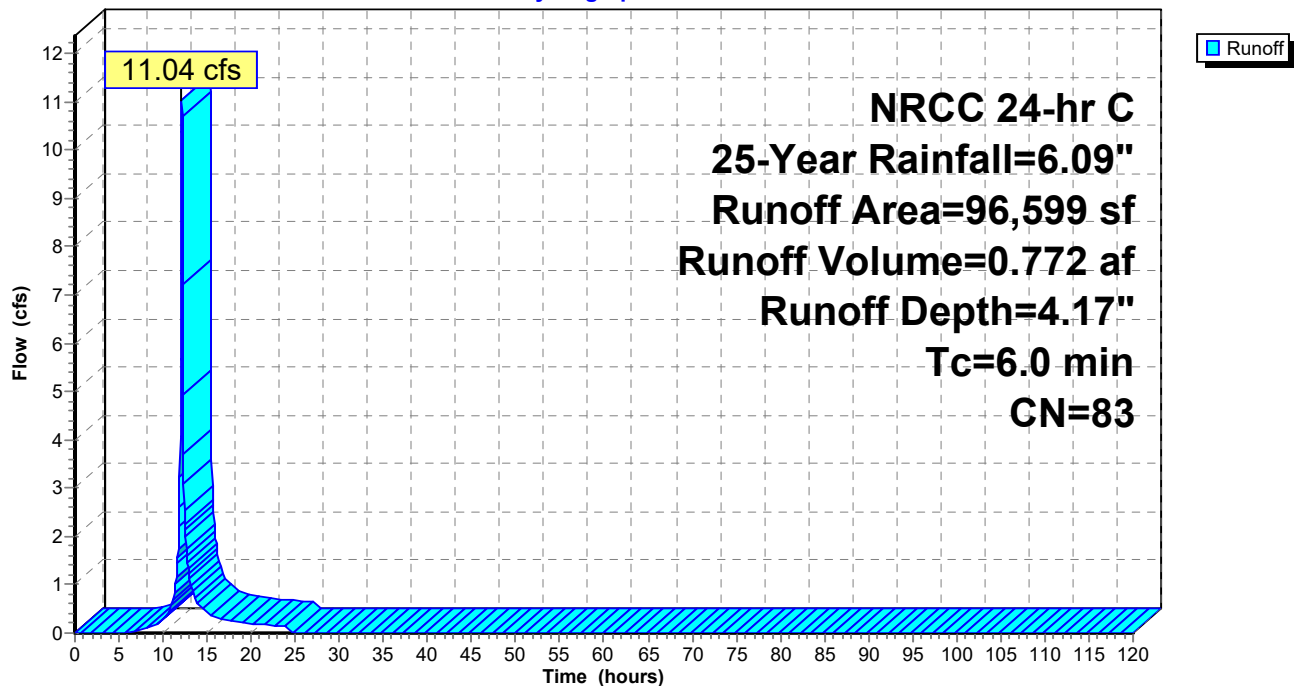
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	4,600	98	BASIN
	36,100	75	1/4 acre lots, 38% imp, HSG B
	55,899	87	1/4 acre lots, 38% imp, HSG D
	96,599	83	Weighted Average
	57,039		59.05% Pervious Area
	39,560		40.95% Impervious Area

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

Subcatchment P-3A: P-3A

Hydrograph



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Summary for Subcatchment P-3B: P-3B

Runoff = 24.40 cfs @ 12.13 hrs, Volume= 1.660 af, Depth= 3.26"

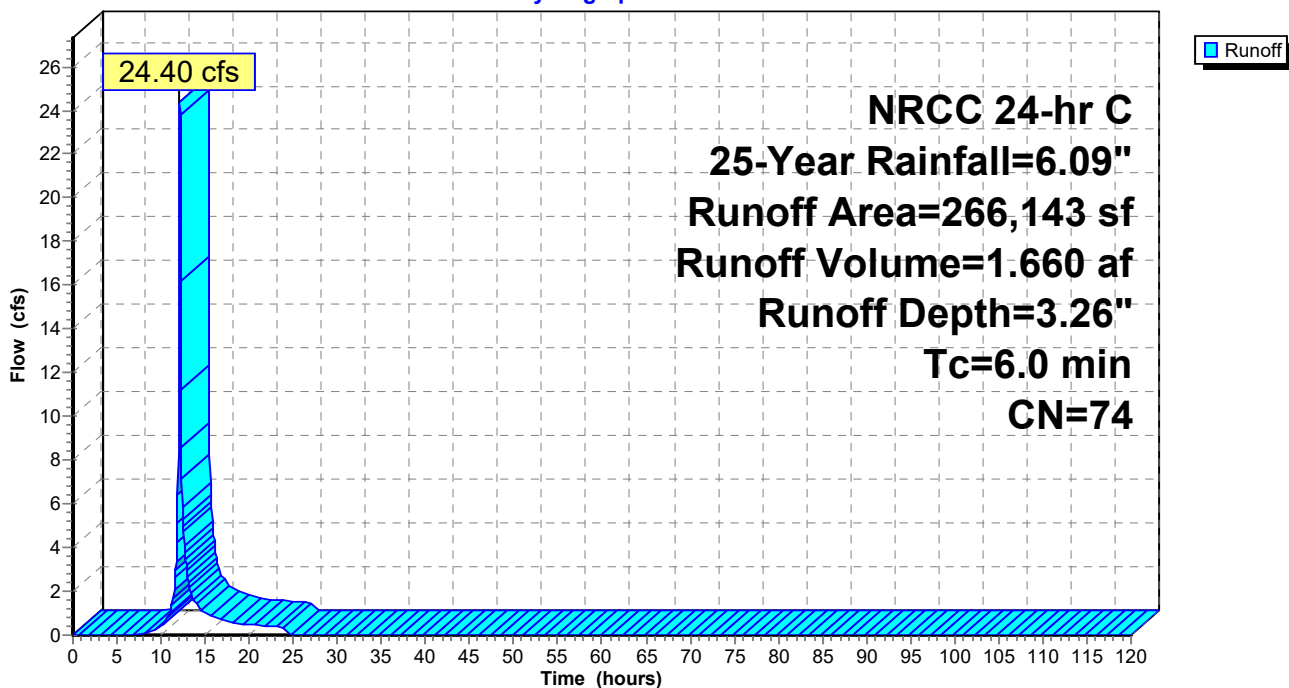
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	9,500	98	BASIN
	9,200	30	Woods, Good, HSG A
	247,443	75	1/4 acre lots, 38% imp, HSG B
	266,143	74	Weighted Average
	162,615		61.10% Pervious Area
	103,528		38.90% Impervious Area

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

Subcatchment P-3B: P-3B

Hydrograph



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Summary for Subcatchment P-3U: P-3U

Runoff = 36.63 cfs @ 12.29 hrs, Volume= 3.782 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	108,000	30	Woods, Good, HSG A
	98,000	39	>75% Grass cover, Good, HSG A
	136,977	61	>75% Grass cover, Good, HSG B
	76,000	55	Woods, Good, HSG B
*	15,800	98	EXIST Roof and Pavement
	58,000	77	Woods, Good, HSG D
	58,000	80	>75% Grass cover, Good, HSG D
*	32,500	98	13 UNITS
*	6,400	98	400 LF OF ROAD
*	1,800	98	2 UNITS DRIVEWAY
	760,977	67	Weighted Average
	534,977		70.30% Pervious Area
	226,000		29.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

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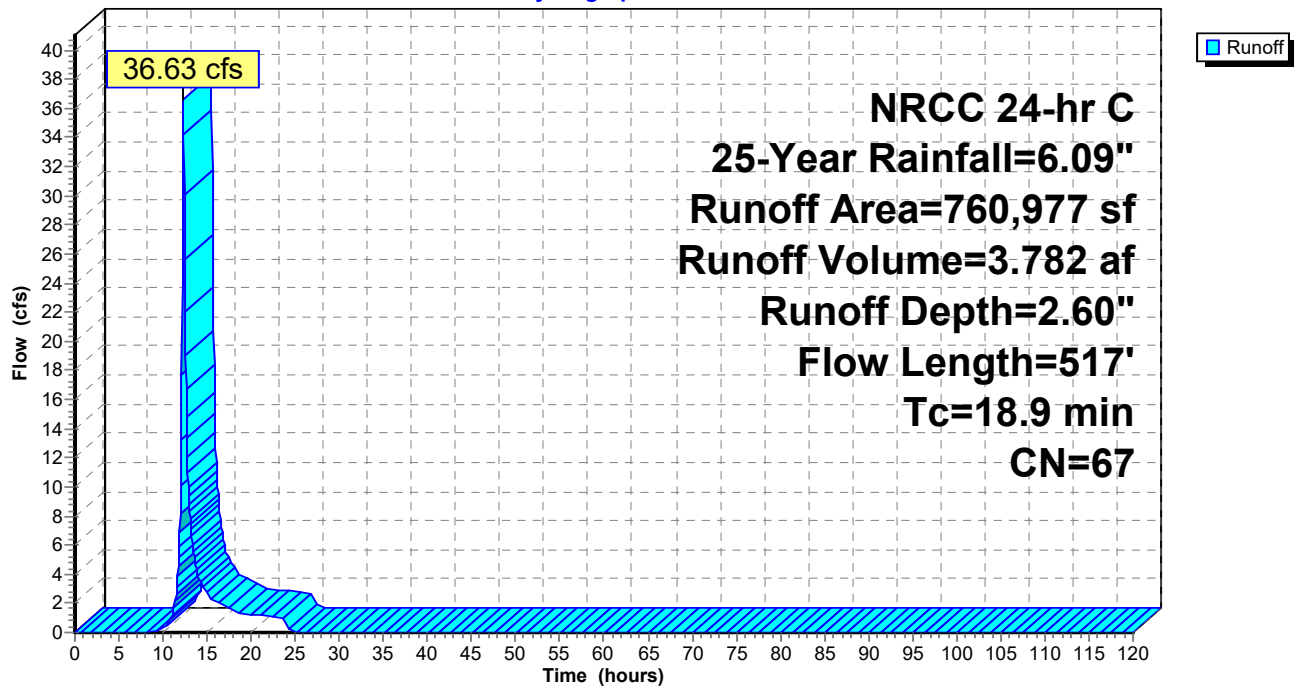
NRCC 24-hr C 25-Year Rainfall=6.09"

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Subcatchment P-3U: P-3U

Hydrograph



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Summary for Subcatchment P-4: P-4

Runoff = 0.51 cfs @ 12.15 hrs, Volume= 0.041 af, Depth= 1.11"

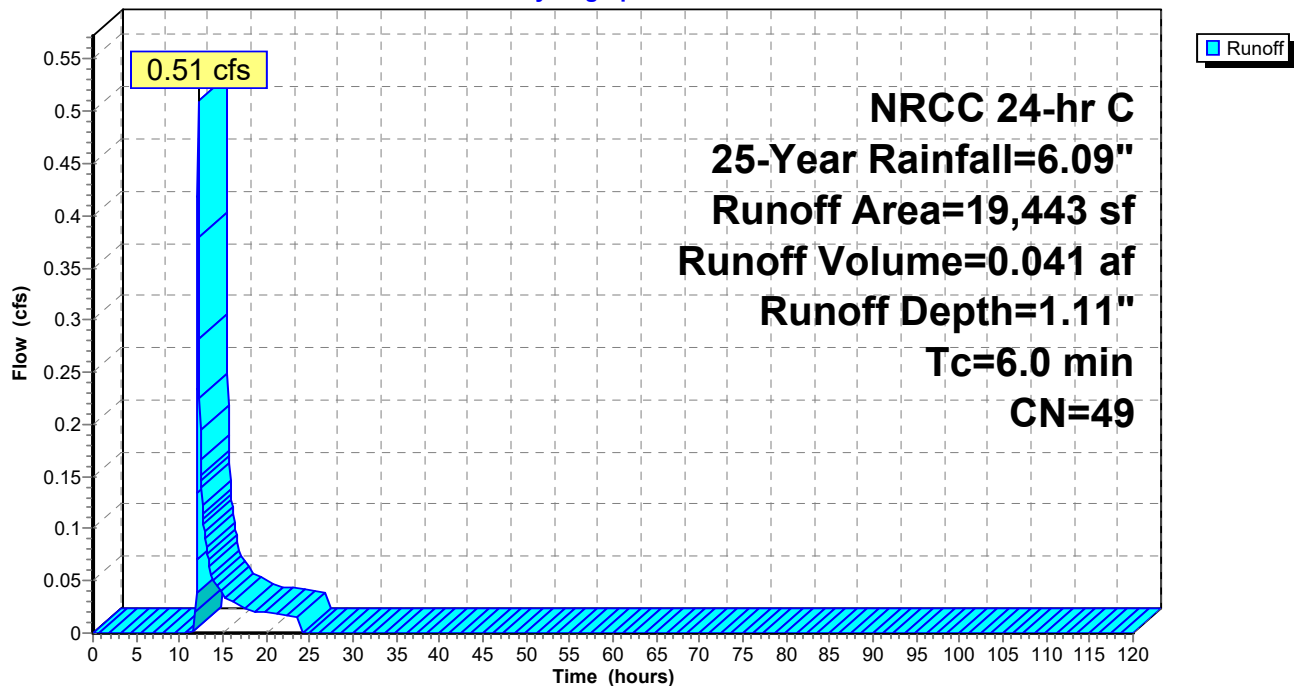
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
5,200	30	Woods, Good, HSG A
10,262	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
19,443	49	Weighted Average
15,462		79.52% Pervious Area
3,981		20.48% Impervious Area

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

Subcatchment P-4: P-4

Hydrograph



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Summary for Subcatchment P-5U: P-5U

Runoff = 9.23 cfs @ 12.32 hrs, Volume= 1.021 af, Depth= 2.42"

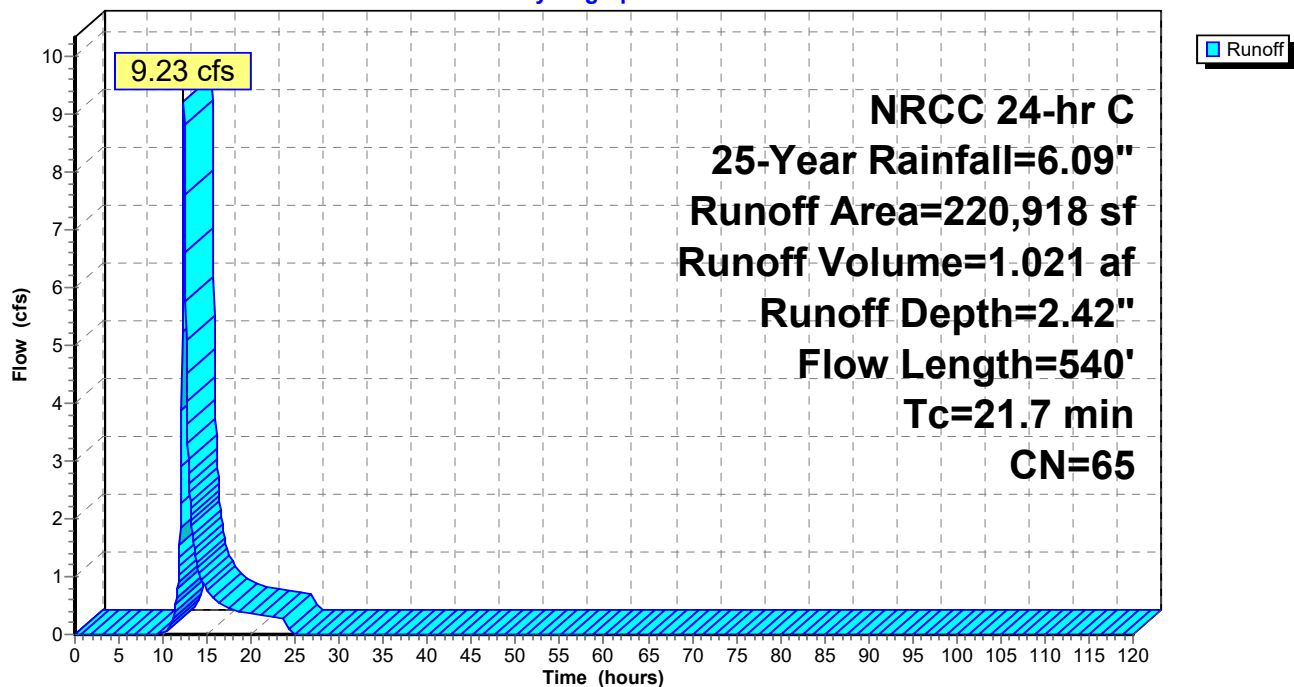
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
83,000	39	>75% Grass cover, Good, HSG A
17,000	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
96,818	80	>75% Grass cover, Good, HSG D
220,918	65	Weighted Average
220,918		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
11.5	490	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.7	540	Total			

Subcatchment P-5U: P-5U

Hydrograph



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Summary for Subcatchment P-6A: P-6A

Runoff = 14.68 cfs @ 12.13 hrs, Volume= 1.005 af, Depth= 3.56"

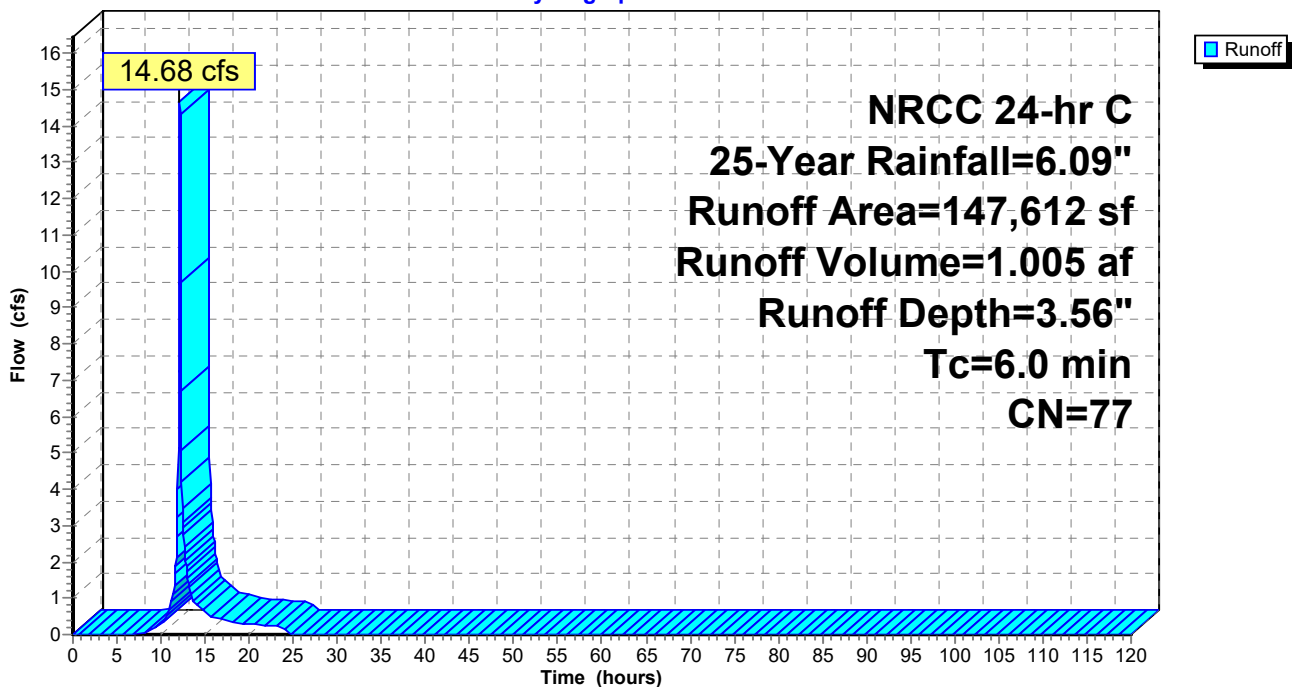
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
134,612	75	1/4 acre lots, 38% imp, HSG B
* 13,000	98	basin
147,612	77	Weighted Average
83,459		56.54% Pervious Area
64,153		43.46% Impervious Area

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

Subcatchment P-6A: P-6A

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Summary for Subcatchment P-6U: P-6U

Runoff = 20.91 cfs @ 12.22 hrs, Volume= 1.868 af, Depth= 2.69"

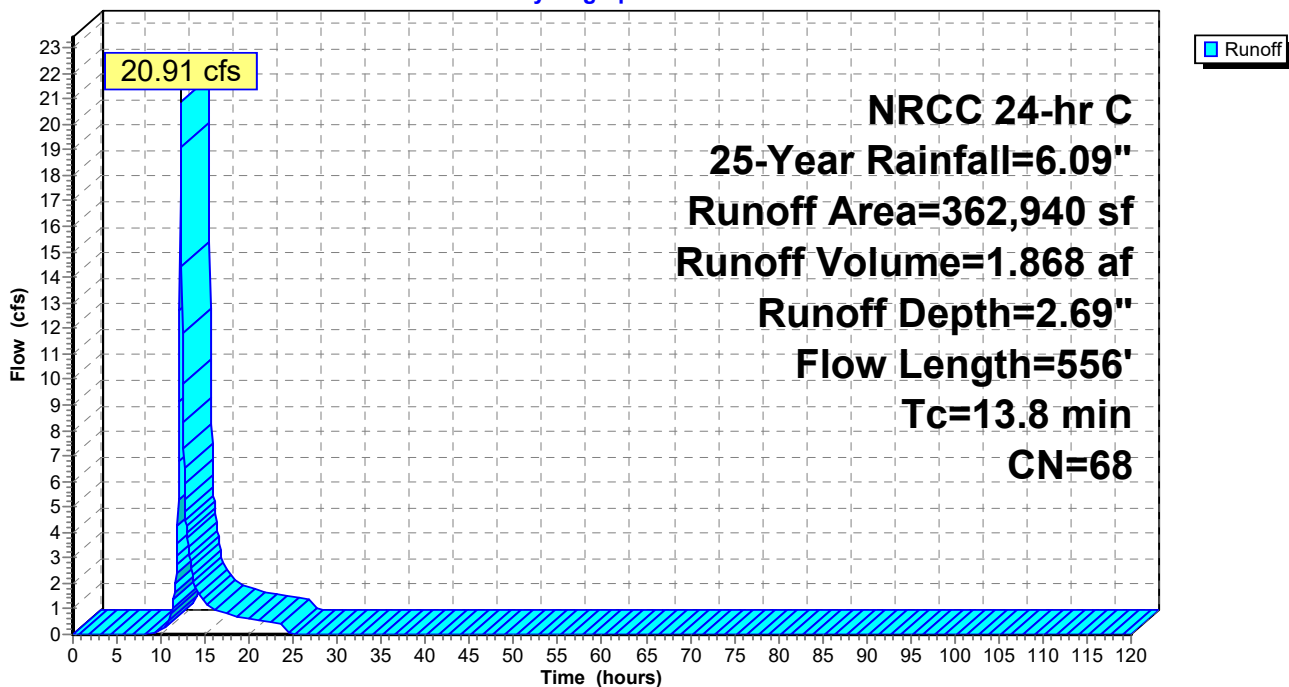
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
164,917	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
362,940	68	Weighted Average
362,940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
5.6	456	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.8	556	Total			

Subcatchment P-6U: P-6U

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Summary for Subcatchment P-7A: P-7A

Runoff = 15.88 cfs @ 12.13 hrs, Volume= 1.078 af, Depth= 2.88"

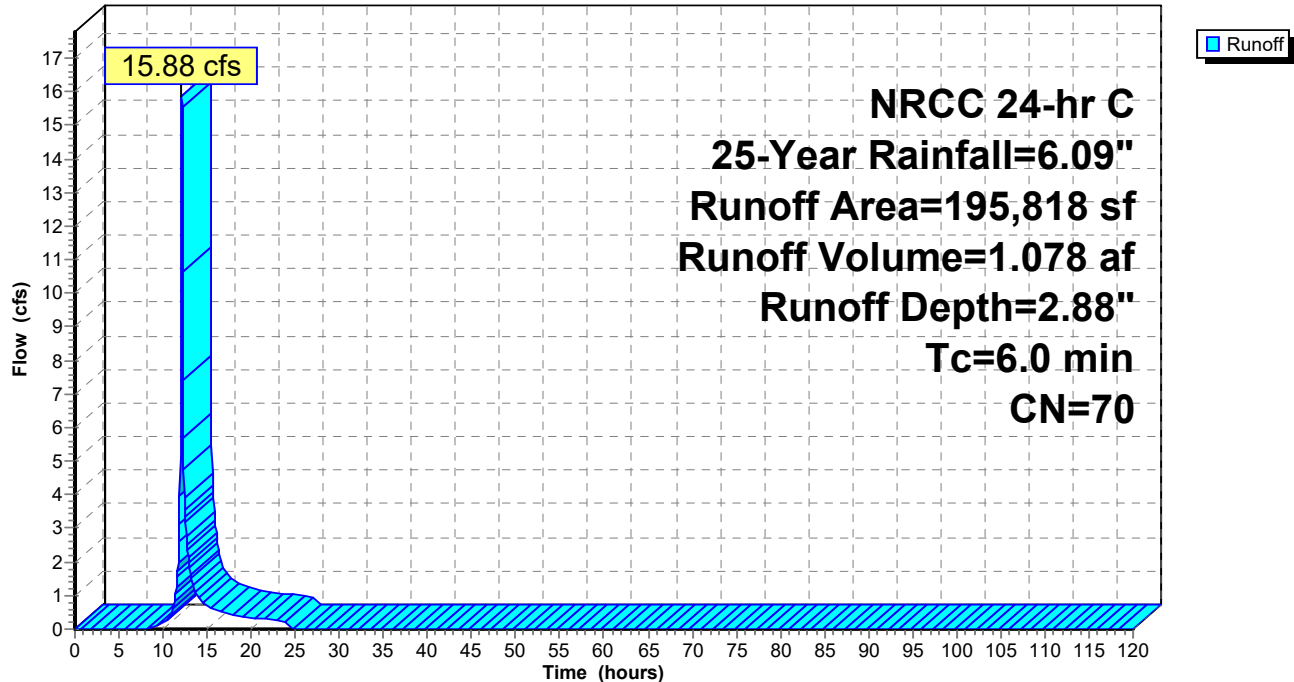
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	43,000	98	pavement parking
*	5,800	98	BUILD roof
*	10,200	98	basin
	94,318	39	>75% Grass cover, Good, HSG A
*	42,500	98	17 HOUSE UNITS
	195,818	70	Weighted Average
	94,318		48.17% Pervious Area
	101,500		51.83% Impervious Area

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

Subcatchment P-7A: P-7A

Hydrograph



Proposed Hydrology

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NRCC 24-hr C 25-Year Rainfall=6.09"

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Summary for Subcatchment P-7U: P-7U

Runoff = 16.19 cfs @ 12.37 hrs, Volume= 2.008 af, Depth= 1.73"

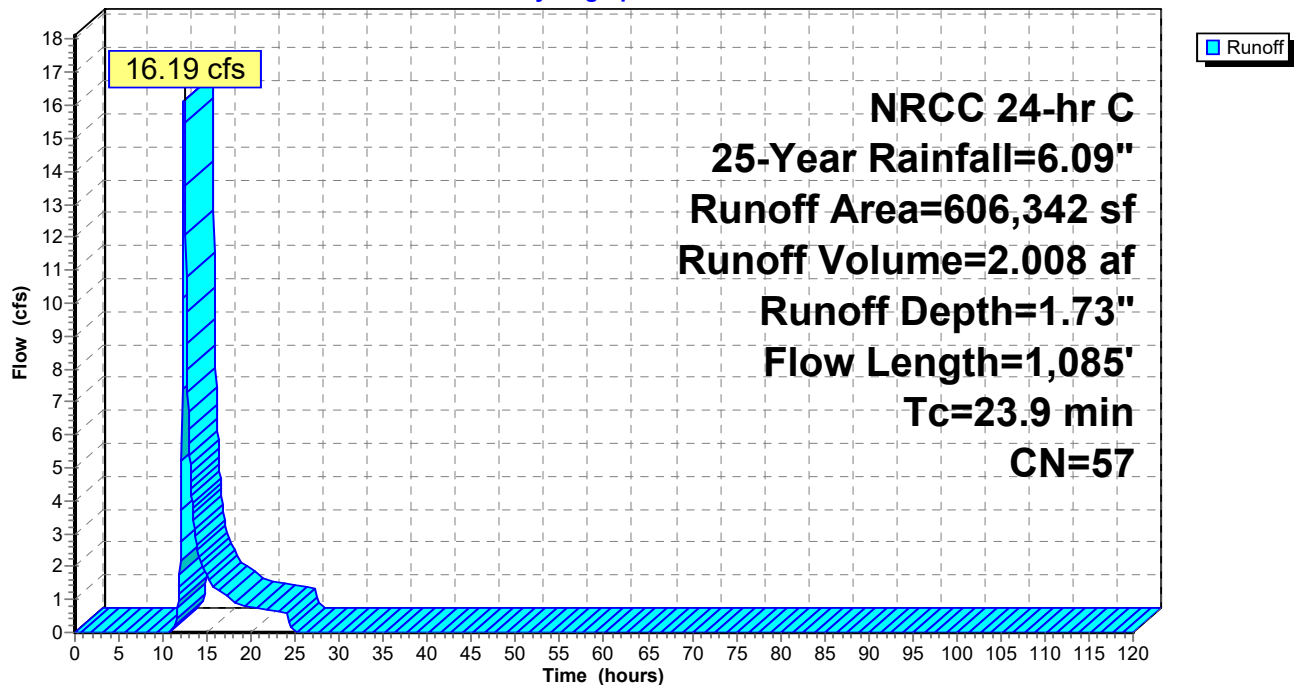
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
403,863	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
606,342	57	Weighted Average
573,604		94.60% Pervious Area
32,738		5.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment P-7U: P-7U

Hydrograph



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Summary for Subcatchment P-8U: P-8U

Runoff = 5.28 cfs @ 12.16 hrs, Volume= 0.394 af, Depth= 1.90"

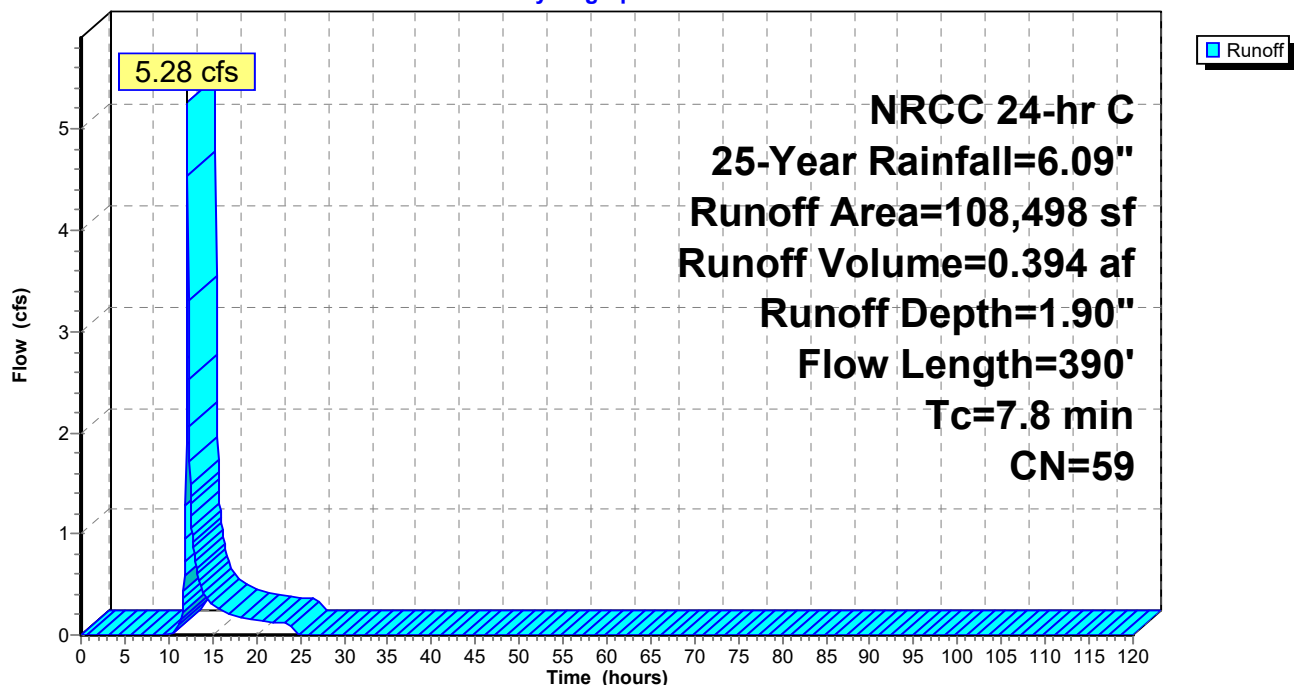
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
* 7,000	98	roof
5,726	98	Water Surface, 0% imp, HSG A
12,978	39	>75% Grass cover, Good, HSG A
43,794	61	>75% Grass cover, Good, HSG B
6,600	30	Woods, Good, HSG A
32,400	55	Woods, Good, HSG B
108,498	59	Weighted Average
101,498		93.55% Pervious Area
7,000		6.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment P-8U: P-8U

Hydrograph



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Summary for Subcatchment P-9A: P-9A

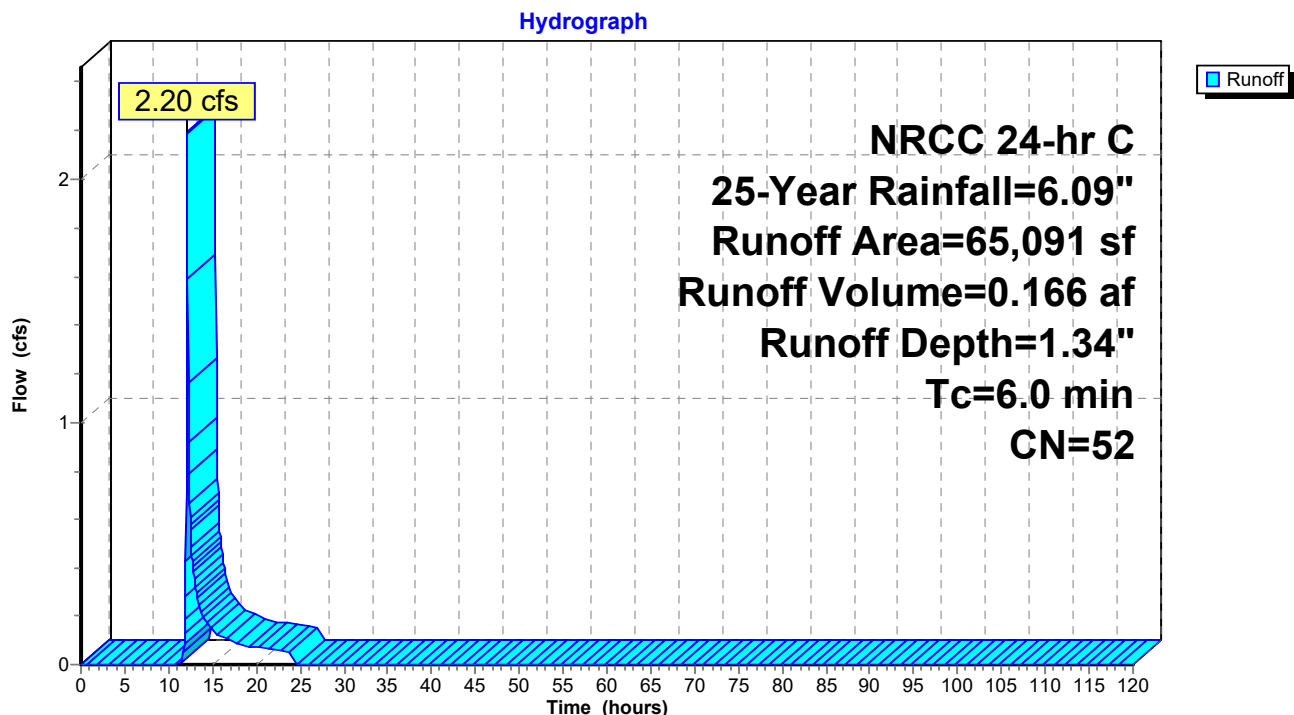
Runoff = 2.20 cfs @ 12.14 hrs, Volume= 0.166 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
	13,200	30	Woods, Good, HSG A
*	15,000	98	ROADS
*	1,700	98	BASIN
	35,191	39	>75% Grass cover, Good, HSG A
	65,091	52	Weighted Average
	48,391		74.34% Pervious Area
	16,700		25.66% Impervious Area

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

Subcatchment P-9A: P-9A



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Summary for Subcatchment P-9B: P-9B

Runoff = 5.56 cfs @ 12.14 hrs, Volume= 0.382 af, Depth= 2.24"

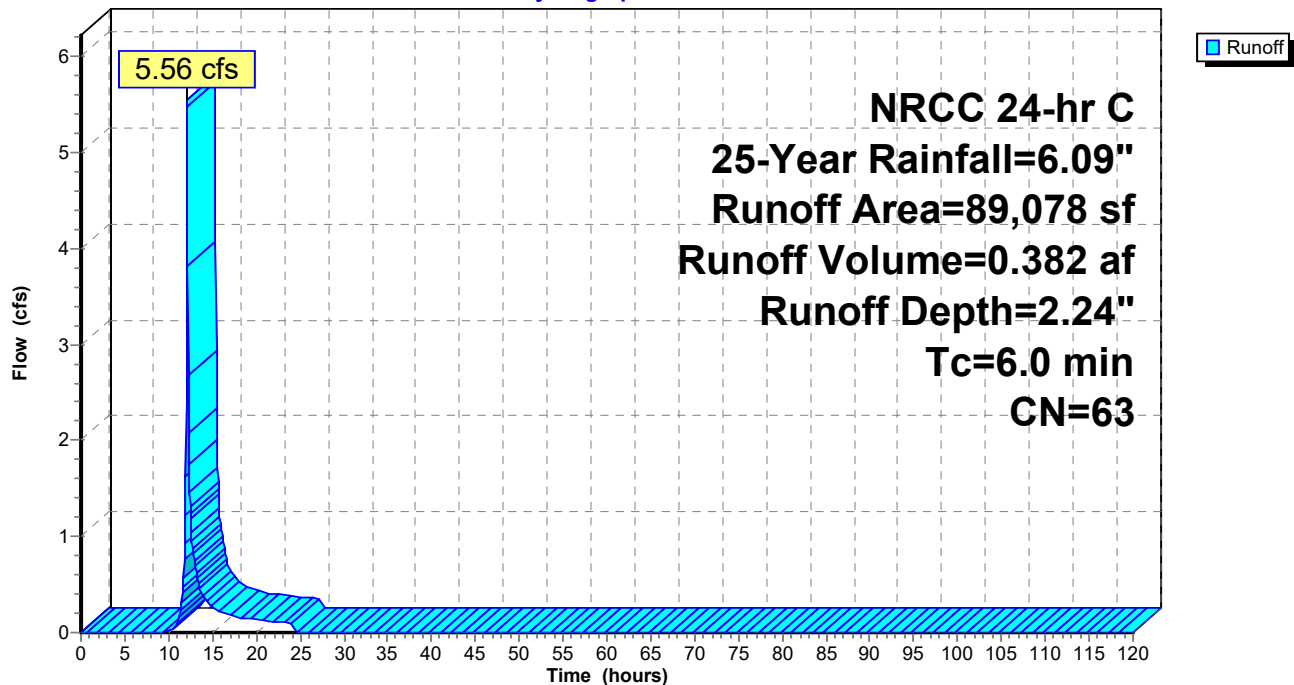
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	4,300	98	BASIN
	84,778	61	1/4 acre lots, 38% imp, HSG A
	89,078	63	Weighted Average
	52,562		59.01% Pervious Area
	36,516		40.99% Impervious Area

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

Subcatchment P-9B: P-9B

Hydrograph



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Summary for Subcatchment P-9C: P-9C

Runoff = 17.18 cfs @ 12.13 hrs, Volume= 1.178 af, Depth= 3.66"

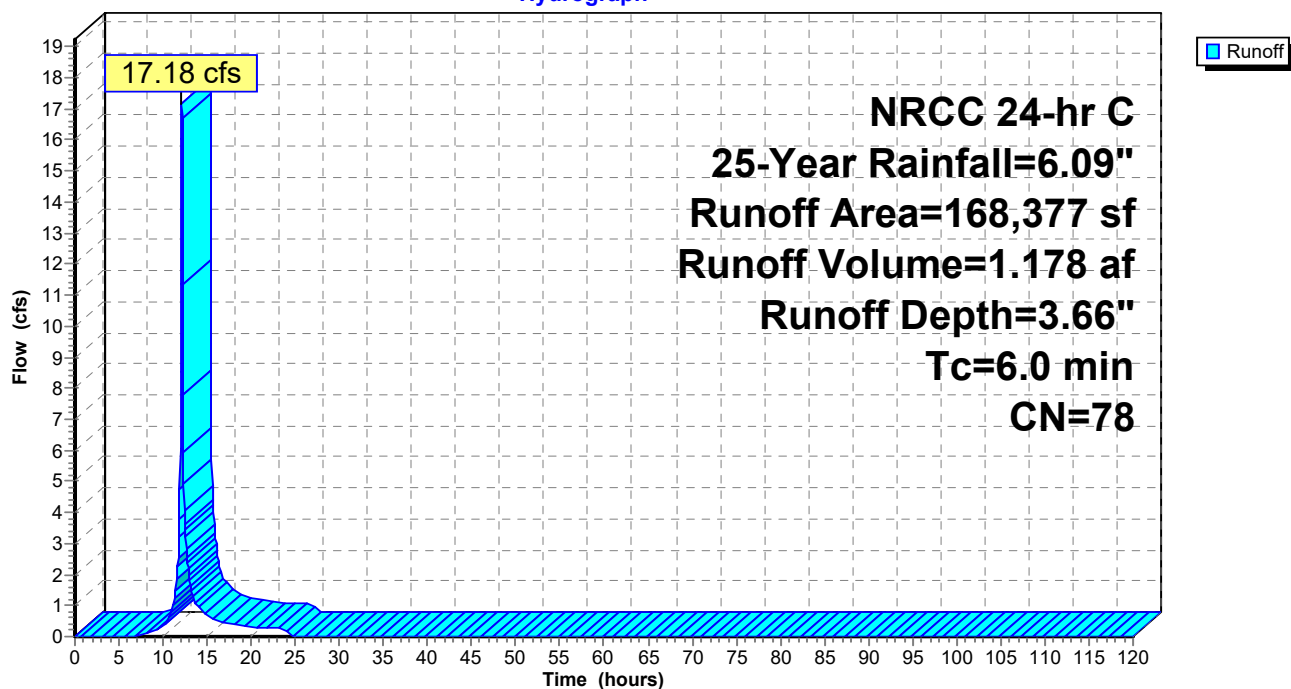
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
20,800	30	Woods, Good, HSG A
104,000	98	Paved parking, HSG A
34,077	39	>75% Grass cover, Good, HSG A
* 9,500	98	ROOF
168,377	78	Weighted Average
54,877		32.59% Pervious Area
113,500		67.41% Impervious Area

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

Subcatchment P-9C: P-9C

Hydrograph



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Summary for Subcatchment P-9U: P-9U

Runoff = 1.11 cfs @ 12.16 hrs, Volume= 0.125 af, Depth= 0.71"

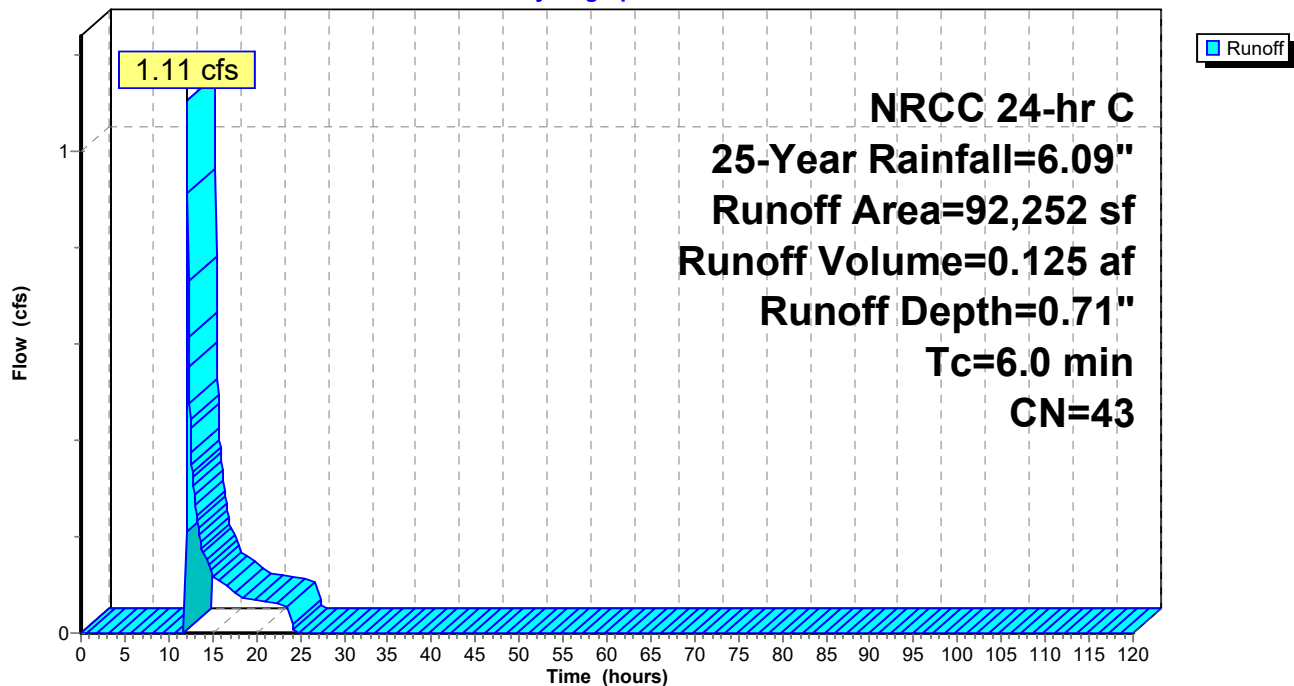
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

Area (sf)	CN	Description
36,000	30	Woods, Good, HSG A
12,000	98	Paved parking, HSG A
44,252	39	>75% Grass cover, Good, HSG A
92,252	43	Weighted Average
80,252		86.99% Pervious Area
12,000		13.01% Impervious Area

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

Subcatchment P-9U: P-9U

Hydrograph



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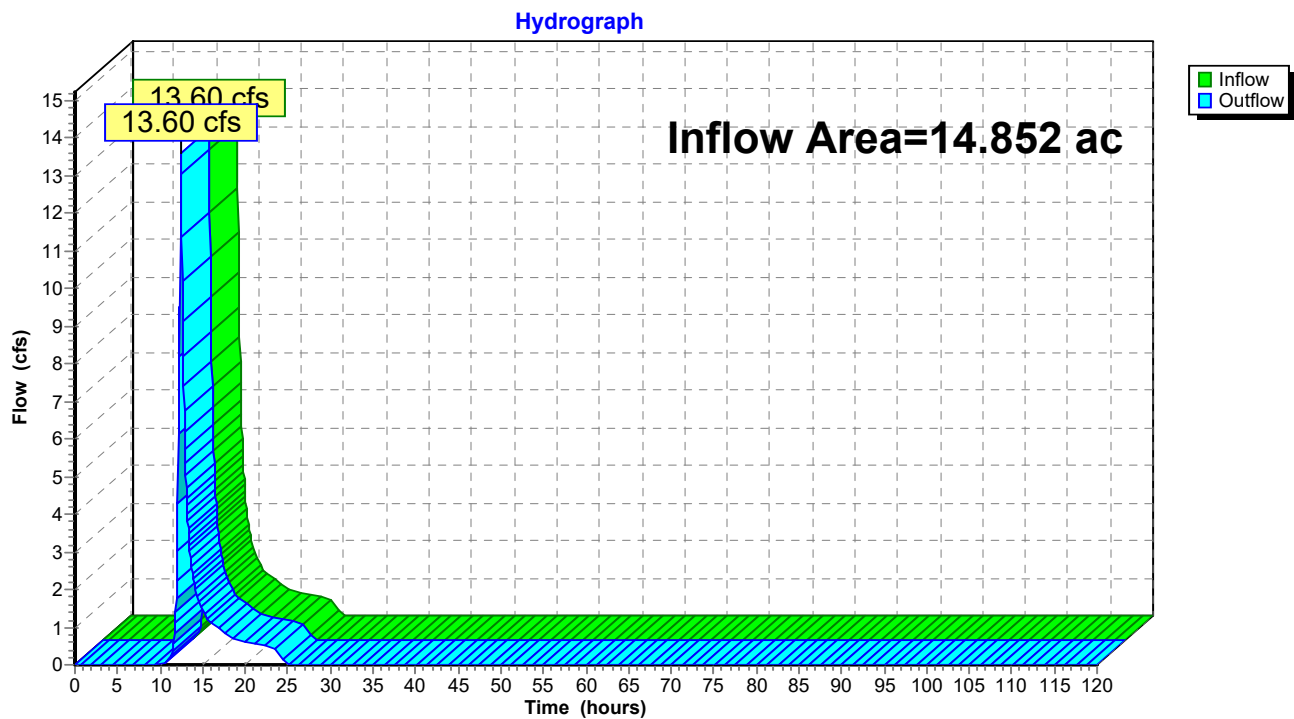
Summary for Reach DP-1: Wetland Series R

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.852 ac, 17.22% Impervious, Inflow Depth = 1.39" for 25-Year event
Inflow = 13.60 cfs @ 12.43 hrs, Volume= 1.719 af
Outflow = 13.60 cfs @ 12.43 hrs, Volume= 1.719 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R



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Summary for Reach DP-10: West Elm Street

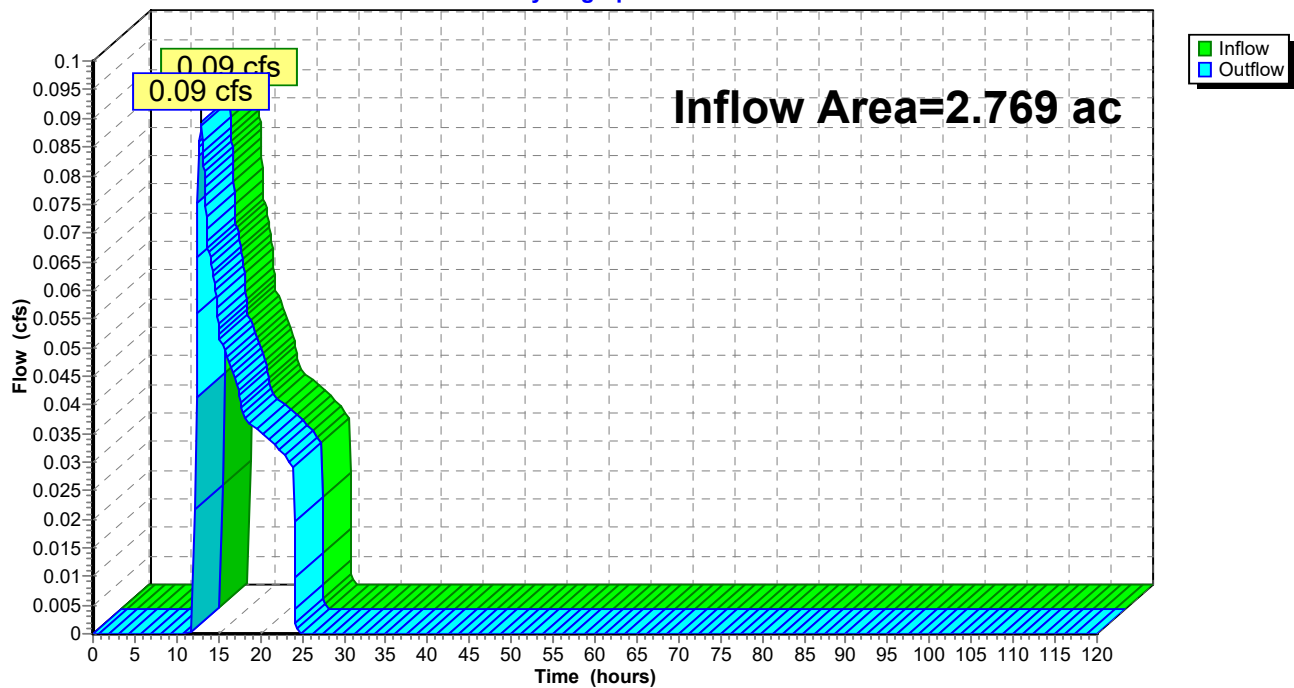
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.769 ac, 6.21% Impervious, Inflow Depth = 0.19" for 25-Year event
Inflow = 0.09 cfs @ 12.93 hrs, Volume= 0.044 af
Outflow = 0.09 cfs @ 12.93 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street

Hydrograph



Proposed Hydrology

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Summary for Reach DP-11: Wetland Series A

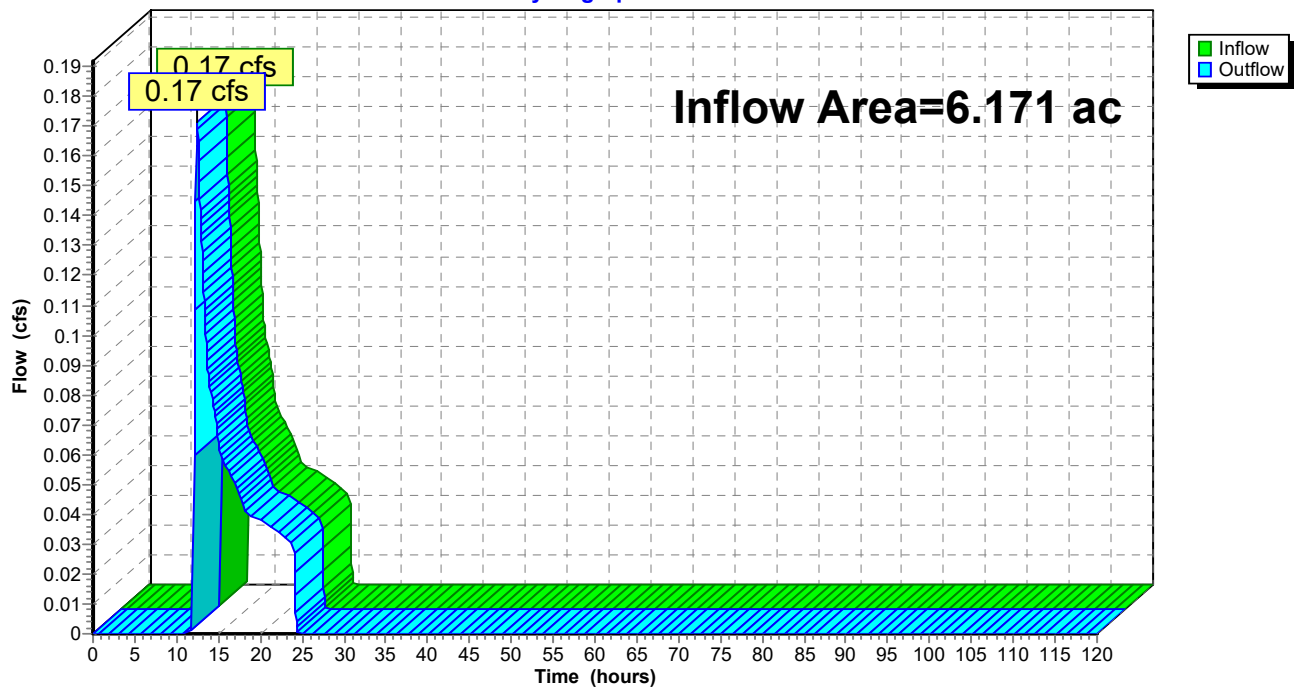
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.171 ac, 9.19% Impervious, Inflow Depth = 0.11" for 25-Year event
Inflow = 0.17 cfs @ 12.42 hrs, Volume= 0.056 af
Outflow = 0.17 cfs @ 12.42 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A

Hydrograph



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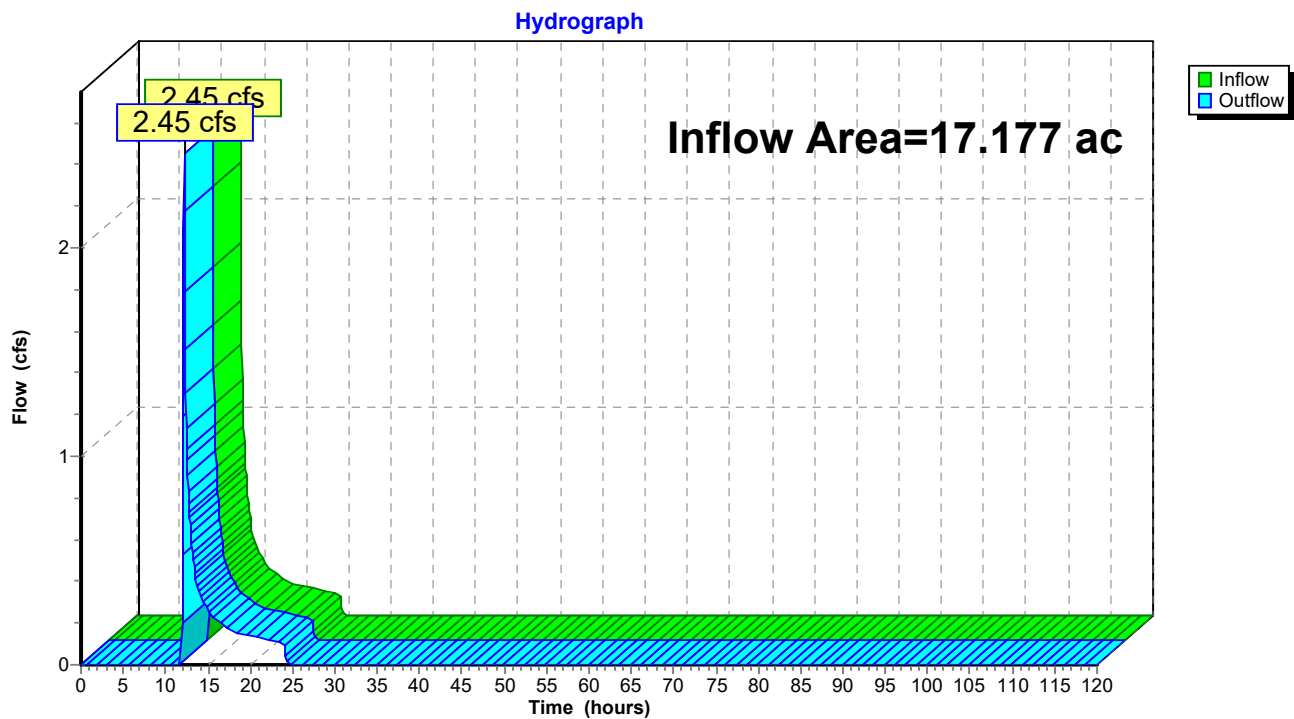
Summary for Reach DP-12: Wetland Series A

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17.177 ac, 20.55% Impervious, Inflow Depth = 0.19" for 25-Year event
Inflow = 2.45 cfs @ 12.20 hrs, Volume= 0.270 af
Outflow = 2.45 cfs @ 12.20 hrs, Volume= 0.270 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A



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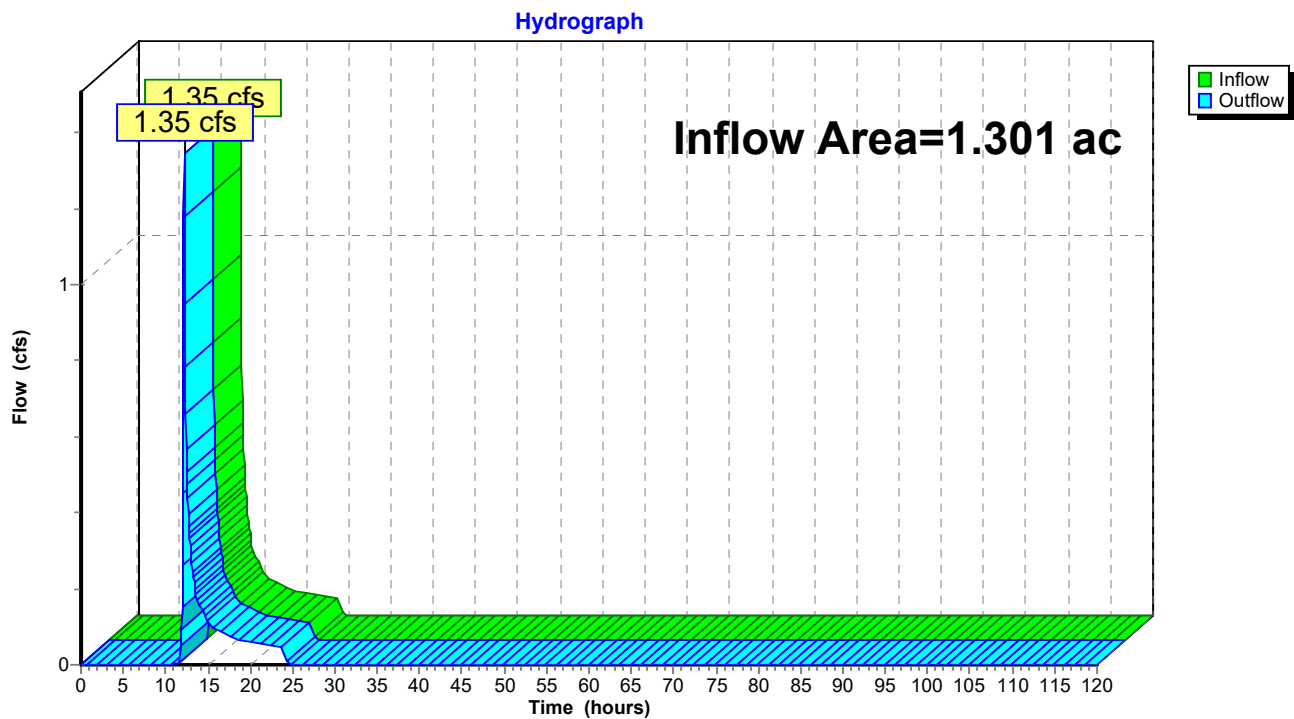
Summary for Reach DP-13: Wetland Series B

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 1.19" for 25-Year event
Inflow = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af
Outflow = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B



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Summary for Reach DP-14: Wetland Series C,D,E,,K,J

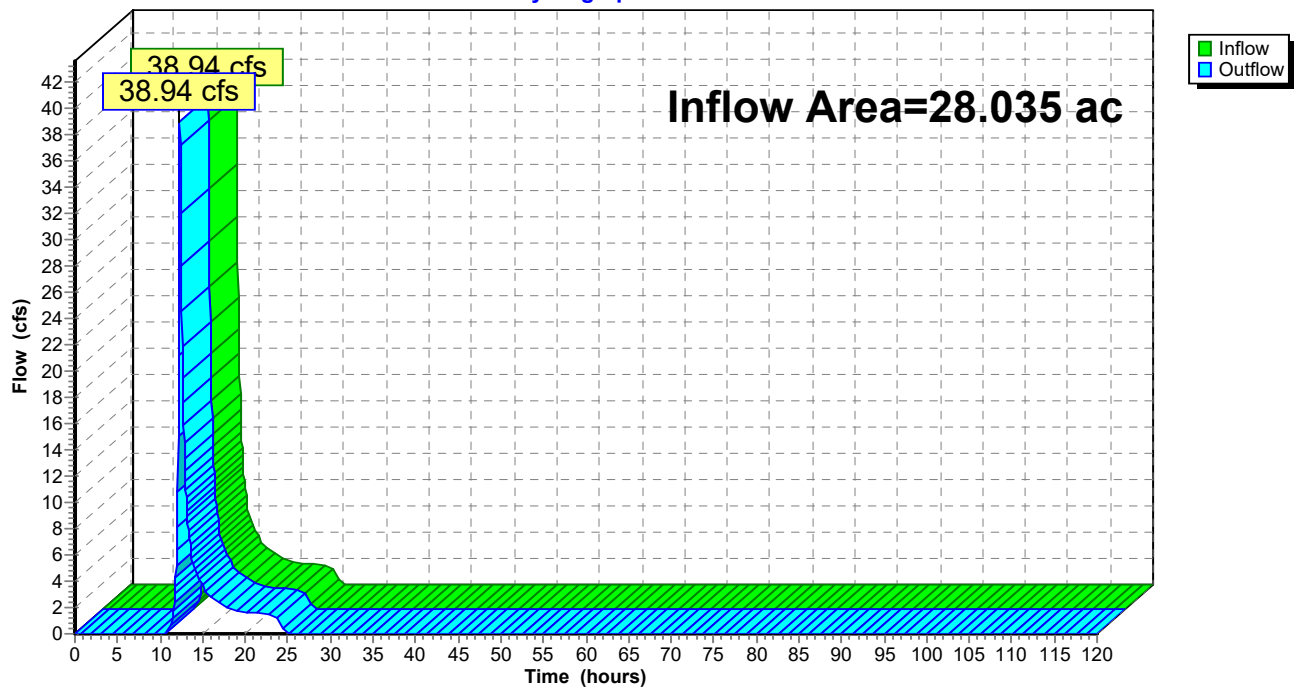
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.035 ac, 0.00% Impervious, Inflow Depth = 1.90" for 25-Year event
Inflow = 38.94 cfs @ 12.32 hrs, Volume= 4.430 af
Outflow = 38.94 cfs @ 12.32 hrs, Volume= 4.430 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J

Hydrograph



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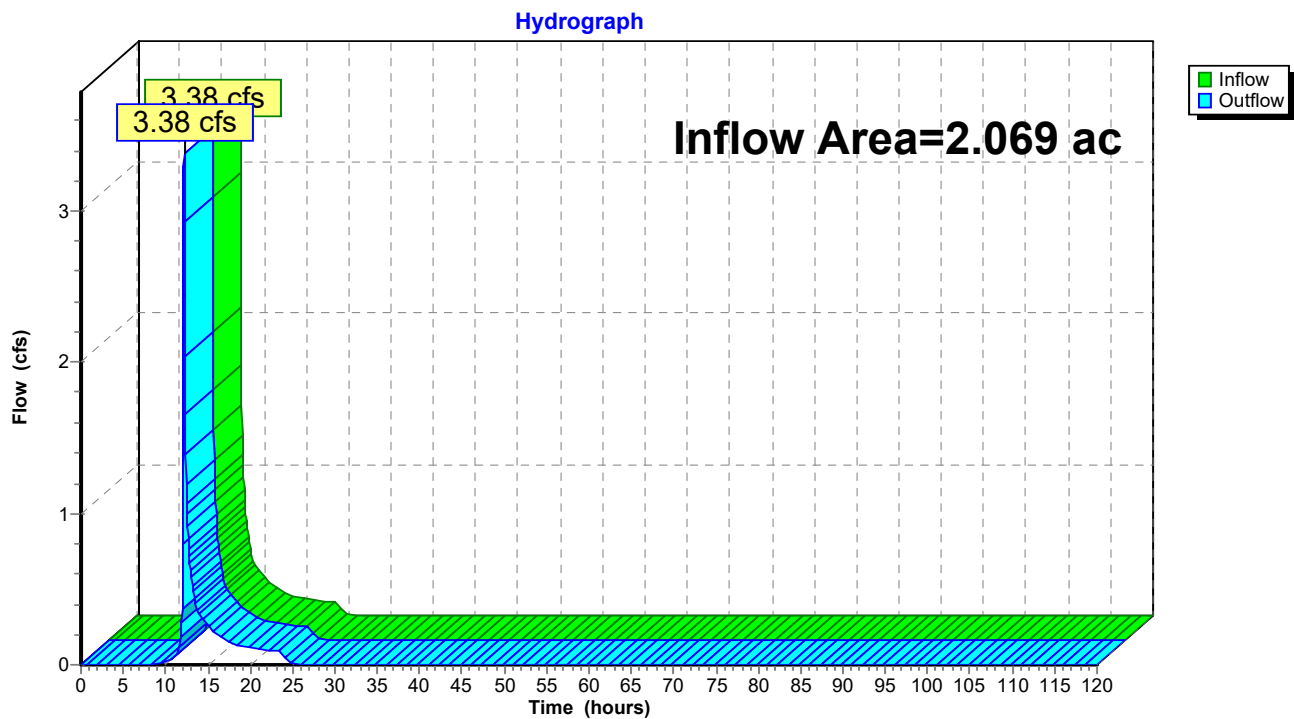
Summary for Reach DP-15: Wetland Series H

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.069 ac, 6.77% Impervious, Inflow Depth = 1.68" for 25-Year event
Inflow = 3.38 cfs @ 12.17 hrs, Volume= 0.290 af
Outflow = 3.38 cfs @ 12.17 hrs, Volume= 0.290 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H



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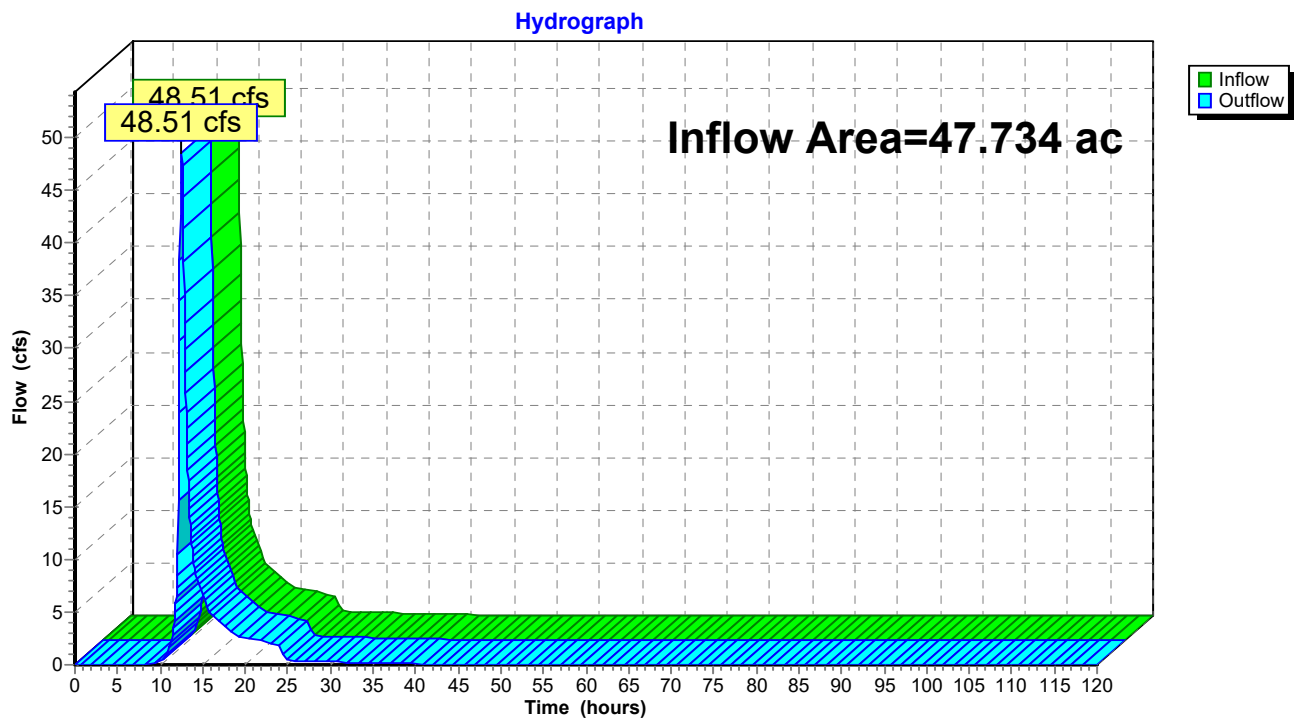
Summary for Reach DP-2: Wetland Series I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.734 ac, 17.87% Impervious, Inflow Depth = 1.97" for 25-Year event
Inflow = 48.51 cfs @ 12.51 hrs, Volume= 7.844 af
Outflow = 48.51 cfs @ 12.51 hrs, Volume= 7.844 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I



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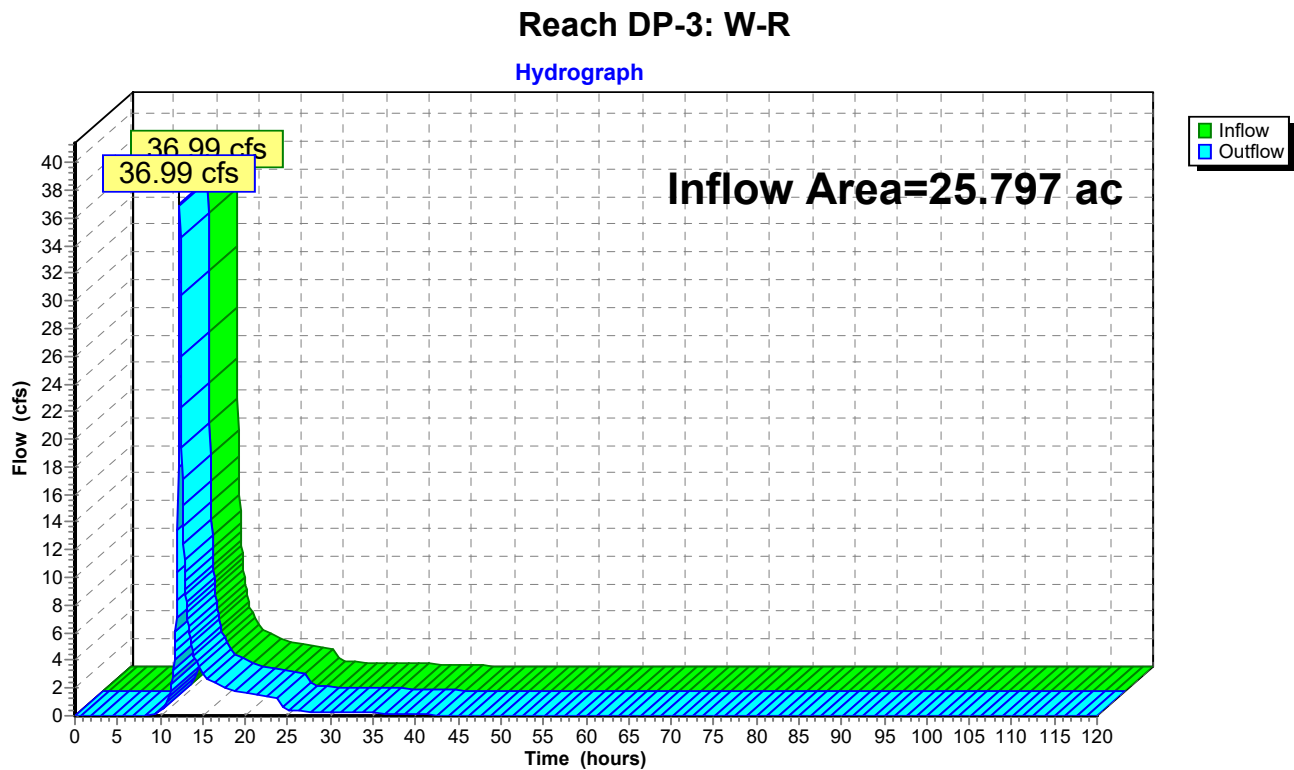
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Summary for Reach DP-3: W-R

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 2.12" for 25-Year event
Inflow = 36.99 cfs @ 12.29 hrs, Volume= 4.554 af
Outflow = 36.99 cfs @ 12.29 hrs, Volume= 4.554 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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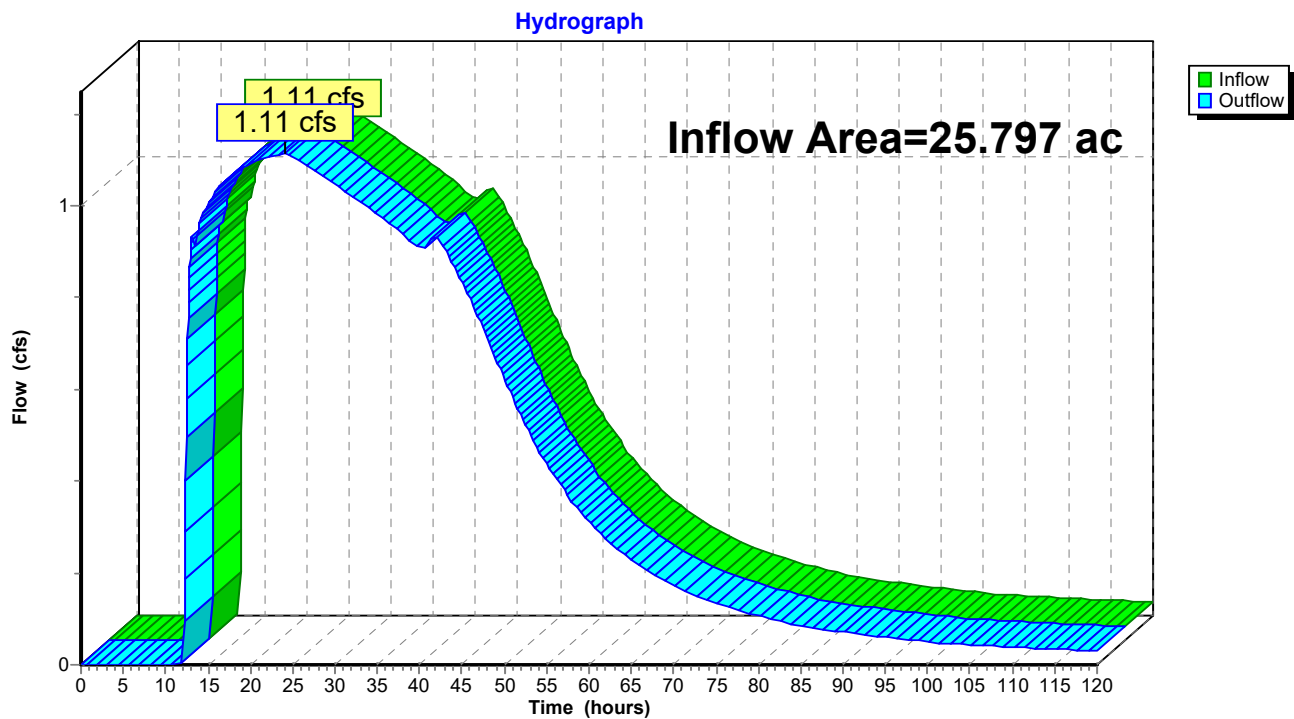
Summary for Reach DP-3 OUT: 8" Copper Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth > 1.80" for 25-Year event
Inflow = 1.11 cfs @ 24.17 hrs, Volume= 3.877 af
Outflow = 1.11 cfs @ 24.17 hrs, Volume= 3.877 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe



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Summary for Reach DP-4: Dwelley Street

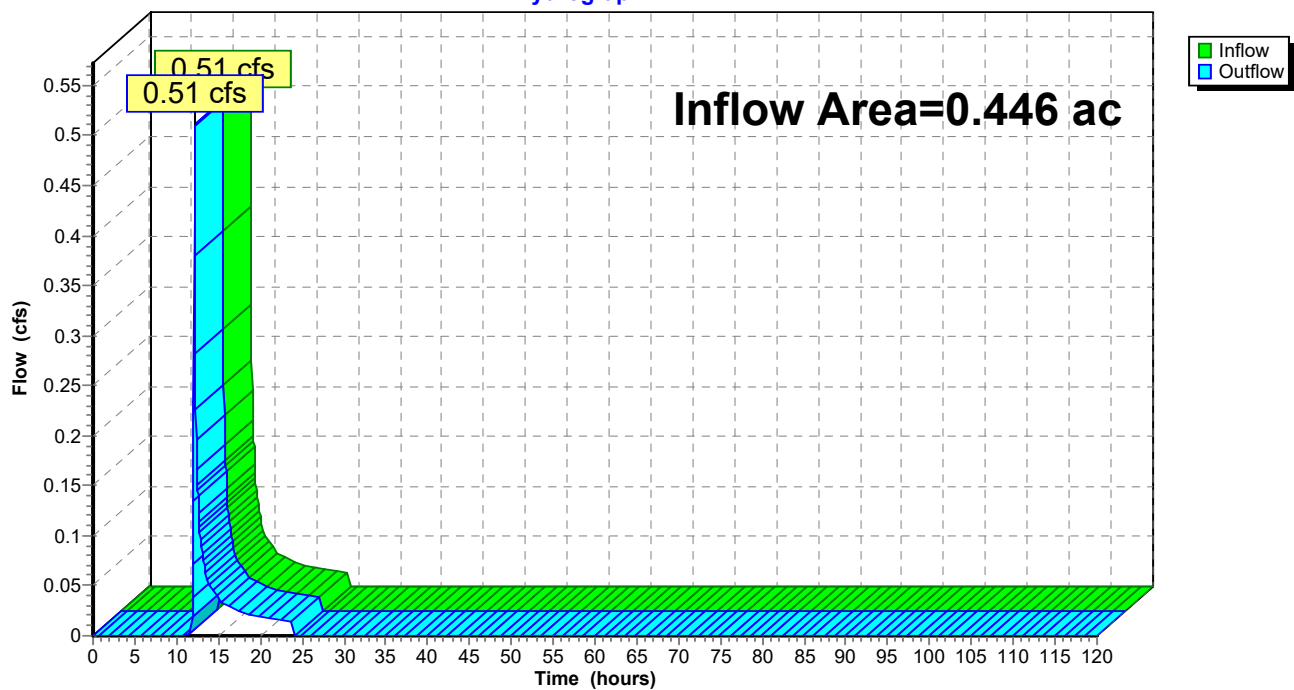
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.446 ac, 20.48% Impervious, Inflow Depth = 1.11" for 25-Year event
Inflow = 0.51 cfs @ 12.15 hrs, Volume= 0.041 af
Outflow = 0.51 cfs @ 12.15 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street

Hydrograph



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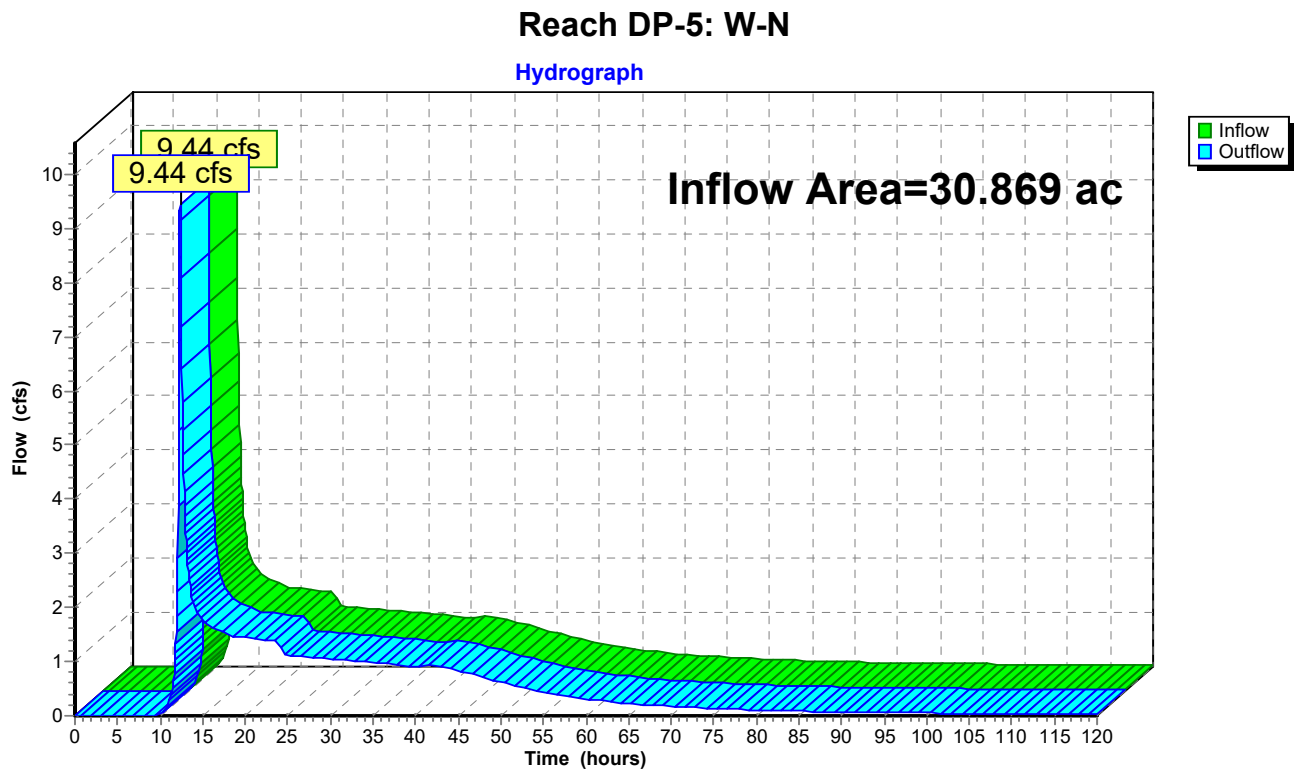
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Summary for Reach DP-5: W-N

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 1.90" for 25-Year event
Inflow = 9.44 cfs @ 12.33 hrs, Volume= 4.899 af
Outflow = 9.44 cfs @ 12.33 hrs, Volume= 4.899 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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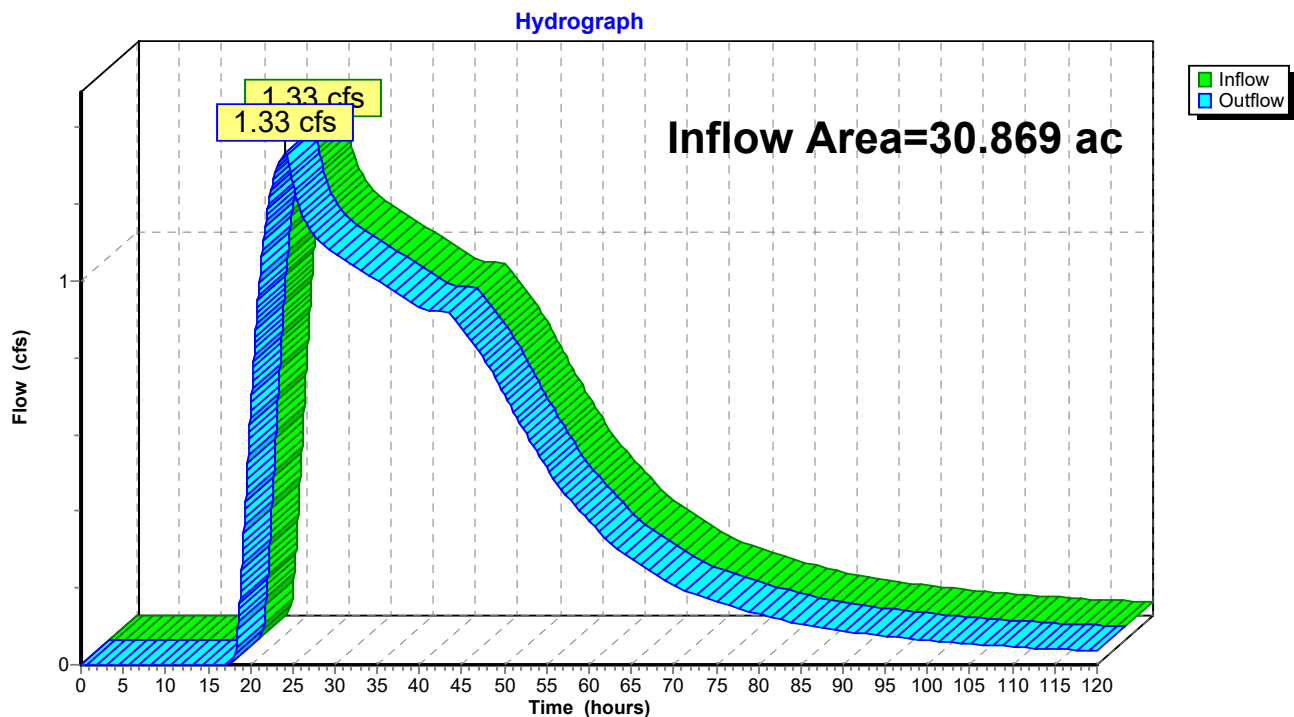
Summary for Reach DP-5 OUT: 24" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 1.38" for 25-Year event
Inflow = 1.33 cfs @ 24.18 hrs, Volume= 3.557 af
Outflow = 1.33 cfs @ 24.18 hrs, Volume= 3.557 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE



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Summary for Reach DP-6: W-QP

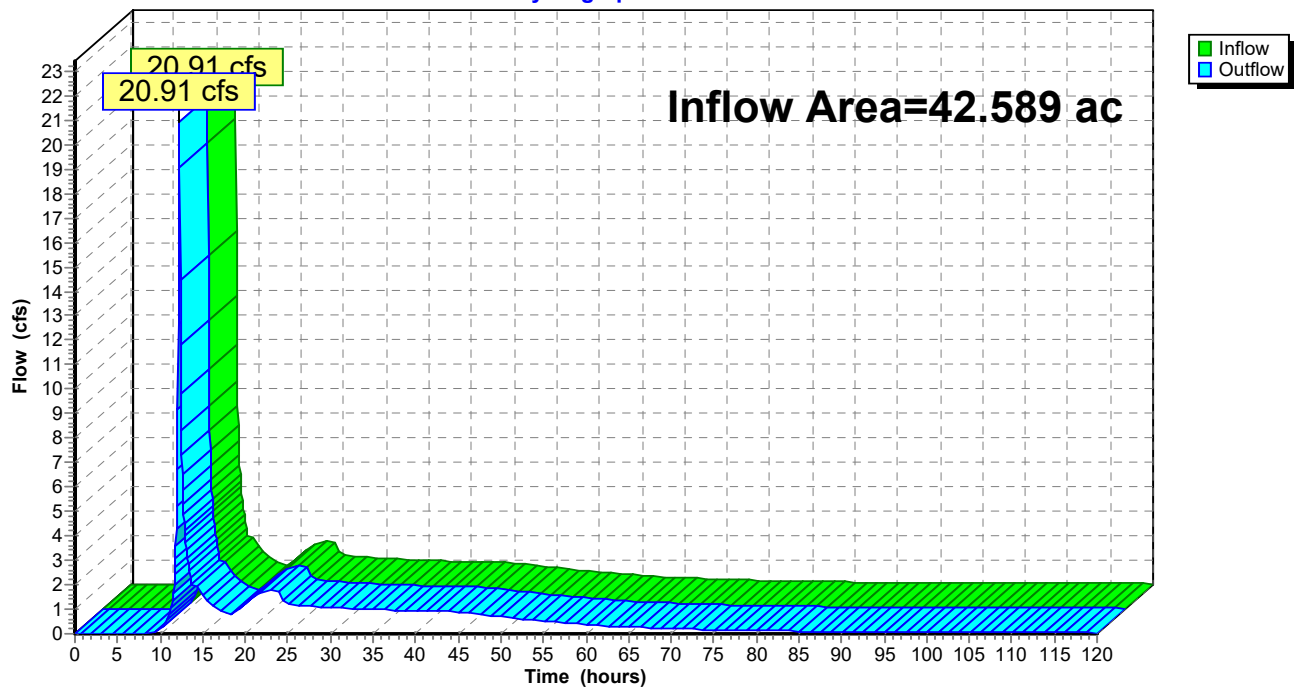
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth > 1.55" for 25-Year event
Inflow = 20.91 cfs @ 12.22 hrs, Volume= 5.509 af
Outflow = 20.91 cfs @ 12.22 hrs, Volume= 5.509 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



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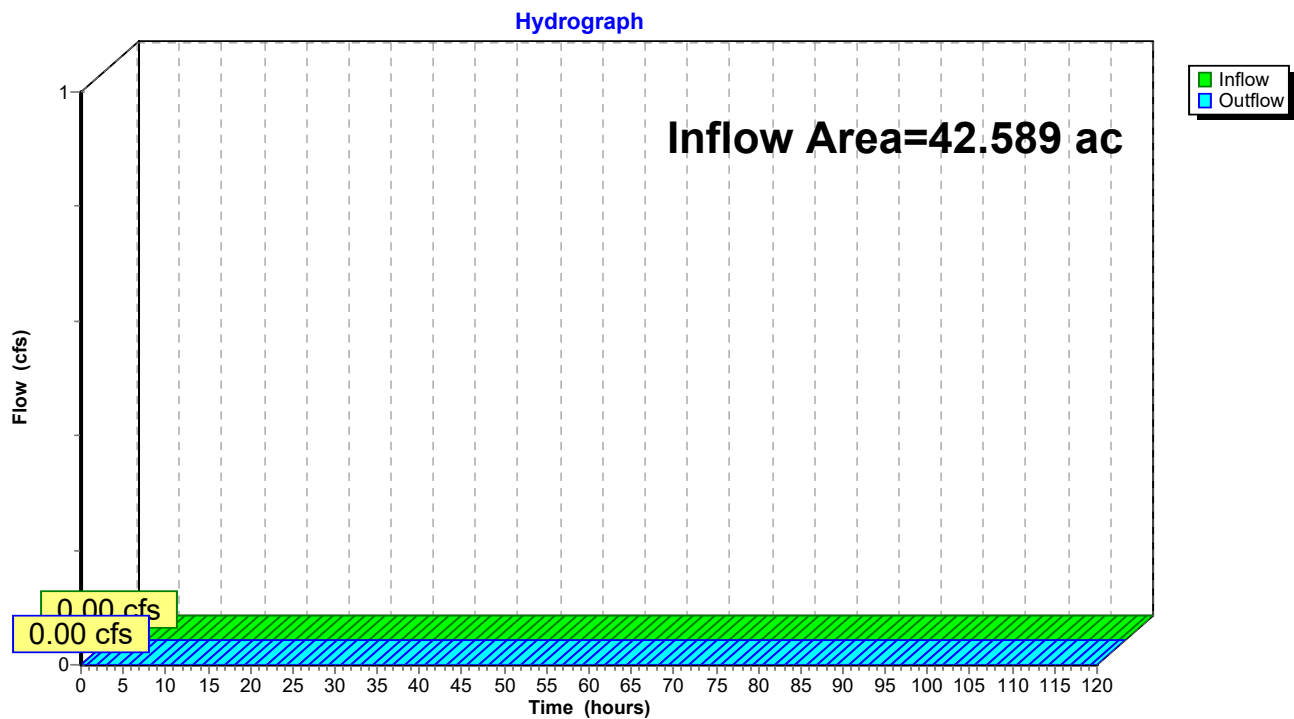
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth = 0.00" for 25-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



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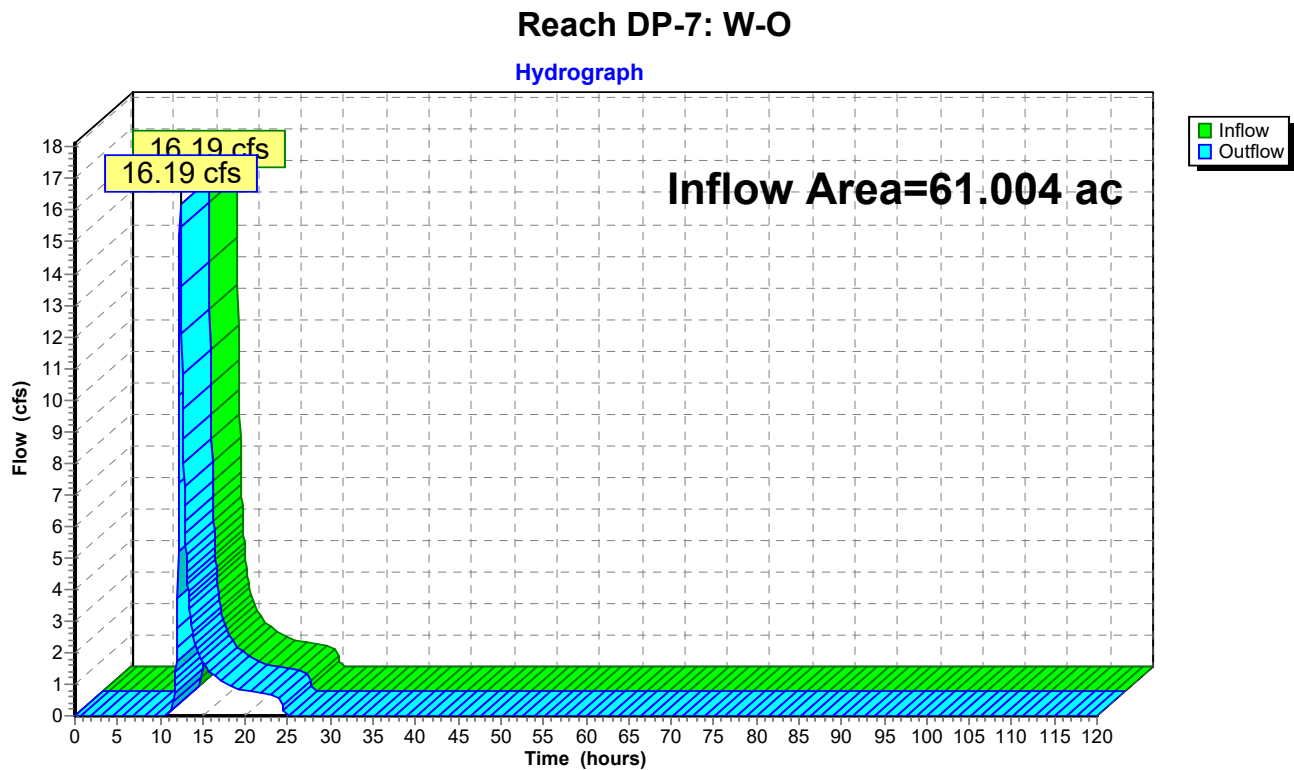
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Summary for Reach DP-7: W-O

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.39" for 25-Year event
Inflow = 16.19 cfs @ 12.37 hrs, Volume= 2.008 af
Outflow = 16.19 cfs @ 12.37 hrs, Volume= 2.008 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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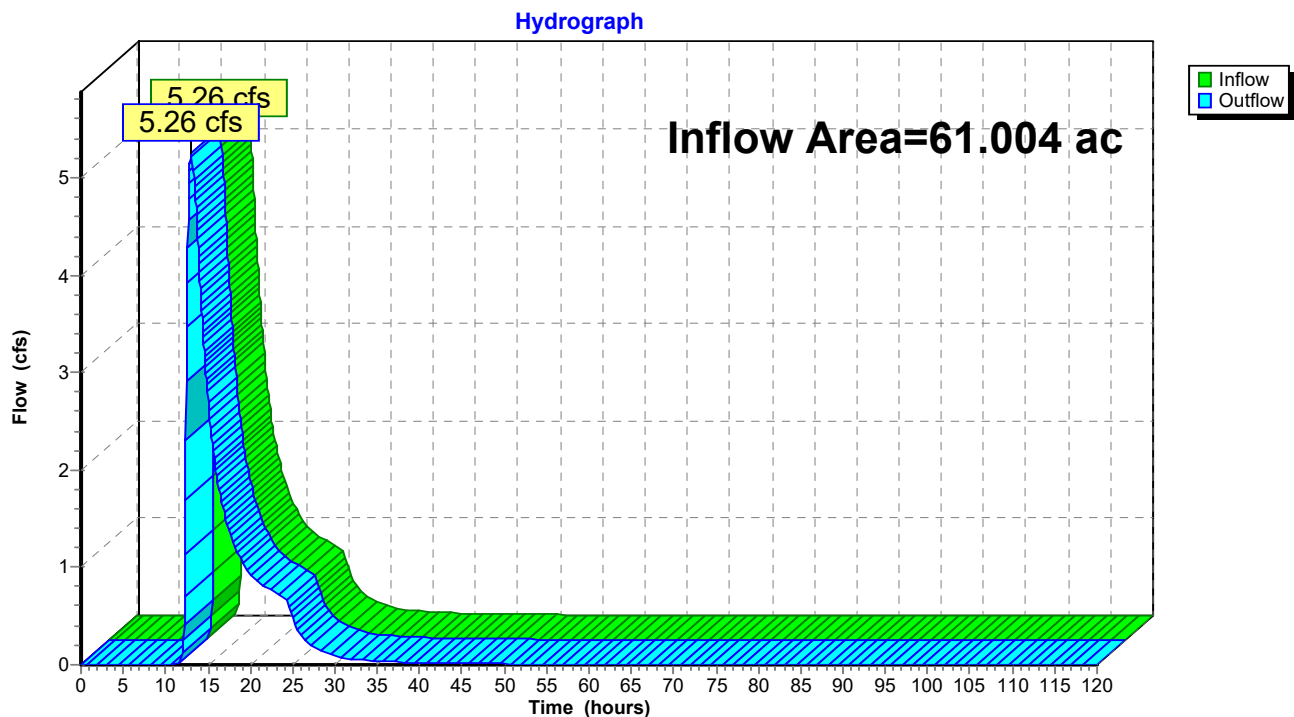
Summary for Reach DP-7 OUT: 12" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.39" for 25-Year event
Inflow = 5.26 cfs @ 13.02 hrs, Volume= 2.007 af
Outflow = 5.26 cfs @ 13.02 hrs, Volume= 2.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 12" RCP PIPE



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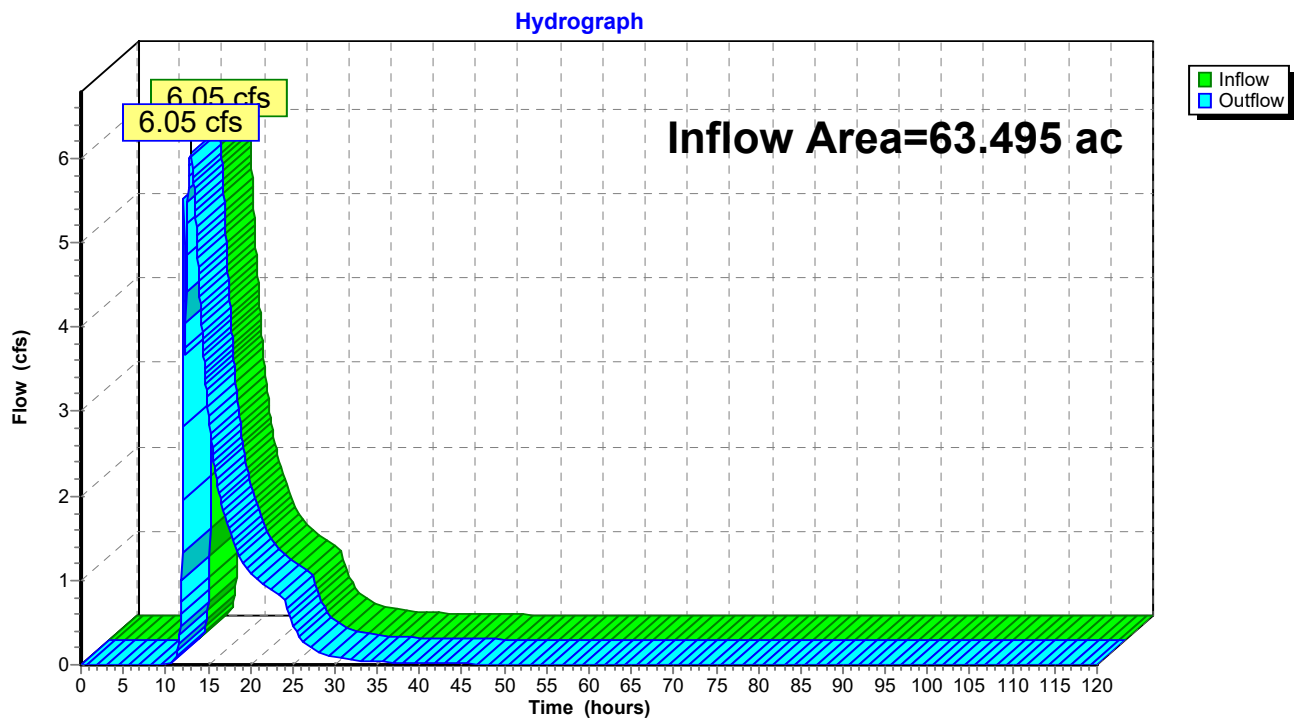
Summary for Reach DP-8: Wetlands Series X

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 63.495 ac, 20.77% Impervious, Inflow Depth = 0.45" for 25-Year event
Inflow = 6.05 cfs @ 12.92 hrs, Volume= 2.400 af
Outflow = 6.05 cfs @ 12.92 hrs, Volume= 2.400 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X



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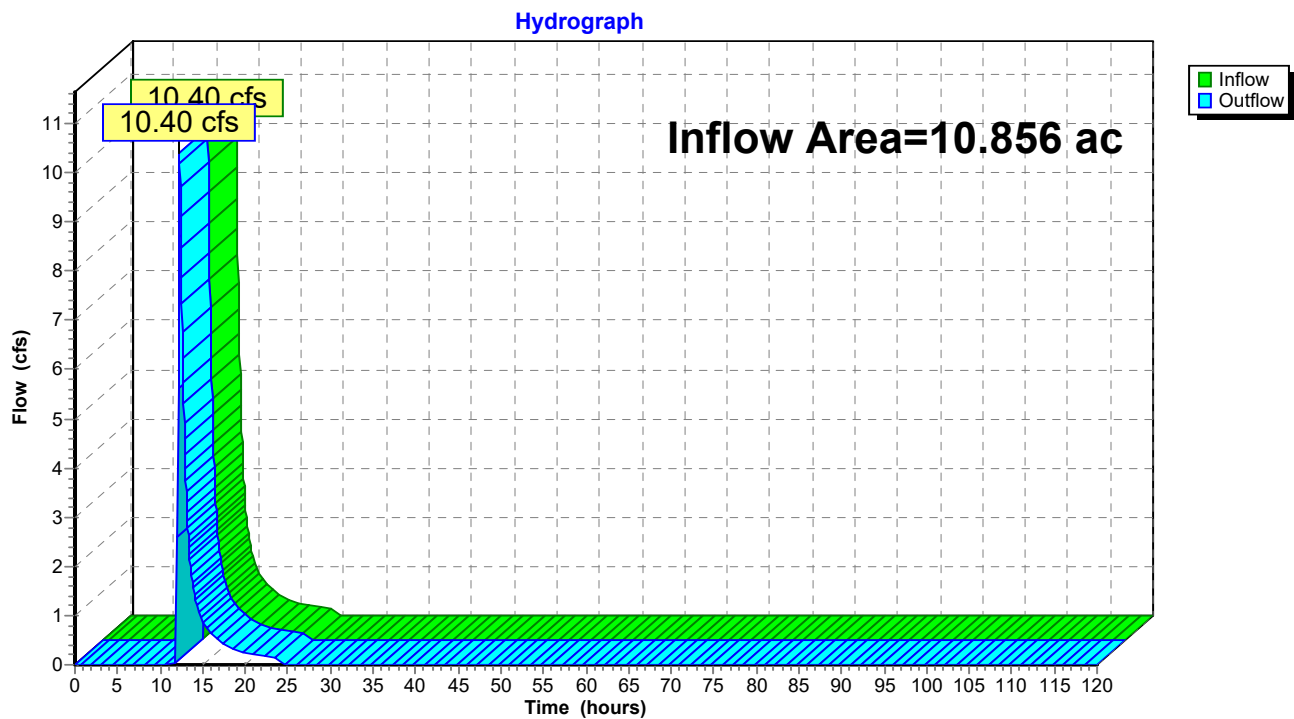
Summary for Reach DP-9: West Elm Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.856 ac, 42.73% Impervious, Inflow Depth = 1.20" for 25-Year event
Inflow = 10.40 cfs @ 12.25 hrs, Volume= 1.088 af
Outflow = 10.40 cfs @ 12.25 hrs, Volume= 1.088 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street



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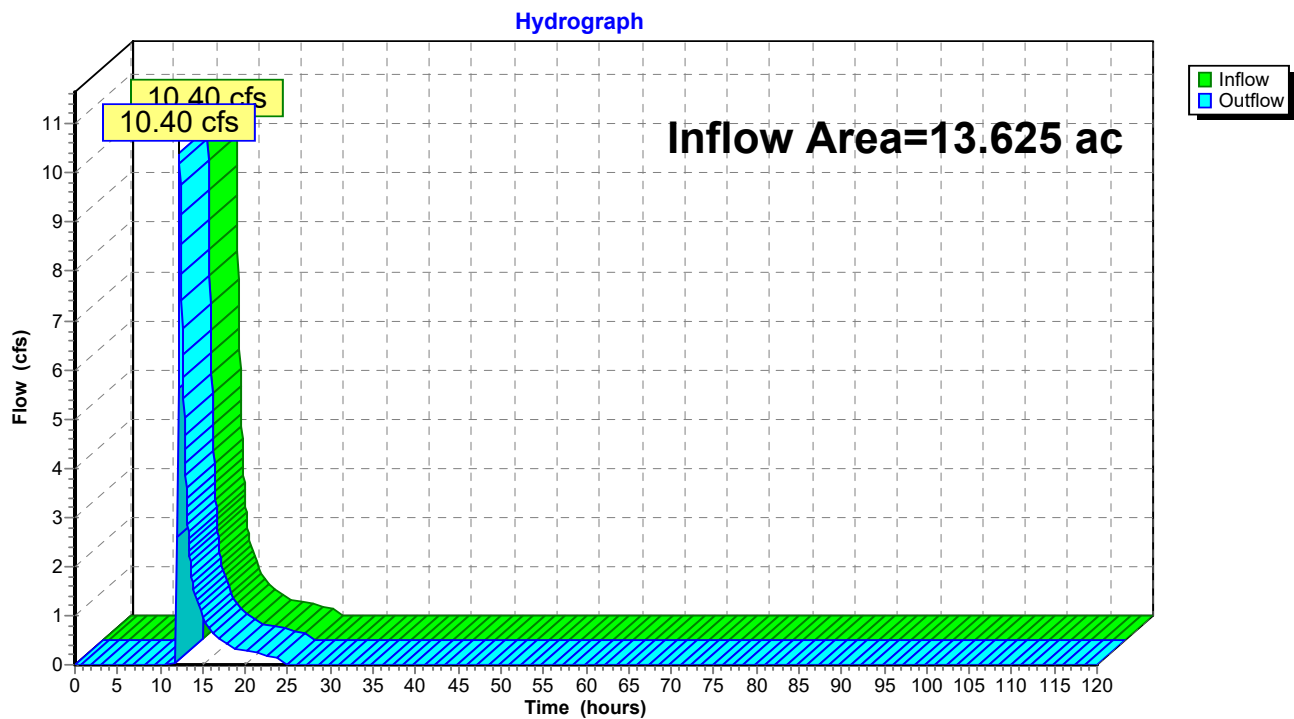
Summary for Reach DP-ELM: West Elm Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.625 ac, 35.31% Impervious, Inflow Depth = 1.00" for 25-Year event
Inflow = 10.40 cfs @ 12.25 hrs, Volume= 1.133 af
Outflow = 10.40 cfs @ 12.25 hrs, Volume= 1.133 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street



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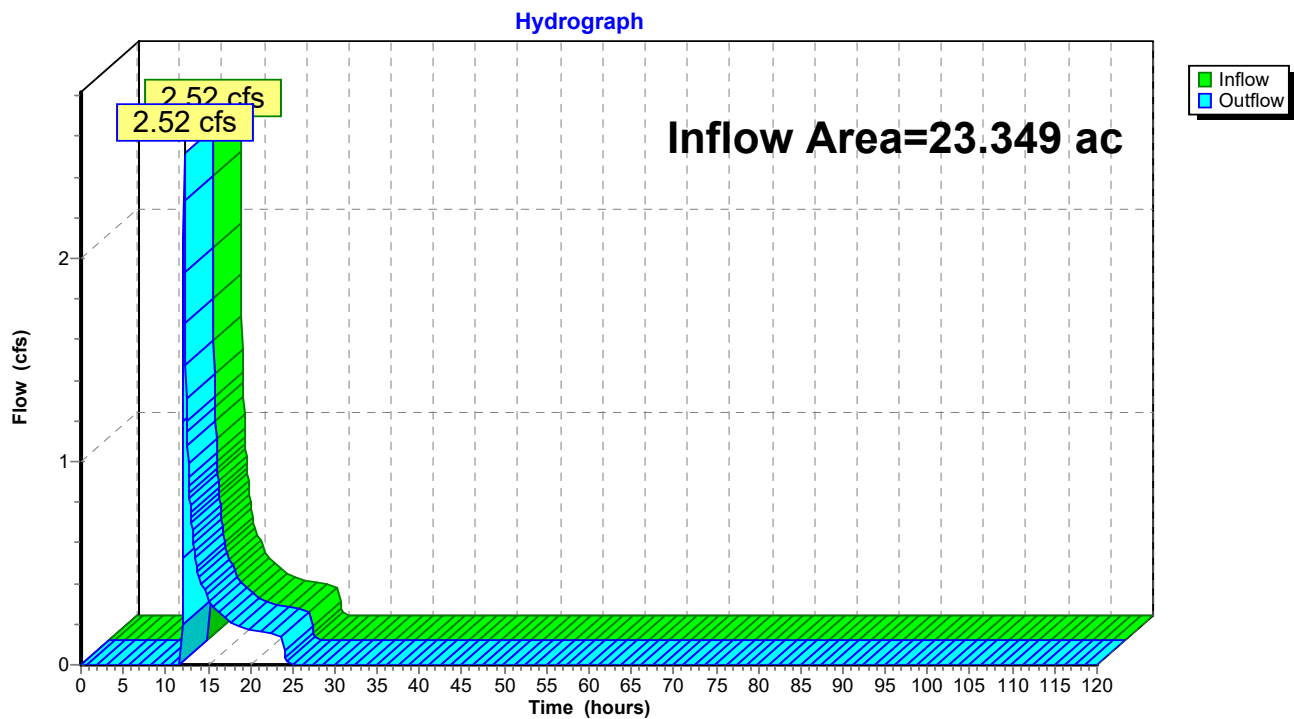
Summary for Reach DP-WA: Wetland Series A

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 23.349 ac, 17.54% Impervious, Inflow Depth = 0.17" for 25-Year event
Inflow = 2.52 cfs @ 12.21 hrs, Volume= 0.326 af
Outflow = 2.52 cfs @ 12.21 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A



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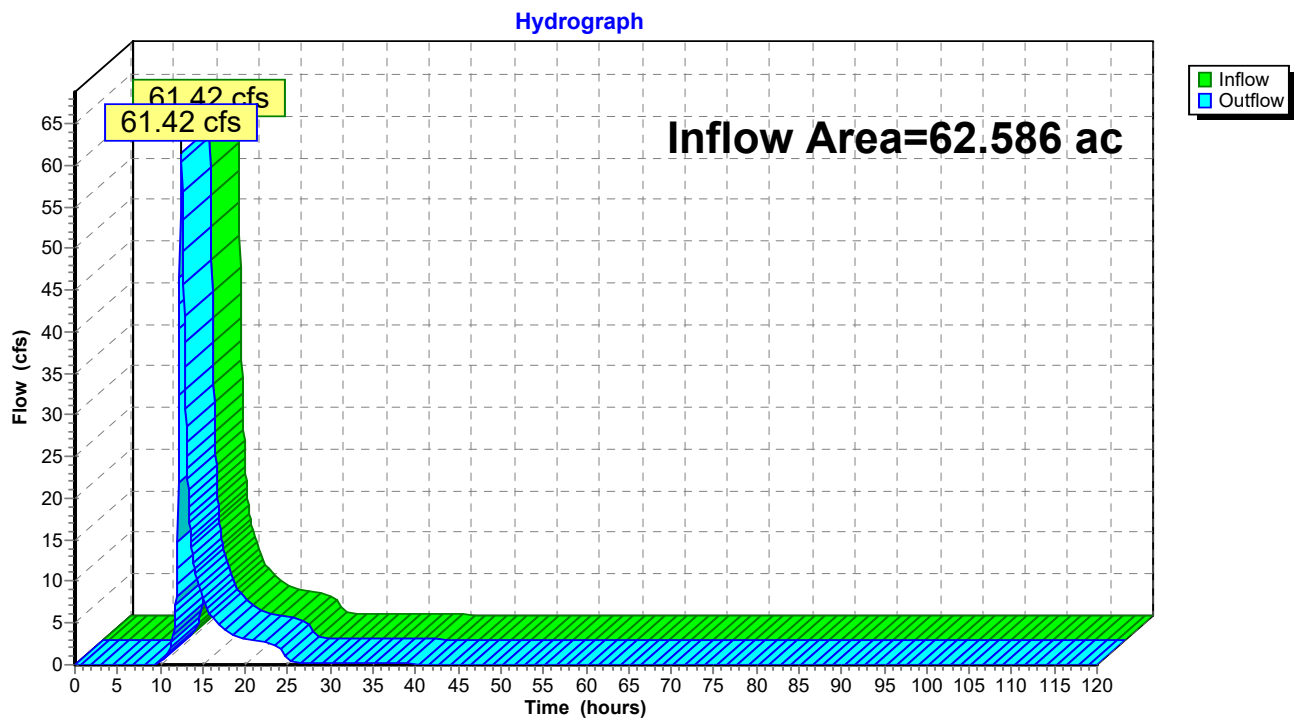
Summary for Reach DP-WI: Wetland Series/Stream I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62.586 ac, 17.71% Impervious, Inflow Depth = 1.83" for 25-Year event
Inflow = 61.42 cfs @ 12.47 hrs, Volume= 9.563 af
Outflow = 61.42 cfs @ 12.47 hrs, Volume= 9.563 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I



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Summary for Pond BAS 1-A: BAS 1-A

Inflow Area = 3.871 ac, 43.69% Impervious, Inflow Depth = 3.56" for 25-Year event
Inflow = 16.78 cfs @ 12.13 hrs, Volume= 1.148 af
Outflow = 1.44 cfs @ 13.27 hrs, Volume= 1.148 af, Atten= 91%, Lag= 68.6 min
Discarded = 1.40 cfs @ 13.27 hrs, Volume= 1.147 af
Primary = 0.04 cfs @ 13.27 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.76' @ 13.27 hrs Surf.Area= 7,171 sf Storage= 21,573 cf

Plug-Flow detention time= 172.3 min calculated for 1.147 af (100% of inflow)
Center-of-Mass det. time= 172.2 min (1,002.2 - 830.0)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	31,322 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	2,480	0	0	2,480
79.00	3,150	2,808	2,808	3,176
80.00	3,880	3,509	6,317	3,935
80.95	4,660	4,051	10,368	4,746
81.00	5,284	248	10,616	5,370
82.00	6,379	5,823	16,439	6,498
83.00	7,434	6,900	23,339	7,593
84.00	8,545	7,983	31,322	8,748

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	8.270 in/hr Exfiltration over Wetted area
#2	Primary	82.75'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.40 cfs @ 13.27 hrs HW=82.76' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 1.40 cfs)

Primary OutFlow Max=0.02 cfs @ 13.27 hrs HW=82.76' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.24 fps)

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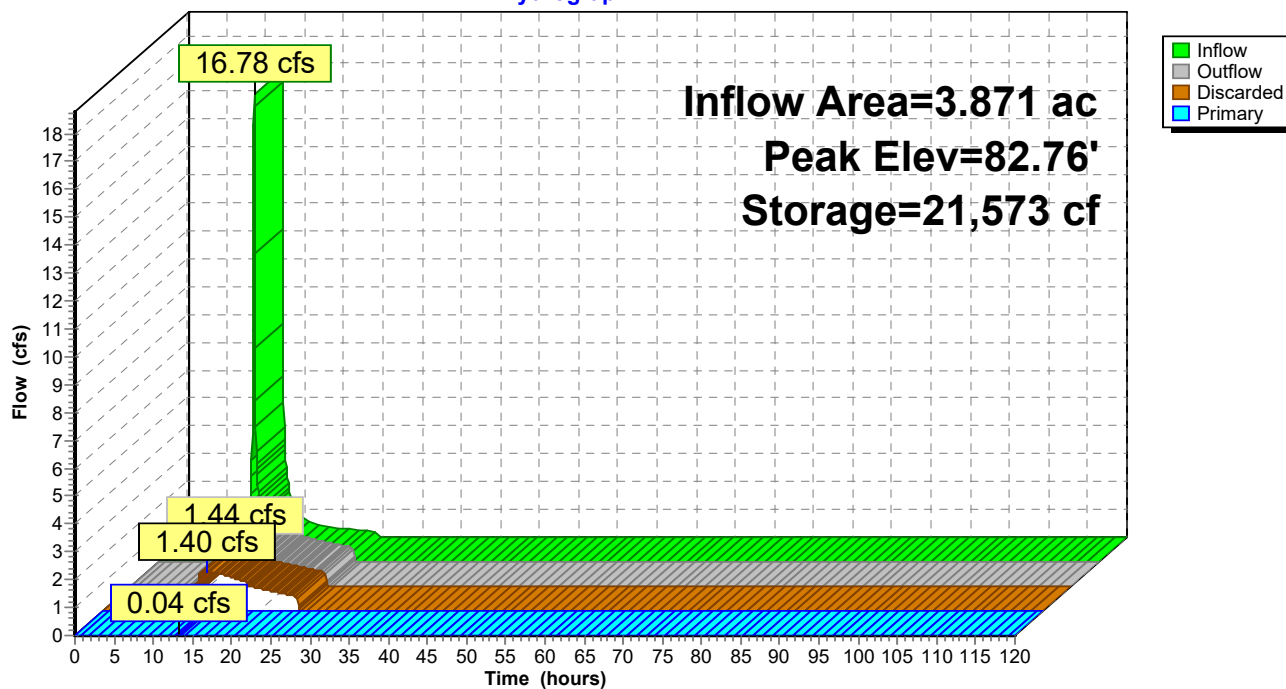
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Pond BAS 1-A: BAS 1-A

Hydrograph



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Summary for Pond BAS 1-B: BAS 1-B

Inflow Area = 6.278 ac, 8.01% Impervious, Inflow Depth = 2.42" for 25-Year event
Inflow = 11.22 cfs @ 12.33 hrs, Volume= 1.264 af
Outflow = 9.61 cfs @ 12.46 hrs, Volume= 1.264 af, Atten= 14%, Lag= 7.4 min
Discarded = 0.14 cfs @ 12.46 hrs, Volume= 0.365 af
Primary = 9.47 cfs @ 12.46 hrs, Volume= 0.899 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.77' @ 12.46 hrs Surf.Area= 5,781 sf Storage= 12,384 cf

Plug-Flow detention time= 267.4 min calculated for 1.264 af (100% of inflow)
Center-of-Mass det. time= 267.9 min (1,144.4 - 876.4)

Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	13,755 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
80.00	3,170	0	0
83.00	6,000	13,755	13,755

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.27'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.14 cfs @ 12.46 hrs HW=82.76' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=9.38 cfs @ 12.46 hrs HW=82.76' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 9.38 cfs @ 1.90 fps)

Proposed Hydrology

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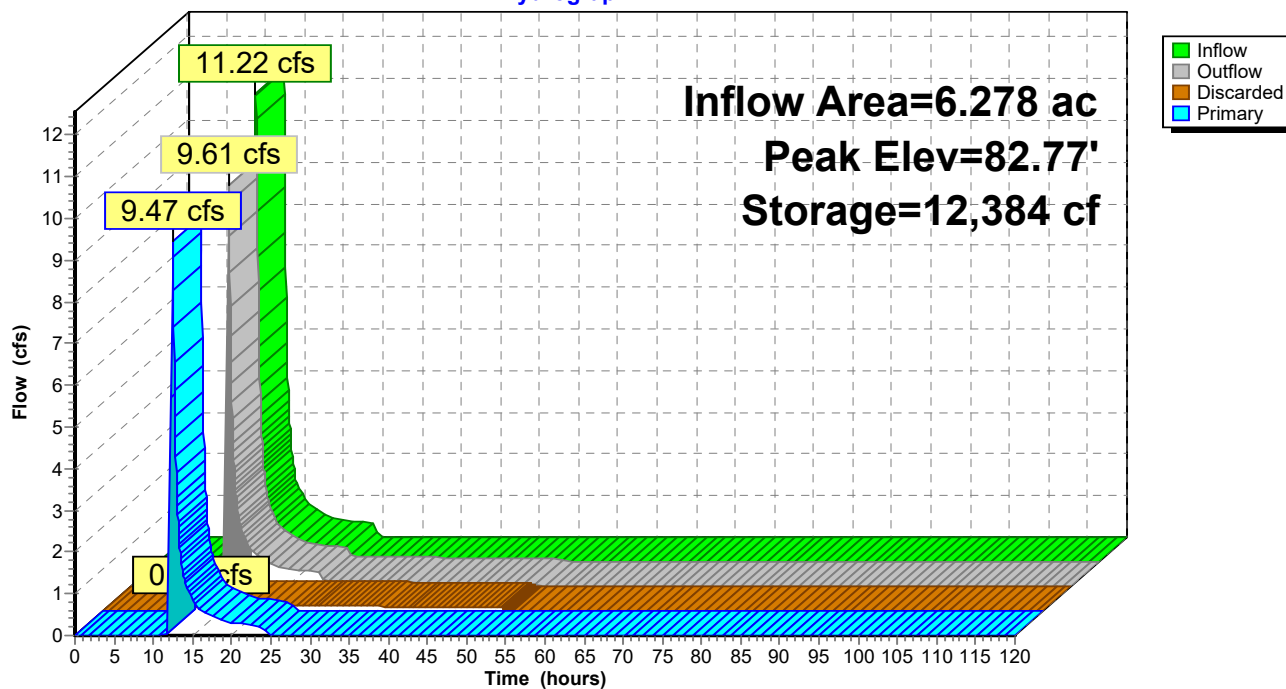
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Pond BAS 1-B: BAS 1-B

Hydrograph



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Summary for Pond BAS 1-C: BAS 1-C

Inflow Area = 0.144 ac, 73.04% Impervious, Inflow Depth = 4.71" for 25-Year event
Inflow = 0.79 cfs @ 12.13 hrs, Volume= 0.057 af
Outflow = 0.77 cfs @ 12.14 hrs, Volume= 0.057 af, Atten= 2%, Lag= 1.0 min
Discarded = 0.01 cfs @ 12.14 hrs, Volume= 0.023 af
Primary = 0.76 cfs @ 12.14 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.95' @ 12.14 hrs Surf.Area= 445 sf Storage= 502 cf

Plug-Flow detention time= 232.8 min calculated for 0.057 af (100% of inflow)
Center-of-Mass det. time= 233.2 min (1,029.8 - 796.6)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	525 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	70	0	0
83.00	455	525	525

Device	Routing	Invert	Outlet Devices
#1	Discarded	81.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.80'	5.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 12.14 hrs HW=82.95' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.75 cfs @ 12.14 hrs HW=82.95' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.75 cfs @ 1.02 fps)

Proposed Hydrology

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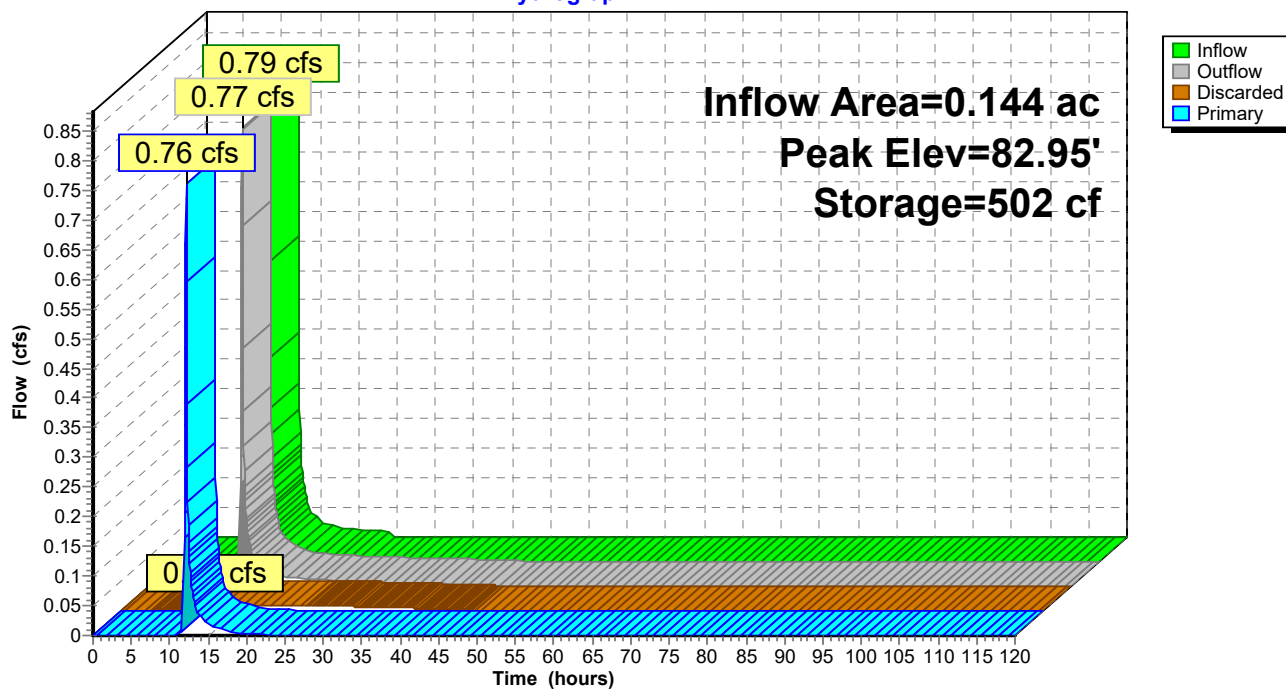
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Pond BAS 1-C: BAS 1-C

Hydrograph



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Summary for Pond BAS 10-A: EXIST BAS 10-A

Inflow Area = 0.796 ac, 7.21% Impervious, Inflow Depth = 0.32" for 25-Year event
Inflow = 0.05 cfs @ 12.54 hrs, Volume= 0.021 af
Outflow = 0.01 cfs @ 24.00 hrs, Volume= 0.021 af, Atten= 76%, Lag= 687.7 min
Discarded = 0.01 cfs @ 24.00 hrs, Volume= 0.021 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 54.83' @ 24.00 hrs Surf.Area= 1,015 sf Storage= 472 cf

Plug-Flow detention time= 509.2 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 509.6 min (1,521.4 - 1,011.9)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 24.00 hrs HW=54.83' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)

↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Hydrology

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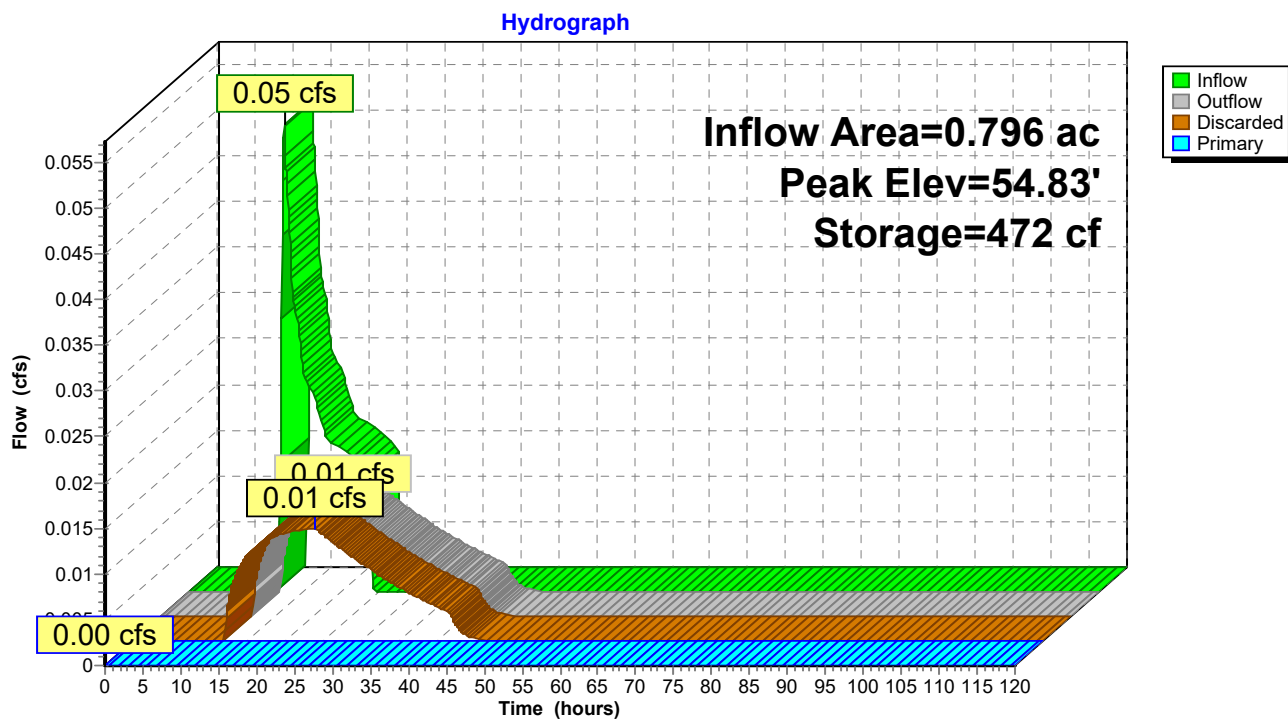
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Pond BAS 10-A: EXIST BAS 10-A



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Summary for Pond BAS 10-B: BAS 10-B

Inflow Area = 1.334 ac, 40.19% Impervious, Inflow Depth = 2.15" for 25-Year event
 Inflow = 3.47 cfs @ 12.14 hrs, Volume= 0.239 af
 Outflow = 0.20 cfs @ 14.62 hrs, Volume= 0.239 af, Atten= 94%, Lag= 149.1 min
 Discarded = 0.20 cfs @ 14.62 hrs, Volume= 0.239 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 78.95' @ 14.62 hrs Surf.Area= 3,462 sf Storage= 4,937 cf

Plug-Flow detention time= 309.7 min calculated for 0.239 af (100% of inflow)
 Center-of-Mass det. time= 309.7 min (1,178.9 - 869.2)

Volume	Invert	Avail.Storage	Storage Description	
#1	77.00'	9,015 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
77.00	1,850	0	0	1,850
78.00	2,450	2,143	2,143	2,472
79.00	3,520	2,969	5,112	3,559
80.00	4,300	3,904	9,015	4,370

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.00'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.20 cfs @ 14.62 hrs HW=78.95' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

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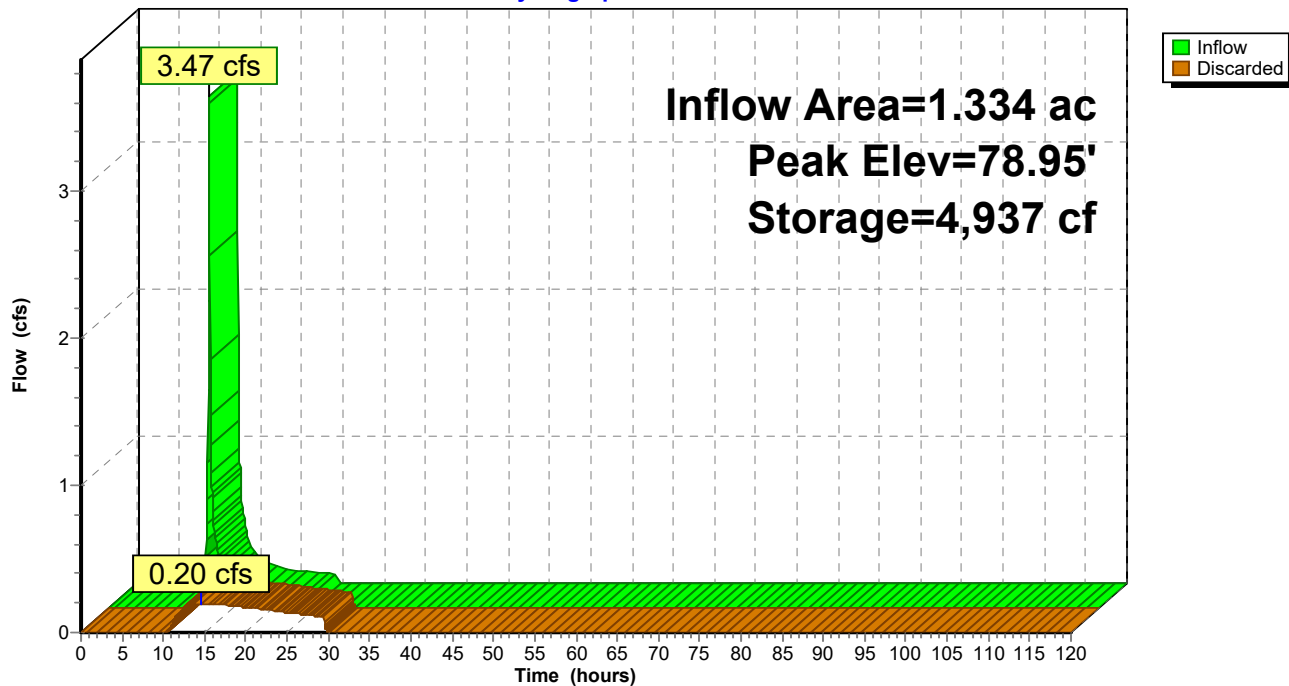
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Pond BAS 10-B: BAS 10-B

Hydrograph



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Summary for Pond BAS 11-B: BAS 11-B

Inflow Area = 4.563 ac, 12.43% Impervious, Inflow Depth = 2.83" for 25-Year event
 Inflow = 15.86 cfs @ 12.13 hrs, Volume= 1.077 af
 Outflow = 3.00 cfs @ 12.57 hrs, Volume= 1.077 af, Atten= 81%, Lag= 26.1 min
 Discarded = 3.00 cfs @ 12.57 hrs, Volume= 1.077 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 44.71' @ 12.57 hrs Surf.Area= 127,000 sf Storage= 10,509 cf

Plug-Flow detention time= 21.2 min calculated for 1.076 af (100% of inflow)
 Center-of-Mass det. time= 21.2 min (870.6 - 849.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	25,400 cf	Custom Stage Data (Conic) Listed below (Recalc) 63,500 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.50	127,000	0	0	127,000
45.00	127,000	63,500	63,500	127,632

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.50'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=3.00 cfs @ 12.57 hrs HW=44.71' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 3.00 cfs)

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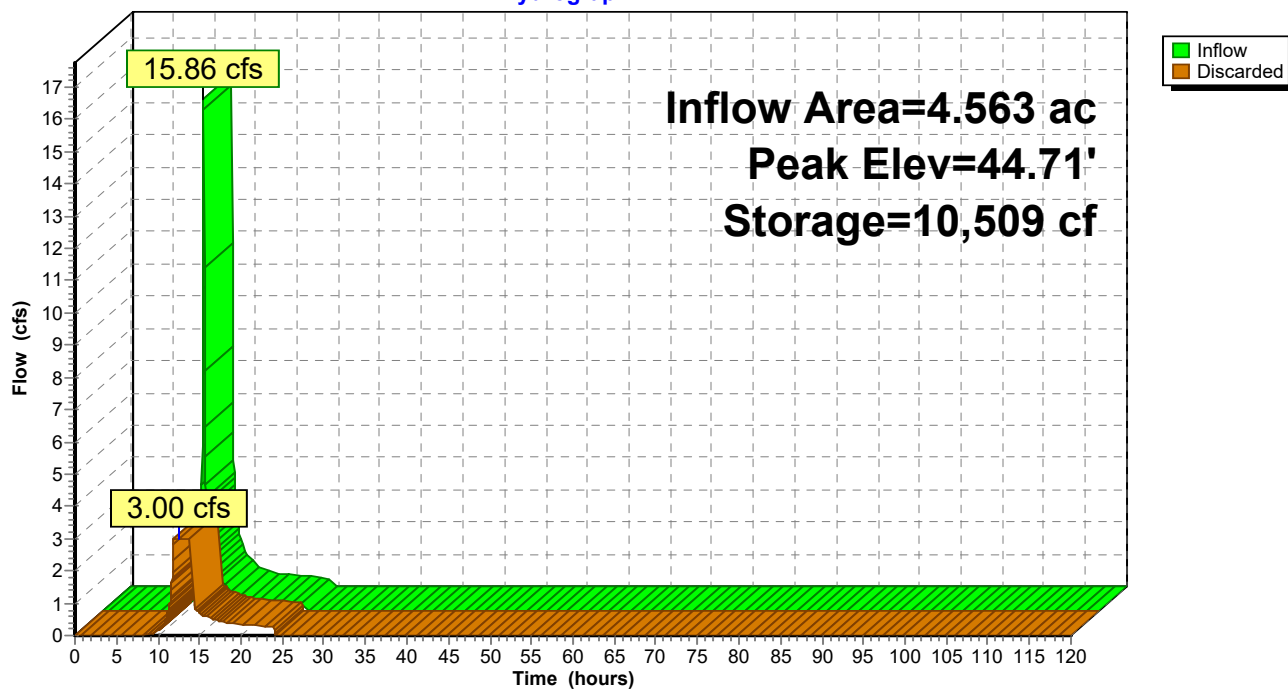
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Pond BAS 11-B: BAS 11-B

Hydrograph



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Summary for Pond BAS 12-A: BAS 12-A

Inflow Area = 6.552 ac, 26.15% Impervious, Inflow Depth = 2.69" for 25-Year event
Inflow = 21.62 cfs @ 12.13 hrs, Volume= 1.469 af
Outflow = 2.73 cfs @ 12.94 hrs, Volume= 1.469 af, Atten= 87%, Lag= 48.3 min
Discarded = 0.74 cfs @ 12.94 hrs, Volume= 1.224 af
Primary = 1.99 cfs @ 12.94 hrs, Volume= 0.245 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 95.63' @ 12.94 hrs Surf.Area= 13,117 sf Storage= 27,815 cf

Plug-Flow detention time= 361.3 min calculated for 1.468 af (100% of inflow)
Center-of-Mass det. time= 361.4 min (1,214.7 - 853.3)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	32,859 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.00	8,250	0	0	8,250
96.00	13,900	32,859	32,859	14,008

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	95.45'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.74 cfs @ 12.94 hrs HW=95.63' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.74 cfs)

Primary OutFlow Max=1.99 cfs @ 12.94 hrs HW=95.63' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.99 cfs @ 1.13 fps)

Proposed Hydrology

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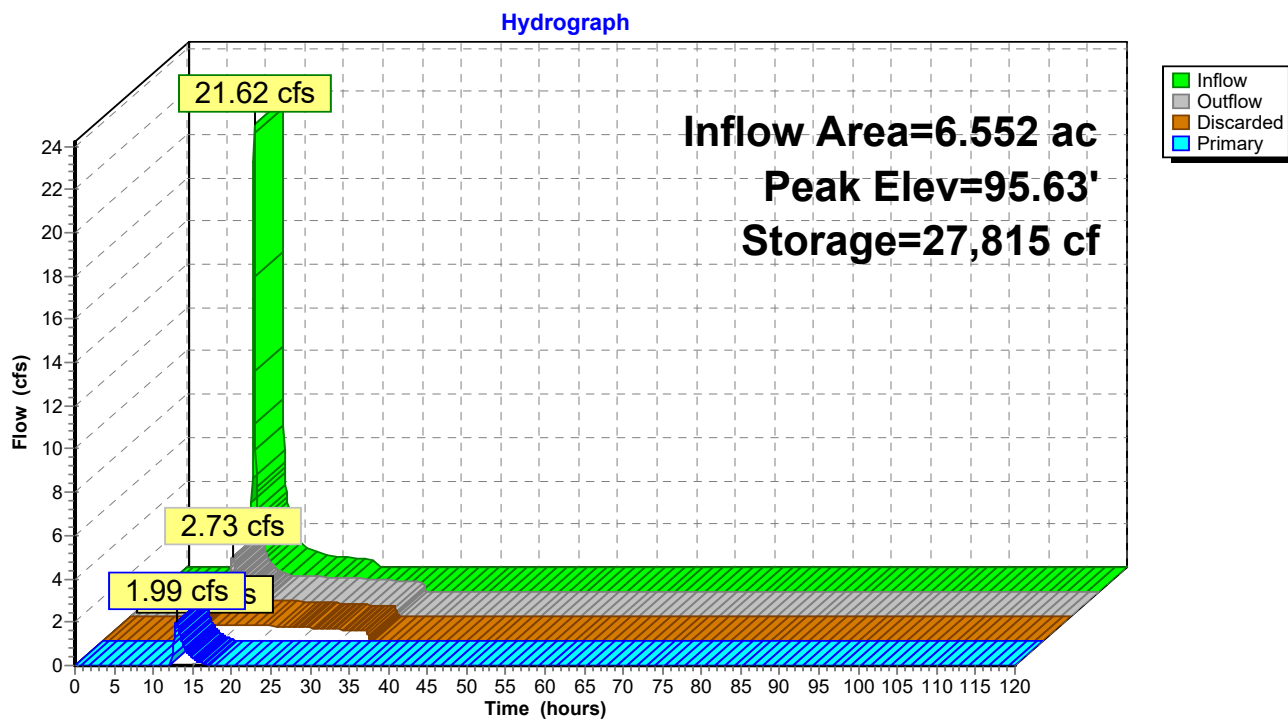
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Pond BAS 12-A: BAS 12-A



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Summary for Pond BAS 12-B: BAS 12-B

Inflow Area = 13.599 ac, 25.11% Impervious, Inflow Depth = 1.16" for 25-Year event
Inflow = 15.11 cfs @ 12.14 hrs, Volume= 1.310 af
Outflow = 0.64 cfs @ 16.76 hrs, Volume= 1.310 af, Atten= 96%, Lag= 277.2 min
Discarded = 0.64 cfs @ 16.76 hrs, Volume= 1.310 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 92.40' @ 16.76 hrs Surf.Area= 27,040 sf Storage= 34,654 cf

Plug-Flow detention time= 591.9 min calculated for 1.309 af (100% of inflow)
Center-of-Mass det. time= 592.1 min (1,461.8 - 869.7)

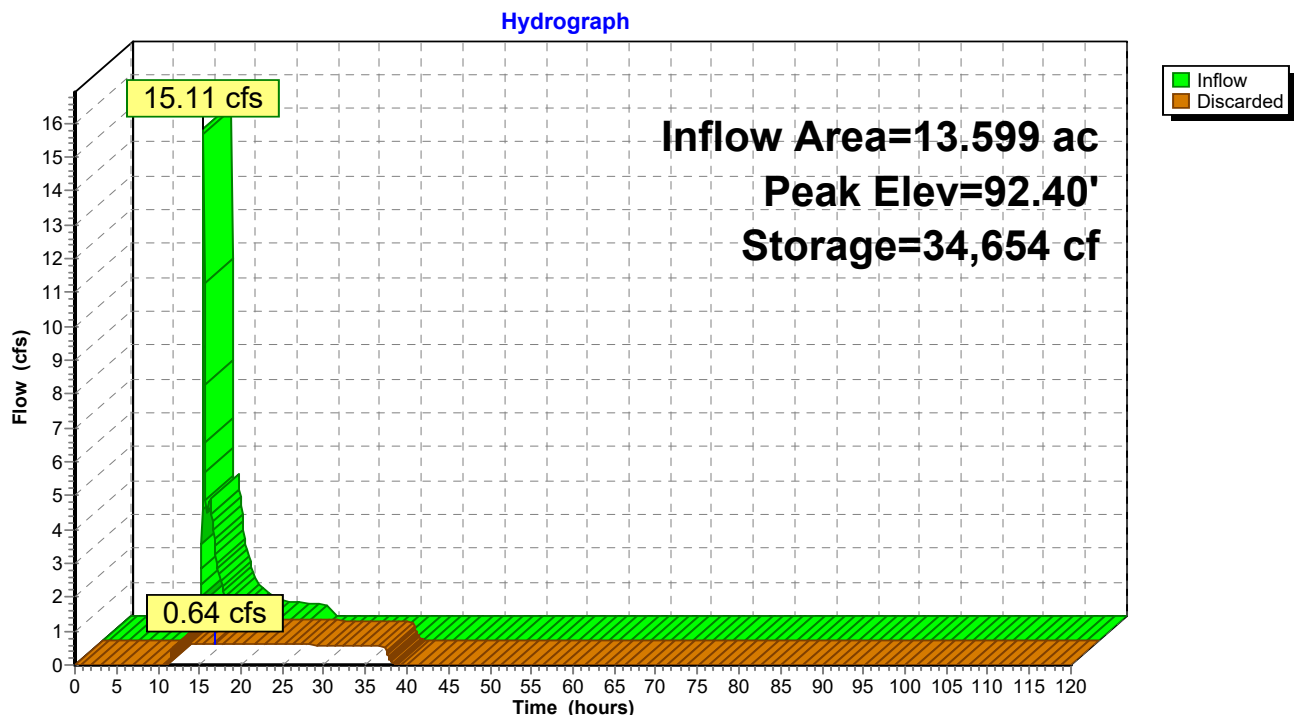
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	82,362 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	22,700	0	0	22,700
94.00	32,500	82,362	82,362	32,657

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.64 cfs @ 16.76 hrs HW=92.40' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.64 cfs)

Pond BAS 12-B: BAS 12-B



Proposed Hydrology

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Summary for Pond BAS 15-A: BAS 15-A

Inflow Area = 0.480 ac, 29.15% Impervious, Inflow Depth = 3.07" for 25-Year event
Inflow = 1.81 cfs @ 12.13 hrs, Volume= 0.123 af
Outflow = 1.73 cfs @ 12.15 hrs, Volume= 0.123 af, Atten= 4%, Lag= 1.3 min
Primary = 1.73 cfs @ 12.15 hrs, Volume= 0.123 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.96' @ 12.15 hrs Surf.Area= 1,481 sf Storage= 660 cf

Plug-Flow detention time= 29.6 min calculated for 0.123 af (100% of inflow)
Center-of-Mass det. time= 29.9 min (872.9 - 843.0)

Volume	Invert	Avail.Storage	Storage Description
#1	82.35'	716 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.35	300	0	0
82.70	1,350	289	289
83.00	1,500	427	716

Device	Routing	Invert	Outlet Devices
#1	Primary	82.35'	3.0" Vert. Orifice/Grate C= 0.600
#2	Primary	82.83'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=1.71 cfs @ 12.15 hrs HW=82.96' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.16 cfs @ 3.36 fps)

2=Sharp-Crested Rectangular Weir (Weir Controls 1.54 cfs @ 1.18 fps)

Proposed Hydrology

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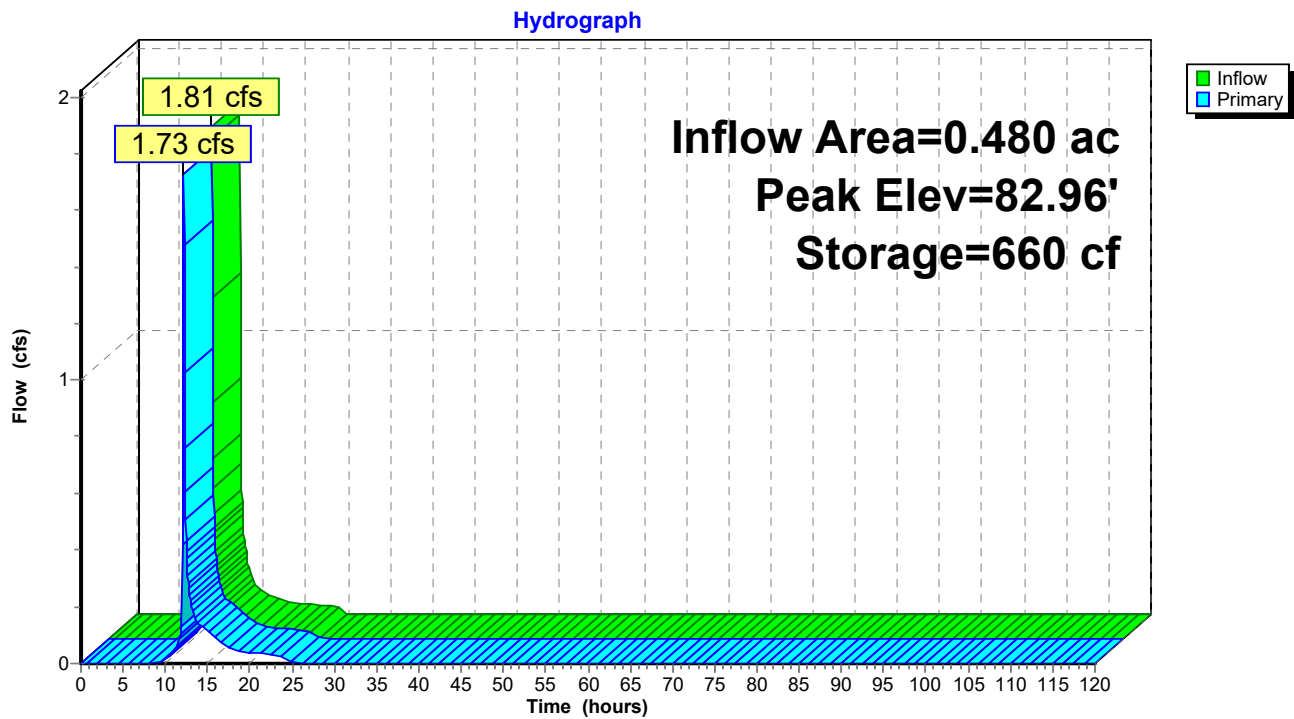
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Pond BAS 15-A: BAS 15-A



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Summary for Pond BAS 2-A: DET BAS 2-A

Inflow Area = 2.386 ac, 38.00% Impervious, Inflow Depth = 2.07" for 25-Year event
Inflow = 5.94 cfs @ 12.14 hrs, Volume= 0.411 af
Outflow = 0.22 cfs @ 16.60 hrs, Volume= 0.411 af, Atten= 96%, Lag= 268.1 min
Primary = 0.22 cfs @ 16.60 hrs, Volume= 0.411 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 104.75' @ 16.60 hrs Surf.Area= 6,858 sf Storage= 10,202 cf

Plug-Flow detention time= 583.0 min calculated for 0.411 af (100% of inflow)
Center-of-Mass det. time= 583.4 min (1,455.4 - 872.0)

Volume	Invert	Avail.Storage	Storage Description
#1	102.80'	20,037 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.80	300	0	0	300
103.00	4,450	394	394	4,450
106.00	8,900	19,643	20,037	8,982

Device	Routing	Invert	Outlet Devices
#1	Primary	102.80'	2.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.22 cfs @ 16.60 hrs HW=104.75' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 6.54 fps)

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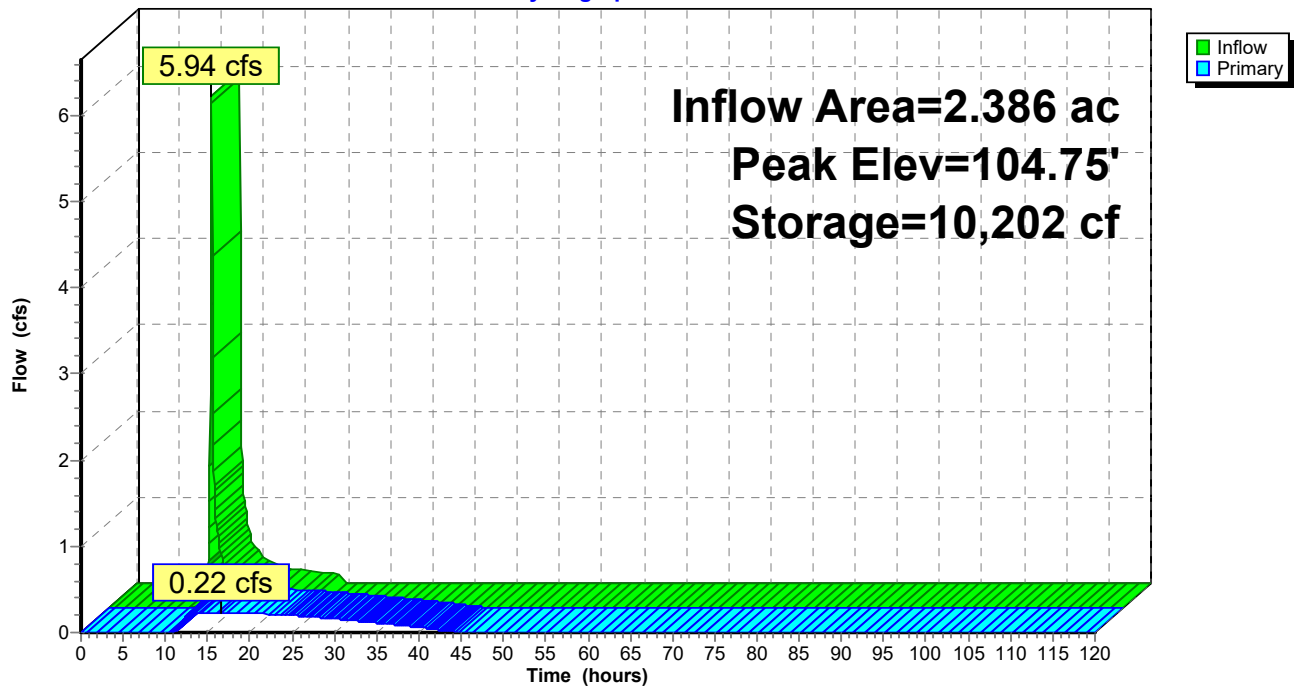
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Pond BAS 2-A: DET BAS 2-A

Hydrograph



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Summary for Pond BAS 2-B: BAS 2-B

Inflow Area = 1.161 ac, 38.00% Impervious, Inflow Depth = 2.78" for 25-Year event
Inflow = 3.97 cfs @ 12.13 hrs, Volume= 0.269 af
Outflow = 3.16 cfs @ 12.19 hrs, Volume= 0.269 af, Atten= 20%, Lag= 3.7 min
Discarded = 0.08 cfs @ 12.19 hrs, Volume= 0.136 af
Primary = 3.08 cfs @ 12.19 hrs, Volume= 0.133 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 99.91' @ 12.19 hrs Surf.Area= 3,379 sf Storage= 2,762 cf

Plug-Flow detention time= 181.9 min calculated for 0.269 af (100% of inflow)
Center-of-Mass det. time= 182.0 min (1,032.8 - 850.8)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	3,067 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
99.00	2,700	0	0	2,700
100.00	3,450	3,067	3,067	3,475

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	99.73'	15.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.08 cfs @ 12.19 hrs HW=99.91' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=3.03 cfs @ 12.19 hrs HW=99.91' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 3.03 cfs @ 1.13 fps)

Proposed Hydrology

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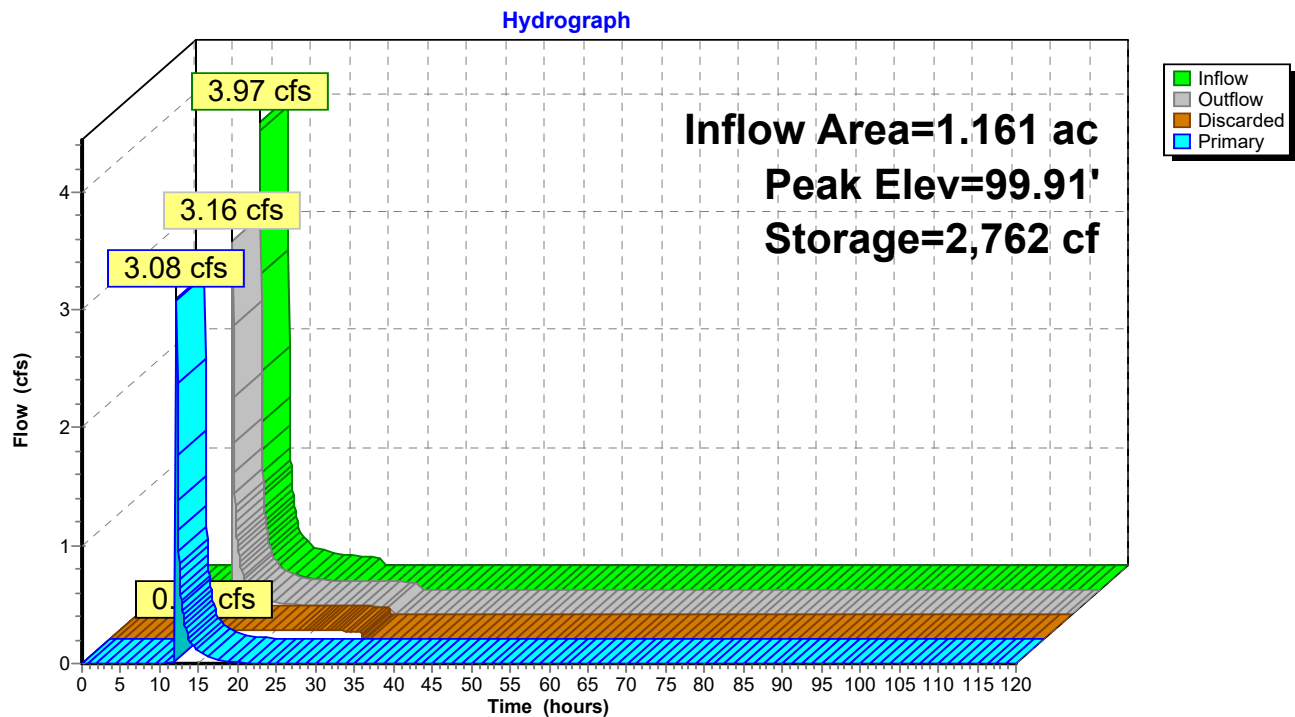
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Pond BAS 2-B: BAS 2-B



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Summary for Pond BAS 2-C: BAS 2-C

Inflow Area = 1.461 ac, 38.00% Impervious, Inflow Depth = 4.39" for 25-Year event
Inflow = 7.57 cfs @ 12.13 hrs, Volume= 0.534 af
Outflow = 6.16 cfs @ 12.18 hrs, Volume= 0.534 af, Atten= 19%, Lag= 3.1 min
Primary = 6.16 cfs @ 12.18 hrs, Volume= 0.534 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.87' @ 12.18 hrs Surf.Area= 4,157 sf Storage= 7,223 cf

Plug-Flow detention time= 281.6 min calculated for 0.534 af (100% of inflow)
Center-of-Mass det. time= 281.9 min (1,088.7 - 806.8)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	7,748 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.60	100	0	0	100
101.00	3,050	494	494	3,050
103.00	4,237	7,255	7,748	4,312

Device	Routing	Invert	Outlet Devices
#1	Device 3	102.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Device 3	100.60'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	100.60'	12.0" Round RCP_Round 12" X 2.00 L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.60' / 100.30' S= 0.0111 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.98 cfs @ 12.18 hrs HW=102.87' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 5.98 cfs of 11.74 cfs potential flow)

↑ **1=Orifice/Grate** (Weir Controls 5.83 cfs @ 1.98 fps)

↑ **2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.12 fps)

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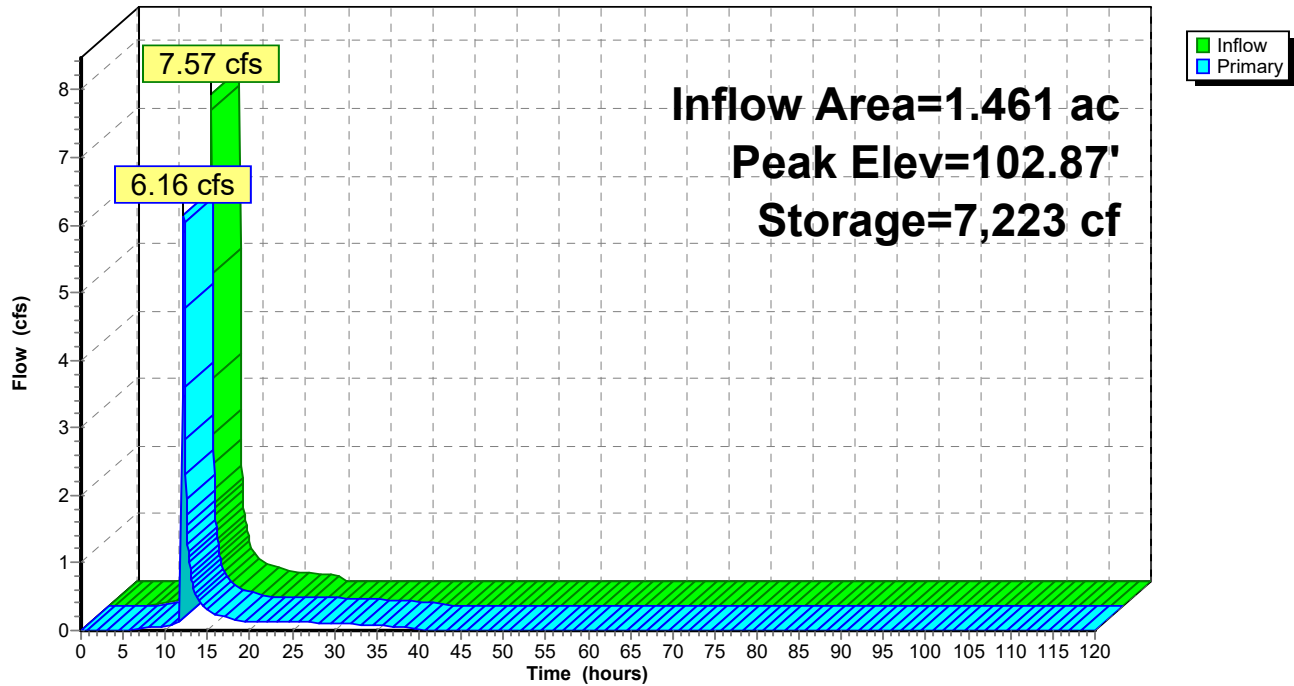
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Pond BAS 2-C: BAS 2-C

Hydrograph



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Summary for Pond BAS 2-D: BAS 2-D

Inflow Area = 8.783 ac, 33.03% Impervious, Inflow Depth = 2.51" for 25-Year event
Inflow = 26.93 cfs @ 12.13 hrs, Volume= 1.835 af
Outflow = 1.34 cfs @ 14.78 hrs, Volume= 1.835 af, Atten= 95%, Lag= 158.6 min
Discarded = 0.51 cfs @ 14.78 hrs, Volume= 1.587 af
Primary = 0.83 cfs @ 14.78 hrs, Volume= 0.249 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 108.70' @ 14.78 hrs Surf.Area= 21,328 sf Storage= 47,502 cf

Plug-Flow detention time= 890.9 min calculated for 1.835 af (100% of inflow)
Center-of-Mass det. time= 890.8 min (1,749.3 - 858.5)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	53,997 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	14,000	0	0	14,000
107.00	16,250	15,111	15,111	16,292
108.00	19,800	17,996	33,107	19,873
109.00	22,000	20,890	53,997	22,132

Device	Routing	Invert	Outlet Devices
#1	Device 3	108.60'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	106.00'	1.020 in/hr Exfiltration over Wetted area
#3	Primary	106.00'	18.0" Round Culvert L= 185.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 106.00' / 102.00' S= 0.0216 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Discarded OutFlow Max=0.51 cfs @ 14.78 hrs HW=108.70' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.51 cfs)

Primary OutFlow Max=0.83 cfs @ 14.78 hrs HW=108.70' (Free Discharge)

↑**3=Culvert** (Passes 0.83 cfs of 9.38 cfs potential flow)

↑**1=Orifice/Grate** (Weir Controls 0.83 cfs @ 1.03 fps)

Proposed Hydrology

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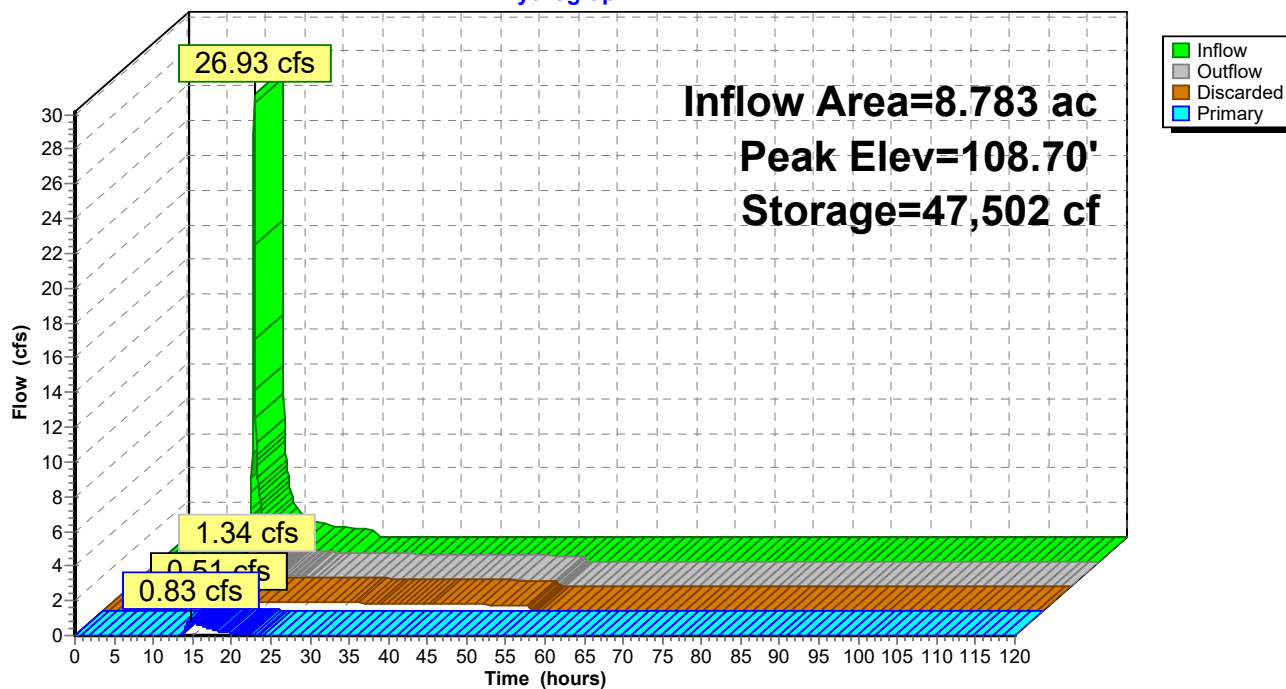
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Pond BAS 2-D: BAS 2-D

Hydrograph



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Summary for Pond BAS 2-E: BAS 2-E

Inflow Area = 2.574 ac, 44.91% Impervious, Inflow Depth = 3.66" for 25-Year event
Inflow = 11.44 cfs @ 12.13 hrs, Volume= 0.785 af
Outflow = 4.48 cfs @ 12.28 hrs, Volume= 0.785 af, Atten= 61%, Lag= 9.2 min
Discarded = 0.32 cfs @ 12.28 hrs, Volume= 0.522 af
Primary = 4.16 cfs @ 12.28 hrs, Volume= 0.263 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 100.88' @ 12.28 hrs Surf.Area= 13,406 sf Storage= 11,199 cf

Plug-Flow detention time= 215.7 min calculated for 0.784 af (100% of inflow)
Center-of-Mass det. time= 215.7 min (1,043.0 - 827.3)

Volume	Invert	Avail.Storage	Storage Description	
#1	100.00'	14,162 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	12,000	0	0	12,000
101.00	13,600	12,792	12,792	13,649
101.10	13,800	1,370	14,162	13,854

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.70'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.32 cfs @ 12.28 hrs HW=100.88' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=4.12 cfs @ 12.28 hrs HW=100.88' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 4.12 cfs @ 1.14 fps)

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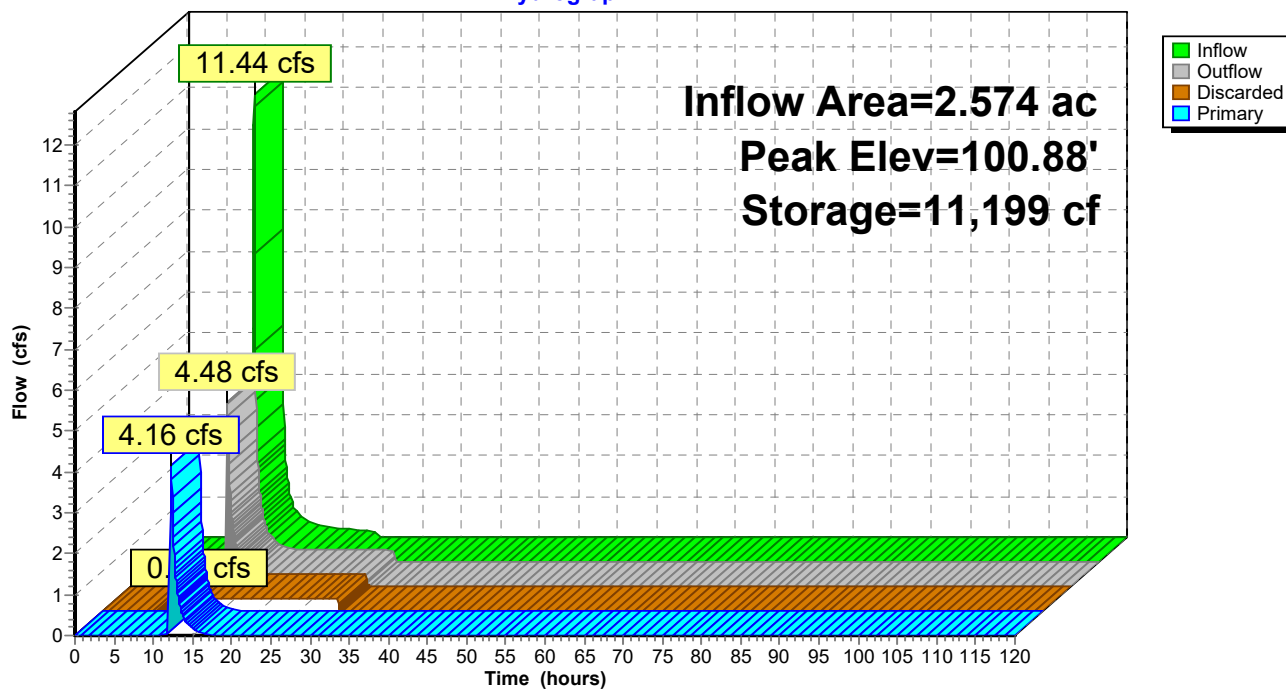
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Pond BAS 2-E: BAS 2-E

Hydrograph



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Summary for Pond BAS 2-F: BAS 2-F

Inflow Area = 3.255 ac, 41.28% Impervious, Inflow Depth = 3.46" for 25-Year event
Inflow = 13.74 cfs @ 12.13 hrs, Volume= 0.938 af
Outflow = 2.46 cfs @ 12.57 hrs, Volume= 0.938 af, Atten= 82%, Lag= 26.6 min
Discarded = 0.58 cfs @ 12.57 hrs, Volume= 0.769 af
Primary = 1.88 cfs @ 12.57 hrs, Volume= 0.169 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.70' @ 12.57 hrs Surf.Area= 10,291 sf Storage= 15,603 cf

Plug-Flow detention time= 219.9 min calculated for 0.938 af (100% of inflow)
Center-of-Mass det. time= 219.9 min (1,052.5 - 832.6)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	19,860 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
101.00	8,130	0	0	8,130
102.00	9,380	8,748	8,748	9,423
103.00	10,700	10,033	18,780	10,790
103.10	10,900	1,080	19,860	10,993

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	102.50'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.58 cfs @ 12.57 hrs HW=102.70' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.58 cfs)

Primary OutFlow Max=1.87 cfs @ 12.57 hrs HW=102.70' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.87 cfs @ 1.19 fps)

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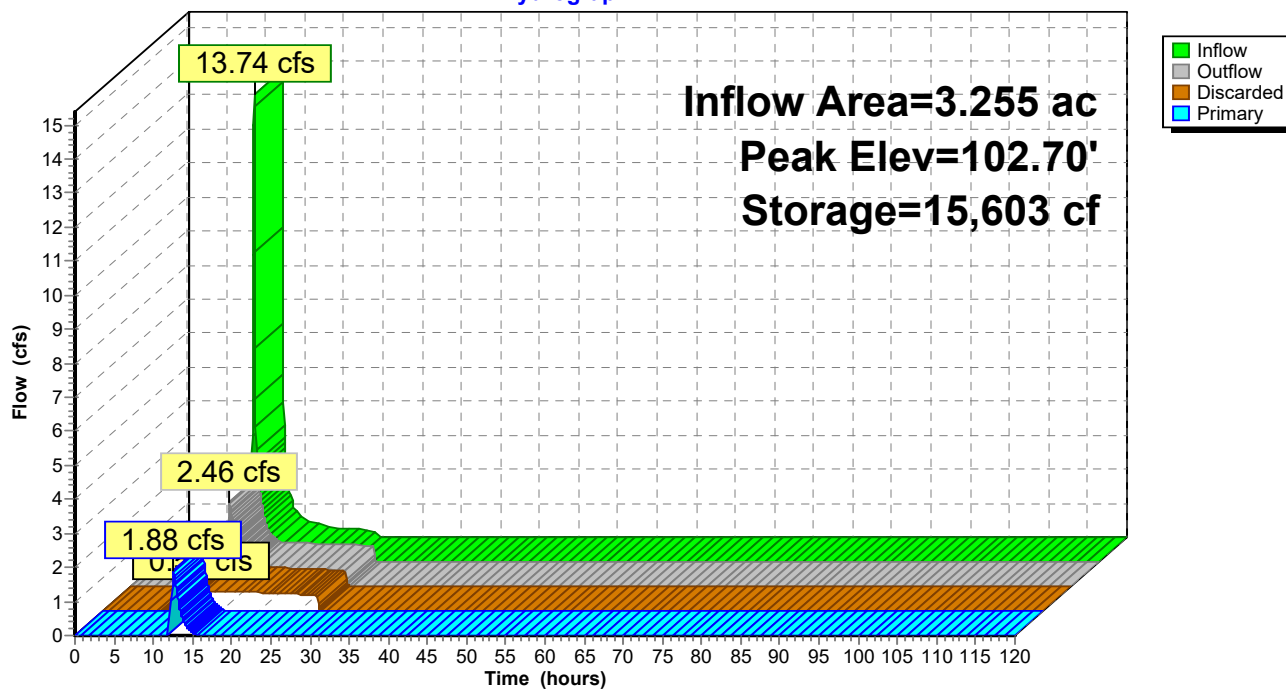
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Pond BAS 2-F: BAS 2-F

Hydrograph



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Summary for Pond BAS 3-A: BAS 3-A

Inflow Area = 2.218 ac, 40.95% Impervious, Inflow Depth = 4.17" for 25-Year event
Inflow = 11.04 cfs @ 12.13 hrs, Volume= 0.772 af
Outflow = 0.40 cfs @ 15.03 hrs, Volume= 0.772 af, Atten= 96%, Lag= 174.1 min
Primary = 0.40 cfs @ 15.03 hrs, Volume= 0.772 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 103.67' @ 15.03 hrs Surf.Area= 9,811 sf Storage= 20,229 cf

Plug-Flow detention time= 597.6 min calculated for 0.771 af (100% of inflow)
Center-of-Mass det. time= 597.9 min (1,410.9 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	100.70'	23,581 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.70	300	0	0	300
101.00	5,100	664	664	5,100
104.00	10,500	22,918	23,581	10,579

Device	Routing	Invert	Outlet Devices
#1	Device 3	100.70'	3.0" Vert. Orifice/Grate C= 0.600
#2	Device 3	103.85'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	100.70'	12.0" Round RCP_Round 12" L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.70' / 99.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 15.03 hrs HW=103.67' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 0.40 cfs of 6.82 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.40 cfs @ 8.12 fps)

↑ **2=Orifice/Grate** (Controls 0.00 cfs)

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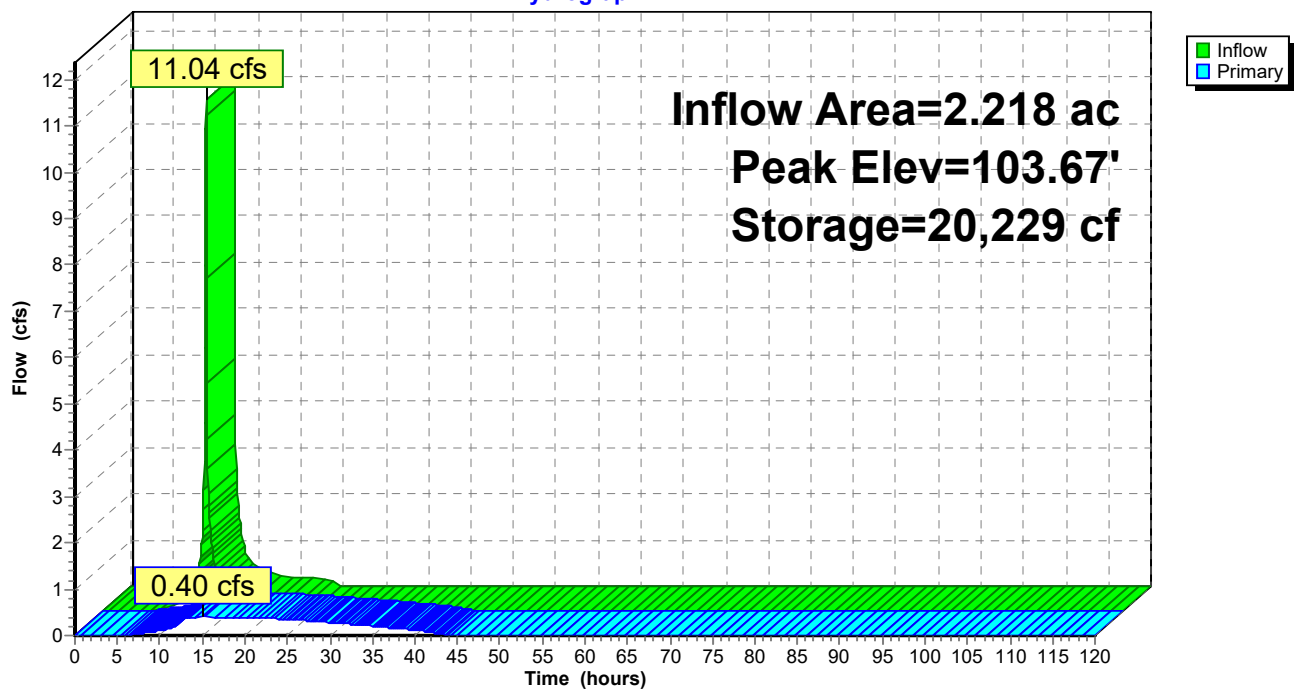
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Pond BAS 3-A: BAS 3-A

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Summary for Pond BAS 3-B: BAS 3-B

Inflow Area = 6.110 ac, 38.90% Impervious, Inflow Depth = 3.26" for 25-Year event
Inflow = 24.40 cfs @ 12.13 hrs, Volume= 1.660 af
Outflow = 0.46 cfs @ 20.72 hrs, Volume= 1.660 af, Atten= 98%, Lag= 515.4 min
Discarded = 0.46 cfs @ 20.72 hrs, Volume= 1.660 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 100.35' @ 20.72 hrs Surf.Area= 19,302 sf Storage= 50,670 cf

Plug-Flow detention time= 1,215.9 min calculated for 1.660 af (100% of inflow)
Center-of-Mass det. time= 1,215.7 min (2,053.6 - 837.9)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	63,788 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
97.00	11,300	0	0	11,300
101.00	21,100	63,788	63,788	21,261

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.60'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.46 cfs @ 20.72 hrs HW=100.35' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=97.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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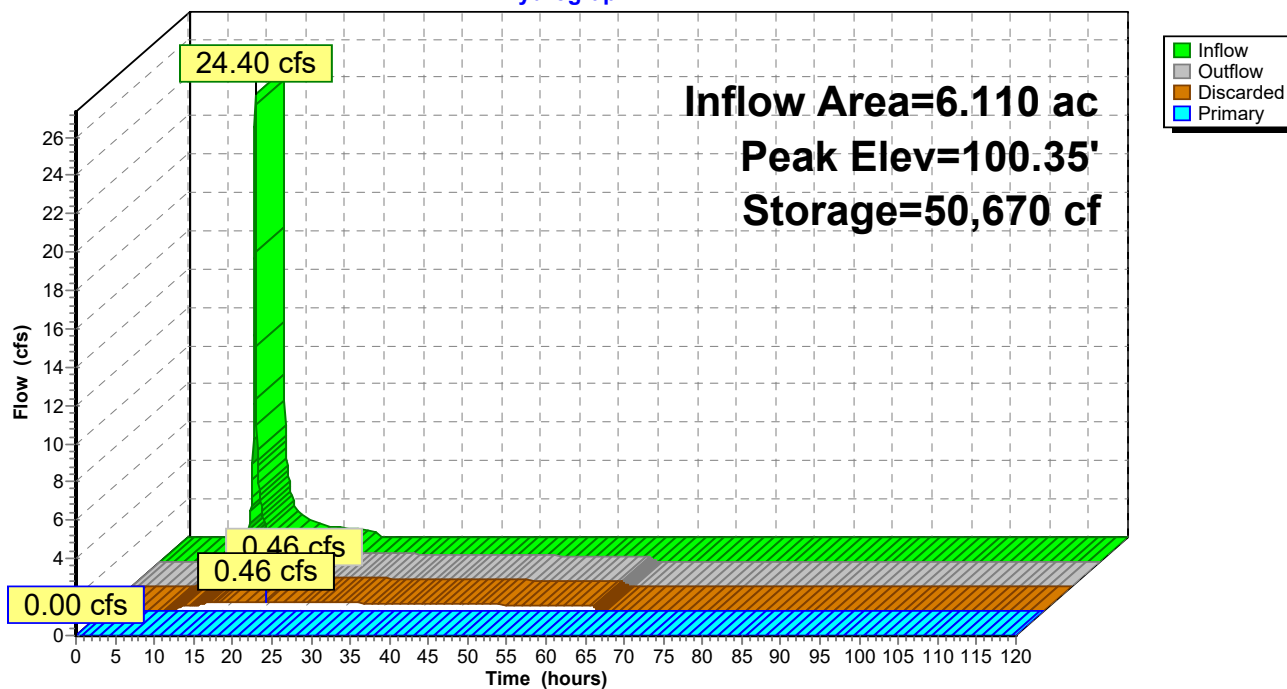
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Pond BAS 3-B: BAS 3-B

Hydrograph



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Summary for Pond BAS 6-A: BAS 6-A

Inflow Area = 3.389 ac, 43.46% Impervious, Inflow Depth = 3.56" for 25-Year event
Inflow = 14.68 cfs @ 12.13 hrs, Volume= 1.005 af
Outflow = 0.71 cfs @ 14.47 hrs, Volume= 1.005 af, Atten= 95%, Lag= 140.2 min
Discarded = 0.29 cfs @ 14.47 hrs, Volume= 0.921 af
Primary = 0.42 cfs @ 14.47 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 90.83' @ 14.47 hrs Surf.Area= 12,159 sf Storage= 26,472 cf

Plug-Flow detention time= 888.3 min calculated for 1.004 af (100% of inflow)
Center-of-Mass det. time= 888.6 min (1,718.6 - 830.0)

Volume	Invert	Avail.Storage	Storage Description
#1	88.30'	28,567 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
88.30	8,860	0	0	8,860
91.00	12,400	28,567	28,567	12,534

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.30'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	90.78'	14.0' long x 21.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.29 cfs @ 14.47 hrs HW=90.83' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=0.41 cfs @ 14.47 hrs HW=90.83' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.41 cfs @ 0.60 fps)

Proposed Hydrology

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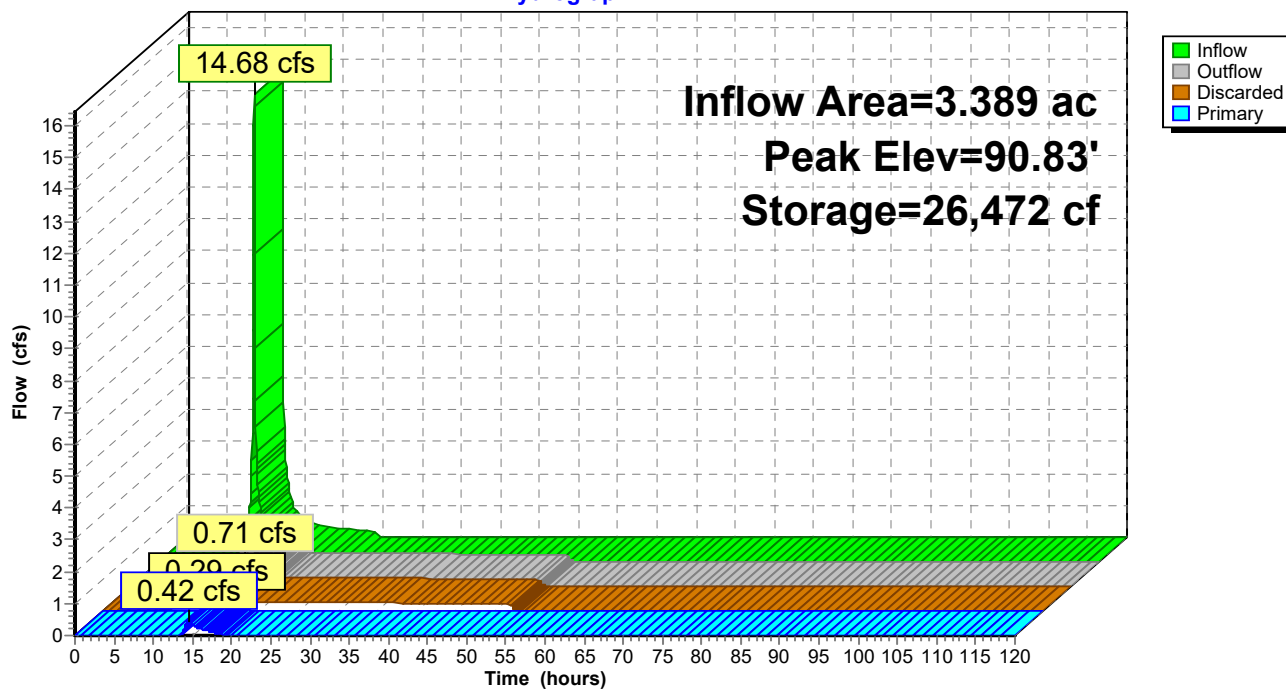
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Pond BAS 6-A: BAS 6-A

Hydrograph



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Summary for Pond BAS 7-A: BAS 7-A

Inflow Area = 4.495 ac, 51.83% Impervious, Inflow Depth = 2.88" for 25-Year event
Inflow = 15.88 cfs @ 12.13 hrs, Volume= 1.078 af
Outflow = 0.39 cfs @ 17.98 hrs, Volume= 1.078 af, Atten= 98%, Lag= 350.9 min
Discarded = 0.39 cfs @ 17.98 hrs, Volume= 1.078 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.31' @ 17.98 hrs Surf.Area= 16,370 sf Storage= 30,236 cf

Plug-Flow detention time= 877.3 min calculated for 1.077 af (100% of inflow)
Center-of-Mass det. time= 877.6 min (1,725.8 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	42,338 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	10,100	0	0	10,100
94.00	18,550	42,338	42,338	18,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	93.87'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.39 cfs @ 17.98 hrs HW=93.31' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=91.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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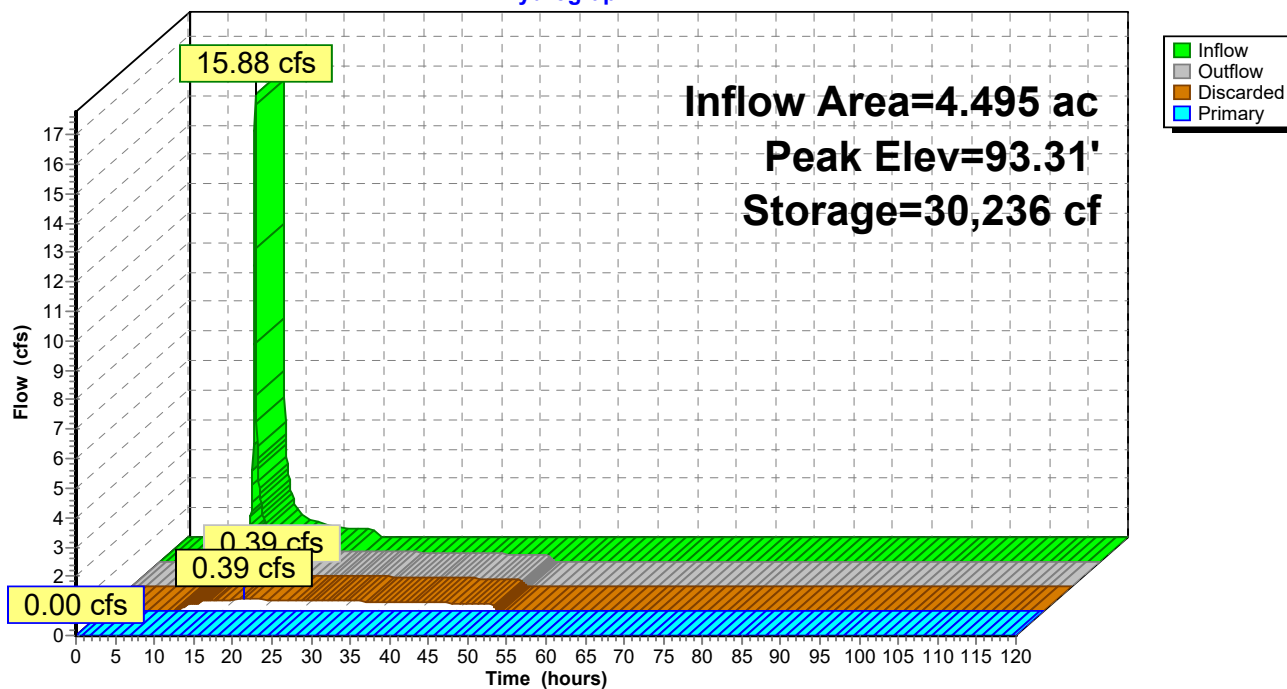
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Pond BAS 7-A: BAS 7-A

Hydrograph



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Summary for Pond BAS 9-A: BAS 9-A

Inflow Area = 2.828 ac, 32.51% Impervious, Inflow Depth = 0.71" for 25-Year event
Inflow = 2.20 cfs @ 12.14 hrs, Volume= 0.166 af
Outflow = 0.12 cfs @ 15.65 hrs, Volume= 0.166 af, Atten= 95%, Lag= 210.7 min
Discarded = 0.12 cfs @ 15.65 hrs, Volume= 0.166 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 63.25' @ 15.65 hrs Surf.Area= 2,111 sf Storage= 3,412 cf

Plug-Flow detention time= 374.3 min calculated for 0.166 af (100% of inflow)
Center-of-Mass det. time= 374.3 min (1,275.2 - 900.8)

Volume	Invert	Avail.Storage	Storage Description
#1	61.00'	5,320 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	1,100	0	0	1,100
63.00	1,850	2,918	2,918	1,897
64.00	3,000	2,402	5,320	3,060

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	63.90'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.12 cfs @ 15.65 hrs HW=63.25' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=61.00' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Hydrology

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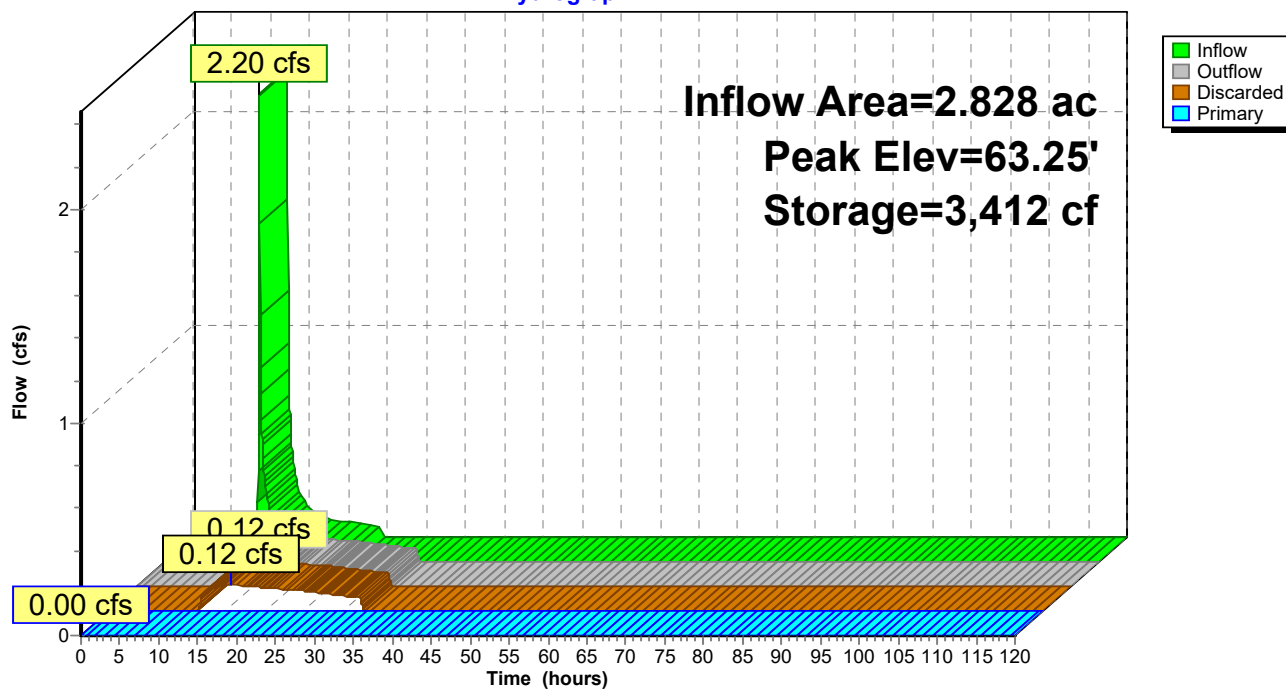
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Pond BAS 9-A: BAS 9-A

Hydrograph



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Summary for Pond BAS 9-B: BAS 9-B

Inflow Area = 5.910 ac, 58.27% Impervious, Inflow Depth = 3.17" for 25-Year event
Inflow = 22.73 cfs @ 12.13 hrs, Volume= 1.560 af
Outflow = 10.15 cfs @ 12.26 hrs, Volume= 1.560 af, Atten= 55%, Lag= 8.0 min
Discarded = 0.46 cfs @ 12.26 hrs, Volume= 0.597 af
Primary = 9.69 cfs @ 12.26 hrs, Volume= 0.963 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 64.08' @ 12.26 hrs Surf.Area= 8,095 sf Storage= 20,450 cf

Plug-Flow detention time= 171.9 min calculated for 1.560 af (100% of inflow)
Center-of-Mass det. time= 171.8 min (1,008.7 - 836.9)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	28,387 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	3,000	0	0	3,000
61.00	3,800	3,392	3,392	3,826
62.00	4,800	4,290	7,682	4,853
63.00	5,750	5,268	12,950	5,837
64.00	8,000	6,844	19,794	8,106
65.00	9,200	8,593	28,387	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	60.00'	2.410 in/hr Exfiltration over Wetted area
#2	Device 3	62.40'	1.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Primary	62.00'	18.0" Round CMP_Round 18" L= 90.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 62.00' / 61.42' S= 0.0064 ' /' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.46 cfs @ 12.26 hrs HW=64.07' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Primary OutFlow Max=9.66 cfs @ 12.26 hrs HW=64.07' (Free Discharge)

↑ **3=CMP_Round 18"** (Passes 9.66 cfs of 9.68 cfs potential flow)

↑ **2=Sharp-Crested Rectangular Weir** (Weir Controls 9.66 cfs @ 4.23 fps)

Proposed Hydrology

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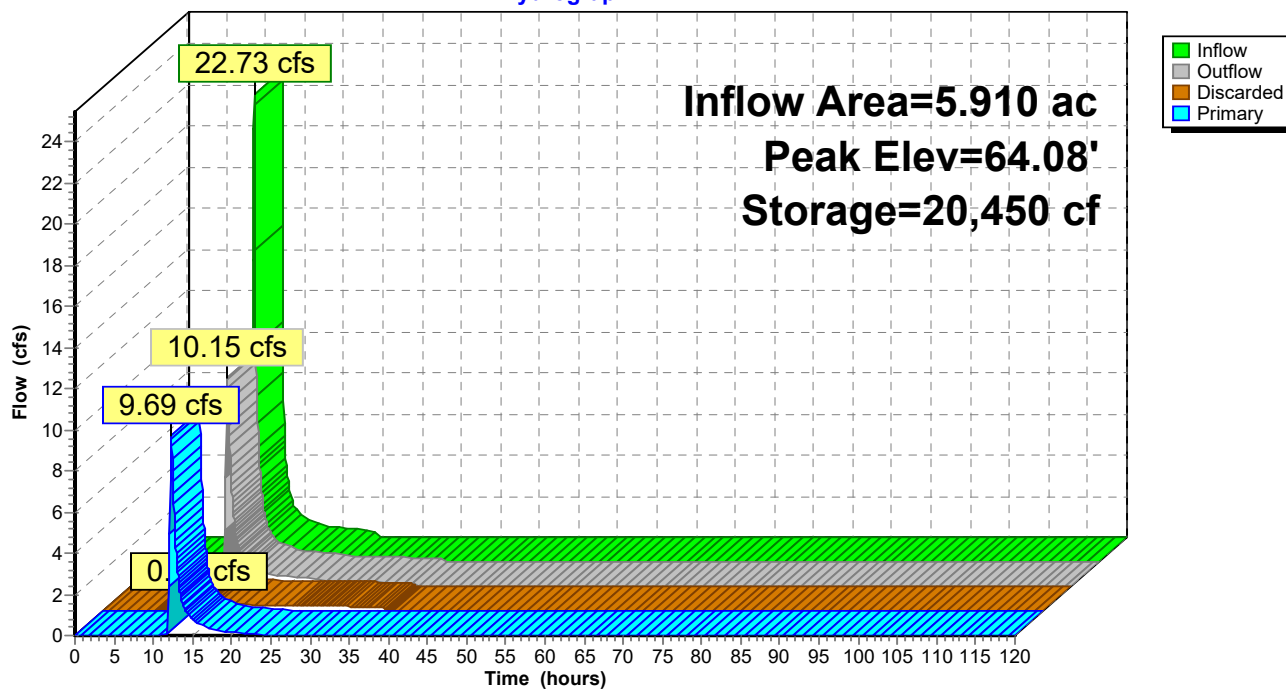
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Pond BAS 9-B: BAS 9-B

Hydrograph



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Summary for Pond W-N: Wetland Series N

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 1.90" for 25-Year event
Inflow = 9.44 cfs @ 12.33 hrs, Volume= 4.899 af
Outflow = 1.33 cfs @ 24.18 hrs, Volume= 3.557 af, Atten= 86%, Lag= 710.7 min
Primary = 1.33 cfs @ 24.18 hrs, Volume= 3.557 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 87.97' @ 24.18 hrs Surf.Area= 32,585 sf Storage= 69,782 cf

Plug-Flow detention time= 1,213.8 min calculated for 3.556 af (73% of inflow)
Center-of-Mass det. time= 612.6 min (2,629.9 - 2,017.3)

Volume	Invert	Avail.Storage	Storage Description
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=1.33 cfs @ 24.18 hrs HW=87.97' (Free Discharge)

↑**1=RCP_Round 24"** (Inlet Controls 1.33 cfs @ 2.76 fps)

Proposed Hydrology

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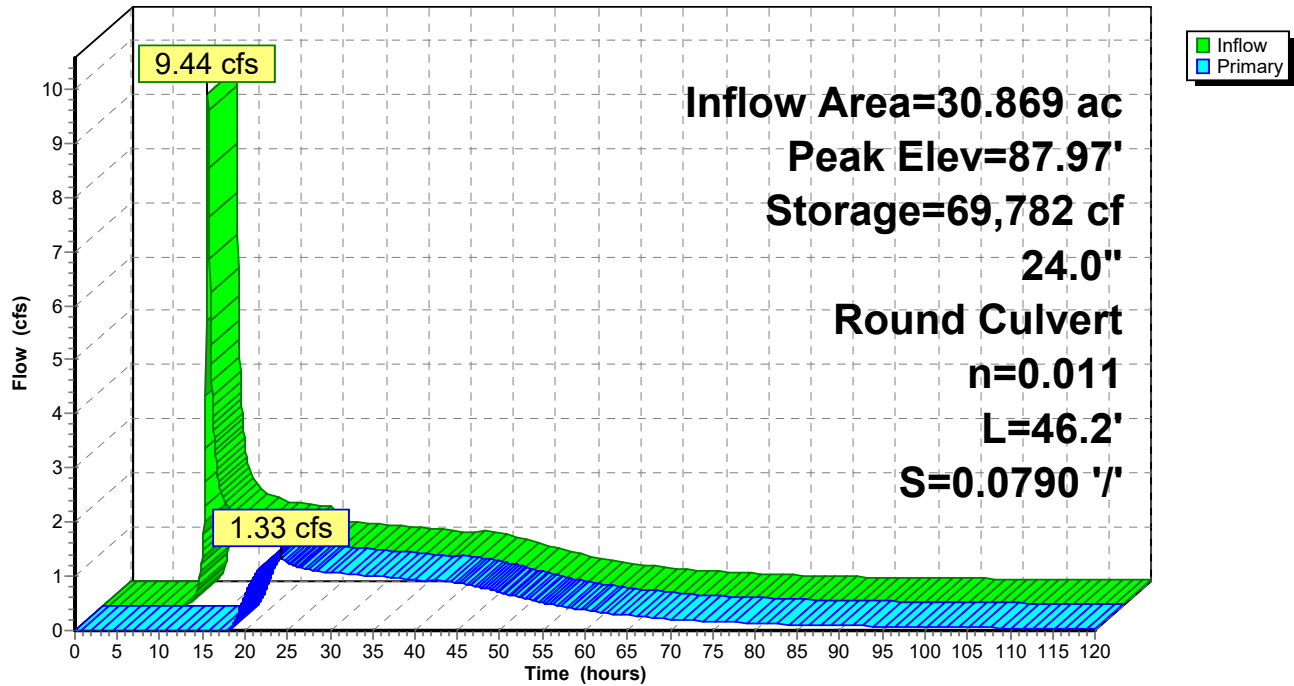
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Pond W-N: Wetland Series N

Hydrograph



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Summary for Pond W-O: Wetland Series O

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.39" for 25-Year event
 Inflow = 16.19 cfs @ 12.37 hrs, Volume= 2.008 af
 Outflow = 5.26 cfs @ 13.02 hrs, Volume= 2.007 af, Atten= 68%, Lag= 39.3 min
 Primary = 5.26 cfs @ 13.02 hrs, Volume= 2.007 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 78.30' @ 13.02 hrs Surf.Area= 19,977 sf Storage= 26,614 cf

Plug-Flow detention time= 154.8 min calculated for 2.006 af (100% of inflow)
 Center-of-Mass det. time= 156.6 min (1,057.0 - 900.4)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S= 0.0114 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=5.25 cfs @ 13.02 hrs HW=78.29' (Free Discharge)

1=Culvert (Inlet Controls 5.25 cfs @ 3.13 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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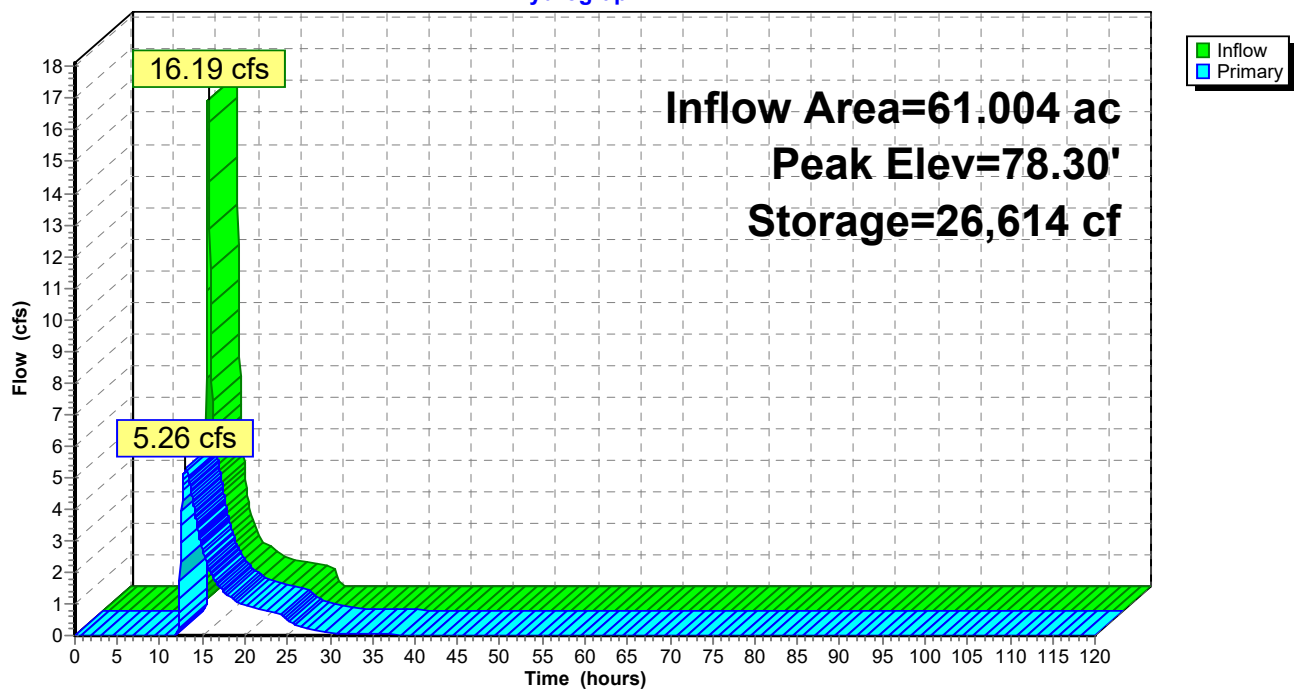
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Pond W-O: Wetland Series O

Hydrograph



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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth > 1.55" for 25-Year event
Inflow = 20.91 cfs @ 12.22 hrs, Volume= 5.509 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 80.17' @ 120.00 hrs Surf.Area= 90,392 sf Storage= 239,957 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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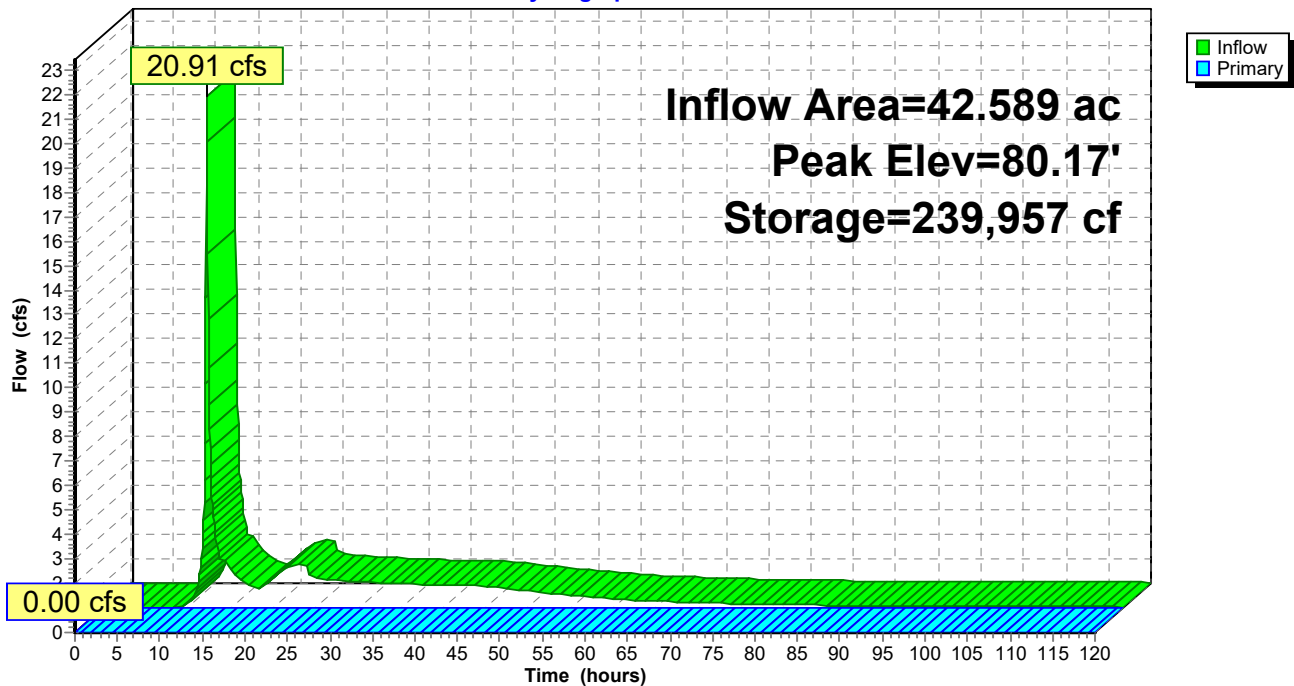
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Pond W-QP: Wetland Series Q & P

Hydrograph



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Summary for Pond W-R: Wetland Series R

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 2.12" for 25-Year event
Inflow = 36.99 cfs @ 12.29 hrs, Volume= 4.554 af
Outflow = 1.11 cfs @ 24.17 hrs, Volume= 3.877 af, Atten= 97%, Lag= 712.7 min
Primary = 1.11 cfs @ 24.17 hrs, Volume= 3.877 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 88.68' @ 24.17 hrs Surf.Area= 86,849 sf Storage= 138,784 cf

Plug-Flow detention time= 1,473.1 min calculated for 3.876 af (85% of inflow)
Center-of-Mass det. time= 1,358.2 min (2,318.1 - 959.9)

Volume	Invert	Avail.Storage	Storage Description
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.11 cfs @ 24.17 hrs HW=88.68' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.11 cfs @ 3.19 fps)

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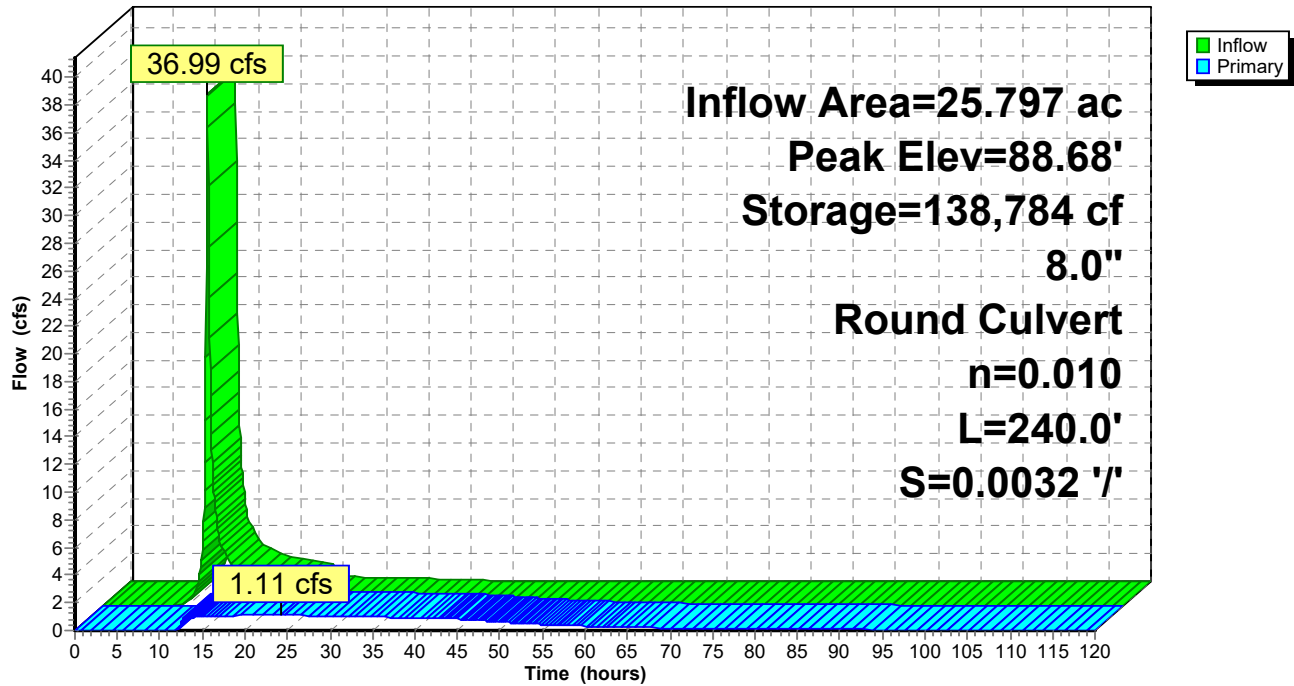
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Pond W-R: Wetland Series R

Hydrograph



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Summary for Subcatchment E-13:

Runoff = 2.62 cfs @ 12.19 hrs, Volume= 0.224 af, Depth= 2.07"

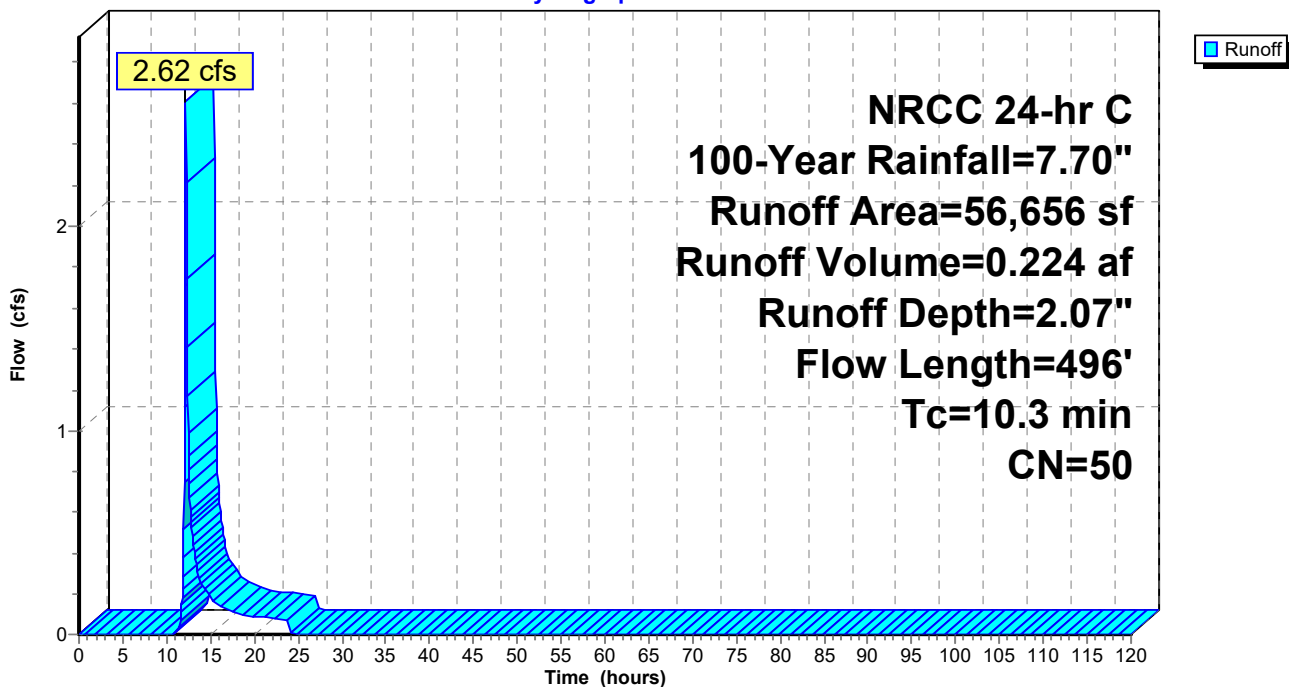
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
30,938	32	Woods/grass comb., Good, HSG A
25,718	72	Woods/grass comb., Good, HSG C
56,656	50	Weighted Average
56,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	50	0.0160	0.14		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
2.1	194	0.0479	1.53		Shallow Concentrated Flow, HR-C Short Grass Pasture Kv= 7.0 fps
2.2	252	0.0748	1.91		Shallow Concentrated Flow, HR-A Short Grass Pasture Kv= 7.0 fps
10.3	496	Total			

Subcatchment E-13:

Hydrograph



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Summary for Subcatchment P-10A: P-10A

Runoff = 0.39 cfs @ 12.17 hrs, Volume= 0.052 af, Depth= 0.78"

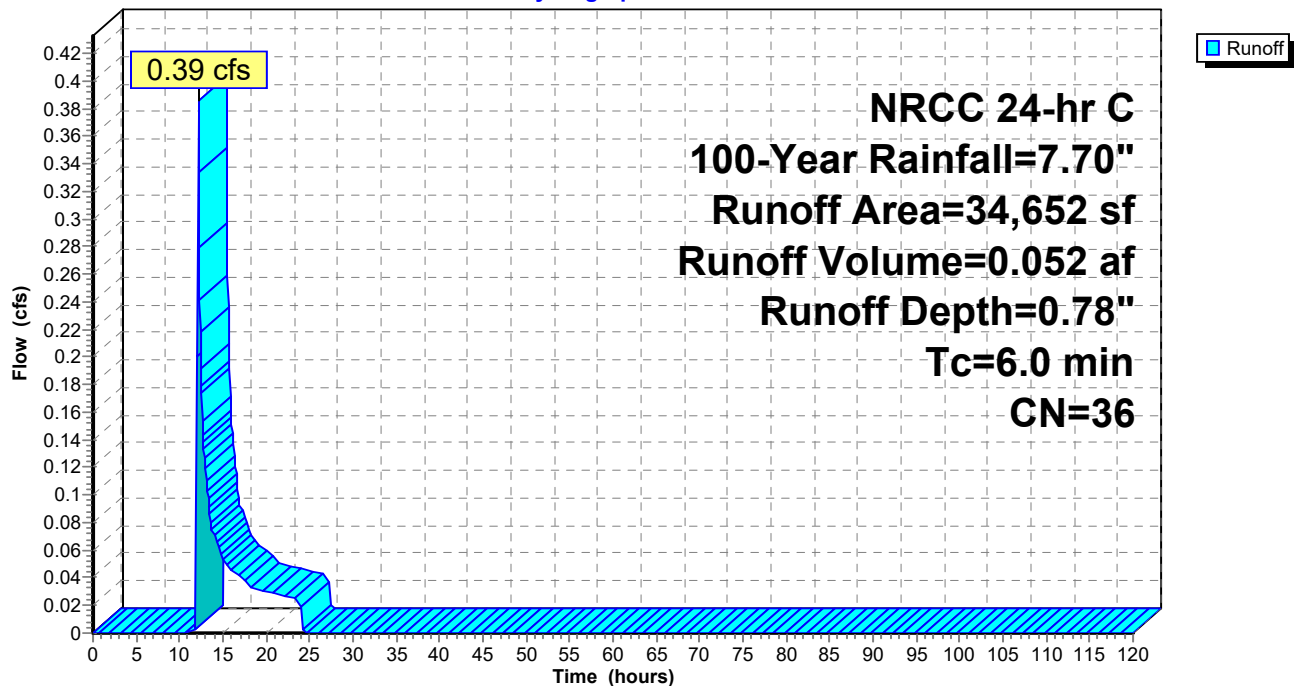
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	2,500	98	roof
	2,500	39	>75% Grass cover, Good, HSG A
	29,652	30	Woods, Good, HSG A
	34,652	36	Weighted Average
	32,152		92.79% Pervious Area
	2,500		7.21% Impervious Area

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

Subcatchment P-10A: P-10A

Hydrograph



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Summary for Subcatchment P-10B: P-10B

Runoff = 5.44 cfs @ 12.13 hrs, Volume= 0.370 af, Depth= 3.33"

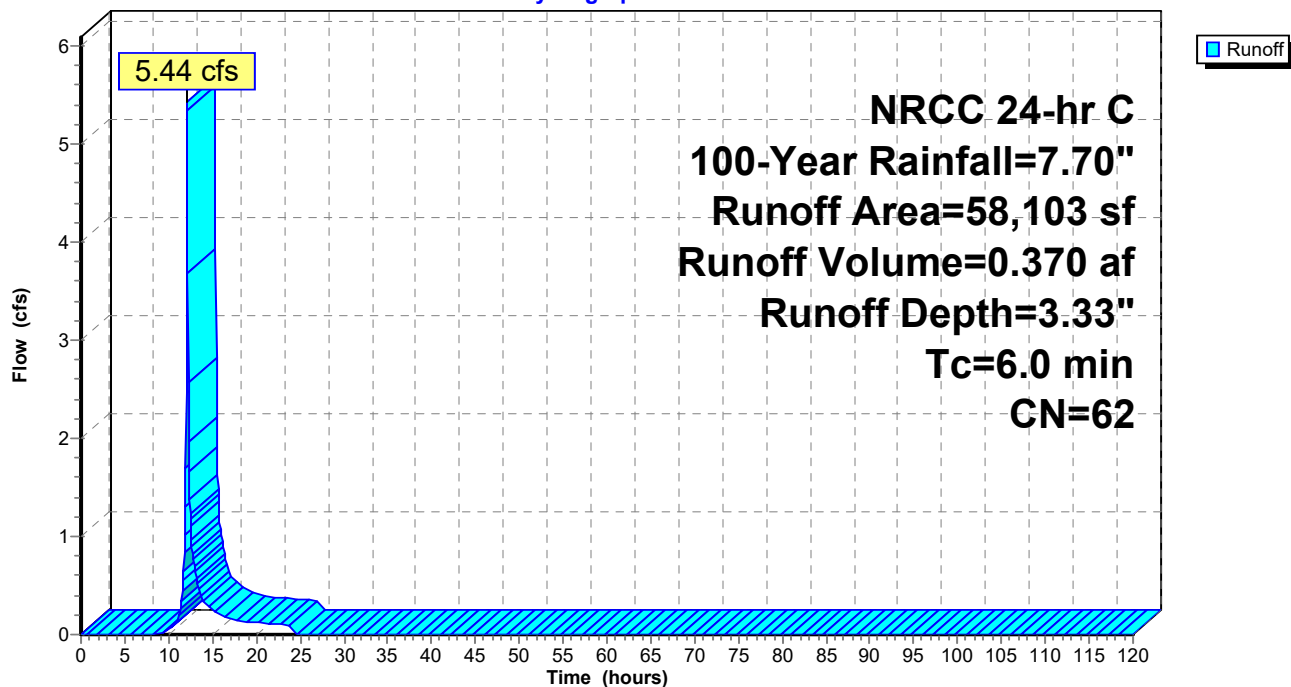
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	2,050	98	basin
	56,053	61	1/4 acre lots, 38% imp, HSG A
	58,103	62	Weighted Average
	34,753		59.81% Pervious Area
	23,350		40.19% Impervious Area

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

Subcatchment P-10B: P-10B

Hydrograph



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Summary for Subcatchment P-10U: P-10U

Runoff = 0.62 cfs @ 12.22 hrs, Volume= 0.116 af, Depth= 0.70"

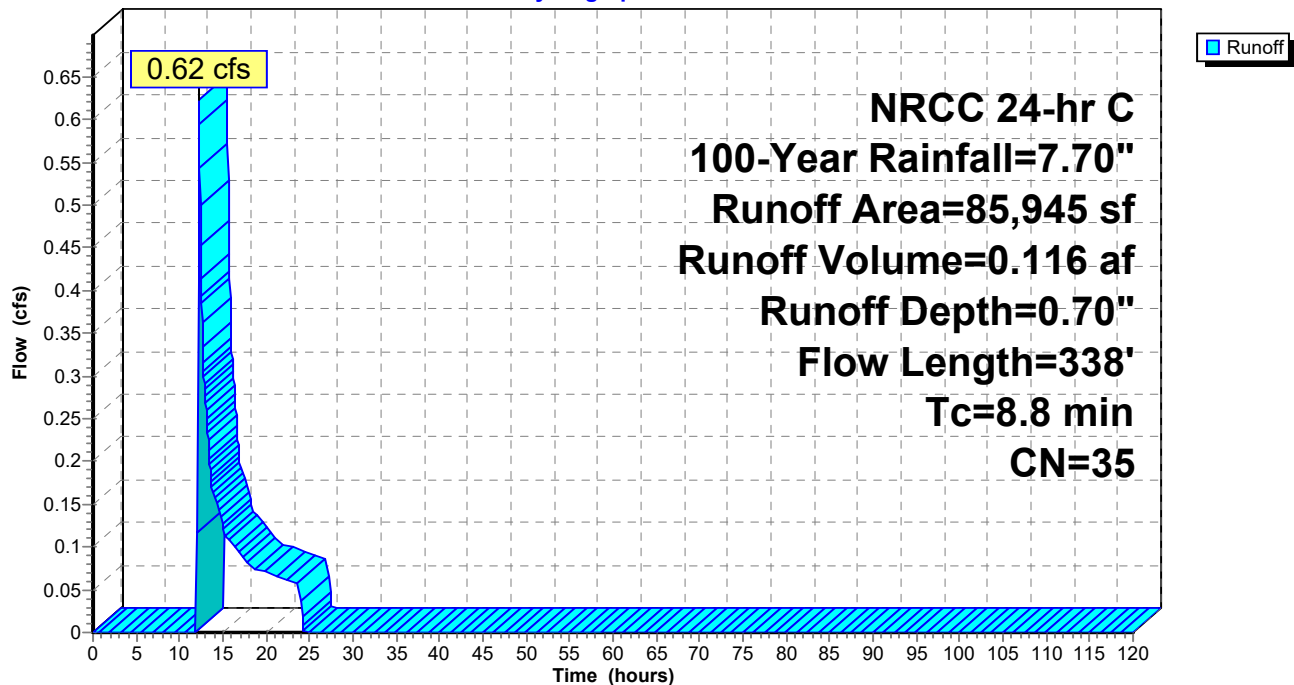
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
4,986	98	Paved parking, HSG A
68,659	30	Woods, Good, HSG A
12,300	39	>75% Grass cover, Good, HSG A
85,945	35	Weighted Average
80,959		94.20% Pervious Area
4,986		5.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0784	0.12		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
1.3	138	0.1246	1.76		Shallow Concentrated Flow, Wooded Woodland Kv= 5.0 fps
0.5	150	0.0729	5.48		Shallow Concentrated Flow, Paved Paved Kv= 20.3 fps
8.8	338	Total			

Subcatchment P-10U: P-10U

Hydrograph



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Summary for Subcatchment P-11A: P-11A

Runoff = 3.49 cfs @ 12.13 hrs, Volume= 0.237 af, Depth= 3.87"

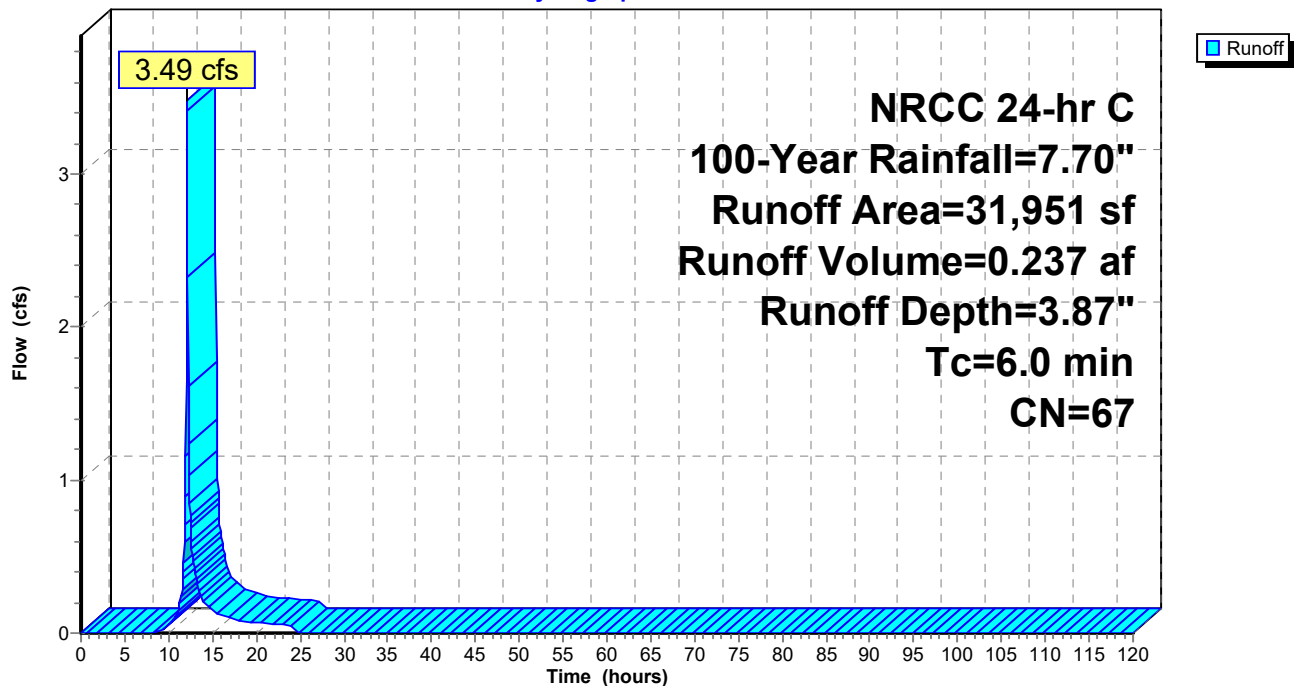
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
	16,752	39	>75% Grass cover, Good, HSG A
*	11,889	98	road with sidewalk
*	3,310	98	PARKING LOT
	31,951	67	Weighted Average
	16,752		52.43% Pervious Area
	15,199		47.57% Impervious Area

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

Subcatchment P-11A: P-11A

Hydrograph



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Summary for Subcatchment P-11B: P-11B

Runoff = 19.71 cfs @ 12.13 hrs, Volume= 1.343 af, Depth= 4.21"

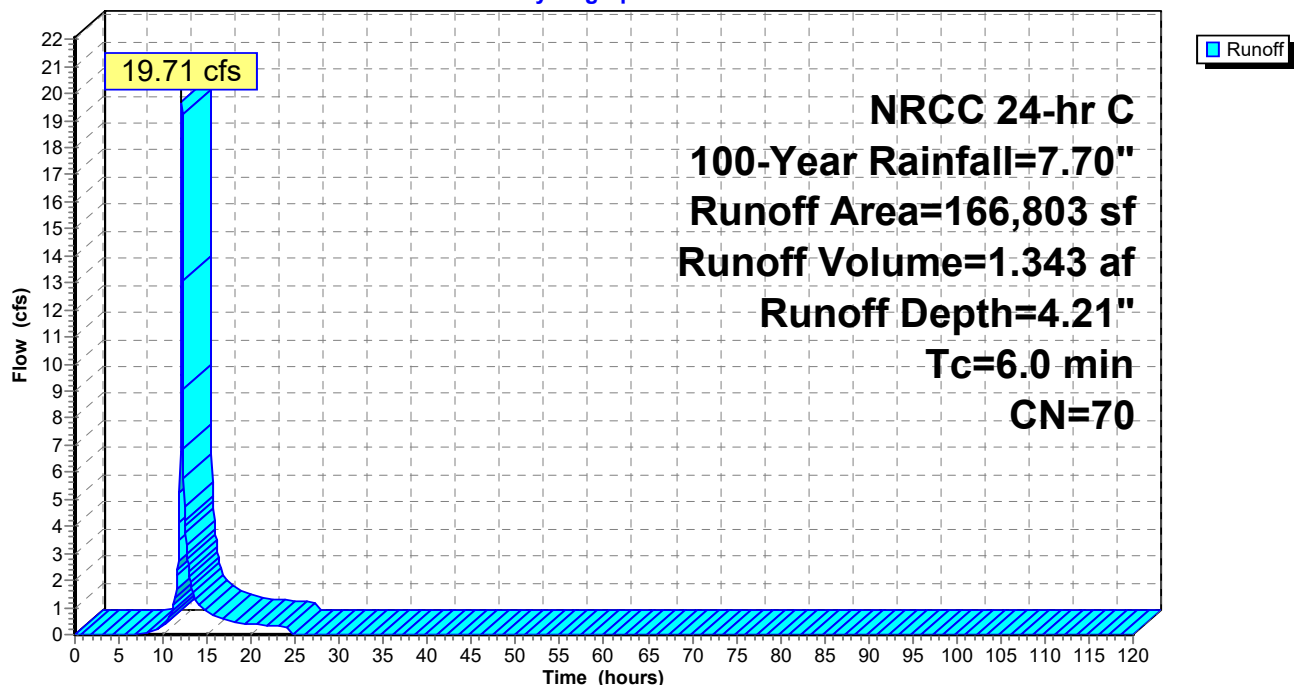
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	9,500	98	roof
	28,000	39	>75% Grass cover, Good, HSG A
	2,303	61	>75% Grass cover, Good, HSG B
*	127,000	75	stone field
	166,803	70	Weighted Average
	157,303		94.30% Pervious Area
	9,500		5.70% Impervious Area

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

Subcatchment P-11B: P-11B

Hydrograph



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Summary for Subcatchment P-11U: P-11U

Runoff = 0.86 cfs @ 12.26 hrs, Volume= 0.127 af, Depth= 0.95"

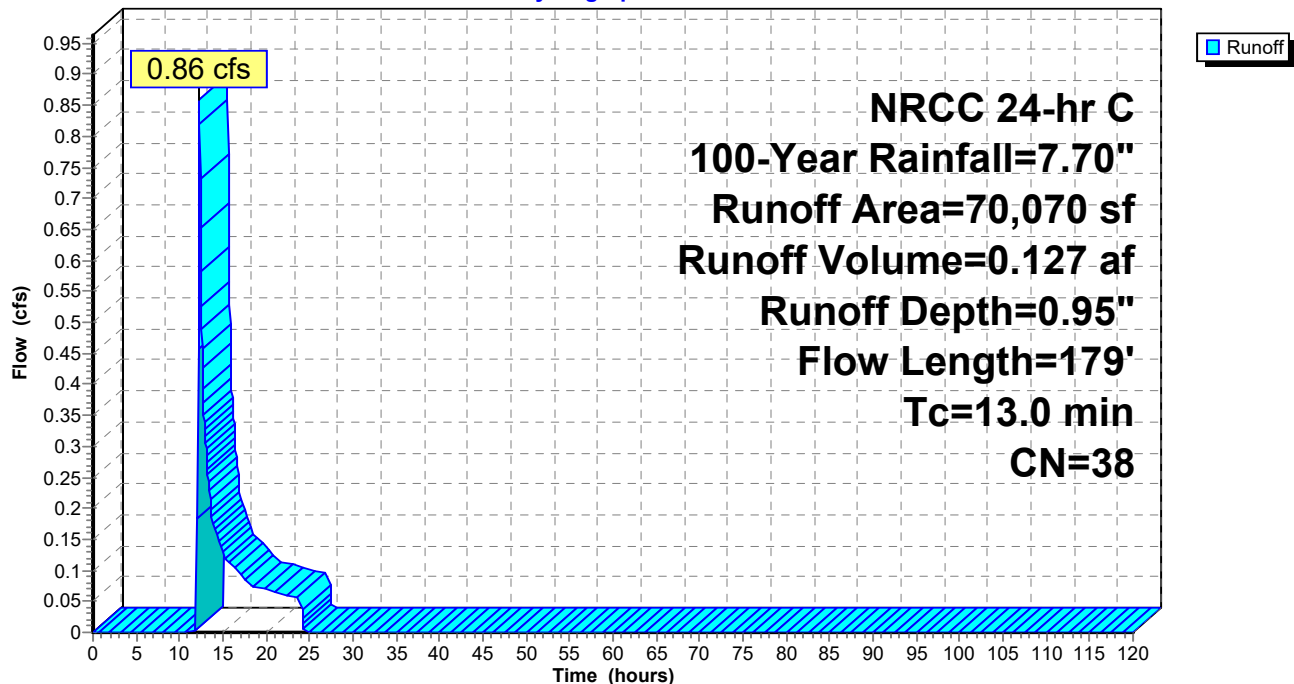
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
23,000	55	Woods, Good, HSG B
47,070	30	Woods, Good, HSG A
70,070	38	Weighted Average
70,070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0880	0.07		Sheet Flow, Sheet Flow Woods: Dense underbrush n= 0.800 P2= 3.37"
1.4	129	0.0942	1.53		Shallow Concentrated Flow, HR-B Woodland Kv= 5.0 fps
13.0	179	Total			

Subcatchment P-11U: P-11U

Hydrograph



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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Subcatchment P-12A: P-12A

Runoff = 32.01 cfs @ 12.13 hrs, Volume= 2.176 af, Depth= 3.98"

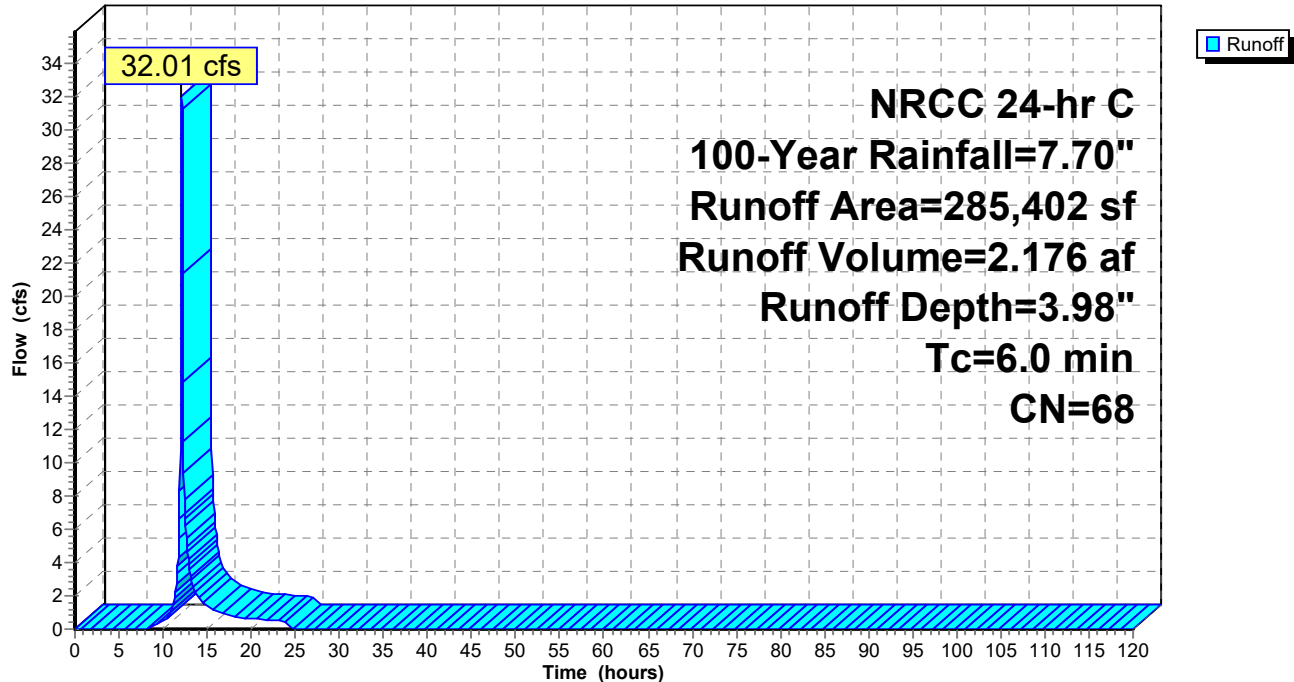
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	9,500	98	basin
	138,400	75	1/4 acre lots, 38% imp, HSG B
	33,000	61	1/4 acre lots, 38% imp, HSG A
	87,300	61	>75% Grass cover, Good, HSG B
	17,202	39	>75% Grass cover, Good, HSG A
	285,402	68	Weighted Average
	210,770		73.85% Pervious Area
	74,632		26.15% Impervious Area

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

Subcatchment P-12A: P-12A

Hydrograph



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Summary for Subcatchment P-12B: P-12B

Runoff = 24.82 cfs @ 12.14 hrs, Volume= 1.701 af, Depth= 2.90"

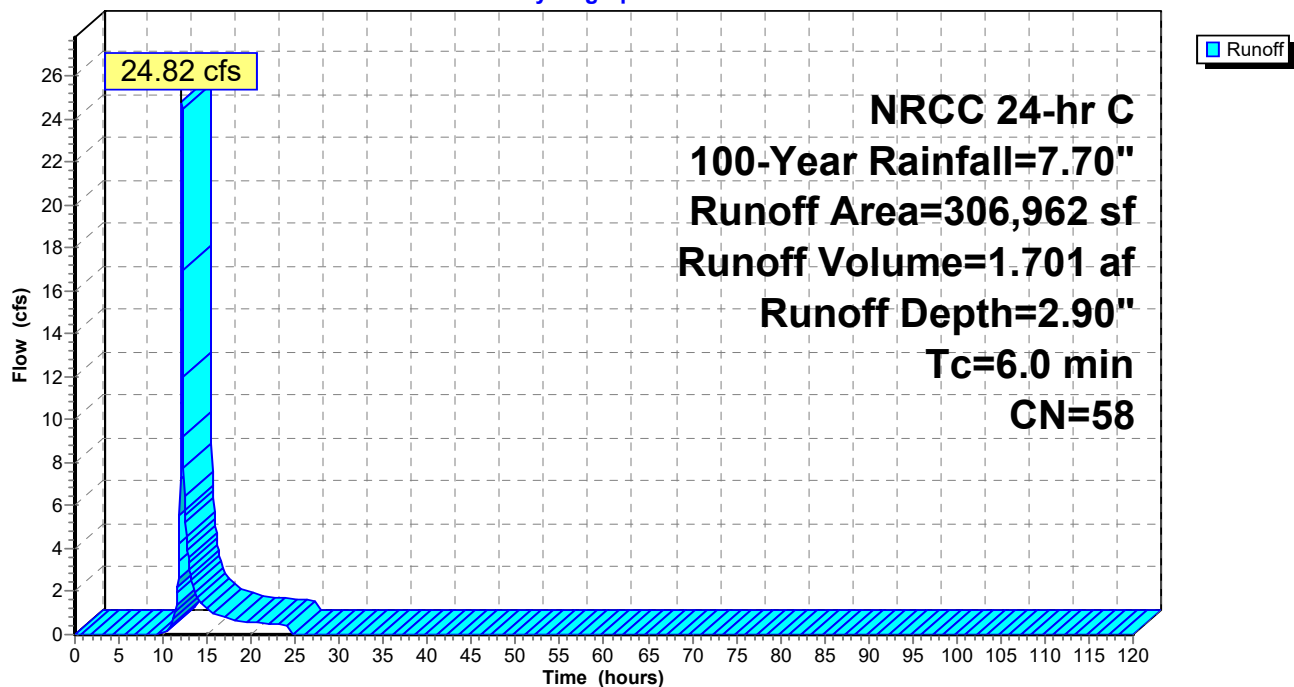
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	22,500	98	basin
	110,800	75	1/4 acre lots, 38% imp, HSG B
	164,162	39	>75% Grass cover, Good, HSG A
*	9,500	98	PARKING LOT
	306,962	58	Weighted Average
	232,858		75.86% Pervious Area
	74,104		24.14% Impervious Area

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

Subcatchment P-12B: P-12B

Hydrograph



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Summary for Subcatchment P-12U: P-12U

Runoff = 5.56 cfs @ 12.19 hrs, Volume= 0.500 af, Depth= 1.68"

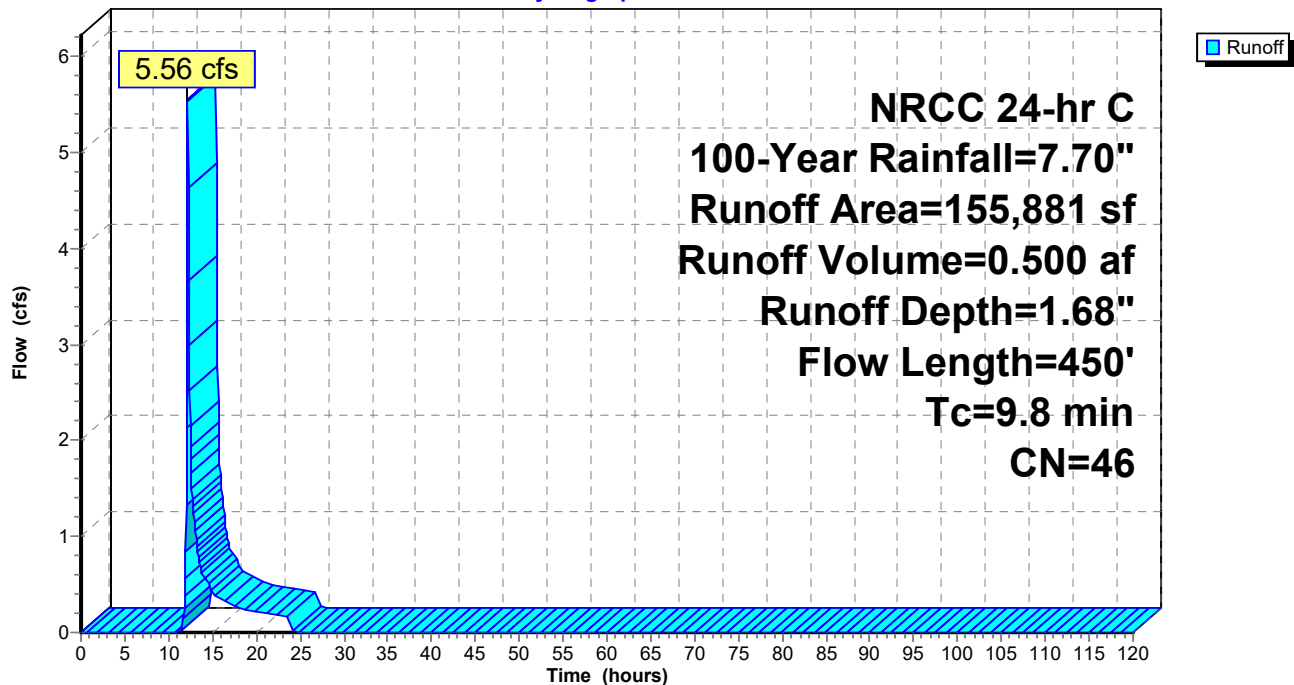
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
80,000	32	Woods/grass comb., Good, HSG A
59,250	58	Woods/grass comb., Good, HSG B
900	79	Woods/grass comb., Good, HSG D
* 5,000	98	2 units roof
10,731	61	>75% Grass cover, Good, HSG B
155,881	46	Weighted Average
150,881		96.79% Pervious Area
5,000		3.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.1200	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
3.9	400	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.8	450	Total			

Subcatchment P-12U: P-12U

Hydrograph



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Summary for Subcatchment P-14: P-14

Runoff = 64.06 cfs @ 12.32 hrs, Volume= 7.016 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
268,666	32	Woods/grass comb., Good, HSG A
329,442	58	Woods/grass comb., Good, HSG B
623,088	72	Woods/grass comb., Good, HSG C
1,221,196	59	Weighted Average
1,221,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	100	0.0200	0.17		Sheet Flow, Grass Grass: Short n= 0.150 P2= 3.37"
0.8	25	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.2	185	0.0417	1.43		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.3	31	0.0470	1.52		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.5	173	0.0279	1.17		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0514	1.59		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.1	181	0.0409	1.42		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	82	0.0343	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.7	129	0.0339	1.29		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
21.0	981	Total			

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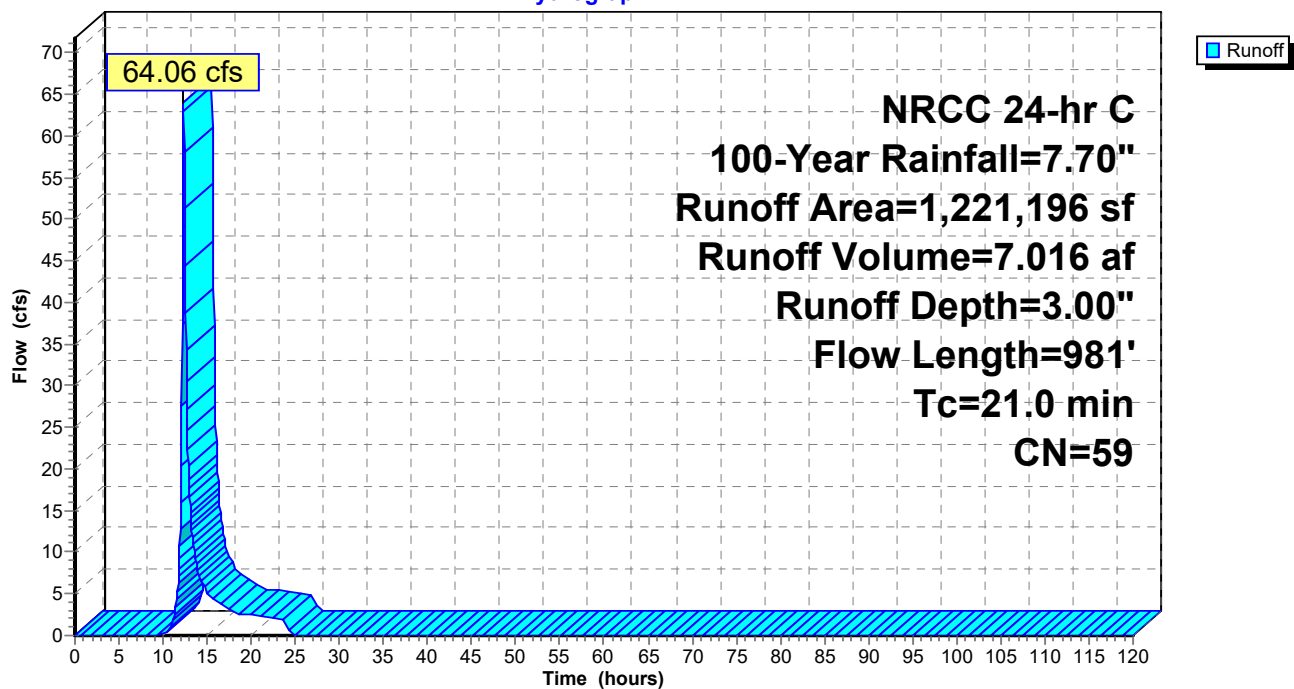
NRCC 24-hr C 100-Year Rainfall=7.70"

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Subcatchment P-14: P-14

Hydrograph



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Summary for Subcatchment P-15A: P-15A

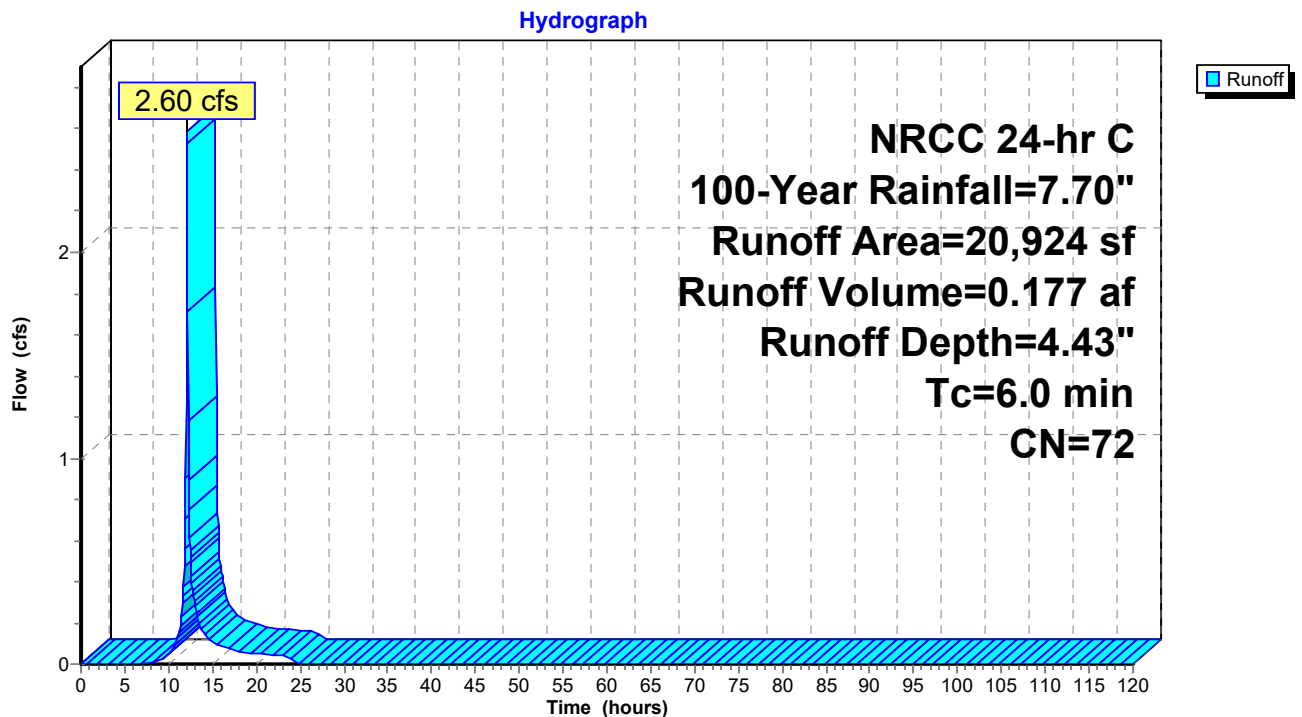
Runoff = 2.60 cfs @ 12.13 hrs, Volume= 0.177 af, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	300	98	BASIN
*	5,800	98	2.5 UNITS
	14,824	61	>75% Grass cover, Good, HSG B
	20,924	72	Weighted Average
	14,824		70.85% Pervious Area
	6,100		29.15% Impervious Area

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

Subcatchment P-15A: P-15A



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Summary for Subcatchment P-15U: P-15U

Runoff = 3.36 cfs @ 12.19 hrs, Volume= 0.287 af, Depth= 2.17"

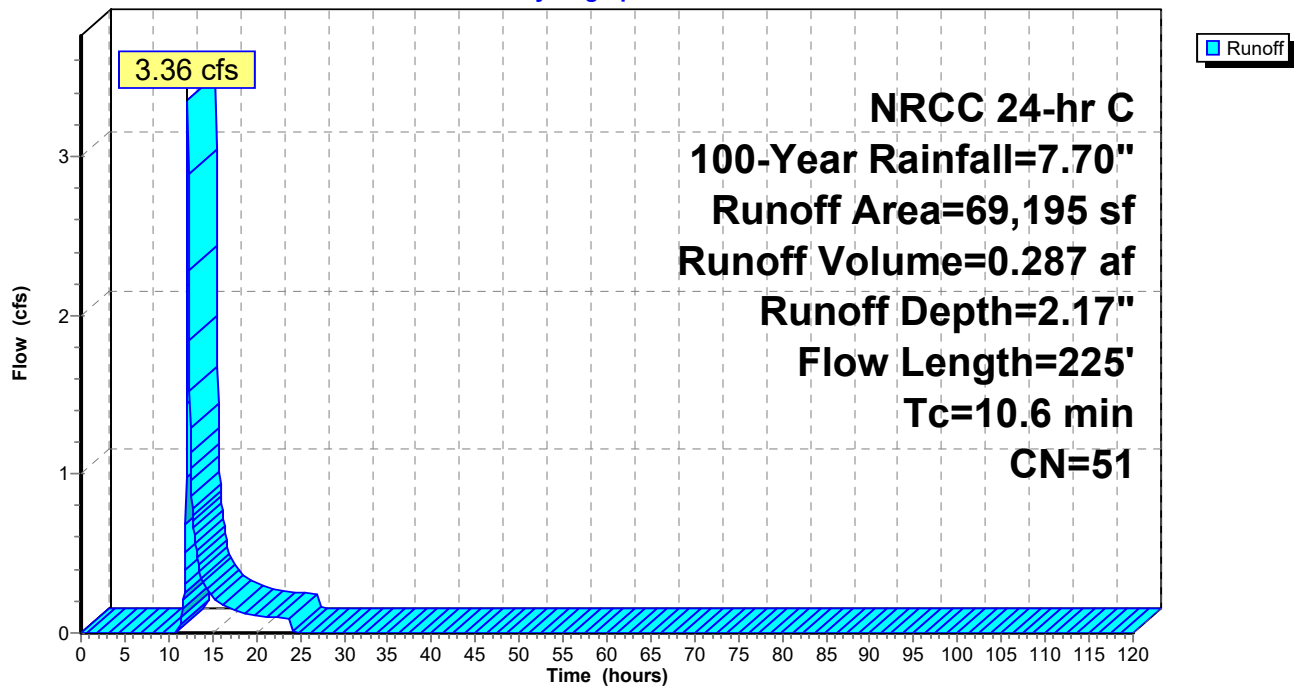
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
13,300	55	Woods, Good, HSG B
26,658	61	>75% Grass cover, Good, HSG B
22,600	30	Woods, Good, HSG A
5,500	77	Woods, Good, HSG D
1,137	39	>75% Grass cover, Good, HSG A
69,195	51	Weighted Average
69,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
2.3	175	0.0650	1.27		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
10.6	225	Total			

Subcatchment P-15U: P-15U

Hydrograph



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Summary for Subcatchment P-1A: P-1A

Runoff = 23.30 cfs @ 12.13 hrs, Volume= 1.613 af, Depth= 5.00"

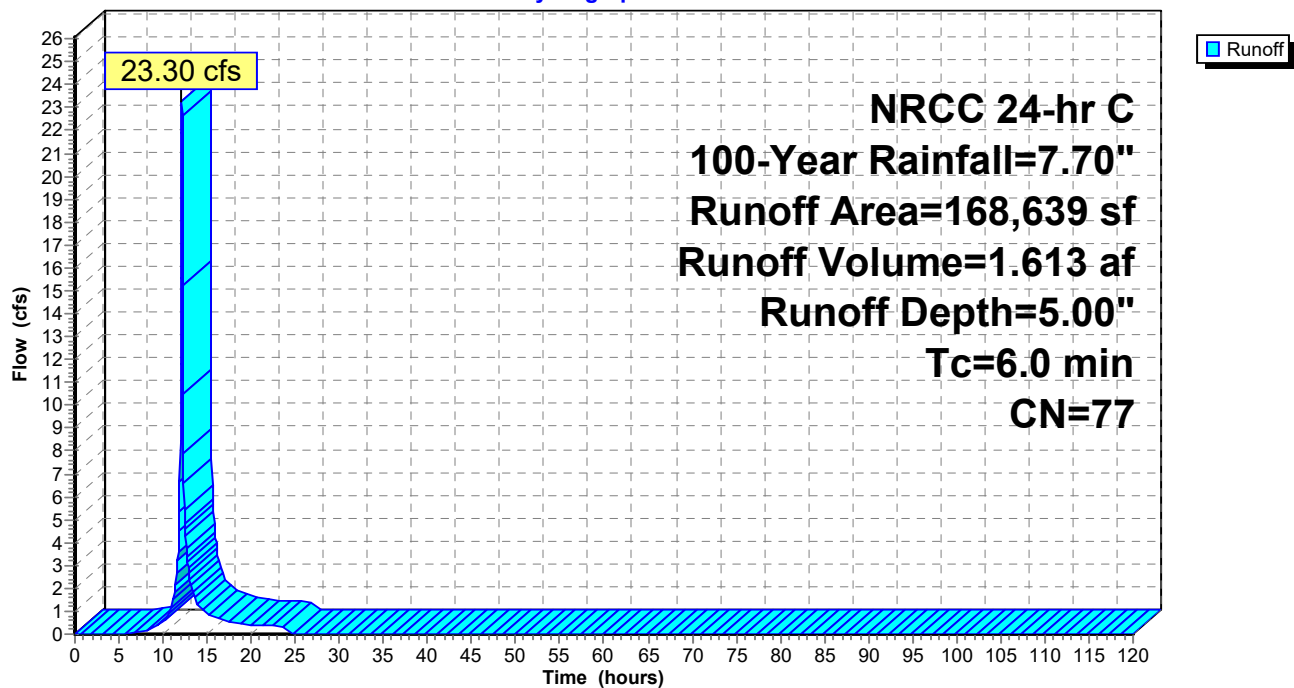
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	5,750	98	basin
*	38,880	98	1620 lf of road
*	3,150	98	630 lf of sidewalk
*	2,500	98	1 unit
*	23,400	98	17 units driveway
	7,380	55	Woods, Good, HSG B
	87,579	61	>75% Grass cover, Good, HSG B
	168,639	77	Weighted Average
	94,959		56.31% Pervious Area
	73,680		43.69% Impervious Area

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

Subcatchment P-1A: P-1A

Hydrograph



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Summary for Subcatchment P-1B: P-1B

Runoff = 17.24 cfs @ 12.33 hrs, Volume= 1.911 af, Depth= 3.65"

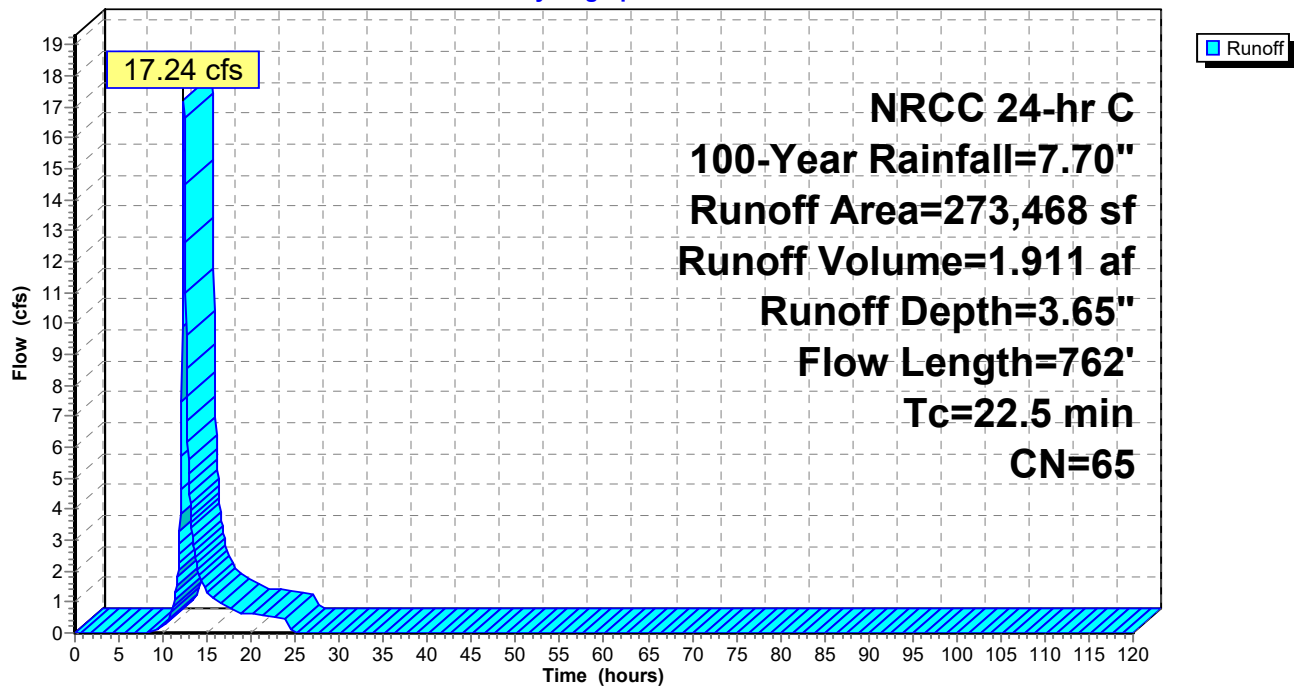
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
* 3,150	98	BASIN
* 8,000	85	500 LF GRAVEL ROAD B SOILS
* 18,750	98	7.5 UNITS
243,568	61	>75% Grass cover, Good, HSG B
273,468	65	Weighted Average
251,568		91.99% Pervious Area
21,900		8.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
17.0	712	0.0100	0.70		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
22.5	762	Total			

Subcatchment P-1B: P-1B

Hydrograph



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Summary for Subcatchment P-1C: P-1C

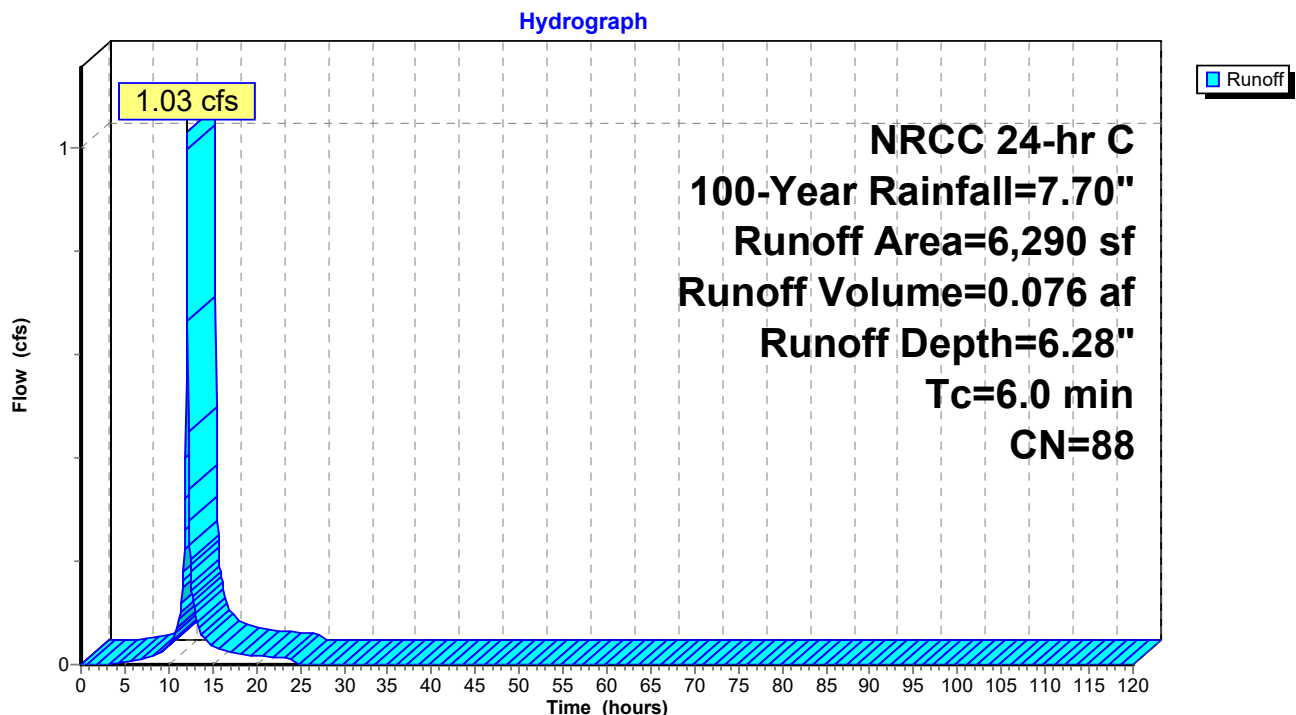
Runoff = 1.03 cfs @ 12.13 hrs, Volume= 0.076 af, Depth= 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	70	98	BASIN
*	3,744	98	156 LF OF ROAD
*	780	98	156 LF OF SIDEWALK
	1,696	61	>75% Grass cover, Good, HSG B
	6,290	88	Weighted Average
	1,696		26.96% Pervious Area
	4,594		73.04% Impervious Area

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

Subcatchment P-1C: P-1C



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Summary for Subcatchment P-1U: P-1U

Runoff = 14.31 cfs @ 12.21 hrs, Volume= 1.222 af, Depth= 3.22"

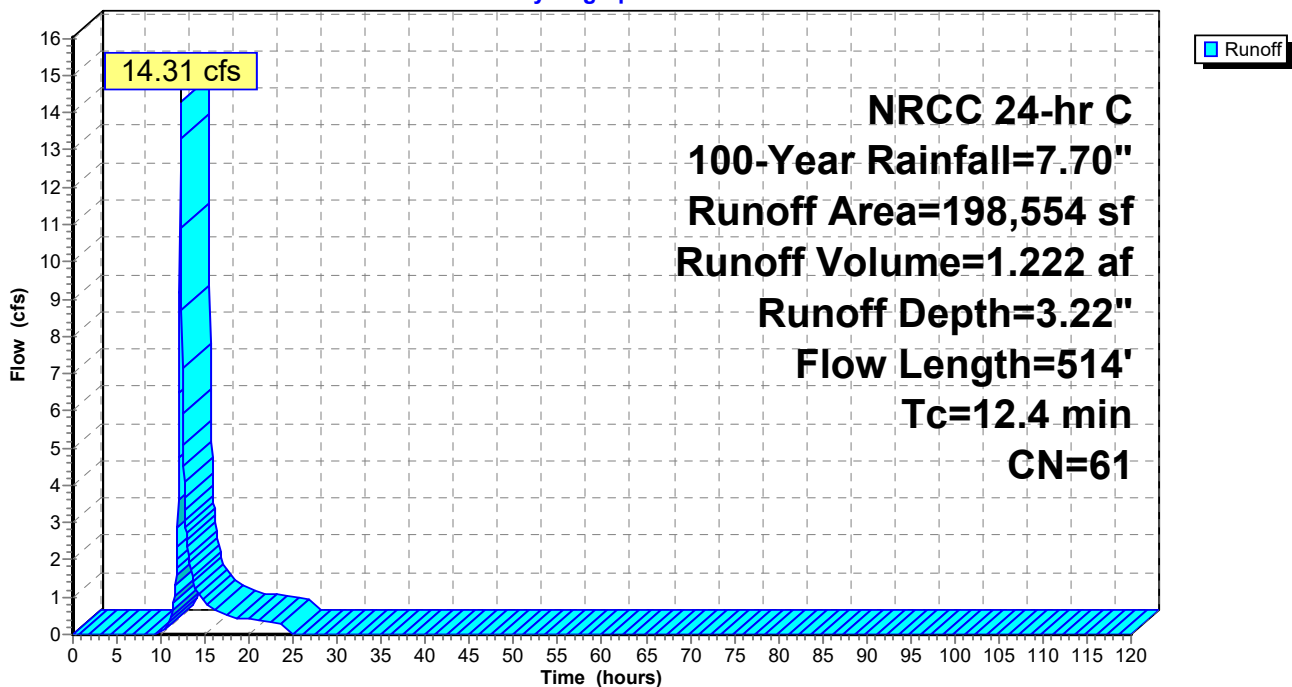
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
107,304	61	>75% Grass cover, Good, HSG B
80,000	55	Woods, Good, HSG B
* 11,250	98	4.5 UNITS
198,554	61	Weighted Average
187,304		94.33% Pervious Area
11,250		5.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1400	0.15		Sheet Flow, Wooded Woods: Light underbrush n= 0.400 P2= 3.37"
6.9	464	0.0500	1.12		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
12.4	514	Total			

Subcatchment P-1U: P-1U

Hydrograph



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Summary for Subcatchment P-2A: P-2A

Runoff = 9.40 cfs @ 12.13 hrs, Volume= 0.640 af, Depth= 3.22"

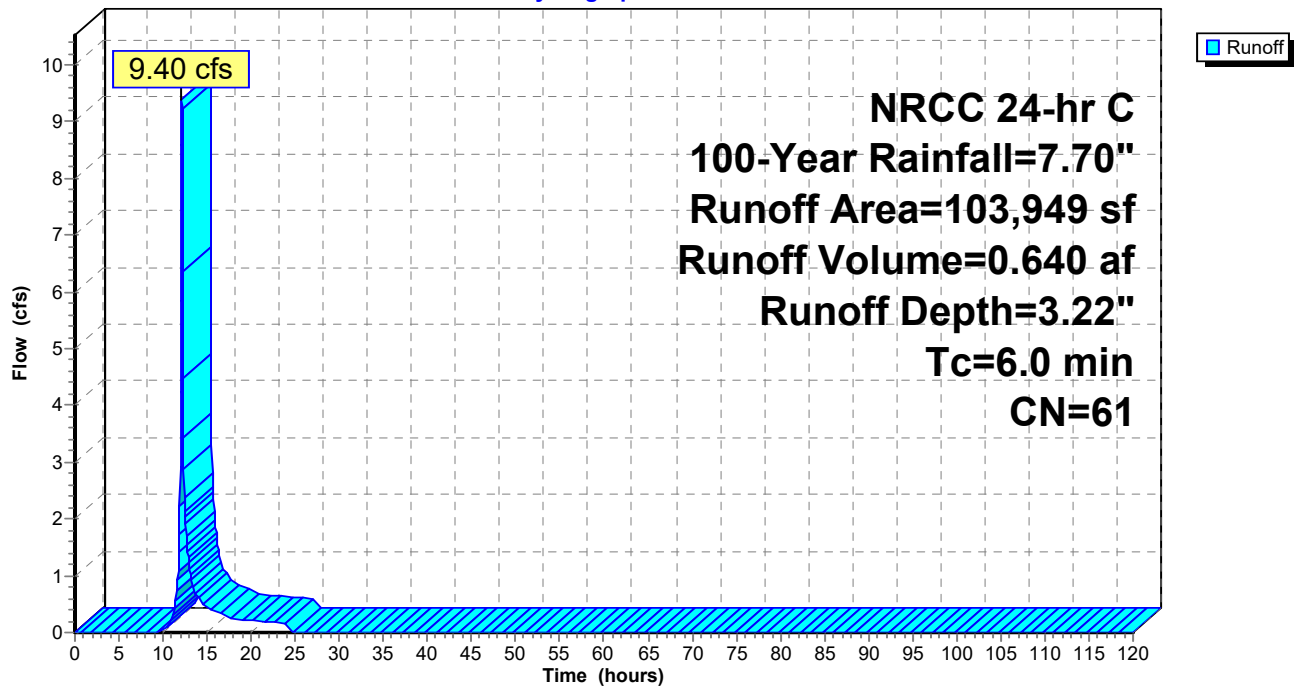
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
103,949	61	1/4 acre lots, 38% imp, HSG A
64,448		62.00% Pervious Area
39,501		38.00% Impervious Area

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

Subcatchment P-2A: P-2A

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Summary for Subcatchment P-2B: P-2B

Runoff = 5.83 cfs @ 12.13 hrs, Volume= 0.396 af, Depth= 4.10"

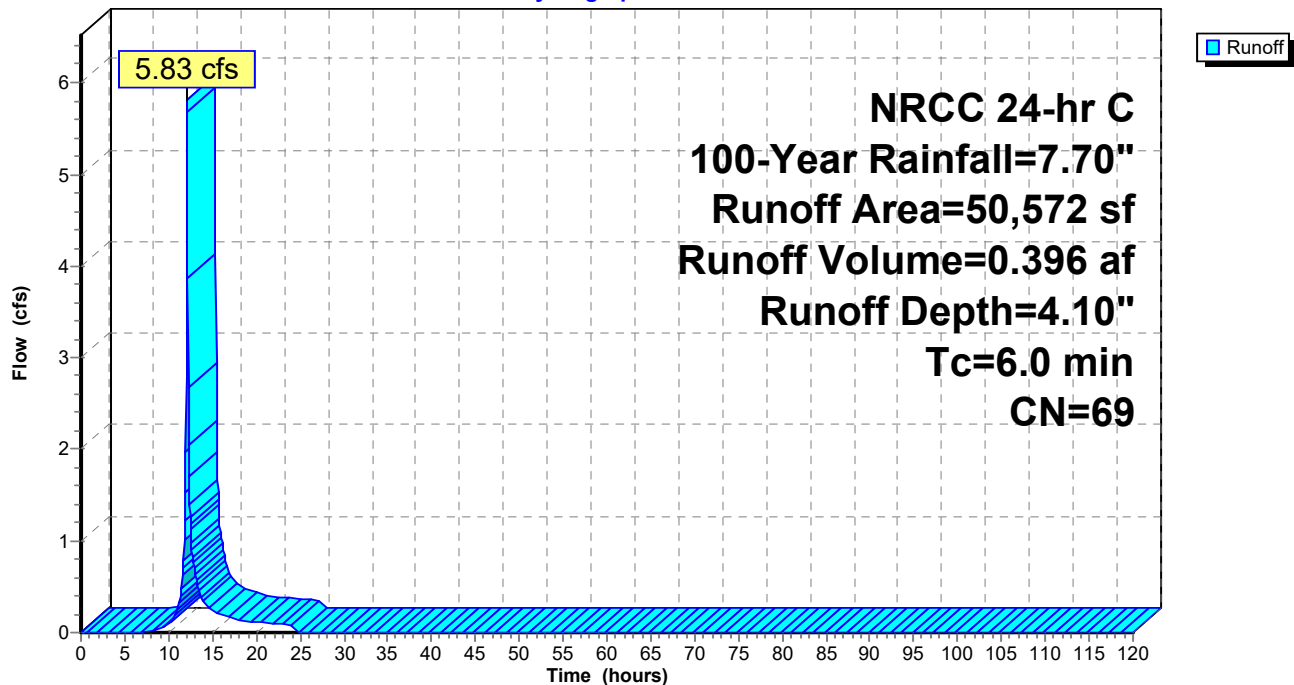
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
34,300	61	1/4 acre lots, 38% imp, HSG A
16,272	87	1/4 acre lots, 38% imp, HSG D
50,572	69	Weighted Average
31,355		62.00% Pervious Area
19,217		38.00% Impervious Area

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

Subcatchment P-2B: P-2B

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Summary for Subcatchment P-2C: P-2C

Runoff = 10.04 cfs @ 12.13 hrs, Volume= 0.721 af, Depth= 5.92"

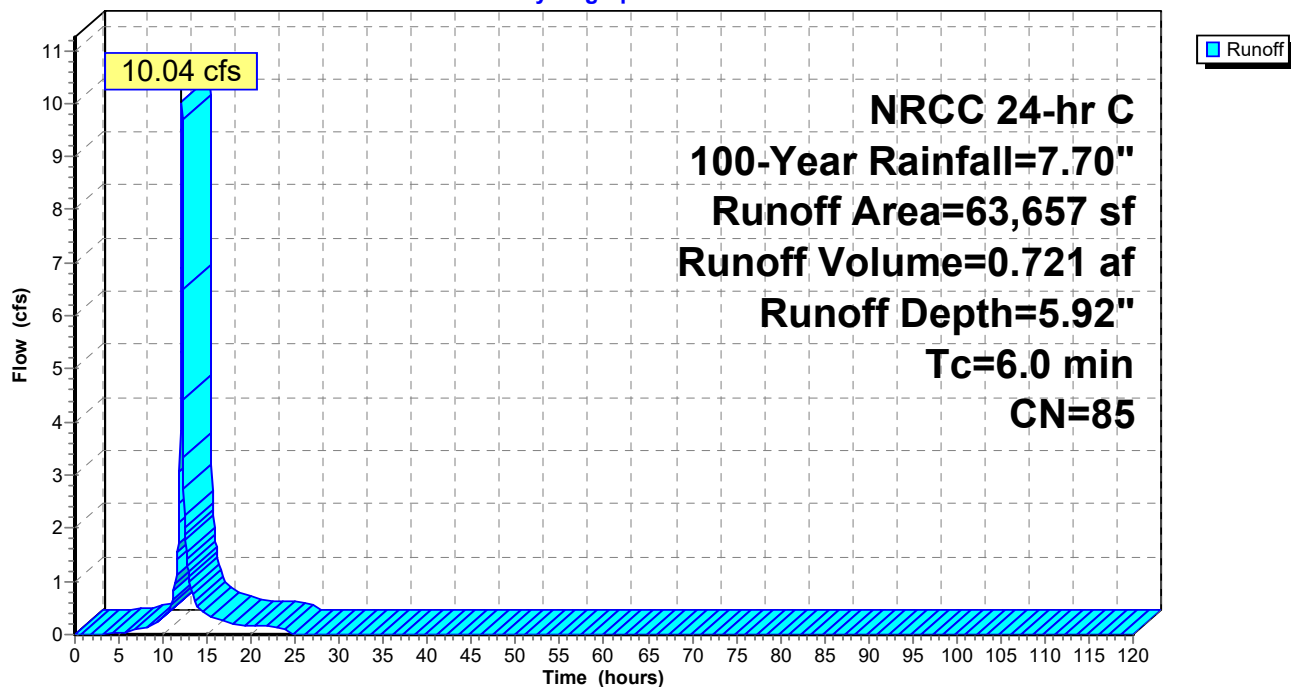
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
54,284	87	1/4 acre lots, 38% imp, HSG D
9,373	75	1/4 acre lots, 38% imp, HSG B
63,657	85	Weighted Average
39,467		62.00% Pervious Area
24,190		38.00% Impervious Area

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

Subcatchment P-2C: P-2C

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Summary for Subcatchment P-2D: P-2D

Runoff = 40.57 cfs @ 12.13 hrs, Volume= 2.754 af, Depth= 3.76"

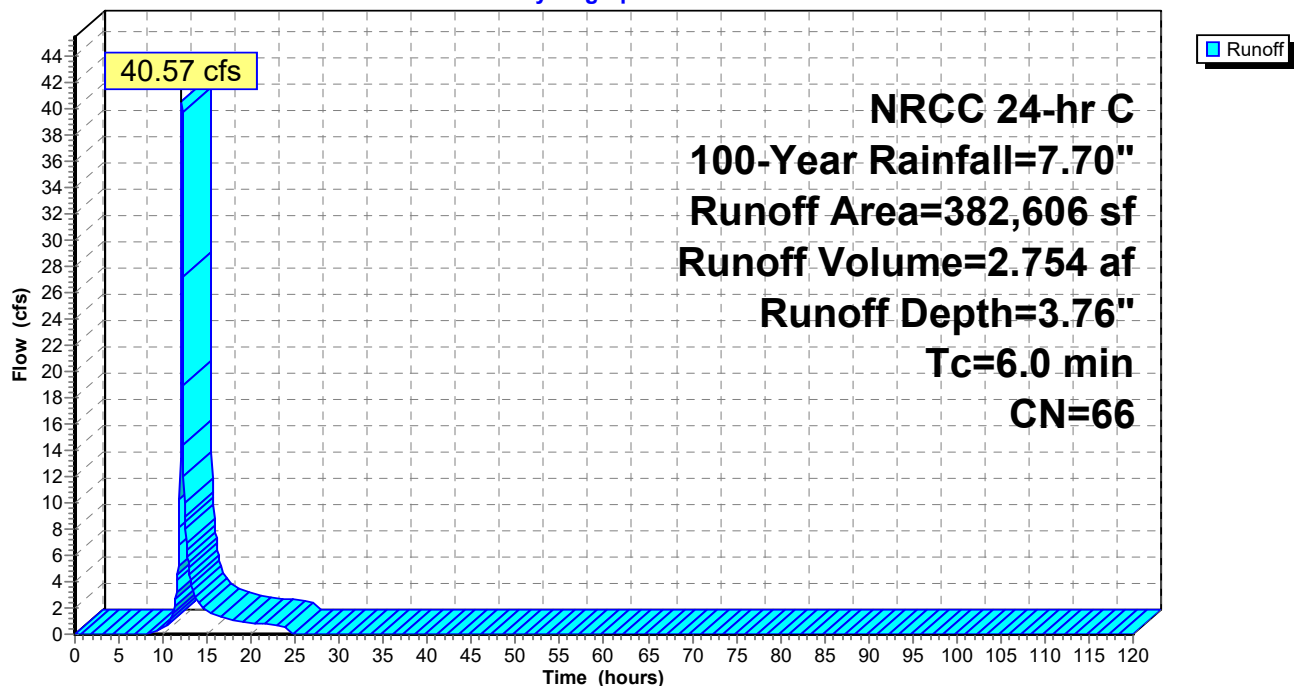
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
163,640	61	1/4 acre lots, 38% imp, HSG A
82,633	87	1/4 acre lots, 38% imp, HSG D
* 15,400	98	basin
30,500	30	Woods, Good, HSG A
9,200	77	Woods, Good, HSG D
* 17,400	98	exist impervious
13,000	74	>75% Grass cover, Good, HSG C
10,000	80	>75% Grass cover, Good, HSG D
40,833	39	>75% Grass cover, Good, HSG A
382,606	66	Weighted Average
256,222		66.97% Pervious Area
126,384		33.03% Impervious Area

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

Subcatchment P-2D: P-2D

Hydrograph



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Summary for Subcatchment P-2E: P-2E

Runoff = 15.79 cfs @ 12.13 hrs, Volume= 1.097 af, Depth= 5.11"

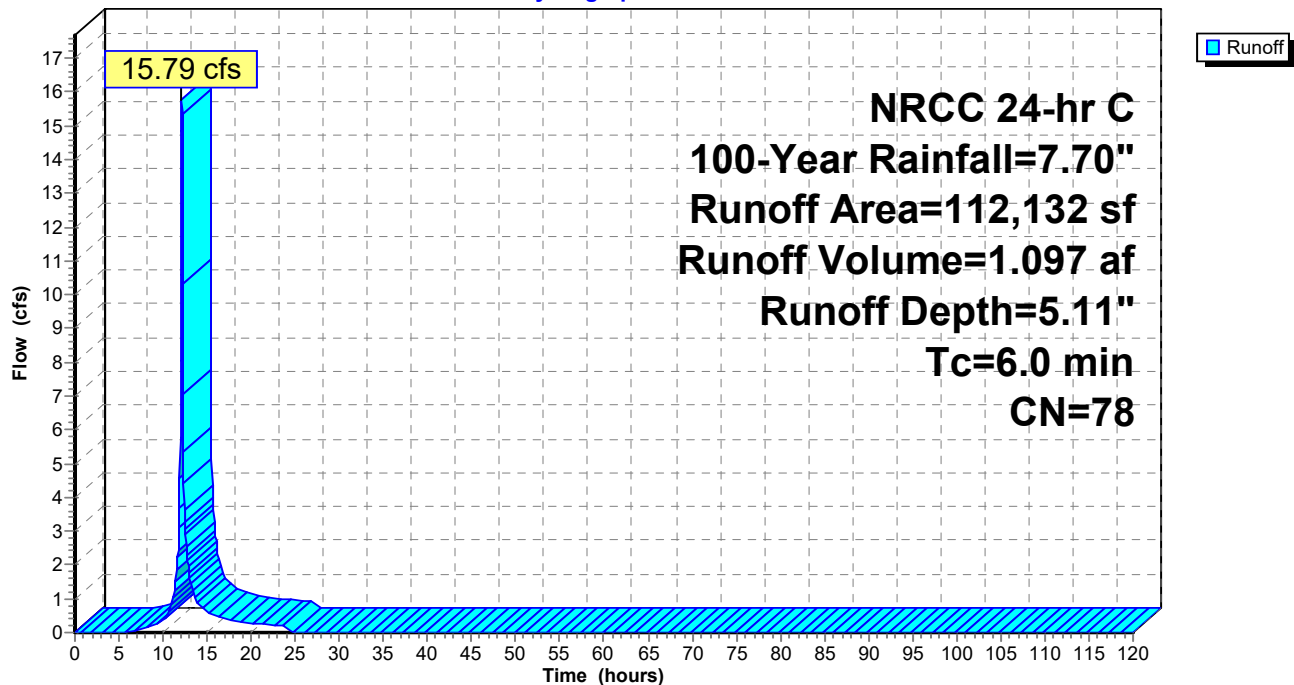
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	12,500	98	basin
	99,632	75	1/4 acre lots, 38% imp, HSG B
	112,132	78	Weighted Average
	61,772		55.09% Pervious Area
	50,360		44.91% Impervious Area

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

Subcatchment P-2E: P-2E

Hydrograph



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Summary for Subcatchment P-2F: P-2F

Runoff = 19.20 cfs @ 12.13 hrs, Volume= 1.325 af, Depth= 4.89"

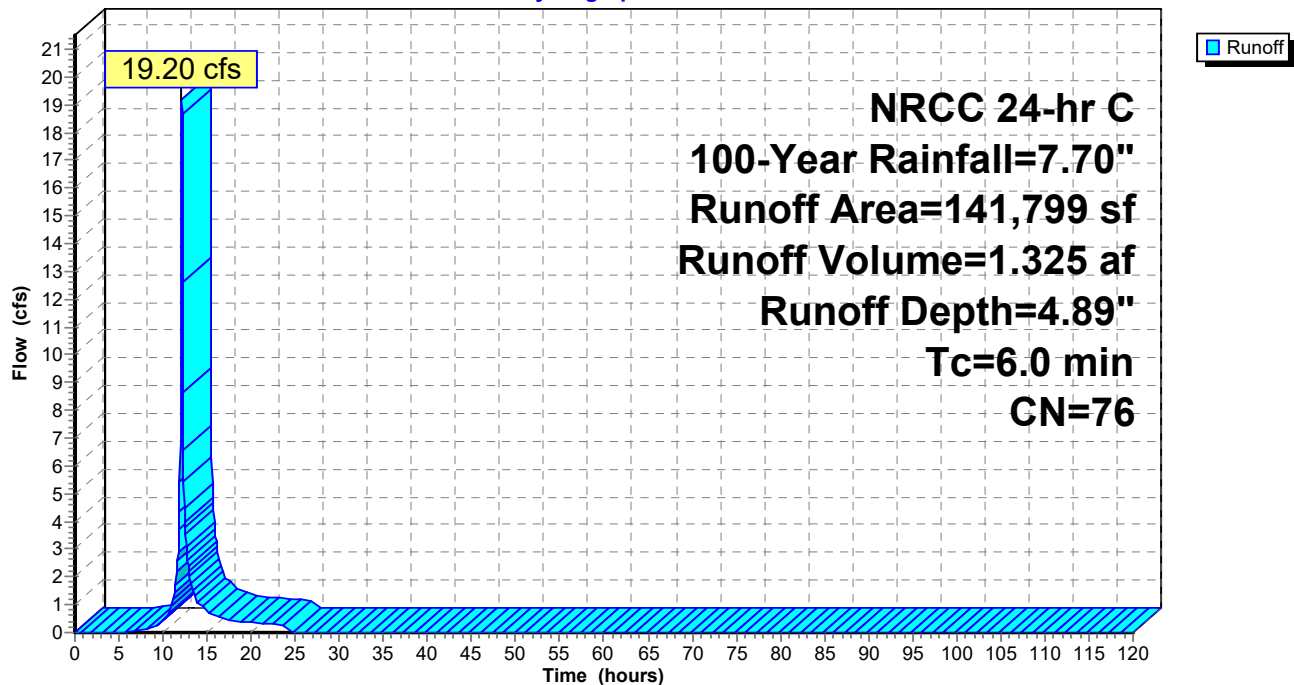
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
134,299	75	1/4 acre lots, 38% imp, HSG B
* 7,500	98	basin
141,799	76	Weighted Average
83,265		58.72% Pervious Area
58,534		41.28% Impervious Area

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

Subcatchment P-2F: P-2F

Hydrograph



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Summary for Subcatchment P-2U: P-2U

Runoff = 62.66 cfs @ 12.52 hrs, Volume= 9.075 af, Depth= 3.87"

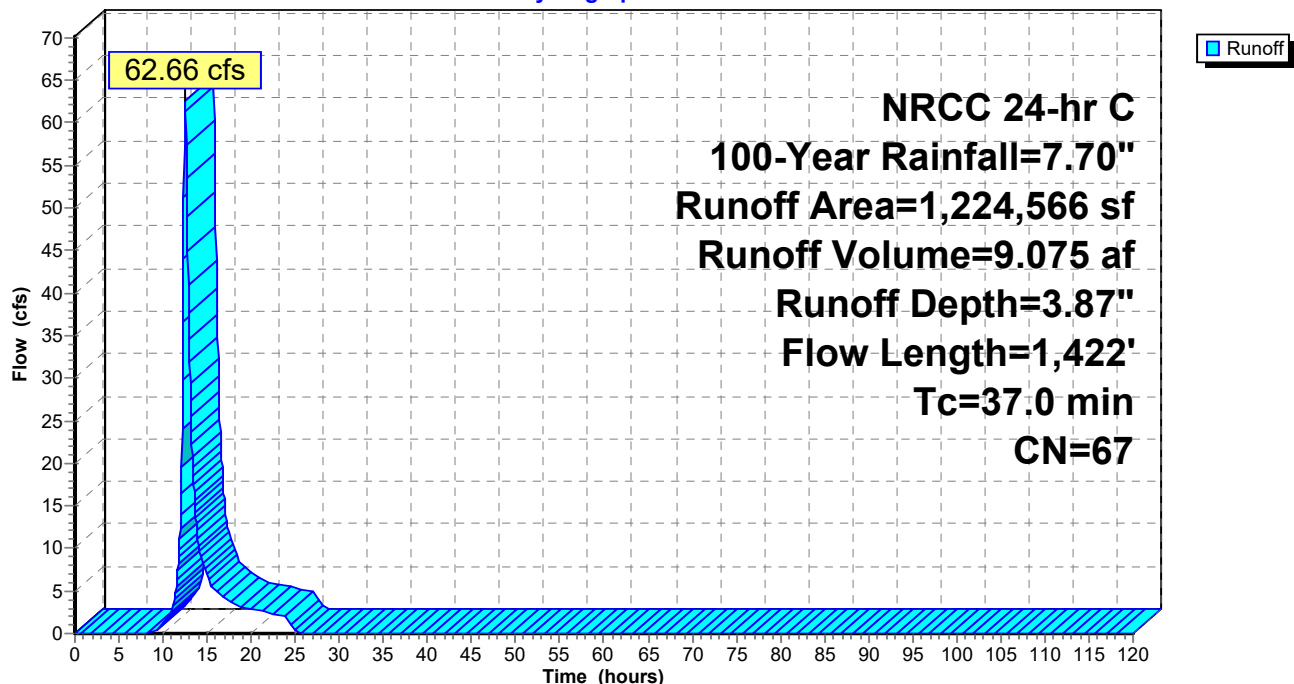
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
126,300	32	Woods/grass comb., Good, HSG A
394,200	58	Woods/grass comb., Good, HSG B
232,300	72	Woods/grass comb., Good, HSG C
418,475	79	Woods/grass comb., Good, HSG D
* 53,291	98	Wetland, HSG D
1,224,566	67	Weighted Average
1,171,275		95.65% Pervious Area
53,291		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	100	0.0830	0.31		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
25.9	973	0.0080	0.63		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	349	0.0040	1.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
37.0	1,422	Total			

Subcatchment P-2U: P-2U

Hydrograph



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Summary for Subcatchment P-3A: P-3A

Runoff = 14.81 cfs @ 12.13 hrs, Volume= 1.052 af, Depth= 5.69"

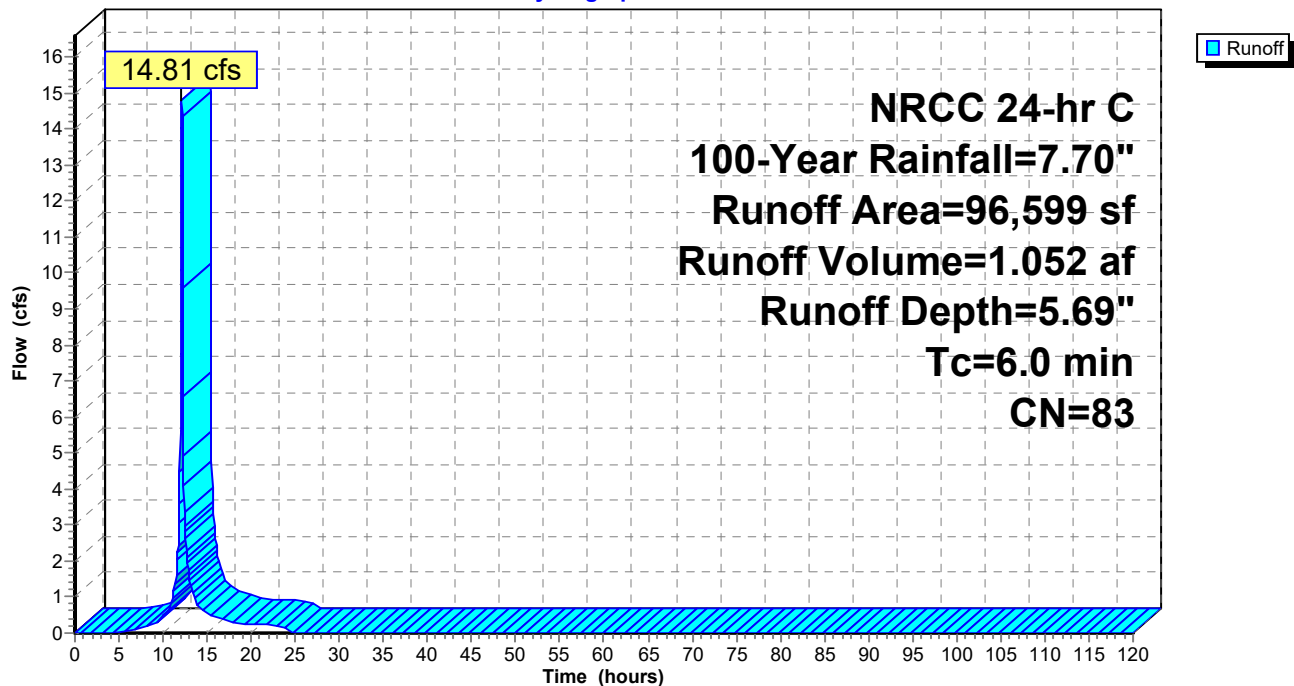
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	4,600	98	BASIN
	36,100	75	1/4 acre lots, 38% imp, HSG B
	55,899	87	1/4 acre lots, 38% imp, HSG D
	96,599	83	Weighted Average
	57,039		59.05% Pervious Area
	39,560		40.95% Impervious Area

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

Subcatchment P-3A: P-3A

Hydrograph



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Summary for Subcatchment P-3B: P-3B

Runoff = 34.55 cfs @ 12.13 hrs, Volume= 2.372 af, Depth= 4.66"

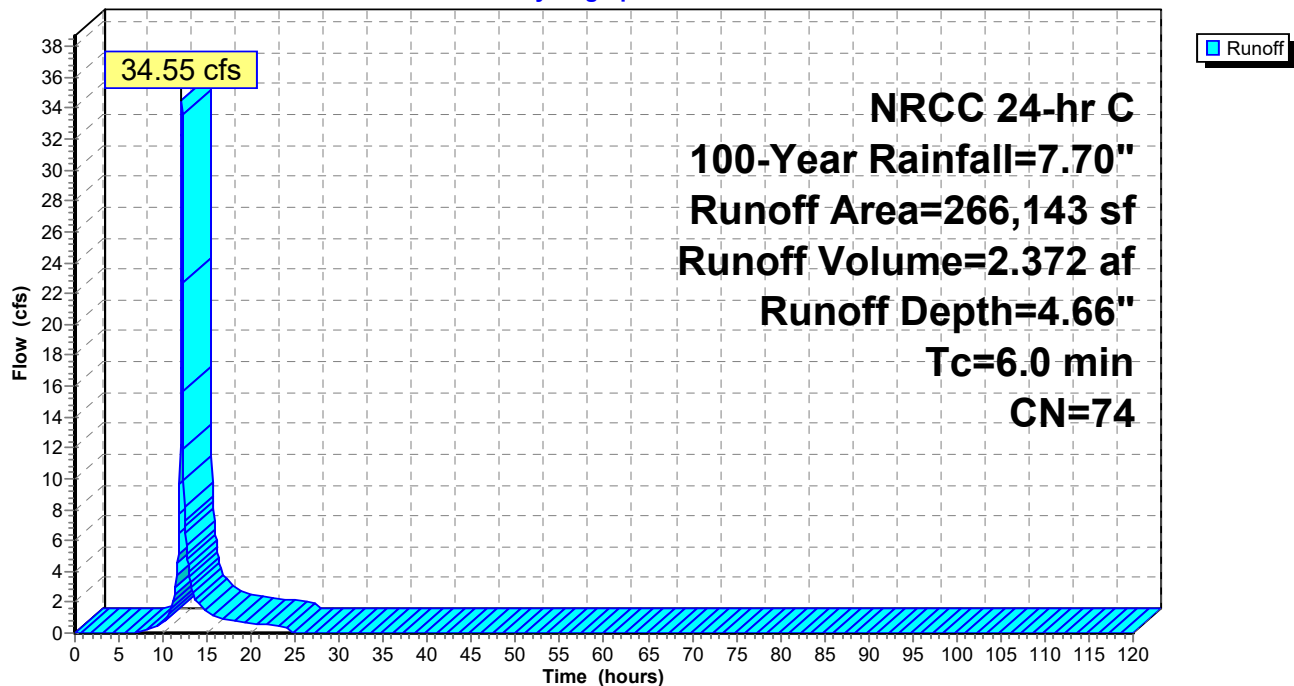
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	9,500	98	BASIN
	9,200	30	Woods, Good, HSG A
	247,443	75	1/4 acre lots, 38% imp, HSG B
	266,143	74	Weighted Average
	162,615		61.10% Pervious Area
	103,528		38.90% Impervious Area

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

Subcatchment P-3B: P-3B

Hydrograph



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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Subcatchment P-3U: P-3U

Runoff = 55.19 cfs @ 12.28 hrs, Volume= 5.639 af, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	169,500	98	wetland, HSG D
	108,000	30	Woods, Good, HSG A
	98,000	39	>75% Grass cover, Good, HSG A
	136,977	61	>75% Grass cover, Good, HSG B
	76,000	55	Woods, Good, HSG B
*	15,800	98	EXIST Roof and Pavement
	58,000	77	Woods, Good, HSG D
	58,000	80	>75% Grass cover, Good, HSG D
*	32,500	98	13 UNITS
*	6,400	98	400 LF OF ROAD
*	1,800	98	2 UNITS DRIVEWAY
	760,977	67	Weighted Average
	534,977		70.30% Pervious Area
	226,000		29.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0340	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
1.4	111	0.0356	1.32		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	59	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	10	0.0136	2.37		Shallow Concentrated Flow, Impervious Paved Kv= 20.3 fps
2.6	135	0.0156	0.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.0	120	0.0198	0.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	32	0.0050	0.49		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
18.9	517	Total			

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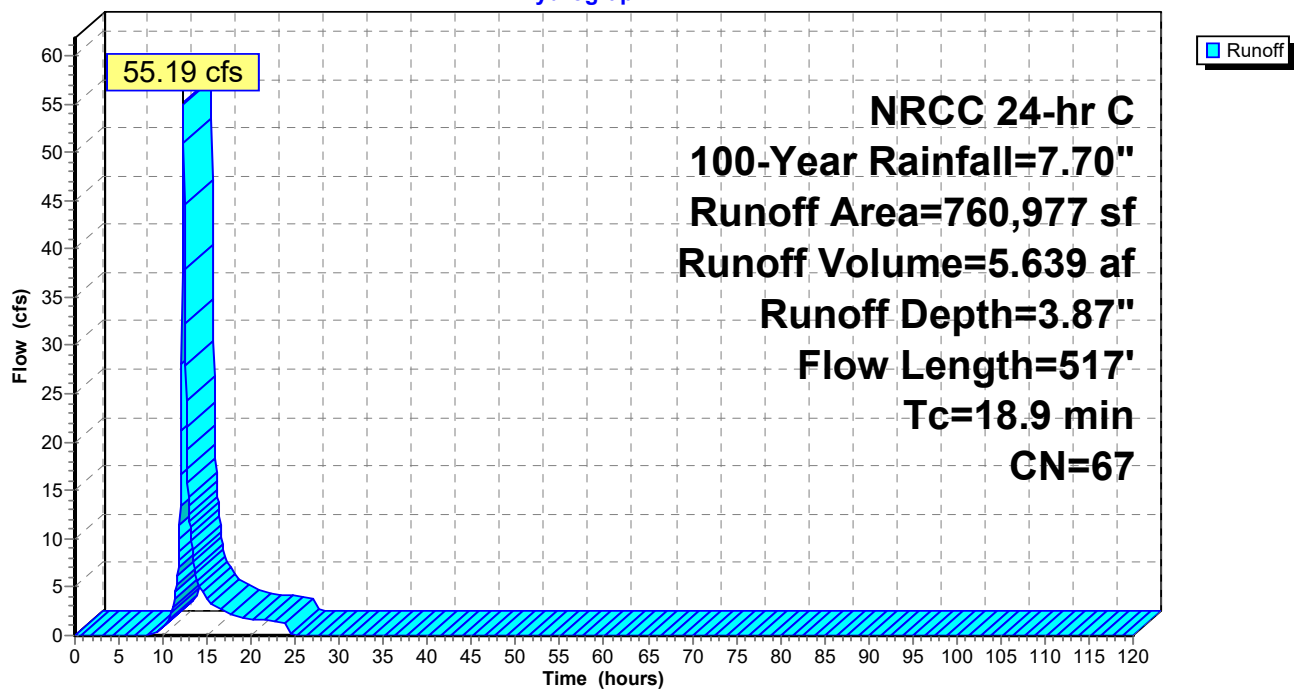
NRCC 24-hr C 100-Year Rainfall=7.70"

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Subcatchment P-3U: P-3U

Hydrograph



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Summary for Subcatchment P-4: P-4

Runoff = 1.01 cfs @ 12.14 hrs, Volume= 0.073 af, Depth= 1.97"

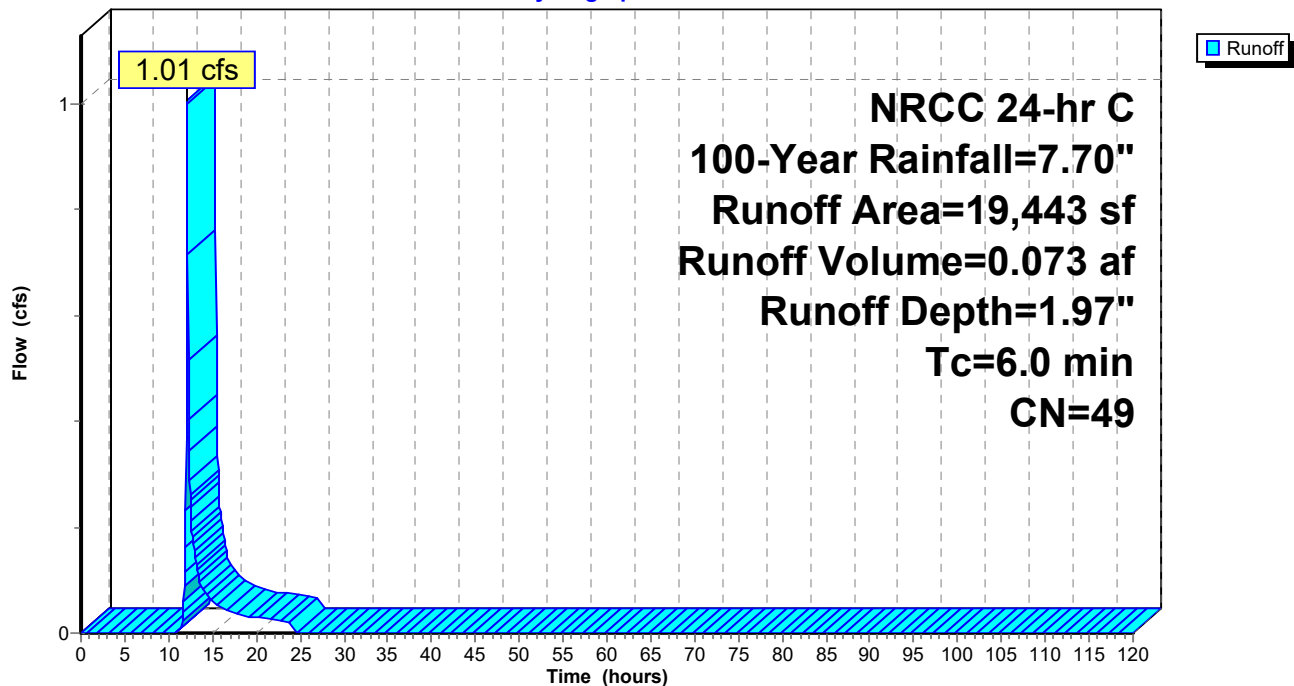
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
5,200	30	Woods, Good, HSG A
10,262	39	>75% Grass cover, Good, HSG A
* 3,981	98	roof and pavement
19,443	49	Weighted Average
15,462		79.52% Pervious Area
3,981		20.48% Impervious Area

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

Subcatchment P-4: P-4

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Summary for Subcatchment P-5U: P-5U

Runoff = 14.17 cfs @ 12.32 hrs, Volume= 1.544 af, Depth= 3.65"

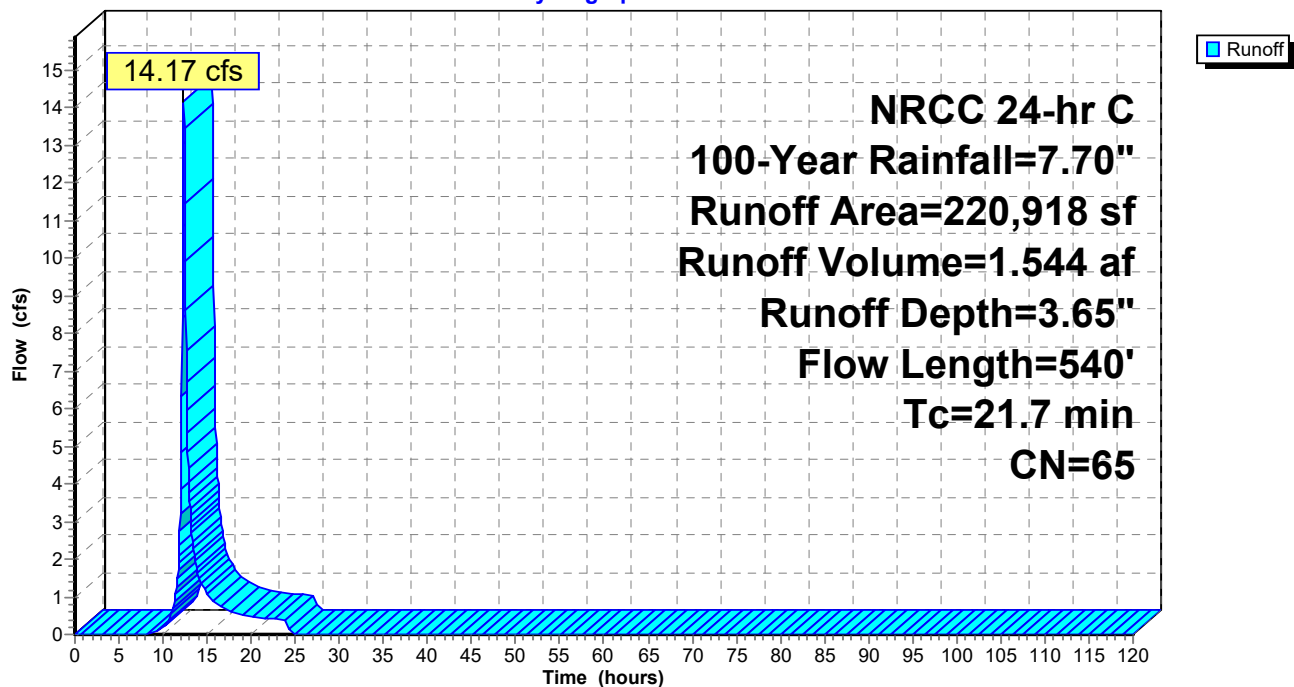
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
83,000	39	>75% Grass cover, Good, HSG A
17,000	61	>75% Grass cover, Good, HSG B
* 24,100	98	WETLAND, 0% imp, HSG D
96,818	80	>75% Grass cover, Good, HSG D
220,918	65	Weighted Average
220,918		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.37"
11.5	490	0.0200	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
21.7	540	Total			

Subcatchment P-5U: P-5U

Hydrograph



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Summary for Subcatchment P-6A: P-6A

Runoff = 20.39 cfs @ 12.13 hrs, Volume= 1.412 af, Depth= 5.00"

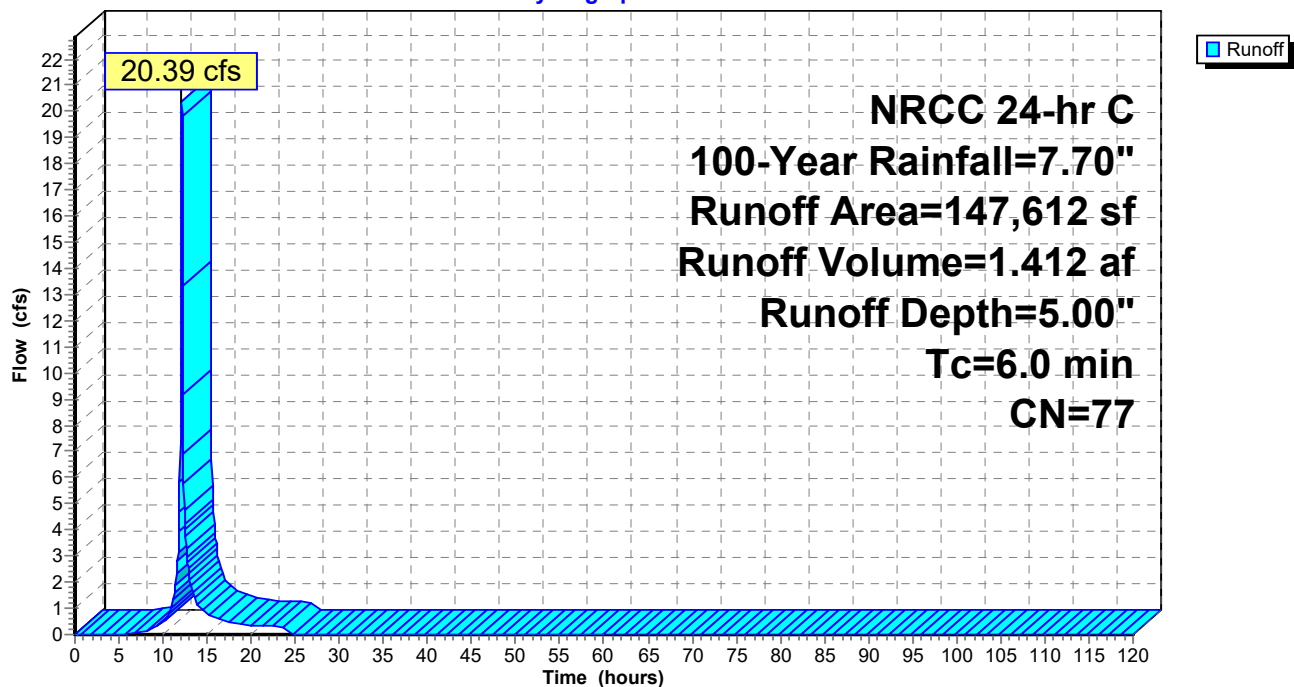
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
134,612	75	1/4 acre lots, 38% imp, HSG B
* 13,000	98	basin
147,612	77	Weighted Average
83,459		56.54% Pervious Area
64,153		43.46% Impervious Area

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

Subcatchment P-6A: P-6A

Hydrograph



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Summary for Subcatchment P-6U: P-6U

Runoff = 31.18 cfs @ 12.22 hrs, Volume= 2.767 af, Depth= 3.98"

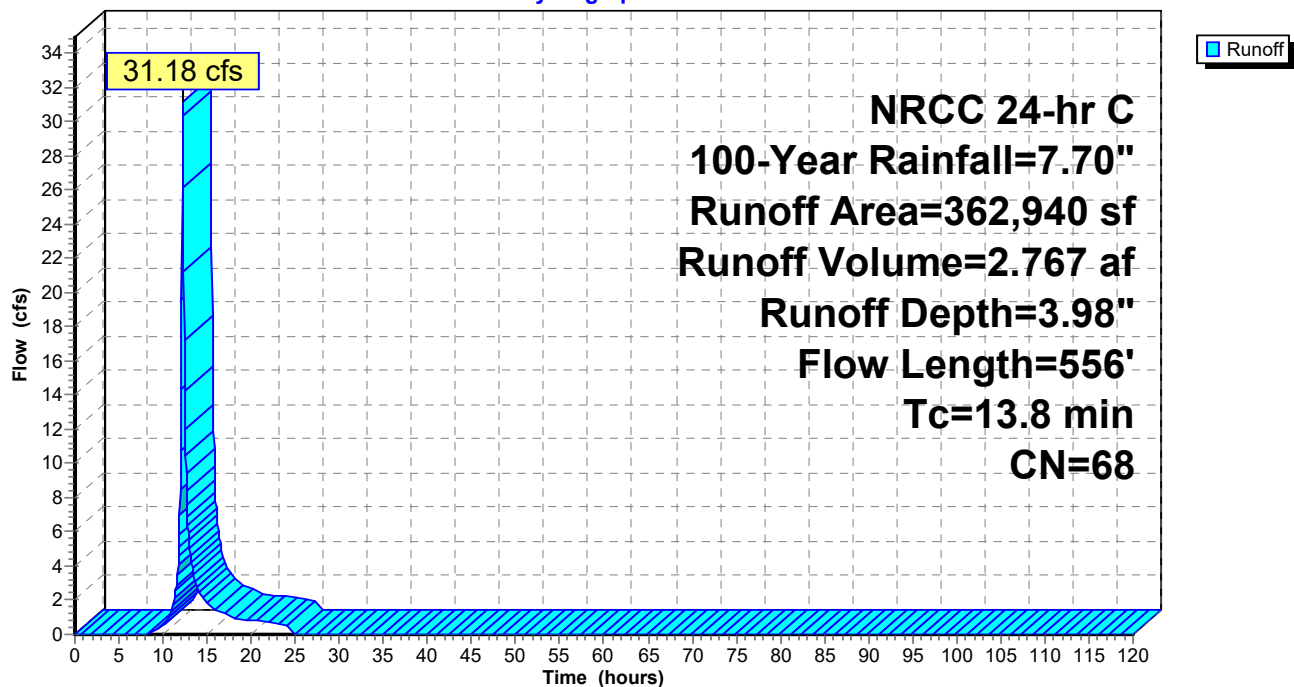
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
45,100	32	Woods/grass comb., Good, HSG A
164,917	58	Woods/grass comb., Good, HSG B
* 82,500	98	WETLAND, 0% imp, HSG D
70,423	80	>75% Grass cover, Good, HSG D
362,940	68	Weighted Average
362,940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0296	0.20		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
5.6	456	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
13.8	556	Total			

Subcatchment P-6U: P-6U

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Summary for Subcatchment P-7A: P-7A

Runoff = 23.14 cfs @ 12.13 hrs, Volume= 1.576 af, Depth= 4.21"

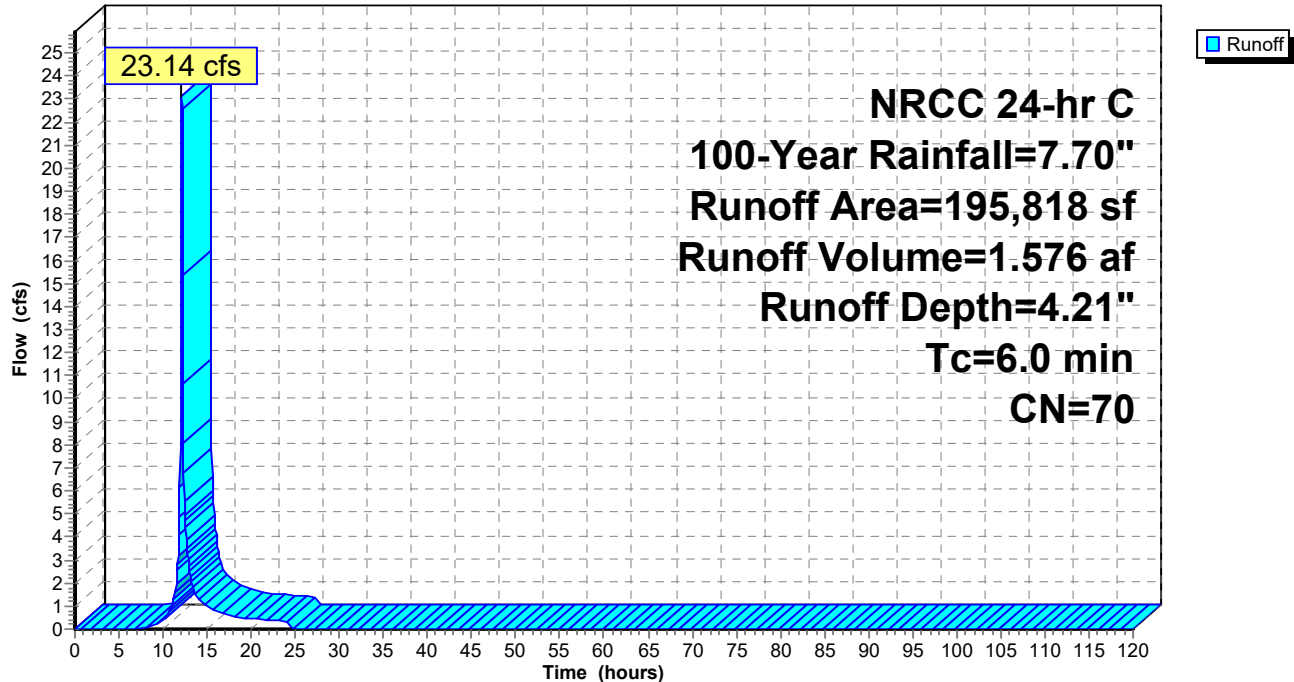
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	43,000	98	pavement parking
*	5,800	98	BUILD roof
*	10,200	98	basin
	94,318	39	>75% Grass cover, Good, HSG A
*	42,500	98	17 HOUSE UNITS
	195,818	70	Weighted Average
	94,318		48.17% Pervious Area
	101,500		51.83% Impervious Area

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

Subcatchment P-7A: P-7A

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Summary for Subcatchment P-7U: P-7U

Runoff = 27.44 cfs @ 12.36 hrs, Volume= 3.237 af, Depth= 2.79"

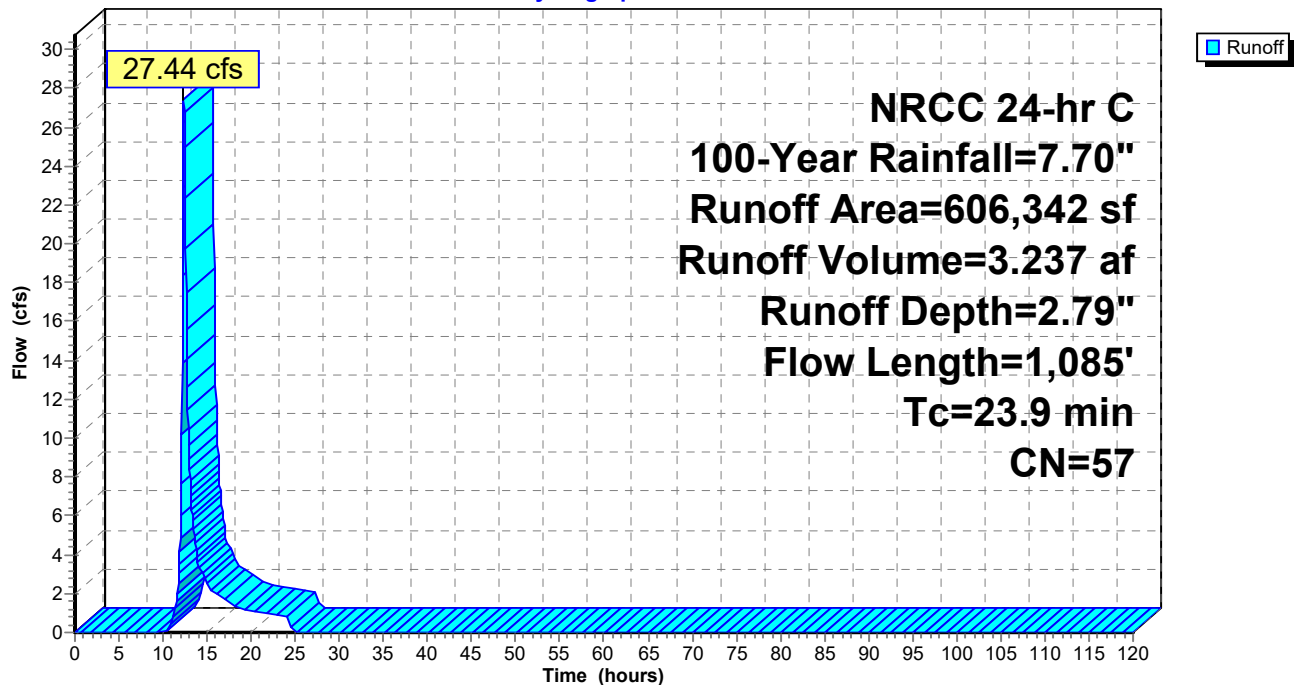
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
32,738	98	Paved parking, HSG B
118,803	32	Woods/grass comb., Good, HSG A
403,863	58	Woods/grass comb., Good, HSG B
33,128	80	>75% Grass cover, Good, HSG D
17,810	98	Water Surface, 0% imp, HSG A
606,342	57	Weighted Average
573,604		94.60% Pervious Area
32,738		5.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0160	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.37"
13.5	985	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
23.9	1,085	Total			

Subcatchment P-7U: P-7U

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Summary for Subcatchment P-8U: P-8U

Runoff = 8.60 cfs @ 12.15 hrs, Volume= 0.623 af, Depth= 3.00"

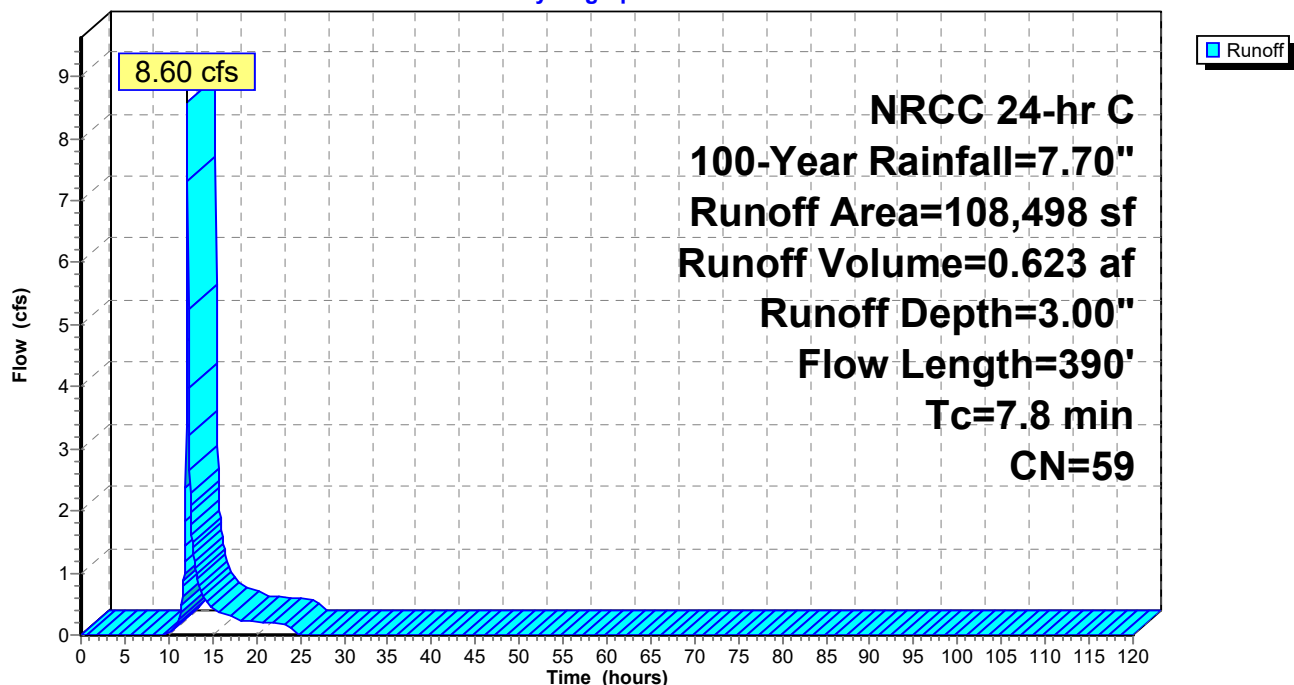
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
* 7,000	98	roof
5,726	98	Water Surface, 0% imp, HSG A
12,978	39	>75% Grass cover, Good, HSG A
43,794	61	>75% Grass cover, Good, HSG B
6,600	30	Woods, Good, HSG A
32,400	55	Woods, Good, HSG B
108,498	59	Weighted Average
101,498		93.55% Pervious Area
7,000		6.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0120	0.12		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.37"
1.1	340	0.0940	4.94		Shallow Concentrated Flow, HR-A Unpaved Kv= 16.1 fps
7.8	390	Total			

Subcatchment P-8U: P-8U

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Summary for Subcatchment P-9A: P-9A

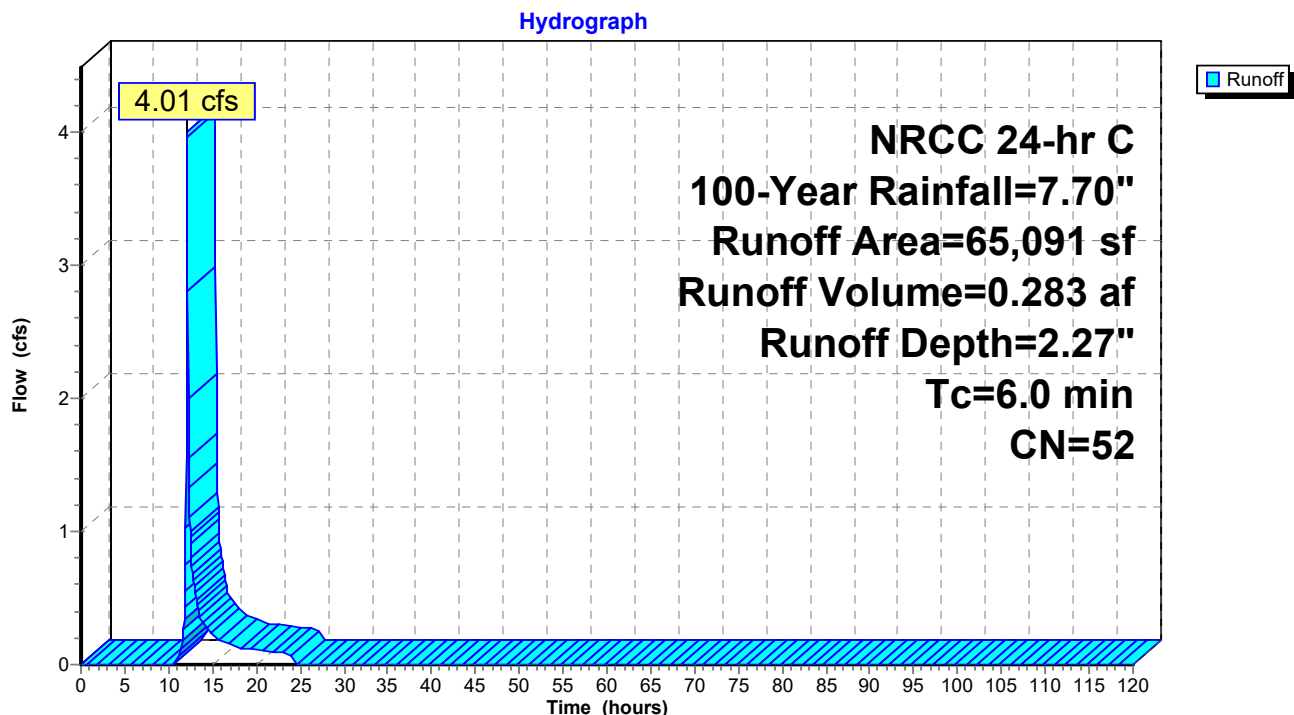
Runoff = 4.01 cfs @ 12.14 hrs, Volume= 0.283 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
	13,200	30	Woods, Good, HSG A
*	15,000	98	ROADS
*	1,700	98	BASIN
	35,191	39	>75% Grass cover, Good, HSG A
	65,091	52	Weighted Average
	48,391		74.34% Pervious Area
	16,700		25.66% Impervious Area

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

Subcatchment P-9A: P-9A



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Summary for Subcatchment P-9B: P-9B

Runoff = 8.62 cfs @ 12.13 hrs, Volume= 0.585 af, Depth= 3.43"

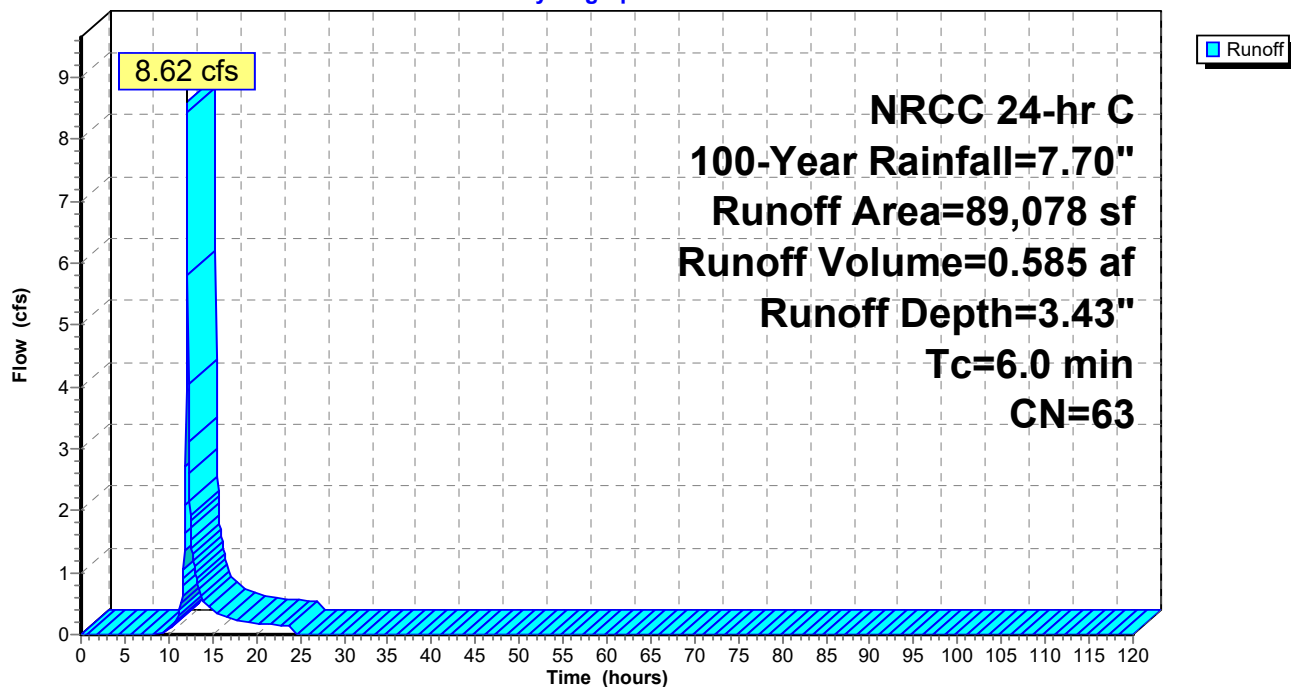
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

	Area (sf)	CN	Description
*	4,300	98	BASIN
	84,778	61	1/4 acre lots, 38% imp, HSG A
	89,078	63	Weighted Average
	52,562		59.01% Pervious Area
	36,516		40.99% Impervious Area

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

Subcatchment P-9B: P-9B

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Summary for Subcatchment P-9C: P-9C

Runoff = 23.71 cfs @ 12.13 hrs, Volume= 1.647 af, Depth= 5.11"

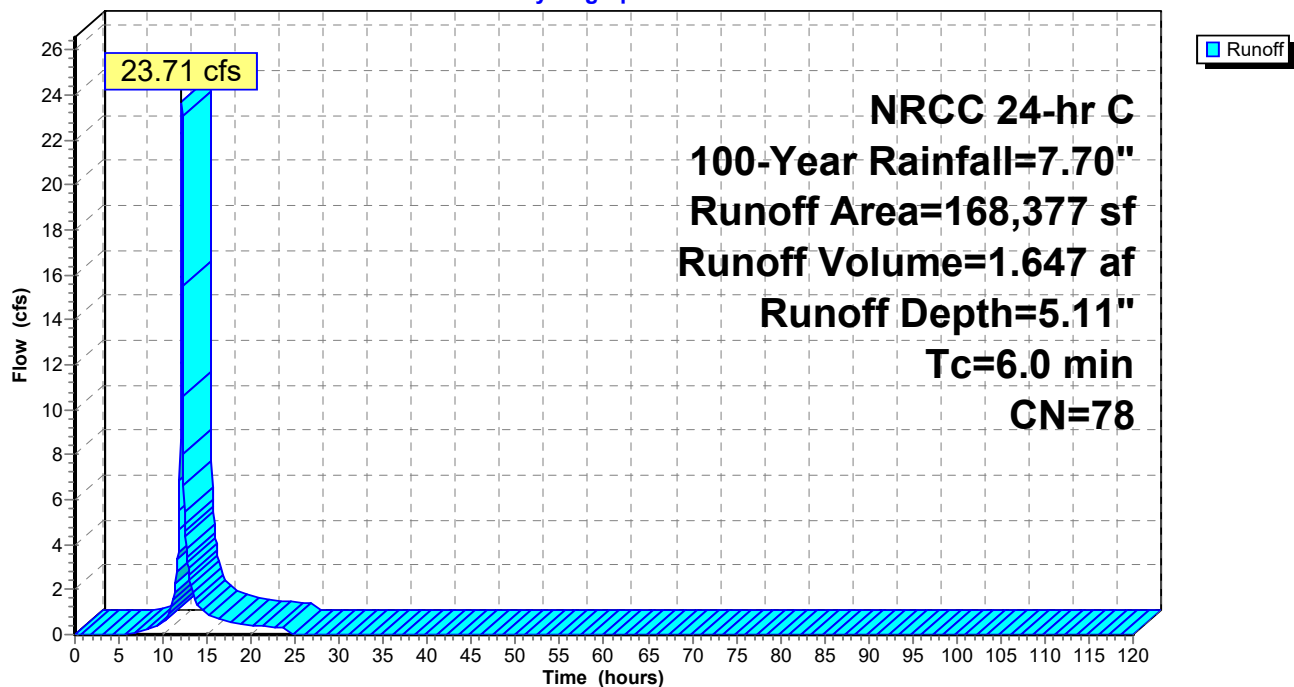
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
20,800	30	Woods, Good, HSG A
104,000	98	Paved parking, HSG A
34,077	39	>75% Grass cover, Good, HSG A
* 9,500	98	ROOF
168,377	78	Weighted Average
54,877		32.59% Pervious Area
113,500		67.41% Impervious Area

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

Subcatchment P-9C: P-9C

Hydrograph



Proposed Hydrology

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Subcatchment P-9U: P-9U

Runoff = 3.01 cfs @ 12.15 hrs, Volume= 0.246 af, Depth= 1.39"

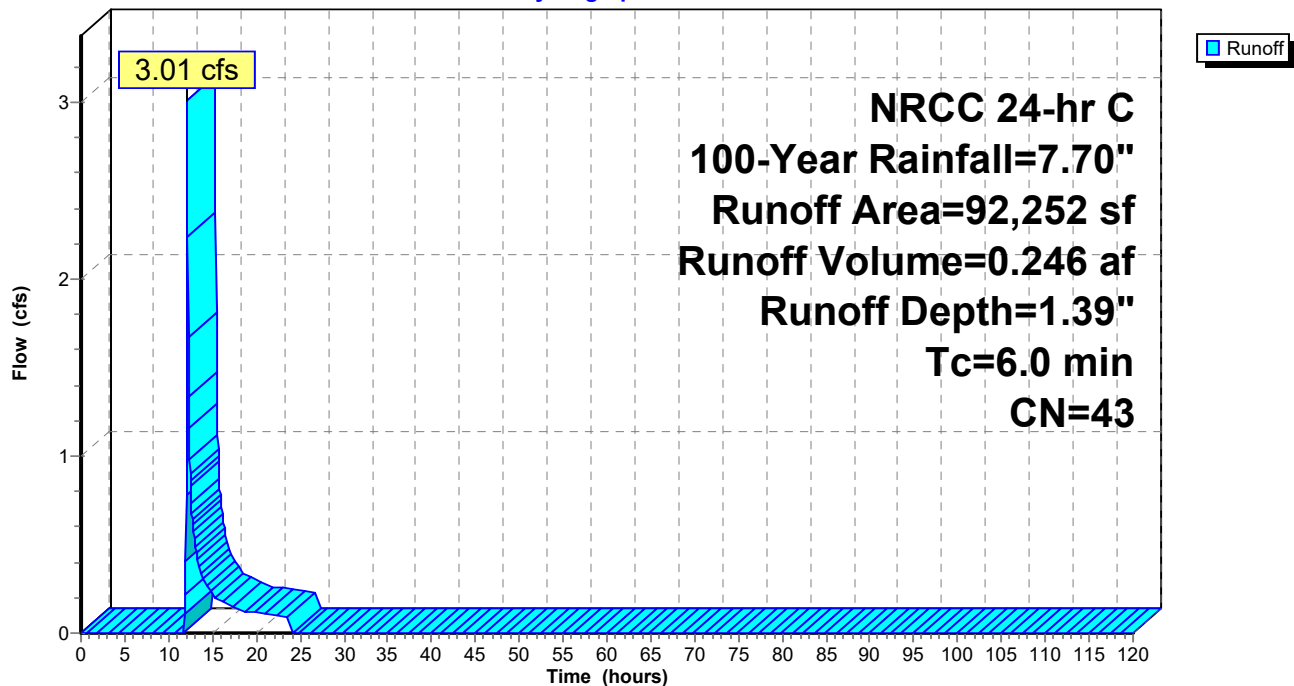
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
36,000	30	Woods, Good, HSG A
12,000	98	Paved parking, HSG A
44,252	39	>75% Grass cover, Good, HSG A
92,252	43	Weighted Average
80,252		86.99% Pervious Area
12,000		13.01% Impervious Area

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

Subcatchment P-9U: P-9U

Hydrograph



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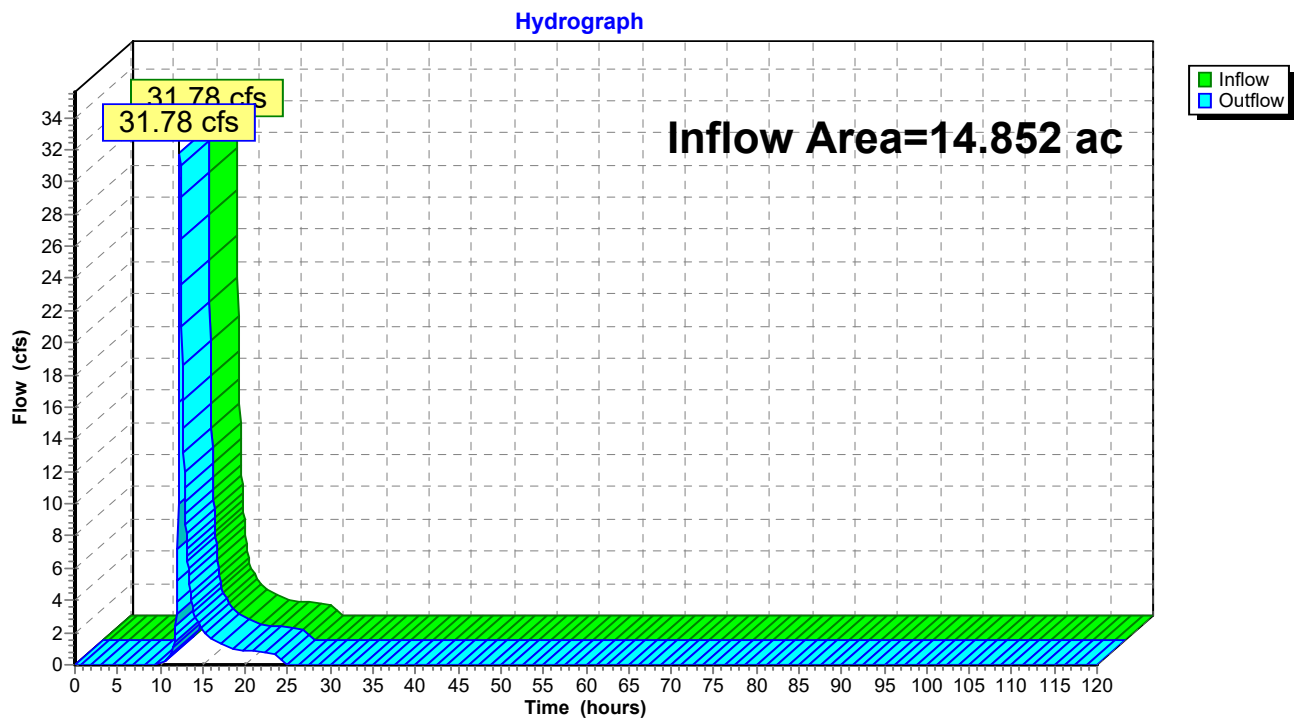
Summary for Reach DP-1: Wetland Series R

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 14.852 ac, 17.22% Impervious, Inflow Depth = 2.49" for 100-Year event
Inflow = 31.78 cfs @ 12.31 hrs, Volume= 3.086 af
Outflow = 31.78 cfs @ 12.31 hrs, Volume= 3.086 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland Series R



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Summary for Reach DP-10: West Elm Street

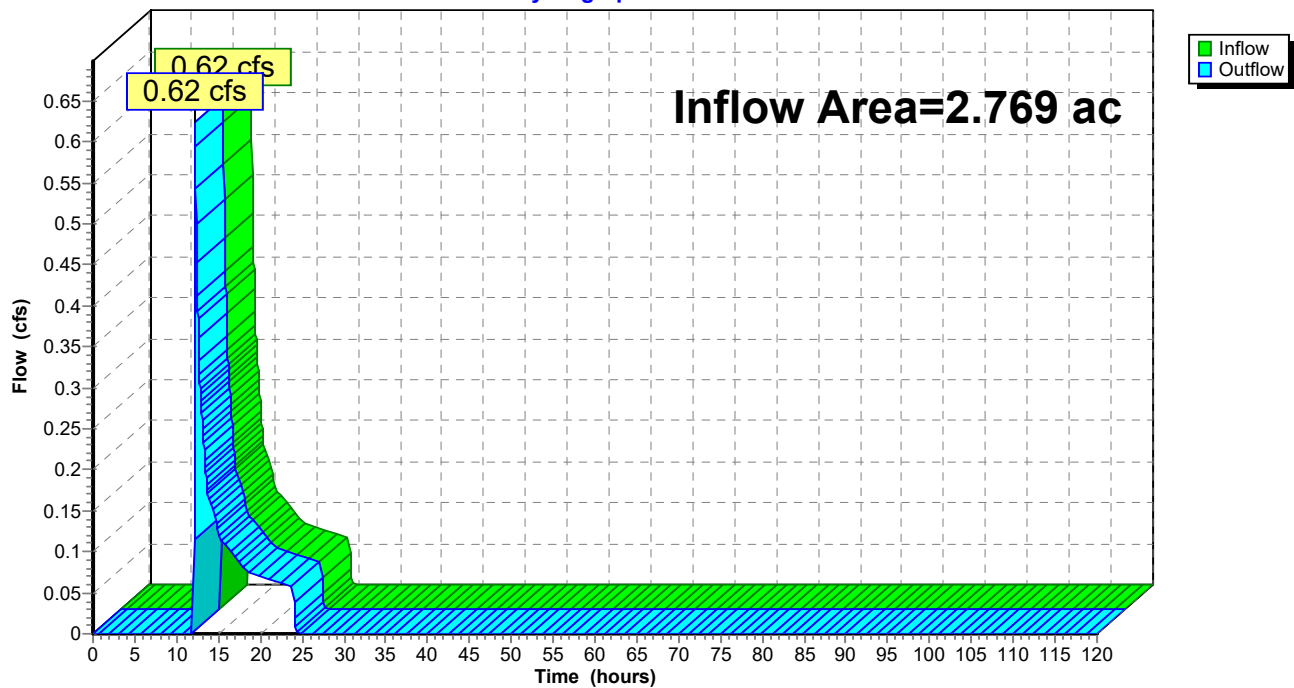
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.769 ac, 6.21% Impervious, Inflow Depth = 0.50" for 100-Year event
Inflow = 0.62 cfs @ 12.22 hrs, Volume= 0.116 af
Outflow = 0.62 cfs @ 12.22 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-10: West Elm Street

Hydrograph



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Summary for Reach DP-11: Wetland Series A

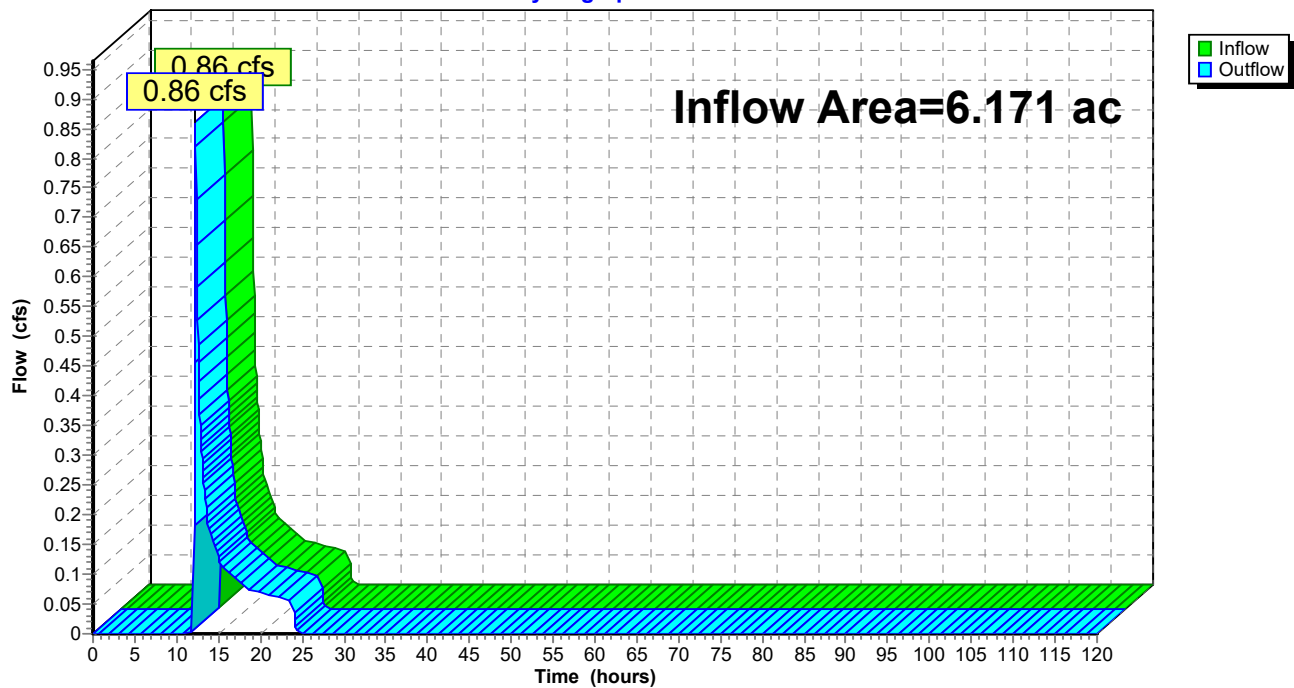
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.171 ac, 9.19% Impervious, Inflow Depth = 0.25" for 100-Year event
Inflow = 0.86 cfs @ 12.26 hrs, Volume= 0.127 af
Outflow = 0.86 cfs @ 12.26 hrs, Volume= 0.127 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-11: Wetland Series A

Hydrograph



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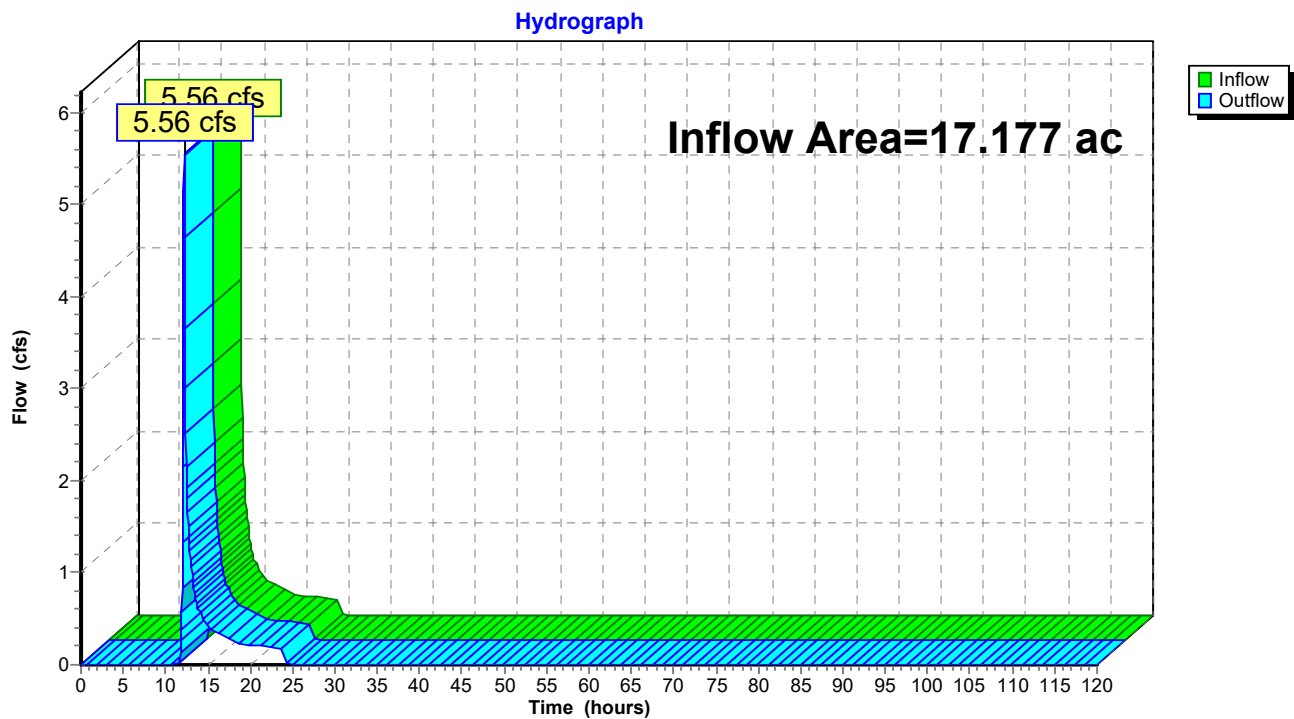
Summary for Reach DP-12: Wetland Series A

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 17.177 ac, 20.55% Impervious, Inflow Depth = 0.35" for 100-Year event
Inflow = 5.56 cfs @ 12.19 hrs, Volume= 0.500 af
Outflow = 5.56 cfs @ 12.19 hrs, Volume= 0.500 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-12: Wetland Series A



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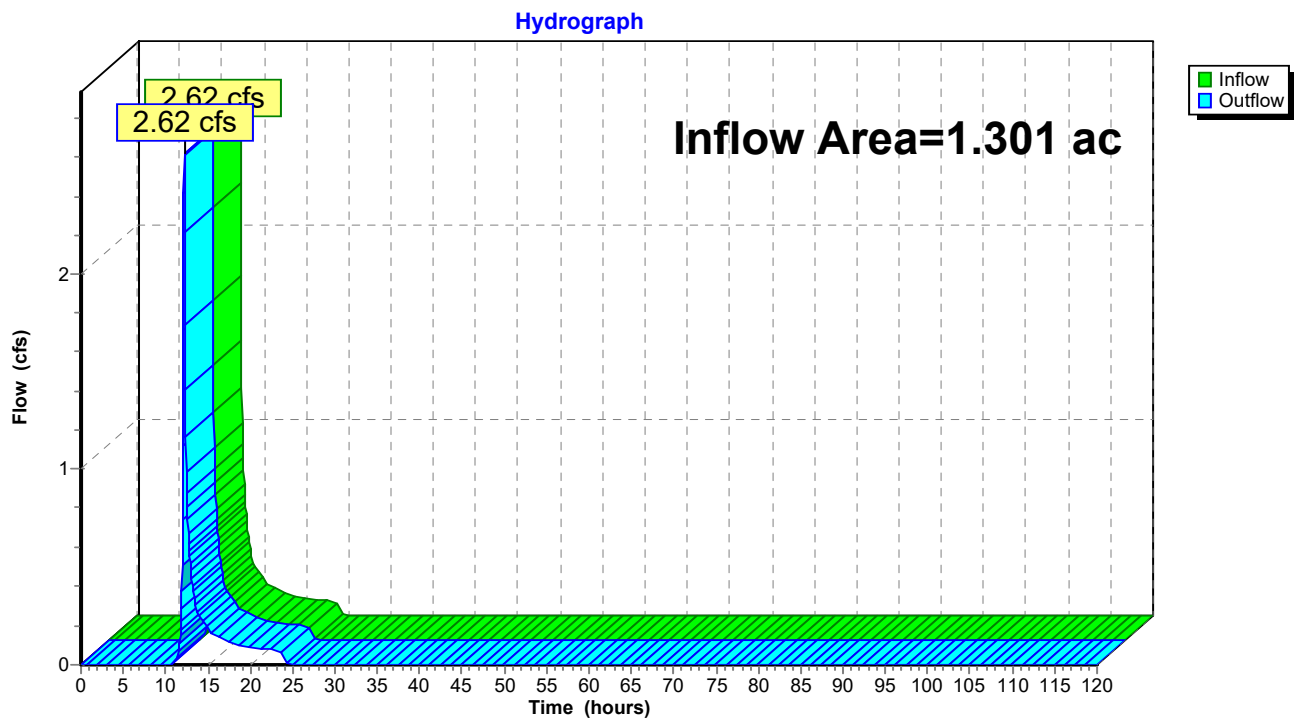
Summary for Reach DP-13: Wetland Series B

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 2.07" for 100-Year event
Inflow = 2.62 cfs @ 12.19 hrs, Volume= 0.224 af
Outflow = 2.62 cfs @ 12.19 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-13: Wetland Series B



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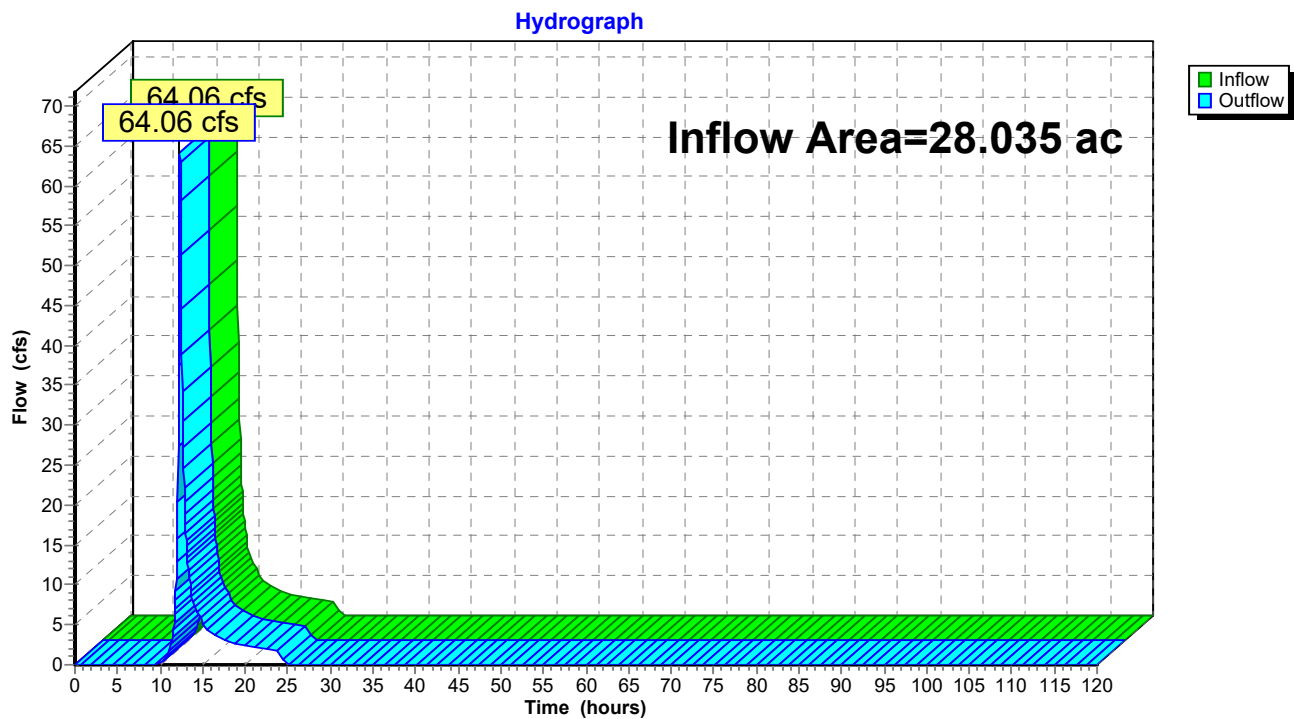
Summary for Reach DP-14: Wetland Series C,D,E,,K,J

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.035 ac, 0.00% Impervious, Inflow Depth = 3.00" for 100-Year event
Inflow = 64.06 cfs @ 12.32 hrs, Volume= 7.016 af
Outflow = 64.06 cfs @ 12.32 hrs, Volume= 7.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-14: Wetland Series C,D,E,,K,J



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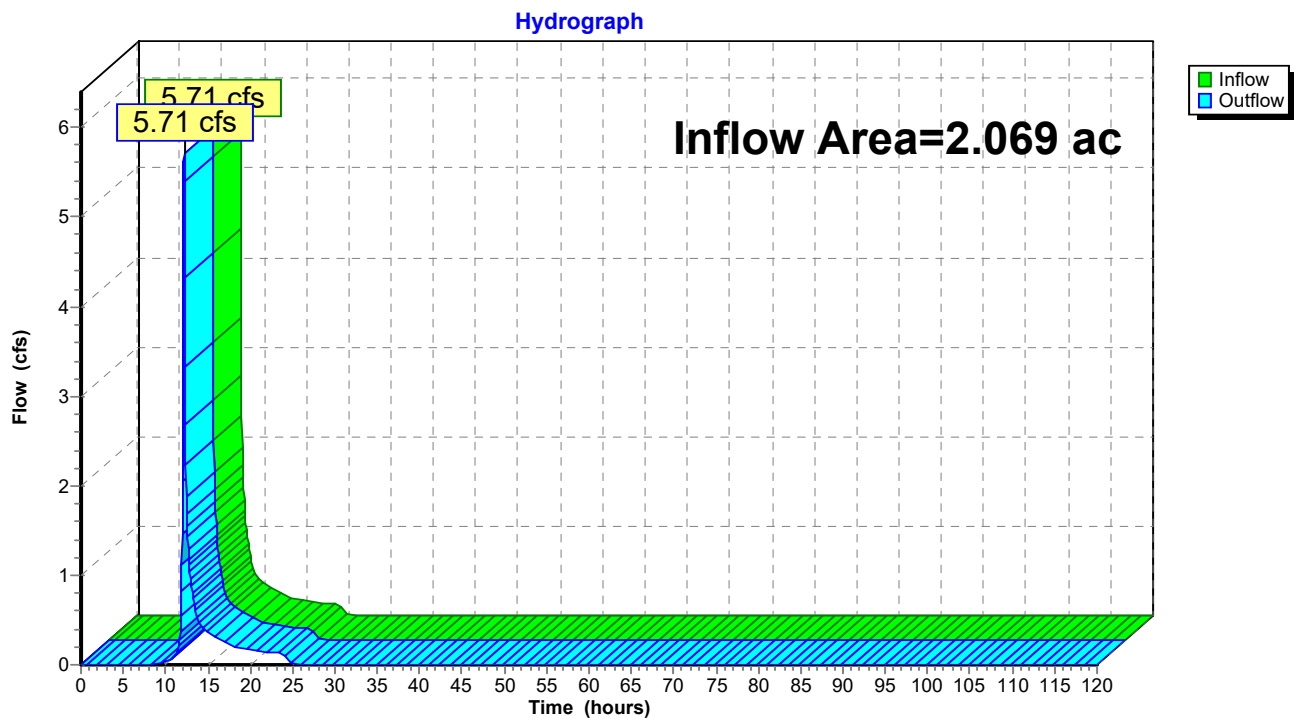
Summary for Reach DP-15: Wetland Series H

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.069 ac, 6.77% Impervious, Inflow Depth = 2.70" for 100-Year event
Inflow = 5.71 cfs @ 12.17 hrs, Volume= 0.465 af
Outflow = 5.71 cfs @ 12.17 hrs, Volume= 0.465 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-15: Wetland Series H



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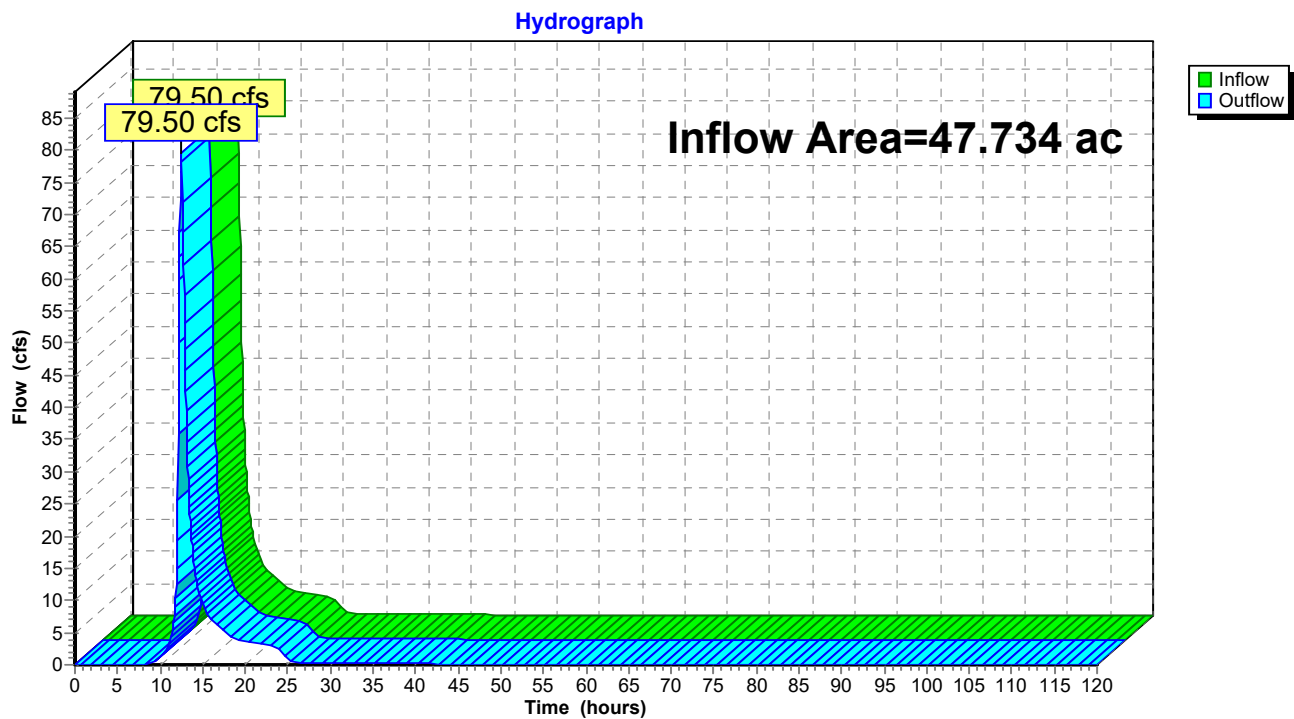
Summary for Reach DP-2: Wetland Series I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 47.734 ac, 17.87% Impervious, Inflow Depth = 3.21" for 100-Year event
Inflow = 79.50 cfs @ 12.50 hrs, Volume= 12.775 af
Outflow = 79.50 cfs @ 12.50 hrs, Volume= 12.775 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-2: Wetland Series I



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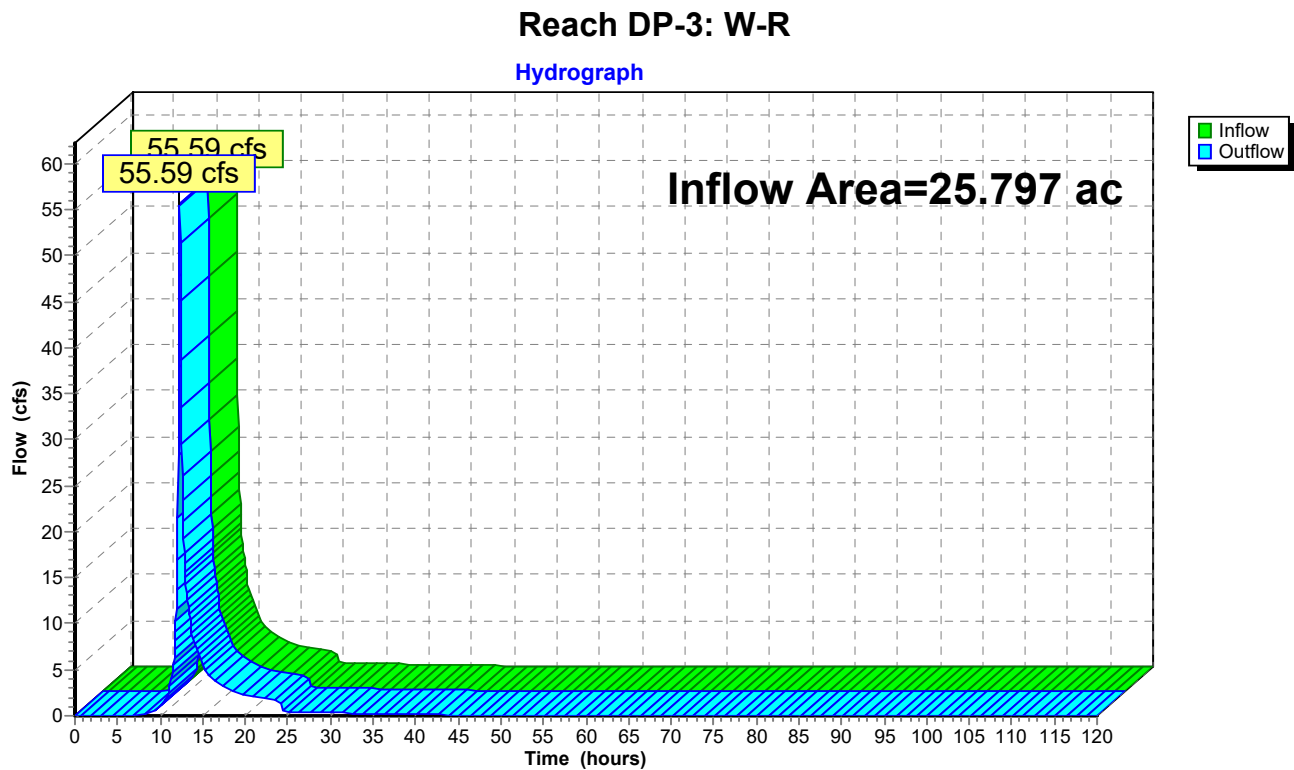
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Summary for Reach DP-3: W-R

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 3.36" for 100-Year event
Inflow = 55.59 cfs @ 12.28 hrs, Volume= 7.214 af
Outflow = 55.59 cfs @ 12.28 hrs, Volume= 7.214 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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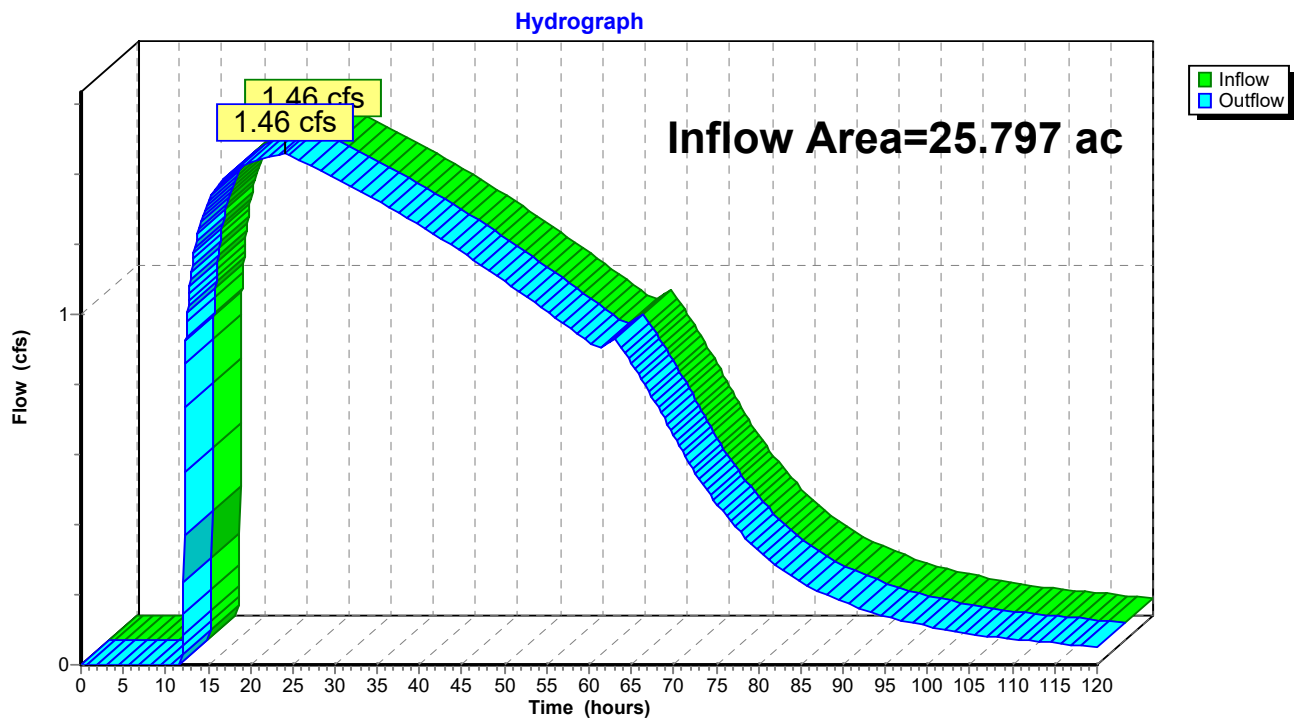
Summary for Reach DP-3 OUT: 8" Copper Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth > 3.01" for 100-Year event
Inflow = 1.46 cfs @ 24.16 hrs, Volume= 6.470 af
Outflow = 1.46 cfs @ 24.16 hrs, Volume= 6.470 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-3 OUT: 8" Copper Pipe



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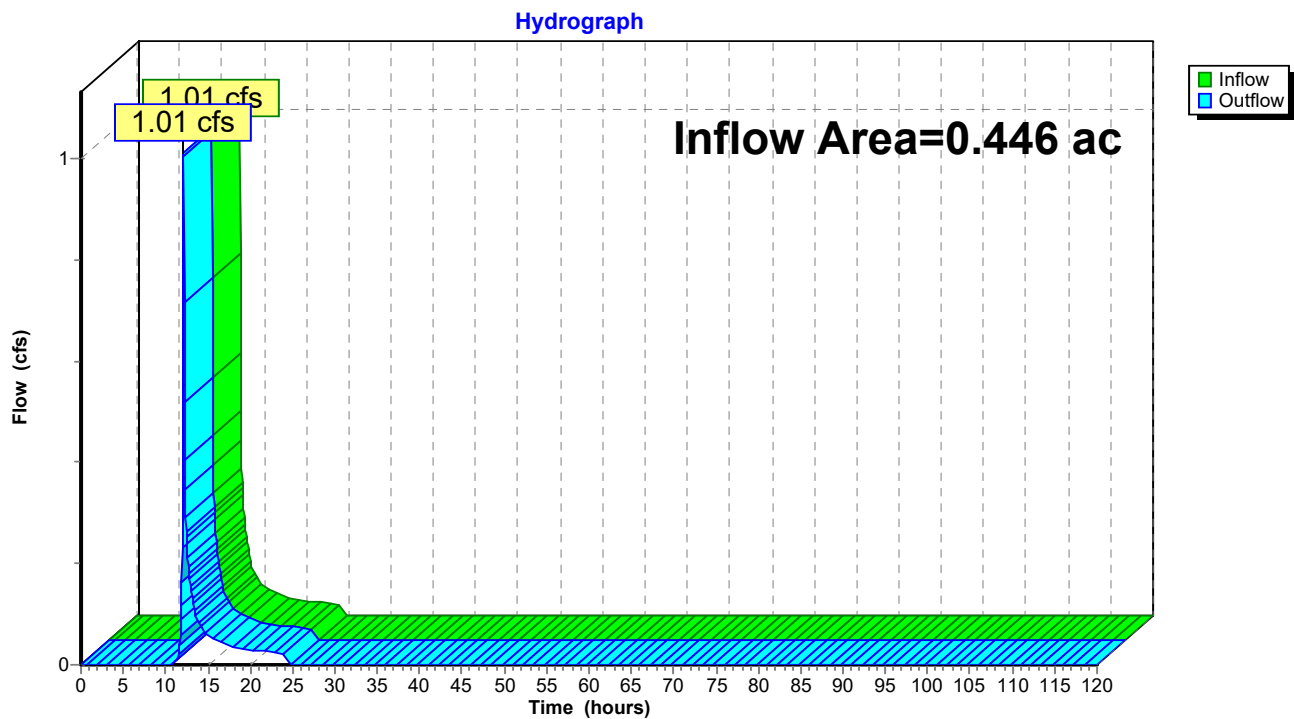
Summary for Reach DP-4: Dwelley Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.446 ac, 20.48% Impervious, Inflow Depth = 1.97" for 100-Year event
Inflow = 1.01 cfs @ 12.14 hrs, Volume= 0.073 af
Outflow = 1.01 cfs @ 12.14 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-4: Dwelley Street



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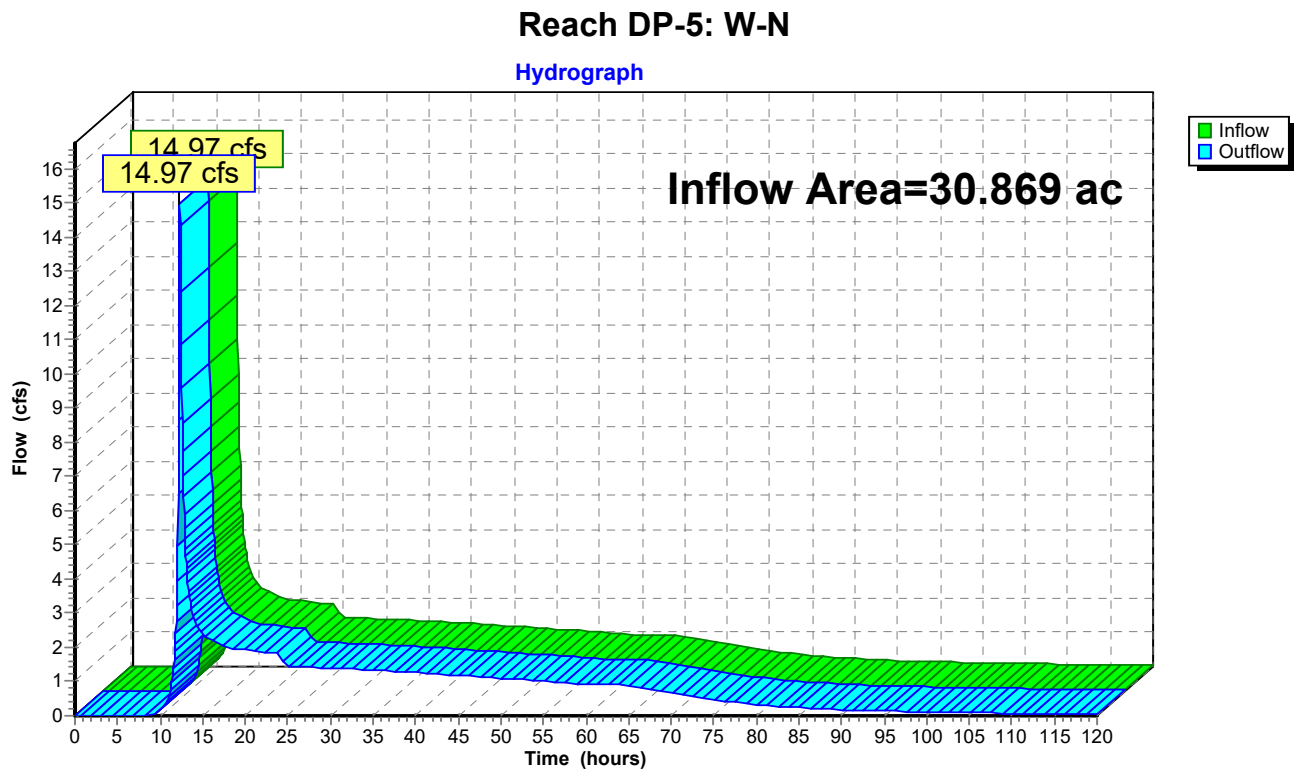
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Summary for Reach DP-5: W-N

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 3.12" for 100-Year event
Inflow = 14.97 cfs @ 12.32 hrs, Volume= 8.014 af
Outflow = 14.97 cfs @ 12.32 hrs, Volume= 8.014 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



Proposed Hydrology

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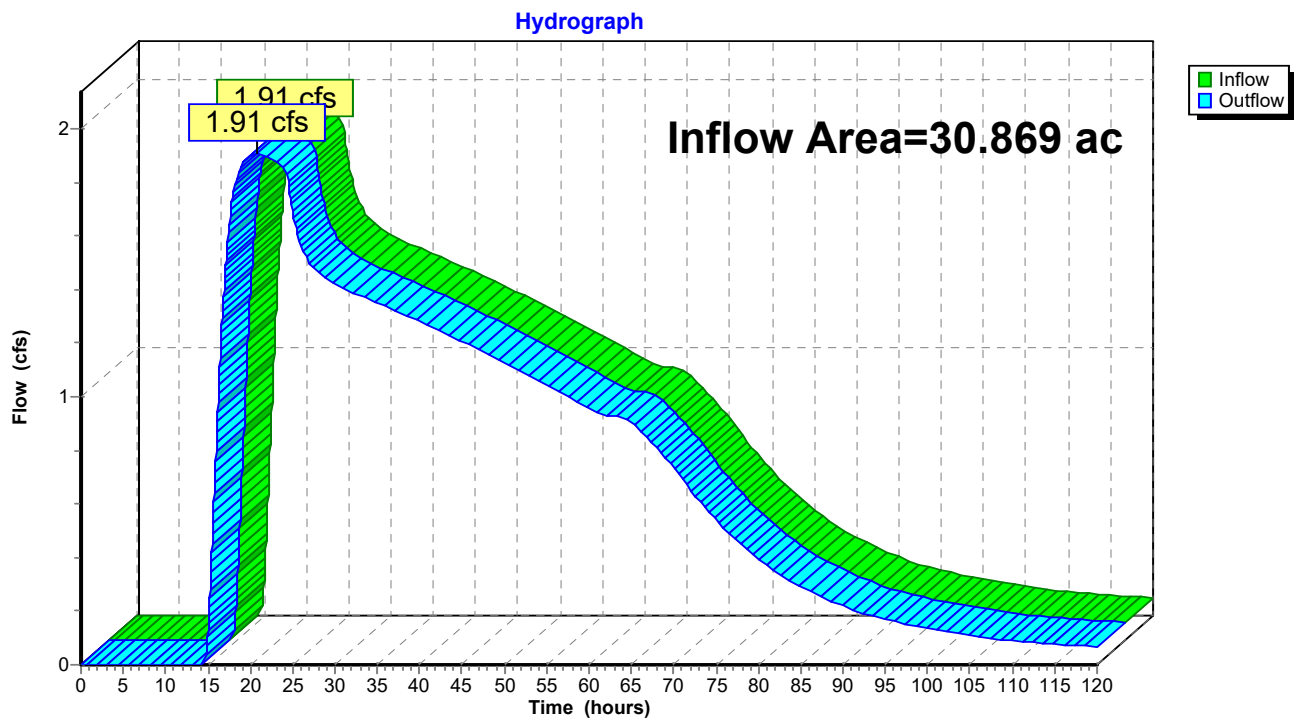
Summary for Reach DP-5 OUT: 24" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 2.59" for 100-Year event
Inflow = 1.91 cfs @ 20.78 hrs, Volume= 6.656 af
Outflow = 1.91 cfs @ 20.78 hrs, Volume= 6.656 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-5 OUT: 24" RCP PIPE



Proposed Hydrology

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Summary for Reach DP-6: W-QP

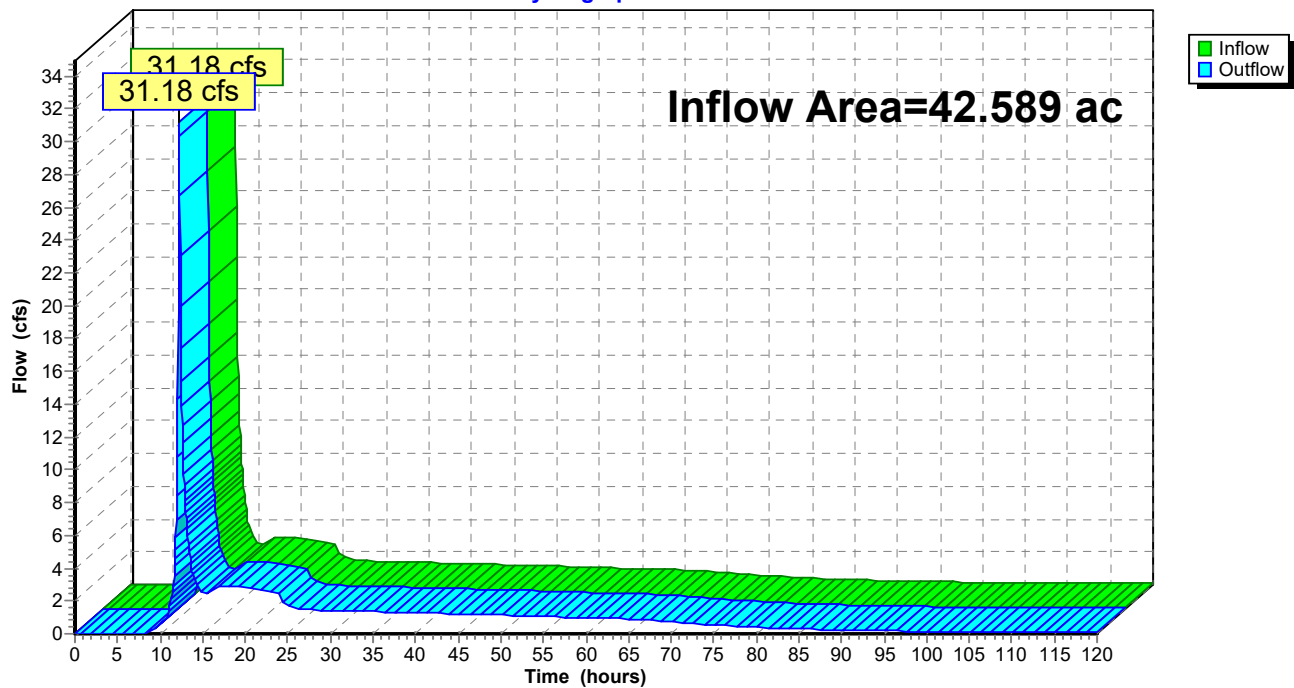
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth > 2.78" for 100-Year event
Inflow = 31.18 cfs @ 12.22 hrs, Volume= 9.875 af
Outflow = 31.18 cfs @ 12.22 hrs, Volume= 9.875 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6: W-QP

Hydrograph



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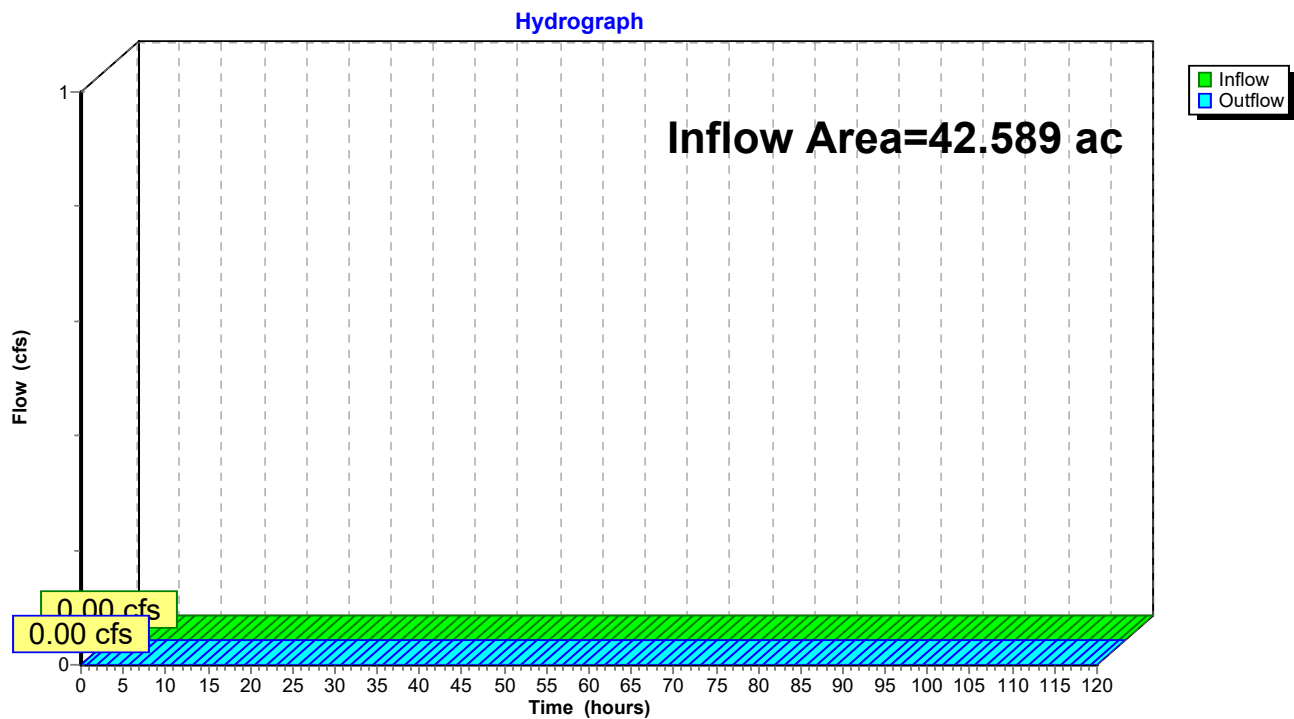
Summary for Reach DP-6 OUT: LAND OVERFLOW

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth = 0.00" for 100-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-6 OUT: LAND OVERFLOW



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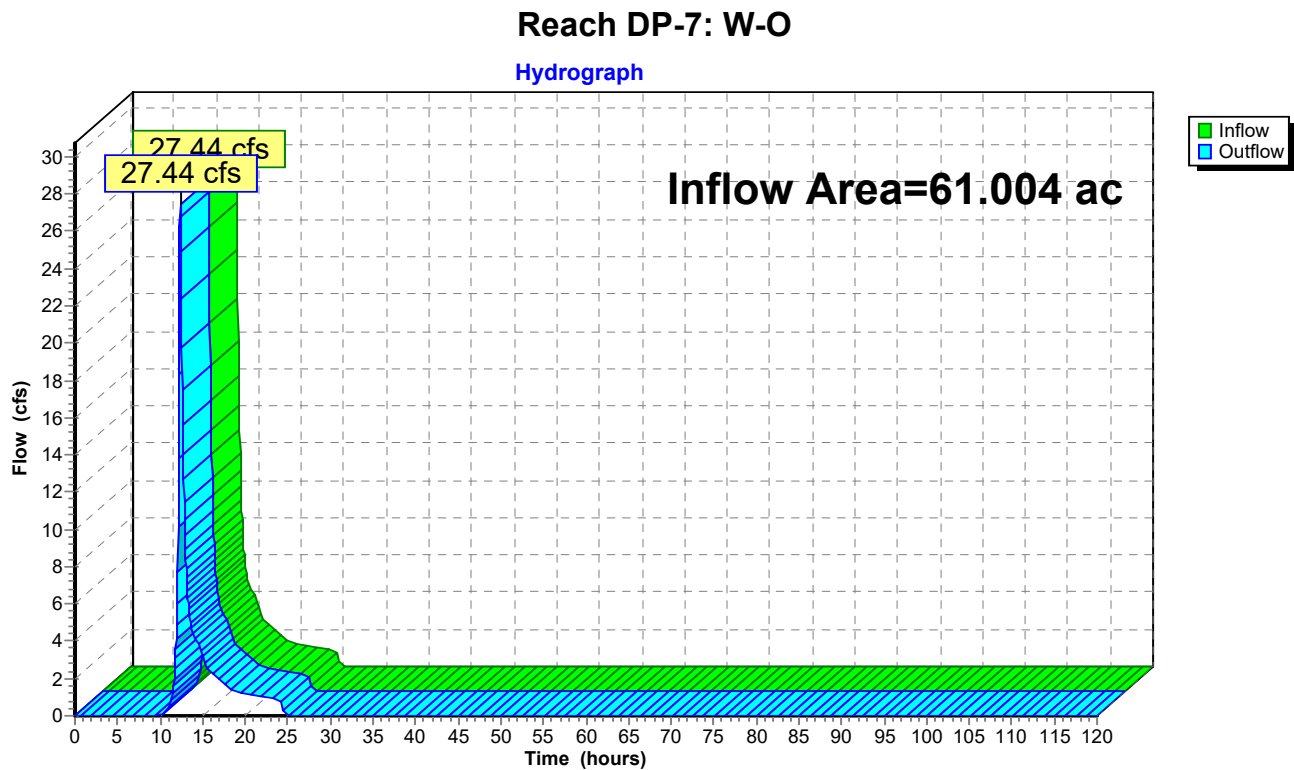
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Summary for Reach DP-7: W-O

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.67" for 100-Year event
Inflow = 27.44 cfs @ 12.36 hrs, Volume= 3.419 af
Outflow = 27.44 cfs @ 12.36 hrs, Volume= 3.419 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs



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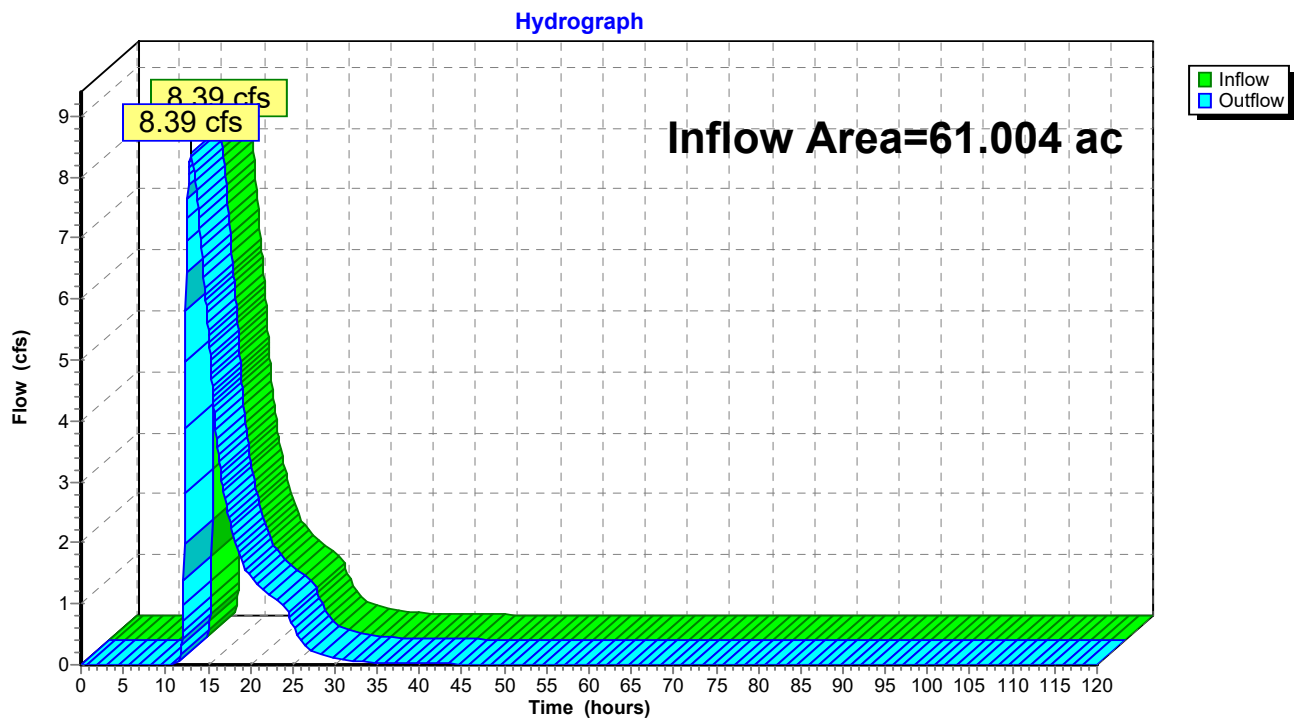
Summary for Reach DP-7 OUT: 12" RCP PIPE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.67" for 100-Year event
Inflow = 8.39 cfs @ 13.00 hrs, Volume= 3.418 af
Outflow = 8.39 cfs @ 13.00 hrs, Volume= 3.418 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-7 OUT: 12" RCP PIPE



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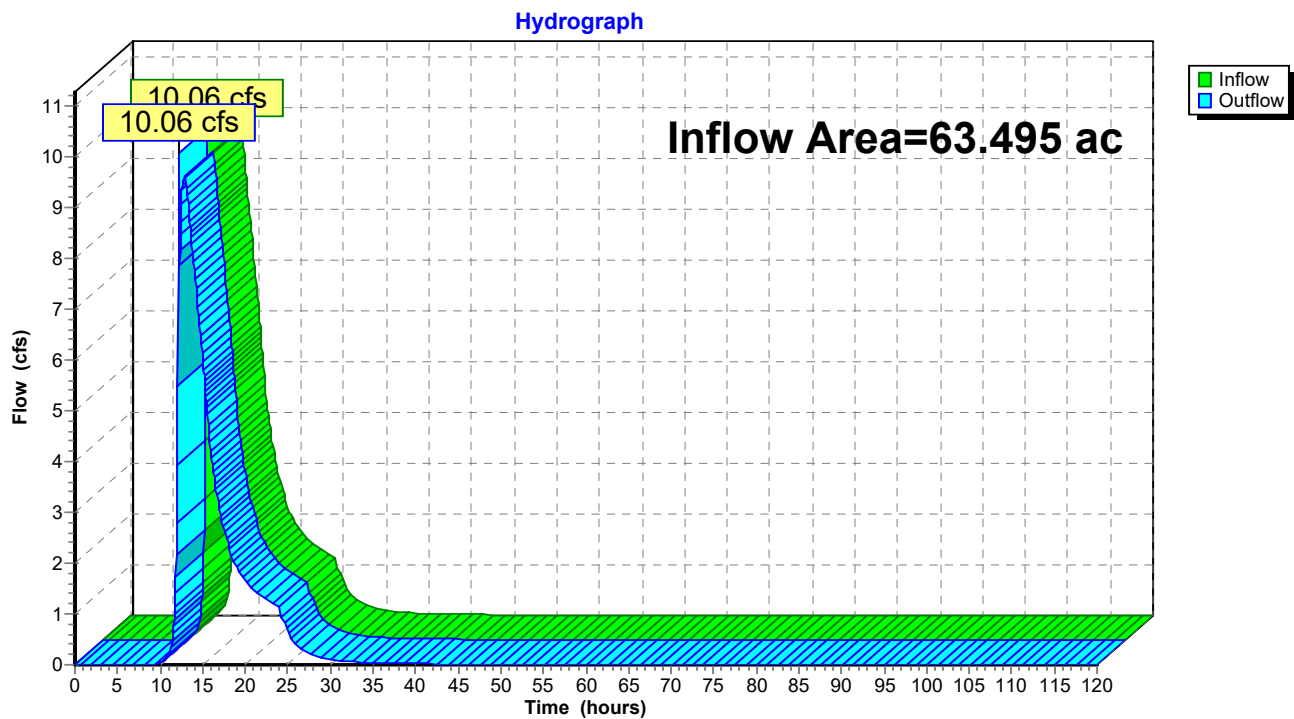
Summary for Reach DP-8: Wetlands Series X

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 63.495 ac, 20.77% Impervious, Inflow Depth = 0.76" for 100-Year event
Inflow = 10.06 cfs @ 12.16 hrs, Volume= 4.041 af
Outflow = 10.06 cfs @ 12.16 hrs, Volume= 4.041 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-8: Wetlands Series X



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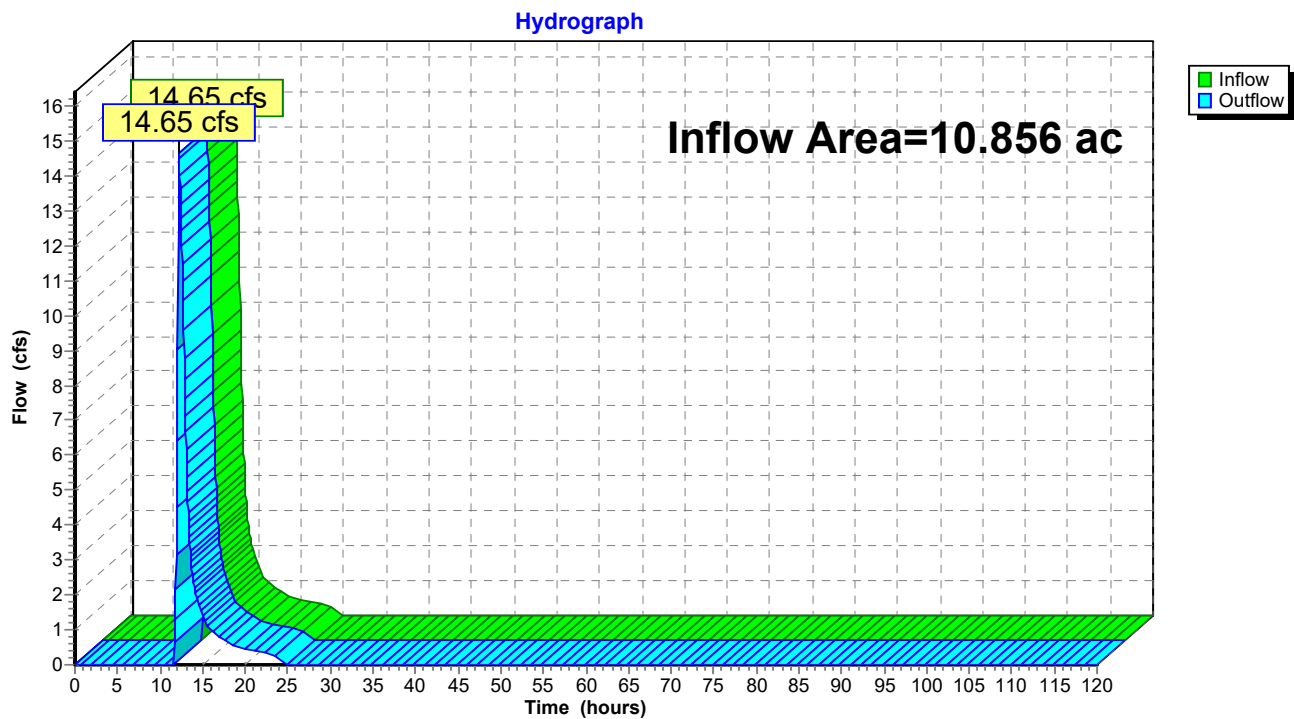
Summary for Reach DP-9: West Elm Street

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.856 ac, 42.73% Impervious, Inflow Depth = 2.08" for 100-Year event
Inflow = 14.65 cfs @ 12.19 hrs, Volume= 1.879 af
Outflow = 14.65 cfs @ 12.19 hrs, Volume= 1.879 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-9: West Elm Street



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Summary for Reach DP-ELM: West Elm Street

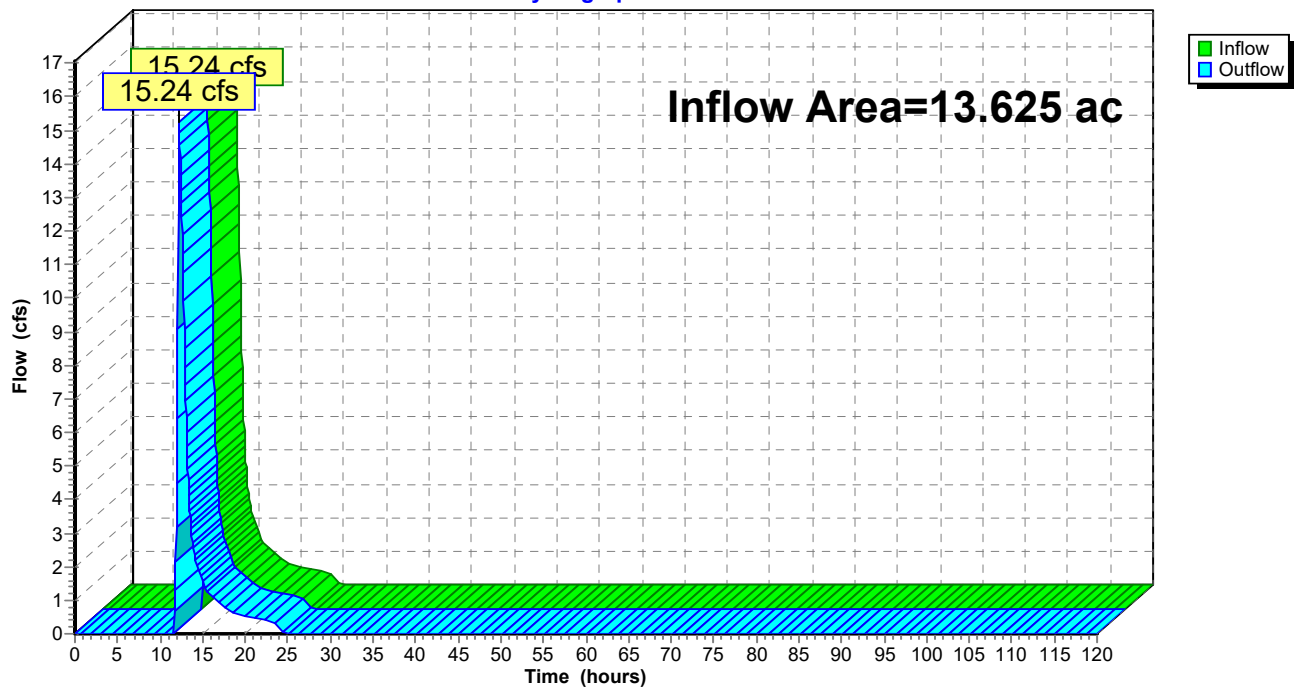
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.625 ac, 35.31% Impervious, Inflow Depth = 1.76" for 100-Year event
Inflow = 15.24 cfs @ 12.20 hrs, Volume= 1.995 af
Outflow = 15.24 cfs @ 12.20 hrs, Volume= 1.995 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-ELM: West Elm Street

Hydrograph



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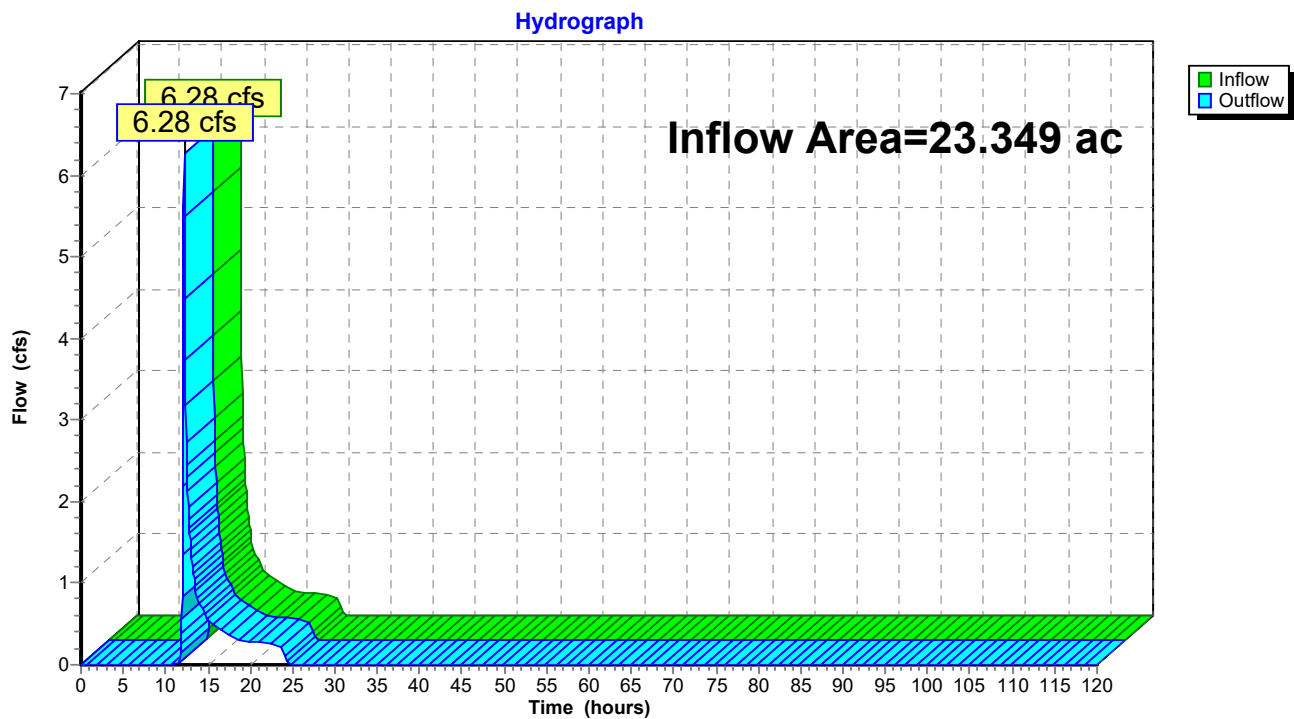
Summary for Reach DP-WA: Wetland Series A

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 23.349 ac, 17.54% Impervious, Inflow Depth = 0.32" for 100-Year event
Inflow = 6.28 cfs @ 12.20 hrs, Volume= 0.627 af
Outflow = 6.28 cfs @ 12.20 hrs, Volume= 0.627 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WA: Wetland Series A



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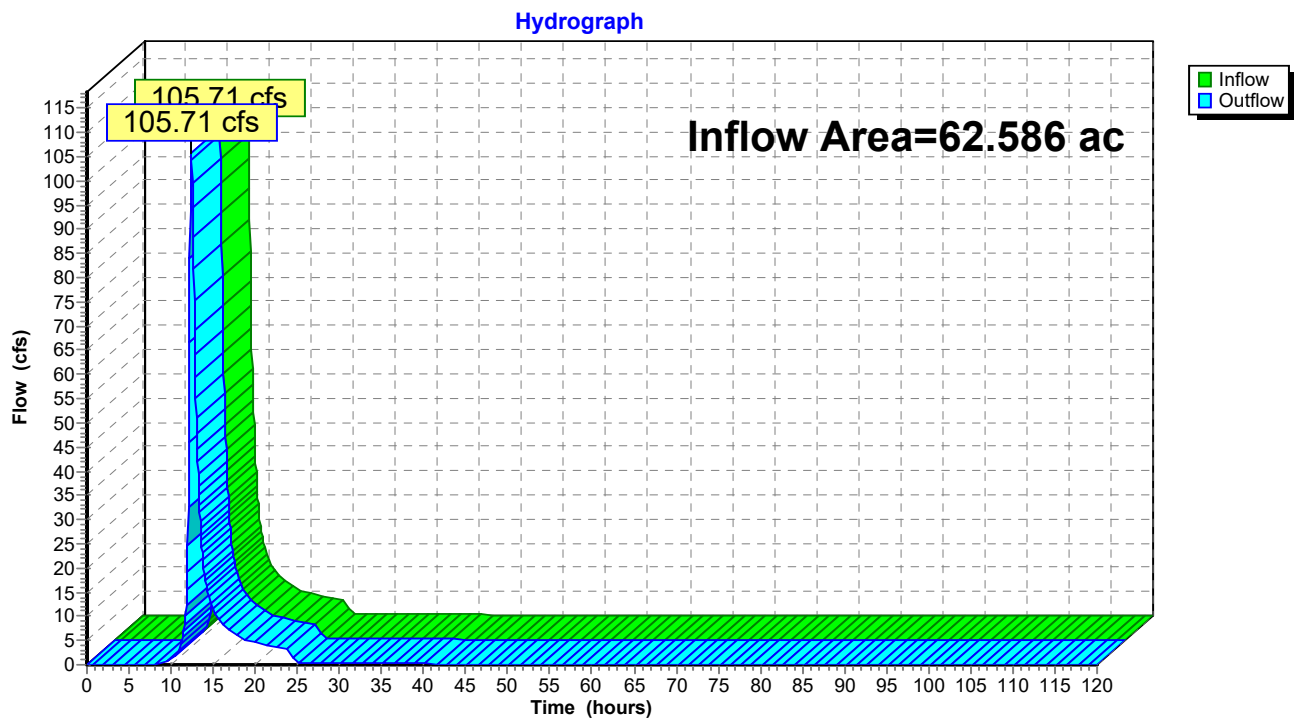
Summary for Reach DP-WI: Wetland Series/Stream I

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 62.586 ac, 17.71% Impervious, Inflow Depth = 3.04" for 100-Year event
Inflow = 105.71 cfs @ 12.42 hrs, Volume= 15.861 af
Outflow = 105.71 cfs @ 12.42 hrs, Volume= 15.861 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DP-WI: Wetland Series/Stream I



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Summary for Pond BAS 1-A: BAS 1-A

Inflow Area = 3.871 ac, 43.69% Impervious, Inflow Depth = 5.00" for 100-Year event
Inflow = 23.30 cfs @ 12.13 hrs, Volume= 1.613 af
Outflow = 7.60 cfs @ 12.32 hrs, Volume= 1.613 af, Atten= 67%, Lag= 11.5 min
Discarded = 1.49 cfs @ 12.32 hrs, Volume= 1.337 af
Primary = 6.10 cfs @ 12.32 hrs, Volume= 0.276 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 83.18' @ 12.32 hrs Surf.Area= 7,629 sf Storage= 24,698 cf

Plug-Flow detention time= 149.9 min calculated for 1.612 af (100% of inflow)
Center-of-Mass det. time= 149.9 min (969.1 - 819.2)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	31,322 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	2,480	0	0	2,480
79.00	3,150	2,808	2,808	3,176
80.00	3,880	3,509	6,317	3,935
80.95	4,660	4,051	10,368	4,746
81.00	5,284	248	10,616	5,370
82.00	6,379	5,823	16,439	6,498
83.00	7,434	6,900	23,339	7,593
84.00	8,545	7,983	31,322	8,748

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	8.270 in/hr Exfiltration over Wetted area
#2	Primary	82.75'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.49 cfs @ 12.32 hrs HW=83.17' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 1.49 cfs)

Primary OutFlow Max=5.95 cfs @ 12.32 hrs HW=83.17' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 5.95 cfs @ 1.76 fps)

Proposed Hydrology

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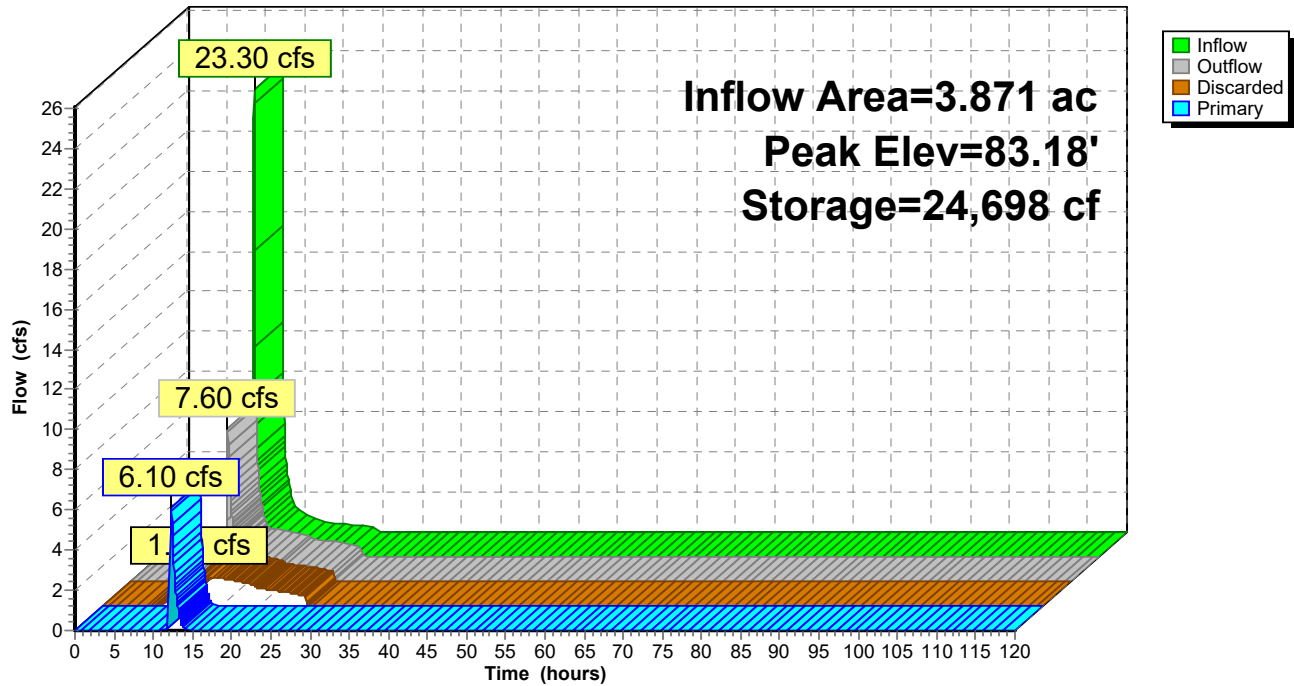
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Pond BAS 1-A: BAS 1-A

Hydrograph



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Summary for Pond BAS 1-B: BAS 1-B

Inflow Area = 6.278 ac, 8.01% Impervious, Inflow Depth = 3.65" for 100-Year event
Inflow = 17.24 cfs @ 12.33 hrs, Volume= 1.911 af
Outflow = 16.52 cfs @ 12.39 hrs, Volume= 1.911 af, Atten= 4%, Lag= 3.6 min
Discarded = 0.14 cfs @ 12.39 hrs, Volume= 0.375 af
Primary = 16.38 cfs @ 12.39 hrs, Volume= 1.536 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.99' @ 12.39 hrs Surf.Area= 5,994 sf Storage= 13,715 cf

Plug-Flow detention time= 182.5 min calculated for 1.911 af (100% of inflow)
Center-of-Mass det. time= 182.4 min (1,045.5 - 863.1)

Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	13,755 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
80.00	3,170	0	0
83.00	6,000	13,755	13,755

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.27'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.14 cfs @ 12.39 hrs HW=82.99' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=16.29 cfs @ 12.39 hrs HW=82.99' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 16.29 cfs @ 2.26 fps)

Proposed Hydrology

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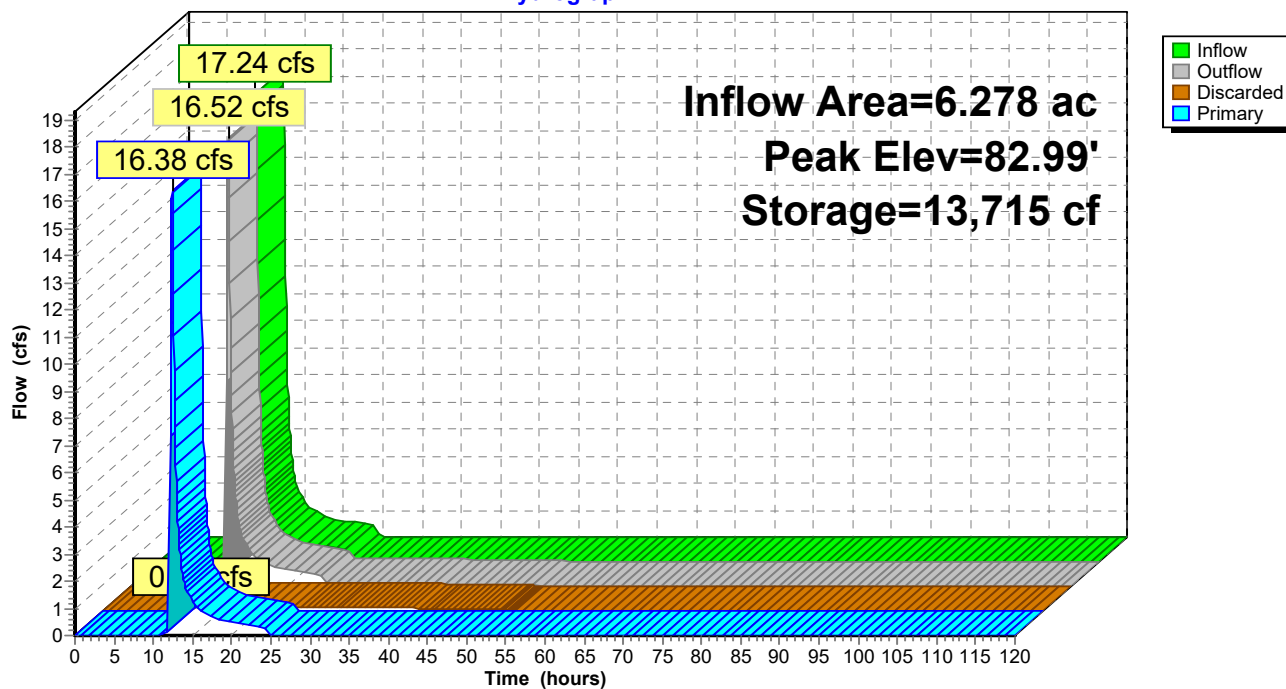
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Pond BAS 1-B: BAS 1-B

Hydrograph



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Summary for Pond BAS 1-C: BAS 1-C

Inflow Area = 0.144 ac, 73.04% Impervious, Inflow Depth = 6.28" for 100-Year event
Inflow = 1.03 cfs @ 12.13 hrs, Volume= 0.076 af
Outflow = 1.02 cfs @ 12.14 hrs, Volume= 0.076 af, Atten= 2%, Lag= 0.9 min
Discarded = 0.01 cfs @ 12.14 hrs, Volume= 0.023 af
Primary = 1.00 cfs @ 12.14 hrs, Volume= 0.052 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.98' @ 12.14 hrs Surf.Area= 451 sf Storage= 515 cf

Plug-Flow detention time= 182.4 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 182.9 min (971.0 - 788.1)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	525 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	70	0	0
83.00	455	525	525

Device	Routing	Invert	Outlet Devices
#1	Discarded	81.00'	1.020 in/hr Exfiltration over Surface area
#2	Primary	82.80'	5.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.01 cfs @ 12.14 hrs HW=82.98' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.98 cfs @ 12.14 hrs HW=82.98' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.98 cfs @ 1.12 fps)

Proposed Hydrology

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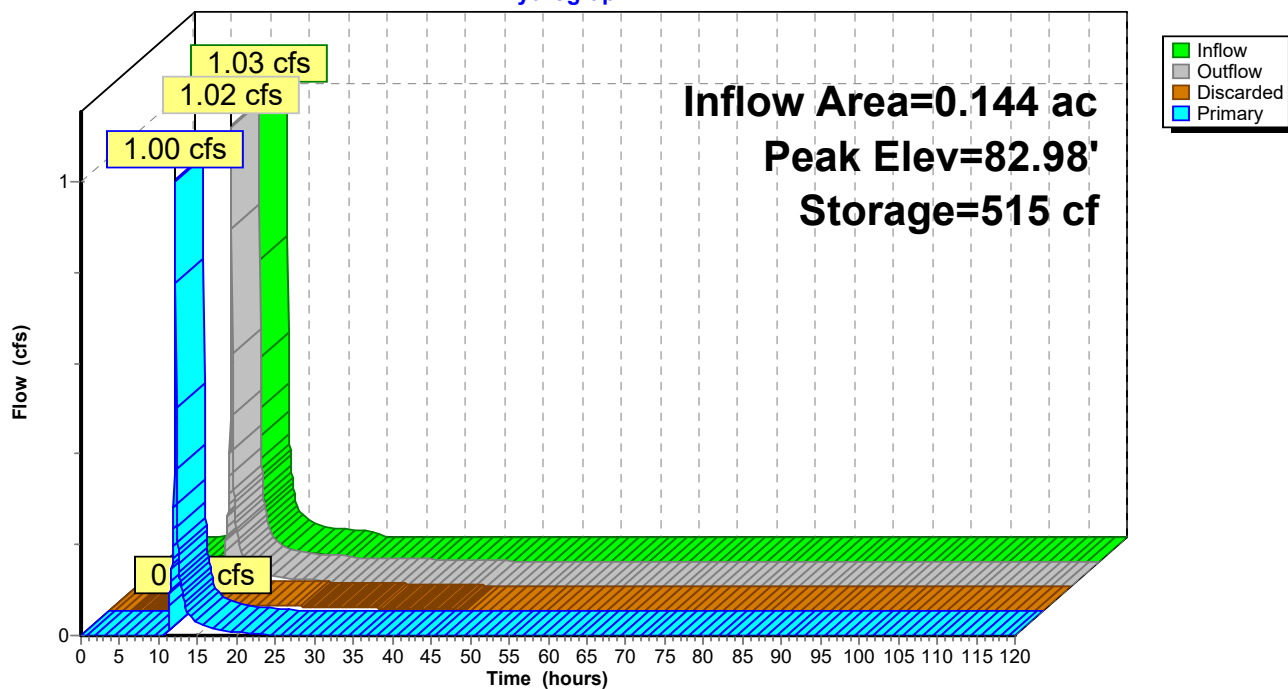
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Pond BAS 1-C: BAS 1-C

Hydrograph



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Summary for Pond BAS 10-A: EXIST BAS 10-A

Inflow Area = 0.796 ac, 7.21% Impervious, Inflow Depth = 0.78" for 100-Year event
Inflow = 0.39 cfs @ 12.17 hrs, Volume= 0.052 af
Outflow = 0.02 cfs @ 24.03 hrs, Volume= 0.052 af, Atten= 95%, Lag= 711.9 min
Discarded = 0.02 cfs @ 24.03 hrs, Volume= 0.052 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 55.53' @ 24.03 hrs Surf.Area= 1,728 sf Storage= 1,456 cf

Plug-Flow detention time= 859.5 min calculated for 0.052 af (100% of inflow)
Center-of-Mass det. time= 860.1 min (1,815.6 - 955.6)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.00'	16,389 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.00	220	0	0	220
55.00	1,250	665	665	1,254
56.00	2,210	1,707	2,372	2,225
59.00	4,000	9,183	11,555	4,108
60.10	4,800	4,833	16,389	4,949

Device	Routing	Invert	Outlet Devices
#1	Discarded	54.00'	0.520 in/hr Exfiltration over Wetted area
#2	Primary	60.00'	15.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.02 cfs @ 24.03 hrs HW=55.53' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.00' (Free Discharge)

↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Hydrology

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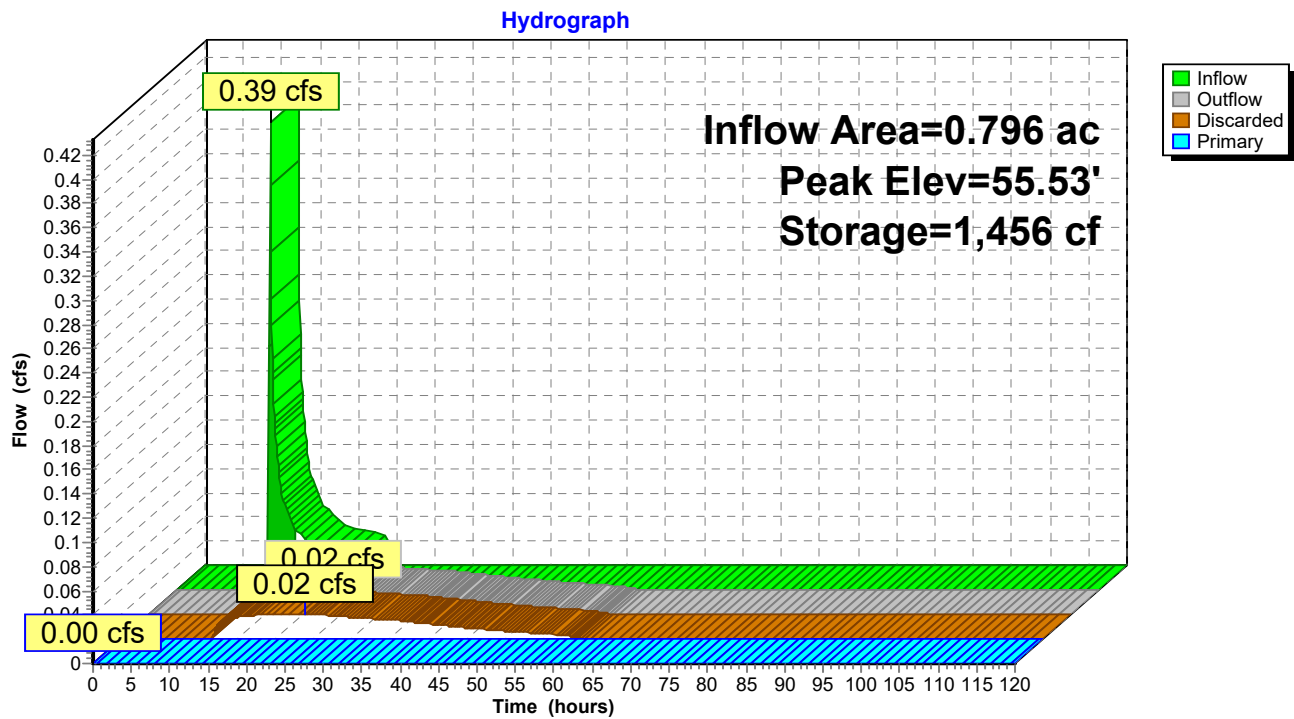
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Pond BAS 10-A: EXIST BAS 10-A



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Summary for Pond BAS 10-B: BAS 10-B

Inflow Area = 1.334 ac, 40.19% Impervious, Inflow Depth = 3.33" for 100-Year event
 Inflow = 5.44 cfs @ 12.13 hrs, Volume= 0.370 af
 Outflow = 0.24 cfs @ 15.01 hrs, Volume= 0.370 af, Atten= 96%, Lag= 172.8 min
 Discarded = 0.24 cfs @ 15.01 hrs, Volume= 0.370 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.89' @ 15.01 hrs Surf.Area= 4,212 sf Storage= 8,555 cf

Plug-Flow detention time= 432.6 min calculated for 0.370 af (100% of inflow)
 Center-of-Mass det. time= 432.7 min (1,287.7 - 855.0)

Volume	Invert	Avail.Storage	Storage Description	
#1	77.00'	9,015 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
77.00	1,850	0	0	1,850
78.00	2,450	2,143	2,143	2,472
79.00	3,520	2,969	5,112	3,559
80.00	4,300	3,904	9,015	4,370

Device	Routing	Invert	Outlet Devices
#1	Discarded	77.00'	2.410 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.24 cfs @ 15.01 hrs HW=79.89' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

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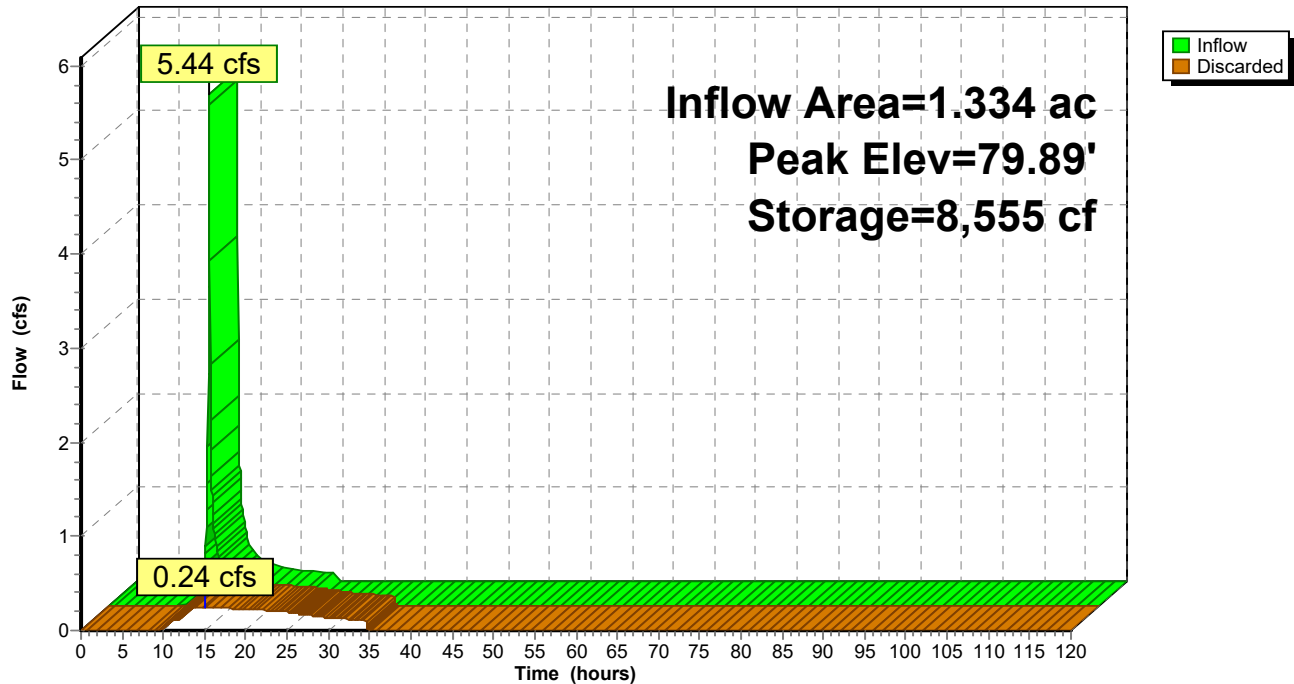
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Pond BAS 10-B: BAS 10-B

Hydrograph



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Summary for Pond BAS 11-B: BAS 11-B

Inflow Area = 4.563 ac, 12.43% Impervious, Inflow Depth = 4.15" for 100-Year event
Inflow = 23.20 cfs @ 12.13 hrs, Volume= 1.579 af
Outflow = 3.01 cfs @ 12.83 hrs, Volume= 1.579 af, Atten= 87%, Lag= 42.1 min
Discarded = 3.01 cfs @ 12.83 hrs, Volume= 1.579 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 44.89' @ 12.83 hrs Surf.Area= 127,000 sf Storage= 19,781 cf

Plug-Flow detention time= 45.4 min calculated for 1.579 af (100% of inflow)
Center-of-Mass det. time= 45.3 min (882.5 - 837.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	25,400 cf	Custom Stage Data (Conic) Listed below (Recalc) 63,500 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
44.50	127,000	0	0	127,000
45.00	127,000	63,500	63,500	127,632

Device	Routing	Invert	Outlet Devices
#1	Discarded	44.50'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=3.01 cfs @ 12.83 hrs HW=44.89' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 3.01 cfs)

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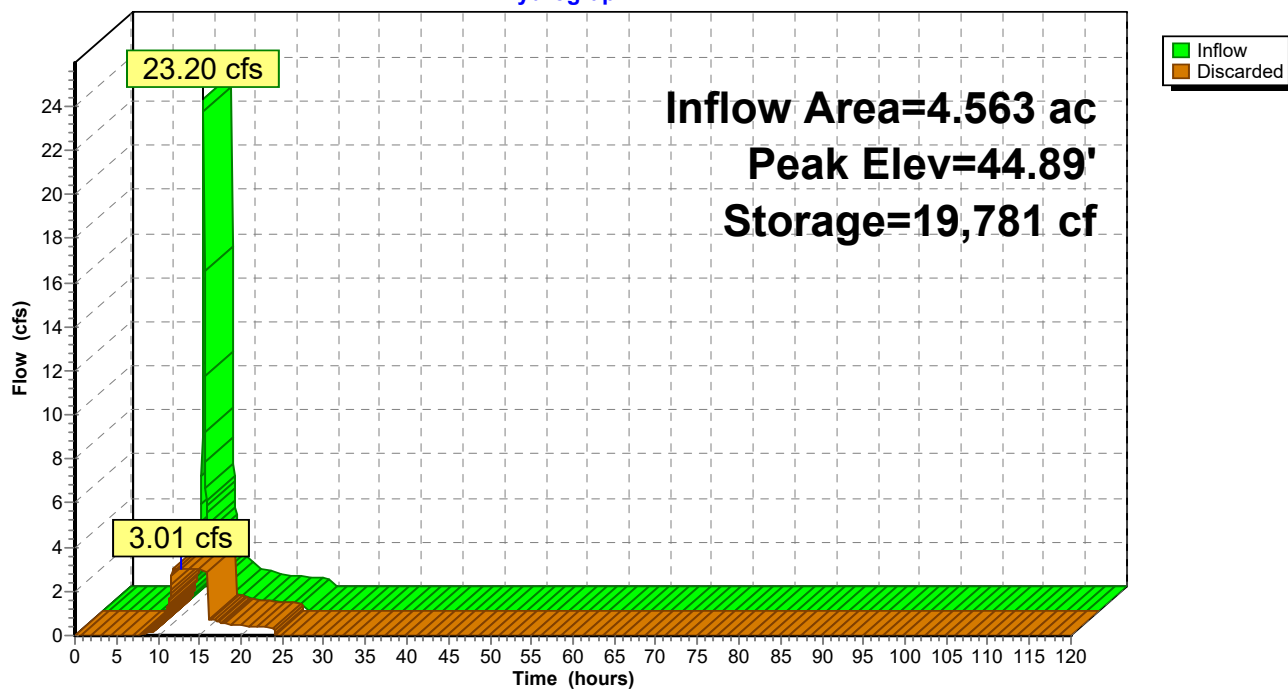
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Pond BAS 11-B: BAS 11-B

Hydrograph



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Summary for Pond BAS 12-A: BAS 12-A

Inflow Area = 6.552 ac, 26.15% Impervious, Inflow Depth = 3.98" for 100-Year event
Inflow = 32.01 cfs @ 12.13 hrs, Volume= 2.176 af
Outflow = 11.02 cfs @ 12.32 hrs, Volume= 2.176 af, Atten= 66%, Lag= 11.1 min
Discarded = 0.78 cfs @ 12.32 hrs, Volume= 1.359 af
Primary = 10.24 cfs @ 12.32 hrs, Volume= 0.817 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 95.97' @ 12.32 hrs Surf.Area= 13,845 sf Storage= 32,496 cf

Plug-Flow detention time= 279.1 min calculated for 2.176 af (100% of inflow)
Center-of-Mass det. time= 279.1 min (1,119.9 - 840.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	32,859 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.00	8,250	0	0	8,250
96.00	13,900	32,859	32,859	14,008

Device	Routing	Invert	Outlet Devices
#1	Discarded	93.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	95.45'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.78 cfs @ 12.32 hrs HW=95.97' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.78 cfs)

Primary OutFlow Max=10.11 cfs @ 12.32 hrs HW=95.97' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 10.11 cfs @ 1.95 fps)

Proposed Hydrology

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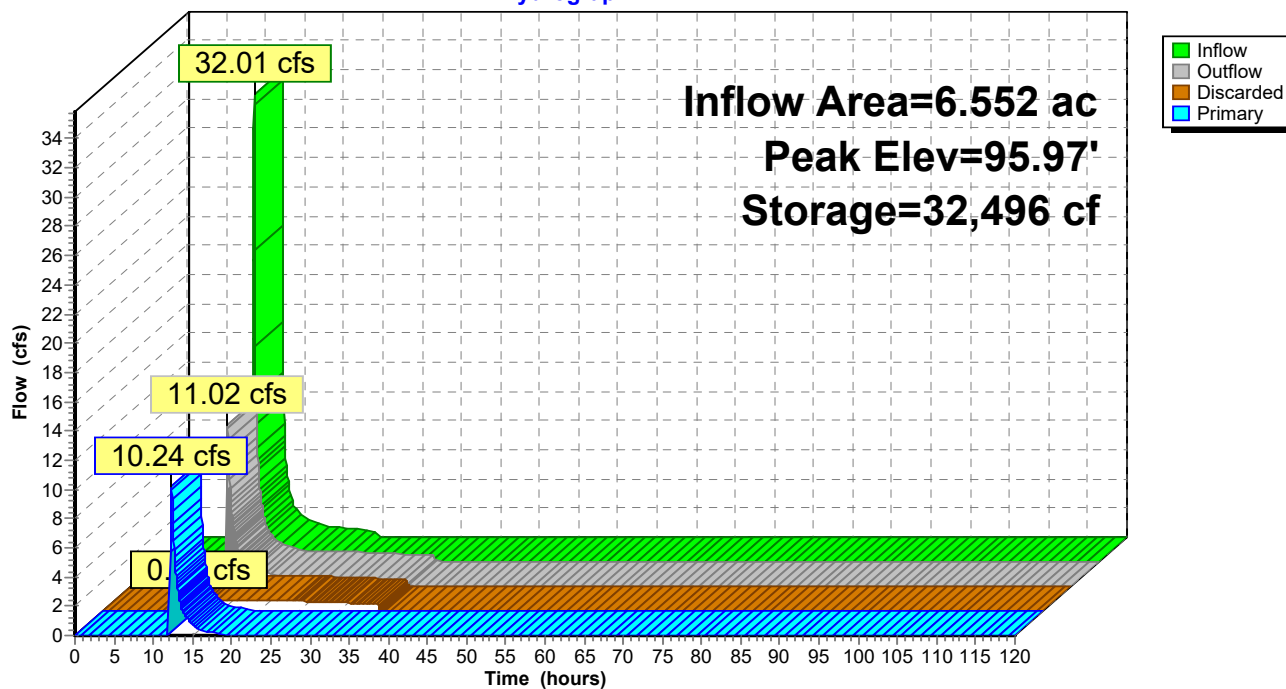
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Pond BAS 12-A: BAS 12-A

Hydrograph



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Summary for Pond BAS 12-B: BAS 12-B

Inflow Area = 13.599 ac, 25.11% Impervious, Inflow Depth = 2.22" for 100-Year event
Inflow = 24.74 cfs @ 12.15 hrs, Volume= 2.518 af
Outflow = 0.76 cfs @ 18.09 hrs, Volume= 2.518 af, Atten= 97%, Lag= 356.4 min
Discarded = 0.76 cfs @ 18.09 hrs, Volume= 2.518 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.91' @ 18.09 hrs Surf.Area= 32,185 sf Storage= 79,492 cf

Plug-Flow detention time= 1,110.7 min calculated for 2.517 af (100% of inflow)
Center-of-Mass det. time= 1,111.1 min (1,955.4 - 844.3)

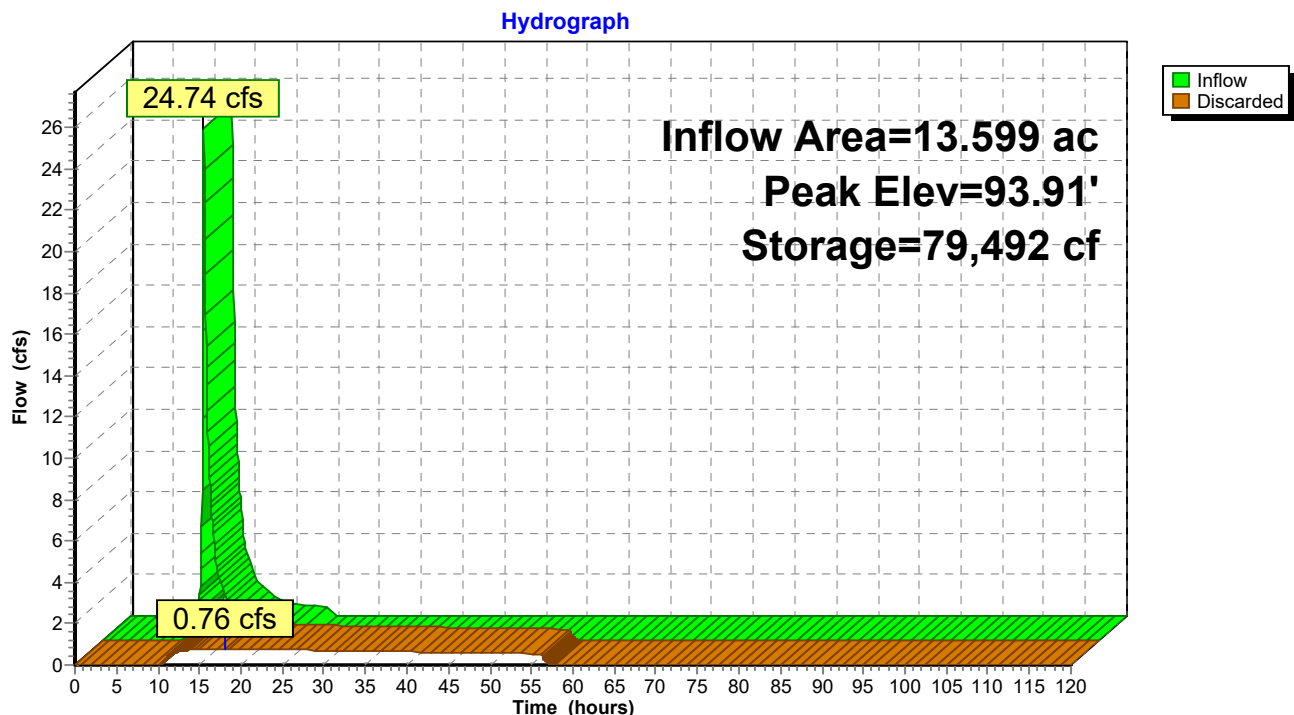
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	82,362 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	22,700	0	0	22,700
94.00	32,500	82,362	82,362	32,657

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area

Discarded OutFlow Max=0.76 cfs @ 18.09 hrs HW=93.91' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.76 cfs)

Pond BAS 12-B: BAS 12-B



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Summary for Pond BAS 15-A: BAS 15-A

Inflow Area = 0.480 ac, 29.15% Impervious, Inflow Depth = 4.43" for 100-Year event
Inflow = 2.60 cfs @ 12.13 hrs, Volume= 0.177 af
Outflow = 2.55 cfs @ 12.15 hrs, Volume= 0.177 af, Atten= 2%, Lag= 1.1 min
Primary = 2.55 cfs @ 12.15 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 83.00' @ 12.15 hrs Surf.Area= 1,500 sf Storage= 716 cf

Plug-Flow detention time= 27.8 min calculated for 0.177 af (100% of inflow)
Center-of-Mass det. time= 26.8 min (858.1 - 831.4)

Volume	Invert	Avail.Storage	Storage Description
#1	82.35'	716 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
82.35	300	0	0
82.70	1,350	289	289
83.00	1,500	427	716

Device	Routing	Invert	Outlet Devices
#1	Primary	82.35'	3.0" Vert. Orifice/Grate C= 0.600
#2	Primary	82.83'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.54 cfs @ 12.15 hrs HW=83.00' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.17 cfs @ 3.50 fps)

2=Sharp-Crested Rectangular Weir (Weir Controls 2.37 cfs @ 1.36 fps)

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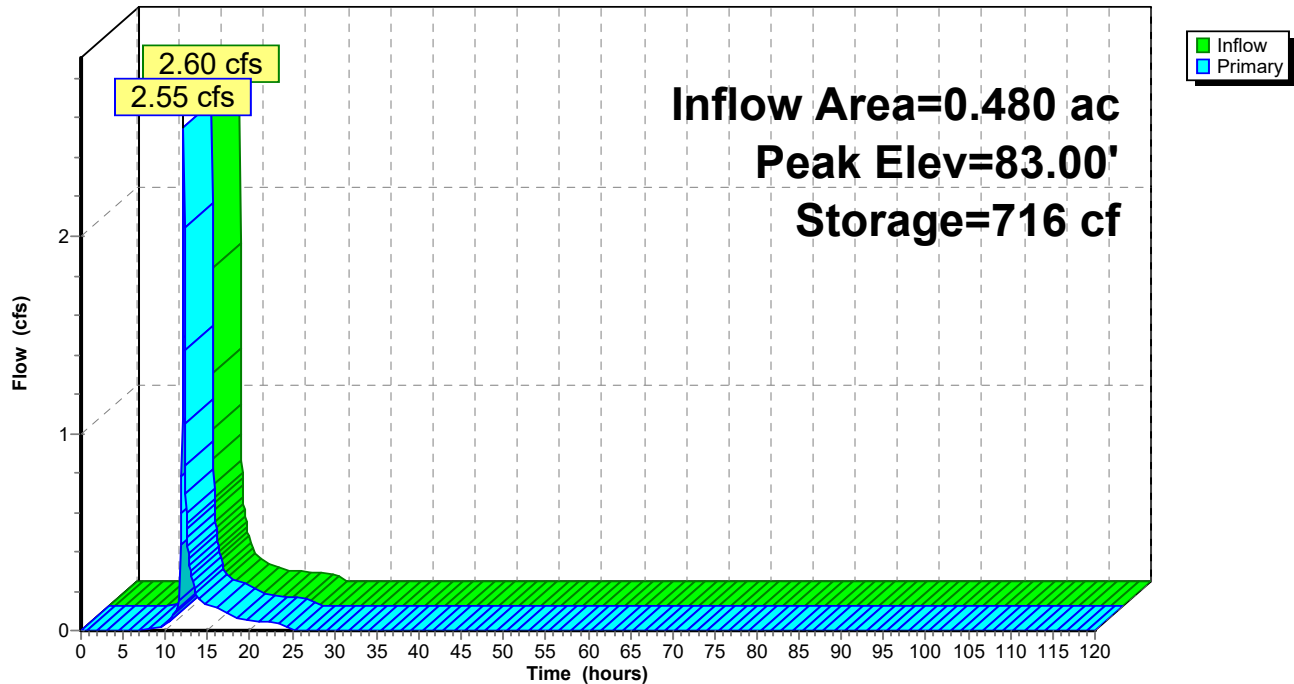
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Pond BAS 15-A: BAS 15-A

Hydrograph



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Summary for Pond BAS 2-A: DET BAS 2-A

Inflow Area = 2.386 ac, 38.00% Impervious, Inflow Depth = 3.22" for 100-Year event
Inflow = 9.40 cfs @ 12.13 hrs, Volume= 0.640 af
Outflow = 0.27 cfs @ 17.42 hrs, Volume= 0.640 af, Atten= 97%, Lag= 316.9 min
Primary = 0.27 cfs @ 17.42 hrs, Volume= 0.640 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 105.71' @ 17.42 hrs Surf.Area= 8,399 sf Storage= 17,508 cf

Plug-Flow detention time= 783.8 min calculated for 0.640 af (100% of inflow)
Center-of-Mass det. time= 784.3 min (1,641.8 - 857.4)

Volume	Invert	Avail.Storage	Storage Description
#1	102.80'	20,037 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.80	300	0	0	300
103.00	4,450	394	394	4,450
106.00	8,900	19,643	20,037	8,982

Device	Routing	Invert	Outlet Devices
#1	Primary	102.80'	2.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.27 cfs @ 17.42 hrs HW=105.71' (Free Discharge)

↑**1=Orifice/Grate** (Orifice Controls 0.27 cfs @ 8.06 fps)

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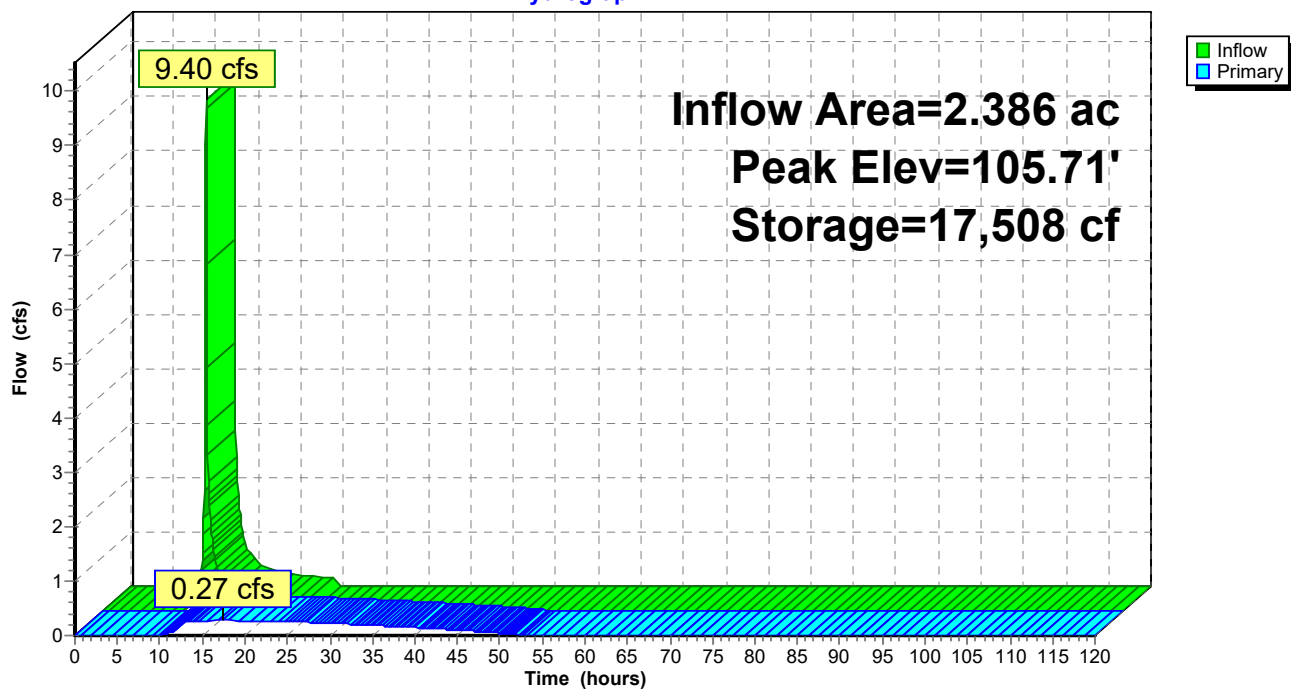
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Pond BAS 2-A: DET BAS 2-A

Hydrograph



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Summary for Pond BAS 2-B: BAS 2-B

Inflow Area = 1.161 ac, 38.00% Impervious, Inflow Depth = 4.10" for 100-Year event
Inflow = 5.83 cfs @ 12.13 hrs, Volume= 0.396 af
Outflow = 5.41 cfs @ 12.16 hrs, Volume= 0.396 af, Atten= 7%, Lag= 1.6 min
Discarded = 0.08 cfs @ 12.16 hrs, Volume= 0.144 af
Primary = 5.33 cfs @ 12.16 hrs, Volume= 0.252 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 99.99' @ 12.16 hrs Surf.Area= 3,442 sf Storage= 3,032 cf

Plug-Flow detention time= 129.8 min calculated for 0.396 af (100% of inflow)
Center-of-Mass det. time= 130.0 min (968.4 - 838.4)

Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	3,067 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
99.00	2,700	0	0	2,700
100.00	3,450	3,067	3,067	3,475

Device	Routing	Invert	Outlet Devices
#1	Discarded	99.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	99.73'	15.0' long x 15.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.08 cfs @ 12.16 hrs HW=99.99' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=5.21 cfs @ 12.16 hrs HW=99.99' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 5.21 cfs @ 1.36 fps)

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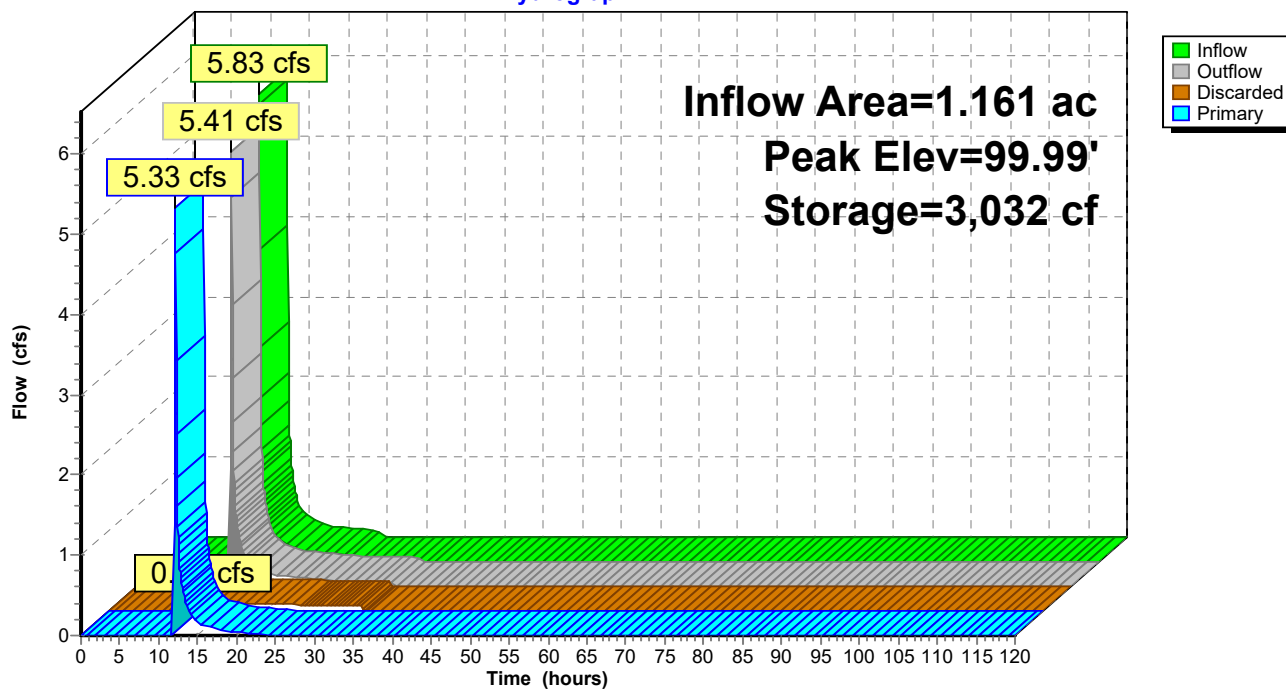
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Pond BAS 2-B: BAS 2-B

Hydrograph



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Summary for Pond BAS 2-C: BAS 2-C

Inflow Area = 1.461 ac, 38.00% Impervious, Inflow Depth = 5.92" for 100-Year event
Inflow = 10.04 cfs @ 12.13 hrs, Volume= 0.721 af
Outflow = 9.02 cfs @ 12.16 hrs, Volume= 0.721 af, Atten= 10%, Lag= 2.0 min
Primary = 9.02 cfs @ 12.16 hrs, Volume= 0.721 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.99' @ 12.16 hrs Surf.Area= 4,228 sf Storage= 7,689 cf

Plug-Flow detention time= 226.0 min calculated for 0.721 af (100% of inflow)
Center-of-Mass det. time= 225.8 min (1,023.3 - 797.5)

Volume	Invert	Avail.Storage	Storage Description
#1	100.60'	7,748 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.60	100	0	0	100
101.00	3,050	494	494	3,050
103.00	4,237	7,255	7,748	4,312

Device	Routing	Invert	Outlet Devices
#1	Device 3	102.50'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Device 3	100.60'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	100.60'	12.0" Round RCP_Round 12" X 2.00 L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.60' / 100.30' S= 0.0111 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=8.81 cfs @ 12.16 hrs HW=102.98' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 8.81 cfs of 12.15 cfs potential flow)

↑ **1=Orifice/Grate** (Weir Controls 8.65 cfs @ 2.26 fps)

↑ **2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.29 fps)

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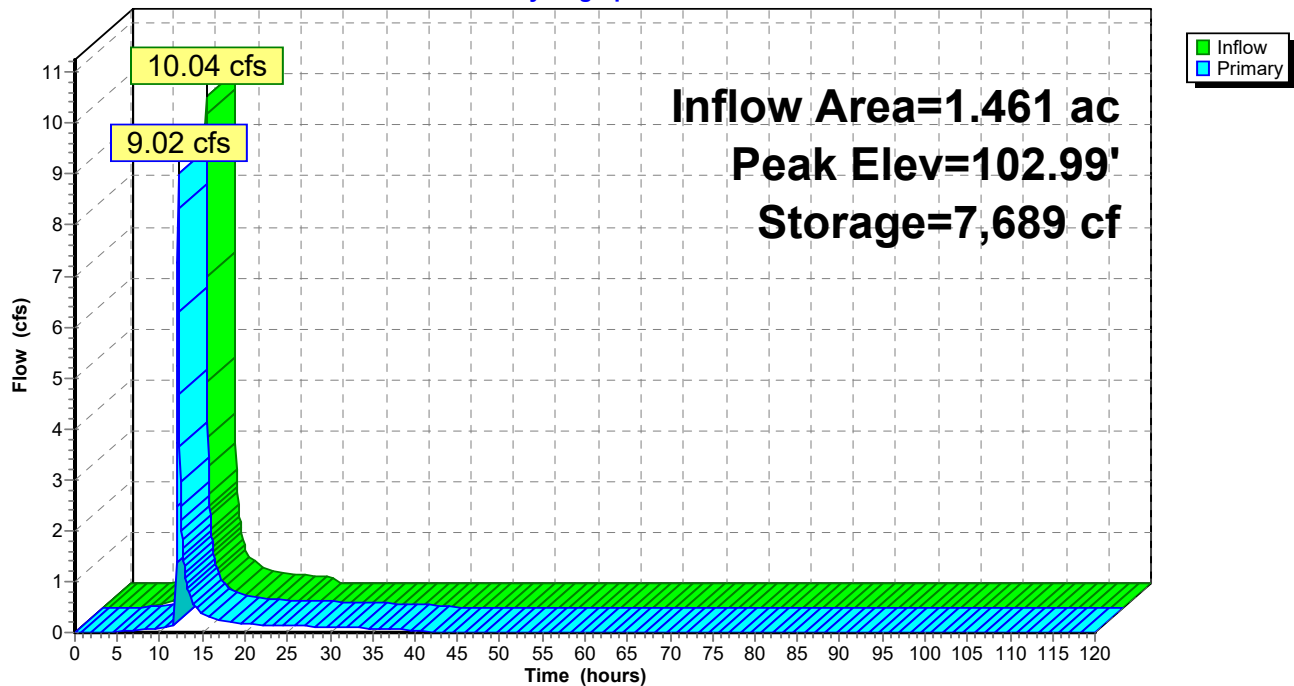
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Pond BAS 2-C: BAS 2-C

Hydrograph



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Summary for Pond BAS 2-D: BAS 2-D

Inflow Area = 8.783 ac, 33.03% Impervious, Inflow Depth = 3.76" for 100-Year event
Inflow = 40.57 cfs @ 12.13 hrs, Volume= 2.754 af
Outflow = 6.23 cfs @ 12.67 hrs, Volume= 2.754 af, Atten= 85%, Lag= 32.5 min
Discarded = 0.52 cfs @ 12.67 hrs, Volume= 1.635 af
Primary = 5.71 cfs @ 12.67 hrs, Volume= 1.119 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 108.96' @ 12.67 hrs Surf.Area= 21,915 sf Storage= 53,167 cf

Plug-Flow detention time= 618.8 min calculated for 2.754 af (100% of inflow)
Center-of-Mass det. time= 618.7 min (1,464.1 - 845.5)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	53,997 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	14,000	0	0	14,000
107.00	16,250	15,111	15,111	16,292
108.00	19,800	17,996	33,107	19,873
109.00	22,000	20,890	53,997	22,132

Device	Routing	Invert	Outlet Devices
#1	Device 3	108.60'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	106.00'	1.020 in/hr Exfiltration over Wetted area
#3	Primary	106.00'	18.0" Round Culvert L= 185.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 106.00' / 102.00' S= 0.0216 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Discarded OutFlow Max=0.52 cfs @ 12.67 hrs HW=108.96' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.52 cfs)

Primary OutFlow Max=5.69 cfs @ 12.67 hrs HW=108.96' (Free Discharge)

↑ **3=Culvert** (Passes 5.69 cfs of 9.99 cfs potential flow)

↑ **1=Orifice/Grate** (Weir Controls 5.69 cfs @ 1.97 fps)

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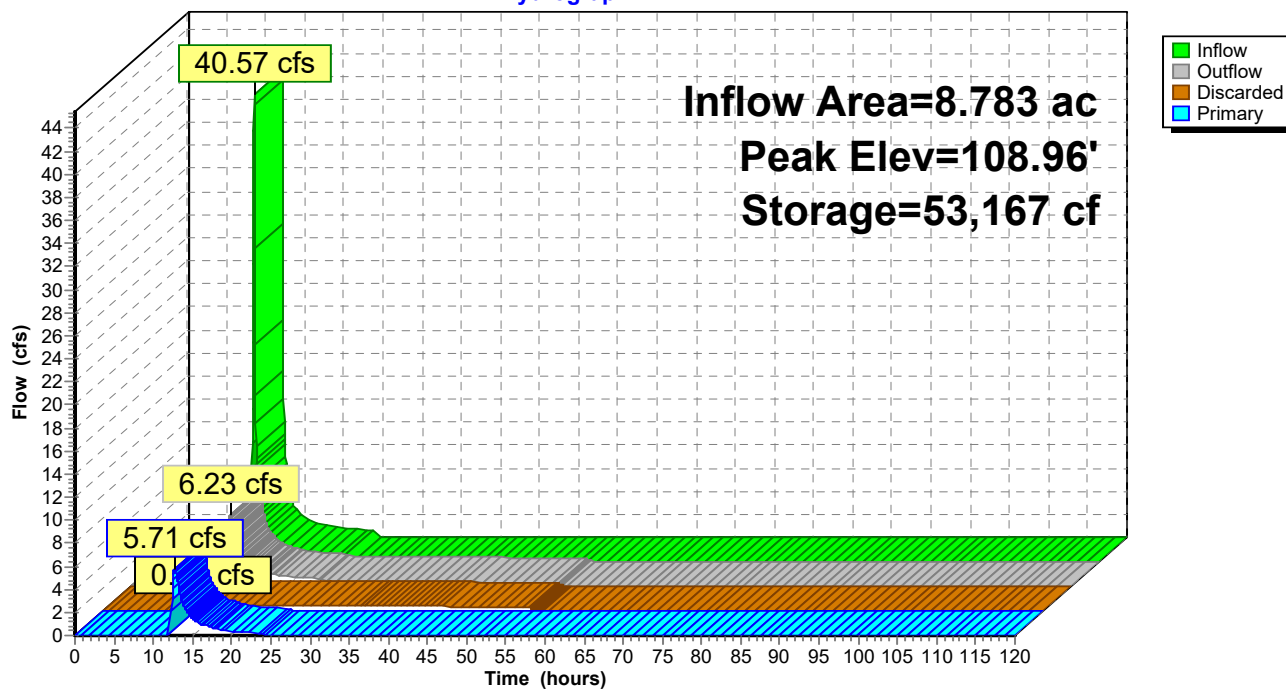
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Pond BAS 2-D: BAS 2-D

Hydrograph



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Summary for Pond BAS 2-E: BAS 2-E

Inflow Area = 2.574 ac, 44.91% Impervious, Inflow Depth = 5.11" for 100-Year event
Inflow = 15.79 cfs @ 12.13 hrs, Volume= 1.097 af
Outflow = 10.98 cfs @ 12.21 hrs, Volume= 1.097 af, Atten= 30%, Lag= 4.5 min
Discarded = 0.32 cfs @ 12.21 hrs, Volume= 0.581 af
Primary = 10.66 cfs @ 12.21 hrs, Volume= 0.516 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 101.04' @ 12.21 hrs Surf.Area= 13,679 sf Storage= 13,330 cf

Plug-Flow detention time= 177.3 min calculated for 1.097 af (100% of inflow)
Center-of-Mass det. time= 177.4 min (994.1 - 816.7)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	14,162 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	12,000	0	0	12,000
101.00	13,600	12,792	12,792	13,649
101.10	13,800	1,370	14,162	13,854

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.70'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.32 cfs @ 12.21 hrs HW=101.04' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=10.53 cfs @ 12.21 hrs HW=101.04' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 10.53 cfs @ 1.56 fps)

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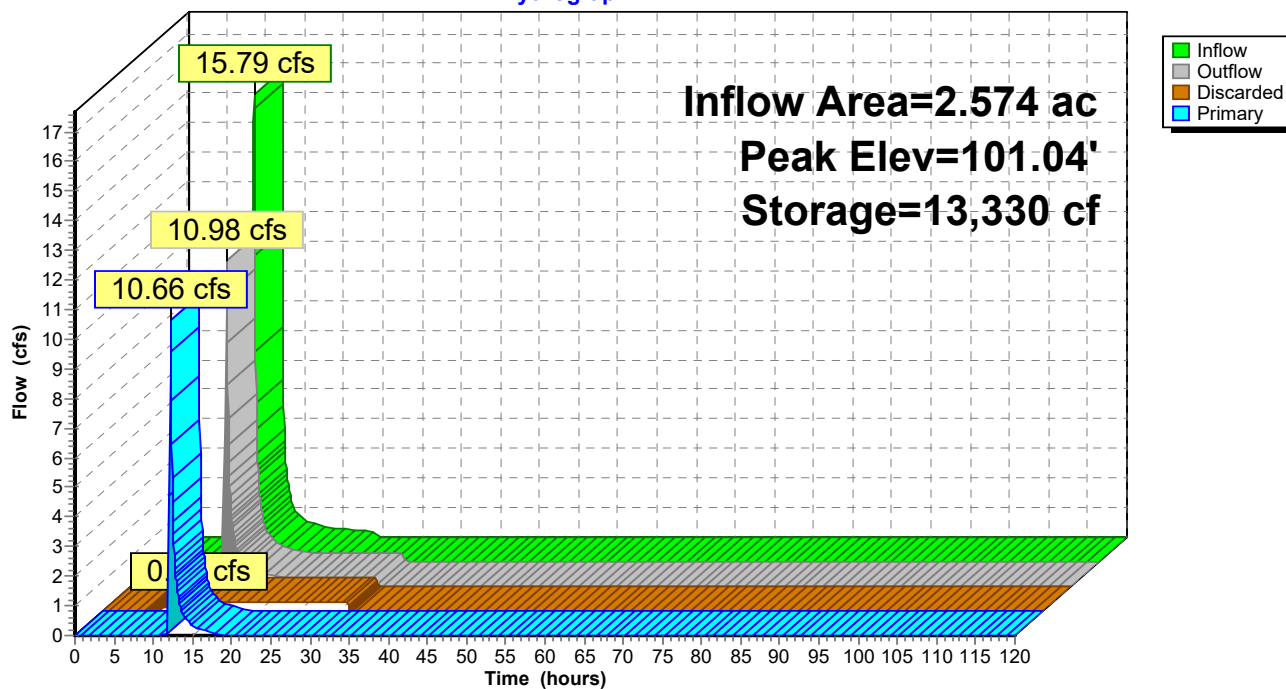
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Pond BAS 2-E: BAS 2-E

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Summary for Pond BAS 2-F: BAS 2-F

Inflow Area = 3.255 ac, 41.28% Impervious, Inflow Depth = 4.89" for 100-Year event
Inflow = 19.20 cfs @ 12.13 hrs, Volume= 1.325 af
Outflow = 8.07 cfs @ 12.27 hrs, Volume= 1.325 af, Atten= 58%, Lag= 8.4 min
Discarded = 0.60 cfs @ 12.27 hrs, Volume= 0.874 af
Primary = 7.47 cfs @ 12.27 hrs, Volume= 0.451 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 102.99' @ 12.27 hrs Surf.Area= 10,690 sf Storage= 18,703 cf

Plug-Flow detention time= 184.7 min calculated for 1.325 af (100% of inflow)
Center-of-Mass det. time= 184.8 min (1,006.5 - 821.7)

Volume	Invert	Avail.Storage	Storage Description
#1	101.00'	19,860 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
101.00	8,130	0	0	8,130
102.00	9,380	8,748	8,748	9,423
103.00	10,700	10,033	18,780	10,790
103.10	10,900	1,080	19,860	10,993

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	102.50'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.60 cfs @ 12.27 hrs HW=102.99' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.60 cfs)

Primary OutFlow Max=7.31 cfs @ 12.27 hrs HW=102.99' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 7.31 cfs @ 1.88 fps)

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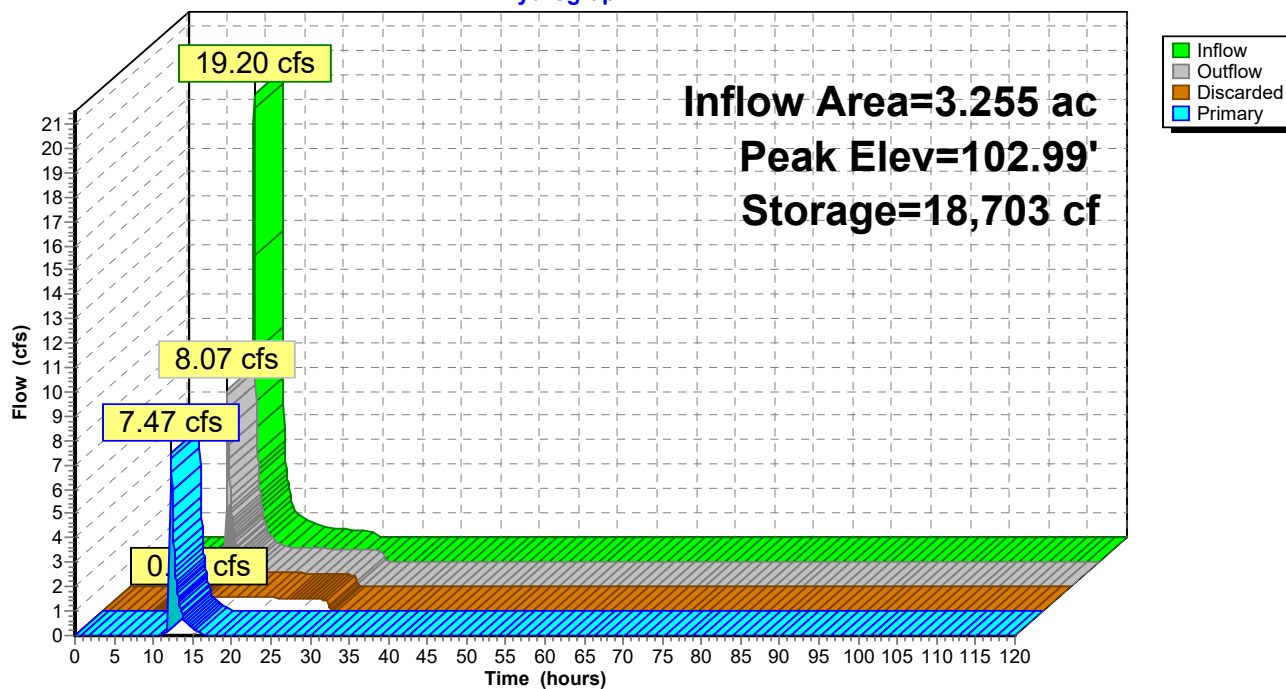
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Pond BAS 2-F: BAS 2-F

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Summary for Pond BAS 3-A: BAS 3-A

Inflow Area = 2.218 ac, 40.95% Impervious, Inflow Depth = 5.69" for 100-Year event
Inflow = 14.81 cfs @ 12.13 hrs, Volume= 1.052 af
Outflow = 1.91 cfs @ 12.74 hrs, Volume= 1.052 af, Atten= 87%, Lag= 36.6 min
Primary = 1.91 cfs @ 12.74 hrs, Volume= 1.052 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 104.00' @ 12.74 hrs Surf.Area= 10,496 sf Storage= 23,560 cf

Plug-Flow detention time= 543.2 min calculated for 1.051 af (100% of inflow)
Center-of-Mass det. time= 543.6 min (1,346.9 - 803.3)

Volume	Invert	Avail.Storage	Storage Description
#1	100.70'	23,581 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.70	300	0	0	300
101.00	5,100	664	664	5,100
104.00	10,500	22,918	23,581	10,579

Device	Routing	Invert	Outlet Devices
#1	Device 3	100.70'	3.0" Vert. Orifice/Grate C= 0.600
#2	Device 3	103.85'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	100.70'	12.0" Round RCP_Round 12" L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 100.70' / 99.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=1.91 cfs @ 12.74 hrs HW=104.00' (Free Discharge)

↑ **3=RCP_Round 12"** (Passes 1.91 cfs of 7.19 cfs potential flow)

↑ **1=Orifice/Grate** (Orifice Controls 0.42 cfs @ 8.58 fps)

↑ **2=Orifice/Grate** (Weir Controls 1.49 cfs @ 1.26 fps)

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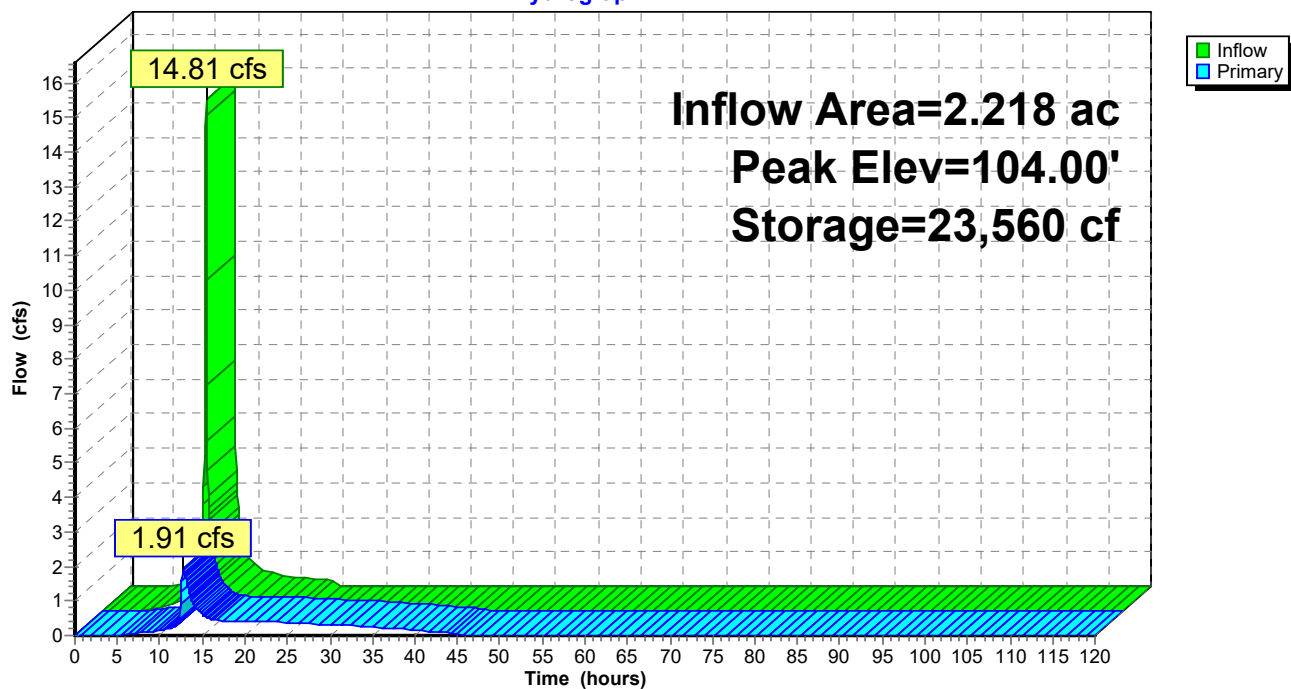
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Pond BAS 3-A: BAS 3-A

Hydrograph



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Summary for Pond BAS 3-B: BAS 3-B

Inflow Area = 6.110 ac, 38.90% Impervious, Inflow Depth = 4.66" for 100-Year event
Inflow = 34.55 cfs @ 12.13 hrs, Volume= 2.372 af
Outflow = 2.46 cfs @ 13.49 hrs, Volume= 2.372 af, Atten= 93%, Lag= 81.9 min
Discarded = 0.49 cfs @ 13.49 hrs, Volume= 1.849 af
Primary = 1.97 cfs @ 13.49 hrs, Volume= 0.523 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 100.80' @ 13.49 hrs Surf.Area= 20,548 sf Storage= 59,696 cf

Plug-Flow detention time= 1,022.8 min calculated for 2.372 af (100% of inflow)
Center-of-Mass det. time= 1,022.7 min (1,849.2 - 826.6)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	63,788 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
97.00	11,300	0	0	11,300
101.00	21,100	63,788	63,788	21,261

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	100.60'	8.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.49 cfs @ 13.49 hrs HW=100.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=1.97 cfs @ 13.49 hrs HW=100.80' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.97 cfs @ 1.21 fps)

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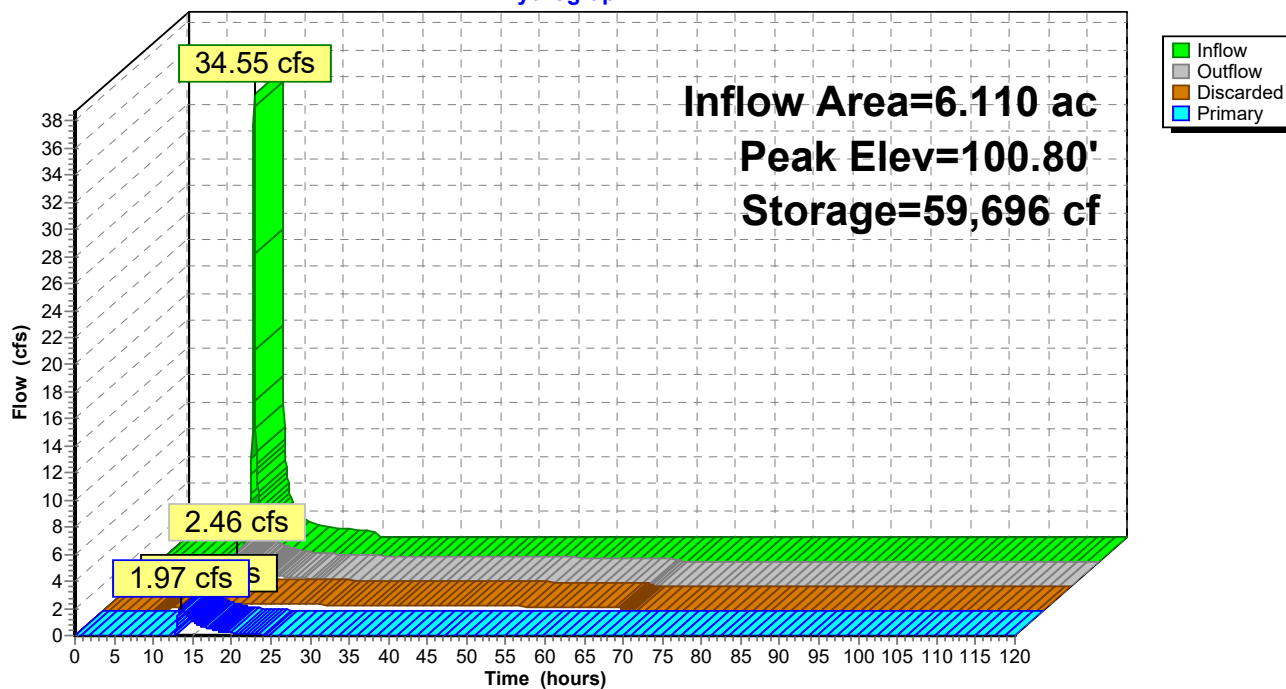
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Pond BAS 3-B: BAS 3-B

Hydrograph



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Summary for Pond BAS 6-A: BAS 6-A

Inflow Area = 3.389 ac, 43.46% Impervious, Inflow Depth = 5.00" for 100-Year event
Inflow = 20.39 cfs @ 12.13 hrs, Volume= 1.412 af
Outflow = 3.72 cfs @ 12.55 hrs, Volume= 1.412 af, Atten= 82%, Lag= 25.3 min
Discarded = 0.30 cfs @ 12.55 hrs, Volume= 0.960 af
Primary = 3.42 cfs @ 12.55 hrs, Volume= 0.452 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 90.98' @ 12.55 hrs Surf.Area= 12,375 sf Storage= 28,348 cf

Plug-Flow detention time= 663.1 min calculated for 1.411 af (100% of inflow)
Center-of-Mass det. time= 663.6 min (1,482.8 - 819.2)

Volume	Invert	Avail.Storage	Storage Description
#1	88.30'	28,567 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
88.30	8,860	0	0	8,860
91.00	12,400	28,567	28,567	12,534

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.30'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	90.78'	14.0' long x 21.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.30 cfs @ 12.55 hrs HW=90.98' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=3.41 cfs @ 12.55 hrs HW=90.98' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 3.41 cfs @ 1.21 fps)

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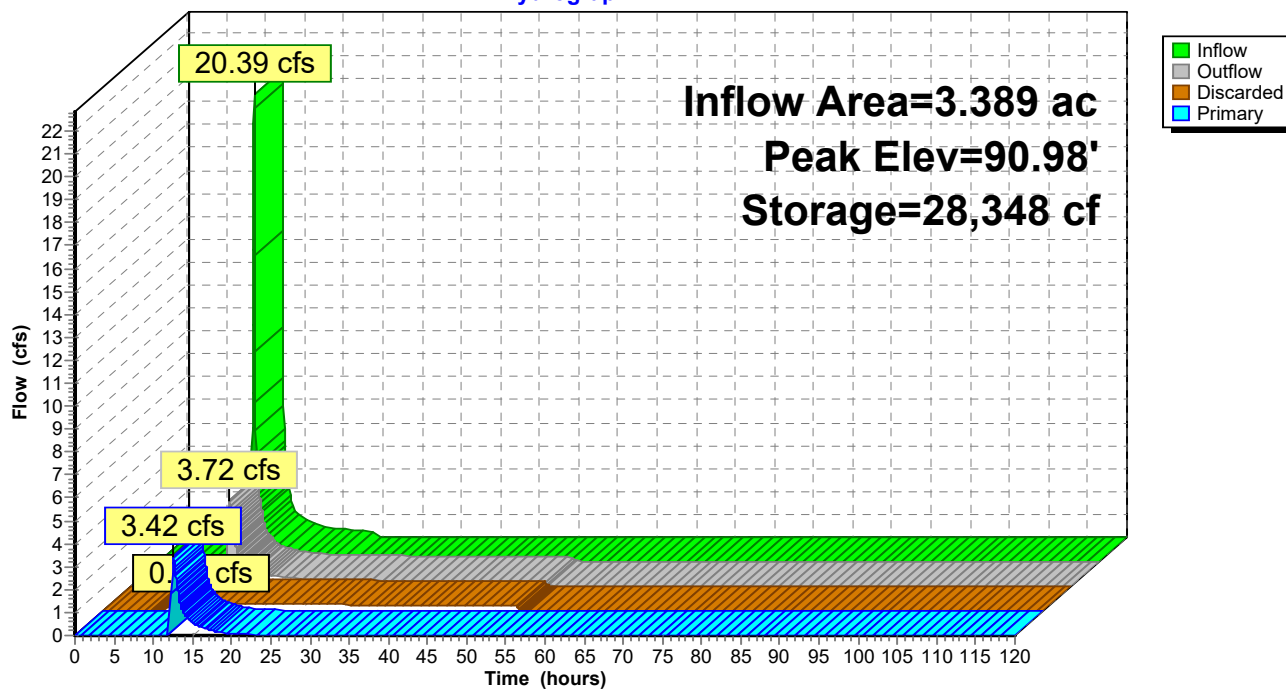
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Pond BAS 6-A: BAS 6-A

Hydrograph



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Summary for Pond BAS 7-A: BAS 7-A

Inflow Area = 4.495 ac, 51.83% Impervious, Inflow Depth = 4.21" for 100-Year event
Inflow = 23.14 cfs @ 12.13 hrs, Volume= 1.576 af
Outflow = 1.27 cfs @ 14.18 hrs, Volume= 1.576 af, Atten= 95%, Lag= 123.2 min
Discarded = 0.43 cfs @ 14.18 hrs, Volume= 1.395 af
Primary = 0.83 cfs @ 14.18 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 93.93' @ 14.18 hrs Surf.Area= 18,328 sf Storage= 41,073 cf

Plug-Flow detention time= 938.8 min calculated for 1.576 af (100% of inflow)
Center-of-Mass det. time= 938.7 min (1,774.8 - 836.1)

Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	42,338 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.00	10,100	0	0	10,100
94.00	18,550	42,338	42,338	18,643

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.00'	1.020 in/hr Exfiltration over Wetted area
#2	Primary	93.87'	20.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.43 cfs @ 14.18 hrs HW=93.93' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=0.81 cfs @ 14.18 hrs HW=93.93' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.81 cfs @ 0.66 fps)

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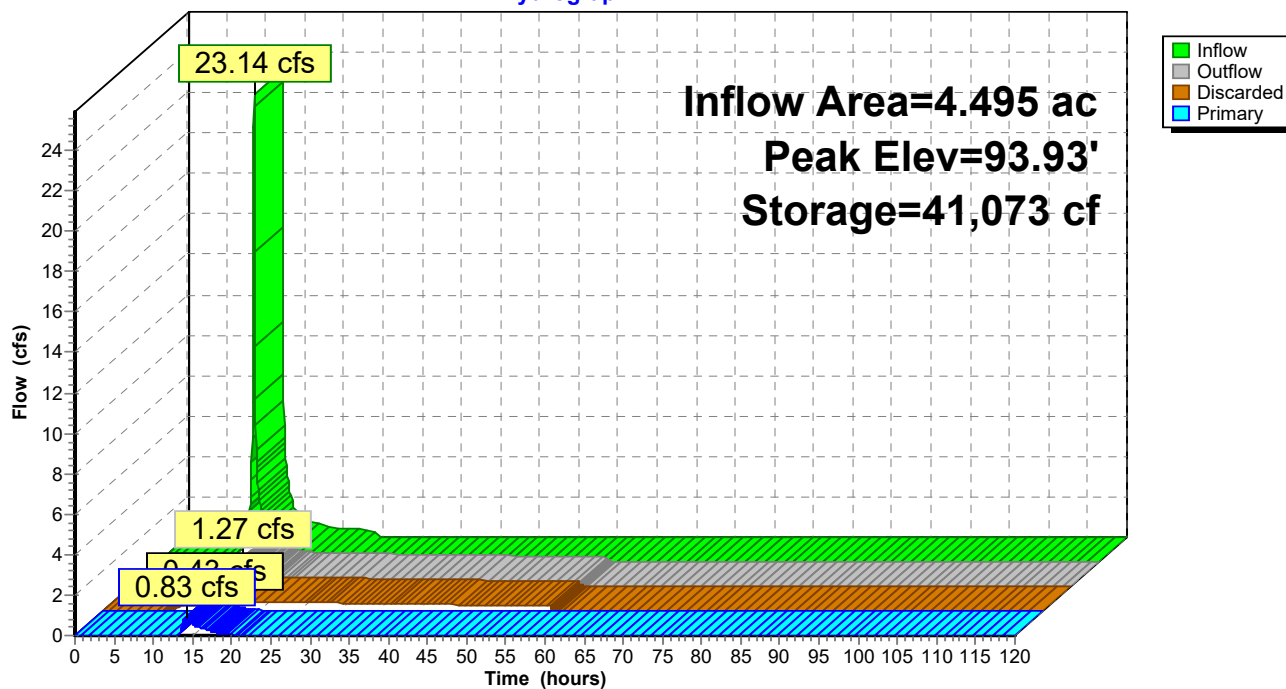
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Pond BAS 7-A: BAS 7-A

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Summary for Pond BAS 9-A: BAS 9-A

Inflow Area = 2.828 ac, 32.51% Impervious, Inflow Depth = 1.20" for 100-Year event
Inflow = 4.01 cfs @ 12.14 hrs, Volume= 0.283 af
Outflow = 0.53 cfs @ 13.05 hrs, Volume= 0.283 af, Atten= 87%, Lag= 54.9 min
Discarded = 0.17 cfs @ 13.05 hrs, Volume= 0.248 af
Primary = 0.36 cfs @ 13.05 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 63.96' @ 13.05 hrs Surf.Area= 2,943 sf Storage= 5,187 cf

Plug-Flow detention time= 375.7 min calculated for 0.283 af (100% of inflow)
Center-of-Mass det. time= 375.7 min (1,257.0 - 881.3)

Volume	Invert	Avail.Storage	Storage Description
#1	61.00'	5,320 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
61.00	1,100	0	0	1,100
63.00	1,850	2,918	2,918	1,897
64.00	3,000	2,402	5,320	3,060

Device	Routing	Invert	Outlet Devices
#1	Discarded	61.00'	2.410 in/hr Exfiltration over Wetted area
#2	Primary	63.90'	10.0' long x 23.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.17 cfs @ 13.05 hrs HW=63.96' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.35 cfs @ 13.05 hrs HW=63.96' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.35 cfs @ 0.63 fps)

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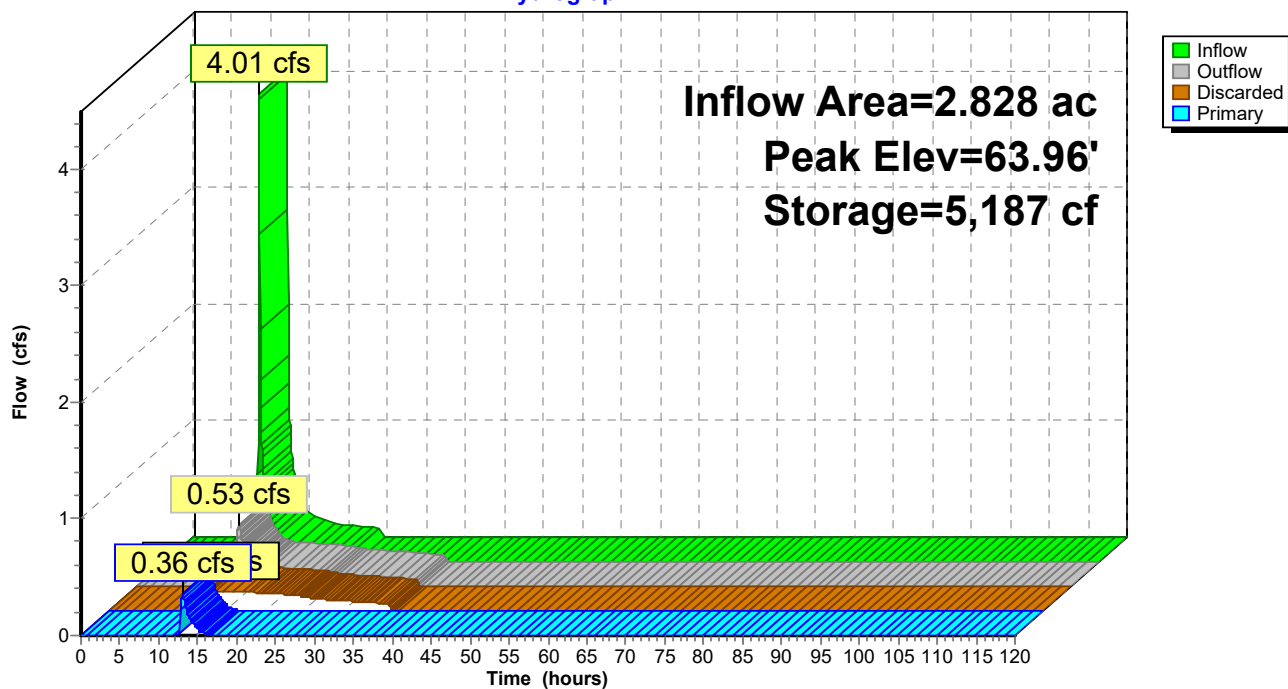
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Pond BAS 9-A: BAS 9-A

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Pond BAS 9-B: BAS 9-B

Inflow Area = 5.910 ac, 58.27% Impervious, Inflow Depth = 4.53" for 100-Year event
Inflow = 32.32 cfs @ 12.13 hrs, Volume= 2.233 af
Outflow = 13.22 cfs @ 12.27 hrs, Volume= 2.233 af, Atten= 59%, Lag= 8.5 min
Discarded = 0.52 cfs @ 12.27 hrs, Volume= 0.634 af
Primary = 12.70 cfs @ 12.27 hrs, Volume= 1.598 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 64.98' @ 12.27 hrs Surf.Area= 9,174 sf Storage= 28,195 cf

Plug-Flow detention time= 131.1 min calculated for 2.232 af (100% of inflow)
Center-of-Mass det. time= 131.4 min (957.5 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	28,387 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	3,000	0	0	3,000
61.00	3,800	3,392	3,392	3,826
62.00	4,800	4,290	7,682	4,853
63.00	5,750	5,268	12,950	5,837
64.00	8,000	6,844	19,794	8,106
65.00	9,200	8,593	28,387	9,350

Device	Routing	Invert	Outlet Devices
#1	Discarded	60.00'	2.410 in/hr Exfiltration over Wetted area
#2	Device 3	62.40'	1.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#3	Primary	62.00'	18.0" Round CMP_Round 18" L= 90.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 62.00' / 61.42' S= 0.0064 ' / S= 0.0064 ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.52 cfs @ 12.27 hrs HW=64.97' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.52 cfs)

Primary OutFlow Max=12.67 cfs @ 12.27 hrs HW=64.97' (Free Discharge)

↑ **3=CMP_Round 18"** (Inlet Controls 12.67 cfs @ 7.17 fps)

↑ **2=Sharp-Crested Rectangular Weir** (Passes 12.67 cfs of 15.95 cfs potential flow)

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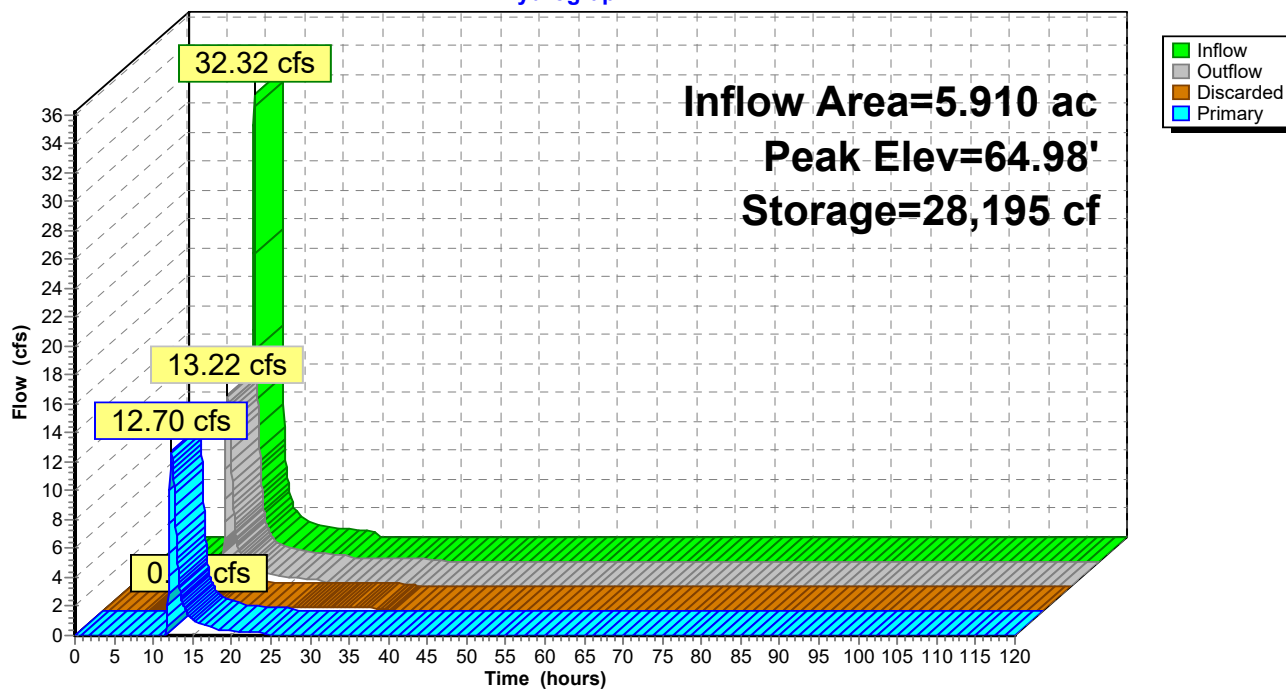
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Pond BAS 9-B: BAS 9-B

Hydrograph



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Summary for Pond W-N: Wetland Series N

Inflow Area = 30.869 ac, 27.45% Impervious, Inflow Depth > 3.12" for 100-Year event
Inflow = 14.97 cfs @ 12.32 hrs, Volume= 8.014 af
Outflow = 1.91 cfs @ 20.78 hrs, Volume= 6.656 af, Atten= 87%, Lag= 507.1 min
Primary = 1.91 cfs @ 20.78 hrs, Volume= 6.656 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 88.06' @ 20.78 hrs Surf.Area= 33,082 sf Storage= 72,609 cf

Plug-Flow detention time= 929.9 min calculated for 6.654 af (83% of inflow)
Center-of-Mass det. time= 454.5 min (2,768.6 - 2,314.0)

Volume	Invert	Avail.Storage	Storage Description
#1	85.50'	151,214 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
85.50	24,094	0	0	24,094
88.00	32,690	70,707	70,707	32,818
89.00	39,800	36,187	106,894	39,960
90.00	49,000	44,320	151,214	49,190

Device	Routing	Invert	Outlet Devices
#1	Primary	87.55'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 87.55' / 83.90' S= 0.0790 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=1.90 cfs @ 20.78 hrs HW=88.06' (Free Discharge)

↑1=RCP_Round 24" (Inlet Controls 1.90 cfs @ 3.03 fps)

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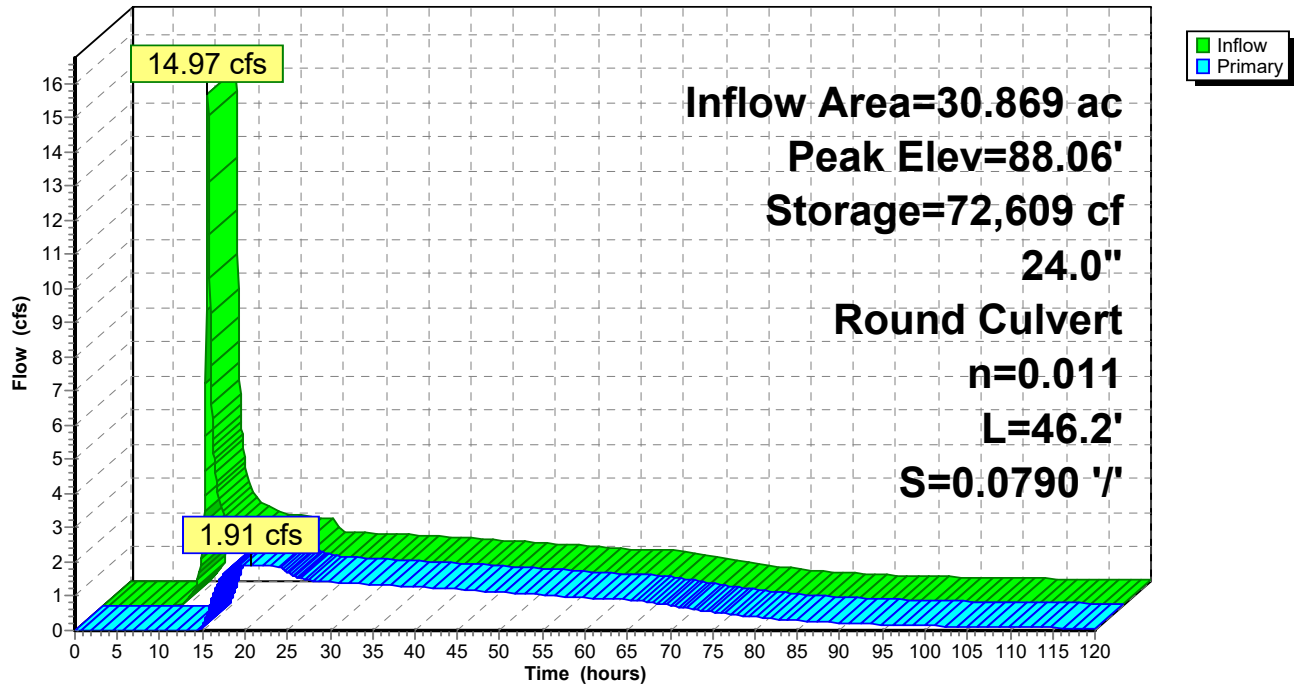
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Pond W-N: Wetland Series N

Hydrograph



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Summary for Pond W-O: Wetland Series O

Inflow Area = 61.004 ac, 21.36% Impervious, Inflow Depth = 0.67" for 100-Year event
Inflow = 27.44 cfs @ 12.36 hrs, Volume= 3.419 af
Outflow = 8.39 cfs @ 13.00 hrs, Volume= 3.418 af, Atten= 69%, Lag= 38.5 min
Primary = 8.39 cfs @ 13.00 hrs, Volume= 3.418 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 79.25' @ 13.00 hrs Surf.Area= 20,460 sf Storage= 45,908 cf

Plug-Flow detention time= 124.4 min calculated for 3.416 af (100% of inflow)
Center-of-Mass det. time= 126.2 min (1,013.0 - 886.8)

Volume	Invert	Avail.Storage	Storage Description
#1	76.94'	139,412 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.94	19,300	0	0	19,300
80.00	20,844	61,405	61,405	21,478
81.00	37,500	28,767	90,173	38,145
82.00	62,000	49,239	139,412	62,658

Device	Routing	Invert	Outlet Devices
#1	Primary	76.94'	18.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.94' / 74.98' S= 0.0114 ' S= 0.0114 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=8.39 cfs @ 13.00 hrs HW=79.25' (Free Discharge)

1=Culvert (Inlet Controls 8.39 cfs @ 4.75 fps)
2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Proposed Hydrology

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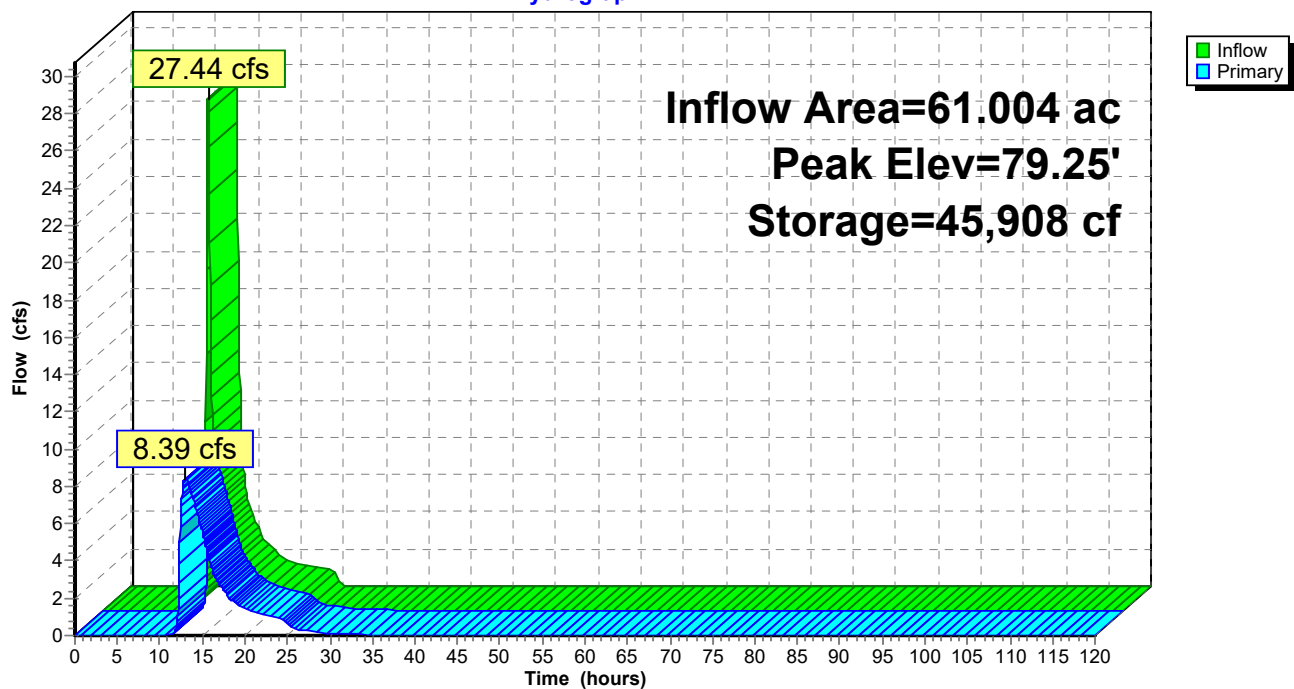
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Pond W-O: Wetland Series O

Hydrograph



Proposed Hydrology

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Summary for Pond W-QP: Wetland Series Q & P

Inflow Area = 42.589 ac, 23.35% Impervious, Inflow Depth > 2.78" for 100-Year event
Inflow = 31.18 cfs @ 12.22 hrs, Volume= 9.875 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 82.17' @ 120.00 hrs Surf.Area= 100,576 sf Storage= 430,154 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	76.76'	515,887 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.76	58,200	0	0	58,200
78.70	58,200	112,908	112,908	59,859
78.76	83,500	4,228	117,136	85,159
83.00	105,000	398,751	515,887	107,147

Device	Routing	Invert	Outlet Devices
#1	Primary	82.80'	45.0' long x 40.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.76' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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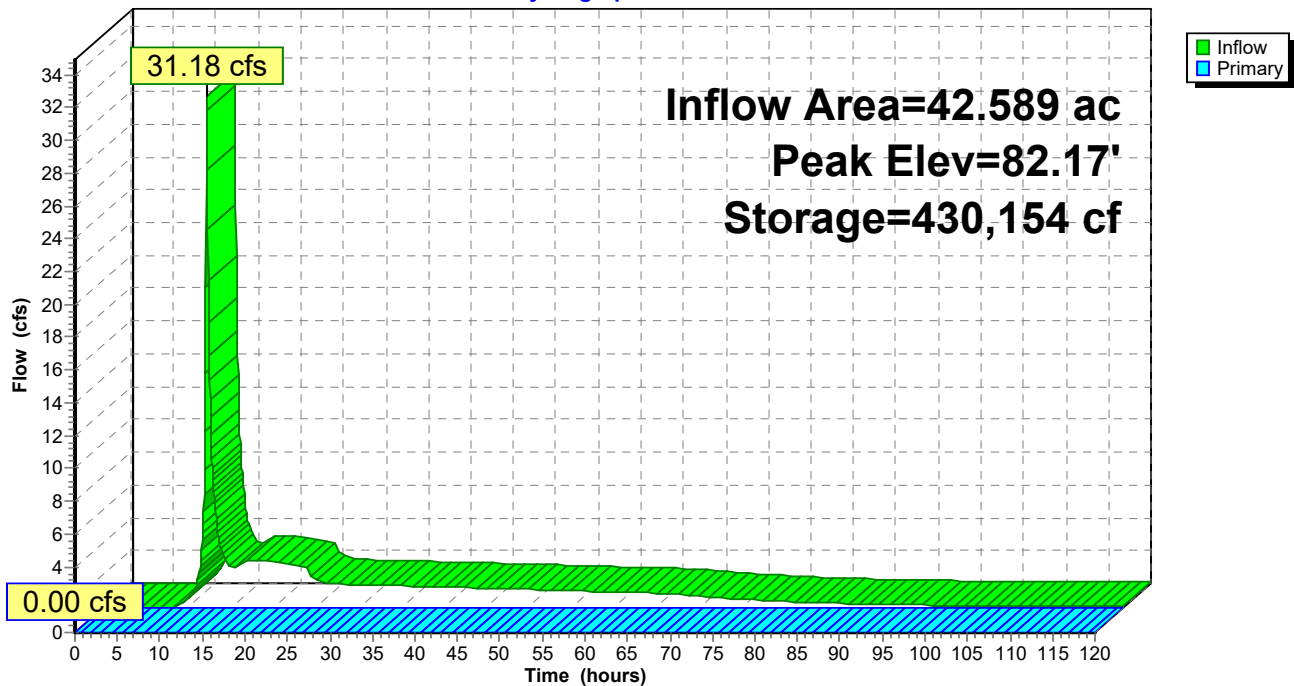
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Pond W-QP: Wetland Series Q & P

Hydrograph



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Summary for Pond W-R: Wetland Series R

Inflow Area = 25.797 ac, 32.85% Impervious, Inflow Depth = 3.36" for 100-Year event
Inflow = 55.59 cfs @ 12.28 hrs, Volume= 7.214 af
Outflow = 1.46 cfs @ 24.16 hrs, Volume= 6.470 af, Atten= 97%, Lag= 712.4 min
Primary = 1.46 cfs @ 24.16 hrs, Volume= 6.470 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 89.77' @ 24.16 hrs Surf.Area= 92,246 sf Storage= 236,822 cf

Plug-Flow detention time= 1,815.0 min calculated for 6.470 af (90% of inflow)
Center-of-Mass det. time= 1,727.3 min (2,660.5 - 933.1)

Volume	Invert	Avail.Storage	Storage Description
#1	87.00'	455,202 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
87.00	78,906	0	0	78,906
92.00	103,740	455,202	455,202	104,308

Device	Routing	Invert	Outlet Devices
#1	Primary	87.26'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.26' / 86.50' S= 0.0032 ' S= 0.0032 ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.46 cfs @ 24.16 hrs HW=89.77' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.46 cfs @ 4.19 fps)

Proposed Hydrology

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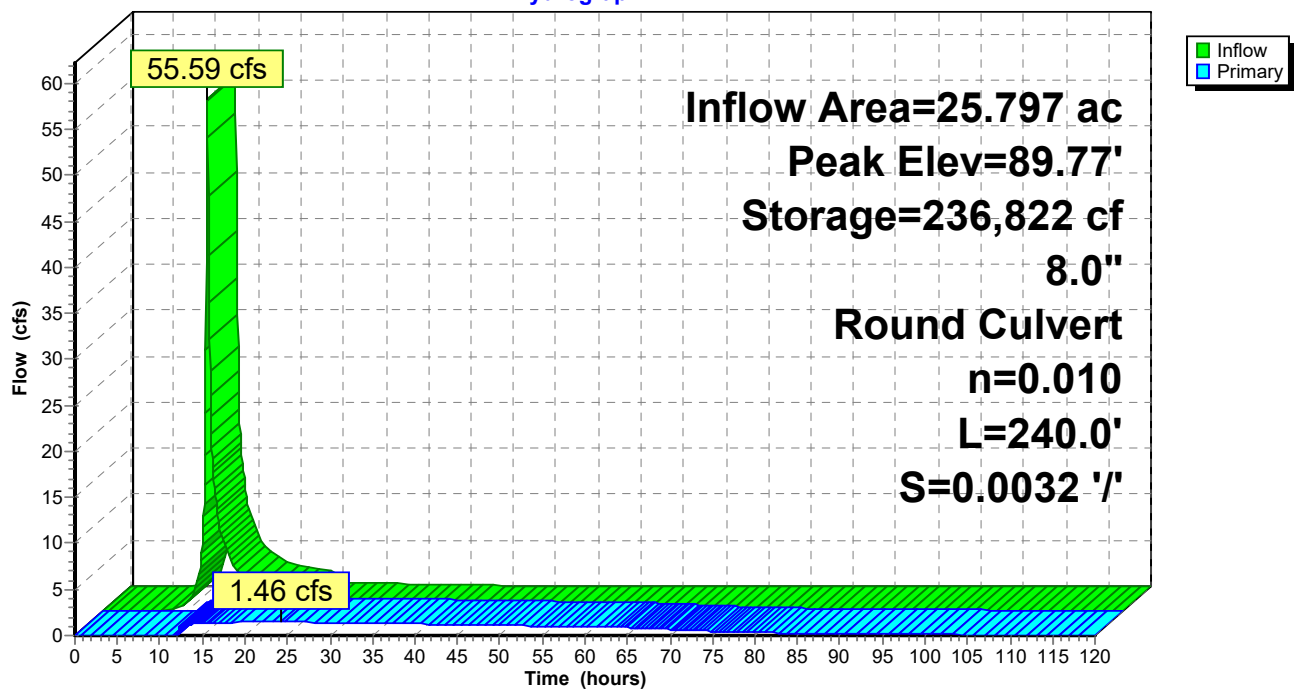
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Pond W-R: Wetland Series R

Hydrograph



SECTION 4 – STORMWATER MANAGEMENT CALCS

4.1 RECHARGE CALCULATIONS

The Required Recharge Volume is computed using the equation provided in the 2008 Massachusetts Stormwater Handbook. The volume is computed as an equivalent depth of rainfall over the proposed impervious areas in accordance with a Target Depth Factor based on the soil classifications. The Calculations is as follows:

$$Rv = (F) \times (\text{Impervious Area})$$

(Equation 1) Volume 3, Ch 1, page 15

- Rv = Required Recharge Volume, expressed in cubic feet, cubic yards, or acre-feet
- F = Target Depth Factor associated with each Hydrologic Soil Group (HSG)
- Impervious Area = new pavement, new rooftop area and courtyard areas
- The Target Depth Factor "F" per Table 2.3.2, Volume 3, Chapter 1 for each soil classification is as follows:
 - A soils = 0.60 inches
 - B soils = 0.35 inches
 - C soils = 0.25 inches
 - D soils = 0.10 inches

The proposed impervious area (driveways, roofs, roads) within limit of work is 384,875 SF. Based on the above formula, the required recharge volume for the site is as follows:

Recharge Within "A" Soils:

- Impervious Area = 455,742 SF
- 0.6 inches x 1/12 feet x 455,742 SF = 22,788 CUBIC FEET

Recharge Within "B" Soils:

- Impervious Area = 555,545 SF
- 0.35 inches x 1/12 feet x 555,545 SF = 16,203 CUBIC FEET

Recharge Within "D" Soils:

- Impervious Area = 96,855 SF
- 0.35 inches x 1/12 feet x 96,855 SF = 807 CUBIC FEET

TOTAL RECHARGE VOLUME REQUIRED = 39,798 CUBIC FEET

<u>RECHARGE VOLUMES</u>		
BASIN	Infiltration Rate (in/hr) (k)	Storage (Recharge) Volume (c.f.) (Rv)
BASIN 1-A	2.41	20,452
BASIN 1-C	1.02	438
BASIN 2-B	1.02	2,132
BASIN 2-D	1.02	45,377
BASIN 2-E	1.02	8,785
BASIN 2-F	2.41	13,599
BASIN 3-B	1.02	55,573
BASIN 6-A	1.02	24,911
BASIN 7-A	1.02	38,692
BASIN 9-A	2.41	5,026
BASIN 9-B	2.41	9,676
BASIN 10-B	2.41	8,172
BASIN 11-B	1.02	25,400
BASIN 12-A	2.41	65,132
BASIN 12-B	1.02	79,129
	TOTAL RECHARGE	402,494
<i>k = saturated hydraulic conductivity (in/hr)</i> <i>Rv = storage volume (c.f.)</i> <i>Volume 3, Chapter 1 of the MA Stormwater Handbook</i>		

TOTAL RECHARGE VOLUME PROVIDED = 402,494 CF

The Storage Recharge volume numbers provided in the table above have been derived utilizing the HydroCAD output for stage storage.

Groundwater Mounding Analysis

Infiltration Basins were reviewed for their separation to groundwater with the addition of each basins anticipated groundwater mounding. The below table provides a summary of the groundwater mounding analysis. For basins with greater than 4 feet of separation to groundwater the analysis was not completed and is noted as N/A in the table.

<u>Mounding Analysis Summary</u>				
BASIN	Estimated Seasonal High Groundwater	Bottom of Basin Elevation	Groundwater Mounding (If Separation is less than 4 feet)	Adjusted Groundwater Separation - To be greater than or equal to 0 feet
BASIN 1-A	76.00	78.00	1.87	0.13
BASIN 1-C*	76.80	81.00	N/A	N/A
BASIN 2-B	97.00	99.00	0.92	1.08
BASIN 2-D	102.00	106.00	N/A	N/A
BASIN 2-E	97.00	99.00	1.98	0.02
BASIN 2-F	98.00	101.00	2.67	0.33
BASIN 3-B	93.10	97.00	3.80	0.10
BASIN 6-A	84.30	88.3	N/A	N/A
BASIN 7-A	85.50	91.00	N/A	N/A
BASIN 9-A*	55.90	60	N/A	N/A
BASIN 9-B*	55.70	61.00	N/A	N/A
BASIN 10-B*	55.70	77.00	N/A	N/A
BASIN 12-A	90.00	93.00	2.67	0.33
BASIN 12-B	88.50	91.00	2.23	0.27
<i>*Test Pit indicated no groundwater encountered - assumed to be bottom of test pit elevation</i>				

Refer to the Groundwater Mounding Analysis spreadsheets following this section.

4.2 DRAWDOWN TIME

Below are the drawdown time calculations for the infiltration systems proposed on the site. The calculation uses estimated hydraulic conductivity values “K” in accordance with the Rawls Rates table. The formula below utilized the recommended formula per the MA Stormwater Handbook as follows:

$$\text{Drawdown Time} = Rv / [(K * \text{Bottom Area}) * (1\text{FT}/12\text{IN})]$$

- Rv = Storage Volume (CF)
- K = Saturated Hydraulic Conductivity per Rawls Rate Table (IN/HR)
- Bottom Area = Area of Bottom of Proposed Recharge Structure (SF)

Below is a summary table of the drawdown calculations:

<u>Drawdown Calculations</u>				
Infiltration BMP	Infiltration Rate (in/hr) (k)	Storage (Recharge) Volume (c.f.) (Rv)	Bottom Area	Draw Down Time (hours)
BASIN 1-A	8.27	20,452	2,480	12.0
BASIN 1-C	1.02	438	72	71.6
BASIN 2-B	1.02	2,132	2,700	9.3
BASIN 2-D	1.02	45,377	14,000	38.1
BASIN 2-E	1.02	8,785	12,000	8.6
BASIN 2-F	2.41	13,599	8,130	8.3
BASIN 3-B	1.02	55,573	11,300	57.9
BASIN 6-A	1.02	24,911	8,860	33.1
BASIN 7-A	1.02	38,692	10,100	45.1
BASIN 9-A	2.41	5,026	1,100	22.8
BASIN 9-B	2.41	9,676	3,000	16.1
BASIN 10-B	2.41	8,172	2,050	19.8
BASIN 11-B	1.02	25,400	127,000	2.4
BASIN 12-A	2.41	24,896	8,250	15.0
BASIN 12-B	1.02	79,129	22,700	41.0
<i>k = saturated hydraulic conductivity (in/hr)</i> <i>Rv = storage volume (c.f.) Bottom Area (s.f.)</i> <i>Volume 3, Chapter 1 of the MA Stormwater Handbook</i>				

Conclusion:

The calculations above show that the infiltration BMPs draw down in less than 72 hours, as required by Standard 3.

4.3 WATER QUALITY

This majority of the site qualifies for the treatment of 0.5" of Rainfall under the MA Stormwater Regulations. However, BMPs 1-A and 1-C fall within an Outstanding Resource Water and requires a treatment of 1.0". The tables below provide the sizing of the proprietary water quality units, and the sediment forebays.

Water Quality Volume (WQV)					Water Quality Volume (WQV)				
Subcatchment	Non-Roof Impervious Area	0.5" or 1" Treatment Required	WQV Required	WQV Provided	Subcatchment	Non-Roof Impervious Area	0.5" or 1" Treatment Required	WQV Required	WQV Provided
P-1U	-	0.5	-	-	P-7A	87,620	0.5	3,651	38,692
P-1A	65,430	1.0	5,453	20,452	P-8U	-	0.5	-	-
P-1B	-	1.0	-	-	P-9U	12,000	0.5	500	*
P-1C	4,524	1.0	377	438	P-9A	15,000	0.5	625	5,026
P-2U	-	0.5	-	-	P-9B	33,850	0.5	1,410	9,676
P-2A	-	0.5	-	-	P-9C	104,000	0.5	4,333	Directed to 9-B
P-2B	19,218	0.5	801	2,132	P-10U	4,986	0.5	208	*
P-2C	-	0.5	-	-	P-10A	-	0.5	-	-
P-2D	110,984	0.5	4,624	59,666	P-10B	21,301	0.5	888	8,477
P-2E	37,861	0.5	1,578	8,785	P-11U	-	0.5	-	-
P-2F	51,034	0.5	2,126	24,242	P-11A	15,199	0.5	633	Directed to 11-B
P-3U	-	0.5	-	*	P-11B	-	0.5	-	19,812
P-3A	34,960	0.5	1,457	1,500	P-12U	-	0.5	-	-
P-3B	94,029	0.5	3,918	55,573	P-12A	65,132	0.5	2,714	24,896
P-4	-	0.5	-	-	P-12B	42,104	0.5	1,754	79,129
P-5U	-	0.5	-	-	P-13	-	0.5	-	-
P-6U	-	0.5	-	-	P-14	-	0.5	-	-
P-6A	51,153	0.5	2,131	28,635	P-15U	-	0.5	-	-
P-7U	32,738	0.5	1,364	*	P-15A	-	0.5	-	-
* Consists of existing untreated pavement					* Consists of existing untreated pavement				

Rain Garden Sizing

The rain garden proposed near Units 85 and 86 is used only for treatment and has not been shown in the model to attenuate runoff in any capacity. A 2' wide peastone diaphragm is proposed on the edge of the gravel turnaround to act as pre treatment.

Area Draining to the Rain Garden: 8,317 s.f.

Storage Capacity of Rain Garden: 1,125 c.f.

At 1,125 c.f. the proposed rain garden exceeds the 1" requirement water quality requirement which would be 693 c.f.

Sediment Forebay Sizing

The below table provides the volumes required for the sediment forebays, along with the actual volume provided in the design.

FOREBAY	TRIBUTORY IMPERVIOUS AREA (SF)	TRIBUTORY IMPERVIOUS AREA (AC)	AMOUNT OF TREATMENT/1 AC IMPERVIOUS (INCH)	REQUIRED VOLUME OF FOREBAY (CF)	PROVIDED VOLUME OF FOREBAY (CF)
BASIN 1-A FOREBAY	67,930	1.56	0.1	566.1	740
BASIN 1-C FOREBAY	4,524	0.10	0.1	37.7	120
BASIN 2-B FOREBAY	6,068	0.14	0.1	50.6	90
BASIN 2-D FOREBAY (WEST)	31,425	0.72	0.1	261.9	300
BASIN 2-D FOREBAY (NORTH)	14,503	0.33	0.1	120.9	450
BASIN 2-D FOREBAY (SOUTH)	65,056	1.49	0.1	542.1	550
BASIN 2-E FOREBAY	37,861	0.87	0.1	315.5	360
BASIN 2-F FOREBAY	51,034	1.17	0.1	425.3	430
BASIN 3-A FOREBAY	34,960	0.80	0.1	291.3	1,500
BASIN 3-B FOREBAY	94,029	2.16	0.1	783.6	3,350
BASIN 6-A FOREBAY	51,153	1.17	0.1	426.3	580
BASIN 7-A FOREBAY	43,000	0.99	0.1	358.3	1,200
BASIN 9-A FOREBAY	15,000	0.34	0.1	125.0	600
BASIN 9-B FOREBAY	145,716	3.35	0.1	1214.3	2,500
BASIN 10-B FOREBAY	21,301	0.49	0.1	177.5	500
BASIN 12-A FOREBAY (NORTH)	46,680	1.07	0.1	389.0	1,200
BASIN 12-A FOREBAY (SOUTH)	18,452	0.42	0.1	153.8	500
BASIN 12-B FOREBAY (NORTH)	11,280	0.26	0.1	94.0	600
BASIN 12-B FOREBAY (SOUTH)	37,824	0.87	0.1	315.2	890

Water Quality Unit Sizing

The below table provides the volumes required for the water quality units proposed ahead of Basin 3-B and 11-B. NJCAT documentation has been provided following this section as supplementary information for the Water Quality Units.

<u>Water Quality Unit Sizing Using Equivalent Flow from 1/2" Rainfall Depth</u>										
Basin	Tributary Area	Tributary Area	Tributary Area	% Impervious	CN Value	WQV	Tc	qu	WQF = qu A Q	Unit
	(SF)	(acre)	(sq miles)			(Inches)	(min)	(csm/in)	(cfs)	
WQU-1 (BAS-11B)	31952	0.734	0.0011	40%	42	0.50	6	795	0.35	CDS 2015-4
WQU-2 (BAS 3-A)	38540	0.885	0.0014	57%	55	0.50	6	795	0.25	CDS 2015-4

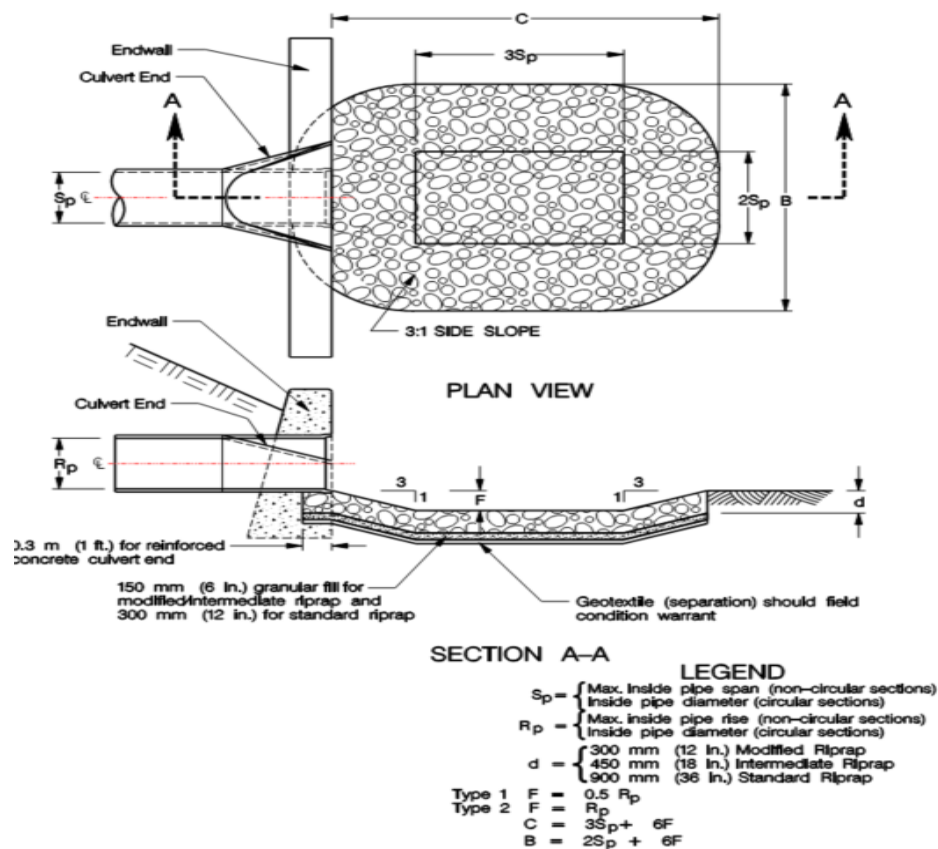
4.4 RIP RAP SPLASH PAD

Rip rap splash pads are designed to dissipate energy, prevent scour at the stormwater outlet, and minimize the potential for downstream erosion. A LEVEL SPREADER / PLUNGE POOLE was sized for each of the outlets of the drainage system. The calculations below are in accordance with the methodology of the "2002 Connecticut Guidelines for Soil Erosion and Sediment Control" produced by The Connecticut Council on Soil and Water Conservation.

Preformed Scour Hole Calculations										
	Q	Do	TW	Depression	C	3Sp	B	2Sp	d50	
	(cfs)	(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(in.)
FES 2-A	0.2	1.0	0.30	0.50	6.00	3.00	5.00	2.00	0.00	0.06
FES 2-D	5.7	1.0	0.30	0.50	6.00	3.00	5.00	2.00	0.42	5.07
FES 3-A	1.9	1.0	0.30	0.50	6.00	3.00	5.00	2.00	0.10	1.18
FES 9-B	8.1	1.5	0.30	0.75	9.00	4.50	7.50	3.00	0.39	4.72
FES 11-B	3.5	1.0	0.30	0.50	6.00	3.00	5.00	2.00	0.22	2.65

Conclusion:

As identified above, the discharge points have been designed to accommodate and exceed the required minimum Preformed scour hole sizing.



4.5 TSS REMOVAL

The project has been designed to comply with the required 80% TSS (minimum) removal per the Massachusetts Stormwater Regulations. Various combinations of stormwater BMPs including deep sump hooded catch basins, oil grit separators, proprietary water quality units and subsurface infiltration or detention basins are utilized.

We note that the TSS train leading to Basin 1-A and 1-C need to meet the 44% TSS pretreatment requirement prior to discharging to an Infiltration BMP. Both of these systems have Deep Sump Hooded Catch Basins that discharge to a Sediment Forebay which results in 44% TSS removal, satisfying this requirement.

The TSS trains have been categorized into 4 types, see below for which category each basin applies to.

Category 1: Deep Sump Catch Basin → Sediment Forebay → Infiltration Basin

1-A, 1-C, 2-D, 2-E, 2-F, 3-B, 6-A, 7-A, 9-A, 9-B, 10-B, 12-A, 12-B

Category 2: Deep Sump Catch Basin → Water Quality Unit → Sediment Forebay → Extended Det. Basin
3-A

Category 3: Deep Sump Catch Basin → Water Quality Unit → Subsurface Infiltration
11-B

Category 4: Swale → Sediment Forebay → Infiltration Basin
2-B

Category 5: Bioretention Area
Rain garden in the area of Unit 85 and 86

Basins that TSS are not applicable
1-B, 2-A, 2-C, 15-A

Please refer to the attached TSS calculation sheets that follow.

4.6 Emergency Spillway Calculation

For basins containing outlet control structures acting as the emergency spillway were analyzed to ensure proper capacity should the primary outlets fail. The only basin this is applicable to is Basin 2-D.

The hydrology model was revised to turnoff off the outlets for the primary outlet control structure and route the outflow through the emergency spillway which consisted of a 2 foot by 2 foot grate. The model output showed the basins peak elevation in the 100 year storm was 109.0 under these conditions. The basin has a berm elevation of 110.0, therefore the emergency spillway is properly sized. See the hydroCAD output accompanying this section for supplemental information.

HANTUSH MOUNDING ANALYSIS SHEETS

Groundwater Mounding Analysis for Basin 1-A

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

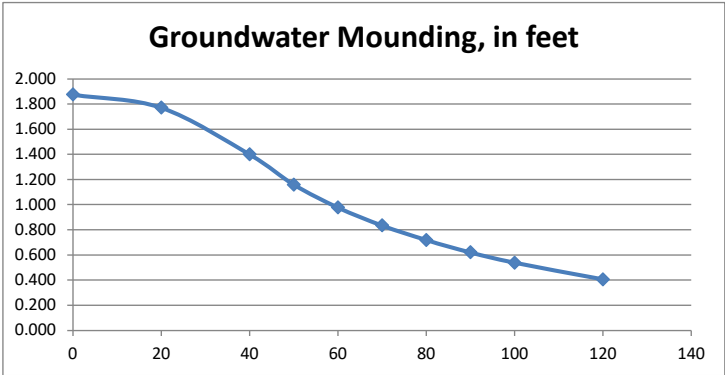
The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)		Conversion Table	
				inch/hour	feet/day
16.5400	R	Recharge (infiltration) rate (feet/day)		0.67	1.33
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
165.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*		2.00	4.00
40.000	x	1/2 length of basin (x direction, in feet)			
15.000	y	1/2 width of basin (y direction, in feet)	hours	days	
0.500	t	duration of infiltration period (days)		36	1.50
42.000	hi(0)	initial thickness of saturated zone (feet)			
In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).					
43.876	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
1.876	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
1.876	0
1.771	20
1.400	40
1.159	50
0.977	60
0.835	70
0.718	80
0.620	90
0.538	100
0.406	120



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

Groundwater Mounding Analysis for Basin 2-B

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

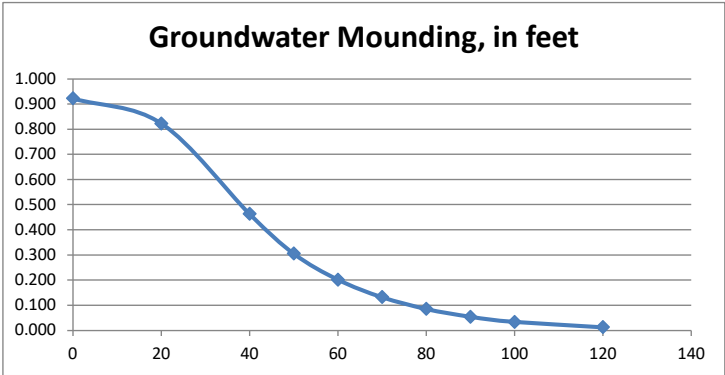
The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)		Conversion Table	
				inch/hour	feet/day
2.0400	R	Recharge (infiltration) rate (feet/day)		0.67	1.33
0.260	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
20.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*		2.00	4.00
35.000	x	1/2 length of basin (x direction, in feet)			
15.000	y	1/2 width of basin (y direction, in feet)	hours	days	
0.390	t	duration of infiltration period (days)		36	1.50
42.000	hi(0)	initial thickness of saturated zone (feet)			
In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).					
42.923	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
0.923	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
0.923	0
0.823	20
0.463	40
0.305	50
0.201	60
0.132	70
0.085	80
0.054	90
0.034	100
0.013	120



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

Groundwater Mounding Analysis for Basin 2-E

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

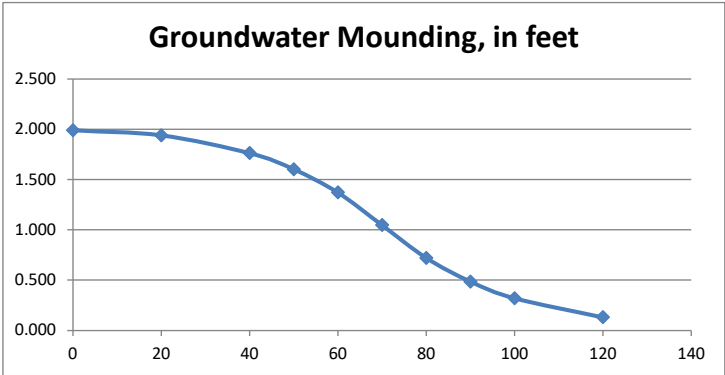
The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)		Conversion Table	
				inch/hour	feet/day
2.0400	R	Recharge (infiltration) rate (feet/day)		0.67	1.33
0.260	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
20.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*		2.00	4.00
70.000	x	1/2 length of basin (x direction, in feet)			
36.500	y	1/2 width of basin (y direction, in feet)	hours	days	
0.360	t	duration of infiltration period (days)		36	1.50
42.000	hi(0)	initial thickness of saturated zone (feet)			
In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).					
43.989	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
1.989	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
1.989	0
1.939	20
1.763	40
1.602	50
1.370	60
1.046	70
0.720	80
0.485	90
0.319	100
0.130	120



Re-Calculate Now



Disclaimer

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Groundwater Mounding Analysis for Basin 2-F

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

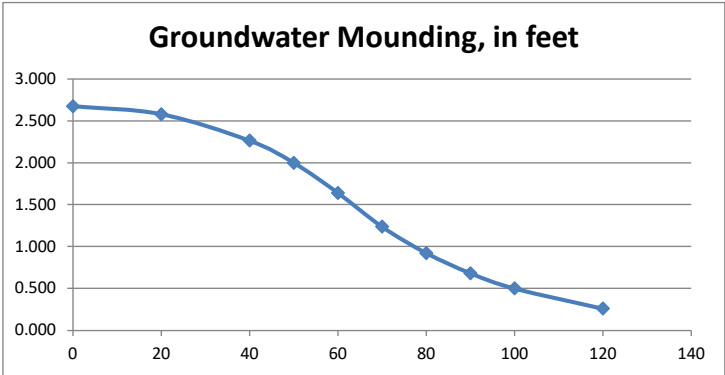
The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)		Conversion Table	
				inch/hour	feet/day
4.8200	R	Recharge (infiltration) rate (feet/day)		0.67	1.33
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
48.20	K	Horizontal hydraulic conductivity, Kh (feet/day)*		2.00	4.00
62.000	x	1/2 length of basin (x direction, in feet)			
35.000	y	1/2 width of basin (y direction, in feet)	hours	days	
0.350	t	duration of infiltration period (days)		36	1.50
42.000	hi(0)	initial thickness of saturated zone (feet)			
44.675	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
2.675	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.675	0
2.579	20
2.264	40
1.998	50
1.638	60
1.237	70
0.922	80
0.681	90
0.499	100
0.260	120



Re-Calculate Now



Disclaimer

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Groundwater Mounding Analysis for Basin 3-B

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

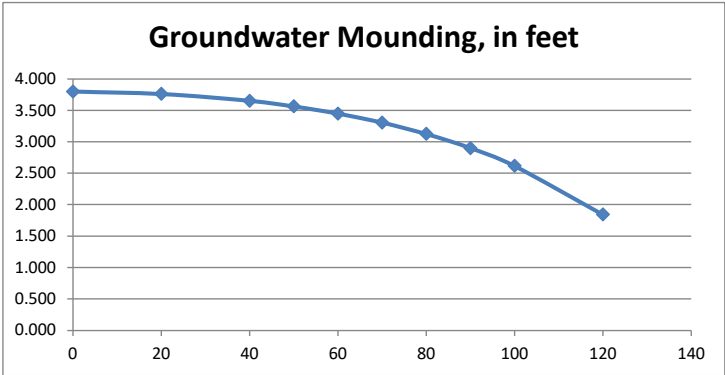
The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)		Conversion Table	
				inch/hour	feet/day
2.0400	R	Recharge (infiltration) rate (feet/day)		0.67	1.33
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
20.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*		2.00	4.00
112.500	x	1/2 length of basin (x direction, in feet)			
23.000	y	1/2 width of basin (y direction, in feet)	hours	days	
2.410	t	duration of infiltration period (days)		36	1.50
42.000	hi(0)	initial thickness of saturated zone (feet)			
In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).					
45.798	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
3.798	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
3.798	0
3.763	20
3.651	40
3.562	50
3.448	60
3.305	70
3.125	80
2.900	90
2.615	100
1.843	120



Re-Calculate Now



Disclaimer

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Groundwater Mounding Analysis for Basin 12-A

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

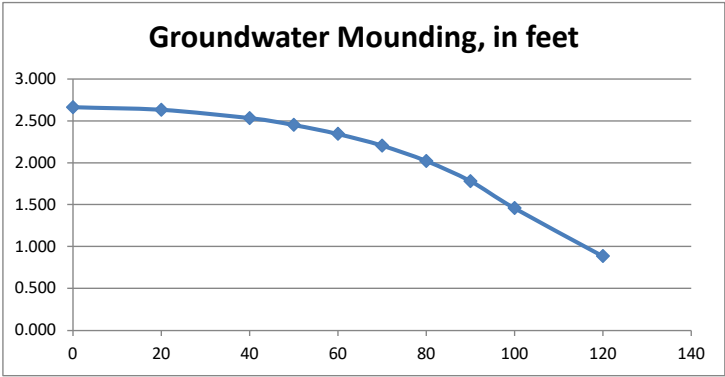
The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)		Conversion Table	
				inch/hour	feet/day
4.8200	R	Recharge (infiltration) rate (feet/day)		0.67	1.33
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
48.20	K	Horizontal hydraulic conductivity, Kh (feet/day)*		2.00	4.00
100.000	x	1/2 length of basin (x direction, in feet)			
20.000	y	1/2 width of basin (y direction, in feet)	hours	days	
0.630	t	duration of infiltration period (days)		36	1.50
42.000	hi(0)	initial thickness of saturated zone (feet)			
44.663	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
2.663	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.663	0
2.632	20
2.532	40
2.451	50
2.344	60
2.204	70
2.021	80
1.780	90
1.457	100
0.885	120



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

Groundwater Mounding Analysis for Basin 12-B

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

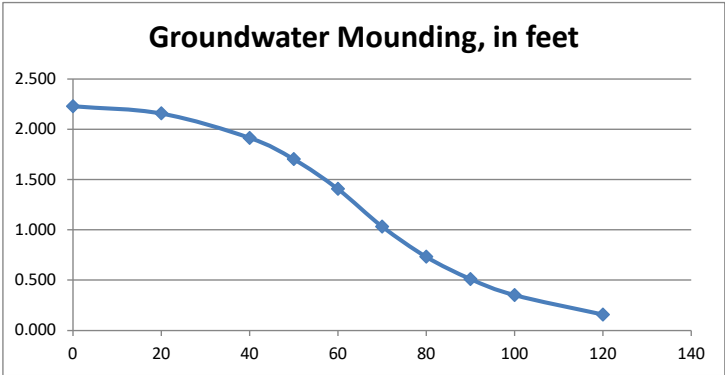
The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)		Conversion Table	
				inch/hour	feet/day
2.0400	R	Recharge (infiltration) rate (feet/day)		0.67	1.33
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
20.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*		2.00	4.00
65.000	x	1/2 length of basin (x direction, in feet)			
35.000	y	1/2 width of basin (y direction, in feet)	hours	days	
0.570	t	duration of infiltration period (days)		36	1.50
42.000	hi(0)	initial thickness of saturated zone (feet)			
In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).					
44.228	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
2.228	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.228	0
2.157	20
1.913	40
1.701	50
1.406	60
1.033	70
0.731	80
0.510	90
0.351	100
0.158	120



Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

NJCAT SUPPLEMENTARY INFORMATION - CDS UNITS



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Nonpoint Pollution Control

Division of Water Quality

401-02B

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CHRIS CHRISTIE

Governor

KIM GUADAGNO

Lt. Governor

BOB MARTIN

Commissioner

March 21, 2017

Derek M. Berg
Contech Engineered Solutions, LLC
71 US Route 1, Suite F
Scarborough, ME 04074

Re: Revised MTD Lab Certification
Continuous Deflective Separator (CDS®) Stormwater Treatment Device by Contech Engineered
Solutions, LLC
On-line Installation

TSS Removal Rate 50%

Dear Mr. Berg:

This revised certification letter supersedes the Department's prior certification dated January 9, 2015. This revision was completed to reflect the updated Manufactured Treatment Device (MTD) scaling methodology as agreed upon by the manufacturers' working group on September 19, 2016. In part, the updated scaling for hydrodynamic MTDs is based on the depth of the reference (tested) MTD from the top of the false floor utilized during removal efficiency testing, not from the physical bottom of the unit. Based on the above decision, Table A-2 of the NJCAT Technology Verification report located at <http://www.njcat.org/uploads/newDocs/CDSVerificationReportFinal1.pdf> has been revised, and Table 1 noted below has been added.

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7 (c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Contech Engineered Solutions, LLC has requested an MTD Laboratory Certification for the CDS® Stormwater Treatment Device.

The verification is subject to the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification

Appendix dated September 2014 (Revised January 2017) for this device is published online at <http://www.njcat.org/verification-process/technology-verification-database.html>.

The NJDEP certifies the use of the CDS® Stormwater Treatment Device by Contech Engineered Solutions, LLC at a TSS removal rate of 50% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.
2. The CDS® Stormwater Treatment Device shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in item 6 below.
3. This CDS® Stormwater Treatment Device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. Additional design criteria for MTDs can be found in Chapter 9.6 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual which can be found on-line at www.njstormwater.org.
5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the CDS® Stormwater Treatment Device. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at <http://www.conteches.com/products/stormwater-management/treatment/cds.aspx#1822141-technical-info> for any changes to the maintenance requirements.
6. Sizing Requirements:

The example below demonstrates the sizing procedure for the CDS®:

Example: A 0.25-acre impervious site is to be treated to 50% TSS removal using a CDS®. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

time of concentration = 10 minutes

i=3.2 in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)

c=0.99 (runoff coefficient for impervious)

$Q=ciA=0.99 \times 3.2 \times 0.25=0.79$ cfs

Given the site runoff is 0.79 cfs and based on Table 1 below, the CDS® Model CDS-4 with an MTFR of 0.93 cfs would be the smallest model approved that could be used for this site that could remove 50% of the TSS from the impervious area without exceeding the MTFR.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix under Table A-1 and A-2.

Table 1 CDS Models

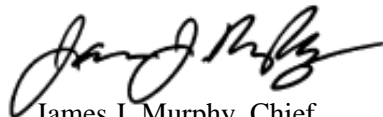
CDS Model	Manhole Diameter (ft.)	Treatment Chamber Depth (ft.)	MTFR (cfs)
CDS-3	3	3.50	0.52
CDS-4	4	3.50	0.93
CDS-5	5	3.75	1.5
CDS-6	6	4.50	2.1
CDS-7	7	5.25	2.8
CDS-8	8	6.00	3.7
CDS-10	10	7.50	5.8
CDS-12	12	9.00	8.4

- Treatment Chamber Depth is defined as the depth below the invert to the top of the false floor installed at 50% sediment depth.

A detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Mr. Shashi Nayak of my office at (609) 633-7021.

Sincerely,



James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

Attachment: Maintenance Plan

c: Chron File
Richard Magee, NJCAT
Vince Mazzei, NJDEP - DLUR
Ravi Patraju, NJDEP - BES
Gabriel Mahon, NJDEP - BNPC
Shashi Nayak, NJDEP – BNPC

NJCAT TECHNOLOGY VERIFICATION

Continuous Deflective Separator (CDS®) Stormwater Treatment Device

(For Models that meet New Jersey's Unique Sizing Requirements)

Contech Engineered Solutions LLC

September, 2014

(Revised Table A-2 January 2017)

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1. Description of Technology

The CDS is a stormwater treatment device intended to remove pollutants, including suspended solids, trash and debris and floating oils from stormwater runoff. The CDS unit is typically comprised of a manhole that houses flow and screening controls designed around patented, continuous deflective separation technology. Figure 1 is a schematic representation of the solid separation mechanism of the CDS technology.

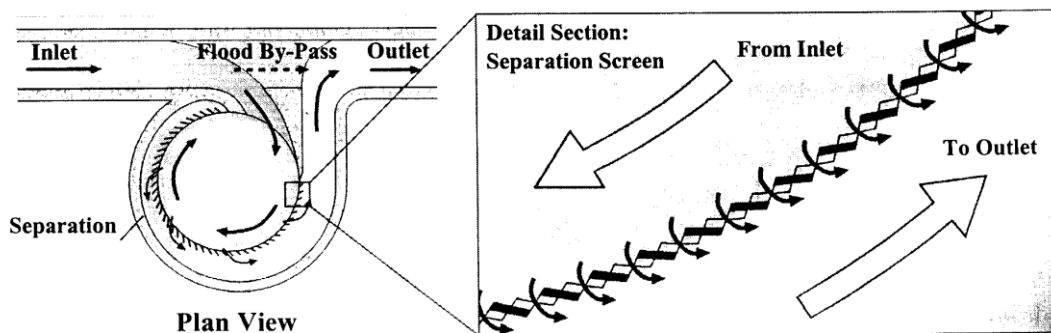


Figure 1 Schematic Representation of the CDS Solid Separation Mechanism

Stormwater runoff enters the CDS unit's diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed. The separation and containment chamber consist of a containment sump in the lower section and an upper separation section. Gross pollutants are separated within the chamber using a perforated screen plate allowing the filtered water to pass through to a volute return system and thence to the outlet pipe. The water and associated gross pollutants contained within the separation chamber are kept in continuous motion by the energy generated by the incoming flow. This has the effect of preventing the separation plate (screen) from being blocked by the gross solids separated from the inflow. The heavier solids ultimately settle into the containment sump. Figure 2 is a schematic representation of a typical CDS unit including critical components. For more details on the functionality of the CDS including drawings, videos and maintenance procedures please visit <http://www.conteches.com/Products/Stormwater-Management/Treatment/CDS.aspx>

The primary purpose of this verification testing was to establish the ability of the CDS to remove suspended solids from runoff as specified in the testing requirements detailed in the "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" (NJDEP HDS Protocol) dated January 25, 2013 (NJDEP 2013a). In particular, the CDS was tested to determine the maximum operating rate that would enable retention of more than 50% of the "NJDEP Particle Size Distribution" as calculated using the weighted annualized formula that is described in Appendix A of the NJDEP HDS Protocol. Since the CDS is most effective at removing the coarser fraction of the suspended solids load it is recommended that the CDS be used as the first component of a treatment train.

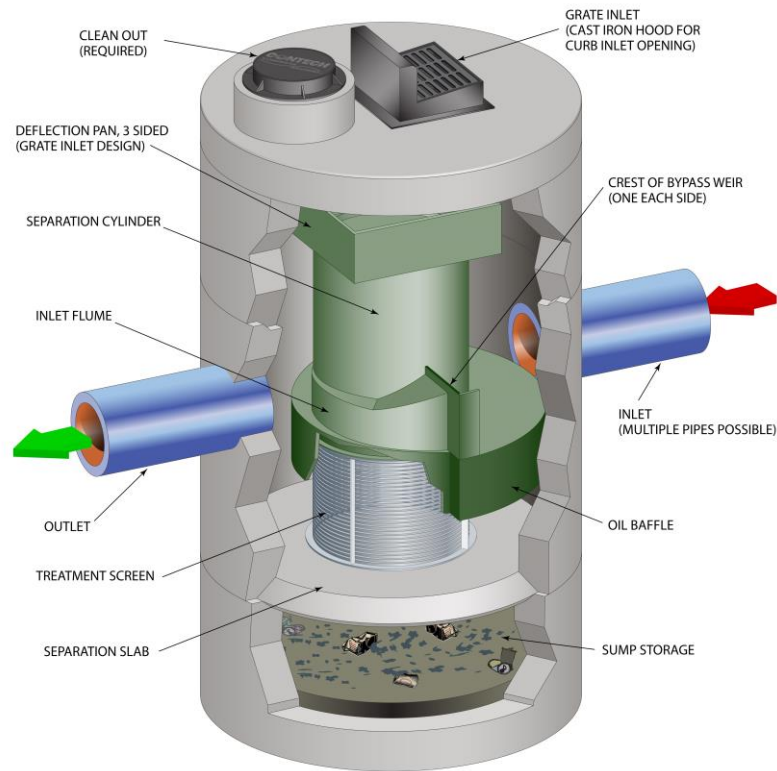


Figure 2 Graphic of Typical Inline CDS Unit and Core Components

2. Laboratory Testing

All TSS removal efficiency testing for this project was carried out at Contech's Scarborough, Maine laboratory under the direct supervision of FB Environmental Associates Inc. (FB). FB is a Portland, Maine based environmental consulting firm with past experience in a diverse suite of stormwater quality projects including past oversight of manufactured BMP testing initiatives. All water quality samples collected during this testing process were analyzed by Maine Environmental Laboratory, which is an independent analytical testing facility. Since Maine Environmental Laboratory does not conduct particle size analysis, and an alternate qualified facility was not identified locally, all particle size distribution (PSD) analysis was completed in-house at Contech's laboratory under the direct supervision of FB for the duration of all PSD analysis.

2.1 Test Setup

A CDS-4 Model (4 ft. diameter) unit was tested in accordance with the NJDEP HDS Protocol. A schematic of the CDS-4 unit is shown in Figure 3. The CDS-4 test unit did not have a sediment weir, as traditionally units sold in NJ have had in the past. (Note: Contech plans to move away from units with a sediment weir.) The CDS-4 is a commercially available unit with a 2 ft diameter x 1.5 ft high 2400 micron perforated screen plate and is offered in New Jersey and other



CDS-4 RATED TREATMENT CAPACITY IS 0.70 CFS [19.8 L/s]. IF THE SITE CONDITIONS EXCEED MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CDS-4 RATED TREATMENT CAPACITY IS 0.70 CFS [19.8 L/s]. IF THE SITE CONDITIONS EXCEED MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)		*	
PEAK FLOW RATE (CFS OR L/s)		*	
RETURN PERIOD OF PEAK FLOW (YRS)		*	
SCREEN APERTURE (2400)		2400	
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH () ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEER.
4. SOLUTIONS LLC REPRESENTATIVE: www.ContechES.com
5. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
6. STRUCTURE SHALL MEET AASHTO H20D LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET H202 (AASHTO M 306) AND BE SUBJECT TO THE CONTRACT SPECIFICATIONS.
7. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

A. ANY SUBSIDE, BACKFILL, DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.

B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MAN-HOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).

C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.

D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.

E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS-4
INLINE CDS
STANDARD DETAIL

3

areas that formally adopt New Jersey's unique sizing requirements. Since New Jersey has very specific criteria in place that govern scaling and determination of treatment flow, as well as a unique weighted 50% removal efficiency calculation tied to historical New Jersey rainfall measurements, CDS models have been specifically tailored to comply with these requirements. Like many technologies, different CDS model configurations are available in different regions depending on local sizing and performance criteria.

Total Suspended Solids Removal Efficiency Laboratory Setup

The laboratory CDS-4 prototype is housed in a 4 ft. diameter cylindrical aluminum tank with a depth of 4.7 ft. below the inlet and outlet inverts to the sump floor. These dimensions are consistent with the commercially available CDS-4. The CDS-4 was TSS removal efficiency tested in a closed loop, re-circulatory laboratory system that is detailed in Figure 4. Inlet and outlet piping consists of 12 in. diameter schedule 40 PVC. Water enters the inlet pipe 12 ft. upstream from the test unit and the test sediment is dry fed through a 6 in. port located 6 ft. upstream from the test unit. Treated effluent is able to freely discharge through a downturned 90 degree elbow into an aluminum catch tank. The catch tank is configured with two filter partitions that filter remaining fines from the effluent prior to recirculation in order to maintain background concentrations at levels less than 20 mg/L. The first partition consists of 24-1 um nominal rated pre-filter bags while the second partition consists of 24-0.5 um rated primary filter bags. Filtered water is re-circulated into the 12 in. inlet pipe through a 10 hp pump. Flows are controlled by a 6 in. gate valve and monitored by a SeaMetrics Online Magmeter (model WMX104) coupled with SeaMetrics model EX201 flow computer.

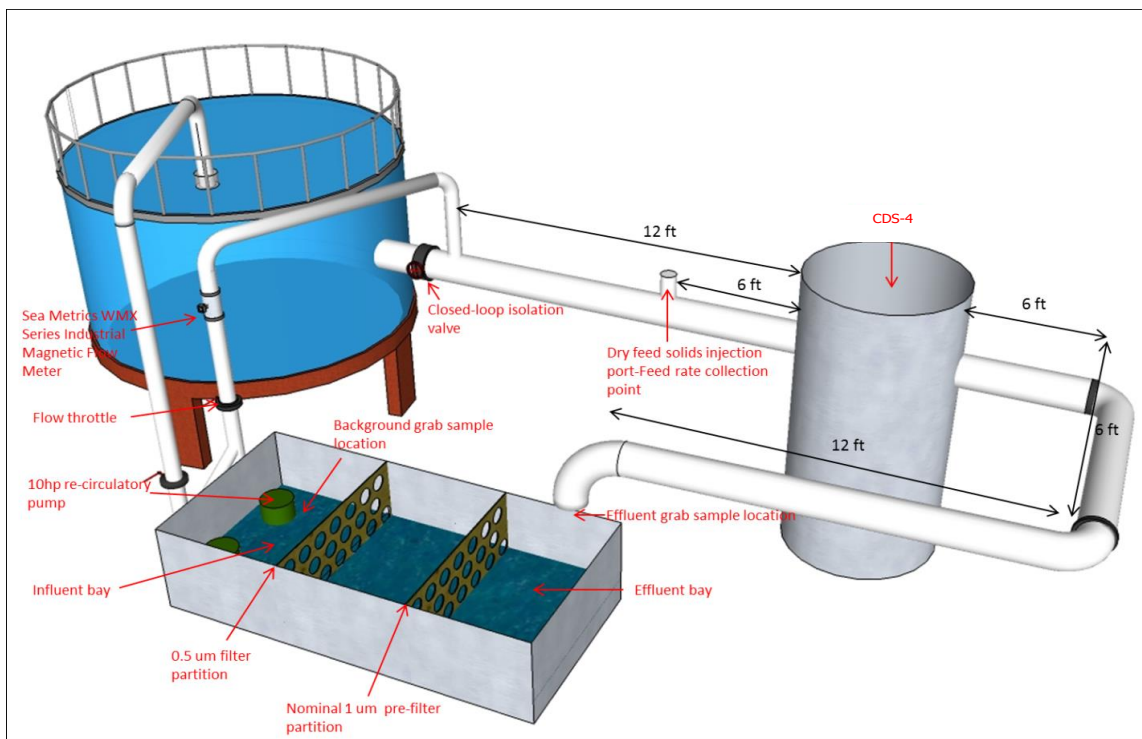


Figure 4 Schematic of TSS Removal Efficiency Laboratory Setup

Scour Test Laboratory Setup

Concerns were raised during the public comment review process on the CDS December 2013 posted verification report relative to the online scour testing procedure followed for the CDS-4 during testing originally completed and submitted to NJCAT in 2013. As a result, Contech agreed to alter the scour testing procedure and repeat the scour testing requirements described in the NJDEP laboratory protocol for hydrodynamic separators. Specifically, commenters questioned whether in addition to the dedicated sedimentation sump, sediment may also accumulate in the annular area outside of the screening chamber. Contech's experience with the CDS has demonstrated that sediment accumulation in this area is generally minimal. Since the possibility of some sediment accumulating in this area during low flows could not be ruled out, Contech agreed to repeat the scour testing procedure after preloading scour testing sediment in the sedimentation sump as well as on top of the annular area outside of the screening chamber.

The scour testing and associated procedures described herein were completed at Contech's full scale laboratory in Portland, Oregon since the Scarborough Maine laboratory was no longer available. All testing and procedures conducted at Contech's facility in Portland were overseen by Dr. Chris Berger, PhD., a colleague of Dr. Scott Wells, from Portland State University who has an extensive background in water quality research. Samples prepared for particle size analysis were sent to Apex Labs in Tigard, Oregon. Apex Labs is an independent certified analytical laboratory. All background and effluent samples collected during the scour testing procedure were also sent to Apex Labs for SSC analysis.

Testing was conducted on a full scale 4 ft. diameter (CDS-4) laboratory unit consistent in all dimensions with the commercially available CDS-4. The CDS-4 unit was housed in a 4 ft. diameter cylindrical aluminum tank. The 50% sediment storage capacity is defined as a sediment depth of 1 ft. and a vertical distance of 1 ft. from the bottom of the 6-inch separation slab. To simulate this condition a false floor was constructed eight inches from the sump floor and covered with four inches of the scour test sediment.

The scour testing on the CDS-4 was completed on a closed loop, re-circulatory laboratory system that is detailed in Figure 5. Water is provided to the unit via a 10 HP pump that pulls water from the HDPE open source tank and directs the water into a 12 in. diameter pipe 11.25 ft. upstream from the test unit. Flow is controlled through three 4 in. actuated valves, and one 4 in. manual bypass valve. Flow is monitored by a SeaMetrics Online Magmeter (model WMX104) coupled with a SeaMetrics FT420 rate indicator and a SeaMetrics DL76 data logger. Treated effluent is able to freely discharge through a downturned 90 degree elbow into an HDPE catch tank (discharge tank). A second 10 HP pump moves water from the discharge tank through two in-line filters of 5um and 1um respectively to remove particulate from the effluent prior to recirculation.

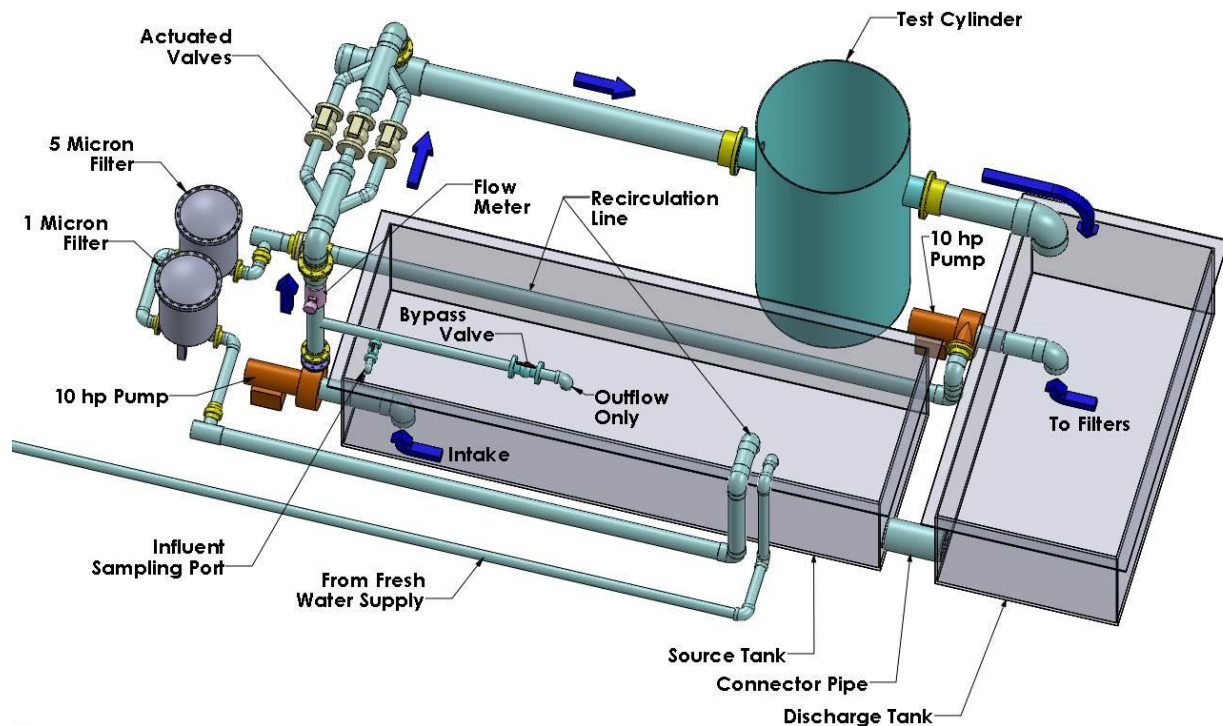


Figure 5 Schematic of Scour Testing Laboratory Setup

2.2 Test Sediment

Test Sediment Feed for Suspended Solids Removal Efficiency Testing

Sediment used for all solids removal testing was high purity silica (SiO_2 99.8%) material (Sp. gr. -2.65) with a particle size distribution (PSD) approximating 55% sand, 40% silt, and 5% clay. Sediment for the entire project was supplied by an outside vendor, blended together in a single batch and then packaged and shipped in fifty 50-lb. bags to Contech. Batch PSD was confirmed by Contech prior to testing by collecting subsamples from 20% of the bags (10 bags/subsamples) and compositing the subsamples into a single sample for PSD analysis. Each of the 50 bags was numbered 1-50 prior to subsample collection. The numbers 1-50 were then written on individual slips of paper and placed into a container. Numbers were pulled from the container at random to determine which of the 10 bags subsamples would be collected from. This process was repeated three times for a total of three separate PSD analyses, each of which was comprised of 10 subsamples.

The mean of the three PSD samples was calculated and plotted as a single PSD curve representing the batch of material. Sediment sampling for PSD analysis was conducted in-house with oversight from FB Environmental Associates, Inc. The three PSD analyses were also carried out in-house under the direct supervision of FB in accordance with ASTM D422-63 (reapproved 2007).

Scour Test Sediment

Prior to the start of testing, Contech procured a batch of scour sediment manufactured to be compliant with the scour sediment PSD specification defined in the NJDEP laboratory protocol. The scour sediment was packaged by the manufacturer into 50 lb. bags for delivery and storage. To ensure that the scour sediment was compliant with the PSD specifications, three composite samples comprised of 12 randomly pulled subsamples were collected and analyzed for PSD. The compositing procedure was as follows: 59 bags of washout sediment were numbered 1-59 prior to subsample collection. Microsoft Excel randomizer function was used to determine 3 sets of 12 randomly determined values using the RANDBETWEEN (x, y) function, where x = 1, and y= 59. Bags with numbers matching each set of randomly determined values were well mixed and then subsamples were collected and mixed together into a sample jar. Each subsample consisted of two level tablespoons of material with a combined weight of approximately 50 grams. The 3 composite samples were sent to Apex Labs in Tigard, Oregon for PSD testing following ASTM D422-63 (Reapproved 2007).

2.3 Removal Efficiency Testing Procedure

Removal efficiency testing utilized the “Effluent Grab Sampling Method,” as described in section 5D of the NJDEP HDS Protocol. FB Environmental provided third party oversight for the duration of all testing. Prior to each test, the flow rate was stabilized at the desired test rate. Once the flow rate was stabilized dry feed of the surrogate test contaminant commenced subsequently initiating the testing procedure. A vibratory hopper and auger (manufactured by Vibra-Screw Inc.) was used to meter solids into the flow stream at a rate calculated to yield 200 mg/L ($\pm 10\%$). Target feed rate (mg/min) was determined by the following formula:

$$\text{Feed Rate} = \text{Target Concentration} \times \text{Target Influent Flow Rate}$$

The grab sampling method was used to directly obtain each effluent, background and feed rate calibration sample. Effluent samples were collected by sweeping bottles in a circular motion through the freely discharging effluent stream. The duration required to obtain each feed rate sample was measured and recorded to the nearest second. The first effluent and background sample were collected simultaneously three detention times after the target flow rate was achieved. Detention time of the test unit was determined through the following formulas:

$$\text{Volume of CDS-4} = \pi \times (2\text{ft})^2 \times 3.7\text{ft} = 46.5\text{ft}^3$$

$$\text{Detention time: } \frac{46.5\text{ft}^3}{\text{Target flow rate (cfs)}}$$

Collection of the first feed rate calibration sample occurred immediately following the collection of the first effluent and background samples. Since the feed rate sampling procedure temporarily disrupts the introduction of solids, a period of three detention times was allowed to elapse before obtaining the second effluent sample. Since feed rate and background samples were collected immediately following and during collection of each odd numbered effluent sample, the collection interval for treated effluent consisted of three detention times after odd numbered

effluent samples and one minute after even numbered effluent samples. After the sixth and final feed rate sample was collected, sampling continued in one minute increments for the remainder of the test until a total of 15 effluent samples were collected.

Following each test all feed rate calibration samples were weighed to the nearest milligram in-house on a calibrated balance. The resultant mass of each sample was divided by the duration required to obtain the sample. FB Environmental oversaw all in-house measurements and calculations. After each test, effluent and background samples were packed for delivery and sent to Maine Environmental Laboratory for analysis in accordance with ASTM D3977-97 (SSC) (re-approved 2007).

The test procedure was repeated for each flow rate corresponding to 25%, 50%, 75%, 100% and 125% of the target MTFR.

2.4 Scour Testing Procedure

Prior to the start of testing, sediment was loaded into the sedimentation sump and leveled at a depth of 4 inches bringing the top of the sediment pile to an elevation consistent with 50% of the maximum sediment storage capacity (12 inches below separation slab). In order to be conservative, 4 inches of sediment was also loaded onto the top surface of the separation slab and leveled accordingly. To gain access to the top of the separation slab the screen and upper internals were temporarily removed from the test unit. After loading and leveling the sediment on the separation slab, the screen and internals were carefully installed to insure minimal disturbance of the pre-loaded sediment.

After sediment had been loaded into the sedimentation sump and onto the separation slab and the unit was fully assembled, the CDS-4 was filled with water using a spray nozzle adjusted to a gentle spray and attached to a garden hose. Water was directed into the center of the sump and an effort was made to minimize disturbance of the sediment. The unit was filled with water to the invert of the inlet and outlet pipe which is consistent with the dry weather condition of the CDS. Filling was terminated just before water reached the height of the inverts. The scour test was carried out 68 hours after filling the unit with water. During testing, the flow was monitored and recorded using a SeaMetrics Online Magmeter (model WMX104) coupled with a SeaMetrics FT420 rate indicator and a SeaMetrics DL76 data logger.

Testing commenced by gradually introducing and increasing flow into the system until a minimum 200% MTFR was achieved. The target tested flow rate was achieved (+/- 10%) within four minutes of introducing flow to the system. The first background and effluent samples were collected five minutes after the introduction of water to the system. Effluent samples were collected by sweeping the sample container through the free discharge of the outlet pipe. Effluent grab sampling continued in two minute increments until a total of 15 samples were obtained. Background samples were collected in new 500ml HDPE bottles through a sample port in the influent pipe upstream of the test unit in evenly spaced intervals throughout the duration of the test. A total of 8 background samples were collected. At the conclusion of testing the effluent and background samples were sent to Apex Laboratories in Tigard, Oregon for suspended solids concentration (SSC) analysis in accordance with ASTM D3977-97.

3. Performance Claims

Per the NJDEP verification procedure document (NJDEP, 2013a), the following are the performance claims made by Contech and/or established via the laboratory testing conducted.

Total Suspended Solids Removal Rate

Based on the laboratory testing conducted, the Contech Continuous Deflective Separation (CDS) Stormwater Treatment Device achieved greater than 50% removal efficiency of suspended solids. In accordance with the NJDEP procedure for obtaining verification of a stormwater manufactured treatment device from NJCAT (NJDEP 2013a) the TSS removal efficiency is rounded down to 50%.

Maximum Treatment Flow Rate (MTFR)

For all of the commercially available model sizes, the hydraulic loading rate used to calculate the MTFR is 33.2 gpm/ft².

Maximum sediment storage depth and volume

The maximum sediment storage depth for each CDS model is one foot. One-foot represents 50% of the 2 ft. sediment sump that is part of each CDS standard model. The available volume is dependent on the size of the manhole. The CDS-4 tested (4' diameter manhole) has 25.1 cubic feet of available storage volume.

Effective treatment area

The effective treatment area is dependent on the size of the CDS model used and is the surface area of the CDS model selected.

Detention time and volume

The CDS-4 detention time at the MTFR is 50 seconds and the total wet volume including sediment sump is 50.3 ft³.

Effective sedimentation area

The effective sedimentation area and effective treatment area for the CDS Stormwater Treatment System are identical.

Online installation

Based on the testing results shown in Section 4.4 the CDS Stormwater Treatment System qualifies for online installation.

4. Supporting Documentation

The NJDEP Procedure (NJDEP, 2013a) for obtaining verification of a stormwater manufactured treatment device (MTD) from the New Jersey Corporation for Advanced Technology (NJCAT) requires that “copies of the laboratory test reports, including all collected and measured data; all

data from performance evaluation test runs; spreadsheets containing original data from all performance test runs; all pertinent calculations; etc.” be included in this section. This was discussed with NJDEP and it was agreed that as long as such documentation could be made available by NJCAT upon request that it would not be prudent or necessary to include all this information in this verification report.

4.1 Test Sediment PSD Analysis – Removal Efficiency Testing

Prior to the start of removal efficiency testing Contech procured 2500 pounds of test sediment deemed compliant with the PSD specification detailed in the NJDEP HDS Protocol and had it packaged into fifty 50 lb bags for delivery and storage. To ensure that sediment was uniformly mixed across the entire batch, three composite samples were created and analyzed for PSD. Test sediment batch PSD for the project was verified by collecting subsamples from 20% of the bags (10 bags/subsamples per composite) and compositing the subsamples into a single sample for PSD analysis. Each of the 50 bags was numbered 1-50 prior to subsample collection. The numbers 1-50 were then written on individual slips of paper and placed into a container. Numbers were pulled from the container at random to determine which of the 10 bags subsamples would be collected from. This process was repeated three times to create a total of three separate composite samples for PSD analyses, each of which was comprised of 10 subsamples from 10 different bags. Sediment sampling for PSD analysis was conducted in-house with oversight from FB Environmental Associates, Inc. The three PSD analyses were also carried out in-house under the direct supervision of FB in accordance with ASTM D422-63 (reapproved 2007).

Results of the three PSD analyses completed on the batch of test sediment are provided in Table 1. The median particle size (d_{50}) of the test material is less than 75 microns for all three samples.

Table 1 Removal Efficiency Sediment Particle Size Distribution Analysis

Contech Test Sediment Particle Distribution Results							
Contech PSD Sample 1		Contech PSD Sample 2		Contech PSD Sample 3		Contech Mean PSD	
Particle Size (μm)	Percent Finer	Particle Size (μm)	Percent Finer	Particle Size (μm)	Percent Finer	Particle Size (μm)	Percent Finer
2000	100.0	2000	100.0	2000	100.0	2000	100.0
1000	99.6	1000	99.7	1000	99.6	1000	99.7
500	96.2	500	96.1	500	96.1	500	96.1
250	87.9	250	87.6	250	93.4	250	89.6
212	83.7	212	83.4	212	89.9	212	85.7
150	74.2	150	73.6	150	80.1	150	76.0
125	67.9	125	67.6	125	73.9	125	69.8
106	62.0	106	61.8	106	68.0	106	63.9
75	51.9	75	51.4	75	57.7	75	53.7
53	45.8	53	45.4	53	51.6	53	47.6
32.9	44.0	32.9	44.0	32.7	45.0	32.8	44.4
21.2	38.0	21.2	38.0	21.2	38.4	21.2	38.2
12.5	32.0	12.5	32.0	12.5	32.0	12.5	32.0
9.1	27.0	9.0	27.0	9.1	26.0	9.0	26.7
6.4	22.0	6.4	23.0	6.4	22.0	6.4	22.3
3.3	15.0	3.3	14.0	3.2	14.0	3.2	14.3
1.4	7.0	1.4	8.0	1.4	8.0	1.4	7.7

The mean PSD for the 3 samples was also calculated and presented in Table 1. As described in the NJDEP HDS Protocol the mean PSD serves as the PSD of the batch of test sediment.

The mean PSD of Contech's test sediment complies with the PSD criteria established by the NJDEP HDS protocol. Figure 6 plots the Contech PSD against the NJDEP PSD specification. The Contech sediment gradation is equivalent to or finer than the NJDEP gradation at all points along the curve. Overall, the Contech sediment blend contains more fines than the NJDEP gradation, particularly below 50 microns. The median particle size of the Contech gradation is approximately 60 microns.

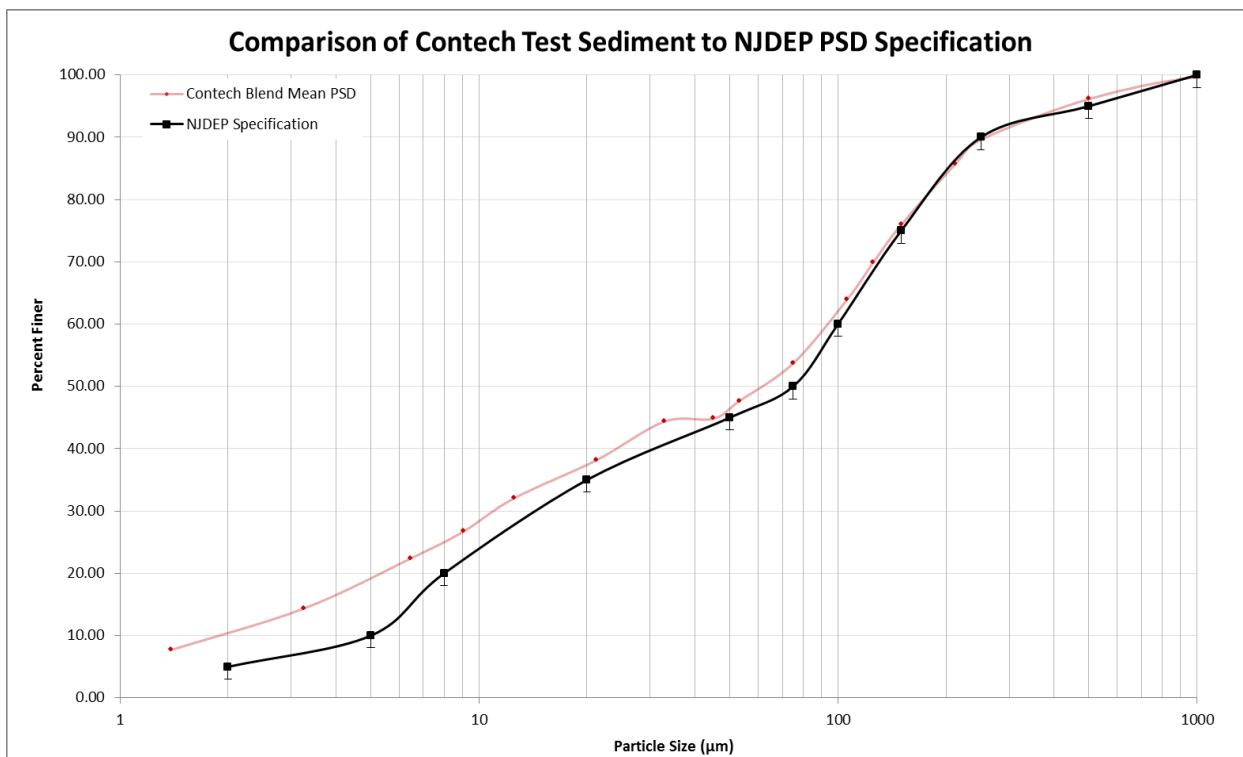


Figure 6 Comparison of the Mean Contech Test Sediment PSD to the NJDEP Removal Efficiency Test Sediment PSD Specification

4.2 Removal Efficiency Testing

In accordance with the NJDEP HDS Protocol, removal efficiency testing was executed on the CDS-4 laboratory unit in order to establish the ability of the CDS to remove the specified test sediment at 25%, 50%, 75%, 100% and 125% of the target MTFR. Prior to the start of testing Contech reviewed existing data and decided to utilize a target MTFR of 0.93 cfs. This target was chosen based on the ultimate goal of demonstrating greater than 50% annualized weighted solids removal as defined in the NJDEP HDS Protocol. The Mean Influent Concentration was

calculated from the mean feed rate and the mean flow rate; while the mean effluent concentration was adjusted by subtraction of the background concentration.

25% MTFR Results

To establish the performance of the CDS-4 at 25% MTFR a test was conducted in accordance with the criteria in the NJDEP HDS Protocol at a target flow rate of 0.23 cfs. Table 2 provides an overview of the test conditions and a summary of the results for the 25% MTFR test. The feed rate calibration sample results are provided in Table 3. Background and effluent sampling results for the trial are presented in Table 4. The CDS-4 removed 67.0% of the test sediment at an operating rate of 0.24 cfs. Each of the QA/QC parameters that pertain to sampling and flow measurement are presented in Table 5 and are in compliance with the thresholds defined in the NJDEP HDS Protocol.

Table 2 Summary of CDS-4 25% MTFR Laboratory Test

CDS-4 25% MTFR Trial Summary					
Trial Date	Target Flow (cfs)	Detention Time (sec)	Target Sediment Concentration (mg/l)	Target Feed Rate (mg/min)	Test Duration (Min)
4-Apr-13	0.23	199	200mg/l	78,547	83.73
Measured Values					
Mean Flow Rate (cfs)	Mean Influent Concentration (mg/l)	Mean Water Temperature F	Mean Adjusted Effluent Concentration (mg/l)	Average Removal Efficiency	QA/QC Compliance
0.24cfs	194	52	64	67.0%	Yes

Table 3 CDS-4 25% MTFR Feed Rate Calibration Sample Results

CDS-4 25% MTFR Feed Rate Calibration Sample Results					
Target Concentration	200 mg/l	Target Feed Rate		78,547 mg/min	
Sample ID	Sample Time (min)	Sample Weight (mg)	Sample Duration (sec)	Feed Rate (mg/min)	Calculated Influent Concentration (mg/L)
Feed Rate 1	9.96	84605	60.31	84170	205
Feed Rate 2	21.92	79959	60.28	79588	193
Feed Rate 3	33.88	78509	60.25	78183	190
Feed Rate 4	45.85	77831	60.25	77508	188
Feed Rate 5	57.81	77270	60.31	76873	187
Feed Rate 6	69.77	82288	60.47	81648	198
			Mean	79662	194

Table 4 CDS-4 25% MTFR Background and Effluent Sample Results

CDS-4 25% of MTFR Test Background and Effluent Sample Results					
Sample ID	Time (min)	Concentration (mg/L)			
Background 1	9.96	2			
Background 2	21.92	2			
Background 3	33.88	2			
Background 4	45.85	2			
Background 5	57.81	2			
Background 6	69.77	2			
Background 7	81.73	2			
Background 8	83.73	2			
Note that the analytical laboratory established a limit of quantification (LOQ) for SSC of 4mg/l. Values below this threshold are reported as non detect (ND) by the laboratory. In following standard reporting practices ND values have been reported at 1/2 the LOQ which is 2mg/l for this study.					
Sample ID	Time (min)	Concentration (mg/L)	Associated Background Concentration (mg/l)	Adjusted Concentration (mg/l)	Temperature F
Effluent 1	9.96	67	2	65	61
Effluent 2	20.92	68	2	66	57
Effluent 3	21.92	68	2	66	56
Effluent 4	32.88	62	2	60	55
Effluent 5	33.88	65	2	63	55
Effluent 6	44.85	63	2	61	54
Effluent 7	45.85	71	2	69	53
Effluent 8	56.81	66	2	64	50
Effluent 9	57.81	66	2	64	51
Effluent 10	68.77	67	2	65	48
Effluent 11	69.77	68	2	66	48
Effluent 12	80.73	71	2	69	47
Effluent 13	81.73	63	2	61	47
Effluent 14	82.73	63	2	61	47
Effluent 15	83.73	66	2	64	47
	Mean	66	2	64	52

Table 5 CDS-4 25% MTFR QA/QC Parameters

CDS-4 25% of MTFR QA/QC Parameters				
Flow Rate				
Target (gpm)	Mean (gpm)	Coef. of Variance	Acceptable Parameters Target	Acceptable Parameters Coef. Of Variance
103.75	108.7	0.01		<0.03
Feed Rate				
Target (mg/min)	Mean (mg/min)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
78547	79662	0.04		<0.1
Influent Concentration				
Target (mg/L)	Mean (mg/L)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
200	194	0.04		<0.1
Background Concentration				
Low (mg/L)	High (mg/L)	Mean (mg/L)	Acceptable Threshold (mg/L)	
2	2	2	<20	

50% MTFR Results

To establish the performance of the CDS-4 at 50% MTFR a test was conducted in accordance with the criteria in the NJDEP HDS Protocol at a target flow rate of 0.46 cfs. Table 6 provides an overview of the test conditions and a summary of the results for the 50% MTFR test. The feed rate calibration sample results are provided in Table 7. Background and effluent sampling results for the trial are presented in Table 8. The CDS-4 removed 54.3% of the test sediment at an operating rate of 0.46 cfs. Each of the QA/QC parameters that pertain to sampling and flow measurement are presented in Table 9 and are in compliance with the thresholds defined in the NJDEP HDS Protocol.

Table 6 Summary of CDS-4 50% MTFR Laboratory Test

CDS-4 50% MTFR Trial Summary					
Trial Date	Target Flow (cfs)	Detention Time (sec)	Target Sediment Concentration (mg/l)	Target Feed Rate (mg/min)	Test Duration (Min)
4-Apr-13	0.46	100	200mg/l	157,095	48.87
Measured Values					
Mean Flow Rate (cfs)	Mean Influent Concentration (mg/l)	Mean Water Temperature F	Mean Adjusted Effluent Concentration (mg/l)	Average Removal Efficiency	QA/QC Compliance
0.46cfs	195	48	89	54.3%	Yes

Table 7 CDS-4 50% MTFR Feed Rate Calibration Sample Results

CDS-4 50% MTFR Feed Rate Calibration Sample Results					
Target Concentration	200 mg/l	Target Feed Rate		157,095 mg/min	
Sample ID	Sample Time (min)	Sample Weight (mg)	Sample Duration (sec)	Feed Rate (mg/min)	Calculated Influent Concentration (mg/L)
Feed Rate 1	4.98	103404	40.32	153875	196
Feed Rate 2	11.96	104049	40.28	154989	198
Feed Rate 3	18.94	105251	40.59	155582	199
Feed Rate 4	25.92	107070	40.32	159330	203
Feed Rate 5	32.90	97634	40.35	145181	185
Feed Rate 6	39.88	99647	40.32	148284	189
			Mean	152873	195

Table 8 CDS-4 50% MTFR Background and Effluent Sample Results

CDS-4 50% of MTFR Background and Effluent Sample Results					
Sample ID	Time (min)	Concentration (mg/L)			
Background 1	4.98	2			
Background 2	11.96	2			
Background 3	18.94	2			
Background 4	25.92	2			
Background 5	32.90	2			
Background 6	39.88	2			
Background 7	46.87	2			
Background 8	48.87	2			
Note that the analytical laboratory established a limit of quantification (LOQ) for SSC of 4mg/l. Values below this threshold are reported as non detect (ND) by the laboratory. In following standard reporting practices ND values have been reported at 1/2 the LOQ which is 2mg/l for this study.					
Sample ID	Time (min)	Concentration (mg/L)	Associated Background Concentration (mg/l)	Adjusted Concentration (mg/l)	Temperature F
Effluent 1	4.98	83	2	81	52
Effluent 2	10.96	87	2	85	49
Effluent 3	11.96	91	2	89	49
Effluent 4	17.94	91	2	89	48
Effluent 5	18.94	88	2	86	48
Effluent 6	24.92	88	2	86	49
Effluent 7	25.92	92	2	90	49
Effluent 8	31.90	87	2	85	48
Effluent 9	32.90	94	2	92	47
Effluent 10	38.88	95	2	93	47
Effluent 11	39.88	99	2	97	47
Effluent 12	45.87	86	2	84	47
Effluent 13	46.87	92	2	90	47
Effluent 14	47.87	102	2	100	46
Effluent 15	48.87	93	2	91	46
	Mean	91	2	89	48

Table 9 CDS-4 50% MTFR QA/QC Parameters

CDS-4 50 % of MTFR QA/QC Parameters				
Flow Rate				
Target (gpm)	Mean (gpm)	Coef. of Variance	Acceptable Parameters Target	Acceptable Parameters Coef. Of Variance
207.5	205.3	0.01		<0.03
Feed Rate				
Target (mg/min)	Mean (mg/min)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
157095	152873	0.03		<0.1
Influent Concentration				
Target (mg/L)	Mean (mg/L)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
200	195	0.03		<0.1
Background Concentration				
Low (mg/L)	High (mg/L)	Mean (mg/L)	Acceptable Threshold (mg/L)	
2	2	2	<20	

75% MTFR Results

To establish the performance of the CDS-4 at 75% MTFR a test was conducted in accordance with the criteria in the NJDEP HDS Protocol at a target flow rate of 0.69 cfs. Table 10 provides an overview of the test conditions and a summary of the results for the 75% MTFR test. The feed rate calibration sample results are provided in Table 11. Background and effluent sampling results for the trial are presented in Table 12. The CDS-4 removed 45.7% of the test sediment at an operating rate of 0.71 cfs. Each of the QA/QC parameters that pertain to sampling and flow measurement are presented in Table 13 and are in compliance with the thresholds defined in the NJDEP HDS Protocol.

Table 10 Summary of CDS-4 75% MTFR Laboratory Test

CDS-4 75% MTFR Trial Summary					
Trial Date	Target Flow (cfs)	Detention Time (sec)	Target Sediment Concentration (mg/l)	Target Feed Rate (mg/min)	Test Duration (Min)
5-Apr-13	0.69	66	200mg/l	235,453	37.26
Measured Values					
Mean Flow Rate (cfs)	Mean Influent Concentration (mg/l)	Mean Water Temperature F	Mean Adjusted Effluent Concentration (mg/l)	Average Removal Efficiency	QA/QC Compliance
0.71	198	59	108	45.7%	Yes

Table 11 CDS-4 75% MTFR Feed Rate Calibration Sample Results

CDS-4 75% MTFR Feed Rate Calibration Sample Results					
Target Concentration	200 mg/l	Target Feed Rate		238,394 mg/min	
Sample ID	Sample Time (min)	Sample Weight (mg)	Sample Duration (sec)	Feed Rate (mg/min)	Calculated Influent Concentration (mg/L)
Feed Rate 1	3.32	118724	30.28	235252	195
Feed Rate 2	8.65	120157	30.29	238013	197
Feed Rate 3	13.97	120241	30.34	237787	197
Feed Rate 4	19.29	117986	30.31	233559	194
Feed Rate 5	24.62	124367	30.47	244897	203
Feed Rate 6	29.94	121793	30.34	240856	200
			Mean	238394	198

Table 12 CDS-4 75% MTFR Background and Effluent Sample Results

CDS-4 75% of MTFR Background and Effluent Sample Results					
Sample ID	Time (min)	Concentration (mg/L)			
Background 1	3.32	2			
Background 2	8.65	4			
Background 3	13.97	2			
Background 4	19.29	5			
Background 5	24.62	8			
Background 6	29.94	9			
Background 7	35.26	14			
Background 8	37.26	14			
Note that the analytical laboratory established a limit of quantification (LOQ) for SSC of 4mg/l. Values below this threshold are reported as non detect (ND) by the laboratory. In following standard reporting practices ND values have been reported at 1/2 the LOQ which is 2mg/l for this study.					
Sample ID	Time (min)	Concentration (mg/L)	Associated Background Concentration (mg/l)	Adjusted Concentration (mg/l)	Temperature F
Effluent 1	3.32	98	2	96	66
Effluent 2	7.65	99	3	96	63
Effluent 3	8.65	104	3	101	63
Effluent 4	12.97	101	3	98	61
Effluent 5	13.97	106	3	103	61
Effluent 6	18.29	107	5	102	60
Effluent 7	19.29	117	5	112	60
Effluent 8	23.62	118	7	111	59
Effluent 9	24.62	115	7	108	58
Effluent 10	28.94	122	9	113	57
Effluent 11	29.94	122	10	112	56
Effluent 12	34.26	118	12	106	55
Effluent 13	35.26	134	13	121	54
Effluent 14	36.26	137	14	123	54
Effluent 15	37.26	125	15	110	54
	Mean	115	7	108	59

Table 13 CDS-4 75% MTFR QA/QC Parameters

75% of MTFR QA/QC Parameters				
Flow Rate				
Target (gpm)	Mean (gpm)	Coef. of Variance	Acceptable Parameters Target	Acceptable Parameters Coef. Of Variance
311	318.4	0.01		<0.03
Feed Rate				
Target (mg/min)	Mean (mg/min)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
235453	238394	0.02		<0.1
Influent Concentration				
Target (mg/L)	Mean (mg/L)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
200	198	0.02		<0.1
Background Concentration				
Low (mg/L)	High (mg/L)	Mean (mg/L)	Acceptable Threshold (mg/L)	
2	14	7	<20	

100% MTFR Results

To establish the performance of the CDS-4 at 100% MTFR a test was conducted in accordance with the criteria in the NJDEP HDS Protocol at a target flow rate of 0.93 cfs. Table 14 provides an overview of the test conditions and a summary of the results for the 100% MTFR test. The feed rate calibration sample results are provided in Table 15. Background and effluent sampling results for the trial are presented in Table 16. The CDS-4 removed 39.2% of the test sediment at an operating rate of 0.93 cfs. Each of the QA/QC parameters that pertain to sampling and flow measurement are presented in Table 17 and are in compliance with the thresholds defined in the NJDEP HDS Protocol.

Table 14 Summary of CDS-4 100% MTFR Laboratory Test

CDS-4 100% MTFR Trial Summary					
Trial Date	Target Flow (cfs)	Detention Time (sec)	Target Sediment Concentration (mg/l)	Target Feed Rate (mg/min)	Test Duration (Min)
3-Apr-13	0.925	49.8	200mg/l	314,189	31.43
Measured Values					
Mean Flow Rate (cfs)	Mean Influent Concentration (mg/l)	Mean Water Temperature F	Mean Adjusted Effluent Concentration (mg/l)	Average Removal Efficiency	QA/QC Compliance
0.93	198	67	120	39.2%	Yes

Table 15 CDS-4 100% MTFR Feed Rate Calibration Sample Results

CDS-4 100% MTFR Feed Rate Calibration Sample Results					
Target Concentration	200 mg/l	Target Feed Rate		314,189 mg/min	
Sample ID	Sample Time (min)	Sample Weight (mg)	Sample Duration (sec)	Feed Rate (mg/min)	Calculated Influent Concentration (mg/L)
Feed Rate 1	2.49	107412	20.25	318258	202
Feed Rate 2	6.98	102117	20.28	302121	192
Feed Rate 3	11.47	104403	20.35	307822	195
Feed Rate 4	15.96	105087	20.43	308626	196
Feed Rate 5	20.45	109563	20.72	317267	201
Feed Rate 6	24.94	105835	20.19	314517	200
			Mean	311435	198

Table 16 CDS-4 100% MTFR Background and Effluent Sample Results

CDS-4 100% of MTFR Background and Effluent Sample Results					
Sample ID	Time (min)	Concentration (mg/L)			
Background 1	2.49	2			
Background 2	6.98	6			
Background 3	11.47	10			
Background 4	15.96	9			
Background 5	20.45	13			
Background 6	24.94	11			
Background 7	29.43	13			
Background 8	31.43	14			
Note that the analytical laboratory established a limit of quantification (LOQ) for SSC of 4mg/l. Values below this threshold are reported as non detect (ND) by the laboratory. In following standard reporting practices ND values have been reported at 1/2 the LOQ which is 2mg/l for this study.					
Sample ID	Time (min)	Concentration (mg/L)	Associated Background Concentration (mg/l)	Adjusted Concentration (mg/l)	Temperature F
Effluent 1	2.49	101	2	99	78
Effluent 2	5.98	119	6	113	75
Effluent 3	6.98	120	7	113	74
Effluent 4	10.47	127	8	119	72
Effluent 5	11.47	127	9	118	71
Effluent 6	14.96	128	10	118	69
Effluent 7	15.96	135	10	125	69
Effluent 8	19.45	138	11	127	66
Effluent 9	20.45	132	11	121	65
Effluent 10	23.94	136	12	124	64
Effluent 11	24.94	129	12	117	63
Effluent 12	28.43	134	13	121	61
Effluent 13	29.43	143	13	130	60
Effluent 14	30.43	142	13	129	59
Effluent 15	31.43	144	13	131	59
	Mean	130	10	120	67

Table 17 CDS-4 100% MTFR QA/QC Parameters

100% of MTFR QA/QC Parameters				
Flow Rate				
Target (gpm)	Mean (gpm)	Coef. of Variance	Acceptable Parameters Target	Acceptable Parameters Coef. Of Variance
415	416.1	0.01		<0.03
Feed Rate				
Target (mg/min)	Mean (mg/min)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
314189	311435	0.02		<0.1
Influent Concentration				
Target (mg/L)	Mean (mg/L)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
200	198	0.02		<0.1
Background Concentration				
Low (mg/L)	High (mg/L)	Mean (mg/L)	Acceptable Threshold (mg/L)	
2	14	10	<20	

125% MTFR Results

To establish the performance of the CDS-4 at 125% MTFR a test was conducted in accordance with the criteria in the NJDEP HDS Protocol at a target flow rate of 1.16 cfs. Table 18 provides an overview of the test conditions and a summary of the results for the 125% MTFR test. The feed rate calibration sample results are provided in Table 19. Background and effluent sampling results for the trial are presented in Table 20. The CDS-4 removed 25.1% of the test sediment at an operating rate of 1.18 cfs. Each of the QA/QC parameters that pertain to sampling and flow measurement are presented in Table 21 and are in compliance with the thresholds defined in the NJDEP HDS Protocol.

Table 18 Summary of CDS-4 125% MTFR Laboratory Test

CDS-4 125% MTFR Trial Summary					
Trial Date	Target Flow (cfs)	Detention Time (sec)	Target Sediment Concentration (mg/l)	Target Feed Rate (mg/min)	Test Duration (Min)
18-Apr-13	1.16	40	200mg/l	392,926	27.94
Measured Values					
Mean Flow Rate (cfs)	Mean Influent Concentration (mg/l)	Mean Water Temperature F	Mean Adjusted Effluent Concentration (mg/l)	Average Removal Efficiency	QA/QC Compliance
1.18	207	55	155	25.1%	Yes

Table 19 CDS-4 125% MTFR Feed Rate Calibration Sample Results

CDS-4 125% MTFR Feed Rate Calibration Sample Results					
Target Concentration	200 mg/l	Target Feed Rate		392926 mg/min	
Sample ID	Sample Time (min)	Sample Weight (mg)	Sample Duration (sec)	Feed Rate (mg/min)	Calculated Influent Concentration (mg/L)
Feed Rate 1	1.99	140782	20.28	416515	208
Feed Rate 2	5.98	140724	20.25	416960	208
Feed Rate 3	9.97	139761	20.29	413290	207
Feed Rate 4	13.97	136840	20.25	405452	203
Feed Rate 5	17.96	136211	20.28	402991	201
Feed Rate 6	21.95	143011	19.9	431189	216
			Mean	414400	207

Table 20 CDS-4 125% MTFR Background and Effluent Sample Results

CDS-4 125% of MTFR Background and Effluent Sample Results					
Sample ID	Time (min)	Concentration (mg/L)			
Background 1	1.99	2			
Background 2	5.98	7			
Background 3	9.97	10			
Background 4	13.97	11			
Background 5	17.96	11			
Background 6	21.95	15			
Background 7	25.94	16			
Background 8	27.94	18			
Note that the analytical laboratory established a limit of quantification (LOQ) for SSC of 4mg/l. Values below this threshold are reported as non detect (ND) by the laboratory. In following standard reporting practices ND values have been reported at 1/2 the LOQ which is 2mg/l for this study.					
Sample ID	Time (min)	Concentration (mg/L)	Associated Background Concentration (mg/l)	Adjusted Concentration (mg/l)	Temperature F
Effluent 1	1.99	130	3	127	63
Effluent 2	4.98	137	5	132	
Effluent 3	5.98	171	6	165	
Effluent 4	8.97	145	8	137	
Effluent 5	9.97	161	9	152	
Effluent 6	12.97	174	10	164	
Effluent 7	13.97	176	11	165	
Effluent 8	16.96	171	12	159	
Effluent 9	17.96	170	13	157	
Effluent 10	20.95	174	14	160	
Effluent 11	21.95	162	15	147	52
Effluent 12	24.94	170	16	154	
Effluent 13	25.94	172	16	156	
Effluent 14	26.94	191	17	174	
Effluent 15	27.94	196	17	179	50
	Mean	167	12	155	55

Table 21 CDS-4 125% MTFR QA/QC Parameters

125% of MTFR QA/QC Parameters				
Flow Rate				
Target (gpm)	Mean (gpm)	Coef. of Variance	Acceptable Parameters Target	Acceptable Parameters Coef. Of Variance
519	528.5	0.02		<0.03
Feed Rate				
Target (mg/min)	Mean (mg/min)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
392926	414400	0.02		<0.1
Influent Concentration				
Target (mg/L)	Mean (mg/L)	Coef. of Variance	Acceptable Parameter Target	Acceptable Parameters Coef. Of Variance
200	207	0.02		<0.1
Background Concentration				
Low (mg/L)	High (mg/L)	Mean (mg/L)	Acceptable Threshold (mg/L)	
2	18	11	<20	

Excluded Data/Results

The NJDEP HDS Protocol requires that any data collected as part of the testing process that is ultimately excluded from the reported results be discussed during the reporting process. No data

was excluded from the datasets that make up each of the 5 qualifying test trials reported herein and ultimately used to determine the annualized weighted TSS Removal Efficiency.

During the testing process four trials were conducted at the target 125% MTFR flow condition that were not included in the qualifying data set. On 4/5/2013, a trial was executed at the target 125% MTFR, but was suspended before the completion of sampling due to a pump failure in the laboratory. On 4/9/2013, a second attempt was made to complete a 125% of MTFR test. This data was disqualified because one of the background samples exceeded the maximum allowable threshold of 20 mg/l. A third 125% MTFR trial was conducted on 4/9/2013 but deemed out of compliance because an issue with the dry feed auger resulted in average influent concentrations below 180 mg/l, which falls below the allowable range of influent concentrations. A fourth attempt to complete the 125% MTFR testing on 4/9/2013 was quickly suspended after a circuit breaker tripped, effectively disabling the laboratory in the middle of the test.

This disclosure represents the only data not otherwise reported and included in the calculations herein.

Annualized Weighted TSS Removal Efficiency

The results of TSS removal efficiency testing at 25%, 50%, 75%, 100% and 125% of a target MTFR of 0.93 cfs and reported herein were entered into the NJDEP specified annualized weighted TSS removal efficiency calculation. The results are presented in Table 22.

Testing in accordance with all of the provisions detailed in the NJDEP HDS Protocol demonstrate that the CDS-4 achieved 50.57% annualized weighted TSS removal at an MTFR of 0.93 cfs (33.2 gpm/ft²). This testing also demonstrates that the CDS-4 exceeds the NJDEP requirement for HDS devices of demonstrating greater than 50% weighted annualized TSS Removal Efficiency at the chosen MTFR.

Table 22 Annualized Weighted TSS Removal of the CDS-4 Tested in Accordance with the NJDEP HDS Protocol at a MTFR of 0.93 cfs.

CDS-4 Annualized Weighted TSS Removal at 0.93cfs MTFR					
Tested Flow Rate as Percentage of MTFR	Actual Tested Flow Rate (cfs)	Actual Percent MTFR	Measured Removal Efficiency	Annual Weighting Factor	Weighted Removal Efficiency
25%	0.24	26%	67.0	0.25	16.75%
50%	0.46	49%	54.3	0.3	16.29%
75%	0.71	76%	45.7	0.2	9.14%
100%	0.93	100%	39.2	0.15	5.88%
125%	1.18	127%	25.1	0.1	2.51%
Weighted Annualized TSS Removal Efficiency					50.57%

4.3 Test Sediment PSD Analysis - Scour Testing

As described in Section 2.2 *Scour Test Sediment*, prior to the start of testing Contech procured a batch of scour sediment deemed compliant with the scour sediment PSD specification defined in the NJDEP HDS Protocol and had it packaged into fifty-nine 50 lb bags for delivery and storage. To ensure that the scour sediment was uniformly mixed across the entire batch, three composite samples were created and analyzed for PSD as previously described.

The results of the PSD analysis performed on the three samples are presented in Table 23 along with the mean PSD for the batch of sediment used for the scour testing. This analysis confirmed that the batch of scour test sediment procured by Contech is in compliance with the NJDEP scour test PSD specification. A visual comparison of the Contech scour sediment PSD and the NJDEP scour test PSD is provided in Figure 7.

Table 23 Results of Scour Testing Sediment Particle Size Distribution Analysis

Contech Scour Test Sediment Particle Distribution Results						
NJDEP Specifications		Contech Scour Sediment				
Particle size (um)	Percent Finer	Particle size (um)	Percent Finer Sample 1	Percent Finer Sample 2	Percent Finer Sample 3	Percent Finer Mean Contech Samples
1000	100	1000	100	100	100	100.0
500	90	500	92.1	91.77	91.22	91.7
250	55	250	56.37	55.28	54.44	55.4
150	40	150	42.15	41.13	40.38	41.2
100	25	106	31.44	30.58	29.97	30.7
75	10	75	11.41	11.08	10.97	11.2
50	0	63	1.64	1.59	1.54	1.6
		53	0	0	0	0

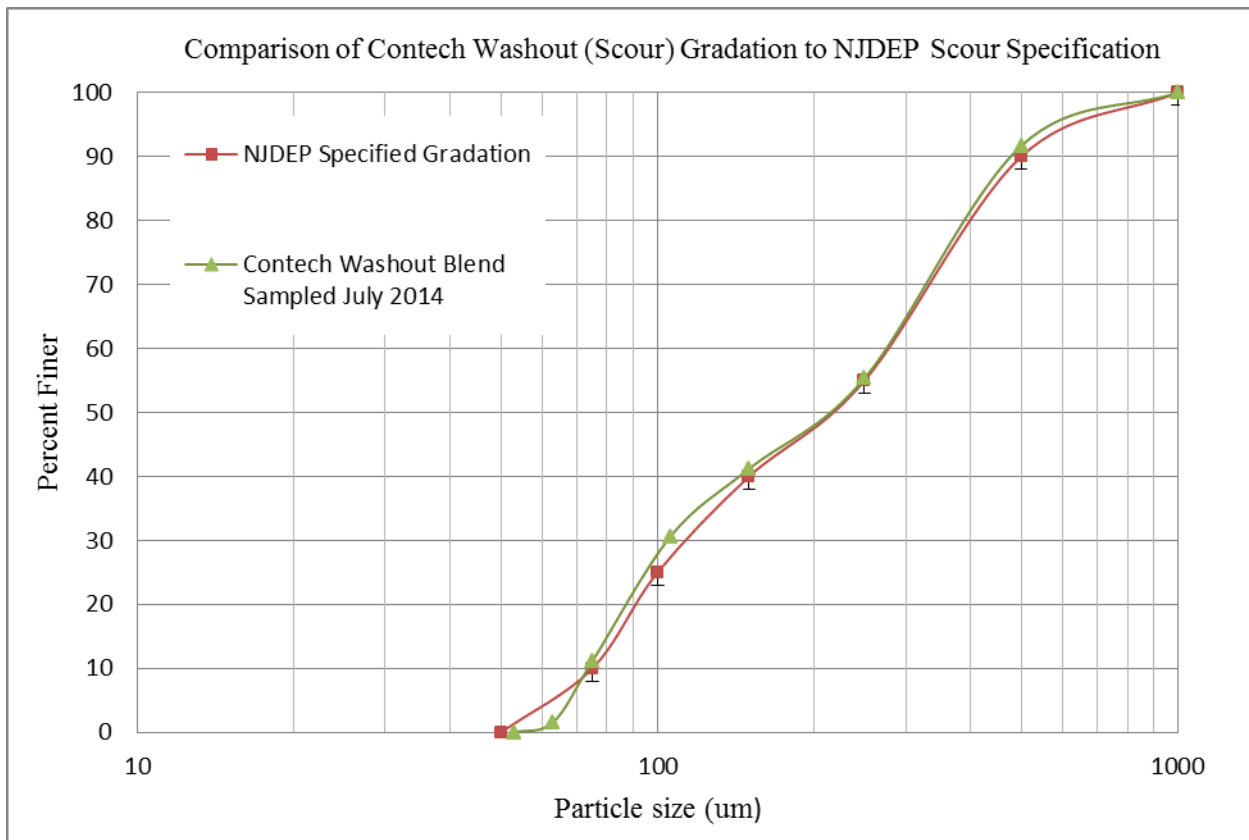


Figure 7 Comparison of Contech Scour Test Sediment PSD to NJDEP Scour Sediment PSD Specification

4.4 Scour Testing for Online Installation

In order to demonstrate the ability of the CDS to be used as an online treatment device scour testing was conducted at greater than 200% of the MTFR in accordance with the NJDEP HDS Protocol. The average flow rate during the online scour test was 838.9 gpm (1.87 cfs), which is 201% of the MTFR (MTFR = 0.93 cfs). The COV for the flow rate during the test period was 0.009, which is less than the allowable maximum COV of 0.03. The water temperature during the testing was 73 degrees. All 8 of the background samples collected during the test were reported as non-detect for suspended solids by the analytical laboratory. All non-detect values of concentration have been reported as ½ of the limit of quantification herein. The limit of quantification was calculated by the laboratory and provided in the laboratory report for each sample. Background results and sample times are provided in Table 24. All background concentrations are well below the 20 mg/l maximum for suspended solids.

Table 24 Concentrations of Background Samples during CDS Scour Testing

Sample	Sample Time (minute)	Reported Result (mg/L)	Reporting Limit (Limit of Quantification) (mg/L)	Background Concentration (mg/l)
Background 1	5	ND	2.00	1.00
Background 2	9	ND	1.98	0.99
Background 3	13	ND	2.04	1.02
Background 4	17	ND	2.00	1.00
Background 5	21	ND	1.98	0.99
Background 6	25	ND	1.98	0.99
Background 7	29	ND	2.00	1.00
Background 8	33	ND	1.98	0.99

A total of 15 effluent grab samples were collected during the testing process. The majority of effluent samples (10 of 15) were reported as non-detect by the analytical lab. The 5 remaining samples all had effluent concentrations less than 5mg/l. Non-detect values were reported at ½ the limit of quantification as calculated by the analytical laboratory. The resulting effluent concentrations were then adjusted to account for the applicable background concentration at the time the sample was collected. The applicable background sample is defined as the background sample/concentration associated with a given effluent sample based on sample time. Note that there are 15 effluent samples vs. 8 background samples as a result of effluent samples being collected more frequently. As a result, multiple effluent samples correspond to most background samples. Since background sample concentration is essentially constant throughout the test period the applicable adjustment to the effluent concentration is also consistent at ~1mg/l for all samples. The resulting effluent concentrations are all 3mg/l or less and well below the 20mg/l threshold established by the NJDEP scour protocol. All effluent sample results are presented in Table 25.

Testing at greater than 200% of the proposed MTFR for the CDS-4 with sediment preloaded in both the sedimentation sump and on top of the unit's separation slab has confirmed that previously captured sediment does not wash out and that the CDS meets the criteria for online use.

Table 25 Results of CDS-4 Online Scour Testing at 201% MTFR

Sample	Sample Time (minute)	Reported Result (mg/L)	Reporting Limit (Limit of Quantification) (mg/L)	Effluent Concentration (mg/l)	Adjusted Effluent Concentration (mg/l)
Effluent 1	5	3.33	2.38	3.33	2.33
Effluent 2	7	ND	3.08	1.54	0.54
Effluent 3	9	ND	2.86	1.43	0.43
Effluent 4	11	ND	2.67	1.34	0.34
Effluent 5	13	ND	2.63	1.32	0.32
Effluent 6	15	4.00	2.35	4.00	3.00
Effluent 7	17	ND	2.78	1.39	0.39
Effluent 8	19	2.41	2.41	2.41	1.41
Effluent 9	21	2.33	2.33	2.33	1.33
Effluent 10	23	3.15	2.25	3.15	2.15
Effluent 11	25	ND	2.44	1.22	0.22
Effluent 12	27	ND	2.38	1.19	0.19
Effluent 13	29	ND	2.90	1.45	0.45
Effluent 14	31	ND	3.17	1.59	0.59
Effluent 15	33	ND	2.33	1.17	0.17

5. Design Limitations

Contech's engineering staff typically works with the site design engineer to ensure all potential constraints are addressed during the specification process and that the CDS Stormwater Treatment System will function as intended.

Required Soil Characteristics

The CDS is an enclosed system that is typically housed within a concrete manhole. The functionality of the CDS system is not influenced by the existing soil conditions at the install location and as such the CDS system can be installed in all soil types.

Slope

It is generally not advisable to install the CDS unit on steep slopes. When the CDS is being considered on slopes exceeding 10% Contech recommends contacting their engineering staff to evaluate the design prior to specification.

Maximum Flow Rate

The MTFR is 33.2 gpm/ft².

Maintenance Requirements

The CDS system must be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants depends heavily on site activities. See Section 6 for a more detailed discussion of maintenance and inspection requirements.

Driving Head

The driving head required for a given CDS model at MTFR or greater flows (for online units) is typically a function of the model size and storm sewer characteristics. Contech's engineering staff consults with the design engineer on each project to ensure there will not be any adverse impacts to the hydraulic grade-line as a result of installing the CDS unit.

Installation limitations

Prior to installation Contech provides contractors detailed installation and assembly instructions and is also available to consult onsite during installation. Pick weights for CDS components are provided prior to delivery so that the contractor can secure proper equipment for lifting CDS units into place.

Configurations

CDS units can be installed online or offline. Online units are equipped with an internal bypass to convey extreme flows around the treatment chamber of the unit.

Structural Load Limitations

CDS units are typically designed for HS-20 loading (32,000 pounds per truck axle). If additional loading is expected it is advisable to contact Contech to assess loading options

Pretreatment Requirements

There are no pre-treatment requirements for the CDS Stormwater Treatment System.

Limitations in Tailwater

If tail-water is present it is important to increase the available driving head within the unit to ensure that the full MTFR is still treated prior to any internal bypass.

Depth to Seasonal High Water Table

CDS unit performance is not typically impacted by high groundwater. Occasionally, when groundwater is expected to be within several feet of finished grade it may be necessary to add a base extension to the unit to counter buoyant forces. If high groundwater is expected Contech's engineering staff can evaluate whether anti-buoyancy measures are required during the design process, but buoyancy issues are relatively uncommon for concrete manhole structures like the CDS.

6. Maintenance Plans

The CDS system must be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit, e.g., unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping will slow accumulation. Additional information on maintenance, including a simple CDS Inspection & Maintenance Log form, can be found in the CDS Inspection and Maintenance Guide – New Jersey at:

<http://www.conteches.com/products/stormwater-management/treatment/cds.aspx#1822141-technical-info>

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant deposition and transport may vary from year to year and regular inspections will help insure that the system is cleaned out at the appropriate time. At a minimum, inspections must be performed twice per year (i.e. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid pollutant accumulations, or in equipment wash-down areas. Additionally, installations where excessive amounts of trash are expected should be inspected more frequently.

The visual inspection must ascertain that the system components are in working order and that there are no blockages or obstructions to the inlet and/or separation screen. The inspection must also identify accumulations of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick such as a stadia rod, tape measure or other measuring instrument. If sorbent material is used for enhanced removal of hydrocarbons then the level of discoloration of the sorbent material should also be identified during inspection. Sorbent material must be replaced when it is predominantly dark in color (similar to oil). It is useful and often required as part of a permit to keep a record of each inspection.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (screen/cylinder) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained behind the screen. For units possessing a sizable depth below grade (depth to pipe), a single access point allows for both sump cleanout and access behind the screen.

The CDS system must be cleaned when the level of sediment in the sump has reached a depth of 18 inches or more to avoid exceeding the maximum 24 inch sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine if the height of

the sediment pile off the bottom of the sump floor exceeds 75% (18 inches) of the total height of isolated sump.

Cleaning

Cleaning of the CDS systems should be done during dry weather conditions when no flow is entering the system. Cleanout of the CDS with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be pumped out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, an oil or gasoline spill must be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis must be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use adsorbent pads since they are usually less expensive to dispose of than the oil/water emulsion that may be created by vacuuming the oily layer. Trash can be netted out if you wish to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure proper safety precautions. Confined Space Entry procedures need to be followed.

Disposal of all material removed from the CDS system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

7. Statements

The following signed statements from the manufacturer, third-party observer and NJCAT are required to complete the NJCAT verification process.

In addition, it should be noted that this report has been subjected to public review (e.g. stormwater industry) and all comments and concerns have been satisfactorily addressed.



STATEMENT OF THIRD PARTY OBSERVER

To: Derek Berg, Contech Engineered Solutions, Scarborough, Maine
From: Forrest Bell, FB Environmental Associates
Subject: Third Party Review Under *Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology* (NJDEP, January 25 2013)¹
Date: September 16, 2013
cc: Cayce Dalton, FB Environmental Associates

Statement of Third Party Observer

FB Environmental has served as the third-party observer for tests performed by Contech Engineered Solutions (Contech) in March through June of 2013. The tests measured the performance of the CDS-4 hydrodynamic separator, including particle size distribution tests for the sediment used in testing. Tests were performed by Contech at their laboratory at 200 Enterprise Drive, Scarborough, Maine, to meet the standards described in *Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology* (NJDEP, January 25 2013)¹. On March 12, 2013, we submitted a statement of our qualifications and disclosure record stating we have no conflict of interests, as required by NJCAT MTD process.

A member of our staff verified compliance with the laboratory test protocol above, and our staff member was physically present to observe the full duration of all laboratory testing. We have also reviewed the data, calculations, and conclusions associated with CDS and particle size distribution testing in the *Verification Testing Report for the CONTINUOUS DEFLECTIVE SEPARATOR (CDS®) Stormwater Treatment Device*, by Contech Engineered Solutions, dated July 1, 2013, and state that they conform to what we saw during our supervision as third-party observer.

A handwritten signature in cursive script that reads 'Forrest Bell'.

September 16, 2013

Signed:

Date

¹ Available at <http://www.nj.gov/dep/stormwater/treatment.html>

July 2, 2013

Dr. Richard Magee
Technical Director
New Jersey Corporation for Advanced Technology
c/o Center for Environmental Systems
Stevens Institute of Technology
One Castle Point on Hudson
Hoboken, NJ 07030

RE: 2013 Verification of the CDS Stormwater Treatment Device

Dr. Magee,

This correspondence is being sent to you in accordance with the "*Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology*" (Process Document) dated January 25, 2013. Specifically, the process document requires that manufacturers submit a signed statement confirming that all of the procedures and requirements identified in the aforementioned process document and the accompanying NJDEP HDS Laboratory Testing Protocol have been met. We believe that the testing executed at Contech's laboratory in Scarborough, ME on the CDS stormwater treatment system during the spring of 2013 under the direct supervision of FB Environmental Associates was conducted in full compliance with all applicable protocol and process criteria. Additionally, we believe that all of the required documentation of the testing and resulting performance calculations has been provided within the submittal accompanying this correspondence.

Please do not hesitate to contact me with any additional questions related to this matter.

Respectfully,



Derek M. Berg
Regulatory Manager- Stormwater

CONTECH Engineered Solutions LLC
71 US Route 1, Suite F | Scarborough, ME 04074
T: 207.885.6174 F: 207.885.9825
DBerg@conteches.com
www.ContechES.com



**Center for Environmental Systems
Stevens Institute of Technology
Castle Point on Hudson
Hoboken, NJ 07030-0000**

September 15, 2013

Elizabeth Dragon
Environmental Engineer
New Jersey Department of Environmental Protection
Bureau of Nonpoint Pollution Control
401-02B, PO Box 420
Trenton, NJ 08625-0420

Derek M. Berg
CONTECH Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074

Forrest Bell
FB Environmental Associates Inc.
97A Exchange Street, Suite 305
Portland, ME 04101

To all,

Based on my review, evaluation and assessment of the testing conducted on the Continuous Deflective Separator (CDS®) by Contech and observed by FB Environmental Associates, the test protocol requirements contained in the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" (NJDEP HDS Protocol) were met or exceeded. Specifically:

Test Sediment Feed

The mean PSD of Contech's test sediment complies with the PSD criteria established by the NJDEP HDS protocol. The Contech PSD was plotted against the NJDEP PSD specification.

The Contech sediment gradation is equivalent to or finer than the NJDEP gradation at all points along the curve. Overall, the Contech sediment blend contains more fines than the NJDEP gradation, particularly below 50 microns. The median particle size of the Contech gradation is approximately 60 microns.

Prior to the start of testing Contech procured a 2500 lbs. batch of scour sediment deemed compliant with the scour sediment PSD specification defined in the NJDEP HDS Protocol. The results of the three scour sediment PSD analysis confirmed that the batch of scour test sediment procured by Contech is in compliance with the NJDEP scour test PSD specification.

Removal Efficiency Testing

In accordance with the NJDEP HDS Protocol, removal efficiency testing was executed on the CDS-4 laboratory unit in order to establish the ability of the CDS to remove the specified test sediment at 25%, 50%, 75%, 100% and 125% of the target MTFR. Prior to the start of testing Contech reviewed existing data and decided to utilize a target MTFR of 0.93 cfs. This target was chosen based on the ultimate goal of demonstrating greater than 50% annualized weighted solids removal as defined in the NJDEP HDS Protocol. The flow rates, feed rates and influent concentration all met the Test protocol's coefficient of variance requirements and the background concentration for all five test runs never exceeded 20 mg/L.

Scour Testing

In order to demonstrate the ability of the CDS to be used as an online treatment device scour testing was conducted at greater than 200% of MTFR in accordance with the NJDEP HDS Protocol. The average flow rate during the online scour test was 1.99 cfs, which is equivalent to 214% of the MTFR (MTFR = 0.93 cfs). With the exception of one background sample and one effluent sample that both had concentrations of 4 mg/l all background and effluent samples were measured as Non Detect during the online scour testing. These results confirm that the CDS-4 did not scour at 214% MTFR and meets the criteria for online use.

Maintenance Frequency

The predicted maintenance frequency for all models is 96 months.

Sincerely,



Richard S. Magee, Sc.D., P.E., BCEE

Memorandum

August 11, 2014

To: Deborah Beck, Contech Engineered Solutions LLC

From: Dr. Chris Berger and Dr. Scott Wells

Handwritten signatures of Dr. Chris Berger and Dr. Scott Wells. Dr. Chris Berger's signature is on the left, and Dr. Scott Wells' signature is on the right.

Re: NJDEP Scour Testing Results for the CDS-4

Scour testing of the Contech CDS-4 were overseen by Dr. Chris Berger during July, 2014 at the Contech Portland, Oregon laboratory. Except for the particle size analysis which was conducted by an outside laboratory, all phases of the test were observed. This included the randomized mixing of the test sediment, preloading and filling of the CDS-4, and the scour test itself. During preloading the initial sediment depths measured in the sedimentation sump and within annular area outside of the screening chamber were confirmed by the observer. The flow rates and frequency of sampling reported for the scour test were also observed and are reported accurately. The test used applicable NJCAT protocol and that their report accurately reflects the testing observed by Dr. Berger.

August 13, 2014

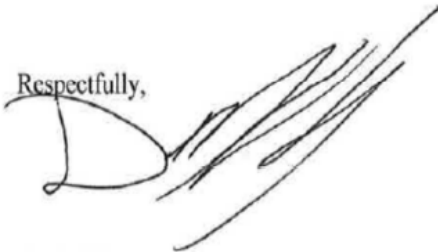
Dr. Richard Magee
Technical Director
New Jersey Corporation for Advanced Technology (NJCAT)
c/o Center for Environmental Systems
Stevens Institute of Technology
One Castle Point on Hudson
Hoboken, NJ 07030

RE: Updated CDS-4 Scour Test Results

Dr. Magee,

This correspondence is to confirm that Contech has successfully completed online scour testing on a full-scale CDS-4 in full compliance with the applicable policies and procedures detailed in the “*2013 NJDEP Laboratory Protocol for Hydrodynamic Separators*”. Specifically testing was limited to completion of the applicable scour testing criteria for use as an online BMP. Also, said scour testing was completed according to the additional conditions described to and agreed upon by NJCAT and the commenters that had raised concern with scour testing previously completed and reported to NJCAT for public review and comment. Please do not hesitate to contact me at any time if you need any additional information about this testing.

Respectfully,



Derek M. Berg
Regulatory Manager- Stormwater

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**Center for Environmental Systems
Stevens Institute of Technology
One Castle Point
Hoboken, NJ 07030-0000**

August 27, 2014

Lisa Schafer
Environmental Engineer
New Jersey Department of Environmental Protection
Bureau of Nonpoint Pollution Control
401-02B, PO Box 420
Trenton, NJ 08625-0420

To all,

Based on my review, evaluation and assessment of the scour retesting conducted on the Continuous Deflective Separator (CDS®) by Contech and observed by Dr. Chris Berger, a colleague of Dr. Scott Wells, from Portland State University, the scour test protocol requirements contained in the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" (NJDEP HDS Protocol) were met or exceeded. The scour retesting was conducted to address concerns raised during the public comment process that sediment that may have been deposited in the annular area outside of the screening chamber during removal efficiency testing could subsequently washout at higher flows.

During the retesting sediment meeting the NJDEP PSD scour test requirement was loaded to a depth of four inches in this annular region and the scour testing repeated. The results confirmed the earlier testing that the resulting effluent concentrations are all 3mg/l or less and well below the 20mg/l threshold established by the NJDEP scour protocol. Therefore the CDS meets the criteria for online use.

Sincerely,

A handwritten signature in blue ink that reads "Richard S. Magee". The signature is written in a cursive, flowing style.

Richard S. Magee, Sc.D., P.E., BCEE

8. References

Contech 2013. *Verification Testing Report for the CONTINUOUS DEFLECTIVE SEPARATOR (CDS®) Stormwater Treatment Device*. Prepared by Contech Engineered Solutions LLC. July 1.

Contech 2014. *NJDEP Scour Testing Results for the CDS-4*. Prepared by Contech Engineered Solutions, LLC. August 1.

NJDEP 2013a. *New Jersey Department of Environmental Protection Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology*. Trenton, NJ. January 25.

NJDEP 2013b. *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device*. Trenton, NJ. January 25.

TOTAL SUSPENDED SOLIDS (TSS) CALC SHEETS

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: **Pembroke Country Club (TSS Category 1)**TSS Removal
Calculation Worksheet

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Infiltration Basin	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

Total TSS Removal =

85%

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Project: **100-152**
 Prepared By: **JG**
 Date: **12/11/2023**

*Equals remaining load from previous BMP (E)
which enters the BMP

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: **Pembroke Country Club (TSS Category 2)**TSS Removal
Calculation Worksheet

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Proprietary Treatment Practice	0.50	0.75	0.38	0.38
Extended Dry Detention Basin	0.50	0.38	0.19	0.19
	0.00	0.19	0.00	0.19
	0.00	0.19	0.00	0.19

Total TSS Removal =

81%

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Project: **100-152**
 Prepared By: **JG**
 Date: **12/11/2023**

*Equals remaining load from previous BMP (E)
which enters the BMP

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: TSS Removal
Calculation Worksheet

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Proprietary Treatment Practice	0.50	0.75	0.38	0.38
Subsurface Infiltration Structure	0.80	0.38	0.30	0.08
	0.00	0.08	0.00	0.08
	0.00	0.08	0.00	0.08

Total TSS Removal =

93%

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E)
which enters the BMP

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: TSS Removal
Calculation Worksheet

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Infiltration Basin	0.80	1.00	0.80	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20

Total TSS Removal =

80%

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E)
which enters the BMP

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: TSS Removal
Calculation Worksheet

B BMP ¹	C TSS Removal Rate ¹	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Bioretention Area	0.90	1.00	0.90	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10

Total TSS Removal =

90%

Separate Form Needs to
be Completed for Each
Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E)
which enters the BMP

EMERGENCY SPILLWAY HYDROCAD OUTPUT

Emergency Spillway Calculation for Basin 2-D

Proposed Hydrology1

Prepared by CDG

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NRCC 24-hr C 100-Year Rainfall=7.70"

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Summary for Pond BAS 2-D: BAS 2-D

Inflow Area = 8.783 ac, 33.03% Impervious, Inflow Depth = 3.76" for 100-Year event
Inflow = 40.57 cfs @ 12.13 hrs, Volume= 2.754 af
Outflow = 5.92 cfs @ 12.72 hrs, Volume= 2.754 af, Atten= 85%, Lag= 35.5 min
Discarded = 0.52 cfs @ 12.72 hrs, Volume= 1.662 af
Primary = 5.40 cfs @ 12.72 hrs, Volume= 1.093 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 109.00' @ 12.72 hrs Surf.Area= 21,998 sf Storage= 53,980 cf

Plug-Flow detention time= 637.7 min calculated for 2.753 af (100% of inflow)
Center-of-Mass det. time= 638.2 min (1,483.7 - 845.5)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	53,997 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	14,000	0	0	14,000
107.00	16,250	15,111	15,111	16,292
108.00	19,800	17,996	33,107	19,873
109.00	22,000	20,890	53,997	22,132

Device	Routing	Invert	Outlet Devices
#1	Device 3	108.65'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Discarded	106.00'	1.020 in/hr Exfiltration over Wetted area
#3	Primary	106.00'	18.0" Round Culvert L= 185.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 106.00' / 102.00' S= 0.0216 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Discarded OutFlow Max=0.52 cfs @ 12.72 hrs HW=109.00' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.52 cfs)

Primary OutFlow Max=5.39 cfs @ 12.72 hrs HW=109.00' (Free Discharge)

↑**3=Culvert** (Passes 5.39 cfs of 10.07 cfs potential flow)

↑**1=Orifice/Grate** (Weir Controls 5.39 cfs @ 1.93 fps)

STAGE STORAGE TABLES - HYDROCAD OUTPUT

Proposed Hydrology

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Stage-Area-Storage for Pond BAS 1-A: BAS 1-A

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
78.00	2,480	2,480	0
78.20	2,608	2,613	509
78.40	2,738	2,748	1,043
78.60	2,872	2,888	1,604
78.80	3,010	3,030	2,192
79.00	3,150	3,176	2,808
79.20	3,290	3,321	3,452
79.40	3,433	3,470	4,125
79.60	3,579	3,622	4,826
79.80	3,728	3,777	5,556
80.00	3,880	3,935	6,317
80.20	4,038	4,100	7,109
80.40	4,200	4,268	7,933
80.60	4,364	4,439	8,789
80.80	4,532	4,613	9,678
81.00	5,284	5,370	10,616
81.20	5,495	5,587	11,694
81.40	5,710	5,808	12,814
81.60	5,929	6,034	13,978
81.80	6,152	6,264	15,186
82.00	6,379	6,498	16,439
82.20	6,584	6,710	17,735
82.40	6,791	6,926	19,073
82.60	7,002	7,145	20,452
82.80	7,217	7,367	21,874
83.00	7,434	7,593	23,339
83.20	7,650	7,818	24,847
83.40	7,869	8,046	26,399
83.60	8,091	8,277	27,995
83.80	8,317	8,511	29,636
84.00	8,545	8,748	31,322

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Stage-Area-Storage for Pond BAS 1-C: BAS 1-C

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
81.00	70	0	82.04	270	177
81.02	74	1	82.06	274	182
81.04	78	3	82.08	278	188
81.06	82	5	82.10	282	193
81.08	85	6	82.12	286	199
81.10	89	8	82.14	289	205
81.12	93	10	82.16	293	211
81.14	97	12	82.18	297	217
81.16	101	14	82.20	301	223
81.18	105	16	82.22	305	229
81.20	109	18	82.24	309	235
81.22	112	20	82.26	313	241
81.24	116	22	82.28	316	247
81.26	120	25	82.30	320	254
81.28	124	27	82.32	324	260
81.30	128	30	82.34	328	267
81.32	132	32	82.36	332	273
81.34	135	35	82.38	336	280
81.36	139	38	82.40	340	287
81.38	143	40	82.42	343	293
81.40	147	43	82.44	347	300
81.42	151	46	82.46	351	307
81.44	155	49	82.48	355	314
81.46	159	53	82.50	359	322
81.48	162	56	82.52	363	329
81.50	166	59	82.54	366	336
81.52	170	62	82.56	370	343
81.54	174	66	82.58	374	351
81.56	178	69	82.60	378	358
81.58	182	73	82.62	382	366
81.60	185	77	82.64	386	374
81.62	189	80	82.66	390	381
81.64	193	84	82.68	393	389
81.66	197	88	82.70	397	397
81.68	201	92	82.72	401	405
81.70	205	96	82.74	405	413
81.72	209	100	82.76	409	421
81.74	212	105	82.78	413	430
81.76	216	109	82.80	416	438
81.78	220	113	82.82	420	446
81.80	224	118	82.84	424	455
81.82	228	122	82.86	428	463
81.84	232	127	82.88	432	472
81.86	236	131	82.90	436	480
81.88	239	136	82.92	440	489
81.90	243	141	82.94	443	498
81.92	247	146	82.96	447	507
81.94	251	151	82.98	451	516
81.96	255	156	83.00	455	525
81.98	259	161			
82.00	263	166			
82.02	266	172			

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Stage-Area-Storage for Pond BAS 2-B: BAS 2-B

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
99.00	2,700	2,700	0
99.02	2,714	2,715	54
99.04	2,728	2,729	109
99.06	2,742	2,744	163
99.08	2,757	2,759	218
99.10	2,771	2,773	274
99.12	2,785	2,788	329
99.14	2,799	2,803	385
99.16	2,814	2,818	441
99.18	2,828	2,833	497
99.20	2,843	2,847	554
99.22	2,857	2,862	611
99.24	2,872	2,877	668
99.26	2,886	2,892	726
99.28	2,901	2,908	784
99.30	2,915	2,923	842
99.32	2,930	2,938	901
99.34	2,945	2,953	959
99.36	2,959	2,968	1,018
99.38	2,974	2,983	1,078
99.40	2,989	2,999	1,137
99.42	3,004	3,014	1,197
99.44	3,019	3,029	1,257
99.46	3,034	3,045	1,318
99.48	3,049	3,060	1,379
99.50	3,064	3,076	1,440
99.52	3,079	3,091	1,501
99.54	3,094	3,107	1,563
99.56	3,109	3,122	1,625
99.58	3,124	3,138	1,687
99.60	3,139	3,154	1,750
99.62	3,154	3,169	1,813
99.64	3,169	3,185	1,876
99.66	3,185	3,201	1,940
99.68	3,200	3,217	2,004
99.70	3,215	3,233	2,068
99.72	3,231	3,249	2,132
99.74	3,246	3,265	2,197
99.76	3,262	3,281	2,262
99.78	3,277	3,297	2,327
99.80	3,293	3,313	2,393
99.82	3,308	3,329	2,459
99.84	3,324	3,345	2,525
99.86	3,339	3,361	2,592
99.88	3,355	3,377	2,659
99.90	3,371	3,393	2,726
99.92	3,387	3,410	2,794
99.94	3,402	3,426	2,862
99.96	3,418	3,442	2,930
99.98	3,434	3,459	2,999
100.00	3,450	3,475	3,067

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Stage-Area-Storage for Pond BAS 2-D: BAS 2-D

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
106.00	14,000	14,000	0
106.10	14,217	14,221	1,411
106.20	14,437	14,445	2,844
106.30	14,657	14,670	4,298
106.40	14,880	14,896	5,775
106.50	15,104	15,125	7,274
106.60	15,330	15,355	8,796
106.70	15,557	15,586	10,340
106.80	15,787	15,820	11,907
106.90	16,017	16,055	13,498
107.00	16,250	16,292	15,111
107.10	16,589	16,634	16,753
107.20	16,932	16,980	18,429
107.30	17,278	17,329	20,139
107.40	17,628	17,682	21,885
107.50	17,981	18,038	23,665
107.60	18,338	18,398	25,481
107.70	18,698	18,762	27,333
107.80	19,062	19,129	29,221
107.90	19,429	19,499	31,145
108.00	19,800	19,873	33,107
108.10	20,015	20,094	35,098
108.20	20,231	20,316	37,110
108.30	20,448	20,539	39,144
108.40	20,666	20,763	41,199
108.50	20,886	20,988	43,277
108.60	21,106	21,215	45,377
108.70	21,328	21,442	47,498
108.80	21,551	21,671	49,642
108.90	21,775	21,901	51,808
109.00	22,000	22,132	53,997

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Stage-Area-Storage for Pond BAS 2-E: BAS 2-E

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
100.00	12,000	12,000	0
100.05	12,078	12,080	602
100.10	12,155	12,160	1,208
100.15	12,234	12,241	1,817
100.20	12,312	12,322	2,431
100.25	12,391	12,403	3,049
100.30	12,469	12,484	3,670
100.35	12,549	12,566	4,296
100.40	12,628	12,647	4,925
100.45	12,708	12,729	5,558
100.50	12,787	12,812	6,196
100.55	12,868	12,894	6,837
100.60	12,948	12,977	7,483
100.65	13,029	13,060	8,132
100.70	13,109	13,144	8,785
100.75	13,191	13,227	9,443
100.80	13,272	13,311	10,105
100.85	13,354	13,395	10,770
100.90	13,435	13,480	11,440
100.95	13,518	13,565	12,114
101.00	13,600	13,649	12,792
101.05	13,700	13,751	13,474
101.10	13,800	13,854	14,162

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Stage-Area-Storage for Pond BAS 2-F: BAS 2-F

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
101.00	8,130	8,130	0
101.05	8,190	8,192	408
101.10	8,251	8,255	819
101.15	8,312	8,318	1,233
101.20	8,373	8,381	1,650
101.25	8,434	8,445	2,070
101.30	8,496	8,508	2,494
101.35	8,557	8,572	2,920
101.40	8,619	8,636	3,349
101.45	8,681	8,701	3,782
101.50	8,744	8,765	4,218
101.55	8,806	8,830	4,656
101.60	8,869	8,895	5,098
101.65	8,932	8,960	5,543
101.70	8,996	9,026	5,991
101.75	9,059	9,091	6,443
101.80	9,123	9,157	6,897
101.85	9,187	9,223	7,355
101.90	9,251	9,290	7,816
101.95	9,315	9,356	8,280
102.00	9,380	9,423	8,748
102.05	9,444	9,489	9,218
102.10	9,508	9,556	9,692
102.15	9,572	9,623	10,169
102.20	9,637	9,689	10,649
102.25	9,702	9,756	11,133
102.30	9,767	9,824	11,619
102.35	9,832	9,891	12,109
102.40	9,898	9,959	12,603
102.45	9,963	10,027	13,099
102.50	10,029	10,095	13,599
102.55	10,095	10,164	14,102
102.60	10,162	10,233	14,608
102.65	10,228	10,301	15,118
102.70	10,295	10,371	15,631
102.75	10,362	10,440	16,148
102.80	10,429	10,510	16,667
102.85	10,496	10,579	17,191
102.90	10,564	10,649	17,717
102.95	10,632	10,720	18,247
103.00	10,700	10,790	18,780
103.05	10,800	10,892	19,318
103.10	10,900	10,993	19,860

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Stage-Area-Storage for Pond BAS 3-B: BAS 3-B

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
97.00	11,300	11,300	0
97.10	11,508	11,511	1,140
97.20	11,718	11,725	2,302
97.30	11,930	11,940	3,484
97.40	12,143	12,157	4,688
97.50	12,359	12,376	5,913
97.60	12,577	12,597	7,160
97.70	12,796	12,820	8,428
97.80	13,017	13,045	9,719
97.90	13,240	13,272	11,032
98.00	13,465	13,501	12,367
98.10	13,692	13,732	13,725
98.20	13,921	13,964	15,105
98.30	14,152	14,199	16,509
98.40	14,385	14,435	17,936
98.50	14,619	14,674	19,386
98.60	14,856	14,914	20,860
98.70	15,094	15,156	22,357
98.80	15,334	15,401	23,879
98.90	15,577	15,647	25,424
99.00	15,821	15,895	26,994
99.10	16,067	16,145	28,588
99.20	16,314	16,397	30,207
99.30	16,564	16,651	31,851
99.40	16,816	16,906	33,520
99.50	17,069	17,164	35,215
99.60	17,325	17,424	36,934
99.70	17,582	17,685	38,680
99.80	17,841	17,949	40,451
99.90	18,102	18,214	42,248
100.00	18,365	18,481	44,071
100.10	18,630	18,751	45,921
100.20	18,897	19,022	47,797
100.30	19,166	19,295	49,701
100.40	19,437	19,570	51,631
100.50	19,709	19,847	53,588
100.60	19,983	20,126	55,573
100.70	20,260	20,407	57,585
100.80	20,538	20,690	59,625
100.90	20,818	20,974	61,692
101.00	21,100	21,261	63,788

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Stage-Area-Storage for Pond BAS 6-A: BAS 6-A

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
88.30	8,860	8,860	0
88.40	8,981	8,985	892
88.50	9,102	9,111	1,796
88.60	9,224	9,238	2,712
88.70	9,347	9,365	3,641
88.80	9,471	9,494	4,582
88.90	9,595	9,623	5,535
89.00	9,721	9,753	6,501
89.10	9,847	9,884	7,479
89.20	9,974	10,016	8,470
89.30	10,102	10,149	9,474
89.40	10,231	10,282	10,491
89.50	10,360	10,417	11,520
89.60	10,490	10,552	12,563
89.70	10,621	10,688	13,618
89.80	10,753	10,825	14,687
89.90	10,886	10,963	15,769
90.00	11,020	11,101	16,864
90.10	11,154	11,241	17,973
90.20	11,289	11,381	19,095
90.30	11,425	11,522	20,231
90.40	11,562	11,664	21,380
90.50	11,700	11,807	22,543
90.60	11,838	11,951	23,720
90.70	11,977	12,095	24,911
90.80	12,117	12,241	26,116
90.90	12,258	12,387	27,335
91.00	12,400	12,534	28,567

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Stage-Area-Storage for Pond BAS 7-A: BAS 7-A

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
91.00	10,100	10,100	0
91.10	10,341	10,343	1,022
91.20	10,584	10,589	2,068
91.30	10,830	10,838	3,139
91.40	11,079	11,090	4,234
91.50	11,331	11,345	5,355
91.60	11,586	11,602	6,501
91.70	11,844	11,863	7,672
91.80	12,104	12,126	8,870
91.90	12,367	12,392	10,093
92.00	12,633	12,661	11,343
92.10	12,902	12,933	12,620
92.20	13,174	13,208	13,924
92.30	13,449	13,486	15,255
92.40	13,726	13,766	16,614
92.50	14,006	14,049	18,000
92.60	14,289	14,336	19,415
92.70	14,575	14,625	20,858
92.80	14,864	14,917	22,330
92.90	15,156	15,211	23,831
93.00	15,450	15,509	25,361
93.10	15,747	15,810	26,921
93.20	16,047	16,113	28,511
93.30	16,350	16,419	30,131
93.40	16,656	16,728	31,781
93.50	16,965	17,040	33,462
93.60	17,276	17,355	35,174
93.70	17,590	17,673	36,917
93.80	17,907	17,993	38,692
93.90	18,227	18,317	40,499
94.00	18,550	18,643	42,338

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Stage-Area-Storage for Pond BAS 9-A: BAS 9-A

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
61.00	1,100	1,100	0
61.10	1,133	1,135	112
61.20	1,166	1,170	227
61.30	1,200	1,206	345
61.40	1,234	1,243	467
61.50	1,269	1,280	592
61.60	1,305	1,318	721
61.70	1,340	1,356	853
61.80	1,377	1,394	989
61.90	1,414	1,433	1,128
62.00	1,451	1,473	1,271
62.10	1,489	1,513	1,418
62.20	1,527	1,554	1,569
62.30	1,565	1,595	1,724
62.40	1,605	1,636	1,882
62.50	1,644	1,679	2,045
62.60	1,684	1,721	2,211
62.70	1,725	1,764	2,382
62.80	1,766	1,808	2,556
62.90	1,808	1,852	2,735
63.00	1,850	1,897	2,918
63.10	1,953	2,001	3,108
63.20	2,058	2,107	3,308
63.30	2,166	2,217	3,519
63.40	2,277	2,329	3,742
63.50	2,390	2,444	3,975
63.60	2,507	2,561	4,220
63.70	2,626	2,682	4,476
63.80	2,748	2,805	4,745
63.90	2,873	2,931	5,026
64.00	3,000	3,060	5,320

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Stage-Area-Storage for Pond BAS 9-B: BAS 9-B

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
60.00	3,000	3,000	0
60.10	3,076	3,078	304
60.20	3,152	3,157	615
60.30	3,230	3,238	934
60.40	3,309	3,319	1,261
60.50	3,388	3,401	1,596
60.60	3,469	3,484	1,939
60.70	3,550	3,568	2,290
60.80	3,632	3,653	2,649
60.90	3,716	3,739	3,016
61.00	3,800	3,826	3,392
61.10	3,895	3,923	3,777
61.20	3,991	4,022	4,171
61.30	4,088	4,122	4,575
61.40	4,186	4,222	4,989
61.50	4,285	4,324	5,412
61.60	4,386	4,428	5,846
61.70	4,488	4,532	6,290
61.80	4,591	4,638	6,743
61.90	4,695	4,745	7,208
62.00	4,800	4,853	7,682
62.10	4,891	4,947	8,167
62.20	4,983	5,042	8,661
62.30	5,076	5,139	9,164
62.40	5,170	5,236	9,676
62.50	5,264	5,334	10,198
62.60	5,360	5,433	10,729
62.70	5,456	5,532	11,270
62.80	5,553	5,633	11,820
62.90	5,651	5,735	12,380
63.00	5,750	5,837	12,950
63.10	5,958	6,047	13,536
63.20	6,170	6,261	14,142
63.30	6,386	6,478	14,770
63.40	6,606	6,700	15,419
63.50	6,829	6,925	16,091
63.60	7,056	7,153	16,785
63.70	7,286	7,386	17,502
63.80	7,520	7,622	18,243
63.90	7,758	7,862	19,006
64.00	8,000	8,106	19,794
64.10	8,116	8,226	20,600
64.20	8,233	8,348	21,418
64.30	8,351	8,470	22,247
64.40	8,470	8,593	23,088
64.50	8,590	8,717	23,941
64.60	8,710	8,842	24,806
64.70	8,831	8,968	25,683
64.80	8,953	9,094	26,572
64.90	9,076	9,222	27,474
65.00	9,200	9,350	28,387

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Stage-Area-Storage for Pond BAS 10-B: BAS 10-B

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
77.00	1,850	1,850	0
77.10	1,906	1,908	188
77.20	1,963	1,967	381
77.30	2,021	2,027	580
77.40	2,080	2,088	786
77.50	2,139	2,150	996
77.60	2,200	2,213	1,213
77.70	2,261	2,276	1,437
77.80	2,323	2,341	1,666
77.90	2,386	2,406	1,901
78.00	2,450	2,472	2,143
78.10	2,548	2,572	2,393
78.20	2,649	2,674	2,653
78.30	2,751	2,778	2,923
78.40	2,855	2,883	3,203
78.50	2,961	2,991	3,494
78.60	3,069	3,101	3,795
78.70	3,179	3,212	4,108
78.80	3,291	3,326	4,431
78.90	3,404	3,442	4,766
79.00	3,520	3,559	5,112
79.10	3,594	3,637	5,468
79.20	3,670	3,715	5,831
79.30	3,746	3,794	6,202
79.40	3,823	3,874	6,580
79.50	3,900	3,955	6,966
79.60	3,979	4,036	7,360
79.70	4,058	4,118	7,762
79.80	4,138	4,201	8,172
79.90	4,218	4,285	8,589
80.00	4,300	4,370	9,015

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Stage-Area-Storage for Pond BAS 11-B: BAS 11-B

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
44.50	127,000	127,000	0
44.51	127,000	127,013	508
44.52	127,000	127,025	1,016
44.53	127,000	127,038	1,524
44.54	127,000	127,051	2,032
44.55	127,000	127,063	2,540
44.56	127,000	127,076	3,048
44.57	127,000	127,088	3,556
44.58	127,000	127,101	4,064
44.59	127,000	127,114	4,572
44.60	127,000	127,126	5,080
44.61	127,000	127,139	5,588
44.62	127,000	127,152	6,096
44.63	127,000	127,164	6,604
44.64	127,000	127,177	7,112
44.65	127,000	127,189	7,620
44.66	127,000	127,202	8,128
44.67	127,000	127,215	8,636
44.68	127,000	127,227	9,144
44.69	127,000	127,240	9,652
44.70	127,000	127,253	10,160
44.71	127,000	127,265	10,668
44.72	127,000	127,278	11,176
44.73	127,000	127,291	11,684
44.74	127,000	127,303	12,192
44.75	127,000	127,316	12,700
44.76	127,000	127,328	13,208
44.77	127,000	127,341	13,716
44.78	127,000	127,354	14,224
44.79	127,000	127,366	14,732
44.80	127,000	127,379	15,240
44.81	127,000	127,392	15,748
44.82	127,000	127,404	16,256
44.83	127,000	127,417	16,764
44.84	127,000	127,430	17,272
44.85	127,000	127,442	17,780
44.86	127,000	127,455	18,288
44.87	127,000	127,467	18,796
44.88	127,000	127,480	19,304
44.89	127,000	127,493	19,812
44.90	127,000	127,505	20,320
44.91	127,000	127,518	20,828
44.92	127,000	127,531	21,336
44.93	127,000	127,543	21,844
44.94	127,000	127,556	22,352
44.95	127,000	127,568	22,860
44.96	127,000	127,581	23,368
44.97	127,000	127,594	23,876
44.98	127,000	127,606	24,384
44.99	127,000	127,619	24,892
45.00	127,000	127,632	25,400

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Stage-Area-Storage for Pond BAS 12-A: BAS 12-A

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
93.00	8,250	8,250	0
93.10	8,415	8,418	833
93.20	8,581	8,587	1,683
93.30	8,749	8,759	2,549
93.40	8,919	8,931	3,433
93.50	9,090	9,106	4,333
93.60	9,263	9,282	5,251
93.70	9,437	9,460	6,186
93.80	9,613	9,639	7,138
93.90	9,791	9,821	8,109
94.00	9,971	10,003	9,097
94.10	10,152	10,188	10,103
94.20	10,334	10,374	11,127
94.30	10,518	10,562	12,170
94.40	10,704	10,751	13,231
94.50	10,892	10,942	14,311
94.60	11,081	11,135	15,409
94.70	11,272	11,329	16,527
94.80	11,464	11,526	17,664
94.90	11,658	11,723	18,820
95.00	11,854	11,923	19,995
95.10	12,051	12,124	21,191
95.20	12,250	12,326	22,406
95.30	12,451	12,531	23,641
95.40	12,653	12,737	24,896
95.50	12,857	12,945	26,171
95.60	13,062	13,154	27,467
95.70	13,269	13,365	28,784
95.80	13,478	13,578	30,121
95.90	13,688	13,792	31,479
96.00	13,900	14,008	32,859

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Stage-Area-Storage for Pond BAS 12-B: BAS 12-B

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
91.00	22,700	22,700	0
91.10	22,998	23,003	2,285
91.20	23,299	23,308	4,600
91.30	23,601	23,615	6,945
91.40	23,905	23,925	9,320
91.50	24,212	24,236	11,726
91.60	24,520	24,549	14,162
91.70	24,830	24,864	16,630
91.80	25,142	25,181	19,128
91.90	25,456	25,500	21,658
92.00	25,772	25,821	24,220
92.10	26,090	26,144	26,813
92.20	26,410	26,469	29,438
92.30	26,731	26,796	32,095
92.40	27,055	27,125	34,784
92.50	27,381	27,456	37,506
92.60	27,708	27,789	40,260
92.70	28,038	28,123	43,048
92.80	28,370	28,460	45,868
92.90	28,703	28,799	48,721
93.00	29,038	29,140	51,609
93.10	29,376	29,483	54,529
93.20	29,715	29,827	57,484
93.30	30,056	30,174	60,472
93.40	30,400	30,523	63,495
93.50	30,745	30,874	66,552
93.60	31,092	31,226	69,644
93.70	31,441	31,581	72,771
93.80	31,792	31,938	75,932
93.90	32,145	32,296	79,129
94.00	32,500	32,657	82,362

SECTION 5 – LONG TERM OPERATION & MAINTENANCE

LONG-TERM STORMWATER OPERATION & MAINTENANCE PLAN

WEATHERVANE AT PEMBROKE COUNTRY CLUB

PROJECT OVERVIEW:

The proposed project consists of 162 single-family residential detached condominiums, a 8-unit multifamily building, 2 existing residential homes, a clubhouse/function/property and a maintenance facility. The project has been designed to comply with the Massachusetts Stormwater Management Regulations.

Appended to this document is a sample maintenance form and a chart describing the anticipated frequency of tasks.

OWNER AND RESPONSIBLE PARTY:

Current Land Owners:

Weatherwane at Pembroke Country Club
190 Old Derby Street, Suite 311
Hingham, MA 02043

Proposed Site Contractor:

J.F. Price Co.
611 Pleasant Street
Weymouth, MA 02189

Proposed Owner (Once project is approved)*:

Weatherwane At Pembroke Country Club
190 Old Derby Street, Suite 311
Hingham, MA 02043

**Should the property be transferred to new ownership, the approved and permitted Operation and Maintenance plan shall be adhered to in perpetuity.*

Weatherwane at Pembroke Country Club has facilities maintenance personnel on-staff. For any service beyond their service ability, they subcontract to the appropriate vendors such as street sweeping, catch basin and water quality unit cleaning, etc.

Ultimately, a Condominium Association will be established that will take over long-term O&M Responsibilities for the residential portion of this project upon project completion and turnover from Weatherwane at Pembroke Country Club to the Condominium Association.

CONSTRUCTION MANAGEMENT:

A construction manager with adequate knowledge and experience on projects of similar size and scope shall be employed to oversee all site work related construction. The contractor shall incorporate the appropriate techniques to control sediment and erosion pollution during construction in accordance with the *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas* and any conditions of approval from the local conservation commission.

Care should be taken when constructing stormwater control structures. Light earth-moving equipment shall be used to excavate in the vicinity of the infiltration areas. Use of heavy equipment causes excessive compaction of the soils beneath the basin resulting in reduced infiltration capacity. At no time shall temporary infiltration areas or settling basins be constructed in the vicinity of the proposed infiltration basins in order to prevent the soils from becoming clogged with sediment.

ON-GOING MAINTENANCE CONTRACT

The non-structural and structural approaches recommended below, as well as the required BMP maintenance, will be completed by Weathervane at Pembroke Country Club contractor, JF Price Co. Adequate personnel with appropriate training and access to proper equipment will be available to complete the tasks. Future responsible parties must be notified of their responsibility to operate and maintain the system in perpetuity.

MAINTENANCE LOG

The Responsible Party shall develop and maintain a log of inspections, maintenance, repairs, and disposal (including location of disposal) during the life of the project. Records will be maintained for at least 3 years and be made available to the Massachusetts Department of Environmental Protection or the Town of Pembroke in accordance with the provisions of the Massachusetts Stormwater Handbook. A sample of such a maintenance log is provided.

STORMWATER BMP MAINTENANCE

The proposed stormwater management system has been designed with appropriate BMPs aimed at reducing the pollutants discharge based upon the intended use of the property. All BMPs require regular maintenance to function as intended. Some management measures have simple maintenance requirements; others are more involved. The Responsible Party must have all BMPs regularly inspected to ensure they are operating properly on an as needed basis, including during runoff events exceeding 0.5 inches of rainfall.

A description of the non-structural and structural approaches to be incorporated is indicated below. The following best management practices are proposed to be incorporated into the stormwater management design to reduce source runoff and improve stormwater runoff discharge quality. The Responsible Party will regularly inspect all BMPs to ensure they are

operating properly. If any deficiencies are identified during these inspections, action to resolve it will be initiated and documented on the maintenance log.

STRUCTURAL BMPs

Deep Sump Hooded Catch Basins

Catch basins shall be labeled with “Do Not Dump, Drains to local Waterway” markers and repair/replace markers as necessary. On a regular basis the inlet pipe and outlet pipe shall be checked for debris and removed as necessary to ensure unobstructed flow of water. Inspections shall occur quarterly. Inspections shall verify the tees are secure and free flowing. Depth of sediment below water line. Basins are to be cleaned whenever sediment and hydrocarbons are observed. Basins shall be cleaned using a vacuum pump.

All liquid shall be pumped from the sump of each basin at least once per year. All sediments and hydrocarbons should be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations.

Water Quality Units

The water quality units (Contech) have been designed with drain manholes at grade to aid in the removal of sediment and debris accumulating in the structure and inspection ports to monitor the accumulation of sediment. Preventative maintenance shall be performed in accordance with manufacturer’s instructions, which is enclosed in this section. Cleaning will take place at the completion of construction and as deemed necessary based on the inspections. Refer to the enclosed “CDS Inspection and Maintenance Guide”.

Subsurface Infiltration Stone System

Inspect and clean pretreatment BMP’s every six months and after every major storm event (2-year return frequency). Check inlet/outlet pipes to determine if they are clogged.

Inspect trench after the first several rainfall events, after all major storms, and on regularly scheduled dates every 6-months. Remove accumulated sediment trash, debris, leaves, and grass clippings.

Infiltration Basins

Remove debris and sediment on an as needed basis. Sediment shall be removed using light equipment so as not to compact the underlying soil. Sediment transported off site and disposed of in accordance with applicable local, state, and federal guidelines and regulations. Vegetated surfaces shall be repaired to ensure stable surfaces exist.

Maintenance shall be done using a “gator” or golf cart sized vehicle to access the basins. Any debris or landscape growth extending within the identified maintenance access paths shall be trimmed/removed accordingly to maintain a clear and open pathway. At least twice a year, mow the vegetated berms, side slopes and basin bottom (if applicable). Remove grass clippings and organic matter to prevent an impervious mat from forming.

Inspection should occur twice annually, once in the fall and then in the spring after the snow melts.

Sediment Forebay

Frequently remove accumulated sediment. At a minimum, inspect forebay monthly and clean them out at least two times a year. Stabilize the floor and sidewalls of the forebay before making it operational. Grass height shall be no higher than 6-inches, and no lower than 3-inches. Check for signs of riling and gulying and repair as needed.

Stone Check Dams

Inspect at least once a month or after every rainfall event. Remove sediment accumulations. Check structure and abutments for erosion, piping, or rock displacement. Repair immediately.

Grass Swale

Inspect swales after the first few months to ensure there is no riling or gulying and that vegetation is adequate. Thereafter, inspect twice a year for slope integrity, vegetative health, soil erosion, ponding, and sediment accumulation. Remove sediment and debris manually at least once per year.

Rain Gardens

Inspection and regular maintenance for Rain Gardens is imperative for the their continued effectivity in treating runoff. The Rain Garden should be inspected monthly for obvious signs of structural failure as well as any debris/trash accumulating. Remove debris/trash during the monthly inspections.

Annually in the Spring the Rain Garden plantings should be inspected and dead vegetation should be removed and replaced. Springtime is also the time to mulch the Rain Garden. If during these two steps it appears the media is no longer functioning properly then both the media and all plantings should be replaced.

Pruning of plants to ensure healthy growth should occur annually in the spring or fall.

NON-STRUCTURAL BMPs

Pavement Sweeping

As street sweeping is a BMP under DEP guidelines, this non-structural BMP is an effective removal of Total Suspended Solids (TSS) in a comprehensive stormwater management program. Litter and debris are to be regularly picked up and removed from the pavement. Paved areas are to be swept a minimum of two times per year, at least once during April and again in September. This BMP is not needed to meet the 80% TSS removal requirement.

Detention Basin

Inspect Wet Basin at least once per year to ensure it is working as designed. Inspect the outlet structures for evidence of clogging or excessive outflow releases. At least twice a year, mow the upper stage, side slopes, embankment, and emergency spillway. At this time, also check the sediment forebay for accumulated material, sediment, trash and debris and remove it. Remove sediment from the basin at least once every 10 years.

Pervious Areas and Slopes

Wherever possible, runoff from paved areas and snowmelt shall be directed over vegetated areas to promote settlement of suspended solids before entering a wetland or resource area. Steep pervious slopes will be permanently vegetated to dissipate energy and reduce potential erosion. No constructed vegetated slopes should exceed 2H:1V. Slopes exceeding 2:1 shall be stabilized with riprap or other similar measures to minimize the potential for future erosion. Irrigation system(s) shall be designed and maintained such that water is not applied to/or allowed to run off onto any impervious surfaces. Although overspray or runoff may be unavoidable during periods of high winds. In the event of accidental damage to system components or other unusual circumstances the system components shall be promptly corrected. Maximum of 1 inch of irrigation water will be applied to irrigated areas per week.

Drainage Control Structures, Flared End Sections, Trash Racks, Riprap Pads, Swales, and Level Spreader Splash Pads

Basin control structures, flared end sections, trash racks, riprap pads and level spreader splash pads shall be inspected and any debris or growth surrounding or within these structures shall be removed. Any/all debris or vegetation encroaching on the control structures or outfall components shall be removed or appropriately trimmed back to maintain the designed control elevation and flow patterns/cross section without impediment. Inspection should occur twice annually, once in the fall and then in the spring after the snow melts. Cleaning will take place at the completion of construction and as deemed necessary based on the inspections and manufacturer's requirements.

Fertilizers

Use of fertilizers shall follow the requirements of 330 CMR 31.0 including but not limited to:

- No fertilizers containing phosphorous shall be applied in the absence of a current soil test indicating that supplemental phosphorous is required.
- No fertilizer shall be applied intentionally or otherwise to impervious surfaces and if so applied, shall be immediately cleaned up.
 - All record keeping requirements shall be followed.
- All time of application requirements including prohibition of applications when heavy rain is forecast within 24 hours shall be followed.

- Lawn clippings: No lawn clippings shall be disposed of onsite.

Pest and Insect Control

- As a first-line defense against pests/insects and weeds (the "First-Line Defense"), the party responsible for maintenance shall avoid the use of non-organic pesticides, herbicides, fungicides and insecticides unless spot treatment is required for a specific control application. The owner shall not be required to undertake extraordinary measures or incur unreasonable cost to locate, purchase or apply non-organic products.
- If the First-Line Defense fails, as determined by the owner or party responsible for maintenance, in its sole but reasonable discretion, non-organic approaches to pest/insect control may be used, the same to be applied by a professional licensed in the Commonwealth of Massachusetts, where required. But in no event shall such non-organic approaches be used within the 25ft buffer zone to the wetlands.

Waste Management

Solid waste and recycling will be contained in garbage cans maintained at each residence for routine and regular trash pickup. Waste deposition in the receptacles will be consistent with state and local regulations. Solid waste and recycling for the Clubhouse and Function will be contained in dumpsters maintained by the restaurant for routine and regular trash pickup. Waste deposition in the dumpsters will be consistent with state and local regulations.

Snow Removal

There shall be no plowing or stockpiling of snow within any resource areas. Typically, a combination of plowing and/or snow blowing is utilized on the individual driveways and a snow blowing "bobcat" is used to clear the sidewalks. No sodium chloride shall be used for ice removal. Alternatively, sand or formulations without chloride may be used. Calcium magnesium acetate (CMA) is preferred. Deicing compounds must be stored or sheltered on impervious pads (i.e. in residential garages and the maintenance facility). No de-icing compounds shall be stored or utilized in wetland resource areas nor the 25ft buffer. Snow that is plowed from the paved driveway surfaces shall be plowed to the edges of the pavement. When capacity of these areas is exceeded, accumulated snow shall be removed. Refer to the attached 11x17 O&M Map which identifies the location of BMPs and provides additional Snow Removal information.

Trash Pickup

Trash will be picked up at each individual home in the standard containers required by the local or private trash company.

Hazardous Waste and Spill Control Containment

In the event of a discharge or spill of oil or another hazardous material, outlets to stormwater management facilities immediately downstream of the spill shall be plugged so that hazardous materials do not enter the system. In the event of a discharge of oil or other hazardous material, responsible facility personnel shall notify the appropriate state agencies, the Town of Pembroke DPW and the EPA National Response Center 1-800-424-8802 shall be notified. All hazardous waste materials will be disposed of in a manner specified by local, state and/or federal regulations and by the manufacturer of such products.

Pet Waste Management

Pooper scooper laws for pets shall be followed. Residents shall not dump pet waste into storm drains, catch basins, stormwater basins, or any other drainage system components. Pet waste shall be scooped up and disposed of properly.

Other Miscellaneous Maintenance Items

Washing or pressure washing of impervious areas will not be part of routine maintenance procedures, though it may be used on occasion in small areas to treat specific problems. No coal tar-based driveway sealer products shall be used on the paved surfaces throughout the site. Asphalt binder sealers shall be used instead.

Stormwater BMP Inspection and Maintenance Log

Facility Name
Address
<div style="display: flex; justify-content: space-between; padding: 0 10px;"> Begin Date End Date </div>

Date	BMP ID#	BMP Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Actions Taken

Instructions: Record all inspections and maintenance for all treatment BMPs on this form. Use additional log sheets and/or attach extended comments or documentation as necessary. Submit a copy of the completed log with the annual independent inspectors' report to the municipality and start a new log at that time.

BMP ID# — Always use ID# from the Operation and Maintenance Manual.

Inspected by — Note all inspections and maintenance on this form, including the required independent annual inspection.

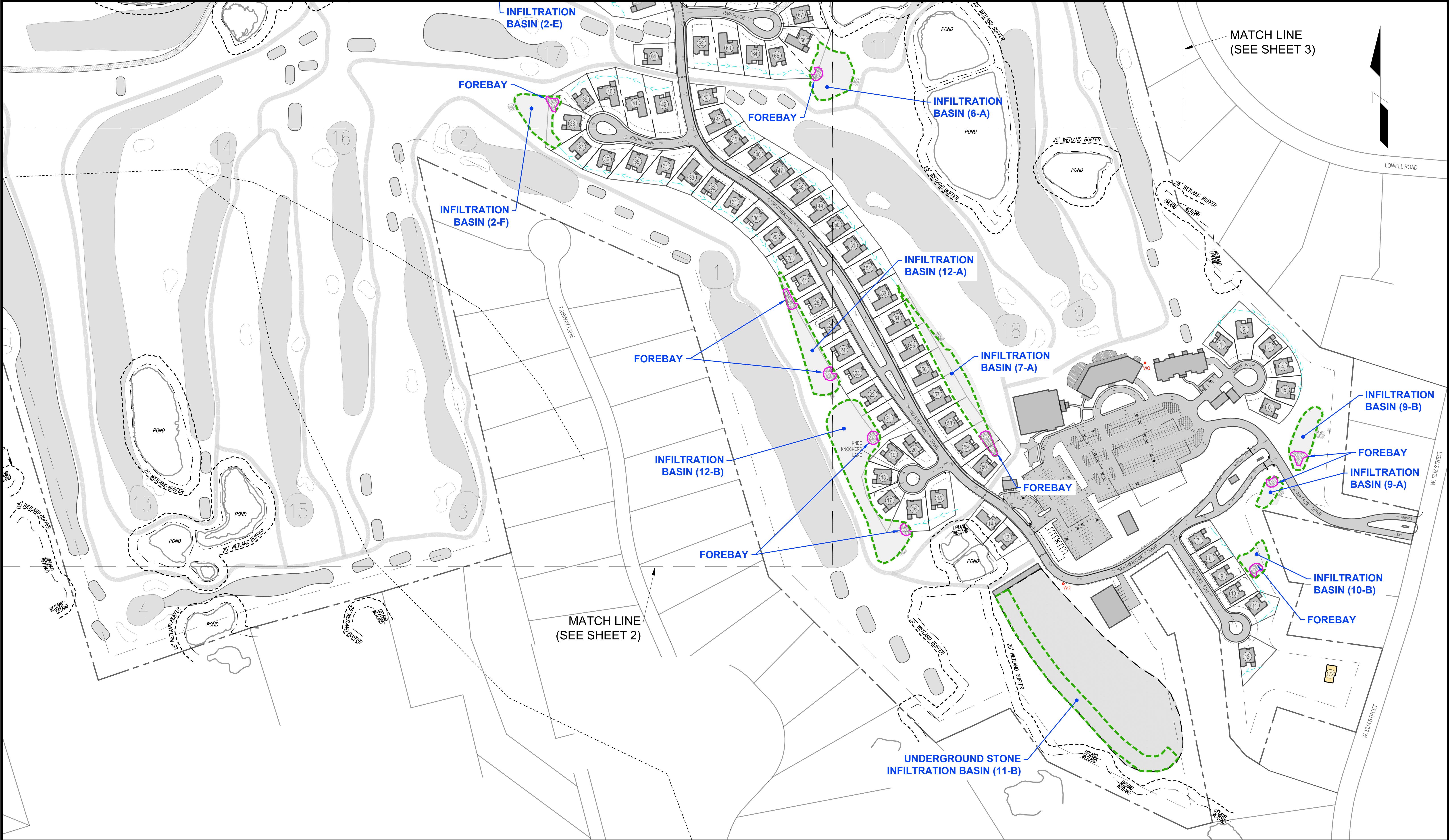
Cause for inspection — Note if the inspection is routine, pre-rainy-season, post-storm, annual, or in response to a noted problem or complaint.

Exceptions noted — Note any condition that requires correction or indicates a need for maintenance.

Comments and actions taken — Describe any maintenance done and need for follow-up.

Stormwater BMP Inspection Matrix

Conventional & LID Best Management Practices	Inspection & Maint. Frequency	Erosion & Scour	Obstructions	Trash & Debris	Sediment Build-Up Removal	Vegetation Cover	Remove/Reset Filter Fabric & Stone As Required	Vac Truck Sediment & Contaminants	Remove/Reset Riprap as Required
Catch Basins	Quarterly								
Subsurface Infiltration System	Twice-Annually (Spring and Fall)								
Grass Swales	Twice-Annually (Spring and Fall)								
Outlet Structure	Twice-Annually (Spring and Fall)								
Water Quality Units	Twice-Annually (Spring and Fall)								
Infiltration Basin	Twice-Annually (Spring and Fall)								
Sediment Forebays	Inspected Monthly Cleaned Quarterly								
Rain Garden	Varies								
Emergency Overflows	Twice-Annually (Spring and Fall)								
Street Sweeping	Twice-Annually (Spring and Fall)								
Outlets (FES, Rip Rap Pad, Level Spreaders)	Twice-Annually (Spring and Fall)								



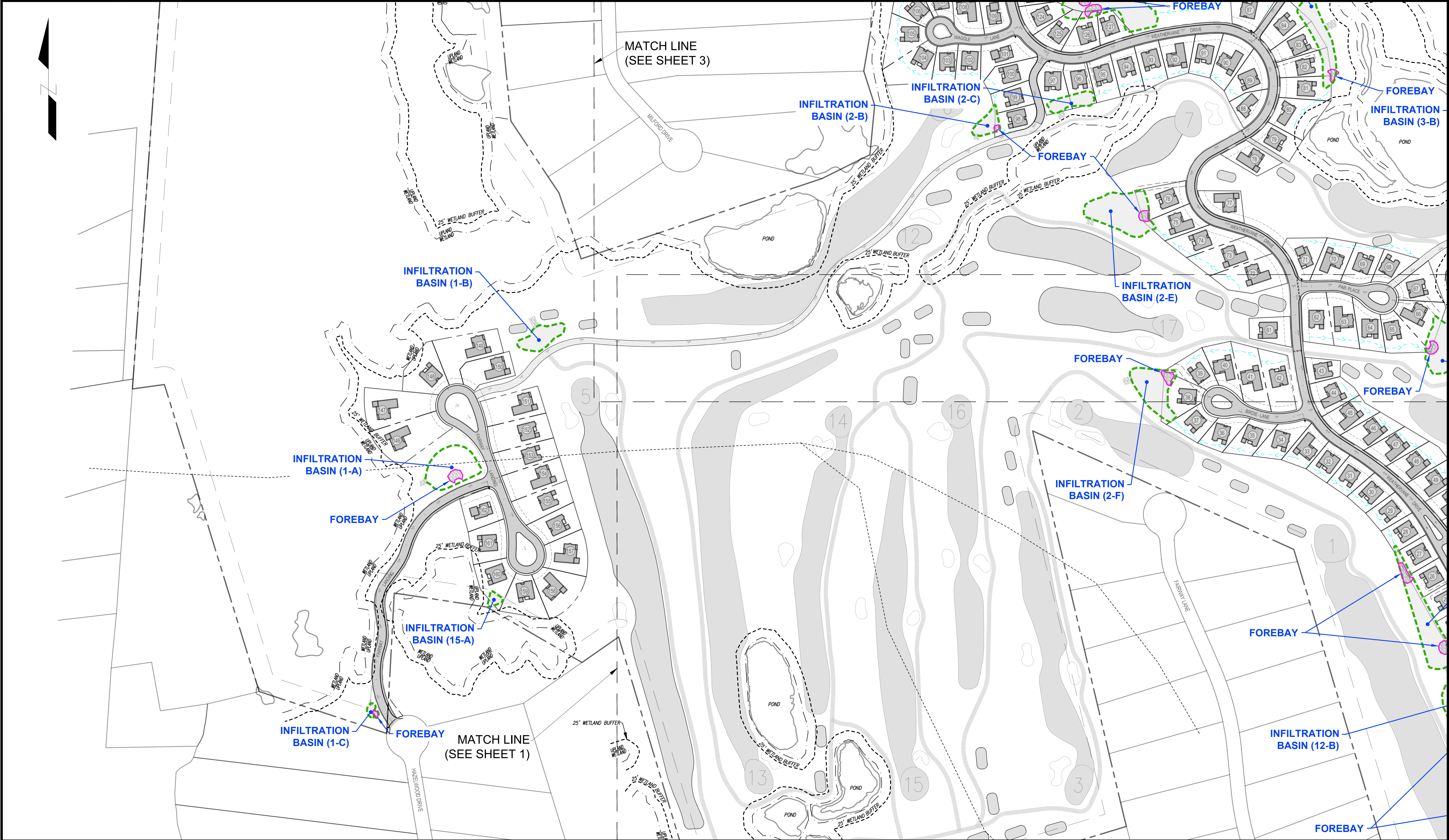
SNOW STORAGE:


- 1. EMERGENCY ACCESS TO BE PLOWED
- 2. STREETS TO BE PLOWED TO EACH EDGE OF PAVEMENT MAINTAINING MIN 20' WIDE ACCESS AT ALL TIMES.
- 3. DRIVEWAYS TO BE PLOWED TO EITHER SIDE OF DRIVEWAY.
- 4. IN MAJOR SNOW EMERGENCIES CONDOMINIUM ASSOCIATION AS AN OPTION OF LAST RESORT COMMITS TO HAULING EXCESS SNOW IN ORDER TO MAINTAIN PROPER ACCESS.
- 5. NO SNOW STORAGE SHALL OCCUR WITHIN WETLAND RESOURCE AREA.





- | | | | | | |
|--|--------------------|--|------------------|--|------------------------|
| | INFILTRATION BASIN | | SEDIMENT FOREBAY | | CDS WATER QUALITY UNIT |
| | DETENTION BASIN | | SWALE | | |
| | RAIN GARDEN | | DRAINAGE SYSTEM | | |


**OPERATION AND
MAINTENANCE BMP MAP**
(SHEET 1)
PEMBROKE COUNTRY CLUB
94 WEST ELM STREET
PEMBROKE, MA
DATE: AUGUST 3, 2023





 INFILTRATION BASIN


 DETENTION BASIN

 RAIN GARDEN

 SEDIMENT FOREBAY

 SWALE

 DRAINAGE SYSTEM

 CDS WATER QUALITY UNIT

SNOW STORAGE:

1. EMERGENCY ACCESS TO BE PLOWED
2. STREETS TO BE PLOWED TO EACH EDGE OF PAVEMENT MAINTAINING MIN 20' WIDE ACCESS AT ALL TIMES.
3. DRIVEWAYS TO BE PLOWED TO EITHER SIDE OF DRIVEWAY.
4. IN MAJOR SNOW EMERGENCIES CONDOMINIUM ASSOCIATION AS AN OPTION OF LAST RESORT COMMITS TO HAULING EXCESS SNOW IN ORDER TO MAINTAIN PROPER ACCESS.
5. NO SNOW STORAGE SHALL OCCUR WITHIN WETLAND RESOURCE AREA.


120

60

0

120

240

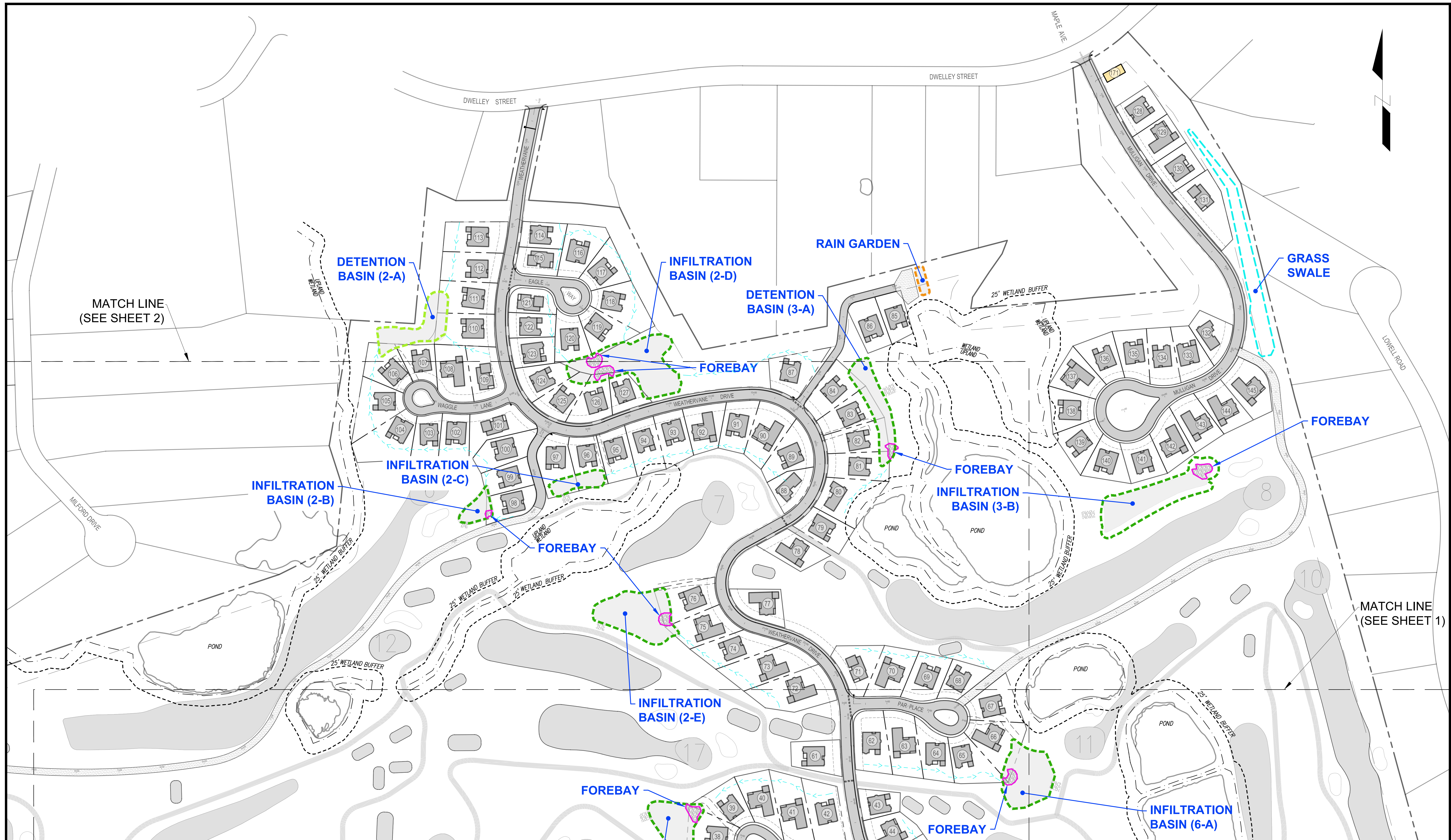


**OPERATION AND
MAINTENANCE BMP MAP**

(SHEET 2)

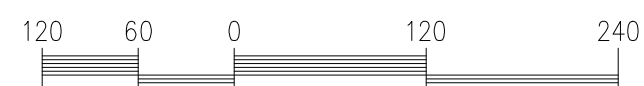
PEMBROKE COUNTRY CLUB

94 WEST ELM STREET
PEMBROKE, MA
DATE: AUGUST 3, 2023



SNOW STORAGE:

1. EMERGENCY ACCESS TO BE PLOWED
2. STREETS TO BE PLOWED TO EACH EDGE OF PAVEMENT MAINTAINING MIN 20' WIDE ACCESS AT ALL TIMES.
3. DRIVEWAYS TO BE PLOWED TO EITHER SIDE OF DRIVEWAY.
4. IN MAJOR SNOW EMERGENCIES CONDOMINIUM ASSOCIATION AS AN OPTION OF LAST RESORT COMMITS TO HAULING EXCESS SNOW IN ORDER TO MAINTAIN PROPER ACCESS.
5. NO SNOW STORAGE SHALL OCCUR WITHIN WETLAND RESOURCE AREA.



- | | | | | | |
|--|--------------------|--|------------------|--|------------------------|
| | INFILTRATION BASIN | | SEDIMENT FOREBAY | | CDS WATER QUALITY UNIT |
| | DETENTION BASIN | | SWALE | | |
| | RAIN GARDEN | | DRAINAGE SYSTEM | | |

**OPERATION AND
MAINTENANCE BMP MAP**
(SHEET 3)
PEMBROKE COUNTRY CLUB
94 WEST ELM STREET
PEMBROKE, MA
DATE: AUGUST 3, 2023

CDS® Inspection and Maintenance Guide



Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treatment products. For information, visit www.ContechES.com or call 800.338.1122

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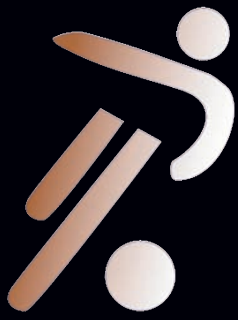
The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment ¹	Floatable Layer Thickness ²	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.



SportsEdge®

Safety. Quality. Versatility. Esthetics.



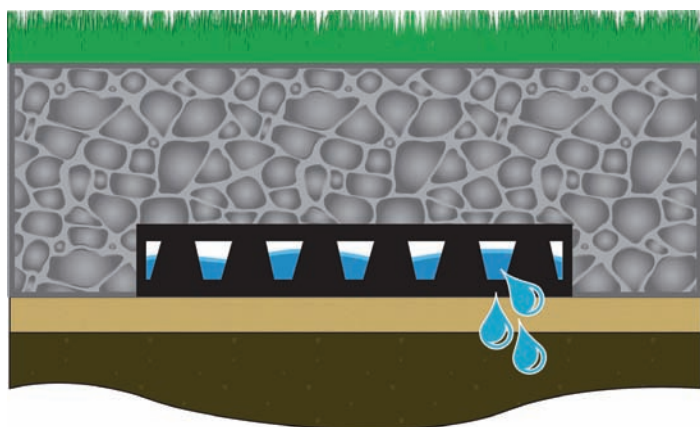
SPORTSEGE® HQ
PANEL DRAIN

www.sportsedge.com

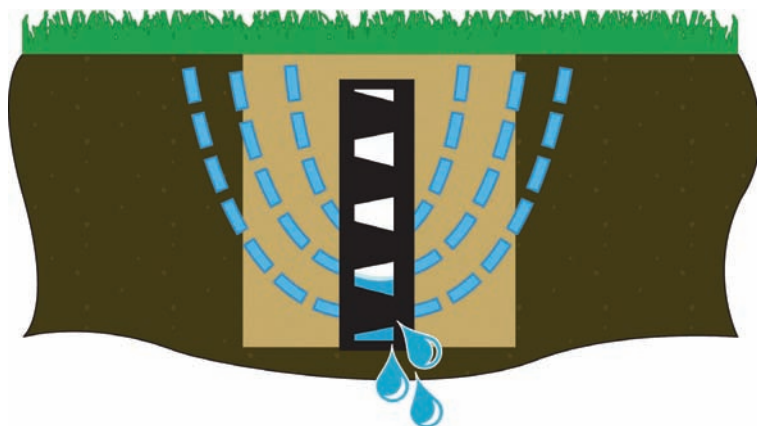
PANEL DRAIN

SportsEdge® HQ Panel Drains are designed to be used as a subsurface drainage system for synthetic and natural turf sports fields. With more than 55% open area, **SportsEdge® HQ** offers significantly higher water collection and

evacuation rates than stone and perforated pipe drains. This two-part pre-fabricated system consists of a solid formed polystyrene perforated core that is fully wrapped with a non-woven spun-bound polypropylene filter fabric. This high strength fabric allows water to pass freely into the core while restricting any movement of rubber, sharp stone or other particles that might clog the core. The spun-bound polypropylene filter fabric allows the very smallest particles to pass into the core to flow out in solution, leaving larger aggregate to stage with voids for uninterrupted drainage. The core allows water to flow to designated drainage exits. This high compressive strength pre-fabricated drain is made from recycled materials.



Typically Installed Horizontally in Synthetic Turf Field Applications.



Typically Installed Vertically in Natural Turf Field Applications.

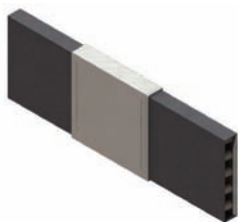


SportsEdge® HQ Panel Drain is available in 6" and 12" widths. Other widths up to 36" are also available. A full line of outlets, splices and fittings are also available.

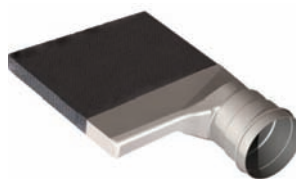
FITTINGS



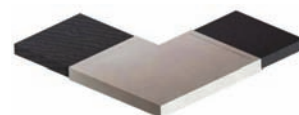
6" End Outlet



6" Splice



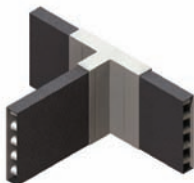
12" End Outlet



12" 90° L



6" Corner Fitting



6" or Universal Tee



Universal Tee Outlet

OUTLETS:

Fittings are available to connect SportsEdge® HQ to 4" pipe. These are available in several configurations, depending on drain width and pipe location. Details are available upon request.

SPLICES & 90° TURNS:

Splices are available for 6" SportsEdge® HQ. Other widths are spliced by peeling back the fabric and interlocking the dimpled core. Afterwards, replace the fabric and secure with tape. Ninety degree L's are available for 6" or 12" HQ.

CORNERS:

Fittings are available for bending drain around corners. Detailed instructions for installation of fittings available upon request.

RECYCLED CONTENT:

SportsEdge® Panel Drain products are manufactured with post industrial recycled content.

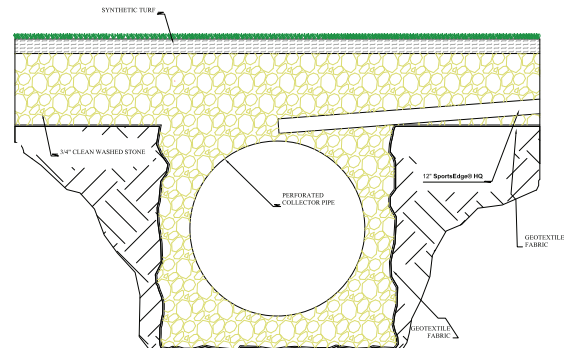


PANEL DRAIN ILLUSTRATIONS

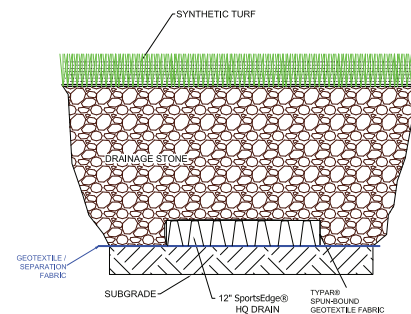
TECHNICAL DATA

Physical Property	Unit of Measure	Typical Value	ASTM Test Method
FABRIC - (PP)			
Grab Tensile	lbs	145	D-4632
Grab Elongation	%	60	D-4632
Puncture Resistance	lbs	50	D-4833
EOS (AOS)	US Std Sieve	70	D-4751
Flow Rate	gpm / ft ²	80	D-4491
CORE			
Thickness	in	1	D-1777
Compressive Strength	PSF	9,000	D-1621
Flow Capacity per unit width	gpm / ft	21	D-4716
All information, drawings and specifications are based on the latest product information available at the time of printing. Due to constant improvement and engineering progress, SportsEdge® reserves the right to make changes without notice. All physical properties are typical values. Standard variations of 10% in mechanical properties and 20% in hydraulic properties are considered normal.			

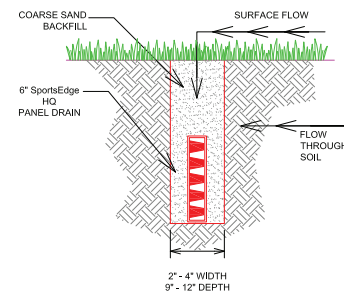
PACKAGING: Roll Sizes- 6" x 150'
12" x 150'



Typical Termination at Collector Pipe



Synthetic Turf HQ- 12 Panel Drain



Natural Turf HQ- 6 Panel Drain



All products available
in Canada & Mexico



DISCLAIMER: The customer and the customer's architects, engineers, consultants and other professionals are completely responsible for the selection, installation, and maintenance of any product purchased from ABT, and EXCEPT AS EXPRESSLY PROVIDED IN ABT'S STANDARD WARRANTIES, ABT MAKES NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE SUITABILITY, DESIGN, MERCHANTABILITY, OR FITNESS OF THE PRODUCT FOR CUSTOMER'S APPLICATION. Copies of ABT's standard warranties are available upon request.



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ABT, INC.

SECTION 6 – SOILS TESTING DATA

ON-SITE REVIEW

DEEP HOLE #: 8 DATE: 11/6/23 TIME: 11:40 WEATHER: 35° Rainy
SITE ADDRESS or MAP/LOT #: Pembroke County Club - Hazelwood
OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: _____ SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: _____ LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-7	A _p	Sandy Loam	10YR 3/2		M-P (Massive, Friable)
7-24	B _w	Sandy Loam	10YR 5/4		M-P
24-73	C ₁	Loamy Sand	2.5Y 6/3		M-P 3% Gravel
73-124	C ₂	Sand	2.5Y 6/3		L.S.G. (Loose Single Grain) 2 1/2% Stone 5% Gravel

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater: _____

Standing in Hole: 120" Weeping from Face: _____ Saturating the Face: _____ Mottling: _____

Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: _____ Witnessed By: _____ Mach./Oper.: _____

Comments: _____

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

ON-SITE REVIEW

DEEP HOLE #: 9 DATE: _____ TIME: 11:15 WEATHER: _____

SITE ADDRESS or MAP/LOT #: _____

OWNER: _____ * JOB NO.: _____

LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: _____ SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: _____ LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-5	A	Sandy loam	10YR 3/2		M-F
5-80	C	Sand	2.5Y 6/3	42"	L.S.G. 5% Stone 15% Gravel

80

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater: _____
Standing in Hole: 68" Weeping from Face: _____ Saturating the Face: _____ Mottling: 42"

Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse: (12"-9")	_____	Time Elapse: (12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6")	_____	Time Elapse: (9"-6")	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: _____ Witnessed By: _____ Mach./Oper.: _____

Comments: Silt pockets in north face of test pit, not consistent in location or elevation.

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

mond just off path shown on plan (10') perp to orientation

ON-SITE REVIEW

DEEP HOLE #: 10 DATE: _____ TIME: 10:56 WEATHER: _____

SITE ADDRESS or MAP/LOT #: _____

OWNER: _____ JOB NO.: _____

LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: 85.8

LAND USE: _____ SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: _____ LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-6	Ap	Sandy Loam	10YR 3/2		M-F
6-18	Bw	Sandy Loam	10YR 5/4		M-F
18-112	C	Sand	2.5Y 6/3		Ls. 5% stone 10% gravel

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater: _____

Standing in Hole: 110" Weeping from Face: _____ Saturating the Face: _____ Mottling: 90" (see below)

Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse: (12"-9")	_____	Time Elapse: (12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6")	_____	Time Elapse: (9"-6")	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: _____ Witnessed By: _____ Mach./Oper.: _____

Comments: Looser for C layer @ 90" with redox in (faint)

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

ON-SITE REVIEW

DEEP HOLE #: 11-A DATE: _____ TIME: 10:30 WEATHER: _____
SITE ADDRESS or MAP/LOT #: _____

OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: _____ SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: _____ LANDFORM: _____
DISTANCES FROM: _____

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft
DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-8	Ap	Sandy Loam	10YR 3/2		M-F
8-24	Bw	Sandy Loam	10YR 5/4		M-F
24-40	C ₁	Loamy Sand	2.5Y 4/3		2% stone 5% gravel M-F
40-48	C ₂	Sand	2.5Y 4/3		L.S.G. 2% stone 5% gravel Firm in place, v. loose in bed

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater: _____
Standing in Hole: 11.0" Weeping from Face: _____ Saturating the Face: _____ Mottling: _____
Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #: _____ Test Date: _____
Depth of Perc: _____ Start of Presoak: _____
End of Presoak: _____ Time @ 12": _____
Time @ 9": _____ Time Elapse: (12"-9") _____
Time AT 6": _____ Time Elapse: (9"-6") _____
Rate: (min/in.): _____ Test Passed/ Failed/ Discon/ Add. Test Req'd: _____
Percolation Hole #: _____ Test Date: _____
Depth of Perc: _____ Start of Presoak: _____
End of Presoak: _____ Time @ 12": _____
Time @ 9": _____ Time Elapse: (12"-9") _____
Time AT 6": _____ Time Elapse: (9"-6") _____
Rate: (min/in.): _____ Test Passed/ Failed/ Discon/ Add. Testing Req'd: _____

Performed By: _____ Witnessed By: _____ Mach./Oper.: _____
Comments: _____

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

ON-SITE REVIEW

DEEP HOLE #: 11-B DATE: _____ TIME: 10:40 WEATHER: _____

SITE ADDRESS or MAP/LOT #: _____

OWNER: _____ JOB NO.: _____

LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: _____ SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: _____ LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-6	A _p	Sandy Loam	10YR 7/2		M-F
6-28	B _u	Sandy Loam	10YR 5/4		M-F
28-46	C ₁	Fine Sandy loam	2.5Y 4/3		M-F 0% stone 0% gravel
46-120	C ₂	Sand	2.5Y 6/3		saturated, difficult to touch 5% sand 2% stone

Redox @ 60" ±
on side of face
↑
this corner

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater: _____

Standing in Hole: 106 Weeping from Face: _____ Saturating the Face: _____ Mottling: 02

Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse: (12"-9")	_____	Time Elapse: (12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6")	_____	Time Elapse: (9"-6")	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/ Discon/ Add. Test Req'd:	_____	Test Passed/ Failed/ Discon/ Add. Testing Req'd:	_____

Performed By: _____ Witnessed By: _____ Mach./Oper.: _____

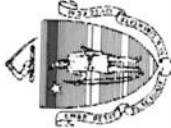
Comments: _____

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

Redox 2.5Y 4/1
2.5YR 6/9

11-B 30 ft South of 11A



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 31

~~45223~~ 7/13/23

Date 11:00

Time

Hole #

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Weather

Latitude

Longitude

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

5. Groundwater Observed: ☒ Yes ☐ No

If yes: _____ Depth to Weeping in Hole

72 Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
0-5	0				Cnc : Dpl:					
5-20	Fill				Cnc : Dpl:					
20-26	1C	LS			Cnc : Dpl:					
26-96	2C	S		44"	Cnc : Dpl:					LS with some resistive clay
					Cnc : Dpl:					
					Cnc : Dpl:					
					Cnc : Dpl:					
					Cnc : Dpl:					

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 32

~~DATE~~ 7/13/23 4:36
Date Time

Latitude

Weather

Longitude

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes: ☐ Disturbed Soil/Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth to Weeping in Hole

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
A ₀	0-12				Cnc : Dpl:					
B _w	12-54				Cnc : Dpl:					
C	54-122			130"	Cnc : Dpl:					
					Cnc : Dpl:					
					Cnc : Dpl:					
					Cnc : Dpl:					
					Cnc : Dpl:					
					Cnc : Dpl:					
Additional Notes:										



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 33

7/13/23
4:45 PM

Hole #

Date

Time

Weather

Latitude

Longitude

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes: ☐ Disturbed Soil/Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

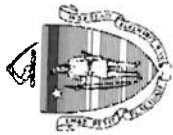
5. Groundwater Observed: ☒ Yes ☐ No

If yes: _____ Depth to Weeping in Hole

12' Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
0-14	Ap	SL		Cnc : Dpl:						
14-32	Bw	SL		Cnc : Dpl:						
32-108	C ₁	LS		Cnc : Dpl:						
108-144	C ₂	S		Cnc : Dpl:			5%	5%		
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
Additional Notes:										



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 34

~~4523~~ 7/13/23

Date 10/30

Time

Weather

Latitude

Longitude

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

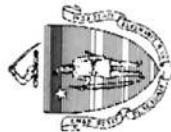
4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth to Weeping in Hole _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones		
0-13	Ap	SL		Cnc : Dpl:						
13-30	Bw	SL		Cnc : Dpl:						
30-132	C	LS		115" Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
Additional Notes:										



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 35

~~4/5/23~~ 7/13/23 11:00

Date

Time

Longitude

1. Land Use: Commercial

Latitude

Weather

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

5. Groundwater Observed: ☒ Yes ☐ No

If yes: 108 Depth to Weeping in Hole

112 Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	Ap	SL		Cnc : Dpl:							
12-24	Bw	SL		Cnc : Dpl:							
24-46	C1	LS		Cnc : Dpl:			5%	10%			
46-112	C2	S		Cnc : Dpl:							
				Cnc : Dpl:							
				Cnc : Dpl:							
				Cnc : Dpl:							
				Cnc : Dpl:							

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 36

Date: 1/5/23

Hole #

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Description of Location: woods next to state

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Time

Weather

Latitude

Longitude

Slope (%)

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth to Weeping in Hole

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-72	Fill				Cnc : Dpl:			15%			
72-108	C ₁	LS			Cnc : Dpl:						
108-126	C ₂	LS		108"	Cnc : Dpl:						Depleted
					Cnc : Dpl:						
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Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 42

Date

Time

Hole #

1. Land Use: Commercial

Weather

Latitude

Longitude

Description of Location: (e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

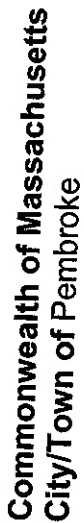
5. Groundwater Observed: ☒ Yes ☐ No

If yes: 65" Depth to Weeping in Hole

90" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features		Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel			
0-12	A _p	SL		Cnc : Dpl:						
12-36	B _u	LS		Cnc : Dpl:						
36-90	C	S		Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
				Cnc : Dpl:						
Additional Notes:										



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

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

Deep Observation Hole Number: 43 Hole #

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)	Vegetation	Surface Stones (e.g., cobbles, stones, boulders, etc.)	Slope (%)
Description of Location:	Woods next to road		

2. Soil Parent Material:

3. Distances from:

	Open Water Body	_____ feet	Landform	Position on Landscape (SU, SH, BS, FS, TS, Plain)
			Drainage Way	_____ feet
				Wetlands _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No Property Line _____ feet Drinking Water Well _____ feet Other _____ feet

☐ If Yes: ☐ Disturbed Soil/Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No
If yes: 114 Depth to Weeping in Hole
120 Depth Standing Water in Hole

Soil Log

Soil Log											
Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-6	Ap			Cnc :							
6-18	Bw			Dpl:							
18-78	C1			Cnc :							
78-102	C2			Dpl:							
102-120	C3			Cnc :							
				Dpl:							
				Cnc :							
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Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-44
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial
(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded
Vegetation

0-3
Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3
Slope (%)

Description of Location: Wooded area between driving range and fairway.

2. Soil Parent Material: _____

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-5	Ap	SL			Cnc :						
					Dpl:						
5-21	Bw	SL			Cnc :						
					Dpl:						
21-31	Fill				Cnc :						
					Dpl:						
31-132	C	FS			Cnc :						Mottling starts at 7.5
					Dpl:						
					Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-45
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial
(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded
Vegetation

0-3
Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3
Slope (%)

Description of Location:

Near the center of the driving range.

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-3	A _P	LS			Cnc : Dpl:						
3-35	C ₁	S			Cnc : Dpl:						
35-144	C ₂	FS		124"	Cnc : Dpl:						Banding at 6'
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-46 7/14/23 11:30am Overcast _____
Hole # Date Time Weather Latitude Longitude

1. Land Use: Commercial Wooded _____
(e.g., woodland, agricultural field, vacant lot, etc.) Vegetation Surface Stones (e.g., cobbles, stones, boulders, etc.) 0-3
Description of Location: Southern part of the driving range. Slope (%)

2. Soil Parent Material: _____
Landform Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Wetlands _____ feet
Property Line _____ feet Drinking Water Well _____ feet Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-10	A _P	SL			Cnc : Dpl:						
10-96	C ₁	S			Cnc : Dpl:						
96-120	C ₂	LS			Cnc : Dpl:						Signs of mottling at 8.4'. Might be trapped water in new layer.
120-144	C ₃	S		126"	Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-47
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3

Slope (%)

Description of Location:

Northeast corner of driving range.

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

5. Groundwater Observed: ☒ Yes ☐ No If yes: _____ Depth to Weeping in Hole 108" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-7	A _P	SL			Cnc : Dpl:						
7-36	B _W	SL			Cnc : Dpl:						
36-58	C ₁	LS			Cnc : Dpl:						
58-108	C ₂	S		90"	Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-48 7/14/23 11:30am Overcast _____
Hole # Date Time Weather Latitude Longitude

1. Land Use: Commercial Wooded _____
(e.g., woodland, agricultural field, vacant lot, etc.) Vegetation Surface Stones (e.g., cobbles, stones, boulders, etc.) 0-3
Description of Location: Northeast corner of driving range. Slope (%)

2. Soil Parent Material: _____
Landform Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Wetlands _____ feet
Property Line _____ feet Drinking Water Well _____ feet Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-7	A _P	SL			Cnc : Dpl:						
7-36	B _W	SL			Cnc : Dpl:						
36-54	C ₁	LS			Cnc : Dpl:						Signs of mottling at 4.5'. Might be trapped water.
54-108	C ₂	S			Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-49
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3

Slope (%)

Description of Location:

West side of west elm street entrance driveway.

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from:

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No

If Yes: ☒ Disturbed Soil/Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth to Weeping in Hole

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-24	Fill				Cnc :						
					Dpl:						
24-28	Ap	SL			Cnc :						
					Dpl:						
28-32	Bw	SL			Cnc :						
					Dpl:						
32-120	C	S			Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						

Additional Notes:



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

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

Deep Observation Hole Number: TP-50
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial

(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3

Slope (%)

Description of Location:

East side of west elm street entrance driveway.

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from:

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☒ Yes ☐ No

If Yes: ☒ Disturbed Soil/Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth to Weeping in Hole

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-5	Ap	SL			Cnc :						
					Dpl:						
5-12	Bw	SL			Cnc :						
					Dpl:						
12-18	Fill				Cnc :						
					Dpl:						
18-126	C	S			Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-51

Hole #

7/14/23

Date

11:30am

Time

Overcast

Weather

Latitude

Longitude

1. Land Use: Commercial Wooded

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3

Slope (%)

Description of Location:

East side of west elm street entrance driveway.

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-4	A _p	SL			Cnc : Dpl:						
4-16	B _w	SL			Cnc : Dpl:						
16-24	Fill				Cnc : Dpl:						
24-120	C	S			Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:



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

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

Deep Observation Hole Number: TP-25
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial
(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded
Vegetation

0-3
Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3
Slope (%)

Description of Location: Wooded area between 78 and 85 Hazelwood Drive.

2. Soil Parent Material: _____

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-6	Ap	SL			Cnc :						
					Dpl:						
6-20	Bw	SL			Cnc :						
					Dpl:						
20-120	C	FS			Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: TP-26
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial
(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded
Vegetation

0-3
Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3
Slope (%)

Description of Location: Wooded area to the west of the water line easement.

2. Soil Parent Material: _____

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-3	A _p	SL			Cnc : Dpl:						
3-11	B _w	SL			Cnc : Dpl:						
11-126	C	S		114"	Cnc : Dpl:						Mottling at 9.5"
					Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:



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

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

Deep Observation Hole Number: TP-27
Hole #

7/14/23
Date

11:30am
Time

Overcast
Weather

Latitude

Longitude

1. Land Use: Commercial
(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded
Vegetation

0-3
Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3
Slope (%)

Description of Location: Wooded area to the east of the water line easement.

2. Soil Parent Material: _____

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

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

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-3	Ap	SL			Cnc :						
					Dpl:						
3-12	Bw	SL			Cnc :						
					Dpl:						
12-132	C	S			Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						
					Cnc :						
					Dpl:						

Additional Notes:



Commonwealth of Massachusetts
City/Town of Pembroke

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

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

Deep Observation Hole Number: 38-39

Hole #

7/14/23

Date

4:30pm

Time

Overcast

Weather

Latitude

Longitude

1. Land Use: Commercial
(e.g., woodland, agricultural field, vacant lot, etc.)

Wooded

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-3
Slope (%)

Description of Location:

Wooded area behind 37 Anthony Drive.

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS, Plain)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

5. Groundwater Observed: ☒ Yes ☐ No

If yes: _____ Depth to Weeping in Hole

136" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-2	O				Cnc : Dpl:						
2-6	Ap	SL			Cnc : Dpl:						
6-22	Bw	SL			Cnc : Dpl:						
22-136	C	LS		102"	Cnc : Dpl:						
					Cnc : Dpl:						
					Cnc : Dpl:						

Additional Notes:



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

A. Facility Information

Weather vane at Pembroke Country Club

Owner Name

94 West Elm Street

Street Address

Pembroke

City

MA

State

B11-33

Map/Lot #

02359

Zip Code

B. Site Information

1. (Check one) ☐ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☐ Yes ☐ No If yes:

Merrimac-urban land complex-0-8%
Plymouth Carver complex-3-8%

Soil Name

sandy and gravelly supraglacial meltout
sandy / gravelly glaciofluvial deposit

Soil Parent material

Soil Limitations

Landform

Web Soil Survey

Source

626B, 481B

Soil Map Unit

3. Surficial Geological Report Available? ☒ Yes ☐ No

If yes:

2018 Bignone, Janetstone,
Mary DiGiacomo

Year Published/Source

Map 3402-152 (Hanover)

Map Unit

Coarse Deposit - poorly sorted to well sorted, gravel & sand, finer layers contain very fine sand

Description of Geologic Map Unit

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

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No

If yes, MassGIS Wetland Data Layer:

7. Current Water Resource Conditions (USGS):

01/29/2020

Month/Day/Year

Range: ☐ Above Normal

Wetland Type

☒ Normal

☐ Below Normal

8. Other references reviewed:



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

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

Deep Observation Hole Number:

TP-1
Hole #

1/20/20
Date

8:31
Time

Sunny 25°
Weather

Latitude

Longitude:

1. Land Use:

woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

conifer + deciduous trees
Vegetation

none

Surface Stones (e.g., cobbles, stones, boulders, etc.)

0-1%
Slope (%)

Description of Location:

wooded area next to residential houses

2. Soil Parent Material:

sandy glacial till deposits

outwash plains
Landform

summit

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable

Materials Present: ☐ Yes ☒ No

If Yes:

☐ Disturbed Soil

☐ Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-11"	A	loam	7.5Yp2.5/2	-	-	-	-	-	massive	very friable	-
11"-26"	B	sandy loam	7.5YR5/8	-	-	-	-	<5%	massive	very friable	-
26"-156"	C	loamy sand	7.5YR5/6	-	-	-	<2%	<5%	massive	very friable	-

Additional Notes:



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

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

Deep Observation Hole Number: TP-2 Hole # 1/30/2020 Date 9:20 Time Sunny 25° Weather
1. Land Use: woodland (e.g., woodland, agricultural field, vacant lot, etc.) deciduous trees Vegetation a few boulders Surface Stones (e.g., cobbles, stones, boulders, etc.) 3-5% Slope (%)
Longitude: 3-5%

Description of Location: wooded area near residential houses
2. Soil Parent Material: sand/gravelly glaciofluvial Landform outwash plain
3. Distances from: Open Water Body _____ feet Position on Landscape (SU, SH, BS, FS, TS) JTH
Drainage Way _____ feet
Property Line _____ feet Wetlands _____ feet
Drinking Water Well _____ feet Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-2"	O	loam	7.5YR2.5/1	—	—	—	—	—	massive	very friable	—
2"-6"	A	loam	7.5YR4/4	—	—	—	—	—	massive	very friable	—
6"-14"	B	sandy loam	7.5YR7/8	—	—	—	—	—	massive	very friable	—
14"-72"	C ₁	loamy sand	7.5YR4/3	—	—	—	—	—	massive	very friable	remove
72"-168"	C ₂	fine medium sand	7.5YR5/4	—	—	—	<5%	—	single grain	loose	—

Additional Notes: 6" 168"



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

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

Deep Observation Hole Number: TP3

Hole #

Date 1/30/2020 Time 10:30

Weather Sunny 25°

Latitude

Longitude:

1. Land Use: woodland
(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation deciduous trees

Surface Stones (e.g., cobbles, stones, boulders, etc.) boulders

Slope (%) 3-5%

Description of Location: Wooded Area close to parking lot

2. Soil Parent Material: sand / gravelly glaciofluvial deposits

Landform outwash plain

Summit

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body _____ feet
Property Line _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable

Materials Present: ☐ Yes ☒ No

If Yes:

☐ Disturbed Soil

☐ Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon / Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-4"	A	loam	7.5YR 2/3	—	—	—	—	—	massive	very friable	—
4"-16"	A	loam	7.5YR 2/3	—	—	—	—	—	massive	very friable	—
16"-24"	B	loam	7.5YR 4/6	—	—	—	—	—	massive	very friable	—
24"-67"	C ₁	loamy sand	7.5YR 5/6	—	—	—	<10%	—	massive	very friable	—
67"-180"	C ₂	fine-med sand		—	—	—	<2%	—	single grain	loose	remove

Additional Notes:



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

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

Deep Observation Hole Number: TP-4

Hole #

Date 1/30/20

Time 11:15 AM

Weather Sunny 30°

Latitude

Longitude:

1. Land Use: Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation deciduous trees

Surface Stones (e.g., cobbles, stones, boulders, etc.) a few boulders

Slope (%) 0-2%

Description of Location: Wooded Area next to parking lot

2. Soil Parent Material: glauconial deposits

Landform outwash plain

Summit

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body _____ feet

Property Line _____ feet

Drainage Way _____ feet

Drinking Water Well _____ feet

Wetlands _____ feet

Other _____ feet

4. Unsuitable

Materials Present: ☐ Yes ☒ No

If Yes:

☐ Disturbed Soil

☐ Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____

Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon / Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-8"	A	Loam	10YR 3/4	—	—	—	—	—	massive	very friable	—
8"-24"	BC	Loamy Sand	10YR 4/6	—	—	—	—	—	massive	very friable	—
24"-48"	C	Loamy Sand	10YR 5/3	—	—	—	<5%	<5%	massive	very friable	—

Additional Notes:



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

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

Deep Observation Hole Number: TP-5
Hole #

Date 1/20/2020

Time 12:15

Weather Sunny 30°

Latitude

Longitude:

1. Land Use woodland
(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation deciduous trees

Surface Stones (e.g., cobbles, stones, boulders, etc.) afew small boulders

Slope (%) 1-2%

Description of Location: woods with medium sized trees 6"-2'

2. Soil Parent Material: sandy glaciofluvial deposits outwash plain Summit
Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material

☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: _____ Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-6"	A	loam	7.5 YR 3/1	-	-	-	-	-	massive	very friable	-
6"-16"	B	sandy loam	7.5 YR 4/6	-	-	-	<2%	-	massive	very friable	-
16"-174"	C	loamy sand	7.5 YR 4/3	-	-	-	2%	10%	massive	very friable	concentrations on east side 24"-31" below surface of pit features not found elsewhere

Additional Notes:



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

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

Deep Observation Hole Number: TP-4

Hole #

Date 1/30/2018 Time 1:00

Weather Donny 30°

Latitude

Longitude:

Slope (%) 0-1%

1. Land Use: Edge of woodland
(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation trees on edge

Surface Stones (e.g., cobbles, stones, boulders, etc.) none

Description of Location: Edge of parking lot & woodland

2. Soil Parent Material: glacioluvial deposits

Landform alluvial plain

Summit

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body _____ feet

Property Line _____ feet

Drainage Way _____ feet

Drinking Water Well _____ feet

Wetlands _____ feet

Other _____ feet

4. Unsuitable

Materials Present: ☐ Yes ☒ No

If Yes:

☐ Disturbed Soil

☐ Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes:

Depth Weeping from Pit

Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-5"	A _p	loam	7.5YR3/1	—	—	—	—	—	massive	very friable	—
5"-30"	B _w	sandy loam	7.5YR4/6	—	—	—	5%	—	massive	very friable	—
30"-44"	BC	loamy sand	7.5YR5/3	—	—	—	5%	<5%	massive	very friable	—
44"-147"	C	loamy sand	7.5YR4/4	—	—	—	10%	<2%	massive	very friable	50"-54" pocket of coarse sand
											106"-147" pocket of coarse sand

Additional Notes:



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

D. Determination of High Groundwater Elevation

1. Method Used:

- ☐ Depth observed standing water in observation hole
- ☐ Depth weeping from side of observation hole
- ☐ Depth to soil redoximorphic features (mottles)
- ☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)

Obs. Hole # _____

_____ inches

Obs. Hole # _____

_____ inches

_____ inches

_____ inches

_____ inches

_____ inches

_____ inches

_____ inches

Index Well Number _____

Reading Date _____

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

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

2. Estimated Depth to High Groundwater: _____ inches

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

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

☒ Yes

☐ No

b. If yes, at what depth was it observed (exclude A and O Horizons)?

Upper boundary:

67"
inches

Lower boundary:

180"
inches

c. If no, at what depth was impervious material observed?

Upper boundary:

_____ inches

Lower boundary:

_____ inches



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

F. Certification

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

Jayn Corsano

Signature of Soil Evaluator

Taylor Corsano / JE14263

Typed or Printed Name of Soil Evaluator / License #

Martha Sullivan, Bruce Bouck

Name of Approving Authority Witness

1/30/2020

Date

12/1/2021

Expiration Date of License

Approving Authority

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

Field Diagrams: Use this area for field diagrams:



Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Site Information

Weatherlane at Pembroke Country Club

Owner Name

94 W Elm Street,

Street Address or Lot #

Pembroke

City/Town

James Bristol III

Contact Person (if different from Owner)

MA

State

781-740-8660

Telephone Number

02359

Zip Code

B. Test Results

	<u>1/30/2020</u> Date	<u>9:28 AM</u> Time	<u>1/30/2020</u> Date	<u>11:38 AM</u> Time
Observation Hole #	<u>TP-1</u>		<u>TP-4</u>	
Depth of Perc	<u>65" → 83"</u>		<u>69" → 88"</u>	
Start Pre-Soak	<u>9:28 AM</u>		<u>11:39 AM</u>	
End Pre-Soak	<u>9:43 AM</u>		<u>11:54 AM</u>	
Time at 12"	<u>9:43 AM</u>		<u>11:54 AM</u>	
Time at 9"	<u>9:55 AM</u>		<u>12:14 PM</u>	
Time at 6"	<u>10:09 AM</u>		<u>12:36 PM</u>	
Time (9"-6")	<u>14 min</u>		<u>22 min</u>	
Rate (Min./Inch)	<u>4.67 min/inch</u>		<u>7.33 min/inch</u>	
Test Passed:	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Test Failed:	<input type="checkbox"/>		<input type="checkbox"/>	

Taylor Corsano

Test Performed By:

Martha Sullivan

Board of Health Witness

Comments:



Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Site Information

Weathervane at Pembroke Country Club

Owner Name

94 W Elm Street

Street Address or Lot #

Pembroke

City/Town

MA

State

02359

Zip Code

Contact Person (if different from Owner)

Telephone Number

B. Test Results

	Date	Time	Date	Time
Observation Hole #	<u>1/30/2020</u>	<u>9:52 AM</u>		
	<u>TP-2</u>			
Depth of Perc	<u>55" → 73"</u>			
Start Pre-Soak	<u>9:54 AM</u>			
End Pre-Soak	<u>10:09 AM</u>			
Time at 12"	<u>10:09 AM</u>			
Time at 9"	<u>10:16 AM</u>			
Time at 6"	<u>10:23 AM</u>			
Time (9"-6")	<u>7 min</u>			
Rate (Min./Inch)	<u>2.33 min/inch</u>			

Test Passed:



Test Failed:



Test Passed:



Test Failed:



Taylor Corsano

Test Performed By:

Martha Sullivan

Board of Health Witness

Comments:



Commonwealth of Massachusetts
City/Town of _____

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

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

Deep Observation Hole Number: 121

Hole #

Date _____

Time _____

Weather _____

Latitude _____

Longitude: _____

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) _____ Vegetation _____ Surface Stones (e.g., cobbles, stones, boulders, etc.) _____ Slope (%) _____

Description of Location: _____

2. Soil Parent Material: _____ Landform _____ Position on Landscape (SU, SH, BS, FS, TS) _____

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Wetlands _____ feet

Property Line _____ feet Drinking Water Well _____ feet Other _____ feet

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

5. Groundwater Observed: ☐ Yes ☐ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-5"	F11	loam									
5"-24"	B	loamy Sand									
24"-120"	C	sand									

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of

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

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

Deep Observation Hole Number: TP-2

Hole #

Date

Time

Weather

Latitude

Longitude:

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) Vegetation Surface Stones (e.g., cobbles, stones, boulders, etc.) Slope (%)

Description of Location:

2. Soil Parent Material: Landform Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body feet Drainage Way feet Wetlands feet
Property Line feet Drinking Water Well feet Other feet

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

5. Groundwater Observed: ☐ Yes ☐ No If yes: Depth Weeping from Pit Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-6"	Topsoil A	loam									
6'-30"	B	loamy sand									
30"-108"	C	sand									

Additional Notes:



Commonwealth of Massachusetts
City/Town of

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

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

Deep Observation Hole Number: TP-3

Hole #

Date

Time

Weather

Latitude

Longitude:

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location: _____

2. Soil Parent Material: _____

Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

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

5. Groundwater Observed: ☐ Yes ☐ No

If yes: _____ Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0'-5"	Fill/A	Loam									
5'-12'	B	loamy sand									
12'-60"	C ₁	coarse sand									
60"-114"	C ₂	fine sand									

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of

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

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

Deep Observation Hole Number: TP-4

Hole #

Date

Time

Weather

Latitude

Longitude:

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) _____ Vegetation _____ Surface Stones (e.g., cobbles, stones, boulders, etc.) _____ Slope (%) _____

Description of Location: _____

2. Soil Parent Material: _____ Landform _____ Position on Landscape (SU, SH, BS, FS, TS) _____

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Wetlands _____ feet

Property Line _____ feet Drinking Water Well _____ feet Other _____ feet

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

5. Groundwater Observed: ☒ Yes ☐ No If yes: 124" Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-3"	A	loam									
3"-42"	B	sandy loam						40%			
42"-114"	C	coarse sand		108"		40-50%		5-10%			

Additional Notes:



Commonwealth of Massachusetts
City/Town of

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

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

Deep Observation Hole Number: TP-5
Hole #

Date _____

Time _____

Weather _____

Latitude _____

Longitude: _____

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) _____ Vegetation _____ Surface Stones (e.g., cobbles, stones, boulders, etc.) _____ Slope (%) _____

Description of Location: _____

2. Soil Parent Material: _____ Landform _____ Position on Landscape (SU, SH, BS, FS, TS) _____

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Wetlands _____ feet

Property Line _____ feet Drinking Water Well _____ feet Other _____ feet

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

5. Groundwater Observed: ☐ Yes ☒ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-10"	A	loam									
10"-24"	B	loamy sand									
24"-72"	C	fine sand		72"							line of mottling

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of _____

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

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

Deep Observation Hole Number: P-6

Hole #

Date _____

Time _____

Weather _____

Latitude _____

Longitude: _____

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.) _____

Vegetation _____

Surface Stones (e.g., cobbles, stones, boulders, etc.) _____

Slope (%) _____

Description of Location: _____

2. Soil Parent Material: _____

Landform _____

Position on Landscape (SU, SH, BS, FS, TS) _____

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes: ☐ Disturbed Soil ☐ Fill Material

☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

If yes: 102" Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-12"	A	Fill									
12"-24"	B	loamy sand									
24"-102"	C	sand (coarse)		48" 54"		16-26% throughout					groundwater @ 2.5'

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of

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

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

Deep Observation Hole Number: 127

Hole #

Date

Time

Weather

Latitude

Longitude:

1. Land Use (e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material:

Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body _____ feet

Drainage Way _____ feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes: ☐ Disturbed Soil ☐ Fill Material

☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☒ No

If yes: 8' Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0"-2"	A	loam									
2"-18"	B	loamy sand									
18"-96"	C ₁	loamy sand		85"		10%					Redox @ 55"
96"-97"	C ₂	coarse sand	coarse sand @	Bottom of pit							

Additional Notes:

likely a loamy sand with pockets of coarse sand

ON-SITE REVIEW

DEEP HOLE #: 23-19 DATE: 12/14/21 TIME: 9:00 AM WEATHER: Cloudy 40°
SITE ADDRESS or MAP/LOT #: Remediate 1C
OWNER: _____ JOB NO.: 12-044
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☒ No: ☐ SLOPE (%): 0-3

VEGETATION: WOODS LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-12	1	L-S	10YR 3/2		
12-28	2	L-S	10YR 5/6		
28-68	3	FINE-SAND	2.5Y 5/4		
				STANDING	
				@ 60"	
				50" DAMP	weeps / possible redox

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☒ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater: _____
Standing in Hole: 60" Weeping from Face: _____ Saturating the Face: _____ Mottling: _____
Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #:	<u>N/A</u>	Percolation Hole #:	_____
Test Date:	<u>12/14/21</u>	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse: (12"-9")	_____	Time Elapse: (12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Gully Mach./Oper.: JF Price
Comments: _____

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

ON-SITE REVIEW

DEEP HOLE #: 18-A DATE: 12/14/21 TIME: 9:30 AM WEATHER: Cloudy 45°
SITE ADDRESS or MAP/LOT #: Penikese CC
OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: CDABC LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (Inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-72		FILL			
72-94	B	L-S			
94-102	C	SAND			

PARENT MATERIAL:

Unsuitable Material Present? Yes: ☐ No: ☐ If Yes:

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED:

Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater:

Standing in Hole: _____ Weeping from Face: _____ Saturating the Face: _____ Mottling: _____

Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price
Comments: _____

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

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ON-SITE REVIEW

DEEP HOLE #: 23-128 DATE: 12/14/21 TIME: 10 AM WEATHER: _____
SITE ADDRESS or MAP/LOT #: _____
OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: Grass LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redox/morphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-48"	Fill				
48/60" - 110"	SAND		2.5Y4/4 @ 88"		weeper/REPORT
			SPANDON @ 96"		

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater: _____

Standing in Hole: _____ Weeping from Face: _____ Saturating the Face: _____ Mottling: 88"

Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	<u>N/A</u>	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse: (12"-9")	_____	Time Elapse: (12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price
Comments: _____

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ON-SITE REVIEW

DEEP HOLE #: 23-17 DATE: 12/14/21 TIME: 11 AM WEATHER: Cloudy 45°
SITE ADDRESS or MAP/LOT #: Perimeter CC
OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☒ No: ☐ SLOPE (%): _____

VEGETATION: Grass LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-6	A	L-S	10YR7/2		Gr FR
6-16	B	L-S	10YR5/6		MASSIVE FR
16-100	C	L-S	2.5Y5/2	None	MASSIVE FR

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☒ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☒ If Yes: What is the depth of Groundwater: _____
Standing in Hole: _____ Weeping from Face: _____ Saturating the Face: _____ Mottling: _____
Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse: (12"-9")	_____	Time Elapse: (12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6")	_____	Time Elapse: (9"-6")	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price
Comments: _____

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ON-SITE REVIEW

DEEP HOLE #: 23-16 DATE: 12/14/21 TIME: 11:30 WEATHER: Cloudy
SITE ADDRESS or MAP/LOT #: 1000 Bicknell St
OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: GRASS LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (Inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-28	FALL	—	—	—	(TRAPPED WATER)
28-38	B	L-S			
38-70	C	L-S			

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☒ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater:
Standing in Hole: _____ Weeping from Face: _____ Saturating the Face: _____ Mottling: 36"

Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price
Comments: _____

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

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ON-SITE REVIEW

DEEP HOLE #: 23-14 DATE: 12/14/21 TIME: 12:45 WEATHER: cloudy
SITE ADDRESS or MAP/LOT #: Dennisport CC
OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☒ SLOPE (%): _____

VEGETATION: Grass LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (Inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-32	FILL				
32-44	AB	10 yr 2 1/2	L-5	weat no	CR CR
44-76	C1	SAND	7.5 YG/2	Ca 34"	SG loose

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater: _____
Standing in Hole: _____ Weeping from Face: 24" Saturating the Face: _____ Mottling: _____

Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	<u>12/14</u>	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/ Discon/ Add. Test Req'd:	_____	Test Passed/ Failed/ Discon/ Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price
Comments: _____

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ON-SITE REVIEW

DEEP HOLE #: 23-15 DATE: 1-5-23 TIME: 11:00 WEATHER: Cloudy
SITE ADDRESS or MAP/LOT #: Romney Rd
OWNER: _____ JOB NO.: _____
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): 0-3

VEGETATION: Lawns LANDFORM: _____

DISTANCES FROM: _____

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-18	A	L-S	10YR 2/2		
18-30	B	L-S	10YR 5/6		
30-58	C	L-S	7.5Y 1/2	Redox Co	ceping @ 18 16"
				28"	From RAIN ??
		could be			
		SHIN			

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater: _____
Standing in Hole: _____ Weeping from Face: _____ Saturating the Face: _____ Mottling: _____
Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price
Comments: _____

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ON-SITE REVIEW

DEEP HOLE #: 22-2 DATE: 1/5/23 TIME: 1:45 PM WEATHER: Cloudy Rain
SITE ADDRESS or MAP/LOT #: 1000
OWNER: BDD JOB NO.: 10-64
LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: Grass / Edge Woods LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (Inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0-22	FILL				
22-30	A ₂	L-S	10YR 3/2	@ 43"	
30-42	B	L-S	10YR 5/6		
42-80	C ₁	L-S	2.5Y 5/2		

PARENT MATERIAL:

Unsuitable Material Present? Yes: ☒ No: ☒ If Yes: _____
Disturbed Soil: ☐ Fill Mat'l: ☒ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED:

Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater: _____
Standing in Hole: _____ Weeping from Face: 48" Saturating the Face: _____ Mottling: _____

Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse: (12"-9")	_____	Time Elapse: (12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6")	_____	Time Elapse: (9"-6")	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Gentry Mach./Oper.: JF Price
Comments: _____

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ON-SITE REVIEW

DEEP HOLE #: _____ DATE: 12/14/21 TIME: _____ WEATHER: _____

SITE ADDRESS or MAP/LOT #: _____

OWNER: _____ JOB NO.: _____

LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: _____ LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0"-8"	A	loam			
8"-16"	B	loamy sand			
16"-110"	C	sand			

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater: _____

Standing in Hole: _____ Weeping from Face: 78" Saturating the Face: _____ Mottling: _____

Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price

Comments: _____

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ON-SITE REVIEW

DEEP HOLE #: TP-24 DATE: 12/14/21 TIME: _____ WEATHER: _____

SITE ADDRESS or MAP/LOT #: _____

OWNER: _____ JOB NO.: _____

LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☐ SLOPE (%): _____

VEGETATION: _____ LANDFORM: _____

DISTANCES FROM:

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (Inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
0"-8"	A	loam			
8"-20"	B	loam sand			
20"-26"	C	sand			

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☐ If Yes: _____

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater: _____

Standing in Hole: _____ Weeping from Face: 100" Saturating the Face: _____ Mottling: _____

Estimated Depth to Seasonal High Ground Water : _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

Performed By: David Newhall Witnessed By: Lisa Cullity Mach./Oper.: JF Price
Comments: _____

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ON-SITE REVIEW

DEEP HOLE #: 23-22 DATE: 12/14/21 TIME: 3:11 WEATHER: _____

SITE ADDRESS or MAP/LOT #: Deming Rd CC

OWNER: BBB JOB NO.: _____

LOCATION (Identify on Plan): _____ GROUND ELEVATION AT SURFACE OF HOLE: _____

LAND USE: Commercial SURFACE STONES: Yes: ☐ No: ☒ SLOPE (%): _____

VEGETATION: WOODS LANDFORM: _____

DISTANCES FROM: _____

OPEN WATER BODY: _____ ft PROPERTY LINE: _____ ft POSSIBLE WET AREA: _____ ft DRAINAGEWAY: _____ ft

DRINKING WATER WELL: _____ ft OTHER: _____

DEEP OBSERVATION HOLE LOG

Depth (Inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency, % Gravels, Stones, Boulders)
1-12	A	L-S	10YR 8/2		GR TA
12-38	B	L-S	10YR 5/1		MASSIVE FR
38-90	C1	SAND	2.5Y 5/4	@ 70"	S.G. L GCS -
				wee/dump	

PARENT MATERIAL: _____ Unsuitable Material Present? Yes: ☐ No: ☒ If Yes: _____

Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☒ No: ☐ If Yes: What is the depth of Groundwater: _____

Standing in Hole: _____ Weeping from Face: 40" Saturating the Face: _____ Mottling: _____

Estimated Depth to Seasonal High Ground Water: _____

PERCOLATION TEST

Percolation Hole #:	_____	Percolation Hole #:	_____
Test Date:	_____	Test Date:	_____
Depth of Perc:	_____	Depth of Perc:	_____
Start of Presoak:	_____	Start of Presoak:	_____
End of Presoak:	_____	End of Presoak:	_____
Time @ 12":	_____	Time @ 12":	_____
Time @ 9":	_____	Time @ 9":	_____
Time Elapse:(12"-9")	_____	Time Elapse:(12"-9")	_____
Time AT 6":	_____	Time AT 6":	_____
Time Elapse: (9"-6"):	_____	Time Elapse: (9"-6"):	_____
Rate: (min/in.):	_____	Rate: (min/in.):	_____
Test Passed/ Failed/	_____	Test Passed/ Failed/ Discon/	_____
Discon/ Add. Test Req'd:	_____	Add. Testing Req'd:	_____

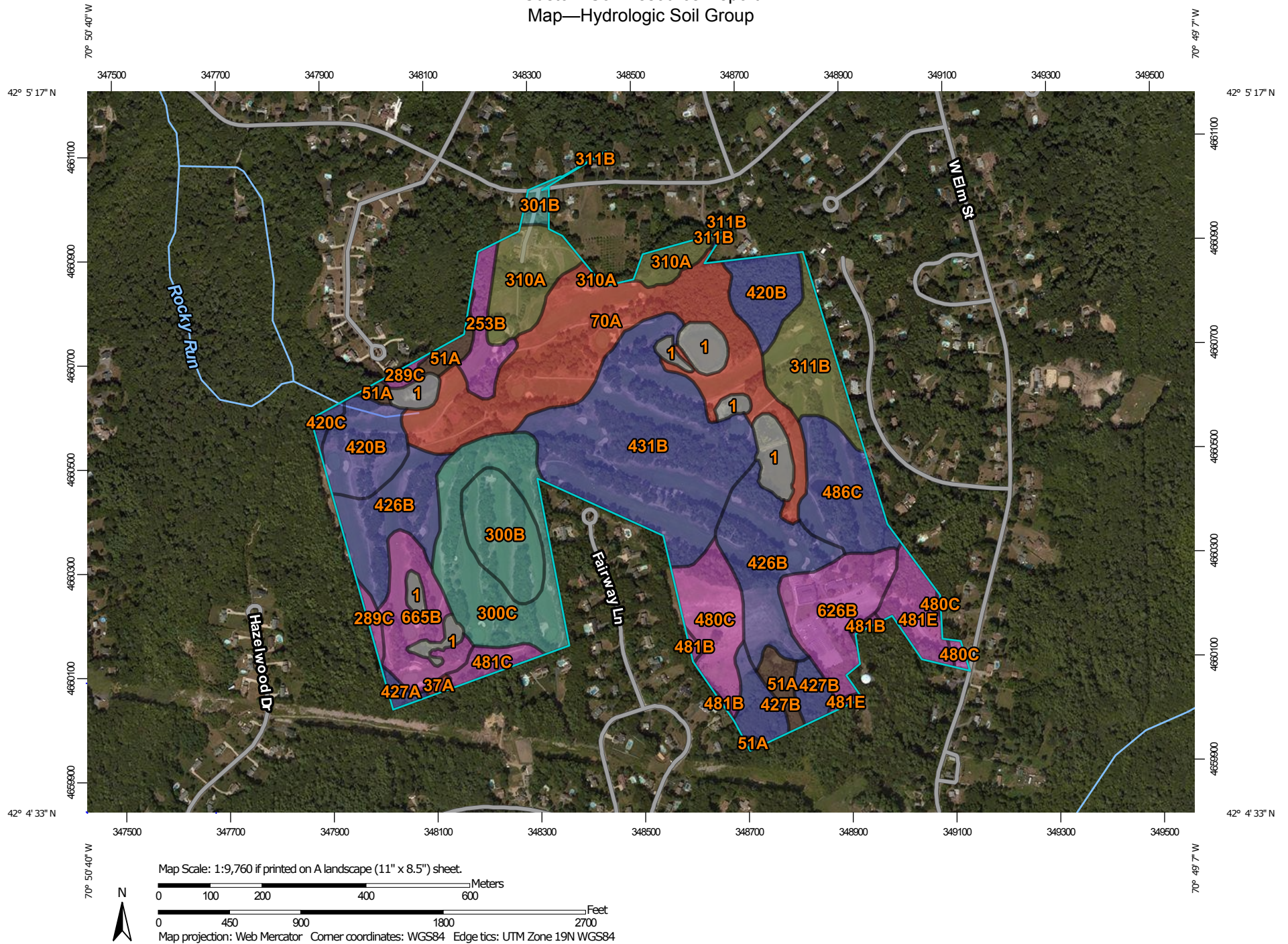
Performed By: David Newhall Witnessed By: Lisa Cully Mach./Oper.: JF Price

Comments: _____

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title 5 and applicable local bylaws, will in fact be feasible on this site.

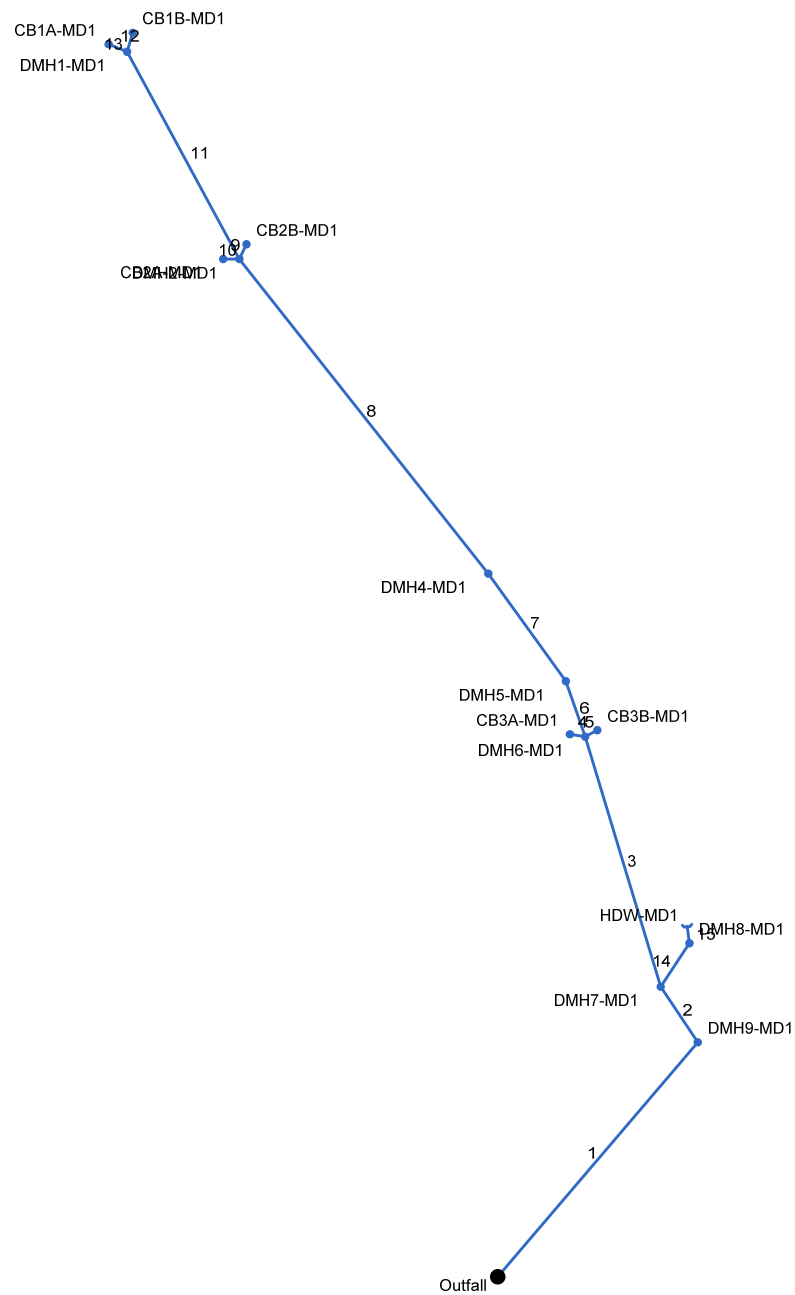
An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

Custom Soil Resource Report Map—Hydrologic Soil Group



SECTION 7 – HYDRAULIC PIPE SIZING

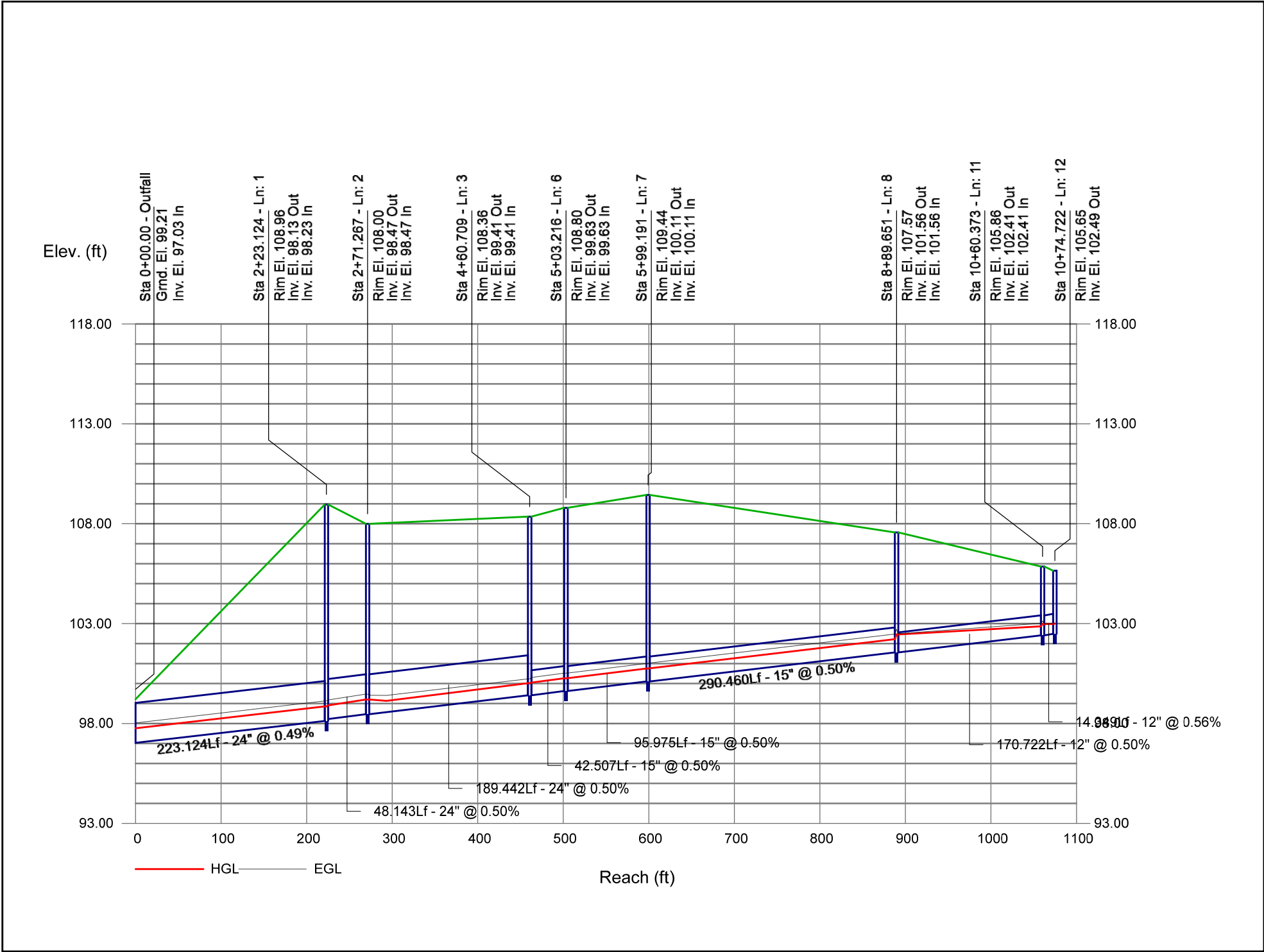
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Tabulation

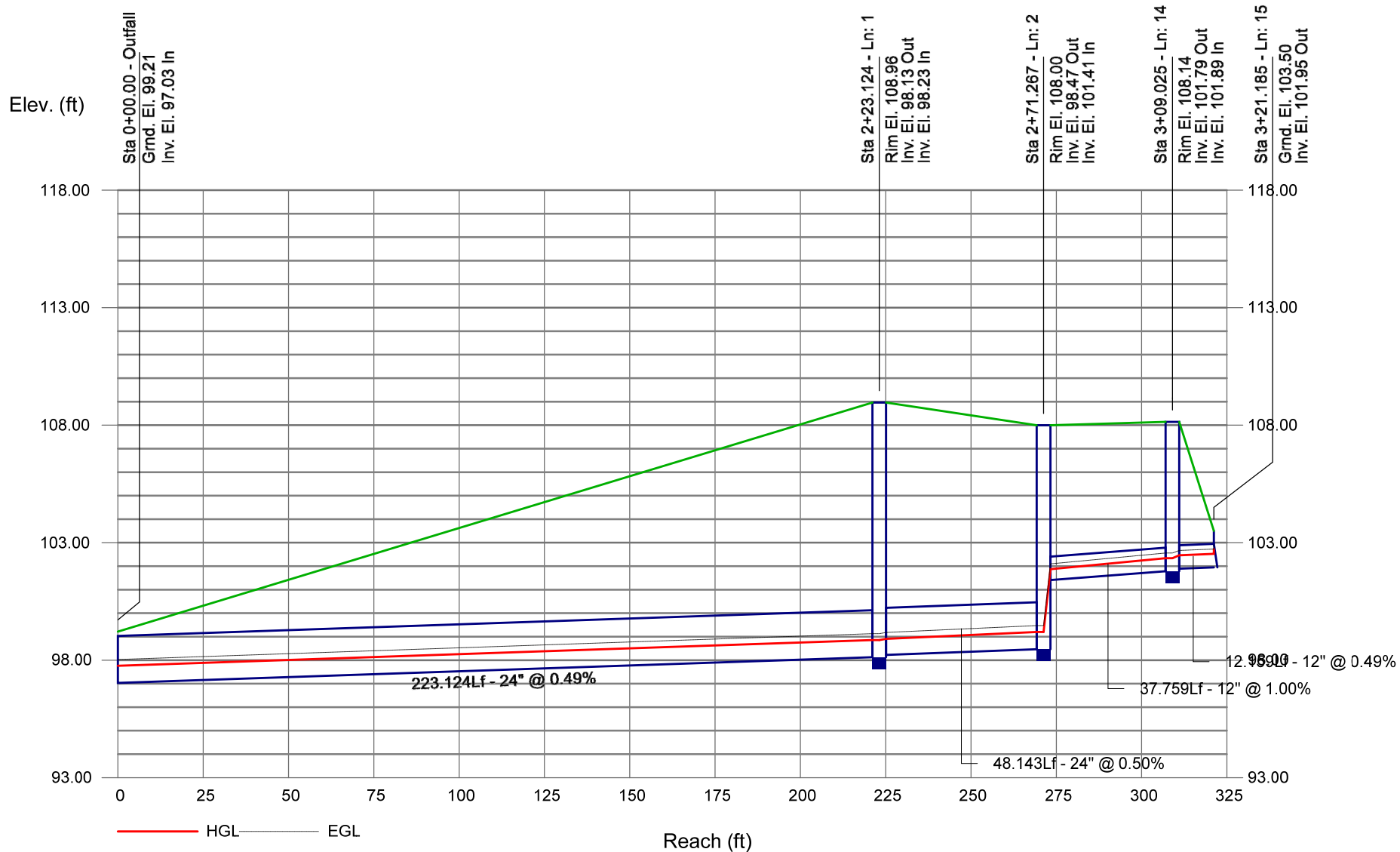
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	223.124	0.00	2.27	0.00	0.00	0.72	0.0	10.3	6.0	4.33	17.17	4.17	24	0.49	97.03	98.13	97.76	98.86	99.21	108.96	Pipe - (41)
2	1	48.143	0.00	2.27	0.00	0.00	0.72	0.0	10.2	6.0	4.36	17.33	4.38	24	0.50	98.23	98.47	98.91	99.20	108.96	108.00	Pipe - (40) (1)
3	2	189.442	0.00	0.75	0.00	0.00	0.48	0.0	9.2	6.2	2.99	17.33	3.30	24	0.50	98.47	99.41	99.20	100.02	108.00	108.36	Pipe - (40)
4	3	11.153	0.03	0.03	0.90	0.03	0.03	6.0	6.0	7.0	0.19	3.83	2.26	12	0.99	104.05	104.16	104.20	104.34	108.36	108.21	Pipe - (50)
5	3	10.029	0.05	0.05	0.90	0.05	0.05	6.0	6.0	7.0	0.31	3.85	2.62	12	1.00	104.04	104.14	104.23	104.37	108.36	108.19	Pipe - (49)
6	3	42.507	0.00	0.67	0.00	0.00	0.41	0.0	9.0	6.2	2.55	4.94	4.05	15	0.50	99.41	99.63	100.05	100.27	108.36	108.80	Pipe - (59) (1) (1)
7	6	95.975	0.00	0.67	0.00	0.00	0.41	0.0	8.6	6.3	2.59	4.94	4.07	15	0.50	99.63	100.11	100.27	100.75	108.80	109.44	Pipe - (59) (1)
8	7	290.460	0.00	0.67	0.00	0.00	0.41	0.0	7.5	6.6	2.70	4.94	4.11	15	0.50	100.11	101.56	100.76	102.22	109.44	107.57	Pipe - (61)
9	8	11.629	0.10	0.10	0.90	0.09	0.09	6.0	6.0	7.0	0.63	3.92	3.22	12	1.03	103.14	103.26	103.41	103.59	107.57	107.31	Pipe - (69)
10	8	11.903	0.28	0.28	0.58	0.16	0.16	6.0	6.0	7.0	1.13	3.87	3.79	12	1.01	103.14	103.26	103.51	103.71	107.57	107.31	Pipe - (70)
11	8	170.722	0.00	0.29	0.00	0.00	0.16	0.0	6.2	6.9	1.09	2.52	2.31	12	0.50	101.56	102.41	102.46	102.86	107.57	105.86	Pipe - (58)
12	11	14.349	0.12	0.12	0.55	0.07	0.07	6.0	6.0	7.0	0.46	2.66	1.09	12	0.56	102.41	102.49	102.98	102.98	105.86	105.65	Pipe - (54)
13	11	14.295	0.17	0.17	0.54	0.09	0.09	6.0	6.0	7.0	0.64	2.49	1.50	12	0.49	102.41	102.48	102.98	102.98	105.86	105.65	Pipe - (55)
14	2	37.759	0.00	1.52	0.00	0.00	0.24	0.0	6.1	7.0	1.69	3.86	4.27	12	1.00	101.41	101.79	101.87	102.34	108.00	108.14	Pipe - (63) (1)
15	14	12.159	1.52	1.52	0.16	0.24	0.24	6.0	6.0	7.0	1.69	2.71	3.64	12	0.49	101.89	101.95	102.46	102.52	108.14	103.50	Pipe - (63)
Project File: Storm-MD1.stm																Number of lines: 15				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Storm Sewer Profile

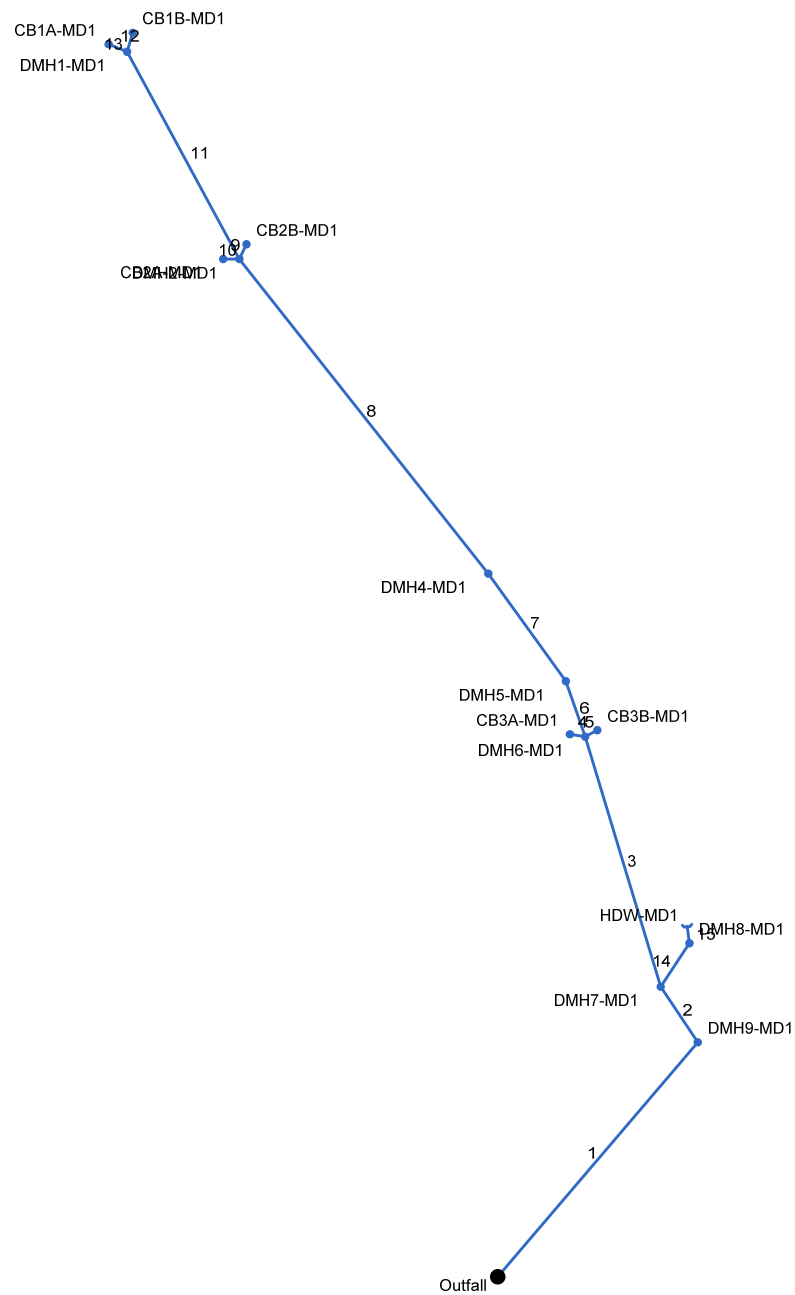


Storm Sewer Profile

Proj. file: Storm-MD1.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

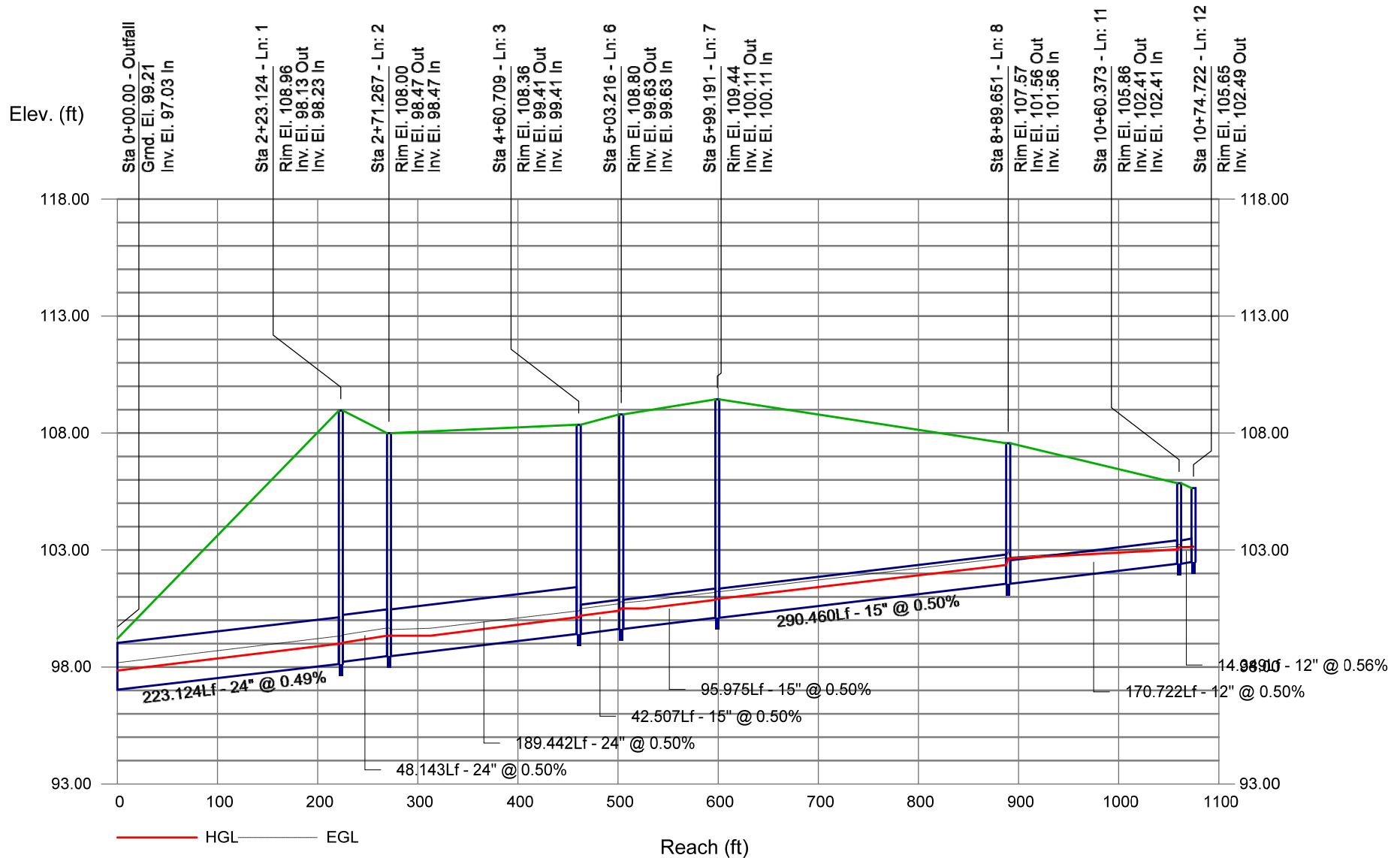


Storm Sewer Tabulation

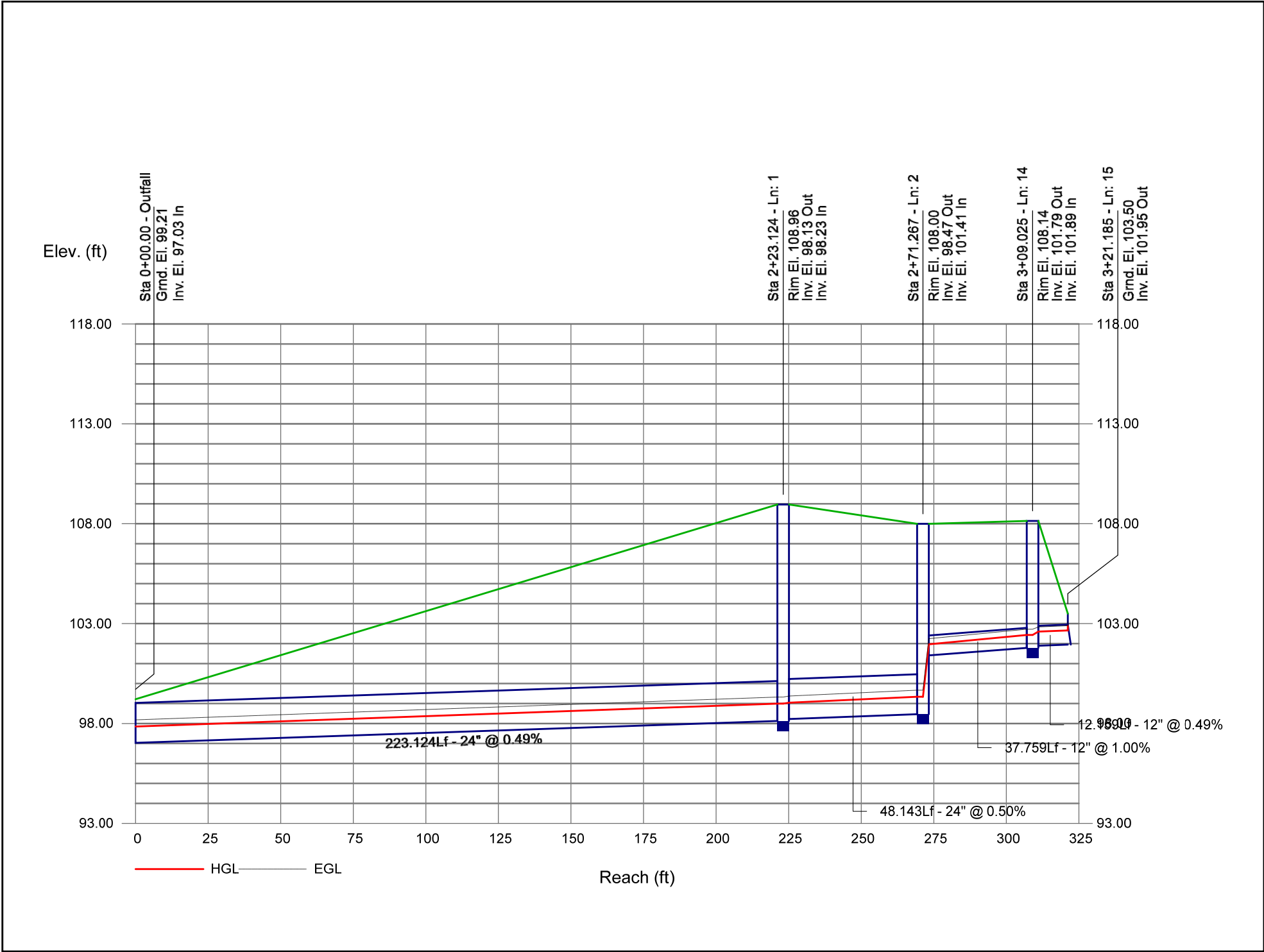
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID	
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up		
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		
1	End	223.124	0.00	2.27	0.00	0.00	0.72	0.0	10.1	8.3	6.04	17.17	4.80	24	0.49	97.03	98.13	97.85	98.99	99.21	108.96	Pipe - (41)	
2	1	48.143	0.00	2.27	0.00	0.00	0.72	0.0	9.9	8.4	6.07	17.33	4.82	24	0.50	98.23	98.47	99.04	99.34	108.96	108.00	Pipe - (40) (1)	
3	2	189.442	0.00	0.75	0.00	0.00	0.48	0.0	9.0	8.6	4.14	17.33	3.63	24	0.50	98.47	99.41	99.34	100.13	108.00	108.36	Pipe - (40)	
4	3	11.153	0.03	0.03	0.90	0.03	0.03	6.0	6.0	9.5	0.26	3.83	2.47	12	0.99	104.05	104.16	104.23	104.37	108.36	108.21	Pipe - (50)	
5	3	10.029	0.05	0.05	0.90	0.05	0.05	6.0	6.0	9.5	0.43	3.85	2.86	12	1.00	104.04	104.14	104.27	104.41	108.36	108.19	Pipe - (49)	
6	3	42.507	0.00	0.67	0.00	0.00	0.41	0.0	8.9	8.6	3.53	4.94	4.38	15	0.50	99.41	99.63	100.19	100.41	108.36	108.80	Pipe - (59) (1) (1)	
7	6	95.975	0.00	0.67	0.00	0.00	0.41	0.0	8.5	8.7	3.58	4.94	4.20	15	0.50	99.63	100.11	100.51	100.87	108.80	109.44	Pipe - (59) (1)	
8	7	290.460	0.00	0.67	0.00	0.00	0.41	0.0	7.4	9.1	3.70	4.94	4.42	15	0.50	100.11	101.56	100.92	102.36	109.44	107.57	Pipe - (61)	
9	8	11.629	0.10	0.10	0.90	0.09	0.09	6.0	6.0	9.5	0.85	3.92	3.52	12	1.03	103.14	103.26	103.46	103.65	107.57	107.31	Pipe - (69)	
10	8	11.903	0.28	0.28	0.58	0.16	0.16	6.0	6.0	9.5	1.53	3.87	4.16	12	1.01	103.14	103.26	103.58	103.78	107.57	107.31	Pipe - (70)	
11	8	170.722	0.00	0.29	0.00	0.00	0.16	0.0	6.2	9.4	1.48	2.52	2.42	12	0.50	101.56	102.41	102.64	103.02	107.57	105.86	Pipe - (58)	
12	11	14.349	0.12	0.12	0.55	0.07	0.07	6.0	6.0	9.5	0.62	2.66	1.11	12	0.56	102.41	102.49	103.12	103.13	105.86	105.65	Pipe - (54)	
13	11	14.295	0.17	0.17	0.54	0.09	0.09	6.0	6.0	9.5	0.87	2.49	1.53	12	0.49	102.41	102.48	103.12	103.13	105.86	105.65	Pipe - (55)	
14	2	37.759	0.00	1.52	0.00	0.00	0.24	0.0	6.1	9.5	2.30	3.86	4.70	12	1.00	101.41	101.79	101.96	102.43	108.00	108.14	Pipe - (63) (1)	
15	14	12.159	1.52	1.52	0.16	0.24	0.24	6.0	6.0	9.5	2.31	2.71	3.87	12	0.49	101.89	101.95	102.60	102.66	108.14	103.50	Pipe - (63)	
Project File: Storm-MD1.stm																Number of lines: 15				Run Date: 12/12/2023			
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																							

Storm Sewer Profile

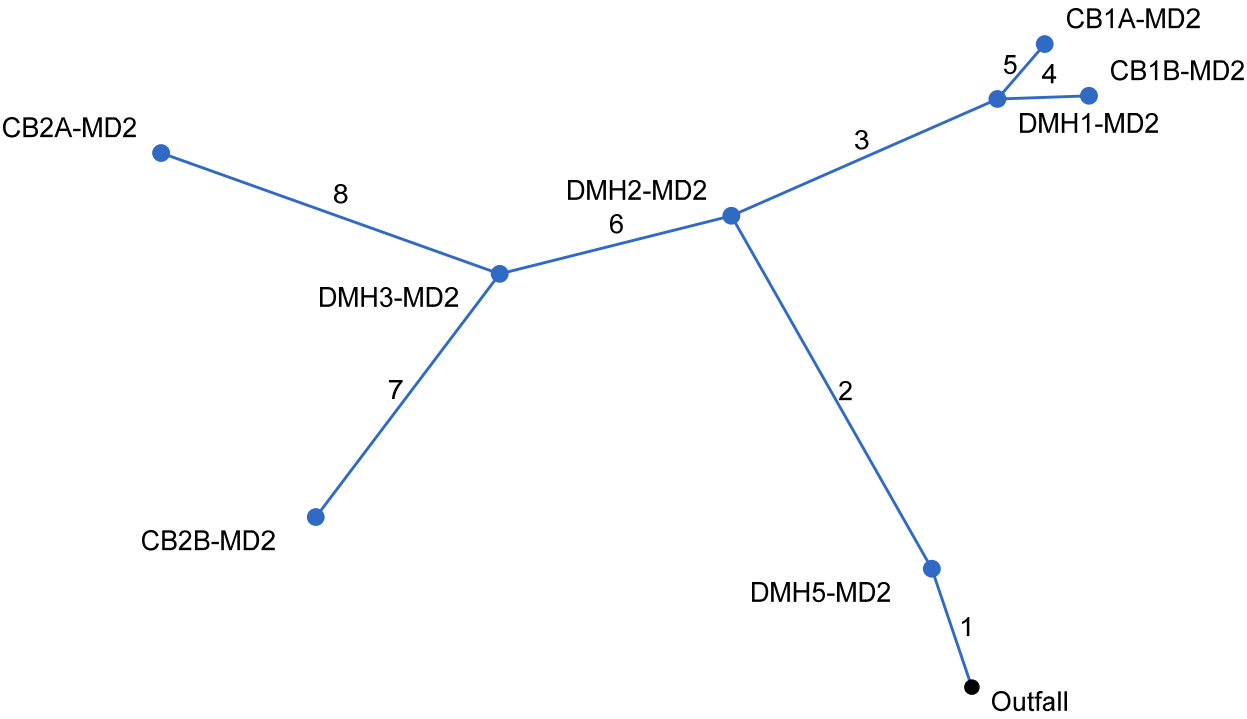
Proj. file: Storm-MD1.stm



Storm Sewer Profile



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

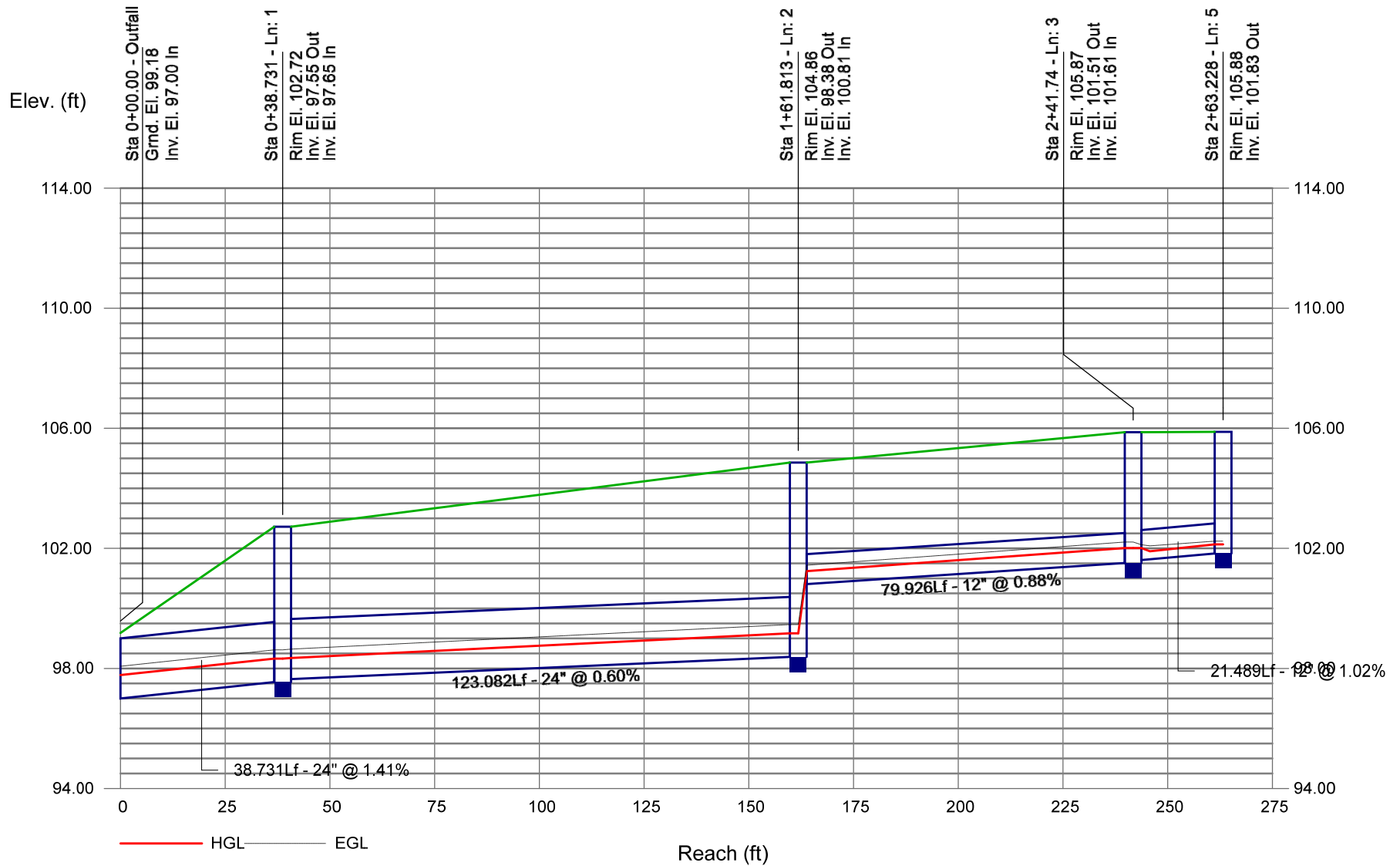


Storm Sewer Tabulation

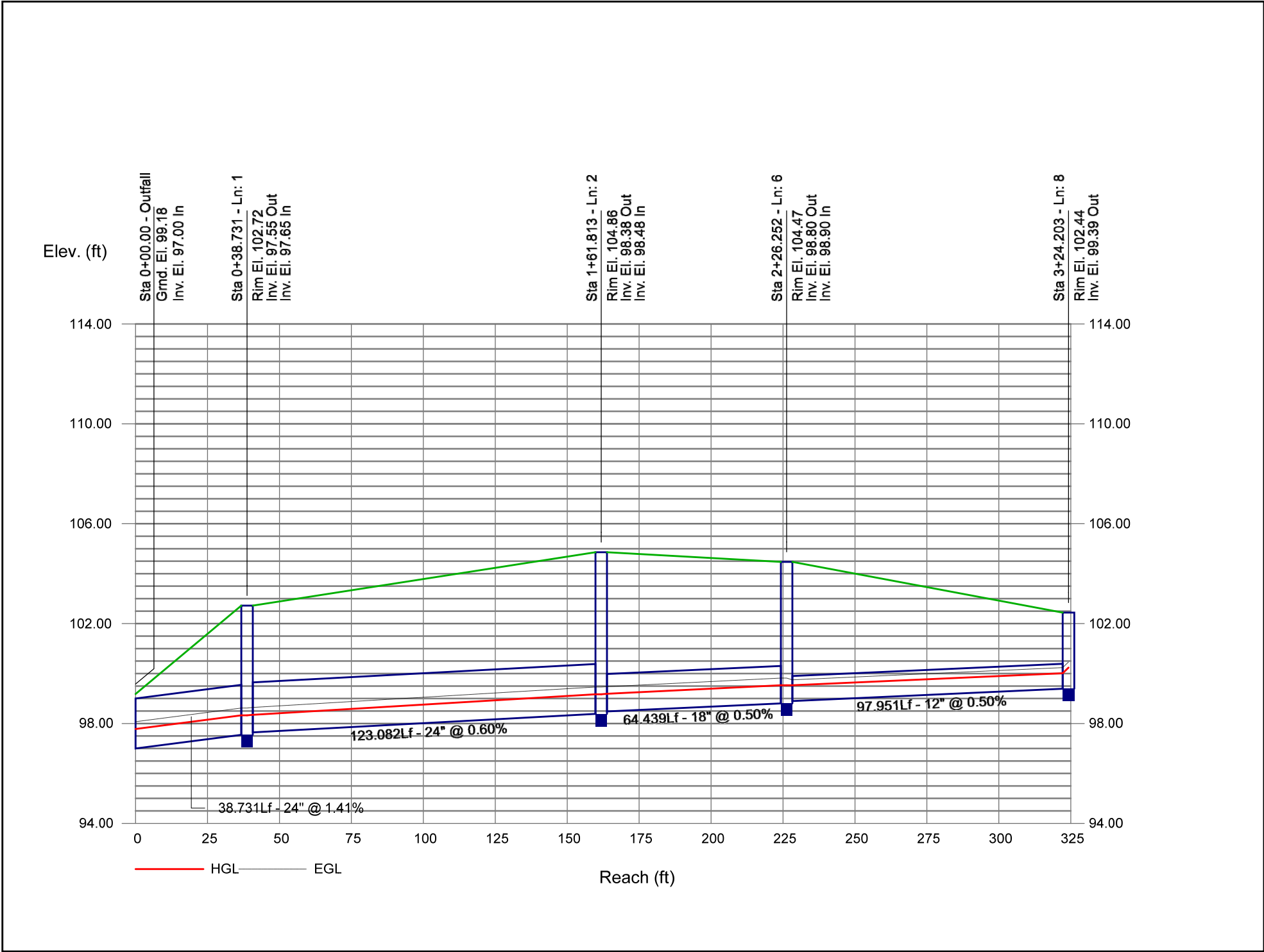
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	38.731	0.00	1.51	0.00	0.00	0.73	0.0	7.1	6.7	4.90	29.11	4.33	24	1.41	97.00	97.55	97.78	98.33	99.18	102.72	Pipe - (44) (1)
2	1	123.082	0.00	1.51	0.00	0.00	0.73	0.0	6.7	6.8	4.98	18.95	4.72	24	0.60	97.65	98.38	98.35	99.17	102.72	104.86	Pipe - (44)
3	2	79.926	0.00	0.42	0.00	0.00	0.20	0.0	6.2	6.9	1.40	3.61	3.94	12	0.88	100.81	101.51	101.24	102.01	104.86	105.87	Pipe - (68)
4	3	24.457	0.28	0.28	0.45	0.13	0.13	6.0	6.0	7.0	0.88	3.90	3.04	12	1.02	101.61	101.86	102.01	102.25	105.87	105.91	Pipe - (48)
5	3	21.489	0.14	0.14	0.54	0.08	0.08	6.0	6.0	7.0	0.53	3.90	2.22	12	1.02	101.61	101.83	102.01	102.13	105.87	105.88	Pipe - (47)
6	2	64.439	0.00	1.09	0.00	0.00	0.53	0.0	6.4	6.9	3.64	8.04	4.36	18	0.50	98.48	98.80	99.19	99.53	104.86	104.47	Pipe - (45) (2)
7	6	90.967	0.51	0.51	0.49	0.25	0.25	6.0	6.0	7.0	1.74	2.74	3.69	12	0.51	98.94	99.40	99.53	99.97	104.47	102.45	Pipe - (66)
8	6	97.951	0.58	0.58	0.49	0.28	0.28	6.0	6.0	7.0	1.96	2.73	3.78	12	0.50	98.90	99.39	99.53	100.01	104.47	102.44	Pipe - (67)
Project File: Storm-MD2.stm																Number of lines: 8				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Storm Sewer Profile

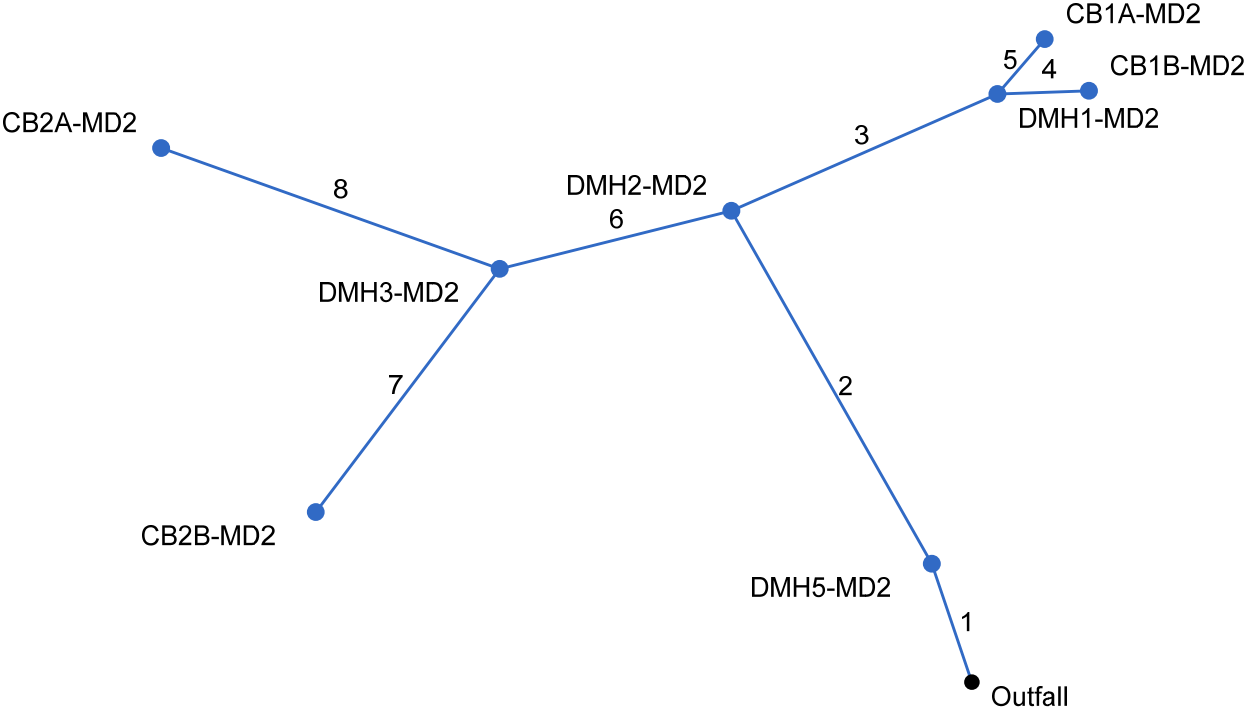
Proj. file: Storm-MD2.stm



Storm Sewer Profile



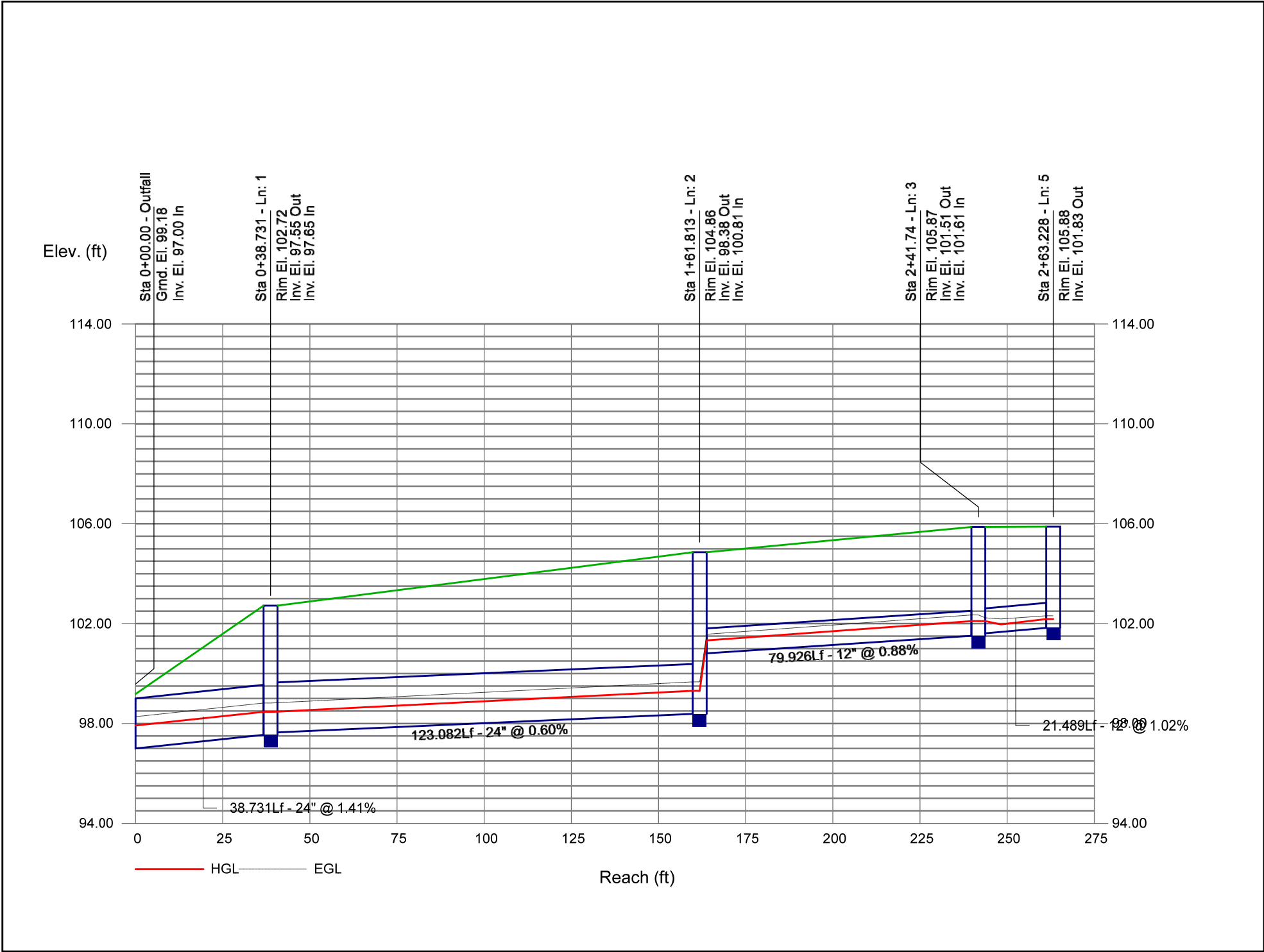
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



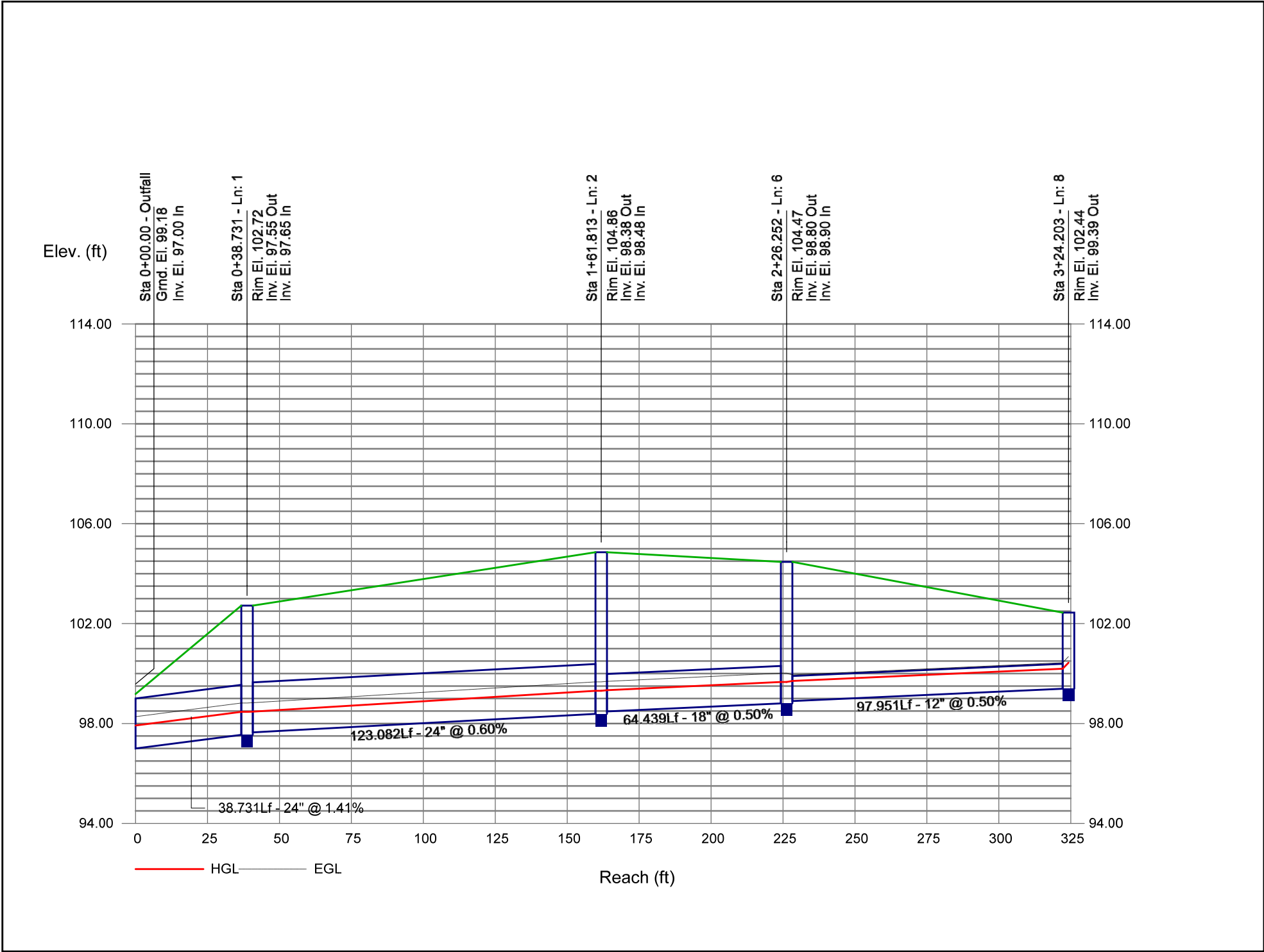
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	38.731	0.00	1.51	0.00	0.00	0.73	0.0	7.0	9.2	6.73	29.11	4.78	24	1.41	97.00	97.55	97.92	98.47	99.18	102.72	Pipe - (44) (1)
2	1	123.082	0.00	1.51	0.00	0.00	0.73	0.0	6.6	9.3	6.82	18.95	5.16	24	0.60	97.65	98.38	98.48	99.31	102.72	104.86	Pipe - (44)
3	2	79.926	0.00	0.42	0.00	0.00	0.20	0.0	6.2	9.4	1.91	3.61	4.32	12	0.88	100.81	101.51	101.33	102.10	104.86	105.87	Pipe - (68)
4	3	24.457	0.28	0.28	0.45	0.13	0.13	6.0	6.0	9.5	1.20	3.90	3.27	12	1.02	101.61	101.86	102.10	102.32	105.87	105.91	Pipe - (48)
5	3	21.489	0.14	0.14	0.54	0.08	0.08	6.0	6.0	9.5	0.72	3.90	2.39	12	1.02	101.61	101.83	102.10	102.18	105.87	105.88	Pipe - (47)
6	2	64.439	0.00	1.09	0.00	0.00	0.53	0.0	6.4	9.4	4.97	8.04	4.78	18	0.50	98.48	98.80	99.34	99.66	104.86	104.47	Pipe - (45) (2)
7	6	90.967	0.51	0.51	0.49	0.25	0.25	6.0	6.0	9.5	2.37	2.74	3.92	12	0.51	98.94	99.40	99.66	100.11	104.47	102.45	Pipe - (66)
8	6	97.951	0.58	0.58	0.49	0.28	0.28	6.0	6.0	9.5	2.68	2.73	3.96	12	0.50	98.90	99.39	99.70	100.19	104.47	102.44	Pipe - (67)
Project File: Storm-MD2.stm																Number of lines: 8				Run Date: 12/12/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

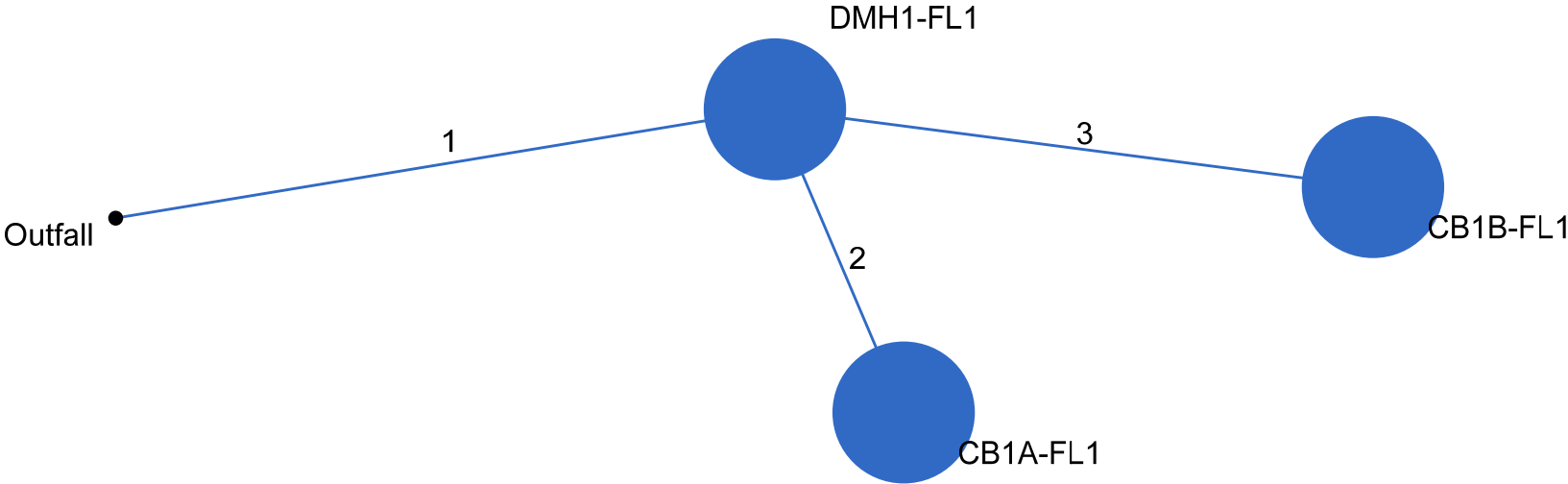
Storm Sewer Profile



Storm Sewer Profile



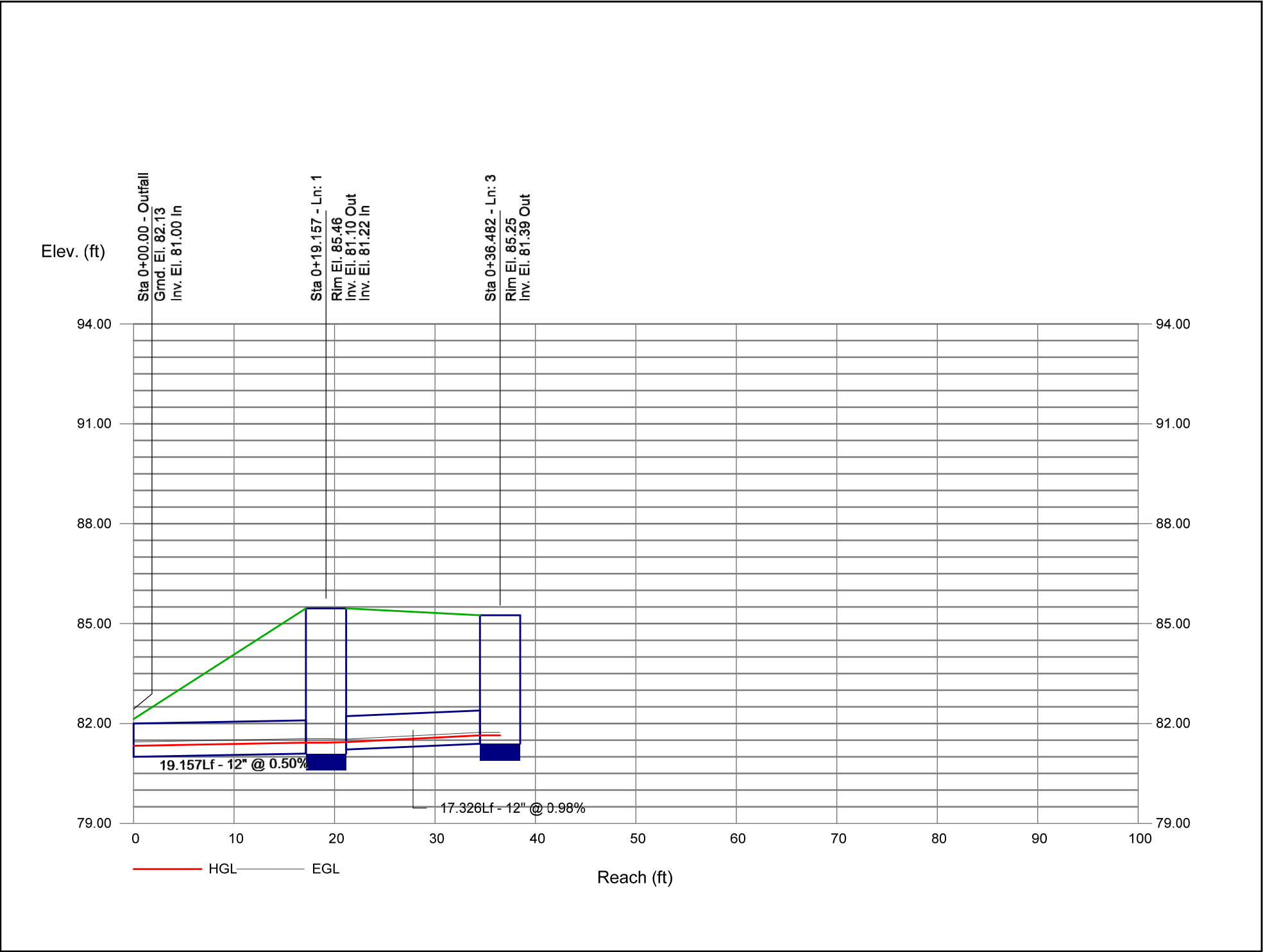
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



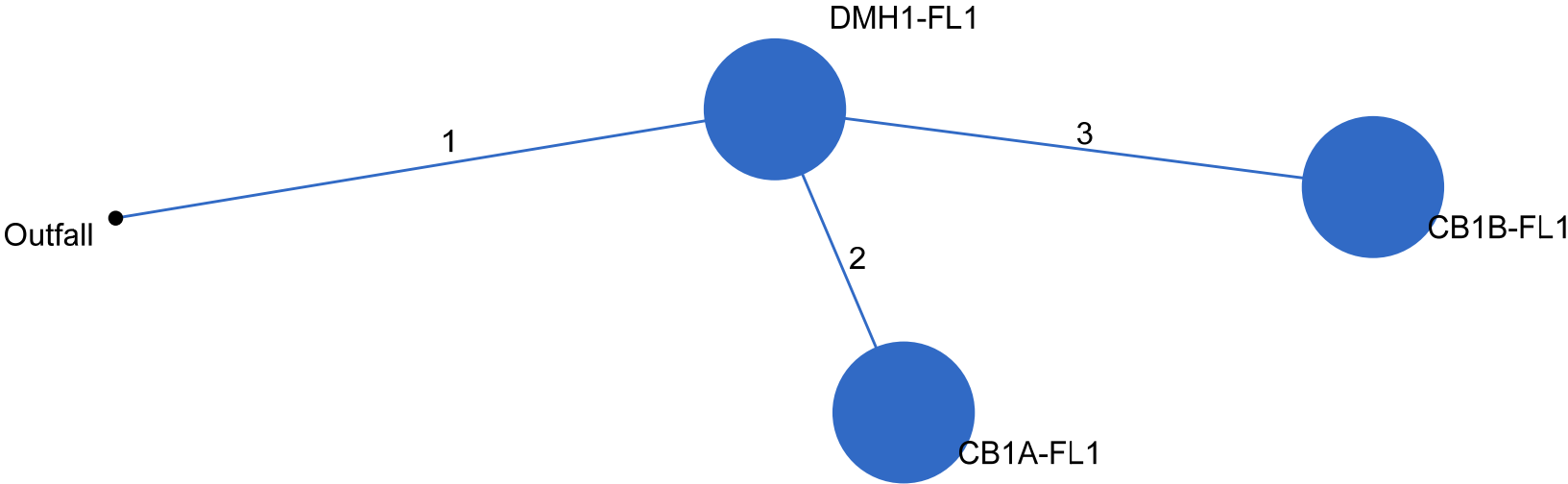
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID							
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up								
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)								
1	End	19.157	0.00	0.10	0.00	0.00	0.09	0.0	6.1	6.9	0.62	2.73	2.78	12	0.50	81.00	81.10	81.33	81.42	82.13	85.46	Pipe - (36)							
2	1	10.387	0.04	0.04	0.90	0.04	0.04	6.0	6.0	7.0	0.25	4.42	2.25	12	1.54	81.23	81.39	81.42	81.60	85.46	85.25	Pipe - (37)							
3	1	17.326	0.06	0.06	0.90	0.05	0.05	6.0	6.0	7.0	0.38	3.53	2.67	12	0.98	81.22	81.39	81.44	81.64	85.46	85.25	Pipe - (38)							

Storm Sewer Profile



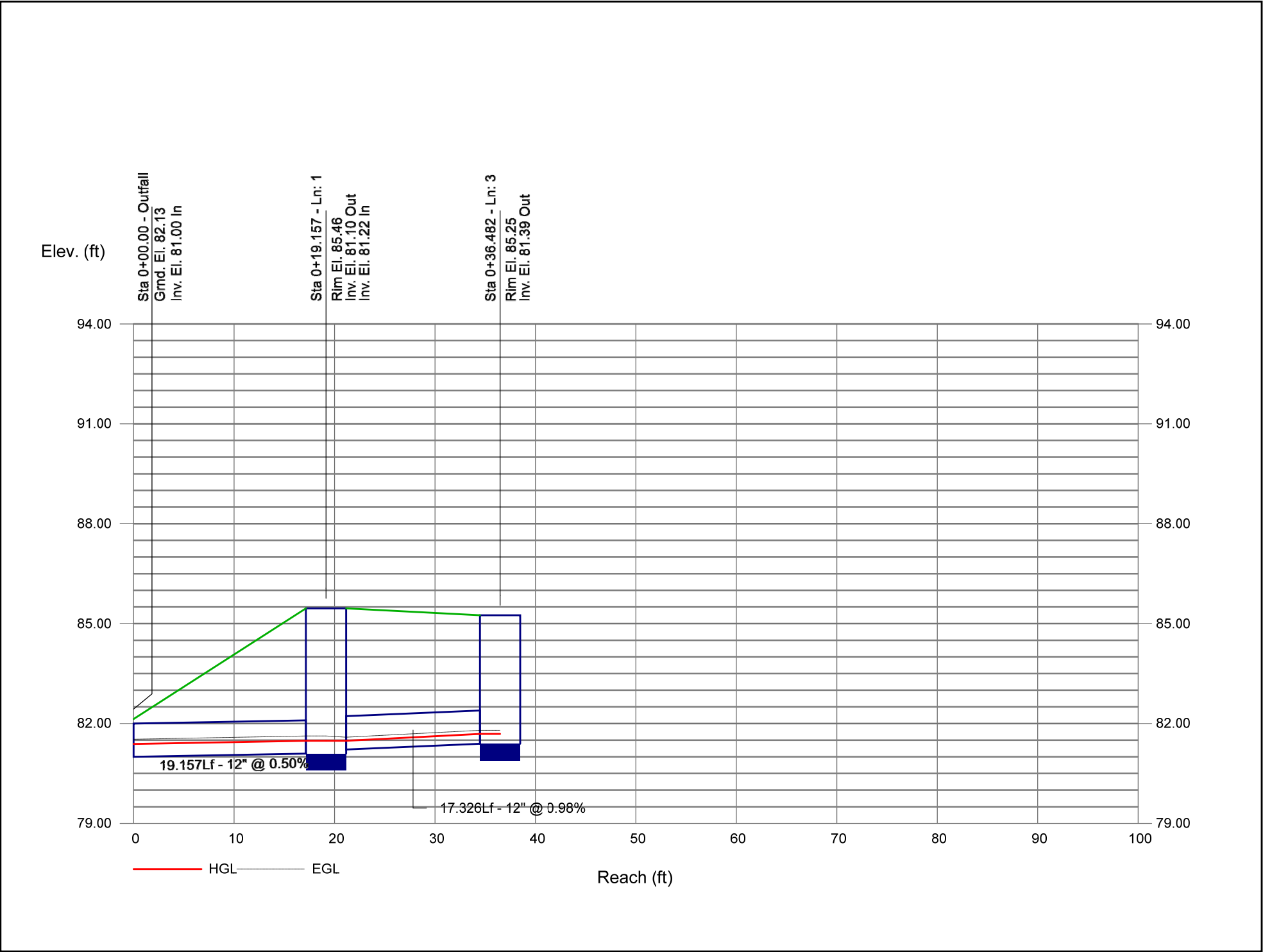
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



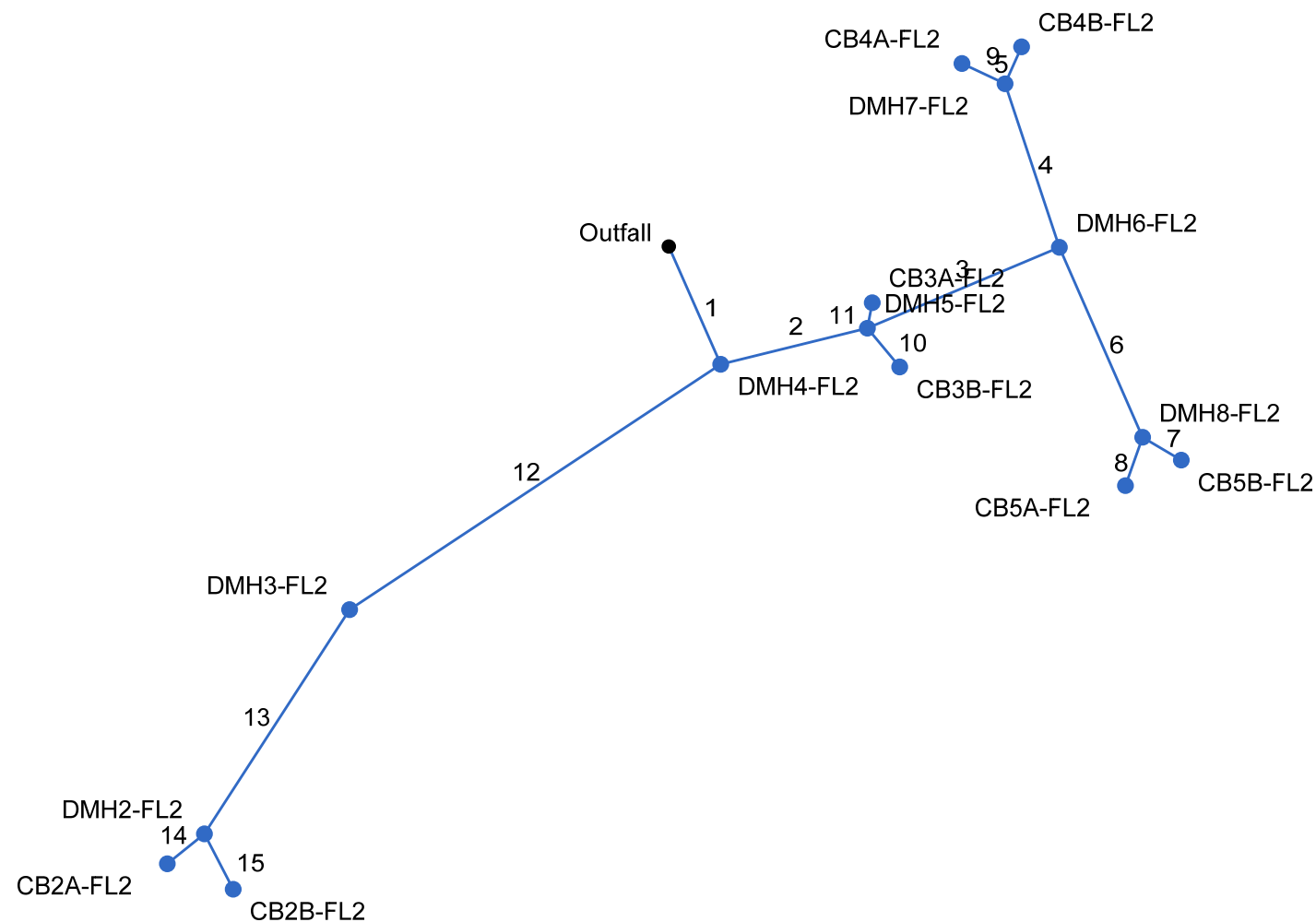
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID							
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up								
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)								
1	End	19.157	0.00	0.10	0.00	0.00	0.09	0.0	6.1	9.5	0.85	2.73	3.06	12	0.50	81.00	81.10	81.38	81.48	82.13	85.46	Pipe - (36)							
2	1	10.387	0.04	0.04	0.90	0.04	0.04	6.0	6.0	9.5	0.34	4.42	2.28	12	1.54	81.23	81.39	81.48	81.63	85.46	85.25	Pipe - (37)							
3	1	17.326	0.06	0.06	0.90	0.05	0.05	6.0	6.0	9.5	0.51	3.53	2.88	12	0.98	81.22	81.39	81.48	81.69	85.46	85.25	Pipe - (38)							

Storm Sewer Profile



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

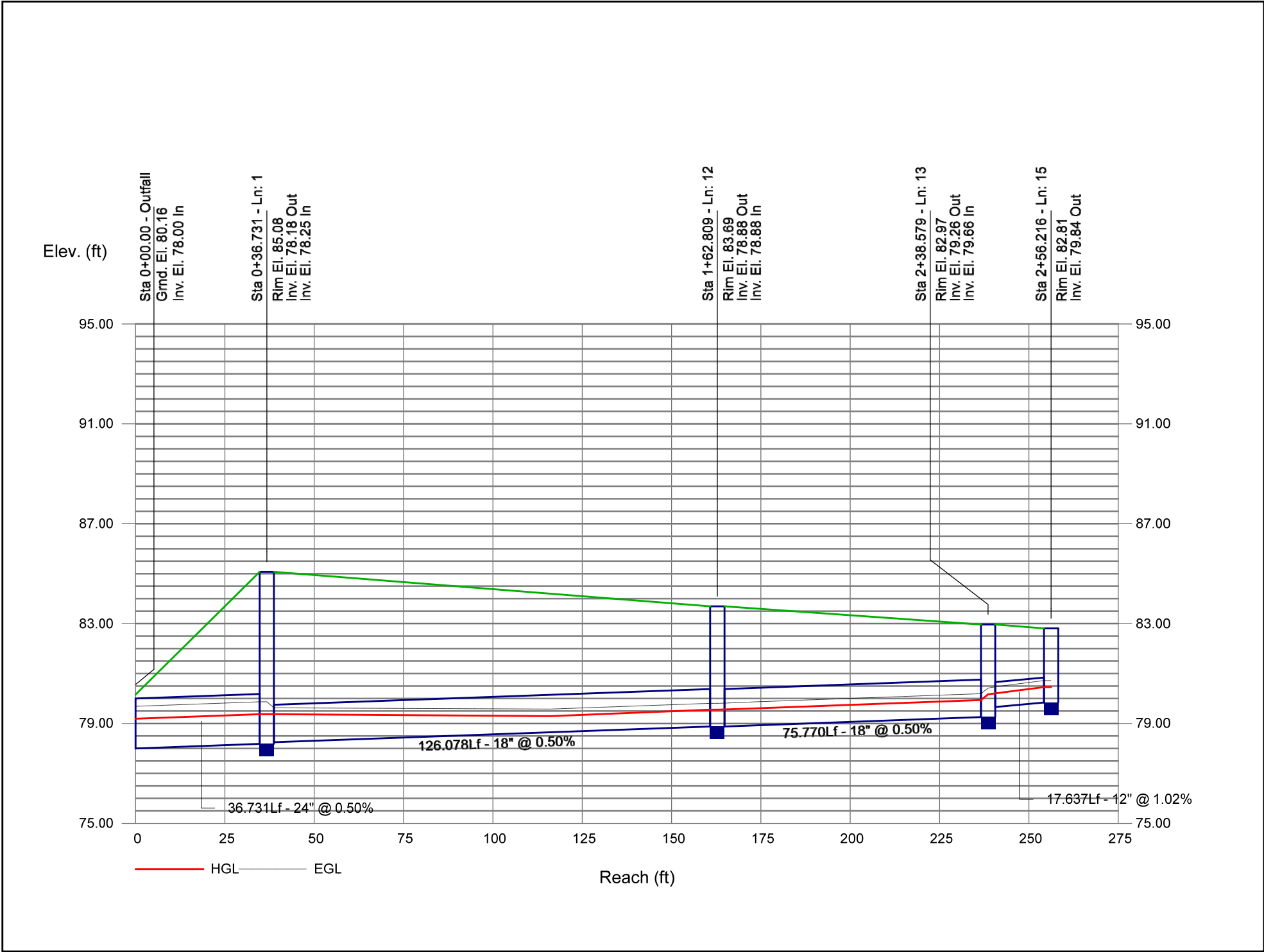


Project File: Storm-FL2.stm	Number of lines: 15	Date: 12/12/2023
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Storm Sewer Tabulation

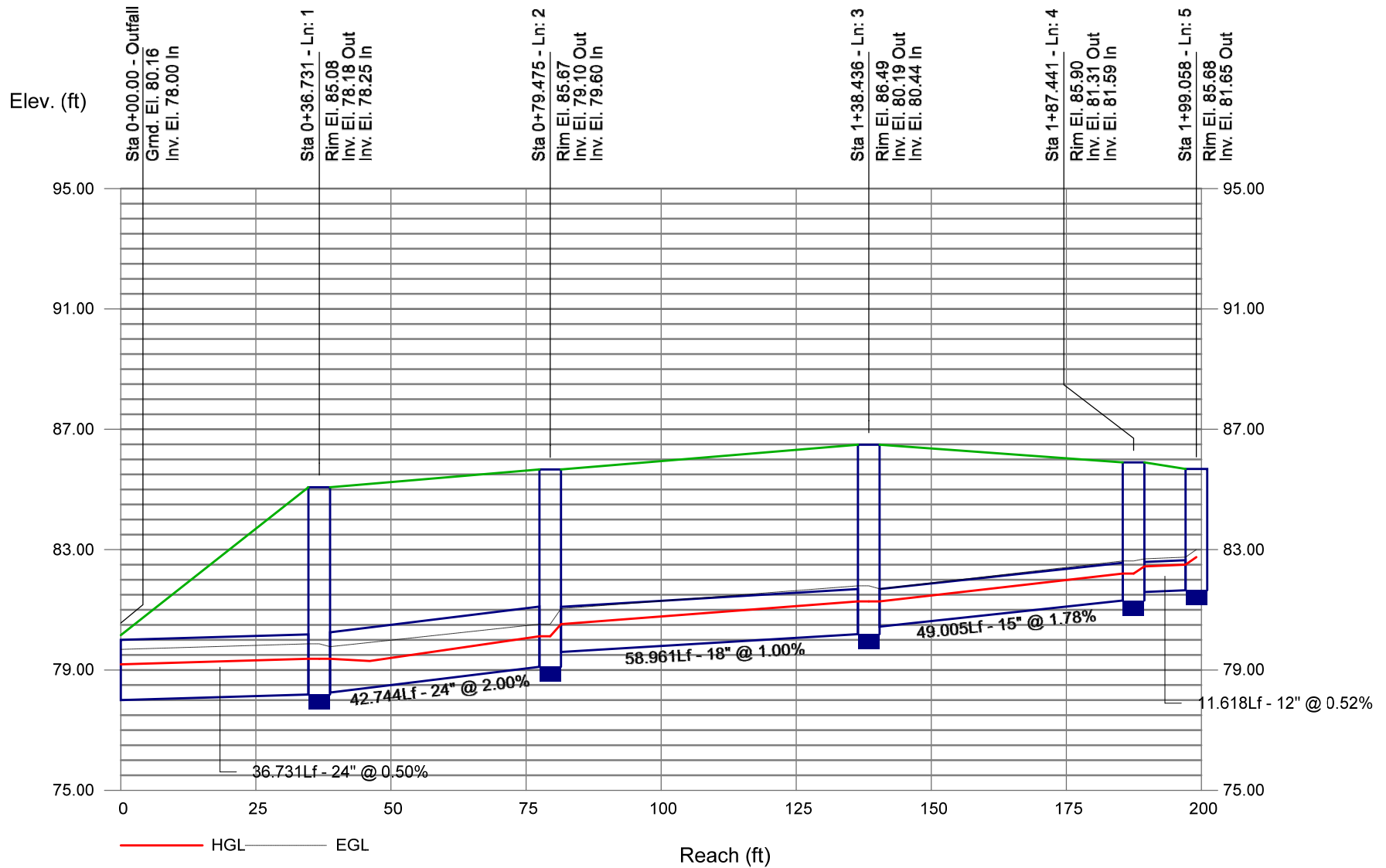
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	36.731	0.00	3.25	0.00	0.00	1.64	0.0	7.1	6.7	11.00	17.33	5.65	24	0.50	78.00	78.18	79.19	79.37	80.16	85.08	Pipe - (60)
2	1	42.744	0.00	2.43	0.00	0.00	1.19	0.0	6.5	6.8	8.14	34.65	4.79	24	2.00	78.25	79.10	79.37	80.12	85.08	85.67	Pipe - (59) (1)
3	2	58.961	0.00	2.37	0.00	0.00	1.15	0.0	6.3	6.9	7.93	11.38	6.36	18	1.00	79.60	80.19	80.52	81.28	85.67	86.49	Pipe - (59)
4	3	49.005	0.00	1.42	0.00	0.00	0.70	0.0	6.1	7.0	4.89	14.26	4.34	18	1.57	80.29	81.06	81.28	81.91	86.49	85.90	Pipe - (53)
5	4	11.618	0.83	0.83	0.50	0.41	0.41	6.0	6.0	7.0	2.86	2.77	4.01	12	0.52	81.59	81.65	82.44	82.50	85.90	85.68	Pipe - (64)
6	3	58.819	0.00	0.95	0.00	0.00	0.45	0.0	6.1	6.9	3.12	4.94	4.26	15	0.50	81.19	81.49	81.91	82.20	86.49	85.93	Pipe - (55)
7	6	12.721	0.59	0.59	0.46	0.27	0.27	6.0	6.0	7.0	1.89	2.86	2.83	12	0.55	81.59	81.66	82.41	82.43	85.93	85.70	Pipe - (63)
8	6	14.524	0.36	0.36	0.49	0.18	0.18	6.0	6.0	7.0	1.23	2.86	2.60	12	0.55	81.59	81.67	82.41	82.14	85.93	85.70	Pipe - (62)
9	4	13.480	0.59	0.59	0.50	0.29	0.29	6.0	6.0	7.0	2.03	2.78	3.87	12	0.52	81.56	81.63	82.20	82.26	85.90	85.67	Pipe - (65)
10	2	14.276	0.04	0.04	0.49	0.02	0.02	6.0	6.0	7.0	0.14	3.82	2.06	12	0.98	81.15	81.29	81.28	81.44	85.67	85.59	Pipe - (66)
11	2	7.474	0.02	0.02	0.90	0.02	0.02	6.0	6.0	7.0	0.13	6.62	2.54	12	2.94	81.15	81.37	81.25	81.51	85.67	85.58	Pipe - (67)
12	1	126.078	0.00	0.82	0.00	0.00	0.45	0.0	6.4	6.9	3.11	8.04	3.13	18	0.50	78.25	78.88	79.37	79.55	85.08	83.69	Pipe - (69)
13	12	75.770	0.00	0.82	0.00	0.00	0.45	0.0	6.1	6.9	3.15	7.43	4.03	18	0.50	78.88	79.26	79.56	79.94	83.69	82.97	Pipe - (58)
14	13	13.523	0.17	0.17	0.90	0.15	0.15	6.0	6.0	7.0	1.07	3.62	2.97	12	1.04	79.66	79.80	80.17	80.23	82.97	82.81	Pipe - (42)
15	13	17.637	0.65	0.65	0.46	0.30	0.30	6.0	6.0	7.0	2.09	3.60	4.43	12	1.02	79.66	79.84	80.21	80.46	82.97	82.81	Pipe - (44)
Project File: Storm-FL2.stm																Number of lines: 15				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Storm Sewer Profile

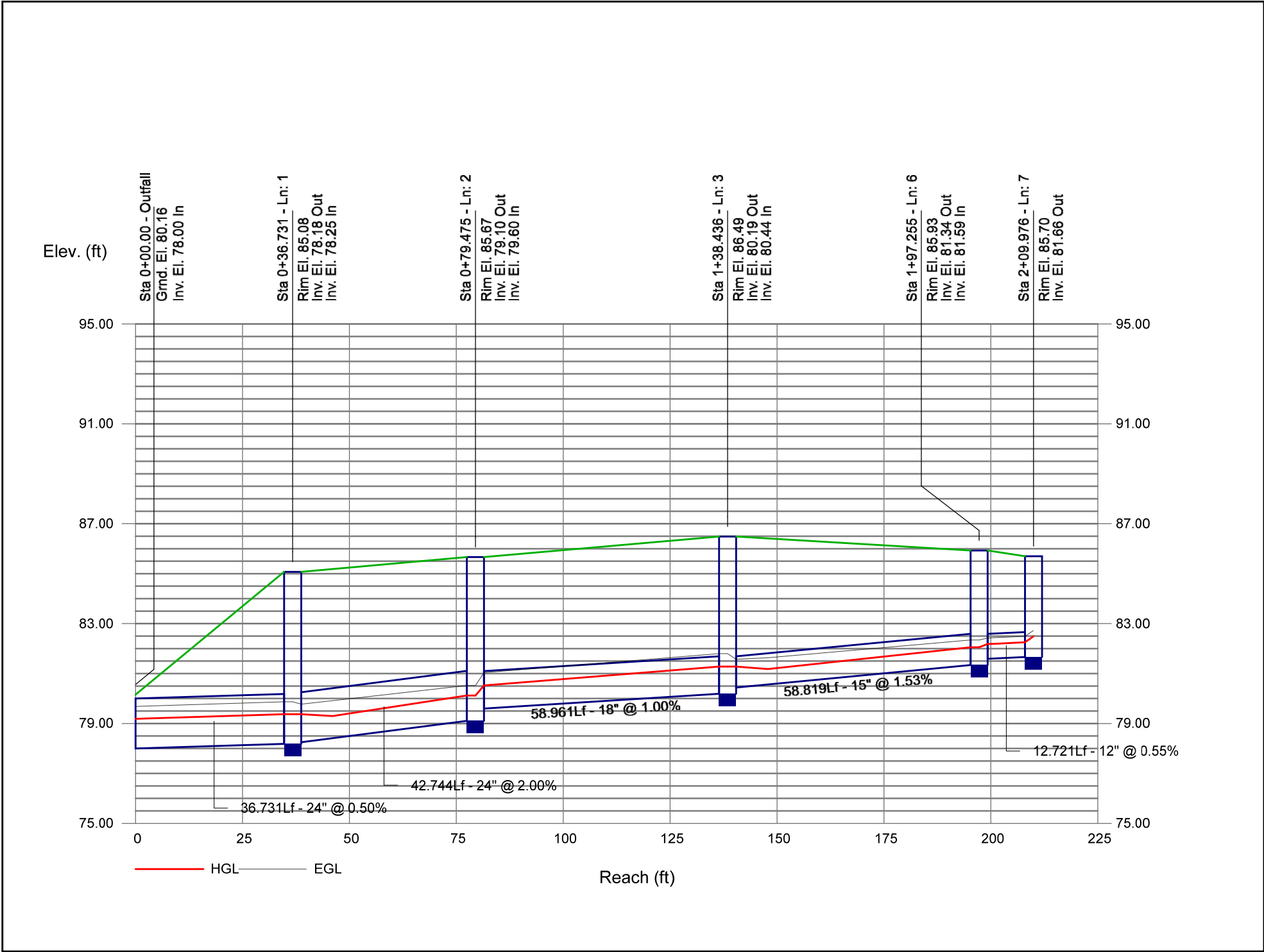


Storm Sewer Profile

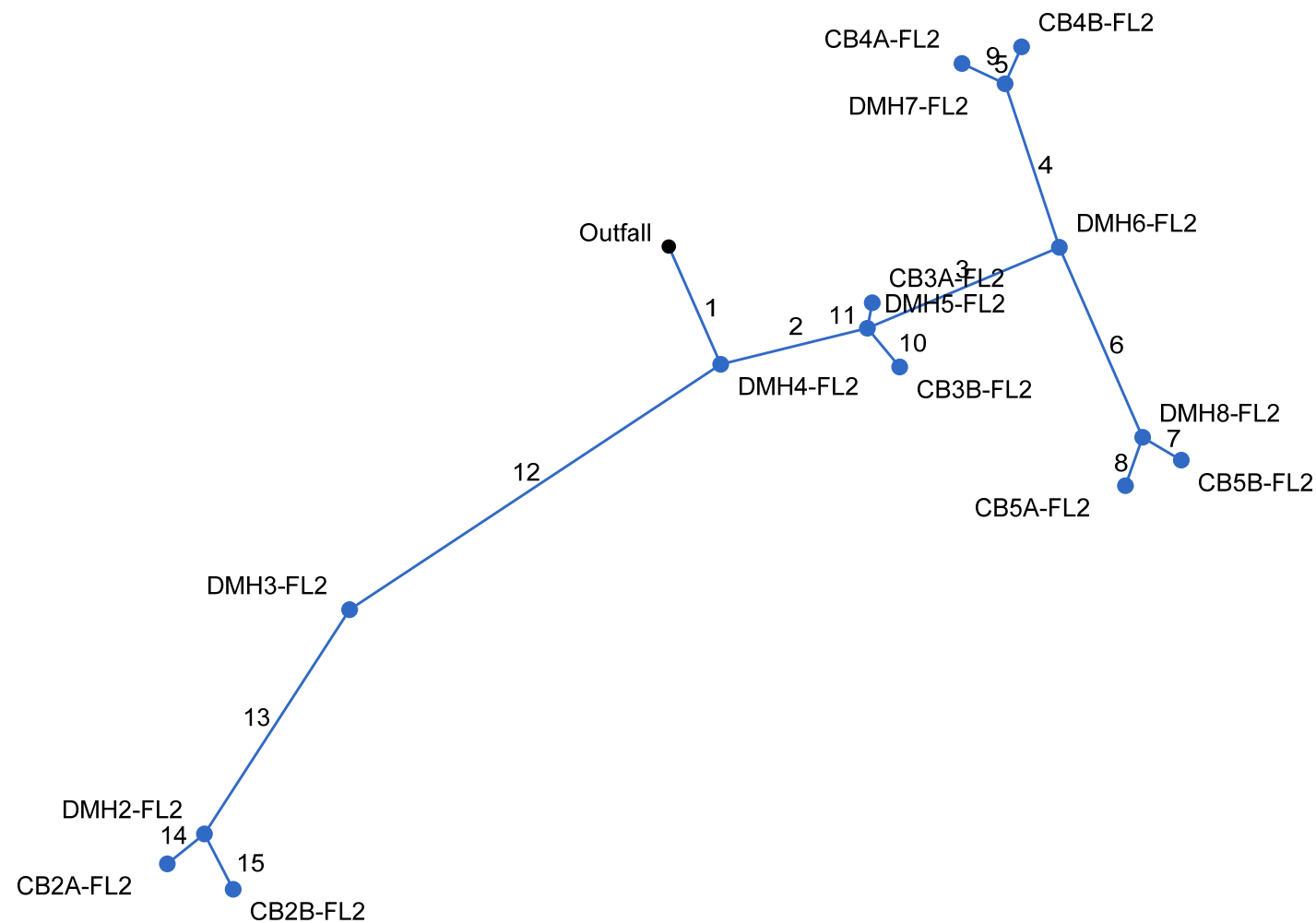
Proj. file: Storm-FL2.stm



Storm Sewer Profile



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



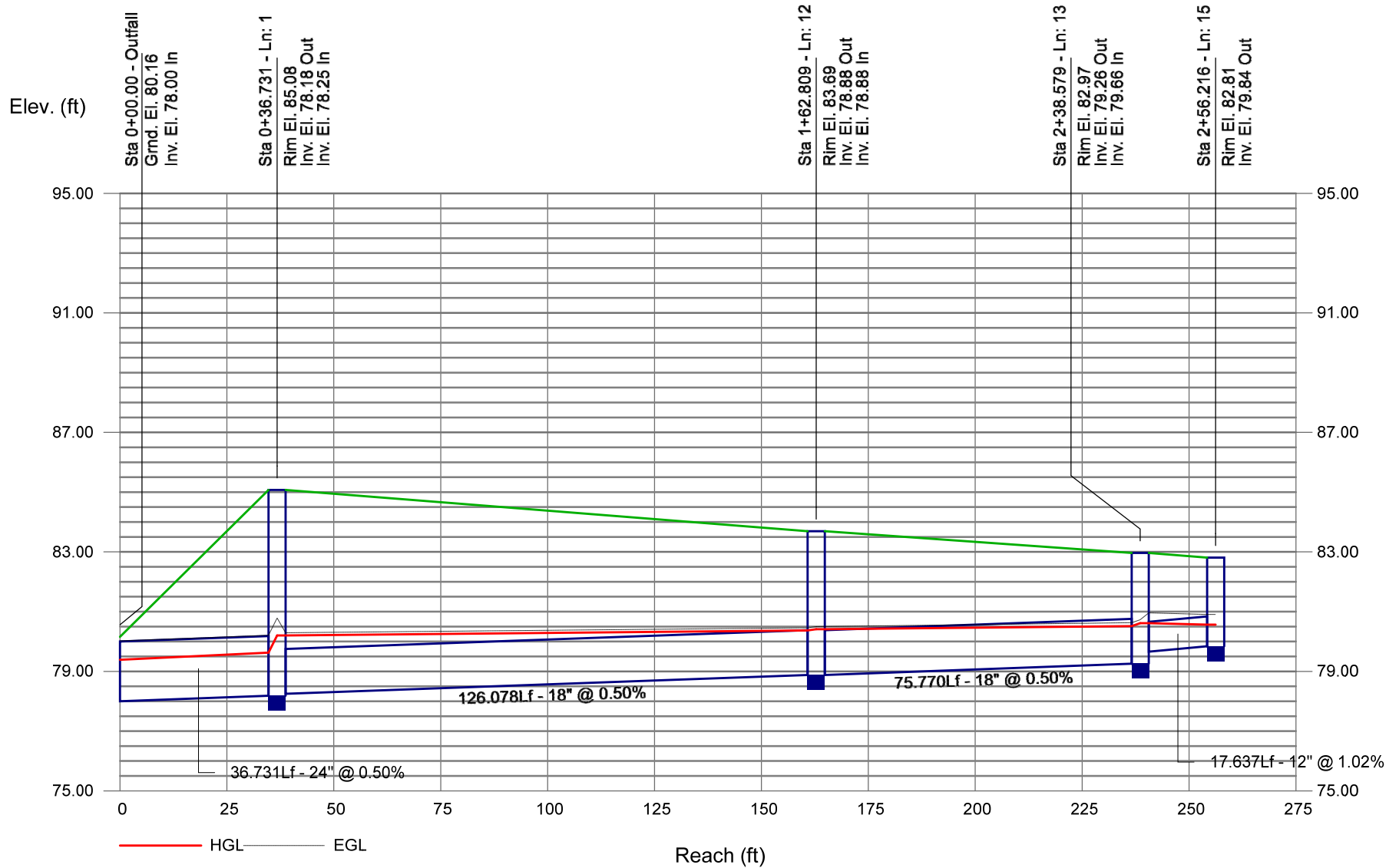
Project File: Storm-FL2.stm	Number of lines: 15	Date: 12/12/2023
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Storm Sewer Tabulation

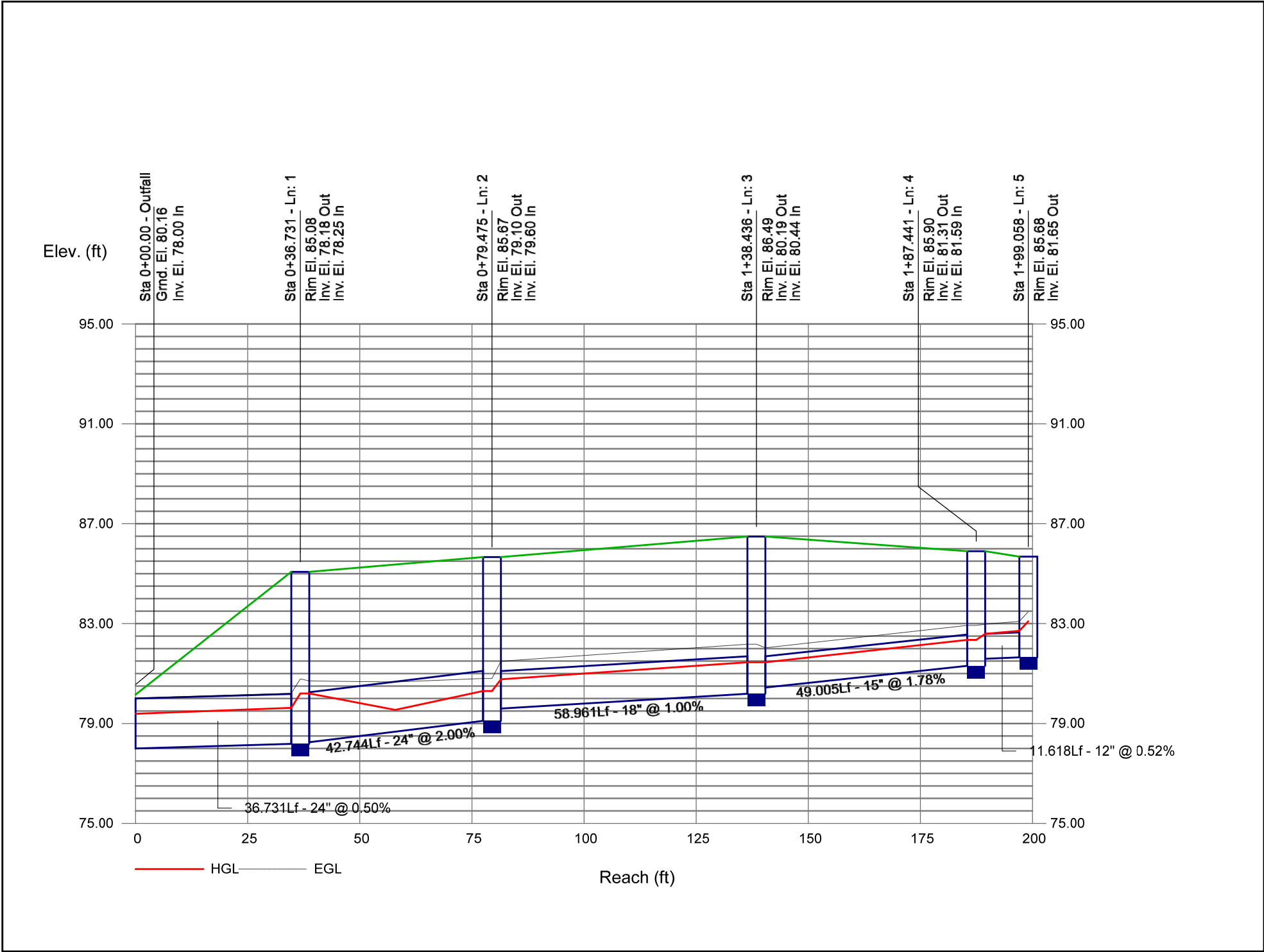
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	36.731	0.00	3.25	0.00	0.00	1.64	0.0	7.5	9.0	14.85	17.33	6.25	24	0.50	78.00	78.18	79.39	79.63	80.16	85.08	Pipe - (60)
2	1	42.744	0.00	2.43	0.00	0.00	1.19	0.0	6.4	9.4	11.13	34.65	4.62	24	2.00	78.25	79.10	80.20	80.30	85.08	85.67	Pipe - (59) (1)
3	2	58.961	0.00	2.37	0.00	0.00	1.15	0.0	6.3	9.4	10.83	11.38	7.08	18	1.00	79.60	80.19	80.77	81.45	85.67	86.49	Pipe - (59)
4	3	49.005	0.00	1.42	0.00	0.00	0.70	0.0	6.1	9.5	6.66	9.32	6.19	15	1.78	80.44	81.31	81.45	82.35	86.49	85.90	Pipe - (53)
5	4	11.618	0.83	0.83	0.50	0.41	0.41	6.0	6.0	9.5	3.90	2.77	4.97	12	0.52	81.59	81.65	82.59	82.71	85.90	85.68	Pipe - (64)
6	3	58.819	0.00	0.95	0.00	0.00	0.45	0.0	6.1	9.5	4.25	8.64	4.44	15	1.53	80.44	81.34	81.45	82.17	86.49	85.93	Pipe - (55)
7	6	12.721	0.59	0.59	0.46	0.27	0.27	6.0	6.0	9.5	2.58	2.86	4.13	12	0.55	81.59	81.66	82.33	82.40	85.93	85.70	Pipe - (63)
8	6	14.524	0.36	0.36	0.49	0.18	0.18	6.0	6.0	9.5	1.68	2.86	3.65	12	0.55	81.59	81.67	82.17	82.22	85.93	85.70	Pipe - (62)
9	4	13.480	0.59	0.59	0.50	0.29	0.29	6.0	6.0	9.5	2.77	2.78	4.04	12	0.52	81.56	81.63	82.38	82.45	85.90	85.67	Pipe - (65)
10	2	14.276	0.04	0.04	0.49	0.02	0.02	6.0	6.0	9.5	0.19	3.82	2.25	12	0.98	81.15	81.29	81.30	81.47	85.67	85.59	Pipe - (66)
11	2	7.474	0.02	0.02	0.90	0.02	0.02	6.0	6.0	9.5	0.17	6.62	2.77	12	2.94	81.15	81.37	81.26	81.54	85.67	85.58	Pipe - (67)
12	1	126.078	0.00	0.82	0.00	0.00	0.45	0.0	6.6	9.3	4.22	8.04	2.39	18	0.50	78.25	78.88	80.20	80.37	85.08	83.69	Pipe - (69)
13	12	75.770	0.00	0.82	0.00	0.00	0.45	0.0	6.1	9.5	4.29	7.43	2.57	18	0.50	78.88	79.26	80.41	80.51	83.69	82.97	Pipe - (58)
14	13	13.523	0.17	0.17	0.90	0.15	0.15	6.0	6.0	9.5	1.45	3.62	2.74	12	1.04	79.66	79.80	80.62	80.31	82.97	82.81	Pipe - (42)
15	13	17.637	0.65	0.65	0.46	0.30	0.30	6.0	6.0	9.5	2.85	3.60	4.19	12	1.02	79.66	79.84	80.62	80.56	82.97	82.81	Pipe - (44)
Project File: Storm-FL2.stm																Number of lines: 15				Run Date: 12/12/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile

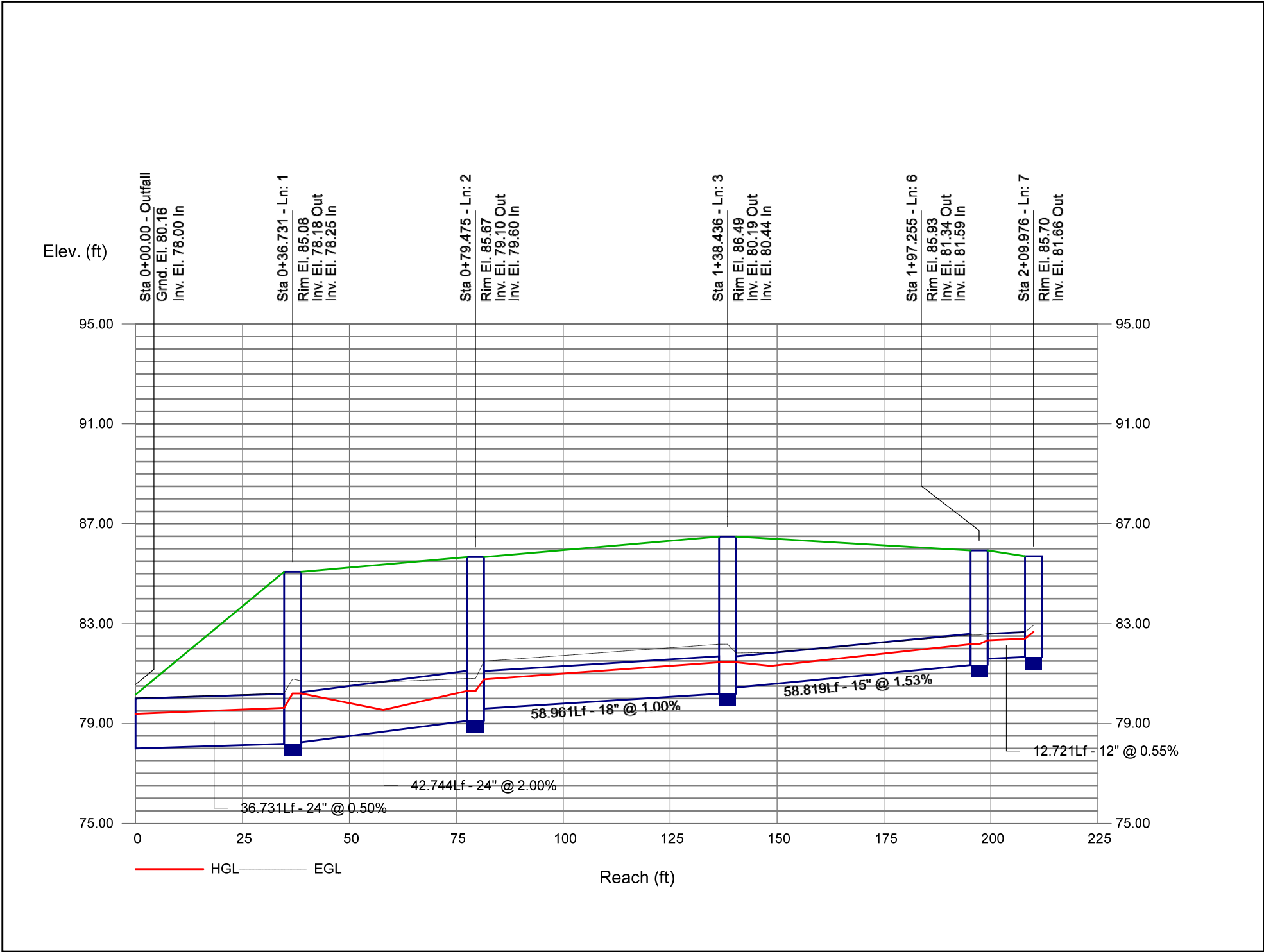
Proj. file: Storm-FL2.stm



Storm Sewer Profile



Storm Sewer Profile



The diagram illustrates the layout of a wastewater treatment plant, showing the flow path from various treatment units to an outfall. The units are labeled with codes, and the flow path is indicated by numbered lines (1-18).

Units and Flow Path:

- CB1A-WL** (Bottom Left) connects to **DMH1-WL** (Line 16).
- DMH1-WL** connects to **DMH2-WL** (Line 15).
- DMH2-WL** connects to **DMH3-WL** (Line 14).
- DMH3-WL** connects to **DMH4-W1A** (Line 13).
- DMH4-W1A** connects to **DMH5-W1A** (Line 12).
- DMH5-W1A** connects to **DMH6-W1A** (Line 11).
- DMH6-W1A** connects to **DMH7-W1A** (Line 10).
- DMH7-W1A** connects to **DMH8-W1A** (Line 9).
- DMH8-W1A** connects to **DMH9-W1A** (Line 8).
- DMH9-W1A** connects to **DMH10-W1A** (Line 7).
- DMH10-W1A** connects to **DMH11-W1A** (Line 6).
- DMH11-W1A** connects to **DMH12-W1A** (Line 5).
- DMH12-W1A** connects to **DMH13-W1A** (Line 4).
- DMH13-W1A** connects to **DMH14-W1A** (Line 3).
- DMH14-W1A** connects to **DMH15-W1A** (Line 2).
- DMH15-W1A** connects to **DMH16-W1A** (Line 1).
- DMH16-W1A** connects to the **Outfall** (Line 1).

Other Units:

- CB1A-W1A** (Top Left) connects to **DMH1-W1A** (Line 98).
- CB1B-W1A** (Top Left) connects to **DMH1-W1A** (Line 98).
- CB2A-W1A** (Middle Left) connects to **DMH3-W1A** (Line 110).
- CB2B-W1A** (Middle Left) connects to **DMH3-W1A** (Line 110).
- CB2A-WL** (Bottom Left) connects to **DMH1-WL** (Line 15).
- CB2B-WL** (Bottom Left) connects to **DMH1-WL** (Line 15).
- CB3A-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3B-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3C-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3D-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3E-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3F-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3G-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3H-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3I-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3J-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3K-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3L-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3M-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3N-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3O-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3P-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3Q-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3R-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3S-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3T-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3U-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3V-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3W-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3X-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3Y-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).
- CB3Z-W1A** (Bottom Left) connects to **DMH7-W1A** (Line 18).

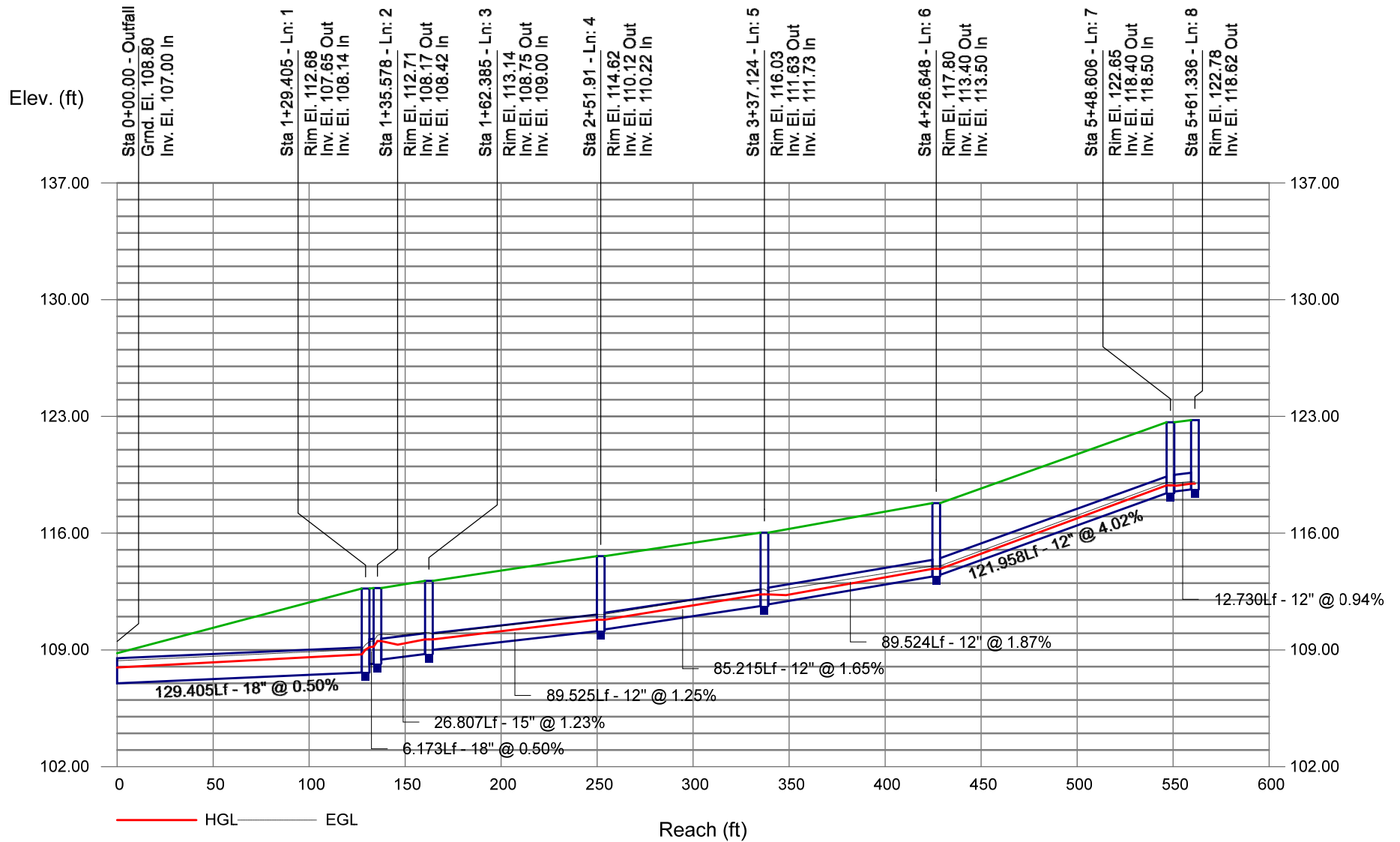
Date: 12/11/2023

Storm Sewer Tabulation

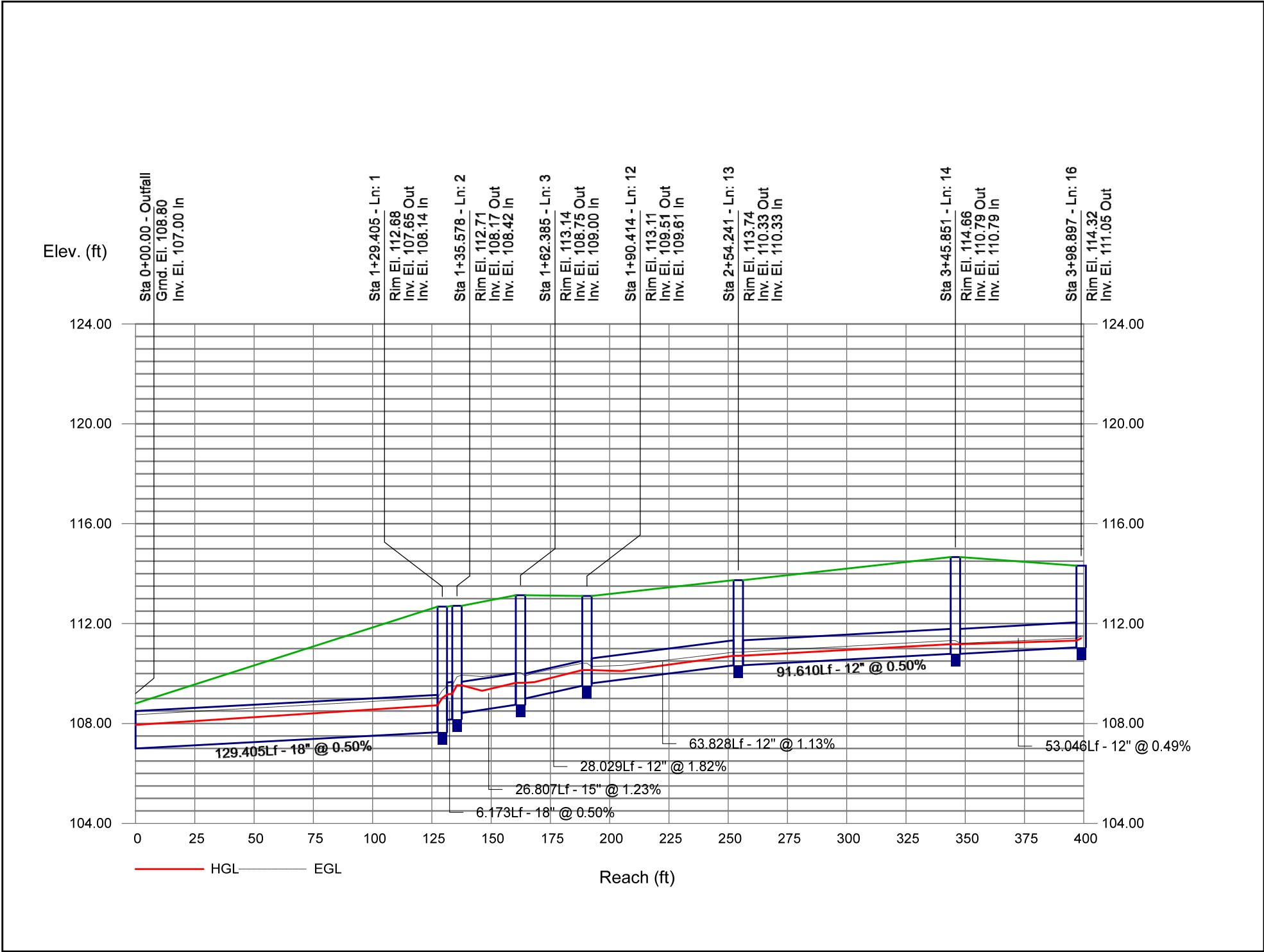
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID	
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up		
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		
1	End	129.405	0.00	1.56	0.00	0.00	0.92	0.0	7.8	6.5	5.99	7.43	4.75	18	0.50	107.00	107.65	107.94	108.73	108.80	112.68	Pipe - (324)	
2	1	6.173	0.00	1.56	0.00	0.00	0.92	0.0	7.8	6.5	6.00	7.43	4.68	18	0.50	108.14	108.17	109.16	109.19	112.68	112.71	Pipe - (325)	
3	2	26.807	0.00	1.24	0.00	0.00	0.72	0.0	7.7	6.5	4.73	7.16	4.61	15	1.23	108.42	108.75	109.53	109.63	112.71	113.14	Pipe - (228)	
4	3	89.525	0.00	0.64	0.00	0.00	0.39	0.0	7.4	6.6	2.61	4.31	4.76	12	1.25	109.00	110.12	109.63	110.81	113.14	114.62	Pipe - (315)	
5	4	85.215	0.00	0.64	0.00	0.00	0.39	0.0	7.1	6.7	2.64	4.96	5.01	12	1.65	110.22	111.63	110.81	112.33	114.62	116.03	Pipe - (314)	
6	5	89.524	0.00	0.24	0.00	0.00	0.17	0.0	6.6	6.8	1.19	5.27	2.90	12	1.87	111.73	113.40	112.33	113.86	116.03	117.80	Pipe - (311)	
7	6	121.958	0.00	0.24	0.00	0.00	0.17	0.0	6.1	6.9	1.21	7.74	4.06	12	4.02	113.50	118.40	113.86	118.86	117.80	122.65	Pipe - (308)	
8	7	12.730	0.11	0.11	0.90	0.10	0.10	6.0	6.0	7.0	0.69	3.75	2.77	12	0.94	118.50	118.62	118.86	118.97	122.65	122.78	Pipe - (309)	
9	7	11.698	0.13	0.13	0.58	0.08	0.08	6.0	6.0	7.0	0.52	3.91	2.34	12	1.03	118.50	118.62	118.86	118.92	122.65	122.72	Pipe - (310)	
10	5	10.655	0.12	0.12	0.68	0.08	0.08	6.0	6.0	7.0	0.57	3.92	1.94	12	1.03	111.73	111.84	112.33	112.15	116.03	115.89	Pipe - (312)	
11	5	10.630	0.28	0.28	0.50	0.14	0.14	6.0	6.0	7.0	0.97	3.92	2.57	12	1.03	111.73	111.84	112.33	112.25	116.03	115.89	Pipe - (313)	
12	3	28.029	0.00	0.60	0.00	0.00	0.33	0.0	7.4	6.6	2.17	4.80	4.17	12	1.82	109.00	109.51	109.63	110.14	113.14	113.11	Pipe - (615)	
13	12	63.828	0.00	0.21	0.00	0.00	0.12	0.0	6.9	6.7	0.84	3.78	2.51	12	1.13	109.61	110.33	110.14	110.71	113.11	113.74	Pipe - (614)	
14	13	91.610	0.00	0.21	0.00	0.00	0.12	0.0	6.4	6.8	0.85	2.73	3.06	12	0.50	110.33	110.79	110.72	111.18	113.74	114.66	Pipe - (613)	
15	14	37.458	0.11	0.11	0.59	0.07	0.07	6.0	6.0	7.0	0.45	2.54	2.06	12	0.51	110.79	110.98	111.18	111.26	114.66	114.30	Pipe - (611)	
16	14	53.046	0.10	0.10	0.60	0.06	0.06	6.0	6.0	7.0	0.42	2.49	1.97	12	0.49	110.79	111.05	111.18	111.32	114.66	114.32	Pipe - (612)	
17	12	11.285	0.20	0.20	0.47	0.09	0.09	6.0	6.0	7.0	0.65	2.60	1.66	12	0.53	109.61	109.67	110.14	110.14	113.11	112.97	Pipe - (617)	
18	12	10.225	0.19	0.19	0.58	0.11	0.11	6.0	6.0	7.0	0.77	2.49	1.93	12	0.49	109.61	109.66	110.14	110.14	113.11	112.92	Pipe - (616)	
19	2	10.421	0.12	0.12	0.66	0.08	0.08	6.0	6.0	7.0	0.55	5.48	0.70	12	2.02	108.17	108.38	109.53	109.53	112.71	112.47	Pipe - (239)	
20	2	10.307	0.20	0.20	0.59	0.12	0.12	6.0	6.0	7.0	0.82	5.51	1.05	12	2.04	108.17	108.38	109.53	109.54	112.71	112.47	Pipe - (238)	
Project File: Storm-W1A.stm																Number of lines: 20				Run Date: 12/11/2023			
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																							

Storm Sewer Profile

Proj. file: Storm-W1A.stm



Storm Sewer Profile



The diagram illustrates the layout of a wastewater treatment plant, showing the flow path from various treatment units to an outfall. The units are labeled with codes, and the flow path is indicated by numbered lines (1-18).

Units and Labels:

- CB1A-WL
- DMH1-WL
- CB1B-WL
- DMH2-WL
- DMH3-WL
- DMH4-W1A
- DMH5-W1A
- DMH6-W1A
- DMH7-W1A
- DMH8-W1A
- DMH9-W1A
- DMH10-W1A
- DMH11-W1A
- DMH12-W1A
- DMH13-W1A
- DMH14-W1A
- DMH15-W1A
- DMH16-W1A
- DMH17-W1A
- DMH18-W1A
- DMH19-W1A
- DMH20-W1A
- DMH21-W1A
- DMH22-W1A
- DMH23-W1A
- DMH24-W1A
- DMH25-W1A
- DMH26-W1A
- DMH27-W1A
- DMH28-W1A
- DMH29-W1A
- DMH30-W1A
- DMH31-W1A
- DMH32-W1A
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- DMH38-W1A
- DMH39-W1A
- DMH40-W1A
- DMH41-W1A
- DMH42-W1A
- DMH43-W1A
- DMH44-W1A
- DMH45-W1A
- DMH46-W1A
- DMH47-W1A
- DMH48-W1A
- DMH49-W1A
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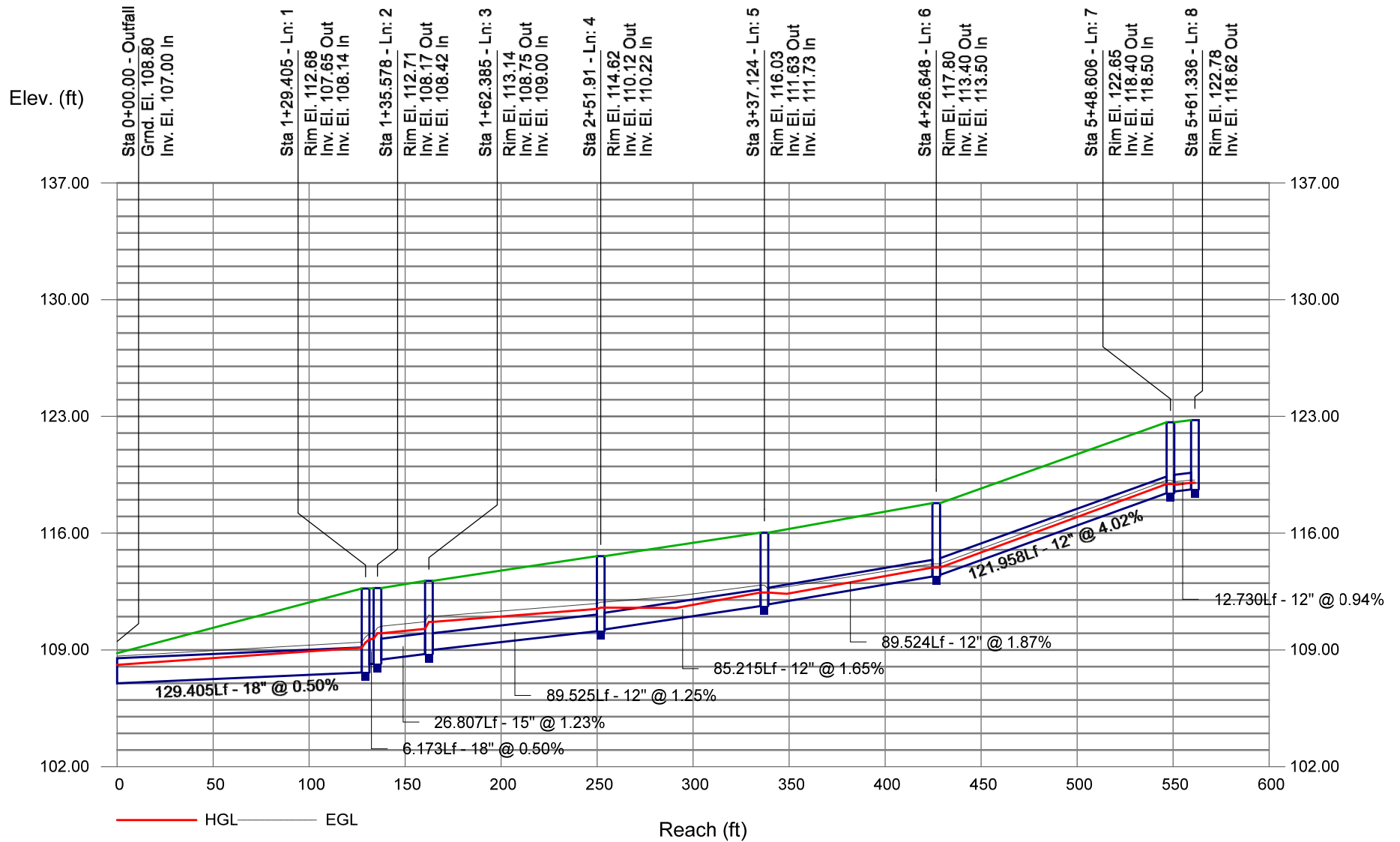
Date: 12/11/2023

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID	
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up		
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		
1	End	129.405	0.00	1.56	0.00	0.00	0.92	0.0	8.1	8.8	8.13	7.43	5.22	18	0.50	107.00	107.65	108.10	109.13	108.80	112.68	Pipe - (324)	
2	1	6.173	0.00	1.56	0.00	0.00	0.92	0.0	8.1	8.8	8.14	7.43	4.61	18	0.50	108.14	108.17	109.64	109.67	112.68	112.71	Pipe - (325)	
3	2	26.807	0.00	1.24	0.00	0.00	0.72	0.0	8.0	8.9	6.41	7.16	5.23	15	1.23	108.42	108.75	110.00	110.26	112.71	113.14	Pipe - (228)	
4	3	89.525	0.00	0.64	0.00	0.00	0.39	0.0	7.3	9.1	3.59	4.31	4.57	12	1.25	109.00	110.12	110.68	111.45	113.14	114.62	Pipe - (315)	
5	4	85.215	0.00	0.64	0.00	0.00	0.39	0.0	7.0	9.2	3.62	4.96	4.96	12	1.65	110.22	111.63	111.54	112.44	114.62	116.03	Pipe - (314)	
6	5	89.524	0.00	0.24	0.00	0.00	0.17	0.0	6.5	9.3	1.62	5.27	3.23	12	1.87	111.73	113.40	112.44	113.94	116.03	117.80	Pipe - (311)	
7	6	121.958	0.00	0.24	0.00	0.00	0.17	0.0	6.1	9.5	1.65	7.74	4.34	12	4.02	113.50	118.40	113.94	118.94	117.80	122.65	Pipe - (308)	
8	7	12.730	0.11	0.11	0.90	0.10	0.10	6.0	6.0	9.5	0.94	3.75	2.96	12	0.94	118.50	118.62	118.94	119.03	122.65	122.78	Pipe - (309)	
9	7	11.698	0.13	0.13	0.58	0.08	0.08	6.0	6.0	9.5	0.71	3.91	2.50	12	1.03	118.50	118.62	118.94	118.97	122.65	122.72	Pipe - (310)	
10	5	10.655	0.12	0.12	0.68	0.08	0.08	6.0	6.0	9.5	0.78	3.92	2.13	12	1.03	111.73	111.84	112.44	112.21	116.03	115.89	Pipe - (312)	
11	5	10.630	0.28	0.28	0.50	0.14	0.14	6.0	6.0	9.5	1.32	3.92	2.85	12	1.03	111.73	111.84	112.44	112.32	116.03	115.89	Pipe - (313)	
12	3	28.029	0.00	0.60	0.00	0.00	0.33	0.0	7.9	8.9	2.92	4.80	3.72	12	1.82	109.00	109.51	110.68	110.87	113.14	113.11	Pipe - (615)	
13	12	63.828	0.00	0.21	0.00	0.00	0.12	0.0	7.2	9.1	1.14	3.78	1.56	12	1.13	109.61	110.33	111.09	111.14	113.11	113.74	Pipe - (614)	
14	13	91.610	0.00	0.21	0.00	0.00	0.12	0.0	6.6	9.3	1.16	2.73	2.37	12	0.50	110.33	110.79	111.16	111.28	113.74	114.66	Pipe - (613)	
15	14	37.458	0.11	0.11	0.59	0.07	0.07	6.0	6.0	9.5	0.62	2.54	1.49	12	0.51	110.79	110.98	111.42	111.43	114.66	114.30	Pipe - (611)	
16	14	53.046	0.10	0.10	0.60	0.06	0.06	6.0	6.0	9.5	0.57	2.49	1.51	12	0.49	110.79	111.05	111.42	111.45	114.66	114.32	Pipe - (612)	
17	12	11.285	0.20	0.20	0.47	0.09	0.09	6.0	6.0	9.5	0.88	2.60	1.12	12	0.53	109.61	109.67	111.09	111.09	113.11	112.97	Pipe - (617)	
18	12	10.225	0.19	0.19	0.58	0.11	0.11	6.0	6.0	9.5	1.05	2.49	1.34	12	0.49	109.61	109.66	111.09	111.09	113.11	112.92	Pipe - (616)	
19	2	10.421	0.12	0.12	0.66	0.08	0.08	6.0	6.0	9.5	0.75	5.48	0.95	12	2.02	108.17	108.38	110.00	110.00	112.71	112.47	Pipe - (239)	
20	2	10.307	0.20	0.20	0.59	0.12	0.12	6.0	6.0	9.5	1.12	5.51	1.43	12	2.04	108.17	108.38	110.00	110.01	112.71	112.47	Pipe - (238)	
Project File: Storm-W1A.stm																Number of lines: 20				Run Date: 12/11/2023			
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																							

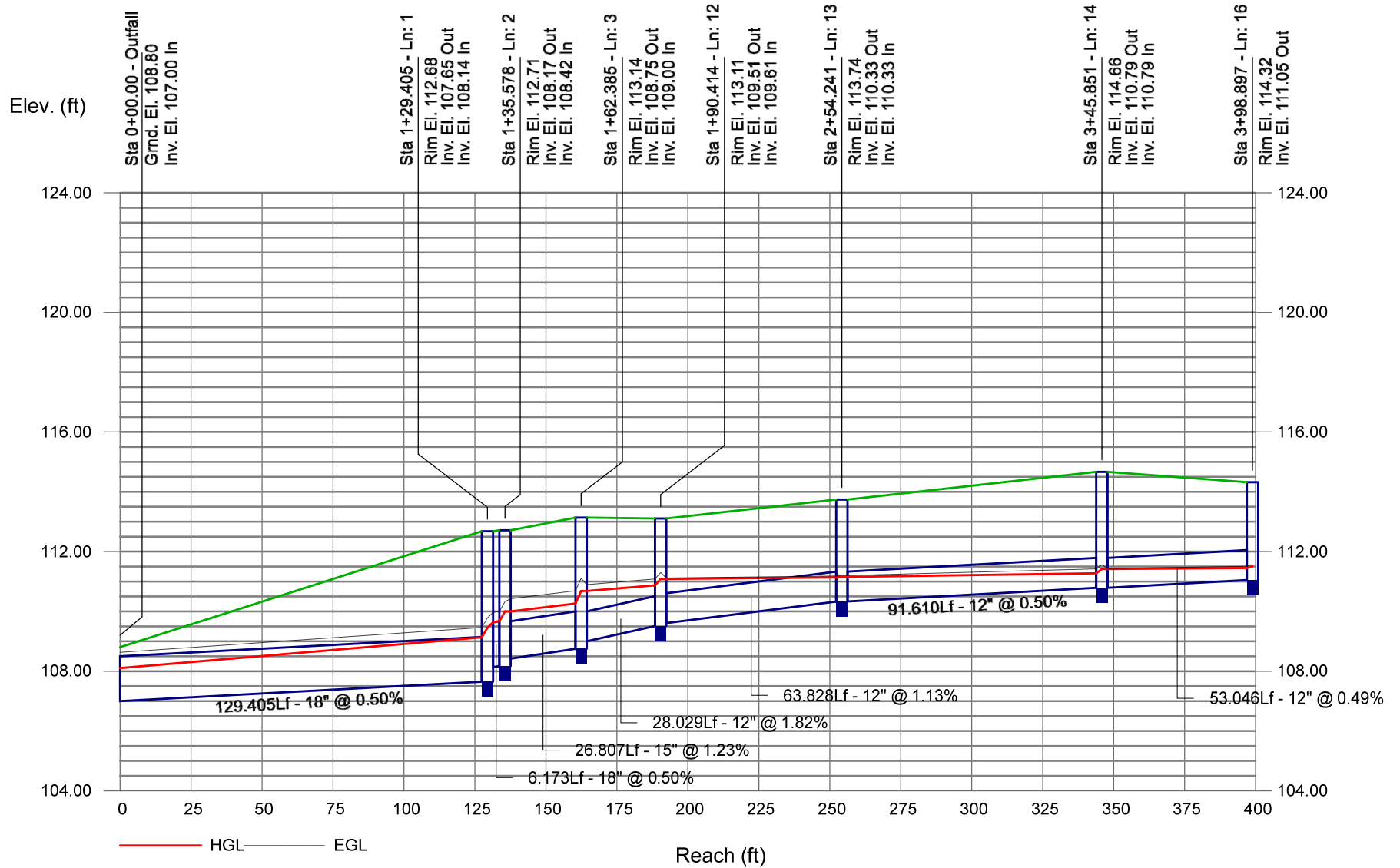
Storm Sewer Profile

Proj. file: Storm-W1A.stm

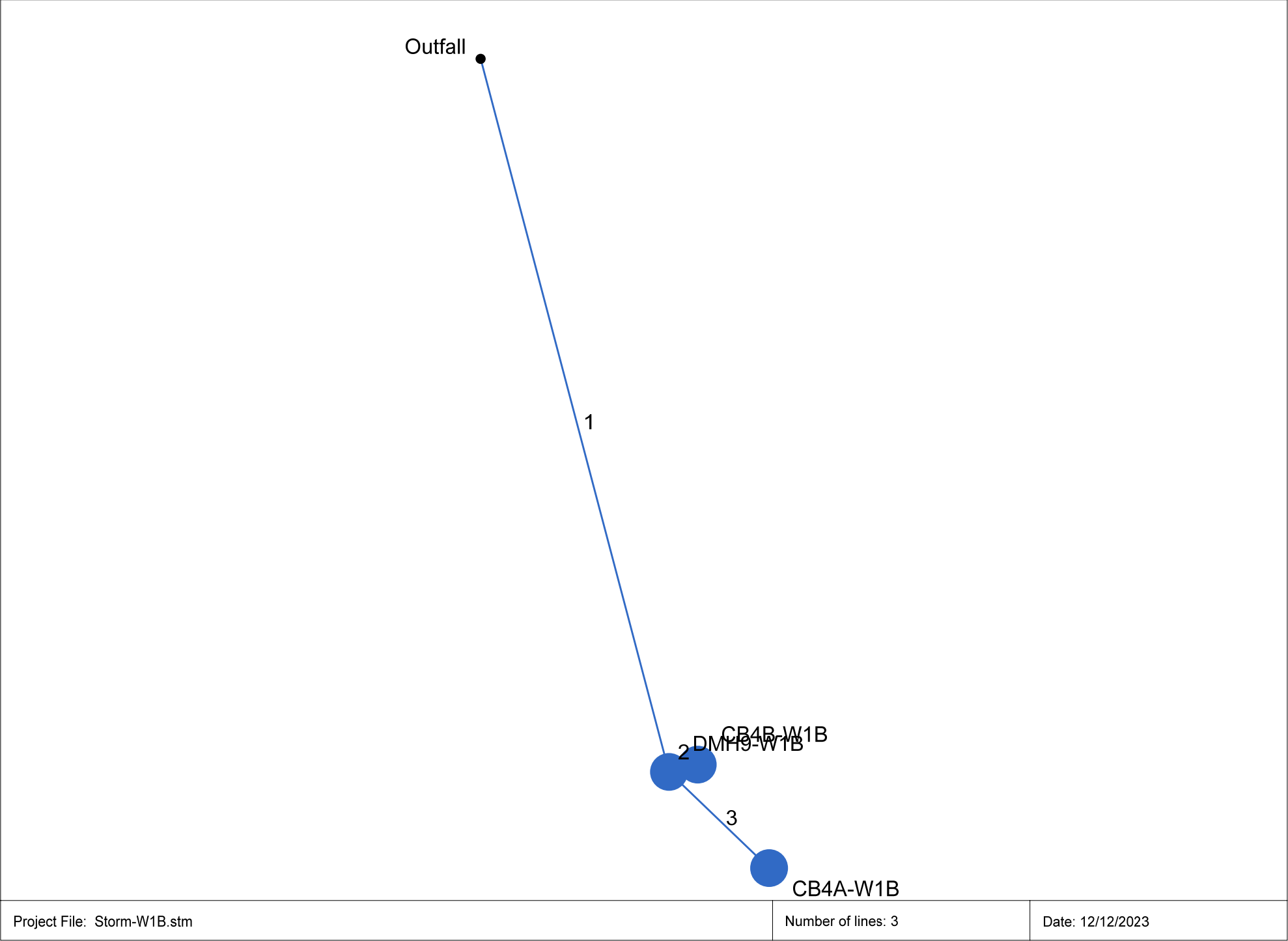


Storm Sewer Profile

Proj. file: Storm-W1A.stm



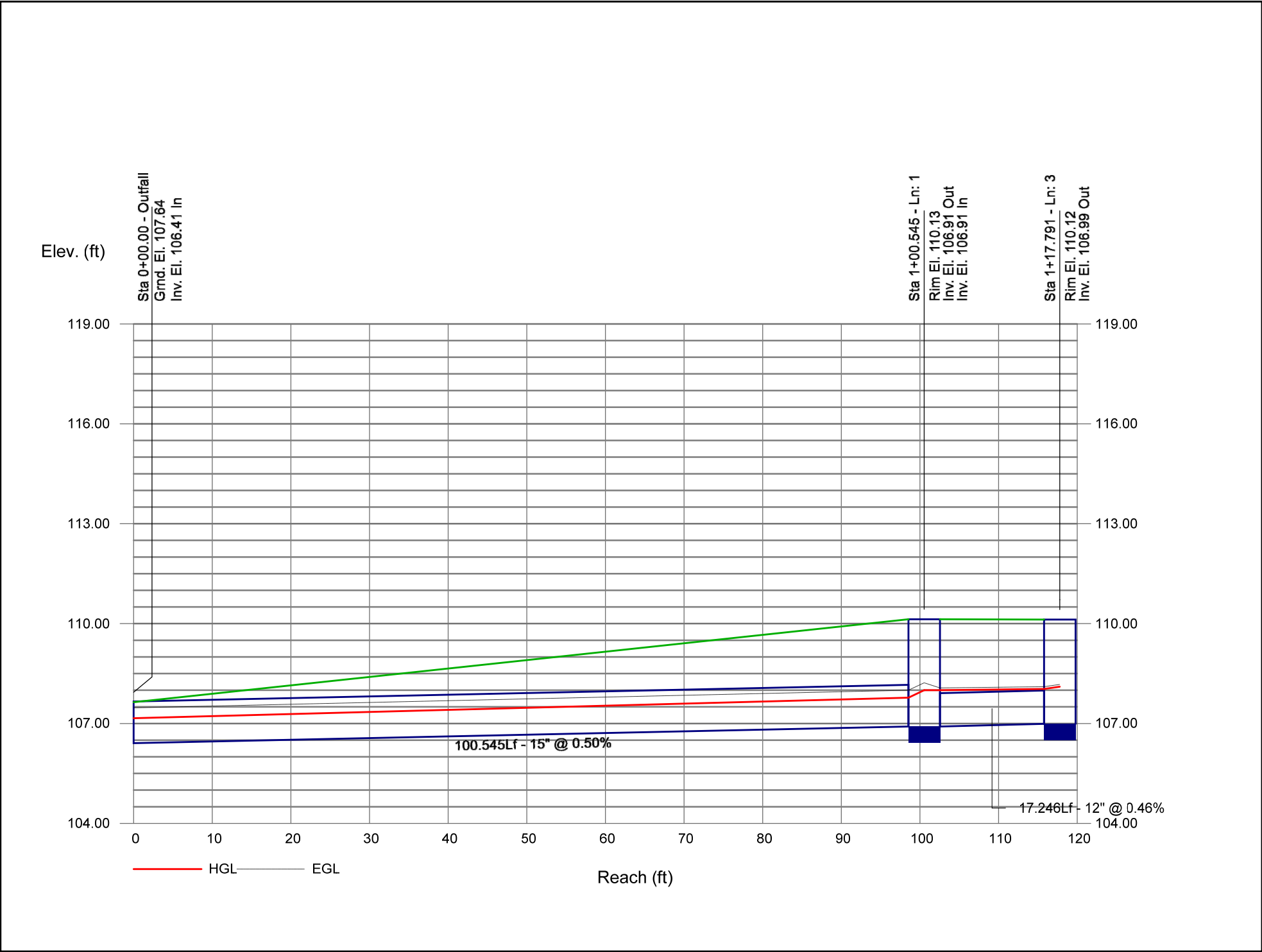
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



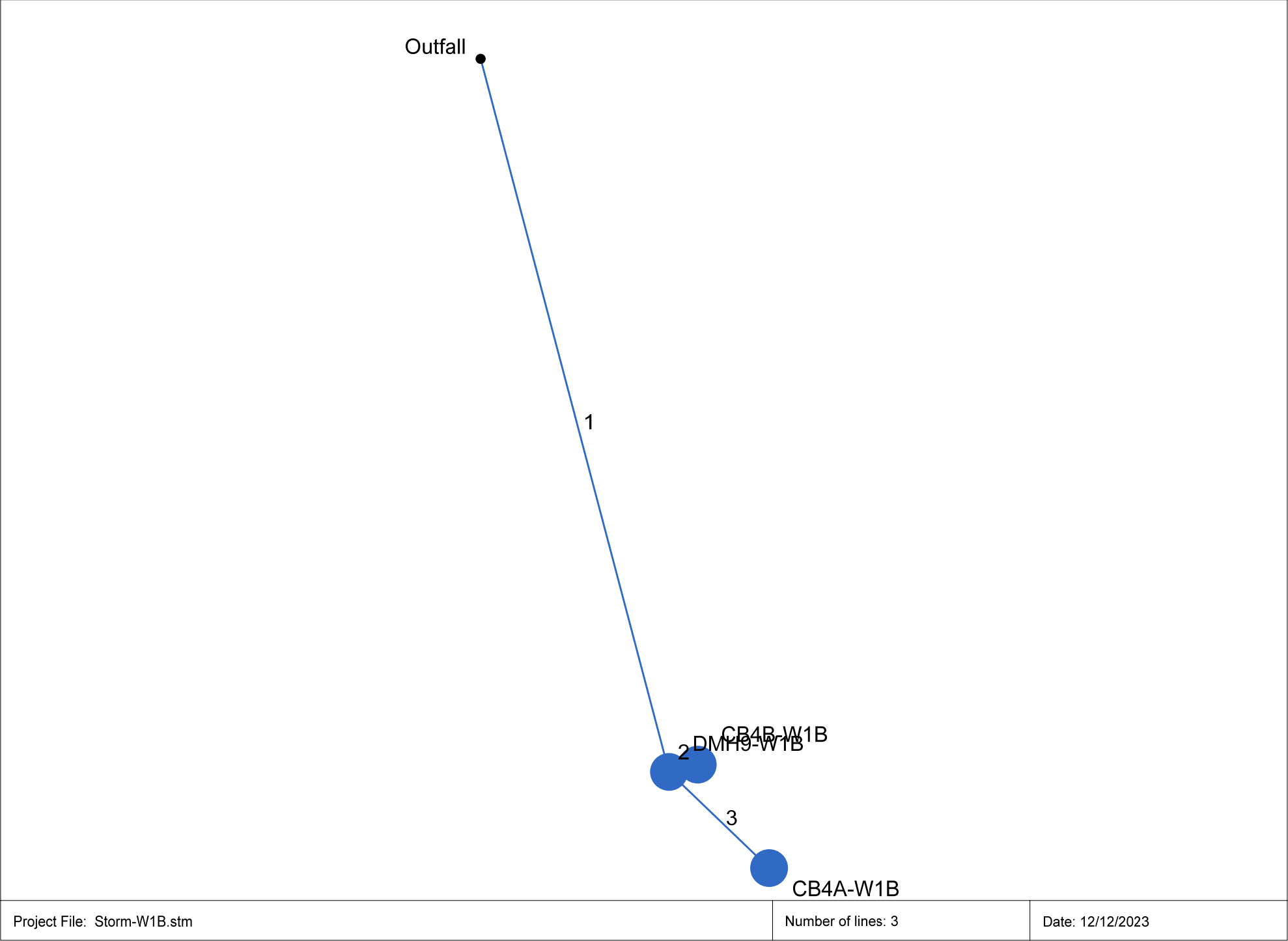
Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (327)	3.44	15	Cir	100.545	106.41	106.91	0.497	107.16	107.78	0.22	108.00	End	Manhole
2	Pipe - (322)	1.81	12	Cir	3.357	106.91	106.93	0.596	108.00*	108.01*	0.08	108.09	1	Grate
3	Pipe - (323)	1.65	12	Cir	17.246	106.91	106.99	0.464	108.00*	108.04*	0.07	108.11	1	Grate
Project File: Storm-W1B.stm									Number of lines: 3			Run Date: 12/12/2023		
NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown).														

Storm Sewer Profile



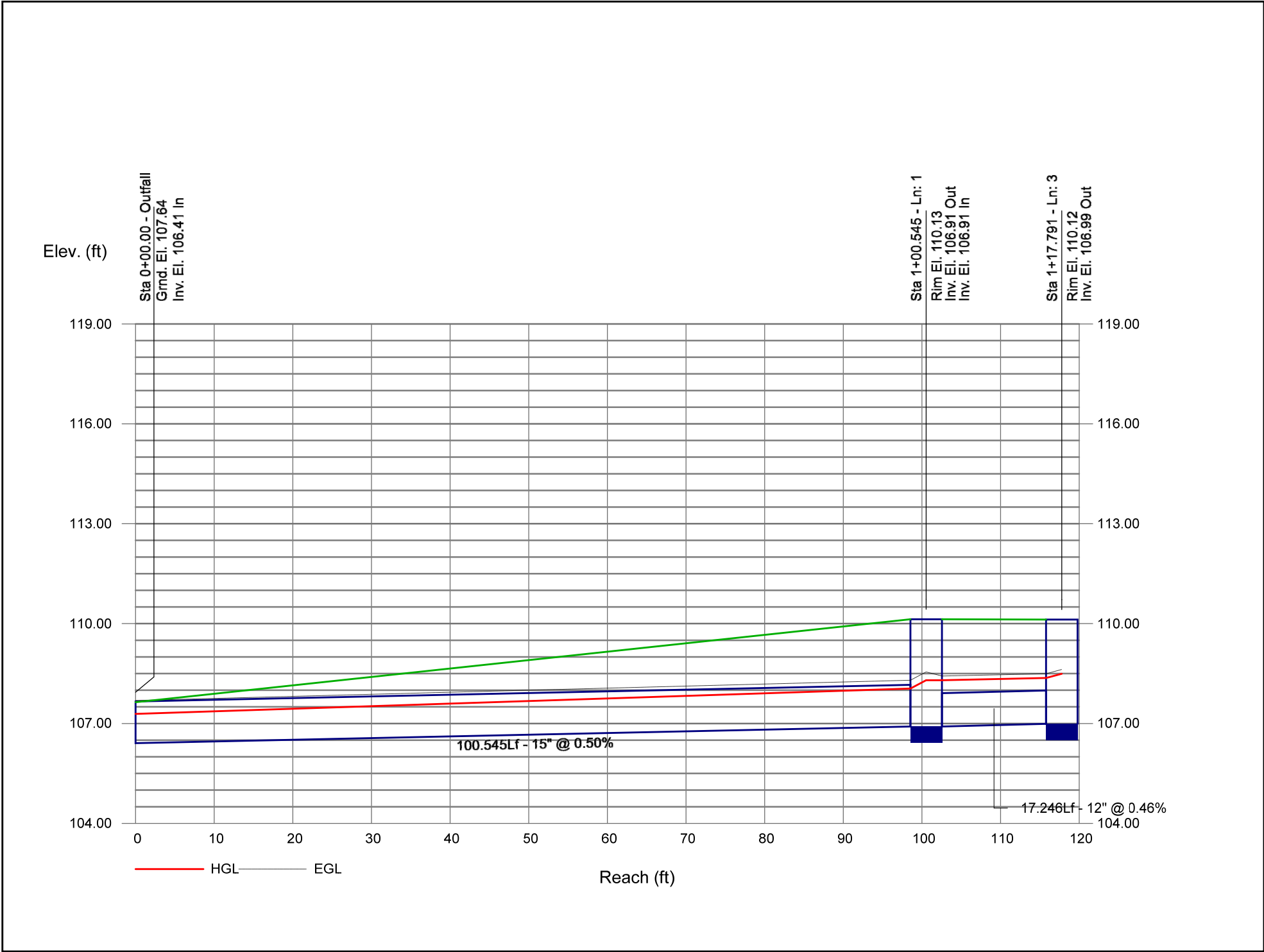
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



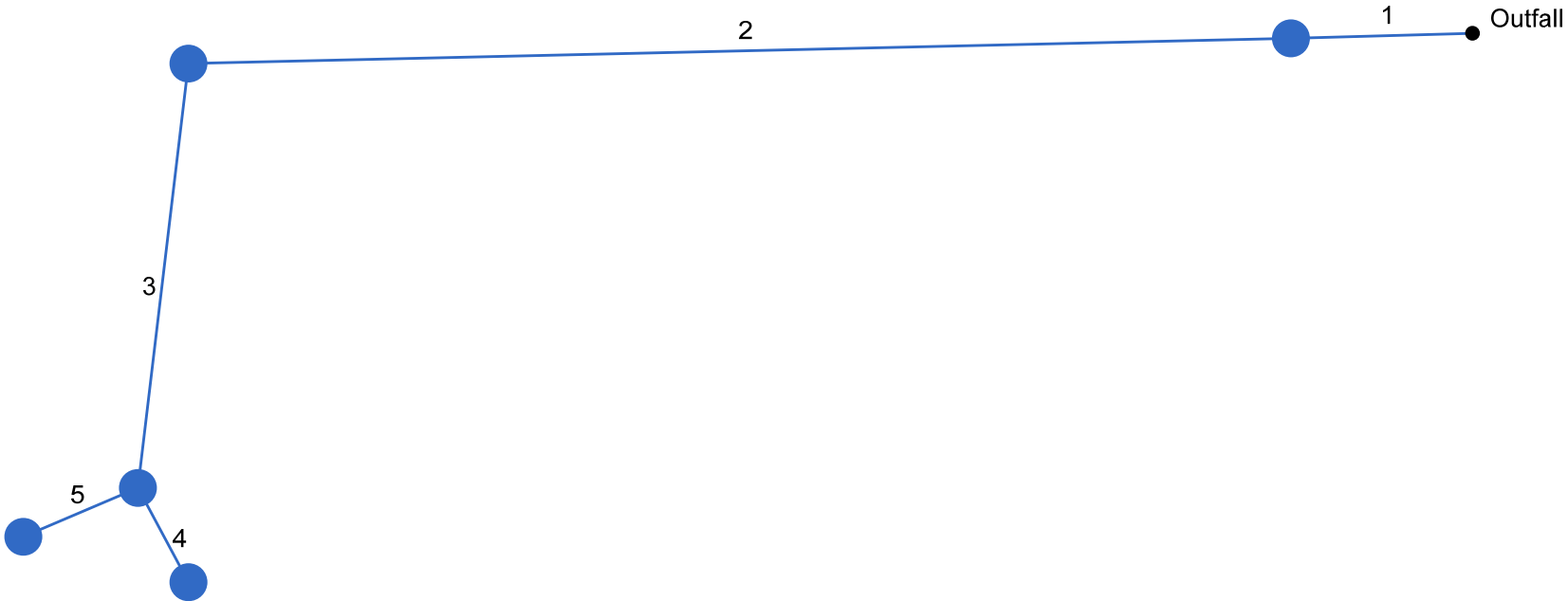
Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (327)	4.70	15	Cir	100.545	106.41	106.91	0.497	107.29	108.05	0.25	108.30	End	Manhole
2	Pipe - (322)	2.47	12	Cir	3.357	106.91	106.93	0.596	108.30*	108.32*	0.15	108.47	1	Grate
3	Pipe - (323)	2.25	12	Cir	17.246	106.91	106.99	0.464	108.30*	108.37*	0.13	108.50	1	Grate
Project File: Storm-W1B.stm									Number of lines: 3			Run Date: 12/12/2023		
NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown).														

Storm Sewer Profile



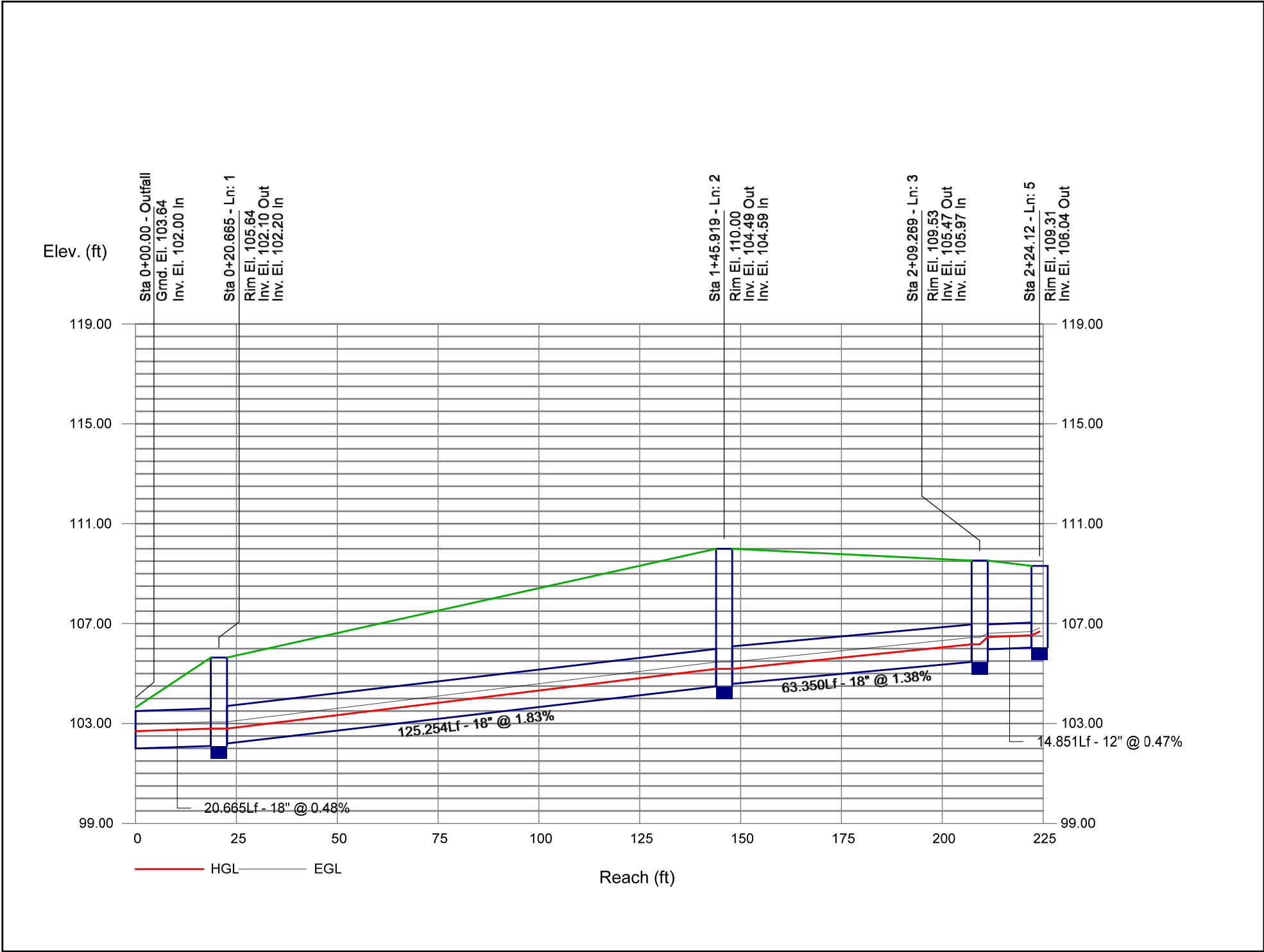
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



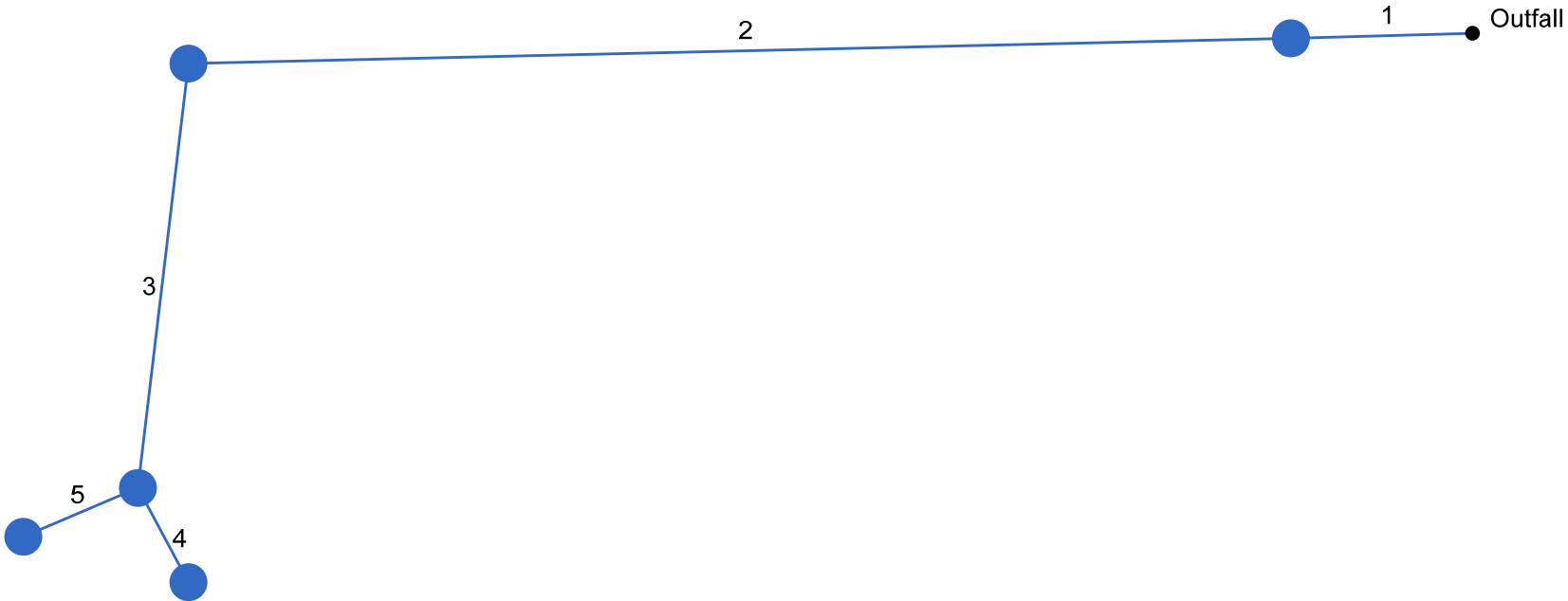
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID									
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up										
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)										
1	End	20.665	0.00	0.89	0.00	0.00	0.49	0.0	6.8	6.8	3.34	7.91	4.16	18	0.48	102.00	102.10	102.70	102.80	103.64	105.64	Pipe - (255) (1)									
2	1	125.254	0.00	0.89	0.00	0.00	0.49	0.0	6.3	6.9	3.40	15.37	4.69	18	1.83	102.20	104.49	102.80	105.19	105.64	110.00	Pipe - (255)									
3	2	63.350	0.00	0.89	0.00	0.00	0.49	0.0	6.1	6.9	3.43	12.34	4.70	18	1.38	104.59	105.47	105.19	106.17	110.00	109.53	Pipe - (254)									
4	3	15.255	0.56	0.56	0.58	0.32	0.32	6.0	6.0	7.0	2.25	2.58	3.70	12	0.52	105.97	106.05	106.69	106.77	109.53	109.31	Pipe - (252)									
5	3	14.851	0.33	0.33	0.52	0.17	0.17	6.0	6.0	7.0	1.19	2.44	3.09	12	0.47	105.97	106.04	106.46	106.53	109.53	109.31	Pipe - (253)									

Storm Sewer Profile



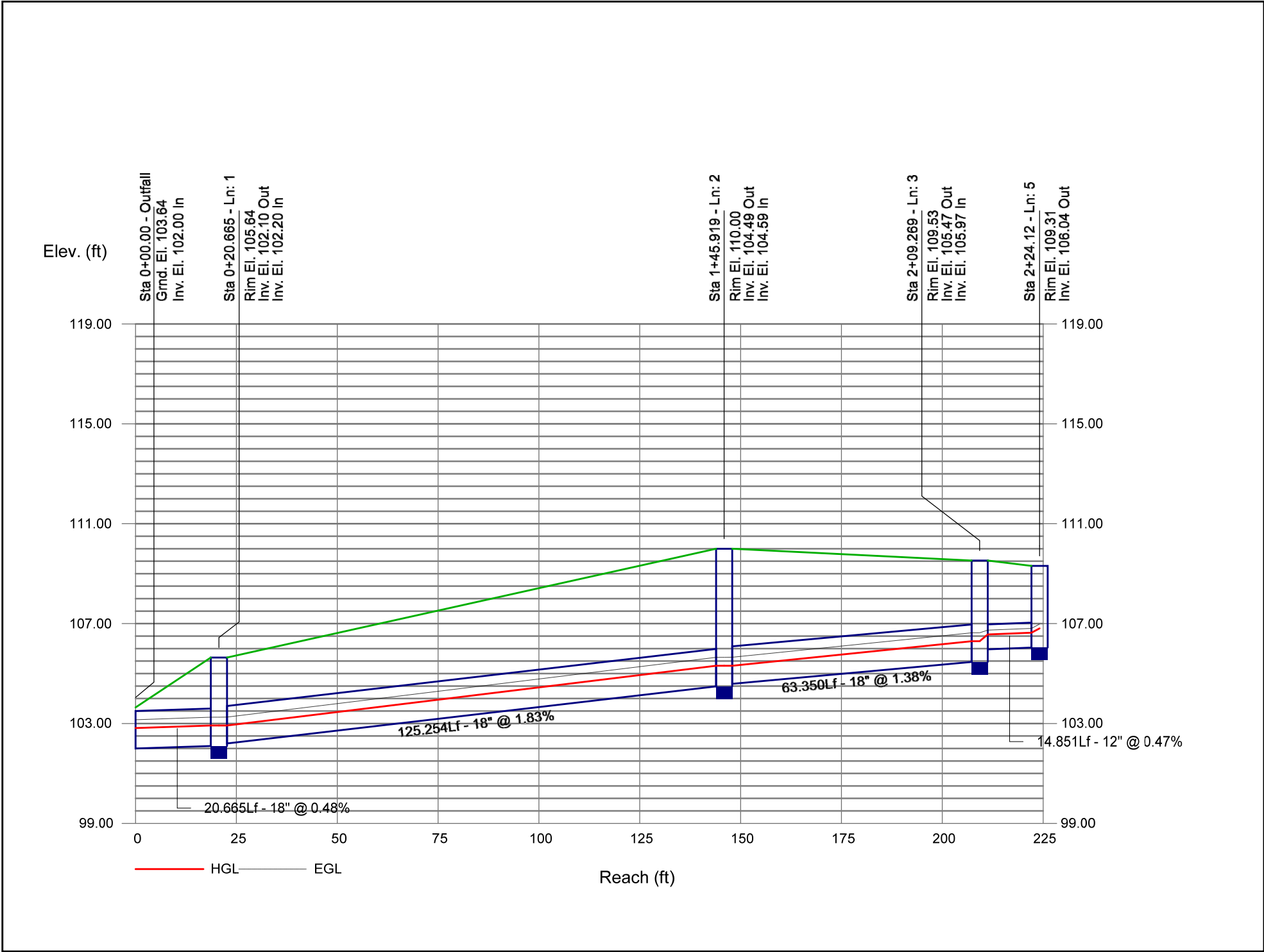
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



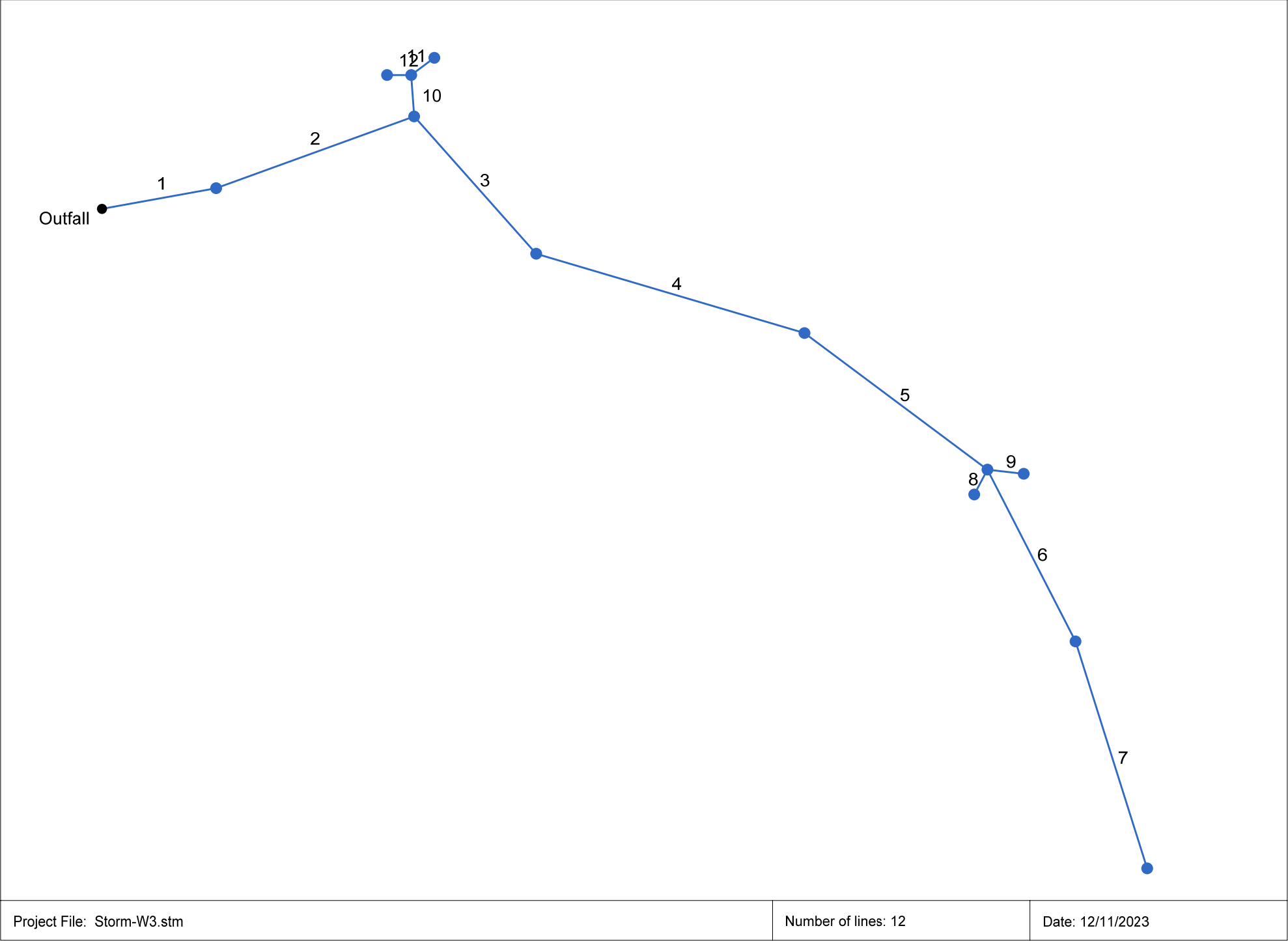
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	20.665	0.00	0.89	0.00	0.00	0.49	0.0	6.7	9.3	4.57	7.91	4.62	18	0.48	102.00	102.10	102.82	102.92	103.64	105.64	Pipe - (255) (1)
2	1	125.254	0.00	0.89	0.00	0.00	0.49	0.0	6.3	9.4	4.64	15.37	5.09	18	1.83	102.20	104.49	102.92	105.31	105.64	110.00	Pipe - (255)
3	2	63.350	0.00	0.89	0.00	0.00	0.49	0.0	6.1	9.5	4.67	12.34	5.10	18	1.38	104.59	105.47	105.31	106.29	110.00	109.53	Pipe - (254)
4	3	15.255	0.56	0.56	0.58	0.32	0.32	6.0	6.0	9.5	3.06	2.58	3.90	12	0.52	105.97	106.05	106.97	107.05	109.53	109.31	Pipe - (252)
5	3	14.851	0.33	0.33	0.52	0.17	0.17	6.0	6.0	9.5	1.62	2.44	3.33	12	0.47	105.97	106.04	106.57	106.64	109.53	109.31	Pipe - (253)
Project File: Storm-W2.stm																Number of lines: 5				Run Date: 12/11/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile



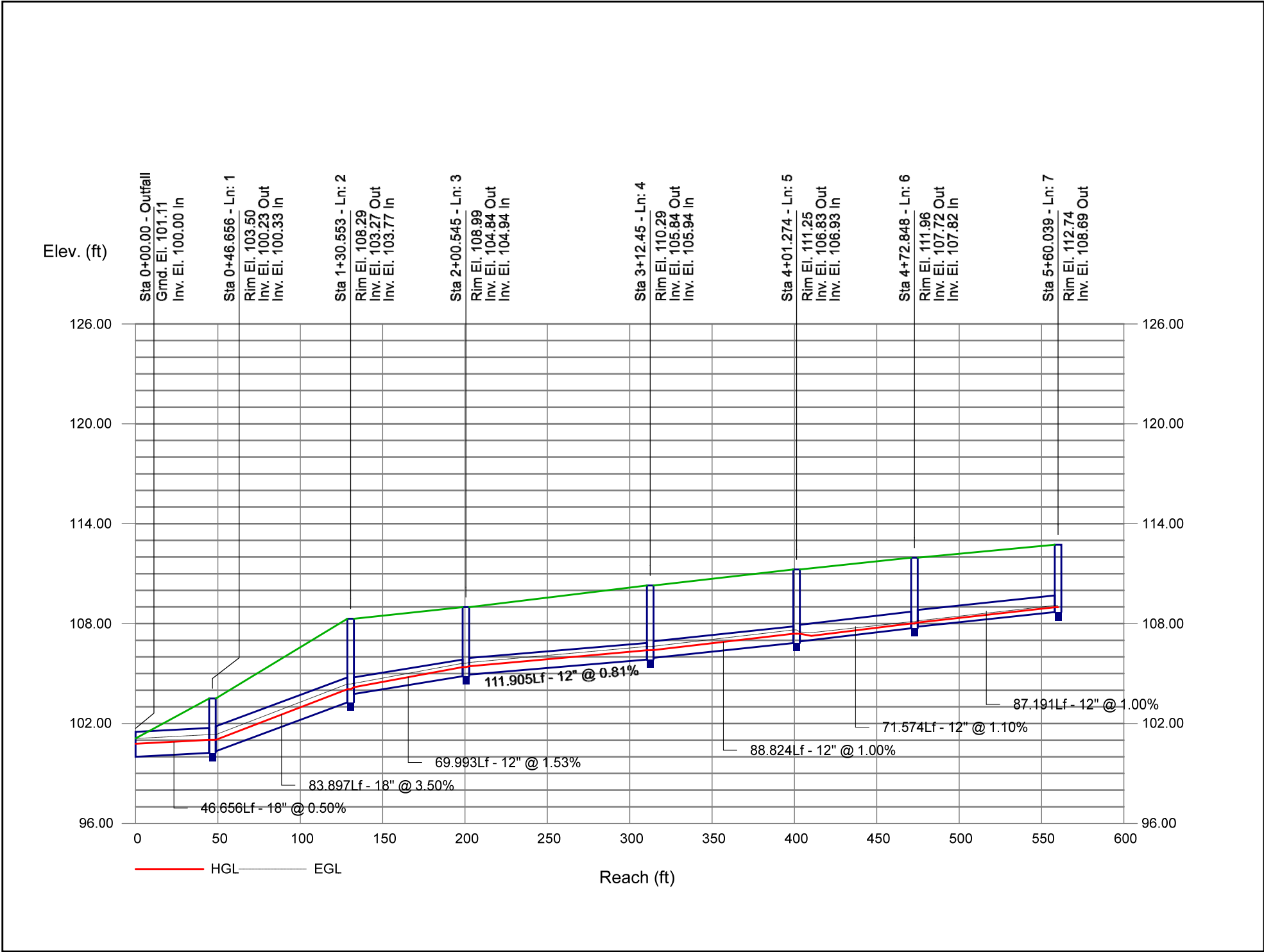
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



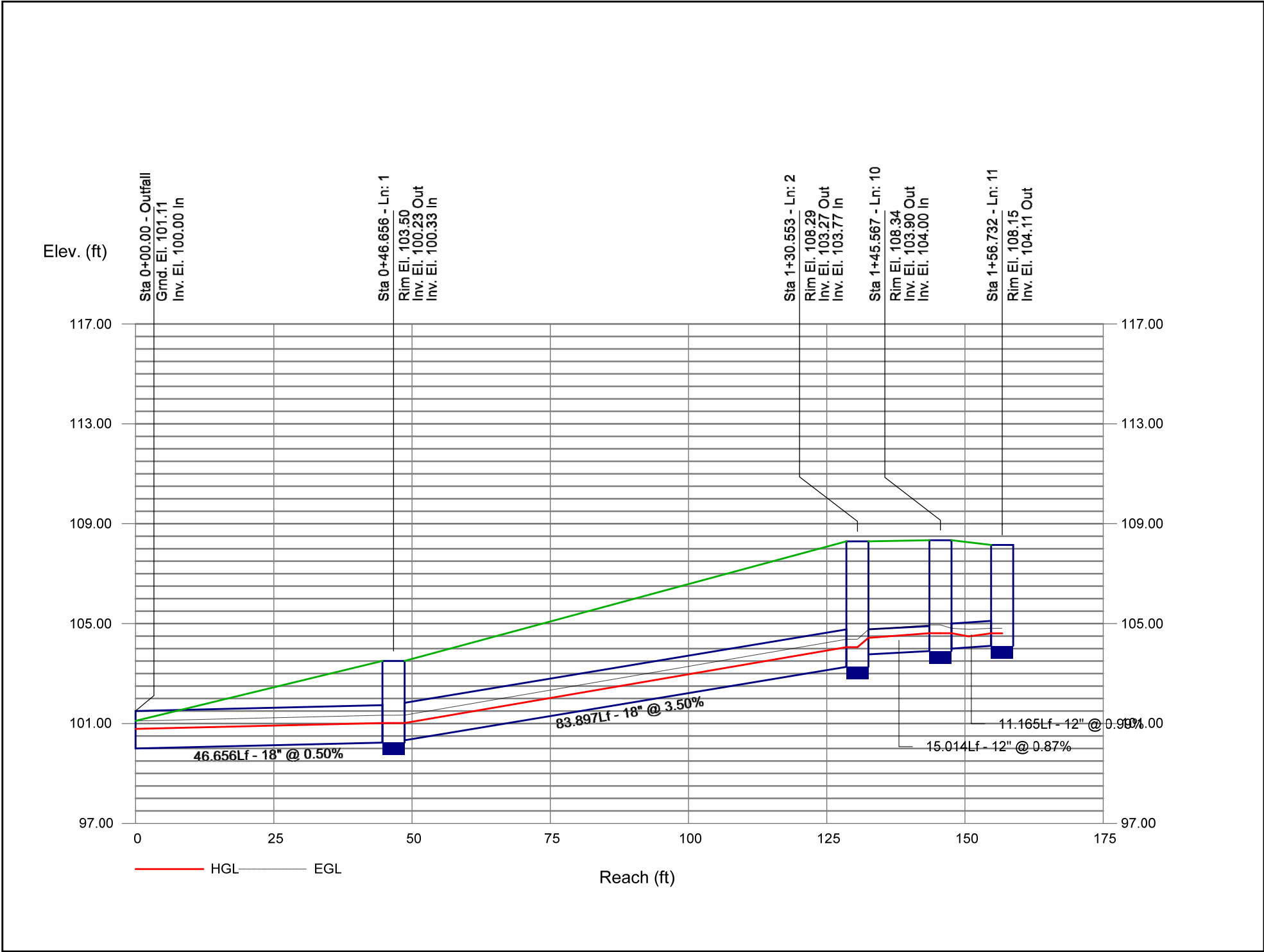
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	46.656	0.00	1.24	0.00	0.00	0.66	0.0	8.4	6.4	4.21	8.04	4.49	18	0.50	100.00	100.23	100.79	101.02	101.11	103.50	Pipe - (271)
2	1	83.897	0.00	1.24	0.00	0.00	0.66	0.0	8.1	6.4	4.25	21.28	4.94	18	3.50	100.33	103.27	101.02	104.06	103.50	108.29	Pipe - (270)
3	2	69.993	0.00	0.39	0.00	0.00	0.26	0.0	7.9	6.5	1.69	4.76	4.68	12	1.53	103.77	104.84	104.18	105.39	108.29	108.99	Pipe - (269)
4	3	111.905	0.00	0.39	0.00	0.00	0.26	0.0	7.4	6.6	1.72	3.46	4.11	12	0.81	104.94	105.84	105.44	106.40	108.99	110.29	Pipe - (268)
5	4	88.824	0.00	0.39	0.00	0.00	0.26	0.0	7.1	6.7	1.74	3.86	4.31	12	1.00	105.94	106.83	106.41	107.39	110.29	111.25	Pipe - (267)
6	5	71.574	0.00	0.09	0.00	0.00	0.07	0.0	6.5	6.8	0.49	4.05	1.99	12	1.10	106.93	107.72	107.39	108.01	111.25	111.96	Pipe - (604) (1)
7	6	87.191	0.09	0.09	0.80	0.07	0.07	6.0	6.0	7.0	0.50	3.85	3.00	12	1.00	107.82	108.69	108.06	108.98	111.96	112.74	Pipe - (604)
8	5	10.439	0.24	0.24	0.58	0.14	0.14	6.0	6.0	7.0	0.97	3.96	2.96	12	1.05	106.93	107.04	107.39	107.45	111.25	111.09	Pipe - (266)
9	5	14.655	0.06	0.06	0.83	0.05	0.05	6.0	6.0	7.0	0.35	3.90	1.66	12	1.02	106.93	107.08	107.39	107.32	111.25	111.16	Pipe - (265)
10	2	15.014	0.00	0.85	0.00	0.00	0.40	0.0	6.1	7.0	2.77	3.59	4.84	12	0.87	103.77	103.90	104.43	104.61	108.29	108.34	Pipe - (261)
11	10	11.165	0.49	0.49	0.41	0.20	0.20	6.0	6.0	7.0	1.41	3.83	3.19	12	0.99	104.00	104.11	104.61	104.61	108.34	108.15	Pipe - (259)
12	10	9.760	0.36	0.36	0.55	0.20	0.20	6.0	6.0	7.0	1.37	3.91	3.12	12	1.02	104.00	104.10	104.61	104.59	108.34	108.15	Pipe - (258)
Project File: Storm-W3.stm																Number of lines: 12				Run Date: 12/11/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

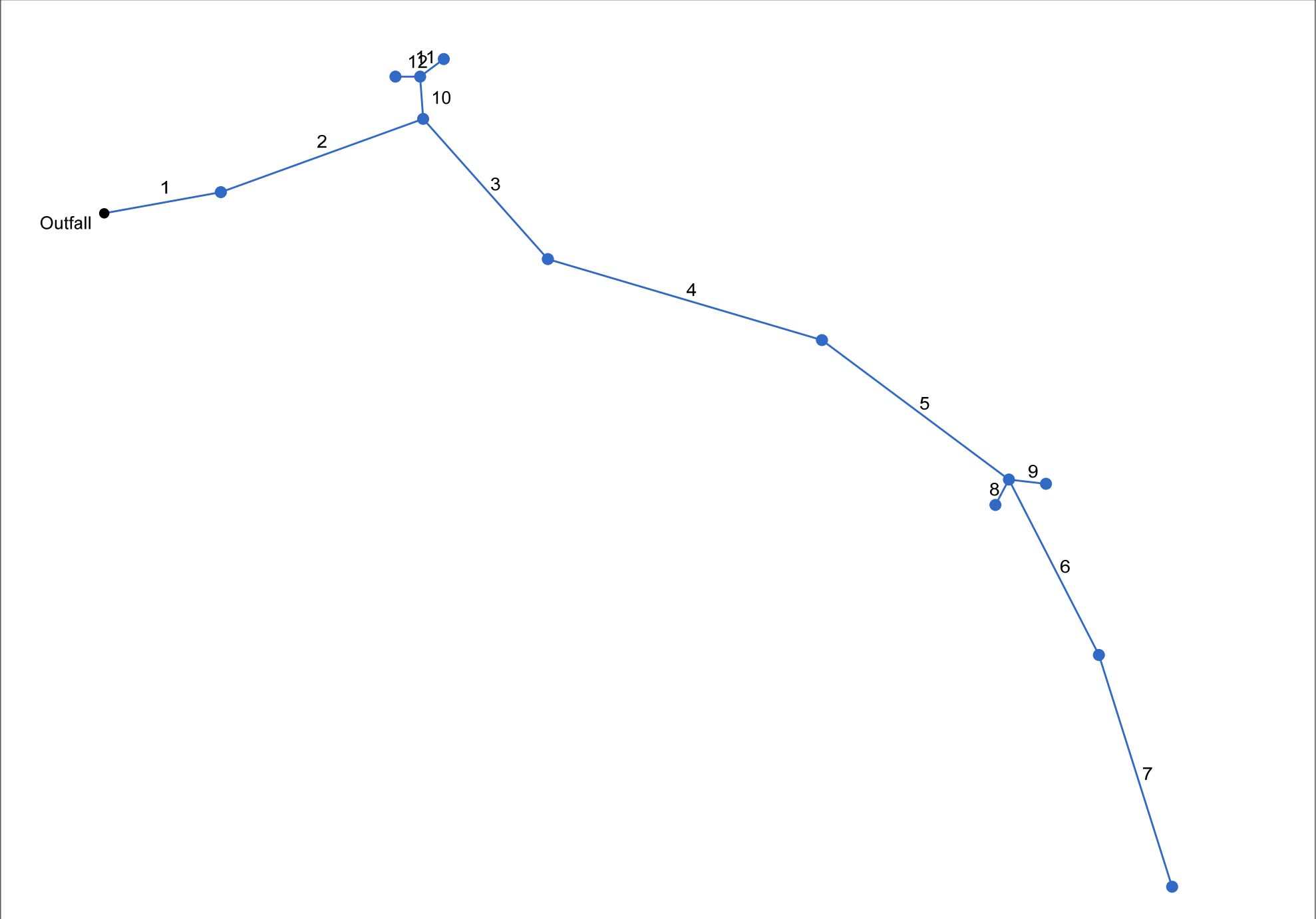
Storm Sewer Profile



Storm Sewer Profile



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

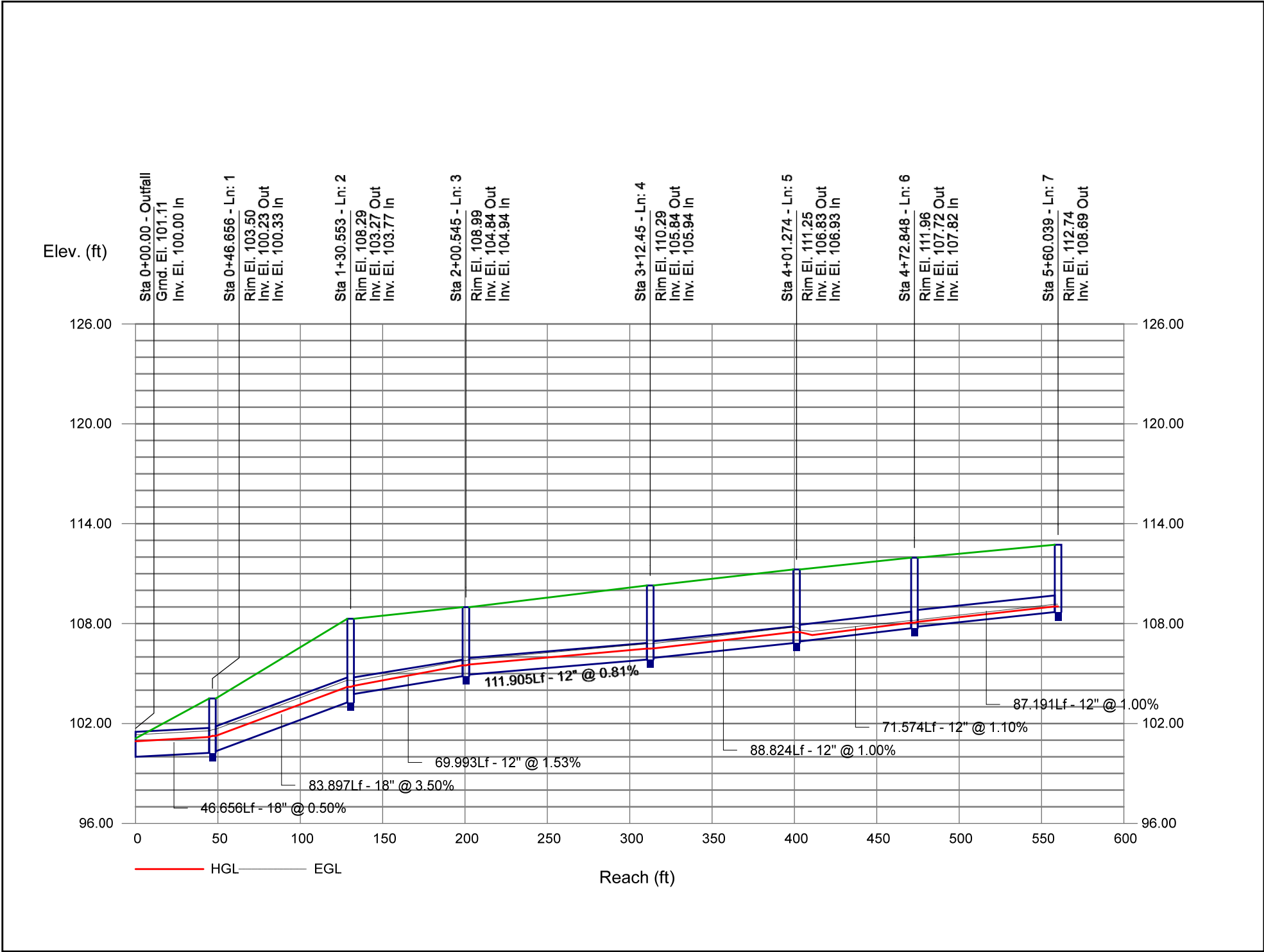


Project File: Storm-W3.stm	Number of lines: 12	Date: 12/11/2023
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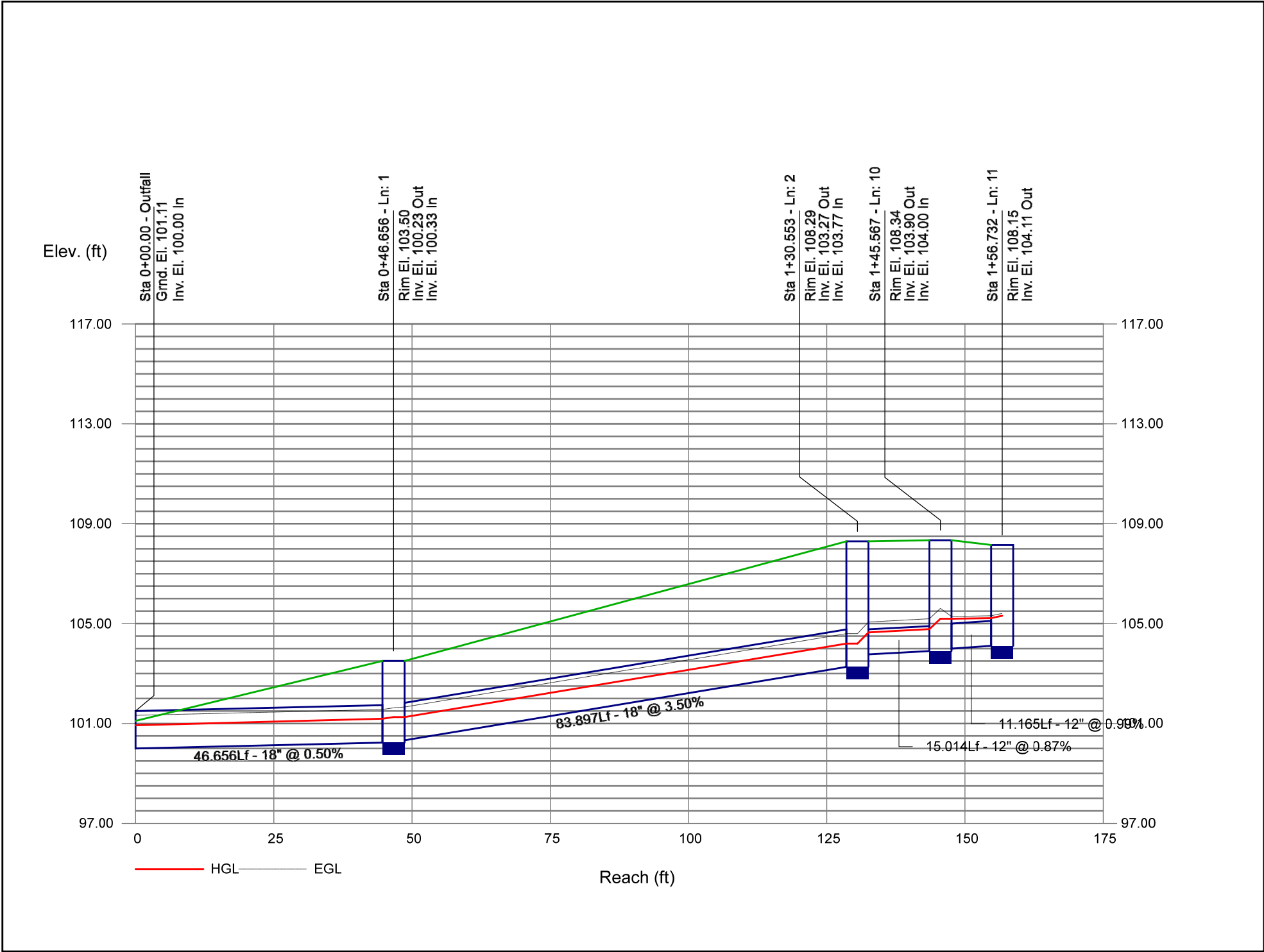
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	46.656	0.00	1.24	0.00	0.00	0.66	0.0	8.2	8.8	5.82	8.04	4.97	18	0.50	100.00	100.23	100.93	101.19	101.11	103.50	Pipe - (271)
2	1	83.897	0.00	1.24	0.00	0.00	0.66	0.0	7.9	8.9	5.87	21.28	5.09	18	3.50	100.33	103.27	101.26	104.20	103.50	108.29	Pipe - (270)
3	2	69.993	0.00	0.39	0.00	0.00	0.26	0.0	7.7	9.0	2.34	4.76	5.17	12	1.53	103.77	104.84	104.26	105.49	108.29	108.99	Pipe - (269)
4	3	111.905	0.00	0.39	0.00	0.00	0.26	0.0	7.3	9.1	2.37	3.46	4.53	12	0.81	104.94	105.84	105.54	106.50	108.99	110.29	Pipe - (268)
5	4	88.824	0.00	0.39	0.00	0.00	0.26	0.0	7.0	9.2	2.39	3.86	4.76	12	1.00	105.94	106.83	106.51	107.49	110.29	111.25	Pipe - (267)
6	5	71.574	0.00	0.09	0.00	0.00	0.07	0.0	6.4	9.3	0.67	4.05	2.16	12	1.10	106.93	107.72	107.49	108.06	111.25	111.96	Pipe - (604) (1)
7	6	87.191	0.09	0.09	0.80	0.07	0.07	6.0	6.0	9.5	0.68	3.85	3.27	12	1.00	107.82	108.69	108.10	109.03	111.96	112.74	Pipe - (604)
8	5	10.439	0.24	0.24	0.58	0.14	0.14	6.0	6.0	9.5	1.32	3.96	3.21	12	1.05	106.93	107.04	107.49	107.53	111.25	111.09	Pipe - (266)
9	5	14.655	0.06	0.06	0.83	0.05	0.05	6.0	6.0	9.5	0.47	3.90	1.80	12	1.02	106.93	107.08	107.49	107.36	111.25	111.16	Pipe - (265)
10	2	15.014	0.00	0.85	0.00	0.00	0.40	0.0	6.1	9.5	3.78	3.59	5.17	12	0.87	103.77	103.90	104.65	104.78	108.29	108.34	Pipe - (261)
11	10	11.165	0.49	0.49	0.41	0.20	0.20	6.0	6.0	9.5	1.93	3.83	2.45	12	0.99	104.00	104.11	105.19	105.22	108.34	108.15	Pipe - (259)
12	10	9.760	0.36	0.36	0.55	0.20	0.20	6.0	6.0	9.5	1.86	3.91	2.37	12	1.02	104.00	104.10	105.19	105.22	108.34	108.15	Pipe - (258)
Project File: Storm-W3.stm																Number of lines: 12				Run Date: 12/11/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

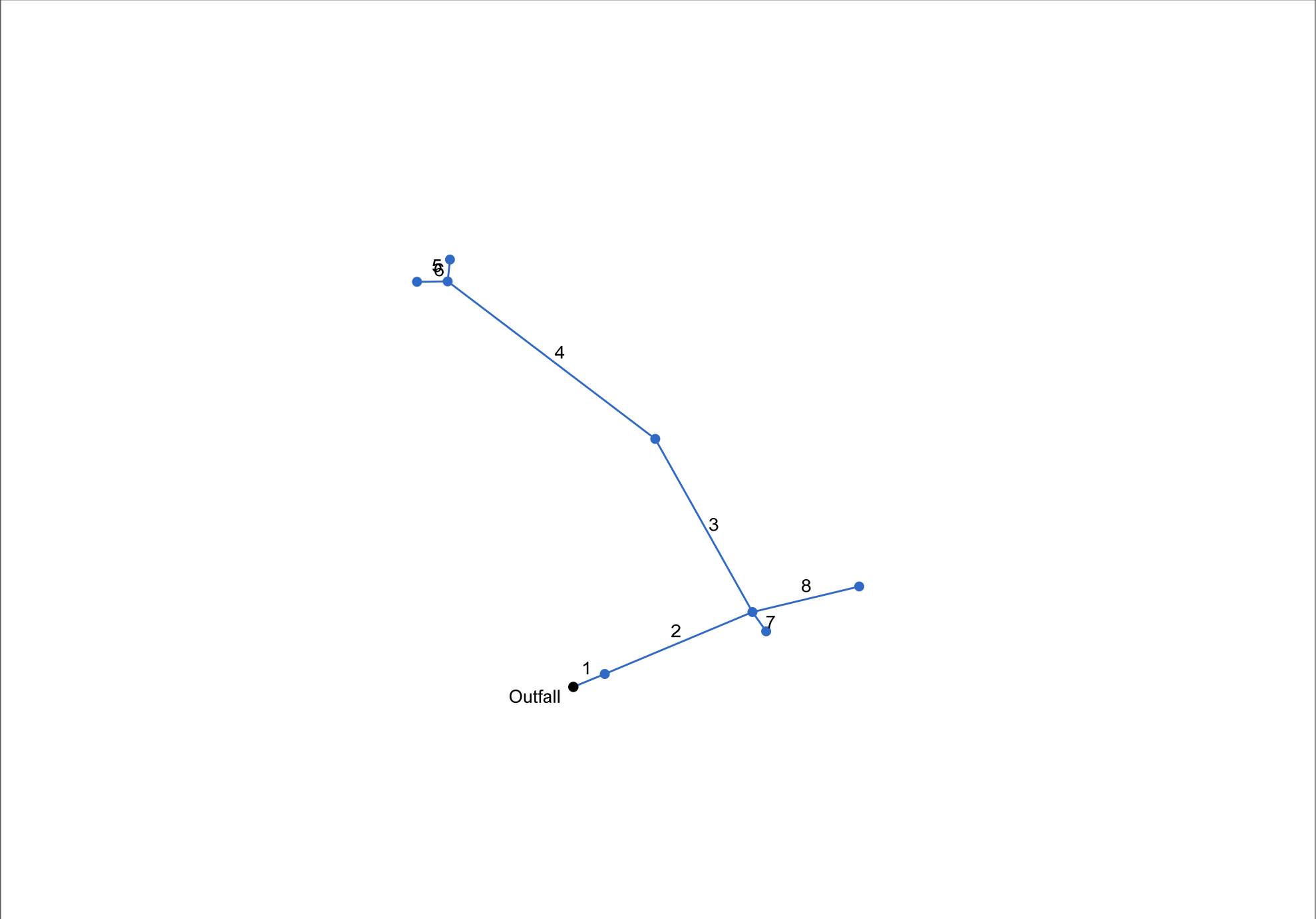
Storm Sewer Profile



Storm Sewer Profile



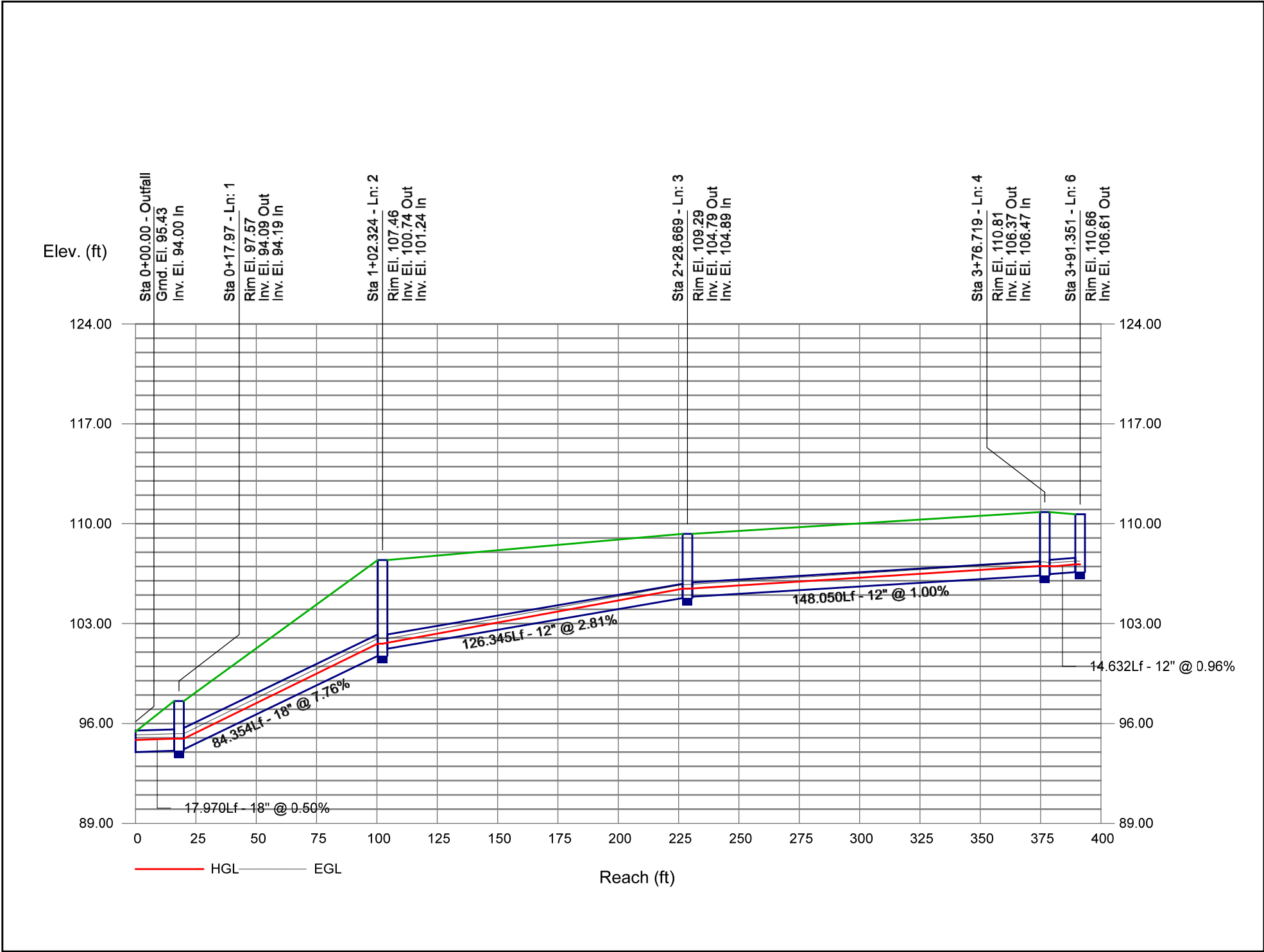
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



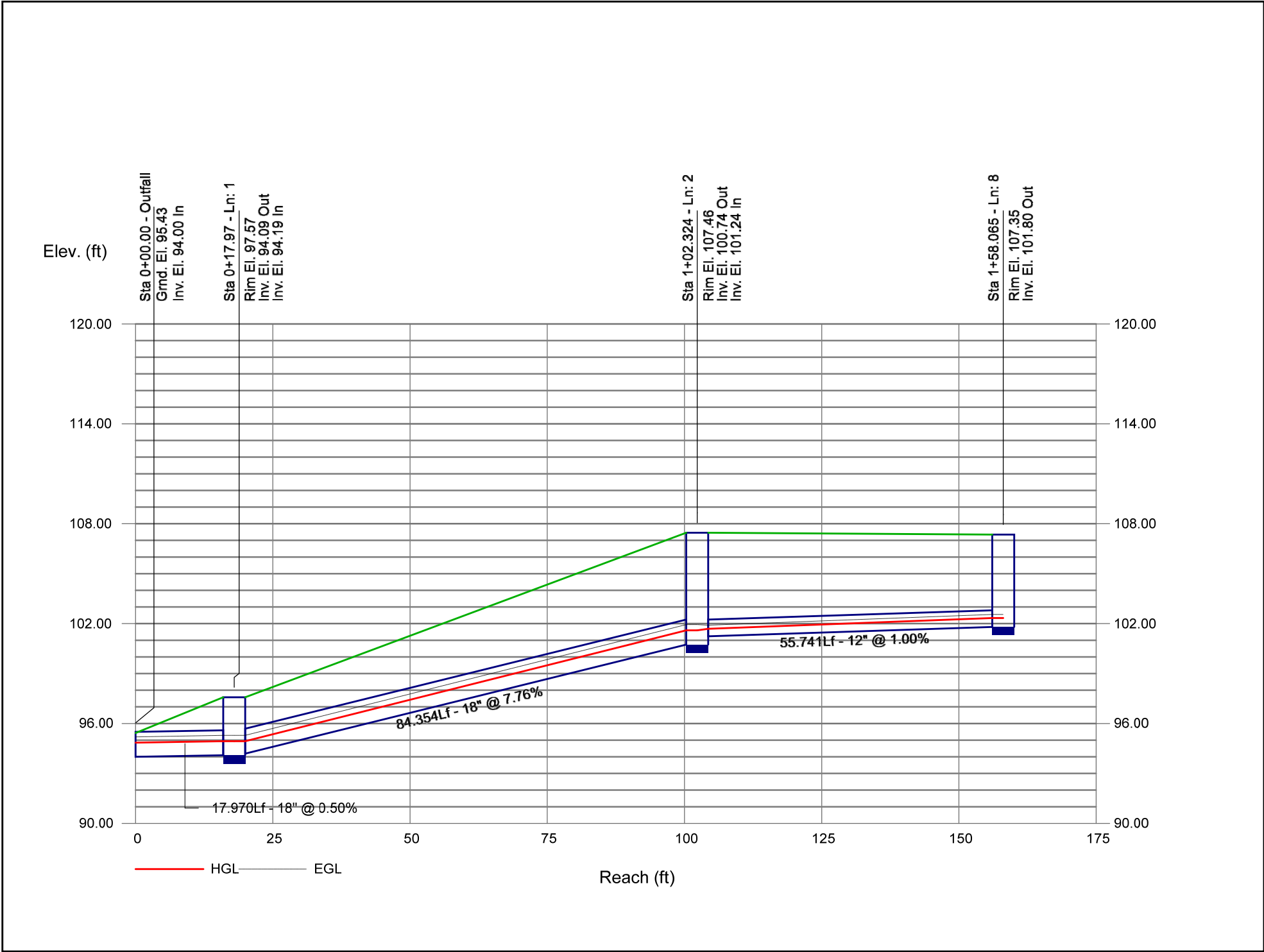
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	17.970	0.00	1.36	0.00	0.00	0.73	0.0	7.3	6.6	4.88	8.04	4.73	18	0.50	94.00	94.09	94.85	94.94	95.43	97.57	Pipe - (337) (1)
2	1	84.354	0.00	1.36	0.00	0.00	0.73	0.0	7.0	6.7	4.92	31.70	5.17	18	7.76	94.19	100.74	94.94	101.59	97.57	107.46	Pipe - (337)
3	2	126.345	0.00	0.66	0.00	0.00	0.35	0.0	6.6	6.8	2.36	6.47	5.95	12	2.81	101.24	104.79	101.66	105.45	107.46	109.29	Pipe - (336)
4	3	148.050	0.00	0.66	0.00	0.00	0.35	0.0	6.1	6.9	2.41	3.86	4.76	12	1.00	104.89	106.37	105.46	107.03	109.29	110.81	Pipe - (335)
5	4	15.262	0.21	0.21	0.52	0.11	0.11	6.0	6.0	7.0	0.77	3.82	2.32	12	0.98	106.47	106.62	107.03	106.99	110.81	110.79	Pipe - (330)
6	4	14.632	0.45	0.45	0.53	0.24	0.24	6.0	6.0	7.0	1.65	3.77	3.70	12	0.96	106.47	106.61	107.03	107.16	110.81	110.66	Pipe - (331)
7	2	14.656	0.28	0.28	0.56	0.16	0.16	6.0	6.0	7.0	1.09	5.43	3.86	12	1.98	101.24	101.53	101.59	101.97	107.46	107.29	Pipe - (332)
8	2	55.741	0.42	0.42	0.55	0.23	0.23	6.0	6.0	7.0	1.60	3.87	4.21	12	1.00	101.24	101.80	101.69	102.34	107.46	107.35	Pipe - (333)
Project File: Storm-W4.stm																Number of lines: 8				Run Date: 12/11/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

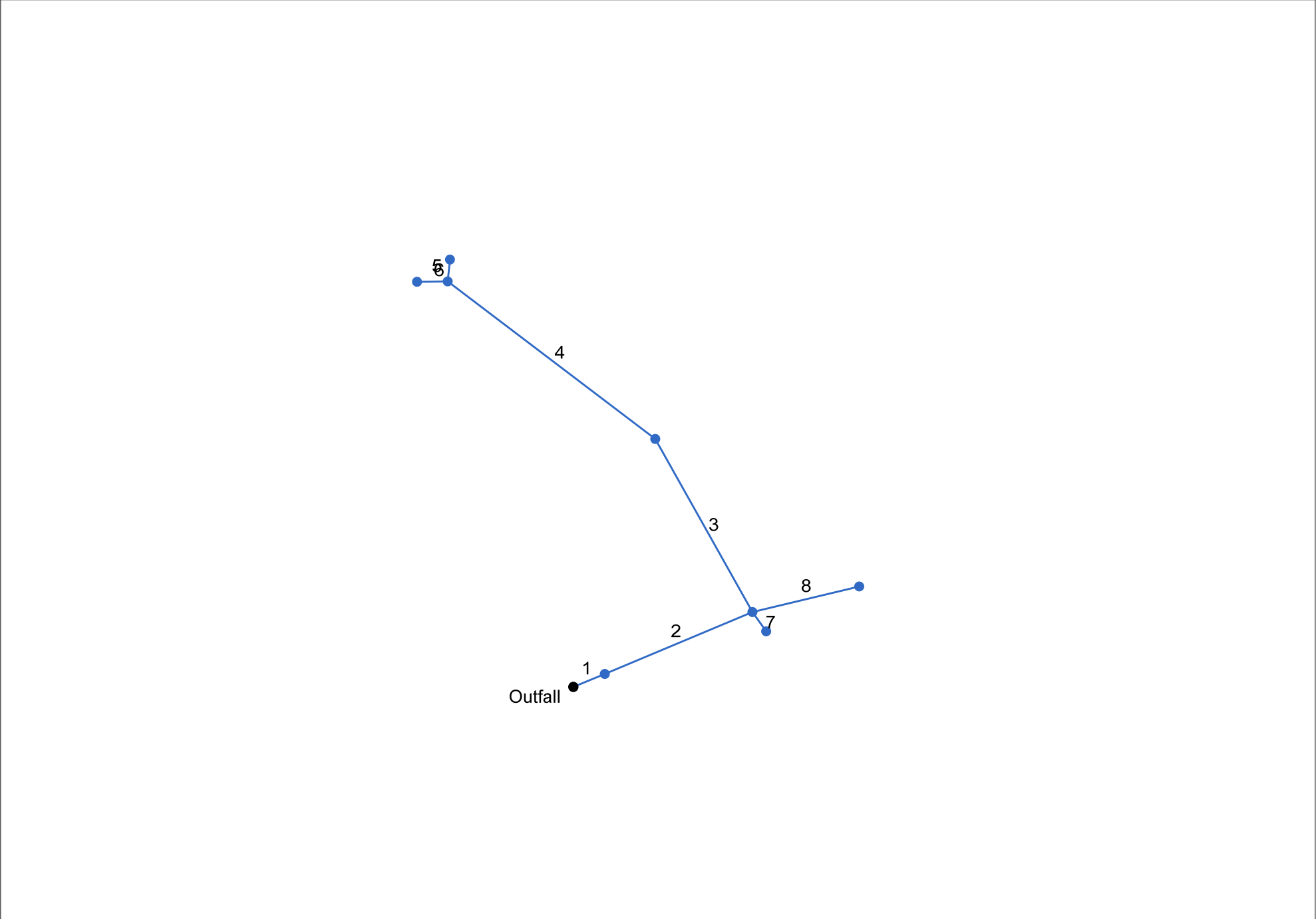
Storm Sewer Profile



Storm Sewer Profile



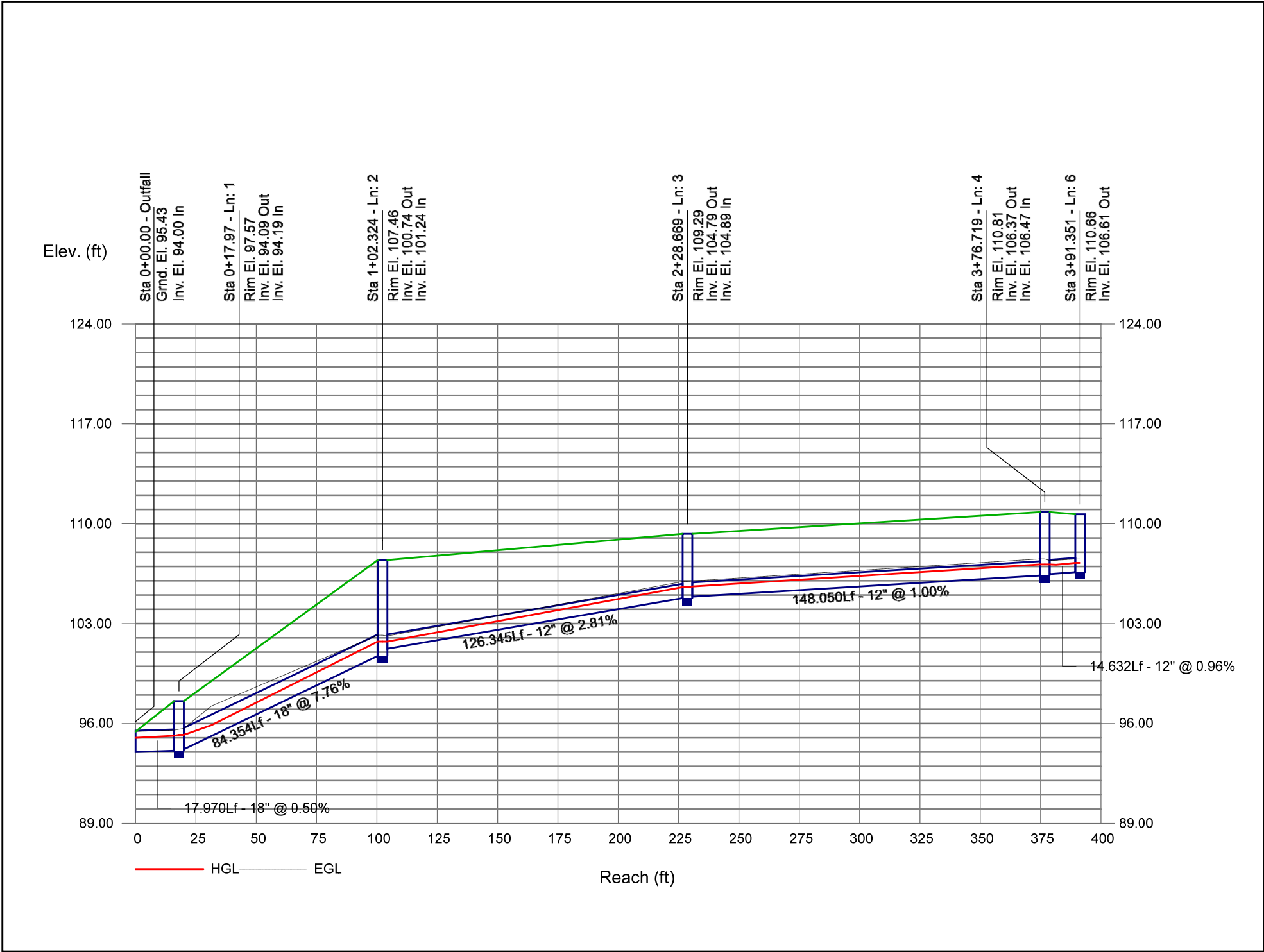
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Tabulation

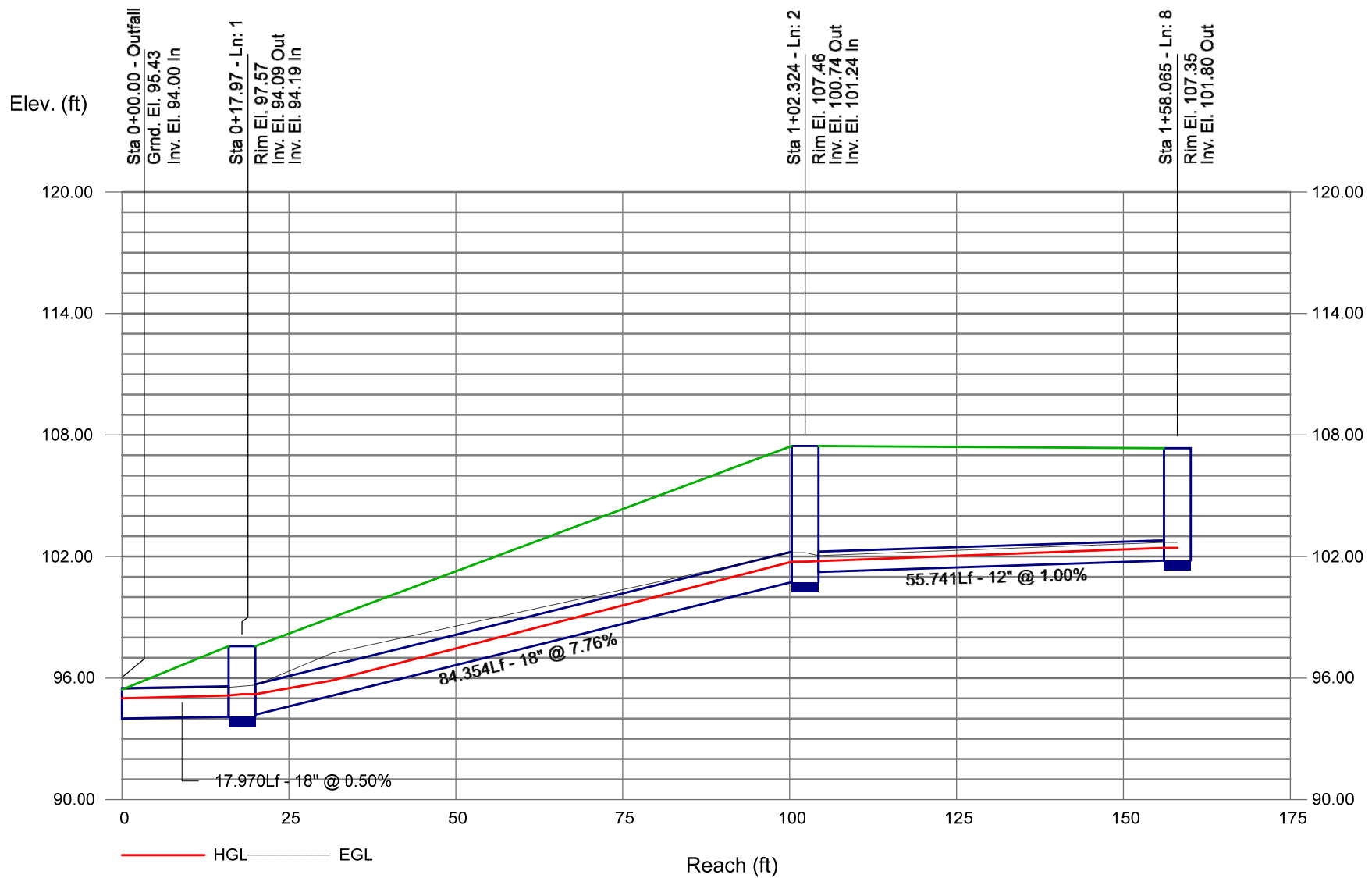
Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	17.970	0.00	1.36	0.00	0.00	0.73	0.0	7.2	9.1	6.70	8.04	5.20	18	0.50	94.00	94.09	95.00	95.14	95.43	97.57	Pipe - (337) (1)
2	1	84.354	0.00	1.36	0.00	0.00	0.73	0.0	6.9	9.2	6.76	31.70	5.35	18	7.76	94.19	100.74	95.20	101.74	97.57	107.46	Pipe - (337)
3	2	126.345	0.00	0.66	0.00	0.00	0.35	0.0	6.6	9.3	3.23	6.47	6.56	12	2.81	101.24	104.79	101.74	105.56	107.46	109.29	Pipe - (336)
4	3	148.050	0.00	0.66	0.00	0.00	0.35	0.0	6.1	9.5	3.28	3.86	5.27	12	1.00	104.89	106.37	105.60	107.14	109.29	110.81	Pipe - (335)
5	4	15.262	0.21	0.21	0.52	0.11	0.11	6.0	6.0	9.5	1.04	3.82	2.55	12	0.98	106.47	106.62	107.14	107.05	110.81	110.79	Pipe - (330)
6	4	14.632	0.45	0.45	0.53	0.24	0.24	6.0	6.0	9.5	2.25	3.77	4.12	12	0.96	106.47	106.61	107.14	107.25	110.81	110.66	Pipe - (331)
7	2	14.656	0.28	0.28	0.56	0.16	0.16	6.0	6.0	9.5	1.49	5.43	3.69	12	1.98	101.24	101.53	101.74	102.05	107.46	107.29	Pipe - (332)
8	2	55.741	0.42	0.42	0.55	0.23	0.23	6.0	6.0	9.5	2.18	3.87	4.62	12	1.00	101.24	101.80	101.78	102.43	107.46	107.35	Pipe - (333)
Project File: Storm-W4.stm																Number of lines: 8				Run Date: 12/11/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile

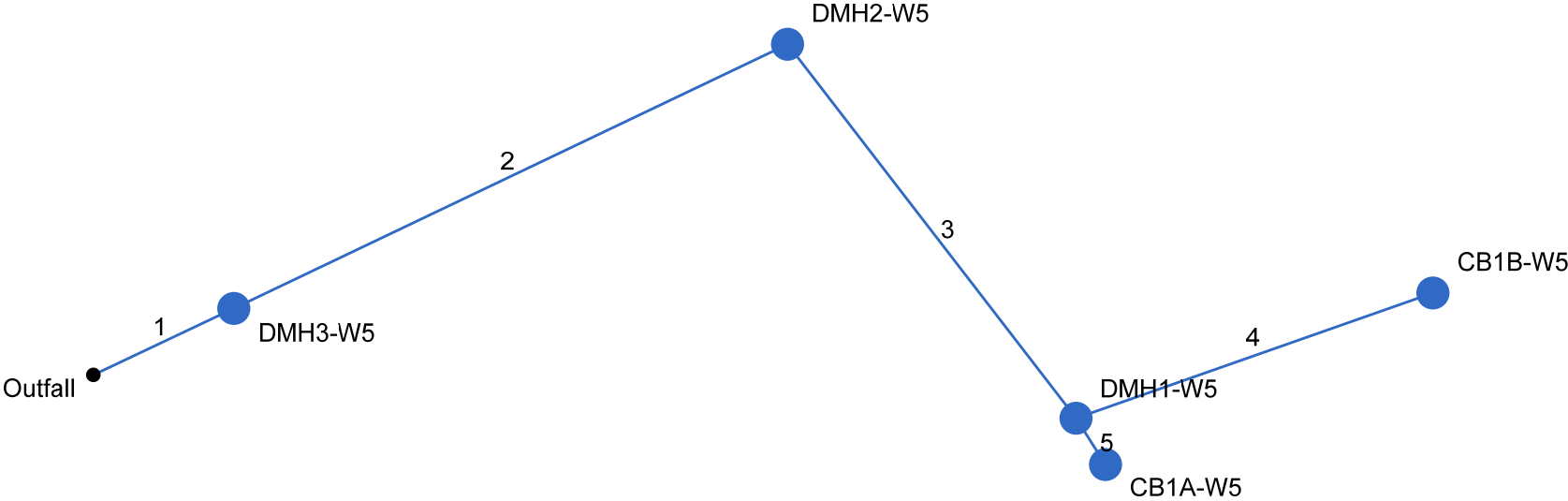


Storm Sewer Profile

Proj. file: Storm-W4.stm



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

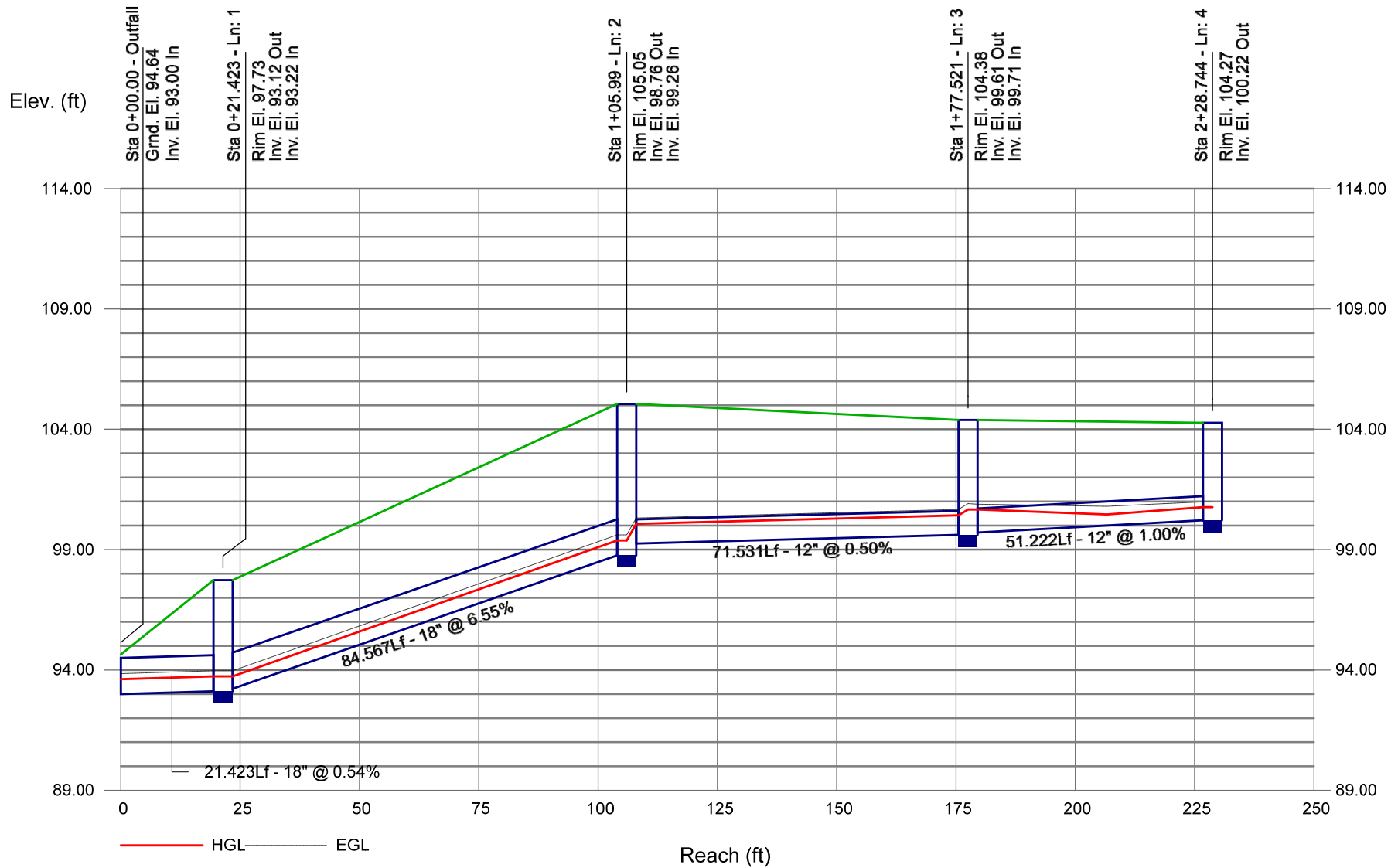


Storm Sewer Tabulation

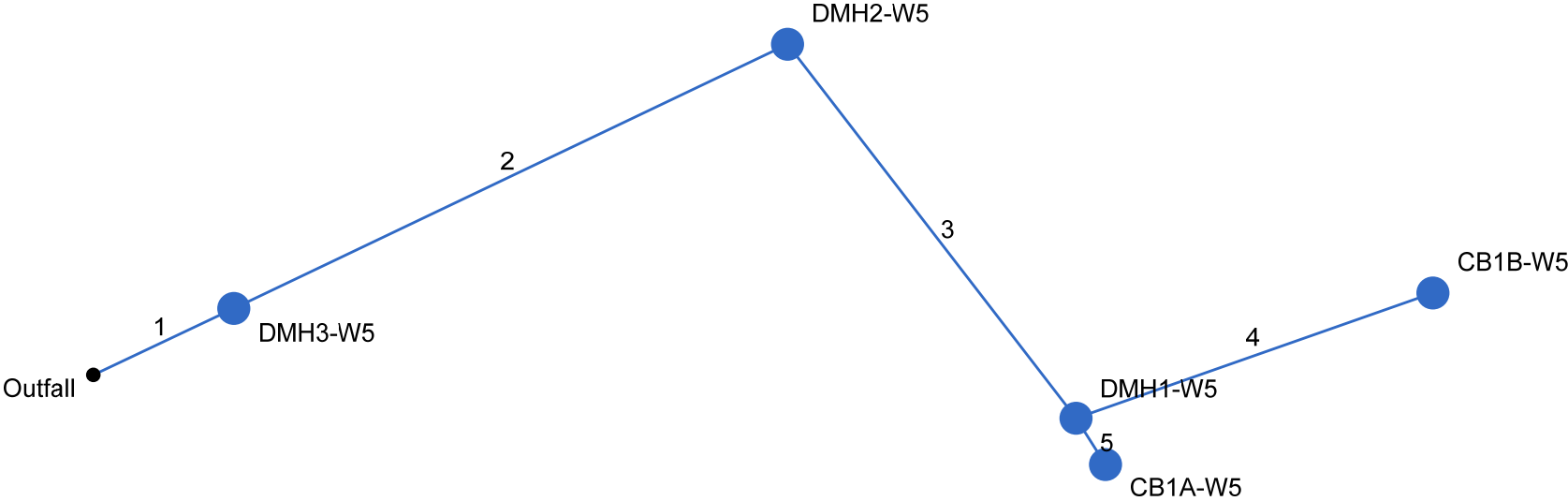
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	21.423	0.00	0.81	0.00	0.00	0.39	0.0	6.9	6.7	2.65	8.39	3.87	18	0.54	93.00	93.12	93.62	93.73	94.64	97.73	Pipe - (356) (1) (1)
2	1	84.567	0.00	0.81	0.00	0.00	0.39	0.0	6.6	6.8	2.68	29.12	4.45	18	6.55	93.22	98.76	93.73	99.38	97.73	105.05	Pipe - (356) (1)
3	2	71.531	0.00	0.81	0.00	0.00	0.39	0.0	6.3	6.9	2.71	2.73	3.96	12	0.50	99.26	99.61	100.07	100.43	105.05	104.38	Pipe - (355)
4	3	51.222	0.49	0.49	0.49	0.24	0.24	6.0	6.0	7.0	1.66	3.85	2.96	12	1.00	99.71	100.22	100.67	100.77	104.38	104.27	Pipe - (340)
5	3	8.293	0.32	0.32	0.49	0.16	0.16	6.0	6.0	7.0	1.09	5.52	2.34	12	2.05	99.71	99.88	100.67	100.32	104.38	104.29	Pipe - (339)
Project File: Storm-W5.stm																Number of lines: 5				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Storm Sewer Profile

Proj. file: Storm-W5.stm



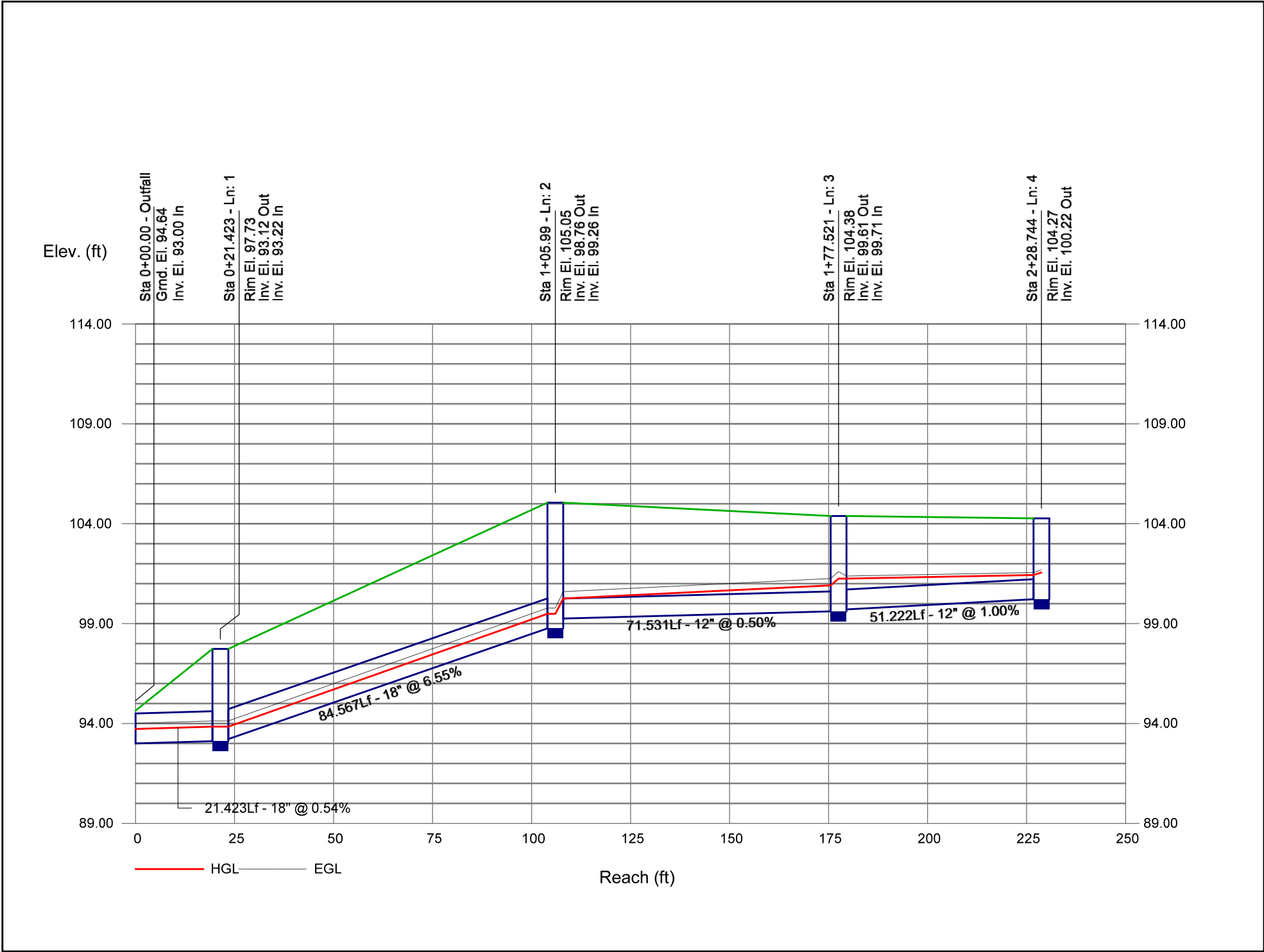
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



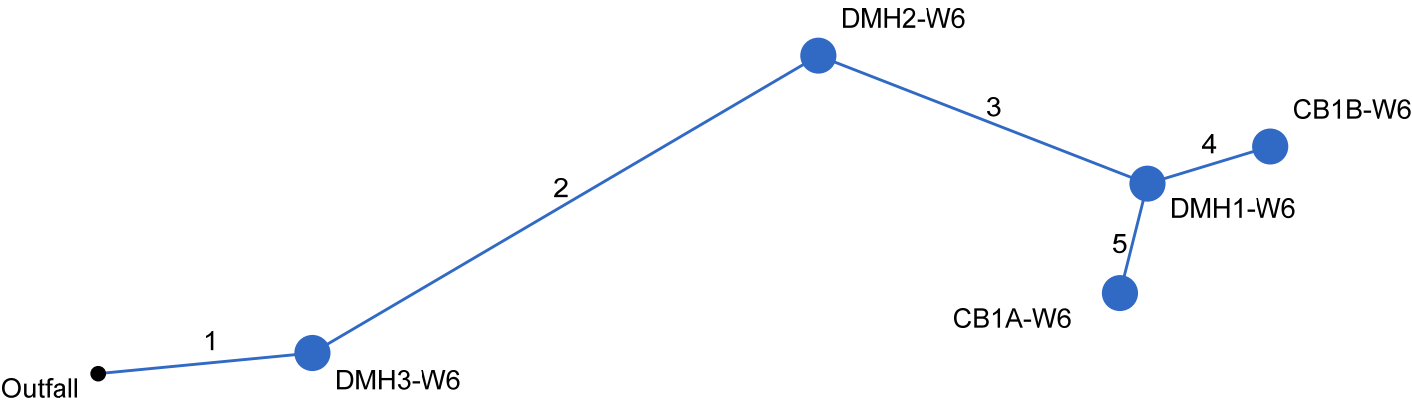
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	21.423	0.00	0.81	0.00	0.00	0.39	0.0	6.8	9.2	3.63	8.39	4.28	18	0.54	93.00	93.12	93.73	93.84	94.64	97.73	Pipe - (356) (1) (1)
2	1	84.567	0.00	0.81	0.00	0.00	0.39	0.0	6.6	9.3	3.67	29.12	4.78	18	6.55	93.22	98.76	93.84	99.49	97.73	105.05	Pipe - (356) (1)
3	2	71.531	0.00	0.81	0.00	0.00	0.39	0.0	6.3	9.4	3.70	2.73	4.71	12	0.50	99.26	99.61	100.26	100.91	105.05	104.38	Pipe - (355)
4	3	51.222	0.49	0.49	0.49	0.24	0.24	6.0	6.0	9.5	2.26	3.85	2.87	12	1.00	99.71	100.22	101.25	101.43	104.38	104.27	Pipe - (340)
5	3	8.293	0.32	0.32	0.49	0.16	0.16	6.0	6.0	9.5	1.48	5.52	1.89	12	2.05	99.71	99.88	101.25	101.27	104.38	104.29	Pipe - (339)
Project File: Storm-W5.stm																Number of lines: 5				Run Date: 12/12/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile



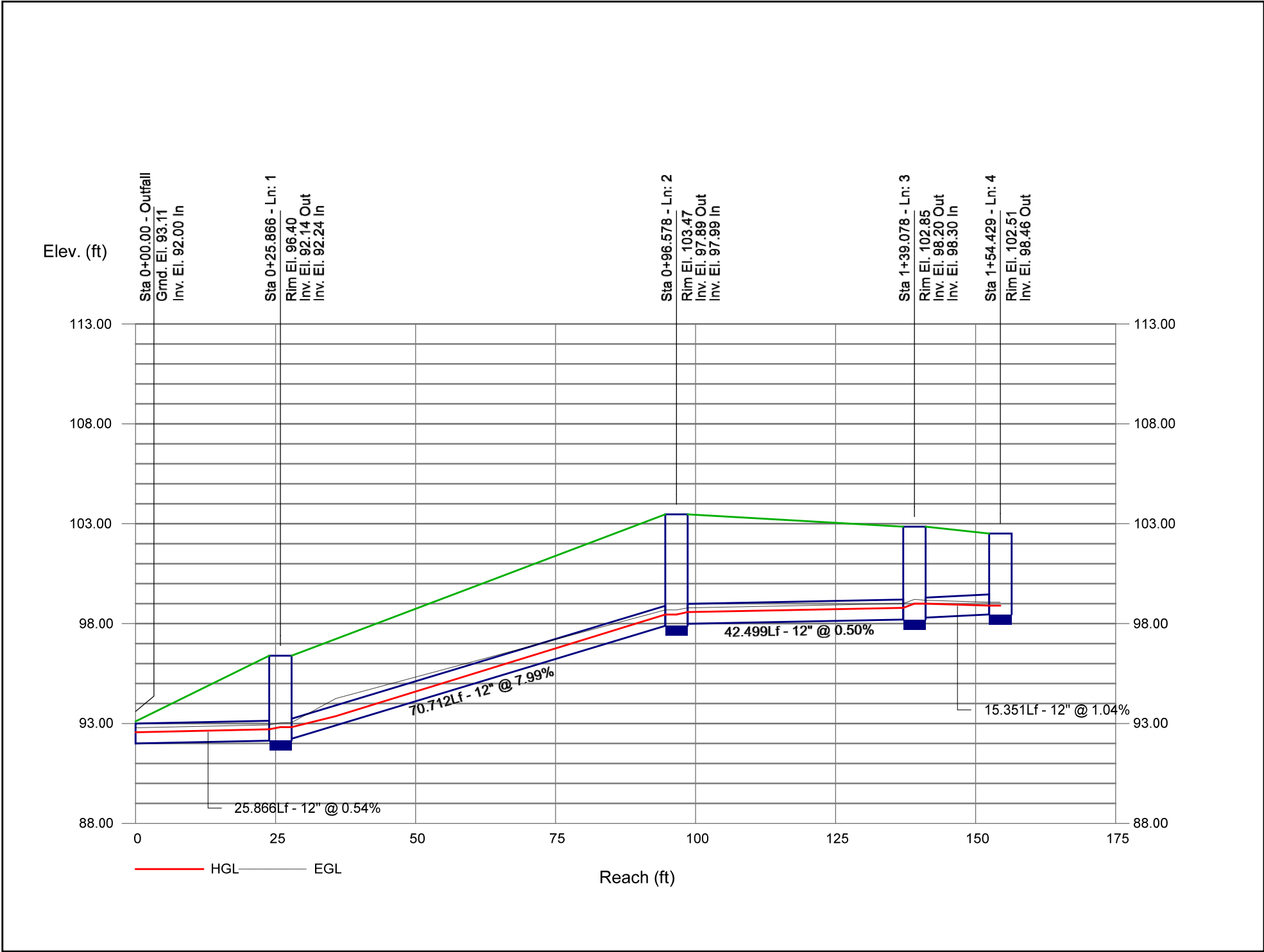
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



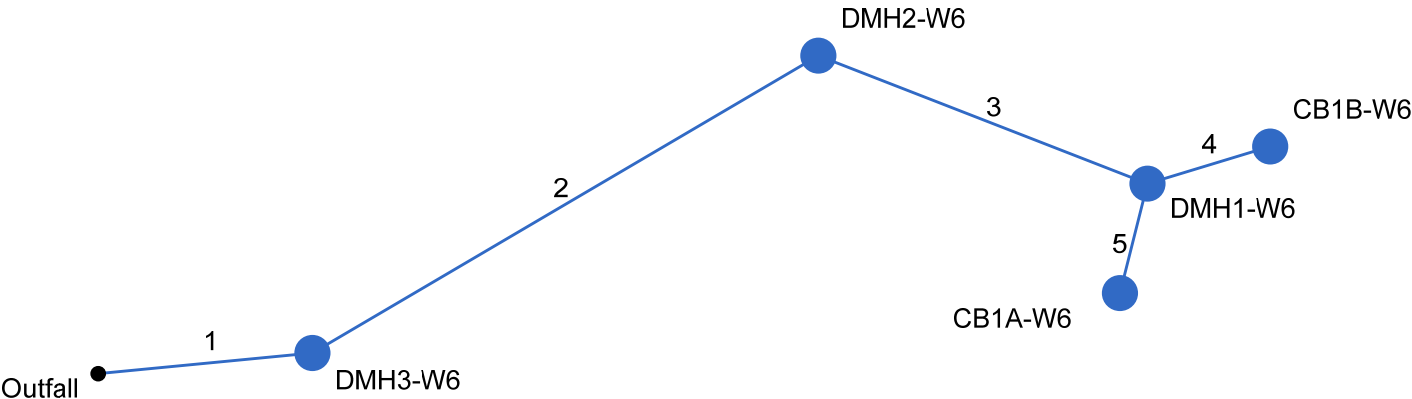
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	25.866	0.00	0.49	0.00	0.00	0.26	0.0	6.6	6.8	1.74	2.83	3.79	12	0.54	92.00	92.14	92.56	92.71	93.11	96.40	Pipe - (360) (1)
2	1	70.712	0.00	0.49	0.00	0.00	0.26	0.0	6.3	6.9	1.76	10.91	3.79	12	7.99	92.24	97.89	92.82	98.45	96.40	103.47	Pipe - (360)
3	2	42.499	0.00	0.49	0.00	0.00	0.26	0.0	6.1	6.9	1.77	2.73	3.70	12	0.50	97.99	98.20	98.58	98.79	103.47	102.85	Pipe - (359)
4	3	15.351	0.32	0.32	0.50	0.16	0.16	6.0	6.0	7.0	1.11	3.94	2.59	12	1.04	98.30	98.46	99.00	98.90	102.85	102.51	Pipe - (358)
5	3	13.660	0.17	0.17	0.57	0.10	0.10	6.0	6.0	7.0	0.67	3.91	1.99	12	1.02	98.30	98.44	99.00	98.78	102.85	102.56	Pipe - (357)
Project File: Storm-W6.stm																Number of lines: 5				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Storm Sewer Profile



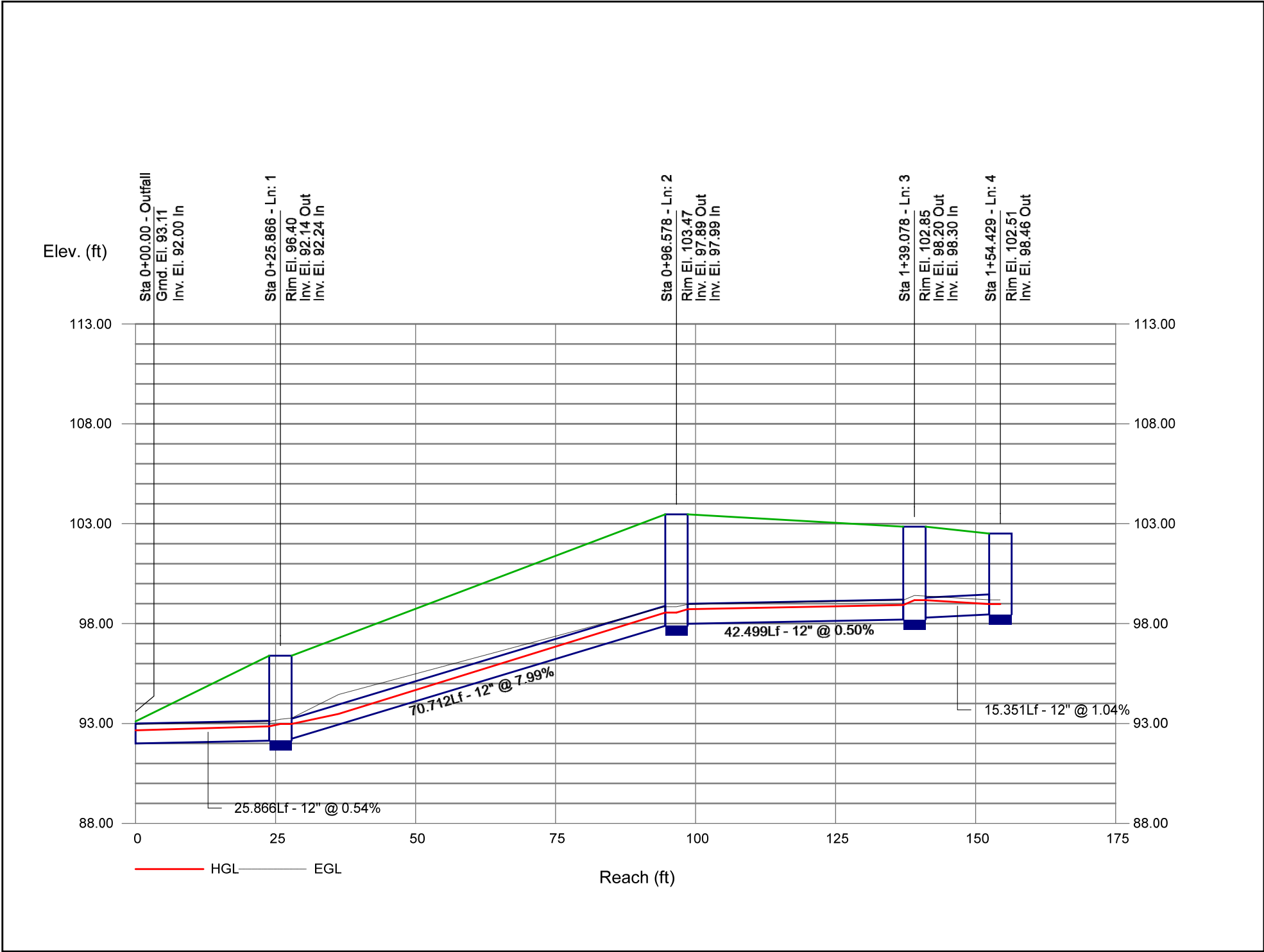
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



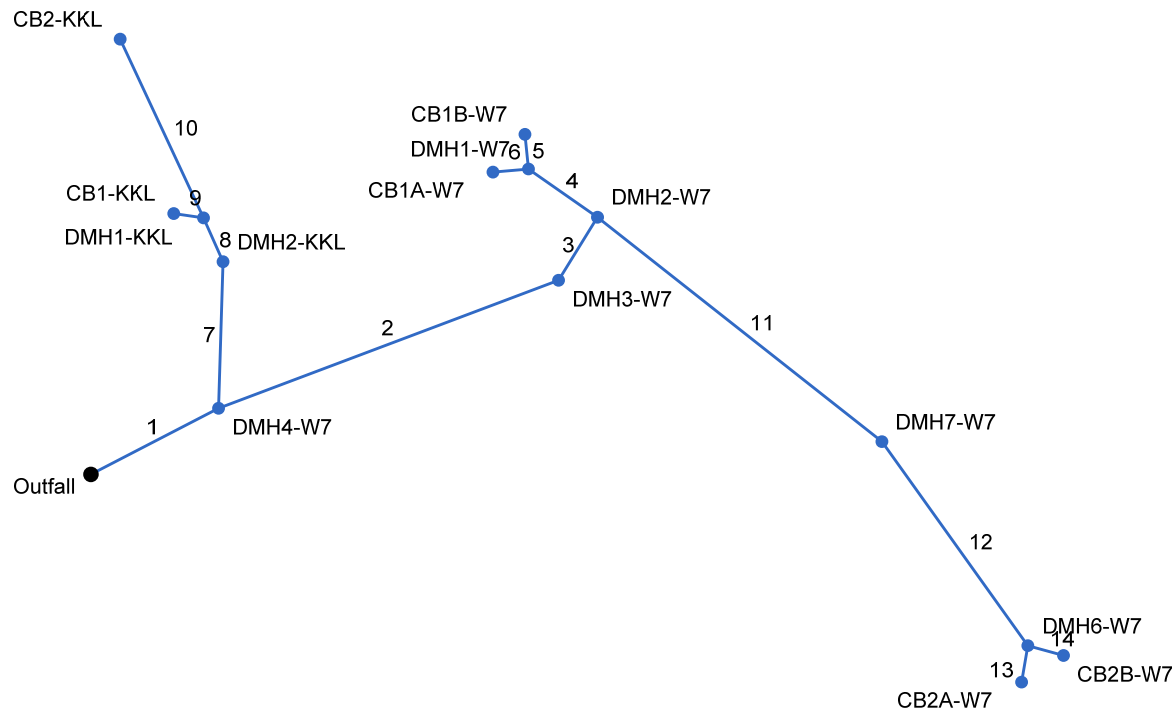
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	25.866	0.00	0.49	0.00	0.00	0.26	0.0	6.6	9.3	2.38	2.83	4.13	12	0.54	92.00	92.14	92.66	92.86	93.11	96.40	Pipe - (360) (1)
2	1	70.712	0.00	0.49	0.00	0.00	0.26	0.0	6.3	9.4	2.40	10.91	4.11	12	7.99	92.24	97.89	92.98	98.55	96.40	103.47	Pipe - (360)
3	2	42.499	0.00	0.49	0.00	0.00	0.26	0.0	6.1	9.5	2.41	2.73	3.92	12	0.50	97.99	98.20	98.72	98.93	103.47	102.85	Pipe - (359)
4	3	15.351	0.32	0.32	0.50	0.16	0.16	6.0	6.0	9.5	1.51	3.94	2.87	12	1.04	98.30	98.46	99.17	98.98	102.85	102.51	Pipe - (358)
5	3	13.660	0.17	0.17	0.57	0.10	0.10	6.0	6.0	9.5	0.91	3.91	2.18	12	1.02	98.30	98.44	99.17	98.84	102.85	102.56	Pipe - (357)
Project File: Storm-W6.stm																Number of lines: 5				Run Date: 12/12/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

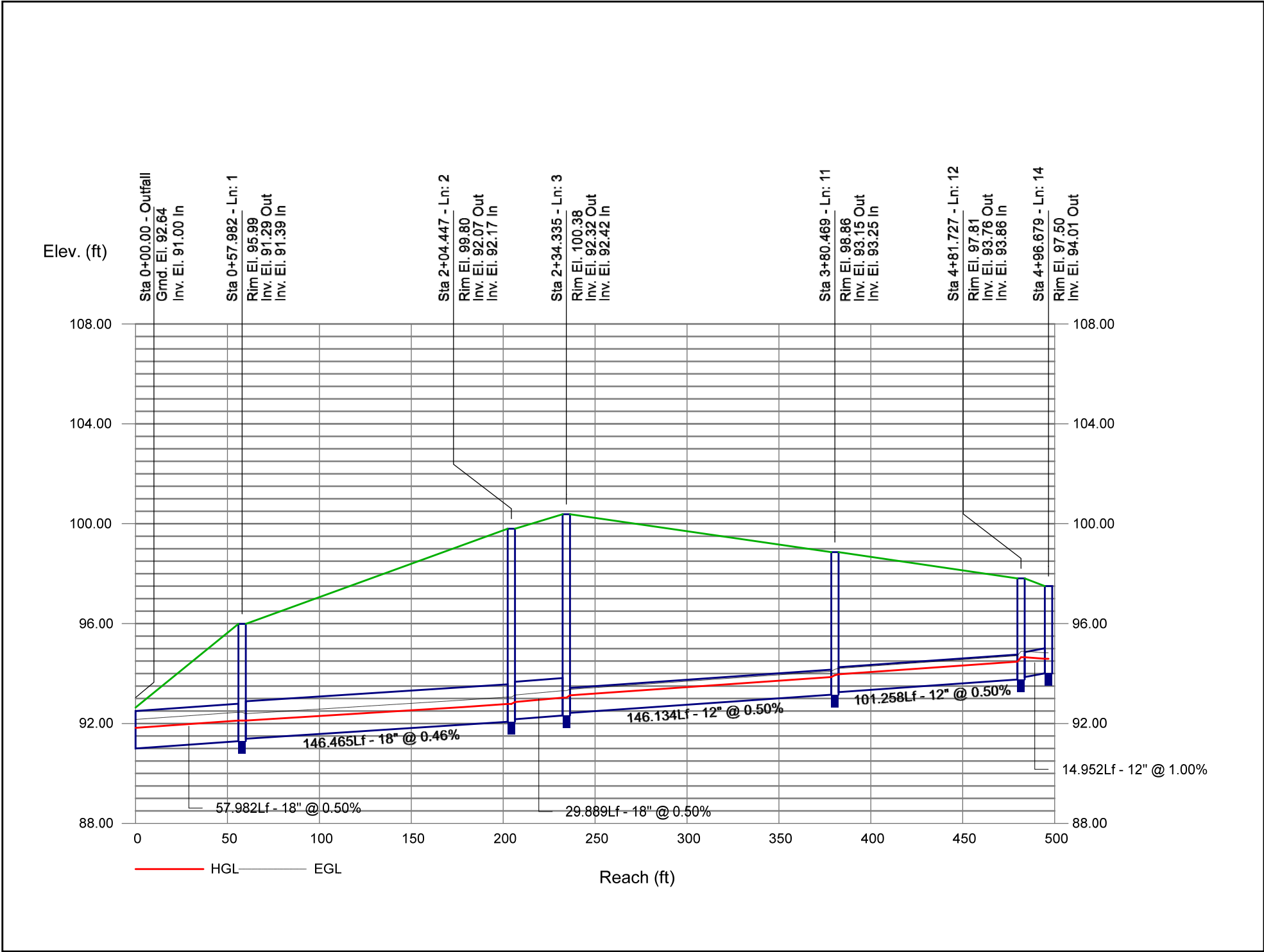


Project File: Storm-W7.stm	Number of lines: 14	Date: 12/12/2023
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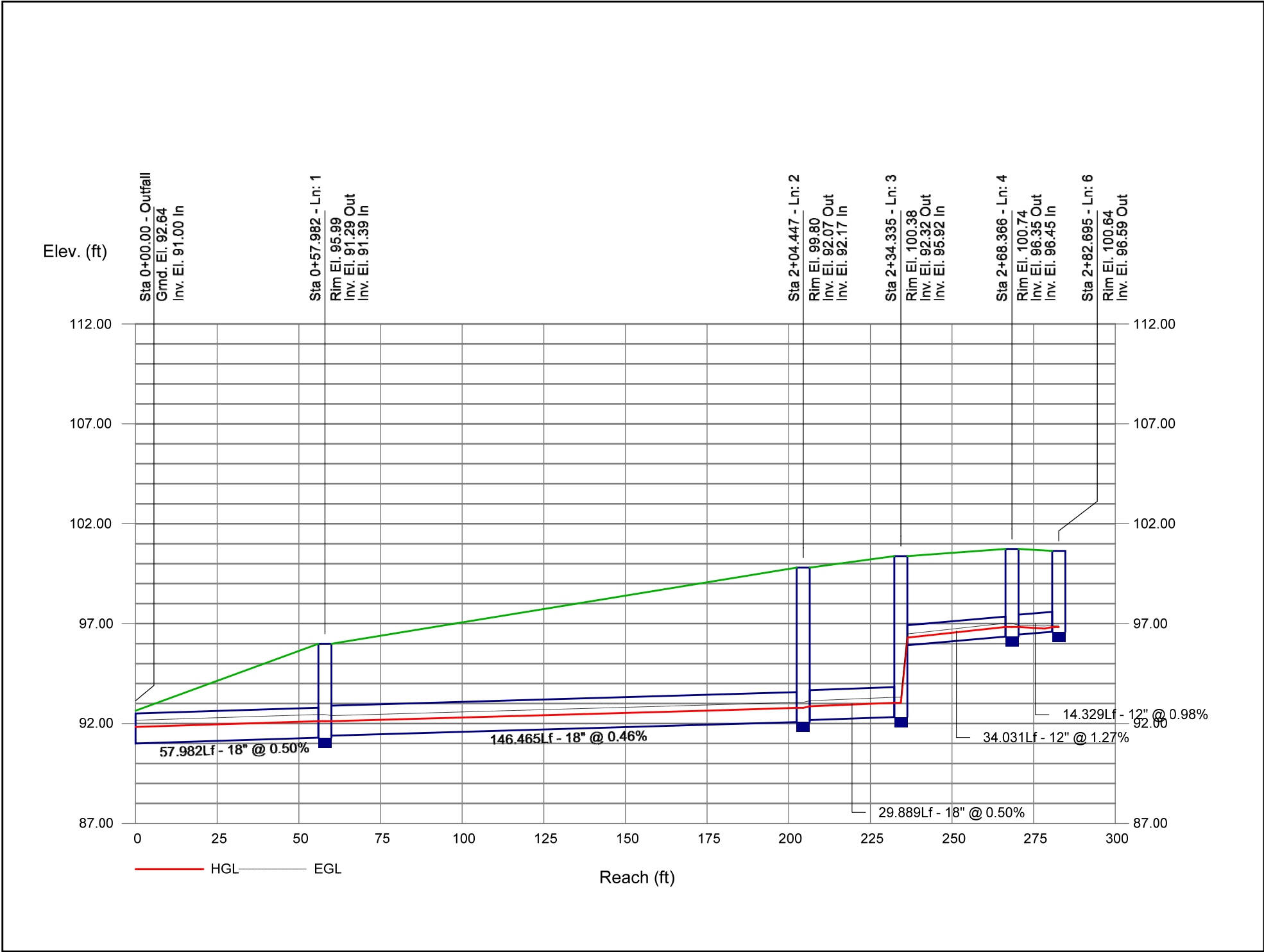
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	57.982	0.00	1.11	0.00	0.00	0.71	0.0	7.9	6.5	4.64	8.05	4.65	18	0.50	91.00	91.29	91.83	92.12	92.64	95.99	Pipe - (329)
2	1	146.465	0.00	0.81	0.00	0.00	0.53	0.0	7.3	6.6	3.50	7.75	4.17	18	0.46	91.39	92.07	92.12	92.78	95.99	99.80	Pipe - (302)
3	2	29.889	0.00	0.81	0.00	0.00	0.53	0.0	7.2	6.7	3.51	8.06	4.32	18	0.50	92.17	92.32	92.86	93.03	99.80	100.38	Pipe - (300)
4	3	34.031	0.00	0.32	0.00	0.00	0.19	0.0	6.1	6.9	1.31	4.34	4.16	12	1.27	95.92	96.35	96.30	96.83	100.38	100.74	Pipe - (298)
5	4	14.133	0.25	0.25	0.57	0.14	0.14	6.0	6.0	7.0	0.99	3.84	3.38	12	0.99	96.45	96.59	96.83	97.01	100.74	100.64	Pipe - (297)
6	4	14.329	0.07	0.07	0.67	0.05	0.05	6.0	6.0	7.0	0.33	3.81	1.74	12	0.98	96.45	96.59	96.83	96.82	100.74	100.64	Pipe - (296)
7	1	59.442	0.00	0.30	0.00	0.00	0.19	0.0	6.8	6.8	1.26	9.87	6.03	12	6.54	91.99	95.87	92.23	96.35	95.99	100.55	Pipe - (305)
8	7	19.285	0.00	0.30	0.00	0.00	0.19	0.0	6.7	6.8	1.27	2.73	3.41	12	0.50	95.96	96.06	96.44	96.54	100.55	100.26	Pipe - (596)
9	8	12.155	0.15	0.15	0.64	0.10	0.10	6.0	6.0	7.0	0.66	2.50	2.69	12	0.49	96.40	96.46	96.75	96.81	100.26	99.72	Pipe - (597)
10	8	79.636	0.15	0.15	0.61	0.09	0.09	6.0	6.0	7.0	0.64	2.52	1.88	12	0.50	96.06	96.46	96.70	96.82	100.26	99.72	Pipe - (598)
11	3	146.134	0.00	0.49	0.00	0.00	0.34	0.0	6.6	6.8	2.31	2.73	3.90	12	0.50	92.42	93.15	93.13	93.86	100.38	98.86	Pipe - (299)
12	11	101.258	0.00	0.49	0.00	0.00	0.34	0.0	6.1	6.9	2.35	2.73	3.90	12	0.50	93.25	93.76	93.97	94.48	98.86	97.81	Pipe - (293)
13	12	14.966	0.08	0.08	0.90	0.07	0.07	6.0	6.0	7.0	0.50	3.57	1.68	12	1.00	93.86	94.01	94.65	94.30	97.81	97.50	Pipe - (291)
14	12	14.952	0.41	0.41	0.65	0.27	0.27	6.0	6.0	7.0	1.86	3.57	3.36	12	1.00	93.86	94.01	94.65	94.59	97.81	97.50	Pipe - (292)
Project File: Storm-W7.stm																Number of lines: 14				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

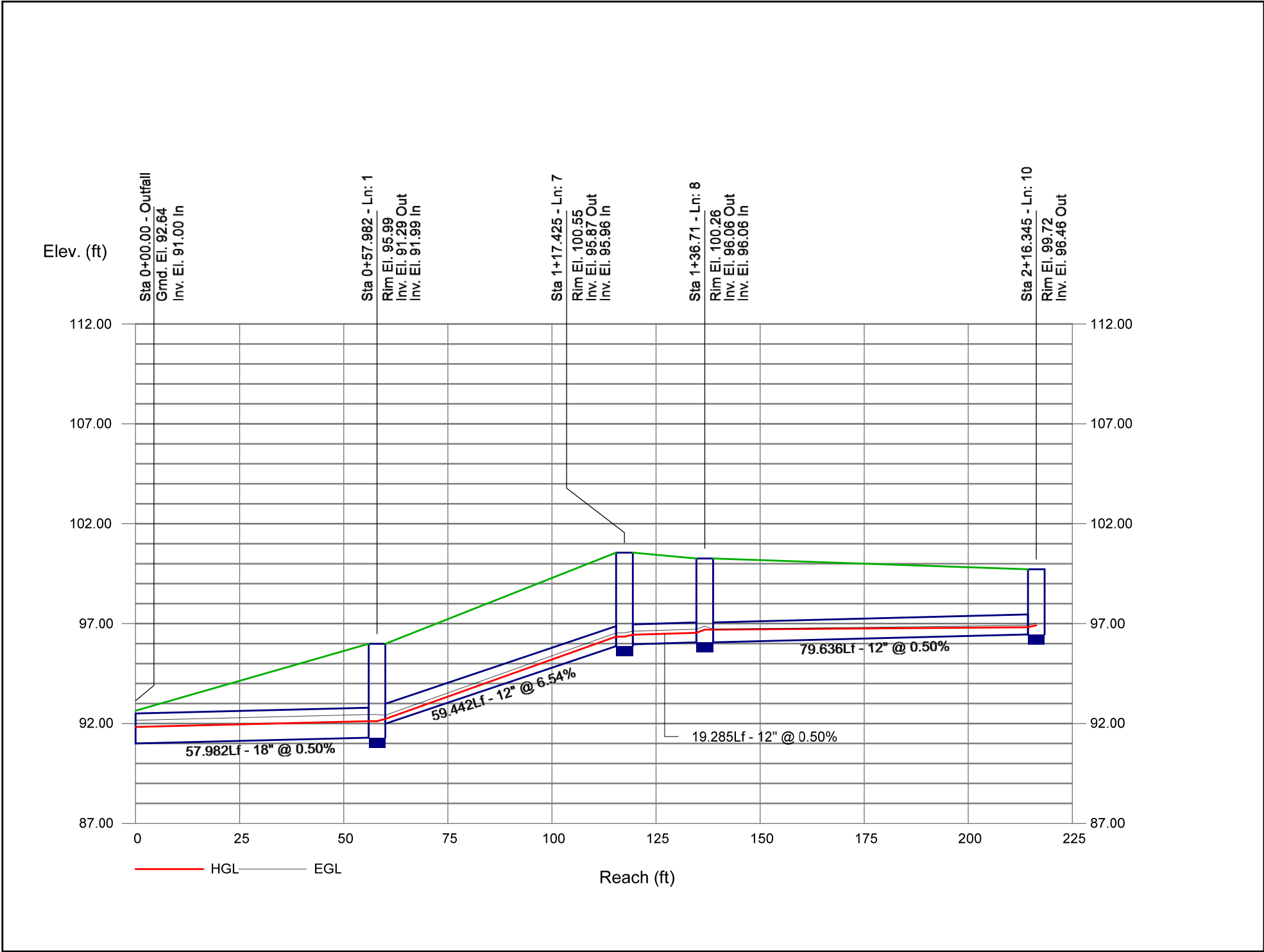
Storm Sewer Profile



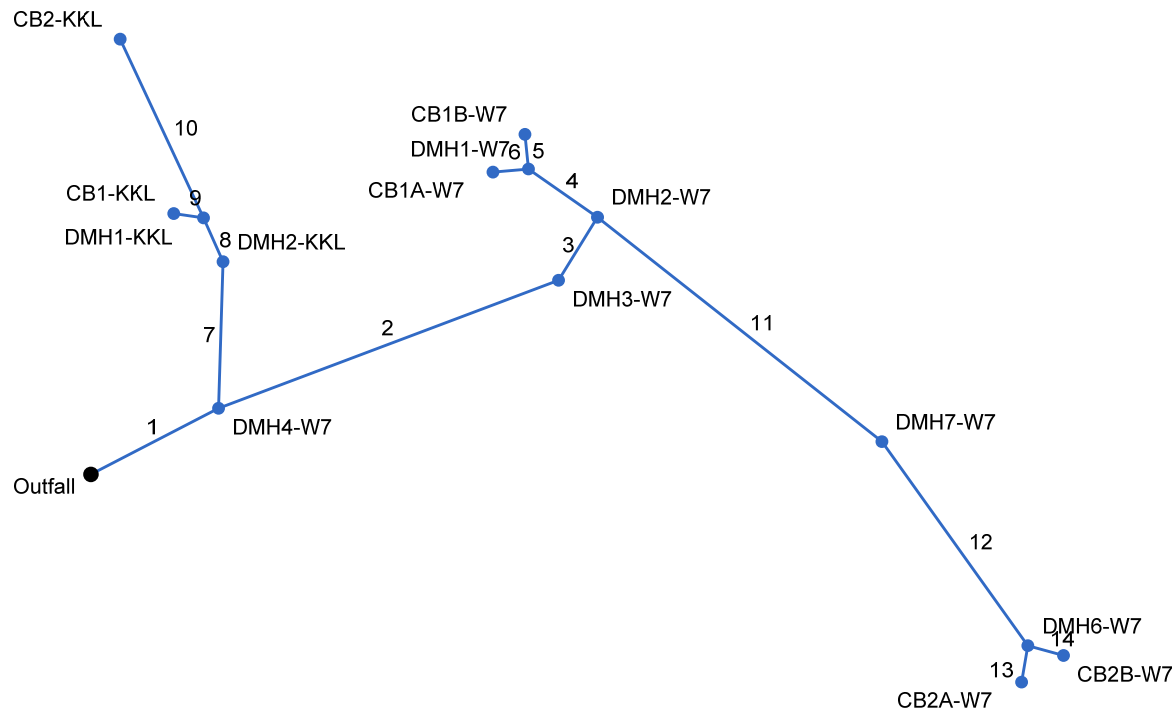
Storm Sewer Profile



Storm Sewer Profile



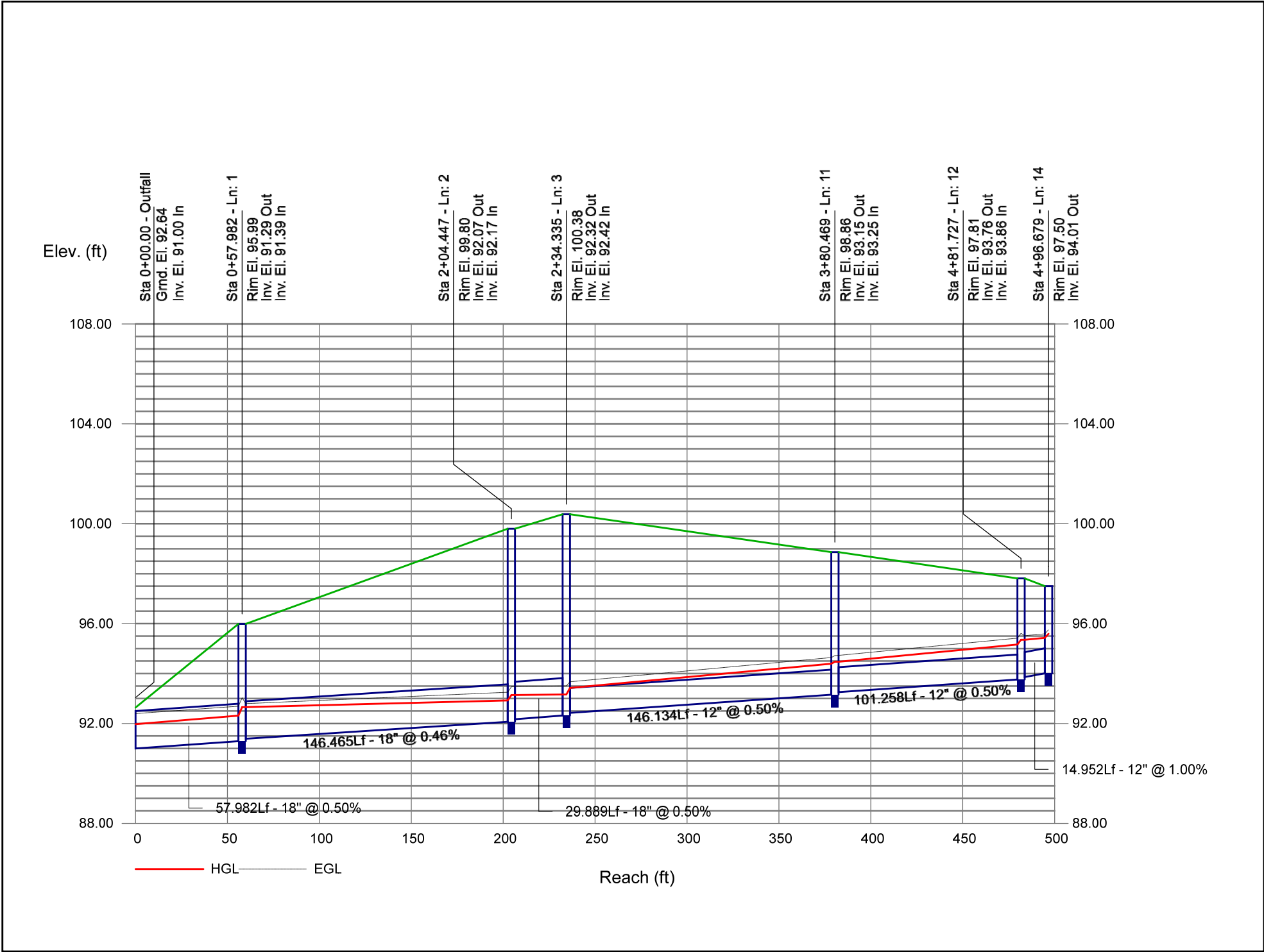
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



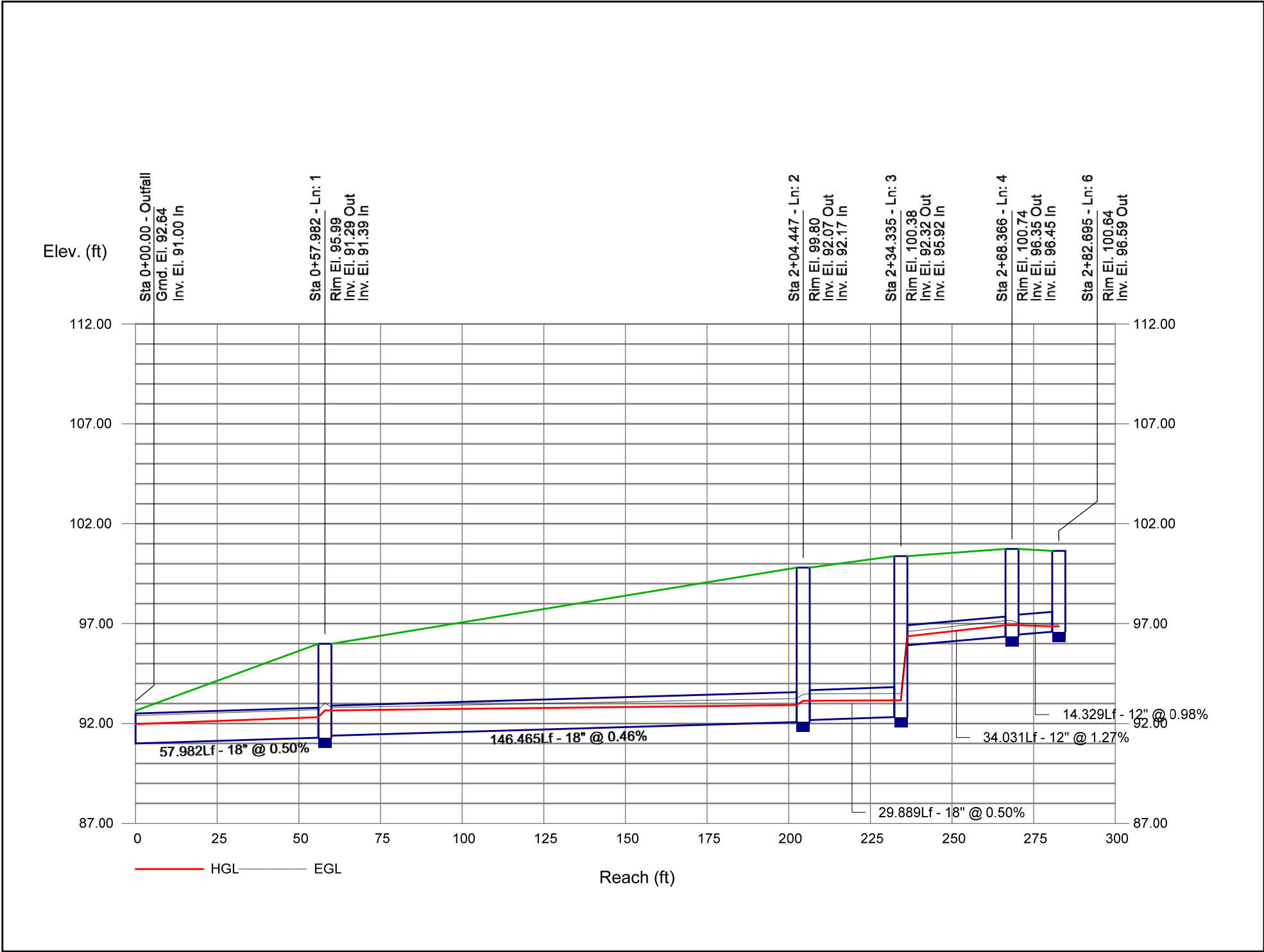
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	57.982	0.00	1.11	0.00	0.00	0.71	0.0	8.4	8.8	6.27	8.05	5.06	18	0.50	91.00	91.29	91.97	92.31	92.64	95.99	Pipe - (329)
2	1	146.465	0.00	0.81	0.00	0.00	0.53	0.0	7.5	9.0	4.76	7.75	3.82	18	0.46	91.39	92.07	92.64	92.92	95.99	99.80	Pipe - (302)
3	2	29.889	0.00	0.81	0.00	0.00	0.53	0.0	7.3	9.1	4.79	0.00	4.33	18	0.50	92.17	92.32	93.14	93.16	99.80	100.38	Pipe - (300)
4	3	34.031	0.00	0.32	0.00	0.00	0.19	0.0	6.4	9.4	1.77	0.00	4.56	12	1.27	95.92	96.35	96.37	96.92	100.38	100.74	Pipe - (298)
5	4	14.133	0.25	0.25	0.57	0.14	0.14	6.0	6.0	9.5	1.35	0.00	3.62	12	0.99	96.45	96.59	96.92	97.08	100.74	100.64	Pipe - (297)
6	4	14.329	0.07	0.07	0.67	0.05	0.05	6.0	6.0	9.5	0.44	0.00	1.87	12	0.98	96.45	96.59	96.92	96.87	100.74	100.64	Pipe - (296)
7	1	59.442	0.00	0.30	0.00	0.00	0.19	0.0	7.3	9.1	1.70	0.00	3.47	12	6.54	91.99	95.87	92.65	96.43	95.99	100.55	Pipe - (305)
8	7	19.285	0.00	0.30	0.00	0.00	0.19	0.0	7.2	9.1	1.71	0.00	3.68	12	0.50	95.96	96.06	96.54	96.64	100.55	100.26	Pipe - (596)
9	8	12.155	0.15	0.15	0.64	0.10	0.10	6.0	6.0	9.5	0.91	0.00	2.90	12	0.49	96.40	96.46	96.82	96.88	100.26	99.72	Pipe - (597)
10	8	79.636	0.15	0.15	0.61	0.09	0.09	6.0	6.0	9.5	0.87	0.00	1.93	12	0.50	96.06	96.46	96.82	96.91	100.26	99.72	Pipe - (598)
11	3	146.134	0.00	0.49	0.00	0.00	0.34	0.0	6.7	9.3	3.14	0.00	4.00	12	0.50	92.42	93.15	93.42	94.39	100.38	98.86	Pipe - (299)
12	11	101.258	0.00	0.49	0.00	0.00	0.34	0.0	6.3	9.4	3.19	0.00	4.06	12	0.50	93.25	93.76	94.47	95.16	98.86	97.81	Pipe - (293)
13	12	14.966	0.08	0.08	0.90	0.07	0.07	6.0	6.0	9.5	0.68	0.00	0.87	12	1.00	93.86	94.01	95.35	95.36	97.81	97.50	Pipe - (291)
14	12	14.952	0.41	0.41	0.65	0.27	0.27	6.0	6.0	9.5	2.53	0.00	3.23	12	1.00	93.86	94.01	95.35	95.43	97.81	97.50	Pipe - (292)
Project File: Storm-W7.stm																Number of lines: 14				Run Date: 12/12/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

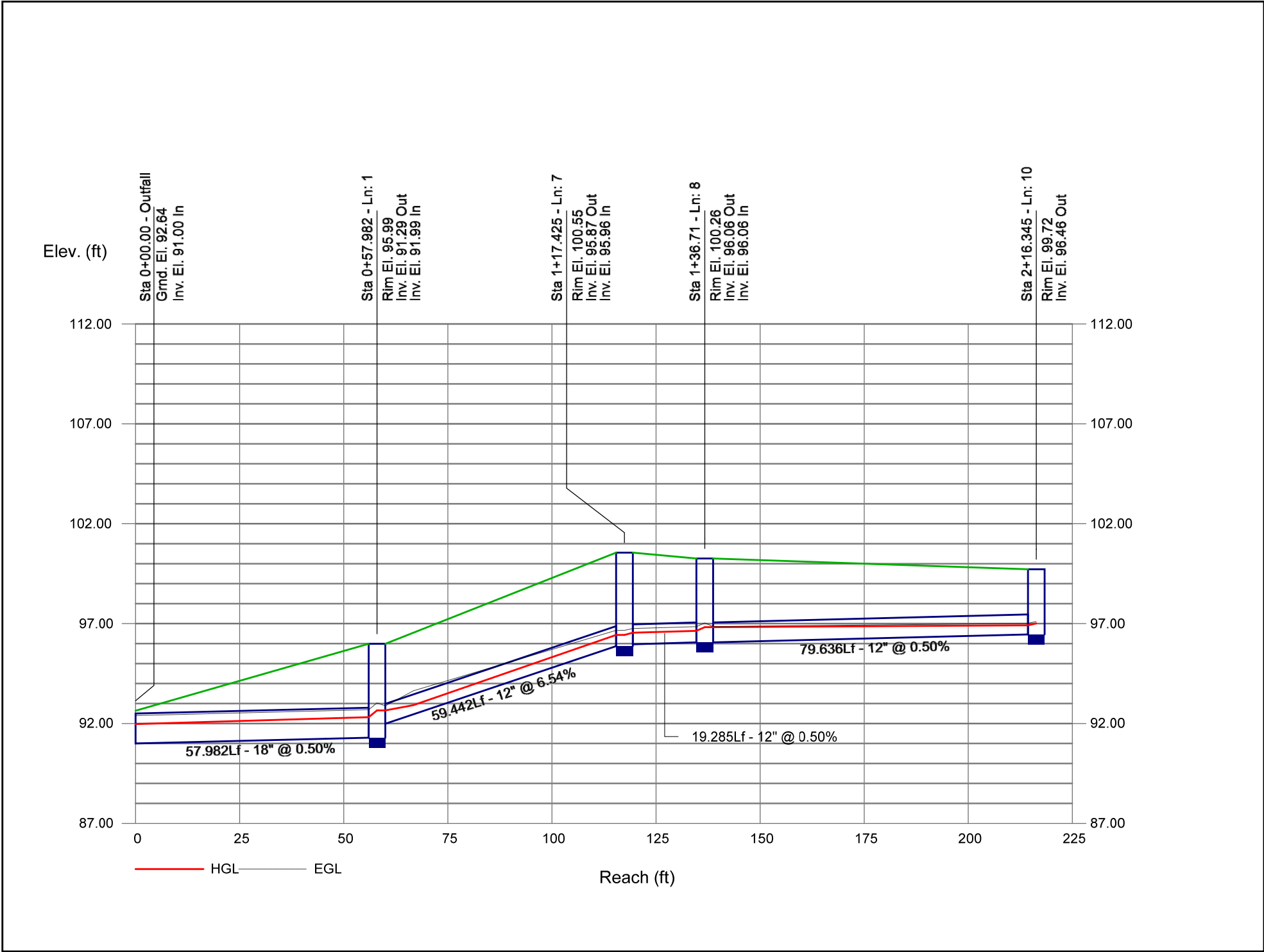
Storm Sewer Profile



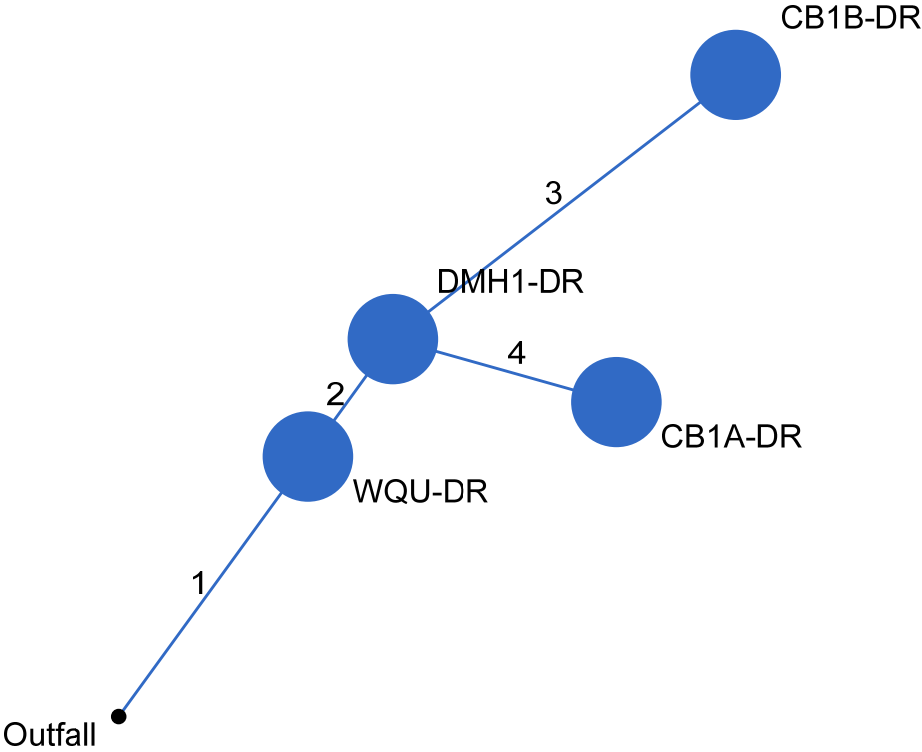
Storm Sewer Profile



Storm Sewer Profile



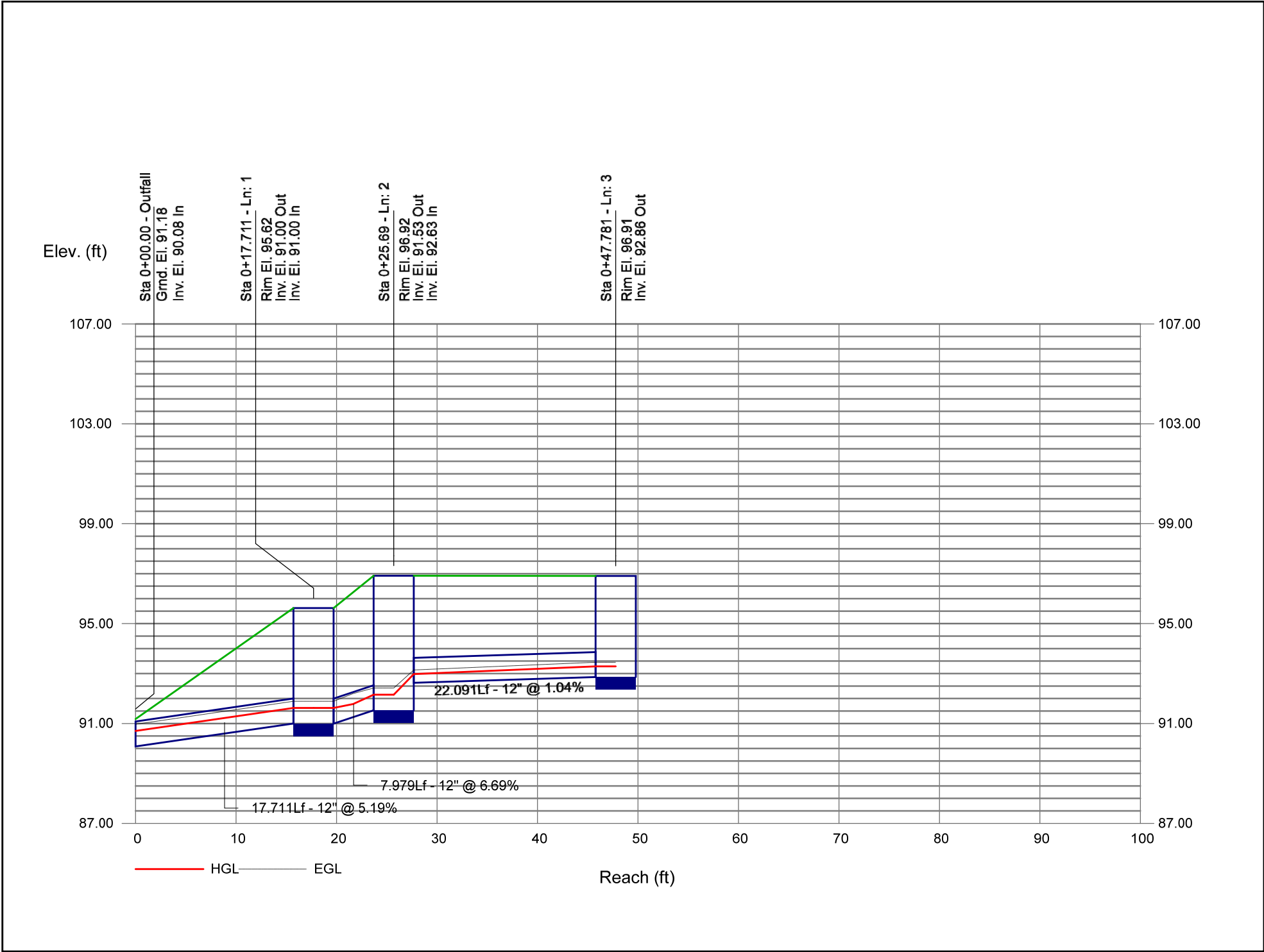
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



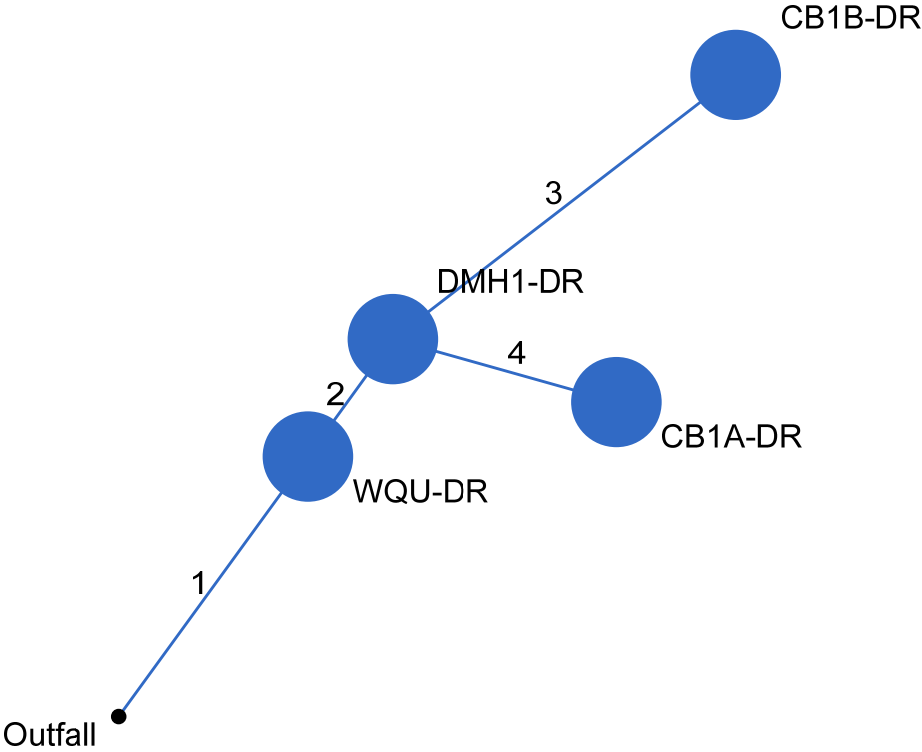
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	17.711	0.00	0.73	0.00	0.00	0.31	0.0	6.1	6.9	2.14	8.79	4.15	12	5.19	90.08	91.00	90.70	91.62	91.18	95.62	Pipe - (580)
2	1	7.979	0.00	0.73	0.00	0.00	0.31	0.0	6.1	6.9	2.14	9.98	4.13	12	6.69	91.00	91.53	91.62	92.15	95.62	96.92	Pipe - (581)
3	2	22.091	0.48	0.48	0.31	0.15	0.15	6.0	6.0	7.0	1.04	3.94	3.73	12	1.04	92.63	92.86	92.98	93.29	96.92	96.91	Pipe - (278)
4	2	10.892	0.25	0.25	0.64	0.16	0.16	6.0	6.0	7.0	1.11	5.48	4.38	12	2.02	92.63	92.85	92.93	93.29	96.92	96.91	Pipe - (279)
Project File: Storm-DR.stm																Number of lines: 4				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Storm Sewer Profile



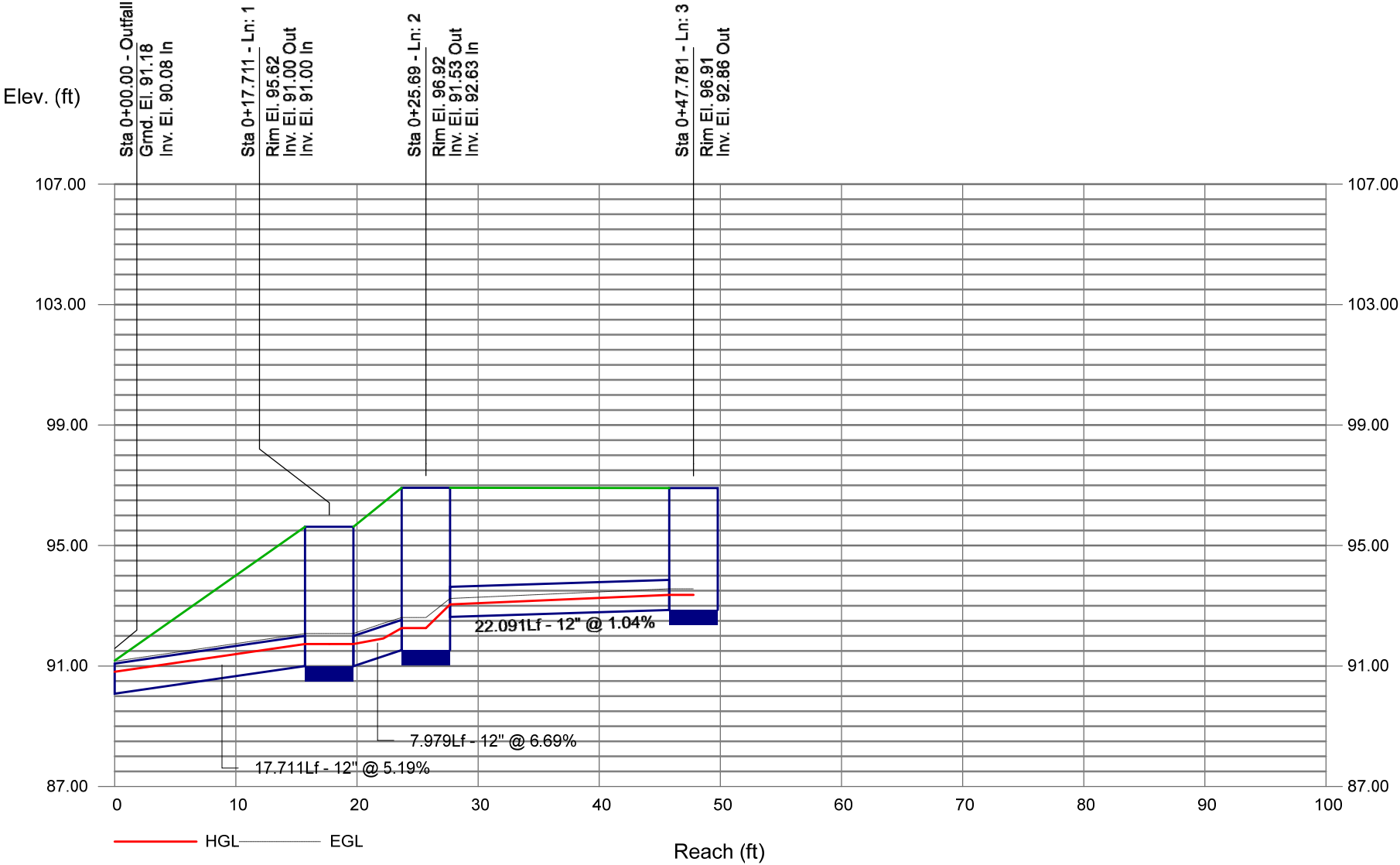
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



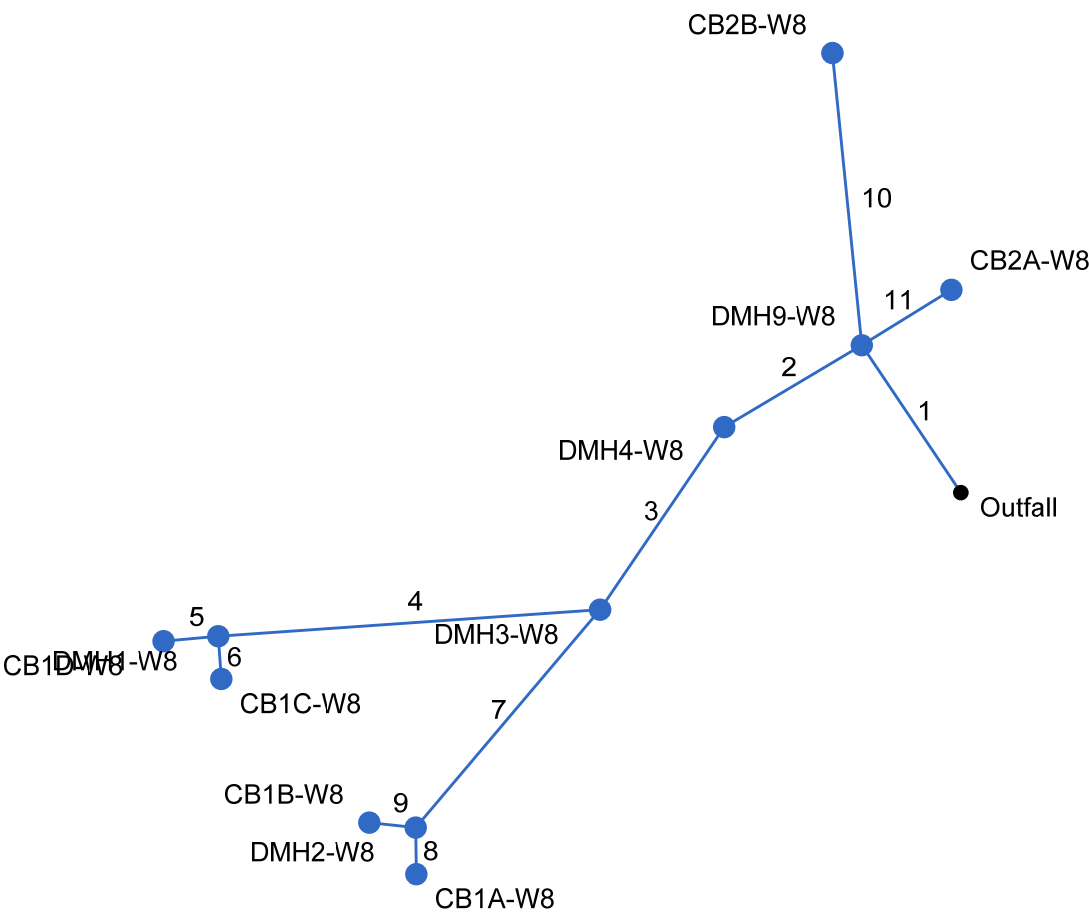
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID								
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up									
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)									
1	End	17.711	0.00	0.73	0.00	0.00	0.31	0.0	6.1	9.5	2.91	8.79	4.74	12	5.19	90.08	91.00	90.81	91.73	91.18	95.62	Pipe - (580)								
2	1	7.979	0.00	0.73	0.00	0.00	0.31	0.0	6.1	9.5	2.92	9.98	4.72	12	6.69	91.00	91.53	91.73	92.26	95.62	96.92	Pipe - (581)								
3	2	22.091	0.48	0.48	0.31	0.15	0.15	6.0	6.0	9.5	1.42	3.94	4.09	12	1.04	92.63	92.86	93.04	93.36	96.92	96.91	Pipe - (278)								
4	2	10.892	0.25	0.25	0.64	0.16	0.16	6.0	6.0	9.5	1.51	5.48	4.80	12	2.02	92.63	92.85	92.99	93.37	96.92	96.91	Pipe - (279)								

Storm Sewer Profile



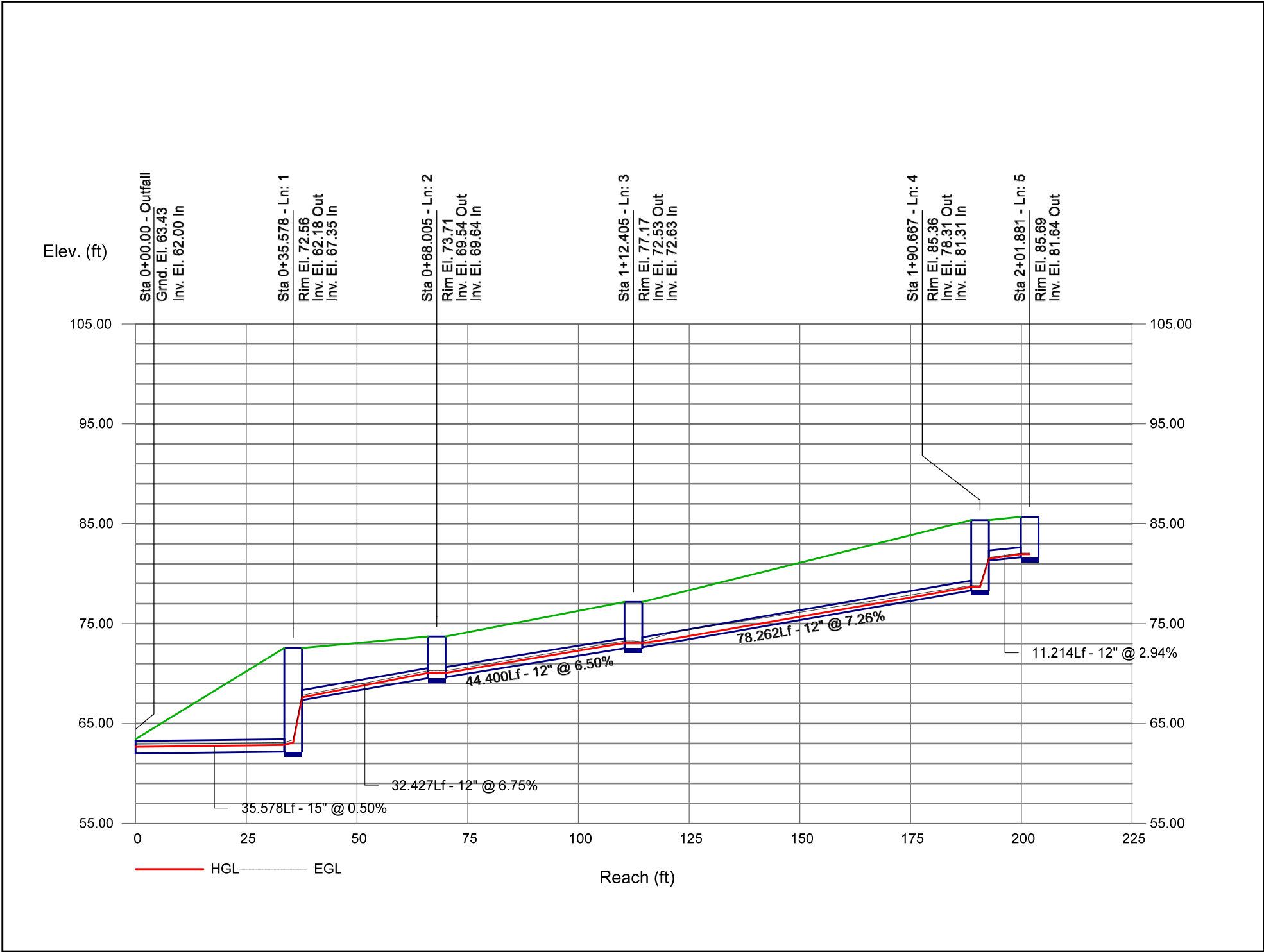
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



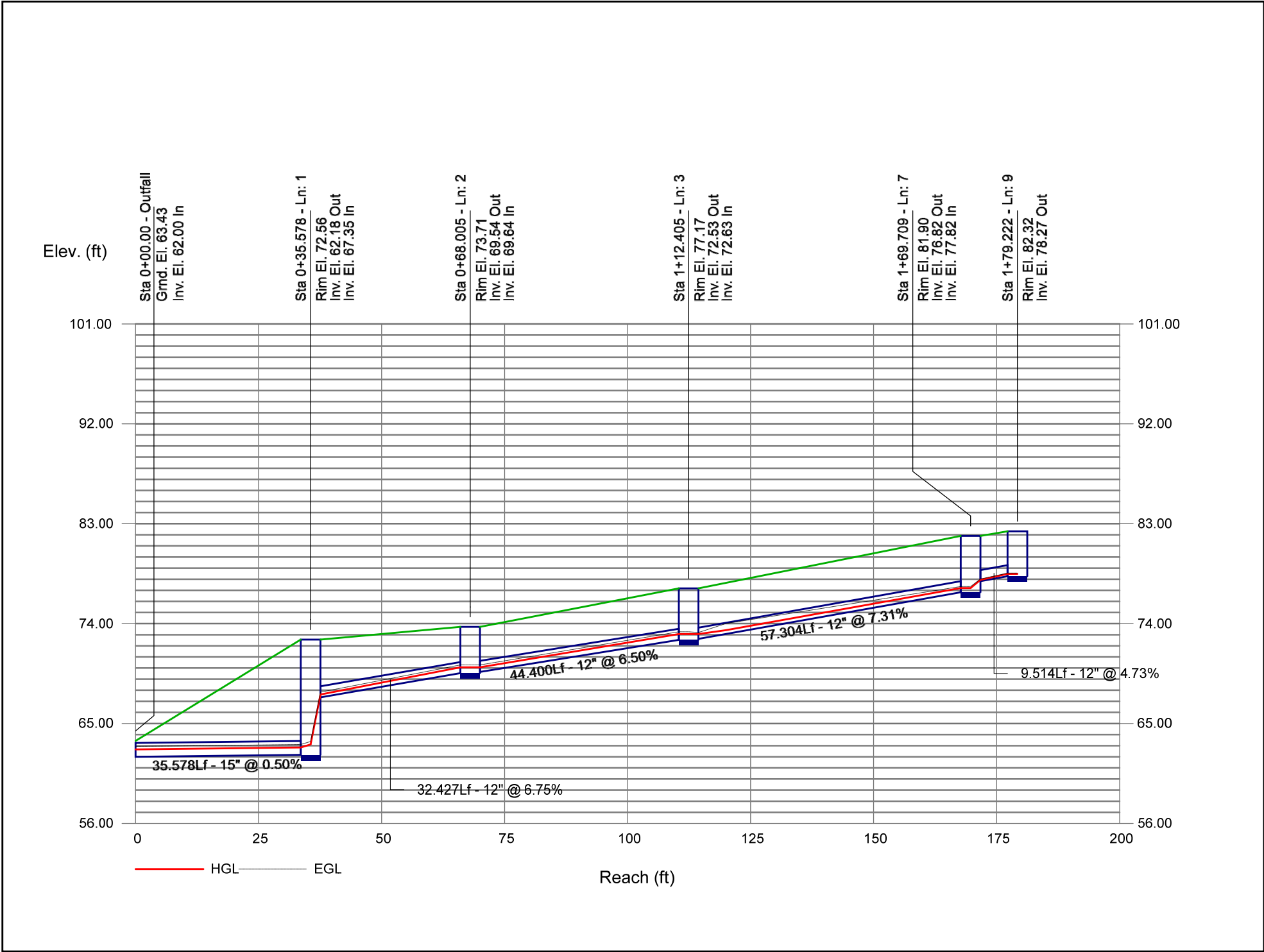
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	35.578	0.00	0.94	0.00	0.00	0.41	0.0	6.8	6.8	2.75	4.94	4.13	15	0.50	62.00	62.18	62.66	62.85	63.43	72.56	Pipe - (369)
2	1	32.427	0.00	0.39	0.00	0.00	0.23	0.0	6.7	6.8	1.53	10.03	6.45	12	6.75	67.35	69.54	67.61	70.07	72.56	73.71	Pipe - (367) (1)
3	2	44.400	0.00	0.39	0.00	0.00	0.23	0.0	6.5	6.8	1.54	9.84	4.31	12	6.50	69.64	72.53	70.07	73.06	73.71	77.17	Pipe - (367)
4	3	78.262	0.00	0.21	0.00	0.00	0.11	0.0	6.0	7.0	0.75	10.39	2.63	12	7.26	72.63	78.31	73.06	78.67	77.17	85.36	Pipe - (601)
5	4	11.214	0.18	0.18	0.45	0.08	0.08	6.0	6.0	7.0	0.56	6.62	3.91	12	2.94	81.31	81.64	81.51	81.95	85.36	85.69	Pipe - (605)
6	4	8.376	0.03	0.03	0.90	0.03	0.03	6.0	6.0	7.0	0.19	7.54	3.02	12	3.82	81.31	81.63	81.42	81.81	85.36	85.68	Pipe - (606)
7	3	57.304	0.00	0.18	0.00	0.00	0.12	0.0	6.0	7.0	0.83	10.43	2.80	12	7.31	72.63	76.82	73.06	77.20	77.17	81.90	Pipe - (364) (1)
8	7	9.315	0.11	0.11	0.74	0.08	0.08	6.0	6.0	7.0	0.57	7.79	4.24	12	4.08	77.82	78.20	78.00	78.51	81.90	82.25	Pipe - (364)
9	7	9.514	0.07	0.07	0.54	0.04	0.04	6.0	6.0	7.0	0.26	8.39	3.50	12	4.73	77.82	78.27	77.94	78.48	81.90	82.32	Pipe - (602)
10	1	58.217	0.31	0.31	0.31	0.10	0.10	6.0	6.0	7.0	0.66	9.45	4.88	12	5.99	67.35	70.84	67.53	71.18	72.56	77.93	Pipe - (365)
11	1	21.378	0.24	0.24	0.36	0.09	0.09	6.0	6.0	7.0	0.59	5.47	3.65	12	2.01	67.35	67.78	67.57	68.10	72.56	72.13	Pipe - (366)
Project File: Storm-W8.stm																Number of lines: 11				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

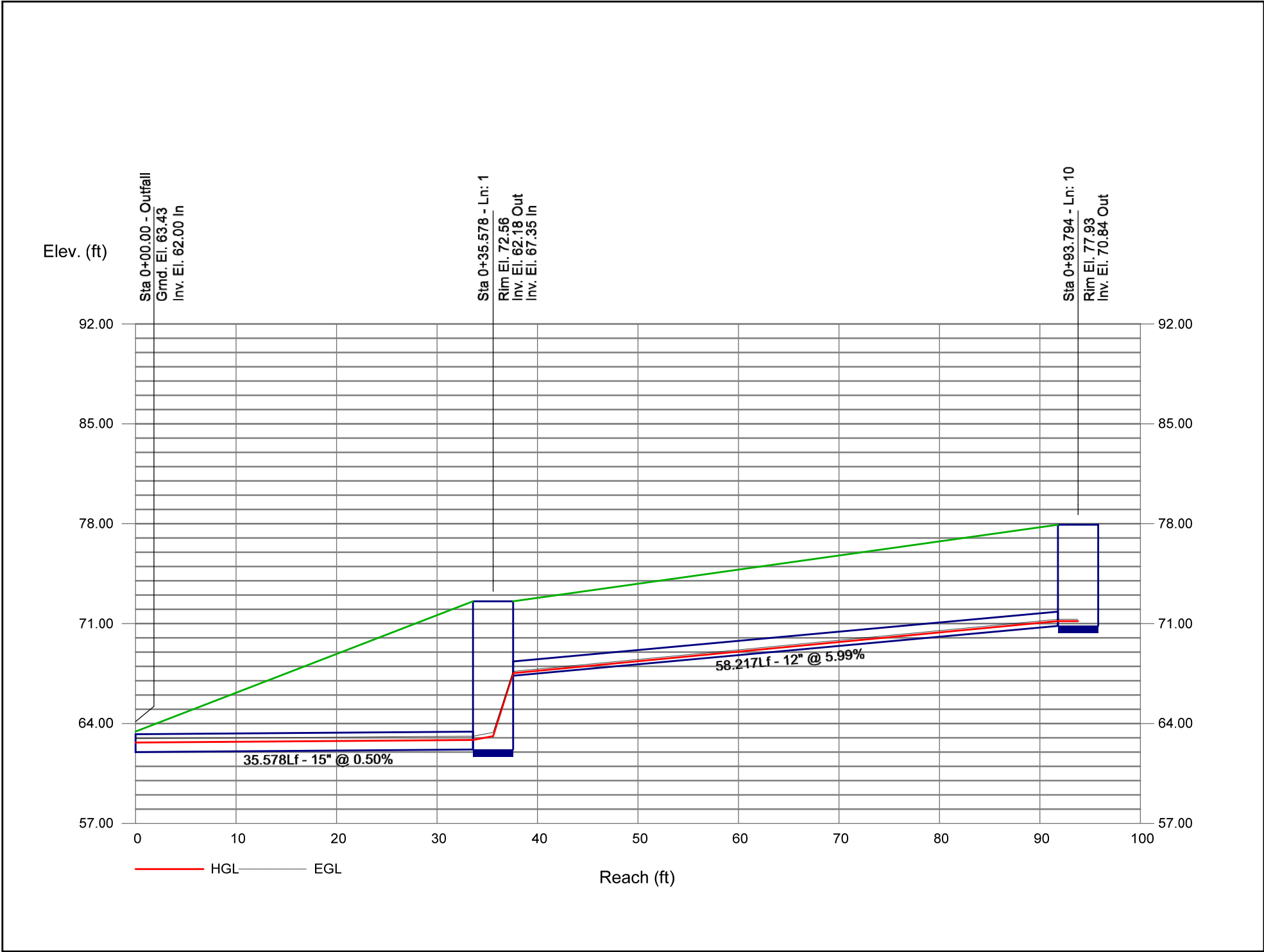
Storm Sewer Profile



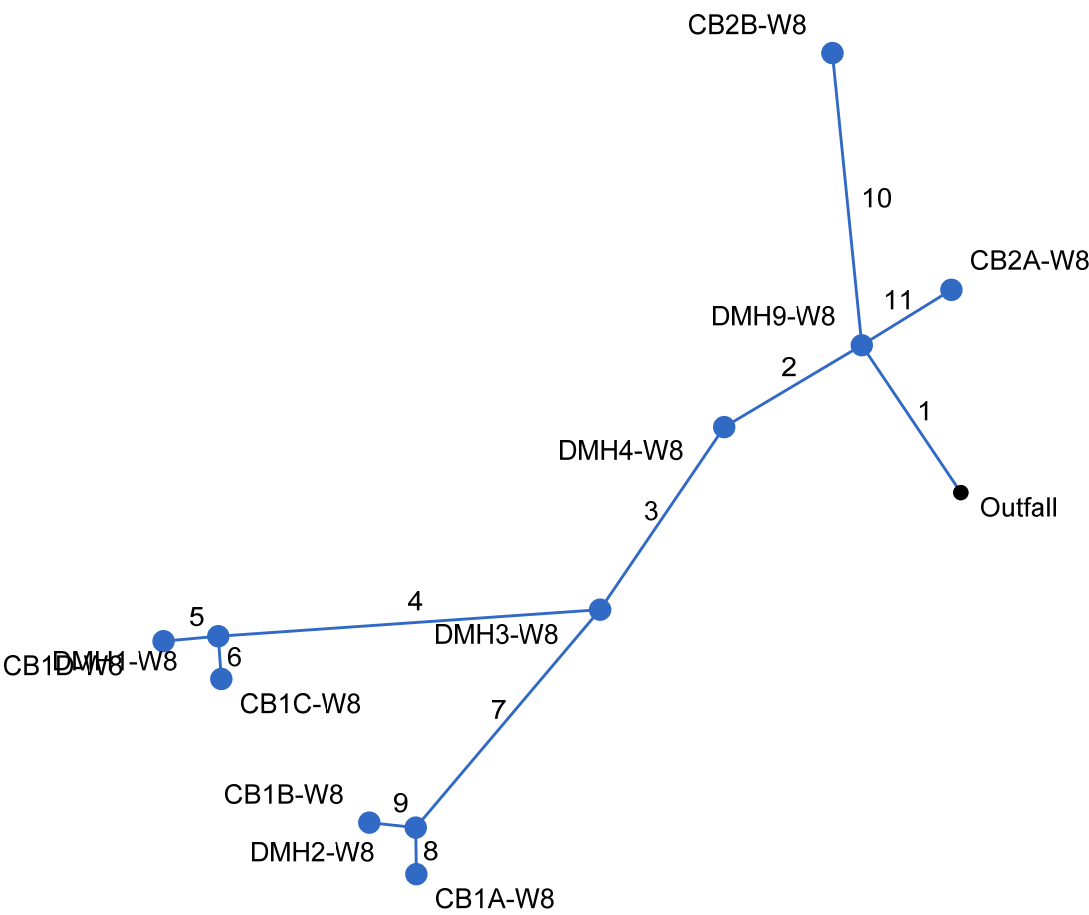
Storm Sewer Profile



Storm Sewer Profile



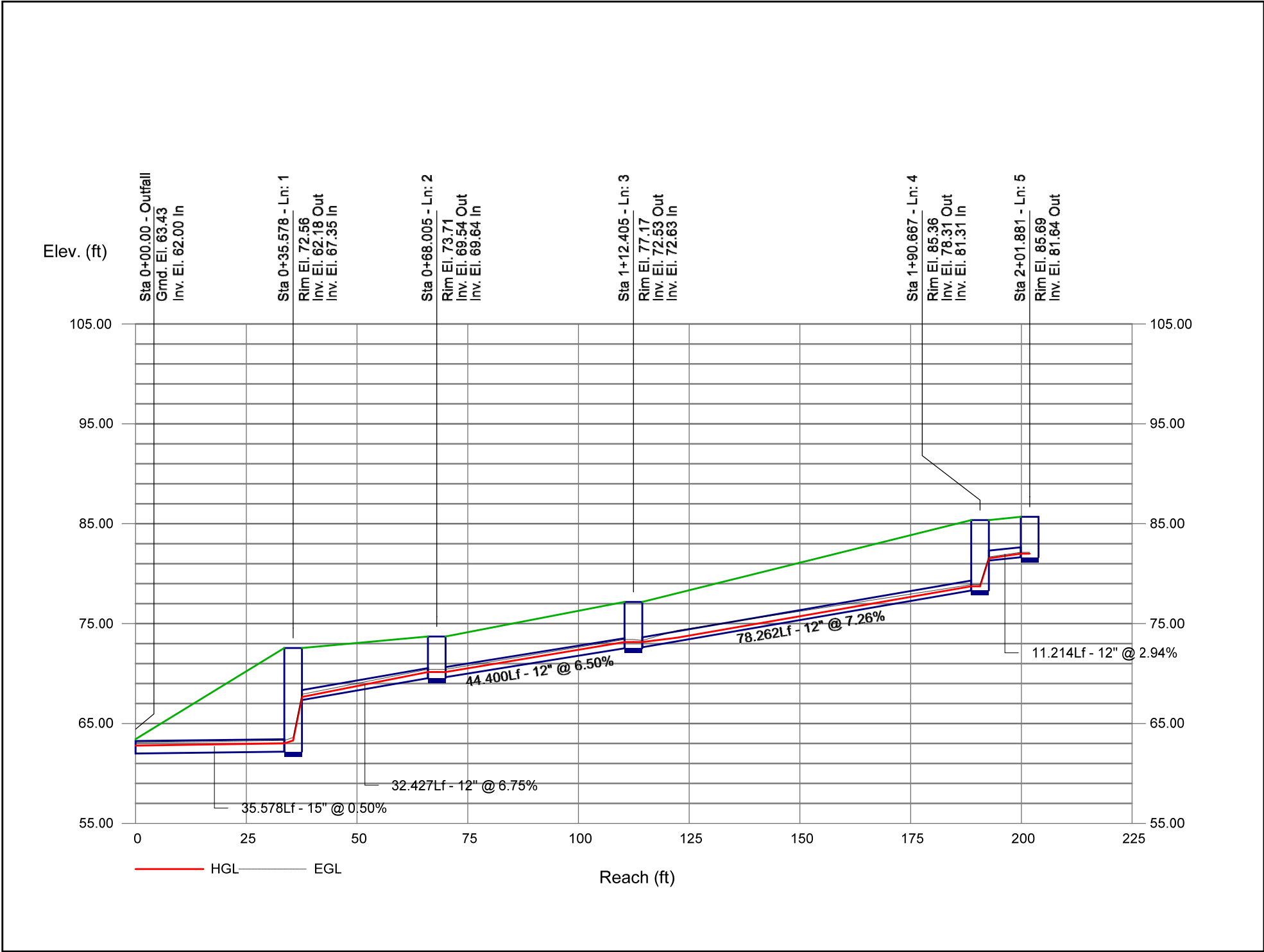
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Tabulation

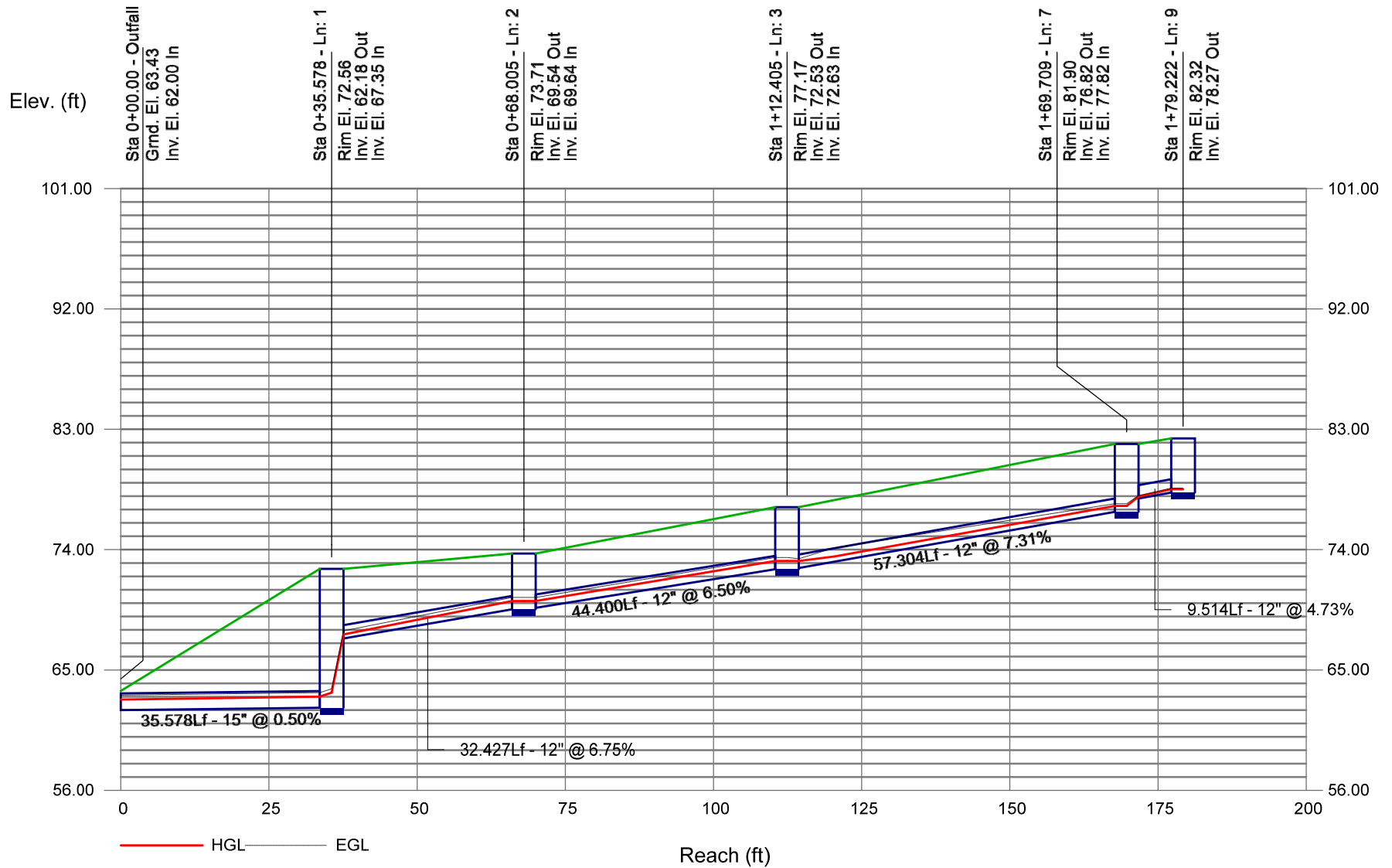
Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	35.578	0.00	0.94	0.00	0.00	0.41	0.0	6.7	9.3	3.77	4.94	4.49	15	0.50	62.00	62.18	62.78	63.01	63.43	72.56	Pipe - (369)
2	1	32.427	0.00	0.39	0.00	0.00	0.23	0.0	6.7	9.3	2.10	10.03	7.10	12	6.75	67.35	69.54	67.66	70.16	72.56	73.71	Pipe - (367) (1)
3	2	44.400	0.00	0.39	0.00	0.00	0.23	0.0	6.5	9.3	2.11	9.84	4.66	12	6.50	69.64	72.53	70.16	73.15	73.71	77.17	Pipe - (367)
4	3	78.262	0.00	0.21	0.00	0.00	0.11	0.0	6.0	9.5	1.02	10.39	2.84	12	7.26	72.63	78.31	73.15	78.73	77.17	85.36	Pipe - (601)
5	4	11.214	0.18	0.18	0.45	0.08	0.08	6.0	6.0	9.5	0.77	6.62	4.28	12	2.94	81.31	81.64	81.54	82.01	85.36	85.69	Pipe - (605)
6	4	8.376	0.03	0.03	0.90	0.03	0.03	6.0	6.0	9.5	0.26	7.54	3.31	12	3.82	81.31	81.63	81.44	81.84	85.36	85.68	Pipe - (606)
7	3	57.304	0.00	0.18	0.00	0.00	0.12	0.0	6.0	9.5	1.13	10.43	3.02	12	7.31	72.63	76.82	73.15	77.27	77.17	81.90	Pipe - (364) (1)
8	7	9.315	0.11	0.11	0.74	0.08	0.08	6.0	6.0	9.5	0.77	7.79	4.64	12	4.08	77.82	78.20	78.03	78.57	81.90	82.25	Pipe - (364)
9	7	9.514	0.07	0.07	0.54	0.04	0.04	6.0	6.0	9.5	0.36	8.39	3.84	12	4.73	77.82	78.27	77.96	78.52	81.90	82.32	Pipe - (602)
10	1	58.217	0.31	0.31	0.31	0.10	0.10	6.0	6.0	9.5	0.90	9.45	5.34	12	5.99	67.35	70.84	67.56	71.24	72.56	77.93	Pipe - (365)
11	1	21.378	0.24	0.24	0.36	0.09	0.09	6.0	6.0	9.5	0.81	5.47	3.99	12	2.01	67.35	67.78	67.61	68.16	72.56	72.13	Pipe - (366)
Project File: Storm-W8.stm																Number of lines: 11				Run Date: 12/12/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile

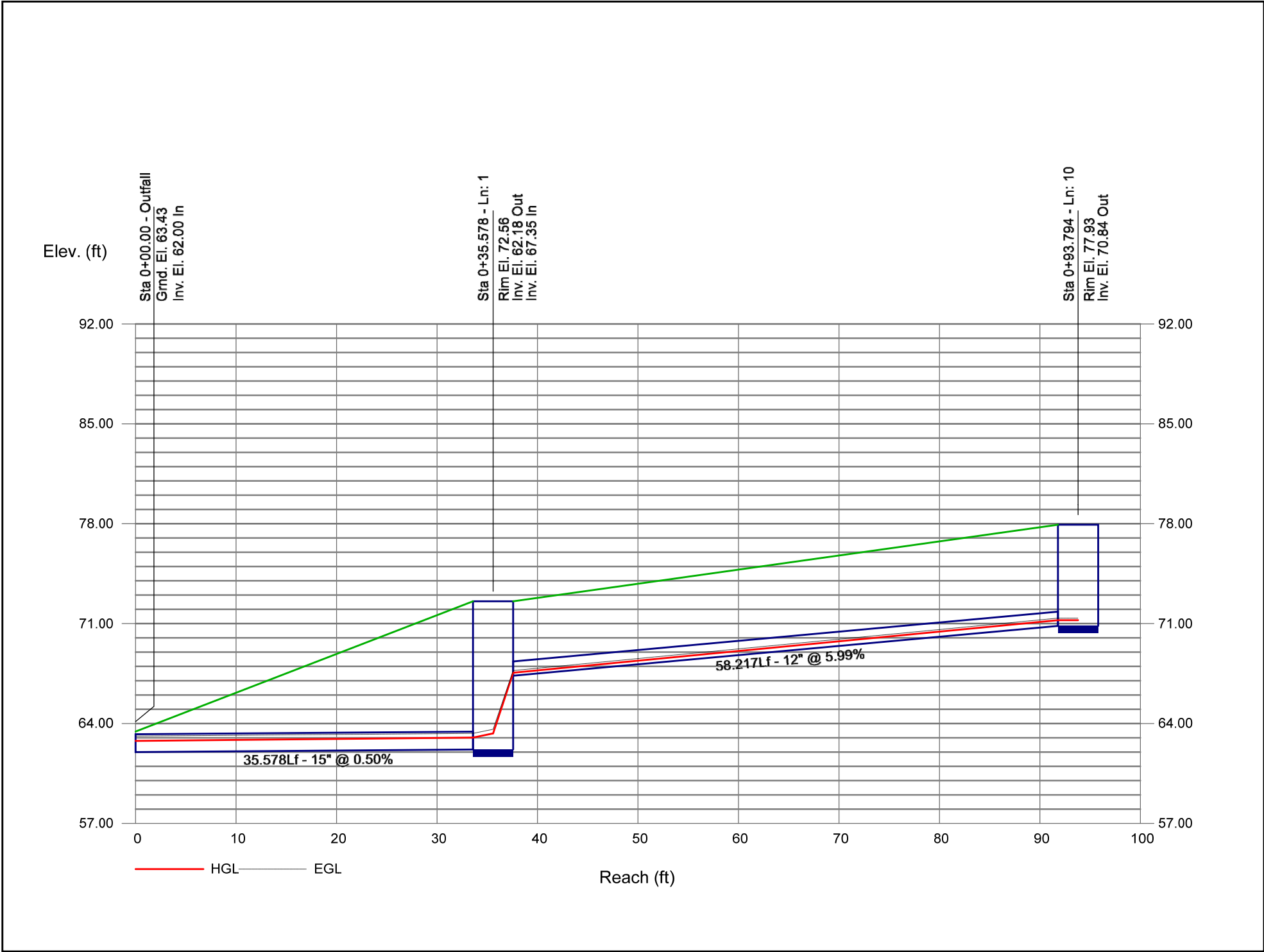


Storm Sewer Profile

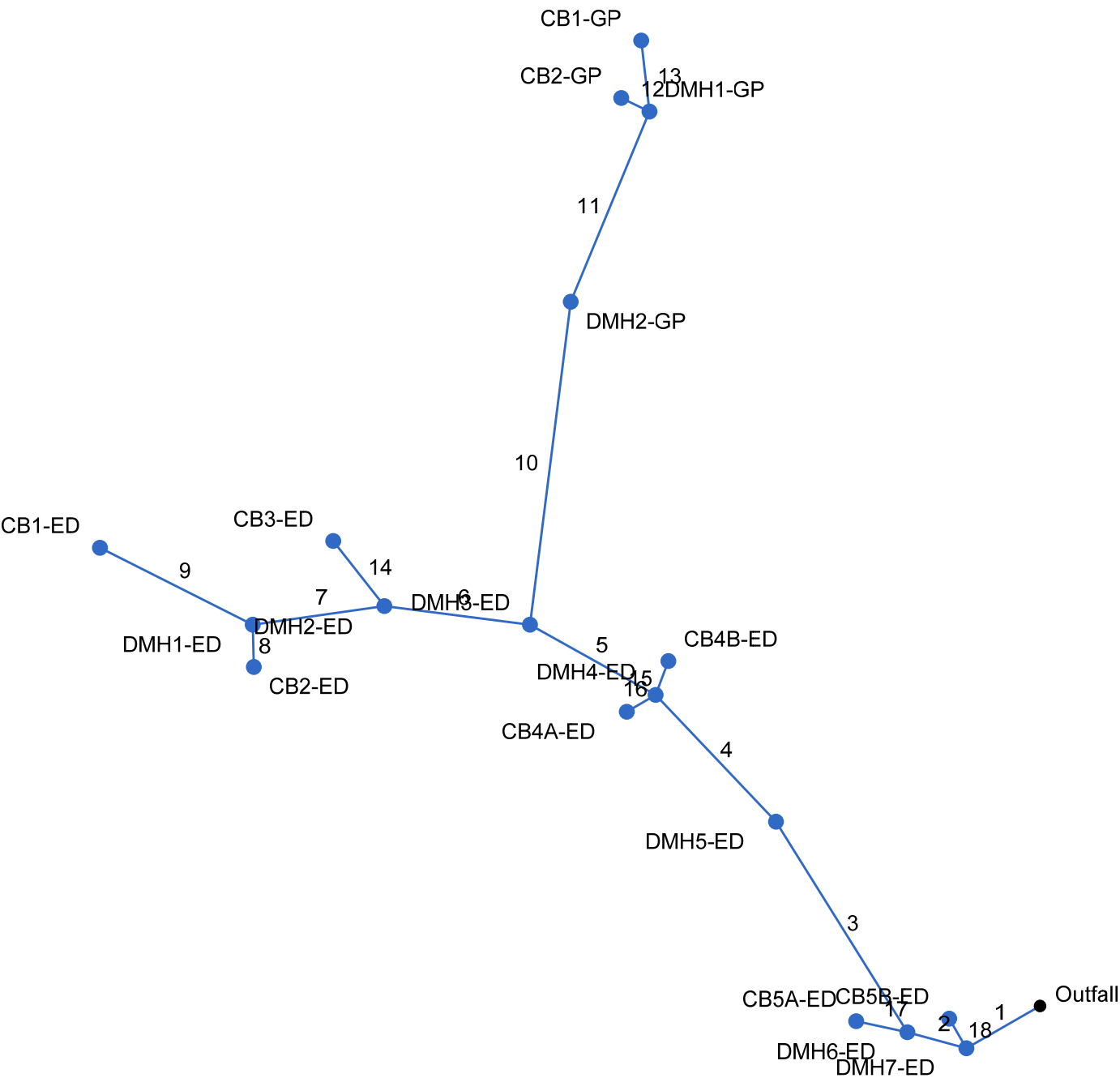
Proj. file: Storm-W8.stm



Storm Sewer Profile



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

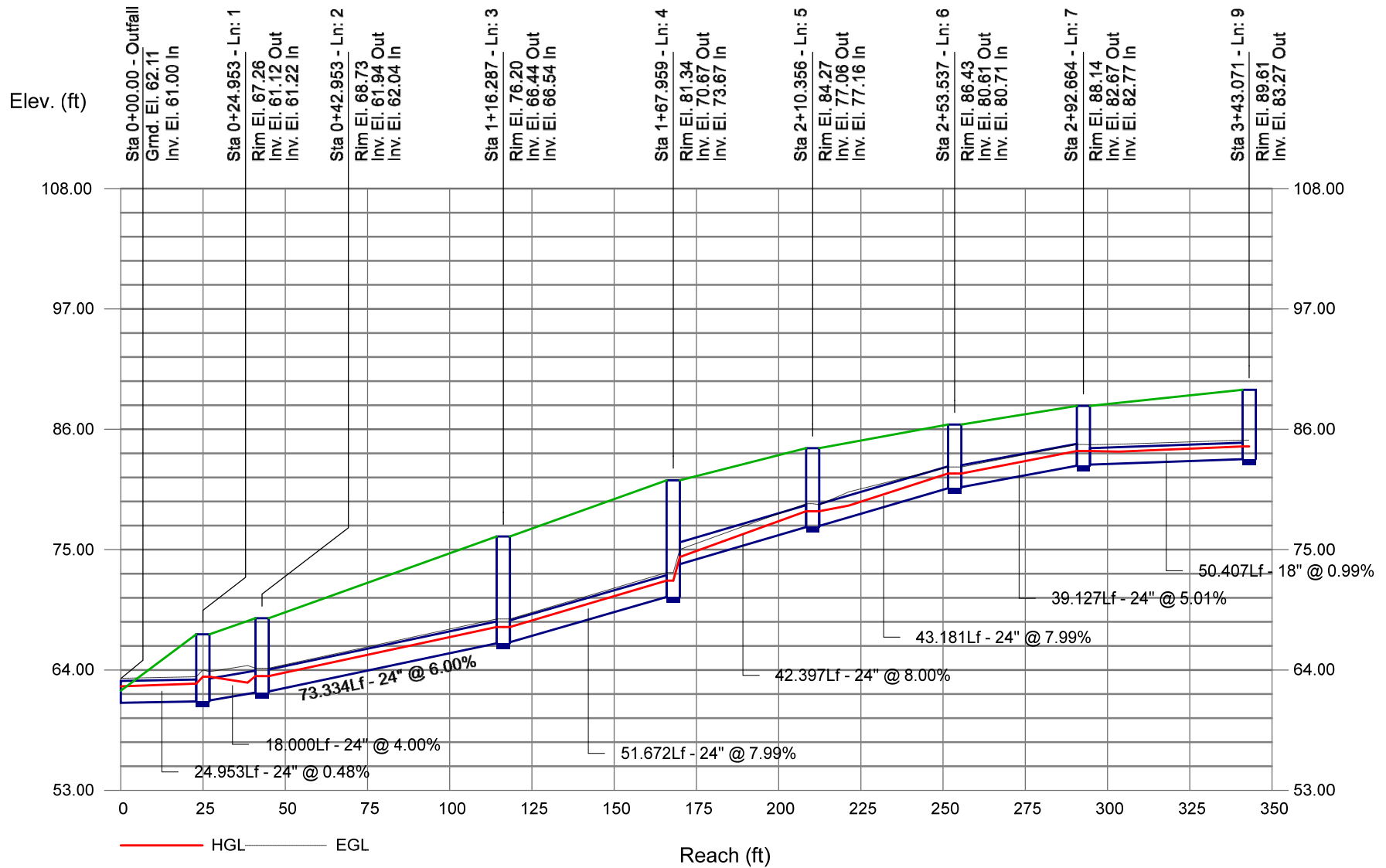


Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	24.953	0.00	4.53	0.00	0.00	2.60	0.0	7.0	6.7	17.46	16.99	6.62	24	0.48	61.00	61.12	62.50	62.75	62.11	67.26	Pipe - (594)
2	1	18.000	0.00	4.46	0.00	0.00	2.57	0.0	6.9	6.7	17.27	49.01	6.17	24	4.00	61.22	61.94	63.38	63.44	67.26	68.73	Pipe - (599)
3	2	73.334	0.00	4.43	0.00	0.00	2.54	0.0	6.8	6.8	17.20	60.02	7.09	24	6.00	62.04	66.44	63.44	67.93	68.73	76.20	Pipe - (591)
4	3	51.672	0.00	4.43	0.00	0.00	2.54	0.0	6.7	6.8	17.28	69.27	7.12	24	7.99	66.54	70.67	67.93	72.17	76.20	81.34	Pipe - (590)
5	4	42.397	0.00	3.35	0.00	0.00	2.38	0.0	6.6	6.8	16.21	69.29	12.32	24	8.00	73.67	77.06	74.33	78.51	81.34	84.27	Pipe - (588)
6	5	43.181	0.00	2.67	0.00	0.00	2.01	0.0	6.2	6.9	13.90	69.26	6.18	24	7.99	77.16	80.61	78.51	81.95	84.27	86.43	Pipe - (587) (1)
7	6	39.127	0.00	2.60	0.00	0.00	2.01	0.0	6.1	6.9	13.91	54.84	6.50	24	5.01	80.71	82.67	81.95	84.01	86.43	88.14	Pipe - (587)
8	7	12.427	0.80	0.80	0.90	0.72	0.72	6.0	6.0	7.0	5.02	9.92	6.68	15	2.01	83.71	83.96	84.34	84.87	88.14	87.60	Pipe - (584)
9	7	50.407	1.80	1.80	0.72	1.29	1.29	6.0	6.0	7.0	8.97	11.33	5.93	18	0.99	82.77	83.27	84.01	84.43	88.14	89.61	Pipe - (583)
10	5	96.253	0.00	0.68	0.00	0.00	0.37	0.0	6.3	6.9	2.52	7.61	5.58	12	3.89	78.03	81.77	78.51	82.45	84.27	89.62	Pipe - (595)
11	10	60.868	0.00	0.68	0.00	0.00	0.37	0.0	6.1	6.9	2.54	3.86	4.85	12	1.00	81.87	82.48	82.46	83.16	89.62	87.33	Pipe - (352)
12	11	9.182	0.10	0.10	0.50	0.05	0.05	6.0	6.0	7.0	0.35	5.40	1.54	12	1.96	82.58	82.76	83.16	83.00	87.33	86.83	Pipe - (351)
13	11	21.134	0.58	0.58	0.55	0.32	0.32	6.0	6.0	7.0	2.20	3.85	4.42	12	0.99	82.58	82.79	83.16	83.42	87.33	86.84	Pipe - (350)
14	6	24.559	0.07	0.07	0.10	0.01	0.01	6.0	6.0	7.0	0.05	5.45	1.78	12	2.00	82.10	82.59	82.17	82.68	86.43	86.47	Pipe - (589)
15	4	10.620	0.13	0.13	0.35	0.05	0.05	6.0	6.0	7.0	0.32	3.74	2.60	12	0.94	77.29	77.39	77.49	77.62	81.34	81.45	Pipe - (586)
16	4	9.887	0.95	0.95	0.12	0.12	0.12	6.0	6.0	7.0	0.82	3.88	3.46	12	1.01	77.29	77.39	77.60	77.77	81.34	81.58	Pipe - (585)
17	2	15.369	0.03	0.03	0.89	0.03	0.03	6.0	6.0	7.0	0.19	5.48	2.61	12	2.02	64.29	64.60	64.42	64.78	68.73	69.58	Pipe - (592)
18	1	10.048	0.07	0.07	0.46	0.03	0.03	6.0	6.0	7.0	0.22	5.44	1.73	12	1.99	63.12	63.32	63.38	63.51	67.26	67.45	Pipe - (593)
Project File: Storm-ED.stm																Number of lines: 18				Run Date: 12/12/2023		
NOTES:Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

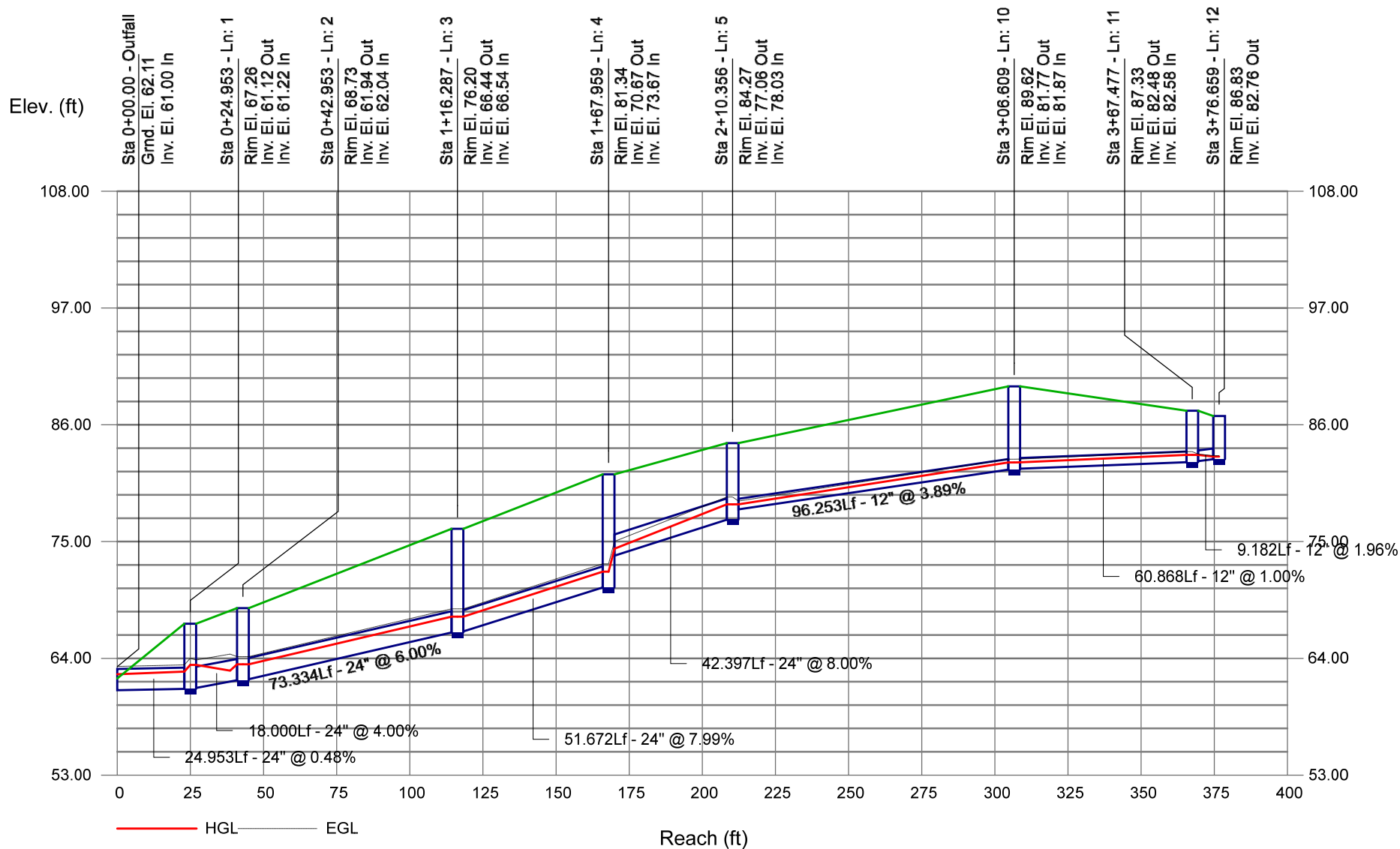
Storm Sewer Profile

Proj. file: Storm-ED.stm

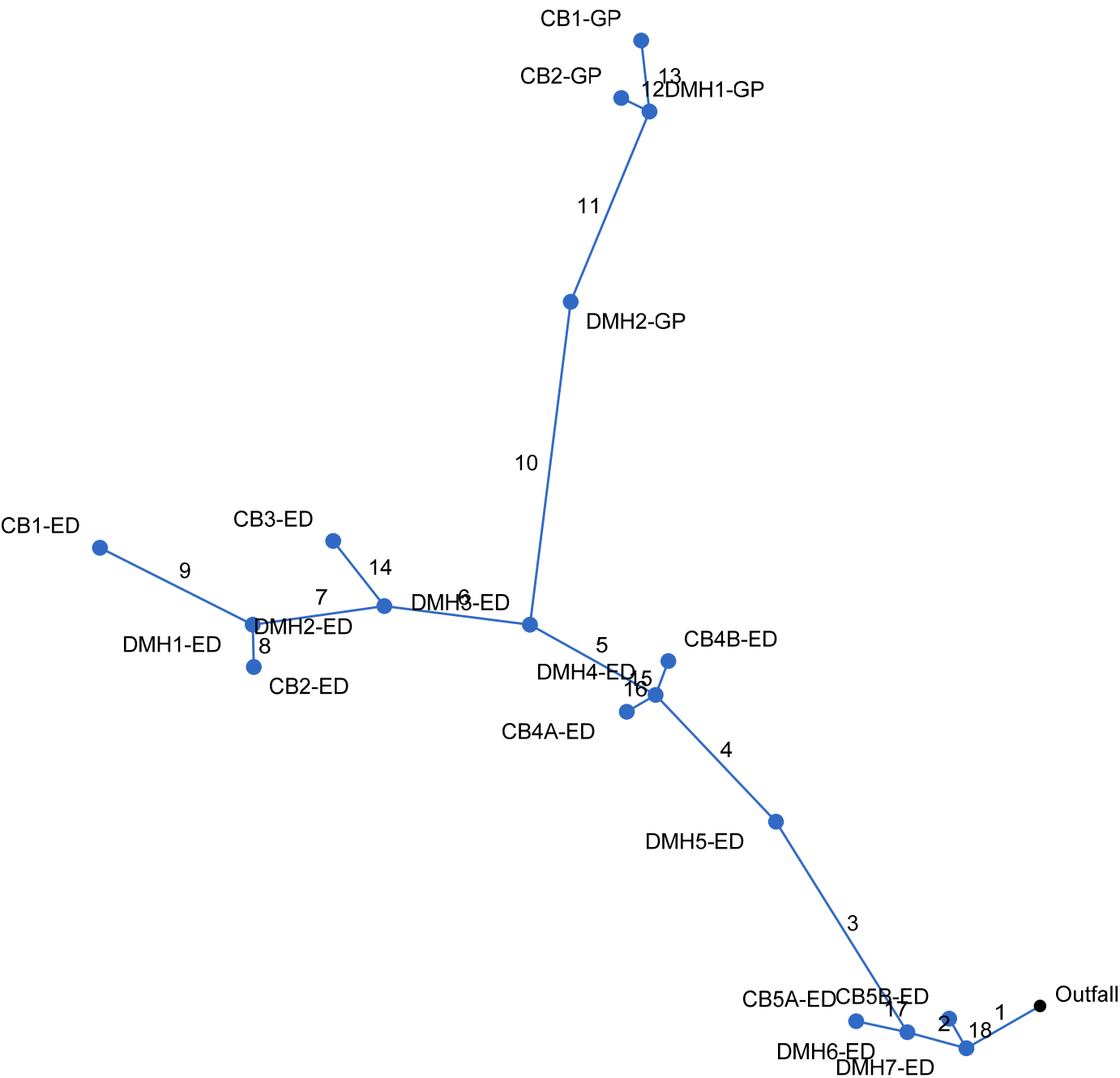


Storm Sewer Profile

Proj. file: Storm-ED.stm



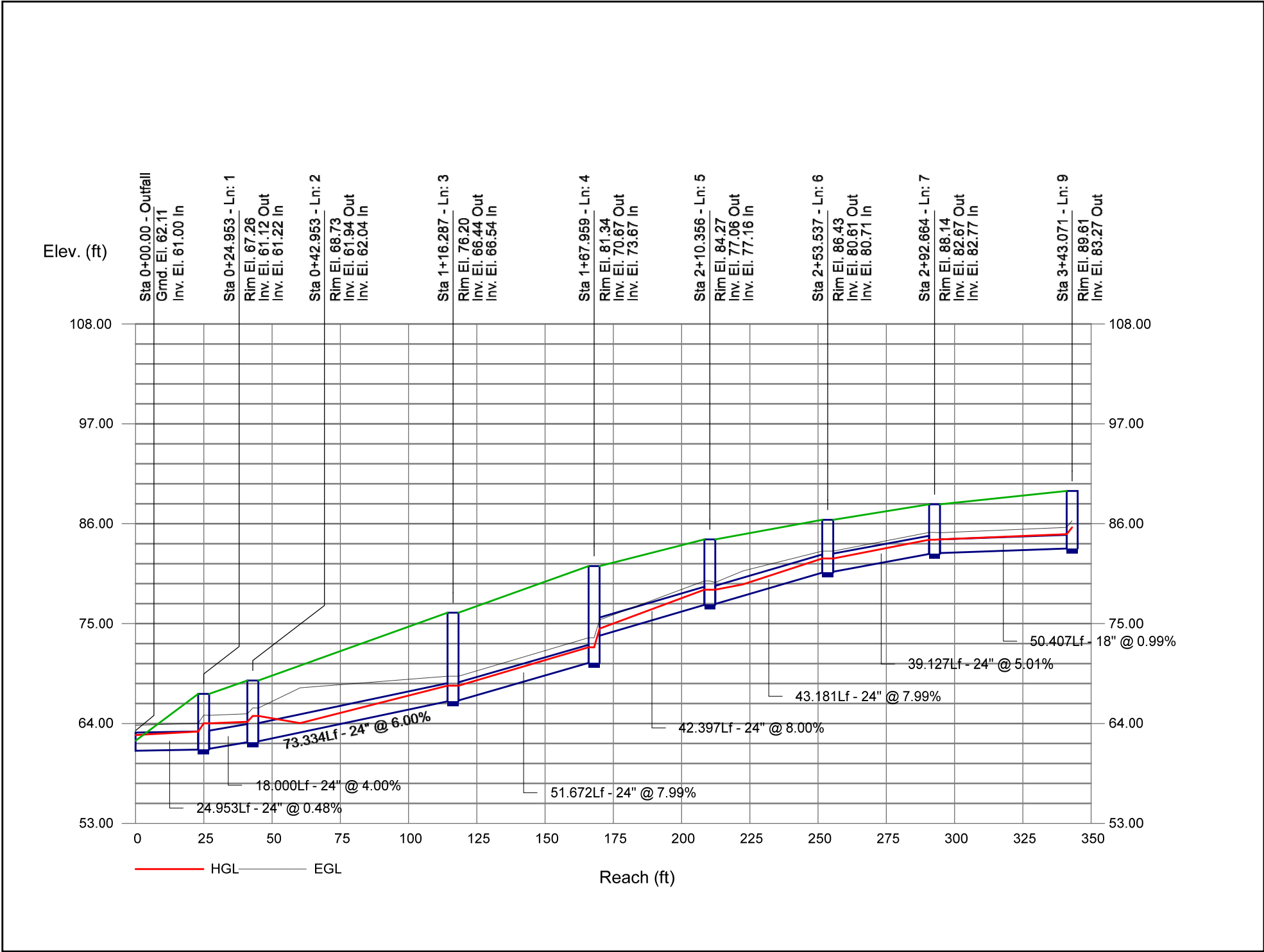
Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Tabulation

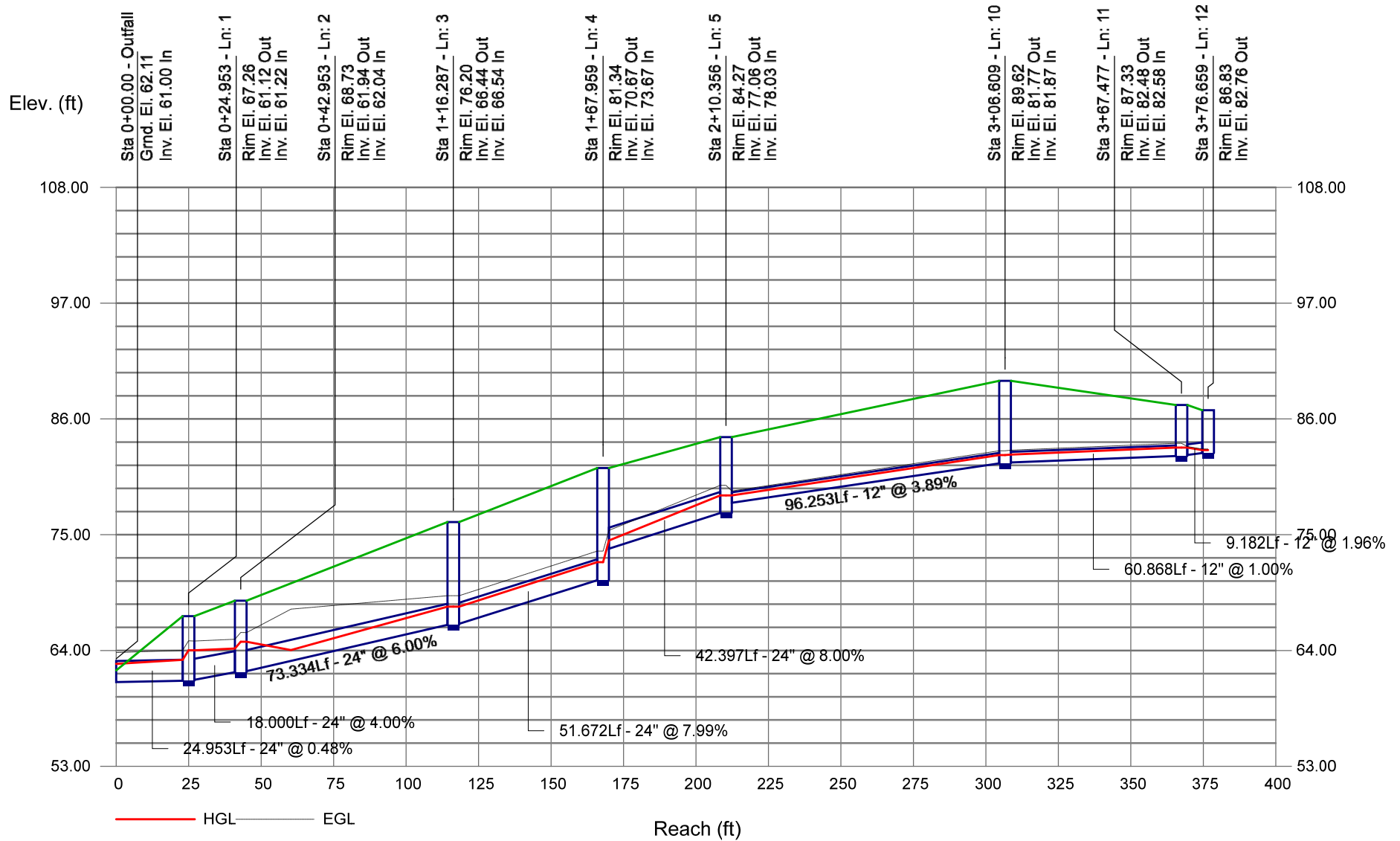
Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	24.953	0.00	4.53	0.00	0.00	2.60	0.0	6.9	9.2	23.93	16.99	7.95	24	0.48	61.00	61.12	62.73	63.12	62.11	67.26	Pipe - (594)
2	1	18.000	0.00	4.46	0.00	0.00	2.57	0.0	6.9	9.2	23.67	49.01	7.54	24	4.00	61.22	61.94	64.02	64.19	67.26	68.73	Pipe - (599)
3	2	73.334	0.00	4.43	0.00	0.00	2.54	0.0	6.7	9.3	23.55	60.02	7.84	24	6.00	62.04	66.44	64.83	68.16	68.73	76.20	Pipe - (591)
4	3	51.672	0.00	4.43	0.00	0.00	2.54	0.0	6.6	9.3	23.63	69.27	8.43	24	7.99	66.54	70.67	68.16	72.39	76.20	81.34	Pipe - (590)
5	4	42.397	0.00	3.35	0.00	0.00	2.38	0.0	6.6	9.3	22.15	69.29	13.74	24	8.00	73.67	77.06	74.45	78.74	81.34	84.27	Pipe - (588)
6	5	43.181	0.00	2.67	0.00	0.00	2.01	0.0	6.2	9.4	18.98	69.26	7.16	24	7.99	77.16	80.61	78.74	82.18	84.27	86.43	Pipe - (587) (1)
7	6	39.127	0.00	2.60	0.00	0.00	2.01	0.0	6.1	9.5	18.97	54.84	7.44	24	5.01	80.71	82.67	82.18	84.24	86.43	88.14	Pipe - (587)
8	7	12.427	0.80	0.80	0.90	0.72	0.72	6.0	6.0	9.5	6.83	9.92	7.47	15	2.01	83.71	83.96	84.47	85.01	88.14	87.60	Pipe - (584)
9	7	50.407	1.80	1.80	0.72	1.29	1.29	6.0	6.0	9.5	12.21	11.33	6.91	18	0.99	82.77	83.27	84.27	84.85	88.14	89.61	Pipe - (583)
10	5	96.253	0.00	0.68	0.00	0.00	0.37	0.0	6.3	9.4	3.44	7.61	5.46	12	3.89	78.03	81.77	78.74	82.56	84.27	89.62	Pipe - (595)
11	10	60.868	0.00	0.68	0.00	0.00	0.37	0.0	6.1	9.5	3.46	3.86	5.36	12	1.00	81.87	82.48	82.61	83.27	89.62	87.33	Pipe - (352)
12	11	9.182	0.10	0.10	0.50	0.05	0.05	6.0	6.0	9.5	0.47	5.40	1.69	12	1.96	82.58	82.76	83.27	83.04	87.33	86.83	Pipe - (351)
13	11	21.134	0.58	0.58	0.55	0.32	0.32	6.0	6.0	9.5	3.00	3.85	4.98	12	0.99	82.58	82.79	83.27	83.53	87.33	86.84	Pipe - (350)
14	6	24.559	0.07	0.07	0.10	0.01	0.01	6.0	6.0	9.5	0.07	5.45	1.94	12	2.00	82.10	82.59	82.18	82.69	86.43	86.47	Pipe - (589)
15	4	10.620	0.13	0.13	0.35	0.05	0.05	6.0	6.0	9.5	0.43	3.74	2.84	12	0.94	77.29	77.39	77.52	77.66	81.34	81.45	Pipe - (586)
16	4	9.887	0.95	0.95	0.12	0.12	0.12	6.0	6.0	9.5	1.12	3.88	3.79	12	1.01	77.29	77.39	77.66	77.83	81.34	81.58	Pipe - (585)
17	2	15.369	0.03	0.03	0.89	0.03	0.03	6.0	6.0	9.5	0.25	5.48	1.37	12	2.02	64.29	64.60	64.83	64.81	68.73	69.58	Pipe - (592)
18	1	10.048	0.07	0.07	0.46	0.03	0.03	6.0	6.0	9.5	0.30	5.44	1.34	12	1.99	63.12	63.32	64.02	63.55	67.26	67.45	Pipe - (593)
Project File: Storm-ED.stm																Number of lines: 18				Run Date: 12/12/2023		
NOTES:Intensity = 124.57 / (Inlet time + 17.60) ^ 0.81; Return period =Yrs. 100 ; c = cir e = ellip b = box																						

Storm Sewer Profile



Storm Sewer Profile

Proj. file: Storm-ED.stm



Storm Sewer IDF Curves

IDF file: Pembroke-Hydraflow.IDF

