



Stormwater Analysis & Report

For

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

August 8, 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, and guest suites 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, 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	1.80	-0.49	11.44	6.31	-5.13	18.59	13.62	-4.97	31.96	25.81	-6.15
2	11.26	11.03	-0.23	36.88	30.63	-6.25	56.33	46.29	-10.04	89.51	70.13	-19.38
3	0.00	0.00	0.00	0.41	0.28	-0.13	0.91	0.84	-0.07	1.20	1.27	0.07
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	0.53	0.35	-0.18	3.14	1.57	-1.57	6.15	2.90	-3.25	12.43	5.66	-6.77
6	0.42	0.29	-0.13	1.59	1.01	-0.58	2.57	1.78	-0.79	3.67	2.70	-0.97
7	0.63	0.56	-0.07	2.61	2.40	-0.21	3.76	3.45	-0.31	12.19	12.01	-0.18
8	0.82	0.82	0.00	3.41	3.39	-0.02	5.61	5.56	-0.05	13.44	13.10	-0.34
WEST ELM ST.	0.68	0.24	-0.44	6.14	4.46	-1.68	11.18	8.82	-2.36	20.78	15.77	-5.01
11	0.03	0.00	-0.03	0.61	0.04	-0.57	2.10	0.17	-1.93	5.88	5.46	-0.42
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	0.11	-0.11	2.46	1.84	-0.62	4.67	3.14	-1.53	8.66	5.37	-3.29

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, 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.

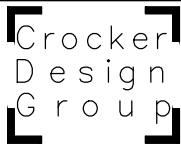
1.12 CONCLUSION

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**

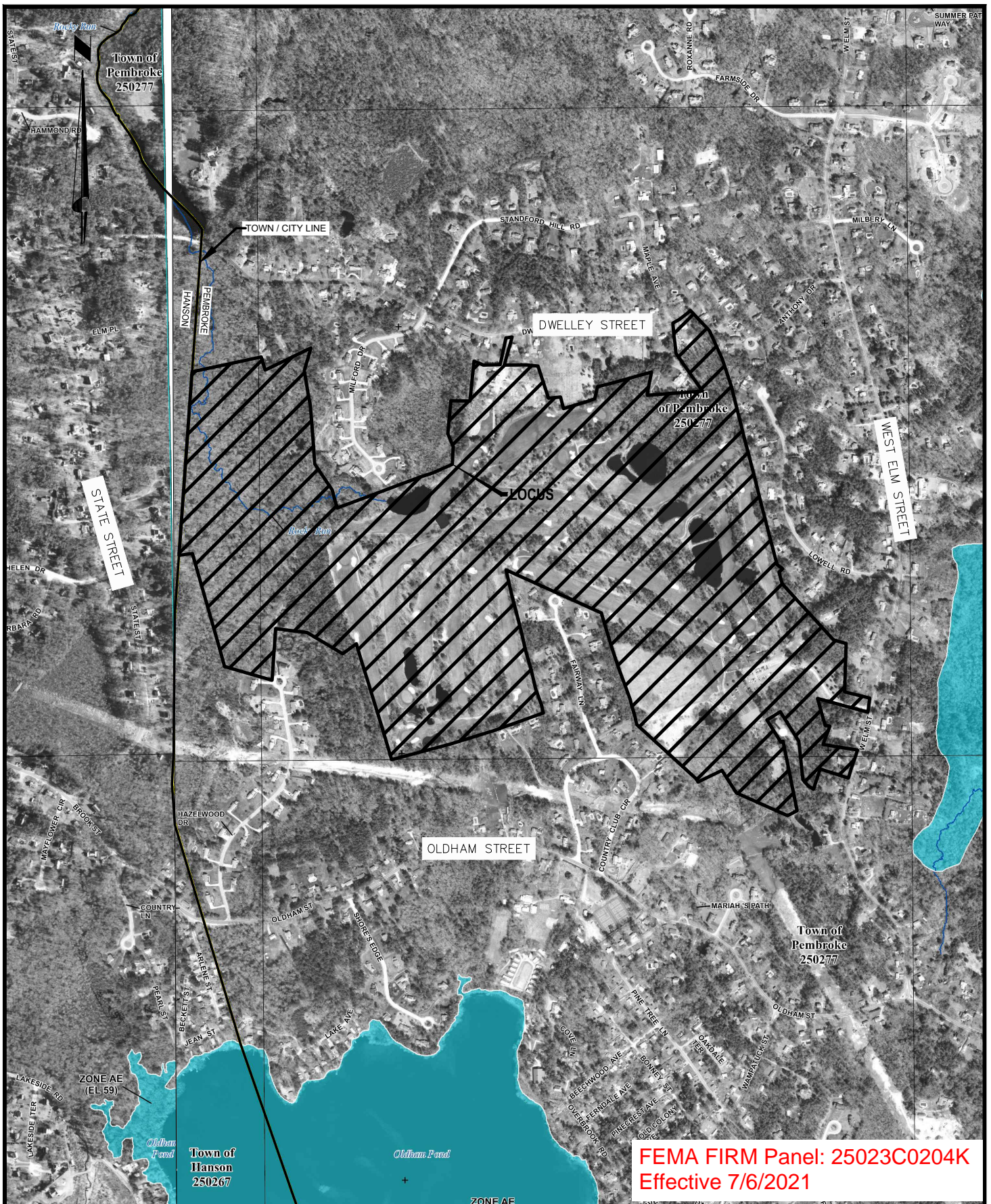
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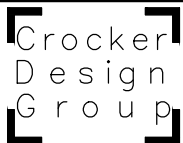
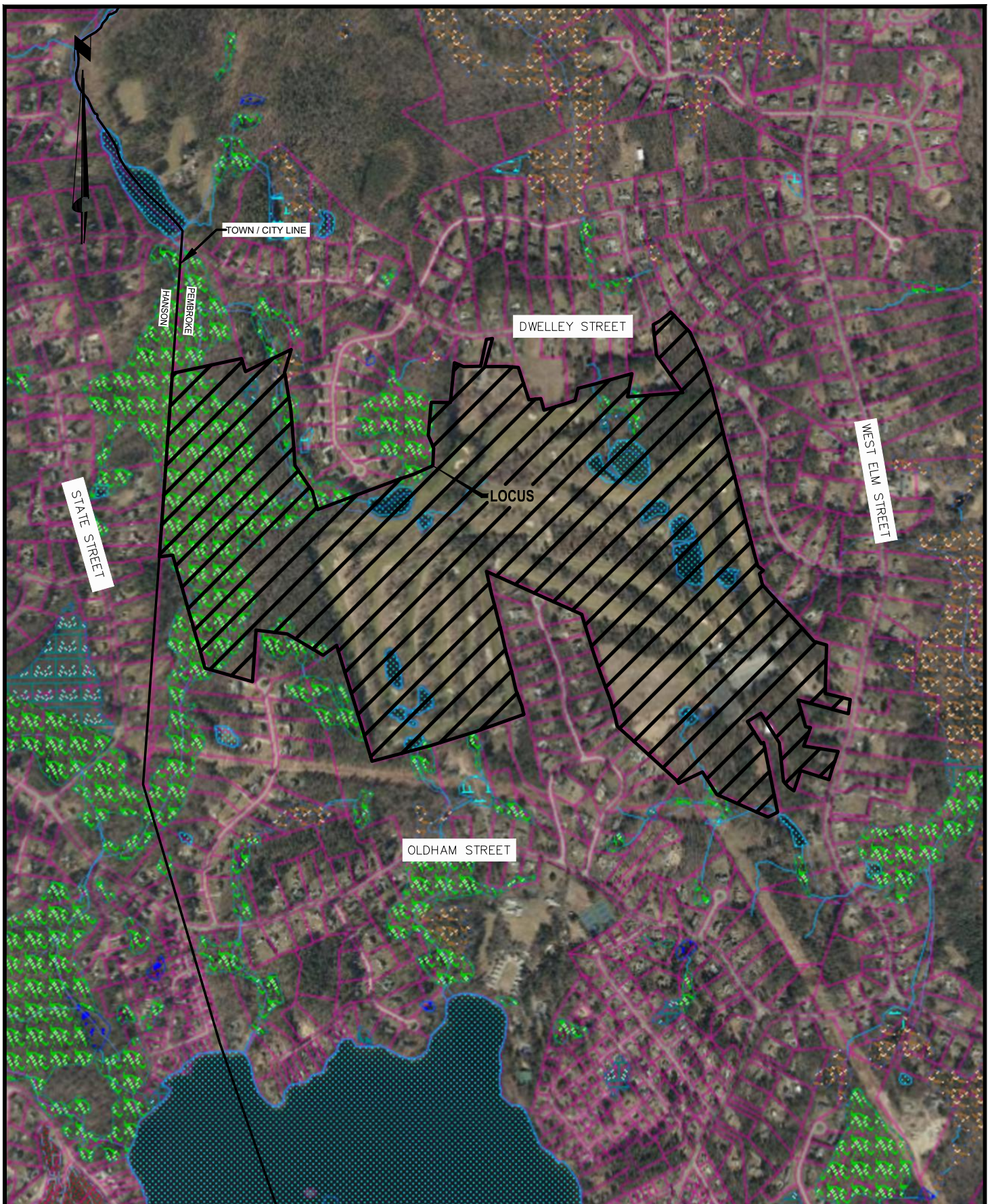
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Drawing Title

WETLANDS EXHIBIT

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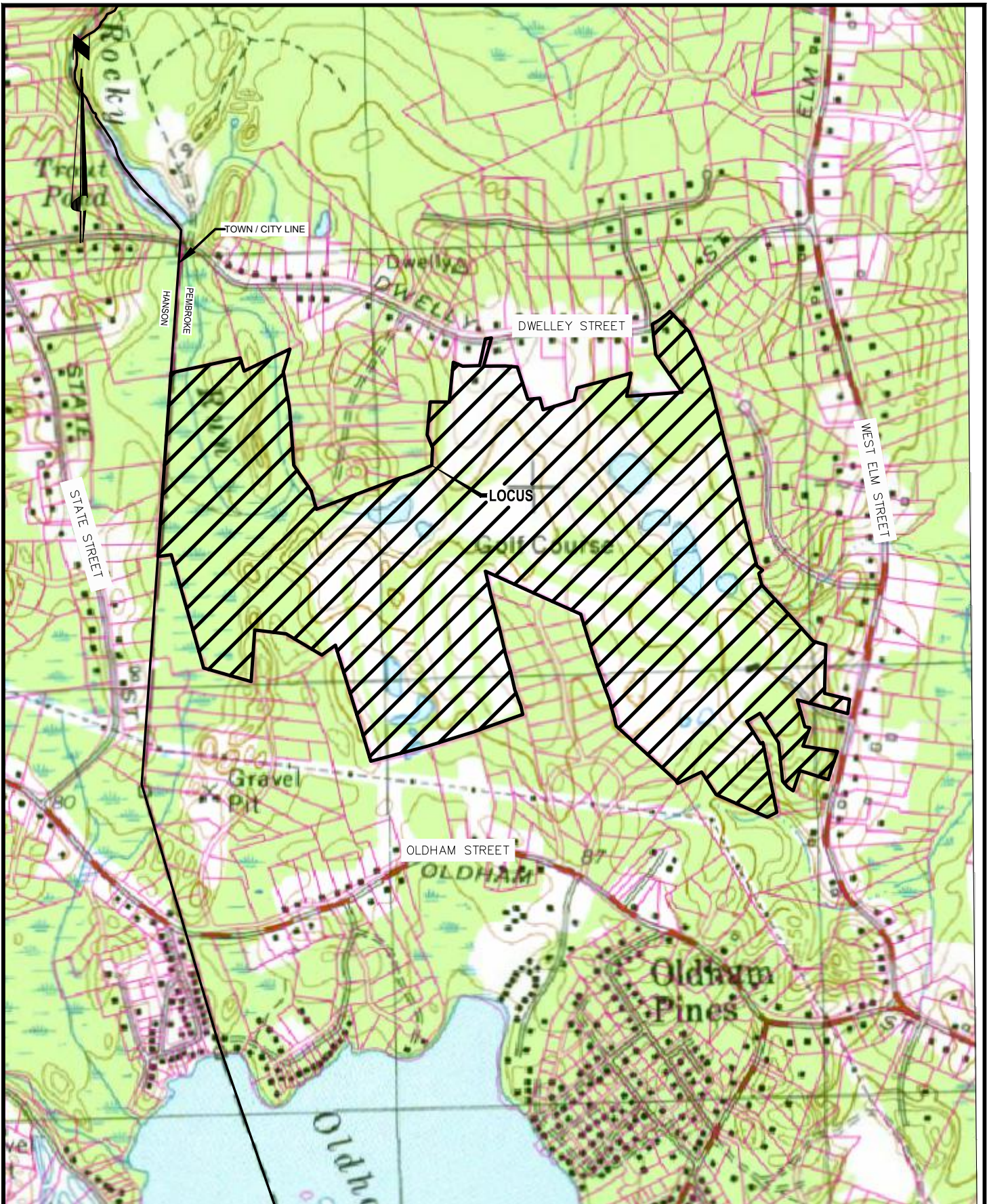
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Drawing Title

USGS EXHIBIT

DATE: 09.21.2022

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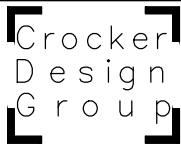
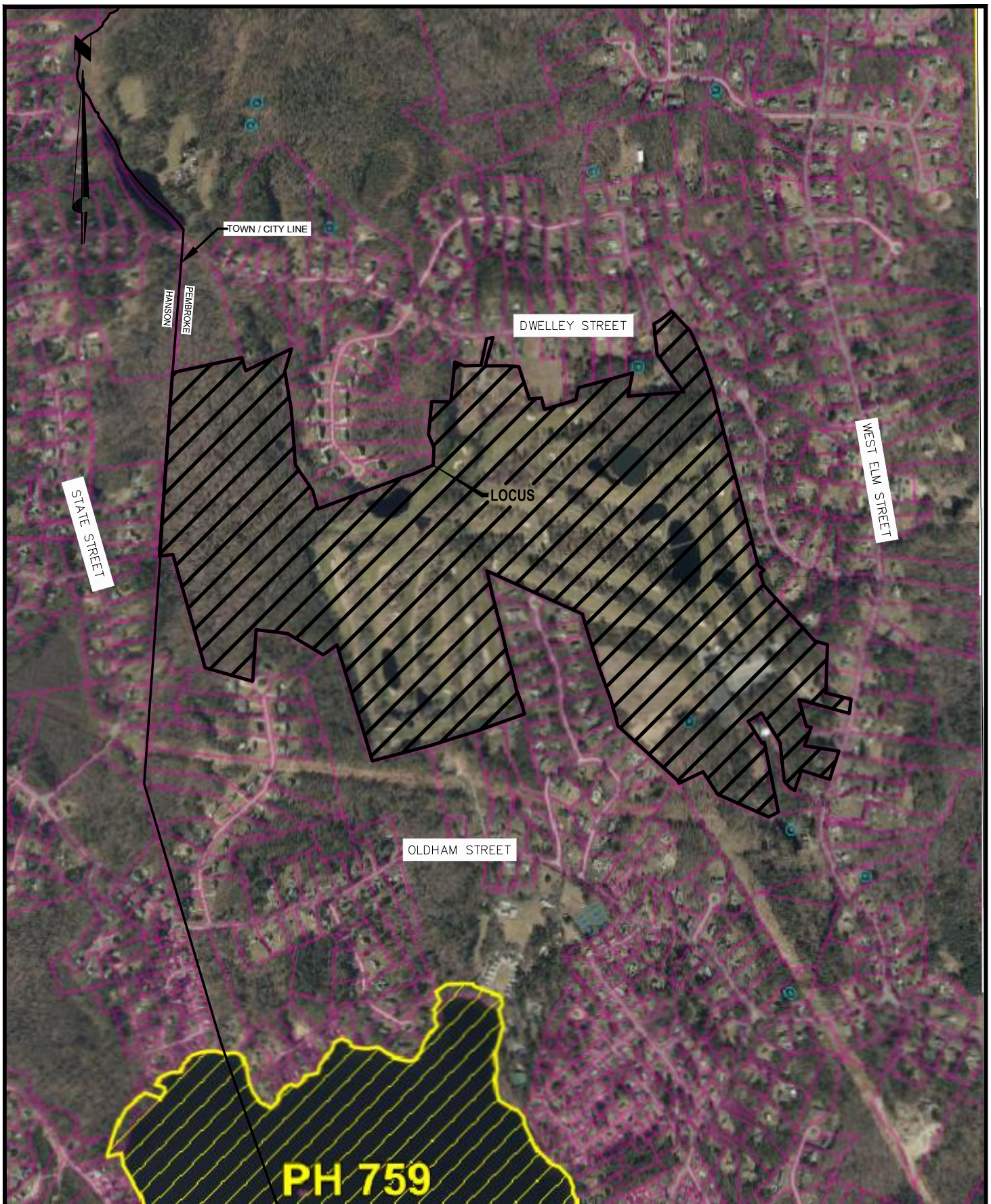
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STREET

Drawing Title **NHESP EXHIBIT**

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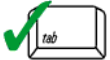
SECTION 2 – STORMWATER CHECKLIST



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.

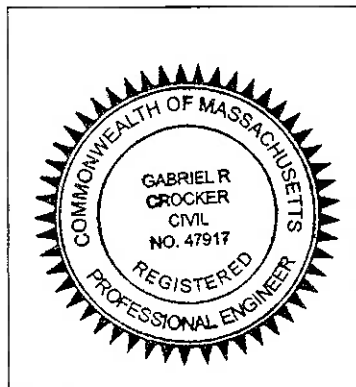
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the 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] 8-8-2023
Signature and Date

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)

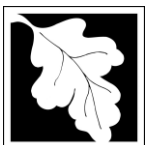
Standard 2: Peak Rate Attenuation

- ☐ 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.

ILLICIT 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.

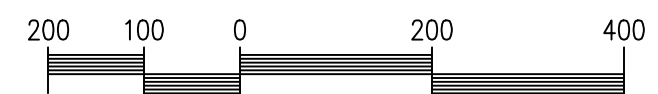
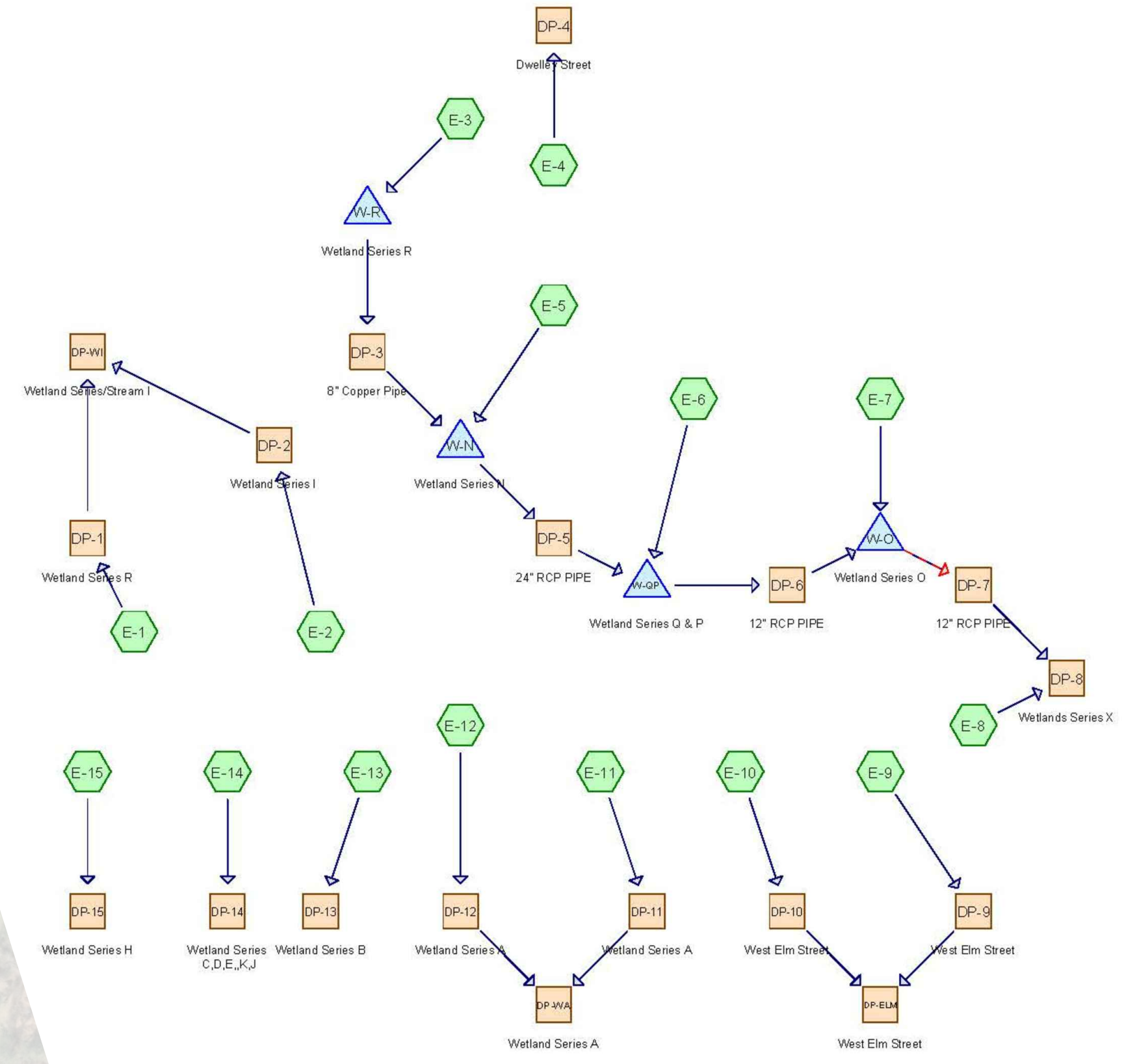
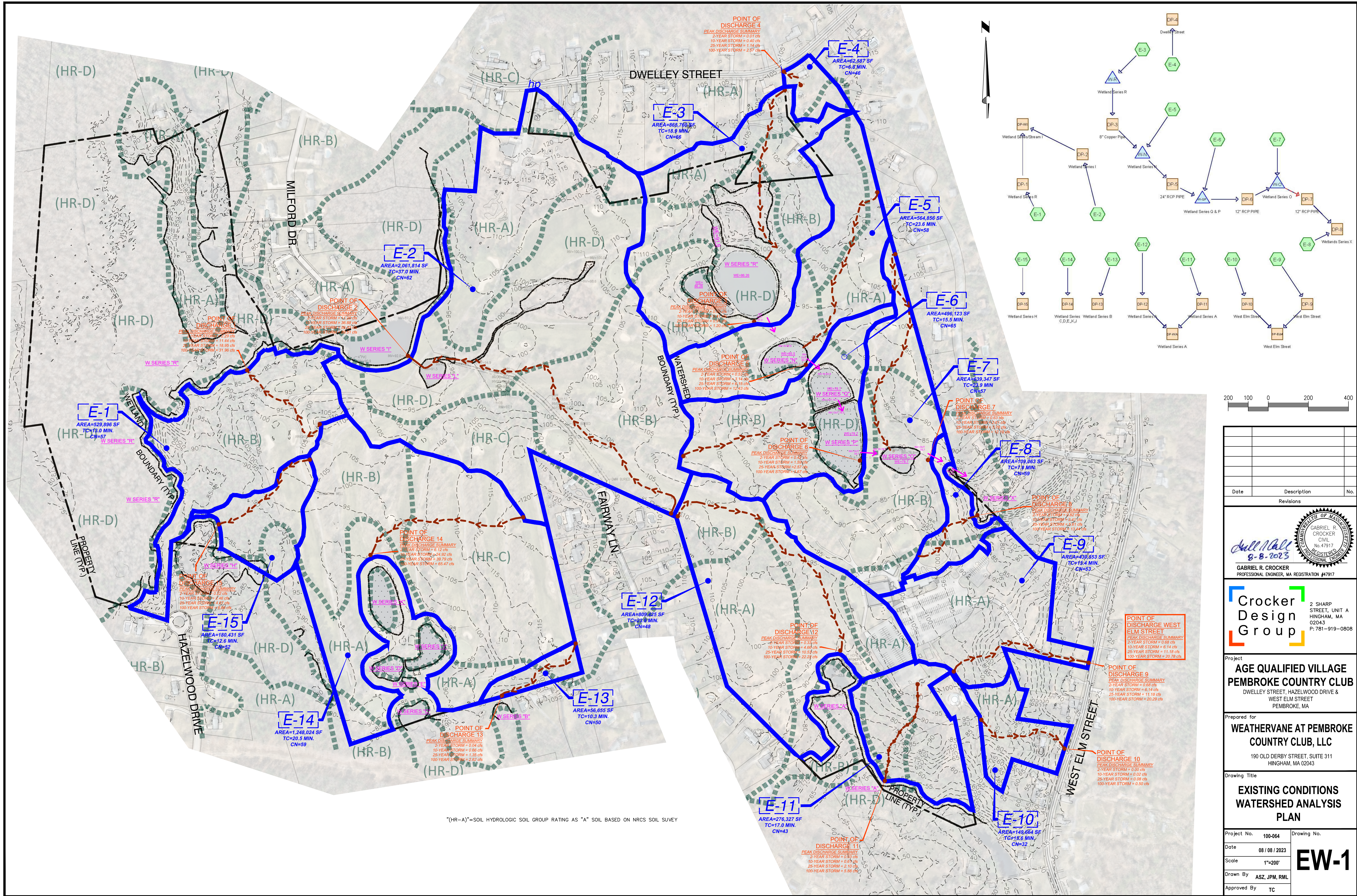
To the best of our knowledge and professional belief no illicit discharges to the stormwater system, surface waters, or wetland resource areas will remain on the site after construction. We will agree to implement a pollution prevention plan to prevent illicit discharges into the stormwater management 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)

Engineer's Signature: _____ Date: _____

Company: Crocker Design Group, LLC.

SECTION 3 – STORMWATER HYDROLOGY MODEL



Date	Description	No.

GABRIEL R. CROCKER
PROFESSIONAL ENGINEER, MA REGISTRATION #47917

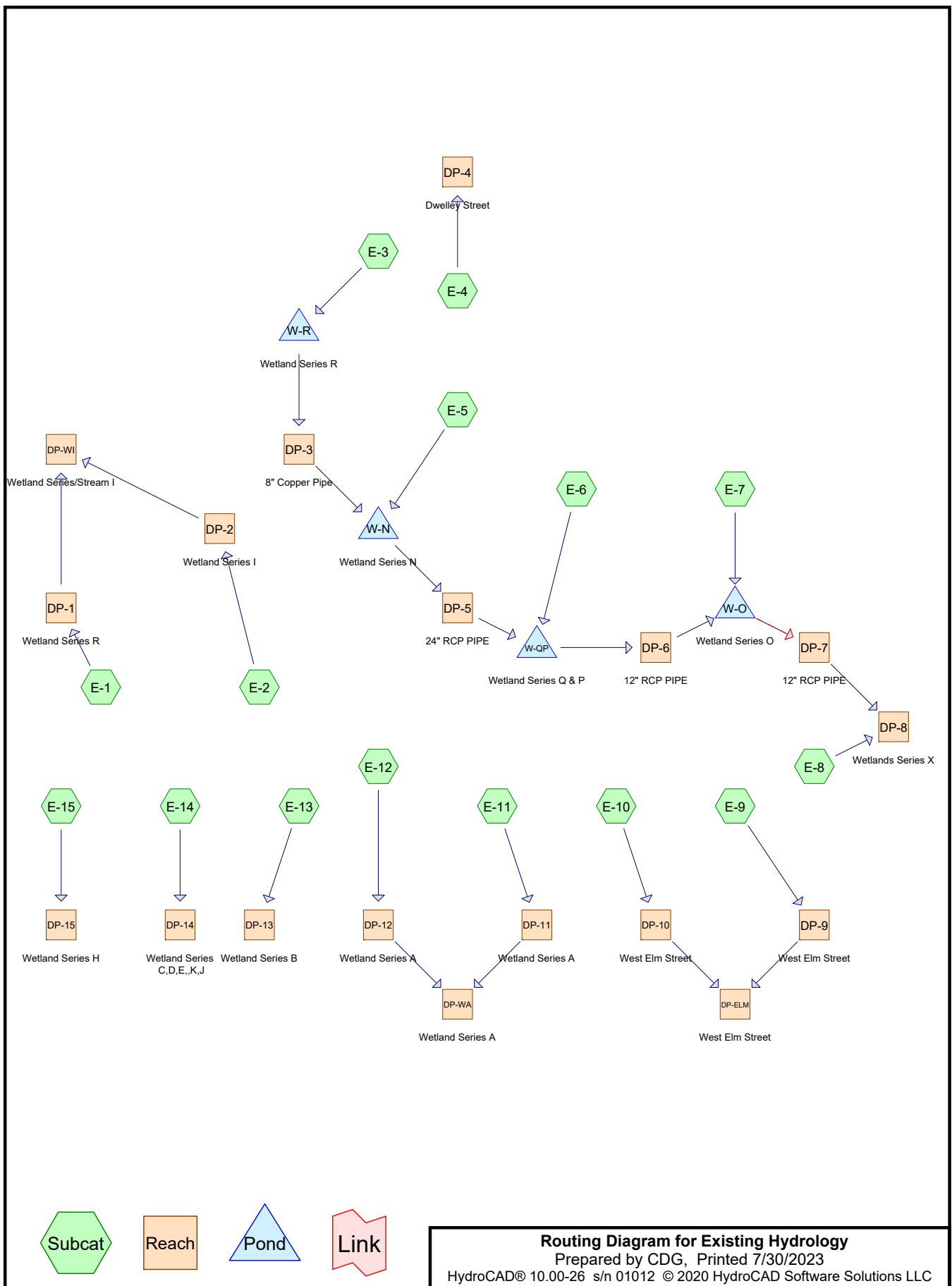
Crocker Design Group

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	
EXISTING CONDITIONS WATERSHED ANALYSIS PLAN	
Project No.	100-064
Date	08 / 06 / 2023
Scale	1"=200'
Drawn By	ASZ, JPM, RML
Approved By	TC
Drawing No.	EW-1



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-10, 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-10)
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-10, 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"

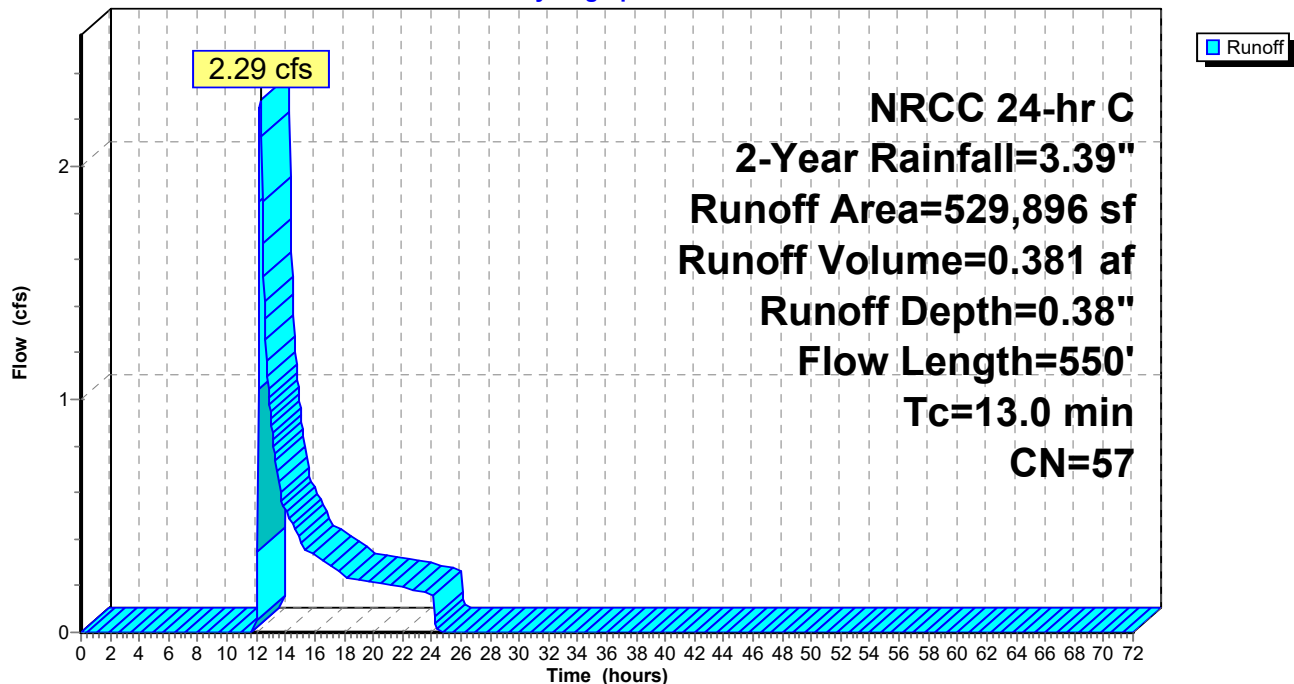
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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-10:

[45] Hint: Runoff=Zero

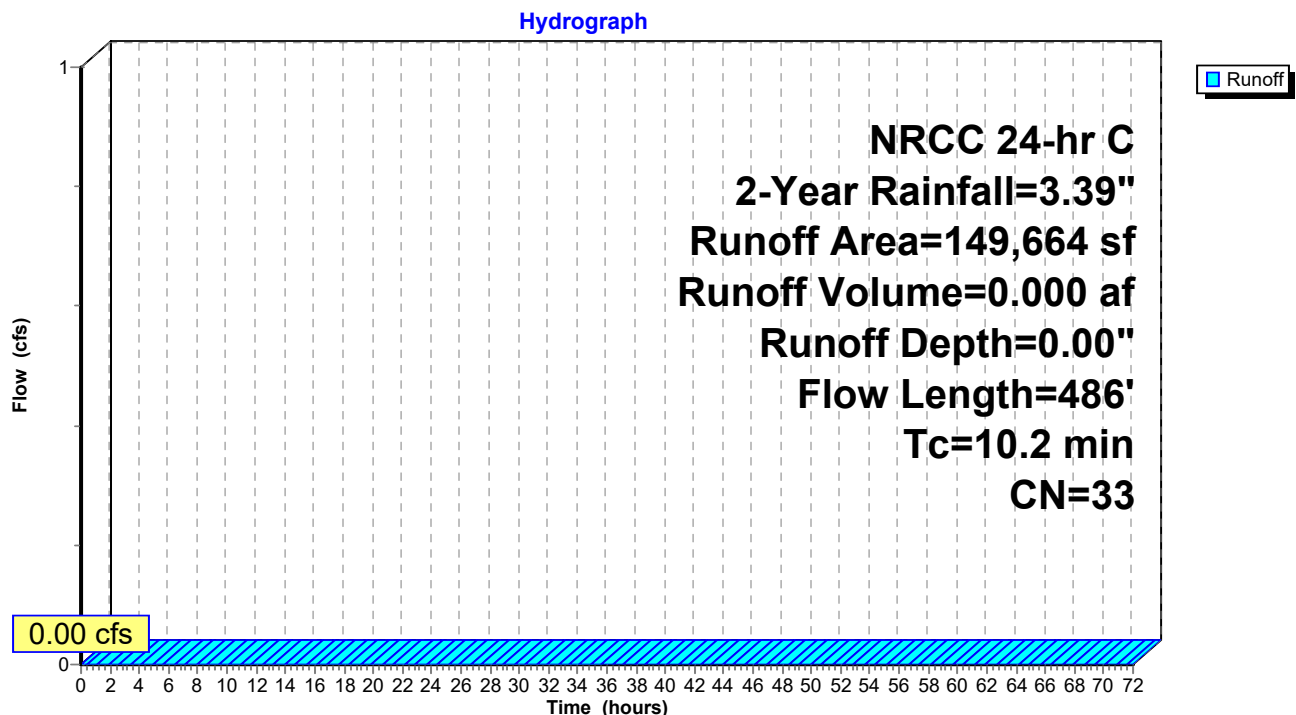
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

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
	134,678	30	Woods, Good, HSG A
	10,000	39	>75% Grass cover, Good, HSG A
	149,664	33	Weighted Average
	144,678		96.67% Pervious Area
	4,986		3.33% 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-10:



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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			

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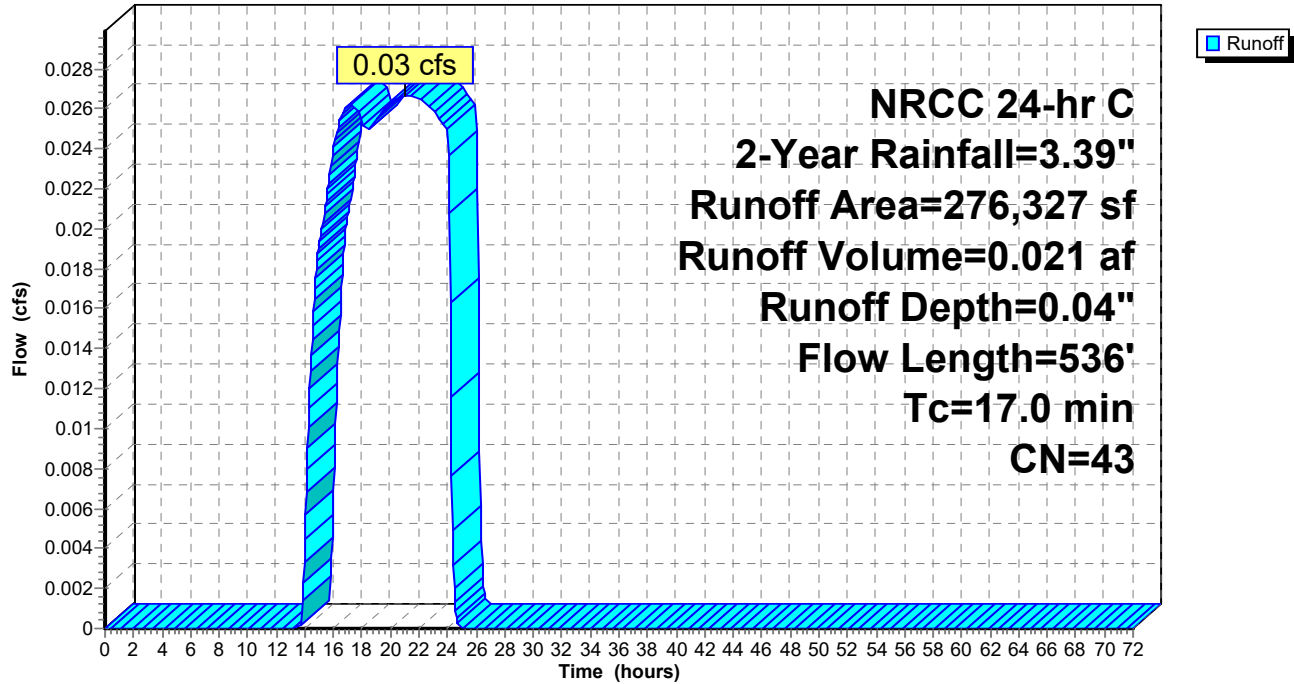
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment E-11:

Hydrograph



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Summary for Subcatchment E-12:

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

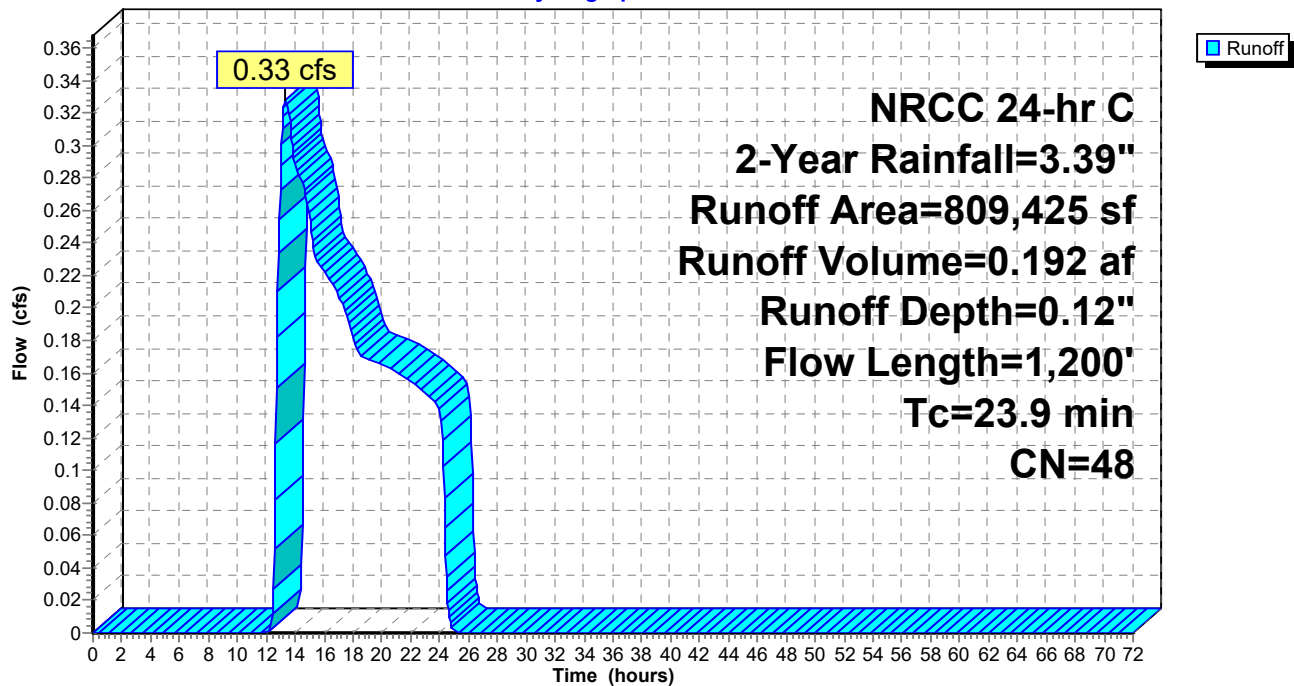
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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"

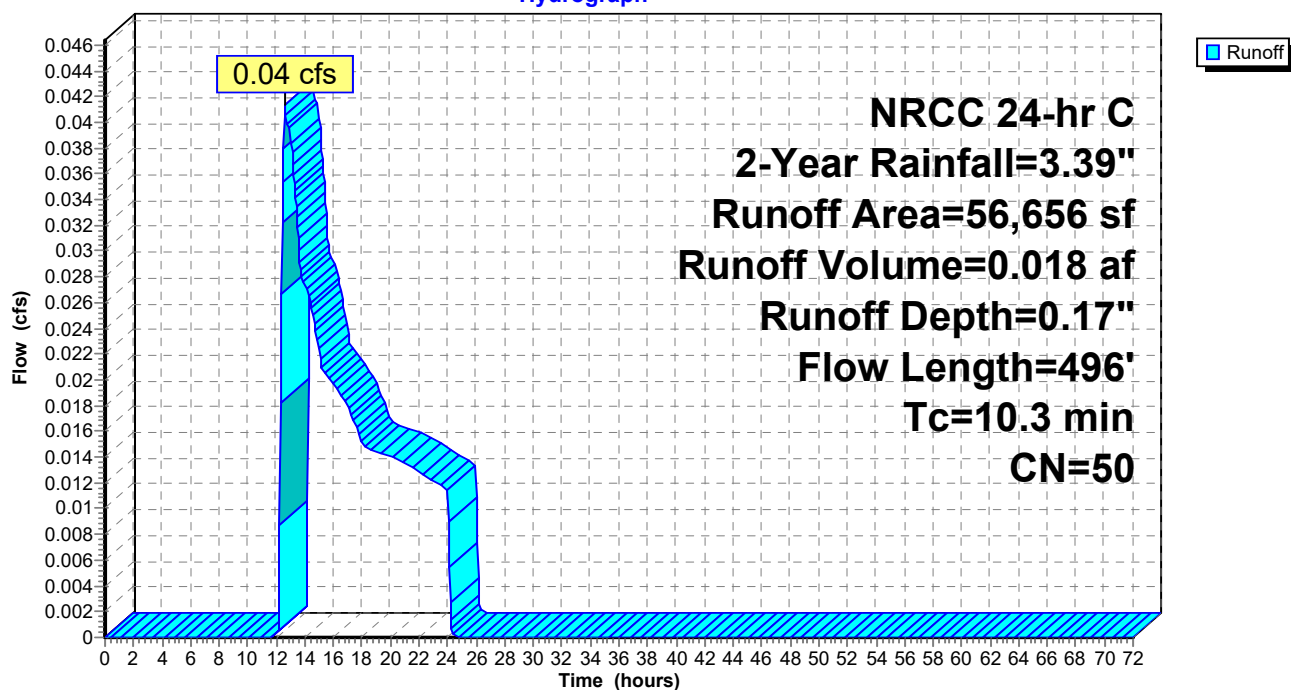
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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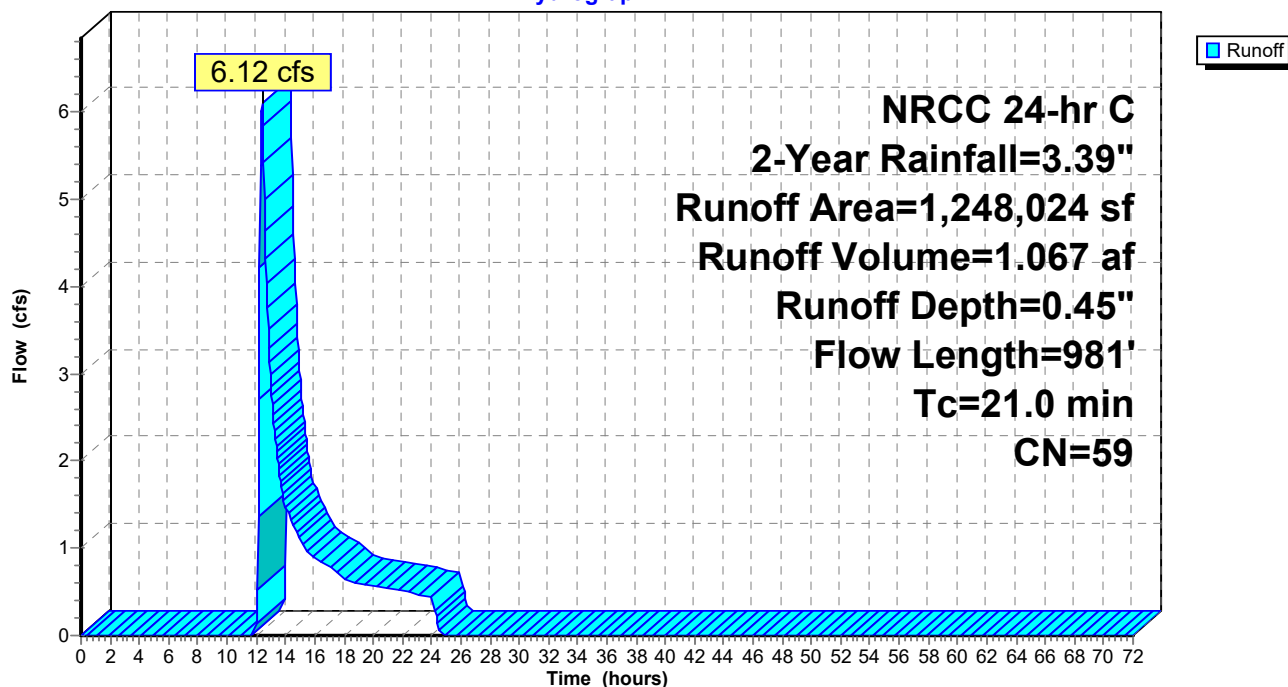
NRCC 24-hr C 2-Year Rainfall=3.39"

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Subcatchment E-14:

Hydrograph



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Summary for Subcatchment E-15:

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

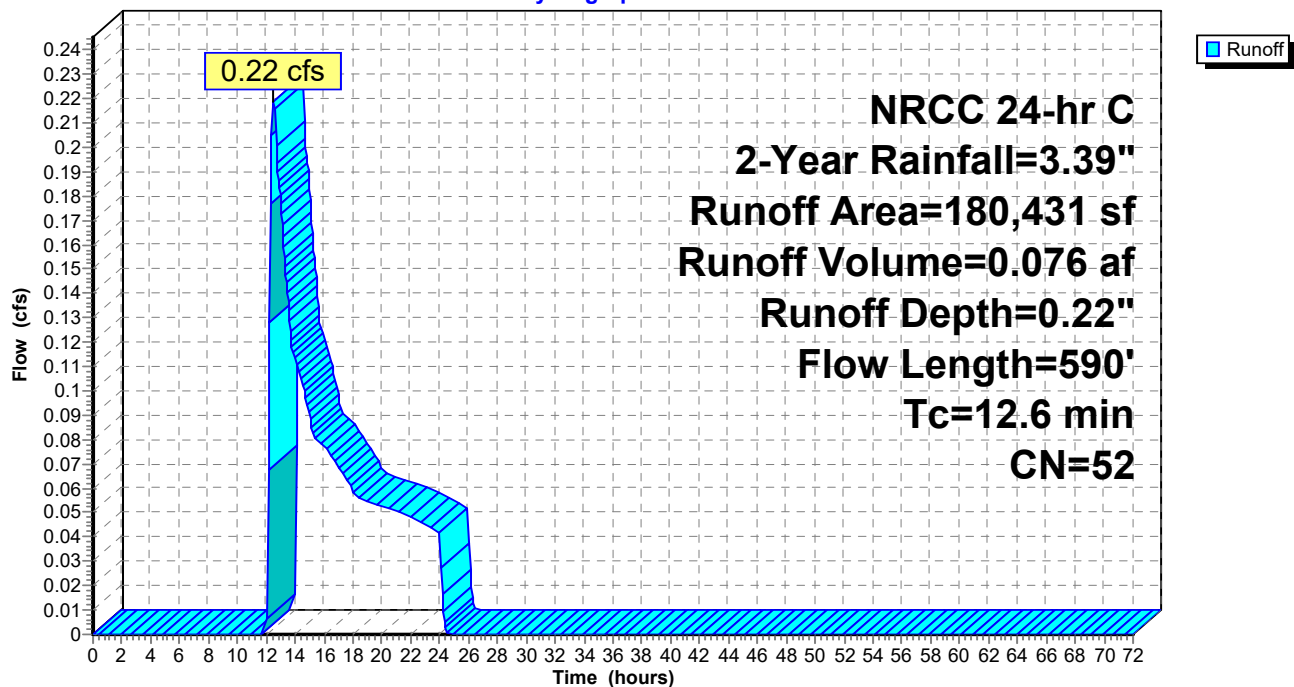
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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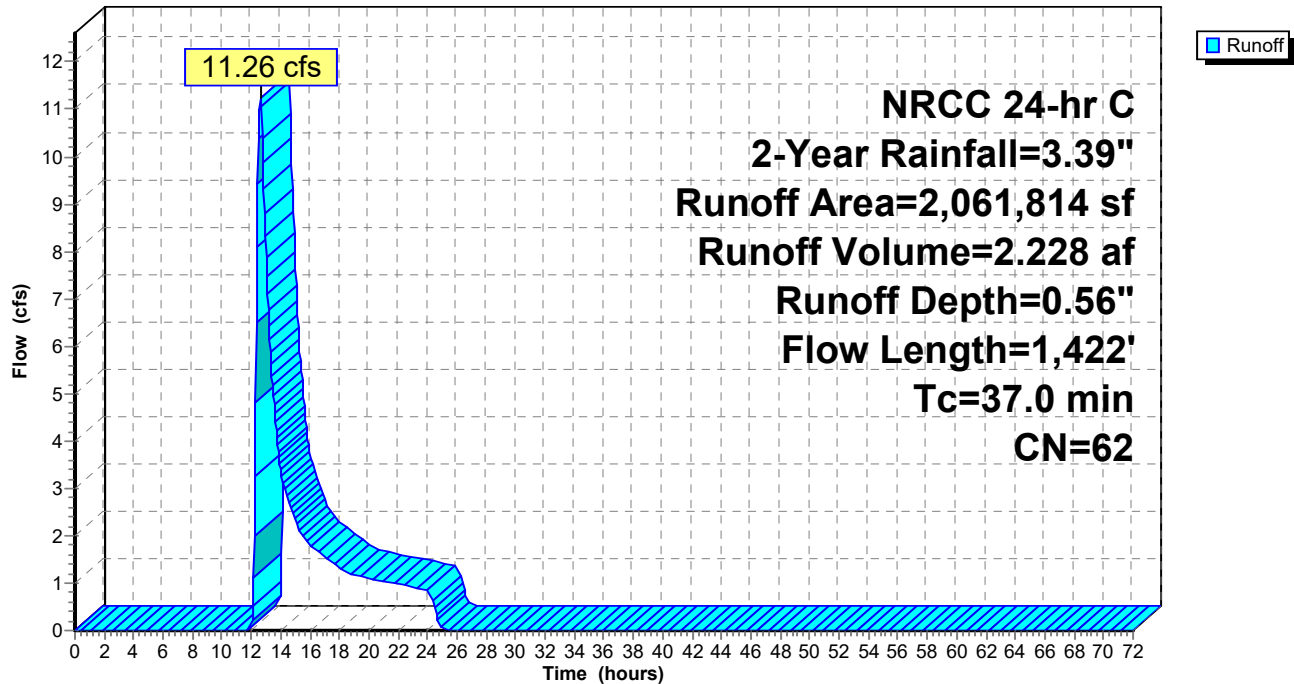
NRCC 24-hr C 2-Year Rainfall=3.39"

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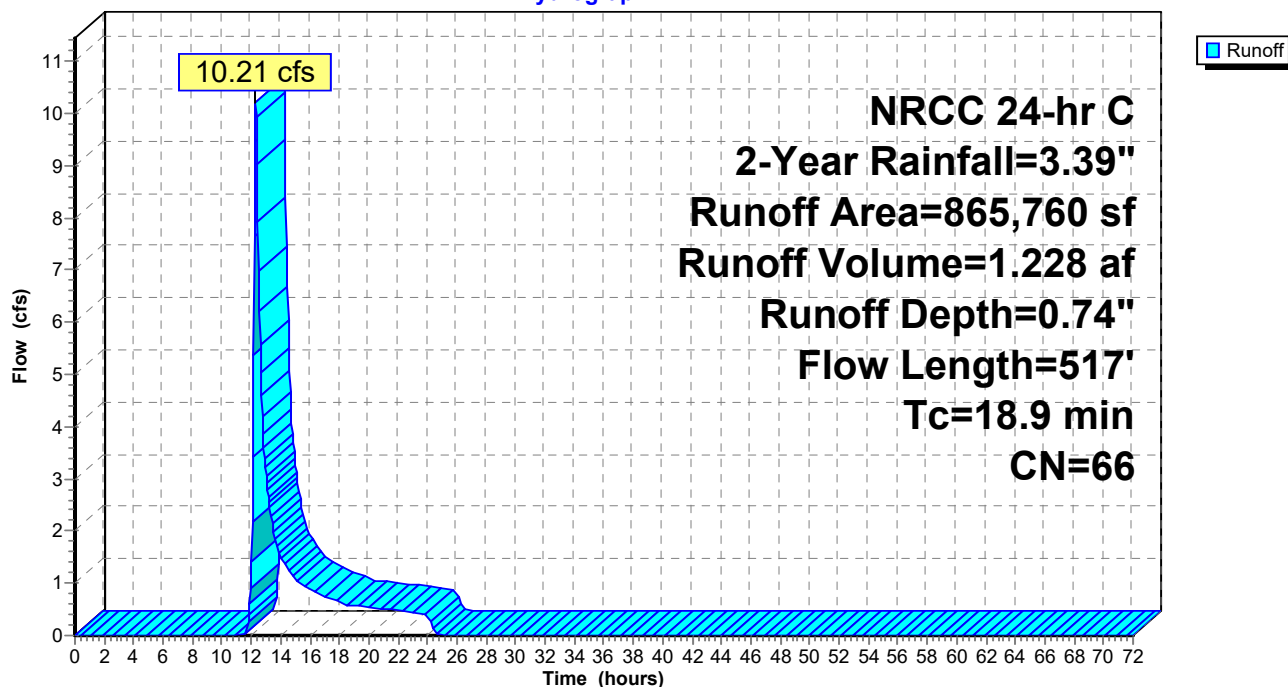
NRCC 24-hr C 2-Year Rainfall=3.39"

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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"

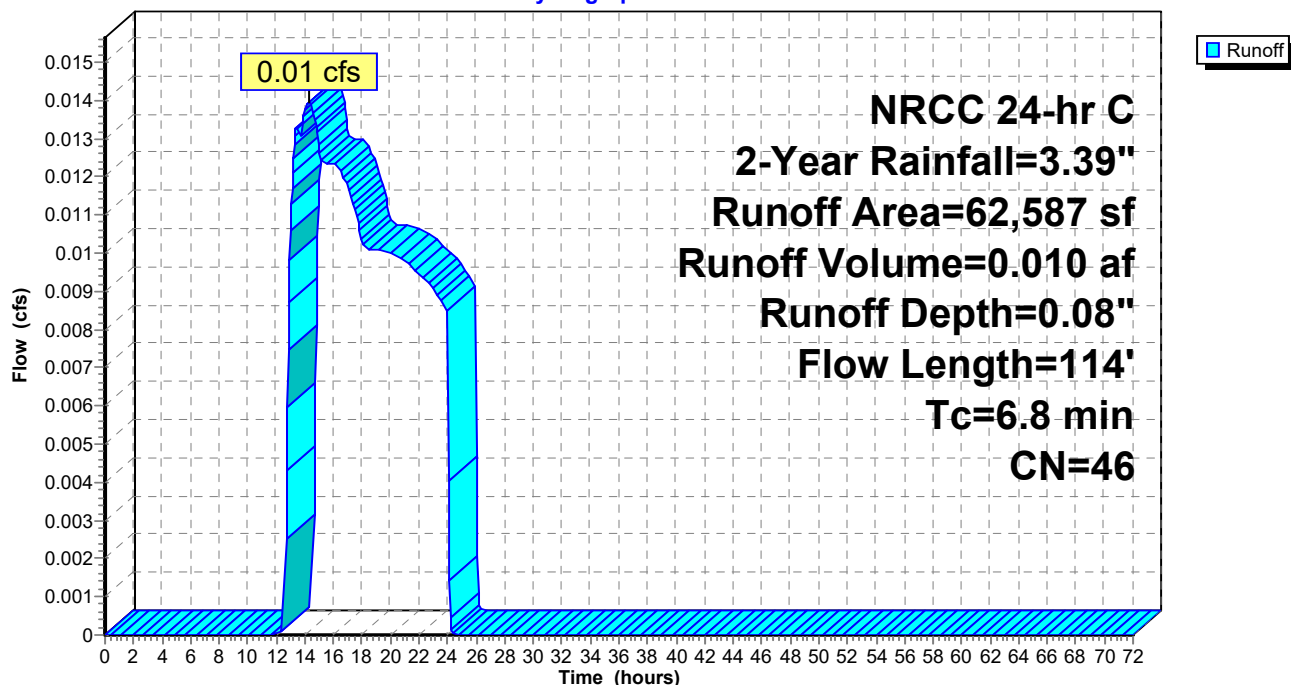
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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



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Summary for Subcatchment E-5:

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

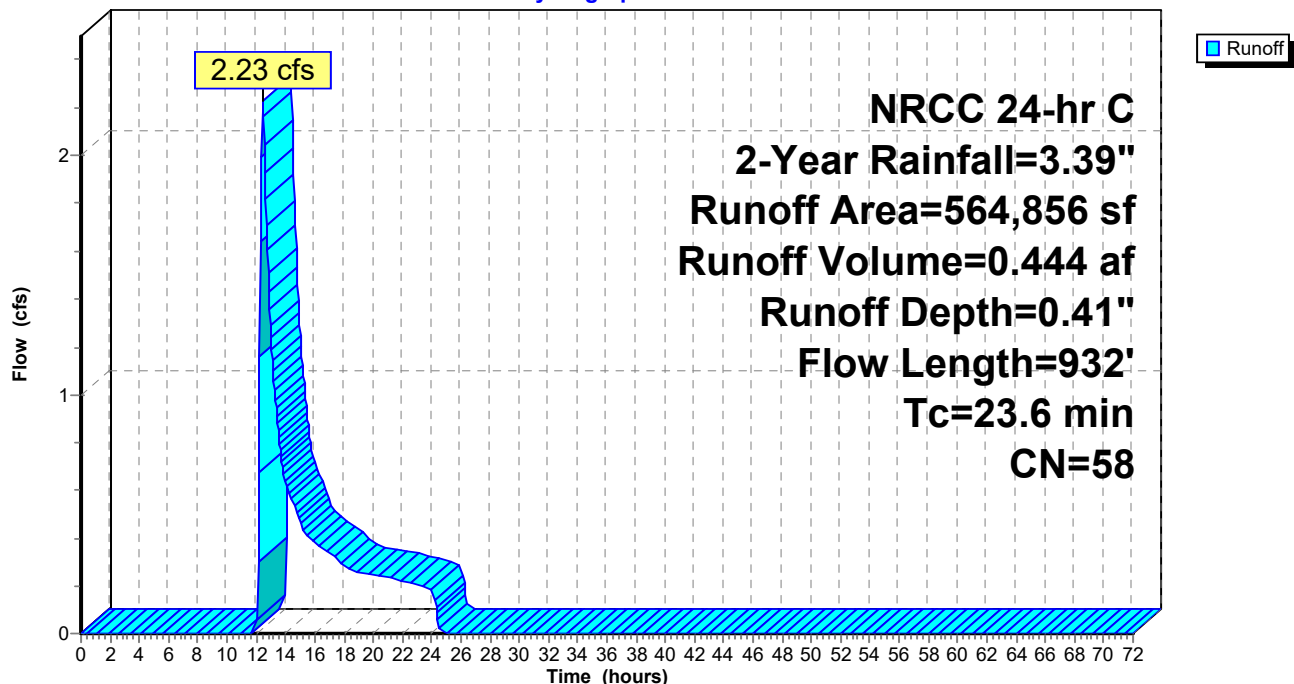
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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"

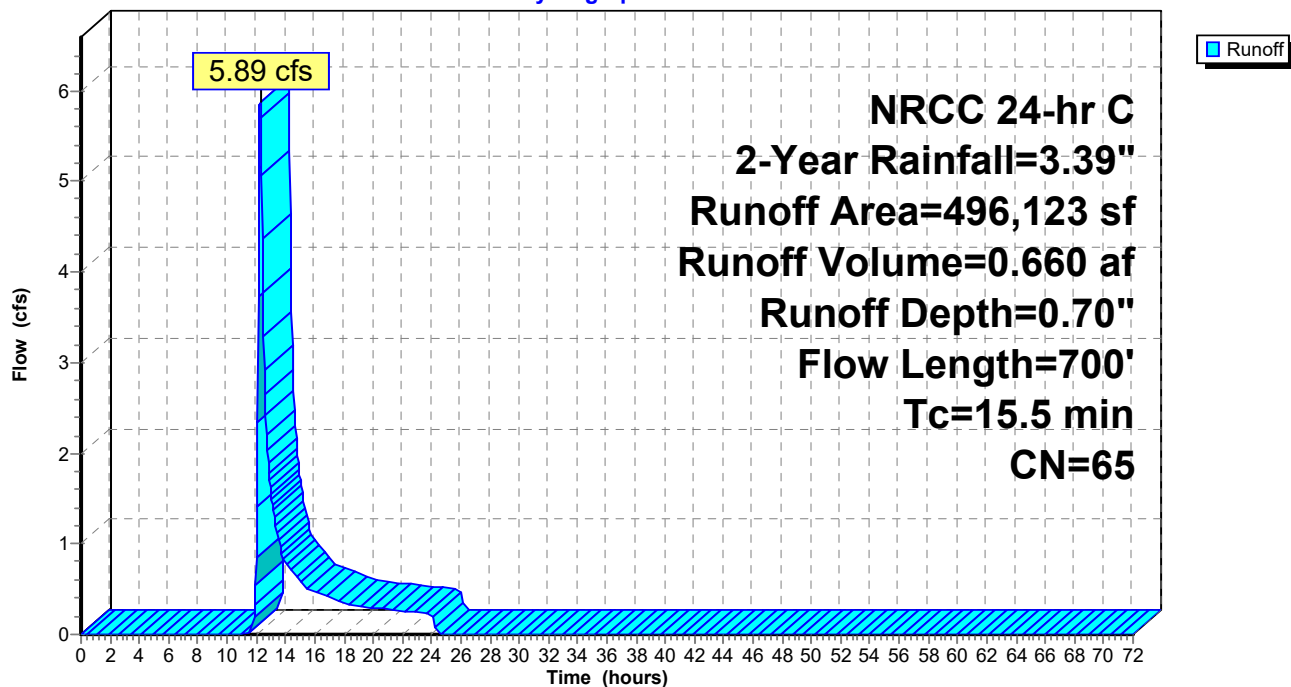
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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"

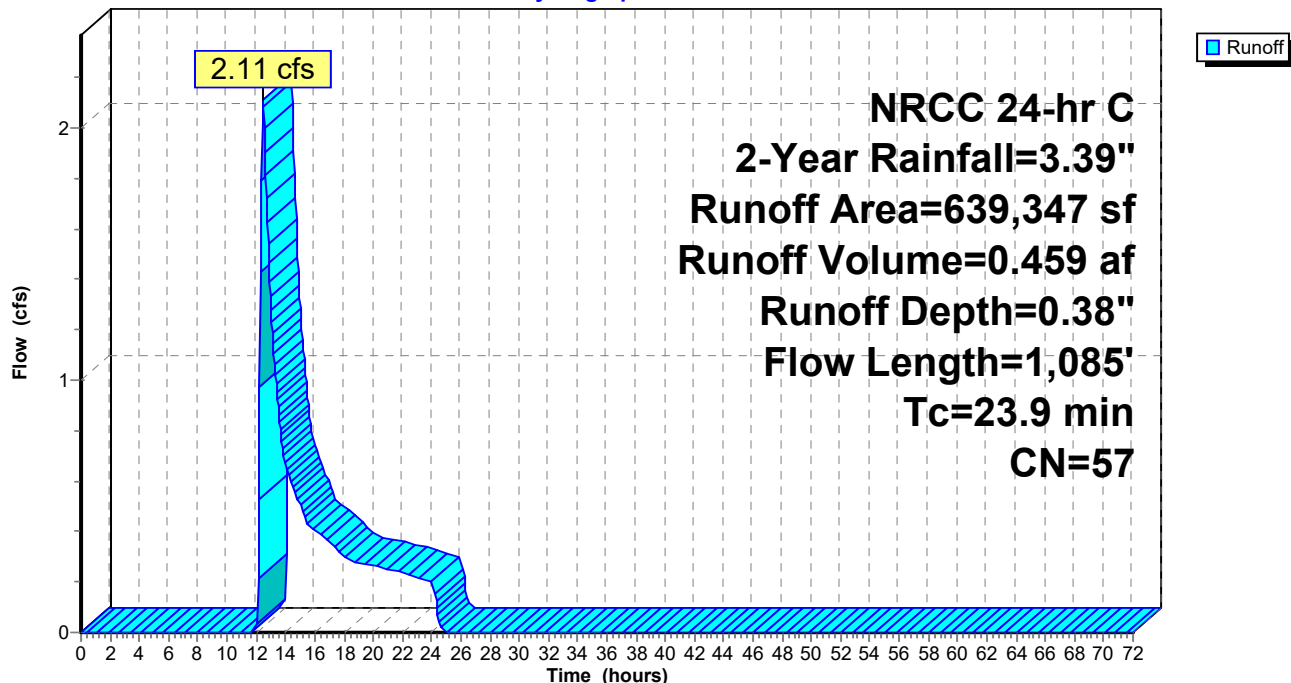
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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"

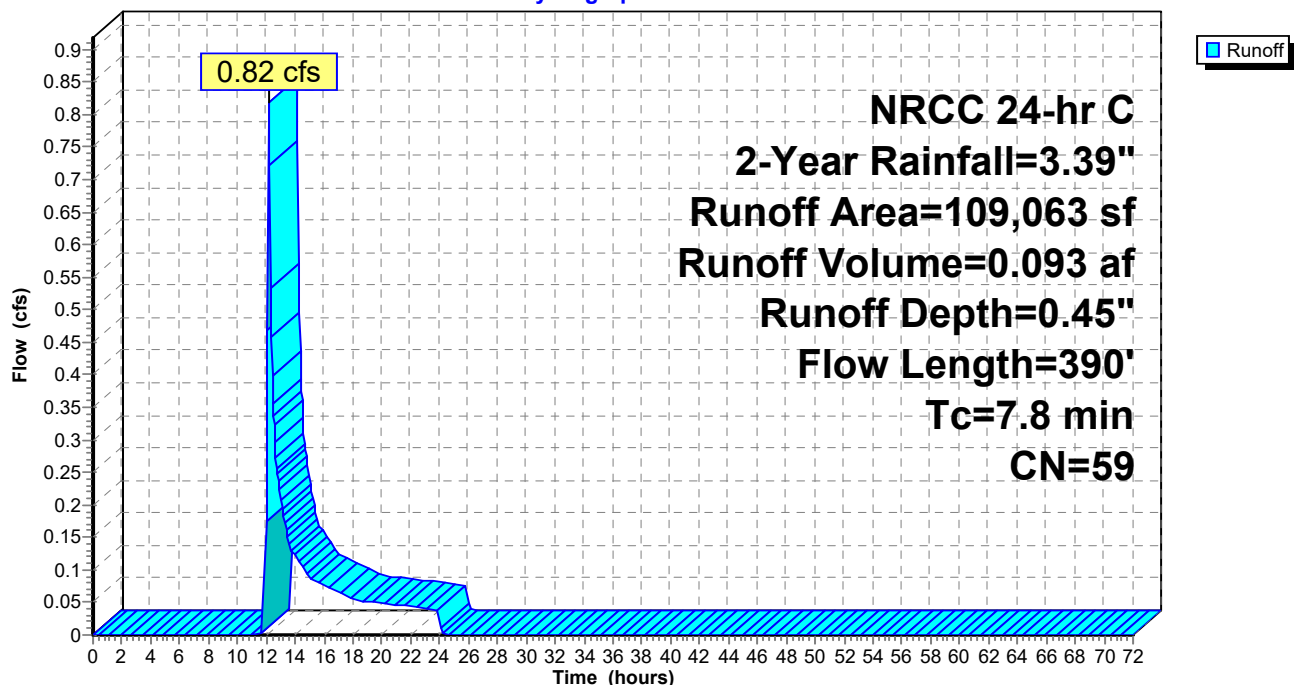
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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"

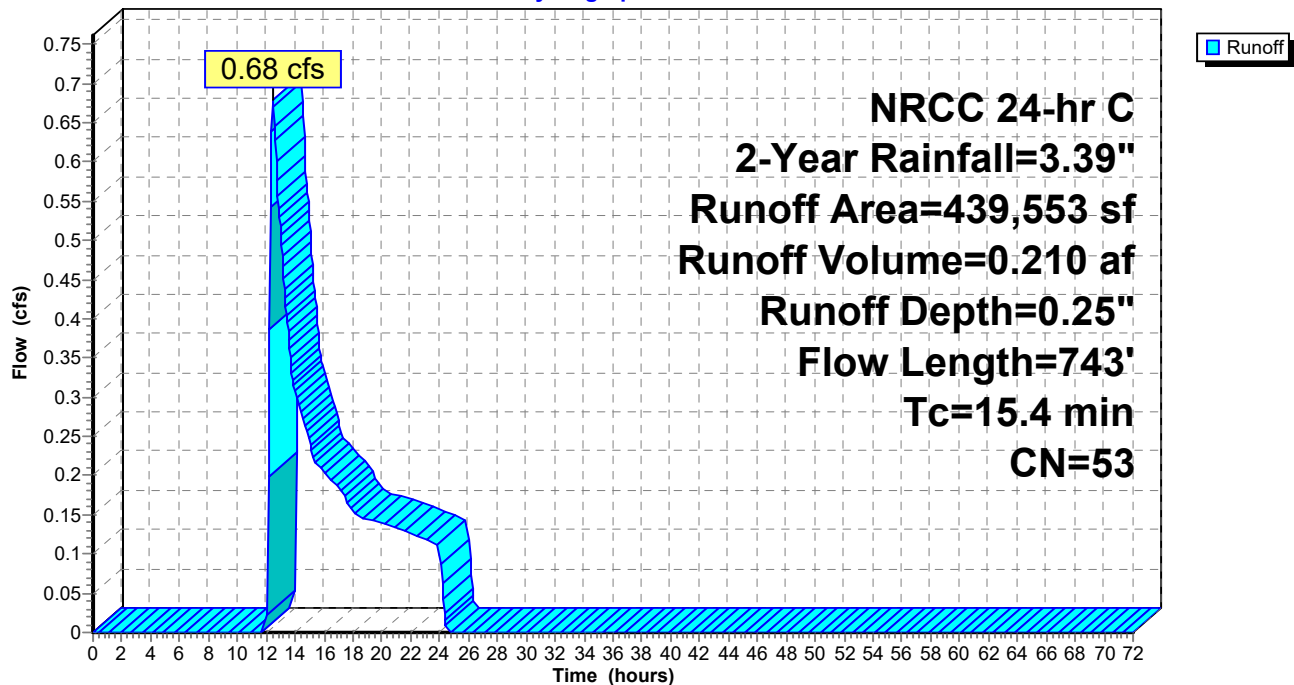
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.39"

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

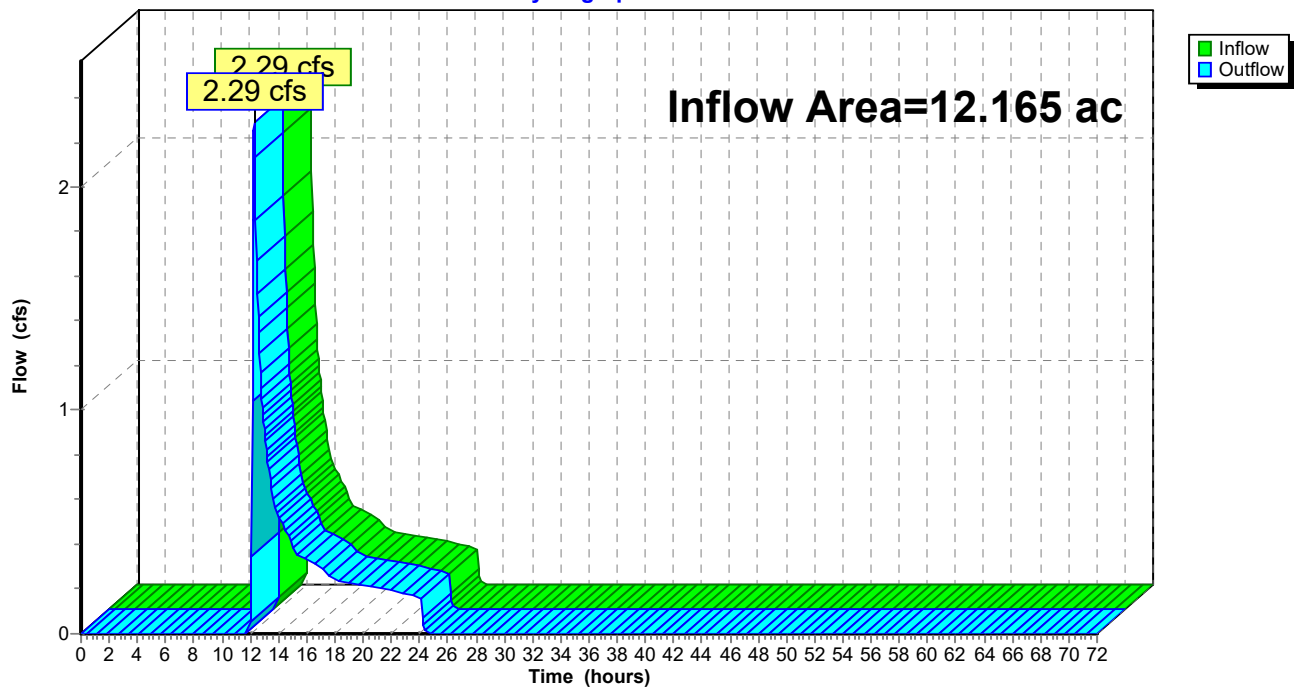
[40] Hint: Not Described (Outflow=Inflow)

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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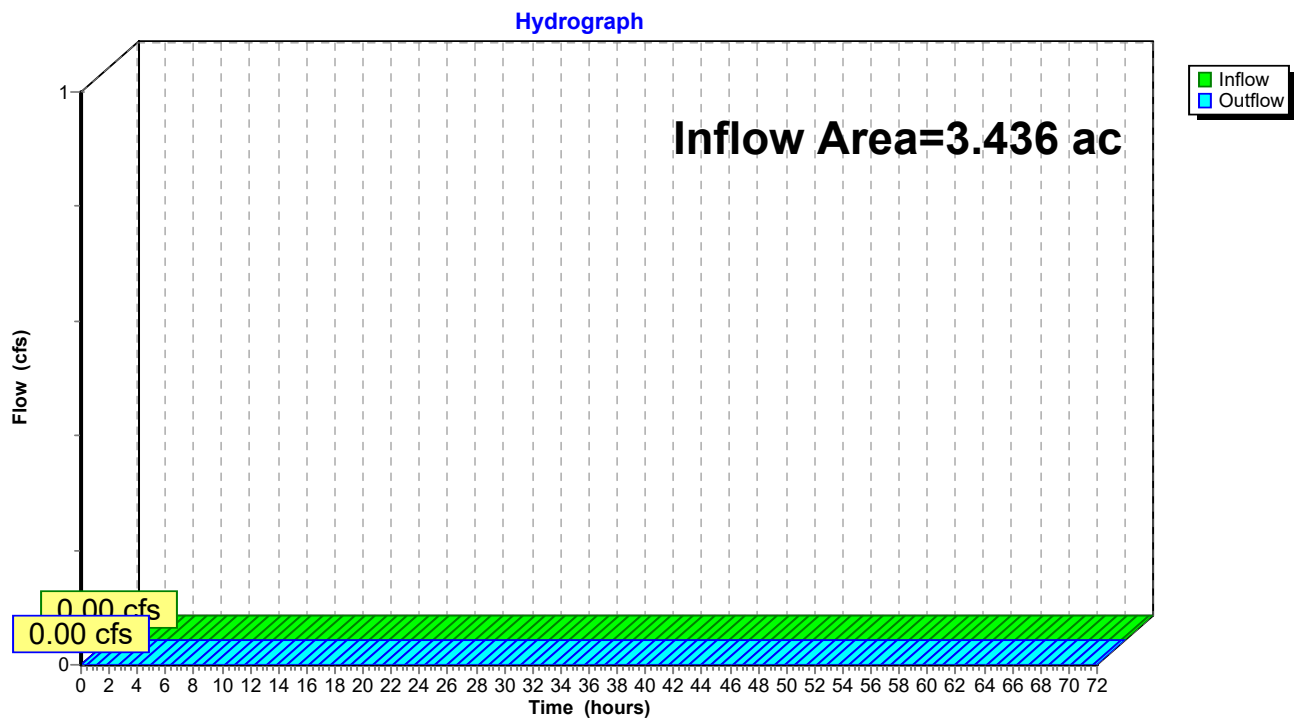
Summary for Reach DP-10: West Elm Street

[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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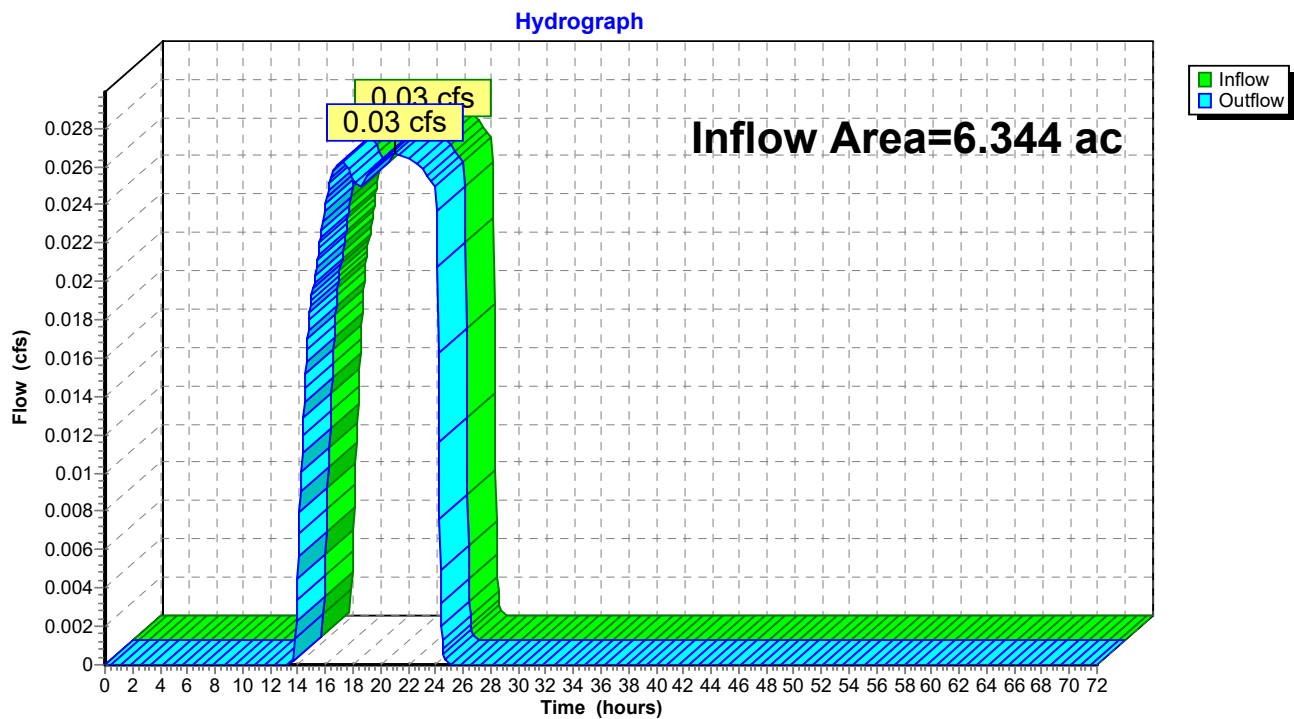
Summary for Reach DP-11: Wetland Series A

[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

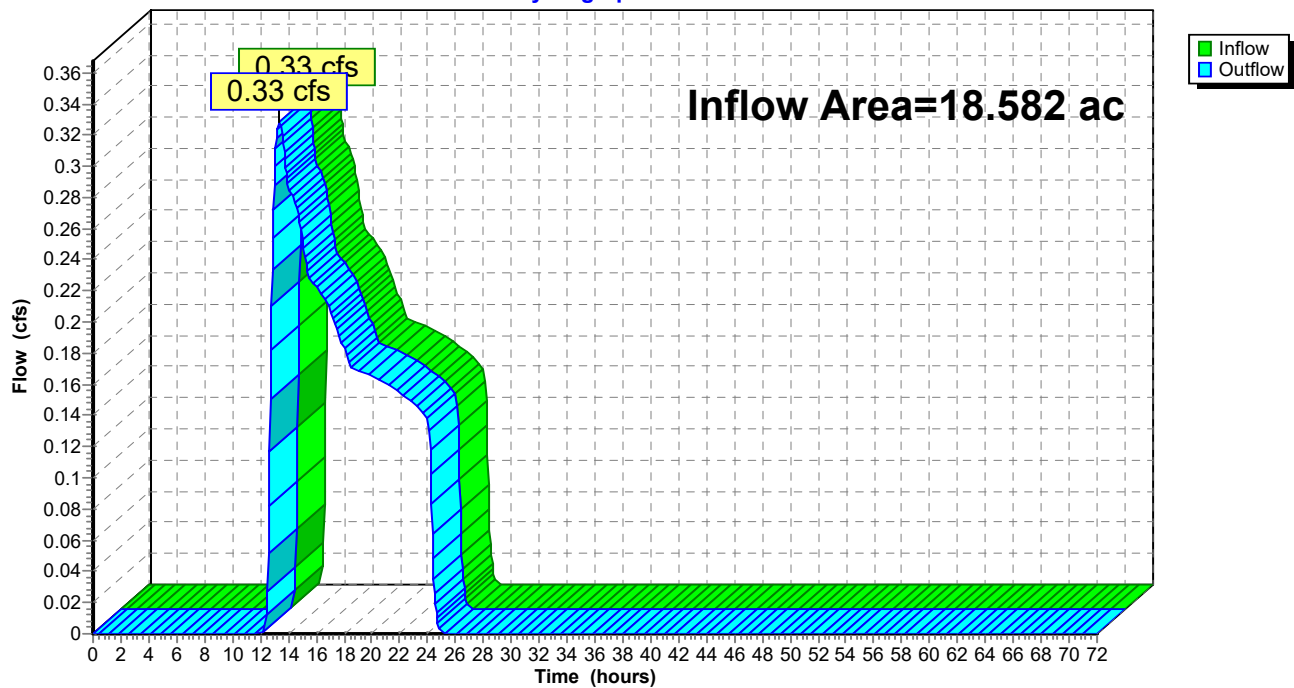
[40] Hint: Not Described (Outflow=Inflow)

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

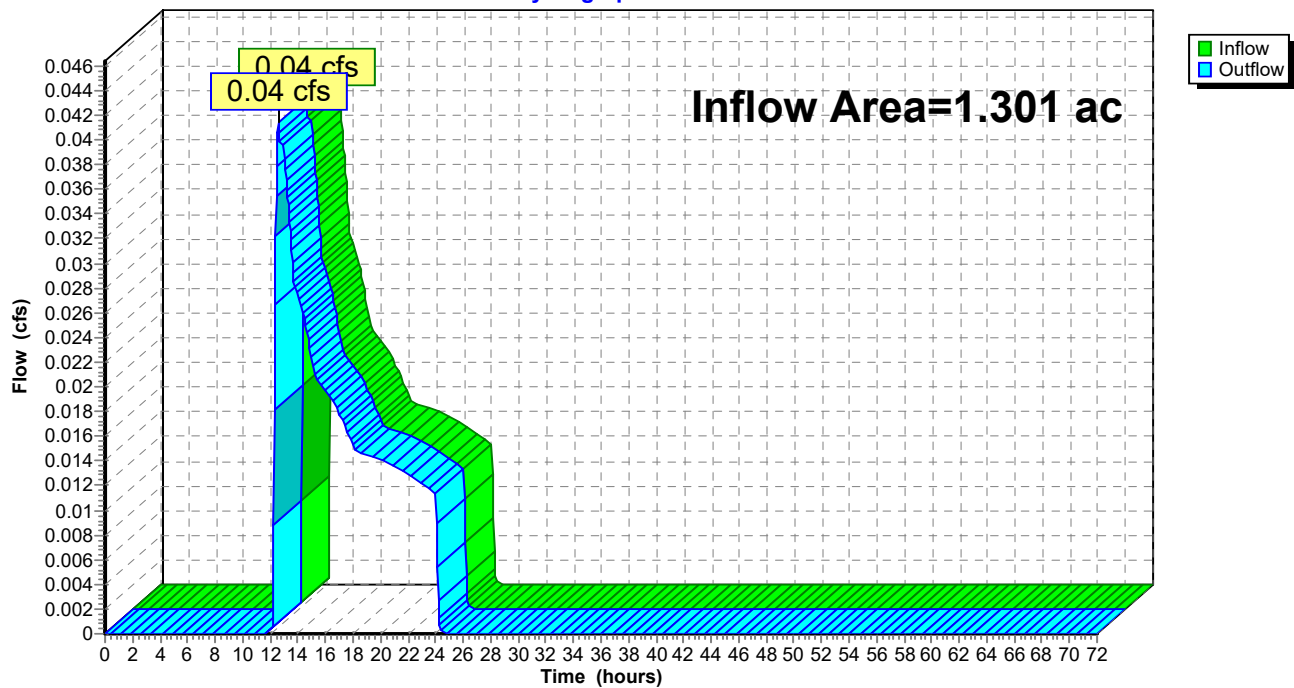
[40] Hint: Not Described (Outflow=Inflow)

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

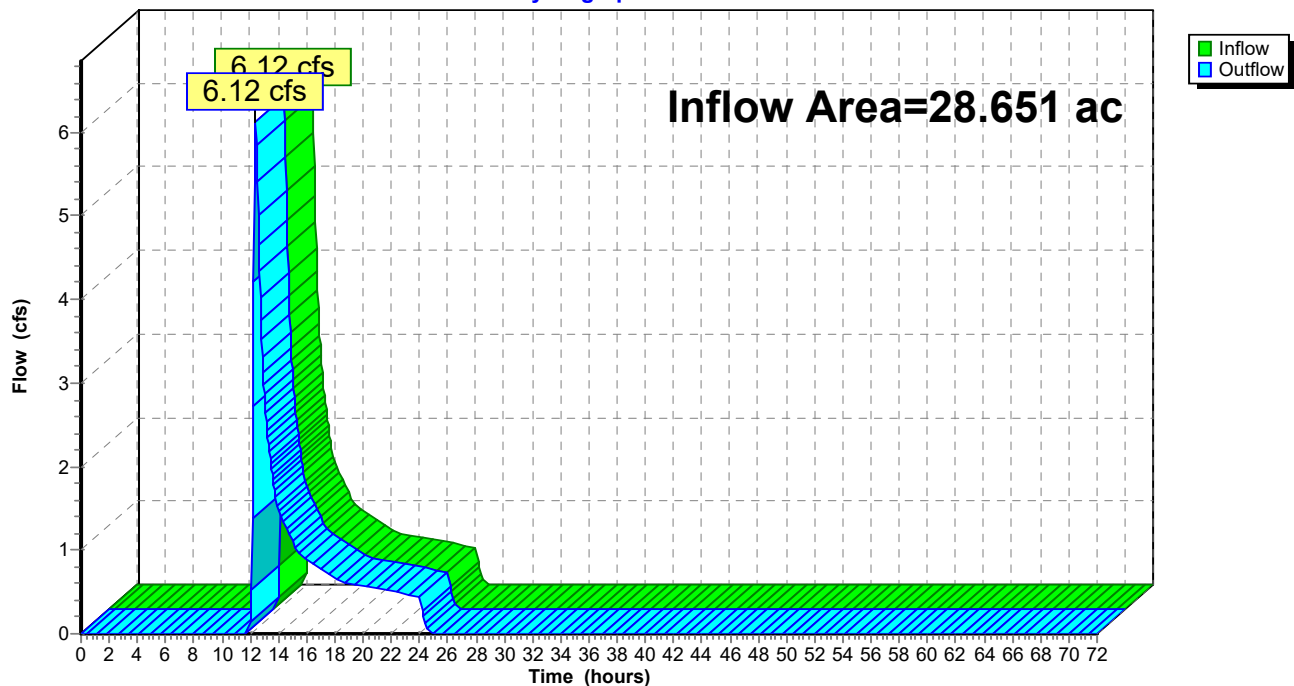
[40] Hint: Not Described (Outflow=Inflow)

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

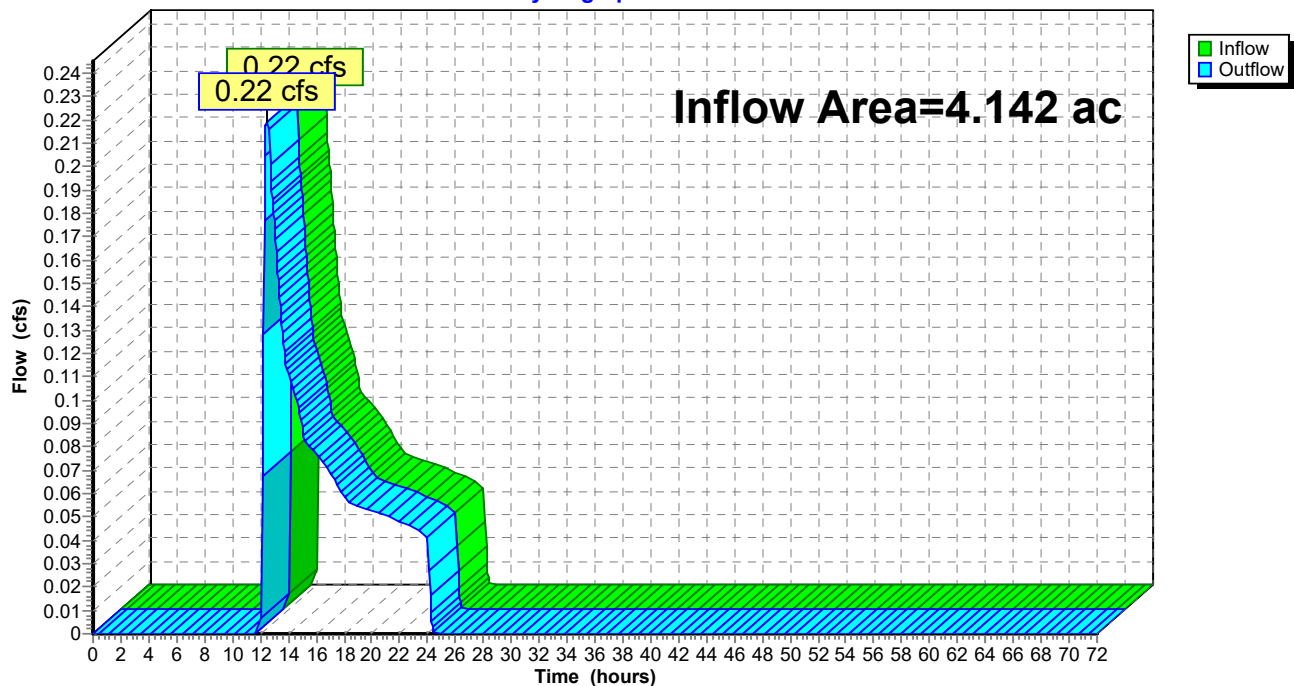
[40] Hint: Not Described (Outflow=Inflow)

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

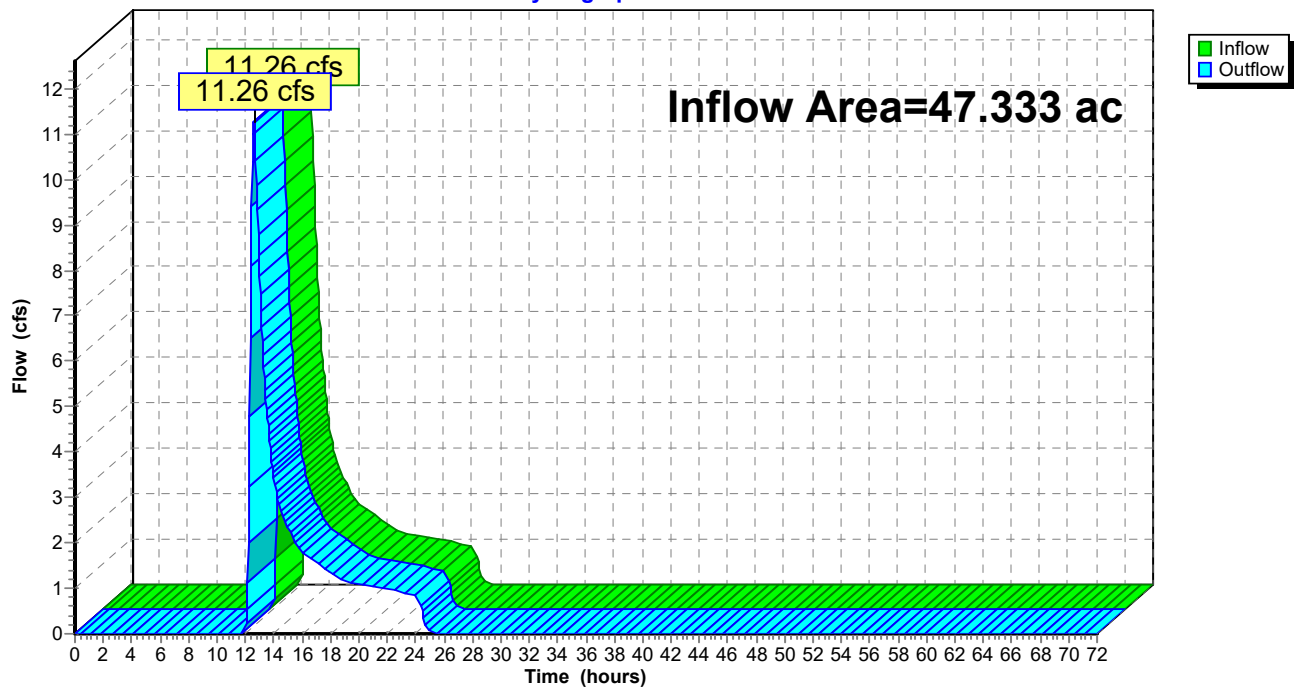
[40] Hint: Not Described (Outflow=Inflow)

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: 8" Copper Pipe

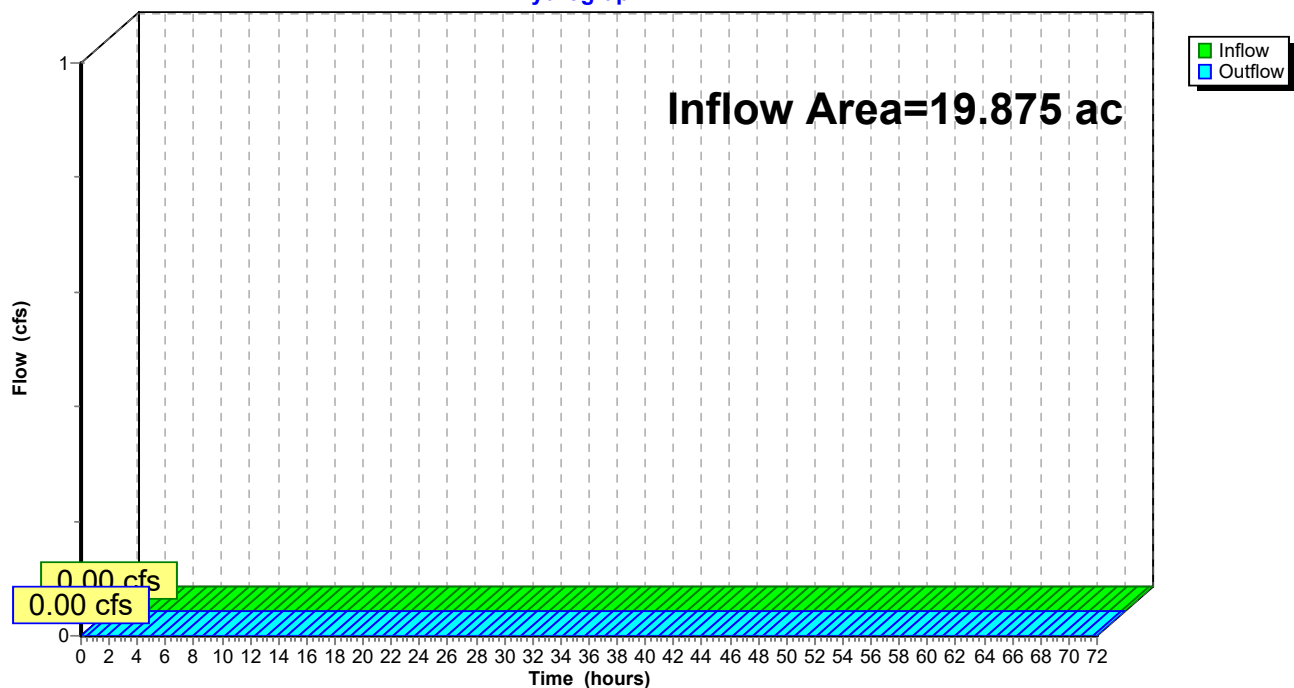
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.875 ac, 21.40% 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-3: 8" Copper Pipe

Hydrograph



Existing Hydrology

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

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Summary for Reach DP-4: Dwelley Street

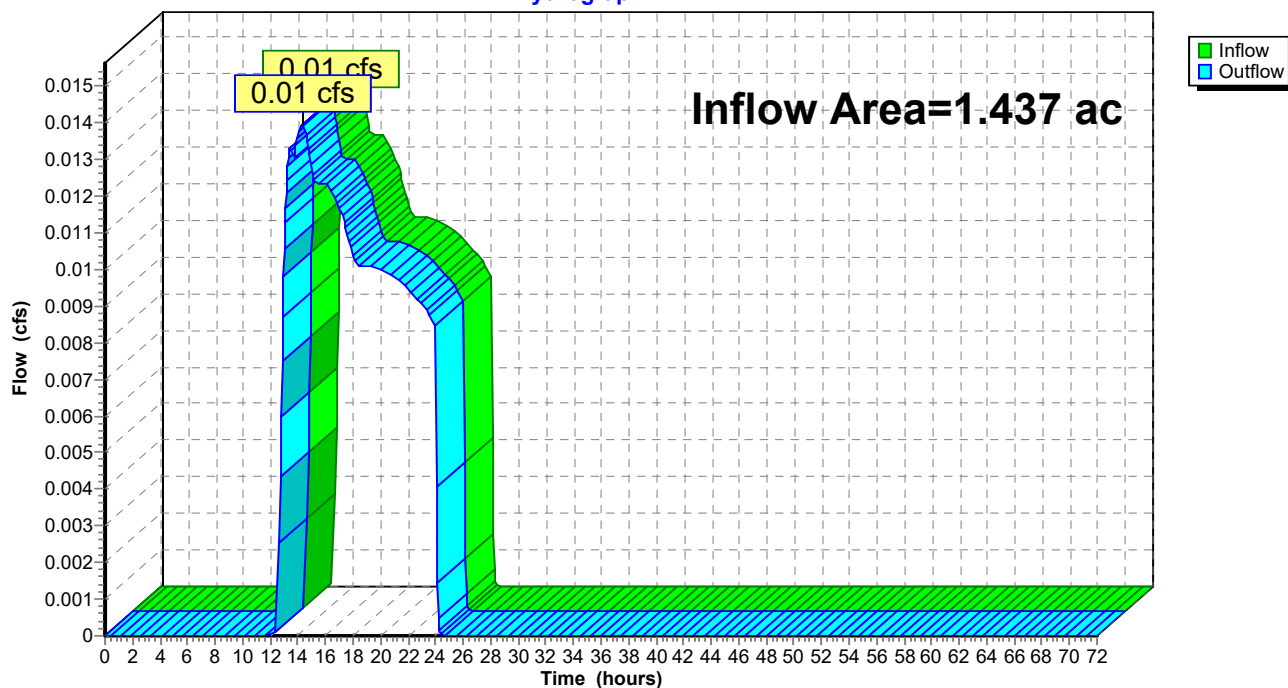
[40] Hint: Not Described (Outflow=Inflow)

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: 24" RCP PIPE

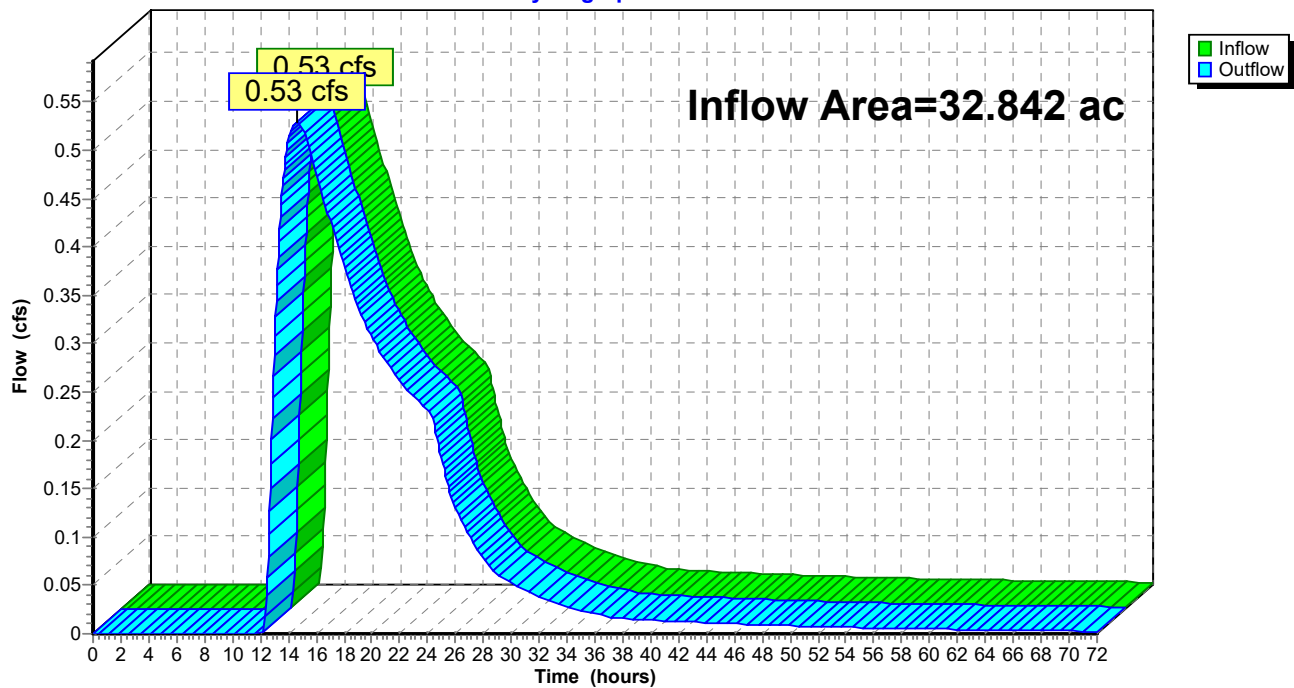
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 0.16" for 2-Year event
Inflow = 0.53 cfs @ 14.66 hrs, Volume= 0.440 af
Outflow = 0.53 cfs @ 14.66 hrs, Volume= 0.440 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: 24" RCP PIPE

Hydrograph



Existing Hydrology

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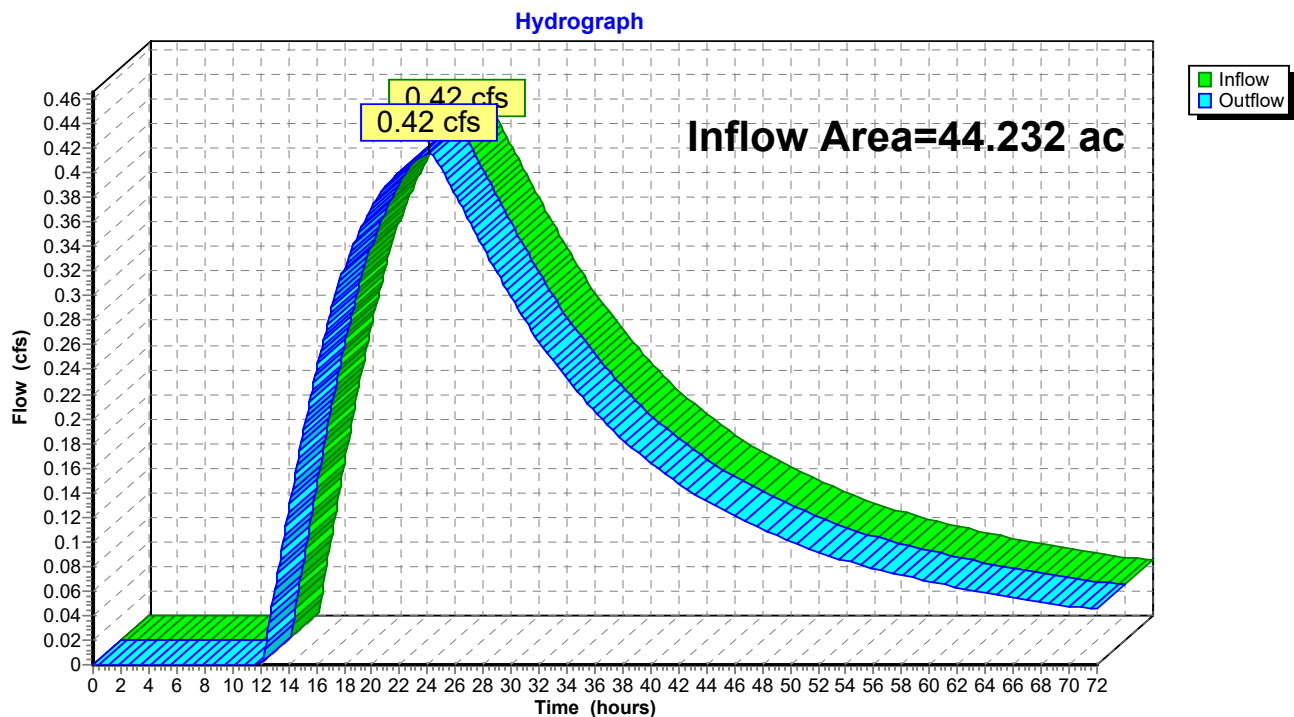
Summary for Reach DP-6: 12" RCP PIPE

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

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 0.24" for 2-Year event
Inflow = 0.42 cfs @ 24.13 hrs, Volume= 0.867 af
Outflow = 0.42 cfs @ 24.13 hrs, Volume= 0.867 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: 12" RCP PIPE



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

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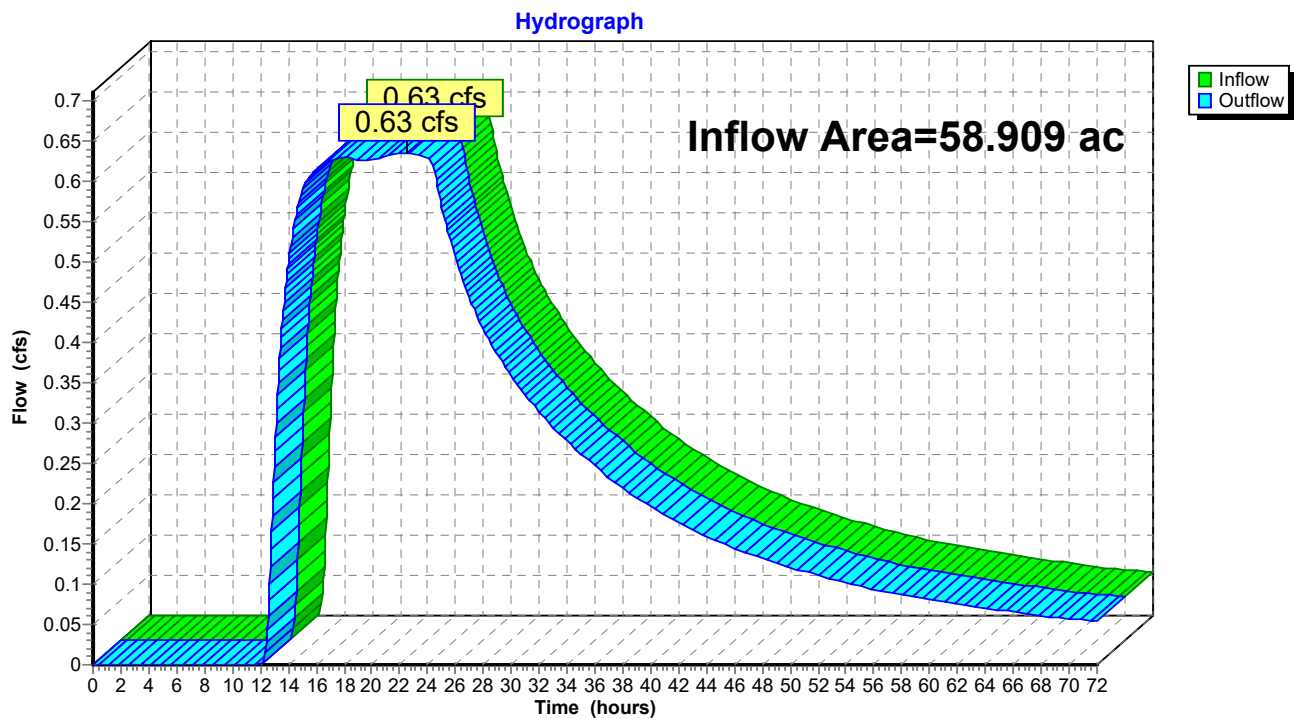
Summary for Reach DP-7: 12" RCP PIPE

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

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 0.26" for 2-Year event
Inflow = 0.63 cfs @ 22.55 hrs, Volume= 1.279 af
Outflow = 0.63 cfs @ 22.55 hrs, Volume= 1.279 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: 12" RCP PIPE



Existing Hydrology

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Summary for Reach DP-8: Wetlands Series X

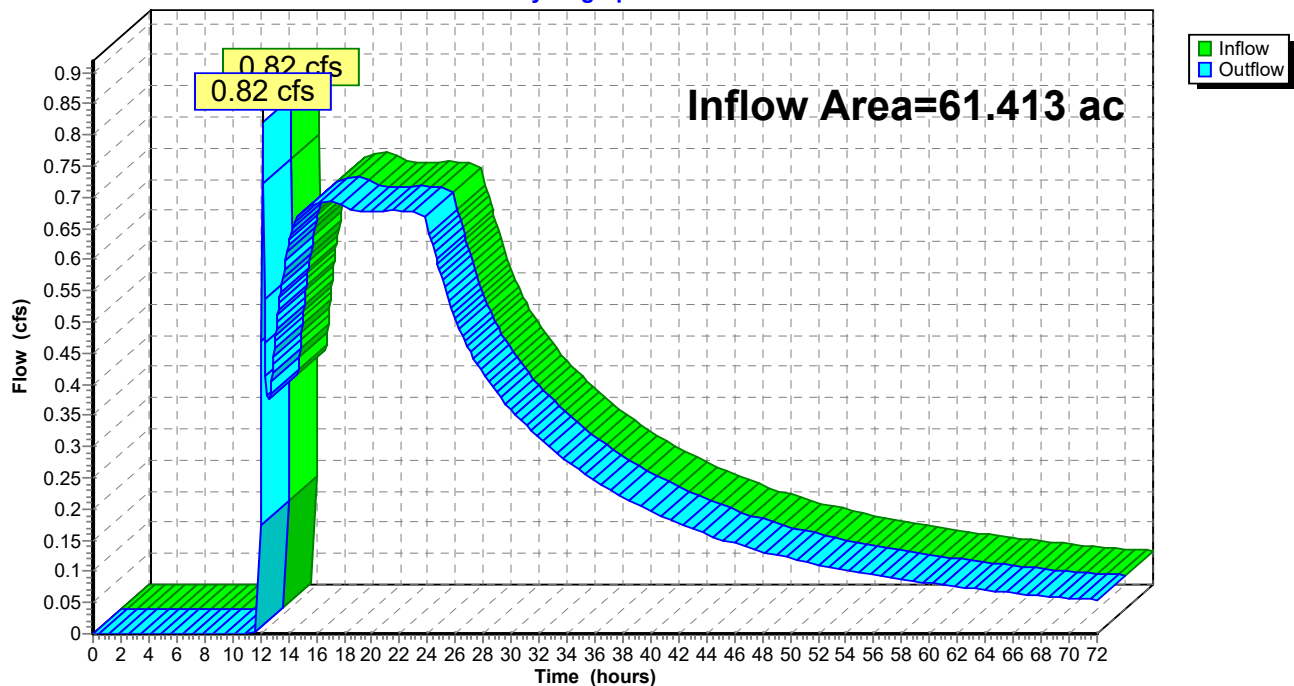
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 0.27" for 2-Year event
Inflow = 0.82 cfs @ 12.18 hrs, Volume= 1.372 af
Outflow = 0.82 cfs @ 12.18 hrs, Volume= 1.372 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

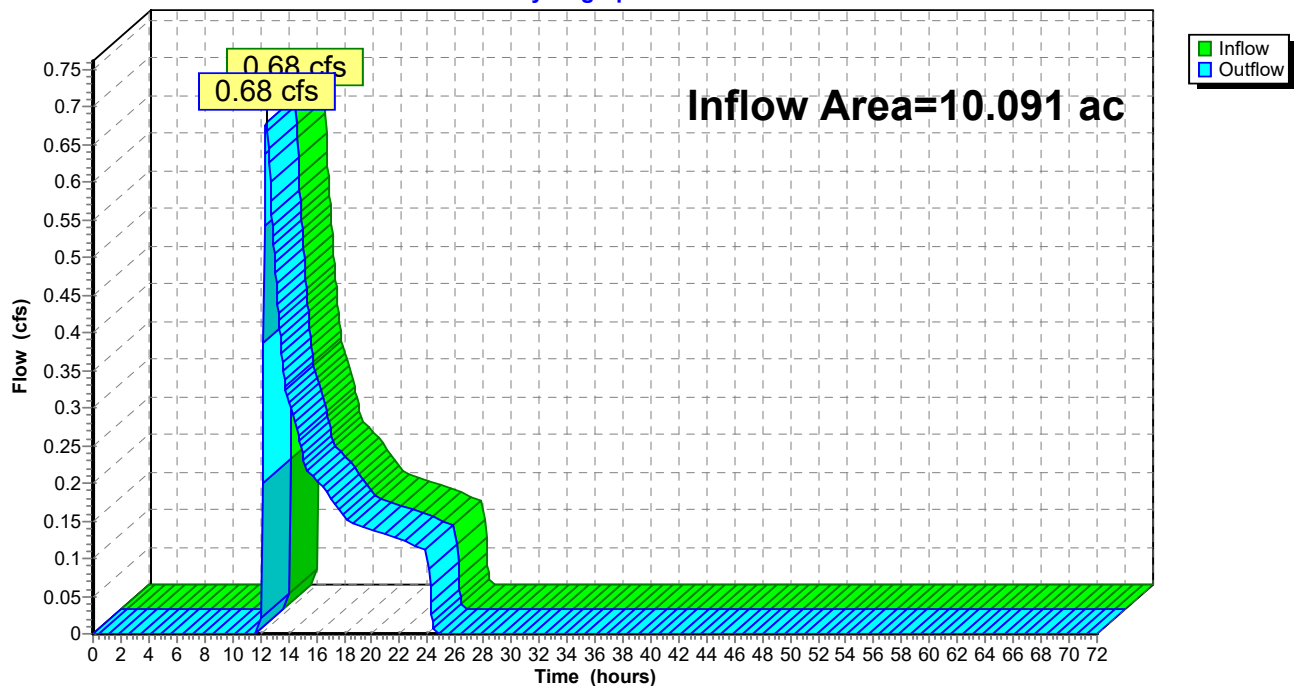
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.091 ac, 31.90% Impervious, Inflow Depth = 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

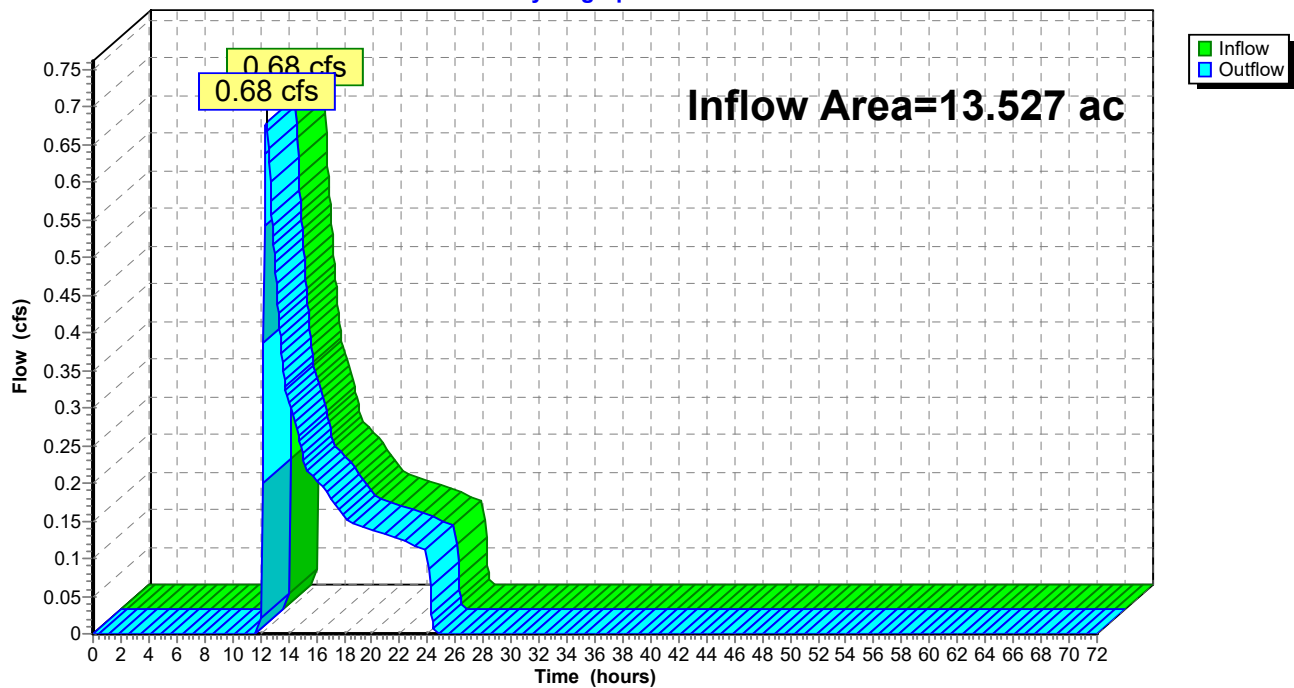
[40] Hint: Not Described (Outflow=Inflow)

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

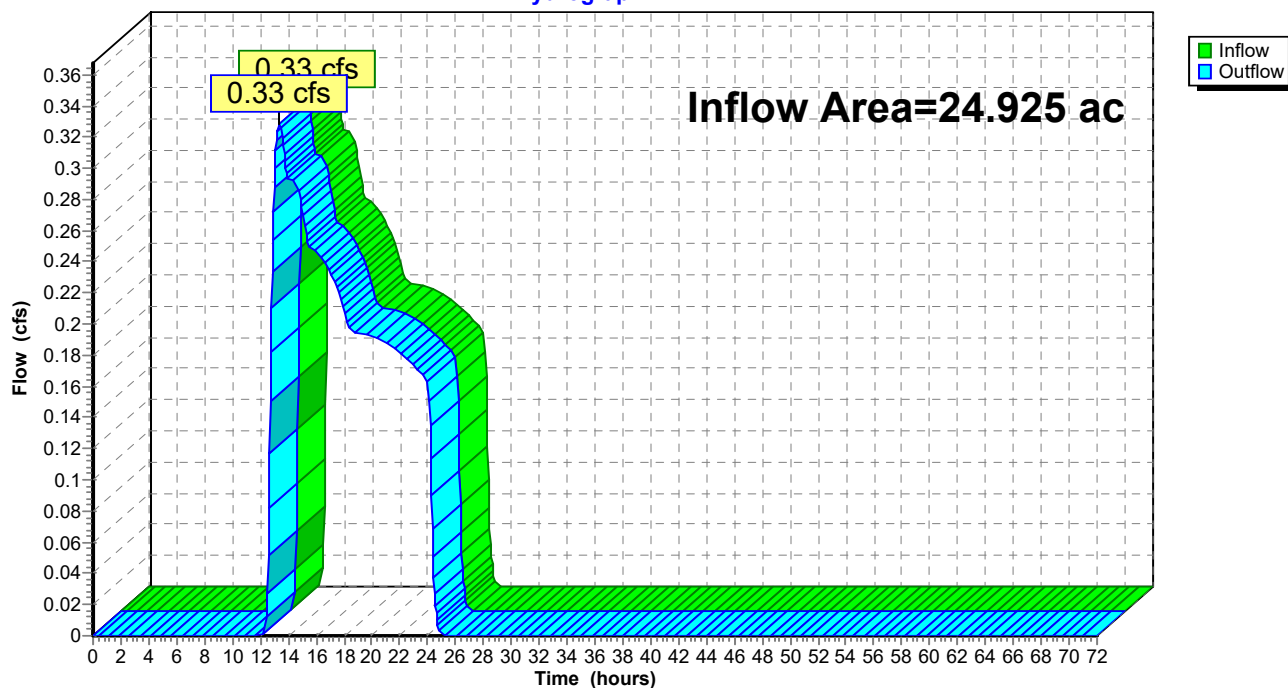
[40] Hint: Not Described (Outflow=Inflow)

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

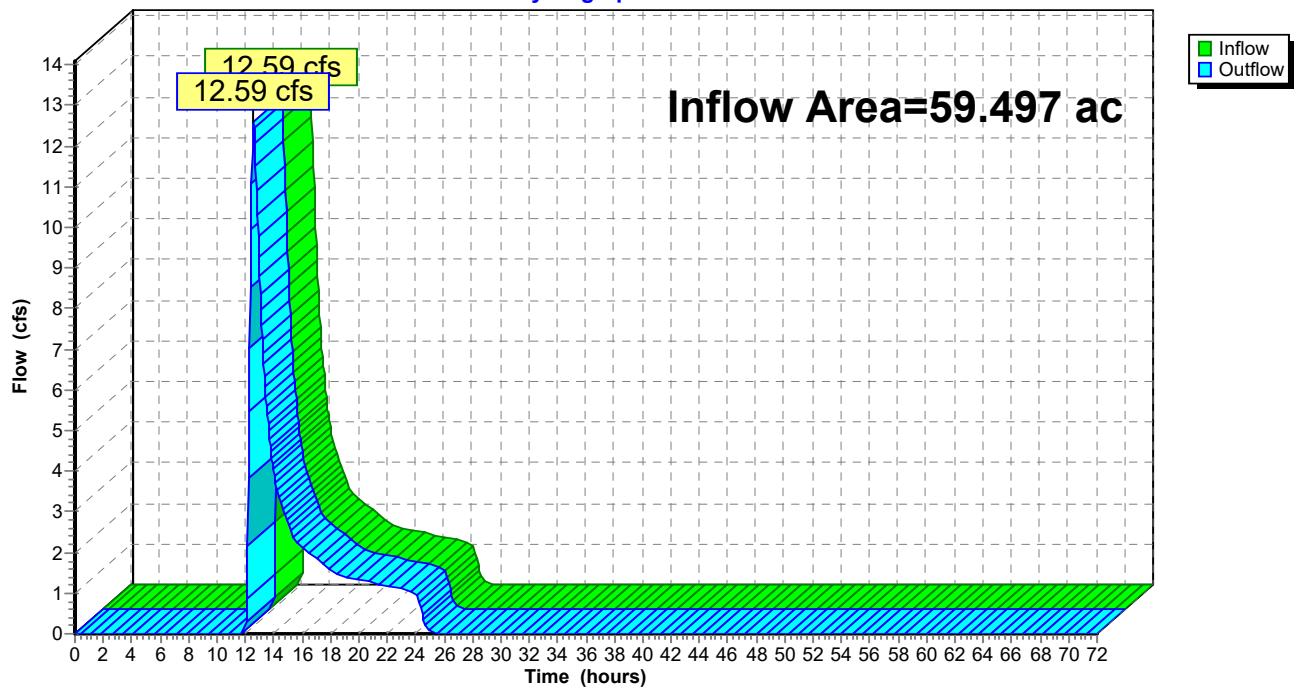
[40] Hint: Not Described (Outflow=Inflow)

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 W-N: Wetland Series N

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth = 0.16" for 2-Year event
 Inflow = 2.23 cfs @ 12.45 hrs, Volume= 0.444 af
 Outflow = 0.53 cfs @ 14.66 hrs, Volume= 0.440 af, Atten= 76%, Lag= 133.1 min
 Primary = 0.53 cfs @ 14.66 hrs, Volume= 0.440 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 85.76' @ 14.66 hrs Surf.Area= 24,932 sf Storage= 6,409 cf

Plug-Flow detention time= 302.4 min calculated for 0.440 af (99% of inflow)
 Center-of-Mass det. time= 297.9 min (1,256.6 - 958.7)

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	85.50'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 85.50' / 83.90' S= 0.0346 ' S Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=0.53 cfs @ 14.66 hrs HW=85.76' (Free Discharge)

↑1=RCP_Round 24" (Inlet Controls 0.53 cfs @ 2.18 fps)

Existing Hydrology

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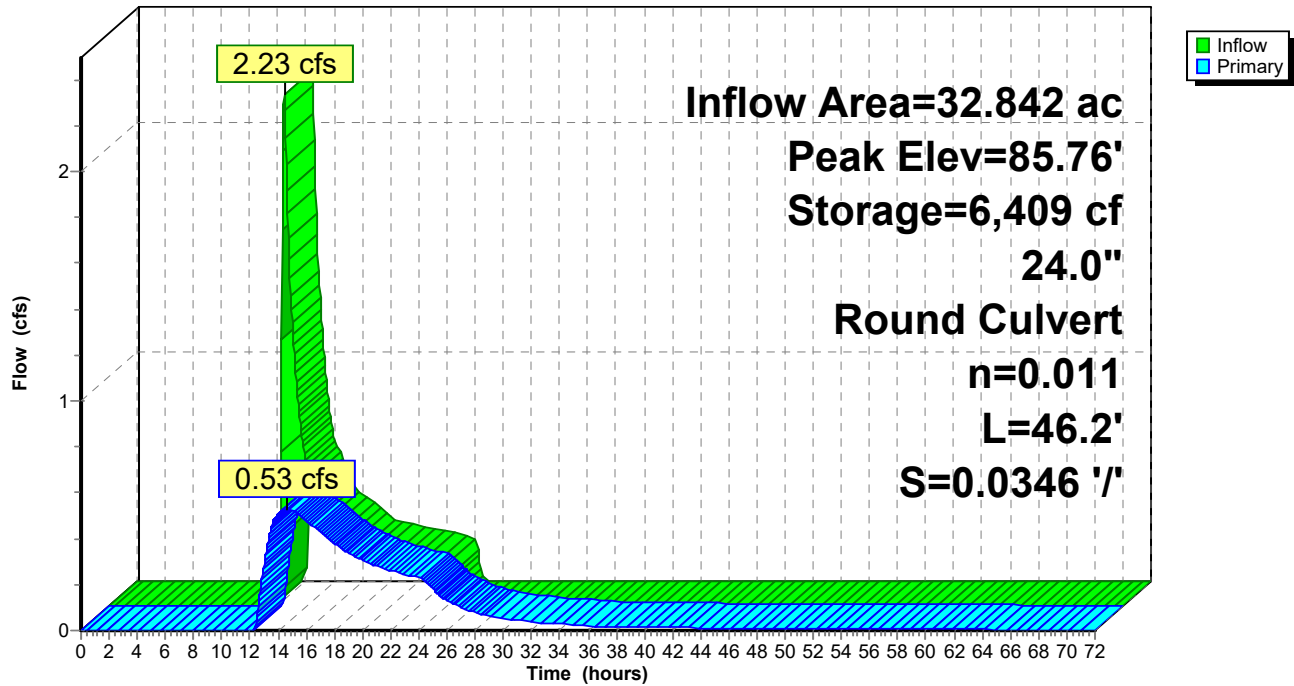
NRCC 24-hr C 2-Year Rainfall=3.39"

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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 > 0.27" for 2-Year event
 Inflow = 2.13 cfs @ 12.47 hrs, Volume= 1.326 af
 Outflow = 0.63 cfs @ 22.55 hrs, Volume= 1.279 af, Atten= 70%, Lag= 605.3 min
 Primary = 0.63 cfs @ 22.55 hrs, Volume= 1.279 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.14' @ 22.55 hrs Surf.Area= 17,877 sf Storage= 7,823 cf

Plug-Flow detention time= 271.6 min calculated for 1.278 af (96% of inflow)
 Center-of-Mass det. time= 184.6 min (1,809.7 - 1,625.2)

Volume	Invert	Avail.Storage	Storage Description	
#1	78.68'	102,529 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)
78.68	16,400	0	0	16,400
80.00	20,844	24,523	24,523	20,889
81.00	37,500	28,767	53,290	37,556
82.00	62,000	49,239	102,529	62,069

Device	Routing	Invert	Outlet Devices
#1	Primary	78.68'	12.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 78.68' / 75.00' S= 0.0214 ' S Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.63 cfs @ 22.55 hrs HW=79.14' (Free Discharge)

- ↑
 1=Culvert (Inlet Controls 0.63 cfs @ 1.82 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

Prepared by CDG

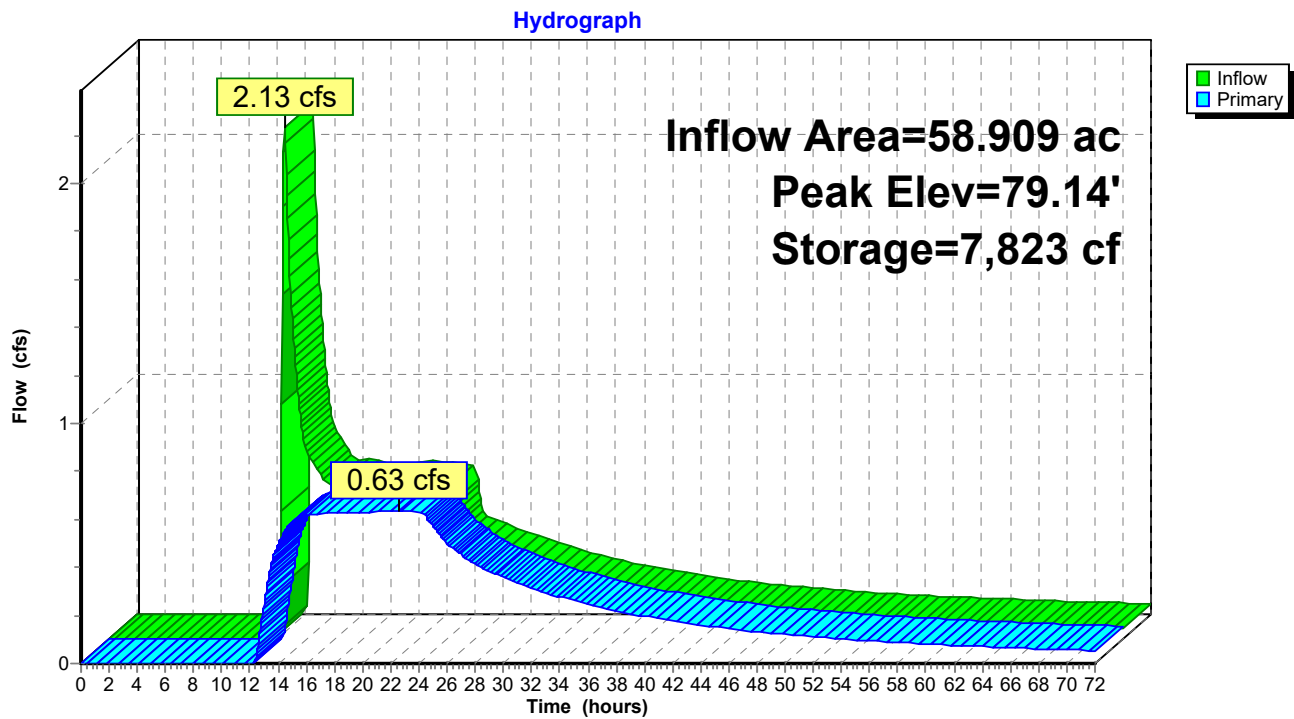
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Pond W-O: Wetland Series O



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 > 0.30" for 2-Year event
 Inflow = 5.89 cfs @ 12.27 hrs, Volume= 1.099 af
 Outflow = 0.42 cfs @ 24.13 hrs, Volume= 0.867 af, Atten= 93%, Lag= 711.9 min
 Primary = 0.42 cfs @ 24.13 hrs, Volume= 0.867 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.08' @ 24.13 hrs Surf.Area= 84,363 sf Storage= 31,434 cf

Plug-Flow detention time= 1,071.3 min calculated for 0.867 af (79% of inflow)
 Center-of-Mass det. time= 923.4 min (1,974.5 - 1,051.1)

Volume	Invert	Avail.Storage	Storage Description
#1	78.70'	402,154 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)
78.70	82,500	0	0	82,500
83.00	105,000	402,154	402,154	105,477

Device	Routing	Invert	Outlet Devices
#1	Primary	78.70'	12.0" Round Culvert L= 20.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 78.70' / 78.30' S= 0.0194 ' S= 0.0194 ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 24.13 hrs HW=79.08' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.42 cfs @ 2.28 fps)

Existing Hydrology

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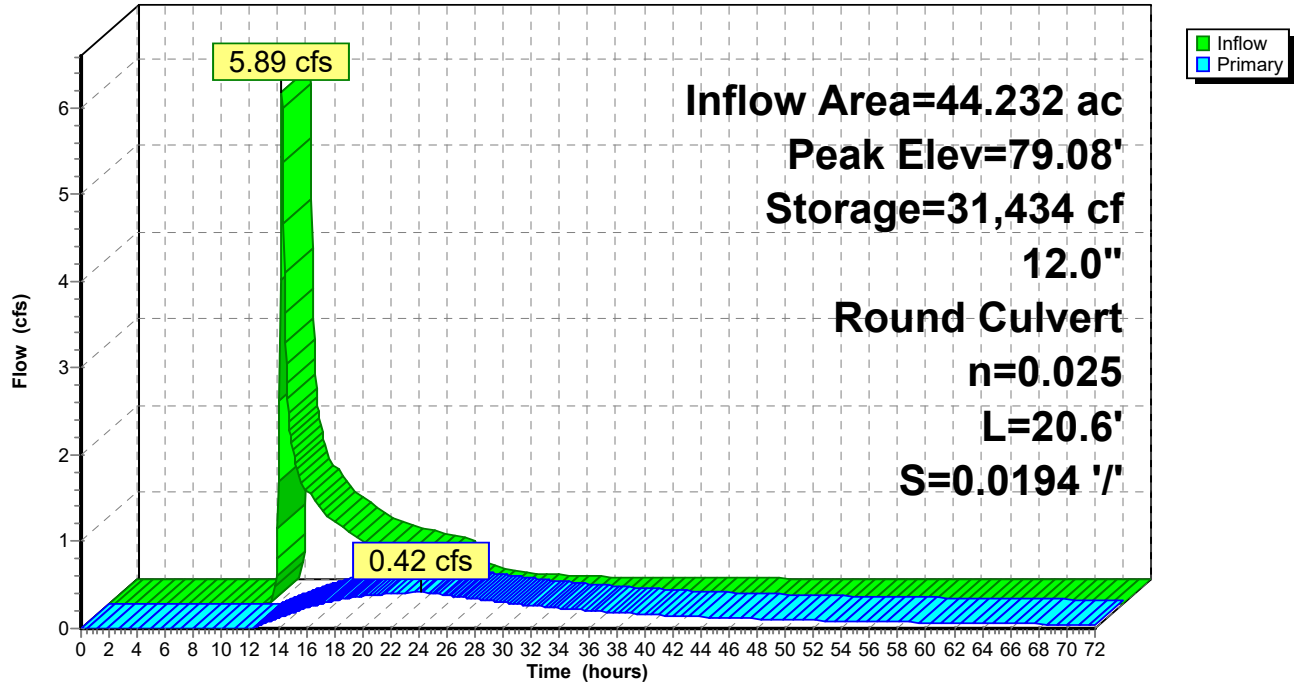
NRCC 24-hr C 2-Year Rainfall=3.39"

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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 = 0.00 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= 86.94' @ 25.10 hrs Surf.Area= 81,620 sf Storage= 53,482 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	86.27'	521,661 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)
86.27	78,906	0	0	78,906
92.00	103,740	521,661	521,661	104,484

Device	Routing	Invert	Outlet Devices
#1	Primary	87.30'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.30' / 86.50' S= 0.0033 ' S= 0.0033 ' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=86.27' (Free Discharge)

↑1=Culvert (Controls 0.00 cfs)

Existing Hydrology

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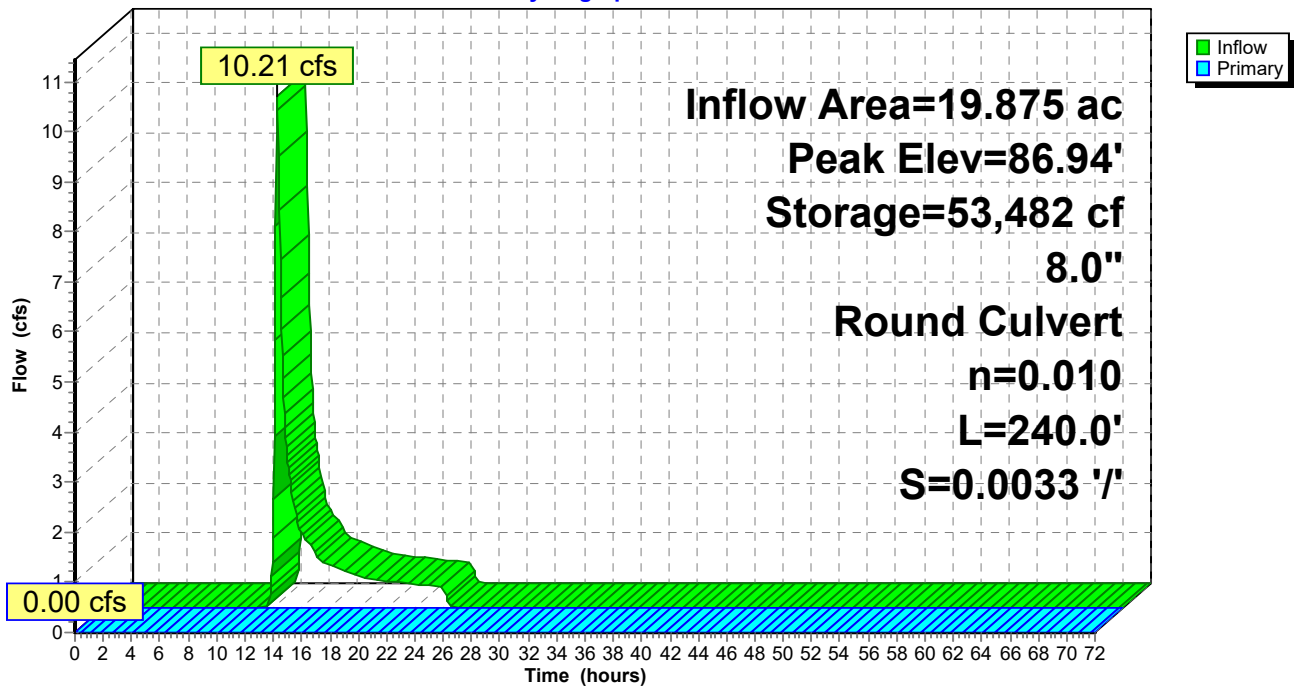
NRCC 24-hr C 2-Year Rainfall=3.39"

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Pond W-R: Wetland Series R

Hydrograph



Existing Hydrology

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

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Summary for Subcatchment E-1:

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

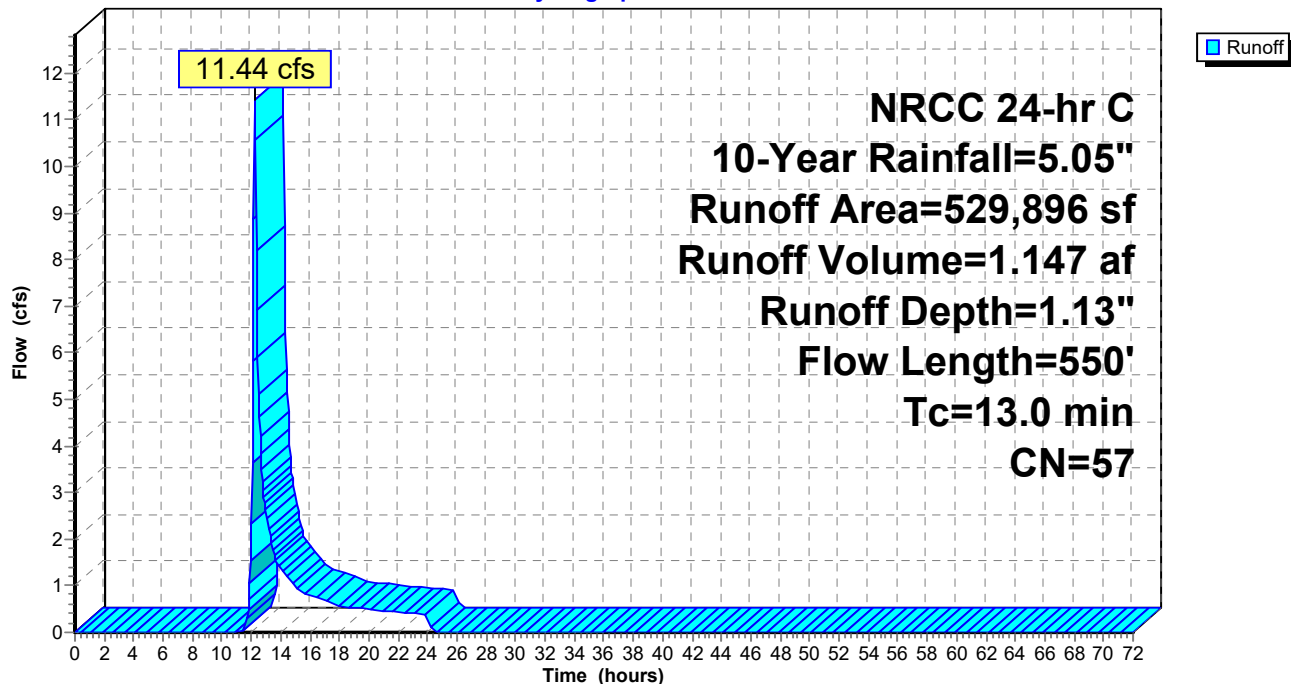
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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-10:

Runoff = 0.02 cfs @ 21.90 hrs, Volume= 0.013 af, Depth= 0.05"

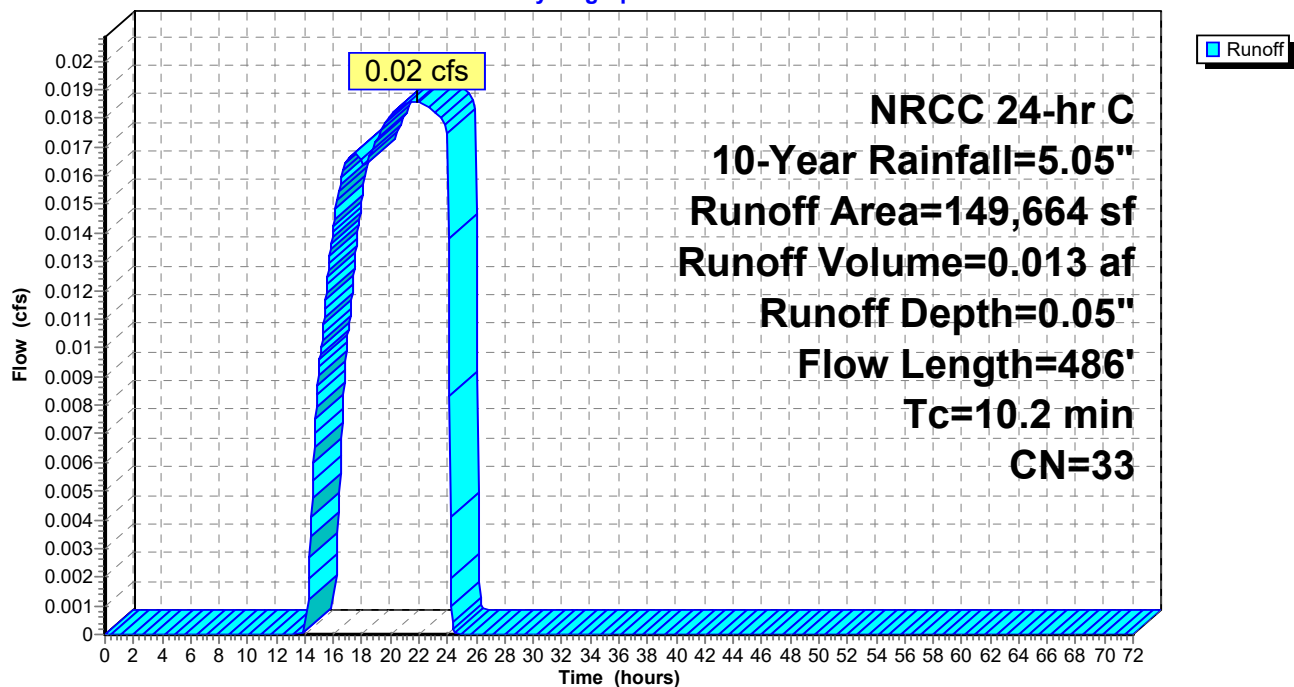
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description
*	4,986	98	ROOF AND Paved parking, HSG A
	134,678	30	Woods, Good, HSG A
	10,000	39	>75% Grass cover, Good, HSG A
	149,664	33	Weighted Average
	144,678		96.67% Pervious Area
	4,986		3.33% 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-10:

Hydrograph



Existing Hydrology

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

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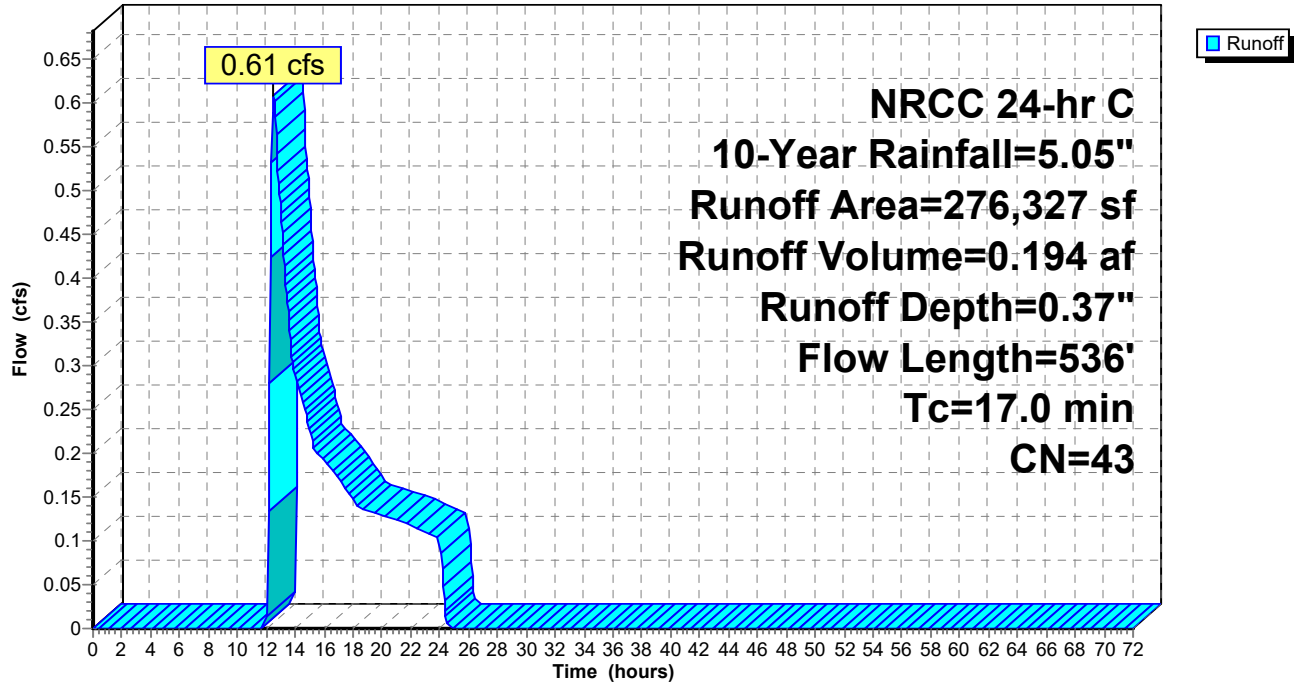
NRCC 24-hr C 10-Year Rainfall=5.05"

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Subcatchment E-11:

Hydrograph



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

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Summary for Subcatchment E-12:

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

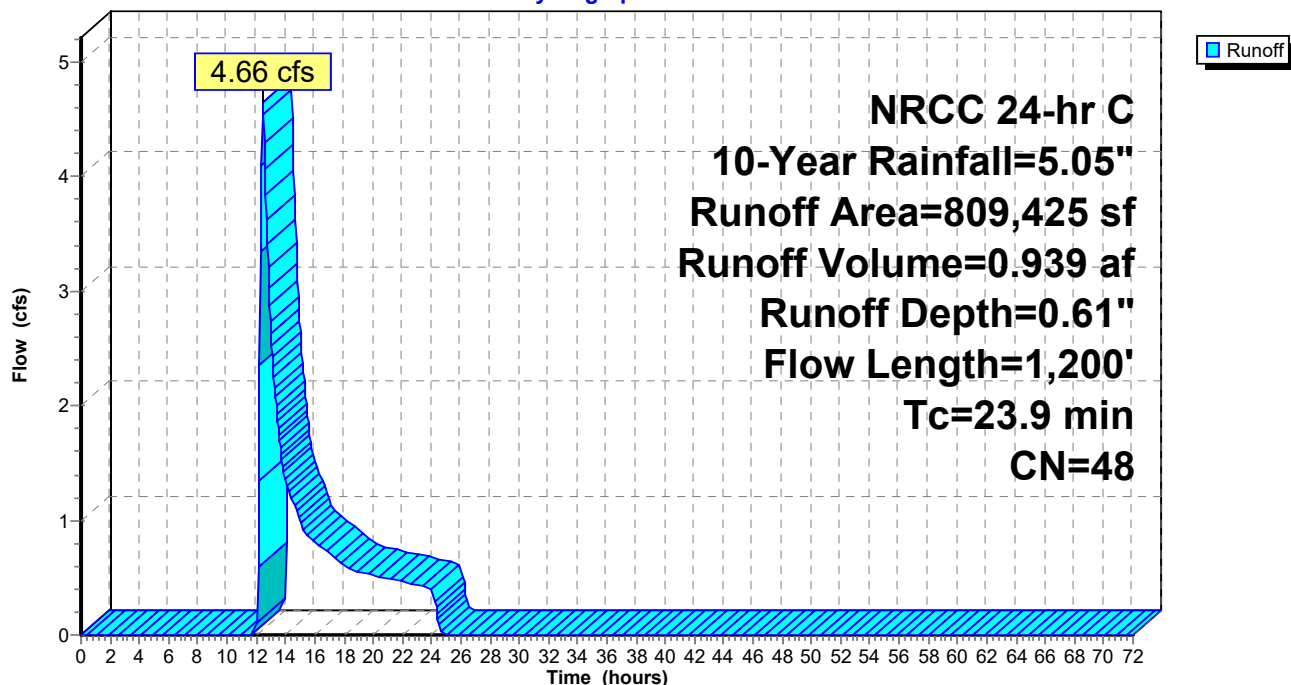
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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



Existing Hydrology

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Summary for Subcatchment E-13:

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

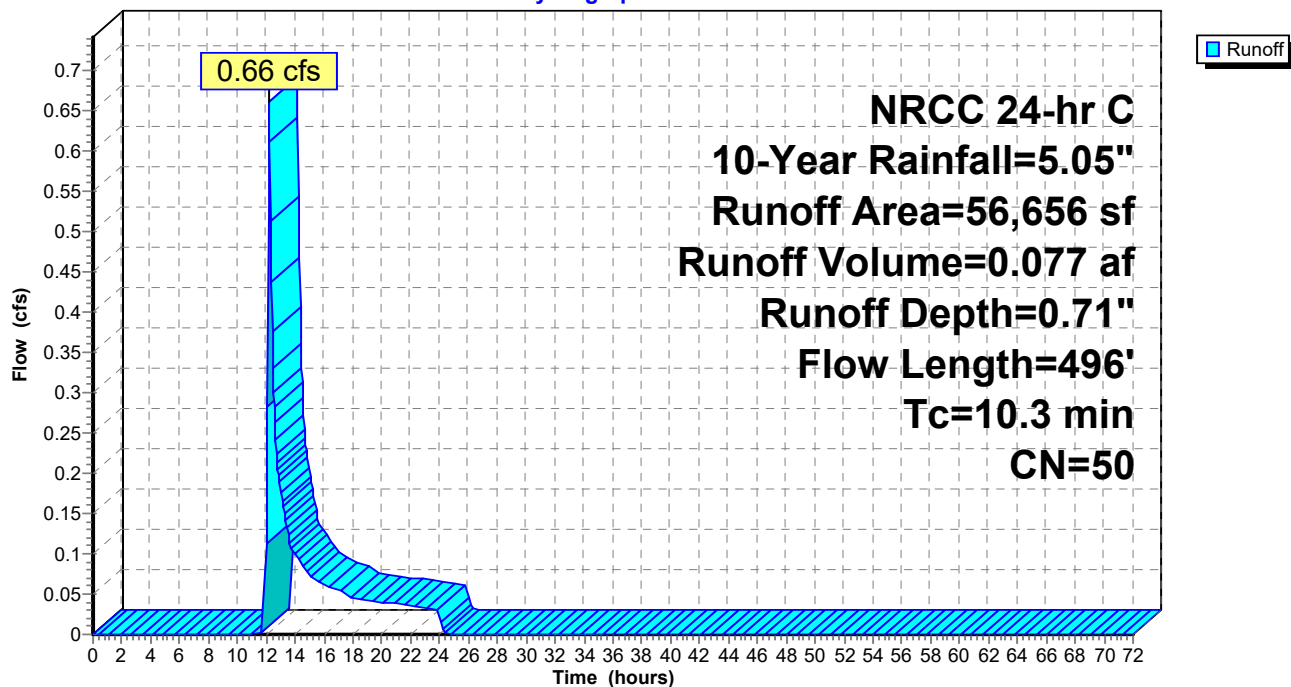
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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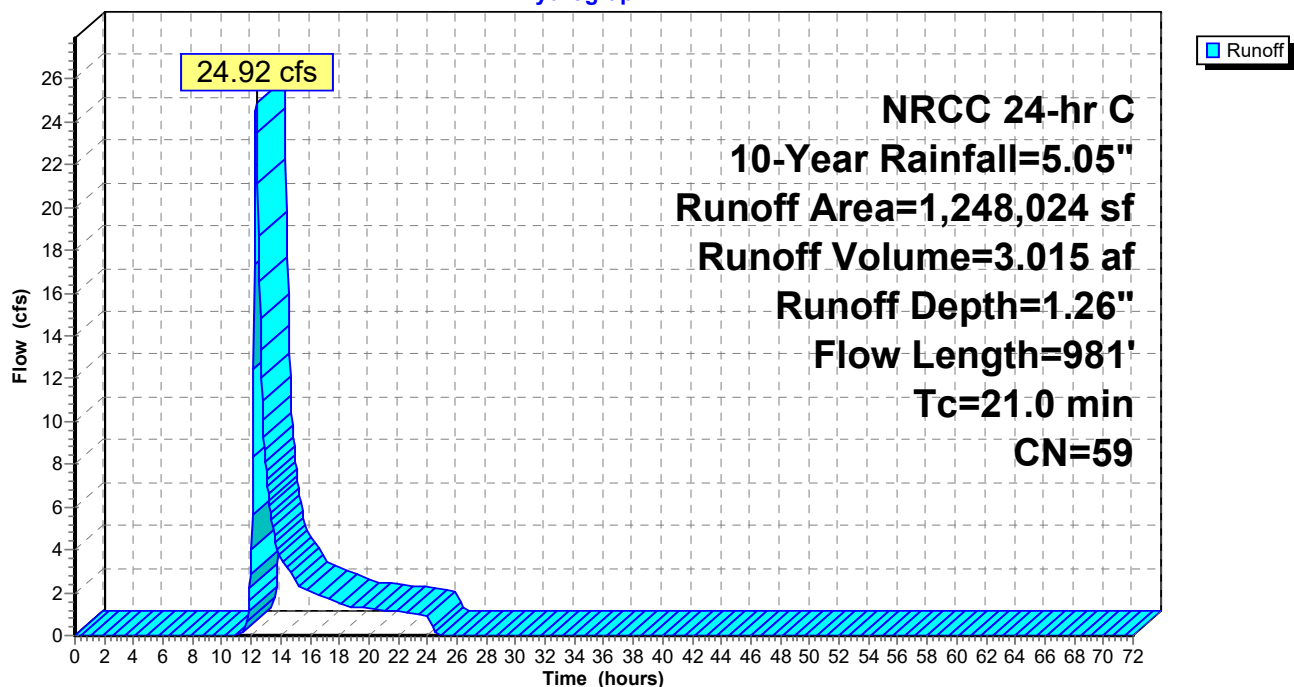
NRCC 24-hr C 10-Year Rainfall=5.05"

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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"

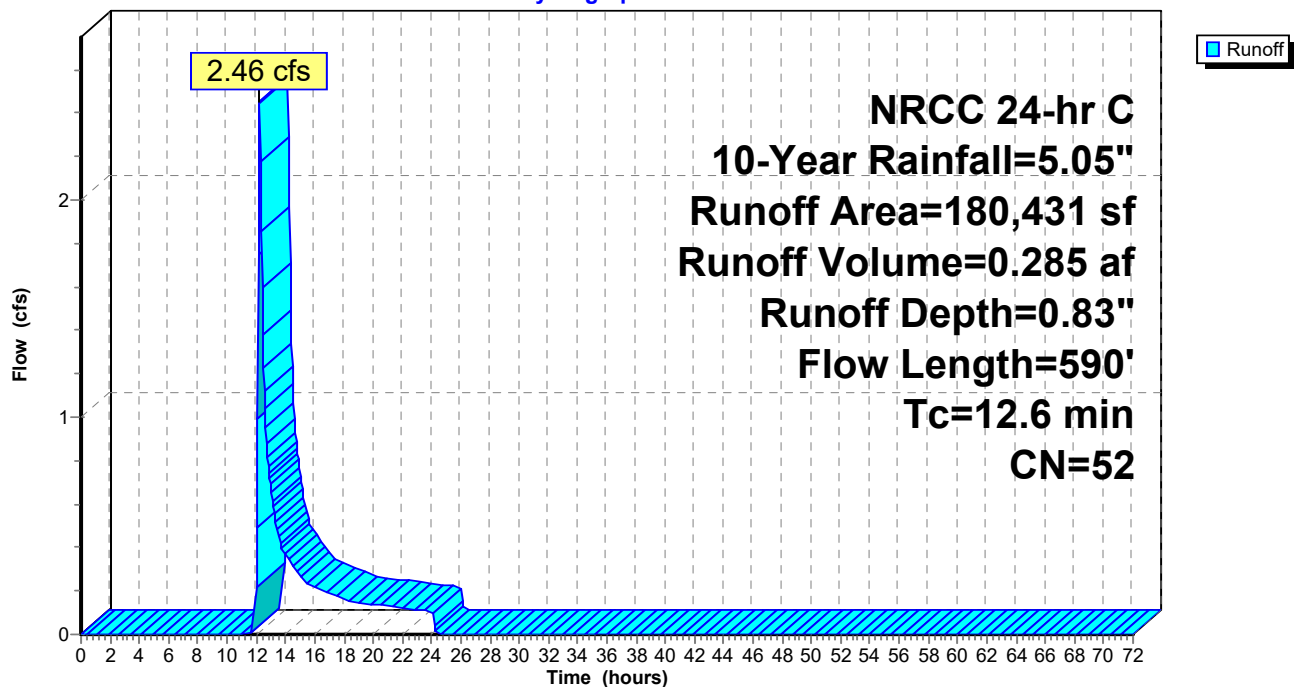
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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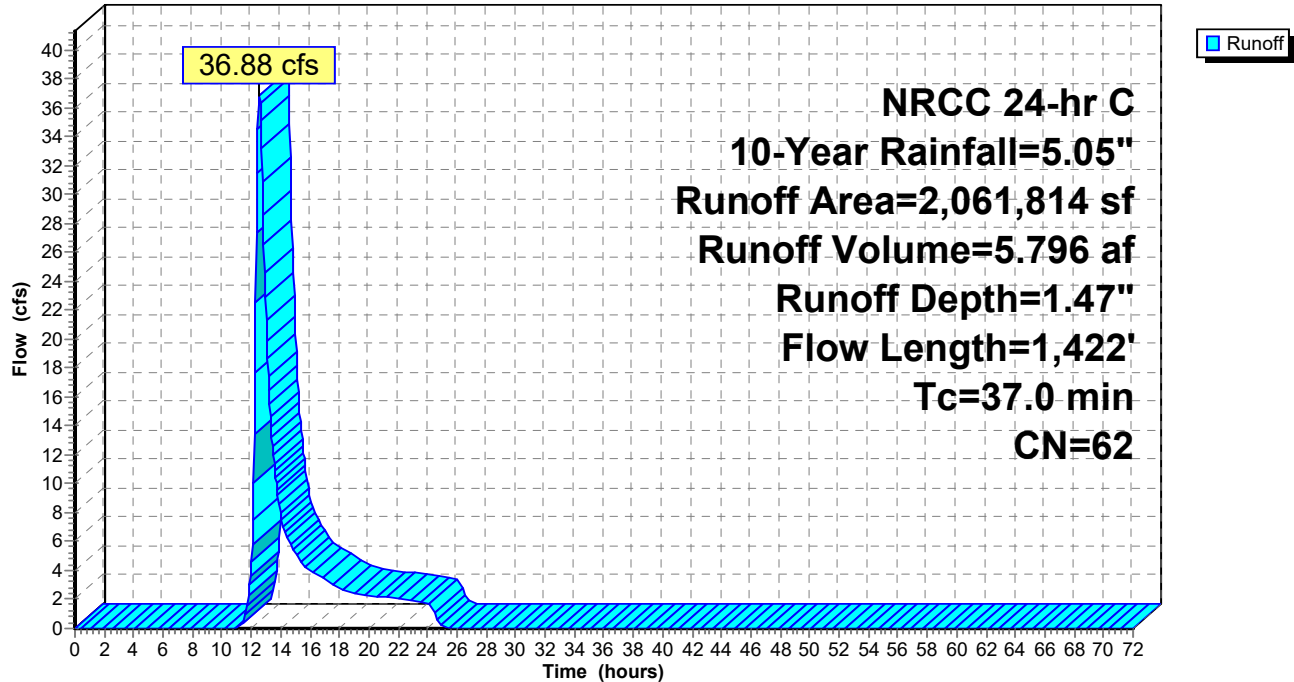
NRCC 24-hr C 10-Year Rainfall=5.05"

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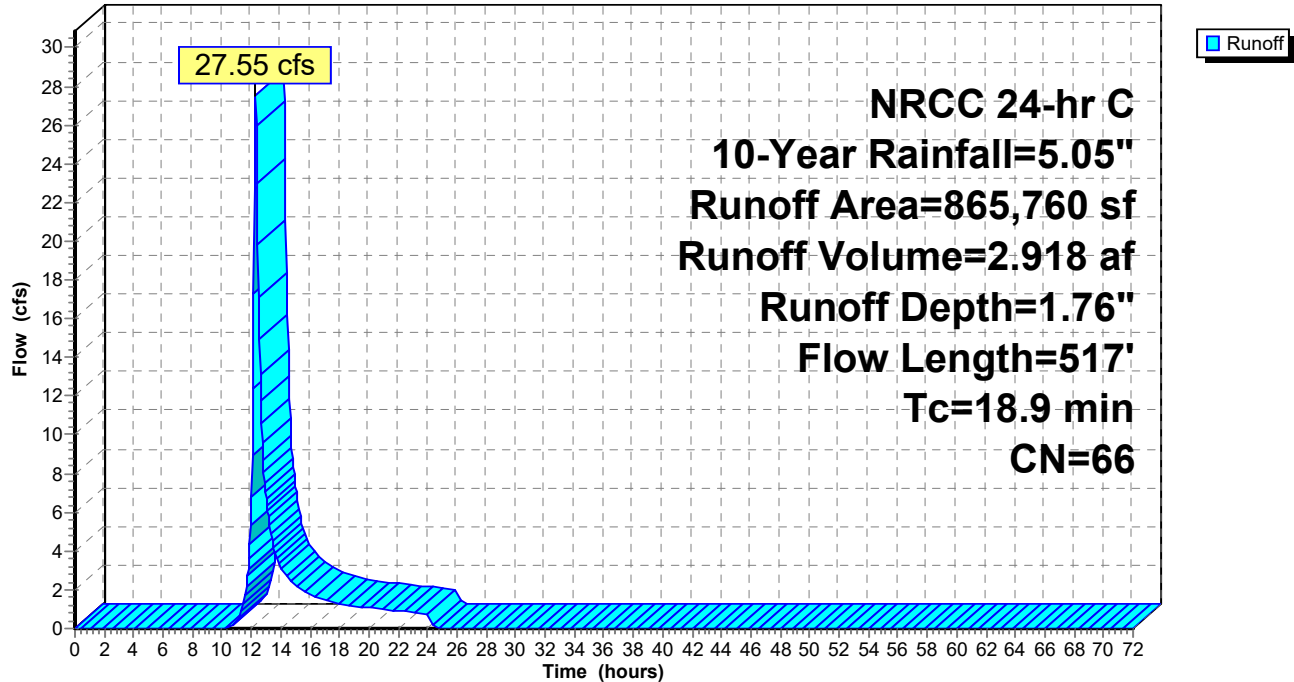
NRCC 24-hr C 10-Year Rainfall=5.05"

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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"

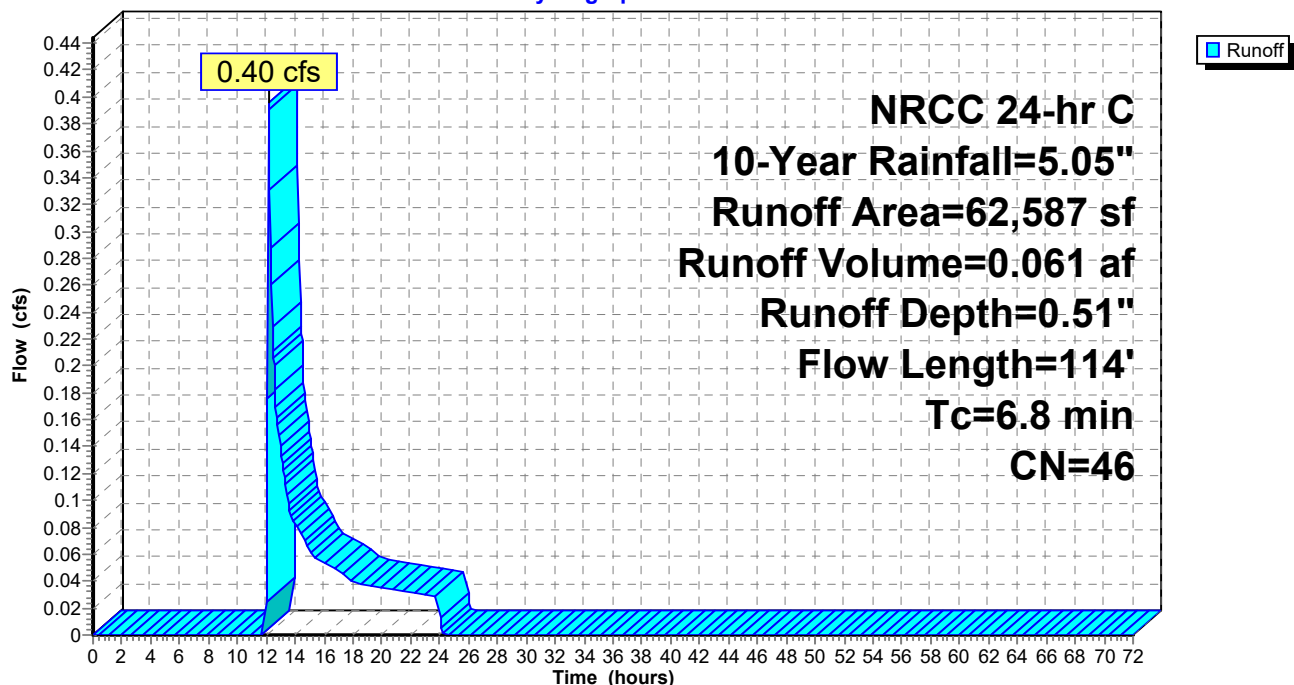
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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"

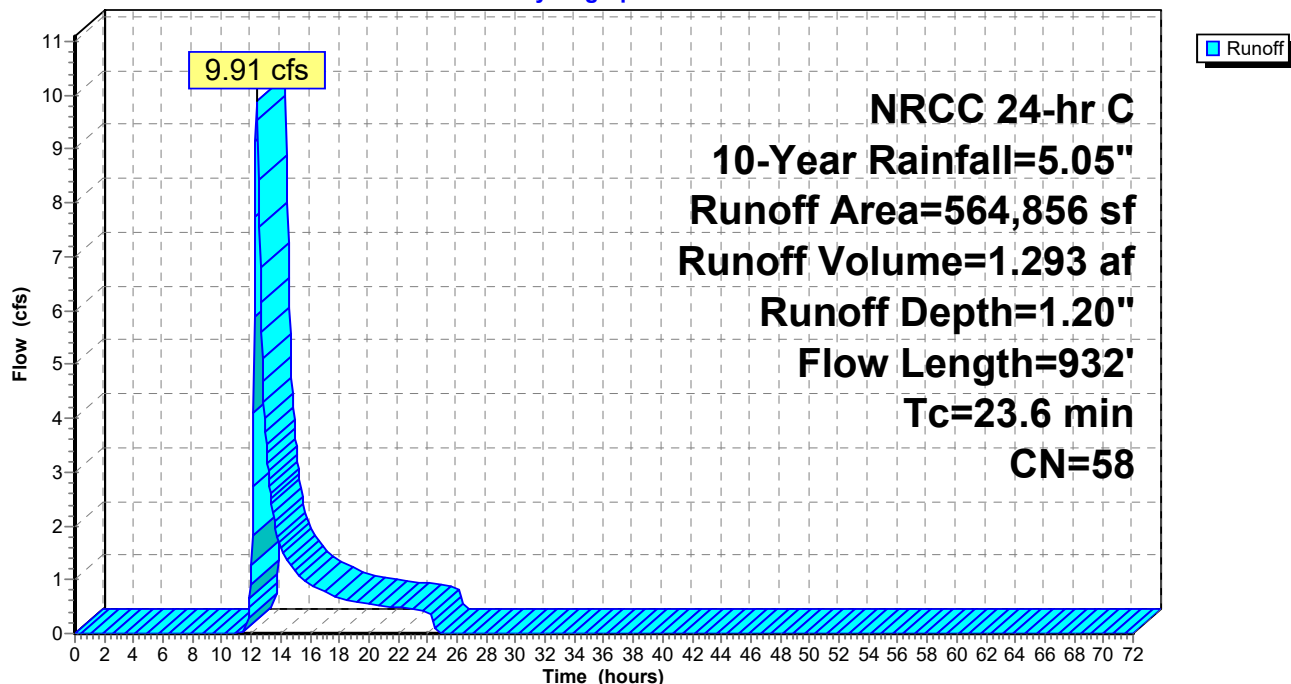
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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



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Summary for Subcatchment E-6:

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

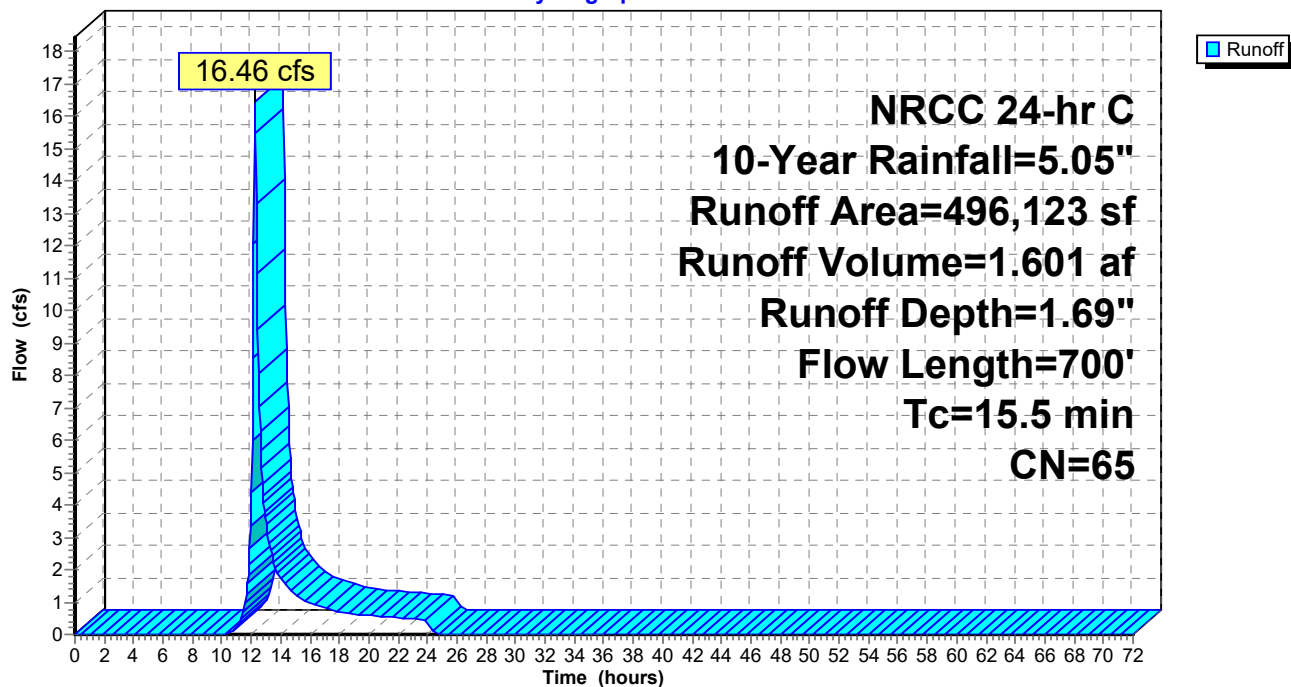
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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"

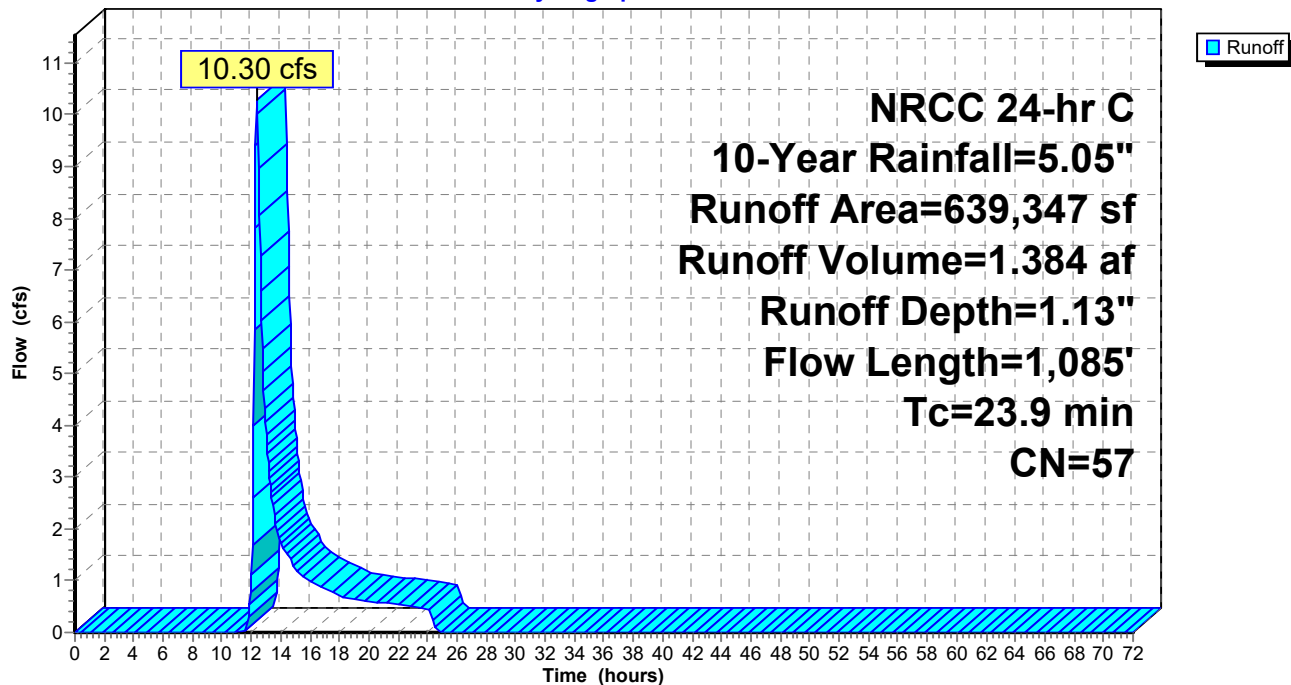
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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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Summary for Subcatchment E-8:

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

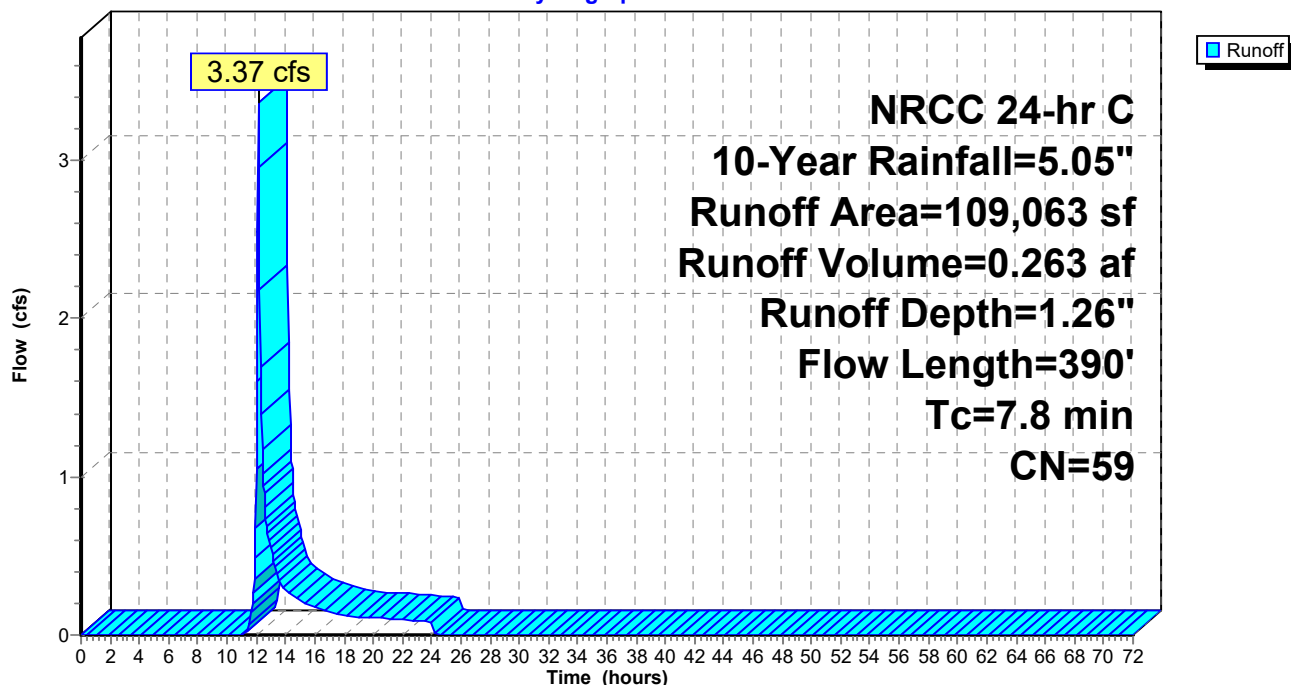
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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



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Summary for Subcatchment E-9:

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

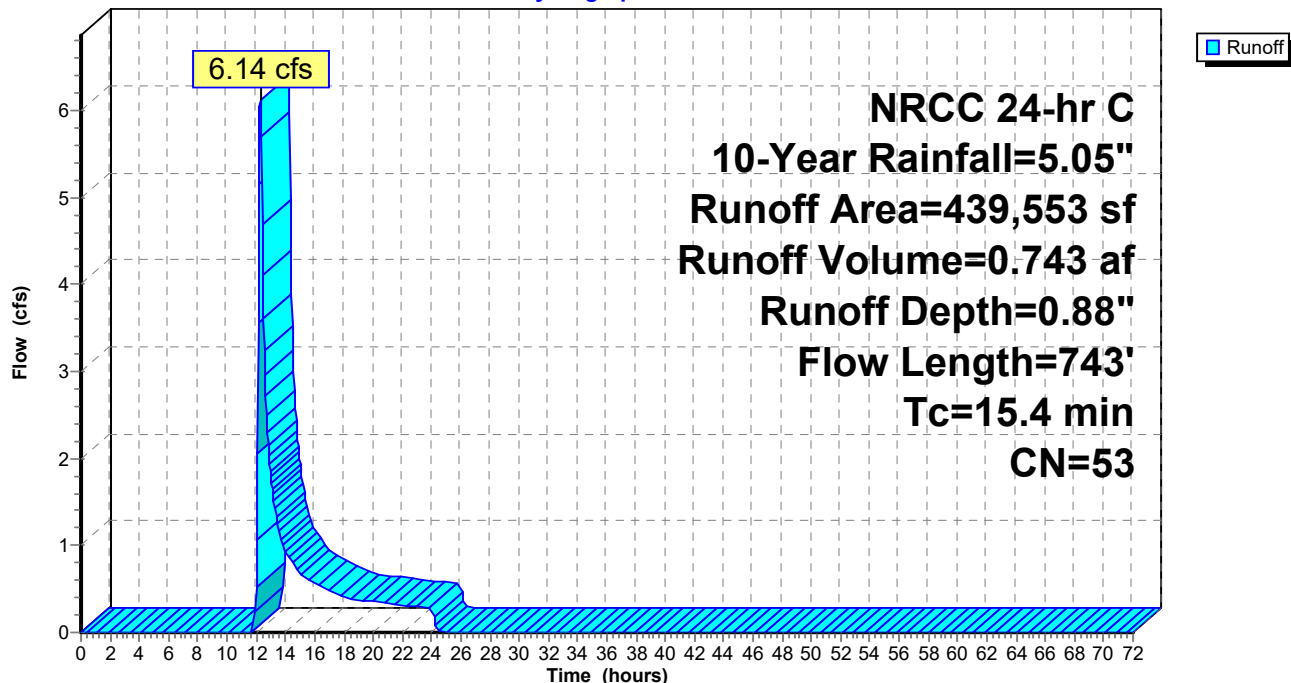
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=5.05"

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



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Summary for Reach DP-1: Wetland Series R

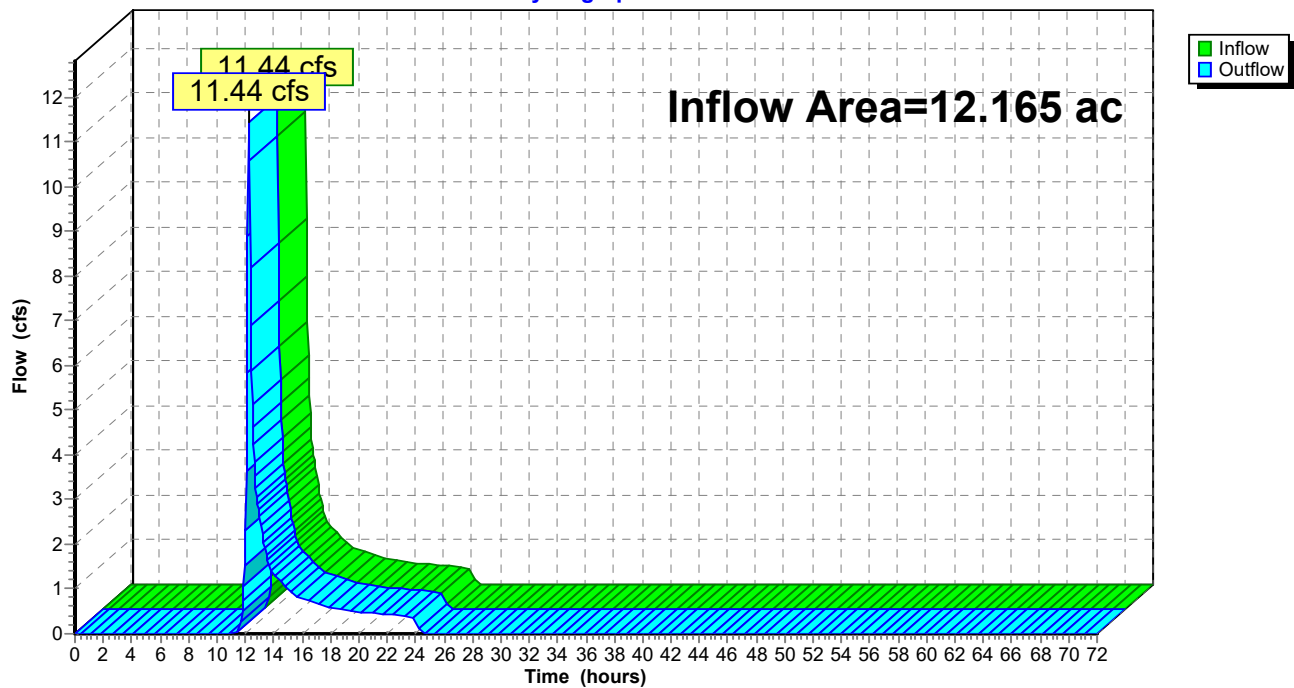
[40] Hint: Not Described (Outflow=Inflow)

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



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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

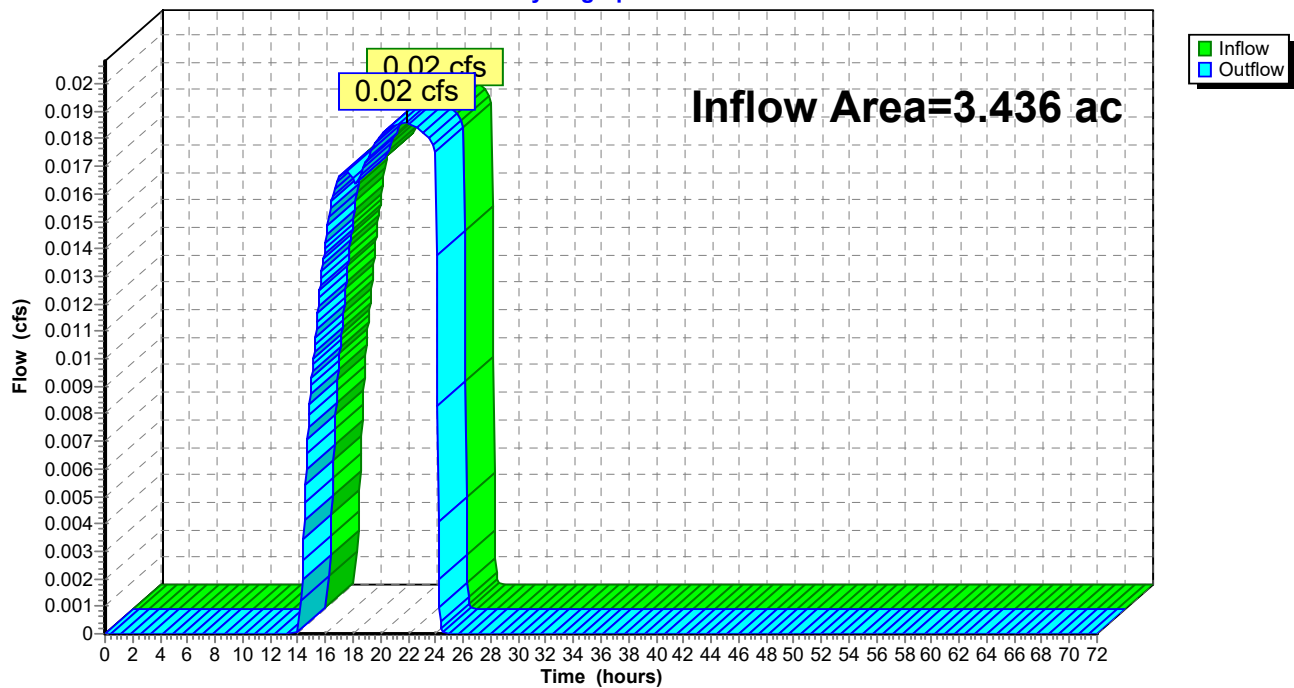
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.436 ac, 3.33% Impervious, Inflow Depth = 0.05" for 10-Year event
Inflow = 0.02 cfs @ 21.90 hrs, Volume= 0.013 af
Outflow = 0.02 cfs @ 21.90 hrs, Volume= 0.013 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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NRCC 24-hr C 10-Year Rainfall=5.05"

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Summary for Reach DP-11: Wetland Series A

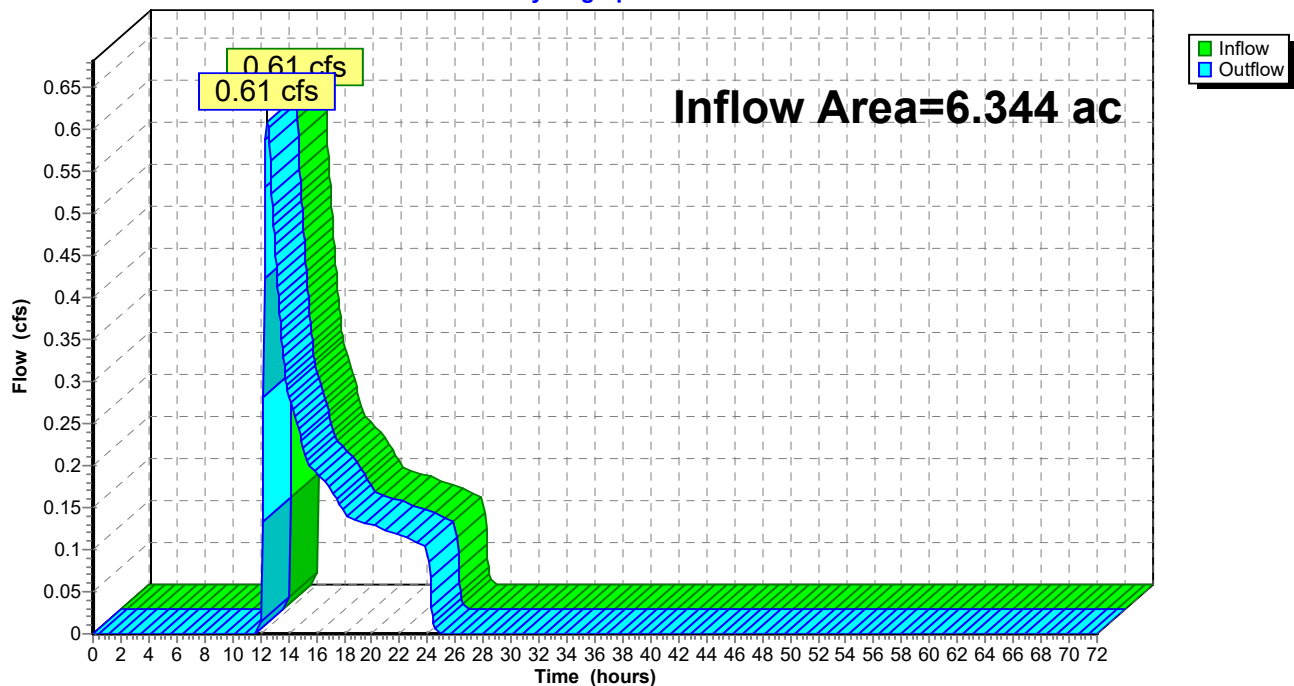
[40] Hint: Not Described (Outflow=Inflow)

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



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Summary for Reach DP-12: Wetland Series A

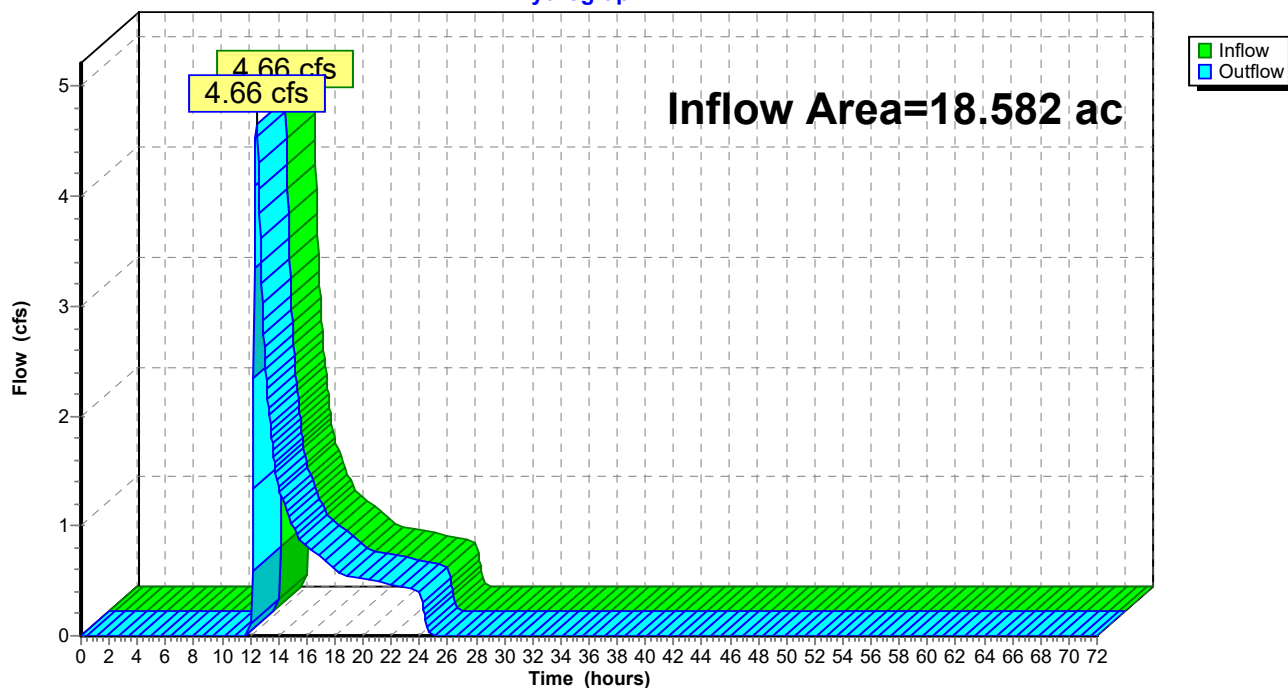
[40] Hint: Not Described (Outflow=Inflow)

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



Existing Hydrology

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

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Summary for Reach DP-13: Wetland Series B

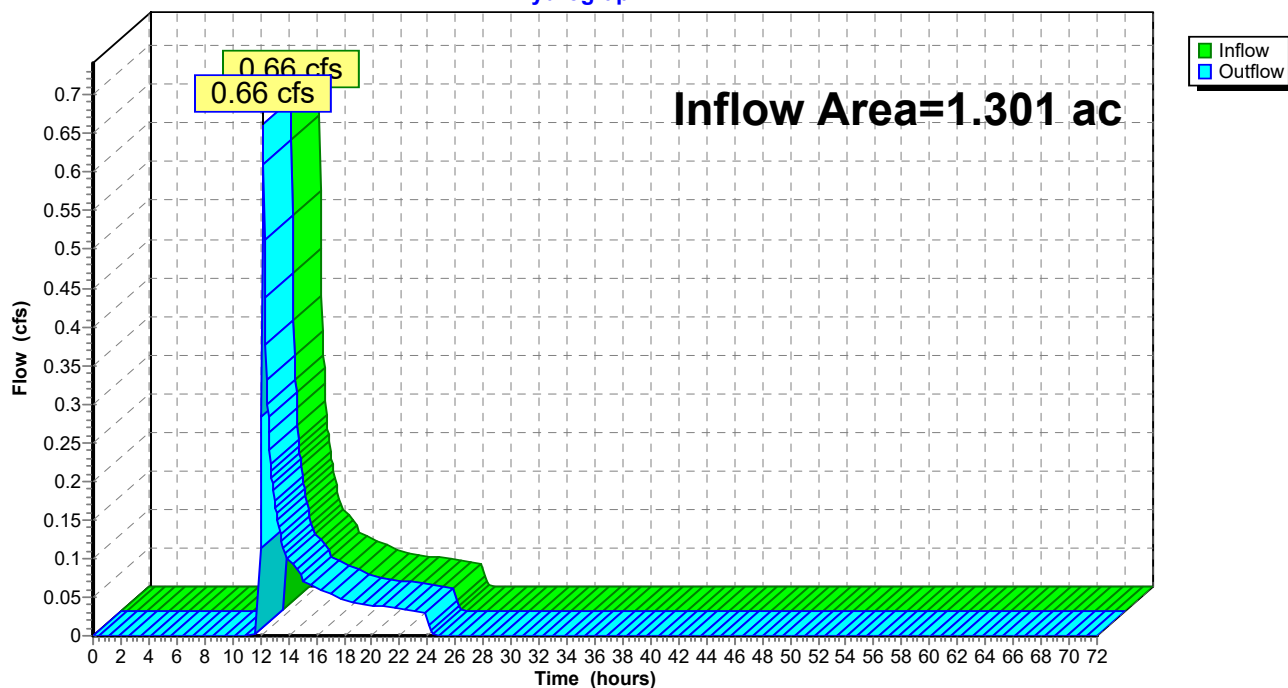
[40] Hint: Not Described (Outflow=Inflow)

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

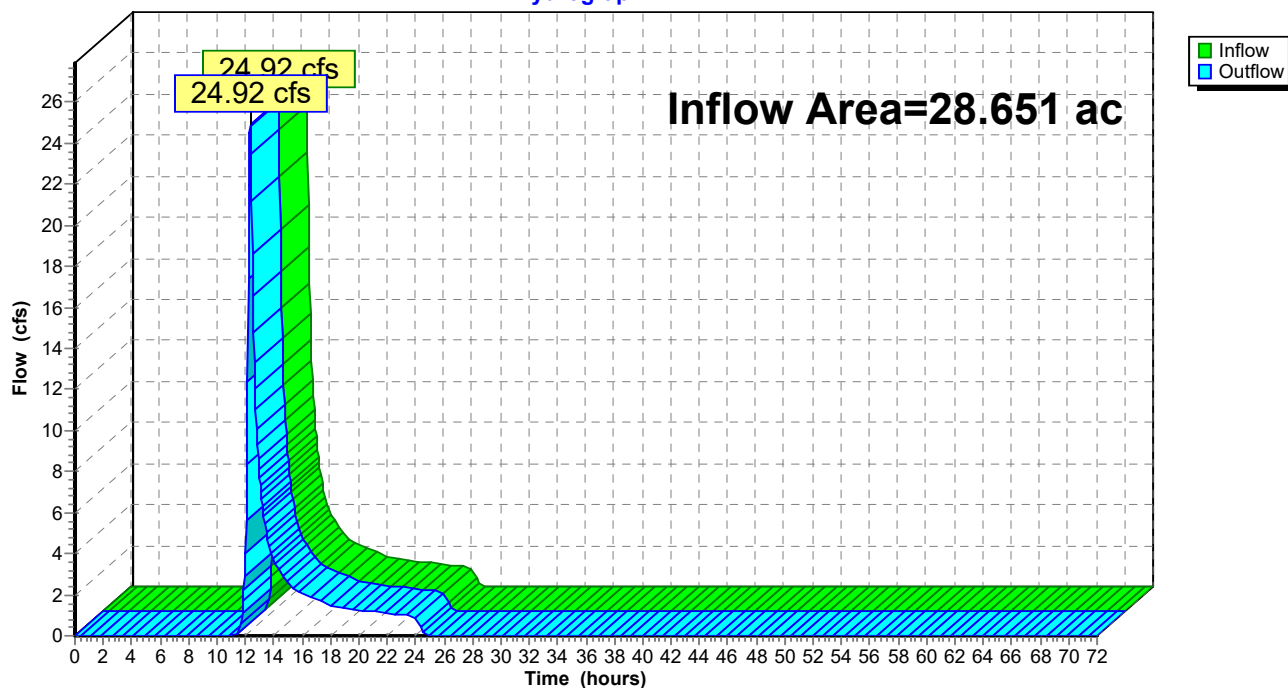
[40] Hint: Not Described (Outflow=Inflow)

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

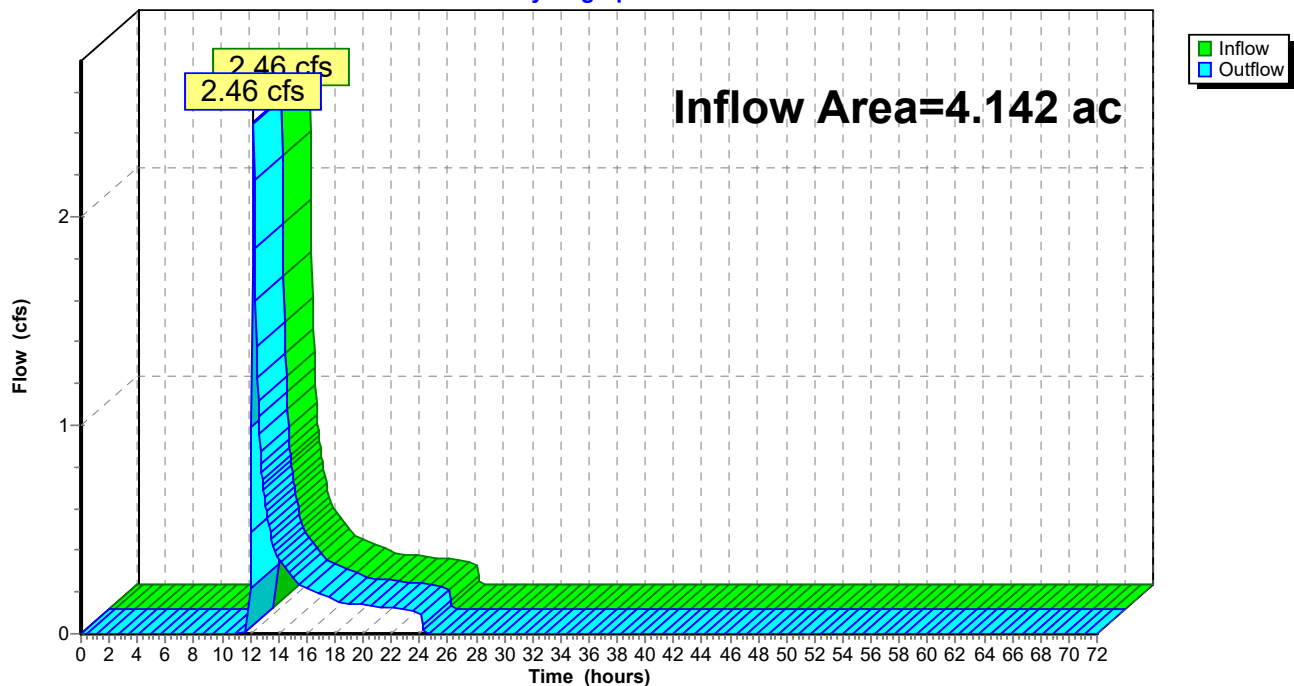
[40] Hint: Not Described (Outflow=Inflow)

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

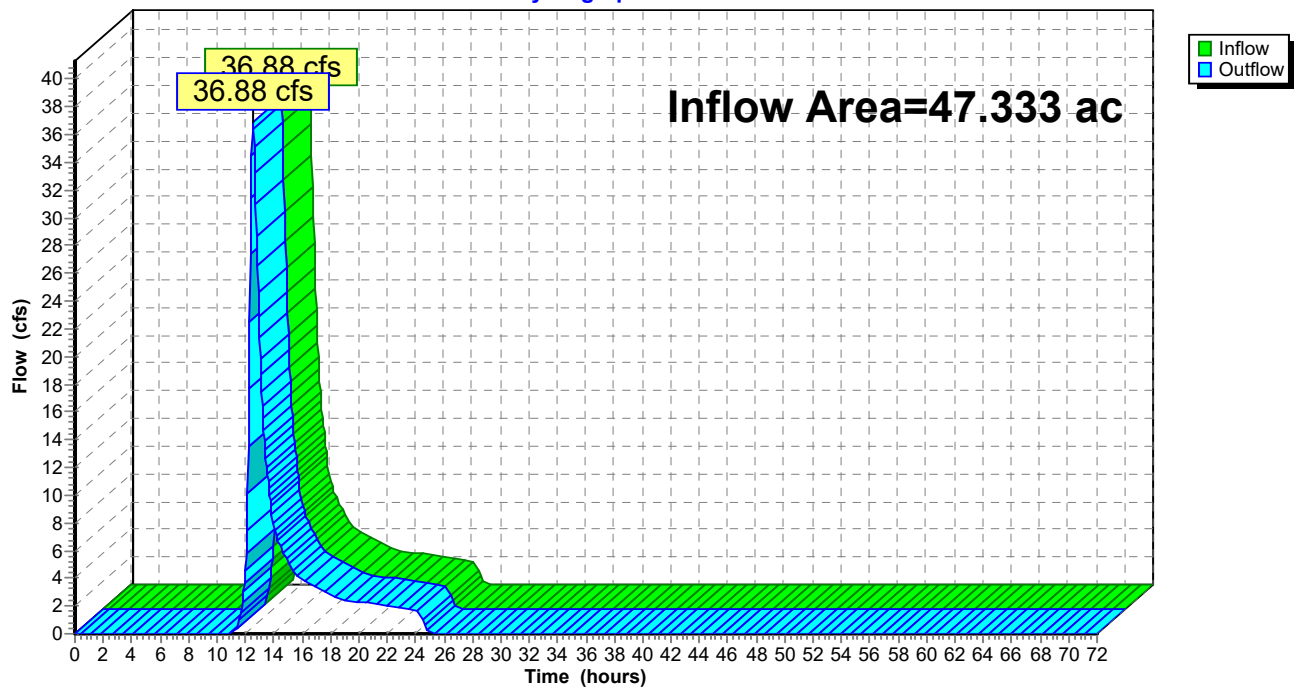
[40] Hint: Not Described (Outflow=Inflow)

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



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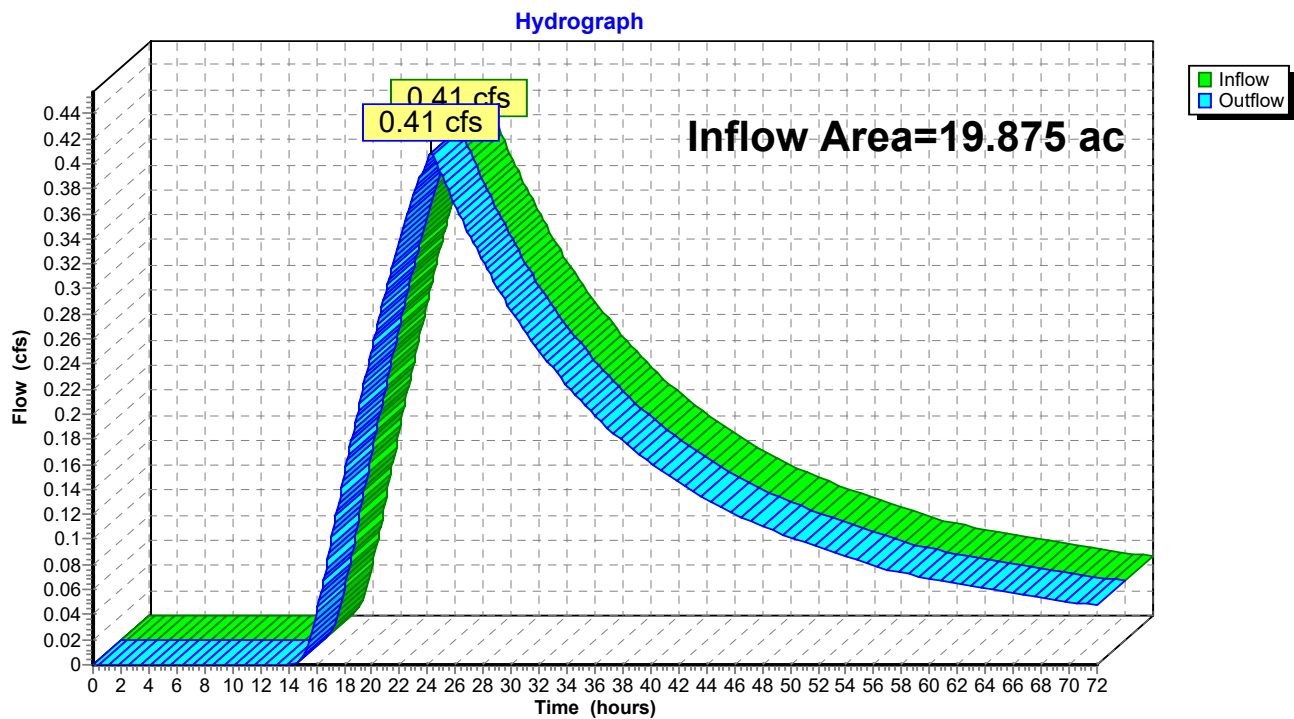
Summary for Reach DP-3: 8" Copper Pipe

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

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth > 0.45" for 10-Year event
Inflow = 0.41 cfs @ 24.26 hrs, Volume= 0.742 af
Outflow = 0.41 cfs @ 24.26 hrs, Volume= 0.742 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: 8" Copper Pipe



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Summary for Reach DP-4: Dwelley Street

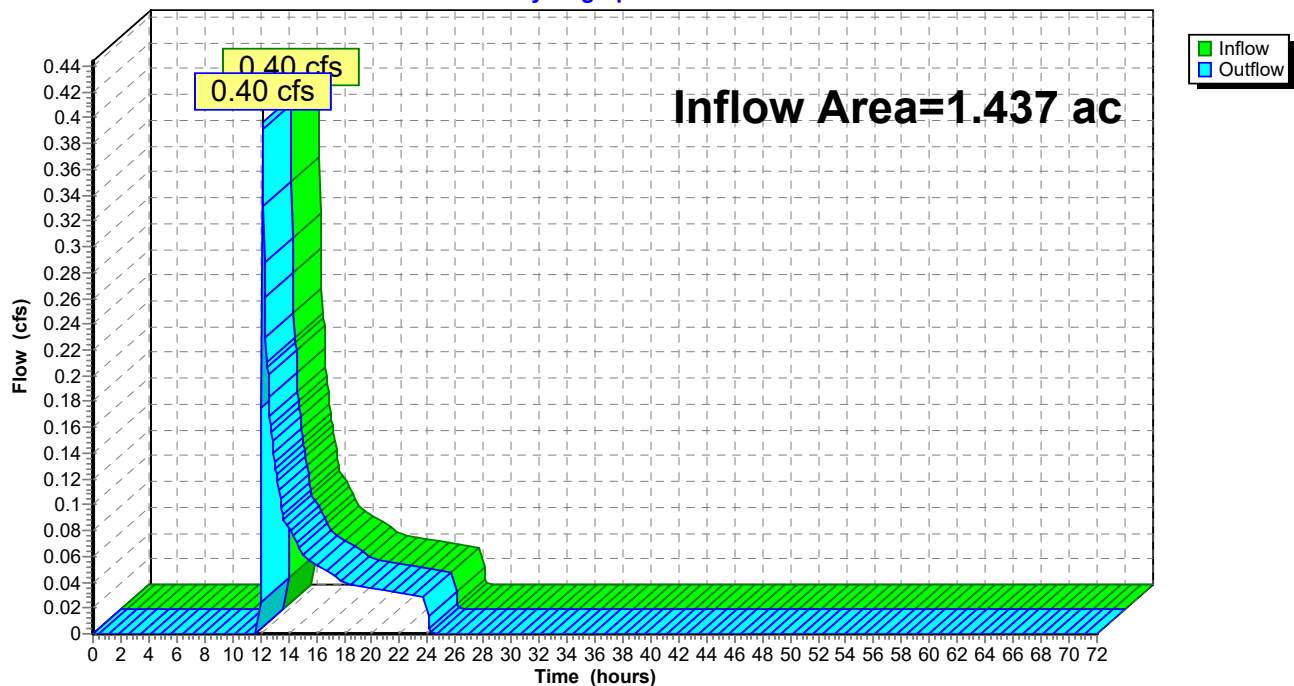
[40] Hint: Not Described (Outflow=Inflow)

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



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Summary for Reach DP-5: 24" RCP PIPE

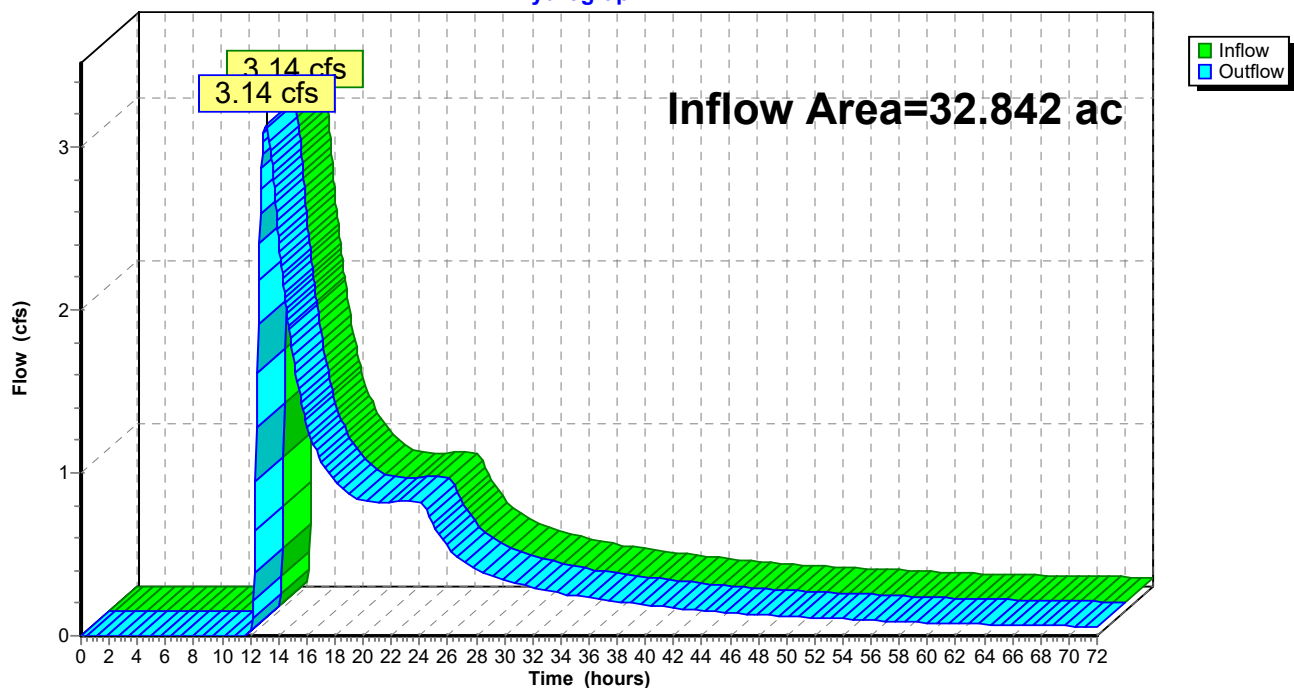
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 0.73" for 10-Year event
Inflow = 3.14 cfs @ 13.11 hrs, Volume= 1.988 af
Outflow = 3.14 cfs @ 13.11 hrs, Volume= 1.988 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: 24" RCP PIPE

Hydrograph



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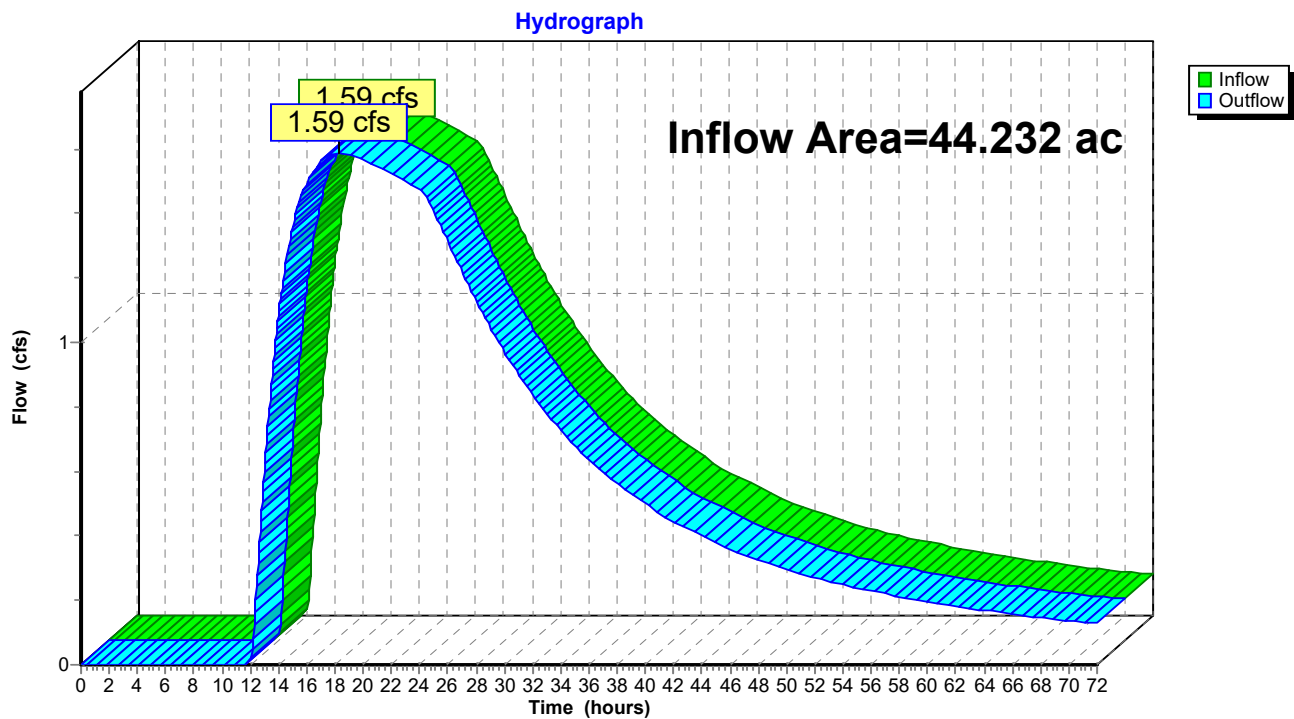
Summary for Reach DP-6: 12" RCP PIPE

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

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 0.87" for 10-Year event
Inflow = 1.59 cfs @ 18.22 hrs, Volume= 3.196 af
Outflow = 1.59 cfs @ 18.22 hrs, Volume= 3.196 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: 12" RCP PIPE



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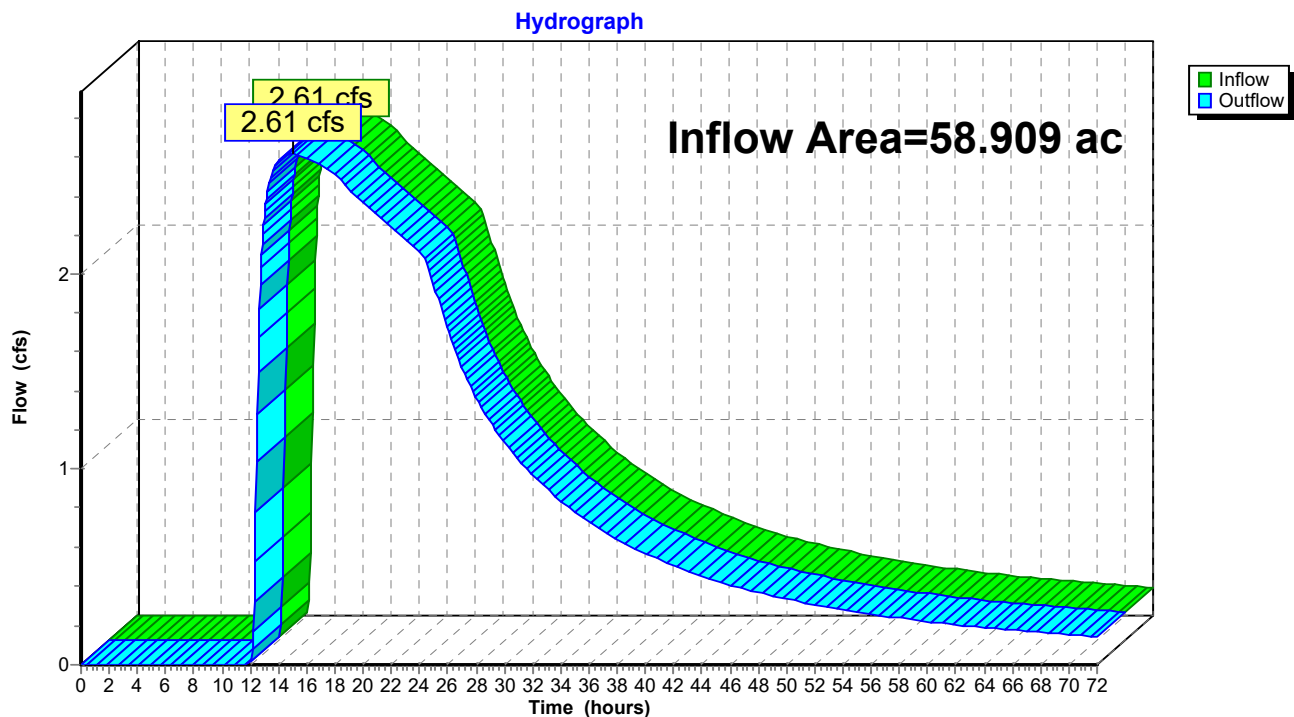
Summary for Reach DP-7: 12" RCP PIPE

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

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 0.92" for 10-Year event
Inflow = 2.61 cfs @ 15.00 hrs, Volume= 4.500 af
Outflow = 2.61 cfs @ 15.00 hrs, Volume= 4.500 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: 12" RCP PIPE



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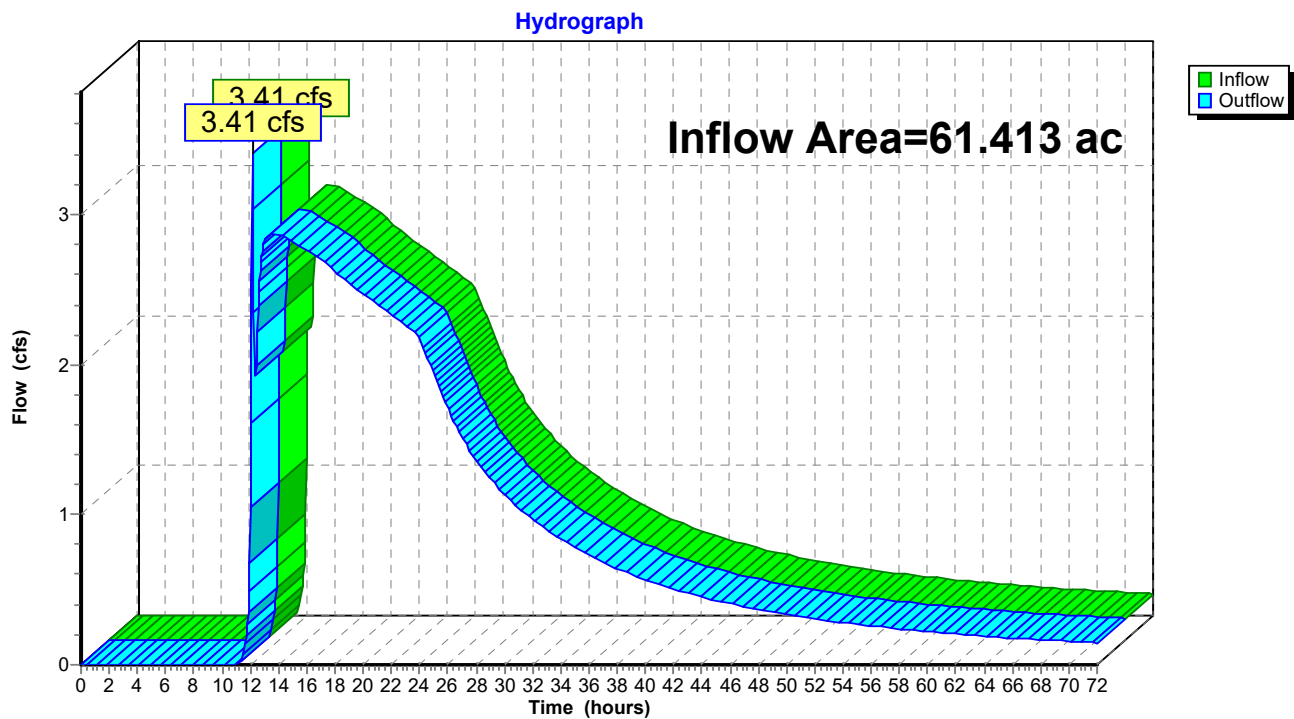
Summary for Reach DP-8: Wetlands Series X

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

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 0.93" for 10-Year event
Inflow = 3.41 cfs @ 12.16 hrs, Volume= 4.763 af
Outflow = 3.41 cfs @ 12.16 hrs, Volume= 4.763 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

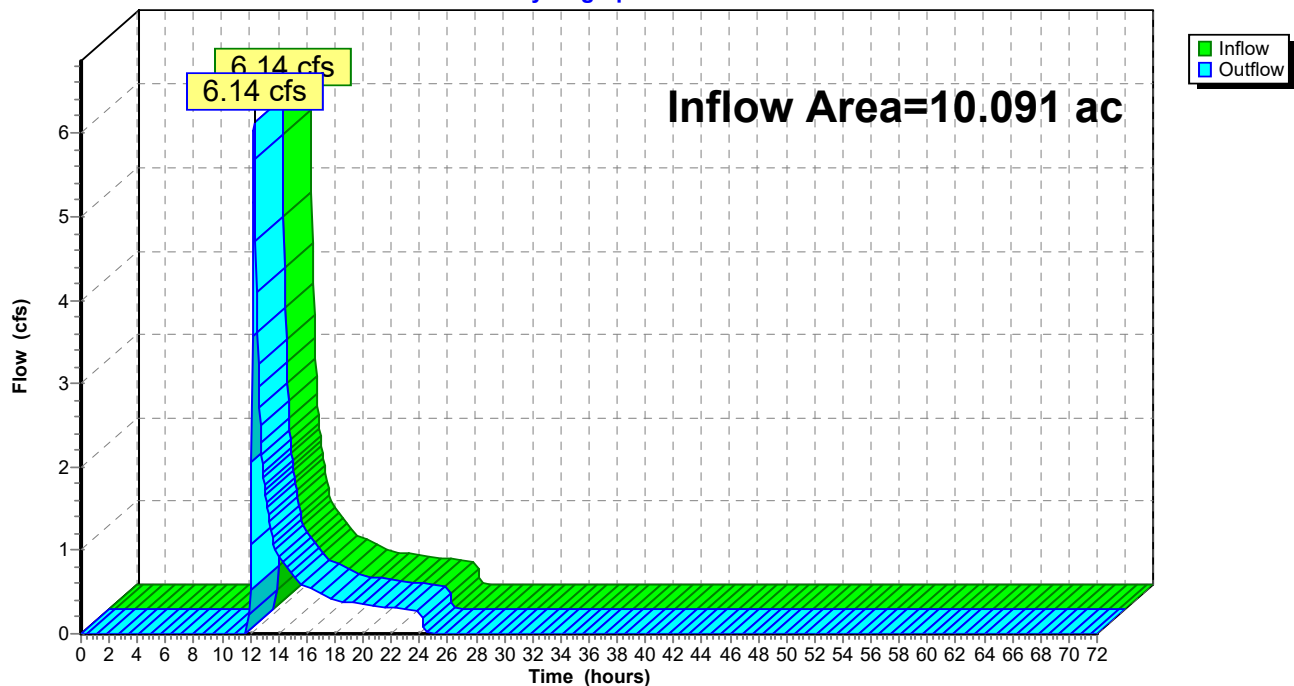
[40] Hint: Not Described (Outflow=Inflow)

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

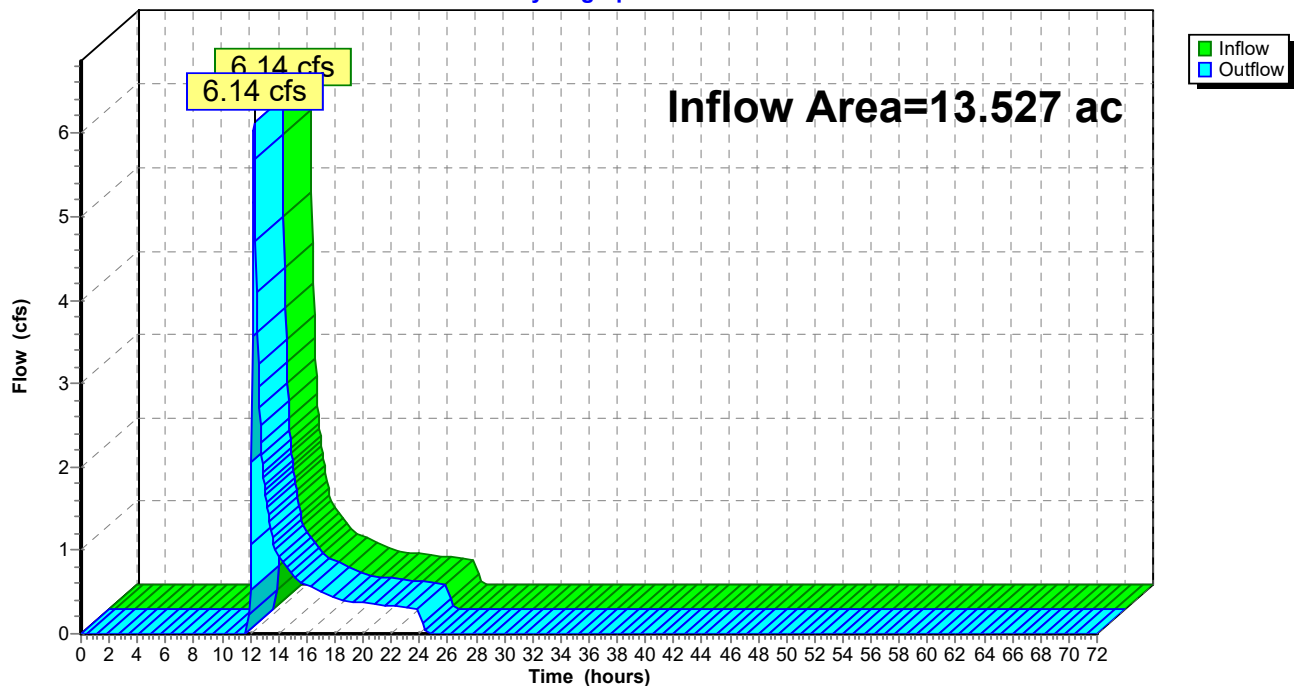
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.527 ac, 24.64% Impervious, Inflow Depth = 0.67" for 10-Year event
Inflow = 6.14 cfs @ 12.27 hrs, Volume= 0.756 af
Outflow = 6.14 cfs @ 12.27 hrs, Volume= 0.756 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



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Summary for Reach DP-WA: Wetland Series A

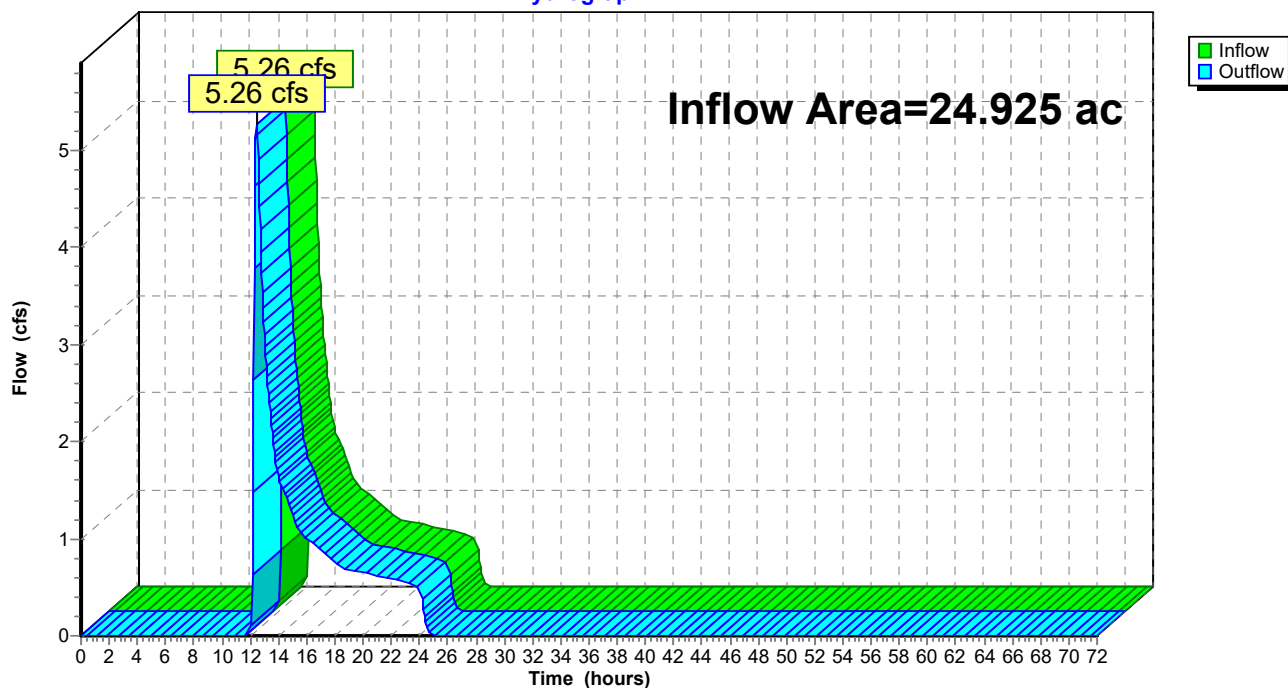
[40] Hint: Not Described (Outflow=Inflow)

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



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

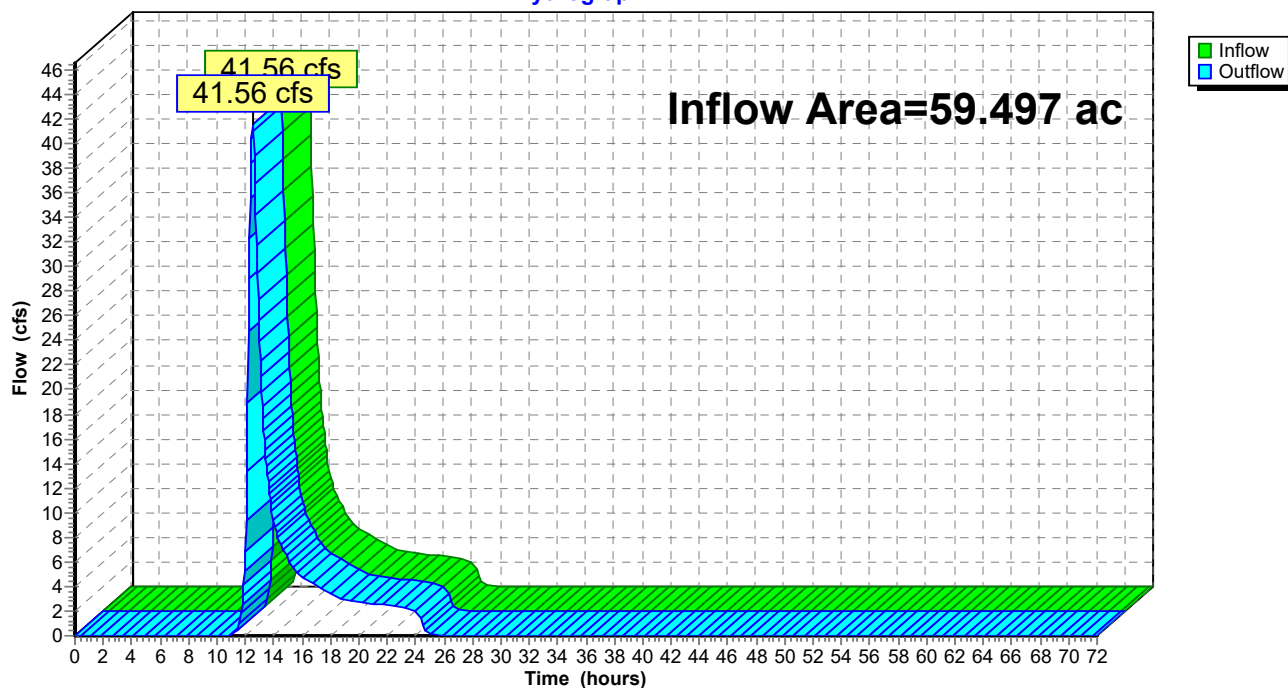
[40] Hint: Not Described (Outflow=Inflow)

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 W-N: Wetland Series N

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 0.74" for 10-Year event
 Inflow = 9.91 cfs @ 12.37 hrs, Volume= 2.034 af
 Outflow = 3.14 cfs @ 13.11 hrs, Volume= 1.988 af, Atten= 68%, Lag= 44.3 min
 Primary = 3.14 cfs @ 13.11 hrs, Volume= 1.988 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 86.16' @ 13.11 hrs Surf.Area= 26,241 sf Storage= 16,640 cf

Plug-Flow detention time= 190.1 min calculated for 1.988 af (98% of inflow)
 Center-of-Mass det. time= 128.7 min (1,484.7 - 1,356.0)

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	85.50'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 85.50' / 83.90' S= 0.0346 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=3.14 cfs @ 13.11 hrs HW=86.16' (Free Discharge)

↑1=RCP_Round 24" (Inlet Controls 3.14 cfs @ 3.46 fps)

Existing Hydrology

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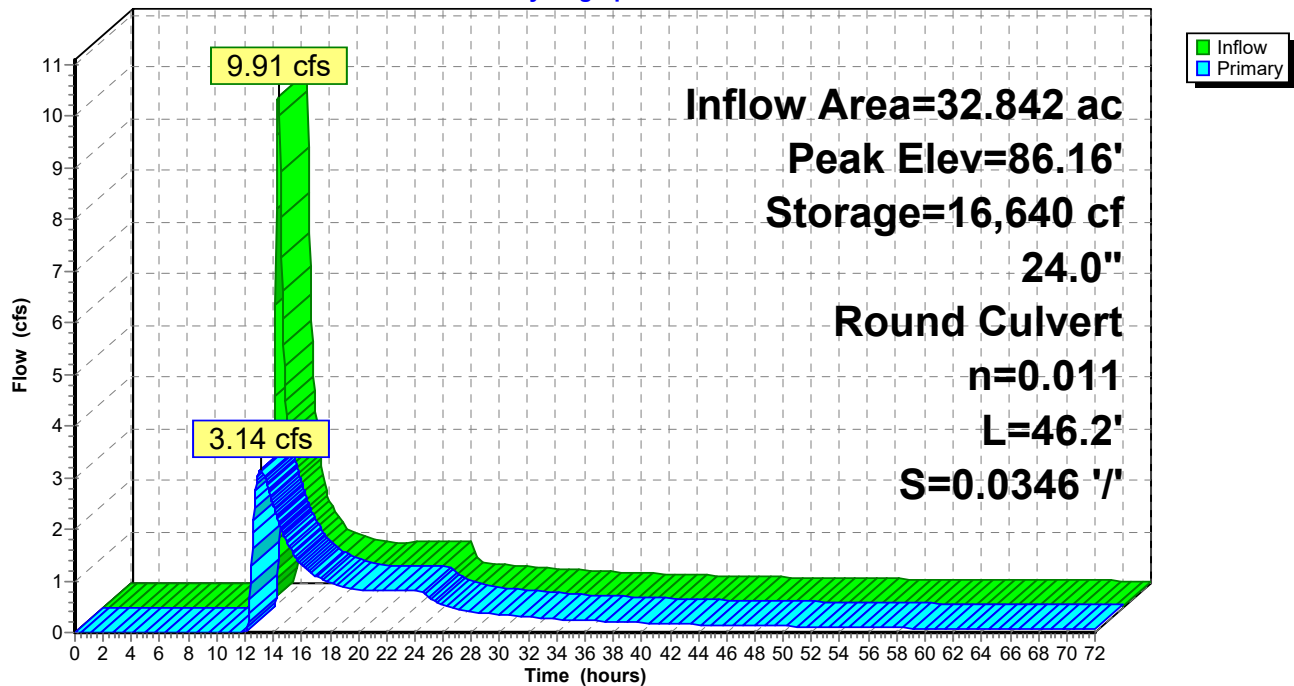
NRCC 24-hr C 10-Year Rainfall=5.05"

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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 > 0.93" for 10-Year event
 Inflow = 10.49 cfs @ 12.38 hrs, Volume= 4.580 af
 Outflow = 2.61 cfs @ 15.00 hrs, Volume= 4.500 af, Atten= 75%, Lag= 157.0 min
 Primary = 2.61 cfs @ 15.00 hrs, Volume= 4.500 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.95' @ 15.00 hrs Surf.Area= 20,652 sf Storage= 23,403 cf

Plug-Flow detention time= 172.4 min calculated for 4.497 af (98% of inflow)
 Center-of-Mass det. time= 127.0 min (1,668.5 - 1,541.5)

Volume	Invert	Avail.Storage	Storage Description	
#1	78.68'	102,529 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)
78.68	16,400	0	0	16,400
80.00	20,844	24,523	24,523	20,889
81.00	37,500	28,767	53,290	37,556
82.00	62,000	49,239	102,529	62,069

Device	Routing	Invert	Outlet Devices
#1	Primary	78.68'	12.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 78.68' / 75.00' S= 0.0214 ' S= 0.0214 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.61 cfs @ 15.00 hrs HW=79.95' (Free Discharge)

1=Culvert (Inlet Controls 2.61 cfs @ 3.33 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

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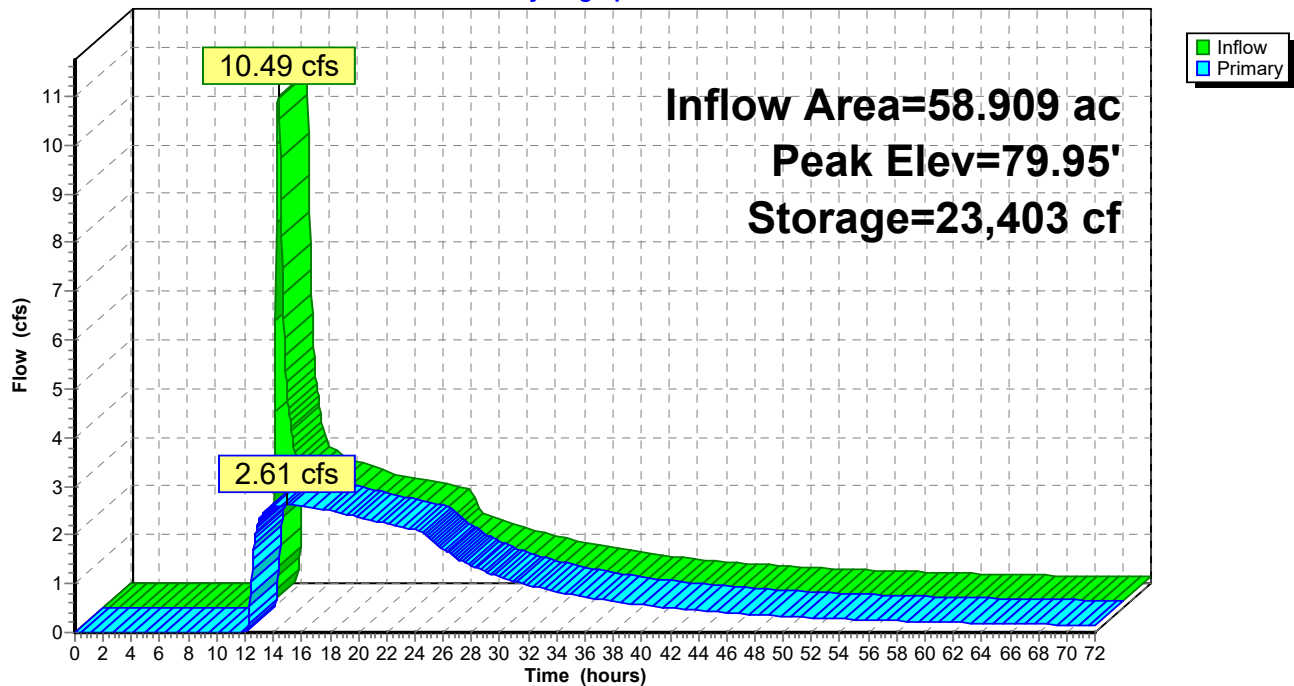
NRCC 24-hr C 10-Year Rainfall=5.05"

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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 > 0.97" for 10-Year event
 Inflow = 16.69 cfs @ 12.26 hrs, Volume= 3.589 af
 Outflow = 1.59 cfs @ 18.22 hrs, Volume= 3.196 af, Atten= 90%, Lag= 357.8 min
 Primary = 1.59 cfs @ 18.22 hrs, Volume= 3.196 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.52' @ 18.22 hrs Surf.Area= 86,574 sf Storage= 69,182 cf

Plug-Flow detention time= 798.5 min calculated for 3.194 af (89% of inflow)
 Center-of-Mass det. time= 596.5 min (1,812.3 - 1,215.8)

Volume	Invert	Avail.Storage	Storage Description
#1	78.70'	402,154 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)
78.70	82,500	0	0	82,500
83.00	105,000	402,154	402,154	105,477

Device	Routing	Invert	Outlet Devices
#1	Primary	78.70'	12.0" Round Culvert L= 20.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 78.70' / 78.30' S= 0.0194 ' S= 0.0194 ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=1.59 cfs @ 18.22 hrs HW=79.52' (Free Discharge)

↑**1=Culvert** (Barrel Controls 1.59 cfs @ 3.14 fps)

Existing Hydrology

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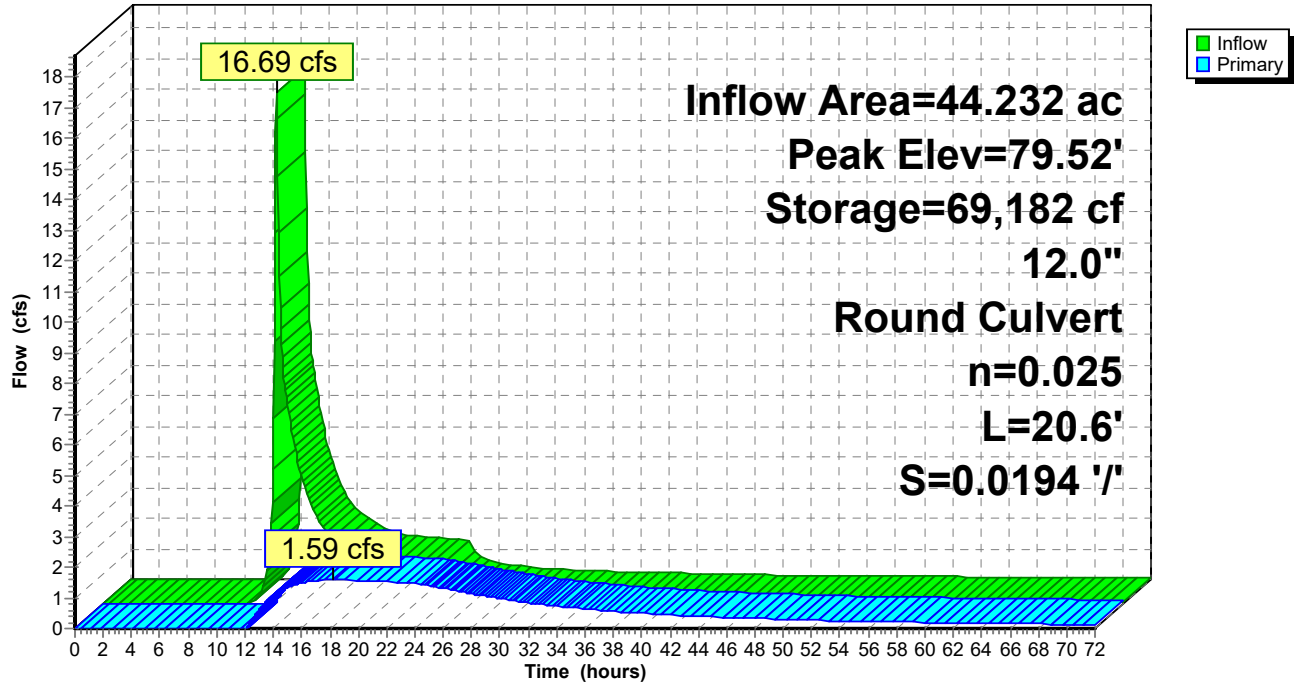
NRCC 24-hr C 10-Year Rainfall=5.05"

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Pond W-QP: Wetland Series Q & P

Hydrograph



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

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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 = 0.41 cfs @ 24.26 hrs, Volume= 0.742 af, Atten= 99%, Lag= 718.1 min
 Primary = 0.41 cfs @ 24.26 hrs, Volume= 0.742 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 87.73' @ 24.26 hrs Surf.Area= 84,908 sf Storage= 119,492 cf

Plug-Flow detention time= 1,404.4 min calculated for 0.742 af (25% of inflow)
 Center-of-Mass det. time= 1,247.7 min (2,129.8 - 882.1)

Volume	Invert	Avail.Storage	Storage Description
#1	86.27'	521,661 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)
86.27	78,906	0	0	78,906
92.00	103,740	521,661	521,661	104,484

Device	Routing	Invert	Outlet Devices
#1	Primary	87.30'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.30' / 86.50' S= 0.0033 ' S= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.41 cfs @ 24.26 hrs HW=87.73' (Free Discharge)

↑**1=Culvert** (Barrel Controls 0.41 cfs @ 2.44 fps)

Existing Hydrology

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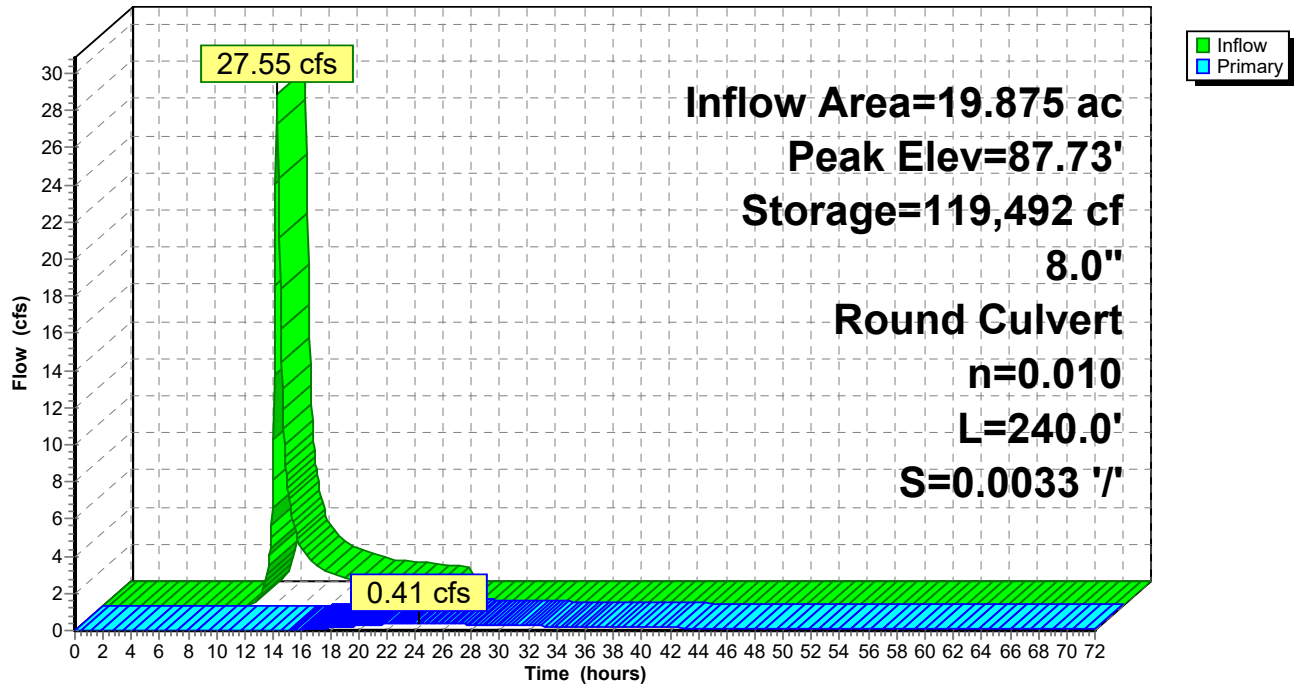
NRCC 24-hr C 10-Year Rainfall=5.05"

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Pond W-R: 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 Subcatchment E-1:

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

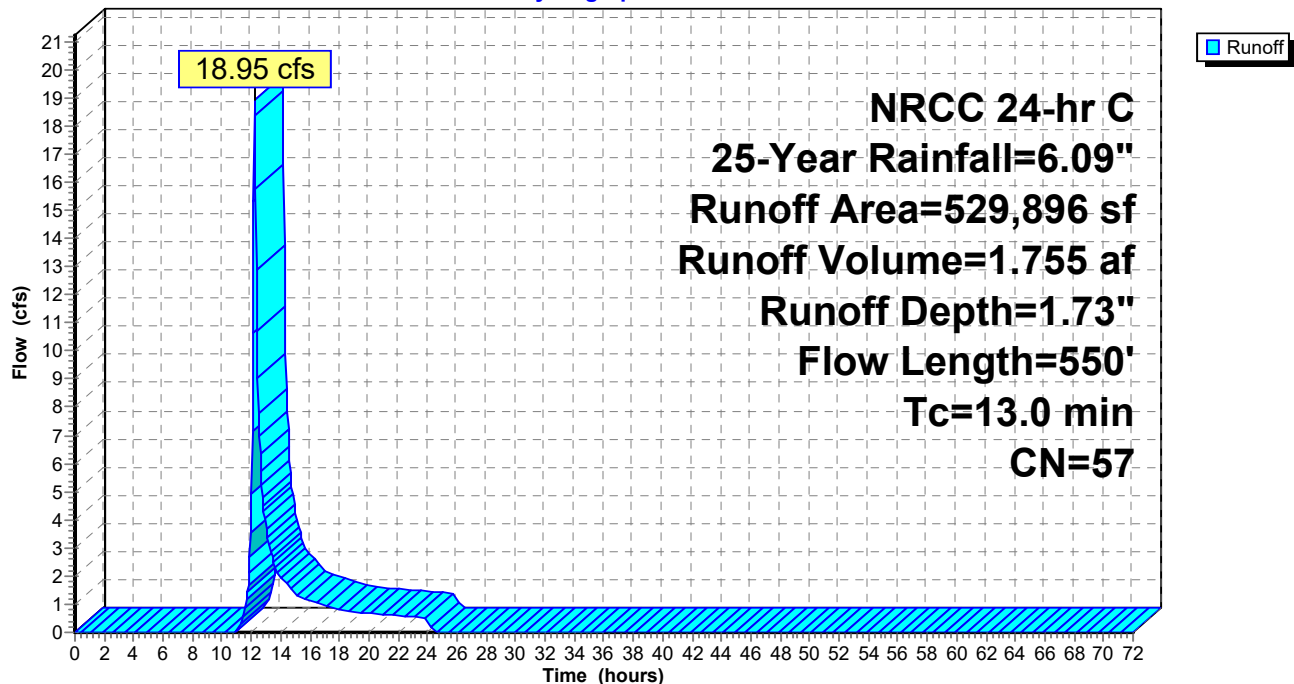
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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



Existing Hydrology

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Summary for Subcatchment E-10:

Runoff = 0.08 cfs @ 13.35 hrs, Volume= 0.053 af, Depth= 0.18"

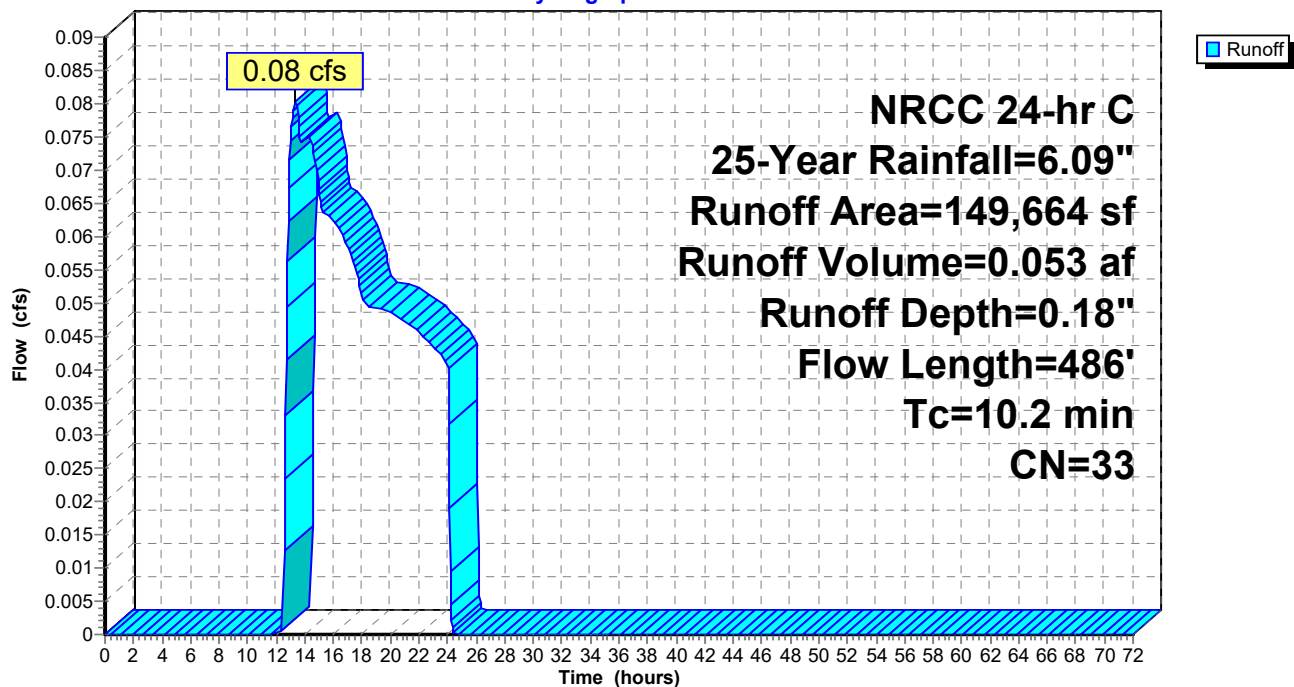
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

	Area (sf)	CN	Description
*	4,986	98	ROOF AND Paved parking, HSG A
	134,678	30	Woods, Good, HSG A
	10,000	39	>75% Grass cover, Good, HSG A
	149,664	33	Weighted Average
	144,678		96.67% Pervious Area
	4,986		3.33% 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-10:

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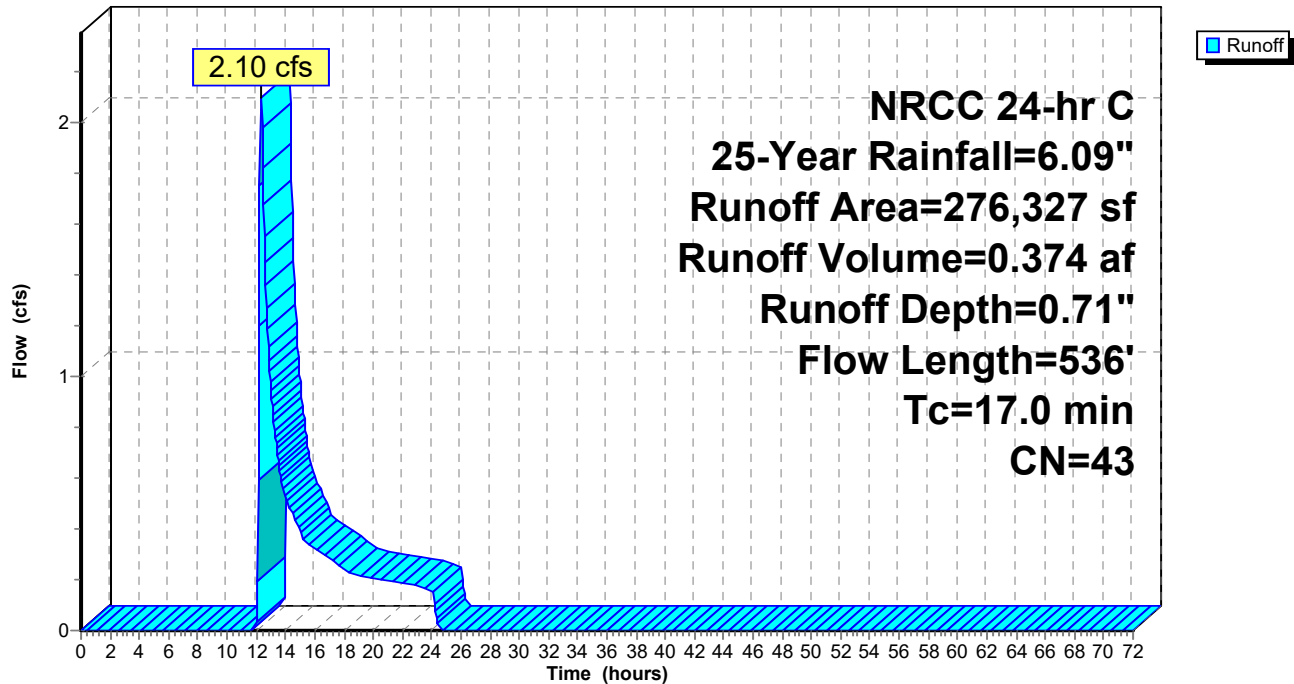
NRCC 24-hr C 25-Year Rainfall=6.09"

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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"

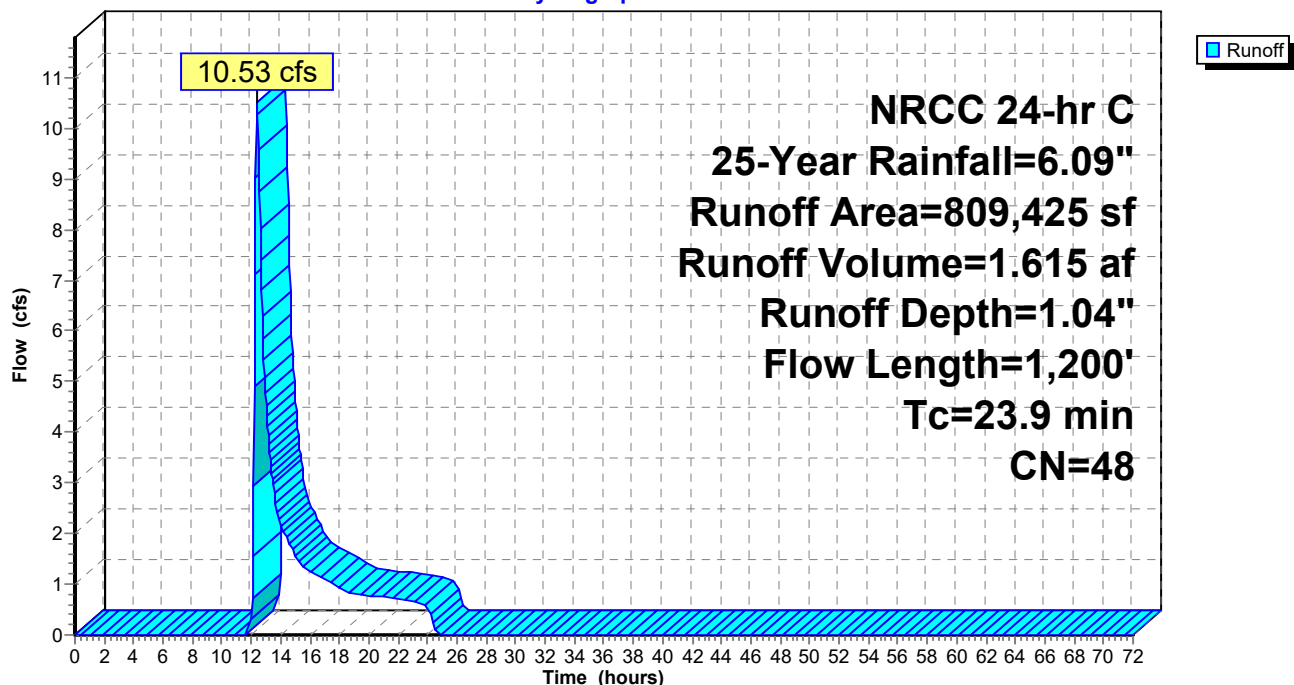
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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"

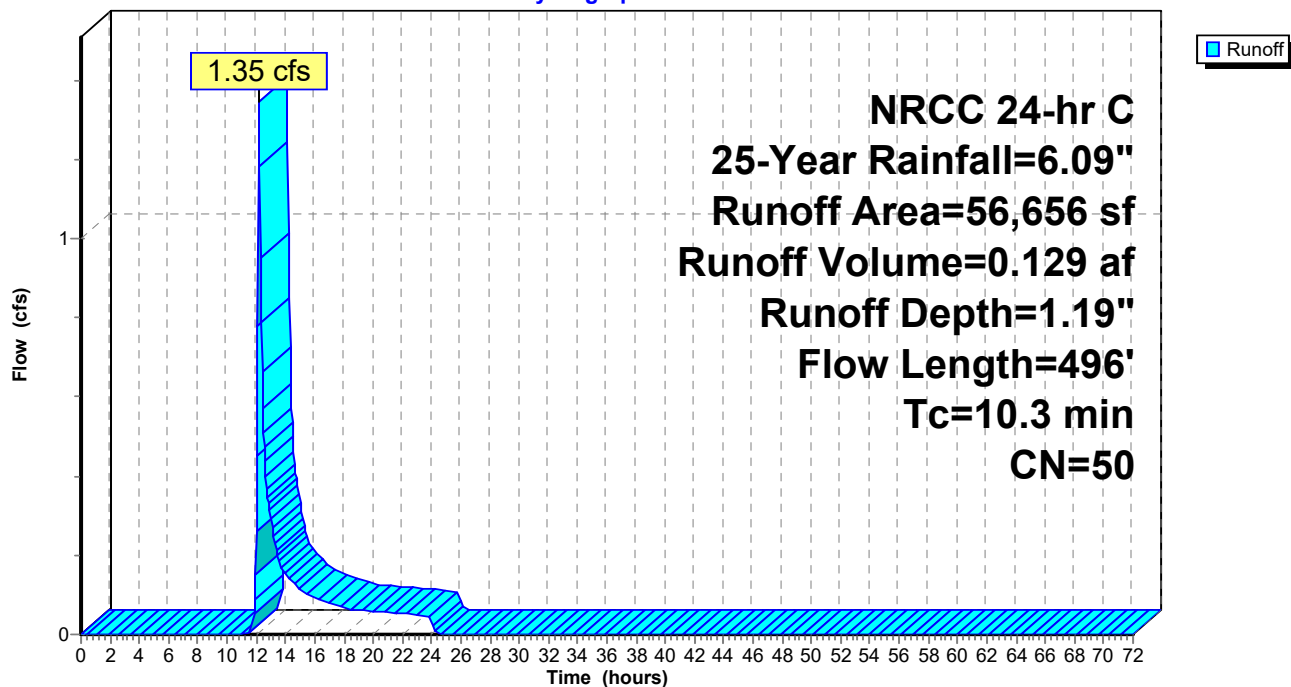
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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



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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			

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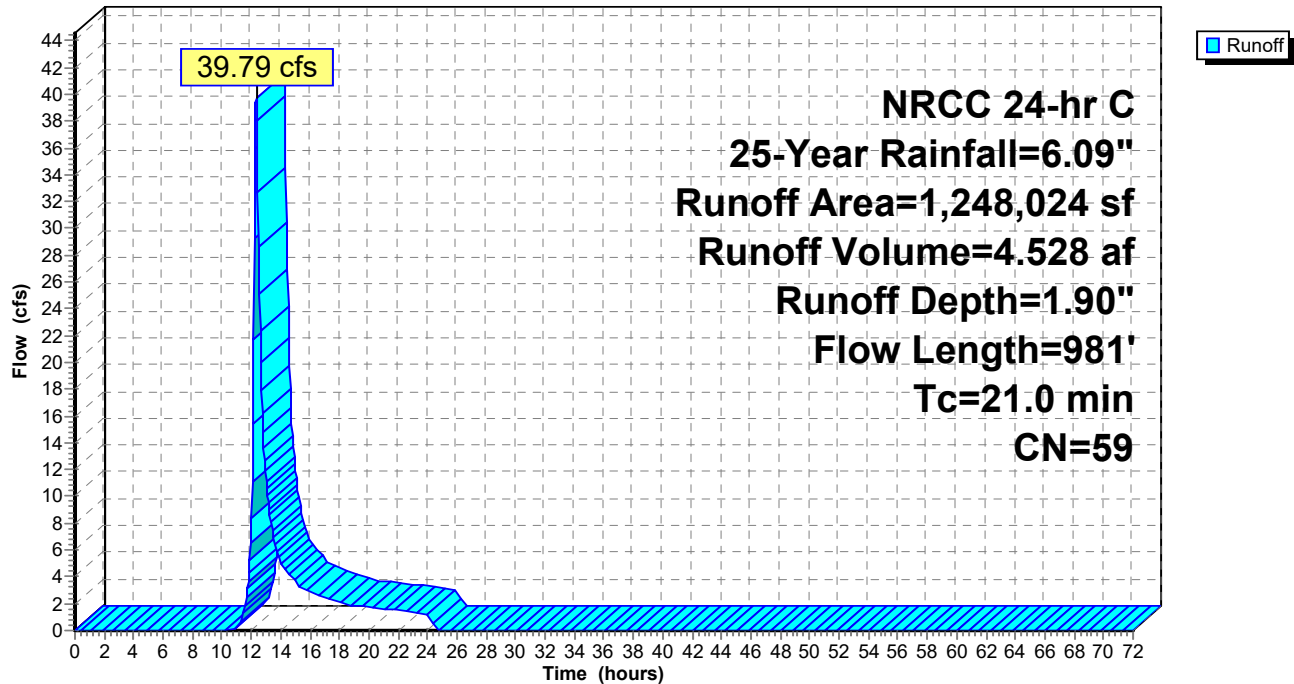
NRCC 24-hr C 25-Year Rainfall=6.09"

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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"

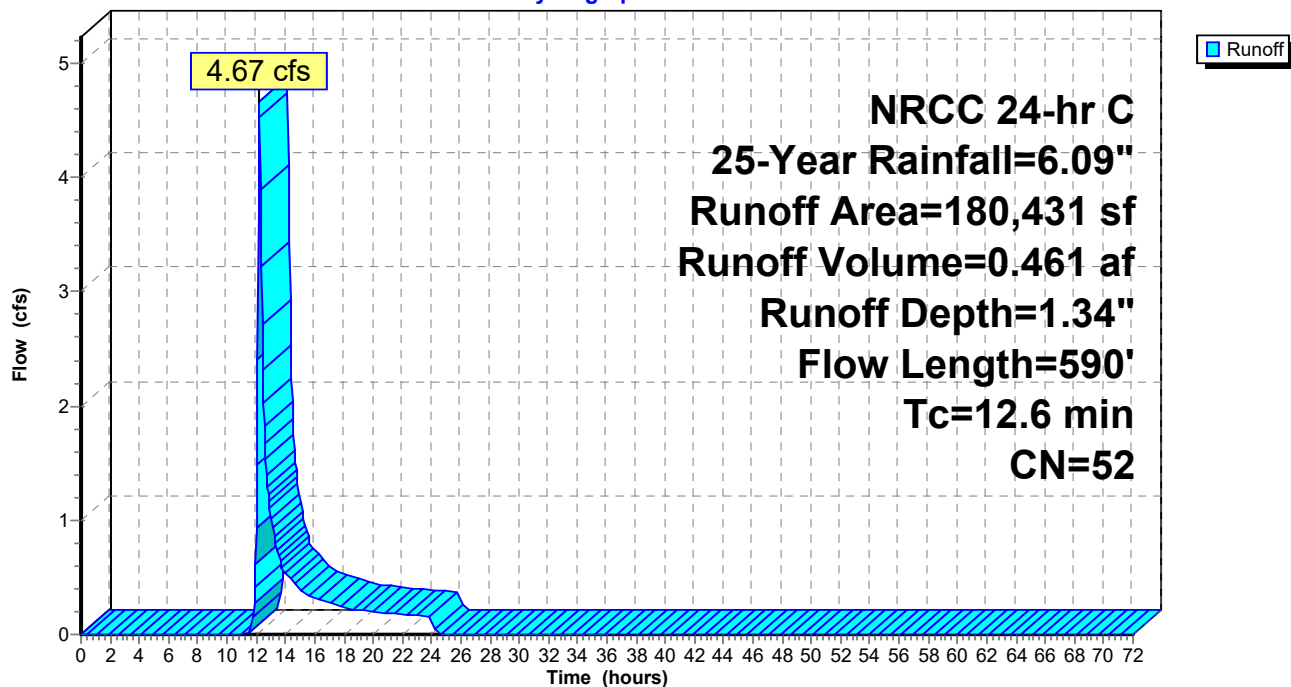
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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



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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			

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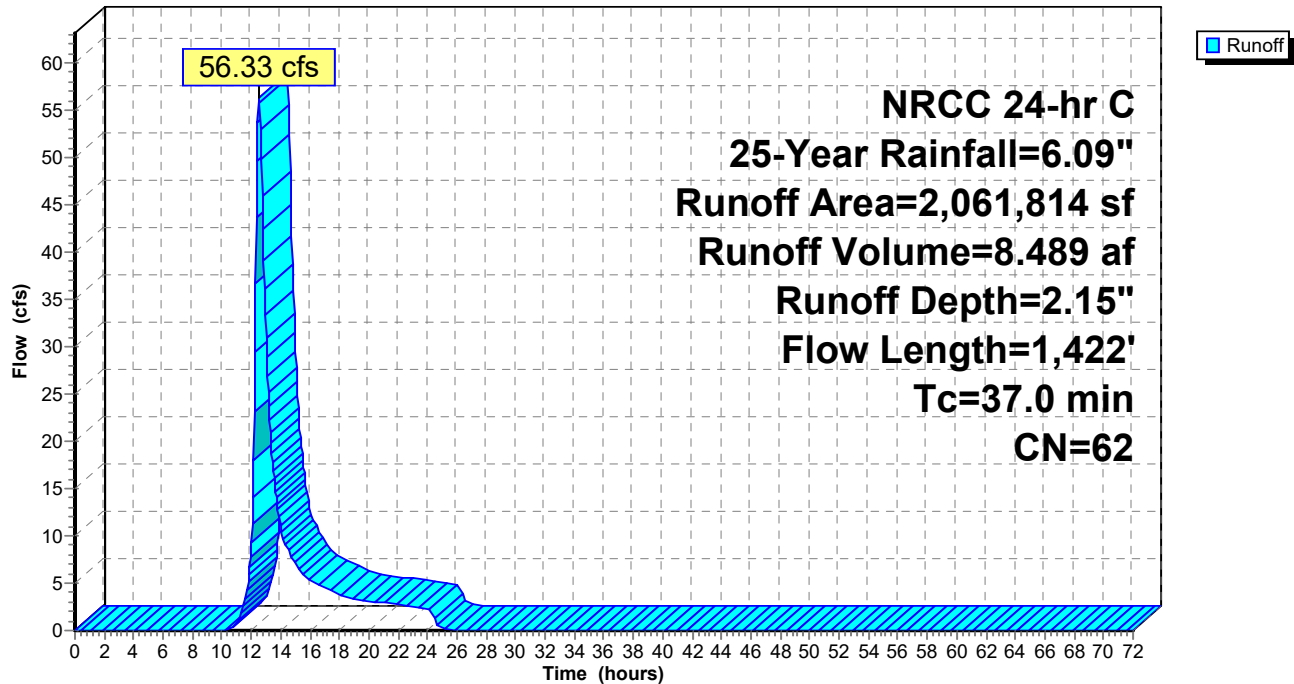
NRCC 24-hr C 25-Year Rainfall=6.09"

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Subcatchment E-2:

Hydrograph



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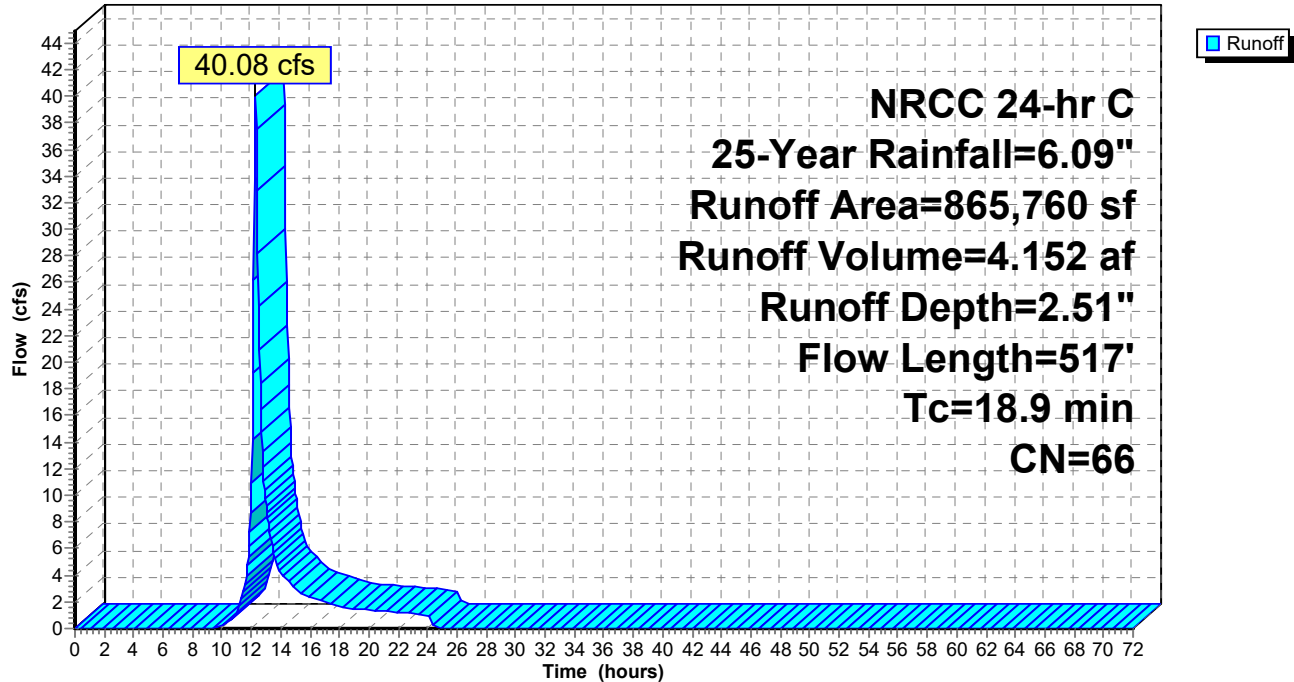
NRCC 24-hr C 25-Year Rainfall=6.09"

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Subcatchment E-3:

Hydrograph



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Summary for Subcatchment E-4:

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

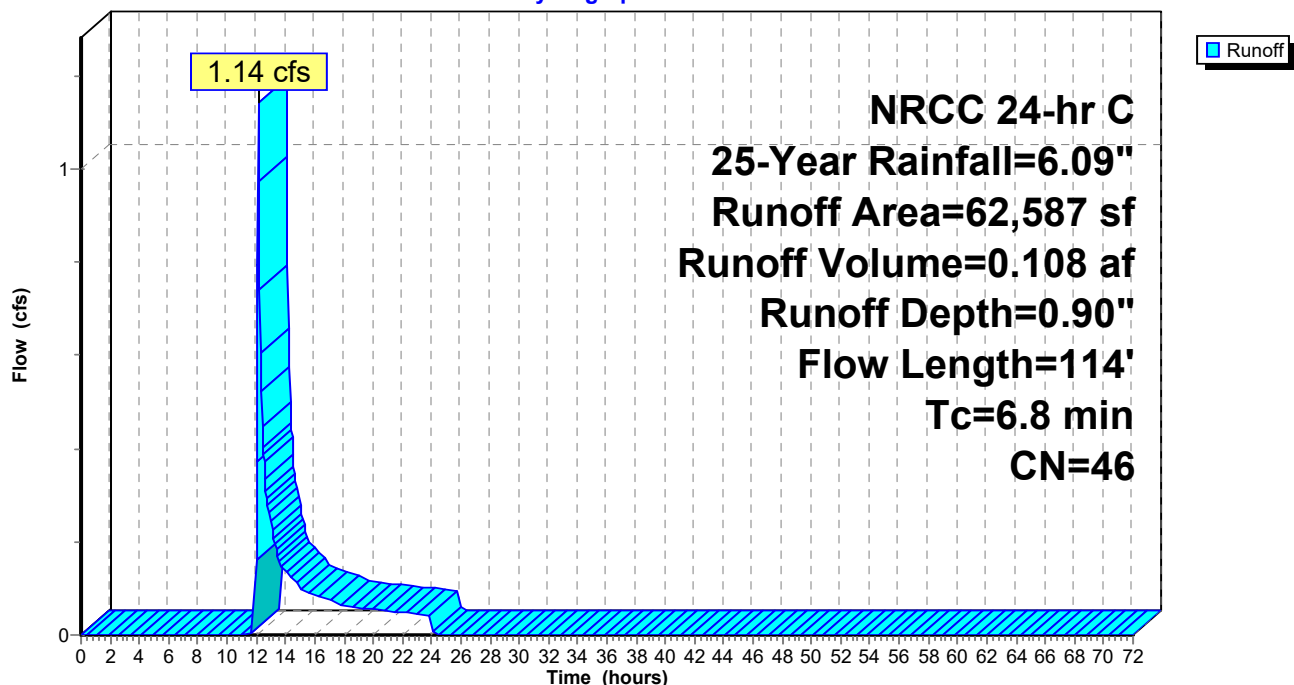
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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



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Summary for Subcatchment E-5:

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

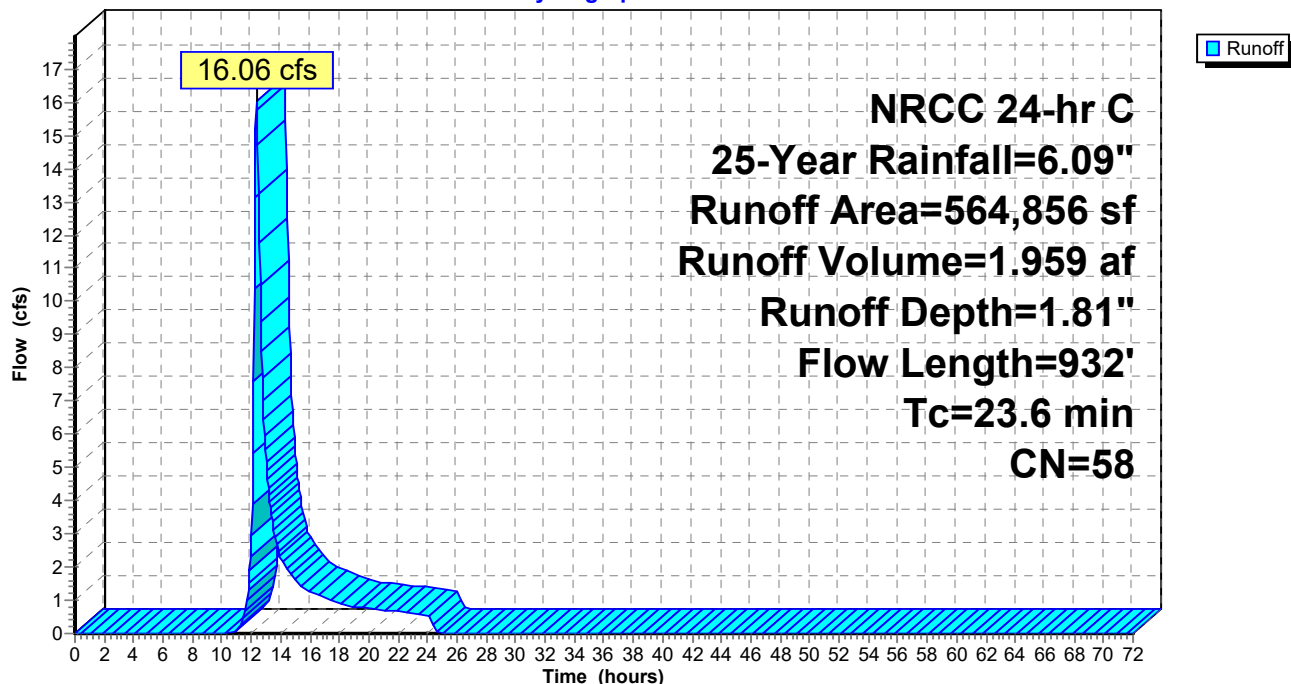
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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"

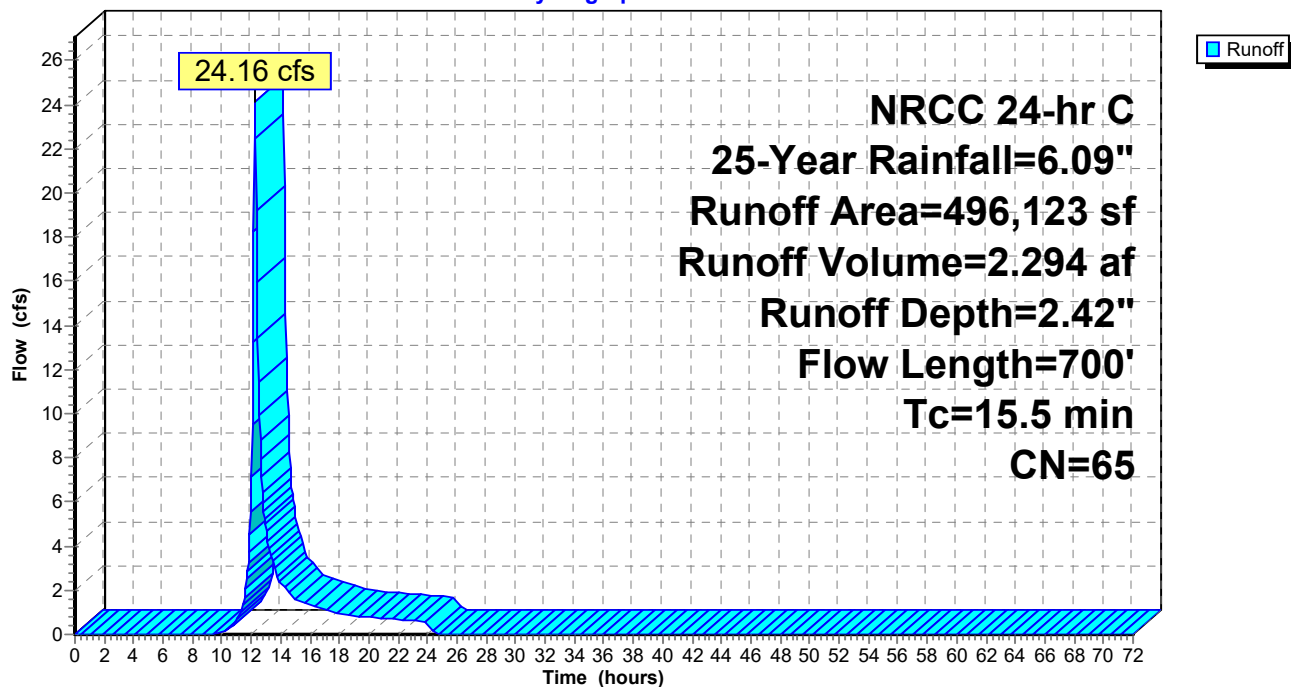
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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"

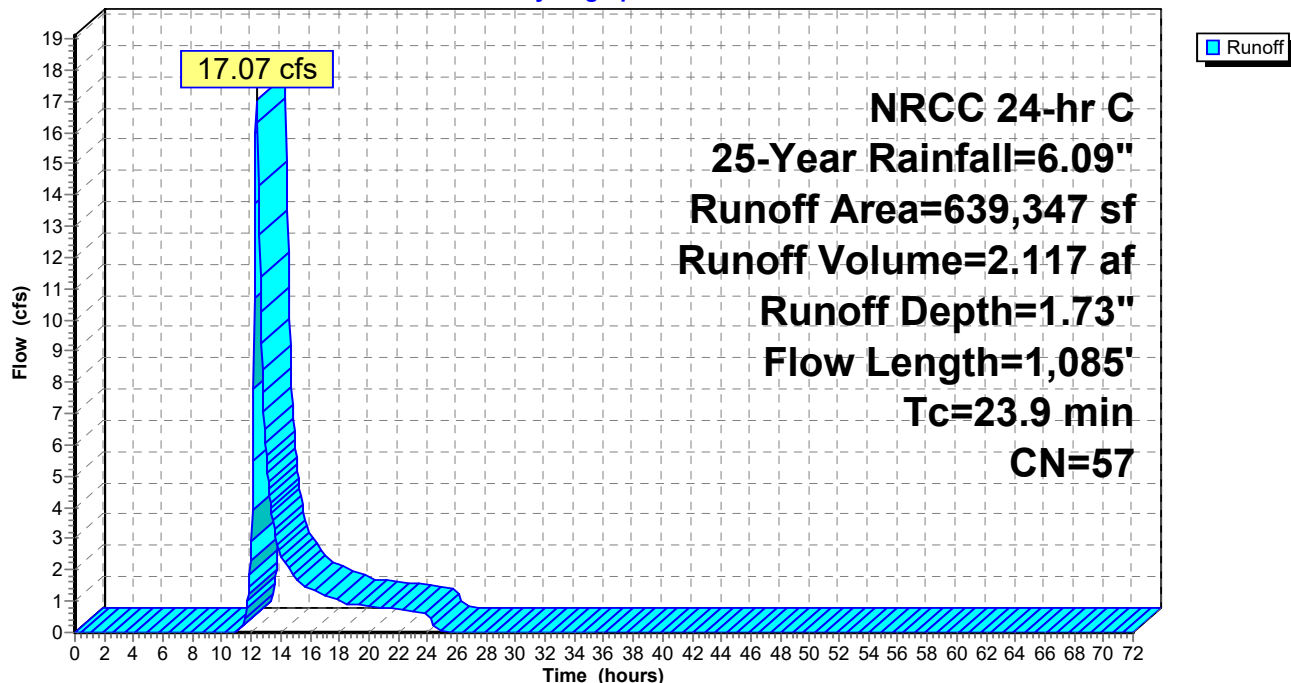
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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"

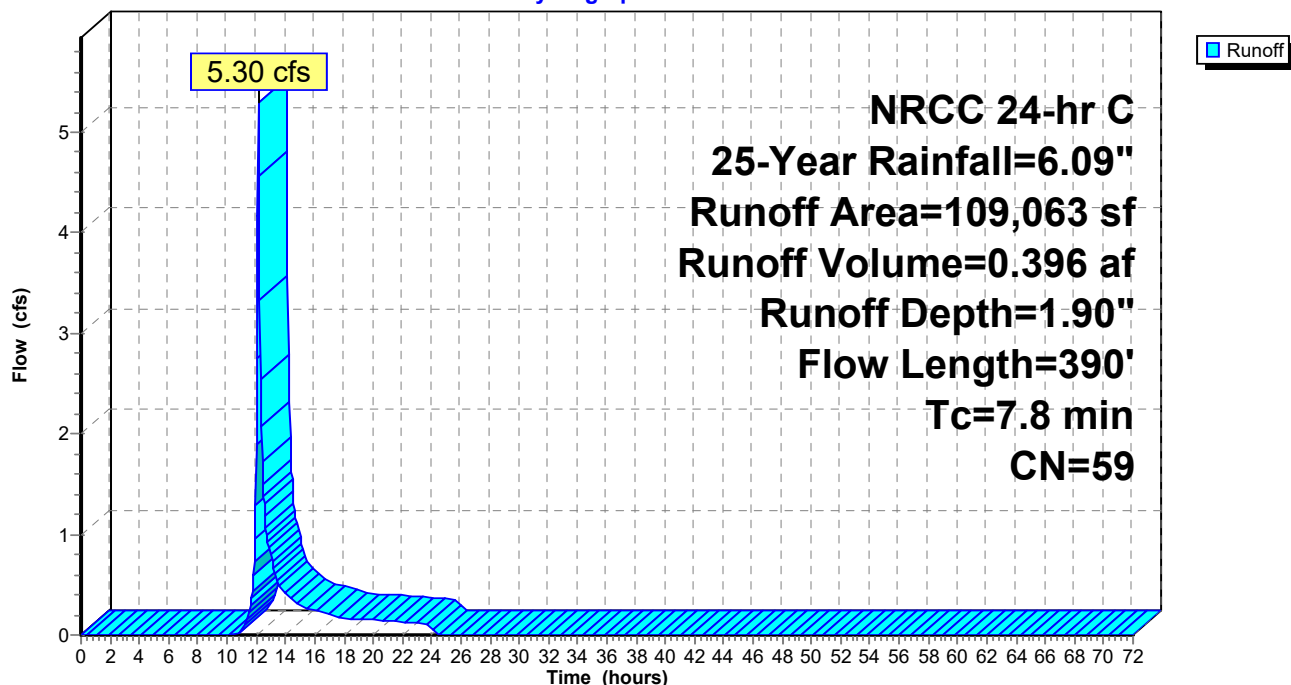
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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"

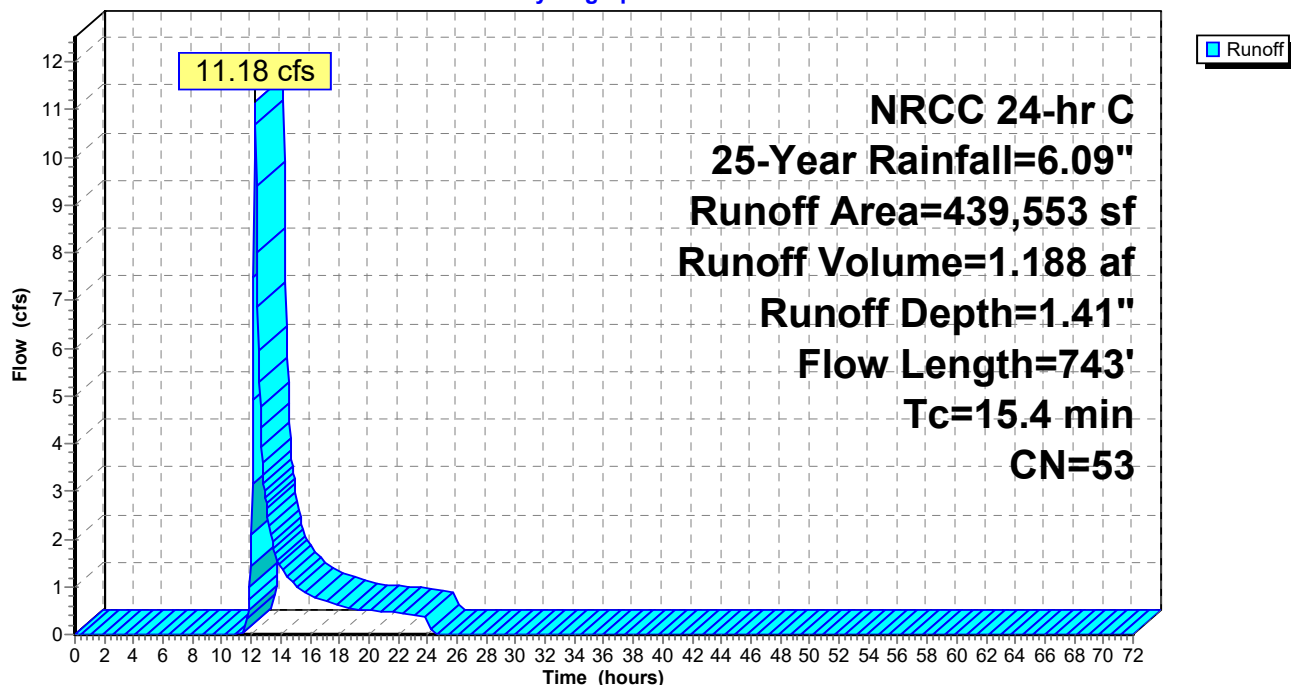
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 25-Year Rainfall=6.09"

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

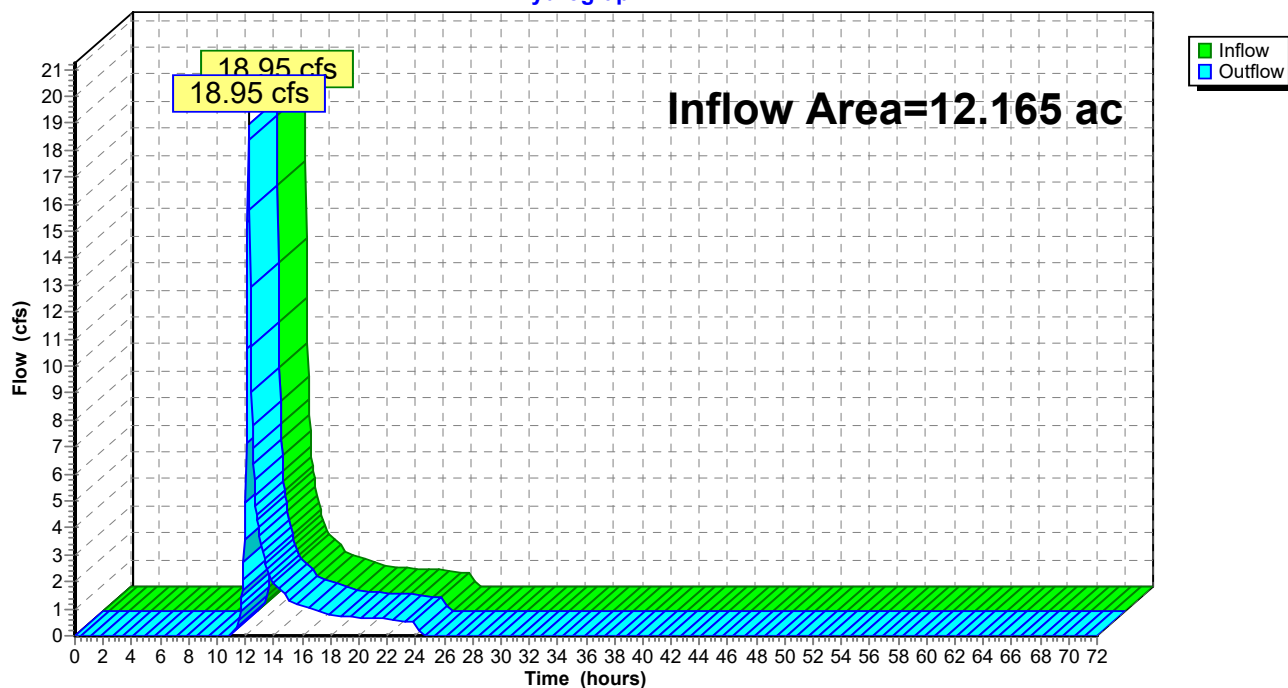
[40] Hint: Not Described (Outflow=Inflow)

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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Summary for Reach DP-10: West Elm Street

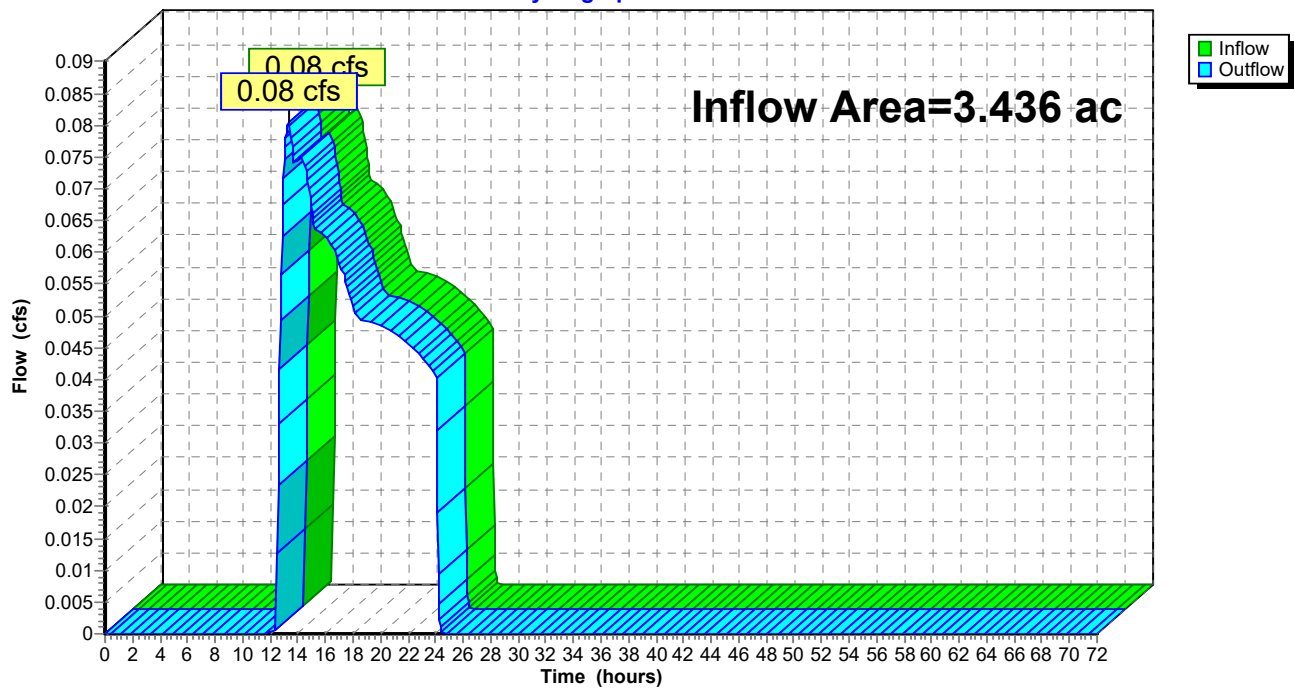
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.436 ac, 3.33% Impervious, Inflow Depth = 0.18" for 25-Year event
Inflow = 0.08 cfs @ 13.35 hrs, Volume= 0.053 af
Outflow = 0.08 cfs @ 13.35 hrs, Volume= 0.053 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

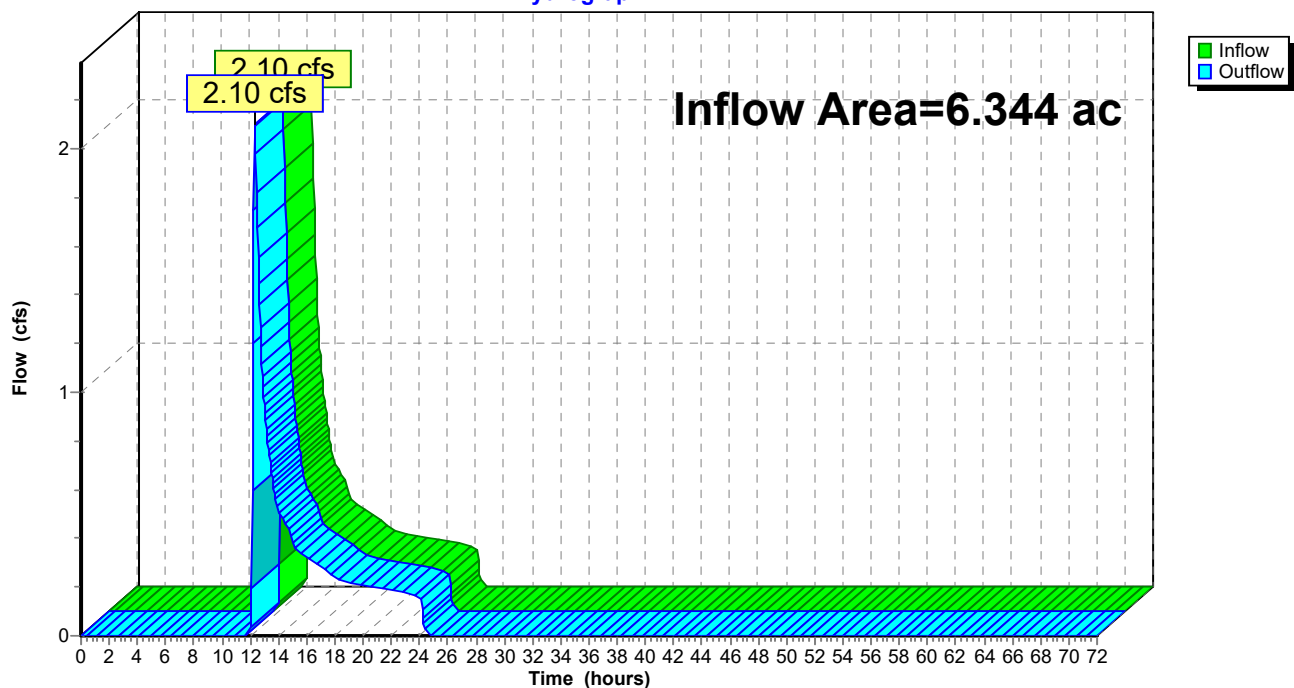
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.344 ac, 6.32% Impervious, Inflow Depth = 0.71" 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



Existing Hydrology

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Summary for Reach DP-12: Wetland Series A

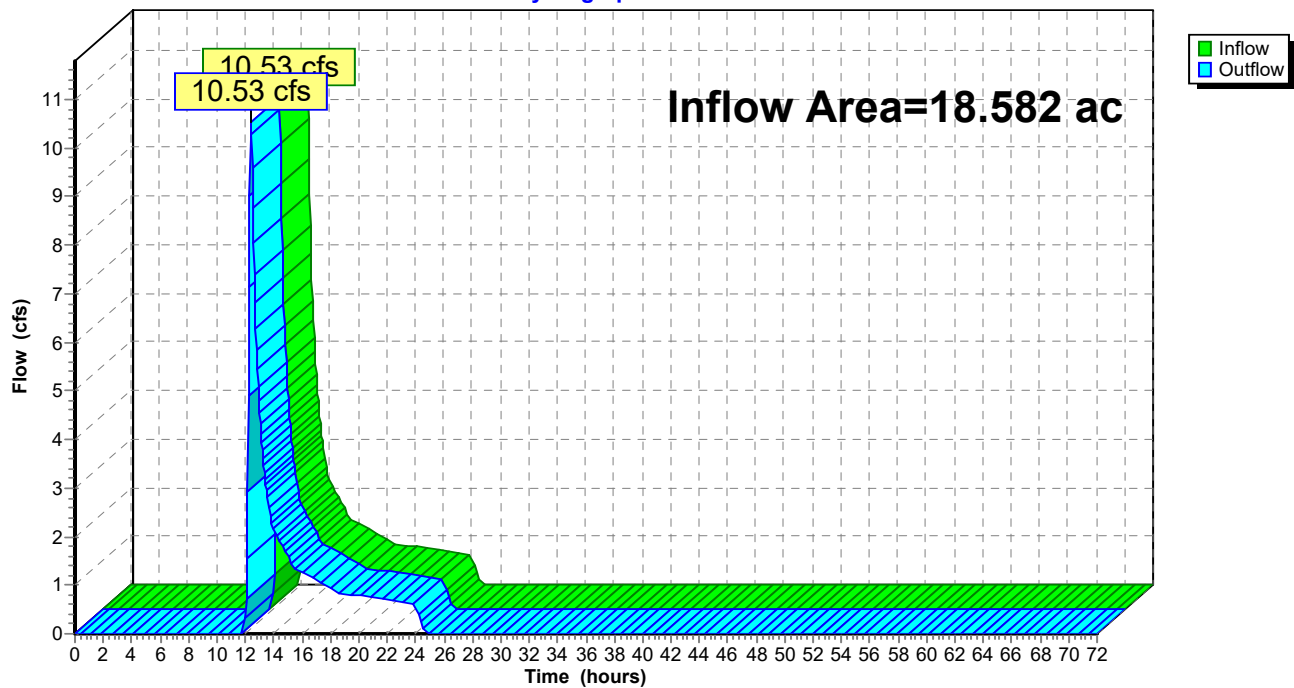
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.582 ac, 5.73% Impervious, Inflow Depth = 1.04" 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



Existing Hydrology

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Summary for Reach DP-13: Wetland Series B

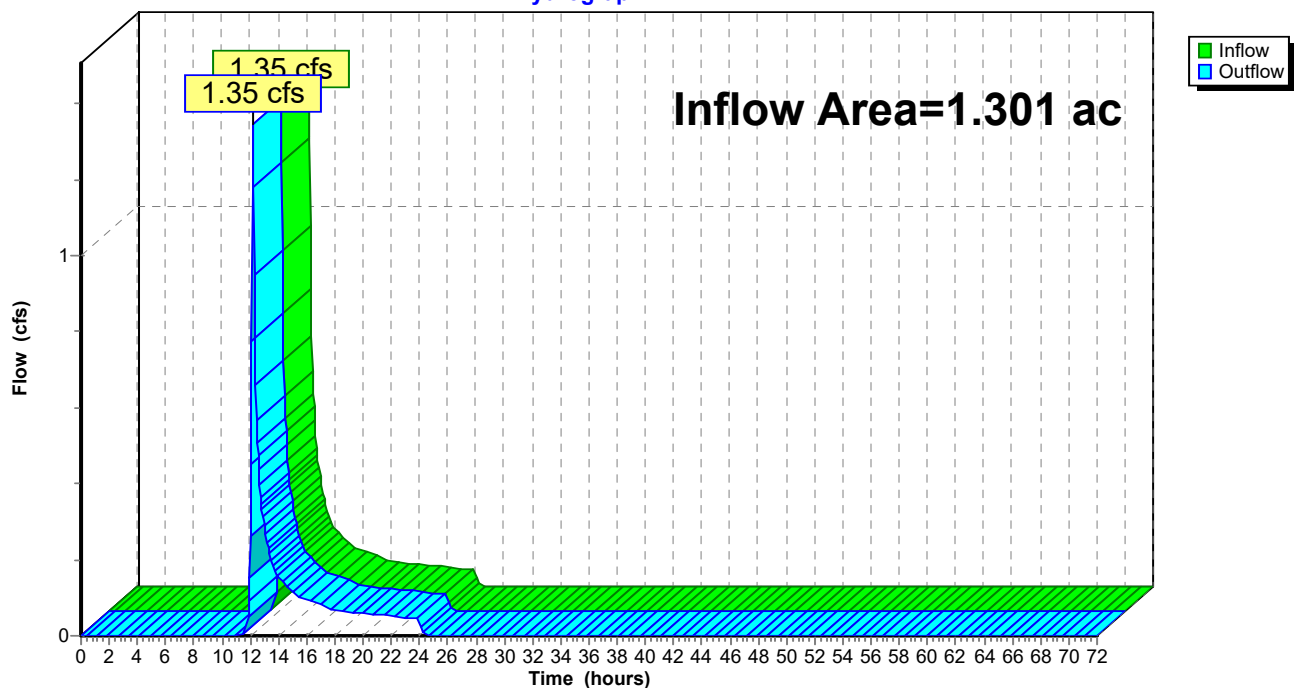
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.301 ac, 0.00% Impervious, Inflow Depth = 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



Existing Hydrology

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

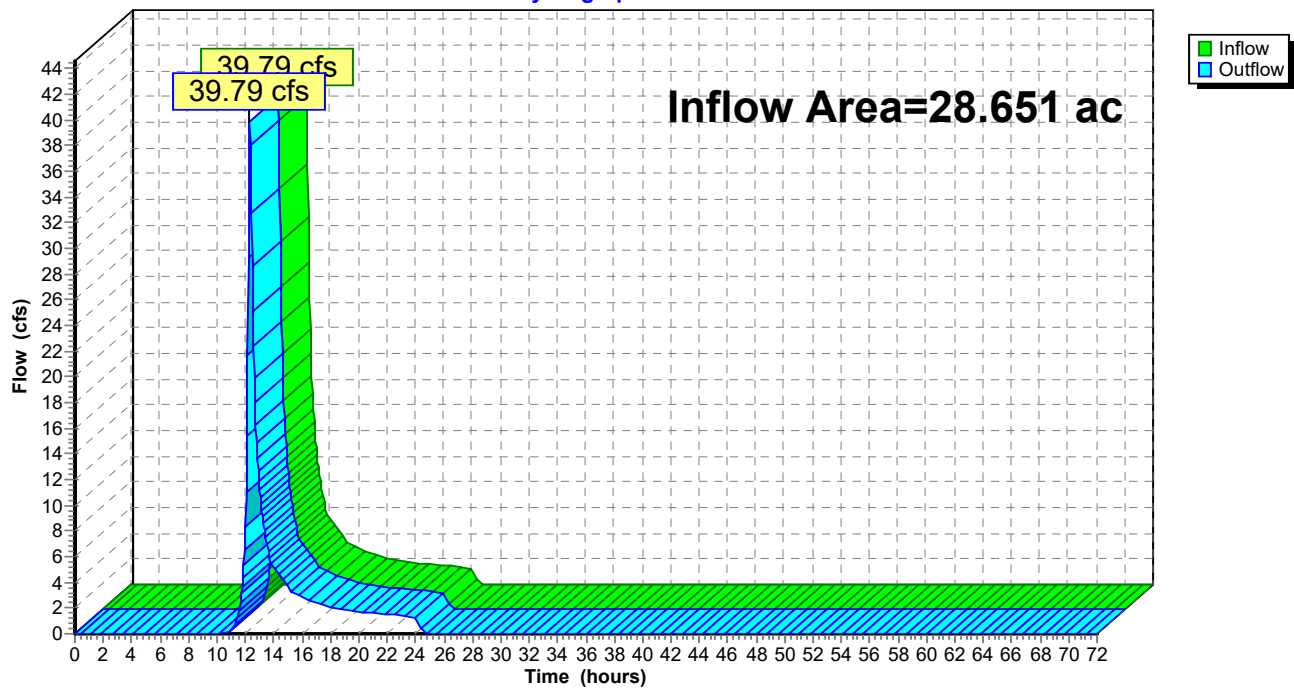
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 28.651 ac, 0.00% Impervious, Inflow Depth = 1.90" 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



Existing Hydrology

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Summary for Reach DP-15: Wetland Series H

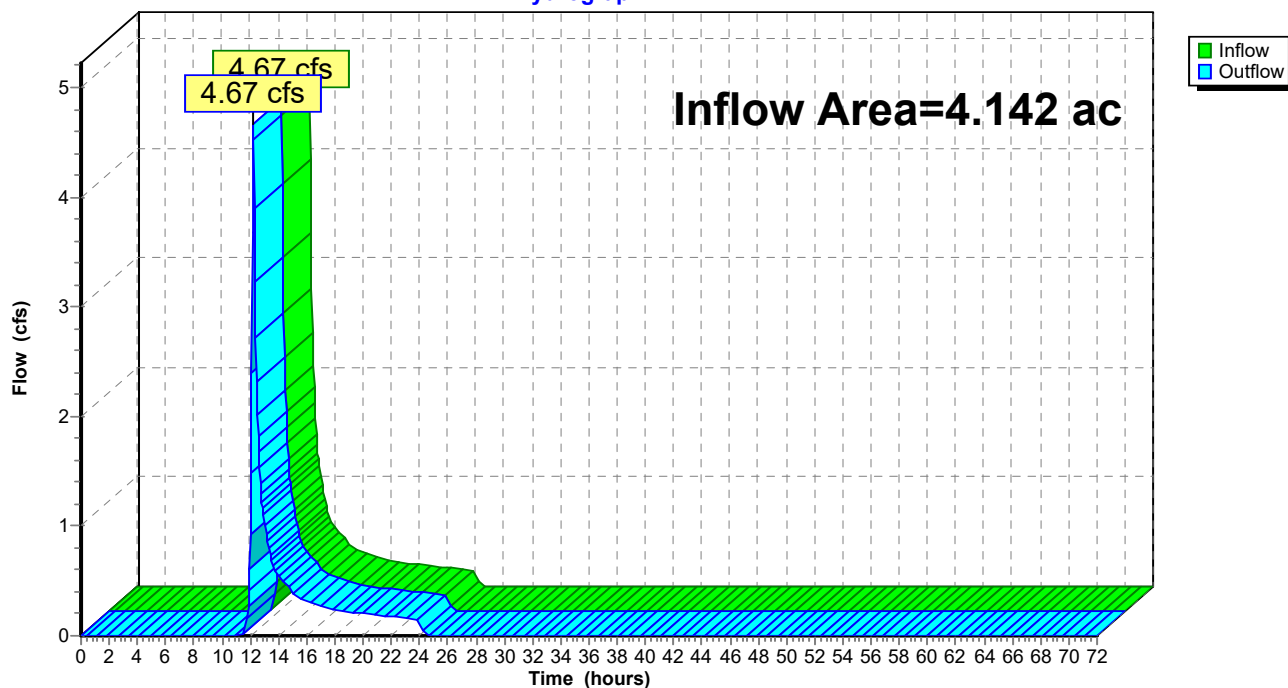
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.142 ac, 0.00% Impervious, Inflow Depth = 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

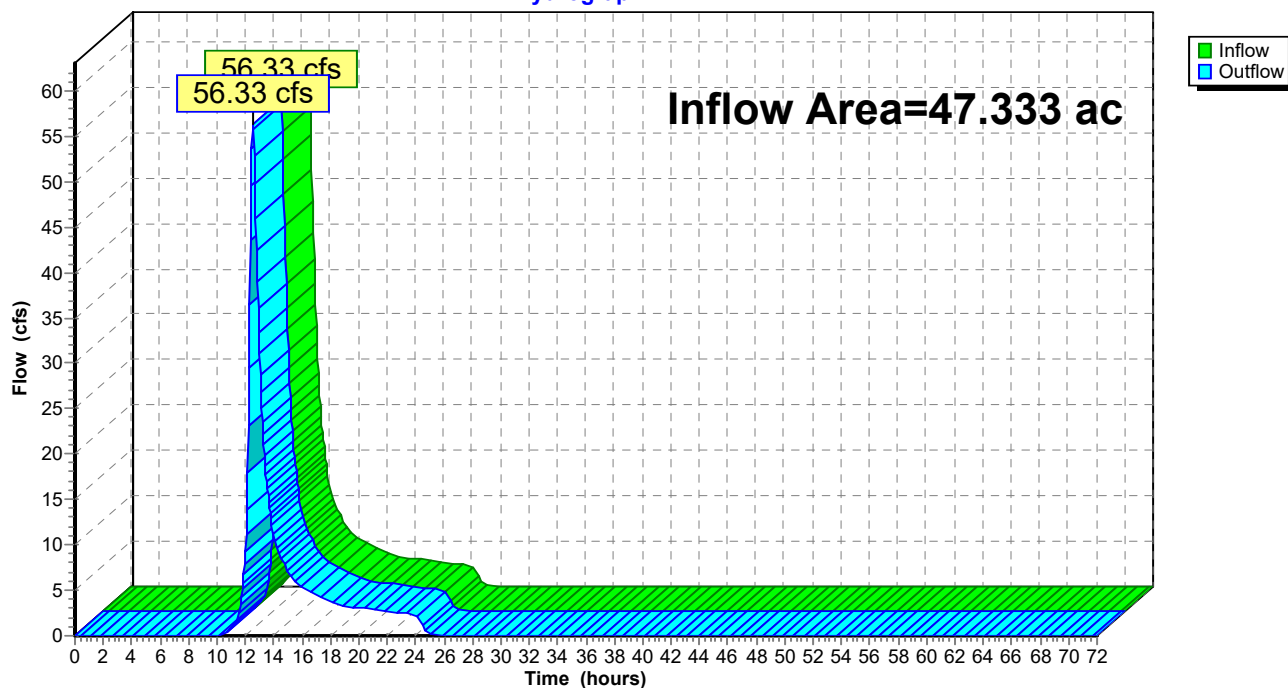
[40] Hint: Not Described (Outflow=Inflow)

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



Existing Hydrology

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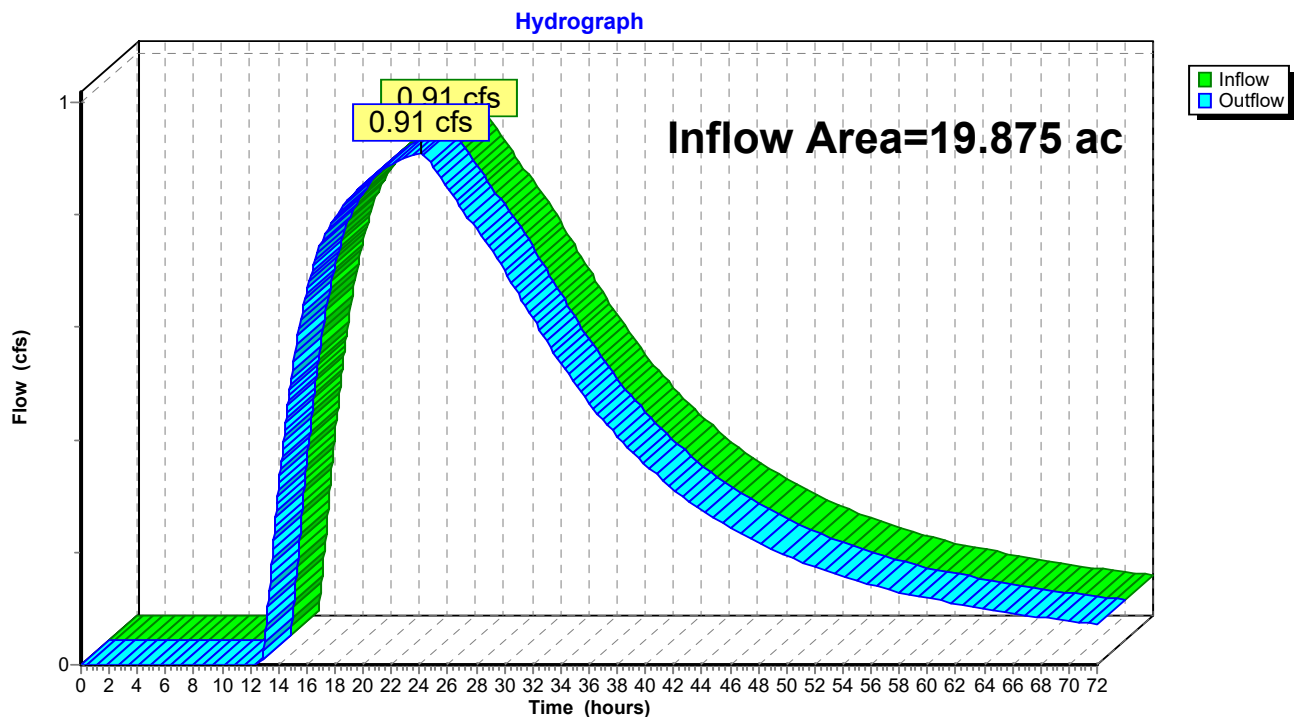
Summary for Reach DP-3: 8" Copper Pipe

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

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth > 1.15" for 25-Year event
Inflow = 0.91 cfs @ 24.14 hrs, Volume= 1.910 af
Outflow = 0.91 cfs @ 24.14 hrs, Volume= 1.910 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: 8" Copper Pipe



Existing Hydrology

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Summary for Reach DP-4: Dwelley Street

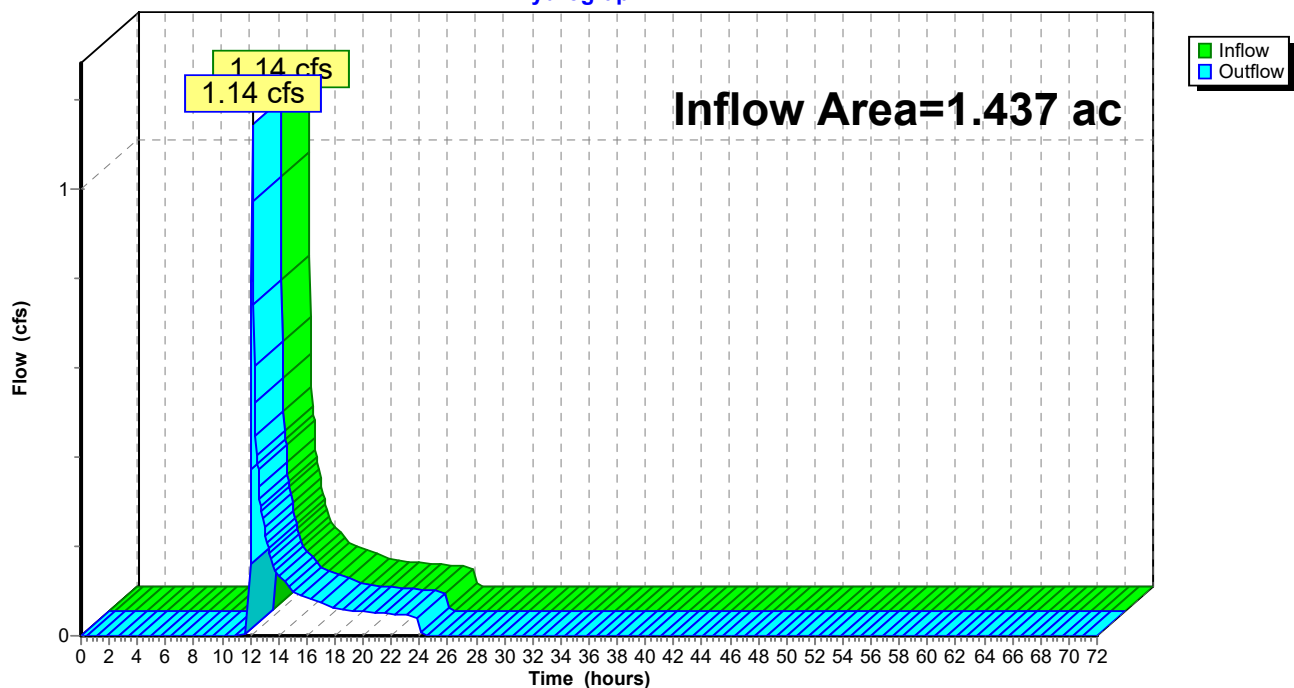
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.437 ac, 6.36% Impervious, Inflow Depth = 0.90" 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: 24" RCP PIPE

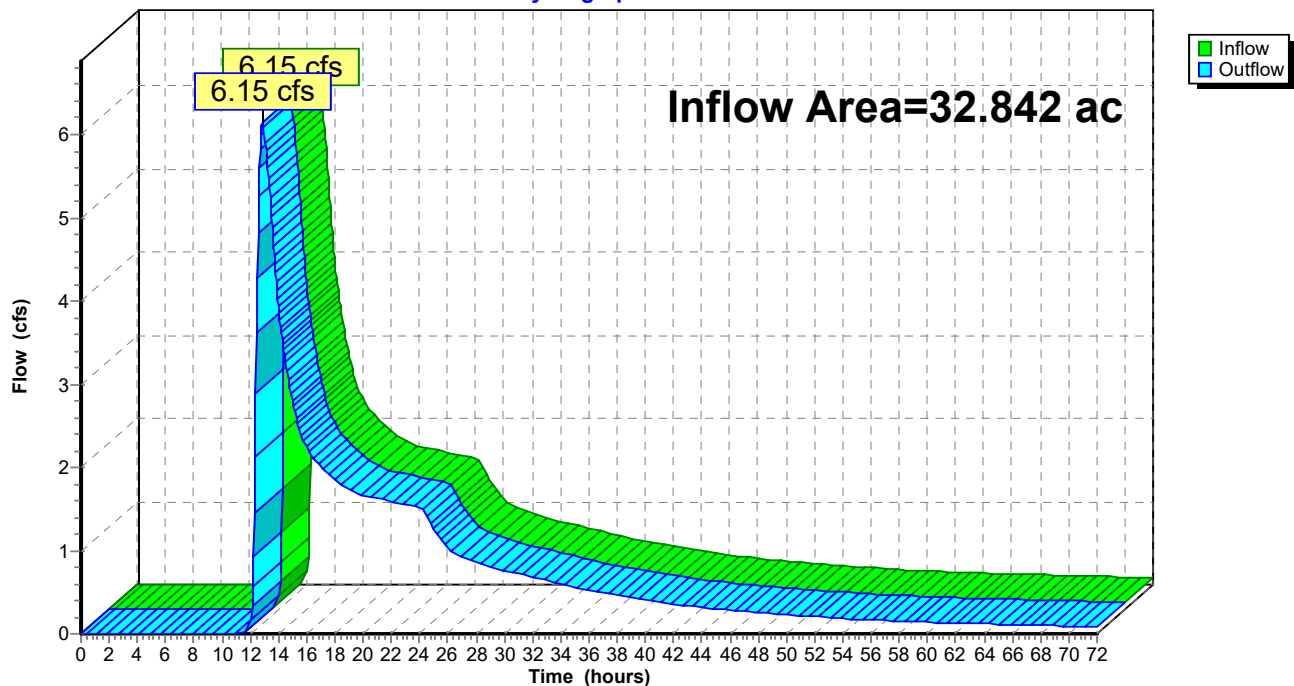
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 1.39" for 25-Year event
Inflow = 6.15 cfs @ 12.88 hrs, Volume= 3.813 af
Outflow = 6.15 cfs @ 12.88 hrs, Volume= 3.813 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: 24" RCP PIPE

Hydrograph



Existing Hydrology

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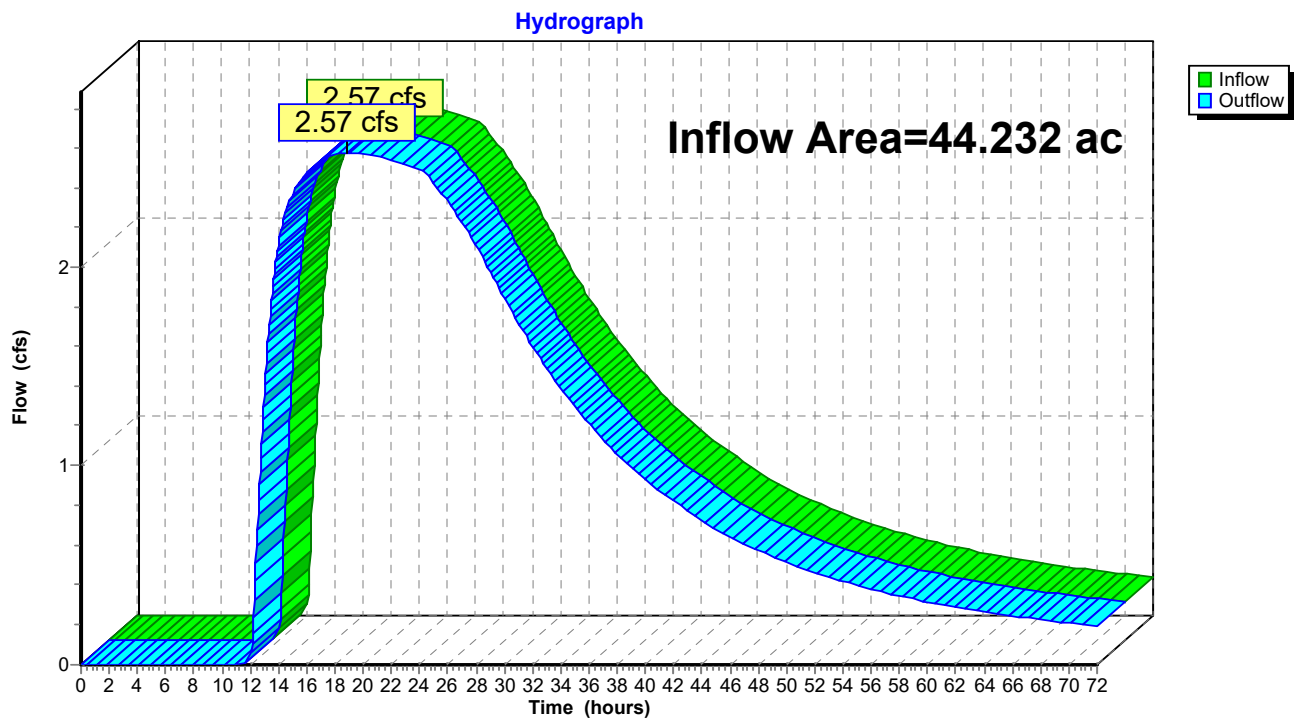
Summary for Reach DP-6: 12" RCP PIPE

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

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 1.53" for 25-Year event
Inflow = 2.57 cfs @ 18.88 hrs, Volume= 5.622 af
Outflow = 2.57 cfs @ 18.88 hrs, Volume= 5.622 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: 12" RCP PIPE



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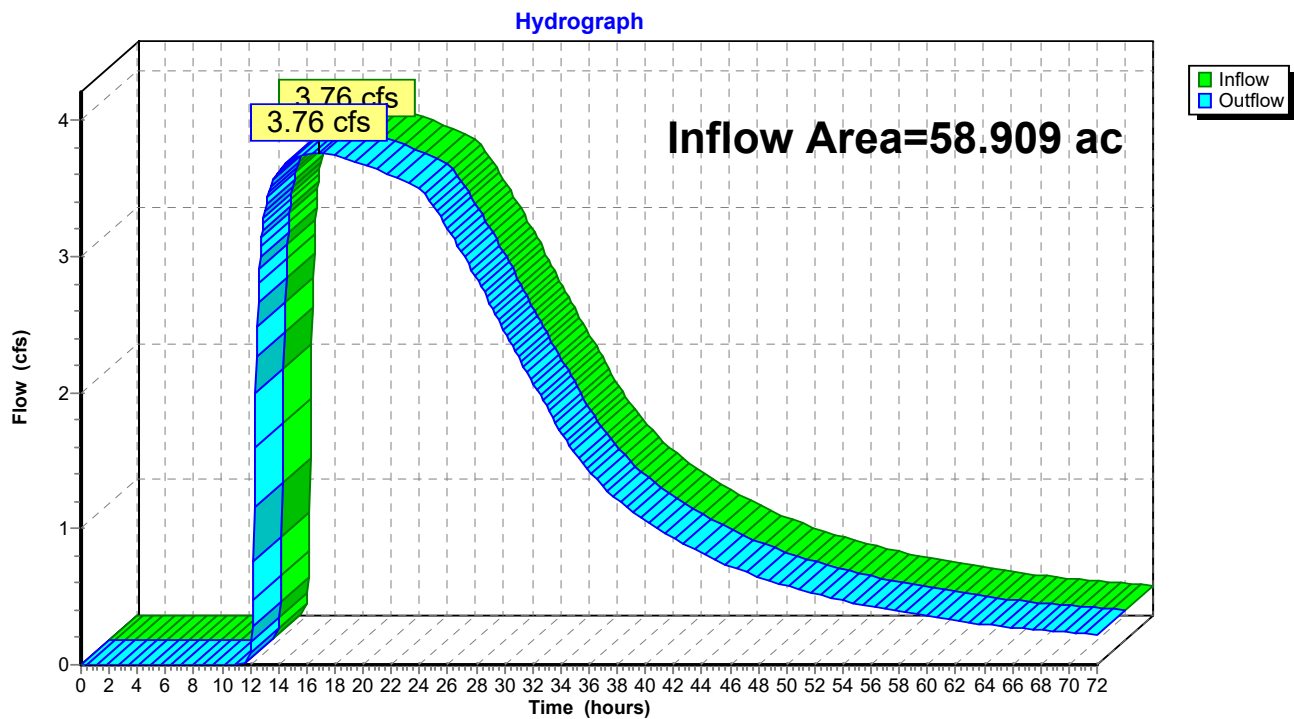
Summary for Reach DP-7: 12" RCP PIPE

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

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 1.56" for 25-Year event
Inflow = 3.76 cfs @ 16.89 hrs, Volume= 7.639 af
Outflow = 3.76 cfs @ 16.89 hrs, Volume= 7.639 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: 12" RCP PIPE



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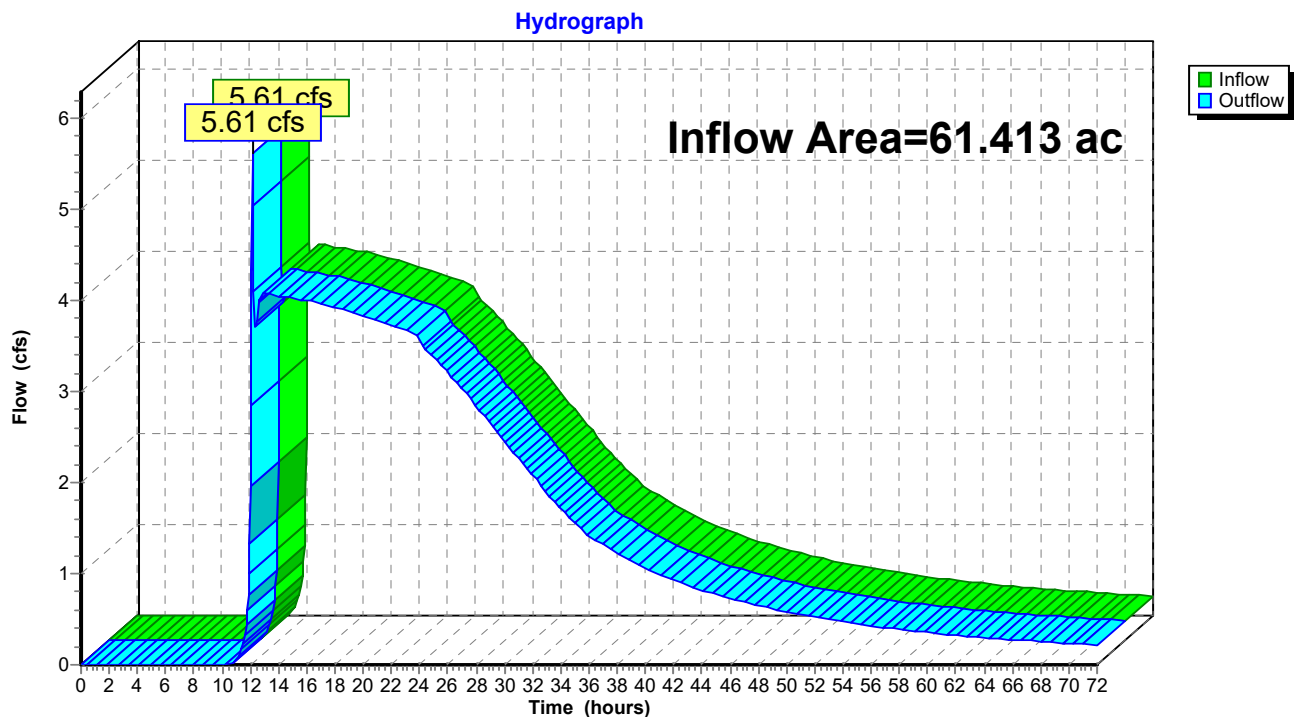
Summary for Reach DP-8: Wetlands Series X

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

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 1.57" for 25-Year event
Inflow = 5.61 cfs @ 12.16 hrs, Volume= 8.035 af
Outflow = 5.61 cfs @ 12.16 hrs, Volume= 8.035 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

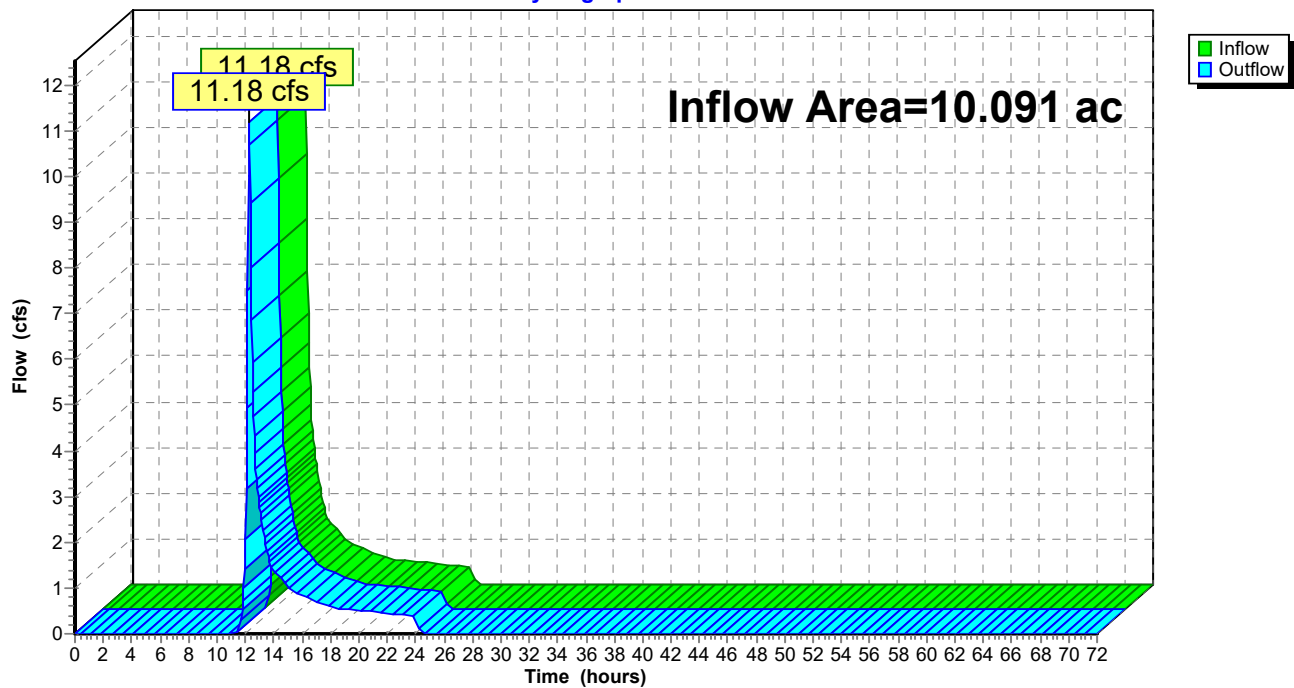
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.091 ac, 31.90% Impervious, Inflow Depth = 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

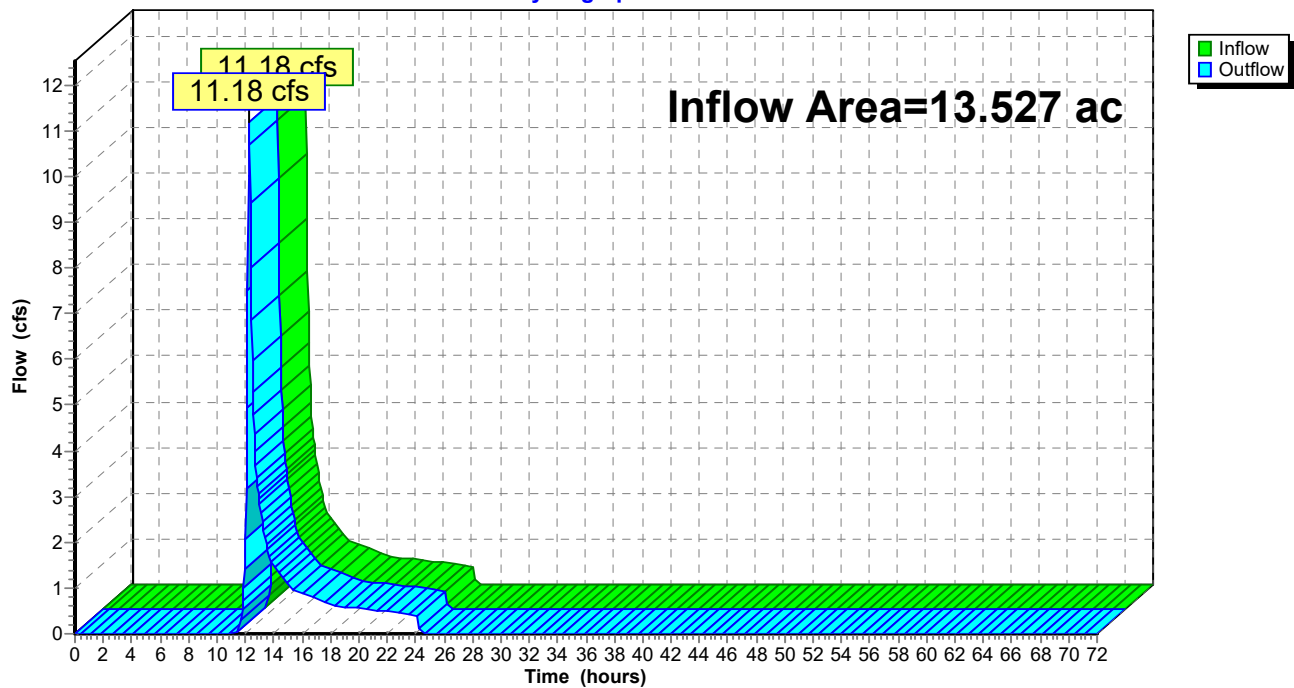
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.527 ac, 24.64% Impervious, Inflow Depth = 1.10" for 25-Year event
Inflow = 11.18 cfs @ 12.26 hrs, Volume= 1.241 af
Outflow = 11.18 cfs @ 12.26 hrs, Volume= 1.241 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

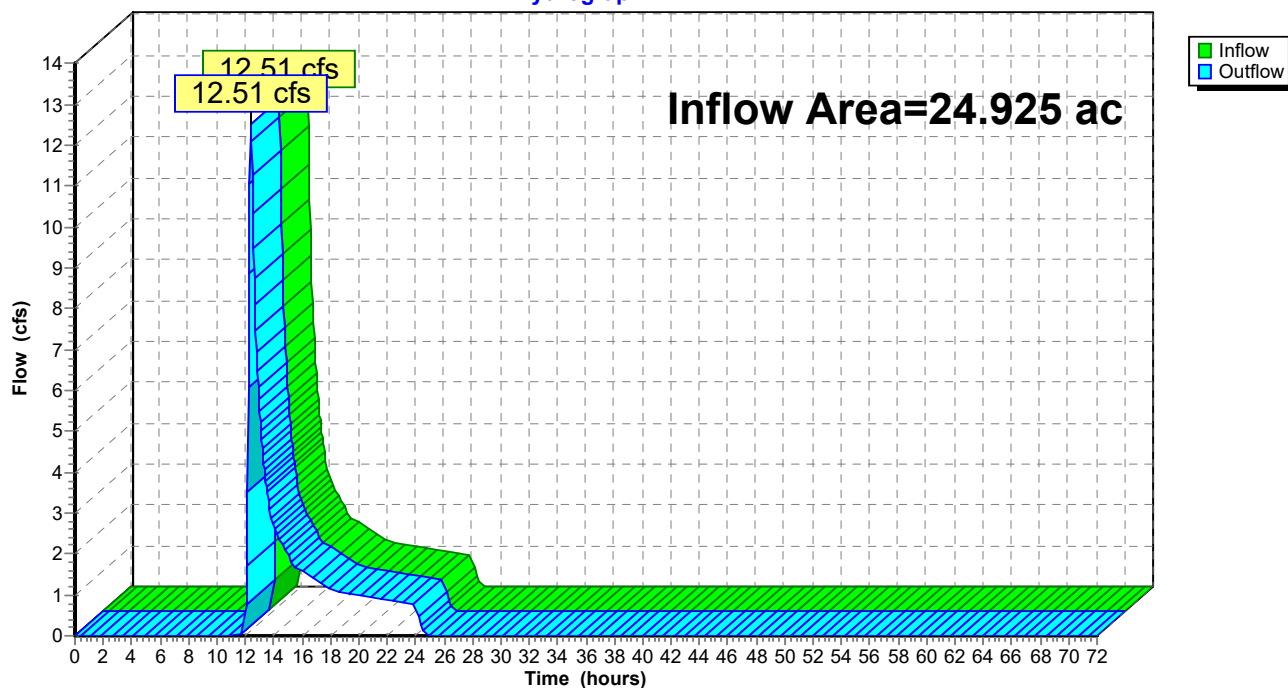
[40] Hint: Not Described (Outflow=Inflow)

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

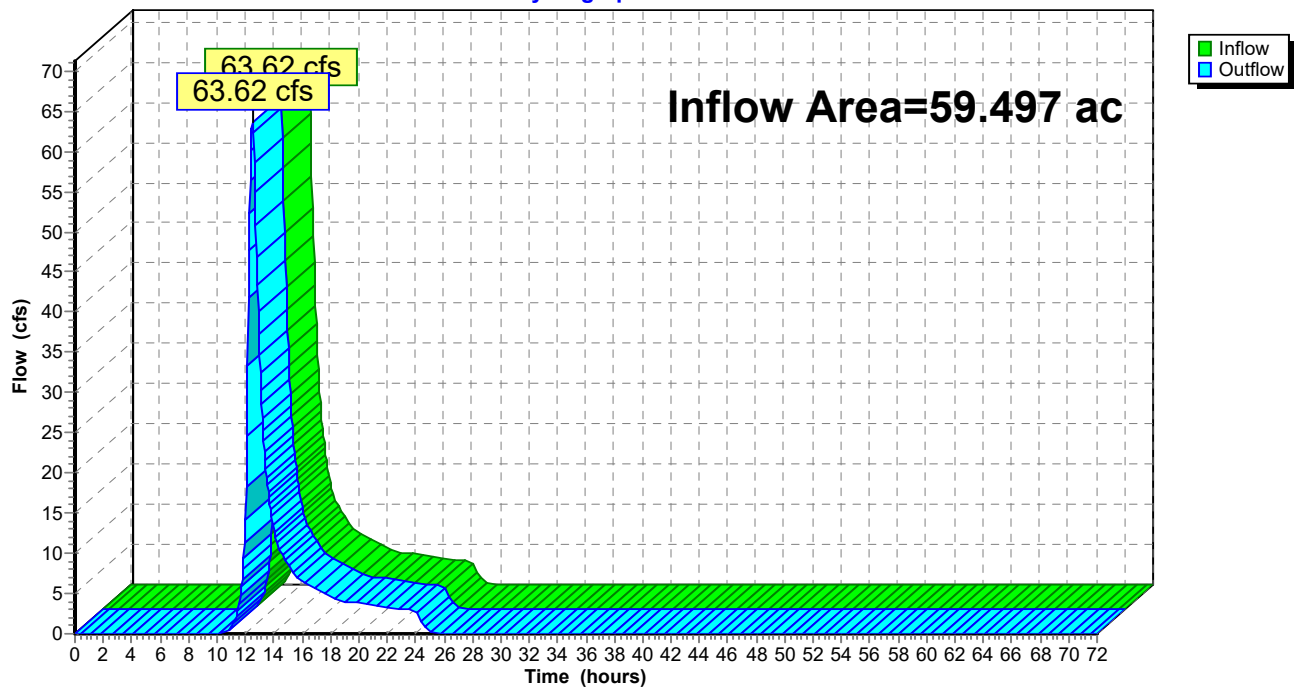
[40] Hint: Not Described (Outflow=Inflow)

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 W-N: Wetland Series N

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 1.41" for 25-Year event
 Inflow = 16.06 cfs @ 12.36 hrs, Volume= 3.869 af
 Outflow = 6.15 cfs @ 12.88 hrs, Volume= 3.813 af, Atten= 62%, Lag= 31.0 min
 Primary = 6.15 cfs @ 12.88 hrs, Volume= 3.813 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 86.45' @ 12.88 hrs Surf.Area= 27,221 sf Storage= 24,474 cf

Plug-Flow detention time= 142.3 min calculated for 3.813 af (99% of inflow)
 Center-of-Mass det. time= 102.6 min (1,494.9 - 1,392.4)

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	85.50'	24.0" Round RCP_Round 24" L= 46.2' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 85.50' / 83.90' S= 0.0346 ' S= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=6.15 cfs @ 12.88 hrs HW=86.45' (Free Discharge)

↑1=RCP_Round 24" (Inlet Controls 6.15 cfs @ 4.16 fps)

Existing Hydrology

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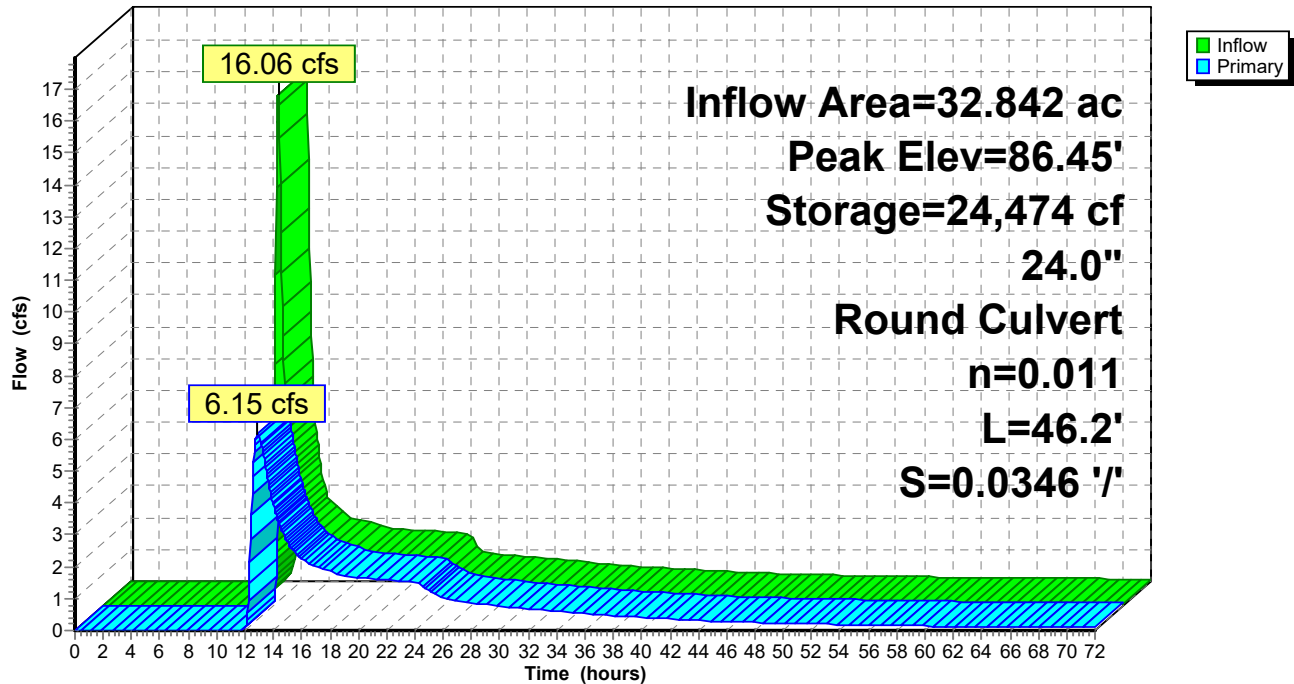
NRCC 24-hr C 25-Year Rainfall=6.09"

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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 > 1.58" for 25-Year event
 Inflow = 17.53 cfs @ 12.37 hrs, Volume= 7.739 af
 Outflow = 3.76 cfs @ 16.89 hrs, Volume= 7.639 af, Atten= 79%, Lag= 270.9 min
 Primary = 3.76 cfs @ 16.89 hrs, Volume= 7.639 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 80.77' @ 16.89 hrs Surf.Area= 33,156 sf Storage= 45,006 cf

Plug-Flow detention time= 181.8 min calculated for 7.634 af (99% of inflow)
 Center-of-Mass det. time= 148.2 min (1,708.1 - 1,559.9)

Volume	Invert	Avail.Storage	Storage Description	
#1	78.68'	102,529 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)
78.68	16,400	0	0	16,400
80.00	20,844	24,523	24,523	20,889
81.00	37,500	28,767	53,290	37,556
82.00	62,000	49,239	102,529	62,069

Device	Routing	Invert	Outlet Devices
#1	Primary	78.68'	12.0" Round Culvert L= 172.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 78.68' / 75.00' S= 0.0214 ' S= 0.0214 ' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	80.80'	20.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=3.76 cfs @ 16.89 hrs HW=80.77' (Free Discharge)

1=Culvert (Inlet Controls 3.76 cfs @ 4.79 fps)
 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Existing Hydrology

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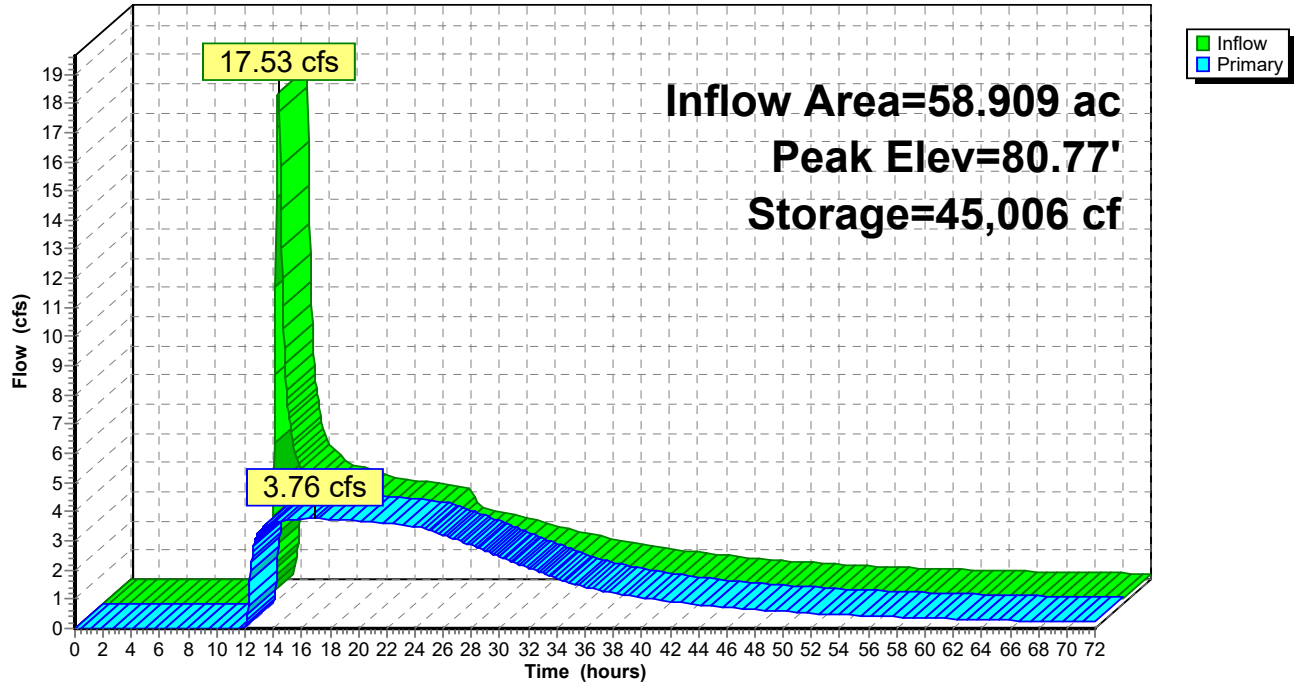
NRCC 24-hr C 25-Year Rainfall=6.09"

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Pond W-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 > 1.66" for 25-Year event
 Inflow = 25.11 cfs @ 12.26 hrs, Volume= 6.107 af
 Outflow = 2.57 cfs @ 18.88 hrs, Volume= 5.622 af, Atten= 90%, Lag= 397.3 min
 Primary = 2.57 cfs @ 18.88 hrs, Volume= 5.622 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.94' @ 18.88 hrs Surf.Area= 88,719 sf Storage= 106,274 cf

Plug-Flow detention time= 710.9 min calculated for 5.622 af (92% of inflow)
 Center-of-Mass det. time= 548.1 min (1,808.2 - 1,260.1)

Volume	Invert	Avail.Storage	Storage Description
#1	78.70'	402,154 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)
78.70	82,500	0	0	82,500
83.00	105,000	402,154	402,154	105,477

Device	Routing	Invert	Outlet Devices
#1	Primary	78.70'	12.0" Round Culvert L= 20.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 78.70' / 78.30' S= 0.0194 ' S= 0.0194 ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=2.57 cfs @ 18.88 hrs HW=79.94' (Free Discharge)

↑**1=Culvert** (Inlet Controls 2.57 cfs @ 3.27 fps)

Existing Hydrology

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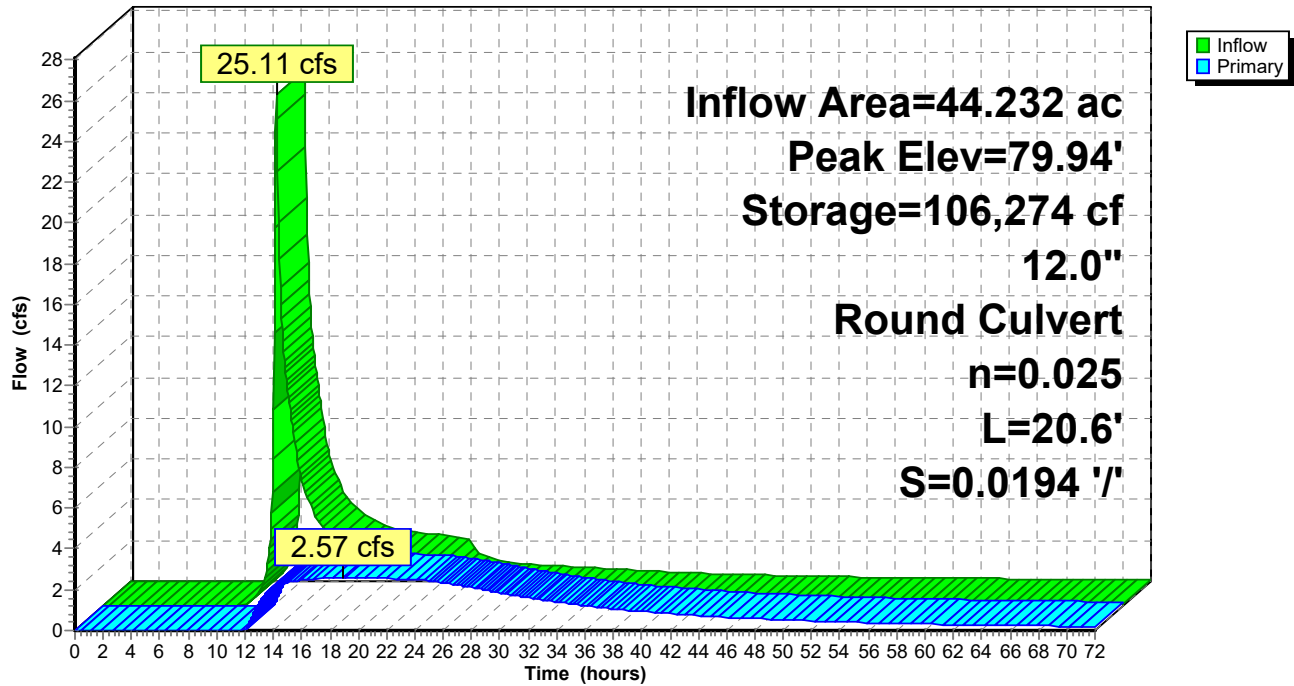
NRCC 24-hr C 25-Year Rainfall=6.09"

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Pond W-QP: Wetland Series Q & P

Hydrograph



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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 = 0.91 cfs @ 24.14 hrs, Volume= 1.910 af, Atten= 98%, Lag= 711.1 min
 Primary = 0.91 cfs @ 24.14 hrs, Volume= 1.910 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 88.10' @ 24.14 hrs Surf.Area= 86,479 sf Storage= 151,472 cf

Plug-Flow detention time= 1,168.2 min calculated for 1.910 af (46% of inflow)
 Center-of-Mass det. time= 1,029.9 min (1,900.4 - 870.5)

Volume	Invert	Avail.Storage	Storage Description
#1	86.27'	521,661 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)
86.27	78,906	0	0	78,906
92.00	103,740	521,661	521,661	104,484

Device	Routing	Invert	Outlet Devices
#1	Primary	87.30'	8.0" Round Culvert L= 240.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 87.30' / 86.50' S= 0.0033 ' S= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.91 cfs @ 24.14 hrs HW=88.10' (Free Discharge)

↑**1=Culvert** (Inlet Controls 0.91 cfs @ 2.60 fps)

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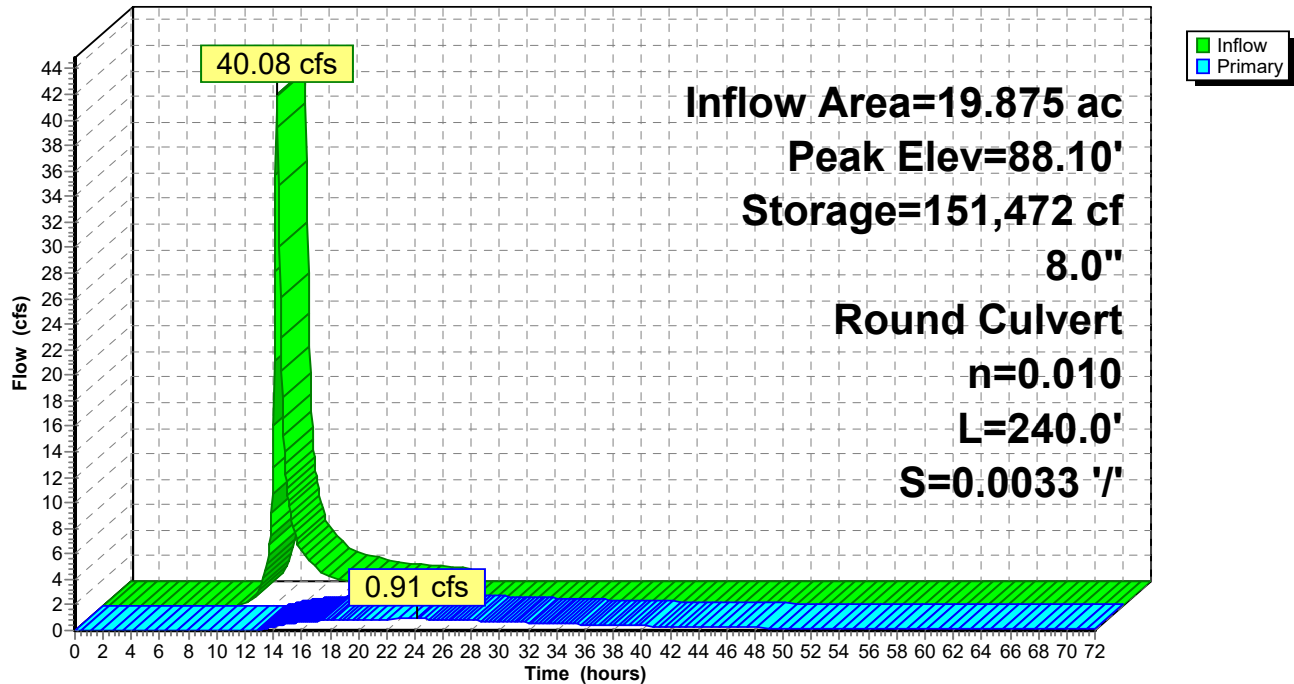
NRCC 24-hr C 25-Year Rainfall=6.09"

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Pond W-R: Wetland Series R

Hydrograph



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Summary for Subcatchment E-1:

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

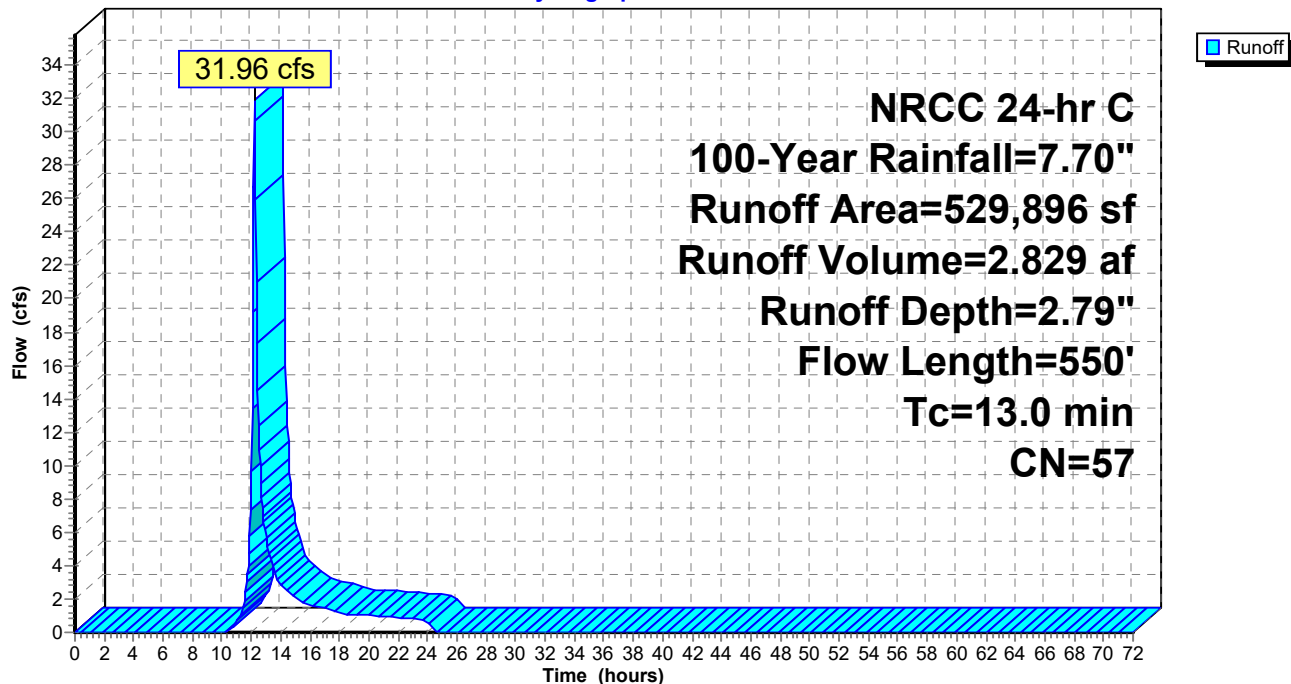
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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-10:

Runoff = 0.54 cfs @ 12.35 hrs, Volume= 0.158 af, Depth= 0.55"

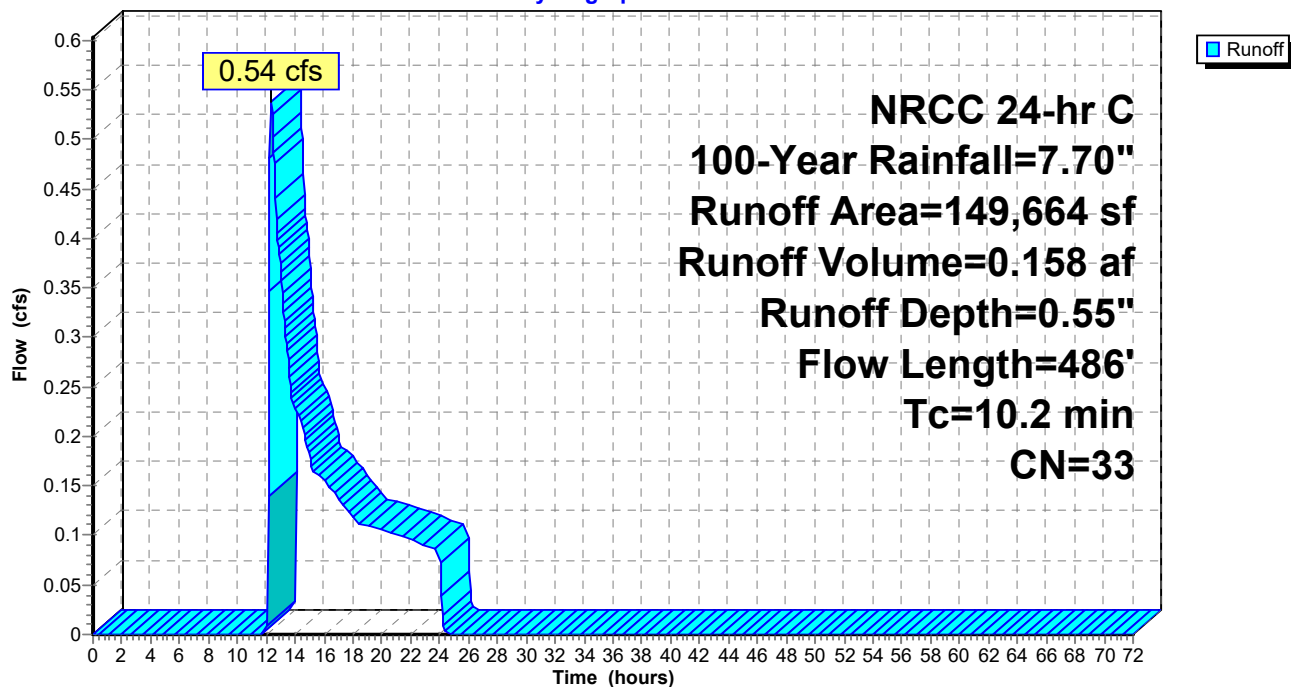
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

Area (sf)	CN	Description
* 4,986	98	ROOF AND Paved parking, HSG A
134,678	30	Woods, Good, HSG A
10,000	39	>75% Grass cover, Good, HSG A
149,664	33	Weighted Average
144,678		96.67% Pervious Area
4,986		3.33% 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-10:

Hydrograph



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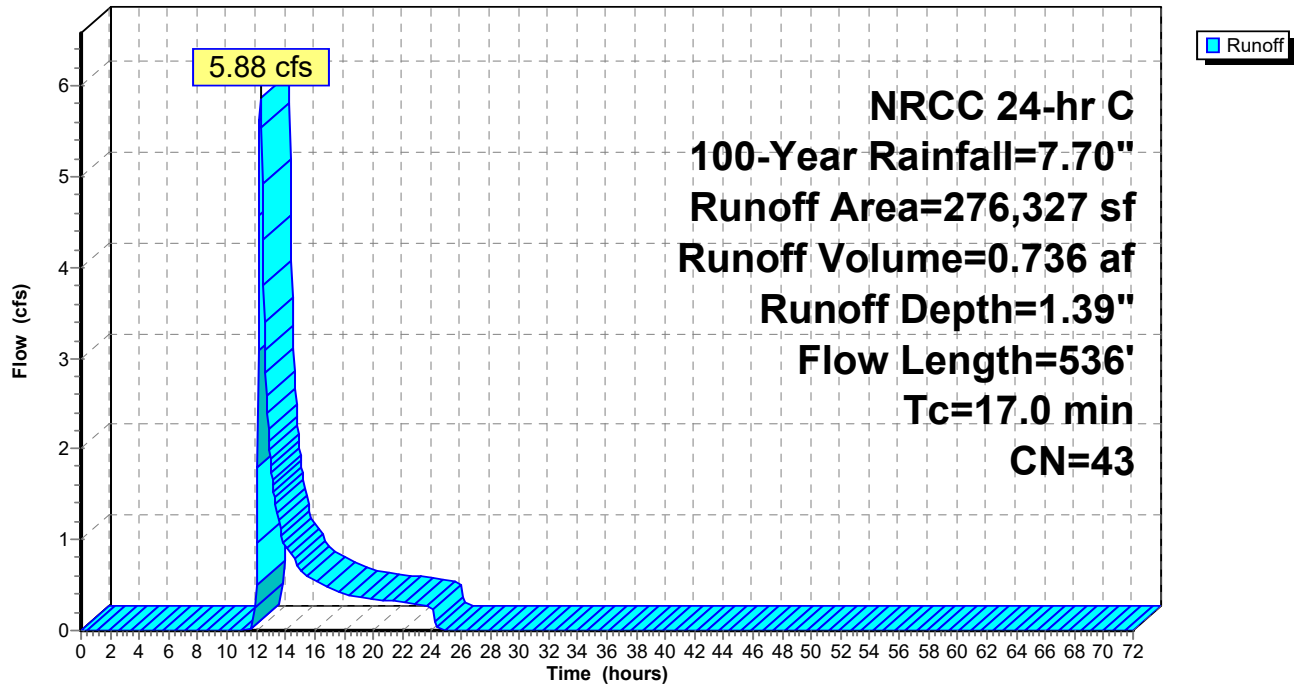
NRCC 24-hr C 100-Year Rainfall=7.70"

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Subcatchment E-11:

Hydrograph



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Summary for Subcatchment E-12:

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

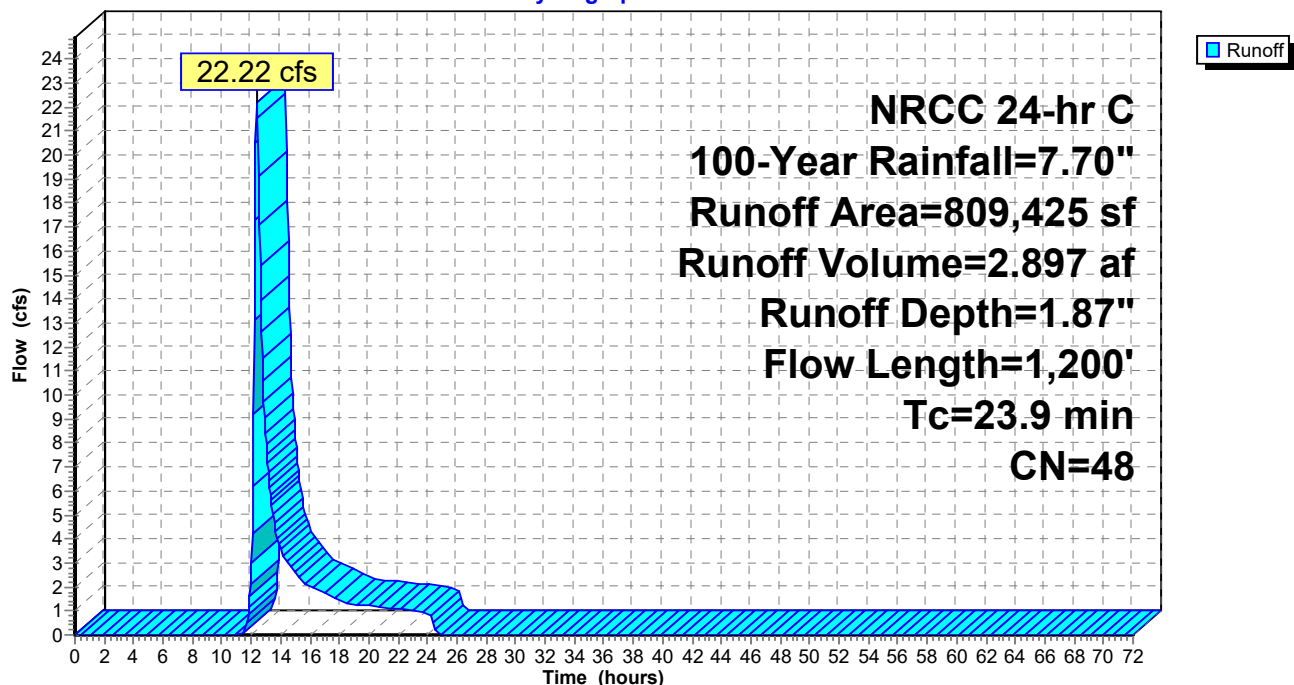
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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"

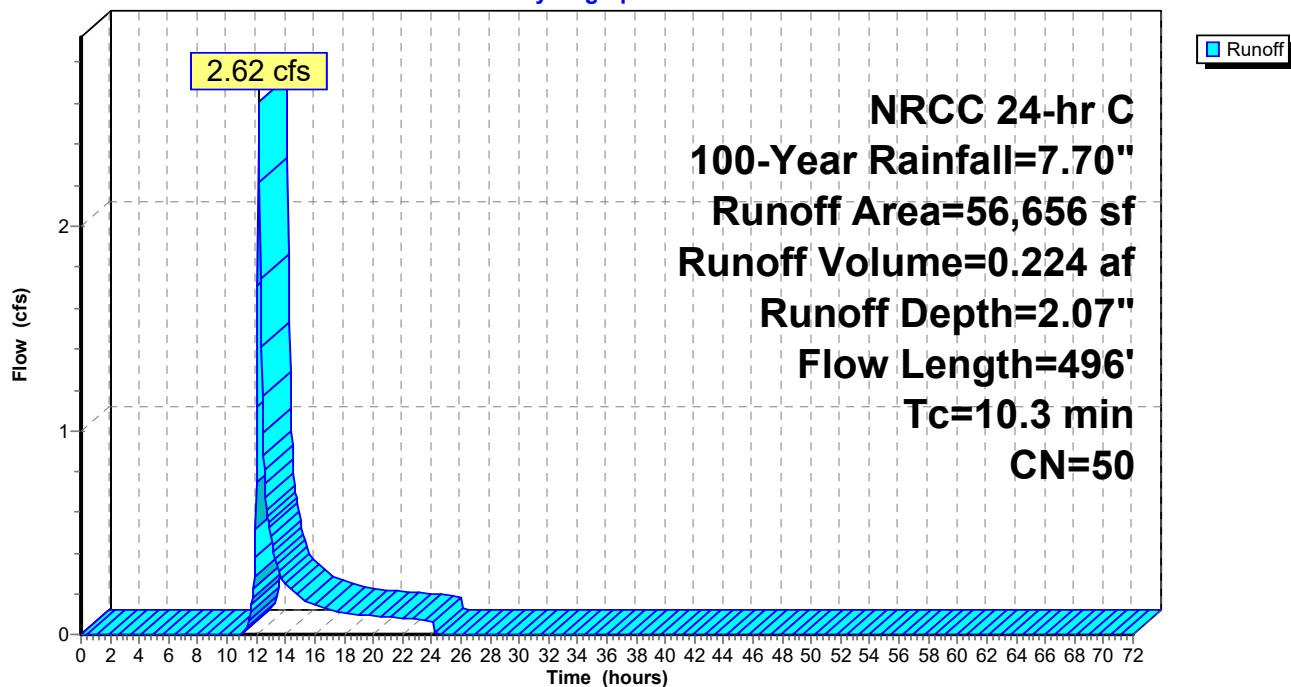
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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			

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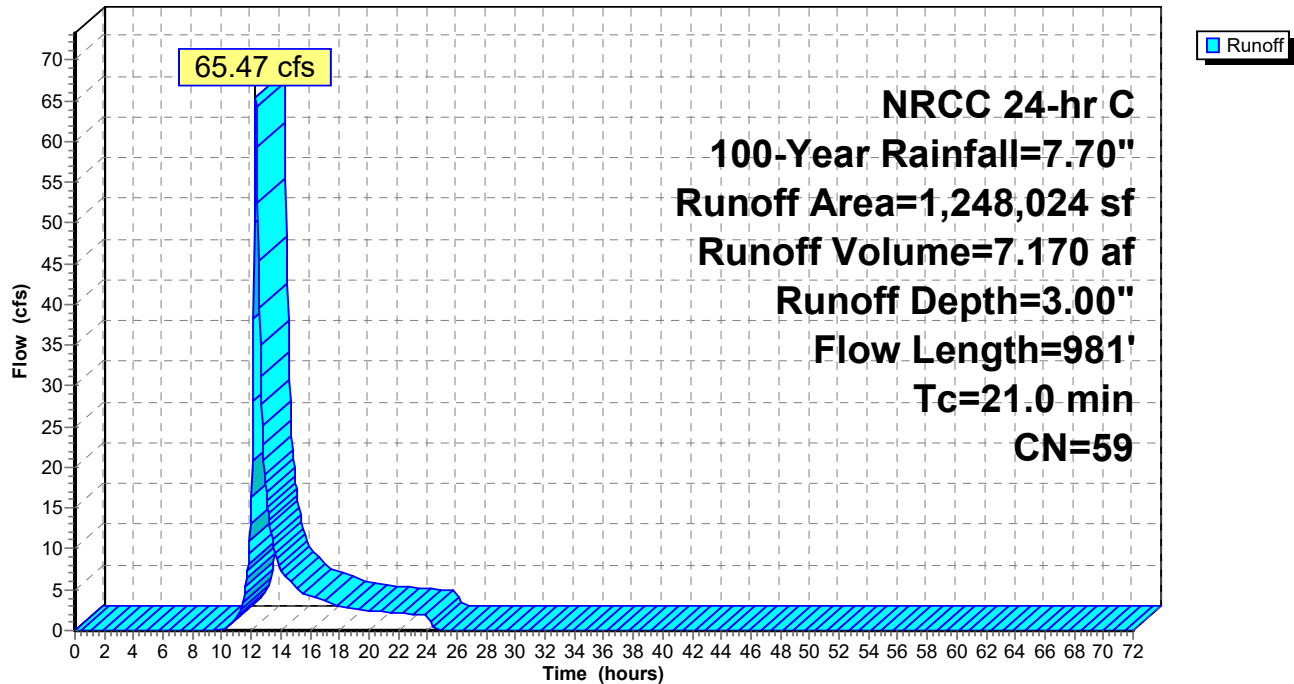
NRCC 24-hr C 100-Year Rainfall=7.70"

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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"

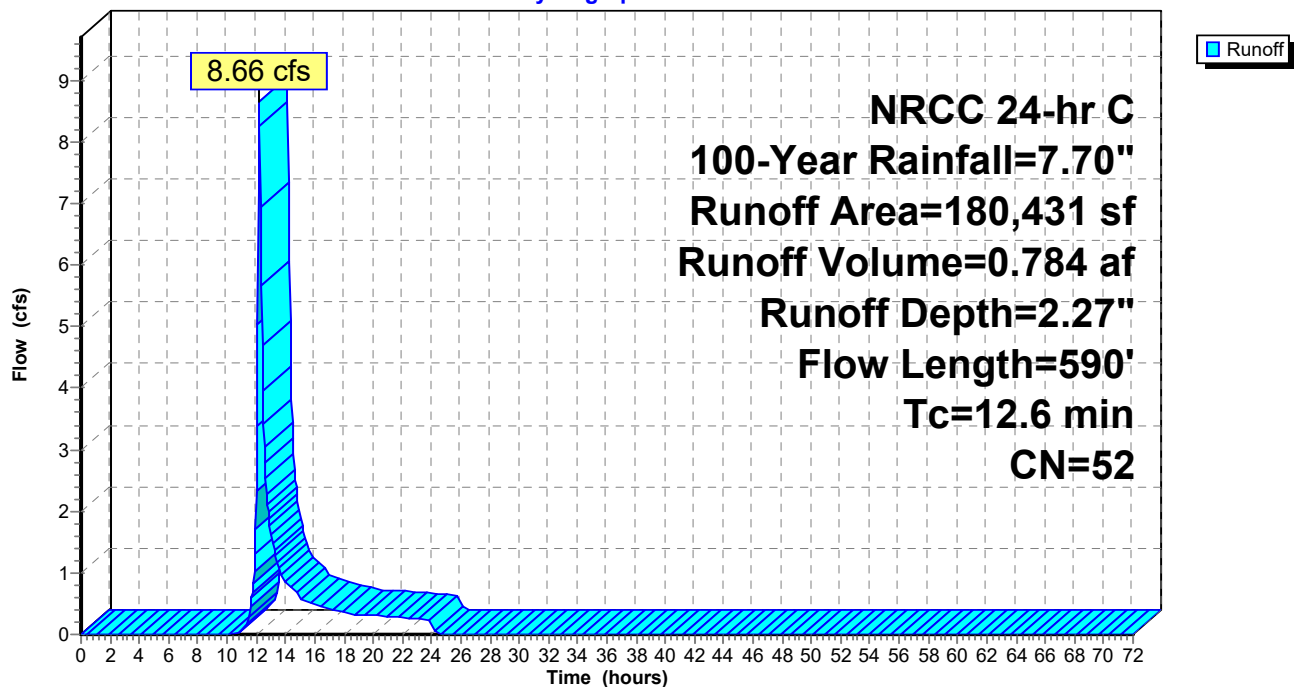
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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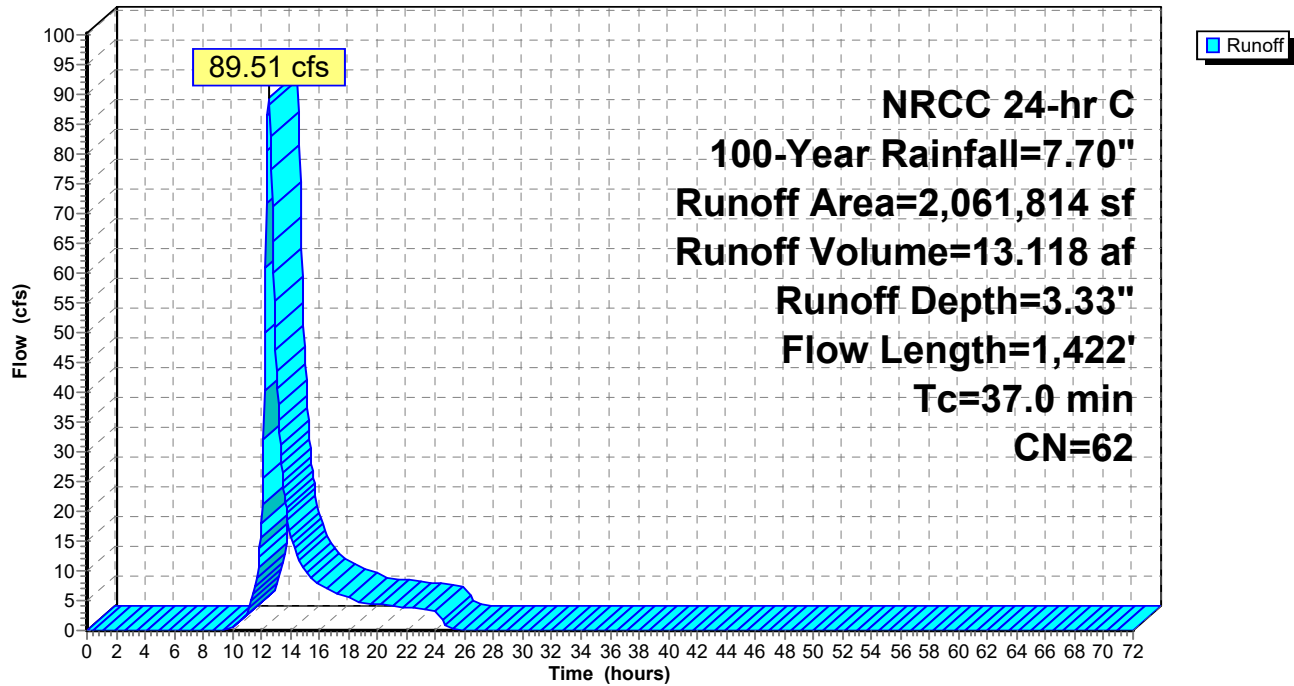
NRCC 24-hr C 100-Year Rainfall=7.70"

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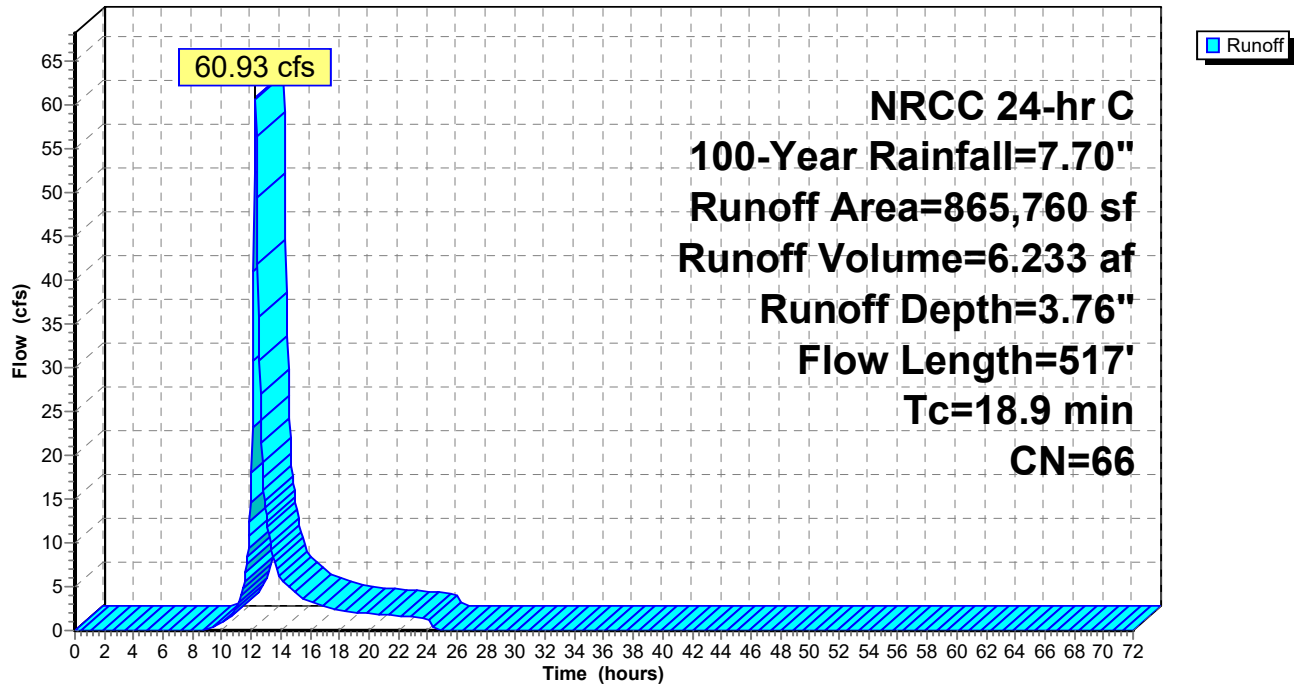
NRCC 24-hr C 100-Year Rainfall=7.70"

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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"

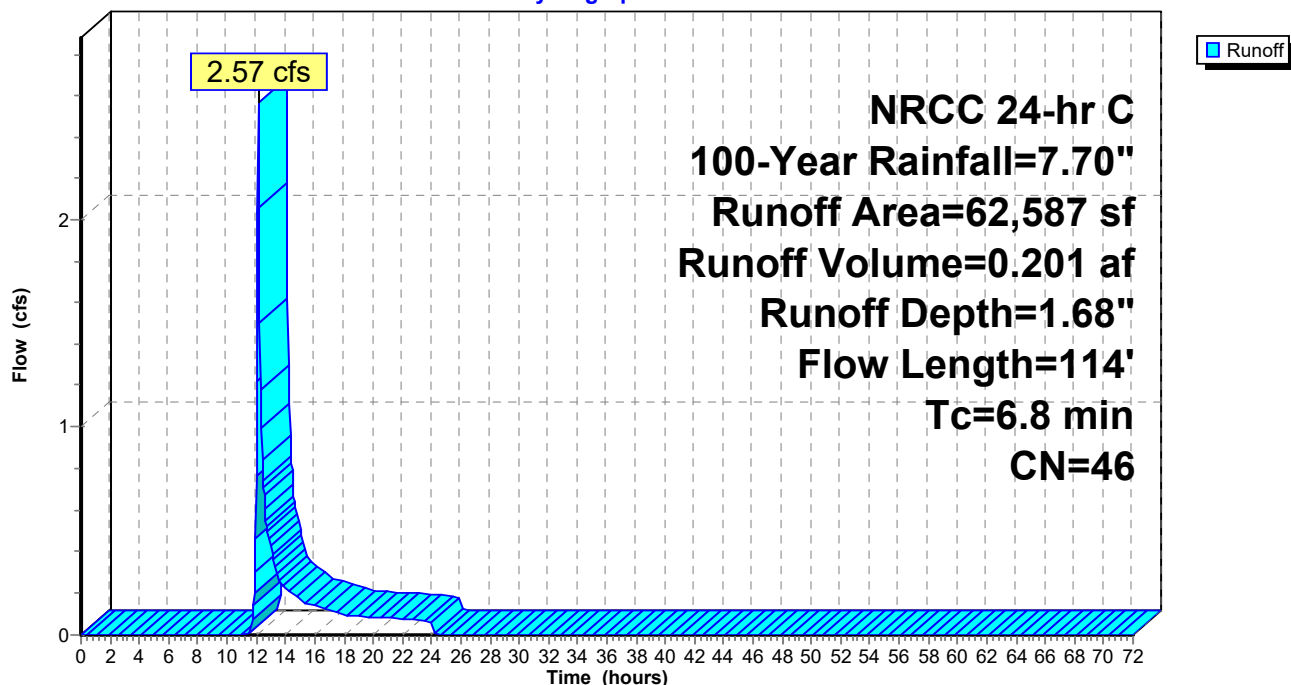
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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"

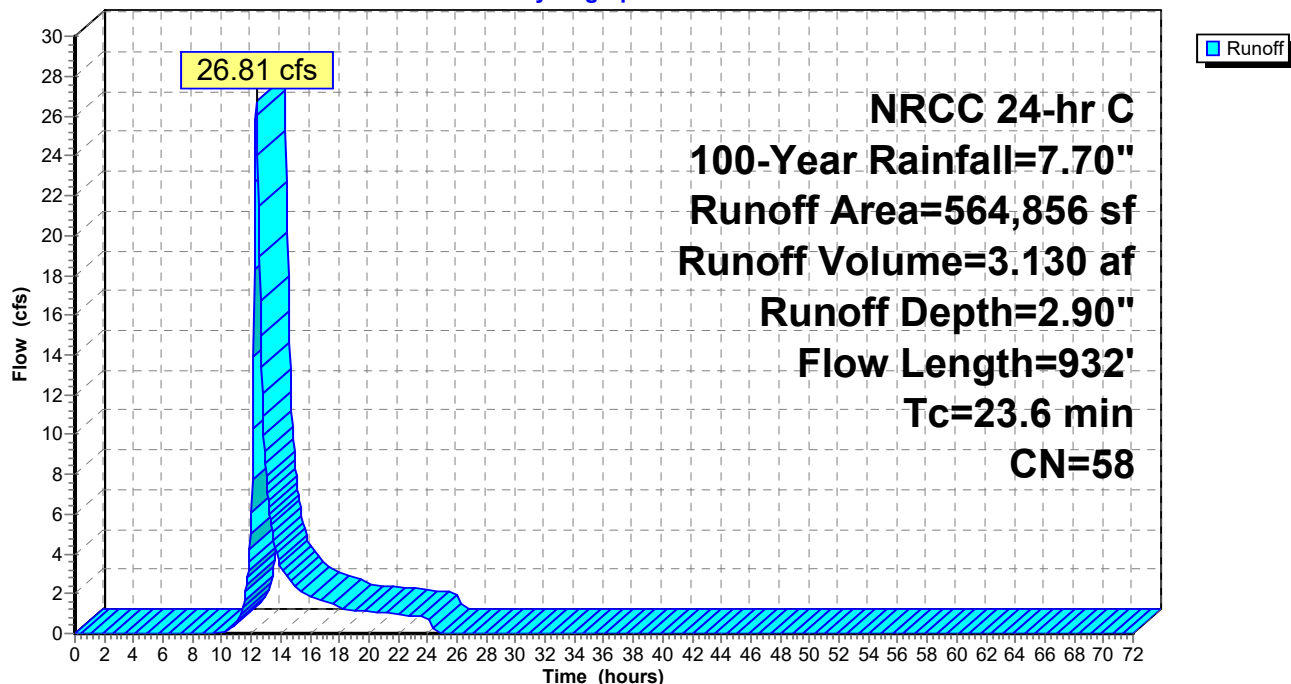
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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"

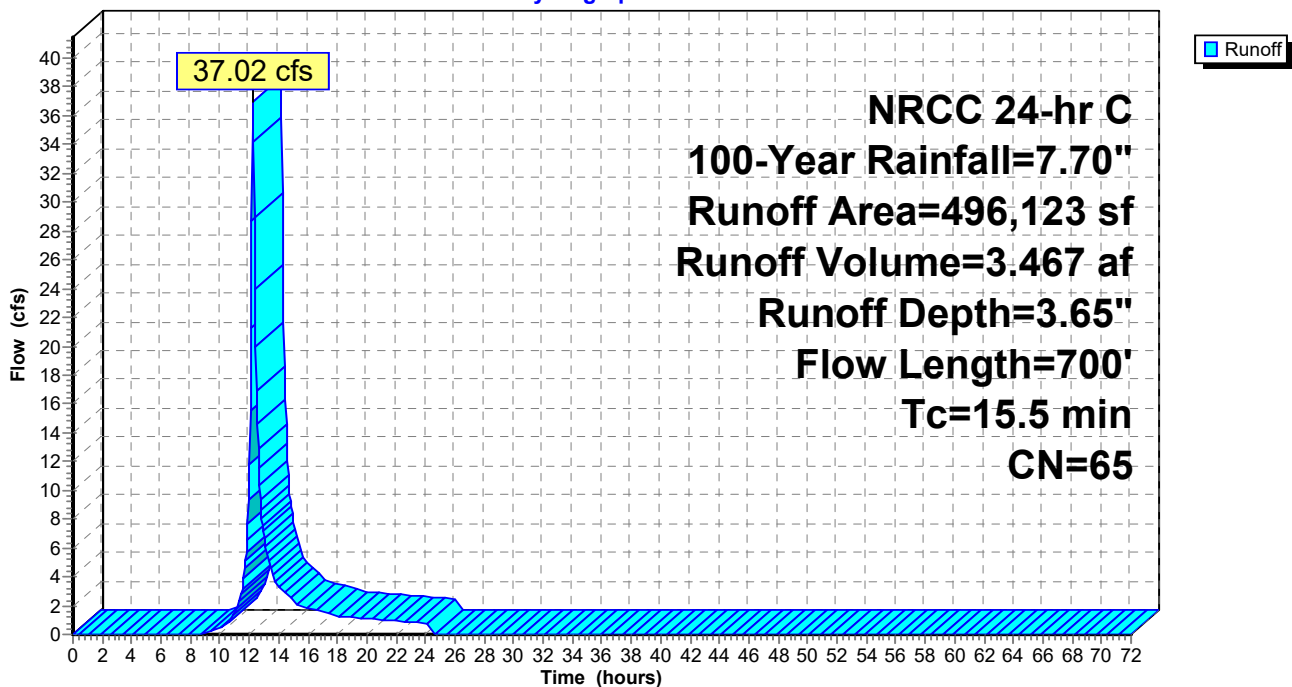
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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"

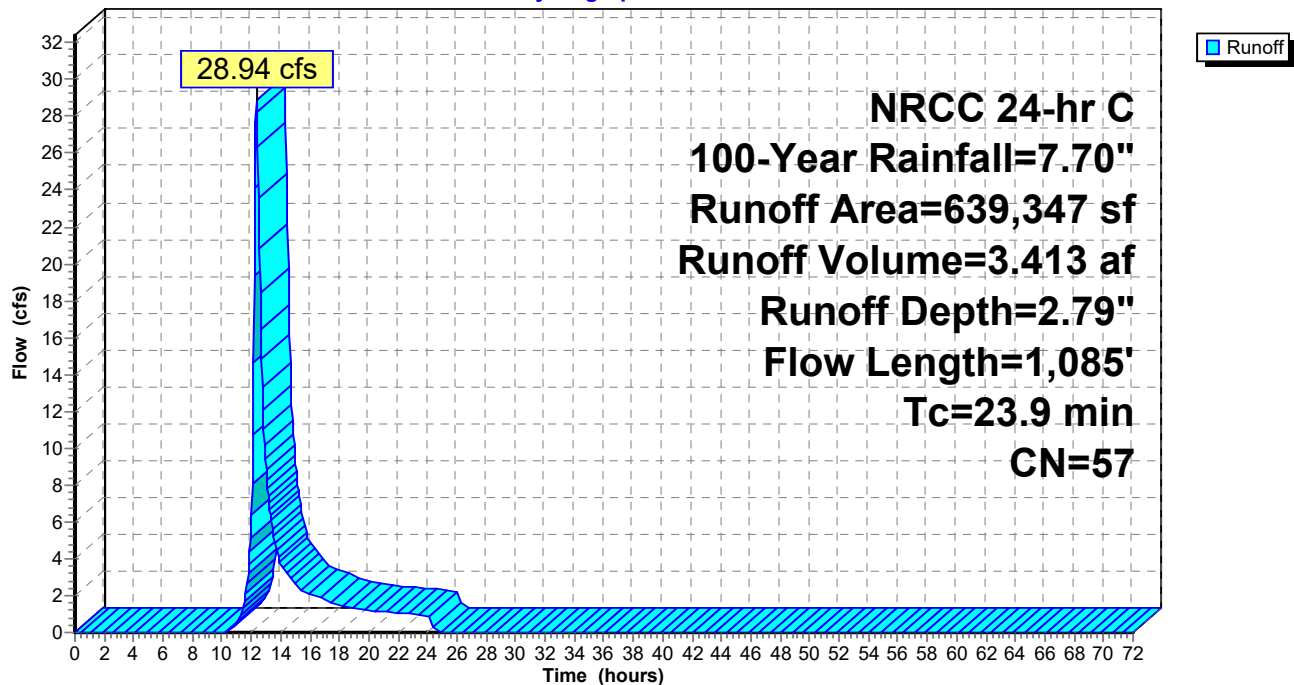
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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



Existing Hydrology

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Summary for Subcatchment E-8:

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

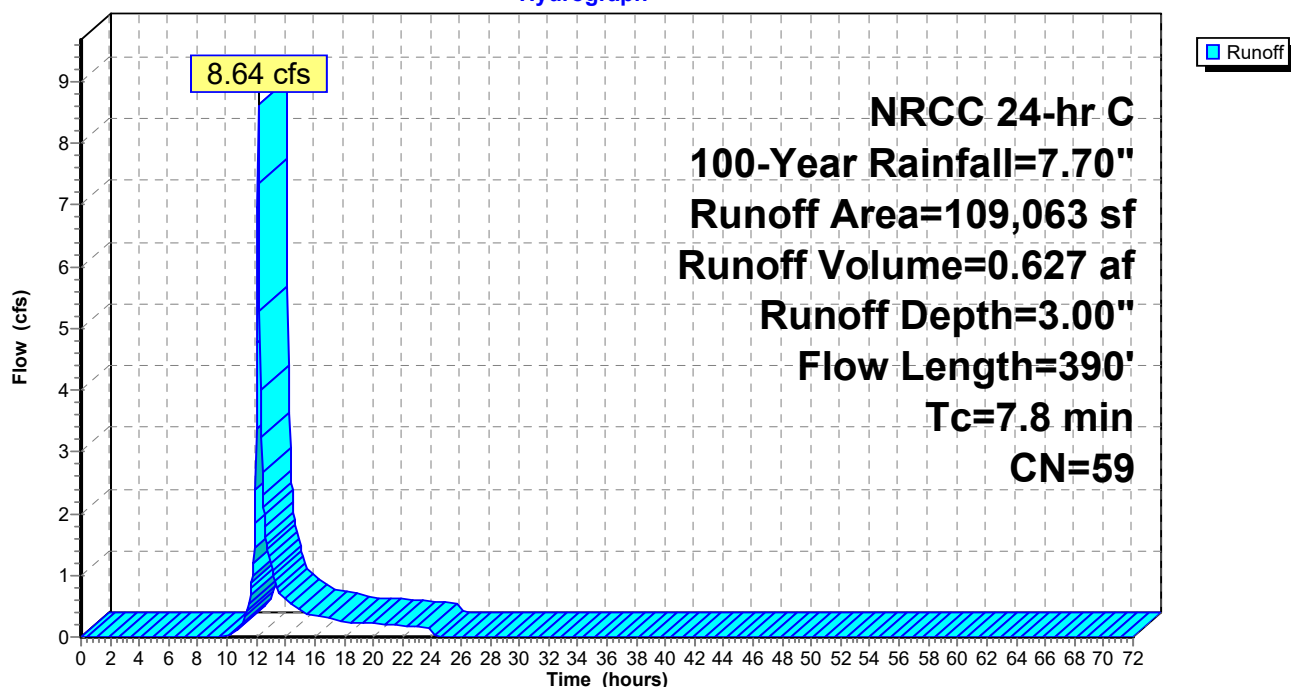
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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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Summary for Subcatchment E-9:

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

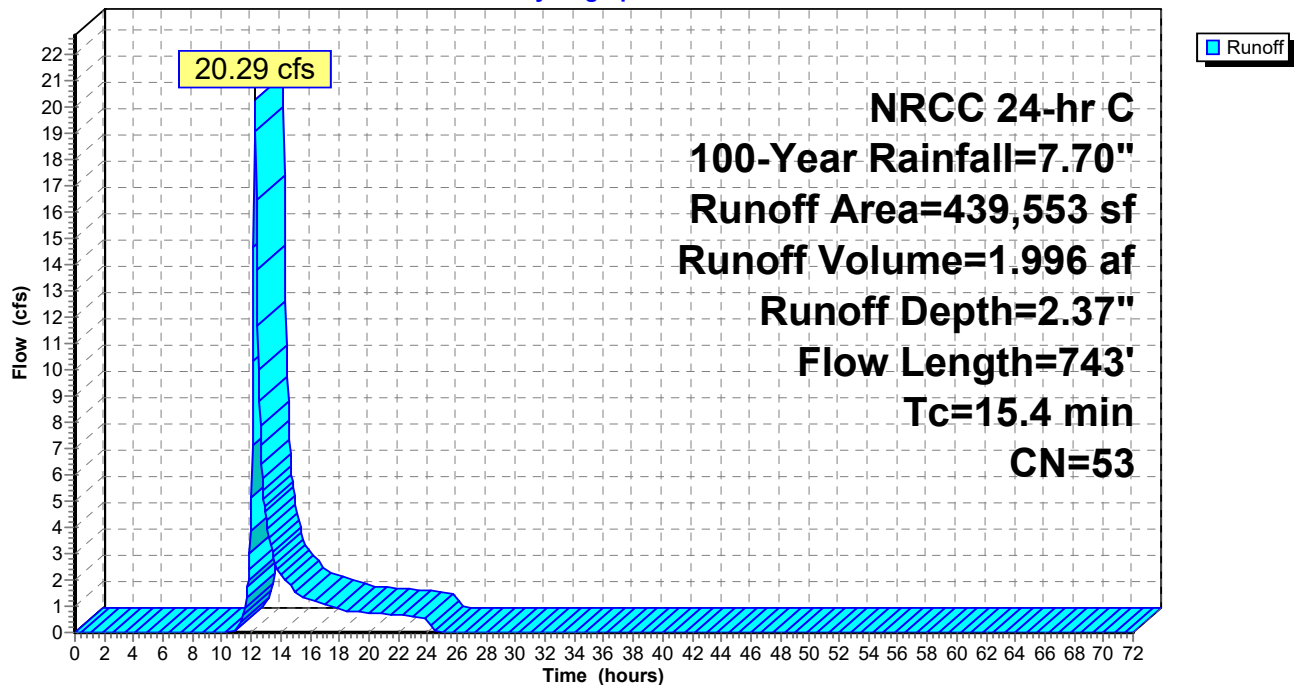
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=7.70"

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



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Summary for Reach DP-1: Wetland Series R

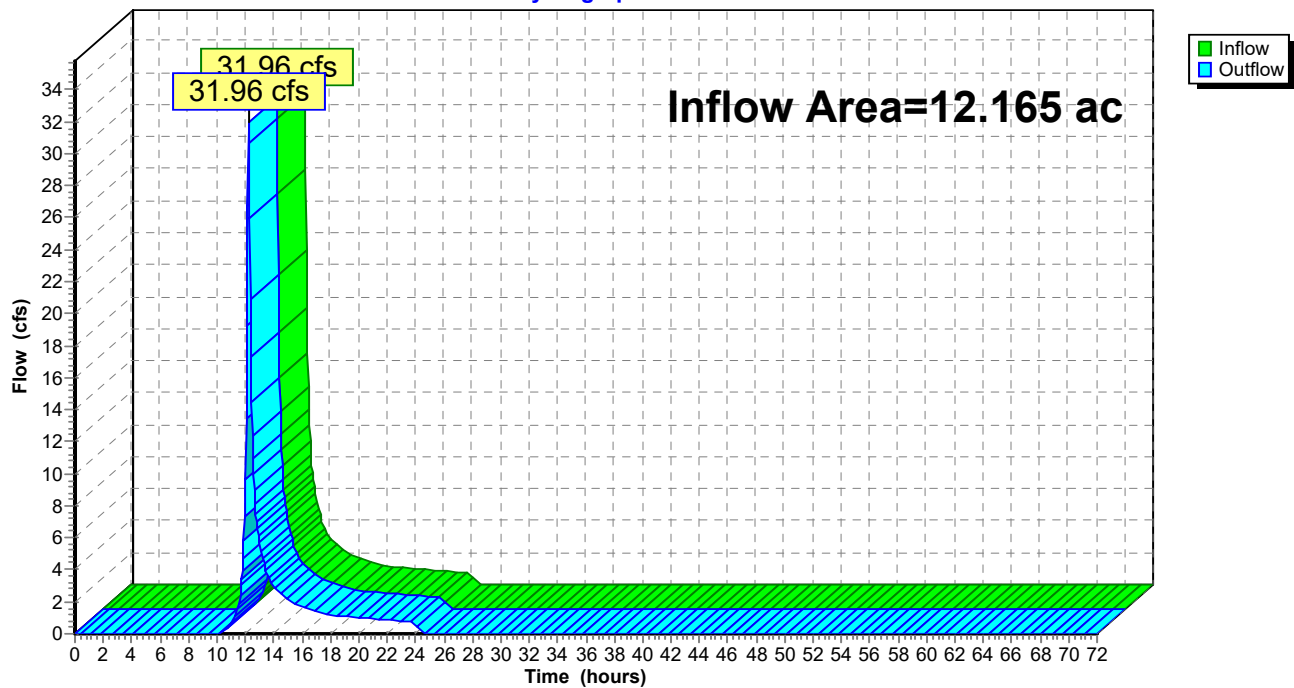
[40] Hint: Not Described (Outflow=Inflow)

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

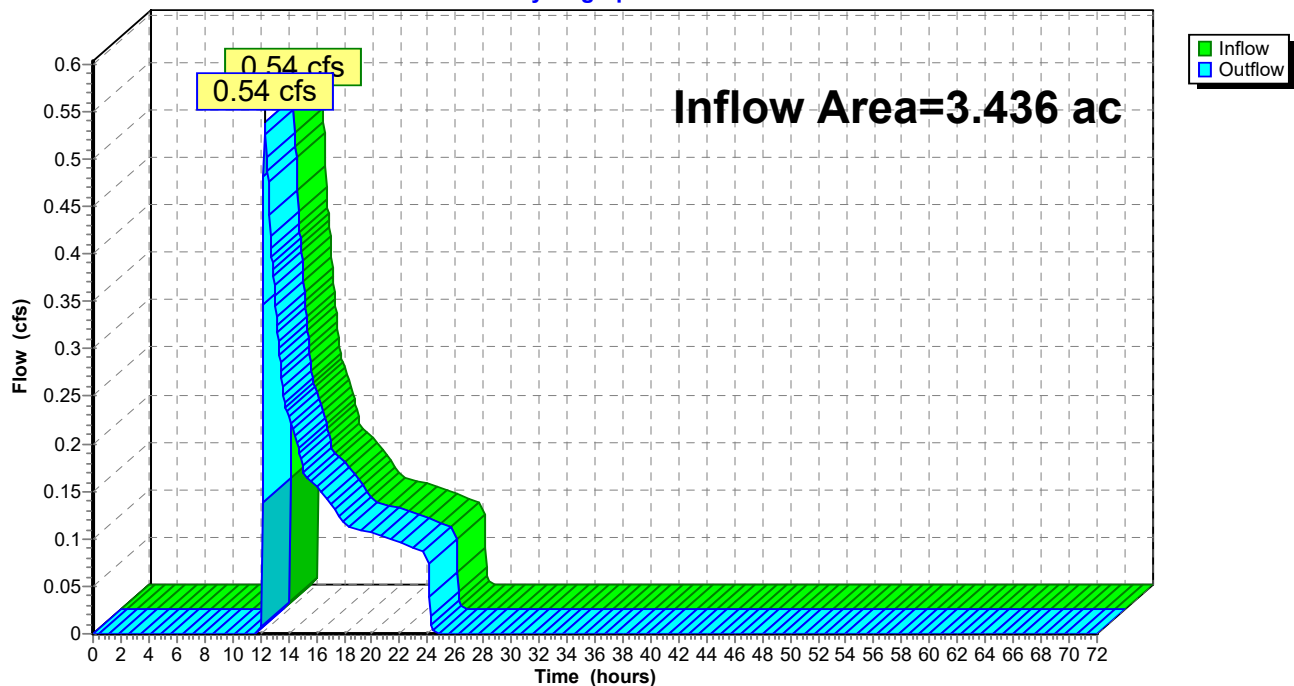
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.436 ac, 3.33% Impervious, Inflow Depth = 0.55" for 100-Year event
Inflow = 0.54 cfs @ 12.35 hrs, Volume= 0.158 af
Outflow = 0.54 cfs @ 12.35 hrs, Volume= 0.158 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

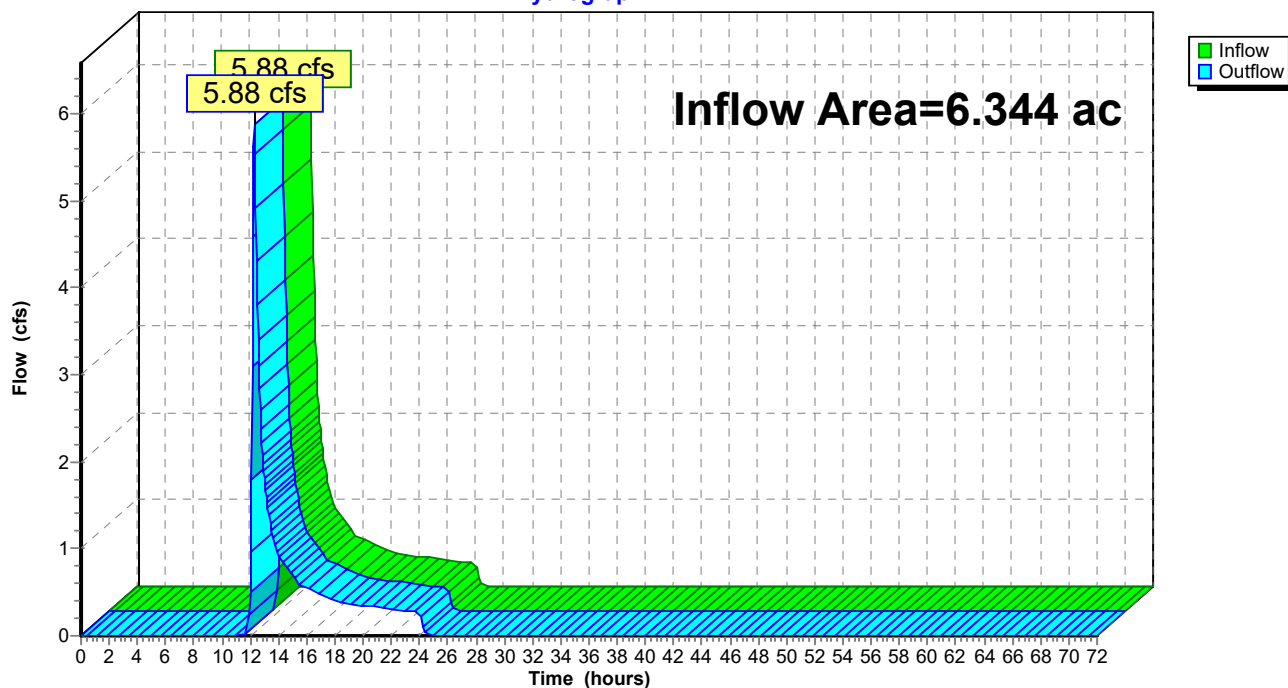
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 6.344 ac, 6.32% Impervious, Inflow Depth = 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



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Summary for Reach DP-12: Wetland Series A

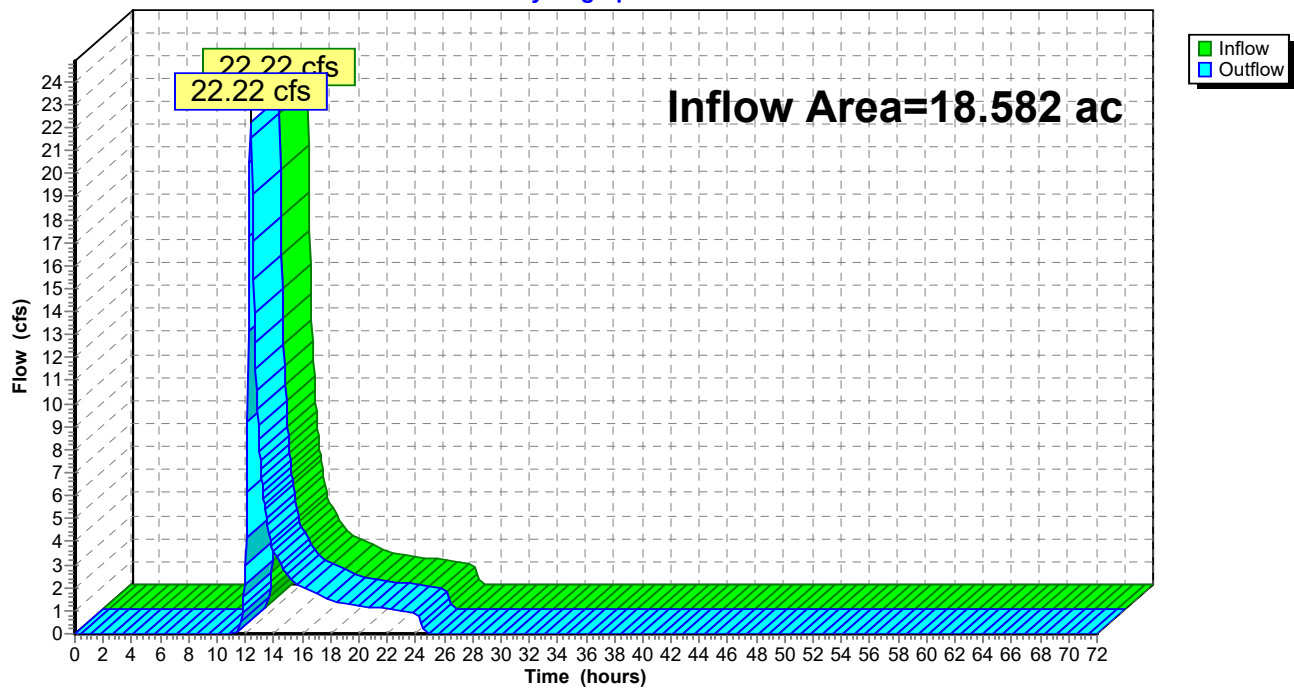
[40] Hint: Not Described (Outflow=Inflow)

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



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Summary for Reach DP-13: Wetland Series B

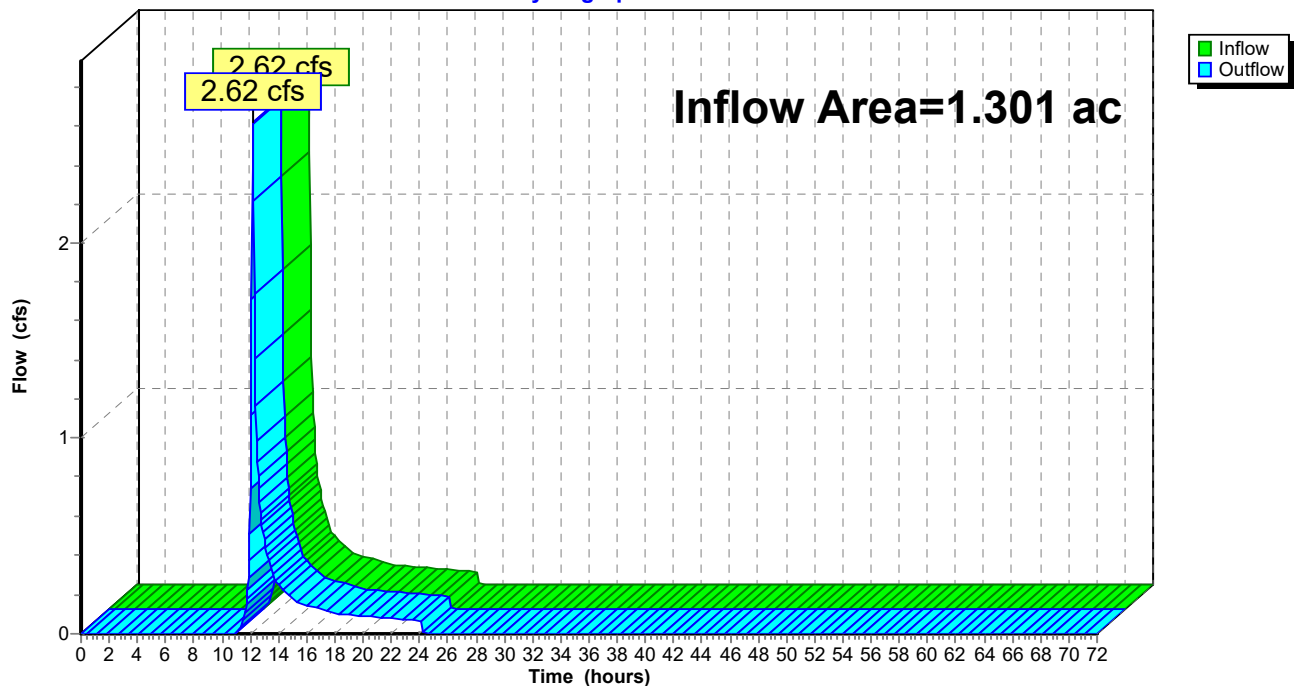
[40] Hint: Not Described (Outflow=Inflow)

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



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

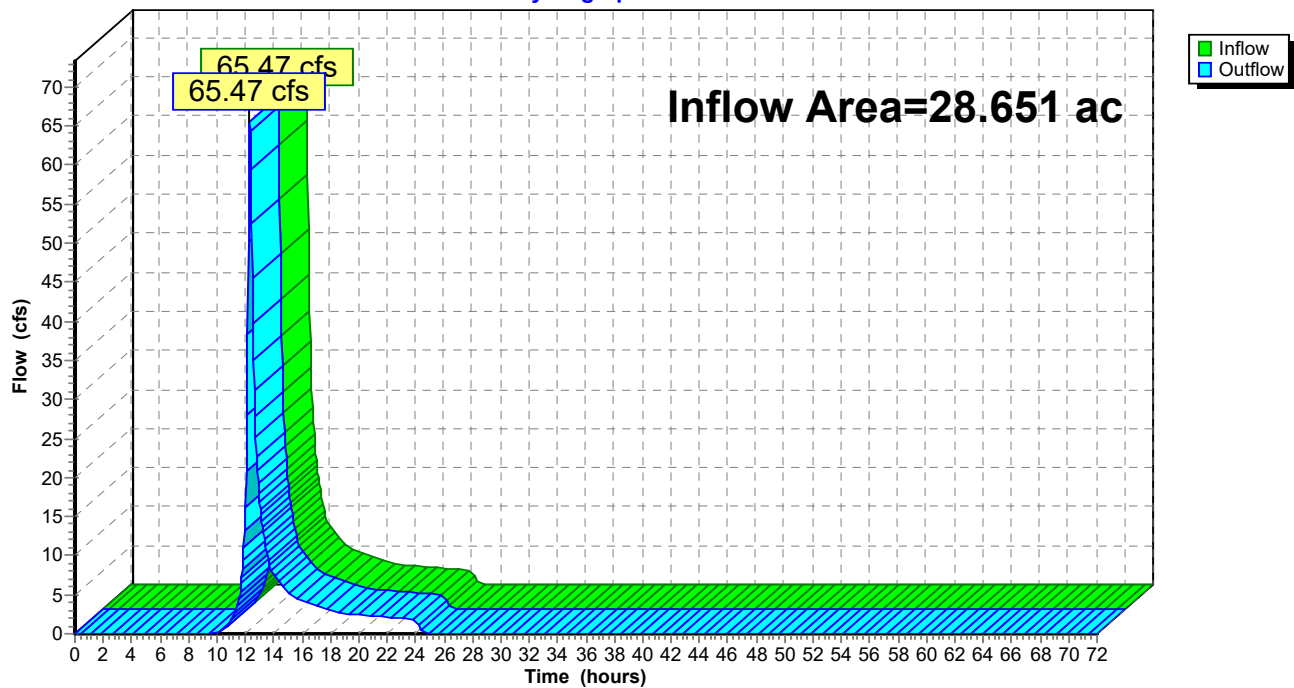
[40] Hint: Not Described (Outflow=Inflow)

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



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Summary for Reach DP-15: Wetland Series H

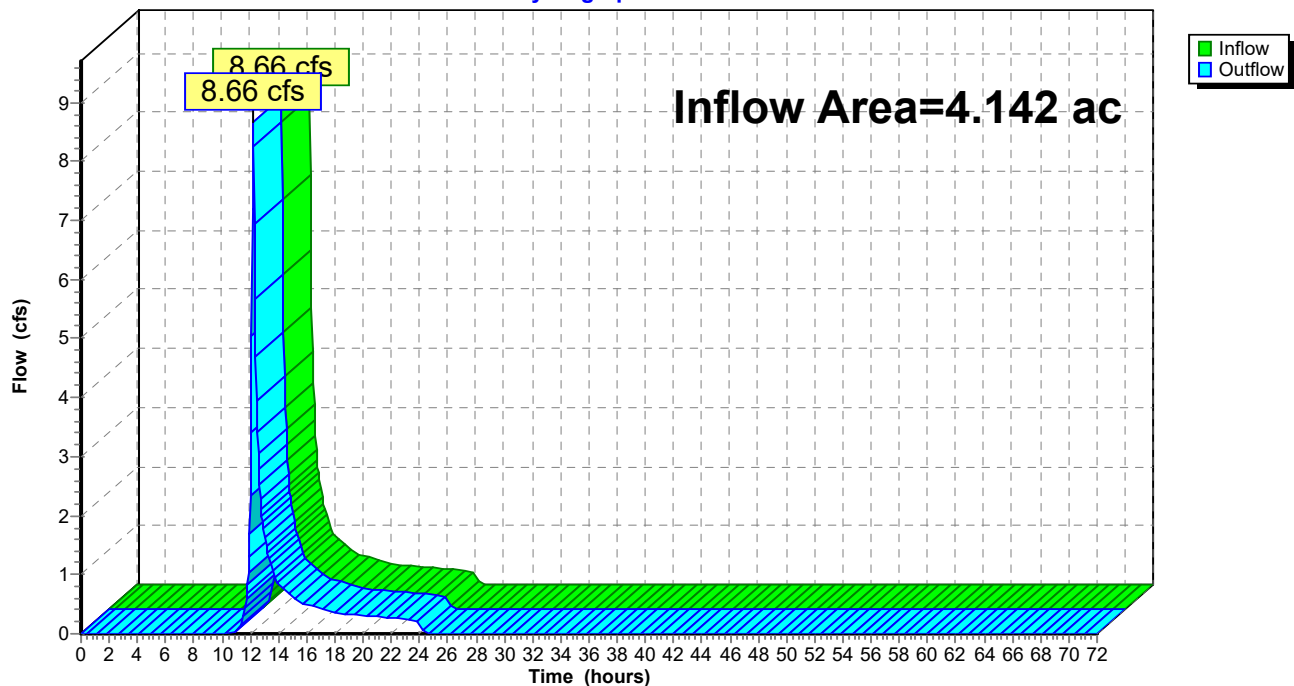
[40] Hint: Not Described (Outflow=Inflow)

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



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Summary for Reach DP-2: Wetland Series I

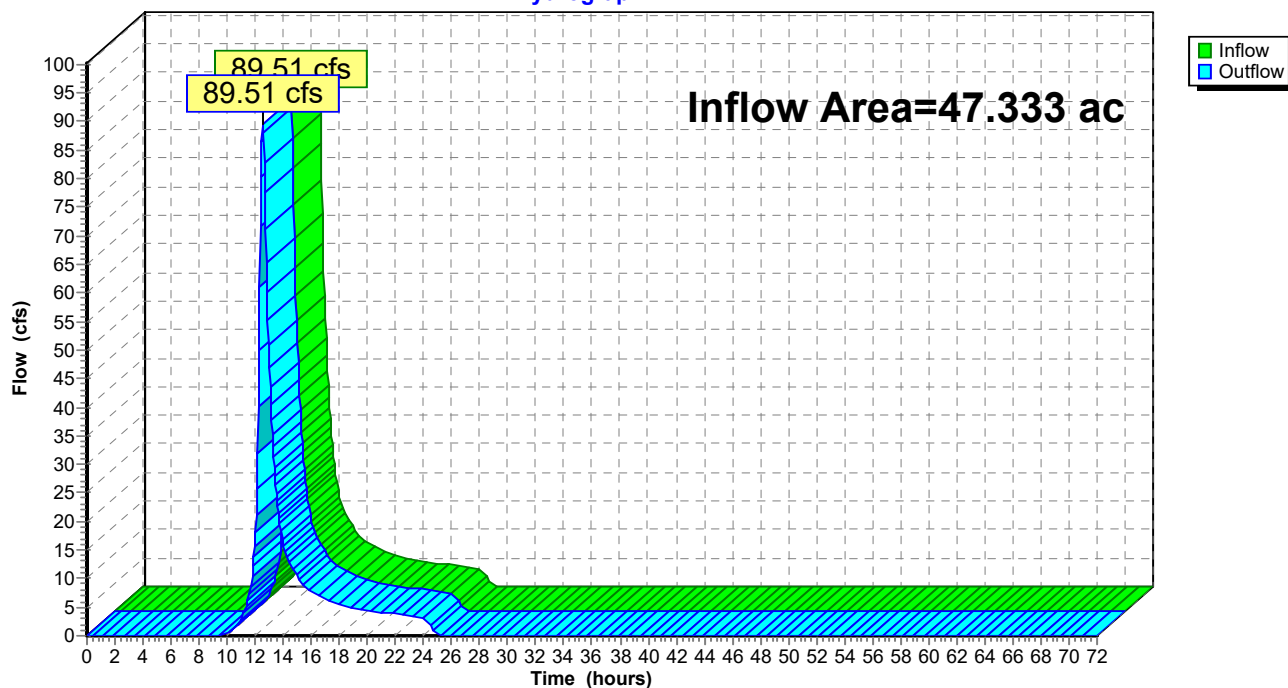
[40] Hint: Not Described (Outflow=Inflow)

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



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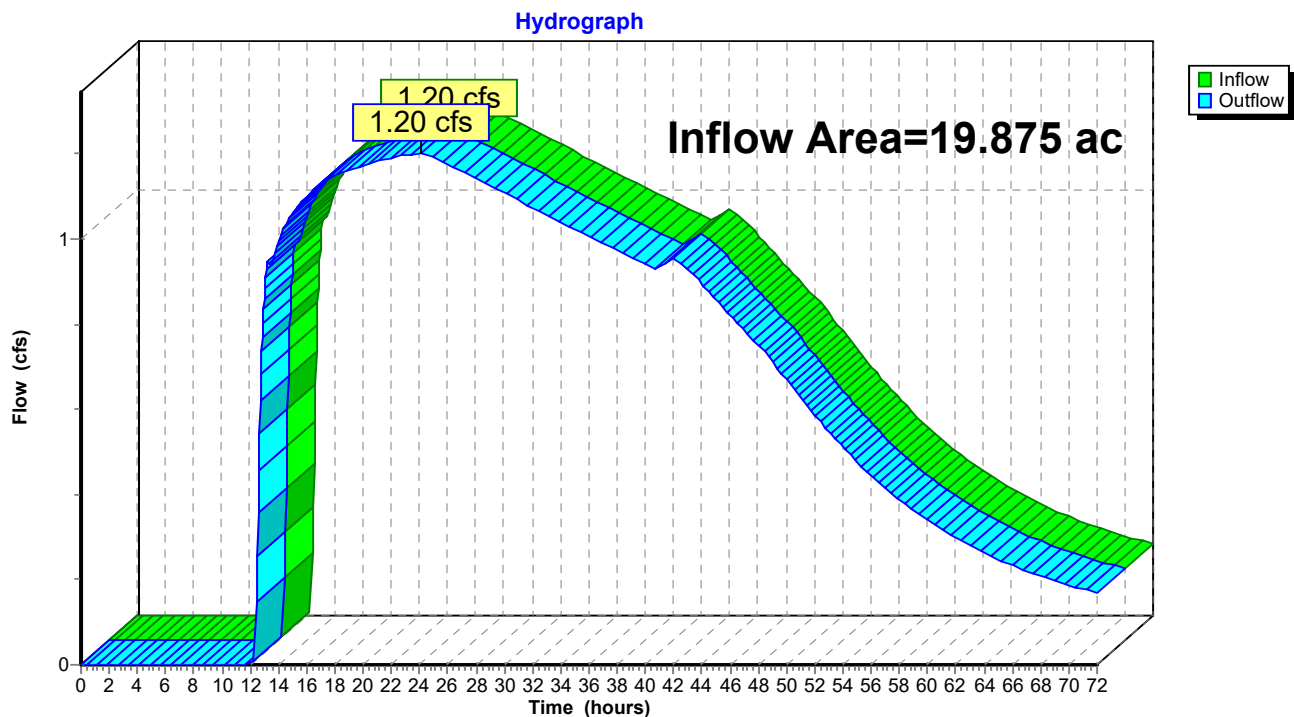
Summary for Reach DP-3: 8" Copper Pipe

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

Inflow Area = 19.875 ac, 21.40% Impervious, Inflow Depth > 2.30" for 100-Year event
Inflow = 1.20 cfs @ 24.15 hrs, Volume= 3.813 af
Outflow = 1.20 cfs @ 24.15 hrs, Volume= 3.813 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: 8" Copper Pipe



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Summary for Reach DP-4: Dwelley Street

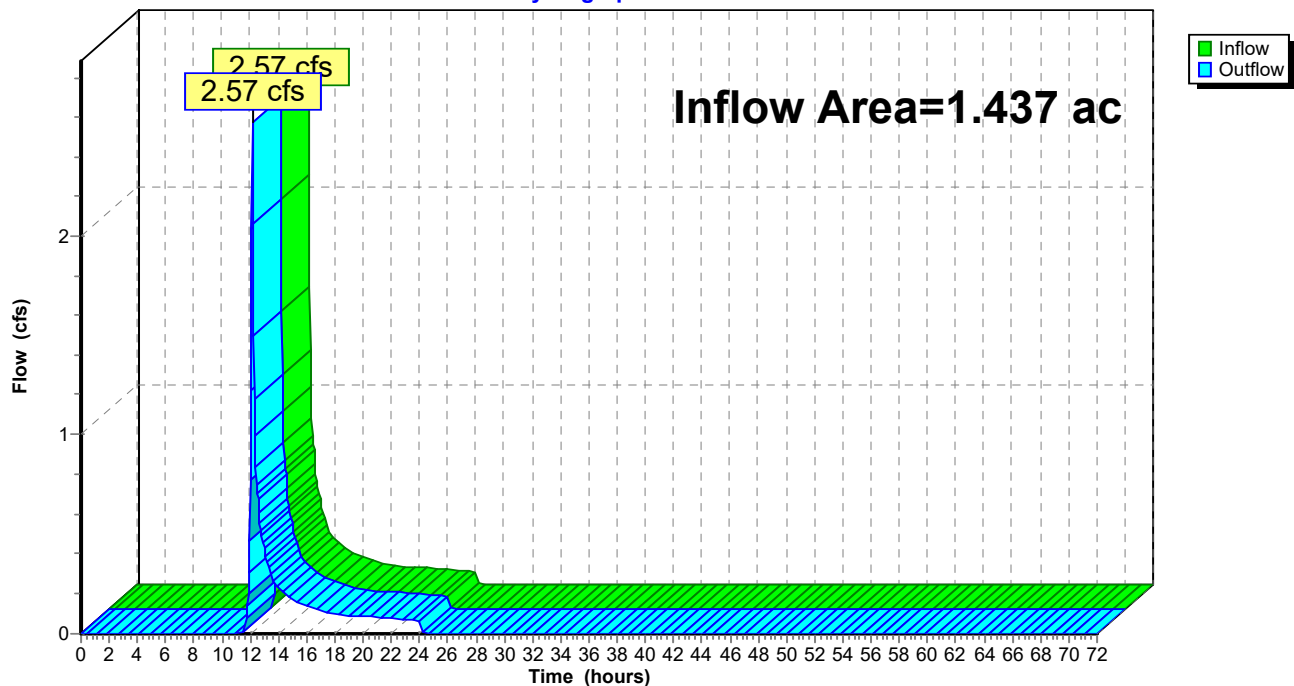
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.437 ac, 6.36% Impervious, Inflow Depth = 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



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Summary for Reach DP-5: 24" RCP PIPE

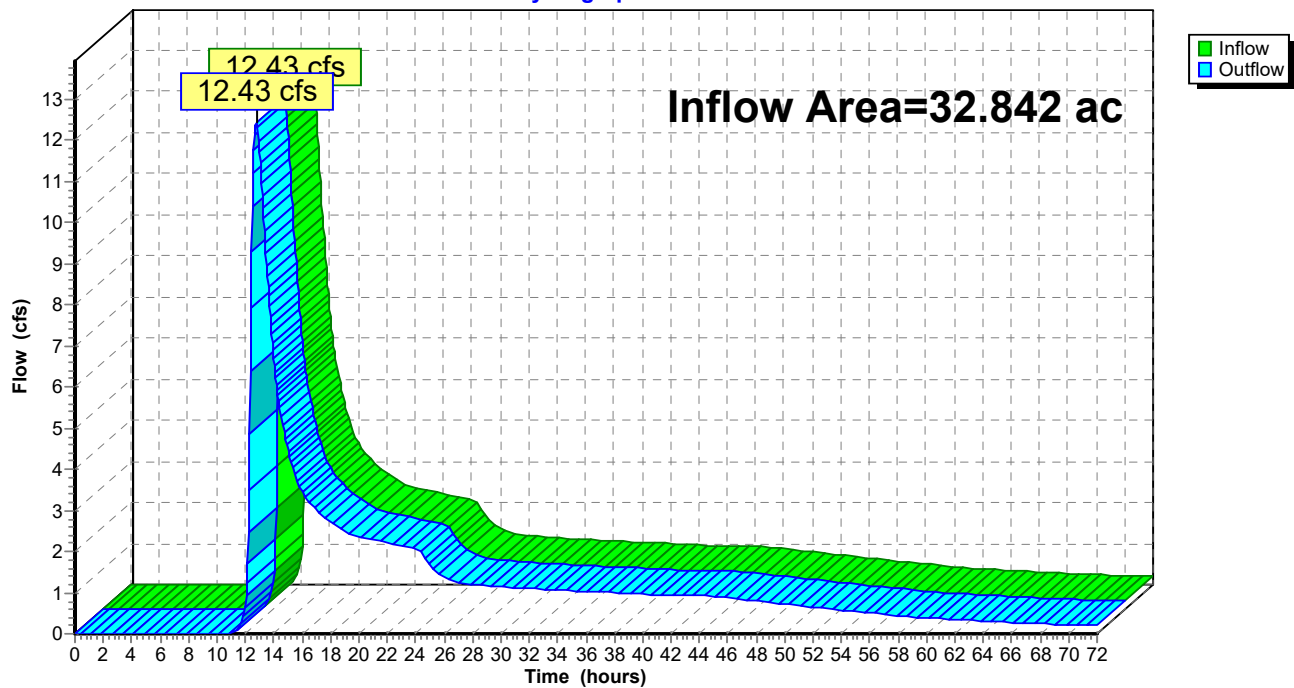
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.842 ac, 12.95% Impervious, Inflow Depth > 2.50" for 100-Year event
Inflow = 12.43 cfs @ 12.77 hrs, Volume= 6.856 af
Outflow = 12.43 cfs @ 12.77 hrs, Volume= 6.856 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: 24" RCP PIPE

Hydrograph



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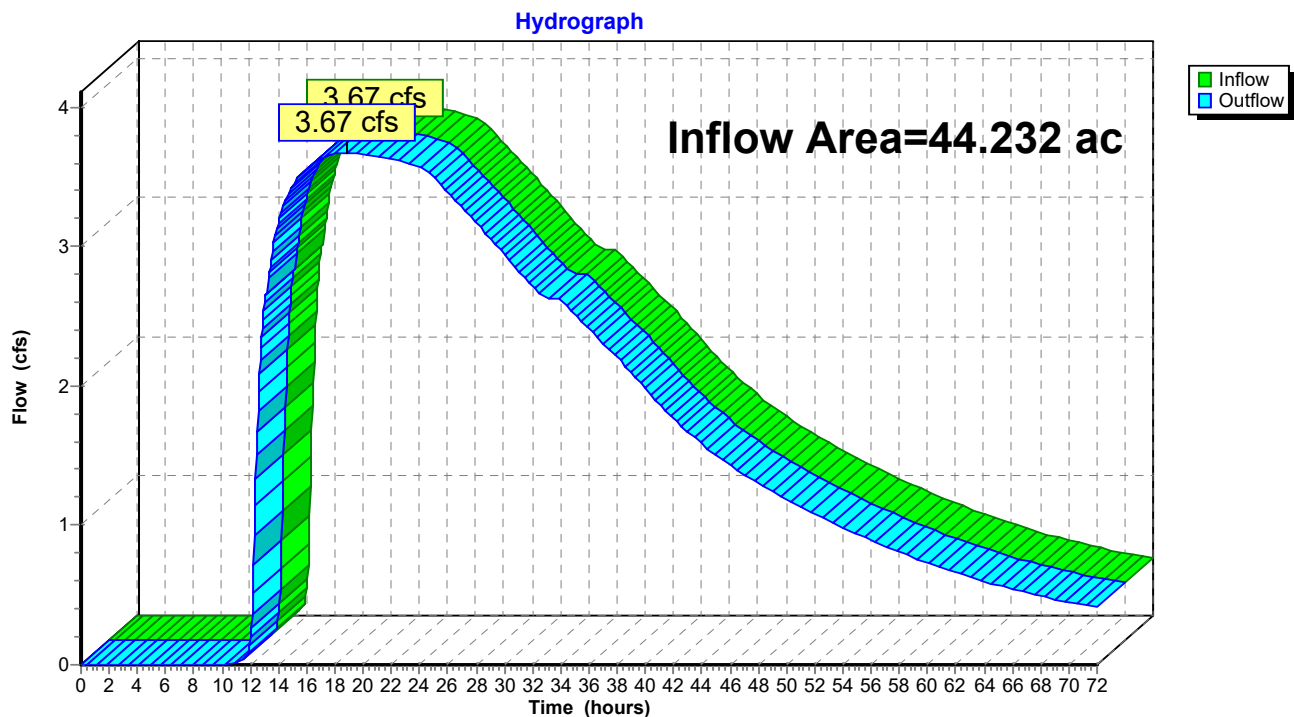
Summary for Reach DP-6: 12" RCP PIPE

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

Inflow Area = 44.232 ac, 9.62% Impervious, Inflow Depth > 2.61" for 100-Year event
Inflow = 3.67 cfs @ 18.83 hrs, Volume= 9.608 af
Outflow = 3.67 cfs @ 18.83 hrs, Volume= 9.608 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-6: 12" RCP PIPE



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Summary for Reach DP-7: 12" RCP PIPE

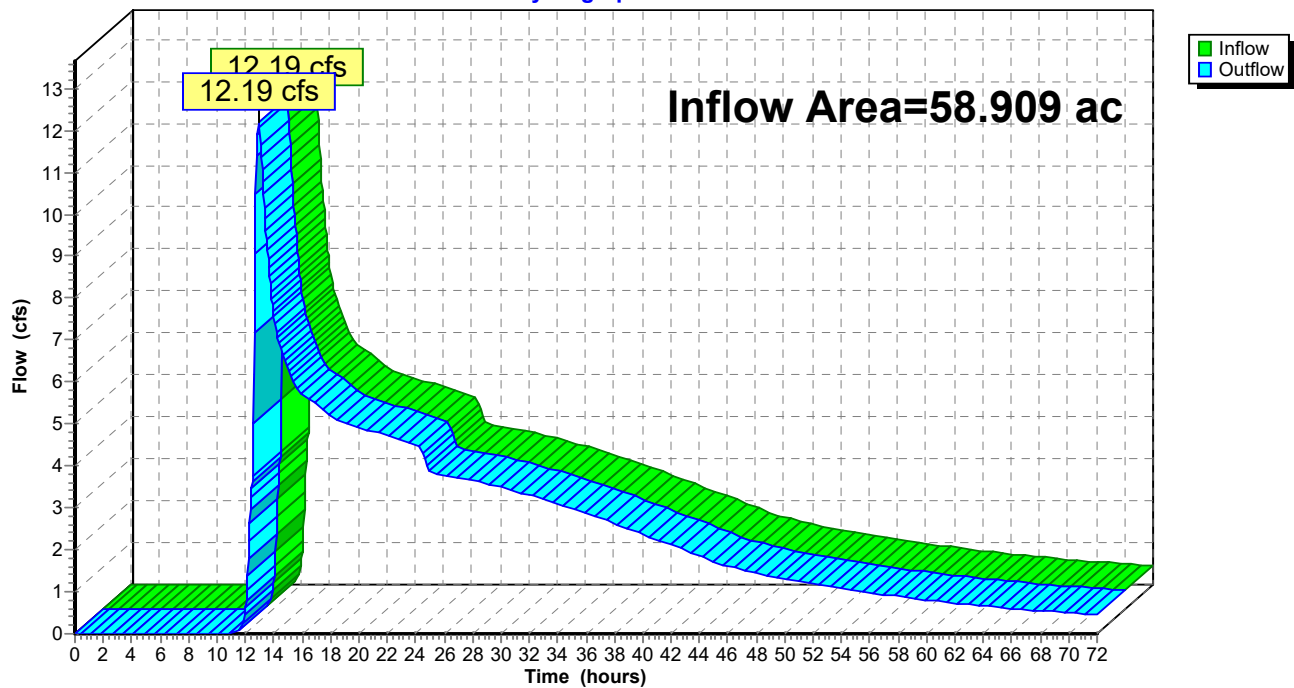
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 58.909 ac, 8.50% Impervious, Inflow Depth > 2.62" for 100-Year event
Inflow = 12.19 cfs @ 12.94 hrs, Volume= 12.873 af
Outflow = 12.19 cfs @ 12.94 hrs, Volume= 12.873 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: 12" RCP PIPE

Hydrograph



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Summary for Reach DP-8: Wetlands Series X

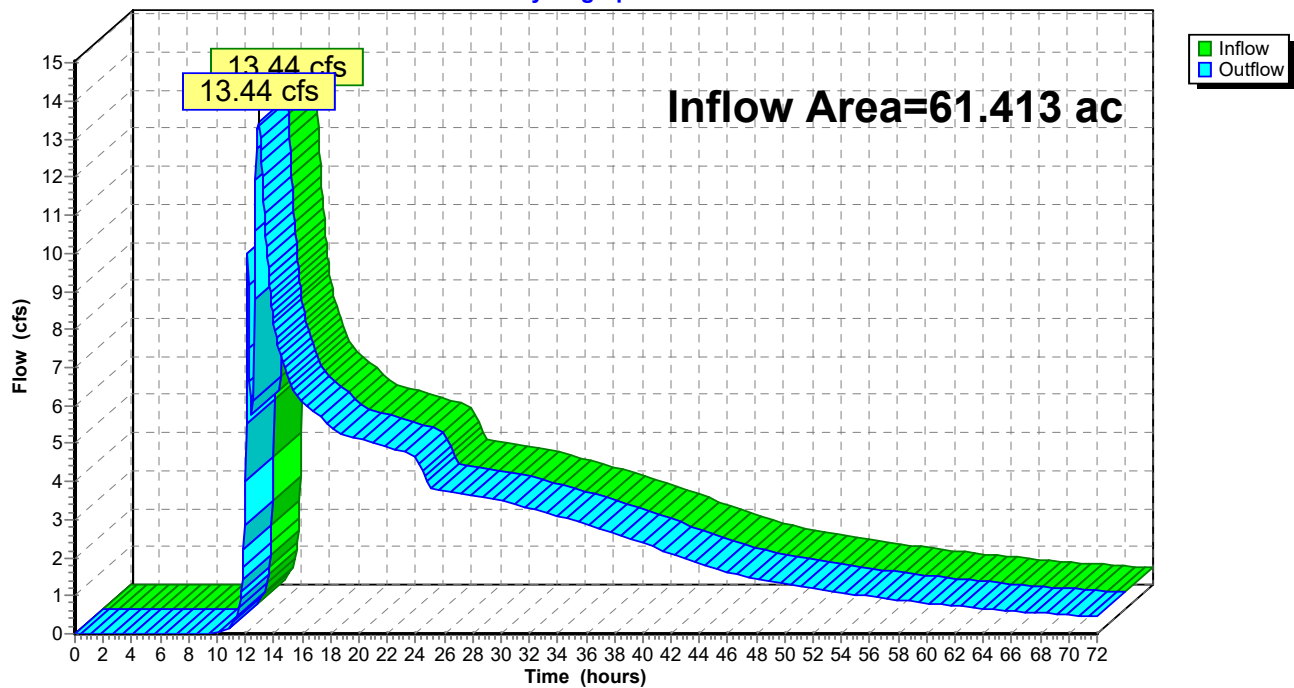
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.413 ac, 8.45% Impervious, Inflow Depth > 2.64" for 100-Year event
Inflow = 13.44 cfs @ 12.92 hrs, Volume= 13.499 af
Outflow = 13.44 cfs @ 12.92 hrs, Volume= 13.499 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

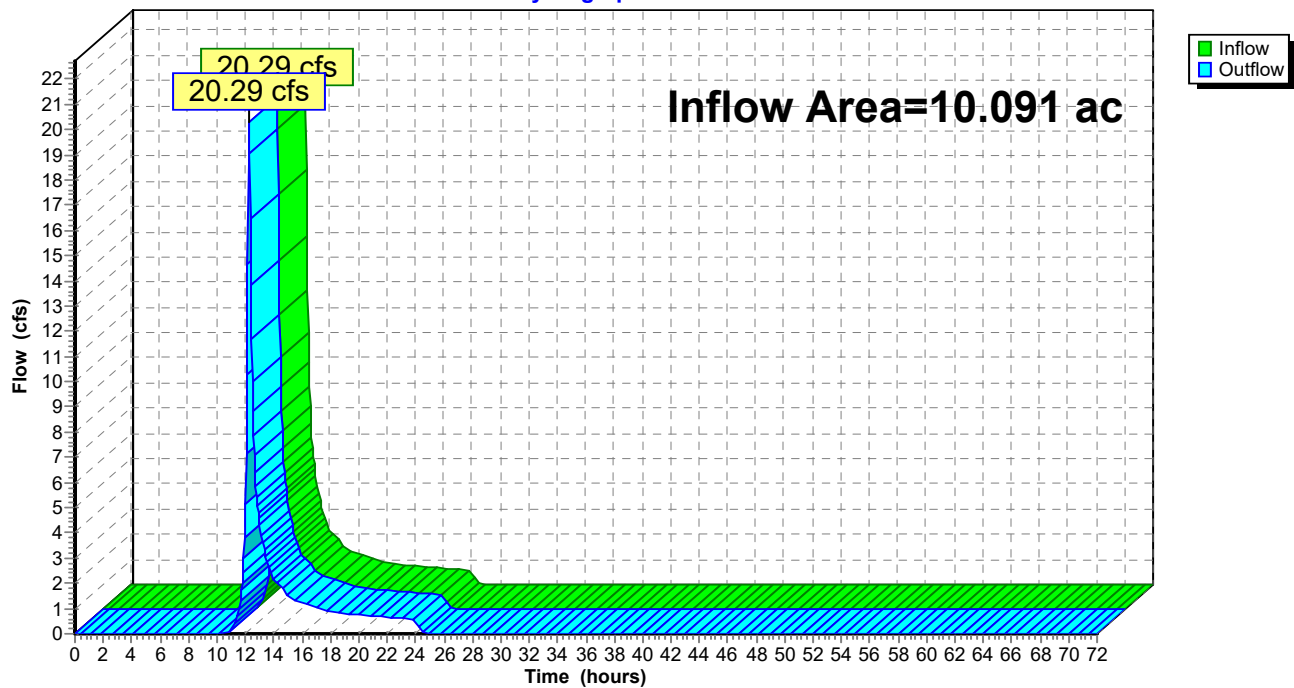
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 10.091 ac, 31.90% Impervious, Inflow Depth = 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

Hydrograph



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Summary for Reach DP-ELM: West Elm Street

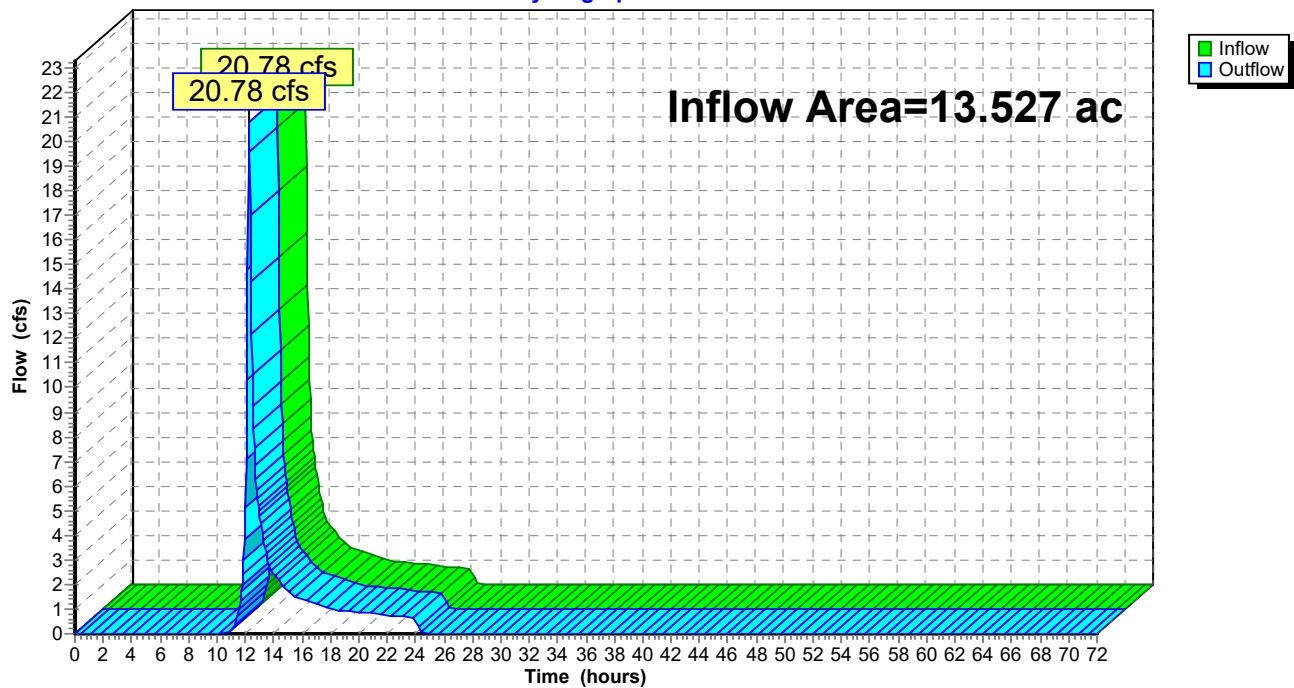
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.527 ac, 24.64% Impervious, Inflow Depth = 1.91" for 100-Year event
Inflow = 20.78 cfs @ 12.25 hrs, Volume= 2.155 af
Outflow = 20.78 cfs @ 12.25 hrs, Volume= 2.155 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

