Stormwater Management Report

Industrial Site Preparation

Gales Ferry, Connecticut

September 28, 2023
Revised September 24, 2024
Revised November 7, 2024

Prepared for

Gales Ferry Intermodal, LLC

549 South Street

Quincy, MA 02169

Loureiro
Engineering • Construction • EH&S • Energy
Waste • Facility Services • Laboratory

Loureiro Engineering Associates, Inc.
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An Employee-Owned Company

Comm. No. 045JC2.06

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Table of Contents

1. INTRODUCTION

This stormwater management report has been prepared by Loureiro Engineering Associates, Inc. (Loureiro) on behalf of Gales Ferry Intermodal LLC to provide a description and calculations for the stormwater management for site regrading and preparation for future industrial development at 1761 Route 12 in Gales Ferry, Connecticut. The property is 165 acres with the proposed work encompassing approximately 38 acres of the property (hereinafter referred to as the "Site"). It is noteworthy that the drainage system designed for the project is an interim system that meets with the requirements included in the 2023 Drainage Manual. The use of this system is expected to be short-term, as the grading proposed is specifically designed to facilitate the development of building plots for industrial use in the future, which would follow shortly after the grading is complete.

1.1 Physical Setting

The subject property is approximately 165 acres (ac) and is located in the Industrial zone (I). The property is the site of the former DOW Chemical manufacturing facility and has been an industrial use for years. A portion of the property is currently used for the manufacturing of Styrofoam products by Americas Styrenics, a tenant of the property. The DOW Chemical facilities at the property terminated their manufacturing existence in 2011 and the former DOW Chemical manufacturing buildings have been removed from the property. The property has rail service with a rail siding and waterfront with an existing pier.

The property has inland wetlands as well as Allyn's Pond. One wetland referenced as the Z series wetland located to the east of the proposed grading activities will be eliminated. Wetlands referenced as the X and Y series may be impacted by the proposed activities due to the removal of a portion of the contributing watershed due to the proposed grading. Wetland mitigation was proposed and approved by the Town of Ledyard Inland Wetlands and Watercourses Commission.

The eastern boundary is bordered by Route 12 as well as some smaller industrial lots and a church that is in the R-40 zone. The western boundary is the Thames River. The northern boundary are residential lots in the R-40 zone. The southern boundary is bordered by properties zoned Commercial Marine (CM) and R-20.

1.2 Flood Plain and Soil Conditions

Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) Flood Insurance Rate Map (FIRM) Number 09011C0354G, effective July 18, 2011, for Town of

Ledyard identifies a portion of the property within the Zone AE (EL11) and Zone X. The only construction activities in areas of flood hazard are wetland mitigation activities. Appendix B includes the FEMA FIRM map for the Site.

The National Resource Conservation Service (NRCS) Soil Survey for the State of Connecticut identified soils within the Site area as Hinckley loamy sand (38E), Hollis-Chatfield-Rock Outcrop complex (75C, 75E, 76E), and as Urban Land (307). Hinckley loamy sand corresponds with the Hydrologic Soil Group (HSG) rating A, and Hollis-Chatfield-Rock outcrop complex corresponds with HSG rating D. Urban Land corresponds with the Hydrologic Soil Group (HSG) rating D. HSG A soils have high runoff potential, HSG B soils have moderately low runoff potential, and HSG D soils generally have slow or unpredictable infiltration rates correlating to high runoff potential. Appendix C includes the NRCS soil map for the site and surrounding area.

2. EVALUATION OF EXISTING CONDITIONS

2.1 Overview

The portion of the Site upon which the activities are proposed is currently undeveloped, with unpaved roads provided the only access to higher elevations of the Site. A transmission line and easement exist through the southern portion of the Site. The area of the Site is currently wooded or densely brushed, with zero percent (%) impervious coverage.

2.2 Existing Stormwater Management

The majority of the Site currently has no existing drainage or stormwater management features. The wetlands to the northeast and west are connected by metal or concrete culverts, flowing to the south and then to the west towards the Thames River. The wooded area of the Site currently is a hill that flows north or south from its peak. Flow downslope to the south flows offsite, while flow downslope to the north flows towards the wetland system or Thames River.

Through available survey information and field visitation, the wetland system has no ultimate outlet discharge to the Thames River.

2.3 Existing Subcatchment Areas

The total analyzed drainage area for the property is approximately 3,285,150 sf or 75.50 ac. The Site is divided into four (4) subcatchment areas. Subcatchment area 1 is comprised of the eastern wooded portion of the site, which flows downslope to the north into the northeastern wetland. Subcatchment area 2 is heavily wooded and flows north through surface flow into the wetland

system. Subcatchment area 3 includes the transmission line easement and flows south offsite. Subcatchment area 4 is the wooded western portion of the site and flows to the north towards the railroad tracks. Drawing 1, Existing Drainage Areas, depicts the existing drainage areas on the property. The four (4) points of compliance (POC) (West Wetlands, Northeast Wetland, South Off-Site, and West Off-Site) are utilized in HydroCAD to evaluate peak-flow leaving the property.

3. PROPOSED DEVELOPMENT

3.1 Overview

The proposed work includes approximately 42 acres of regrading and rock blasting of the Site to provide space for future industrial development. No new structures are included in the construction activities proposed in this plan. An overall small percentage of disconnected impervious areas will be added by the exposure of bedrock. Final conditions will include grassed open space, vegetated rock benches, and a new stormwater management system.

3.2 Proposed Subcatchment Areas

The redeveloped Site and overall property is divided into eleven (11) subcatchment areas. Subcatchments 1, 2, 5, 7, and 11 will remain unchanged under new conditions. All other subcatchments will include open grass and graded rock areas that will drain to new stormwater basins. These basins will be connected with a pipe and manhole system that will discharge to the western wetlands. The Site work will result in an increase in impervious area for the property, increasing from zero percent (%) to 5.2 percent impervious for the Site. Drawing 2, Proposed Drainage Areas, depicts the new drainage areas on the property.

3.3 Design Criteria & Proposed Stormwater Management Systems

The post-development stormwater runoff analysis was based on the 2-, 10-, 25-, 50-, and 100-year 24-hour storm events. The removal of wooded areas requires on-site attenuation to meet the existing runoff rates as closely as possible.

The drainage improvements for the site will include a manhole and swale network to collect most of the newly graded areas. To attenuate and reduce peak flows, infiltration basins will be included in the drainage system. The system is designed to fully retain runoff up to the 100-year storm event. Any runoff that outlets from the system will flow into the existing wetland system north of the Site.

To improve stormwater quality discharging from the Site, the basins have been sized to hold and infiltrate the full water quality volume (WQV) for each basin's respective subcatchment. WQV calculations are provided in Appendix E.

4. STORMWATER MANAGEMENT EVALUATION

4.1 Stormwater Runoff Calculations

The following evaluation was prepared to identify the qualitative and quantitative stormwater runoff characteristics for the existing and proposed conditions at the site. The stormwater management system was designed for the 2-year, 10-year, 25-year, 50-year, and 100-year design storms.

4.1.1 Design Methodology

Site specific point precipitation frequency estimates used to generate peak stormwater flow were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 10 Version 3: Precipitation-Frequency Atlas of the United States, Northeastern States (rev. 2015). Precipitation-frequency estimates are based upon frequency analysis of partial duration series with a 90% confidence interval of data largely from the National Centers for Environmental Information (NCEI).

The methods described in Urban Hydrology for Small Watersheds, 2nd Edition, (Technical Release Number 55 [TR-55]) from the Natural Resources Conservation Service formerly the Soil Conservation Service – [SCS], 1986) were used to calculate stormwater peak-flow generated from pre- and post-redevelopment conditions. These methods, which are incorporated into the HydroCAD computer software program, use well documented procedures to calculate stormwater runoff volume, peak-flow rate of discharge, hydrographs and storage volumes required for floodwater reservoirs in small watersheds. The method uses the SCS Runoff Curve Number method to estimate runoff volume, calculates times of concentration, produces tabular hydrographs and estimates basin storage capacity.

4.1.2 Curve Numbers

The curve numbers (CN) values utilized for the analysis of the existing and proposed conditions included:

New grassed area, CN = 39 (Good grass cover, HSG A)
New grassed area, CN = 80 (Good grass cover, HSG D)
Brush, CN = 30 (good condition, HSG A)
Brush, CN = 56 (good condition, HSG B)
Brush, CN = 77 (good condition, HSG D)
Dirt roads, CN = 72 (HSG A)

Dirt roads, CN = 89 (HSG D)
Gravel roads, CN = 76 (HSG A)
Gravel roads, CN = 91 (HSG D)
Gravel surface (represents new access road), CN = 96 (HSG A, D)
Unconnected pavement (represents exposed bedrock), CN = 98 (HSG A, D)
Woods, CN = 30 (Good condition, HSG A)
Woods, CN = 55 (Good condition, HSG B)
Woods, CN = 77 (Good condition, HSG D)
Woods/grass combo (represents new rock bench plantings), CN = 86 (HSG D)

The weighted CN of the existing property is 56. The weighted CN of the property with the new development is 62. This is due to the removal of wooded areas.

4.2 Existing and Proposed Peak-Flow Comparison

With the use of detention, total peak flows are reduced during all analyzed storm events.

Table 1 – Peak-Flow Comparison, Cubic Feet per Second

	2-Year Event		10-Year Event		25-Year Event		50-year Event		100-year Event	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
West Wetlands (POC 1)	0.69	0.56	7.91	2.88	17.51	11.26	26.55	22.29	37.44	35.89
West Off-Site (POC 2)	0.31	0.17	3.92	1.92	7.82	4.14	11.18	6.16	15.08	8.53
South Off-Site (POC 3)	15.37	10.95	30.07	21.38	39.67	28.19	46.96	33.4	54.78	38.98
Total	16.37	11.68	41.9	26.18	65	43.59	84.69	61.85	107.3	83.4

The table shows decreasing total peak flow runoff during all analyzed storm events. This is due to the robust infiltration basins capturing and retaining the Site's runoff. Overall, new drainage conditions should function similarly to those of existing conditions. Appendix D includes the HydroCAD report for the existing and new Site analysis.

4.3 Water Quality

The methods described in the 2023 Connecticut Stormwater Quality Manual ("the Manual") were utilized to calculate the WQV of the redevelopment. The WQV for the site is equivalent to the runoff generated with the first 1.3 inches of rainfall. As flow from rock benches will enter grassed areas with low slopes before reaching infiltration basins, exposed impervious rock areas meet impervious disconnection criteria defined in the Manual. Each subcatchment was analyzed to determine its respective WQV. Low-level outlets were then designed to be above the WQV storage

elevation, meaning that WQVs will be fully retained and infiltrated on-site without discharging to the POCs.

As the basins will have a loam surface following completion of construction, an infiltration rate of 0.5 inches per hour (in/hr) was used in drainage calculations, in accordance with the Manual. The infiltration basins have also been designed to fully drain within 48 hours following a storm event, meeting State requirements.

The drainage system leads to a hydrodynamic separator before discharge to the wetlands. The basins will also allow suspended sediment to be settled and captured before stormwater is discharged. Sizing calculations for the hydrodynamic separator are included in Appendix E.

4.3.1 Temporary Sediment Basin Design

Each separate phase of this project will be equipped with a phase specific sediment basin serving the respective area. The sediment basins have been designed in accordance with the 2023 Connecticut Guidelines for Soil Erosion and Sediment Control. Each sediment basin will be equipped with adequate storage for a full-year of sediment and an outlet system designed to maximize the efficiency of the basin and pass the 25-year recurrence interval storm event. The related computations for the basin sizing, outlet system and outlet protection are included in Appendix F.

4.4 Stormwater System Maintenance Program

To help facilitate the function and longevity of the stormwater management system, a maintenance program and inspection checklist has been developed for the components and surrounding areas. The maintenance includes periodic inspections, scheduled cleanings and details on identifying signs of failures in the system. A full checklist of system features shall be completed to provide a log of inspections, cleanings, repairs, and any important information regarding the system. The program will be implemented after installation with more frequent inspections early and fewer inspections after a year or when the system function becomes more predictable. The program, checklist, and past inspection/maintenance logs will be provided to the current or future owners and necessary facility personnel. The maintenance program and checklist are included as Appendix G.

5. CONCLUSION

The new Site work includes a new stormwater management system for the primary conveyance of the stormwater discharging from the Site. The proposed system provides attenuation and treatment of all stormwater events leaving the Site, managing post-development runoff rates. The stormwater basins include sufficient storage capacity for the WQV to offer treatment of Site stormwater. Overall, the new drainage system will improve water quality discharging from the property while providing lower flow rates to receiving areas.

DRAWINGS

Drawing 1 –Existing Drainage Areas

4

2

3

1

TIME OF CONCENTRATION PATH (TYP)

N/F DOROTHY E. LEWIS VOL. 527 / PG. 558 #60 CHAPMAN LANE

N/F DOROTHY E. LEWIS VOL. 391 / PG. 831 #56 CHAPMAN LANE

N/F MARIE E. BRIDGMAN VOL. 267 / PG. 838 #54 CHAPMAN LANE

N/F DORTHY E. LEWIS VOL. 558 / PG. 527 #48 CHAPMAN LANE

CHAPMAN LANE

N/F ALLEN D. SMITH & ELIZABETH T. SMITH VOL. 170 / PG. 552 #40 CHAPMAN LANE

N/F THE COMMUNITY METHODIST CHURCH, OF GALES FERRY, INCORPORATED VOL. 56 / PG. 574 #6 CHAPMAN LANE

N/F THE COMMUNITY METHODIST CHURCH, OF GALES FERRY, INCORPORATED VOL. 56 / PG. 574 #6 CHAPMAN LANE

N/F PAUL CERVENY #1721 ROUTE 12 SERVED BY PRIVATE WELL

SENTRY/GUARD POST

FORT DECATUR

THAMES RIVER

EBB

FLOOD

N/F PROVIDENCE AND WORCESTER RAILROAD COMPANY VOL. 118 / PG. 1136

N/F ALLYN BURYING GROUND "CEMETERY" VOL. 1 / PG. 633 VOL. 1 / PG. 637 (SEE NOTE #9 IN EXCEPTIONS)

DOCK

LEASE AREA #5 TO DOW CHEMICAL

WET AREA

BLDG SEE DETAIL "C" SHEET 8

BLDG 28

BLDG 25

BLDG 31A

BLDG 31 (WAREHOUSE)

BLDG 37

BLDG 36

SAND SHED BLDG 30

BLDG 38

BLDG 32A

BLDG 34

SNET 1729

SNET 1731

SNET 1732

SNET 1734

SEDI

50 0 50 100 150

SCALE IN FEET

REV.	DESCRIPTION OF REVISION	DATE	APPR.

STAMP

Loureiro Engineering Associates, Inc.
100 Northfield Street • Greenwich, CT 06830
Phone: 860-747-6181 • Fax: 860-747-8822
An Employee-Owned Company • www.LoureiroEng.com

EXISTING DRAINAGE AREAS

GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335

GALES FERRY INTERMODAL LLC
349 EAST STREET, SUITE 201, TEWKSBURY, MA 01876

SCALE 1"=100'

COMM. NO. 045IC2.06

DRAWN BY APH

DATE 9/28/2023

APPROVED BY GFA

DATE 9/28/2023

DRAWING 1

SHEET NO. 1 NO. OF SHEETS 2

Drawing 2 – Proposed Drainage Areas

NEW DRAINAGE AREAS

GALES FERRY INTERMODAL
1737 & 1761 ROUTE 12, GALES FERRY, CT 06335

GALES FERRY INTERMODAL LLC
349 SOUTH STREET, GROTON, CONNECTICUT 06340

SCALE	COMM. NO.	DRAWN BY	DATE	APPROVED BY	DATE
1" = 100'	0451C2.06	APH	9/28/2023	GFA	9/28/2023

DRAWING
2

SHEET NO. 2 NO. OF SHEETS 2

REV.	DESCRIPTION OF REVISION	DATE	APPR.

STAMP

Loureiro Engineering Associates, Inc.
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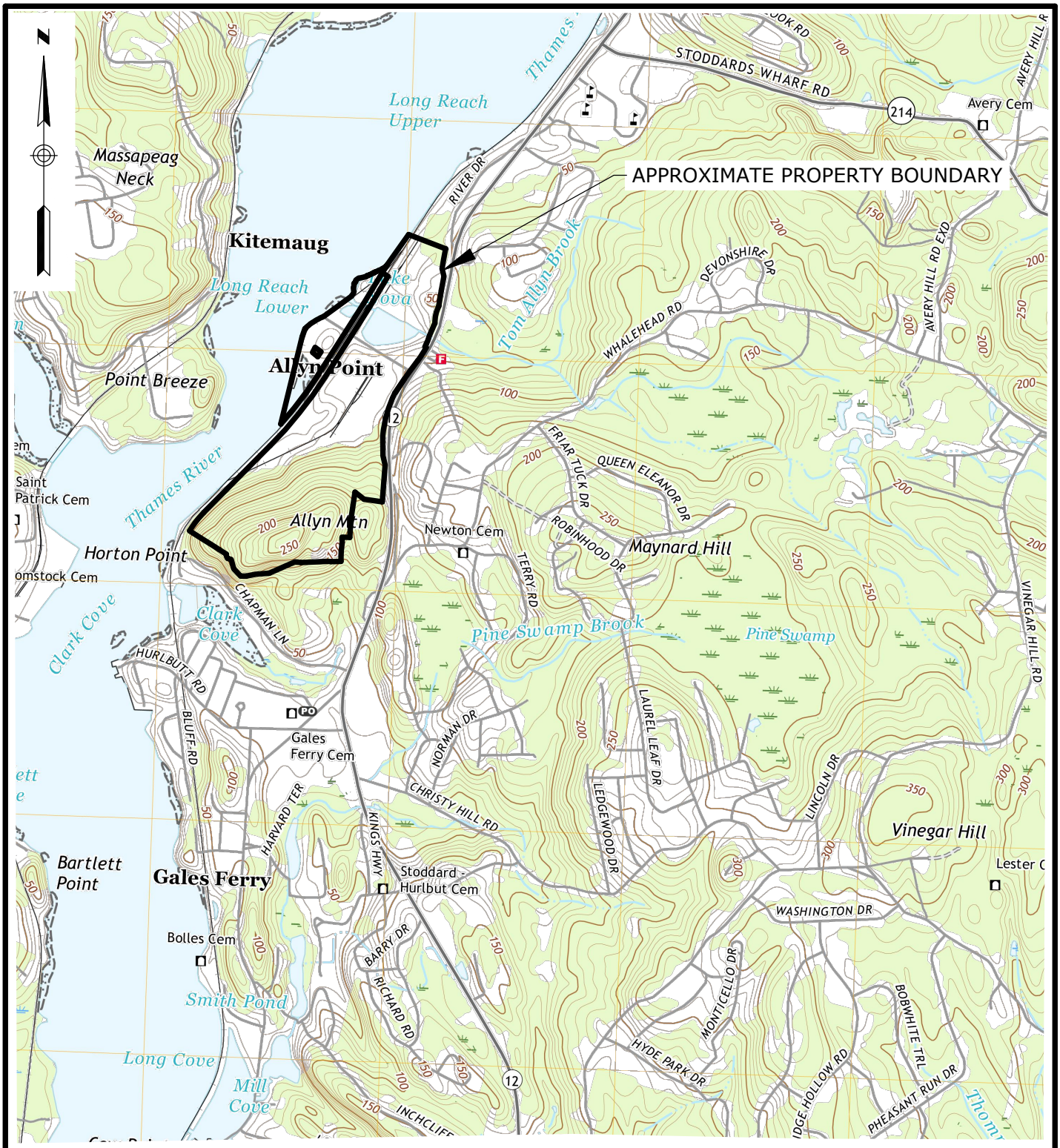
P:\GALES FERRY\ROUTE 12\1761\DOCS\DA LOCAL PERMIT FOR ROCK CRAWLING\GALES FERRY INTERMODAL DA.dwg Saved: 9/25/2024 4:35 PM Printed: 10/25/2024 3:52 PM

APPENDIX A

USGS Site Location Map



MAP REFERENCE:

SECTION OF THE USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP FOR UNCASVILLE, CT; MAP VERSION DATE 2021.

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DRAINAGE REPORT
ATTACHMENT A
SITE LOCATION MAP

INDUSTRIAL SITE PREPARATION PLAN
1761 ROUTE 12, GALES FERRY, CT

PREPARED FOR:

GALES FERRY INTERMODAL LLC
549 SOUTH STREET, QUINCY, MA

SCALE	COMM. NO.	DATE
1" = 2,000'±	045JC2.06	9/28/2023

1

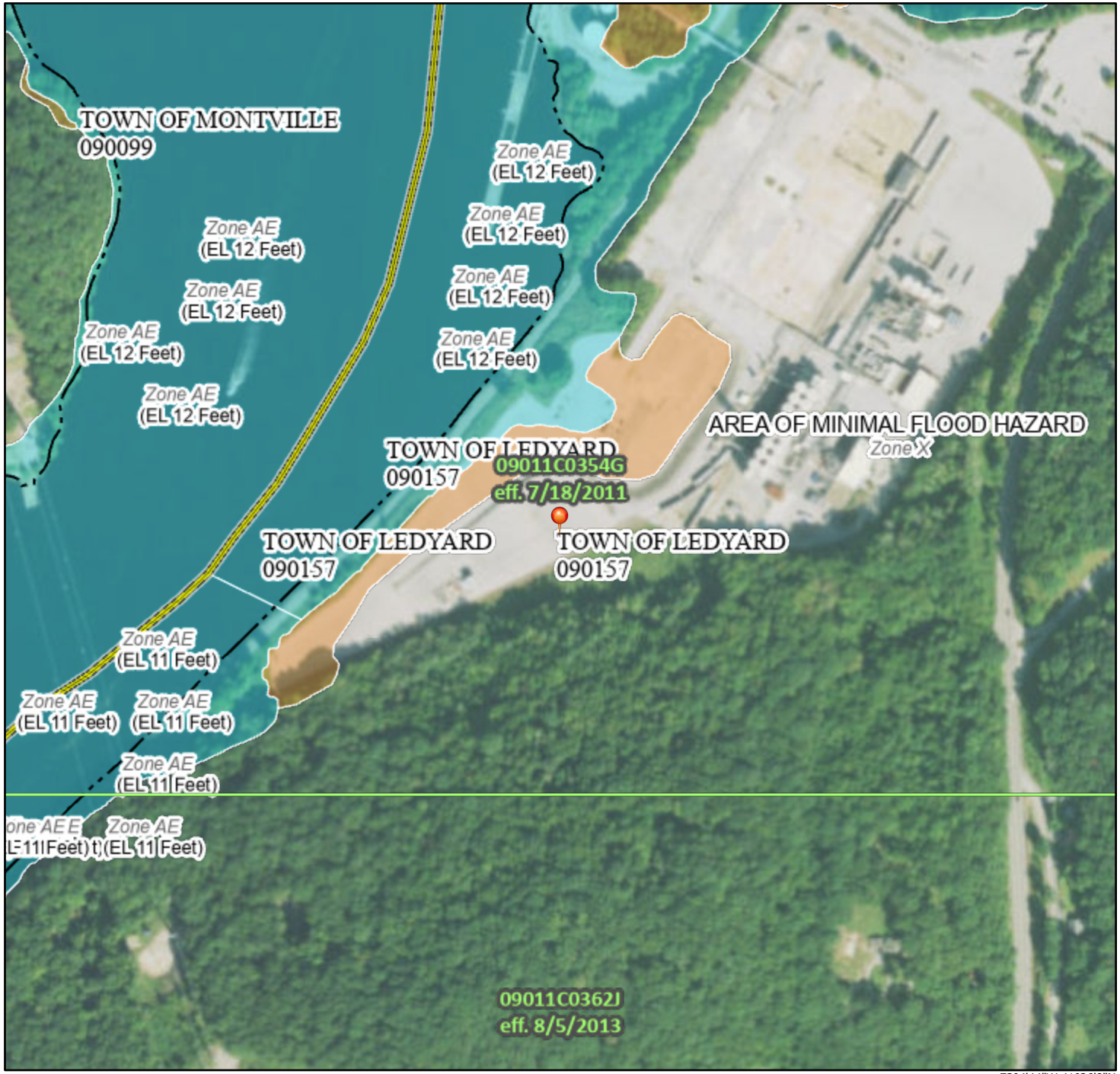
APPENDIX B

FEMA FIREMETTE Map

National Flood Hazard Layer FIRMette

FEMA

72°5'22"W 41°26'35"N



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

1:6,000

72°4'44"W 41°26'8"N

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/25/2023 at 11:34 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

APPENDIX C

Natural Resources Conservation Service – Web Soil Survey

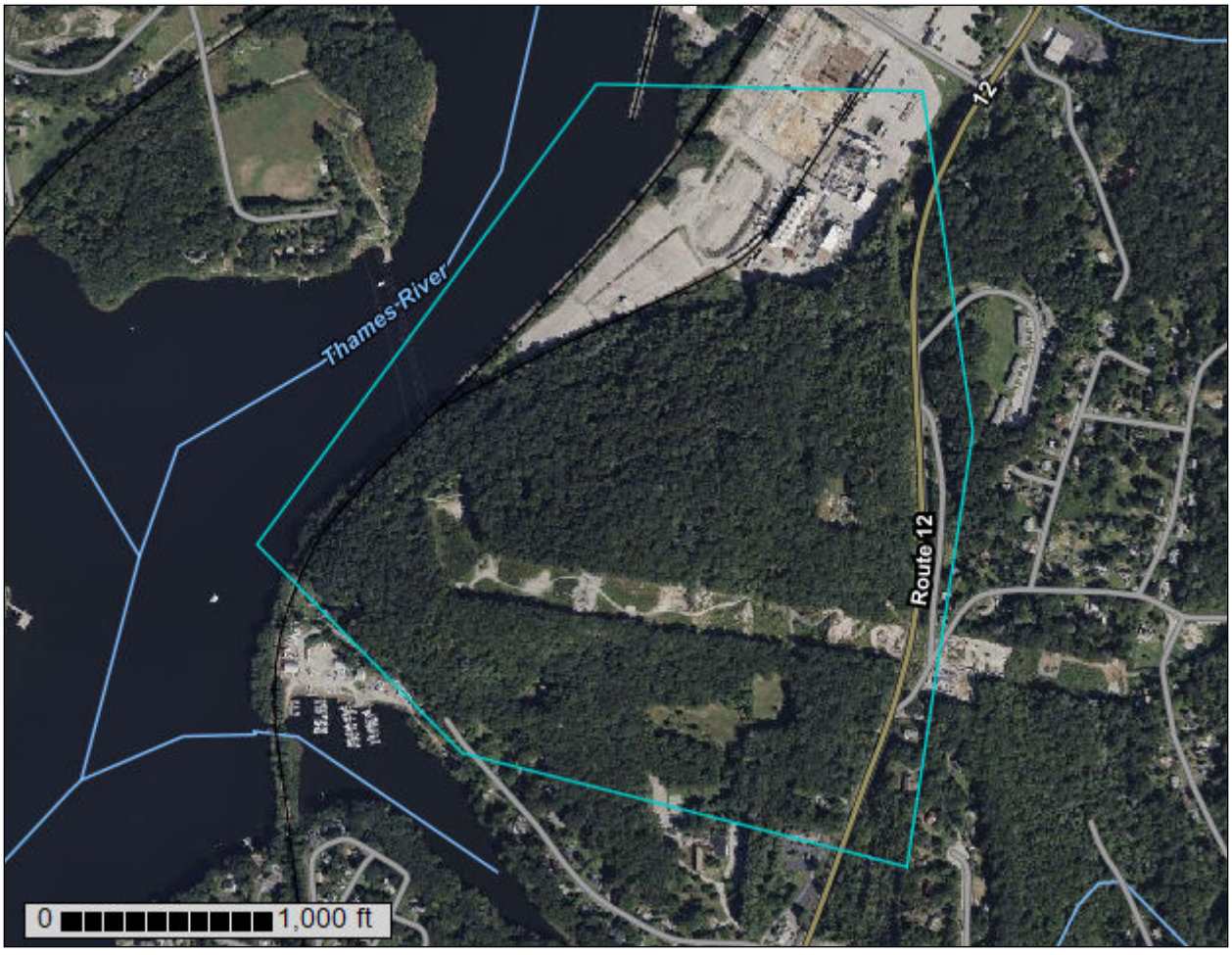
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for State of Connecticut, Eastern Part



September 23, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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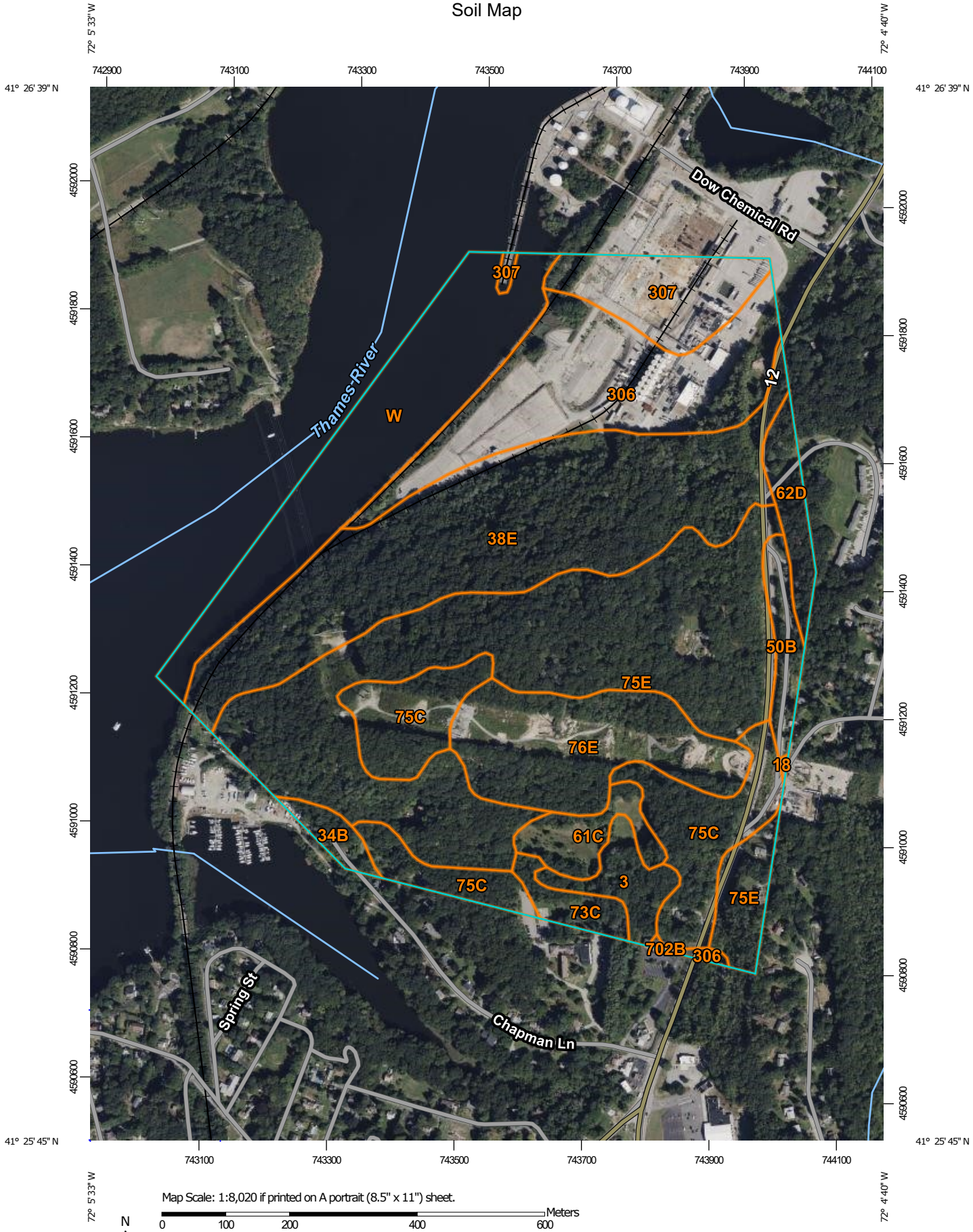
Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:8,020 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

Soil Survey Area: State of Connecticut, Eastern Part
Survey Area Data: Version 1, Sep 15, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	3.9	1.9%
18	Catden and Freetown soils, 0 to 2 percent slopes	0.1	0.0%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	1.8	0.9%
38E	Hinckley loamy sand, 15 to 45 percent slopes	40.5	20.2%
50B	Sutton fine sandy loam, 3 to 8 percent slopes	3.2	1.6%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	4.1	2.1%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	3.6	1.8%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	2.5	1.3%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	19.3	9.6%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	51.3	25.6%
76E	Rock outcrop-Hollis complex, 3 to 45 percent slopes	16.2	8.1%
306	Udorthents-Urban land complex	22.8	11.4%
307	Urban land	8.8	4.4%
702B	Tisbury silt loam, 3 to 8 percent slopes	0.1	0.1%
W	Water	21.9	10.9%
Totals for Area of Interest		**200.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic

class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut, Eastern Part

3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qt
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 40 percent
Leicester, extremely stony, and similar soils: 35 percent
Whitman, extremely stony, and similar soils: 17 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Leicester, Extremely Stony

Setting

Landform: Ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg - 7 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 39 inches: gravelly fine sandy loam
C2 - 39 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Description of Whitman, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat

A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Swansea

Percent of map unit: 2 percent
Landform: Bogs, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

18—Catden and Freetown soils, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t2r2
Elevation: 0 to 1,390 feet

Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Catden and similar soils: 45 percent
Freetown and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Catden

Setting

Landform: Depressions, bogs, fens, depressions, depressions, kettles, marshes, swamps
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed herbaceous organic material and/or highly decomposed woody organic material

Typical profile

Oa1 - 0 to 2 inches: muck
Oa2 - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY042NY - Semi-Rich Organic Wetlands
Hydric soil rating: Yes

Description of Freetown

Setting

Landform: Depressions, marshes, depressions, bogs, swamps, kettles
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Natchaug

Percent of map unit: 7 percent
Landform: Depressions, depressions, depressions
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 6 percent
Landform: Drainageways, depressions
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Timakwa

Percent of map unit: 5 percent
Landform: Depressions
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 2 percent
Landform: Depressions, drainageways, outwash deltas, outwash terraces
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Hydric soil rating: Yes

34B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Outwash terraces, dunes, deltas, outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

38E—Hinckley loamy sand, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 2svmj

Elevation: 0 to 1,280 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Hinckley

Setting

Landform: Eskers, kames, outwash deltas, outwash terraces, moraines, outwash plains, kame terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Outwash plains, outwash terraces, moraines, eskers, kames

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Eskers, kames, moraines, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Eskers, kame terraces, outwash deltas, outwash terraces, moraines, kames, outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent
Landform: Kames, eskers, outwash deltas, outwash plains, kame terraces, outwash terraces, moraines
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

50B—Sutton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w69j
Elevation: 0 to 1,410 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Sutton

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 5 inches: fine sandy loam
Bw1 - 5 to 17 inches: fine sandy loam
Bw2 - 17 to 25 inches: sandy loam
C1 - 25 to 39 inches: gravelly sandy loam
C2 - 39 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 12 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 9 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent

Landform: Ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge

Percent of map unit: 5 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Whitman

Percent of map unit: 1 percent
Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

61C—Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w820
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton, very stony, and similar soils: 50 percent
Charlton, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton, Very Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Chatfield, very stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Sutton, very stony

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

Leicester, very stony

Percent of map unit: 5 percent
Landform: Hills, drainageways, depressions, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

62D—Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w81r
Elevation: 0 to 1,640 feet
Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 55 percent
Charlton, extremely stony, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, nose slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Charlton, Extremely Stony

Setting

Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear

Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, extremely stony

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

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Hollis, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex

Across-slope shape: Linear, convex
Hydric soil rating: No

73C—Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2w698
Elevation: 0 to 1,550 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, very stony, and similar soils: 50 percent
Chatfield, very stony, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Very Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Chatfield, Very Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Sutton, very stony

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

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

Hollis, very stony
Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, very stony
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

75C—Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9lqn
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile
Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam

Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Typical profile
R - 0 to 0 inches: bedrock

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Charlton
Percent of map unit: 7 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton, very stony
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Brimfield
Percent of map unit: 1 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, red parent material
Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed, sandy subsoil
Percent of map unit: 1 percent
Hydric soil rating: No

75E—Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 9lqp
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Chatfield

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

R - 0 to 0 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Charlton
Percent of map unit: 7 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Leicester
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Sutton, very stony
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, red parent material
Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed, sandy subsoil
Percent of map unit: 1 percent
Hydric soil rating: No

Brimfield
Percent of map unit: 1 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

76E—Rock outcrop-Hollis complex, 3 to 45 percent slopes

Map Unit Setting
National map unit symbol: 9lqq
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 55 percent
Hollis and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Landform: Ridges, hills

Typical profile

R - 0 to 0 inches: bedrock

Properties and qualities

Slope: 3 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Description of Hollis

Setting

Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 3 to 45 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Chatfield
Percent of map unit: 10 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Charlton
Percent of map unit: 6 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Leicester
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Brimfield
Percent of map unit: 1 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Sutton, very stony
Percent of map unit: 1 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

306—Udorthents-Urban land complex

Map Unit Setting
National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent
Urban land: 39 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Human-transported material

Typical profile

^A - 0 to 5 inches: loam
^C1 - 5 to 21 inches: gravelly loam
^C2 - 21 to 79 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 6 inches: cemented material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Udorthents, wet substratum

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

Rock outcrop

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

307—Urban land

Map Unit Setting

National map unit symbol: 9lmh
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 10 percent
Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 10 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

702B—Tisbury silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y07h
Elevation: 0 to 1,260 feet

Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Tisbury

Setting

Landform: Outwash terraces, outwash plains, valley trains, deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 18 inches: silt loam
Bw2 - 18 to 26 inches: silt loam
2C - 26 to 65 inches: extremely gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 24 to 36 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 16 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B/D
Ecological site: F144AY026CT - Moist Silty Outwash
Hydric soil rating: No

Minor Components

Agawam

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, outwash terraces, moraines, kames
Landform position (two-dimensional): Footslope, backslope, shoulder, summit, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, tread
Down-slope shape: Convex

Across-slope shape: Convex
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Outwash terraces, moraines, eskers, kames, outwash plains
Landform position (two-dimensional): Summit, toeslope, backslope, footslope, shoulder
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ninigret

Percent of map unit: 3 percent
Landform: Kame terraces, outwash plains, kames, outwash terraces, moraines
Landform position (two-dimensional): Footslope, backslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

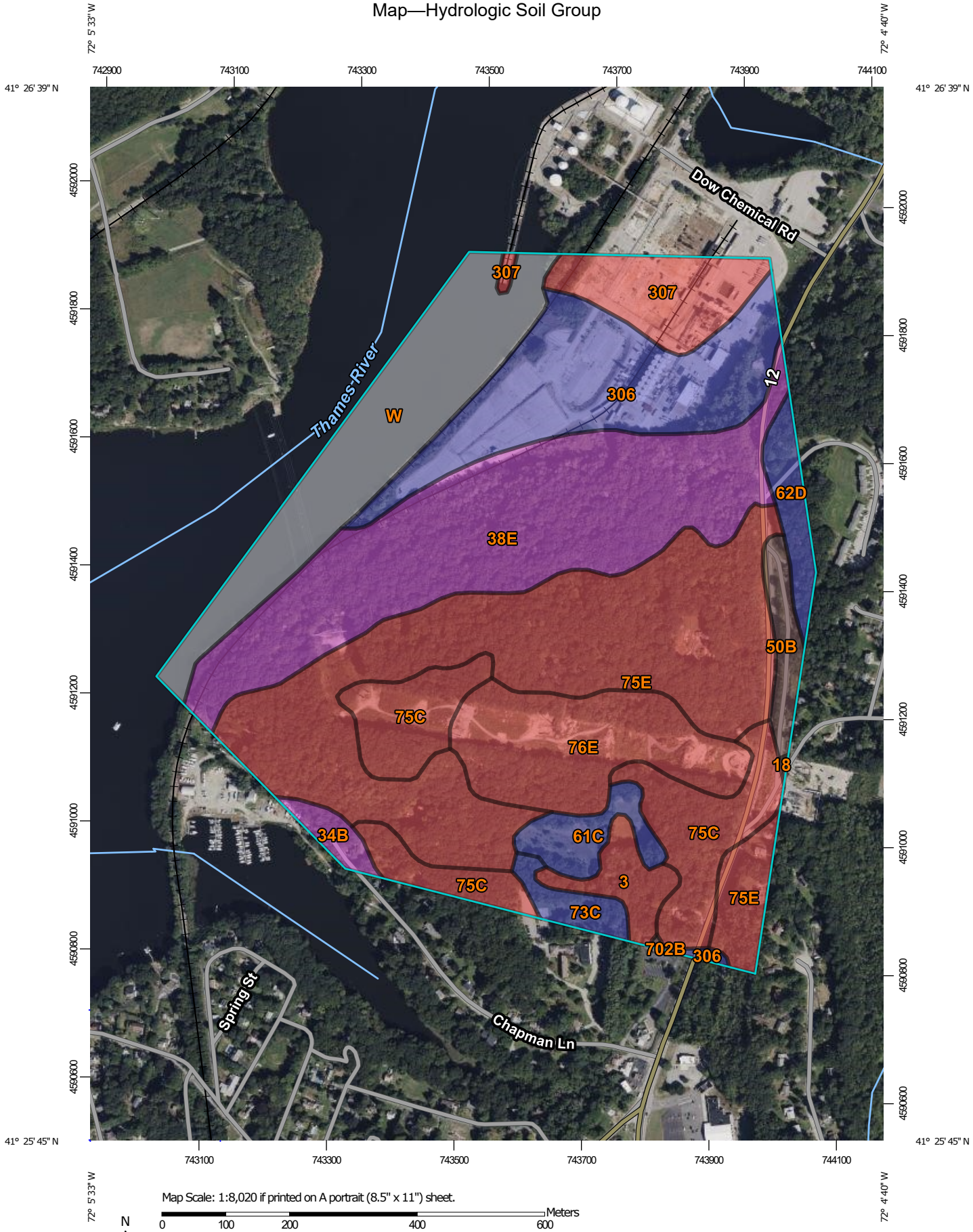
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:8,020 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

Soil Survey Area: State of Connecticut, Eastern Part
Survey Area Data: Version 1, Sep 15, 2023

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	3.9	1.9%
18	Catden and Freetown soils, 0 to 2 percent slopes	B/D	0.1	0.0%
34B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	1.8	0.9%
38E	Hinckley loamy sand, 15 to 45 percent slopes	A	40.5	20.2%
50B	Sutton fine sandy loam, 3 to 8 percent slopes	B/D	3.2	1.6%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	4.1	2.1%
62D	Canton and Charlton fine sandy loams, 15 to 35 percent slopes, extremely stony	B	3.6	1.8%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	2.5	1.3%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	D	19.3	9.6%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	D	51.3	25.6%
76E	Rock outcrop-Hollis complex, 3 to 45 percent slopes	D	16.2	8.1%
306	Udorthents-Urban land complex	B	22.8	11.4%
307	Urban land	D	8.8	4.4%
702B	Tisbury silt loam, 3 to 8 percent slopes	B/D	0.1	0.1%
W	Water		21.9	10.9%
Totals for Area of Interest			**200.3**	**100.0%**

Rating Options—Hydrologic Soil Group

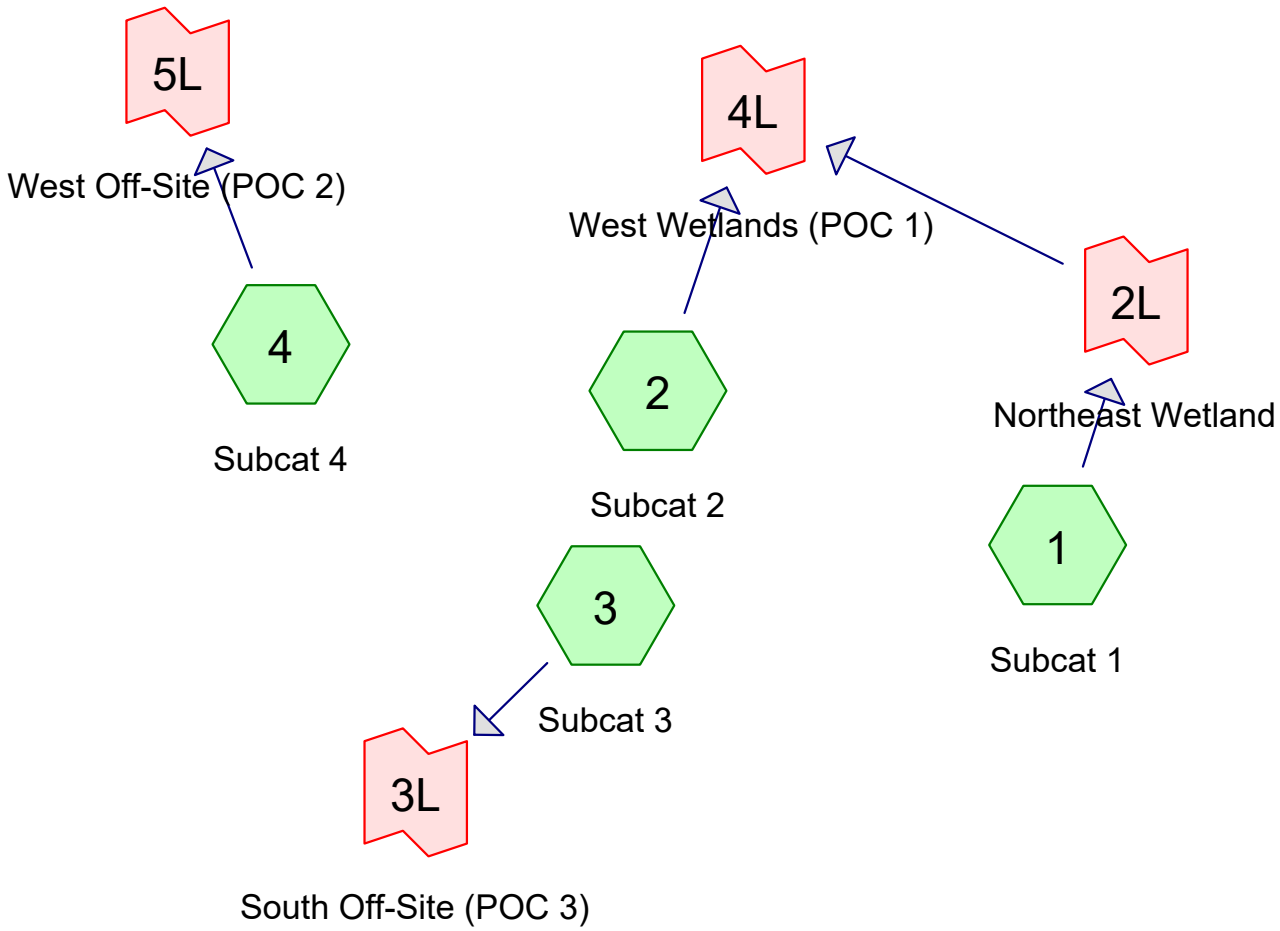
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D

HydroCAD Reports



Subcat Reach Pond Link

Routing Diagram for Existing Conditions

Prepared by Loureiro Engineering Assoc, Inc, Printed 9/25/2024

Project Notes

Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF
Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	NOAA 24-hr	D	Default	24.00	1	3.46	2
2	10-yr	NOAA 24-hr	D	Default	24.00	1	5.12	2
3	25-yr	NOAA 24-hr	D	Default	24.00	1	6.15	2
4	50-yr	NOAA 24-hr	D	Default	24.00	1	6.92	2
5	100-yr	NOAA 24-hr	D	Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
76,636	30	Brush, Good, HSG A (1, 2, 4)
4,103	48	Brush, Good, HSG B (1, 2)
120,327	73	Brush, Good, HSG D (2, 3, 4)
14,375	72	Dirt roads, HSG A (1, 2)
3,886	89	Dirt roads, HSG D (2, 3)
11,764	76	Gravel roads, HSG A (2, 4)
81,857	91	Gravel roads, HSG D (2, 3, 4)
2	0	Woods, Good (4)
1,411,426	30	Woods, Good, HSG A (1, 2, 4)
16,034	55	Woods, Good, HSG B (1)
1,544,730	77	Woods, Good, HSG D (1, 2, 3, 4)
3,285,140	**56**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
1,514,200	HSG A	1, 2, 4
20,137	HSG B	1, 2
0	HSG C	
1,750,801	HSG D	1, 2, 3, 4
2	Other	4
3,285,140		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
76,636	4,103	0	120,327	0	201,065	Brush, Good	1, 2, 3, 4
14,375	0	0	3,886	0	18,261	Dirt roads	1, 2, 3
11,764	0	0	81,857	0	93,621	Gravel roads	2, 3, 4
1,411,426	16,034	0	1,544,730	2	2,972,192	Woods, Good	1, 2, 3, 4
1,514,200	**20,137**	**0**	**1,750,801**	**2**	**3,285,140**	**TOTAL AREA**	

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=0.12"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=0.23 cfs 6,596 cf

Subcatchment 2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=0.12"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=0.47 cfs 12,875 cf

Subcatchment 3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=1.47"
Flow Length=691' Tc=42.4 min CN=78 Runoff=15.37 cfs 109,967 cf

Subcatchment 4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=0.19"
Flow Length=846' Tc=13.2 min CN=50 Runoff=0.31 cfs 5,831 cf

Link 2L: Northeast Wetland Inflow=0.23 cfs 6,596 cf
Primary=0.23 cfs 6,596 cf

Link 3L: South Off-Site (POC 3) Inflow=15.37 cfs 109,967 cf
Primary=15.37 cfs 109,967 cf

Link 4L: West Wetlands (POC 1) Inflow=0.69 cfs 19,471 cf
Primary=0.69 cfs 19,471 cf

Link 5L: West Off-Site (POC 2) Inflow=0.31 cfs 5,831 cf
Primary=0.31 cfs 5,831 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 135,268 cf Average Runoff Depth = 0.49"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=2.55 cfs 32,920 cf

Subcatchment2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=0.58"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=5.74 cfs 64,257 cf

Subcatchment3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=2.81"
Flow Length=691' Tc=42.4 min CN=78 Runoff=30.07 cfs 210,922 cf

Subcatchment4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=0.74"
Flow Length=846' Tc=13.2 min CN=50 Runoff=3.92 cfs 23,259 cf

Link 2L: Northeast Wetland Inflow=2.55 cfs 32,920 cf
Primary=2.55 cfs 32,920 cf

Link 3L: South Off-Site (POC 3) Inflow=30.07 cfs 210,922 cf
Primary=30.07 cfs 210,922 cf

Link 4L: West Wetlands (POC 1) Inflow=7.91 cfs 97,177 cf
Primary=7.91 cfs 97,177 cf

Link 5L: West Off-Site (POC 2) Inflow=3.92 cfs 23,259 cf
Primary=3.92 cfs 23,259 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 331,357 cf Average Runoff Depth = 1.21"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=1.00"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=5.50 cfs 56,718 cf

Subcatchment2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=1.00"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=12.83 cfs 110,708 cf

Subcatchment3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=3.71"
Flow Length=691' Tc=42.4 min CN=78 Runoff=39.67 cfs 278,224 cf

Subcatchment4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=1.22"
Flow Length=846' Tc=13.2 min CN=50 Runoff=7.82 cfs 38,155 cf

Link 2L: Northeast Wetland Inflow=5.50 cfs 56,718 cf
Primary=5.50 cfs 56,718 cf

Link 3L: South Off-Site (POC 3) Inflow=39.67 cfs 278,224 cf
Primary=39.67 cfs 278,224 cf

Link 4L: West Wetlands (POC 1) Inflow=17.51 cfs 167,426 cf
Primary=17.51 cfs 167,426 cf

Link 5L: West Off-Site (POC 2) Inflow=7.82 cfs 38,155 cf
Primary=7.82 cfs 38,155 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 483,804 cf Average Runoff Depth = 1.77"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=8.28 cfs 77,432 cf

Subcatchment 2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=19.44 cfs 151,139 cf

Subcatchment 3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=4.40"
Flow Length=691' Tc=42.4 min CN=78 Runoff=46.96 cfs 329,989 cf

Subcatchment 4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=1.62"
Flow Length=846' Tc=13.2 min CN=50 Runoff=11.18 cfs 50,859 cf

Link 2L: Northeast Wetland Inflow=8.28 cfs 77,432 cf
Primary=8.28 cfs 77,432 cf

Link 3L: South Off-Site (POC 3) Inflow=46.96 cfs 329,989 cf
Primary=46.96 cfs 329,989 cf

Link 4L: West Wetlands (POC 1) Inflow=26.55 cfs 228,571 cf
Primary=26.55 cfs 228,571 cf

Link 5L: West Off-Site (POC 2) Inflow=11.18 cfs 50,859 cf
Primary=11.18 cfs 50,859 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 609,419 cf Average Runoff Depth = 2.23"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Subcat 1 Runoff Area=680,739 sf 0.00% Impervious Runoff Depth=1.79"
Flow Length=1,302' Tc=47.6 min CN=47 Runoff=11.62 cfs 101,811 cf

Subcatchment 2: Subcat 2 Runoff Area=1,328,730 sf 0.00% Impervious Runoff Depth=1.79"
Flow Length=1,011' Tc=33.6 min CN=47 Runoff=27.45 cfs 198,724 cf

Subcatchment 3: Subcat 3 Runoff Area=899,497 sf 0.00% Impervious Runoff Depth=5.15"
Flow Length=691' Tc=42.4 min CN=78 Runoff=54.78 cfs 386,124 cf

Subcatchment 4: Subcat 4 Runoff Area=376,174 sf 0.00% Impervious Runoff Depth=2.09"
Flow Length=846' Tc=13.2 min CN=50 Runoff=15.08 cfs 65,619 cf

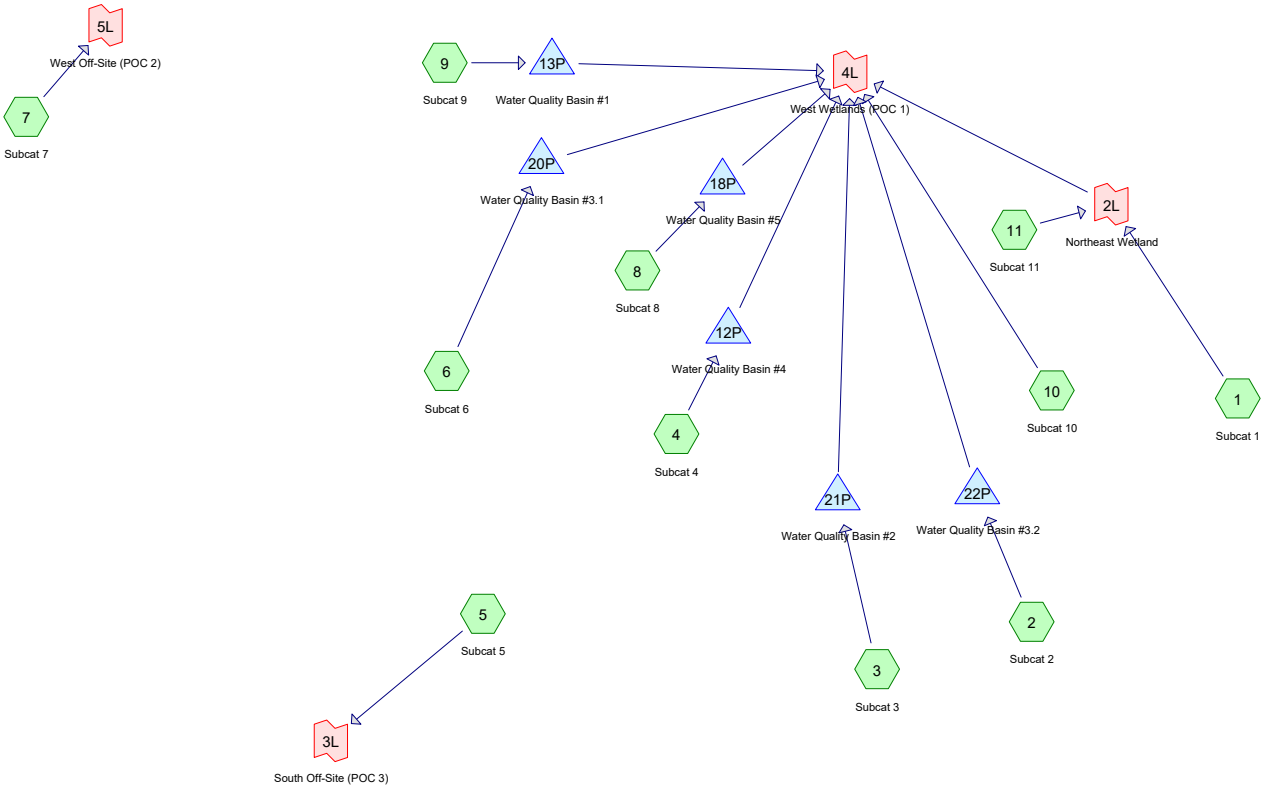
Link 2L: Northeast Wetland Inflow=11.62 cfs 101,811 cf
Primary=11.62 cfs 101,811 cf

Link 3L: South Off-Site (POC 3) Inflow=54.78 cfs 386,124 cf
Primary=54.78 cfs 386,124 cf

Link 4L: West Wetlands (POC 1) Inflow=37.44 cfs 300,535 cf
Primary=37.44 cfs 300,535 cf

Link 5L: West Off-Site (POC 2) Inflow=15.08 cfs 65,619 cf
Primary=15.08 cfs 65,619 cf

Total Runoff Area = 3,285,140 sf Runoff Volume = 752,278 cf Average Runoff Depth = 2.75"
100.00% Pervious = 3,285,140 sf 0.00% Impervious = 0 sf



Subcat Reach Pond Link

Routing Diagram for New Conditions

Prepared by Loureiro Engineering Assoc, Inc, Printed 9/25/2024

Project Notes

Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF
Defined 5 rainfall events from CT-Gales Ferry-1761 Route 12_DEPTHS IDF

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	NOAA 24-hr	D	Default	24.00	1	3.46	2
2	10-yr	NOAA 24-hr	D	Default	24.00	1	5.12	2
3	25-yr	NOAA 24-hr	D	Default	24.00	1	6.15	2
4	50-yr	NOAA 24-hr	D	Default	24.00	1	6.92	2
5	100-yr	NOAA 24-hr	D	Default	24.00	1	7.74	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
883,042	39	>75% Grass cover, Good, HSG A (1, 2, 3, 4, 6, 8, 9, 10, 11)
400,892	80	>75% Grass cover, Good, HSG D (2, 3, 4, 6)
76,598	30	Brush, Good, HSG A (1, 7, 11)
4,094	48	Brush, Good, HSG B (1, 11)
118,932	73	Brush, Good, HSG D (5, 6, 7)
1,022	72	Dirt roads, HSG A (1)
2,922	89	Dirt roads, HSG D (5)
9,853	76	Gravel roads, HSG A (7)
72,185	91	Gravel roads, HSG D (5, 7)
39,655	96	Gravel surface, HSG A (2, 3, 4, 8, 9, 10, 11)
24,103	98	Unconnected pavement, HSG A (2, 9)
145,671	98	Unconnected pavement, HSG D (3, 4, 5, 6)
453,950	30	Woods, Good, HSG A (1, 2, 7, 10, 11)
16,017	55	Woods, Good, HSG B (1)
704,815	77	Woods, Good, HSG D (1, 2, 3, 4, 5, 6, 7)
329,560	86	Woods/grass comb., Poor, HSG D (2, 3, 4, 6, 9)
3,283,311	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
1,488,222	HSG A	1, 2, 3, 4, 6, 7, 8, 9, 10, 11
20,111	HSG B	1, 11
0	HSG C	
1,774,978	HSG D	1, 2, 3, 4, 5, 6, 7, 9
0	Other	
3,283,311		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
883,042	0	0	400,892	0	1,283,934	>75% Grass cover, Good	
76,598	4,094	0	118,932	0	199,624	Brush, Good	
1,022	0	0	2,922	0	3,944	Dirt roads	
9,853	0	0	72,185	0	82,038	Gravel roads	
39,655	0	0	0	0	39,655	Gravel surface	
24,103	0	0	145,671	0	169,774	Unconnected pavement	
453,950	16,017	0	704,815	0	1,174,782	Woods, Good	
0	0	0	329,560	0	329,560	Woods/grass comb., Poor	
1,488,222	**20,111**	**0**	**1,774,978**	**0**	**3,283,311**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	12P	21.00	19.10	184.0	0.0103	0.012	0.0	30.0	0.0
2	13P	14.00	12.50	107.0	0.0140	0.012	0.0	30.0	0.0
3	18P	20.00	19.50	25.0	0.0200	0.013	0.0	18.0	0.0
4	20P	16.00	13.80	202.0	0.0109	0.013	0.0	30.0	0.0
5	21P	22.00	21.00	56.0	0.0179	0.013	0.0	24.0	0.0
6	22P	34.00	22.00	838.0	0.0143	0.013	0.0	24.0	0.0

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.03"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=0.01 cfs 341 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=0.55"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=1.11 cfs 6,954 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=0.14"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=0.24 cfs 6,240 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=1.75"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=10.83 cfs 70,122 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=1.47"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=10.95 cfs 76,511 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=1.40"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=8.06 cfs 47,326 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=0.14"
Flow Length=815' Tc=28.4 min CN=48 Runoff=0.17 cfs 4,036 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=0.05"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=0.01 cfs 423 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=0.08"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=0.04 cfs 1,360 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=0.06"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.01 cfs 248 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.00 cfs 0 cf

Pond 12P: Water Quality Basin #4 Peak Elev=24.41' Storage=45,819 cf Inflow=10.83 cfs 70,122 cf
Discarded=0.47 cfs 51,826 cf Primary=0.18 cfs 18,296 cf Outflow=0.65 cfs 70,122 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.02' Storage=212 cf Inflow=0.04 cfs 1,360 cf
Discarded=0.04 cfs 1,360 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,360 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.04' Storage=69 cf Inflow=0.01 cfs 423 cf
Discarded=0.01 cfs 423 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 423 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=19.19' Storage=27,462 cf Inflow=8.06 cfs 47,326 cf
Discarded=0.30 cfs 26,031 cf Primary=0.32 cfs 21,295 cf Outflow=0.62 cfs 47,326 cf

Pond 21P: Water Quality Basin #2 Peak Elev=22.14' Storage=1,502 cf Inflow=0.24 cfs 6,240 cf
Discarded=0.12 cfs 6,240 cf Primary=0.00 cfs 0 cf Outflow=0.12 cfs 6,240 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=35.48' Storage=3,700 cf Inflow=1.11 cfs 6,954 cf
Discarded=0.06 cfs 5,821 cf Primary=0.04 cfs 1,133 cf Outflow=0.10 cfs 6,954 cf

Link 2L: Northeast Wetland Inflow=0.01 cfs 341 cf
Primary=0.01 cfs 341 cf

Link 3L: South Off-Site (POC 3) Inflow=10.95 cfs 76,511 cf
Primary=10.95 cfs 76,511 cf

Link 4L: West Wetlands (POC 1) Inflow=0.56 cfs 41,313 cf
Primary=0.56 cfs 41,313 cf

Link 5L: West Off-Site (POC 2) Inflow=0.17 cfs 4,036 cf
Primary=0.17 cfs 4,036 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 213,561 cf Average Runoff Depth = 0.78"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

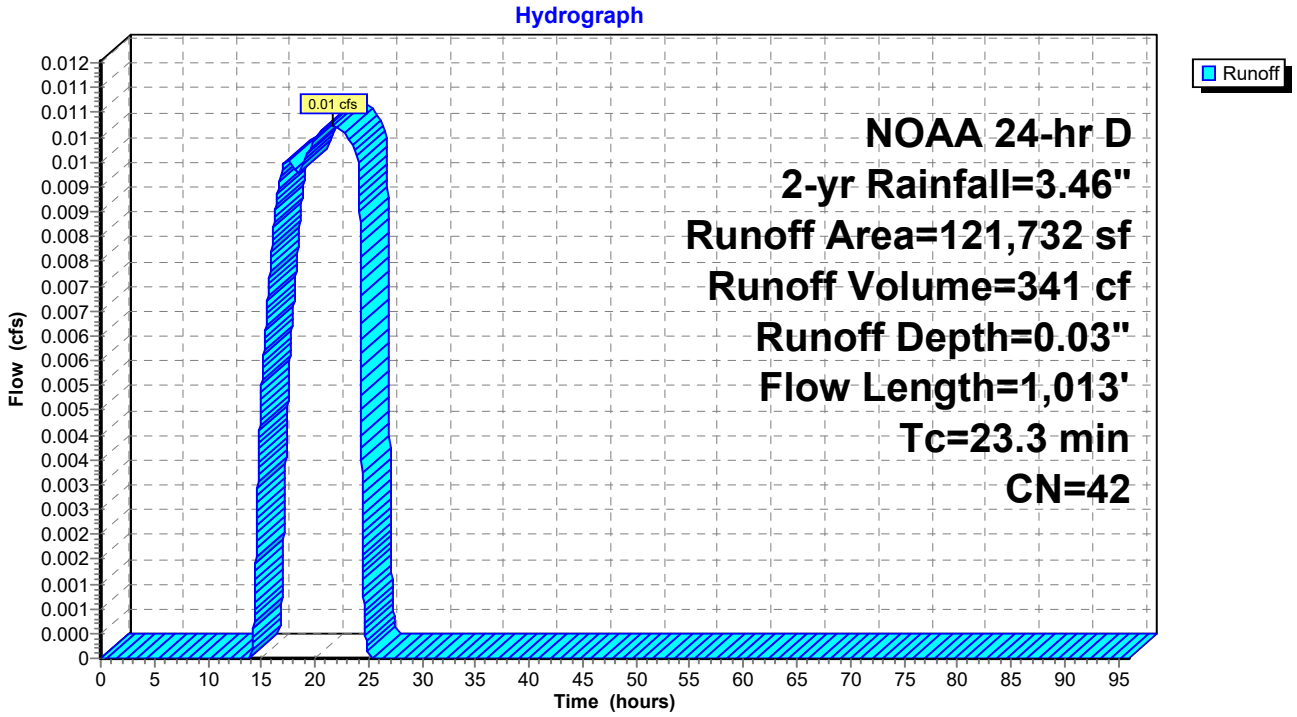
Runoff = 0.01 cfs @ 21.62 hrs, Volume= 341 cf, Depth= 0.03"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

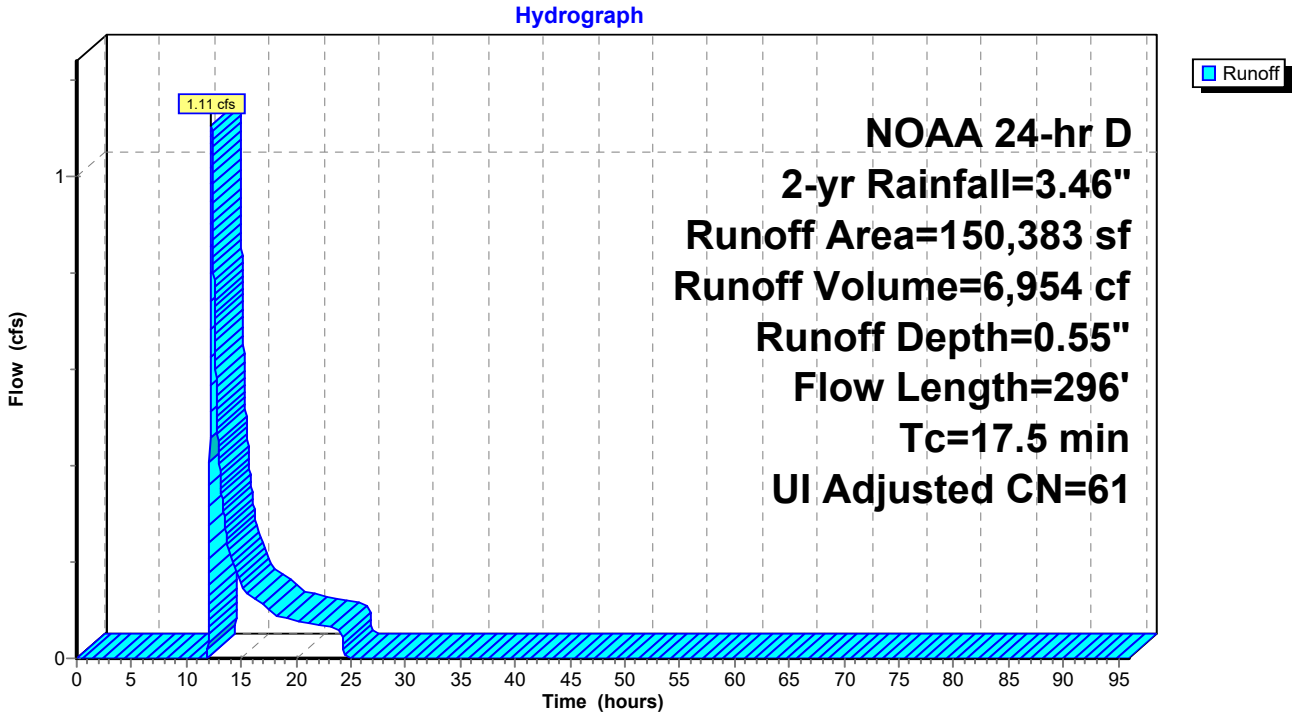
Runoff = 1.11 cfs @ 12.31 hrs, Volume= 6,954 cf, Depth= 0.55"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

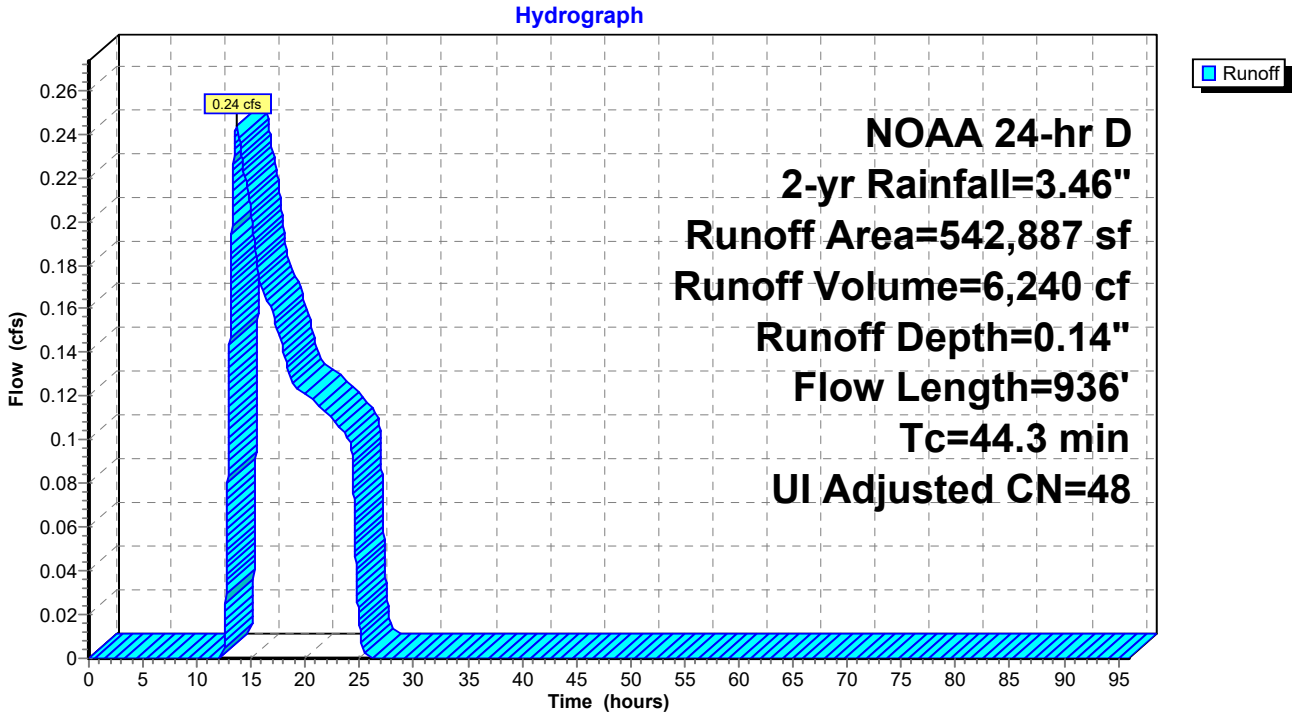
Runoff = 0.24 cfs @ 13.73 hrs, Volume= 6,240 cf, Depth= 0.14"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

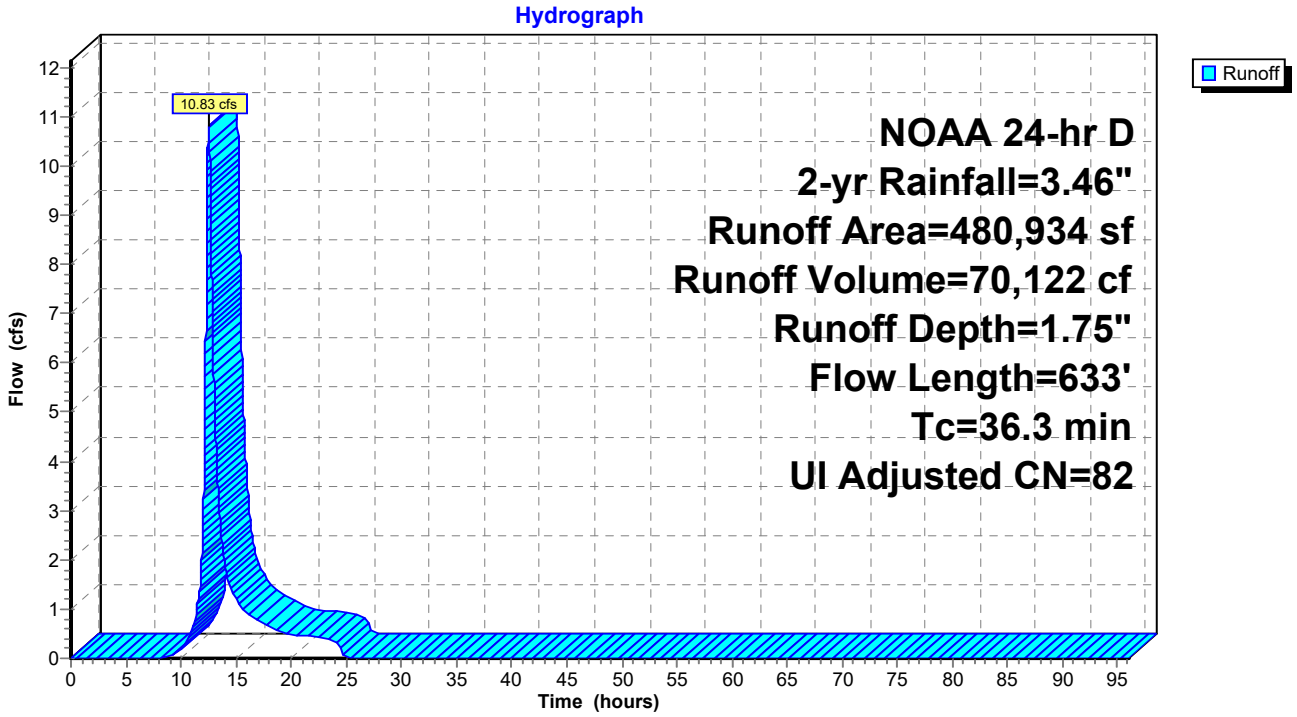
Runoff = 10.83 cfs @ 12.50 hrs, Volume= 70,122 cf, Depth= 1.75"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

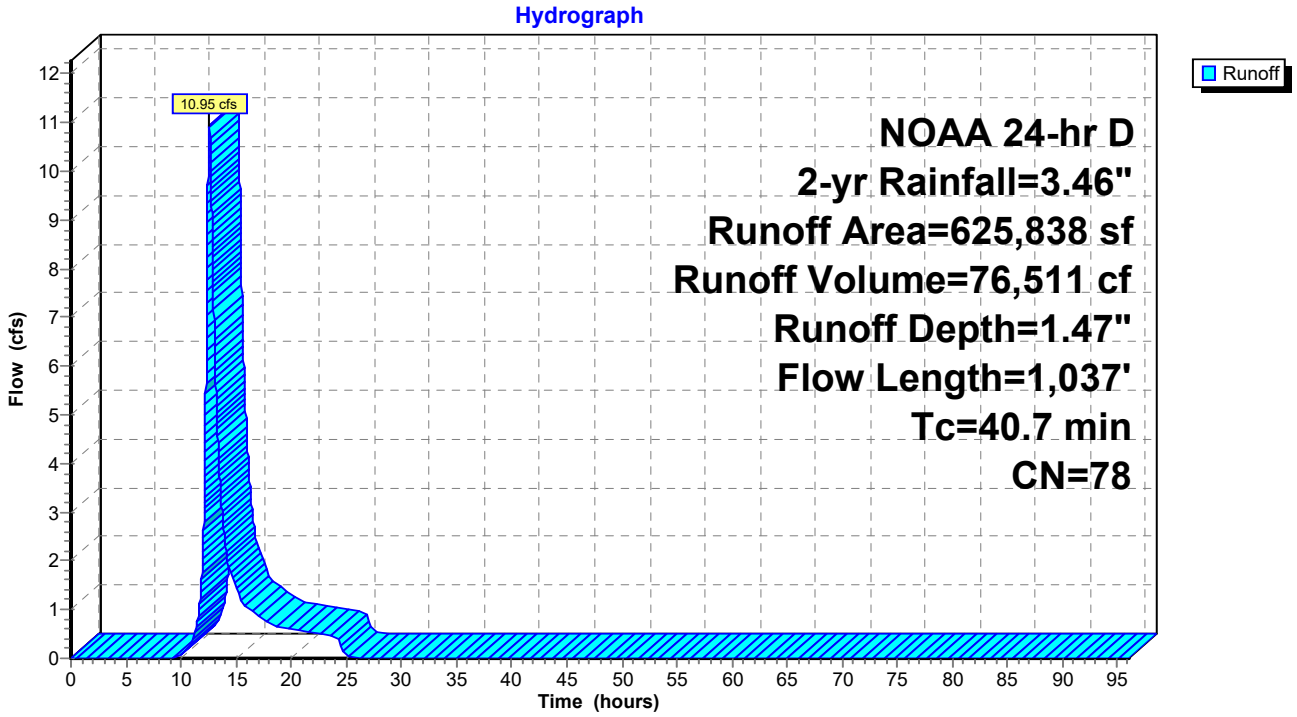
Runoff = 10.95 cfs @ 12.57 hrs, Volume= 76,511 cf, Depth= 1.47"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

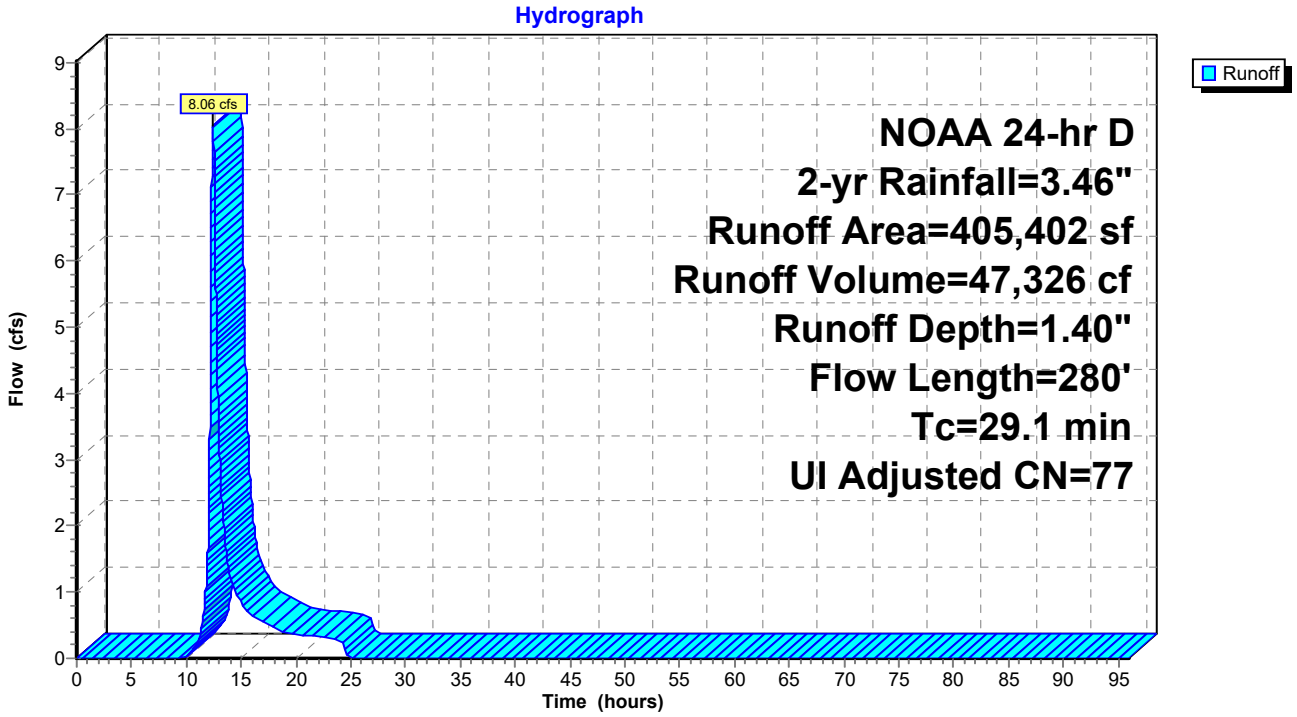
Runoff = 8.06 cfs @ 12.42 hrs, Volume= 47,326 cf, Depth= 1.40"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

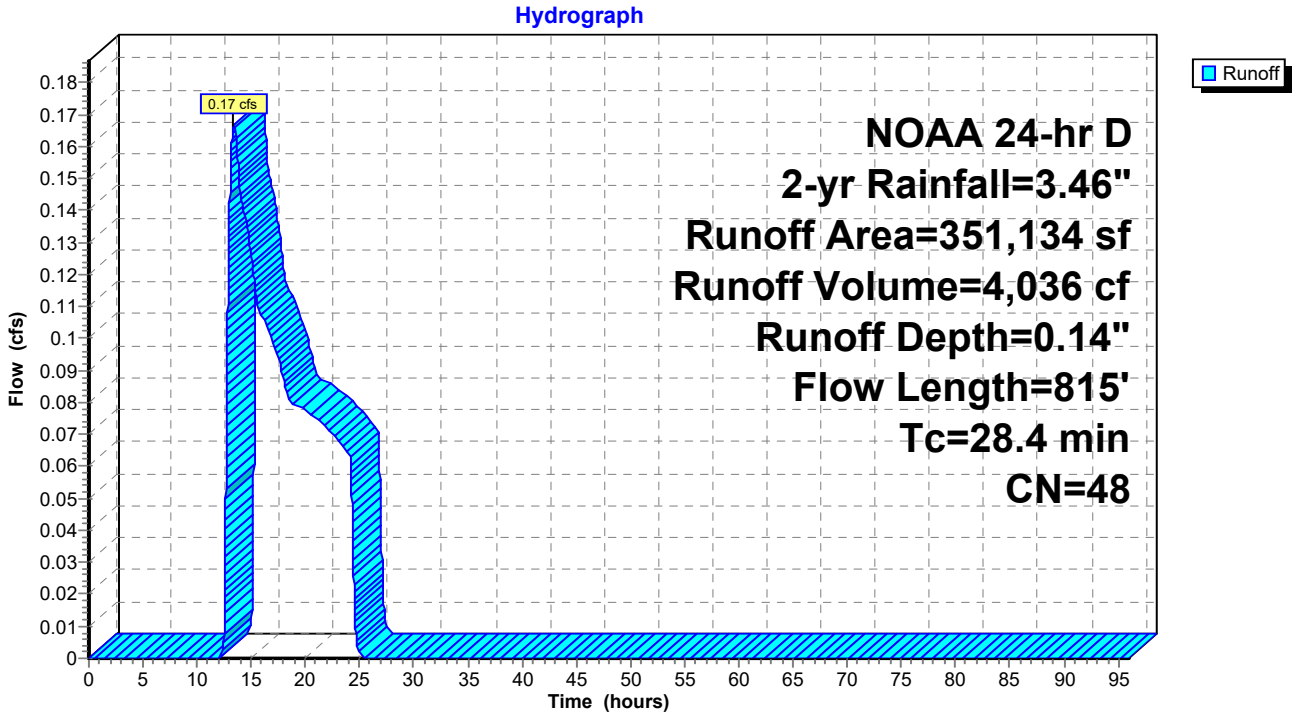
Runoff = 0.17 cfs @ 13.35 hrs, Volume= 4,036 cf, Depth= 0.14"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

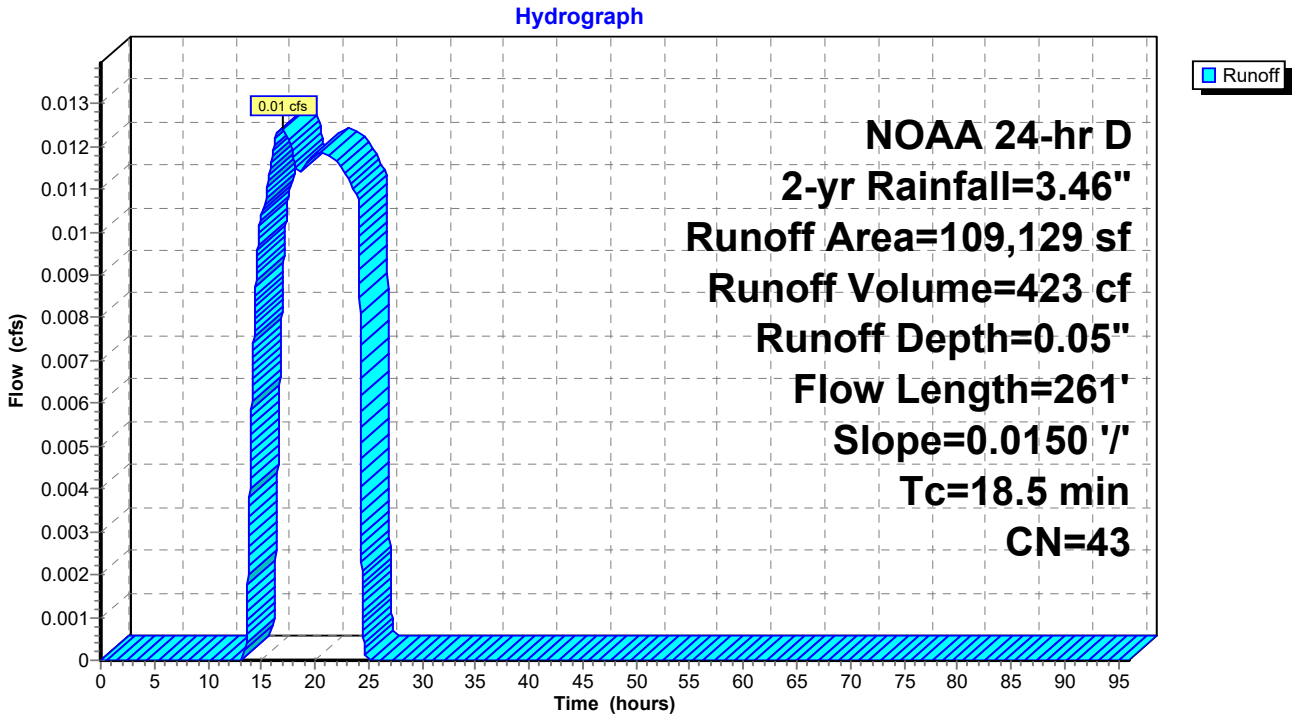
Runoff = 0.01 cfs @ 16.96 hrs, Volume= 423 cf, Depth= 0.05"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

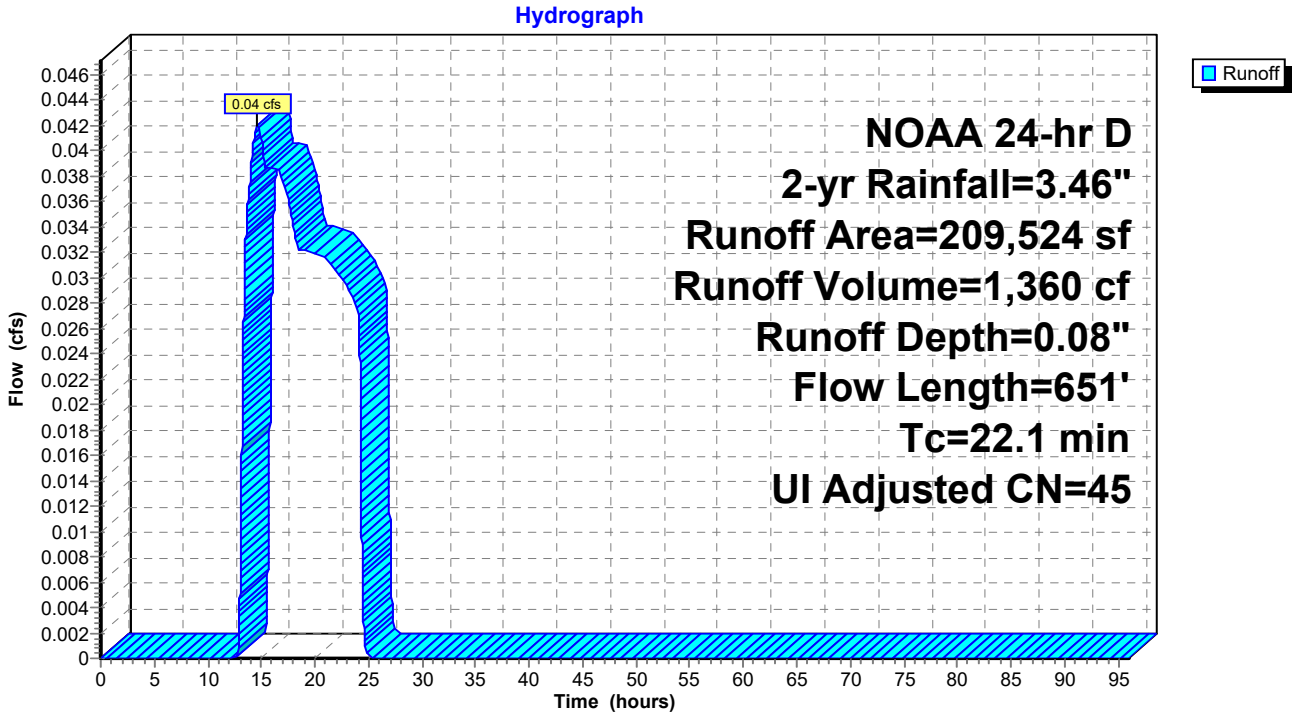
Runoff = 0.04 cfs @ 14.66 hrs, Volume= 1,360 cf, Depth= 0.08"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

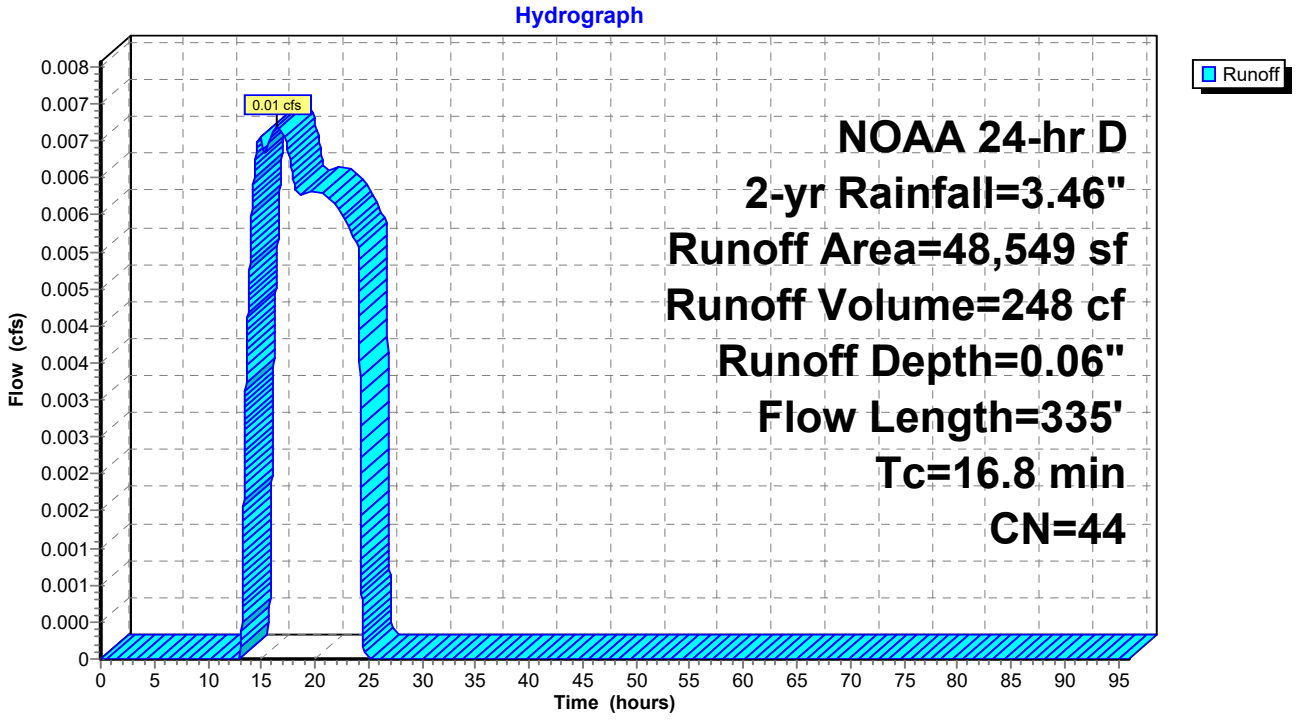
Runoff = 0.01 cfs @ 16.48 hrs, Volume= 248 cf, Depth= 0.06"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

[45] Hint: Runoff=Zero

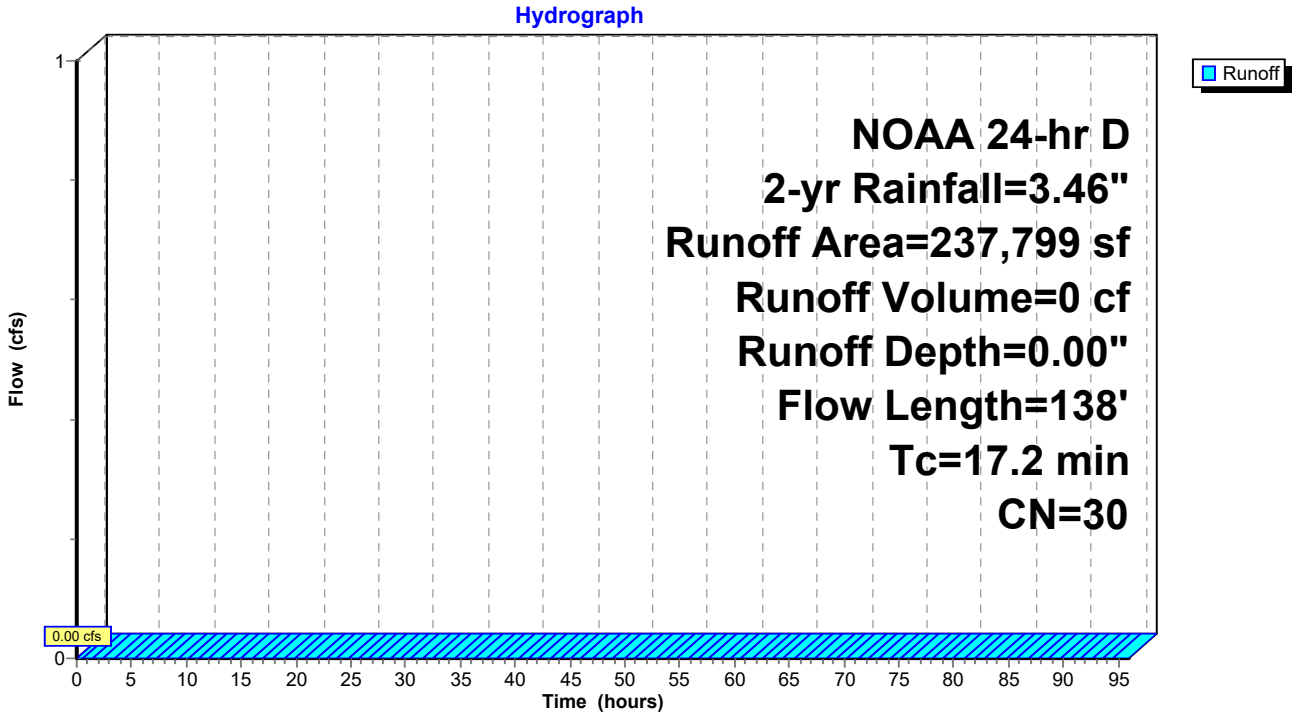
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 2-yr Rainfall=3.46"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 1.75" for 2-yr event
Inflow = 10.83 cfs @ 12.50 hrs, Volume= 70,122 cf
Outflow = 0.65 cfs @ 17.80 hrs, Volume= 70,122 cf, Atten= 94%, Lag= 317.9 min
Discarded = 0.47 cfs @ 17.80 hrs, Volume= 51,826 cf
Primary = 0.18 cfs @ 17.80 hrs, Volume= 18,296 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 24.41' @ 17.80 hrs Surf.Area= 16,202 sf Storage= 45,819 cf

Plug-Flow detention time= 919.7 min calculated for 70,114 cf (100% of inflow)
Center-of-Mass det. time= 919.9 min (1,790.7 - 870.8)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

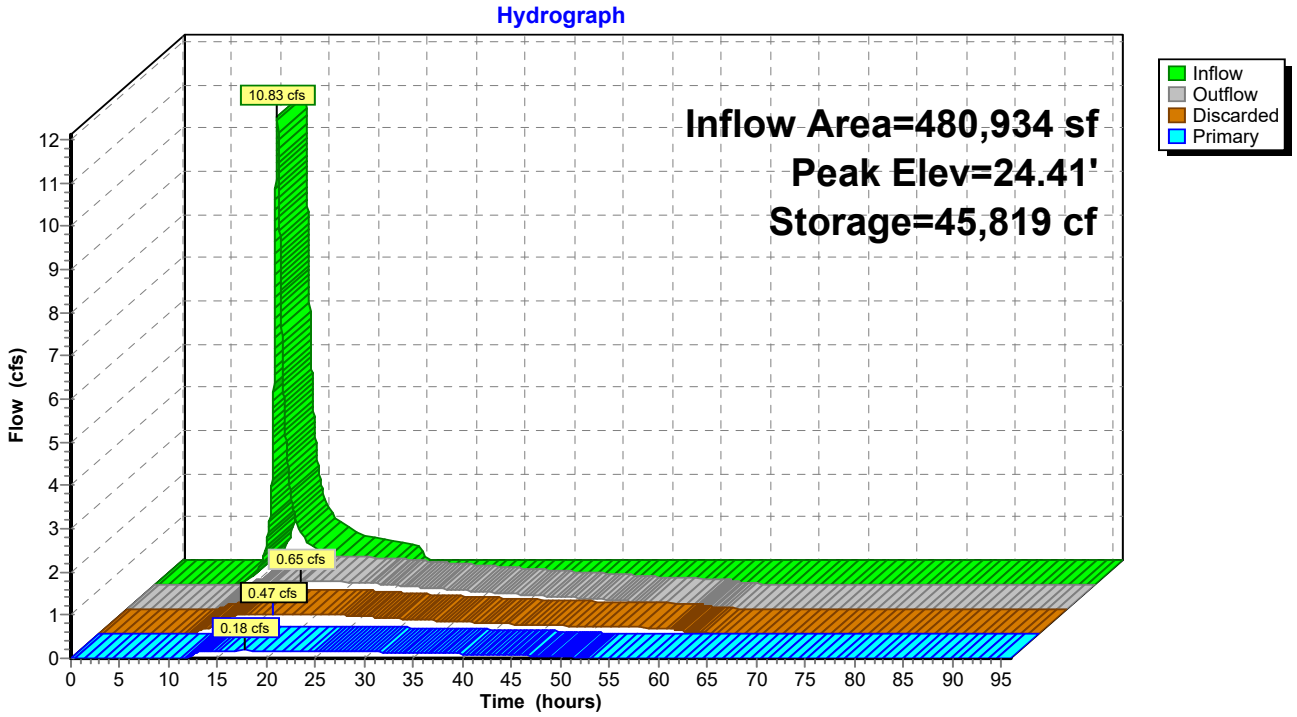
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.47 cfs @ 17.80 hrs HW=24.41' (Free Discharge)
└**3=Exfiltration** (Controls 0.47 cfs)

Primary OutFlow Max=0.18 cfs @ 17.80 hrs HW=24.41' (Free Discharge)
└**1=Culvert** (Passes 0.18 cfs of 34.76 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.38 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 0.08" for 2-yr event
Inflow = 0.04 cfs @ 14.66 hrs, Volume= 1,360 cf
Outflow = 0.04 cfs @ 17.68 hrs, Volume= 1,360 cf, Atten= 16%, Lag= 181.4 min
Discarded = 0.04 cfs @ 17.68 hrs, Volume= 1,360 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.02' @ 17.68 hrs Surf.Area= 9,214 sf Storage= 212 cf

Plug-Flow detention time= 100.2 min calculated for 1,360 cf (100% of inflow)
Center-of-Mass det. time= 100.2 min (1,205.3 - 1,105.0)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

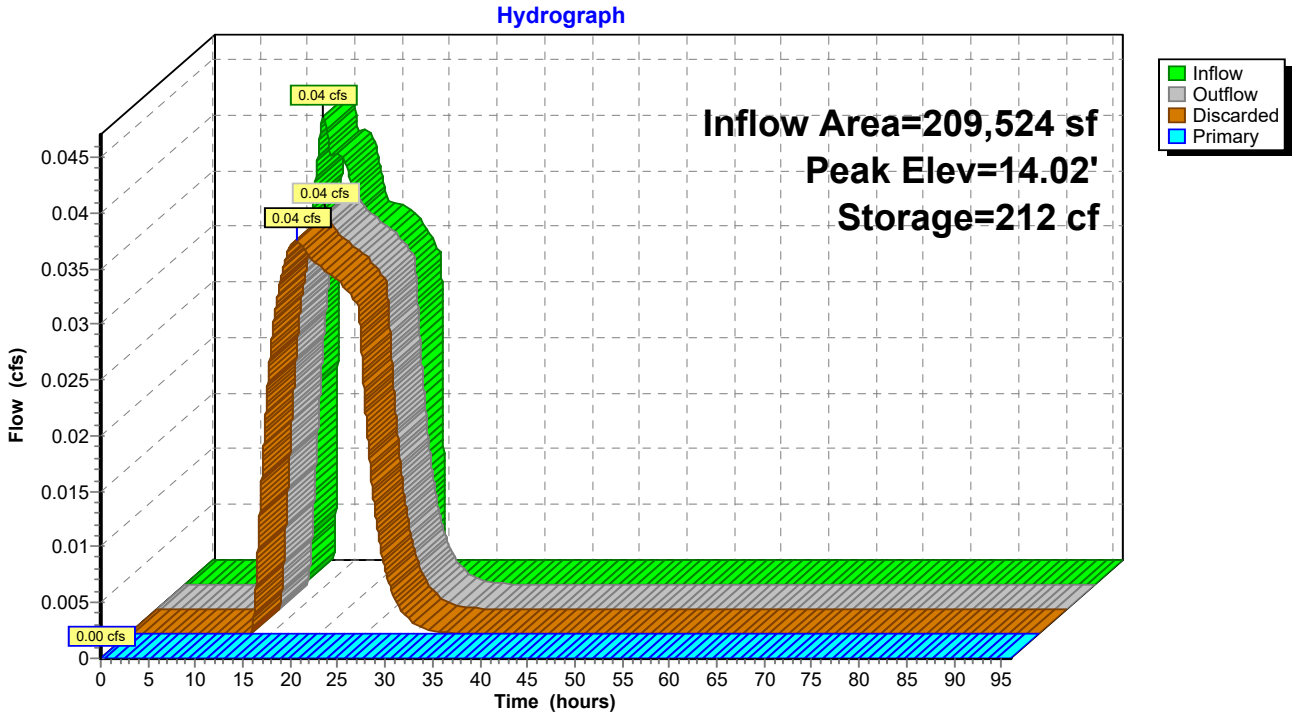
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.11 cfs @ 17.68 hrs HW=14.02' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=14.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 0.05" for 2-yr event
Inflow = 0.01 cfs @ 16.96 hrs, Volume= 423 cf
Outflow = 0.01 cfs @ 22.07 hrs, Volume= 423 cf, Atten= 6%, Lag= 306.4 min
Discarded = 0.01 cfs @ 22.07 hrs, Volume= 423 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.04' @ 22.07 hrs Surf.Area= 1,745 sf Storage= 69 cf

Plug-Flow detention time= 99.7 min calculated for 423 cf (100% of inflow)
Center-of-Mass det. time= 99.6 min (1,251.0 - 1,151.5)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

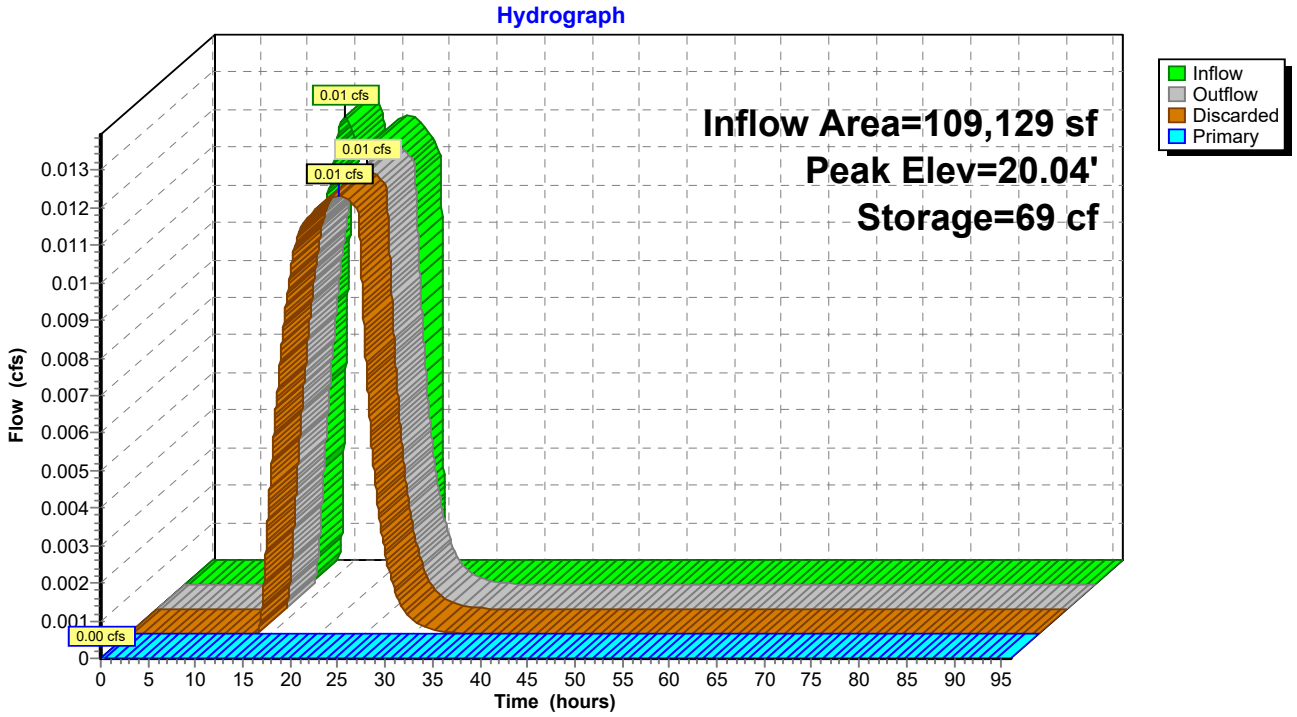
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 22.07 hrs HW=20.04' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=20.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 1.40" for 2-yr event
Inflow = 8.06 cfs @ 12.42 hrs, Volume= 47,326 cf
Outflow = 0.62 cfs @ 16.23 hrs, Volume= 47,326 cf, Atten= 92%, Lag= 228.6 min
Discarded = 0.30 cfs @ 16.23 hrs, Volume= 26,031 cf
Primary = 0.32 cfs @ 16.23 hrs, Volume= 21,295 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 19.19' @ 16.23 hrs Surf.Area= 11,007 sf Storage= 27,462 cf

Plug-Flow detention time= 628.4 min calculated for 47,326 cf (100% of inflow)
Center-of-Mass det. time= 628.3 min (1,509.4 - 881.2)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

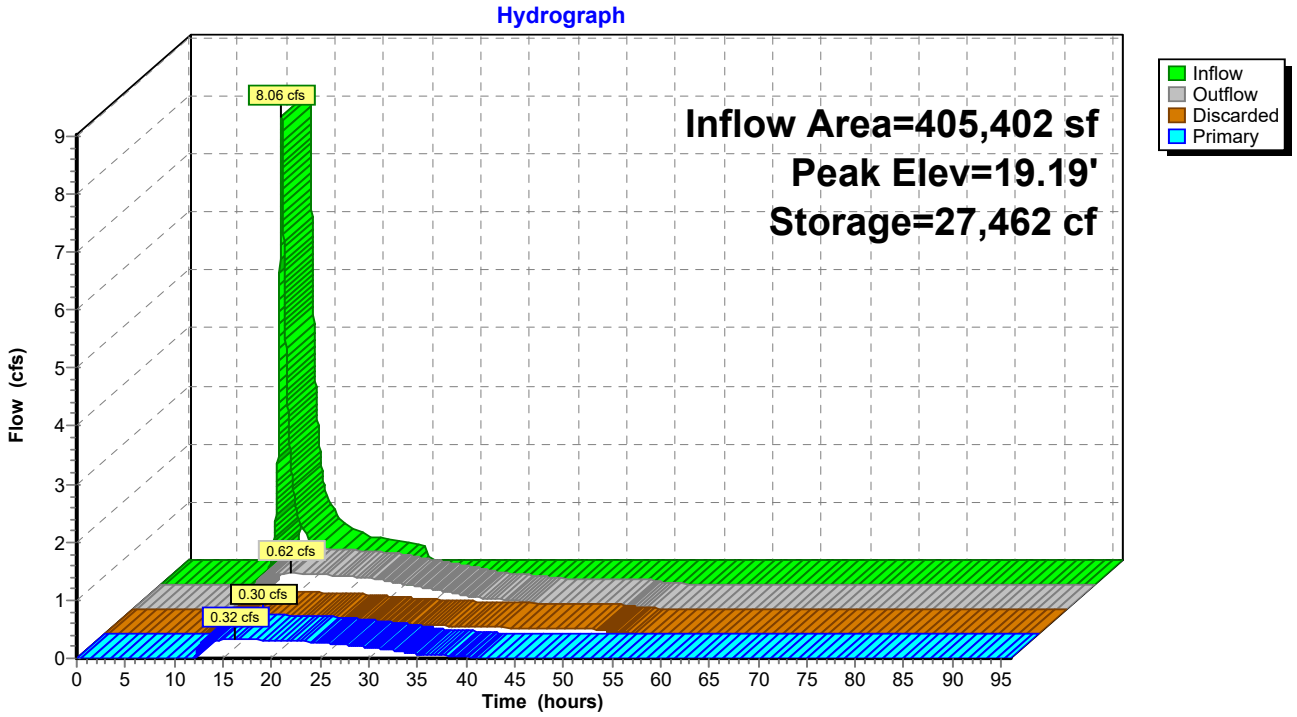
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 16.23 hrs HW=19.19' (Free Discharge)
└**3=Exfiltration** (Controls 0.30 cfs)

Primary OutFlow Max=0.32 cfs @ 16.23 hrs HW=19.19' (Free Discharge)
└**1=Culvert** (Passes 0.32 cfs of 32.92 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.77 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.99 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 0.14" for 2-yr event
Inflow = 0.24 cfs @ 13.73 hrs, Volume= 6,240 cf
Outflow = 0.12 cfs @ 18.89 hrs, Volume= 6,240 cf, Atten= 49%, Lag= 309.7 min
Discarded = 0.12 cfs @ 18.89 hrs, Volume= 6,240 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.14' @ 18.89 hrs Surf.Area= 10,769 sf Storage= 1,502 cf

Plug-Flow detention time= 166.3 min calculated for 6,240 cf (100% of inflow)
Center-of-Mass det. time= 166.2 min (1,237.5 - 1,071.3)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

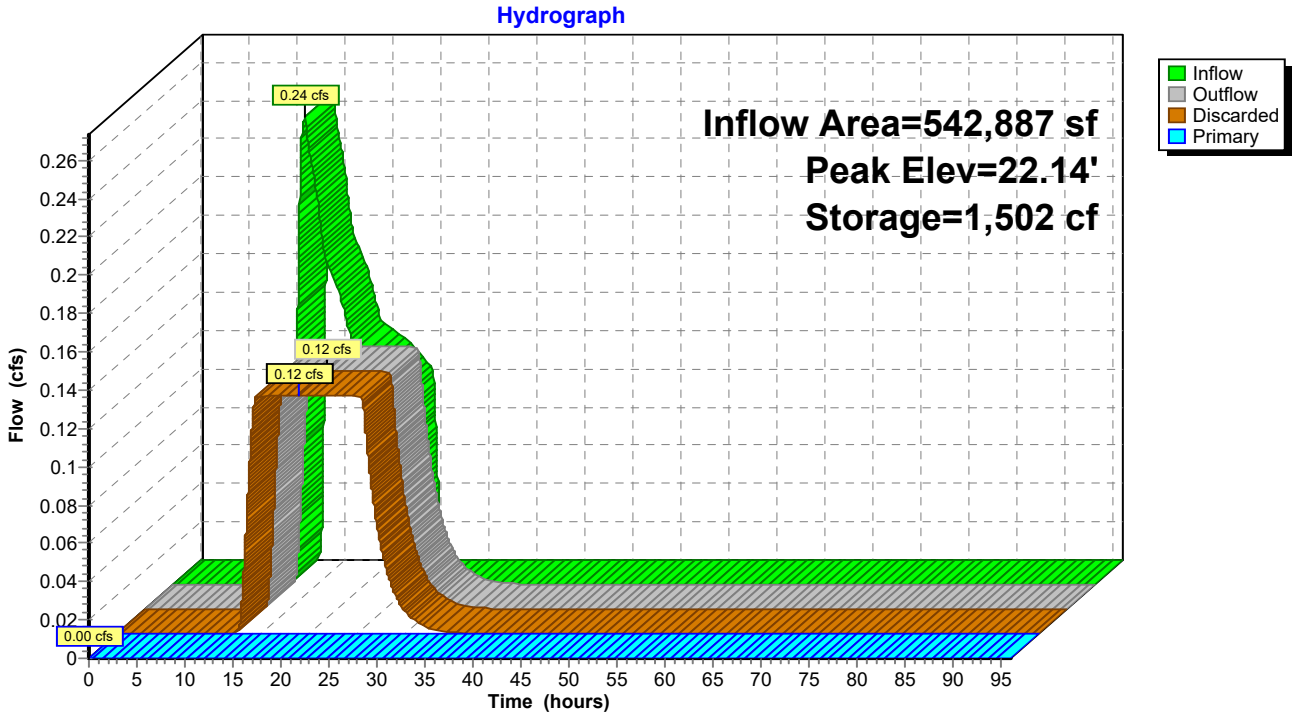
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 18.89 hrs HW=22.14' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=22.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 0.55" for 2-yr event
Inflow = 1.11 cfs @ 12.31 hrs, Volume= 6,954 cf
Outflow = 0.10 cfs @ 17.51 hrs, Volume= 6,954 cf, Atten= 91%, Lag= 311.8 min
Discarded = 0.06 cfs @ 17.51 hrs, Volume= 5,821 cf
Primary = 0.04 cfs @ 17.51 hrs, Volume= 1,133 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 35.48' @ 17.51 hrs Surf.Area= 3,080 sf Storage= 3,700 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 641.2 min calculated for 6,954 cf (100% of inflow)
Center-of-Mass det. time= 641.1 min (1,574.1 - 933.0)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

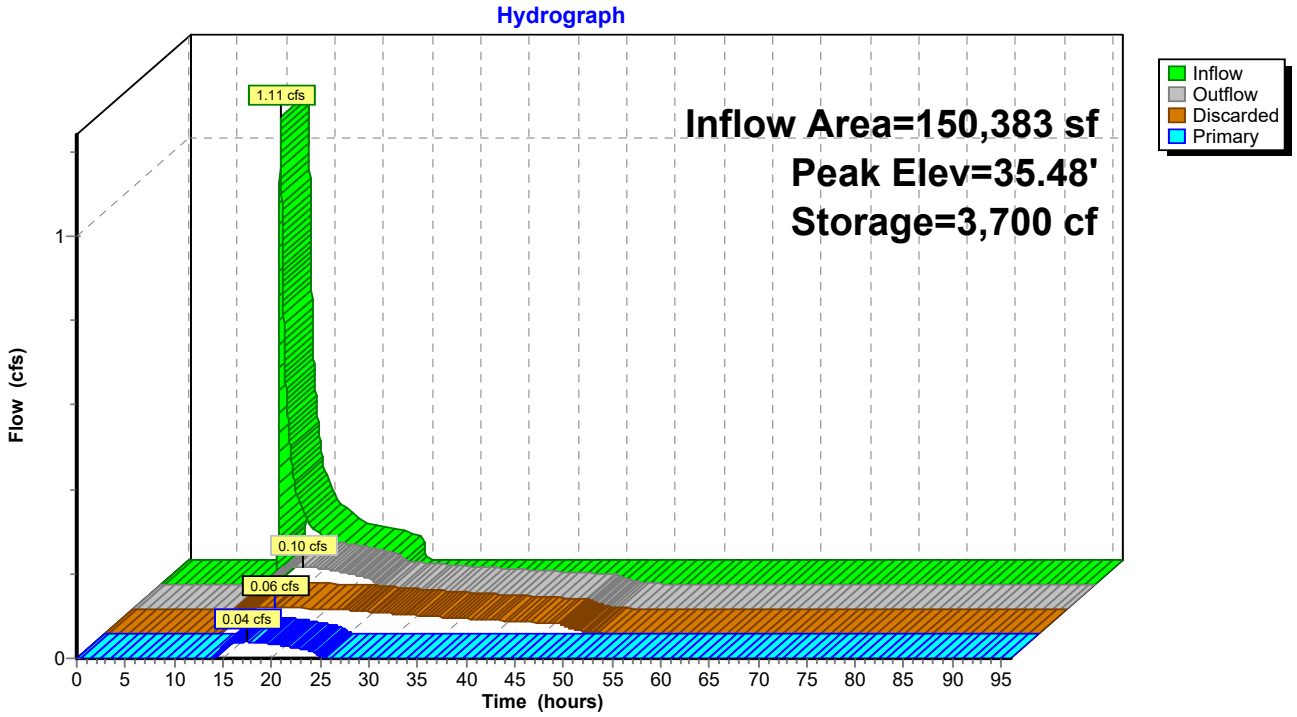
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 17.51 hrs HW=35.48' (Free Discharge)
└**3=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.04 cfs @ 17.51 hrs HW=35.48' (Free Discharge)
└**1=Culvert** (Passes 0.04 cfs of 10.29 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.82 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

Pond 22P: Water Quality Basin #3.2

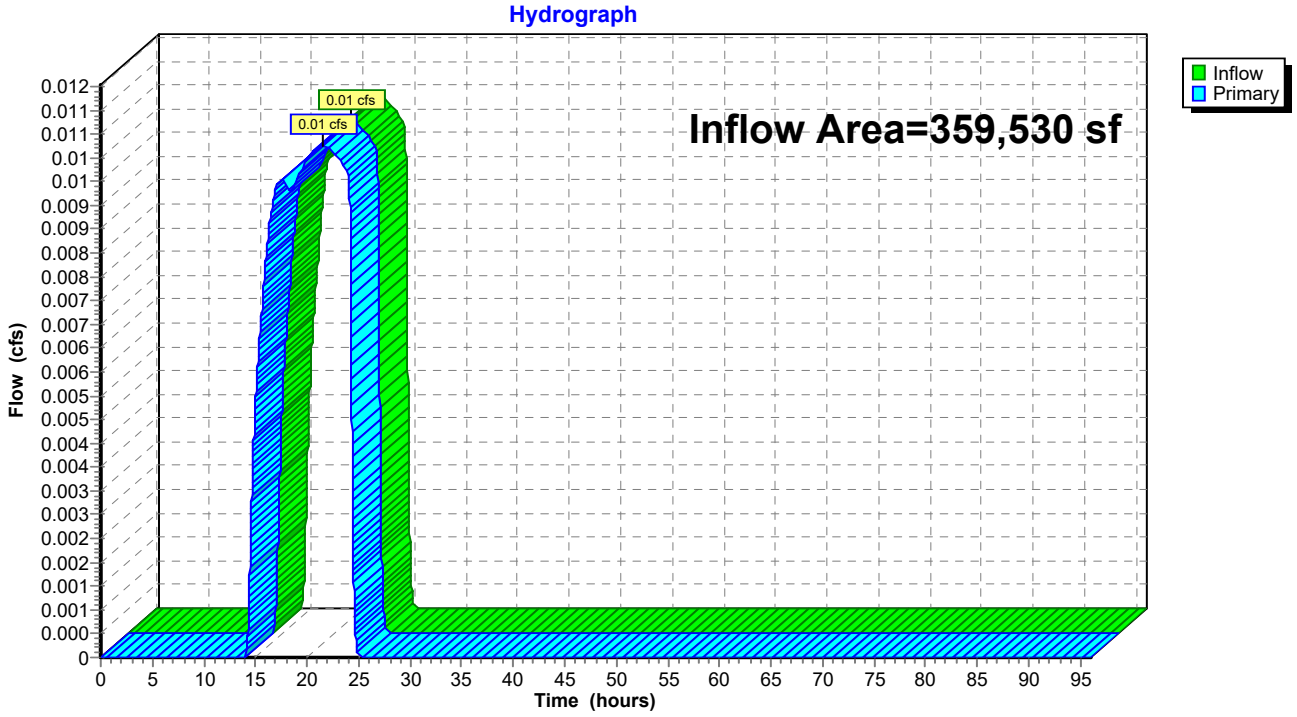


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.01" for 2-yr event
Inflow = 0.01 cfs @ 21.62 hrs, Volume= 341 cf
Primary = 0.01 cfs @ 21.62 hrs, Volume= 341 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

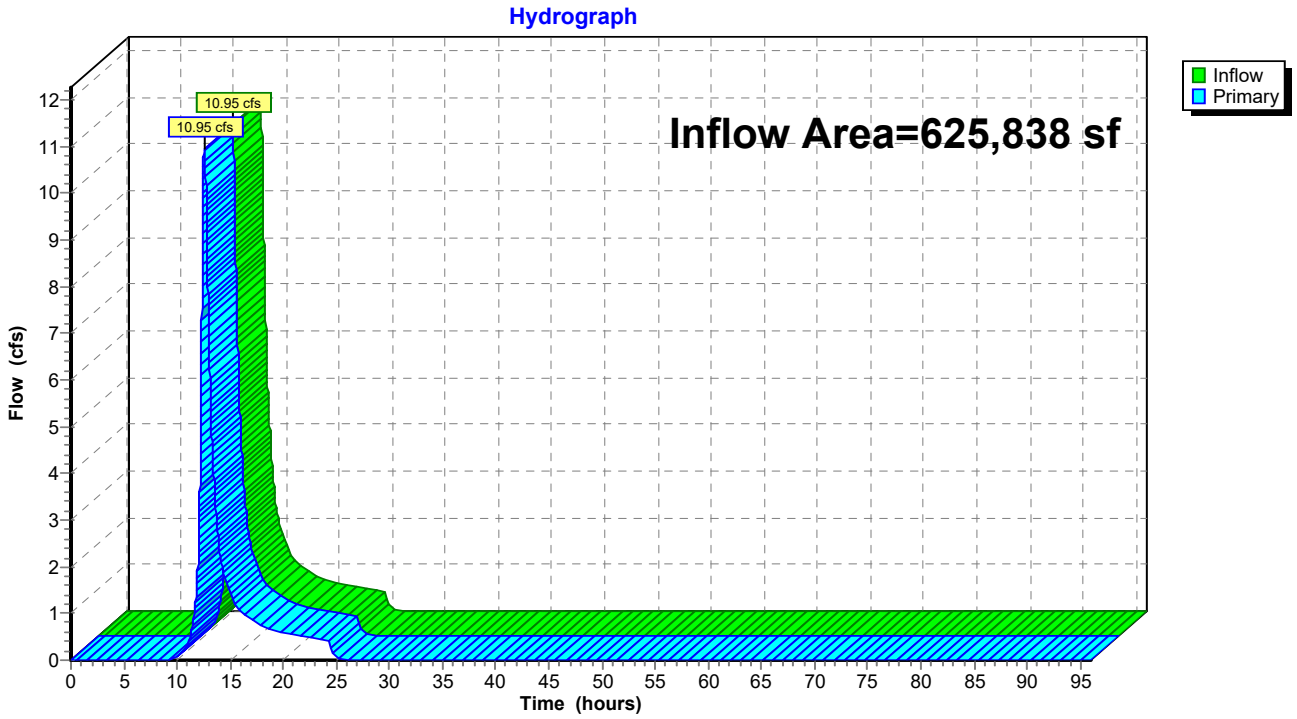


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 1.47" for 2-yr event
Inflow = 10.95 cfs @ 12.57 hrs, Volume= 76,511 cf
Primary = 10.95 cfs @ 12.57 hrs, Volume= 76,511 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

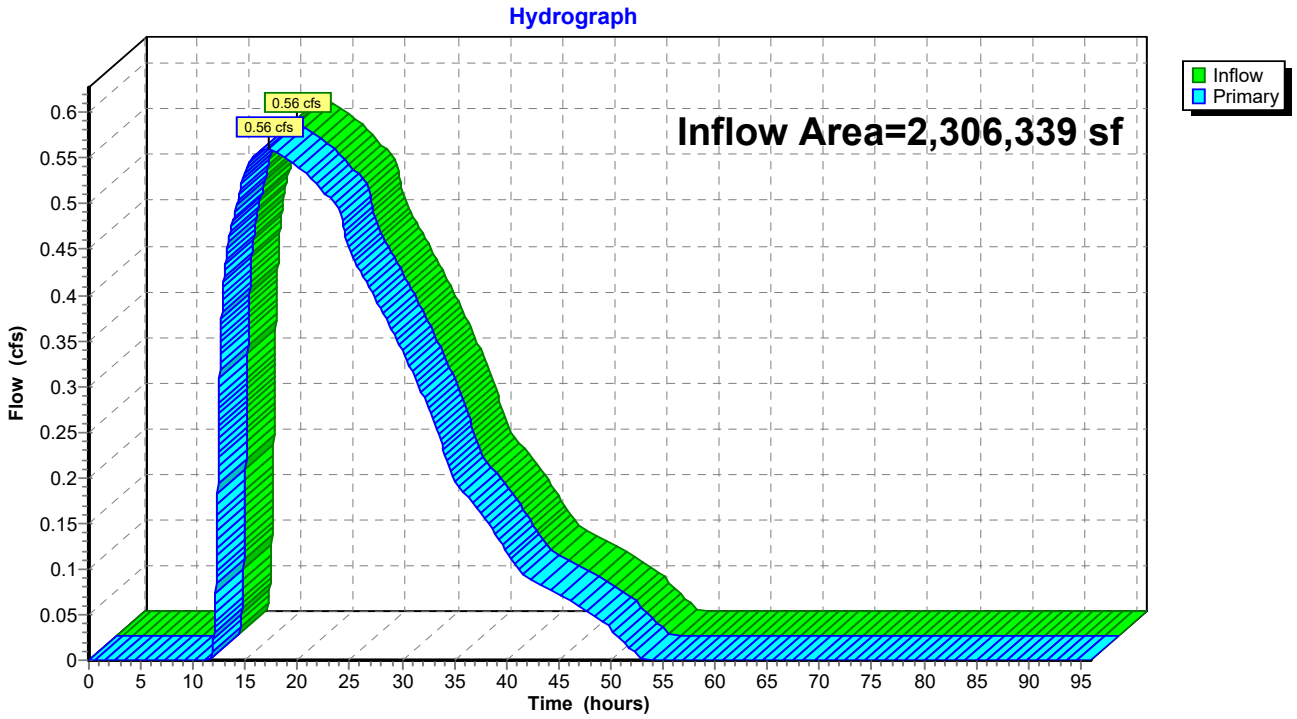


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 0.21" for 2-yr event
Inflow = 0.56 cfs @ 17.16 hrs, Volume= 41,313 cf
Primary = 0.56 cfs @ 17.16 hrs, Volume= 41,313 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

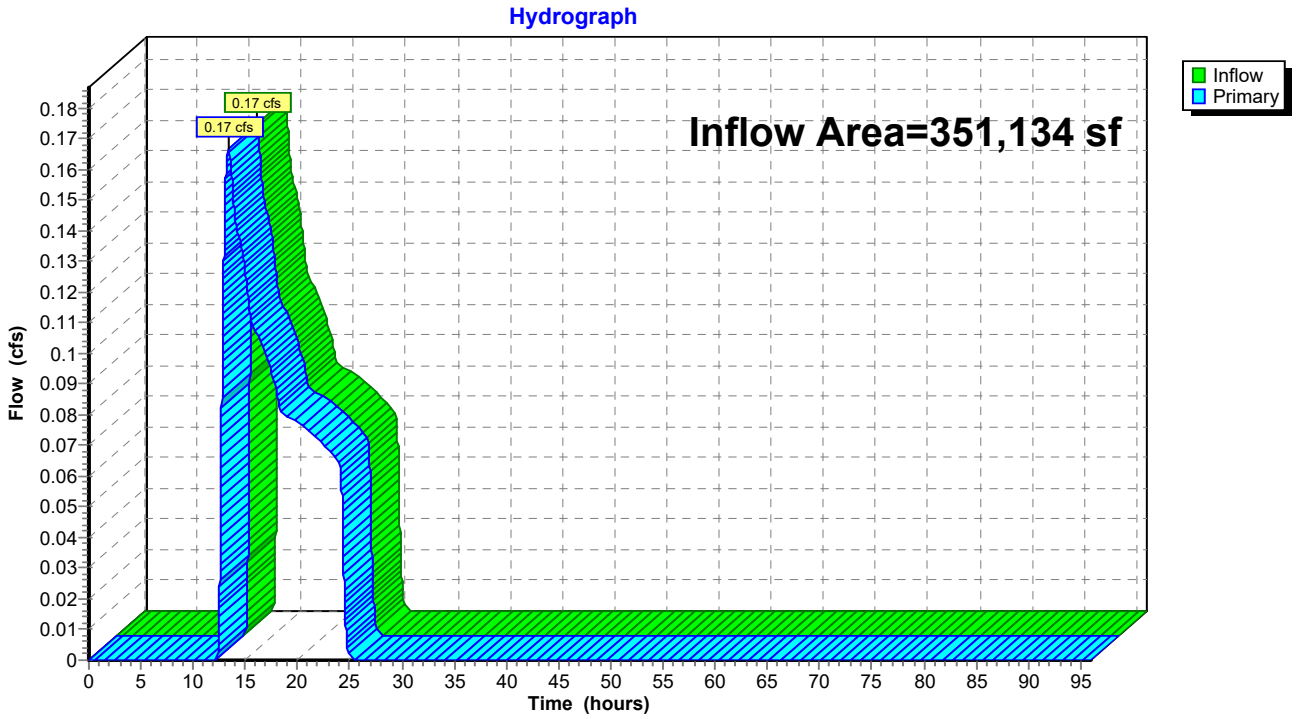


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 0.14" for 2-yr event
Inflow = 0.17 cfs @ 13.35 hrs, Volume= 4,036 cf
Primary = 0.17 cfs @ 13.35 hrs, Volume= 4,036 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.34"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=0.22 cfs 3,489 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=1.44"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=3.69 cfs 18,068 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=0.63"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=2.43 cfs 28,622 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=3.19"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=19.76 cfs 127,713 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=2.81"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=21.38 cfs 146,752 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=2.72"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=15.99 cfs 92,016 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=0.63"
Flow Length=815' Tc=28.4 min CN=48 Runoff=1.92 cfs 18,512 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=0.39"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=0.25 cfs 3,525 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=0.48"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=0.73 cfs 8,390 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=0.43"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.15 cfs 1,753 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.01 cfs 171 cf

Pond 12P: Water Quality Basin #4 Peak Elev=26.19' Storage=77,285 cf Inflow=19.76 cfs 127,713 cf
Discarded=0.67 cfs 70,180 cf Primary=1.28 cfs 57,533 cf Outflow=1.95 cfs 127,713 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.39' Storage=3,714 cf Inflow=0.73 cfs 8,390 cf
Discarded=0.11 cfs 8,390 cf Primary=0.00 cfs 0 cf Outflow=0.11 cfs 8,390 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.56' Storage=1,061 cf Inflow=0.25 cfs 3,525 cf
Discarded=0.02 cfs 1,877 cf Primary=0.07 cfs 1,649 cf Outflow=0.10 cfs 3,525 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=21.59' Storage=58,623 cf Inflow=15.99 cfs 92,016 cf
Discarded=0.51 cfs 49,763 cf Primary=0.46 cfs 42,253 cf Outflow=0.97 cfs 92,016 cf

Pond 21P: Water Quality Basin #2 Peak Elev=22.94' Storage=10,669 cf Inflow=2.43 cfs 28,622 cf
Discarded=0.14 cfs 12,579 cf Primary=0.51 cfs 16,042 cf Outflow=0.65 cfs 28,622 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=36.51' Storage=7,315 cf Inflow=3.69 cfs 18,068 cf
Discarded=0.09 cfs 8,018 cf Primary=0.59 cfs 10,050 cf Outflow=0.69 cfs 18,068 cf

Link 2L: Northeast Wetland Inflow=0.22 cfs 3,660 cf
Primary=0.22 cfs 3,660 cf

Link 3L: South Off-Site (POC 3) Inflow=21.38 cfs 146,752 cf
Primary=21.38 cfs 146,752 cf

Link 4L: West Wetlands (POC 1) Inflow=2.88 cfs 132,939 cf
Primary=2.88 cfs 132,939 cf

Link 5L: West Off-Site (POC 2) Inflow=1.92 cfs 18,512 cf
Primary=1.92 cfs 18,512 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 449,010 cf Average Runoff Depth = 1.64"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

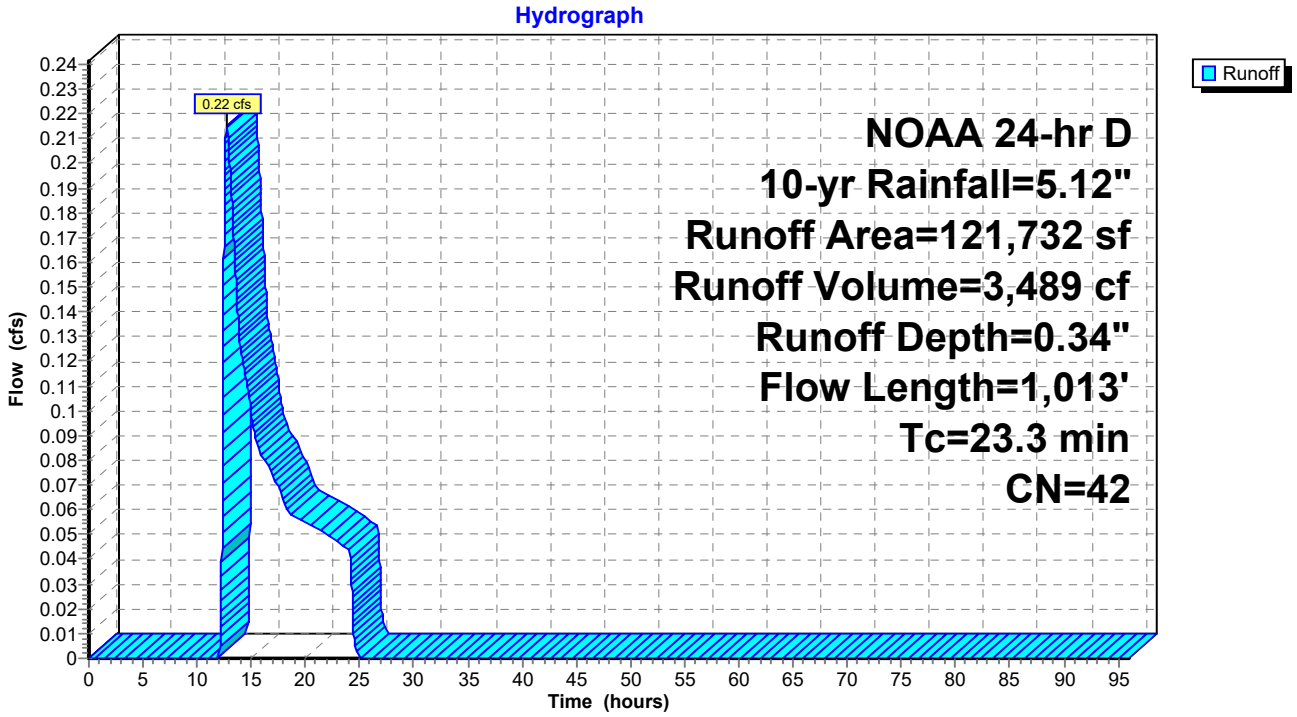
Runoff = 0.22 cfs @ 12.71 hrs, Volume= 3,489 cf, Depth= 0.34"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

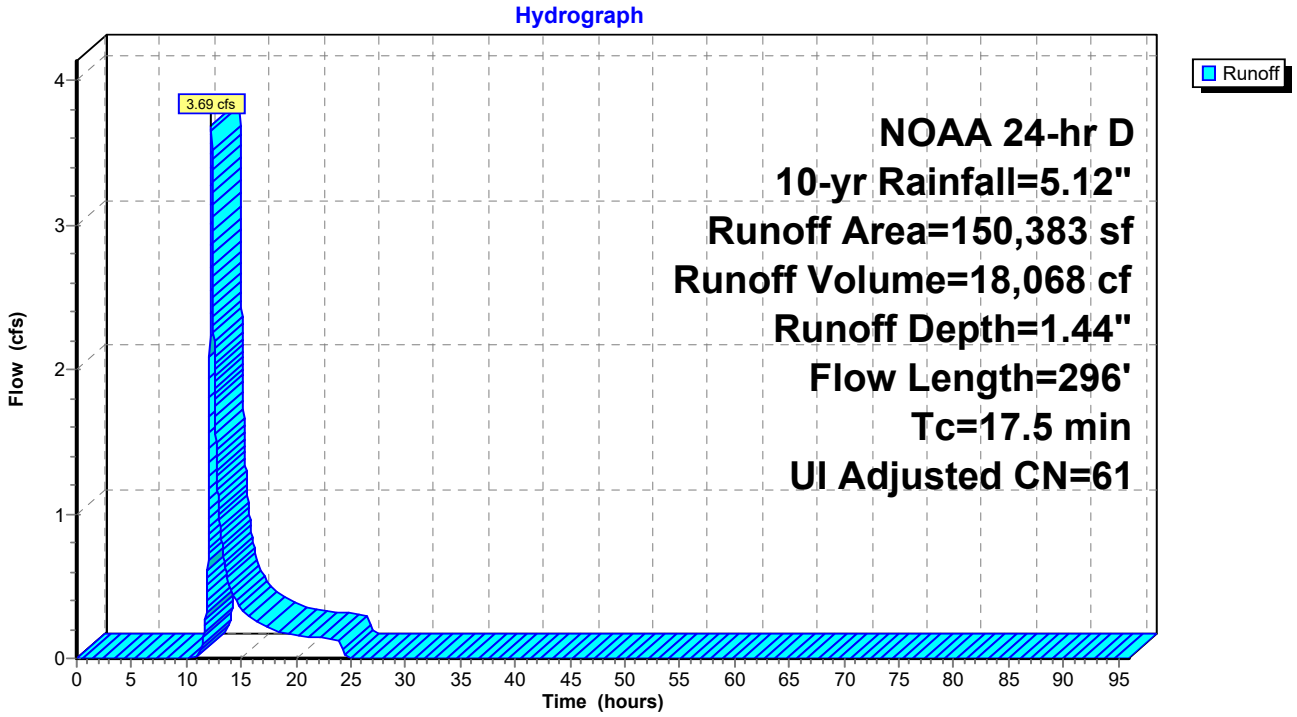
Runoff = 3.69 cfs @ 12.27 hrs, Volume= 18,068 cf, Depth= 1.44"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

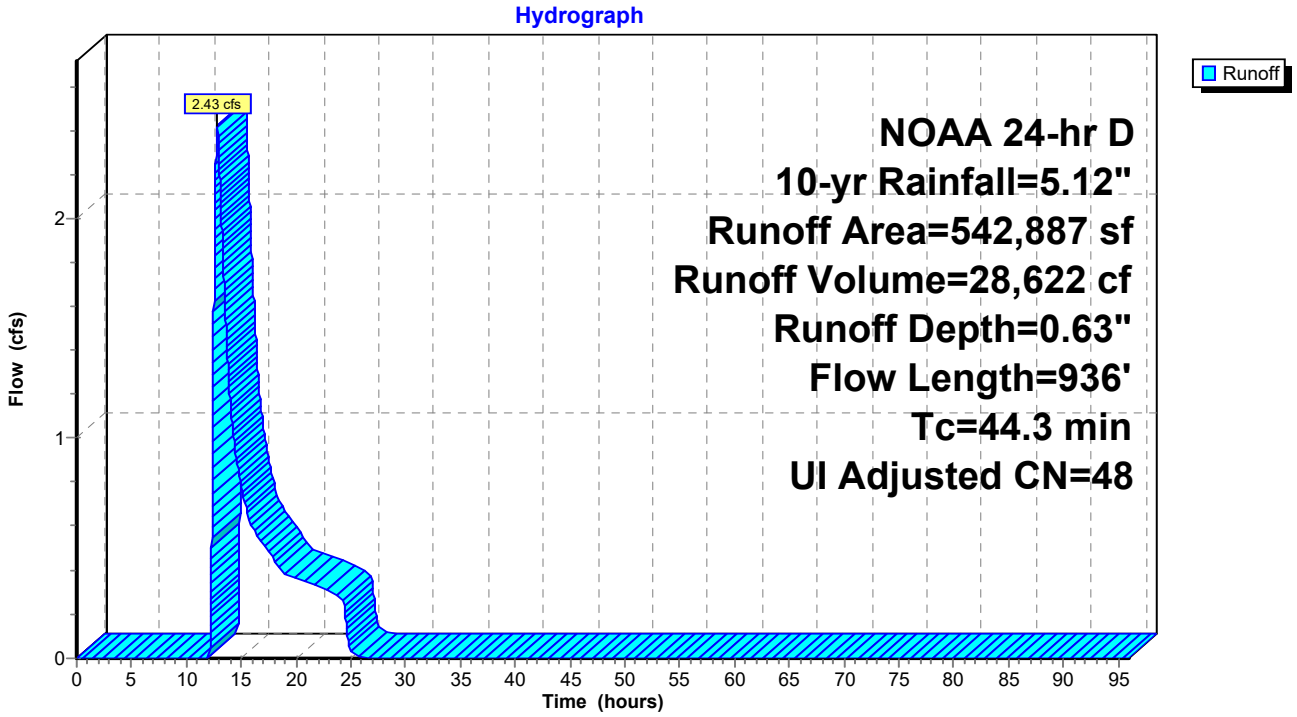
Runoff = 2.43 cfs @ 12.80 hrs, Volume= 28,622 cf, Depth= 0.63"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

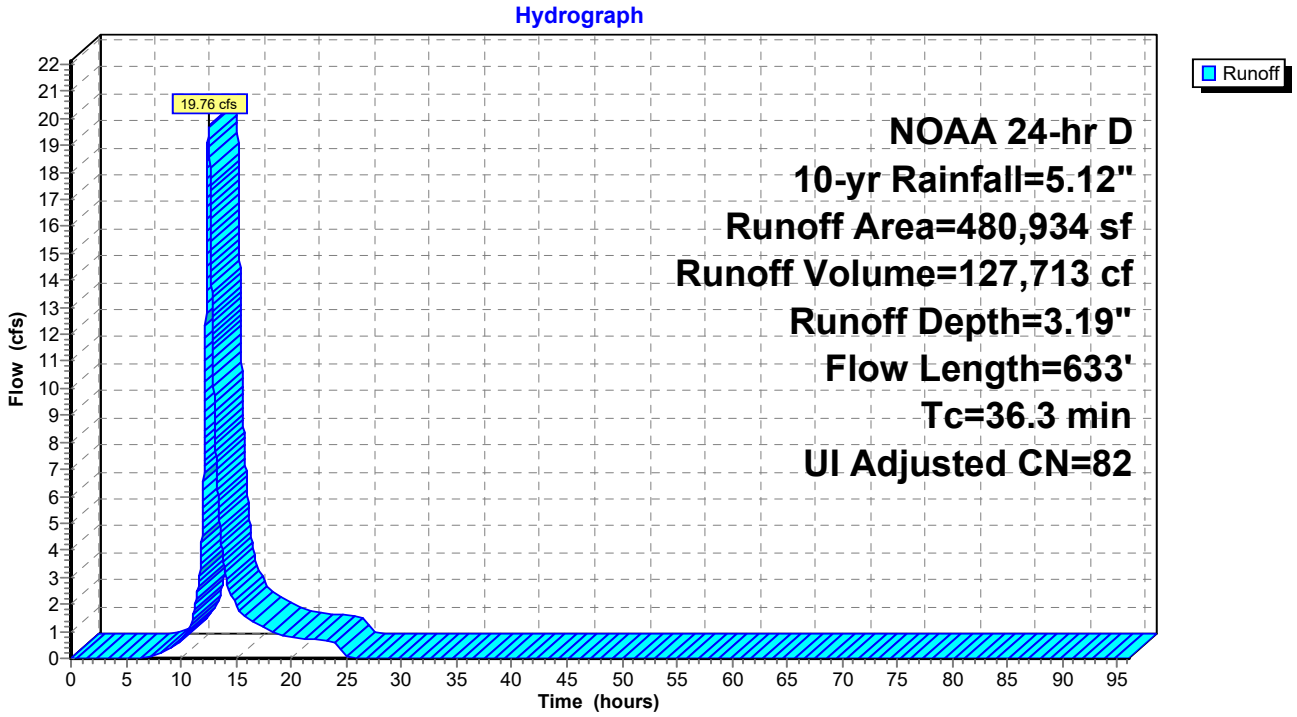
Runoff = 19.76 cfs @ 12.50 hrs, Volume= 127,713 cf, Depth= 3.19"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

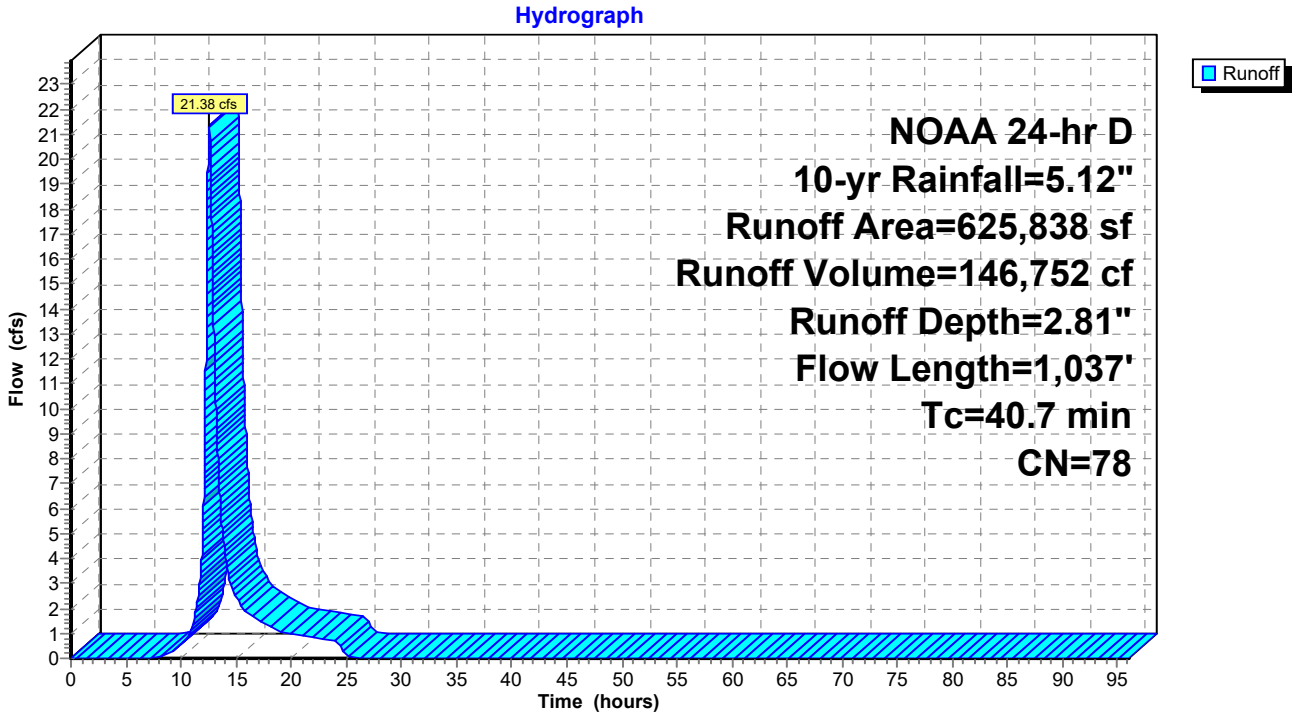
Runoff = 21.38 cfs @ 12.57 hrs, Volume= 146,752 cf, Depth= 2.81"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

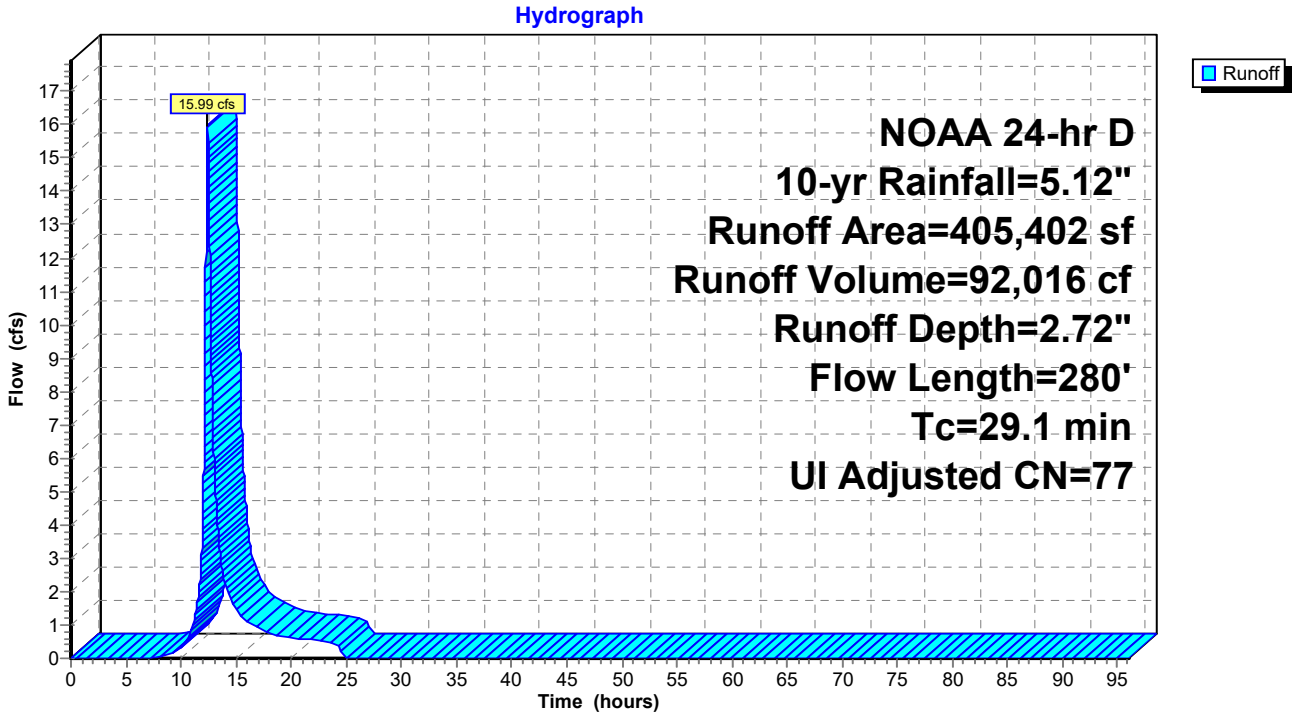
Runoff = 15.99 cfs @ 12.41 hrs, Volume= 92,016 cf, Depth= 2.72"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

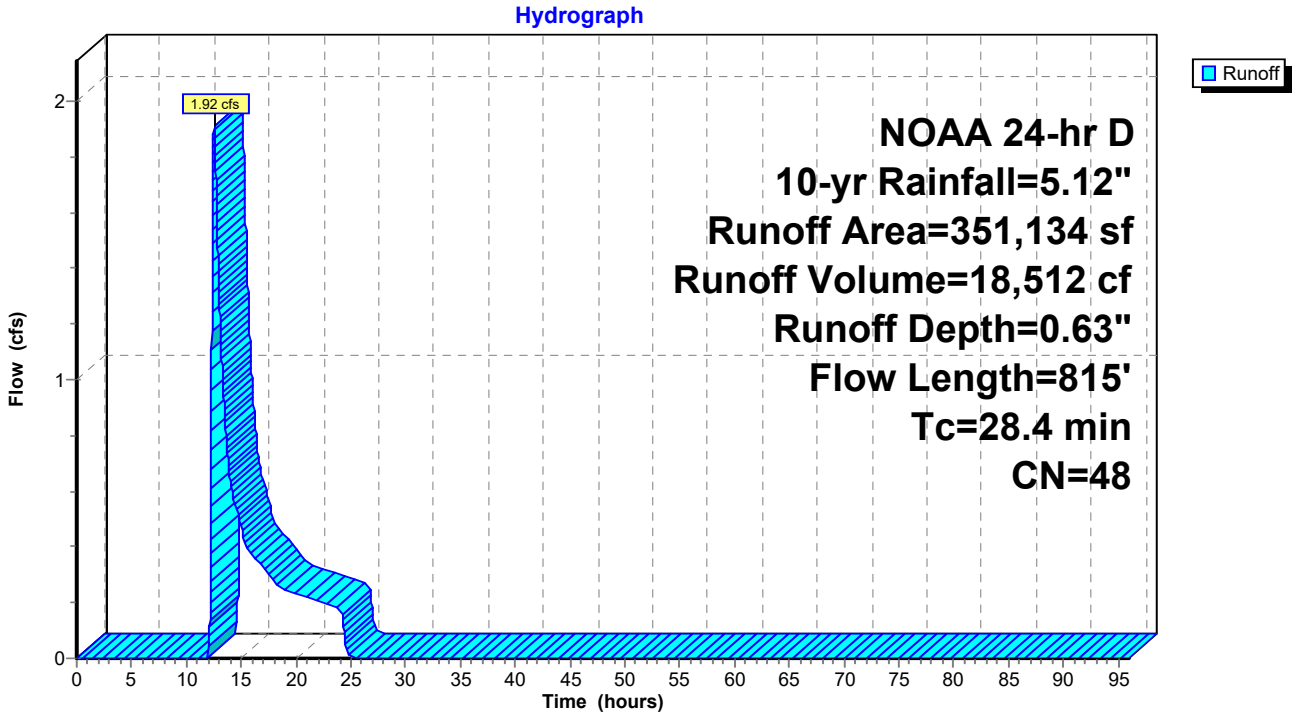
Runoff = 1.92 cfs @ 12.53 hrs, Volume= 18,512 cf, Depth= 0.63"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

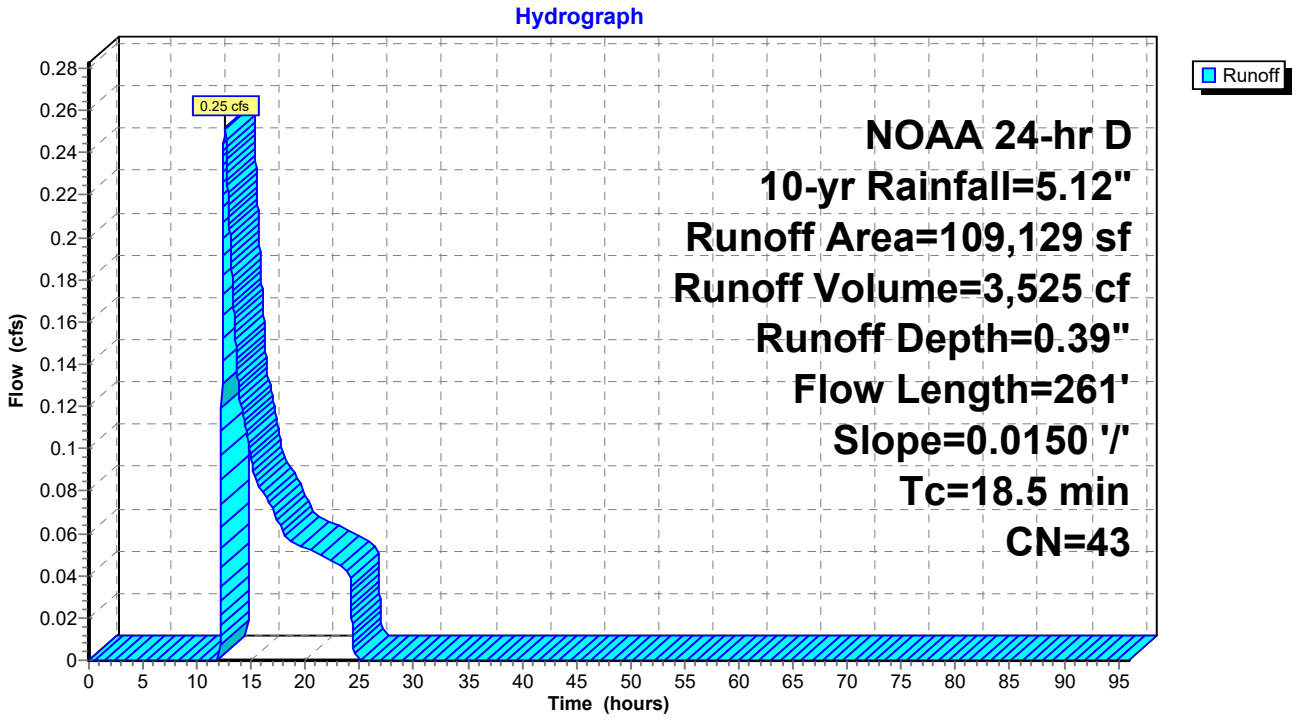
Runoff = 0.25 cfs @ 12.56 hrs, Volume= 3,525 cf, Depth= 0.39"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

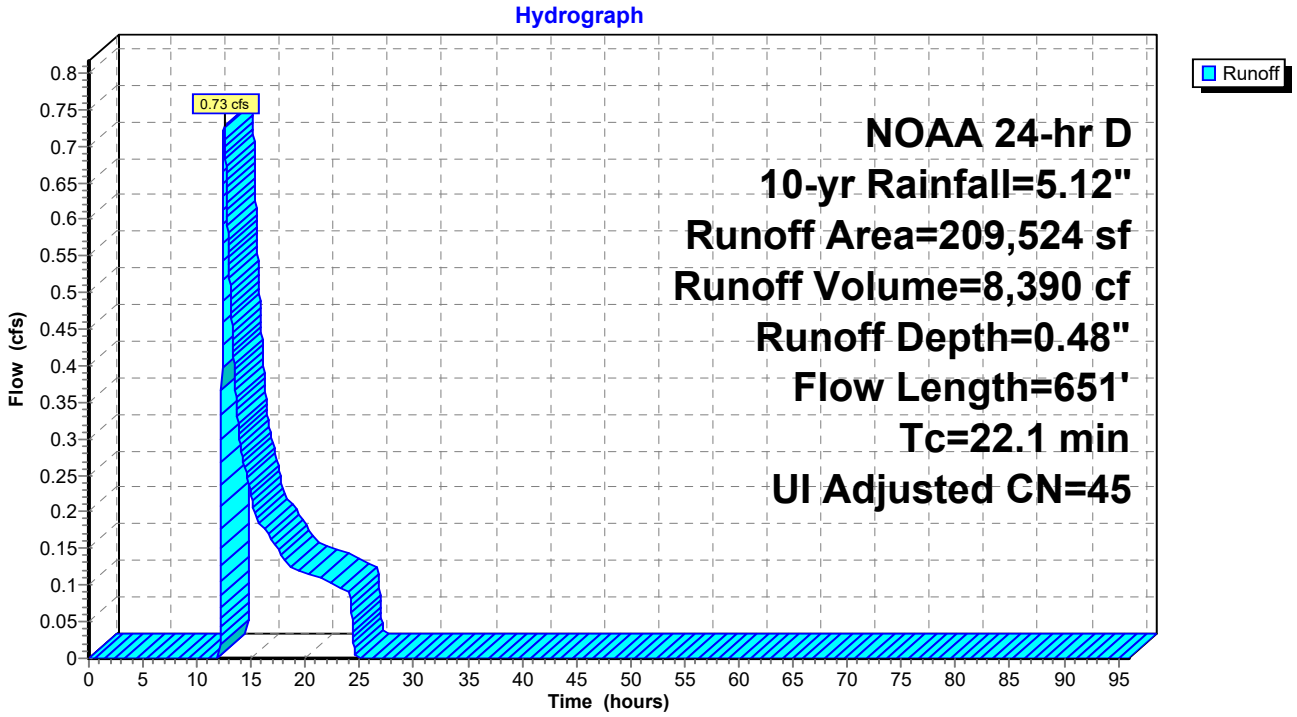
Runoff = 0.73 cfs @ 12.49 hrs, Volume= 8,390 cf, Depth= 0.48"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

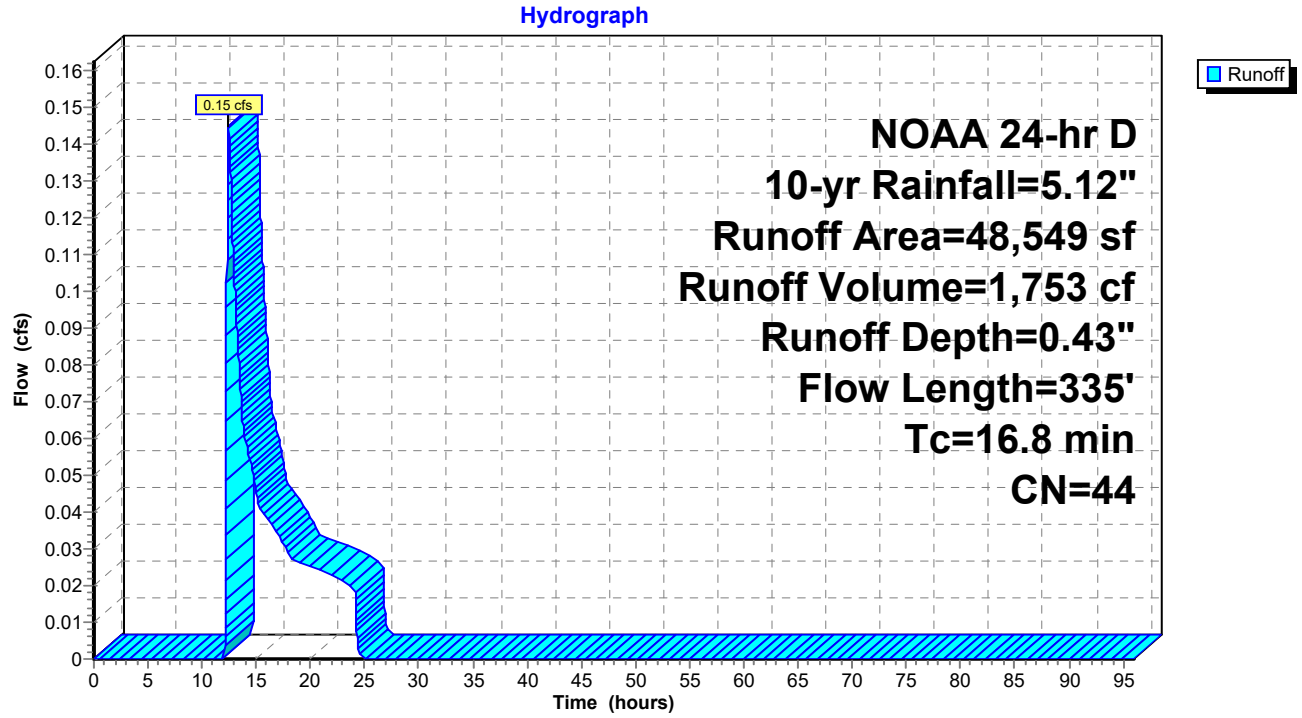
Runoff = 0.15 cfs @ 12.42 hrs, Volume= 1,753 cf, Depth= 0.43"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

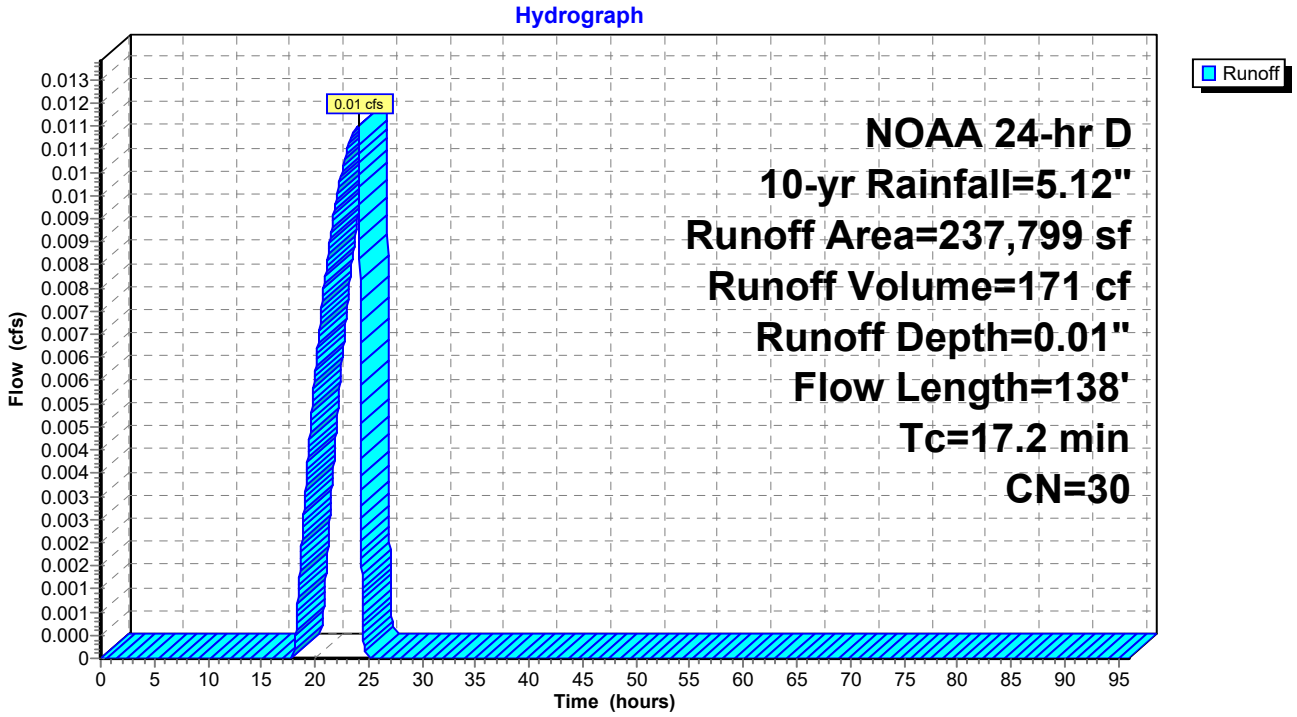
Runoff = 0.01 cfs @ 24.02 hrs, Volume= 171 cf, Depth= 0.01"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 10-yr Rainfall=5.12"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 3.19" for 10-yr event
Inflow = 19.76 cfs @ 12.50 hrs, Volume= 127,713 cf
Outflow = 1.95 cfs @ 15.06 hrs, Volume= 127,713 cf, Atten= 90%, Lag= 153.9 min
Discarded = 0.67 cfs @ 15.06 hrs, Volume= 70,180 cf
Primary = 1.28 cfs @ 15.06 hrs, Volume= 57,533 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 26.19' @ 15.06 hrs Surf.Area= 19,346 sf Storage= 77,285 cf

Plug-Flow detention time= 781.9 min calculated for 127,713 cf (100% of inflow)
Center-of-Mass det. time= 781.9 min (1,633.6 - 851.7)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

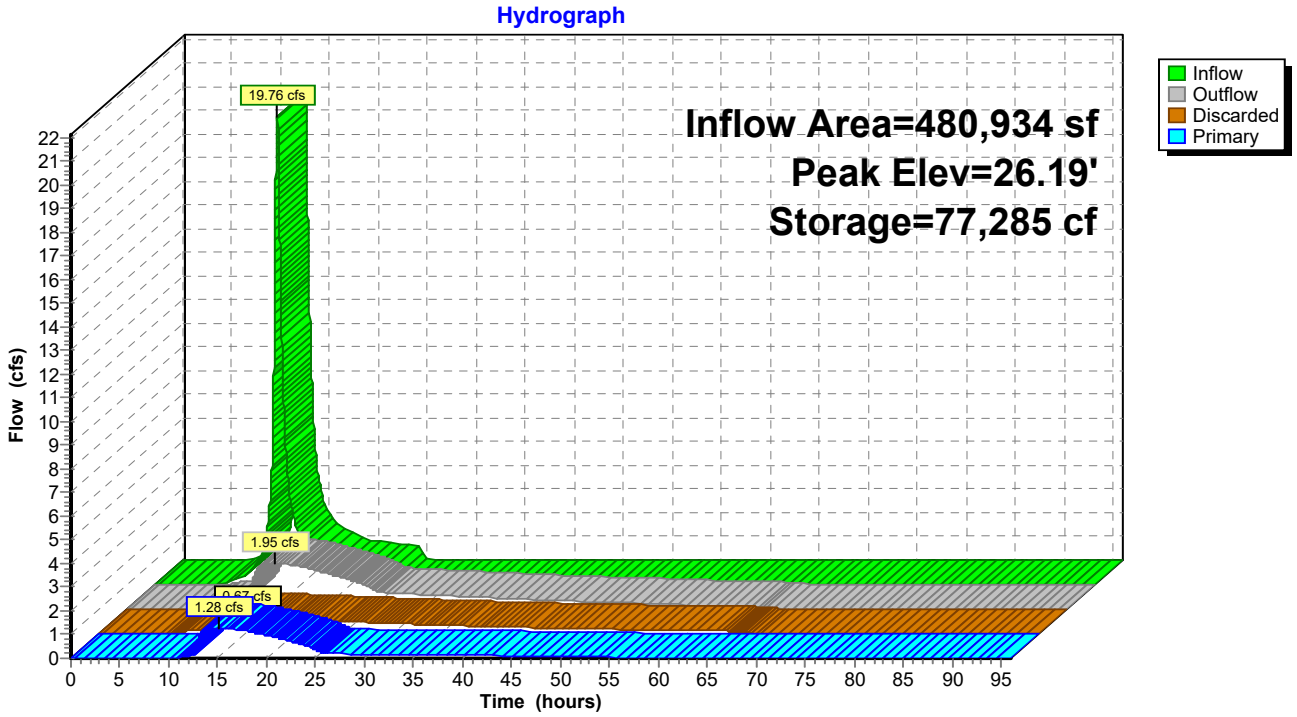
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.67 cfs @ 15.06 hrs HW=26.19' (Free Discharge)
└**3=Exfiltration** (Controls 0.67 cfs)

Primary OutFlow Max=1.28 cfs @ 15.06 hrs HW=26.19' (Free Discharge)
└**1=Culvert** (Passes 1.28 cfs of 46.89 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.23 cfs @ 10.55 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.05 cfs @ 5.35 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 0.48" for 10-yr event
Inflow = 0.73 cfs @ 12.49 hrs, Volume= 8,390 cf
Outflow = 0.11 cfs @ 20.71 hrs, Volume= 8,390 cf, Atten= 84%, Lag= 493.3 min
Discarded = 0.11 cfs @ 20.71 hrs, Volume= 8,390 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.39' @ 20.71 hrs Surf.Area= 9,766 sf Storage= 3,714 cf

Plug-Flow detention time= 396.0 min calculated for 8,389 cf (100% of inflow)
Center-of-Mass det. time= 396.1 min (1,373.0 - 976.9)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

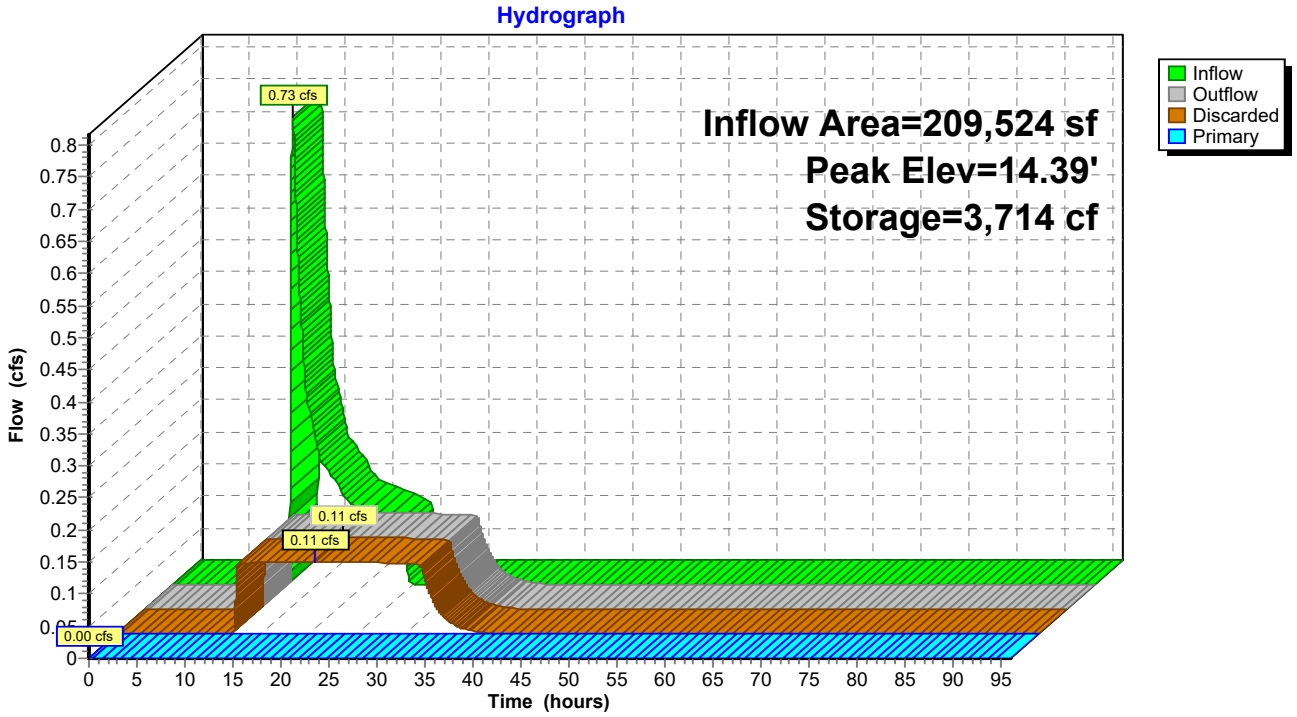
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.11 cfs @ 20.71 hrs HW=14.39' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=14.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 0.39" for 10-yr event
Inflow = 0.25 cfs @ 12.56 hrs, Volume= 3,525 cf
Outflow = 0.10 cfs @ 14.95 hrs, Volume= 3,525 cf, Atten= 61%, Lag= 143.6 min
Discarded = 0.02 cfs @ 14.95 hrs, Volume= 1,877 cf
Primary = 0.07 cfs @ 14.95 hrs, Volume= 1,649 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.56' @ 14.95 hrs Surf.Area= 2,082 sf Storage= 1,061 cf

Plug-Flow detention time= 268.4 min calculated for 3,525 cf (100% of inflow)
Center-of-Mass det. time= 268.4 min (1,259.4 - 990.9)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

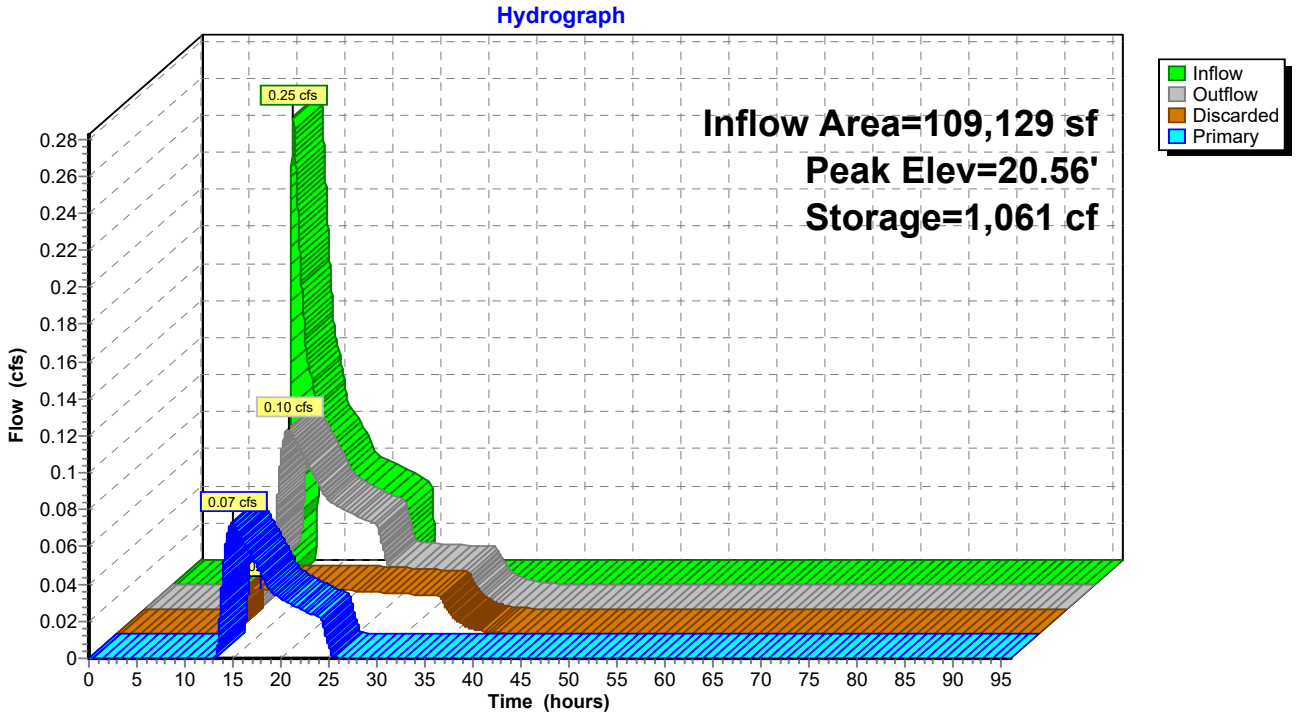
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 14.95 hrs HW=20.56' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.07 cfs @ 14.95 hrs HW=20.56' (Free Discharge)
└**1=Culvert** (Passes 0.07 cfs of 1.53 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.36 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 2.72" for 10-yr event
Inflow = 15.99 cfs @ 12.41 hrs, Volume= 92,016 cf
Outflow = 0.97 cfs @ 16.87 hrs, Volume= 92,016 cf, Atten= 94%, Lag= 267.5 min
Discarded = 0.51 cfs @ 16.87 hrs, Volume= 49,763 cf
Primary = 0.46 cfs @ 16.87 hrs, Volume= 42,253 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 21.59' @ 16.87 hrs Surf.Area= 15,008 sf Storage= 58,623 cf

Plug-Flow detention time= 816.7 min calculated for 92,016 cf (100% of inflow)
Center-of-Mass det. time= 816.6 min (1,676.4 - 859.8)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

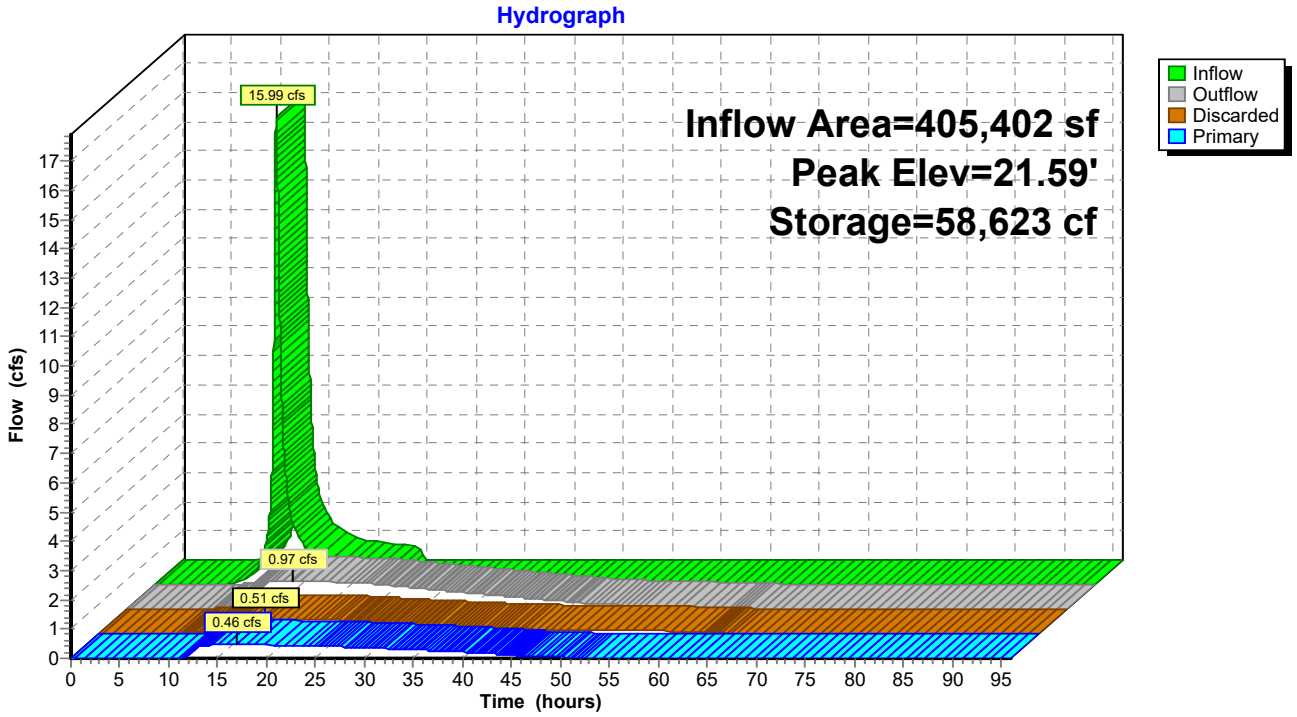
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.51 cfs @ 16.87 hrs HW=21.59' (Free Discharge)
└**3=Exfiltration** (Controls 0.51 cfs)

Primary OutFlow Max=0.46 cfs @ 16.87 hrs HW=21.59' (Free Discharge)
└**1=Culvert** (Passes 0.46 cfs of 49.25 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 10.78 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.22 cfs @ 10.22 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 0.63" for 10-yr event
Inflow = 2.43 cfs @ 12.80 hrs, Volume= 28,622 cf
Outflow = 0.65 cfs @ 15.59 hrs, Volume= 28,622 cf, Atten= 73%, Lag= 167.2 min
Discarded = 0.14 cfs @ 15.59 hrs, Volume= 12,579 cf
Primary = 0.51 cfs @ 15.59 hrs, Volume= 16,042 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.94' @ 15.59 hrs Surf.Area= 12,060 sf Storage= 10,669 cf

Plug-Flow detention time= 323.3 min calculated for 28,619 cf (100% of inflow)
Center-of-Mass det. time= 323.5 min (1,299.9 - 976.5)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

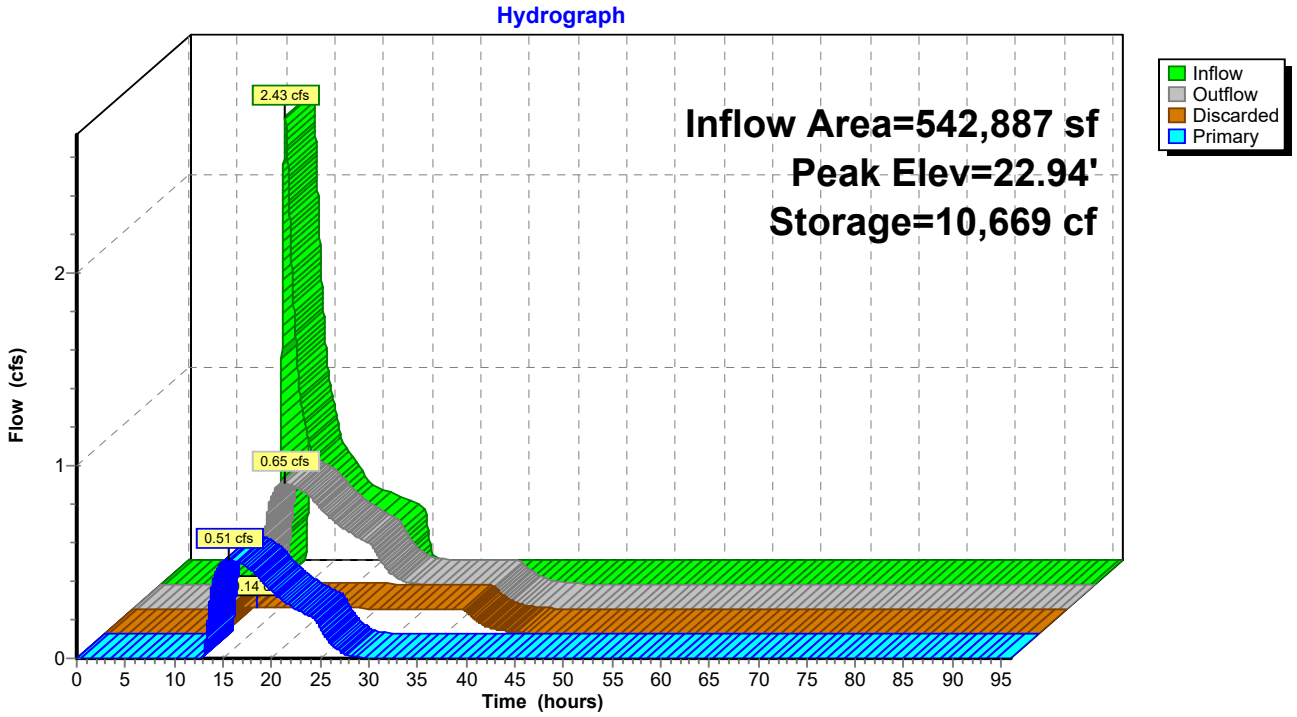
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 15.59 hrs HW=22.94' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.51 cfs @ 15.59 hrs HW=22.94' (Free Discharge)
└**1=Culvert** (Passes 0.51 cfs of 4.83 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.51 cfs @ 2.61 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 1.44" for 10-yr event
Inflow = 3.69 cfs @ 12.27 hrs, Volume= 18,068 cf
Outflow = 0.69 cfs @ 13.42 hrs, Volume= 18,068 cf, Atten= 81%, Lag= 68.8 min
Discarded = 0.09 cfs @ 13.42 hrs, Volume= 8,018 cf
Primary = 0.59 cfs @ 13.42 hrs, Volume= 10,050 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 36.51' @ 13.42 hrs Surf.Area= 3,957 sf Storage= 7,315 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 415.2 min calculated for 18,066 cf (100% of inflow)
Center-of-Mass det. time= 415.4 min (1,310.6 - 895.2)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

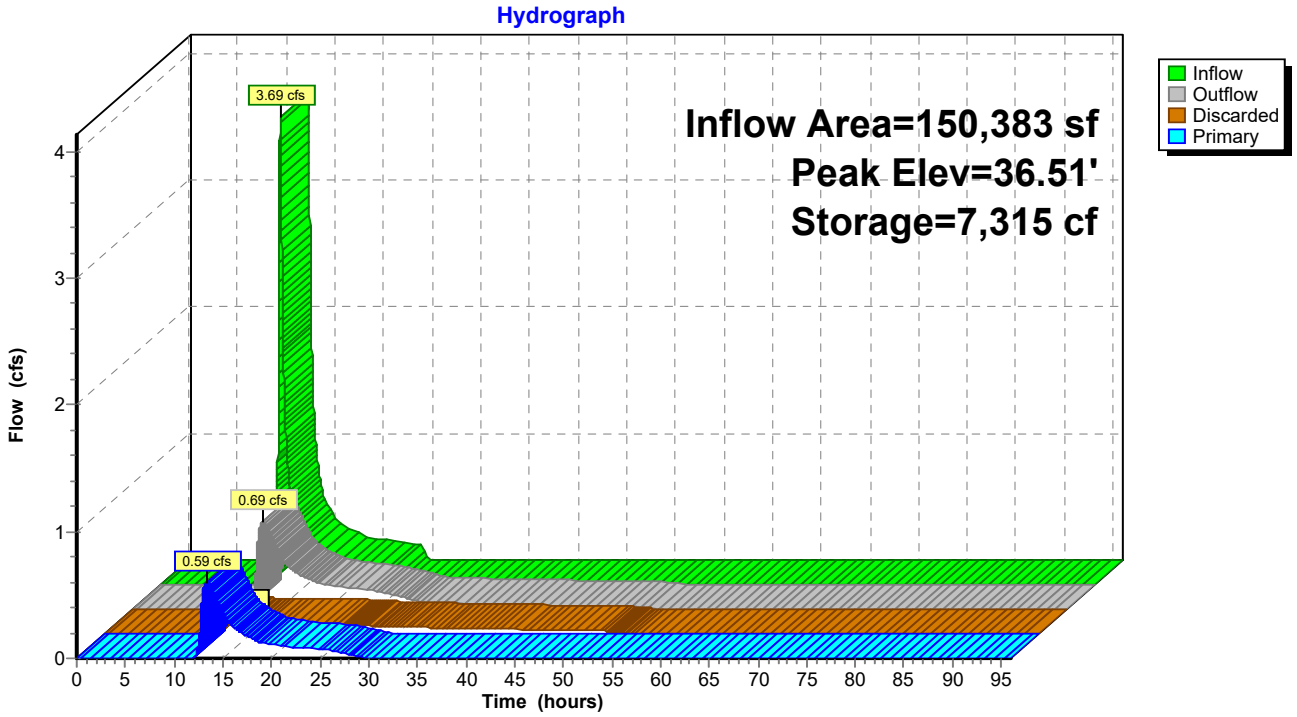
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 13.42 hrs HW=36.51' (Free Discharge)
└**3=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.59 cfs @ 13.42 hrs HW=36.51' (Free Discharge)
└**1=Culvert** (Passes 0.59 cfs of 18.56 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.21 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.48 cfs @ 2.44 fps)

Pond 22P: Water Quality Basin #3.2

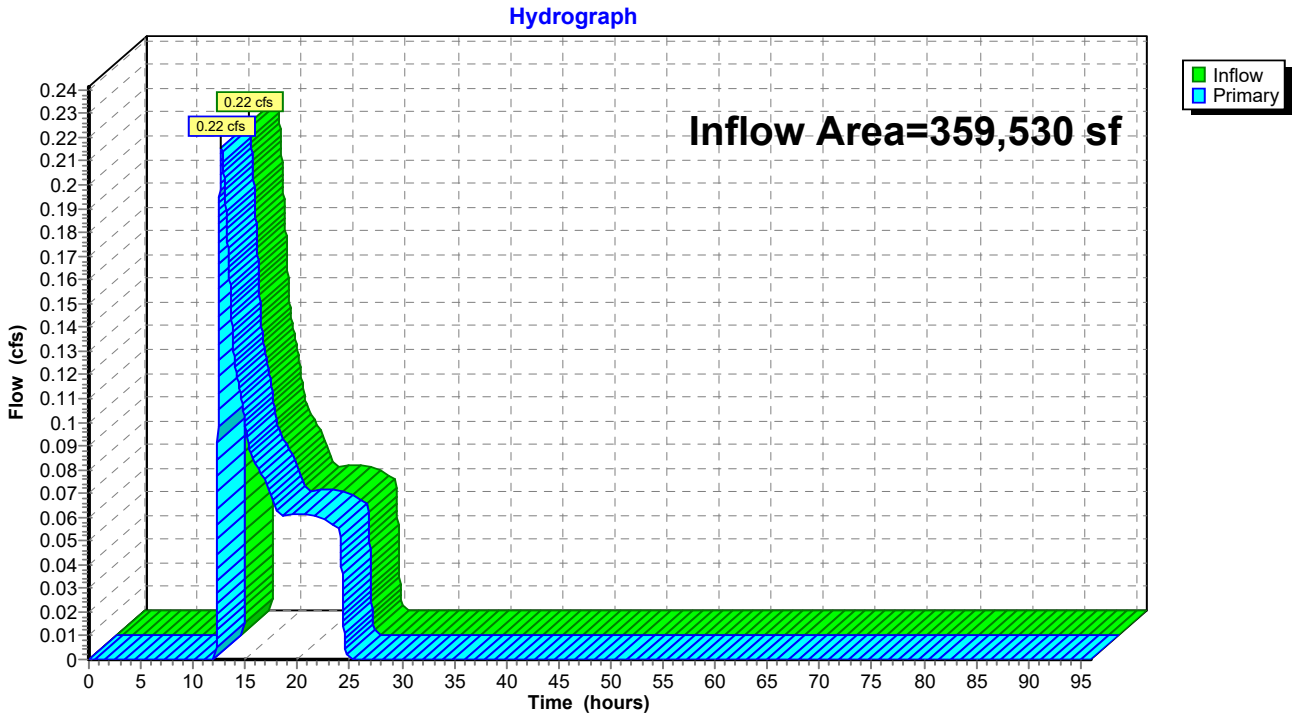


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.12" for 10-yr event
Inflow = 0.22 cfs @ 12.71 hrs, Volume= 3,660 cf
Primary = 0.22 cfs @ 12.71 hrs, Volume= 3,660 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

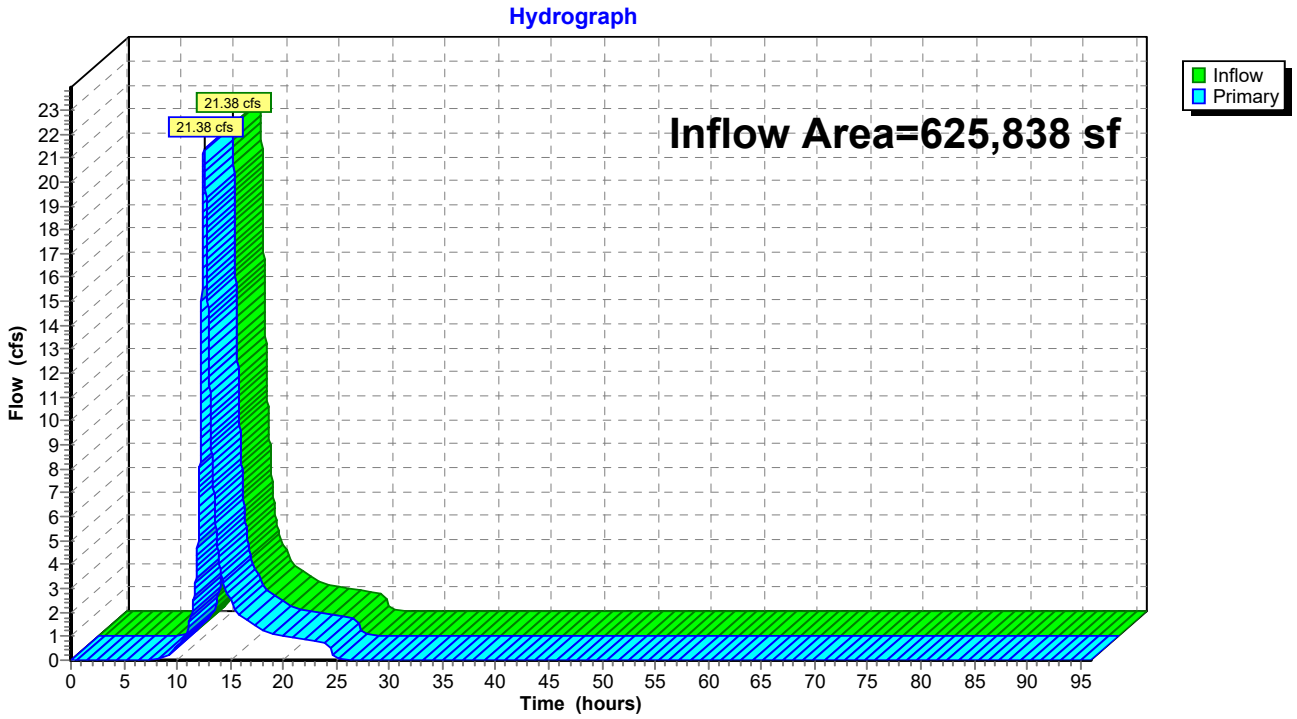


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 21.38 cfs @ 12.57 hrs, Volume= 146,752 cf
Primary = 21.38 cfs @ 12.57 hrs, Volume= 146,752 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

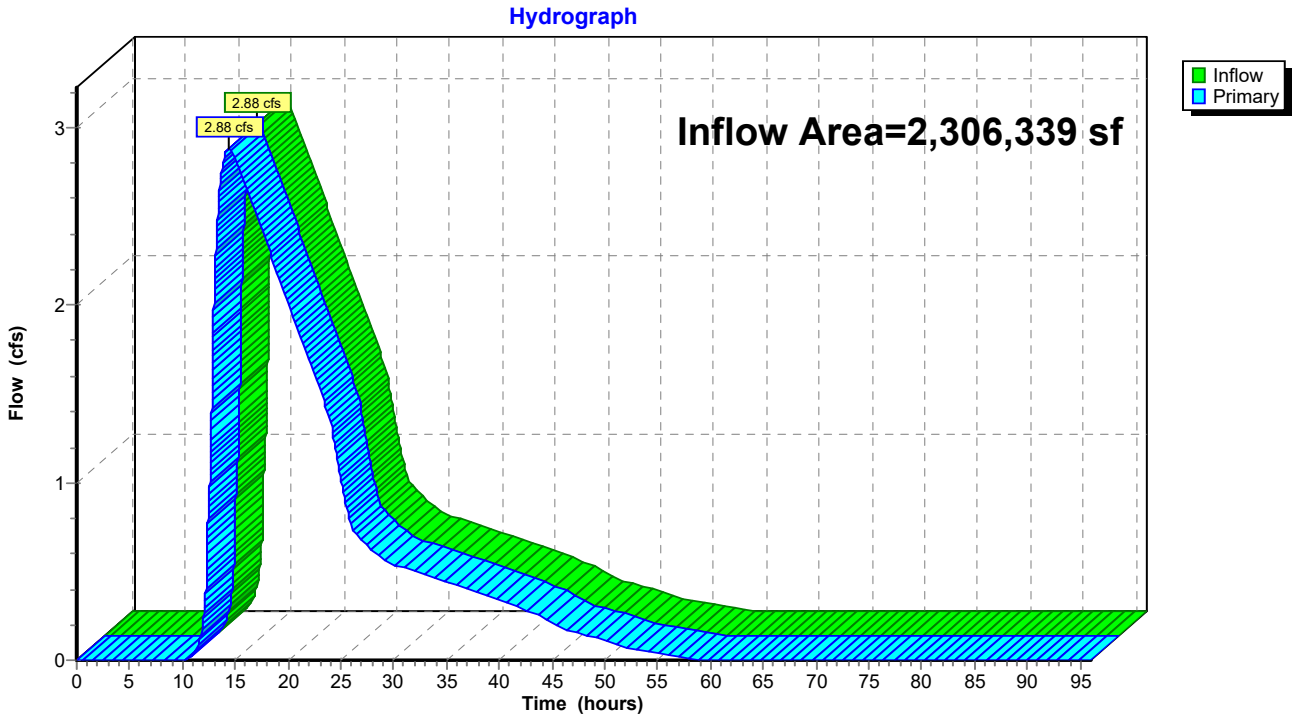


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 0.69" for 10-yr event
Inflow = 2.88 cfs @ 14.37 hrs, Volume= 132,939 cf
Primary = 2.88 cfs @ 14.37 hrs, Volume= 132,939 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

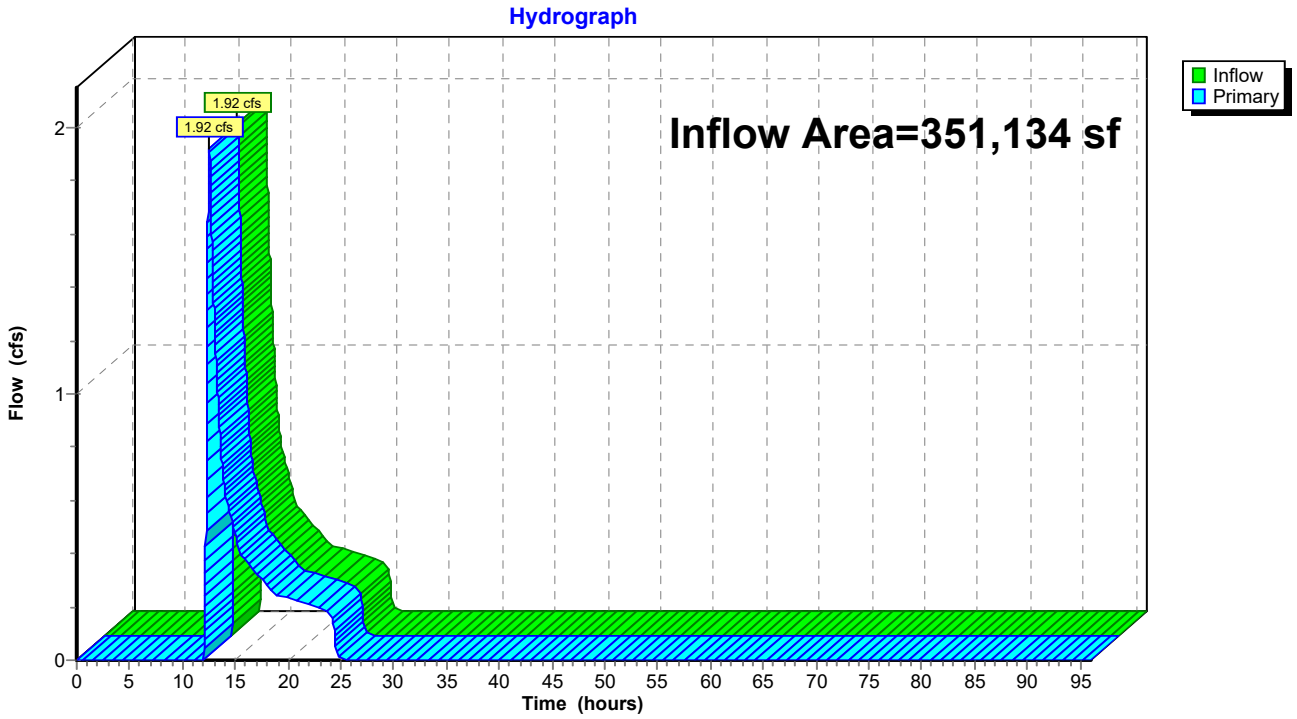


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 0.63" for 10-yr event
Inflow = 1.92 cfs @ 12.53 hrs, Volume= 18,512 cf
Primary = 1.92 cfs @ 12.53 hrs, Volume= 18,512 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.67"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=0.68 cfs 6,771 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=2.11"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=5.63 cfs 26,399 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=1.07"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=5.07 cfs 48,447 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=4.13"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=25.45 cfs 165,334 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=3.71"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=28.19 cfs 193,578 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=3.61"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=21.21 cfs 121,972 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=815' Tc=28.4 min CN=48 Runoff=4.14 cfs 31,335 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=0.73"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=0.80 cfs 6,645 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=0.86"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=1.94 cfs 15,052 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=0.80"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.44 cfs 3,219 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.09"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.05 cfs 1,757 cf

Pond 12P: Water Quality Basin #4 Peak Elev=26.79' Storage=89,391 cf Inflow=25.45 cfs 165,334 cf
Discarded=0.75 cfs 75,822 cf Primary=5.63 cfs 89,512 cf Outflow=6.37 cfs 165,334 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.66' Storage=6,416 cf Inflow=1.94 cfs 15,052 cf
Discarded=0.12 cfs 10,024 cf Primary=0.18 cfs 5,028 cf Outflow=0.30 cfs 15,052 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.75' Storage=1,478 cf Inflow=0.80 cfs 6,645 cf
Discarded=0.03 cfs 1,953 cf Primary=0.30 cfs 4,692 cf Outflow=0.33 cfs 6,645 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=22.22' Storage=68,378 cf Inflow=21.21 cfs 121,972 cf
Discarded=0.57 cfs 57,208 cf Primary=3.14 cfs 64,764 cf Outflow=3.71 cfs 121,972 cf

Pond 21P: Water Quality Basin #2 Peak Elev=23.62' Storage=19,229 cf Inflow=5.07 cfs 48,447 cf
Discarded=0.15 cfs 13,807 cf Primary=0.93 cfs 34,641 cf Outflow=1.08 cfs 48,447 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=37.17' Storage=10,158 cf Inflow=5.63 cfs 26,399 cf
Discarded=0.12 cfs 8,595 cf Primary=1.05 cfs 17,804 cf Outflow=1.17 cfs 26,399 cf

Link 2L: Northeast Wetland Inflow=0.68 cfs 8,528 cf
Primary=0.68 cfs 8,528 cf

Link 3L: South Off-Site (POC 3) Inflow=28.19 cfs 193,578 cf
Primary=28.19 cfs 193,578 cf

Link 4L: West Wetlands (POC 1) Inflow=11.26 cfs 228,187 cf
Primary=11.26 cfs 228,187 cf

Link 5L: West Off-Site (POC 2) Inflow=4.14 cfs 31,335 cf
Primary=4.14 cfs 31,335 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 620,510 cf Average Runoff Depth = 2.27"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

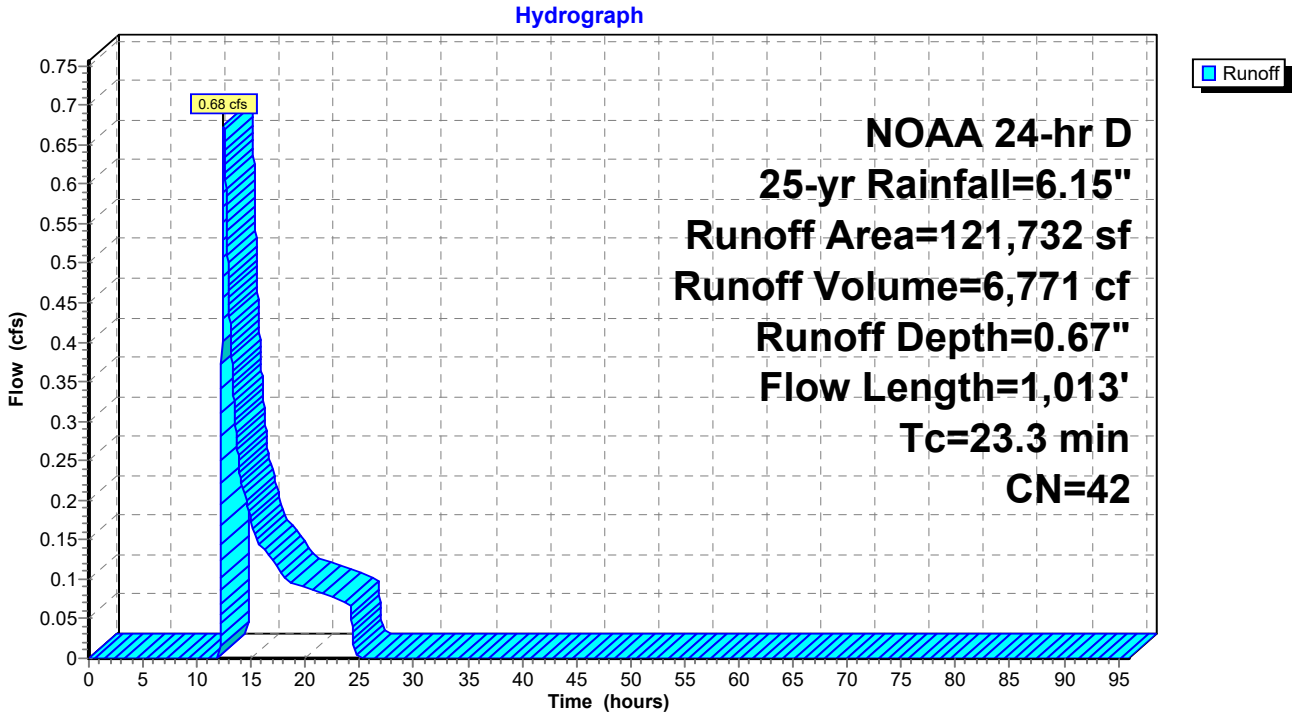
Runoff = 0.68 cfs @ 12.46 hrs, Volume= 6,771 cf, Depth= 0.67"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

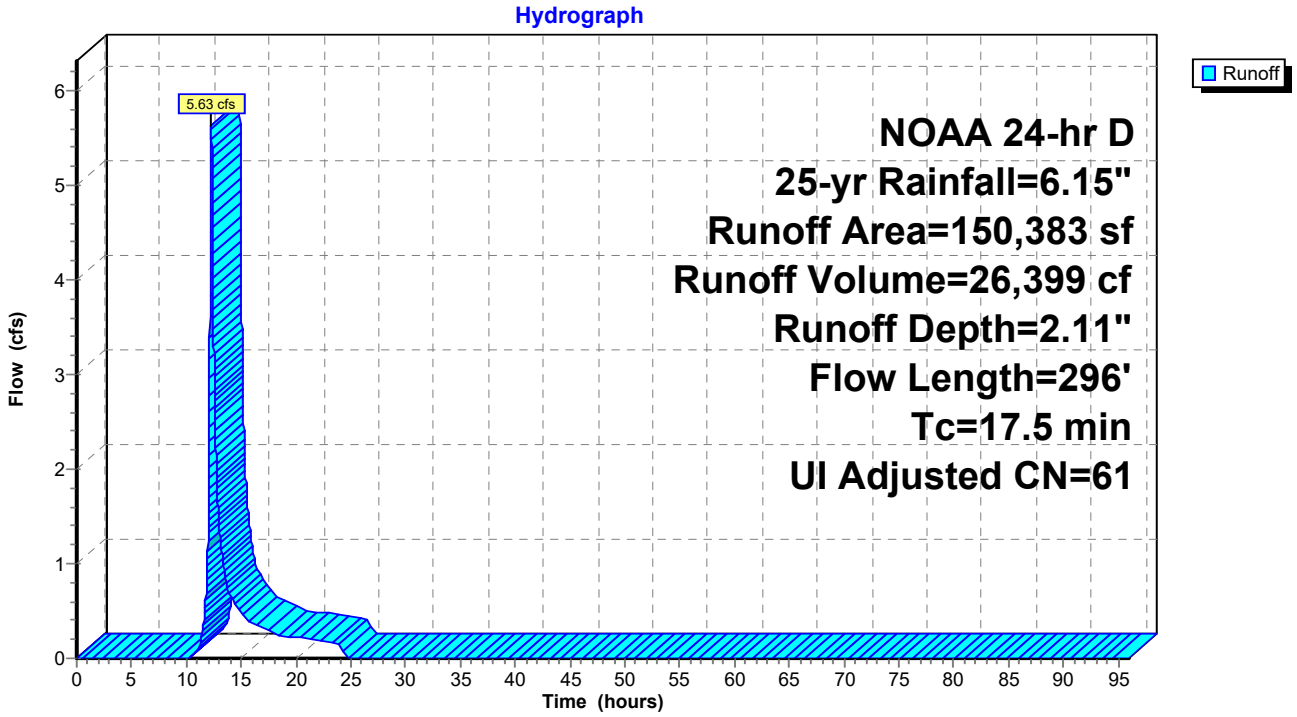
Runoff = 5.63 cfs @ 12.27 hrs, Volume= 26,399 cf, Depth= 2.11"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

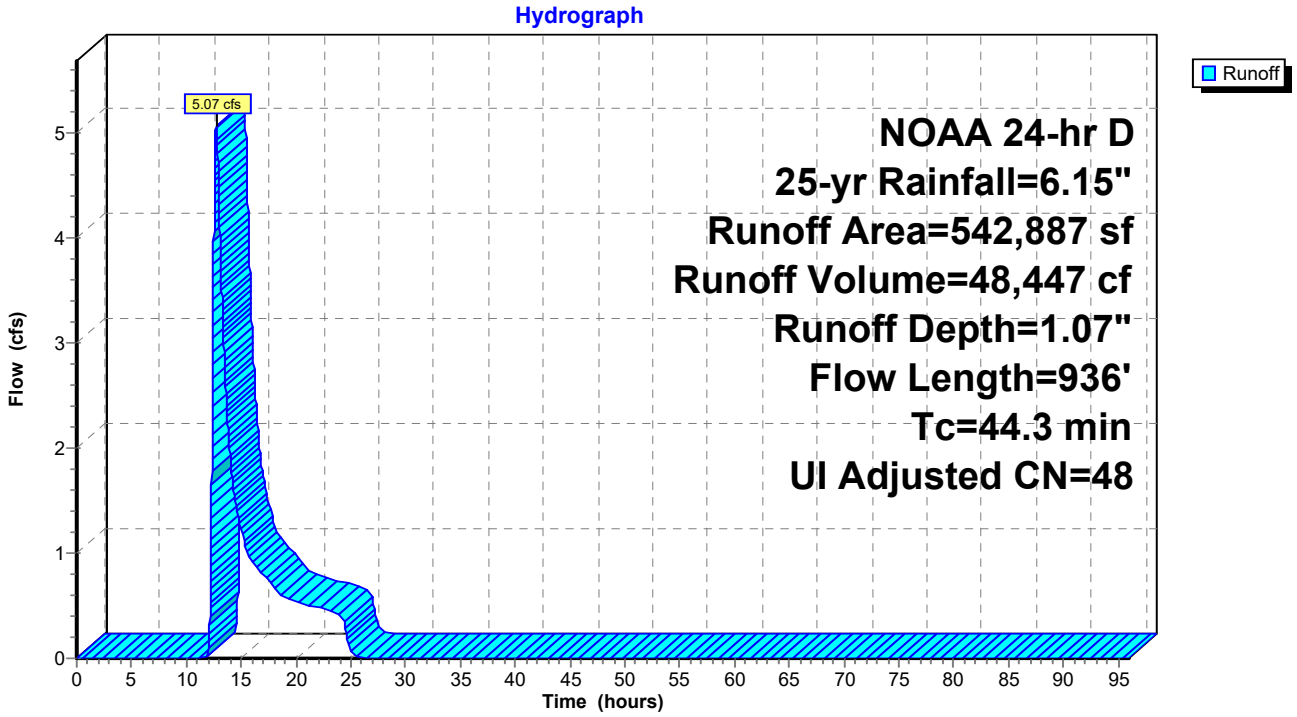
Runoff = 5.07 cfs @ 12.75 hrs, Volume= 48,447 cf, Depth= 1.07"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

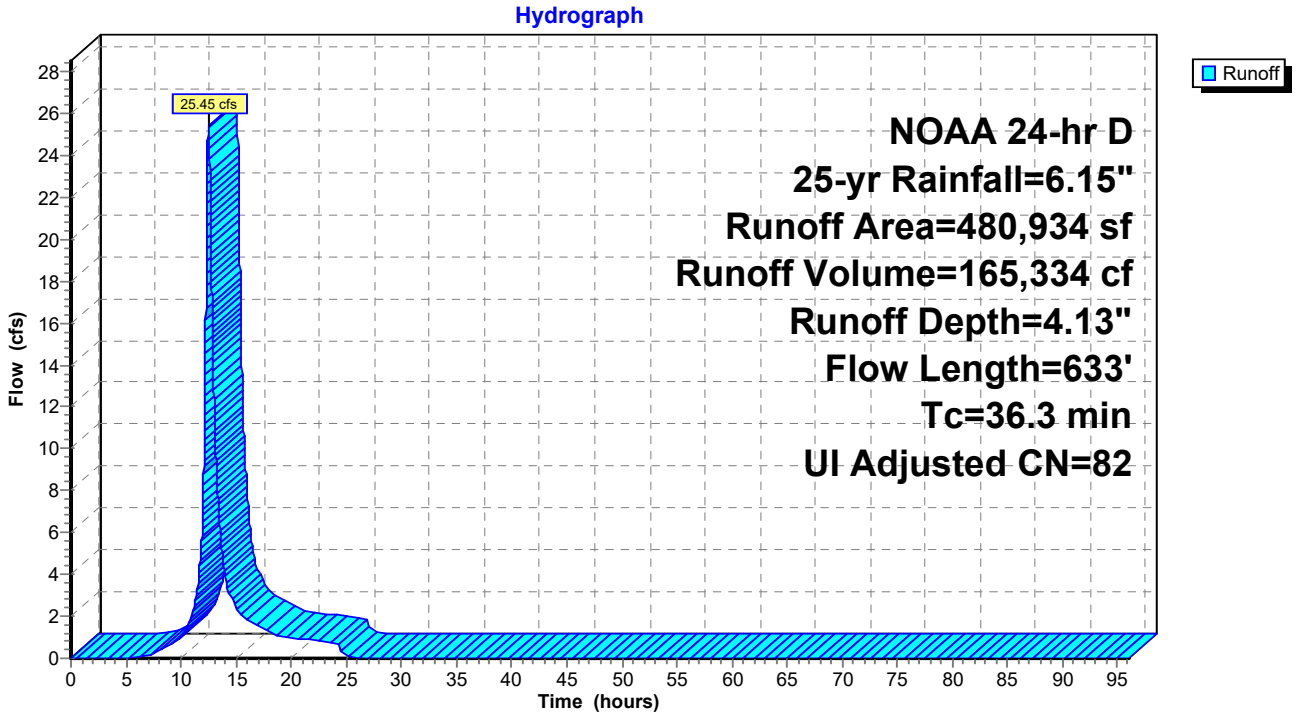
Runoff = 25.45 cfs @ 12.47 hrs, Volume= 165,334 cf, Depth= 4.13"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

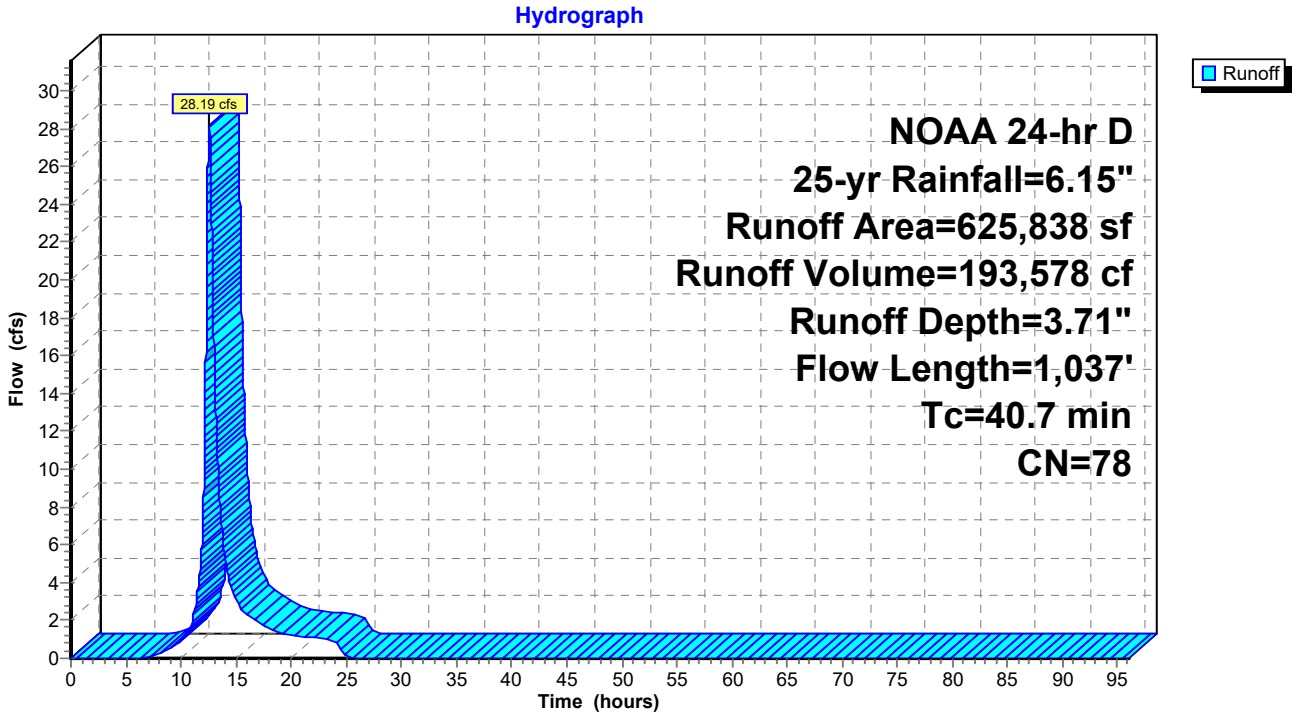
Runoff = 28.19 cfs @ 12.54 hrs, Volume= 193,578 cf, Depth= 3.71"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

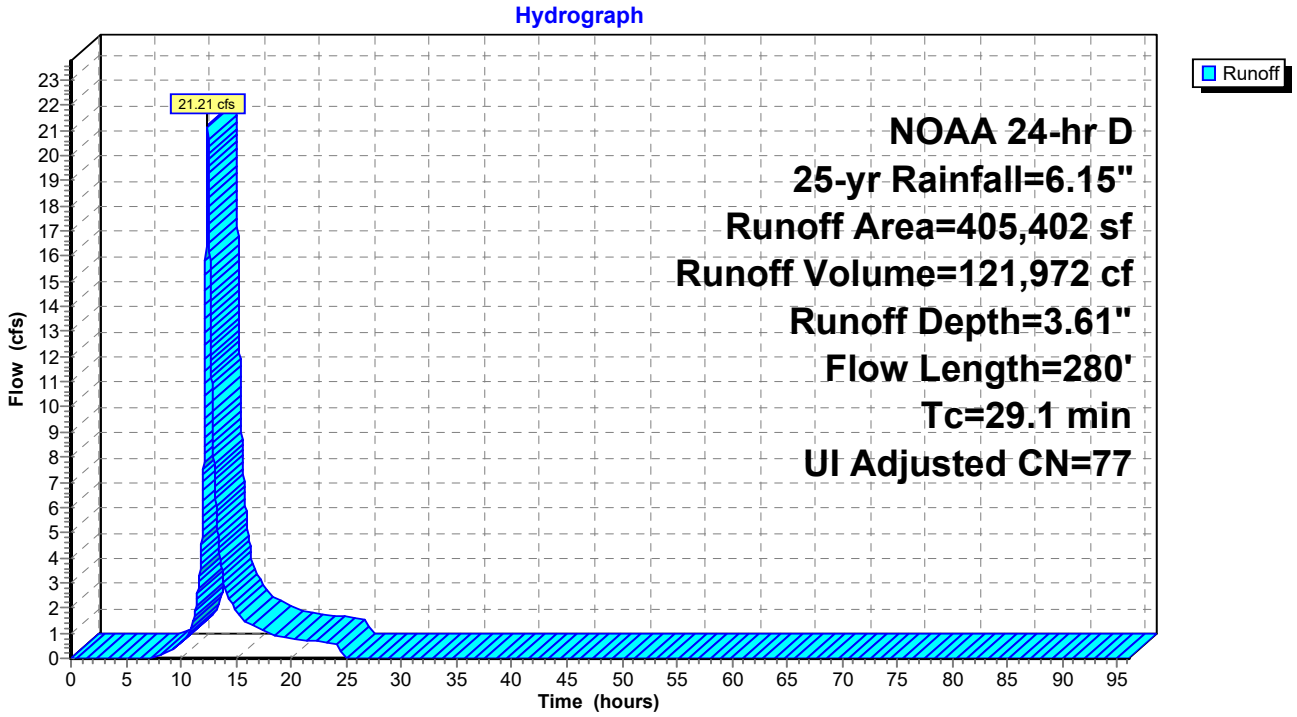
Runoff = 21.21 cfs @ 12.41 hrs, Volume= 121,972 cf, Depth= 3.61"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

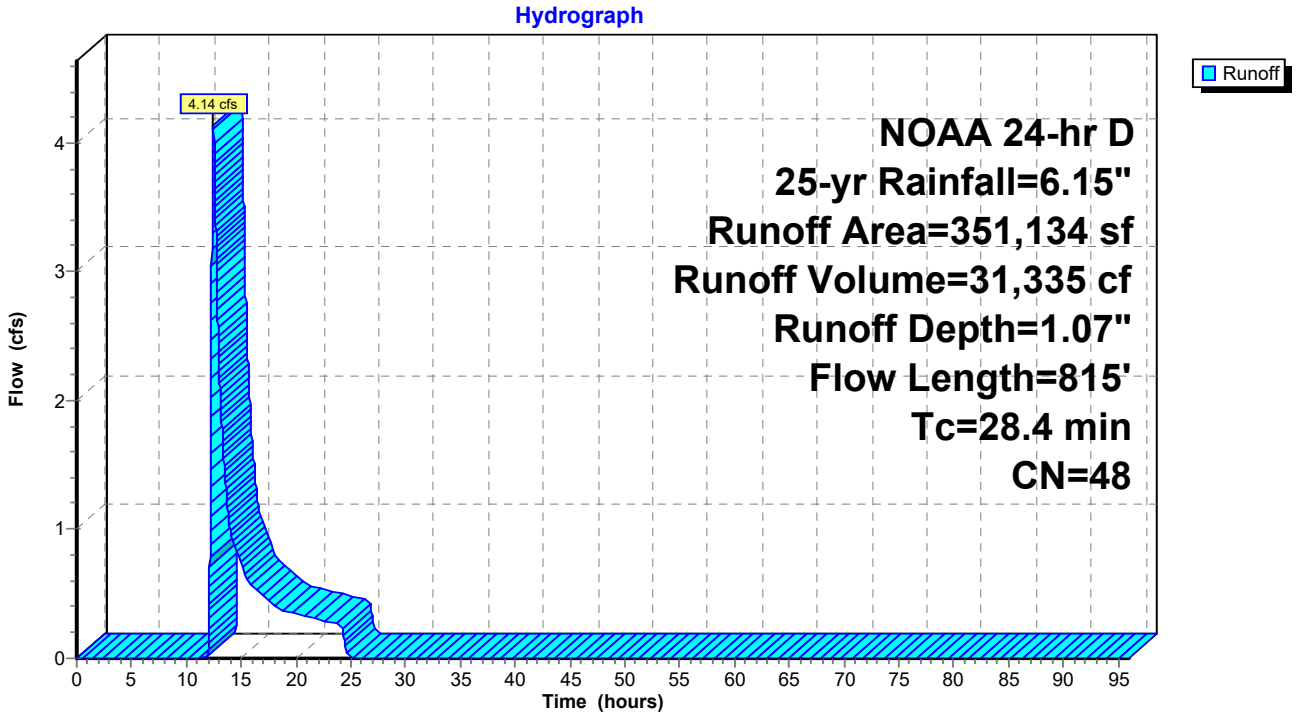
Runoff = 4.14 cfs @ 12.47 hrs, Volume= 31,335 cf, Depth= 1.07"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

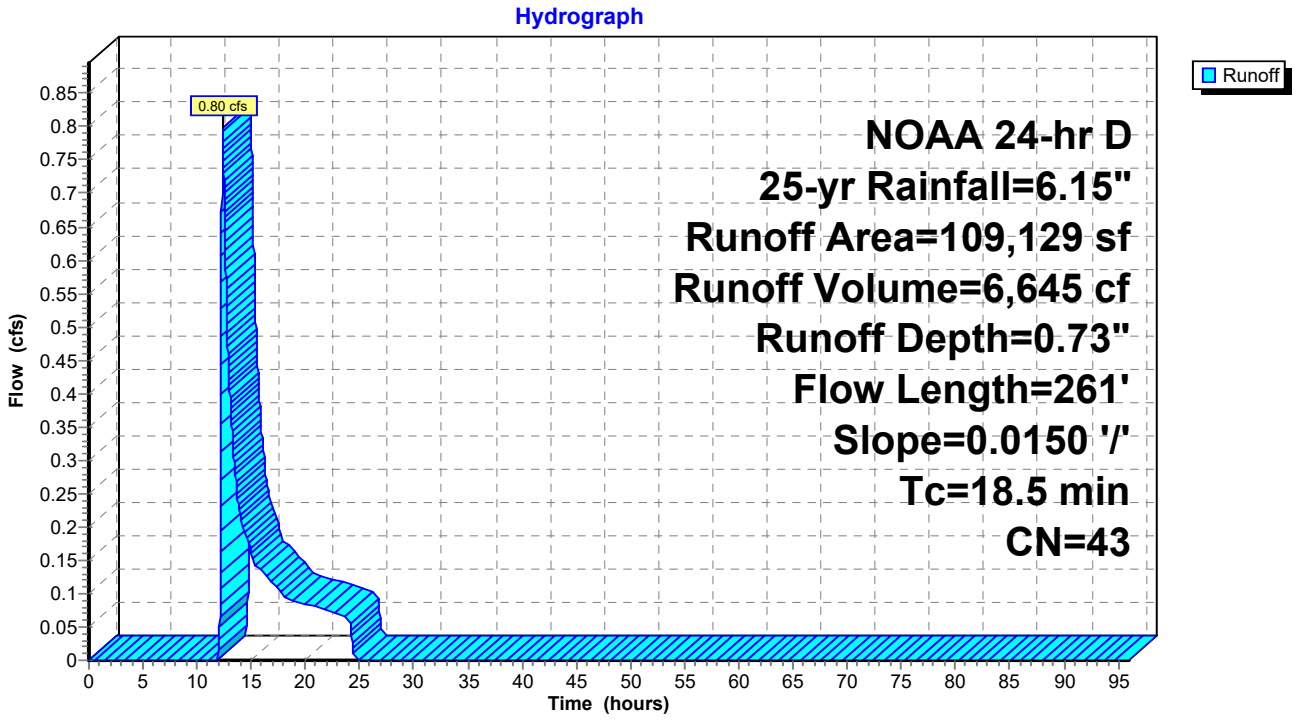
Runoff = 0.80 cfs @ 12.36 hrs, Volume= 6,645 cf, Depth= 0.73"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

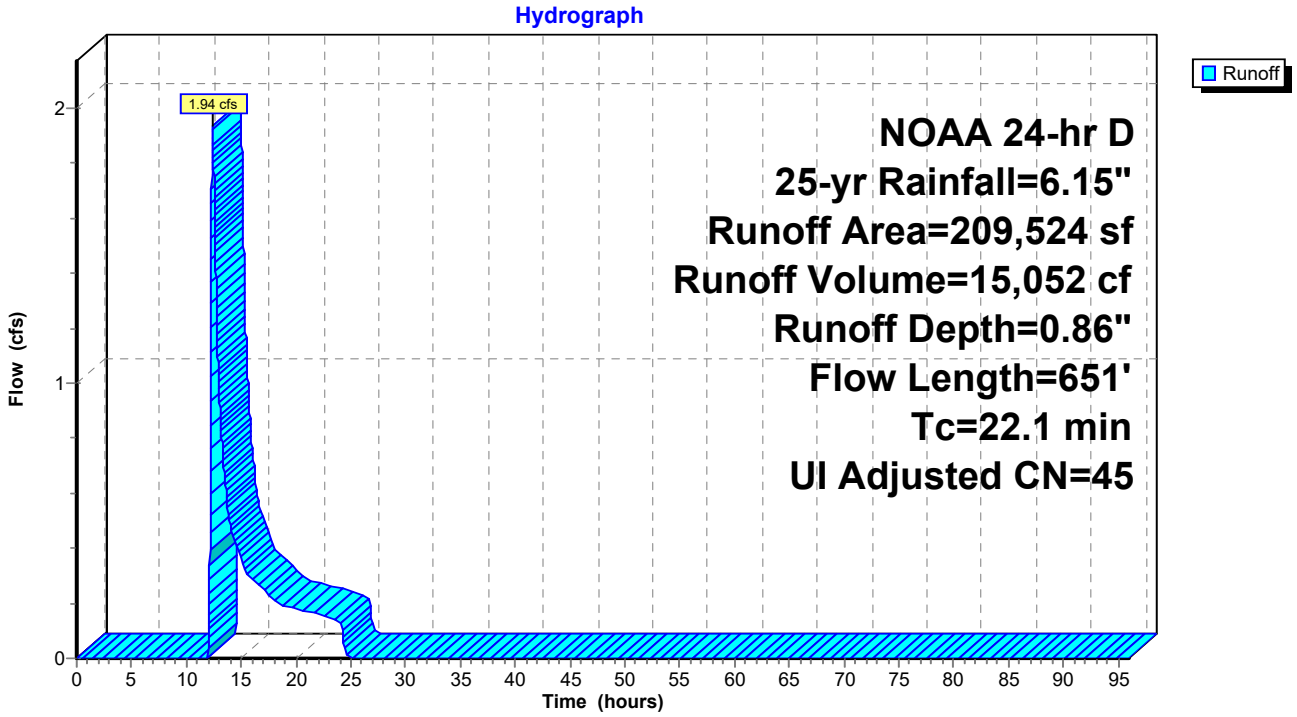
Runoff = 1.94 cfs @ 12.40 hrs, Volume= 15,052 cf, Depth= 0.86"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

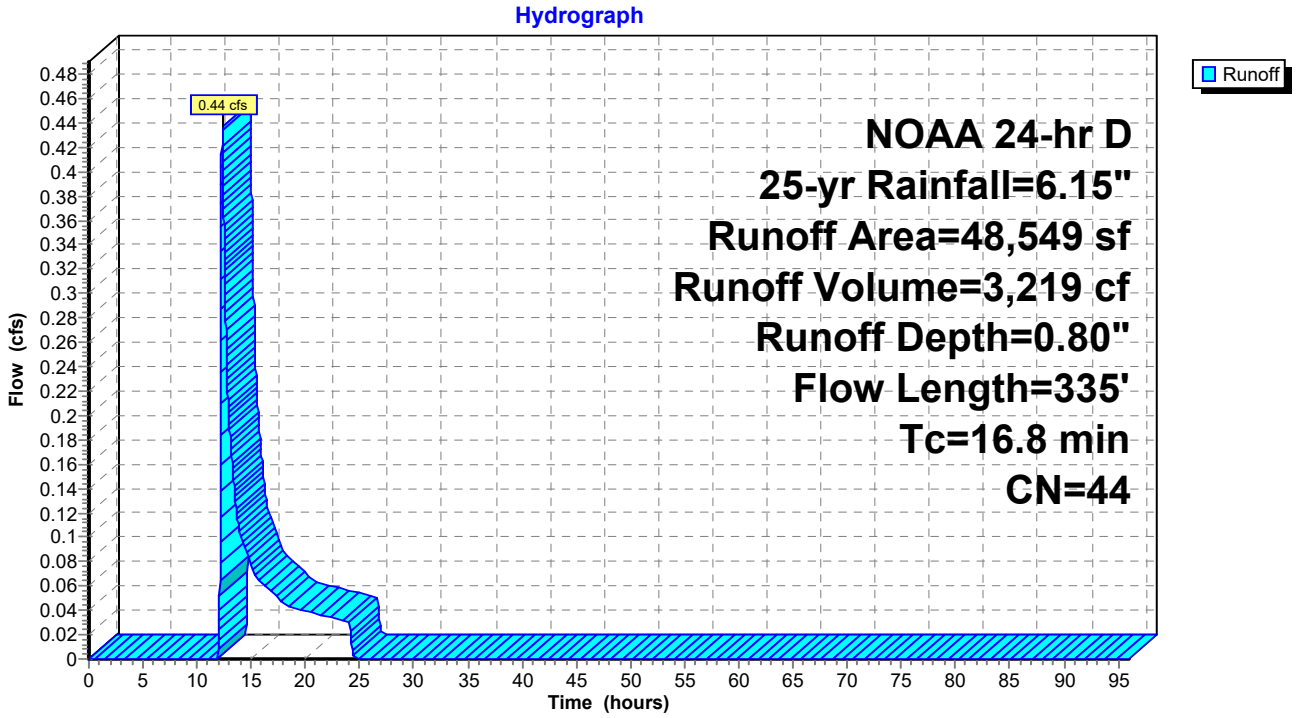
Runoff = 0.44 cfs @ 12.32 hrs, Volume= 3,219 cf, Depth= 0.80"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

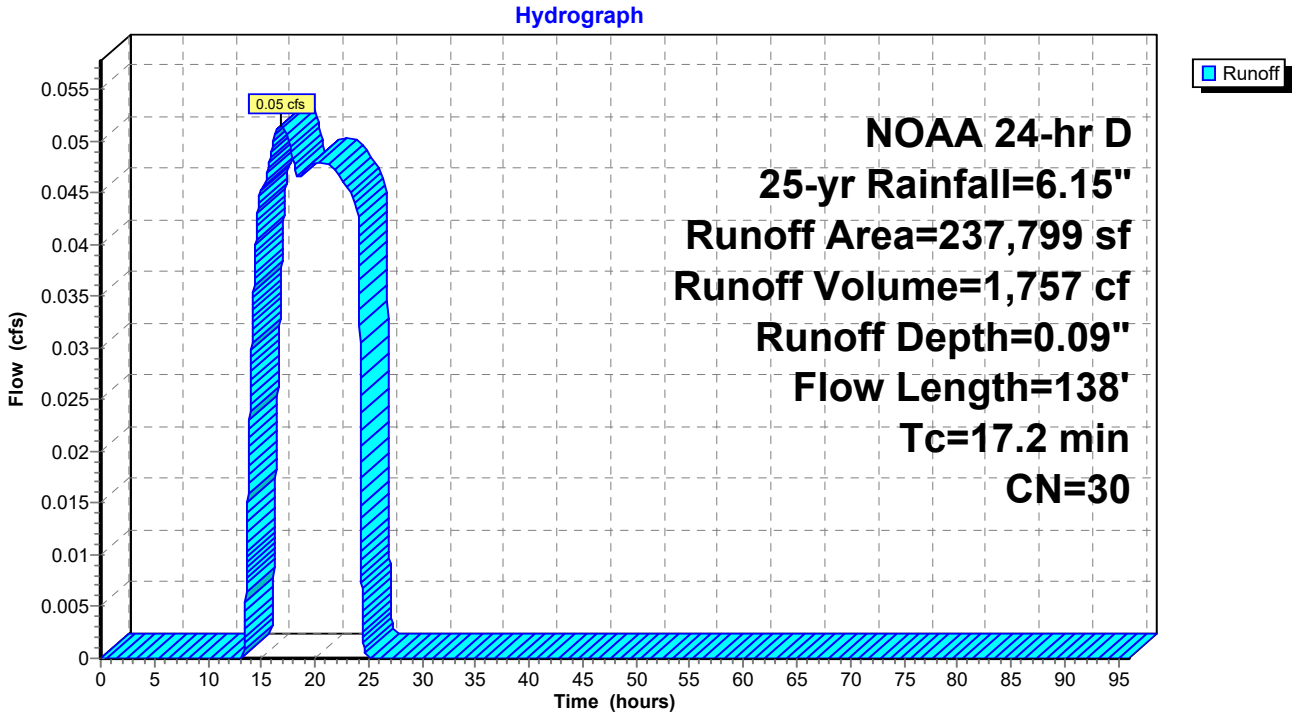
Runoff = 0.05 cfs @ 16.84 hrs, Volume= 1,757 cf, Depth= 0.09"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 25-yr Rainfall=6.15"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 4.13" for 25-yr event
Inflow = 25.45 cfs @ 12.47 hrs, Volume= 165,334 cf
Outflow = 6.37 cfs @ 13.49 hrs, Volume= 165,334 cf, Atten= 75%, Lag= 61.2 min
Discarded = 0.75 cfs @ 13.49 hrs, Volume= 75,822 cf
Primary = 5.63 cfs @ 13.49 hrs, Volume= 89,512 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 26.79' @ 13.49 hrs Surf.Area= 20,477 sf Storage= 89,391 cf

Plug-Flow detention time= 673.6 min calculated for 165,334 cf (100% of inflow)
Center-of-Mass det. time= 673.5 min (1,517.1 - 843.5)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

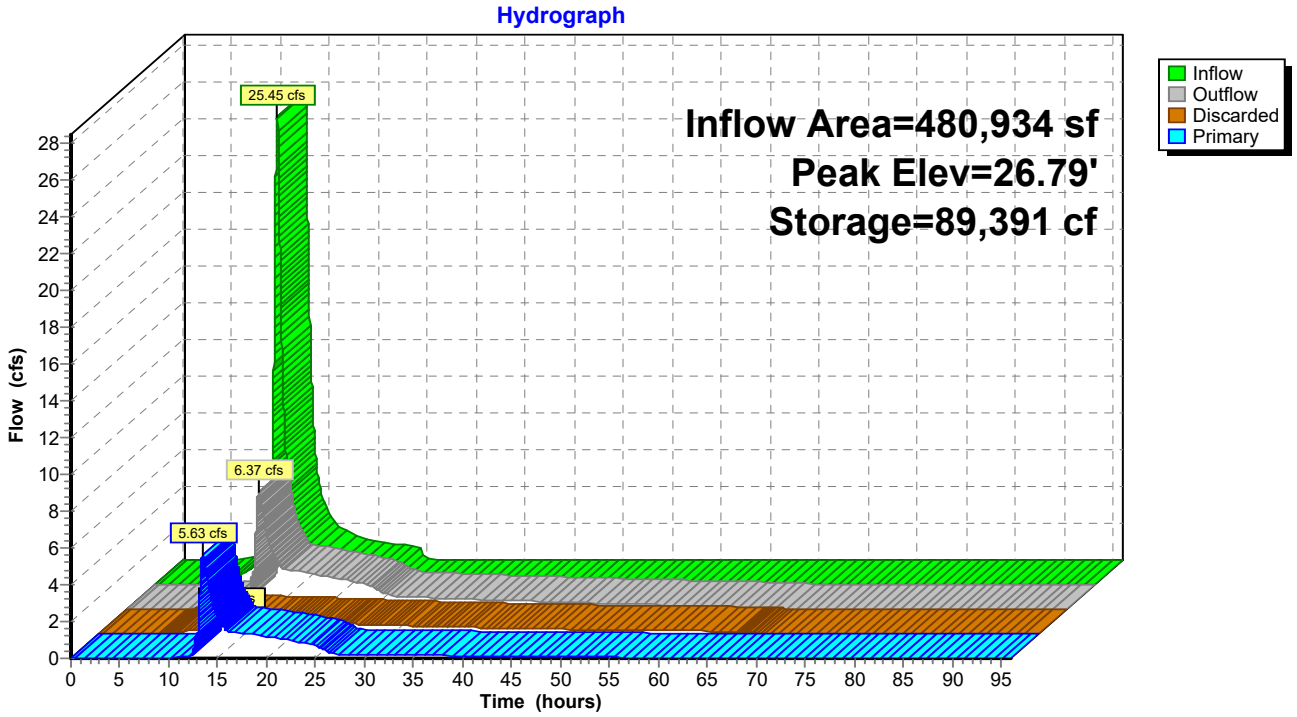
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.75 cfs @ 13.49 hrs HW=26.79' (Free Discharge)
└**3=Exfiltration** (Controls 0.75 cfs)

Primary OutFlow Max=5.61 cfs @ 13.49 hrs HW=26.79' (Free Discharge)
└**1=Culvert** (Passes 5.61 cfs of 50.38 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 4.08 cfs @ 1.74 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 11.20 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.28 cfs @ 6.54 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 0.86" for 25-yr event
Inflow = 1.94 cfs @ 12.40 hrs, Volume= 15,052 cf
Outflow = 0.30 cfs @ 15.60 hrs, Volume= 15,052 cf, Atten= 84%, Lag= 191.8 min
Discarded = 0.12 cfs @ 15.60 hrs, Volume= 10,024 cf
Primary = 0.18 cfs @ 15.60 hrs, Volume= 5,028 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.66' @ 15.60 hrs Surf.Area= 10,181 sf Storage= 6,416 cf

Plug-Flow detention time= 392.5 min calculated for 15,051 cf (100% of inflow)
Center-of-Mass det. time= 392.6 min (1,339.4 - 946.8)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

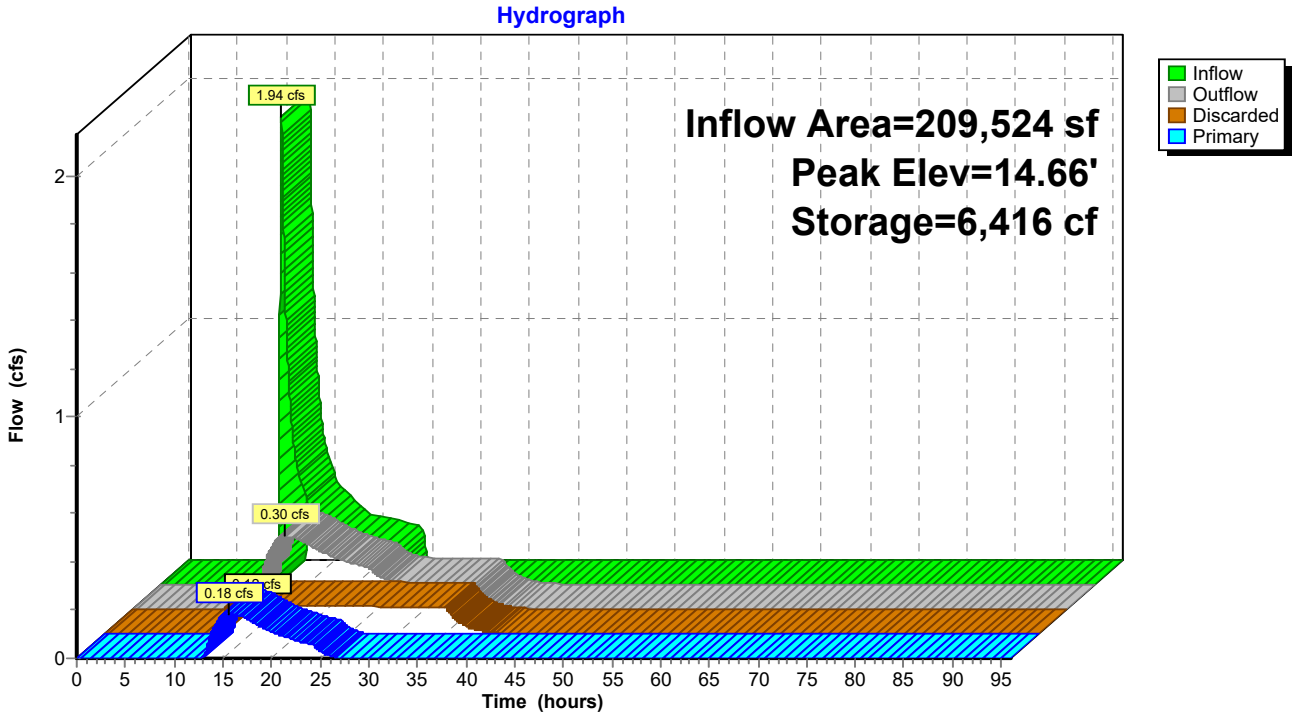
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 15.60 hrs HW=14.66' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.18 cfs @ 15.60 hrs HW=14.66' (Free Discharge)
└**1=Culvert** (Passes 0.18 cfs of 2.89 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 1.75 fps)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 0.73" for 25-yr event
Inflow = 0.80 cfs @ 12.36 hrs, Volume= 6,645 cf
Outflow = 0.33 cfs @ 13.28 hrs, Volume= 6,645 cf, Atten= 59%, Lag= 55.5 min
Discarded = 0.03 cfs @ 13.28 hrs, Volume= 1,953 cf
Primary = 0.30 cfs @ 13.28 hrs, Volume= 4,692 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.75' @ 13.28 hrs Surf.Area= 2,216 sf Storage= 1,478 cf

Plug-Flow detention time= 166.9 min calculated for 6,644 cf (100% of inflow)
Center-of-Mass det. time= 167.0 min (1,122.6 - 955.5)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

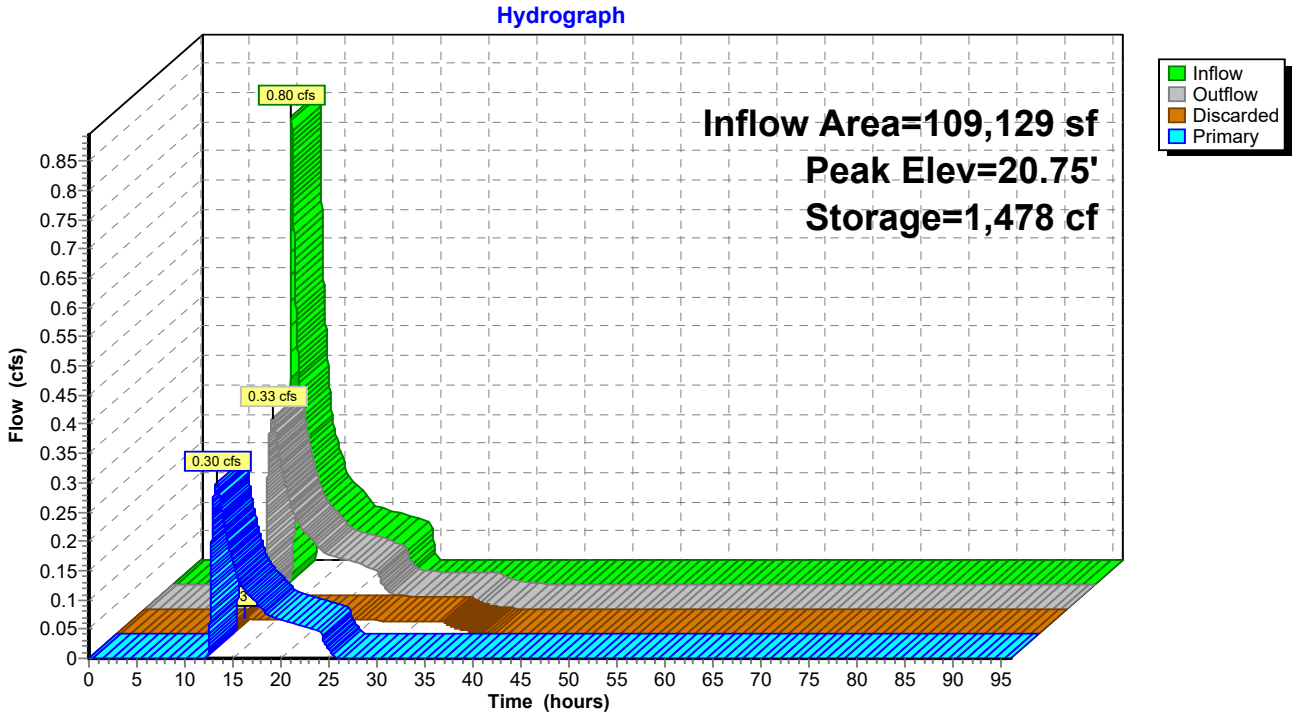
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.28 hrs HW=20.75' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.30 cfs @ 13.28 hrs HW=20.75' (Free Discharge)
└**1=Culvert** (Passes 0.30 cfs of 2.63 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.30 cfs @ 2.02 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 3.61" for 25-yr event
Inflow = 21.21 cfs @ 12.41 hrs, Volume= 121,972 cf
Outflow = 3.71 cfs @ 13.63 hrs, Volume= 121,972 cf, Atten= 83%, Lag= 73.6 min
Discarded = 0.57 cfs @ 13.63 hrs, Volume= 57,208 cf
Primary = 3.14 cfs @ 13.63 hrs, Volume= 64,764 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.22' @ 13.63 hrs Surf.Area= 16,122 sf Storage= 68,378 cf

Plug-Flow detention time= 743.3 min calculated for 121,972 cf (100% of inflow)
Center-of-Mass det. time= 743.3 min (1,594.1 - 850.9)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

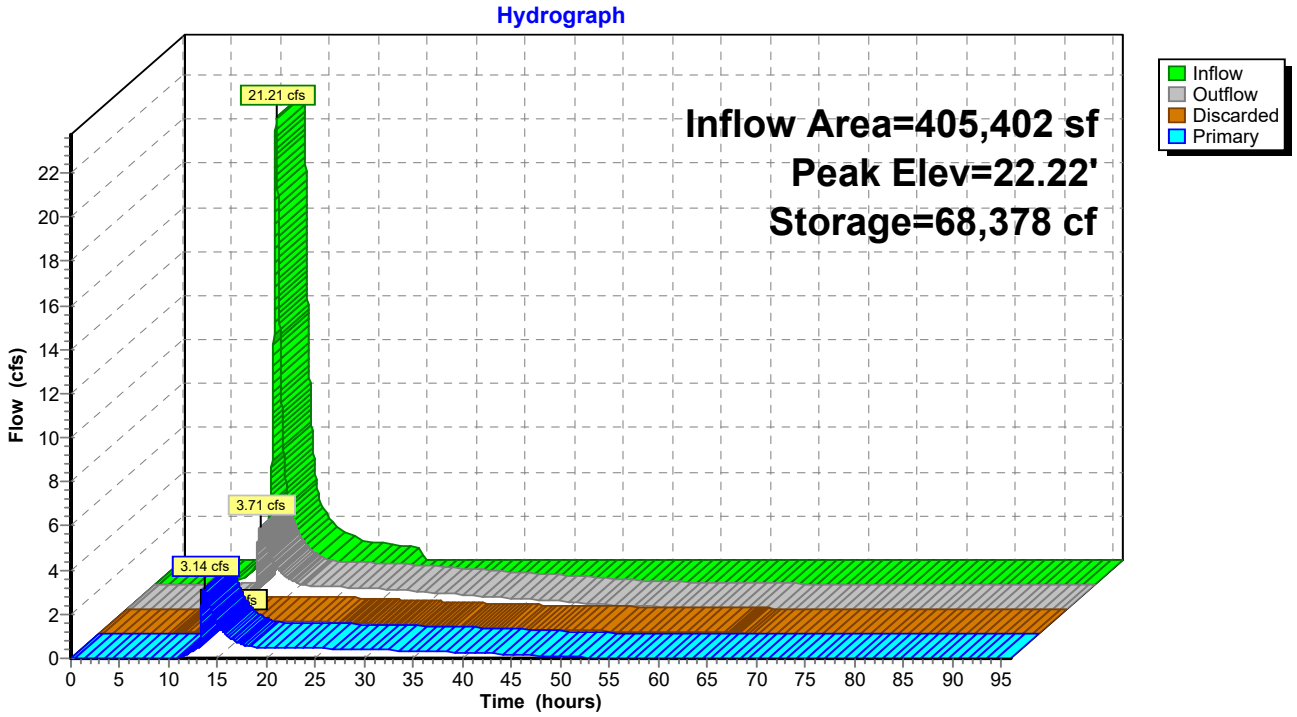
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.57 cfs @ 13.63 hrs HW=22.22' (Free Discharge)
└**3=Exfiltration** (Controls 0.57 cfs)

Primary OutFlow Max=3.12 cfs @ 13.63 hrs HW=22.22' (Free Discharge)
└**1=Culvert** (Passes 3.12 cfs of 52.21 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.64 cfs @ 1.50 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.43 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.24 cfs @ 10.91 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 1.07" for 25-yr event
Inflow = 5.07 cfs @ 12.75 hrs, Volume= 48,447 cf
Outflow = 1.08 cfs @ 15.36 hrs, Volume= 48,447 cf, Atten= 79%, Lag= 156.7 min
Discarded = 0.15 cfs @ 15.36 hrs, Volume= 13,807 cf
Primary = 0.93 cfs @ 15.36 hrs, Volume= 34,641 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 23.62' @ 15.36 hrs Surf.Area= 13,182 sf Storage= 19,229 cf

Plug-Flow detention time= 299.8 min calculated for 48,447 cf (100% of inflow)
Center-of-Mass det. time= 299.6 min (1,251.7 - 952.1)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

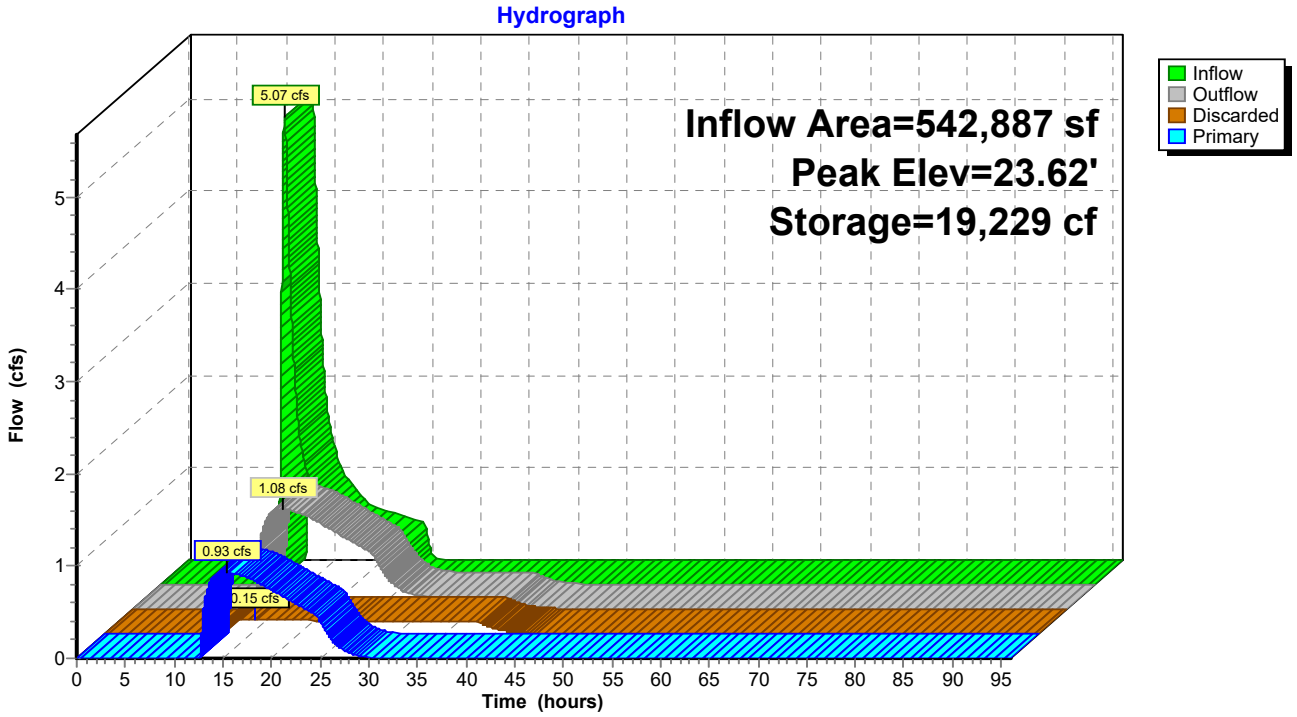
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 15.36 hrs HW=23.62' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.93 cfs @ 15.36 hrs HW=23.62' (Free Discharge)
└**1=Culvert** (Passes 0.93 cfs of 11.84 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.93 cfs @ 4.75 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 2.11" for 25-yr event
Inflow = 5.63 cfs @ 12.27 hrs, Volume= 26,399 cf
Outflow = 1.17 cfs @ 13.18 hrs, Volume= 26,399 cf, Atten= 79%, Lag= 54.6 min
Discarded = 0.12 cfs @ 13.18 hrs, Volume= 8,595 cf
Primary = 1.05 cfs @ 13.18 hrs, Volume= 17,804 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 37.17' @ 13.18 hrs Surf.Area= 4,568 sf Storage= 10,158 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 317.6 min calculated for 26,399 cf (100% of inflow)
Center-of-Mass det. time= 317.5 min (1,199.5 - 882.1)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

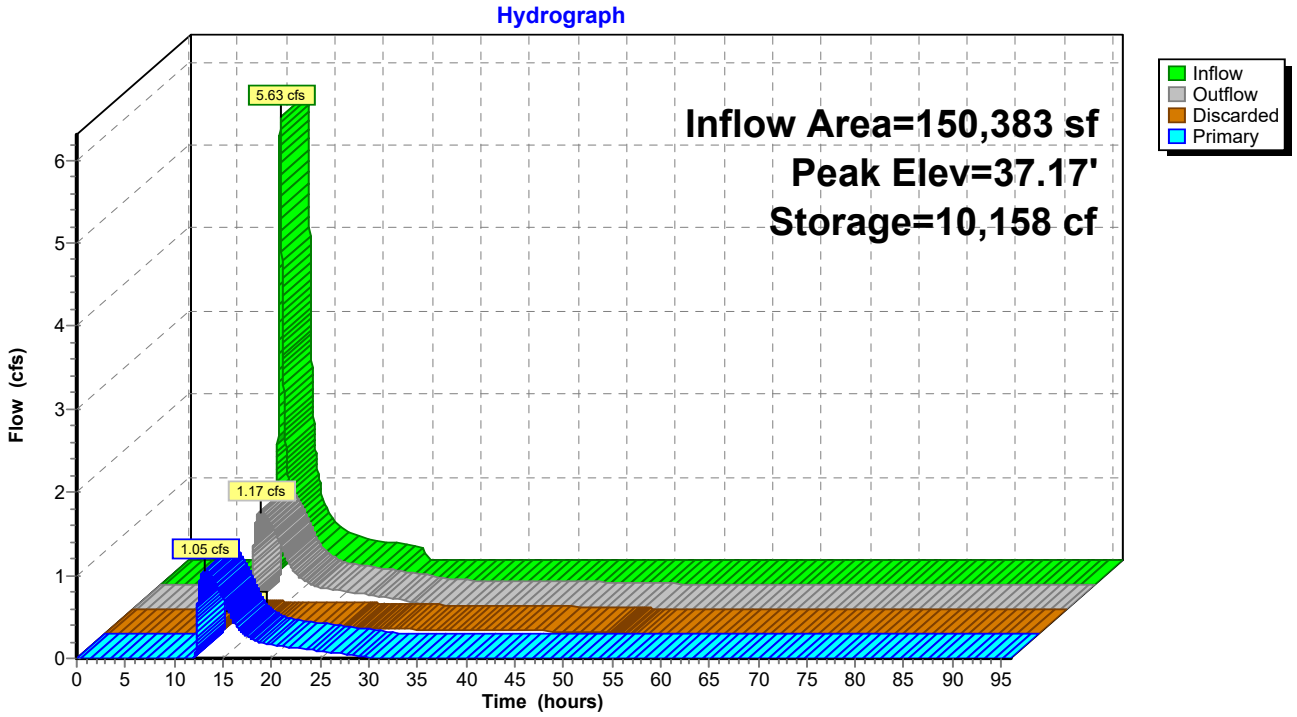
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 13.18 hrs HW=37.17' (Free Discharge)
└**3=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=1.05 cfs @ 13.18 hrs HW=37.17' (Free Discharge)
└**1=Culvert** (Passes 1.05 cfs of 22.30 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.53 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.91 cfs @ 4.63 fps)

Pond 22P: Water Quality Basin #3.2

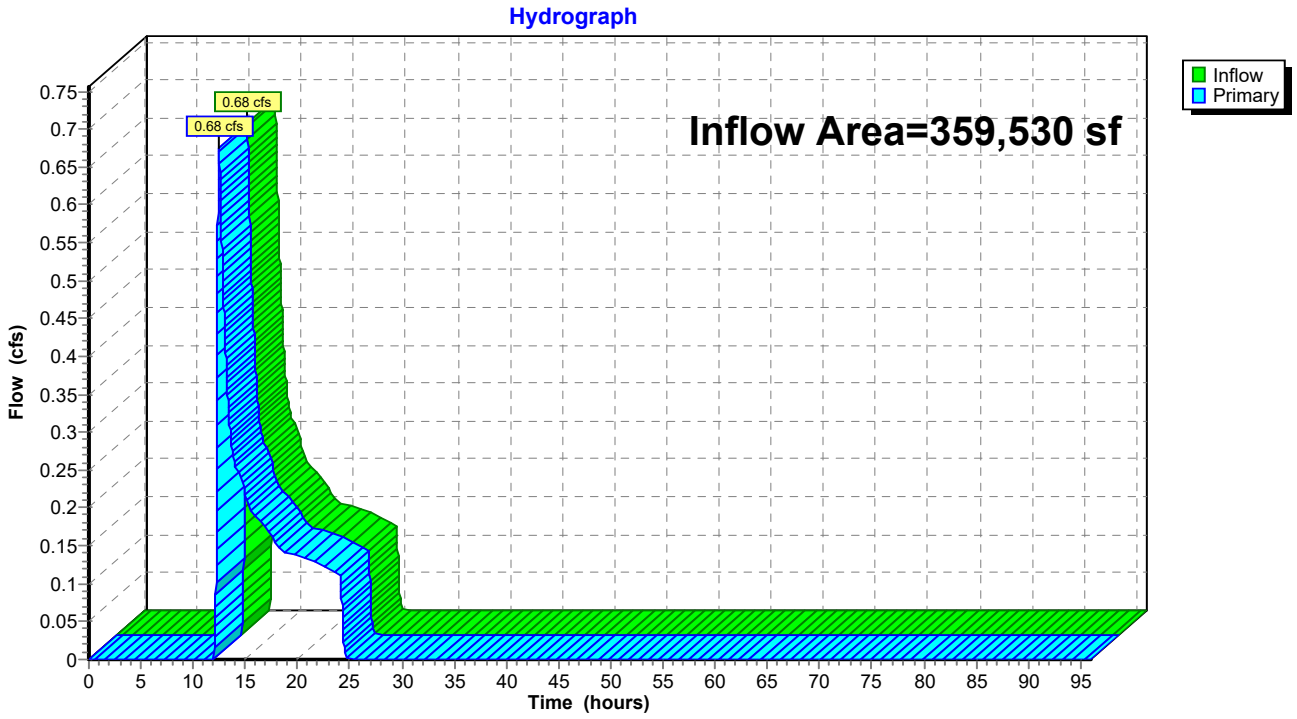


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.28" for 25-yr event
Inflow = 0.68 cfs @ 12.46 hrs, Volume= 8,528 cf
Primary = 0.68 cfs @ 12.46 hrs, Volume= 8,528 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

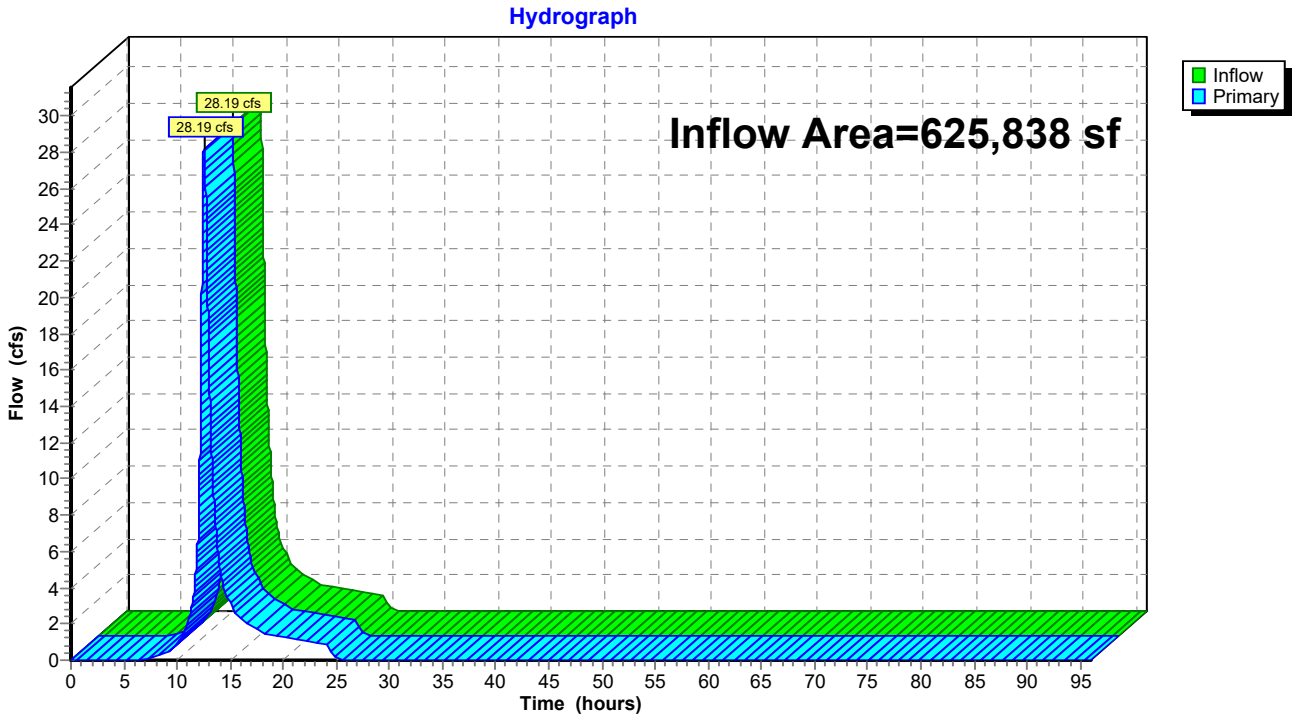


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 3.71" for 25-yr event
Inflow = 28.19 cfs @ 12.54 hrs, Volume= 193,578 cf
Primary = 28.19 cfs @ 12.54 hrs, Volume= 193,578 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

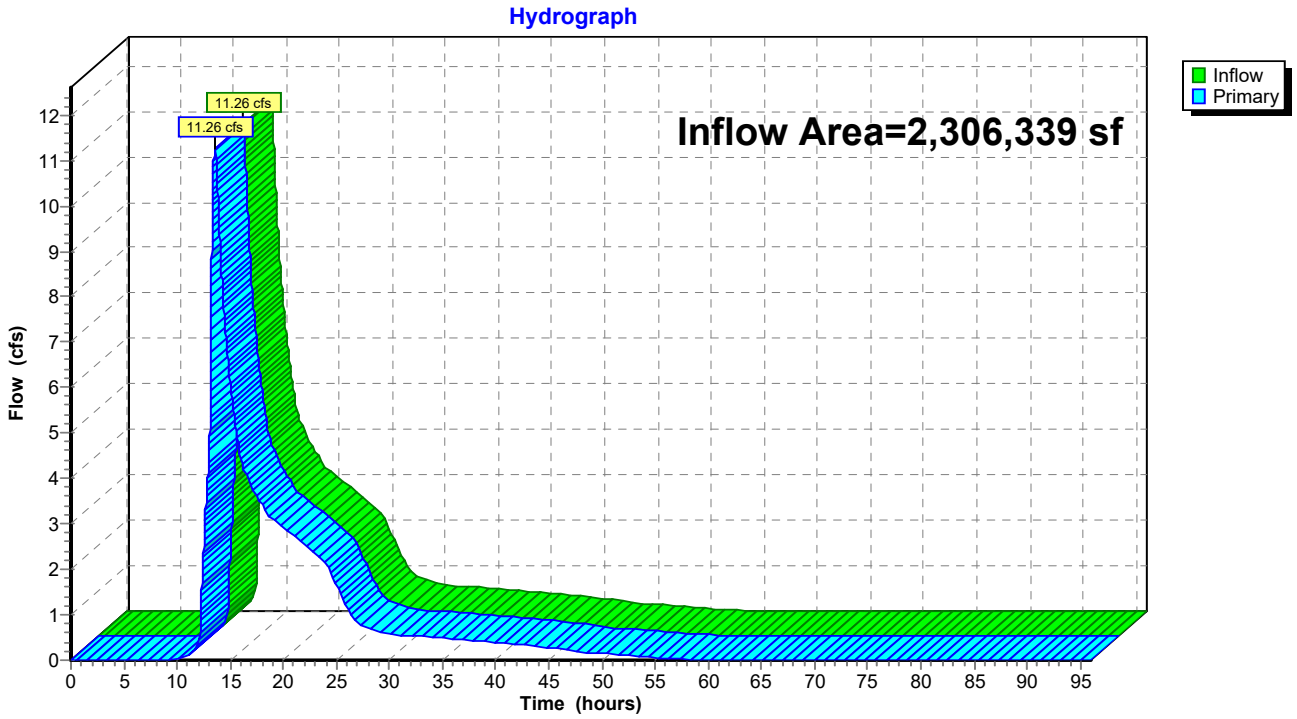


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 1.19" for 25-yr event
Inflow = 11.26 cfs @ 13.55 hrs, Volume= 228,187 cf
Primary = 11.26 cfs @ 13.55 hrs, Volume= 228,187 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

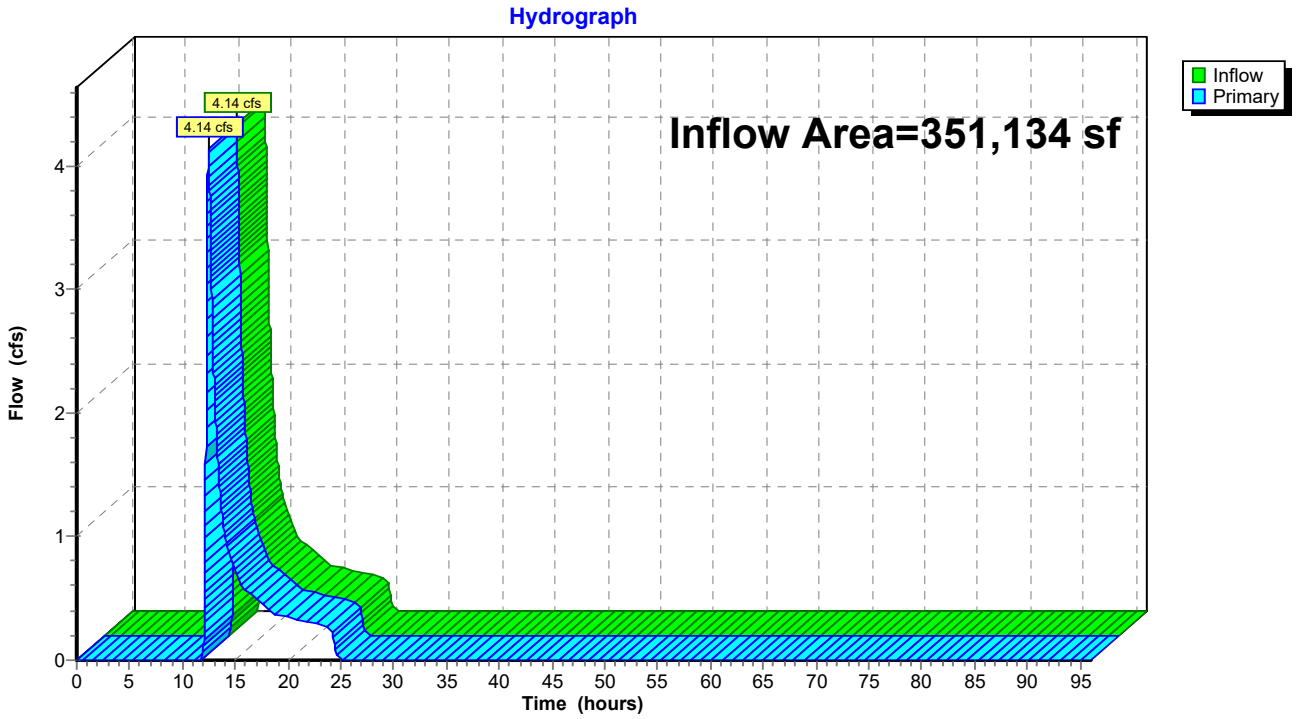


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 1.07" for 25-yr event
Inflow = 4.14 cfs @ 12.47 hrs, Volume= 31,335 cf
Primary = 4.14 cfs @ 12.47 hrs, Volume= 31,335 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=1.22 cfs 9,762 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=2.64"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=7.19 cfs 33,139 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=1.45"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=7.49 cfs 65,580 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=4.84"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=29.75 cfs 194,026 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=4.40"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=33.40 cfs 229,595 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=4.29"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=25.18 cfs 145,066 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=1.45"
Flow Length=815' Tc=28.4 min CN=48 Runoff=6.16 cfs 42,417 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=1.04"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=1.40 cfs 9,456 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=1.20"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=3.12 cfs 20,945 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=1.12"
Flow Length=335' Tc=16.8 min CN=44 Runoff=0.74 cfs 4,527 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.20"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.13 cfs 3,932 cf

Pond 12P: Water Quality Basin #4 Peak Elev=27.01' Storage=93,953 cf Inflow=29.75 cfs 194,026 cf
Discarded=0.77 cfs 78,208 cf Primary=11.07 cfs 115,818 cf Outflow=11.85 cfs 194,026 cf

Pond 13P: Water Quality Basin #1 Peak Elev=14.84' Storage=8,249 cf Inflow=3.12 cfs 20,945 cf
Discarded=0.12 cfs 10,434 cf Primary=0.41 cfs 10,512 cf Outflow=0.54 cfs 20,945 cf

Pond 18P: Water Quality Basin #5 Peak Elev=20.97' Storage=1,967 cf Inflow=1.40 cfs 9,456 cf
Discarded=0.03 cfs 1,998 cf Primary=0.53 cfs 7,459 cf Outflow=0.56 cfs 9,456 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=22.41' Storage=71,537 cf Inflow=25.18 cfs 145,066 cf
Discarded=0.59 cfs 59,197 cf Primary=7.34 cfs 85,869 cf Outflow=7.93 cfs 145,066 cf

Pond 21P: Water Quality Basin #2 Peak Elev=24.27' Storage=28,052 cf Inflow=7.49 cfs 65,580 cf
Discarded=0.17 cfs 15,166 cf Primary=1.20 cfs 50,414 cf Outflow=1.37 cfs 65,580 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=37.76' Storage=12,992 cf Inflow=7.19 cfs 33,139 cf
Discarded=0.14 cfs 9,050 cf Primary=1.32 cfs 24,089 cf Outflow=1.47 cfs 33,139 cf

Link 2L: Northeast Wetland Inflow=1.22 cfs 13,694 cf
Primary=1.22 cfs 13,694 cf

Link 3L: South Off-Site (POC 3) Inflow=33.40 cfs 229,595 cf
Primary=33.40 cfs 229,595 cf

Link 4L: West Wetlands (POC 1) Inflow=22.29 cfs 312,381 cf
Primary=22.29 cfs 312,381 cf

Link 5L: West Off-Site (POC 2) Inflow=6.16 cfs 42,417 cf
Primary=6.16 cfs 42,417 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 758,445 cf Average Runoff Depth = 2.77"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

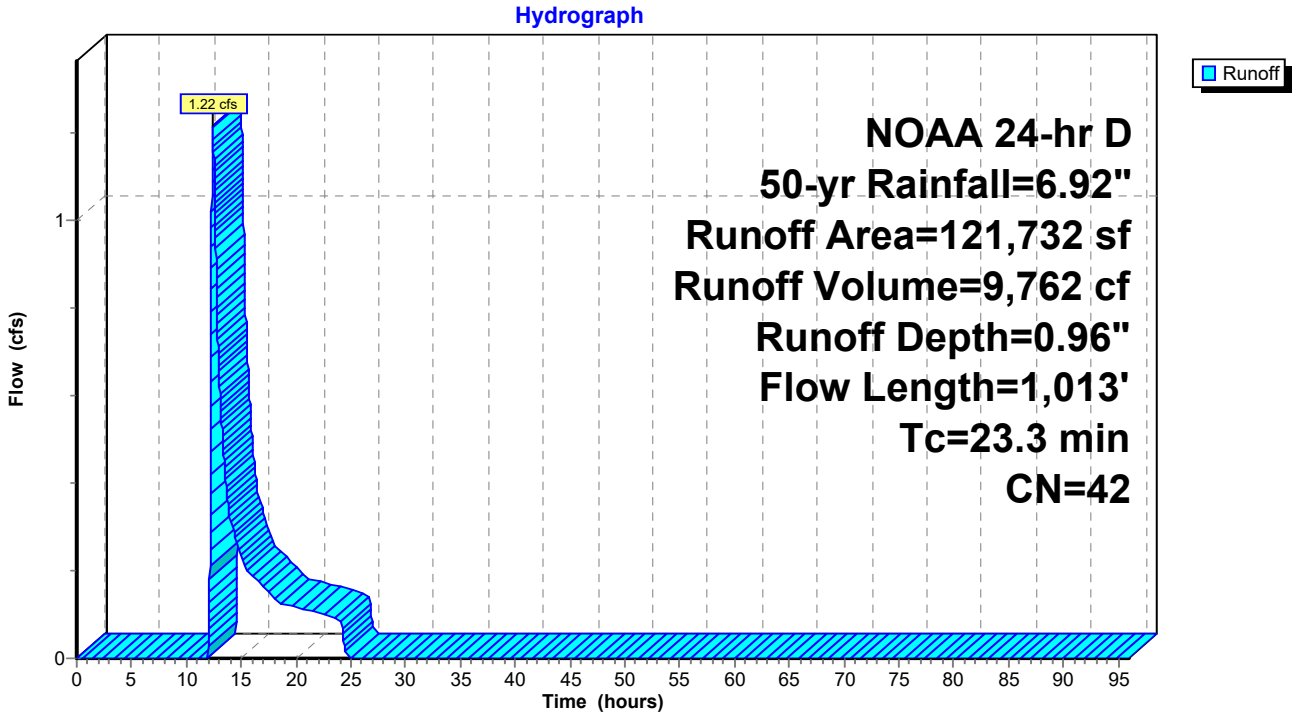
Runoff = 1.22 cfs @ 12.42 hrs, Volume= 9,762 cf, Depth= 0.96"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

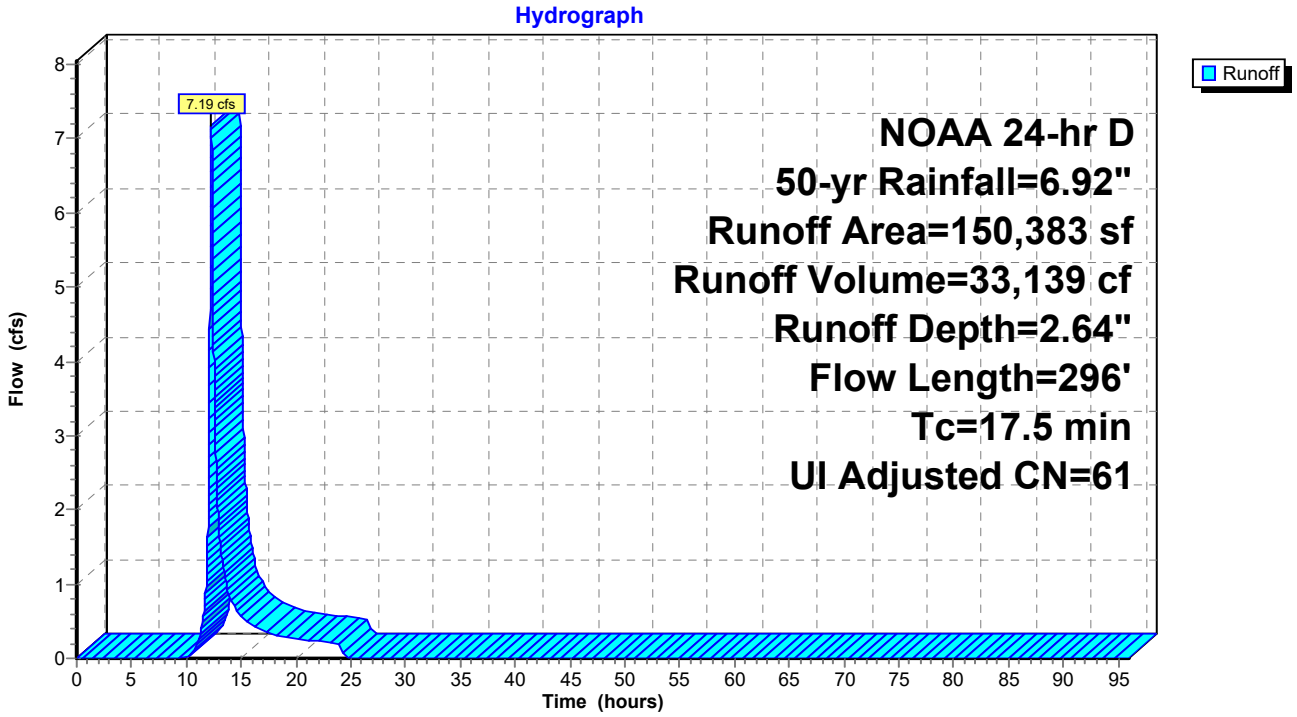
Runoff = 7.19 cfs @ 12.27 hrs, Volume= 33,139 cf, Depth= 2.64"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

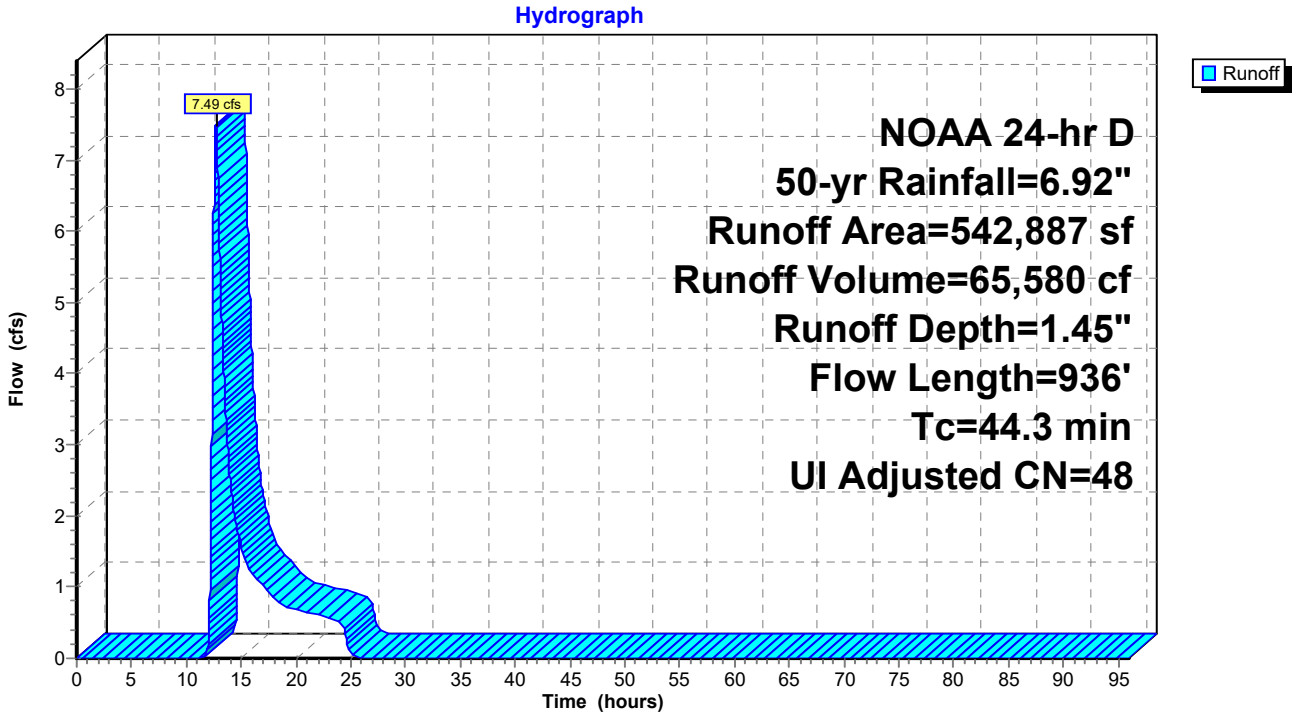
Runoff = 7.49 cfs @ 12.70 hrs, Volume= 65,580 cf, Depth= 1.45"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

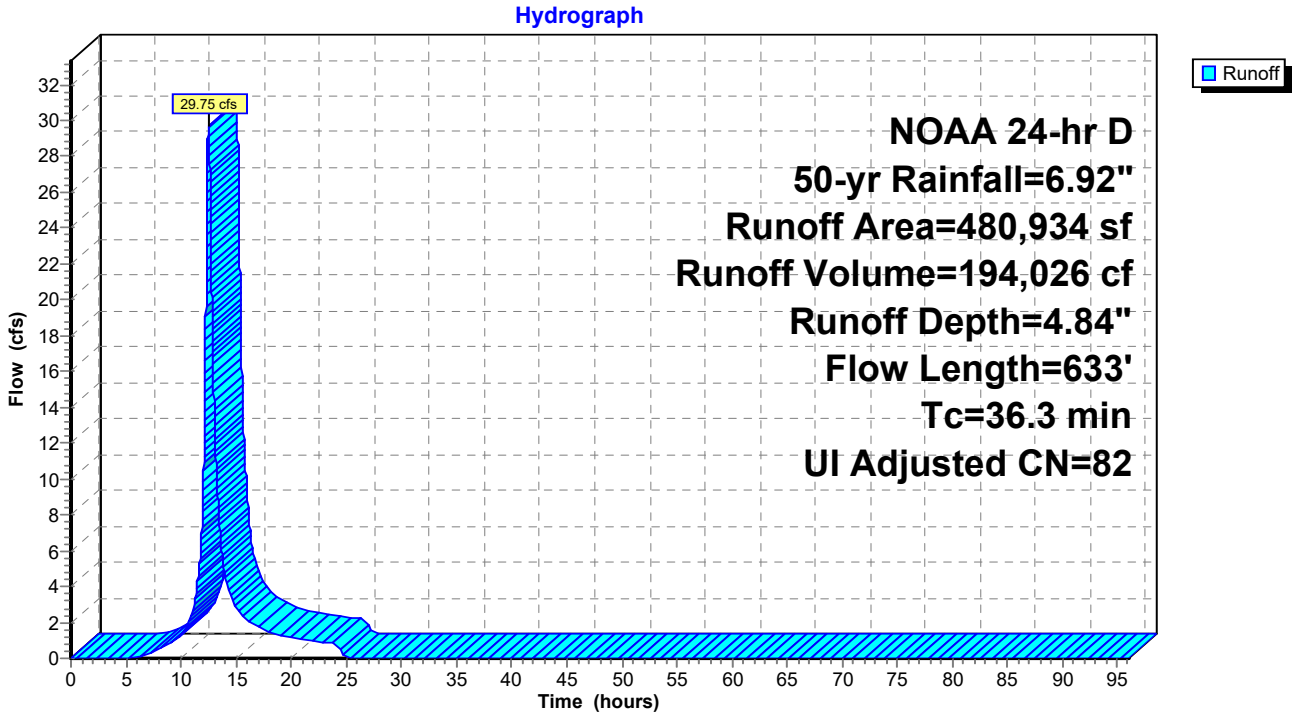
Runoff = 29.75 cfs @ 12.47 hrs, Volume= 194,026 cf, Depth= 4.84"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

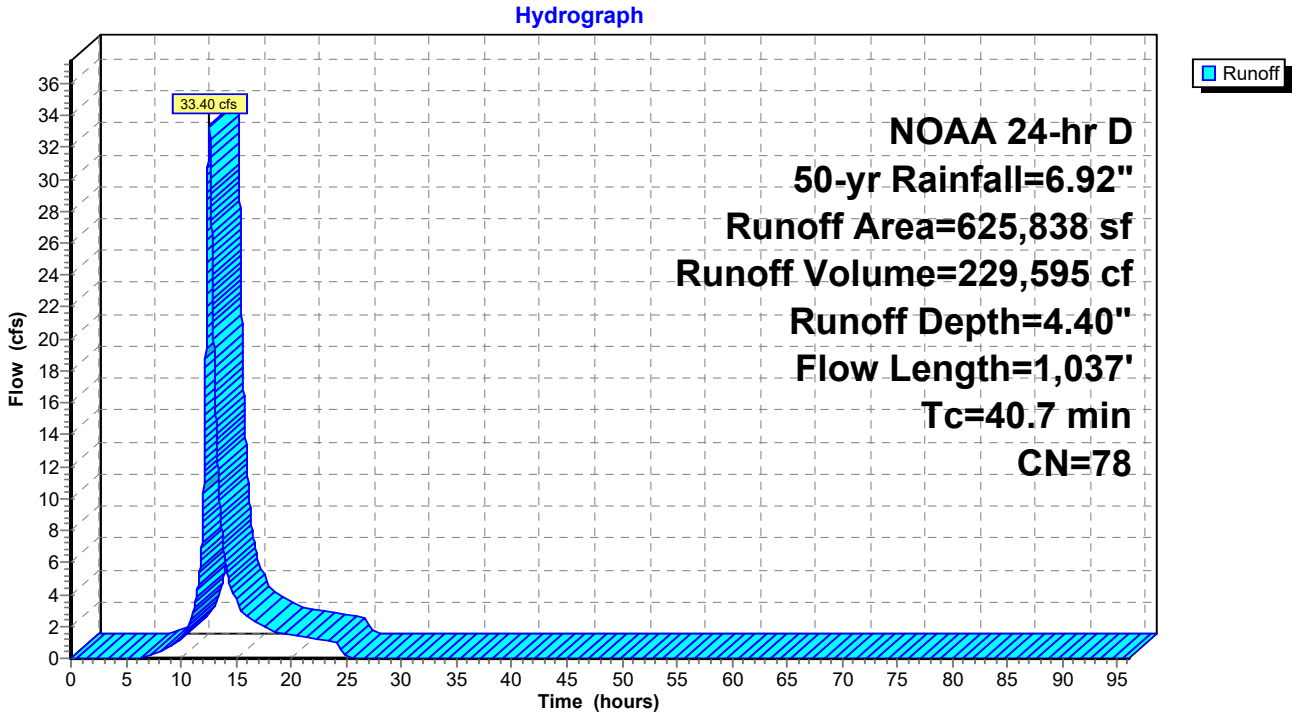
Runoff = 33.40 cfs @ 12.53 hrs, Volume= 229,595 cf, Depth= 4.40"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

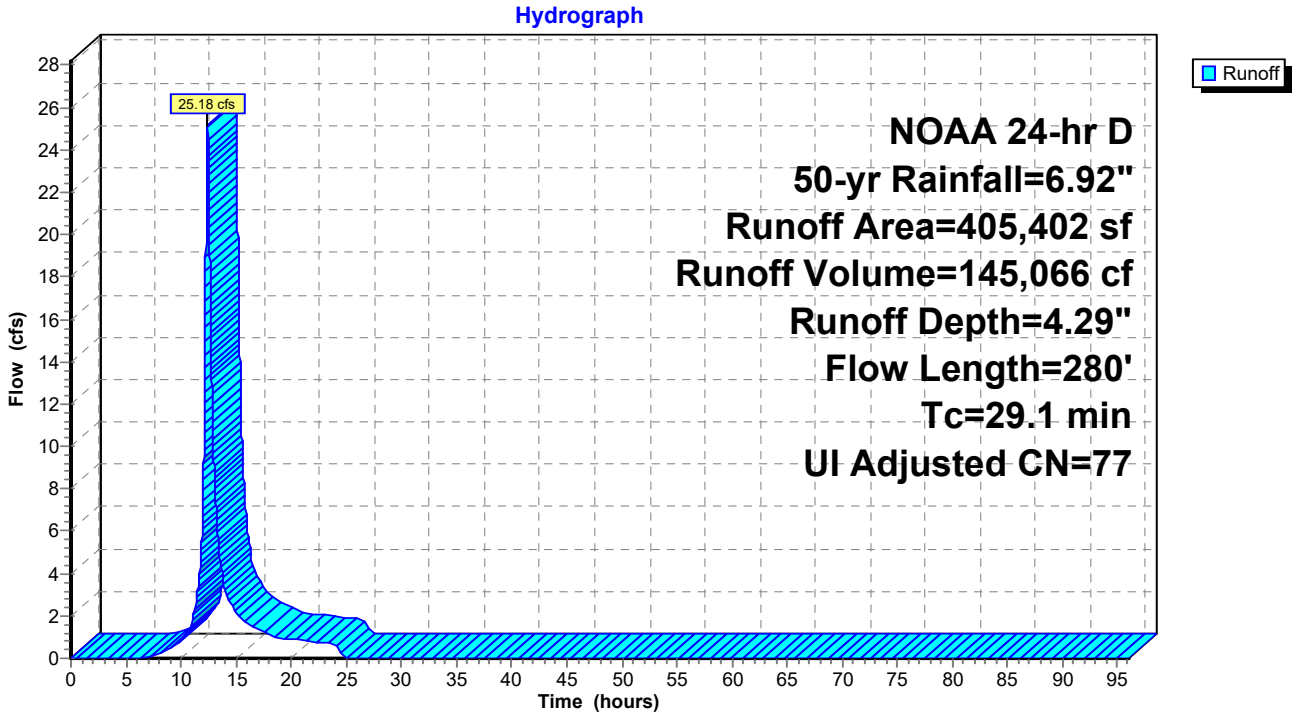
Runoff = 25.18 cfs @ 12.39 hrs, Volume= 145,066 cf, Depth= 4.29"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

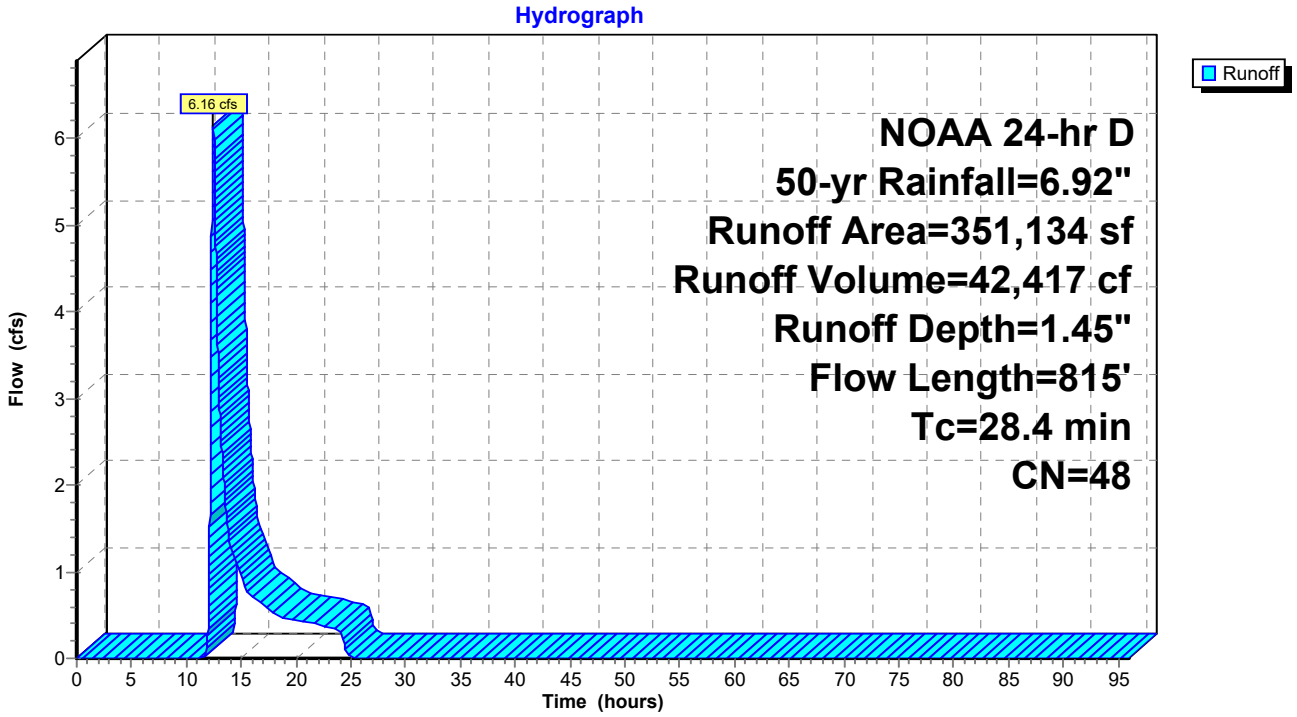
Runoff = 6.16 cfs @ 12.46 hrs, Volume= 42,417 cf, Depth= 1.45"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

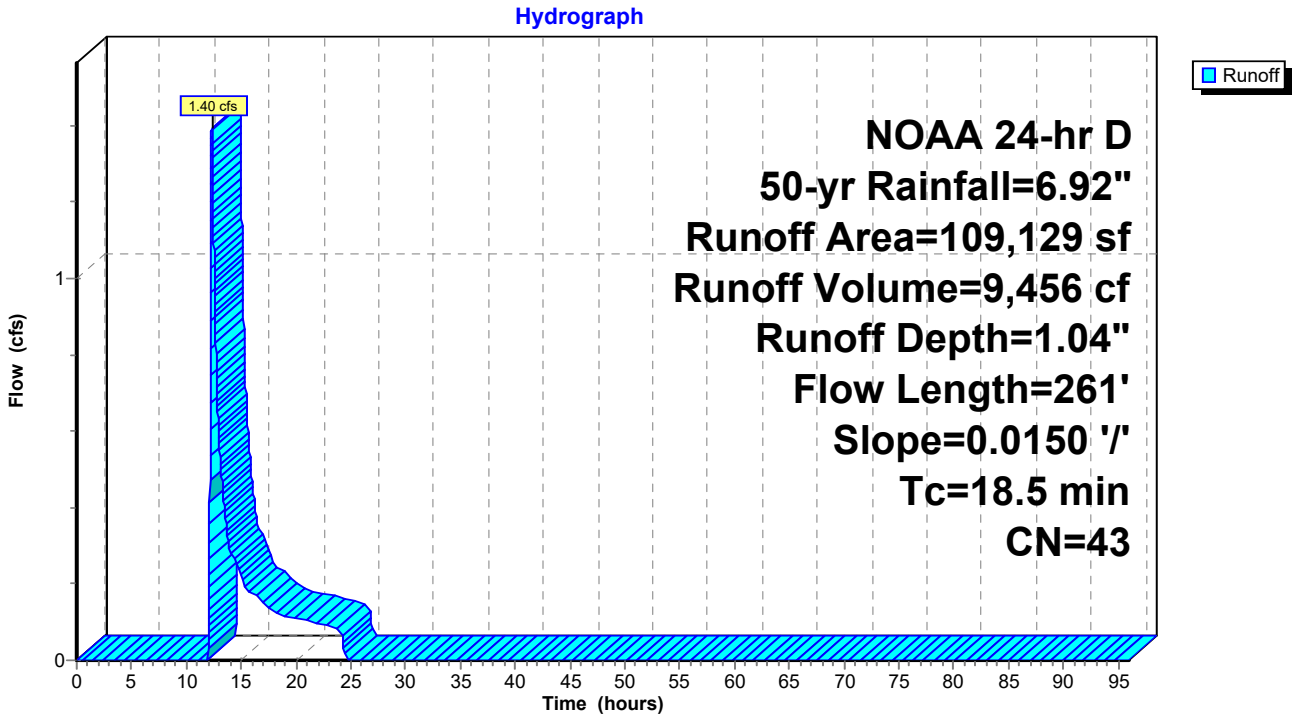
Runoff = 1.40 cfs @ 12.33 hrs, Volume= 9,456 cf, Depth= 1.04"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

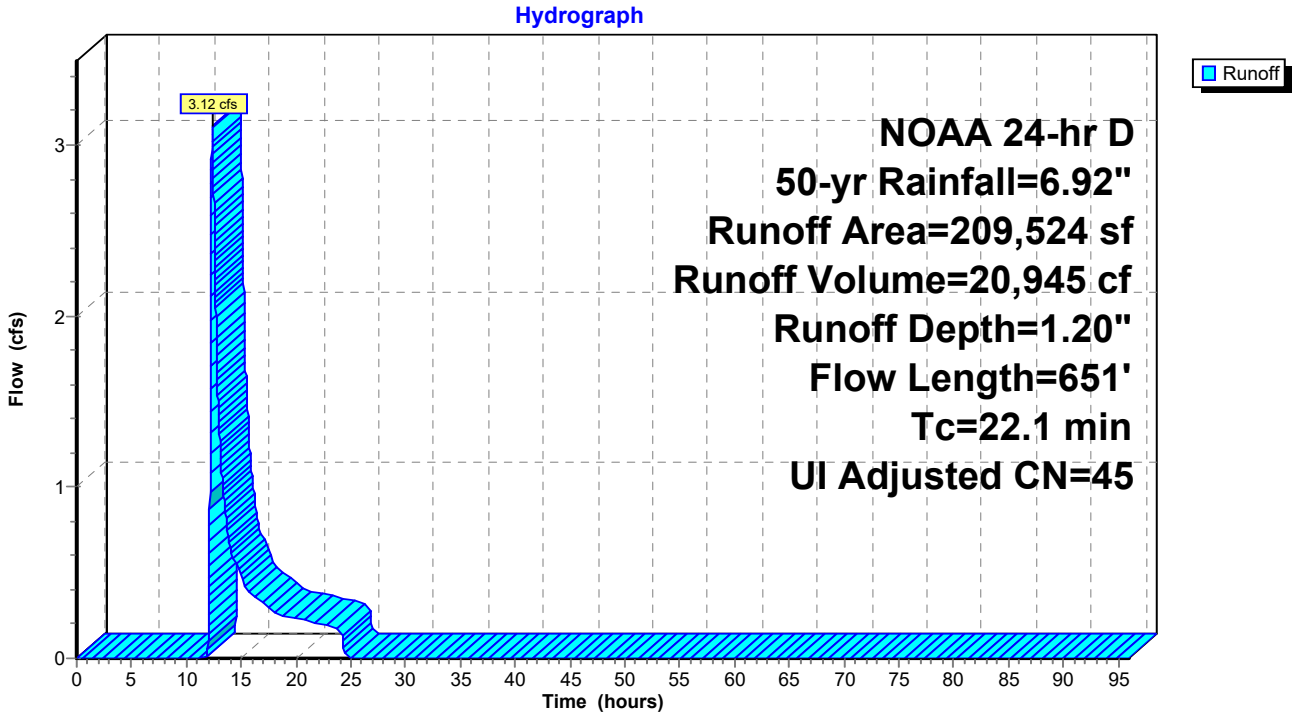
Runoff = 3.12 cfs @ 12.38 hrs, Volume= 20,945 cf, Depth= 1.20"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

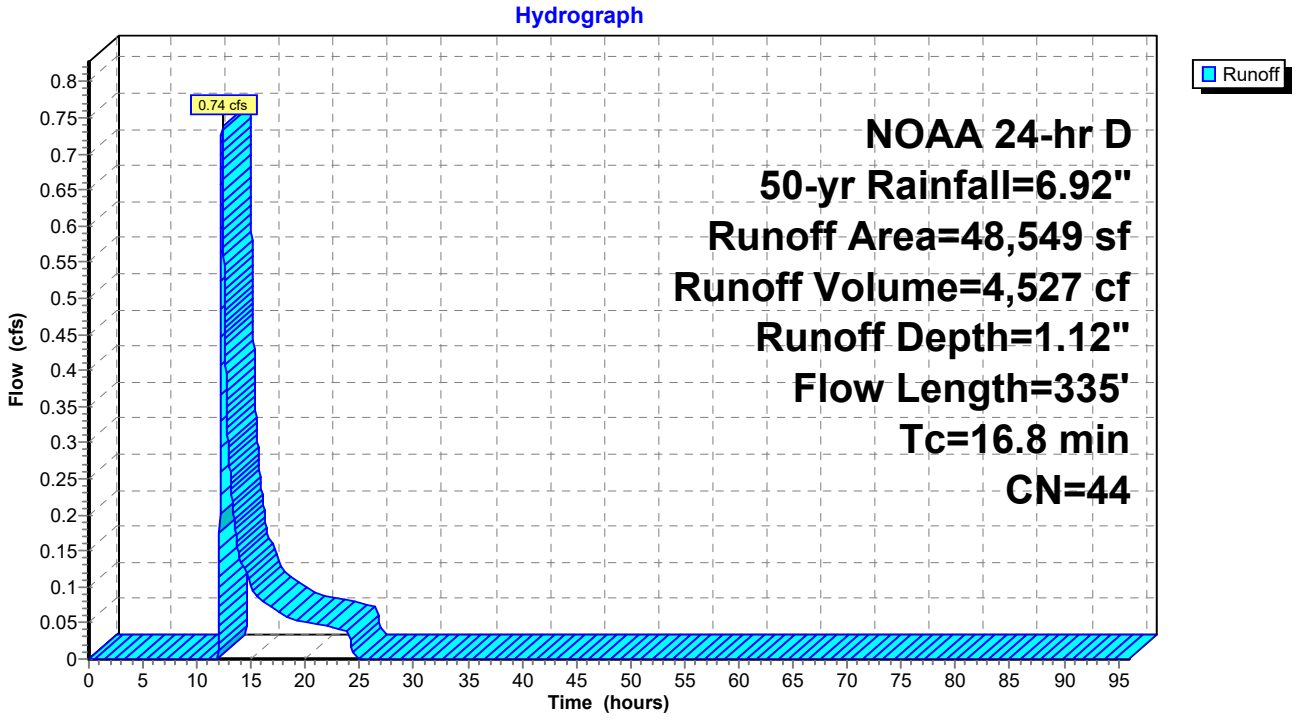
Runoff = 0.74 cfs @ 12.30 hrs, Volume= 4,527 cf, Depth= 1.12"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

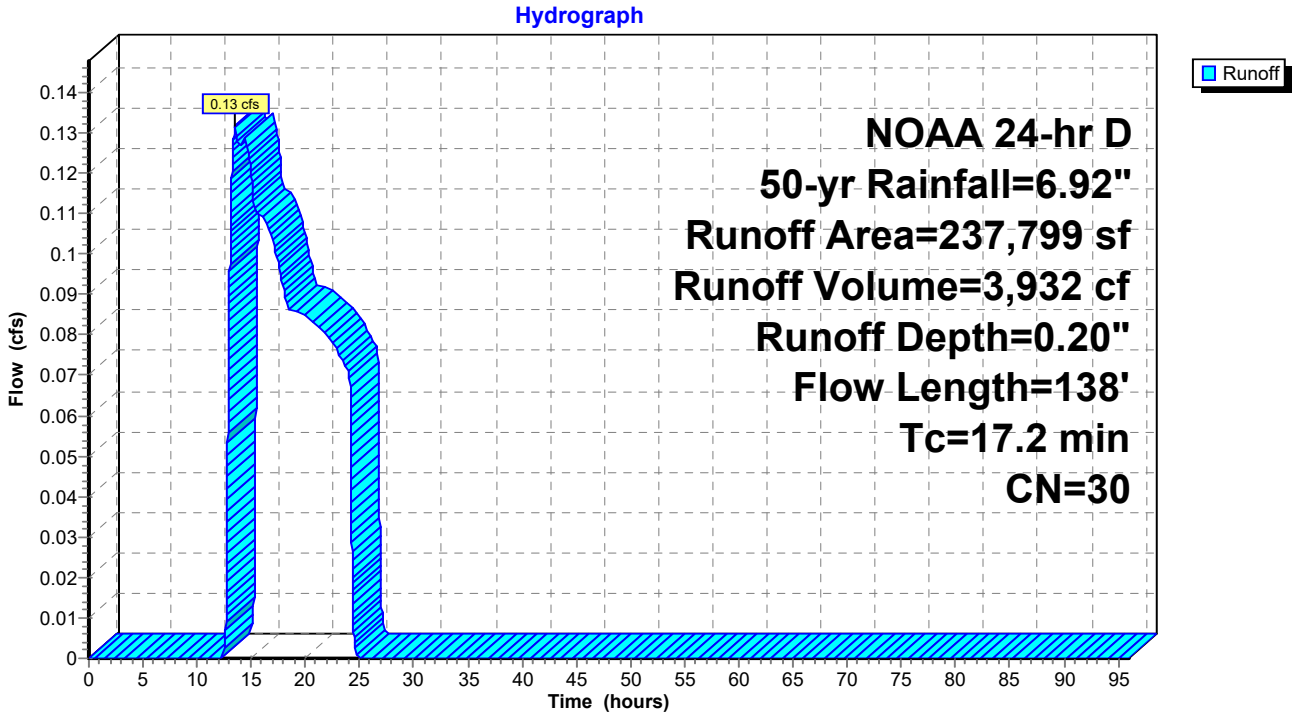
Runoff = 0.13 cfs @ 13.51 hrs, Volume= 3,932 cf, Depth= 0.20"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 50-yr Rainfall=6.92"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 4.84" for 50-yr event
Inflow = 29.75 cfs @ 12.47 hrs, Volume= 194,026 cf
Outflow = 11.85 cfs @ 13.12 hrs, Volume= 194,026 cf, Atten= 60%, Lag= 38.6 min
Discarded = 0.77 cfs @ 13.12 hrs, Volume= 78,208 cf
Primary = 11.07 cfs @ 13.12 hrs, Volume= 115,818 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 27.01' @ 13.12 hrs Surf.Area= 20,894 sf Storage= 93,953 cf

Plug-Flow detention time= 597.2 min calculated for 194,006 cf (100% of inflow)
Center-of-Mass det. time= 597.5 min (1,436.0 - 838.5)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

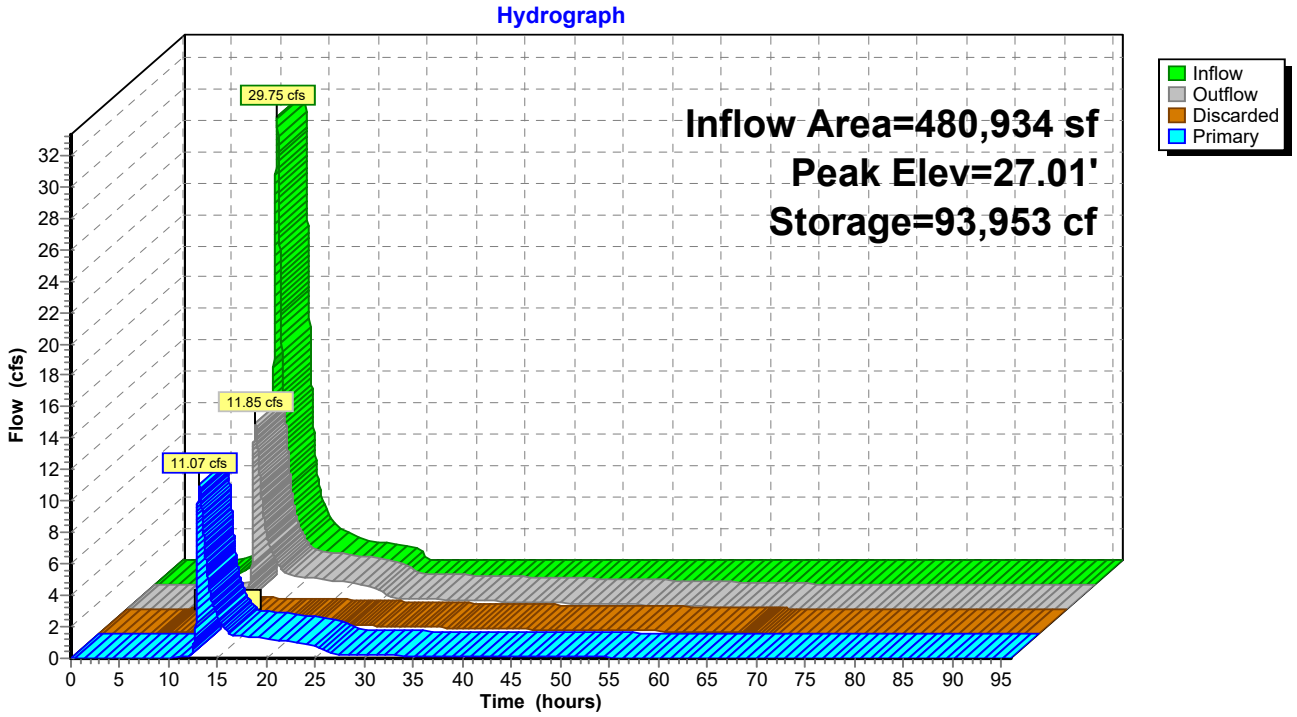
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.77 cfs @ 13.12 hrs HW=27.01' (Free Discharge)
└**3=Exfiltration** (Controls 0.77 cfs)

Primary OutFlow Max=11.07 cfs @ 13.12 hrs HW=27.01' (Free Discharge)
└**1=Culvert** (Passes 11.07 cfs of 51.59 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 9.46 cfs @ 2.30 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.43 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.36 cfs @ 6.92 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 1.20" for 50-yr event
Inflow = 3.12 cfs @ 12.38 hrs, Volume= 20,945 cf
Outflow = 0.54 cfs @ 14.63 hrs, Volume= 20,945 cf, Atten= 83%, Lag= 135.0 min
Discarded = 0.12 cfs @ 14.63 hrs, Volume= 10,434 cf
Primary = 0.41 cfs @ 14.63 hrs, Volume= 10,512 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 14.84' @ 14.63 hrs Surf.Area= 10,458 sf Storage= 8,249 cf

Plug-Flow detention time= 332.1 min calculated for 20,943 cf (100% of inflow)
Center-of-Mass det. time= 332.2 min (1,264.1 - 931.9)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

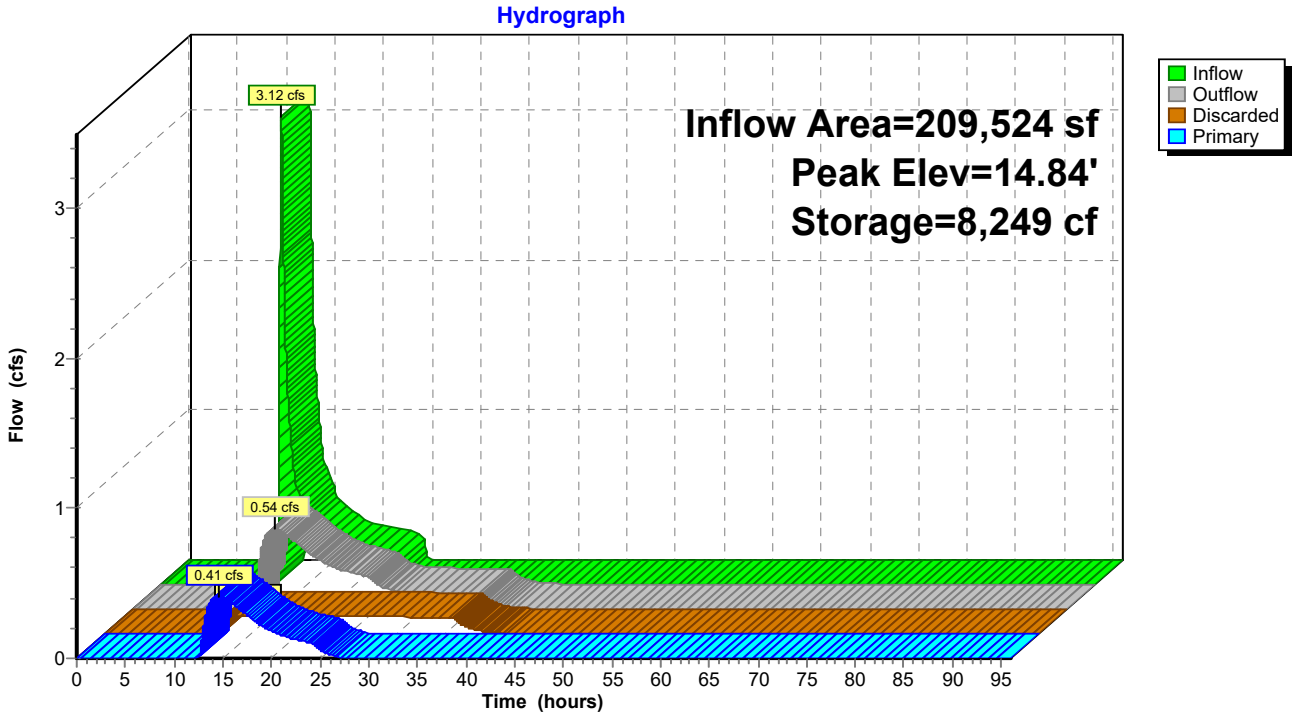
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 14.63 hrs HW=14.84' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.41 cfs @ 14.63 hrs HW=14.84' (Free Discharge)
└**1=Culvert** (Passes 0.41 cfs of 4.53 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.41 cfs @ 2.26 fps)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 1.04" for 50-yr event
Inflow = 1.40 cfs @ 12.33 hrs, Volume= 9,456 cf
Outflow = 0.56 cfs @ 13.02 hrs, Volume= 9,456 cf, Atten= 60%, Lag= 41.5 min
Discarded = 0.03 cfs @ 13.02 hrs, Volume= 1,998 cf
Primary = 0.53 cfs @ 13.02 hrs, Volume= 7,459 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 20.97' @ 13.02 hrs Surf.Area= 2,368 sf Storage= 1,967 cf

Plug-Flow detention time= 129.0 min calculated for 9,455 cf (100% of inflow)
Center-of-Mass det. time= 129.1 min (1,067.6 - 938.5)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

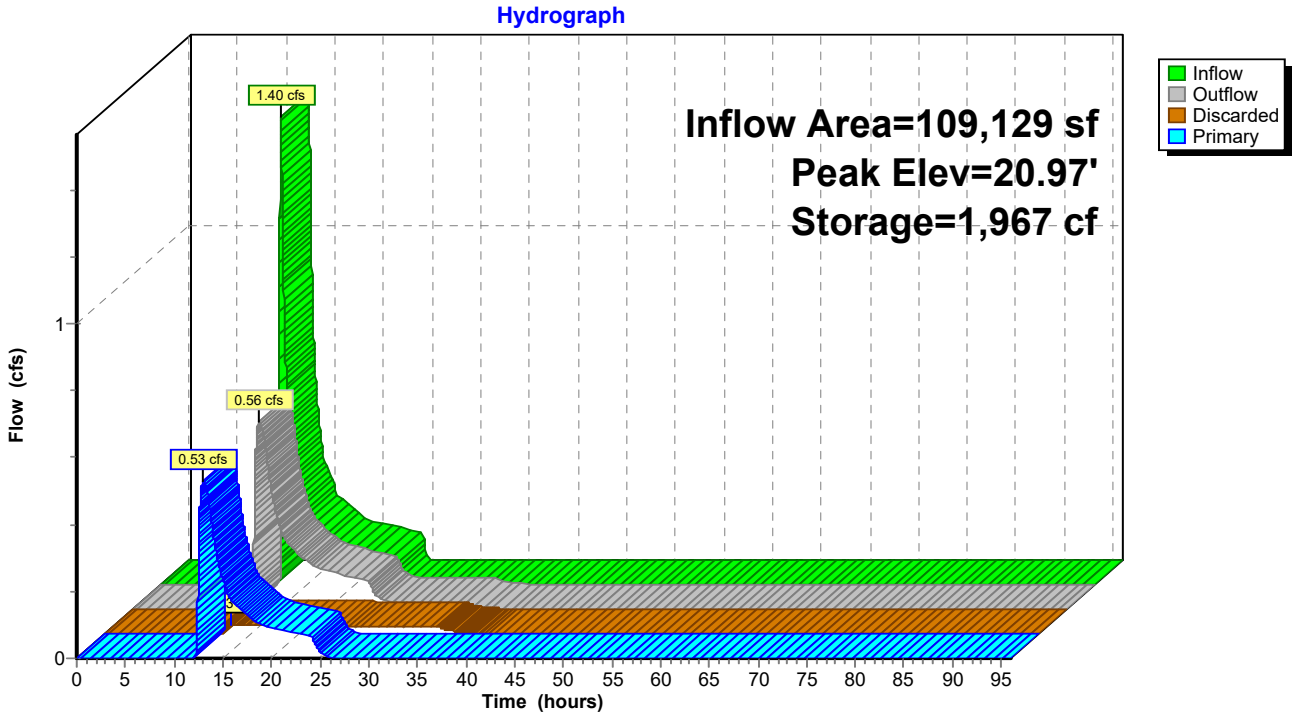
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 13.02 hrs HW=20.97' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.53 cfs @ 13.02 hrs HW=20.97' (Free Discharge)
└**1=Culvert** (Passes 0.53 cfs of 4.03 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.71 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 4.29" for 50-yr event
Inflow = 25.18 cfs @ 12.39 hrs, Volume= 145,066 cf
Outflow = 7.93 cfs @ 13.09 hrs, Volume= 145,066 cf, Atten= 69%, Lag= 41.8 min
Discarded = 0.59 cfs @ 13.09 hrs, Volume= 59,197 cf
Primary = 7.34 cfs @ 13.09 hrs, Volume= 85,869 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.41' @ 13.09 hrs Surf.Area= 16,471 sf Storage= 71,537 cf

Plug-Flow detention time= 651.8 min calculated for 145,066 cf (100% of inflow)
Center-of-Mass det. time= 651.8 min (1,497.1 - 845.4)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

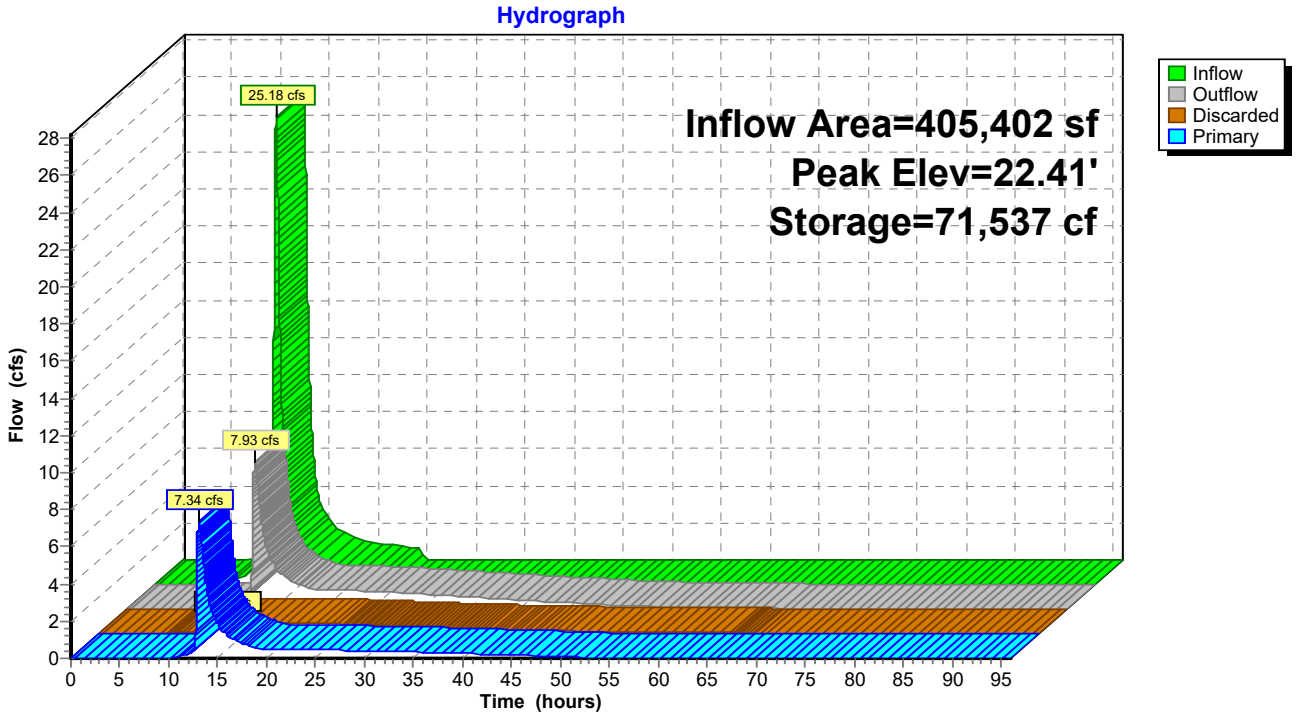
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.59 cfs @ 13.09 hrs HW=22.41' (Free Discharge)
└**3=Exfiltration** (Controls 0.59 cfs)

Primary OutFlow Max=7.31 cfs @ 13.09 hrs HW=22.41' (Free Discharge)
└**1=Culvert** (Passes 7.31 cfs of 53.06 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 6.82 cfs @ 2.06 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.63 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.24 cfs @ 11.12 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 1.45" for 50-yr event
Inflow = 7.49 cfs @ 12.70 hrs, Volume= 65,580 cf
Outflow = 1.37 cfs @ 15.41 hrs, Volume= 65,580 cf, Atten= 82%, Lag= 162.9 min
Discarded = 0.17 cfs @ 15.41 hrs, Volume= 15,166 cf
Primary = 1.20 cfs @ 15.41 hrs, Volume= 50,414 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 24.27' @ 15.41 hrs Surf.Area= 14,279 sf Storage= 28,052 cf

Plug-Flow detention time= 319.5 min calculated for 65,573 cf (100% of inflow)
Center-of-Mass det. time= 319.6 min (1,259.2 - 939.6)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

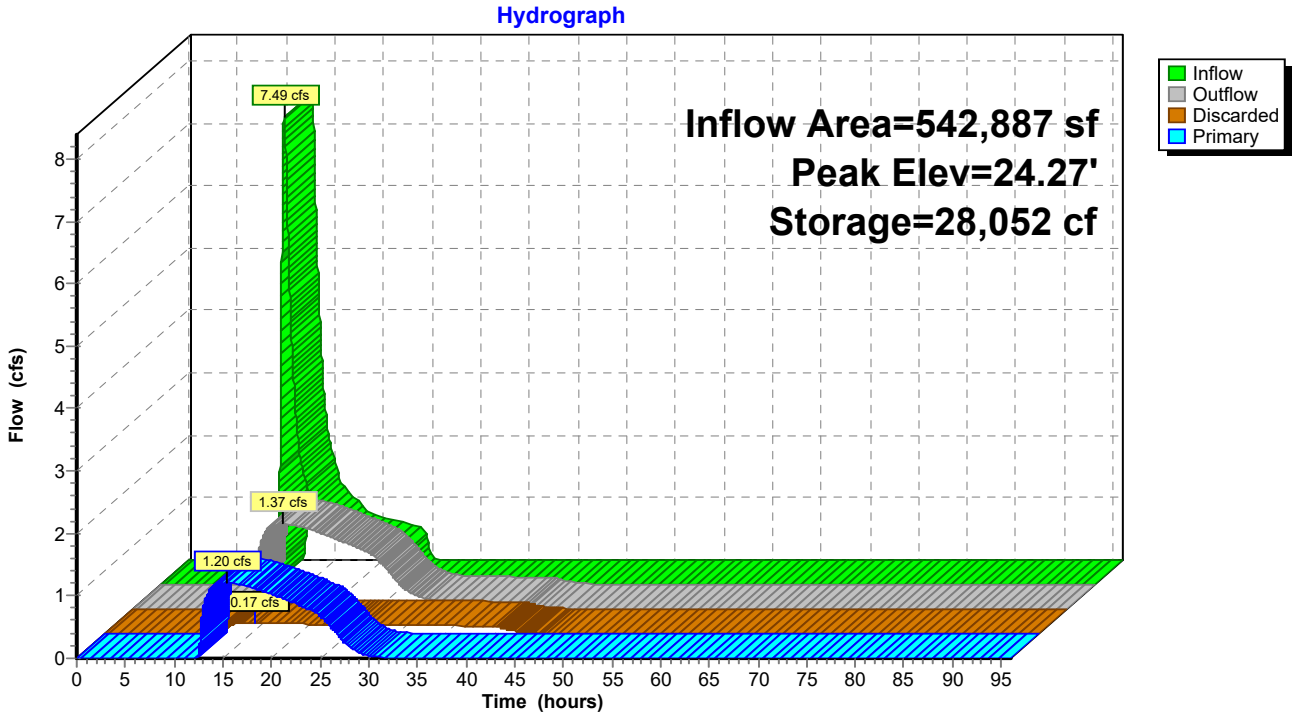
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 15.41 hrs HW=24.27' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=1.20 cfs @ 15.41 hrs HW=24.27' (Free Discharge)
└**1=Culvert** (Passes 1.20 cfs of 17.02 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 1.20 cfs @ 6.12 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 2.64" for 50-yr event
Inflow = 7.19 cfs @ 12.27 hrs, Volume= 33,139 cf
Outflow = 1.47 cfs @ 13.16 hrs, Volume= 33,139 cf, Atten= 80%, Lag= 53.2 min
Discarded = 0.14 cfs @ 13.16 hrs, Volume= 9,050 cf
Primary = 1.32 cfs @ 13.16 hrs, Volume= 24,089 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 37.76' @ 13.16 hrs Surf.Area= 5,127 sf Storage= 12,992 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 276.2 min calculated for 33,139 cf (100% of inflow)
Center-of-Mass det. time= 276.1 min (1,150.7 - 874.5)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

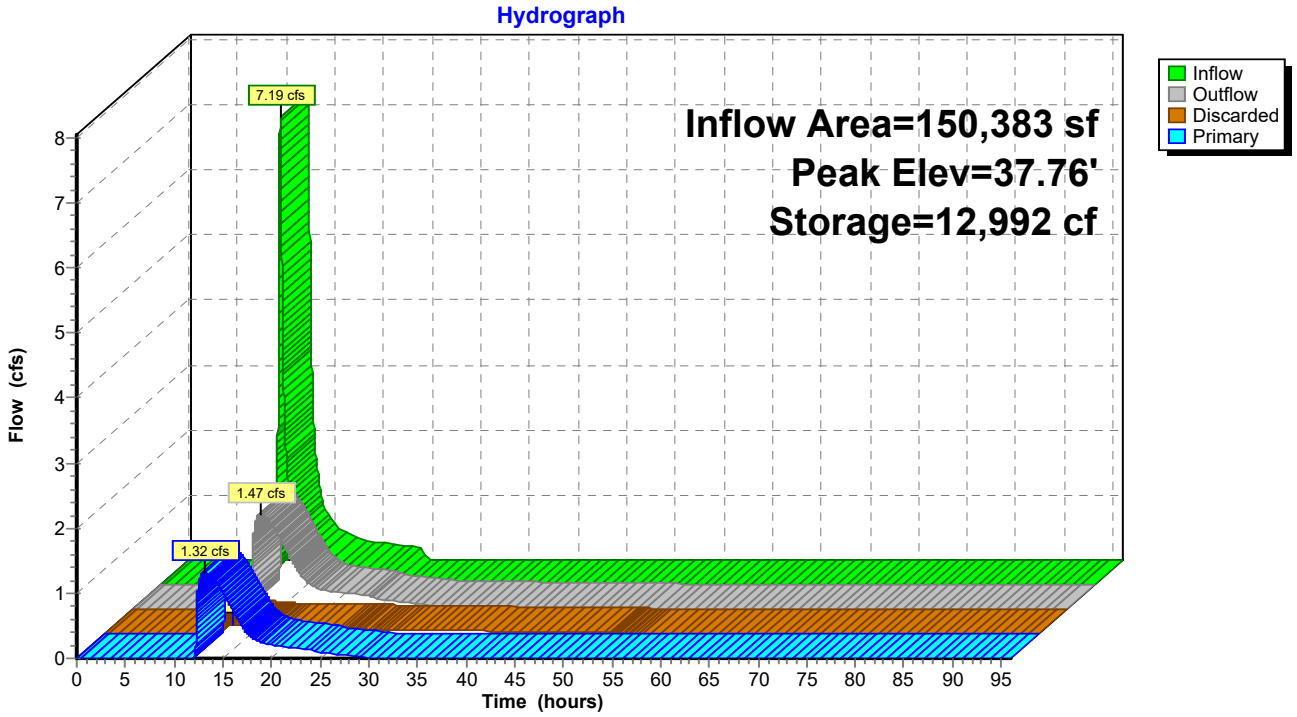
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 13.16 hrs HW=37.76' (Free Discharge)
└**3=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=1.32 cfs @ 13.16 hrs HW=37.76' (Free Discharge)
└**1=Culvert** (Passes 1.32 cfs of 25.12 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.50 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.16 cfs @ 5.91 fps)

Pond 22P: Water Quality Basin #3.2

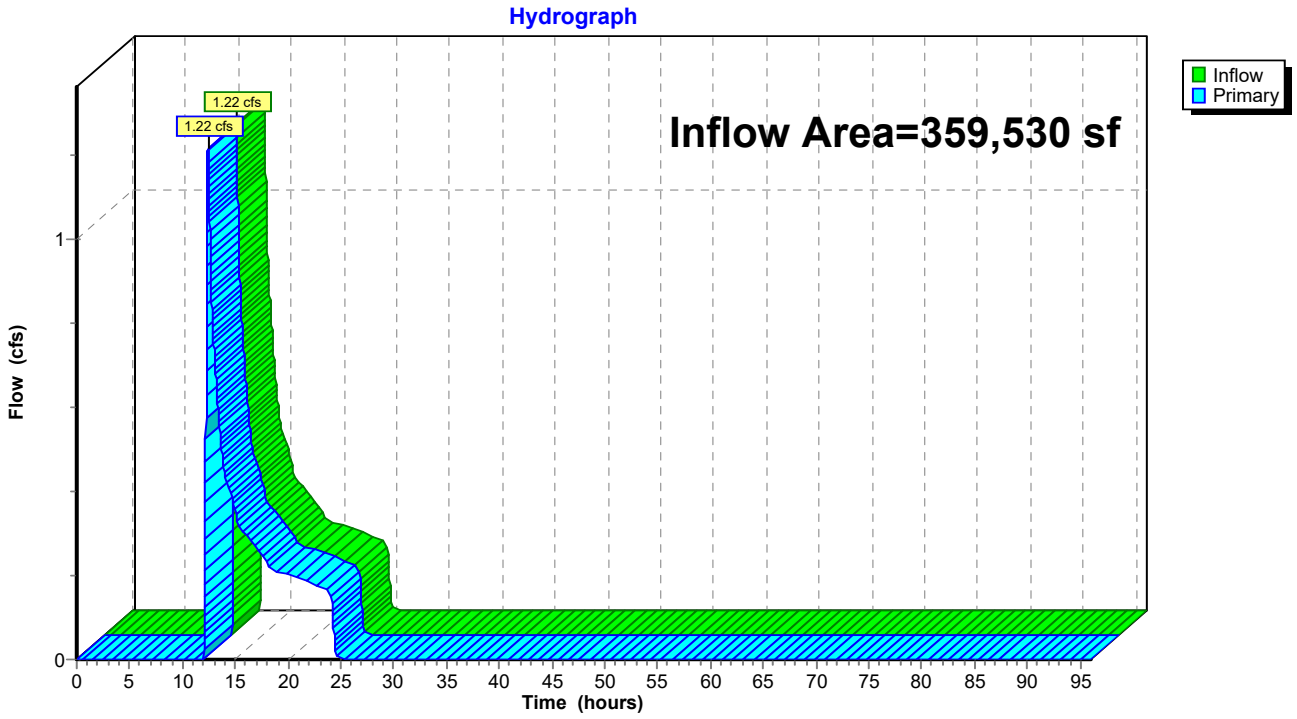


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.46" for 50-yr event
Inflow = 1.22 cfs @ 12.42 hrs, Volume= 13,694 cf
Primary = 1.22 cfs @ 12.42 hrs, Volume= 13,694 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

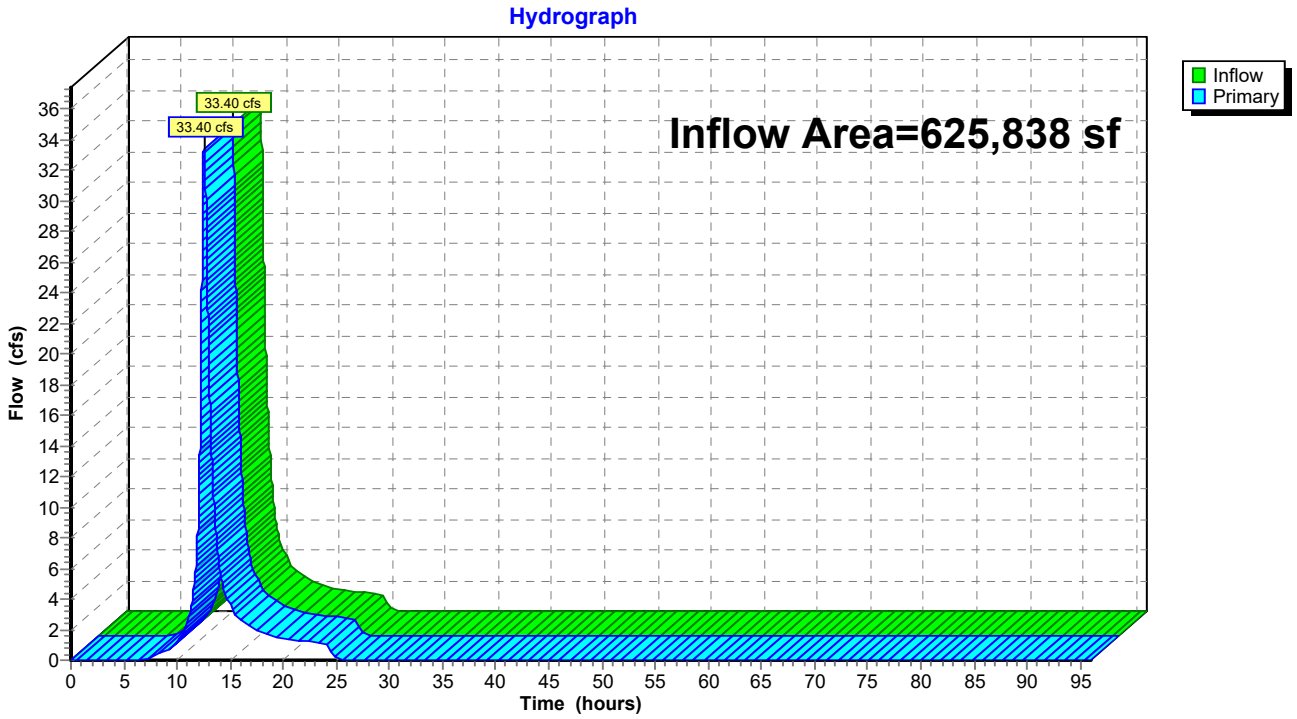


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 4.40" for 50-yr event
Inflow = 33.40 cfs @ 12.53 hrs, Volume= 229,595 cf
Primary = 33.40 cfs @ 12.53 hrs, Volume= 229,595 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

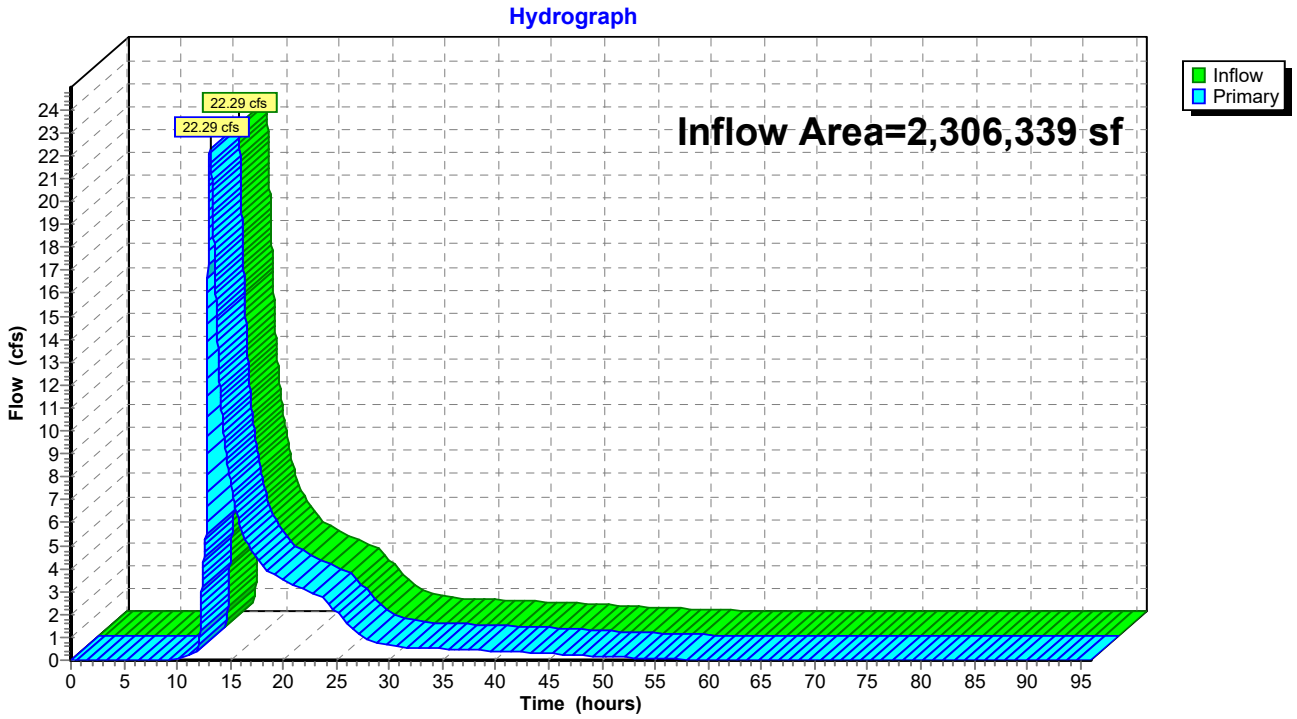


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 1.63" for 50-yr event
Inflow = 22.29 cfs @ 13.11 hrs, Volume= 312,381 cf
Primary = 22.29 cfs @ 13.11 hrs, Volume= 312,381 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

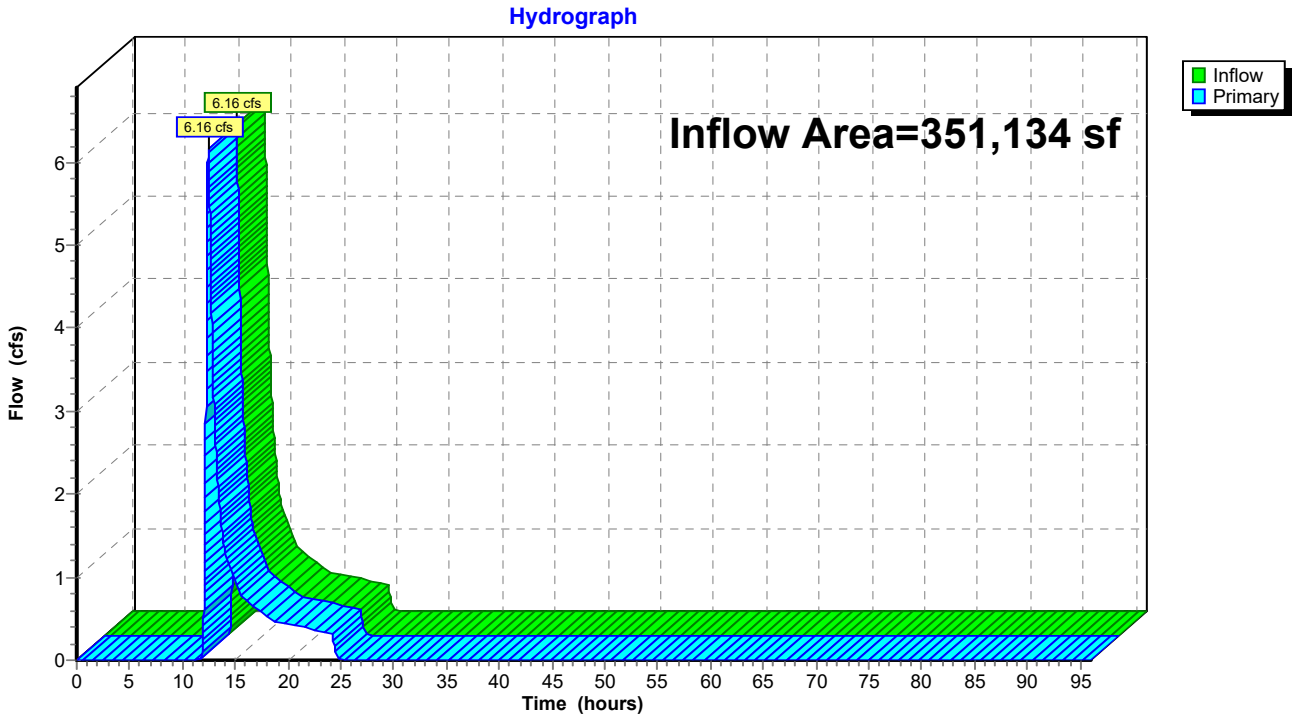


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 1.45" for 50-yr event
Inflow = 6.16 cfs @ 12.46 hrs, Volume= 42,417 cf
Primary = 6.16 cfs @ 12.46 hrs, Volume= 42,417 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Subcat 1 Runoff Area=121,732 sf 0.00% Impervious Runoff Depth=1.32"
Flow Length=1,013' Tc=23.3 min CN=42 Runoff=1.93 cfs 13,381 cf

Subcatchment2: Subcat 2 Runoff Area=150,383 sf 12.20% Impervious Runoff Depth=3.25"
Flow Length=296' Tc=17.5 min UI Adjusted CN=61 Runoff=8.92 cfs 40,700 cf

Subcatchment3: Subcat 3 Runoff Area=542,887 sf 2.45% Impervious Runoff Depth=1.89"
Flow Length=936' Tc=44.3 min UI Adjusted CN=48 Runoff=10.40 cfs 85,652 cf

Subcatchment4: Subcat 4 Runoff Area=480,934 sf 13.66% Impervious Runoff Depth=5.61"
Flow Length=633' Tc=36.3 min UI Adjusted CN=82 Runoff=34.34 cfs 224,968 cf

Subcatchment5: Subcat 5 Runoff Area=625,838 sf 0.00% Impervious Runoff Depth=5.15"
Flow Length=1,037' Tc=40.7 min CN=78 Runoff=38.98 cfs 268,652 cf

Subcatchment6: Subcat 6 Runoff Area=405,402 sf 16.44% Impervious Runoff Depth=5.04"
Flow Length=280' Tc=29.1 min UI Adjusted CN=77 Runoff=29.46 cfs 170,147 cf

Subcatchment7: Subcat 7 Runoff Area=351,134 sf 0.00% Impervious Runoff Depth=1.89"
Flow Length=815' Tc=28.4 min CN=48 Runoff=8.53 cfs 55,399 cf

Subcatchment8: Subcat 8 Runoff Area=109,129 sf 0.00% Impervious Runoff Depth=1.41"
Flow Length=261' Slope=0.0150 '/' Tc=18.5 min CN=43 Runoff=2.16 cfs 12,838 cf

Subcatchment9: Subcat 9 Runoff Area=209,524 sf 2.74% Impervious Runoff Depth=1.60"
Flow Length=651' Tc=22.1 min UI Adjusted CN=45 Runoff=4.57 cfs 27,951 cf

Subcatchment10: Subcat 10 Runoff Area=48,549 sf 0.00% Impervious Runoff Depth=1.51"
Flow Length=335' Tc=16.8 min CN=44 Runoff=1.11 cfs 6,091 cf

Subcatchment11: Subcat 11 Runoff Area=237,799 sf 0.00% Impervious Runoff Depth=0.36"
Flow Length=138' Tc=17.2 min CN=30 Runoff=0.34 cfs 7,088 cf

Pond 12P: Water Quality Basin #4 Peak Elev=27.23' Storage=98,492 cf Inflow=34.34 cfs 224,968 cf
Discarded=0.80 cfs 80,493 cf Primary=17.68 cfs 144,475 cf Outflow=18.48 cfs 224,968 cf

Pond 13P: Water Quality Basin #1 Peak Elev=15.09' Storage=10,927 cf Inflow=4.57 cfs 27,951 cf
Discarded=0.13 cfs 10,822 cf Primary=0.63 cfs 17,129 cf Outflow=0.75 cfs 27,951 cf

Pond 18P: Water Quality Basin #5 Peak Elev=21.30' Storage=2,809 cf Inflow=2.16 cfs 12,838 cf
Discarded=0.03 cfs 2,047 cf Primary=0.76 cfs 10,791 cf Outflow=0.80 cfs 12,838 cf

Pond 20P: Water Quality Basin #3.1 Peak Elev=22.62' Storage=74,968 cf Inflow=29.46 cfs 170,147 cf
Discarded=0.61 cfs 60,891 cf Primary=13.04 cfs 109,256 cf Outflow=13.65 cfs 170,147 cf

Pond 21P: Water Quality Basin #2 Peak Elev=25.02' Storage=39,346 cf Inflow=10.40 cfs 85,652 cf
Discarded=0.18 cfs 16,928 cf Primary=1.46 cfs 68,724 cf Outflow=1.64 cfs 85,652 cf

Pond 22P: Water Quality Basin #3.2 Peak Elev=38.40' Storage=16,468 cf Inflow=8.92 cfs 40,700 cf
Discarded=0.17 cfs 9,604 cf Primary=1.57 cfs 31,096 cf Outflow=1.74 cfs 40,700 cf

Link 2L: Northeast Wetland Inflow=2.02 cfs 20,469 cf
Primary=2.02 cfs 20,469 cf

Link 3L: South Off-Site (POC 3) Inflow=38.98 cfs 268,652 cf
Primary=38.98 cfs 268,652 cf

Link 4L: West Wetlands (POC 1) Inflow=35.89 cfs 408,031 cf
Primary=35.89 cfs 408,031 cf

Link 5L: West Off-Site (POC 2) Inflow=8.53 cfs 55,399 cf
Primary=8.53 cfs 55,399 cf

Total Runoff Area = 3,283,311 sf Runoff Volume = 912,866 cf Average Runoff Depth = 3.34"
94.83% Pervious = 3,113,537 sf 5.17% Impervious = 169,774 sf

Summary for Subcatchment 1: Subcat 1

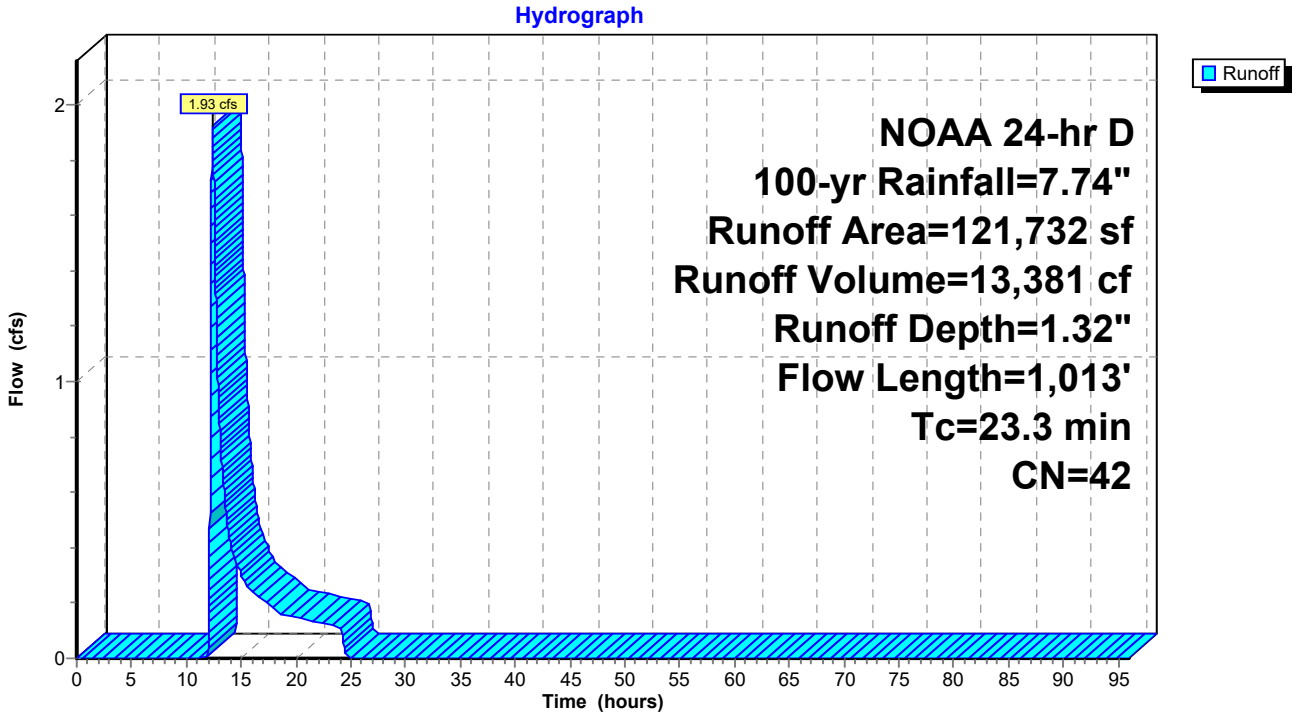
Runoff = 1.93 cfs @ 12.40 hrs, Volume= 13,381 cf, Depth= 1.32"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
700	48	Brush, Good, HSG B
14,806	55	Woods, Good, HSG B
1,211	55	Woods, Good, HSG B
24	39	>75% Grass cover, Good, HSG A
1,022	72	Dirt roads, HSG A
9,987	30	Brush, Good, HSG A
13,422	30	Woods, Good, HSG A
21,799	77	Woods, Good, HSG D
58,761	30	Woods, Good, HSG A
121,732	42	Weighted Average
121,732	42	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.2400	0.13		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.46"
10.0	913	0.0920	1.52		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.3	1,013	Total			

Subcatchment 1: Subcat 1



Summary for Subcatchment 2: Subcat 2

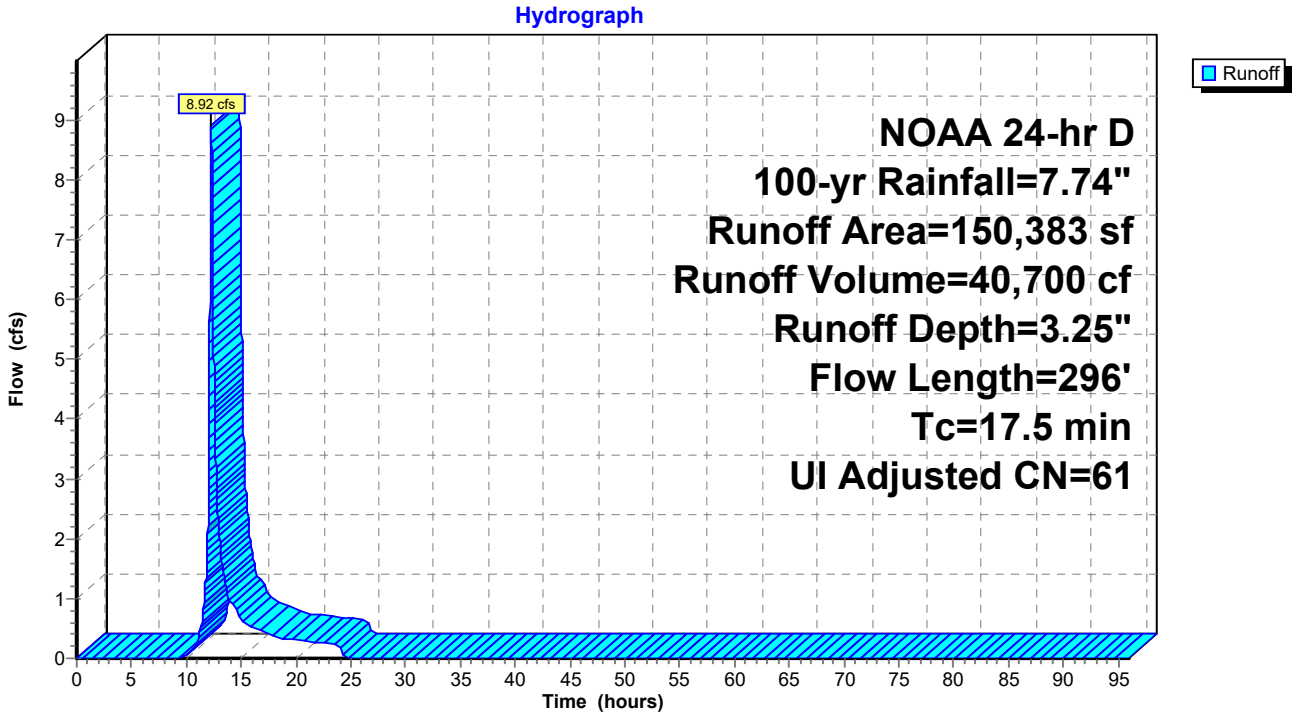
Runoff = 8.92 cfs @ 12.27 hrs, Volume= 40,700 cf, Depth= 3.25"
Routed to Pond 22P : Water Quality Basin #3.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
72,676	39		>75% Grass cover, Good, HSG A
18,352	98		Unconnected pavement, HSG A
995	96		Gravel surface, HSG A
6	30		Woods, Good, HSG A
4,992	77		Woods, Good, HSG D
35,625	86		Woods/grass comb., Poor, HSG D
17,737	80		>75% Grass cover, Good, HSG D
150,383	64	61	Weighted Average, UI Adjusted
132,031	59	59	87.80% Pervious Area
18,352	98	98	12.20% Impervious Area
18,352			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	62	0.0730	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.0					**Direct Entry, rock crossing**
0.9	234	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
17.5	296	Total			

Subcatchment 2: Subcat 2



Summary for Subcatchment 3: Subcat 3

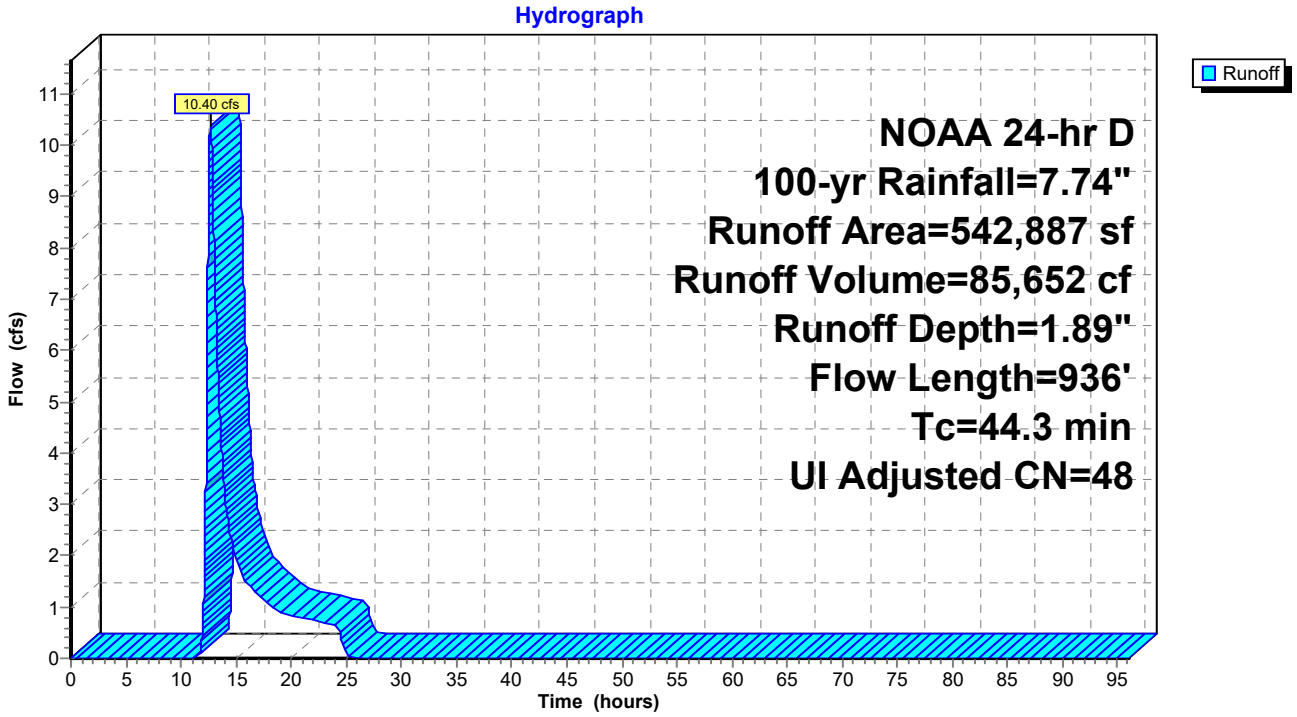
Runoff = 10.40 cfs @ 12.66 hrs, Volume= 85,652 cf, Depth= 1.89"
Routed to Pond 21P : Water Quality Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
185,176	39		>75% Grass cover, Good, HSG A
238,754	39		>75% Grass cover, Good, HSG A
15,049	96		Gravel surface, HSG A
13,325	98		Unconnected pavement, HSG D
55,139	80		>75% Grass cover, Good, HSG D
9,578	77		Woods, Good, HSG D
25,866	86		Woods/grass comb., Poor, HSG D
542,887	49	48	Weighted Average, UI Adjusted
529,562	48	48	97.55% Pervious Area
13,325	98	98	2.45% Impervious Area
13,325			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					**Direct Entry,**
28.7	100	0.0350	0.06		**Sheet Flow, sheet**
					Woods: Dense underbrush n= 0.800 P2= 3.46"
2.1	246	0.0813	2.00		**Shallow Concentrated Flow, scf**
					Short Grass Pasture Kv= 7.0 fps
11.5	590	0.0150	0.86		**Shallow Concentrated Flow, scf grass**
					Short Grass Pasture Kv= 7.0 fps
44.3	936	Total			

Subcatchment 3: Subcat 3



Summary for Subcatchment 4: Subcat 4

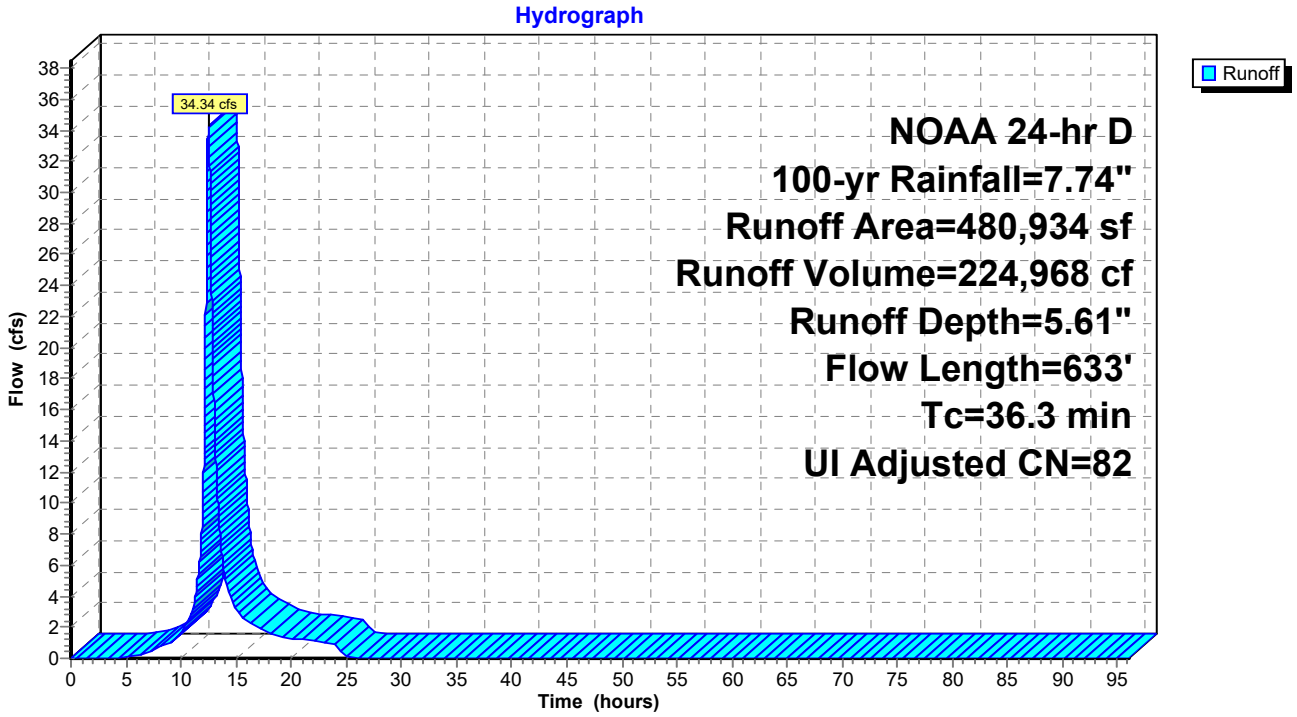
Runoff = 34.34 cfs @ 12.47 hrs, Volume= 224,968 cf, Depth= 5.61"
Routed to Pond 12P : Water Quality Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
414	96		Gravel surface, HSG A
9,603	39		>75% Grass cover, Good, HSG A
0	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
2	77		Woods, Good, HSG D
5,250	77		Woods, Good, HSG D
0	77		Woods, Good, HSG D
23,224	77		Woods, Good, HSG D
249,238	80		>75% Grass cover, Good, HSG D
65,690	98		Unconnected pavement, HSG D
127,513	86		Woods/grass comb., Poor, HSG D
480,934	83	82	Weighted Average, UI Adjusted
415,244	81	81	86.34% Pervious Area
65,690	98	98	13.66% Impervious Area
65,690			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.6	100	0.0300	0.05		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	50	0.1988	1.11		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
3.0	483	0.1500	2.71		**Shallow Concentrated Flow, scf grass** Short Grass Pasture Kv= 7.0 fps
36.3	633	Total			

Subcatchment 4: Subcat 4



Summary for Subcatchment 5: Subcat 5

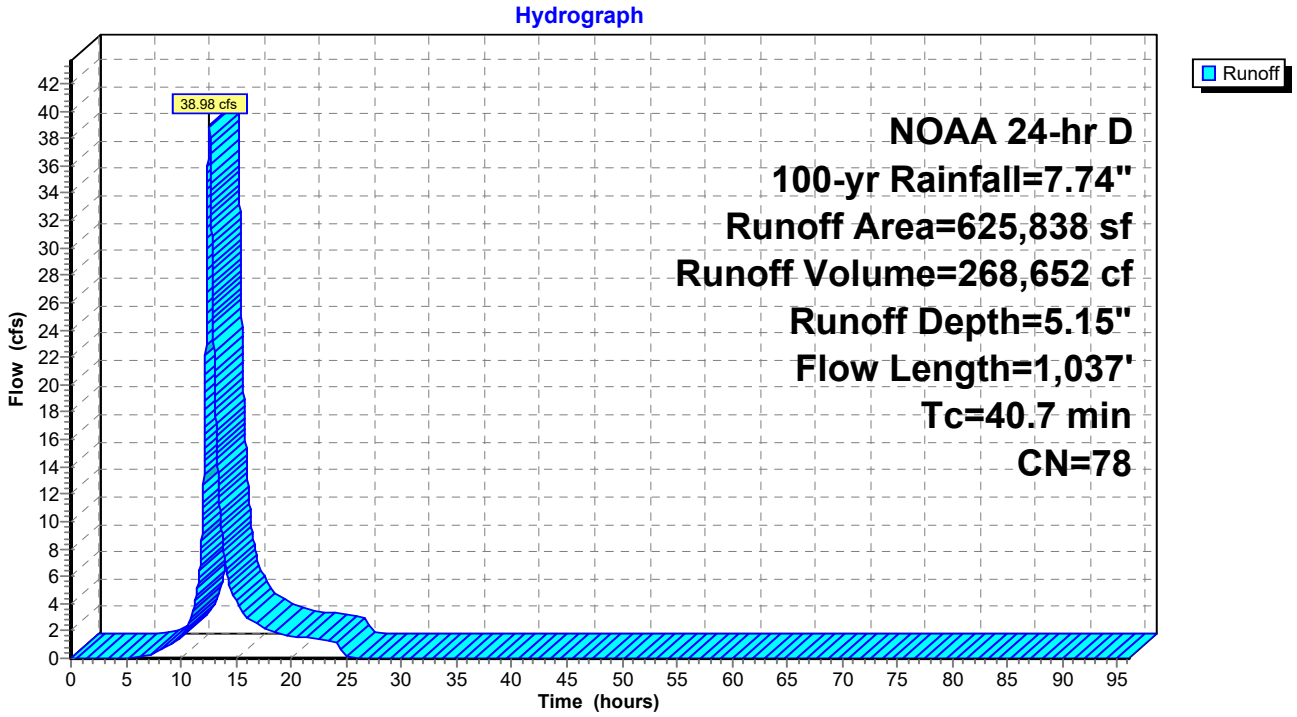
Runoff = 38.98 cfs @ 12.53 hrs, Volume= 268,652 cf, Depth= 5.15"
Routed to Link 3L : South Off-Site (POC 3)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
0	98	Unconnected pavement, HSG D
14,987	73	Brush, Good, HSG D
1,504	91	Gravel roads, HSG D
39,327	91	Gravel roads, HSG D
18,528	91	Gravel roads, HSG D
2,922	89	Dirt roads, HSG D
2,214	73	Brush, Good, HSG D
7,635	77	Woods, Good, HSG D
137,134	77	Woods, Good, HSG D
10,652	77	Woods, Good, HSG D
291,847	77	Woods, Good, HSG D
34,529	77	Woods, Good, HSG D
23,786	77	Woods, Good, HSG D
1,988	73	Brush, Good, HSG D
357	91	Gravel roads, HSG D
38,427	73	Brush, Good, HSG D
625,838	78	Weighted Average
625,838	78	100.00% Pervious Area
0	98	0.00% Impervious Area
0		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.0	100	0.0450	0.06		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
6.1	225	0.0600	0.61		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
0.7	112	0.1560	2.76		**Shallow Concentrated Flow, scfbrush** Short Grass Pasture Kv= 7.0 fps
0.5	140	0.0820	4.61		**Shallow Concentrated Flow, scf unpaved** Unpaved Kv= 16.1 fps
7.4	460	0.1740	1.04		**Shallow Concentrated Flow, scf woods** Forest w/Heavy Litter Kv= 2.5 fps
40.7	1,037	Total			

Subcatchment 5: Subcat 5



Summary for Subcatchment 6: Subcat 6

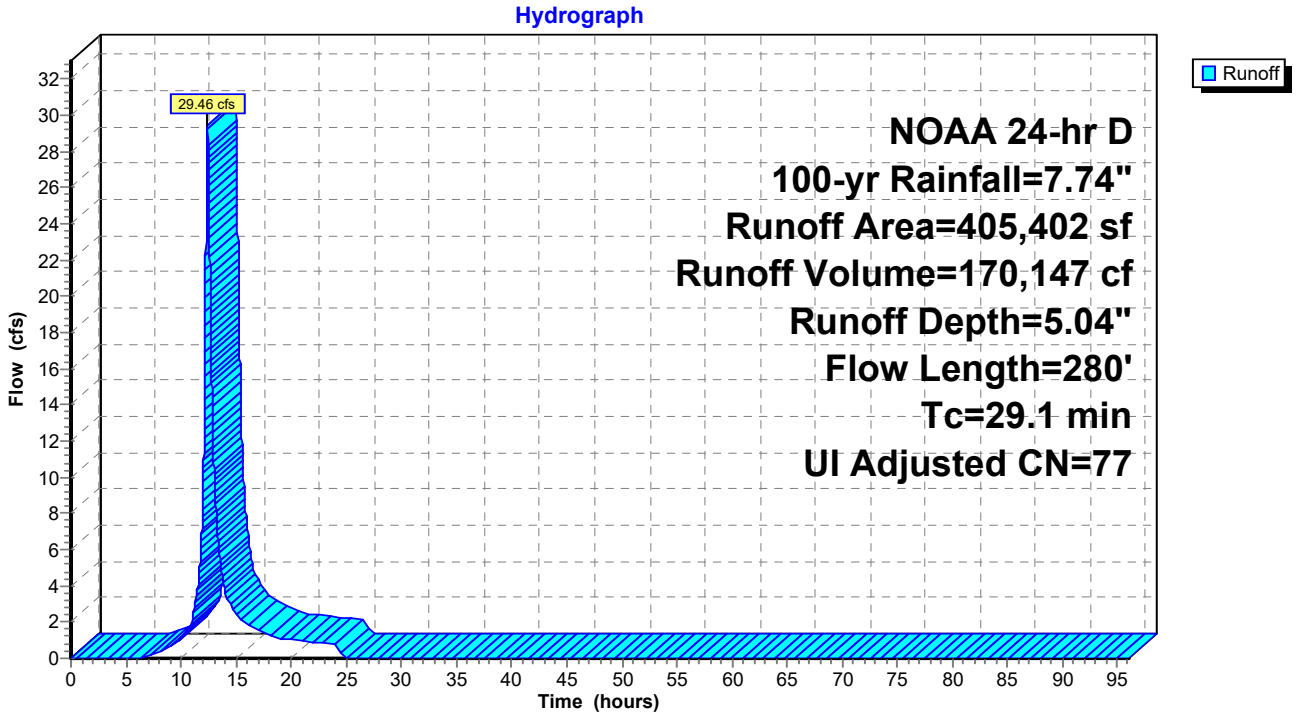
Runoff = 29.46 cfs @ 12.39 hrs, Volume= 170,147 cf, Depth= 5.04"
Routed to Pond 20P : Water Quality Basin #3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
1,758	73		Brush, Good, HSG D
66,656	98		Unconnected pavement, HSG D
1,257	77		Woods, Good, HSG D
34,488	77		Woods, Good, HSG D
49,599	39		>75% Grass cover, Good, HSG A
43,447	77		Woods, Good, HSG D
129,391	86		Woods/grass comb., Poor, HSG D
28	73		Brush, Good, HSG D
78,778	80		>75% Grass cover, Good, HSG D
405,402	79	77	Weighted Average, UI Adjusted
338,746	76	76	83.56% Pervious Area
66,656	98	98	16.44% Impervious Area
66,656			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0500	0.07		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
2.2	180	0.3000	1.37		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
2.0					**Direct Entry, rock crossing**
29.1	280	Total			

Subcatchment 6: Subcat 6



Summary for Subcatchment 7: Subcat 7

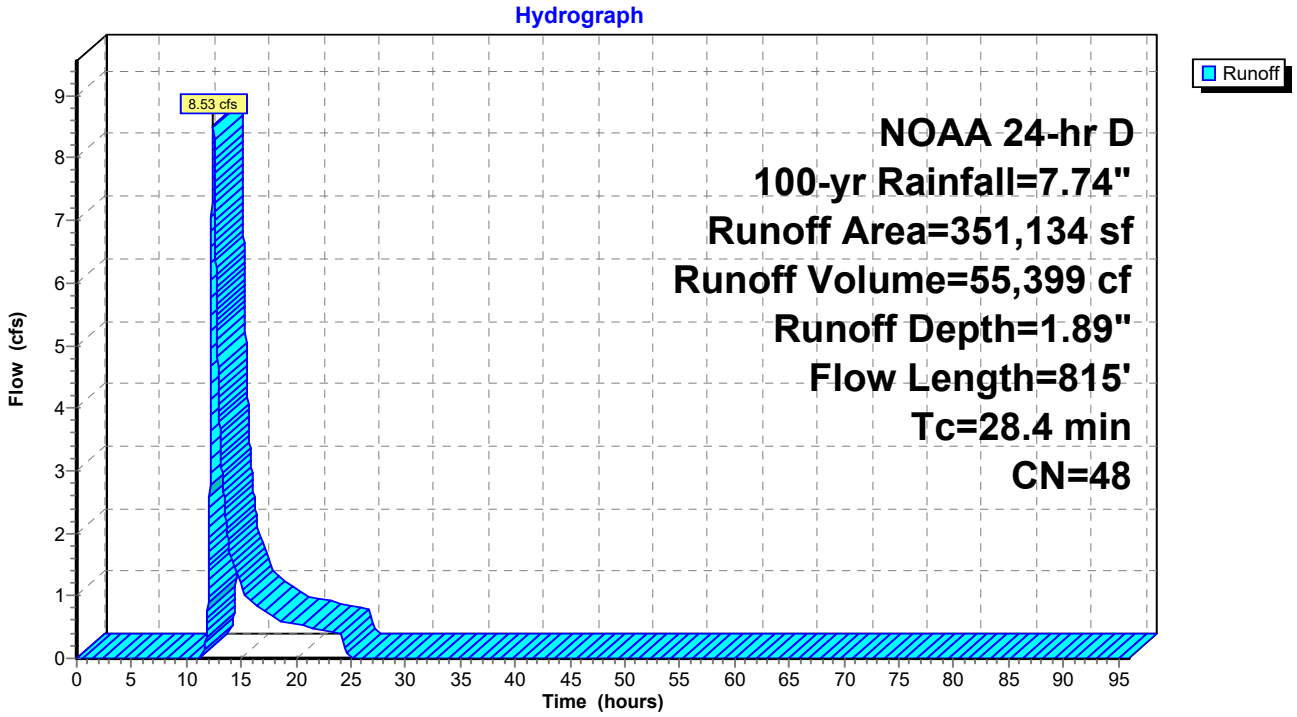
Runoff = 8.53 cfs @ 12.44 hrs, Volume= 55,399 cf, Depth= 1.89"
Routed to Link 5L : West Off-Site (POC 2)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
8,651	91	Gravel roads, HSG D
11,645	73	Brush, Good, HSG D
8,819	73	Brush, Good, HSG D
23	77	Woods, Good, HSG D
338	77	Woods, Good, HSG D
7	77	Woods, Good, HSG D
9,853	76	Gravel roads, HSG A
17,832	30	Brush, Good, HSG A
195,049	30	Woods, Good, HSG A
1,207	30	Woods, Good, HSG A
7,262	77	Woods, Good, HSG D
47,566	77	Woods, Good, HSG D
39,066	73	Brush, Good, HSG D
1	91	Gravel roads, HSG D
3,817	91	Gravel roads, HSG D
351,134	48	Weighted Average
351,134	48	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.1000	0.09		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
9.5	715	0.2500	1.25		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
28.4	815	Total			

Subcatchment 7: Subcat 7



Summary for Subcatchment 8: Subcat 8

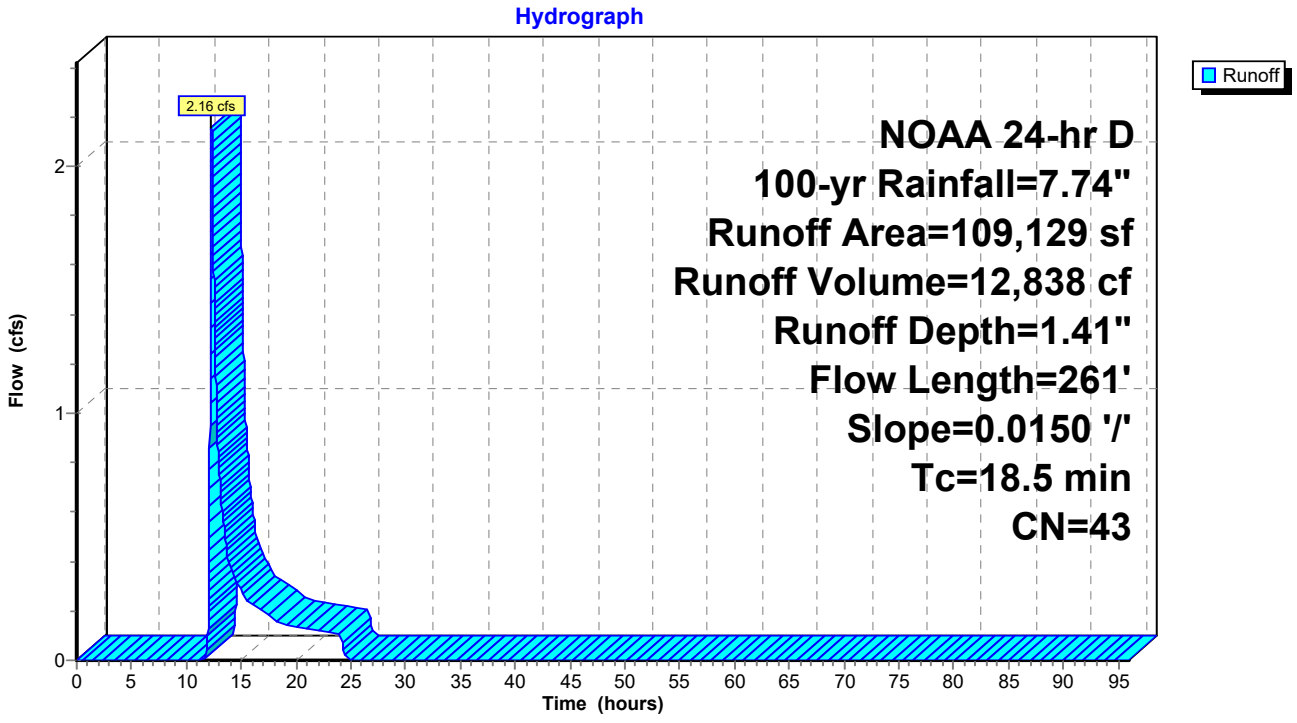
Runoff = 2.16 cfs @ 12.31 hrs, Volume= 12,838 cf, Depth= 1.41"
Routed to Pond 18P : Water Quality Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
8,265	96	Gravel surface, HSG A
10,542	39	>75% Grass cover, Good, HSG A
90,322	39	>75% Grass cover, Good, HSG A
109,129	43	Weighted Average
109,129	43	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
3.1	161	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
18.5	261	Total			

Subcatchment 8: Subcat 8



Summary for Subcatchment 9: Subcat 9

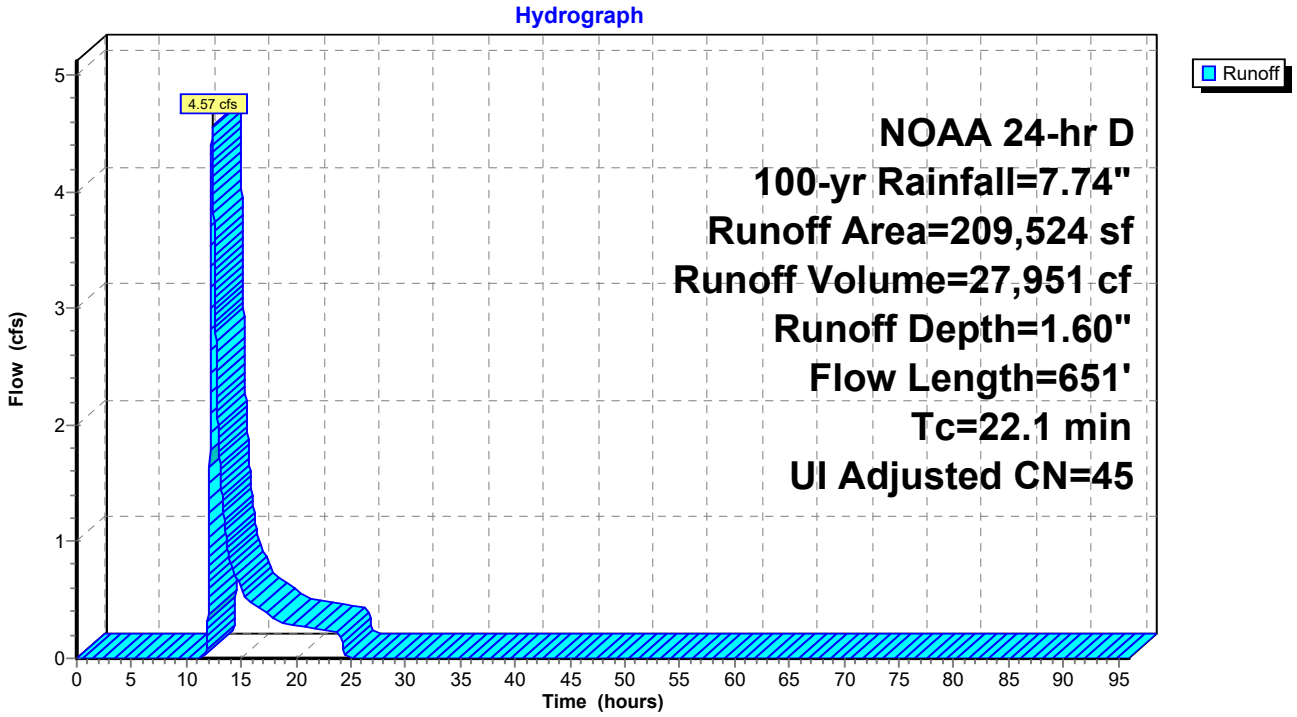
Runoff = 4.57 cfs @ 12.36 hrs, Volume= 27,951 cf, Depth= 1.60"
Routed to Pond 13P : Water Quality Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Adj	Description
5,751	98		Unconnected pavement, HSG A
10,904	96		Gravel surface, HSG A
181,704	39		>75% Grass cover, Good, HSG A
11,165	86		Woods/grass comb., Poor, HSG D
209,524	46	45	Weighted Average, UI Adjusted
203,773	45	45	97.26% Pervious Area
5,751	98	98	2.74% Impervious Area
5,751			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
5.7	291	0.0150	0.86		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
1.0	260	0.0100	4.26	17.02	**Channel Flow, swale** Area= 4.0 sf Perim= 8.0' r= 0.50' n= 0.022 Earth, clean & straight
22.1	651	Total			

Subcatchment 9: Subcat 9



Summary for Subcatchment 10: Subcat 10

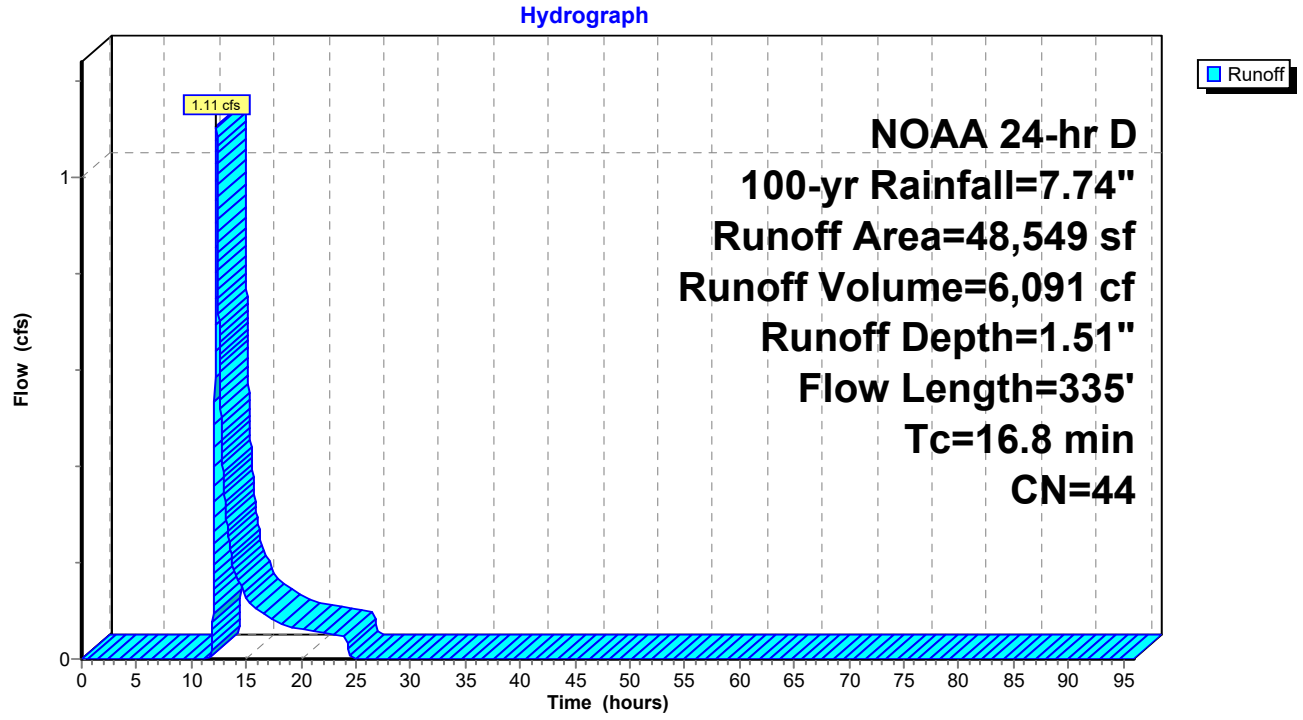
Runoff = 1.11 cfs @ 12.29 hrs, Volume= 6,091 cf, Depth= 1.51"
Routed to Link 4L : West Wetlands (POC 1)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
15,200	39	>75% Grass cover, Good, HSG A
29,317	39	>75% Grass cover, Good, HSG A
4,025	96	Gravel surface, HSG A
5	30	Woods, Good, HSG A
1	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
0	30	Woods, Good, HSG A
48,549	44	Weighted Average
48,549	44	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0150	0.11		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.46"
1.4	235	0.1500	2.71		**Shallow Concentrated Flow, scf** Short Grass Pasture Kv= 7.0 fps
16.8	335	Total			

Subcatchment 10: Subcat 10



Summary for Subcatchment 11: Subcat 11

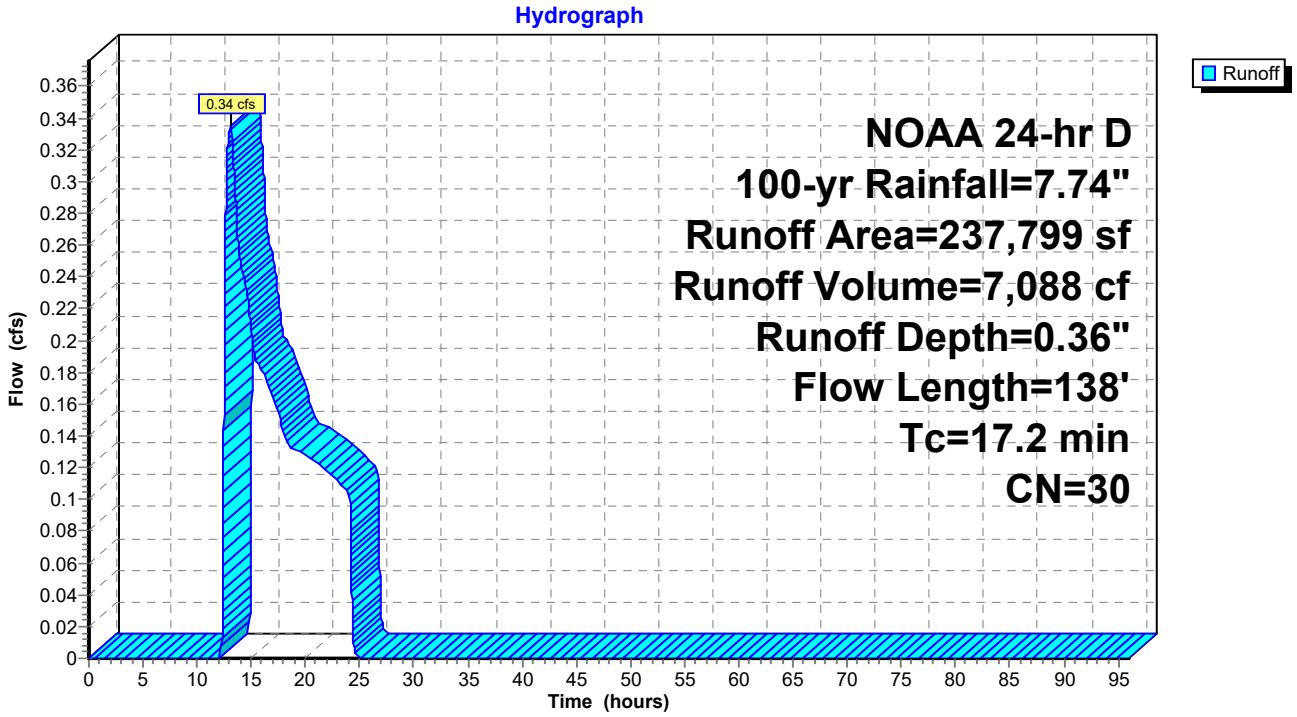
Runoff = 0.34 cfs @ 13.05 hrs, Volume= 7,088 cf, Depth= 0.36"
Routed to Link 2L : Northeast Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NOAA 24-hr D 100-yr Rainfall=7.74"

Area (sf)	CN	Description
3,394	48	Brush, Good, HSG B
72	39	>75% Grass cover, Good, HSG A
3	96	Gravel surface, HSG A
29	39	>75% Grass cover, Good, HSG A
24	39	>75% Grass cover, Good, HSG A
48,779	30	Brush, Good, HSG A
185,489	30	Woods, Good, HSG A
8	30	Woods, Good, HSG A
237,799	30	Weighted Average
237,799	30	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.1400	0.10		**Sheet Flow, sheet** Woods: Dense underbrush n= 0.800 P2= 3.46"
0.7	38	0.1369	0.93		**Shallow Concentrated Flow, scf** Forest w/Heavy Litter Kv= 2.5 fps
17.2	138	Total			

Subcatchment 11: Subcat 11



Summary for Pond 12P: Water Quality Basin #4

Inflow Area = 480,934 sf, 13.66% Impervious, Inflow Depth = 5.61" for 100-yr event
Inflow = 34.34 cfs @ 12.47 hrs, Volume= 224,968 cf
Outflow = 18.48 cfs @ 12.92 hrs, Volume= 224,968 cf, Atten= 46%, Lag= 27.1 min
Discarded = 0.80 cfs @ 12.92 hrs, Volume= 80,493 cf
Primary = 17.68 cfs @ 12.92 hrs, Volume= 144,475 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 27.23' @ 12.92 hrs Surf.Area= 21,303 sf Storage= 98,492 cf

Plug-Flow detention time= 534.6 min calculated for 224,945 cf (100% of inflow)
Center-of-Mass det. time= 534.8 min (1,368.7 - 833.9)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	115,489 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

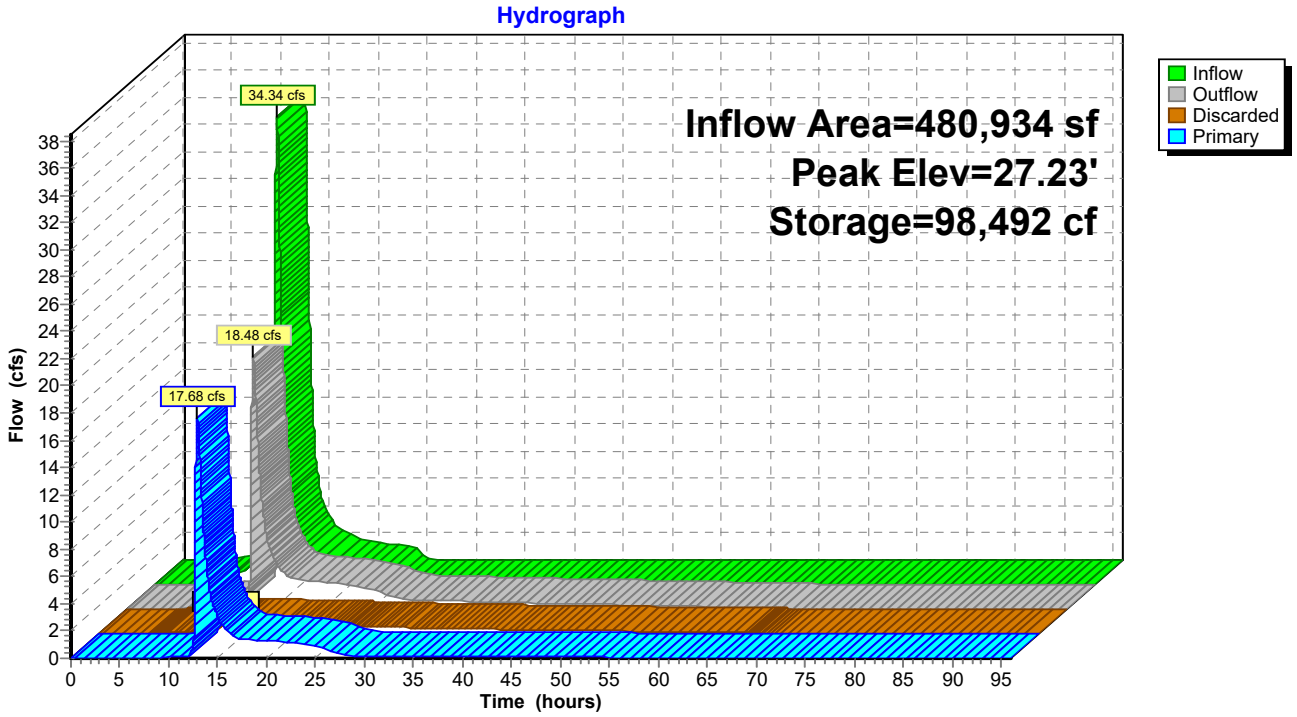
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	10,788	488.0	0	0	10,788
22.00	12,288	512.0	11,530	11,530	12,762
23.00	13,860	536.0	13,066	24,596	14,831
24.00	15,504	560.0	14,674	39,270	16,995
25.00	17,220	584.0	16,354	55,625	19,253
26.00	19,008	608.0	18,107	73,731	21,607
27.00	20,868	632.0	19,931	93,662	24,055
28.00	22,800	656.0	21,827	115,489	26,598

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**30.0" Round Culvert** L= 184.0' Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.10' S= 0.0103 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	26.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	21.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 19.00'
#4	Device 1	21.30'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	24.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.80 cfs @ 12.92 hrs HW=27.23' (Free Discharge)
└**3=Exfiltration** (Controls 0.80 cfs)

Primary OutFlow Max=17.66 cfs @ 12.92 hrs HW=27.23' (Free Discharge)
└**1=Culvert** (Passes 17.66 cfs of 52.74 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 15.98 cfs @ 2.74 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.64 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.43 cfs @ 7.27 fps)

Pond 12P: Water Quality Basin #4



Summary for Pond 13P: Water Quality Basin #1

Inflow Area = 209,524 sf, 2.74% Impervious, Inflow Depth = 1.60" for 100-yr event
Inflow = 4.57 cfs @ 12.36 hrs, Volume= 27,951 cf
Outflow = 0.75 cfs @ 14.28 hrs, Volume= 27,951 cf, Atten= 84%, Lag= 115.5 min
Discarded = 0.13 cfs @ 14.28 hrs, Volume= 10,822 cf
Primary = 0.63 cfs @ 14.28 hrs, Volume= 17,129 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 15.09' @ 14.28 hrs Surf.Area= 10,853 sf Storage= 10,927 cf

Plug-Flow detention time= 294.6 min calculated for 27,951 cf (100% of inflow)
Center-of-Mass det. time= 294.5 min (1,214.4 - 919.9)

Volume	Invert	Avail.Storage	Storage Description
#1	14.00'	66,060 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

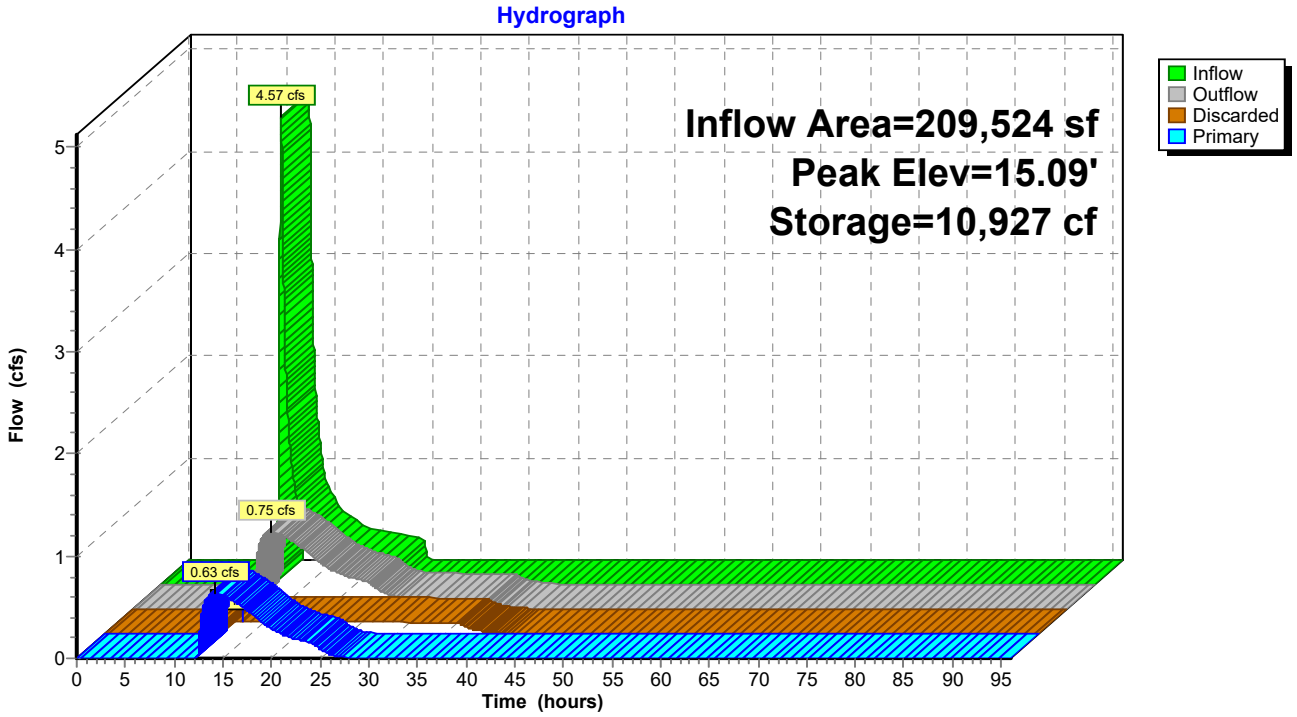
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
14.00	9,180	498.0	0	0	9,180
15.00	10,710	522.0	9,935	9,935	11,194
16.00	12,312	546.0	11,502	21,437	13,302
17.00	13,986	570.0	13,140	34,577	15,505
18.00	15,732	594.0	14,850	49,427	17,803
19.00	17,550	618.0	16,633	66,060	20,196

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**30.0" Round Culvert** L= 107.0' Ke= 0.500 Inlet / Outlet Invert= 14.00' / 12.50' S= 0.0140 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf
#2	Device 1	18.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	14.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	14.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.13 cfs @ 14.28 hrs HW=15.09' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.63 cfs @ 14.28 hrs HW=15.09' (Free Discharge)
└**1=Culvert** (Passes 0.63 cfs of 7.33 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.63 cfs @ 3.20 fps)

Pond 13P: Water Quality Basin #1



Summary for Pond 18P: Water Quality Basin #5

Inflow Area = 109,129 sf, 0.00% Impervious, Inflow Depth = 1.41" for 100-yr event
Inflow = 2.16 cfs @ 12.31 hrs, Volume= 12,838 cf
Outflow = 0.80 cfs @ 12.95 hrs, Volume= 12,838 cf, Atten= 63%, Lag= 38.3 min
Discarded = 0.03 cfs @ 12.95 hrs, Volume= 2,047 cf
Primary = 0.76 cfs @ 12.95 hrs, Volume= 10,791 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 21.30' @ 12.95 hrs Surf.Area= 2,608 sf Storage= 2,809 cf

Plug-Flow detention time= 106.5 min calculated for 12,836 cf (100% of inflow)
Center-of-Mass det. time= 106.6 min (1,031.6 - 925.0)

Volume	Invert	Avail.Storage	Storage Description
#1	20.00'	18,040 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

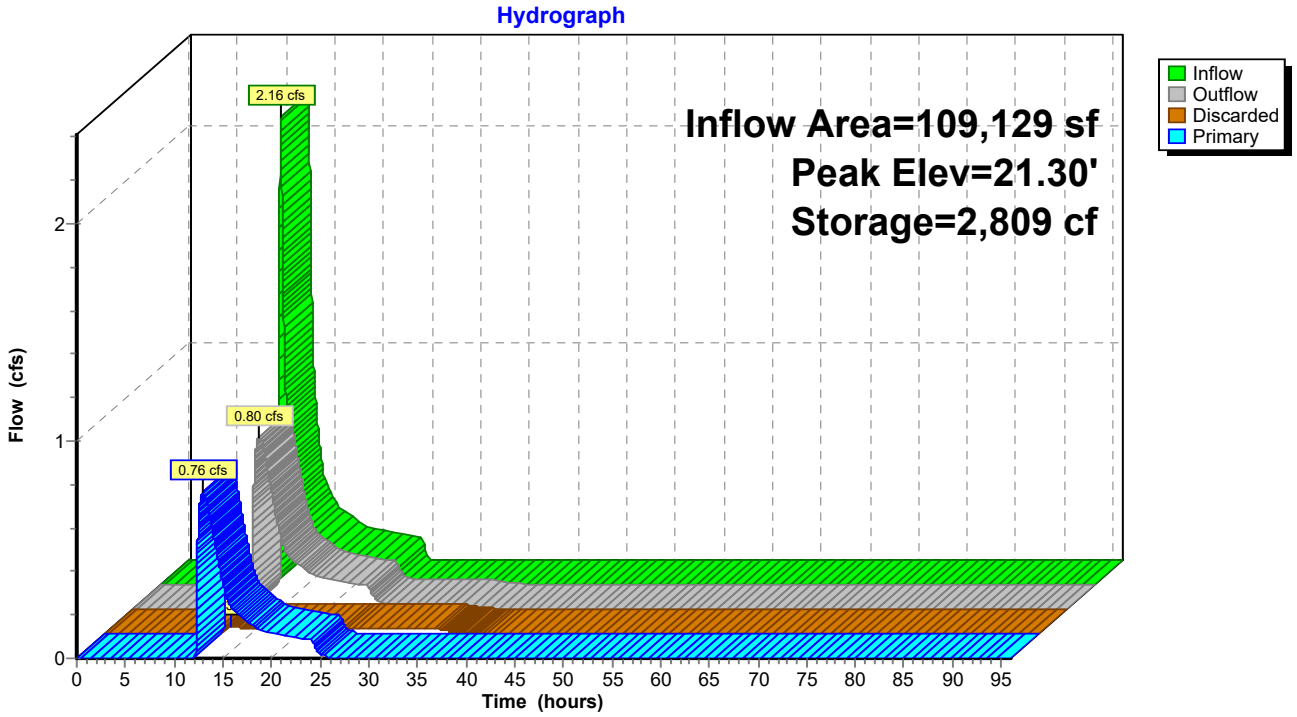
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
20.00	1,720	212.0	0	0	1,720
21.00	2,392	236.0	2,047	2,047	2,604
22.00	3,136	260.0	2,756	4,802	3,584
23.00	3,952	284.0	3,536	8,339	4,658
24.00	4,840	308.0	4,389	12,727	5,826
25.00	5,800	332.0	5,313	18,040	7,090

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	**18.0" Round Culvert** L= 25.0' Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.50' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	24.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	20.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	20.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.95 hrs HW=21.30' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.77 cfs @ 12.95 hrs HW=21.30' (Free Discharge)
└**1=Culvert** (Passes 0.77 cfs of 6.35 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.77 cfs @ 3.90 fps)

Pond 18P: Water Quality Basin #5



Summary for Pond 20P: Water Quality Basin #3.1

Inflow Area = 405,402 sf, 16.44% Impervious, Inflow Depth = 5.04" for 100-yr event
Inflow = 29.46 cfs @ 12.39 hrs, Volume= 170,147 cf
Outflow = 13.65 cfs @ 12.85 hrs, Volume= 170,147 cf, Atten= 54%, Lag= 27.1 min
Discarded = 0.61 cfs @ 12.85 hrs, Volume= 60,891 cf
Primary = 13.04 cfs @ 12.85 hrs, Volume= 109,256 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 22.62' @ 12.85 hrs Surf.Area= 16,846 sf Storage= 74,968 cf

Plug-Flow detention time= 574.7 min calculated for 170,129 cf (100% of inflow)
Center-of-Mass det. time= 575.0 min (1,415.3 - 840.3)

Volume	Invert	Avail.Storage	Storage Description
#1	16.00'	81,518 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

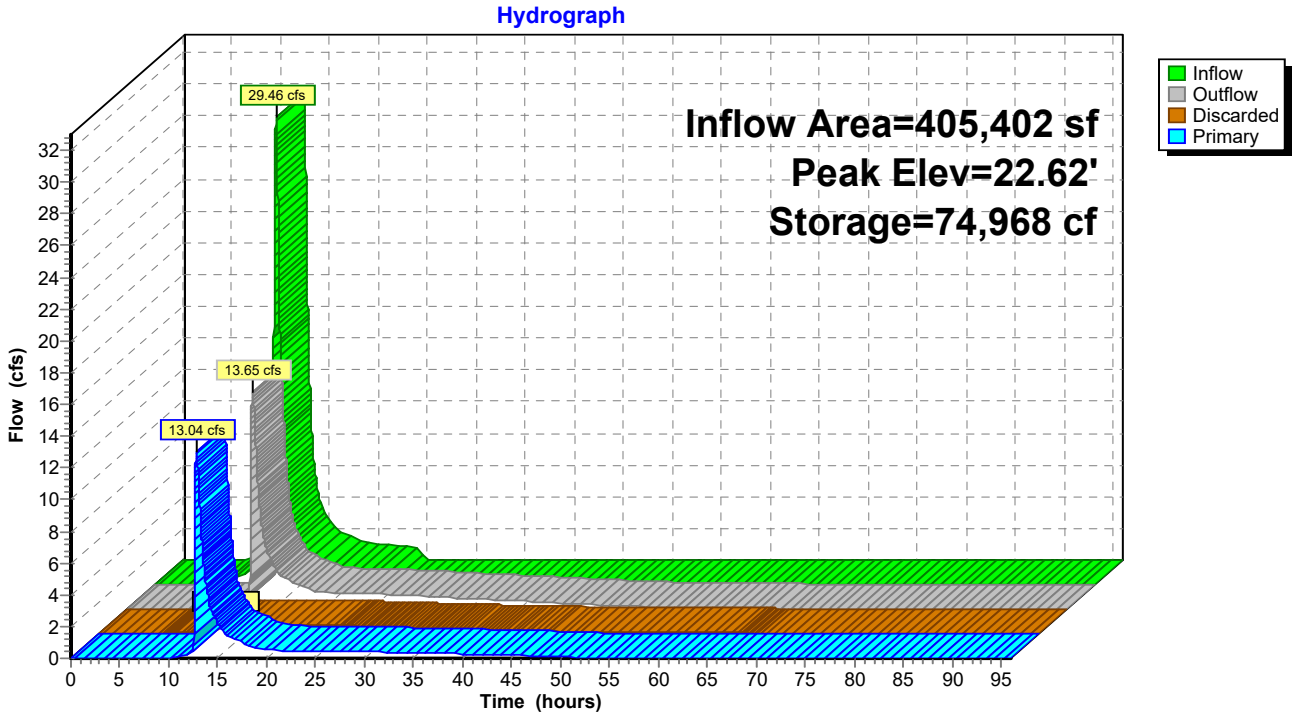
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
16.00	6,336	450.0	0	0	6,336
17.00	7,722	474.0	7,018	7,018	8,160
18.00	9,180	498.0	8,440	15,458	10,079
19.00	10,710	522.0	9,935	25,393	12,093
20.00	12,312	546.0	11,502	36,895	14,201
21.00	13,986	570.0	13,140	50,035	16,405
22.00	15,732	594.0	14,850	64,886	18,703
23.00	17,550	618.0	16,633	81,518	21,095

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**30.0" Round Culvert** L= 202.0' Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.80' S= 0.0109 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf
#2	Device 1	22.00'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	16.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 14.00'
#4	Device 1	16.50'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	17.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.61 cfs @ 12.85 hrs HW=22.62' (Free Discharge)
└**3=Exfiltration** (Controls 0.61 cfs)

Primary OutFlow Max=13.01 cfs @ 12.85 hrs HW=22.62' (Free Discharge)
└**1=Culvert** (Passes 13.01 cfs of 53.94 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 12.51 cfs @ 2.53 fps)
  ├**4=Orifice/Grate** (Orifice Controls 0.26 cfs @ 11.83 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.25 cfs @ 11.33 fps)

Pond 20P: Water Quality Basin #3.1



Summary for Pond 21P: Water Quality Basin #2

Inflow Area = 542,887 sf, 2.45% Impervious, Inflow Depth = 1.89" for 100-yr event
Inflow = 10.40 cfs @ 12.66 hrs, Volume= 85,652 cf
Outflow = 1.64 cfs @ 15.53 hrs, Volume= 85,652 cf, Atten= 84%, Lag= 172.2 min
Discarded = 0.18 cfs @ 15.53 hrs, Volume= 16,928 cf
Primary = 1.46 cfs @ 15.53 hrs, Volume= 68,724 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 25.02' @ 15.53 hrs Surf.Area= 15,621 sf Storage= 39,346 cf

Plug-Flow detention time= 354.2 min calculated for 85,652 cf (100% of inflow)
Center-of-Mass det. time= 354.1 min (1,283.4 - 929.3)

Volume	Invert	Avail.Storage	Storage Description
#1	22.00'	74,350 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

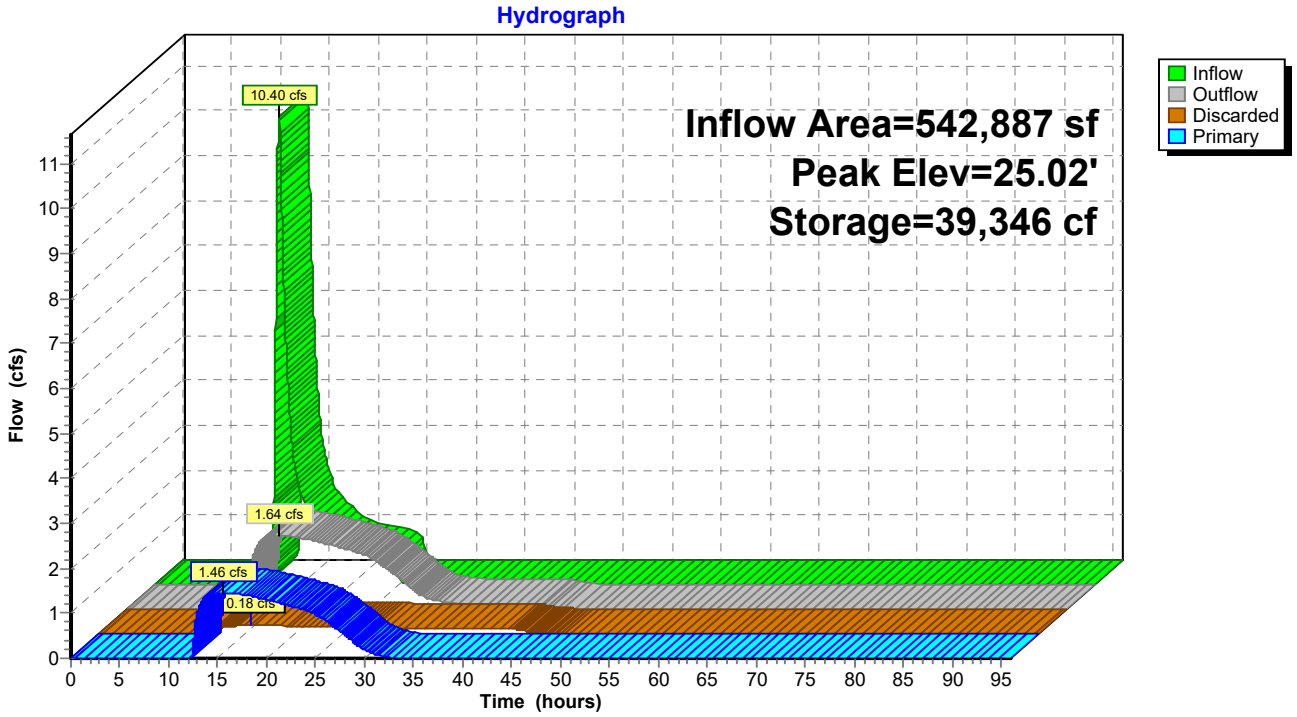
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
22.00	10,550	552.0	0	0	10,550
23.00	12,152	546.0	11,342	11,342	11,309
24.00	13,826	570.0	12,980	24,322	13,512
25.00	15,572	594.0	14,690	39,012	15,810
26.00	17,930	618.0	16,737	55,749	18,203
27.00	19,280	642.0	18,601	74,350	20,691

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**24.0" Round Culvert** L= 56.0' Ke= 0.500 Inlet / Outlet Invert= 22.00' / 21.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	26.80'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	22.00'	**0.500 in/hr Exfiltration over Surface area**
#4	Device 1	22.40'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.18 cfs @ 15.53 hrs HW=25.02' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=1.46 cfs @ 15.53 hrs HW=25.02' (Free Discharge)
└**1=Culvert** (Passes 1.46 cfs of 21.51 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 1.46 cfs @ 7.41 fps)

Pond 21P: Water Quality Basin #2



Summary for Pond 22P: Water Quality Basin #3.2

Inflow Area = 150,383 sf, 12.20% Impervious, Inflow Depth = 3.25" for 100-yr event
Inflow = 8.92 cfs @ 12.27 hrs, Volume= 40,700 cf
Outflow = 1.74 cfs @ 13.17 hrs, Volume= 40,700 cf, Atten= 81%, Lag= 54.0 min
Discarded = 0.17 cfs @ 13.17 hrs, Volume= 9,604 cf
Primary = 1.57 cfs @ 13.17 hrs, Volume= 31,096 cf
Routed to Link 4L : West Wetlands (POC 1)

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 38.40' @ 13.17 hrs Surf.Area= 5,766 sf Storage= 16,468 cf
Flood Elev= 39.00' Surf.Area= 6,400 sf Storage= 20,137 cf

Plug-Flow detention time= 249.4 min calculated for 40,696 cf (100% of inflow)
Center-of-Mass det. time= 249.6 min (1,117.5 - 867.8)

Volume	Invert	Avail.Storage	Storage Description
#1	34.00'	20,137 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

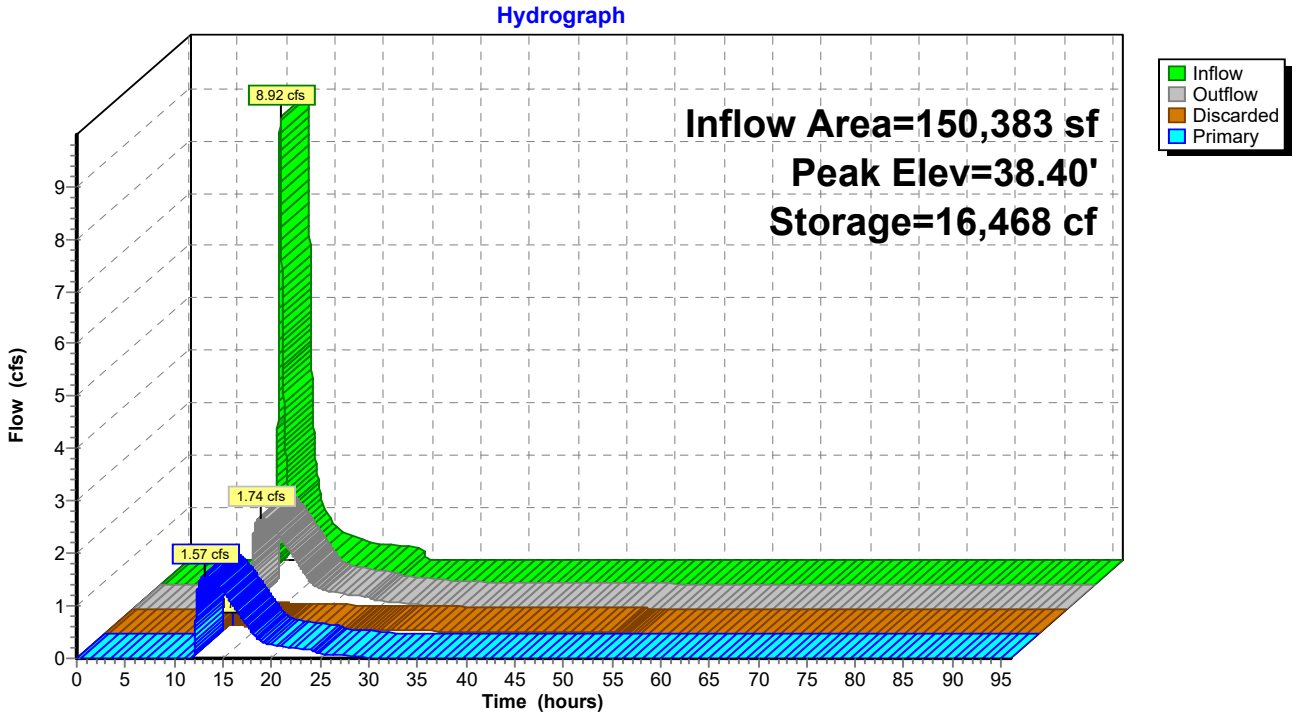
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
34.00	1,960	236.0	0	0	1,960
35.00	2,704	260.0	2,322	2,322	2,939
36.00	3,520	284.0	3,103	5,425	4,013
37.00	4,408	308.0	3,956	9,381	5,182
38.00	5,368	332.0	4,880	14,261	6,445
39.00	6,400	356.0	5,876	20,137	7,804

Device	Routing	Invert	Outlet Devices
#1	Primary	34.00'	**24.0" Round Culvert** L= 838.0' Ke= 0.500 Inlet / Outlet Invert= 34.00' / 22.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	38.50'	**48.0" W x 36.0" H Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Discarded	34.00'	**0.500 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 32.00'
#4	Device 1	35.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	36.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 13.17 hrs HW=38.40' (Free Discharge)
└**3=Exfiltration** (Controls 0.17 cfs)

Primary OutFlow Max=1.57 cfs @ 13.17 hrs HW=38.40' (Free Discharge)
└**1=Culvert** (Passes 1.57 cfs of 27.68 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**4=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.43 fps)
  └**5=Orifice/Grate** (Orifice Controls 1.39 cfs @ 7.05 fps)

Pond 22P: Water Quality Basin #3.2

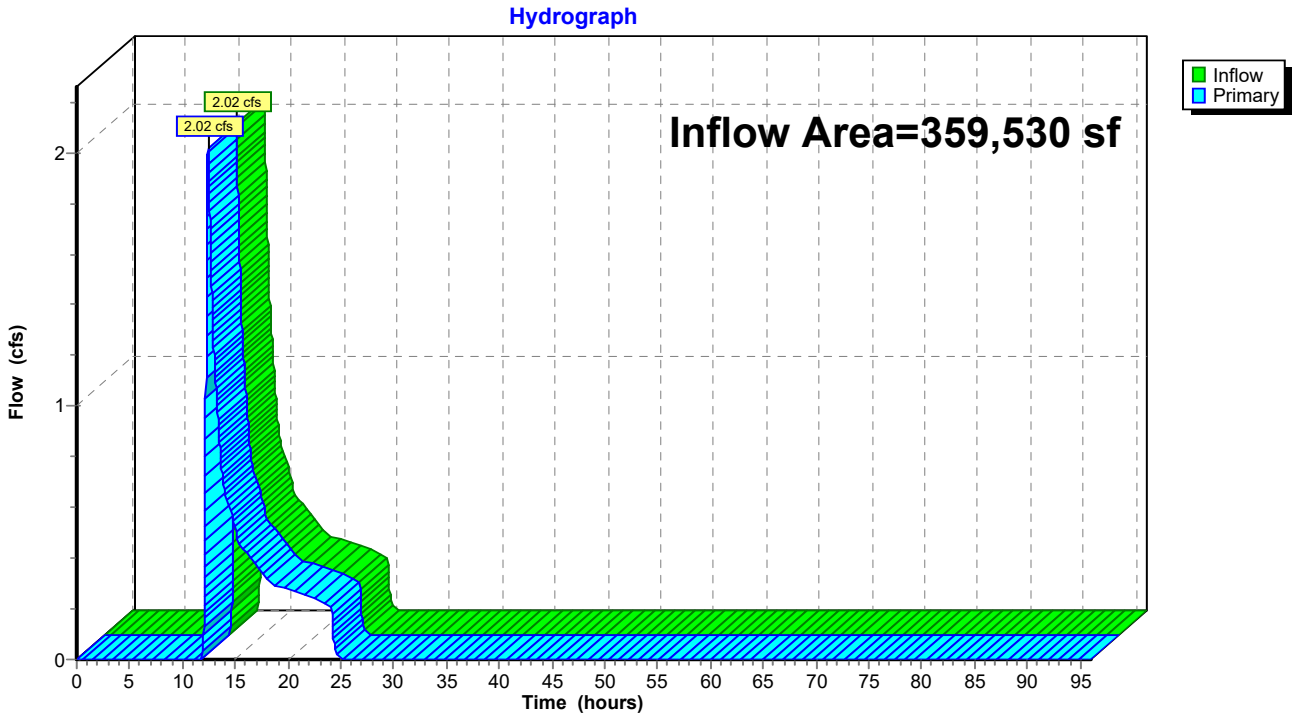


Summary for Link 2L: Northeast Wetland

Inflow Area = 359,530 sf, 0.00% Impervious, Inflow Depth = 0.68" for 100-yr event
Inflow = 2.02 cfs @ 12.42 hrs, Volume= 20,469 cf
Primary = 2.02 cfs @ 12.42 hrs, Volume= 20,469 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : West Wetlands (POC 1)

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 2L: Northeast Wetland

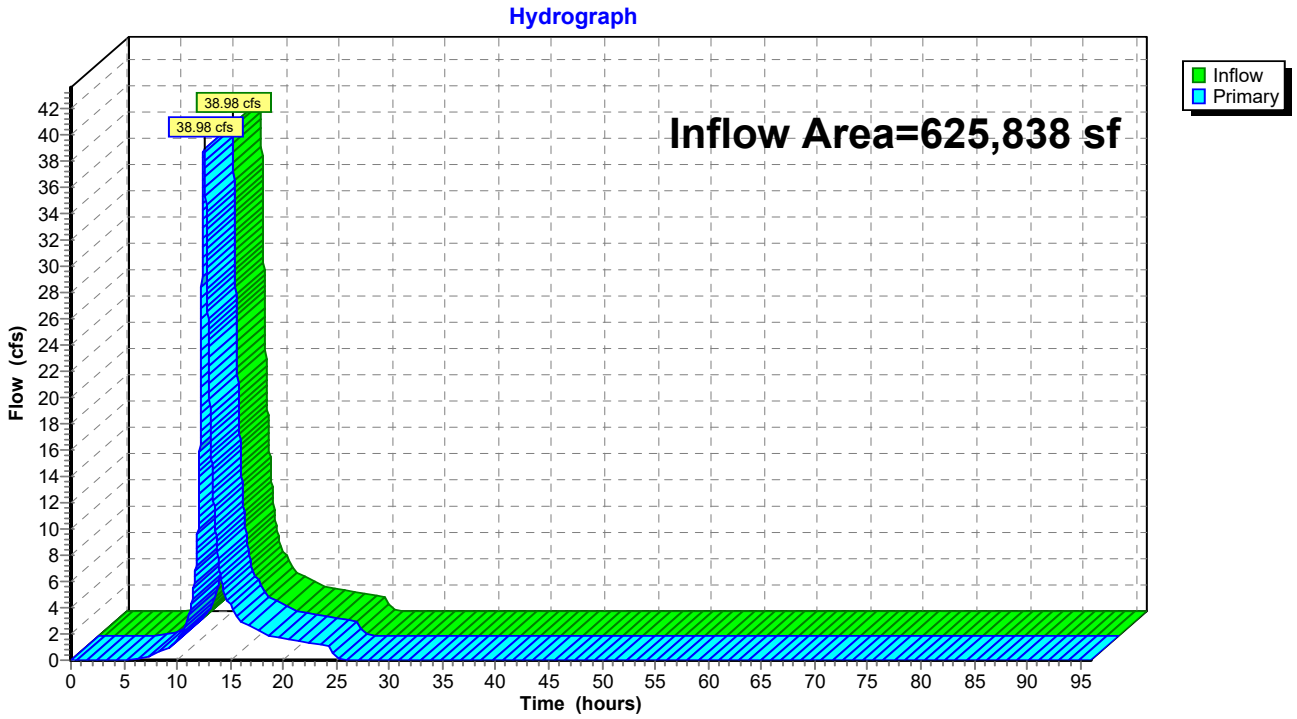


Summary for Link 3L: South Off-Site (POC 3)

Inflow Area = 625,838 sf, 0.00% Impervious, Inflow Depth = 5.15" for 100-yr event
Inflow = 38.98 cfs @ 12.53 hrs, Volume= 268,652 cf
Primary = 38.98 cfs @ 12.53 hrs, Volume= 268,652 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3L: South Off-Site (POC 3)

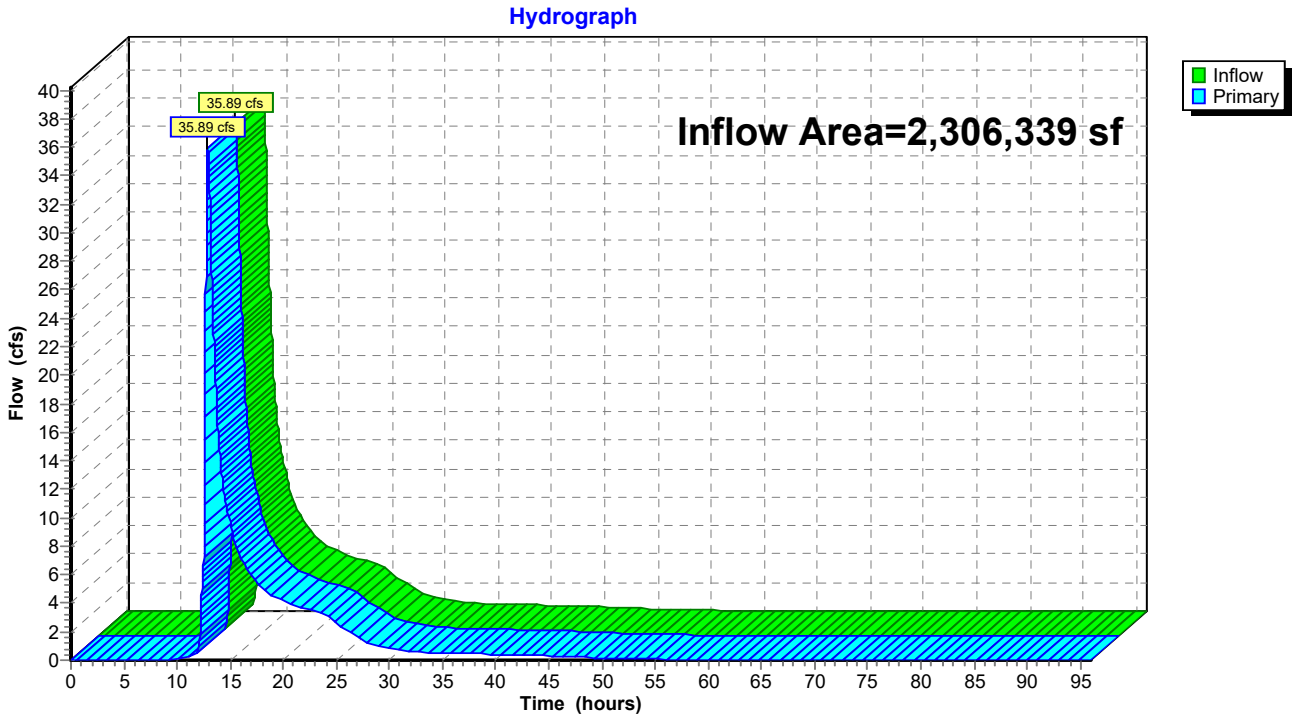


Summary for Link 4L: West Wetlands (POC 1)

Inflow Area = 2,306,339 sf, 7.36% Impervious, Inflow Depth = 2.12" for 100-yr event
Inflow = 35.89 cfs @ 12.89 hrs, Volume= 408,031 cf
Primary = 35.89 cfs @ 12.89 hrs, Volume= 408,031 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 4L: West Wetlands (POC 1)

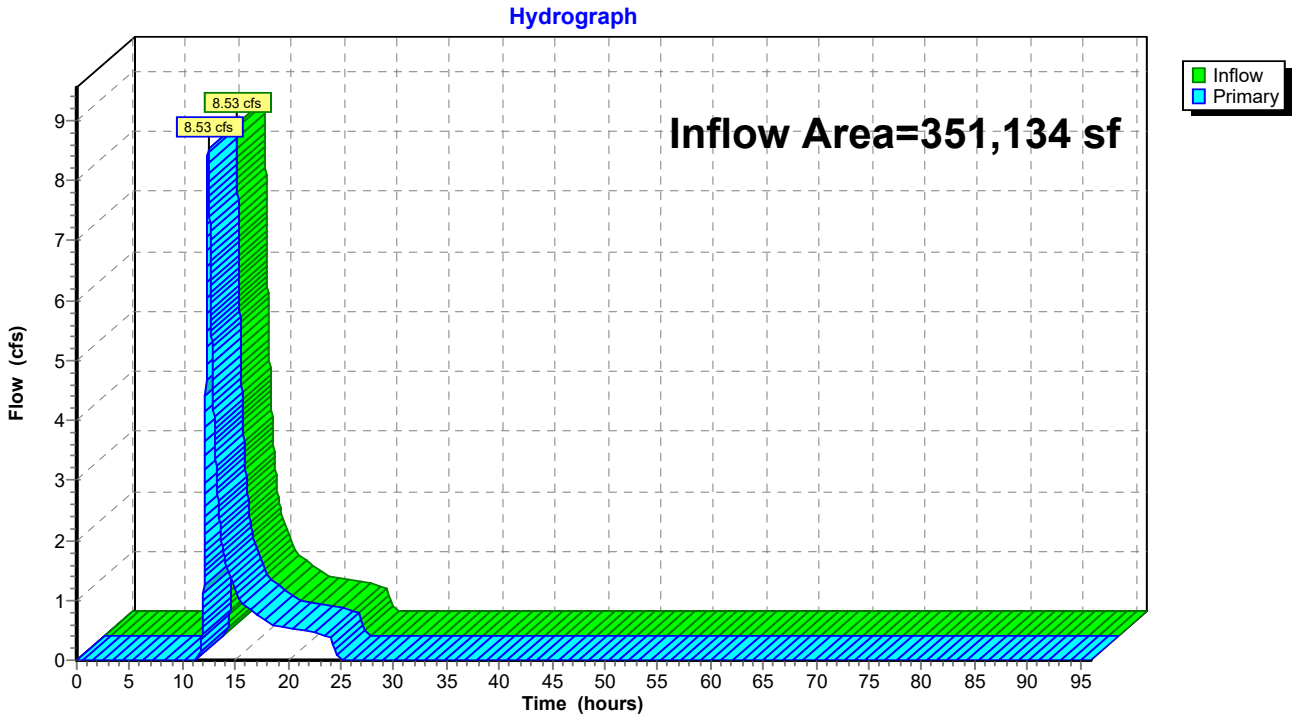


Summary for Link 5L: West Off-Site (POC 2)

Inflow Area = 351,134 sf, 0.00% Impervious, Inflow Depth = 1.89" for 100-yr event
Inflow = 8.53 cfs @ 12.44 hrs, Volume= 55,399 cf
Primary = 8.53 cfs @ 12.44 hrs, Volume= 55,399 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 5L: West Off-Site (POC 2)



APPENDIX E

Water Quality Volume and Water Quality Flow Calculations

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Project:	Cashman Industrial Site Preparation		
Calculated By:	Alex Healy	**Date:**	**09/20/24**
Checked By:	George Andrews	**Date:**	**09/20/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	Developed Site (DA-2, DA-3, DA-4, DA-6, DA-8, DA-9, DA-10)
Condition:	Post-Construction

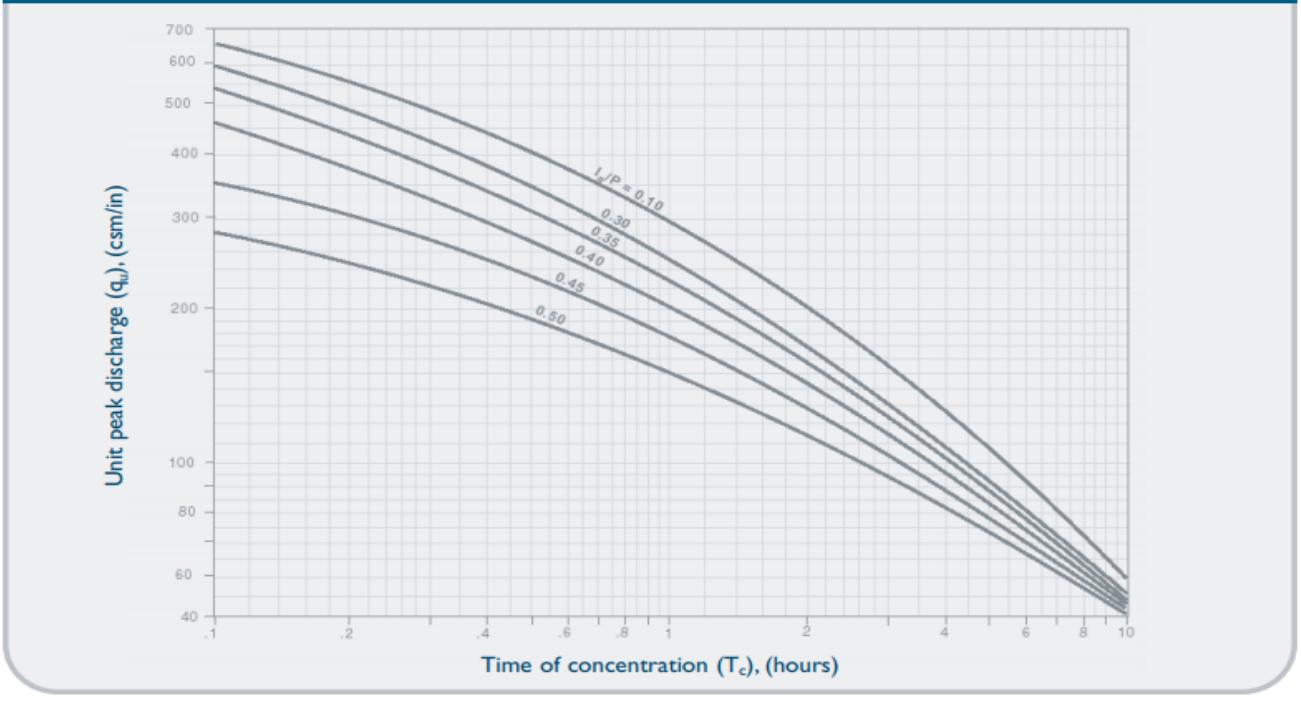
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	0%	
Volumetric Runoff Coefficient, R:	*0.050*	
Area, A:	44.69	acres
Water Quality Volume, WQV:	***10,545***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.065*	*in*	
Runoff Curve Number, CN:	*72*		
Time of Concentration, Tc: (>=10 min)	10.0	*min*	
Time of Concentration, Tc:	0.167	*hr*	
Initial Abstraction, I_a:	*0.778*	*in*	
I_a/P:	*0.598461538*		
Unit Peak Discharge, q_u:	400	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.06983*	mi^2	
Water Quality Flow, WQF:	***1.82***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



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Project:	Cashman Industrial Site Preparation		
Calculated By:	Alex Healy	**Date:**	**09/20/24**
Checked By:	George Andrews	**Date:**	**09/20/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	DA 2
Condition:	Post-Construction

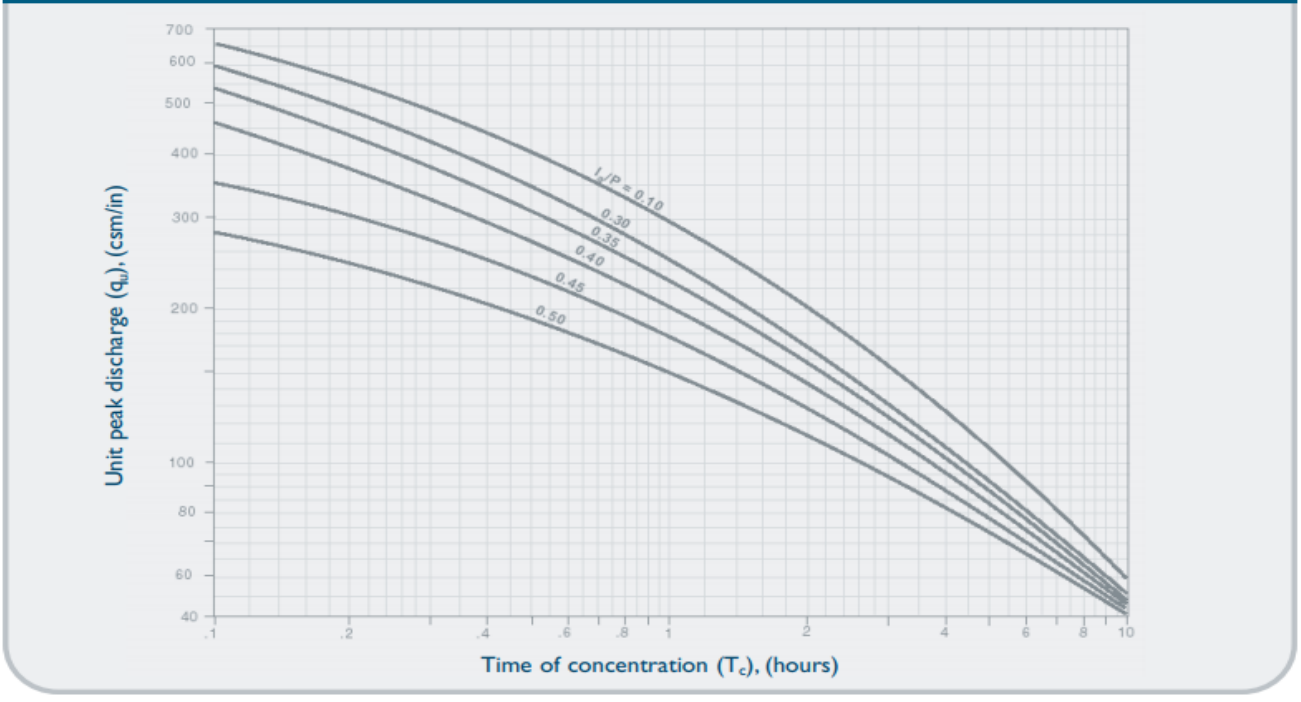
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	0%	
Volumetric Runoff Coefficient, R:	*0.050*	
Area, A:	3.45	acres
Water Quality Volume, WQV:	***814***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.065*	*in*	
Runoff Curve Number, CN:	*72*		
Time of Concentration, Tc: (>=10 min)	17.5	*min*	
Time of Concentration, Tc:	0.292	*hr*	
Initial Abstraction, I_a:	*0.778*	*in*	
I_a/P:	*0.598461538*		
Unit Peak Discharge, q_u:	250	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.00539*	mi^2	
Water Quality Flow, WQF:	***0.09***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



Stage-Area-Storage for Pond 22P: Water Quality Basin #3.2

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	
34.00	1,960	1,960	0	
34.20	2,099	2,148	406	
34.40	2,243	2,340	840	
34.60	2,392	2,536	1,303	
34.80	2,546	2,736	1,797	
35.00	2,704	2,939	2,322	
35.20	2,859	3,146	2,878	LOW-LEVEL ORIFICE ELEVATION 35.25
35.40	3,018	3,357	3,466	
35.60	3,181	3,572	4,086	
35.80	3,348	3,791	4,738	
36.00	3,520	4,013	5,425	
36.20	3,690	4,239	6,146	
36.40	3,863	4,469	6,901	
36.60	4,041	4,703	7,692	
36.80	4,222	4,941	8,518	
37.00	4,408	5,182	9,381	
37.20	4,592	5,427	10,281	
37.40	4,781	5,676	11,218	
37.60	4,973	5,929	12,193	
37.80	5,168	6,185	13,207	
38.00	5,368	6,445	14,261	
38.20	5,567	6,710	15,354	
38.40	5,770	6,977	16,488	
38.60	5,976	7,249	17,663	
38.80	6,186	7,524	18,879	
39.00	**6,400**	**7,804**	**20,137**	
39.20	6,400	7,804	20,137	
39.40	6,400	7,804	20,137	
39.60	6,400	7,804	20,137	
39.80	6,400	7,804	20,137	
40.00	6,400	7,804	20,137	
40.20	6,400	7,804	20,137	
40.40	6,400	7,804	20,137	
40.60	6,400	7,804	20,137	
40.80	6,400	7,804	20,137	
41.00	6,400	7,804	20,137	
41.20	6,400	7,804	20,137	
41.40	6,400	7,804	20,137	

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Project:	Cashman Industrial Site Preparation		
Calculated By:	Alex Healy	**Date:**	**09/20/24**
Checked By:	George Andrews	**Date:**	**09/20/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	DA 3
Condition:	Post-Construction

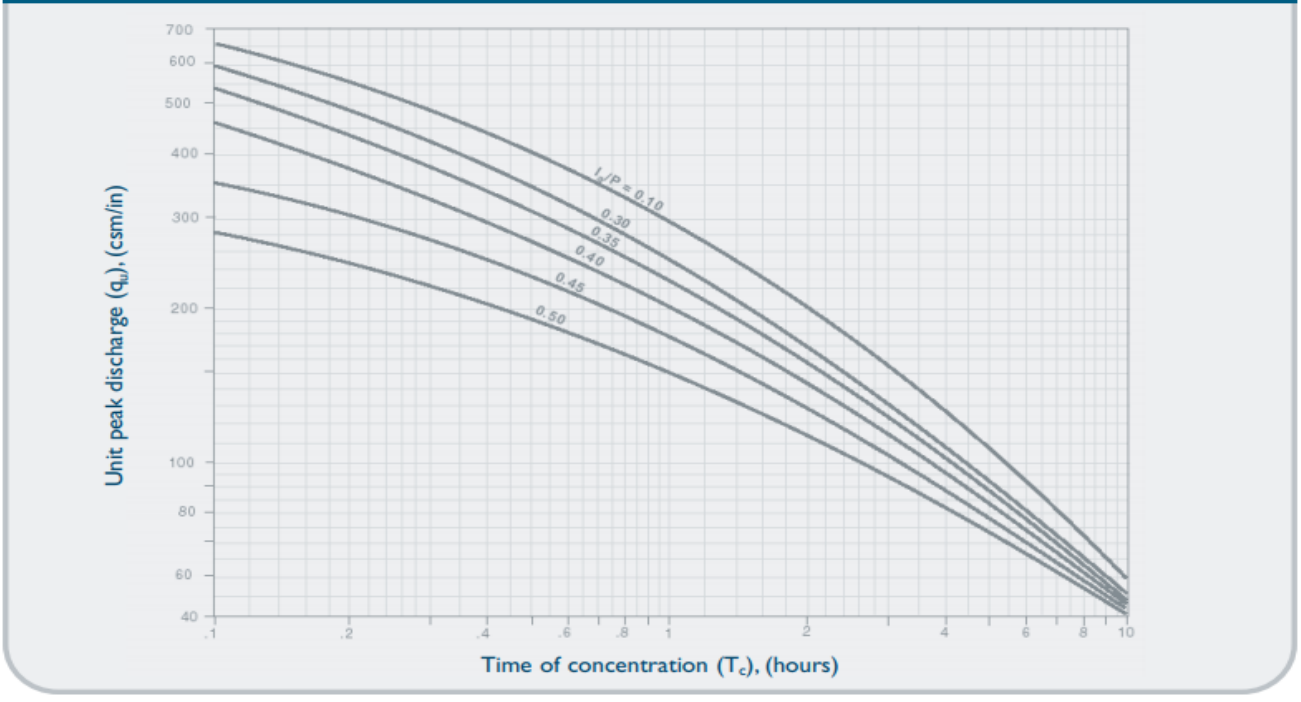
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	0%	
Volumetric Runoff Coefficient, R:	*0.050*	
Area, A:	12.46	acres
Water Quality Volume, WQV:	***2,941***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.065*	*in*	
Runoff Curve Number, CN:	*72*		
Time of Concentration, Tc: (>=10 min)	10.0	*min*	
Time of Concentration, Tc:	0.167	*hr*	
Initial Abstraction, I_a:	*0.778*	*in*	
I_a/P:	*0.598461538*		
Unit Peak Discharge, q_u:	260	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.01947*	mi^2	
Water Quality Flow, WQF:	***0.33***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



Stage-Area-Storage for Pond 21P: Water Quality Basin #2

LOW-LEVEL ORIFICE ELEVATION 22.40

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
22.00	10,550	0
22.10	10,705	1,063
22.20	10,861	2,141
22.30	11,019	3,235
22.40	11,177	4,345
22.50	11,337	5,471
22.60	11,498	6,612
22.70	11,660	7,770
22.80	11,823	8,944
22.90	11,987	10,135
23.00	12,152	11,342
23.10	12,315	12,565
23.20	12,478	13,805
23.30	12,643	15,061
23.40	12,809	16,333
23.50	12,976	17,622
23.60	13,143	18,928
23.70	13,312	20,251
23.80	13,483	21,591
23.90	13,654	22,948
24.00	13,826	24,322
24.10	13,996	25,713
24.20	14,167	27,121
24.30	14,339	28,546
24.40	14,512	29,989
24.50	14,686	31,448
24.60	14,861	32,926
24.70	15,037	34,421
24.80	15,214	35,933
24.90	15,393	37,464
25.00	15,572	39,012
25.10	15,800	40,581
25.20	16,030	42,172
25.30	16,262	43,787
25.40	16,495	45,424
25.50	16,730	47,086
25.60	16,967	48,771
25.70	17,205	50,479
25.80	17,445	52,212
25.90	17,687	53,968
26.00	17,930	55,749
26.10	18,063	57,549
26.20	18,196	59,362
26.30	18,330	61,188
26.40	18,464	63,028
26.50	18,599	64,881
26.60	18,734	66,747
26.70	18,870	68,628
26.80	19,006	70,521
26.90	19,143	72,429
27.00	**19,280**	**74,350**
27.10	19,280	74,350
27.20	19,280	74,350
27.30	19,280	74,350
27.40	19,280	74,350
27.50	19,280	74,350
27.60	19,280	74,350
27.70	19,280	74,350
27.80	19,280	74,350
27.90	19,280	74,350
28.00	19,280	74,350
28.10	19,280	74,350
28.20	19,280	74,350
28.30	19,280	74,350
28.40	19,280	74,350
28.50	19,280	74,350
28.60	19,280	74,350
28.70	19,280	74,350
28.80	19,280	74,350
28.90	19,280	74,350
29.00	19,280	74,350
29.10	19,280	74,350
29.20	19,280	74,350
29.30	19,280	74,350
29.40	19,280	74,350
29.50	19,280	74,350
29.60	19,280	74,350
29.70	19,280	74,350
29.80	19,280	74,350

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Project:	Cashman Industrial Site Preparation		
Calculated By:	Alex Healy	**Date:**	**09/20/24**
Checked By:	George Andrews	**Date:**	**09/20/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	DA 4
Condition:	Post-Construction

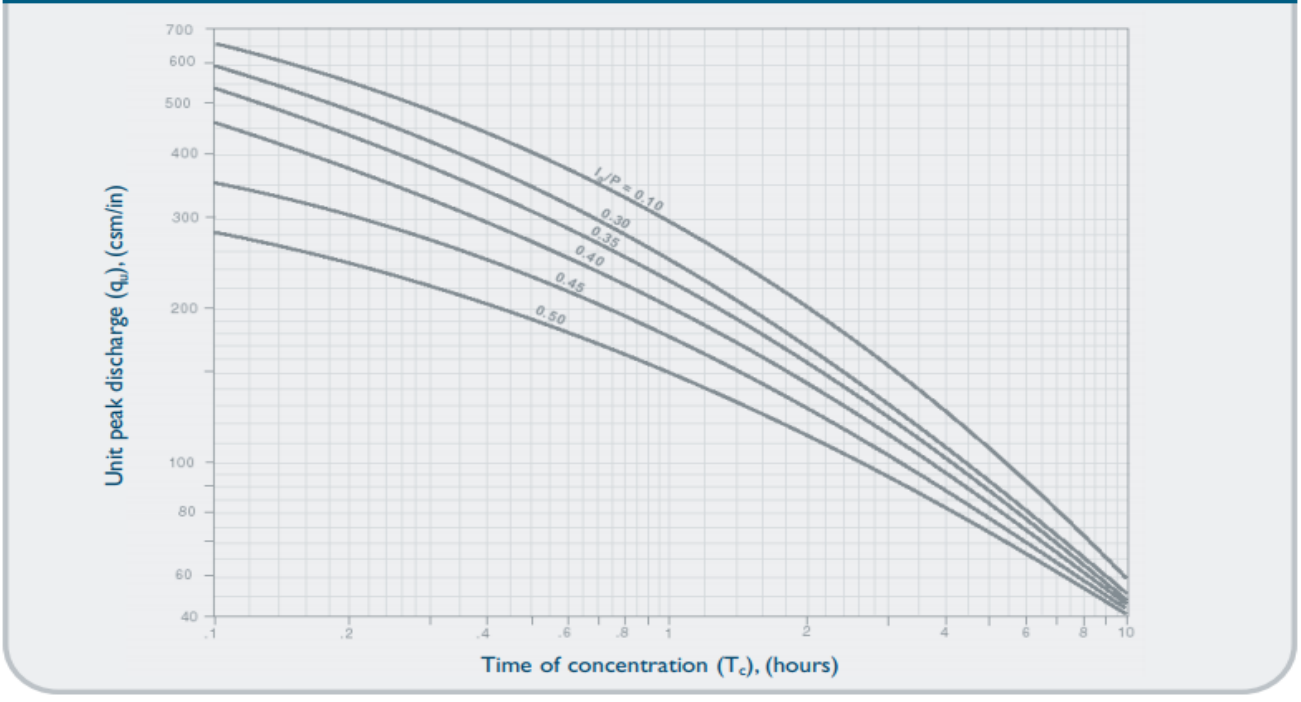
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	0%	
Volumetric Runoff Coefficient, R:	*0.050*	
Area, A:	11.04	acres
Water Quality Volume, WQV:	***2,605***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.065*	*in*	
Runoff Curve Number, CN:	*72*		
Time of Concentration, Tc: (>=10 min)	10.0	*min*	
Time of Concentration, Tc:	0.167	*hr*	
Initial Abstraction, I_a:	*0.778*	*in*	
I_a/P:	*0.598461538*		
Unit Peak Discharge, q_u:	260	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.01725*	mi^2	
Water Quality Flow, WQF:	***0.29***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



Stage-Area-Storage for Pond 12P: Water Quality Basin #4

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)
21.00	10,788	10,788	0
21.20	11,080	11,175	2,187
21.40	11,376	11,566	4,432
21.60	11,676	11,961	6,738
21.80	11,980	12,360	9,103
22.00	12,288	12,762	11,530
22.20	12,595	13,168	14,018
22.40	12,905	13,578	16,568
22.60	13,220	13,992	19,181
22.80	13,538	14,410	21,856
23.00	13,860	14,831	24,596
23.20	14,181	15,256	27,400
23.40	14,507	15,685	30,269
23.60	14,835	16,118	33,203
23.80	15,168	16,555	36,203
24.00	15,504	16,995	39,270
24.20	15,840	17,439	42,405
24.40	16,180	17,887	45,607
24.60	16,523	18,339	48,877
24.80	16,870	18,794	52,216
25.00	17,220	19,253	55,625
25.20	17,571	19,717	59,104
25.40	17,925	20,183	62,653
25.60	18,282	20,654	66,274
25.80	18,643	21,129	69,966
26.00	19,008	21,607	73,731
26.20	19,373	22,089	77,569
26.40	19,742	22,575	81,481
26.60	20,114	23,064	85,466
26.80	20,489	23,558	89,527
27.00	20,868	24,055	93,662
27.20	21,248	24,556	97,874
27.40	21,631	25,061	102,161
27.60	22,017	25,569	106,526
27.80	22,407	26,081	110,968
28.00	**22,800**	**26,598**	**115,489**
28.20	22,800	26,598	115,489
28.40	22,800	26,598	115,489
28.60	22,800	26,598	115,489
28.80	22,800	26,598	115,489
29.00	22,800	26,598	115,489
29.20	22,800	26,598	115,489
29.40	22,800	26,598	115,489

LOW-LEVEL ORIFICE ELEVATION 21.30

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Project:	Cashman Industrial Site Preparation		
Calculated By:	Alex Healy	**Date:**	**09/20/24**
Checked By:	George Andrews	**Date:**	**09/20/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	DA 6
Condition:	Post-Construction

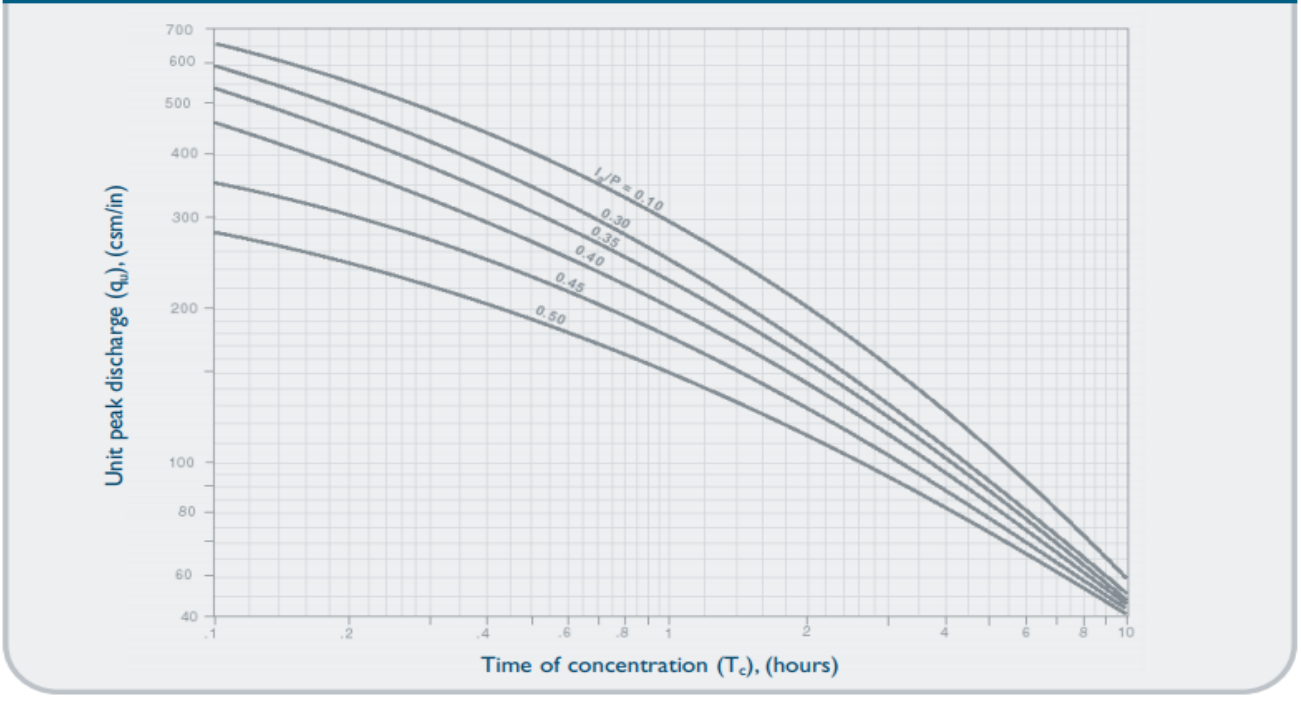
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	0%	
Volumetric Runoff Coefficient, R:	*0.050*	
Area, A:	9.30	acres
Water Quality Volume, WQV:	***2,194***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.065*	*in*	
Runoff Curve Number, CN:	*72*		
Time of Concentration, Tc: (>=10 min)	10.0	*min*	
Time of Concentration, Tc:	0.167	*hr*	
Initial Abstraction, I_a:	*0.778*	*in*	
I_a/P:	*0.598461538*		
Unit Peak Discharge, q_u:	260	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.01453*	mi^2	
Water Quality Flow, WQF:	***0.25***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



Stage-Area-Storage for Pond 20P: Water Quality Basin #3.1

Elevation (feet)	Surface (sq-ft)	Wetted (sq-ft)	Storage (cubic-feet)	
16.00	6,336	6,336	0	
16.20	6,602	6,693	1,294	
16.40	6,874	7,054	2,641	LOW-LEVEL ORIFICE ELEVATION 16.50
16.60	7,151	7,419	4,044	
16.80	7,434	7,788	5,502	
17.00	7,722	8,160	7,018	
17.20	8,004	8,536	8,590	
17.40	8,290	8,916	10,219	
17.60	8,582	9,300	11,906	
17.80	8,878	9,688	13,652	
18.00	9,180	10,079	15,458	
18.20	9,477	10,474	17,324	
18.40	9,778	10,873	19,249	
18.60	10,084	11,276	21,235	
18.80	10,395	11,683	23,283	
19.00	10,710	12,093	25,393	
19.20	11,021	12,507	27,566	
19.40	11,337	12,925	29,802	
19.60	11,658	13,347	32,102	
19.80	11,983	13,772	34,466	
20.00	12,312	14,201	36,895	
20.20	12,638	14,634	39,390	
20.40	12,969	15,071	41,951	
20.60	13,304	15,512	44,578	
20.80	13,643	15,956	47,272	
21.00	13,986	16,405	50,035	
21.20	14,327	16,857	52,866	
21.40	14,672	17,312	55,766	
21.60	15,021	17,772	58,735	
21.80	15,375	18,235	61,775	
22.00	15,732	18,703	64,886	
22.20	16,088	19,174	68,067	
22.40	16,447	19,648	71,321	
22.60	16,811	20,127	74,647	
22.80	17,178	20,609	78,045	
23.00	**17,550**	**21,095**	**81,518**	
23.20	17,550	21,095	81,518	
23.40	17,550	21,095	81,518	
23.60	17,550	21,095	81,518	
23.80	17,550	21,095	81,518	
24.00	17,550	21,095	81,518	
24.20	17,550	21,095	81,518	
24.40	17,550	21,095	81,518	
24.60	17,550	21,095	81,518	
24.80	17,550	21,095	81,518	
25.00	17,550	21,095	81,518	

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Project:	Cashman Industrial Site Preparation		
Calculated By:	Alex Healy	**Date:**	**09/20/24**
Checked By:	George Andrews	**Date:**	**09/20/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	DA 8
Condition:	Post-Construction

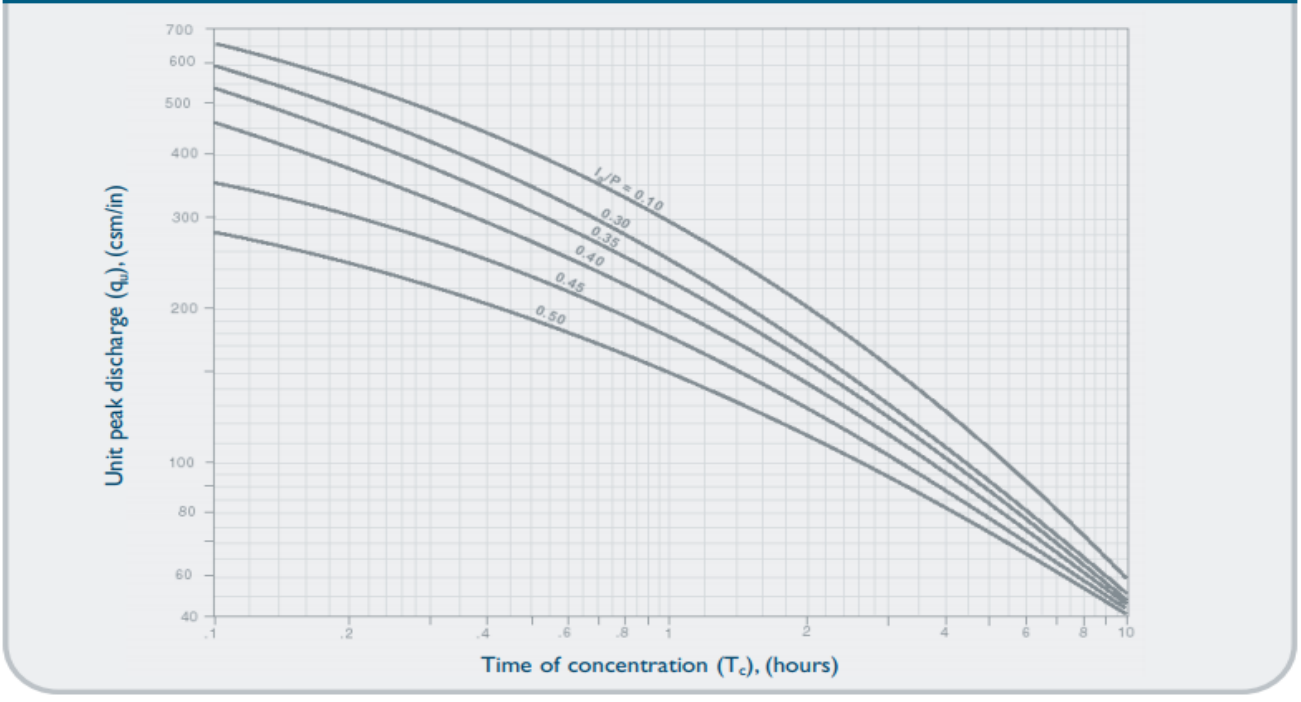
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	0%	
Volumetric Runoff Coefficient, R:	*0.050*	
Area, A:	2.50	acres
Water Quality Volume, WQV:	***590***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.065*	*in*	
Runoff Curve Number, CN:	*72*		
Time of Concentration, Tc: (>=10 min)	10.0	*min*	
Time of Concentration, Tc:	0.167	*hr*	
Initial Abstraction, I_a:	*0.778*	*in*	
I_a/P:	*0.598461538*		
Unit Peak Discharge, q_u:	260	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.00391*	mi^2	
Water Quality Flow, WQF:	***0.07***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



Stage-Area-Storage for Pond 18P: Water Quality Basin #5

LOW-LEVEL ORIFICE ELEVATION 20.40

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
20.00	1,720	0
20.10	1,782	175
20.20	1,846	356
20.30	1,910	544
20.40	1,976	739
20.50	2,042	939
20.60	2,110	1,147
20.70	2,179	1,361
20.80	2,249	1,583
20.90	2,320	1,811
21.00	2,392	2,047
21.10	2,462	2,289
21.20	2,533	2,539
21.30	2,605	2,796
21.40	2,678	3,060
21.50	2,751	3,332
21.60	2,826	3,610
21.70	2,902	3,897
21.80	2,979	4,191
21.90	3,057	4,493
22.00	3,136	4,802
22.10	3,213	5,120
22.20	3,292	5,445
22.30	3,371	5,778
22.40	3,451	6,119
22.50	3,532	6,468
22.60	3,614	6,826
22.70	3,697	7,191
22.80	3,781	7,565
22.90	3,866	7,948
23.00	3,952	8,339
23.10	4,037	8,738
23.20	4,122	9,146
23.30	4,209	9,562
23.40	4,296	9,988
23.50	4,385	10,422
23.60	4,474	10,865
23.70	4,564	11,317
23.80	4,655	11,778
23.90	4,747	12,248
24.00	4,840	12,727
24.10	4,932	13,216
24.20	5,025	13,714
24.30	5,119	14,221
24.40	5,214	14,737
24.50	5,309	15,263
24.60	5,406	15,799
24.70	5,503	16,345
24.80	5,601	16,900
24.90	5,700	17,465
25.00	**5,800**	**18,040**
25.10	5,800	18,040
25.20	5,800	18,040
25.30	5,800	18,040
25.40	5,800	18,040
25.50	5,800	18,040
25.60	5,800	18,040
25.70	5,800	18,040
25.80	5,800	18,040
25.90	5,800	18,040
26.00	5,800	18,040
26.10	5,800	18,040
26.20	5,800	18,040
26.30	5,800	18,040
26.40	5,800	18,040
26.50	5,800	18,040
26.60	5,800	18,040
26.70	5,800	18,040
26.80	5,800	18,040
26.90	5,800	18,040
27.00	5,800	18,040

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Project:	Cashman Industrial Site Preparation		
Calculated By:	Alex Healy	**Date:**	**09/20/24**
Checked By:	George Andrews	**Date:**	**09/20/24**

Water Quality Volume and Water Quality Flow Worksheet

Watershed:	DA 9
Condition:	Post-Construction

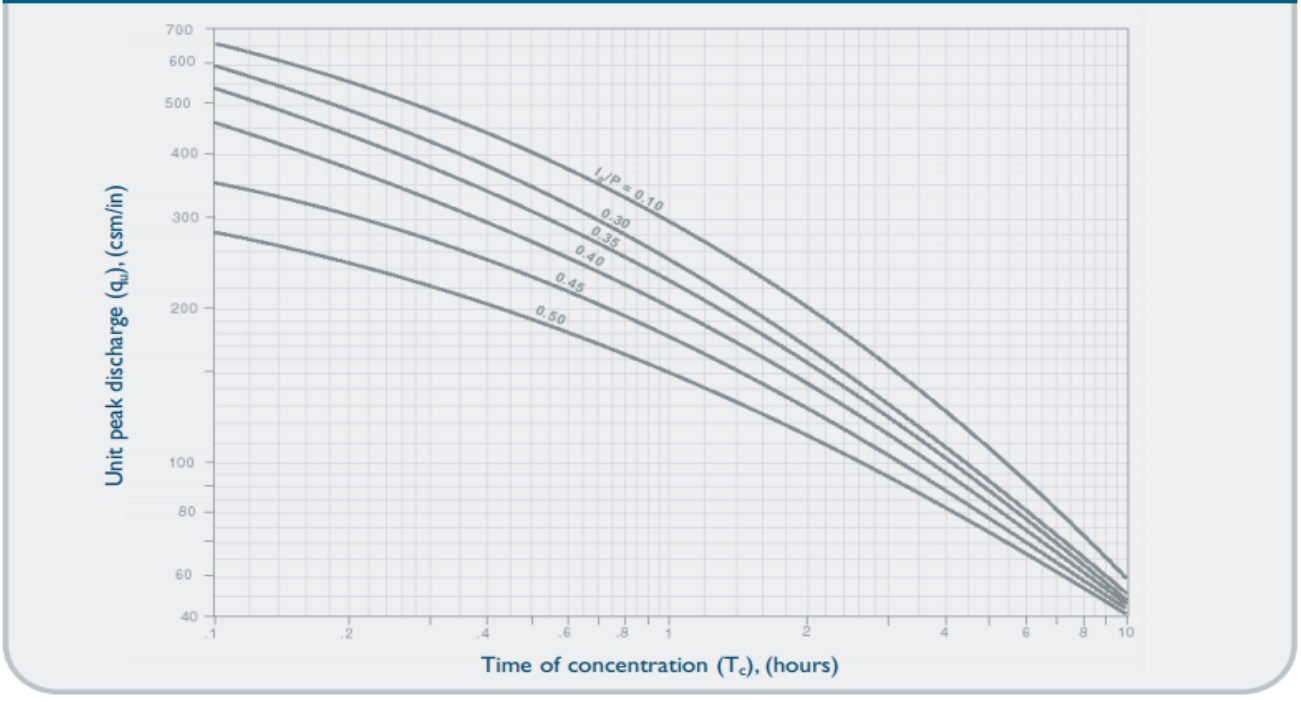
Water Quality Volume

Design Precipitation, P:	1.3	*in*
Percent Impervious Cover, I:	0%	
Volumetric Runoff Coefficient, R:	*0.050*	
Area, A:	4.80	acres
Water Quality Volume, WQV:	***1,133***	C.F.

Water Quality Flow

Runoff Depth, Q:	*0.065*	*in*	
Runoff Curve Number, CN:	*72*		
Time of Concentration, Tc: (>=10 min)	10.0	*min*	
Time of Concentration, Tc:	0.167	*hr*	
Initial Abstraction, I_a:	*0.778*	*in*	
I_a/P:	*0.598461538*		
Unit Peak Discharge, q_u:	260	*csm/in*	(from Exhibit 4-111 below)
Area, A:	*0.00750*	mi^2	
Water Quality Flow, WQF:	***0.13***	*cfs*	

Exhibit 4-111 Unit peak discharge (q_u) for NRCS (SCS) type III rainfall distribution



Stage-Area-Storage for Pond 13P: Water Quality Basin #1

LOW-LEVEL ORIFICE ELEVATION 14.40

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
14.00	9,180	0
14.10	9,328	925
14.20	9,477	1,866
14.30	9,627	2,821
14.40	9,778	3,791
14.50	9,930	4,776
14.60	10,084	5,777
14.70	10,239	6,793
14.80	10,395	7,825
14.90	10,552	8,872
15.00	10,710	9,935
15.10	10,865	11,014
15.20	11,021	12,108
15.30	11,179	13,218
15.40	11,337	14,344
15.50	11,497	15,486
15.60	11,658	16,644
15.70	11,820	17,817
15.80	11,983	19,007
15.90	12,147	20,214
16.00	12,312	21,437
16.10	12,475	22,676
16.20	12,638	23,932
16.30	12,803	25,204
16.40	12,969	26,492
16.50	13,136	27,798
16.60	13,304	29,120
16.70	13,473	30,458
16.80	13,643	31,814
16.90	13,814	33,187
17.00	13,986	34,577
17.10	14,156	35,984
17.20	14,327	37,408
17.30	14,499	38,850
17.40	14,672	40,308
17.50	14,846	41,784
17.60	15,021	43,277
17.70	15,197	44,788
17.80	15,375	46,317
17.90	15,553	47,863
18.00	15,732	49,427
18.10	15,909	51,009
18.20	16,088	52,609
18.30	16,267	54,227
18.40	16,447	55,863
18.50	16,629	57,517
18.60	16,811	59,189
18.70	16,994	60,879
18.80	17,178	62,587
18.90	17,364	64,314
19.00	**17,550**	**66,060**
19.10	17,550	66,060
19.20	17,550	66,060
19.30	17,550	66,060
19.40	17,550	66,060
19.50	17,550	66,060
19.60	17,550	66,060
19.70	17,550	66,060
19.80	17,550	66,060
19.90	17,550	66,060
20.00	17,550	66,060
20.10	17,550	66,060
20.20	17,550	66,060
20.30	17,550	66,060
20.40	17,550	66,060
20.50	17,550	66,060
20.60	17,550	66,060
20.70	17,550	66,060
20.80	17,550	66,060
20.90	17,550	66,060
21.00	17,550	66,060

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Project: _____

Calculated By: _____ **Date:** _____

Checked By: _____ **Date:** _____

Water Quality Volume and Water Quality Flow Worksheet

EQUATIONS (CTDEEP Connecticut Stormwater Quality Manual)

$$WQV = \frac{(1")(R)(A)}{12}$$

where:
- WQV = water quality volume (ac-ft)
- R = volumetric runoff coefficient = 0.05+0.009(I)
- I = percent impervious cover
- A = site area in acres

Compute the NRCS Runoff Curve Number (CN) using the following equation, or graphically using **Figure 2-1** from TR-55 (USDA, 1986) (reproduced below):

$$CN = \frac{1000}{[10 + 5P + 10Q - 10(Q^2 + 1.25QP)^{1/2}]}$$

where:
- CN = Runoff Curve Number
- P = design precipitation, inches (1" for water quality storm)
- Q = runoff depth (in watershed inches)

$$= \frac{[WQV\,(acre-feet] \times [12(inches/foot)]}{Drainage\ Area\ (acres)}$$

❍ *Read initial abstraction (I_a) from Table 4-1 in Chapter 4 of TR-55 (reproduced below); compute I_a/P*

Table 4-1 I_a values for runoff curve numbers

Curve number	I_a (in)	Curve number	I_a (in)	Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	55	1.636	70	0.857	85	0.353
41	2.878	56	1.571	71	0.817	86	0.326
42	2.762	57	1.509	72	0.778	87	0.299
43	2.651	58	1.448	73	0.740	88	0.273
44	2.545	59	1.390	74	0.703	89	0.247
45	2.444	60	1.333	75	0.667	90	0.222
46	2.348	61	1.279	76	0.632	91	0.198
47	2.255	62	1.226	77	0.597	92	0.174
48	2.167	63	1.175	78	0.564	93	0.151
49	2.082	64	1.125	79	0.532	94	0.128
50	2.000	65	1.077	80	0.500	95	0.105
51	1.922	66	1.030	81	0.469	96	0.083
52	1.846	67	0.985	82	0.439	97	0.062
53	1.774	68	0.941	83	0.410	98	0.041
54	1.704	69	0.899	84	0.381		

$$WQF = (q_u)(A)(Q)$$

where:
- WQV = water quality flow (cfs)
- q_u = unit peak discharge (cfs/mi2/inch)
- A = drainage area (mi2)
- Q = runoff depth (in watershed inches)

$$= \frac{[WQV\,(acre-feet] \times [12(inches/foot)]}{Drainage\ Area\ (acres)}$$

Estimated Net Annual Solids Load Reduction
Based on the Rational Rainfall Method

CONTECH ENGINEERED SOLUTIONS

CASCADE separator™

CASHMAN INDUSTRIAL SITE

GALES FERRY, CT

HDS

AREA	44.69	acres	**CASCADE MODEL**	CS-4	
WEIGHTED C	0.05		**PARTICLE SIZE**	110	microns
TC	10.00	minutes	**RAINFALL STATION**	34	

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Hydraulic Loading Rate (gpm/ft2)	Removal Efficiency (%)	Incremental Removal (%)
0.02	9.7%	1.60	100.0	9.7
0.04	9.7%	3.19	100.0	9.7
0.06	9.8%	4.79	100.0	9.8
0.08	7.7%	6.38	100.0	7.7
0.10	8.0%	7.98	100.0	8.0
0.12	5.4%	9.58	100.0	5.4
0.14	4.7%	11.17	100.0	4.7
0.16	5.5%	12.77	99.9	5.5
0.18	3.5%	14.37	98.4	3.4
0.20	4.1%	15.96	96.9	4.0
0.25	6.5%	19.95	93.1	6.1
0.30	5.5%	23.94	89.4	4.9
0.35	4.0%	27.93	85.6	3.4
0.40	2.0%	31.92	81.9	1.6
0.45	2.1%	35.91	78.1	1.7
0.50	2.0%	39.90	74.4	1.5
0.75	5.1%	59.86	55.6	2.8
1.00	2.5%	76.08	38.5	1.0
1.50	1.8%	76.08	25.7	0.5
2.00	0.5%	76.08	19.2	0.1
				91.4
			Removal Efficiency Adjustment[2] =	6.5%
			Predicted % Annual Rainfall Treated =	92.5%
			Predicted Net Annual Load Removal Efficiency =	**84.9%**

1 - Based on 10 years of hourly precipitation data from NCDC station 806, Bridgeport WSO ARPT, Fairfield County, CT

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

APPENDIX F

Temporary Sediment Basin Calculations

Cashman Industrial Site Preparation Plan

"Newly Graded Area" cover type used
TC=5.0 min

Phase 1:
Peak flow 25 year storm = 1.94 cfs
Total 10 hour volume = 5,359 cf
Peak flow 10 year storm = 0.73 cfs

Phase 2:
Peak flow 25 year storm = 5.07 cfs
Total 10 hour volume = 18,666 cf
Peak flow 10 year storm = 2.43 cfs

Phase 3.1 (Western):
Peak flow 25 year storm = 21.21 cfs
Total 10 hour volume = 75,432 cf
Peak flow 10 year storm = 15.99 cfs

Phase 3.2 (Q25
Peak flow 25 year storm = 5.63 cfs
Total 10 hour volume = 13,873cf
Peak flow 10 year storm = 3.69 cfs

Phase 4:
Peak flow 25 year storm = 25.45cfs
Total 10 hour volume = 106,069 cf
Peak flow 10 year storm = 19.76 cfs

Phase 5:
Peak flow 25 year storm = 0.80 cfs
Total 10 hour volume = 2,159 cf
Peak flow 10 year storm = 0.25 cfs

Phase I

Universal Soil Loss

Drainage area (ac)	DA	9.2
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.079512

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 5,359 input from hydrograph

Wet Storage (CF)= 8822.529

Basin Width

Q5 (CFS) Q25 1.94

Width (ft)= 13.92839

Basin Length

Length (ft)= 27.85678 minimum

234' x 75' x 5'

Outlet

Q25 (CFS)	Q25	1.94
Outlet Area (SF)	A	0.97

Adjusted A (SF)= 0.983773 4' x 5'

Barrel Size

Q25 (CFS)	Q25	1.94
Pipe D (FT fromGohi Culvert Seelye		30"

Spillway

Q25 (CFS)	Q25	1.94	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required (FT)= 0.570588

Phase II

Universal Soil Loss

Drainage area (ac)	DA	10
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.086426

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 18,666 input from hydrograph

Wet Storage (CF)= 22430.71

Basin Width

Q5 (CFS) Q25 5.07

Width (ft)= 22.51666

Basin Length

Length (ft)= 45.03332 minimum

241' x 80' x 5'

Outlet

Q25 (CFS)	Q25	5.07
Outlet Area (SF	A	2.535

Adjusted A (SF)= 2.570994 3.5' x 4'

Barrel Size

Q25 (CFS)	Q25	5.07
Pipe D (FT fromGohi Culvert Seelye		30"

Spillway

Q25 (CFS)	Q25	5.07 Assume 50% plugged w/trash
Cw coeff	C	1.7
H (FT)	H	1

L of spillway required= 1.491176

Phase III (1)

Universal Soil Loss

Drainage area (ac)	DA	6.2
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.053584

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 75,432 input from hydrograph

Wet Storage (CF)= 77766.12

Basin Width

Q5 (CFS) Q25 21.21

Width (ft)= 46.05432 minimum

Basin Length

Length (ft)= 92.10863 minimum

234' x 75' x 5'

Outlet

Q25 (CFS)	Q25	21.21
Outlet Area (SF	A	10.605

Adjusted A (SF)= 10.75558 4' x 3'

Barrel Size

Q25 (CFS)	Q25	21.21
Pipe D (FT fromGohi Culvert Seelye		30"

Spillway

Q25 (CFS)	Q25	21.21	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 6.238235

Phase III (2)

Universal Soil Loss

Drainage area (ac)	DA	3.5
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.030249

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 13,873 input from hydrograph

Wet Storage (CF)= 15190.65

Basin Width

Q5 (CFS) Q25 5.63

Width (ft)= 23.72762

Basin Length

Length (ft)= 47.45524 minimum

128' x 50' x 5'

Outlet

Q25 (CFS)	Q25	5.63
Outlet Area (SF	A	2.815

Adjusted A (SF)= 2.85497 3' x 2'

Barrel Size

Q25 (CFS)	Q25	5.63
Pipe D (FT fromGohi Culvert Seelye		24"

Spillway

Q25 (CFS)	Q25	5.63	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 1.655882

Phase IV

Universal Soil Loss

Drainage area (ac)	DA	9.8
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.084697

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 106,069 input from hydrograph

Wet Storage (CF)= 109758.4

Basin Width

Q5 (CFS) Q25 25.45

Width (ft)= 50.44799

Basin Length

Length (ft)= 100.896 minimum

228' x 100' x 6'

Outlet

Q25 (CFS)	Q25	25.45
Outlet Area (SF	A	12.725

Adjusted A (SF)= 12.90568 5' x 5'

Barrel Size

Q25 (CFS)	Q25	25.45
Pipe D (FT fromGohi Culvert Seelye		36"

Spillway

Q25 (CFS)	Q25	25.45	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 7.485294

Phase V

Universal Soil Loss

Drainage area (ac)	DA	3
Avg Erosion (SB-1)	A	50
Deliv Ratio (SB-12)	DR	0.4
Trap Eff.	TE	0.8
Sed Density (SB-2)	~	85

Volume (acft/yr)= 0.025928

Residense Time

RT (hrs)= RT 10

Residence volume (CF) 2,159 input from hydrograph

Wet Storage (CF)= 3288.412

Basin Width

Q5 (CFS) Q25 0.8

Width (ft)= 8.944272

Basin Length

Length (ft)= 17.88854 minimum

116' x 50' x 5'

Outlet

Q25 (CFS)	Q25	0.8
Outlet Area (SF	A	0.4

Adjusted A (SF)= 0.40568 30" diameter CMP

Barrel Size

Q25 (CFS)	Q25	0.8
Pipe D (FT fromGohi Culvert Seelye		18"

Spillway

Q25 (CFS)	Q25	0.8	Assume 50% plugged w/trash
Cw coeff	C	1.7	
H (FT)	H	1	

L of spillway required= 0.235294

Sediment Basin Outlet Design

Phase I

Outlet Structure Size (FT)	5'x4'x5'	LxWxH
Outlet Pipe Diameter (FT)	30"	
Spillway Width (FT)	10'	

Phase II

Outlet Structure Size (FT)	4'x3.5'x5'	LxWxH
Outlet Pipe Diameter (FT)	30"	
Spillway Width (FT)	8.5'	

Phase III (1)

Outlet Structure Size (FT)	4'x3'x5'	LxWxH
Outlet Pipe Diameter (FT)	30"	
Spillway Width (FT)	7.5'	
	Q25	

Phase III (2)

Outlet Structure Size (FT)	3'x2'x5'	LxWxH
Outlet Pipe Diameter (FT)	24"	
Spillway Width (FT)	3'	

Phase IV

Outlet Structure Size (FT)	5'x5'x6'	LxWxH
Outlet Pipe Diameter (FT)	36"	
Spillway Width (FT)	12'	

Phase V

Outlet Structure Size (FT)	30"	Diameter
Outlet Pipe Diameter (FT)	18"	
Spillway Width (FT)	2.5'	

APPENDIX G

Stormwater Management Maintenance Program and Inspection Checklist

1761 Route 12, Gales Ferry, CT

Stormwater Management System Maintenance Program

There shall be periodic maintenance of the stormwater systems on the property after installation. In order to ensure effective performance of the system, the following stormwater maintenance program has been established. The property owner will be responsible for implementation of this program. A log and schedule of all inspections, cleanings, and repairs shall be maintained by the property owner. All maintenance documents shall be transferred to any future owners upon sale or transfer of the property.

A. Catch basins/Manholes

Catch basins are designed with sumps for the purpose of collecting coarse sediment. All catch basins should be inspected two times per year, specifically during times for high levels of maintenance around the site. Sediment should be removed when it extends to within 6 inches of the outlet pipe invert or not less than once per year. Cleanout should be facilitated via vacuum truck or other means that accomplish sediment removal. The sediment shall be disposed of in an approved off-site location in accordance with town and state requirements.

B. Asphalt

Asphalt areas should be swept annually. Ideal sweeping timeframe is in the spring after winter sanding or salting for deicing. Deicing chemicals should be kept to a minimum during the winter months.

C. Stormwater basin

The stormwater basin shall be inspected twice per year. Inspections shall include the following:

- Check for sediment accumulation, trash, and debris.
- Check for blockages, structural integrity, and evidence of erosion at inlets, outlets, and overflow spillways;
- Check that the trash rack at the low-level outlet is clear and the outlet is functioning properly;

Regular maintenance includes the following:

- Prune trees and shrubs as needed.
- Inspect soil and repair eroded areas seasonally or as necessary.
- Remove any invasive species (including roots) that have become established within the basin and embankments.
- Sediment removal should occur at a minimum of every five years or before the sediment storage capacity has been filled.

D. Lawn and vegetated areas

Vegetated cover shall be maintained on all earth surfaces to minimize soil erosion. Fertilizer use should be minimized and applied using careful application processes. Vehicles shall be prohibited from driving or parking on vegetated areas to prevent compaction of soils.

Stormwater Management System Maintenance Checklist

E. Hydrodynamic Separator (Stormceptor)

The hydrodynamic separator shall be inspected and maintained during catch basin inspections and cleaning. An inspection is made by checking the depth of sediment in each manhole with a grade stick or similar device. Maintenance is required when the sediment depth exceeds 20 inches. Minimum inspection is recommended twice a year to maintain operation and function of the unit.

Maintenance Instructions:

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. Access this area through the 10" diameter access cylinder.
2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment.
3. Use a high-pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
    - Check with the local sewer authority for authority to discharge the liquid.

1761 Route 12, Gales Ferry,CT

Stormwater Management System Maintenance Checklist

Inspection Date: _____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
Drainage Structures			
Sedimentation Accumulation			
Large Floating Debris			
Inlet/Outlet			
Structure walls			
Riser			
Frame and Cover			
Infiltration System			
Settling Over System			
Sedimentation Accumulation			
Large Floating Debris			
Inspection Structure Integrity			
Inspection Inlets/Outlets			
Surrounding Lawn and Vegetated Areas			
Signs of Erosion			
Ponding/Settling			
Overgrowth			

Additional Comments: _____